



Kent Scott
Site Vice President
225-381-4374

RBG-48194

10 CFR 50.73

September 01, 2022

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Licensee Event Report 50-458 / 2022-03-00, Division 1 Standby Diesel
Generator Speed Sensor Power Supply Failure

River Bend Station – Unit 1
NRC Docket Nos. 50-458
Renewed Facility Operating License No. NPF-47

In accordance with 10 CFR 50.73, enclosed is the subject Licensee Event Report.

This document contains no commitments.

Should you have any questions, please contact Mr. Tim Schenk, Regulatory Assurance
Manager, at 225-381-4177.

Respectfully,

KCS/dmw

Enclosure: Licensee Event Report 50-458 / 2022-03-00, Division 1 Standby Diesel
Generator Speed Sensor Power Supply Failure

cc: NRC Region IV Regional Administrator - Region IV
NRC Senior Resident Inspector - River Bend Station
NRC Project Manager - River Bend Station

RBG-48194
Enclosure
Page 1 of 1

Enclosure

RBG-48194

**Licensee Event Report 50-458 / 2022-03-00, Division 1 Standby Diesel Generator Speed
Sensor Power Supply Failure**



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
<https://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 Collection 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 River Bend Station, Unit 1	2. Docket Number 05000 458	3. Page 1 OF 3
---	--------------------------------------	--------------------------

4. Title
Division 1 Standby Diesel Generator Speed Sensor Power Supply Failure

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
07	04	2022	2022	003	00	09	01	2022	NA	05000 NA
									NA	05000 NA

9. Operating Mode 1	10. Power Level 100%
-------------------------------	--------------------------------

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

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 checked="" type="checkbox"/> 50.73(a)(2)(v)(A)	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 checked="" 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 checked="" type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" 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)	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 in NRC 366A).				

12. Licensee Contact for this LER

Licensee Contact Tim Schenk, Manager – Regulatory Assurance	Phone Number (Include Area Code) 225-381-4177
--	--

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
X	EK	CNV	D283	Y	X	EK	CNV	D283	Y

14. Supplemental Report Expected			15. Expected Submission Date		
<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)		Month	Day	Year
			11	09	2022

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

On July 04, 2022, at 2115 Central Time, while River Bend Station, Unit 1 was operating in Mode 1 at 100 percent power, the Division 1 Standby Diesel Generator was declared Inoperable due to failure of redundant power supplies in the speed control circuitry. This was discovered during monthly surveillance testing. The failed power supplies provide power to the exciter flash circuitry and ramp governor control. This condition would have prevented the Division 1 Standby Diesel Generator from providing power to Division 1 Emergency Loads.

The issue was determined to be reportable in accordance with 10 CFR 50.73(a)(2)(v)(A), (B), (C), and (D) as any event or condition that could have prevented the fulfillment of the safety function of structures or systems. This event was not reportable in accordance with 10 CFR 50.72 because the Division 2 Standby Diesel Generator was operable and available at the time of discovery.

The condition was corrected by replacing the power supplies on July 07, 2022.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<https://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 Collection 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		
River Bend Station, Unit 1	05000- 458	YEAR	SEQUENTIAL NUMBER	REV NO.
		2022	- 003	- 00

NARRATIVE

EVENT DESCRIPTION

On July 04, 2022, at 2115 Central Time, River Bend Station, Unit 1 (RBS) was operating in Mode 1 at 100 percent power. There were no other structures, systems, or components (SSCs) that were inoperable that contributed to this event.

A failure was identified in the speed control circuitry of the Division 1 Standby Diesel Generator (EGS-EG1A) [EK] [DG] during monthly surveillance testing per STP-309-0201, Division I Diesel Generator Operability Test. EGS-EG1A was declared inoperable due to the speed control circuitry failure and documented in the RBS Corrective Action Program in CR-RBS-2022-03801.

EGS-EG1A speed control circuit contains redundant Dynalco SDC-2000, 125 VDC to 24 VDC power supply converters (EGS-E/EX43A and EGS-E/EY43A) [CNV]. These components supply power to individual speed switches and tachometers. EGS-E/EY43A also supplies power to Emergency Response Information System (ERIS) [ID] computer point (EGSEY009) [SI]. The speed control circuit is designed such that either one of the power supplies is sufficient to allow field flash and loading of the diesel generator. These power supplies were refurbished by Paragon and installed in December 2020. The failures occurred after approximately 1.5 years with an expected replacement frequency of 8 years.

Timeline of events:

- 06/01/22 – STP-309-0201, Division 1 Diesel Generator Operability Test completed. This was the last known successful operability run for EGS-EG1A. This verified that both EGS-E/EX43A and EGS-E/EY43A were functioning properly on 06/01/22 because the local tachometers and EGSEY009 provided proper indication.
- 06/08/22 – ERIS computer point, EGSEY009 "flatlined" starting on 06/08/22, which is most likely when EGS-E/EY43A lost power. This was not a normally monitored component and went undetected until troubleshooting identified the condition on 07/05/22.
- 06/12-13/22 – Performed STP-309-0202, Division 2 Diesel Generator Operability Test. The normal requirements of this test resulted in 0.63 hours of Unavailability for the Division 2 Standby Diesel Generator (EGS-EG1B) [EK] [DG].
- 07/04/22 – EGS-EG1A, Division 1 Emergency Diesel Generator was declared inoperable.
- 07/05/22 – Trouble shooting determined the failure of both power supplies EGS-E/EX43A and EGSE/EY43A.
- 07/05/22 – Trouble shooting determined that both power supplies had blown fuses.
- 07/05/22 – Common Mode Failure evaluation determined that EGS-EG1B utilizes the same exact design and manufacturer for these components. However, voltage readings for EGS-E/EX43B and EGS-E/EY43B were satisfactory leading to the conclusion that the failure was not currently present in EGS-EG1B.
- 07/05/22 – Common Mode Failure evaluation excluded the Division 3 High Pressure Core Spray Diesel Generator due to differing designs.
- 07/06/22 – RBS function testing to determine the cause of the blown fuses was inconclusive.
- 07/07/22 – Completed installation of EGS-E/EX43A and EGS-E/EY43A power supplies per Engineering Change (EC-87792). The new Phoenix power supplies are designed with external lights to provide positive indication of power status.
- 07/07/22 – Completed post maintenance testing and declared EGS-EG1A operable.
- 08/04/22 – The failed Dynalco SDC-2000 power supplies were shipped to an outside vendor, Engine Systems Inc., to perform a detailed failure analysis. Preliminary results are expected in September 2022.

As stated in the timeline above, monthly surveillance testing rendered EGS-EG1B unavailable for a total of 0.63 hours during June 12-13, 2022. The discovery of EGSEY009 "flatlined" starting on June 08, 2022, means that EGS-E/EY43A most likely lost power at that time. Although either EGS-E/EY43A or EGS-E/EX43A functioning properly would allow EGS-EG1A to load, the timing of EGS-E/EX43A power loss is unknown. Therefore, this condition is being reported in accordance with 10 CFR 50.73(a)(2)(v) as "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (A) Shut down the reactor and maintain it in a safe shutdown condition; (B) Remove residual heat; (C) Control the release of radioactive material; or (D) Mitigate the consequences of an accident." This event was not an ENS notification because EGS-EG1B was operable and available at the time of discovery.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<https://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 Collection 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		
River Bend Station, Unit 1	05000- 458	YEAR	SEQUENTIAL NUMBER	REV NO.
		2022	- 003	- 00

SAFETY ASSESSMENT

This assessment is being performed under the assumption that EGS-E/EX43A lost power on June 08, 2022, the same day that EGSEY009 "flatlined" which indicated that EGS-E/EY43A had lost power. This would have made EGS-EG1A unavailable from June 08, 2022, until July 07, 2022, when the new Phoenix power supplies were installed and EGS-EG1A was declared operable. On June 12-13, 2022, EGS-EG1B was placed in Maintenance Mode and made unavailable for a total of 0.63 hours to support normal surveillance testing. If an actual Loss of Offsite Power had occurred while EGS-E1B was in Maintenance Mode, operators would have restored it back to Operational Mode in accordance with AOP-0050, STATION BLACKOUT and/or SOP-0053, STANDBY DIESEL GENERATOR AND AUXILIARIES. EGS-EG1B was available for most of time that EGS-EG1A was unavailable. Additionally, no Loss of Offsite Power or Loss of Coolant Accident occurred during this time, therefore this event was of minimal significance to the health and safety of the public.

EVENT CAUSE

The direct cause of this event is currently unknown. The RBS troubleshooting plan identified blown fuses internally to both power supplies. The team understood that a blown fuse is not a cause but a symptom and continued to perform preliminary testing on the removed power supplies which produced inconclusive results.

The inconclusive results of testing the faulty power supplies at RBS dictated that a failure analysis would be required by an outside vendor. Both failed power supplies were shipped to Engine Systems, Inc. on August 04, 2022. RBS is scheduled to receive preliminary results in September 2022. RBS plans to submit a supplemental report detailing the results of the vendor failure analysis.

CORRECTIVE ACTIONS

Completed:

- Replaced EGS-EG1A power supplies, EGS-E/EX43A and EGS-E/EY43A. The new design by Phoenix has external indication of power status.
- Replaced EGS-EG1B power supplies, EGS-E/EX43B and EGS-E/EY43B. The new design by Phoenix has external indication of power status.
- Revised OSP-0028 LOG REPORT - NORMAL SWITCHGEAR, CONTROL, AND DIESEL GENERATOR BUILDINGS to include local monitoring of EGS-E/EX43A, EGS-E/EY43A, EGS-E/EX43B, and EGS-E/EY43B power supply lights once per shift.
- Revised OSP-0027 LOG REPORT - MAIN CONTROL ROOM to include monitoring ERIS computer points associated with Division 1, 2, and 3 Diesel Generator tachometers from the Main Control Room once per shift.

Planned actions tracked in the Corrective Action Program:

- Revise the Adverse Condition Analysis product to incorporate findings and learnings from the vendor failure analysis. The intent is to present the updated document to station management.
- Submit a supplement to this Licensee Event Report to incorporate the findings of the vendor failure analysis.

PREVIOUS SIMILAR EVENTS

None

NOTE:

Energy Industry Identification System (EIIIS) codes and component codes are identified in the text of this report as [XX].