

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

July 11, 2016

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

Serial No.: 16-273  
SPS: TSC  
Docket No.: 50-280  
50-281  
License No.: DPR-32  
DPR-37

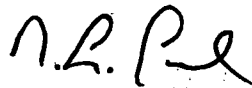
Dear Sir or Madam:

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

Report No. 50-280, 50-281/2016-001-00

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,



N. L. Lane,  
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

IE22  
NRR

**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 [Infocollections.Resource@nrc.gov](mailto:Infocollections.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 4

**4. TITLE**

Emergency Service Water Pump Inoperable Due to Corrosion of Valve Support

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
05	11	2016	2016	- 001 - 00		07	11	2016	Surry Power Station, Unit 2	05000 - 281
									FACILITY NAME	DOCKET NUMBER
										05000

**9. OPERATING MODE****11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)**

N	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
100	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<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)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<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)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

**12. LICENSEE CONTACT FOR THIS LER**

## LICENSEE CONTACT

Barry Garber

## TELEPHONE NUMBER (Include Area Code)

(757) 365-2725

**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
X	BI	PSF	B779	Y	X	BI	SPT	H913	Y

**14. SUPPLEMENTAL REPORT EXPECTED**☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

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

On April 7, 2016 at 0638 hours, with Surry Power Station Units 1 and 2 operating at 100% power, the Emergency Service Water Pump (ESWP) 1B cooling water discharge valve flange was found to be cracked, and the pump was declared inoperable. During flange and valve support repair activities, four bolts on the cooling water discharge valve support base plate were found to be failed due to corrosion. The flange was replaced and the support base plates were anchored with stainless steel bolts. ESWP 1B was returned to operable status on April 9, 2016 at 1105 hours. The cause of the flange and support failure was corrosion of the base plate and anchor bolts from repetitive exposure to service water. On May 11, 2016, an Engineering evaluation determined that the piping and support had been non-functional for prior operability based on the potential for lateral displacement during a seismic event. Therefore, this report is being submitted, pursuant to 10 CFR 50.73(a)(2)(i)(B), for operations prohibited by Technical Specifications, and pursuant to 10 CFR 50.73(a)(2)(v)(B), an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat. Based on the risk assessment of this event, the risk impact was determined to be of very low significance, and, as a result, the health and safety of the public were not affected.

NRC FORM 366A  
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



## LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Surry Power Station, Unit 1	05000 - 280	2016	001	00

### NARRATIVE

#### 1.0 DESCRIPTION OF THE EVENT

Three diesel-driven vertical Emergency Service Water Pumps (ESWPs) [EIS-BI-P] are provided at the James River intake structure [EIS-KE-NN] to deliver required service water makeup to the intake canal [EIS-KE-NN] in case of a total loss of station power. In the event of a Loss of Coolant Accident (LOCA) and a total loss of station power, with the requirement that the non-LOCA unit must also be cooled down, two of the three ESWPs would be required to provide the design service water makeup. Technical Specification (TS) 3.14.A.4 states that when the reactor coolant system temperature or pressure exceeds 350°F or 450 psig, three emergency service water pumps shall be operable. TS 3.14.B allows one ESWP to remain inoperable for a period not to exceed 7 days.

On April 7, 2016, during a walk-down of the ESWP house [EIS-BI-MK], the ESWP 1B cooling water discharge valve piping flange [EIS-BI-LB-PSF] was found to be cracked. A follow on Engineering and Maintenance inspection confirmed the cracked flange and observed a cooling water discharge valve support [EIS-BI-LB-SPT] was raised due to corrosion buildup under the support base plate. With Units 1 and 2 operating at 100% power, ESWP 1B was declared inoperable as of 0638 hours, based on the deteriorated condition of the flange.

During flange repair activities, the valve support, consisting of two stanchions and two base plates, was removed to install stainless steel anchor bolts. On the north base plate, the existing carbon steel anchor bolts were found to be failed due to corrosion. The cracked flange was repaired, the valve support base plate anchor bolts were replaced, and ESWP 1B was returned to operable status on April 9, 2016 at 1105 hours. The elapsed time from discovery until the ESWP 1B was returned to service was 52 hours and 27 minutes.

On May 11, 2016, an engineering review determined that the piping and support were non-functional for prior operability based on the potential for lateral displacement during a seismic event. If this were to occur, cooling water would discharge to the ESWP house. It is expected that since ESWPs are operated locally, the ESWP 1B would be shut down to minimize water intrusion into the ESWP pump house. Based upon the as-found conditions of the failed valve support anchor bolts, the condition of the ESWP 1B was determined to be present for a time greater than the 7 day limiting condition. Therefore, this report is being submitted pursuant to 10 CFR 50.73 (a)(2)(i)(B), an operation or condition that was prohibited by the plant's Technical Specifications. In addition, during the prior 7-day period when ESWP 1B was determined to be inoperable, ESWP 1C was removed from service for maintenance. Therefore, this report is also being submitted pursuant to 10 CFR 50.73(a)(2)(v)(B), an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat.

#### 2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

The duration of the ESWP 1B flange and valve support failure is undetermined due to the nature of

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corrosion progression. The engineering review determined that the degraded condition was present for a period longer than the 7-day allowed outage time. A review of surveillance testing conducted since 2014 found no leakage observed from the cooling water discharge. Based upon the successful completion of the operability tests, ESWP 1B could have performed its design function in the event of a Design Basis Large Break LOCA coincident with a loss of offsite power. However, if a seismic event were also to occur, the cooling water discharge pipe could fail, due to the degraded support, and ESWP 1B would be shutdown to prevent water intrusion into the ESWP house.

Seismic Reliability evaluations indicate that ESWPs do not play a significant role in Seismic Core Damage Sequences. The probability of a Design Basis Large Break LOCA coincident with a loss of offsite power and a seismic event is low. Therefore, based on the assessment of this event, the risk impact was determined to be of very low significance, and, as a result, the health and safety of the public were not affected.

**3.0 CAUSE**

The preliminary cause of the ESWP 1B cooling water discharge valve support and flange failure was due to corrosion of the base plate and anchor bolts from repetitive exposure to service water. The carbon steel support base plates and carbon steel anchor bolts were located in a low spot on the concrete floor and were subjected to wet conditions. The base plate corrosion caused the support to elevate, applied stress to the joint, and cracked the flange.

**4.0 IMMEDIATE CORRECTIVE ACTIONS**

Repairs to the ESWP 1B cooling water discharge piping and support were completed, and the ESWP 1B was returned to operable status April 9, 2016 at 1105 hours. ESWP 1A and 1C cooling water discharge valves, piping, and supports were inspected and found to be unaffected.

**5.0 ADDITIONAL CORRECTIVE ACTIONS**

An apparent cause evaluation was initiated for this event.

An extent of condition was performed in the ESWP house and corrosion was identified on other support base plates. These conditions were evaluated and no further operability concerns were identified. The additional items were entered into the corrective action program.

**6.0 ACTIONS TO PREVENT RECURRENCE**

The ESWP 1B cooling water discharge valve support anchor bolts were replaced with stainless steel anchor bolts to limit the vulnerability to corrosion.

The corrective actions from the approved apparent cause evaluation will be entered into the corrective action program.

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**7.0 SIMILAR EVENTS**

In 2015, corroded floor anchor bolts on a service water pipe support In Mechanical Equipment Room (MER) #3 were observed but the design function was not affected. Corrective actions extent of condition was limited to other supports in MER #3 and #4 (CR1012368).

**8.0 MANUFACTURER/MODEL NUMBER**

Flange - 3 inch fiberglass; support foundation base plate material carbon steel; concrete anchor bolts - carbon steel Hilti Kwik Bolt

**9.0 ADDITIONAL INFORMATION**

None