NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Davis-Besse Unit 1	0 5 0 0 0 3 4 6	1 OF 0 3

TITLE (4)
Reactor trip caused by automatic insertion of Axial Power Shaping Rods

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 5 0 0 0
0 1	0 8	8 4	8 4	— 0 0 1	— 0 1	0 3	2 9	8 4		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 4 6	20.402(b)	20.405(c)	XX 50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
John D. Swartz	4 1 9 2 5 9 - 5 0 0 0

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	R B	6 9	M 4 5 5	Y							

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

Due to a condenser tube leak, reactor power was reduced to 46%. Operators borated the Reactor Coolant System to minimize the normal negative imbalance caused by the rod insertion during the power reduction. When core imbalance turned around and became positive due to rod withdrawal and Xenon, operators added demineralized water to the RCS to allow rods to insert. Due to a failure in the Control Rod Drive Control System, the operators could not operate the Axial Power Shaping Rods to help reduce the positive core imbalance, and the Axial Power Shaping Rods inserted without command. The imbalance as read by the out-of-core detectors was much greater than the imbalance as read by the incore detectors. The apparent reason for the out-of-core detectors reading much greater than the more accurate incore detectors is because the out-of-cores are calibrated to imbalance caused by an Axial Power Shaping Rod movement. The positive core imbalance increased to the Reactor Protection System flux/delta flux/flow setpoint, and the reactor tripped about 3.5 hours after reducing power to 46%. The Control Rod Drive Control System problem was due to a faulty logic card which was later repaired.

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

Description of Occurrence: On January 8, 1984, the unit was operating at approximately 100% power. At 1640 hours, high conductivity alarms of the condensate discharging from the polishers were received by Control Room operators, and a reduction in power to 50% was commenced at a rate of 1/3% per minute, eventually reaching 46%.

As the Integrated Control System (ICS) reduced reactor power, regulating Group 7 rods inserted into the core, and the core imbalance went from -2% to a maximum negative imbalance of -10% as measured by the out-of-core detectors. The more accurate incore detector system read -8%. The imbalance remained at approximately -8% for approximately one hour.

In response to the Xenon buildup, the control rods withdrew to a maximum value of 91% withdrawn at 2115 hours. During the 1.5 hour period of rod withdrawal, the core imbalance increased to +20% by out-of-cores (+10% by incores) due to both rod withdrawal and the relative burnout of Xenon in the top of the core as compared to the bottom. To limit rod withdrawal, the operator began adding demineralized water at 1955 hours. The control rod insertion (due to the water added) was not enough to completely stop the increase on imbalance.

Approximately eight minutes prior to the trip, the Axial Power Shaping Rods (APSR) were selected to be withdrawn, however, the rods automatically started inserting. The Reactor Operator stopped the insertion by selecting a different group of regulating rods.

The reactor tripped at 2318 hours on Reactor Protection System (RPS) flux/delta flux/flow. At this time, the out-of-core detectors, which the RPS looks at, were indicating an imbalance of approximately +24%. The incore detectors were indicating an imbalance of approximately +12%. This event is reportable under 10CFR50.73(a)(2)(iv), Automatic Actuation of RPS.

Designation of Apparent Cause of Occurrence: The cause of the positive imbalance was due to the large difference in the amount of Xenon in the top of the core as compared to the bottom. The apparent reason for the out-of-core detectors reading much greater than the more accurate incore detectors is because the out-of-cores are calibrated to imbalance caused by an APSR movement. The imbalance caused by APSR movement is more conservative than any combination of Xenon, Group 7, or APSRs. Therefore, the reactor trip imbalance setpoint is always conservative.

The cause of the APSR in motion, without a manual command, was found to be a failed integrated circuit gate on system logic module C6 (IC2). The fault caused a constant manual "in" command, which when Group 8 was selected, resulted in the APSR group run in.

Analysis of Occurrence: The RPS acted as designed, tripping the reactor when the flux/delta flux/flow setpoint was reached on the out-of-core detectors. A reactor trip would have occurred earlier in the event if the plant would have been at a higher power during the imbalance swing due to a tighter RPS operating envelope on flux/delta flux/flow.

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The calibration of the out-of-core detector imbalance to an imbalance caused by APSR movement is more conservative than any combination of Xenon, Group 7, or APSRs. Therefore, the reactor trip imbalance setpoint is always conservative.

Corrective Action: On January 9, 1984 at 0830 hours, Instrument and Control Mechanics repaired the faulty system logic card under Maintenance Work Order 1-84-0102-00. The group was tested satisfactorily and declared operable at 1245 hours on January 9, 1984. Toledo Edison personnel will work with Babcock & Wilcox to investigate the possibility of reducing some of the excess conservatism in out-of-core imbalance indication.

Failure Data: This is the first failure of this type system logic module.

Report No: NP-33-84-01 DVR No(s): 84-001

TOLEDO EDISON

March 29, 1984

Log No. K84-355
File: RR 2 (NP-33-84-01)

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

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

Gentlemen:

Enclosed is Revision 1 to Licensee Event Report 84-001, which is being submitted in accordance with 10CFR50.73. The revisions to the report are indicated by a "1" in the left margin of each page.

The system code for component failures was taken from the old LER instruction book since the new IEEE-805 is not yet available.

Yours truly,

TD Murray

Terry D. Murray
Station Superintendent
Davis-Besse Nuclear Power Station

TDM/ljk

Enclosure

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

Mr. Walt Rogers
DB-1 NRC Resident Inspector

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