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RBG-47545

February 19, 2015

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

Subject: Licensee Event Report 50-458 / 2014-006-00
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

RBF1-15-0136

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,

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
(via ICES reporting)

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

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

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 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 Page 2 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

Automatic Reactor Scram and Primary Containment Isolation Due to Loss of Power on the Division 2 Reactor Protection System With a Concurrent Division 1 Half-scram

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
12	25	2014	2014	- 006	- 00	02	19	2015	FACILITY NAME	DOCKET NUMBER 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)	☑ 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)
85	☐ 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

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
Joseph A. Clark, Manager - Regulatory Assurance	(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	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☑ NO				

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

On December 25, 2014, at 0836 CST, a reactor scram occurred while the plant was operating at approximately 85 percent power. This event resulted from the loss of power on the Division 2 reactor protection system (RPS) bus, in conjunction with a pre-existing half-scram on Division 1. The loss of Division 2 RPS power also resulted in a Division 2 containment isolation signal. Approximately four minutes after the scram, reactor water level increased to the Level 8 setpoint, causing the running main feedwater pump to trip. As reactor water level decreased back through the normal operating range, operators attempted to re-start main feedwater pump "C," but its supply breaker failed to close. Main feedwater pump "A" was subsequently returned to service. As reactor water level decreased to the point at which the startup feedwater regulating valve (FRV) should have opened to establish automatic control, the valve failed to open. Attempts to open it with a manual input signal were unsuccessful, and the "C" main FRV was put back into service. By that time, reactor water level had decreased slightly below the Level 3 RPS actuation setpoint, resulting in a second scram signal. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an automatic actuation of the RPS system and the primary containment isolation logic. No plant parameters required the actuation of any standby diesel generators or emergency core cooling systems. No reactor safety-relief valves actuated. This event was of minimal safety significance with respect to the health and safety of the public.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
River Bend Station - Unit 1	05000 458	2014	- 006	- 00	2 OF 4

NARRATIVE

REPORTED CONDITION

On December 25, 2014, at 0836 CST, a reactor scram occurred while the plant was operating at approximately 85 percent power. This event resulted from the loss of power on the Division 2 reactor protection system (RPS) (**JD**) bus, in conjunction with a pre-existing half-scram on Division 1. The loss of Division 2 RPS power also resulted in a Division 2 containment isolation signal.

Approximately four minutes after the scram, reactor water level increased to the Level 8 setpoint, causing the running main feedwater pump (**SJ**) to trip. As reactor water level decreased back through the normal operating range, operators attempted to re-start main feedwater pump "C," but its supply breaker failed to close. Main feedwater pump "A" was subsequently returned to service. As reactor water level decreased to the point at which the startup feedwater regulating valve (FRV) should have opened to establish automatic control, the valve failed to open. Attempts to open it with a manual input signal were unsuccessful, and the "C" main FRV was put back into service. By that time, reactor water level had decreased slightly below the Level 3 RPS actuation setpoint, resulting in a second scram signal.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an automatic actuation of the RPS system and the primary containment isolation logic (**JM**).

INVESTIGATION and IMMEDIATE ACTIONS

The Division 1 half-scram had been inserted two days prior to the event, in compliance with Technical Specifications, following the failure of an instrumentation channel on the no. 2 main turbine control valve. Teams were formed to investigate the separate significant aspects of the event, as follows:

Loss of Division 2 RPS Bus

Power was lost when the output breaker on the RPS motor-generator (MG) in the Division 2 subsystem tripped. The mostly likely cause of the output breaker trip was an intermittent failure of the MG field flash card due to a degraded capacitor. The capacitor was replaced, and the MG was tested and returned to a standby condition as a backup power supply. The alternate power supply will remain in service carrying the bus until completion of a modification to eliminate the field flash card as a potential source of recurrence of this problem.

Misoperation of the Startup FRV

The operation of the startup FRV was investigated to determine why it was unresponsive to either the automatic controller or the operator's manual input. Maintenance technicians discovered a failed circuit card in the "manual" side of the valve controller. The "automatic" function of the controller had operated correctly in the post-scram environment once reactor water level had returned to normal, and this was confirmed again during the troubleshooting.

Additionally, Engineering personnel determined that the performance of the valve was consistent with its design criteria. The valve and its control logic are designed for flow control, and not simply for isolation. When the valve receives a gradual "open" signal from the closed position, there is no specific time response requirement. This design feature can allow a delayed response that, in the scram recovery scenario, may be too slow to arrest a significant downward trend in reactor water level.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
River Bend Station - Unit 1	05000 458	2014	- 006	- 00	3 OF 4

NARRATIVE

The procedural guidance to isolate the main FRVs and use the startup FRV in a scram recovery was developed in 2010 to mitigate the effects of any seat leakage through the main FRVs. At that time, Operations developed the procedure change and validated its feasibility in the training simulator. However, no cross-discipline review by Engineering was requested. The investigation of December 25 event found that the simulator model does not accurately reflect the actual operating characteristics of the startup FRV, in that the simulated performance of the valve is more responsive than the actual valve. An Engineering review could have brought the actual operating characteristics to light. This factor, in conjunction with the simulator performance, reinforced the concept that the startup FRV was capable of controlling reactor water level in the post-scram transient condition.

Malfunction of Main Feedwater Pump "C"

The failure of main feedwater pump "C" was found to have been was caused by an "over-racked" condition of its supply breaker (that is, the breaker racking mechanism had slightly over-travelled the last time the breaker was returned to service). This caused the limit switches that detect the position of the breaker mechanism within the cabinet to give the control logic circuit a false indication that the breaker was not connected to the bus. Interim instructions have been implemented to have electricians verify the condition of all similar breakers each time they are racked in.

CORRECTIVE ACTION TO PREVENT RECURRENCE

The following corrective actions are planned, and will be tracked and documented in the corrective action program:

Loss of Division 2 RPS Bus

A design modification will be installed to eliminate the potential for a failure in the field flash card to affect the operation of the MG set once it is loaded.

Misoperation of the Startup FRV

Operating procedures have been revised to direct that, in the scram recovery environment, one of the main FRVs will remain in service. The startup FRV is not to be used in that condition.

The main FRVs are on the schedule of work items for the upcoming refueling outage. Valve seat leakage is one of the deficiencies to be addressed.

Malfunction of "C" Main Feedwater Pump

Guidance on racking the main feedwater pump breakers (and those of similar design) will be incorporated into the pertinent operating procedures.

Additionally, the deficiency that necessitated the insertion of the Division 1 half-scam on December 23 was corrected prior to plant startup.

PREVIOUS OCCURRENCE EVALUATION

River Bend Station previously reported an event that occurred on December 6, 2014, in which the Division 2 RPS bus de-energized unexpectedly. That condition resulted in a Division 2 containment isolation and a half-scram. The investigation did not conclusively determine the cause of the trip of the Division 2 RPS motor-generator (MG) output breaker, which initiated the event. Repairs were made to the MG control circuits to address the most likely causes of the trip, and the MG was load tested for approximately 30 hours prior to being placed back into service. . It was postulated that another intermittent failure was occurring in the field flash

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
River Bend Station - Unit 1	05000 458	2014	- 006	- 00	4 OF 4

NARRATIVE

circuit card, and a design modification is being developed to mitigate that failure, but that remains a future activity. As described above, the source of the MG output breaker trip on December 25 has not been conclusively identified, so it is not certain whether the corrective actions for the December 6 event should have precluded the December 25 event.

SAFETY SIGNIFICANCE

No plant parameters requiring the actuation of any standby diesel generators or the emergency core cooling systems were exceeded. No reactor safety-relief valves actuated. All reactor control rods properly inserted at the scram signal. This event was, thus, of minimal significance to the health and safety of the public.

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