



Davis-Besse Nuclear Power Station
5501 N. State Route 2
Oak Harbor, Ohio 43449

Mark B. Bezilla
Site Vice President, Davis-Besse Nuclear

419-321-7676

May 26, 2020

L-20-122

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 2020-002

Enclosed is Licensee Event Report (LER) 2020-002, "Manual Reactor Trip on Trip of Reactor Coolant Pumps due to loss of 13.8 KV Bus Potential Transformer Fuse." This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A).

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. James M. Vetter, Manager – Regulatory Compliance and Emergency Response, at (419) 321-7393.

Sincerely,


P.J. McCloskey for M.B. Bezilla
Mark B. Bezilla

JCS

Enclosure: LER 2020-002

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

JEZ2
NRR

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
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1. Facility Name Davis-Besse Nuclear Power Station, Unit 1	2. Docket Number 05000 346	3. Page 1 OF 4
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4. Title:
Manual Reactor Trip on Trip of Reactor Coolant Pumps due to loss of 13.8 kV Bus Potential Transformer Fuse

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
03	25	2020	2020	002	00	05	26	2020	Facility Name	Docket Number
										05000
										05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)							
2	<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)				
10. Power Level	<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)				
0	<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

Licensee Contact Joseph C. Sturdavant, Staff Specialist – Regulatory Compliance	Telephone Number (Include Area Code) (419) 321-8199
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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

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

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On March 25, 2020, with the Davis-Besse Nuclear Power Station starting up from a refueling outage in Mode 2 at approximately zero (0) percent power in the Intermediate Range, the control room operators received a plant computer trouble alarm and low voltage indication for the 13.8 kV B Bus. As a result of this indicated power loss on B Bus, the two (2) Reactor Coolant Pumps powered from this bus tripped. The operators subsequently manually tripped the reactor at 1240 hours and performed actions to stabilize Reactor Coolant System temperature and pressure. Plant response to the reactor trip was uncomplicated and decay heat removal through normal feedwater and main condenser remained available and the plant remained in Mode 3.

The most likely cause of the fuse failure (and subsequent manual reactor trip) is that the replacement fuses installed and specified by a 2014 equivalency evaluation were not appropriate for this fuse application. Actions taken include replacing the B Bus fuses. Scheduled actions include determining a more appropriate fuse for this and similar applications and replacing identified fuses.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a manual actuation of the Reactor Protection System.



**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 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.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Davis-Besse Nuclear Power Station Unit 1	05000 - 346	2020	- 002	- 00

NARRATIVE

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

System Description:

The Davis-Besse Nuclear Power Station (DBNPS) onsite electrical systems include the 13.8 kV [EB], the 4160 V [EA, EB], and the 480 V [EC, ED] AC distribution systems, two 4160 V emergency diesel generator (EDG) units [EK-DG] and one non-essential 4160 V diesel generator which serves as the alternate AC source for station blackout concerns. The DBNPS 13.8 kV distribution system consists of two (2) buses (A and B Bus) that provide a power source for Reactor Coolant Pump (RCP) [AB-P] and Circulating Water [KE] Pump [KE -P] operation, and feeds the 4160 V and 480 V busses. The 13.8 kV B Bus powers, among other equipment, RCP 1-2 and RCP 2-1.

The primary function of the Reactor Coolant System (RCS) [AB] is removal of the heat generated in the fuel due to the fission process, and transfer of this heat, via the steam generators (SG) [SG], to the secondary plant. The RCS configuration for heat transport uses two RCS loops. Each RCS loop contains an SG and two reactor coolant pumps (RCPs). The transient or accident analysis for the plant has been performed assuming either three or four pumps are in operation.

The Reactor Protection System (RPS) [JC] Manual Reactor Trip provides the operator with the capability to trip the reactor from the control room in the absence of any other trip condition. The Manual Reactor Trip channels are retained for the overall redundancy and diversity of the RPS.

Technical Specifications:

Operating License Condition 2.C.3(a) states the DBNPS Reactor shall not be operated in Modes 1 and 2 with less than three (3) Reactor Coolant Pumps in operation.

DESCRIPTION OF EVENT:

On March 25, 2020, with the DBNPS starting up from a refueling outage in Mode 2 at approximately zero (0) percent power in the Intermediate Range, the control room operators received a plant computer trouble alarm and low voltage indication for the 13.8 kV B Bus. As a result of this indicated power loss on B Bus, RCP 1-2 and RCP 2-1 tripped (1 pump per RCS loop). The operators manually tripped the reactor at 1240 hours and performed actions of procedure DB-OP-02000, "RPS, SFAS, SFRCS Trip, or SG Tube Rupture," isolating steam sources to stabilize RCS temperature and pressure.

Plant response to the reactor trip was uncomplicated and decay heat removal through normal feedwater and the main condenser remained available and the plant remained in Mode 3. In addition to the two (2) tripped RCPs, Circulating Water Pump 4 also tripped off the affected 13.8 kV B Bus. The 13.8 kV Bus B did not lose voltage due to the PT-1 fuse failure, as the low voltage readings were a result of the single phase fuse failure, and therefore, the remainder of the 13.8 kV B Bus loads remained powered during this event. Additionally, the corresponding electrical distribution side safety-related EDG #2 did not start.



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CAUSE OF EVENT:

The direct cause of this event was determined to be a spurious failure of the 13.8 kV Bus B, Potential Transformer PT-1, B-phase fuse. This caused three (3) operating 13.8 kV motors (RCP 1-2, RCP 2-1, and Circulating Water Pump 4) to trip off.

The primary cause of the 13.8 kV Bus B-phase fuse failure (and subsequent manual reactor trip) was due to the replacement fuses specified by a 2014 equivalency evaluation were not appropriate for this application. These replacement fuses were installed in 2014 as a replacement fuse for the installed fuses that were obsolete.

ANALYSIS OF EVENT:

A Probabilistic Risk Assessment (PRA) qualitative evaluation was performed for the March 25, 2020 manual scram. This qualitative screening resulted in very low safety significance as the deficiency in question did not result in a loss of mitigation equipment relied upon to transition the plant to a stable shutdown condition. A conservative quantitative analysis of this uncomplicated plant scram resulted in a delta Core Damage Frequency (CDF) that is well below the thresholds for very small increases in risk as discussed in Regulatory Guide 1.174. The risk of this event is therefore considered very low safety significance in accordance with the Regulatory Guidance.

Reportability Discussion:

The manual actuation of the Reactor Protection System was reported in accordance with 10 CFR 50.72(b)(2)(iv)(B) at 1528 hours on March 25, 2020 (Event Number 54611). The manual actuation of the Reactor Protection System is reportable as a Licensee Event Report per 10 CFR 50.73(a)(2)(iv)(A) within 60 days of occurrence. All safety systems performed as required in response to the event, and no loss of safety functions occurred.

CORRECTIVE ACTIONS:

Completed Actions:

All three (3) fuses for the 13.8 kV Bus B Potential Transformer PT-1 were replaced prior to reactor restart.

An engineering review was performed to identify an appropriate replacement for the 15.5CAV0.5E fuse type in the 13.8 kV potential transformer.

Scheduled Actions:

The fuses for the 8 PTs identified as being the same fuse in similar applications as the PT fuse involved in this event are scheduled to be replaced.

Lessons learned from this event will be discussed with engineering personnel to perform a more comprehensive risk review when performing equivalency evaluations.



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PREVIOUS SIMILAR EVENTS:

A similar event occurred within the previous 3 years involving the fuse type replaced by the 2014 equivalency evaluation. On November 24, 2018, DBNPS Start-up Transformer 02 Voltmeter EI6210 was found indicating low voltage, similar to this event. In this condition, Bus B would not have been able to transfer to the selected reserve source (X02). Troubleshooting found the B-phase fuse blown for 13.8 kV Cubicle HB05 PT-2. All three (3) fuses for HB05 PT-2 were replaced. No cause analysis of the fuse failure was performed. This November 2018 event did not result in an LER reportable event.