Progress Energy

Serial: NPD-NRC-2010-088 10CFR52.79
November 16, 2010

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
SUPPLEMENT 1 TO RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 046 RELATED TO SEISMIC DESIGN PARAMETERS

References:
1. Letter from Chandu P. Patel (NRC) to Garry Miller (PEF), dated May 20, 2009, "Request for Additional Information Letter No. 046 Related to SRP Section 3.7.1 for the Levy County Nuclear Plant Units 1 and 2 Combined License Application"

2. Letter from John Elnitsky (PEF) to U. S. Nuclear Regulatory Commission (NRC), dated November 2, 2009, "Response to Request for Additional Information Letter No. 046 Related to Seismic Design Parameters", Serial: NPD-NRC-2009-222

Ladies and Gentlemen:

Progress Energy Florida, Inc. (PEF) hereby submits a supplemental response to the Nuclear Regulatory Commission's (NRC) request for additional information provided in Reference 1.

A supplemental response to NRC question 03.07.01-1 is addressed in the enclosure. The enclosure also identifies changes that will be made in a future revision of the Levy Nuclear Plant Units 1 and 2 application.

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 November 16, 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

Progress Energy Florida, Inc.
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NRO

Levy Nuclear Plant Units 1 and 2
Supplement 1 to Response to NRC Request for Additional Information Letter No. 046
Related to SRP Section 3.7.1 for the Combined License Application,
Dated May 20, 2009

NRC RAI #	Progress Energy RAI #	Progress Energy Response
03.07.01-1	L-0207 & L-0845	November 2, 2009; Serial: NPD-NRC-2009-222 & Supplemental response enclosed – see following pages

NRC Letter No.: LNP-RAI-LTR-046

NRC Letter Date: May 20, 2009

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 03.07.01-1

Text of NRC RAI:

Levy FSAR Section 3.7.1.1.2 states that the foundation input response spectra (FIRS) which are based on the site-specific ground motion response spectra (GMRS), are considered in site-specific response analysis. It is further stated that the resulting Levy FIRS are exceeded by the AP1000 CSDRS spectra by a factor greater than 3 in both the horizontal and vertical directions over the entire frequency range of interest. It is concluded in this Section that this large margin of exceedance is sufficient to preclude any uncertainties associated with the effects of adjacent structures supported on drilled shafts.

It is important to point out that the FIRS and the CSDRS are defined at different elevations and, therefore, cannot be compared directly. The process requires that deterministic site-specific calculations be performed to generate the ground motions (both horizontal and vertical) at plant grade for each of the three soil columns used in the SSI calculation (BE, UB and LB site profiles in accordance with SRP Section 3.7.2 –II. Acceptance Criteria). The comparison that needs to be made is then the CSDRS for AP1000 with the envelope of the spectra generated at the ground surface for each of the three SSI profiles. The use of the FIRS in this comparison is inappropriate.

Figures 2.5.2-247 & -248 show that discreet shear wave velocities as measured by the P-S logger are quite variable, ranging by wide margins from the average value within the zone of influence. This puts into question the degree of variability assumed in the SSI calculations, the assumption of uniformity of properties within a given layer if voids filled with soft soil are present within the same rock stratum, and the impact of potential variability in layer properties across the footprint of the NI on SSI response.

Finally, the design of the NI structures are based on the intrinsic assumption that the properties of the soils to the side of the structure are the same as under the foundation and that the seismic gap between the NI and adjacent facilities is adequate to account for the relative displacements anticipated for the plant. The behavior of the adjacent structures under seismic loading is directly related to the design of the drilled shafts supporting these structures as well as the support these soils can provide to the drilled shafts.

Please provide justification for the assumed uniformity of layer structure for SSI response evaluations and potential impact of loss of support of side soils on drilled shaft design in case of Levy site.

PGN RAI ID #: L-0845

PGN Response to NRC RAI:

The plant design grade at LNP is at elevation 15.5 m (51 ft.) NAVD88. The site around the plant will be graded to avoid flooding due to Probable Maximum Precipitation. The finished grade elevation for the site will vary from elevation 15.2 m (50 ft.) NAVD88 near the plant to elevation 14.3 (47 ft.) NAVD88 away from the plant as shown in Figures RAI 03.07.01-02-1 and RAI

03.07.01-02-2. To be consistent with the AP1000 DCD nomenclature, this supplementary response revises the NRC Letter 046 RAI 03.07.01-01 (PGN RAI ID #: L-0207) response submitted via Progress Energy Letter NPD-NRC-2009-222 dated November 02, 2009 as follows:

The phrase "finished grade" in the response is revised to "design grade".

Associated LNP COL Application Revisions:

The following text changes will be made to the LNP FSAR in a future revision:

[Note: the text changes revise "finished grade" to "design grade"]

1. COLA Part 2, FSAR, Subsection 2.5.0.2.5 sixth (last) paragraph will be revised from:

   "The site response analyses profiles for the finished grade case were developed by adding a layer of engineered fill to the GMRS profiles to bring the top elevation up to 15.5 m (51 ft.) NAVD88. The analyses were performed for a wide range of engineered fill properties."

   To Read:

   "The site response analyses profiles for the design grade case were developed by adding a layer of engineered fill to the GMRS profiles to bring the top elevation up to 15.5 m (51 ft.) NAVD88. The analyses were performed for a wide range of engineered fill properties."

2. COLA Part 2, FSAR, Subsection 2.5.0.2.6 third paragraph, first sentence will be revised from:

   "Performance-based surface response spectra (PBSRS) and associated soil column outcropping response (SCOR) foundation input response spectra (FIRS) were developed using the site response analysis of profiles that extended to the finished grade elevation."

   To Read:

   "Performance-based surface response spectra (PBSRS) and associated soil column outcropping response (SCOR) foundation input response spectra (FIRS) were developed using the site response analysis of profiles that extended to the design grade elevation."

3. COLA Part 2, FSAR, Subsection 2.5.0.2.6 third paragraph, fifth sentence will be revised from:

   "Finished grade (elevation 15.5 m [51 ft.]) SSI input response spectra were also developed."

   To Read:

   "Design grade (elevation 15.5 m [51 ft.]) SSI input response spectra were also developed."

4. COLA Part 2, FSAR, Subsection 2.5.2.5 second paragraph after the numbered list (last paragraph), sixth sentence (last sentence) will be revised from:

"The primary difference is that the PBSRS is developed for the plant finished grade and includes the effects of engineered fill that raises nominal site grade from approximately +12.8 m (+42 ft.) to +15.5 m (+51 ft.) NAVD88."

To Read:

"The primary difference is that the PBSRS is developed for the plant design grade and includes the effects of engineered fill that raises nominal site grade from approximately +12.8 m (+42 ft.) to +15.5 m (+51 ft.) NAVD88."

5. COLA Part 2, FSAR, Subsection 2.5.2.5.3.2 first paragraph will be revised from:

"The process described above for developing the GMRS profile amplification functions was repeated for the finish grade PBSRS profiles."

To Read:

"The process described above for developing the GMRS profile amplification functions was repeated for the design grade PBSRS profiles."

6. COLA Part 2, FSAR, Subsection 2.5.2.6.1 first sentence of the third paragraph after the bulleted list (last paragraph) will be revised from:

"The above process was followed to develop finished grade surface response spectra at elevation 15.5 m (51 ft.) NAVD88."

To Read:

"The above process was followed to develop design grade surface response spectra at elevation 15.5 m (51 ft.) NAVD88."

7. COLA Part 2, FSAR, Subsection 2.5.2.6.2 eighth paragraph first sentence will be revised from:

"CAV hazard calculations were also performed for the finished grade PBSRS profiles."

To Read:

"CAV hazard calculations were also performed for the design grade PBSRS profiles."

8. COLA Part 2, FSAR, Subsection 2.5.2.6.2 ninth paragraph fourth sentence will be revised from:

"These CAV/no-CAV ratios are then used to scale the smooth finished grade surface spectra described in FSAR Subsection 2.5.2.6.1 to produce hazard-consistent mean finished grade surface UHRS that are based on the use of the CAV filter."

To Read:

"These CAV/no-CAV ratios are then used to scale the smooth design grade surface spectra described in FSAR Subsection 2.5.2.6.1 to produce hazard-consistent mean design grade surface UHRS that are based on the use of the CAV filter."

9. COLA Part 2, FSAR, Subsection 2.5.2.6.6 first paragraph first sentence will be revised from:

"Following the guidance given in Section 5.2.1 of the Interim Staff Guidance DC/COL-ISG-017, a horizontal PBSRS is developed from the finished grade UHRS shown on..."

To Read:

"Following the guidance given in Section 5.2.1 of the Interim Staff Guidance DC/COL-ISG-017, a horizontal PBSRS is developed from the design grade UHRS shown on..."

10. COLA Part 2, FSAR, Subsection 2.5.4.8.5 fifth paragraph second sentence will be revised from:

"The plant finished grade will be established at elevation 15.5 m (51 ft.) NAVD88 by placing engineered fill above the improved/ replaced in-situ material."

To Read:

"The plant design grade will be established at elevation 15.5 m (51 ft.) NAVD88 by placing engineered fill above the improved/ replaced in-situ material."

11. COLA Part 2, FSAR, Subsection 2.5.4.8.5 sixth paragraph third sentence will be revised from:

"For the Turbine Building, the top of the 6 ft. thick foundation mat is at two levels: at grade elevation 15.5 m (51 ft.) NAVD88 and at elevation 9.1 m (30 ft.) NAVD88."

To Read:

"For the Turbine Building, the top of the 6 ft. thick foundation mat is at two levels: at design grade elevation 15.5 m (51 ft.) NAVD88 and at elevation 9.1 m (30 ft.) NAVD88."

12. COLA Part 2, FSAR, Subsection 3.7.1.1.1 second paragraph, first and second sentences will be revised from:

"Plant finished grade will be established at elevation 15.5 m (51 ft.) NAVD88 by placing engineered fill above in-situ material. Performance based surface horizontal and vertical response spectra (PBSRS) at the finished grade elevation were developed using the same methodology and in-situ soil properties used for developing the GMRS described in Subsection 2.5.2.6."

To Read:

"Plant design grade will be established at elevation 15.5 m (51 ft.) NAVD88 by placing engineered fill above in-situ material. Performance based surface horizontal and vertical response spectra (PBSRS) at the design grade elevation were developed using the same methodology and in-situ soil properties used for developing the GMRS described in Subsection 2.5.2.6."

13. COLA Part 2, FSAR, Subsection 3.7.1.1.1 third paragraph, first and second sentences will be revised from:

"In addition to the PBSRS, finished grade Soil Structure Interaction (SSI) analysis input surface spectra were developed using Subsection 5.2.1 of the Interim Staff Guidance DC/COL-ISG-017 as described in Subsection 2.5.2.6. The finished grade surface response spectra from..."

To Read:

"In addition to the PBSRS, design grade Soil Structure Interaction (SSI) analysis input surface spectra were developed using Subsection 5.2.1 of the Interim Staff Guidance DC/COL-ISG-017 as described in Subsection 2.5.2.6. The design grade surface response spectra from..."

14. COLA Part 2, FSAR, Subsection 3.7.1.1.1 fourth paragraph, third sentence will be revised from:

"However, it does not envelop the finished grade surface SSI input response spectra from the three soil columns in the high frequency range (greater than approximately 30 Hz)."

To Read:

"However, it does not envelop the design grade surface SSI input response spectra from the three soil columns in the high frequency range (greater than approximately 30 Hz)."

15. COLA Part 2, FSAR, Subsection 3.7.1.1.2 second paragraph, first sentence will be revised from:

"The top of the basemat for the Annex Building, Radwaste Building, and the Turbine Building (except for the condenser pit area) is at finished grade elevation 15.5 m (51 ft.) NAVD88."

To Read:

"The top of the basemat for the Annex Building, Radwaste Building, and the Turbine Building (except for the condenser pit area) is at design grade elevation 15.5 m (51 ft.) NAVD88."

16. COLA Part 2, FSAR, Subsection 3.7.2.8.1 first paragraph (with LMA SUP 3.7-5), the second and third sentences will be revised from:

"The Annex Building foundation (top of mat) is at finished grade. Figure 2.5.2-297 shows a comparison of the LNP performance based surface response spectra (PBSRS) at the plant finished grade and the CSDRS."

To Read:

"The Annex Building foundation (top of mat) is at design grade. Figure 2.5.2-297 shows a comparison of the LNP performance based surface response spectra (PBSRS) at the plant design grade and the CSDRS."

17. COLA Part 2, FSAR, Figure 2.5.2-283A title will be revised from:

"Envelope of Finished Grade Amplification Functions for the 500 ft/sec Fill Velocity"

To Read:

"Envelope of Design Grade Amplification Functions for the 500 ft/sec Fill Velocity"

18. COLA Part 2, FSAR, Figure 2.5.2-283B title will be revised from:

"Envelope of Finished Grade Amplification Functions for the 850 ft/sec Fill Velocity"

To Read:

"Envelope of Design Grade Amplification Functions for the 850 ft/sec Fill Velocity"

19. COLA Part 2, FSAR, Figure 2.5.2-283C title will be revised from:

"Envelope of Finished Grade Amplification Functions for the 1000 ft/sec Fill Velocity"

To Read:

"Envelope of Design Grade Amplification Functions for the 1000 ft/sec Fill Velocity"

20. COLA Part 2, FSAR, Figure 2.5.2-284A title will be revised from:

"Smoothed Enveloped Finished Grade Amplification Functions for the 500 ft/sec Fill Case"

To Read:

"Smoothed Enveloped Design Grade Amplification Functions for the 500 ft/sec Fill Case"

21. COLA Part 2, FSAR, Figure 2.5.2-284B title will be revised from:

"Smoothed Enveloped Finished Grade Amplification Functions for the 850 ft/sec Fill Case"

To Read:

"Smoothed Enveloped Design Grade Amplification Functions for the 850 ft/sec Fill Case"

22. COLA Part 2, FSAR, Figure 2.5.2-284C title will be revised from:

"Smoothed Enveloped Finished Grade Amplification Functions for the 1000 ft/sec Fill Case"

To Read:

"Smoothed Enveloped Design Grade Amplification Functions for the 1000 ft/sec Fill Case"

23. COLA Part 2, FSAR, Figure 2.5.2-308 title will be revised from:

"Surface UHRS for the Levy Finished Grade PBSRS Profile Based on PSHA Inputs of Minimum Magnitude of m_b 5.0 or CAV"

To Read:

"Surface UHRS for the Levy Design Grade PBSRS Profile Based on PSHA Inputs of Minimum Magnitude of m_b 5.0 or CAV"

24. COLA Part 2, FSAR, Figure 2.5.2-309 title will be revised from:

"Horizontal Finished Grade UHRS and the PBSRS for the Levy Site"

To Read:

"Horizontal Design Grade UHRS and the PBSRS for the Levy Site"

Attachments/Enclosures:

None.