

JAN 16 1985

Docket Nos. 50-266
and 50-301

Mr. C. W. Fay, Vice President
Nuclear Power Department
Wisconsin Electric Power Company
231 West Michigan Street
Milwaukee, Wisconsin 53201

Dear Mr. Fay:

On February 10, 1981 the NRC staff issued Generic Letter 81-14, Seismic Qualification of Auxiliary Feedwater Systems, to all operating Pressurized Water Reactor licensees. You responded to Generic Letter 81-14 by letters dated July 16, 1981, May 4 and December 15, 1982, February 11, 1983, January 31 and December 4, 1984. We have reviewed your responses and have completed our initial review. The results of our review are contained in the enclosed status report which includes a copy of the Technical Evaluation Report (TER) prepared by our contractor, Lawrence Livermore National Laboratory. We request that you review the enclosed status report and attached TER with particular attention to the open items. We also request that you contact us to schedule a meeting with the NRC staff for resolution of those open items. If you have any questions, contact your NRC Project Manager, T. Colburn.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

Original signed by:

James R. Miller, Chief
Operating Reactors Branch #3
Division of Licensing

Enclosure:
Status Report

cc: See next page

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STATUS REPORT

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

SEISMIC QUALIFICATION OF THE AUXILIARY FEEDWATER SYSTEM

Introduction

Since the accident at Three Mile Island, attention has been focused on the ability of pressurized water reactors to provide reliable decay heat removal. While it is recognized that alternate methods may be available to remove decay heat following transients or accidents, heat removal via the steam generators is the first choice for accomplishing a safe shutdown of the plant. Therefore, there should be reasonable assurance that the auxiliary feedwater system (AFW) can withstand the postulated safe shutdown earthquake (SSE).

To address this concern, the NRC developed and initiated Multiplant Action C-14, "Seismic Qualification of Auxiliary Feedwater Systems." The objective of this plan is to increase, to the extent practicable, the capability of those plants without seismically qualified AFW to withstand earthquakes up to the SSE level. This program was implemented with the issuance of NRC Generic Letter 81-14, dated February 10, 1981. Our review of the licensee's responses to this letter is the subject of this evaluation.

Evaluation

The attached report was prepared for us by our consultant, Lawrence Livermore National Laboratory, as part of our technical assistance contract program. The report provides their technical evaluation of the licensee's conformance to the requirements of Generic Letter 81-14. The consultant's TER indicates that the AFW may not continue to function during and following a seismic event as great as the safe shutdown earthquake. This conclusion is based upon cited weaknesses in the piping, power supplies and structures/housing. The TER also indicates that the licensee did not conduct a walkdown of the nonseismic portions of the AFW system.

Subsequent to the consultant's review, we requested the licensee, in a letter dated November 12, 1982, to review the consultant's report and provide any comments relevant to our reaching a safety conclusion. The licensee's response dated December 15, 1982 contained comments on the consultant's report that involved the location in the licensee's original submittal of specific design details. We have reviewed the information provided by the licensee and our consultant's technical evaluation and have performed our own review of the licensee's responses to Generic Letter 81-14. Our summary findings are described below.

Pumps And Motors

The Point Beach Nuclear Plant auxiliary feedwater system (AFWS) utilizes two steam driven pumps and two electric motor driven pumps for the two units. Each unit has one steam driven pump and both units share the two electric motor driven pumps. The auxiliary feedwater pumps including the support

systems, are qualified to withstand the effects of the safe shutdown earthquake. The auxiliary feedwater pumps are located in the control building which is also designed to withstand the effects of the safe shutdown earthquake.

Piping

The major piping components of the Point Beach AFWS are designed to withstand the effects of a safe shutdown earthquake. The licensee has stated that only nine branch lines were not originally designed to withstand the effects of a safe shutdown earthquake. These branch lines are identified by the numbers 20 through 28 and are described as follows:

1. Branch piping numbers 20 and 21 connect the AFWS to the Units 1 and 2 condensers respectively.
2. Branch piping number 22 is a 1.5 inch connection between the AFWS and the waste and blowdown evaporator distillate processing system.
3. Branch piping number 23 is a 4 inch connection between the AFWS and the heating boiler feed pump.
4. Branch piping number 24 is a 2 inch diameter connection that provides a source of water to the turbine plant chemical addition tanks.
5. Branch piping number 25 is a 3 inch diameter connection between the AFWS and the mixed bed demineralizer in the makeup water treatment system.
6. Branch piping numbers 26, 27 and 28 are condensate return lines that connect the steam heating condensate pumps to the AFWS.

In order for the design of these branch lines to be acceptable they should be isolated from the safety-related portions of the AFWS by two seismic Category I valves in series.

The licensee also identified Branch Piping numbers 10 to 13, the 1.5 inch recirculation pipe for each of the four AFWS pumps and Branch Piping numbers 6 to 9, the discharge piping connections of each pump, as not being adequately supported. The licensee should be prepared to discuss the available means to seismically support these recirculation and discharge lines.

The licensee identified Branch Piping numbers 14 to 19 as overflow, drain, and instrument connections on the condensate storage tank. The licensee should be prepared to address the lines in their discussion on the condensate storage tank.

Valves/ Actuators

The only valves in the AFWS that are not seismically qualified are the valves that isolate the nonseismic branch lines from the safety-related portion of the AFWS. These valves are addressed in the section on Piping.

Power Supplies

Except for battery racks and the supports for cable conduits in cubicles P38A and P38B, the components of the power supplies to the auxiliary feedwater system are qualified to withstand the effects of the safe shutdown earthquake.

The licensee has committed to upgrade the battery racks and the cable conduits in cubicles P38A and P38B to withstand the effects of the safe shutdown earthquake. In order for the design of the power supplies to be acceptable, the licensee should upgrade the battery racks and cable conduits.

Water Sources

The two condensate storage tanks, which are the primary water source of the auxiliary feedwater system, are not qualified to withstand the effects of the safe shutdown earthquake. The service water system is a seismic Category I water source but must be manually switched over to provide water for the auxiliary feedwater system. In order for the design of the AFW water sources to be acceptable, the licensee should justify the manual switchover to the service water system as the source for auxiliary feedwater. This justification should include a description of the necessary operator actions and procedures and the time allowed the operator to complete each action.

In a memorandum (C. W. Fay to H. R. Denton, dated July 16, 1981), the licensee stated that each condensate storage tank with approximately 180 tons of water was mounted to the control building roof with eight 3/4 inch diameter anchor bolts. Since these tanks are nonseismic, the consequences of these tanks breaking loose from their mounts and impacting the control building roof should be analyzed, including the effects of flooding.

Initiation/ Control Systems

The licensee has reviewed the initiation/control system and identified the following components that are not designed to withstand the effects of a safe shutdown earthquake:

1. Conduits DO 1-2, 2-4001, 1-4000 and 1-4001;
2. Conduits above panels D12, D13 and D14;
3. Four safeguard motor control center (1B32, 1B42, 2B32 and 2B42).

The licensee has committed to upgrade these initiation/control system components. In order for the design of initiation/control systems to be acceptable, the licensee should upgrade the conduits and motor control centers to withstand a safe shutdown earthquake.

Structures

Except for the seismic Class 1 control building, other structures housing or supporting the AFW system including the turbine building, auxiliary building, auxiliary building superstructure and the facade in containment building are not designed to seismic requirements. The licensee's submittal did not discuss the seismic capability of these nonseismic Class I structures except that the turbine building was analyzed for seismic loading assuming the turbine building crane to be located above the control building. This analysis concluded that the turbine building was capable of withstanding a safe shutdown earthquake. In order for this analysis to be acceptable, the licensee should verify that the worst loading on the turbine building was considered for this seismic analysis.

In order for the design of the structures housing the AFW system to be acceptable, the licensee should demonstrate that all these structures are capable of withstanding a safe shutdown earthquake.

Walkdown Of AFW System

The walkdown conducted by the licensee was performed for the seismically qualified components but was not performed for the nonseismic components of the AFW system. In order for the licensee's walkdown to be acceptable, the licensee should conduct a walkdown of the nonseismic areas of the AFW system.

Conclusions

Our consultant has concluded that the information contained in the licensee's responses to GL 81-14 are incomplete with regard to the seismic capability of the AFW piping and structures. Furthermore, we conclude that the licensee's submittals are insufficient with regard to AFW power supplies, water sources and initiation/control systems.

Based on the licensee submittals, we concur with our consultant that the Point Beach AFW system does not provide a reasonable assurance that it will perform its required safety function following a safe shutdown earthquake.

Attachment:
TER

TECHNICAL EVALUATION REPORT
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2
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 Point Beach Units 1 and 2 responded with a letter dated July 16, 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 25, 1982 [Ref. 4]. The licensee provided a supplemental response in a letter dated May 4, 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/modification of this plant's AFW system.

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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 procedures 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, schematic sketch of the AFW system.
- o Additionally, description of methodologies and acceptance criteria for seismically qualified portions of the AFW system.
- o Additionally, results of walkdown of seismically qualified areas of the AFW system and identification of areas of modification/upgrade with proposed schedule to upgrade.

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 those 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 - Licensee has stated that branch pipings Nos. 20 to 28 were not originally required to be seismic. Connections 20 and 21 go to the Unit 1 and 2 Condensers. Connection 22 is a 1.5 inch connection to the Waste and Blowdown Evaporator Distillate Processing System. Connection 23 is a 4-inch connection to the heating boiler feed pump. Connection 24 is a 2-inch diameter connection that provides a source of water to the turbine plant chemical addition tanks. Connection 25 is a 3-inch diameter connection to the mixed bed demineralizer in the makeup water treatment system. Connections 26, 27 and 28 were not clearly identified in licensee's response. Licensee's response did not discuss the seismic capability of these branch lines, therefore, we judge that they possess a less than OBE level of seismic capability.
- o Valves/Actuators - None
- o Power Supplies - None
- o Water Source(s) - The condensate storage tank of the primary water source is seismic Class II. However, a seismic Class I secondary water and supply path, the service water system, is available and a manual switchover procedure exists.
- o Initiation/Control System - None
- o Structures - Except for the seismic Class I control building, other structures housing or supporting the AFW system including the turbine building, auxiliary building superstructure and the facade in containment building were not designed to seismic requirements. Licensee's response did not discuss the seismic capability of these non-seismic Class I structures except that recently the turbine building has been analyzed for seismic loading assuming the turbine building crane to be located above the control building and was found to be capable of withstanding an SSE. Classification needs to be made, however, that this is the worst loading condition for the turbine building in the presence of a seismic event. We therefore conclude that the structures in general have a less than OBE level of seismic capacity.

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

- | | |
|------------------------------------|---------------|
| o <u>Pumps/Motors</u> | None |
| o <u>Piping</u> | Less than OBE |
| 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> | Less than OBE |

In summary, our evaluation indicates that the licensee's AFW system does not possess an overall seismic capability that can withstand an SSE.

The primary water source and supply path is not seismically qualified, therefore, switchover to the seismically qualified secondary water source and supply path is required. The licensee stated that such procedure is available by warning the operator when the low level (20% or four feet) on the condensate storage tank occurs. The operator then opens the auxiliary feedwater pump service water system suction valves following such a warning.

Seismic qualification information for any alternate decay heat removal system was not provided in the licensee's responses. This information was requested by G. 81-14 if substantial lack of seismic qualification is indicated for the AFW system. Based on the information provided by the licensee we did not find that the licensee's AFW system has an SSE capability. For the purpose of removing decay heat following an SSE, the licensee needs to either re-analyze and/or modify its AFW system, or to provide an alternate decay heat removal system seismically qualified to the SSE level and appropriate operating procedures.

Regarding the AFW boundary, the licensee's responses indicated that piping branch connections 6 through 28 do not comply with GL81-14 boundary definitions because they do not have a second normally closed valve. Pipe connections 6 through 9 are outlet connections for the pump recirculation piping. Connections 10 through 13 were not clearly identified in licensee's response. Connections 14 through 19 are overflow, drain, and instrument connections on the Condensate Storage Tank. Connections 20 through 28 are described previously in page 3 of this report. The licensee stated that the AFW system was included within the scope of seismic related Bulletins 79-02, 79-04, 79-07, 79-14, 80-11, and IE Information Notice 80-21, except for part of the piping supports identified under IE 79-14 that will be upgraded by the end of June, 1982.

(2) Walk-Down of Non-Seismically Qualified Portions of AFW System

A walk-down of the non-seismically qualified areas of the AFW system is required, but has not been conducted.

(3) Additional Information

The licensee provided schematic representation of the plant including structures, major AFW system components and piping, and showed sketches of piping in the IE Bulletin 79-14 program with identification of pipe connections. Also included are preliminary piping isometrics from the IE Bulletin 79-14 program.

Regarding the valves, additional information provided by the licensee stated that IE Bulletin 79-14 piping analyses did not analyze the valve itself, but as long as the acceleration level on the valve was less than $3g$, the valve operator was considered acceptable, otherwise, the valve received additional evaluation.

For other items in the AFW system that are seismically qualified, the seismic qualification methodologies are given in the FSAR and are consistent with that applied to other safety-related systems in the plant.

A recent walkdown on seismically qualified items has identified the following deficiencies: (a) Main Piping: The 1.5" D₈-3 recirculation pipe for each of the four AFW pumps and the discharge piping of each pump are not adequately supported. These deficiencies are planned to be corrected, but no definite schedule is given. (b) Power Supplies: Seismic resistance of the battery racks in the Battery Room is questionable and will be upgraded. Supports for cable conduits in P38A and P38B cubicles will also be upgraded. (c) Initiation/Control System: Conduits D01-2, 2-4001, 1-4000 and 1-4001 and conduits above panels D12, D13 and D14 do not have adequate supports. Clamps will be provided to overcome these deficiencies. Also, the four safeguard motor control centers (1B32, 1B42, 2B32, and 2B42) in auxiliary building are presently not anchored to the floor. Supports will be installed to secure these cabinets. Upgrading of most of the above mentioned items identified in the recent walkdown will be performed by the end of 1982.

3. CONCLUSIONS

The information contained in licensee's responses to Generic Letter 81-14 is incomplete with regard to the seismic capacity of nonseismically qualified piping and structures. The walkdown conducted by the licensee had been performed for the seismically qualified items and did not cover the non-seismically qualified branch connections and structures. Most of the deficiencies identified as a result of this walkdown will be upgraded by the end of June, 1982. The licensee also stated that the AFW system boundary does not fully conform to the definition specified in Q.81-14.

Based on the submitted information, we conclude that the AFW system does not provide a reasonable assurance to perform its required safety function following an SSE. Therefore, we recommend that the NRC considers requiring the licensee to provide a re-analysis and/or modification of the AFW system to acquire an SSE level of capacity.

REFERENCES

1. D. G. Eisephut, 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. C. W. Fay, Wisconsin Electric Power Company, letter to H. R. Denton of U.S. Nuclear Regulatory Commission, July 16, 1981.
4. R. A. Clark, U.S. Nuclear Regulatory Commission, letter to C. W. Fay of Wisconsin Electric Power Company, "Request for Additional Information on Seismic Qualification of the Auxiliary Feedwater System, Point Beach Nuclear Plant Units 1 and 2," January 25, 1982.
5. C. W. Fay, Wisconsin Electric Power Company, letter to H. R. Denton of U.S. Nuclear Regulatory Commission, May 4, 1982.

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