March 14, 2014

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Department of the Army
Jacksonville District Corps of Engineers
Miami Regulatory Office
9900 Southwest 107th Ave, Suite 203
Miami, Florida 33176
SAJ-2009-02417 (IP-MLC)

Re: FPL Turkey Point Units 6 & 7 Project, Application No. SAJ-2009-02417 (IP-MLC)

Dear Ms. Sotelo:

This letter is in response to your 02 October 2013 letter requesting additional information concerning Florida Power & Light Company's (FPL) application for a Department of the Army permit, assigned number SAJ-2009-02417 (IP-MLC). Specifically, the Corps' October 2 letter was in reference to FPL's June 28, 2013 response to the Corps' March 14, 2013 request for additional information. Where applicable, the Corps' questions have been separated by issue for clarity in FPL's response.

Question 1:
(A) In question 1), the Corps stated its concern that Florida Power & Light Company (FP&L) has not correctly applied the 404(b)(1) Guidelines and the presumptions against discharge of fill into special aquatic sites in that your site selection criteria does not demonstrate practicability but only a preference. Whether FP&L currently owns the land is not an appropriate factor for determining practicability pursuant to the 404(b)(1) Guidelines. Availability of an off-site alternative is determined based on whether it "could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity." 40 C.F.R. § 230.10(a)(2). This information has not been provided to the Corps to date. If FP&L wishes to demonstrate that an off-site alternative is not practicable based on availability, then this is the information that FP&L must provide to the Corps for independent review and verification.

Response:
As stated in 40 C.F.R. § 230.10(a)(2), "An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant, which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered." FPL has considered areas not presently owned, and included those sites in the October 2011 Section 404(b)(1) Alternatives Analysis (L-2011-477). Specifically, construction of the Project at the Glades, Okeechobee, or Martin sites would require acquisition of lands not presently owned by FPL. However, in no case was the fact that an off-site alternative that is not currently owned a determining factor regarding the practicability of the alternative site. To the contrary, the practicability determination followed the 404(b)(1) guidelines through an evaluation of cost, existing technology, and logistics in light of the overall project purpose.

Whether currently under FPL ownership or not, the inland alternative sites are not practicable due to the cumulative consideration of all practicability factors in light of the overall project purpose.

(B) Furthermore, current land use/zoning, the presence of existing infrastructure, impacts to roads, and location relative to need are not determinative of practicability unless FP&L explains how these factors impact cost, logistics, and existing technology. For example, the fact that some areas would require a land use approval does not indicate whether that site is practicable without more information regarding how difficult it would be to obtain that approval (i.e., logistics, cost).

Response:
FPL's evaluation considered nine practicability factors, described in the October 2011 Section 404(b)(1) Alternatives Analysis Table 5.1-1, 5.2-1, and Table 1 from FPL's June 28, 2013 RAI response to the Corps. No single factor was determinative of practicability. The impacts of the referenced practicability factors (current land use/zoning, presence of existing infrastructure, impacts to roads, and location relative to need) upon costs and logistics are further explained below:

Practicability Factor	Cost	Logistics
FPL-Owned Land	Acquisition of potentially several thousand acres has direct impact on costs	Uncertainty associated with acquisition from numerous landowners
Appropriate Land Use	Change in zoning requires CDMP modification, incurring costs associated with legal, environmental, and landuse planning consultations with County	Schedule implications due to CDMP modification, uncertainty with local government approval
Existing Infrastructure for Nuclear Plant	Use of existing nuclear facility reduces cost of design and construction of new infrastructure (security, administration, switchyards, parking, etc.)	NRC guidance NUREG-1555 (NRC, 2007) addresses the advantages of existing nuclear facilities that have been previously reviewed by the NRC for construction and operation of a nuclear power plant and/or demonstrated to be environmentally satisfactory on the basis of operating experience.
Impacts from Additional Transportation Facilities	Construction of additional roadways or rail spurs for construction and/or operation directly increases overall project costs	Logistical concerns with presence of sufficient right-of-way, acquisition of additional right-of-way, traffic control, etc.
Location Relative to Generation Need	Direct impact on costs resulting from the need to import significant energy into capacity-deficient regions. Locating new generation outside of the southeast area increases the amount of power moved over longer distances, incurring an increase in transmission losses. Additional generation would be required to account for the increased losses, thereby increasing costs.	Logistical issues associated with long term generation/load distribution. Generation near the load center provides voltage support, reduced transmission losses, and reduced reliance on imported energy. Maintaining a balance of generation and transmission increases overall system efficiency.

(C) Lack of water supply would demonstrate impracticability in terms of logistics, but FP&L has not demonstrated this factor to date. For example, the South Florida Water Management District provided a response to the Nuclear Regulatory Commission that confirmed water could be obtained from Lake Okeechobee and other sources so a more in-depth explanation is needed as to why these alternative sites that propose using these water sources are not practicable.

Response:
The June 29, 2012 correspondence from the SFWMD to the NRC did not confirm that water could be obtained from Lake Okeechobee or surface waters connected to Lake Okeechobee; to the contrary, it referenced the 2008 Restricted Allocation Area rule and alternative water supplies:

> "*To summarize our discussion, surface water availability from Lake Okeechobee for any of the proposed sites is limited by the District's Restricted Allocation Area rule. This rule was adopted in 2008 and applies to new uses within the Lake Okeechobee Basin. Specifically, this rule restricts use of water from Lake Okeechobee, and the surface waters hydraulically connected to Lake Okeechobee in the integrated conveyance systems, to those uses which have historically occurred, the base condition water use. In 2006, when FPL completed their alternative sites study, the District did not have specific criteria "capping" water availability from the Lake Okeechobee Basin. As presented in the 2006 alternative sites study, the consumptive uses proposed by FPL could potentially (emphasis added) meet the water use regulatory criteria in place at the time*.
>
> *It is important to note that, while surface and ground water availability for the three inland alternative sites may currently be limited, the Restricted Allocation Area rule allows for allocation of water to new projects through several, potential sources. One example discussed at our meeting was water supply made available through the termination of existing water rights. This could be accomplished by purchasing farmland currently served by Lake Okeechobee supplies, terminating the water use associated with the existing agricultural operations, and applying for an allocation to meet the consumptive use needs of the new power plant. In addition, alternative water supplies would be viable should any of the alternative sites be considered. Examples of alternative water supply sources include reclaimed water, storage of excess stormwater runoff in reservoirs, and deep saline aquifers*."

The Restricted Allocation Area rule was discussed in FPL's October 2011 Section 404(b)(1) Alternatives Analysis and a detailed analysis of alternative water supplies was presented in FPL's June 28, 2013 RAI response to the Corps and FPL's July 8, 2013 response to NRC RAI 6353 Question 11. A refined analysis of alternative water supply scenarios referenced by SFWMD was conducted that supported the characterization of the three inland sites as viable and potentially licensable, but not practicable due to uncertainty, logistics, technology, and cost factors. Three alternative water supply scenarios were described, relying upon combinations of groundwater from two aquifers, surface water cropping during the wet season, storage reservoirs, and re-allocation of existing agricultural water use permits:

- Scenario 1: Minimize re-allocation of agricultural water use permits by cropping surface water and using Upper Floridan Aquifer (UFA) and Middle Floridan Aquifer [Avon Park Production Zone (APPZ)] groundwater sources during dry conditions

- Scenario 2: No use of APPZ groundwater source for backup, reduced surface water cropping with UFA groundwater source for backup during dry conditions, greater re-allocation of agricultural water use permits required

- Scenario 3: No use of UFA groundwater source for backup and no re-allocation of agricultural water use permits, surface water cropping with APPZ groundwater source and reverse osmosis (RO) treatment for backup

Logistical, technological, and cost concerns associated with Scenario 1 include not only land acquisition and construction of a 3,000 acre cooling water reservoir, but also construction and operation of large well fields within the UFA and APPZ. Scenario 1 relies upon the capture of excess surface water; extended drought years could eliminate this portion of the water balance, restrict UFA groundwater withdrawals, and require reliance upon the brackish APPZ groundwater exclusively. This would necessitate RO treatment as described in Scenario 3 to prevent the shutdown of the plant during times of extended drought. In order to construct the plant at the Martin site, Scenario 1 would also require the purchase and re-allocation of water use permits associated with approximately 6 square miles (3,900 acres) of agricultural lands. Land acquisition of this magnitude would require identification of landowners willing to vacate significant tracts of irrigated land, effectively permanently removing these lands from agricultural production.

Under Scenario 2, purchase of vast acreage of agricultural lands would be required for re-allocation of water use permits. Approximately 21 to 31 square miles (13,200 – 20,000 acres) of irrigated agricultural lands would be removed from production. Logistically, land acquisition of this magnitude is highly uncertain and not practicable.

Scenario 3 would require land acquisition and construction of a 3,000-acre cooling water reservoir, as well as a large scale (63 MGD) APPZ well field and RO facility capable of treating 37 MGD of the brackish groundwater, to produce 26 MGD of fresh cooling water. An RO facility of this size is similar in magnitude to the Tampa Bay Water desalination plant, one of the largest desalination facilities in North America. Scenario 3 avoids the uncertainty associated with extended drought years and re-allocation of agricultural water use permits, hence its use in the analysis, but includes additional technology, logistical, and cost uncertainties compared to the use of reclaimed water at the Turkey Point site.

(D) Furthermore, it appears that FP&L has only analyzed whether an alternative would be cost effective," meaning whether there would be any additional costs, without answering the question of what are these additional costs in context of the overall cost of the project. In fact, FP&L's June 28, 2013 submittal shows that several off-site alternatives are less expensive in terms of water supply.

Response:
FPL's analysis was not limited to whether an alternative would be cost effective; rather, for each alternative site, FPL analyzed issues of availability, cost, existing technology, and logistics in light of the overall project purpose. FPL has repeatedly cautioned that no one component of the project can be viewed in isolation including the costs of water supply. FPL provided comparative data on costs of alternative water supply scenarios in response to the Corps request dated March 14, 2013 (Question #2). On balance in light of the overall project costs the relative costs of many of the sites are fairly comparable but that ignores that the certainty of the re-allocation of existing agricultural water use permits from existing users is wholly unknown, use of brackish water within the interior of the state is problematic, and that the use of reclaimed water proposed at Turkey Point adds considerable costs to that site but achieves a considerable environmental benefit.

(E) Additionally, some of the alternative sites propose the construction of a desalination or reverse osmosis plant, but it is not clear in the submittal as to how much adverse salt water drift would occur that would justify the construction of the desalination or reverse osmosis plant. Another factor to consider is that costs associated with the operation of these plants may be greatly reduced, if the water is not cleaned to primary drinking water standards. Can you please explain why primary drinking water standards were selected? If the proposed nuclear reactors Units 6 & 7 are able to limit the distribution of salt water from migrating into the adjacent Biscayne National Park, and the same nuclear reactor models are proposed at these locations, why does it appear that the salt water particulates are more migratory in Central Florida but not in South Florida? The Corps understands the concerns about salt water negatively impacting the citrus industry in Central Florida, but how far are these salt water particulates expected to travel?

Response:
The modeling results of cooling tower drift resulting from operation using brackish groundwater were presented in Section 5.1.4 of the 2011 Alternatives Analysis (pgs 62-64), identifying the distance surrounding the cooling towers that would experience salt deposition at levels known to cause adverse effects to vegetation. In order to avoid cooling tower drift impacts, approximately ½ of the total volume of brackish groundwater would need to be treated through reverse osmosis to reduce the total dissolved solids (TDS). This treated water would then be blended with the untreated water to reduce total TDS concentrations prior to use in the cooling system. The treatment level is not to drinking water standards; reverse osmosis is used to remove TDS only.

As described in Section 5.1.4 of the October 2011 Section 404(b)(1) Alternatives Analysis, cooling tower drift can contain high concentrations of dissolved minerals when using high TDS makeup water. Deposition of high TDS drift particles can influence water quality and adversely impact ecosystems. All areas of Florida have natural background deposition with higher levels near coastal environments. These coastal areas support flora and fauna with high tolerance for saltwater drift, such as coastal mangroves with physiological characteristics to allow the plants to survive in highly saline soils and areas of salt spray. Natural deposition varies depending upon the location relative to the coast. In highly exposed beach dune areas, natural deposition ranges from 140 to 375 kilogram/hectare/month (kg/ha/month) while less exposed areas such as coastal hammocks experience natural deposition rates from 12.5 to 33.3 kg/ha/month (KBN Engineering and Applied Sciences, Inc., 1988). In contrast, natural deposition rates for inland areas of south central Florida near Lake Okeechobee are about 4 kg/ha/month or less (FCG, 1988).

The TDS concentrations in south central Florida surface waters are typically in the range from <500 to 1,000 ppm. With modern cooling tower drift control technology and assuming four cycles of concentration, the maximum deposition from cooling tower drift when using freshwater would be less than natural deposition and would not cause adverse impacts to water quality, agriculture or natural ecosystems. However, inland sites that utilize water from the middle and lower Floridan Aquifer having a TDS of at least 10,000 ppm that is primarily salt (sodium and chloride) can have adverse impacts to surrounding water quality and vegetative communities. Deposits of TDS at rates of 1 to 2 kilogram/hectare/month (kg/ha/mo) is generally not damaging to vegetation, while deposition rates approaching or exceeding 10 kg/ha/month in any month during the growing season could cause leaf damage in many species (NRC, 2011).

To evaluate the effect of salt deposition, an analysis was conducted using the EPA and FDEP approved AERMOD model to predict the amount of salt deposition resulting from use high TDS groundwater (i.e., 10,000 ppm or greater). The simulation was modeled based on the cooling tower operational

parameters associated with the requirements for two AP1000 units. Five years of meteorological data for upper air and surface data for the closest primary National Weather Service station was used in the analysis. Based on 4 cycles of concentration in circulating cooling towers, the TDS in the circulating water using 10,000 ppm water from the middle/lower Floridan Aquifer would be 40,000 ppm, greater than that of seawater. A deposition rate of 10 kg/ha/month was used to evaluate the potential impacts due to cooling tower drift. This deposition rate coincides with the NRC criteria and the research on threshold effects to vegetation. In addition, a deposition rate of 10 kg/ha/month is about 2.5 times higher than the natural deposition experienced in inland areas of south central Florida.

Utilizing the modeling results, salt drift in excess of 10 kg/ha/month would extend approximately 2 kilometers from the cooling towers. Maximum monthly deposition would exceed 30 kg/ha/month within 1 kilometer of the cooling towers. Based on this analysis, the use of high TDS groundwater from the middle or lower Floridan aquifer may result in adverse impacts to salt-intolerant vegetative communities and aquatic systems within a 2 kilometer radius of the cooling towers, and are therefore must be diluted with less saline waters prior to use to reduce cooling tower drift.

Sites located along the coast could potentially utilize seawater for makeup to circulating water cooling towers. Seawater has a TDS concentration of 33,300 ppm or higher. The TDS in the cooling towers circulating water for seawater would range from 50,000 to 65,000 ppm based on 1.5 cycles of concentration. Based on the deposition analysis and a TDS in the circulating water of up to 65,000 ppm, the distances where deposition is equal to or less than 10 kg/ha/month would be less than 6 kilometers from the cooling towers. The plant species found in coastal areas are highly tolerant to salt deposition as demonstrated by the natural deposition rates that exceed 10 kg/ha/month. As a result, no adverse effects would occur from the use of cooling towers at coastal sites and cooling towers using seawater are a practicable alternative at coastal sites.

Question 2: In response to question 2, the Corps is unclear as to where some of the quoted terminology comes from, such as "frustrate the overall project purpose." None of the cases referenced in the June 28, 2013 submittal include this language. Rather, the case cited by FP&L in footnote 4, Nat'l Wildlife Fed'n v. Whistler, states, "The cumulative destruction of our nation's wetlands that would result if developers were permitted to artificially constrain the Corps' alternatives analysis by defining the projects' purpose in an overly narrow manner would <u>frustrate</u> the statute and its accompanying regulatory scheme." 27 F.3d 1341, 1346 (8th Cir. 1994)(emphasis added). Furthermore, FPL's assertion in footnote 4 of the June 28, 2013 submittal that "[t]hese factors must be considered in totality" is not supported by the case cited. This request for additional information will again convey the Corps' request that FP&L clearly demonstrate that the proposed project is the least environmentally damaging practicable alternative with information that the Corps can independently review and verify. This includes information showing that off-site alternatives are either not available, not practicable in terms of cost, logistics, or technology, or more environmentally damaging than FP&L's preferred alternative.

Response:
The reference to frustrating the overall project purpose comes from *City of Shoreacres v. Waterworth*, 420 F.3d 440, 449 (5th Cir. 2005). The citation was inadvertently deleted. The intended use of "frustrate" was that the inland sites "complicate" achieving the overall project purpose given the water challenges to overcome and the land use logistics.

A summary of the practicability factors applied to each site was provided in the June 28, 2013 response to the Corps' March 2013 RAI (Question 2, Table 1). As discussed in the response to Question 1 above, FPL has demonstrated that the proposed project is the least environmentally damaging practicable

alternative, by providing facts and information showing that off-site alternatives are either not available, not practicable in terms of cost, logistics, or technology, or more environmentally damaging than the preferred alternative.

Question 3: Again, the Corps has reservations that FPL does not correctly apply the 404(b)(1) Guidelines and the presumptions against discharge of fill into special aquatic sites. There is concern that FPL's site selection criteria do not demonstrate practicability but only a preference. Originally, FP&L considered over 20 potential sites, then narrowed the review to 10-15 potential sites, then 5 potential sites, upon which FP&L's Section 404(b)(1) Guidelines alternative site analysis is based. Since most potential sites were eliminated prior to selecting the remaining 5 alternative sites, the Corps is unsure if all factors were appropriately applied and would request that FP&L clearly demonstrate that each of the 20 or more off- site alternatives are either not practicable or more environmentally damaging. For example, on page 21 of the RAI submittal (L-2011-477 Enclosure Page 34 of 206), the second paragraph contains a discussion of a CERP project that was recently implemented next to the Martin A site. The Martin A site was eliminated from further consideration but it is not clearly stated for which reason; practicability or because it was not the least environmentally damaging? The discussion needs to be expanded and needs to include the data and rationale behind the determination so that the Corps can independently review and verify the information that FPL used to come to their conclusion. This example is typical of what is still needed from each of the alternative sites that were evaluated in the RAI.

Response:
FPL appreciates and applied the 404(b)(1) Guidelines in its 2011 alternatives analysis. The site selection study conducted in accordance with NUREG-1555 (NRC, 2007) and the Electric Power Research Institute (EPRI) Siting Guide: *Site Selection and Evaluation Criteria for an Early Site Permit Application* (EPRI, 2002), practicability evaluation of alternate sites, analysis of practicable sites in accordance with criteria presented in 40 CFR Part 230, and ultimate determination that the Turkey Point site was the LEDPA is well documented from the 2006 Site Selection Study Report, the Environmental Report (ER) provided with the COLA, the 2011 Augmented Site Selection Study Report, the 2011 Section 404(b)(1) Alternatives Analysis, the June 28, 2013 response to the Corps' March 2013 RAI, and the July 8, 2013 responses to the NRC's RAIs dated November 2012 (RAI 6879) and August 2012 (RAI 6353, Question 11). All of the documents and additional supporting documentation are included in the attached CD for your ease of reference.

The site selection process was conducted in accordance with the applicable NRC guidelines, as explained in FPL's July 8, 2013 response to NRC RAI 6879, Question 2:

> *Under the NRC's NEPA implementing guidance, NUREG-1555 (NRC, 2007), and Regulatory Guide 4.7 (NRC, 1998), applicants screen sites to develop sites that are "suitable," not necessarily practicable as defined in the 404(b)(1) context. Under this process, FPL, using "reconnaissance level information," identified suitable potential sites that meet the seven minimum criteria outlined in NUREG-1555, including consideration of consumptive uses of water, jeopardy of protected species, and impacts to aquatic ecosystems, as well as the safety and operational criteria from Regulatory Guide 4.7. These were treated as exclusionary criteria throughout the process, beginning with regional screening to identify candidate areas and then potential sites, so that no potential sites failing these criteria were considered in the identification of candidate sites. From this large list of suitable potential sites, FPL optimized the list by applying discretionary factors in order to help limit an otherwise "unworkable number of possible locations" (NRC, 2007). These discretionary factors, such as the distance to transmission and the existence of land-use conflicts, are not used to determine whether a site is suitable or viable, but*

instead are used to ensure the set of candidate sites meets the final NRC requirement for candidate sites, that they "would be among the best that could reasonably be found for the proposed plant" (NRC, 2007).

As discussed on page 15 of the 2011 Augmented Site Selection Study Report, each of the 23 sites was evaluated qualitatively with respect to the following considerations:

- Sufficient land currently exists for new nuclear power plant construction
- Sufficient land can be obtained for new nuclear plant construction
- Adequate sources of water; and
- Transmission feasibility.

The comparative scoring and weighting of sites in the August 2011 Augmented Site Selection Report gives detailed analysis of all of the candidate sites. The relative scoring shouldn't be misinterpreted to reflect "preferences" but the application of objective criteria used to determine that no alternative site was environmentally preferable to Turkey Point. It is important to note, due to the District's regulatory constraints on consumptive use of surface and groundwater, logistical and technological challenges with water supply would occur at any potential site located within the interior of the state, as discussed in the Enclosure 1 of the response to NRC RAI 6879, Question 2.

With respect to the elimination of the Martin A site in the 2011 Augmented Site Study, as referenced in the 2011 Section 404(b)(1) Alternatives Analysis, the comparison with the Martin site did not reveal any significant advantages. To the contrary, the location of the Martin A site adjacent to the C-44 Reservoir and Stormwater Treatment Area, upon lands that are not owned by FPL, and with no existing infrastructure to support nuclear generation, were identified as factors leading to elimination of the Martin A site in favor of the Martin site.

The site selection process started in 2006, reliance on the NUREG 1555 criteria, and the iterative screening methodology used to determine the five alternate sites were discussed during meetings at the Corps' Miami Regulatory Office in April 2010 and May 2011 and during numerous weekly conference calls prior to submittal of the October 2011 404(b)(1) Alternatives Analysis. The process mirrored that which was successfully used in the Progress Energy Levy nuclear siting process. The screening process based on NUREG and 40 CFR 230.10 criteria led to a practicability decision, NOT a preference. The ultimate reduction of 23 sites within the Region of Interest to 10 primary sites, 5 reasonable alternatives, and then to 2 practicable sites is substantiated in the attached materials.

Sincerely,

Matthew J. Raffenberg
Director of Environmental Licensing and Permitting

CC: Alicia Williamson, NRC

References:

FCG, 1988. Florida Acid Deposition Study, Final Report: A Synthesis of the Florida Acid Deposition Study, Volumes 1 and 2. Florida Electric Power Coordinating Group (FCG), Tampa, FL.

KBN Engineering and Applied Sciences, Inc. 1988. Environmental Assessment of Salt Drift from Florida Power Corporation Crystal River Plant.

NRC, 1998. Regulatory Guide 4.7 - General Site Suitability Criteria for Nuclear Power Stations.

NRC, 2007. Standard Review Plans for Environmental Reviews for Nuclear Power Plants (NUREG-1555).

NRC, 2011. Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Main Report (NUREG-1437) Volume 1.