33

DE_FOIA Resource

From: Marksberry, Don
Sent: Tuesday, August 30, 2011 9:25 AM
To: Dube, Donald; Kauffman, John; Kammerer, Annie; Kanney, Joseph; See, Kenneth; Manoly, Kamal; Chokshi, Nilesh; Cook, Christopher; Munson, Clifford; Li, Yong; Jones, Henry; Karas, Rebecca
Cc: Dudek, Michael; Reed, Timothy; Foster, Jack; Cubbage, Amy; Collins, Timothy; Witt, Kevin
Subject: Inputs for recommendations 2.1 and 2.3
Attachments: NTTF Recommendation 2 1 dma1 (8-30-2011).docx; NTTF Recommendation 2 3 dma1 (8-30-2011).docx

All

Here is the consolidation of inputs to the one pager for recommendations 2.1 and 2.3. Special thanks to the flooding folks who provided much needed supporting information on each plant.

Please provide your mark ups by COB today (Tuesday, August 30).

Thanks.

Don
415-3092 (voice mail does not work)

E/22 (12)

NTTF Recommendation 2.1

1. Recommendation as Provided in the NTTF Report

The Task Force recommends that the NRC require licensees to reevaluate and upgrade as necessary the design-basis seismic and flooding protection of SSCs for each operating reactor.

2.1 Order licensees to reevaluate the seismic and flooding hazards at their sites against current NRC requirements and guidance, and if necessary, update the design basis and SSCs important to safety to protect against the updated hazards.

2. Current Regulatory Framework

This recommendation will be implemented using existing regulatory framework consisting of regulations, regulatory guides, and the standard review plan. The implementation of this recommendation will benefit from ongoing regulatory activities including the update to Regulatory Guide 1.59, "Design Basis Floods for Nuclear Power Plants," and the issuance of a proposed generic letter, "Seismic Risk Evolutions for Operating Reactors," to obtain information needed to resolve Generic Issue (GI)-199, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants." In addition, recent plant inspections by staff in accordance with Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event," and licensee's plant inspections in response to the Fukushima Daiichi accidents will help inform the implementation of this recommendation.

A list of regulatory documents associated with seismic and flooding hazards for operating and new reactors is provided in the attachment to this recommendation.

3. Staff's Assessment of NTTFR 2.1

The staff agrees with the NTTF for the need to reevaluate the seismic and flooding hazards at operating reactor sites against current NRC requirements and guidance. The staff's limited assessment of this recommendation indicates that significant differences exist between plants in the way they provide against design-basis natural phenomena and the safety margins provided. The staff concluded that sufficient regulatory guidance currently exists to permit licensee's reevaluations without unnecessary delay. The staff noted that the implementation of this recommendation would require significant resources and specialized expertise to review licensee's reevaluations and document results of staff evaluations (e.g., safety evaluation reports). In addition, licensee's reevaluations and staff reviews may take several years to complete due to limited technical expertise in some technical areas. The staff noted that results of inspections of structures, systems, and components (SSCs) at Fukushima Daiichi and Daini Nuclear Power Stations may help inform the implementation of this recommendation.

Seismic hazards. With regard to seismic hazards, currently available seismic data and models show increased seismic hazard estimates for some operating nuclear power plant sites. The state of knowledge of seismic hazards within the United States has evolved to the point that it would be appropriate for licensees to reevaluate the designs of existing nuclear power reactors to ensure that SSCs important to safety will withstand a seismic event without loss of capability to perform their intended safety function.

Flooding hazards. With regard to flooding hazards, the assumptions and factors that were considered in flood protection at operating plants vary considerably. In some cases, the design basis did not consider the effects from the local intense precipitation and related site drainage. In other cases, the probable maximum flood (PMF) is calculated differently at units co-located at the same site, depending on the time of licensing, resulting in different design-basis flood protection. The Task Force and the staff have noted that some plants have an overreliance on operator actions and temporary flood mitigation measures such as sandbagging, temporary flood walls and barriers, and portable equipment to perform safety functions. For several sites, the staff noted that all appropriate flooding hazards are not documented in the current Final Safety Analysis Report (FSAR).

The Task Force and the staff noted that flooding risks are of concern due to a "cliff-edge" effect, in that the safety consequences of a flooding event may increase sharply with a small increase in the flooding level. Therefore, all licensees should confirm that SSCs important to safety are adequately protected from floods.

4. Staff Recommendations

Seismic hazards. Staff recommends undertaking regulatory actions to direct licensees to reevaluate the implications of updated seismic hazards on operating reactors based on current seismic hazard data and models. If the new designbasis for seismic hazards exceeds the original design basis, the licensee should demonstrate what protection measures are in place or will be developed, including the timeframe.

Flooding hazards. Staff recommends undertaking regulatory actions to direct licensees to reevaluate flooding hazards from all appropriate flooding sources to include effects from local intense precipitation falling on the site and the associated drainage systems, PMF on streams and rivers, upstream and downstream dam failures, storm surge, seiche, tsunami, and ice effects. Licensee actions under this recommendation should include, but not limited to, the following:

- If hazard reviews were not previously completed for all appropriate flooding sources, these hazard reviews should be completed and documented in the FSAR.
- All analyses should be available for inspection and review.
- A table of the design basis water heights for each of the appropriate flooding sources should be included in the FSAR along with a description of the site grade, flood protection, and flood margin.

- A description of the site grade and all SSCs below the design basis flood elevation requiring flood protection shall also be provided in a separate table.
- Finally, if the new design basis water height exceeds the original design basis height, demonstrate what flood protection measures are in place or will be developed, including the timeframe.

5. Resources

Attachment 2.1-1
A list of Regulatory Documents Associated with Seismic and Flooding Hazards

Regulations

- General Design Criteria 2, "Design Bases for Protection Against Natural Phenomena," of Appendix A to 10 CFR Part 50
- 10 CFR 100.23, "Geologic and Seismic Siting Criteria"
- Appendix S, "Earthquake Engineering Criteria for Nuclear Power Plants," to 10 CFR Part 50
- 10 CFR 100.20, "Factors To Be Considered When Evaluating Sites"
- Regulatory Guide (RG) 1.29, "Seismic Design Classification," issued in 1972 and updated in 1973, 1976, 1978, and 2007

Regulatory Guides

- RG 1.59, "Design Basis Floods for Nuclear Power Plants," issued in 1973 and updated in 1976 and 1977
- RG 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," issued in 1973
- RG 1.102, "Flood Protection for Nuclear Power Plants," issued in 1975 and updated in 1976
- RG 1.125, "Physical Models for Design and Operation of Hydraulic Structures and Systems for Nuclear Power Plants," issued in 1977 and updated in 1978 and 2009
- RG 1.208, "A Performance-Based Approach To Define the Site-Specific Earthquake Ground Motion," issued in 2007

Standard Review Plan and Interim Staff Guidance

- Standard Review Plan (SRP) (NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition"), updated in March 2007
- Interim Staff Guidance (ISG) for new reactors: DC/COL-ISG-1, "Interim Staff Guidance on Seismic Issues of High Frequency Ground Motion," DC/COL-ISG-7, "Assessment of Normal and Extreme Winter Precipitation Loads on the Roofs of Seismic Category I Structures," and DC/COL-ISG-20, "Seismic Margin Analysis for New Reactors Based on Probabilistic Risk Assessment"

Generic Issues

- Generic issue (GI)-199, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants" initiated June 9, 2005
- Proposed GI regarding flooding following upstream dam failures

Generic Communications

- Information Notice IN-2010-018, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants," dated September 2, 2010
- Proposed generic letter, "Seismic Risk Evolutions for Operating Reactors," to obtain information needed to resolve Generic Issue (GI)-199, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants"

Inspection Procedures

- Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event"

NTTF Recommendation 2.3

1. Recommendation as Provided in the NTTF Report

The Task Force recommends that the NRC require licensees to reevaluate and upgrade as necessary the design-basis seismic and flooding protection of SSCs for each operating reactor.

2.3 Order licensees to perform seismic and flood protection walk-downs to identify and address plant-specific vulnerabilities and verify the adequacy of monitoring and maintenance for protection features such as watertight barriers and seals in the interim period until longer term actions are completed to update the design basis for external events.

2. Current Regulatory Framework

This recommendation will be implemented using existing regulatory framework consisting of regulations, regulatory guides, and the standard review plan. The implementation of this recommendation will benefit from ongoing regulatory activities including the update to Regulatory Guide 1.59, "Design Basis Floods for Nuclear Power Plants," and the issuance of a proposed generic letter, "Seismic Risk Evolutions for Operating Reactors," to obtain information needed to resolve Generic Issue (GI)-199, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants." In addition, recent plant inspections by staff in accordance with Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event," and licensee's plant inspections in response to the Fukushima Daiichi accidents will help inform the implementation of this recommendation.

A list of regulatory documents associated with seismic and flooding hazards for operating and new reactors is provided in the attachment to Recommendation 2.1.

3. Staff's Assessment of NTTFR 2.3

The staff agrees with the NTTF with the need to perform seismic and flood protection walk-downs to ensure that existing protection and mitigation measures are available, functional, and adequately maintained.

Seismic hazards. The staff's limited assessment of this recommendation indicates that significant efforts by staff to evaluate GI-199 and draft the related proposed generic letter will provide insights that can be used in the development of guidance for seismic protection walk-downs. Recent plant inspections by staff in accordance with Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event," and licensee's plant inspections in response to the Fukushima Daiichi accidents will help inform the implementation of this recommendation. In addition, the staff noted that results of ongoing inspections and evaluations of structures, systems, and components (SSCs) at Fukushima Daiichi and Daini Nuclear Power Stations may provide some insights for this recommendation. Evaluations of the

recent earthquake near the North Anna Power Station on August 23, 2011 may also provide valuable insights.

Flooding hazards. With regard to flooding hazards, the Task Force and the staff have noted that some plants have an overreliance on operator actions and temporary flood mitigation measures such as sandbagging, temporary flood walls and barriers, and portable equipment to perform safety functions. Results of staff's inspections at nuclear power sites in accordance with Temporary Instruction 2515/183 identified potential issues and observations regarding mitigation measures. Recent flooding at the Fort Calhoun site showed the importance of temporary flood mitigation measures. The staff noted that guidance should be developed with external stakeholder involvement to ensure consistent walk-downs.

4. Staff Recommendations

Seismic hazards. Staff recommends undertaking regulatory actions to direct licensees to perform flood protection walk-downs to identify and address plant-specific vulnerabilities and verify the adequacy of monitoring and maintenance for protection features. The staff noted that guidance should be developed with external stakeholder involvement to ensure consistent walk-downs.

Flooding hazards. Staff recommends undertaking regulatory actions to direct licensees to perform flood protection walk-downs to identify and address plant-specific vulnerabilities and verify the adequacy of monitoring and maintenance for flood protection features to ensure the site drainage systems perform as designed during local intense precipitation events. Staff should solicit input from external stakeholders during the development of guidance for flooding protection walk-downs. Walk-downs should include a review of plant flood protection plans, where applicable. Elements that should be examined include assumptions regarding lead times and flood durations, feasibility and practicality of temporary measures (e.g. temporary flood barriers, alternate electrical cabling, alternate cooling water connections, etc.), staging of equipment and supplies, and site accessibility. Additional walk-downs should be conducted to identify and address watertight barriers and seals in the interim period until longer term actions are completed to update the design basis for flood hazards (see NTTFR 2.1).

5. Resources