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**Subject: Comments on Draft Regulatory Guide DG-1157**

My comments on DG-1157 are on the "Piping Damping" sections of the document.

The DG specifies damping values for piping systems of 4% for SSE and 3% for OBE as *applicable for time-history, response spectra, and equivalent static analysis procedures for structural qualification*. These values are inconsistent with ASME Section III Appendix N specified values of 5% for both OBE and SSE [Table N-1230-1].

The DG should be revised to be consistent with Appendix N. The Appendix N values have been in the Code for a number of years, and represent the best data that the nuclear industry has on damping values for use on design of piping systems. The Appendix N values were developed through the code committee consensus process, and NRC staff code committee members were actively involved in that process.

The stated basis for the DG damping values is . . . *Regulatory Position 2 in Section C of this revised guide provides the piping damping values that resulted from the staff's experience with ASME Code Case N-411 and application reviews of new reactor designs*. From my perspective, this is not an appropriate basis for establishing damping values. The DG should be based on the best technical data that is available rather than previous licensing positions. Appendix N represents the best data that the industry has at this time. Code Case N-411 was superceded by Appendix N.

I know of no technical basis for saying that the Appendix N damping values are not valid for piping system design. NUREG/CR-6919 briefly discusses Appendix N damping as follows.

*ASME has annulled Code Case N411-1, because Non-Mandatory Appendix N to Section III currently recommends 5% damping at all frequencies, for both OBE and SSE (Ref. 4). The staff had previously accepted 5% SSE damping for AP1000, for uniform support motion, response spectrum analysis of piping systems (Ref. 16). The staff invoked restrictions on its use, consistent with the qualifications formerly in Regulatory Guide 1.84 for Code Case N411-1.*

*The staff continues to accept former Code Case N411-1 damping subject to the restrictions identified in Regulatory Guide 1.84. The staff considers acceptance of 5% damping for AP1000 to be a case-specific determination.*

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NRC has accepted Appendix N damping for AP1000. There is no valid technical reason to object to using Appendix N for new construction. Appendix N damping values should be used without restrictions for elastic analysis of piping systems for seismic response and for other dynamic loads such as building filtered loads and water hammer.

The appropriate approach to specify piping damping values for new construction in RG 1.61 is to simply refer to Appendix N Table N-1230-1 rather than list specific values. With this approach, NRC is not required to update the RG every time Appendix N changes. NRC staff personnel on the Section III code committee are involved in changes to Appendix N. If there is a significant technical concern on a revised Appendix N damping value that NRC is not able to resolve with the code committee to their satisfaction, the NRC could take exception to that edition of the code.

One minor comment – the use of OBE>SSE/3 rather than just OBE in Table 3 is confusing. The >SSE/3 should be deleted. The damping values apply for the OBE earthquake regardless of the intensity relative to SSE.

With the expected resurgence of nuclear power in the US, I would hope that NRC would take a different approach on Regulatory Guides for seismic design. It is my position that the seismic Regulatory Guides result in unrealistically high seismic loads (amplified floor response spectra) for design of piping systems. I believe there is one basic cause – too much reliance on conservatism. There are many steps in the seismic design process, and past NRC practice has been to specify conservative parameters for each step of the process rather than most probable parameters. The accumulation of conservatism causes unrealistically high seismic loads (amplified floor response spectra) for design of piping systems.

I recommend that NRC consider getting out of the seismic design requirements business and relying on ASCE, ASME, and other industry standards. Back in the early days of nuclear plant construction, the leadership of NRC on seismic issues was necessary and beneficial to the industry. But now, NRC staff does not have the required collective technical expertise to establish seismic design standards. That expertise is in the industry code committees.

Sincerely,



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