

Georgia Power Company
40 Inverness Circle Parkway
Post Office Box 1295
Birmingham, Alabama 35201
Telephone 205 877-7279

J. T. Beckham, Jr.
Vice President—Nuclear
Hatch Project



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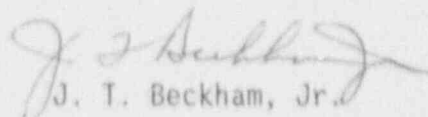
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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PLANT HATCH - UNIT 2
NRC DOCKET 50-366
OPERATING LICENSE NPF-5
LICENSEE EVENT REPORT
SINGLE FAILURE VULNERABILITY
DISCOVERED IN BOP SYSTEM

Gentlemen:

Georgia Power Company is voluntarily submitting the enclosed Licensee Event Report (LER) concerning a single failure vulnerability which was discovered in a balance of plant (BOP) system. This event occurred at Plant Hatch - Unit 2.

Sincerely,



J. T. Beckham, Jr.

MCM/cr

Enclosure: LER 50-366/1992-013

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. L. D. Wert, Senior Resident Inspector - Hatch

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LICENSEE EVENT REPORT (LER)

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|--|--------|--|----------------|-----------------|-------|------------------|-----------------|---------------|-----------------|--|------------------|---|-----|----------|--|
| FACILITY NAME (1) PLANT HATCH, UNIT 2 | | | | | | | | | | DOCKET NUMBER (2) 05000366 | | PAGE (3) 1 of 4 | | | |
| TITLE (4) SINGLE FAILURE VULNERABILITY DISCOVERED IN BOP SYSTEM | | | | | | | | | | | | | | | |
| EVENT DATE (5) | | | LER NUMBER (6) | | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | | | | |
| MONTH | DA | YEAR | YEAR | SEQ NUM | REV | MONTH | DAY | YEAR | FACILITY NAMES | | DOCKET NUMBER(S) | | | | |
| 07 | 22 | 92 | 92 | 013 | 00 | 09 | 16 | 92 | | | 05000 | | | | |
| OPERATING MODE (9) | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11) | | | | | | | | | | | | | |
| 1 | | 20.402(b) | | | | 20.405(c) | | | | 50.73(a)(2)(iv) | | 73.71(b) | | | |
| POWER LEVEL | | 97 | | 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) | | <input checked="" type="checkbox"/> OTHER (Specify in Abstract below) | | | |
| | | 20.405(a)(1)(iii) | | | | 50.73(a)(2)(i) | | | | 50.73(a)(2)(viii)(A) | | VOLUNTARY | | | |
| | | 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 LER (12) | | | | | | | | | | | | | | | |
| NAME STEVEN B. TIPPS, MANAGER NUCLEAR SAFETY AND COMPLIANCE | | | | | | | | | | TELEPHONE NUMBER AREA CODE 912 367-7851 | | | | | |
| COMPLETE ONE LINE FOR EACH FAILURE DESCRIBED IN THIS REPORT (3) | | | | | | | | | | | | | | | |
| CAUSE | SYSTEM | COMPONENT | MANUFAC-TURER | REPORT TO APRDS | CAUSE | SYSTEM | COMPONENT | MANUFAC-TURER | REPORT TO APRDS | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| SUPPLEMENTAL REPORT EXPECTED (14) | | | | | | | | | | EXPECTED SUBMISSION DATE (15) | | MONTH | DAY | YEAR | |
| <input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) | | | | | | | | | | <input checked="" type="checkbox"/> NO | | | | | |
| ABSTRACT (16) | | | | | | | | | | | | | | | |

On 7/22/92, Unit 2 was in the Run mode at a power level of 2372 CMWT (97 percent of rated thermal power) in an end-of-cycle coastdown. At that time, Corporate support personnel confirmed that the single failure or misoperation of an electrical circuit breaker in a balance of plant (BOP) switchgear could result in the plant conditions beyond those assumed in the licensing analysis.

Specifically, the single failure would result in a loss of power to 120/208 volt AC distribution panel 2R25-S023 and cause de-energization of the feedwater (FW) heater control circuitry. This would result in isolation of the turbine extraction steam to both trains of all FW heaters except one and could cause the final FW temperature to be reduced by 290 degrees F. The analysis for the loss of FW heating event assumes a final FW temperature reduction of only 100 degrees F. Analyses performed for a final FW temperature reduction of 290 degrees F indicates the local power level in the limiting fuel node could exceed the fuel design parameters. However, no Technical Specification Safety Limits would be exceeded.

The cause of the event was inadequate design. Since the affected system is not safety related, single failure criteria were not addressed during system design. Corrective action involved administratively reducing the MAPFACp correction factor curve. This correction factor reduces the value of the maximum average planar linear heat generation rate (MAPLHGR) limit to account for operation at less than rated thermal power. This adjustment will ensure that a 290 degree F reduction in final FW temperature would not result in exceeding any fuel design parameters. A design modification is being developed to segregate the power supplies to remove this single failure vulnerability.

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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 7/22/92, Unit 2 was in the Run mode at a power level of 2372 CMWT (97 percent of rated thermal power) in an end-of-cycle coastdown. At that time, the Corporate Core Analysis staff confirmed that a single failure or misoperation of a component in a balance of plant (BOP) system could result in transient conditions beyond those assumed in the fuel licensing analysis. A trip or operator error associated with breaker 8T on 208 volt switchgear 2A (MPL no. 2R23-S021) (EIIS Code EC) could result in the loss of 120 volt distribution panel 2R25-S023 (EIIS Code EC). This panel supplies power to the controls for the following feedwater (FW) heaters (EIIS Code SJ) for both trains A and B: 4th stage, 6th stage, 7th stage, 8th stage, and 12th stage. Controls for the 10th stage FW heaters would be unaffected. The "stage" designation identifies the heater based on the turbine stage from which the extraction steam is drawn. The loss of control power would result in a signal to close the extraction steam supply valves (EIIS Code SE) to all of these heaters. This interlock is designed to isolate the extraction steam supply lines on heater high water level to prevent water from backing up the lines and potentially causing turbine damage. The loss of FW heating event assumes a 100 degree F reduction in final FW temperature. The simultaneous loss of extraction steam to all of these heaters would result in a final FW temperature reduction of approximately 290 degrees F. A conservative analysis performed for this event indicates the local power level in the limiting fuel node could exceed design parameters. However, such an event would not result in the violation of any Safety Limit contained in the Technical Specifications.

CAUSE OF EVENT

The cause of this event was inadequate design. Since the affected system is not safety related, single failure criteria were not rigorously applied during system design. Therefore, the heater high level isolation logic was designed such that a single power supply failure could cause most of the heaters to lose their steam supply simultaneously.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This report is being voluntarily submitted because a condition was discovered which could have led to transient conditions beyond those assumed in the licensing analysis. An analysis of the postulated transient, loss of 5 of 6 FW heater stages, indicates a resultant final FW temperature reduction of

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approximately 290 degrees F. The licensing analysis performed for a loss of FW heating event assumed a FW temperature reduction of 100 degrees F.

Thermal limits in the Technical Specifications serve to regulate plant operations such that no Safety Limit will be violated during any postulated plant transient. They also serve to ensure that other fuel design parameters are not exceeded. These parameters are conservative indicators below which fuel damage will not occur. One of the transients evaluated is the loss of feedwater heating (LOFWH) event. As discussed in NEDO-24011-P-A (GESTAR-II), and as required by General Electric's technical design procedures, the LOFWH event assumes the plant is operating at full power and that the total reduction in FW temperature corresponds to the maximum number of FW heaters that can be tripped or bypassed as a result of a single malfunction of equipment or operator error. This event is analyzed to determine if it could be the limiting transient with respect to the minimum critical power ratio (MCPR) thermal limits. For Unit 2, the LOFWH transient was determined to not be one of the limiting events when the maximum temperature reduction was 100 degrees F.

Following the discovery that the temperature reduction during the LOFWH transient could be more severe than previously assumed, the fuel vendor (General Electric) re-analyzed the event assuming the FW temperature reduction was 290 degrees F. Although not required by GESTAR-II, this event was also analyzed at less than full power conditions. It was determined that at no time in the current cycle could this event have caused the violation of any Safety Limit. The calculations showed that the other fuel design parameters would have been exceeded for powers less than 100 percent but above 63 percent.

If breaker 8T on 208 volt switchgear 2A had been tripped or malfunctioned prior to implementing corrective actions, the probability of fuel damage would have been extremely low for the following reasons:

1. The unit has operated at high powers most of the time. At these power levels, a thermal power monitor scram would have prevented any violation of fuel design parameters. Therefore, the probability that this event would have occurred at a worse power condition was very low (probably less than 5 percent of the operating cycles).
2. The fuel design parameters are conservative relative to conditions where fuel damage would actually occur.
3. Plant procedures require immediate operator actions to decrease recirculation flow to reduce core power by at least 20 percent upon discovery of loss of FW heating. These actions would typically proceed much more rapidly than the temperature reduction.

Even though the probability of fuel damage was extremely low, as described above, the offgas system (Gaseous Radwaste System) would have controlled the release of radioactive gases to the atmosphere. The offgas system is provided with radiation monitors and in the event of high radiation, isolation valves are closed to prevent offgas flow to the main stack. Consequently, it is judged that this condition did not pose a risk to the health and safety of the public.

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TEXT

CORRECTIVE ACTIONS

The power dependent correction factor applied to the MAPLHGR limit to account for operation at less than rated thermal power is designated as MAPFACp. To avoid exceeding any fuel design parameters due to a severe LOFWH event during the rest of Cycle 10, the MAPFACp values were modified from 63 to 100 percent core thermal power. These values were incorporated into the process computer, and the Unit 2 Core Operating Limits Report is being revised.

The Unit 1 FW heater logic has been reviewed. This potential single failure vulnerability does not exist on Unit 1.

A design modification is being developed to segregate the power supplies such that this single failure vulnerability is removed. This modification will be implemented during the upcoming Unit 2 refueling outage which is currently scheduled to begin in mid-September 1992.

ADDITIONAL INFORMATION

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

No failed components were involved in this event.

There are no previous events similar to this event.