

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

October 30, 1996



Docket No. 50-321

HL-5256

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

Edwin I. Hatch Nuclear Plant - Unit 1
Licensee Event Report
Ground on 600-Volt Bus Causes Loss of RPS Power Supply and
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 (LER) concerning a ground on a 600-volt bus which caused a loss of RPS power supply and unplanned ESF system actuations.

Sincerely,

J. T. Beckham, Jr.

DLM/eb

Enclosure: LER 50-321/1996-012

cc: Georgia Power Company

Mr. H. L. Sumner, General Manager - Nuclear Plant
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. Ebnetter, Regional Administrator

Mr. B. L. Holbrook, Senior Resident Inspector - Hatch

IE22/1

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PDR ADOCK 05000321
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EXPIRES: 5/31/96

LICENSEE EVENT REPORT (LER)

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 (MN887714), 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.

FACILITY NAME (1)

DOCKET NUMBER (2)

PAGE (3)

Edwin I. Hatch Nuclear Plant - Unit 1

0 5 0 0 0 3 2 1 1 OF 4

TITLE (4)

Ground on 600-Volt Bus Causes Loss of RPS Power Supply and Unplanned ESF System Actuations

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)
1	0	8	9	6	0	1	2	0	0	0
1	0	8	9	6	0	1	2	0	0	0
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR ? : (Check one or more of the following) (11)							
1			<input checked="" type="checkbox"/> 20.402(b) <input type="checkbox"/> 20.405(c) <input type="checkbox"/> 50.73(a)(2)(iv) <input type="checkbox"/> 73.71(b)							
POWER LEVEL (10)			<input type="checkbox"/> 20.405(a)(1)(i) <input type="checkbox"/> 50.36(c)(1) <input type="checkbox"/> 50.73(a)(2)(v) <input type="checkbox"/> 73.71(c)							
1			<input type="checkbox"/> 20.405(a)(1)(ii) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(vi) <input type="checkbox"/> 73.71(c)							
			<input type="checkbox"/> 20.405(a)(1)(iii) <input type="checkbox"/> 50.73(a)(2)(i) <input type="checkbox"/> 50.73(a)(2)(vii)(A) <input type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)							
			<input type="checkbox"/> 20.405(a)(1)(iv) <input type="checkbox"/> 50.73(a)(2)(ii) <input type="checkbox"/> 50.73(a)(2)(vii)(B)							
			<input type="checkbox"/> 20.405(a)(1)(v) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 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

AREA CODE

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	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs		
X	L	W	C	B	L	4	I	0	4	5	No

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED

MONTH DAY YEAR

SUBMISSION

DATE (15)

YES (if yes, complete EXPECTED SUBMISSION DATE)

X

NO

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

On 10/8/96 at 1600 EDT, Unit 1 and 2 were in the Run mode both at a power level of 2558 CMWT (100 percent rated thermal power). At that time, the supply breaker to Unit 1 Reactor Protection System (RPS) bus "B" power supply opened. Logic systems powered by the RPS bus include the RPS trip logic, the Main Control Room Environmental Control System (MCRECS) initiation logic, the Standby Gas Treatment System (SGTS) initiation logic, Secondary Containment Isolation System trip 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, Secondary Containment isolation, SGTS initiation, several PCIS valve isolations, MCRECS pressurization mode initiation, and other actuations. Licensed personnel verified the proper plant response to the initiating signal and, by 1610 EDT, had energized the affected RPS bus from its alternate supply. Affected systems subsequently were returned to their normal lineups.

The most probable cause of the supply breaker trip was an electrical ground on 600-volt bus 1D coupled with a nonfault-tolerant design of the breaker trip device. The ground was caused by a failure of the insulation on the power cable to the crankcase heater for the cardox storage room air conditioner. The ground is believed to have produced a spurious trip of the breaker due to electromagnetic interference (EMI). Corrective actions for this event include replacing the cable and heater and investigating the use of breaker trip devices less susceptible to EMI.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1) Edwin I. Hatch Nuclear Plant - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 2 1	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL YEAR	REVISION NUMBER			
		9 6	- 0 1 2	- 0 0	2	OF	4

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 10/8/96 at 1600 EDT, Unit 1 and 2 were in the Run mode both at a power level of 2558 CMWT (100 percent rated thermal power). At that time, the 600-volt supply breaker to the Unit 1 "B" Reactor Protection System (RPS, EIIS Code JE) bus power supply motor generator set tripped. This breaker is supplied from Unit 1 600-volt bus 1D. When the breaker tripped, the motor-generator coasted down until its own output breakers tripped on underfrequency per design.

The trip of the output breakers caused Group 2, Group 5, and outboard 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; Secondary Containment isolated and all four trains of both units' Standby Gas Treatment Systems (SGTS, EIIS Code BH) initiated; the Primary Containment Hydrogen and Oxygen Analyzers (EIIS Code IK) isolated; and 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 1610 EDT, licensed personnel energized RPS bus "B" from its alternate supply. Affected systems subsequently were returned to their normal lineups.

CAUSE OF EVENT

The most probable cause of the supply breaker trip was an electrical ground on 600-volt bus 1D coupled with a nonfault-tolerant design of the breaker trip device. The ground was caused by a failure of the insulation on a portion of the power supply cable to the crankcase heater for the cardox storage room air conditioner (EIIS Code LW). The ground is believed to have produced a spurious trip of the RPS motor generator set supply breaker due to electromagnetic interference (EMI).

Nonfault-tolerant design also caused the trip of the motor generator set supply breaker. This breaker is equipped with a microprocessor-based trip unit which is sensitive to EMI. It also is located on the 600-volt bus which was affected by the ground. Radio frequency noise generated by the ground

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FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (b)

PAGE (3)

YEAR	SEQUENTIAL YEAR	REVISION NUMBER
96	012	00

Edwin I. Hatch Nuclear Plant - Unit 1

05000321

96-012-00

3 OF 4

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

apparently affected the trip unit such that its microprocessor actuated the breaker. This vulnerability to spurious trips triggered by EMI has been observed previously throughout the industry on breakers equipped with this particular type of microprocessor-based trip unit.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

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

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 supply breaker to the "B" RPS motor-generator set tripped apparently due to EMI arising from the ground on 600-volt bus 1D. When the breaker tripped, the motor generator set coasted down until its own output breakers tripped on underfrequency per design. Upon loss of power or control signal, systems powered by the RPS de-energize to their "safe" configuration, that is, they initiate their emergency or accident functions. All systems affected by this event responded per design for a power interruption; licensed personnel verified this per procedure immediately after the event occurred. Had a design basis accident or transient occurred in conjunction with the trip of the RPS power supply, plant systems powered from the RPS bus would have been in their emergency configurations, and no further automatic actuations of these systems would have been required to mitigate the accident or transient.

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 failed power supply cable and the crankcase heater, supplied as one unit, were replaced on 10/10/96 per Maintenance Work Order 1-96-3143. The "B" RPS bus subsequently was returned to its normal supply, that is, 600-volt bus 1D.

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		YEAR	SEQUENTIAL YEAR	REVISION NUMBER			
Edwin I. Hatch Nuclear Plant - Unit 1	05000321	96	-012	-00	4	OF	4

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

Investigation into the procurement and use of suitable breaker trip devices less susceptible to EMI was in progress prior to the occurrence of this event and will continue.

ADDITIONAL INFORMATION

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

Failed Component Information:

Master Parts List Number: 1Z41-B035
Manufacturer: Industrial Eng and Equipment
Manufacturer Code: I045
Type: Power Supply Cable
Model Number: 14AL638630C24

EIIS System Code: LW
EIIS Component Code: CBL4
Root Cause Code: X
Reportable to NPRDS: No

A previous similar event in the past two years in which a ground on an electrical system produced plant responses similar to those experienced in this event was reported in Licensee Event Report 50-321/1995-005, dated 9/28/95. In the previous event, a ground from a failed elevator brake solenoid caused the supply breaker to the RPS bus "B" motor generator to trip, apparently from electromagnetic interference. Corrective actions for the previous event included moving the elevator power supply to another bus, investigating the use of noise filters to reduce the effects of EMI, and investigating the possibility of using different breaker trip devices less susceptible to EMI. The use of noise filters on other breaker trip devices has proven ineffective to date. The investigation into an acceptable alternate trip device was ongoing at the time of this event. This investigation will continue.