energy harbor

Davis-Besse Nuclear Power Station
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Terry J. Brown
Site Vice President, Davis-Besse Nuclear

419-321-7676

April 13, 2021

L-21-084

10 CFR 50.73

ATTN: Document Control Desk
United States Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject:
Davis-Besse Nuclear Power Station, Unit 1
Docket Number 50-346, License Number NPF-3
Licensee Event Report 2021-001

Enclosed is Licensee Event Report (LER) 2021-001, "Emergency Diesel Generator Speed Switch Failure due to Direct Current System Ground." This event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B).

There are no regulatory commitments contained in this letter or its enclosure. The actions described represent intended or planned actions and are described for information only. If there are any questions or if additional information is required, please contact Mr. Robert W. Oesterle, Manager, Site Regulatory Compliance and Emergency Response, at (419) 321-7462.

Sincerely,

Terry J. Brown

GMW

Enclosure: LER 2021-001

cc: NRC Region III Administrator
NRC Resident Inspector
NRR Project Manager
Utility Radiological Safety Board

IE22
NRR

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

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

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-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.

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/nuregs/staff/sr1022/r3/

1. Facility Name	2. Docket Number	3. Page
Davis-Besse Nuclear Power Station, Unit 1	05000 346	1 OF 4

4. Title:
Emergency Diesel Generator Speed Switch Failure due to Direct Current System Ground

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
02	12	2021	2021	- 001 -	00	04	12	2021		05000
									Facility Name	Docket Number
										05000

9. Operating Mode	10. Power Level
1	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)
☐ 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 in NRC Form 366A).

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include area code)
Gerald M. Wolf, Supervisor – Regulatory Compliance	(419) 321-8001

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	ST	D283	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 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On September 4, 2020, with the Davis-Besse Nuclear Power Station operating at approximately 100 percent power, Emergency Diesel Generator (EDG) 2 failed to start during scheduled monthly surveillance testing. A failed speed switch was identified and replaced, restoring the EDG to Operable status on September 7, 2020. Because the speed switch failed after only ten months in service, it was shipped to an external vendor for analysis. Based on the vendor analysis conclusion in conjunction with a review of applicable plant data, it was determined on February 12, 2021 that the speed switch was failed on September 1, 2020, due to a shorted component within the switch in conjunction with a ground on the station 125 VDC system.

Since the EDG was determined to be failed prior to discovery during routine monthly testing and the necessary Technical Specification actions for an inoperable EDG were not performed based on the time of failure, this event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B) as operation of the plant in a condition prohibited by the Technical Specifications.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Davis-Besse Nuclear Power Station Unit 1	05000 - 346	2021	- 001	- 00

NARRATIVE

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

System Description:

The Davis-Besse Nuclear Power Station (DBNPS) Class 1E Alternating Current (AC) Electrical Power Distribution System sources consist of the offsite power sources (preferred power sources, normal and alternate) and the two onsite standby Emergency Diesel Generators (EDGs). An EDG [EK-DG] starts automatically on a Safety Features Actuation System (SFAS) [JE] actuation or on an essential bus degraded voltage or loss of voltage signal. After an EDG has started, it will automatically tie to its respective bus after offsite power is tripped.

Technical Specifications:

Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.1.b requires two EDGs be Operable in Modes 1 through 4. With one EDG inoperable LCO 3.8.1.b requires the following:

1. Surveillance Requirement 3.8.1.1 must be performed within one hour and at least once per 8 hours thereafter to verify correct breaker alignment and indicated power availability for each offsite circuit,
2. Any required feature(s) supported by the inoperable EDG must be declared inoperable when its redundant required feature(s) is inoperable within 4 hours from discovery,
3. The Operable EDG must be determined to be not inoperable due to common mode cause failure or perform Surveillance Requirement 3.8.1.2 to verify the Operable EDG starts from standby conditions and achieves steady state voltage and frequency within 24 hours, and
4. Two EDGs must be restored to Operable status within 7 days or the plant must be in Hot Standby (Mode 3) within the next 6 hours and in Cold Shutdown (Mode 5) within the following 30 hours.

DESCRIPTION OF EVENT:

On September 4, 2020, EDG 2 was declared inoperable and unavailable at 1112 hours for routine monthly testing to satisfy TS Surveillance Requirement 3.8.1.2. During the first idle start at 1134 hours, EDG 2 locked out on a failure to start. Due to work having been performed on the air start side that was being used to start the EDG, a second start attempt was performed on the opposite air start side, which also resulted in an EDG lock out on failure to start. Based on the observed indications from the second start attempt, the likely cause of the failure to start was suspected to be either the EDG speed switch [EK-ST] or magnetic pickup. Subsequent inspection of the EDG 2 speed switch identified internal overheating damage. The failed speed switch was replaced and the EDG tested satisfactorily, allowing the EDG to be declared Operable on September 7, 2020 at 1800 hours.

CAUSE OF EVENT:

The failed speed switch had been installed in October 2019 as a ten-year preventive maintenance activity. Due to the short period of time between installation and failure, the failed speed switch was shipped to an external vendor, whose inspection revealed excessive damage at the input power section of the speed switch. Based on the vendor's conclusion that the failure may have been related to the power supplied to the speed switch, a review of the DBNPS 125 VDC system [EJ] history was performed. This review, completed on February 12, 2021, identified a hard ground had been received on Direct Current Motor Control Center (DCMCC) 2 [EJ-MCC] on August 25, 2020. Troubleshooting of this ground commenced later that day. On September 1, 2020, the breaker [BQ-BKR] for the High Pressure Injection Pump 2 DC oil pump motor was opened at approximately 1500 hours as part of these

NARRATIVE

CAUSE OF EVENT: (Continued)

troubleshooting efforts, resulting in the ground switching from a hard ground to an oscillating ground. This oscillating ground condition cleared when the EDG 2 speed switch was removed on September 5, 2020, following the failure during testing.

The DBNPS 125 VDC system is an ungrounded system, so a single ground will not have an adverse impact on the 125 VDC System or individual components receiving power from the 125 VDC System. The 125 VDC System is equipped with ground detection instrumentation that allows for identification and removal of a ground to prevent more significant issues. The most likely cause of the failed EDG 2 speed switch was a shorted component within the speed switch concurrent with a ground on the 125 VDC power supply to the speed switch, resulting in failure of the switch. With two competing grounds it is postulated there was sufficient direct current flow to cause the damage identified in the speed switch. Neither of the grounds on the 125 VDC system led plant personnel to conclude that any plant equipment had failed as a result of the grounds, and the speed switch was not known to be failed until regularly scheduled testing was performed.

ANALYSIS OF EVENT:

A qualitative risk assessment was performed for the approximately 6 days EDG 2 was unavailable, starting with the initiation of the oscillating ground on September 1, 2020 at approximately 1500 hours, and ending with EDG 2 becoming available following completion of testing on September 7 at approximately 1600 hours. During this time period, all redundant train 1 equipment remained Operable, and no risk-significant equipment in train 2 was unavailable or inoperable. The plant risk associated with the extended unavailability of EDG 2 for less than the 7-day Completion Time of TS LCO 3.8.1 Required Action B.4 is considered to be of very low safety significance.

Reportability Discussion:

When the EDG 2 speed switch was initially discovered failed following the unsuccessful test start on September 4, 2020, there was no firm evidence at that time that the switch had failed prior to the test, so the failure was assumed to be at the time of discovery in accordance with NRC reporting guidance contained in NUREG-1022, Event Reporting Guidelines for 10 CFR 50.72 and 50.73, Revision 3. Following receipt of the vendor's evaluation of the failed switch and further review of the DBNPS 125 VDC System history, it was determined EDG 2 was inoperable prior to the start of the September 4, 2020, monthly test. EDG 2 was determined to be inoperable for approximately 3 days with the plant operating in Mode 1 prior to it being declared inoperable and unavailable on September 4, 2020, at 1112 hours for monthly testing. Because Technical Specification 3.8.1 requires actions to be taken within 1 hour for an inoperable EDG, this issue represents operation of the plant in a condition that is prohibited by the plant's Technical Specifications, which is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B). This Licensee Event Report is being submitted 60 days from the discovery of the reportable issue on February 12, 2021, in accordance with 10 CFR 50.73(a)(1). Because all redundant train 1 equipment remained Operable during the time EDG 2 was inoperable, no loss of Safety Function per 10 CFR 50.73(a)(2)(v) occurred.

When Surveillance Requirement 3.8.1.1 was performed within one hour of declaring EDG 2 inoperable on September 4, no issues were identified with the offsite circuit breaker alignments and power availability. EDG 1 was successfully idle started on September 5 at 0900 hours in accordance with Surveillance Requirement 3.8.1.2 to satisfy LCO 3.8.1 Action B.3.1 to verify it was not inoperable due to a potential common cause failure. EDG 2 was subsequently restored to Operable status within the 7 days allowed by LCO 3.8.1 Action B.4.

NARRATIVE

CORRECTIVE ACTIONS:

Completed Actions:

The ground on the High Pressure Injection Pump 2 DC oil pump motor was repaired on September 3, 2020, by repairing the damaged wire to the motor.

A replacement speed switch was installed and post maintenance testing was completed satisfactorily on September 7, 2020, allowing EDG 2 to be declared Operable at 1800 hours.

Scheduled Actions:

No further actions are planned.

PREVIOUS SIMILAR EVENTS:

There have been no Licensee Event Reports (LERs) at the DBNPS in the past three years related to the EDGs.