10CFR50.73

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

May 18, 2022

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

Serial No.: 22-160
SPS: SCN
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 / 2022-001-00

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

Very truly yours,

Fred Mladen
Site Vice President
Surry Power Station

Enclosure

Commitment contained in the LER: 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

NRC FORM 366 (08-2020) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2023

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LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. Facility Name	2. Docket Number	3. Page
Surry Power Station Unit 1	05000 280	1 OF 4

4. Title

Failure of Two Intake Canal Level Probes Due to Biofouling

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
03	22	2022	2022	- 001 -	00	05	18	2022	Surry Power Station Unit 2	05000 281
									Facility Name	Docket Number 05000

9. Operating Mode	10. Power Level
N	100

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*

10 CFR Part 20	☐ 20.2203(a)(2)(vi)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(A)	**10 CFR Part 73**
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.69(g)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(4)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(i)	**10 CFR Part 21**	☑ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(1)(i)
☐ 20.2203(a)(2)(ii)	☐ 21.2(c)	☐ 50.73(a)(2)(i)(C)	☑ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(i)
☐ 20.2203(a)(2)(iii)	**10 CFR Part 50**	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)	☐ 73.77(a)(2)(ii)
☐ 20.2203(a)(2)(iv)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)	
☐ 20.2203(a)(2)(v)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)	

☐ **OTHER** (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include area code)
Fred Mladen, Surry Power Station Site Vice-President	(757) 365-2001

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS		Cause	System	Component	Manufacturer	Reportable to IRIS
C	JE	LE	F132	Y						

14. Supplemental Report Expected		15. Expected Submission Date	Month	Day	Year
☑ No	☐ Yes (If yes, complete 15. Expected Submission Date)				

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

The non-essential Service Water (SW) automatic isolation function ensures adequate intake canal inventory can be maintained by the emergency service water pumps following a design basis accident. This is accomplished using intake canal level probes which will isolate the non-essential equipment once the canal level drops below a predetermined level. On 3/22/2022 during routine testing, 2 of the 4 probes failed their response time test. The probes were cleaned, retested satisfactory, and returned to service.

The cause of the test failure was determined to be biofouling. There were no safety consequences since an engineering analysis concluded that the intake canal level and inventory would have been sufficient to support all accident analysis assumptions. Planned corrective actions include increased testing to monitor the biofouling buildup and the continued testing of probe coatings to reduce the biofouling.

This event is being reported as a condition prohibited by the stations' Technical Specifications and a common cause failure.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Surry Power Station Unit 1	05000- 280	2022	- 001	- 00

NARRATIVE

Plant Operating Conditions Prior to the Event

Both units operating at 100%

1.0 Description of Event

The non-essential Service Water (SW) automatic isolation function [EIIS: JE, KG] ensures adequate intake canal inventory can be maintained by the emergency service water pumps [EIIS: BI, P] following a design basis loss of coolant accident (LOCA) with a coincident loss of offsite power (LOOP). This function is designed to actuate when any three of the four intake canal level probes [EIIS: JE, LE] sense water level drop from the normal 28-foot level past a fixed level point of 23.5 feet. The probes are required to actuate in 55 seconds or less to ensure that the automatic logic initiates prior to the intake canal level dropping to 23 feet under all design basis scenarios. The 23-foot level is the initial condition used in the accident analyses.

The four (4) intake canal level probes are routinely cleaned and inspected from April to October. This is based on the typical period that the colonial hydroids grow in the service water system, plus some buffer time on either side of that time range. Typically, the probes are found clean during the April and May cleanings and found clean in the September and October cleanings. Although there is some variance from year to year, in general, this cleaning period has worked best for the discovery and removal of colonial hydroids.

On 3/22/2022, the 18-month channel 1 and channel 4 [EIIS: JE, CHA] intake canal level probe calibrations were both scheduled. They were scheduled and performed sequentially. Both probes had been installed approximately 18 months earlier (channel 1 on 7/10/2020 and channel 4 on 7/15/2020). The channel 1 probe was tested first and produced an as found response time of 106 seconds. This was greater than the 55 second acceptance criteria. The probe was inspected and cleaned per the calibration procedure. Minimal fouling was noted (recorded as 0%-5% and hydroid-free). The actuation settings were checked per the calibration procedure. No adjustments were made, and no problems were found. The probe was retested in accordance with the calibration procedure and produced a satisfactory response time of 38 seconds.

Following this completed calibration, the channel 4 probe was tested, with an as-found response time of 119 seconds. The probe was inspected and cleaned per the calibration procedure. Minimal fouling was noted (also recorded as 0%-5% and hydroid-free). The actuation settings were checked per the calibration procedure. No adjustments were made, and no problems were found. The probe was retested in accordance with the procedure and had a satisfactory response time of 53 seconds.

Since a satisfactory response time was obtained on each probe with no actions performed, other than the cleaning, it was concluded that the slow time response on each probe was due to the common cause of biofouling. Since biofouling is a phenomenon that requires a period of a few days to become established, it is likely that the biofouling existed on both probes for a period exceeding 72 hours prior to the test.

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NARRATIVE

The probes were last cleaned and inspected on 10/5/2021. The channel 3 probe had been time response tested with satisfactory results (10-15 seconds) on 3/2/2022. The channel 2 probe was time response tested with satisfactory results (17 seconds) on 4/19/2022.

Reportability

A review of each individual probe test (on 3/22/2022) showed that in both cases, the Technical Specification (TS) actions taken were appropriate based on a time of discovery failure determination. However, when the tests are taken in aggregate and assessed against the reporting requirements delineated in NUREG-1022, Rev. 3, "Event Report Guidelines 10 CFR 50.72 and 50.73," it was concluded that both probes were likely inoperable prior to their time of discovery and that the station had operated in a condition prohibited by the TS; Consequently, this report is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B). This report is also being reported pursuant to 10 CFR 50.73(a)(2)(vii)(D) as a common cause inoperability of independent trains or channels, i.e., a single cause resulted in two independent probe channels to become inoperable in a single system designed to mitigate the consequences of an accident.

2.0 Significant Safety Consequences and Implications

To determine the potential impact of the slow time response on the non-essential SW automatic isolation function, Engineering performed an evaluation to determine the intake canal minimum level that would have resulted from the slow time responses measured on 3/22/2022. This evaluation assessed the operating conditions present during the interval from the last cleaning (10/5/2021) to the time of the calibration tests (3/22/2022).

The analysis concluded that the intake canal level and inventory would have been sufficient to support all accident analysis assumptions even if all four probes were conservatively assumed to actuate at the slowest of the four as found measured response times. In other words, the non-essential service water would have isolated prior to the intake canal level dropping below the assumed initial condition level of 23 feet.

Additionally, intake canal level is also monitored by an independent system that provides level indication and high/low level alarms in the main control room. In the event of loss of intake canal level, station procedures direct corrective/ mitigative actions, including isolation of non-essential SW.

In summary, this event resulted in no safety consequences or significant implications and the health and safety of the public was not affected at any time.

3.0 Cause of the Event

Since both intake canal level probes produced a satisfactory response time with no actions other than being cleaned, it has been concluded that the cause of the event was due to the material that was removed when cleaned. Observations indicate a muddy film that is suspected of being biofouling noted on both probes.

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
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NARRATIVE

The biofilm was easily removed with a clean cotton cloth. Once the fouling was removed, the response time testing was found to be satisfactory. The channel 1 probe retested at 38 seconds and the channel 4 probe retested at 53 seconds. These response times are comparable to response times measured during bench testing (i.e., when clean).

4.0 Immediate Corrective Action

The probes were cleaned, retested, and returned to service.

5.0 Additional Corrective Actions

On 4/21/2022, all four intake canal probes were inspected and cleaned as part of the routine April to October cleaning cycle.

6.0 Planned Corrective Actions

1. Several new coatings are being tested to reduce the biofouling material buildup. The performance of these probes and coatings will be monitored throughout the summer and winter seasons for effectiveness.

2. The cleaning frequency will be changed from April to October, which was based on calendar months, to year-round until the cause of the biofouling is better understood.

7.0 Similar Events

1. LER S1 1997-009-01, "Intake Canal Level Probes Inoperable Due to Marine Growth."
2. LER S1 1998-010-00, "Intake Canal Level Probes Inoperable Due to Marine Growth."

8.0 Additional Information

Units 1 and 2 continued to operate at 100% power.

Failed Component - Liquid Level Switch, Model 8-66, Manufactured by Fluid Components International (FCI).