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Joseph R. Bynum
Vice President, Nuclear Operations

MAY 11 1991

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

Dear Sir:

TVA - BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 1 - DOCKET NO. 50-259 -
FACILITY OPERATING LICENSE DPR-33 - REPORTABLE OCCURRENCE REPORT
BFRO-50-259/91005

The enclosed report provides details concerning the potential for loss of the Residual Heat Removal Service Water and Emergency Equipment Cooling Water Systems following a seismic event as a result of inadequately documenting the design basis of flexible couplings used for Class I piping. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(v).

Very truly yours,

TENNESSEE VALLEY AUTHORITY


J. R. Bynum

Enclosure
cc: see page 2

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U.S. Nuclear Regulatory Commission

MAY 11 1991

cc (Enclosure):

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NRC Resident Inspector, BFN

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)
Browns Ferry Unit 1DOCKET NUMBER (2) | PAGE (3)
050002 | 5 | 9 | 1 | OF | 0 | 3

TITLE (4)

Potential Failure of Residual Heat Removal Service Water and Emergency Equipment Cooling Water Systems
Following Seismic Event as a Result of Inadequately Documented Design Basis

EVENT DAY (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)											
			SEQUENTIAL	REVISION				FACILITY NAMES			DOCKET NUMBER(S)									
MONTH	DAY	YEAR	NUMBER	NUMBER	MONTH	DAY	YEAR													
0	4	1	2	9	1	9	1	0	0	5	0	0	0	5	1	1	9	1	Browns Ferry Unit 2	05000260
0	4	1	2	9	1	9	1	0	0	5	0	0	0	5	1	1	9	1	Browns Ferry Unit 3	05000296
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following)(11)																		
N		20.402(b)			20.405(c)			50.73(a)(2)(iv)			73.71(b)									
POWER LEVEL (10)		20.405(a)(1)(i)			50.36(c)(1)			X 50.73(a)(2)(v)			73.71(c)									
0		20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)			OTHER (Specify in									
0		20.405(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)			Abstract below and in									
0		20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)			Text, NRC Form 366A)									
0		20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)												

LICENSEE CONTACT FOR THIS LER (12)

NAME
Stewart A. Wetzel, Engineer, Compliance Licensing

TELEPHONE NUMBER

AREA CODE |

2 | 0 | 5 | 7 | 2 | 9 | - | 2 | 0 | 4 | 8

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED MONTH | DAY | YEAR

SUBMISSION |

DATE (15) | | |

YES (If yes, complete EXPECTED SUBMISSION DATE) | X | NO

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

On April 12, 1991, TVA determined that a previously recognized condition had not been reported in accordance with the requirements of 10 CFR 50.73. This condition involved the potential for failure of the Residual Heat Removal Service Water (RHRSW) and Emergency Equipment Cooling Water (EECW) Systems during a seismic event.

The root cause of this condition was a failure to clearly document the design basis of flexible couplings used for Class I piping. Drawings did not accurately depict the as-designed or as-constructed configuration of the couplings, and specifications were not available to clearly describe the design and installation requirements.

In response to this condition programs were established to resolve past deficiencies which led to inadequately documented or analyzed designs. Design documents were revised to establish guidelines and requirements for design and analysis of flexible joints. In addition, Class I piping with Dresser couplings was evaluated and necessary modifications for Unit 2 performed. Modifications for Units 1 and 3 will be performed before each respective unit's restart. Finally, the Final Safety Analysis Report will be revised to reflect the results of the analysis and modifications.

LICENSEE EVENT REPORT (LER)

TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER ()	PAGE (3)
		SEQUENTIAL	REVISION
		YEAR	NUMBER
Browns Ferry Unit 1	05010025991	005	002 OF 03

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

DESCRIPTION OF CONDITION

On April 12, 1991, TVA determined that a previously recognized condition had not been reported in accordance with the requirements of 10 CFR 50.73. This condition involved the potential for failure of the Residual Heat Removal Service Water (RHRSW) [BI] and Emergency Equipment Cooling Water (EECW) [BI] Systems during a seismic event.

In July 1987, during performance of hydrostatic testing of RHRSW piping, a flexible joint (Dresser coupling) failed due to excessive axial load. Subsequently, on December 5, 1987, a condition adverse to quality report was written to document that protection of buried piping from differential movement of the soil and building structures was not achieved because none of the existing flexible joint designs could have accommodated differential movement in the direction along the axis of the pipe. This was the result of a rigid connection which was installed across the flexible joint to prevent pressure loads from pulling apart the piping from the joint. As a result of this design, a seismic event could have caused loss of RHRSW and EECW. This condition existed since original construction of the plant.

On January 27, 1988, TVA determined that this condition was reportable in accordance with 10 CFR 50.72 and 50.73. A four-hour, non-emergency report was made to NRC at that time. However, the 30-day licensee event report (LER) was not made. Subsequently, TVA re-evaluated this condition for reportability. This review once again determined that this condition is reportable in accordance with 10 CFR 50.72 and 50.73.

At the time this condition was originally discovered, all three units were shutdown and defueled. The potential loss of the EECW and RHRSW Systems following a seismic event is reportable in accordance with 10 CFR 50.73(a)(2)(v).

ANALYSIS OF CONDITION

The RHRSW System is a manually initiated, Seismic Class I system that provides cooling water to the residual heat removal (RHR) heat exchangers. The RHRSW System also provides standby core and containment cooling and supplies water to the EECW System (the RHRSW System is automatically initiated to supply water to the EECW System).

The EECW System is an automatically initiated, Seismic Class I system that provides cooling water to the diesel generators (DGs), the Unit 3 DG environmental chillers, RHR and core spray equipment room environmental coolers, RHR pump seal coolers and the Control Building emergency cooling unit. The EECW System also provides an emergency Class I cooling water supply for the Control Room air conditioning chillers, station service air compressors (including after-chillers), the Reactor Building Closed Cooling Water System heat exchangers, the hydrogen/oxygen analyzers and the Unit 3 Shutdown Board Room chillers.

(6-89)

Expires 4/30/92

LICENSEE EVENT REPORT (LER)

TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER ()				PAGE (3)			
		SEQUENTIAL	REVISION						
Browns Ferry Unit 1		YEAR	NUMBER	NUMBER					
		050002	5991	--005	--000	03	01	03	

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

If a seismic event had occurred when the EECW and RHRSW Systems were required to perform their safety functions, the flexible couplings could have separated causing a loss of flow through the systems. Therefore, this is considered to be a significant condition.

CAUSE OF CONDITION

The root cause of this condition was a failure to clearly document the design basis of flexible couplings used for Class I piping. Drawings did not accurately depict the as-designed or as-constructed configuration of the couplings, and specifications were not available to clearly describe the design and installation requirements. This is an example of a previously recognized weakness in design control at Browns Ferry Nuclear Plant (BFN) which has been documented in Volume 3 of the Nuclear Performance Plan (NPP).

CORRECTIVE ACTIONS

Consistent with the commitments in Volume 3 of the NPP for BFN, programs were established to resolve past deficiencies which led to inadequately documented or analyzed designs. The requirements for these programs were developed and implemented. Project instructions were also issued which augment the requirements of the programs.

TVA added a section to the Rigorous Analysis Handbook which established guidelines for design and analysis of flexible joints. A clarifying statement was also added to a design criteria that established requirements for analysis of flexible joints.

In conjunction with the Bulletin 79-14 program, Class I piping with Dresser couplings was evaluated, and necessary modifications required for Unit 2 performed. Modifications for Units 1 and 3 will be performed before each respective unit's restart. These corrective actions are documented in TVA's May 23, 1988 response to a Notice of Violation (NOV) cited in NRC Inspection Report 50-259, 260, 296/88-04.

Finally, the Final Safety Analysis Report (FSAR) will be revised to reflect the results of the analysis and modifications. This corrective action is documented in TVA's May 23, 1988 response to an NOV cited in NRC Inspection Report 50-259, 260, 296/88-04.

PREVIOUS SIMILAR EVENTS

There have been no previous similar events at BFN involving the potential failure of the EECW and RHRSW Systems as a result of a seismic event.

COMMITMENTS

There are no new commitments being made in this LER.

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