

July 23, 1982

TECHNICAL EVALUATION REPORT
DAVIS-BESSE NUCLEAR PLANT UNIT 1
SEISMIC QUALIFICATION OF AUXILIARY FEEDWATER SYSTEM

1. INTRODUCTION

Since the accident at Three Mile Island, considerable attention has been focused on the capability of nuclear power plants to reliably remove decay heat. The NRC has recently undertaken Multiplant Action Plan C-14 "Seismic Qualification of AFW Systems" [Ref. 1], which is the subject of this evaluation.

To implement the first phase of Action Plan C-14, the NRC issued Generic Letter No. 81-14 "Seismic Qualification of AFW Systems" [Ref. 2], dated February 10, 1981, to all operating PWR licensees. This letter requested each licensee (1) to conduct a walk-down of non-seismically qualified portions of the AFW system and identify deficiencies amenable to simple actions to improve seismic resistance, and (2) to provide design information regarding the seismic capability of the AFW system to facilitate NRC backfit decisions.

The licensee of Davis-Besse Unit 1 responded with a letter dated July 15, 1981 [Ref. 3]. The licensee's response was found not to be complete and a Request for Additional Information (RAI) was issued by the NRC, dated January 11, 1982 [Ref. 4]. The licensee provided a supplemental response in a letter dated February 10, 1982 [Ref. 5].

This report provides a technical evaluation of the information provided in the licensee's responses to the Generic Letter, and includes a recommendation regarding the need for additional analysis and/or upgrading modifications of this plant's AFW system.

2. EVALUATION

Information provided in licensee's responses included:

- o Specification of the overall seismic capability of the AFW system.
- o Identification of AFW system components that are currently non-seismically qualified for SSE.
- o Summary of procedure for switchover to the secondary water source and supply path.
- o Discussion of levels of seismic capability of non-seismically qualified components.
- o Description of the AFW system boundary.
- o Status of compliance with seismic related NRC Bulletins and Information Notices.
- o Additionally, a schematic sketch of the AFW system.
- o Additionally, description of methodologies and acceptance criteria for seismically qualified components.
- o Additionally, identification of areas of modification/upgrade that have been completed or are proposed along with a schedule.

We have reviewed the licensee's responses, and a point-to-point evaluation of licensee's responses against Generic Letter's requirements is provided below.

(1) Seismic Capability of AFW System

Except for those items identified in the following, the AFW system has been designed, constructed and maintained to withstand an SSE utilizing methods and acceptance criteria consistent with that applicable to other safety-related systems in the plant. Presently, those items identified by the licensee as not being fully seismically qualified are evaluated below:

- o Pumps/Motors - None
- o Piping - The auxiliary feedwater pump turbine (AFPT) pipe support. Under IE Bulletin 79-14, reanalysis of the stress associated with the AFPT has indicated an increase in the loads transmitted to the AFPT

nozzles. The AFPT supplier indicated that these loads would be acceptable for continued short term operations. Design modifications to the AFPT pipe support have been completed and field installations are in progress.

- o Valves/Actuators - None
- o Power Supplies - None
- o Water Source(s) - The condensate storage tank (CST) and the suction piping from the CST to its entrance to the auxiliary building. However, a secondary water source, i.e., the service water system (SWS) and supply path is seismically qualified for SSE, and an automatic switchover is provided. All equipment required to effect the switchover from the CST to SWS is Seismic Category I.
- o Initiation/Control System - None
- o Structures - Structures supporting or housing safety related portion of the AFW system have been designed as Seismic Category I except for 12 masonry walls/subwalls which did not meet the requirements of IE Bulletin 80-11. The 12 masonry walls/subwalls are Nos. 2297, 3036, 3167, 3177, 3187, 3441, 4016, 4647, 4796, 4826, 4886, 4896. The modifications to walls 3447, 4647 and 4826 have been completed, and the modifications to the remaining nine walls are in progress, to be completed by January, 1983 or sooner.

Based on our evaluation, those areas of the AFW system judged not to possess an SSE level capability are identified below:

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|---|----------------------------------|-------|
| o | <u>Pumps/Motors</u> | None |
| o | <u>Piping</u> | None* |
| o | <u>Valves/Actuators</u> | None |
| o | <u>Power Supplies</u> | None |
| o | <u>Water Source(s)</u> | None |
| o | <u>Initiation/Control System</u> | None |
| o | <u>Structures</u> | None* |

*Note: Currently not fully seismically qualified, but are being upgraded.

Based on the above evaluation, we conclude that the AFW system will possess an SSE level of seismic capability upon completion of the modifications to the AFPT pipe support and the nine concrete masonry walls/subwalls.

A seismic category I switchover from the primary source to a seismically qualified secondary water source is provided. Information regarding the seismic capability of any alternate decay heat removal system is not required because the AFW system will have an SSE level of seismic capability upon the completion of all proposed modifications of the presently non-seismically AFW system components.

Regarding the AFW system boundary, all branch lines except one have two valves that are normally closed or capable of automatic closure when safety function of the AFW system is required. The one exception is the alternate-supply-to-startup-feed-pump line, which has only one normally closed valve.

The AFW system was included within the scope of the seismic related NRC Bulletins 79-02, 79-04, 79-07, 79-14, 80-11 and IE Information Notice 80-21.
(2) Walk-down of Non-Seismically Qualified Portions of AFW System

A walk-down of the non-seismically qualified areas of the AFW system has not been conducted since they have been upgraded or are presently under modification.

(3) Additional Information

The licensee provided a schematic sketch of the AFW system including the water sources, heat sink, suction and discharge piping, major mechanical equipment, and structures supporting and housing the AFW system items.

Additionally, licensee's responses provided a description of the methodologies, loading combinations and acceptance criteria that were used in the design of the seismically qualified portions of the AFW system.

The licensee also provided the following information on completed and scheduled modification/upgrade related to, but not as a direct result of, GL 81-14:

- o AFPT pipe support design modifications have been completed, and installation will be completed by the end of the 1982 refueling outage, under facility change request (FCR) 79-421.
- o The AFPT exhaust piping has been redesigned and rerouted to provide separate exhaust from each of the turbines. This modification was completed under facility change request (FCR) 79-421.
- o Modifications to concrete masonry walls/subwalls No. 3447, 4647 and 4826 have been completed. Modifications to remaining nine masonry walls/subwalls No. 2297, 3036, 3167, 3177, 3187, 4016, 4796, 4886 and 4896 will be completed in January, 1983 or sooner as indicated in licensee's September 29, 1981 letter, Serial No. 1-217.

3. CONCLUSIONS

The information contained in licensee's responses to GL 81-14 is incomplete since it does not provide sufficient information on the level of seismic capability of the currently non-seismically qualified areas. The licensee did not conduct a walk-down of the non-seismically qualified areas of the AFW system. However, these non-seismically qualified areas have been, or are being, upgraded by the licensee. It is also noted that the licensee's AFW system boundary does not fully conform to the definition specified in GL 81-14. Based on the submitted information, we conclude that the AFW system at Davis-Besse Unit 1 will be able to provide the safety-related function following the occurrence of an SSE to assure safe shutdown of the plant upon completion of the scheduled AFW system upgrade. Therefore, we recommend that no further action be initiated regarding re-analysis and/or upgrading of the AFW system of this plant under NRC Multiplant Action C-14.

REFERENCES

1. D. G. Eisenhut, U.S. Nuclear Regulatory Commission, memorandum to H. R. Denton, "Multiplant Action Plan C-14: Seismic Qualification of Auxiliary Feedwater Systems," February 20, 1981.
2. U.S. Nuclear Regulatory Commission, Generic Letter No. 81-14 to all operating pressurized water reactor licensees, "Seismic Qualification of Auxiliary Feedwater Systems," February 10, 1981.
3. R. P. Crouse, Toledo Edison Company, letter to D. G. Eisenhut of U.S. Nuclear Regulatory Commission, July 15, 1981.
4. U.S. Nuclear Regulatory Commission, letter to R. P. Crouse, of Toledo Edison Co., "Request for Additional Information on Seismic Qualification of the Auxiliary Feedwater System, Davis-Besse Nuclear Power Station Unit 1," January 11, 1982.
5. R. P. Crouse, Toledo Edison Company, letter to D. G. Eisenhut of U.S. Nuclear Regulatory Commission, February 10, 1982.