

September 6, 2013

Mr. Jeffrey A. Halfinger, Vice President
Technology Development
Babcock and Wilcox mPower
109 Ramsey Place
Lynchburg, VA 24501

SUBJECT: REQUEST FOR THE REVIEW OF BABCOCK & WILCOX MPOWER TOPICAL REPORT 11111-000-30R-K01G-00002, REVISION 0, "IMPLEMENTATION OF RANDOM VIBRATION THEORY SOIL-STRUCTURE INTERACTION" (TAC NO. RN6075)

Dear Mr. Halfinger:

By letter dated June 28, 2013, (Agencywide Documents Access and Management System (ADAMS) ML13192A202) Babcock & Wilcox mPower, Inc. (B&W mPower), submitted Topical Report 11111-000-30R-K01G-00002, Revision 0, "Implementation of Random Vibration Theory Soil-Structure Interaction," to the U.S. Nuclear Regulatory Commission (NRC) staff for review.

The purpose of this letter is to provide the results of the NRC staff's acceptance review of Topical Report 11111-000-30R-K01G-00002, "Implementation of Random Vibration Theory Soil-Structure Interaction." The acceptance review was performed to determine if there is sufficient technical information in scope and depth to allow the NRC to complete its detailed technical review. After a thorough review the NRC staff identified areas for further discussion (Enclosure) and held teleconference calls with B&W mPower on August, 12, 2013 and September 3, 2013, to discuss the topical report. The NRC has concluded that additional information is required for the NRC staff to complete its detailed review and make an independent assessment regarding the acceptability of Topical Report 11111-000-30R-K01G-00002, Revision 0, "Implementation of Random Vibration Theory Soil-Structure Interaction."

In order to make the application complete, the NRC staff requests that B&W mPower supplement the topical report application with the information identified in the Enclosure. NRC staff looks forward to receiving the supplemental information related to questions 1 through 5, 7, and 9 by September 30, 2013. Further discussion between the NRC staff and B&W mPower will be held to determine the submittal date of the supplemental information for questions 6 and 8. If the Topical Report 11111-000-30R-K01G-00002, "Implementation of Random Vibration Theory Soil-Structure Interaction." is subsequently accepted for review, you will be advised of any further information needed to support the NRC Staff's detailed technical review by separate correspondence.

J. Halfinger

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If you have any questions, please contact Yanelly Malave at (301)-415-1519 or Joelle Starefos at (301) 415-6091.

Sincerely,

/RA/

Stewart L. Magruder, Branch Chief
Small Modular Reactor Licensing Branch 1
Division of Advanced Reactors and Rulemaking
Office of New Reactors

Project No.: 0776

Enclosure: NRC Staff Questions Provided to B&W on August 22, 2013.

cc: Distribution via listserv

J. Halfinger

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NRO-002

OFFICE	PM:NRO/DARR/SMRLB1	BC:NRO/DE/SEB2	BC:NRO/DARR/SMRLB1
NAME	Y. Malave	J. Xu	S. Magruder
DATE	09/03/2013	09/04/2013	09/06/2013

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NRC Staff Questions Provided to B&W mPower on August 22, 2013 (ML13234A335)

NRC Staff Questions to B&W mPower

B&W mPower Topical Report, "Implementation of Random Vibration Theory (RVT) for Seismic Soil-Structure Interaction", Report No. 11111-000-30R-K01G-00002

As part of the mPower Design Certification (DC), B&W have submitted the subject Topical Report (TR) which will be incorporated by reference in the DC application. As a result of the acceptance review the NRC staff has determined that the following information should be provided in order for the staff to conduct the review.

1. Theoretical formulation provided in Chapter 4 needs additional details regarding the derivation of the formulas including the assumptions used in the derivation. For specific formulas (Equations 4, 5, and 7) while the applicable references were cited, the Topical Report (TR) should include the details on how the formulas were derived and used including the assumptions made for implementation of the methodology.
2. The key factor for the analysis based on Random Vibration Theory (RVT) is the determination of peak factor based on the solution of the first passage problems. The peak factor is a function of several parameters such as the type of the random process (narrow band or broad band), duration of the process, zero crossing rate of the random variable, shapes of the power spectral density function, and the probability of non-exceedance. As such, provide in the TR a detailed derivation of the peak factor (p) used in the RVT application including the primary assumptions and its limitations as appropriate.
3. Include Figures of the peak factor that indicates the effect on the peak factors due to variations in the spectral parameters (such as zero crossing rates, δ).
4. Describe in detail the proposed RVT approach that will be used in determining all the response quantities of interest including stress, strain, forces, moments and the in-structure response spectra including the probability of exceedance level assumed for the calculated response quantities.
5. Describe in detail how the duration of the strong ground motion was estimated, including the sensitivity of the derived input PSD and the response quantity of interest to any uncertainties in the estimation of the strong motion duration.
6. Include Figures of the final PSDs of the input ground motions used in the example problems of the TR.
7. Describe in detail how the time histories were selected. Was the guidance in Section 3.7.1, Acceptance Criteria II.1.B of the NUREG-0800 followed in developing the time histories? What is the expected peak ground acceleration of the target response spectra

Enclosure

used to generate the spectrum compatible PSD? What is the mean square acceleration value of the spectrum compatible PSD used in the analysis?

8. The report should clearly indicate the location of the control point where the input motion is specified.
9. The report should indicate the specific options of the SASSI analysis program used in generating the results presented in the report.