PMLevyCOLPEm Resource

From: Anderson, Brian
Sent: Tuesday, September 28, 2010 2:40 PM
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Cc: PMLevyCOLPEm Resource
Subject: DRAFT RAIs - SRP sections 2.4.3, 2.4.5, 2.4.6 - Levy County Units 1 and 2 Combined License Application
Attachments: LNP Draft RAI 4842 - 2.4.6.doc; LNP Draft RAI 5106 - 2.4.3.doc; LNP Draft RAI 5107 - 2.4.5.doc

Importance: High

Attached are three draft RAIs related to SRP sections 2.4.3, 2.4.5, and 2.4.6 for the Levy County Units 1 and 2 Combined License Application. Please let me know if you would like to schedule a conference call to discuss these RAIs.

Thank you,
Brian

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Hearing Identifier: Levy_County_COL_Public
Email Number: 682

Mail Envelope Properties (B46615B367D1144982B324704E3BCEED3059C5E74B)

Subject: DRAFT RAIs - SRP sections 2.4.3, 2.4.5, 2.4.6 - Levy County Units 1 and 2 Combined License Application
Sent Date: 9/28/2010 2:39:34 PM
Received Date: 9/28/2010 2:39:35 PM
From: Anderson, Brian

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Post Office: HQCLSTR01.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	422	9/28/2010 2:39:35 PM
LNP Draft RAI 4842 - 2.4.6.doc	37882	
LNP Draft RAI 5106 - 2.4.3.doc	34298	
LNP Draft RAI 5107 - 2.4.5.doc	32762	

Options
Priority: High
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 4842
Levy County, Units 1 and 2
Progress Energy Florida, Inc.
Docket No. 52-029 and 52-030
SRP Section: 02.04.06 - Probable Maximum Tsunami Flooding
Application Section: FSAR Section 2.4

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.06-***

In RAI 2.4.6-02 (RAI ID 2162, Question 8855), the staff requested the applicant to provide a discussion in the updated FSAR of the hill-slope failures near the Levy County site with reference to the findings in Section 2.5 of the FSAR.

The applicant's response, dated 22 July 2009, provided a description of hill-slope stability in the RAI response that is reasonable, but did not appear to indicate that the FSAR will be changed to include this description Section 2.4.6.3. In their response, the applicant indicates a change in FSAR Section 2.5.5 that is unrelated to this RAI.

In RAI 2.4.6-03 (RAI ID 2162, Question 8856), the staff requested the applicant to provide a clarification in the updated FSAR of the meaning of the descriptor “impact” as used on pg. 2.4-45 of the FSAR: “…historically no Caribbean tsunami has impacted the United States Gulf Coast.”

The applicant's response, dated 22 July 2009, provided a description of what is meant by “impact”, but does not appear to indicate that the FSAR will be changed to include this description in Section 2.4.6.2.

In RAI 2.4.6-08 (RAI ID 2162, Question 8862), the staff requested the applicant to provide the theoretical basis, assumptions (e.g., source parameterization), and applicability to the Levy County site for the tsunami attenuation function discussed on pg. 2.4-53 (Equation 2.4.6-1) and make available the details of the Monte Carlo analysis used to estimate the maximum wave height and where the maximum wave height estimate is geographically located. For this and other methods of tsunami analysis indicated in the FSAR, provide the procedure use to calculate tsunami propagation, runup, and inundation (i.e., tsunami water levels) at the Levy County site from offshore tsunami amplitude.

The applicant's response, dated 22 July 2009, provided substantial new effort regarding analysis for tsunami generation, propagation, and runup. NRC staff requests additional documentation of the formulas for source amplitude. The water depths listed in Table 1 seem arbitrary (300-800 m for East Breaks). In addition, the response does not appear to describe source “diameter” is determined. The numbers for the Veracruz and Venezuela source diameters (Table 4) appear to have typographic errors. The assumption that "wave amplitude onshore cannot exceed its estimated runup height at shore” does not appear to utilize standard tsunami terminology. Further, variable Co in equations 17 and 18 does not appear to be defined.

In RAI 2.4.6-015 (RAI ID 4217, Question 16353), the staff requested the applicant to provide additional details regarding new methodology for tsunami analysis described in response to RAI 2.4.6-08. This discussion should specifically include (1) the basis for source amplitude formulae (they are not contain in Silver et al., 2009); (2) clarify what is meant by "wave amplitude onshore

cannot exceed its estimated runup height at shore" (statement is incorrect using standard tsunami terminology); (3) definition of variable Co in equations 17 and 18.

The applicant's response, dated 25 March 2010 (using their revised method), provided a maximum "runup" of 22.5 m which does appear to be reasonably consistent with a "run-in" distance of 2.07 km that is estimated by the applicant. In the staff's 2HD analysis using conservative friction values, an attenuated 3 m runup is associated with a18 km inundation distance. Using similar scaling for the applicant's 22.5 m runup would result in tsunami that would impact the site.

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, the staff requests the following:

1) Please provide an FSAR update to include information contained in applicant's response to RAI 2.4.6-02 (RAI ID 2162, Question 8855)

2) Please provide an FSAR update to include information contained in applicant's response to RAI 2.4.6-03 (RAI ID 2162, Question 8856)

3) In reference to Progress Energy's response to RAI 02.04.06-15 (25 March 2010, NPD-NRC-2010-025, L0696), the PMT runup (21.4 m) given in Table 1 appears to be inconsistent with the accompanying inundation distance. It is noted that runup is defined as the ground elevation at the location of maximum tsunami inundation, which is consistent with the depiction given in Figure ATTACHMENT 02.04.06-15A. As can be found from topographic maps, the ground elevation at a distance of 1.2 miles from the shoreline in the direction of the Levy County site is approximately 1m. The 21 m topographic elevation is well inland of the Levy County site. It would not be expected that two separate equations are needed to find the runup and the inundation distance; calculation of either one, used in conjunction with topographic maps, provides the other value.

Please provide clarification on these values (eta and X in Table 1), including which of the two values should be used to define the PMT, and if the variable definitions as given in Figure ATTACHMENT 02.04.06-15A are correct. In Table 1 provided in the response, please provide the geographic location (lat, long) corresponding to the location at the given distance R from the source, as well as the depth at that location, since it is needed to determine the runup elevation. Please present all equations used, including a discussion of assumptions inherent in these equations and the associated conservatism, and the procedure to calculate the provided values. Please provide all input data sources, calculation packages, and associated modeling input files.

Request for Additional Information No. 5106
Levy County, Units 1 and 2
Progress Energy Florida, Inc.
Docket No. 52-029 and 52-030
SRP Section: 02.04.03 - Probable Maximum Flood (PMF) on Streams and Rivers
Application Section: FSAR Section 2.4

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.03-***

In RAI 2.4.3-05 (RAI ID 4628, Question 17566), the staff requested the applicant to provide a probable maximum flood (PMF) analysis for the Withlacoochee River watershed that used (1) an appropriate rainfall-runoff response function for Lake Rousseau and (2) unit hydrographs for the subbasins of the Withlacoochee River watershed that are appropriately representative of overland flow and runoff generation conditions in the basin and conservative in predicting the discharge in the Withlacoochee River at the time a probable maximum precipitation (PMP) event is likely to occur.

The applicant's response, dated May 7, 2010, stated that the applicant's approach to a unit hydrograph for generation of runoff from the precipitation falling on the surface of Lake Rousseau would result in a conservative estimate of the probable maximum flood because the lag times associated with subbasins upstream of Lake Rousseau are larger than a day. Therefore, the applicant stated that use of the alternative approach of assuming no lag in generation of runoff from precipitation falling on the surface of Lake Rousseau would not be conservative because peak runoff from the upstream subbasins would not coincide with the peak runoff from Lake Rousseau. While NRC agrees that using a unit hydrograph for Lake Rousseau would be more conservative, the analysis that supports safety conclusions in the FSAR must be representative of the hydrologic characteristics of the study area, in addition to being conservative. The applicant must provide an appropriate rainfall-runoff response function for Lake Rousseau and update the PMF analysis based on this response function.

The applicant's May 7, 2010 response also described a sensitivity analysis that was performed to determine the ability of the subbasin unit hydrographs to predict large floods including the standard project flood. The applicant stated that Snyder peak coefficient, the parameter C_p, was increased from its regional value of 0.6 to 0.8, a 33 percent increase that would result in a corresponding increase of 33 percent to peak discharge. The FSAR Rev 1 Table 2.4.3-221 shows that a C_p value of 0.8 was used for all subbasins. However, the text in FSAR Rev 1 Section 2.4.3.3.1 states that a value of 0.6 was used for C_p.

While the applicant has demonstrated that the unit hydrographs it employs estimate the peak discharge of relatively large floods conservatively, the literature guidance also recommends reduction in time to peak for the unit hydrographs that are used to predict large floods such as the PMF. NRC requests that the applicant:

(1) verify that the value of Snyder peaking coefficient, C_p, used in the PMF analysis is 0.8
(2) adjust time to peak discharge appropriately for each subbasin unit hydrograph
(3) update the PMF analysis
(4) provide input files for the PMF analysis, and
(5) provide related updates to FSAR Section 2.4.3, ensuring that the text is consistent with the analysis performed.

Request for Additional Information No. 5107
Levy County, Units 1 and 2
Progress Energy Florida, Inc.
Docket No. 52-029 and 52-030
SRP Section: 02.04.05 - Probable Maximum Surge and Seiche Flooding
Application Section: FSAR Section 2.4

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.05-***

In RAI 2.4.5-09 (RAI ID 4629, Question 17567) , the staff requested the applicant to provide the following information: (a) an analysis of the probable maximum storm surge (PMSS) event using a technically sound and conservative approach such as that predicted by a storm surge model (e.g., Sea, Lake, and Overland Surges from Hurricanes (SLOSH)) with input from appropriate Probable Maximum Hurricane (PMH) scenarios, (b) an estimate of sea level rise accounting for current climatic predictions, and (c) if factored into the PMSS analysis (i.e., application of margins), a detailed description of the process for determining uncertainty estimations.

The applicant's response, dated June 18, 2010, does not appear to describe an estimation of PMSS at and near the LNP site using PMH scenarios input into a currently-accepted hydrodynamic storm surge model. NRC requests that the applicant:

(1) utilize a set of plausible PMH scenarios consistent with National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) Report 23 (NWS 23) as input to a currently-accepted storm surge model (such as SLOSH)
(2) use initial open-water conditions that are consistent with current understanding of long-term sea-level rise and are valid for the life of the proposed plant
(3) provide estimates of coincident wind wave runup
(4) maps of highest PMSS water surface elevation at and near the LNP site, and
(5) provide updates to FSAR Section 2.4.5 including descriptions of data, methods, model setup, PHM scenarios and how they are consistent with NWS 23, treatment of uncertainty in the analysis, and available margins.