DUKE ENERGY.

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Serial: RNP-RA/13-0120

JAN 0 2 2014

10 CFR 50.73

Attn: Document Control Desk
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/RENEWED LICENSE NO. DPR-23

LICENSEE EVENT REPORT NO. 2013-003-00
REACTOR TRIP ON 4KV BUS UNDERVOLTAGE DURING LOAD TRANSFER

Ladies and Gentlemen:

Pursuant to 10 CFR 50.73, Duke Energy Progress, Inc. is submitting the attached Licensee Event Report. There are no outstanding corrective actions required to restore compliance with NRC requirements; restoration of compliance has been met. Should you have any questions regarding this matter, please contact Mr. R. Hightower, Supervisor – Licensing/Regulatory Programs at (843) 857-1329.

This document contains no new Regulatory Commitments.

Sincerely,

W. R. Gideon
Site Vice President
H. B. Robinson Steam Electric Plant, Unit No. 2

WRG/jmw

Attachment

c: V. McCree, NRC, Region II
Siva Lingam, NRC, NRR
NRC Resident Inspector

IE22
NRR

US NRC Document Control Desk
Attachment to Serial: RNP-RA/13-0120
4 pages (including this cover page)

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LICENSEE EVENT REPORT NO. 2013-003-00
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NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

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

LICENSEE EVENT REPORT (LER)

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

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 Service 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.

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4. TITLE

Reactor Trip on 4KV Bus Undervoltage During Load Transfer

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
11	05	2013	2013	- 003	- 00	01	02	2014	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

MODE 1

10. POWER LEVEL

019

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)
R. Hightower, Manager Regulatory Affairs	843-857-1329

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
A	EA	EA		Y		X	BI	BI		Y

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 1801 hours EST on 11/5/2013, with the Unit in Mode 1 at 19% power, Robinson Nuclear Plant (RNP) experienced an automatic reactor trip while operators were transferring loads from the Startup Transformer (SUT) [EA] to the Unit Auxiliary Transformer (UAT) [EA], as part of activities associated with coming on line and increasing power following Refueling Outage 28. During the coordinated breaker operation, the reactor tripped when an anomaly occurred that resulted in the actuation of two undervoltage relays associated with the loss of 2 of 3 4KV buses. The 'A' Emergency Diesel Generator (EDG)[EB] auto-started and supplied the E-1 emergency bus [EB] as a result of the undervoltage transient. A 4 hour Non-Emergency notification was made to the NRC per 10 CFR 50.72(b)(2)(iv)(B) due to the valid Reactor Protection System Actuation, and an 8 hour Non-Emergency notification per 10 CFR 50.72(b)(3)(iv)(A) due to the valid actuation of Auxiliary Feed Water (AFW)[BA] and EDG auto-start and subsequent starting of required undervoltage loads, save 'A' Service Water Pump[KG].

The investigation into the cause of this event determined that advanced aging/fatigue of the phenolic operating rods of the UAT breaker (52/7) caused the failure of the 'B' phase operating rod, which prevented closure of the 'B' phase of the breaker. The corrective action to address rod failure involved replacement of operating rods in all four incoming breakers.

The cause of the failure of the 'A' Service Water Pump to sequence onto the E-1 bus during the blackout sequence was attributed to a loose wire termination in the Emergency Control Station.

This event did not impact the health and safety of the public.

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NARRATIVE

PLANT IDENTIFICATION

Westinghouse - Pressurized Water Reactor

IDENTIFICATION OF EVENT

At 1801 hours EST on 11/5/2013, with the unit in Mode 1 at 19% power, Robinson Nuclear Plant (RNP) experienced an automatic reactor trip while operators were transferring loads from the Unit Startup Transformer (SUT) [EA] to the Unit Auxiliary Transformer (UAT) [EA], in accordance with plant procedures. During the coordinated breaker operation, the reactor tripped when an anomaly occurred that resulted in the actuation of two undervoltage relays associated with the loss of 2 of 3 4KV buses. By design, the one running 'A' Main Feedwater Pump[SJ] tripped and caused the auto-start of Auxiliary Feedwater System, which maintained the Steam Generator water levels within the normal operating band. The 'A' Emergency Diesel Generator (EDG)[EB] auto-started and supplied the E-1 emergency bus [EB] as a result of the undervoltage transient.

EVENT DATE

November 05, 2013

REPORT DATE

January 04, 2014

CONDITIONS PRIOR TO EVENT

MODE 1, 19% Power

DESCRIPTION OF EVENT

At 1801 hours EST on 11/5/2013, with the Unit in Mode 1 at 19% power, Robinson Nuclear Plant (RNP) experienced an automatic reactor trip while operators were transferring loads from the Unit Startup Transformer (SUT) to the Unit Auxiliary Transformer (UAT), in accordance with plant procedures. When the breaker (52/7) control switch connecting the UAT to 4KV Bus 1 was taken to the 'close' position, the 52/7 breaker's 'A' and 'C' phases closed, however the 'B' phase operating rod had failed thereby inhibiting closure of the 'B' phase of the breaker. When the 52/7 control switch was returned to center position, breaker 52/12, Incoming Line – Startup Transformer to 4KV Bus 2, opened as designed. When breaker 52/12 opened, the undervoltage relays for buses 1 and 2 actuated at a setpoint equal to 75% of nominal bus voltage. Reactor trip signal logic directs a reactor trip when 2 out of 3 4KV buses feeding Reactor Coolant Pumps undervoltage relays trip. As a result of the trip of their associated undervoltage relays, an automatic reactor trip occurred. The Turbine automatically tripped due to the reactor trip causing the turbine stop valves to close while the switchyard generator output breakers 52/8 and 52/9 remained closed. With the turbine stop valves closed while the switchyard breakers are closed, the 60 second time delay pick-up relays initiated and timed out resulting in Generator Lockout Relay 86BU tripping and closing breaker 52/12. Normal voltage was restored to 4KV buses 1 and 2 when breaker 52/12 closed.

LICENSEE EVENT REPORT (LER)
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NARRATIVE

The voltage drop on the 4KV buses was sufficient to pick up the E-1 Bus undervoltage relays and initiate the blackout sequence on Bus E-1. The 'A' Emergency Diesel Generator (EDG) auto-started and the 'A' EDG load sequencer loaded the required Engineered Safety Features (ESF) loads onto E-1 with the exception of the 'A' Service Water Pump.

CAUSAL FACTORS/CORRECTIVE ACTIONS

The root cause of the reactor trip event is advanced aging/fatigue of breaker 52/7 phenolic operating rod materials. Degradation of the rod materials caused failure of the 'B' operating rod, which prevented closing of the 'B' phase of the breaker, 52/7. Interim corrective action to address rod failure involved replacement of operating rods in all four incoming breakers. Long term corrective action to prevent recurrence consists of replacing the operating rods for all 4KV incoming breakers with high tensile strength operating rods.

The failure of the 'A' Service Water (SW) Pump to start was due to a loose wire termination in the Emergency Control Station. The loose wire termination was immediately secured. The loose termination was attributed to a historical condition based on maintenance records searches going back over fifteen years that did not identify any work performed in this particular Emergency Control Station.

SAFETY ANALYSIS

The risk consequences of this event were minimal based on the successful reactor trip and operators' ability to successfully start SW Pump 'D' after SW Pump 'A' failed to start as expected. SW Pump 'A' remained available by a manual start and the transient was not complicated by additional equipment failures, malfunctions or human errors.

The reactor was at 19% power and power ascension following completion of the refueling outage was in progress. Therefore, the decay heat load was well below that of a full-power trip after a period of operation and well within the capabilities of the decay heat removal systems. In addition, Auxiliary Feedwater actuation had recently been demonstrated successfully, and no corrective or preventive maintenance had been performed on that system since that time. The Condensate Storage Tank (CST) capacity was adequate to remove the above decay heat load for an extended period before requiring refill. Backup sources of feedwater were available during the event.

Important accident mitigation equipment remained available throughout this event.

ADDITIONAL INFORMATION

An evaluation of external Operating Experience (OE) shows that this event would not have been prevented by available OE, therefore this was not considered a missed opportunity to utilize OE.