

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

August 27, 2007

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

Serial No.: 07-0538
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. 50-339/2007-003-00

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

Sincerely,

Page Kemp for
Daniel G. Stoddard, P.E.
Site Vice President
North Anna Power Station

Enclosure

Commitments contained in this letter: None

cc: United States Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-8931

Mr. J. T. Reece
NRC Senior Resident Inspector
North Anna Power Station

JR22

NRC

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: 50 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 (3150-0066), 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.

1. FACILITY NAME NORTH ANNA POWER STATION , UNIT 2	2. DOCKET NUMBER 05000 339	3. PAGE 1 OF 4
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4. TITLE
Automatic Reactor Trip Due to Invalid Safety Injection Relay Actuations

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	29	2007	2007	-- 003 --	00	08	27	2007	FACILITY NAME	DOCUMENT NUMBER
										05000
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i> <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 style="font-size: small;">Specify in Abstract below or in NRC Form 366A</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)	Specify in Abstract below or in NRC Form 366A
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10. POWER LEVEL 100%																																					

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME M. D. Sartain, Director Station Safety and Licensing	TELEPHONE NUMBER <i>(Include Area Code)</i> (540) 894-2108
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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
E	BQ	IMOD	W893	Y					

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

On June 29, 2007 at 1752 hours, with Unit 2 in Mode 1 at 100% power, an automatic turbine trip, reactor trip and Phase "A" Containment Isolation occurred due to an invalid Train "B" Safety Injection actuation. Following the trip, some Train "B" Safety Injection equipment would not reset from the Main Control Room. Manual actions were performed to secure Safety Injection flow. During this process, the Pressurizer filled and spilled over to the Pressurizer Relief Tank rupturing one of the rupture disks. This allowed Reactor Coolant System water to reach the Unit 2 Containment basement. The cause of this event was the failure of zener diode CR34 on Universal card A313 located in the "B" Train of the Solid State Protection System. This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) for an event that resulted in the automatic actuation of the Reactor Protection System and Engineered Safety Function Systems. Unit 2 was cooled down to Mode 5 conditions at 0839 hours on June 30, 2007. The health and safety of the public were not affected at any time during the event.

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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 29, 2007, Unit 2 was in Mode 1 at 100 percent power and 955 MWe steady-state operation. All primary system parameters were normal for power operation. At 1752 hours, an automatic turbine trip, reactor trip and Phase "A" Containment Isolation occurred due to an invalid Train "B" Safety Injection (SI) actuation. Operations personnel performed the immediate action steps of procedure 2-E-0, Reactor Trip or Safety Injection, which directed a manual actuation of both Trains of SI. Operations personnel proceeded through 2-E-0 and determined the SI to be invalid. At 1805 hours the "A" Train of SI [BQ] was successfully reset using the bench-board switches in the Main Control Room (MCR) [NA]. The "B" Train of SI could not be reset from the MCR requiring manual actions.

At 1808 hours, Pressurizer (PZR) level [AB, PZR] was increasing due to SI flow and went off-scale high. At 1810 hours, PZR Power Operated Relief Valve (PORV) 2-RC-PCV-2455C [RV] cycled for the first time to relieve increasing pressure. 2-RC-PCV-2455C cycled approximately 51 times discharging to the PZR Relief Tank (PRT). At 1816 hours, a PRT [TK] rupture disc [RPD] failed as designed spilling Reactor Coolant System (RCS) inventory to the containment sump [BE]. While securing SI and restoring normal charging flow, charging motor operated valve (MOV) 2-CH-MOV-2289B [CB, FCV] and 2-SI-MOV-2867B [BQ, FCV] had to be de-energized and operated locally due to the inability to reset Train "B" SI. The time between initial PRT rupture disc failure and isolation of SI flow was approximately five minutes. At 1828 hours, Operations personnel transitioned to 2-ES-1.1, SI Termination.

At 1854 hours, the Mode Selector Switch at the "B" Train Solid State Protection System (SSPS) cabinet [JG, CAB] was repositioned to TEST and successfully eliminated the Train "B" SI signal. However, not all of the associated relays reset. The 2J Emergency Diesel Generator [EK], MCR Bottled Air Trains 1, 2, and 4 [VI], and Auxiliary Feedwater System [BA] all required additional manual actions to reset. At 2100 hours, the Operations personnel transitioned TO 2-OP-3.2, Unit Shutdown from Mode 3 to Mode 4.

During the event RCS temperature decreased to approximately 537 degrees F and was returned to 547 degrees F by throttling AFW flow. RCS [AB] pressure decreased to 1995 psig but increased as the PZR filled during the SI. RCS pressure cycled at approximately 2270 psig as 2-RC-PCV- 2455C controlled pressure until SI flow was isolated.

At 2045 hours on June 29, 2007, a 4-hour Non-Emergency Report was made to the NRC in accordance with 10 CFR 50.72 (b)(2)(iv)(A), for Emergency Core Cooling System Discharge to the RCS, and 10 CFR 50.72 (b)(2)(iv)(B) for Reactor Protection System (RPS) Actuation. An 8-hour Non-Emergency Report was also made in accordance with 10 CFR 50.72 (b)(3)(iv)(A) for RPS Actuation.

During cooldown and depressurization to Mode 5 all three accumulator [ACC] discharge

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MOVs [BQ, FCV] were closed per procedure. During cooldown 2-SI-MOV-2865C [FCV] reopened as a result of Train "B" of SSPS being in test. This resulted in approximately 5 percent of the "C" Accumulator flowing to the RCS. The valve was subsequently closed and de-energized. The unit was cooled down to Mode 5 conditions at 0839 hours on June 30, 2007. At 1748 hours on July 8, 2007 the reactor was taken critical and 100 percent power was reached at 1335 hours on July 9, 2007.

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

This event resulted from an invalid actuation of the Train "B" of SI which was unable to be reset from the MCR. This failure resulted in a complicated trip response that required manual actions outside of the MCR to secure safety injection flow and to restore other equipment that actuated from the signal. No personnel safety issues occurred and no entry into the Emergency Plan was required. No radioactivity was released from the containment building. The health and safety of the public were not affected at any time during the event. This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) for an event that resulted in the automatic actuation of the RPS and ESFAS [JE].

3.0 CAUSE

The cause of this event was the failure of zener diode CR34 on Universal card A313 [IMOD] located in Train "B" of the SSPS. The zener diode failed as a short allowing current to flow causing a low (voltage drop) on the circuit which actuated "B" Train master relays K501 and K521. This resulted in the invalid actuation of Train "B" SI which caused a Main Feedwater Water isolation and Phase "A" Containment Isolation. The turbine tripped as expected which caused a reactor trip. This same failure also prevented the Train "B" of SI from being reset from the MCR, requiring local actions to be taken by the Operations and Maintenance staff. The most probable cause for the diode failure was age-related degradation or from being a random failure.

A contributing cause of the failure was due to not implementing a program to detect/correct age-related degradation with the SSPS cards. A strategy of trending failures was employed to determine if additional actions were warranted. This strategy did not allow prevention, nor prediction of the A313 card failure.

4.0 IMMEDIATE CORRECTIVE ACTION(S)

Operations personnel entered appropriate procedures and stabilized the plant. Operations personnel proceeded through 2-E-0 and determined the SI to be invalid. At 1805 hours,

Train "A" of SI was successfully reset using the bench-board switches in the MCR. The Train "B" of SI could not be reset from the MCR. At 1854 hours, the Mode Selector Switch at the Train "B" SSPS cabinet was repositioned to TEST and successfully eliminated the Train "B" SI signal.

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5.0 ADDITIONAL CORRECTIVE ACTIONS

An abnormal procedure was developed to reset SI locally and training was provided. Training included a review of the event and the performance deficiencies noted in the event response.

All SSPS cards were removed and tested using a KIMKA tester. Components were repaired or replaced as necessary to ensure card reliability.

6.0 ACTIONS TO PREVENT RECURRENCE

All SSPS cards will be removed from the Unit 1 SSPS and tested during the Fall 2007 Refueling Outage. Components will be repaired or replaced as required to ensure the cards are reliable.

A determination will be made if additional on-line testing/checks for the SSPS can be performed to evaluate card health in order to identify imminent failure.

Life cycle management for SSPS cards will be implemented.

7.0 SIMILAR EVENTS

This event is not a repeat of a card failure due to a zener diode failure nor is it a repeat of a card failure that caused a similar plant transient. Although similar SSPS card failures have occurred a review of the history of this universal card, A313 shows no other failures have occurred. Card failures have previously been repaired and tracked to monitor the overall failure rate. The overall failure rate has been approximately 1% of all cards. Corrective actions have been initiated to establish a strategy to test/repair/replace SSPS cards.

8.0 ADDITIONAL INFORMATION

At the time of this event, North Anna Unit 1 was operating at 100 percent power.

Component Information

Description: Universal Logic Board A313
 Manufacturer: Westinghouse / W893
 Model No.: 6056D21G01
 Serial No.: 2170