

Georgia Power Company
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201
Telephone 205 877-7122

C. K. McCoy
Vice President, Nuclear
Vogtle Project



Georgia Power

The southern electric system

May 18, 1992

ELV-03758
000388

Docket No. 50-424

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

Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
LICENSEE EVENT REPORT
TESTING REVEALS ESFAS SEQUENCERS TO BE
OPERATING OUTSIDE OF DESIGN BASIS

In accordance with 10 CFR 50.73, Georgia Power Company (GPC) hereby submits the enclosed report related to an event which was discovered on April 24, 1992.

Sincerely,

C.K.M.'G
C. K. McCoy

CKM/NJS

Enclosure: LER 50-424/1992-002

xc: Georgia Power Company
Mr. W. B. Shipman
Mr. M. Sheibani
NORMS

U. S. Nuclear Regulatory Commission
Mr. S. D. Ebnetter, Regional Administrator
Mr. D. S. Hood, Licensing Project Manager, NRR
Mr. B. R. Bonser, Senior Resident Inspector, Vogtle

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LICENSEE EVENT REPORT (LER)

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| FACILITY NAME (1) VOGTLE ELECTRIC GENERATING PLANT - UNIT 1 | DOCKET NUMBER (2) 05000424 | PAGE (3) 1 OF 1 |
|--|-------------------------------|--------------------|

TITLE (4)
TESTING REVEALS ESFAS SEQUENCERS TO BE OPERATING OUTSIDE OF DESIGN BASIS

| 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) |
| 04 | 24 | 92 | 92 | 002 | 00 | 05 | 18 | 92 | VEGP - UNIT 2 | | 05000425 |
| | | | | | | | | | | | 05000 |

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

| OPERATING MODE (9) | 20.402(b) | 20.405(c) | 50.73(a)(2)(iv) | 73.71(b) |
|-------------------------|-------------------|-------------------|----------------------|-------------------|
| 1 POWER LEVEL 100 | 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 |
| | 20.405(a)(1)(iii) | X 50.73(a)(2)(i) | 50.73(a)(2)(viii)(A) | Abstract below |
| | 20.405(a)(1)(iv) | X 50.73(a)(2)(ii) | 50.73(a)(2)(viii)(B) | 10 CFR 21 |
| | 20.405(a)(1)(v) | 50.73(a)(2)(iii) | 50.73(a)(2)(x) | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER |
|---|------------------|
| MEHDI SHEIBANI, NUCLEAR SAFETY AND COMPLIANCE | 706 826-3209 |

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

| CAUSE | SYSTEM | COMPONENT | MANUFAC-TURER | REPORT TO NPRDS | CAUSE | SYSTEM | COMPONENT | MANUFAC-TURER | REPORT TO NPRDS |
|-------|--------|-----------|---------------|-----------------|-------|--------|-----------|---------------|-----------------|
| B | J E | T M R | E O 6 2 | Y | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

| | | | | | |
|--|--|-------------------------------|-------|-----|------|
| <input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) | <input checked="" type="checkbox"/> NO | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|--|--|-------------------------------|-------|-----|------|

ABSTRACT (16)

On April 24, 1992, it was determined that the plant could have been in a condition that was outside of its design basis due to a potential for delays in cycling on equipment using the engineered safety feature actuation system (ESFAS) sequencer. A design inadequacy in an automatic test insertion (ATI) circuit could have caused the sequencer's main timing bus to reset after the sequence had begun, resulting in the delays. Technical Specification (TS) 3.0.3 was entered for Unit 1 and jumpers were installed to defeat the ATI circuitry. This was completed and TS 3.0.3 was exited. Since Unit 2 was in Mode 5 for a refueling outage, it was not immediately affected because the sequencers were not required to be operable.

The vendor has been consulted, and a plan of action is being developed regarding a redesign of the sequencer automatic testing logic which will allow restoration of the ATI circuit without the attendant possibility of an ATI initiated timing interruption.

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TEXT

A. REQUIREMENT FOR REPORT

This report is required per 10 CFR 50.73 (a)(2)(i) because Unit 1 operated in a condition outside of Technical Specification (TS) requirements when a TS 3.0.3 entry was required. Additionally, this report is required per 10 CFR 50.73 (a)(2)(ii) because both Units 1 and 2 could have operated in a condition that was outside of the plant design basis. This event is also reportable per 10 CFR 21.

B. UNIT STATUS AT TIME OF EVENT

At the time of the discovery of this event, Unit 1 was operating in Mode 1 (power operation) at 100 percent of rated thermal power (RTP). Unit 2 was operating in Mode 5 (cold shutdown) at 0 percent RTP and in a refueling outage. Other than that described herein, there was no inoperable equipment which contributed to the occurrence of this event.

C. DESCRIPTION OF EVENT

On April 8, 1992, engineered safety feature actuation system (ESFAS) testing was in progress on Unit 2, which was in Mode 5 following refueling. At 1814 EDT, the Train B sequencer was cycled as a part of safety injection (SI) actuation testing. However, upon reviewing the test results on the following day, it was found that sequencer step times for steps 6, 7, 8, and 9 were delayed by approximately 14 seconds. The sequencer vendor was contacted, and a troubleshooting test was devised. The following week, the test was performed four times with the step delays occurring on one of the four tests. The controller "A" module was replaced, and further tests were performed. Personnel found that, upon actuation from an SI signal, the step delays were continuing to occur intermittently. Further tests were performed using additional monitoring points, and at various times in the automatic test insertion (ATI) circuitry cycle. It was determined that, upon receipt of a SI actuation signal and at a certain ATI step, the test would run for 15 to 17 seconds, the main timing bus would reset, and then resume counting from zero. The problem did not occur in the presence of an undervoltage signal or an undervoltage signal coincident with an SI signal. During the night of April 23-24, the test was repeated several times with the same results, confirming the source of the time delays. After consulting with the vendor, both Unit 1 sequencers were checked and found to have the same potential timing problem.

Since the plant is analyzed to respond to emergency conditions based on the specific times controlled by the sequencer, it was determined that the plant could have been in a condition that was outside of its design basis. On April 24, 1992 at 0500 EDT, TS 3.0.3 was entered for Unit 1 while jumpers were installed to defeat the ATI circuitry. At 0504 EDT, this was completed for the Train A sequencer and, TS 3.0.3 was exited. Jumpers were installed on the Train B sequencer, and it was restored to service at 0515 EDT. Unit 2 was not immediately affected since the sequencers are not required to be operable in Mode 5.

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TEXT

C. CAUSE OF EVENT

The cause of this event was a design inadequacy in the ATI circuitry which resulted in the delay of the stepping sequence while cycling through a specific ATI step.

D. ANALYSIS OF EVENT

An investigation determined that this problem could only occur when an SI signal occurred while the ATI was on a specific step. This step lasts for 20 seconds out of a 120-second ATI sequence. The sequencer step delay represented a condition that could have been outside of the design basis of the plant because the plant was analyzed for component sequencing during the specific times being output from the sequencer. The following is an evaluation of the potential effects of the sequencer step delay on the safety analysis:

1. Non-Loss Of Coolant Accidents

Past sensitivities with safety injection actuation delays on the order of 20 seconds have been evaluated and determined to cause a small departure from nucleate boiling ratio (DNBR) penalty (reduced calculated DNBR). This penalty would have applied only for the steamline break core response transient, given the 20-second delay in the ESFAS sequencer. It is expected that no violation of the DNBR acceptance criteria for the steamline break would have resulted. The steamline break mass/energy release for containment response is essentially unaffected by this safety injection delay.

2. Steam Generator Tube Rupture (SGTR) Assessment

Since the standard methodology for SGTR analyses has established that a 0-second delay time for safety injection actuation is the most limiting case, a longer delay would then be bounded by the current analysis assumption with no adverse effect.

3. LOCA Assessment

The step delay in the safety injection signal caused by a design inadequacy in the ATI circuit would result in a penalty to the large and small break LOCA analyses because it will delay the initiation of safety injection flow, main feedwater isolation, and auxiliary feedwater start. These delays would lead to slower core recovery and reduced heat removal via the secondary side. Each of these effects will result in a peak clad temperature (PCT) penalty (increased calculated PCT) for the LOCA. The consequence of this penalty is not possible to determine without extensive analytical evaluation. Note that there is a 94-degree F margin to the acceptance criteria for the large break LOCA and 372-degree F margin to the acceptance criteria for the small break LOCA based on the most recent fuel rerating analysis and applicable PCT assessments.

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4. Containment Integrity Evaluation

Any additional delay time for safety injection flow delivery beyond that assumed in the LOCA containment response analysis would result in a calculated peak pressure penalty (increased calculated containment pressure). The consequence of this penalty is not possible to determine without extensive analytical evaluation. Note that there is a 15.5 psi margin to the containment design criteria based on the most recent rerating analysis.

E. CORRECTIVE ACTIONS

1. The ATI circuitry has been defeated on the Unit 1 and Unit 2 sequencers. Defeating the ATI does not affect the ability of the sequencer to perform its safety function.
2. The vendor has been consulted and a plan of action is being developed regarding a redesign of the sequencer automatic testing logic to allow restoration of ATI operation without the possibility of an ATI initiated timing interruption. Georgia Power Company expects to have this design change implemented by the end of the next refueling outage for each unit.

G. ADDITIONAL INFORMATION

1. Failed Components:
ESFAS Sequencer manufactured by Eaton Industries
Model #9N57
2. Previous Similar Events:
None
3. Energy Industry Identification System Code:
Engineered Safety Feature Actuation System - JE
Safety Injection System - BQ