FirstEnergy

Davis-Besse Nuclear Power Station
5501 North State Route 2
Oak Harbor, Ohio 43449-9760

NP-33-98-010

Docket No. 50-346

License No. NPF-3

October 26, 1998

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

Ladies and Gentlemen:

LER 1998-010
Davis-Besse Nuclear Power Station, Unit No. 1
Date of Occurrence - September 24, 1998

Enclosed please find Licensee Event Report 1998-010, 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,

James H. Lash
Plant Manager
Davis-Besse Nuclear Power Station

GMW/dlc

Enclosure

cc: Mr. J. L. Caldwell
Acting Regional Administrator
USNRC Regio.. III

Mr. Stephen J. Campbell
DB-1 NRC Senior Resident Inspector

Utility Radiological Safety Board

IE22

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50.0 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)

Misdiagnosis of Feedwater Control Valve Solenoid Valve Failure During Testing Results In Manual Reactor Trip

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	24	1998	1998	-- 010 --	00	10	26	1998		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

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

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Gerald M. Wolf, Engineer - Licensing	(419) 321-8114

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	SJ	PSV	C339	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 15 single-spaced typewritten lines) (16)

On September 24, 1998, at 1401 hours with the plant at 100 percent power, during testing of the Steam Feedwater Rupture Control System (SFRCS), the position indicating light for a Main Feedwater Control Valve to Steam Generator (SG) 1 solenoid valve did not illuminate after the test trip switches were released. Troubleshooting erroneously determined the limit switch internal to the solenoid valve had failed, when in actuality the solenoid valve failed to properly reset. At 2200 hours, testing on the complimentary SFRCS logic channel repositioned the complimentary channel solenoid valve. This combined with the solenoid valve failure resulted in closure of the Main Feedwater Control Valve to SG 1. The reactor was manually tripped by the control room operator after observing closure of the Main Feedwater Control Valve to SG 1. The failed solenoid valve has been replaced, and training will be conducted regarding the misdiagnosis that occurred during troubleshooting of the solenoid valve failure. This event is being reported in accordance with 10CFR50.73(a)(2)(iv) as an event that resulted in manual actuation of the Reactor Protection System.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

Description of Occurrence:

On September 24, 1998, with the plant in Mode 1 operating at 100 percent power, monthly Surveillance Testing was initiated on the Steam and Feedwater Rupture Control System (SFRCS) [Energy Industry Identification System Identifier JB] utilizing procedure DB-MI-03212, "Channel Functional Test of SFRCS Actuation Channel 2 Logic for Mode 1." The SFRCS is designed such that protective actions are initiated when a trip condition is sensed for the two complementary logic channels (out of four total logic channels) of a single actuation channel (out of two total actuation channels). These protective actions include closing both Main Feedwater Control Valves in the event of a Main Feedwater or Main Steam line rupture on either Steam Generator (SG). Closure of a Main Feedwater Control Valve [SJ-FCV] is accomplished by de-energizing both respective logic channel solenoid valves [SJ-PSV]. For SFRCS actuation channel 2, Main Feedwater Control Valve to SG 1, SP6B, is closed when SFRCS logic channel 2 de-energizes solenoid valve SVSP6B1 and SFRCS logic channel 4 de-energizes solenoid valve SVSP6B2. During testing on SFRCS logic channel 2 at 1401 hours, the green position indicating light for solenoid valve SVSP6B1 did not illuminate after the test trip switches were released to reset the logic channel, indicating the solenoid valve may not have properly reset. The amber trip light, which indicates the status of the SFRCS trip relay for SVSP6B1, extinguished as expected when the test trip switches were released, indicating a trip signal was no longer present at the solenoid valve. Testing was temporarily suspended to investigate the cause for the green position indicating light failing to illuminate. This investigation determined the solenoid was energized when the logic channel was reset, and the solenoid valve moved when the solenoid was energized. It was concluded the limit switch internal to the solenoid valve had failed, resulting in erroneous indication of the solenoid valve position. The solenoid valve was verified to trip when the SFRCS test trip switches were depressed, ensuring the solenoid valve remained capable of performing its designated function, and testing was resumed.

Upon completion of the portion of the test for SFRCS logic channel 2, testing was initiated for SFRCS logic channel 4. A pre-evolution brief was conducted for the control room operators regarding the indication problem experienced during logic channel 2 testing for SVSP6B1, and the possibility that SP6B may close during testing of SFRCS logic channel 4 was discussed. When the test trip switches were depressed at 2200 hours on September 24, 1998, to simulate a logic channel 4 actuation on SG 2 low pressure, the control room operators observed SP6B begin to close. As discussed during the pre-evolution brief, the control room operators manually tripped the reactor from 100 percent power.

Unit response to the reactor trip was as designed. Plant parameters stabilized within their normal post-trip values. One Main Steam Safety Valve (MSSV) [SB-RV], SP17B6, which had been gagged closed prior to this evolution due to a low setpoint, did not reseat properly when the gagging device became disconnected. Main Steam header pressure was manually reduced by the control room operator to reseat SP17B6.

Initial notification of this manual reactor trip was made to the NRC at 2312 hours on September 24,1998, in accordance with the four-hour reporting requirement of 10CFR50.72(b)(2)(ii). This report is being submitted in accordance with 10CFR50.73(a)(2)(iv).

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

Apparent Cause of Occurrence:

The apparent cause of this event was a misdiagnosed failure of the Main Feedwater Control Valve solenoid valve SVSP6B1. This misdiagnosis resulted in the conclusion by the individuals involved that conditions were acceptable to continue SFRCS testing, when in fact, Main Feedwater Control Valve to SG 1, SP6B, was in a half-tripped condition. A similar event occurred on October 23, 1997, when the position light for SVSP6B2 failed to illuminate during SFRCS logic channel 4 testing. The October 1997 event was diagnosed to be caused by a failure of the solenoid valve position switch and not the solenoid valve itself. Troubleshooting methods similar to those used in October, 1997, were employed for the solenoid valve failure that occurred on September 24, 1998.

When SFRCS logic channel 4 low main steam pressure condition was simulated with SP6B effectively in a half-tripped condition from SFRCS logic channel 2, the Main Feedwater Control Valve to SG 1 began to close, prompting the control room operators to manually trip the reactor.

The failure of the solenoid valve, a contributing factor to this event, exhibited itself during monthly testing performed to satisfy the Technical Specification Surveillance Requirements for the SFRCS. The purpose of Surveillance Testing is to periodically demonstrate at a set minimum frequency that the overall system functional capability is sufficiently maintained comparable to the original design standards. This testing was successful in revealing SVSP6B1 no longer performed as designed. Initial examination of the failed solenoid valve has revealed that the valve internals did not fully travel to the reset position after it had reached normal operating temperature. The solenoid valve will be returned to the manufacturer for further investigation of the cause of failure.

The MSSV gagging device failed to keep SP17B6 closed when the vibration of the other MSSVs lifting during the trip caused the gagging screw to back out of the dimple on the MSSV. As the screw backed out, the MSSV started to open, which increased vibration of SP17B6, backing out the screw further until the gagging device became disconnected from the MSSV. This gagging device had been obtained from the MSSV vendor and installed per the vendor's instructions.

Analysis of Occurrence:

There were no safety concerns identified during or as a result of this event. The reactor was manually tripped prior to reaching the Reactor Protection System (RPS) [JC] high pressure trip setpoint to avoid challenging the RPS. The Control Rod Drive Trip Breakers opened and all control rods inserted on the reactor trip as designed. The Steam Generator outlet pressure increased due to the closing of the Main Turbine Stop Valves [TA-ISV]. The Turbine Bypass Valves (TBVs)[SB-PCV] and the Atmospheric Vent Valves (AVVs) [SB-PCV] opened and the MSSVs lifted in response to the increasing secondary system pressure. The MSSVs (except for SP17B6) and the AVVs closed as Steam Generator outlet pressure decreased. The TBVs controlled Steam Generator outlet pressure at the post-trip setpoint. The Safety Features Actuation System [JE] was not challenged during this event.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

Corrective Actions:

The faulty solenoid valve, SVSP6B1, was replaced and tested, and the gagging device reinstalled on SP17B6, prior to the plant entering Mode 2 at 0359 hours on September 26, 1998. The gagging device was reinstalled with the gagging screw double-nutted to prevent vibration from backing the screw out, and the arms of the gagging device were also bolted down and the bolting lock-wired to keep the gagging device in place.

Training will be provided to Plant Engineering and Maintenance Engineering personnel typically involved in troubleshooting activities. This training will discuss the lessons learned from this event and reinforce expectations for troubleshooting plant equipment problems. This training will be completed by December 18, 1998.

The solenoid valve failure was discovered during monthly Surveillance Testing for the SFRCS. This testing was successful in revealing the failure of the solenoid valve prior to the plant trip. Therefore, any corrective actions deemed necessary to prevent future failures of these SFRCS solenoid valves will be in accordance with the Davis-Besse Nuclear Power Station (DBNPS) corrective action process, as would any other equipment deficiency identified during Surveillance Testing.

Failure Data:

There have been no LERs at the DBNPS in the previous years involving a reactor trip or actuation of an Engineered Safety Feature as a result of a misdiagnosis during troubleshooting.

NP-33-98-010-0

PCAQR 98-1745