

GPU Nuclear Corporation
Post Office Box 480
Route 441 South
Middletown, Pennsylvania 17057-0191
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:

July 16, 1984
5211-84-2160

Office of Nuclear Reactor Regulation
Attn: J. F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

Three Mile Island Nuclear Generating Station Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
EFW System Seismic Interaction Walkdown

In response to your letter of June 25, 1984 and subsequent to our walkdown of the TMI-1 Emergency Feedwater System with you and your staff on May 22, 1984 we conducted an in-depth walkdown to identify potential seismic interactions between the Emergency Feedwater System and other systems, components and structures. Our walkdown included a comprehensive tabulation and disposition of each potential interaction in the cubicles in which EFW equipment is installed in the Intermediate Building and a review of EFW piping in the Reactor Building. (Item 18 of Attachment 1 concerning EFW piping attached to a Reactor Building stairway is being reanalyzed to assure SSE qualification). We found a couple of items requiring minor modifications to preclude seismic interactions (Item 4 and 15 of Attachment 1) which will be completed in August, 1984.

Several questions were raised as a result of our walkdown with you and your staff on May 22, 1984. In addition, several more items were identified during the subsequent GPUN walkdown. The attached tabulation (Attachment 1) lists all the items cited as a result of the walkdowns and provides the resolutions for each. As previously reported to you, we have also examined piping located in the Intermediate Building that is identified on our flow diagrams as not being Seismic Category I. This examination was performed to determine if any piping breaks might occur such that they could affect the function of the EFW system or create a harsh environment that would preclude access to the Intermediate Building. The results of our evaluation indicate that none of this piping poses an HELB hazard or possible loss of EFW system function as a result of a seismic event for the reasons detailed in Attachment 2.

8407200191 840716
PDR ADOCK 05000289
F PDR

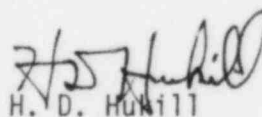
GPU Nuclear Corporation is a subsidiary of the General Public Utilities Corporation

A001
1/1

We believe that the walkdown we conducted was comprehensive and that we have identified the possible seismic interactions between the EFW System and other structures, systems and components.

In conclusion, we have reviewed the stresses for all high energy pipe in the Intermediate Building whose failure would produce a harsh environment and have determined by analysis or engineering evaluation that this piping will remain intact during and after an SSE. We have also reviewed the FSAR values for allowable limits on piping in the Intermediate Building and only for the case of the auxiliary steam line are the values exceeded. However, based on our evaluation of this line under SSE, the pressure boundary will not be breached. Therefore, based on the walkdowns performed, a harsh environment will not be created in the Intermediate Building as a result of an SSE and access will, therefore, be assured.

Sincerely,



H. D. Humill
Director, TMI-1

HDH/MRK/mle

Attachments

cc: R. Conte
J. Van Vliet

ATTACHMENT NO. 1

QUESTIONS AND RESOLUTIONS FROM SEISMIC INTERACTION WALKDOWNS OF TMI-1 EMERGENCY FEEDWATER SYSTEM

<u>ITEM</u>	<u>QUESTION</u>	<u>RESOLUTION</u>
1. HYAC ductwork above EFW pump EF-P2A.	Is the ductwork seismically supported?	Yes, Seismic Category I.
2. Four (4) compressed air lines above EFW pump EF-P2B (sizes 1", 2", 1-1/2", 1-1/2").	Are these lines seismically supported?	Yes, two of these are Seismic Category I and two of these are Seismic Category III. They are all supported from common support structures in the vicinity of EF-P2B, which per engineering evaluations will remain intact during and after SSE.
3. Main Steam Line "Elbow" and "Tee" above pump EF-P2B.	Is piping Seismic Category I?	Yes.
4. Cubicle containing Instrument Air compressor IA-P1A.	Is anything related to EFW in this cubicle and, if so, can it be adversely affected by non-seismic equipment in the area?	Yes. <u>EFW Related Items In The Area:</u> Control-cable for EF-V30A, Power Cables for EF-P2A and EP-P2B and Power & Control Cables for EF-V1B and EF-V2B. <u>Seismic Interaction Precluded, as follows:</u> -Instrument Air Receiver IA-T-1A, also in this cubicle is seismically anchored and thus cannot damage EFW items. -Radiation Monitor RMA-2, also in this cubicle, will be anchored to the floor to preclude sliding impact with power and control cables for EF-V2B and power cable for EF-P2B. -No other potential interactions with EFW noted.

- | | | |
|--|---|--|
| 5. Floor drain line above CST cross-connect piping between CO-V111A/B. | Can this drain line fall during a seismic event and damage the cross-connect? | No - The drain line is embedded in concrete at the top and bottom. Our engineering assessment is that the line will not fall during an SSE. |
| 6. Floor drain line above valves EF-V4&5. | Can this drain line fall during a seismic event and damage EF-V4 and 5? | No - see item 5. |
| 7. 2" lines that tie into Main Steam pipes upstream of MS-V2A/B. | What are these lines and are they Seismic Category I? | These are the OTSG shroud drains; they are Seismic Category I. |
| 8. Restraint/Shield above valve EF-V1B. | What is this structure for? | This is an HELB restraint/shield to protect the EFW cross-connect suction piping from a line break of the adjacent steam header. See FSAR (Updated Version) Appendix 14A for details. |
| 9. Fire Water Piping at El. 322' in the Intermediate Building. | Is this piping seismically supported? | No; however, there are no EFW components below this pipe on El. 322' that can be affected. |
| 10. Fire Water Pipe Break. | What are the consequences? How can a break be isolated? | Flooding effects of a line break are enveloped by a feed-water line break. A fire water line break can be isolated from the Turbine Building. Flooding can be detected by the Intermediate Building sump alarms. |
| 11. Operator access platforms at MS-V4A/B. | Are these platforms seismically supported? | Engineering assessment is that these platforms have sufficient seismic resistance. |

- | | | |
|--|---|---|
| 12. Cable trays 284 & 667 in vicinity of valve MS-V4A. | Are these cable trays seismically supported? | Yes. |
| 13. 8" main steam line in Instrument Air Compressor IA-P1B Cubicle. | Is this pipe Seismic Category I?

Are there HELB's postulated in this cubicle? | Yes.

No. Therefore, there is no impact on the EFW suction cross-connect pipe in this cubicle. |
| 14. Instrument Air Receiver IA-T-1B in the same cubicle with EFW suction cross-connect piping. | Can the air receiver fall and damage the EFW cross-connect? | IA-T1B is seismically anchored and will not fall during an SSE. |
| 15. Ladder mounted on Reactor Bldg. wall in EFW-P2B pump room. | Could the ladder fall and damage EFW conduits for EFW flow indicators and control cable for Valve EF-V30B? | Ladder mounting bolts will be replaced to assure SSE qualification. |
| 16. 3" Drain Header for Main Steam Line Steam Traps | a. Could this line fall during an SSE and impact power cables for MS-V2B and MS-V8B?

b. Could horizontal motion of this line during an SSE result in impact of the line with adjacent cable trays 284 & 667 (which carry cables for MS-V2A/B, MS-V8A/B, EFW Turbine Driven Pump cables, and cables for Reactor Bldg. Emergency Cooling)? | a. Our analysis indicates that this line will not fall during an SSE.

b. Yes, however engineering evaluation indicates that impact will not damage cables. |
| 17. Stairs leading from E1. 305' to 322' at northwest corner of Intermediate Bldg. | Can these stairs fall during an SSE and break EFW recirc pipe? | No. Even if it did fall, a broken EFW recirc line is not critical. Flooding is not a problem and water loss poses no CST inventory problem for the reasons cited in our earlier correspondence. (GPUN Ltr. dated 2/4/83 5211-83-040). |

18. EFW pipe supported
from stairs in
containment

Will the stairwell
inside the Reactor
Bldg. remain intact
(and thus the EFW
line supported) under
SSE conditions?

Analysis performed in
response to IEB's 79-
02 & 14 show that EFW
piping remains intact
during an SSE. Some
questions have arisen
about the stairs which
are being pursued.

HIGH ENERGY PIPING STRESS ANALYSIS FOR SECONDARY PIPING
IN THE INTERMEDIATE BUILDING

1. Main Feedwater Piping ("B" loop) Upstream of the Feedwater Check Valve Inside the Intermediate Building - As shown in Ref. 1, all stresses in this line are well below the Giambusso stress level criteria for selecting HELB locations. Also, the design code (B31.1) allowable stress limit for the line at operating conditions is not exceeded when the line is subjected to a coincident Safe Shutdown Earthquake (SSE). Thus, the piping is judged to be equivalent to Seismic Category I.
2. Main Steam Piping Downstream of MS-V8A/B (steam dump to turbine bypass valves) - These lines were analyzed for HELB as covered in Chapter 14 of the TMI-1 FSAR (See Table 14A-3). The HELB analysis indicates that all stresses in these lines are below the Giambusso stress level for selecting HELB locations. Also, the design code (B31.1) allowable stress limit for the line at operating conditions is not exceeded when the line is subjected to a coincident SSE. Thus, the piping is judged to be equivalent to Seismic Category I.
3. Main Steam Piping Downstream of the Main Steam Isolation Valves (MSIV's) MS-V1A, B, C, D - These lines were analyzed for HELB as discussed in Chapter 14 of the TMI-1 FSAR (see Table 14A-3). The HELB analysis indicates that all stress levels are well below the Giambusso stress level criteria for selecting HELB locations. Also, the allowable stress limit of the design code (B31.1), with the line at the operating conditions, is not exceeded when the line is subjected to a coincident SSE. Thus, the piping is judged to be equivalent to Seismic Category I.
4. Auxiliary Steam to EFW Pump Turbine - This line carries 200 psig saturated steam to the EFW pump (EF-P1) turbine driver. This supply of steam is used for operating the EFW pump when main steam is not available (i.e., during testing or hot standby). This line is pressurized whenever either of the TMI-1 auxiliary boilers are operating. The auxiliary boilers are normally not operated when main steam and extraction steam are available. When the plant is operated at load (above approximately 25% load) and 8th stage extraction steam is available, auxiliary steam requirements are satisfied by that source. The auxiliary boilers would be operated during periods of hot standby and low loads (i.e., less than about 25% load) when turbine extraction steam is not available to feed the auxiliary steam system.

We have inspected the auxiliary steam piping supports in the Intermediate Building. This piping is supported from the ceiling by threaded rod hangers. It is our assessment that for horizontal seismic accelerations, these supports will not transfer large forces or motions from the building to the piping.

For vertical seismic accelerations, there is a possibility of some force and motion transfer to the piping, but because the overall system flexibility is high it is judged that these effects will be negligible. Also, the support anchor bolts have been reviewed for seismic resistance capability. The evaluation indicates that support anchor bolts are capable of withstanding seismic loadings.

Thus, the piping will not experience large seismic stresses that could cause a breach of the systems' pressure boundary.

5. Piping Downstream of Valves (CO-V14A/B) - We have previously indicated that the piping downstream of CO-V14A/B from the Intermediate Building to a point inside the trench of the Turbine Building may be considered to have seismic resistance based on an analysis done in response to IEB 79-14. Reference 2 provides the analysis.
6. Main Steam Code Safety Relief Valve Vent Stacks - As indicated in our Letter No. 5211-82-150 dated 7/7/82, the vent stacks for the main steam safety valves are judged to be adequate for seismic events. This judgement is based on the fact that the vent stack is a single vertical run of pipe that is adequately supported for deadweight and discharge loads; the supporting scheme is judged adequate to withstand an SSE.
7. Main Steam Line Drains - The main steam line drain piping within the Intermediate Building is Seismic Category I through the last valve before the drain line steam trap. The drain lines from the steam trap through the downstream drain piping are identified as Seismic Category III. Although the Seismic Category I boundary is upstream of the steam trap, we judge (by inspection) the steam drain station (including the shutoff valve just downstream of the trap) to have seismic resistance. Also, these traps were specified to meet Seismic Category I requirements. During a seismic event the piping downstream of the drain station might be postulated to break. For steam to flow from the break it would have to pass through the trap and would be terminated since the trap is designed to pass condensate, and close on steam flow. These traps, which have 3/4" socket weld connections are not expected to pass sufficient flashing condensate to preclude operator access to the Intermediate Building.

- References:
1. GPUNC Final Safety Analysis Report (FSAR) Updated Version - Appendix 14A, "Design Review for Consideration of Effects of Piping System Breaks Outside Containment".
 2. "GPUNC Topical Report No. 003, Rev. 1, TMI Unit 1 - Docket No. 50-289 USNRC I.E. Bulletin No. 79-14 Final Report" and attached GPUNC TDR No. 194, "Final Report to USNRC for I.E. Bulletin 79-14 Requirements at TMI Unit 1".

1r/0298e