

October 6, 2008

Mr. James Scarola, Senior Vice President
and Chief Nuclear Officer
Progress Energy, Inc.
P.O. Box 1551
Raleigh, NC 27602

SUBJECT: ACCEPTANCE REVIEW FOR THE LEVY COUNTY NUCLEAR POWER PLANT
UNITS 1 AND 2 COMBINED LICENSE APPLICATION

Dear Mr. Scarola:

By letter dated July 28, 2008, Progress Energy Florida, Inc. (PEF) submitted its application to the U.S. Nuclear Regulatory Commission (NRC) for a combined license (COL) for two AP1000 advanced passive pressurized water reactors in accordance with the requirement contained in 10 CFR Part 52, "Licenses, Certifications and Approvals for Nuclear Power Plants." This letter informs you that the NRC staff has completed its acceptance review and has determined that your application is acceptable for docketing. These reactors will be identified as Levy Nuclear Power Plant (LNP) Units 1 and 2 and are to be located at a site in Levy County, Florida. The docket numbers established for LNP Units 1 and 2 are 52-029 and 52-030, respectively.

The LNP combined license application (COLA) incorporates by reference Appendix D to 10 CFR Part 52 and the AP1000 Design Control Document submitted by Westinghouse as Revision 16. As allowed by 10 CFR 52.55(c), at your own risk, you have referenced a design certification application that has been docketed but not granted. Therefore, your COL review schedule is dependent on the review schedule for the design certification. In addition, as a subsequent combined license applicant, your COL application review schedule is also dependent on the review schedule for the Tennessee Valley Authority's Bellefonte Units 3 and 4 COLA (the reference COLA for the AP1000 design center). Because it utilizes the standard content contained in the reference COL application (R-COLA), it is incumbent upon PEF to remain cognizant of the resolution of the standard technical issues that will be addressed during the NRC review of the Bellefonte R-COL application. If you determine that it is necessary to resolve a standard issue differently for the LNP Units 1 and 2 COLA, you must notify the NRC immediately so that we may determine the review impact of this standard issue being considered as site specific.

As discussed with your staff, the date that we intend to publish a schedule for review can not be determined until additional information is provided by you. Although our acceptance review determined that the LNP COLA is complete and technically sufficient, the complex geotechnical characteristics of the Levy County site require additional information in order to develop a complete and integrated review schedule. Enclosure 1 contains this Request for Additional Information (RAI).

As necessary, other RAIs will be issued separately. Because of the scheduling uncertainty in the areas of geotechnical science and structural engineering, the NRC staff does not intend to commence a review of these areas until all associated RAIs are sufficiently answered. For all other sections of the LNP COLA, the NRC staff intends to commence reviews based on the availability of resources.

Your application submittal letter requested that the NRC consider the following milestones when preparing our complete and integrated review schedule: Final Environmental Impact Statement issuance in June 2010, Limited Work Authorization issuance in September 2010, and COL issuance in January 2012. Because of the complexity of the site characteristics and the need for additional information, it is unlikely that the LNP COLA review can be completed in accordance with this requested timeline. The NRC staff expects to interact with you as the safety and environmental review schedules are developed.

Enclosure 2 is a notice of acceptance for docketing. This notice is being forwarded to the Office of the Federal Register. A separate notice will be published in accordance with the provisions of 10 CFR 2.104, regarding the hearing.

Should you have any questions, please contact me at (301) 415-9967 or send an e-mail to Brian.Anderson@nrc.gov.

Sincerely,

/RA/

Brian Anderson, Lead Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-029
52-030

Enclosures:

1. Request for Additional Information
2. Federal Register Notice

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Sincerely,
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Brian Anderson, Lead Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-029
52-030

- Enclosures:
1. Request for Additional Information
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NAME	KGGoldstein R. Butler for	BAnderson	SBrock	SCoffin
DATE	10/02/08	10/02/08	10/06/08	10/02/08

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**Request for Additional Information
Levy County Units 1 and 2
Progress Energy Florida, Inc.
Docket No. 52-029 and 52-030**

**QUESTIONS for Geosciences and Geotechnical Engineering Branch 1 (RGS1)
SRP Section: 02.05.01 - Basic Geologic and Seismic Information
Application Section: SRP 2.5.1**

02.05.01-1

Please summarize the information being used as the technical basis for the dissolution rates presented, including documentation of the basis for indicating that dolomitized limestone dissolves less readily than non-dolomitized limestone, to enable an adequate assessment of karst development as a potential future geologic hazard. Include any references necessary.

02.05.01-2

Reference is made to a "subset" of the regional fracture system which apparently exhibits the same orientation as fractures in the regional fracture system (Attachment 2, pg. 4 of supplement, Karst Discussion).

Please qualify whether these "subset" fractures are simply smaller-scale features (i.e., having a shorter length along strike but the same orientation) than the regional fractures, and discuss whether or not they could exercise local control on dissolution. Please also discuss the pertinence of the observed fracture spacings in the outcrops relative to the regional fracture sets.

02.05.01-3

The supplement states that grouting will inhibit the development of karst by preventing the flow of groundwater through the grouted zones beneath the nuclear island (Attachment 2, pg. 15 of supplement, Permeation Grouting Discussion).

Please address the potential issue of how altering the groundwater flow regime by grouting could affect dissolution below and around the periphery of the grouted zone to assure that this aspect has been considered.

02.05.01-4

The supplement refers to a "shelf" within the Avon Park Formation defined by lowered shear wave velocity measurements (Attachment 2, pg. 15 of supplement, Permeation Grouting Discussion).

Please qualify this "shelf" in the Avon Park Formation to clearly indicate lithology involved relative to composition, thickness, lateral distribution, and material properties.

02.05.01-5

The supplement lists assumptions and postulations used to calculate lateral dimensions of borehole features (Attachment 2, pg. 7 of supplement, Karst Discussion - Excess Grout Takes), and states that 9.9 ft is the maximum lateral extent of dissolution cavities at depth. Considering a fracture spacing of 19 ft., if dissolution developed along two parallel fractures with this spacing, then the resulting cavity could easily exceed 9.9 ft. if the two cavities coalesced at depth.

Please discuss the uncertainty involved in the estimate of a 9.9 ft. maximum lateral extent for dissolution cavities and the potential for coalescing dissolution cavities at depth.

02.05.01-6

The supplement cites Dr. A. Randazzo (Attachment 2, pg. 7 of supplement, Karst Discussion - Excess Grout Takes) as supporting the statement that the horizontal dimension of dissolution features associated with vertical fractures is a fraction of the vertical dimension, but does not summarize the information documenting the statement that lateral extent of dissolution features developed along fractures is about 20% of the vertical dimension.

Please summarize the evidence, with appropriate references, for the statement that lateral extent of dissolution features related to fractures is only about 20% of their vertical dimension.

02.05.01-7

The supplement refers to estimates as "conservative" for definition of a 10-ft. maximum lateral extent for dissolution voids at any depth (Attachment 2, pg. 8 of supplement, Karst Discussion - Excess Grout Takes), even though subsurface investigations do not appear to clearly document this lateral limit due to borehole spacing and depth.

Please summarize the evidence leading to the conclusion that dissolution cavities will be no greater than 10 ft. in lateral extent, since that dimension is used as the basis for design of the RCC. Please discuss whether or not it is anticipated that voids of that size presently exist within the proposed grout zone and explain the approach that will be followed if large voids are discovered based on grout takes.

QUESTIONS for Geosciences and Geotechnical Engineering Branch 1 (RGS1)

SRP Section: 02.05.02 - Vibratory Ground Motion

Application Section: SRP 2.5.2

02.05.02-1

Please describe your plans for ensuring the shear wave velocity post-grouting was appropriately represented in the site response analyses you performed in your previous calculation of the GMRS.

02.05.02-2

Please provide additional justification why geophysical tools, such as resistivity, microgravity, and seismic tomography, were not used to characterize the extent of subsurface voids at depth. Please also describe your plans for any post-grouting geophysical testing to assure that dissolution cavities are filled and demonstrate post-grouting uniformity of the site.

QUESTIONS for Geosciences and Geotechnical Engineering Branch 1 (RGS1)

SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations

Application Section: SRP 2.5.4

02.05.04-1

Please provide a sufficiently detailed discussion to justify that the borings adequately characterize karst at depth at the site, and that the existing borehole spacing is sufficient to characterize the lateral dimension of dissolution cavities and assess their correlation and interpreted lack of connectivity between boreholes.

02.05.04-2

The Avon Park Formation may contain dissolution voids, soil-filled dissolution voids, and highly variable strengths of subsurface rock materials based on Rock Quality Designation (RQD), shear wave velocity measurements, and compressive strength test results from intact samples.

- a. Please provide a more detailed explanation of how the supporting rock profile was modeled in the Finite Element (FEM) analysis. Include a detailed explanation of how the material properties for subsurface materials supporting the RCC were determined for application in the FEM. Indicate how variability in the rock mass, voids and low density soil-filled voids were modeled in the FEM.
- b. Please describe how the results from the FEM were compared with shear strength in the Avon Park Formation in the static and dynamic bearing capacity calculations. Please provide sample calculations.
- c. Please describe how rock mass properties were determined for use in the U.S Army Corps of Engineers (USACE) bearing capacity equations you referenced, and provide a sample calculation for bearing capacity using the USACE method for static and dynamic loads.
- d. Please indicate how the limestone supporting the RCC meets the uniformity requirements for subgrade reaction.

02.05.04-3

The supplement states that, because incremental shear stresses at EI -150 ft were only 2 psi, characterization of subsurface conditions below this depth were considered to be adequate and, consequently, settlement magnitudes were deemed to be appropriate.

- a. Given the small number of borings, please discuss the basis for the conclusion that larger voids which may collapse and consequently affect settlement do not exist below EI -150 ft.

- b. Please provide a sketch of the rock profile assumption, including rock mass elastic properties used in the elastic settlement analyses. Provide a sample calculation using the Boussinesq stress distribution down to 2B. Please indicate how rock mass elastic properties for the settlement calculation were determined and how karst features were incorporated into the rock mass property determinations for settlement analysis.

QUESTIONS for Structural Engineering Branch 1 (AP1000/EPR Projects) (SEB1)
SRP Section: 03.08.05 - Foundations
Application Section: 3.8.5.1

03.08.05-1

Under, SRP Section 3.8.5, "Foundations," the staff reviews the adequacy of foundations of all Seismic Category I structures. A foundation is a structural element that connects the superstructure and the supporting medium, such as soils or rocks. The purpose of the foundation is to hold the superstructure in place and to transmit all loads of the superstructure to the underlying soils or rocks.

Levy FSAR Section 3.8.5.1, "Description of the Foundations," references FSAR Section 2.5.4, "Stability of Subsurface Materials and Foundations," for a description of the foundation depth of overburden and depth of embedment. FSAR Section 2.5.4 describes that, below the NI basemat, a 35-foot thick RCC bridging mat will be used to transmit the NI loads under static and dynamic conditions to the karst foundation. However, details regarding how this bridging mat will transform the NI loads to the karst foundation are not provided.

Staff requests the applicant to:

- (a) Describe the methods used to transmit the static and dynamic loads of the NI through the bridging mat to the karst foundation, and justify the use of the RCC bridging mat between the NI basemat and the karst foundation.
- (b) Provide requirements of material, installation, and compaction for the RCC bridging mat, and the analysis and design methods for the bridging mat.

COL Progress Energy - Levy County Mailing List

(Revised 09/29/2008)

cc:

Ms. Michele Boyd
Legislative Director
Energy Program
Public Citizens Critical Mass Energy
and Environmental Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

Ms. Georgia Cranmore
Assistant Regional Administrator
NOAA Fisheries Southeast Regional Office
9721 Executive Center Drive North
Saint Petersburg, FL 33702

Mr. James Scarola
Sr. Vice President and
Chief Nuclear Officer
Progress Energy, Inc.
P.O. Box 1551
Raleigh, NC 27602

COL Progress Energy - Levy County Mailing List

Email

APH@NEI.org (Adrian Heymer)
awc@nei.org (Anne W. Cottingham)
brian.mccabe@pgnmail.com (Brian McCabe)
BrinkmCB@westinghouse.com (Charles Brinkman)
chris.burton@pgnmail.com (Chris Burton)
chris.maslak@ge.com (Chris Maslak)
CumminWE@Westinghouse.com (Edward W. Cummins)
cwaltman@roe.com (C. Waltman)
david.lewis@pillsburylaw.com (David Lewis)
david.waters@pgnmail.com (Dave Waters)
dlochbaum@UCSUSA.org (David Lochbaum)
garry.miller@pgnmail.com (Garry D. Miller)
greshaja@westinghouse.com (James Gresham)
gzinke@entergy.com (George Alan Zinke)
jgutierrez@morganlewis.com (Jay M. Gutierrez)
jim.riccio@wdc.greenpeace.org (James Riccio)
JJNesrsta@cpsenergy.com (James J. Nesrsta)
joe.w.donahue@pgnmail.com (Joe Donahue)
John.O'Neill@pillsburylaw.com (John O'Neill)
Joseph_Hegner@dom.com (Joseph Hegner)
KSutton@morganlewis.com (Kathryn M. Sutton)
kwaugh@impact-net.org (Kenneth O. Waugh)
lchandler@morganlewis.com (Lawrence J. Chandler)
Marc.Brooks@dhs.gov (Marc Brooks)
Margaret.Bennet@dom.com (Margaret Bennet)
maria.webb@pillsburylaw.com (Maria Webb)
mark.beaumont@wsms.com (Mark Beaumont)
matias.travieso-diaz@pillsburylaw.com (Matias Travieso-Diaz)
media@nei.org (Scott Peterson)
Mike.Halpin@dep.state.fl.us (Mike Halpin)
mike_moran@fpl.com (Mike Moran)
MSF@nei.org (Marvin Fertel)
nirsnet@nirs.org (Michael Mariotte)
patriciaL.campbell@ge.com (Patricia L. Campbell)
paul.gaukler@pillsburylaw.com (Paul Gaukler)
Paul@beyondnuclear.org (Paul Gunter)
phinnen@entergy.com (Paul Hinnenkamp)
pshastings@duke-energy.com (Peter Hastings)
RJB@NEI.org (Russell Bell)
RKTemple@cpsenergy.com (R.K. Temple)
robbrinkman@cox.net (Rob Brinkman)
robert.kitchen@pgnmail.com (Robert H. Kitchen)
roberta.swain@ge.com (Roberta Swain)
ronald_m_bright@bellsouth.net (Ronald Bright)

COL Progress Energy - Levy County Mailing List

sabinski@suddenlink.net (Steve A. Bennett)
sandra.sloan@areva.com (Sandra Sloan)
sfrantz@morganlewis.com (Stephen P. Frantz)
Tansel.Selekler@nuclear.energy.gov (Tansel Selekler)
twinkletoesdms@aol.com (Robert and Deborah Smith)
Vanessa.quinn@dhs.gov (Vanessa Quinn)
VictorB@bv.com (Bill Victor)
wwebb3@tampabay.rr.com (Winn Webb)