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License No. NPF-3

January 14, 1991

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

Gentlemen:

LER 90-016
Davis-Besse Nuclear Power Station, Unit No. 1
Date of Occurrence - December 13, 1990

Enclosed please find Licensee Event Report 90-016, which is being submitted to provide 30 days written notification of the subject occurrence. This LER is being submitted in accordance with 10CFR50.73(a)(2)(iv).

Very truly yours,

A handwritten signature in cursive script that reads 'Louis F. Storz'.

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

LFS/eld

Enclosure

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

Mr. Paul Byron
DB-1 NRC Sr. Resident Inspector

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LICENSEE EVENT REPORT (LER)

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

TITLE (4)
Reactor Trip Due to Group Rod Drop

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)																	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER (S)																
1	2	1	3	9	0	9	0	0	1	1	4	9	1	0	1	5	1	0	1	0	1	3	4	1	6	1

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

OPERATING MODE (9)	20.402(b)	20.406(a)	20.73(a)(2)(iv)	73.71(b)
1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
POWER LEVEL (10)	20.406(a)(1)(i)	20.30(a)(1)	20.73(a)(2)(iv)	73.71(a)
1 0 0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	20.406(a)(1)(ii)	20.30(a)(2)	20.73(a)(2)(iv)	OTHER (Specify in 20.406(a)(1)(ii) and in 73.71(a) and in 73.71(b))
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	20.406(a)(1)(iii)	20.73(a)(2)(i)	20.73(a)(2)(iv)(A)	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	20.406(a)(1)(iv)	20.73(a)(2)(ii)	20.73(a)(2)(iv)(B)	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	20.406(a)(1)(v)	20.73(a)(2)(iii)	20.73(a)(2)(v)	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LICENSEE CONTACT FOR THIS LER (12)

NAME R. W. Gaston, Licensing Technologist TELEPHONE NUMBER 413 19 3 12 11 1-17 19 17 17

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 0 1 2 DAY 1 1 3 YEAR 9 1 1

ABSTRACT (Limit to 1400 spaces. LA approximately fifteen spaces above typewritten lines) (16)

On December 13, 1990 at 0844 hours, the plant experienced a Reactor Coolant System (RCS) low pressure trip. A functional test of the Reactor Protection System (RPS) Channel 1 Reactor Trip Module Logic and Reactor Trip Breaker B was in progress when the trip occurred. Reactor Trip Breaker B had been previously tripped as part of the RPS functional test. Seven of eight control rods in Rod Group 7 dropped into the core causing reactor power to initially decrease to approximately 48 percent. RCS pressure and temperature decreased due to a resulting mismatch between reactor power and feedwater flow. RPS subsequently tripped the reactor on low RCS pressure. Plant response to the reactor trip was normal with key parameters remaining in the normal post-trip band. The apparent cause of the group rod drop was a degradation in the "A" side power train of the Control Rod Drive (CRD) system such that with the "B" side Reactor Trip Breaker open, the current supplied to the CRD motor stators was not sufficient to support motion of the Group 7 Control Rods. An action plan was developed to identify the specific cause. Action plan implementation is currently in progress.

Immediate notification was made per 10CFR50.72(b)(2)(ii) on December 13, 1990, at 0944 hours. The reactor trip is being reported pursuant to the requirements of 10CFR50.73(a)(2)(iv).

A revision to this LER will be submitted when the root cause is determined.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1): Davis-Besse Unit No. 1	DOCKET NUMBER (2): 0 5 0 0 0 3 4 6 9 0	LER NUMBER (6):			PAGE (3): 0 2 OF 0 4
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
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TEXT (If more space is required, use additional NRC Form 308A (7-82))

Description of Occurrence:

On December 13, 1990, at 0844 hours, the plant experienced a Reactor Coolant System (RCS) low pressure trip. Surveillance Test DB-MI-03011, Channel Functional Test of RPS (RPS-JC) Channel 1 Reactor Trip Module Logic and Reactor Trip Breaker B was in progress prior to the trip. Reactor Trip Breaker B had been previously tripped as part of the surveillance test.

Approximately 15 seconds prior to the reactor trip seven of eight control rods in regulating Rod Group 7 dropped into the core causing reactor power to decrease to approximately 48 percent. RCS pressure and temperature decreased due to resulting mismatch between reactor power and feedwater flow. RPS (RPS-JC) subsequently tripped the reactor on low RCS pressure.

Plant response to the reactor trip was normal with key parameters remaining in the normal post-trip band. The rod which did not initially drop with the Group 7 rods inserted when the reactor trip signal was received.

The reactor trip (RPS actuation) is reportable in accordance with 10CFR50.73(a)(2)(iv). Immediate notification to the NRC was made via the Emergency Notification System (ENS) at 0944 hours on December 13, 1990 per 10CFR50.72(b)(2)(ii).

The plant was restarted on December 15, 1990 and returned to full power operation on December 16, 1990.

Apparent Cause of Occurrence:

The plant trip was caused by a low RCS pressure input to RPS. The RCS low pressure condition resulted from a reactor power to feedwater flow mismatch which occurred when the Group 7 control rods dropped into the reactor.

The apparent cause of the group rod drop was a degradation in the "A" side power train of the Control Rod Drive (CRD) System such that with the "B" side Reactor Trip Breaker open, the current supplied to the CRD motor stators was not sufficient to support motion of the Group 7 Control Rods. An action plan was developed to identify the specific cause of the problem. Troubleshooting and testing activities are currently being conducted in accordance with this action plan. Selected points in the CRD System "A" side power train have been instrumented to allow monitoring during troubleshooting.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		01	16	00	03	OF 04

TEXT: If more space is required, use additional NRC Form 366A (1/17)

Apparent Cause of Occurrence (Continued):

A high resistance in the current return path for the Rod 7-1 stator motor windings was identified prior to the plant trip. This high resistance caused a stronger magnetic field in the Rod 7-1 CRD motor. This is the likely cause of Rod 7-1 remaining in place when the rest of the rod group dropped on December 13, 1990. Control Rod 7-1 was inserted when the reactor trip signal was received.

Analysis of Occurrence:

The Reactor Protection System (RPS) properly responded to a valid RCS low pressure condition which resulted from the unanticipated insertion of Group 7 control rods. Plant response to the trip was normal with key parameters remaining in the normal post-trip band. The post-trip response is categorized as an "A" event per the Babcock and Wilcox Owner's Group (B&WOG) criteria. The severity of the trip was minimized by the power reduction to 48 percent immediately prior to the trip. The CRD System anomaly which initiated this event is currently under investigation.

Corrective Action:

Prior to restarting the plant on December 15, 1990, proper operation of all Group 7 CRD power supplies was established by:

- Performing cabinet wiring checks
- Verifying phase indication lights on power supply and individual transfer switches were lit in the proper sequence
- Monitoring each power supply phase feeding Group 7 rods and observing the proper waveforms
- Moving Group 7 rods with the CRD breakers B open and noting no abnormalities

In addition, a suspect CRD motor generator set voltage regulator card was replaced on December 27, 1990. Subsequent monitoring revealed this was not a likely cause of the group rod drop.

Although no specific cause for the initiating event was identified during preliminary investigation, it is believed that the existence of a CRD system fault concurrent with rod motion resulted in the group rod drop and subsequent plant trip. Standing Order No. 90-061 (reissued as 91-030) was issued on December 14, 1990 to require the Reactor Demand Hand/Auto Station and Rod Control panel be placed in manual to inhibit rod motion during any surveillance testing which involved the opening of a CRD breaker.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Davis-Besse Unit No. 1	DOCKET NUMBER (2) 050003469	LER NUMBER (8)			PAGE (3)	
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TEXT: If more space is required, use additional NRC Form 306A 3/177

Corrective Action (Continued):

During the week of January 7, 1991, surveillance testing was successfully completed for RPS and Anticipatory Reactor Trip System (ARTS) channels 1 and 2 and Diverse Scram System (DSS) Channel 2.

Monitoring of selected points in the CRD will continue in conjunction with ongoing troubleshooting efforts to determine the specific cause of the CRD system malfunction.

A revision of this LER will be submitted when the root cause is determined.

Failure Data:

The most recent reactor trip initiated from a CRD System malfunction occurred on January 18, 1989 and was reported in LER No. 89-03, dated February 16, 1989.

NP-33-90-20

PCAO NO. 90-0755