

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 4										PAGE (3) 1 OF 0 4																					
TITLE (4) Auxiliary Feed Pump Turbine Response Time Problems																																									
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 3			2 3			8 5			8 5			0 0			7 0			2 1			1 2			6 8			5			0 5 0 0 0 0						0 5 0 0 0 0					
OPERATING MODE (9)						THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 8: (Check one or more of the following) (11)																																			
POWER LEVEL (10) 0 1 0 1 0						20.402(b)						20.406(a)						50.73(a)(2)(iv)						73.71(b)																	
						20.406(a)(1)(i)						50.38(a)(1)						50.73(a)(2)(v)						73.71(a)																	
						20.406(a)(1)(ii)						50.38(a)(2)						50.73(a)(2)(vi)						OTHER (Specify in Abstract below and in Text, NRC Form 365A)																	
						20.406(a)(1)(iii)						50.73(a)(2)(i)						50.73(a)(2)(vii)(A)																							
						20.406(a)(1)(iv)						50.73(a)(2)(ii)						50.73(a)(2)(vii)(B)																							
20.406(a)(1)(v)						50.73(a)(2)(iii)						50.73(a)(2)(viii)																													
20.406(a)(1)(vi)						50.73(a)(2)(iv)						50.73(a)(2)(ix)																													
LICENSEE CONTACT FOR THIS LER (12)																																									
NAME Jim Dunne																				TELEPHONE NUMBER 4 1 9 2 4 9 - 5 6 4 4																					
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											
B			B A			6 5 W			2 9 0			Y						X			B A			S N B			X 9 9 9			N											
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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)																																									
<p>On March 23, 1985, the post trip review of a Steam and Feedwater Rupture Control System Trip from 28 percent rated thermal power noted an apparent response time problem for Auxiliary Feedwater Pump 1-2. Additionally, several days prior to the trip a visual inspection of the main stream supply lines to both Auxiliary Feed Pump Turbines identified loose hanger bolts and some hanger damage.</p> <p>Investigations determined that an improperly sized speed bushing in a new governor installed on Auxiliary Feed Pump Turbine 1-2 caused a slower response time for Auxiliary Feed Pump 1-2 than was required by Technical Specifications. The cause for loose hanger bolts and hanger damage is believed to be the result of water slug forces created by steam condensing in the long run of the cold (ambient temperature) piping during the initial steam flow into the Auxiliary Feedwater Pump Turbine Steam Supply (AFPTSS) piping system.</p> <p>Changes have been made to the governor speed bushing to ensure that the AFW system response time criteria would be met. All loose hanger bolts had been re-torqued and most of the damaged hangers had been either repaired or replaced prior to the trip. Plant procedures have been modified to minimize the transient loads placed on the steam piping due to system actuation and surveillance testing.</p> <p>The response time event was reportable per 10CFR50.73(a)(2)(ii)(A). The loose hanger bolts and hanger damage was reportable per 10CFR50.73(a)(2)(ii)(A) and (2)(ii)(B).</p>																																									
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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104
EXPIRES 8/31/85

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TEXT: If more space is required, use additional NRC Form 365A's (17)

Description of Occurrence: On March 23, 1985, the post trip review of a Steam and Feedwater Rupture Control System, SFRCS, (JB), trip from 28 percent rated thermal power showed that Auxiliary Feedwater Pump, AFP, (BA) 1-2 had not met its 40 second response time required by Technical Specification 3.3.2.2. Both AFP's in the Auxiliary Feedwater System are turbine-driven pumps with steam supplied from the two 36" main steam lines through 6 inch supply lines which are reduced to 4 inch lines before reaching the turbines. The SFRCS trip occurred on March 21, 1985, during a controlled shutdown for a maintenance outage (see LER 85-005, NP-33-85-06). AFP 1-2 was declared inoperable at 1110 hours on March 23, 1985, and the Station entered the action statement of Technical Specification 3.7.1.2, which requires the Auxiliary Feedwater System to be restored to operability within 72 hours, or be in Hot Shutdown in the next 12 hours. Since the Station had entered Mode 5 (Cold Shutdown) the same day to permit control rod drive repairs (see LER 85-006, NP-33-85-09), the action statement was being satisfied.

In addition, AFP 1-1 had been declared inoperable on March 16, 1985, after the discovery of damage to the following hangers on the main steam piping to AFPT 1-1:

3A-EBD-19-H14
3A-EBD-19-H25
3A-EBD-19-H28
3A-EBD-19-H32
3A-EBD-19-H34
3A-EBD-19-H66
3A-EBD-19-H132
3A-EBD-19-H135

An engineering evaluation of the hanger damage concluded that the damage to hanger 3A-EBD-19-H28 required AFP 1-1 to be declared inoperable. This hanger was repaired on March 17, 1985, allowing AFP 1-1 to be declared operable. Hangers 3A-EBD-19-H25, H34, and H135 were determined to be operable in their as-found condition. The remaining hangers were restored to their as-built condition by March 23, 1985. An operability analysis for AFPT 1-1 determined that the steam supply line for AFPT 1-1 met its short term operability requirements. A visual inspection of the AFPT steam lines after the March 21, 1985 trip and SFRCS actuation did not identify any new hanger damage.

Hanger damage was also identified on the main steam piping to AFPT 1-2 over the period of March 1-16, 1985. An operability evaluation was conducted for AFPT 1-2 and it was determined to meet its short-term operability requirements. However, based on the implications of multiple hanger damage, the hangers and anchor involved have been listed below:

3A-EBD-19-H49
3A-EBD-19-H50
3A-EBD-19-H142
3A-EBD-19-H144
3A-EBD-19-H147
Anchor A3-

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

Designation of Apparent Cause of Occurrence: Investigations determined that the cause of the AFPT1-2 response time problem was the rate at which the turbine accelerated to its full speed of 3600 RPM. The acceleration rate is governed by the size of an internal speed setting bushing within the turbine governor. During the 1984 Refueling Outage a Facility Change Request (FCR 83-136) was implemented which replaced the original AFPT 1-2 governor with a new Woodward PGG governor. The speed setting bushing supplied on the new governor was a 30 second bushing. This rate prevented AFPT 1-2 from meeting the AFW system response time requirement. An error made in interpreting events in the post modification testing allowed the response time problem to go undetected.

The cause of the hanger damage is believed to be the result of water slug forces created by steam condensing in the long run of the cold piping during the initial steam flow into the AFPTSS piping system. This conclusion is discussed in greater detail in Appendix C.1.1, Action Plan Nos. 1A, 1B, and 1C, of the Findings, Corrective Actions, Generic Implications Report of the "Toledo Edison Course of Action" submittal (Serial No. 1182) which was provided to the NRC on September 10, 1985.

Analysis of Occurrence: During the SFRCS trip from 28% reactor power, the slow response time (approximately 48 seconds) for AFP 1-2 did not create any significant problems. AFP 1-1 met the AFW system response time criteria ensuring that adequate feedwater flow was available for cooling the RCS.

Both AFPT steam lines have been affected with hanger damage and loose hanger bolts due to transients loads. Excluding the damage to hanger 3A-EBD-19-H28, analysis has shown that the hanger damage discovered to date has not affected the short-term operability of the piping system.

Corrective Action: The corrective actions taken were:

1. Replace the internal speed setting bushing on the new Woodward PGG governor for AFPT 1-2 with a 15 second ramp bushing. No changes have been made to AFPT 1-1 since it uses the original Woodward governor and not the new Woodward PGG governor.
2. Change the logic for steam supply valves MS106A and MS107A so that they will no longer open simultaneously with valves MS106 and MS107.
3. Revise the surveillance test for PSL106A-106D and PSL107A-107D so as to perform the test without use of either main steam or auxiliary steam.
4. Instruct operator to slowly open the supply valve from the auxiliary steam system when using auxiliary steam to test AFW pumps.
5. Replace and/or repair damaged hangers and re-torque all loose bolts.

After corrective item 1 was completed on the governor, ST 5071.02, SFRCS Refueling Test, was performed to determine the response time of AFPT 1-2. AFP 1-2 was declared operable at 0608 hours on April 12, 1985. AFPT 1-1 was also tested and its response time was verified to be within Technical Specification requirements.

Damage/discrepancies identified as a result of the detailed inspection plan developed for the AFPTSS piping system have been documented on Non-Conformance Reports (NCR).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0114
EXPIRES 8-7-85

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

The NCRs will be evaluated, cumulative operability evaluations conducted, and corrective actions taken as necessary to ensure the AFPTSS piping system meets its operability requirements prior to restart from the present shutdown.

Toledo Edison is planning on maintaining the AFPTSS piping system hot with steam up to newly installed turbine steam admission valves whenever the plant is in Modes 1, 2, or 3. This will eliminate the situation of the AFW system being put into service under cold conditions. Toledo Edison is presently implementing this operational configuration change. In addition, operational and maintenance changes, such as ensuring the adequate drainage of condensate from the piping system prior to the introduction of steam, will be made. As a result, the AFPTSS piping system will no longer be maintained and operated in the same manner under which the hanger and support degradation occurred.

In light of the determination of the root cause and the planned changes, the performance of inservice testing to quantify the loads experienced during the initial pressurization and heatup of the cold steam piping has been deemed unnecessary. However, confirmatory testing to confirm that transitory piping movements and subsequent support or hanger degradation will not occur on the AFPTSS piping system is planned to be conducted prior to exceeding Mode 3 from the present shutdown.

Failure Data: This is the first report on an SFRCS response time problem.

Report No: NP-33-85-08DVR(s): 85-045 & 85-051



November 26, 1985

Log No. K85-1519
File: RR2 (NP-33-85-08)

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

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

Gentlemen:

Enclosed is Revision 2 to Licensee Event Report 85-007. The revisions to the report are indicated by a "2" in the left margin of each page.

Please destroy or mark superseded your previous copy of this report and replace with the attached revision.

Yours truly,

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

LFS/syc

Enclosure

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

Mr. Walt Rogers
DB-1 NRC Resident Inspector

SYC/001

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