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Georgia Power
the southern electric system

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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PLANT HATCH - UNIT 1
NRC DOCKET 50-321
OPERATING LICENSE DPR-57
LICENSEE EVENT REPORT
SPURIOUS BREAKER TRIP RESULTS IN
LOSS OF RPS BUS AND ESF 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 spurious breaker trip which resulted in a loss of the "B" RPS bus and ESF actuations. This event occurred at Plant Hatch - Unit 1.

Sincerely,

J. T. Beckham, Jr.

OCV/cr

Enclosure: LER 50-321/1992-012

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. Ebneter, Regional Administrator
Mr. L. D. Wert, Senior Resident Inspector - Hatch



IE22

NRC Form 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

# LICENSEE EVENT REPORT (LER)

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| PLANT HATCH, UNIT 1 | 0 5 0 0 0 3 2 1 | 1 OF 5 |

TITLE (4)
SPURIOUS BREAKER TRIP RESULTS IN LOSS OF RPS BUS AND ESF ACTUATIONS

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQ NUM | REV | MONTH | DAY | YEAR | FACILITY NAMES | DOCKET NUMBER(S) |
| | | | | | | | | | PLANT HATCH, UNIT 2 | 0 5 0 0 0 3 6 6 |
| 0 5 | 1 7 | 9 2 | 9 2 | 0 1 2 | 0 0 | 0 6 | 1 1 | 9 2 | | 0 5 0 0 0 |

OPERATING MODE (9): 1

POWER LEVEL: 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11)

| | | | |
|---|---|---|---|
| 20.402(b) | 20.405(c) | X 50.73(a)(2)(iv) | 73.71(b) |
| 20.405(a)(1)(i) | 50.36(c)(1) | 50.73(a)(2)(v) | 73.71(c) |
| 20.405(a)(1)(ii) | 50.36(c)(2) | 50.73(a)(2)(vii) | OTHER (Specify in Abstract below) |
| 20.405(a)(1)(iii) | 50.73(a)(2)(i) | 50.73(a)(2)(viii)(A) | |
| 20.405(a)(1)(iv) | 50.73(a)(2)(ii) | 50.73(a)(2)(viii)(B) | |
| 20.405(a)(1)(v) | 50.73(a)(2)(iii) | 50.73(a)(2)(x) | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER |
|---|---|
| | AREA CODE |
| STEVEN B. TIPPS, MANAGER NUCLEAR SAFETY AND COMPLIANCE, HATCH | 912 367-7851 |

COMPLETE ONE LINE FOR EACH FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORT TO NPRDS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORT TO NPRDS | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

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

ABSTRACT (16)


On 05/17/92 at 0030 CDT, 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 tripped. This caused a loss of power to the 'B' trip system of the RPS, the Process Radiation Monitoring System, the Neutron Monitoring System, the Primary Containment Isolation System (PCIS), and the Offgas Radiation Monitoring System. These systems tripped on loss of power per design, resulting in a half scram signal in RPS trip system 'B', closure of various PCIS valves, and other ESF actuations. Licensed operations personnel restored power to RPS bus 'B' via its alternate supply, and all affected systems were restored to their normal configurations by 0045 CDT. RPS bus 'B' continued to be powered through its alternate supply until 1918 CDT on 05/22/92 when it was transferred back to the MG sets following load testing.

The cause of this event could not be determined. RPS bus 'B' was powered through its alternate supply for several days until a load test could be performed on the RPS power supply system. The load test identified no anomalies with the RPS power supply system.

Corrective actions for this event include functionally testing and calibrating the protective relay circuitry on the affected RPS power supply, load testing the affected RPS power supply system, temporarily installing power monitoring equipment on RPS bus 'B', and a review by the architect/engineer (A/E) of the possibility of installing a time delay relay in the RPS power supply protective relay circuitry.

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor
Energy Industry Identification System codes are identified in the text as (EIIS Code XX).

DESCRIPTION OF EVENT

On 05/17/92 at 0030 CDT, Unit 1 was in the Run mode at a power level of 2436 CMWT (100% rated thermal power). At that time, the 'B' Reactor Protection System (RPS, EIIS Code JE) motor-generator (MG) set tripped. This caused a loss of power to the 'B' trip system of the RPS, the Process Radiction Monitoring System (EIIS Code IL), the Neutron Monitoring System (EIIS Code IG), the Primary Containment Isolation System (PCIS, EIIS Code JM), and the Offgas Radiation Monitoring System (EIIS Code IL). The "fail-safe" design of these systems results in their assuming the tripped state when power is interrupted or the control signal is lost. Thus, the loss of power to the above named systems resulted in a half scram signal on RPS trip system 'B', closure of various Group 2 PCIS valves, closure of one Group 5 PCIS valve which isolated the Reactor Water Cleanup (RWCU, EIIS Code CE) System, and closure of outboard small bore Group 1 isolation valves. The 'B' trains of the Unit 1 and Unit 2 Standby Gas Treatment Systems (SGTS, EIIS Code BH) started, and the Unit 1 and Unit 2 Secondary Containment ventilation systems isolated. Also, the Main Control Room Environmental Control (MCREC, EIIS Code VI) System automatically entered the pressurization mode, and the operating steam packing exhauster tripped. All affected systems responded per design.

When the trip occurred, licensed personnel entered abnormal operating procedure 34AB-OPS-066-1S, "LOSS OF RPS BUS," and aligned RPS bus 'B' to its alternate power supply. All affected systems were restored to normal operation by 0045 CDT.

Maintenance personnel who were called to investigate the trip found that the MG set output breakers had opened. Protective relays supply trip signals to the breakers on an undervoltage, overvoltage, or underfrequency condition. These relays do not have a "first-hit" recording capability. Therefore, the cause of the breaker tripping was not evident.

Following the trip, Instrument and Control technicians functionally tested and calibrated all the protective relays which control the output breakers. No problems were identified. RPS bus 'B' continued to be powered through its alternate supply for the next several days while the RPS MG set and protective relay circuitry were load-tested and their performance monitored. Per the load test methodology, the MG set output was connected to a resistive load cell and operated for 24 hours at a power level comparable to that experienced in normal operation. The RPS MG set output was then monitored using both a power quality analyzer as well as a transient recorder. The purpose of the power analyzer was to quantify deviations from expected parameters, and the purpose of the

transient recorder was to identify and electronically "capture" any perturbations in power input to the load cell. However, the results of the test were not conclusive since no abnormal conditions were observed during the test period.

Following the conclusion of the load test, RPS bus 'B' was returned to its normal supply through the MG set by 1918 CDT on 05/22/92. Both monitoring devices were left connected to the bus. As of this writing, no further disturbances have been detected in the power supplied to RPS bus 'B.'

CAUSE OF EVENT

The cause of this event could not be conclusively determined. Maintenance personnel who were called to investigate the trip found that the MG set output breakers had opened. However, the protective relays which supply trip signals to the breakers do not have a "first-hit" recording capability. Therefore, it could not be determined whether the trip occurred due to undervoltage, overvoltage, or underfrequency conditions. Instrument and Control technicians functionally tested and calibrated the protective relays, but found no problems with them. Subsequently, a load test was conducted on RPS motor-generator set 'B' and its associated protective relay circuitry. However, the test did not reveal any unusual operating characteristics, and power remained stable throughout the period of the test. Therefore, the results of the load test were inconclusive.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event is reportable per 10 CFR 50.73 (a)(2)(iv) because unplanned actuations of several Engineered Safety Features (ESFs) occurred. Specifically, RPS bus 'B' tripped spuriously, resulting in automatic actuations of ESF systems powered by the bus.

The Reactor Protection System ensures the integrity of the fuel cladding and nuclear system process barriers by initiating a scram when certain process conditions exist. These conditions include, among others, low reactor water level, high reactor pressure, and high radiation in the main steam lines. Electrical power for the RPS is normally supplied through the RPS MG sets. The 'A' MG set supplies power to the 'A' RPS bus and the 'B' MG set supplies power to the 'B' bus.

The Reactor Protection System is designed to supply stable electrical power to a variety of plant instrumentation systems, including the Process Radiation Monitoring System, the Neutron Monitoring Syste RPS, PCIS, and the Offgas Radiation Monitoring System. The RPS requires a high degree of power stability in order to ensure that instrumentation powered by the bus performs as designed. This is achieved by using MG sets to condition the power supplied to the RPS. Should the power output from the MG sets drift outside specified voltage and frequency parameters, protective relay circuitry is designed to trip the output

breakers. Alternate power supplies are available to RPS and are fed through essential cabinets via other protective breakers. The protective breakers on the alternate power supplies provide the same degree of protection against degraded voltage or frequency conditions as those on the normal supply.

Loss of power to an RPS bus results in a half scram signal being generated by the trip system powered by the affected RPS bus, and in trip signals being sent to one division of several other plant systems, including Groups 1, 2, and 5 PCIS valves, SGTS, and the MCREC System. All of these systems are designed to "fail safe" (i.e., they initiate their emergency actions upon interruption of power or loss of signal) and functioned per design given the trip signal which was introduced when the RPS bus lost power. These trips were in place for a few minutes until the alternate power supply was aligned to feed RPS. Affected systems were all restored to normal configuration within approximately fifteen minutes. Alternate power was then used for approximately six days until load testing was completed. RPS was then restored to its normal configuration with power being supplied through the MG sets. The 'A' MG set and related systems were not affected by this event.

In the event that a design basis accident had occurred during the period when the affected RPS bus was tripped, the unaffected 'A' trip system would have tripped as designed. Since the 'B' trip system was already in the tripped state, a full scram signal would have been generated per design. Had an accident occurred while the RPS bus was being fed via its alternate supply, both trip systems would have been operable and would have responded per design.

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 protective relay circuitry which controls the output breakers on the affected RPS MG set was functionally tested and calibrated. No anomalies were identified, and all the relays functioned as expected during the calibration.

The affected RPS MG set and its associated protective relay circuitry were subjected to a load test. Since no unusual indications were observed during the load test, the test results were not conclusive. Following the load test, the RPS bus was realigned to its normal power supply with power monitoring equipment installed. Monitoring of the RPS power supply will continue as deemed necessary.

As committed to in LER 50-321/1992-010, dated 05/20/92, an evaluation of recent RPS trips is being performed for possible common causes, including those related to the age of the components.

Additionally, the architect/engineer (A/E) is evaluating the possibility of installing a time delay relay in the protective relay circuitry. The function of the time delay relay would be to prevent unnecessary trips from occurring due to short duration transients occurring on the bus.

TEXT

ADDITIONAL INFORMATION

1. Other Systems Affected: No systems were affected other than those mentioned in this report.

2. Previous Similar Events: Events reported in the past two years in which the RPS power supply system tripped were described in the following LERs:

   50-321/1991-014, dated 09/09/91,
   50-321/1991-015, dated 09/18/91,
   50-321/1992-005, dated 03/18/92,
   50-321-1992-010, dated 05/20/92,
   50-366/1991-020, dated 12/02/91, and
   50-366/1992-005, dated 05/19/92.

Corrective actions for these events included replacing failed components, issuing an operating order to augment control of the Standby Gas Treatment System, performing a design review of a protective relay in the RPS, performing a design review of SGTS, performing a failure analysis on a representative sample of light bulbs, adjusting RPS output voltage, performing a design review of circuit breakers in the RPS, and counseling involved personnel.

These corrective actions would not have prevented this event because they addressed only the specific causes of particular events. However, in view of the increased component failure rate experienced with the RPS power supply system in the past year, potential common causes for component failures are presently being investigated.

3. Failed Components Identification: No failed components contributed to or resulted from this event.