

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

September 19, 2022

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

Serial No.: 22-247
SPS: MSG
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. 50-280/2022-002-00

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

Commitments 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



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/>)

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, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: oir_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name
Surry Power Station, Unit 1

2. Docket Number
05000 280

3. Page
1 OF 4

4. Title
Failure of Unit 1 Emergency Diesel Generator Results in an Operation or Condition Prohibited by Technical Specifications

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
07	25	2022	2022	- 002 -	00	09	15	2022	Surry Power Station, Unit 2	05000 281
									Facility Name	Docket Number
										05000

9. Operating Mode

N/N

10. Power Level

100/100

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

<input type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 10 CFR Part 21	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<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)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
<input type="checkbox"/> OTHER (Specify here, in abstract, or NRC 366A).				

12. Licensee Contact for this LER

Licensee Contact
Fred Mladen, Site Vice President, Surry Power Station

Phone Number (Include area code)
(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
B	EK	DG	G080	Y					

14. Supplemental Report Expected

No Yes (If yes, complete 15. Expected Submission Date)

15. Expected Submission Date

Month	Day	Year

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

On July 25, 2022, with both Surry Power Station Units 1 and 2 at 100% power, the 7-day Technical Specification (TS) Allowed Outage Time (AOT) for an emergency diesel generator (EDG) was exceeded due to a partial loss of load during monthly surveillance testing for the Unit 1 emergency diesel generator (EDG-1), requiring repair and restoration. To complete the EDG-1 repair, balancing, testing, and return to service, a request for enforcement discretion was submitted and approved that extended the TS AOT by two days (for a total of nine days). During event troubleshooting, it was revealed that the cause was corrosion between the lugs of the field lead causing a hard ground on one pole of the generator rotor.

The risk analysis performed for this event concluded that the increase in core damage and large early release probability remained within the NRC Enforcement Manual, Appendix F limits. Completed corrective actions included the replacement of the EDG-1 generator and verification of operability of the EDG-2 and EDG-3.



**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/>)

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, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: omb_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME Surry Power Station, Unit 1	2. DOCKET NUMBER 05000-280	3. LER NUMBER		
		YEAR 2022	SEQUENTIAL NUMBER 002	REV NO. 00

NARRATIVE

PLANT OPERATING CONDITIONS BEFORE THE EVENT

Surry Power Station (SPS) Unit 1 and Unit 2 were at 100% power.

1.0 DESCRIPTION OF THE EVENT

The SPS emergency diesel generator (EDG) [EIS: DG] for Unit 1 (EDG-1) and Unit 2 EDG (EDG-2) are dedicated to emergency buses 1H and 2H [EIS: BU], respectively. A third diesel generator (EDG-3) is provided as a "swing diesel" and is shared by both units (the "J" bus). Each EDG has 100% capacity and is connected to an independent 4160 V emergency bus. EDG-1 provides emergency power to certain equipment and systems common to Units 1 and 2, including the Auxiliary Feedwater system (AFW) [EIS: BA] cross-tie between Units 1 and 2, the Auxiliary building [EIS: NF] filter exhaust fan [EIS: FAN], Main Control Room (MCR) [EIS: NA] chiller [EIS: CHU], and MCR/Emergency Switchgear Room [EIS: EK] filtered supply fans [EIS: FAN].

At 0956 on July 18, 2022, the SPS EDG-1 for Unit 1 was removed from service to perform the monthly surveillance test. Approximately 20 minutes after reaching full load, EDG-1 experienced a partial loss of load. The MCR operators noted that the generator load had lowered and the generator output current indication was above the normal amps for fully loaded. Local field operators noted a change in engine sound normally associated with decreasing load; subsequently, EDG-1 was unloaded and ran unloaded for 30 minutes before being secured in accordance with the normal shutdown sequence. Following shutdown, EDG-1 was removed from service for investigation.

Troubleshooting was performed, and it was discovered that a lead to the generator exciter [EIS: EXC] was grounded. A physical inspection of this lead revealed a failure between the generator brush rigging and the panel wiring at the bolted connection point. A bridge and megger check on the generator stator was satisfactory. Further troubleshooting of the generator rotor indicated a hard ground on one out of eight (8) rotor poles.

It was concluded that repairs to EDG-1 were necessary, including replacement of the generator. During the return-to-service testing portion of the repair effort, activities required to complete the repair, perform post-maintenance testing, and return the SPS Unit 1 EDG-1 to service would not be accomplished within the 7-day Allowed Outage Time (AOT) (reference: TS 3.16.B.1.a.3 for an inoperable EDG), and as such, a request for enforcement discretion was requested and verbally approved on July 24, 2022, at 14:27. This enforcement discretion allowed a 2-day extension to the 7-day AOT to complete the EDG-1 return to service activities.

TS 3.16.B.1.a.3 requires an inoperable EDG to be restored to service within seven (7) days or action be initiated to place the appropriate unit in a shutdown condition. In addition, TS 3.0.2 states that TS action statements associated with any individual systems, subsystems, trains, components, and devices that EDG-1 supports also would be governed by the 7-day EDG AOT. Since EDG-1 provides emergency power to certain equipment and systems common to Units 1 and 2, the shutdown of Unit 2 also would be required upon the expiration of the EDG-1, 7-day AOT.

During final return-to-service testing, at 0956 on July 25, 2022, with both Surry Power Station (SPS) Unit 1 and Unit 2 at 100% power, the AOT for TS 3.16.B.1.a.3 was exceeded for Unit 1. Additionally, TS 3.0.2 for Unit 2 was not satisfied due to the inoperability of EDG-1 beyond that allowed by TS 3.16.B.1.a.3. Both units remained at 100% power throughout the restoration of EDG-1 that was declared operable at 1705 on July 26, 2022.



**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/>)

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, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: oira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME Surry Power Station, Unit 1	2. DOCKET NUMBER 05000-280	3. LER NUMBER		
		YEAR 2022	SEQUENTIAL NUMBER 002	REV NO. 00

NARRATIVE

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

Due to the unavailability of EDG-1, additional Probabilistic Risk Assessment (PRA) calculations were performed to support the requested enforcement discretion for the additional 48-hour extension of the AOT for TS 3.16. The additional PRA calculations performed, without compensatory measures included, indicated values of 3.301E-08 for the Incremental Conditional Core Damage Probability (ICCDP) and 1.967E-09 for Incremental Conditional Large Early Release Probability (ICLERP), which were below the NRC Enforcement Manual, Appendix F, limits of 5E-7 for ICCDP and 5E-8 for ICLERP. Additionally, during the period of enforcement, compensatory actions were put in place for defense-in-depth protection.

3.0 CAUSE OF THE EVENT

The EDG-1 was in service for approximately 50 years when the generator failure occurred. A physical inspection of the field lead disclosed a failure between the generator brush rigging and the panel wiring at the bolted connection point. Further troubleshooting of the generator rotor indicated a hard ground on one (1) of eight (8) poles. The failure of the lead caused additional electrical stress on the insulation system of the field that resulted in the first coil on the pole closest to the field connection to fail to ground. The failed generator was sent to the vendor for failure analysis, and the vendor confirmed that the field circuit was grounded to the shaft through a grounded pole. From the failure analyses performed, it was revealed that the cause was corrosion between the lugs of the field lead that led to the hard ground on one pole of the generator rotor.

4.0 IMMEDIATE CORRECTIVE ACTION

EDG-1 was declared inoperable and removed from service. In accordance with TS 3.16.B.1.a.2, the EDG-2 and the swing EDG-3 were successfully run within 24 hours to demonstrate operability and to ensure that the EDGs were not susceptible to a common cause failure. Additionally, due to EDG-1 providing emergency power to the AFW cross-tie between Units 1 and 2, TS 3.6.1.3 was entered. Equipment protections were implemented to protect safe shut down capabilities, and troubleshooting efforts were initiated.

5.0 ADDITIONAL CORRECTIVE ACTIONS

When the short to ground was discovered on one of the field windings, troubleshooting efforts were suspended in favor of generator replacement. Compensatory measures were implemented during the extended EDG-1 AOT as specified in the approved Notice of Enforcement Discretion (NOED). Completed corrective actions include the replacement of the EDG-1 generator, replacement of the field lead and repair of the connection, and inspection of the EDG-3 field leads for corrosion and heating.

6.0 PLANNED CORRECTIVE ACTIONS

Planned corrective actions include refurbishment of the failed EDG-1 generator and inspection of the EDG-2 field leads for corrosion and heating.



**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/>)

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, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: oir_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME		2. DOCKET NUMBER		3. LER NUMBER		
Surry Power Station, Unit 1		05000-		280		
				YEAR	SEQUENTIAL NUMBER	REV NO.
				2022	002	00

NARRATIVE

7.0 SIMILAR EVENTS

A review of the last five years showed no similar events at SPS.

8.0 ADDITIONAL INFORMATION

SPS Unit 1 and Unit 2 remained at 100% power throughout the repair and return to service of EDG-1.

Failed Component: Generator/General Motors/Electro-motive Division, A-20 style generator