PSEGESPeRAIPEm Resource

From: Chowdhury, Prosanta
Sent: Thursday, October 27, 2011 11:24 AM
To: 'PSEGRAIResponses@pseg.com'
Cc: PSEGESPeRAIPEm Resource; 'James.Mallon@pseg.com'; 'David.Robillard@pseg.com'; Colaccino, Joseph; Silvia, Andrea; Clark, Phyllis; McLellan, Judith; Jones, Henry; Raione, Richard
Subject: PSEG Site ESPA FINAL RAI 39 (eRAI 6051) SRP-02.04.05 (RHEB)
Attachments: PSEG Site ESPA Final RAI 39 (eRAI 6051).pdf

Please find attached RAI 39 for the PSEG Site ESP application. Following issuance of the draft of RAI 39 on October 5, 2011, a telecon was held on October 27, 2011, to provide clarification on Questions 02.04.05-1, 02.04.05-5, 02.04.05-6, 02.04.05-9, and 02.04.05-11, as requested by PSEG. As a result of the discussion, in Question 02.04.05-5, reference to an SSAR Figure was corrected, and in Question 02.04.05-11, the fourth sentence was extended to clarify staff's expectation, and in the last sentence, the word "will" was replaced with "may". No other changes were necessary, and therefore, we are issuing this RAI as final.

The schedule we have established for review of your application assumes technically correct and complete responses within 30 calendar days of receipt of RAIs; however, you indicated via email on October 17, 2011, and during the clarification telecon on October 27, 2011, that response to some Questions in this RAI may require more than 30 days. Later, on October 27, 2711, you requested during a phone call that the RAI response due date be 45 days from the issuance of the final RAI, instead of the normal 30 days; you stated that this request was based on your review of the full scope of the RAI and time required to ensure a complete response to the RAI; you also indicated that you may be able to respond to some Questions earlier than 45 days. After reviewing your request, we concluded that a 45-day response period is acceptable for this RAI. As our standard practice, we will assess any impact the additional response time may have on the review schedule. If this RAI cannot be responded to within 45 calendar days, it is expected that a date for receipt of this information will be provided to the staff within the 30-calendar day period so that the staff can assess how this information will impact the published schedule.

If you have any questions, please contact me.

Prosanta Chowdhury
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EPR Projects Branch
Division of New Reactor Licensing
Office of New Reactors
301-415-1647

Hearing Identifier: PSEG_Site_EarlySitePermit_RAI
Email Number: 81

Mail Envelope Properties (320204600EA7B9408FE833FF15E4FF7D7F5A1E7599)

Subject: PSEG Site ESPA FINAL RAI 39 (eRAI 6051) SRP-02.04.05 (RHEB)
Sent Date: 10/27/2011 11:24:19 AM
Received Date: 10/27/2011 11:24:39 AM
From: Chowdhury, Prosanta

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Files	**Size**	**Date & Time**
MESSAGE	2078	10/27/2011 11:24:39 AM
PSEG Site ESPA Final RAI 39 (eRAI 6051).pdf	36573	

Options
Priority: Standard
Return Notification: No
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Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 39

Application Revision 0

FINAL

10/27/2011

PSEG Site ESP
PSEG Power LLC, PSEG Nuclear LLC
Docket No. 52-043
SRP Section: 02.04.05 - Probable Maximum Surge and Seiche Flooding
Application Section: 2.4.5

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.05-1

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. Regulatory Guide 1.59, supplemented by current best practices, provides an acceptable methodology for estimating storm surge induced by PMH. NOAA NWS Report 23 provides an acceptable method for estimating the winds associated with the PMH for the proposed site. SSAR Section 2.4.5.1 provides a bulleted list of meteorological parameters for the PMH at the project site. The NRC staff requests that PSEG provide a table of wind speeds developed from the PMH meteorological parameters listed in SSAR Section 2.4.5.

02.04.05-2

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Sections 2.4.5.1 and 2.4.5.2.2.2 discuss the storm surge induced by PMH storms with different parameter combinations at the open coast. The NRC staff requests that PSEG provide a table of storm surge levels developed with the Bodine model for the different PMH meteorological parameter combinations listed in SSAR Section 2.4.5, or justify why this information is not necessary. In addition, please provide any analyses that demonstrate the influence of varying track direction on surge levels at the open coast and project site.

02.04.05-3

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Section 2.4.5.1 discusses modification of the default wind drag coefficient applied in the Bodine model to estimate storm surge at the proposed site. The NRC staff requests that PSEG provide

results of sensitivity testing undertaken to evaluate the effect of modifying the default wind drag coefficient in the Bodine storm surge model, or justify why this is not necessary.

02.04.05-4

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Sections 2.4.5.2.1 and 2.4.5.2.2 discuss application of the Bodine storm surge model to develop the surge at the mouth of Delaware Bay. The NRC staff requests that PSEG provide the Bodine model input files and information on boundary conditions applied in the modeling, or justify why this is not necessary.

02.04.05-5

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Sections 2.4.5.2.1 and 2.4.5.2.2 discuss validation of the applied methodology to estimate storm surge at the proposed site with comparisons to the Chesapeake-Potomac hurricane (1933) [reference to Bretschneider, 1959]. The NRC staff requests that PSEG provide additional discussion and verification of the development of water level records, including datum conversions, from the Bretschneider (1959) report. The NRC staff also requests that PSEG clarify the calculation of the storm surge from the observed water levels and tidal record at the Reedy Point, Delaware Station — SSAR Figure 2.4.5-4. Finally, the NRC staff requests that PSEG provide justification that the model predictions are conservative.

02.04.05-6

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Sections 2.4.5.2.2.2 and 2.4.5.2.2.3 discuss application of the SLOSH storm surge model to develop the surge at the mouth of Delaware Bay and at the proposed project site. In addition, SSAR Sections 2.4.5.2.2.2 and 2.4.5.2.2.3 discuss and compare the model results (e.g., SLOSH versus Bodine); however, the storm characteristics for each method are not completely explained. The NRC staff requests that PSEG provide additional information on the storm parameters for the SLOSH model that developed the SLOSH Display Program V. 1.61g data applied in the study. This data will allow a more direct comparison of the storm parameters applied to develop the SLOSH (visualization program) and Bodine model storm surge estimates at the mouth of Delaware Bay and at the proposed project site.

Discussions with the applicant during the site audit suggested that the applicant may obtain the SLOSH executable files and conduct SLOSH model simulations using site specific (e.g., PMH) storm characteristics. The NRC staff requests that PSEG provide results from any SLOSH simulations conducted by the applicant for storms with the PMH parameters.

02.04.05-7

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Section 2.4.5.2.2.3 discusses application of the HEC-RAS model to propagate the storm surge at the mouth of Delaware Bay (developed by the Bodine model) to the project site approximately 80 km (50 miles) inland. The NRC staff requests that PSEG provide additional information on the testing done to confirm that execution of more recent HEC-RAS model versions (v. 4.1 released in early 2010) than applied in the SSAR did not result in significant changes to the HEC-RAS model results.

02.04.05-8

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Section 2.4.5.2.2.3 discusses application of the Kamphuis wind setup model to estimate wind-induced water level changes from the mouth of Delaware Bay (developed by the Bodine model) to the project site approximately 80 km (50 miles) inland. The NRC staff requests that PSEG provide the model setup and input conditions applied to develop the wind-induced water level changes from the mouth of Delaware Bay to the project site. The NRC staff requests that PSEG provide information related to any additional analysis completed to understand how the shape of Delaware Bay would influence wind-induced water level changes in the bay.

02.04.05-9

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Section 2.4.5.3.1 discusses the development of the wave runup at the project site. The NRC staff requests that PSEG provide plots that illustrate the wind vector directions and magnitudes at the time of, and at several times before and after, maximum PMH surge. NRC staff also requests that PSEG provide wave runup estimates at the proposed project site for these times.

02.04.05-10

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Section 2.4.5.3.2 discusses the development of the wave runup estimate for the project site. The NRC staff requests that PSEG provide details of the equations and parameters applied to estimate the wind-induced wave runup at the project site. Specifically, the NRC staff requests that PSEG provide information on the equations applied, the wind speed averaging calculations, and the breaking ratio applied. In addition, the NRC staff requests that PSEG clearly define the wave heights (maximum versus significant) applied in the equations.

02.04.05-11

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, estimates of the probable maximum hurricane (PMH) and the probable maximum storm surge are needed. The storm surge induced by the PMH can be estimated as recommended by Regulatory Guide 1.59, supplemented by current best practices. SSAR Section 2.4.5.6 discusses the effects of sediment deposition and erosion at the project site. The NRC staff requests that PSEG provide additional information concerning the sediment dynamics near the proposed project site under hurricane-induced current velocities, including additional information to support the assumption of uniform deposition. Analysis of the two-dimensional (horizontal) distribution of sediment erosion and deposition may require estimation of the two-dimensional current velocity field (application of a two-dimensional hydrodynamic model).