Entergy Operations, Inc.
River Bend Station
5485 U. S. Highway 61N
St: Francisville, LA 70775
Tel 225 381 4374
Fax 225 381 4872
eolson@entergy.com

Eric W. Olson
Site Vice President

RBG-47265

July 20, 2012

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

Subject: Licensee Event Report 50-458 / 2012-002-00
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

RBF1-12-0097

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 Mr. Joseph Clark at 225-381-4177.

Sincerely,

R. Godbois for E. Olson

EWO/dhw

Enclosure

IE22
NRR

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 Records Center
E-Mail (MS Word format)

Ms. Tracie Lowery
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
JiYoung Wiley
P.O. Box 4312
Baton Rouge, LA 70821-4312

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

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 (T-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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
River Bend Station – Unit 1	05000 - 458	1 OF 3

4. TITLE

Automatic Reactor Scram Due to Low Main Condenser Vacuum Resulting From Electrical Fault

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
									n/a	05000
05	21	2012	2012	-002	-00	07	20	2012	FACILITY NAME n/a	DOCKET NUMBER 05000

9. OPERATING MODE

1

10. POWER LEVEL

100

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

☐ 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)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 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)
☐ 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

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Joseph A. Clark, Manager – Licensing	225-381-4177

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
n/a									

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)*

On May 21, 2012, at 2:52 p.m., while the plant was operating at 100% power, an automatic reactor scram occurred due to a partial loss of vacuum in the main condenser. This condition initially caused a trip of the main turbine, and the fast closure of the turbine control valves provided the actuation signal to the reactor protection system (RPS). Main condenser vacuum remained within the operating limits for use of the main turbine bypass valves, thus reactor pressure was automatically controlled following the initial transient. The reactor feedwater system remained in service. The decrease in main condenser vacuum resulted from the loss of two of four circulating water pumps. This condition was caused by the failure of a splice in one of three 13.8kV cables providing power to half of the 4160V switchgear at the circulating water structure. The splice failure resulted in a small fire inside a manhole located outside the protected area. The plant fire brigade confirmed the fire was out within approximately 24 minutes of the onset of the event. Six reactor safety-relief valves actuated in response to the main turbine trip. The reactor core isolation cooling (RCIC) system steam supply valve automatically closed due to a false high-flow signal from the steam flow sensors. The system was restored to its standby configuration at 5:36 p.m. No plant parameters requiring the automatic actuation of the RCIC system were exceeded during the event. The failed splice was replaced, and the other cables in the circuit were tested for integrity, resulting in the replacement of one other splice. This event is being reported in accordance with 10CFR50.73(a)(2)(iv)(A) as an automatic actuation of the RPS system. There were no safety-related systems out of service at the time of the event.

REPORTED CONDITION

On May 21, 2012, at 2:52 p.m., while the plant was operating at 100% power, an automatic reactor scram occurred due to a partial loss of vacuum in the main condenser (SG) (**COND**). This condition initially caused a trip of the main turbine, and the fast closure of the turbine control valves provided the actuation signal to the reactor protection system (RPS) (JC). Main condenser vacuum remained within the operating limits for use of the main turbine bypass valves, thus reactor pressure was automatically controlled following the initial transient. The reactor feedwater system remained in service.

The decrease in main condenser vacuum resulted from the loss of two of four circulating water pumps (**P**). This condition was caused by the failure of a splice in one of three 13.8kV cables (**CBL5**) providing power to half of the 4160V switchgear at the circulating water structure. The splice failure resulted in a small fire inside a manhole located outside the protected area. The plant fire brigade confirmed the fire was out within approximately 24 minutes of the onset of the event.

Six reactor safety-relief valves actuated in response to the main turbine trip. The reactor core isolation cooling (BN) (RCIC) system steam supply valve automatically closed due to a false high-flow signal from the steam flow sensors. The system was restored to its standby configuration at 5:36 p.m. No plant parameters requiring the automatic actuation of the RCIC system were exceeded during the event.

This event is being reported in accordance with 10CFR50.73(a)(2)(iv)(A) as an automatic actuation of the RPS system. There were no safety-related systems out of service at the time of the event.

INVESTIGATION and CAUSAL ANALYSIS

The failed splice was removed from the cable, and sent to an offsite lab for analysis. It was determined that the arc which resulted in the cable fault originated at a projection on the end of the splice sleeve and extended across the insulation to the edge of the spiral shield. The projection at the end of the splice sleeve was the result of an incomplete crimp applied at this splice point during original plant construction. It is likely that this projection acted as a concentrator that placed unusually high electrical stress on the insulation material, causing the insulation material to slowly degrade. Though the electrical stress induced by the projection did cause the insulation material to degrade, it is unknown if this degradation alone would have caused the cable to fail prior to the 40 year life expectancy.

In addition to the increased electrical stress produced by the projection, the faulted cable showed evidence of insulation degradation due to water intrusion. Water intrusion was evident in the failure analysis through the presence of water-treeing in the splice insulation layer and corrosion products throughout several layers of the splice.

It is uncertain if either of the anomalies listed above would have individually degraded the insulation to the point of a cable failure before the expected service life. However, the combination of the projection resulting from incomplete crimping of the splice sleeve during original construction and insulation degradation due to water intrusion, did accelerate the degradation of the insulation dielectric properties such that a premature cable fault occurred.

CORRECTIVE ACTION TO PREVENT RECURRENCE

The other two cables in the circuit providing the affected circulating water system switchgear were tested for insulation integrity. This testing revealed degradation in one of those cables, and the affected splice was repaired.

Other manholes within the scope of the station's cable reliability program were inspected for presence of splices and signs of potential cable wetting. Splices were identified in five other manholes, and the affected cables have either been successfully tested within the last operating cycle, or have been scheduled for testing by the end of the next refueling outage in March 2013.

Manholes outside the scope of the cable reliability program will be inspected for water intrusion. If a cable splice is located in any manhole exhibiting such signs, a preventative maintenance task will be created to periodically pump the manhole down.

The risk-ranking of program cables will be revised to take into consideration the risk associated with cable splices located in wetted environments.

Regarding the spurious isolation of the RCIC system, a modification was made to the steam flow isolation instrumentation (FT) to add a time delay to the circuit. This time delay will prevent future occurrences of such a trip.

Future actions are being tracked within the station's corrective action program.

PREVIOUS OCCURRENCE EVALUATION

No similar events have been reported by River Bend Station within the last five years.

SAFETY SIGNIFICANCE

The plant responded to the main turbine trip as described in the Updated Safety Analysis Report. No plant parameters exceeded the actuation setpoints for standby diesel generators or the emergency core cooling systems. Thus, this event was of minimal safety significance to the health and safety of the public.

(NOTE: Energy Industry Component Identification codes are annotated as (**XX**).)