



Exelon Generation Company, LLC  
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Braidwood Station  
35100 South Route 53, Suite 84  
Braceville, IL 60407-9619

10 CFR 50.73

June 18, 2018  
BW180064

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

Braidwood Station, Unit 1  
Renewed Facility Operating License No. NPF-72  
NRC Docket No. STN 50-456

Subject: Licensee Event Report 2018-001-00 – 1A Emergency Diesel Generator Lost Voltage During a Surveillance Due to a Failed Exciter Diode, Which Resulted in an Unplanned Actuation of Bus 141 Undervoltage Relay

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee Event Report System."

There are no regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact Mr. Francis Jordan, Regulatory Assurance Manager, at (815) 417-2800.

Respectfully,

A handwritten signature in black ink that reads "Marri Marchionda-Palmer".

Marri Marchionda-Palmer  
Site Vice President  
Braidwood Station

Enclosure: LER 2018-001-00

cc: NRR Project Manager – Braidwood Station  
Illinois Emergency Management Agency – Division of Nuclear Safety  
US NRC Regional Administrator, Region III  
US NRC Senior Resident Inspector (Braidwood Station)  
Illinois Emergency Management Agency – Braidwood Representative



### LICENSEE EVENT REPORT (LER)

(See Page 2 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/nureqs/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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by 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.

<b>1. Facility Name</b> <b>Braidwood Station, Unit 1</b>	<b>2. Docket Number</b> <b>05000456</b>	<b>3. Page</b> <b>1 OF 3</b>
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**4. Title**  
1A Emergency Diesel Generator Lost Voltage During a Surveillance Due to a Failed Exciter Diode, Which Resulted in an Unplanned Actuation of Bus 141 Undervoltage Relay

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	19	2018	2018	- 001 -	00	06	18	2018	N/A	N/A
									Facility Name	Docket Number
									N/A	N/A

<b>9. Operating Mode</b>	<b>11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)</b>			
6	<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 checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<b>10. Power Level</b>	<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)
000	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input 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 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**

<b>Licensee Contact</b> Francis Jordan	<b>Telephone Number (Include Area Code)</b> 815-417-2800
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**13. Complete One Line for each Component Failure Described in this Report**

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
X	EK	1DG01EA	--	Yes	N/A	N/A	N/A	N/A	N/A

<b>14. Supplemental Report Expected</b> <input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date) <input checked="" type="checkbox"/> No	<b>15. Expected Submission Date</b>	Month N/A	Day N/A	Year N/A
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**Abstract** (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On April 19, 2018 at 1152 hours, during performance of a pre-planned bus undervoltage (UV) actuation surveillance, with the 1A diesel generator (DG) solely supplying electrical power to bus 141, the 1A DG lost voltage resulting in an unplanned valid actuation of Engineered Safety Feature (ESF) bus 141 UV relay. On April 19, 2018 at 1201 hours, operators restored power to ESF bus 141 via crosstie of the Unit 2 offsite power source.

The cause of this event was a failed exciter "Free-Wheeling" diode in the DG exciter rotor circuit due to shorting. Corrective actions taken included replacing the exciter diode on the 1A DG.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) for "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section ...," specifically 10 CFR 50.73(a)(2)(iv)(B)(8) for the "Emergency ac electrical power systems, including: emergency diesel generators..."



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

(See NUREG-1022, R.3 for instruction and guidance for completing this form  
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Braidwood	05000456	2018	- 001	- 00

**NARRATIVE**

**A. Plant Operating Conditions Before the Event:**

Event Date: April 19, 2018

Unit: 1 Mode: 6 Reactor Power: 000 percent

Unit 1 Reactor Coolant System [AB]: Shutdown for refueling outage Temperature: 84 F

No structures, systems or components were inoperable at the start of this event that contributed to the event:

**B. Description of Event:**

On April 19, 2018 Braidwood was performing a pre-planned surveillance to (1) demonstrate operability of the 1A diesel generator (DG) [EK] and associated Engineered Safety Feature (ESF) equipment on a simulated loss of bus [ED] voltage with no safety injection signal, and (2) verify the generator's capacity to reject bus 141 on an undervoltage actuation (UV), initiating the 1A DG to emergency start and sequence loads on the UV signal. On April 19, 2018 at 1152 hours, following the 1A DG solely supplying electrical power to bus 141, the 1A DG lost voltage resulting in an unplanned valid actuation of bus 141 UV relay.

On April 19, 2018 at 1201 hours, operators restored power to ESF bus 141 via crosstie of the Unit 2 offsite power source. Shutdown cooling was maintained throughout the event as the 1B residual heat removal train was unaffected by the actuation.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) for "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section ...," specifically 10 CFR 50.73(a)(2)(iv)(B)(8) for the "Emergency ac electrical power systems, including: emergency diesel generators..." This LER is being submitted in follow-up to ENS 53347 made on April 19, 2018.

**C. Cause of Event**

The cause of this event was a failed exciter "Free-Wheeling" diode in the DG exciter rotor circuit due to shorting resulting in bus 141 de-energization. The failure analysis revealed the cause of the diode failure was due to a massive electrical overstress which caused die cracking. There was no evidence of any manufacturing defect.

**D. Safety Consequences:**

This condition had no actual safety consequences impacting plant or public safety.

The safety-related function of the DGs is to provide an emergency source of power in the event offsite power is not available to supply all the electric loads required for safe shutdown of the reactor. A loss of offsite power signal will start the DGs which will attain rated frequency and voltage within ten seconds and energize the busses. An ESF safety injection (SI) signal will also start the DGs; however, the DGs will not energize the busses on an ESF SI signal if offsite power is available. The 1B DG was operable and available to supply the electric loads required; therefore, there would have been no safety consequences during a design basis event. There was no loss of safety function for this event.



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**NARRATIVE**

**E. Corrective Actions:**

Completed Corrective Actions: Replaced the exciter diode on the 1A DG.

**F. Previous Occurrences:**

No previous, similar Licensee Event Reports were identified at the Braidwood Station.

**G. Component Failure Data:**

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model</u>	<u>Mfg. Part Number</u>
--*	Diode (freewheeling)	N/A	1N3091

\* There are various manufacturers of this diode