

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Davis-Besse Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 3 4 6 1 OF 0 3										PAGE (3) 1 OF 0 3		
TITLE (4) Reactor Trip on Flux/Delta Flux/Flow																						
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 NAMES						DOCKET NUMBER(S)							
0	4	2	4	8	5	0	0	9	0	0	0	5	2	2	8	5	0 5 0 0 0					
OPERATING MODE (9) 1						THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																
POWER LEVEL (10) 0 9 8						20.402(b)				20.406(e)				<input checked="" type="checkbox"/> 50.73(e)(2)(iv)				73.71(b)				
						20.406(a)(1)(i)				50.36(a)(1)				<input type="checkbox"/> 50.73(e)(2)(v)				73.71(e)				
						20.406(a)(1)(ii)				50.36(a)(2)				<input type="checkbox"/> 50.73(e)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 305A)				
						20.406(a)(1)(iii)				50.73(e)(2)(i)				<input type="checkbox"/> 50.73(e)(2)(viii)(A)								
						20.406(a)(1)(iv)				50.73(e)(2)(ii)				<input type="checkbox"/> 50.73(e)(2)(viii)(B)								
						20.406(a)(1)(v)				50.73(e)(2)(iii)				<input type="checkbox"/> 50.73(e)(2)(ix)								
LICENSEE CONTACT FOR THIS LER (12)																						
NAME Stan Batch										TELEPHONE NUMBER AREA CODE 4 1 9 2 4 9 - 5 0 0 0												
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																						
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS												
E	J,K	I,S,C	T,I	4,7	Y																	
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR						
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO										

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

Davis-Besse Unit 1 was operating at 98 percent of full power when at 0353:38 hours, all four Reactor Protection System flux/delta flux/flow bistables tripped. The cause of the trip was attributed to a Reactor Coolant System flow instrumentation oscillation signal, in conjunction with an overly conservative setting of the flux/delta flux/flow bistables.

The plant response to the trip was as expected. Several equipment anomalies occurred, but these anomalies had little effect on the actual plant transient.

Evaluations of the reactor coolant flow instrumentation signal oscillations are being performed. Station procedures are being reviewed to insure that the flux/delta flux/flow setpoint is set within the allowable band but not overly conservative.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Davis-Besse Unit 1	0 5 0 0 0 3 4 6	8 5	— 0 0	9 — 0 0	0 2	OF	0 3

TEXT (If more space is required, use additional NRC Form 306A's) (17)

Description of Occurrence: Davis-Besse Unit 1 was operating at 98 percent full power with all Integrated Control System, ICS, (JA), control stations in automatic. No testing was in progress, and no power change was being performed. Core imbalance was fairly stable at a value of approximately -4 percent. At 0353:38 hours, all four Reactor Protection System, RPS, (JD), flux/delta flux/flow bistables tripped within ten milliseconds of each other. No plant parameter had changed which indicated the root cause of the trip. The plant response to the trip was as expected.

Several equipment anomalies occurred, but these anomalies had little effect on the actual plant transient. At approximately three seconds after the reactor trip, a false Steam and Feedwater Rupture Control System, SFRCS, (JB), steam generator level half trip occurred on Channel 2 for Steam Generator #1. The actual steam generator levels were over 100 inches at the time of this half trip. One channel of SFRCS tripping does not isolate main feedwater or actuate the Auxiliary Feedwater Pumps. Therefore, this did not significantly affect the transient.

At approximately nine seconds after the reactor trip, Main Feed Pump Turbine, MFPT, (JK) #1 tripped. Since MFPT #2 remained available and supplied normal feedwater flow after the trip, tripping of the one main feed pump turbine did not affect the plant post trip response.

This event is being reported in accordance with Paragraph 50.73(a)(2)(iv) which requires the reporting of any event or condition that resulted in a manual or automatic actuation of any engineered safety features, including the Reactor Protection System.

Designation of Apparent Cause of Occurrence: The apparent cause of this occurrence was a momentary low RCS flow signal oscillation, in conjunction with a overly conservative setting of the flux/delta flux/flow bistables in the RPS. A new type of flow transmitter was installed at Davis-Besse during the 1984 Refueling Outage to provide environmentally qualified flow indication. These flow transmitters are more sensitive to flow oscillations than the previous transmitters since they do not require a significant displacement for their operation (no bellows). Therefore, any hydraulic oscillations are sensed by the transmitters and input to the RCS flow monitoring function.

Investigation into the RPS setpoints after the trip revealed that the flux/delta flux/flow setpoint had been set too conservatively. At the time of the reactor trip, the flux/delta flux/flow setpoint was at approximately 103-104 percent full power, which is approximately 3 percent lower than the maximum allowable setpoint. The combination of the conservative setpoint and the oscillation in the RCS flow signal caused the indication to reach the upper limit of the RPS flux/delta flux/flow setpoint.

Analysis of Occurrence: The event was initiated by a trip on flux/delta flux/flow for which the setpoint was verified to be overly conservative. Therefore, the RPS protection was adequate, and plant safety was not impacted.

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

The SFRCS module actuated to the safe (tripped) condition. Therefore, the operability of the SFRCS was not affected. Normal pressurizer levels and steam generator water inventories were maintained throughout the event. Auxiliary Feedwater Pumps were not actuated, and the power operated relief valve was not challenged.

Corrective Action: Surveillance testing was performed on the SFRCS channel that half tripped to check the bistable and channel electronics. No deficiencies were discovered. A Containment entry was made to inspect the transmitter itself and to apply a differential pressure by individual operation of the source valves. The transmitter operated correctly and is indicating a level which agrees with the redundant level transmitters for that steam generator. The tripping of an SFRCS channel, when steam generator levels are well above the trip setpoint, has not previously occurred at Davis-Besse. Subsequent performance of the SFRCS channel has been satisfactory.

Exhaustive testing was performed to determine the cause of the Main Feed Pump #1 trip. During the 1984 Refueling Outage, Davis-Besse installed electronic governors on the MFPTs. These governors are faster acting than the old hydraulic governors, and it was thought a low control oil pressure may have occurred when the post trip target feed pump speed signal was received. The main feed pump was tested with 200, 400, and 600 rpm step increases. A turbine trip would not recur, and oil pressure would not decrease to near the trip value. The calibration of the vacuum trip switch, the high discharge pressure trip switch, both low oil pressure switches, and both thrust bearing trip switches was checked with no deficiencies found. A review of the post trip data indicated that the main feed pump post trip target speed was controlling the new MFPT governors at a higher than desired speed. This high speed demand may have contributed to the loss of the main feed pump by placing an excessive demand on the pump speed. The pump post trip target speed was reduced. Subsequent operation of the pump at power has been satisfactory.

During the plant restart, reactor power was limited to 90 percent of full power to provide ample operating margin while further evaluations are being performed. Station procedures are being reviewed to insure that the flux/delta flux/flow setpoint is set within the allowable band, but not overly conservative.

Evaluations of the RCS flow signal oscillations are being performed to determine a design for a filter network to reduce signal noise. This modification will be accomplished under Facility Change Request 85-103.

Failure Data: Although Davis-Besse Unit 1 has tripped on high imbalance in the past, this is the first trip which has occurred from exceeding the maximum power limit of the flux/delta flux/flow setpoint. Normally, the high flux trip setpoint is set at a flux setpoint lower than the flux/delta flux/flow high flux trip setpoint. The trip occurred on the high flux setpoint of the flux/delta flux/flow window only because of an overly conservative setting.

Report No: NP-33-85-13DVR No(s): 85-065



May 22, 1985

Log No. K85-817
File: RR 2 (NP-33-85-13)

Docket No. 50-346
License No. NPF-3

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Gentlemen:

LER No. 85-009
Davis-Besse Nuclear Power Station Unit 1
Date of Occurrence: April 24, 1985

Enclosed is Licensee Event Report 85-009 which is being submitted in accordance with 10CFR50.73, to provide 30 day written notification of the subject occurrence.

Yours truly,

Stephen M. Quennoz
Plant Manager
Davis-Besse Nuclear Power Station

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Enclosure

cc: Mr. James G. Keppler,
Regional Administrator,
USNRC Region III

Mr. Walt Rogers
DB-1 NRC Resident Inspector

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