

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

May 22, 2015

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

Serial No.: 15-174  
NAPS: JHL  
Docket No.: 50-338  
License No.: NPF-4

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 1.

Report No. 50-338/2015-002-00

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

IE22  
NRC



**LICENSEE EVENT REPORT (LER)**

(See Page 2 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 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](mailto: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	<b>2. DOCKET NUMBER</b> 05000338	<b>3. PAGE</b> 1 OF 3
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**4. TITLE**  
Manual Reactor Trip Due to Inability to Maintain Main Generator Voltage in Specification

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
04	02	2015	2015	002	00	05	22	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	<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)
10. POWER LEVEL  100	<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)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER	
LICENSEE CONTACT Gerald T. Bischof, Site Vice President	TELEPHONE NUMBER (Include Area Code) (540) 894-2101

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
B	TL	RG		Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE		
<input checked="" type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input type="checkbox"/> NO	MONTH	DAY	YEAR
	07	17	15

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

On April 2, 2015, at 0426 hours, with Unit 1 operating at 100 percent power, a manual reactor trip was initiated due to the inability to maintain main generator voltage in specification. This also resulted in a turbine trip. The operations crew entered the reactor trip procedure and stabilized Unit 1 in Mode 3 at normal operating pressure and temperature. All control rods fully inserted into the core following the reactor trip. The inability to maintain generator voltage in specification was due to a failure of a component in a firing circuit downstream of the automatic voltage regulator (AVR). A root cause evaluation is still in progress. At 0655 hours, a 4-hour Non-Emergency Report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(iv)(B) for "an event causing actuation of the Reactor Protection System when the reactor is critical" and an 8-hour report was also made in accordance with 10 CFR 50.72(b)(3)(iv)(A) for "an event causing actuation of the Auxiliary Feedwater System (AFW)." Two of the AVR gate firing modules (GFM) were replaced and the third GFM was evaluated to not be required and was disabled. The health and safety of the public were not affected by this event.



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
North Anna Power Station Unit 1	05000338	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 3	
		2015	- 002	- 00		

**NARRATIVE**

**1.0 DESCRIPTION OF THE EVENT**

On April 2, 2015, at 0426 hours, with Unit 1 operating at 100 percent power, a manual reactor trip was initiated due the inability to maintain main generator (EIS System TL, Component GEN) voltage in specification. Prior to the initiation of the manual reactor trip, the operations crew had entered abnormal procedure 1-AP-26, Voltage Regulator Failure, due to the Unit 1 main generator voltage being high. Several control room annunciators (EIS Component ANN) had locked in with the generator output greater than 600 MVARs out and manual actions to lower voltage were ineffective. As a result, the manual reactor trip was initiated. This also resulted in a turbine trip.

Troubleshooting subsequently revealed that the output from the number 2 gate firing module (GFM) (EIS Component IMOD) in the firing circuit downstream of the main generator automatic voltage regulator (AVR) (EIS Component RG) failed high causing the generator output to be greater than 600 MVARs out.

Following the reactor trip the Reactor Protection System (RPS) and all Engineered Safety Feature Actuation System (ESFAS) (EIS System JE) equipment actuated as designed, including the Auxiliary Feedwater (AFW) pumps (EIS System BA, Component P). The control room operators responded to the event in accordance with emergency procedure 1-E-0, Reactor Trip or Safety Injection. The operators then stabilized the plant using 1-ES-0.1, Reactor Trip Recovery.

At 0655 hours, a 4-hour Non-Emergency Report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(iv)(B) for "an event causing actuation of the Reactor Protection System when the reactor is critical" and an 8-hour report was also made in accordance with 10 CFR 50.72(b)(3)(iv)(A) for "an event causing actuation of the Auxiliary Feedwater System (AFW)."

**2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS**

No significant safety consequences resulted from this event because the RPS and ESFAS systems actuated as designed following initiation of the manual trip. The health and safety of the public were not affected by this event.

**3.0 CAUSE**

The inability to maintain generator voltage in specification was due the output from the number 2 GFM in the firing circuit downstream of the AVR failing high causing the generator output to be greater than 600 MVARs out. A root cause evaluation is still in progress.

LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
North Anna Power Station Unit 1	05000338	YEAR	SEQUENTIAL NUMBER	REV NO.	3 OF 3
		2015	- 002	- 00	

NARRATIVE

**4.0 IMMEDIATE CORRECTIVE ACTION(S)**

The control room operators responded to the event in accordance with emergency procedure 1-E-0, Reactor Trip or Safety Injection. The operators then stabilized the plant using 1-ES-0.1, Reactor Trip Recovery. All safety systems responded appropriately. The unit was stabilized at no-load conditions, the Main Feedwater system was placed in service to all three SGs, and the AFW system was secured and returned to automatic.

**5.0 ADDITIONAL CORRECTIVE ACTIONS**

During the Unit 1 shutdown, two of the GFM's were replaced and the third installed GFM was evaluated to not be required and was disabled.

ODM #352 has been completed to address continued operation with GFM number 3 disabled for the Unit 1 AVR.

The failed number 2 GFM was shipped offsite for failure analysis to determine the reason for the module failure.

**6.0 ACTIONS TO PREVENT RECURRENCE**

The final root cause evaluation report will address any actions to prevent recurrence. These actions will be tracked in the Corrective Action Program.

**7.0 SIMILAR EVENTS**

LER N2-2010-001-00 dated June 23, 2010, documents a Unit 2 automatic reactor trip from 74% power while testing a new digital automatic voltage regulator (AVR). A turbine trip due to a generator lockout caused the automatic reactor trip. The root cause of the generator lockout protective relay actuation was determined to be inadequate guidance for software validation for non-safety related equipment that can impact power generation.

**8.0 ADDITIONAL INFORMATION**

North Anna Unit 2 continued operating in Mode 1, 100 percent power during this event.

North Anna Unit 2 has the same GFM's in the AVR firing circuit, but there is no indication that these components have failed high. If one of the three GFM's in the AVR firing circuit failed high, an annunciator in the main control room would alarm.