

**Virginia Electric and Power Company
Surry Power Station
5570 Hog Island Road
Surry, Virginia 23883**

June 14, 2011

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

Serial No.: 11- 312
SPS: JSA
Docket No.: 50-280
50-281
License No.: DPR-32
DPR-37

Dear Sirs:

Pursuant to 10CFR50.73, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to Surry Power Station Units 1 and 2.

Report No. 50-280, 50-281/2011-001-00

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

Very truly yours,



Gerald T. Bischof,
Site Vice President
Surry Power Station

Enclosure

Commitment contained in this letter: None



cc: U.S. Nuclear Regulatory Commission, Region II
Marquis One Tower, Suite 1200
245 Peachtree Center Ave., NE
Atlanta, GA 30303-1257

NRC Senior Resident Inspector
Surry Power Station

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.

1. FACILITY NAME Surry Power Station, Unit 1	2. DOCKET NUMBER 05000 - 280	3. PAGE 1 OF 6
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4. TITLE
Reactor Trip on Both Units Due to Loss of Offsite Power

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	16	11	2011	001	00	06	14	11	Surry Unit 2	05000 - 281
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE N	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (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)							
10. POWER LEVEL 100%	<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 checked="" 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 checked="" 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

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
B. L. Stanley, Director Safety and Licensing	(757) 365-2003

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
C	FK	BU	various	Y					

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

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

On April 16, 2011, at 1849 hours, with Surry Power Station Unit 1 at 100% reactor power and Unit 2 at 98.3% reactor power, an automatic reactor trip occurred on Unit 1 and on Unit 2 due to the loss of offsite power resulting from damage inflicted in the switchyard from a tornado. All automatic safety systems, including Emergency Diesel Generators, performed as designed. The loss of offsite power resulted in violating several Technical Specifications including unavailability of independent offsite power. Following the unit trips, Pressurizer/Pressurizer spray temperature difference and Pressurizer heatup rate were also exceeded. A Notification of Unusual Event was declared at 1855 hours due to loss of offsite power to both emergency busses on both units. This event is reportable pursuant to 10CFR50.73(a)(2)(iv)(A) since the event resulted in automatic actuation of reactor protection systems, 10CFR50.73(a)(2)(i)(B) for operation or condition prohibited by Technical Specifications, and 10CFR73.71(a)(4) for delayed implementation of compensatory measures for loss of power to one source of surveillance equipment.

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NARRATIVE

1.0 DESCRIPTION OF THE EVENT

On Saturday April 16, 2011, a Tornado Watch was issued by the National Weather Service (NWS) from 1217 hours until 2100 hours EDT for Southeastern Virginia including Surry County, Virginia. NWS issued a Tornado Warning at 1811 hours.

At 1849 hours, with Surry Power Station Unit 1 at 100% reactor power and Unit 2 at 98.3% reactor power, automatic reactor trips occurred on both units due to a loss of offsite power (LOOP) resulting from damage inflicted in the switchyard from a tornado. Damage to the switchyard resulted in a loss of power to the Reserve Station Service Transformers (RSSTs) [EIS-EA-XFMR] and Station Service Buses [EIS-EA-BU].

The operating teams promptly initiated the appropriate emergency operating procedures and completed the immediate actions with no discrepancies. Both teams initiated the abnormal procedure for the loss of power and transitioned to the Natural Circulation Cooldown procedure. A natural circulation cooldown was necessary due to loss of all Station Service Buses.

The plant responded to the reactor/turbine trip as designed. Emergency Diesel Generators (EDGs) [EIS-EK-DG] auto started and loaded, and the Anticipated Transient Without Scram Mitigation System Actuation Circuitry (AMSAC) armed and initiated. Due to the station blackout signal, the Circulating Water outlet motor operator valves (MOVs) throttled closed to approximately 25% open and the Station Blackout Diesel (AAC) automatically started. Auxiliary Feedwater (AFW) pumps [EIS-BA-P] started as designed. All three Emergency Service Water Pumps [EIS-BI-P] were started per procedure to control intake canal level. The common emergency diesel generator, EDG #3, automatically loaded onto the Unit 1 J Emergency bus [EIS-EB-BU] leaving the Unit 2 J Emergency bus de-energized as designed. At 1917 hours, EDG #3 was transferred to the Unit 2 J bus and the AAC diesel generator was aligned to the Unit 1 J bus, providing power to all emergency buses at 1922 hours.

Following the reactor trips, Unit 1 RCS cooled down below the nominal temperature of 547°F to a minimum of 517°F, and Unit 2 RCS cooled down below the nominal temperature of 547°F to a minimum of 504°F. The cooldowns were due to the loss of RCPs, the transition to natural circulation, and the coincident AFW flow. Unit 2 experienced further cooldown due to the inability to throttle AFW flow with the Unit 2 J bus initially de-energized.

A Notification Of Unusual Event (NOUE) was declared at 1855 hours due to loss of offsite power to both emergency busses on both units.

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At 2236 hours, shift personnel made a four-hour report pursuant to 10CFR50.72(b)(2)(iv)(B) due to valid automatic actuation of Reactor Protection Systems and an eight-hour non-emergency report pursuant to 10CFR50.72(b)(3)(iv)(A) due to automatic actuation of the Auxiliary Feedwater System and Emergency Diesel Generators.

At 2352 hours, both A and B RSSTs were energized by offsite power. Offsite power was restored to the Unit 1 J emergency bus and the AAC diesel was secured on April 17, 2011 at 0035 hours. Offsite power was also restored to the Unit 2 H emergency bus at 0153 hours, and EDG #2 was secured at 0241 hours. Offsite power was restored to the two remaining emergency buses, Unit 1 H and Unit 2 J, on April 17, 2011 at 1803 hours and 2109 hours, respectively, and EDG #1 and EDG #3 were secured.

A one hour notification was made to the NRC on April 17, 2011 at 0250 hours pursuant to 10CFR73.71(b) for the delayed implementation of compensatory measures for the loss of power to one source of surveillance equipment for unattended openings (UAO). Power was lost to the equipment on April 16, 2011 at 1849 hours and compensatory measures were not established until 0010 hours on April 17, 2011. All physical security barriers remained intact.

At 0515 hours on April 17, 2011, one RCP on each unit was returned to service to facilitate placing both units in Cold Shutdown. Pressurizer pressure control was challenged because adequate Pressurizer Spray flow was not available with only the A RCP in service. This condition required Operators to use auxiliary spray from the Chemical and Volume Control System (CVCS) as a means of Pressurizer pressure control. During RCS cooldown and Residual Heat Removal (RHR) heatup, the Unit 1 and Unit 2 Pressurizer temperature and charging/auxiliary spray temperature exceeded the difference limit of 320°F as allowed by Technical Specification (TS) 3.1.B.3.

Unit 2 achieved Cold Shutdown on April 17, 2011 at 1853 hours, Unit 1 achieved Cold Shutdown on April 18, 2011 at 0203 hours and TS 3.0.1 action statements were exited. The NOUE was exited on April 19, 2011 at 0745 hours after necessary repairs were completed to the switchyard.

On April 20, 2011 at 0211 hours, while performing a Unit 1 RHR system operability test, Unit 1 RHR letdown was isolated per procedure, resulting in a Pressurizer insurge. When letdown flow was restored, Pressurizer level decreased from 40% to 32% over a 15 minute period, and the Pressurizer liquid space temperature increased over a one hour period from 279°F to 425°F which exceeded the TS 3.1.B.3 Pressurizer heatup rate of less than 100°F per hour.

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This report is being submitted pursuant to:

- 10CFR50.73(a)(2)(iv)(A) as an event that resulted in the automatic actuation of engineered safety features and the reactor protection system;
- 10CFR50.73(a)(2)(i)(B) for operation prohibited by TSs;
 - Less than the minimum number of operable/operational RCS loops as required by TS 3.1.A.1.c
 - Less than two emergency buses energized on Unit 1 and Unit 2 when the RCS is greater than 350°F and 450 psig as required by TS 3.16.A.2 and 3
 - Less than the minimum number of operable physically independent circuits from the offsite transmission network to energize the 4,160V and 480V emergency buses as required by TS 3.16.A.4
 - Less than 2 circulating water pumps per unit operable when the RCS is greater than 350°F and 450 psig as required by TS 3.14.A.3
 - Less than the required number of component cooling pumps operable when the reactor coolant system is greater than 350°F and 450 psig as required by TS 3.13.B
 - The Unit 1 and Unit 2 RCS Pressurizer temperature and spray temperature exceeded the difference limit of TS 3.1.B.3
 - Unit 1 RCS Pressurizer exceeded the heatup rate specified by TS 3.1.B.3
- 10CFR73.71(a)(4) for the failure of a safeguard system that could have allowed unauthorized or undetected access to a protected area for which compensatory measures have not been employed within the required timeframe of one hour.

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

Automatic safety systems, including EDGs, performed as designed. Appropriate operator actions were taken in accordance with emergency operating procedures. Operating teams initiated the abnormal procedure for the loss of power and transitioned to the Natural Circulation Cooldown procedure that was necessary due to loss of all Station Service Buses. The units were brought to a stable condition. There were no radiation releases due to these events. Therefore, the health and safety of the public were not affected at any time during this event.

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The risk of this event was assessed considering the dual unit shutdown and the duration when offsite power was not available to power the RSSTs. The conditional core damage probability was estimated to be moderate, but the equipment required for accident mitigation in the scenarios considered remained available throughout the event. The performance of the EDGs and timely recovery of offsite power reduced the significance of this event. Physical security barriers remained intact during power loss to surveillance equipment and the Pressurizer had no adverse consequence due to exceeding Pressurizer spray line differential temperature.

3.0 CAUSE

The root cause of the LOOP and resultant dual unit trip was determined to be wind damage inflicted by a tornado that passed directly through the Surry switchyard. The transmission lines and switchyard components were not designed to withstand the wind force generated by the tornado.

The preliminary cause of the Unit 1 and Unit 2 Pressurizer and Pressurizer spray line differential temperature in excess of the TS 3.1.B.3 limit on April 17, 2011 was insufficient procedural guidance to ensure compliance with the 320°F TS limit.

The cause of the April 20, 2011 Unit 1 Pressurizer heatup rate exceeding the TS 3.1.B.3 limit was a human performance event involving operator failure to recognize the challenge of reinitiating letdown flow following conclusion of the RHR system operability test.

The preliminary cause of the untimely implementation of compensatory measures after the loss of power to UAO security equipment was conflicting prioritization of resources following the onsite tornado event.

4.0 IMMEDIATE CORRECTIVE ACTION(S)

Following the reactor trips, control room operators acted promptly to place the units in a safe, shutdown condition in accordance with emergency operating procedures.

Immediate restoration of offsite power was initiated to allow restarting an RCP on each unit, starting circulating water pumps, securing emergency service water pumps, providing offsite power to one emergency bus for each unit, and securing the AAC and EDG #2. Offsite power was restored to the two remaining emergency buses, Unit 1 H and Unit 2 J, on April 17, 2011 at 1803 hours and 2109 hours, respectively.

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5.0 ADDITIONAL CORRECTIVE ACTIONS

Tornado generated debris from the switchyard that was deposited in the intake canal was removed prior to startup of Unit 1.

The procedure for RCS and Pressurizer heatup/cool-down verification has been revised to enhance monitoring of critical parameters necessary to prevent exceeding the Pressurizer spray line differential temperature limit. An Apparent Cause Evaluation (ACE) is reviewing both Unit 1 TS 3.1.B.3 violations and corrective actions from the ACE will be implemented. An evaluation of exceeding the Pressurizer spray line differential temperature limit was performed and concluded there was no adverse consequence to the Pressurizer, and the Pressurizer is capable of performing its design function.

Following the loss of power to the UAO post related security equipment, interim actions were implemented to ensure the timely implementation of compensatory measures. An ACE will be completed and corrective actions will be implemented to ensure unattended access openings remain protected.

Operators involved with managing the thermal limits when the April 20, 2011 Unit 1 Pressurizer heatup rate exceeded the TS 3.1.B.3 limit were removed from licensed duties for remediation.

6.0 ACTIONS TO PREVENT RECURRENCE

To minimize the complications from recurrence of a similar event, an evaluation will be completed to look for enhancements to the switchyard.

7.0 SIMILAR EVENTS

None

8.0 MANUFACTURER/MODEL NUMBER

None

9.0 ADDITIONAL INFORMATION

Unit 1 was brought online at 1952 hours on April 23, 2011. Unit 2 commenced the scheduled refueling outage.