

**Virginia Electric and Power Company  
North Anna Power Station  
1022 Haley Drive  
Mineral, Virginia 23117**

July 2, 2013

Attention: Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Serial No.: 13-309  
NAPS: MPW  
Docket No.: 50-339  
License No.: NPF-7

Dear Sirs:

Pursuant to 10CFR50.73, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to North Anna Power Station Unit 2.

Report No. 50-339/2013-001-00

This report has been reviewed by the Facility Safety Review Committee and will be forwarded to the Management Safety Review Committee for its review.

Sincerely,



Gerald T. Bischof  
Site Vice President  
North Anna Power Station

Enclosure

Commitments contained in this letter: None

cc: United States Nuclear Regulatory Commission  
Region II  
Marquis One Tower  
245 Peachtree Center Ave., NE, Suite 1200  
Atlanta, Georgia 30303-1257

NRC Senior Resident Inspector  
North Anna Power Station

*TE22  
MLR*

**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 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.

<b>1. FACILITY NAME</b> North Anna Power Station , Unit 2	<b>2. DOCKET NUMBER</b> 05000 339	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Manual Reactor Trip Due To Increased Vibrations on Main Turbine/Generator Bearing Number 9

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	DOCUMENT NUMBER
05	10	2013	2013	-- 001 --	00	07	02	2013	FACILITY NAME	DOCUMENT NUMBER
										05000
										05000

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)																																				
<b>10. POWER LEVEL</b>  60	<table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td></td> </tr> </table>	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	
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Specify in Abstract below or in NRC Form 366A

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME <b>Gerald T. Bischof, Site Vice President</b>	TELEPHONE NUMBER (Include Area Code) <b>(540) 894-2101</b>
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**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	TL	38	S125	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
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**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 10, 2013, at 0612 hours with Unit 2 in Mode 1, 60 percent power following a refueling outage, a manual reactor trip was initiated as a result of increased vibrations on the number 9 main turbine/generator bearing and a report of a luminous discharge in the main generator exciter enclosure. All systems responded as expected following the manual trip. The auxiliary feedwater (AFW) pumps received an automatic start signal due to the resulting low-low level in "C" Steam Generator (SG). The AFW System operated as designed with no abnormalities noted and was subsequently returned to automatic operation. The SG levels were restored to normal operating level. When resetting AMSAC, a second AFW system automatic start occurred due to a procedure sequence error and was determined to be an invalid signal. At 0820 hours, a 4 hour report was made in accordance with 10CFR50.72(b)(2)(iv)(B) for Reactor Protection System (RPS) actuation and 8 hour report in accordance with 10CFR50.72(b)(3)(iv)(A) for the first AFW pump automatic start. This event is reportable per 10 CFR 50.73(a)(2)(iv)(A) for a condition that resulted in automatic actuation of the RPS and AFW System. The health and safety of the public were not affected by the event since the equipment responded as designed.

LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET

1. FACILITY NAME  NORTH ANNA POWER STATION UNIT 2	2. DOCKET  05000 - 339	6. LER NUMBER			3. PAGE  2 OF 4
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NARRATIVE

**1.0 DESCRIPTION OF THE EVENT**

On May 10, 2013, at 0517 hours with Unit 2 in Mode 1, 60 percent power, number 9 main turbine/generator bearing vibrations (EIIS SYS-TL, Component-38) began increasing from approximately 5 mils. Unit 2 was in the process of increasing power following a refueling outage when this occurred. At 0545 hours an adjustment was performed to lower main generator reactive power. Following the adjustment, number 9 main turbine/generator bearing vibrations increased to approximately 9 mils. The main generator reactive power was immediately returned to the previous value with no corresponding improvement in vibration levels.

At 0602 hours a slight ramp down in turbine load was commenced. The number 9 main turbine/generator bearing vibrations continued to slowly increase. At 0610 hours a noticeable decrease to 7 mils occurred. Concurrently, a report from the field notified the control room crew that a luminous discharge was observed inside the exciter enclosure.

At 0612 hours a manual reactor trip was initiated as a result of increased vibrations on the number 9 main turbine/generator bearing to 9.5 mils and a report of the luminous discharge in the Main Generator Exciter enclosure. All primary system parameters were normal for power operation at 60 percent power. All systems responded as expected following the manual trip. All control rods (EIIS SYS-AA, Component-ROD) inserted into the core at the time of the trip and decay heat was removed via the main condenser steam dumps. The auxiliary feedwater (AFW) pumps (EIIS SYS-BA, Component-P) received an automatic start signal due to the resulting low-low level in "C" steam generator (EIIS-SYS-AB, Component-SG). The AFW System operated as designed with no abnormalities noted. The SG levels were restored to normal operating level. At 0745 hours the AFW pumps were secured and returned to automatic.

At 0859 hours, when the switch for the Anticipated Transient Without Scram Accident Mitigation System Actuation Circuit (AMSAC) was taken to reset to clear "AMSAC ARMED" annunciator, the AFW system automatically actuated during simultaneous performance of 2-ES 0.1, Reactor Trip Response and 2-OP-7.11, Shutdown of Unnecessary Plant Equipment Following Entry Into EOPS. Due to the plant conditions at the time, there was low decay heat on Unit 2, which required minimizing AFW flow to the steam generators to limit cool down. Steam generator levels had not yet been restored to within the normal level band. AMSAC was placed in "BYPASSED" without first being "RESET". The AFW system was secured per steps in 2-ES-0.1 and returned to auto. This was an invalid actuation since actual plant conditions did not require the automatic start of the AFW System.

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NARRATIVE

**2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS**

No significant safety consequences resulted from this event since the Reactor Protection System (RPS) and the Engineered Safety Feature (ESF) System equipment responded as designed. As such, the event posed no significant safety implications and the health and safety of the public were not affected by the event.

On May 10, 2013, at 0820 hours, a 4 hour report was made in accordance with 10CFR50.72(b)(2)(iv)(B) for RPS actuation and 8 hour report in accordance with 10CFR50.72(b)(3)(iv)(A) for the first AFW pump automatic start. This event is reportable per 10 CFR 50.73(a)(2)(iv)(A) for a condition that resulted in automatic actuation of the RPS and AFW System. The second AFW system actuation was invalid and is also being reported per 10 CFR 50.73(a)(2)(iv)(A).

**3.0 CAUSE**

The direct cause of the event was a combination of the alignment dowel causing a ground on the number 9 bearing pedestal which allowed electrical erosion to remove material from the bearing surface causing a hydraulic rub on the number 9 bearing and improper bearing loading caused by misalignment of the number 9 bearing pedestal.

The root cause was determined to be the Fleet Turbine Group's (FTG) lack of technical expertise coupled with a less than optimal procedure for turbine activities led to an over reliance and inadequate challenging of the turbine vendor.

The cause of the second AFW system actuation when resetting AMSAC was determined to be a procedure weakness. Procedure 2-ES-0.1 did not direct the crew to observe the proper status lights that should be expected when AMSAC has been properly reset.

**4.0 IMMEDIATE CORRECTIVE ACTION(S)**

The Control Room crew responded to the reactor trip in accordance with emergency procedure 2-E-0, Reactor Trip or Safety Injection. The post trip response progressed as expected and the Control Room crew transitioned to 2-ES-0.1, Reactor Trip Response. All equipment responded as designed.

**5.0 ADDITIONAL CORRECTIVE ACTIONS**

Maintenance was performed to restore the equipment to proper functionality including replacement of the number 9 main turbine/generator bearing and the permanent magnet generator, fan and housing repairs, realignment of the exciter and number 9 pedestal, and proper installation of the number 9 pedestal alignment dowel. The hydrogen and air side seal oil temperature control was modified and the hydrogen and air side seal oil temperature indicators were calibrated.

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**NARRATIVE**

**6.0 ACTIONS TO PREVENT RECURRENCE**

The controlling procedure for reassembly of the turbine generator is being revised to ensure critical steps are noted and have the appropriate verifications to ensure that there is the proper level of vendor oversight, and ensure that any as left measurements that are unsatisfactory require a Condition Report to ensure there is the proper level of documentation and evaluation. Benchmarking is being performed to determine qualification/training requirements for turbine group personnel.

With regard to the second AFW pump start, procedure changes have been initiated to improve the wording contained in both 2-ES-0.1 and 2-OP-7.11. Lessons learned from the event will be discussed during upcoming sessions of the Licensed Operator Requalification Program (LORP).

**7.0 SIMILAR EVENTS**

None.

**8.0 ADDITIONAL INFORMATION**

Unit 1 was operating in Mode 1, 100 percent power on May 10, 2013 and was not affected by this event.

Description: Shoe type bearing  
 Manufacturer: Siemens  
 Part No.: 613F432G01