



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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RULES AND DIRECTIVES
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Ms. Cindy Bladey, Chief
Rules, Announcements, and Directives Branch (RADB)
Division of Administrative Services
Office of Administration
Mailstop OWFN-12H8
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

3/5/2015

OK FR 12043

176

SUBJ: EPA Review and Comments
Draft Environmental Impact Statement (DEIS)
Turkey Point Nuclear Plant, Units 6 and 7, Combined Licenses (COLs)
Miami-Dade County, Florida
CEQ No. 20150054

Dear Ms. Bladey:

Pursuant to Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA), Region 4 reviewed the Draft Environmental Impact Statement (DEIS) for the Turkey Point Nuclear Plant, Units 6 and 7, Combined Licenses (COLs), NUREG-2176. We appreciate your continued coordination and communication with us, and your reopening and extension of the public comment period for this review. The purpose of this letter is to provide our review and comments regarding the proposed project.

This DEIS is the result of Florida Power and Light Company (FPL) submitting an application to the U.S. Nuclear Regulatory Commission (NRC) for combined construction permits and operating licenses for the proposed Turkey Point Units 6 and 7. The proposed action includes construction and operation of two Westinghouse AP1000 Pressurized Water Reactors (PWRs) and ancillary facilities at the Turkey Point site, each having thermal power ratings of 3,415 MW(t).

The federal actions include the NRC's decision whether or not to issue the licenses, and the U.S. Army Corps of Engineers (USACE) decision to issue, deny, or issue with modifications a Department of the Army (DA) permit, pursuant to Section 404 of the Clean Water Act (CWA) for dredge and fill activities in Waters of the U.S., and to construct structures in navigable waters of the U.S. related to the project.

SUNSI Review Complete

Template = ADM - 013

E-RIDS= ADM-03

Add= A. Williamson (ARWI)

The USACE and the National Park Service (NPS) are cooperating agencies on this EIS; Biscayne National Park (BNP) and the Everglades National Park (ENP) are in proximity to the project area. The NRC's preliminary recommendation related to the environmental aspects of the project is that the COLs be issued for Units 6 and 7. This DEIS is for the licensing of the two new reactor units (Units 6 and 7), and not for issues pertaining to the existing reactor units (Units 3 and 4). However, based on our review, there are some environmental aspects of the proposed new units that relate to the existing facilities.

Based on EPA's review of the project, we rated the DEIS Preferred Alternative as Environmental Concerns (EC), Category 2-Insufficient Information. The EC-2 rating indicates that we have serious concerns, and that the document does not contain enough information needed to fully assess some of the environmental impacts that should be avoided in order to fully protect the environment. Please refer to the enclosed Summary of Rating Definitions for a detailed explanation of EPA's ratings.

EPA's concerns, associated with the alternatives analysis and the project impacts, include the following subject areas:

- Cumulative impacts to the Biscayne aquifer, an EPA-designated sole source aquifer
- Underground injection wells, karst delineation and permitting requirements
- Section 404 CWA permitting and documentation
- Impacts to Aquatic Resources of National Importance (ARNI)
- Water quality and water supply needs for the new reactors
- Numeric Nutrient Criteria within Biscayne Bay
- Migration of hypersaline effluent and radionuclides
- National Parks and aquatic preserves, species and habitats protection
- Radionuclides, nuclear waste storage and disposition
- Air quality criteria pollutants and modelling information
- Socioeconomics, Environmental Justice (EJ) outreach
- Tribal concerns, National Historic Preservation Act (NHPA) documentation
- Climate change, greenhouse gases (GHG) and sea level supporting information
- Indirect and cumulative impacts, transmission lines, alternatives analysis clarification


In summary, our areas of greatest concern relate to impacts on groundwater and drinking water quality, ecosystems and habitats, also including indirect and cumulative impacts. The enclosed comments state our concerns in detail, and we request that these concerns be fully addressed in the Final Environmental Impact Statement (FEIS).

The DEIS provides useful information and covers a variety of complex environmental issues related to the COL process for the proposed new units. We appreciate your coordination and outreach to us to discuss the numerous technical issues and our environmental concerns regarding this project, and your response to our request for additional review time for this DEIS.

We look forward to working with the NRC to reduce this project's impacts, and to provide environmental protection for future generations. We request that the FEIS address our concerns,

which are detailed in the enclosed comments. We are available for further discussion, and willing to work with the NRC. We look forward to reviewing the FEIS. If you have any questions, please contact Ramona McConney of my staff at 404-562-9615.

Sincerely,

A handwritten signature in black ink, appearing to read 'H. Mueller', with a long horizontal stroke extending to the right.

Heinz J. Mueller, Chief
NEPA Program Office
Resource Conservation and Restoration Division

Enclosures: EPA Review and Comments
Summary of Rating Definitions and Follow Up Action

Cc: Alicia Williamson-Dickerson, NRC
Colonel Alan M. Dodd, USACE
Megan L. Clouser, SAJ
Bryan Faehner, NPS

EPA Review and Comments
Draft Environmental Impact Statement (DEIS)
Turkey Point Nuclear Plant, Units 6 and 7, Combined Licenses (COLs)

General

We appreciate your efforts to minimize project impacts for the proposed Units 6 and 7 by using reclaimed wastewater from the Miami-Dade Water and Sewer Department (MDWSD) treatment system as cooling water, with the alternative source being groundwater supplied from horizontal radial collector wells installed in the Biscayne Aquifer on the Turkey Point peninsula. The lateral collector wells would extend up to 900 feet from the central caisson beneath Biscayne Bay (page 3-25). We appreciate the plans to avoid releasing blowdown to surface water bodies. However, based on the EPA's review of the DEIS, there are a number of serious concerns regarding the direct, indirect and cumulative impacts of this project, and further information and clarification is needed.

Water Quality and Water Supply Concerns

Surface Water

Concerns regarding fresh water needs for Biscayne National Park (BNP), the Everglades National Park (ENP), the Comprehensive Everglades Restoration Plan (CERP), in addition to other fresh water needs in the area, need to be clarified in the Final Environmental Impact Statement (FEIS). The EPA has concerns regarding the project's fresh water supply requirements, cumulatively added to the existing fresh water needed to supply the existing Units 3 and 4, as well as for drinking water, agricultural and ecosystems in the region, in an environment already experiencing saltwater intrusion.

The Biscayne aquifer underlying the area is prone to saltwater intrusion because this area has low land-surface altitude and a low topographic gradient, and is bordered by sources of saltwater in Biscayne Bay, and, further east, by the Atlantic Ocean. Page 2-66 states that the most important factors contributing to the regional intrusion of saltwater from the ocean into the aquifer are rerouting of sheet flow to drainage canals and groundwater pumping.

Recommendations: Page 2-45 of the DEIS states that the cooling canal system/industrial wastewater facility "... is a closed-cycle cooling system, but is not a closed hydrologic system." EPA notes that since this is not a closed cycle hydrologic system, and therefore the FEIS should include a more in-depth discussion relating to the cumulative impacts associated with the hydrologic complex.

The FEIS should include a water balance calculation for the site that shows all the potential sources of water supplying the site, and discharges and other releases from the site under normal operating conditions. This balance should include seepages from the canal system and changes in evaporative losses (e.g., changes in thermal load due to projected completion of the conversion to synchronous condenser mode for Units 1 and 2). Additionally, the FEIS should discuss the

releases or seepages from the Industrial Waste Facility (IWF). Specifically, the FEIS should document the presence of any direct releases from the IWF to the surrounding surface waters via breaches in the berms.

Section 404 CWA Permitting

The EPA has numerous concerns regarding the analyses, data and mitigation required for the CWA Section 404 permitting application. We noted a number of details and data that need to be clarified, with additional information provided to the EPA prior to the publication of the FEIS, in order for the FEIS to meet the needs of all the project's permitting requirements.

The EPA reviewed the permit application number 2009-02417(SP-MLC) submitted to the U.S. Army Corps of Engineers (USACE) by Florida Power & Light (FPL), and responded in writing on April 9, 2015 and May 4, 2015. EPA's letters state our CWA Section 404 concerns regarding the proposed project. These comments should be considered and responded to by the project team, with further information provided in the FEIS. In addition, we identified the following concerns in the DEIS:

Section 2.2.2.3, Makeup and Potable Water Systems (pg. 2-20): Table 2-6 lists 447.80 acres of wetlands within the reclaimed water pipeline corridor, and 159.95 acres within the potable water pipeline corridor. It also states (pg.4-9) that FPL proposes to grade the disturbed portions of the corridor to the contours of the surrounding landscape and re-vegetate or return these areas to previous land uses. The EPA appreciates the effort to minimize wetland impacts by this action. The EPA is still unclear on the total extent and type of permanent impacts which will occur due to this activity. Please clarify.

Section 2.3, Water (pg. 2-26): The DEIS states that the alternate cooling water source supplied by the radial collector wells would be limited to a maximum of 60 days per year by the Florida State Conditions of Certification. The DEIS is not clear regarding what contingency plans will be implemented should the 60 day limitation be exhausted and the reclaim water supply is not available. FPL has stated that the Conditions of Certification addresses the contingency plan for emergency water allocation. Please clarify this issue with a detailed explanation of contingency plans in the FEIS.

Section 3.2.2.1, Landscape and Stormwater Drainage (pg. 3-8) : The proposed nuclear reactor Units 6 and 7, including cooling towers, makeup water reservoir, new substation and associated facilities, would be built on a filled "218 acre island" enclosed by a stabilized earth wall to the north, east, and west. A reinforced concrete wall could be constructed to the south.

The elevation within the fill island would range from 19 feet to 26 feet North American Vertical Datum of 1988. With the threat of sea level rise in the foreseeable future, the EPA has concerns on what effect this may have on the surrounding infrastructure to this created island; there are concerns that rising sea levels could potentially surround the island at some point in the future during the lifespan of this project.

Please provide information in the FEIS which would support construction of the project, considering the fact that even though the power units will be constructed on this island, the

surrounding landscape may be impacted by sea level rise or storm surges that may affect the feasibility of the project, given the project purpose.

FPL has stated that they provided substantial scientific data and testimony regarding the effects of sea level rise during the State site certification proceedings, and that the Recommended Order, adopted in the Final Order on Certification states: *"The plant design elevation accounts for more than maximum storm surge plus sea level rise. FPL has provided reasonable assurance that the project is not contrary to the public interest as it relates to the sea level rise."* The FEIS should evaluate, document and clarify the effectiveness of proposed measures to protect the facility from storm surges and rising sea level.

Section 3.2.3.4, Support and Laydown Areas (pg. 3-20): The EPA requests that the FEIS provide additional avoidance and minimization efforts by restoring wetlands associated with support and laydown areas after construction is completed.

Section 4.1.1.2, Pipelines (pg. 4-9) Table 4-3: Outlines major land use acreages for the pipelines but is not clear on the specific acres of wetlands to be impacted. Please provide more detail about wetland impacts for this activity, to be consistent with the format illustrated in Table 4-1 of the DEIS for the Turkey Point site.

Section 4.1.1.3, Access Roadways (pg. 4-9) Table 4-4: Outlines major land use acreages for access road improvement but is not clear on the specific acres of wetlands to be impacted. Please provide more detail about wetland impacts for this activity, to be consistent with the format illustrated in Table 4-1 of the DEIS for the Turkey Point site.

Section 4.1.2, Transmission-Line Corridors and Associated Areas (pg. 4-15) Tables 4-5 and 4-6: Outlines major land use acreages for transmission-line corridors and associated areas, but is not clear on the specific acres of wetlands to be impacted. Please provide more detail regarding wetland impacts for this activity, to be consistent with the format illustrated in Table 4-1 of the DEIS for the Turkey Point site.

Section 4.3.1.6, Wetland Mitigation Plan (pg.4-70): The DEIS states that FPL instituted measures during project planning to avoid and minimize impacts on wetlands to the greatest extent practicable. Proposed avoidance and minimization measures include maximizing the previously disturbed areas, while minimizing use of areas with high-quality intact wetlands. The corridor selection for the reclaimed water pipeline, portable water pipeline, and transmission facilities maximized co-location with other existing or proposed infrastructure, to limit land disturbance.

The Public Notice published by the USACE on March 13, 2015 stated that the project proposes impacts to 1000 acres of tidal and freshwater wetlands. FPL stated in their letter of May 14, 2015, addressed to USACE, that the correct number for the direct wetland impacts for the project is 710 acres, with temporary impacts to 50 acres. These include impacts to high quality, tidal mangrove wetlands.

Mangrove wetlands located within south Florida form a vital component of the estuarine and marine environment, providing a major organic detrital base to the aquatic food chains,

significant habitat for arboreal, intertidal and subtidal organisms, nesting sites, cover and foraging grounds for birds, and habitat for reptiles and mammals. Mangroves also provide protected nursery area for fishes, crustaceans, and shellfish.

Mangroves are one of the most biologically productive ecosystems in the world, also serving as storm buffers by functioning as wind breaks, and through prop root baffling of wave action. Mangrove roots stabilize shorelines and fine substrates, reducing turbidity, and enhancing water clarity. Mangroves improve water quality and clarity by filtering upland runoff, and trapping waterborne sediments and debris. The cumulative loss of this habitat has reduced overall water quality and fisheries production within the south Florida ecosystem. For these reasons, the EPA considers these mangrove wetlands to be aquatic resources of national importance (ARNI).

In addition, the proposed project would impact sawgrass marshes, which provide principal environmental values related to water quality and quantity. They serve as filter systems for water, and protect natural bodies of water from eutrophication. Numerous birds can be found in this community year-round, or for over-wintering. They also provide habitat for frogs, snails, and crayfish, which serve as food sources for larger protected animals that are found in this region. Protected animals that can be found in and around sawgrass marsh systems include the Everglades mink (*Mustela vison evergladensis*), Florida panther (*Felis concolor coryi*), snail kite (*Rostrhamus sociabilis*), wood stork (*Mycteria americana*), and American alligator (*Alligator mississippiensis*). Therefore, the EPA considers sawgrass marshes to be ARNI.

Further, the proposed project would impact submerged aquatic vegetation (SAV), which includes *Ruppia maritima*, *Thalassia testudinum*, and *Halodule wrightii*. Fin and shell fish commonly associated with this species include Florida crawfish, stone crab, blue crab, penaeid shrimp, sea trout, gray snapper, red drum, pinfish, mullet, and flounder. Moreover, SAV provides attachment sites for periphyton which in turn increases food value for the base of marine and estuarine food webs. SAV aids in stabilizing the shallow water submerged land which promotes water quality. SAV also performs important nutrient uptake functions, which assist in the maintenance of water quality. For these reasons, the EPA also considers SAV to be ARNI.

According to the CWA Section 404(b)(1) Guidelines, 40 CFR § 230.91(c), and the February 6, 1990, Memorandum of Agreement between the U.S. Army Corps of Engineers and the EPA regarding the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines, an applicant must demonstrate avoidance and minimization of wetland impacts before compensatory mitigation can be considered. Subpart H of the CWA Section 404(b)(1) Guidelines describes several (but not all) means of minimizing impacts of an activity.

Section 4.3.1.6, Wetland Mitigation Plan (pg.70): The DEIS states that, as part of the compensatory mitigation offset projects impacts, FPL proposes to restore two parcels totaling 812 acres.

CWA 404 Permit NEPA Documentation: EPA understands that the NRC is addressing impacts of the onsite facility, and that offsite facilities, such as the transmission lines and other related facilities, will not be considered in detail for the purposes of this EIS. The EPA also understands that the USACE intends to adopt the NRC's EIS for the purposes of their CWA Section 404

permit action. However, many of the associated and connected actions, such as construction of the transmission lines, are not considered in the NRC's EIS. For the purposes of permit issuance, the USACE should state how they plan to address associated NEPA documentation for these offsite facilities, as those impacts are directly related to this project. NEPA coverage for these permit actions should be included within NRC's FEIS.

Recommendations: EPA recommends that the NRC document the USACE intentions for addressing their NEPA documentation and timing with NRC's FEIS and permit issuance. The FEIS should include a mitigation plan which details how the proposed mitigation is in compliance with the Federal Compensatory Mitigation Rule, dated April 2008.

The EPA requests that the FEIS address additional measures that can be taken to avoid and minimize onsite tidal and freshwater wetland impacts. As stated previously, the Public Notice published by the USACE stated that the project proposes impacts to 1000 acres of tidal and freshwater wetlands, and FPL stated in their response to USACE that the correct number for the direct wetland impacts for the project is 710 acres, with temporary impacts to 50 acres. Project impacts will include impacts to ARNI. The FEIS should clarify the acreage that would be impacted.

EPA understands that a benthic survey has not been completed at the FPL Turkey Point site for some years. In order to evaluate the proposed project, the FEIS should include a colored copy benthic survey of the boat basin, radial collector well locations, and the Units 6 & 7 site. The benthic survey should extend a radius of 50 feet around submerged lands of these locations. The benthic survey should include a description of the protocol used to complete the survey, sampling dates, and a map that illustrates the density and location of each SAV found at the site. The seagrass survey should be conducted between the months of June and September to ensure the survey is conducted during the active growing season. The benthic survey is necessary for the EPA to determine extent of SAV impacts that will occur by the proposed project.

The FEIS should include a wetland jurisdictional determination, so that a complete review of wetland impacts can be determined. During the wetland jurisdictional determination review, the EPA is willing to participate with that review, prior to publishing in the FEIS.

Also, the FEIS should include Uniform Mitigation Assessment Method scores (Parts 1 and 2), for the proposed impact and mitigation sites. Technical rationale for each score should also be included.

Overall, the FEIS should include updated information regarding the CWA Section 404 permitting process, and include information responsive to the concerns stated in EPA's letters to the USACE, as well as the specific concerns listed here. Impacts should be avoided to the maximum extent feasible, and unavoidable impacts should be effectively mitigated.

Numeric Nutrient Criteria (NNC)

The FEIS should include detailed information regarding impacts associated with potential exceedances of the NNC. The Florida Department of Environmental Protection (FDEP)

approved NNC water quality standards for estuaries including Biscayne Bay. However, there is no discussion in the DEIS regarding the project's potential impacts regarding the NNC and Biscayne Bay.

The NRC acknowledges the hydraulic connection between the cooling canal system (CCS)/industrial wastewater facility (IWF) and the hydrologic complex, especially during the tidal cycle (page 2-46) and states, *"Recently, the IWF has experienced algal blooms, increased water temperatures, and increases in concentrations in salinity and nutrients. The precise cause of this anomaly is not understood at this time."* However, the FEIS should further evaluate whether the overheated water in the canal, with increased nutrients due to concentrations resulting from evaporation, contributed to the formation of the algal blooms.

EPA is concerned regarding the interconnection of the IWF, Biscayne Aquifer and Biscayne Bay. NRC acknowledges this connection when it states, *"Hydraulic heads in monitoring wells near Biscayne Bay fluctuated in response to tidal cycles indicating a potential for tide-induced flow between the bay, shallow groundwater and the cooling canals in this area of the IWF."* (page 2-68.)

On page 2-69, NRC also discusses a FPL study that examines the dynamic processes between the IWF, surface water and groundwater as it is related to water quality, but does not discuss the results of that study. NRC also discusses a required monitoring study of the IWF to evaluate the *"horizontal and vertical hydrologic exchanges with the surrounding environment"*. EPA requests that the NRC better describe the existing condition of the current operations of Units 3 and 4, and related water quality impacts, in the FEIS.

EPA also understands that the IWF is used for the existing nuclear reactors (Units 3 and 4), and that cooling water from the new units 6 and 7, will use reclaimed water from MDWSD, and the blowdown from the cooling tower will be discharged into the Boulder Zone via UIC wells.

However, the IWF will be accepting wastewater from the new reactors (Units 6 and 7), and these additional wastewater streams include excavation dewatering, stormwater run-off, muck spoil run off and drift deposition. There is a potential for these additional wastewater streams to increase nutrient loading, including nitrate, for which EPA has set a drinking water maximum contaminant level (MCL), to the underlying Biscayne Aquifer, (an Underground Source of Drinking Water under the SDWA), given the existing hydrologic connection between the IWF and groundwater.

The DEIS discusses operational surface water quality impacts associated with the IWF (page 5-19, 5.2.1.4). The DEIS individually examines the surface water quality impacts associated with excavation dewatering, stormwater discharge, muck spoil runoff and drift deposition. However, the DEIS does not holistically and additively analyze these additional stresses to the IWF. Also, the NRC does not discuss these additional wastewater stresses to the IWF and potential impacts to the underlying groundwater.

EPA acknowledges that there are no current exceedances of the NNC. However, the DEIS should evaluate the future project in the context of potential NNC impacts and possible related algal blooms beyond the IWF. EPA requests that the NRC better describe the existing condition

of the current operations of Units 3 and 4 and related water quality impacts in the FEIS and, if available, disclose the results of the FPL studies discussed in the DEIS. The EPA is concerned that the combined and additional wastewater discharges into the IWF could potentially lead to exceedances of the NNC.

Recommendations: The EPA is concerned that the proposed project could cause NNC exceedances within Biscayne Bay, and requests that more detailed information be provided in the FEIS. Specifically, EPA requests that the NRC consider the additive effects of all the wastewater being placed into the IWF. The FEIS should describe how the additional wastewater discharges to the IWF could potentially impact the Biscayne Aquifer, potentially increase NNC levels within Biscayne Bay and the potential for the algal bloom to expand beyond the IWF.

Sole source aquifer and salinity issues

The EPA has several serious concerns related to groundwater, with the paramount concern being the condition of the Biscayne Aquifer, an EPA-designated sole source aquifer serving as a drinking water resource in the south Florida area. The Biscayne aquifer has already suffered significant and unacceptable hypersalinity impacts, and the EPA is concerned that the proposed project may result in further migration of the hypersaline plume.

The estimated average rate of saltwater migration is between 525 feet per year in the northern part of the cooling canals, and 660 feet per year in the southern part, [FDEP AO OGC No. 14-0741.] Many municipal water supply systems to the west of the Turkey Point cooling water canals rely on the Biscayne aquifer, and if the hypersaline plume continues to migrate, these water supply systems could potentially need additional treatment, or alternative sources of water supply. We are concerned about the potential for additional and cumulative impacts to the sole source aquifer, in addition to the existing hypersaline impacts.

Protecting the freshwater lens in southeast Miami-Dade County is also a critical priority, since this important resource supports critical marsh wetland communities, as well as irrigation and public water supply needs. This fresh water supply is needed to preserve and restore Biscayne National Park (BNP) and Biscayne Bay, and for supporting the Comprehensive Everglades Restoration Plan (CERP).

We appreciate your efforts to minimize impacts from the proposed project by using reclaimed wastewater as cooling water. The DEIS also states that current alternative backup cooling water source plans call for saltwater supplied from horizontal radial collector wells installed in the Biscayne aquifer, between 25 and 40 feet beneath the bed of Biscayne Bay and adjacent to Biscayne National Park. The DEIS notes that the use of these wells as a backup source is limited to 60 days.

However, there are concerns that FPL could eventually require more water from the radial collector wells than currently estimated, and that FPL may need to withdraw freshwater to supply the needs of the two new reactors, in the event that adverse circumstances arise and backup water sources fail to supply sufficient quantity. The FEIS should address contingency plans in detail.

Concerns exist that future circumstances, such as draughts and/or temperature issues, may require freshwater withdrawals that could potentially impact water quantity and quality, and contribute to the risk of additional saltwater intrusion into groundwater supplies. Furthermore, there are concerns that water withdrawals from the radial collector wells could potentially contribute to increased hypersalinity.

- The DEIS states that FPL intends to place the construction dewatering water into the cooling canals. Other information indicates that dewatering water and other wastewaters generated during construction will be injected via a Class I injection well permitted by FDEP (page 4-30). This needs to be clarified in the FEIS. Estimated discharges from these waste streams would be 1200 gpm, or 1.73 mgd, of discharge into the IWF for approximately 1 year (page 3-23). The DEIS does not discuss the composition of the constituents in the wastewater. FPL also intends to drain all of the new facilities' stormwater discharge into the IWF (pages 3-8 and 3-27). On page 4-36 (4.2.3.1), NRC also states, *"Because the transport of sediment in the stormwater runoff from the disturbed area would be minimized by the use of the BMPs, and controlled by a stormwater-retention basin, the effects of offsite water quality are expected to be minor."*
- The DEIS discusses volumes and potential pollutants of stormwater and wastewater to be placed in the IWF (page 5-19); however, the document did not discuss the types of stormwater retention basins and other best management practices (BMPs). The FDEP permit does not include information regarding possible BMPs. Additionally, FPL intends to place dewatering wastewater in the IWF as well. The NRC considered impacts of the excavation dewatering activities (4.2.3.2, page 4-37), but in relationship to inflows caused by excavation dewatering, and relationship to outflows due to the cooling canals canal seepage (mass balance).
- The DEIS individually views the surface water quality impacts associated with excavation dewatering, stormwater discharge, muck spoil run off and drift disposition, but does not holistically and additively analyze these additional stresses to the IWF. Also, the DEIS does not discuss these additional wastewater stresses to the IWF, and potential impacts to the underlying groundwater. The DEIS notes that the impacts would be minor; however, it does not discuss possible impacts related to the hypersalinity plume. The EPA is concerned that these additional wastewater activities would further stress the IWF and potentially worsen the hypersalinity plume, cumulatively and adversely impacting the Biscayne Aquifer. We note that additional waters will be added to the IWF to address the heating and hypersalinity issues, however, the extent to which the additional waters will alleviate the hypersalinity levels in the plume is unclear.

Recommendations: The FEIS should clarify whether remediation measures are planned to remedy the serious issues that exist with hypersalinity migration. Also, the FEIS should provide more detail regarding the dewatering and stormwater activities (including types of pollutants, volumes, types of BMPs and stormwater-retention basins).

EPA also recommends that the NRC consider and evaluate the additive impacts of the additional wastewater discharges (excavation dewatering, stormwater runoff activities, muck spoil runoff and drift disposition) into the IWF as a result of constructing the new reactors (Units 6 and 7), specifically as it relates to the hypersalinity plume and Biscayne aquifer and associated drinking water wells.

Underground injection of effluents

The DEIS states that blowdown water from the cooling towers, and other plant discharge effluents from proposed Units 6 and 7, would be collected in a sump and injected into the Boulder Zone, a cavernous, high-permeability South Florida geologic horizon within the Lower Floridan aquifer system. The surrounding surface water bodies would neither be directly used for the primary water supply, nor for the heat sink for the proposed Units 6 and 7. However, we have concerns regarding the potential for vertical migration of the injectate, as no adequate confining zone has been shown to exist between the injection zone and lowermost underground source of drinking water (USDW).

Several investigations by the United States Geological Survey (USGS) in southeast Florida (the latest is USGS Scientific Investigations Report 2015-5013) have shown that the limited confinement which may exist between the Lower Floridan and Upper Floridan has been reduced or eliminated by karst features and faulting. FPL has not produced any documentation to delineate karst features or faults in the Floridan which may significantly alter hydraulics of the injectate at this facility.

Further, additional data, including conducting more comprehensive aquifer testing and incorporation of karst features and fault delineation, as well as results of aquifer testing into predictive modeling, are needed to assess potential injectate impacts on USDWs. In addition to injection in the Boulder Zone creating upward gradients, the Upper Floridan is proposed to be used as a source of cooling water, also creating upward gradients from the Lower Floridan, with the potential to impact the USDWs in the area.

A petition was submitted to EPA on April 28, 2015, to designate the entire Floridan aquifer system as a Sole Source Aquifer (SSA) under 40 CFR Part 149. The area in the petition includes the Lower Floridan, which contains the Boulder Zone. Although the Boulder Zone is saline, it is hydraulically connected to fresh water zones lying above. If confinement of the overlying layer is not sufficient, the injection of effluent into the Boulder Zone could result in waste, including radionuclides, being emplaced into the lowermost USDW. EPA's review of the petition is in progress.

The MDWSD installed Class I injection wells for discharging effluent from the South District wastewater treatment plant (WWTP) into the Boulder Zone; injection began in 1983. This facility is located approximately 8 miles north of the Turkey Point facility. In 1994, MDWSD notified the Florida Department of Environmental Protection (FDEP) that ammonia and total kjeldahl nitrogen (TKN) had been found outside the injection zone in the freshwater aquifer protected by the Safe Drinking Water Act (SDWA) as a USDW. (EPA's well classification information: <http://water.epa.gov/type/groundwater/uic/wells.cfm>)

EPA issued consent order 4-UICC-006-95 in 1995, which became effective in 1997. This order included testing to determine whether confinement existed, as required by federal and state regulations, for Class I wells. In February 2001, the report *"Evaluation of Confining Layer Integrity Beneath the South District Wastewater Treatment Plant, Miami-Dade Water and Sewer Department, Dade County, Florida,"* by R.C. Starr, T.S. Green, and L.C. Hull was completed. The conclusions included the finding that the geologic data provided for review were not sufficient to demonstrate that the Middle Confining Unit is a competent, low hydraulic conductivity layer capable of preventing upward migrations of fluids from the Boulder Zone into the overlying underground source of drinking water. Also, the geochemical data showed that groundwater in the Upper Floridan aquifer is contaminated with treated wastewater.

Based upon EPA's review of the available scientific information and data, there is no information to show that sufficient confinement exists to meet the Underground Injection Control (UIC) regulatory requirements for Class I wells. Class I wells must meet the "No-Migration Clause" of the UIC regulations at 40 CFR § 144.12(b). Recent USGS studies indicate that karst collapse features and possibly transmissive faults exist in the subsurface in the south Florida area, and modeling for the proposed Class I wells should determine whether the proposed wells would meet the criteria in order to comply with UIC Class I permit requirements.

It is not clear whether the installation of a desalinization unit has been considered, in order to reduce or control the salinity of the water in the cooling canal system, and decrease the rate of migration of the hypersaline plume towards the water supply wells completed in the Biscayne sole source aquifer.

Recommendations: The FEIS should include more information regarding the proposed deep injection wells to be used for wastewater disposal, including the status of the permitting process of the 12 deep injection wells that are proposed, the planned timeline for permitting of these wells, and planning for surface discharge of effluents in the event that delays occur in the permitting process.

In addition, the FEIS should include information regarding subsurface karst delineation, aquifer testing and modeling that will be required to demonstrate that this project will be protective of the USDWs in the Upper Floridan. Also, the FEIS should evaluate the other alternatives that are being considered for effluent discharge. In addition, the FEIS should include details of a robust monitoring plan to ensure the protection of the Biscayne aquifer, the public drinking water supply, and prevention of migration of injectate into freshwater.

The proposed injection wells are contingent upon future issuance of applicable UIC permits, for which substantial issues will need to be addressed. More data and modeling is needed to determine whether all requirements will be met in order to issue the required permits. Since the proposed planning for disposition of blowdown/effluent is contingent upon issuance of the required permits by FDEP, alternatives will need to be developed.

Everglades National Park, Biscayne National Park and Biscayne Bay Aquatic Preserve

The EPA is concerned about the proposed project's potential impacts to the Everglades National Park (ENP), Biscayne National Park (BNP) and Biscayne Bay Aquatic Preserve (BBAP). Turkey Point is in close proximity to both the BNP and BBAP. In the Affected Environment section of the DEIS (pages 2-10 – 2-13), the NRC recognizes the unique characteristics of the ENP, BNP and BBAP, and that many of these waters are listed as Outstanding Florida Waters.

Although the DEIS generally addresses some of the issues facing these national and state protected lands, the DEIS does not specifically address potential impacts facing these fragile and vital resources. EPA is concerned that the radial collector wells (RCWs) could impact the hydrology of BNP, and potentially impact tidal cycles and inflow of freshwater towards the national parks and the aquatic preserve. The FEIS should clarify whether there will be pre and/or post construction monitoring to ensure that the RCWs are not impacting the ENP, BNP and BBAP.

EPA is concerned that the proposed projects' additional wastewater discharges to the IWF could contribute to increased salinity in the underlying Biscayne Aquifer, and increase the salinity and nutrient loading to BNP and BBAP. Also, EPA is concerned that drift deposition could impact ENP, BNP and BBAP. The NRC should provide additional details regarding these impacts, and any other project impacts to ENP, BNP and BBAP.

Recommendations: The FEIS should specifically and holistically describe impacts to the ENP, BNP and BBAP. Because these are vitally important national and regional resources, the NRC should individually and robustly address potential impacts, both construction and operational, to these public lands.

These specific impacts for the ENP, BNP and BBAP should be separately described in the Affected Environment (Chapter 2), Construction Impacts at the Turkey Point Site (Chapter 4), Operational Impacts at the Turkey Point Site (Chapter 5), and Cumulative Impacts (Chapter 7), sections of the FEIS.

Additionally, EPA recommends NRC and USACE develop a robust monitoring and adaptive management plan (in collaboration with resource agencies) to address any unforeseen future impacts to ENP, BNP and BBAP especially related to the potential operational impacts associated with the RCW. EPA recommends these commitments be reflected in the ROD.

Comprehensive Everglades Restoration Plan (CERP)

The EPA is concerned with the project's potential impacts to CERP. The CERP is a 30 year, \$10-12 billion ecosystem project designed to restore the greater Everglades ecosystem. CERP is the largest ecosystem restoration project in the US, and although the Corps and the South Florida Water Management District (SFWMD) are the primary cost share partners, several other local, state, Federal agencies (including EPA), and NGOs are active partners in CERP.

A primary goal of CERP is to restore flows to the greater Everglades and Everglades National Park (ENP). One of the CERP projects is the Biscayne Bay Coastal Wetlands (BBCW) project. EPA is concerned that the proposed project will impact BBCW. In particular, L31E canal is an important part of BBCW. The DEIS states:

“Groundwater flow in the Biscayne aquifer is also affected by an interceptor ditch adjacent to the west side of the cooling canals and east of the L-31E Canal. Water is pumped from the interceptor ditch into the IWF cooling canals when needed to maintain a water level in the ditch that is lower than the water level in the L-31E Canal. This is designed to keep groundwater from moving westward from the interceptor ditch toward the L-31E Canal and keep cooling canal water from affecting groundwater quality to the west (FPL 2014-TN4069). However, because deeper permeable layers within the Biscayne aquifer may be isolated from hydraulic head in the ditch by lower permeability layers, it is possible that some water from the cooling canals could move to the west. As discussed in Section 2.2.3 below, monitoring by FPL indicates that hypersaline water from the cooling canals has moved west of the L31-E Canal in the deeper part of the Biscayne aquifer.”

Also, when discussing project components of the BBCW, the DEIS states, “L-31 East Flow Way – isolation of the L-31E Canal from the major discharge canals and allowing freshwater flow through the L-31E Levee into saltwater marsh. Pump stations and culverts are to be added to facilitate freshwater discharges.”

The FEIS should clarify whether the NRC anticipates that the proposed project will continue to use water from L31E to augment waters for the IWF, and if so, what the impacts would be to the L31N canal. Also, impacts to the Biscayne Aquifer and further movement of the saline water into Biscayne Bay should be further defined and detailed.

The SFWMD permitted FPL to continue pumping water from L31E canal into the IWF for 2 years, but there is no discussion regarding this subject in the DEIS. EPA is concerned that continued use of the L31E canal as a source of water for the cooling canal system could impact the success of the BBCW and possibly exacerbate movement of salinity through the Biscayne Aquifer.

Recommendations: The EPA recommends that the FEIS better describe the interaction between the FPL’s use of L31E canals for the IWF in the existing facility, and proposed project and potential impacts to the BBCW and Biscayne Aquifer. The EPA also recommends that the FEIS discuss the 2-year SFWMD permit to pump water from the L31E canal into the IWF, and resulting impacts to BBCW and Biscayne Aquifer.

EPA also notes that, effective July 14, 2014, SFWMD updated consumptive use permitting (CUP) criteria as part of a statewide effort headed by the FDEP, and joined by all five water management districts. The FEIS should document any changes to existing or future permitting actions relative to this criteria.

Threatened and Endangered Species

The DEIS summarizes the NRC's coordination with the U.S. Fish and Wildlife Service (FWS) and state wildlife agencies in Florida. Mitigation measures include protocols and requirements for protecting the American crocodile, Smalltooth Sawfish, Nassau Grouper, manatees and sea turtles. However, unavoidable adverse impacts would include permanent loss of some onsite aquatic environments, and some disturbance of aquatic environments and potential disturbance of species. Also, there would be habitat loss and land adversely affected for resident American crocodiles (page 2-122 and Table 4-10).

Recommendations: The EPA defers to the FWS and the State wildlife agencies on these issues and agrees that the FEIS should provide updated information. Impacts should be avoided to the maximum extent feasible, and unavoidable impacts should be mitigated.

Radioactivity and Nuclear Waste

Radionuclides

Existing and historic operations at Turkey Point have resulted in radionuclides (tritium) migrating into the hydrologic complex. The DEIS discusses deep-well injection scenarios and postulated doses in Section 5.9.3.3. One of these scenarios includes postulated maximum radionuclide concentrations of tritium, strontium and cesium (page 5-108). Although the DEIS states that there would be no observable health impacts on the public from normal operation of the proposed units (page 5-109), EPA has concerns regarding potential environmental pathways and cumulative impacts related to radionuclides.

Recommendations: The FEIS should provide updated information regarding the progress with defining the extent of the tritium contamination. Updated sampling data should be included or referenced in the FEIS, with modeling information included regarding potential cumulative impacts.

Nuclear waste storage

Liquid, gaseous, and solid radioactive waste management systems would collect and treat the radioactive byproducts of operating the proposed Turkey Point Units 6 and 7, and these byproducts would be handled separately from the byproducts of existing Units 3 and 4. Spent nuclear fuel will require continued on-site storage.

Due to the uncertainty regarding future availability of a geologic repository or other away-from-reactor storage facility, on-site storage may be required for many decades, until a permanent repository is established. The DEIS notes that each nuclear island would consist of a containment building, shield building, and auxiliary building; the radwaste building would be separate from the island, approximately 36 feet above grade (page 3-19).

Recommendations: The FEIS should clarify plans regarding how the storage of spent nuclear fuel will be handled in order to prevent contamination, in the event of flooding at the site. We note that the proposed Units 6 and 7 will be elevated to provide safety from potential flooding,

however, the low sea level in this area combined with the area's history of hurricanes requires that measures to address potential flooding be thoroughly evaluated and documented.

Air Quality

Air Quality Criteria Pollutants

Section 5.7.1 discusses the potential impacts of criteria pollutants associated with operation of Units 6 and 7. The analysis indicates that the principal emissions associated with the new units are emissions of particulate matter with an aerodynamic diameter of 10 microns or less (PM10). Table 5-7 includes estimates of anticipated emissions of criteria pollutants associated with the operation of proposed units 6 and 7. Emission factors from PM10 are cited for the maximum mechanical drift from all six cooling towers. However, it is unclear what assumptions were used to estimate emissions of PM2.5.

Section 7.6.1 discusses the cumulative impacts of criteria air pollutants and indicates that the operation of Units 6 and 7 cooling towers would result in plumes and salt deposition, including "significant salt deposits" when using make-up water, with the highest concentrations occurring within the Turkey Point site, specifically including deposition on the current industrial cooling canals. Hence, the impacts of salinity of the cooling canals cannot be separated from impacts of the new units.

Potential impacts related to interactions of the Unit 6 and 7 cooling towers with the emissions from the stack of the combined-cycle generating Unit 5 were not discussed in the impacts or cumulative impacts sections. The analysis indicates that CALPUFF modelling was performed to determine the impact area, however, this analysis was not included in the appendices. Hence, it is not possible to determine if interactions between these stacks may occur. Of particular concern is the formation of PM2.5 from nitrates, ammonium, or other salts. Table 5-1, which addresses the constituent salts, does not address whether ammonium salts are present. It is not clear from the discussion whether ammonia was not present in samples from the reclaimed water facility, or whether no tests were conducted for this constituent.

Recommendations: EPA recommends that a report documenting the findings of the plume modelling be included in the FEIS appendices, including information on stack height and interaction between the emissions plumes from Units 5, 6, and 7. In addition, EPA recommends clarification of Tables 5-1 and 5-7 or related text to include assumptions used to estimate emissions of PM2.5 from the cooling towers, and the presence of ammonia or ammonium salts related to the use of reclaimed water from the sewage treatment facility.

Socioeconomics and Environmental Justice

Socioeconomics

We note the distinction in the DEIS between temporary construction impacts and longer-term operation impacts. However, since the facility's construction is likely to be underway for seven years, these impacts may be considered significant for the local communities. Issues regarding

traffic congestion, socioeconomic impacts, Environmental Justice, and other issues that directly concern the local communities, as well as operational impacts related to these matters, should be fully clarified in the FEIS, pursuant to our comments.

We understand that the NRC cannot include mitigation measures in the licenses that do not pertain to safety and security. However, the EPA encourages the project team and the applicant to continue coordinating with the communities that will be impacted by the proposed project, and to continue a comprehensive public outreach strategy to inform residents of the risks and impacts as a result of the proposed project. In particular, potential traffic impacts and emergency preparedness measures should be coordinated with local communities.

Recommendations: The EPA encourages a comprehensive public outreach strategy. This should include, but is not limited to, targeted outreach campaigns to neighbors, informational literature, and updated websites. Traffic impacts and emergency preparedness measures are particular topics that should be addressed and coordinated with local communities.

Environmental Justice (EJ)

Pursuant to Executive Order 12898, the DEIS (Section 2.6) includes demographic and impact data, including minority and low-income populations. The project team assessed the potential for disproportionately high and adverse health and environmental impacts, and concluded that there are no environmental pathways where the identified EJ populations in the 50-mile region would be likely to suffer disproportionately high and adverse environmental or health impacts as a result of the proposed project (page 10-7).

Communities may experience both benefits and burdens associated with this project, and should be involved in meaningful discussions with the project team throughout the decision-making process. We encourage the project team to continue coordinating with the communities that will be impacted by the licensing and permitting actions. Community involvement and discussion of project issues should take place throughout project planning. In particular, local communities have voiced their concerns regarding transmission line routing and potential economic impacts resulting from the location of these lines.

Demographics: The NRC includes demographic information related to minority and low income populations. The project area contains minority and low-income populations within the 50 mile project area that includes Miami-Dade County and portions of Broward, Collier, and Monroe Counties. U.S. Census data from the American Community Survey was used to evaluate minority and low-income populations prior to the identification of disproportionate impacts. Thresholds that include the 50% Criterion and the Meaningfully Greater Criterion were used to compare race and income data from the block group level to the reference population at the State. The use of these thresholds are consistent with the Council for Environmental Quality EJ Guidance.

Analyses: Based on our review, EPA has concerns regarding how the *Meaningfully Greater Criteria* was applied. The DEIS used a 20% threshold, however, the manner in which it is

applied or calculated can mean that minority or low-income populations may not be appropriately identified.

In the DEIS, 20% is simply added to the reference population (i.e., 20% threshold + 42.2% minority population = 62.2% minority threshold). However, the way the threshold should be used to yield consistent benchmarks involves taking 20% of 42.2% minority population, which is 8.44, and adding that to 42.2, resulting in a benchmark of 50.64%. Using this mathematical calculation will yield consistent benchmarks that will be 20% higher than the reference population, regardless of the initial percent population value.

Meaningful engagement: Communication with minority and low-income populations and other interested individuals, community, community and organizations should consider (as appropriate) encompassing adaptive and innovative approaches to both public outreach, (i.e. disseminating relevant information) ,and participation (receiving community input), since minority populations and low-income population often experience barriers to engagement. NRC indicates that there was active phone and field consultations with various organizations and study of applicant's Environmental Report (ER) to identify affected populations and unique exposure pathways.

Recommendations: The FEIS EJ sections should include information about the outreach and participation methods to minority and low-income populations that may have limited English proficiency, particularly since migrant workers that are primarily Hispanic are located approximately 3 miles from the proposed site. In addition, the FEIS should also include a summary of any EJ comments or concerns, and the NRC's response to those comments.

EJ Impacts: The NRC's EJ analysis includes a summary of noise, air quality, water resource and traffic impacts on affected minority and low-income populations, including Native American tribes and populations that are dependent on subsistence resources. According to the DEIS, there are no disproportionate high and adverse impact to EJ populations.

Recommendations: Based on our review of the EJ section of the DEIS, it was difficult to identify the impacts to minority and low-income populations. Most of the impacts are marginalized for various reasons, including proximity. While the DEIS summarizes the impacts associated with the construction of the reactors and traffic, it is unclear whether there are other impacts that should be considered, such as impacts associated with transmission lines constructed through minority and low-income communities. The FEIS should clarify whether these and other impacts will primarily be borne by EJ communities.

Local residents should be involved in meaningful discussions with the project team throughout the decision-making process. Efforts should be made to meaningfully involve and outreach to residents near the site and with increased visibility to the facility's structures and its emissions. The project team should take community concerns regarding transmission line routing and impacts into consideration, and these concerns should be fully addressed to the extent feasible. Dialog between the project team and the communities should continue.

Tribal Coordination

Consultation

The EPA encourages government to government consultation with the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida at all levels of decision-making. The EPA works closely with both Tribes on Everglades-related matters, and is committed to working with other federal partners to prioritize the Tribes' water quality and water management concerns.

National Historic Preservation Act (NHPA)

Historic Preservation

NRC's evaluation anticipates that indirect visual impacts on National Register-eligible buildings will occur in the transmission line corridor. Specific impacts are to be determined based on USACE impact evaluation related to transmission lines on cultural resources. FPL agreed to develop a work plan for additional cultural resources studies related to requirements for the transmission line corridors and offsite facilities.

The DEIS (Section 2.7) describes the project team's coordination with the Florida State Historic Preservation Office (SHPO) and tribes. The document concludes that the potential impact of license renewal on cultural and historic resources is minimal. The USACE is the lead federal agency for Section 106 of the National Historic Preservation Act (NHPA), and the consultation for this project is in progress.

Recommendations: Compliance with Section 106 of the National Historic Preservation Act (NHPA) should be documented as the project progresses. The FEIS should include an update regarding the mitigation measures developed in consultation with the Florida State Historic Preservation Officer (SHPO).

The FEIS should also include an update of coordination activities with the SHPOs and tribes, along with the finalized decision documents pursuant to Section 106 of the NHPA, if available. The EPA defers to the SHPOs and tribes on these issues. EPA encourages government-to-government consultation with the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida at all levels of decision-making.

Climate Change, Greenhouse Gases (GHG), Sea Level

Climate Change and Sea Level Rise

The Turkey Point site is in a low-lying, flood-prone, (Section 2.2.1.4, p. 2-6) coastal area at or near sea level. It is often flooded by tides or freshwater runoff (Section 2.4.1.1, p. 2-74). Additionally, it is bounded by Biscayne Bay to the east, Card Sound to the south, and wetlands to the west.

Florida Power & Light proposes to build the proposed action on a filled "island" (Section 3.2.2.1, p. 3-8). This island would contain the proposed two new nuclear units' power blocks and most of the associated infrastructure: the mechanical draft cooling towers, makeup-water

reservoir, substation, underground injection control wells, and various small associated buildings. This island would be constructed on a vacant 218-acre mudflat, known as “Mud Island” (Section 4.1.1.1, pp. (4-4) – (4-6)). This 218-acre mudflat is to be excavated down to XX feet and then filled to a plant grade of 26 feet. This elevation is above the design basis flood elevation of 24.8 ft. (Section 5.11.2.4, p. 5-129).

Additionally, this land island is to be enclosed by a stabilized earth perimeter wall on the north, east, and west sides and a reinforced concrete wall on the south side (Section 3.2.2.1, p. 3-8). This land island will also be surrounded by 4,370 acres (Section 2.3.1, p. 2-42) or 5,900 acres (Section 2.2.1.6, p. 2-7) of existing man-made, unlined cooling canals of the industrial waste facility. It is unclear whether the land island will be 26 feet above these existing cooling canals.

Climate Change Adaptation: NRC’s analysis of climate-change effects (Appendix I) does not consider potential climate-change impacts to the proposed action, nor subsequent impacts to the surrounding environment. Instead it documents NRC’s qualitative determination of the likely changes described in Chapter 5 (operational impacts) if the environment is altered in a manner consistent with current climate-change predictions (Appendix I, p. I-1).

Recommendations: EPA recommends NRC discuss potential climate-change impacts to the facility, resulting impacts to the surrounding communities, ecosystems, infrastructure, land uses, etc., and mitigation opportunities. Additionally, EPA recommends NRC use available sea-level rise and storm-surge models to quantify impacts to the proposed action, which can facilitate identification of associated impacts to the affected environment. For example, the USACE’s Sea Level Rise analysis where alternatives are evaluated using “low,” “intermediate,” and “high” rates of future sea level rise for both “with” and “without” project conditions.¹

Stormwater Management Design Event: NRC states the stormwater management system for the new plant area will be designed to handle a 25-year, 72-hour design storm event (Section 3.4.2.1, p. 3-30).

Recommendations: EPA recommends NRC provided some supporting environmental information justifying the sufficiency of a 25-year, 72-hour design storm event for this facility in this area. As noted by NRC, the U.S. Global Change Research Program has determined that extreme heavy precipitation events are expected to increase in frequency and intensity. For example, an event that now occurs once in 20 years is projected to occur 2 to 3 times as often by the end of the century.

Heavy precipitation events are expected to have a 20-percent increase in the amount of precipitation falling. While the number of tropical storms occurring around the globe will decrease, those that occur will be stronger in force, yielding more Category 4 and 5 storms. Rainfall rates associated with tropical storms are expected to be greater, “...with projected increases of about 20 percent averaged near the center of hurricanes” (GCRP 2014-TN3472). (Appendix I, p. 1-3)

¹ Incorporating Sea Level Change in Civil Works Programs (31 December 2013) Department of the Army, U.S. Army Corps of Engineers, ER 1100-2-8162, Regulation No. 1100-2-8162, available at http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_1100-2-8162.pdf

Stormwater Management Cooling Canals: NRC states the stormwater runoff will be directed to the existing cooling canals of the existing industrial wastewater facility.

Recommendations: EPA recommends NRC discuss the impacts of heavy precipitation events, sea level rise, and storm surge on the existing cooling canals and their stormwater-management effectiveness and associated impacts to the affected environment. For example during the hurricane season of 2004, Hurricanes Frances and Jeanne created high-water surges of over 18 feet (Section 9.3.2.4, p. 9-70).

Reportedly, storm surge can range up to 20 feet and last a day in known extreme cases.² Moreover, NRC qualitatively presumes the unlined cooling canals' water-surface elevation will rise in response to sea level rise (Appendix I, p.1-5). EPA recommends that the cooling canals' water elevations be analyzed in context of sea-level rise projections and the resulting impacts assessed.

Sea Level Rise and Regional Stormwater Management: As noted by NRC, land was drained by a series of canals to support urban and agricultural development (Section 7.3.2.1, p. 7-22). The anticipated encroaching sea-level can reverse water transport by moving sea water into these canals. Thereby raising the water-surface level and decreasing stormwater storage potential within these canals. Moreover, the rising water-surface level within these canals reflects the saturation of the surrounding soils. Saturated soils are unable to store storm water. Additionally, sea level rise is expected to decrease the water elevation gradient along this canal-drainage system. Thereby reducing the capacity for gravity-driven drainage through the canal network

Recommendations: EPA recommends NRC consider the effects of sea level rise, storm surge, and extreme storm events upon the regional canal system and surrounding saturated soils and associated impacts to the proposed action. EPA recommends this analysis include the stability of the proposed 218-acre, 26-foot elevated, land island having a three-sided earthen berm. For example, FPL proposes to include the underground injection control wells within the elevated, 218-acre, land island (Section 4.1.1.1, p. 4-4).

EPA recommends NRC discuss whether these canals, UIC wells, and the four proposed radial collector wells, will act as conduits to transport ground water under the influence of sea level rise into the proposed facility. As NRC has noted, the drainage canals also provide a conduit for seawater to flow inland at high tide (Section 2.3.3.2, p. 2-66). Additionally, the analysis should include the combined effects of sea level rise combined storm surge and a heavy precipitation event.

As NRC noted (Appendix I), the U.S. Global Change Research Program rates the vulnerability of the Turkey Point area to sea-level rise as "high" to "very high," and notes an "imminent threat of increased inland flooding during heavy rain events in low-lying coastal areas such as southeastern Florida, where just inches of sea level rise will impair the capacity of stormwater drainage systems to empty into the ocean."

² Miami-Dade Sea Level Rise Task Force Report and Recommendations, July 1, 2014, available at <http://www.miamidade.gov/planning/library/reports/sea-level-rise-final-report.pdf>

Sea Level Rise and Land Subsidence: Prior work suggests that land subsidence rates in South Florida could be in the 0.7 to 1.8 mm per year range, with Dade County at 1.1 mm per year, which could add 7 to 18 cm (or more) to sea level rise estimates for this area through the year 2080.³

Recommendations: EPA recommends NRC discuss the potential impacts of filling a 218-acre mudflat, and thereby raising it to the proposed 26-foot plant grade, upon the Turkey Point area's land subsidence rate and affected environment. Additionally, EPA recommends NRC discuss this impact in context of projected sea level rise, storm surge, and extreme precipitation events. As stated earlier, the U.S. Global Change Research Program predicts the occurrence of more category 4 and 5 storms.

Sea Level Rise and Shoreline erosion: The proposed action is to be located in a low lying coastal area subject to shoreline erosion. It will impact 591 coastal acres. This includes 182 acres of mudflat, 32 acres of open water, and 89 acres of various mangrove types, sawgrass marsh, and mixed wetland hardwood (Section 4.3.1.1, pp. (4-40) – (4-42)). Additionally, the industrial wastewater facility covers another 5,600 acres along 5 miles of the Biscayne Bay shoreline (Section 2.3.1.1, p. 2-44). Moreover an existing barge-turning basin is to be enlarged by 4,356 ft² to accommodate large barges (Section 4.2.1.1, p. 4-27). Approximately 328 miles (40 percent) of Florida's sandy beaches are eroding enough to threaten existing developments and recreation areas.⁴ According to the state Department of Environmental Protection, 485 miles of beaches (59%) already are experiencing erosion, with 387 miles experiencing "critical erosion."⁵

Recommendations: EPA recommends NRC examine the potential for shoreline erosion impacts associated with rising sea levels, storm surges, and increasing occurrence of Category 4 and 5 storms on the proposed action and associated impacts upon the affected environment.

Climate Change and Drought impacts: As noted by NRC, climate-related changes include increased frequency and intensity of extreme weather, e.g., heavy downpours, floods, and droughts (Section 2.9.2, p. 2-208). For example, the drought of 2006 lowered the level of Lake Okeechobee to an all-time record of 8.82 foot mean sea level (Section 9.3.2.4, p. 9-70). Droughts and water shortages have the potential to increase in severity and frequency as the water demand increases in south Florida, independent of climate change effects. A minimum of one severe drought every decade can be expected.⁶

³ Climate Change in Coastal Areas in Florida: Sea Level Rise Estimation and Economic Analysis to Year 2080, Center for Economic Forecasting and Analysis (2008). Available at <http://www.cefa.fsu.edu/content/download/47234/327898>

⁴ Saving Florida's VANISHING Shores, http://www.epa.gov/climatechange/Downloads/impacts-adaptation/saving_FL.pdf

⁵ Florida's Resilient Coasts: A State Policy Framework for Adaptation to Climate Change, http://www.ces.fau.edu/files/projects/climate_change/Fl_ResilientCoast.pdf

⁶ Droughts and Water Shortages in Central and South Florida (September 2001) SFWMD Technical Paper EMA #396 available at http://www.sfwmd.gov/portal/page/portal/pg_grp_tech_pubs/portlet_tech_pubs/ema-396.pdf

Ninety percent of South Florida has been designated as a water resource caution area.⁷ These are areas that have critical water supply problems, or are projected to have these problems in the next 20 years. Chapter 62-40, F.A.C. requires reuse within these designated areas. Florida currently uses more reclaimed water (43 percent of wastewater) than any other state.

Recommendations: EPA has concerns regarding estuary and habitat impacts related to lengthy periods of droughts. In particular, the potential for increased salinity in existing brackish water habitats should be evaluated. Due to the proximity of saline, hypersaline and seawater in the area, measures to prevent increasing salinity should be addressed; in particular, brackish water species and habitat protection measures should be fully evaluated with regard to the project's impacts and potential future climate conditions.

If the proposed action needed to rely on the radial wells as the primary source of cooling water for extended periods during the project's projected life, the impacts to the near shore aquatic ecosystems should be assessed. Impacts of concern include how the volume of water required for cooling purposes and drawn from Biscayne Bay may potentially affect the salinity levels of the near shore Biscayne Bay, and the associated aquatic ecosystem. EPA recommends that this impact analysis also consider extended periods of drought, characteristic of the southeast U.S.

Greenhouse Gases (GHGs)

EPA appreciates the thorough GHG analysis in the DEIS, which evaluated the carbon dioxide (CO₂) equivalent emissions of the proposed two new nuclear power plants in context of building, operating, and decommissioning (Sections 4.7, 5.7.1, 6.1.3, and 6.3). NRC made conservative GHG-emission estimates by basing them on the most GHG-emission intensive nuclear technology (i.e., the uranium fuel cycle).

Consequently, NRC estimated the total nuclear power plant lifecycle footprint to be 10,500,000 MT CO₂e, with a 7-year preconstruction and construction phase, 40 years of operation, and 10 years of decommissioning. NRC concluded the cumulative impacts from other past, present, and reasonably foreseeable future actions on air quality resources in the geographic areas of interest would be moderate for GHGs. Additionally, NRC concluded the fossil fuel impacts, including GHG emissions, from the direct and indirect consumption of electric energy for fuel-cycle operations would be small (page 6-9).

Recommendations: EPA recommends that the NRC address the following in its FEIS:

- The GHG emissions analysis used a 40-year (Section 7.6.2, p. 7-33) operation period while the Climate Change Effect analysis (Appendix J) incorporated the license renewal which could extend operation of the two reactors another 20 years. EPA recommends NRC's GHG emissions analysis use the 60-year operation period similar to that used in Appendix J.
- Clarify what the uranium fuel cycle is, i.e., identify the activities associated with the production of electricity from nuclear reactions. This could be done effectively with a simple diagram.

⁷ Florida Water Management and Adaptation in the Face of Climate Change: A White Paper On Climate Change And Florida's Water Resources November 2011, available at http://floridacclimate.org/docs/water_management.pdf

- Whether the GHG emissions analysis in the DEIS addresses the GHG emissions associated with decommissioning the existing 2 nuclear power plants (Units 3 and 4), in addition to the new ones (Units 6 and 7). EPA recommends the decommissioning of units 3 and 4 also be included as part of the GHG cumulative-effects analysis.

Indirect and Cumulative Impacts

Indirect and Cumulative Impacts

Several potential cumulative and indirect project impacts are of particular concern at Turkey Point, particularly radionuclides in surface water and groundwater, along with hypersalinity. Also, issues related to all nuclear power plants, including spent nuclear fuel storage, transportation and disposition, and groundwater monitoring for radionuclides, will require continued monitoring as the project progresses.

The existing unlined Industrial Waste Facility (IWF)/Cooling Canal System (CCS) for Units 3 and 4 has issues regarding radionuclides and hypersalinity releases to the aquifer complex. Increasing water withdrawals from the canals, combined with additional groundwater withdrawals, could result in changing the level of the groundwater complex in the area surrounding the open interval of the withdrawal wells, eventually resulting in surface water impacts.

EPA is concerned regarding the proposed project's potential for cumulative impacts on the migration of the existing hypersaline plume, particularly since the quantity of water in the cooling water canals will increase as a result of this project. EPA is especially concerned with ensuring the protection of public drinking water wells located to the west. Therefore, as a result of the proposed changes, further migration of the hypersaline plume is expected, and there is likely to be an increase in the rate of westward migration, increasing the potential for contact with offsite wells.

EPA has concerns regarding the adjacent Biscayne Bay and the surrounding terrestrial environment, particularly that operation of additional units could potentially contribute to existing issues, and thereby increase cumulative impacts and environmental stressors. EPA has concerns that historical operating conditions at the site, combined with future construction and operation of new units, could result in increased saltwater intrusion, increased levels of radionuclides in water, and proximity of a hypersaline plume and sole source aquifer impacts.

Recommendations: The FEIS should evaluate the environmental stressors, in their entirety, on the ecosystem surrounding Turkey Point. The potential impacts of current operations, combined with future groundwater withdrawals needed for construction and operation of the facility, should be fully evaluated, and impacts should be avoided to the maximum extent feasible.

The issue of impacts on water supply wells should be thoroughly evaluated and discussed in the FEIS. The westward movement of the plume as a result of continued use of the cooling water canals should be projected through predictive modeling extending through the expected

operation of the project. The project team should explain what steps will be taken to monitor and protect drinking water supplies in the event that the hypersaline plume encounters a public water supply well.

Transmission line impacts

We have concerns regarding the proposed transmission line corridor route potentially impacting the Everglades National Park. The second and third legs of the West Preferred Corridor would traverse a landscape just east of the Everglades National Park characterized by wetlands and disturbed wetlands; a portion of the second leg would be adjacent to the eastern perimeter of the park (page 2-17).

EPA is concerned with the lack of information in the DEIS regarding the National Park Services' (NPS) DEIS (*Acquisition of Florida Power & Light Company Land in the East Everglades Expansion Area Draft Environmental Impact Statement*, January 2014). The NPS decision regarding the land exchange action will greatly influence which transmission corridor is viable.

Recommendations: The FEIS should clarify the impacts to the Everglades (particularly to the Everglades National Park) associated with the Western Preferred Corridor, and better describe the NPS land exchange DEIS. Efforts should be made to avoid impacts to the extent feasible, and to effectively mitigate impacts where they are unavoidable.

Alternatives analysis

In addition to considering the environmental effects of the proposed action, the DEIS addresses alternatives to the proposed action, including the no-action alternative, alternative siting locations, alternative energy sources, and system designs.

The Executive Summary (pg. xxxvi) states that the NRC staff eliminated several energy sources (e.g., wind, solar, geothermal, and biomass) from full consideration because they are not capable of meeting the need of the project. The EPA would prefer that the NRC evaluation consider the combining of renewable energy sources, such as wind and solar, as an alternative to meet the needs of the project.

Glades, Martin, Okeechobee, and St. Lucie were evaluated as alternative sites for nuclear stations. The NRC staff concluded that all of these alternative sites were generally comparable, and that it would be difficult to state that one site is preferable to another, from an environmental perspective. The DEIS then concludes that the Turkey Point site prevailed because "*none of the alternatives is environmentally preferable to the proposed site,*" (page xxxvii).

We also note that the proposed islands for Units 6 and 7 would be elevated 20-25 feet, in order to decrease the risk of flooding from hurricanes and other weather events that are prone to occur in this area.

Recommendations: Given the environmental concerns at the Turkey Point site, particularly regarding the Biscayne sole source aquifer, public drinking water supply well concerns,

hypersalinity and radionuclide migration issues, proximity of two national parks, Biscayne Bay Aquatic Preserve, and the issues described in EPA's Section 404 CWA comment letters in addition to the other issues detailed above, the reason for the environmental preference for the Turkey Point site is unclear.

The FEIS states that the alternative locations are generally comparable. Therefore, it is unclear why the Turkey Point site is preferred. The FEIS should further clarify and document the rationale that was used, particularly regarding evaluation of viewshed issues and operational analyses.

Also, the evacuation scenarios of the Florida Keys should be evaluated as part of the siting issues, and compared with the evacuation scenarios of the alternative sites. The Florida Keys communities are offshore, and therefore have different evacuation routes than other potential sites that do not involve offshore communities with evacuation concerns. The evacuation of offshore communities in the event of an emergency should be thoroughly considered, and should also take into account the possible impacts of hurricanes occurring in conjunction with a nuclear plant emergency.

Monitoring and Adaptive Management

EPA is concerned about the numerous environmental issues and sustainability related to the project, particularly the current operations of the IWF. The development of the hypersalinity plume, the recent uprate waiver for salinity and temperature, and pumping of water from the L31E canal and other sources to the IWF cause concern that the IWF may not be ecologically viable in the long term. EPA is concerned that the need to place additional water into the IWF in order for it to remain functional is not a long term solution, since the IWF is needed for the proposed project. EPA is particularly concerned regarding the drainage of Unit 6 and 7's construction and post-construction stormwater into the existing IWF, especially considering the numerous issues related to the current operations of the IWF.

Given these uncertainties, as well as uncertainties related to climate change (especially increases in storms and sea level rise, operations of the RCW, and possible exacerbation of the hypersalinity plume), EPA believes that a monitoring and adaptive management plan is needed to prepare for any future, unforeseen environmental issues related to the construction and operation of Units 6 and 7. Therefore, EPA requests that NRC and USACE (with resource agency collaboration) develop a robust monitoring and adaptive management plan.

Recommendations: EPA recommends that NRC and USACE develop a monitoring and adaptive management plan with collaboration from resource agencies, and other stakeholders, for inclusion in the FEIS. Further, EPA recommends NRC and USACE commit to the implementation of the monitoring and adaptive management plan in the Record of Decision (ROD).

SUMMARY OF RATING DEFINITIONS AND FOLLOW UP ACTION*

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impacts. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS state, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1-Adequate

The EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collecting is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for the EPA to fully assess the environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of the Federal Actions Impacting the Environment