

**Virginia Electric and Power Company  
North Anna Power Station  
P. O. Box 402  
Mineral, Virginia 23117**

August 16, 2010

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

Serial No.: 10-454  
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. 50-339/2010-004-00

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,



N. Larry Lane  
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  
NRR

**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 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.

|  |                                      |                          |
|--|--------------------------------------|--------------------------|
| <b>1. FACILITY NAME</b><br>NORTH ANNA POWER STATION , UNIT 2 | <b>2. DOCKET NUMBER</b><br>05000 339 | <b>3. PAGE</b><br>1 OF 4 |
|--|--------------------------------------|--------------------------|

**4. TITLE**  
Automatic Reactor Trip and Engineered Safety Feature Actuation Due to Lightning Strike

| 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 |
| 06            | 16  | 2010 | 2010          | -- 004 --         | 00      | 08             | 16  | 2010 | FACILITY NAME                | DOCUMENT NUMBER |
|               |     |      |               |                   |         |                |     |      |                              | 05000           |
|               |     |      |               |                   |         |                |     |      |                              | 05000           |

|                                   |  |   |  |   |
|-----------------------------------|--|---|--|---|
| <b>9. OPERATING MODE</b><br><br>1 | <b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply) |   |  |   |
|                                   | <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)   |
| <b>10. POWER LEVEL</b><br><br>98% | <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)             | <input type="checkbox"/> VOLUNTARY LER        |

**12. LICENSEE CONTACT FOR THIS LER**

|   |  |
|---|--|
| FACILITY NAME<br>F. Mladen, Director Station Safety and Licensing | TELEPHONE NUMBER (Include Area Code)<br>(540) 894-2108 |
|---|--|

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
|       |        |           |              |                    |       |        |           |              |                    |

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

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

On June 16, 2010, at 1920 hours North Anna Unit 2 experienced an automatic reactor trip from 98 percent power during a severe thunderstorm. A lightning strike within the Protected Area was the direct cause of this event. The lightning strike caused an Overtemperature Delta T (OTΔT) reactor trip signal without an actual overtemperature condition. The control room team responded to the reactor trip in accordance with procedure 2-E-0, Reactor Trip or Safety injection. All Engineered Safety Feature equipment responded as designed. A non-emergency 4-hour report was made to the NRC Operations Center at 2108 hours on June 16, 2010, in accordance with 10 CFR 50.72(b)(2)(iv)(B). An 8-hour report was also made in accordance with 10 CFR 50.72(b)(3)(iv)(A) due to actuation of the Auxiliary Feedwater System (AFW). This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) for a condition that resulted in automatic actuation of the Reactor Protection System (RPS) and the AFW system. This event posed no significant safety implications since the reactor protection systems functioned to trip the reactor. Therefore, the health and safety of the public were not affected by this event.

LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

**1.0 DESCRIPTION OF THE EVENT**

On June 16, 2010 at 1920, during a thunderstorm, Unit 2 reactor tripped from 98% power on Overtemperature Delta Temperature (OTΔT) (EIS System JC) due to spiking on two protection channels (EIS Component CHA). This thunderstorm generated lightning which apparently struck one or more buildings(EIS Component BLDG) in the Protected Area (PA). Three wide range Reactor Coolant System (RCS) temperature indications (EIS Sys AB, Component TI) failed and components in the Auxiliary Monitoring Panel in the Fuel Building were damaged. The lightning surge spiked the Unit 2 OTΔT Protection Channels I and II circuitry causing Unit 2 to trip. The reactor trip initiated a turbine trip. The control room team responded to the reactor trip in accordance with procedure 2-E-0, Reactor Trip or Safety injection. All Engineered Safety Feature (EIS System-JE) equipment responded as designed. The post trip response progressed smoothly and within five minutes the Operations crew transitioned to 2-ES-0.1, Reactor Trip without Safety Injection.

The Unit 2 reactor tripped on OTΔT due to voltage transients that corrupted signals on two protection channels. A combination of station ground degradation and instrument shielding anomalies contributed to lightning-induced transients propagating to Unit 2 channels I and II protection racks. Existing Appendix "R" instrument wiring configuration provided a common point for introduction of transient energy into the protection cabinets.

**2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS**

This event posed no significant safety implications since the reactor protection functioned to trip the reactor. All Engineered Safety Feature equipment responded as designed. Therefore, the health and safety of the public were not affected by this event.

A non-emergency 4-hour report was made to the NRC Operations Center at 2108 hours on June 16, 2010, in accordance with 10 CFR 50.72 (b)(2)(iv)(B). During this call an 8-hour report was also made in accordance with 10 CFR 50.72(b)(3)(iv)(A) due to actuation of the Auxiliary Feedwater System (EIS System-BA). This event is reportable pursuant to 10 CFR 50.73 (a)(2)(iv)(A) for a condition that resulted in automatic actuation of the reactor protection system and the AFW system

**3.0 CAUSE**

The cause of this event was a lightning strike within the PA. The lightning strike induced a voltage transient of sufficient magnitude on the Channel I and II Overtemperature Delta Temperature (OTΔT) protection circuits to cause actuation of the Reactor Protection System which resulted in the Unit 2 reactor trip.

**4.0 IMMEDIATE CORRECTIVE ACTION(S)**

The Control Room team responded to the reactor trip in accordance with procedure 2-E-0,

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**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)

Reactor Trip or Safety injection. The post trip response progressed smoothly and the Control Room team transitioned to 2-ES-0.1, Reactor Trip without Safety Injection.

**5.0 ADDITIONAL CORRECTIVE ACTIONS**

A design change has been implemented to install the lag time constants in the  $\Delta T$  Leg and  $T_{AVG}$  Leg of the  $\Delta T/T_{AVG}$  Protection System in order to dampen and/or reduce the effects of unwanted transients (e.g., lightning strikes) on the system.

While investigating the cause(s) to the Unit 2 trip, it was discovered that the cable shield for RTD 2-RC-TE-2410A (EIS Sys AB, Component TE) was electrically grounded at two locations, auxiliary monitoring panels 1-EI-CB-203 and 2-EI-CB-97A. A temporary modification (TM) was implemented to lift the shield lead for 2-RC-TE-2410A, which removed the ground loop and a potential path for induced voltage spikes coupling onto other instrumentation.

During the initial investigation of the Unit 2 trip, it was determined that a potential path for induced voltage spikes on the Narrow Range loop "B" temperature RTD's existed on the cable shield. A TM was implemented to lift the shield leads for 2-RC-TE-2420 and 2-RC-TE-2423 in order to remove a potential path for induced voltage spikes on the Narrow Range loop temperature RTD's associated with this event.

Ground grid resistance testing was performed around Unit 1 and 2 Containments to ascertain any degradation of the ground grid connections. Four deficiencies were identified around the protected zone Unit 2 Containment (EIS Sys NH, Component BLDG) and the Service Building (EIS Sys MF, Component BLDG). The deficient connections were re-established between Unit 1 Containment, Unit 2 Containment, and the Service Building. An Electrical Preventive Maintenance (EPM) procedure is being developed to perform testing of ground grid integrity.

During the TM process two excavations of underground to above ground connections were performed. At one location the conductor was not connected to the building ground and the other location revealed a sub standard connection with a below grade mechanical connector. Both connections were repaired.

**6.0 ACTIONS TO PREVENT RECURRENCE**

The actions noted above are sufficient to prevent recurrence.

**7.0 SIMILAR EVENTS**

LER N2-2005-001-00 reported an automatic reactor trip and ESF actuation as a result of a lightning strike within the Protected Area.

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**8.0 ADDITIONAL INFORMATION**

Unit 1 was not affect by this event.