



Entergy Operations, Inc.  
River Bend Station  
5485 U.S. Highway 61N  
St. Francisville, LA 70775  
Tel: 225-381-4157

William F. Maguire  
Site Vice President

RBG-47690

July 12, 2016

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

Subject: Licensee Event Report 50-458 / 2016-006-00  
River Bend Station – Unit 1  
Docket No. 50-458  
License No. NPF-47

RB1-16-0081

Dear Sir or Madam:

In accordance with 10 CFR 50.73, enclosed is the subject Licensee Event Report. This document contains no commitments. If you have any questions, please contact Ms. Kristi Huffstatler at 225-378-3305.

Sincerely,

A handwritten signature in black ink, appearing to read "W. Maguire".

WFM / dhw

Enclosure

cc: U. S. Nuclear Regulatory Commission  
Region IV  
1600 East Lamar Blvd.  
Arlington, TX 76011-4511

NRC Sr. Resident Inspector  
P. O. Box 1050  
St. Francisville, LA 70775

INPO  
(via ICES reporting)

IEZZ  
NRR

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Central Records Clerk  
Public Utility Commission of Texas  
1701 N. Congress Ave.  
Austin, TX 78711-3326

Department of Environmental Quality  
Office of Environmental Compliance  
Radiological Emergency Planning and Response Section  
Ji Young Wiley  
P.O. Box 4312  
Baton Rouge, LA 70821-4312



**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

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 and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto: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.

**1. FACILITY NAME**

River Bend Station - Unit 1

**2. DOCKET NUMBER**

05000 458

**3. PAGE**

1 OF 3

**4. TITLE**

Potential Loss of Safety Function of Multiple Systems Due to Design Deficiency in 480-volt Circuit Breakers

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
05	13	2016	2016	006	00	07	12	2016	FACILITY NAME	DOCKET NUMBER
										05000
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
100	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<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)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

**12. LICENSEE CONTACT FOR THIS LER**

LICENSEE CONTACT

Kristi Huffstatter, Manager - Regulatory Assurance (acting)

TELEPHONE NUMBER (Include Area Code)

(225) 378-3305

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
(see text)									

**14. SUPPLEMENTAL REPORT EXPECTED**

YES (If yes, complete 15. EXPECTED SUBMISSION DATE)  NO

**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

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

At 1200 CDT on May 13, 2016, while the plant was operating at 100 percent power, the shift manager was notified of a design inadequacy that could potentially prevent both divisions of the standby gas treatment system (GTS) from performing its design function. Under certain specific conditions, the 480-volt circuit breakers supplying the GTS fans may not re-close following a trip signal. In the postulated condition in which a start signal is followed by an immediate (within 0.075 seconds) trip signal, the breaker could fail to close at the next attempt. As a result of this condition, both divisions of GTS were declared inoperable. The initial investigation of this condition determined that circuit breakers in the main control building air conditioning system (HVC) and the diesel generator building ventilation system (HVP) are also susceptible to this postulated failure mechanism. This defect has the potential to similarly cause the HVC and HVP systems to be incapable of performing their safety function. The affected circuit breakers in those systems have been modified to correct the deficiency. This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) and (a)(2)(v)(D) as operations prohibited by Technical Specifications and an event that could have caused a loss of safety functions of the affected systems. The specific scenario in which this failure mechanism could plausibly have occurred is a highly unlikely event. Additionally, standing orders were already in place at the time of this event that directed the operators to take compensatory actions to preserve the safety function of the affected systems. Those orders will remain in effect until all modifications are complete. Thus, this condition does not represent a significant challenge to the health and safety of the public.



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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1. FACILITY NAME  River Bend Station - Unit 1	2. DOCKET NUMBER  05000- 458	3. LER NUMBER		
		YEAR 2016	SEQUENTIAL NUMBER 006	REV NO. 00

**NARRATIVE**

**REPORTED CONDITION**

At 1200 CDT on May 13, 2016, while the plant was operating at 100% power, the shift manager was notified of a design inadequacy that could potentially prevent both divisions of the standby gas treatment system (GTS) [BH] from performing its design function. Under certain specific conditions, the 480-volt circuit breakers (\*\*BKR\*\*) supplying the GTS fans may not re-close following a trip signal. In the postulated condition in which a start signal is followed by an immediate (within 0.075 seconds) trip signal, the breaker could fail to close at the next attempt. As a result of this condition, both divisions of GTS were declared inoperable.

The initial investigation of this condition determined that circuit breakers in the main control building air conditioning system (HVC) [VI] and the diesel generator building ventilation system (HVP) [VJ] are also susceptible to this postulated failure mechanism. This defect has the potential to similarly cause the HVC and HVP systems to be incapable of performing their safety function.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) and (a)(2)(v)(D) as operations prohibited by Technical Specifications, and an event that could have caused a loss of safety functions of the GTS, HVC, and HVP systems.

**INVESTIGATION and IMMEDIATE ACTIONS**

At 1240, the Division 1 GTS subsystem was manually started. Since the postulated breaker failure mechanism is precluded when the breaker is closed, this action allowed the Division 1 subsystem to be restored to an operable status.

**BACKGROUND**

The safety-related 480-volt switchgears were originally constructed with GE AKR breakers. Due to age and obsolescence, the GE breakers were replaced with Square D Masterpact breakers. A notable design difference between the two designs is in how the "anti-pumping" functionality is achieved. Pumping is the rapid, repeated opening and closing of the breaker when "open" and "close" signals are applied simultaneously. In the AKR design, the anti-pumping function was accomplished electrically using relays. In the Masterpact design, the function is accomplished mechanically by the breaker operating mechanism.

This mechanical mechanism of the Masterpact breakers has a documented failure history. After several failures at RBS and at another utility, the vendor released a Part 21 notification describing a failure mode for Masterpact breakers. When a susceptible breaker receives an "open" signal when standing close signal is present, the closing mechanism has the potential to bind. This can cause the breaker to be incapable of responding to any subsequent "close" signal. The binding can be corrected by the operator action to depress the "open" pushbutton on the front of the breaker.

**CAUSAL ANALYSIS**

The reported condition was precipitated by RBS' evaluation of a failure analysis report from the circuit breaker vendor. RBS engineering personnel had witnessed offsite testing of Masterpact breakers for the purposes of evaluating the effectiveness of the vendor-provided solution for the anti-pump mechanism malfunction. This testing determined that even with the vendor-recommended solution implemented, the reported failure mode can still occur if a "close" signal is followed within 0.075 seconds by an "open" signal. In this highly unlikely sequence of events, the breaker will trip as expected, but it may not successfully respond to the next "close" signal.



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CONTINUATION SHEET**

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		YEAR  2016	SEQUENTIAL NUMBER  006	REV NO.  00

**NARRATIVE**

Given this specific set of circumstances, breakers in the closed position are not susceptible to this failure mode. For equipment that can be run continuously, the compensatory measure is to maintain the affected breakers in the closed position. For the breakers in the HVC system, the compensatory measure is to clear the condition and restart the system. These measures ensured the continued operability of the affected breakers.

**CORRECTIVE ACTIONS TO PREVENT RECURRENCE**

The Masterpact breakers serving the air handling units in the main control building air conditioning system, the standby gas treatment system filter trains, and the emergency exhaust fans in the diesel generator rooms have been modified to correct the reported deficiency. The remaining breakers in the affected population are being scheduled for modification.

**PAST OCCURRENCE EVALUATION**

Design deficiencies in Masterpact breakers were previously reported in LER 050-458 / LER 2016-005-00 (April 25, 2016). The new failure mechanism being reported here was not known prior to the most recent laboratory testing. Thus, it was not possible for this new condition to have been precluded.

**SAFETY SIGNIFICANCE**

The specific scenario in which the new failure mechanism can plausibly occur is a highly unlikely event. Additionally, standing orders were already in place at the time of this event that directed the operators to take compensatory actions to preserve the safety function of the affected systems. Those orders will remain in effect until all modifications are complete. Thus, this condition does not represent a significant challenge to the health and safety of the public.

(NOTE: Energy Industry Identification System component function identifier and system name of each component or system referred to in the LER are annotated as (\*\*XX\*\*) and [XX], respectively.)