Progress Energy

Serial: NPD-NRC-2010-054
July 9, 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. 088 RELATED TO STABILITY OF SUBSURFACE MATERIALS AND FOUNDATIONS

Reference: Letter from Brian C. Anderson (NRC) to Garry Miller (PEF), dated March 29, 2010, "Request for Additional Information Letter No. 088 Related to SRP Section 2.5.4 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. 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 July 9, 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

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NRO

Levy Nuclear Plant Units 1 and 2
Response to NRC Request for Additional Information Letter No. 088 Related to SRP Section 2.5.4 for the Combined License Application, dated March 29, 2010

NRC RAI #	Progress Energy RAI #	Progress Energy Response
02.05.04-26	L-0805	Response enclosed – see following pages

RAI Response

NRC Letter No.: LNP-RAI-LTR-088

NRC Letter Date: March 29, 2010

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.05.04-26

Text of NRC RAI:

In your response to RAI 2.5.4-24 you indicate that 7 ft. of liquefiable Quaternary soils will be removed and replaced with engineered fill, and that the engineered fill will be used to raise the site grade to El. 51.0 ft. NAVD 88, such that 15 ft. of engineered fill will cap the soil column used in the liquefaction analysis. The engineered fill will underlie the Category 2 Annex Building, Turbine Building and Radwaste Building and surround the drilled piers that will support these buildings. The engineered fill will also cap the CLSM placed between the diaphragm walls and nuclear island sidewalls.

The FSAR provides limited information about the nature of the engineered fill overlying the CLSM. Therefore, the staff requests the following additional information as required by 10CFR100.23 and as outlined in the guidance provided in RG 1.206, RG 1.138, and RG 1.198.

a. Please provide the source, type, quantity and limits of engineered backfill to be placed.
b. Provide compaction specifications and engineering properties assumed for the proposed engineered backfill.
c. The shear wave velocity assumed in the revised liquefaction analysis seems high for a surface engineered fill. Justify the shear wave velocity of 1000 fps assumed for the engineered backfill in the liquefaction analysis.

PGN RAI ID #: L-0805

PGN Response to NRC RAI:

a. The source of the engineered fill/backfill material has not been formally established. It is currently anticipated to be from a local source. This fill material will consist of sand with varying amounts of silt and clay and be classified in accordance with the Unified Soil Classification System (USCS) as SW, SM or SC. The cross sectional area of the engineered fill to be placed above the CLSM is shown in Figure RAI 02.05.04-26-1. This engineered fill extends from the wall of the nuclear island to the outside edge of the diaphragm wall (approximately). The cross-sectional area of the engineered fill is approximately 40 SF. The perimeter of the diaphragm wall is approximately 850 LF. The total volume of this engineered fill is therefore anticipated to be on the order of 1,000-2,000 CY. The properties of the engineered fill that will be placed under the adjacent Category II and non-seismic structures were previously provided in the response to RAI 03.07.01-01 (NPD-NRC-2009-222).

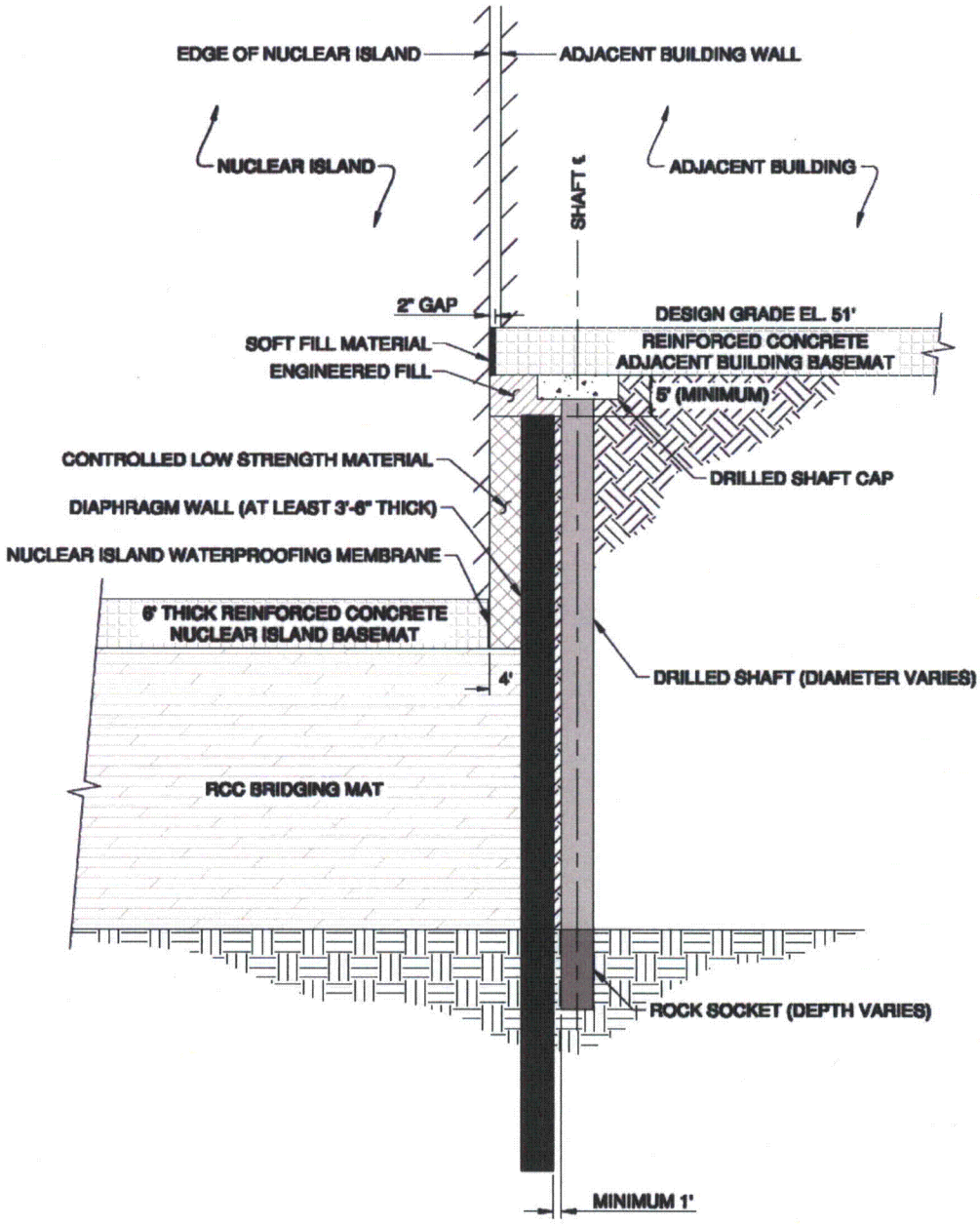

FIGURE RAI 02.05.04-26-1
DRILLED SHAFTS INTERACTION WITH DIAPHRAGM WALL AND LOCATION OF ENGINEERED FILL ABOVE CLSM

b. The engineered fill overlying the CLSM will be placed in loose lifts and compacted to 95 percent of its maximum dry density as determined by ASTM D 1557, Modified Proctor method. The moisture content of the fill will be controlled to within +/- 2 percent of its optimum moisture content. The unit weight of the material is estimated to be between 100 pcf and 125 pcf, with a best estimate of approximately 110 pcf. As such, no systematic changes to material properties are expected for different depths. The shear wave velocity of this material is estimated to be between 500 fps and 1000 fps, with a best estimate of 850 fps. These properties are based on the properties of the S-1, S-2, and S-3 soil layers at the LNP site, and our experience in testing in-place compacted engineered fill material based on 95 percent compaction. The properties of

the engineered fill are provided in FSAR Table 2.5.4.5-201 as modified in the response to RAI 03.07.01-1 (NPD-NRC-2009-222).

c. As an input to the revised liquefaction analysis, effective cyclic shear stresses were developed for ground motion response spectra (GMRS) that considered the shear wave velocity of the engineered fill material to be 500 fps, 850 fps, and 1000 fps. The resulting effective cyclic shear stresses developed for the site are shown in Figure RAI 02.05.04-26-2 for LNP1 input. For elevations below 36 ft NAVD 88, the effective cyclic shear stresses obtained for the subsurface profile that considered the engineered fill material to have a shear wave velocity of 1000 fps is slightly higher compared to the other two, as shown below. Thus, for the revised liquefaction analysis, the engineered fill shear wave velocity was conservatively considered to be 1000 fps. This consideration only applied to this revised liquefaction analysis.

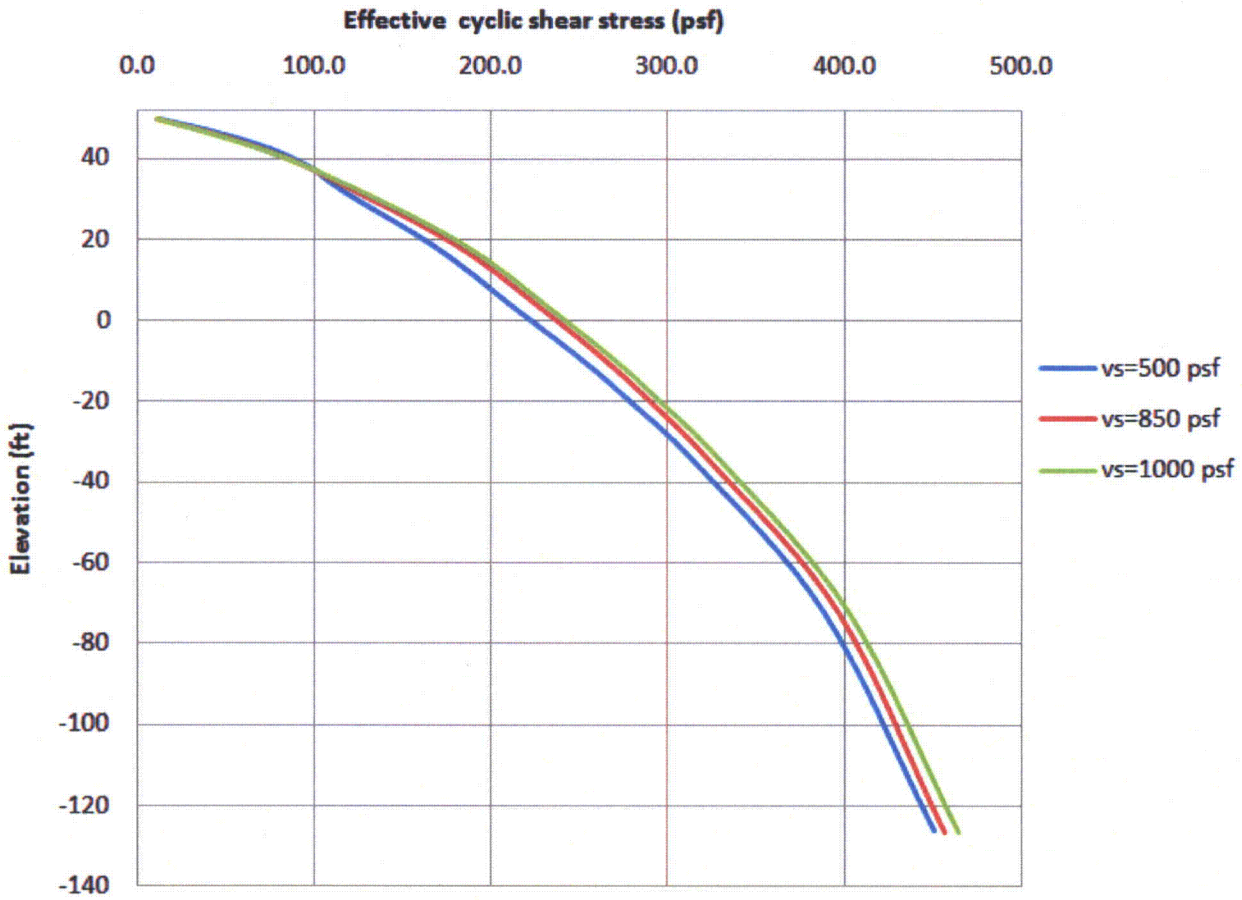

FIGURE RAI 02.05.04-26-2
LNP1 EFFECTIVE CYCLIC SHEAR STRESSES VS ELEVATION

Associated LNP COL Application Revisions:

In FSAR Table 2.5.4.5-201, the "Strength Parameter" for "Engineered Fill" will be modified from:

> Drained friction angle of 33 degrees (or equivalent shear strength); SM-SC USCS Classification

to:

> Drained friction angle of 34 degrees (or equivalent shear strength); SM-SC USCS Classification

In FSAR Table 2.5.4.5-201, Note (c) will be modified from:

> c) Engineered fill is expected to be compacted to 95 percent of its maximum dry density, with a unit weight of 110 pcf.

to:

> c) Engineered fill will be compacted to 95 percent of its maximum dry density as determined by ASTM D 1557, Modified Proctor method, with a dry unit weight of 110 pcf. The moisture content of the fill will be controlled to within +/- 2 percent of its optimum moisture.

Attachments/Enclosures:

None