



L-2014-190
10 CFR 52.3

June 18, 2014

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Re: Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Response to NRC Request for Additional Information Letter No. 080
(eRAI 7467) Related to SRP Section 02.01.03 Population Distribution

Reference:

NRC letter dated May 20, 2014, Request for Additional Information Letter No. 080
Related to SRP Section 02.01.03 Population Distribution for the Turkey Point
Nuclear Plant Units 6 and 7 Combined License Application

Florida Power & Light Company (FPL) provides, as an attachment to this letter, its response to NRC RAI No. 02.01.03-3 (eRAI 7467) provided in the referenced letter. The attachment identifies changes that will be made in a future revision of the Turkey Point Units 6 and 7 Combined License Application (if applicable). If you have any questions, or need additional information, please contact me at 561-691-7490.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 18, 2014.

Sincerely,

A handwritten signature in blue ink, appearing to read 'William Maher', is written over a blue horizontal line.

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/RFO

Attachment: FPL Response to NRC RAI No. 02.01.03-3 (eRAI 7467)

Proposed Turkey Point Units 6 and 7
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cc:

PTN 6 & 7 Project Manager, AP1000 Projects Branch 1, USNRC DNRL/NRO
Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant 3 & 4

NRC RAI Letter No. PTN-RAI-LTR-080 Dated May 20, 2014

SRP Section: 02.01.03 – Population Distribution

NRC RAI Number: 02.01.03-3 (eRAI 7467)

In a letter #055, dated March 28, 2012, NRC Staff requested the applicant to provide additional information (RAI 6079), pertaining to SRP Section 02.01.03, Population Distribution, addressing population density. In a letter dated April 25, 2012, the applicant provided the response with a proposed revision to FSAR Section 2.1.3.6. The response stated that “A comparison of the environmental impacts from construction and operation for the proposed site and each of the top alternative sites indicated that environmental impacts would, in general, be higher than or similar to those at the Turkey Point Site. Therefore, based on these analyses, **FPL concluded that no alternative site is environmentally preferable to the proposed Turkey Point Site.**”

When identifying Turkey Point as the preferred alternative, criteria such as safety, environmental, and economic factors, including population density, were taken into account along with advantages the Turkey Point site has due to the existing nuclear units.” However, the response did not provide the basis, rationale and justification that Turkey Point had clear advantages over the alternative sites. Because Turkey Point exceeds the Regulatory Guide 4.7 criterion of population density of 500 persons/ sq. mile within 20 miles of the site, more information is needed regarding the relative merits of the proposed site.

The staff requests the applicant to explain how the Turkey Point Site fared compared to the alternative sites to finally conclude that the Turkey Point Site is the most suitable site compared to the other four sites considered for alternative site analysis. Provide documentation in the FSAR of the basis that satisfies the requirement of (10 CFR 100.21(h)), “Reactor sites should be located away from very densely populated centers. Areas of low population density are, generally, 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.”

“Examples of 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, etc. Some of these factors are included in, or impact, the other criteria included in this section.”

To the extent that the response to this request may contradict information that has been provided in the Environmental Report or other submittals associated with the environmental review, please provide an explanation of how the new information changes the information that has been previously submitted.

FPL RESPONSE:

As discussed in NUREG-0800, meeting the requirements of 10 CFR 52.79(a)(1), 10 CFR 100.20(a), and 10 CFR 100.21(a) provide assurance that members of the public living in the proximity of an operating reactor can either be protected or safely evacuated such that they will not be subjected to excessive radiological doses in the unlikely event of a radiological emergency. Further, as cited in RG 4.7, 10 CFR 100.20 provides factors to be considered in determining the acceptability of a site for a nuclear power reactor. Population density and use characteristics of the site environs, including exclusion area, the population distribution (low population zone), and site-related characteristics is a factor that must be evaluated to determine whether individual as well as societal risk of potential plant accidents is low, and that physical characteristics unique to the proposed site that could pose a significant impediment to the development of emergency plans are identified. This supports NRC's defense-in-depth philosophy that locating reactors away from densely populated centers facilitates emergency planning and preparedness, as well as reduces potential doses and property damage in the event of a severe accident. Other factors include the nature and proximity of manrelated hazards and physical characteristics of the site, including seismology, meteorology, geology, and hydrology.

Turkey Point Units 6 & 7 does not meet the RG 4.7 population density criterion of 500 persons per square mile at all radii within 20 miles of the site, i.e., as shown in Figure 2.1-227, the projected year 2030 cumulative population beyond approximately six miles from the Turkey Point site exceeds, while between the 1 and 5 mile radii this population density criterion is met. Consequently, to provide assurance as indicated in 10 CFR Part 100 that the population density did not pose a significant impediment to the development of emergency plans, FPL placed particular emphasis on demonstrating acceptable measures for public radiological safety when assessing accidents at the Turkey Point site. The principal accident safety measures supporting a determination that, on balance, Turkey Point is an acceptable site despite its surrounding population density are:

- As documented in FSAR Subsection 15.6.5.3.7.3, and DCD Table 15.6.5-3, the Turkey Point site characteristics meet the radiation dose reference values for the public established in 10 CFR 50.34(a)(1)(ii)(D) and 10 CFR 52.79(a)(1)(vi), such that:
 - An individual assumed to be located at any point on the exclusion area boundary would not receive a radiation dose in excess of 25 rem total effective dose equivalent (TEDE) over any 2-hour period following a postulated fission product release into the containment;
 - An individual located on the outer radius of the established low population zone for the course of the postulated accident would not receive a radiation dose in excess of 25 rem TEDE.
- As documented in Part 5 of the Turkey Point Units 6 & 7 Combined License Application, the Turkey Point Emergency Plan, along with the associated Turkey Point Evacuation Time Estimate, takes into account the consequences of radiological emergencies, as required by 10 CFR 50.47 and 10 CFR 50 Appendix E. In addition, this Plan addresses guidance and meets the intent of the criteria established and provided within Regulatory

Guide 1.101 and NUREG-0654/FEMA-REP-1 Rev. 1, a joint NRC and Federal Emergency Management Agency (FEMA) document.

Additionally, 10 CFR 100.21(h), states that reactor sites should be located away from very densely populated centers; areas of low population density are, generally, 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. As presented in FSAR 2.1.3.5, the closest population center (population of greater than 25,000) is the city of Homestead. Turkey Point Units 6 & 7 are approximately 4.5 miles east of the southeastern municipal limits of Homestead. The distance to the boundary of the population center is 1.6 times the radius of the 5 mile LPZ. This distance meets the requirement that the population center distance be at least one and one-third times the distance from the reactor to the outer boundary of the LPZ (10 CFR 100.21(b)).

Therefore, in accordance with the objectives outlined in 10 CFR 100.21(h) and RG 4.7, the principal considerations influencing FPL's selection of the Turkey Point site over other alternative sites with lower nearby population densities include several unique safety, economic, reliability and environmental attribute advantages that would not be realized if the plant was developed elsewhere. Specifically, the Turkey Point site is considered to have significant advantages over the other alternative sites with respect to the following five project features:

1. **Ability to Balance Generation and Load in Southeast Florida** (economic, reliability attributes) – The Turkey Point site provides generation within Miami-Dade County, closer to the load than any other alternative site, and directly addresses the projected generation/load imbalance objective of the project. Turkey Point is the only site that fully addresses this project objective. The other alternative site locations are significantly less favorable, and would lead to increased costs to maintain the standard of reliability (e.g., transmission construction, transmission losses) compared to Turkey Point.
2. **Unique Cooling Water Supply Source** (safety, reliability, and environmental attributes) – Cooling water supply for the proposed units at Turkey Point will primarily utilize reclaimed water supplied by the Miami Dade Water and Sewer Department with groundwater from radial collector wells as a backup supply. This approach to water supply – feasible and available only at Turkey Point – provides significant advantages including:
 - Safety and reliability of a dedicated water source (reclaimed water) that assures water availability with reduced impacts from variances in, e.g., climate trends, regulatory policy, or competing water uses and that reduces potential safety concerns that could result from an interruption in cooling water availability.
 - Available backup in operational supply through availability of water from the radial well system.
 - Other potential cooling water sources that could be tapped with proper regulatory approvals in emergency conditions (e.g., Biscayne Bay, existing Turkey Point cooling canal system), should emergency supplies be necessary.

- Use of reclaimed water will enable Miami-Dade County to meet approximately one-half of its water use permit and outfall elimination requirements. In the absence of reuse opportunities, all or a significant portion of this treated domestic wastewater would likely continue to be discharged to the ocean or deep injection wells.
- Avoidance of costs and environmental impacts associated with developing conventional (i.e., surface water, groundwater) sources that are subject to existing high demand and restrictive regulatory policy.
- Reduced land acquisition cost and environmental impacts for construction of large-acreage cooling water lakes that would be required at sites where only conventional water supplies are available.

A potentially licensable cooling water supply plan was identified for each of the alternative sites, which confirmed that the factors listed above only apply to the Turkey Point site.

3. **Land Availability** (economic and environmental attributes) – Turkey Point is an existing nuclear power plant site with room for expansion. As such, the costs associated with procurement of new lands and/or gaining new land use approvals is minimized. Additionally, any cooling water storage reservoir at the Turkey Point site would be significantly smaller than would be required at greenfield sites, thereby avoiding both additional cost and environmental impacts.
4. **Existing Nuclear Power Plant Infrastructure** (safety, economic, and environmental attributes) – As an operating nuclear power plant site, Turkey Point has a fully developed nuclear plant infrastructure that can be utilized for development of the new units, thus minimizing the costs associated with new infrastructure development. Specific aspects of the existing Turkey Point infrastructure that benefit new unit development are:
 - Heavy haul access identified within the existing FPL property boundary requiring reduced infrastructure development due to the presence of existing features necessitating upgrades/improvements.
 - Road transportation infrastructure that would require limited non-permanent improvements to accommodate the additional site workforce.
 - Security program and infrastructure common to areas outside of the proposed Turkey Point Units 6 & 7 protected area.
 - Existing nuclear workforce of construction, maintenance, and operations personnel available to support the construction, testing, and operation of Turkey Point Units 6 & 7.

Each of these factors favor the Turkey Point site because of reduced or avoided costs for new infrastructure development, as well as providing the ability to take advantage of staff institutional knowledge and experience developed over the years of existing unit operation at Turkey Point.

5. **Emergency Planning Infrastructure** (safety and economic attributes) – As an operating nuclear power plant site, Turkey Point has in place an approved emergency plan, with associated established agreements and relationships with local emergency response agencies. FPL notes that this existing infrastructure already takes into account the

population densities and distributions in the vicinity of the Turkey Point site. Significant safety and cost advantages accrue from the ability to use a proven emergency planning infrastructure for the new units, versus developing and demonstrating programs at a new site.

Project features one and two are critical to achieving FPL's project objectives, with the accompanying safety, reliability, economic and environmental attribute advantages applying solely to the Turkey Point site. Project features three through five apply to some degree at multiple alternative sites (e.g., project feature four applies at the St. Lucie alternative site). However, all project features and their associated attribute advantages are available only at the Turkey Point site. This superlative result is the reason FPL selected the Turkey Point site above other alternative sites, when considering population density.

This response does not contradict information provided by FPL supporting NRC's environmental review of the proposed Turkey Point Units 6 & 7 project.

This response is PLANT SPECIFIC.

References:

None

ASSOCIATED COLA REVISIONS:

The second paragraph of FSAR Subsection 2.1.3.6 will be revised as follows in a future COLA revision:

2.1.3.6 Population Density

Given the reactor startup dates of 2022 for Unit 6 and 2023 for Unit 7, and an operational period of 60 years, operations could extend until 2083. Figure 2.1-227 shows the cumulative population (including transients) in 2030 (more than 5 years after initial site approval). On the same figure, spanning the same radial distances, a population curve shows the required population to achieve a hypothetical density of 500 people per square mile as required by RG 4.7, Position C.4. To determine the cumulative population for the hypothetical density of 500 people per square mile, the density was multiplied by the land area (area within the circle characterized as land) at various radii as well as the circular area. Due to the number of Turkey Point employees at the 1 mile radius, the 2030 population is greater than the 500 people per square mile density criterion specified in RGs 1.206 and 4.7, using both land area and circular area. Using land area to determine the population from a hypothetical density of 500 people per square mile, the projected 2030 population at the 10 and 20 mile radii exceed this criterion. Using circular area, the projected 2030 population at the 10 and 20 mile radii exceed the population calculated using a hypothetical density of 500 people per square mile. ~~As such, in accordance with RG 4.7, the analysis of alternative sites should pay particular attention to alternative sites having lower population density with consideration given to other factors such as safety, environmental, or economic considerations which may result in the site with the higher population density being found acceptable.~~

While the Turkey Point site does not meet the RG 4.7 population density criterion of 500 people per square mile within 20 miles of the site, related safety factors were considered to provide assurance that members of the public living in the proximity of an operating reactor can either be protected or safely evacuated such that they will not be subjected to excessive radiological doses in the unlikely event of a radiological emergency. These considerations included assurance that the Turkey Point site:

- **Met the radiation dose requirements to the public established in 10 CFR 52.79(a)(1)(vi) (Subsection 15.6.5.3.7.3).**
- **Developed the Turkey Point Emergency Plan, along with the associated Turkey Point Evacuation Time Estimate, which takes into account the consequences of radiological emergencies, as required by 10 CFR 50.47 and 10 CFR 50 Appendix E.**

For particular sites located away from a very densely populated center but not in an area of low density, such as Turkey Point, RG 4.7 requires that the analysis of alternative sites pay particular attention to alternative sites having lower population density. In selecting the Turkey Point site, an analysis of alternative sites for the Turkey Point site for the construction and operation of two nuclear power reactors was performed as required by 10 CFR 51.45(b)(3). This evaluation process was also consistent with the special case noted in NUREG-1555, Section 9.3(III)(8), and considered the advantages already present at existing nuclear facilities within the region of interest. Initially, following a detailed evaluation process, potential sites were identified for consideration. These sites were then evaluated based on a range of performance criteria and weight factors derived using methodology consistent with the modified Delphi process specified in the Electric Power Research Institute, Inc.'s document, Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application. During these initial screening phases, specific consideration was given to the avoidance of high population areas, and a prominent weight factor for the population criterion was used during the screening of potential alternative sites. After three successive stages of qualitative and quantitative evaluation, the top five candidate sites were identified. A comparison of the environmental impacts from construction and operation for the proposed site and each of the top alternative sites indicated that environmental impacts would, in general, be higher than or similar to those at the Turkey Point site. Therefore, based on these analyses, FPL concluded that no alternative site is environmentally preferable to the proposed Turkey Point site. ~~When identifying Turkey Point as the preferred alternative, criteria such as safety, environmental, and economic factors, including population density, were taken into account along with the advantages the Turkey Point site has due to the existing nuclear facilities.~~

Further, in accordance with RG 4.7, when identifying Turkey Point as the preferred alternative over other alternative sites with lower nearby population densities, the principal considerations influencing FPL's selection of the Turkey Point site included several unique safety, economic, reliability and environmental attribute advantages that would not be realized if the plant was developed elsewhere. Specifically, the Turkey Point site is considered to have critical advantages over the other alternative sites with respect to the following five project features:

- 1. Ability to Balance Generation and Load in Southeast Florida (economic, reliability attributes).**
- 2. Unique Cooling Water Supply Source (safety, reliability, and environmental attributes).**
- 3. Land Availability (economic and environmental attributes).**
- 4. Existing Nuclear Power Plant Infrastructure (safety, economic, and environmental attributes).**
- 5. Emergency Planning Infrastructure (safety and economic attributes).**

ASSOCIATED ENCLOSURES:

None