

September 12, 2006

MEMORANDUM TO: Michele G. Evans, Deputy Director
Engineering Research Applications
Division of Fuel, Engineering and Radiological Research
Office of Nuclear Regulatory Research

THRU: Anthony H. Hsia, Branch Chief /RA/
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SUBJECT: SUMMARY OF AUGUST 29, 2006, CATEGORY 2 PUBLIC MEETING
WITH NUCLEAR ENERGY INSTITUTE (NEI) TO DISCUSS SEISMIC
ISSUES RELATED TO FUTURE REACTOR SITING

August 29, 2006, a public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and Nuclear Energy Institute (NEI) at NRC Headquarters in Rockville, MD. The purpose of this meeting was to continue the dialogue with industry of reaching a common understanding as a basis for resolving seismic issues related to siting for future nuclear power plants. Topics such as industry's integrating task results for determining the performance-based site specific safe shutdown earthquake response spectra for future nuclear plants, the status of Draft Regulatory Guide (DG-1146), "A Performance-Based Approach to Define the Safe Shutdown Earthquake Ground Motion," and industry's geotechnical and structural task reports were discussed. A list of meeting attendees is included as Enclosure 1. The meeting agenda is provided as Enclosure 2.

Summary of the Meeting

After introductions, Gene Imbro, NRC, provided feedback to industry about the delayed technical reports in the letter to NEI dated August 22, 2006. Mr. Imbro informed industry that the agency's goal is to finalize the draft regulatory guide, which will contain new guidance pertaining to a performance-based approach for defining the safe-shutdown earthquake (SSE) ground motion for new nuclear power reactor designs, by March 2007 and that the draft regulatory guide would be available for public comments in October 2006.

Andrew Murphy, NRC staff, informed industry that the staff has made significant progress in resolving the seismic issues related to future reactor siting with the development of the draft regulatory guide, DG-1146. The staff is considering the following as part of the draft regulatory guide:

1. The NRC is in agreement with the ASCE 43-05 performance-based approach

2. ASCE 43-05 mean frequency target performance goal of 1×10^{-5} /yr for seismic induced onset of significant inelastic deformation (FOSID).
3. CAV-filtering for PSHA
4. The value of sigma on PSHA
5. Soil amplification approaches (2A, 2B, 2A/3, 4)
6. The existing guidance, described in Regulatory Guide 1.165, "Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion," dated March 1997, remains an acceptable approach for licensee use.

Robert Kassawara, Electric Power Research Institute (EPRI), presented the key technical activities for resolving the seismic issues associated with the new plant resolution program: responding to NRC comments on the G-task reports, plans and schedules for completion of the Integrated report, "Sensitivity of Performance-Based Approaches for Determining the SSE Ground Motion for New Plant Sites," Task S2.1(a), "Effect of Seismic Wave Incoherence on Foundation and Building Response," and Task S2.1(b), "Spatial Coherency Models for Soil-Structure Interaction." Mr. Kassawara stated that the results of Task S2.1 play an important part in determining the site-specific performance-based response spectrum and that it should be part of the draft regulatory guide. Mr. Kassawara discussed the use of the cumulative absolute velocity (CAV) filter for characterizing the damage potential of small magnitude earthquakes. Mr. Kassawara also stated that the application of a minimum CAV value significantly reduces the contribution of small magnitude earthquakes to the total hazard. At the end of his presentation, the staff asked NEI to provide NRC the before and after results of the CAV-filtering process in probabilistic seismic hazard analysis (PSHA) and the CAV-filtered site response spectra of each of the 28 nuclear power plant sites.

Robert P. Kennedy, RPK Structural Mechanics Consulting, discussed Task G1.1, "Assessment of a Performance-Based Approach for Determining Seismic Ground Motions for New Plant Sites." Mr. Kennedy stated that a modification is required in the performance-based approaches for establishing the SSE site specific response spectrum for future nuclear power plants. Mr. Kennedy suggested that by applying a lower limit to the performance-based method, the CAV-filtered hazard curves for low seismicity sites would achieve the target performance goal for significantly curved hazard curves. At the end of his presentation, the staff asked NEI to submit a cover letter with a spreadsheet showing the CAV/soil amplification in the calculation of the seismic hazard.

Carl Stepp, consultant to NEI, proceeded with the discussion on the Task I1.1 report, "Guidance for Determining of Performance-Based Site Specific Safe Shutdown Earthquake Response Spectra for Future Nuclear Plants." The objectives of the Task I1.1 report were stated as: 1) to update the Central Eastern United States (CEUS) probabilistic seismic hazard model with current technologies, 2) to update certain methods and procedures for determining SSE ground motion, and 3) to update methods and procedures for evaluating the site-specific response spectrum (SSRS) at the ground surface.

Industry strongly recommends using the 2A/3 soil amplification approach for evaluating the site response analysis. The NRC staff informed NEI that the soil amplification approaches would be acceptable to the staff on a case-by-case basis. Industry also proposed that the performance-based site-specific safe shutdown earthquake response spectra for future nuclear

plants be determined using the performance-based approach defined in the ASCE 43-05 Standard, "Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities," and that the Incoherency Transfer Function be applied to the SSRS at the ground surface to obtain the site-specific performance-based design response spectrum. The staff stated that there are some technical issues with the incoherency function and that when the staff receives the answers to the RAIs for Task S2.1(a) and S2.1(b), it would help in the development of the standard review plan. The staff intends to forward to NEI additional RAIs in regard to Task S2.1 reports by September 12, 2006.

Industry cited three issue that need to be resolved regarding the Incoherency Transfer Function: 1) determine if there are technical issues with the Incoherency Function, 2) resolve issues with incoherency analysis using SASSI and CLASSI codes, and 3) provide a demonstration example to the NRC using a simplified approach showing how the incoherency function should be used. NEI was asked to assist the staff in providing the NRC a copy of the CLASSI code that was used to compute the results in the S2.1 report.

At the conclusion of the meeting, the NRC staff and industry agreed to the following action items:

1. NEI to assist the staff in providing the NRC a copy of the CLASSI code that was used to compute the results in the S2.1 report.
2. NRC to provide additional RAIs to industry in regards to Task S2.1 reports by September 12, 2006.
3. NEI to submit the "before and after" CAV-filtered site response spectra for each of the 28 sites by September 8, and a spreadsheet showing the CAV/soil amplification in the calculation of the seismic hazard, by September 15, 2006.
4. NEI to submit responses to existing RAIs by September 30, 2006.

The staff and industry proposed to meet twice in October 2006 to discuss the incoherency issue and to further the discussion on "common understanding."

Enclosures:

1. List of Attendees
2. Meeting Agenda
3. Presentation Material

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