

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Davis-Besse Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 4 6	PAGE (3) 1 OF 04
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TITLE (4)
Containment Purge Exhaust Duct Support Spans Seismic Isolation Boundary

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)						
1	2	0	8	4	0	2	1	0	0	1	1	7	8	5			0 5 0 0 0
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OPERATING MODE (9) 6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)											
POWER LEVEL (10) 0 1 0 0	20.402(b)			20.405(c)			50.73(a)(2)(iv)			73.71(b)		
	20.405(a)(1)(i)			50.36(e)(1)			50.73(a)(2)(v)			73.71(e)		
	20.405(a)(1)(ii)			50.36(e)(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 John K. Wood							TELEPHONE NUMBER		
							AREA CODE 4 1 1 9		
							2 5 9 1 - 2 1 3 6 7		

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											
B	V	C	D	U	C	T	F	1	7	0	N									

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)

An engineering walkdown during the 1984 Refueling Outage found some seismic ductwork supports spanning seismic isolation boundaries. Further analysis found that of the thirty-one (31) supports identified that only one could be postulated to fail under a seismic load and cause the associated ductwork to fail. This support is located on the Containment Purge Exhaust System (CPE) outside of Containment. A failure of this portion of the ductwork would create an opening in the Emergency Ventilation System (EVS) negative pressure boundary. This would reduce the ability of the EVS to draw down the annulus and penetration rooms.

This is being reported in accordance with 10CFR50.73(a)(2)(V)(C) as a condition that could have prevented the fulfillment of the safety function of a system needed to control the release of radioactive material.

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TEXT (If more space is required, use additional NRC Form 386A's) (17)

Description of Occurrence: While performing an engineering walkdown during the 1984 Refueling Outage, Bechtel Power Corporation personnel discovered "Q" listed (Q) and Seismic Class I (S/I) ductwork and/or ductwork supports that spanned building seismic isolation boundaries (joints). Seismic isolation joints are wall and floor seams which isolate different building zones to allow for expansion and differential movement. A walkdown was performed specifically to identify any Q or S/I heating, ventilation, and air conditioning (HVAC) systems and/or supports that span seismic joints. Eight (8) areas were found where ductwork spanned seismic joints. All were analyzed and found to be acceptable. Thirty-one (31) supports were identified and analyzed. Twenty-four were found to be acceptable for long term plant operation, and four were found acceptable for interim operation. The remaining three supports would have been overstressed under seismic loading, but two of them would have remained intact and performed their intended safety function. The final support, however, could be postulated to fail under a seismic load and that the associated ductwork could also fail.

This support is located on the Containment Purge Exhaust System, CPE, (VA), between Isolation Dampers HV 5009 and HV 5021. This system has no safety related function, but since it penetrates the Emergency Ventilation System, EVS, (VI), negative pressure boundary, a portion of the ductwork includes "Q" designed and installed isolation capabilities. Under seismic loading, the postulated support and ductwork failure would degrade or remove the isolation capability which would jeopardize the safety function of the EVS.

Designation of Apparent Cause of Occurrence: The identified HVAC ductwork and supports were installed correctly with respect to the original design details. Fluor-Pioneer, Inc., was under contract to Lumm-Irsay Joint Venture to perform the design engineering for the seismic supports in compliance with Specifications 7749-M-410 and 7749-C-41. Subsequently, the support designs were approved by Bechtel prior to installation.

It was discovered by the recent Bechtel review that the differential movement between two adjacent seismic zones was not factored into the design of ductwork systems and/or supports that spanned the zones. The building/zone movements in combination with the weight and seismic loading would have caused overstressed conditions in three ductwork supports as described above.

Analysis of Occurrence: The event identified in this LER cannot be classified as an active failure. The postulated ductwork failure is dependent upon experiencing a seismic event of safe shutdown earthquake magnitude. Since Davis-Besse has not experienced any significant seismic activity since the support installation, the overstressing and failure of the support and associated ductwork is strictly analytical.

In assessing the safety implications (had there been a seismic event) of the ductwork and supports which span seismic joints, it was determined that 28 (out of 31) supports and the eight areas of ductwork spanning were acceptable for interim operation while the remaining three supports would have experienced stress levels

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above the allowables. Of the three, CPE ductwork support #435-04-1B could have failed under seismic loading which could have caused rupture or collapse of the 42" CPE ductwork and possible failure of isolation dampers HV 5009 and HV 5021 and both trains of EVS exhaust and recirculation ductwork routed adjacent to it.

This portion of the CPE ductwork penetrates the 603'0" elevation floor which is part of the EVS negative pressure boundary. The isolation valves in the ductwork are considered part of that pressure boundary and, therefore, are required to close for proper operation of the EVS. The EVS is required to draw and maintain a negative pressure (greater than or equal to .25 inches water gauge) in the shield building annulus, mechanical penetration rooms, emergency core cooling system pump and heat exchanger room, and the makeup pump room following a loss of coolant accident so as to limit airborne fission product leakage to the environment. Failure of the support and ductwork could have caused an unanalyzed opening to be created in the EVS negative pressure boundary, thereby limiting EVS exhaust capability.

Corrective Action: Identification of all locations where a seismic joint is spanned by a seismic HVAC system/support was performed through a complete review and field walkdown of all nuclear safety related or Seismic Class I HVAC systems. As noted previously, a total of eight ductwork areas and thirty-one supports were identified where the support/ductwork spanned seismic joints.

1. All eight areas of ductwork spanning and twenty-four of the thirty-one supports were analyzed and found to have adequate flexibility to remain intact and perform their intended safety function for long term plant operation.
2. Four of the thirty-one supports require modifications to bring their stress levels to within allowables for long term operation. (Supports: one each on CPE and Radwaste Exhaust Systems, and two on the Radwaste Supply System). It was determined, however, that the stress levels are within the allowables for short term operation. A Facility Change Request (FCR) is presently being prepared to perform the required modifications.
3. The remaining three supports were found not acceptable for short term operation and required immediate modifications. These supports were modified during a two week period beginning December 10, 1984:
 - 1) CPE - Support #435-04-1B
- FCR 84-225 and NCR 84-208
 - 2) EVS - Support #410-07-C31Z
- FCR 84-224 and NCR 84-208
 - 3) Fuel Handling Area Exhaust - Support #NQ/410-03-7
- FCR 84-221 and NCR 84-208

With the completion of the above modifications the ductwork supports and HVAC systems will be acceptable for long term plant operation.

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An investigation was also performed to verify all seismic related engineering work performed by Fluor-Pioneer, Inc. It was determined that the HVAC support work discussed in this LER was the only "Q" engineering performed by Fluor-Pioneer.

Failure Data: This is the first report of seismic supports spanning seismic joints.

Report No: NP-33-84-23

DVR No(s): 84-184



January 17, 1985

Log No. K85-173
File: PR 2 (NP-33-84-23)

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

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

Gentlemen:

LER No. 84-021
Davis-Besse Nuclear Power Station Unit 1
Date of Occurrence: December 20, 1984

Enclosed is Licensee Event Report 84-021 which is being submitted in accordance with 10CFR50.73, to provide 30 day written notification of the subject occurrence.

Yours truly,

A handwritten signature in cursive script, appearing to read 'Stephen M. Quennoz'.

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

SMQ/ljk

Enclosure

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

Mr. Walt Rogers
DB-1 NRC Resident Inspector

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