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April 27, 2011

Docket Nos.: 50-424

NL-11-0628

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

Vogtle Electric Generating Plant-Unit 1  
Licensee Event Report 2010-001-01  
Breaker Failure Results in 1B Train Containment Cooling  
System Being Declared Inoperable

Ladies and Gentlemen:

In accordance with the requirements of 10CFR50.73(a)(2)(i)(B) Southern Nuclear Operating Company (SNC) is submitting a revised Licensee Event Report (LER) concerning the breaker failure that resulted in the 1B train Containment Cooling system being declared inoperable. Subsequent statistical analysis performed by the breaker vendor found that on a few occasions, given the right stack up of tolerances, the screw that holds a plastic cover in place could contact the breaker closing mechanism. Additionally, the due date for implementing a permanent change that would ensure the screw, that holds the cover in place, could not contact the closing mechanism, was extended. Lastly, the event date on the LER cover sheet was corrected. These three items necessitated the revision to the LER.

This letter contains no NRC commitments. If you have any questions, please contact Doug McKinney at (205) 992-5982.

Respectfully submitted,

A handwritten signature in black ink that reads "T. E. Tynan". The signature is written in a cursive style with a large initial "T".

T. E. Tynan  
Vice President – Vogtle

TET/TMH/kss

Enclosure: Unit 1 Licensee Event Report 2010-001-01

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cc: Southern Nuclear Operating Company  
Mr. J. T. Gasser, Executive Vice President  
Mr. T. E. Tynan, Vice President – Vogtle  
Ms. P. M. Marino, Vice President – Engineering  
RType: CVC7000

U. S. Nuclear Regulatory Commission  
Mr. V.M. McCree, Regional Administrator  
Mr. P. G. Boyle, NRR Project Manager - Vogtle  
Mr. M. Cain, Senior Resident Inspector – Vogtle

**Enclosure**  
**Vogtle Electric Generating Plant-Unit 1**  
**Licensee Event Report 2010-001-01**  
**Breaker Failure Results in 1B Train Containment Cooling**  
**System Being Declared Inoperable**

**LICENSEE EVENT REPORT (LER)**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (1-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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.

<b>1. FACILITY NAME</b> Vogtle Electric Generating Plant - Unit 1	<b>2. DOCKET NUMBER</b> 05000 424	<b>3. PAGE</b> 1 OF 5
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**4. TITLE**  
Breaker Failure Results in 1B Train Containment Cooling System Being Declared Inoperable

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	26	2010	2010	- 001 -	01	04	27	2011		05000
									FACILITY NAME	DOCKET NUMBER
										05000

<b>9. OPERATING MODE</b>  I	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)</b>									
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
<b>10. POWER LEVEL</b>  100	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER						
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A						

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME Vogtle Electric Generating Plant/Mark Hickox, Principal Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 706-826-4129
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**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
B	BK	BKR	B455	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>			<b>15. EXPECTED SUBMISSION DATE</b>		
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)			<input checked="" type="checkbox"/> NO		
	MONTH	DAY	YEAR		

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

During an attempted start of one of the four required 1B train containment cooling fans in low speed on October 24, 2010, the fan failed to start. Subsequent troubleshooting revealed that the failure of the fan to start was due to a malfunction of the 480 volt breaker that provides power to the fan motor low speed winding. Based upon the investigation performed, it was determined the breaker had been rendered incapable of closing since September 26, 2010. This was the last time the breaker had been closed and the containment cooling fan had operated in low speed satisfactorily. Consequently, the 1B train of Containment Cooling was Inoperable for approximately 28 days from September 26, 2010 until the failure was discovered on October 24, 2010.

Investigation into the breaker failure determined that the cause was due to a screw, that holds a molded plastic cover in place, being inserted too deep. This ultimately led to the screw binding the breaker closure mechanism. Corrective actions included temporarily removing this same screw on other similar breakers to ensure this type of failure could not occur. A design change is planned to provide permanent resolution to this issue.

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CONTINUATION SHEET**

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**NARRATIVE**

**A. REQUIREMENT FOR REPORT**

The Containment Cooling system [BK] at Vogtle Electric Generating Plant is comprised of two trains, each of sufficient capacity to supply 100 percent of the design cooling requirement. Each train is comprised of four fan units. Each fan unit has two speeds of operation, high speed for normal operation and low speed for post-accident operation. Each fan motor has two separate windings (one high speed and one low speed), that are powered from separate breakers. During normal operation four fan units are running in high speed. In post accident operation following an actuation signal, the Containment Cooling system fans are designed to start automatically in slow speed if not already running. If running in high (normal) speed, the fans automatically shift to slow speed. The fans are operated at the lower speed during accident conditions to prevent motor overload from the higher mass atmosphere. Technical Specification LCO 3.6.6 requires two containment cooling trains to be Operable in Modes 1 through 4. When one train of Containment Cooling is Inoperable, the required action is to return the train of Containment Cooling to Operable status within 72 hours or to be in Mode 3 within the following 6 hours and Mode 5 within 84 hours. During an attempted start of one of the four B train containment cooling fans in low speed on October 24, 2010, the fan failed to start. Subsequent troubleshooting revealed that the failure of the fan to start was due to a malfunction of the 480 volt breaker that provides power to the fan motor low speed winding. Based upon the investigation performed, it was concluded that due to the failure mode of the breaker that feeds the low speed winding, the breaker had been rendered incapable of closing since September 26, 2010. This was the last time the breaker had been closed and the containment cooling fan had operated in low speed satisfactorily. Consequently, the 1B train of Containment Cooling was Inoperable for approximately 28 days from September 26, 2010 until the failure was discovered on October 24, 2010. This timeframe exceeds the 72 hours allowed by Technical Specification 3.6.6 Condition B. Therefore this event is reportable pursuant to:

10CFR50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications..."

**B. UNIT STATUS AT TIME OF EVENT**

At the time of the event on September 26, 2010 Unit 1 was operating in Mode 1 at 100 percent rated thermal power. There was no other inoperable equipment except for that described herein that contributed to this event.

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**C. DESCRIPTION OF EVENT**

Technical Specification Surveillance Requirement SR 3.6.6.2 requires that each Containment Cooling train fan unit be operated for greater than or equal to 15 minutes at a frequency of every 31 days. On September 26, 2010 each of the 1B train Containment Cooling fan units were successfully started in low speed and operated for greater than 15 minutes satisfying this surveillance requirement. Once all four of the 1B train fans had successfully passed the surveillance test, all four 1B train fans were placed in normal (high speed) alignment and continued to operate in high speed until October 24, 2010. On October 24, 2010 as part of the next scheduled surveillance test, all four 1B train fans were stopped. During the subsequent attempted start in low speed of the 1B train Containment Cooling fans, one of the fans failed to start. Due to the failure of the fan to start, the 1B train Containment Cooling system was declared Inoperable. As a result, Operations personnel entered Technical Specification LCO 3.6.6 Condition B.

**D. CAUSE OF EVENT**

Investigation into the failed start attempt of one of the 1B train Containment Cooling fans determined that the cause of the failure was due to the breaker that provides power to the low speed winding, being mechanically bound. This condition prevented the breaker from closing and hence the fan from starting. The cause of the breaker binding was due to a screw that holds a molded plastic face cover in place contacting the closing mechanism. During the previous breaker closure, when the closing mechanism contacted the screw, the mechanism became bound, which prevented the closing mechanism from functioning during the close attempt. During the investigation it was also noted that the molded plastic cover tab, that the screw bears against, was broken which allowed the screw to be inserted further than designed. The breaker (trade name Emax) that failed was rated for 480 volts, was manufactured by ABB and was installed in this location on April 7, 2008 as part of a Design Change Package (DCP). The DCP was initiated due to obsolescence of the General Electric 480 volt AKR breakers that had been inservice since plant startup. Prior to installation in the plant, the breaker was inspected and the set up verified by plant electricians. Part of the set up verification requires that the molded plastic cover to be removed and reinstalled. There are four screws that hold the plastic cover in place. Neither the vendor manual nor the plant procedure required that the screws be torqued to a specific value, only that they be tightened. Additionally, maintenance was performed on the breaker May 7, 2010 to replace the closing coil which also required removal and reinstallation of the cover. The investigation concluded that one potential cause for the screw tab on the molded plastic cover being broken was due to the screw being over tightened during installation

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of the plastic cover. The breaker manufacturer performed a statistical analysis of the tolerances of the affected components. The analysis confirmed that given the right stack up of tolerances, it was possible, in a limited number of cases, that the screw could contact the closing mechanism. The maximum interference identified was less than 0.0012 inches as designed. During inspection and testing of the breaker that failed to close, it was confirmed that the screw would contact the closing mechanism when the screw was tightened to the recommended torque value. However, during subsequent testing the failure mode could only be recreated when the screw was further tightened. It was also noted that the breaker had been successfully closed on at least 32 occasions as part of the monthly surveillance test from the time the breaker was installed on April 7, 2008 and at least 6 times from when the maintenance was performed on May 7, 2010 until the failure occurred on October 24, 2010. However, it could not be conclusively determined if the screw had further inserted as a result of the breaker operating (e.g. vibration) or if the dynamic forces involved in opening and closing the breaker caused relative movement between the screw and closing mechanism which led to the breaker binding on October 24, 2010. In either case, the failure of the breaker was due to the cover being damaged which allowed the screw to be inserted further than the design allowed, combined with a stack up of tolerances for the affected components which ultimately resulted in the screw contacting and binding the closing mechanism.

**E. ANALYSIS OF EVENT**

The Containment Cooling system at Vogtle Electric Generating Plant is comprised of two trains, each of sufficient capacity to supply 100 percent of the design cooling requirement. During the time period from September 26, 2010 until October 24, 2010 the 1B train Containment Cooling system was rendered Inoperable due to the malfunctioning breaker. However, the 1A train Containment Cooling system remained Operable and capable of providing 100 percent of the design cooling requirement. Therefore, the event did not result in a loss of safety system function. Additionally, a risk assessment of this condition was performed for the time period the configuration existed, and the increase in core damage frequency (CDF) and large early release frequency (LERF) were found to be low. Also, there were no events which required a Containment Cooling system actuation during the time the configuration existed. Based on these considerations, there was no adverse affect on plant safety or on the health and safety of the public.

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**F. CORRECTIVE ACTIONS**

1. Temporary modifications for both Unit 1 and Unit 2 were initiated that allowed removal of the top right hand screw on all of the 1E and certain non-1E ABB Emax breakers. The top right hand screw is one of four screws that hold the molded plastic cover in place and is the only one that could potentially interfere with the closing mechanism. An engineering evaluation was performed and it was determined that removal of the screw would not compromise the seismic qualification of the breaker.
  
2. All of the 1E and certain non-1E ABB Emax breakers were inspected in place to determine if the molded plastic cover was damaged and the top right hand screw was removed as allowed by the Temporary Modifications. All but six of the breakers had the screw removed. The six breakers that remain were found to have damaged covers and all of these breakers are energized to support current plant operation. For the breakers found with damaged covers, the breaker should be de-energized to remove the screw. Otherwise the potential to introduce foreign material from the damaged cover into the breaker internal operating mechanism exists. However, based upon the inspection performed, it was concluded that these breakers would open and reclose if demanded. The subject screws were removed for Unit 1 during the recent Spring 2011 outage and will be removed for Unit 2 during the upcoming Fall refueling outage, when the breakers can be de-energized.
  
3. A permanent change will be implemented that will preclude the possibility of the top right hand screw from contacting the closing mechanism on all 1E and certain non-1E 480 Volt ABB Emax breakers. The expected completion date for this activity is October 15, 2012.

**G. ADDITIONAL INFORMATION**

1. Failed Components:

480 Volt Breaker, Manufactured by ABB, Model E2N-A16 (Trade name Emax)

2. Previous Similar Event:

A review of events reported within the last 3 years did not identify a similar event that was caused by a breaker malfunction.

3. Energy Industry Identification System Codes:

Containment Fan Cooling -[BK]