



Progress Energy

Serial: NPD-NRC-2010-049
June 18, 2010

10CFR52.79

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

**LEVY NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 52-029 AND 52-030
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 090 RELATED TO
PROBABLE MAXIMUM SURGE AND SEICHE FLOODING**

Reference: Letter from Brian C. Anderson (NRC) to John Elnitsky (PEF), dated May 7, 2010,
"Request for Additional Information Letter No. 090 Related to SRP Section 2.4.5 for
the Levy County Nuclear Plant, Units 1 and 2 Combined License Application"

Ladies and Gentlemen:

Progress Energy Florida, Inc. (PEF) hereby submits our response to the Nuclear Regulatory Commission's (NRC) request for additional information provided in the referenced letter. A response to the NRC request is addressed in the enclosure.

If you have any further questions, or need additional information, please contact Bob Kitchen at (919) 546-6992, or me at (727) 820-4481.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 18, 2010.

Sincerely,

John Elnitsky
Vice President
New Generation Programs & Projects

Enclosure

cc : U.S. NRC Region II, Regional Administrator
Mr. Brian C. Anderson, U.S. NRC Project Manager

**Levy Nuclear Plant Units 1 and 2
Response to NRC Request for Additional Information Letter No. 090 Related to
SRP Section 2.4.5 for the Combined License Application, dated May 7, 2010**

<u>NRC RAI #</u>	<u>Progress Energy RAI #</u>	<u>Progress Energy Response</u>
02.04.05-9	L-0808	Response enclosed – see following pages

NRC Letter No.: LNP-RAI-LTR-090

NRC Letter Date: May 7, 2010

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.04.05-09

Text of NRC RAI:

In response to staff's RAI 2.4.5-05, the applicant stated that the extrapolation equation that was used to estimate PMSS at the LNP site is based on National Oceanic and Atmospheric Administration National Weather Service's Sea, Lake and Overland Surges from Hurricanes (SLOSH) modeling results for hurricanes of Categories 1 through 5 in the Gulf of Mexico near the LNP site. Through independent confirmatory analysis, the staff determined that the Probable Maximum Storm Surge (PMSS) water surface elevations obtained by using the extrapolation procedure described by the applicant may be conservative, but does not appear to provide hydrodynamic basis that captures the complex interaction of the storm surge and inland topography within the equation.

Provide the following information: (a) an analysis of the PMSS event using a technically sound and conservative approach such as those predicted by a storm surge model (e.g., SLOSH) with input from appropriate Probable Maximum Hurricane scenarios, (b) an estimate of sea level rise and the reasons why the use of historical estimations of sea level rise (SLR) is more conservative than 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, or justify the exclusion of this information.

PGN RAI ID #: L-0808

PGN Response to NRC RAI:

This RAI includes three information requests and therefore, the response to this RAI is presented in three parts:

- a) An analysis of the PMSS event using a technically sound and conservative approach such as those predicted by a storm surge model (e.g., SLOSH) with input from appropriate Probable Maximum Hurricane scenarios;
 - b) An estimate of sea level rise and the reasons why the use of historical estimations of sea level rise (SLR) is more conservative than 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, or justify the exclusion of this information.
- (a) An analysis of the PMSS event using a technically sound and conservative approach such as those predicted by a storm surge model (e.g., SLOSH) with input from appropriate Probable Maximum Hurricane scenarios:

The Probable Maximum Hurricane (PMH) parameters considered for the LNP site were obtained from the NOAA NWS Report 23 (LNP FSAR Reference 2.4.5-205) as suggested by Regulatory Guide 1.59. These parameters have been described in LNP FSAR Subsection 2.4.5.1.2 and presented in LNP FSAR Table 2.4.5-203. Further, these parameters have also been described in the response to LNP FSAR RAI 02.04.05-02.

As requested by the NRC, a storm surge model (e.g., SLOSH) with input from appropriate Probable Maximum Hurricane scenarios was used to analyze the PMSS event. LNP FSAR Subsection 2.4.5.2.4 and the response to LNP FSAR RAI 02.04.05-05 describe the equations developed using the SLOSH model results for hurricane Categories 1 through 5. These equations provide a hydrodynamic basis that captures the complex interaction of the storm surge and inland topography by considering the worst case surge heights for Category 5 hurricanes in the form of maximum of the MEOWs (Maximum Envelope of Water) [MOMs].

According to the NOAA definition of hurricane categories, a hurricane having a wind speed more than 155 miles/hour and central pressure less than 920 millibars is classified as a Category 5 hurricane. LNP FSAR Table 2.4.5-203 presents the PMH parameters for the LNP site and shows that the wind speed varies from 156 to 157 miles/hour and the central pressure varies from 889 to 891 millibars. Therefore, the considered PMH for the LNP site can be categorized by a Category 5 hurricane, and application of the available SLOSH model results are valid. Furthermore, the results from the SLOSH model used to develop equations corresponds to extreme hurricane conditions as created by the National Hurricane Center (NHC) by extracting the highest peak surge values from two or more MEOWs.

(b) An estimate of sea level rise and the reasons why the use of historical estimations of sea level rise (SLR) is more conservative than current climatic predictions:

As presented in the response to LNP FSAR RAI 02.04.03-02, actual observed data from 1914 through 2006 indicate the long-term sea level rise at the Cedar Key datum is 1.8 mm/year with a 95% confidence interval of +/- 0.19 mm/year. Further, the response to LNP FSAR RAI 02.04.03-02 also depicts a well defined deterministic trend of sea level rise along with small seasonal and random fluctuations around the mean trend line. These small fluctuations can be accounted for by considering the upper 95% confidence interval of the mean trend line. Because the trend in sea level rise is based on 92 years of observed data at the Cedar Key datum which is very close the LNP site, these estimates for future sea level rise will be more reliable than using hypothetical climatic predictions. Current climatic predictions inherently include a significant magnitude of uncertainty and cannot be termed reliable. Therefore, a SLR prediction based on a well known deterministic trend from 92 years of observed data that incorporates the uncertain part by adding the upper 95% confidence interval is more reliable than current climatic predictions.

(c) If factored into the PMSS analysis (i.e., application of margins), a detailed description of the process for determining uncertainty estimations, or justify the exclusion of this information:

As described in LNP FSAR Subsections 2.4.5.2.5, 2.4.5.3.1, and 2.4.5.3.2, a Monte-Carlo simulation (MCS) was used for determining uncertainty estimations. A total of 1000 iterations were run and the maximum elevation values were adopted to account for uncertainty.

The PMSS analysis is composed of the following components used for determining uncertainty estimations:

- PMSS: Regulatory Guide 1.59 does not include a process for estimating uncertainty as an acceptable criterion. Further, no guideline is provided to conduct an uncertainty analysis for the method it describes.
- A formal uncertainty analysis was conducted using a MCS procedure that characterizes the total water elevation due to PMH surge and wind activity. The results are shown on

Figure 2.4.5-232. In addition, a MCS method has been used for uncertainty analysis for both wind wave setup and wave runup and the maximum values were adopted.

- As described above, the SLR component consists of a 95% confidence interval of +/- 0.19 mm/yr due to seasonal and random phenomenon. Therefore, this uncertainty has already been included in the estimates.

Associated LNP COL Application Revisions:

No COLA changes have been identified associated with this response.

Attachments/Enclosures:

None.