ATTACHMENT

Staff Responses to Commission Pre-Hearing Questions

NRC STAFF RESPONSES TO COMMISSION PRE-HEARING QUESTIONS

1. In making its inimicality determination, the NRC Staff states that it is not aware of any information presenting foreign ownership, control or domination (FOCD) concerns. Explain the nexus between FOCD concerns and the Staff's inimicality finding.

Staff Response: The Atomic Energy Act of 1954 (AEA), as amended, charges the Commission with making an inimicality determination for the licensing of utilization facilities. Section 102 of the AEA states that any license issued for a utilization or production facility for industrial or commercial purposes must meet the requirements set out in Section 103 of the AEA. Section 103d. of the AEA provides, in part, that:

> No license may be issued to an alien or any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. In any event, no license may be issued to any person within the United States if, in the opinion of the Commission, the issuance of a license to such a person would be inimical to the common defense and security or to the health and safety of the public.

When conducting this inimicality review, the Staff must evaluate whether the involvement of a particular foreign interest in a pending application is or is not inimical to the common defense and security of the United States (U.S.). Inimicality with respect to foreign interests either exists or does not exist. It cannot be mitigated; rather, it can only be eliminated. This is because the involvement of certain foreign interests is considered, in and of itself, to cause harm to the common defense and security. There are a small number of countries, and foreign corporations and entities associated with those countries, whose direct or indirect involvement with an NRC licensee would pose an unacceptable risk to the common defense and security of the U.S., no matter what level of security measures were implemented to address that risk.

While the FOCD and inimicality provisions of the AEA arose from the same national security concerns, the provisions are embodied in separate sentences in Section 103d. of the AEA. As such, the Staff addresses FOCD and inimicality as separate determinations, although the two determinations both include national security considerations.

The Staff also believes that there is a significant difference between an inimicality determination and an FOCD determination. When conducting an FOCD review in which the Staff identifies FOCD concerns, Negation Action Plans may be developed and incorporated as license conditions to address and mitigate the FOCD concerns. These Negation Action Plans operate largely through the imposition of requirements that ensure that trustworthy and reliable U.S. citizens are responsible for safety and security decisions at the facility and that foreign ownership or investment does not result in unauthorized access to the facility, nuclear materials, or sensitive information. The FOCD prohibition applies without regard to the identity of the foreign country involved.

It should be noted that both FOCD and the inimicality review use much of the same data. The inimicality review, in part, identifies whether there is a potential foreign tie that presents national security concerns, which cannot be mitigated. The inimicality review also ensures compliance

with all of the applicable regulatory requirements. The FOCD review identifies ways to mitigate foreign influence, given that it can be mitigated.

With respect to Turkey Point, no foreign interests were identified, and as such there were no FOCD or inimicality concerns identified.

2. The FSER and combined license application provide a construction cost estimate range of $13.700 billion to $19.994 billion for two units. Recent statements by the V.C. Summer Units 2 and 3 licensees indicate that the cost estimate range to construct two AP1000 reactors is $22 billion to $23 billion.

a. Explain whether the construction cost estimate range provided in the application and cited in the FSER—$13.700 billion to $19.994 billion for two units—is still appropriate to use.

The benefit-cost analysis in Chapter 10 of the FEIS estimates that the cost of building two AP1000 reactors at the site is $12.8 to $18.7 billion.

b. How do these new cost estimates affect the benefit-cost analysis in Chapter 10?

Staff Response:

a. The construction cost estimate provided by the applicant for Turkey Point 6 and 7 remains reasonable and appropriate. Since issuance of the combined licenses (COLs) for V.C. Summer Units 2 and 3, construction activities have experienced cost overruns that can be attributed, in part, to higher engineering, procurement, and construction contract charges resulting from project delays for various reasons (e.g., delays in fabrication and delivery of structural modules), increases in the scope of work being performed, and first-of-a kind testing. The presumption that these challenges and increased costs would likewise occur at Turkey Point is speculative prior to licensing and construction. Although it is possible that Turkey Point may realize cost overruns of their own in the future, the applicant has provided a reasonable range of costs by which the higher cost estimate (~$20 billion) is close to the $22 or $23 billion estimate to complete V.C. Summer.

As background and as reflected in the Staff's final safety evaluation report (FSER) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16253A219), the applicant has used, in part, a Westinghouse/Shaw consortium to develop its technology-specific cost estimate for the proposed Turkey Point units. Additionally, the Staff compared the applicant's construction cost estimate with cost estimate data from a number of studies, including a Massachusetts Institute of Technology interdisciplinary study, updated in 2009, entitled, "The Future of Nuclear Power;" and the U.S. Department of Energy's Energy Information Agency 2012 Annual Energy Outlook.[1] The Staff also found the applicant's cost estimate to be consistent with publicly available cost estimates for other U.S. AP1000 projects (e.g., Levy Nuclear

[1] *See* Turkey Point Units 6 and 7 FSER – Chapter 1, "Introduction and Interfaces," page 1-38, footnote 10 (Nov. 10, 2016) (ADAMS Accession No. ML16253A219).

Plant Units 1 and 2). In this review, the Staff concluded that the applicant's construction cost estimate was consistent with the studies identified above.

b. The estimate included in the final environmental impact statement (FEIS) remains reasonable and appropriate, and the new cost estimates for V.C. Summer do not influence the analysis or conclusions in the FEIS for Turkey Point Units 6 and 7. The estimates produced by applicants are termed "order of magnitude" cost estimations—for high-level planning purposes only, derived without the benefit of blueprints and plans. Order of magnitude cost estimates typically provide a point estimate cost within a plus-or-minus 50 percent range.[2]

3. In Part II of the Discussion section of SECY-16-0136, the Staff notes that four of the seventeen departures from the AP1000 certified design are unique to the Turkey Point Units 6 and 7 combined license application.

Which four departures are unique to this application?

Staff Response: The following four departures are unique to this application:

PTN DEP 2.0-1 – This departure increases the 50-year return period operating basis wind speed from 145 miles per hour (mph) (233 kilometers per hour (kph)) to 150 mph (241 kph) to reflect site-specific conditions. The Staff reviewed this departure and determined that the applicant's stated site characteristics are acceptable for the Turkey Point Units 6 and 7 site. The Staff's evaluation is in FSER Section 2.0.4.

PTN DEP 2.0-2 – This departure changes the maximum normal wet-bulb (noncoincident) air temperature from 80.1°F (26.7 °C) to 81.5°F (27.5 °C), an increase of 1.4°F (0.8 °C). The Staff reviewed the departure and determined that the increased value is appropriate for the Turkey Point Units 6 and 7 site. The Staff's evaluation is in FSER Section 2.0.4.

PTN DEP 2.0-4 – This departure modifies the minimum distance from the source boundary to the exclusion area boundary to 0.27 mile (0.43 kilometers (km)) rather than the AP1000 DCD site parameter of 0.5 mile (0.80 km). The Staff reviewed this departure and determined that the applicant's use of a distance less than the one provided in the AP1000 DCD is acceptable because it would result in more conservative (higher) χ/Q estimates that are still within regulatory limits. The Staff's evaluation is in FSER Section 2.0.4.

PTN DEP 19.58-1 – This departure increases the initiating event frequency for certain categories of high winds (hurricanes) at Turkey Point Units 6 and 7. The Staff reviewed this departure and determined that it does not alter the Staff conclusion that high winds do not contribute to core damage. Accordingly, for the Turkey Point Units 6 and 7 high winds analysis, further risk assessment is not necessary. The Staff's evaluation is in FSER Section 19.58.4.

4. The Turkey Point site exceeds the RG 4.7 criterion for population density of 500 persons/square mile within 20 miles of the site.

[2] Perry's Chemical Engineers' Handbook 9-63-68 (Robert H. Perry & Don W. Green, eds., 7 ed.1997).

Staff: Explain in more detail the basis for the Staff's conclusion that 10 C.F.R. §§ 100.20 and 100.21 are satisfied, including a discussion of

a. the highest predicted population density within about 5 years from initial plant approval averaged over any radial distance out to 20 miles;

b. how the Staff determined that the site was "not well in excess" of the population density criterion of 500 persons/square mile within 20 miles of the site;

c. the site's proximity to Miami;

d. the other factors about the Turkey Point site that led the Staff to find it acceptable despite a higher population density; and

e. the revisions to the Final Safety Analysis Report (FSAR) Section 2.1.3.6 and why the Staff found them acceptable.

Staff and Applicant: The low population density criterion states that within about five years of plant site approval, the population density should not exceed 500 persons per square mile. Based on FPL's projection, this criterion is exceeded from 5 to 20 miles by about one-third

f. Explain in more detail whether FPL and/or the Staff considered whether additional actions or compensatory measures were necessary in FPL's emergency plan due to the increased population density.

Staff Response: Title 10 of the *Code of Federal Regulations* (10 CFR) 100.20(a) and 10 CFR 100.21(h) provide requirements for population density in determining the acceptability of a site for a stationary power reactor. Regulatory Guide (RG) 4.7, "General Site Suitability Criteria for Nuclear Power Stations," provides guidance acceptable to the Staff for meeting the requirements of 10 CFR 100.20 and 10 CFR 100.21. RG 4.7 specifies that projected changes in population within about 5 years after initial plant approval should be evaluated. Therefore, the applicant evaluated the population for the year 2030 (which is more than 5 years after initial plant approval). The applicant provided U.S. Census data information and available state and county future population projections based on growth rates, zoning and other pertinent data, considering the start date of units as the year 2030.

The guidance provided in RG 4.7, Revision 2, Regulatory Position C.4, states that…

> …a reactor should preferably be located such that, at the time of initial site approval and within about 5 years thereafter, the population density, including weighted transient population, averaged over any radial distance out to 20 miles (cumulative population at a distance divided by the area at that distance), does not exceed 500 persons per square mile. A reactor should not be located at a site where the population density is well in excess of the above value. If the population density of the proposed site exceeds, but is not well in excess of, the preferred value, the analysis of alternative sites should pay particular attention to alternative sites with lower population density. Other factors, such as safety, environmental, or economic characteristics, will be

considered, which may result in the site with higher population density being found acceptable.

The Staff's evaluation included the review and verification of population density in 2030 in assessing the site suitability criterion. In performing its review and in accordance with the requirements of 10 CFR 100.20 and 100.21 and the guidance in RG 4.7, the Staff considered and evaluated other factors of the Turkey Point site including safety, environmental, and economic aspects. The Staff examined site and physical characteristics that allow adequate security and emergency plans, and the development of measures to ensure the public health and safety.

The Staff's basis for acceptability and conclusion is summarized below:

a. In FSAR Section 2.1.3, "Population Distribution," the applicant presented population projection data for the year 2030 to include radial distances 0-1, 1-2, 2-3, 3-4, 4-5, 5-10 and 10-20 miles. The population density calculated as an average over the radial distance of 0-5 miles is 58 people per square mile, for 0-10 miles it is 718 people per square mile, and for 0-20 miles it is 656 people per square mile. The latter two values exceed the value of RG 4.7 by about 30-40 percent.

b. There is no specific guidance pertaining to the population density as to what constitutes a value that is "well in excess" of the 500 persons per square mile. In accordance with RG 4.7, in its consideration as to whether a value greater than 500 persons per square mile is acceptable, the Staff looks closely at other factors, such as safety, environmental, or economic characteristics. As mentioned in the response to e) below, the Staff considered these other factors in its review of acceptability of the population density around the site.

c. In accordance with long standing NRC guidance (RG 4.7 and NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, (LWR Edition)," Standard Review Plan (SRP) Section 2.1.3), the population density reviewed for the COL application is that value determined out to 20 miles from the site. Miami is located approximately 25 miles north of the center of the proposed site which is beyond the 20 miles provided in NRC guidance.

d. Due to the exceedance of density criterion of 500 people per square mile, the Staff is required to evaluate other factors in accordance with the regulatory requirements set forth in 10 CFR 100.21(h) and the guidance provided in RG 4.7.

   10 CFR 100.21(h) states that reactor sites should be located away from very densely populated centers. Areas of low population density are preferred. However, in determining the acceptability of a particular site located away from a very densely populated center but not in an area of low density, consideration will be given to safety, environmental, economic, or other factors, which may result in the site being found acceptable. These factors include, but are not limited to, such factors as the higher population density site having superior seismic characteristics, better access to skilled labor for construction, better rail and highway access, shorter transmission line requirements, or less environmental impact on undeveloped areas, wetlands or endangered species.

   RG 4.7 states that if the population of the proposed site exceeds, but is not well in excess of, 500 people per square mile, the analysis of alternative sites should pay

particular attention to alternative sites having lower population density, giving consideration to other factors such as safety, environmental, or economic considerations, which may result in the site with the higher population density being found acceptable. In performing its review and in accordance with the requirements of 10 CFR 100.20 and 100.21 and the guidance in RG 4.7, the Staff considered and evaluated other factors of the Turkey Point site including safety, environmental, and economic aspects. Attention was given to site and physical characteristics that allow adequate security and emergency plans and measures to be developed to ensure the public health and safety. The Staff found that when all factors were considered and even with a population density greater than 500 persons/square mile, the site was acceptable because the application provided adequate assurance that the public health and safety would be assured.

The factors considered in the evaluation are presented in response to part e, below.

e. The applicant provided a response to the Staff's request for additional information (RAI) pertaining to the rationale, justification and clear advantages in selecting Turkey Point as the preferred site over the alternative sites with lower population density. The response and the revisions to the FSAR Section 2.1.3.6 included discussion of the following five site features:

    1. Ability to Balance Generation and Load in Southeast Florida (economic, reliability attributes),

    2. Unique Cooling Water Supply Source (safety, reliability, and environmental),

    3. Land Availability (economic and environmental attributes),

    4. Existing Nuclear Power Plant Infrastructure (safety, economic, and environmental), and

    5. Emergency Planning Infrastructure (safety and economic attributes)

    Specific emphasis in the RAI response highlighted assurance that the Turkey Point site (1) met the radiation dose requirements to the public established in 10 CFR 52.79(a)(1)(vi) (FSAR Subsection 15.6.5.3.7.3) and (2) facilitated development of the Turkey Point Emergency Plan, along with the associated Turkey Point Evacuation Time Estimate (ETE), which takes into account the consequences of radiological emergencies, as required by 10 CFR 50.47 and 10 CFR Part 50, Appendix E.

    The applicant noted that its site evaluation process was consistent with the exception noted in NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants," (ESRP) Section 9.3 (III)(8) (for additional details, see the response to Question 34) and considered the advantages already present at existing nuclear facilities in the region of interest. The applicant's alternative sites were evaluated by the applicant based on range of performance criteria and weighting factors derived using methodologies consistent with the modified Delphi process specified in the Electric Power Research Institute's document, "Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application."

    In the FEIS, the Staff also evaluated the environmental impacts of building and operating two new reactors at the Turkey Point site and at four alternative sites. The Staff

compared the impacts at the alternative sites to those at the Turkey Point site and concluded that none of the alternative sites was environmentally preferable to the Turkey Point site.

The Staff reviewed all of the information provided by the applicant and found the information about the five site features highlighted in the RAI response to be reasonable. Furthermore, the Staff also found acceptable as documented in FSER Chapter 15 the potential radiation dose consequences resulting from a postulated design basis accident as well as the acceptability of the emergency plans as documented in FSER Chapter 13 (see discussion below). Based on all of the information available to the Staff about the safety, environmental, and economic aspects of the site that are contained in the FSAR, Environmental Report (ER), and RAI responses, the Staff concluded that, although the population density averaged over radial distance of 0-10 miles and 0-20 miles from the site exceeds 500 persons per square mile, the Turkey Point site is suitable for the construction and operation of two additional nuclear units. As an example, the advantages provided by the existing nuclear power plant infrastructure and the emergency planning infrastructure would contribute to reasonable assurance of the protection of public health and safety in the event of the unlikely occurrence of a design basis or severe accident.

Therefore, the Staff concludes that the Turkey Point site is acceptable, in accordance with the requirements of 10 CFR 100.21(h), because, as discussed above in parts a through e, (1) the Turkey Point site has a number of features that are advantageous from a safety, environmental and economic perspective, and (2) the alternative sites were not environmentally preferable to the Turkey Point site.

f. The Staff did consider the possibility of increased population density surrounding the proposed Turkey Point Units 6 and 7 site, and determined that no additional actions or compensatory measures were necessary in Florida Power & Light's (FPL's) emergency plan. Specifically, the existing regulations fully address how any increase in population density would be identified and reflected in the emergency plan.

Section IV.7 of Appendix E to 10 CFR Part 50 addresses changes in plume exposure pathway emergency planning zone (EPZ) population for a COL, as follows:

> After an applicant for a combined license under 10 CFR Part 52 of this chapter receives its license, the licensee shall conduct at least one review of any changes in the population of the EPZ at least 365 days prior to its scheduled fuel load. The licensee shall estimate EPZ permanent resident population changes using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. If the EPZ permanent resident population increases such that it causes the longest ETE [evacuation time estimate] value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ, to increase by 25 percent or 30 minutes, whichever is less, from the licensee's currently approved ETE, the licensee shall update the ETE analysis to reflect the impact of that population increase. The licensee shall submit the updated ETE analysis to the NRC for review under § 50.4 of this chapter no later than 365 days before the licensee's scheduled fuel load.

In addition, pursuant to Section IV.5 of Appendix E to 10 CFR Part 50, the licensee is required to estimate EPZ permanent resident population changes once a year between the decennial censuses. Specifically, increases in population density are addressed in Section IV.6, which reads as follows:

> If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE [Evacuation Time Estimate] value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the nuclear power reactor licensee's currently NRC approved or updated ETE, the licensee shall update the ETE analysis to reflect the impact of that population increase. The licensee shall submit the updated ETE analysis to the NRC under § 50.4 no later than 365 days after the licensee's determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.

The ETE Report, which supplements the Emergency Plan for Turkey Point Units 6 and 7, identifies the road network and capacities surrounding the Turkey Point site that would provide State and local governments with site-specific information needed for protective action decision-making. (Section 13.3.4.10, "Protective Response," and Section 13.3.4.17, "Evacuation Time Estimate Analysis," of the FSER for the Turkey Point Units 6 and 7 COL application, address the development and use of ETEs supporting the Turkey Point site).

As stated in the Executive Summary of NUREG/CR-7002 (SAND2010-0016P), "Criteria for Development of Evacuation Time Estimate Studies" (ADAMS Accession No. ML113010515), the ETE is primarily used to inform protective action decision-making and may also be used to assist in development of traffic management plans to support an evacuation. The ETE is used as an information tool, and, therefore, no minimum evacuation time must be achieved. ETEs should be used by licensees in the development of offsite protective action recommendations and by offsite response organizations when making offsite protective action decisions. Further, Section 5.4, "Reviews and Updates," of NUREG/CR-7002 states the following:

> Emergency planners depend on the accuracy of the ETE analysis to support evacuation decisions; therefore, it should be reviewed periodically to identify changes that may have occurred. Whenever population increases occur that cause ETE values to materially increase, the ETE analysis should be updated in accordance with the requirements of Section IV of Appendix E to 10 CFR Part 50.

In addition, 10 CFR 50.54(q) requires that licensees maintain the capability and resources necessary to prepare for and respond to a radiological emergency, as described in the emergency plan. 10 CFR 50.54(q)(2) further states that a licensee shall follow and maintain the effectiveness of an emergency plan that meets the requirements in Appendix E to 10 CFR Part 50, and the planning standards of 10 CFR § 50.47(b).

Finally, the Federal Emergency Management Agency (FEMA) provides for continuous assessment of offsite preparedness, which is addressed in the FEMA "Program Manual – Radiological Emergency Preparedness" (FEMA P-1028, January 2016). This is commonly referred to as the "FEMA REP Manual," which serves as the principal source of policy and guidance for the FEMA REP Program. The following sections of the manual address, in part, FEMA's continuous assessment responsibilities:

> B. Purpose – Planning and Preparedness Strategy
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> The REP Program currently relies on a combination of exercises, SAVs [Staff assistance visits], plan reviews, and an Annual Letter of Certification (ALC) to develop a recommendation of reasonable assurance. Over the course of the last 30 years, the reasonable assurance assessment began to rely on the biennial exercise over the other components. The REP Program Manual includes guidance that allows for an ongoing assessment approach through evaluation of a broader range of activities than those previously used.
>
> E.4 Planning and Preparedness Assessment Strategy
>
> Ongoing assessment: FEMA supplements these "snapshot" assessments with the evaluation and observation of ongoing activities including full-scale, functional, and table top exercises; other types of drills; seminars; training activities; interviews; and responses to actual events. In addition, FEMA employs a dedicated Site Specialist for each NPP [nuclear power plant] whose responsibilities include maintaining an ongoing assessment record that reflects the status of offsite preparedness and training. This approach allows FEMA to maintain a more up-to-the-minute assessment of reasonable assurance throughout the year and provide increased integration with other Federal, State, local, and Tribal government preparedness activities.

Therefore, the existing NRC and FEMA regulations and guidance adequately address how any increase in population density surrounding the Turkey Point site would be identified and reflected in the emergency plan. Requirements for continuous maintenance and assessment of emergency plans, including updating the ETE, are further addressed in the Staff's response to Question 16.b.

5. In Sections 2.3.1.4.3 and 3.3 of the FSER the Staff evaluated whether FPL adequately addressed severe weather conditions and wind and tornado loading. The highest recorded 3-second gust wind speed in the Turkey Point Units 6 and 7 area resulted from Hurricane Andrew in 1992. FPL updated the combined license application to include a footnote noting 167 miles per hour (mph) as the site historic maximum speed. However, the Staff accepted the use of 161 mph as the site characteristic operating basis wind speed, which should be considered a severe environmental load that could infrequently be encountered during the plant life, and therefore, can be expected to be exceeded.

"Nuclear power plants must be designed so that they remain in a safe condition under extreme meteorological events . . . that *could reasonably be predicted to*

***occur at the site.*" RG 1.221 at 2 (emphasis added). Due to its location alongside the Atlantic Ocean, the state of Florida is extremely susceptible to hurricanes. In 2005 alone, the region was hit by 3 record-breaking Category 5 hurricanes that peaked at sustained winds of 175-185 mph. Hurricanes of this magnitude could reasonably affect the proposed nuclear power plants. Did FPL or the Staff conduct confirmatory calculations to demonstrate that exceeding winds of this magnitude will not cause adverse effects on the safety-related structures, systems, and components?**

Staff Response: RG 1.221, "Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants," establishes the hurricane wind speeds for a return period of 10 million years. For this return period, the Turkey Point analysis used a gust wind speed of 260 mph (which corresponds to a sustained wind speed of 213 mph), which envelops the sustained winds of 175-185 mph documented during the three Category 5 storms in 2005, as well as the estimated gust wind speed of 225 mph for Hurricane Irma. Additionally, the AP1000 standard plant is designed for a tornado with a gust wind speed of 300 mph at a frequency of 10 million years. Therefore, the Staff determined that confirmatory calculations were not necessary to demonstrate that winds exceeding the site characteristic operating basis wind speed of 161 mph will not cause adverse effects on the safety-related structures, systems, and components.

As of September 30, 2017, Hurricane Irma has produced the highest hurricane wind speeds recorded during the 2017 Atlantic hurricane season. The highest sustained (1-minute average) wind speed measured for Hurricane Irma was 185 mph as the storm passed north of Puerto Rico, approximately 1000 miles east-southeast from the Turkey Point site.[1] The tornado and hurricane wind speeds discussed in the Turkey Point 6 and 7 FSAR and staff FSER are recorded in 3-second gust wind speeds. Using the same conversion factor as hurricanes discussed in the FSAR, the highest sustained wind speed of 185 mph for Irma corresponds to maximum 3-second gust wind speed of approximately 225 mph. This estimation of the gust wind speed was confirmed by the National Hurricane Center.[3] As part of the Turkey Point application, both the applicant and the Staff reviewed tropical cyclones that passed within 100 nautical miles of the site. Hurricane Irma passed within 100 nautical miles of the site as it approached Key West, Florida with estimated reduced wind gusts of 161 mph.

6. The application states that the 50-year return period 3-second wind gust is 150 miles per hour (mph) and used a scaling factor of 1.07, consistent with ASCE/SCI Standard 7-05, Table C6-7, to determine the 100-year return period 3-second wind gust of 161 mph. However, FPL's response to RAI 5908, Question 02.03.01-2 states that the highest estimated historical 3-second wind gust speed was estimated to be 204 mph during Hurricane Andrew in 1992. FSER § 2.3.1.4.3 states:

> **The staff accepts the applicant's response to RAI 5908, Question 02.03.01-2 (ML11276A100) and the continued use of 161 mph as the site characteristic operating basis wind speed because the AP1000 operating basis wind speed is based on the 100- year return period, not the historic maximum wind.**

[3] http://www.nhc.noaa.gov/archive/2017/al11/al112017.fstadv.032.shtml, accessed Sept. 30, 2017.

Explain in further detail why it is acceptable to use the 100-year return period of 161 mph and not the site specific historic maximum wind encountered in 1992, for structures, systems and components for the proposed Turkey Point Units 6 and 7.

Staff Response: The Staff found that FPL's assessment accounts for the fact that the 100-year return gust wind speed of 161 mph may be exceeded during the life of the facility. The Turkey Point Units 6 and 7 analysis, described in FSER Section 3.3.1.4, uses a gust wind speed of 161 mph to establish the operating basis wind load, to which FPL adds margins to account for the possibility that the operating basis gust wind speed might not be the highest wind recorded for the site.

As discussed in the Staff response to Question 5, the Staff has monitored information from recent 2017 tropical storm and hurricane events. Consistent with RG 1.221, which calls for consideration of a return gust wind speed of 10 million years for design basis analyses, FPL analyzed Turkey Point Units 6 and 7 using a gust wind speed of 260 mph, which envelops the recently estimated gust wind speed of 225 mph for Hurricane Irma. As such, the design basis analyses as documented in the Turkey Point Units 6 and 7 FSAR remain conservative and bounding.

7. In the FSER climate change discussion (§ 2.3.1.4.7), the Staff referenced the U.S. Global Change Research Program's (USGCRP) 2009 "Global Climate Change Impacts in the United States." How would FPL's application and the Staff's review be affected (if at all) by the most recent 2014 USGCRP National Climate Assessment? Would there be any impact on the findings in the FSER?

Staff Response: Climate change projections between the 2009 USGCRP report and the 2014 USGCRP report do not warrant changes in the Staff's review of FPL's application and do not impact the findings in the Staff's FSER. Data regarding climate change in the 2009 USGCRP report for the Turkey Point site are not significantly different than data contained in the 2014 USGCRP report. For example, both the 2009 and 2014 USGCRP reports predict dry-bulb temperature changes by the end of the century to be between 3 degrees Fahrenheit (low emissions scenario) and 6 degrees Fahrenheit (high emissions scenario) for Southeastern Florida, where the Turkey Point site is located. The Staff's FSER statements regarding climate change are therefore consistent with those made for the region in the USGCRP 2014 report.

8. In view of the departures in Maximum Safety Wet Bulb (Noncoincident) Air Temperature, did the Staff and FPL consider the impact of the projected increase in daytime and nighttime air temperatures, as reported in the 2014 USGCRP National Climate Assessment? If not, how would FPL's analysis and the Staff's review be affected by the Assessment?

Staff Response: No, the Staff did not consider the impact of the projected increase in daytime and nighttime air temperatures, as reported in the 2014 USGCRP National Climate Assessment, on the maximum safety wet bulb temperature. The 2014 USGCRP, while projecting increases to dry-bulb temperatures, does not provide future projections to changes in wet-bulb temperature, which is the focus of the requested departure; therefore, the staff's review would not be affected. Regarding the maximum safety wet bulb temperature departure, the staff reviewed the applicant's analysis of the departure using approved guidance and review standards. If it becomes evident that long-term climatic change is influencing the most severe natural phenomena reported at the Turkey Point Units 6 and 7 site, the staff will follow the process described in SECY-16-0144, Proposed Resolution of Remaining Tier 2 and 3

Recommendations Resulting From Fukushima Dai-Ichi Accident, to address any effect changes in the environment may have on maximum safety wet-bulb temperature. See the response to Q16.d for further information.

9. The FSER states that flooding from Biscayne Bay during severe storms, such as the Probable Maximum Precipitation storm event, would be the most severe and controlling event among all flooding scenarios.

Explain how the Staff and FPL reviewed and evaluated the assumption that the flooding from Biscayne Bay during severe storms would be the most severe and controlling event.

Staff Response: The Staff reviewed and evaluated all potential flood-causing mechanisms in accordance with SRP Section 2.4, and the associated regulatory guidance referenced therein. Flood-causing mechanisms included coastal storm surge, including from Biscayne Bay (FSER Section 2.4.5), flooding due to streams and rivers (FSER Section 2.4.3), flooding from potential dam failures (FSER Section 2.4.4), flooding from probable maximum tsunami (FSER Section 2.4.6), flooding due to ice effects (FSER Section 2.4.7), and flooding caused by channel diversions (FSER Section 2.4.8).

The Staff also evaluated the potential for floods to occur as a result of rain falling directly on the site. As discussed in FSER Section 2.4.2.4.3, the Staff examined the site impacts from a probable maximum precipitation (PMP) event. The PMP considered a rainfall rate of 19.4-inches over 1-hr. The analysis showed that drainage features and grading efficiently remove water from the power block area during the PMP event. The maximum water elevation resulting from the PMP event (24.5 ft) was lower than the design plant grade (26.0 ft) and no safety-related facilities would be affected as a result of the PMP flooding.

After considering all of these flood-causing mechanisms, the event with the highest water elevation occurred from the Biscayne Bay storm surge event. Based on the staff's evaluation of the data available as of September 30, 2017, for the recent 2017 tropical storm and hurricane events, the Staff determined that the design basis analyses for storm surge, as documented in the Turkey Point Units 6 and 7 FSAR, remain conservative and bounding. Additional information regarding the recent tropical storm and hurricane events as they relate to storm surge is set forth in the Staff response to Question No. 10.

10. FPL used guidance in NOAA NWS Report 23 (NOAA, 1979) as the basis for defining the combination of parameters of the wind field for the Probable Maximum Hurricane (PMH) at the location of Turkey Point Units 6 and 7. The PMH parameter values provided by NOAA NWS 23 are based on data from historical hurricanes from 1851 to 1977.

a. Did the Staff and FPL consider information on hurricanes and storm surge obtained in the period since the NOAA NWS 23 data were collected (1977-present)?

b. If not, how could such information affect the values or ranges of the PMH parameters used in the analysis?

Staff Response:

a. Yes, the Staff considered information on hurricanes and storm surge recorded since the data used to develop National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) 23, "Meteorological Criteria for Standard Project Hurricane and Probable maximum Hurricane Windfields, Gulf and East Coast of the United States," were collected. The Staff factored that information into its evaluation of the parameters for the wind field of the PMH. The central pressure at landfall of the PMH considered in the Turkey Point Units 6 and 7 storm surge analysis is lower (more intense) than that for any storm making landfall in the continental U.S.

Subsequent to the completion of the FSER for Turkey Point Units 6 and 7, the Staff obtained information on recent 2017 tropical storm and hurricane events (i.e., hurricanes Harvey, Irma, and Maria), including information on storm surge. As of September 30, 2017, Hurricane Irma generated the peak total surge for the 2017 hurricane season. Based on data from NOAA tide gauges, the peak storm surge resulting from Hurricane Irma was 7.8 feet near Jacksonville, Florida. Peak total surge was less than 4 feet at the Virginia Key tide gauge, which is approximately 25 miles north-northeast of the Turkey Point site, and is the nearest gauge to the site. Only limited preliminary 2017 storm surge data are available to date for other areas of Florida and the Atlantic islands; however, the available preliminary surge levels reported remain well below the 17.5 feet of surge calculated for Turkey Point Units 6 and 7, which is based on the Probable Maximum Hurricane (PMH). In evaluating the storm surge from the PMH, the Staff considered the historical record of hurricanes, including the only two (Labor Day in 1935 and Andrew in 1992) Category 5 hurricanes to make landfall in Florida. As noted above, data available to date indicates that the 2017 hurricanes did not generate storm surges in excess of the PMH. As such, the storm surge of historical record in Florida remains 15.4 feet for Hurricane Andrew in 1992. Below are some of the sources cited in the FSER or consulted by Staff that provided information on storms more recent than 1977:

Bender, Morris A., Thomas R. Knutson, Robert E. Tuleya, Joseph J. Sirutis, Gabriel A. Vecchi, Stephen T. Garner, Isaac M. 2010."Modeled Impact of Anthropogenic Warming on the frequency of Intense Atlantic Hurricanes." Science 327, 454 (22 Jan 2010) DOI:10.1126/science.1180568

Blake, E.S., Rappaport, Edward N., and Landsea, Christopher W. 2007. "The Deadliest, Costliest, and Most Intense United States Tropical Cyclones from 1851 to 2006 (and Other Frequently Requested Hurricane Facts)," NOAA Technical Memorandum NWS TPC-5, April.

Blake, Eric S., Landsea, Christopher W., and Gibney, Ethan J. 2011. "The Deadliest, Costliest, and Most Intense United States Tropical Cyclones from 1851 to 2010 (and Other Frequently Requested Hurricane Facts)," NOAA Technical Memorandum NWS NHC-6, August.

FEMA, USACE, and NOAA. 2005. Federal Emergency Management Agency, the U.S. Army Corps of Engineers and NOAA. 2005. "2004 Hurricane Season Post Storm Assessment of the National Hurricane Program Study Products." Retrieved from http://chps.sam.usace.army.mil/USHESdata/Assessments/2004Storms/2004_hurricane_season_page.htm on July 23, 2010.

Irish, J.L., Resio, D.T., and J.J. Ratcliff, 2008: The influence of storm size on hurricane surge, J. Phys. Oceanogr., 38 (9), 2003-2013.

Masters, Jeffrey. Undated. "A Detailed View of the Storm Surge: Comparing Katrina to Camille." Weather Underground, Inc. Retrieved from http://www.wunderground.com/hurricane/surge_details.asp on June 20, 2011.

NOAA, 1993 and 2005, Hurricane Andrew, Preliminary Report: National Hurricane Center. 10 December 1993; addendum 7 February 2005. Available at http://www.nhc.noaa.gov/1992andrew.html, accessed June 21, 2011.

NOAA, Historical Hurricane Tracks, NOAA Coastal Service Center. Available at http://maps.csc.noaa.gov/hurricanes/

Powell, Mark D., and Samuel H. Houston. 1998. "Surface Wind Fields of 1995 Hurricanes Erin, Opal, Luis, Marilyn, and Roxanne at Landfall." Monthly Weather Review 126, May 1998, 1259-1273. Retrieved from http://www.aoml.noaa.gov/hrd/Powell/powell_3.pdf on June 20, 2011.N/A

b. The Staff considered information on hurricanes and storm surge obtained after the NOAA NWS 23 data were collected. See the Staff's response to Question 10.a, above.

11. The Staff and FPL concluded that the selected PMH meteorological parameters are conservative on the basis that the central pressure at landfall of the recommended PMH is lower than that for any storm included in the U.S. historical record documented by Blake et al. (2007), and the wind speed is higher than for any storm in the record. Storm surge is also a function of the storm size. Observations and modeling have shown that a storm of lower intensity but larger size can generate a higher surge (e.g., Resio and Westerink, 2008). Describe how storm size was considered in the judgment that the selected PMH meteorological parameters are conservative.

Staff Response: As described in FSAR Section 2.4.5.2.2.3, the applicant's analysis of storm surge included model simulations that tested the sensitivity of water height at the site to different hurricane parameter combinations, including: forward speed of the hurricane, storm size (measured as the radius of maximum winds), storm trajectory, and distance from the storm track to the Turkey Point site. When storm intensity and other parameters were held constant by the applicant, and storm size was varied within the range of values for radius of maximum winds (4 to 20 nautical miles) recommended by NWS 23, the maximum storm surge was found with the value of 20 nautical miles.

The applicant evaluated a range of simulated surge elevations for storm sizes of 25, 30, 40, and 100 nautical miles, while holding the storm intensity constant. This is a conservative assumption since these two parameters are not independent. Extremely intense storms defined by low central pressure are typically smaller storms because angular momentum is conserved and a vortex contracts in horizontal extent as the storm increases in rotational speed. The NWS 38, "Hurricane Climatology for the Atlantic and Gulf Coast of the United States," analyzed the joint probability of hurricane size (radius of maximum winds) and hurricane intensity. The NWS found that large hurricanes (i.e., 45 nautical miles or larger) are generally of moderate or weak intensity, while extremely intense hurricanes (i.e., central pressure less than 920 millibars)

typically have a storm size well below 20 nautical miles. The applicant noted that a storm size of 30 nautical miles produced the highest storm surge elevation at the site, exceeding the 20 nautical mile storm size by 2.6 percent of the total water height. At storm sizes beyond 30 nautical miles, the surge elevation at the site decreased (see FSAR Figure 2.4.5-207). As described in FSER Section 2.4.5.4.5, the Staff determined that 20 nautical miles was a conservative selection since the sensitivity study produced a relatively small 2.6 percent change in total water height when the storm size was increased beyond the upper bound in the NWS 23 guidance. In addition, the applicant added 20 percent to the storm surge prediction to account for model uncertainty, as discussed in FSAR Section 2.4.5.2.2.5. This adjustment provides sufficient conservatism to offset the uncertainty in storm size. The data from recent hurricane events do not exceed the values used by Staff and applicant in their analyses. See Staff's response to Question 10 for more information. As such, the analyses remain conservative.

12. Did the Staff and FPL consider the cumulative impact of storm events during the life of the units, including the cumulative effect of land subsidence associated with the weight of the proposed facilities in conjunction with a strong hurricane surge? If not, why not?

Staff Response: The Staff appropriately considered storm events during the life of the units because a licensee is required to maintain the plant in accordance with its design and licensing basis. Therefore, there would be no cumulative impact from storm events over the life of the units. In addition, a framework outlined in SECY-16-0144, "Proposed Resolution of Remaining Tier 2 and 3 Recommendations Resulting from the Fukushima Dai-Ichi Accident" (ADAMS Accession No. ML16286A552), provides a graded approach that allows NRC to proactively, routinely, and systematically seek, evaluate, and respond to new information on natural hazards, including flooding from coastal hazards.

As an example of Staff's evaluation of new information on natural hazards, the staff has monitored information from recent 2017 tropical storm and hurricane events (i.e., hurricanes Harvey, Irma, and Maria),which includes wind speed, storm surge, and extreme precipitation. Hurricane Irma generated the peak total surge for the 2017 hurricane season of 7.8 feet near Jacksonville, FL[4] based on data from NOAA tide gauges. Peak total surge was less than 4 feet at the Virginia Key tide gauge,[5] which is approximately 25 miles north-northeast of the site and is the nearest gauge to the Turkey Point site. Only limited preliminary 2017 storm surge data are available to date for other areas of Florida and the Atlantic islands; however, the available preliminary surge levels reported remain well below the 17.5 feet of surge calculated for Turkey Point Units 6 and 7, which is based on the PMH. The Staff reviewed the new information generated by these recent hurricanes to confirm the conservative and bounding nature of the meteorological and hydrological design bases for the Turkey Point Units 6 and 7. As stated in the FSER, all safety-related structures, systems, and components are at or above an elevation of 26.0 ft and would not be impacted by the AP1000 design basis storm surge height of 24.8 ft or by lower storm surge levels, as were generated by Hurricane Irma.

The Staff considered the effect of land subsidence associated with the weight of the proposed facilities in conjunction with a strong hurricane surge. The geotechnical properties of the supporting base materials take into account the configuration, design and weight of the proposed facility, as discussed in FSER Section 2.5.4. To establish the plant foundation fill, overburden soils and poor quality rock will be removed, the exposed rock will be grouted with

[4] https://tidesandcurrents.noaa.gov/waterlevels.html?id=8720030, accessed Sept. 30, 2017.
[5] https://tidesandcurrents.noaa.gov/waterlevels.html?id=8723214, accessed Sept. 30, 2017.

cement and concrete fill will be placed atop the grouted rock. The plant foundation is supported by the concrete fill, which is of sufficient strength to limit subsidence to an acceptable level. Two Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) are identified in the COL application for the concrete fill and grouting under the nuclear island to ensure that the fill is within plant design specifications, as described in FSER Section 2.5.4. The Staff concluded that the supporting foundation materials, qualified fill concrete, and foundation grouting will result in a solid foundation for the nuclear island that meets the stability requirements.

As discussed above, the safety review determined that: 1) the plant will be maintained per the design and licensing basis; 2) all safety-related structures systems and components would not be impacted by the design basis storm surge height of 24.8 ft or lower storm surges; and 3) the plant foundation design is of sufficient strength to limit subsidence to an acceptable level.

Therefore, there would be no cumulative impacts associated with storm events during the life of the units, including the cumulative effect of land subsidence associated with the weight of the proposed facilities in conjunction with a strong hurricane surge, and no need to address it in the FEIS.

13. To account for sea-level rise over the life of the plant, FPL added a nominal long-term sea-level adjustment of 1 ft. to the estimates of 10-percent high tide level and initial rise. FPL considered this adjustment conservative because it bounds the largest linear trends in sea levels observed at several tide gauges in the south Florida region.

The Staff noted that climate modeling studies have estimated accelerated rates of sea level rise in excess of FPL's trend analysis of historical records. Nevertheless, the Staff accepted FPL's use of linear trend analysis using historical observations.

In its September 16, 2016 letter, the Advisory Committee on Reactor Safeguards (ACRS) also noted the possibility of accelerated sea level rise due to climate change. The ACRS accepted the use of linear trend analysis using historical observations because any accelerated rise due to climate change would be gradual and could be addressed by adaptation. However, the ACRS noted its expectation "that the Turkey Point Units 6 and 7 licensing basis will be explicit concerning the assumed sea level rise of one foot, and that the licensee will remain aware of recorded sea level rise so as to recognize the potential exceedance during the plant life." ACRS Letter at 3.

Do the FSER or the draft combined licenses for Turkey Point Units 6 and 7 address such monitoring? If so, how? If not, explain how FPL plans to address the potential for accelerated sea level rise.

Staff Response: The Staff does not take credit for monitoring sea level rise in the FSER, nor do the draft COLs include a license condition to require such monitoring. Please see FPL's response to this question for FPL's plans to address the potential for accelerated sea level rise.

The Staff will proactively, routinely, and systematically seek, evaluate, and respond to new information on natural hazards, including flooding from coastal hazards, which may include sea level rise, in accordance with the framework outlined in SECY-16-0144, "Proposed Resolution of Remaining Tier 2 and 3 Recommendations Resulting from the Fukushima Dai-Ichi Accident"

(ADAMS Accession No. ML16286A552). For additional information, see the Staff's response to Question 16, Part d.

14. The Staff has received feedback from external stakeholders recommending that it use higher estimates of regional sea level rise than the 1 ft. (0.3m) estimate used in the application. SECY-16-0136 at 22. NOAA guidance recommends consideration of its highest estimate scenario for global sea level rise (6.6 ft. (2.0m)) when planning new infrastructure with a long anticipated life cycle such as a power plant. NOAA Guidance at 12.

a. Did the Staff or FPL utilize the information referenced in NOAA's December 2012 guidance?

b. Explain how (if at all) using NOAA's highest estimates for global sea level rise would affect the analyses performed by FPL and the design of Turkey Point Units 6 and 7, and whether or not doing so would be appropriate under the NRC's current guidance.

Staff Response:

a. No, the Staff did not utilize the maximum sea level rise estimates in NOAA's December 2012 guidance. In accordance with guidance in NUREG-0800, SRP Section 2.4.5 and JLD-ISG-2012-06, the Staff used data from nearby tide gages to estimate sea level rise.

b. Sea level rise is one component in a collection of conservative parameters to calculate the design basis flood height from storm surge at the Turkey Point site. The storm surge analysis consists of a collection of conservative factors for the hurricane, including central pressure, radius of maximum winds, forward speed, and track direction. In addition, the storm surge water height further conservatively uses the coincident occurrence of the peak high tide based on a 21-year cycle. The values of these parameters used for the analysis reflect the direct hit of a hurricane more severe than Hurricane Andrew in 1992. The FPL analysis also applies an estimate of sea level rise at the site of 1 foot based on observed data, which the Staff determined was reasonable for the storm surge analysis. Adding conservatism to any of the above factors, including sea level rise, may result in the introduction of additional realisms in the other factors, or could result in a more conservative design basis. Based on the Staff's evaluation of the data available as of September 30, 2017, for the recent 2017 tropical storm and hurricane events, the Staff determined that the design basis analyses for storm surge, as documented in the Turkey Point Units 6 and 7 FSAR, remains conservative and bounding. Additional information regarding the recent tropical storm and hurricane events as they relate to storm surge is set forth in the Staff response to Question 10.

   While NRC guidance provides an acceptable method for determining storm surge at any particular site, an applicant is free to propose other methods, which could include use of the 2012 NOAA guidance, which the Staff would review.

15. Miami-Dade County Zoning Resolution No. Z-56-07, Condition No. 21, provides, in part, that "the design and elevation of FPL project features such as but not limited to roadways and other fill pads shall be based on the planned higher water levels in this area as well as sea level rise pursuant to CM-9H of the Miami-Dade CDMP [Comprehensive Development Master Plan]." In turn, CM-9H provides that "[r]ise

in sea level projected by the federal government, and refined by the Southeast Florida Regional Climate Change Compact, shall be taken into consideration in all future decisions regarding the design, location, and development of infrastructure and public facilities in the County." Comprehensive Development Master Plan: Adopted Components, VII. Coastal Management Element, at VII-15 (http://www.miamidade.gov/planning/library/reports/planning-documents/cdmp/coastalmanagement.pdf).

Miami-Dade County noted that FPL has agreed to consider Southeast Florida Regional Climate Change Compact data and reports for its planning purposes for Units 6 and 7.

a. Staff and Applicant: How was Miami-Dade County Zoning Resolution No. Z-56-07, and specifically Condition No. 21, considered in the combined license application and Staff review, respectively?

b. Applicant: Discuss how FPL is considering the data and reports of the Southeast Florida Regional Climate Change Compact. Also discuss any actions FPL intends to take based on, or consistent with, the Compact's data and reports. How, if at all, does this effort impact the combined license application?

Staff Response: The Staff notes that the components of the Comprehensive Development Master Plan (CDMP), as adopted by the Miami-Dade Board of County Commissioners are available at http://www.miamidade.gov/planning/cdmp-adopted.asp (last visited September 9, 2017) (providing the CDMP adopted components including amendments adopted through November 18, 2015).

a. Miami-Dade County Zoning Resolution No. Z-56-07, and specifically Condition No. 21, is not discussed in FPL's application. The Staff did not consider Miami-Dade County Zoning Resolution No. Z-56-07, and specifically Condition 21, as part of its environmental and safety reviews. The Staff notes that the Southeast Florida Regional Climate Change Compact (SFRCC) is primarily a local-area refinement of projections from the federal agencies and the Intergovernmental Panel on Climate Change.

   While the Staff considered sea level projections by the federal government for the analysis (FSER Section 2.4.5.4.4), it did not evaluate those refined by the SFRCC. The Staff considered sea level rise data from federally maintained tide gauges as part of Staff's review of FPL's design basis flood height for the storm surge flood-causing mechanism. The maximum water surface elevation for flooding from storm surge is an elevation of 24.8 ft, resulting from the PMH analysis. Since the site grade is an elevation of 26 ft, the Turkey Point site grade is higher than the 100-yr flood or a Category 3 hurricane surge event discussed as part of the CDMP (page VII-14). The Turkey Point storm surge analysis incorporating a Category 5 hurricane (i.e., the PMH) results in a much higher water level elevation (24.8 ft) than would result from a Category 3 hurricane surge event or a 100-yr flood. As more fully discussed in Staff's response to Question 5, data available to date indicates that the 2017 hurricanes did not generate storm surges in excess of the PMH. As such, the storm surge of historical record in Florida remains 15.4 feet for Hurricane Andrew in 1992.

b. [FPL answer].

16. The NRC received comments from the Cities of Miami and South Miami, Miami-Dade County, and Florida Senator José Javier Rodríguez about the potential consequences of sea level rise during the license term if sea level rise is greater than the levels assumed in the application.

a. Discuss the likelihood of a radiological incident requiring evacuation occurring coincident with a local flooding event at Turkey Point.

b. How (if at all) would sea level rise during the license term that is greater or more accelerated than assumed by FPL impact emergency planning (e.g., road accessibility)?

c. Have the Staff and FPL considered whether any design assumptions are vulnerable to a sea level rise greater or more accelerated than the rate assumed by FPL in its application? If so, discuss those assumptions and how potential impacts would be ameliorated or otherwise addressed.

d. Applicant: What process does FPL plan to use to ensure the safety of Units 6 and 7 if sea level rise exceeds the assumptions used in the application during the license term?

Staff: What regulatory processes could the NRC use to ensure adequate protection of public health and safety in such a scenario?

Staff Response: The Turkey Point site grade is higher than the design basis flood elevation for storm surge. Therefore, all safety-related structures, systems, and components are expected to remain functional during and after an external flooding event. The Staff response to part c of this question addresses future monitoring of challenges to the design basis storm surge flood elevation. The Staff response to part d addresses how the Staff would act if such challenges actually arise while the plant is operating. The Staff response to Question 17 includes additional details on the coping capability of the plant.

a. In the Staff's judgment, a design-basis flooding event coupled with a radiological event warranting evacuation is a small fraction of the baseline core damage frequency for the AP1000. As for the AP1000 design's core damage frequency, NUREG-1793, Supplement 2, documents the Staff's conclusion that the AP1000 design meets the NRC's safety goals and represents an improvement in safety over PWRs designed before those goals were published. Evacuation is discussed below and in the Staff's response to part b. In the event that offsite power becomes unavailable during a design-basis flooding event, installed systems in robust structures are sufficient to keep the core cooled. These structures are designed to protect key systems from flooding.

   At Turkey Point, evacuation in response to an impending hurricane is far more likely than evacuation for a radiological event. State and local officials typically implement a weather-related evacuation of the public in advance of a severe weather event, before evacuation routes would be affected. One of the lessons learned from Hurricane Andrew (1992) was the value of ensuring that reactors are shut down in accordance with licensee procedures in anticipation of a hurricane that could result in flooding. This makes a release less likely and reduces the consequences if a release does occur. Further, the AP1000 design is robust in regard to preventing radiological accidents.

Accordingly, it would be highly unlikely that a radiological incident warranting evacuation would occur coincident with a design basis flooding event at the Turkey Point site.

b. Sea level rise during the license term that is greater or more accelerated than assumed by FPL could impact emergency planning if the additional sea level rise affected the established evacuation routes surrounding the Turkey Point site. In particular, sea level rise could affect the Evacuation Time Estimate (ETE) report required by 10 CFR 50.47(b)(10). The ETE report for the Turkey Point COL application, which supplements the Emergency Plan for Turkey Point Units 6 and 7, identifies the road network and capacities surrounding the site that would provide State and local governments with site-specific information needed for protective action decision-making. Pursuant to 10 CFR Part 50, Appendix E, Section IV, any impacts on the evacuation road network would be evaluated by the licensee to determine if the ETEs should be updated. Such impacts would include consequences of sea level rise during the license term.

   The regulations in 10 CFR Part 50, Appendix E, Section IV require updates to ETEs, and 10 CFR 50.54(q)(2) requires the licensee to follow and maintain the effectiveness of the emergency plan. In addition, the Federal Emergency Management Agency (FEMA) provides for continual assessment of offsite preparedness, which is addressed in the FEMA "Program Manual – Radiological Emergency Preparedness" (FEMA P-1028, January 2016). This is commonly referred to as the "FEMA REP Manual," which serves as the principal source of policy and guidance for the FEMA REP Program. Provisions for continual maintenance and assessment of emergency plans are further addressed in the Staff's response to Question 4.f.

c. The Staff did consider sea level rise as part of storm surge in the design basis flood evaluation. No other design basis parameter is affected by sea level rise. The design basis flood height for the flood caused by storm surge is elevation 24.8 ft while the design plant grade elevation is 26 ft. The value of the design basis flood height is not vulnerable to a sea level rise greater or more accelerated than the rate assumed by FPL in its application because sufficient conservatism is included in the storm surge estimate. Although an assumption was made regarding sea level rise over the expected plant life, sea level rise is but one component of the overall design basis flood height for storm surge. Calculation of storm surge includes other conservatisms in hurricane parameters, coincident high tide, and wind wave runup. Accordingly, the design basis for flooding from storm surge is reasonably conservative for proposed Units 6 and 7. Based on the Staff's evaluation of the data available as of September 30, 2017, for the recent 2017 tropical storm and hurricane events, the Staff determined that the design basis analyses for storm surge, as documented in the Turkey Point Units 6 and 7 FSAR, remain conservative and bounding. Additional information regarding the recent tropical storm and hurricane events as they relate to storm surge is set forth in the Staff response to Question 10.

d. Regarding future sea level rise changes, the Staff has developed a framework in SECY-16-0144, "Proposed Resolution of Remaining Tier 2 and 3 Recommendations Resulting from the Fukushima Dai-Ichi Accident" (ADAMS Accession No. ML16286A552), to ensure ongoing assessment of natural hazard information that expands upon the concepts described in SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations" (ADAMS Accession No. ML15254A008). The framework outlined in SECY-16-0144 provides a graded approach that allows NRC to proactively, routinely, and systematically seek, evaluate, and respond to new information

on natural hazards, including increased sea level elevations. Under this framework, the Staff will collect, aggregate, review, and assess information related to natural hazards on an ongoing basis. The Commission approved the framework in Staff Requirements Memorandum SRM-SECY-16-0144. The Staff is in the process of developing infrastructure to support implementation of the framework.

17. Section 20.1 of the FSER states that following an initial 72-hour coping period, support is necessary to continue passive system cooling and that, in some cases, the support will be provided by installed ancillary equipment (RTNSS equipment). The FSER states that the installed ancillary equipment is capable of supporting passive system cooling for 3 to 7 days after the event.

Describe whether the ancillary (RTNSS) equipment referred to in Section 20 of the FSER will be contained in structures that are protected from all natural hazards for the licensing and design basis of Turkey Point Units 6 and 7. If not, provide an explanation as to why this equipment does not need to be protected from such external events. Is the onsite equipment for mitigating the effects of 10 C.F.R. § 50.54(hh)(2) stored in structures designed to withstand all natural hazards for Turkey Point Units 6 and 7? If not, provide an explanation as to why this equipment does not need to be protected from such external events.

Staff Response: The installed ancillary equipment referred to in Chapter 20 of the Turkey Point Units 6 and 7 FSER, "Requirements Resulting from Fukushima Near-Term Task Force Recommendations" (ADAMS Accession No. ML16266A198), is not protected from all beyond design basis natural hazards. The Turkey Point Units 6 and 7 Chapter 20 FSER, states that "following the 72-hour passive system coping time, support is necessary to continue passive system cooling. From 3 to 7 days, this support can be provided by installed plant ancillary equipment or by offsite equipment installed to connections provided in the AP1000 design." (Emphasis added.) The availability of offsite equipment allows the plant operator to maintain core and spent fuel pool cooling and containment function after the 72-hour coping time.

The Turkey Point Units 6 and 7 Chapter 20 FSER references NEI 12-06, Revision 0, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," (ADAMS Accession No. ML12242A378), which was endorsed by the NRC in JLD-ISG-2012-01, Revision 0, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ADAMS Accession No. ML12229A174).

As indicated in Appendix F, "Guidance for AP1000 Design," of NEI 12-06, Revision 0:

> [E]quipment relied upon to support FLEX implementation does not need to be qualified to all extreme environments that may be posed, but some basis should be provided for the capability of that equipment to remain functional or to be easily repaired. Equipment that is stored far enough from the site such that it would not be subjected to the hazard that affected the site need not be designed or qualified for any of the assumed hazards. In addition, the storage arrangements (building, etc.) would not be required to have any hazard capability. Since AP1000 has a 72-hour passive system coping time, there is significant time to transport equipment from off-site. Use of more than one storage

location is not necessary as long as the storage site is far enough away from the site(s) such that the same extreme hazard could not affect both the plant(s) and the storage location. In this way, the storage location would not be required to be built to nuclear safety standards for hazard protection. This approach is reasonable considering the small number and size of the equipment needed for AP1000 long term passive system cooling, and the significant coping period provided by the AP1000 before the equipment would be needed.

The Staff further notes that in 2014 the nuclear industry officially opened two National Response Centers: in Memphis, Tennessee, and Phoenix, Arizona. These response centers, which are geographically distant from each other and from the Turkey Point site, help U.S. nuclear power plants meet the requirements of the NRC's Mitigation Strategies Order EA-12-049, issued after the Fukushima accident. These centers contain portable extra equipment to duplicate plants' emergency diesel generators, pumps, and so on. This equipment would maintain plant safety functions for an indefinite period. The Strategic Alliance for FLEX Emergency Response (SAFER) is managing the response centers. SAFER has completed two exercises to demonstrate to the NRC they can get backup equipment to any site within 24 hours.

Regarding compliance with 10 CFR 50.54(hh)(2), the equipment that is relied on to satisfy 10 CFR 50.54(hh)(2) is not required to be stored in structures designed to withstand all natural hazards because it is designed to assist in the mitigation of one particular beyond-design-basis scenario: loss of large areas of the facility due to fires or explosions. Protection of the plant against natural hazards is addressed by other requirements.

18. In FSER § 11.2.4 and in RAI 6985, Question 11.02-6, the Staff stated that there is a need to ensure that NRC and Florida Department of Environmental Protection requirements, when issued, do not conflict or impose duplicative requirements, such as for radiological monitoring, periodic inspections and testing in confirming the mechanical integrity of the injection and monitoring wells, and requirements for well abandonment and closure at the end of their operational cycles or in the event of well failures and migration of radioactive materials into the Upper Floridan Aquifer. The Staff also noted the potential need for the inclusion of specific license conditions on the design features of injection and monitoring wells whose construction would not be completed before the issuance of the combined licenses.

<u>Staff</u>:

a. How were issues related to the potential for duplicative or conflicting requirements and the potential need for license conditions on the design features for the injection and monitoring wells resolved?

b. Where is the resolution documented?

c. What, if any, role will the NRC have with respect to oversight and inspection of the deep well injection system operation? Would that role change in the event of a system malfunction that releases radioactivity to the Upper Floridan Aquifer?

Staff and Applicant:

d. Are additional radiological monitoring and recordkeeping necessary to ensure that cumulative radionuclide concentrations are not exceeded over the lifetime of the plant?

e. Will FPL implement the NEI ground water protection initiative as detailed in NEI-07-07, "Industry Ground Water Protection Initiative – Final Guidance Document," for Turkey Point Units 6 and 7, and will that guidance be applicable to the deep well injection system?

Staff Response:

a. The Florida Department of Environmental Protection (FDEP) administers the Underground Injection Control program under authority delegated from the U.S. Environmental Protection Agency (EPA). The FDEP Underground Injection Control program requirements for injection and monitoring wells are comprehensive, and include provisions on piping integrity and leak detection up to the injection point. At the outset of the review, the Staff determined there was a potential for those FDEP requirements to duplicate or possibly conflict with NRC requirements. To address this matter, the Staff compared the FDEP requirements for the injection and monitoring wells to NRC requirements and determined that the FDEP requirements related to piping integrity and leak detection up to the point of injection do not duplicate any NRC requirements.

   In conducting its review, the Staff considered the need for license conditions on the design features of injection and monitoring wells whose construction would not be completed before the issuance of the combined license. The RAI responses from FPL demonstrated that NRC regulatory requirements were satisfied (see FSER pages 11-20 through 11-36). Accordingly, the Staff determined that NRC license conditions were not necessary to govern the injection and monitoring wells.

b. The resolution of issues related to the potential for duplicative or inconsistent NRC and FDEP requirements is not documented because the information FPL provided in response to the RAI 6985, Question 11.02-6, showed that FDEP requirements did not impede FPL from complying with NRC requirements applicable to liquid radioactive effluents.

c. The Staff concluded that significant upwelling of injected effluent is not likely at the Turkey Point site. If upwelling did occur, it would not impact the overlying Upper Floridan aquifer (FEIS Section 5.2.1.3). Although the NRC oversees the liquid effluents discharged to the deep well injection system, the NRC has no role in the oversight and inspection of the deep well injection system operation. The applicant is responsible for meeting all FDEP requirements in this regard. FDEP, using authority delegated from the EPA, also specifies actions to take in the event that a well malfunctions and releases water to the Upper Floridan aquifer. Should there be a failure or system malfunction, the applicant has indicated that 11 wells (9 active and 2 backup) are sufficient for disposal of the liquid effluents. If groundwater monitoring detects an upwelling of the injected fluid, FPL is required to report this information to the FDEP. Based on the nature of the problem, FPL would remove the problematic wells from service, investigate the problem, and repair the problematic wells. FPL must comply with the remedial measures set by FDEP, and if plugging and abandonment is required, FPL must follow the requirements

imposed by FDEP. Well plugging and abandonment procedures are described in the applicant's response to RAI 6985, Question 11.02-6.

In addition, the effluent released via deep well injection must meet the effluent concentration limits specified in 10 CFR Part 20, Appendix B prior to discharge. The Staff confirmed the information provided by the applicant meets the criteria described in 10 CFR 20.2002 and verified the FPL analysis that supports the conclusion that liquid radioactive effluents will result in doses less than "a few millirem/yr," in conformance with SECY-07-0060 "Basis and Justification for Approval Process for 10 CFR 20.2002 Authorizations and Options for Change" (ADAMS Accession No. ML062050587).

d. No additional NRC requirements are necessary. The Staff's confirmatory analysis shows that the expected normal effluent releases are below the dose objectives specified in 10 CFR Part 50, Appendix I, and the effluent concentration limits specified by 10 CFR Part 20, Appendix B are met prior to discharge using this method of disposal.

e. Yes, FPL will implement portions of NEI 07-07, "NEI Groundwater Protection Initiative NEI Peer Assessment Report" (ADAMS Accession No. ML101930553), as documented in FSAR Appendix 12AA. FSAR Appendix 12AA refers to and adopts NEI 08-08A, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination" (ADAMS Accession No. ML093220530) for a description of the groundwater monitoring program. NEI 08-08A refers to NEI 07-07, Section 1, and its provisions for developing procedures or programs in accordance with the Groundwater Protection Initiative. The guidance in Section 1 of NEI 07-07 is applicable to deep well injection.

19. The National Park Service (NPS) participated in the environmental review as a cooperating agency under a July 2, 2013, Memorandum of Agreement by providing special expertise for the areas in and around the adjacent national parks (Biscayne and Everglades National Parks).

a. Summarize the input and comments the NPS provided the Staff with respect to its area of expertise and discuss how this information was considered in the environmental review with respect to impacts to the Biscayne and Everglades National Parks.

b. The FEIS states that the NPS issued its own EIS and Record of Decision for a related action on March 16, 2016. Given that the NPS was a cooperating agency, why did the two agencies prepare and issue separate EISs?

c. Although it served as a cooperating agency in preparation of the FEIS, as evidenced by its comments on the FEIS NPS continues to have significant concerns with the proposed action. Discuss how the Staff took into account NPS's views as it was preparing the FEIS.

Staff Response:

a. The National Park Service (NPS) comments with respect to the Biscayne and Everglades National Parks were related to water quality and associated cumulative impacts from the industrial wastewater facility (IWF); the quality of hydrologic modeling used to evaluate the radial collector wells; the impacts to the Comprehensive Everglades Restoration Plan (CERP) and the Biscayne Bay Coastal Wetlands (BBCW) projects; and consideration of threatened and endangered fauna and flora (more detailed information

can be found in Appendix E of the FEIS). Regarding water quality, the Staff, along with members of the NPS team, met with State and local authorities to discuss FPL's plans to use reclaimed water as a primary source of water for cooling, as well as plans to use water from underneath Biscayne Bay through the backup radial collector well system (RCW). The Staff and NPS met regularly with the U.S. Geological Service (USGS) and Pacific Northwest National Laboratory to generate the input and output parameters used to run the model included in the draft environmental impact statement (DEIS), which evaluated the surface and ground water effects of running the RCWs on the surrounding hydrological environment, including the Biscayne and Everglades National Parks. Based on comments from NPS and others regarding CERP and BBCW, the Staff undertook a more detailed groundwater modelling study for the FEIS. Experts from NPS were directly involved in development of the scenarios that the Staff included in the modeling study. A regular series of both online and face-to-face meetings were conducted to brief and solicit comments from the NPS experts throughout the period of the modeling effort. Modeling scenarios included conditions proposed as possible mitigations associated with CERP and BBCW, such as increased recharge to the west of the site to see if the operations of the RCWs would reduce the efficacy of these mitigations. Finally, the Staff and NPS team members discussed how each applicable threatened and endangered species would be dispositioned in the environmental impact statement (EIS) as well as the Staff's February 2015 Biological Assessment, written in support of Section 7 Endangered Species Act consultation.

b. The two agencies prepared and issued separate EISs because the process and schedule each agency uses to implement the National Environmental Policy Act (NEPA) differed enough that keeping the reviews separate was the better course of action. Additionally, the NPS EIS addressed the potential environmental impacts from the NPS's exchange of FPL-owned land within the Everglades National Park boundary as well as the indirect impacts that could result from the subsequent construction and operation of transmission lines either inside or outside the park boundary as a result of the land exchange alternative selected. The land exchange between NPS and FPL is outside of the NRC's regulatory purview, and thus the NRC's EIS did not include this information.

c. The Staff took NPS's views into account throughout the environmental review process, including the pre-application phase. As a result of NPS's input, the Staff's review examined in greater detail certain aspects within the scope of the EIS and performed additional analysis in response to NPS's comments as discussed in Staff's response to part a of this question. Additionally, NPS participated as a member of the team by working directly with the various NRC subject matter experts during scoping and the development of the EIS. NPS was also involved in NRC interactions with the applicant and various State and local agencies. The Staff also held numerous meetings both in person at the NPS offices in South Florida and via telecom with members of the NPS team to discuss NPS concerns. NPS received preliminary copies of the appropriate sections of the draft EIS as well the final EIS for review and comment.

20. a. Provide any updates or changes to the Staff's list of authorizations, permits, and certifications since the publication of the FEIS. Include an update on the status of the State's Conditions of Certification, as SECY-16-0136 noted that a Florida state court's April 20, 2016, decision, in which it ruled that the Florida Siting Board should have considered whether to require FPL to bury a portion of the transmission lines and that the record was inadequate to support certain

mitigation measures associated with transmission lines in the East Everglades, has become final.

b. SECY-16-0136 further states that the Staff "has considered these circumstances and determined that even if the Conditions of Certification are revisited on remand, it remains reasonable to expect that Conditions of Certification similar to or no less effective than those originally issued will be in place before construction and operation of the proposed units begins." Explain this assumption in more detail, and describe the Staff's basis for continuing to rely on the imposition of these conditions in evaluating environmental impacts.

Staff Response:

a. Since publication of the FEIS in October 2016, the only update to the information in FEIS Appendix H is the information the Staff received from the U.S. Fish and Wildlife Service (FWS) with regard to the conclusion of Section 7 consultation for the Endangered Species Act. Consultation was completed via a Biological Opinion (BO) issued by the FWS on June 23, 2017. Regarding the remand on the FDEP Conditions of Certification for the Turkey Point Units 6 and 7 project, the decision became final on November 22, 2016, as stated in SECY-16-0136, "Staff Statement in Support of the Uncontested Hearing for Issuance of Combined Licenses for Turkey Point Units 6 and 7 (Docket Nos. 52-040 and 52-041)" (ADAMS Accession No. ML16237A433), and the only update in status is that the Florida Supreme Court denied a motion for a stay on February 24, 2017.

b. The Staff continues to rely on the Conditions of Certification in evaluating the environmental impacts because 1) the court remand affected only a small scope of the environmental review pertaining to the proposed Eastern Everglades section of the Western Consensus transmission line corridor; and 2) the Staff expects that the State will respond to the remand by establishing revised Conditions of Certification calling for mitigation measures for the subject transmission lines that are substantially similar to those originally imposed, or more restrictive. The court ruling indicated the Conditions of Certification were inadequate in certain respects; therefore, the Staff expects additional rather than fewer mitigation measures would result. Any additional required mitigation measures would not change the Staff's conclusions in the FEIS. Nonetheless, as a result of the court ruling, the Staff expanded its discussion in FEIS Section 4.1.2.1 of possible adverse effects from building the transmission lines on local communities compared to DEIS Section 4.1.2.1. FEIS Section 4.1.2.1 acknowledges that the Staff was aware of the court decision to remand but expected that any ultimate response would establish revised mitigation measures for the transmission lines in the Conditions of Certification "similar to or no less effective than those originally issued" (FEIS at page 4-17).

21. Under the Florida State Conditions of Certification, use of the Radial Collector Wells (RCWs) would be limited to a maximum of 60 days per year. The U.S. Geological Survey (USGS) examined a 90-day pumping scenario for the RCWs.

a. Staff and Applicant: Does either the Staff or FPL envision using the RCWs for 90 days?

b. Staff: Does the Staff anticipate a limit on use of the RCWs being included in the USACE permit?

Staff Response:

a. No. In view of the 60-day per year limit on RCW use in the Conditions of Certification, the Staff does not envision use of the RCWs for 90 days per year. The Staff used three models, including the USGS model, in order to evaluate the impacts of pumping the RCWs. The Staff used each model to evaluate a variety of pumping scenarios. The Staff evaluated a 90-day pumping scenario using the USGS model before FDEP imposed the 60-day RCW pumping limit in the Conditions of Certification. The Staff evaluated pumping scenarios at more than the 60-day limit set forth in the Conditions of Certification (90 days of pumping and continuous pumping) to understand the sensitivity of the system, as discussed in FEIS Appendix G.3.2.2.

b. The FDEP Conditions of Certification limit FPL's use of the RCW system to 60 days per year. Should the U.S. Army Corps of Engineers (USACE) grant FPL's request for a Department of the Army permit, the 60-day per year limit on the use of the RCW system in the Conditions of Certification would become a condition on the Department of the Army permit in accordance with the Clean Water Act. *See* 33 U.S.C. § 1341(d).

22. Although the proposed RCWs would be used for emergencies only, both the NPS and the EPA state that they are concerned about a potential scenario where the RCWs would be used for a longer period of time.

Explain whether such a scenario was considered and evaluated by the Staff. If it was considered and evaluated, discuss the analysis and results. If not, why not?

Staff Response: Yes, although the pumping period and amount of water withdrawn from the wells would be limited by the FDEP's Conditions of Certification to 60 days or less per year, the Staff did consider continuous operation of the RCWs as part of the bounding sensitivity analysis. The Staff notes that, per the AP1000 design, neither the primary (reclaimed water) nor backup water (RCWs) are safety-related, and, as such, would not be relied upon in a transient or in response to an emergency, such as a design basis accident or severe accident. The Staff's sensitivity analysis indicates that there were only minimal changes to water chemistry and availability between the no operation, 60-day, 90-day and continuous operation (365-day) scenarios. These results are discussed in Appendix G.3.2 of the FEIS.

23. Section 2.6.1 of the FEIS identifies the Staff's efforts to identify and evaluate environmental justice populations. The EPA commented on the Staff's environmental justice analysis and, among other things, expressed concern with the Staff's outreach and communication efforts with respect to minority and low-income populations and other individuals, particularly where those populations may have limited English proficiency. Noting that the FEIS was not revised in response to its comments, the EPA reiterated its concerns in its comments on the FEIS.

In its response to the EPA's comments on the DEIS (FEIS app. A at E-322), the Staff states that "Recommendations for meaningful outreach and involvement of the local communities [are] outside the NRC's NEPA and Executive Order 12898 requirements." In view of the EPA's comments, discuss how the Staff conducted

its environmental justice review for the Turkey Point combined license application, including how it determined that the impacts considered (including those designated as SMALL) would not lead to a disproportionately high and adverse human health or environmental effects, and how this review satisfied NEPA.

Staff Response: The Staff's review of environmental impacts for new reactor license applications is based on the requirements of 10 CFR 51.71(d) (complying with governmentally-imposed environmental quality standards and requirements), 10 CFR 52.18 (reviewing applications for early site permits), 10 CFR 52.81 (reviewing applications for combined licenses), 10 CFR 100.10 (site acceptance), and Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," (impacts on minority and low-income populations). In accordance with Commission direction, the NRC fulfills its environmental justice (EJ) obligations through NEPA. *See* Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions, 69 Fed. Reg. 52,040 (Aug. 24, 2004) (final policy statement).

The Staff implements these regulations through the ESRP, which is Staff's primary guidance for environmental impact analyses. The EJ guidance described in these documents is further guided by NRC's EJ process set forth in the Office of Nuclear Reactor Regulation, Office Instruction LIC 203, Revision 3, "Procedural Guidance for Preparing Categorical Exclusions, Environmental Assessments, and Considering Environmental Issues" (ADAMS Accession No ML12234A708). Office Instruction LIC 203 references portions of EO 12898 and the Council on Environmental Quality's (CEQ's) guidance, "Environmental Justice: Guidance under the National Environmental Policy Act*" (*1997), that are within the scope of the NRC's authority and provides a methodology for identifying EJ populations of interest (i.e., EJ communities where further review is needed). Updates to the Staff's EJ analysis process are described in ISG-026 "Combined License and Early Site Permit COL-ESP-ISG-026 Environmental Issues Associated with New Reactors" (ADAMS Accession No. ML14100A665).

The Staff adheres to its guidance documents for its assessment of (and outreach to) EJ populations for all environmental impact analyses. The Staff's guidance documents instruct Staff to use the Site Audit process (and other site visits as needed) to perform "boots-on-the-ground" assessments of the location of EJ populations, their general socioeconomic and environmental characteristics, and to identify and evaluate potential EJ populations of interest that may have been overlooked in a simple Census search. This is done through Staff interviews of local officials and first responders, local civic and humanitarian organizations, minority oriented churches, and minority business leaders. This extensive field work process ensures that the Staff's EJ assessment is thorough and inclusive of all EJ communities and that EJ populations have had an additional opportunity to address their concerns to the NRC.

The Staff followed this guidance in fulfilling its EJ responsibilities for the Turkey Point Units 6 and 7 COL review. Consideration of limited English proficiency was handled throughout these interactions by employing bilingual Staff and interpreters at all points of interaction with the public. The Staff performed a very detailed outreach and communication effort for the Turkey Point EJ assessment by: (1) using Census information to identify EJ populations of interest; (2) sending a bilingual team of Staff to the local area on four occasions to interview local government leaders, business leaders, philanthropic organizations, minority religious leaders, and local minority businesses and support organizations (such as the Seminole Tribe of Florida, ASPIRA of Florida, Inc., and M.U.J.E.R. Inc. (Mujeres, Unidas, en Justicia, Educacion, y

Reforma, which translates to Women, United in Justice, Education, and Reform—a non-profit community-based social service organization located in Homestead, FL)) about physical and socioeconomic impacts on EJ populations; (3) conducting over 20 meetings with community members over the 7 years of the FEIS development, including pre-meeting announcements in both English and Spanish in all local news sources, including newspaper, radio, and television advertisements, and through local fliers and bulletin board invitations; (4) reviewing the applicant's EJ information in the ER; and (5) analyzing and processing the results of these activities into a concise assessment of potential EJ impacts. Much of this comprehensive review is detailed in FEIS Sections 4.5 and 5.5; additional information can be found in the Turkey Point public record.

After reviewing the evidence presented in the various sections of these chapters, and after considering any special pathways through which EJ populations of interest could receive a disproportionately high and adverse impact, the review team did not identify any adverse impacts on any EJ populations. The discussion of Staff's EJ analysis and conclusions detailing the location and magnitude of each potential impact can be found in the FEIS in Sections 4.5 and 5.5, and in the Turkey Point public record.

For clarification, the NRC's EJ analysis does not lend itself to a "SMALL, MODERATE, or LARGE" determination of impacts. Rather, EJ impacts are a binary assessment and the Staff, through its guidance in ISG-026, makes a determination of "NONE" when no EJ population is found to have the potential for an EJ impact; and POTENTIAL when there is found to be evidence such impacts could occur. Accordingly, Staff determined NONE of the construction-related and operations-related pathways identified in the Turkey Point FEIS had the potential for imposing disproportionately high and adverse impacts on any EJ population.

EPA's comment (FEIS Appendix E page E-322) makes a number of recommendations to Staff on how to engage with the community surrounding Turkey Point over the course of the project. However, the Atomic Energy Act, NEPA, and Executive Order 12898 do not grant NRC authority over environmental activities beyond the licensing process. Once the NRC has issued a licensing decision, further community outreach pursuant to NEPA and Executive Order 12898 is outside the scope of NRC's authority. In other words, although the EJ requirements continue until a licensing decision is made, the NRC's responsibilities for EJ involvement do not extend to activities during construction, operation, and decommissioning. Therefore, the Staff considers its process and the evaluation of impacts in the FEIS sufficient to fulfill its EJ responsibilities under NEPA and Executive Order 12898.

24. The U.S. Army Corps of Engineers (USACE) was designated as the lead federal agency for the National Historic Preservation Act (NHPA) Section 106 process. The FEIS states that the "USACE's NHPA Section 106 consultation for this project has been completed with the exception of the transmission line consultation with the SHPO [State Historic Preservation Officer] and the THPOs [Tribal Historic Preservation Officers] for STOF [Seminole Tribe of Florida] and the Miccosukee Tribe[,] which is ongoing." FEIS at 4-123. The FEIS further states "that the impacts from the construction and preconstruction activities for the proposed transmission lines and other offsite activities would be MODERATE with the potential for greater impacts. This finding was based on (1) the large number of known NRHP [National Register of Historic Places]-eligible or potentially eligible resources that are located in the offsite areas and (2) USACE's ongoing NHPA Section 106 consultation with the Florida SHPO and [f]ederally recognized tribes."

Id. at 4-124. The FEIS, however, clarifies that in accordance with 10 C.F.R. § 50.10(a)(2)(vii), "transmission lines are not included in the definition of construction and are not an NRC-authorized activity. Because of this, the NRC staff concludes that the potential impacts on historic and cultural resources from NRC authorized construction activities would be SMALL." Id. at 4-125.

Discuss the Staff's involvement with the Section 106 consultations that the USACE has yet to carry with respect to transmission lines.

Staff Response: FEIS Section 2.7.3 discusses the status of the consultation up to issuance of the FEIS. As discussed in FEIS Section 2.7.3, in 2015, both NRC and USACE conducted two government-to-government meetings regarding the proposed transmission line corridors with the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida in June 2016 (ADAMS Accession Nos. ML16266A254 and ML16266A255, respectively). The Staff's involvement following the issuance of the FEIS with the USACE's Section 106 consultation has been to discuss the status of the Section 106 consultation with the USACE on a bi-weekly basis. The USACE has kept the Staff informed of its progress on its consultation. The USACE informed the Staff that consultation with the Tribes is complete (ADAMS Accession No. ML17296A888).

25. A general license for an independent spent fuel storage installation (ISFSI) is issued under 10 C.F.R. § 72.210 to all combined license holders.

a. While there is already an ISFSI at the Turkey Point site, did the Staff explicitly consult with the SHPO and Tribes on the issuance of a general license to the Applicant for an ISFSI at the Turkey Point site, given the potential need for expansion of the current facility?

b. If the Staff did not inform the SHPO and Tribes about the general license for an ISFSI during consultation, did the Staff inform them after consultation? If so, what was their response?

c. If the Staff did not inform the SHPO and Tribes of the general license for an ISFSI during consultation, explain why the Staff's NHPA consultation was adequate.

d. What requirements or procedures would ensure that historic and cultural resources are adequately protected if FPL constructs an additional ISFSI or expands the existing ISFSI?

a. The Staff carried out its NHPA consultation consistent with NRC guidance. During consultation with the SHPO and Tribes, the Staff did not explicitly discuss the issuance of a general license to FPL for an independent spent fuel storage installation (ISFSI) for Turkey Point Units 6 and 7. The Staff did, however, reference this information as a part of the consultation record and, as discussed in the response to part b below, conducted additional post-consultation outreach to the SHPO regarding the availability of an ISFSI general license to FPL for Turkey Point Units 6 and 7 if the COLs are issued.

b. Yes. With regard to the action before the NRC, consultation was complete on May 22, 2015. After consultation, as an extra outreach step, on August 11, 2016, the Staff from the NRC and the USACE conducted a teleconference with the SHPO (Florida Division of Historical Resources). The purpose of this teleconference was to (1) provide an

overview and status of the environmental and Section 106 reviews; (2) inform the SHPO of the impending issuance of the FEIS; and (3) describe how, under 10 CFR 72.210, a general license is issued for the storage of spent fuel in an ISFSI at power reactor sites. The Staff stated that per NRC regulations, the ISFSI has to be built onsite. The Staff discussed identification efforts completed to date, confirming that no National Register-eligible sites had been identified on the Turkey Point site. The Staff stated that the applicant will follow an inadvertent discovery procedure which includes a stop work provision should any resources be encountered during construction or operation of the proposed facility. In response, the Florida SHPO expressed no concerns. The Staff did not make a similar post-consultation call to the Tribes.

c. The Staff's NHPA consultation covered the entire area of potential effect (APE) associated with the Turkey Point Units 6 and 7 project, consistent with NHPA's requirements. The APE for any future generally-licensed ISFSI is within the APE for the power reactors because the ISFSI must be located on site (10 CFR 72.210) and in a protected area (10 CFR 72.212(b)(9)(ii)). Accordingly, the consultation on the APE for the entire Turkey Point site adequately addresses any APE associated with a future ISFSI, including any associated expanded or new protected areas for the ISFSI allowed under 10 CFR 72.212(b)(9)(ii). Last, the Staff notes that the general license for the ISFSI is listed in FEIS Appendix H as a license authorized if a COL is issued.

d. Should FPL decide to construct an additional ISFSI or to expand the existing ISFSI, FPL will have procedures in place to protect historical or cultural resources. The USACE will add a condition to its permit to require that FPL have an inadvertent discovery process, pursuant to 36 CFR 800.13. This process is described in FEIS Section 4.6.

26. FPL has committed to undertake wetland mitigation projects, including the Northwest Restoration Project, which entails rehabilitating the vegetation on 238 acres, three years of monitoring, and preservation of the acreage under a conservation easement, and the SW 320th Street Restoration Project. Describe the SW 320th Street Restoration Project, including FPL commitments with respect to: activities, duration of activities, and long-term preservation of land.

Staff Response: The SW 320th Street Restoration Project is described in the "Turkey Point Units 6 and 7 Mitigation Plan, Rev 2 (USACE Supplement)" prepared by the applicant and dated August 2012 (ADAMS Accession No. ML16216A222). This proposed wetland mitigation project consists of restoring and enhancing 574 acres of existing tidal wetlands on property owned by the applicant approximately 4 miles northwest of the Turkey Point Units 6 and 7 site. Specific activities outlined for the project include "the removal of exotic species of vegetation, removal of ditches to restore natural topography and enhance hydrology, supplemental planting of desirable native wetland vegetation, and preservation through a conservation easement" (Mitigation Plan at p. 26). These activities are similar to those that the applicant proposed for the Northwest Restoration Project. The plan does not specify the timing or duration of mitigation activities. The land for SW 320th Street Restoration Project will be preserved through a permanent conservation easement, as specified in the plan.

27. The FEIS states that Units 6 and 7 are proposed to be constructed on an area known colloquially as "Mud Island." The FEIS further explains that this "area is predominantly a mudflat, which is a special aquatic site according to the 404(b)(1) Guidelines. Special aquatic sites have special ecological characteristics that

significantly influence or positively contribute to the general overall environmental health or vitality of the entire ecosystem of a region." FEIS at 4-5. The FEIS, however, notes that the "USACE will consider this designation during the review of the DA [Department of the Army] permit application." *Id.*

a. Explain whether and how this designation was considered in the Staff's environmental review.

b. Explain whether the Staff will need to take any additional steps following the USACE's review of the DA permit application.

The FEIS explains that "Miami-Dade County and cities within the county have raised issues related to the aesthetic compatibility of parts of the proposed new transmission lines with some urban areas. In addition, NPS has raised compatibility questions regarding where parts of the proposed transmission lines would be situated close to or adjacent to Everglades National Park." FEIS at 5-5.

c. Explain how the Miami-Dade County and National Park Service comments on the location of the transmission lines were considered by the Staff in its environmental review process.

Staff Response:

a. The Staff addressed impacts to wetlands and other "special aquatic sites" covered under the Section 404(b)(1) guidelines under the Clean Water Act using the general term "wetlands" in sections of the FEIS addressing terrestrial ecological resources. Section 4.3.1 of the FEIS characterizes the 218 acre "mud island" as wetlands consisting mostly of non-vegetated mudflat habitat with numerous small, scattered mangrove heads and two remnant ditches and associated spoils, all with the status of regulated wetlands (FEIS page 4-38). Table 4-8 of the FEIS counts the loss of the "mud island" among the total resulting permanent losses of wetlands. The FEIS acknowledges how loss of the mud island would constitute a loss of winter foraging habitat for the threatened rufa red knot (FEIS page 4-50). Table 4-10 of the FEIS quantitatively compares the ecological and hydrological benefits of the "mud island" and other affected wetlands to the similar benefits provided by the wetland mitigation actions proposed by the applicant to the USACE. The relevant information was factored into the Staff's conclusion that building the project would result in MODERATE impacts to terrestrial resources. The Staff's evaluation of impacts to aquatic ecological resources also considers impacts to wetlands and mudflats, specifically with respect to how those impacts could affect aquatic species such as fish and the threatened American crocodile.

b. No, the NRC Staff will not have to take any additional action regarding the evaluation of impacts to wetlands and other waters of the United States following issuance of a Department of the Army permit.

c. The FEIS acknowledges that the NPS and multiple local communities raised concerns when commenting on the draft EIS over the visual compatibility of the proposed transmission lines with affected national parks and residential landscapes (FEIS at 4-15). The FEIS explains how the applicant used a systematic process recognized by the State of Florida to define the proposed transmission line corridors and how the

Conditions of Certification issued by the Florida Siting Board established reasonable mitigation measures. The FEIS also explained that portions of the state certification pertaining to the transmission lines in the East Everglades had been remanded to the state Siting Board. Finally, the FEIS states the Staff's expectation that the mitigation measures ultimately adopted for the portion of the transmission lines remanded to the Siting Board would likely be at least as effective as those required in the original Siting Board Conditions of Certification. See Staff's response to Question 20 for more information on this subject.

28. The Staff concluded that "the overall impacts of building activities on the economy in the socioeconomic impact area would be SMALL for the 50 mi region and the economic impact area, with the exception of a MODERATE, adverse impact on traffic in the Homestead and Florida City area, based upon FPL's identified mitigation strategies. The review team determined there would be a LARGE, adverse impact on traffic if the identified mitigation strategies were not implemented." FEIS at 4-119.

How does FPL plan to address the identified mitigation measures to minimize and mitigate the impacts on traffic?

[FPL answer].

29. Discuss the potential for cumulative impacts relating to saltwater intrusion and the hypersaline plume underneath the Turkey Point site, as a result of the use of radial collector wells for Units 6 and 7 in addition to the existing use of the cooling canals for Units 3 and 4.

Staff Response: Cumulative impacts to water resources resulting from the operation of the radial collector wells (RCWs) are discussed in Section 7.2 of the FEIS and specific comments are addressed in FEIS Appendix E. Saltwater intrusion from the sea into the Biscayne aquifer in southeast Florida has been documented by USGS to have been occurring since before 1939. This has resulted in elevated salinity into the groundwater in the Biscayne aquifer in the vicinity of the Turkey Point site. Because of its elevated salinity, groundwater from the Biscayne aquifer in the vicinity of the Turkey Point site cannot be used as a drinking water source without treatment. But, this saltwater intrusion from the sea is unrelated to operations at Turkey Point. Although saltwater intrusion is unrelated to operations at Turkey Point, seepage of hypersaline water from the Industrial Waste Facility (IWF) cooling canals associated with Turkey Point Units 3 and 4 has resulted in locally higher groundwater salinity near the cooling canals.

The Staff considered numerical modeling studies to assess the impacts of operation of the RCWs that included the IWF hypersaline plume. The models consistently indicated that pumping the RCWs is unlikely to cause a noticeable change in the existing extent of saltwater intrusion or significantly affect movement of the hypersaline plume. See FEIS Section 5.2.1.2.

The latest of these models, the Review Team Focused Model, evaluated the impact of the RCWs in an altered environmental baseline that included the salinity increases in the Turkey Point Units 3 and 4 cooling canal system (CCS). This model also evaluated actions proposed to freshen (reduce salinity within) the CCS and stop the movement of the hypersaline plume, as proposed by state agencies and FPL as part of the Administrative Order. See FEIS Appendix G.3.2.3.

As discussed in Appendix G.3.2 of the FEIS, the review team determined that cumulative impacts of pumping RCWs, under a range of possible future conditions, would be minimal. The EIS acknowledged that operation of the proposed RCWs installed beneath Biscayne Bay could move hypersaline water from the IWF toward the RCWs. Freshening of the CCS would result in increased piezometric heads beneath the IWF and divert eastern movement of groundwater to the north and south around the north end of the IWF and to the south away from the south end of the IWF. The fraction of the water that enters the RCW laterals from sources other than Biscayne Bay would likely increase. However, any increase in volume and concentration of the seepage from the IWF to the underlying portion of the Biscayne aquifer is not expected to have a noticeable impact on the quality of groundwater in the areas of the Biscayne aquifer. In addition, the denser hypersaline plume would remain well below the bay floor and not affect the bay.

30. FPL's primary source of cooling water for the proposed Turkey Point Units 6 and 7 would be reclaimed water from the Miami-Dade Water and Sewer Department South District Wastewater Treatment Plant. In comments to the Commission, the City of South Miami states that "Miami-Dade County has recognized the high likelihood of completely reconstructing the county's waste water systems in 30 years."

a. Have the Staff and FPL considered the possible impacts of reconstruction of the Miami-Dade waste water system on the ability to use the system as a source of cooling water during the license term?

b. If reconstruction of the system were to occur, how would it impact construction and/or operation of the proposed new units?

Staff Response:

a. Yes. The Staff discussed the reliability and continued availability of the supply of reclaimed water with FPL and the Miami-Dade Water and Sewer Department (Water and Sewer Department). In particular, the Staff discussed the Water and Sewer Department's plans for its facilities, which is documented in its Water Supply Facilities Work Plan. The Staff determined that reclaimed water from the Water and Sewer Department's South District Wastewater Treatment Plant (South District Plant) would be a reliable source of water for cooling for power generation operations for the proposed Turkey Point Units 6 and 7. Further, in accordance with Miami-Dade County Ordinance 14-79 Rule 5.09, assessments of the impact of sea-level rise on infrastructure is now a critical component of Water and Sewer Department planning. As such, the Water and Sewer Department has considered the impacts of sea-level rise on the three wastewater treatment facilities (including the South District Plant) as part of the 20-year Water Supply Facilities Work Plan. The report considered a full range of mitigation alternatives and compared the cost and effort required to implement extreme actions, such as moving the plant, to cheaper and more easily implemented actions. These more easily implemented measures include construction of large scale surge barriers, raising equipment levels, asset protection barriers (flood panels and water tight doors), and plugging of drains and sewers. These reports are part of an ongoing effort which will involve further modeling, evaluation of infrastructure impacts, and determination of mitigation strategies.

   In view of the Water and Sewer Department's efforts to focus on adaptation rather than abandonment described above, the Staff concluded in FEIS Appendix I (page I-10) that

"…any physical change in the environment from global climate change would occur at a rate slow enough that local governments could adapt to whatever negative impacts may arise." As a result, it is reasonably foreseeable that Miami-Dade County will recognize and mitigate impacts to infrastructure before they become unusable. In addition, the Water and Sewer Department has committed to supply reclaimed water to Turkey Point under the Miami-Dade County Ocean Outfall Legislation Compliance Plan, Chapter 2008-232, "Laws of Florida Wastewater Disposal/Ocean Outfalls" (June 28, 2013).

The Staff recognizes that it is typical for wastewater treatment plants to be upgraded or modified when needed. As such, the Staff did anticipate that modifications to the wastewater infrastructure are likely to occur over the licensing period. Although it is speculative to assume that the county's wastewater systems would be completely reconstructed in 30 years, the Staff is confident that such changes in infrastructure do not imply that wastewater will not continue to be produced, treated, and made available for reuse throughout the infrastructure improvements. Therefore, the Staff determined that the reclaimed water supply would remain reliable.

b. If a complete reconstruction of the county's wastewater systems were to occur, it would not impact construction and operation of the proposed Turkey Point Units 6 and 7, because of the following:

    1. Reclaimed water would not be used for construction or preconstruction activities. As noted in FEIS Section 4.2.2.1, water needed for construction and preconstruction of the proposed units would be obtained through the existing potable water supply from Miami Dade County.

    2. As mentioned above in part a, for operation of Turkey Point Units 6 and 7, the Staff is confident that wastewater will continue to be produced, treated, and made available for reuse throughout the infrastructure improvements. For cooling for power generation operation, the proposed plant would take about 73 million gallons per day from the South District Plant. The South District Plant currently processes approximately 97 million gallons per day and has a capacity of about 300 million gallons per day.

31. The need for power analysis in Chapter 8 of the FEIS notes that in 2008, the Florida Public Services Commission forecast a need for power in the 2020 timeframe. Has the Public Services Commission updated its analysis since 2008, and, if so, how does it affect the Staff's need for power analysis?

Staff Response: The Florida Public Service Commission (FPSC) updates its analyses continuously but has not reconsidered its determination of need for the two AP1000 units at Turkey Point. The need for power analysis in the FEIS was based on a determination of need from the FPSC based on Final Order PSC-08-0237-FOF-EI, dated April 11, 2008. In that determination of need, FPSC stated not only that there is a need for about 6,000 MW(e) of additional baseload electricity generation by 2020, but also that the need should be filled by the proposed Turkey Point Units 6 and 7. Until the NRC makes a final decision on the license application, it is Staff's practice to review any new information that may impact the FEIS to determine whether changes are warranted. At this time, FPSC's determination of need is still in effect. Therefore, the Staff's need for power determination has not changed and no further analysis is warranted.

32. In its comments, NPS states that "FPL applied different criteria to screening the non-Turkey Point sites than it used to screen the existing Turkey Point site," and that the presence of an existing, operating nuclear power plant at the site contributed to the favorable ranking of the Turkey Point site. NPS Comments on FEIS and FSER at 3. NPS asserts that the siting analysis overlooked the impact of supporting infrastructure and failed to consider a number of other factors. *Id.*

a. In terms of site selection and alternative site analysis, was consideration given to the current operation of Turkey Point Units 3 and 4 and the hypersaline plume underneath the cooling canal system? If so, discuss. If not, why not?

b. How did the siting analysis consider the impacts of supporting infrastructure, such as FPL's proposed Western Transmission Corridor, and other factors identified on page 3 of the NPS Comments on the FEIS and FSER?

Staff Response:

a. The Staff did consider the current operation of Turkey Point Units 3 and 4 and the hypersaline plume underneath the cooling canal system in its evaluation of the site selection process and in the comparison of the sites. In Chapters 4 through 6 of the FEIS, the Staff addressed the environmental impacts of building and operating the proposed new units at the Turkey Point site. In Chapter 7, the Staff evaluated the cumulative impacts of the project. As stated in the FEIS (page 7-1), cumulative impacts "may result when the environmental effects associated with the proposed action are overlaid or added to temporary or permanent effects associated with past, present, and reasonably foreseeable future projects." The cumulative impacts of the proposed project at the Turkey Point site were compared to the cumulative impacts of building the reactors at the alternative sites in Section 9.3.6 of the FEIS. The Staff concluded that none of the alternative sites was environmentally preferable based on the comparison of the cumulative impacts.

   Among the sources of cumulative impacts, the Staff considered those associated with the existing units at Turkey Point, including the cooling canal system. Section 7.2 of the FEIS provides the discussion of specific impacts to surface and groundwater. The cooling canal system, which is used to cool existing Units 3 and 4, would not be used by the proposed new units. However, the Staff did consider the impacts of the cooling canal system under cumulative impacts (see Section 7.2 of the FEIS). In addition, the saline plume under the cooling canal system was considered in the Staff's evaluation of the impacts of operating the radial collector wells (RCWs) for the new units (see Section 5.2.1.2 of the FEIS). Such consideration was appropriate because the RCWs would draw a small portion of water from the Biscayne Aquifer, the same aquifer that is being affected by the plume.

b. The factors listed in the letter from the NPS were considered in the Staff's environmental evaluation, with the exception of those factors that are unrelated to environmental impacts from the construction and operation of the new units. Specifically, the fourth through seventh bullets in the NPS list relate to the impacts of the operation of the cooling canal system on the environment. These are not

impacts of the proposed project and the Staff correctly excluded such impacts from Chapters 4 and 5 of the FEIS, but they were considered in Chapter 7 as they relate to cumulative impacts, as discussed above. Factors in the NPS list that the Staff did consider in the FEIS include items such as population considerations (which were included in the Staff's evaluation of the environmental impacts of postulated accidents, addressing the proximity of the site to Miami), and visual impacts (which were considered under socioeconomics). See FEIS Section 5.11 for the Staff's evaluation of environmental impacts of postulated accidents and Sections 4.4.1.6 and 5.4.1.6 for the Staff's evaluation of visual impacts.

The FEIS evaluation of the proposed and alternative sites includes consideration of cumulative impacts associated with supporting infrastructure, including new transmission corridors supporting each site. For example, although the NRC does not regulate transmission lines, the Staff considered the impacts of building and operating the proposed Eastern and Western transmission line corridors in Sections 4.1.2, 4.3.1.2, 5.1.2, 7.1, and 7.3.1 of the FEIS. Such impacts were then considered in the comparison of the proposed site with the alternative sites in Section 9.3 of the FEIS.

33. The Staff concludes that none of the viable alternatives is environmentally preferable to building a new baseload nuclear power generation plant at the Turkey Point site.

Given the concerns identified by the NPS related to site selection, explain more fully the bases for the Staff's conclusion.

Staff Response: The Staff evaluated all impacts of building and operating the new units at the proposed site. See FEIS Chapters 4, 5 and 6. In addition, the Staff evaluated the cumulative impacts of the project when considering the environmental effects associated with the proposed action overlaid or added to temporary or permanent effects associated with past, present, and reasonably foreseeable future projects. See FEIS Chapter 7. The Staff's evaluation included impacts to the Biscayne and Everglades National Parks.

The process and methods used by FPL to screen from the Region of Interest down to the Candidate Sites were reviewed by the Staff in FEIS Section 9.3.1. The Staff concluded that the FPL process was "reasonable and consistent with the guidelines presented in" ESRP Section 9.3, and the Electric Power Research Institute's Technical Report 1006878, "Siting Guide: Site Selection and Evaluation for an Early Site Permit Application," published in March 2002. The Staff found that FPL's systematic alternative siting analysis demonstrated a logical selection process and application of screening and exclusionary siting criteria. In its analysis, FPL evaluated the likely environmental impacts associated with the respective sites, including the evaluation of suitability criteria; identified acceptable alternative sites; and clearly provided the mechanism for selection of the final proposed site.

In Section 9.3 of the FEIS, the Staff considered locating the proposed reactors at four alternative sites. In Sections 9.3.2 through 9.3.5 of the FEIS, the Staff thoroughly evaluated the cumulative environmental impacts at these alternatives sites, using the best available information from numerous sources in accordance with the guidance in ESRP Section 9.3. The Staff then compared the cumulative impacts at the alternative sites to those at the proposed site (which had been evaluated to an even greater depth, including consideration of the potential impacts to the national parks), as discussed in Section 9.3.6 of the FEIS. The Staff concluded

that none of the alternative sites were environmentally preferable to the proposed site and, therefore, none were obviously superior.

34. The Staff concludes that none of the viable alternatives is environmentally preferable to building a new baseload nuclear power generation plant at the Turkey Point site.

As noted by the NPS, however, and as discussed in the FEIS, the Turkey Point site was given credit in the analysis for being an existing site. The FEIS notes that when screening for potential sites, Turkey Point ranked below the top eight sites according to the screening criteria. FEIS at 9-39 to 9-40. Explain in more detail how credit for being an existing site was factored into the Alternative Siting Analysis.

As part of that discussion, explain how FPL's exclusionary criteria were or were not applied to the Turkey Point site. FEIS at 9-35. For example, the FEIS states that one of the exclusionary criteria is for the presence of critical habitat, yet the Turkey Point site has critical habitat for the American crocodile.

Staff Response: In FPL's site selection process, the Turkey Point site was handled differently than the alternative sites. However, this difference was in accordance with NRC guidance in ESRP Section 9.3. ESRP Section 9.3 includes the following:

> Recognize that there will be special cases in which the proposed site was not selected on the basis of a systematic site-selection process. Examples include plants proposed to be constructed on the ***site of an existing nuclear power plant*** previously found acceptable on the basis of a NEPA review and/or demonstrated to be environmentally satisfactory on the basis of operating experience, and sites assigned or allocated to an applicant by a State government from a list of State-approved power-plant sites. For such cases, the reviewer should ***analyze the applicant's site-selection process only as it applies to candidate sites other than the proposed site, and the site-comparison process may be restricted to a site-by-site comparison of these candidates with the proposed site***. The site selection process is the same for this case except for the fact that the proposed site is not selected from among the candidate sites based on a site by site comparison. [Emphasis added.]

FPL utilized this exception in its selection of the Turkey Point site. FPL then implemented an acceptable systematic and logical selection process to identify the alternative sites and to compare its proposed site to the alternative sites to determine if any alternative was environmentally preferable. FPL concluded that none of the alternative sites were environmentally preferable to the proposed site. The Staff performed an independent comparison of the sites and also concluded that none of the alternative sites were environmentally preferable to the proposed site.

Using its site selection process, FPL rated and ranked the Turkey Point site with other sites identified as possible alternative sites. However, because FPL used the exception in ESRP

Section 9.3, the exclusionary criteria were not used to select the Turkey Point site as the preferred site.

Regarding credit for an existing nuclear site, the Staff does not specifically give any special credit to such sites. Rather, it evaluates the cumulative impacts at the proposed site, and compares them to the cumulative impacts at the alternative sites. This approach is used regardless of whether the proposed site is an existing nuclear plant site. However, the fact that the proposed site is an existing nuclear plant site can be one factor in the cumulative impacts analysis. For example, when it considered the visual impacts of building and operating the new units at the Turkey Point site, the Staff considered the fact that the existing five units (two nuclear units and three fossil units) at the site had already significantly impacted the viewshed. Therefore, the addition of the two new units would not change the viewshed significantly. If Turkey Point had been an undeveloped site, then the Staff's evaluation of the visual impacts of the new units on Biscayne National Park would have been based on a change from an undeveloped site to an industrial facility.

35. FPL appears to have excluded candidate sites that were near census blocks where population density was greater than 300 persons/mi^2 and critical habitat for threatened or endangered species. FEIS at 9-35. If the 300 persons/mi^2 and critical habitat criteria were not used, does any available information suggest that another candidate site would be obviously superior to the Turkey Point site?

Staff Response: No. Because areas failing to meet the exclusionary criteria were not evaluated further, the Staff has no information regarding the suitability of possible sites in these areas.

36. What actions would be required under the Farmland Protection Policy Act if FPL did decide to proceed with a site in the vicinity of "unique farmland"?

Staff Response: No actions would be required. The Farmland Protection Policy Act of 1981 (FPPA), 7 U.S.C. §§ 4201–09, instructs all federal agencies to "minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses." 7 U.S.C. § 4201(b). However, Federal permitting or licensing is explicitly exempted from the definition of "Federal program" in the FPPA. 7 CFR 658.2(c)(1)(i). Because the NRC's Federal action is limited to licensing FPL's proposed action, the FPPA imposes no requirements on the NRC if FPL were to proceed with a site in the vicinity of "unique farmland," which is defined in the FPPA as farmland that is used for the production of specific high-value food and fiber crops. 7 U.S.C. § 4201(c)(1)(b). In the EIS, the Staff used the FPPA's definition of "unique farmland" and "prime farmland" to characterize land in the vicinity of the proposed Turkey Point site and the alternative sites. Any impact findings the Staff made regarding that farmland were made pursuant to NEPA and did not involve consideration of the FPPA.

37. The EIS states that for the Martin site "FPL acknowledged that its solar facility used available lands and that additional new land would have to be acquired in order to develop the new units." How much additional land would FPL need to acquire? Would these additional lands share similar characteristics to the land at the Martin site?

Staff Response: In a letter dated April 18, 2013 (ADAMS Accession No. ML13109A431), FPL indicated it would need some additional land for the project at the Martin site if the solar facility remains; however, FPL did not provide specific acreage. In addition, if a reservoir was required,

FPL indicated in a July 8, 2013, letter (ADAMS Accession No. ML13196A063, see in particular page 6 of the attachment) that it would have to acquire approximately 3000 acres of adjacent land. The letter also stated that this land is of a similar nature (i.e., agricultural or other undeveloped areas) to the land on the Martin site.

38. Pages 9-96 and 9-141 of the FEIS state that the "Martin site is an 11,300 ac area," but page 9-125 suggests that the site is actually "22,300 ac." Clarify this discrepancy.

Staff Response: The Martin site is an 11,300 acre site. The reference made on page 9-125, in the discussion of impacts to aquatic ecology, erroneously reports 22,300 acres instead of 11,300 acres. This discrepancy does not affect the analysis of impacts to aquatic resources for the Martin alternative site.

39. Although FPL "proposed building an additional 3000 ac cooling-water storage reservoir" for the Glades, Martin, and Okeechobee sites, the Staff determined that "cooling water could be obtained from groundwater beneath [these sites] and that the cooling-water storage reservoir was unnecessary." FEIS at 9-64, 9-118, 9-167. Does FPL agree? The groundwater is generally not used because it is brackish. What challenges would FPL face in using such groundwater during operation?

Staff Response: The NRC Staff cannot comment on behalf of FPL as to whether it agrees with the position that cooling water could be obtained from groundwater beneath the inland alternative sites without the need for water storage reservoirs or a reverse osmosis plant.

The design of the system and its operation would ultimately be determined by the applicant, in coordination with the South Florida Water Management District (SFWMD). As long as the applicant obtains the necessary permits from SFWMD, the Staff does not anticipate any particular technical challenges to the operation of the system as it was described in the FEIS. Please see the Staff's response to Question 40 for additional information regarding the position of the SFWMD regarding whether such permits could be obtained.

40. NRC Regulatory Guide 4.2 states that candidate sites should be "potentially licensable." In discussing how three of the five candidate sites would obtain cooling water, the FEIS states that there is "significant uncertainty regarding how the cooling system at any of these three sites" would be implemented. FEIS at 9-43. Given this uncertainty, as well as the uncertainties discussed in the FEIS about whether these sites could obtain the necessary permits to obtain cooling water, describe why the Staff considered these sites to be potentially licensable, and thus, appropriate for consideration as candidate sites.

Staff Response: The five candidate sites (which include the proposed Turkey Point site) identified by Staff in the FEIS are considered potentially licensable sites. If one of the inland sites (Glades, Martin and Okeechobee) were chosen for construction and operation of a new nuclear plant, the actual design of the cooling water system and its operation would be determined by the applicant, in coordination with the SFWMD. In a letter dated June 29, 2012 (ADAMS Accession No. ML12191A171), the SFWMD stated that "there are mechanisms in place through the District's water use regulatory program for FPL to assemble the available, permittable surface and groundwater sources and meet the water needs" of a power plant located at one of the inland sites. Based on this letter from SFWMD, the Staff concluded in the FEIS that FPL could obtain the permits for the cooling water required to operate the plant.

The "significant uncertainty" discussed in the FEIS at 9-43 relates to exactly how the cooling systems would be designed and operated at three inland sites. For the purposes of Staff's alternative site analysis under NEPA, the Staff evaluated the impacts of a potential arrangement with limited environmental impacts. In Section 9.3.1.7 of the FEIS, the Staff addresses how the impacts would be different if a reservoir is required for the cooling system.

41. For the Glades and Okeechobee sites FPL proposes to build 3,000 ac cooling reservoirs, but both of these sites are listed as 3,000 ac in size. FEIS at 9-44, 9-148. Would FPL need to acquire additional land for these sites if they were selected?

Staff Response: Yes. While there is sufficient land to accommodate the new units on both the Glades and Okeechobee sites, FPL notes that there is not sufficient land to support the proposed reservoir at these sites. FPL would therefore have to purchase additional parcels of land to support the proposed reservoir, if one of these sites were selected. FPL discusses this scenario in a letter to the NRC dated July 8, 2013 (ADAMS Accession No. ML13196A063, see in particular page 6 of the attachment) sent in response to a Staff RAI. In this letter, FPL indicates that there is undeveloped land adjacent to each of the sites to allow for the development of the proposed reservoir.

42. In light of the NPS concerns discussed in its letter dated December 19, 2016 regarding the proposed transmission line corridors, discuss the FEIS's cumulative impacts analysis on ecological resources from the proposed transmission lines.

Staff Response: In its December 2016 letter, the NPS raised concerns regarding possible adverse effects on the wood stork and Everglade snail kite. Both species are listed as threatened or endangered under the Endangered Species Act. Cumulative impacts from the project, including the associated transmission lines, to each of these Federally-listed species are addressed in detail in the Staff's Biological Assessment, completed in February 2015, and in the Biological Opinion (BO) issued in June 2017 by the Fish and Wildlife Service (FWS). The FWS concluded in the BO that the project, including the transmission lines, would not put either species in jeopardy of extinction. The Staff's consideration of potential cumulative impacts to these two endangered bird species is reflected in the Staff's evaluation of cumulative impacts to terrestrial resources in Section 7.3 of the FEIS. In Section 7.3, the Staff concluded that the overall incremental contribution of the project, including the transmission lines, would be MODERATE. The incidental take limits and terms and conditions established by the FWS in the Incidental Take Statement (ITS) are designed to ensure that no listed species, including the wood stork and Everglade snail kite, are placed in jeopardy of extinction. Implementation of the terms and conditions will be ensured through NRC's Environmental Protection Plan (EPP) and conditions in the Department of the Army permit, as discussed further in the Staff's response to Question 52.

43. In its letter dated December 19, 2016, NPS states "the FEIS is inaccurate because the important issue is maintaining freshwater delivery to Biscayne Bay, not the volume of saltwater in the Bay. Elsewhere the FEIS states that the use of surface water from the L-31 E Canal diverts it from and could result in less freshwater available for CERP [the Comprehensive Everglades Restoration Plan] BBCW [Biscayne Bay Coastal Wetlands] Project. The NPS considers this a diversion and

elimination of freshwater that will negatively impact Biscayne NP, Biscayne Bay, and the BBCW Project."

How did the Staff consider the potential for freshwater diversion and elimination in the analysis of impacts to surface water from the construction and operation of the proposed facility?

Staff Response: While the diversion of freshwater is unrelated to the proposed facility, the Staff did consider use of surface water from L-31E and other possible mitigative actions as a change to the range of affected environments that were considered in the Staff's groundwater modeling assessment. This is discussed in FEIS Section 5.2.1.2 (Changes in the Hypersaline Plume), Appendix G.3.2.3 (Summary of the Review Team Focused Modeling) and in responses to comments received on the DEIS (Appendix E pages, E-159, E-168, E-187, E-221 and E-224).

As part of the EIS analysis, the Staff used modeling to assess impacts on water resources. Construction related impacts, which were evaluated by the Staff in Section 4.2 of the FEIS, were temporary and bounded by impacts anticipated from operation.

For operational impacts, the Staff included boundary conditions to represent mitigation actions (e.g. increase or decrease in upward groundwater gradient, elevation of water in L-31E, elevation of water in the cooling canals) and to determine if these would alter the impact of the RCWs' operation on the salinity in the Bay or in the Biscayne aquifer. These simulations predicted only minor changes to the environment and a result that led to a SMALL impact.

Beginning in July 2014, Turkey Point's cooling canal system (CCS) experienced higher than usual temperatures. A number of factors contributed to the temperatures, including high summer temperatures, low rainfall, elevated salinity, and an algae bloom. On August 27, 2014, FPL requested the South Florida Water Management District (SFWMD) to issue an Emergency Order for temporary authorization to utilize the SFWMD's right-of-way and to divert and use water from the L-31E Canal System to help moderate the unusually high temperatures and salinity. On August 28, 2014, the Executive Director of the SFWMD issued an Emergency Order granting FPL's request subject to certain conditions, and with an expiration date of October 15, 2014. Subsequently, on September 11, 2014, the SFWMD's Governing Board reviewed and concurred with the Emergency Order. In Sections 5.2.1.2 (Changes in the IWF Hypersaline Plume) and 7.2 of the FEIS, the Staff discussed the proposed project's minor interactions with the industrial wastewater facility and that these interactions will not alter the frequency or magnitude of salinity events. The Staff recognizes the diversion of water from L-31E Canal will minimally reduce the freshwater available for the CERP BBCW Project.

44. In light of the EPA's comments on the FEIS, discuss the evaluation and impacts to Biscayne and Everglades National Parks and the Biscayne Bay Aquatic Preserve from potential migration of the hypersaline plume, and interconnectivity between the industrial wastewater facilities (IWF) and the Biscayne Aquifer and Biscayne Bay.

Staff Response: The IWF is not a feature of the design of the proposed Turkey Point Units 6 and 7. FPL entered into a consent decree in 1971 to build the IWF to be used for cooling purposes instead of the original once-through cooling system for Turkey Point Units 3 and 4. To the extent the EPA comments relate to the current state of the IWF, the comment is outside the scope of the Turkey Point Units 6 and 7 project. Nonetheless, the IWF is a feature of the site on which Turkey Point Units 6 and 7 are proposed to be constructed and operated, and the Staff

evaluated the effects of building and operating proposed Turkey Point Units 6 and 7 on the environment surrounding the proposed facility. These effects include the potential for the Turkey Point Units 6 and 7 RCWs to induce movement of the hypersaline plume from the IWF, as documented in EIS Sections 5.2.1.1 and 5.2.1.2 (with additional detail presented in Appendix G.3.2). In describing the environmental setting for the proposed action in EIS Section 2.3, the Staff disclosed the currently-existing impacts of construction and operation of the IWF on the quality of shallow ground water and the Biscayne Bay.

With respect to the impacts of the proposed units, the Staff evaluated how actions related to Turkey Point Units 6 and 7, such as the pumping of the RCWs, could impact water availability and chemistry in an altered baseline environment. That environment included the IWF, the hypersaline plume in the Biscayne Aquifer beneath the IWF, and actions that have been or may be taken to freshen the IWF and limit western movement of the plume. Modeling discussed in the EIS predicts that while the RCW system would draw water primarily from the overlying Biscayne Bay, a small portion would be drawn from inland portions of the Biscayne aquifer, possibly influencing movement of the existing hypersaline plume. The analyses further predict that the RCWs would not noticeably impact the hypersaline plume, the Biscayne aquifer, or interconnected resources such as Biscayne Bay, which includes the Biscayne National Park and the Biscayne Bay Aquatic Preserve. Further, the Everglades National Park is outside the area of influence of the RCWs. In summary, there is no indication that construction or operation of the proposed Turkey Point Units 6 and 7 will complicate or exacerbate the existing environmental impacts of the IWF or measurably impact interconnected water resources.

45. As noted above, the NPS states that the proposed units would affect the Comprehensive Everglades Restoration Plan (CERP) and its Biscayne Bay Coastal Wetlands (BBCW) project, as well as the ecological health of the natural resources in Biscayne and Everglades National Parks. Discuss the Staff's evaluation of the proposed project's impacts to the Biscayne and Everglades National Parks in light of the NPS comments.

Staff Response: The NPS comments on the EIS, presented in its letter dated December 19, 2016, states that the proposed Turkey Point Units 6 and 7 would exacerbate NPS's concerns with the existing Turkey Point facility, affect the success of CERP and its BBCW project, as well as affect the ecological health of Biscayne and Everglades National Parks. The NPS says that withdrawals of surface water from the L-31E Canal for freshening of the cooling canals will result in less water being available for the CERP and its BBCW project. This diversion of water was in response to the recent occurrence of high temperatures and high salinity in the cooling canals.

Although this action is not related to the proposed Turkey Point Units 6 and 7, the Staff did consider the diversion of water from L-31E as a possible change in the affected environment. The Staff also considered whether changes in the affected environment would alter the impact from operation of the RCWs on the salinity in Biscayne Bay, as discussed in the draft EIS. The Staff explains in EIS Section 5.2.1.2, Appendix G.3.2.3, and in responses to comments received on the draft EIS (Appendix E pages, E-159, E-168, E-187, E-221 and E-224) that supplemental modeling analyses were performed to evaluate the impact of RCW pumping in an environment altered by the CCS hypersaline plume and actions proposed to freshen the CCS (such as withdrawal of water from L-31E). Analyses presented in the EIS predict that the RCW system would draw water primarily from the overlying Biscayne Bay with only a small amount coming from inland portions of the Biscayne Aquifer. Specifically, the amount of freshwater withdrawn from the Biscayne Aquifer, which was already predicted to be very small, would not change

appreciably, and impacts of the operation of the RCWs on freshwater availability would remain SMALL. This small impact on freshwater availability due to RCW operation would not noticeably alter the freshwater available to the CERP BBCW project or either Everglades or Biscayne National Park.

46. The NPS recommended that the Staff consider Secretarial Order Number 3330, "Improving Mitigation Policies and Practices," which encourages agencies to focus on mitigation efforts that improve resources in the face of climate change. Since both the Everglades National Park and Biscayne Bay serve as key resources in protecting south Florida's groundwater, did the Staff review or consider Secretarial Order Number 3330?

Staff Response: No, the Staff did not specifically consider Secretarial Order Number 3330 in the environmental review of Turkey Point Units 6 and 7. However, the Staff did review Secretarial Order Number 3330 and concluded that the EIS's updated climate change analysis in Appendix I was in alignment with or went beyond the Secretarial Order Number 3330 guidance. Furthermore, the Staff's climate change analysis in EIS section I.3.2 considered mitigation measures related to hydrology, including groundwater.

47. In its letter to the Staff regarding consultation pursuant to Section 7 of the Endangered Species Act, the National Marine Fisheries Service (NMFS) assumed the project would be carried out under certain conditions. With respect to the following three issues, discuss the license conditions or other mechanisms (for example, inclusion of a condition in a different federal permit) that require FPL to adhere to these assumptions:

a. Implementation of NMFS's *Sea Turtle and Smalltooth Sawfish Construction Guidelines*.

b. Use of turbidity curtains during dredging to contain any dredging related suspended sediments and prevent water quality degradation.

c. Use of a ramp-up start procedure when pile driving that will allow adequate time for animals to leave the project area and so minimize injurious noise impacts.

Staff Response: None of the three items noted in this question will be specifically addressed in the Turkey Point Units 6 and 7 COLs, if issued. However, the applicant is applying for a Department of the Army permit from the United States Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. As described below, the Staff expects that the Department of the Army permits would include these items.

a. The scope of the project includes potential impacts to species under jurisdiction of the National Marine Fisheries Service, including swimming sea turtles and smalltooth sawfish. The USACE will include "Sea Turtle and Smalltooth Sawfish Construction Conditions," as outlined in a letter dated April 26, 2017 from NMFS (ADAMS Accession No. ML17143A153), as well as other conditions protecting these species in any Section 404 permit that it issues to the applicant.

b. The Department of the Army Section 404 permits typically include conditions requiring permittees to implement reasonable and appropriate measures for protecting adjoining waterways from sedimentation.

c. The pile driving would take place within wetland and mudflat areas known colloquially as "Mud Island." The Staff expects that USACE would include reasonable and appropriate conditions in the Section 404 permit to protect marine and coastal fish and wildlife against noise injury.

48. In the FEIS, NRC staff noted that, with respect to a biological monitoring and adaptive management plan to address aquatic resources potentially affected by construction and operation of Units 6 & 7, "an interagency team would be valuable to coordinate monitoring efforts and share data."

Has the Staff taken any steps to initiate the creation of such an interagency team?

Staff Response: No. The National Marine Fisheries Service commented that, "[o]ne way to efficiently accomplish developing the biological monitoring and adaptive management plan was to establish and [sic] interagency team…," but did not ask the NRC to initiate the creation of such a team. Therefore, the Staff has not done so. Moreover, it would be more efficient to establish such a team shortly before initiation of construction activities.

49. The FWS had asked the Staff to provide updated information on the effect of the deposition of reclaimed water drift on American crocodile habitat. The Staff concluded that adverse effects on species near the industrial wastewater facility (cooling canals), such as the American crocodile, are "highly unlikely." But the Staff acknowledged that the toxicological benchmarks it used are based on single chemical exposures, often in laboratory controlled conditions, and that "[t]here is a growing research area in combinatorial exposure effects of contaminants by measuring adverse outcome pathways, or effects-directed analysis. Even so, a general acknowledgement that real-world conditions where exposures to hundreds of natural and anthropogenic compounds occur under varying water-quality conditions, even in known contaminated areas, will require reliance on observable outcomes through monitoring."

Applicant: How does FPL intend to monitor the chemical or contaminant concentrations in wildlife during the license term?

Staff: Will the Staff include a license condition (or other mechanism) for monitoring the contaminant concentrations in wildlife?

Staff Response: The Staff does not intend to include a condition in the Environmental Protection Plan (EPP) as part of the COLs, if issued, that requires the applicant to monitor contaminant concentrations in wildlife. By letter dated September 28, 2016 (ADAMS Accession Package No. ML16237A316), the Staff provided FWS with information regarding the potential effects of deposition from reclaimed water drift on the American crocodile habitat and the FWS did not provide any further comments on the subject. When FWS issued the ITS on June 23, 2017, it did not include any requirements to monitor for contaminate concentrations in American crocodiles or other wildlife; therefore, the Staff did not include a condition in the EPP.

50. In the NRC Staff Analysis of Biological Opinion and Submission of Proposed License Conditions for Turkey Point Units 6 & 7 (July 7, 2017), the Staff stated that FWS identified items in its Biological Opinion and Incidental Take Statement to be included in the proposed combined licenses for Turkey Point Units 6 & 7. In response, the Staff recommends that eight license conditions be included in any NRC combined licenses and noted that the U.S. Army Corps of Engineers (USACE) will include the remaining items in its Section 404 permit, issued under the Clean Water Act.

a. Clarify the conditions that the Staff expects the USACE to incorporate into its permit.

b. How did the Staff and USACE determine which non-discretionary terms and conditions would be included in the NRC licenses versus the USACE permit?

c. The Staff analysis states that the USACE committed in an email to include any remaining conditions in its permit. Discuss whether an emailed commitment to include conditions in a permit that has not yet been issued is sufficient for the NRC to comply with Section 7 of the Endangered Species Act.

Staff Response:

a. In a letter dated August 24, 2017 (ADAMS Accession No. ML17201Q242), the Staff documented the agreement with USACE to include in USACE's Section 404 permit items outlined in the Biological Opinion (BO) and Incidental Take Statement (ITS) that the NRC will not be including in the proposed Environmental Protection Plan (EPP) of the COLs, if issued. The conditions that USACE agreed to incorporate into its permit are documented in Enclosure 2 to the letter and are listed here:

FPL shall implement the following Minimization and Conservation Measures as described in detail on Pages 8 through 13 of the BO:

1. Install wildlife fencing and underpasses of the composition specified, and at the locations specified, on Pages 8 and 9 of the BO.

2. Implement a site worker education program on threatened and endangered species as described on Page 9 of the BO.

3. Implement the measures indicated on BO Pages 9 and 10 for protection of sea turtles, manatees, and benthic marine resources; including those in the Florida Fish and Wildlife (FWS) Conservation Commission's *Standard Manatee Construction Conditions for In-Water Work*.

4. Implement the FWS *Eastern Indigo Snake Protection Measures* on Page 9 of the BO.

5. Establish a speed limit of 25 mph for vehicles transporting muck to the muck storage sites as stated on Page 10 of the BO.

6. Implement the FPL Avian Protection Plan provided as Appendix A to the BO.

7. Implement the wetland mitigation measures indicated on Page 10 of the BO.

8. Perform shorebird, wood stork, and sea grass surveys as outlined on Page 11 of the BO, and report those surveys to the FWS Vero Beach Field Office.

9. Restore construction access roadways to their baseline condition, as outlined on Page 12 of the BO.

10. Reserve or acquire 2,154 Panther Habitat Units from the Panther Island Mitigation Bank, to the acceptance of the FWS Vero Beach Field Office as stated on Page 12 of the BO.

11. Acquire enough wetland credits from the Hole-in-the-Donut Mitigation Bank to provide 71.3 lb. of wood stork forage biomass from short hydroperiod wetlands and 1347.3 lb. from long hydroperiod wetlands as described on Page 12 of the BO.

12. Relocate any individuals of Federally-listed threatened or endangered plant species that cannot be avoided when building the proposed transmission line through the Kings Highway Pine Rockland to a new location acceptable to the FWS Vero Beach Field Office as stated on Page 13 of the BO.

b. All conditions within NRC's regulatory authority, such as surveying, monitoring, and reporting requirements, can be found in Appendix B of the draft COLs. The Staff requested that USACE include those items from the BO that Staff determined to be outside of the NRC's authority to regulate under the AEA. Terms and conditions beyond the NRC's regulatory authority, such as items establishing requirements for conservation actions, installing protective landscape features, performing wetland mitigation, or other habitat improvement actions will be addressed in the conditions to the Department of the Army permit.

c. A Federal agency has discretion under Section 7 of the Endangered Species Act to determine "whether and in what manner to proceed" with fulfilling its Section 7 duties. 50 CFR 402.15. In order to comply with Section 7 for the Turkey Point Units 6 and 7 review, the NRC was required to complete consultation with the FWS and, after the FWS issued the BO for the project, to ensure that the proposed licensee complies with the terms and conditions set forth in the ITS issued with the BO. 50 CFR 402.14(h)(3)(i)(1)(iv). As the NRC cannot ensure that licensees comply with non-discretionary terms and conditions in a BO absent a license condition, the Staff determined that license conditions were appropriate and coordinated with the USACE to ensure that all non-discretionary terms and conditions were included in either the NRC license as conditions or the USACE 404 permit.

   On June 29, 2017, the NRC engaged in a conference call with representatives from the FWS and the USACE regarding the Turkey Point Units 6 and 7 BO. The NRC discussed its proposal to incorporate the non-discretionary mitigation measures within its jurisdiction into the EPP in the COLs, while the USACE confirmed that it would incorporate the remaining measures into its Section 404 permit. This agreement was memorialized in an email from the USACE to the NRC (ADAMS Accession

No. ML17213A355). This agreement is further memorialized in the August 24, 2017, letter from the NRC to USACE (ADAMS Accession No. ML17201Q242). The FWS also received a copy of this letter. Additionally, recorded notes from the conference call state that representatives from the FWS agreed with this proposal (ADAMS Accession No. ML17215A469). The NRC Staff believes that this process is sufficient to fulfill its obligations under Section 7(a)(2) of the Endangered Species Act, particularly in light of FWS's acceptance to the proposed approach and the assessment of the project in the BO and ITS.

51. On August 1, 2016, the Council on Environmental Quality released guidance relating to greenhouse gas emissions and climate change in NEPA reviews.

Explain whether (and if so, how) the Staff considered this guidance in its NEPA analyses of the impacts on greenhouse gas emissions and the effects of climate change.

Staff Response: The Staff followed Commission direction in evaluating the Turkey Point Units 6 and 7 COL application. The Commission in CLI-09-21 (ADAMS Accession No. ML093070689) directed the Staff to develop guidance on greenhouse gas emissions.[6] The guidance is in COL/ESP-ISG-026, Attachment 1: "Staff Guidance for Greenhouse Gas and Climate Change Impacts for New Reactor Environmental Impact Statements" (ADAMS Accession No. ML14100A157), which the Staff applied in its review of the Turkey Point COL application. This guidance is generally consistent with the CEQ's "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews." The CEQ guidance was finalized after the ISG and DEIS were published in 2014 and 2015, respectively, but early versions of the CEQ guidance were considered in developing the ISG (and hence the DEIS). The CEQ guidance was withdrawn on April 5, 2017 (82 FR 16576).

52. The Environmental Protection Plan (EPP) includes requirements noted in the FWS' Incidental Take Statement (ITS). However, some of the requirements in the EPP are not identical to those in the ITS (e.g., EPP item 8 on the disposition of dead or injured specimens). Explain these discrepancies.

Staff Response: The requirements in the draft EPP, such as item 8, are not identical to the requirements written in the ITS because the draft EPP is a summary of the ITS requirements issued in the FWS BO (ADAMS Accession No. ML17177A673). Additionally, the requirements in the Turkey Point Units 6 and 7 draft EPP were written so that the structure and language would be consistent with previously issued EPPs.

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[6] In CLI-09-21, the Commission stated:

> We expect the Staff to include consideration of carbon dioxide and other greenhouse gas emissions in its environmental reviews for major licensing actions under the National Environmental Policy Act. The Staff's analysis for reactor applications should encompass emissions from the uranium fuel cycle as well as from construction and operation of the facility to be licensed. The Staff should ensure that these issues are addressed consistently in agency NEPA evaluations and, as appropriate, update Staff guidance documents to address greenhouse gas emissions.

The USACE, which is a cooperating agency and jointly participated in the consultation under Section 7 of the Endangered Species Act, agreed to include the ITS requirements that were outside the NRC's regulatory authority as conditions to the Department of the Army permit, when issued. This agreement to split the terms and conditions listed in the BO ITS is documented in a letter from the Staff to the USACE dated August 24, 2017 (ADAMS Accession No. ML17201Q242).

53. The FWS' Biological Opinion notes that the NRC must reinitiate consultation under various circumstances (e.g., if the results of surveys indicate that certain species occur on the project site). How will the licenses reflect this requirement?

Staff Response: The draft licenses do not reflect FWS's statement in the BO that the NRC is required to reinitiate consultation under certain circumstances. However, the draft licenses contain the Environmental Protection Plan (EPP), which requires FPL to conduct activities throughout the life of the plant that will ensure that FPL will be in contact with the FWS. For example, FPL will be required by the EPP to conduct surveys and to monitor the presence of a listed species or suitable habitat on the site, and to report to the FWS and the NRC if a species is discovered on the site. FPL is also required to coordinate with the FWS to minimize any adverse effect or "take" of a species.

54. Conditions 1-3 and 7-8 in 2.3 of the EPP provide specific actions for the licensee to take if threatened or endangered species are discovered. However, conditions 3-6 do not provide any specific actions to be taken if wood storks are discovered. Explain what steps, if any, FPL is expected to take upon discovering wood storks.

Staff Response: FPL is required to perform the wood stork surveys in response to Conditions 3 through 6 of Section 2.3 of the draft EPP. Condition 7 of the EPP requires FPL to submit an annual report to FWS during construction if FPL observes any dead or injured wood storks within the project area. Additionally, Condition 8 of the EPP requires FPL to immediately notify FWS if any dead, injured, or sick wood storks are located on the site, and to follow FWS's instructions regarding its care, disposition, and/or preservation.

55. Explain whether the discussion of impacts in the Draft Record of Decision on page 5 refers to the cumulative impacts or the impacts from the NRC licensed construction and operation activities.

Staff Response: The discussion of environmental impacts in the draft Record of Decision on page 5 is referring to the potential impacts from constructing and operating the proposed Turkey Point Units 6 and 7. These construction and operational impacts, in the vicinity of the Turkey Point site, include the impacts as a result of preconstruction and NRC licensed activities.

56. The discussion on page 5 of the Draft Record of Decision observes that "impacts during construction to Historic and Cultural Resources are expected to be MODERATE but the NRC authorized construction impact level is SMALL." It also notes that impacts to Land Use and terrestrial ecosystems would be MODERATE, but page 10-6 of the FEIS indicates that for these areas "NRC authorized construction impact level is SMALL." Should the Record of Decision also note

that "the NRC-authorized construction impact level is SMALL" for Land Use and terrestrial ecosystems?

Staff Response: The summary of the Staff's evaluation within the draft Record of Decision on page 5 should account for the totality of potential impacts to each resource area as documented in the EIS. The Staff will revise the draft Record of Decision such that all resource area impact levels will be consistent with statements in the EIS after the mandatory hearing, per Staff's usual practice.

57. Should the Record of Decision be updated to reflect any terms and conditions that the FWS required in its final Biological Opinion?

Staff Response: The Staff does plan to update the draft Record of Decision to appropriately reflect applicable terms and conditions outlined in the Biological Opinion issued by the Fish and Wildlife Service on June 23, 2017. The update will summarize how NRC's responsibilities under Section 7 of the Endangered Species Act have been concluded as well as specific license conditions that will be included in the Turkey Point Units 6 and 7 COLs, if issued.

58. What process has the Staff used to evaluate potential new and significant information that would require supplementation of the FEIS since its publication? Describe any information that was considered under this process.

Staff Response: Since publication of the EIS in October 2016 and the supplement, published in December 2016, the Staff has used the process described in the Staff guidance document titled "Staff Process for Determining if a Supplement to an Environmental Impact Statement is Required in Accordance with10 CFR 51.92(a) or 51.72(a)" (ADAMS Accession No. ML120950050). The only information that was considered and that utilized the aforementioned process was new information regarding a draft settlement between the City of Miami and FPL that would lead to FPL undergrounding approximately 6 miles of transmission lines within the proposed Eastern transmission line corridor considered in the final EIS. The Staff conducted an audit with FPL regarding the new information and ultimately concluded the project was a separate action with independent utility and would not substantively alter the conclusions drawn in the EIS regarding the cumulative environmental impacts of the Turkey Point Units 6 and 7 project.

59. In the *NRC Staff Analysis of Biological Opinion and Submission of Proposed License Conditions for Turkey Point Units 6 & 7,* the Staff states that the Biological Opinion affirmed the Staff's conclusions except for two areas, where it elevated the conclusions. The Staff states that the elevated conclusions are based on "recent information that the NRC staff and FPL provided to FWS after completion of the Biological Assessment in 2015. This information included survey data and updated reports that the eastern indigo snake was present on the proposed site." Why did this new information, which included the existence of an endangered species on the proposed site, not trigger the need for a supplemental EIS?

Staff Response: After submittal of the Biological Assessment in February 2015, the Staff provided information to the FWS in a letter dated September 28, 2016 (ADAMS Accession No. ML16237A312) and informally via email. This information was a compilation of docketed material that FPL provided over the course of the environmental review. The Staff considered all of this material as part of its review in EIS Section 4.3.1.3. The Staff provided the information

to assist the FWS in responding to NRC's request for formal consultation. The Staff interpreted available information regarding the eastern indigo snake as not likely to adversely affect that species; however, the FWS interpreted the same information, when provided by the NRC, as indicative of potential adverse effects. To address FWS concerns, the draft Environmental Protection Plan developed by the Staff requires updated surveys for the eastern indigo snake prior to ground disturbance, in accordance with the terms and conditions of the Incidental Take Statement. Additionally, the Department of the Army permit is expected to require implementation of the FWS eastern indigo snake protection measures. Under 10 CFR 51.92, no supplement was required.