November 27, 2010

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http://www.federalregister.gov/articles/2010/08/13/2010-20005/notice-of-availability-of-the-draft-environmental-impact-statement-for-the-combined-licenses-for

Re: Supplemental comments on Draft Environmental Impact Statement (DEIS) of Proposed Combined Licenses for Levy Nuclear Plant Units 1 and 2, Docket Nos. 52-029 and NRC-2008-0558
Project No. SAJ-208-00490 (IP-GAH)
Supplemental DEIS Required

Dear Project Managers Hambrick and Bruner:

On October 26, 2010 I submitted preliminary comments on the proposed Combined Licenses for Levy Nuclear Plant Units 1 and 2 ("LNP" and "project") referenced above and requested a 60-day extension of time pursuant to the ADA to submit more detailed comments on the proposed project. You granted only a 30-day extension, which was insufficient for me to address the myriad grave inadequacies of the LNP DEIS. The attached supplemental comments represent only a small fraction of the DEIS' failure to comply with the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Clean Water Act (CWA), the Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson-Stevens Act") and other federal requirements. Although my comments are not comprehensive, they are sufficient to justify the necessity for a supplemental DEIS.

Two circumstances require preparation of a supplemental DEIS. A supplemental DEIS must be prepared if either (1) [t]he agency makes substantial changes in the proposed action that are relevant to environmental concerns, or (2) [t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts (40 C.F.R. § 1502.9(c)(1) & (2)). See Dubois v. U.S. Department of Agriculture, 102 F.3d 1273, 1291-92 (1st Cir. 1996); California v. Block, 690 F.2d 753 (9th Cir.1982). See also NRDC v. Hughes, 437 F. Supp. 981, 990 (D.D.C. 1977).

Clearly both circumstances apply to the LNP DEIS. First, the project as proposed in the DEIS fails to comply with federal requirements referenced above, as described in my preliminary and supplemental comment letters and affidavit dated November 12, 2010, and would require "substantial changes in the proposed action that are relevant to environmental concerns." Second, my comment letters and affidavit provide extensive "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts" that the DEIS failed to give a hard look at or even consider. Therefore, I assume that you will be preparing a supplemental DEIS to address these grave inadequacies so that the public will be provided a meaningful opportunity to submit

comments regarding the direct, indirect and cumulative impacts of this proposed project. If you do not intend to prepare and publish a supplemental DEIS for public comment, I renew my request for accommodation pursuant to the ADA by being granted the remaining 30-day extension to attempt to complete my public comments regarding additional grave inadequacies of the DEIS referenced above.

The conclusions in the LNP DEIS suggest that neither PEF nor the responsible agencies read the geological descriptions in "Chapter 2 – Site Characteristics" of the LNP Fire and Safety Analysis Report (FSAR). For your convenience I have included some of the more salient excerpts from that chapter with my other exhibits (see Bacchus Exhibit C12). How the Nuclear Regulatory Commission (NRC) could seriously consider a proposal to construct a behemoth, multi-unit nuclear power plant on top of freshwater forested wetlands (one of our most effective carbon sinks) embedded in a fragile karst flood plain riddled with relict sinkholes interspersed with fracture networks in the midst of one of the most environmentally sensitive areas in the state defies comprehension. Consequently the public review period was grossly inadequate to address the myriad critical deficiencies of the proposed LNP project.

My supplemental comments on the critical deficiencies of the LNP DEIS, supporting the need for a supplemental DEIS for the proposed project, are provided in the attachment. The exhibits referenced in my supplemental comments were too numerous and large to forward by email. My post office was closed on Saturday, November 27, but I will mail a CD copy of all of my exhibits to the attention of Mr. Bruner at the address provided above on Monday. For immediate access my exhibits can be downloaded from the following link:
http://www.nirs.org/nukerelapse/levy/levyhome.htm

Sincerely,

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SUPPLEMENTAL COMMENTS

A. Critical Deficiencies in the DEIS for the Proposed LNP

1. **Previous comments describing critical deficiencies –** For a description of only some of the myriad deficiencies in the DEIS for the proposed project, refer to my preliminary comment letter dated 10/26/10 and my affidavit dated 11/12/10 regarding the proposed project and proposed Tarmac mine, **Bacchus Exhibits A1 and A2** respectively. The comments and exhibits in my initial comment letter and affidavit are incorporated herein by reference, including my CV providing my expertise and relevant peer-reviewed scientific publications.

2. **Failure to include essential water-related modeling data files –** One of the primary grave deficiencies in the LNP DEIS is the failure to provide public access to the water-related model files. In addition to the failure of the LNP DEIS to include these essential data, both the NRC and Progress Energy Florida, Inc. (PEF) refuse to provide public access to these essential data, as evidenced in the Motion for Order Compelling Discovery of PEF Groundwater Model Digital Files for Proposed LNP dated 9/27/10 (**Bacchus Exhibit A3**). The following excerpts from that motion are examples of the legal basis supporting the production of the model data files for public review:

> 10CFR § 2.336 notes that parties must provide:
> A copy, or a description by category and location, of all documents and data compilations in the possession, custody, or control of the party that are relevant to the contentions, provided that if only a description is provided of a document or data compilation, a party shall have the right to request copies of that document and/or data compilation… CFR § 2.336(2(i)
>
> See *Bartley v. Isuzu Motors, Ltd.,* 151 F.R.D. 659, 660-661 (D. Colo.1993) (emphasis in bold):
> When one party seeks to present a computer study, in order to defend against the conclusions that are said to flow from these efforts, the discovering party not only must be given access to the data that represents the computer's work product, but he also must see the data put into the computer, the programs used to manipulate the data and produce the conclusions, and the theory or logic employed by those who planned and executed the experiment. **All of the information used in generating the computer simulations is relevant to Defendants' challenge of this evidence, not merely the information which conforms to Plaintiff's theory of the case.**
>
> Further Federal cases also support Interveners' right to the models, particularly the decision rendered in *City of Cleveland v. Cleveland Electric Illuminating Co.,* 538 F. Supp. 1257 (N.D. Ohio 1981), where the court granted a motion to compel "production of data and calculations underlying the conclusions contained in the reports of certain experts." *Id.* at 1266. The court accepted the argument that because the reports reflected the results of elaborate calculations "presumably premised upon various computer simulations," that the program used and the various inputs and assumptions could not be confidently deduced from the written data presented. *Id.*
>
> Any use of computerized data presents some obstacles…because of the difficulty of knowing the precise methods employed in programming the computer as well as the inability to determine the effectiveness of the persons responsible for feeding data into the computer.

> *United States v. Cepeda Penes*, 577 F.2d 754, 760-61 (1st Cir. 1978), *quoted in City of Cleveland,* 538 F. Supp. at 1266.
>
> Finally, *City of Cleveland* summarizes the reasoning behind granting the motion to compel:
> Certainly, where, as here, the expert reports are predicated upon complex data, calculations and computer simulations which are neither discernible nor deducible from the written reports themselves, disclosure thereof is essential to the facilitation of "effective and efficient examination of these experts at trial..."
> (citation omitted).
> *City of Cleveland,* 538 F. Supp. at 1267.

3. **Oral argument and testimony to compel release of water-related modeling data files –** Because of the gravity of this omission, the Atomic Safety and Licensing Board (ASLB) held Oral Argument and Testimony 11/17/10 on the Motion to Compel PEF to produce all water-related model files for modeled results for the proposed project (**Bacchus Exhibit A4**). During that proceeding, the NRC admitted that their conclusions in the LNP DEIS that the environmental impacts from the proposed project would be "SMALL" were based in part on PEF's simulated results from the water-related models. They also testified that staff had not reviewed the water-related model files. Instead, NRC relied on PEF's claims that the model data were not flawed. Note that NRC required that I submit my supplemental comments **before** they released the transcript of the oral argument and testimony held on 11/17/10. That transcript is incorporated herein by reference as **Bacchus Exhibit A5**.

4. **Evaluation of model files is essential –** An evaluation of model files is essential to ensure the integrity and appropriateness of the model simulations. Examples of why model files are essential include the following:

- To do a thorough assessment of the model structure
  - number and thicknesses of layers
  - where the layers are thicker or thinner
  - Grid size
- For a thorough assessment of a model's hydraulic parameters
  - Storage values and variations
  - Hydraulic conductivity values and variations
- For a thorough assessment of the model's boundaries
  - What the model domain is
- For a thorough assessment of the model's boundary conditions
  - What boundary condition types and values are used at the model borders
  - What boundary condition types and values are used internally in the model
- In order to assess how they approximated the intricate surface water/groundwater interaction that dominates water movement in Florida, and how they approximated the critical role of the surface water and unsaturated zone in this interaction with a model that only simulates flow in the saturated zone
  - If transient simulations were run, those simulatons need to be evaluated to determine if they vary realistically overland flow to the wetlands and other surface water bodies with a program that only considers the saturated zone
- In order to evaluate whether or not any transient simulations were run
  - Evaluation of how precipitation, ET, runoff to the wetlands, and streamflow was varied over time
- For a thorough analysis of the conclusion that on-site stormwater ponds would create an equivalent hydrologic environment as the natural wetlands currently on and/or surrounding the proposed LNP site

5. **Additional critical deficiencies of water-related models prevent hard look at construction impacts –** In addition to the critical deficiencies described above, the LNP DEIS does not appear to include any model results of impacts to groundwater or surfacewater levels of flows – including natural overland flow – that would result from the construction phase of the proposed project.

Furthermore, there is no evidence in the LNP DEIS that construction-phase alterations were even analyzed, thus preventing the NRC and the U. S. Army Corps of Engineers (Corps) from taking a hard look at direct, indirect and cumulative adverse impacts of the construction phase of the proposed project, which would exceed "LARGE". Therefore, **a supplemental DEIS is required to assess the water-related direct, indirect and cumulative adverse impacts of the construction phase of the proposed project** to provide the affected public and other agencies the ability to provide meaningful comments on water-related impacts during the construction phase of the proposed project.

6. **Additional inadequacies of proposed project described in amended contention –** The inadequacies of the proposed project are further described in the Amended Contention 4 filed on 11/15/10 by intervenors challenging combined license application for the project. A copy of that amended contention is incorporated herein as **Bacchus Exhibit A6**.

7. **Failure to take a hard look at direct, indirect and cumulative impacts of mined raw materials to construct the proposed project –** According to page 3-3 of the LNP DEIS, "Each reactor containment structure for the AP1000 is approximately 225 ft high and 130 ft in diameter. Each reactor unit is supported by a multicell mechanical draft cooling tower that is approximately 1000 ft long and 56 ft high (PEF 2009a)." Because the LNP DEIS failed to identify with certainty the location where the extensive aggregate/raw materials required to construct the proposed project would be mined, the authoring agencies could not take a hard look at the direct, indirect and cumulative adverse impacts of mining the extensive aggregate/raw materials required to fill the two 100-foot deep holes proposed to be excavated to create a foundation for the cooling towers and to construct the two huge cooling towers, other facilities and roads associated with the proposed project. Those impacts would exceed "LARGE." Consequently, the public was deprived the opportunity of providing comments on the direct, indirect and cumulative adverse impacts that should have been identified in the LNP DEIS. Thus, **a supplemental DEIS is required to identify with certainty the source of those mined aggregate/raw materials and to determine the direct, indirect and cumulative adverse impacts of that mining** in conjunction with the other construction and operation impacts of the proposed LNP project.

8. **Failure to identify the location of mined aggregate/raw materials to construct the proposed project –** As indicated above, another of the grave deficiencies of the LNP DEIS was the failure of the authoring agencies to confirm with certainty the location where the extensive aggregate/raw materials would be mined to fill the two 100-foot deep, multiple-acre holes proposed to be excavated for the two huge cooling towers and to construct those 56-foot tall cooling towers, roads and other facilities associated with the proposed project. The LNP DEIS only suggested that those required raw materials might be mined from the Tarmac King Road limestone mine ("Tarmac mine").

9. **Segmenting the impacts of the proposed project –** The Tarmac mine is proposed to be located immediately west of the proposed LNP project. If, as the DEIS suggests but fails to confirm, the proposed Tarmac mine would be the source of the extensive aggregate/raw materials as fill for the 100-foot deep foundations and for constructing structures and roads associated with the proposed LNP project, then the DEIS has illegally segmented that part of the project. Not only did the DEIS fail to confirm the precise source of the extensive aggregate/raw materials required for the proposed LNP project, the DEIS also failed to provide a full account of the volume of aggregate/raw materials that would be required to construct the proposed project. Therefore, the affected public and other agencies could not provide meaningful comments regarding the direct, indirect and cumulative adverse impacts that would occur from the mining of the aggregate/raw materials, which would exceed "LARGE." Thus, **a supplemental DEIS is required to identify the volume of mined aggregate/raw materials required for the proposed LNP project to determine the direct, indirect and cumulative adverse impacts of that mining** in conjunction with the other construction and operation impacts of the proposed LNP project.

10. **Supplemental DEIS combining proposed LNP project and proposed mine supplying aggregate/raw materials –** No DEIS has been produced evaluating the direct, indirect and cumulative adverse impacts that would occur from the proposed Tarmac mine, which would exceed "LARGE."

Therefore, the **segmentation of these co-mingled** direct, indirect and cumulative adverse impacts should be remedied by conducting a comprehensive evaluation of the proposed LNP project and proposed Tarmac mine in a single **supplemental DEIS.**

11. **Failure to take a hard look at the comprehensive economic impacts from the myriad direct, indirect and cumulative adverse impacts -** Another critical deficiency in the LNP DEIS the failure of the agencies to take a hard look at all of the economic impacts of the myriad direct, indirect and cumulative adverse impacts, which would exceed "LARGE." Such a hard look at all of the economic impacts is not possible because of the grave deficiencies of the LNP DEIS, such as those described above and those described below. Therefore, **a supplemental DEIS is required to prepare a comprehensive economic assessment of the myriad direct, indirect and cumulative adverse impacts from the proposed project.**

12. **Adverse economic impacts solely from production of mining aggregate/raw materials for proposed LNP project -** Despite the impossibility of conducting a comprehensive economic impact assessment based on the information provided in the LNP DEIS, an economic assessment of mining in Levy County was completed in February 2010. A copy of that assessment, which included an assessment of the proposed Tarmac mine, is incorporated herein as **Bacchus Exhibit A7**. That economic assessment includes the following statements:

> What is the future market destination for the rock? Tarmac indicates the market is to be a 100-mile driving radius around the mine. However, in this area, there are already 93 abandoned mines and 48 operating mines, according to government statistics,[13] and even these are working at a fraction of their capacity. [page 9]
>
> When the same volume of commerce, that is $6.4 million, is spent on hunting and fishing activities, the Model shows that almost three times the number of direct jobs – that is, 89 direct jobs vs. 35 for mining – and twice the number of total jobs (112 vs. 52 for mining). Furthermore, the sum of all taxes (lines 9-15, cols. 3 & 7) generated by the hunting and fishing model is twice that of the mining model. [page 12]
>
> The mine, on the other hand, is a foreign-owed, centrally-operated branch plant, while recreation is a decentralized, highly-personalized set of individual behaviors and spending, competing for the same space as the mine. [page 12]
>
> The opening of a large-scale mine in Gulf Hammock could actually result in a net loss of jobs as the resources in the Hammock degenerate, hunting is closed off, water quality becomes compromised, and aquaculture and tourism in Cedar Key are threatened. [page 13]
>
> The mine itself is within the hurricane-surge reach and evacuation zone of a category 2 and higher storm….The danger lies in the probable displacement of water borne quarry pit impurities or from other mine related activities, affecting the coastal waters of the Gulf, Waccassassa Bay fissing and the aquaculture of Cedar Key.[24] [page 15]
>
> The map entitled, "Faults and Fracture Traces' after Vernon, 1951, "submitted in the SWFWMD application file, shows major transversal (D-cuts)(I-subterranean karst fractures) that may act as conduits for water flows and increased transmissivity. This could result in surprisingly faster flow-rates from the mine pit to the Waccassassa Bay State Preserve and Big Bend Sea Grasses Preserve.[25] [pages 15-16]
>
> **In summary, the total of "Probable Nearby Losses" [from the proposed Tarmac mine] are calculated to be $88 million and 1,280 jobs and a labor income of $37 million and Levy County fees of $172,000** (Line 13.1, cols. 5-7, 12). [pages 16-17, emphasis added]

13. **Failure to preserve cultural resource sites because of critical deficiencies in methods of investigations and areas of assessment for proposed LNP project –** The results of a review of the potential impact of the construction of the proposed LNP facility on the region's cultural resources, including prehistoric and historic archaeological sites, standing structures, cemeteries, and bridges are included in **Bacchus Exhibit A8**, which is incorporated herein by reference. That review is summarized in the following compelling excerpts, with the grossly inadequate area investigated shown in Figure 3 of the report attached as **Bacchus Exhibit A8** [emphasis added]:

> Focus is on the suitability and adequacy of the professional cultural resource assessments, particularly as regards the potential impacts of the day-to-day running of the plant on potentially undiscovered cultural resources. Construction of the LNP will have irreversible consequences for the local environment, and if there are cultural resources destroyed by either the building of or maintenance of the plant, this will result in a heritage that should be shared by all being lost by all.
>
> These laws, regulations, and statutes are designed to help protect and preserve the rapidly disappearing cultural heritage of these United States. Without such protection, many, many historically significant cultural features would be lost to posterity, with no record of their existence or passing. In particular, Native American sites would likely suffer a disparate level of destruction, including burial sites.
>
> Florida possesses what may be the greatest density of underwater and organically preserved sites in the world (Purdy 1991), but archaeologists have not developed adequate means to discover those sites before they are exposed by land altering activities. Two well-publicized examples from Florida clearly illustrate the bounty and risks of its enormous tracts of inundated land. These examples also illustrate the occasional shortcomings of site discovery methodology. The use of shovel-test pits at regular intervals is highly effective in areas where standing water or shallow water tables are not an issue, but in areas where water and wetlands are present, this method fails terribly. Compounding the issue, there are not commonly employed alternatives in areas of inundation or shallow water tables, leaving those areas that are often most likely to have well preserved sites totally uninvestigated.
>
> A world famous example of a spectacular accidental discovery in Florida wetlands is the Windover site near Titusville. During the construction of a housing development in 1982, the simple dewatering of a small, undistinguished pond turned up a number of human bones. After a standard investigation by local law enforcement, archaeologists were called in and began excavation of the site. Years later, the Windover site is one of the only sites in world to produce intact brain matter and abundant organic materials, including fabric, cordage, and wood in a context greater than 7,000 years old. Windover is but one of many aquatic cemeteries in Florida, and if anything has been learned over the years, native **Floridians commonly practiced aqueous burial, and any small wetland is potentially a graveyard**.
>
> More recently, during some of the most intense drought conditions on record, dozens of dugout canoes begin to be exposed in Newnan Lake, near Gainesville, a similar karst area where significant groundwater withdrawals occur. A large scale salvage program was initiated, resulting in the recording and dating of over 50 canoes, most dating to ca. 5,000 years ago. Many, many more were not saved, due to time, damage, and financial considerations. Again, **a small Florida wetland produced one of the most spectacular archaeological finds in North America**.
>
> In association with the Combined License Application to the Nuclear Regulatory Commission by Progress Energy Florida, Inc. (PEF), cultural resource investigations were undertaken in two

phases, both through contract with CH2M Hill. In 2007, Sara Orton conducted a survey for historically significant standing structures older than 50 years in an area within a 1 mile radius of the projected center of the LNP site and along a .25 mile corridor along the projected transmission corridor (Figure 2). This survey did not locate any structures greater than 50 years old (Orton 2008). There are however several previously recorded historic standing structures nearby, most importantly in the nearby community of Yankeetown, southwest of the LPN project area. Two structures, 8Lv707 and 8Lv708, are considered eligible for inclusion in the National Register of Historic Places (NRHP).

The second phase of cultural resource survey was conducted by personnel from New South Associates, subcontracted by CH2M Hill (Koski et al 2008). This survey was intended to locate any buried or exposed archaeological sites in the area to be potentially impacted by the LNP project and assess the potential of those sites for inclusion in the NRHP. There were actually three separate surveys conducted, one of a circular area directly atop the plant construction area, measuring ca. 300 acres, and combining surface inspection, systematic shovel-testing, and judgmental shovel-testing, an area of ca. 2500 acres inspected by systematic shovel testing, and an area of ca. 3300 acres, inspected by judgmental shovel testing and surface inspection.

Shovel tests are small holes, ca. 18 inches across or less, usually extending to a depth of ca. 3 feet, unless water is encountered. Soils from these tests are screened to recover artifacts. Shovel testing is the primary method of site discovery in much of the eastern United States…. **There is some ambiguity in the report if the total number of shovel tests reported for this area includes those excavated within the 300 acre circular area.** Presuming that the total of 150 shovel tests does not include those within the circular parcel, and excluding that same parcel from the acreage total, **there was an average of one shovel test every 20 acres.**

Extensive wetlands are cited by Koski et al. as reason for the small amount of shovel testing within the 3,300 acre LPN site parcel. As stated above, there was an extremely low rate of testing in this parcel, an average of one shovel test per 20 acres. **Of course, most the shovel tests were focused in areas suitable for shovel testing.** Koski et al. estimate that they actually tested ca. 700 acres of the 3,300 total (2008: 41), **leaving as much as 2,600 acres completely untested**. **A large part of this untested area is inundated land, i.e., that land most likely to have buried archaeological sites with well-preserved materials**.

Accounting for the corridor, there remains more than 1,900 acres of unsurveyed land in the southern site block. **Between the two blocks, as much as 4,500 acres have not been surveyed for cultural resources in any fashion whatsoever. The rates of shovel testing in areas tested is worrisome as well, with an average of a single shovel test per 4 acres being the highest intensity strategy employed.**

An argument could be made that the boundaries of these site blocks only represent the property to be controlled by the LPN, not areas that are scheduled to be altered. That may be the case, that no construction will take place beyond the areas already surveyed, but **once the areas have been considered "cleared", there will be no further investigation if PEF, or anyone, decides to conduct land altering activity within those bounds.**

More certain is the impact that drawdown (removal of water from the aquifer) will have on the local water table. A series of model maps (Figure 4) shows that there will be a consistent and repeated depression of the local water table, by as much as 5 feet (PEF 2010: Fig. 5-1). For all of the sites with preserved organics in local mucks and peats, this repeated drying of the local water table will be ruinous.

Conclusion

As indicated above, although legal requirements may appear to have been met by the cultural resources investigations the methods used for the site surveys were not conducive for identifying cultural resources where they are most likely to occur - in the wetlands. Therefore, the status of permits should be re-evaluated as they relate to cultural resources. It would be prudent to survey all the acreage within the LNP properties, in addition to all of the surrounding areas that would be affected by any alterations of the water levels. Most importantly, methodology needs to be devised to investigate the wetlands and other inundated areas, even if it is only exploratory at this time. Finally, the visual impact of the structures to be built should be reconsidered, with a much more intensive modeling of sightlines and viewshed.

14. **Inadequate methodology and extent of site assessments –** Clearly the methods of the cultural resource site surveys conducted for the proposed LNP project were flawed and the area surveyed was gravely inadequate. Accepting that flawed methodology as adequate would be tantamount to a parent allowing a young child to search diligently for Easter eggs inside a house when the parent is aware that all of the Easter eggs are hidden outside. The NRC and Corps must ensure that more suitable methodology is developed, directed specifically to the extensive wetlands on and surrounding the proposed LNP site, to determine where the cultural resource "Easter eggs" are hidden.

15. **Supplemental DEIS required to address deficiencies in methods and areas of cultural resource site assessment -** Based on my professional expertise, research and experience spanning more than 30 years, it is my professional opinion that a 0.5-foot drawdown of the surficial aquifer for less than a season's duration will alter the hydroperiod of and dewater the wetlands on and surrounding the proposed LNP and proposed Tarmac mine sites, resulting in "LARGE" and irreversible alterations in the chemical, physical and biological integrity of the nations waters and destroying cultural resource sites at unknown locations as described in **Bacchus Exhibit A8**. Further, it is my professional opinion that those wetlands will be dewatered and the natural hydroperiods altered by proposed construction activities described in the LNP DEIS, also resulting in "LARGE" and irreversible alterations in the chemical, physical and biological integrity of the nations waters and destroying cultural resource sites at unknown locations. The extent and magnitude of those hydroperiod alterations have not been determined or assessed by modeling or any other means apparent in the LNP DEIS. Therefore, **a supplemental DEIS is required to: (a) determine a more realistic and accurate area of the surface and subsurface foot-print of water-related impacts where cultural resource site surveys should be conducted; (b) design and propose for public comment more appropriate methodology for conducting cultural resource site surveys within the newly determined area of off-site impacts in addition to on-site areas that were not assessed and (c) determine a more accurate viewshed impact zone all of which are required due to the myriad "LARGE" direct, indirect and cumulative adverse impacts from the proposed project.**

16. **Recent adverse impacts of inadequate cultural resource site assessments –** In addition to the inadequacies described in the report included as **Bacchus Exhibit A8**, recent adverse impacts of inadequate cultural resource site assessments are described in the Palm Beach Post article by Christine Stapleton titled "Tribes angry, Everglades projects halt after workers dig up major burial ground but don't tell." That article describes the agencies' failure to identify a significant native American burial site at a construction site where prior cultural resource surveys were conducted. More disturbing, the article describes the agencies' apparent intent to conceal the discovery from the tribes. A copy of that article is incorporated herein as **Bacchus Exhibit A9** and also is available at the following link http://www.palmbeachpost.com/news/state/tribes-angry-everglades-projects-halt-after-workers-dig-1073931.html

B. Federal Agency Comments on DEIS for the Proposed LNP

1. **LNP DEIS Deficiencies described by USEPA –** The U.S. Environmental Protection Agency (USEPA) describe numerous deficiencies in the LNP DEIS in its comment letter dated 10/26/10. A copy of that letter is incorporated herein as **Bacchus Exhibit B1**. An example of those deficiencies was the failure of the LNP DEIS to include the detailed "CFBC and Withlacoochee River Survey and Monitoring Plan." Post DEIS submittal of such survey and monitoring plans solely to regulatory agencies deprives the public of its ability to provide public comments on these critical components of proposed projects and circumvents the intent of NEPA. Therefore, **a supplemental DEIS is required to include that and all other survey and monitoring plans to provide adequate opportunity for public comment.**

2. **LNP DEIS Deficiencies described by NOAA –** The National Oceanic and Atmospheric Administration (NOAAO also submitted a comment letter on 10/26/10 describing numerous deficiencies in the LNP DEIS. A copy of that letter is incorporated herein as **Bacchus Exhibit B2**. An example of those deficiencies was the failure of the LNP DEIS to provide adequate baseline data and an insufficient proposal for what would constitute "baseline data." Refer to **Bacchus Exhibit D4** describing criteria for baseline data for wetland/terrestrial ecosystems. Post DEIS submittal of such baseline data/proposed data collection plans solely to regulatory agencies deprives the public of its ability to provide public comments on these critical components of proposed projects and circumvents the intent of NEPA. Therefore, **a supplemental DEIS is required to include that and all other survey and monitoring plans to provide adequate opportunity for public comment.**

C. Affected Area of Proposed LNP project

1. **Long-term site-specific knowledge of site conditions -** The LNP DEIS lacks accounts and documentation of conditions from people with long-term site-specific knowledge of the proposed LNP and Tarmac mine sites. Emily Casey has resided for more than 50 years in the vicinity of where the adverse impacts of the proposed LNP project would occur, as indicated in her declaration provided in **Bacchus Exhibit C1** and incorporated herein by reference.

2. **Documentation of rapid flow of water through unnamed streams -** The video recordings of images and sounds that Ms. Casey took in the immediate vicinity of the proposed LNP site and the proposed Tarmac mine site during separate dates during the October-May "dry season" document the rapid flow of water through channels of unnamed streams. Her documentation of significant flow of water through unnamed streams during the "dry season" refutes implications by PEF and the DEIS that significant flow of surface waters could not occur without the presence of named streams.

3. **Documentation of surface water flow into numerous karst conduits –** The videos and the first ground photograph taken by Ms. Casey and provided with her declaration also show that this flowing surface water is diverted rapidly underground, into the aquifer system, through karst conduits. She states in her declaration that she has observed similar holes of various sizes throughout the stream channel and associated floodplain and that most of those holes were covered by vegetation and difficult to see.

4. **Failure of the DEIS to take a hard look the influence of karst conduits on simulated water-related model results –** The DIES reveals that the NRC and Corps failed to take a hard look at – or even consider – the influence of karst conduits known to occur in the vicinity of the proposed LNP and mine sites on the simulated water-related model results. Furthermore, there is no evidence in the DEIS that the NRC and Corps attempted to locate and map the karst conduit system that they should have know existed at the proposed LNP site.

5. **Karst conduit systems mapped at similar sites in Florida –** Karst conduit systems have been mapped at similar sites in Florida. Examples of such karst conduit systems that have been mapped in Florida are provided in Figure 3 of **Bacchus Exhibit C2**. As described in this peer-reviewed publication, similar karst conduits have been documented to extend for miles, including under natural stream channels.

6. **Adverse impacts of the proposed project on karst conduit flow –** It is my professional opinion that similar karst conduits occur throughout the proposed LNP and proposed Tarmac sites, either at or below the surface. Furthermore, it is my professional opinion that the proposed LNP and proposed Tarmac projects would result it "LARGE" irreversible direct, indirect and cumulative adverse impacts to the chemical, physical and biological integrity of the nations waters, in part because of the presence of these karst conduits.

7. **Surface waters on the proposed LNP site –** The two aerial photographs of the proposed LNP site that Ms. Casey also took during the "dry season" and included in her declaration (**Bacchus Exhibit C2**) show the extensive cypress wetlands that occur throughout that site and other areas of surface water. These photographs refute implications by PEF and the DEIS that significant surface waters do not occur on the proposed LNP site.

8. **Significant surfacewater flow generated from the proposed LNP site –** The two remaining ground photographs that Ms. Casey took between the proposed LNP site and the proposed Tarmac site during the "dry season" and included in her declaration (**Bacchus Exhibit C2**) document the significant flow of surface water generated from the proposed LNP site. The conceptual drawing of the proposed LNP project in DEIS Fig. 3-2; the floodplain map; the USGS topographic map; and wetland classification map, incorporated herein as **Bacchus Exhibits C3-C6**, further verify that this water is an integral part of the floodplains of the surrounding named streams and contributing a significant freshwater contribution to the Waccassassa Bay State Preserve.

9. **Navigation through the floodplain** - **Bacchus Exhibits C3-C6** also illustrate the manner in which Ms. Casey's father was able to navigate his boat from the area of the floodplain

between the proposed Tarmac mine site and the proposed LNP site to the Withlacoochee River to fish, as described in her declaration.

10. **Floodplain wetlands are Waters of the U.S. –** Even if the floodplain wetlands throughout the proposed LNP site and the proposed Tarmac mine site were not navigable, those wetlands would be regulated under the CWA pursuant to U.S. v. Banks (873 F. Supp. 650). It is my professional opinion that the cypress wetlands throughout the proposed LNP site are comparable to the cypress wetlands described in **Bacchus Exhibits C7** that are regulated under the CWA.

11. **LNP DEIS failed to consider fracture networks and relict sinkholes –** Figure Fig 2.6-2 from PEF's Environmental Report, incorporated herein as **Bacchus Exhibit C8**, identified faults and sinkholes in the vicinity of the proposed project. There is no indication in the LNP DEIS that the water-related models incorporated preferential flowpaths from faults and sinkholes or other karst features known to occur at the proposed LNP site, such as fracture networks and relict sinkholes. The economic report included as **Bacchus Exhibit A7** references at least one source for mapped fracture networks in the vicinity of the proposed LNP site. The cypress wetlands occurring extensively throughout the forested floodplain where the proposed LNP would be constructed are known to be established in relict sinkholes. Sinkholes are known to be aligned along fractures. Relict sinkholes also are known to be destabilized as a result of the types of construction and operation activities described in the DEIS that would occur for the proposed LNP project.

12. **Concentric drawdown contours fail to account for karst preferential flow features** – Figure 5-1 of the LNP DEIS, incorporated herein as **Bacchus Exhibit C9**, represents the model-simulated groundwater drawdown contours for the proposed LNP site. Obviously the concentric drawdown contours of this model simulation does not reflect the influence of linear fracture networks, anastomizing karst conduits or sinkholes.

13. **Model grid alignment and scales fail to account for karst preferential flow features** – Figure 2-12 of the LNP DEIS, incorporated herein as **Bacchus Exhibit C10**, illustrates the model grid alignment and generalized scales. The model alignment on a north/south-east/west orientation clearly is inappropriate for assessing impacts related to preferential flow through documented faults and fracture networks that are oriented northeast/southwest and northwest/southeast. Additionally, model cells appear to be far too large to detect preferential flow through karst conduits and activated relict sinkholes. Therefore, even in the absence of model files, you can conclude that the model design was inappropriate for the proposed LNP site. Therefore, **a supplemental DEIS is required to prepare a more realistic model and design as a first step in assessing the myriad "LARGE" direct, indirect and cumulative adverse impacts from the proposed project.**

14. **The LNP DEIS failed to take a hard look at impacts on the potentiometric high –** The potentiometric high for the area occurs east of the proposed LNP site, as shown in the King Road mine Figure 11, incorporated herein as **Bacchus Exhibit C11**. Therefore, **a supplemental DEIS is required to assess the adverse direct, indirect and cumulative adverse impacts of the proposed LNP project and proposed Tarmac mines on the potentiometric high.**

15. **Geological conditions and constraints of the proposed LNP site -** The geological descriptions in "Chapter 2 – Site Characteristics" of the LNP Fire and Safety Analysis Report (FSAR) provide a revealing account of the conditions and constraints of the proposed LNP site and surrounding area. Some of the more salient excerpts from that chapter are provided in **Bacchus Exhibit C12**, incorporated herein by reference. Those descriptions suggest that the NRC and Corps failed to take a hard look at the how a proposal to construct a behemoth, multi-unit nuclear power plant on top of freshwater forested wetlands (one of our most effective carbon sinks) embedded in a fragile karst flood plain riddled with relict sinkholes interspersed with fracture networks in the midst of one of the most environmentally sensitive areas in the state could possibly meet the public interest test required for approval of the proposed LNP project. I encourage the reviewing agencies to read the FSAR excerpts in

Bacchus Exhibit C12, particularly in consideration of the water-related models that are being used to predict impacts from the proposed LNP project.

D. Adverse Environmental Impacts from Altered Water Quantity and Quality from the Proposed LNP
See related exhibits from Bacchus' affidavit dated 11/12/10 on the proposed LNP and proposed Tarmac mine

1. **Recalibrated groundwater model assessing operational impacts only** – Despite the fact that the reviewing agencies apparently failed to require PEF to model or otherwise quantify or assess water-related impacts of any construction activities described for the proposed LNP site, it appears that they did recognize that PEF's original groundwater model of operational impacts (developed for state certification) was inadequate. Those inadequacies were referenced in LNP DEIS Section 2.3.1.2, page 2-28, lines 32-37, page 2-29, lines 1-6, as follows:

> Because the data submitted to the State of Florida was considered a "poor fit" with the LNP site, a corrected model was deemed necessary by Staff:
> … to simulate predevelopment, current, and future potentiometric surfaces for the LNP site and vicinity (PEF2009e)…Because this DWRM2 model was recalibrated to the USGS regional interpretation of the Upper Floridan aquifer potentiometric surface, which incorporated only limited information in the vicinity of the LNP site, a poor fit between simulated and observed heads in the vicinity of the LNP site was obtained…To improve the goodness of fit over this portion of the model domain, which encompasses the proposed LNP well-field and thus is important to the assessment of groundwater impacts, the model was recalibrated by PEF using both site-specific and regional head data. A detailed description of this model and the recalibration process is provided by PEF (2009d).

2. **Invalidation of State Certification**- Ignoring the overwhelming evidence that even the recalibrated model is grossly inadequate (as described in this comment letter and my previous affidavits), the recalibrated model raises the question of whether the state certification has been invalidated. Evidence described and presented in my affidavit, incorporated as **Bacchus Exhibit A2,** suggests that not only was the state certification based on the original model (determined by NRC and the Corps to be a "poor fit"), but that the Florida's reviewing agencies have not even reviewed the recalibrated model. Consequently, the site certification may have been invalidated by the recalibrated model, rendering the LNP DEIS premature.

3. **Multi-basin and sub-basin affected areas** – Impacts from the proposed LNP site will affect multiple sub- basins and basins as illustrated by the figures and tables and reports incorporated herein as **Bacchus Exhibit D1a-g**, These areas include the adjacent Withlacoochee drainage basin and the Waccassassa drainage basin governed in part by the Suwannee River Water Management District (**Bacchus Exhibit D1a**); coastal areas (**Bacchus Exhibit D1b**); Outstanding Florida Waters (**Bacchus Exhibit D1c**); and springs and estuarine ecosystems (**Bacchus Exhibit D1d**).

4. **Multi-basin impacts on Rainbow Springs and the Rainbow River** – The first figure in that composite exhibit, LNP DEIS Figure 2-7, illustrates the proximity of the Rainbow Springs and River, in the adjacent Withlacoochee drainage basin, to the poteniometric high adjacent to the proposed LNP site. The LNP DEIS failed to take a hard look at the adverse direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on Rainbow Springs and River. In my professional opinion those impacts would exceed "LARGE" and would result in irreversible alterations of the chemical, physical and biological integrity of those national waters.

5. **Multi-basin impacts on coastal discharges of surface and ground waters** – Similarly, the LNP DEIS failed to take a hard look at the direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on coastal discharges of surface and ground waters from the three sub-basins shown in LNP DEIS Figure 2-8 (**Bacchus Exhibit D1b**). In my professional opinion those impacts would exceed "LARGE" and would result in irreversible alterations of the chemical, physical and biological integrity of those national waters.

6. **Multi-basin impacts on Outstanding Florida Waters, springs and estuarine ecosystems -** Additionally the LNP DEIS failed to take a hard look at the direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on the Outstanding Florida Waters, springs and estuarine ecosystems shown in PEF LNP Exhibit Griffin-1 (**Bacchus Exhibit D1c**) and in LNP DEIS Figure 2-17 (**Bacchus**

Exhibit D1d). In my professional opinion those impacts would exceed "LARGE" and would result in irreversible alterations of the chemical, physical and biological integrity of those national waters.

7. **Multi-basin impacts on waters governed in part by the Suwannee River Water Management District -** Additionally, the LNP DEIS failed to take a hard look at the direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on waters governed in part by the Suwannee River Water Management District. For example, the Suwannee River Water Management District Water Supply Assessment Report 2010 (**Bacchus Exhibit D1e**). Table 2-12 of that report clearly shows that **"0.00"** million gallons per day (MGD) of water will be used for thermoelectric power generation in Levy County for the years spanning 2010 through 2030. Clearly that analysis contradicts description of the construction and operation of the proposed LNP project in the LNP DEIS, which would capture and hold captive on-site and/or use as cooling tower water all natural overland flow currently supplying water to surrounding ecosystems in Levy County. That **"0.00"** MGD of water used also does not recognize the diversion of groundwater, as described in this comment letter, that would result from the construction and operation of the proposed LNP project. This grave inadequacy reinforces the conclusion that the DEIS failed to address direct, indirect and cumulative adverse impacts beyond the on-site, surface footprint of the proposed LNP project. This is additional evidence that **a supplemental DEIS is required to prepare a more realistic model of all water-related impacts as a first step in assessing the myriad "LARGE" direct, indirect and cumulative adverse impacts from the proposed project.**

8. **Multi-basin impacts on impaired waters -** The Florida Department of Environmental Protection (FDEP) has designated the Withlacoochee and the Waccassassa Rivers as impaired waters (**Bacchus Exhibits D1f and D1g**, respectively). The LNP DEIS failed to take a hard look at the direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on the impairment of these waters. For example, how will the extraction and diversion of large volumes of surface and ground waters during construction and operation of the proposed LNP and unidentified mine site affect the chemical, physical and biological integrity of those impaired national waters and the biota that rely on those waters for survival? This grave deficiency is additional evidence that **a supplemental DEIS is required to prepare a more realistic model of all water-related impacts as a first step in assessing the myriad "LARGE" direct, indirect and cumulative adverse impacts from the proposed project.**

9. **Giant 100-foot deep holes in the karst flood plain refilled with aggregate mined as additional giant holes in the karst flood plain -** The LNP DEIS failed to include any conceptual renderings of the giant 100-foot deep holes that would be excavated into the flood plain during construction of the proposed LNP project or the similar permanent giant holes that would be excavated in the floodplain to mine aggregate for fill and raw materials to construct the proposed LNP project. The lack of such an image prevents the public from adequately comprehend the full magnitude of the direct, indirect and cumulative adverse impacts from just that aspect of the proposed project that will exceed "LARGE." The photograph from a similar nuclear power plant under construction in Georgia is included in **Bacchus Exhibit D2** and incorporated herein, to provide that perspective. Note the miniscule appearance of the large earthmoving equipment in that photograph that is dwarfed by the size of that hole. It is my professional opinion that the mere excavation of those giant holes, ignoring the myriad other impacts from discharge of fill in floodplain wetlands would result in "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal. Therefore, **a supplemental DEIS is required to adequately illustrate how these excavations will be accomplished in a flood plain replete with relict sink wetlands and fracture networks without resulting in myriad "LARGE" direct, indirect and cumulative adverse impacts, including irreversible degradation of the chemical, physical and biological integrity of national waters.**

10. **Failure of the LNP DEIS to consider highest ranked critical wildlife habitat** - The LNP DEIS failed to take a hard look at, or even consider, the myriad "LARGE" direct, indirect and cumulative adverse impacts, including irreversible degradation of the chemical, physical and biological integrity of national waters on the highest ranked critical wildlife habitat which surrounds the proposed LNP site. The location of this critical wildlife habitat in Levy County is depicted in **Bacchus Exhibit D3**, which is incorporated herein by reference. The ranking was a result

of the The Integrated Wildlife Habitat Ranking System 2009 report for Florida (Endries et al., 2009). The map was produced from the GIS shape file provided by the Florida Wildlife Commission's web site at: http://research.myfwc.com/features/view_article.asp?id=35544
It is my professional opinion that construction and operation of the proposed LNP project alone would result in "LARGE" and irreversible adverse impacts to not only the high-ranked wildlife habitat in Levy County, but all wildlife habitat in Levy County by altering the chemical, physical and biological integrity of the nations waters, both inland and coastal. Therefore, **a supplemental DEIS is required to adequately illustrate how the myriad direct, indirect and cumulative adverse impacts, including irreversible degradation of the chemical, physical and biological integrity of national waters will affect Levy County's wildlife habitat.**

11. **Failure of the LNP DEIS to require documentation of multi-year preconstruction baseline conditions –** One of the most significant deficiencies in the LNP DEIS is its failure to require detailed, multi-year documentation of baseline conditions, prior to any construction or operation activities associated with the proposed LNP project and the interlinked proposed Tarmac mine. The "Assessment of Baseline Conditions and Change in Wetlands Associated with Groundwater Withdrawal and Diversion" is described in the 1995 peer-reviewed publication by Bacchus, incorporated herein by reference as **Bacchus Exhibit D4**. It is my professional

12. **Failure of the LNP DEIS to require modeling or other quantification of impacts from passive dewatering –** Another significant deficiency in the LNP DEIS is its failure to require detailed quantification of passive dewatering of the proposed LNP site and surrounding area. The irreversible direct, indirect and cumulative adverse impacts associated with passive dewatering are described in the 2006 peer-reviewed publication by Bacchus, incorporated herein by reference as **Bacchus Exhibit D5**. It is my professional opinion that the construction/pre-operation site alterations described in the LNP DEIS will result in passive dewatering and "LARGE" irreversible direct, indirect and cumulative adverse impacts.

13. **Catastrophic destructive wildfires –**The hydroperiod alterations that would result from the construction and operation of the proposed LNP project would cause catastrophic destructive wildfires in the area surrounding the proposed LNP site. The scientific basis for this conclusion is described in my 2007 peer-reviewed scientific publication incorporated herein as **Bacchus Exhibit C7** and in my previous affidavit.

14. **Filling forested floodplain wetlands –**The conceptual drawing of proposed LNP project in DEIS Fig. 3-2, incorporated herein as **Bacchus Exhibit C3**, also illustrates the culmination of part of the filling of those cypress wetlands to construct the proposed LNP. For example, page 4-4 of the LNP DEIS, lines 20-22 states:

> The ground elevation of the reactors and cooling towers, which is currently located within the 100-year floodplain, would be raised 8 ft. above the existing grade, so that the structures would be above the 100-year floodplain.

The proposed stormwater ponds are not shown in that figure. Ms. Casey's declaration includes a copy of Figure 3-4 from the LNP DEIS, which shows the location of the four proposed stormwater ponds that would include both filling and excavation of those floodplain wetlands. The following statement from page 4-10 of the LNP DEIS, lines 23-27 confirms that the source of the fill has not been finalized:

> PEF has not made a final determination regarding the source of the fill material for the LNP site. To provide additional context for the potential impacts of fill mining, the review team considered the impacts if the proposed Tarmac King Road Limestone Mine provided the source of fill. The proposed mine would be located 1 mi west of the intersection of U.S. Highway 19 (US-19) and King Road in Levy County, about 2 mi west of the LNP site.

It is my professional opinion that the filling of those floodplain wetlands and the excavation of the fill material, whether independently or cumulatively, would result in "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal.

15. **Additional adverse impacts to natural overland flow proposed -** The following statement on page 4-20, lines 20-27 of the LP DEIS reveal additional "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal:

> Hydrologic alterations also will result from grading and building a series of stormwater-drainage ditches. These surface modifications will result in changes in the rate and distribution of surface recharge and may affect groundwater levels beneath the LNP site. Stormwater=drainage ditches will direct runoff into three stormwater-retention and infiltration ponds. Any excess [sic] rainfall will be pumped to the cooling-tower blowdown basin and, if necessary, discharged with blowdown….

It is my professional opinion that the construction and operation of those proposed stormwater ponds within the floodplain wetlands would result in irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal, that would exceed "LARGE." See also my affidavit included in **Bacchus Exhibit A2**.

16. **Additional inadequacies of the LNP DEIS regarding adverse impacts to Waters of the U.S. -** The following statement on page 4-20, beginning on line 28 of the LP DEIS reveal additional "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal:

> The local groundwater aquifers that could be affected by the building of proposed LNP Units 1 and 2 are the surficial and Upper Floridan aquifers. Surface modifications will alter the thickness of the surficial aquifer and the nature and location of recharge and discharge zones. During building, anticipated hydrologic alterations include temporary [sic] changes in the groundwater levels associated with dewatering of excavations for the proposed structures. The current conceptual foundation design calls for substantial dewatering of each nuclear island area (containing the containment vessels, shield building, and auxiliary building) to depths of approximately 100 ft below the existing grade (PEF 2009b). Under this design, subsurface grouting and diaphragm walls would be used to isolate the excavation and minimize the impacts of dewatering on surrounding groundwater levels. Grouted diaphragm walls would be installed to minimize lateral groundwater inflow, and grout would be injected into the carbonate rock below the planned excavation depth to minimize upward groundwater flow into the excavation. These two engineered barriers would allow the excavation to be dewatered and minimize the amount of drawdown that occurs outside the grouted excavation. Thus, the impact of nuclear island dewatering on the surrounding groundwater system is expected to be minor.

The LNP DEIS fails to produce any peer-reviewed publications of studies evaluating the degree to which such an engineering fantasy minimized environmental impacts. In fact, the LNP DEIS failed to provide any examples of other locations where such a large scale grouting scheme has been conducted successfully in a karst aquifer system such as the one at the proposed LNP site. **A supplemental DEIS is required to provide such information so that it can be reviewed by the public and affected agencies.**

17. **"Mitigation" for land-use impacts –**The following statement beginning on page 4-10, line 37 of the LP DEIS is evidence that the NRC and Corps not only have failed to analyze the direct, indirect and cumulative impacts of the proposed filling of floodplain wetlands, but would create additional adverse impacts from capturing all of the natural overland flow essential for the surrounding ecosystems (e.g., the flowing water in videos and photographs in Ms. Casey's declaration) in the proposed stormwater ponds:

> To lessen the land-use impacts, PEF has indicated that it would use mitigation measures during construction and preconstruction activities, such as erosion control access roads, and restricted construction (PEF 2000a). Stormwater runoff from LNP corridors would be controlled by a

> stormwater-drainage system. Three stormwater ponds would be designed and constructed to fully contain the runoff from a 25-year, 24-hour rainfall.

It is my professional opinion that the proposed filling of floodplain wetlands that would result in "LARGE" adverse impacts could not possibly be minimized or reduced by the proposed "mitigation" referenced above.

18. **Dewatering of proposed LNP site via transfer of cooling water to Crystal River power plant** – Page 3-8 of the LP DEIS, lines 23-33, state that there would be no discharge of cooling water from the proposed LNP site. Instead, all water extracted from groundwater wells and the Cross Florida Barge Canal would be permanently removed from the associated ecosystems. In my professional opinion, this diversion of water would magnify the irreversible hydroperiod alterations beyond the proposed LNP site.

E. Adverse Environmental Impacts from Aerial Deposition of Salt and Other Contaminants from the Proposed LNP

1. **No basis for conclusion that impacts from aerial deposition will be "SMALL" –** The 26 paragraphs provided in my affidavit dated 11/12/10, included in **Bacchus Exhibit A2** and incorporated herein by reference, provide extensive scientific basis for concluding that the direct, indirect and cumulative adverse impacts from aerial deposition of salt and other contaminants from the proposed LNP project would exceed "LARGE." **Bacchus Exhibits E1-E5** supporting those conclusions also are incorporated herein. Therefore, the following statement from NUREG 1437 "4.3.5.1.3 Conclusion" is unsupported and thus arbitrary and capricious (emphasis added):

> Because the impacts of cooling tower drift on native plants are expected to be of small significance at all plants and because the potential mitigation measures would be costly, no mitigation measures beyond those implemented during the current term license would be warranted. Cumulative impacts on natural plant communities are not a consideration because of the distance between nuclear power plant sites and other facilities that may have large cooling towers. This is a Category 1 issue.

2. **Additional documentation that impacts will not be "SMALL" –** Additional internal documents refute the conclusion referenced above that the impacts of cooling tower drift on native plants are expected to be of small significance. For example, see highlighted excerpts in NUREG-1555, incorporated herein as **Bacchus Exhibit E6.** Additional support for the conclusion that the impacts of drift from the proposed LNP project would be "LARGE" is provided by the following excerpts from NUREG 1437 "4.3.5.1.1 Overview of Impacts:"

> In addition, native vegetation may suffer changes in community structure (Talbot 1979) in response to ice damage or differences in species tolerances to drift…
>
> Species vary in their sensitivity to soil salinity and foliar salt deposition, and their tolerances of drift deposition are not well known. Curtis et al. (PPSP) determined that experimental exposure to saline cooling-tower drift for one growing season resulted in foliar damage to vegetation when leaf Cl- levels were between 3145 and 9000 m g/g dry weight.
>
> Age of leaves also affects sensitivity to deposition. McCune et al. 1977 found that the youngest leaves of deciduous woody species and the year-old needles of conifers were more susceptible than leaves of other ages. Seasonal deposition, therefore, has the potential to affect these species groups differently. The most sensitive native species, flowering dogwood, shows injury from deposition above 1.2 kg/ha (1.1 lb/acre) per week
>
> Natural draft cooling towers using brackish water at the coal-fired Chalk Point plant resulted in elevated chloride concentrations in vegetation after 1 year of tower operation (PPSP-CPCTP-18), but symptoms of salt toxicity in native trees had not been observed after 2 years of operation (Lauver et al. 1978), after which monitoring was terminated because of the absence of significant effects (C. L. Mulchi, University of Maryland, personal communication with H. Quarles, ORNL, Oak Ridge, Tennessee, March 15, 1995).
>
> Vegetation monitoring at nuclear plants is described in Section 4.3.4. Of the 18 plants reviewed, visible vegetation damage resulting from cooling tower operation was reported for only the Catawba, Palisades, and Prairie Island plants, all with mechanical-draft towers (Table 4.3)

At Palisades, monitoring conducted in response to observed vegetation damage included chloride and sulfate deposition and visual observation of damage. Vegetation damage resulted primarily from sulfate

Vegetation damage was found to correlate with elevated rates of sulfate deposition from the Palisades towers (Rochow 1978); chloride deposition, however, was less than 1.0 g/m2/month in areas of extensive vegetation damage and did not correlate with the damage. Sulfate deposition rates were 0.61 g/m2/month between 700 and 1609 m (2296 and 5278 ft) and 9.0 g/m2/month within 50 m (164 ft) of the tower.

Monitoring at Prairie Island included aerial photography, ground surveys of vegetation, and acorn viability monitoring. Viability of acorns collected from red oak trees located near the mechanical-draft towers was low, although acorn production appeared normal.

Drift deposition up to 95.6 kg/ha (85.3 lb/acre) per year has occurred on the site within 1.6 km (1 mile) of the cooling towers. Amounts of approximately 25 to 50 kg/ha (22 to 45 lb/acre) per year were predicted to alter soil salinity enough to affect vegetation over the long term (McBrayer and Oakes 1982).

Damage from operation of mechanical-draft towers at Palisades was more extensive than for the other nuclear plants, but was limited to about 8 ha (20 acres) on the site.

3. **Monitoring of Salt Drift Impacts at Crystal River Nuclear Power Plant –** Additional evidence of the adverse impact of salt drift on native vegetation is seen in the excerpts from the 1995 monitoring report for the Crystal River Nuclear Power Plant in adjacent Citrus County incorporated herein as **Bacchus Exhibit E7**. Despite the list of inadequacies of that study, the dramatic irreversible damage to native vegetation can be seen in Figures 13a and 13b of that report described as "Areas of Heavy Cabbage Palm Stress and Mortality in the Brackish Marsh Zone West of the Coastal Control Site."

F. Unpermitted "Taking" of Endangered and Threatened Species

1. **Inadequate assessment of environmental impacts prevents determination of unpermitted "taking" -** Because PEF and the DEIS have failed to identify, describe and consider all of the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP, required to determine the "affected area" of the proposed project, the affected public and regulatory agencies have been precluded from providing meaningful comments regarding the unpermitted "taking" of federally listed endangered and threatened species. In fact, because of the gross inadequacies of the DEIS, agencies such as the U.S. Fish and Wildlife Service (USFWS) and the U.S. Environmental Protection Agency (USEPA) are incapable of determining the total number of individuals of federally listed species such as manatees, sea turtles that will be "taken" (killed) and other environmental effects as a result of the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP.

2. **Spring discharges along the CFBC –** Federally endangered manatees are marine mammals. Like all mammals, manatees must drink fresh water to survive. Fresh groundwater discharges as springs are critical sources of fresh water for survival of manatees. **Bacchus Exhibit F1** includes five photographs of freshwater springs discharging along the CFBC in the immediate vicinity of where the proposed LNP has relocated it's groundwater withdrawal wells, where surfacewater withdrawals would occur and where the 100-foot deep pits and stormwater ponds would be excavated. This exhibit was submitted to NRC on September 23, 2010 as part of the public comments on the DEIS. This exhibit and the attachments referenced in this exhibit describe additional information that PEF and the DEIS failed to consider regarding adverse environmental impacts that would occur from the proposed LNP. The attachments referenced in this exhibit should be part of the official public record for the DEIS and are incorporated herein by reference.

3. **Coastal spring discharges used as source of freshwater consumption by manatee –** I have observed the CFBC springs illustrated in the photographs referenced above on numerous occasions and have verified that those discharges are fresh water. I have observed manatee drinking water from springs similar to those CFBC springs shown in the photographs referenced above, including coastal springs with less flow than the springs discharging to the CFBC.

4. **Example of unpermitted "taking" of federally endangered manatees by proposed LNP –** In my professional opinion, the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP would terminate the flow of the springs discharging to the CFBC and other coastal springs in the vicinity of the proposed LNP. My opinion is based, in part, on my knowledge of the existing threats to the survival and recovery of manatees and other federally listed species including anthropogenic alterations of water quantity and quality such as those described in my peer-reviewed publication titled "species. Part I: Marine ecological disturbances" (**Bacchus Exhibit F2).** Furthermore, it is my opinion that the cessation of flow of those springs discharging to the CFBC and other areas in the affected area of the proposed LNP would result in the unpermitted "taking" of an undetermined number of manatees. The unpermitted "taking" of manatee may not be confined to the CFBC manatee population described in the Recommended Order for Save the Manatee Club, Inc. Case No. 96-1723 and attached hereto as **Bacchus Exhibit F3**. The unpermitted "taking" of manatee may include additional manatees in the coastal (estuarine) areas northwest and southwest of the proposed LNP.

G. Avoidance - Alternatives Not Considered or Inadequately Assessed v. Mitigation

1. **Misconception of mitigation –** Consideration of mitigation is not appropriate if a reasonable alternative is available that would **avoid** discharge of fill in wetlands. Reasonable alternatives for providing power exist, as described below, but were not considered in the LNP DEIS. Additional misconceptions regarding mitigation are illustrated on page 4-10 of the LP DEIS, beginning on line 37, as follows:

> To lessen the land-use impacts, PEF has indicated that it would use mitigation measures during construction and preconstruction activities, such as erosion control access roads, and restricted construction (PEF 2000a). Stormwater runoff from LNP corridors would be controlled by a stormwater-drainage system. Three stormwater ponds would be designed and constructed to fully contain the runoff from a 25-year, 24-hour rainfall.

As described throughout my comments letters and affidavit, the construction activities described in the LNP DEIS exceed "LARGE" and in my opinion would result in irreversible direct, indirect and cumulative impacts far beyond the property boundaries of the proposed LNP site. Furthermore, it is a disturbing misconception that capturing and diverting essential overland flow could be considered as "mitigation." In my professional opinion, that aspect alone would result in "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nation's waters.

2. **Avoidance alternatives not considered or inadequately assessed** - The DEIS addressed Alternatives in the Abstract; Section 1.4 "Alternatives to the Proposed Actions;" Section 9.0 "Environmental Impacts of Alternatives;" Section 9.1 "No Action Alternative;" Section 9.2 "Energy Alternatives" but fails to address alternatives that would avoid **all** of the adverse environmental impacts described in my affidavits and exhibits, while still providing energy to customers at an affordable price. At least some of the alternatives that PEF and the DEIS failed to consider could provide energy at a far lower cost than the environmentally devastating proposed LNP and would eliminate the need for environmentally destructive and costly transmission corridors and substations linked to the proposed LNP and shown in **Bacchus Exhibit G1**. Examples of the "avoidance" alternatives that the DEIS and PEF failed to consider include the following.

3. **Roof-top solar funded by PEF** - Neither the DEIS nor PEF took a hard look at roof-top solar funded by PEF would allow power to be produced in the metropolitan areas where it would be used, rather than in remote rural areas such as the proposed LNP site and then transferred, via transmission corridors and substations to other counties. This type of roof-top solar network is promoted by the Florida Solar Energy Center and the California Solar Energy Center. See **Bacchus Exhibits G2** and **G3** respectively for additional information regarding those alternatives for avoiding all of the adverse environmental impacts described in my affidavits and comments provided by others.

4. **Decoupling no-build alternative** – Additionally, the DEIS and PEF failed to take a hard look at the decoupling alternative voluntarily implemented by PEF as a substitute for constructing and operating the environmentally destructive proposed LNP. This alternative is described in **Bacchus Exhibit G4.**

5. **Indirect future energy use reductions via increased efficiency and off-grid renewable options - no-build alternative –** Many alternatives for significant reductions of residential and commercial energy use have been developed, including off-grid options. Neither the DEIS nor PEF took a hard look at, or even considered an alternative where PEF would fund those options as a "no-build" alternative that would avoid all of the adverse environmental impacts described in my affidavits and comments provided by others.

H. No Bona fide Comprehensive Cumulative Effects Analysis Conducted

1. **No comprehensive cumulative effects analysis conducted** – Neither the DEIS nor PEF conducted a bona fide comprehensive cumulative effects analysis that would occur, including the adverse environmental impacts described in my affidavits and exhibits, if the proposed LNP was constructed and operated compared to the cumulative impacts of readily available alternatives. In 1997, the Council on Environmental Quality released its findings regarding "Considering Cumulative Effects Under the National Environmental Policy Act. Executive Office of the President; What are Cumulative Impacts?" identifying how such an analysis is conducted. A synopsis of that extensive report is incorporated herein as Bacchus **Exhibit H-1**. The cumulative effects analysis also would need to include all of the adverse impacts referenced in my recent affidavit and related exhibits, my original affidavit dated February 6, 2009, regarding adverse environmental impacts and attached to my recent affidavit as Bacchus Exhibit H-2 and my preliminary DEIS comment letter dated 10/26/10 on the proposed.

2. **Comprehensive cumulative effects analysis requires establishment of the "area of impact"** – No scientifically based "area of impact" for the proposed LNP can be established until the cumulative effects analysis has been completed. The "area of impact" is dependant on the detailed cumulative effects analysis, which would include, at the least, all of the areas of direct, indirect and cumulative impacts, identified in the various maps referenced above and incorporated**.**

3. **Failure to comply with other NEPA and federal requirements** – In addition to the DEIS' failure to conduct a comprehensive cumulative impacts assessment, the DEIS fails to comply with a host of other federal requirements. Examples of these deficiencies are provided in my preliminary DEIS comment letter dated 10/26/10 on the proposed LNP and attached hereto as **Bacchus Exhibit A1**.

4. **Supplemental DEIS required to address deficiencies in current DEIS** – Because of the gross inadequacies in the DEIS, a supplemental DEIS is essential to provide meaningful comments from the public and sister regulatory agencies. For example, the USFWS cannot determine the comprehensive number of federally listed species and individuals of those species that will be "taken" if the proposed LNP is constructed and operated based on the information provided in the current DEIS. Similarly, organizations and individuals dedicated to protecting federally listed species, such as "Save the Manatee" would be unable to determine that a manatee population is threatened by the proposed LNP simply by reading the current DEIS. Therefore, a supplemental DEIS is required.

I. List of Bacchus Exhibits and References

1. **Exhibits and References –** A comprehensive list of exhibits and references for my supplemental comment letter is included as **Bacchus Exhibit I.**