10 CFR 50.73

Progress Energy

Serial: RNP-RA/08-0118
JAN 15 2009

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/LICENSE NO. DPR-23

LICENSEE EVENT REPORT NO. 2008-002-00
REACTOR TRIP DUE TO HIGH TURBINE VIBRATION

Ladies and Gentlemen:

The attached Licensee Event Report is submitted in accordance with the requirements of 10 CFR 50.73. Should you have any questions regarding this matter, please contact Mr. C. A. Castell at (843) 857-1626.

Sincerely,

Ernest J. Kapopoulos, Jr.
Plant General Manager
H. B. Robinson Steam Electric Plant, Unit No. 2

CAC/ahv

Attachment

c: L.A. Reyes, NRC, Region II
M. G. Vaaler, NRC, NRR
NRC Resident Inspector

Progress Energy Carolinas, Inc.
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES 08/31/2010

LICENSEE EVENT REPORT (LER)

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

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4. TITLE

Manual Reactor Trip due to High Turbine Vibrations

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	17	2008	2008	- 002	- 00	01	16	2009	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

1

10. POWER LEVEL

78%

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 Specify in Abstract below or in NRC Form 366A	
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)		

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Ashley Valone	843-857-1256

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

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 0551 hours EST on November 17, 2008, the H. B. Robinson Steam Electric Plant, Unit No. 2, reactor was manually tripped from approximately 78% power due to high vibrations detected on the main turbine. At 0516 hours EST, the No. 9 bearing vibration was about 13.5 mils and increasing. A power reduction from 100% power was commenced in accordance with Abnormal Operating Procedure, AOP-006. At approximately 0551 hours, with power level at approximately 78%, the No. 9 bearing vibrations reached the AOP-006 trip criterion of 14 mils and the reactor was manually tripped. The auxiliary feedwater system started automatically, as expected, in response to steam generator level changes after the reactor trip. The primary system and steam generator power operated relief valves and safety valves did not actuate during this event. The main feedwater system, main steam system, and condenser remained available during the event and were used for decay heat removal.

The root cause investigation for the turbine vibrations determined that the most probable causes were: 1) The size and placement techniques for the shims installed under the exciter base were incorrect, 2) procedure, CM-024, "Exciter Maintenance and Inspection," utilized standard shim placement, which for the new exciter was not adequate, 3) incorrect clearances of the refurbished generator hydrogen seal resulted in a rub condition, and 4) a vendor fabrication error in the exciter gusset plate configuration could have resulted in a soft foot condition. This report is being made in accordance with 10 CFR 50.73(a)(2) (iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in 10 CFR 50.73(a)(2)(iv)(B).

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
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H. B. Robinson Steam Electric Plant, Unit No. 2	05000261	2008	- 002	- 00	2 OF 3

NARRATIVE

I. DESCRIPTION OF EVENT

At 0551 hours EST, on November 17, 2008, the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, reactor was manually tripped from approximately 78% power due to high vibrations detected on the main turbine [TA:TRB]. The reactor trip was initiated in accordance with Abnormal Operating Procedure, AOP-006, "Turbine Eccentricity / Vibration."

At approximately 0230 hours EST, turbine vibration on the No. 9 bearing was approximately 10.9 mils and increasing. By 0516 hours EST, the No. 9 bearing was at about 13.5 mils and still increasing. A power reduction from 100% power was commenced in accordance with Operating Procedure, OP-105, "Maneuvering the Plant when Greater than 25% Power." At approximately 0551 hours EST, with power level at approximately 78%, the No. 9 bearing vibrations reached the trip criterion of 14 mils specified in AOP-006 and the reactor was tripped.

The auxiliary feedwater system [BA] started automatically, as expected, in response to steam generator [AB:SG] level changes after the reactor trip. The 'B' Main Feedwater Pump [SJ:P] also tripped as typical following a reactor trip. The primary system and steam generator power operated relief valves [AB:RV] and safety valves did not actuate during this event. The main feedwater system [SJ], main steam system [SB], and condenser [SG:COND] remained available during the event.

II. CAUSE OF EVENT

The cause of the event was due to a manual reactor trip in accordance with procedure, AOP-006. This guidance is conservative and in place to protect the turbine.

III. ANALYSIS OF EVENT

The condition described in this Licensee Event Report is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in a manual or automatic actuation of any of the systems listed in 10 CFR 50.73 (a)(2)(iv)(B), including the reactor protection system and auxiliary feedwater system.

This event was investigated using the HBRSEP, Unit No. 2, Corrective Action Program and documented in Significant Adverse Nuclear Condition Report 306903. The investigation found that the root cause of the high turbine vibrations could not be narrowed down to one specific cause. The investigation determined that the most probable causes of the high turbine vibrations were: 1) The size and placement techniques for the shims installed under the exciter base were incorrect, 2) procedure, CM-024, "Exciter Maintenance and Inspection," utilized standard shim placement, which for the new exciter was not adequate, 3) incorrect clearances of the refurbished generator hydrogen seal resulted in a rub condition, and 4) a vendor fabrication error in the exciter gusset plate configuration could have resulted in a soft foot condition.

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NARRATIVE

Additionally, a new procedure, CM-042, "Generator Maintenance and Inspection," was used to install the refurbished and machined generator hydrogen seals during RO-25. This procedure did not provide independent verification or a QC hold point for the critical dimensions. The lack of verification performed on these tight clearances is the most probable cause of the generator hydrogen seal rub.

The soft foot condition can be attributed to incorrect positioning of shim material.

IV. CORRECTIVE ACTIONS

Completed Corrective Actions:

- Gusset plates were added to provide more stability.
- Generator Hydrogen seal was replaced and critical dimensions verified.
- 15 inch shims were installed and were placed in different locations.
- Night Order 08-17 was issued on December 3, 2008, stating, "If turbine vibrations exceed 10 mils, a normal plant shutdown should be commenced in accordance with GP-006 [Normal Plant Shutdown From Power Operation To Hot Shutdown]."
- Abnormal Operating Procedure, AOP-006, was revised to improve operator guidance for determining the need to trip the reactor, reduce the likelihood of reactor trips due to turbine vibrations, and has also been modified to add actions for operators to reduce turbine vibrations.

Planned Corrective Actions:

- Procedures CM-042, "Generator Maintenance and Inspection," and CM-024, "Exciter Maintenance and Inspection," are scheduled to be revised by March 20, 2009, to strengthen the detail concerning shim installation and to provide independent verification or QC hold points for all critical dimensions.

V. ADDITIONAL INFORMATION

Previous Similar Events:

Recent LERs for HBRSEP, Unit No. 2, were reviewed. There were no similar events identified.