FirstEnergy

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

NP-33-00-002-00

Docket No. 50-346

License No. NPF-3

April 28, 2000

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

Ladies and Gentlemen:

LER 2000-002
Davis-Besse Nuclear Power Station, Unit No. 1
Date of Occurrence - March 29, 2000

Enclosed please find Licensee Event Report 2000-002, which is being submitted to provide written notification of the subject occurrence. This LER is being submitted in accordance with 10CFR50.73(a)(2)(i)(B).

Very truly yours,

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

GMW/s

Enclosure

cc: Mr. J. E. Dyer, Regional Administrator, USNRC Region III
Mr. K. S. Zellers, DB-1 NRC Senior Resident Inspector
Utility Radiological Safety Board

IE22

COMMITMENT LIST

The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station in this document. Any other actions discussed in the submittal represent intended or planned actions by Davis-Besse. They are described only as information and are not regulatory commitments. Please notify the Manager - Regulatory Affairs (419-321-8466) at Davis-Besse of any questions regarding this document or associated regulatory commitments.

COMMITMENTS	DUE DATE
1. Test the six MSSVs installed during 12RFO	1. No later than 120 days after return to full power operations following 12RFO
2. Evaluate results of MSSV testing performed 120 days after 12RFO to determine adequacy of gray finish on valve seats.	2. Prior to start of 13RFO (Spring, 2002)
3. Test the six MSSVs on vendor's steam header to check accuracy of the current hydroset test methodology.	3. November 15, 2000
4. Inspect the six MSSVs removed during 12RFO to investigate the cause of the valves to lift above allowable values.	4. November 15, 2000
5. Evaluate use of valve stem displacement equipment for testing of MSSVs.	5. Prior to end of 13RFO
6. Continue to test all MSSVs every refueling outage unless otherwise specified. The increased frequency testing will continue until sufficient data is obtained to provide justification for less testing.	6. Ongoing
7. Test each MSSV prior to installation if the MSSV has been in storage for greater than two years.	7. Ongoing
8. Continue to follow the progress of the EPRI project to investigate the cause of MSSVs sticking, and to determine appropriate actions to prevent future sticking. Incorporate the EPRI project's proposed actions as appropriate.	8. Ongoing

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)

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TITLE (4)
Main Steam Safety Valve Setpoints Greater Than Technical Specification Allowable Values

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
03	29	2000	2000	-- 002 --	00	04	28	2000		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1
POWER LEVEL (10)	94

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

	20.2201(b)		20.2203(a)(2)(v)	X	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)		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

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 March 27 and March 28, 2000, with the unit in Mode 1 at approximately 94 percent power, setpoint testing was conducted on the Main Steam Safety Valves (MSSVs). All 18 installed MSSVs were tested. Six of the tested MSSVs had a setpoint more than one percent above the Technical Specification allowable value. The setpoint of each MSSV was adjusted to within the allowable value upon discovery, as necessary. Based on the as-found lift setting pressures, the Main Steam System pressure would not have exceeded previously evaluated values during any anticipated overpressure transients. Six of the tested MSSVs, including four that had a setpoint above the Technical Specification allowable value and two with the lowest setpoints, were removed to be rebuilt to aid in the determination of the potential causes. This event is being reported in accordance with 10CFR50.73(a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications.

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

DESCRIPTION OF OCCURRENCE:

On March 27 and March 28, 2000, with the unit in Mode 1 at approximately 94 percent power, setpoint testing was conducted on the Main Steam Safety Valves (MSSVs) [SB-RV] in accordance with the requirements of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Nine MSSVs are installed on each of the two steam generator main steam headers; valves SP17B1 through 9 on Steam Generator 1 header, and valves SP17A1 through 9 on Steam Generator 2 header. Two MSSVs on each header have a setpoint of 1050 psig, and the remaining seven valves have a setpoint of 1100 psig. These 18 MSSVs prevent the secondary system pressure from exceeding 110 percent of its design pressure during the most severe anticipated system operational transient. Technical Specification 3.7.1.1 action a allows continued power operations with MSSVs inoperable provided the High Flux Trip Setpoint is reduced based on the operable MSSV relieving capacity; there are a minimum of two operable MSSVs per Steam Generator, at least one with a setpoint not greater than 1050 psig (+/- 1%); and no operable MSSV has a setpoint greater than 1100 psig (+/- 1%).

All 18 MSSVs were designated for in-place testing. On March 29, 2000, a Condition Report was initiated that documented the results of the MSSV testing. The following six MSSVs had setpoints that were more than one percent above the Technical Specification allowed setpoint:

Valve Number	Desired Setpoint (psig)	As Found Setpoint (psig)	Offset (%)
SP17A3	1100	1115	1.4
SP17A5	1100	1138	3.0
SP17A9	1100	1163	5.7
SP17B1	1100	1119	1.7
SP17B6	1050	1070	1.9
SP17B7	1050	1093	4.0

The remaining twelve MSSVs tested had setpoints not greater than one percent above the Technical Specification allowed setpoint.

The existence of similar discrepancies in multiple valves is an indication that the discrepancies arose over a period of time. Therefore, it is assumed the plant operated with multiple MSSVs inoperable without taking the actions specified in Technical Specification 3.7.1.1. In accordance with the guidance contained in NUREG-1022, Event Reporting Guidelines for 10 CFR 50.72 and 50.73 (Revision 1), this condition represents operation of the plant in a condition that is prohibited by the plant's Technical Specifications. Therefore, this event is being reported as a Licensee Event Report in accordance with 10CFR50.73(a)(2)(i)(B). Upon discovery of each individual valve's lift setting pressure being outside of the Technical Specification allowable value, the valve was declared inoperable until the setpoint was adjusted to be within the allowable value. The High Flux Trip Setpoint had been reduced in accordance with Technical Specification 3.7.1.1 action a for one MSSV to be inoperable prior to the start of testing.

APPARENT CAUSE OF OCCURRENCE:

The specific root cause of the MSSVs to have a setpoint greater than the Technical Specification allowable setpoint is unknown. There are two areas that have been identified for further investigation: seat and disc galling, and testing methodology.

The initial test lift of valve SP17B7, which has a 1050 psig setpoint, was at 1093 psig. The second test lift, performed to fulfill ASME Code requirements, was at 1062 psig without any adjustments performed from the initial test lift. This high initial lift phenomenon has been identified at other nuclear power plants with Dresser 3700 series safety valves. As a result, the Electric Power Research Institute (EPRI) initiated a project to investigate the cause of MSSVs sticking. Results of the EPRI project indicates the high lift phenomenon occurs somewhere within 30 to 90 days after installation of the safety valve and is a result of some form of sticking or galling of the seat and nozzle. The sticking or galling only occurs after maintenance is performed. Typically after one or two safety valve lifts the sticking/galling does not repeat. A gray finish on the disc to nozzle interface may reduce the potential for sticking/galling. Prior to this event, a mirror finish has been used on all Davis-Besse Nuclear Power Station (DBNPS) MSSVs to ensure leak tightness, and no valve lifts are performed once the MSSVs are reinstalled following maintenance. The gray finish is rougher than the mirror finish, and may help reduce galling between the seat and nozzle surfaces that occurs while the valve is inservice.

The current testing methodology (Hydroset) has a tolerance of one percent, which is identical to the Technical Specification tolerance. Other potential sources of inaccuracy are the fact that the pressure of the Main Steam System during the test is read from a 0-1000 psig gauge that has an accuracy of +/ 0.5%, and that the Main Steam System header pressure fluctuates 5 to 20 psig during normal operation. Additional inaccuracy may be introduced because the lift point of the MSSV is determined by the audible noise that occurs when the safety valve lifts. The tolerance of the testing methodolgy was identified as a potential cause of a previous occurrence of the MSSVs to lift outside of the Technical Specification required tolerance, as documented in DBNPS LER 1998-001.

When DBNPS LER 1998-001 was submitted, the cause of the MSSV that lifted at the highest pressure was attributed to the fact that the valve had been in storage for a period of time prior to installation. It was theorized that the extra pressure that exists between the valve seat and nozzle due to the lack of a force to counteract the spring force while a MSSV is in storage over a period of time caused the MSSV to stick when initially tested, possibly due to minor galling of the seat and nozzle surfaces. However, storage of an MSSV is no longer believed to be a contributor to a MSSV setpoint being above the Technical Specification allowed value. Based on the results of the testing performed in March 2000, it is now believed this valve exhibited sticking/galling of the seat and nozzle as described above. This phenomenon was recognized at the time LER 1998-001 was written, but was not understood. The EPRI project to investigate the cause of MSSVs sticking was conducted after the submission of LER 1998-001.

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

ANALYSIS OF OCCURRENCE:

The MSSVs are designed to provide sufficient relieving capacity to assure the Main Steam System pressure remains below 1155 psig, or 110 percent of its design pressure of 1050 psig, during the most severe anticipated system operational transient as described in Section 5.2.2.3 of the Updated Safety Analysis Report (USAR) and Technical Specification Bases 3/4.7.1.1. The ASME Code (OM-1-1981) establishes the as-found setpoint for safety valves at +/- three percent of the valve nameplate setpoint. Because of the previous MSSV test failures as documented in LER 1998-001, and to support a possible License Amendment to increase the Technical Specification setpoint tolerance, an analysis was performed to determine the effect of MSSV setpoint drift above the Technical Specification allowed setpoint. This analysis concluded that overpressure protection is assured for each steam generator for each of the following conditions:

1050 psig setpoint MSSVs:	1100 psig setpoint MSSVs:
1 inoperable (does not lift)	1 inoperable (does not lift)
1 begins to open at +4% setpoint	6 begin to open at +3% setpoint

Only one MSSV on each header (SP17B7 and SP17A6) had a lift setting pressure more than three percent above the setpoint specified in the Technical Specifications. Assuming these valves would not lift, the as-found setpoints of the remaining MSSVs is bounded by this analysis. Therefore, the MSSVs would have provided the required overpressure protection for the Steam Generators.

CORRECTIVE ACTIONS:

Upon discovery of each MSSV with a setpoint higher than the Technical Specification allowable value, the setpoint of the valve was adjusted to be within the allowable value to support continued plant operation. The testing was performed with the High Flux Trip Setpoint reduced in accordance with Technical Specification 3.7.1.1 action a for one MSSV inoperable prior to the start of MSSV testing.

The four MSSVs exhibiting the highest relative setpoint (1100 psig setpoint valves SP17A5, SP17A9 and 1050 setpoint valves SP17B6 and SP17B7) have been removed from the system for inspection. Two other MSSVs (1050 setpoint valve SP17A7 and 1100 psig setpoint valve SP17B3) that lifted five percent below the Technical Specification allowable value have also been removed from the system for inspection. Six qualified spare MSSVs with a gray finish on the valve seats have been installed on the main steam line headers. The six installed valves will be tested at power no later than 120 days after return to full power operations. The results of this testing will be evaluated to determine if a gray finish on the valve seats is adequate to prevent sticking. This evaluation will be complete prior to the start of the thirteenth refueling outage, which is currently scheduled for Spring 2002.

CORRECTIVE ACTIONS: (Continued)

The six valves removed from the system will be tested on a vendor's steam header at full steam pressure, and the results of this testing will be compared to the as-left hydroset readings to check the accuracy of the current hydroset test methodology. These valves will also be inspected to investigate the cause of the MSSVs to lift above the Technical Specification allowable value. These actions will be completed by November 15, 2000.

Test equipment has been developed that measures the movement of the stem to determine the lift setpoint. This valve stem displacement equipment is automatic and does not rely on a test gauge or audible noise to determine valve lift point; therefore, the test results of this equipment may be more reliable. The test methodology that utilizes valve stem displacement equipment will be evaluated to determine if it can be used to satisfy the Technical Specification Surveillance Requirement for the MSSVs. This equipment will be evaluated, and implemented if deemed acceptable, by the end of the thirteenth refueling outage.

The following are the corrective actions previously proposed in LER 1998-001 documenting the previous occurrence of the MSSVs to lift outside of the Technical Specification required tolerance:

1. All MSSVs will be tested every refueling outage unless otherwise specified until sufficient data is obtained to provide justification for less testing.
2. Each MSSV will be tested prior to installation if the MSSV has been in storage for greater than two years.
3. One of the MSSVs rebuilt during 11RFO will be tested prior to the end of the thirteenth refueling outage.
4. A setpoint check will be performed on a sample of the MSSVs that are refurbished and reinstalled during 12RFO.
5. The progress of the EPRI project to investigate and correct the cause of MSSVs sticking will be followed and the project's proposed actions will be incorporated as appropriate.

Actions 1 and 5 will continue to be performed as originally proposed. Action 3 was proposed to help identify the effects of storage on the setpoint of a MSSV. Since storage of a MSSV is no longer believed to be a cause of a MSSV setpoint setpoint being above the Technical Specification allowed value, this action will no longer be performed. Action 2, which is also associated with storage of a MSSV, will be maintained to ensure stored MSSVs have the proper setpoint when installed. Action 4 will be performed on all six MSSVs installed during 12RFO no later than 120 days after return to full power operations as described previously.

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FAILURE DATA:

DBNPS LER 1998-001 documents a previous occurrence where MSSV setpoints were outside of the Technical Specification allowable values. It should be noted that LER 1998-001 reported MSSVs that lifted more than one percent below the Technical Specification allowable value as being inoperable as well as reporting the MSSVs that lifted more than one percent above the allowable value. Technical Specification 3.7.1.1 only requires the MSSVs to have a setpoint not greater than the specified value (+/- 1%), so the MSSVs that lift below the specified value need not be declared inoperable.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

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