

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:)	
)	
FLORIDA POWER & LIGHT COMPANY)	Docket No. 50-250
)	Docket No. 50-251
(Turkey Point Nuclear Generating Station, Unit Nos. 3 and 4))	
)	August 1, 2018
)	
(Subsequent License Renewal Application))	

**REQUEST FOR HEARING AND PETITION TO INTERVENE SUBMITTED BY
FRIENDS OF THE EARTH, NATURAL RESOURCES DEFENSE COUNCIL,
AND MIAMI WATERKEEPER**

PRELIMINARY STATEMENT

Friends of the Earth, Inc. (“FOE”), Natural Resources Defense Council, Inc. (“NRDC”), and Miami Waterkeeper, Inc. (“Miami Waterkeeper”) (collectively, “Petitioners”) hereby submit this hearing request and petition to intervene in the Nuclear Regulatory Commission (“NRC”) subsequent relicensing proceeding that will determine whether Turkey Point Nuclear Generation Station, Unit Nos. 3 and 4 (“Turkey Point”), will be licensed to operate until 2052 and 2053, respectively. Florida Power & Light Company (“Applicant” or “FPL”) owns and operates Turkey Point. These units have operated since the early 1970s adjacent to the Florida Everglades, Biscayne Bay, and several population centers on South Florida’s Atlantic coast.

STANDING

Friends of the Earth

FOE is a national non-profit environmental organization headquartered and incorporated

in the District of Columbia with an office in Berkeley, California.¹ FOE has a nationwide membership of over 100,000 (including approximately 4,800 members in Florida) and 1.49 million online activists.² FOE seeks to defend the environment and create a more healthy and just world.³ Since its inception in 1969, FOE has sought to improve the environmental, health, and safety conditions at civil nuclear facilities licensed by the NRC and its predecessor agencies.⁴ To that end, FOE utilizes its institutional resources, including legislative advocacy, litigation, and public outreach and education, to minimize the risks that nuclear facilities pose to its members and to the general public.

Anne Hemingway Feuer is a member of FOE and lives in Cutler Bay, Florida, approximately five miles from Turkey Point.⁵ Ms. Feuer and her husband frequently work from home and grow avocados, mangoes, carambolas, bananas, tomatoes and pineapples in their yard. Ms. Feuer and her husband enjoy walking and biking at Black Point Marina and in Everglades National Park, as well as eating local seafood. Ms. Feuer is concerned about the continued operation of Turkey Point for an additional 20 years without adequate analysis of Turkey Point's environmental impacts.⁶ Prevailing winds blow off the ocean from Turkey Point toward Ms. Feuer's home. An accident at Turkey Point would personally and significantly affect Ms. Feuer

¹ Declaration of Peter Stocker (Attachment A) at ¶ 2.

² *Id.* at ¶ 4.

³ *Id.* at ¶ 3.

⁴ *Id.* at ¶¶ 3, 5.

⁵ Declaration of Anne Hemingway Feuer (Attachment B) at ¶¶ 1, 4.

⁶ *Id.* at ¶¶ 6-8.

and her husband. An accident would affect the value of Ms. Feuer's home, would prevent Ms. Feuer from enjoying the fresh fruits that grow in our yard, and, in the event of a radiation leak, would cause significant harm to Ms. Feuer's health and safety.⁷

Laura Bauman is a member of FOE and lives in Key Largo, Florida, approximately 41 miles from Turkey Point.⁸ Ms. Bauman is a wetland ecologist who works in the Everglades and Florida Bay.⁹ As an avid diver, Ms. Bauman has regularly swum in the waters around Turkey Point for nearly 20 years.¹⁰ An accident at Turkey Point would personally affect Ms. Bauman and her family.¹¹ Ms. Bauman and her family could not live or work in Key Largo, and may be forced to evacuate.¹² An accident would adversely affect her drinking water source, as well as her ability to continue diving near Turkey Point.¹³

Vicki McGee-Absten is a member of FOE and lives in Key Largo, Florida, approximately 35 miles from Turkey Point.¹⁴ An accident at Turkey Point would seriously affect Ms. McGee-Absten's and her family's health and safety.¹⁵ Ms. McGee-Absten and her family could not live or work in Key Largo, and may be forced to evacuate.¹⁶ Ms. McGee-Absten has enjoyed recreating in waters near Turkey Point for approximately 50 years. She is concerned

⁷ *Id.* at ¶¶ 7, 9, 13.

⁸ Declaration of Laura Bauman (Attachment C) at ¶¶ 1, 4.

⁹ *Id.* at ¶ 4.

¹⁰ *Id.* at ¶ 10.

¹¹ *Id.* at ¶¶ 6-8.

¹² *Id.* at ¶ 5.

¹³ *Id.* at ¶ 10.

¹⁴ Declaration of Vicki McGee-Absten (Attachment D) at ¶¶ 1, 4.

¹⁵ *Id.* at ¶¶ 6-8, 12.

¹⁶ *Id.* at ¶ 5.

about the effects of tritium pollution on the local watershed, and specifically on her ability to recreate near Turkey Point and her access to clean drinking water.¹⁷ The continued operation of Turkey Point for an additional 20 years without ensuring that the aging plant can withstand foreseeable accidents, natural disasters and climate change impacts poses a significant risk to Ms. McGee-Absten's and her family's personal health and safety, the market value of her home, and her interest in using and protecting the environment around Turkey Point.¹⁸

Patricia J. Wynn is a member of FOE and lives in Miami, Florida, approximately 20 miles from Turkey Point.¹⁹ Ms. Wynn has been an avid windsurfer since 1978, and has regularly windsurfed waters near Turkey Point for over 20 years. Ms. Wynn is concerned about reports of heightened tritium pollution from Turkey Point.²⁰ She is concerned that continued operation of Turkey Point during the subsequent license renewal period will threaten her ability to safely recreate in the environment around Turkey Point.²¹ An accident at Turkey Point would personally affect Ms. Wynn.²²

Jonathan Lester Fried, a member of FOE, lives in Homestead, Florida, approximately 12 miles from Turkey Point.²³ Mr. Fried is executive director of WeCount!, Inc., a non-profit organization in Homestead.²⁴ Mr. Fried enjoys recreating in the waters near Turkey Point, and

¹⁷ *Id.* at ¶ 10.

¹⁸ *Id.* at ¶ 12.

¹⁹ Declaration of Patricia J. Wynn (Attachment E) at ¶¶ 1, 4.

²⁰ *Id.* at ¶ 9.

²¹ *Id.* at ¶ 9.

²² *Id.* at ¶¶ 6-9, 11.

²³ Declaration of Jonathan Lester Fried (Attachment F) at ¶¶ 1, 4.

²⁴ *Id.* at ¶ 4.

an accident would adversely impact his ability to continue recreating there.²⁵ An accident at Turkey Point resulting in a radiation leak would harm Mr. Fried's personal health and safety.²⁶

Natural Resources Defense Council

NRDC is a national non-profit environmental organization with offices in Washington, D.C., New York City, San Francisco, Chicago, Santa Monica, and Beijing.²⁷ NRDC has a nationwide membership of over 384,000 (plus hundreds of thousands of online activists), including 15,324 members in Florida, at least 1,746 members living within 50 miles of Turkey Point Units 3 and 4. Among its missions, NRDC seeks to maintain and enhance environmental quality, to safeguard the natural world for present and future generations, and to foster the fundamental right of all people to have a voice in the decisions that affect their environment. Since its inception in 1970, NRDC has sought to improve the environmental, health, and safety conditions at the nuclear facilities operated by the Department of Energy and the civil nuclear facilities licensed by the NRC and their predecessor agencies. To that end, NRDC utilizes its institutional resources, including legislative advocacy, litigation, and public outreach and education, to minimize the risks that nuclear facilities pose to its members and to the general public.

Dr. Philip Stoddard is a member of NRDC and has been since 1993.²⁸ Dr. Stoddard lives

²⁵ *Id.* at ¶¶ 7, 8, 10.

²⁶ *Id.* at ¶ 7.

²⁷ Declaration of Gina Trujillo (Attachment G) at ¶¶ 1–6.

²⁸ Declaration of Phillip Stoddard (Attachment H) at ¶ 2.

at 6820 SW 64th Court, South Miami, Florida, and has lived at that address for about fifteen years.²⁹ Dr. Stoddard's home is approximately 18 miles from Turkey Point Units 3 and 4. In his capacity as Mayor of the City of South Miami, Florida, Dr. Stoddard has toured Turkey Point Units 3 and 4 and has studied issues related to flooding, evacuation, environmental problems related to the cooling canal system, and other issues at Turkey Point Units 3 and 4.³⁰ Due to the location of Dr. Stoddard's home within the 50-mile emergency planning zone for the ingestion pathway, Dr. Stoddard is concerned that an accident at Turkey Point Units 3 and 4 would result in dangerous airborne levels of radioiodines and increased risk of radiation-induced thyroid cancers. He is concerned by the lack of a plan to distribute potassium iodide prophylaxis to the vulnerable population before airborne exposure to radioiodines.³¹ Dr. Stoddard is personally familiar with FPL's "shelter-in-place" plan in the event of a radiation emergency. Dr. Stoddard is concerned that the plan, which calls for residents to stay in their homes and tape over door seams and A/C vents to prevent radiation exposure, is unreasonable and unworkable.³²

Miami Waterkeeper

Miami Waterkeeper is a Florida non-profit organization with a mission to defend, protect, and preserve the aquatic integrity of South Florida's watershed and wildlife through citizen involvement and community action.³³ Miami Waterkeeper seeks to eliminate or mitigate threats

²⁹ *Id.* at ¶ 3.

³⁰ *Id.* at ¶¶ 5-6.

³¹ *Id.* at ¶ 8.

³² *Id.* at ¶ 7.

³³ Declaration of Rachel Silverstein, Ph.D (Attachment I) at ¶ 2.

to South Florida's coastal waters. Miami Waterkeeper works to ensure a clean and vibrant South Florida watershed and coastal culture for future generations. Miami Waterkeeper uses education, community outreach, and legal advocacy to protect South Florida's marine ecosystems, marine life, and coral reefs.³⁴ Miami Waterkeeper is a member of the Waterkeeper Alliance, an international organization uniting more than 190 Waterkeeper affiliates across the world. Miami Waterkeeper has approximately 100 members.

Rachel Silverstein, Ph.D lives approximately 30 miles from Turkey Point.³⁵ Dr. Silverstein is the Executive Director of Miami Waterkeeper, as well as a member of Miami Waterkeeper and the Waterkeeper Alliance, and a member of NRDC. Dr. Silverstein holds a Ph.D. in the Department of Marine Biology and Fisheries from the University of Miami's Rosenstiel School for Marine and Atmospheric Science.³⁶ In her role at Miami Waterkeeper, Dr. Silverstein patrols the bays, monitors and tests water quality, investigates pollution problems, enforces state and federal environmental laws and works with government officials and civic leaders to develop better environmental policy.³⁷ Dr. Silverstein enjoys boating in southern Biscayne Bay, as well as scuba diving, snorkeling, and camping in Biscayne National Park and the Florida Keys National Marine Sanctuary. Along with her family, Dr. Silverstein frequently visits Everglades National Park. Dr. Silverstein plans to continue visiting nearby national parks

³⁴ *Id.* at ¶ 2

³⁵ *Id.* at ¶ 8.

³⁶ *Id.* at ¶ 3.

³⁷ *Id.* at ¶ 3.

and marine sanctuaries, and enjoying viewing the unique wildlife that depend on sustained fresh water flow for their habitats and lifecycles.³⁸ As a resident of Miami-Dade County, Dr. Silverstein relies on the Biscayne Aquifer as a primary source of drinking water. Dr. Silverstein is concerned that the hypersaline plume emanating from Turkey Point's cooling canal system is contaminating the Biscayne Aquifer.³⁹ If an accident happened and a radiation release occurred, Dr. Silverstein's personal safety may be at risk.⁴⁰

Daniel Parobok is a member of Miami Waterkeeper and lives 28 miles from Turkey Point.⁴¹ Mr. Parobok works as a biologist in Monroe County, Florida. Mr. Parobok frequently uses and enjoys the waters of South Florida, including those of Biscayne National Park and the area near Turkey Point for recreational purposes, including boating and fishing for bonefish, permit, snapper, tarpon, sheepshead, snook, and redfish.⁴² Mr. Parobok frequently boats and fishes in Biscayne Bay, Card Sound, Barnes Sound, and Florida Bay. Mr. Parobok enjoys viewing wildlife such as manatees, turtles, birds, dolphins, and crocodiles when he recreates in these areas.⁴³ In his professional capacity, Mr. Parobok regularly conducts listed species surveys for wildlife including turtles, cara caras, queen conch, woodstorks, scrub jays, red cockaded woodpeckers, everglades snail kites, sand skinks, and gopher tortoises.⁴⁴ Mr. Parobok is

³⁸ *Id.* at ¶ 6.

³⁹ *Id.* at ¶ 7.

⁴⁰ *Id.* at ¶ 8.

⁴¹ Declaration of Daniel Parobok (Attachment J) at ¶¶ 4, 7.

⁴² *Id.* at ¶ 4.

⁴³ *Id.* at ¶ 5.

⁴⁴ *Id.* at ¶ 5.

concerned that Turkey Point’s cooling canal system (sometimes referred to as the “CCS”) is degrading the environment that he relies upon for recreational, aesthetic, and professional purposes.⁴⁵ Mr. Parobok also relies on the Biscayne Aquifer as a primary source of drinking water. He is concerned that the hypersaline plume from Turkey Point’s cooling canal system will harm his source of drinking water.⁴⁶

Legal standards

Under the AEA, the Commission must grant a hearing on a license application upon “the request of any person whose interest may be affected by the proceeding, and shall admit any such person as a party to such proceeding.”⁴⁷ To that end, a petitioner must provide the Commission with information regarding “(1) the nature of the petitioner’s right under the governing statutes to be made a party; (2) the nature of the petitioner’s property, financial, or other interest in the proceeding; and (3) the possible effect of any decision or order on the petitioner’s interest.”⁴⁸ “The NRC generally uses judicial concepts of standing in interpreting this regulation.”⁴⁹ Thus, a petitioner may intervene if it can specify facts showing “that (1) it has suffered or will suffer a distinct and palpable harm constituting injury-in-fact within the zone of interests arguably protected by the governing statutes, (2) the injury is fairly traceable to the

⁴⁵ *Id.* at ¶ 7.

⁴⁶ *Id.* at ¶ 6–7.

⁴⁷ 42 U.S.C. § 2239(a)(1)(A).

⁴⁸ *Entergy Nuclear Vermont Yankee, L.L.C., and Entergy Nuclear Operations, Inc. (Vermont Yankee Nuclear Power Station)*, 60 N.R.C. 548, 552 (2004) (citing 10 C.F.R. § 2.309(d)(1)).

⁴⁹ *Entergy Nuclear Vermont Yankee*, 60 N.R.C. at 552.

action being challenged, and (3) the injury will likely be redressed by a favorable determination.”⁵⁰ In determining whether a petitioner has met the requirements for establishing standing, the petition is to be construed “in favor of the petitioner.”⁵¹

Member organizations such as FOE, NRDC, and Miami Waterkeeper may intervene on behalf of their members if they can “demonstrate that the licensing action will affect at least one of [their] members, . . . identify that member by name and address, and . . . show that [they are] authorized by that member to request a hearing on his or her behalf.”⁵² FOE, NRDC, and Miami Waterkeeper have each supplied declarations from one or more members who reside within 50 miles of Units 3 and 4. Each declaration describes the economic, aesthetic, and environmental interests they wish to safeguard and the harms that the relicensing of Units 3 and 4 without full compliance with the law will pose to those interests.⁵³ Each of the Member Declarants supports this Petition, and has authorized his or her respective organization to intervene in this proceeding and request a hearing on his or her behalf.⁵⁴

Petitioners’ experts discuss in their declarations the inadequacies in the applicant’s analysis of potential adverse environmental consequences of renewing the operating licenses for Units 3 and 4, including inadequate analysis of sea level rise and its impacts on the plant and

⁵⁰ *Id.* at 552–53.

⁵¹ *Id.* at 553 (citing *Institute of Technology* (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 N.R.C. 111, 115 (1995)).

⁵² *Id.*

⁵³ *See generally* Attachments A - J.

⁵⁴ *Id.*

affected resources. These inadequacies impact Member Declarants' right to a complete and accurate assessment of the costs and benefits of the proposed action and alternatives to the proposed action.

As Member Declarants explain, they will suffer (or will be under threat of suffering) concrete and particularized injuries from the continued operations of Units 3 and 4 operations without adequate analysis of threatened environmental harms.⁵⁵ Petitioners' experts confirm the science behind these concerns: if Units 3 and 4 are not relicensed, the potential harms will not occur; and even if Units 3 and 4 are relicensed, the adverse environmental consequences caused by operations can be substantially mitigated if they are identified, analyzed and, based on that analysis, mitigated. Units 3 and 4 may not continue operations without a license from the Commission.⁵⁶ Accordingly, Turkey Point and the NRC will have caused these injuries if the proposed new operating license is issued as currently proposed. By granting Petitioners the relief they request and requiring that an adequate environmental analysis be performed, Member Declarants will obtain redress for their injuries. Even if the Applicant chooses to revise its ER to provide a legally sufficient analysis, Member Declarants will still have obtained redress: NEPA, in NRC's implementing regulations at 10 C.F.R. Parts 2 and 51, accords procedural rights to Member Declarants, whose concrete interests may be harmed by the project. By requiring FPL and the NRC staff to comply with these authorities' requirements, Member Declarants'

⁵⁵ Feuer Decl., at ¶¶ 6–8; Bauman Decl., at ¶¶ 6–8; McGee-Absten Decl., at ¶¶ 6–8; Wynn Decl., at ¶¶ 5–7; Fried Decl., at ¶¶ 7, 8, 10; Stoddard Decl., at ¶ 8; Silverstein Decl., at ¶¶ 7–9; Parobak Decl., at ¶ 7.

⁵⁶ 42 U.S.C. § 2133.

procedural rights will have been vindicated.⁵⁷

Finally, Member Declarants have expressed concerns that fall within the zone of interests protected by NEPA and its implementing regulations.⁵⁸ Their concerns also fall within the zone of interests protected by the AEA and its implementing regulations.⁵⁹

Member Declarants therefore have standing to intervene in their own right: they have met the requirements for injury-in-fact, causation, and redressability, and their concerns fall within the zone of interests protected by NEPA, the AEA, and their implementing regulations. They will be affected by Turkey Point's proposed relicensing and failure to provide a legally adequate environmental analysis, have provided their names and addresses, and have authorized their respective member organizations (Miami Waterkeeper, FOE, or NRDC) to intervene in this proceeding on their behalf. Thus, Petitioners have standing to pursue this action.⁶⁰

⁵⁷ See *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 572 n.7 (1992) (“[P]rocedural rights are special: The person who has been accorded a procedural right to protect his concrete interests can assert that right without meeting all the normal standards for redressability and immediacy.”) (internal quotations omitted); see also *Duke Energy Corp.* (McGuire, Units 1 and 2; Catawba, Units 1 and 2) CLI-02-17, 56 N.R.C. 1, 10 (July 23, 2002) (emphasizing NEPA’s goal to “ensure that the agency does not act upon incomplete information, only to regret its decision after it is too late to correct.”).

⁵⁸ See, e.g., *Ouachita Watch League v. Jacobs*, 463 F.3d 1163, 1173 (11th Cir. 2006) (“[S]ince the injury alleged is environmental, it falls within the zone of interests protected by NEPA”); *Sabine River Auth. v. U.S. Dep’t of Interior*, 951 F.2d 669, 675 (5th Cir. 1992) (plaintiffs’ concerns about impacts on water quality and quantity fell within NEPA’s zone of interests).

⁵⁹ *Sequoyah Fuels Corp. and General Atomic* (Gore, Oklahoma Site), 39 N.R.C. 54, 75 (1994) (membership organization granted standing by showing that “the health and safety interests of its members are within the AEA-protected zone of interests”); *Babcock and Wilcox* (Apollo, Pennsylvania Fuel Fabrication Facility), 37 N.R.C. 72, 80 (1993) (holding that specified “health, safety, and environmental concerns . . . clearly come within the zone of interests safeguarded by the AEA and NEPA”).

⁶⁰ *Entergy Nuclear Vermont Yankee*, 60 N.R.C. at 553.

NOTICE OF INTENT TO PARTICIPATE

Pursuant to 10 C.F.R. § 2.309 and the Notice of License Renewal Application; Opportunity to Request a Hearing and to Petition for Leave to Intervene, 83 Fed. Reg. 19,304 (May 2, 2018), Petitioners Friends of the Earth, Natural Resources Defense Council, and Miami Waterkeeper hereby submit contentions regarding FPL's application for subsequent renewal of its licenses to operate Turkey Point Units 3 and 4 for an additional 20 years, or until 2052 and 2053, respectively. As demonstrated below, these contentions should be admitted because they satisfy the NRC's admissibility requirements in 10 C.F.R. § 2.309.⁶¹

As noted above, at least one member of each Petitioner lives within 50 miles of the Turkey Point reactors, has authorized his or her respective member organization to represent his or her interests in environmental protection in this proceeding and, thus, pursuant to 10 C.F.R. § 2.309(d)(1), each Petitioner has standing for purposes of raising its concerns in this proceeding.

CONTENTIONS

Pursuant to 10 C.F.R. § 2.309, Petitioners set forth below the specific contentions they seek to litigate. Each contention challenges the sufficiency of the application under NRC regulations, as specified therein, as well as its compliance with NEPA. Petitioners acknowledge that, as a private entity, FPL is not directly bound by NEPA. However, pursuant to 10 C.F.R. § 2.309(f)(2), Petitioners have styled their NEPA contentions as against the ER.⁶² Because an applicant's ER generally serves as the basis for the Commission's eventual Draft SEIS,

⁶¹ By Order of the Commission dated June 29, 2018, the time for filing a Petition to Intervene by all parties was extended to August 1, 2018.

⁶² 10 C.F.R. § 2.309(f)(2) ("On issues arising under the National Environmental Policy Act, the petitioner shall file contentions based on the applicant's environmental report.").

Petitioners raise these NEPA concerns at this time in order to preserve any objections they may have if the flaws that appear in the ER also appear in the Draft SEIS. In addition, if the Draft SEIS deviates from FPL's ER in a manner to which Petitioners object, they plan to submit amended or new contentions addressing these deviations pursuant to 10 C.F.R. § 2.309(f)(2).

Each of Petitioner's contentions is within the scope of this license renewal proceeding, which is described in Parts 51 and 54.⁶³ A license renewal application review typically implicates issues that fall into one of two broad areas: safety/aging management issues, and public health/environmental impacts. Petitioner's contentions are focused on environmental and public health impacts.

The scope of the environmental review is defined by 10 C.F.R. Part 51, the NRC's "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," NUREG-1437 (May 1996) (the "GEIS"), and the initial hearing notice and order.⁶⁴ Some environmental issues that might otherwise be germane in a license renewal proceeding have been resolved generically for all plants and are normally, therefore, "beyond the scope of a license renewal hearing."⁶⁵ These "Category 1" issues are classified in 10 C.F.R. Part 51, Subpart A, Appendix B. Category 1 issues may be raised when a petitioner (1) demonstrates that there is new and significant information subsequent to the preparation of the GEIS regarding the environmental

⁶³ See *Florida Power & Light Co.*, CLI-01-17, 54 NRC 3, 6–13 (Jul. 19, 2001); Nuclear Power Plant License Renewal, 60 Fed. Reg. 22,461 (May 8, 1995).

⁶⁴ See, e.g., *Vermont Yankee*, 64 N.R.C. at 148–49.

⁶⁵ *Turkey Point*, 54 NRC at 15; see 10 C.F.R. § 51.53(c)(3)(i).

impacts of license renewal; (2) files a petition for a rulemaking with the NRC; or (3) seeks a waiver pursuant to 10 C.F.R. § 2.335.⁶⁶

Each of Petitioner’s contentions are “material” to the findings NRC must make.⁶⁷ A “material” issue is one that would make a difference in the outcome of the proceeding.⁶⁸ “This means that there should be some significant link between the claimed deficiency and either the health and safety of the public or the environment.”⁶⁹

Each of Petitioner’s contentions also demonstrate sufficient information to show that a genuine dispute exists with the Applicant on a material issue of law or fact. NRC set forth factors relevant to determining if a genuine dispute exists when it adopted the current version of 10 C.F.R. § 2.309(f)(1):

This will require the intervenor to read the pertinent portions of the license application, including the Safety Analysis Report and the Environmental Report, state the applicant's position and the petitioner's opposing view. Where the intervenor believes the application and supporting material do not address a relevant matter, it will be sufficient for the intervenor to explain why the application is deficient.⁷⁰

As set forth in detail in the following contentions, Petitioners satisfy the admissibility standard with respect to each contention.

**CONTENTION 1-E: THE ENVIRONMENTAL REPORT FAILS TO CONSIDER
A REASONABLE RANGE OF ALTERNATIVES TO THE
PROPOSED ACTION, AS REQUIRED BY NEPA AND NRC**

⁶⁶ *Turkey Point*, 54 NRC at 10-12; see also 10 C.F.R. § 51.53(c)(3)(iv) (new and significant information).

⁶⁷ 10 C.F.R. § 2.309(f)(1)(iv).

⁶⁸ Rules for Practice for Domestic Licensing Proceedings—Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,172 (Aug. 11, 1989).

⁶⁹ *Vermont Yankee*, 60 NRC 548, 557 (Nov. 22, 2004).

⁷⁰ 54 Fed. Reg. at 33,170.

IMPLEMENTING REGULATIONS.

1. Statement of the issue of law or fact to be raised or controverted (10 C.F.R. § 2.309(f)(1)(i))

The Environmental Report (§ 7.3) fails to comply with 10 C.F.R. §§ 51.45(c) and 51.53(c)(3)(iii)⁷¹ because it fails to consider an alternative under which the existing cooling canal system would be replaced with cooling towers to reduce the well-documented adverse environmental effects related to the cooling canal system. The Environmental Report fails to include an accurate or complete analysis of “alternatives available for reducing or avoiding adverse environmental effects” and because it does not contain an adequate “consideration of alternatives for reducing adverse impacts . . . for all Category 2 license renewal issues.”⁷² The Environmental Report unlawfully fails to consider replacement of the canal cooling system with cooling towers as a reasonable alternative that would “reduc[e] or avoid[] adverse environmental effects” relating to numerous Category 2 issues (described below).⁷³

⁷¹ 10 C.F.R. § 51.53(c)(3) applies to applications for an “initial renewed license,” and it is unclear whether the requirements of that subsection apply to an application for a subsequent license renewal, such as the one FPL seeks here. Even if the Commission determines that § 51.53(c)(3) does not apply, Petitioners hereby rely upon 10 C.F.R. § 51.53(c)(1) and (2), which provide:

(1) Each applicant for renewal of a license to operate a nuclear power plant under part 54 of this chapter shall submit with its application a separate document entitled ‘Applicant’s Environmental Report—Operating License Renewal Stage.’ (2) The report must contain a description of the proposed action, including the applicant’s plans to modify the facility or its administrative control procedures as described in accordance with § 54.21 of this chapter. This report must describe in detail the affected environment around the plant, the modifications directly affecting the environment or any plant effluents, and any planned refurbishment activities. In addition, the applicant shall discuss in this report the environmental impacts of alternatives and any other matters described in § 51.45.

⁷² 10 C.F.R. § 51.53(c)(3)(iii).

⁷³ 10 C.F.R. § 51.45(c); *see also* Turkey Point Nuclear Power Plant, Units 3 and 4, Applicant’s Environmental Report Subsequent Operating License Renewal Stage, ADAMS Accession No. ML18037A836 (Jan. 2018), at 7-39

1. Brief explanation of basis for the contention (10 C.F.R. § 2.309(f)(1)(ii)); concise statement of the alleged facts or expert opinions supporting the contention (10 C.F.R. § 2.309(f)(1)(v)); and statement that a genuine dispute exists with the licensee on a material issue of law or fact (10 C.F.R. § 2.309(f)(1)(vi))

The Environmental Report violates NEPA's requirement that each NEPA document consider a range of reasonable alternatives.⁷⁴ NEPA requires a "discussion of alternatives" that "must '[r]igorously explore and objectively evaluate all reasonable alternatives.'"⁷⁵ The NRC's regulations implementing NEPA require that, FPL's "discussion of alternatives shall be sufficiently complete to aid the Commission in developing and exploring, pursuant to section 102(2)(E) of NEPA, 'appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.'"⁷⁶ An agency's consideration of reasonable alternatives is "the heart" of NEPA.⁷⁷ "The existence of a viable but unexamined alternative renders [a NEPA document] inadequate."⁷⁸

The Environmental Report considered only two alternatives: (1) the preferred alternative (renew the operating licenses for Units 3 and 4) and (2) the no-action alternative (not renew the operating licenses and, instead, implement replacement power sources).⁷⁹ The Environmental

(hereinafter "ER").

⁷⁴ See 42 U.S.C. § 4332(2)(C).

⁷⁵ *Union Neighbors United, Inc. v. Jewell*, 831 F.3d 564, 569 (D.C. Cir. 2016) (quoting 40 C.F.R. § 1502.14).

⁷⁶ 10 C.F.R. § 51.45(b)(3).

⁷⁷ *Union Neighbors United*, 831 F.3d at 575 (citing 40 C.F.R. § 1502.14). CEQ's regulations implementing NEPA apply to all federal agencies, including the NRC. *Union Neighbors United*, 831 F.3d at 569 n.1 (citing 40 C.F.R. § 1500.3).

⁷⁸ *Natural Res. Defense Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005) (internal quotation marks omitted); see also *City of Grapevine v. Dep't of Transp.*, 17 F.3d 1502, 1506 (D.C. Cir. 1994) (agency must consider "all 'feasible' or 'reasonable' alternatives[.]").

⁷⁹ ER, at 7-1.

Report evaluated three replacement power sources within the no-action alternative:

1. Natural Gas-Fired Generation. Construct a 1,726-MWe natural gas combined-cycle plant utilizing closed-cycle cooling with mechanical draft cooling towers using reclaimed water as the source of cooling water make-up.⁸⁰
2. New Nuclear Generation. Construct a new nuclear facility with a 1,668-MWe generating capacity utilizing closed-cycle cooling with a mechanical draft cooling tower. Cooling water make-up would be reclaimed water from the Miami-Dade Water and Sewer Department.⁸¹
3. Combination of Natural Gas-Fired Generation and Solar PV Facilities. Construct a 1,636-MWe natural gas combined-cycle plant utilizing closed-cycle cooling with mechanical draft cooling towers. Construct four 75-MWe solar photovoltaic facilities (no cooling system required).⁸²

In the license renewal context, NRC’s NEPA regulations require all environmental reports to include certain analyses of environmental impacts of alternatives to the proposed action (granting a license renewal). 10 C.F.R. § 51.53(c)(iii) provides that the environmental report “must contain a consideration of alternatives for reducing adverse impacts, as required by § 51.45(c), for all Category 2 license renewal issues.” 10 C.F.R. § 51.45(c) provides that 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.*”⁸³

The Environmental Report (§ 7.3) fails to satisfy either 10 C.F.R. §§ 51.45(c) or 51.53(c)(3)(iii). The ER purports to satisfy NEPA’s obligation to consider alternatives available for reducing adverse impacts in two short, conclusory paragraphs devoid of any substantive

⁸⁰ ER, at 7-3.

⁸¹ ER, at 7-22.

⁸² ER, at 7-4. *See also* ER, at 8-5, Table 8.0-2 (describing cooling system for each replacement power option).

⁸³ Emphasis added.

analysis. Section 7.3 of the Environmental Report (titled “Alternatives for Reducing Adverse Impacts”) states:

No additional alternatives were considered by FPL to reduce impacts, because . . . the continued operation of PTN does not result in significant adverse effects to the environment.⁸⁴

The Environmental Report does not consider cooling towers as an alternative that would reduce adverse impacts related to the following Category 2 issues:

- Threatened, endangered, and protected species and essential fish habitat⁸⁵;
- Groundwater use conflicts (plants that withdraw more than 100 gallons per minute)⁸⁶; and
- Radionuclides released to groundwater.⁸⁷

Each of the above issues are Category 2 issues.⁸⁸

- Replacing the existing cooling canal system with cooling towers is a reasonable alternative to granting the subsequent license renewal application.*

Replacing the existing cooling canal system with cooling towers is a reasonable and feasible alternative to granting the requested license renewal based on continued operation of the cooling canal system during the renewal term.⁸⁹ FPL itself has demonstrated that the siting and

⁸⁴ ER, at 7-39.

⁸⁵ ER, at 4-37 to 4-43.

⁸⁶ ER, at 4-22 to 4-23.

⁸⁷ ER, at 4-25 to 4-29.

⁸⁸ See Appendix B to Subpart A of Part 51—Environmental Effect of Renewing the Operating License of a Nuclear Power Plant, 10 CFR Pt. 51, Subpt. A, App. B.

⁸⁹ Declaration of Bill Powers (attached to Petition to Intervene by Southern Alliance for Clean Energy), submitted Aug. 1, 2018; see generally Expert Report of Bill Powers, P.E., Powers Engineering (hereinafter “Cooling Tower Feasibility Assessment”) (Attachment K).

water supply aspects of cooling towers are feasible.

First, FPL chose cooling towers rather than the existing cooling canal system or another cooling system at Turkey Point Units 6 and 7, for which the NRC has granted combined construction permits and operating licenses. Both Units 6 and 7 would utilize closed-cycle wet-cooling towers using reclaimed water from the Miami-Dade Water and Sewer Department.⁹⁰ The EIS for Units 6 and 7 includes specific design elements of the cooling system, including: (a) a plan for piping reclaimed water from the Miami-Dade Water and Sewer Department South District Wastewater Treatment Plant to the cooling system for Units 6 and 7; (b) location of the water-treatment facility and related infrastructure; (c) storage of treated reclaimed water in a make-up water reservoir.⁹¹

Second, each of the three replacement power options under the no-action alternative considered in the Environmental Report incorporate closed-cycle cooling with mechanical draft cooling towers.⁹² None of the replacement power options—not even the new nuclear generation option—would utilize the existing cooling canal system. In other words, under the alternative to shut down Units 3 and 4 and construct and operate a new nuclear plant, FPL has deemed construction of cooling towers as the best option, rather than utilization of the already

⁹⁰ NRC Final Report, “Environmental Impact Statement for Combined Licenses for Turkey Point Nuclear Plant Units 6 and 7,” ADAMS Accession No. ML16300A104 (Oct. 2016), at 3-8 to 3-14, *available at* <https://www.nrc.gov/reactors/new-reactors/col/turkey-point/documents.html#eis> (hereinafter “FEIS for Units 6 and 7”); Cooling Tower Feasibility Assessment, at 9-11.

⁹¹ *Id.*

⁹² ER, at 7-3, 7-22, 8-5.

constructed cooling canal system.

Third, Turkey Point Unit 5 (a natural gas combined-cycle unit that began operating in 2007) already utilizes mechanical-draft cooling towers that use make-up water drawn from the Upper Floridan Aquifer.⁹³ Thus, it is clear that the siting and water supply aspects of cooling towers are feasible.

Construction of cooling towers to replace the existing cooling canal system at Units 3 and 4 is feasible. Palisades Nuclear Plant, an 800-MW plant in Michigan, converted from a once-through cooling system to a closed-cycle wet cooling tower system after a significant period of operating utilizing the once-through system.⁹⁴ At least five other power plants have also converted to a closed-cycle system.⁹⁵

The cost of replacing the cooling canal system with cooling towers is reasonable. The cost of the Palisades retrofit was approximately \$99/kW in 2017 dollars.⁹⁶ The installed cost of cooling towers at Turkey Point Units 3 and 4, each of which has nearly the same capacity as Palisades (816 MW), would be approximately \$81 million per unit for conventional inline mechanical draft cooling towers, or \$162 million for both units.⁹⁷ This \$160 million capital expense, amortized over only ten years at standard rates, equates to approximately \$41 million

⁹³ Cooling Tower Feasibility Assessment, at 7–8.

⁹⁴ EPA, “Technical Development Document for the Proposed Section 316(b) Phase II Existing Facilities Rule” (Apr. 2002), at 4-1 (hereinafter “EPA 2002 TDD”).

⁹⁵ EPA 2002 TDD, at 4-1 to 4-6; Cooling Tower Feasibility Assessment, at 28–29 & n.138.

⁹⁶ Cooling Tower Feasibility Assessment, at 15.

⁹⁷ *Id.*

annual cost for both units.⁹⁸ Given that the subsequent license renewal periods, if granted, would not expire until 2052 and 2053, FPL could expect a much longer amortization period and, therefore, a lower annual cost. This would equate to an increase of less than one percent of the energy charge component of an FPL residential customer's bill.⁹⁹

b. *Replacing the cooling canal system with cooling towers would satisfy the proposed action's purpose and need.*

NEPA requires the agency (or here, FPL) to “discuss those alternatives that are reasonable and ‘will bring about the ends’ of the proposed action.”¹⁰⁰ The Environmental Report here considered only two alternatives: (1) the proposed action (renew the operating licenses for Units 3 and 4) and (2) the no-action alternative (not renew the operating licenses and, instead, implement replacement power sources).¹⁰¹ FPL determined that those two alternatives constituted a reasonable range of alternatives because the proposed action “is to renew the [operating licenses] for PTN, which would preserve the option for FPL to continue to operate PTN and provide reliable base-load power throughout the 20-year SLR period to meet future power generating needs.”¹⁰²

But the proposed action's purpose and need—to continue to provide baseload power—does not limit the range of reasonable alternatives to (1) grant the license renewal application as

⁹⁸ *Id.* at 15–16.

⁹⁹ *Id.* at 16.

¹⁰⁰ *In Re Hydro Res., Inc.*, 53 N.R.C. 31, 55 (Jan. 31, 2001) (quoting *Citizens Against Burlington v. Busey*, 938 F.2d 190, 195 (D.C. Cir. 1991)); see also *In the Matter of NextEra Energy Seabrook, LLC* (Seabrook Station, Unit 1), 75 N.R.C. 301, 342–43 (Mar. 8, 2012).

¹⁰¹ ER, at 7-1.

¹⁰² ER, at 7-1.

filed or (2) deny the application.¹⁰³ Instead, NEPA requires FPL to consider any reasonable alternative that satisfies the project’s purpose and need. Construction of cooling towers satisfies that test. For the reasons described above, retrofitting the plant to use cooling towers is technically and economically feasible. And installing cooling towers aligns with the proposed action’s purpose and need by allowing Units 3 and 4 to continue to provide baseload power.

c. *Replacing the existing cooling canal system with cooling towers would reduce adverse impacts related to Category 2 issues.*

i. Threatened, endangered, and protected species and essential fish habitat

Continued operation of Units 3 and 4 during the subsequent license renewal term will result in harm to threatened, endangered, and protected species and essential fish habitat. Replacing the cooling canal system with cooling towers would reduce these adverse impacts. Subsequent to the uprate for Units 3 and 4, both temperature and salinity in the cooling canal have increased, resulting in decreased nesting and fewer American crocodiles, an endangered species, observed in the cooling canals.¹⁰⁴ In 2017, the FWS explained that:

[T]here has been a reduction in the number of crocodile nests produced within the CCS. A total of 9 nests were observed in 2015 and 8 in 2016. The decrease in nesting in the CCS has occurred with a concomitant decrease in the number of crocodiles observed within the CCS.... In addition, the body condition of many of the crocodiles observed within the CCS has decreased (i.e., animals appear emaciated and much thinner than healthy animals of the same total length).

¹⁰³ See ER, at 1-1 (quoting NRC, “Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants,” NUREG-1437, Vols. 1 & 3, Rev. 1 (June 2013) (discussing purpose and need) (hereinafter “2013 GEIS Revision”).

¹⁰⁴ See Biological Opinion for Combined License for Turkey Point Nuclear Plant, Units 6 and 7 (June 23, 2017), at 20, (hereinafter “2017 BiOp”); see *infra* Contention 5-E.

Moreover, anecdotal evidence suggests that a majority of the fish and invertebrate species that used to provide prey for the crocodile in the waters of the CCS no longer occur or are greatly diminished in numbers... [These issues] are thought to be the result of the recent increase in water temperature and salinity, and decrease in water quality within the waters of CCS observed during the past few years, beginning in 2013... [The cause for the decrease in water quality conditions] include FPL's recent increase in power production from nuclear Units 3 and 4, [and] the discharge of vegetative cutting within the CCS.¹⁰⁵

Thus, ceasing operation of the cooling canals as a heat sink and replacing them with cooling towers, while keeping the canals in place, would protect existing American crocodile habitat. With an adequate effort to freshen the canals,¹⁰⁶ and without the dangerously high temperatures of the recent past, the canals would continue to provide valuable critical habitat into the future.

Furthermore, the cooling canal system has driven the westward migration of a hypersaline plume, resulting in salination of freshwater wetlands that are habitat for a range threatened and endangered species, including the Florida panther, American crocodile, indigo snake, snail kite, red knot and wood stork.¹⁰⁷ Replacing the cooling canals with cooling towers would mitigate serious environmental impacts on threatened and endangered species.¹⁰⁸

ii. Groundwater use conflicts

The Environmental Report recognizes that “[i]f the applicant’s plant pumps more than 100 gallons (total onsite) of groundwater per minute, an assessment of the impact of the

¹⁰⁵ 2017 BiOp, at 20.

¹⁰⁶ Direct Testimony and Exhibits of Sorab Panday, Docket No. 20170007-EI (Aug. 23, 2017), at 35:7-14 (Attachment L) (hereinafter “Panday Tr.”)

¹⁰⁷ 2017 BiOp, at 44.

¹⁰⁸ See *infra* Contention 5-E.

proposed action on groundwater must be provided.”¹⁰⁹ The ER acknowledges that continued use of the cooling canal system will further stress the already strained groundwater resources below and near Turkey Point.¹¹⁰ Given these impacts on groundwater use conflicts (a category 2 issue) and the ability of cooling towers to reduce these impacts, construction of cooling towers is a reasonable alternative.

Both state and local governments have found FPL to be violating the water quality laws and regulations that they enforce by contaminating the freshwater portions of the Biscayne Aquifer. As a result, the Applicant has been ordered, through a series of administrative enforcement efforts by the Florida Department of Environmental Protection (FDEP) and Miami-Dade County, to take remedial measures, including adding 15 MGD of mildly saline water from the Floridan Aquifer (2.5 PSU) into the cooling canals to dilute canal salinities. FPL’s goal is to achieve an average concentration of 34 PSU in the canals by April 2020.

The Applicant has now proposed and begun testing a plan to construct a “recovery well system” to attempt to draw the plume back toward the cooling canal system.¹¹¹ This plan would require installation of a series of wells located near the interceptor ditch and screened near the base of the Biscayne Aquifer that would withdraw approximately 14 MGD of water from that part of the aquifer for disposal via reinjection into the Boulder Formation.¹¹² The recovery well

¹⁰⁹ ER, at 4-23.

¹¹⁰ See ER, at 9-11 (noting notice of violation issued by the Florida Department of Environmental Protection related to the hypersaline plume migrating away from the cooling canal system toward the Biscayne Aquifer).

¹¹¹ ER, at 3-109.

¹¹² ER, at 3-109, 9-12 – 9-13.

system would assert additional pressure on existing groundwater use conflicts by withdrawing even more groundwater from an already stressed Biscayne Aquifer. The plan, moreover, would not abate continued leaching of hypersaline water from the unlined canals in the cooling canal system into groundwater.¹¹³

Recent developments suggest the remedial measures FPL is taking to mitigate the adverse environmental impacts of operating the cooling canal system measures are not having the intended effects.¹¹⁴ Even if they do work as designed, there will still be net addition of salt to the aquifer from cooling canal system, and 15 MGD of saline water (34 PSU) migrating into aquifer every day, with part of that migrating into freshwater at upper levels of the aquifer causing adverse environmental impacts (impacts to freshwater wetlands and other surface waters, and impacts to listed species that rely on those wetlands, and salination of a potable water aquifer). These impacts reduce the amount of groundwater available to users in South Florida, including the Florida Keys, thereby exacerbating groundwater use conflicts.

Neither the NRC nor the Applicant has considered any other alternatives to mitigate these impacts on groundwater use conflicts. Because the stress on groundwater resources originates from operation of the cooling canal system as the ultimate heat sink for Units 3 and 4, the ER should have considered closure of the cooling canal system and installation of mechanical draft

¹¹³ Panday Tr., at 35:7-36:12

¹¹⁴ For example, recent salinity measurements in the L-31 canal west of the interceptor ditch indicate that saline water from the plume has surfaced in and entered the L-31 canal, from which it can now enter adjacent freshwater wetlands, causing further adverse environmental impacts. As the County explains, “The water quality of the L-31 E was initially freshwater and salinities during the period of record have increased to over 29 PSU.” Letter from Lee N. Heft, Director, Miami-Dade County Division of Environmental Resources Management to Lee Crandall and Timothy Rach, Florida Department of Environmental Protection (July 18, 2018), at 3 (Attachment M) (hereinafter “FDEP-DERM July 2018 Letter”). Over the past ten years, canal salinities have trended upward and the highest salinities (29 PSU) were recorded during the first quarter of 2018. DERM-FDEP July 2018 Letter, at 55, 56.

cooling towers instead. The cooling tower alternative is certain to remediate the impacts of continued operation. Under such an alternative, there would be no new addition of salt to the aquifer.

Decommissioning the cooling canal system and construction of cooling towers would result in no future risk to groundwater use. Proper implementation of a closed-cycle cooling system would ensure no further harm to groundwater. FPL's failure to consider a cooling-tower alternative violates the requirement to consider alternatives that would reduce adverse impacts for all Category 2 license renewal issues.¹¹⁵

The Applicant's failure to consider cooling towers as an alternative is even more egregious when considered in light of new and significant information regarding the impacts of the cooling canal system on groundwater use conflicts. The agency (or here, FPL) is required to follow the "rule of reason" in preparing a NEPA document, and this rule "governs . . . *which* alternatives the agency must discuss."¹¹⁶ The rule of reason does not permit the Applicant to delineate the range of alternatives in a vacuum. Instead, "where changed circumstances affect the factors relevant to the development and evaluation of alternatives, the [agency] must account for such change in the alternatives it considers."¹¹⁷ "[T]he concept of 'alternatives' is an evolving one, requiring the agency to explore more or fewer alternatives as they become better

¹¹⁵ 10 C.F.R. §§ 51.53(c)(3)(iii) and 51.45(c).

¹¹⁶ *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 195 (D.C. Cir. 1991) (internal quotation marks omitted).

¹¹⁷ *Natural Res. Defense Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005).

known and understood.”¹¹⁸

Rather than assessing this information and utilizing it to determine which alternatives to address and the extent to address them (as NEPA requires),¹¹⁹ the Applicant relies on the naked assertion that the continued operation of Units 3 and 4—and, therefore, the cooling canal system —“does not result in significant adverse effects to the environment.”¹²⁰ By any measure, this statement is false.¹²¹ It is clear that continued operation of Units 3 and 4 will result in significant environmental effects relating to Category 2 issues. The Applicant should have considered new information regarding groundwater use impacts in delineating the range of alternatives.

iii. Radionuclides released to groundwater

Recent water sampling has found elevated tritium levels surrounding the cooling canal system.¹²² Tritium is a radioactive type of hydrogen that is released with nuclear power plant wastewater.¹²³ The Applicant has documented nine releases of radioactive liquids into the environment.¹²⁴ As sea level rises and the cooling canal system is subject to more frequent inundation, the elevated levels of tritium found in the cooling canal system wastewater will spread into the environment. Conversion to a closed-cycle cooling system, such as cooling

¹¹⁸ *Vermont Yankee Nuclear Power Corp. v. Nat. Res. Def. Council, Inc.*, 435 U.S. 519, 552–53 (1978).

¹¹⁹ See *Natural Res. Defense Council*, 421 F.3d at 813.

¹²⁰ ER, at 7-39.

¹²¹ An environmental impact statement will be prepared to analyze the environmental effects of the license renewal. 10 C.F.R. § 51.20(b)(2). An environmental impact statement is prepared only for “major federal actions significantly affecting the quality of the human environment.” 42 U.S.C. 4332(2)(C) (emphasis added). The Applicant’s statement in the Environmental Report that continued operation of Units 3 and 4 does not result in significant adverse environmental impacts is, therefore, contrary to the NRC’s assessment, as well as the plain facts.

¹²² Miami Herald, *FPL Nuclear Plant Canals Leaking Into Biscayne Bay, Study Confirms* (Updated May, 17, 2016), <https://www.miamiherald.com/news/local/environment/article64667452.html>.

¹²³ NRC, “Backgrounder on Tritium, Radiation Protection Limits, and Drinking Water Standards,” <https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/tritium-radiation-fs.html>.

¹²⁴ ER, at 4-26.

towers, would eliminate discharges of wastewater into the environment and, thus, eliminate risk of further release of tritium into the environment. The Applicant's failure to consider such an alternative violates 10 C.F.R. §§ 51.53(c)(3)(iii) and 51.45(c).

d. *Applicant's failure to discuss the reasons for eliminating a cooling-towers alternative from further study violates NEPA.*

The Applicant's failure to even state the reasons it did not evaluate cooling towers as alternative violates NEPA. NEPA requires an agency (or here, FPL) to "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from the detailed study, briefly discuss the reasons for their having been eliminated."¹²⁵ The Applicant made no attempt in the Environmental Report to comply with this requirement. Instead, the company summarily concluded that, because the purpose of the proposed action was to continue to provide baseload power during the subsequent renewal term, the alternatives that required consideration were the preferred alternative (granting the subsequent license renewal application) and the no-action alternative (denying the application). That does not satisfy NEPA's "hard look" test.

4. The issue raised in the contention is within the scope of the proceeding (10 C.F.R. § 203.9(f)(1)(iii))

NRC regulations broadly divide the scope of a license renewal proceeding into (1) safety/aging management issues, and (2) environmental impacts. This contention concerns environmental impacts. The scope of the required environmental review is established by 10 C.F.R. Part 51 and the GEIS for license renewals.¹²⁶ This contention is within the scope of the

¹²⁵ 40 C.F.R. § 1502.14(a).

¹²⁶ *Entergy Nuclear Vermont Yankee, LLC* (Vermont Yankee), LBP-06-20, 64 N.R.C. 131, 148-49 (2006).

proceeding because it challenges the sufficiency of the environmental analysis in the Environmental Report and the GEIS.

5. The issue raised in the contention is material to the findings the NRC must make to support relicensing (10 C.F.R. § 203.9(f)(1)(iv))

An issue is “material” if “the resolution of the dispute would make a difference in the outcome of the licensing proceeding.”¹²⁷ “This means that there must be some link between the claimed error or omission regarding the proposed licensing action and the NRC’s role in protecting public health and safety or the environment.”¹²⁸ The issue raised in this contention—The Applicant’s failure to comply with NRC’s regulations requiring consideration of alternatives—relates directly to the NRC’s role in protecting public health and safety and the environment. NEPA imposes requirements on the NRC to ensure environmental protection. The failure to comply with these requirements is material to the findings NRC must make to support relicensing. Petitioners request a hearing and intervention to present evidence that mechanical draft cooling towers are an alternative to mitigate adverse impacts of continuing to operate Units 3 and 4.

CONTENTION 2-E: THE ENVIRONMENTAL REPORT FAILS TO ADEQUATELY CONSIDER THE CUMULATIVE IMPACTS OF CONTINUED OPERATION OF UNITS 3 AND 4.

1. Statement of the issue of law or fact to be raised or controverted (10 C.F.R. § 2.309(f)(1)(i))

Applicant’s Environmental Report (§ 4.12) fails to comply with 10 C.F.R.

¹²⁷ *Vermont Yankee*, 64 N.R.C. at 149.

¹²⁸ *Id.*

§ 51.53(c)(3)(ii) because it does not address the “impacts of operation during the renewal term[] for those issues identified as Category 2 issues.” Specifically, Applicant fails to adequately address cumulative impacts of the continued operation of Units 3 and 4 on water resources associated with reasonably foreseeable increases in sea levels rise and air temperature.¹²⁹ Applicant fails to address cumulative impacts on groundwater associated with its cooling canal system.¹³⁰

2. Brief explanation of the basis for the contention (10 C.F.R. § 2.309(f)(1)(ii))

NRC’s NEPA regulations require an applicant to include in its environmental report “analyses of the environmental impacts . . . associated with license renewal and the impacts of operation during the renewal term, for those issues identified as Category 2 issues in Appendix B to Subpart A of [Title 10, Part 51].”¹³¹ These regulations specifically require an applicant to “provide information about other past, present, and reasonably foreseeable future actions occurring in the vicinity of the nuclear plant that may result in a cumulative effect.”¹³² This cumulative impacts analysis must account for climate change, including rising sea levels and a hotter climate.¹³³ A failure to take a hard look at cumulative impacts, including those from climate change, violates the NRC’s NEPA regulations and thus NEPA.

Here, the Environmental Report does not address cumulative impacts from the reasonably foreseeable effects of climate change, including sea level rise and hotter temperatures.¹³⁴

¹²⁹ See 10 CFR Pt. 51, Subpt. A, App. B.

¹³⁰ See ER, at 4-68 – 4-69.

¹³¹ 10 C.F.R. § 51.53(c)(3)(ii).

¹³² 10 C.F.R. § 51.53(c)(3)(O).

¹³³ See 2013 GEIS Revision, at 1-30 (noting that climate change impacts on affected resources will be treated on a plant-specific basis).

¹³⁴ ER at 4-62 – 4-74.

While NRC Guidance provides that an applicant’s cumulative impacts analysis may, under limited circumstances, assume cumulative impacts are avoided through management, those circumstances are not present here. Specifically, NRC Guidance allows an applicant to assume cumulative impacts regulated and monitored by a permitting process are managed if, but only if, the facility is “in compliance with their respective permits.”¹³⁵ The Guidance does not authorize applicants to assume cumulative impacts are managed following permit violations.

Here, Applicant’s Environmental Report fails to address cumulative impacts on groundwater because it assumes such impacts associated with the hypersaline plume from the cooling canal system “would be managed” based on compliance with a Consent Order with the Florida Department of Environmental Protection and a Consent Agreement with Miami-Dade County.¹³⁶ NRC Guidance, however, does not authorize Applicant to assume cumulative impacts will be managed where, as here, the applicant actually *violated* its permit and is now required to mitigate future violations and remediate existing impacts to correct its violations.¹³⁷

3. The issue raised in the contention is within the scope of the proceeding (10 C.F.R. § 2.309(f)(1)(iii))

The issue is within the scope of the proceeding because NRC’s NEPA regulations require

¹³⁵ NRC Regulatory Guide 4.2, Rev. 1, Supp. 1, “Preparation of Environmental Reports for Nuclear Power Plant License Renewal Applications,” (July 2009), at 49, *available at* <https://www.nrc.gov/docs/ML1306/ML13067A354.pdf>.

¹³⁶ ER, at 4-68.

¹³⁷ *See e.g., State of Florida Dep’t of Environmental Protection v. Florida Power & Light Co.*, OGC File No. 16-0241 (Fla. Dep. of Env’tl Prot. Jun. 20, 2016) (Consent Order), ¶ 19 (Ordering Applicant to “cease discharges from the [cooling canal system] that impair the reasonable and beneficial use of the adjacent G-II ground waters to the west of the [cooling canal system] in violation of Condition IV.1 of the Permit and Rule 62-520.400, F.A.C.”).

a plant-specific assessment of cumulative impacts in the applicant’s Environmental Report.¹³⁸

Additionally, the NRC recognizes that “impacts from individually minor actions may be significant when considered collectively over time.”¹³⁹

4. The issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding (10 C.F.R. § 2.309(f)(1)(iv))

The issue raised is material to the findings NRC must make because the NRC is required to undertake a cumulative impacts analysis.¹⁴⁰ The issue is also material because a failure to take a hard look at cumulative impacts associated with the proposed project constitutes a violation of NEPA.

5. Concise statement of the alleged facts or expert opinions which support the petitioner’s position on the issue and on which the petitioner intends to rely at hearing (10 C.F.R. § 2.309(f)(1)(v))

Global mean sea level in the area around Turkey Point has risen over the past century and is projected to continue rising at an accelerated rate throughout this century and beyond.¹⁴¹ Relative to the year 2000, there is at least a 90 percent probability that global mean sea level will rise by 0.3–0.6 feet by 2030 and 0.5–1.2 feet by 2050.¹⁴² By 2100, scientists predict that global mean sea level will rise by at least 1.0 foot and could rise more than 8 feet under certain

¹³⁸ Appendix B to Subpart A of Part 51–Environmental Effect of Renewing the Operating License of a Nuclear Power Plant, 10 CFR Pt. 51, Subpt. A, App. B

¹³⁹ ER, page 4-63 (referencing 2013 GEIS Revision, § 4.13).

¹⁴⁰ 10 CFR Pt. 51, Subpt. A, App. B

¹⁴¹ Declaration of Dr. Robert Kopp (“Kopp Decl.”) ¶ 12(i) (Attachment N) (referencing William V. Sweet et al., “*Sea Level Rise*,” in CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT, VOL. 1 333–363 (D.J. Wuebbles et al. eds., 2017).

¹⁴² *Id.* ¶ 12(ii).

greenhouse gas emissions and Antarctic ice sheet stability scenarios.¹⁴³ Sea-level rise for the remainder of this century in south Florida, including around Turkey Point will be faster than the average over the last century in every reasonably foreseeable climate change scenario.¹⁴⁴

Through 2060, there is between a 68 and 95 percent chance that average sea-level rise at the Key West tidal gauge, which reflects relative sea level at Turkey Point, will exceed 1 foot above the National Tidal Datum Epoch.¹⁴⁵ Through 2060, there is a 10 to 37 percent chance that average sea level rise will exceed 2 feet if today's rate of growth in emissions of greenhouse gases continues, leading to a near-doubling of carbon dioxide emissions between today and 2050, with continued growth thereafter.¹⁴⁶ By 2100, there is a 15 to 83 percent chance that average sea level will exceed 4 feet if today's rate of growth in emissions of greenhouse gases continues.¹⁴⁷

Most experts believe hurricanes and tropical storms will become more intense as temperatures rise due to climate change.¹⁴⁸ Assuming storm characteristics do not change, sea level rise will increase the frequency and extent of extreme flooding associated with coastal storms, such as hurricanes.¹⁴⁹ For an intense storm with an appropriate track, extreme water levels well above the highest level observed historically at a particular site are well within the

¹⁴³ *Id.* ¶ 12(ii),

¹⁴⁴ *Id.* ¶ 13.

¹⁴⁵ *Id.* ¶¶ 17, 30(a).

¹⁴⁶ *Id.* ¶¶ 25, 30(b).

¹⁴⁷ *Id.* ¶ 30(c).

¹⁴⁸ *Id.* ¶ 15.

¹⁴⁹ *Id.* ¶ 12(v).

range of possibility.¹⁵⁰

The effect of sea level rise can be added to storm surge. Extreme high-water levels arise from the superimposition of tidal and storm influences on top of average sea level.¹⁵¹ If the sea level rises by one foot, for example, the probability of storms increasing water levels to the height of 2.0 feet becomes 50% rather than 1%.¹⁵² Even with drastic reductions in emissions of greenhouse gases and with a relatively stable Antarctic ice sheet, it is likely (greater than two chances in three) that sea-level rise will exceed 1 foot in south Florida by 2060.¹⁵³ If the Antarctic becomes unstable, as predicted by some, and greenhouse gas emissions continue to grow at today's rate, sea level rise in Florida is likely to exceed 4 feet by 2100, and there is a greater than 1-in-10 chance of exceeding 10 feet by 2100.¹⁵⁴ The annual average temperature of the contiguous United States is projected to rise throughout this century.¹⁵⁵ For the period 2021–2050, temperatures are projected to rise on average by 2.5°F for a lower scenario, which still makes this near-term average comparable to the hottest year in the historical record (2012).¹⁵⁶ Projected temperature increases in the Southeast for the 2036–2065 period range from 3.40°F to 4.30°F.¹⁵⁷ Projected changes in temperatures extremes for the Southeast region over 2036–2065

¹⁵⁰ *Id.* ¶ 33.

¹⁵¹ *Id.* ¶ 31.

¹⁵² *Id.* ¶ 34.

¹⁵³ *Id.* ¶ 38.

¹⁵⁴ *Id.* ¶ 40.

¹⁵⁵ CLIMATE SCIENCE SPECIAL REPORT, at 195.

¹⁵⁶ *Id.*

¹⁵⁷ *Id.* at 197, Table 6.4.

are projected to be 5.79°F for the warmest day of the year compared to the 1976–2005 period.¹⁵⁸ Change in the warmest 5-day, 1-in-10-year event for the same period is 11.09°F.¹⁵⁹ Extreme temperatures in the contiguous United States are projected to increase even more than average temperatures, with heat waves becoming more intense.¹⁶⁰

The Applicant’s current operating license limits allowable intake water temperature for Units 3 and 4 at 104°F.¹⁶¹ In 2014 The Applicant requested and received from the NRC a modification to its license authorizing an increase of 4°F (from 100 to 104) for its cooling water intake.¹⁶² FPL requested this modification to its license because “prolonged hot weather in the area has resulted in sustained elevated [Ultimate Heat Sink] temperatures High temperatures during the daytime with little cloud cover and low precipitation have resulted in elevated canal water temperatures at the Turkey Point site.”¹⁶³ The average intake temperature of cooling water for Units 3 and 4 is 2.5°F above the average ambient air temperature.¹⁶⁴ The foreseeable increase in air temperature at Turkey Point during the subsequent license renewal period, absent mitigating measures, will cause intake water temperatures to exceed the 104°F limit in Applicant’s operating license. An increase in air temperature during the subsequent license renewal period will increase the rate of evaporation from the cooling water canals,

¹⁵⁸ *Id.* at 198, Table 6.5.

¹⁵⁹ *Id.*

¹⁶⁰ *Id.* at 202.

¹⁶¹ ER, at 3-112.

¹⁶² ER, at 3-112.

¹⁶³ FP&L, Letter, “Request for Enforcement Discretion Regarding Technical Specification 3/4.7.4, Ultimate Heat Sink,” ADAMS Accession No. ML14204A083 (July 21, 2014), encl. at 3.

¹⁶⁴ FP&L, Letter, “License Amendment Request No. 231, Application to Revise Technical Specification to Revise Ultimate Heat Sink Temperature Limit,” ADAMS Accession No. ML14196A006 (July 10, 2014), encl. at 5.

thereby increasing salinity in the canals and cumulative impacts on groundwater. Additional mitigation measures or alternatives will be necessary to lower this increase in salinity.

6. A genuine dispute exists with the applicant on a material issue of law or fact (10 C.F.R. § 2.309(f)(1)(vi))

A genuine dispute exists with the Applicant's analysis of cumulative impacts on water resources. First, Applicant failed to consider cumulative impacts on water resources associated with reasonably foreseeable increases in sea level rise and hotter temperatures during the subsequent license renewal period. Second, Applicant erroneously assumes that cumulative impacts associated with the hypersaline plume emanating from the cooling canal system will be mitigated through a management program. NRC guidance, however, authorizes an applicant to make this assumption only when it complies with its permits. Here, Applicant *violated* its permits and has caused significant impacts on groundwater resources in the vicinity of Turkey Point.

a. *Section 4.12.4 Fails to Analyze Cumulative Impacts on Water Resources*

Applicant's approach to analyzing the cumulative impacts on water resources from climate change is woefully inadequate. The Environmental Report omits sea level rise from the list of "climate change indicators" when sea level rise will significantly impact Turkey Point.¹⁶⁵ Indeed, the reasonably foreseeable impacts from sea level rise during the current license renewal period have already required the company to implement mitigation measures to protect against flood events.¹⁶⁶ Applicant predicts a sea level rise of 0.39 feet *before* its current license expires

¹⁶⁵ ER, at 4-69 – 4-71.

¹⁶⁶ FP&L, Letter, "NEI 12-06, Revision 2, Appendix G, G.4.2, Mitigating Strategies Assessment (MSA) for FLEX Strategies report for the New Flood Hazard Information," ADAMS Accession No. ML17012A065 (Dec. 20, 2016).

in the early 2030s. Applicant cannot meaningfully address cumulative impacts from climate change without accounting for greater and more accelerated sea level rise during the subsequent license renewal period.

Applicant describes its cooling canal system as a “closed-cycle” system with no apparent “discernable influence on Biscayne Bay.” However, reasonably foreseeable impacts from sea level rise will increase the risk of flooding at Turkey Point, including the potential for overtopping or breach of the canal system, leading to direct discharges of polluted canal water into surface water resources including Biscayne Bay.

Applicant also fails to analyze cumulative impacts on water resources associated with the reasonably foreseeable increase in air temperature. Higher air temperatures will increase the rate of evaporation in the cooling canal system leading to more saline conditions. Higher salinity in the cooling canals will, as has been shown, adversely impact groundwater resources.

b. *Applicant’s Environmental Report (§ 4.12.4.2) Erroneously Assumes that Cumulative Impacts Associated with its Hypersaline Plume will be Managed.*

As a matter of law, Applicant may not rely on NRC Regulatory Guide 4.2, Revision 1 to assume that cumulative impacts from its plant will be eliminated through a management program.¹⁶⁷ The Guidance provides that applicants for a license renewal may assume cumulative impacts are managed under certain limited circumstances. For an applicant to benefit from this assumption, the cumulative impacts must be regulated and monitored by a permitting process and the facility must be “in compliance with their respective permits.”¹⁶⁸

¹⁶⁷ ER, at 4-86.

¹⁶⁸ NRC Regulatory Guidance 4.2, Rev. 1, Supp. 1, at 49.

Here, however, Applicant violated its permits and relevant regulations with respect to groundwater resources. For example, discharges from the cooling canal system have impaired “the reasonable and beneficial use of adjacent G-II ground waters to the west of the [Cooling Canal System] in violation of Condition IV.1 of [Applicant’s] Permit and Rule 62-520.400, F.A.C.”¹⁶⁹ Applicant seeks to turn the NRC guidance on its head by conflating permit compliance with remedial compliance. These are not the same. The former represents continual compliance with applicable permit conditions and regulations. The latter represents actual harm to the environment with new conditions and requirements, arrived through negotiations, seeking to correct past harm to the environment and mitigate future harm. NRC’s NEPA regulations and guidance do not authorize Applicant to assume cumulative impacts will be managed when the facts demonstrate that impacts have not been managed through permit compliance.

CONTENTION 3-E: THE ENVIRONMENTAL REPORT FAILS TO CONSIDER NEW AND SIGNIFICANT INFORMATION REGARDING THE EFFECT OF SEA LEVEL ON CERTAIN CATEGORY 1 AND 2 ISSUES, IN VIOLATION OF 10 C.F.R. § 51.53(C)(3)(iv).

1. Statement of the issue of law or fact to be raised or controverted (10 C.F.R. § 2.309(f)(1)(i))

The Environmental Report (§§ 3 and 5) fails to comply with 10 C.F.R. § 51.53(c)(3)(iv) because it fails to analyze new and significant information regarding the effect of sea level rise on a number of Category 1 and 2 issues. Section 51.53(c)(3)(iv) requires an environmental

¹⁶⁹ *State of Florida Dep’t of Environmental Protection v. Florida Power & Light Co.*, OGC File No. 16-0241 (Fla. Dep. of Env’t Prot. Jun. 20, 2016) (Consent Order) ¶ 19.

report submitted as part of a license renewal application to “contain any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware.” Neither the GEIS nor the Environmental Report contains any analysis of new and significant information regarding sea level rise relating to the following Category 1 or 2 issues:

- Surface water use conflicts (Category 2)
- Groundwater use conflicts (plants that withdraw more than 100 gallons per minute) (Category 2)
- Cumulative impacts (Category 2)
- Termination of plan operations and decommissioning (Category 1)

1. Brief explanation of the basis for the contention (10 C.F.R. § 2.309(f)(1)(ii)) and concise statement of the alleged facts or expert opinions supporting the contention (10 C.F.R. § 2.309(f)(1)(v))

NRC regulations require an environmental report to consider any “new and significant” information that may alter previous environmental conclusions.¹⁷⁰ “New and significant information” is defined as “[i]nformation not considered in the assessment of impacts evaluated in the GEIS leading to a seriously different picture of the environmental consequences of the action than previously considered.”¹⁷¹

This obligation applies to both Category 1 and 2 issues.¹⁷² “[E]ven where the GEIS has found that a particular impact applies generically (Category 1), the applicant must still provide

¹⁷⁰ 10 C.F.R. § 51.53(c)(3)(iv).

¹⁷¹ ER, at 5-1 (citing NRC Regulatory Guide 4.2, Supp. 1, Rev. 1).

¹⁷² *Massachusetts v. United States*, 522 F.3d 115, 120 (1st Cir. 2008).

additional analysis in its Environmental Report if new and significant information may bear on the applicability of the Category 1 finding at its particular plant.”¹⁷³ This requirement is intended to ensure that “[w]hen the GEIS and SEIS are combined [or here, the GEIS and the Environmental Report], they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding.”¹⁷⁴

Here, the GEIS and the Environmental Report, when combined, do not “cover all issues that NEPA requires be addressed.” Far from it: the GEIS expressly recognized that analysis of the effects of GHG emissions and climate change upon nuclear power plants could not be assessed generically.¹⁷⁵ The GEIS provided, therefore, that “each SEIS [will include] a plant-specific analysis of any impacts caused by GHG emissions over the course of the license renewal term *as well as any cumulative impacts caused by potential climate change upon the affected resources during the license renewal term.*”¹⁷⁶

The Environmental Report, however, fails to include an analysis of the effects of sea level rise in relation to numerous Category 1 and 2 issues. Beyond a brief mention that sea level rise will impact certain threatened, endangered, and sensitive species, the Environmental Report

¹⁷³ *In the Matter of Fla. Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), 54 N.R.C. 3, 11 (July 19, 2001).

¹⁷⁴ *Massachusetts*, 522 F.3d at 120.

¹⁷⁵ 2013 GEIS Revision, at 1-29 to 1-30.

¹⁷⁶ 2013 GEIS Revision, at 1-30 (emphasis added); *see also In the Matter of Duke Energy Carolinas, LLC* (Combined License Application for William States Lee III Nuclear Station, Units 1 & 2), 84 N.R.C. 180 (Dec. 15, 2016); *In the Matter of Tennessee Valley Auth.* (Bellefonte Nuclear Power Plant, Units 3 & 4) 2009 WL 3659545, at *3 (N.R.C. Nov. 3, 2009) (“We expect the Staff to include consideration of carbon dioxide and other greenhouse gas emissions in its environmental reviews for major licensing actions under the National Environmental Policy Act.”).

does not discuss sea level rise *at all*.¹⁷⁷ Section 5 of the Environmental Report, “Assessment of New and Significant Information,” contains only a summary of the process used by FPL to assess whether any new and significant information required analysis. The entirety of the FPL’s analysis appears in one sentence: “As a result of this review, FPL is aware of no new and significant information regarding the environmental impacts of license renewal associated with PTN.”¹⁷⁸ That conclusion fails to address information relating to sea level rise. This information is both new and significant.

The failure to address sea level rise is even more stark in light of Applicant’s acknowledgement of future sea level rise at Turkey Point. In 2016, the company acknowledged that probable maximum storm surge exceeded the plant’s design basis in several respects when “20 Year Sea Rise” was considered.¹⁷⁹ In the same document, FPL acknowledged that three “flood barrier segments” at Turkey Point “are not sufficient” to prevent flooding “when the projected 20 year sea-level rise of 0.39 inches is included.”¹⁸⁰

Moreover, the Final Environmental Impact Statement prepared for issuance of the combined construction permits and operating licenses for Turkey Point Units 6 and 7

¹⁷⁷ ER, at 3-181, 3-205, 3-210, 4-71.

¹⁷⁸ ER, at 5-4.

¹⁷⁹ FP&L, Letter, “NEI 12-06, Revision 2, Appendix G, G.4.2, Mitigating Strategies Assessment (MSA) for FLEX Strategies report for the New Flood Hazard Information,” ADAMS Accession No. ML17012A065 (Dec. 20, 2016), encl. at 11, Table 2.2-3.

¹⁸⁰ *Id.* encl. at 16; *see also id.* (“In the longer term, sea level rise may result in wave run-up overtopping the north and south barriers in the turbine building.”). Additionally, a projected 20-year sea level rise of 0.39 inches unreasonably low and not supported by any evidence. *See* Kopp Decl. at ¶ 30(a) and (d) (projecting a 68-95 percent chance that average sea level rise at Key West will exceed 1 foot by 2060 and, under a “High emissions scenario,” projecting a 1.5-39 percent chance that average sea level rise will exceed 6 feet by 2100).

acknowledge that global sea level is projected to rise 1 to 4 feet by 2100, and that some projections predict 8.2 feet by 2100 relative to 2000.¹⁸¹ The FEIS acknowledged that this scenario would mean that “much of South Florida would be uninhabitable and millions of people would likely be displaced.”¹⁸² The FEIS further acknowledged that:

- “Sea-level rise combined with more frequent Category 4 and 5 storms will increase the potential for damaging storm surge events at the Turkey Point site.”¹⁸³
- Sea level rise and storm surge would result in release of “sediment and nutrients” from the Turkey Point site.¹⁸⁴
- “Sea-level rise could stress mangrove forests due to inundation and could stress surviving wetland vegetation by introducing brackish water farther inland,” as well as also “place additional stress on the same habitats and wildlife affected by [Turkey Point’s] operational impacts.”¹⁸⁵

Despite the above discussion of the effects of sea level rise in the Units 6 and 7 FEIS, the Environmental Report submitted with the Units 3 and 4 license renewal application fails to address the issue at all. This deficiency violates NEPA.

a. *Cumulative effects (Category 2)*

The Environmental Report’s cumulative effects analysis (§ 4.12) fails entirely to discuss

¹⁸¹ NRC, Final Report, “Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7, Appendices A to K,” ADAMS Accession No. ML16301A018 (Oct. 2016), App. I at I-3, available at <https://www.nrc.gov/docs/ML1630/ML16301A018.pdf>; see also Kopp Decl. at ¶¶ 38.

¹⁸² *Id.*

¹⁸³ *Id.* at I-5.

¹⁸⁴ *Id.* at I-6

¹⁸⁵ *Id.* at I-6 to I-7. Because Units 6 and 7, if constructed, will be cooled by cooling towers rather than the existing cooling canal system, the FEIS for Units 6 and 7 did not address the effects of sea level rise in relation to the cooling canal system.

the sea level rise-related impacts upon affected resources. The GEIS recognized that “[c]hanges in climate have the potential to affect air and water resources, ecological resources, and human health, and should be taken into account when evaluating cumulative impacts over the license renewal term.”¹⁸⁶ But the Environmental Report fails to address a primary localized effect of climate change: sea level rise. This failure violates the GEIS’s assurance that each SEIS (or environmental report) will contain “a plant-specific analysis of any impacts caused by GHG emissions over the course of the license renewal term as well as any cumulative impacts caused by potential climate change upon the affected resources during the license renewal term.”¹⁸⁷

- b. *Water resources (Surface water use conflicts (Category 2) and groundwater use conflicts (plants that withdraw more than 100 gallons per minute) (Category 2))*

The Environmental Report erroneously fails to account for the effect sea level rise will have on freshwater availability, ground water resources, and release of polluted cooling water into Biscayne Bay.¹⁸⁸ The Environmental Report’s analysis of water resources impacts rests on the assumption that the cooling canal system is a “closed-loop” system and will not release of radionuclides or other pollution into the environment—an assumption that will no longer be valid once sea level rise has eliminated the “closed-loop” nature of the cooling canal system.¹⁸⁹

¹⁸⁶ 2013 GEIS Revision, at 1-29.

¹⁸⁷ 2013 GEIS Revision, at 1-30; *see* Contention 3-E.

¹⁸⁸ *See* ER, at 4-20 – 4-29.

¹⁸⁹ E.g., ER, at 4-26. The cooling canal system is not “closed-loop.” *See* ER at 3-114 (“The cooling canals by design are in direct hydraulic connection to the underlying surficial aquifer and are authorized to discharge to groundwater by the state of Florida IWW permit and the associated federal NPDES permit which is issued under delegation to the state of Florida[.]”).

Climate change will result in sea level rise and more extreme and more frequent storm surges at Turkey Point.¹⁹⁰ Sea level rise will result in a frequent interchange of water from Biscayne Bay and the cooling canal system. These effects paint a “seriously different picture of the environmental consequences of the action than previously considered,” and therefore must be considered.¹⁹¹

c. Termination of plant operations and decommissioning (Category 1)

Neither (1) the license renewal GEIS, (2) the GEIS prepared to analyze impacts related to plant decommissioning, nor (3) the Environmental Report addresses the effects of sea level rise on termination of plant operations and the decommissioning process.¹⁹² Sea level rise will affect Applicant’s ability to terminate plant operations and decommission the plant. If a subsequent license renewal is granted, Units 3 and 4 operating licenses will expire in the early 2050s, and the decommissioning process is expected to take 60 years to complete. This means that decommissioning will continue well past 2100, when sea level at Turkey Point could rise between four and ten feet.¹⁹³ NEPA requires either a GEIS or the Environmental Report to analyze this issue.¹⁹⁴ The failure to do so violates NEPA.

2. The issue raised in the contention is within the scope of the proceeding because it relates to Applicant’s failure to consider new and significant information relating to Category 1 and 2 issues (10 C.F.R. § 203.9(f)(1)(iii))

¹⁹⁰ Kopp Decl. at ¶¶ 12(iv).

¹⁹¹ ER, at 5-1.

¹⁹² See 2013 GEIS Revision, at 4-10; NRC, Final Report, “Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Vol. 1, Supp. 1 (NUREG-0586),” ADAMS Accession No. ML023500395 (Nov. 2002); ER, at 7-1.

¹⁹³ Kopp. Decl. at ¶¶ 40.

¹⁹⁴ *Massachusetts*, 522 F.3d at 120.

This issue is within the scope of the proceeding because NRC’s NEPA regulations require the Environmental Report to include “any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware.”¹⁹⁵

3. The issue raised in the contention is material to the findings the NRC must make to support relicensing (10 C.F.R. § 203.9(f)(1)(iv))

An issue is “material” if “the resolution of the dispute would make a difference in the outcome of the licensing proceeding.”¹⁹⁶ “This means that there must be some link between the claimed error or omission regarding the proposed licensing action and the NRC’s role in protecting public health and safety or the environment.”¹⁹⁷ The issue raised in this contention—Applicant’s failure to comply with NRC’s regulations requiring consideration of all relevant information in its NEPA analysis—relates directly to the NRC’s role in protecting public health and safety and the environment. NEPA imposes requirements on the NRC to ensure environmental protection. The failure to comply with these requirements is material to the findings NRC must make to support relicensing.

4. A genuine dispute of material fact or law exists regarding the Environmental Report’s analysis (10 C.F.R. § 2.309(f)(1)(vi))

A genuine dispute of material fact or law exists regarding the sufficiency of the ER’s analysis of new and significant information. The Applicant has concluded that it need not

¹⁹⁵ 10 C.F.R. § 51.53(c)(3)(iv).

¹⁹⁶ *Vermont Yankee*, 64 N.R.C. at 149.

¹⁹⁷ *Id.*

discuss any new and significant information regarding the environmental impacts of license renewal.¹⁹⁸ Petitioners contend to the contrary, that the ER’s failure to analyze new and significant information regarding the effect of sea level rise on numerous category 1 and 2 issues is unlawful.¹⁹⁹

CONTENTION 4-E: THE ENVIRONMENTAL REPORT FAILS TO DESCRIBE THE FORESEEABLE AFFECTED ENVIRONMENT DURING THE SUBSEQUENT LICENSE RENEWAL PERIOD.

1. Statement of the issue of law or fact to be raised or controverted (10 C.F.R. § 2.309(f)(1)(i))

Applicant’s Environment Report (§ 3) erroneously fails to describe the reasonably foreseeable affected environment during the subsequent license renewal period (2032–2053) in violation of 10 C.F.R. § 51.53(c)(2). This failure renders Applicant’s analyses of environmental impacts (§ 4), mitigating actions (§ 6), and alternatives analysis (§ 8) legally insufficient.²⁰⁰

2. Brief explanation of the basis for the contention (10 C.F.R. § 2.309(f)(1)(ii))

NEPA prohibits agencies from making decisions without first taking a “hard look” at the environmental consequences, requiring agencies to prepare an environmental impact statement (EIS).²⁰¹ The “heart” of the EIS is the agency’s evaluation and analysis of alternatives to the proposed action.²⁰² This analysis turns on an accurate description of the areas “to be affected by

¹⁹⁸ ER at 5-4.

¹⁹⁹ See 54 Fed. Reg. at 33,170 (“Where the intervenor believes the application and supporting material do not address a relevant matter, it will be sufficient for the intervenor to explain why the application is deficient.”).

²⁰⁰ 42 U.S.C. § 4332(2)(A); 10 C.F.R. § 51.53(c)(3)(ii) and (iii).

²⁰¹ *Sierra Club v. Fed. Energy Regulatory Comm’n*, 867 F.3d 1357, 1367 (D.C. Cir. 2017).

²⁰² 10 C.F.R. Part 51, App. A, §§ 4, 5; see also 40 C.F.R. § 1502.14.

the proposed action.”²⁰³ Without an accurate description of the affected environment, an agency is unable to meaningfully “understand the effects of the alternatives.”²⁰⁴

*When the impacts occur is as important as where.*²⁰⁵ A description of the affected environment as it exists today is legally insufficient when the environment will undergo reasonably foreseeable and significant changes by the time the project commences and throughout its proposed lifetime. An agency’s failure to consider this information in any meaningful or logical way violates NEPA.²⁰⁶

Here, Applicant omitted from its Environmental Report any description of reasonably foreseeable and significant aspects of the affected environment. The Environmental Report fails to discuss the changes in the surrounding environment and their effects on Turkey Point, including sea level rise, increased air temperature, increased surface water temperature, acidification, annual precipitation, drought, and increased storm intensity.²⁰⁷ Thus, the Applicant

²⁰³ 10 C.F.R. Part 51, App. A, § 6; *see also* 10 C.F.R. § 51.53(c)(2) (requiring a detailed description of the affected environment).

²⁰⁴ 40 C.F.R. § 1502.15.

²⁰⁵ 10 C.F.R. § 51.53(c)(3)(ii) (requiring analyses of “environmental impacts of the proposed action . . . *during the renewal term.*”).

²⁰⁶ *See AquAlliance v. U.S. Bureau of Reclamation*, 287 F. Supp. 3d 969, 1031–32 (E.D. Cal. 2018) (granting summary judgment to plaintiffs where agency failed to reconcile information on climate change impacts with ultimate conclusions about proposed action).

²⁰⁷ Applicant admits elsewhere that sea level rise is reasonably foreseeable, relevant, and significant. *See e.g.* FP&L, Letter, “NEI 12-06, Revision 2, Appendix G, G.4.2, Mitigating Strategies Assessment (MSA) for FLEX Strategies report for the New Flood Hazard Information,” ADAMS Accession No. ML17012A065 (Dec. 20, 2016), encl. at 16 (stating that various barrier segments at the plant are “adequate for the current sea-level; however, they are not sufficient when the projected 20 year sea-level rise of 0.39 inches is included and require modification to increase the height of the flood barrier.”); *see also*, Attachment Q, Declaration of David Lochbaum, who provided an expert declaration upon which Petitioners rely and states: “[t]he license renewal rule, specifically 10 CFR 54.29, states that a renewed license may be issued if the Commission finds that “there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB” [current

provided no analysis of alternatives to avoid the effects of these changes. As a result, Applicant's Environmental Report violates 10 C.F.R. § 51.53(c)(2), 40 C.F.R. § 1202.15, and 42 U.S.C. § 4332(2)(C).

3. The issue raised in the contention is within the scope of the proceeding (10 C.F.R. § 2.309(f)(1)(iii))

NRC's NEPA regulations require an applicant for a license renewal to draft an Environmental Report.²⁰⁸ The regulations specifically require a detailed description of the effected environment, which forms the basis of the applicant's, and later the NRC's, analyses of environmental impacts, mitigation measures, and alternatives.²⁰⁹ Consequently, Applicant's failure to describe the affected environment during the relevant time frame is within the scope of this proceeding.

4. The issue raised in the contention is material to the findings the NRC must make to support the action involved in the proceeding (10 C.F.R. § 2.309(f)(1)(iv))

A contention is "material" to the NRC's duty to make environmental findings if the issue of law or fact it raises "is of possible significance to the result of the proceeding. This means that there should be some significant link between the claimed deficiency and either the health and safety of the public or the environment."²¹⁰

The issue raised in this contention is material because Applicant's failure to describe the

licensing basis]. Because the flooding evaluations and assessments only went out to 2033, the expiration of the current operating licenses, and there is no evaluation or assessment concluding that reactor operation beyond 2033 will remain bound by those analyses, reasonable assurances needed to issue subsequent license renewals cannot be found." Att. Q at ¶ 41.

²⁰⁸ 10 C.F.R. § 51.53(c).

²⁰⁹ *Id.*

²¹⁰ *In re Entergy Nuclear Vt. Yankee L.L.C. & Entergy Nuclear Operations*, 60 N.R.C. 548, 556, 2004 NRC LEXIS 247, *16-17 (N.R.C. November 22, 2004).

reasonably foreseeable affected environment during the subsequent license renewal period taints the analyses of environmental impacts, mitigating actions, and alternatives. There are plainly real and significant differences, both in terms of safety and environmental impacts, between operating Units 3 and 4 in the affected environment described in Applicant's environmental report and one that is substantially hotter and prone to extreme flooding.

5. Concise statement of facts or expert opinions which support Petitioner's position and on which the Petitioner intends to rely at hearing (10 C.F.R. § 2.309(f)(1)(v))

Global mean sea level in the area around Turkey Point has risen over the past century and is projected to continue rising at an accelerated rate throughout this century and beyond.²¹¹ Relative to the year 2000, there is at least a 90 percent probability that global mean sea level will rise by 0.3–0.6 feet by 2030 and 0.5–1.2 feet by 2050.²¹² By 2100, scientists predict that global mean sea level will rise by at least 1.0 foot and could rise more than 8 feet under certain greenhouse gas emissions and Antarctic ice sheet stability scenarios.²¹³ Outside of Alaska, relative sea level rise along all U.S. coastlines will be greater than the global average rise.²¹⁴

Sea-level rise for the remainder of this century in south Florida, including around Turkey Point will be faster than the average over the last century in every reasonably foreseeable climate change scenario.²¹⁵ Through 2060, there is between a 68 and 95 percent chance that average sea-

²¹¹ Kopp Decl. ¶ 12(i) (referencing William V. Sweet et al., *Sea Level Rise*, in CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT, VOL. 1 333–363 (D.J. Wuebbles et al. eds., 2017).

²¹² *Id.* ¶ 12(ii).

²¹³ *Id.* ¶¶ 12(ii), 40.

²¹⁴ *Id.* ¶ 12(iii).

²¹⁵ *Id.* ¶ 13.

level rise at the Key West tidal gauge, which reflects relative sea level at Turkey Point, will exceed 1 foot above the National Tidal Datum Epoch.²¹⁶ Through 2060, there is a 10 to 37 percent chance that average sea level will exceed 2 feet with continuing unchecked fossil-fuel-based economic growth, leading to a near-doubling of carbon dioxide emissions between today and 2050, with continued growth thereafter.²¹⁷ By 2100, there is a 15 to 83 percent chance that average sea level will exceed 4 feet if the world's use of fossil fuels continues to grow unabated.²¹⁸

Assuming storm characteristics do not change, sea level rise will increase the frequency and extent of extreme flooding associated with coastal storms, such as hurricanes.²¹⁹ Extreme high-water levels arise from the superimposition of tidal and storm influences on top of average sea level.²²⁰ Most experts believe hurricanes and tropical storms will become more intense as temperatures rise due to climate change.²²¹

For an intense storm with an appropriate track, extreme water levels well above the highest level observed historically at a particular site are well within the range of possibility.²²² The effect of sea level rise can be added to storm surge. If the sea level rises by one foot, for example, the probability of storms increasing water levels to the height of 2.0 feet becomes 50%

²¹⁶ *Id.* ¶¶ 30(a).

²¹⁷ *Id.* ¶¶ 25, 30(b).

²¹⁸ *Id.* ¶ 30(c).

²¹⁹ *Id.* ¶ 12(v).

²²⁰ *Id.* ¶ 31.

²²¹ *Id.* ¶ 15.

²²² *Id.* ¶ 33.

rather than 1%.²²³

Even if emissions are drastically curtailed, and the Antarctic Ice Sheet remains relatively stable, it is likely (greater than two chances in three) that sea-level rise will exceed 1 foot in south Florida by 2060.²²⁴ If emissions around the world continue to grow unrestrained, and the Antarctic Ice Sheet becomes unstable, sea-level rise in Florida is likely to exceed 4 feet by 2100, and there is a greater than 1-in-10 chance of exceeding 10 feet by 2100.²²⁵

The annual average temperature of the contiguous United States is projected to rise throughout this century.²²⁶ For the period 2021–2050, temperatures are projected to rise on average by 2.5°F for a lower scenario, which still makes this near-term average comparable to the hottest year in the historical record (2012).²²⁷ Projected temperature changes in the Southeast for the 2036–2065 period range from 3.40°F to 4.30°F.²²⁸ Projected changes in temperatures extremes for the Southeast region over 2036–2065 are projected to be 5.79°F for the warmest day of the year compared to the 1976–2005 period.²²⁹ Change in the warmest 5-day, 1-in-10-year event for the same period is 11.09°F.²³⁰ Extreme temperatures in the contiguous United States are projected to increase even more than average temperatures, with heat waves becoming

²²³ *Id.* ¶ 34.

²²⁴ *Id.* ¶ 40.

²²⁵ *Id.* ¶¶ 38–40.

²²⁶ CLIMATE SCIENCE SPECIAL REPORT, at 195.

²²⁷ *Id.*

²²⁸ *Id.* at 197, Table 6.4.

²²⁹ *Id.* at 198, Table 6.5.

²³⁰ *Id.*

more intense.²³¹ Oceans have absorbed about 93 percent of excess heat from global climate change, altering global and regional feedbacks.²³² Surface ocean temperatures have increased by an average of 1.3°F (.70°C) from 1900 to 2016.²³³

However, the Southeast region of the U.S. has experienced over .13°C of surface temperature rise over the same period.²³⁴ The Southeast region is projected to have 1.6 to 2.7°C of sea surface temperature rise by 2080.²³⁵ The residual heat that the ocean does not absorb causes land and sea ice to melt, which amplifies subsurface ocean warming and ice shelf melting due to increased thermal stratification, which reduces the ocean's ability to transport heat to deep waters.²³⁶ Increased ocean stratification contributes to further ocean warming and mean sea level rise.²³⁷

Ocean surface waters have become 30 percent more acidic over the past 150 years.²³⁸ Annually, oceans absorb more than a quarter of the CO₂ emitted into the atmosphere from human activities. Under higher emission scenarios, the average surface ocean acidity is projected to increase by 100 to 150 percent. Increased CO₂ in the ocean decreases the amount of carbonate ions available, affecting saturation states for calcium carbonate compounds, which many marine

²³¹ *Id.* at 202.

²³² *Id.* at 365.

²³³ *Id.* at 367.

²³⁴ *Id.* at 368, Table 13.1.

²³⁵ *Id.*

²³⁶ *Id.* at 369.

²³⁷ *Id.*

²³⁸ *Id.* at 372

species use to build shells or skeletons.²³⁹

Increased air temperatures, due to anthropogenic climate change, have created deficits in surface soil moisture, and surface soil moisture is *likely* to decrease as evaporation will outpace precipitation.²⁴⁰ However, extreme precipitation events will increase in frequency and intensity throughout the contiguous U.S because of higher atmospheric water vapor concentrations due to increasing atmospheric temperatures.²⁴¹ Studies project that increased heavy precipitation will continue into the future; the number of extreme events will increase between 50 to 200 percent the historical average for every region, depending on emission scenario.²⁴²

Extreme precipitation events in the Southeast region are projected to increase by 9 percent in the lower emission scenario and 12 percent in the higher emission scenario by mid-century. Increased atmospheric water vapor concentration also causes increased precipitation within hurricanes by enhancing moisture convergence into the storm.²⁴³ Hurricanes are responsible for the most extreme precipitation events, especially in southeastern U.S., and those events are predicted to be heavier in the future.²⁴⁴ Numerical model simulations predict an increase in tropical cyclones (hurricanes and typhoons) in a warmer world, and the models show a general increase in the number of very intense storm events.²⁴⁵ Temperature and precipitation

²³⁹ *Id.* at 371–72.

²⁴⁰ *Id.* at 231–47.

²⁴¹ *Id.* at 216.

²⁴² *Id.* at 218.

²⁴³ *Id.* at 222.

²⁴⁴ *Id.*

²⁴⁵ *Id.* at 257–76.

extremes are becoming more common, and some have become more frequent, intense, or have longer duration. These extremes have impacts on water quality and availability, agriculture, human health, infrastructure, and on iconic ecosystems and species.²⁴⁶

6. A genuine dispute exists over the Applicant’s description of the affected environment (10 C.F.R. § 2.309(f)(1)(vi))

Petitioner contends that Applicant’s Environment Report “fails to contain information on a relevant matter as required by law.”²⁴⁷ Petitioner identifies each such failure below and the supporting reasons for this belief, including various widely-accepted reports on climate change and expert opinions on the reasonably foreseeable affected environment. These failures create a genuine dispute on material issues of law and fact because, at a minimum, they render Applicant’s analyses of environmental impacts of alternatives under consideration incomplete and incorrect in violation of NEPA.

c. Section 3.3 of Applicant’s Environmental Report Fails to Accurately Describe the Meteorology and Air Quality that Will Exist During the License Renewal Period

The Environmental Report (§ 3.3) omits information about reasonably foreseeable increases in the ambient air temperature during the license renewal period.²⁴⁸ Applicant’s discussion of cumulative impacts from climate change omits this information as well.²⁴⁹

Increased temperatures can affect whether Units 3 and 4 are able to operate in the

²⁴⁶ *Id.* at 18.

²⁴⁷ 10 C.F.R. § 2.309(f)(1)(vi).

²⁴⁸ *See e.g.*, FEIS for Units 6 and 7, at 2-212 (“The projected change in temperature by 2100, which encompasses the period of the licensing action in the southeastern United States is a regional average increase of between 4°F to 8°F in the annual average temperature.”).

²⁴⁹ ER, at 4-66, 4-69 (omitting information about reasonably foreseeable increases in sea level).

configuration described in the Environmental Report. Namely, higher temperatures affect the cooling canal system's heat exchange capacity either directly, by warming the water, or indirectly via degraded water quality.²⁵⁰ Applicant will need to implement measures for reducing the temperature of water in the cooling canal system to reduce temperatures as they approach the current license limit of 104°F. If the plant cannot run as efficiently as predicted, or at all, if there are high temperatures in the cooling canal system, then the Environmental Report must account for the corresponding difference in power output when considering the purpose and need of the project and the analysis of alternatives.

d. *Section 3.6.1.3 of Applicant's Environmental Report Fails to Accurately Describe the Potential for Flooding During the License Renewal Period.*

Applicant's description of the affected environment's potential for flooding (§ 3.6.1.3) omits relevant information about reasonably foreseeable and significant sea level rise. For example, in the context of its flood hazard reevaluations (not discussed in the ER), Applicant determined that its design-basis flood barriers were "not sufficient when the projected 20 year [initial license renewal period] sea-level rise of 0.39 inches is included and require modification to increase the height of the flood barrier."²⁵¹ Though there is *no* dispute that mean sea levels will rise significantly in the reasonably foreseeable future, Applicant fails to discuss this issue or

²⁵⁰ ER, at 4-33 (describing various issues that impacted the Cooling Canal System's heat exchange capacity).

²⁵¹ FP&L, Letter, "NEI 12-06, Revision 2, Appendix G, G.4.2, Mitigating Strategies Assessment (MSA) for FLEX Strategies report for the New Flood Hazard Information," ADAMS Accession No. ML17012A065 (Dec. 20, 2016), encl. at 16; *see also* Declaration of David Lochbaum (Attachment Q) ¶ 22.

capture this important aspect of the affected environment in its Environmental Report.²⁵²

Dr. Kopp, Petitioner's expert, opines that even under the best-case emissions scenario, there is greater than two chances in three that sea-level rise will exceed 1 foot in south Florida by 2060.²⁵³ This will dramatically increase the rate of flooding:

1.0 feet of average sea-level rise turns the current 50% annual probability high-water level (1.0 feet above Mean Higher High Water) into the new average higher high-water level and the current 1% annual probability high-water level (2.0 feet above Mean Higher High Water) into the new 50% annual probability high-water level. 2.0 feet of average sea-level rise turns the current 1% annual probability high-water level into the new average higher high water level. The effects of this cannot be understated: at Key West, 3.0 feet of sea-level rise is sufficient to turn the highest water level experienced to a flood level expected to be exceeded, on average, half of the days of the year.²⁵⁴

Superimposed on higher sea levels, tidal and storm influences will lead to extreme high-water levels at Turkey Point.

If Units 3 and 4 are unable to achieve the stated 1,632 megawatts output due to flooding, then the Environmental Report must account for this diminished output in the discussion of the project's purpose and need as well as the analysis of alternatives.

e. *Section 3.6.2 of Applicant's Environmental Report Fails to Accurately Describe Groundwater Resources that Will Exist During the License Renewal Period.*

Applicant's Environmental Report fails to address the reasonably foreseeable condition

²⁵² See *id.*; Pacific Northwest National Laboratory, "Potential Impacts of Accelerated Climate Change, Annual Report of Work for NRC Agreement Number NRC-HQ-60-14-D-0025," ADAMS Accession No. ML16208A282 (May 2016). Applicant's discussion of cumulative impacts similarly omits information about reasonably foreseeable sea level rise. See ER, § 4.12.

²⁵³ Kopp Decl. ¶ 38.

²⁵⁴ Kopp Decl. ¶ 34.

of groundwater resources during the relevant time period, 2032–2053.²⁵⁵ This failure is material to the NRC’s decision. Applicants like FPL whose plants pump “more than 100 gallons (total onsite) of groundwater per minute” must assess the impact of the proposed action on groundwater resources.²⁵⁶

Applicants cannot, however, adequately assess groundwater impacts from the operation of the plant during the subsequent license renewal period without first accurately describing groundwater resources during the same period. Applicant states—without explanation—that it does not anticipate increasing groundwater withdrawals beyond currently permitted levels during the renewal period.²⁵⁷ Because it does not anticipate increasing its groundwater withdrawals, Applicant concludes that environmental impacts from its future withdrawals will remain the same (allegedly small) and do not warrant additional mitigation measures.²⁵⁸ Applicant’s analysis of this issue fails to address, however, whether sufficient groundwater resources will be available during the license renewal period. In fact, it is highly probable that groundwater resources will be inadequate, putting Turkey Point’s need for groundwater in conflict with the need for drinking water of the population of South Florida.

**CONTENTION 5-E: THE ENVIRONMENTAL REPORT FAILS TO ADDRESS
THE ADVERSE EFFECT OF OPERATING THE COOLING
CANAL SYSTEM FOR AN ADDITIONAL 20 YEARS ON**

²⁵⁵ Applicant’s Supplement to the Environment Report, similarly does not address the reasonably foreseeable future state of groundwater resources. FP&L, “Turkey Point Units 3 and 4 Subsequent License Renewal Application, Appendix E Environmental Report Supplemental Information,” ADAMS Accession No. ML18102A521 (Apr. 10, 2018).

²⁵⁶ 10 C.F.R. § 51.53(c)(3)(ii)(C); Applicant admits groundwater use conflicts are a relevant Category 2 issue in this proceeding. ER, at 4-9.

²⁵⁷ ER at 4-23.

²⁵⁸ *Id.*; FP&L, “Turkey Point Units 3 and 4 Subsequent License Renewal Application, Appendix E Environmental Report Supplemental Information,” ADAMS Accession No. ML18102A521 (Apr. 10, 2018), encl. Attachment 1, at 4 (concluding Turkey Point groundwater withdrawals are small and do not warrant additional mitigation measures).

**SURFACE WATERS, FRESHWATER WETLANDS, AND
ENDANGERED SPECIES PRESENT IN THOSE
WETLANDS**

1. Statement of the issue of law or fact to be raised or controverted (10 C.F.R. § 2.309(f)(1)(i))

NRC regulations require the Environmental Report to consider the effects of Turkey Point’s continued operation on surface waters, freshwater wetlands, and endangered species present in those wetlands.²⁵⁹ But the ER gives no consideration to how the salinization of freshwater wetlands caused by the cooling canal system will impact threatened or endangered species, and otherwise harm important plant and animal habitats. This failure violates NEPA.

2. Brief explanation of the basis for the contention (10 C.F.R. § 2.309(f)(1)(ii)) and concise statement of facts or expert opinions which support Petitioners’ position and on which Petitioners intend to rely at hearing (10 C.F.R. § 2.309(f)(1)(v))

Operation of the cooling canal system causes salt and other pollutants to migrate into the groundwater surrounding the cooling canals.²⁶⁰ Heat from Units 3 and 4 causes evaporation of water in the cooling canals that concentrates salt, creating a hypersaline environment in the canals. The relatively denser saline water leaches out of the cooling canal system and into the aquifer, creating a “hypersaline plume.”²⁶¹ This process and associated environmental impacts have been recognized by the NRC, the State of Florida, and Miami-Dade County.²⁶²

²⁵⁹ 10 C.F.R. § 51.53(c)(3)(ii)(E) (ER must consider the “impact of refurbishment, continued operations, and other license renewal-related construction activities on important plant and animal habitats” and “on threatened or endangered species”); *see also id.* § 51.53(c)(3)(ii)(B) (ER must consider impacts on fish and shellfish resources resulting from thermal changes and impingement and entrainment).

²⁶⁰ ER, at 3-82, 3-111.

²⁶¹ ER, at 3-111.

²⁶² *See infra* notes 114, 137.

Over the last four decades, the portion of the Biscayne Aquifer below the cooling canal system has become saturated with hypersaline water moving down into the aquifer and radially in all directions, including westward (*i.e.*, towards the Model Lands Basin, the wider Everglades, and drinking water wells screened in the Biscayne Aquifer), and eastward towards Biscayne Bay where the plume discharges to the surface water.²⁶³

Salt migrating out of the cooling canal system has formed a hypersaline plume and has moved the saltwater/freshwater interface westwards at all elevations in the Biscayne Aquifer.²⁶⁴ Operation of the cooling canal system has driven the saltwater/freshwater interface at the base of the aquifer several miles westward into what was previously a potable portion of the aquifer.²⁶⁵

The cooling canal system is bounded to the west, southwest, south, and northwest by extensive freshwater wetlands that form part of the Everglades. The nearest wetland watershed unit is called the Model Lands Basin and consists primarily of publicly owned, undeveloped freshwater wetlands that are important habitat for plants and animals, including multiple endangered species.²⁶⁶ Endangered species that depend on this wetland habitat include the Florida panther, American crocodile, indigo snake, snail kite, red knot and wood stork.²⁶⁷ The Model Lands Basin also contains the company's Everglades Mitigation Bank.

²⁶³ See NRC, License Amendment To Increase the Maximum Reactor Power Level, Florida Power & Light Company, Turkey Point, Units 3 and 4, Final Environmental Assessment and Finding of No Significant Impact, 77 Fed. Reg. 20059, 20062 (Apr. 3, 2012) (“Because the PTN canals are unlined, there is an exchange of water between the PTN canal system and local groundwater and Biscayne Bay” including a seasonal “flow of hypersaline water from the CCS toward the Everglades”).

²⁶⁴ Chin, David A, Ph.D., *The Cooling System at the FPL Turkey Point Power Station* at 12 (2015) (Attached hereto as Exhibit O).

²⁶⁵ *Id.* at 12-13.

²⁶⁶ ER, at 3-149.

²⁶⁷ 2017 BiOp, at 44.

The discharge of saline groundwater from the cooling canal system is now degrading those wetlands. According to Miami-Dade County: “The FPL Turkey Point CCS, as well as FPL’s Everglades Mitigation Bank are located in the extreme southeast region of the county, in an area that is experiencing significant westward migration of the salt intrusion front at the base of the Biscayne aquifer, and where historically fresh surface water canals have recently been documented with higher conductivity and chloride levels uncharacteristic of fresh water bodies.”²⁶⁸

The County has also noted that “hydrologic impacts including salt intrusion and groundwater and surface water contamination have been documented on these lands.”²⁶⁹

Measurements recorded in County-owned wetlands west of the canal in April 2018 found that shallow groundwater in the area now exhibits conductivity of more than 5000 microSiemens ($\mu\text{mhos/cm}$).²⁷⁰ These conductivity levels are dangerously high for a naturally freshwater environment.²⁷¹

²⁶⁸ DERM-FDEP July 2018 Letter, at 2.

²⁶⁹ *Id.* at 4.

²⁷⁰ *Id.* at 27, 59.

²⁷¹ See EPA, *Conductivity*, <https://archive.epa.gov/water/archive/web/html/vms59.html> (last visited July 27, 2018) (“Conductivity is a measure of the ability of water to pass an electrical current. Conductivity in water is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron, and aluminum cations (ions that carry a positive charge). . . . The conductivity of rivers in the United States generally ranges from 50 to 1500 $\mu\text{mhos/cm}$. Studies of inland fresh waters indicate that streams supporting good mixed fisheries have a range between 150 and 500 $\mu\text{mhos/cm}$. Conductivity outside this range could indicate that the water is not suitable for certain species of fish or macroinvertebrates. Industrial waters can range as high as 10,000 $\mu\text{mhos/cm}$.”); see also Ami L. Riscassi and Raymond W. Schaffranek, USGS, *Flow Velocity, Water Temperature, And Conductivity In Shark River Slough, Everglades National Park, Florida: July 1999 – August 2001* (2002), available at <https://pubs.usgs.gov/of/2003/ofr03348/> (Appendix C records specific conductance in the range of 300 to 500 $\mu\text{mhos/cm}$ over two years of observations).

Further, recent salinity measurements in the L-31 canal west of the interceptor ditch indicate that saline water from the plume has surfaced in and entered the L-31 canal, from which it can now enter adjacent freshwater wetlands, causing further degradation of the wetlands.²⁷² As the County explains, “The water quality of the L-31 E was initially freshwater and salinities during the period of record have increased to over 29 PSU.”²⁷³ Over the past ten years, canal salinities have trended upward and the highest salinities (29 PSU) were recorded during the first quarter of 2018.²⁷⁴ Some of this information thus post-dates Applicant’s Environmental Report, and none of this information has been previously considered by the NRC.

Turkey Point discharges other pollutants from the cooling canal system to nearby surface waters via the Biscayne Aquifer. Specifically, violations of surface water ammonia standards have been observed in canals near Turkey Point.²⁷⁵ In the ER, Applicant claims that ammonia detected in surface water is not the result of point or non-point source contamination attributable to Turkey Point.²⁷⁶ Miami-Dade County, however, has offered evidence that Turkey Point is a key source of the ammonia and is responsible for the violations of water quality standards.²⁷⁷ Ammonia can have direct and highly toxic effects on the aquatic environment,²⁷⁸ yet the ER fails

²⁷² DERM-FDEP July 2018 Letter, at 3, 26, 51; NRC, “Environmental Impact Statement for Combined Licenses for Turkey Point Nuclear Plant Units 6 and 7,” Appendix I at I-6 (describing harm to wetland vegetation caused by the advance of brackish water farther inland).

²⁷³ DERM-FDEP July 2018 Letter, at 3.

²⁷⁴ *Id.* at 55, 56.

²⁷⁵ Letter from Wilbur Mayorga (Miami-Dade County, Division of Environmental Resources Management) to Matthew J. Raffenberg (FPL) at 1-2 (July 10, 2018) (Attachment P) (“Mayorga – Raffenberg Letter”).

²⁷⁶ ER, at 9-13, 3-93 -94.

²⁷⁷ Mayorga – Raffenberg Letter at 1-2.

²⁷⁸ Final Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater 2013, 78 Fed. Reg. 52192,

to consider the impacts of ammonia discharges on threatened and endangered species and important habitat.²⁷⁹

3. The issue raised in the contention is within the scope of the proceeding (10 C.F.R. § 2.309(f)(1)(iii))

NRC regulations plainly require the ER to address the effects of Turkey Point’s continued operations on surface waters, freshwater wetlands, and endangered species.²⁸⁰ The effects on these resources of the Turkey Point’s cooling canal system are therefore within the scope of this proceeding.

4. The issue raised in the contention is material to the findings the NRC must make to support the action involved in the proceeding (10 C.F.R. § 2.309(f)(1)(iv))

A contention is “material” to the NRC’s duty to make environmental findings if the issue of law or fact it raises “is of possible significance to the result of the proceeding. This means that there should be some significant link between the claimed deficiency and either the health and safety of the public or the environment.”²⁸¹

There is a significant link between the issue raised in this contention—FPL’s failure to assess the impacts of Turkey Point’s operations on surface waters, freshwater wetlands, and threatened and endangered species—and “the health and safety of the public or the environment.”²⁸² NRC regulations require the ER to include such an analysis. Each aspect of

52192 (Aug. 22, 2013)

²⁷⁹ 10 C.F.R. § 51.53(c)(3)(ii)(E) and (B).

²⁸⁰ *See, e.g.*, 10 C.F.R. § 51.53(c)(3)(ii)(E) (ER must consider “impact of refurbishment, continued operations, and other license renewal-related construction activities on important plant and animal habitats” and “on threatened or endangered species”); *id.* § 51.53(c)(3)(ii)(B) (ER must consider impacts on fish and shellfish resources resulting from thermal changes and impingement and entrainment).

²⁸¹ *In re Entergy Nuclear Vt. Yankee L.L.C. & Entergy Nuclear Operations*, 60 N.R.C. 548, 556–57, 2004 NRC LEXIS 247, *16-17 (N.R.C. November 22, 2004).

²⁸² *Id.*

the contention relates directly to an impact on the public health or the environment and, thus, is material to the findings the NRC must make to support relicensing.

5. A genuine dispute of material fact or law exists over the Environmental Report's analysis (10 C.F.R. § 2.309(f)(1)(vi))

Where the intervenor alleges that a license renewal application does not address a relevant matter, a genuine dispute of material fact or law exists if the intervenor explains why the application is deficient.²⁸³ Petitioners meet this standard. Here, the Applicant has failed to give any consideration to the impacts that groundwater salinization caused by the Turkey Point cooling system could have on surface waters, freshwater wetlands and the plants and animals that live there, including threatened and endangered species. Applicant states that studies it conducted “to determine the influence of the cooling canals on the surrounding areas through migration of groundwater” demonstrate that “the cooling canals do not have any ecological impact on the surrounding areas.”²⁸⁴ Applicant’s discussion of “Threatened, Endangered, and Protected Species, and Essential Fish Habitat” did not even consider the effects of salinization of freshwater wetlands west of Turkey Point.

Petitioners have cited authoritative government documents that establish that Applicant’s analysis does not comply with NRC regulations.²⁸⁵ These analyses plainly evidence saltwater intrusion into historically fresh surface water canals and wetlands.²⁸⁶ Furthermore, there is a genuine dispute as to the impact of ammonia on nearby surface waters.

²⁸³ 54 Fed. Reg. at 33,170.

²⁸⁴ ER, at 4-69.

²⁸⁵ 10 C.F.R. § 51.53(c)(3)(ii)(E) and (B).

²⁸⁶ *See, e.g.*, DERM-FDEP July 2018 Letter, at 2.

CONCLUSION

For the reasons stated above, Petitioners should be admitted as parties to the proceeding to pursue the admissible contentions they have presented.

Respectfully submitted,

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Filed this 1st day of August, 2018

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:)	
)	
FLORIDA POWER & LIGHT COMPANY)	Docket No. 50-250
)	Docket No. 50-251
(Turkey Point Nuclear Generating Station, Unit Nos. 3 and 4))	
)	August 1, 2018
)	
(Subsequent License Renewal Application))	

CERTIFICATE OF SERVICE

Pursuant to 10 C.F.R. § 2.305, I certify that, on this date, a copy of the foregoing
*“Request For Hearing And Petition To Intervene Submitted By Friends Of The Earth, Natural
Resources Defense Council, And Miami Waterkeeper”* was served upon the Electronic
Information Exchange (“EIE,” the NRC’s E-Filing System), in the above-captioned docket,
which to the best of my knowledge resulted in transmittal of same to those on the EIE Service
List for the captioned proceeding.

/Signed (electronically) by/
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