



Commonwealth Edison
 One First National Plaza, Chicago, Illinois
 Address Reply to: Post Office Box 767
 Chicago, Illinois 60690

July 14, 1981



Mr. Harold R. Denton, Director
 Office of Nuclear Reactor Regulation
 U.S. Nuclear Regulatory Commission
 Washington, DC 20555

Subject: Zion Station Units 1 and 2
 Seismic Qualification of Auxiliary
 Feedwater Systems
NRC Dockets 50-295 and 50-304

Reference (a): February 10, 1981, letter from
 D. G. Eisenhut to All Operating
 PWR Licensees

Dear Mr. Denton:

Reference (a) requested information regarding the seismic design of Zion Station's auxiliary feedwater systems. Attachment A to this letter contains the requested information. In general, no plant changes are necessary.

One (1) signed original and thirty-nine (39) copies of this letter are provided for your review.

Please address questions regarding this matter to this office.

Very truly yours,

T. R. Tramm
 Nuclear Licensing Administrator

Attachment

cc: Zion Resident Inspector

1m

2285N

*A001
s
1/1*

ATTACHMENT A

Additional Information Regarding Zion Auxiliary Feedwater System Seismic Design

System Design

The auxiliary feedwater system at the Zion Station has been designed as Seismic Class 1 with the exception of the primary water and supply path. This non-seismic portion includes the system piping from the condensate storage tank (CST) to a motorized valve at the suction of the auxiliary feedwater pumps. The design of the auxiliary feedwater system does include a secondary water and supply path that is designed as Seismic Class 1. This seismic portion includes the system piping from the Seismic Class 1 service water system to the Seismic Class 1 portion of the suction piping of the auxiliary feedwater pumps. All Seismic Class 1 components of the auxiliary feedwater system are housed within structures that are protected from missile and/or tornado damage. (Reference Zion FSAR Section 6.7 and Figure 6.7-1) In addition the auxiliary feedwater system at the Zion Station has been designed, constructed, and maintained (and included within the scope of seismic related Bulletins 79-02, 79-04, 79-07 79-14, and 80-11 and IE Information Notice 80-21) to withstand a Safe Shutdown Earthquake (SSE).

Table 1 contains the relevant FSAR design references for Zion's auxiliary feedwater system. Additional seismic qualification references can be found in Table 2. These references provide the required descriptions of the methodologies and acceptance criteria including methods employed, seismic input, load combinations, which include the SSE, allowable stresses, qualification testing and engineering evaluations performed.

Operating Procedures

In the event it is necessary to switch from the primary water and supply path to the secondary water and supply path, Zion Station has developed an operating procedure that is to be followed to accomplish this task. This procedure is quite detailed and is based upon CST level. This procedure is divided into two sections with two important referenced appendices. The first section details operating procedures for a slow, steady loss of CST level while the second section details operating procedures for a sudden uncontrolled loss of CST level. Each procedure section provides level setpoints for continued operation, unit shutdown, tank unit cross-ties, and AFW pump suction transfer to the service water system along with appropriate direction for subsequent action. In addition, the first appendix provides a curve showing CST level requirements including "caution" and "unsafe" tank level regions. The second appendix provides detailed operator instruction for switching from the CST to the service water system including pump operation sequencing, valve lineups, flow verification, and pump flow balancing. This procedure is maintained on file at the Zion Station and is part of Zion Station's abnormal operating procedures program.

Walkdown

In accordance with the NRC request, a "walkdown" was conducted at the Zion Station of the non-seismically qualified portion of the Auxiliary Feedwater System. Again, the non-seismic portion includes the system piping from the CST to a motorized valve at the suction of the auxiliary feedwater pumps. (Reference Zion FSAR Figure 6.1-1). This walkdown was conducted by personnel who were involved with the initial design, current maintained design, and who are experienced in the analysis, design and evaluation of structures, systems, and components. This walkdown was conducted to evaluate the adequacy of the current design and to verify that the "as-installed" system is in accordance with the original plant requirements.

Based upon the results of this walkdown it is our judgement that this piping system is adequately designed and installed in accordance with the original plant requirement. Therefore, we are not proposing the installation of any additional supports or restraints for this portion of the auxiliary feedwater system. However, station personnel will conduct a general maintenance program for all hangers on this system to tighten or replace bolts, tighten turnbuckles, and to adjust pipe attachments.

TABLE 1

AUXILIARY FEEDWATER SEISMIC QUALIFICATION

1. Pumps/Motors: Reference Zion FSAR paragraphs 6.7.1, 6.7.2, 6.7.3 (Motors; Question 4.23 page Q4.23-5).
2. Piping: Reference Zion FSAR paragraphs 6.7.1, 6.7.3, Figures 6.7-1, 1.2.1, Figures 1.2-17 thru 1.2-52, and Question 4.30, Question 4.23.
3. Valves/Actuators: Reference Zion FSAR paragraphs 6.7.1, 6.7.2, 6.7.3, and Figure 6.7-1.
4. Power Supplies: Reference Zion FSAR paragraphs 8.4.1.4 (page 8.1-6) and Question 5.85. In addition CECO is actively pursuing this item in accordance with IE information notice 80-21.
5. Primary Water and Supply Path: Reference Zion FSAR paragraph 6.7.3, and Figure 6.7-1.
6. Secondary Water and Supply Path: Reference Zion FSAR paragraph 6.7.3, and Figure 6.7-1.
7. Initiation and Control System: Reference Zion FSAR Question 7.24 page 7.24-1.
8. Structures Supporting or Housing These AFW System Items: Reference Zion FSAR paragraph 6.7.1 and Question 4.26 (page Q4.26-1).

TABLE 2

Zion FSAR References

<u>Section</u>	<u>Title</u>
1.2.1	Seismic Criteria-Methods of Analysis for Class I, II & III.
Figure 1.2-17	Response Spectra (various buildings and elevations)
Question 4.26	Seismic Design Basis considering the effects of Vertical Seismic Loads on Class I Structures.
Question 4.30	Seismic Design Criteria of Class I Piping.
Question 4.23	Seismic Analysis for Class I Systems.
Question 4.23-7	Computer Code WESTDYN used for Dynamic Analysis.
Question 4.24	Calculations for Seismic Excited Mode.
Question 4.25	Equipment and Flow Response Spectra.
Question 4.27	Floor Response Spectra.
Question 4.28	Seismic System Analysis.
Question 4.29	Seismic Effects of Class II Piping Systems on Class I Piping.
Question 4.31	Seismic Design Criteria Class I Mechanical Components.
Question 4.32	Field Location of Seismic Supports.
Question 4.33	Seismic Design Basis.
Question 4.33.1	Design Organizations.
Question 4.33.2	Interchanges and Coordination among Design Organizations.
Question 4.33.3	Design Control.
Question 4.33.4	Purchase Specifications.
Question 4.50	Class I Piping Stress Limits.
Question 4.52	Vertical Load Factors.

Question 4.53	Dynamic Response Spectra Analysis of Class I Piping.
Question 4.54	Floor Response Spectra Peaks.
Question 4.55	Rigidity of Components.
Question 4.57	Equipment Seismic Design Criteria.
Question 4.58	Damping Ratios.
Question 4.60	Example Piping System Seismic Classes I & II.
Question 4.64	OBE-DBE.
Question 4.67	Constant Vertical Load Factor.
Question 4.68	Simplified Dynamic Analysis.
Question 4.69	Floor Response Spectra.
Question 4.70	Threshold of Rigidity.
Question 5.85	Seismic Reaction from Cable Trays.

sb/0187Z