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Georgia Power
the southern electric system

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Docket No. 50-366 HL-4480

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

Edwin I. Hatch Nuclear Plant - Unit 2
Licensee Event Report
Blown Fuse Results in Unplanned
Automatic Actuations of Engineered Safety Features

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 blown fuse which caused unplanned actuations of several engineered safety features. This event occurred at Plant Hatch - Unit 2.

Sincerely,

J. T. Beckham, Jr.

OCV/cr

Enclosure: LER 50-366/1993-011

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

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NRC FORM 366 (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 (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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
EDWIN I. HATCH NUCLEAR PLANT - UNIT 2	0 5 0 0 0 3 6 6	1 OF 6

TITLE (4)
BLOWN FUSE RESULTS IN UNPLANNED AUTOMATIC ACTUATIONS OF ENGINEERED SAFETY FEATURES

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 2	2 0	9 3	9 3	– 0 1 1	– 0 0	0 1	1 3	9 4	PLANT HATCH, UNIT 1	0 5 0 0 0 3 2 1
									FACILITY NAME	0 5 0 0 0

OPERATING MODE (9)	1
POWER LEVEL (10)	0 8 5

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR ?: (Check one or more of the following) (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 and in Text, NRC Form 366A)
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 (include area code)
STEVEN B. TIPPS, NUCLEAR SAFETY AND COMPLIANCE MANAGER	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 NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On 12/20/93 at 0945 EST, Unit 2 was in the Run mode at a power level of 2070 CMWT (85 percent rated thermal power) and Unit 1 was in the Run mode at a power level of 2387 CMWT (98 percent rated thermal power). At that time, technicians were performing a surveillance procedure to test the refueling floor vent radiation monitor instruments. This procedure requires the installation of jumpers in the "A" logic to prevent an automatic actuation of the Standby Gas Treatment (SBGT) system. After jumpers were installed on the contact side of relay 2D11A-K80 in trip auxiliary unit 2C51A-Z2A, fuse 2D11A-F14A blew on the coil side of this relay. Since this fuse supplies control power to both the "A" and "B" division logic systems, equipment associated with the "B" division received a start signal, initiating the "B" division SBGT system, closing the outboard Secondary Containment dampers, and actuating various outboard Group 2 Primary Containment Isolation System (PCIS) valves. Technicians then halted the surveillance. When the jumpers were removed, the same equipment associated with the "A" division also actuated.

The cause of this event has not been determined. The circuit in which the jumpers were placed is electrically independent from the circuit in which the fuse blew.

Corrective actions for this event included examination of relays from this and two previous similar events. Other corrective actions included reviewing the procedure which was in use at the time of the event and increasing the size of the fuse in the affected circuit. All these actions are complete. In addition, the affected circuits and wiring will be traced and verified during the next refueling outage.

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 12/20/93 at 0945 EST, Unit 2 was in the Run mode at a power level of 2070 CMWT (85 percent rated thermal power) and Unit 1 was in the Run mode at a power level of 2387 CMWT (98 percent rated thermal power). At that time, technicians were performing surveillance procedure 57SV-D11-007-2S, "Refueling Floor Exhaust Vent Radiation Monitor Instrument Functional Test." This test procedure requires the installation of jumpers across the contacts of relays in the "A" division of the actuation logic to prevent Engineered Safety Features (ESFs) associated with that division from actuating when the instruments are tested. The technicians installed the jumpers properly, but while they were preparing for the next step of the procedure, an automatic start of the "B" division of both units' Standby Gas Treatment Systems (SBGT, EIIS Code BH) occurred; the outboard Secondary Containment (EIIS Code NG) isolation dampers closed, and various Group 2 Primary Containment Isolation System (PCIS, EIIS Code JE) outboard valves closed. When the technicians were told about the actuations, they halted progress on their surveillance and began to "back out" of it. However, when they removed the jumpers which had been installed previously, the "A" division SBGT systems received an initiation signal; the inboard Secondary Containment isolation dampers closed, and various inboard Group 2 PCIS valves closed.

By 1009 EST, licensed personnel completed confirmation that all affected ESF systems had responded as required, and attempted to reset the various isolation signals. However, the signals could not be reset. This prompted further investigation which revealed that fuse 2D11A-F14A supplying power to trip auxiliary unit 2C51A-Z2A had blown. This fuse supplies control power for logic involving both divisions of refueling floor radiation monitoring instrumentation (EIIS Code IL). Thus, it was determined that when the fuse blew, actuations occurred in the "B" division logic which had no jumpers to prevent actuations, and subsequently the "A" division in which the logic had been jumpered out actuated when the technicians removed the jumpers.

By 1120 EST, the blown fuse was replaced; the various actuation signals were reset, and all affected systems were returned to their normal configuration.

CAUSE OF EVENT

The cause of this event has not been determined. It is known that the ESF actuations occurred as the result of a blown fuse. (The second set of actuations occurred when the jumpers were removed.) However, the reason for the fuse blowing has not been determined.

Supervision investigated the event immediately after it occurred, interviewing the involved technicians as well as carefully inspecting the work location. It was determined that the jumpers had been properly placed and that the fuse had not blown due to grounding associated with jumper placement. This determination was based on three facts. First, special jumpers were used which feature retractable insulated shielding that protects the conductor from accidental contact with metal structures within the panel. Second, no evidence of arcing could be found in the vicinity of the work location. Third, the jumpers were installed in a circuit which is electrically isolated from the circuit that contains the fuse. That is, the jumpers were installed across the contacts of relay 2D11A-K80, but the fuse blew in a different circuit supplying power to the relay coil. Had the jumpers been grounded during installation, a different fuse feeding power to other relays via these contacts would have blown. Thus it was concluded that personnel error (i.e., grounding a jumper or placing it on the wrong terminal) had not been a factor in the event.

The procedure in use at the time was reviewed. It was found that, in this particular event, the installation of jumpers was the first action required by the procedure. Since the fuse blew before any other actions were taken, there were no other actions in the procedure which could have had any effect on the circuit containing the fuse. Hence it was concluded that procedural error had not been a factor in the event.

In this event, the fuse blew in the circuit which feeds 24 VDC power to the coil of relay 2D11A-K80, even though the jumpers were installed in a circuit which feeds 120 VAC power through the contacts of this relay. Therefore, since the circuit containing the jumpers is distinct from the circuit in which the fuse blew, a connection between the two circuits was sought. The only place where the two circuits are in close physical proximity is inside of relay 2D11A-K80 in trip auxiliary unit 2C51A-Z2A. This relay and eleven similar relays related to two previous events were disassembled and examined for any evidence of internal fault, such as degraded or worn insulation, flashover, faulty wiring, etc. No obvious signs of failure were identified in any of the relays, and resistance measurements taken between the coil conductors and contact conductors showed that no electrical connection existed. Therefore, the relays were sound and in good operating condition. A review of industry experience concerning this particular relay was conducted, but no reports of failures were identified. Thus it was concluded that relay failure had not been a factor in this event.

This event was compared to previous events involving actuations of Engineered Safety Features due to blown fuses. Two events, reported in LERs 50-321/1992-016, dated 7/10/92, and 50-321/1993-005, dated 5/14/93, were identified in which similar circuitry had experienced actuations which were difficult to explain. The only common factors which were identified, however, were that similar surveillance procedures were being performed, and both procedures required the installation of jumpers to prevent actuations. As in this event, the blown fuses were located in different circuits from where the jumpers were installed. In both of the previous events, personnel error and procedure error were determined not to have been factors.

Finally, to ensure that fault protection in the affected circuitry was not over-conservative, the architect/engineer (A/E) was consulted concerning fuse sizing in the affected circuits. It was found that the vendor manual originally specified a five-ampere fuse, although a one-ampere fuse has been used in this circuit for the past several years. The A/E has since provided analysis showing that a five-ampere fuse is indeed acceptable in this application, but the fact that the fuse sizing may have been over-conservative does not account for the fact that the fuse which blew is located in a different circuit from where the jumper was installed.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event is reportable per 10 CFR 50.73 (a)(2)(iv) because unplanned automatic actuations of Engineered Safety Features occurred. Specifically, a blown fuse in a radiation monitoring circuit caused actuations of both units' Standby Gas Treatment systems, isolation of various Group 2 PCIS valves, and closure of Secondary Containment isolation dampers.

The SBGT systems are designed to limit the release of radioactive material to the environment following leakage of radioactive material into the Secondary Containment. The SBGT systems automatically filter the air from the Secondary Containment following an accident and discharge it via the Main Stack (EIIS Code VL). Each unit's SBGT system consists of two identical, redundant, 100 percent capacity air filtration systems containing the necessary heaters, filters and exhaust fans. When an SBGT system initiation signal is received, the normal building ventilation systems automatically isolate to allow the SBGT system to maintain a negative pressure on the reactor building and refueling floor. This prevents unfiltered air from leaking out of the Secondary Containment into the atmosphere.

The Group 2 PCIS is designed to automatically close certain Primary Containment Isolation Valves (PCIVs) to provide protection against accidents involving the release of radioactive material from the fuel or nuclear process barriers. Group 2 systems are generally those systems whose lines do not communicate directly with the reactor vessel, but penetrate the Primary Containment and communicate with the free space inside it.

In this event, a blown fuse resulted in actuations of the "B" divisions of both units' SBGT systems, outboard Group 2 PCIS valves, and outboard Secondary Containment isolation dampers. Subsequently, removal of the jumpers actuated the "A" division logic and caused further actuations in the companion channels/trains of these systems. Immediately after the event, licensed personnel confirmed that all actuations occurred as designed given the signal which was introduced when the fuse blew and the jumpers were removed. Had a design basis accident occurred during this event, the involved systems and circuitry would already have been in their designed accident configurations with safety functions completed as required.

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

Corrective actions for this event included the following:

1. The blown fuse was replaced, actuation signals were reset, and all affected systems were returned to their normal status. This action has been completed.

2. Relays designated as 2D11A-K80 in the affected circuit of trip auxiliary units 2C51A-Z2A and 2C51A-Z2C were removed and replaced with new relays from warehouse stock. The removed relays were examined by engineering personnel for signs of internal fault, but no evidence of internal fault was observed. This action has been completed.

3. Surveillance procedure 57SV-D11-007-2S was performed again to ensure proper function of the radiation monitoring instrumentation and associated logic. This time, no unexpected actuations occurred. The radiation monitoring instrumentation performed as designed, and the surveillance was completed without incident. This action has been completed.

4. The affected fuse, 2D11A-F14A, which is a one-ampere fuse, has been replaced with a five-ampere fuse in accordance with analysis performed by the A/E. Similarly, a one-ampere fuse in an associated logic channel, fuse 2D11A-F14B, has been changed to a five-ampere fuse.

5. The wiring associated with the blown fuse as well as the wiring in the circuit where the jumper was installed will be traced and verified (or, "red-lined") during the next refueling outage on Unit 2, currently scheduled to begin in the Spring of 1994.

6. The A/E will perform an analysis of similar radiation monitoring circuitry on Unit 1 to determine whether the one-ampere fuses installed in those circuits should be changed to five-ampere fuses. Should the analysis demonstrate that this would be reasonable and prudent, the fuse will be changed during the next Unit 1 refueling outage, currently scheduled to begin in the Fall of 1994.

ADDITIONAL INFORMATION

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

2. Failed Equipment Information: No equipment failures have been identified in conjunction with this event.

3. Previous Similar Events: Events occurring in the past two years in which blown fuses in radiation monitoring equipment resulted in ESF actuations similar to those described in this report were reported in LERs 50-321/1992-016, dated 07/10/92, and 50-321/1993-005, dated 05/14/92. Corrective actions for these events included replacing blown fuses, replacing relays which were powered through the blown fuse, and inspecting components and wiring associated with the blown fuse. These corrective actions would not have prevented this event because they all addressed hardware conditions on Unit 1, whereas the current event occurred on Unit 2. Also, no similar problems had occurred on Unit 2, so no generic conclusions applicable to Unit 2 regarding such matters as circuit design, relay design, and fuse sizing were evident.