

An Approach to Assess Quality and Validity of IPEEE Analysis

Background

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, provided they meet certain criteria, in which case these plants would not need to perform new seismic risk analyses. 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 for review by the NRC staff.

Use of IPEEE Results for Screening

Certain criteria are necessary if licensees choose to screen a facility based on IPEEE results. The criteria for screening have been grouped 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.

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, 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

Provide responses to the following items 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 adequate for screening purposes even if responses are provided to the adequacy criteria provided below.

Adequacy Demonstration

The following items, and the information that should be provided, reflect the major technical considerations that will determine 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. Each of the following should be addressed in the submittal to the NRC.

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 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

DRAFT