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General Comment

Please find the attached scoping comments of FoE and NRDC, for Docket No. NRC-2018-0101.

Attachments

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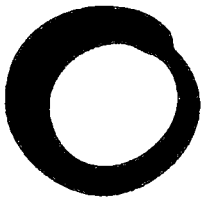

Friends of the Earth

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May Ma
Office of Administration
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U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Re: Comments on the Scope of the U.S. Nuclear Regulatory Commission's Environmental Impact Statement for Proposed Subsequent License Renewal of the Operating Licenses for Turkey Point Nuclear Plant Unit Nos. 3 and 4. Docket Nos. 50-250 and 50-251; NRC-2018-0101

Friends of the Earth ("FOE") and the Natural Resources Defense Council ("NRDC") hereby submit the following comments regarding the scope of the U.S. Nuclear Regulatory Commission's ("NRC") environmental impact statement for the subsequent license renewal for the Turkey Point Nuclear Plant Unit Nos. 3 and 4.

Friends of the Earth strives for a more healthy and just world and has been a loud and fearless voice for the environment. For 40 years, Friends of the Earth has been a leading voice in the U.S. opposing nuclear reactors. Friends of the Earth advocates to move beyond this dangerous and dirty technology to the clean renewable energy and efficiency technologies of the 21st century. Friends of the Earth's nuclear campaign works to reduce risks for people and the environment by supporting efforts to close existing nuclear reactors and fighting proposals to design and build new ones.

NRDC is a national non-profit membership environmental organization with offices in Washington, D.C., New York City, San Francisco, Chicago, Los Angeles and Beijing. NRDC has a nationwide membership of over one million combined members and activists. NRDC's activities include maintaining and enhancing environmental quality and monitoring federal agency actions to ensure that federal statutes enacted to protect human health and the environment are fully and properly implemented. Since its inception in 1970, NRDC has sought

to improve the environmental, health, and safety conditions at the nuclear facilities operated by DOE and the civil nuclear facilities licensed by the NRC and their predecessor agencies.

I. BACKGROUND

The Florida Power & Light Company ("FPL") owns and operates the Turkey Point nuclear power station, including reactor unit Nos. 3 and 4. These units began operating in 1972 and 1973, respectively. In 2000, FPL submitted an application to renew its operating license for Units 3 and 4 for an additional 20 years under 10 C.F.R. Part 54. The NRC granted this request after completing a safety review and a National Environmental Policy Act ("NEPA") environmental impact statement. Consequently, the current Unit 3 and 4 operating licenses will expire on July 19, 2032 and April 10, 2033, respectively.

FPL now asks the NRC to renew these already-extended licenses, which are not set to expire for more than a decade, for another twenty years. If granted, Turkey Point Units 3 and 4 would be licensed to operate until 2052 and 2053, respectively, for a total of approximately 80 years.

II. COMMENTS ON THE SCOPE OF NRC'S ENVIRONMENTAL IMPACT STATEMENT

A. Scoping Requirements Under NEPA and CEQ Regulations

When a major federal action significantly affecting the human environment is proposed, NEPA requires agencies to produce a detailed statement, known as an Environmental Impact Statement (EIS).[1] An EIS describes the environmental impacts and alternatives to mitigate those impacts.[2] The first step NEPA requires is scoping. Scoping defines the range of alternatives that the agency must consider for their proposed action.

Agencies must evaluate their proposed action for alternatives that make the action more environmentally friendly, as well as consider alternatives that make the proposed action unnecessary. In *Calvert Cliffs' Coordinating Committee, Inc. v. Atomic Energy Commission*, the court stated the alternatives requirement:

> ensure[s] that each agency decision maker has before him and takes into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit analysis. Only in that fashion is it likely that the most intelligent, optimally beneficial decision will ultimately be made.[3]

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[1] 42 U.S.C § 4332(2)(c).

[2] 40 C.F.R. § 1502.14 (describing the alternatives section as the "heart" of the EIS process).

[3] Calvert Cliffs' Coordinating Committee, Inc. v. U. S. Atomic Energy Commission, 449 F.2d 1109, 1114 (D.C. Cir.

An agency "must answer three questions in order. First, what is the purpose of the proposed project? Second, given that purpose, what are the reasonable alternatives to the project? And third, to what extent should the agency explore each particular alternative?"[4] "The agency's choice of alternatives are, then, evaluated in light of these stated objectives; an alternative is properly excluded from consideration in an environmental impact statement only if it would be reasonable for the agency to conclude that the alternative does not 'bring about the ends of the federal action.'"[5]

For the purposes of these scoping comments, NRC regulations provide that as soon as practicable after public notice of intent, the NRC uses the scoping process to "[d]etermine the scope of the statement and identify the significant issues to be analyzed in depth . . . . [i]dentify other environmental review and consultation requirements related to the proposed action so that other required analyses and studies may be prepared concurrently and integrated with the environmental impact statement . . ." and "[i]ndicate the relationship between the timing of the preparation of environmental analyses and the Commission's tentative planning and decision-making schedule."[6]

NEPA, through the preparation of an EIS, requires decisionmakers to make an informed decision based on all the relevant factors and consideration of the environment. Here, the NRC cannot authorize FPL to operate the Turkey Point reactors until the early 2050s without fully taking into account the state of the environment as impacted by climate change.

B. The NRC Must Consider the Future State of the Affected Environment for the Lifespan of the Second Turkey Point Operating Relicensing and Its Decommissioning.

The EIS must address the state of the environment that is likely to exist during the proposed license renewal period and subsequent decommissioning. This includes climate change impacts that are well-documented by federal, state, and international authorities. Turkey Point nuclear power station is located on the Florida coast at elevations only slightly above sea level and in an ecologically important and sensitive area subject to a variety of environmental stressors. NRC cannot satisfy NEPA's hard look without first establishing the proper environmental baseline for its analysis.

1971).

[4] Habitat Education Center, Inc. v. U.S. Forest Service, 593 F. Supp. 2d 1019, 1026-27 (E.D. Wis. 2009), *aff'd*, 609 F.3d 897 (7th Cir. 2010).

[5] City of Alexandria, Va. v. Slater, 198 F.3d 862, 867 (D.C. Cir. 1999) (citing Citizens Against Burlington, 938 F.2d at 195).

[6] 10 C.F.R. § 51.29.

1. Sea level rise

The world's scientists have studied global warning for nearly four decades. They have concluded unequivocally that the seas will rise during the 2032–2053 timeframe, the period for which the license extension is sought; the only question is how much. The NEPA analysis for Turkey Point must begin by presenting the results of these analyses and establishing an appropriate environmental baseline. It should focus not only on the mean expected sea level rise, but, more importantly, on predictions of extreme sea level rise during the relicensing timeframe. This is the only approach consistent with the NRC's approach to safety issues at nuclear power reactors that the NRC has long articulated.

Scientists predict the average global mean sea level will rise more than 8 feet by 2100, putting Turkey Point and its affected environment at serious risk.[7] Not only do rising sea levels place operations at Turkey Point at risk due to flooding, they can dramatically alter the surrounding environment through coastal inundation of inland areas, saltwater intrusion, and corresponding loss of habitat.[8] Ecosystems that now exist around Turkey Point are likely to face degradation as the ocean forces ecological changes in coastal wetlands and estuaries.[9]

Sea level rise is also a significant factor in salt water intrusion, which affects one of South Florida's most precious resources—freshwater. As oceans rise, salt water will move inland and diminish the availability of freshwater in both surface and groundwater systems. A loss of freshwater resources due to sea level rise makes an already depleted resource even more scarce. This is particularly concerning at Turkey Point, where hyper saline water from the facility's cooling canal system has already contaminated surrounding groundwater systems requiring FPL to invest millions of dollars to address the problem.

Further, a loss of freshwater resources increases the likelihood of conflict between various uses of the resource. While FPL's freshwater requirements may not lead to conflict today, the EIS must consider whether its requirements will lead to conflicts as freshwater becomes more scarce in South Florida.

Rising sea levels also make Turkey Point more vulnerable to flooding, which can occur even in the absence of a strong storm or hurricane. FPL has 15,861 feet of coastline on Biscayne Bay, much of which is dedicated to the cooling canal system.[10] While flooding of the cooling canal

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[7] NAT'L OCEANIC AND ATMOSPHERIC ADMIN., NOAA TECHNICAL REPORT NOS CO-OPS 083, GLOBAL AND REGIONAL SEA LEVEL RISE SCENARIOS FOR THE UNITED STATES 10 (Jan. 2017) [hereinafter NOAA SEA LEVEL RISE SCENARIOS]

[8] *Id.* at 2.

[9] SOUTHEAST FLORIDA REGIONAL CLIMATE CHANGE COMPACT, UNIFIED SEA LEVEL RISE PROJECTION 10 (Oct. 2015).

[10] FLORIDA POWER & LIGHT, APPLICANT'S ENVIRONMENTAL REPORT: SUBSEQUENT OPERATING LICENSE RENEWAL STAGE FOR TURKEY POINT NUCLEAR PLANT UNITS 3 AND 4, at 3-82 (2018), *available at* https://www.nrc.gov/reactors/operating/licensing/renewal/applications/turkey-point-subsequent.html [hereinafter FPL ENVIRONMENTAL REPORT],

system will obviously impact operations at Turkey Point, it will also release hypersaline water from the canals—and whatever other pollutants they harbor—into the broader environment. Flooding and inundation must also be taken into account in regard to the storage of irradiated nuclear fuel at the site—in both pools and dry casks.

The scope of the EIS must also consider impacts from decommissioning on the affected environment after the proposed licensing period, *i.e.* after 2053. Environmental impacts from decommissioning the Turkey Point reactors will be far more significant if, as predicted, the Turkey Point site is underwater or suffers frequent and severe flooding. Indeed, it is unclear how the NRC would proceed with decommissioning a nuclear power plant that suffers from constant or near-constant flooding. Not only would flooding expose the environment to radioactive and contaminated materials, it may make decommissioning infeasible.

Associated with these risks, the NRC should also give careful consideration to the range of sea-level rise predictions. As scientific models provide new and significant information related to rising oceans, the NRC should address the risks of accidents, radioactive leakage, damage to the reactor, or damage to the spent fuel storage system that could be caused by an increase in sea level of several meters, and or by hurricanes or other extreme storm surges in an ocean several meters higher than today's.[11] The discussion should be framed with the health and safety of the several million people who live within Miami-Dade, and surrounding counties, in mind. The NRC should consult with domestic and international experts on sea level rise in order to evaluate the range and various impacts on accident modeling.

Last, the EIS must identify and consider measures to mitigate environmental impacts from Turkey Point when mean sea levels are predicted to be many feet above today's levels.[12]

2. Subsidence

The EIS should consider the future state of the environment as it relates to the potential for subsidence at the Turkey Point site. Subsidence is sinking of land due to increased groundwater uptake; as the water is withdrawn, silt and clay take up less space, and the ground shifts downward.[13] Some studies indicate that, in addition to sea level rise, areas along the east coast, including Florida, are experiencing subsidence.[14]

As the east coast sinks, the resulting increased vulnerability to sea level rise and climate change becomes a pressing issue, including the reasonably foreseeable impacts to the cooling canals. Subsidence will only cause further impacts on local wetlands and endangered and threatened

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[11] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS1140 (2013), *available at* https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter13_FINAL.pdf.

[12] FPL's Environmental Report provides an example of mitigation measures for addressing hyper saline water from Turkey Point's cooling canal system. FPL ENVIRONMENTAL REPORT, *supra* note 10, at 3-92.

[13] *What is Subsidence?*, NOAA, https://oceanservice.noaa.gov/facts/subsidence.html (last updated Oct. 10, 2017).

[14] NOAA SEA LEVEL RISE SCENARIOS, *supra* note 7, at 10.

species. The NRC should consider alternatives that reduce the impact of subsidence and resulting potential for flooding, as well as consider the effects of any action that FPL will need to do.

3. Rising Temperatures

The world's scientists have also concluded unequivocally that global temperatures will continue to rise at an unprecedented rate throughout the license extension period and beyond. Again, the question is not whether this will happen, but by how much. The EIS must include these predictions and focus on extreme temperature predictions during the license and decommissioning period.

Rising temperatures can lead to dramatic environmental changes. As temperatures rise, species unable to tolerate the temperature increase will either migrate or perish. Species that can tolerate the temperature increase and therefore remain may nevertheless become less resilient to environmental insults. For example, an aquatic species that might have withstood a one-degree temperature shock from Turkey Point's thermal discharge may no longer be able to withstand that shock as the environment warms.

Rising temperatures can also lead to a loss of freshwater resources due to increased evaporation and transpiration. As noted above with salt water intrusion, loss of freshwater resources may amplify impacts from Turkey Point, lead to conflicts over freshwater resources, or both.

Rising temperatures may also affect plant operations and/or spent fuel storage and corresponding environmental impacts. Several nuclear power plants have been forced to scale back or shut down due to rising temperatures. Cooling water may be too warm for full power operations or heated cooling water may be too warm to discharge for ecosystems in the receiving waters.[15]

4. Storm Intensity and Duration

Rising temperatures lead to an increase in storm intensity and duration.[16] This is a result of higher ocean temperatures that fuel storms with more energy and greater evaporation and transpiration. With more energy and airborne moisture, storms will generate higher wind speeds and more rainfall. As storms, including hurricanes, become more severe and intense, so too will

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[15] U.S. DEPARTMENT OF ENERGY, DOE/PI-0013, U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER 2 (Jul. 2013), https://www.energy.gov/sites/prod/files/2013/07/f2/20130716-Energy%20Sector%20Vulnerabilities%20Report.pdf [hereinafter DOE REPORT].

[16] *Extreme Weather*, NAT'L CLIMATE ASSESSMENT, https://nca2014.globalchange.gov/highlights/report-findings/extreme-weather (last visited June 18, 2018) (detailing the changes to extreme weather events due to climate change); *see also* Brad Plumer & Nadja Popovich, *How Global Warming Fueled Five Extreme Weather Events*, N.Y. Times (Dec. 14, 2017), https://www.nytimes.com/2017/12/14/climate/climate-extreme-weather-attribution.html (reporting that human-caused climate change was a "significant driver" for 21 out of 27 extreme weather events in 2016).

their impacts on the human environment. FPL admits that their safety systems have been compromised by hurricanes in the past.[17]

5. Drought

Climate change can also lead to changes in water availability due to drought. While increasing temperatures can lead to more severe weather, it can also leave areas without little precipitation for extended periods resulting in drought conditions. Drought conditions in South Florida, like salt water intrusion and rising temperatures, can lead to an increased scarcity of freshwater resources and similar results.

Drought conditions can also affect the supply of nuclear fuel. FPL refuels each of its Turkey Point reactor units on an 18-month schedule. The EIS should consider environmental impacts of uranium mining and processing required to fuel Turkey Point for an additional 20 years, including impacts on water supplies.

Drought conditions have already caused significant environmental impacts at Turkey Point, including increased salinity and algae growth in the cooling canal system, requiring FPL to expend resources on mitigating the environmental impacts. Some of these mitigation measures create additional environmental impacts, such as FPL's plan to extract groundwater to "freshen" the cooling canal system.[18]

The scope of the EIS must consider the baseline environment as affected by drought during the relicensing period and subsequent decommissioning.

6. Population Growth

Implicit with the increased effects of climate change is the increased potential for catastrophic or significant accidents for FPL. However, catastrophic events are not needed to greatly affect the economic stability of the county. Miami-Dade County continues to grow in population; the Environmental Report states that from 2000 to 2015, the population grew from 2,253,362 to 2,693,117.[19] Similarly, Miami-International Airport (MIA) is only 25 miles north of the PTN facility,[20] and generates over $33 billion dollars annually.[21] Any on-site problem due to a severe weather event, or increased flooding due to sea-level rise, will have equally severe economic ramifications. The NRC should consider the potential effects of climate change on their facility, with respect to the larger economic area and accident modeling, in order to give decision makers

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[17] FPL ENVIRONMENTAL REPORT, *supra* note 10, at 3-27.

[18] *Id.* at 9-13.

[19] *Id.* at 3-2.

[20] *Id.*

[21] *About*, MIA, http://www.miami-airport.com/about_us.asp (last visited June 7, 2018) (noting that the airport averages over 838,000 passengers weekly).

a full and informed decision-making process.

7. Reduction in Plant Efficiencies

FPL applied for an uprate in 2013, but predicted their heat rejection rate would be lower than before the uprate. To the contrary, the canal water was several degrees warmer than expectations. However, FPL could not connect the hotter cooling canal system water with the increased power output.[22] FPL partially explains the conditions by decreased heat exchange efficiency. Heat exchange is dependent on the difference in temperature between the two substances exchanging heat; if the temperature of the surrounding air is warmer, there is a lower rate at which heat will be given off. As average temperatures rise, FPL will need experience a warmer canal system and will need to consider the effect on plant efficiency, which necessarily depends upon adequate cooling. FPL has already felt the effects of climate change, and therefore it is not reasonable to avoid in-depth analysis of the educated assumptions associated with climate change and sea-level rise modeling. The actions that FPL will have to take in order to mitigate the effects on plant efficiency should be taken into account.

C. The NRC Must Consider the Environmental Impacts of Measures Turkey Point Must Take to Operate in an Environment Impacted by Climate Change.

The EIS for the subsequent license renewal must also consider environmental impacts from measures FPL will need to take for adapting to a changed environment. This requires that the NRC first determine what measures will be needed to operate during the license renewal period followed by an analysis of their environmental impacts. This post-adaptation analysis falls within the scope of the EIS that, as the NRC stated previously, will include a "plant-specific analysis of . . . any cumulative impacts caused by potential climate change upon the affected resource during the license renewal term."[23] If the environmental impact statement does not address impacts from climate-adaptation measures, then it must address the environmental impacts assuming FPL does *not* adapt. To illustrate, NRC will need to consider the affected environment during the license renewal time frame, including the effects of sea level rise. NRC must address the Turkey Point's impacts on the future environment assuming *either* it has or has not taken steps to adapt.

1. Cooling canal system

Turkey Point's cooling canal systems are vulnerable to sea level rise. The canals lie just above sea level, placing them squarely in the path of rising seas, storm surge, coastal flooding, and similar impacts. If the canals were inundated by sea water or flooded from storm surge, they would not be able to serve Turkey Point's cooling needs. Operations at other nuclear power

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[22] FPL ENVIRONMENTAL REPORT, *supra* note 10, at 4-33 (explaining that the increased temperatures could be partly explained by lower than average rainfall over a period of three years).

[23] U.S. NUCLEAR REGULATORY AGENCY, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS, NUREG-1437, Vol. 1 Rev. 1 1-30 (Jun. 2013).

plants have been impacted by rising temperatures and flooding.[24]

Various estimates of sea level rise place the cooling canal system at risk of becoming inundated during the subsequent license renewal period.[25] FPL will inevitably be forced to adapt to this new environment, and whatever measures it takes will necessarily have environmental impacts.

A related concern is the capacity of the canal system to provide adequate cooling for Turkey Point. If, as predicted, ambient temperatures continue to rise, it is unclear whether the existing canal system will be able to dissipate enough heat for continued operation. If the current design is inadequate for dissipating heat, then FPL will need to take steps to modify some aspect of its operation. This might include downrating the plant, physically modifying the cooling canal system, introducing cooling water to the canals from nearby water resources, or redesigning the cooling system altogether.

The NRC should consider alternatives to the cooling canal system to truly make it "closed," either by construction of a new system of cooling pipes, or an upgrade to the lining of the canals, which will reduce impacts from groundwater intrusion. This will have a profound effect on the impacts that climate change will have on the facility, and the impacts on the environment from the facility. Not least of which, impacts on threatened and endangered plant or animal species that require lower salinity environments. The impacts due to construction of site-specific canal lining or a truly closed cooling system should be taken into account.

2. Other Turkey Point Structures

In addition to the cooling canal system, other structures at Turkey Point are vulnerable to sea level rise and related flooding and storm surge events. The environmental impact statement should consider the range of estimates for sea level rise for the proposed license renewal period and determine whether FPL will need to take steps to adapt to rising seas. The environmental impact statement should then consider the environmental impacts associated with these measures.

The NRC should consider improvements to existing flood and stormwater management systems on the FPL site, especially as these events are likely to increase in severity and frequency. An improved flood or stormwater system would reduce potential impacts on the surrounding aquatic and terrestrial environments. The foreseeable site-specific impacts due to construction of any improvements to existing systems should be taken into account

The NRC should consider building a higher sea wall on either side of the cooling canal system which could help prevent impacts of flooding more severe storms. The impacts due to construction of those site-specific sea walls should be taken into account

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[24] *See e.g.* DOE REPORT, *supra* note 15, at 2–3 (indicating "considerable flooding" at Turkey Point during hurricanes stronger than Category 3).

[25] *Id.* at 34.

The NRC should also consider the impacts that accrue from overall "armoring" and improvement to plant features. Importantly, the NRC should focus on the cost, effectiveness, and cost/effectiveness for these options, as these are highly salient factors for local decision makers.

3. Water Shortages

The environmental impact statement should also consider FPL's response to potential water shortages during the subsequent license renewal period. While water is available today for operating Turkey Point, it may not be available during the license renewal period. This may result from drought conditions, overuse of water resources, or other limitations. The analysis should consider what steps FPL will need to take for operating Turkey Point under low- or no-water circumstances and any corresponding environmental impacts.

4. Spent Nuclear Fuel Storage

We are aware that the NRC's obligation to address the environmental impacts of spent fuel are addressed in the Continued storage EIS, but for the purposes of this precise analysis of the impending sea level rise and increased flooding at the Turkey Point reactors, the NRC should analyze several site specific impacts, including changes in procedure for spent fuel management or pool and/or dry storage location.

5. Decommissioning

The NRC should consider climate change impacts on the decommissioning process. Rising sea levels, and other climate impacts, are likely to interfere with the decommissioning process if left unmitigated. Notably, the decommissioning process will take longer than the 20-year license renewal period to complete; the power plant will be there until 2093 if the no-action alternative is taken and potentially to 2113 if the power plant is relicensed.[26] Thus, the environmental impact statement must consider projections of sea level rise beyond the license renewal period. If, as predicted, sea level rise accelerates through the remainder of the century, it will have a dramatic impact on the east coast, including Turkey Point. FPL will need to adapt to the rising sea levels both during the proposed operational lifetime and the subsequent decommissioning. Related impacts must be addressed.

D. The Scope of the EIS Must Include Unintended Environmental Consequences Even Assuming FPL's Full Compliance with Applicable Regulations

The scope of the EIS must include unintended environmental consequences even under conditions of regulatory compliance. The EIS cannot, as FPL suggests, assume that compliance with regulations, orders, and agreements with regulatory agencies will only result in insignificant

[26] FPL ENVIRONMENTAL REPORT, *supra* note 10, at 6-7 (noting that the decommissioning process takes 60 years).

impacts.[27] As FPL admits, it can operate the Turkey Point facility "in full compliance with all applicable regulations" and still experience "unintended" environmental consequences requiring corrective action and environmental remediation.[28]

E. The NRC Must Address Impacts on Local and Regional Efforts to Adapt to Climate Change.

In Florida, government entities at all levels are taking steps to adapt to climate change impacts. For example, in 2014, Miami-Dade County passed a resolution requiring "all county infrastructure projects to consider potential impacts of sea level rise during all project phases . . . ."[29]

The NRC should analyze in-depth, coordinate, and cooperate with current Miami-Dade Policies and Initiatives, Miami-Dade's Sea Level Task Force, and the South Florida Regional Climate Change Compact.[30] Not only may these organizations help prepare the EIS by providing site-specific sea level and climate change information, but the information gained will only aid decision makers in the future.

F. Military Bases

As we adapt to changing and more modern threats, the NRC should coordinate with the appropriate military agencies, DOI, DOE, DOD and DHS, to help plan for and mitigate any effects from terrorist attacks, theft of radiological materials, and risks to cybersecurity. A changing environment will provide challenges to transporting radiological materials, and possibly increased vulnerability to cyber or terrorist attacks from damage to power systems due to increased flooding. Upgrades to these systems and management plans are foreseeable as climate change will impact response times or power generation.

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[27] *Id.* at 4-2.

[28] Post-Hearing Brief of Florida Power & Light Company, In re: Environmental Cost Recovery Clause, Docket No. 20170007-EI, Doc. No. 09748-2017 at 8 (Nov. 13, 2017) (arguing that it should recover costs from ratepayers for actions taken to mitigate releases of hyper saline water from the cooling canal system).

[29] MIAMI-DADE COUNTY, RESOLUTION SETTING POLICY FOR MIAMI-DADE COUNTY; DIRECTING THE MAYOR OR DESIGNEE TO REQUIRE ALL COUNTY INFRASTRUCTURE PROJECTS TO CONSIDER POTENTIAL IMPACTS OF SEA LEVEL RISE DURING ALL PROJECT PHASES INCLUDING BUT NOT LIMITED TO PLANNING, DESIGN, AND CONSTRUCTION, AND FURTHER DIRECTING THE MAYOR OR DESIGNEE TO EVALUATE THE EXISTING INFRASTRUCTURE IN THE FACE OF SEA LEVEL RISE, R-341-14, (May 6, 2014), http://www.miamidade.gov/govaction/matter.asp?matter=140804&file=true&fileAnalysis=false&yearFolder=Y2014.

[30] *Climate Change*, MIAMI-DADE GREEN, https://www.miamidade.gov/green/climate-change.asp (last updated June 19, 2018).

G. No-Action Alternatives and Mitigation of Their Impacts

If the no-action alternative is taken, the FPL Environmental Report only offers three alternatives that would account for the baseload generation that the nuclear plant would produce between 2032–2053.[31] FPL suggests a new nuclear option, a natural gas (NGCCC) power plant, and a combination of NGCCC and solar energy. However, these alternatives lack the requisite rule of reason as those options do not discuss the impacts of climate change, as well as avoid discussion of new technologies that reduce environmental impacts. The scientific facts about ocean levels and temperature at the site and years in question compel the analysis of an alternative source of electricity to Turkey Point further inland and to the North as a fundamental alternative to the license application.

Further, the ER falls into the trap of presuming that past is prologue, and that which served the grid in the past is, of necessity, the only way to serve the grid in the future. Just because so-called baseload resources provided essential reliability services historically does not mean these are the only resources that can provide those services today. Indeed, sound evidence demonstrates that other technologies are currently providing such reliability services.[32] Presumptions in favor of incumbent technologies would have prevented the emergence of the many new technologies that have enhanced the reliability and resilience of today's grid. To ensure a meaningful environmental review and proper comparison of alternatives, NRC should ignore dated assumptions regarding "baseload" resources and start its inquiry from a rational (and technology neutral) framework that recognizes the contributions of all technology types to grid reliability and whether there is even a need for continuation or replacement of this generation in light of efficiency improvements.

If the NRC is to consider the widest range of alternatives, such as considering a new site for "new nuclear" option, as an alternative to the option for a plant right next to existing FPL facility, it must use the rule of reason in applying the economic realities for all of the following technologies. This could reduce the impacts on the known wetland, CERP preservation,[33] and on any existing endangered or threatened species within the FPL 6-mile vicinity. As well as, relocation might reduce any potential effects from sea-level rise.

The NRC should consider rebuilding or re-commissioning Units 1, 2, or 5 with better nuclear technologies that have stalled construction of Units 6 and 7.[34] Or the NRC could consider an

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[31] FPL ENVIRONMENTAL REPORT, *supra* note 10, at 7-3.

[32] *Fourteen Alleged Magical Properties That Coal and Nuclear Plants Don't Have and Shouldn't Be Paid Extra for Providing*, Amory Lovins, July 21, 2017, *found online at* https://rmi.org/news/fourteen-alleged-magical-properties-coal-nuclear-plants-dont-shouldnt-paid-extra-providing/.

[33] *Id.* at 3-4.

[34] *Regulator Approves Licenses for New Florida Units*, WORLD NUCLEAR NEWS (Apr. 6, 2018), http://www.world-nuclear-news.org/NN-Regulator-approves-licences-for-new-Florida-units-0604184.html (reporting that FPL "intends to pause the project to observe and understand the challenges faced by the first wave of AP1000 projects

alternative that upgrades those Units to NGCCC systems.

The NRC should consider NGCCC power generation alternatives that include new carbon capture and storage technologies, which would further reduce the impacts of GHG emissions from fossil fuel energy. Especially in regards to President Trump's new tax credit for metric tons of carbon captured and uses of that captured carbon, which is driving technology growth.[35]

The NRC should also consider relocating NGCCC plant alternatives to reduce the 100-mile pipeline needed.[26] Put simply, the closer you are, the less you have to build, and the fewer impacts and associated right-of-way issues the pipeline will have, or at least, less complicated right-of-way issues.

The NRC should consider the range of demand-side management options that exist, including regulatory or legislative incentives for at-home solar PV panels that have been successful at reducing baseload requirements. A consideration of reasonable demand-side management techniques is appropriate, especially as smarter technologies, grids, and grid storage impact our energy use.[36] The FPL Environmental Report states that reduction of over 1,360 MWe is the only time FPL would consider this option, a value that is not reasonable to obtain, as it represents an 83% reduction in energy use.[37] But a more reasonable reduction in energy demand will make alternative energy sources more viable: i.e. If a 400 MWe reduction is made, then *these* alternative energy options are viable...if an 800 MWe reduction is made, then these alternatives exist, etc. This leaves room for a more complete analysis and decision-making process, especially as at-home solar panels can significantly increase property values and affect the socioeconomics of the region.[38]

The NRC should consider, along with reasonable demand-side management, alternative green energies that have become significantly more commercially viable, such as wind energy technology that reduces costs by half.[39] The NRC should not limit the discussion to just one

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currently under way.").

[35] James Temple, *The Carbon-Capture Era May Finally Be* Starting, MIT TECH. R. (Feb. 20, 2018), https://www.technologyreview.com/s/610296/the-carbon-capture-era-may-finally-be-starting/.

[36] *Batteries Perform Many Different Functions on the Power Grid, Today In Energy*, U.S. Energy Info. Admin. (Jan. 8, 2018), https://www.eia.gov/todayinenergy/detail.php?id=34432 (noting the exponential growth grid storage has had in the past few years); *see also* Jeff St. John, *Global Energy Storage to Double 6 Times by 2030, Matching Solar's Spectacular Rise*, GTM (Nov. 21, 2017), https://www.greentechmedia.com/articles/read/global-energy-storage-double-six-times-by-2030-matching-solar-spectacular#gs.PzT8u64 (noting that an estimated $103 Billion will be invested in energy storage over that time period).

[37] FPL ENVIRONMENTAL REPORT, *supra* note 10, at 7-6.

[38] BEN HOEN ET AL., LAWRENCE BERKELEY NAT'L LAB., LBNL-6942E, SELLING INTO THE SUN: A PRICE PREMIUM ANALYSIS OF A MULTI-STATE DATASET OF SOLAR HOMES 36 (2015).

[39] U.S. DEP'T OF ENERGY, OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY, DISTRIBUTED WIND COMPETITIVENESS IMPROVEMENT PROJECT 2 (Feb. 2018),

alternative energy, i.e. just solar, because a combination of green energy production is the more sensible and realistic way to approach generating the required base load. In doing so, the NRC should consult with appropriate energy-efficiency experts, including the Office of Energy Efficiency and Renewable Energy, which hold the most current and accurate data.

The NRC should consider identifying specific sites, not just four unspecified locations, for combined solar and photovoltaics alternative.[40] Known locations for solar energy may increase property values in the surrounding area and have effects on environmental justice and socioeconomic impacts.[41] Specific locations will help improve the decision-making process.

For the combined NGCCC and solar alternative, the NRC should consider an alternative that uses less NGCCC power and more solar panel locations.[42] In their current alternative, the NGCCC would generate the same amount of power used in the solo NGCCC alternative. However, an alternative that does not reduce natural gas power production commensurate with increased solar power production does not apply the "rule of reason." These alternatives become more prudent as better grid and storage technologies become available.

H. Mitigation Alternatives and Other Considerations for In-depth Analysis

As mentioned above, there are secondary alternatives that the NRC should consider when creating the EIS for the SLRA for Units 3 and 4.

The NRC should consider the ground and surface water interface, and full disclosure of impacts from the canal system, and the resulting violations issued against FPL.[43] Including how this interface effects local fauna and endangered and threatened species as they adapt, or not, to a higher salinity environment. A categorical denial of any effect on surface waters, and therefore wildlife, is inappropriate.[44]

The NRC should consider the impacts of saltwater and corrosion on concrete and other buildings and materials within PTN for their lifespan between 60–80 years. Some of which has already

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https://www.energy.gov/sites/prod/files/2018/02/f49/Distributed-Wind-Competitiveness-Improvement-Project-02-27.pdf.

[40] FPL ENVIRONMENTAL REPORT, *supra* note 10, at 7-30.

[41] *Id.* at 7-4.

[42] *Compare*, FPL ENVIRONMENTAL REPORT, *supra* note 10, at 7-4, *and Id.* at 7-3.

[43] FPL ENVIRONMENTAL REPORT, *supra* note 10, at 3-93, 9-11 (detailing Miami-Dade County Department of Environmental Resources Management (MDC DERM) allegations against FPL for violations of water quality standards and criteria of groundwater).

[44] *See Id.* at 4-71 (concluding that "[t]he studies' data support the conclusion that the cooling canals do not have any ecological impact on the surrounding areas, and there is no evidence of cooling canal water in the surrounding marsh and mangroves areas from a groundwater pathway.").

been repaired or replaced due to leaks of radwaste, including instances where FPL admits they did not know how long the leak lasted.[45]

The NRC should consider alternatives that reduce the impact from worker transportation, such as enhanced public transportation or an FPL-owned park-n-go. This alternative will reduce the cumulative impacts of foreseeable, regular car emissions and maintenance that each employee is reasonably expected to do, such as change tires, oil, or purchase a new vehicle. All of which is reasonably foreseeable over a 20-year period that is still 14 years away. The importance of this alternative is emphasized by the fact 85% of the PTN workforce lives within Miami-Dade County.[46]

The NRC should also consider the effects of leakage, servicing, repair, and disposal of refrigerant equipment, as FPL did not include a determination of these impacts.[47] It is foreseeable that these actions are going to happen in the operating period, and it would not be difficult to ascertain how many times these refrigerants have been repaired or replaced in the past and then apply that knowledge for 60-to-80-year-old parts.

I. Relationship between the timing of the preparation of environmental analyses and the Commission's tentative planning and decision-making schedule

As a part of the scoping under the NRC regulations, scoping should indicate the timing of environmental analysis and decision-making schedule. The Commissioner should delay the preparation of the EIS and decision-making until 2028, or in any case, much closer to the date of the current license expiration. The delay should happen for three reasons. First, there has never been another SLRA for the operational period between 60–80 years. For this reason, the NRC should be hesitant about making a final decision without a full understanding of the future environment and alternative energies that are becoming more efficient and commercially viable. By not waiting or delaying, the NRC sends a dangerous signal to other nuclear operators that if those operators can submit their SLRA incredibly early, they do not have to consider certain alternatives or impacts.

Secondly, the NRC should delay because alternative energies *are* getting more efficient and commercially viable, and this is happening at an accelerated rate. The rate of progress shows this to be true, as well as the vast amount of money that is being invested into smart, green technologies in the U.S. and around the globe. Correspondingly, huge investments are being made into energy storage, which has been the limiting factor for distributed energy generation. By waiting, the NRC could have a better and more complete list of reasonable alternatives that could help inform any decision maker.

Lastly, the NRC should consider delaying the preparation of the EIS because the models and

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[45] *Id.* at 3-115 ("Since 2012, there have been nine unplanned releases of radioactive materials from PTN.").

[46] *Id.* at 3-293.

[47] *Id.* at 3-31.

predictions for the future can be checked, confirmed, or modified to match the manifested results. Then, the resulting and current data will provide better information for decision making. Using stale data to make the EIS now hampers the decision making of Miami-Dade County in the future simply because they are relying on old information. Time only helps the decision-making process as alternative energies and the effects of climate change become more well known.

III. CONCLUSION

It is important for the NRC address the above issues within the environmental impact statement for the potential subsequent relicensing of FPL's Turkey Point facility. Without addressing these issues, the NRC cannot comply with NEPA's mandate to take a hard look at the environmental impacts of its decision.

Sincerely,

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