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David N. Lorfing
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RBG-47127

March 2, 2011

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

Subject: Licensee Event Report 50-458 / 10-004-01
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

File No. G9.5

RBF1-11-0044

Dear Sir or Madam:

In accordance with 10CFR50.73, enclosed is the subject Licensee Event Report. This document contains no commitments. If you have any questions, please contact me at 225-381-4157.

Sincerely,

David N. Lorfing
Manager – Licensing

Enclosure

JE22
NRR

cc: U. S. Nuclear Regulatory Commission
Region IV
612 East Lamar Blvd., Suite 400
Arlington, TX 76011-4125

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

INPO Records Center
E-Mail (MS Word format)

Mr. Jim Calloway
Public Utility Commission of Texas
1701 N. Congress Ave.
Austin, TX 78711-3326

Mr. Jeffrey P. Meyers
Louisiana Department of Environmental Quality
Attn: OEC-ERSD
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 4

4. TITLE

High Pressure Core Spray System Inoperable Due to Failed Motor Oil Reservoir Drain Plug

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
										05000
11	07	2010	2010	-004-	-01	03	02	2011	FACILITY NAME	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)*
David N. Lorfing, Manager – Licensing	225-381-4157

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
E	BG	(see text)	(see text)	YES					

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 November 7, 2010, at 10:23 a.m. CDT, with the plant operating at 100 percent power, the high pressure core spray (HPCS) pump was declared inoperable following the discovery of an oil leak on the pump motor. The source of the oil leak was found to be a cracked drain plug on the lower motor bearing oil reservoir. The oil plug was replaced, and the HPCS system was restored to its standby condition at 7:40 p.m. CDT that same day. The investigation of this event determined that the oil plug cracked due to application of torque to correct an oil leak. The oil leak had been caused by age-related degradation of the O-ring on the plug, attributable to the lack of a preventative maintenance task to provide for its periodic replacement. A new oil plug was installed on the motor, and the system was returned to service. The preventative maintenance program is being updated to include this plug and O-ring.

This condition is being reported in accordance with 10CFR50.73(a)(2)(v)(D) as the loss of a system needed to mitigate the consequences of an accident. No other safety-related systems were out of service during the time that the HPCS system was inoperable. This event was of minimal significance with respect to the health and safety of the public.

REPORTED CONDITION

On November 7, 2010, at 10:23 a.m. CDT, with the plant operating at 100 percent power, the high pressure core spray (HPCS) (BG) pump was declared inoperable following the discovery of an oil leak on the pump motor (**MO**). This condition is being reported in accordance with 10CFR50.73(a)(2)(v)(D) as the loss of a system needed to mitigate the consequences of an accident.

The oil plug was replaced, and the HPCS system was restored to its standby condition at 7:40 p.m. CDT that same day. No other safety-related systems were out of service during the time that the HPCS system was inoperable.

INVESTIGATION

On July 14, 2010, a minor, unquantifiable oil leak was found on the lower reservoir drain plug of the HPCS pump. The leak appeared only as oil sheen around the drain plug. On August 7, the leak was quantified as approximately 1 drop every 3 minutes. A maintenance technician tightened the plug approximately one-quarter turn that day, which had no apparent effect. The leakage rate was determined to be stable, and it was concluded that the pump remained capable of performing its safety function.

The approximate timeline of subsequent activities concerning this event, developed from documentation and from interviews with the operators and maintenance technicians, is as follows. Oil was added to the reservoir on September 13. The HPCS system was operated on September 20 for scheduled surveillance testing, and no increase in the leakage rate was seen. Oil was again added to the reservoir on October 26. No further oil additions were made until November 7. Twice-weekly inspections of the pump by the operators confirmed that the leakage had not increased. (Operators also perform a general inspection of the pump room each shift, checking for oil accumulation on equipment and other conditions. Those inspections continued to be satisfactory.) On October 29, the operators wrapped an absorbent pad around the plug to eliminate the need to clean up oil around the pump pedestal, and to eliminate the potential slipping hazard. These pads were subsequently replaced three times prior to November 7 (the last replacement was on November 5), and on each occasion, the oil leak rate had not increased.

On November 7, the operator removed the absorbent pad, and found that the leak had increased to a small stream approximately one-tenth of an inch in diameter. The HPCS pump was removed from service, and the oil drain plug was replaced with a new part.

IMMEDIATE CORRECTIVE ACTIONS

The failed drain plug was replaced, and the HPCS pump was restored to service at 7:40 p.m. CDT on the same day. At the time of this event, no similar leaks existed on the other emergency core cooling system (ECCS) pumps, which share a common drain plug design with the HPCS pump.

CAUSAL ANALYSIS

Visual inspection of the removed drain plug assembly identified a circumferential fracture on the threaded portion of the drain plug. The drain plug assembly and O-ring were then sent to an independent laboratory for analysis.

Laboratory analysis found that the plug fracture surface exhibited a purely ductile failure of a low tensile strength material with significant porosity. The lab postulated that the initial leakage of the drain plug was the result of O-ring failure. The O-ring exhibited surface cracks and chips and had developed a permanent set in the radial direction due to its more than 24 years of service. It appeared that an attempt to mitigate the leakage was made by further tightening of the drain plug. The fracture along the head of the plug caused the markedly higher leak rate discovered on November 7.

The pump motor vendor (General Electric) was contacted to provide detailed information about the drain plug material and design of the drain plug assembly and O-ring. The laboratory analysis determined that the failed drain plug material was zinc alloy die casting, which is consistent with one of the specified materials by GE.

GE also provided service information recommending that low nitrile Buna O-rings be replaced with medium Buna-N O-rings containing at least 27 percent nitrile to improve seal reliability and increase the life of the seals. It was also recommended that the O-rings should be replaced at every other oil change. The laboratory analysis found that the drain plug O-ring was the recommended 27 percent nitrile material.

That same service information was reviewed by RBS in 1991, and it was agreed to replace the drain plug O-rings and sight glass O-rings. The review stated that "A [preventative maintenance] task or multiple tasks will be initiated to track work which will be performed in accordance with the GE SIL." This investigation found that no such tasks were ever initiated.

CORRECTIVE ACTIONS TO PREVENT RECURRENCE

The failed drain plug assembly and O-ring are common to the upper and lower motor bearing reservoirs of the five emergency core cooling pump motors (i.e., low pressure core spray, three residual heat removal subsystems, and high pressure core spray). The remaining drain plug assemblies are also originally installed components. A schedule has been set for replacing all

those plugs with new stainless steel parts. In the interim, the maintenance technicians were informed not to apply torque to the currently installed plugs in an attempt to stop any future leakage.

Preventative maintenance tasks will be developed to replace the drain plug O-rings on a schedule consistent with vendor recommendations.

PREVIOUS OCCURRENCE EVALUATION

There have been no similar events reported by RBS since January 1, 2005.

SAFETY SIGNIFICANCE

Two of three divisions of ECCS are required for the RBS loss of coolant accident analyses. While HPCS was out of service, Division 1 and Division 2 ECCS systems and the automatic depressurization system were available, and would have met the ECCS performance criteria of 10CFR50.46. The HPCS system was returned to service within the time limit of the Required Action in the plant's Technical Specifications. This event was of minimal safety significance with respect to the health and safety of the public.

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