

August 28, 2013

Ms. Kimberly A. Keithline  
Senior Project Manager  
Nuclear Energy Institute  
1776 I Street NW, Suite 400  
Washington, DC 20006-3708

SUBJECT: APPROVAL OF ELECTRIC POWER RESEARCH INSTITUTE GROUND  
MOTION MODEL REVIEW PROJECT FINAL REPORT FOR USE BY CENTRAL  
AND EASTERN UNITED STATES NUCLEAR POWER PLANTS

Dear Ms. Keithline:

On behalf of the Nuclear Regulatory Commission (NRC), I am responding to the Nuclear Energy Institute's (NEI's) June 3, 2013, letter<sup>1</sup> transmitting the Electric Power Research Institute (EPRI) Final Report, EPRI (2004, 2006) Ground-Motion Model (GMM) Review Project (Updated EPRI GMM). The NEI letter transmitted the Updated EPRI GMM report for NRC staff review and requested an endorsement decision by August 30, 2013. This Updated EPRI GMM was developed for use by nuclear power plants in the central and eastern United States (CEUS) in responding to site-specific seismic hazard reevaluations requested by NRC letter dated March 12, 2012, per Title 10 to the *Code of Federal Regulations*, Section 50.54(f)<sup>2</sup> (50.54(f) letter).

The NRC staff formally reviewed the Updated EPRI GMM report and provided clarification questions to NEI in a letter dated July 5, 2013.<sup>3</sup> By letter dated July 30, 2013,<sup>4</sup> NEI submitted a response to the NRC staff's questions, and a public meeting was held to discuss the Updated EPRI GMM on August 6, 2013.<sup>5</sup> The NRC staff has reviewed NEI's July response and finds the clarifications to be generally acceptable.

Due to limited available data, there are uncertainties associated with predicting earthquake ground motions in the CEUS. To address these uncertainties, the EPRI GMM update was conducted in accordance with the Senior Seismic Hazard Analysis Committee (SSHAC) process, including a formal peer review panel and the participation of many recognized independent experts in the field of engineering seismology.

In comparison to the earlier EPRI (2004, 2006) GMM, a significant amount of new data was evaluated and used to develop the Updated GMM. EPRI also incorporated the latest models in

---

<sup>1</sup> The EPRI Report can be found in the Agencywide Document Access and Management System (ADAMS) at package Accession No. ML13155A553.

<sup>2</sup> The 50.54(f) letter is available in ADAMS under Accession No. ML12053A340.

<sup>3</sup> The letter is available in ADAMS under Accession No. ML13178A361.

<sup>4</sup> The letter is available in ADAMS under Accession No. ML13218A052.

<sup>5</sup> The meeting summary is available in ADAMS under Accession No. ML13227A019.

order to characterize the uncertainty and took measurements of the subsurface properties at many of the earthquake recording sites.

The NRC staff recognizes many of the challenging issues associated with developing updated GMMs for the CEUS such as the characterization of ground motions in the Gulf region, including the boundaries dividing the Gulf from the mid-continent in the CEUS. The lack of earthquake recordings in eastern Gulf Coast regions, such as Florida, renders the identification of clearly defined boundaries difficult. Other challenges in developing a GMM for the CEUS include the treatment of uncertainty and the limited number of more recent models available for predicting ground motions in stable continental regions. The staff has, however, concluded that the Updated EPRI GMM addresses these challenging issues sufficiently to support NRC approval.

Many of these issues are currently being addressed in more detail as part of the Next Generation Attenuation project for eastern North America (NGA-East). The NGA-East project is being conducted as a higher level SSHAC project than the EPRI GMM update and will benefit from the development of new GMMs based on an expanded suite of earthquake recordings and simulations. Once complete, the NGA-East will replace this Updated EPRI GMM.

The NRC staff has, therefore, determined that the Updated EPRI GMM is an acceptable ground motion attenuation model for use by CEUS plants in developing plant-specific ground motion response spectra until such time as the NGA-East project is completed and has been reviewed and approved by NRC staff.

If you have any questions, please contact Ms. Lisa Regner at 301-415-1906 or by email at [Lisa.Regner@NRC.gov](mailto:Lisa.Regner@NRC.gov).

Sincerely,

**/RA/**

David L. Skeen, Director  
Japan Lessons-Learned Project Directorate  
Office of Nuclear Reactor Regulation

order to characterize the uncertainty and took measurements of the subsurface properties at many of the earthquake recording sites.

The NRC staff recognizes many of the challenging issues associated with developing updated GMMs for the CEUS such as the characterization of ground motions in the Gulf region, including the boundaries dividing the Gulf from the mid-continent in the CEUS. The lack of earthquake recordings in eastern Gulf Coast regions, such as Florida, renders the identification of clearly defined boundaries difficult. Other challenges in developing a GMM for the CEUS include the treatment of uncertainty and the limited number of more recent models available for predicting ground motions in stable continental regions. The staff has, however, concluded that the Updated EPRI GMM addresses these challenging issues sufficiently to support NRC approval.

Many of these issues are currently being addressed in more detail as part of the Next Generation Attenuation project for eastern North America (NGA-East). The NGA-East project is being conducted as a higher level SSHAC project than the EPRI GMM update and will benefit from the development of new GMMs based on an expanded suite of earthquake recordings and simulations. Once complete, the NGA-East will replace this Updated EPRI GMM.

The NRC staff has, therefore, determined that the Updated EPRI GMM is an acceptable ground motion attenuation model for use by CEUS plants in developing plant-specific ground motion response spectra until such time as the NGA-East project is completed and has been reviewed and approved by NRC staff.

If you have any questions, please contact Ms. Lisa Regner at 301-415-1906 or by email at [Lisa.Regner@NRC.gov](mailto:Lisa.Regner@NRC.gov).

Sincerely,  
**/RA/**  
 David L. Skeen, Director  
 Japan Lessons-Learned Project Directorate  
 Office of Nuclear Reactor Regulation

**DISTRIBUTION:**

PUBLIC  
 JLD R/F  
 LRegner  
 EDO RI, RII, RIII, & RIV  
 BWittick  
 CMunson, NRO  
 JAKE, NRO  
 YLee, NRR

RidsOgcMailCenter Resource  
 RidsOpaMail Resource  
 RidsNrrDorI Resource  
 RidsNrrLASLentResource  
 RidsAcrsAcnw\_MailCTR Resource  
 NChokshi, NRO  
 KManoly, NRR

ADAMS Accession No.: ML13233A102

\* via e-mail

<b>OFFICE</b>	NRR/JLD/LA*	NRR/JLD/PMB/PM	NRO/DSEA/SLS	NRO/DSEA/D
<b>NAME</b>	SLent	LRegner	CMunson	SFlanders
<b>DATE</b>	08/21/2013	08/23/2013	08/28/2013	08/27/2013
<b>OFFICE</b>	NRR/JLD/PMB/BC	OGC*	NRR/DE/D	NRR/JLD/D
<b>NAME</b>	MMitchell	BMizuno (NLO)	PHiland	DSkeen
<b>DATE</b>	08/26/2013	08/20/2013	08/23/2013	08/28/2013

**OFFICIAL RECORD COPY**