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Design-Basis Floods for Nuclear Power Plants

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General Comment

The purpose of this submission is to provide feedback from the ASME/ANS Joint Committee on Nuclear Risk Management (JCNRM) to the U.S. Nuclear Regulatory Commission (NRC) on the recently released draft regulatory guide related to external flooding design basis (DG-1290: Design Basis Floods for Nuclear Power Plants). The following was balloted and approved by the JCNRM.

Context:

DG-1290 notes that the Commission "encouraged the use of probabilistic methods" but DG-1290 goes on to explain that "a widely accepted framework and toolset for probabilistic assessment of all potential flood hazards at a site are not currently available nor are standards acceptable to the NRC staff available for the review of this type of an analysis." DG-1290 states that "the NRC staff will evaluate [probabilistic flood hazard assessments; PFHAs] on a case-by-case basis." We understand that NRC plans to issue guidance on PFHA, with a goal of issuing a draft for comment by approximately the end of CY2022. DG-1290 does not identify the forthcoming/planned Regulatory Guide to alert potential users to alternate guidance that permits/facilitates NRC review of PFHAs.

Concern:

NRC recognizes the value of PFHAs in estimating external flood hazards. PFHAs are widely used in many non-nuclear applications, some of which result in hazard estimates down to low exceedance frequencies. Furthermore, PFHAs and methods based on PFHA concepts have been reviewed when evaluating post-Fukushima 50.54(f) responses. Nonetheless, the current language may serve to discourage the use of probabilistic methods by creating regulatory uncertainty for future applicants regarding the viability and acceptability of PFHAs to NRC staff.

Proposed Resolution:

Part 8 of the forthcoming ASME/ANS Level 1/LERF PRA Standard [2] provides a series of high-level and supporting requirements to ensure PFHAs address a range of important technical issues while recognizing the current limitations of knowledge/practice. The Standard's PFHA requirements build off

experience in assessing other hazards for nuclear power facilities while making adaptations to reflect the context and characteristics of flooding hazards. As such, the associated probabilistic risk assessment (PRA) requirements can serve as a basis for a framework for evaluating PFHAs. The use of such a framework will help to ensure a PFHA has the appropriate attributes for use in a design basis assessment. It is recommended that in the forthcoming update to RG 1.59, the NRC staff reference or endorse the forthcoming PRA Standard as providing relevant requirements for assessing flood hazards probabilistically. It is believed that the use of this framework will provide the NRC and industry with a basis for ensuring quality, technical adequacy, and consistency within the PFHAs and predictability in the licensing process while continuing to allow flexibility for review and approval of the PFHA's implementation details.

Additional Notes (noted during comment ballot):

- It is recommended that any differences between DG-1290 and NEI 1804 (endorsed by RG 1.233) regarding design basis frequencies be addressed in Appendix K.
- It is anticipated that, given publication timelines, the forthcoming revision of ASME/ANS Level 1/LERF PRA Standard [2] will be published prior to the publication of the updated RG 1.59.