

FAQ 33: HRR – Interim Actions for Partial Mitigation

A. TOPIC: HRR - Interim Actions for Partial Mitigation

Source document: March 1, 2013 Eric Leeds 50.54(f) Supplemental Information Letter Section:

B. DESCRIPTION:

What methods could be considered to develop interim actions as part of the Hazard Reevaluation Report submittal if the reevaluated hazard cannot be fully addressed by protection or mitigation?

March 1, 2013 Eric Leeds 50.54(f) Supplemental Information Letter:

Interim Actions (Requested Information Item 1.d) -

Licensees whose Hazard Reevaluation results are not bounded by their current design basis were requested to describe in their 50.54(f) letter response interim actions, taken or planned, to address the reevaluated flooding hazard while the staff assesses the safety and regulatory significance of the reevaluated hazard. The staff's review of the proposed interim actions will leverage appropriate sections and concepts from existing guidance documents such as NEI 1207, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features and JLD-ISG-2012-05, "Guidance for Performing the Integrated Assessment for External Flooding to evaluate the acceptability of the interim actions.

Licensees should describe the interim actions in sufficient detail to allow the NRC staff to assess their acceptability, in order to allow licensees the time needed to perform the integrated assessment and then implement permanent plant modifications, if necessary. The NRC staff will consider the appropriateness of the interim actions in the context of a licensee's ability to respond to the reevaluated flooding hazard(s) and how these actions continue to provide assurance of the licensee's ability to maintain the plant in a safe condition.

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D. RESOLUTION: (Include additional pages if necessary. Total pages: 34)

Inquiry number: 33 Priority: H

The Basis for Interim Actions

The NRC's March 2012 50.54(f) cover letter states that the current regulatory approach and the resultant plant capabilities provide confidence that an accident with consequences similar to the Fukushima accident is unlikely to occur in the United States. The NRC letter concluded that continued plant operation and the continuation of licensing activities do not pose an imminent risk to public health and safety.

The flooding reevaluations being performed in response to the NRC's March 12, 2012 50.54(f) letter are for beyond design basis events. As such, they do not constitute an immediate operability concern and are not reportable outside of the response to the 50.54(f) letter unless the reevaluation results identify concerns with the current licensing or design basis. Note however, that the new condition does need to be entered into the corrective action program for evaluation.

Methods for Developing Interim Actions

Based on the conservatisms in the deterministic approaches being used to reevaluate flooding hazards in

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accordance with present day methodology, these events should be considered very unlikely events. Interim actions should be implemented as soon as reasonable. The time frame for development and deployment of interim actions should be informed by the relative risk(s) and frequency of occurrence (if known) of the updated extreme flooding event evaluated for the Hazard Reevaluation Report (HRR). The time frame will also be impacted by the significance of the scope of the interim actions, and time needed to develop and implement them. Interim actions should focus on assuring the ability to maintain the critical safety functions necessary to prevent core damage, spent fuel damage, and loss of containment integrity as a result of the new beyond design basis flood determined in the Hazard Re-evaluation Report (HRR) of an external flooding event. The NRC has described interim actions in the March 1, 2013 Eric Leeds 50.54(f) Supplemental Information Letter. Also, the NRC inspection procedure TI- 2515/190 used to inspect interim actions at the sites provides additional insights on the appropriate actions to be put in place.

In some cases, the severity of the hazard defined by the HRR will be such that it may not be possible to fully protect or mitigate the site from its effects by implementing interim actions. In these situations, licensees should contact their NRC Project Manager prior to the HRR submittal to explain the conditions and explore options. As the licensee is considering its strategy, the following concepts might be useful. The following strategies might be considered as means to mitigate the condition to the extent possible:

- Implement all feasible-practical mitigation and protection strategies: Even if it is not possible to fully mitigate the reevaluated hazard, recognizing that the event has a low frequency of occurrence, the first approach should be to consider enhance-enhancing the existing flood protection features and implement new ones to the maximum extent practical. Any amount by which the current flood protection features are enhanced makes the likelihood of exceeding their capabilities less.
- Refine the hazard considered: For the most part, the flooding hazard determination is a deterministic evaluation using the conservative combinations of parameters and events defined by the various governing regulatory guides, NUREGs, ISG documents, and standards. The resulting flooding hazard is a very low probability event. Since the reevaluated flooding hazard is a beyond design basis event for existing plants, it is reasonable to further refine the analysis of the reevaluated hazard to a more “credible” event (as opposed to a more bounding extreme event that may result from a full application of the conservatisms in the governing guidance documents). For the purpose of flooding hazard reevaluations, a credible event is defined as having a reasonable annual exceedance probability (AEP) that may be on the order of 10^{-6} or greater; a flooding event with an annual exceedance probability less than this need not be considered. However, the methodologies used to determine an extreme flooding event AEP may not be readily available in all cases. Precedent evaluations should be reviewed and additional research may be warranted to justify the use of a alternate methods to determine an event’s frequency of occurrence.
- Probability of Exceedance: Interim actions are intended to provide contingency measures during the time between completion of the hazard reevaluation report and the integrated assessment report. The integrated assessment will determine the overall effect of the hazard on the site and the long term activities that will be implemented to address the effects. Since interim actions are only intended to bridge this period of time, it is reasonable to use a threshold of 10^{-4} annual exceedance probability to determine what actions are necessary. In other words:
 - If it can be shown that a plant is protected (i.e., flooding at CLB flood level plus APM does not affect safety related SSCs) against a hazard with an annual probability of exceedance of 10^{-4} , then no interim actions are necessary.
 - Alternately, it is only necessary to implement interim actions to the extent required to protect from or mitigate a hazard with a 10^{-4} annual probability of exceedance.
- Monitoring: Monitor the status of input parameters whose assumed values drive the reevaluated flood hazard and take a graded approach to actions as those parameters approach their assumed values. For example, if a dam failure evaluation assumes a 100 year snow pack, monitor the actual snow pack at an appropriate frequency, increase the frequency if a defined threshold is reached, engage the operator of

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the dam to evaluate plans for water management if the snow pack continues to increase, and shutdown the plant if the 100 year snow pack is reached and the resulting flood cannot be fully protected or mitigated.

- Use of "FLEX" equipment: FLEX was designed as a means of mitigating beyond design basis events. To the extent that it is implemented at a site, FLEX equipment, or other equipment with similar functionality, should be considered to maintain critical safety functions. Consider establishing FLEX equipment storage locations, and connection points, and associated procedures such that equipment functionality is maintained assuming the flood height and conditions determined by the reevaluation results.
- Allowing flood waters to enter plant buildings: The critical safety functions to maintain are core and spent fuel pool cooling and containment integrity. In some extreme situations an acceptable strategy may be remove the vessel head, flood up the vessel and refueling canal, and allow flood waters to enter site buildings with the possible loss of SSC's that are not required to provide the necessary cooling function.

Note that interim actions are not expected to be permanent modifications. The Integrated Assessment will determine mitigation or protective actions to be considered by the NRC during their 10CFR50.54(f) letter section 2.1 Phase 2 review to determine if any regulatory actions are needed to protect against the updated flooding related hazards (e.g., update the design basis and protection for SSCs important to safety).

Rigor for Interim Actions

- All new interim flood protection features (e.g., sandbags inflatable barriers, self-inflating flood bags, ventilation louver covers) will be acquired, pre-staged and maintained to provide the planned protection or mitigation.
- The design of the new flood mitigation equipment will be evaluated to withstand the environmental conditions that might accompany the applicable reevaluated flood event.
- Station procedures will be revised to direct installation of the new flood mitigation equipment including appropriate event triggers to activate the procedures.
- Training on the use and installation of the new flood mitigation equipment will be conducted for all necessary personnel.
- Installation of the new flood mitigation equipment will be evaluated to ensure that it can be properly installed within the planned timeframes using reasonable simulations, or other appropriate methods.

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E. NRC Review:

Not Necessary X Necessary _____

Explanation: This topic has been reviewed with the NRC and their comments addressed, but a formal acceptance by the NRC will not be provided. The above strategies are a compilation of industry concepts and approaches.

F. Industry Approval:

Documentation Method: _____ Date: _____

G. NRC Acceptance:

Interpretation _____ Agency Position _____

Documentation Method: _____ Date: _____

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