UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE SECRETARY

In the Matter of Florida Power and Light Company Turkey Point Units 3 and 4	)	Docket Nos. 50-250/251-SLR

SOUTHERN ALLIANCE FOR CLEAN ENERGY'S
REQUEST FOR HEARING AND PETITION TO INTERVENE

I. INTRODUCTION

Pursuant to 10 C.F.R. § 2.309, the hearing notice published by the U.S. Nuclear Regulatory Commission ("NRC" or "Commission") at 83 Fed. Reg. 19,304 (May 2, 2018), and the Secretary's Order of June 13, 2018, Southern Alliance for Clean Energy ("SACE") hereby requests a hearing on Florida Power & Light Company's ("FPL's") application for "subsequent" license renewal ("SLR") for the Turkey Point nuclear power plant, Units 3 and 4. In Section II, SACE describes the organization and its standing to request a hearing. Section III sets forth SACE's contentions, which addresses the inadequacy of FPL's Environmental Report (Attachment 3 to FPL's SLR application of February 2018) to satisfy the National Environmental Policy Act ("NEPA").

In brief, SACE's Contention 1 challenges FPL's failure to grapple with the serious environmental damage caused by the cooling canal system ("CCS"), relied on by FPL for the past four decades to cool the Units 3 and 4 reactors, to the fragile Biscayne Bay ecosystem, the regional drinking water supply, and wildlife habitat in the CCS itself. FPL should not be allowed another twenty years of operation before analyzing the reasons for the failures of its efforts over the past decades to stem those impacts. Nor should FPL be allowed to go forward with a second license renewal term before reckoning with the fact that new measures it proposes for mitigation

of the CCS' impacts in the future are mutually inconsistent and counter-productive. Finally, FPL should be required to address an alternative cooling system, already approved and used by FPL for other plants on the Turkey Point site, which would eliminate the need for the CCS and thereby avoid its adverse environmental impacts: mechanical draft cooling towers. SACE provides extensive and detailed support for the concerns raised in its contentions in technical reports prepared by experts whom SACE has retained for a federal district court lawsuit challenging the CCS' noncompliance with the Clean Water Act ("CWA"). *Southern Alliance for Clean Energy, Tropical Audubon Society, Inc., and Friends of the Everglades, Inc. v. Florida Power & Light Co.,* No. 1:16-cv-23017-DPG (filed Oct. 11, 2016) ("CWA lawsuit").

II. SACE HAS STANDING TO REQUEST A HEARING.

Pursuant to 10 C.F.R. § 2.309(d), a request for a hearing must address: (1) the nature of the petitioner's right under the Atomic Energy Act ("AEA") to be made a party to the proceeding, (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding, and (3) the possible effect of any order that may be entered in the proceeding on the petitioner's interest. The Atomic Safety and Licensing Board ("ASLB") summarized these standing requirements as follows:

> In determining whether a petitioner has sufficient interest to intervene in a proceeding, the Commission has traditionally applied judicial concepts of standing. Contemporaneous judicial standards for standing require a petitioner to demonstrate that (1) it has suffered or will suffer a distinct and palpable harm that constitutes injury-in-fact within the zone of interest arguably protected by the governing statutes (*e.g.*, the Atomic Energy Act of 1954 and the National Environmental Policy Act of 1969); (2) the injury can fairly be traced to the challenged actions; and (3) the injury is likely to be redressed by a favorable decision. An organization that wishes to intervene in a proceeding may do so either in its own right by demonstrating harm to its organizational interests, or in a representational capacity by demonstrating harm to its members. To intervene in a representational capacity, an organization must show not only that at least one of its members would fulfill the standing requirements, but also that he or she has authorized the organization to represent his or her interests.

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Pacific Gas & Electric Co. (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 426 (2002).

SACE is a nonprofit, nonpartisan membership organization that promotes responsible energy choices that solve global warming problems and ensure clean, safe and healthy communities throughout the Southeast. SACE has staff, board members and members in Florida and throughout the Southeast, including offices in Knoxville, Tennessee; Asheville, North Carolina; and Atlanta, Georgia.

SACE's standing to participate in this proceeding is demonstrated by the declarations of Dan Kipnis (June 19, 2018) (Attachment 1); Mark Oncavage (June 25, 2018) (Attachment 2); and Richard Reynolds (June 20, 2018) (Attachment 3). As demonstrated in their declarations, these SACE members live near the Turkey Point site, *i.e.*, within 50 miles, and would be adversely affected by an accident at the reactors if FPL's operating license is renewed for a second term. SACE has presumptive standing by virtue of its members' location within 50 miles of a proposed nuclear plant operation. *Diablo Canyon*, 56 NRC at 426-27 (citing *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-06, 53 NRC 138, 146, *aff'd*, CLI-01-17, 54 NRC 3 (2001)).

By intervening in this proceeding, SACE seeks to protect its members' health, safety and lives, as well as the health and safety of the general public and the environment. SACE seeks to ensure that FPL's operating license is not approved for a second renewal term unless and until FPL demonstrates full compliance with NEPA's requirements for protection of public health and the environment.

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III. LEGAL FRAMEWORK: REQUIREMENTS OF

A. NEPA's Statutory Requirements

NEPA implements 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 v. Methow Valley Citizens Council,* 490 U.S. 332, 348 (1989) and citing 42 U.S.C. § 4331). NEPA has two key purposes: to ensure that the agency "will have available, and will carefully consider, detailed information concerning significant environmental impacts" before it makes a decision; and to guarantee that "the relevant information will be made available to the larger audience that may also play a role in the decision-making process and implementation of that decision." *Robertson,* 490 U.S. at 349.

In fulfilling NEPA's first purpose of evaluating the environmental impacts of its decisions, NEPA requires a federal agency to take a "hard look" at potential environmental consequences by preparing an EIS prior to any "major Federal action[] significantly affecting the quality of the human environment." *Robertson,* 490 U.S. at 349; 42 U.S.C. § 4332(c). The "hallmarks of a 'hard look' are thorough investigation into environmental impacts and forthright acknowledgment of potential environmental harms." *National Audubon Society v. Dep't of Navy*, 422 F.3d 174, 185 (4th Cir. 2005).

An EIS must include an evaluation of the cumulative impacts of a proposed action. As set forth in the regulations of the President's Council on environmental Regulations:

> "Cumulative Impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

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40 C.F.R. § 1508.7.

In addition, the agency must "rigorously explore and objectively evaluate the projected environmental impacts of all reasonable alternatives for completing the proposed action." *Van Ee v. EPA*, 202 F.3d 296, 309 (D.C. Cir. 2000). The alternatives analysis is the "heart" of an EIS. *City of Alexandria, Va. v. Slater*, 198 F.3d 862, 866 (D.C. Cir. 1999) (quoting 40 C.F.R. § 1502.14);

In fulfilling NEPA's second purpose of public participation, the agency's environmental analysis must be published for public comment "to permit the public a role in the agency's decision-making process." *Robertson*, 490 U.S. at 349-50; *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 443 (4th Cir. 1996). NRC's Part 51 regulations also allow interested members of the public to participate in the environmental decision-making process through the NRC's hearing process. 10 C.F.R. §51.104(a).

B. NRC Regulations for Implementation of NEPA

NRC regulation 10 C.F.R. § 51.45 requires that a reactor license applicant must submit an environmental report with its application. Specific requirements for license renewal applications are set forth in 10 C.F.R. § 51.53(c). Section 51.53(c)(2) establishes general requirements for reactor license renewal applicants, and § 51.53(c)(3) establishes requirements for applicants "seeking an initial renewed license." Because FPL is seeking a subsequent renewed license, § 51.53(c)(2) applies in this proceeding. Section 51.53(c)(2) requires an operating license renewal applicant (other than an applicant for initial license renewal) to describe, *inter alia*, "the affected environment around the plant," the "environmental impacts of alternatives," and "any other matters described in § 51.45(a)." Section 51.45(a), requires, in turn, that the Environmental Report must include the following information:

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> *Analysis*. The environmental report must include an analysis that considers and balances the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects. . . . The environmental report must also contain an analysis of the cumulative impacts of the activities to be authorized by the limited work authorization, construction permit, or combined license in light of the preconstruction impacts described in the environmental report. . . . The analyses for environmental reports shall, to the fullest extent practicable, quantify the various factors considered. To the extent that there are important qualitative considerations or factors that cannot be quantified, those considerations or factors shall be discussed in qualitative terms. The environmental report should contain sufficient data to aid the Commission in its development of an independent analysis.

IV. CONTENTIONS

Contention 1: Inadequate Discussion of Environmental Impacts of CCS

A. Statement of Contention

FPL's Environmental Report for Turkey Point Units 3 and 4 violates the National Environmental Policy Act ("NEPA") and NRC implementing regulation 10 C.F.R. § 51.53(c) by underestimating, or at times ignoring, the environmental impacts to the surrounding water resources by continuing to use the Cooling Canal System ("CCS") for cooling of Turkey Point Units 3 and 4. In particular, the Environmental Report fails to provide an adequate analysis of the environmental impacts of the CCS on the chemistry of groundwater, surface water and its aquatic life, and the CCS' own ecosystem. These adverse environmental impacts include the migration of a hypersaline plume that has developed in the Biscayne Aquifer beneath the CCS and now extends for miles in all directions. Contaminants in the plume and the groundwater, generated by the Turkey Point plant, include phosphorous, ammonia, TKN, total nitrogen, radioactive tritium, and chlorophyll *a*. The areas directly affected by these pollutants include the underlying Biscayne Aquifer and its protected G-II groundwater, surface waters of Biscayne Bay and Card Sound, and the L-31E Canal. Directly affected areas also include the CCS' seagrass ecosystem, which provides habitat for the federally threatened American crocodile. And

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indirectly affected areas include the Greater Everglades, which may be impacted by withdrawal of surface waters intended for use in Everglades restoration, for the purpose of reducing temperatures or salinity in the CCS.

FPL's Environmental Report also violates NEPA by overestimating the effectiveness of its proposed mitigation measures and failing to acknowledge how those mitigation measures will interact and undermine each other. For instance, FPL proposes to pump lower salinity water from the Floridan aquifer into the CCS to "freshen" it and thereby meet a required salinity limit of 34 psu ("practical salinity units"). Environmental Report at 3-94 – 3-95. FPL also proposes to extract contaminated water out of the underlying aquifer for purposes of reducing the hypersaline plume emitted by the CCS. But the addition of water into the CCS will increase the driving head of the hypersaline plume, thereby driving it downward into the aquifer and exacerbating the contamination of groundwater. In short, by flushing salt out of the CCS, FPL will drive the plume deeper into the aquifer, increasing the threat to the drinking water supply and Biscayne Bay. And the proposed extraction of water from the aquifer for purposes of reducing and removing the hypersaline plume is unlikely to have any significant or lasting positive effect.

Finally, FPL ignores or underestimates the cumulative impacts of past and future operations of the CCS. A cumulative impacts analysis is essential to evaluate the effects and interaction of the many water management measures that FPL and others have undertaken or proposed to mitigate the effects of Turkey Point's cooling system on the environment. NEPA requires FPL to undertake a broad and rigorous analysis of the cumulative effects of these mitigation strategies, comparing them and evaluating their interactions and net results. FPL should also examine how the mitigation strategies for Turkey Point interact with other environmental programs in the region, such as the Central Everglades Restoration Program

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("CERP"). FPL has yet to undertake such an analysis, and therefore its Environmental Report fails to satisfy NEPA.

As a result of the significant defects in FPL's Environmental Report, FPL's conclusion that the environmental impacts of continuing to operate the CCS during the SLR term will be "small" must be rejected as arbitrary and unsupported, and thereby inadequate to satisfy NEPA.

B. Basis Statement

1. Factual background on operating license issuance, renewal, and amendment for Turkey Point Units 3 & 4

In 1972-73, the NRC licensed the Turkey Point reactors for initial 40-year terms (until 2012 for Unit 3 and 2013 for Unit 4). As originally licensed, each of the Turkey Point reactors was designed for 2,200 megawatts ("MWs") of electricity generation. The NRC renewed FPL's operating licenses for Turkey Point Units 3 and 4 for an additional 20 years in 2002. Environmental Report at 1-1.

Since initial licensing of Turkey Point, FPL has obtained NRC authorization for two power uprates, raising the thermal output of each reactor from 2,300 megawatts ("MW") to 2,644 MW.[1]

2. Factual Background on the Cooling Canal System

a. General description

In the mid-1970s, in response to a 1971 federal court order ordering FPL to stop discharging cooling water directly into Biscayne Bay from its two operating oil-and-gas-fired

[1] In 1996, the NRC approved a power uprate, taking each of the reactors to 2,300 MW. Letter from Richard P. Croteau, NRC, to T.F. Plunkett, FPL, re: Turkey Point Units 3 and 4 – Issuance of Amendments re: Thermal Power Uprate (TAC Nos. M94313 and M94315) (Sept. 26, 1996) (ML013390234). In 2012, the NRC approved an "extended power uprate" ("EPU") to 2,644 MW for each reactor. Letter from Jason C. Paige, NRC, to Mano Nazar, FPL, re: Turkey Point Nuclear Plant, Units 3 and 4 -Issuance of Amendments Regarding Extended Power Uprate (TAC Nos. ME4907 and ME4908) (June 15, 2012) (ML11293A365).

units and prohibiting discharges to Biscayne Bay from FPL's two planned new nuclear units 3 and 4. FPL constructed a giant, 6,000-acre, two-miles-wide-by-five-miles-long, unlined cooling canal system adjacent to Biscayne Bay and Card Sound. *U.S. v. Florida Power & Light Co.,* 53 F.R.D. 249 (S.D.Fl. 1971) ("*U.S. v. FPL*"). Since then, FPL has depended on the CCS to receive direct discharge of heated water from Units 3 and 4, in order to prevent direct discharge of heated water into Biscayne Bay. The CCS also serves as the ultimate heat sink for the plant. Environmental Report at 3-82.

FPL characterizes the CCS as an "Industrial Waste Water" ("IWW") and "closed cycle" facility that does not discharge to surface water. Environmental Report at 2-4. However, the CCS does not function as a closed loop system hydrologically. As FPL concedes, the porosity of the rock under the CCS is "exceptional." Environmental Report at 2-7. As a result, water migrates freely between the CCS and the underlying aquifer. There is no geologic difference between the porosity of the limestone underlying the CCS from the limestone surrounding the CCS. Consequently, CCS water migrates outward in all directions. Expert Report of William Nuttle, Ph.D, PEng (Ontario) at 6 (May 14, 2018) ("Nuttle Report") (Attachment 4).

b. How Salinity Concentrates in the CCS

As CCS water is circulated and warmed by exposure to the reactors, evaporation losses to the atmosphere remove freshwater from the canal system causing a concentration of salinity that exceeds typical ocean salinities by a factor of more than two. Expert Report of Kirk Martin at 1 (May 14, 2018) ("Martin Report") (Attachment 5). Evaporation in the CCS is about 50 percent higher than what would occur from the same area of mangrove wetland under natural conditions. Nuttle Report at 4.

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Heat from the Turkey Point reactors contributes to the rate of evaporation and therefore the salinity of the CCS. After the NRC approved the extended power uprate for Units 3 and 4 in 2012, the heat level in the CCS, also rose. Environmental Report at 4-33. In 2014, in order to avoid shutdowns of the reactors for exceedance of the maximum temperature of 100 degrees Fahrenheit ("ºF") for the ultimate heat sink, the NRC amended FPL's license to allow the CCS temperature to rise to 104 ºF. *Florida Power & Light Co.* (Turkey Point Nuclear Generating, Units 3 and 4), LBP-16-08, 83 NRC 417, 422 (2016) ("LBP-16-08").

Salinity in the CCS has increased over time, due to increased evaporation. FPL states that initially, in the early 1970s, the annual average salinity in the CCS was approximately 34 psu. Environmental Report at 3-91. By 2013, annual average salinity had increased to approximately 70 psu in 2013. *Id.* Just a year later the salinity had exceeded 90 psu, causing the South Florida Water Management District ("SFWMD") to order the addition of massive amounts of freshwater from the nearby L-31 E canal to prevent the salinity and temperature from continuing to rise. SFWMD Emergency Final Order (May 19, 2015) (ML15314a699) ("SFWMD Emergency Order").

Increased salinity in water is accompanied by a corresponding increase in water density that causes hypersaline water to migrate downward into the underlying groundwater system and radially outward from beneath the CCS. Martin Report at 1. As discussed below in Section B.3.a, the hypersaline plume has moved and expanded several miles from the non-potable G-III groundwater underlying Turkey Point into the G-II drinking water groundwater to the west.

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3. The affected environment

a. Biscayne Aquifer

The environment affected by Turkey Point operations and the CCS includes the Biscayne Aquifer, which lies beneath the CCS. The Biscayne Aquifer is porous and connects with Biscayne Bay. Martin Report at 5. The Biscayne Aquifer is the "main aquifer in the surficial aquifer system in southeastern Florida" and "is used for primary water supply." Environmental Report at 3-96. The portion of the Biscayne Aquifer underlying the Turkey Point plant contains total dissolved solids ("TDS") concentrations greater than 10,000 mg/L (*i.e.,* saline to saltwater), and at FPL's request, this groundwater was reclassified from G-II to Class G-III non-potable. To the west of the G-III aquifer lies the potable G-II aquifer, which is protected as drinking water supply. The G-II potable aquifer is threatened by a hypersaline plume of groundwater, originating in the CCS, that extends radially from the CCS approximately 4 miles. Martin Report at 1-3. *See also* Expert Report of Larry Brand, Ph.D, Figure 4 at page 6 (May 14, 2018) ("Brand Report") (Attachment 6). On the east side of the CCS, the Biscayne Aquifer communicates with Biscayne Bay; and contamination from the CCS reaches Biscayne Bay by migrating through direct hydrological connections in the porous limestone. Martin Report at 5-11.

b. Biscayne Bay and Card Sound

The Turkey Point reactors lie adjacent to Biscayne Bay, the largest estuary on the coast of southeast Florida. The CCS lies within porous limestone that is connected hydrologically with the surrounding waters of the Bay. Biscayne Bay is also the site of Biscayne National Park, the largest marine park in the national park system; and it is contiguous with the southern Florida Everglades and Florida Bay. A portion of the Biscayne Bay Aquatic Preserve is located immediately east of the Turkey Point site; and a separate portion of the preserve, along with the

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Florida Keys National Marine Sanctuary, is located adjacent to the south-southeastern border of the site boundary. The close proximity of the CCS to Biscayne Bay and the Florida Keys Marine Sanctuary is shown in Figure 3.1-5 of the Environmental Report.

Biscayne Bay is protected under the Clean Water Act as Outstanding National Resource Waters ("ONRW"), *i.e.,* "high quality waters such as waters of National Parks, State parks and wildlife refuges, and waters of exceptional recreational or ecological significance." 40 C.F.R. § 131.12(a)(3), Florida Administrative Code ("F.A.C.") 62-302.700(10)(a). The Bay's highly bio-productive estuarine ecosystem includes extensive sea grass beds and mangrove forests, and supports numerous species, including 600 native fish, neo-tropical water birds and migratory habitat, and 20 threatened and endangered species including multiple species of sea turtles, the Florida manatee, the least tern, Schaus' swallowtail butterfly and the American crocodile.

Card Sound, a shallow bay south of the Turkey Point site, lies entirely within the Florida Keys National Marine Sanctuary. Environmental Report at 3-148. The mangrove forests surrounding Card Sound are part of the longest continuous stretches of mangroves remaining on the eastern coast of Florida, and they serve as food and refuge for approximately 70 percent of the area's commercially and recreationally important marine species. *Id.*

c. Cooling Canal System environment

The CCS itself is part of the environment affected by Turkey Point's operation. For many years after construction, the CCS was a healthy environment for fish and wildlife, attracting the federally threatened American crocodile:

> The CCS IWW facility contains an extensive system of canals and berms, and it has historically supported a variety of species of fish, mollusks, crustaceans, and submerged aquatic vegetation that are tolerant of subtropical, hypersaline environments. Table 3.7-1 provides a list of species historically known to occur in the CCS based on previous FPL monitoring studies. Many of these species were eaten by the federally threatened American crocodiles that live in the CCS. Adult American crocodiles were first observed

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> in the CCS in 1976, and nesting was first documented on the cooling canal berms in 1978. As a result, FPL developed a crocodile management plan that focused on the creation and enhancement of habitat and long-term population monitoring. [citation omitted].

Environmental Report at 3-164. Until 2010, the CCS "operated as a seagrass-based biological system." As the salt level in the CCS increased over time, however, the seagrass beds began to die off. By 2012, according to FPL, "few seagrass beds remained." *Id.* Although crocodiles remain in the CCS, their numbers are declining. *Id.* at 3-195.

d. Everglades

The Turkey Point reactors lie within the Florida Everglades ecosystem. As described in the Environmental Report:

> The broader Everglades ecosystem, which includes Biscayne National Park, has been in decline, and many of the species found in the park's fragile ecosystems are in danger of extinction or regional extirpation. The Comprehensive Everglades Restoration Plan (CERP) is a major restoration initiative that aims to restore the quantity, quality, timing, and distribution of fresh water in an effort to reverse decades of environmental decline. The Biscayne Bay Coastal Wetlands project is an effort under the comprehensive plan that will rehydrate wetlands and reduce point-source discharge into Biscayne Bay. The CERP is essential to revitalizing habitat within Everglades and Biscayne national parks. The plan is a major initiative of the U.S. Department of Interior and a wide range of other agencies, including the U.S. Army Corps of Engineers (USACE). At a cost of more than $10.5 billion and with more than a 35-year timeline, it is the largest hydrologic restoration project ever undertaken in the United States.

In a 2015 Consent Agreement with Miami-Dade County, FPL has acknowledged "the benefit of hydrologic restoration projects" contemplated by the CERP "in controlling movement of hypersaline and saline waters in the Biscayne Aquifer." Consent Agreement at 7 (Oct. 6, 2015). (ML15295A208). Therefore FPL has agreed to a number of measures to raise and maintain water elevations on its site, as well as monitoring of the hypersaline plume. *Id.* at 7-8.

In addition, water from the L-31E Canal is used to flood adjacent wetlands as part of the CERP. *See* SFWMD Order at 15. And around 2014, FPL installed flow barriers in the L-31E

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Canal, near Card Sound, and in the S20 canal to prevent the intrusion of salt water in the canals. Nuttle Report at 10. The demands of the CCS for additional lower-saline water may conflict with the demands of the CERP for maintaining high water elevations in the region.

4. History of measures to reduce environmental impacts of CCS

Beginning with the 1960s construction of the L-31E levee and canal and the 1970s construction of the CCS, FPL and others have implemented numerous measures to mitigate the effects of the Turkey Point cooling system on groundwater and surface water. In 2009, for example, FPL and the SFWMD entered the Fifth Supplement Agreement for Groundwater, Surface Water, and Ecological Monitoring in and around the Turkey Point CCS. In 2015, the Miami-Dade County Division of Environmental Resource Management ("DERM") issued an order requiring FPL to take further action to address water pollution emanating from the CCS. This order later led to a Consent Agreement between FPL and Miami-Dade County. Under the Consent Agreement, FPL agreed to take numerous corrective actions, including establishing a Corrective Action Plan. In 2016, the Consent Agreement was amended to address the issue of ammonia exceedances in surface water surrounding the CCS.

In addition, in 2016, FPL and the Florida Department of Environmental Protection ("FDEP") agreed to a separate Consent Order, establishing remediation and abatement measures to abate and protect against contamination of the Biscayne Aquifer and Biscayne Bay. The Consent Order directs FPL to reduce the average annual salinity to 34 psu or below within 4 years. FPL is to conduct "freshening activities" to achieve this goal. FPL describes freshening activities as "using fresher water sources to replace freshwater evaporated from the CCS and thereby reduce the average annual CCS salinity." Nuttle Report at 19.

Among the most significant mitigation measures required of FPL are:

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a. L-31E Canal

In the 1960s, before licensing of Turkey Point, the SFWMD L-31E Canal and levee were built along the Biscayne Bay shoreline, with the purpose of blocking surface water and groundwater flow from inland areas to the bay. 2002 SEIS for Turkey Point License Renewal at 4-49. The CCS was later built less than 0.4 km (1/4 mi) to the east of the L-31E Canal. *Id.* FPL relies on the L-31E Canal to block or redirect the westward flow of groundwater from the CCS. Environmental Report at 3-105. In addition, FPL has pumped water from the L-31E Canal to "freshen" the CCS. *Id.* at 208. The L-31E Canal is a navigable waterway. Brand Report at 4.

The L-31E Canal has another important use, as a source of water for the Central Everglades Restoration Project ("CERP"). *See* "SFWMD Emergency Order") at 5-7. And SFWMD has allowed FPL to remove water from the L-31E Canal on an emergency basis to reduce salinity levels in the CCS. *Id.* This use is a potential conflict with the use of canal water reserved for the CERP.

b. Cooling canal system

In practical effect, the CCS itself constitutes a court-ordered mitigation measure for the adverse effects of cooling the Turkey Point facility, including the Turkey Point Units 3 and 4 reactors. In 1972, when the NRC issued its Environmental Impact Statement ("EIS") for the Turkey Point Units 3 and 4 operating license, FPL proposed a once-through cooling system that would discharge cooling water directly into Card Sound. Environmental Statement for the Turkey Point Plant at X-5 (1972) ("1972 EIS") (ML092030310). FPL considered and rejected other alternatives, including mechanical draft cooling towers. *Id.* at X-5 – X-10. As conceded in the 1972 EIS, however, direct discharges into Card Sound or Biscayne Bay were prohibited by *U.S. v. FPL*. *Id.* at X-20. Thus, FPL built the CCS to satisfy the court's order.

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c. Interceptor ditch

At the time FPL built the CCS, FPL agreed with the Central and Southern Florida Flood Control District (predecessor of the SFWMD) to build a separate "interceptor ditch" just west of and adjacent to the CCS, and near the L-31E Canal and levee. Environmental Report at 2-9. The purpose of the interceptor ditch is to restrict westward movement of saline groundwater from the CCS and limit groundwater salinity levels "to those amounts which would occur without the existence of the CCS." *Id.* Water levels in the interceptor ditch must be manipulated in order to prevent the westward movement of groundwater. As described by FPL:

> During most of the year, a natural seaward gradient does exist. During those times when a westward gradient is measured from the interceptor ditch/CCS and the L-31E Canal, pumps located within the interceptor ditch are activated to lower the stage in the interceptor ditch to at least 0.25 feet below the concurrent stage measured in the L-31E, thereby restoring a seaward gradient.

Environmental Report at 3-105.

d. Pumping additional water into CCS

Under the 2016 Consent Order between FPL and FDEP, FPL is required to take a number of actions to abate and remediate the existing and potential environmental effects of the CCS. Environmental Report at 3-92. As summarized by FPL:

> The primary objectives of the 2016 CO are to: (1) cease discharges from the CCS that impair the reasonable and beneficial use of the adjacent G-II groundwaters west of the CCS; (2) prevent releases of groundwater from the CCS to surface waters connected to Biscayne Bay that result in exceedances of surface water quality standards in Biscayne Bay by undertaking restoration projects at Turtle Point and Barge Basin; and (3) provide mitigation to address impacts due to historic operation of the CCS.

Id. These requirements include lowering the salinity in the CCS to 34 psu. FPL plans to do this by adding brackish water from the Upper Floridan Aquifer, saline water from Biscayne Aquifer wells, and freshwater from the L-31E Canal into the CCS. Environmental Report at 2-8, Martin Report at 12.

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e. Recovery wells

Under the Consent Order, FPL also must remediate the hyper-saline groundwater in the Biscayne Aquifer west and north of FPL's property. FPL proposes to carry out the remediation by installing recovery wells located along the western edge of the CCS to extract hypersaline water from the aquifer. Environmental Report at 3-109, Martin Report at 12.

f. Backfilling of remnant canals

Pursuant to the 2016 Consent Order, FPL plans to attempt mitigation of nutrient contamination in Biscayne Bay by backfilling two manmade excavations at the Barge Basin Canal (sites TPBBSW-6 and 8) and the Turtle Point Canal (site TPBBSW-7). Environmental Report at 9-15, Martin Report at 12.

5. The Environmental report violates NEPA by incorrectly minimizing the significance of the CCS' environmental impacts.

In violation of NEPA, FPL attempts to minimize the significance of the CCS' environmental impacts by underestimating them.

a. Underestimated environmental impacts on Biscayne Aquifer

FPL erroneously minimizes the environmental impacts of the CCS on the Biscayne Aquifer. For instance, FPL asserts that the hypersaline plume from the CCS extends 1.5 miles from the Turkey Point site. Environmental Report at 3-91. In reality, however, the data show that the hypersaline groundwater plume has moved more than two miles westward of the CCS and is currently influencing movement of the saline water interface within the Biscayne Aquifer more than four miles inland. *See* Brand Report, Figure 4 at page 6. As stated by Mr. Martin, the "CCS has dramatically impacted water quality in the Biscayne Aquifer west of the CCS and is the principle (sic) influence on the movement of the saline water interface in the Biscayne Aquifer

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that continues to threaten fresh drinking water sources in southern Miami-Dade County." Martin Report at 13.

In addition, while FPL claims to be in compliance with its permits related to operation of the CCS, groundwater modeling shows that westward migration of the hypersaline groundwater plume is a significant contributor to water quality violations in the potable G-II groundwater to the west of the CCS. Expert Report of Edward A. Swakon, P.E. at 1 (May 14, 2018) (Attachment 7) ("Swakon Report").

b. Underestimated environmental impacts on Biscayne Bay

FPL claims to have studied the groundwater interface with Biscayne Bay and found that "the groundwater pathway is having no discernable influence on Biscayne Bay." Environmental Report at 4-68. But FPL's assertion is contradicted by ample evidence that wastewater from the CCS is reaching Biscayne Bay and that it has a significant adverse environmental impact. As discussed in the Martin Report, groundwater data for tritium from beneath Biscayne Bay indicate that movement of the contaminant plume originating from the CCS is radial and likely extends as far east as the plume migration to the west. Martin Report at 4. Elevated tritium levels are also found in surface water samples taken in deeper portions of Biscayne Bay. *Id.* at 5. These readings are consistent with the high porosity and permeability of the bedrock immediately underlying the CCS and Biscayne Bay. *Id.* Samples from locations adjacent to or within manmade channels that connect Biscayne Bay to the outer edge of the CCS show Nitrogen, Phosphorous, and Chlorophyll *a* levels in excess of regulatory limits. *Id.* at 5-6. *See also* Brand Report (noting levels of total nitrogen, total phosphorous, ammonia, and chlorophyll *a* in excess of regulatory limits).

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The environmental effects of nutrient seepage from the CCS into Biscayne Bay are significant, because Biscayne Bay is a "low-nutrient" or "nutrient-limited" ecosystem. Expert Report of J.W. Fourqurean, Ph.D (Miami) at 1 (May 14, 2018) (Attachment 8) ("Fourqurean Report"). If nutrient delivery is increased, seagrasses are killed and replaced by fast-growing, noxious seaweed. *Id.* The density and species composition of the seagrasses of southern Biscayne Bay are controlled by the availability of phosphorous. *Id.* at 3. In Dr. Fourqurean's expert opinion, the operation of the CCS has (1) carried phosphorous-polluted groundwater to near-shore surface waters through the highly porous bedrock of the Biscayne Aquifer and (2) has dissolved carbonates in that bedrock, releasing additional phosphorus that had been incorporated into that rock. As this phosphorus reaches the seagrass meadows offshore in Biscayne Bay, it will continue to degrade the ecosystem and cause an imbalance and change the nature of the surrounding marine environment. *Id.* at 6.

c. Underestimated impacts on the American crocodile habitat in the CCS

FPL acknowledges that the crocodile population in the CCS has declined in recent years. Comparing 2013 and 2014 with 2015, FPL reports that the number of successful nests declined from 25 to 9, and the number of tagged hatchlings declined from 429 in 2013 to 409 in 2014 to 119 in 2015. Environmental Report at 3-195. By 2016, FPL had located only 8 successful nests and 127 hatchlings. *Id.* Instead of acknowledging that this steep decline signals a loss of critical seagrass bed habitat for a threatened species caused by its own operation of the CCS, however, FPL blithely asserts that "[t]he American crocodile population continues to remain in a much stronger position than before the Turkey Point CCS was established." *Id.* at 3-195. FPL has also assured the U.S. Fish and Wildlife Service, in its consultation letter under the Endangered Species Act, that renewal of the Turkey Point operating license "will not change the effects" of

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the plant's operation on the American crocodile because FPL does not plan any "refurbishments, construction, or physical changes." Letter from Matthew J. Raffenberg, FPL, to Roxanne Hinzman, U.S. Fish and Wildlife Service (Jan. 20, 2018) (Attachment B to Environmental Report).

These assertions are absurd: FPL created critical seagrass habitat for the American crocodile (*see* Figure 3.7-4) that is in the process of destruction by the continued operation of the CCS through continued exposure to excessive levels of salt and nutrients. *See* Fourqurean Report at 1-3. A second renewal of FPL's operating license, if the CCS is allowed to continue to operate, would destroy that habitat completely. This significant adverse environmental impact on a threatened species must be admitted and analyzed in the Environmental Report.

6. The Environmental Report violates NEPA by overstating the beneficial effects of existing and proposed mitigating measures and ignoring their negative effects.

FPL also attempts to minimize the environmental impacts of the CCS by overstating the beneficial effects of existing and proposed mitigating measures to offset the adverse environmental impacts of continuing to operate the CCS. These mitigative measures include pumping water from groundwater wells into the CCS, extracting saline water from the aquifer, and backfilling remnant excavations that serve as channels for groundwater migration. Not only are these measures less effective than FPL claims, but one is clearly counter-productive: the addition of water to the CCS, intended to benefit the CCS ecosystem, is now exacerbating and will continue to exacerbate the migration of a hypersaline plume into the underlying aquifer. "To rely on beneficial environmental effects of mitigation measures . . . without also evaluating the potential negative effects of those same measures, runs directly counter to the twin aims of NEPA – review and disclosure." LBP-16-08, 83 NRC at 446 (citing *Entergy Nuclear*

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Operations, Inc. (Indian Point Nuclear Generating Units 2 & 3), CLI-16-07, 83 NRC 293, 307 (2016)).

a. Overstated effectiveness of existing and planned mitigative measures to reduce and remove the hypersaline plume

FPL asserts that it has already extracted approximately 890,000 tons of salt from the Biscayne Aquifer beneath the CCS, and expects that its recovery well system will stop the westward migration of the hypersaline plume within three years from now. Environmental Report at 3-94. FPL further predicts that the plume will be retracted "back to the FPL site boundary" within ten years." *Id.* This conclusion is disputed by SACE's experts Martin, Nuttle and Swakon. Based on groundwater and surface water monitoring data showing contamination of the Aquifer and Biscayne Bay, Mr. Martin asserts that:

> The hypersaline plume originating from the FPL CCS has dramatically impacted water quality in the Biscayne Aquifer west of the CCS and is the principle influence on the movement of the saline water interface in the Biscayne Aquifer that continues to threaten fresh drinking water sources in southern Miami-Dade County. Impacts of the CCS plume are radial and adversely affecting water quality in Biscayne Bay to the east as indicated by nutrient and salinity data collected from Biscayne Bay surface water monitoring sites.

Martin Report at 13. In addition, as noted by Mr. Martin, the considerable distance of the recovery well locations from the western extent of the plume will limit FPL's ability to fully extract the hypersaline water. Martin Report at 12.

Relying on a data-based water budget for the CCS, the recovery well system, and the Aquifer, Dr. Nuttle concludes that the volume of contaminated water that can be extracted using the recovery well system "is barely adequate to offset the rate at which the continued operation of the cooling canals adds water to the plume" (Nuttle Report at 3), and therefore success of the recovery well system is "highly unlikely." *Id.* at 18. As explained by Dr. Nuttle:

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> The Consent Order prescribes that the recovery well system is supposed to "halt the westward migration of hypersaline water from the CCS within 3 years," and "retract the hypersaline plume to the L-31E canal within 10 years." To accomplish this, a series of 10 recovery wells will be sited along the western boundary of the CCS. These wells will remove water from the plume, which is to be disposed by deep well injection. Operation of the recovery well system is subject to the constraint that there be no "adverse environmental impacts." This is assured by establishing an upper limit on the aggregate rate that the wells can withdraw water from the plume – 5.4 billion gallons per year, or 15 mgd.
>
> At the maximum rate pumping rate, it is highly unlikely that the recovery well system can succeed in retracting the plume within 10 years. In 2013, it was estimated that the western extent of the plume contained 123 billion gallons of water originally discharged from the CCS. This is more than twice the volume of water that can be recovered if the recovery wells are pumped at their maximum rate for 10 years. And, it is certain that, through mixing with ambient water in the aquifer and the accumulated discharge from the CCS over the past 5 years, the volume of hypersaline water that now must be removed to retract the plume is much larger. CCS water added to the aquifer with a salinity of 60 psu can be diluted with nearly an equal volume of freshwater and still be considered hypersaline.

Id. (citations omitted). And as Mr. Swakon concludes, based on independent groundwater modeling, "[t]he methods employed by FPL to halt the movement of the saltfront are insufficient." Swakon Report at 2.

FPL also overstates the likely positive effects on groundwater flow of backfilling two man-made excavations at the Barge Basin Canal (sites TPBBSW-6 and 8) and the Turtle Point Canal (site TPBBSW-7). While backfilling of deeper excavations at those two sites will likely reduce the direct flow of contaminated groundwater into Biscayne Bay at those particular locations, numerous pathways exist that are not being addressed. Martin Report at 12. Other existing deep excavated sites such as the Old Card Sound Canal and unfilled continuations of Barge Bay and Turtle Point canals will continue to provide direct pathways for contaminant travel. In addition, numerous natural underground connections exist within the Biscayne Aquifer and sampling from deep seeps within Biscayne Bay indicate groundwater migration into the Bay especially during low tide events. *Id.*

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b. Negative impacts of mitigation measures to reduce salt levels in the CCS

FPL proposes to mitigate the hypersaline condition of the CCS by "freshening" it with water from other sources. Environmental Report at 3-306. According to FPL, "[a]ready FPL's actions are achieving improvements in CCS salinity." Environmental Report at 3-90. But FPL fails to account for the exacerbating effect of pumping more water into the CCS on the migration of the hypersaline plume in the underlying aquifer. In particular, FPL fails to acknowledge that adding water to the CCS has the adverse consequence of increasing the hydraulic head on the hypersaline plume, thereby driving it farther into the Biscayne Aquifer. Martin Report at 12, Nuttle Report at 20, Expert Report of E.J. Wexler, P.Eng. (Ontario) at 2 (May 14, 2018) (Attachment 9) ("Wexler Report").

The effect of the hydraulic head of the hypersaline plume can be seen in the correlation between water levels in the CCS and contamination levels in Biscayne Bay, as demonstrated by surface water monitoring data in Biscayne Bay. Martin Report at 10. These data show particularly elevated nutrient concentrations in Biscayne Bay surface waters when water levels are high in the CCS. *Id.* The period of highest water levels in the CCS corresponds to water being added to the CCS from the L-31E Canal and other sources to reduce temperature and salinity within the CCS. A comparison of ammonia levels in Biscayne Bay with times of high water levels in the CCS strongly suggests that the addition of significant amounts of water to the CCS will increase contaminant flows from the CCS to the surrounding groundwater system and to surface waters of Biscayne Bay. *Id.*

As noted by Dr. Nuttle:

> The effect of "freshening activities" is exactly opposite the usual meaning of the term "cease discharges from the CCS." In the context of the CCS water budget (Eq.'s 1 and 2), freshening activities increase the daily quantities of "other inputs." This has two effects. First, the volume of water in the CCS increases. Second, as the volume and water levels

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> increase, the flow of water into the aquifer from the CCS increases until it balances the inflow provided by new sources of water. Likewise, the long-term reduction in salinity to 35 psu requires reducing the mass of salt in the CCS. The only mechanism that removes salt from the CCS is by flushing it into the aquifer.

Nuttle Report at 20. As Dr. Brand points out, high concentrations of nutrients are also associated with the hypersaline plume. FPL has failed to grapple with the problem posed by SACE's experts, as summarized by Dr. Nuttle: that freshening of the CCS works at "cross purposes" with the goal of eliminating or reducing the hypersaline plume. Nuttle Report at 20. *See also* Brand Report at 25-26 ("Considering the amount of water being proposed to be added to the CCS on a daily basis will raise the driving head of the CCS causing flushing and forced seepage on a more consistent basis. In other words, requiring a standard of 34 psu in the CCS will actually make the nutrient pollution in Biscayne Bay and in the G II aquifer worse.")

7. FPL fails to adequately address the cumulative impacts of operating Turkey Point Units 3 and 4 and the CCS.

FPL asserts that the environmental impacts of operating Turkey Point Units 3 and 4 and the CCS for an additional twenty years will be small because FPL will comply with its permits for the CCS:

> As indicated in Section 4.12 of NRC Regulatory Guide 4.2, Revision 1 (NRC 2013b), it may be assumed that cumulative impacts are managed as long as facility operations are in compliance with their respective permits. Given that FPL continues to comply with its permits for groundwater withdrawals and injection, the FDEP CO [consent order] for freshening of the cooling canals, and the CA [consent agreement] with Miami-Dade County for remediation of the hypersaline plume, cumulative impacts would be managed, and continued operation of PTN during the SLR period would be small.

Environmental Report at 4-69. But the history of Turkey Point's operation shows that FPL is not in compliance with its permits. *See* Section B.5.a above. In addition, these permits are part of a successive long string of failed mitigation measures intended to stem the adverse environmental impacts of Turkey Point's cooling water discharges on the fragile Biscayne Bay ecosystem,

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dating back to the court order for construction of the CCS in 1971. The CCS has not only failed to protect Biscayne Bay, but it has salted the aquifer beneath the site, threatening drinking water supplies and other uses. While FPL and its regulators have piled on additional mitigative measures – most recently the interceptor ditch and "freshening" of the CCS with water pumped from groundwater wells and the L-31E canal – these efforts have failed to halt the movement of the hypersaline plume farther into the aquifer. And FPL's latest strategy, the recovery well project, has no real hope of succeeding. Nuttle Report at 18. NEPA requires that the environmental implications of this succession of failures must be examined before FPL may be allowed to operate Turkey Point and the CCS for another twenty years.

In a cumulative impact analysis, FPL should examine the environmental impacts of its efforts to contain pollutants from the CCS, examining the effectiveness and adverse effects of all of its mitigation measures, past, present and proposed. FPL should begin by putting its mitigation efforts in historical context. As described in FPL's 2002 License Renewal SEIS:

> Since the mid-nineteenth century, water management activities in southern Florida have disrupted the natural groundwater flow in the Turkey Point area. As the U.S. Environmental Protection Agency (EPA) stated in their review of the environmental statement for the construction of the Turkey Point Plant (AEC 1972, Appendix E-1 0), "it is essential to note that the flow of surface water over the marsh area and through the mangrove fringe has not existed for over 30 years because of drainage canals and roads that serve as diversion dikes."

Id. at 4-49. Thus, FPL should examine the historical effectiveness and adverse effects of the L-31 levee, in combination with the CCS, in creating the hypersaline plume that threatens the Biscayne Aquifer. As FPL acknowledged in the environmental report for the combined licensing proceeding for Turkey Point Units 6 and 7:

> Because the L-31E levee intercepted freshwater flows that historically discharged as sheet flow to the coastal wetlands and the bay east of the canal, the salinity of the wetlands has increased over time.

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Turkey Point Units 6 & 7 COL Application Part 3 - Environmental Report (Dec. 8, 2014) (ML14342A011). In the Environmental Report for Turkey Point Units 3 and 4, FPL fails to address the combined effects of the L-31E levee and evaporation from the CCS on the degree to which the CCS and the underlying aquifer have become hypersaline and contaminated other parts of the aquifer and Biscayne Bay.

FPL should also assess the cumulative impacts of the CCS, combined with other environmental factors, on hypersalinity in the CCS and the aquifer beneath. FPL's Environmental Report fails to provide such an analysis, treating the various factors that contribute to increased temperatures in the CCS as if they were separate and completely independent rather than examining their relationship. For instance, FPL attributes post-uprate temperature increases in the CCS to:

> a series of events that degraded CCS water quality and negatively affected the heat exchange capacity of the CCS, including the following: lower than average precipitation into the CCS during 2011 through early 2014; reduced circulation within the CCS; periods of degraded water quality in the CCS during 2012 and 2013 (increased salinity, turbidity, and algal concentration); and decreased CCS heat exchange efficiency from historical levels in 2013 and 2014, likely due to significant blockages and increased sediment levels principally in the northern segments of the CCS.

Environmental Report at 4-33. But FPL fails to address the interaction of environmental factors such as salinity, turbidity, and algal concentrations with the operation of the CCS. For instance, as discussed in the Fourqurean Report, an increased level of nutrients in seagrass beds causes seagrass mass to increase before die-off occurs. *Id.* at 3. Dr. Brand also raises the concern that flushing of the CCS with more water will exacerbate nutrient contamination in Biscayne Bay. Brand Report at 1-2. FPL should examine the degree to which operation of the Turkey Point reactors and the CCS interacts with these environmental factors.

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As discussed above, FPL attributes the temperature rise in the CCS to environmental factors other than the increased thermal output of Turkey Point Units 3 and 4. Petitioners contend that the reactors' thermal output is, indeed, a significant contributor if not the most important contributor. In any event, if continued operation of Turkey Point Units 3 and 4 at higher temperatures contributes to a system that is already overheated from other sources such as the increasingly warm climate, it is one more reason for concern that the system is being overloaded and therefore alternatives must be examined. The demand for water to cool or freshen the CCS must also be examined in relation to the demand for water to restore the Everglades, such as the water in the L-31E Canal.

Finally, FPL's cumulative impact analysis should examine the long-term cumulative effects of the CCS on the American Crocodile, a species that was drawn to the CCS when it was built, thrived there for decades, and then recently went into collapse. FPL's addition of water to the CCS has not, so far, reversed the steady decline of the American crocodile in recent years. Furthermore, FPL's cumulative impacts analysis should examine the degree to which FPL, by attempting to mitigate one environmental problem (hypersalinity in the CCS) has seriously aggravated another environmental problem: groundwater and surface water pollution. The cumulative impacts analysis should also address the net result of increasing the hydraulic head on the hypersaline plume by pumping more water into the CCS at the same time that FPL attempts to draw the plume back to the site boundary by pumping out the aquifer.

NEPA requires that FPL's cumulative impact analysis must cover both space and time, looking at all of the environmental resources and values FPL seeks to protect. 40 C.F.R. § 1508.7. Space includes the massive South Florida landscape and waterscape of Biscayne Bay and its environs, the Biscayne Aquifer beneath the Bay and the land, and the micro-environment

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of the CCS. The time period that should be examined stretches from the construction of the L-31E levee and canal in the 1960s, through 1971 licensing and the four decades of Turkey Point's operation, through the end of FPL's SLR term in 2053, and well beyond -- because the fragile ecosystems of South Florida will bear the marks of Turkey Point's operation indefinitely.

C. Demonstration that the Contention is Within the Scope of the Proceeding

Contention 1 is within the scope of this SLR proceeding because it raises an issue of compliance with NEPA and NRC regulations for implementation of NEPA.

D. Demonstration that the Contention is Material to the Findings NRC Must Make to Renew FPL's operating license

Contention 1 is material to the findings that NRC must make in order to renew FPL's operating license for a second time because it seeks to ensure that FPL's application fulfills the requirements of NEPA and NRC regulations for the implementation of NEPA.

E. Concise Statement of the Facts or Expert Opinion Supporting the Contention, Along with Appropriate Citations to Supporting Scientific or Factual Materials

In Contention 1, SACE relies on and explicitly cites statements in FPL's Environmental Report, publicly available government documents, and the expert reports attached to this hearing request and petition to intervene. The author of each expert report has submitted a declaration stating that the facts in his expert report are true and correct, and that the expert opinion stated in the expert report is based on his best professional judgment. *See*:

Attachment 11, Declaration of William Nuttle, Ph.D, PEng (Ontario) (July 17, 2018)
Attachment 12: Declaration of Kirk Martin, P.G. (July 30, 2018)
Attachment 13: Declaration of Larry Brand, Ph.D (July 26, 2018)
Attachment 14: Declaration of Edward A. Swakon, P.E. (June 29, 2018)
Attachment 15: Declaration of J.W. Fourqurean, Ph.D (Miami) (July 17, 2018)
Attachment 16: Declaration of E.J. Wexler, P.Eng (July 25, 2018)

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As discussed in the Declaration of James Porter (July 25, 2018) (Attachment 17), some of the information in these expert reports or their attachments is marked confidential, privileged, or copyrighted. Notwithstanding these markings, neither SACE nor the authors of the expert reports seek to withhold those reports and materials from public disclosure under 10 CFR § 2.390 or otherwise. The authors of the reports have confirmed SACE may publicly use all of the information in their reports and attachments in this proceeding, and that they have all necessary permissions from third parties. *Id.*, par. 3.

Contention 2: Inadequate Consideration of the Alternative of Mechanical Draft Cooling Towers

A. Statement of Contention

FPL has failed to consider the reasonable alternative of cooling the Turkey Point Units 3 and 4 reactors with mechanical draft cooling towers, in violation of NEPA and 10 C.F.R. § 51.53(c)(2). The cooling tower alternative should be considered because it is feasible and cost-effective. It is also superior to FPL's preferred alternative of continuing to rely on the CCS, because it would likely eliminate the adverse impacts of continuing to operate the CCS that are set forth in Contention 1.

B. Basis Statement

FPL's SLR application is governed by NRC regulations 10 C.F.R. §§ 51.53(c)(2) and 51.45. These provisions require FPL's Environmental Report to consider alternatives that are "relevant to mitigation." FPL's Environmental Report fails to satisfy these requirements because it does not consider the reasonable, feasible and cost-effective mitigation alternative of substituting mechanical draft cooling towers for the CCS. Consideration of reasonable mitigation alternatives is required by 10 C.F.R. §§ 51.45 and 51.53(c)(2). "An otherwise reasonable alternative may not

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be excluded from discussion solely on the ground that it is not within the jurisdiction of the NRC." 10 C.F.R. Part 51, Appendix A to Subpart A, § 5.

Mechanical draft towers are demonstrably reasonable, feasible and cost-effective, as demonstrated by the attached Expert Report of Bill Powers, P.E., Powers Engineering (May 14, 2018) ("Powers Report") (Attachment 10). As set forth in Mr. Powers' Report:

- Mechanical cooling towers would completely eliminate the adverse environmental impacts of the CCS, by eliminating the CCS as a source of cooling water and substituting reclaimed water from the Miami-Dade Water and Sewer Department ("MDWASD"). As discussed in Mr. Powers' Report, "[t]he pumping of 14 mgd from the Upper Floridan Aquifer for CCS salinity control can be discontinued when the Units 3 and 4 cooling towers are operational, as makeup water for these cooling towers will be MDWASD reclaimed water and the CCS will no longer be used for cooling." *Id.* at 26. The net evaporation from the cooling towers would be about the same as from the CCS; but the towers would use low-salinity reclaimed water, thus avoiding the continued concentration of salt in the CCS by evaporation of the brackish water in the CCS. Powers Report at 26-27. A zero liquid discharge ("ZLD") system would be utilized to treat blowdown from the Units 3 and 4 cooling towers to eliminate wastewater discharges.
- As a result of substituting cooling towers for the CCS, the CCS would no longer be used to circulate water through the Turkey Point reactors, thereby heating the water beyond natural temperature levels. Thus, it would no longer be necessary to pump water into the CCS to maintain salinity below 34 psu. *Id.* The CCS could be restored to a thriving seagrass community and wildlife habitat.

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- If water is not pumped into the CCS, then abatement measures by FPL, such as the extraction of water from recovery wells, would have a greater chance of success. *See* Nuttle Report, cited in Contention 1.
- The use of mechanical draft cooling towers with ZLD technology at Turkey Point Units 3 and 4 represents the best available technology for eliminating surface water thermal discharge impacts and hypersalinity impacts on the aquifer underlying the CCS.
- Use of MDWASD reclaimed water as the makeup water supply for the proposed Units 3 and 4 cooling towers would contribute to the resolution of a regional treated wastewater discharge disposal challenge and eliminate evaporative losses of surface water in the CCS due to heated discharge water from Units 3 and 4.
- Mechanical draft towers would be a cost-effective alternative to the CCS. Powers' Report at 1-2, 30, 39-40.
- The feasibility of using MDWASD reclaimed water as cooling tower makeup water supply at Turkey Point is well-established. Reclaimed water is the sole source of makeup water supply at Palo Verde Nuclear. Reclaimed water is identified by FPL as the primary source of makeup water for the Turkey Point Units 6 and 7 cooling towers, which have been licensed by the NRC (although FPL has delayed the project). FPL also identified its intention to potentially transition its Unit 5 cooling tower makeup water supply from the Upper Floridan Aquifer to reclaimed water at some point in the future. A Joint Participation Agreement signed by FPL and Miami-Dade on April 10, 2018 would facilitate this transition. The Joint Participation Agreement envisions MDWASD supplying up to 60 million gallons per day ("mgd") of reclaimed water for use in the CCS and the Unit 5 cooling tower by the end of 2025. Powers Report at 24.

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- Construction of cooling towers would ensure the reliability of the Units 3 and 4 cooling systems through 2052 and 2053, the respective end dates requested by FPL for Units 3 and 4 in its January 2018 license extension application to the NRC. Powers Report at 2.

In addition, the reasonableness of mechanical draft cooling towers as a mitigation alternative is established by the fact that they have been consistently considered in every environmental study for licensing or re-licensing of Turkey Point. *See* 1972 EIS at X-21 and XI-2 (alternative cooling system for nuclear reactors); 2002 GEIS Supplement at 8-8 (cooling system for natural gas alternative); and Environmental Report at (cooling system for natural gas alternative).

C. Demonstration that the Contention is Within the Scope of the Proceeding

Contention 2 is within the scope of this SLR proceeding because it raises an issue of compliance with NEPA and NRC regulations for implementation of NEPA.

D. Demonstration that the Contention is Material to the Findings NRC Must Make to renew FPL's operating license

Contention 2 is material to the findings that NRC must make in order to renew FPL's operating license for a second time because it seeks to ensure that FPL's application fulfills the requirements of NEPA and NRC regulations for the implementation of NEPA.

E. Concise Statement of the Facts or Expert Opinion Supporting the Contention, Along with Appropriate Citations to Supporting Scientific or Factual Materials

In Contention 2, SACE relies on and explicitly cites statements in FPL's Environmental Report, publicly available government documents, and the expert report of Bill Powers, P.E. (June 28, 2018) (Attachment 18). Mr. Powers has submitted a declaration stating that the facts in his expert report are true and correct, and that the expert opinion stated in his expert report is based on his best professional judgment.

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V. CONCLUSION

For the foregoing reasons, SACE's hearing request and petition to intervene should be granted.

Respectfully submitted,
___/signed electronically by/__
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August 1, 2018

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE SECRETARY

In the Matter of Florida Power and Light Company Turkey Point Units 3 and 4	)	Docket Nos. 50-250/251-SLR

CERTIFICATE OF SERVICE

I certify that on August 1, 2018, I posted copies of the foregoing Southern Alliance for Clean Energy's Hearing Notice and Petition to Intervene on the NRC's Electronic Information Exchange System. I also posted the following attachments to SACE's Hearing Notice and Petition to Intervene:

Attachment 1 Declaration of Dan Kipnis (June 19, 2018)
Attachment 2: Declaration of Mark Oncavage (June 19, 2018)
Attachment 3: Declaration of Richard Reynolds (June 20, 2018)
Attachment 4: Expert Report of William Nuttle, Ph.D, PEng (Ontario) (May 14, 2018)
Attachment 5: Expert Report of Kirk Martin (May 14, 2018) ("Martin Report")
Attachment 6: Expert Report of Larry Brand, Ph.D (May14, 2018) (with Addendum)
Attachment 7: Expert Report of Edward A. Swakon, P.E. (May 14, 2018) (with Addendum)
Attachment 8: Expert Report of J.W. Fourqurean, Ph.D (Miami) (May 14, 2018)
Attachment 9: Expert Report of E.J. Wexler, P.Eng. (Ontario) (May 14, 2018) (with 3 Addenda)
Attachment 10: Expert Report of Bill Powers, P.E., Powers Engineering (May 14, 2018)
Attachment 11: Declaration of William Nuttle, Ph.D, PEng (Ontario) (July 17, 2018)
Attachment 12: Declaration of Kirk Martin, P.G. (July 30, 2018)
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Attachment 16: Declaration of E.J. Wexler, P.Eng (July 25, 2018)
Attachment 17: Declaration of James Porter (July 25, 2018)
Attachment 18: Declaration of Bill Powers, P.E. (June 28, 2018)

___/signed electronically by/__
Diane Curran

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