

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

Southern Nuclear
Operating Company, Inc.
Post Office Box 1295
Birmingham, Alabama 35201
Tel 205.992.7279



Energy to Serve Your WorldSM

NL-04-0738

April 28, 2004

Docket No.: 50-321

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

Edwin I. Hatch Nuclear Plant
Licensee Event Report
4160V Normal Supply Breaker Shutter Failure
Trips MOC Switch Causing DG Start on Undervoltage

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 the automatic actuation of an emergency diesel generator.

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/whc/daj

Enclosures: LER 50-321/2004-003

cc: Southern Nuclear Operating Company
Mr. J. B. Beasley, Jr., Executive Vice President
Mr. G. R. Frederick, General Manager – Plant Hatch
RTYPE: CHA02.004

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

JEZ

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: 50 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.

1. FACILITY NAME

Edwin I. Hatch Nuclear Plant - Unit 1

2. DOCKET NUMBER

05000-321

3. PAGE

1 OF 5

4. TITLE
4160V Normal Supply Breaker Shutter Failure Trips MOC Switch Causing DG Start on Undervoltage

| | | | | | | | | | | |
|------------------------------|-----|------|---|--------------------|----------------------|---|-----|------|-------------------------------------|------------------|
| 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) |
| 3 | 03 | 2004 | 2004 | 003 | 0 | 4 | 28 | 2004 | | 05000 |
| 9. OPERATING MODE (9) | | | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § : (Check all that apply) | | | | | | | |
| 5 | | | 20.2201(b) | 20.2203(a)(3)(ii) | 50.73(a)(2)(ii)(B) | 50.73(a)(2)(ix)(A) | | | | |
| 10. POWER LEVEL | | | 20.2201(d) | 20.2203(a)(4) | 50.73(a)(2)(iii) | 50.73(a)(2)(x) | | | | |
| 000 | | | 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

| | |
|---|---|
| NAME | TELEPHONE NUMBER (Include Area Code) |
| Steven B. Tipps, Nuclear Safety and Compliance Manager, Hatch | (912) 537-5880 |

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 |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
| D | EB | CAB | W120 | Y | | | | | |
| | | | | | | | | | |

14. SUPPLEMENTAL REPORT EXPECTED

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

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

On March 3, 2004 at 1345 EST, Unit 1 was in the refueling mode. At that time the 'swing' (1B) emergency diesel generator (DG) started unexpectedly during the planned removal of the normal supply breaker for the 1F 4160 VAC emergency bus (1R22-S006, Frame 11). A problem with the shutter in this breaker cubicle caused it to become hung up on the breaker when it was being removed from the cubicle. This caused the shutter linkage to depress the Mechanism Operated Cell (MOC) switch which in turn caused an undervoltage signal to be generated, starting the 'swing' DG.

The shutter problem was caused by procedure omissions. The 4160 VAC switchgear Preventive Maintenance procedure did not require checks to ensure the shutter assembly travels freely and the C-channel is not deformed. Additionally, the procedure did not contain guidance for the installation of an L-bracket or mounting bolt that could interfere with the shutter linkage arm when the breaker is being put into the cubicle and subsequently racked in. The maintenance procedure will be revised to provide additional guidance by June 30, 2004.

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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 are identified in the text as (EIS Code XX).

DESCRIPTION OF EVENT

On March 3, 2004 at 1345 EST, the 'swing' (1B) emergency diesel generator (DG) started unexpectedly during the planned removal of the normal supply breaker for the 1F 4160 VAC emergency bus (1R22-S006, Frame 11) (EIS Code EB). A problem with the shutter in this breaker cubicle caused it to become hung up on the breaker when it was being removed from the cubicle. This caused the shutter linkage to depress the Mechanism Operated Cell (MOC) switch, which in turn caused an undervoltage signal to be generated, starting the 'swing' DG (EDG, EIS Code EK). The shutter problem was caused by inadequate procedures that did not ensure there would be no interferences with the shutter assembly during the installation and racking in of the breaker.

The event was the result of the shutter assembly for the normal supply breaker for the 1F 4160 VAC emergency bus (1R22-S006, Frame 11) becoming hung on the conductor fingers of the breaker as it was being racked out. When the breaker was subsequently being removed from the cubicle, the front of the shutter linkage arm (used to raise or lower the shutter) pivoted downward until it momentarily depressed the Mechanism Operated Cell (MOC) switch. The logic interpreted the depression of the MOC switch as the normal supply breaker being closed in. This caused the alternate supply breaker to trip. With the normal supply breaker being removed from the cubicle and the alternate supply breaker tripped, the 'swing' DG started on a bus undervoltage signal. As the breaker continued to be removed from the cubicle, the shutter became free from the breaker's conductor fingers and fell back into the cubicle releasing the MOC switch. The release of the MOC switch permitted the alternate supply breaker to re-close before the DG output breaker tied to the de-energized bus.

The shutters for the 4160 VAC breakers are raised when the breakers are installed and are lowered when the breakers are removed from their cubicles. It was determined from an inspection of the shutter involved in this event that the C-channel (which functions as a guide for the shutter as it is raised or lowered during breaker installation or removal) was deformed in two locations. The location of these C-channel deformations coincided with where the cubicle's fixed pins contacted the C-channel when the breaker was installed in the cubicle (i.e., the shutter was in the raised position). The location and type of C-channel deformations led to the conclusion that the shutter had been pried off of the fixed pins while it was in the raised position.

An investigation of the event concluded that a breaker previously installed in this cubicle had either a mounting bolt or L-bracket (used for fastening the barrier to the side of the breaker) installed improperly, causing an interference with the slotted bracket for the shutter linkage arm. This interference caused the slotted bracket attached to the shutter C-channel to become bent while prying

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off the C-channel from the lower fixed pin. The breaker that was installed during this event was inspected, and it was determined that it did not have the mounting bolt or L-bracket installed improperly. However, interviews with plant personnel revealed that there have been past instances where this L-bracket and mounting bolt assembly has been installed incorrectly. With the shutter off of this lower fixed pin, the shutter had more of a tendency to bind when being raised or lowered while the breaker was being racked in or out. It also permitted the shutter to tilt slightly. Both of these conditions made it more likely for the shutter to hang up on the breaker conductor fingers. It is concluded that this event occurred because the shutter did hang up on the fingers when the breaker was racked out, prying the shutter off of the top fixed pin. Subsequently, when the breaker was being removed from the cubicle, the shutter was pulled completely off the top fixed pin. Then as the shutter continued to be drawn out of the cubicle with the breaker its linkage arm was forced downward depressing the MOC switch. The fiberglass portion of the shutter resisted the movement out of the cubicle and eventually the shutter became free from the breaker fingers and fell to the floor releasing the MOC switch.

CAUSE OF EVENT

The shutter problem was caused by procedure omissions. The 4160 VAC switchgear Preventive Maintenance procedure did not require checks to ensure the shutter assembly travels freely and the C-channel is not deformed. Additionally, the procedure did not contain guidance for the installation of an L-bracket or mounting bolt that could interfere with the shutter linkage arm when the breaker is being put into the cubicle and subsequently racked in.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event is reportable per 10 CFR 50.73 (a)(2)(iv)(A) because an automatic actuation of a system listed in paragraph (a)(2)(iv)(B)(8) occurred. Specifically, the 'swing' DG automatically started from an undervoltage signal generated when the MOC switch for the normal supply breaker was depressed causing the alternate supply breaker to trip.

The Unit 1 Class 1E AC Electrical Power Distribution System AC sources consist of the offsite power sources (preferred power sources, normal and alternate), and the onsite standby power sources (DGs 1A, 1B, and 1C). As required by 10 CFR 50, Appendix A, GDC 17, the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems. The Class 1E AC distribution system is divided into redundant load groups, so loss of any one group does not prevent the minimum safety functions from being performed. Each load group has connections to two preferred offsite power supplies and a single DG. Offsite power is supplied to the 230 kV and 500 kV switchyards from the transmission network by eight transmission lines. From the 230 kV switchyards, two electrically and physically separated circuits provide AC power, through startup auxiliary transformers 1C and 1D, to 4160 VAC ESF buses 1E, 1F, and 1G.

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Startup auxiliary transformer (SAT) 1D provides the normal source of power to ESF buses 1E, 1F, and 1G. If any 4160 VAC ESF bus loses power, an automatic transfer from SAT 1D to SAT 1C occurs. The onsite standby power source for 4160 VAC ESF buses 1E, 1F, and 1G consists of three DGs. DGs 1A and 1C are dedicated to ESF buses 1E and 1G, respectively. DG 1B (the 'swing' DG) is a shared power source and can supply either Unit 1 ESF bus 1F or Unit 2 ESF bus 2F. A DG starts automatically on a loss of coolant accident (LOCA) signal (i.e., low reactor water level signal or high drywell pressure signal) or on an ESF bus degraded voltage or undervoltage signal. After the DG has started, it automatically ties to its respective bus after offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage, independent of or coincident with a LOCA signal.

In this event, the logic interpreted the depression of the MOC switch as the normal supply breaker being closed in. This caused the alternate supply breaker to trip. With the normal supply breaker being removed from the cubicle and the alternate supply breaker tripped, the 'swing' DG started on a bus undervoltage signal. As the breaker continued to be removed from the cubicle, the shutter became free from the breaker's conductor fingers and fell back into the cubicle releasing the MOC switch. The release of the MOC switch permitted the alternate supply breaker to re-close before the DG output breaker tied to the de-energized bus.

In this event, all components and systems functioned as designed, given the momentary bus undervoltage signal generated. During this event, the 'swing' DG remained operable (with the exception of approximately 5 minutes while the DG was being barred over after being shutdown) and was capable of supplying power to the bus if the normal and alternate source of power to the bus remained unavailable. Based on this analysis, it is concluded that this event did not adversely affect nuclear safety.

CORRECTIVE ACTIONS

Unit 1's 4160 VAC breakers were inspected (without removing the breaker from the cubicle) and the gap between the breaker and the slotted bracket where the shutter linkage arm inserts was visually estimated. Of the breaker cubicles inspected, some damage was observed on four of the shutters. Two of the shutters were inspected further and Maintenance Engineering determined that the C-channels for the shutters were acceptable.

Unit 2's 4160 VAC breakers will be inspected (without removing the breaker from the cubicle) and any anomalies for the shutter assemblies will be noted. This action will be completed by June 30, 2004.

Caution tags will be placed on the breakers identified with shutter anomalies (i.e., the two on Unit 1 and any identified during the Unit 2 inspections). The tags will require that an electrician witness the removal of the breakers from their cubicle. The electrician will ensure that the shutter linkage arm

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does not move downward toward the MOC switch when these breakers are removed from their cubicles. This action will be completed by June 30, 2004.

Maintenance personnel involved in removing breakers from cubicles have been made aware of this event (by a shop bulletin) to ensure that the shutter linkage arm does not move downward toward the MOC switch when removing Unit 2 breakers from their cubicles before the June 2004 inspections are completed.

The 4160 VAC switchgear Preventive Maintenance procedure will be revised to require checks to ensure the shutter assembly travels freely and the C-channel is not deformed. Additionally, specific guidance will be added to the procedure concerning the installation of the L-bracket or mounting bolt that could interfere with the shutter linkage arm when the breaker is being put into the cubicle and subsequently racked in. This procedure revision will be completed by June 30, 2004.

ADDITIONAL INFORMATION

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

This LER does not contain any permanent licensing commitments.

There were no previous similar events reported in the past two years in which a failure of a 4160 VAC breaker shutter assembly caused an unplanned safety system actuation.

Failed Component Information:

Master Parts List: 1R22-S006, Frame 11
 Manufacturer: Westinghouse
 Manufacturer Code: W120
 Model Number: 437D937 GY01
 Type: Shutter Assembly
 EIS System Code: EB
 EIS Component Code: CAB
 Root Cause Code: D
 Reportable to EPIX: Yes