

Georgia Power Company
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201
Telephone 205 877-7279

J. T. Beckham, Jr.
Vice President - Nuclear
Hatch Project



August 8, 1994

Docket Nos. 50-321
50-366

HL-4657

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

Edwin I. Hatch Nuclear Plant
Licensee Event Report
Loss of the "B" RPS Bus Power Supply
Causes Unplanned ESF System Actuations

Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv), Georgia Power Company is submitting the enclosed Licensee Event Report concerning a loss of electrical power to the "B" reactor protection system bus which resulted in unplanned engineered safety features system actuations. This event occurred at Plant Hatch - Units 1 and 2.

Sincerely,

J. T. Beckham, Jr.

JKB/cr

Enclosure: LER 50-321/1994-008

cc: Georgia Power Company
Mr. H. L. Sumner, Nuclear Plant General Manager
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. Ebner, Regional Administrator
Mr. B. L. Holbrook, Senior Resident Inspector - Hatch

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NRC FORM 306 (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 (MNB87714), 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)					
FACILITY NAME (1) EDWIN I. HATCH NUCLEAR PLANT - UNIT 1				DOCKET NUMBER (2) 5 0 0 0 3 2 1 1 OF 4	
TITLE (4) LOSS OF THE "B" RPS BUS POWER SUPPLY CAUSES UNPLANNED ESF SYSTEM ACTUATIONS					
EVENT DATE (5)		LER NUMBER (6)		REPORT DATE (7)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
0 7	1 4	9 4	9 4	0 0 8	0 0
				REPORT DATE (7)	
				MONTH DAY YEAR	
				0 8 0 8 9 4	
				FACILITY NAME	
				PLANT HATCH UNIT 2	
				DOCKET NUMBER(S)	
				0 5 0 0 0 3 6 6	
				FACILITY NAME	
				0 5 0 0 0	
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 7: (Check one or more of the following) (11)					
OPERATING MODE (9)		20.402(b)		20.405(c)	
1				X 50.73(a)(2)(iv)	
POWER LEVEL (10)		20.405(a)(1)(i)		50.73(a)(2)(v)	
1 0 0		20.405(a)(1)(ii)		50.73(a)(2)(vii)	
		20.405(a)(1)(iii)		50.73(a)(2)(i)(A)	
		20.405(a)(1)(iv)		50.73(a)(2)(i)(B)	
		20.405(a)(1)(v)		50.73(a)(2)(ix)	
OTHER (Specify in Abstract below and in Text, NRC Form 366A)					
LICENSEE CONTACT FOR THIS LER (12)					
NAME				TELEPHONE NUMBER (include area code)	
STEVEN B. TIPPS, NUCLEAR SAFETY AND COMPLIANCE MANAGER, HATCH				9 1 2 3 6 7 - 7 8 5 1	
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs	
X		R L Y	G 0 8 0	Y	
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)					
<p>On 7/14/94 at 2111 EDT, Unit 1 was in the Run mode at a power level of 2436 CMWT (100% rated thermal power). At that time, the output breakers for the "B" Reactor Protection System (RPS) motor-generator (MG) set opened. This caused a loss of power to the "B" channels of the RPS, Offgas Radiation Monitoring System, Process Radiation Monitors, Neutron Monitoring System, and Primary Containment Isolation System (PCIS). These systems actuated on loss of power according to their design resulting in an automatic reactor shutdown signal in RPS logic system "B," closure of various PCIS valves, and actuation of the pressurization mode of the Main Control Room Environmental Control System and the "B" trains of the Unit 1 and Unit 2 Standby Gas Treatment Systems. Power was restored to the bus from an alternate power supply and all affected equipment was returned to its normal configuration by 2307 EDT.</p> <p>The cause of this event appears to have been component failure. A set of relay contacts in the generator voltage regulation circuit was found to be pitted, burned, and misaligned. As part of event investigation activities, this relay was slightly bumped, causing the contacts to open. This resulted in a loss of field excitation to the generator and a subsequent loss of output voltage from the generator. The output breakers then opened on loss of voltage to their trip coils per design. It appears therefore that the state of this set of contacts made it susceptible to opening spuriously. The relay was replaced and the MG set was returned to service at 1420 EDT on 7/21/94.</p>					

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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.

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

SYSTEM AND COMPONENT IDENTIFICATION

General Electric - Boiling Water Reactor

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

DESCRIPTION OF EVENT

On 7/14/94 at 2111 EDT, Unit 1 was in the Run mode at a power level of 2436 CMWT (100% rated thermal power). At that time, the output breakers for the "B" Reactor Protection System (RPS, EIS Code JC) motor-generator (MG) set, its normal power supply, opened. This caused a loss of power to the "B" channels of the RPS, Offgas Radiation Monitoring System (EIS Code IL), Process Radiation Monitors (EIS Code IL), Neutron Monitoring System (EIS Code IG), and Primary Containment Isolation System (PCIS, EIS Code JM). The "fail safe" design of these systems resulted in their assuming the actuated state when power was interrupted.

Per design, the interruption of power to these systems caused an automatic reactor shutdown signal in RPS logic system "B," closure of various Group 2 PCIS valves, closure of outboard Group 1 isolation valve 1B21-F019, and closure of Group 5 PCIS valve 1G31-F004, the Reactor Water Cleanup (RWCU, EIS Code CE) system outboard isolation valve. Additionally, the Main Control Room Environmental Control System (EIS Code VI) automatically entered the pressurization mode; the "B" trains of the Unit 1 and Unit 2 Standby Gas Treatment Systems automatically started; both units' secondary containments isolated; and the operating steam packing exhaustor shut down. All affected systems responded per design.

Operations personnel placed the "B" RPS bus on an alternate power supply. By 2130 EDT, all affected systems except the RWCU system were returned to their normal configuration. At 2223 EDT, RWCU pump 1A was returned to service and both RWCU filter/demineralizers were returned to service by 2307 EDT.

CAUSE OF EVENT

The cause of this event appears to have been component failure. A set of relay contacts in the generator voltage regulation circuit was found to be pitted, burned, and misaligned. As part of investigation activities performed subsequent to the event, this relay was slightly bumped, causing the contacts to open. This resulted in a loss of field excitation to the generator and a subsequent loss of output voltage from the generator. The output breakers then opened on loss of voltage to their trip coils per design. It appears therefore that the condition of this set of contacts made it susceptible to opening spuriously.

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

Additional troubleshooting activities did not reveal any other problems with the MG set. The output breakers were removed and bench-tested for one hour at a current of 150 amps, approximately three times the normal current through the breakers, per Maintenance Work Order 1-94-3570. The breakers did not actuate nor were any other problems noted. The actuation setpoints and time delays for the undervoltage, overvoltage, and underfrequency bus protection relays were checked. All setpoints and time delays were within procedural limits. No other problems with these relays were observed.

The MG set was placed on a load bank on 7/15/94 to simulate a load on the MG set and a power monitoring system was connected to observe various parameters, including generator and field voltage regulator output. No abnormalities or actuations, other than those resulting from the bumping of the relay in the generator voltage regulation circuit, were detected during the approximately seven days the MG set was supplying power to the load bank. Therefore, it was concluded that this event likely was caused by component failure, specifically, spurious opening of the aforementioned misaligned relay contacts.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This report is required by 10 CFR 50.73(a)(2)(iv) because an event occurred in which Engineered Safety Feature (ESF) systems experienced unplanned automatic actuations. Specifically, the output breaker of the "B" RPS MG set opened, de-energizing the "B" RPS bus and causing actuations of the ESF systems listed previously.

RPS busses "A" and "B" are designed to supply stable electrical power to a variety of plant instrumentation systems, including the Process Radiation Monitoring System, Neutron Monitoring System, RPS, PCIS, and Offgas Radiation Monitoring System. A high degree of power stability is achieved by using MG sets to condition the power supplied to the RPS bus. However, should the power output from the MG sets fail to meet voltage or frequency requirements, breakers are designed to open to protect the instrumentation supplied by the RPS busses. This is accomplished with protection relays which open the MG set output breakers on sensed overvoltage, undervoltage, and/or underfrequency conditions from the power supply to the RPS bus or on the bus itself.

The design of the systems listed in the preceding paragraph is such that upon loss of power, they fail to the "safe" condition. In this event, the "B" MG set output breakers opened. This resulted in loss of power to the bus and, consequently, to the systems powered by the bus. All systems responded per design; that is, actuations and isolations occurred as expected upon the loss of power.

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TEXT CONTINUATION

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

On the basis of the above 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 relay was replaced per Maintenance Work Order 1-94-3570 and the MG set was returned to service at 1420 EDT on 7/21/94.

ADDITIONAL INFORMATION

No systems other than those previously mentioned in this report were affected by this event.

Failed Component Information:

Master Parts List Number: 1C71-K2
Type: Relay
Manufacturer: General Electric
Model Number: CR120A01102AC
Manufacturer Code: G080

EIIS System Code: N/A
EIIS Component Code: RLY
Root Cause Code: X
Reportable to NPRDS: Yes

Previous similar events in the last two years in which the RPS MG set output breakers opened resulting in loss of power to an RPS bus were reported in the following Licensee Event Reports:

50-321/1992-025 dated 10/26/92

50-366/1992-029 dated 01/15/93

50-321/1994-001 dated 04/12/94

50-366/1993-001 dated 01/22/93

50-321/1994-005 dated 05/24/94

Corrective actions for the previous events could not have prevented this event because the previous events were not caused by a failure of the relay in the generator voltage regulation circuit, or a similar failure of any relay associated with the RPS MG set. The previous events were caused by either loose or faulty connections or setpoint drift in one of the bus protection relays. Since these causes are unrelated to the cause of this event, previous corrective action would not have prevented or anticipated the failure of the relay and, hence, prevented this event.