Appendix B

PPRP Closure Letter

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November 15, 2014

Mr. Robert W. Bryce
Hanford PSHA Project Manager
Pacific Northwest National Laboratory
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P.O. Box 999, MSIN K6-75
Richland, WA 99352

Subject: Hanford Site-Wide Probabilistic Seismic Hazard Analysis Participatory Peer Review Panel Closure Letter

Dear Mr. Bryce:

Consistent with the requirements for a SSHAC[1] Level 3 study, the Hanford Site-Wide (HSW) Probabilistic Seismic Hazard Analysis (PSHA) Participatory Peer Review Panel (hereafter "PPRP" and "Panel") is pleased to issue this PPRP Closure Letter containing our findings with respect to the HSW PSHA SSHAC Level 3 project. The Panel participated in the study following implementation guidance for a SSHAC Level 3[2] study. The Panel was actively engaged in all phases and activities of the Project's implementation, including final development of the Project Plan and planning of the evaluation and integration activities, which are the core of the SSHAC assessment process.

Consistent with regulatory guidance for SSHAC projects, the role of the PPRP is to conduct a review of both the *process* followed and the *technical* assessments made by the Technical Integration (TI) Teams. Accordingly, this letter documents the activities that the PPRP has undertaken in its review of the PSHA, its review of the adequacy of the process followed, and its findings relative to the technical adequacy of the PSHA.

PPRP Activities for the PSHA Review

The notion of a participatory peer review process entails the continual review of a project from its start to its completion. Thus, proper implementation requires adequate opportunities during the conduct of the study for the PPRP to understand the data being used, the analyses performed for the study, the TI Team's evaluations and integration of the technical bases for its assessments, and the completeness and clarity of the

[1]Budnitz, R.J., G. Apostolakis, D.M. Boore, L.S. Cluff, K.L. Coppersmith, C.A. Cornell, and P.A. Morris (1997). *Recommendations for Probabilistic Seismic Hazard Analysis: Guidance on Uncertainty and the Use of Experts (known as the "Senior Seismic Hazard Analysis Committee Report", or "SSHAC Guideline"),* NUREG/CR-6372, U.S. Nuclear Regulatory Commission, TIC; 235076, Washington, D.C.

[2]USNRC (2012). *Practical Implementation Guidelines for SSHAC Level 3 and 4 Hazard Studies*, NUREG-2117, U.S. Nuclear Regulatory Commission, Washington, D.C.

documentation. Participatory review also involves opportunities for the PPRP to provide its reviews and comments in written form during the conduct of the project, such that the suggestions and recommendations made by the Panel can be considered by the TI Teams in a timely fashion prior to completion of the work. Written comments by the PPRP serve to document the review process and provide a vehicle for ensuring that all aspects of the SSHAC process have been adequately conducted.

The activities of the PPRP for the HSW PSHA are summarized in the table below, which include written reviews during various stages of the project.

Date	PPRP Activity
April 23, 2012	Kick-off Meeting and Site Tour: All PPRP members attended in person
May 25, 2012	Submittal of PPRP written review comments on Kick-off Meeting
July 23-27, 2012	SSHAC Workshop No. 1: All PPRP members attended in person as observers
August 11, 2012	Submittal of PPRP written review comments on SSHAC Workshop No. 1
September 11, 2012	GMC Working Meeting No. 1a: PPRP representative attended via teleconference as an observer
September 17-19, 2012	SSC Working Meeting No. 1: PPRP representatives attended in person as observers
October 24, 2012	GMC Working Meeting No. 1b: PPRP representatives attended via teleconference as observers
December 3-8, 2012	SSHAC Workshop No. 2: All PPRP members attended in person as observers
January 3, 2013	Submittal of PPRP written review comments on SSHAC Workshop No. 2
February 18-21, 2013	GMC Working Meeting No. 2: PPRP representatives attended in person as observers
February 25-28, 2013	SSC Working Meeting No. 2: PPRP representatives attended in person as observers
August 13-16, 2013	GMC and SSC Working Meetings No. 3: PPRP representatives attended via teleconference and in person as observers
September 17, 2013	Quaternary Geologic Studies Field Trip: PPRP representative attended in person as an observer
November 11-15, 2013	SSHAC Workshop No. 3: All PPRP members attended in person as active participants
December 7, 2014	Submittal of PPRP written review comments on SSHAC Workshop No. 3
January 13-16, 2014	SSC Working Meeting No. 4: PPRP representatives attended via teleconference and in person as observers
January 13-17, 2014	GMC Working Meeting No. 4: PPRP representative attended in person as an observer
March 6-7, 2014	PPRP Briefing Meeting on changes made to the GMC and SSC models following Workshop No. 3 and on the PPRP written review comments on Workshop No. 3: All PRPP members attended in person as active participants
June 16, 2014	Submittal of PPRP written review comments on HSW PSHA Draft Report No. 1
June 18, 2014	Teleconference with TI Teams to discuss PPRP written review comments on partially complete HSW PSHA draft report: All PRPP members attended

June 30, 2014	Submittal of PPRP written review comments on HSW PSHA Draft Report No. 2 and on TI Teams' responses to PPRP written review comments on PSHA Draft Report No. 1
October 23, 2014	Submittal of PPRP written review comments on HSW PSHA Draft Report No. 3 and on TI Teams' responses to PPRP written review comments on PSHA Draft Report No. 2
November 11, 2014	Submittal of PPRP written review comments on HSW PSHA Draft Report No. 4 and on TI Teams' responses to PPRP written review comments on PSHA Draft Report No. 3
November 16, 2014	Submittal of HSW PSHA PPRP Closure Letter

The activities listed above are those that were related directly to the conduct of the HSW PSHA and the development of the HSW PSHA report. Prior to the HSW PSHA work activities, the Panel was provided with the Mid-Columbia Project PSHA report and other documents related to Hanford Site seismic hazards. Although those documents provided a useful background for the Panel, this letter does not address these activities, because they lie outside of the SSHAC Level 3 process for the new HSW PSHA.

The Panel concludes that its ongoing review and feedback interactions with the TI Teams during the conduct the HSW PSHA project activities fully met the expectations for a SSHAC Level 3 study. From the presentation of the plans for conducting the HSW PSHA at the outset of the project to the completion of the HSW PSHA report, the TI Teams provided multiple and effective communications to the PPRP. Conference calls and written communications allowed the PPRP to fully understand the technical support for the TI Teams' assessments. The TI Teams provided written responses to PPRP comments documenting that all comments had been adequately considered during the conduct of the work and its documentation.

SSHAC *Process* Review

As explained in NUREG-2117 (USNRC, 2012), the SSHAC process consists of two important activities, described as follows:

> "The fundamental goal of a SSHAC process is to carry out properly and document completely the activities of evaluation and integration, defined as:
>
> - *Evaluation*: The consideration of the complete set of data, models, and methods proposed by the larger technical community that are relevant to the hazard analysis.
> - *Integration*: Representing the center, body, and range of technically defensible interpretations in light of the evaluation process (i.e., informed by the assessment of existing data, models, and methods)."

These activities are essential to any SSHAC Level study and to both refinements to existing studies as well as new PSHAs (such as the HSW PSHA).

During the *Evaluation* phase of the HSW PSHA, the TI Teams considered new data, models, and methods that have become available in the technical community since the previous HSW PSHA project was completed in 1995. Importantly, the TI Teams also evaluated new site-specific data and methods for conducting site-response analysis, which is included as part of the HWS PSHA project as guidelines that ensure that there is a proper interface between the reference-rock hazard and the site-response analyses that will be conducted by the engineering consultants. The Panel concludes that the TI Teams conducted an adequate evaluation process and that this process has been sufficiently documented in the PSHA report.

During the *Integration* phase of the project, SSC and GMC models and site-response methodological guidance were developed for purposes of the HSW-specific PSHA. SSHAC guidelines require that the technical bases for the PSHA model be documented thoroughly in the PSHA report. The PSHA document demonstrates the consideration by the TI Teams of the existence of seismic-source and ground-motion data and models that have become available since the previous HSW PSHA model was developed. The site-response guidelines entailed developing shear-wave velocity profiles for the Saddle Mountain Basalts and conducting a site-response analysis in light of models and methods that have been identified by the U.S. Nuclear Regulatory Agency and used in recent analyses for nuclear facilities. Documentation in the PSHA report confirms that the GMC TI Team was aware of the applicable site-specific data, as well as models and methods for building the profiles, accounting for uncertainties, and carrying out the site-response analysis in order to develop these guidelines.

Based on the review of the *Evaluation* and *Integration* activities conducted by the TI Teams, as well as the documentation of these activities in the PSHA report, the PPRP concludes that the SSHAC process has been adequately conducted.

SSHAC *Technical* Review

The role of the PPRP in the review of the technical aspects of the project is specified in NUREG-2117 (USNRC, 2012) as follows:

> "The PPRP fulfills two parallel roles, the first being technical review. This means that the PPRP is charged with ensuring that the full range of data, models, and methods have been duly considered in the assessment and also that all technical decisions are adequately justified and documented.
>
> The responsibility of the PPRP is to provide clear and timely feedback to the TI/TFI and project manager to ensure that any technical or process deficiencies are identified at the earliest possible stage so that they can be corrected. More commonly, the PPRP provides its perspectives and advice regarding the manner in which ongoing activities can be improved or carried out more effectively. In terms of technical review, a key responsibility of the PPRP is to highlight any data, models or proponents that have not been

> considered. Beyond completeness, it is not within the remit of the PPRP to judge the weighting of the logic-trees in detail but rather to judge the justification provided for the models included or excluded, and for the weights applied to the logic-tree branches."

Consistent with this USNRC guidance, the PPRP reviewed at multiple times during the project the TI Teams' analyses and evaluations of data, models, and methods. These reviews included conference calls, post-workshop meetings, written comments, and the review of drafts of the PSHA report. Through these reviews, the PPRP communicated feedback to the TI Teams regarding data and approaches that did not appear to have been considered, suggestions for methods being used within the technical community, and recommendations for ways that the documentation could be improved to include more discussion of the technical bases for the assessments.

Examples of PPRP feedback regarding the technical aspects of the project can be found in the written comments provided at various times to the TI Teams.

The TI Teams were responsive to the questions, comments, and suggestions made by the PPRP relative to the technical aspects of the project. Therefore, the Panel concludes that the technical aspects of the projects have been adequately addressed.

Conclusion

On the basis of the PPRP's review of the HSW PSHA, the Panel concludes that both the process and technical aspects of the assessment fully meet accepted guidance and current expectations for a SSHAC Level 3 study.

We appreciate the opportunity to provide our review of the project.

Sincerely,

HSW PSHA PPRP Members

Kenneth W. Campbell
Chair

Brian S.-J. Chiou

William R. Lettis

William U. Savage

J. Carl Stepp