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This case concerns the adequacy of the U.S. Nuclear Regulatory Commission’s (NRC’s) Final Environmental Impact Statement (2011) (“FEIS”) (**Exhibit NRC001**) for the proposed Levy nuclear power plant Units 1 and 2 (“LNP”) to address the potentially catastrophic environmental impacts of construction and operation of the proposed reactors on the extremely fragile aquatic and terrestrial ecosystem in which Progress Energy Florida, Inc. (“PEF”) proposes to build two new 1100-MW AP1000 nuclear reactors. Through water withdrawals for construction and operation, the Levy project threatens to severely and irreversibly harm the ecosystem by altering the seasonal variations in water flow, known as “hydroperiods,” on which plants and animals, including endangered species, depend for their survival; and by exacerbating

eutrophication and the intrusion of salt water into pristine freshwater systems. In addition, the integrity of the environment is threatened by salt emitted by LNP cooling towers during operation.

As demonstrated in the attached testimony of Intervenor's expert witnesses, Gareth Davies (**Exhibit INT001**), Dr. Tim Hazlett (**Exhibit INT101**), David Still (**Exhibit INT201**), and Dr. Sydney Bacchus (**Exhibit INT301**), the FEIS falls dismally short of the "hard look" required by the National Environmental Policy Act ("NEPA"). *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). In particular, the FEIS' conclusion that the nuclear plants will not have any significant impacts on aquatic and terrestrial ecosystems is based on the gross oversimplification of existing environmental conditions, including the complex karstic geology of the site which connects the groundwater and surface water on the LNP site to a huge region. The FEIS also relies on out-of-date information about severe conditions in Florida that will affect the impacts of LNP, including increasing periods of drought and mining in the area. As a result, the FEIS seriously understates both the severity and the geographical range of the environmental impacts of LNP.

In addition, the FEIS ignores or downplays cumulative impacts that, together with the impacts of construction and operation of LNP, significantly threaten the health of the local environment. These cumulative impacts include mining (including mining to be conducted for the purpose of building LNP), increased conditions of drought in the area, and water consumption by other users.

Finally, the FEIS attempts to compensate for its inadequate analysis of water use impacts by making a determination that the impacts will be mitigated by a groundwater monitoring plan and "dewatering" plan to be reviewed by the State of Florida after the COL is issued. By punting environmental issues into the future without addressing them in the FEIS, the NRC

violates NEPA's cardinal principle that environmental impacts of agency action must be considered *before* the action is taken, not afterwards. *Robertson*, 490 U.S. at 349. Moreover, the NRC may not assign to a state agency its own independent responsibility under NEPA for evaluating environmental impacts. *Calvert Cliffs Coordinating Comm. v. U.S. AEC*, 449 F.2d 1109, 1123 (D.C. Cir. 1971).

II. PROCEDURAL BACKGROUND

On July 8, 2008, Progress Energy Florida, Inc. ("PE") submitted a combined license ("COL") application to the NRC for two new reactors in Levy County, Florida. The proposed location of the new reactors is a "green fields" site that is undeveloped. The application included an Environmental Report ("ER") that discussed the environmental impacts of the proposed project on the environment, including aquatic and terrestrial impacts.

On February 6, 2009, Intervenors submitted a set of contentions challenging PEF's COL application. The ASLB partially admitted Contention 4, which challenged the adequacy of the ER to address onsite and offsite dewatering impacts, impacts of salt drift from the saltwater cooling towers into the freshwater aquatic environment, and the underestimation of the zone of environmental impact and the areal extent of impact on listed species, irreversible and irretrievable impacts, and mitigation measures. LBP-09-10, 70 NRC 51, 101-06, 149-50 (2009).

The NRC Staff published a Draft Environmental Impact Statement ("DEIS") for LNP, concluding that the environmental impacts of concern to the Intervenors were either "low" or "moderate" but that in no case were they significant. In November 2010, Intervenors amended Contention 4 to address the DEIS, and their contention was admitted in significant part on February 22, 2011.

Dr. Bacchus submitted extensive comments on the DEIS, repeating the concerns raised in Contention 4, but the NRC did not make any significant changes in the final FEIS that was

issued in the spring of 2011.

III. APPLICABLE LEGAL REQUIREMENTS

A. National Environmental Policy Act

1. General requirements of NEPA

In Contention 4, Intervenors seek compliance with the procedural requirements of the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321-4370f, which are intended to implement a “broad national commitment to protecting and promoting environmental quality.” *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87 (1998) (quoting *Robertson*, 490 U.S. at 348 and citing 42 U.S.C. § 4331). The preparation of an environmental impact statement (“EIS”) is “[c]hief among [the] procedures” established by NEPA for protection of the environment. *Id.* In an EIS, an agency must take a “hard look” at the environmental consequences of a proposed project. *Id.* (citing *Robertson*, 490 U.S. at 349-50; *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 443 (4th Cir. 1996)). The results of this “hard look” must be published for public comment “to permit the public a role in the agency’s decision-making process.” *Id.*

In order to enable an agency to conduct the “hard look” required by NEPA, an EIS must contain a sufficient discussion of the relevant issues and opposing viewpoints.” *Louisiana Energy Services*, 47 NRC at 88 (citing *Tongass Conservation Society v. Cheney*, 924 F.2d 1137, 1140 (D.C. Cir. 1991) (quoting *Natural Resources Defense Council v. Hodel*, 865 F.2d 288, 294 (D.C. Cir. 1988)). In *Louisiana Energy Services*, for example, the Commission affirmed an ASLB decision that an EIS for a proposed uranium enrichment plant had not sufficiently analyzed the disparate environmental impacts of a proposed road closure on the neighboring environmental justice communities, including transportation-related impacts, impacts on property values, and mitigation impacts. 47 NRC at 106-110. The FEIS was remanded for

revision. *Id.* at 110.

2. Requirements for discussion of environmental impacts in EIS

An EIS must discuss environmental impacts that are “reasonably foreseeable or have some likelihood of occurring.” *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-09-7, 69 NRC 613, 631 (2009) (citing *Long Island Lighting Co.* (Shoreham Nuclear Power Station), ALAB-156, 6 AEC 831, 836 (1973)). Impacts that must be considered include both direct impacts (*i.e.*, impacts that occur at the same time and place as the action) and indirect impacts (*i.e.*, impacts that are caused by the action at a later time or more distant place yet are still reasonably foreseeable). *Id.* at 632 (citing 40 C.F.R. § 1502.16, 1508.8).

In addition, an FEIS must discuss the cumulative or “synergistic” impacts of a proposed action. *Hydro Resources, Inc.* (P.O. Box 15910), Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 57-58 (2001) (citing *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976)). The cumulative impacts analysis “looks at the possibility that . . . impacts may combine in such a fashion that will enhance the significance of their individual effects.” *Id.*

NEPA fundamentally requires agencies to consider the environmental impacts of their actions *before* they approve the actions, rather than waiting until “after the die is cast.” *Robertson*, 490 U.S. at 349. Moreover, the agency must reach its own independent conclusions and may not delegate its NEPA responsibility to other federal agencies or state agencies. *Calvert Cliffs*, 449 F.3d at 1123. *See also* LBP-09-10, 70 NRC 51, 100 (rejecting “the proposition that the ER [Environmental Report] and EIS [for the Levy LNP] can properly exclude any environmental impact that is regulated by another federal or state entity or that, because NRC has no jurisdiction to *regulate* an environmental impact, it can be excluded, *per se*, from the ER or EIS”).

3. Significance of environmental impacts

Where a proposed action will have environmental impacts that are significant, NEPA requires that an agency must consider alternatives for avoiding or mitigating those impacts. *Van Eye v. EPA*, 202 F.3d 296, 309 (D.C. Cir. 2000). Therefore the designation of impacts as “significant” or “insignificant” is important. The NRC characterizes the significance of environmental impacts as “SMALL,” “MODERATE,” or “LARGE,” with “LARGE” impacts being the only impacts having significance. 10 C.F.R. Part 51, Appendix B, Table B-1 n.3. *See also* FEIS Vol. 2 at xxxii. According to the NRC, impacts of “LARGE” significance “are clearly noticeable and are sufficient to destabilize important attributes of the resource.” *Id.*¹ As the ASLB observed in LBP-09-10, the term “resource” is not defined:

For example, in determining whether the LNP project will have noticeable impacts on water resources, should we define the resource as the onsite wetlands? The regional wetlands and waters? The Gulf of Mexico? The oceans? More specifically, at one point PEF suggests that mining for aggregate for concrete can be summarily dismissed because the 25,000 cubic yards of concrete (and aggregate) needed for the LNP project is negligible compared to the “global or national” availability of concrete. If the “resource” is the globe, then the mining necessitated by any individual project will almost never have a noticeable impact on the resource.

Id., 70 NRC at 101. Intervenor respectfully submit that where there are no specific standards or definitions, NEPA must be applied under a “rule of reason” to evaluate whether the agency has examined a geographic region where significant impacts may occur. *Grazing Field Farms v.*

¹ The definitions of “SMALL” and “MODERATE” significance are as follows:

SMALL--For the issue, environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts that do not exceed permissible levels in the Commission's regulations are considered small as the term is used in this table.

MODERATE--For the issue, environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

Id.

Goldschmidt, 626 F.2d 1068, 1072 (1st Cir. 1980). Only if the impacts in a potentially affected region are “remote and speculative” may they be disregarded. *City of New York v. Dept. of Transp.*, 715 F.2d 732, 738 (2d Cir. 1983).

4. Public participation

NRC regulation 10 C.F.R. §§ 51.74 and 51.75(c) require that an EIS for a COL application must be circulated in draft form before it can be finalized. The regulation serves one of NEPA’s key purposes: to give the public “a springboard for public comment.” *Robertson*, 490 U.S. at 349 (quoting *Baltimore Gas & Electric Co.*, 462 U.S. 87, 97 (1983)). The Final EIS must respond to “relevant responsible opposing views.” 10 C.F.R. § 51.91(b).

B. Burden of Proof

Generally, in NRC licensing proceedings the applicant carries the burden of proof. 10 C.F.R. § 2.325 (2011) (“Unless the presiding officer otherwise orders, the applicant or the proponent of an order has the burden of proof.”). In a hearing on NEPA issues, the NRC Staff bears the ultimate burden of proof. *Louisiana Energy Services*, 47 NRC at 89.

The Intervenor also carry a “burden of going forward.” *Amergen Energy Co.* (Oyster Creek Nuclear Generating Station), CLI-09-7, 69 NRC 235, 269 (2009) (quoting *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1093 (1983)). The NRC has compared the burden of proof with intervenors’ burden of going forward as follows:

The ultimate burden of proof on the question of whether the permit or the license should be issued is ... upon the applicant. But where ... one of the other parties contends that, for a specific reason ... the permit or license should be denied, that party has the *burden of going forward* with evidence to buttress that contention. Once he has introduced sufficient evidence to establish a *prima facie* case, the burden then shifts to the applicant who, as part of his overall burden of proof, must provide sufficient rebuttal to satisfy the Board that it should reject the contention as a basis for denial of the permit or license.

Id.

IV. DESCRIPTION OF INTERVENORS' WITNESSES

Intervenors have attached the testimony of four highly qualified experts regarding the scientific and regulatory deficiencies in the FEIS.

- Gareth Davies (**Exhibit INT001**) is an expert in the hydrogeology of karst regions who is employed as a consultant hydrogeologist for Cambrian Ground Water Co. and also works for the Tennessee Department of Environment and Conservation in the Department of Energy Oversight Office.
- Dr. Tim Hazlett (**Exhibit INT101**) is an expert in hydrogeology, integrated groundwater-surface water modeling, and the use of numerical models for the quantitative assessment of groundwater and groundwater-surface water systems. He is President and CEO of DHI Water & Environment, Inc., a consulting service business in the U.S. and Canada.
- David Still (**Exhibit INT201**) is an expert on water management issues with 18 years of experience as a regulator in the Suwanee River Water Management District ("SRWMD"). Recently retired from SRWMD, Mr. Still is a consultant on technical and policy issues related to water management in Florida.
- Dr. Sydney Bacchus (**Exhibit INT301**) is a hydroecologist specializing in the assessment of hydroecological environmental impacts in the southeastern coastal plains physiographic province, with particular emphasis on man-made alterations of natural hydroperiods, in particular karst hydrology of the Floridan aquifer system. Dr. Bacchus, who is employed by Applied Environmental Services, L.L.C. as a hydroecologist, has studied the hydroecology of the Floridan aquifer system for 40 years.

V. SUMMARY OF KEY POINTS IN INTERVENORS' TESTIMONY

A. Failure to Adequately Evaluate the Environmental Impacts of LNP

Intervenors' testimony demonstrates a number of key respects in which the FEIS fails to

take a “hard look” at the environmental impacts of LNP on wetlands, floodplains, special aquatic sites, and other waters.

1. Incorrect, overly simplistic and invalid assumptions

The testimony identifies three key assumptions relied on by the FEIS that are overly simplistic, wrong, or outdated: (a) the assumption that the geologic medium through which groundwater flows is evenly porous, (b) the use of an inappropriate groundwater model, (c) reliance on outdated data regarding drought and rainfall, and (d) averaging of data regarding the hydroperiods, or seasonal fluctuations in water levels, on which the plants and animals in the LNP wetlands depend.

First, as discussed in the testimony of Gareth Davies (**Exhibit INT001**), construction and operation of the Levy Nuclear Plant (“LNP”) will cause considerable disturbance to the local groundwater and surface water flow by physically altering flow paths and withdrawing large amounts of groundwater from the Upper Floridian Aquifer. Mr. Davies is concerned that the FEIS assumes that groundwater flows through a porous medium and does not adequately recognize that most of the flow in this area goes through preferential path-ways. Dr. Hazlett (**Exhibit INT101**), Mr. Still (**Exhibit INT201**) and Dr. Bacchus (**Exhibit INT301**), agree with Mr. Davies’ conclusion.

Because groundwater flow paths are currently unknown, Mr. Davies asserts that it is not possible to rely upon the predictions in the FEIS that are based upon the assumption that the aquifers behave as though the flow travels evenly through the porous medium. In reality, because of the nature of the flow paths, impacts from LNP on the flow of water could be more severe and occur further away than predicted, impacts could occur faster than expected, and freshwater springs could be cut-off. In addition, salinity levels could be affected. Therefore Mr. Davies believes the area studied by the FEIS should have been expanded beyond the 20-mile

area that was studied. To predict the impacts more reliably, Mr. Davies recommends mapping of some of the major preferential flow paths and use of a model that is more physically realistic.

Dr. Hazlett evaluated the model relied on in the FEIS to predict the hydrogeological effects of dewatering. As discussed in Dr. Hazlett's Testimony (**Exhibit INT101**), this model is a steady state media model that makes no attempt to predict the interaction of the freshwater in the FAS with saline water from the Gulf. The model has serious shortcomings because it cannot predict how changes will occur over time, it omitted salinity interactions with the nearby barge canal from the model, it is not well-suited to predict how pumping of the FAS will affect levels or salinity in the SAS, and it assumes that the aquifers themselves are uniform, which they are not. As a result of these shortcomings, the model is not a suitable tool to predict how the local wetlands, which are sensitive to short term changes in SAS levels and salinity, will be affected by the proposed pumping at LNP.

The FEIS used historical rainfall averages, but there are indications that drought conditions are becoming more common. The-permitting agency and the NRC Staff have relied upon long term rainfall records and are not looking at current conditions. For example, the FEIS at p. 2-221 states that "the review team determined that mean annual precipitation in the region is approximately 53 in.," but we have not received that much precipitation in the past six years. Since 1990 the annual total has been less than the postulated average for 14 of the 22 years.

As a long-time water management regulator, Mr. Still asserts that the FEIS relies on outdated and incomplete data regarding rainfall, drought patterns, and groundwater use. **Exhibit INT201**. The FEIS' assumption of approximately 53" of rainfall is based on old and outdated records that do not reflect recent climate trends. Moreover, in addition to average rainfall, the FEIS should have examined temporal variation in rainfall to determine impacts during drought conditions. When utilizing freshwater from highly dynamic coastal karst systems, one cannot

rely upon long term averaging of rainfall conditions. In the short term, during times of drought, the resource can be destroyed by over-pumping, which leads to saltwater intrusion.

As Dr. Bacchus (**Exhibit INT301**) testifies, the FEIS grossly oversimplifies the hydroecological conditions of the LPN site and the geographic area of adverse impacts, erroneously assuming that it is acceptable to evaluate environmental impacts based on averages and ignoring well-documented preferential flow paths associated with depressional pond-cypress wetlands. Although the FEIS recognizes the existence of hydroperiods, for example, it does not actually analyze the significant role they play in the ecological health of the region, which are critical determining factors in hydroperiod responses.

2. Cumulative impacts

All of the witnesses point to cumulative impacts as significant concerns that have not been adequately addressed by the FEIS. As testified by Mr. Davies, quarrying in the vicinity of the LNP may have significant effects on the flow system in the area. His concern is shared by Dr. Hazlett, Mr. Still, and Dr. Bacchus. Dr. Bacchus' testimony address the effects of the Tarmac mine, Knight Sand mine, and Adena Ranch in detail.

In addition, as a general matter, Mr. Davies points out that withdrawal of groundwater for consumption upgradient of any coastal area can encourage saline intrusion inland. There has already been the extensive removal of groundwater for irrigation and drinking water in the area, which is the likely cause of a measured decline in some area groundwater quantity. This indicates that even without dewatering at the LNP site, there is probably a depletion of fresh groundwater occurring. Given the currently stressed nature of the aquifer, Mr. Davies believes that all significant current and proposed groundwater extractions should be included in the modeling of the regional groundwater resources.

As Dr. Bacchus also testifies, the FEIS also ignores or downplays significant contributors to the

cumulative impacts of the LPN, such as the effect of water withdrawals from the Withlacoochee Canal, that is referenced in the FEIS as the “Cross Florida Barge Canal” (“CFBC”), on salinity levels in Withlacoochee Bay. In addition, the FEIS fails to examine the cumulative effects of dewatering and other hydroperiod alterations when combined with deposition and drift of salt from the LPN cooling towers and fires that are essential in maintaining important ecosystems in the vicinity of the proposed LNP but will become destructive wildfires because of the dewatering and other hydroperiod alterations associated with the proposed LNP. As an example, abnormally low or high water levels may have little impact during winter, the normal dormant period for vegetation. However, the same perturbations can result in irreversible adverse impacts to those wetlands if these perturbations occur during the active growing season of even a single year. Likewise, repeated periods of these perturbations have more severe impacts on the ecological systems than a single event. The seasonal component is important because most vegetation becomes dormant during the winter months. Therefore, perturbations of the natural hydroperiod during this period of time have less impact on the vegetation than the same perturbations during periods when new growth, flowering, or fruiting may occur, such as in the spring) or during periods of the growing season when high temperatures occur, such as in the summer. Dr. Bacchus testifies that LPN will disturb these delicate cycles through increased salinization, eutrophication, and salt drift. The impacts to vegetation and wildlife, including endangered species, will be significant in the areas where the effects of LNP occur.

3. Climate change

As Mr. Davies also points out, the FEIS acknowledges sea level rise may already be contributing to wetland losses (FEIS 7-22) without analyzing how or predicting how future sea level rise will impact the Floridan aquifer. The interaction of saline and fresh water means that sea level fluctuation should also be considered when evaluating the impacts of dewatering in a karst environment, because in conduits removal of fresh water will mean more saline water entering. Dr. Hazlett notes that this could push saltwater inland, both above and below ground,

and the groundwater gradient would flatten. Therefore the effects of climate change should be modeled over the 60-year period that LNP may operate. Dr. Bacchus also addresses the inadequacy of the FEIS to address climate change.

C. Unlawful Reliance on State Regulatory Process for Analysis of Environmental Impacts and Mitigation Measures.

The NRC attempts to compensate for the FEIS' inadequate analysis of water use impacts by making a determination that the impacts will be mitigated by a groundwater monitoring plan and "dewatering" plan to be reviewed by the State of Florida and approved in "Conditions of Certification" after the COL is issued. Progress Energy must submit an "Alternative Water Supply Plan" to "evaluate, identify, and propose alternative water supply development" of 1,580,000 gallons per day. As discussed in Mr. Still's and Dr. Bacchus' testimony, given the potentially severe impacts of LNP on the fragile wetlands and aquatic ecosystems in the area, this alternative water supply plan is a very important aspect of the FEIS. Indeed, it is arguable that the consideration of alternatives is *the* most important aspect of an EIS. In addition, as Mr. Still testifies, water use alternatives are available that could significantly mitigate the impacts of LNP. Yet, the NRC has postponed this vital analytical step until *after* licensing the LNP. In addition, NRC does not propose to do the analysis itself. Instead, it proposes to foist its responsibility onto ill-equipped and underfunded local and State authorities.

By punting environmental issues into the future without addressing them in the FEIS, the NRC violates NEPA's cardinal principle that environmental impacts of agency action must be considered *before* the action is taken, not afterwards. *Robertson*, 490 U.S. at 349. Moreover, the NRC may not assign to a state agency its own independent responsibility under NEPA for evaluating environmental impacts. *Calvert Cliffs Coordinating Comm. v. U.S. AEC*, 449 F.2d 1109, 1123 (D.C. Cir. 1971).

D. Inadequate Response to Comments

The NRC responded to Intervenor's expert's comments in Appendix E to the FEIS. It did not, however, undertake to gather any additional data or to cure the deficiencies listed above; instead, it merely attempted to rationalize them. Accordingly, the NRC's response to Intervenor's comments is insufficient to comply with NEPA.

VI. CONCLUSION

For the foregoing reasons, the ASLB should find that the FEIS for the Levy COL is inadequate to comply with NEPA or justify the licensing of LNP.

Respectfully submitted,

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