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Georgia Power
the southern electric system

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Docket No. 50-321

HL-3236
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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Edwin I. Hatch Nuclear Plant - Unit 1
Licensee Event Report
Loss of Condenser Vacuum
Results in Unplanned Manual Scram

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 loss of main condenser vacuum which resulted in an unplanned manual scram and a group 2 primary containment isolation. This event occurred at Plant Hatch Unit 1.

Sincerely,

J. T. Beckham, Jr.

OCV/cr

Enclosure: LER 50-321/1993-001

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

JE22

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 5

TITLE (4)
LOSS OF CONDENSER VACUUM RESULTS IN UNPLANNED MANUAL SCRAM AND GROUP 2 PRIMARY CONTAINMENT ISOLATION

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 3	1 6	9 3	9 3	0 0 1	0 0	0 4	0 8	9 3		0 5 0 0 0

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

OPERATING MODE (9)	1											
POWER LEVEL	0 3 6		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	MANUFAC-TURER	REPORT TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORT TO NPRDS	
X	T C	T R P	Y 0 1 0	N							

SUPPLEMENTAL REPORT EXPECTED (14)

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

ABSTRACT (16)

On 3/16/93 at 0812 CST, Unit 1 was in the Run mode at a power level of 877 CMWT (36% rated thermal power). At that time, Operations personnel manually scrammed the reactor in response to decreasing main condenser vacuum. Vacuum began decreasing approximately 45 minutes prior to the manual scram. Operations personnel noted the decrease and investigated possible causes. They also lowered reactor power from 1267 CMWT (52% rated thermal power) to 877 CMWT in an attempt to stop the decrease. However, vacuum continued to decrease and, with vacuum at 23.2 inches Hg, the reactor was manually scrammed to avoid an automatic scram and a trip of the Reactor Feedwater Pumps on low condenser vacuum. Reactor water level decreased to two inches above instrument zero (160 inches above the top of the active fuel) immediately following the scram due to void collapse from the rapid reduction in power before being recovered with the "A" Reactor Feedwater Pump. As water level decreased to below 12.5 inches above instrument zero, a Group 2 Primary Containment Isolation signal was received on low (Level 3) water level per design. All Group 2 isolation valves closed; however, valve 1G11-F019 did not close within the required time of 15 seconds.

The loss of vacuum was apparently caused by component failure. The steam trap in the condensate drain line for the Unit 1 steam packing exhauster apparently stuck in the open position. This created an air inleakage flow path to the main condenser. The inleakage flow rate exceeded the capacity of the main condenser steam jet air ejector; therefore, vacuum decreased. The cause of valve 1G11-F019 not closing within its required time was apparently excessive stem friction from its packing. Corrective actions for this event include rebuilding the steam trap, repacking valve 1G11-F019, and rebuilding its actuator.

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 3/16/93 at 0812 CST, Unit 1 was in the Run mode at a power level of 877 CMWT (36% rated thermal power). At that time, licensed Operations personnel manually scrammed the reactor in response to steadily decreasing main condenser (EIIS Code SQ) vacuum. Main condenser vacuum began decreasing from its normal value of 28.5 inches Hg approximately 45 minutes prior to the manual scram. Operations personnel noted the decrease in vacuum and investigated possible causes. This included checking various areas of the plant (e.g., condenser bay, moisture separator/reheater drain tanks) for inleakage paths and verifying proper operation of the circulating water system and the main condenser steam jet air ejector (EIIS Code SH). No problems were found in these areas or with this equipment. They also lowered reactor power from 1267 CMWT (52% rated thermal power) to 877 CMWT in an attempt to stop the decrease in vacuum. However, main condenser vacuum continued to decrease and, with vacuum at 23.2 inches Hg, the reactor was manually scrammed.

The manual scram was initiated as a conservative action to avoid an automatic scram which would have occurred from Turbine Stop Valve and Turbine Control Valve fast closure, had the main turbine (EIIS Code TA) tripped on low condenser vacuum (22.3 inches Hg). Immediately after the scram, vacuum increased to approximately 25.5 inches Hg because noncondensible gasses (e.g., disassociated hydrogen and oxygen) entrained in the turbine exhaust steam were no longer entering the condenser. Therefore, the manual scram also prevented the loss of the Reactor Feedwater Pumps (EIIS Code SJ) which also trip on low condenser vacuum.

Reactor water level decreased from its normal level of 37 inches above instrument zero (195 inches above the top of the active fuel) to two inches above instrument zero immediately following the scram due to void collapse from the rapid reduction in power. Water level was recovered to and maintained at or above its normal level with the "A" Reactor Feedwater Pump. No Emergency Core Cooling Systems actuated nor were any required to actuate to recover or maintain reactor water level.

As water level decreased to below 12.5 inches above instrument zero, another scram signal and a Group 2 Primary Containment Isolation System (PCIS, EIIS Code JM) signal were received on low (Level 3) reactor water level per design. All Group 2 PCIS isolation valves closed; however, subsequent review of the Safety Parameter Display System (EIIS Code IQ) computer tape from the scram revealed that valve 1G11-F019, the inboard drywell equipment drain sump pump discharge isolation valve, did not close within the Unit 1 Technical Specifications

required time limit of 15 seconds. It took approximately 16 seconds to close. The outboard isolation valve, 1G11-F020, closed in eight seconds; therefore, the affected primary containment penetration was isolated within the required time.

Reactor pressure was controlled with the Turbine Bypass Valves (EIIS Code SO) and did not exceed its pre-scram value of 940 psig. No Safety Relief Valves opened nor were any required to open to control reactor pressure.

The scram was reset at 0847 CST. At that time, the unit was in the Hot Shutdown condition with reactor water level greater than 30 inches above instrument zero and reactor pressure below 825 psig.

CAUSE OF EVENT

The loss of vacuum was apparently caused by component failure. The steam trap, 1N22-D014, in the three-inch condensate drain line from the in-service Unit 1 steam packing exhauster (EIIS Code TC) apparently stuck in the open position. This created an air inleakage flow path to the main condenser. The inleakage flow rate exceeded the capacity of the main condenser steam jet air ejector; therefore, vacuum decreased.

The cause of valve 1G11-F019 not closing within its required time was apparently excessive packing-to-stem friction. 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, an Engineered Safety Feature system. The RPS actuated from a manual scram signal initiated by licensed Operations personnel in response to decreasing main condenser vacuum. The manual scram was initiated prior to receipt of an automatic scram which would have occurred from Turbine Stop Valve and Turbine Control Valve fast closure, had the main turbine tripped on low condenser vacuum (22.3 inches Hg). As expected, reactor water level decreased following the manual scram due to void collapse from the rapid decrease in reactor power. This resulted in a second RPS actuation signal and a Group 2 PCIS isolation signal on low (Level 3) reactor water level. One of the Group 2 PCIS isolation valves, 1G11-F019, did not function properly in that it exceeded its Technical Specifications time limit for closing.

To protect the main condenser from damage due to an overpressure condition, the main turbine is designed to trip on loss of condenser vacuum. This prevents the further introduction of noncondensible gasses entrained in the turbine exhaust steam and the aggravation of the loss of vacuum condition.

The Primary Containment Isolation System 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 PCIS isolation valves, initiated by a low reactor water level condition, prevents the escape of radioactive material from the primary containment through process lines.

In this event, failure of a steam trap in a condensate drain line to the "B" main condenser shell created a flow path for noncondensible gasses to reach the main condenser. The flow rate of the noncondensible gasses was greater than the ability of the steam jet air ejector to remove them. Therefore, vacuum decreased as the volume of noncondensible gasses increased and began to pressurize the condenser. As vacuum approached the main turbine trip setpoint, and the cause of the decreasing vacuum could not be found, the reactor was manually scrammed. This prevented the loss of the Reactor Feedwater Pumps, which also trip on low condenser vacuum, maintaining them available to control the water level transient which occurs following a scram.

Reactor water level decreased as expected due to void collapse from the rapid reduction in power. This resulted in 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 recover reactor water level. Consequently, at no time was water level less than 160 inches above the top of the active fuel. No Emergency Core Cooling Systems actuated nor were any required to actuate.

All Group 2 PCIS isolation valves closed. However, valve 1G11-F019 took approximately one second longer to close than allowed by Unit 1 Technical Specifications Table 3.7-1. The redundant isolation valve for the associated penetration, 1G11-F020, closed in eight seconds thereby isolating the applicable primary containment penetration within the required time limit.

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

Steam trap 1N22-D014 will be rebuilt per Maintenance Work Order 1-91-7740 prior to startup from the current Unit 1 refueling outage.

Valve 1G11-F019 will be repacked, and its actuator rebuilt, per Maintenance Work Order 1-92-1784 prior to startup from the current Unit 1 refueling outage.

ADDITIONAL INFORMATION

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

Failed Component Information:

Master Parts List Number: 1N22-D014
Manufacturer: Yarway
Model Number: 40 FL
Type: Impulse Steam Trap
Manufacturer Code: Y010
EIIS System Code: TC
Reportable to NPRDS: No
Root Cause Code: X
EIIS Component Code: TRP

There have been no reportable events in the last two years in which the reactor scrammed or had to be scrammed as a result of a loss of condenser vacuum.

Failure of valve 1G11-F019 to isolate within its required time was reported in Licensee Event Report 50-321/1992-014 dated 6/19/92. In that event, the valve also took 16 seconds to close following receipt of a Group 2 PCIS isolation signal. This problem was caused by excessive packing-to-stem friction forces. Since the valve is an inboard valve, its packing could not be replaced until the unit was in a Cold Shutdown condition. Interim actions were initiated to ensure the valve would function properly until its packing could be replaced. These interim actions, which consisted of stroking and lubricating the valve every two weeks, apparently were successful in ensuring the valve would close in less than 15 seconds. In fact, the valve was stroked on 3/3/93 and its closure time was 14.56 seconds. The valve was stroked and lubricated at least 18 times between 6/19/92 and the date of this event. The valve consistently closed in less than the required 15 seconds. Therefore, it is concluded that the interim actions, including their frequency, were adequate to provide reasonable assurance the valve was operable.