Tom Tynan
Vice President - Vogtle

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SOUTHERN COMPANY
Energy to Serve Your World℠

June 15, 2007

NL-07-1264

Docket No.: 50-425

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Vogtle Electric Generating Plant – Unit 2
Licensee Event Report 2-2007-002
Unit 2 Main Generator tripped resulting in an automatic reactor trip

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73, Southern Nuclear Operating Company (SNC) is submitting the enclosed Licensee Event Report concerning Unit 2 main generator trip resulting in an automatic reactor trip.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

T. E. Tynan

T. E. Tynan
Vice President – Vogtle
Vogtle Electric Generating Plant
7821 River Road
Waynesboro, GA 30830

TET/DRB/mfk

Enclosure: LER 2-2007-002

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. D. H. Jones, Vice President – Engineering
RType: CVC7000

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. B. K. Singal, NRR Project Manager – Vogtle
Mr. G. J. McCoy, Senior Resident Inspector - Vogtle

Enclosure
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NRC FORM 366 (6-2004)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB: NO. 3150-0104	EXPIRES: 06/30/2007
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)		Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.	

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE

Unit 2 Main Generator tripped, resulting in an automatic reactor trip

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
04	23	2007	2007	002	00	6	15	2007	FACILITY NAME	DOCKET NUMBER(S) 05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
1		20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(i)(C)		50.73(a)(2)(vii)
		20.2201(d)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(A)
		20.2203(a)(1)		20.2203(a)(4)		50.73(a)(2)(ii)(B)		50.73(a)(2)(viii)(B)
		20.2203(a)(2)(i)		50.36(c)(1)(i)(A)		50.73(a)(2)(iii)		50.73(a)(2)(ix)(A)
10. POWER LEVEL		20-2203(a)(2)(ii)		50.36(c)(1)(ii)(A)	X	50.73(a)(2)(iv)(A)		50.73(a)(2)(x)
		20-2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(v)(A)		73.71(a)(4)
54		20.2203(a)(2)(iv)		50.46(a)(3)(ii)		50.73(a)(2)(v)(B)		73.71(a)(5)
		20.2203(a)(2)(v)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(C)		OTHER
		20.2203(a)(2)(vi)		50.73(a)(2)(i)(B)		50.73(a)(2)(v)(D)		Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
David R. Bowles, Performance Analysis	(706) 826-3767

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	[redacted]	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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

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

On April 23, 2007, at 1024 EDT, Unit 2 experienced an automatic reactor trip from approximately 54% power during power ascension following completion of refueling outage 2R12. The main generator neutral overcurrent relay actuated resulting in a Generator/Turbine/Reactor trip. The post-trip investigation revealed that a ground fault had occurred on the main generator 'A' phase bushing. The bushing fault was a result of stator water leaking out of the tang area of the main generator 'A' phase bushing and saturating the bushing insulation. The wet insulation provided the ground fault path that caused the main generator neutral overcurrent relay to actuate.

Investigation determined that the primary cause of this event was the design of the main generator bushing tang assembly due to it being a cast copper component utilizing a braze material that is susceptible to crevice corrosion. Prior to restart, the leak was repaired in the main generator 'A' phase bushing tang assembly, a helium tracer gas test was performed on all three main generator tang assemblies, and the Generator Gas System operating procedure was revised to ensure main generator hydrogen pressure is maintained at a higher pressure than stator water.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
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17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

A. REQUIREMENT FOR REPORT

10 CFR 50.73 (a)(2)(iv)(A) requires this report because an unplanned actuation of the reactor protection system (RPS) occurred.

B. UNIT STATUS AT TIME OF EVENT

At the time of this event, Unit 2 was in Mode 1 (Power Operation) at approximately 54% rated thermal power during power ascension following completion of refueling outage 2R12. Other than that described herein, there was no inoperable equipment that contributed to the occurrence of this event.

C. DESCRIPTION OF EVENT

On April 23, 2007, at 1024 EDT, Unit 2 experienced an automatic reactor trip from approximately 54% power during power ascension following completion of refueling outage 2R12. The main generator neutral overcurrent relay actuated resulting in a Generator/Turbine/Reactor trip. All safety related systems responded as designed, and the plant was stabilized in Mode 3. The NRC Operations Center was notified of this event on April 23, 2007 at 1125 EDT.

Investigation of the event revealed that a ground fault had occurred as a result of stator water leaking out of the tang area of the main generator 'A' phase bushing and saturating the bushing insulation. The wet insulation provided the ground fault path. The fault started tracking through the wet insulation and carbonized the path, which then led to increased tracking and eventually reaching a level which caused the main generator neutral overcurrent relay to actuate. This caused a lockout relay to actuate which resulted in a Generator/Turbine/ Reactor trip.

D. CAUSE OF EVENT

Investigation determined that the primary cause of this event was the design of the main generator bushing tang assembly due to the use of a cast copper tang assembly and braze material that is susceptible to crevice corrosion. The bushing tang connects the bushing to the phase connection. The tang is water cooled along with the remainder of the bushing assembly. The leak locations were at the top of the tang where a rectangular plate was brazed to the cast tang assembly. Possible causes of the leak include crevice corrosion, porosity in the copper casting, or a bad braze. The various other joints in the bushing assembly are field brazed. All the brazed connections in the main generator utilize the same braze process.

To compensate for this design susceptibility, operating procedures should have required the main generator hydrogen pressure to be maintained at a higher pressure than stator water. This operating strategy was not a requirement of the original design but was a result of stator water leaks encountered in the industry. The procedure changes recommended by GE Technical Information Letter (TIL) 1098, "Inspection of Generators with Water Cooled Stator Windings" in May, 1991 were implemented into the operating procedures. However, revisions made to the operating procedures in 2001 relaxed these requirements by allowing the main generator

hydrogen pressure to be at a lower pressure than stator water for short periods of operation (i.e. less than one week).

The 2R12 refueling outage did not include any significant main generator maintenance activities. A major factor in this event was that stator cooling was run for approximately 7 hours after the main generator was degassed at the beginning of 2R12 refueling outage. Given the leaks in the bushing tang, these 7 hours of stator cooling operation would have allowed the insulation to become saturated. Since this connection is taped and epoxy coated, it would not have dried out appreciably during the 2R12 refueling outage. Once the unit was started up from 2R12, current started tracking through the wet insulation, carbonizing the path, which eventually resulted in the electrical fault to ground on the 'A' phase bushing.

E. ANALYSIS OF EVENT

The Reactor Protection System (RPS) is designed to generate a reactor trip signal due to a generator / turbine trip when the reactor is operating above the P-9 permissive. When the main generator neutral overcurrent relay actuated, the RPS functioned as designed to trip the reactor. All safety related systems responded as designed, and the plant was stabilized in Mode 3. Based on these considerations, there was no adverse effect on plant safety or on the health and safety of the public as a result of this event.

This event does not represent a safety system functional failure.

F. CORRECTIVE ACTIONS

1. The leak in the 'A' phase bushing tang assembly was repaired prior to restart.

2. Helium tracer gas testing was performed on all three bushing tang assemblies prior to restart.

3. Stator Cooling System and Generator Gas System operating procedures have been revised to include the appropriate guidance to prevent water intrusion into the main generator from stator cooling in the event of a leak.

G. ADDITIONAL INFORMATION

1) Failed Components:
None

2) Previous Similar Events:
None

3) Energy Industry Identification System Codes:
Main Generator System – TB
Main Generator Stator Cooling System – TJ