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SOUTHERN COMPANY
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March 26, 2002

Docket No. 50-321

HL-6211

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

Edwin I. Hatch Nuclear Plant - Unit 1
Licensee Event Report
Manual Reactor Scram Inserted Because of
High Hydrogen Content in the Off Gas System

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv), Southern Nuclear Operating Company is submitting the enclosed Licensee Event Report (LER) concerning a manual reactor scram inserted because of high hydrogen content in the off gas system.

Respectfully submitted,

Lewis Sumner

H. L. Sumner, Jr.

OCV/eb

Enclosure: LER 50-321/2002-001

cc: Southern Nuclear Operating Company
Mr. P. H. Wells, Nuclear Plant General Manager
SNC Document Management (R-Type A02.001)

U.S. Nuclear Regulatory Commission, Washington, D.C.
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NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 7/31/2004
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1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Edwin I. Hatch Nuclear Plant - Unit 1	05000-321	1 OF 5

4. TITLE
Manual Reactor Scram Inserted Because of High Hydrogen Content in the Off Gas System

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) 05000
02	08	2002	2002	001	0	03	26	2002	FACILITY NAME	DOCKET NUMBER(S) 05000

9. OPERATING MODE: 1

10. POWER LEVEL: 27

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	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) 367-7851

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
X	WF	LSV	L087	Yes					
X	WF	LS	R290	Yes					

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

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

On 02/08/2002, at 2252 EST, Unit 1 was in the Run mode at 27% rated thermal power (746 CMWt). At that time, the Reactor Protection System (RPS) was manually actuated to facilitate placing the Main Condenser mechanical vacuum pump in service. Prior to the reactor shutdown, on 02/08/2002, at approximately 2100 EST, degraded operation of the Main Condenser Off Gas Recombiner System had resulted in high hydrogen in the Off Gas. Procedure 34AB-N62-001-1S (FAILURE OF RECOMBINER AND CONTROL OF SUSTAINED COMBUSTION IN THE OFF GAS SYSTEM) was entered at about 2100 EST and licensed personnel proceeded to reduce reactor power from 100 percent rated thermal power beginning at about 2105 EST. Per the procedure, the in-service Steam Jet Air Ejector was removed from service at about 2200 EST due to Off Gas Hydrogen concentration reaching approximately 4%. Unit 1 was scrammed to facilitate placing the mechanical vacuum pump in service for maintaining the Main Condenser as the heat sink. The lowest Reactor Water Level during the scram was approximately 165 inches above the top of the active fuel (7 inches above instrument zero) this was above any ESF actuation settings. Therefore, no automatic ESF actuations were received and none were required. There was no Reactor Pressure increases during the scram. Reactor pressure following the reactor shutdown did not exceed the pre-event level of 1035 psig.

The cause of the event was component failures that resulted in blocked drain lines in the off gas system. The blocked drain lines caused the recombining action to degrade resulting in high hydrogen in the off gas system. Corrective actions included restoring the off gas system drain lines.

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor
Energy Industry Identification System codes appear in the text as (EIIS Code XX).

DESCRIPTION OF EVENT

On 02/08/2002, at 2252 EST, Unit 1 was in the Run mode at 746 CMWT (27 percent rated thermal power). At that time, the Reactor Protection System (RPS, EIIS Code JC) was manually actuated to maintain the Main Condenser (EIIS Code Q) as the heat sink.

At 2252 EST on February 8, 2002 the reactor was scrammed at approximately 27% RTP and the Main Turbine subsequently tripped. Per off gas system recorder 1N62R602 the point 1 temperature in the Recombiner 1N62A001A began falling from 320°F to 220°F between 1700 EST and 1730 EST. Between 1700 EST and 1900 EST both points 2 and 3 began falling from 600°F to 400°F on the same recorder 1N62R602. At 1930 EST point 2 had fallen to 220°F and Off Gas Hydrogen levels began increasing per recorder1N62R603 at 1935 EST. At 2045 EST point 3 had fallen to 220°F. Per GE SIL 150 Revision 2 Supplement 3, the minimum temperature of 250°F must be maintained to have a dry catalyst surface for gas to gas catalyst contact and to have an adequate catalyst reaction rate constant in the Recombiner. At 2045 EST operators were directed to drain the Preheater (1N62B001A, EIIS Code WF) and to check the Electric Boiler (1N62D530, EIIS Code WF) with the purpose of correcting the problems associated with the Recombiner. Operators found the Electric Boiler, (EIIS Code WF) flooded and pressurized to about 280 psig.

At about 2100 EST procedure 34AB-N62-001-1S (FAILURE OF RECOMBINER AND CONTROL OF SUSTAINED COMBUSTION IN THE OFF GAS SYSTEM) was entered and a power reduction began at 100% RTP at about 2105 EST. The Steam Jet Air Ejector (SJAE, EIIS Code SH) was removed from service at about 2200 EST due to Off Gas Hydrogen concentration reaching approximately 4%. Unit 1 was scrammed to facilitate placing the Main Condenser mechanical vacuum pump in service for maintaining the Main Condenser as the heat sink. The lowest Reactor Water Level during the scram was approximately 7 inches above instrument zero and since that level was above any Engineered Safety Features (ESF) actuation settings, none were received.

The RPS actuation resulted in a rapid insertion of all control rods. As expected, following a reactor scram, void collapse occurred in the reactor core region resulting in a reduction of reactor water level. The lowest level reached during the transient was seven inches above instrument zero (165 inches above the top of the active fuel). The "B" Reactor Feedwater Pump (RFP, EIIS Code SJ) restored water level to normal. Additionally, the reactor pressure did not exceed the pre-event level of 1035 psig.

CAUSE OF EVENT

This event was the result of component failures. There are six drain lines on the Off Gas system (EIIS Code WF) between the third stage Steam Jet Air Ejector and Catalytic Recombiners (1N62A001A and 1N62A001B). One of these drain lines is unique to the Catalytic Recombiner 1N62A001B that was not in service during this event. The drain line that is unique to the Catalytic Recombiner 1N62A001A that was in service was functioning as designed. However, the four drain lines on the Off Gas system between the third stage Steam Jet Air Ejector and the Preheater (1N62B001A) were isolated due to various component failures. Each one of these drain lines has a drain pot that fills with water that actuates a level switch that in turn actuates a one inch solenoid operated valve to open and drain the line. Per the GE SIL 150 Revision 2 Supplement 1, "the system is designed to provide superheated (dry) steam to the recombiner. If the steam entering the recombiner is wet, water collects on the catalyst, inhibiting the recombining action. This results in an uncombined hydrogen/oxygen mixture passing through the recombiner with a constant increase in the hydrogen concentration in the system downstream from the recombiner." Per GE SIL 150 Revision 2 Supplement 3, "smaller sized drains are susceptible to plugging, thereby causing loss of recombination due to catalyst wetting." Although the Unit 1 drain lines are only one inch in diameter and the SIL recommends two inches, plugging was not the cause of this event. However, four of the five drain lines became isolated which resulted in the same consequences as a plugged line.

One drain line (containing valve 1N62F133A) was concluded to be isolated due to the solenoid valve being in the de-energized closed position and unable to open prior to the event. Two of the drain lines (containing valves 1N62F133B and 1N62F015A) were concluded to be isolated due to their solenoid valves being in the de-energized closed position and unable to open prior to the event and the inability of the valves' level switches (1N62N057B and 1N62N056A) to actuate at the appropriate setpoint. One drain line (containing valve 1N62F015B) was concluded to be isolated due to the inability of the valve's level switch (1N62N056B) to actuate at the appropriate setpoint.

One drain line (containing valve 1N62F126A) was concluded to be open and draining as required prior to the event.

REPORTABILITY AND SAFETY ASSESSMENT

This report is required pursuant to 10 CFR 50.73(a)(2)(iv) because a condition occurred which required a manual actuation of an engineered safety feature. Specifically, the Reactor Protection System was manually actuated as a conservative action that was not part of a pre-planned normal reactor shutdown.

The Reactor Protection System is designed to automatically shutdown the reactor by rapidly inserting the control rods into the reactor core when sensed parameters exceed predetermined setpoints. One of the parameters sensed is a Main Turbine trip or Turbine Stop Valve (TSV, EIIS Code TA) closure at greater than a nominal 28 percent rated thermal power. A trip of the Main Turbine (i.e., closure of the TSVs) with the reactor at power results in a reactor pressure transient and a reactivity transient. The reactor pressure vessel and the reactor core are designed with ample margin to withstand these transients; however, when a turbine trip is anticipated conservative actions should be taken to manually shut down the reactor to avoid or lessen the transient. An automatic trip of the Main Turbine occurs on Main Condenser low vacuum to preclude damage to the Main Turbine and the Main Condenser due to an over-pressure condition.

In this event, an automatic turbine trip was not imminent; however, the RPS was manually initiated to facilitate placing the mechanical vacuum pump in service, thus preserving the main condenser as a heat sink. The reactor

pressure remained at the pre-event level of 1035 psig. As expected following the scram, void collapse occurred in the reactor core region resulting in a reactor water level transient. The lowest level reached during the transient was seven inches above instrument zero (165 inches above the top of the active fuel) before level was restored by the "B" RFP. Therefore, the reactor pressure vessel was not subjected to any abnormal pressure transients and the fuel was adequately covered during the event.

Based on this analysis, it is concluded that this event did not adversely impact nuclear safety.

CORRECTIVE ACTIONS

The 1N62F133A and 1N62F133B solenoid valves were replaced. The 1N62F015A solenoid coil was replaced. The 1N62N056B level switch for the 1N62F015B drain line was repaired. The 1N62N056A and 1N62N057B level switches for the 1N62F015A and 1N62F133B drain lines will be replaced during the spring 2002 refueling outage.

An interim corrective action has been established to require manually stroking the drain valves open with the control switch periodically (four of the six valves are stroked daily and two of the six drain valves are stroked weekly). An evaluation of the system will be performed to determine the reliability of the drain lines and the components associated with the drain lines by 6/01/2002. This evaluation will determine if the interim actions will continue to be necessary.

ADDITIONAL INFORMATION

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

There were no previous similar events in the last two years in which the reactor was manually scrammed because of Hydrogen concentration in the off gas system.

Master Parts List Number: 1N62F133A and 1N62F133B
Type: Offgas Preheater Drain Solenoid Valves
Manufacturer: Laurence
Vendor Code (VPN): L087
EIIS System Code: WF
EIIS Component Code: SLV
Root Cause Code: X
Reportable to EPIX: Yes

Master Parts List Number: 1N62F015A
Type: Offgas Preheater 1A Shell Drain Solenoid Valve
Manufacturer: Laurence
Vendor Code (VPN): L087
Model: 506WA44PSSWS
EIIS System Code: WF
EIIS Component Code: LSV
Root Cause Code: X
Reportable to EPIX: Yes

Master Parts List Number: 1N62N056A and 1N62N056B
Type: Offgas Preheater 1B Shell Drain Float Level Switches
Manufacturer: Robertshaw
Vendor Code: R290
Model: SL-326-A1X
EIIS System Code: WF
EIIS Component Code: LS
Root Cause Code: X
Reportable to EPIX: Yes

Master Parts List Number: 1N62N057B
Type: Condensate In Process line Float Level Switch
Manufacturer: Robertshaw
Vendor Code: R290
Model: SL-326-A2X
EIIS System Code: WF
EIIS Component Code: LS
Root Cause Code: X
Reportable to EPIX: Yes