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Georgia Power
The Southern electric system

HL-2261
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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

PLANT HATCH - UNIT 1
NRC DOCKET 50-321
OPERATING LICENSE DPR-57
LICENSEE EVENT REPORT
AN APPARENT MANUFACTURER ERROR RESULTS IN A
REACTOR SCRAM ON TURBINE STOP VALVE CLOSURE

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 an apparent manufacturer error which resulted in a reactor scram on turbine stop valve closure. This event occurred at Plant Hatch - Unit 1.

Sincerely,

J. T. Beckham, Jr.

OCV/cr

Enclosure: LER 50-321/1992-014

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 (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 6

TITLE (4)
MANUFACTURER ERROR RESULTS IN A REACTOR SCRAM ON TURBINE STOP VALVE CLOSURE

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)
											0 5 0 0 0
0 5	2 2	9 2	9 2	0 1 4		0 0	0 6	1 9	9 2		0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11)			
POWER LEVEL	0 4 7	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	
B	T G	F L T	H 1 9 3	Y E S							

SUPPLEMENTAL REPORT EXPECTED (14)

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

ABSTRACT (16)

On 5/22/92 at 2326 CDT, Unit 1 was in the Run mode at a power level of 1138 CMWT (47% rated thermal power). At that time, the four Turbine Stop Valves (TSVs) unexpectedly closed causing a full scram on TSV closure per design. As expected, water level decreased immediately following the scram due to void collapse from the rapid reduction in power. Level decreased to instrument zero (158 inches above the top of the active fuel) before being recovered to and maintained at its normal level (37 inches above instrument zero) with the "A" Reactor Feedwater Pump. As water level decreased to below 12.5 inches above instrument zero, a Group 2 Primary Containment Isolation System signal was received on low water level per design. All Group 2 Valves closed; however, valve 1G11-F019 did not close within the Technical Specifications required time limit of 15 seconds. It took approximately 16 seconds to close.

The cause of the event was an apparent manufacturer error. Filters supplied for use in the Unit 1 Electrohydraulic Control (EHC) system were made of material apparently incompatible with EHC fluid. As a result, they failed, allowing foreign particles to enter the system. This caused the fine mesh strainer on the servovalve of TSV #2 to clog resulting in closure of the TSVs. The cause of valve 1G11-F019 not closing within its required time was apparently excessive stem friction from the packing. Corrective actions for this event include replacing the Unit 1 and Unit 2 EHC system filters with the correct type, replacing the Unit 1 EHC servovalve inlet screens, replacing a solenoid valve, lubricating the stem on valve 1G11-F019, increasing the surveillance frequency on valve 1G11-F019, and repacking the valve during the next outage in which Cold Shutdown is achieved.

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 5/22/92 at 2326 CDT, Unit 1 was in the Run mode at a power level of 1138 CMWT (47% rated thermal power). The unit was operating at a reduced power level because of problems with two of the three Unit 1 cooling towers. At that time, the four Turbine Stop Valves (TSVs, EIIS Code TA) unexpectedly closed causing a full reactor scram on TSV closure per design. Additionally, the End of Cycle Recirculation Pump Trip (EOC-RPT) breakers opened per design on TSV closure resulting in a trip of both Recirculation Pumps (EIIS Code AD).

As expected, reactor water level decreased immediately following the scram due to steam void collapse. Water level decreased to its minimum value of zero inches indicated (instrument zero, 158 inches above the top of the active fuel) before being recovered to and maintained at its normal level (37 inches above instrument zero) with the "A" Reactor Feedwater Pump (EIIS Code SJ). No Emergency Core Cooling Systems operated nor were any required to operate to recover or maintain water level.

During the reactor water level transient, as reactor water level decreased to 12.5 inches above instrument zero, a second full scram signal and a Group 2 Primary Containment Isolation System (PCIS, EIIS Code JM) signal were received on low reactor water level per design. All Group 2 Primary Containment Isolation Valves (PCIVs, EIIS Code JM) consequently closed.

Reactor pressure was adequately controlled with the Turbine Bypass Valves (EIIS Code SO). No Safety Relief Valves opened nor were any required to open to control reactor pressure.

At four minutes into the event (i.e., at 2330 CDT), reactor water level had been restored and stabilized and the scram signal was reset.

Subsequent review of the Safety Parameter Display System (SPDS, EIIS Code IQ) tape from the scram showed that PCIV 1G11-F019, a drywell equipment drain pump discharge valve, did not close within the Technical Specifications required time limit of 15 seconds. The SPDS tape and additional stroke timing of the valve showed that it took approximately 16 seconds to close. Consequently, at 0702 CDT, on 5/23/92, with Unit 1 in the Hot Shutdown condition, the valve was declared inoperable and the redundant PCIV in the same penetration, 1G11-F020, was closed per the requirements of Unit 1 Technical Specifications section 3.7.D.2.

The solenoid valve on PCIV 1G11-F019 was replaced and the valve stem was lubricated. The valve was then stroked and found to close in less than the required Technical Specification limit. It was declared operable on 5/23/92 at 2130 CDT.

CAUSE OF EVENT

The cause of the unexpected closure of the TSVs and the resulting scram was an apparent manufacturer error. In 1990, the manufacturer of filters supplied for use in the fluid reservoir recirculation and filtration subsystem of the Electrohydraulic Control (EHC, EIIS Code TG) system changed the material used in the filter. (The filters are ordered through a vendor using a vendor's part number. The failed filter was ordered by the vendor's part number, as usual, and was received from the vendor under the old part number. GPC, therefore, was not aware of the changes made by the filter's manufacturer.) The new material was apparently not compatible with the EHC fluid. As a result, after being in service for approximately six months, the filter deteriorated to the point of failure, thereby allowing foreign particles to get into the EHC system components.

One such component was the servovalve for TSV #2. The servovalve is an electrohydraulically operated valve that controls the hydraulic actuator of the TSV. The servovalve is designed such that on a loss of hydraulic fluid pressure to the servovalve, a closing bias spring causes the servovalve to direct hydraulic fluid away from the TSV actuator to a drain header. The TSV then would close on a loss of hydraulic fluid pressure to the actuator. In this event, particles from the failed filter material clogged the fine mesh strainer in the supply port of the servovalve for TSV #2. The resulting decrease in EHC fluid flow to the servovalve resulted in TSV #2 drifting closed. Since the position of the other three TSVs follows the position of TSV #2, they also drifted closed.

The cause of PCIV 1G11-F019 failing to close within its required time was apparently excessive friction between the valve stem and the valve packing. It was initially believed that the cause was a sticking solenoid valve associated with the 1G11-F019 valve air operator. Consequently, the solenoid valve was replaced. Additionally, the exposed portion of the valve stem was lubricated and then the valve was stroked in order to transfer some of the lubricant into the packing-to-stem interface (a routine preventive maintenance activity). Subsequent timing of the valve showed that it was closing within the the Technical Specification limit. In retrospect, however, after evaluating the stroke time history of the valve, it was concluded that the cause was most likely due to the valve packing causing excessive packing-to-stem friction and not due to a sticking solenoid valve. Specifically, previous stroke times of the valve showed that the valve stroke time increased by a step change after the valve was repacked in October of 1991 and has gradually increased since that time.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This report is required by 10 CFR 50.73(a)(2)(iv) due to the unplanned actuation of the Reactor Protection System (RPS, EIIS Code JC) and the Group 2 PCIS Engineered Safety Feature systems. RPS actuated per design when the TSVs drifted to less than 90 percent open with reactor power at greater than 30 percent CMWT. Also, as expected during the ensuing reactor water level transient, a second RPS actuation signal and a Group 2 PCIS isolation signal were received on low reactor vessel water level. One of the Group 2 PCIVs, 1G11-F019, did not function properly in that it exceeded its Technical Specification time limit for closing.

RPS automatically initiates a reactor scram to mitigate the consequences of transients and accidents and to ensure that the radioactive materials barriers, such as the fuel cladding and pressure system boundary are maintained. Closure of the TSVs with the reactor at power can result in the addition of a significant amount of positive reactivity to the core as the resultant reactor pressure increase collapses steam voids. Therefore, in anticipation of a reactor pressure increase and neutron flux increase, a scram is initiated when the TSVs are at less than 90 percent open with reactor power at greater than 30 percent. With respect to the core thermal-hydraulic limits, the scram on TSV closure provides additional margin to that provided by the high reactor pressure and high neutron flux scrams. Tripping the Recirculation pumps also provides additional margin by limiting the steam void collapse and thus the associated positive reactivity addition. The high pressure scram, in conjunction with the pressure relief system, is adequate to preclude overpressurizing the pressure system boundary; however, the TSV closure scram and the Recirculation pump trip provide additional margin.

PCIS provides timely protection against the onset and consequences of events involving the potential release of radioactive materials from the fuel and nuclear system process barriers by isolating, generally by the closure of two series and redundant isolation valves, appropriate lines which penetrate Primary Containment. Closure of the Group 2 PCIVs, initiated by a low reactor water level condition, prevents the escape of radioactive material from Primary Containment through process lines.

In this event, the TSVs closed when the fine mesh strainer on the servovalve for TSV #2 became clogged. RPS actuated on TSV closure, per design, resulting in a reactor scram. In addition, the EOC-RPT breakers opened as a result of the TSV closure, causing both recirculation pumps to trip. The reactor water level decreased as expected due to steam void collapse, causing a second RPS actuation signal and a Group 2 PCIS isolation signal on low reactor water level. The "A" Reactor Feedwater Pump responded per design to limit the drop in water level and to recover it to, and maintain it at, the normal level. At no time was water

level less than 158 inches above the top of the active fuel. No Emergency Core Cooling Systems actuated nor were any required to actuate to restore or maintain water level.

All Group 2 PCIVs closed. However, valve 1G11-F019 took about one second longer to close than allowed by Unit 1 Technical Specifications Table 3.7-1. The redundant PCIV for the associated penetration, PCIV 1G11-F020, did close within the required time, isolating the penetration as required.

Based on the above discussion, it is concluded that this event had no adverse impact on nuclear safety. This analysis is applicable to all power levels.

CORRECTIVE ACTIONS

The Unit 1 and Unit 2 EHC system fluid reservoir recirculation and filtration subsystem filters were replaced with filters made of materials compatible with the EHC fluid. (The installed Unit 2 filters had the same material as the Unit 1 filters. Although they had not yet failed, they did show some signs of deterioration after being in service only approximately six weeks.) The remaining filters in warehouse stock were placed on hold and have been returned to the vendor.

The fine mesh strainers on the Unit 1 EHC system servovalves were replaced, including those for TSV #2 (the other three TSVs do not have servovalves), the four Turbine Control Valves, the two Combined Intercept Valves, and the three Turbine Bypass Valves.

The EHC fluid in the Unit 1 EHC system reservoir was removed and the reservoir was filled with new fluid.

The solenoid valve on PCIV 1G11-F019 was replaced and the valve stem was lubricated as previously mentioned. The valve was then stroked and found to close in less than the required Technical Specification limit Since this valve is the inboard primary containment isolation valve, the packing cannot be replaced unless the plant is in Cold Shutdown. Consequently, the condition will be investigated and corrected during the next outage in which Cold Shutdown is achieved. In the interim, the valve surveillance frequency will be increased from once per quarter to once every two weeks. Additionally, the valve stem will be cleaned and lubricated following each surveillance.

ADDITIONAL INFORMATION

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

Failed Component Information:

Master Parts List Number: 1N32-D005
Manufacturer: Hilliard Corporation
Model Number: PL-310-12-BC
Type: Filter
Manufacturer Code: H193
EIIS System Code: TG
Reportable to NPRDS: Yes
Root Cause Code: B
EIIS Component Code: FLT

There have been no reportable events in the last two years in which unplanned Engineered Safety Feature system actuations have occurred because of component failures caused by manufacturer errors.