

An Approach to Assess Quality and Validity of IPEEE Analysis

Background

Attachment 1 (seismic hazard and risk reevaluation) to the NRC's 50.54(f) Request for Information letter describes activities related to determining updated assessment of hazard and risk for US NPPs. In order to support industry response to the 50.54(f) letter, NEI has implemented a program focused on developing a guidance document entitled "Screening, Prioritization and Implementation Details (SPID)." The SPID will support industry's response to the request for implementation. As part of the SPID development, NEI has expressed a position that seismic risk assessments performed as part of the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities (Generic Letter 88-20, Supplement 4) that demonstrate plant capacity to levels higher than the new GMRS can be used to "screen out" plants, in which case these plants would not need to perform new seismic risk analyses. NRC staff agrees that quality IPEEE submittals with the appropriate attributes can be used for this purpose. IPEEE submittals using either SPRA or SMA analyses can be considered for screening but in either case the analysis must have certain attributes to be considered acceptable to the NRC staff.

Use of IPEEE Results for Screening

The NRC staff has categorized the necessary criteria for use of the IPEEE results for screening purposes into four categories:

- General Considerations
- Prerequisites
- Adequacy Demonstration
- Documentation

Responses to the items in the Prerequisite and Adequacy Demonstration categories should be provided in the hazard submittal to the NRC. The staff will review each submittal and determine whether the provided information demonstrates the adequacy of the IPEEE analysis and risk insights for the purpose of screening out from the need to perform a further risk evaluation. In addition to reviewing the documentation provided in the submittal to the NRC, the staff will also review the SERs and TERs to assess the strengths and weaknesses of the IPEEE submittals.

General Considerations

IPEEE Reduced scope margin assessments cannot be used for screening. Focused scope margin submittals may be used after having been enhanced to bring the assessment in line with full scope assessments. The enhancements include (1) a full scope detailed review of relay chatter for components such as electric relays and switches and (2) a full evaluation of soil failures, such as liquefaction, slope stability, and settlement.

The spectrum to be compared to the GMRS for screening purposes should be based on the plant-level HCLPF actually determined by the IPEEE and reported to NRC. If this is less than

the review level earthquake (RLE) spectrum, then the RLE must be shifted appropriately to reflect the actual HCLPF. In cases where modifications were required to achieve HCLPF submitted in the IPEEE, the licensee must verify the changes (and describe the current status) in the submittal. This information is also required as part of the Recommendation 2.3 seismic walkdown. Similarly, the uniform hazard spectrum (UHS) for IPEEE seismic probabilistic risk analyses (SPRA) should be anchored at the plant-level HCLPF.

Prerequisites

Responses to the following items must be provided with the hazard evaluation In order to use the IPEEE analysis for screening purposes and to demonstrate that the IPEEE results can be used for comparison with the GMRS:

1. Verify that commitments made under the IPEEE have been met. If not, address and close those commitments.
2. Verify whether all of the modifications and other changes credited in the IPEEE analysis are in place and verified.
3. Verify that any identified deficiencies or weaknesses to NUREG-1407 in the plant specific NRC SER are properly justified to ensure that the IPEEE conclusions remain valid.
4. Verify that major plant modifications since the completion of the IPEEE have not degraded/impacted the conclusions reached in the IPEEE.

If any of the four above items are not verified and documented in the hazard submittal to the NRC, then the IPEEE results will not be considered by the staff to be adequate for screening purposes even if responses are provided to the adequacy criteria provided below.

IPEEE Adequacy Criteria

The following items, and the information that should be provided, reflect the major technical considerations that the staff will take into account in determining whether the IPEEE analysis, documentation, and peer review are considered adequate to support use of the IPEEE results for screening purposes.

With respect to each of the criteria below, the submittal should describe the key elements of (1) the methodology used, (2) whether the analysis was conducted in accordance with the guidance in NUREG-1407 and other applicable guidance and (3) a statement, if applicable, as to whether the methodology and results are adequate for screening purposes. The staff will evaluate the description of each of the criteria below in its integrated totality rather than using a pass/fail approach. As such, even if one or more of the criteria is not deemed to be adequate, the staff may still decide that the overall IPEEE analysis is adequate to support its use for screening purposes.

1. Structural models and structural response analysis (use of existing or new models, how soil conditions including variability were accounted for)
2. In-structure demands and in-structure response spectra (scaling approach or new analysis)
3. Selection of seismic equipment list or safe shutdown equipment list
4. Screening of components
5. Walkdowns
6. Fragility evaluations (generic, plant-specific analysis, testing, documentation of results)
7. System modeling (diversity of success paths, development of event and fault trees, treatment of non-seismic failures, human actions)
8. Containment performance
9. Peer review (how peer review conducted, conformance to guidance, peer review membership, peer review findings and their disposition)

Documentation

Licensees that choose to implement the use of the IPEEE results for screening purposes should provide a response for each of the criteria in the Prerequisite and Adequacy Demonstration categories in their hazard submittal to the NRC. Licensees should also provide an overall conclusion statement asserting that the IPEEE results are adequate for screening and that the risk insights from the IPEEE are still valid under current plant configurations. The staff will review each submittal and determine whether the provided information demonstrates the adequacy of the IPEEE results for the purpose of screening out from the need to perform a further risk evaluation. The information used by each licensee to demonstrate the adequacy of the IPEEE results for screening purposes should be made available at the site for potential staff audit.