Attachment 15 – Affidavit of Dr. Sydney Bacchus,
February 6, 2009

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE SECRETARY OF THE COMMISSION

In the Matter of	)	
Progress Energy Florida, Inc.;	)	Docket No. 52-029 and 52-030
Application for the Levy County	)	
Nuclear Power Plant Units 1 and 2	)	
Combined Operating License	)	

EXPERT DECLARATION BY DR. SYDNEY T. BACCHUS IN SUPPORT OF PETITIONERS' STANDING TO INTERVENE IN THIS PROCEEDING

Under penalty of perjury, I, Sydney T. Bacchus, Ph. D., declare as follows:

A. EDUCATION, RESEARCH, AND PROFESSIONAL WORK EXPERIENCE

1. **Name -** My name is Sydney Bacchus and I am a third-generation Floridian. I was a full-time Florida resident for approximately 40 years and a part-time Florida resident for approximately the past decade, while completing my doctoral degree. My business address is P. O. Box 174, Athens, Georgia 30603-0174.

2. **Advanced degrees -** I received a Bachelor of Science degree (1972) and a Master of Science degree (1977) from Florida State University (Department of Biological Sciences). My Masters research involved evaluating the changes in wetland and aquatic plant community composition in response to changing salinity regimes and changes in hydroperiod. Hydroperiod components include: a) the depth or stage of fluctuating ground and surface water; b) the duration of the water level at a given depth and stage; and c) the periodicity and seasonality of the water level fluctuations. My minor field of study was chemistry.

3. **Multidisciplinary doctoral program -** I completed graduate-level (predoctoral) courses in Hydrology, Hydrogeology, Geochemistry and Water Quality at the University of South Florida, then transferred to the University of Georgia (Athens) to complete more extensive graduate-level courses (e.g., Soil Physics, Geophysics, Forest Hydrology, Forest Pathology, Tree Physiology and various aspects of Ecology) for a multidisciplinary doctoral degree program in Hydroecology. Hydroecology is a multidisciplinary field that combines both physical and life sciences. It is the study of the interaction between living organisms and the water-related aspects (both quantity and quality) of their environment.

4. **Research focus -** The focus of my doctoral research was adverse environmental impacts (aka effects) associated with anthropogenic (man-induced) groundwater alterations. I received my Doctorate degree from the University of Georgia (Institute of Ecology) in 1999, after successfully defending my Dissertation titled, "New Approaches for Determining Sustainable Yield from the Regional Karst Aquifer of the Southeastern Coastal Plain." My research was conducted through representative subregions of the regional Floridan aquifer system. That regional aquifer system extends throughout the entire State of Florida and the coastal plains portions of Georgia, South Carolina and Alabama.

5. **Grants -** During my doctoral program, I received several grants from state agencies in Florida and federal agencies that supported my doctoral research. One of my grants from United States Geological Survey (USGS) supported geophysical research to evaluate the degree of connection between the Floridan aquifer and depressional wetlands throughout Florida and south Georgia. Other grants supported a controlled experiment, observing responses of native tree species to prolonged water stress and fungal pathogens. Those grants are listed in my Curriculum Vitae (CV) and incorporated into my affidavit. *See* Bacchus Exhibit A.

6. **Published literature -** I am familiar with the body of published literature relevant to my multidisciplinary area of expertise. Specifically, these include the fields of Hydrology, Hydrogeology, Submarine Groundwater Discharge, Geochemistry, Water Quality, Geophysics, Forest Hydrology, Forest Pathology, Tree Physiology and various aspects of Ecology, as they relate to Florida's wetlands, other special aquatic sites and native wildlife habitat. I have authored or co-authored approximately 40 refereed (peer-reviewed) papers in those fields, specifically regarding groundwater/surfacewater interactions, karst aquifers, and flood plains/wetlands (aka special aquatic sites). My publications have been based on research I have conducted in wetlands (special aquatic sites) and other ecosystems, including marine, estuarine, and freshwater aquatic ecosystems throughout Florida. I also have served as a peer reviewer for manuscripts (related to the fields referenced above) that have been submitted to professional journals for publication. A list of my relevant peer-reviewed publications, awards and recognition of my work in the fields described above, as well as a description of my professional experience and affiliations with professional societies and other organizations, are provided in my CV (Bacchus Exhibit A).

B. OMISSIONS, MISREPRESENTATIONS AND FAILURES OF PROPOSED LEVY NUCLEAR PLANT (LNP) ENVIRONMENTAL REPORT (ER) TO ADDRESS ADVERSE DIRECT, INDIRECT AND CUMULATIVE ENVIRONMENTAL IMPACTS

B.1. Statement of issue

7. **Direct, indirect and cumulative environmental impacts –** The LNP Units 1 and 2 COL Application Part 3, Environmental Report (ER) failed to address adverse direct, indirect and cumulative environmental impacts of the proposed LNP facility.

B.1. Explanation of basis

8. **Addressing direct, indirect and cumulative environmental impacts –** In 1997, the U.S. Council on Environmental Quality (Council) published a report defining and describing the approach for addressing adverse direct, indirect and cumulative effects (aka impacts), as required by federal law. The title of the report is "Considering Cumulative Effects Under the National Environmental Policy Act." A synopsis of the Council's report, relevant to the scope of this proceeding is attached hereto as Bacchus Exhibit B. The citation for the report is: Council on Environmental Quality. 1997. Considering Cumulative Effects Under the National Environmental Policy Act. Executive Office of the President; What are Cumulative Impacts? Synopsis of the U. S. Council on Environmental Quality. The executive summary of that report is available at: http://ceq.hss.doe.gov/nepa/ccenepa/exec.pdf

B.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

9. **Direct, indirect and cumulative environmental impacts in site vicinity and**

region– I have long-term knowledge of both the "vicinity" (9.7 km (6 mi) radius) and "region" (extending from the vicinity perimeter to 80 km (50 mi)) of the proposed 1,257 hectare (3,105 acre) LNP site, as defined on page 1-viii of the Environmental Report (ER). I also have long-term knowledge of the Withlacoochee River, extending from the headwaters in the Green Swamp to the Gulf of Mexico and designated as an Outstanding Florida Water (OFW), as defined on page 1-ix of the Environmental Report (ER). I have conducted research and numerous site inspections in those areas. I also have reviewed the ER report for the proposed LNP, including, but not limited to, Chapters 1, 4, 5, 6 and 10. It is my professional opinion that the ER has failed to address significant adverse direct, indirect and cumulative environmental impacts that would occur if the proposed LNP is constructed and operated as proposed.

10. **Examples of specific omissions, misrepresentations and failures –** By comparing the Council's approach for addressing adverse direct, indirect and cumulative impacts and the impacts described in the following sections, specific examples of the significant omissions, misrepresentations and failures to address environmental impacts are apparent in Table 4.6-1 of the LNP ER (page 4-90 through 4-97). A summary of the adverse impacts during construction of the proposed LNP project, identified by the LNP ER, is provided below. The only impacts addressed in that LNP ER table are characterized as "SMALL" impacts, with the exception of a ranking of "SMALL-MODERATE" for the two subsections noted by an asterisk:

Land Use Impacts

Land Use Category

Long-Term Land Use Restrictions and Physical Changes of Site and Vicinity – for Levy County
Short-Term Physical Changes in Land Use and Mitigation – associated with access roadway upgrades
Construction Impacts on the Geologic Environment – impacts on mineral resources
Transmission Corridors – for 3 new transmission corridors, 3 new substations and a 500-kV switchyard
Off-Site Areas – on nearby structures and roadways
Historic Properties – on or near archeological or historic properties

Water-Related Impacts

Erosion/Sediment, Surface Water, Groundwater and/or Water Use Categories

Freshwater Streams – at the LNP site, transmission corridors and pipeline routes
Lakes and Impoundments – on surface water bodies, including impoundments
Cross Florida Barge Canal – impacts on the CFBC
Groundwater – Hydrologic alterations from construction of the LNP
Wetlands - Hydrologic impacts from construction in wetlands
Freshwater Water Bodies – impacts on CFBC and other surface water bodies
Wetlands – impacts at the LNP site
Groundwater Use – impacts on groundwater use

Ecological Impacts

Terrestrial Ecosystem and/or Aquatic Ecosystem Categories

Plant Site – impacts on terrestrial ecology associated with the LNP site*
On-site Pools – impacts of LNP construction on aquatic ecosystems in the LNP site
Cooling Water Intake Structure – impacts on the CFBC shoreline on aquatic ecology
Cooling System Blowdown Discharge Pipeline –pipeline corridor construction impacts on aquatic ecology

Socioeconomic Impacts
Noise, Air Quality, Traffic, Socioeconomic and/or Other Categories
Air Quality – impacts from construction activities on air quality
Visual Aesthetic Disturbances – impact of construction activities on visual aesthetic disturbances [sic]
Social Structure – impacts on social structure
Housing – impacts on housing availability from construction
Educational System – impacts to educational systems from construction
Recreation – impacts of construction to recreational facilities and opportunities
Public Services and Facilities – impacts of construction to public services and facilities
Security Services – impacts on site security and access restrictions
Water and Wastewater Services – impacts on water and wastewater services
Transportation Facilities – "SMALL" impacts on primary transportation routes providing access to the site
'MODERATE" impacts on traffic related to construction of the LNP*
Distinctive Communities – impacts on special or distinctive communities
Minority Populations – impacts on racial, ethnic, and special groups in the region
Low Income Populations – impacts on low income populations

Radiation Exposure to Workers
Effluents/Wastes and "Rad Exp to Const Wkrs" Categories
Radiation Protection and ALARA Program – impacts on construction workers from direct radiation and to radioactive effluents from LNP routine operation

C. GRANTING A COMBINED LICENSE (COL) TO PROGRESS ENERGY FLORIDA (PEF) TO CONSTRUCT AND OPERATE PROPOSED LEVY COUNTY UNITS 1 AND 2 (LNP) WOULD RESULT IN THREATS TO WETLANDS, FLOOD PLAINS, SPECIAL AQUATIC SITES AND WATERS DUE TO FAILURE TO CONSIDER ADVERSE DIRECT, INDIRECT AND CUMULATIVE IMPACTS

C.1. Statement of issue

11. **Constructing in flood plains** - The LNP ER failed to address adverse direct, indirect and cumulative environmental impacts of constructing the proposed LNP facility within flood plains and on wetlands, special aquatic sites and waters.

C.1. Explanation of basis

12. **Increasing elevations -** Figure 4.1-4 and page 4-6 of the LNP ER's "Environmental Impacts of Construction" chapter confirm that the proposed nuclear units 1 and 2 would be constructed in the 100-year flood zone. *See* Bacchus Exhibit C. In fact, LNP Figure 4.1-4 confirms that the majority of the site and the 6-mile radius "vicinity" of the proposed LNP are within the 100-year flood zone. Page 4-6 of the ER further confirms that during the proposed construction, the ground elevation would be raised to a level up to 2.7 m (9 ft) higher than the existing level. The "plant site" is described in the ER as "approximately 121 ha (300 ac.) near the center of the LNP site" (page 1-viii).

C.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

13. **Fill for proposed LNP construction site in flood zone -** Based on the proposed

impacts described under "Explanation of basis," above, approximately 2.7 m (9 ft) of aggregate material (aka "fill") would be placed over "approximately 121 ha (300 ac.)" at the proposed LNP site in the flood zone. The ER fails to identify the source of this significant aggregate fill. The most logical sources for this aggregate fill are the existing and proposed mines in Levy and Citrus Counties. Existing mines include the Cemex Inglis Quarry mine, in northwest Citrus County). Proposed mines include the Tarmac (aka Titan King Road) mine, approximately 5 km (3 mi) northwest of the proposed LNP site, and the Nature Coast Mine in northwest Citrus County.

14. **State agency concerns regarding mining impacts -** Some of the significant and myriad concerns regarding adverse environmental impacts that would occur if those proposed mines are permitted are expressed in the Florida Department of Environmental Protection's letter to Tarmac America, dated November 19, 2008. A copy of that letter is incorporated herein as Bacchus Exhibit D.

15. **Published literature describing environmental impacts from mining –** The mechanisms by which mining irreversibly alters the natural hydroperiod in the vicinity surrounding mines are described in peer-reviewed, published literature, such as the paper titled, "Nonmechanical dewatering of the regional Floridan aquifer system." A copy of that publication is incorporated herein as Bacchus Exhibit E. That publication also describes irreversible adverse environmental impacts that occur as a result of natural hydroperiod alterations from mining. Those impacts are illustrated in the case study of four mining sites located throughout Florida. These adverse impacts occur to terrestrial ecosystems, as well as to wetlands, flood plains, special aquatic sites and other waters.

16. **Unaddressed adverse impacts from mining of fill -** It is my professional opinion that the mining of the aggregate material to fill the proposed LNP site in the flood zone will result in the destruction and other irreversible adverse impacts to terrestrial ecosystems, as well as to wetlands, flood plains, special aquatic sites and other waters throughout and beyond the proposed plant site, vicinity and region, as described on page 1-viii of the ER. These hydroperiod and related adverse environmental impacts were not addressed in the ER.

C.2. Statement of issue

17. **Construction materials** - The ER failed to address adverse direct, indirect and cumulative environmental impacts on flood plains, wetlands, special aquatic sites and waters from additional mining for the production of raw materials, such as aggregate for concrete, to construct the proposed LNP facility.

C.2. Explanation of basis

18. **Concrete foundation, units and other structures – "**Foundations and other structures will require substantial amounts of concrete" (LNP ER page 4-56). Concrete components of the proposed LNP project include the "cooling water intake structure" (LNP ER page 4-54). "The large volume requirements will require the installation and operation of a temporary concrete batch plant on the site during the construction period. While there will be air emissions from the concrete batch plant, they are expected to consist primarily of PM (from cement and aggregate handling and storage) and diesel exhaust emissions from trucks accessing the batch plant during operations" (LNP ER page 4-56). "The structures will be supported with engineered foundations. The foundations will normally consist of either direct buried structures with concrete backfill or reinforced concrete drilled piers" (LNP ER page 3-86). In addition, the

LNP ER suggests the following related activities will be conducted **prior to** the "approval of the COLA" under a "Limited Work Authorization" (page 4-106, emphasis added):
Prepare nuclear island foundation surface with dental **concrete**
Place roller compacted **concrete** under the nuclear islands
Install mud mat under the nuclear islands
Install rebar in the nuclear island **concrete** foundations
Erect safety related **concrete** placement forms
Install Turbine Building foundation drilled shafts
Install Annex Building foundation drilled shafts
Install Radwaste Building foundation drilled shafts
Install circulating water piping between the cooling tower basins and the entrance point to the turbine building condensers
Install the raw water system intake structure and make-up line to the cooling tower basin.

C.2. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

19. **Raw materials for concrete foundation, units and other structures -** The ER fails to identify the source of the mined raw materials (aggregate) for the extensive concrete required to construct the proposed LNP project. The most logical sources for this mined raw material are the existing and proposed mines in Levy and Citrus Counties, listed above.

20. **Mining impacts from raw materials for concrete** – The concerns over the significant and myriad adverse environmental impacts that would occur if those proposed mines are permitted, as expressed in Bacchus Exhibit D, respectively, are valid regardless of whether those mines would be producing aggregate for fill or aggregate as a raw material to make concrete.

21. **Published literature describing environmental impacts from mining** – The mechanisms by which mining irreversibly alters the natural hydroperiod in the vicinity surrounding mines, as described in Bacchus Exhibit E, are the same, regardless of whether those mines would be producing aggregate for fill or aggregate as a raw material to make concrete. These adverse impacts occur to terrestrial ecosystems, as well as to wetlands, flood plains, special aquatic sites and other waters. A related scientific publication describing excessive loss of water through evaporation occurring from large bodies of water, such as mine pits, is:

Swancar, A., T.M. Lee and T.M. O'Hare. 2000. Hydrogeologic setting, water budget, and preliminary analysis of ground-water exchange at Lake Starr, a seepage lake in Polk Couty, Florida. U.S. Geological Survey Water-Resources Investigations Report 00-4030. 65 pp.

22. **Unaddressed adverse impacts from mining raw materials for concrete -** It is my professional opinion that the mining of the aggregate material to make concrete for the proposed LNP foundation, units and other structures will result in the destruction and other irreversible adverse impacts to terrestrial ecosystems, as well as to wetlands, flood plains, special aquatic sites and other waters throughout and beyond the proposed plant site, vicinity and region, as described on page 1-viii of the ER. These hydroperiod and related adverse environmental impacts were not addressed in the ER.

C.3. Statement of issue

23. **On-site mining and dewatering -** The ER failed to address adverse direct, indirect and cumulative environmental impacts on flood plains, wetlands, special aquatic sites

and waters of on-site mining (excavation) and dewatering to construct and operate the proposed LNP and all associated components.

C.3. Explanation of basis

24. **Embedment and related dewatering on site –** Page 4-34 of the LNP ER's "Environmental Impacts of Construction" chapter confirms that on-site mining would occur to a depth of "approximately 75 ft." for the "embedment" and that the excavation depth for that embedment "is below the static water table." The LNP ER also confirmed that ground water "will need to be removed based on the embedment depth" and that the dewatering will cause "groundwater depressions" (page 4-34). Page 4-33 of the LNP ER also states, "Hydrologic alteration will result from construction activities including a change in groundwater levels within the LNP site resulting from grading and construction of a series of stormwater drainage ditches" and that a "series of stormwater drainage ditches will be created around and within the construction area to direct stormwater away from LNP facilities" and "into three stormwater retention/infiltration ponds." The LNP ER also acknowledges that the on-site mining and dewatering may alter water quality (page 4-34). The LNP ER further asserts that "excessive dewatering effects" can be prevented by installing and monitoring "[T]emporary groundwater wells" (page 4-34).

25. **Dewatering from water use on site – "**The LNP will require water for both plant cooling and operational uses. The plant will use two independent circulating water systems (CWSs) with seawater used for the CWS that cools the turbine-generator, and freshwater used for the service water system (SWS)…. Freshwater from the raw water system (RWS) will also be used for the other water services required for operation…. The RWS supply will be from supply wells installed into the freshwater aquifer at the site… The RWS supply will be from supply wells installed into the freshwater aquifer at the site…. Per Table 3.3-2, it is estimated that the normal consumptive water use from cooling tower evaporation is 2.3 m3/s (81.4 ft 3/sec) or 30,427 gpm. Consumptive water use from service water cooling tower evaporation is 0.08 m3/s (2.8 ft3/sec) or 1248 gpm (Table 3.3-2). Water consumption for fuel cycle activities would require approximately 43,067 million L (11,377 million gal.) of water (Table 10.1-2)." *See* LNP Application Part 3, 10.2.1.2. A copy of the Water Use Permit (WUP) application submitted on June 2, 2008 by Progress Energy Florida, Inc. to the Southwest Florida Water Management District (SWFWMD) for the proposed LNP project is incorporated herein as Bacchus Exhibit F. This application would allow maximum withdrawals of approximately 6 Million Gallons per Day (MGD) from the proposed LNP site. Groundwater withdrawals from Floridan aquifer "supply wells" would be allowed for fire protection, potable and sanitary needs of 800 workers/visitors. All (100% of the water withdrawn would be discharged/disposed of to another location. Four groundwater supply wells have been requested to be located at the proposed LNP site. *See* Bacchus Exhibit F. The precise locations of those proposed wells were not provided in the LNP ER. Page 4-34 of the LNP ER's "Environmental Impacts of Construction" chapter also confirms that groundwater withdrawals would occur on the proposed LNP site for the following purposes and rates:

Soil compaction – 300,000 gallons per day (gpd)
Dust and erosion control – 100,000 gpd
Concrete mixing – 100,000 gpd
Miscellaneous – 50,000 gpd

C.3. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

26. **Impacts of on-site excavations, water-use, cooling towers and other dewatering -** Based on my scientific research and professional experience of more than 30 years in evaluating adverse impacts to wetlands, flood plains, special aquatic sites and other waters, it is my professional opinion that any of the proposed on-site water use, dewatering and excavations, including for embedment and stormwater ponds, whether considered individually or cumulatively, would result in irreversible destruction of the wetlands, flood plains, special aquatic sites and other waters. The irreversible destruction would occur throughout and beyond the site and vicinity of the proposed LNP project, as described on page 1-viii of the LNP ER. Additionally, it is my professional opinion that that "excessive dewatering effects" cannot be prevented by installing and monitoring groundwater wells, regardless of whether those wells are temporary or permanent, as claimed in the LNP ER (page 4-34). Therefore, in my professional opinion, any of the proposed on-site water use, dewatering and excavations described above, whether considered individually or cumulatively, would result in "LARGE" rather than "SMALL" impacts to wetlands, flood plains, special aquatic sites and other waters throughout and beyond the site and vicinity of the proposed LNP project.

27. **Cumulative impacts of evaporative loss -** If the 30,427 gallons per minute of evaporative loss (identified in the LNP report) is multiplied by 60 minutes per hour and 24 hours per day, the total daily evaporative loss from the cooling towers is 43,814,880 gallons per day (gpd) or 43.8 MGD. *See* LNP Application Part 3, 10.2.1.2. That astronomical evaporative loss will include salt drift, which will be contaminating the surrounding wetlands, flood plains, special aquatic sites and other waters throughout and beyond the site and vicinity of the proposed LNP project. Damage from salt drift would be more significant at this proposed LPN facility because the LNP facility is proposed to be located inland, rather than on the coast. Based on all of the above, it is my professional opinion that it is not possible to mitigate those "LARGE" impacts. *See* Bacchus Exhibit E and the following references for examples of peer-reviewed scientific publications and citations on dewatering in support of my statements of fact, opinions and conclusions of these contentions:

Bacchus, S. T., D. D. Archibald, K. O. Britton, and B. L. Haines. 2005. Near infrared model development for pond-cypress subjected to chronic water stress and *Botryosphaeria rhodina*. Acta Phytopathologica et Entomologica Hungarica 40(2-3):251-265

Bacchus et al. 2003. Near infrared spectroscopy of a hydroecological indicator: New tool for determining sustainable yield for Floridan aquifer system. Hydrological Processes 17:1785-1809.

Bacchus, S. T. 2000. Uncalculated impacts of unsustainable aquifer yield including evidence of subsurface interbasin flow. Journal of American Water Resources Association 36(3):457-481.

C.4. Statement of issue

28. **Wetlands connected to the Floridan aquifer system -** The ER failed to address adverse direct, indirect and cumulative environmental impacts of constructing the proposed LNP facility within wetlands that are connected to the underlying Floridan aquifer system via relict sinkholes.

C.4. Explanation of basis

29. **Preferential connections to the Floridan aquifer system –** The LNP ER failed to

acknowledge that the pond-cypress (*Taxodium ascendens*) wetlands and those associated with other natural waters on the site and within the vicinity and region of the proposed LNP project are connected to each other and the underlying Floridan aquifer system through a network of relict sinkholes.

C.4. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

30. **Adverse impacts beyond proposed site -** The pond-cypress wetlands and those associated with other natural waters on the site and within the vicinity and region of the proposed LNP project are connected to each other and the underlying Floridan aquifer system through a network of relict sinkholes. Therefore, adverse direct, indirect and cumulative impacts to pond-cypress wetlands proposed by the LNP project would result in adverse impacts beyond the proposed LNP site. *See* Bacchus Exhibit E and references provided above. Off-site wetlands, flood plains, special aquatic sites and other waters, such as Outstanding Florida Waters (OFW) and Shellfish Harvesting Areas (SHA), that would be irrevocably affected by the proposed LNP project would include, but not be limited to:

Levy Blue Spring and associated wetlands and uplands
Withlacoochee River (OFW) and associated wetlands and uplands
Waccasassa River (OFW) and associated wetlands and uplands
Waccasassa Bay (SHA) and associated wetlands and uplands
Gulf Hammock
Big Bend Seagrasses Aquatic Preserve (SHA)
Waccasassa Bay Preserve State Park
Goethe State Forest
Big King Spring and associated wetlands and uplands
Little King Spring and associated wetlands and uplands
Turtle Creek and associated wetlands and uplands
Spring Run Creek and associated wetlands and uplands
Smith Creek and associated wetlands and uplands
Demory Creek and associated wetlands and uplands
Tomes Creek and associated wetlands and uplands
Ten Mile Creek and associated wetlands and uplands
Withlacoochee Bay (SHA) and associated wetlands and uplands

C.5. Statement of issue

31. **Outstanding Florida Waters -** The ER failed to address adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project on "Outstanding Florida Waters" (OFW).

C.5. Explanation of basis

32. **Dewatering of Outstanding Florida Waters –** The LNP ER did not address the adverse direct, indirect and cumulative environmental impacts of the mining/excavations, water use and other dewatering required for the proposed LNP project, as referenced above, on OFWs, such as the Withlacoochee and Waccasassa Rivers and associated wetlands and uplands.

C.5. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

33. **Highest standard of protection violated –** In Florida, the highest standard of protection are provided to "Outstanding Florida Waters." *See* Sections 62-302.700(9(a)(3), 9(b)(17) of 9 the Florida Administrative Code. In my professional opinion, the adverse direct, indirect and cumulative environmental impacts of the mining/excavations, water use and other dewatering required for the proposed LNP project, as referenced above, will dewater the Withlacoochee and Waccasassa Rivers and associated wetlands and uplands. These OFWs and associated wetlands and uplands are aquatic and terrestrial ecosystems, as referenced in the LNP ER, including Table 4.6-1. By dewatering these OFWs and associated aquatic and terrestrial ecosystems, the proposed LNP project would result in "LARGE" and irreversible adverse impacts, rather than the "SMALL" impacts reported in the LNP ER.

D. GRANTING A COMBINED LICENSE (COL) TO PROGRESS ENERGY FLORIDA (PEF) TO CONSTRUCT AND OPERATE PROPOSED LEVY COUNTY UNITS 1 AND 2 (LNP) WOULD RESULT IN IRREPARABLE HARM TO WATER QUALITY FROM ADVERSE DIRECT, INDIRECT AND CUMULATIVE IMPACTS

D.1. Statement of issue

34. **Alteration of nutrient concentrations -** The LNP ER failed to address adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project on nutrient concentrations in wetlands, flood plains, special aquatic sites and other waters resulting from dewatering.

D.1. Explanation of basis

35. **Nutrient concentrations altered by dewatering –** The LNP ER did not address the adverse direct, indirect and cumulative environmental impacts of the mining/excavations, water use and other dewatering required for the proposed LNP project, as referenced above, on nutrient concentrations in wetlands, flood plains, special aquatic sites and other waters.

D.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

36. **Imbalances in natural populations of aquatic flora and fauna –** By dewatering the wetlands, flood plains, special aquatic sites and other waters throughout the site, vicinity and region of the proposed LNP project, all existing nutrient concentrations will increase relative to any water that remains, even in the absence of any new addition of nutrients. Therefore, it is my professional opinion that the dewatering caused by the proposed LNP project would violate Florida's narrative water quality standard for nutrients. *See* Rule 62-302.530(47)(b), Florida Administrative Code, because the dewatering would result in imbalances in natural populations of aquatic flora and fauna in the wetlands, flood plains, special aquatic sites and other waters listed above, as well as in others not listed above, throughout the proposed LNP site, vicinity and region.

D.2. Statement of issue

37. **Destructive wildfires as a new source of nutrients -** The LNP ER failed to address adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project on destructive wildfires in wetlands, flood plains, special aquatic sites and other waters and destructive wildfires as a new source of nutrients to those wetlands, flood plains, special aquatic sites and other waters.

D.2. Explanation of basis

38. **Destructive wildfires caused by dewatering –** The LNP ER did not address the scientific causal connection between dewatering of the type, nature and magnitude that would result from the proposed LNP project, as referenced above, on destructive wildfires in wetlands, flood plains, special aquatic sites and other waters. Additionally, the LNP ER failed to address the impacts of this new source of nutrients would have on the dewatered in wetlands, flood plains, special aquatic sites and other waters.

D.2. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

39. **New addition of nutrients from destructive wildfires –** By dewatering the wetlands, flood plains, special aquatic sites and other waters throughout the site, vicinity and region of the proposed LNP project, those areas will be subjected to destructive wildfires that will destroy the trees and organic soils. As the trees and organic soils are consumed by the destructive wildfires, nutrients are released into the air and water. This new source of nutrients, combined with water reductions in the wetlands, flood plains, special aquatic sites and other waters from the mining/excavations, water use and other dewatering associated with the proposed LNP project, will result in increased nutrient concentrations and subsequent imbalances in natural populations of aquatic flora and fauna. The following reference is an example of peer-reviewed scientific publications supporting my conclusions:

Bacchus, S. T. 2007. More inconvenient truths: Wildfires and wetlands, SWANCC and Rapanos. National Wetlands Newsletter 29(11):15-21.

D.3. Statement of issue

40. **Salt drift from cooling towers as a water quality contaminant-** The LNP ER failed to address adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project, with cooling towers that would use coastal waters, at an inland location in and surrounded by freshwater wetlands, flood plains, special aquatic sites and other waters that would be adversely affected by dewatering from the construction and operation of the LNP project if it is licensed.

D.3. Explanation of basis

41. **Water quality contamination caused by cooling-tower salt drift –** The LNP proposes to use coastal waters for cooling towers located inland, in and surrounded by freshwater wetlands, flood plains, special aquatic sites and other waters that would be dewatered by the construction and operation of the proposed LNP. Yet the LNP ER failed to address: a) the adverse direct, indirect and cumulative environmental impacts of saltwater drift on inland water quality and b) the increased threat of inland water quality contamination that would occur from new sources of saltwater contaminants via salt-drift deposition from the LNP cooling towers on inland waters, aquatic and terrestrial ecosystems that would be dewatered by the construction and operation of the proposed LNP.

D.3. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

42. **Unavoidable water quality contamination caused by cooling-tower salt drift –** "Operation-Related Unavoidable Adverse Environmental Impacts" described in the LNP ER include "salt

drift from cooling towers" (LPN page 10-26). The site and vicinity of the proposed LNP project is an inland, freshwater flood plain, with extensive freshwater wetlands, special aquatic sites and other waters, including freshwater aquatic ecosystems. *See* LNP ER Figure 4.1-4 and Bacchus Exhibit C, incorporated herein. Despite these facts LNP's conclusion regarding water quality impacts of these "Unavoidable Adverse Environmental Impacts" is "It is expected that normal releases of contaminants into the environment from the LNP will have negligible effects on surface and groundwater uses and will be in compliance with an approved NPDES permit issued by the Florida Department of Environmental Protection (FDEP)…" *See* LNP Application Part 3, 10.2.1.2.

43. **Abnormal releases of contaminants into the environment** – Although "salt drift from cooling towers" may constitute "normal releases of contaminants into the environment" for a nuclear facility, such facilities in Florida "normally" are located on the coast. For the proposed location of the LNP facility, in an inland, freshwater flood plain, with extensive freshwater wetlands, special aquatic sites and other waters, including freshwater aquatic ecosystems and Outstanding Florida Waters, salt drift and deposition of that magnitude does not constitute "normal releases of contaminants into the environment." The evaporative loss from the proposed LNP cooling would be 43,814,880 gallons per day (gpd) or 43.8 MGD. *See* LNP Application Part 3, 10.2.1.2. This magnitude of evaporative loss is equivalent to the volume of water in municipal water supply for moderately large communities throughout Florida. Adverse impacts from the release of excessive salt from the proposed LNP project would not represent the sole environmental impact from the proposed LNP project. Release of that contaminant by LNP would occur in freshwater wetlands, special aquatic sites and other waters, including freshwater aquatic ecosystems that would be dewatered from the construction and operation phases of the proposed LNP project.

44. **Cooling-tower salt-drift contaminants into the environment would cause irreparable harm to water quality** – In my professional opinion, the state NPDES permit application review process would be fatally flawed if it ignored the catastrophic adverse impacts to water quality throughout the site, vicinity and region of the proposed LNP's aerial "discharge" of large volumes of saline water into those inland, freshwater ecosystems, including Outstanding Florida Waters. Outstanding Florida Waters reportedly are provided the highest standard of protection under Sections 62-302.700(9(a)(3), 9(b)(17) of 9 the Florida Administrative Code. Despite the outcome of the state's NPDES permit review process, in my opinion, the LNP ER was grossly negligent in ignoring the adverse direct, indirect and cumulative environmental impacts of saltwater drift on inland water quality and b) the increased threat of inland water quality contamination that would occur from new sources of saltwater contaminants via salt-drift deposition from the LNP cooling towers on inland waters, aquatic and terrestrial ecosystems that would be dewatered by the construction and operation of the proposed LNP. It is my professional opinion that the abnormal releases of cooling-tower salt-drift contaminants into the environment would cause irreparable harm to water quality throughout the site, vicinity and region of the proposed LNP project, including Outstanding Florida Waters.

E. GRANTING A COMBINED LICENSE (COL) TO PROGRESS ENERGY FLORIDA (PEF) TO CONSTRUCT AND OPERATE PROPOSED LEVY COUNTY UNITS 1 AND 2 (LNP) WOULD RESULT IN IRREPARABLE HARM TO THE QUALITY OF THE NATION'S AIR RESOURCES FROM ADVERSE DIRECT, INDIRECT AND CUMULATIVE IMPACTS, BY RELEASING STORED CARBON, THUS INCREASING GLOBAL CLIMATE DISRUPTION AND SEA-LEVEL RISE

E.1. Statement of issue

45. **Prematurely killing trees by discharging cooling-tower salt drift, dewatering, cutting, herbicide application and other means releases stored carbon** – The LNP ER failed to address adverse direct, indirect and cumulative environmental impacts to the nation's air resources resulting from the premature death of countless inland trees throughout the site, vicinity and region of the proposed LNP project due to: a) dewatering of the site, vicinity and region of the proposed LNP project; b) destructive wildfires from dewatering of the site, vicinity and region of the proposed LNP project; c) cooling-tower salt-drift contaminants discharged in freshwater wetlands, flood plains, special aquatic sites and other waters, including aquatic and terrestrial ecosystems; d) filling and other construction within the flood zone for the proposed LNP project, and e) cutting, herbicide application and other means of prematurely killing trees in the transmission/utility corridors and other LNP areas in conjunction with the proposed construction and operation of the proposed LNP project.

E.1. Explanation of basis

46. **Trees store carbon and compensate for greenhouse gases that cause global climate disruption** – Trees represent a significant storage of carbon and are moderators of greenhouse gases that cause global climate disruption. *See* http://www.sciencedaily.com/releases/2008/09/080908185330.htm Aerial discharges of cooling-tower salt-drift contaminants throughout the inland site, vicinity and region of the proposed LNP project would kill countless native trees. Dewatering of the site, vicinity and region of the proposed LNP project during construction and operation and destructive wildfires caused by the dewatering would kill countless native trees. Filling and other construction within the flood zone for the proposed LNP project would kill countless native trees. Cutting, herbicide application and other means of prematurely killing trees also are proposed in transmission/utility corridors and other areas in conjunction with the construction and operation of the proposed LNP project. The premature death of those trees would occur from each of those proposed activities independently and cumulatively during the construction and operation of the proposed LNP project, in conjunction with other adverse direct, indirect and cumulative environmental impacts on those trees. The premature death of those trees would be tantamount to significant releases of greenhouse gases in the vicinity of the proposed LNP project.

E.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

47. **Forests as carbon-storage solutions for climate stabilization -** Scientists have estimated that natural forests can store an "average of 1,300 pounds of carbon per acre per year." The estimated carbon storage capacity for forested areas in one state was determined to be "the equivalent of yearly emissions from about 225,000 cars." Further, "the concept of using forests to store carbon has steadily gained attention among policymakers, especially since the Kyoto Protocol was adopted in 1997 as a global program to reduce greenhouse gas emissions." *See* Bacchus Exhibit G, incorporated herein.

48. **Premature tree deaths from construction and operation of the proposed LNP project equivalent to greenhouse gas emissions –** The inland site, vicinity and region of the proposed LNP project is heavily forested with both upland and wetland trees. In fact, the proposed LNP site is in immediate proximity to the Goethe State Forest, the forested Gulf Hammock Wildlife Management Area and Wacasassa Bay State Preserve. The trees throughout the site, vicinity and region of the proposed LNP project are providing extensive carbon storage. *See* Bacchus Exhibit G. The preceding paragraphs include my opinions and documentation describing extensive premature tree death that would occur throughout the inland site, vicinity and region of the proposed LNP project during construction and operation of the nuclear facility. The causes of the premature tree deaths described above include: a) filling and other construction within the flood zone for the proposed LNP project; b) dewatering of the site, vicinity and region of the proposed LNP project; c) destructive wildfires from dewatering of the site, vicinity and region of the proposed LNP project; and d) cooling-tower salt-drift contaminants discharged in freshwater wetlands, flood plains, special aquatic sites and other waters, including aquatic and terrestrial ecosystems. In addition to those causes of premature tree deaths from the construction and operation of the proposed LNP project, described above, premature death of trees would occur from cutting, herbicide application and other means of prematurely killing trees in the transmission/utility corridors and other LNP areas in conjunction with the proposed construction and operation of the proposed LNP project. Page 4-12 of the LNP ER includes the following description under clearing right of ways:

> Restrictive clearing will consist of the cutting and removal of all trees and growth with a mature height greater than 3.7 m (12 ft.), leaving all other vegetation in the ROW outside of the access road and structure pad areas. Trees will be cut to as low as possible or to existing water level. Stumps may be left in place to preserve the root mat, and treated with an approved herbicide to prevent regrowth.

The premature death of those trees will release stored carbon, comparable to releasing the "yearly emissions from about 225,000 cars" if the forests referenced in Bacchus Exhibit G were prematurely killed.

49. **Nuclear generation produces greenhouse gas emissions –** The following statements were included in the LNP ER: "The FPSC notes that nuclear generation is one generating technology that produces no greenhouse gas emissions" (p. 8-74). **"**The construction of new nuclear generation will not only increase fuel diversity but provide energy without the emission of greenhouse gases" (p. 8-74). "Given concerns in Florida and the rest of the south about climate change and carbon emissions, the LNP will serve another important need by reducing carbon emissions in the state" (p. 8-80). Because premature death of trees would occur throughout the site, vicinity and region of the proposed LNP project from construction and operation of the LNP project, release of that stored carbon is equivalent to yearly emissions of greenhouse gases from cars. Therefore, it is my opinion that those statements in the LNP ER are without factual basis.

50. **Irreparable harm from release of stored carbon from LNP construction and operation–** Significant air quality degradation is caused by the large-scale release of stored carbon due to the premature death of trees throughout the site, vicinity and region of the proposed LNP project. In my opinion, these carbon releases constitute irreparable harm to the quality of the Nation's air resources.

51. **Release of stored carbon from LNP construction and operation increases climate disruption and sea-level rise –**This increase in carbon releases from large-scale

premature tree deaths also contributes to increased climate disruption, which increases sea-level rise. The LNP ER failed to address these and other adverse direct, indirect and cumulative environmental impacts to the nation's air resources resulting from the premature death of trees from the proposed LNP project. The magnitude and extent of existing and increasing sea-level rise in Florida, including some of the socioeconomic impacts, is described briefly in Bacchus Exhibit H, incorporated herein.

E.2. Statement of issue

52. **Additional air quality degradation from destructive wildfires -** The LNP ER failed to address adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project on the release of particulate matter (PM) from destructive wildfires in wetlands, flood plains, special aquatic sites and other waters.

E.2. Explanation of basis

53. **Increased particulate matter from destructive wildfires –** The LNP ER did not address the causal relationship between increased particulate matter (PM) and the destructive wildfires that would be caused by the construction and operation of the proposed LNP project. The LNP ER also did not address the direct, indirect and cumulative adverse impacts of releases of stored carbon and PM on the Nation's air quality.

E.2. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

54. **Decreased air quality from increased airborne particulate matter –** It is my professional opinion that the destructive wildfires that would occur throughout the site, vicinity and region of the proposed LNP project due to the construction and operation impacts described above, would convert trees and organic soils into significant airborne particulate matter that cannot be controlled, reduced or mitigated by PEF. A significant amount of this particulate matter ultimately will be deposited into the surrounding waters, resulting in water quality degradation, in addition to air quality degradation. *See* Bacchus Exhibit E and the following peer-reviewed scientific publication:

Bacchus, S. T. 2007. More inconvenient truths: Wildfires and wetlands, SWANCC and Rapanos. National Wetlands Newsletter 29(11):15-21.

F. GRANTING A COMBINED LICENSE (COL) TO PROGRESS ENERGY FLORIDA (PEF) TO CONSTRUCT AND OPERATE PROPOSED LEVY COUNTY UNITS 1 AND 2 (LNP) WOULD RESULT IN IRREPARABLE HARM TO PUBLIC LANDS AND WATERS AND PRIVATE PROPERTY OWNED BY VARIOUS INTERVENERS AND OTHER INDIVIDUALS, DUE TO ADVERSE DIRECT, INDIRECT AND CUMULATIVE IMPACTS

F.1. Statement of issue

55. **Irreparable harm to public lands and waters and private property not owned by PEF -** The LNP ER failed to address the adverse direct, indirect and cumulative environmental impacts, as described above, on public preserves, parks, forests, wildlife management areas, state sovereign lands, waters of the state and US and private property not owned by PEF from constructing and operating the proposed LNP project.

F.1. Explanation of basis

56. **Zone of impact for irreparable harm to public and private property not determined –** Because the LNP ER failed to address any of the adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project described above, the LNP ER likewise failed to identify the zone of environmental impact from the proposed LNP project. In fact, the LNP ER erroneously concluded that the environmental impacts from the proposed LNP project were insignificant or "SMALL" *See* Table 4.6-1 (LNP ER pages 4-90 through 4-97). Consequently, no attempt was made in the LNP ER to determine the zone of impact or the extent of irreparable harm for the proposed LNP project.

F.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

57. **Zone of impact for irreparable harm includes public preserves, parks, forests, wildlife management areas, state sovereign lands, waters of the state and US and private property –** The LNP ER erroneously concluded that the environmental impacts from the proposed LNP project were insignificant or "SMALL." *See* Table 4.6-1 (LNP ER pages 4-90 through 4-97). This conclusion was made without consideration of the adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project described above. Based on the adverse impacts described above, in my professional opinion, all of the environmental impact categories addressed in Table 4.6-1 (LNP ER pages 4-90 through 4-97) should have been recorded as "LARGE." In my professional opinion, those adverse impacts also are irreparable and incapable of being mitigated. Because the LNP ER failed to address any of the adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project described above, the LNP ER likewise failed to identify the zone of environmental impact from the proposed LNP project. In my professional opinion, the zone of impact and extent of irreparable harm for the proposed LNP project includes private property owned by various interveners and other individuals in Levy, Marion, Citrus and Alachua Counties. In my professional opinion, the zone of impact and extent of irreparable harm for the proposed LNP project also includes, but is not limited to the following public preserves, parks, forests, wildlife management areas, state sovereign lands, waters of the state and waters of the US:

Goethe State Forest
Levy Blue Spring and associated wetlands and uplands
Withlacoochee River (OFW) and associated wetlands and uplands
Waccasassa River (OFW) and associated wetlands and uplands
Waccasassa Bay (SHA) and associated wetlands and uplands
Gulf Hammock Wildlife Management Area
Big Bend Seagrasses Aquatic Preserve (SHA)
Waccasassa Bay Preserve State Park
Big King Spring and associated wetlands and uplands
Little King Spring and associated wetlands and uplands
Turtle Creek and associated wetlands and uplands
Spring Run Creek and associated wetlands and uplands
Smith Creek and associated wetlands and uplands
Demory Creek and associated wetlands and uplands
Tomes Creek and associated wetlands and uplands
Ten Mile Creek and associated wetlands and uplands

Withlacoochee Bay (SHA) and associated wetlands and uplands
Crystal River Preserve State Park
Florida Springs Coastal Greenway

58. **Zone of impact implications –** Because the LNP ER failed to address the adverse direct, indirect and cumulative environmental impacts, as described above, and erroneously concluded that the environmental impacts from the proposed LNP project were "SMALL," Rather than "LARGE" and irreparable, the impacts to other categories must be reconsidered. For example, other categories of impacts addressed in Table 4.6-1 (LNP ER pages 4-90 through 4-97) included: Land Use Impacts and Socioeconomic Impacts. It is my professional opinion that the irreparable environmental problems described above will result in "LARGE" rather than "SMALL" Land Use and Socioeconomic Impacts.

G. GRANTING A COMBINED LICENSE (COL) TO PROGRESS ENERGY FLORIDA (PEF) TO CONSTRUCT AND OPERATE PROPOSED LEVY COUNTY UNITS 1 AND 2 (LNP) WOULD RESULT IN IRREPARABLE HARM TO AND JEOPARDIZE SURVIVAL AND RECOVERY OF FEDERALLY LISTED SPECIES, FROM ADVERSE MODIFICATION OF CRITICAL HABITAT AND UNPERMITTED TAKING DUE TO FAILURE TO CONSIDER ADVERSE DIRECT, INDIRECT AND CUMULATIVE IMPACTS

G.1. Statement of issue

59. **Jeopardized survival and recovery of federally listed species -** The LNP ER failed to address the adverse direct, indirect and cumulative environmental impacts, as described above, on the survival and recovery of federally listed species.

G.1. Explanation of basis

60. **Zone of impact for irreparable harm to and jeopardized survival and recovery of federally listed species –** Because the LNP ER failed to address any of the adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project described above, the LNP ER likewise failed to identify the zone of environmental impact from the proposed LNP project on federally listed species. In fact, the LNP ER should have concluded there were "LARGE" adverse impacts on numerous federally listed species.

G.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

61. **Federally listed species on public lands and waters -** The public lands and waters listed above, within the zone of impact for the proposed LNP project, support federally listed species and/or habitat critical to survival and recovery, including, but not limited to:
Eastern indigo (threatened)
Florida scrub jay (threatened)
Green turtle (endangered)
Manatee (endangered)
Red-cockaded woodpecker (endangered)
Wood stork (endangered)

62. **Habitat critical for survival and recovery of listed species –** Irreparable harm to the natural hydroperiod in Florida ultimately results in irreparable harm to habitat critical for the survival and recovery of species, such as wood storks, red cockaded woodpeckers and

Eastern indigo snakes. Wood storks (*Mycteria americana*) and red cockaded woodpeckers (*Picoides* (=*Dedrocopos*) *borealis*) are listed as endangered by the U.S. Fish and Wildlife Service (USFWS). Eastern indigo snakes (*Drymarchon corais couperi*) are listed as threatened by the USFWS. *See* "South Florida Multi-Species Recovery Plan" prepared for USFWS Southeast Region, Atlanta, GA, May 18, 1999.

63. **Depressional wetlands as habitat critical to the survival and recovery of wood storks –** Wood storks in Florida rely on natural depressional wetlands such as pond-cypress domes and sloughs and wet prairies for both foraging and nesting. Natural depressional wetlands in Florida are among the most sensitive wetlands to hydroperiod alteration. The adverse direct, indirect and cumulative impacts of the proposed LNP project would result in irreversible destruction of significantly more than ten acres of natural depressional wetlands which could be used by wood storks for foraging and nesting. *See* preceding paragraphs and Bacchus Exhibit E. Pond-cypress wetlands occur throughout the site, vicinity and region of the proposed LNP project. *See* LNP ER Appendix 2.2-2.

64. **Natural pine forests as habitat critical to the survival and recovery of red cockaded woodpeckers –**Successful nesting and reproduction of red cockaded woodpeckers require older growth stands of live native pine trees. Native species of pines are among the most sensitive native trees to hydroperiod alteration. The adverse direct, indirect and cumulative impacts of the proposed LNP project would result in irreversible destruction of significant stands of natural pine that could be used by red cockaded woodpeckers for nesting. *See* preceding paragraphs and Bacchus Exhibit E.

65. **Seagrass beds as habitat critical to the survival and recovery of green turtles –** Green turtles feed in seagrass beds in coastal areas within the zone of impact from the proposed LNP project. In my professional opinion, the adverse direct, indirect and cumulative impacts of the proposed LNP project would result in irreversible destruction of significant areas of seagrass beds that could be used by green turtles for survival and recovery. *See* preceding paragraphs and Bacchus Exhibit E.

66. **Violations of Sections 7 and 9 of the Endangered Species Act** – It is my professional opinion that Section 7 and Section 9 consultations with the U. S. Fish and Wildlife Service should be initiated for the species references above, pursuant to the Endangered Species Act for the site, vicinity and zone of impact. Such consultations cannot be initiated until the entire zone of impact from the proposed LNP project has been determined for these habitats. In the absence of those consultations, it is my professional opinion that the adverse direct, indirect and cumulative impacts of the proposed LNP project would result in the unlawful taking of federally endangered and threatened species, in violation of Sections 7 and 9 of the Endangered Species Act.

H. GRANTING A COMBINED LICENSE (COL) TO PROGRESS ENERGY FLORIDA (PEF) TO CONSTRUCT AND OPERATE PROPOSED LEVY COUNTY UNITS 1 AND 2 (LNP) WOULD RESULT IN IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES AND THE INABILITY TO MITIGATE ADVERSE ENVIRONMENTAL IMPACTS DUE TO FAILURE TO CONSIDER ADVERSE DIRECT, INDIRECT AND CUMULATIVE IMPACTS

H.1. Statement of issue

67. **Irreversible and irretrievable commitments of resources and inability to mitigate adverse environmental impacts –** The LNP ER's failure to address the adverse direct, indirect and

cumulative environmental impacts, as described above, would result in the irreversible and irretrievable commitments of resources and inability to mitigate adverse environmental impacts if the proposed LNP project is constructed and operated as proposed.

H.1. Explanation of basis

68. **Irreversible and irretrievable commitments of resources and inability to mitigate adverse environmental impacts –** The LNP ER's failure to address any of the adverse direct, indirect and cumulative environmental impacts of constructing and operating the proposed LNP project described above, precluded them from identifying the zone of environmental impact from the proposed LNP project. Without a determination of the zone of impact, bona fide mitigation of the adverse environmental impacts cannot occur.

H.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

69. **Irreversible and irretrievable commitments of resources and inability to mitigate adverse environmental impacts -** It is my professional opinion that constructing and operating the proposed LNP project would result in irreversible and irretrievable commitments of resources throughout the site, vicinity and region of the proposed LNP project. It also is my professional opinion that environmental harm described above, that would occur from constructing and operating the proposed LNP project cannot be repaired or mitigated.

I. GRANTING A COMBINED LICENSE (COL) TO PROGRESS ENERGY FLORIDA (PEF) TO CONSTRUCT AND OPERATE PROPOSED LEVY COUNTY UNITS 1 AND 2 (LNP) WOULD IGNORE ALTERNATIVES THAT HAVE NONE OF THE ADVERSE ENVIRONMENTAL IMPACTS ADDRESSED ABOVE

I.1. Statement of issue

70. **Alternatives without adverse environmental impacts of proposed LNP –** The LNP ER failed to address alternatives to the proposed LNP that are readily available and that would avoid the adverse direct, indirect and cumulative environmental impacts described above.

I.1. Explanation of basis

71. **Alternatives without adverse environmental impacts of proposed LNP –** Chapter 9 of the LNP ER addressed alternatives to the proposed action. Although solar power was addressed on page 9-13, that alternative was summarily dismissed as, "too large to construct at the LNP site." The LNP ER's "Alternatives to the Proposed Action" failed to address the decoupling alternative.

I.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

72. **"Footprints" of solar alternative and proposed LNP –** The LNP ER addressed solar power alternatives on page 9-13, but summarily dismissed solar alternatives, based on the statement below. This statement presumes a "footprint of approximately 28,600 ha (71,500 ac.) for PV and 13,200 ha (33,000 ac.) for solar thermal systems" and concludes those footprints are "much too large to construct at the LNP site." It is my professional opinion that the subsurface "footprint" of the proposed LNP (e.g., hydroperiod impacts) would exceed the site and vicinity of the proposed LNP and simply would "take" surrounding public and private lands and waters, without compensation, for construction and operation of the proposed LNP.

Construction of solar power generating facilities has substantial impacts on wildlife habitat, land use, and aesthetics. As stated in the GEIS, land requirements are high: 14,000 ha (35,000 ac.) per 1000 MWe for PV and approximately 6000 ha (14,000 ac.) per 1000 MWe for solar thermal systems. This would require a footprint of approximately 28,600 ha (71,500 ac.) for PV and 13,200 ha (33,000 ac.) for solar thermal systems to produce a 2200-MWe baseload capacity. Both of these are much too large to construct at the LNP site.

73. **Solar alternative with smaller footprint than proposed LNP –** The Florida Solar Energy Center promotes the approach of utility companies constructing and/or maintaining solar collectors on existing residential and commercial roof tops for power generation rather than constructing the solar collectors on land in a natural state, farmlands or other land use. California has a similar program. *See* Bacchus Exhibits I-1 and I-2, incorporated herein. This approach is contrary to what was evaluated and summarily dismissed in the "Solar Power" alternatives section of the LNP ER, in part, due to "substantial impacts on wildlife habitat, land use, and aesthetics. The approach promoted by the Florida Solar Energy Center would have a far smaller physical and environmental impact "footprint" - zone of impact - than the proposed LNP, would require no water and would result in none of the adverse environmental impacts of the proposed LNP that I have described in the preceding paragraphs. Furthermore, in my opinion, the "wildlife habitat, land use, and aesthetics" impacts of the proposed LNP project far exceed those of the roof-top solar collectors alternative promoted by the Florida Solar Energy Center.

74. **Decoupling alternative without adverse environmental impacts of proposed LNP –** The LNP ER failed to address the decoupling alternative. The decoupling alternative is described by Dr. Joe Romm, senior fellow with the Center for American Progress, in Bacchus Exhibit J, incorporated herein. In my professional opinion, the decoupling alternative would have a far smaller "footprint" – zone of impact – than constructing and operating the proposed LNP project. Furthermore, it is my opinion that the decoupling alternative would have none of the adverse environmental impacts of the proposed LNP that I have described in the preceding paragraphs.

J. GRANTING A COMBINED LICENSE (COL) TO PROGRESS ENERGY FLORIDA (PEF) TO CONSTRUCT AND OPERATE PROPOSED LEVY COUNTY UNITS 1 AND 2 (LNP) WOULD BE INCONSISTENT WITH 40 CFR § 230

J.1. Statement of issue

75. **Proposed LNP is inconsistent with 40 CFR § 230 –** The LNP ER failed to address the inconsistencies of the proposed LNP project with 40 CFR § 230.

J.1. Explanation of basis

76. **Inconsistencies of proposed LNP is with 40 CFR § 230 –** The proposed LNP project is inconsistent with 40 CFR § 230 regarding at least the following, as described in the remaining paragraphs:
Productive and valuable public resources
Food chain production and general habitat and nesting sites for aquatic or land species
Study of the aquatic environment, sanctuaries and refuges
Natural drainage characteristics, salinity distribution, and other environmental characteristics
Natural storage areas for storm and flood waters
Natural groundwater discharge and recharge and water purification
Uniqueness
Failure to consider relevant information
Injury to property, invasion of other rights and superseding the rights and interests of the public

J.1. Statement of facts and opinions supporting the dispute and deficiencies within the scope of this proceeding

77. **Examples of inconsistencies of proposed LNP is with 40 CFR § 230 –** The LNP ER failed to acknowledge that the construction and operation of the proposed LNP would be inconsistent with 40 CFR § 230, including 40 CFR § 230.41(b) and other provisions of 40 CFR § 230, as described below.

> When disruptions in flow and circulation patterns occur, apparently minor loss of wetland acreage may result in major losses through secondary impacts. Discharging fill material in wetlands as part of municipal, industrial or recreational development may modify the capacity of wetlands to retain and store floodwaters and to serve as a buffer zone shielding upland areas from wave actions, storm damage and erosion. (*See* 40 CFR § 230.41(b))

78. **Productive and valuable public resources -** Based on my personal knowledge, site inspections and review of historic and current documents of the site, vicinity and region of the proposed LNP project, the wetlands, flood plains, special aquatic sites and other waters that would be destroyed or otherwise affected directly, indirectly and cumulatively by all aspects of the proposed LNP project are a "productive and valuable public resource," as referenced in 40 CFR § 230.10.

79. **Food chain production and general habitat and nesting sites for aquatic or land species** – In my professional opinion, the wetlands, flood plains, special aquatic sites and other waters within the site, vicinity and region of the proposed LNP project perform functions important to the public interest, which include at least: food chain production and general habitat and nesting sites for aquatic or land species, as described by 40 CFR § 230.10.

80. **Study of the aquatic environment, sanctuaries and refuges** - Some of those wetlands, flood plains, special aquatic sites and other waters, have been set aside for study of the aquatic environment or as sanctuaries or refuges, as described in 40 CFR § 230.10. Examples include Outstanding Florida Waters (OFW) and Shellfish Harvesting Areas (SHA), such as, but not limited to, those in or associated with the following:

Goethe State Forest
Levy Blue Spring and associated wetlands and uplands
Withlacoochee River (OFW) and associated wetlands and uplands
Waccasassa River (OFW) and associated wetlands and uplands
Waccasassa Bay (SHA) and associated wetlands and uplands
Gulf Hammock Wildlife Management Area
Big Bend Seagrasses Aquatic Preserve (SHA)
Waccasassa Bay Preserve State Park
Big King Spring and associated wetlands and uplands
Little King Spring and associated wetlands and uplands
Turtle Creek and associated wetlands and uplands
Spring Run Creek and associated wetlands and uplands
Smith Creek and associated wetlands and uplands
Demory Creek and associated wetlands and uplands
Tomes Creek and associated wetlands and uplands
Ten Mile Creek and associated wetlands and uplands
Withlacoochee Bay (SHA) and associated wetlands and uplands
Crystal River Preserve State Park
Florida Springs Coastal Greenway

81. **Natural drainage characteristics, salinity distribution, and other environmental characteristics** – Construction of the proposed LNP project would result in the destruction or irreversible alteration of wetlands, flood plains, special aquatic sites and other waters that, in turn, would result in detrimental affects on natural drainage characteristics, salinity distribution, or other environmental characteristics, contrary to 40 CFR § 230.10.

82. **Natural storage areas for storm and flood waters** - Those wetlands, flood plains, special aquatic sites and other waters would be destroyed or altered as a result of the proposed LNP project are preventing both erosion and storm damage and serve as valuable storage areas for storm and flood waters, as described in 40 CFR § 230.10. Those benefits no longer would be provided in the vicinity and region of the proposed LNP.

83. **Natural groundwater discharge and recharge and water purification -** Those wetlands, flood plains, special aquatic sites and other waters would be destroyed or altered as a result of the proposed LNP project include areas that would not have a valid Individual Permit from the U.S. Corps of Engineers. Those wetlands, flood plains, special aquatic sites also are historic groundwater-discharge areas. Those areas maintained minimum baseflows important to aquatic resources and prime natural recharge areas, as described in 40 CFR § 230.10. Consequently, those environmentally sensitive natural areas also were serving significant water purification functions, as identified in 40 CFR § 230.10.

84. **Uniqueness –** It is my professional opinion that those wetlands destroyed or adversely altered as a result of the proposed LNP project are unique in nature compared to wetlands in virtually all other states in the United States (*See* 40 CFR § 230.10). I saw no indication that the ER addressed the uniqueness of those wetlands, or that those wetlands were intimately linked with the Floridan aquifer system. Likewise, I found no indication that a comprehensive (or, in fact, any) analysis had been conducted of the myriad significant cumulative effects that would result from the proposed LNP project, as described in 40 CFR § 230.10. Finally, I found no evidence that the ER had addressed the "section 404(b)(1) guidelines," as described in 40 CFR § 230.10.

85. **Failure to consider relevant information** – I saw no indication that the LNP ER addressed relevant information regarding the numerous adverse cumulative impacts that would occur in the vicinity and region if the proposed LNP project was constructed and operated as proposed. Categories in 40 CFR § 230.10 for consideration of information relevant to the cumulative impacts include fish and wildlife; water quality; historic, cultural, scenic, and recreational values; property ownership; activities affecting coastal zones; activities that may affect marine sanctuaries; compliance with other federal, state, or local requirements; floodplain management; water supply and conservation; energy conservation; environmental benefits; and economics. *See* all of the adverse impacts described in the preceding paragraphs related to those issues.

86. **Injury to property, invasion of other rights and superseding the rights and interests of the public** – In my professional opinion, construction of the proposed LNP project in the flood plain and wetlands will result in "injury to property or invasion of other rights" beyond the site and vicinity of the proposed LNP project, thus superseding the rights and interests of the public. In my professional opinion the adverse direct, indirect and cumulative impacts would extend to property not owned by LNP, contrary to the provisions of 40 CFR § 230.10. In my professional opinion the adverse direct, indirect and cumulative impacts would extend to environmentally sensitive land "protected" as public lands, including those listed above

K. SUMMARY

87. **Proposed LNP inconsistent with state and federal regulations, including NEPA and ESA**– In conclusion, it is my professional opinion that the construction and operation of the proposed LNP project in the flood plain and wetlands would be inconsistent with state and federal regulations, including NEPA and the Endangered Species Act. *See* all preceding paragraphs and Bacchus Exhibits and references, summarized in Bacchus Exhibit K.

I declare, under penalty of perjury, that the factual statements above are true and correct, to the best of my knowledge, and the expressions of opinion stated above are based on my best professional judgment.

Sydney T. Bacchus

Sydney T. Bacchus, Ph. D.

February 6, 2009