May 26, 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/**
Mechanical and Structural Engineering Branch
Engineering Research Applications

FROM: Vaughn V. Thomas, Project Manager **/RA/**
Mechanical and Structural Engineering Branch
Engineering Research Applications

SUBJECT: SUMMARY OF MAY 11-12, 2006, CATEGORY 2 PUBLIC MEETING WITH NUCLEAR ENERGY INSTITUTE (NEI) TO DISCUSS SEISMIC ISSUES RELATED TO FUTURE REACTOR SITING

May 11-12, 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 plan for integrating the results of their technical reports into the revision of a new regulatory guide, the NRC position on selecting an acceptable performance target for establishing a safe shutdown earthquake (SSE) design response spectrum (DRS) and industry's 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 – May 11, 2006

After introductions, Anthony Hsia, from the NRC, provided feedback to industry in regards to the NRC position on an acceptable performance-based target value and the development of a new regulatory guide. A. Hsia informed industry that the NRC is considering the use of the American Society of Civil Engineers (ASCE) Standard 43-05, "Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities," performance-based approach with a Frequency of Significant Inelastic Deformation (FOSID) target value of 1×10^{-5} per year. A. Hsia also stated that a new regulatory guide will be developed and that Regulatory Guide (RG) 1.165, "Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion" will be retained. Industry suggested that it would be easier for them to make changes to the existing guide, RG 1.165, rather than issuing a new regulatory guide.

William Schmidt, from Electric Power Research Institute (EPRI), discussed deliverables, action items/request for additional information (RAIs), and the "Integration Report" outline as part of the on-going discussion on the new plant seismic issue resolution program.

Industry plans to submit an integration report covering the G-tasks: G1.1, “Assessment of a Performance-Based Approach for Determining Seismic Ground Motions for New Plant Sites,” G1.2, “Use of Cumulative Absolute Velocity (CAV) in Determining Effects of Small Magnitude Earthquakes on Seismic Hazard Analyses,” and G1.3, “Truncation of the Lognormal Distribution and Value of the Standard Deviation for Ground Motion Models in the Central and Eastern United States,” at the end of June 2006. Industry indicated that those reports would serve as the technical bases for updating seismic regulatory guidance for determination of the SSE ground motion. RAIs and responses for the G-task reports would be included as appendixes.

Kelly Merz, from ARES Corporation, continued with the discussion on task S2.2, “Effect of Negligible Inelastic Behavior on High Frequency Response” which provides the analytical basis for incorporating the effects of inelastic deformation of equipment anchorages on high frequency response of building mounted equipment. Dr. Merz addressed the fillet weld low-cycle fatigue concerns, the weld load-deformation behavior, recommendations for high frequency screening of functional equipment, and the development of vertical response modification model. Bruce Ellingwood, consultant to Brookhaven National Laboratory (BNL), asked several questions during the presentation. Dr. Merz stated that the task S2.2 report was modified to incorporate new data and that a revised copy of the report will be submitted to the NRC by June 30, 2006.

Summary of the Meeting – May 12, 2006

Dr. Norman Abrahamson, consultant to NEI, proceeded with his presentation by discussing the RAIs that were submitted to NEI on the following tasks: G1.2 report, “Use of CAV in Determining Effects of Small Magnitude Earthquakes on Seismic Hazard Analyses” which provides the technical basis for establishing the appropriate distribution of low magnitude earthquakes for use in probabilistic seismic hazard computations for nuclear power plant applications; and S2.1(b), “Spatial Coherency Models for Soil-Structure Interaction” which analyzes the coherency model used for application to soil-structure interaction analyses for nuclear power plants. NRC staff and BNL consultants asked Dr. Abrahamson to clarify key technical issues during his presentation.

Greg Hardy, consultant to NEI, concluded with his review of RAIs for the task S2.1(a) report, “Effect of seismic Wave Incoherence on Foundation and Building Response” which describes the effect of seismic wave incoherence on structures/foundations similar to those being considered for advanced reactor designs. Mr. Hardy presented the audience with a list of preliminary comments that the NRC submitted on task 2.1(a) that was modified to include his resolution. During his presentation, NRC staff and BNL consultants asked several questions in regards to materials that were presented in the report and to better understand industry’s responses to the RAIs.

Jim Johnson, consultant to NEI, continued with the approaches that can be used to incorporate seismic wave incoherence into seismic analyses. Mr. Johnson gave a brief presentation about using the Direct method, (e.g., CLASSI, SASSI programs) versus the Incoherency Transfer Function (ITF) method. NRC staff requested a copy of the CLASSI and SASSI code along with the user manuals.

At the end of the meeting, the NRC staff caucused and industry agreed to the following items:

1. Industry to provide a short paper justifying the validity of the CAV threshold value of 0.16 g-sec (possible with examples). NRC requested industry to send the paper by June 1, 2006.

2. Industry to submit final reports with responses to RAIs by June 30, 2006.

3. NRC to provide input on key elements for the industry "Integration Report" by May 31, 2006.

4. NRC to inform industry by June 1, 2006 that if reinvestigation of CAV calculation is necessary.

5. NRC to provide additional RAIs to industry by May 31, 2006.

The staff and industry proposed to meet in mid-July 2006 to discuss Regulatory DG-1146, "Identification and Characterization on Seismic Sources and Determination of a Performance-Based Safe Shutdown Earthquake Ground Motion."

After asking for public comments or questions, the meeting was adjourned.

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

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