Enclosure

Regulatory Guide Periodic Review

Regulatory Guide Number:	**1.102, Revision 1**
Title:	**Flood Protection for Nuclear Power Plants**
Office/Division/Branch:	**RES/DE/SGSEB**
Technical Leads:	**Joseph Kanney, Kenneth See**
Staff Action Decided:	**Revise**

1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

Flood protection features and procedures for civil infrastructure have evolved considerably since the current revision of RG 1.102 was issued in 1976. Perceptions of the risk that external flooding may pose to nuclear power plants (NPPs) has also evolved considerably during this time frame, based on operational experience of flooding events at several NPPs. Examples include:

- 1999 Extratropical cyclone and subsequent coastal flooding at Blayais (France)
- 2011 Tsunami and subsequent coastal flooding at Fukushima Daiichi (Japan)
- 2011 Seasonal rainfall and snowmelt induced Missouri River flooding at Fort Calhoun
- 2014 Locally heavy precipitation and subsequent flooding at St. Lucie
- 2019 Seasonal rainfall and snowmelt induced Missouri River flooding at Cooper

In addition, proposed NPP designs, as well as potential applications and siting locations are rapidly evolving away from large light-water reactors (e.g. small modular reactors, micro reactors, non-light-water reactors).

In updating RG 1.102, some of the technical issues that should be considered include:

- To the extent possible, guidance should be technology neutral (with respect to reactor design)
- Guidance should be broad and flexible to accommodate new and different applications and siting locations envisioned for small modular reactors and microreactors
- Guidance should emphasize the desirability of permanent, passive protection in order to minimize risk owing to unreducible uncertainties in hazard forecasting and mobilization of temporary or active flood protection features. However, the appropriate role of temporary and/or active flood protection as defense-in-depth should be recognized.

2. What is the impact on internal and external stakeholders of <u>not</u> updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?

The agency anticipates license applications for small modular reactors, and several new and advanced reactor designs, including microreactors over the next decade. The current guidance implicitly focuses on large light-water power reactors, and is not well-suited for licensing and oversight of the anticipated new license applications.

3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?

Revision of the guide is estimated to require 0.25 NRC FTEs.

4. Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?

Revise.

5. Provide a conceptual plan and timeframe to address the issues identified during the review.

The staff plans to develop a draft guide by end of the fourth quarter of FY 2021, and issue it for public comment in the second quarter of FY 2022.

NOTE: This review was conducted in March 2021 and reflects the staff's plans as of that date. These plans are tentative and subject to change.