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June 29, 2007

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

Subject: Licensee Event Report 50-458 / 07-002-00
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

File Nos. G9.5, G9.25.1.3

RBG-46709
RBF1-07-0113

Ladies and Gentlemen:

In accordance with 10CFR50.73, enclosed is the subject Licensee Event Report. This document contains no commitments.

Sincerely,

David N. Lorfing
Manager – Licensing

DNL/dhw
Enclosure

IE22

NRR

cc: U. S. Nuclear Regulatory Commission
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NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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

Unplanned Manual Reactor Scram Due to Loss of Cooling on No. 2 Main Transformer

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
05	04	2007	2007	- 002 -	00	06	29	2007	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE

1

10. POWER LEVEL

67

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

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

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
D	EL	XFMR	(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)*

At 1256 CDT on May 4, 2007, an unplanned manual reactor scram was initiated following the loss of cooling on the No. 2 main transformer. Reactor power at the time of the scram was approximately 67 percent. Following the scram, reactor water level briefly decreased below Level 3 as expected, resulting in the automatic closure of two containment isolation valves in the suppression pool cleanup system. This isolation was confirmed to have occurred as designed. Control of reactor pressure and water level was promptly established. No emergency coolant injection system actuation was required. This event is being reported in accordance with 10CFR50.73(a)(2)(iv)(A) as a condition that resulted in the unplanned manual actuation of the reactor protection system. The loss of cooling to the transformer resulted from an electrical fault in the cooling system control cabinet caused by rainwater intrusion. The cabinet was repaired and sealed, and preventative maintenance procedures are to be enhanced to prevent recurrence. The plant responded to the manual scram as expected, thus this event was of minimal safety significance.

REPORTED CONDITION

At 1256 CDT on May 4, 2007, an unplanned manual reactor scram was initiated following the loss of cooling on the No. 2 main transformer (**XFMR**). Reactor power at the time of the scram was approximately 67 percent. Following the scram, reactor water level briefly decreased below Level 3 as expected, resulting in the automatic closure of two containment isolation valves in the suppression pool cleanup system. This isolation was confirmed to have occurred as designed. Control of reactor pressure and water level was promptly established. No emergency coolant injection system actuation was required. This event is being reported in accordance with 10CFR50.73(a)(2)(iv)(A) as a condition that resulted in the unplanned manual actuation of the reactor protection system.

INVESTIGATION AND CAUSAL ANALYSIS

Two Westinghouse main transformers (EL) convert the 22kv output of the main generator (**GEN**) to 230kv for distribution on the electrical grid. Each transformer is rated for approximately 70 percent of the generator's maximum capacity. The transformers are cooled by oil circulating through the internal windings. The oil is pumped through external radiators, where fans provide forced air circulation. Power to the oil pumps and fans is supplied by switchgear in the plant, arranged in two independent systems that are each capable of providing 100 percent of the necessary cooling.

During the morning before the scram, heavy rainstorms were moving through the local area. At 1108, a ground fault alarm (**ALM**) was received in the main control room, in conjunction with the process computer point "480 BUS 1E GROUND FAULT." The 480 volt switchgear NJS-LDC1E supplies one source of the power to the main transformer cooling system. Operators were dispatched to investigate the cause of the alarm. At 1110, both the process computer points and the ground fault alarm cleared. At the same time, two additional process computer alarms actuated, along with a main control panel alarm, indicating that breakers supplying power to the No. 2 main transformer cooling system had tripped.

Operators began closely monitoring the oil and winding temperatures in the transformer, while attempting to restore power via the alternate supply. After implementing the procedures for reconfiguring the cooling power supply, it was determined that no oil pumps or radiator fans could be restarted. Meanwhile, an examination of the cooling system control cabinet mounted on the transformer found that a significant electrical fault had occurred inside the cabinet. The fault had damaged a terminal block (**DBLK**) in the cabinet, resulting in the inability to operate any of the pumps or fans.

At 1221, a power reduction was commenced to take the main generator and the main transformer out of service. Initial investigation by electrical engineers determined that the transformer is rated for a maximum of 30 minutes of operation at full load with no

cooling in service. When this was communicated to the main control room crew, it was determined that the normal reactor shutdown procedure could not be conducted quickly enough to avoid overheating the transformer. The decision was made to manually actuate a reactor scram.

The fault in the control cabinet was determined to have been caused by water intrusion. Sealant around electrical conduits penetrating the cabinet was found to be degraded, which allowed the entry of rainwater. Additionally, the insulating material under the terminal block mounting studs is made of a cellulose-based material which tends to absorb moisture. This condition likely contributed to the susceptibility for arcing across the terminal block. An examination of the control cabinet on the No. 1 main transformer found that the insulation was made of a laminated resin material, which is impervious to moisture. No record of any modification to the No. 2 transformer control cabinet was found, thus, the insulation material likely was part of the original installation.

Further examination of the control cabinet found evidence that water intrusion had likely occurred in the past. A review of preventive maintenance procedures for the main transformer determined that no specific instructions are provided for inspecting the control cabinet for signs of leakage. Additionally, no requirements existed to periodically replace the sealant around the cabinet penetrations.

The peak temperatures in the transformer oil and windings during the event remained below design limits. Oil samples found no unusual signs of degradation.

Analysis of the plant response to this event found that one process computer point alarm failed to actuate. This alarm would have indicated to the operators that a ground fault had also occurred on switchgear NJS-LDC1F. This switchgear is the second source of power to the cooling system on No. 2 main transformer. This process computer point alarm should have actuated, because the fault in the transformer control cabinet also affected that switchgear. The failure of this alarm, in conjunction with ambiguous wording of other process computer points, hindered the operators' response to the event, in that they initially believed that the alternate source of power was available.

CORRECTIVE ACTION TO PREVENT RECURRENCE

Numerous actions are being taken to address the various factors that contributed to this event. All these actions are being tracked in the station's corrective action program.

All other large power transformers installed outdoors on the site were inspected for similar conditions. Only the No. 1 main transformer showed any evidence of minor water intrusion into the control cabinet. No other power transformers were found to have the same cellulose-based insulation in the control cabinets. Sealant was applied to penetrations on the control cabinets on the main transformers to ensure that they remain

watertight. The control cabinets on the main transformers were modified to replace the terminal block with in-line splices.

Preventive maintenance procedures for the main transformers are being revised to (1) periodically replace the conduit sealant, and, (2) specifically inspect for any evidence of water intrusion.

Actions are being developed to correct the deficiencies identified in the process computer alarm system.

PREVIOUS OCCURRENCE EVALUATION

No scrams at River Bend Station in the last ten years have resulted from a loss of capacity of the main transformers.

SAFETY SIGNIFICANCE

The manual actuation of the reactor protection system was successful, and all reactor control rods were fully inserted. The automatic closure of the containment isolation valves in the suppression pool cleanup system occurred as designed when reactor water level briefly decreased below Level 3. No other actuations were required by that signal. No emergency coolant injection systems or standby diesel generators were required to initiate during this event. Thus, this event was of minimal significance to the health and safety of the public.

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