



A Centenor Energy Company

EDISON PLAZA  
300 MADISON AVENUE  
TOLEDO, OHIO 43652-0001

AR-92-0002  
NP-33-91-008

Docket No. 50-346

License No. NPF-3

January 9, 1992

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, D. C. 20555

Gentlemen:

LER 91-008  
Davis-Besse Nuclear Power Station, Unit No. 1  
Date of Occurrence December 10, 1991

Enclosed please find Licensee Event Report 91-008, which is being submitted to provide 30 days written notification of the subject occurrence. This LER is being submitted in accordance with 10 CFR 50.73(a)(2)(iv).

Very truly yours,

Louis F. Storz  
Plant Manager  
Davis-Besse Nuclear Power Station

LFS/ed

Enclosure

cc: Mr. A. Bert Davis  
Regional Administrator  
USNRC Region III

Mr. William Levis  
DB-1 NRC Sr. Resident Inspector

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## LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-500) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (2150-0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON, DC 20503

FACILITY NAME (1)

Davis-Besse Unit No. 1

DOCKET NUMBER (2)

0 5 0 0 0 3 3 6 1 0 1 4

TITLE (4)

Reactor Trip Due To Blown Fuse During Maintenance On Non-Essential 4160V AC Bus D2

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)			
MONTH	DAY	YEAR	YEAR	SERIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER (9)	
1	2	1	0	9	1	9	1	0	0	8	0 0 0 1 0 9 9 2	0 5 0 0 0 0
OPERATING MODE (10)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)									
3			20.402(b)			20.405(c)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)			75.71(b)
POWER LEVEL (10)			0.1211			20.405(a)(1)(ii)			50.36(c)(1)			75.71(c)
			20.405(a)(1)(iii)			50.36(c)(2)			50.73(a)(2)(v)			OTHER Sp. in Abstract below 40% in 1st NRR 40% = 100%
			5.405(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(vi)			
			20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(vii)			
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(viii)			

LICENSEE CONTACT FOR THIS LER (12)

NAME

Mark A. Turkal, Engineer - Nuclear Licensing

TELEPHONE NUMBER

AREA CODE

4 1 1 4 3 1 2 1 1 - 1 7 1 3 1 7 1 7

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)		NO		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input checked="" type="checkbox"/>		<input type="checkbox"/>		0 1 2	0 1 4	0 1 2	

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On December 10, 1991 at 0906, with the plant in Mode 3, work was being performed on non-essential 4160V AC Bus D2 which resulted in a blown fuse. This caused the reverse phase sequence undervoltage relay for Bus D2 (relay 47/D2) to actuate. Although no actual undervoltage condition existed, actuation of relay 47/D2 caused select Bus D2 load breakers to trip including the Motor Driven Feedwater Pump (MDFP) feeder breaker. The loss of the MDPF resulted in a loss of feedwater to the Once Through Steam Generators (OTSGs), and the subsequent actuation of the Steam and Feedwater Rupture Control System (SFRCS). The SFRCS initiated Auxiliary Feedwater, isolated Main Feedwater, and isolated Main Steam, as designed. In addition, the SFRCS actuation initiated the Anticipatory Reactor Trip System (ARTS) which tripped open the Control Rod Drive (CRD) trip breakers. The group one rods, which were 100% withdrawn, properly inserted into the reactor core. Automatic plant response was satisfactory and operator actions were appropriate. The blown fuse was replaced and feedwater was restored by restarting the MDPF approximately 15 minutes after it tripped.

A review team has been assembled to determine what additional precautions can be taken to prevent similar events. The team is expected to make its recommendations by March 4, 1992.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD? COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  Davis-Besse Unit No. 1	DOCKET NUMBER (2)  0500034691	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
			008	00	02	OF 04

TEXT (if more space is required, use additional NRC Form 365A's) (17)

Description of Occurrence:

On December 10, 1991 at 0906, the plant was in Mode 3, at normal operating temperature and pressure, during a forced outage for repairs of Emergency Diesel Generator 1-2 (EK). Reactor core decay heat removal was via the Once Through Steam Generators (OTSGs-SD) and the Main Condenser (SG). The Motor Driven Feedwater Pump (MDFP-SJ) was supplying feedwater to the OTSGs. Electricians were performing Station Blackout (SBO) Diesel Generator modification work on the non-essential 4160V AC Bus D2 (EA) in accordance with a maintenance work order.

The work, in part, consisted of disconnecting wires from terminal block 8 in Bus D2 cubicle 3 (AD203). These wires supply power to cubicle 13 (breaker AD213) from the potential transformer, PT, located in cubicle 3. The PT supplies bus phase and voltage instrumentation which includes the bus undervoltage relay. The electricians were performing a preliminary voltage check on the circuitry with one voltmeter lead landed on terminal block 8 when a ground occurred between the secondary side of the cubicle 3 PT and the terminal block 8 shorting bar. Grounding the PT output blew a secondary side PT fuse which properly caused the reverse phase sequence undervoltage relay for Bus D2 (relay 47/D2) to actuate. Although no actual undervoltage condition existed, actuation of relay 47/D2 resulted in tripping of select Bus D2 load breakers which included MDFF feeder breaker.

The loss of the MDFF resulted in a loss of feedwater to the OTSGs. The Steam and Feedwater Rupture Control System (SFRCS-JB) subsequently actuated due to high reverse delta pressure (i.e. OTSG pressure to main feedwater discharge pressure miss-match). The SFRCS initiated Auxiliary Feedwater (BA), isolated Main Feedwater (SJ), and isolated Main Steam (SB), as designed. In addition, the SFRCS actuation initiated the Anticipatory Reactor Trip System (ARTS) which opened the Control Rod Drive (CRD-AA) trip breakers. The group one rods, which were 100% withdrawn, properly inserted into the reactor core. Automatic plant response was satisfactory and operator actions were appropriate. The blown fuse was replaced and the MDFF restarted approximately 15 minutes after it tripped.

This event was reported to the NRC at 1228 hours via the ENS per 10 CFR 50.72(b)(2)(ii) and is being reported as an LER in accordance with 10 CFR 50.73(a)(2)(iv) as an automatic reactor trip.

Apparent Cause of Occurrence:

The root cause of the SFRCS actuation and subsequent reactor trip can be attributed to several contributing factors. The actual ground occurred as a result of personnel error on the part of the electrician performing the preliminary voltage check. This work was made more difficult by physical conditions in the field. Due to the configuration of the installed circuitry,

ESTIMATED BUDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P330), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (316G0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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Davis-Besse Unit No. 1	0   5   0   0   0   3   4   6	9   1	-   0   0   8	-   0   0	0   3 OF 0   4

Apparent Cause of Occurrence (Continued):

with PT leads landed on a current transformer, CT, terminal block, there was a greater potential for grounding when dealing with energized leads. This made completion of the design corrections very difficult.

The work in progress on the non-essential 4160V AC Bus D2 was intended to correct a design weakness in the circuitry associated with the SBO Diesel Generator. Specifically, the installed circuitry had PT leads landed on a CT terminal block. CT terminal blocks have a shorting bar which creates a greater potential for grounding when dealing with energized leads. The PT leads were installed on a CT shorting block because the vendor drawings used during the design did not clearly identify the block as a CT shorting block. The design required use of six spare terminals and the CT block was the only block in the panel with available terminals. This circuitry configuration is not a standard design practice at Davis-Besse. The design review performed by Davis-Besse Engineering failed to identify this situation and the modification was installed with way design weakness.

The final factor contributing to this event was a lack of adequate communication of the risk associated with the maintenance activities. The risk associated with performing the design enhancement with Bus D2 energized was known. However, a briefing held with the Shift Manager prior to commencing work did not include all members of the Operating Shift and did not adequately address the potential risk to the plant. Thus, actual field work commenced with group one control rods 100% withdrawn and the SFRCS and ARTS armed. When the inadvertent grounding occurred and the MDFP tripped, the SFRCS and ARTS functioned properly and an automatic reactor trip occurred.

#### Analysis of Occurrence:

The SFRCS and ARTS systems responded as designed. The inadvertent SFRCS actuation in Mode 3 had no effect on plant safety. All group 1 control rods properly inserted into the reactor core. The plant was subcritical both before and after the event. Automatic plant response was satisfactory and operator actions were appropriate.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  Davis-Besse Unit No. 1	DOCKET NUMBER (2)  0500034691	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
			008	00	04	OF 04

TEXT (if more space is required, use additional NRC Form 366A's) (17)

Corrective Action:

A review team consisting of Maintenance, Design, ISE, and Operations personnel has been assembled to review this and any identified similar occurrences to determine what additional precautions should be taken to prevent future events. The team will review existing plant design and maintenance practices to determine if any changes are necessary. In addition, this effort will include a review of possible methods to improve pre-job communications. The team is expected to make its recommendations for management review by March 4, 1992. In the interim, the importance of proper communication of planned activities, both during shift turnover meetings and during pre-job briefings, will be stressed with the Operations and Maintenance organizations. These discussions will highlight the need to ensure that appropriate personnel are aware of existing plant conditions and the impact the planned activity may have. This event will be reviewed by Operations personnel as part of their required reading. The interim actions will be completed by January 31, 1992.

The specific details of this design weakness and the consequences on the plant have been discussed with the Design Engineering Section. This LER will be reviewed by Design Engineering personnel by January 31, 1992.

The design deficiency in the SBO diesel circuitry will be corrected during the eighth refueling outage when the non-essential 4160V AC Bus D2 is removed from service.

Failure Data:

Previous instances where the loss of an electrical bus resulted in an unplanned automatic actuation reported under 10 CFR 50.73(a)(2)(iv) include LER 90-006, Inadvertent SFAS Actuation While Defueled When Breaker Switch HAAE2 Was Bumped Open, and LER 90-010, Inadvertent Safety Features Actuation With Injection Of 1,000 Gallons Of Boiled Water.

Two previous instances of inadvertent SFRCS initiations have been reported under 10 CFR 50.73(a)(2)(iv). They are LER 88-025, Inadvertent Initiation Of Steam And Feedwater Rupture Control System, and LER 88-026, Inadvertent Initiation Of Steam And Feedwater Rupture Control.

Report No.: NP-33-91-008

PCAO No.: 91-0612