



Photo courtesy of Florida Power and Light

CONSTRUCTION AND OPERATION OF TURKEY POINT NUCLEAR PLANT UNITS 6 & 7

Draft Environmental Impact Statement Reader's Guide

March 2015

Introduction

Florida Power and Light Company (FPL) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) on June 30, 2009, for combined licenses to construct and operate two new nuclear units (Turkey Point Units 6 and 7) on the Turkey Point site near Homestead, Florida. Turkey Point Units 6 and 7 would be located directly south of FPL's existing power units.

What is this document?

The NRC is reviewing the application submitted by FPL and prepared a draft environmental impact statement for the Turkey Point Units 6 and 7 project. This document, the Reader's Guide, summarizes the impacts of the building and operation of two new nuclear units at the Turkey Point site as presented in the draft environmental impact statement. The Reader's Guide also summarizes the cumulative impacts and alternatives evaluated.

WHERE CAN I FIND MORE INFORMATION?

- An electronic version of the entire environmental impact statement can be found on the compact disc included with this summary.
- View an online version at <http://www.nrc.gov/reactors/new-reactors/col/turkey-point/documents.html>.
- Review a printed copy or compact disc at
 - Homestead Branch Library, 700 North Homestead Boulevard, Homestead, FL
 - South Dade Regional Library, 10750 SW 211th St, Miami, FL
 - Contact the U.S. Nuclear Regulatory Commission Environmental Project Manager: Alicia Williamson, at Alicia.Williamson@nrc.gov

What Is Being Proposed and Why?

FPL is seeking approval for building and operating two new reactor units at the Turkey Point site to provide additional electricity for use in the FPL service territory. The two new Westinghouse Advanced Passive 1000 (AP1000) pressurized water reactor units would be capable of providing approximately 2,200 megawatts of electricity of baseload-generating capacity. A closed-cycle wet-cooling system is proposed for both the circulating-water system and the service-water system. Reclaimed water from the Miami-Dade Water and Sewer Department would supply makeup water for the circulating-water system. When reclaimed water is not available in sufficient quantity or quality, circulating-water system makeup water would be saltwater pumped from radial collector wells in the subsurface sediment of Biscayne Bay.

The growing population and development in the FPL service territory requires additional sources of electricity to meet the anticipated power needs in 2022 and 2023.

Who Is Leading the Review of the Turkey Point Units 6 and 7 Project?

The NRC is the lead Federal agency for granting the combined licenses. The U.S. Army Corps

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act is a national policy for the environment that establishes the basis for considering environmental issues in the conduct of Federal activities.

The Act requires the following:

- Use a systematic, interdisciplinary approach for decisionmaking on actions that may affect the environment.
- Inform and involve the public in the decisionmaking process.
- Consider significant environmental impacts associated with the action.
- Consider alternatives and their impacts on the proposed action.

The environmental impact statement provides the necessary information required under this Act.

of Engineers and the National Park Service are cooperating with the NRC in the preparation of the environmental impact statement. The National Park Service participated in the environmental review as a cooperating agency by providing special expertise for the areas in and around the national parks. Only the NRC and U.S. Army Corps of Engineers have a specific regulatory action related to the proposed combined licenses. The license decision from the U.S. Nuclear Regulatory Commission relates to the building and operation of nuclear power facilities. Permits from the U.S. Army Corps of Engineers are necessary to perform building and operation activities that may affect nearby waterbodies. The NRC and U.S. Army Corps of Engineers must ensure that the **National Environmental Policy Act** process is properly conducted and completed before they can provide approval for this project. Because the reviews necessary for both agencies are similar, having both agencies work together saves time when reviewing an application. All agencies have worked together to produce an **environmental impact statement**, which describes the effects of building and operating new nuclear reactors on the environment.

ENVIRONMENTAL IMPACT STATEMENT

An environmental impact statement is required for any action that may have significant effects on the environment.

An environmental impact statement describes the potential for project effects on the environment and is used to help determine whether an action should be permitted.

The NRC staff (including its contractor staff at Pacific Northwest National Laboratory and Information Systems Laboratory) and U.S. Army Corps of Engineers staff reviewed FPL's application and environmental information and collectively determined the environmental impact levels. The impact determinations made in this environmental impact statement should not be attributed to the National Park Service, but only to the NRC and U.S. Army Corps of Engineers. The NRC staff and the U.S. Army Corps of Engineers staff, and contractor experts are known as the "review team."

A detailed description of how the NRC determines whether to issue a license to FPL is explained in the

following sections. The U.S. Army Corps of Engineers determination is independent of the NRC's decision; and the U.S. Army Corps of Engineers will conclude its analyses in its Record of Decision, which is separate from the environmental impact statement.

What Is the U.S. Nuclear Regulatory Commission's Process for Issuing a New Reactor License?

Once an application has been accepted, two separate reviews are prepared that address safety and environmental impacts, as shown in Exhibit A below.

Exhibit A shows the complete process for licensing reviews. The final product from the safety review is a safety evaluation report that details reactor design and safety issues. The final product from the environmental review is an environmental impact statement that describes the environmental effects of building and operating a nuclear plant. Both reviews will be addressed in a mandatory hearing in front of the Commissioners of the U.S. Nuclear Regulatory Commission. A contested hearing may be held if an outside group successfully files a petition that raises safety or environmental concerns about the combined licenses. The final decision on whether to grant the combined licenses will be made by the **NRC's Commission**.

THE COMMISSION

The U.S. Nuclear Regulatory Commission has five Commissioners who are selected by Presidential appointment. The Commission develops policies and regulations for nuclear reactors and nuclear materials safety, issues licenses, and rules on legal matters.

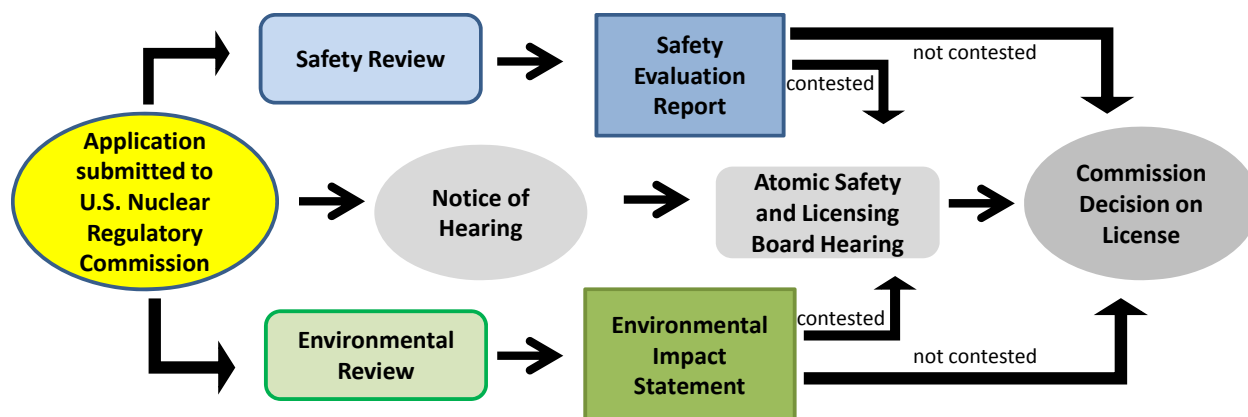


EXHIBIT A. NEW REACTOR LICENSING PROCESS

SAFETY REVIEW PROCESS

The purpose of the safety review is to ensure the new reactors will be safely built and operated according to NRC regulations and requirements. The review includes an evaluation of the design of the facility, siting requirements, quality assurance programs, physical security, and emergency preparedness. Additional information included in the analysis describes radioactive waste management and radiation protection. There are opportunities for public participation during the safety review process. The NRC's analysis is documented in the safety evaluation report.

FPL proposes to use the certified AP1000 pressurized water reactor design. Reactors must have documentation that provides information about the engineering design of the reactor; the inspections, tests, and acceptance rules for its safe operation; and a description of how the reactor will connect with other components of the energy system.

The **Advisory Committee on Reactor Safeguards** reviews each application and the NRC's safety evaluation report (see Exhibit B), and provides advice to the NRC's five-member

Commission about the potential hazards for the new nuclear plant and the acceptability of the proposed safety standards.

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

The Advisory Committee on Reactor Safeguards is composed of non-U.S. Nuclear Regulatory Commission technical experts. It is structured so that experts representing many technical areas can provide independent advice to the U.S. Nuclear Regulatory Commission.

Exhibit B shows the steps involved in the safety review process leading up to the mandatory hearing and potential license issuance.

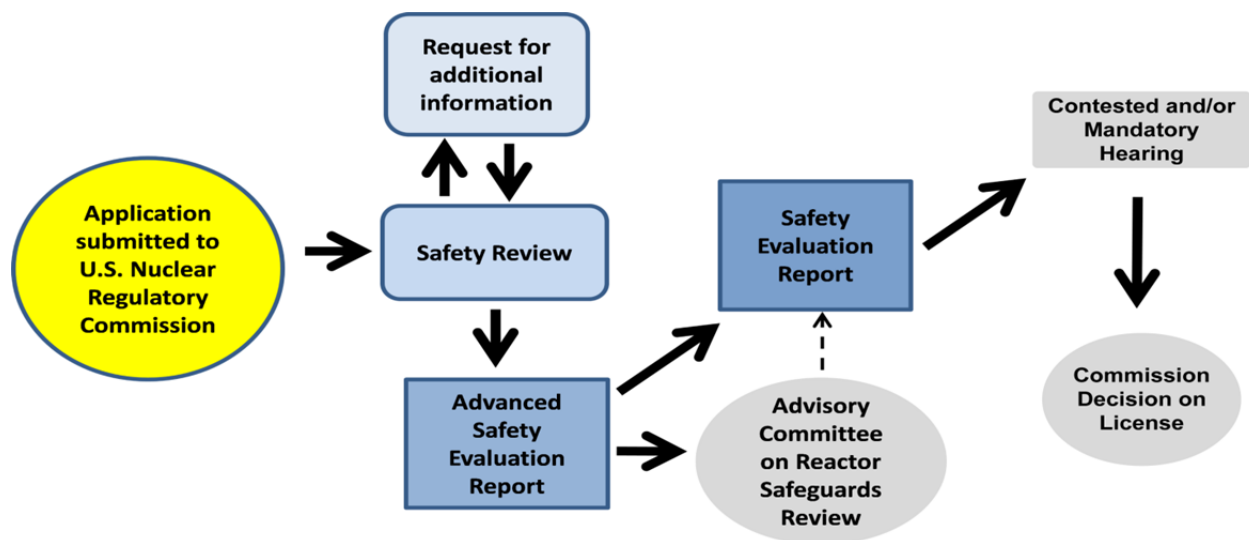


EXHIBIT B. SAFETY REVIEW PROCESS

ENVIRONMENTAL REVIEW PROCESS

The environmental review includes a careful look at the potential environmental impacts of building and operating new nuclear reactors and the potential mitigation measures for reducing environmental effects. The NRC applies the National Environmental Policy Act and the U.S. Nuclear Regulatory Commission's Environmental Standard Review Plan that provides detailed instructions for the review of each environmental subject area (e.g., water, human health, ecology).

Environmental effects are explained using guidelines from the **Council on Environmental Quality**.

COUNCIL ON ENVIRONMENTAL QUALITY

The Council coordinates environmental efforts between Federal agencies and the White House offices to develop environmental policies. The Chair of the Council serves as the environmental policy advisor to the President.

The environmental review includes consultation and coordination with local, State, and Federal agencies and Tribal Nations, as well as independent evaluations by the U.S. Nuclear Regulatory Commission, U.S. Army Corps of Engineers, National Park Service, and contractor experts. These experts review the applicant's information about the environment; visit and tour the proposed and alternative sites; request further information from the applicant as needed; review other published studies and reports; and, when necessary, perform additional analyses to confirm the applicant's conclusions. The analysis of the environmental impacts is documented in the environmental impact statement.

In addition, the environmental review includes input from the public by inviting comments before the draft environmental impact statement is prepared, and again after the draft environmental impact statement is issued. Impacts are categorized as **SMALL, MODERATE, LARGE**, or a range of these categories. Exhibit C shows a more detailed process flow for environmental reviews leading up to the mandatory hearing and potential license issuance.

IMPACT CATEGORIES

- **SMALL** – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
- **MODERATE** – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- **LARGE** – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

COMMISSION REVIEW AND DECISION

A mandatory hearing for a combined license is conducted by the Commission. *Combined license* means a combined construction permit and operating license with conditions. An Office of the Secretary document is prepared that summarizes the NRC review team's environmental analyses of granting the combined license for the Commission to use in the mandatory hearing. In addition, a contested hearing may be held by the **Atomic Safety and Licensing Board** if an outside party successfully files a petition that raises safety or environmental concerns about licensing the plant. The Atomic Safety and Licensing Board then makes a recommendation to the Commission about whether to grant a combined license.

ATOMIC SAFETY AND LICENSING BOARD

The Atomic Safety and Licensing Board panel are employees of the U.S. Nuclear Regulatory Commission who act as administrative judges on behalf of the Commission. This panel rules over contested public hearings.

The NRC's five-member **Commission** makes the final decision about whether or not to grant a combined license.



EXHIBIT C. ENVIRONMENTAL REVIEW PROCESS

Who Else Did the U.S. Nuclear Regulatory Commission Work with on This Environment Impact Statement?

A large number of Federal, Tribal, State of Florida, county and local agencies, and community organizations were contacted during the development of the environmental impact statement. These parties provided comments and information used to develop a good understanding of the environmental resources in the area and the potential for environmental impacts. Detailed information about consultations can be found in Appendix F of the environmental impact statement.

See Appendix C of the environmental impact statement for more information about how this project has coordinated with Federal, Tribal, State of Florida, county, and local agencies.

AGENCIES AND TRIBES CONTACTED FOR THIS PROJECT

- Advisory Council on Historic Preservation
- Biscayne National Park, National Park Service
- Everglades National Park, National Park Service
- U.S. Army Corps of Engineers, Jacksonville District
- U.S. Environmental Protection Agency, Region 4
- National Marine Fisheries Service, Southeast Regional Office
- U.S. Fish and Wildlife Service, Vero Beach
- Florida Keys National Marine Sanctuary
- Florida Department of Environmental Protection
- South Florida Water Management District
- Florida Department of State, State Historic Preservation Office
- Florida Department of Health, Bureau of Radiation Control
- Florida Wildlife and Fisheries Conservation Commission
- Florida Keys Aqueduct Authority
- Miami-Dade County Department of Regulatory and Economic Resources
- Miccosukee Tribe of Indians of Florida
- Muscogee (Creek) Nation
- Poarch Band of Creek Indians
- Seminole Nation of Oklahoma
- Seminole Tribe of Florida
- Miami-Dade County Historic Preservation Chief
- Florida Office of Historic and Archaeological Resources
- Archaeological and Historical Conservancy, Inc.
- City of Miami Historic Preservation Officer
- City of Coral Gables
- City of Homestead Community Redevelopment Agency
- City of South Miami
- Village of Pinecrest, Florida
- Office of the City Attorney's Office, City of Miami

In addition to a combined license from the U.S. Nuclear Regulatory Commission, FPL needs many other environmental permits and authorizations to begin building and operating Turkey Point Units 6 and 7. Appendix H of the environmental impact statement contains a comprehensive list of all of the permits and requirements FPL will need to build and operate new nuclear facilities.

Description of the Project

The Turkey Point site is located in southeast Miami-Dade County, Florida, near Homestead. Turkey Point Units 6 and 7 would be located on the same site as the existing Turkey Point site, which has five other power plants, including two nuclear power reactors. The site is located 25 mi south of Miami. The primary source of cooling water for the proposed Units 6 and 7 would be reclaimed water received from the Miami-Dade Water and Sewer Department South District Treatment Plant and discharged through the use of onsite underground injection wells to the

Boulder Zone, a cavernous, high-permeability South Florida geologic horizon located at depths of approximately 2,800 to 3,500 ft in the Lower Floridan aquifer. When reclaimed water cannot supply the quantity and/or quality of water needed for the plant, a second source for makeup water would consist of radial collector wells that would withdraw saltwater from under Biscayne Bay. Exhibit D is a conceptual figure of the Turkey Point Units 6 and 7 site.



EXHIBIT D. CONCEPTUAL LAYOUT OF THE TURKEY POINT UNITS 6 AND 7

How Does the Project Affect the Environment?

The building and operation of Turkey Point Units 6 and 7 would have effects on multiple environmental and regional resources. The environmental impact statement considers the potential for impact on each resource.

LAND-USE IMPACTS

Units 6 and 7 would occupy approximately 591 ac within a tract of approximately 9,640 ac owned by FPL surrounding two existing nuclear and three existing non-nuclear power plants. The two new power blocks and most support facilities would be developed on a vacant 218 ac island situated east of Biscayne Bay, south of the existing power plants, and north of an existing cooling canal system. Additional support facilities would be situated on multiple tracts of undeveloped FPL-owned land close to the island. Most of the affected land has previously been

disturbed in connection with the older power plants. The new facilities would not conflict with existing land uses but could noticeably affect waters immediately to the east that are managed as part of Biscayne National Park. Miami-Dade County issued an Unusual Use Resolution in 2007 authorizing development of Units 6 and 7 and ancillary facilities in accordance with applicable zoning. Building and operation of the new facilities would not interfere with mineral resource development or agriculture and would not affect lands designated as prime or unique farmland. FPL would obtain a Coastal Zone Consistency Determination from the State of Florida prior to initiating work.

Building and operating associated offsite support facilities such as transmission lines, pipelines, access roads, and substations could involve as much as 7,000 ac of offsite land. Most of the affected offsite land would be managed as linear corridors within which certain compatible land uses such as agriculture might be possible. Most of the corridors would traverse rural landscapes with little potential for conflict with adjoining land uses. However, some of the transmission lines would pass through dense urban areas where residents have expressed concerns about possible land-use conflicts. Some of the transmission lines would also pass very close to the eastern perimeter of Everglades National Park where they could noticeably conflict with park objectives related to aesthetic quality and wildlife management.

While elements of Units 6 and 7 could noticeably affect nearby land uses, especially land uses associated with the two National Parks and urban areas traversed by one of the new transmission lines, the project would not destabilize these or other land uses.

WATER-RELATED IMPACTS

FPL will use a unique design to effectively eliminate any direct impacts on the local water resources. By using reclaimed water from Miami Dade Water and Sewer Department that would otherwise have been disposed of through deep-well injection as the predominate source of water for the plant, FPL would not affect the region's critical water supply. By discharging the plant's effluents into a deep and well-isolated aquifer, which has a composition similar to seawater, FPL would not affect the region's water quality. The nuclear reactors themselves use an innovative passive design that does not require a water supply for safe shutdown. In its review, the staff has not identified any reasons why the reclaimed water supply would not be highly reliable. However, in order to continue power generation during any disruption in reclaimed water supply, a backup water source has been included in FPL's design. The backup water source would withdraw water through shallow horizontal wells that extend beneath Biscayne Bay.

The cooling canal system for the existing power plants is the dominant feature of the existing Turkey Point site. The existence of the cooling canals has affected the Biscayne Bay and the underlying aquifer. Therefore, the staff closely examined the potential for alterations in the cooling canals as a result of the proposed action. Reliance on reclaimed water for water supply and discharge to deep aquifers for effluent disposal eliminates all direct impacts on the cooling canals during normal operation. The staff closely evaluated indirect effects such as dewatering and demucking during construction, leaching of muck removed during construction, deposition of chemicals from drift off the cooling towers, stormwater runoff, and temporary use of the backup water source and determined the alterations would be minor. Most alterations would be so minor that they would not be detectable.

The alterations to Biscayne Bay and the Biscayne aquifer as a result of the possible operation of the backup wells were subjected to a detailed independent modeling analysis performed by the United States Geological Survey. Model simulations, which conservatively assumed continuous operation of the backup wells, showed only minor changes to the Biscayne Bay and the underlying aquifer, as a result of most of the water seeping gradually into the wells from the Biscayne Bay. Operation of these wells would be restricted to less than 60 days during any year. Through review of published studies relating to deep well injection in South Florida, the review team determined that migration of injected wastewater is not predicted to alter overlying aquifers that could plausibly be a source of drinking water. Independent analysis by the review team using very conservative assumptions indicates that even if upward migration of injected wastewater occurs, changes in water quality would be negligible.

Potable water for drinking water, construction activities, fire protection, and demineralized water are typical of the needs for the building and operation of any industrial facility of this size and would be supplied by the MDWASD. The design FPL has proposed for the new units effectively minimizes the impacts on both the water use and the water quality in this exceptionally sensitive region.

TERRESTRIAL ECOLOGY IMPACTS

Impacts from clearing, excavation, building of roads, and the placement of fill to develop Turkey Point Nuclear Plants Units 6 and 7 would require permanent disturbance to approximately 573 ac of habitat within the Turkey Point site. The majority of the affected area (328 ac) is wetlands, including a predominant mudflat and remnant mangrove stands. Additional offsite acreage within multiple proposed transmission corridors ranges from approximately 5,000 to 6,500 ac of mostly wetlands and lands previously altered by development. Installation of offsite pipelines would also affect additional acres. Some habitat would be permanently lost, some wildlife would be killed, and other wildlife would be temporarily displaced during project activities.

AQUATIC ECOLOGY IMPACTS

Installation of radial collector wells and expansion of the equipment barge-unloading area are expected to cause temporary disturbances to aquatic species and habitats in adjacent nearshore areas. Use of reclaimed water for operation of the cooling system will not have noticeable effects on surrounding aquatic resources. In addition, operation of radial collector wells would be limited to 60 days per year, and is not expected to have noticeable effects on aquatic resources in nearshore areas. Release of discharge waters will occur by deep well injection and will not noticeably affect aquatic species or habitats in the nearshore areas surrounding the plant.

PROTECTED SPECIES

Species and/or critical habitat that are protected by Federal laws, such as the Endangered Species Act of 1973. If a listed, protected species is found, the Federal agency must consult with either the Fish and Wildlife Service or National Marine Fisheries Service or both to conclude if there is an adverse effect on the species or habitat.

PROTECTED SPECIES

Twenty-nine Federally protected or candidate animal and 19 Federally protected or candidate plant species live in habitats associated with the building and operation of the Turkey Point Units 6 and 7. Most of them are not likely to be harmed. Federally protected species that may be harmed include the American crocodile, Florida panther, wood stork, Everglade snail kite, Bartram's scrub hairstreak butterfly, Florida brickell-bush, and Carter's small-flowered flax. Consultation with the U.S. Fish and Wildlife Service is currently in progress to determine the degree of adverse effects on all 48 species. The National Marine Fisheries Service considers the nearshore and tidal waters near the Turkey Point site to be essential fish habitat for four different groups of managed aquatic species.

Appendix F in the draft environmental impact statement displays the correspondence between the NRC and the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to consult with those two Federal agencies on the potential for adverse impacts on Federally protected terrestrial and aquatic species, respectively, and with the National Marine Fisheries Service to consult on the potential for adverse impacts on essential fish habitat. The final environmental impact statement will present the conclusions reached by each of these Federal agencies.

SOCIOECONOMIC IMPACTS

The review team assessed the potential socioeconomic impacts from building and operating the proposed two new units at the Turkey Point site within a 50 mi radius of the proposed site. This area includes a portion of southern Broward County, the southeastern corner of Collier County, the eastern side of Monroe County, and almost all of Miami-Dade County. The Turkey Point site is in a largely isolated location— all major population centers are north of the plant and to the south and west the land is sparsely populated and to the east is the Atlantic Ocean. Therefore, the review team identified the communities of Homestead and Florida City, as the primary place where socioeconomic and environmental justice impacts would be occur.

Direct physical impacts are the consequence of the direct influence of construction and operation impacts on people, buildings, the transportation infrastructure (roads, rail, and waterways), and the aesthetic quality of local viewsheds. Because most of the sources of physical impacts attenuate rapidly with distance, intervening foliage, and variations in terrain, the review team determined all of the building- and operations-related direct physical impacts would be SMALL, with the exception of aesthetic impacts along the transmission line corridor during building and operations, which would be MODERATE.

Demographic impacts derive from the in-migration of new workers during the projected 10 years for construction and 40 years of operations. According to FPL, during the peak employment period during construction, there would be 3,950 construction workers and 33 operations workers, and half of all workers would bring their families and move into the 50 mi region. The review team determined at the peak of construction employment, there would be a small net population increase in Miami-Dade County and the Homestead and Florida City area (based on 2009 population estimates). In addition, the impact during operations would be even further reduced because of the much smaller operations workforce; the review team determined that the impact of demographic changes due to construction and operations would both be SMALL.

Exhibit E is a visual characterization of the changes in building and operations workforces during the construction period.

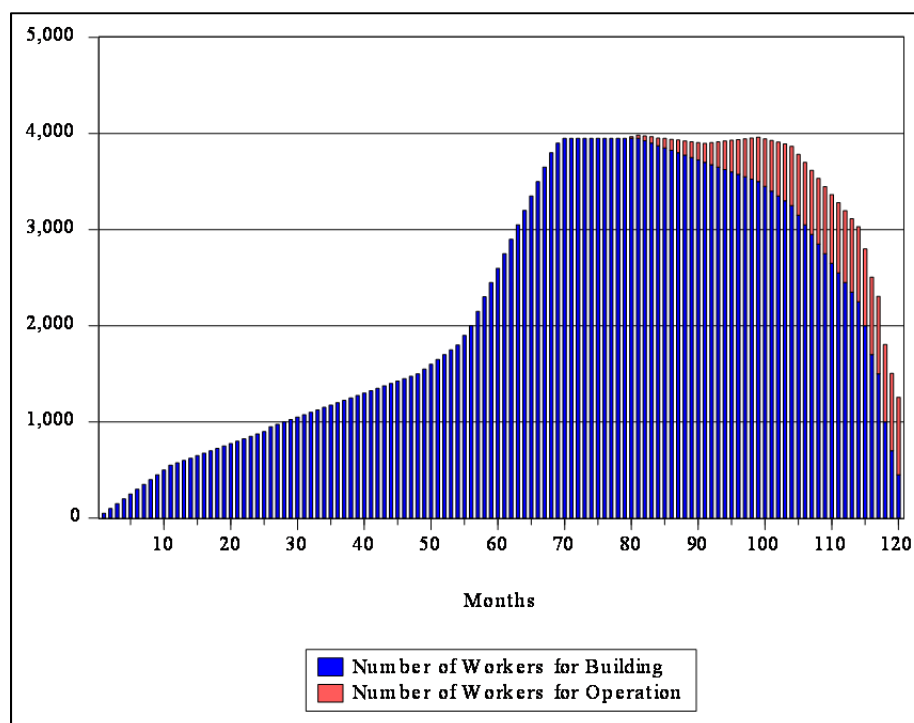


EXHIBIT E. TOTAL WORKFORCE AT TURKEY POINT UNITS 6 AND 7

ECONOMY

The in-migration of workers during construction and later during operations stimulates the economies of the communities where the workers live. For each of the 3,290 construction workers moving into Miami-Dade County, the Bureau of Economic Analysis (BEA) estimates almost one more job will be created (0.9535 jobs per new Miami-Dade resident). Because of the long-term duration of the operations jobs, BEA estimates each of the 671 operations workers who moves to Miami-Dade County would stimulate the creation of more than twice as many jobs as the construction workers—2.1696 jobs per operations worker.

FPL pays a corporate income tax to the State of Florida, 5.5 percent of its net revenues. The review team estimated that during operations the State of Florida would receive about \$31 million a year in corporate income taxes, an addition of about 1.7 percent to Florida's 2010-2011 corporate income tax revenues.

Property tax revenues would not change significantly during construction, because half of the workforce already lives in the region and most of the in-migrating construction workers would rent existing homes instead of adding to the property tax rolls. During operations, the number of operations workers who moved into the county and decided to build would also have a minor effects on the tax annual revenues. For Miami-Dade County, this would amount to an increase of up to 15 percent of the Miami-Dade County property tax revenues, and for the Miami-Dade School District, about 9.6 percent. Therefore, the review team determined that the economic impacts on Miami-Dade County would be SMALL and beneficial.

INFRASTRUCTURE AND COMMUNITY SERVICES

Impacts on infrastructure and community services include construction- and operations-related impacts on traffic, recreation, housing, public services (water and sewer utilities, police, fire departments, and hospitals), and on the public school system.

Traffic during the construction period will create intermittent, short-lived but noticeable impacts, primarily on the roads surrounding the Turkey Point site. The magnitude of the impact will follow the same general trend as the number of workers on the site, as shown above in the construction period worker chart (Exhibit E); i.e., it is projected to grow gradually from baseline levels for several years and then grow at a rapid rate to its peak, before it levels off and eventually declines rapidly over the last few years of the construction project. Although FPL has identified a number of road improvements it plans to make to minimize the traffic impacts, the review team expects MODERATE impacts. During operations, the traffic impacts would still be MODERATE, even though the number of workers commuting to the Turkey Point site would be significantly fewer than the number of construction workers that drove to the site.

Recreation effects include visual, audible, and availability changes to the recreational experience. Because the Turkey Point site is adjacent to Biscayne National Park and near the Everglades National Park, the review team recognized the environmental sensitivity of the area but because the site is already developed with five other power plants on it, the review team determined the changes to the viewshed during construction and operations would be SMALL.

Housing should create SMALL impacts in Miami-Dade County. Impacts may be slightly larger in Homestead and Florida City, which are the closest communities to the site, during the peak construction period. During operations, the migration of workers into Homestead and Florida City would account for less than 5 percent of the available housing.

Police, fire-protection, and medical facilities would all experience a temporary increase in the call for their services, but the review team determined that the impacts on all three would be SMALL during construction and even smaller during operations.

Schools would see a temporary increase in the number of students in the Miami-Dade County school system during construction. The Miami-Dade School District typically has a 1 percent variation in enrollment and the review team determined the additional students would have no discernable impact on the large school district. During operations, the impact of students migrating into Miami-Dade County and the communities of Homestead and Florida City would be much lower than that during construction. Therefore, the review team determined that the impacts of construction and operations on the local school system would be SMALL.

ENVIRONMENTAL JUSTICE IMPACTS

Environmental justice (EJ) refers to a Federal policy established under Executive Order 12898 that requires each Federal agency to identify and address, as appropriate, the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority or low-income populations. Minority categories are defined as American Indian or Alaskan Native; Asian; Native Hawaiian or other Pacific Islander; Black races; or Hispanic ethnicity; and “other” may be considered a separate minority category. Low-income refers to individuals living in households meeting the official poverty measure. The

review team examined the geographic distribution of minority and low-income people within the 50 mi demographic region of the Turkey Point site and identified 1,238 Census Block Groups that had a representation of minorities large enough for the review team to consider them “environmental justice populations of interest.” The review team also identified 210 Census Block Groups with a sufficiently large representation of low-income people to also be considered EJ populations of interest. Over half of the Census Block Groups in the 50-mi region contained Hispanic populations of interest, the highest representation of any single racial or ethnic group and twice the number of Census Block Groups for the next highest racial group, Black or African American. The review team found no other racial or ethnic group that had populations of interest in more than 2 percent of the Census Block Groups in the 50-mi region. Further, the review team identified migrant agricultural workers as being present in the area, of low-income status, Hispanic, and potentially vulnerable to environmental air and noise pollution due to their extended presence outdoors.

Sometimes environmental justice populations of interest can be overlooked by the NRC’s census analysis process. To ensure that the census analysis reached all of the correct Census Block Groups, the review team traveled to Homestead and interviewed local, State, Tribal, and county officials, business leaders, and key members of minority communities in Homestead, Florida City, and Miami. Interviews revealed the census analysis was accurate.

AREAS OF POTENTIAL EFFECT

A geographic area in which an action may change the character or use of a historic property.

After reviewing the evidence presented and after considering all potential pathways by which minority or low-income populations could be more affected than the general public, the review team did not identify any disproportionately high and adverse human health or environmental impacts and concludes that construction and operation activities for the proposed Turkey Point Units 6 and 7 would not result in any environmental justice impacts.

HISTORIC AND CULTURAL RESOURCES

Building and operation of new nuclear generating units at the Turkey Point could affect either known or undiscovered archaeological sites, historic buildings, and traditional places important to local groups. In accordance with the provisions of the National Historic Preservation Act and the National Environmental Policy Act, the NRC and the U.S. Army Corps of Engineers are required to make a reasonable and good faith effort to identify historic properties and cultural resources in the **Areas of Potential Effect** and, if present, determine whether any significant impacts are likely.

The U.S. Army Corps of Engineers is the lead Federal Agency for National Historic Preservation Act Section 106 review. A detailed archaeological survey and cultural resource study concluded that no known cultural resources or historic sites are located within the Area of Potential Effect at the Turkey Point site. Further, the study found that no resources eligible for the National Register of Historic Places occur in the broader area of indirect impacts, meaning there is little potential for visual impacts from building and operating the new nuclear generating units. The Florida State Historic Preservation Office has concurred with the finding that no adverse effects

on historic resources would result from the construction and operation of the new nuclear generating units.

The U.S. Army Corps of Engineers is responsible for considering the effects on historic and cultural resources from the construction of new transmission lines. An assessment of recorded cultural resources and historic buildings in the Area of Potential Effects for the transmission lines shows that there are more than 200 recorded resources along the proposed routes. Most of the rest have not been evaluated to determine whether they are significant. Many of these resources could be visually affected by the project. More detailed cultural resource surveys, as required by the Florida State Historic Preservation Office and the U.S. Army Corps of Engineers, will identify exactly how many resources are present along the transmission lines, and how they might be affected. Consultation between the U.S. Army Corps of Engineers, the Florida State Historic Preservation Office, and local Native American tribes is ongoing.

For the purposes of the review team's onsite National Environmental Policy Act analysis, based on the information provided by FPL, consultation with the Florida State Historic Preservation Office, and the review team's independent evaluation, the review team concludes that the impacts from the construction and preconstruction activities of Units 6 and 7 project site Area of Potential Effects would be SMALL. This finding was based on (1) no known historic properties within the Units 6 and 7 project site Area of Potential Effects, (2) FPL's commitment to develop procedures to follow in the event that ground-disturbing activities discover historic or cultural resources, and (3) consultation with the Florida State Historic Preservation Office that concluded with a finding of no historic properties affected for the Turkey Point Units 6 and 7 project Area of Potential Effects.

For the purposes of the review team's offsite National Environmental Policy Act analysis, based on the information provided by FPL, the U.S. Army Corps of Engineer's ongoing National Historic Preservation Act Section 106 review for the project, and the review team's independent evaluation, the review team concludes 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.

The review team concludes that, while the overall project, including construction and operation of new transmission lines, would have a MODERATE impact on historic properties, the potential for impacts resulting from the NRC-authorized portion of the project, restricted to the Turkey Point site, is SMALL.

METEOROLOGICAL AND AIR QUALITY IMPACTS

Building activities for Units 6 and 7 at the Turkey Point site would result in temporary impacts on local air quality because of the emissions associated with ground-clearing activities and the use of a concrete batch plant. Air emissions during operation would primarily be generated by vehicles and diesel generators; however, the diesel generators would be used only intermittently and for brief durations. Release of heat and moisture from operation of the cooling-water system also may affect air quality via the condensation of heated water discharged from the cooling towers that may result in visible steam clouds, ground fogging, plume shadowing, and salt deposition. However, any impacts on meteorology and air quality from these phenomena would be minimal and mostly confined to the Turkey Point site.

Car and truck emissions would vary based on time of day and number of workers driving to and from the Turkey Point site, but the overall effects of these traffic emissions would be localized and temporary and would have a minimal impact on air quality.

NONRADIOLOGICAL HEALTH IMPACTS

Nonradiological public health concerns would include exposure to dust and vehicle exhaust, occupational injuries, and noise, as well as the transport of materials and personnel to and from the site during building activities and also from electromagnetic fields, and possible health effects from operation of the cooling-water system during operations. Occupational injuries to workers would be mitigated through training and the use of appropriate equipment and protective clothing. An industrial safety program would be instituted that meets all applicable Federal and State safety requirements throughout the project to minimize risks to workers.

Building activities that generate dust and vehicle exhaust would occur on the site, but the land around the Turkey Point site is almost exclusively undeveloped and characterized by wetlands and occasional wooded tracts. Therefore, the effects of dust and noise upon nearby populations would be minor. During operation, noise levels for plant operation are also expected to be minor.

Electromagnetic fields result from the flow of electricity through a transmission line. The immediate impacts of electromagnetic fields, such as electric shock, would be controlled and minimized by placement of the lines. The review team reviewed available scientific literature about the long-term effects of extremely low-frequency electromagnetic fields on human health and found that the scientific evidence regarding the long-term effects of extremely low-frequency electromagnetic fields on human health does not conclusively link such fields to adverse health impacts.

Reclaimed water received from the Miami-Dade Water and Sewer Department South District Treatment Plant would be the primary source of water for the cooling system. It would be discharged through the use of onsite underground injection control wells to the Boulder Zone located approximately 2,800 to 3,500 ft underground. When reclaimed water cannot supply the quantity and/or quality of water needed for the cooling-water system, a second source for makeup water would consist of radial collector wells that would withdraw saltwater from under Biscayne Bay.

Some harmful bacteria and pathogens may grow in warm waters. The potential health effects on the public and workers from microorganisms that favor warmer water were found to be unlikely for several reasons. Because of the lack of complete exposure pathways, the use of high-level disinfection and other treatments on the reclaimed water beyond the requirements of Part III of Florida Administrative Code 62-610, and the lack of concern for etiological agents in the secondary cooling-water source from Biscayne Bay, the likelihood of impacts from etiological agents on workers and health would be minimal.

RADIOLOGICAL HEALTH IMPACTS

Once Units 6 and 7 are operational, the sources of radiation exposure from normal operations for plant workers at the Turkey Point site would include direct radiation exposure and gas effluent releases. Members of the public, plants, and animals nearby could also receive a radiation dose from the nuclear units through direct exposure and gas effluent releases (breathing or by eating food grown or raised in the vicinity upon which radioactive material dispersed in the atmosphere may have been deposited), as shown in Exhibit F and Exhibit G.

Treated liquid radioactive effluent from operations at proposed Turkey Point Units 6 and 7 would be discharged into the Boulder Zone deep aquifer via a deep-well injection system. Because of the unique nature of this radioactive effluent discharge into a deep non-drinking water aquifer, no radiological health impacts are expected from this effluent disposal pathway.

NONRADIOLOGICAL WASTE IMPACTS

Nonradioactive waste that would be generated, handled, and disposed of during building activities for Units 6 and 7 at the Turkey Point site includes cleared vegetation, construction debris, stormwater runoff, municipal and sanitary waste, dredged spoils, dust, and air emissions. Cleared vegetation would be burned, disposed of offsite, or left to decompose within the cleared lands. Some vegetation may be removed with unsuitable soils and muck and be placed in one of the spoil areas where it would decompose in place. Dredged spoils from dredging in the equipment barge-unloading area would be spread on the industrial wastewater facility berms.

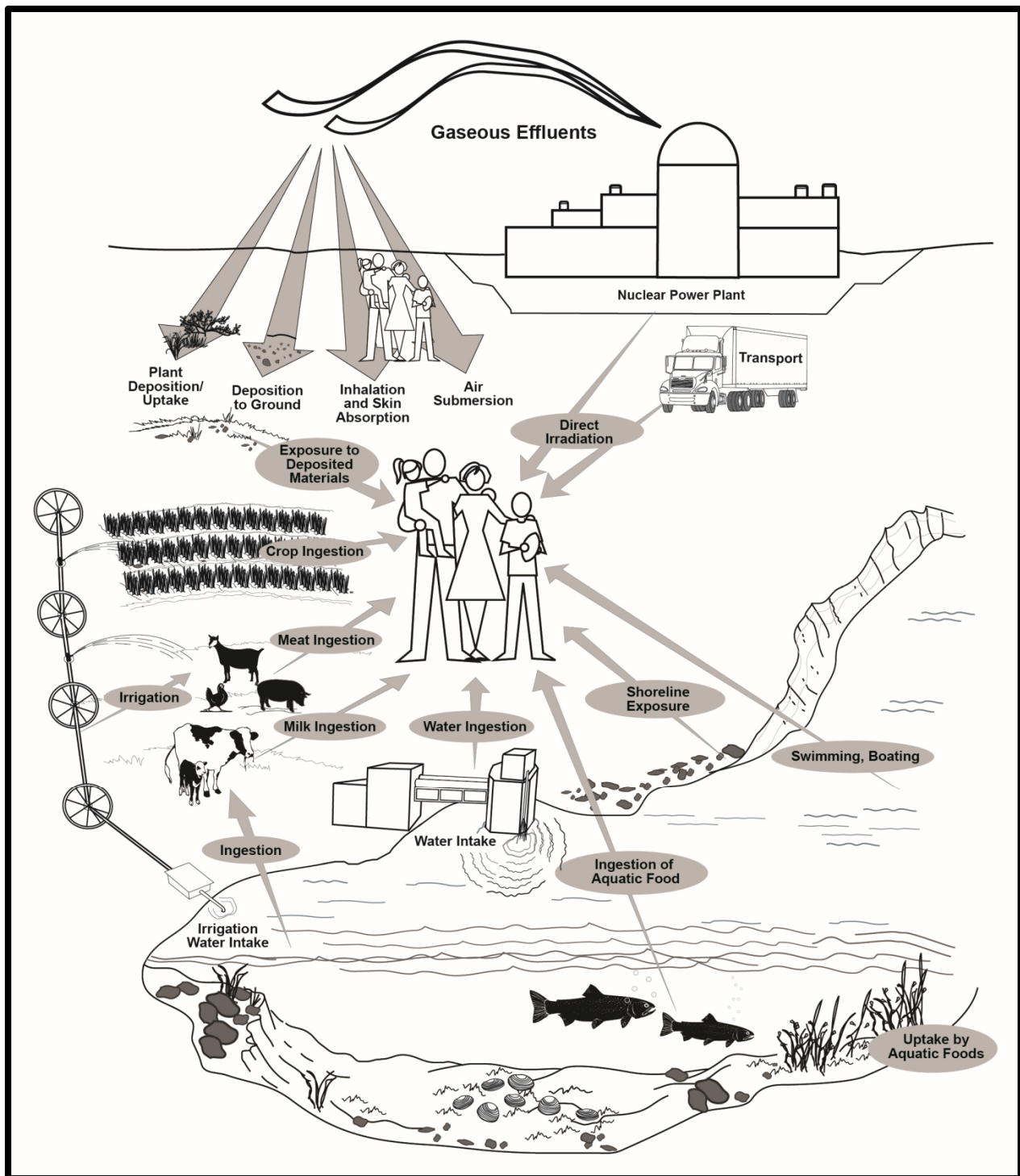


EXHIBIT F. EXPOSURE PATHWAYS TO MAN (SOURCE: ADAPTED FROM SOLDAT ET. AL 1974)

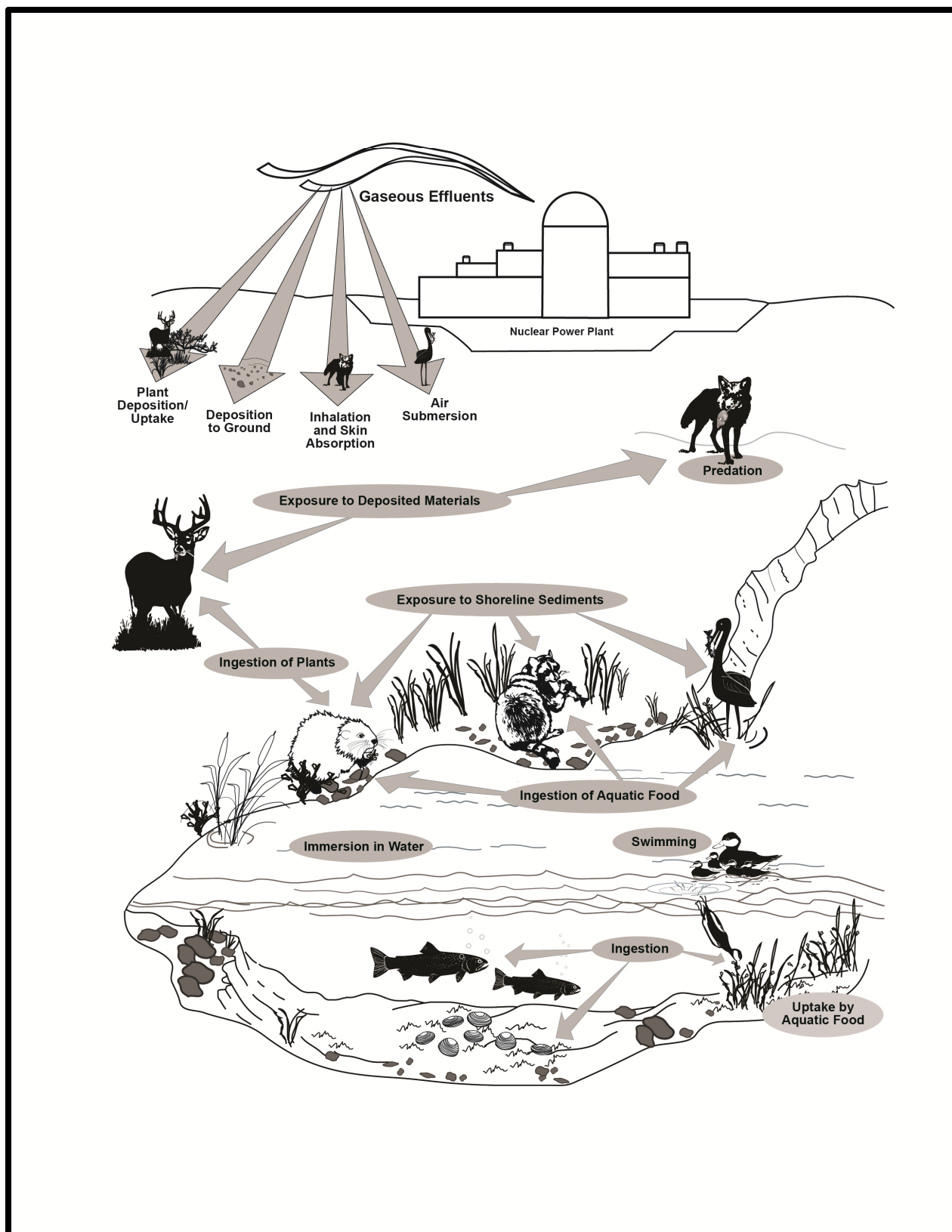


EXHIBIT G. EXPOSURE PATHWAYS TO WILDLIFE AND PLANTS (SOURCE: ADAPTED FROM SOLDAT ET. AL 1974)

The types of nonradioactive waste that would be generated, handled, and disposed of during the operation of Units 6 and 7 at the Turkey Point site include solid wastes, liquid effluents, and air emissions. Solid wastes include municipal waste, sewage-treatment sludge, and industrial wastes. Liquid waste includes discharges such as effluents containing chemicals or biocides, wastewater effluents, site stormwater runoff, and other liquid wastes such as used oils, paints, and solvents that require offsite disposal. In addition, small quantities of hazardous waste and mixed waste (i.e., waste with both hazardous and radioactive characteristics) may be generated during plant operations. FPL would be required to follow all regulations related to gaseous, liquid, and air nonradioactive wastes during building and operations. The review team found the impacts would be minimal based on compliance with State and Federal Regulations.

Exhibit H lists the final impacts associated with the building and operation of Turkey Point Units 6 and 7 on each resource area.

EXHIBIT H. IMPACTS ON RESOURCES

Resource Category	Preconstruction and Construction	Operation
Land Use	MODERATE (NRC-authorized construction impact level is SMALL)	MODERATE (NRC-authorized construction impact level is SMALL)
Water-Related		
Water Use – Surface Water	SMALL	SMALL
Water Use – Groundwater Use	SMALL	SMALL
Water Quality – Surface Water	SMALL	SMALL
Water Quality – Groundwater	SMALL	SMALL
Ecology		
Terrestrial Ecosystems	MODERATE (NRC-authorized construction impact level is SMALL)	MODERATE
Aquatic Ecosystems	SMALL to MODERATE	SMALL
Socioeconomic		
Physical Impacts	SMALL	SMALL
Demography	SMALL	SMALL
Economic Impacts on the Community	SMALL	SMALL
Infrastructure and Community Services	SMALL to MODERATE	SMALL to MODERATE
Environmental Justice	NONE ^(a)	NONE ^(a)
Historic and Cultural Resources	MODERATE (NRC-authorized construction impact level is SMALL)	SMALL
Air Quality	SMALL	SMALL
Nonradiological Health	SMALL	SMALL
Nonradiological Waste	SMALL	SMALL
Radiological Health	SMALL	SMALL
Postulated Accidents	n/a	SMALL
Fuel Cycle, Transportation, and Decommissioning	n/a	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

How Can the Impacts Be Reduced?

Many of the SMALL impacts are considered minimal because monitoring and use of environmental practices and safeguards would reduce any negative effects on an environmental resource. However, some of the impacts greater than SMALL can be reduced, compensated for, or prevented from becoming disruptive.

WETLANDS IMPACTS

Previous development has substantially altered 247 ac of the project area within the Turkey Point site and 2,500-2,600 ac within the proposed transmission corridors, and much of the acreage within the proposed pipeline corridors. Permanent development within the proposed transmission corridors would only occupy approximately 15 percent of lands within the transmission corridors. FPL has proposed to mitigate loss of wetlands and wetland function through wetland restoration, enhancement, preservation, and mitigation banking. Linear features (pipelines and transmission lines) have been co-located where feasible. Both the State of Florida and the U.S. Fish and Wildlife Services would require site-specific plant and animal surveys prior to any ground-clearing activities. FPL is also required to institute measures to minimize risk and conduct research to quantify effects on selected wildlife species.

AQUATIC IMPACTS

Mitigation of impacts on the American crocodile may minimize vehicle collisions during construction. Any mitigation plans would be developed during consultation between FPL and the U.S. Fish and Wildlife Service.

MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS

In its evaluation of potential environmental impacts caused during the building and operation of the proposed Turkey Point Units 6 and 7, the review team relied on FPL's compliance with the following measures and controls that would limit adverse environmental impacts:

- compliance with applicable Federal, State, and local laws, ordinances, and regulations intended to prevent or minimize adverse environmental impacts (e.g., solid-waste management, erosion and sediment control, air emissions, noise control, stormwater management, spill response and cleanup, hazardous material management)
- compliance with applicable Federal and State requirements of permits or licenses required for building and operation of the new units (e.g., Department of the Army Section 404 Permit, National Pollutant Discharge Elimination System permit, Florida Department of Environmental Protection final Conditions of Certification)
- implementation of Best Management Practices and good construction practices to limit potential impacts
- incorporation of environmental protection requirements into construction contracts.

The review team considered these measures and controls in its evaluation of the impacts of plant building and operation. They are fully analyzed in Sections 4.11 and 5.11 of the environmental impact statement. For every environmental resource area, some kind of coordination with another Federal, State, or local agency is required to gain permission to build and operate Turkey Point Units 6 and 7. The required permits and certifications are in

Appendix H of the environmental impact statement. Exhibit I provides a summary of planned activities to help minimize environmental effects from building and operating the proposed Turkey Point Units 6 and 7.

EXHIBIT I. SUMMARY OF PLANNED MEASURES AND CONTROLS TO MINIMIZE ENVIRONMENTAL IMPACTS

Resource Area	Impact Minimization Plan
Land Use	<ul style="list-style-type: none"> • Site-preparation and site-development activities for proposed Units 6 and 7 would be conducted in accordance with applicable Federal, State, and local regulations and would be consistent with applicable zoning and land-use plans. FPL would acquire the necessary permits and authorizations and would implement environmental controls such as stormwater-management systems, fugitive dust control, and spill-containment controls before initiating earth disturbance. FPL stated that it would use standard dust-control measures, and stabilize, contour, and re-vegetate permanently disturbed lands. • FPL would be required to comply with applicable laws, regulations, and permit requirements. Standard industry construction practices that FPL proposes to use include erosion-control devices, matting to reduce compaction caused by equipment, use of wide-track vehicles when crossing wetlands, and restoration activities after the transmission lines are built. FPL has indicated that it will use existing rights-of-way to the extent practicable and that it routinely uses standard industry construction practices, environmental Best Management Practices (BMPs), and mitigation measures to ensure adverse environmental effects of construction are avoided, minimized, or mitigated. FPL also stated that it will use restrictive land-clearing processes in forested wetland areas (right-of-way clearing and preparation), turbidity screens and erosion-control devices in areas of wetlands and water resources (access road/structure pad construction), existing access roads for ingress and egress to rights-of-way where available (access road/structure pad construction), and standard industry construction practices for foundation and structure excavation and construction (line construction).
Water-related Impacts	<ul style="list-style-type: none"> • For hydrological alterations, grouting at the base of the approximately 35 ft deep plant excavations and use of bentonite slurry walls would limit extraction of groundwater from the Biscayne aquifer and hydraulically isolate the plant excavations from Biscayne Bay and Biscayne National Park. • For water use, areas affected by installation of radial collector well caissons and laterals would be isolated with sheet piling technology or the equivalent if needed to control extraction of groundwater. The presence of the industrial wastewater facility and the berm to the east of the return canal would restrict surface-water flows and limit impacts on down-stream bodies of surface water or resources including wetlands and Biscayne Bay. • For water-quality, building activities related to the transmission lines and pipelines would comply with Federal and State regulations. Environmental BMPs would be applied, including use of existing rights-of-way to the extent practicable, erosion-control devices, matting to reduce compaction, and post-construction restoration activities. Work would be performed under existing permits/plans and a stormwater pollution prevention plan developed for the building activities. Berms would be installed to direct onsite runoff to the industrial wastewater facility.

EXHIBIT I. SUMMARY OF PLANNED MEASURES AND CONTROLS TO MINIMIZE ENVIRONMENTAL IMPACTS (CONTD)

Resource Area	Impact Minimization Plan
	<ul style="list-style-type: none"> • Offsite: A perimeter berm could be used to restrict the flow of surface water onto the property. The berm could also be used in association with detention basins and a truck-wash facility to reduce surface-water runoff from the site and prevent soils from being unintentionally spread to offsite areas. Drainage ditches could be used to direct surface-water flow away from the site and could be reconnected to any drainage features that once flowed through the property to maintain surface flow. • Cutoff walls (sheet piles) would be installed to isolate equipment in the barge-unloading area from the turning basin. This work would be performed under permit requirements issued by the U.S. Army Corp of Engineers. • Activities related to installation of deep injection wells and injection monitoring wells are regulated by Florida Department of Environmental Protection's Underground Injection Control Program and local permits. These regulations specify approved construction techniques and testing and monitoring requirements to ensure that groundwater quality is not adversely affected by construction of the wells. • Any surface-water runoff related to construction of the deep-injection wells, monitoring wells, and associated equipment would be directed to the cooling canals of the industrial wastewater facility. • Existing roads would be used to the extent practicable. Ditches and the use of culverts would allow stormwater drainage to be maintained along the road route. During onsite construction, stormwater runoff would be directed to retention basins before being discharged to the industrial wastewater facility. If modification of the existing draining ditches or drainage features is required, the impacts would be temporary and the disturbed areas would be returned to preconstruction conditions. • All work would be performed in accordance with site-obtained permits. During offsite construction, surface water would be routed to areas that could accept the additional surface flow that would then alter the flow in the vicinity of the road. • Cutoff wall technology including the use of a slurry wall could be used to limit potential impacts during construction dewatering activities. The water from dewatering activities would be discharged into the cooling canals of the industrial wastewater facility. • The construction activities would be performed in accordance with the required local, State, and Federal guidelines and accepted industry practices. The necessary permits would be obtained before beginning construction activities. The delivery pipeline routes would be recontoured afterward. Excavated material would be stockpiled in designated spoils areas. Sedimentation barriers would be installed to limit potential impacts on surface waterbodies. Sedimentation basins would also be used to minimize the potential for surface-water runoff impacts on nearby waterbodies in accordance with Florida Department of Environmental Protection regulations. Once construction activities are complete, the drainage would be restored to preconstruction conditions. • Sheet piles could be used to limit potential impacts during construction dewatering activities. Water from dewatering activities would be added to the industrial wastewater facility. • The necessary construction activities would be performed under a new stormwater pollution prevention plan or under a modification of an existing Turkey Point stormwater pollution prevention plan and associated spill-prevention plan that could include oil and fuel containment.

EXHIBIT I. SUMMARY OF PLANNED MEASURES AND CONTROLS TO MINIMIZE ENVIRONMENTAL IMPACTS (CONTD)

Resource Area	Impact Minimization Plan
Terrestrial Ecosystems	<ul style="list-style-type: none"> Impacts on wetlands, including but not limited to mangrove forests, would be minimized by installation of culverts under existing road beds and the use of silt fences. Unavoidable wetland impacts would be mitigated through a series of wetland restoration projects on FPL-owned land and purchase of credits in two nearby wetland mitigation banks, the Everglades Mitigation Bank and Hole-in-the-Donut Mitigation Bank. Measures to reduce noise and vibration levels during construction may include staggering work activities and use of noise dampeners and noise-control equipment on vehicles and equipment. To the extent practicable, unnecessary lights would be turned off at night, lights would be turned downward or hooded directing light downward, and lower-powered lights would be used during construction to minimize impacts on wildlife. Impacts on wetlands within the wood stork core foraging area would be mitigated as prescribed by regulatory agencies. To mitigate the potential for collisions or electrocutions, avian-friendly design standards would be used as provided for in the avian protection plan.
Aquatic Ecosystems	<ul style="list-style-type: none"> A project-specific management plan for crocodiles and other listed species has been created for this building activity. Mitigation measures may include warning signs and education material (for construction personnel) about the presence and status of crocodiles and restrictions of nocturnal activities. Traffic access at the north end of the cooling canals of the industrial wastewater facility may pose a threat to crocodiles crossing this road and would be mitigated by installation of a wildlife corridor to provide pathways for crocodiles to travel between wetlands on either side of this road. Construction of transmission facilities within the cooling canals of the industrial wastewater facility may avoid known crocodile nests and be conducted between nesting seasons. During in-water and nearshore construction activities, a Barge Delivery Plan would be followed to reduce the risk of collision with or injury of manatees by tug and barge operations or dredging. In addition, FPL would follow the guidance provided by the National Marine Fisheries Service to protect sea turtles and Smalltooth Sawfish during nearshore construction activities. Spill-prevention techniques would include locating storage areas for petroleum products at a safe distance from surface waters. Any spills of diesel fuel, hydraulic fluid, or lubricants during building would be cleaned up to prevent spilled fuel or oil from affecting aquatic resources. A Spill-Prevention, Control, and Countermeasure Plan would be implemented in accordance with U.S. Environmental Protection Agency regulations. Spills would be attended to and not allowed to flow to nearby surface water. Modification to the equipment barge-unloading area would be performed using cutoff wall technology (sheet piles) to isolate the equipment barge-unloading area from the turning basin. Dredging, if necessary, would conform with guidance provided by the U.S. Army Corps of Engineers and dredging permit conditions. Building activities would be controlled to minimize any impacts on red mangroves or Mangrove Rivulus.

EXHIBIT I. SUMMARY OF PLANNED MEASURES AND CONTROLS TO MINIMIZE ENVIRONMENTAL IMPACTS (CONTD)

Resource Area	Impact Minimization Plan
Socioeconomics and Environmental Justice	<ul style="list-style-type: none"> Physical Impacts: Implement dust-control plan. Phase construction to minimize daily emissions of greenhouse gases. Perform proper maintenance of construction vehicles to maximize efficiency and minimize emissions. To the extent possible, minimize aesthetic impacts on the natural and built environment through the selection process of transmission line corridors, engineering options, and construction techniques used. Social and Economic Impacts: Communicate with municipal and county government authorities, nongovernmental organizations, and local media to disseminate project information and enable businesses and individuals to make informed decisions and economic choices, as project construction is phased out. Communicate with local and regional governmental and nongovernmental organizations to disseminate project information and enable organizations to plan accordingly for new residential and commercial development, additional demand for water and wastewater services, law enforcement and firefighting services, and increased enrollment in public schools. Schedule fill deliveries to not coincide with peak commuting hours and schedule construction material deliveries to not be concentrated during peak hours of travel. Build new entrance and access road and widen existing roads and turning lanes. Environmental Justice: No mitigating measures or controlled are considered to be required.
Historic and Cultural Properties	<ul style="list-style-type: none"> Complete cultural resource surveys for the transmission lines and any other offsite facilities that have not been surveyed, prior to initiating proposed and future ground-disturbing activities. The surveys would include subsurface testing and visual impact assessments where required. Evaluate the significance of any identified cultural or historic resources within the Areas of Potential Effect and consult with the Florida State Historic Preservation Office to define mitigation requirements, as appropriate, for construction of the transmission lines. Continue consultation between the U.S. Army Corps of Engineers and local Native American Tribes during the course of the cultural resources studies. Follow established procedures to halt work and consult with the Florida State Historic Preservation Office if a potential unanticipated historic or cultural resource is discovered.
Nonradiological Health	<ul style="list-style-type: none"> Comply with Federal, State, and local regulations governing construction activities and construction vehicle emissions. Comply with Federal and local noise-control ordinances. Comply with Federal and State occupational safety and health regulations. Implement traffic-management plan. Control fugitive dust.
Radiological Health	<ul style="list-style-type: none"> Maintain doses to construction workers below NRC public dose limits. Maintain doses to members of the public below the NRC's and the U.S. Environmental Protection Agency's regulatory standards. Maintain occupational doses below NRC standards and ensure implementation of a program to maintain plant worker doses as low as reasonably achievable.
Nonradioactive Waste	<ul style="list-style-type: none"> Hazardous and nonhazardous solid wastes would be managed according to County, State, and Federal handling and transportation regulations. Implement recycling and BMPs to minimize waste generation.

What Is the Relationship of This Project with Other Projects in the Area?

Cumulative impacts may result when the environmental effects associated with the proposed action are added to the temporary or permanent effects associated with past, present, and near-future projects. Cumulative impacts can result from the combination of effects that might have been minor by themselves, but become more noticeable when affecting the same resource over a period of time.

A number of projects exist near the Turkey Point site or are proposed for areas near the site. These projects may be complete or in various stages of development. If project information was available and the project had the potential to contribute to cumulative impacts, it was detailed in the environmental impact statement. Exhibit J lists a few of the major projects considered in the cumulative impacts assessment. Chapter 7 of the environmental impact statement contains a comprehensive list. Exhibit K provides a comparison of cumulative environmental impacts between the proposed site and alternative sites.

EXHIBIT J. LIST OF PAST, PRESENT, OR NEAR-FUTURE PROJECTS NEAR THE TURKEY POINT UNITS 6 AND 7 SITE

Project Name	Summary of Project
Comprehensive Everglades Restoration Plan (CERP)	A major restoration initiative that will restore the quantity, quality, timing, and distribution of fresh water in an effort to reverse decades of unintended environmental decline. This effort is made up of numerous projects (e.g., Biscayne Wetlands Restoration Project) in the region. The projects in and around the region are discussed in Section 2.3.1.1 of the environmental impact statement
Turkey Point Units 1-4	Two 720 MW nuclear and three oil/gas 2,900 MW plants
Conversion of Turkey Point Units 1 and 2 to use as synchronous condensers	
Resources Recovery Facility	77 MW waste-to-energy plant
Medley Landfill	9.6 MW landfill gas power-generation plant
South Dade Landfill	Two 2 MW co-generation gas power-generation project
Lauderdale Power Plant	Two 884 MW oil/gas power-generation plants
Port Everglades Power Plant	420 MW oil/gas power-generation plant
Homestead Power Plant	53 MW oil/gas power-generation plant
Homestead City Utilities – Gordon W. Ivey Power Plant	60 MW oil power-generation plant
Wheelabrator South Broward, Inc.	67 MW waste-to-power plant
Waste-to-Energy Facility	Rock, sand, crushed and broken limestone, nonmetallic minerals, concrete block and brick
Various Mining Projects	
Various Transportation Projects	Road, traffic, and pedestrian projects
Biscayne National Park	Biscayne fishery management plan

**EXHIBIT J. LIST OF PAST, PRESENT, OR NEAR-FUTURE PROJECTS NEAR THE
TURKEY POINT UNITS 6 AND 7 SITE (CONTD)**

Project Name	Summary of Project
Florida Keys National Marine Sanctuary	Wildlife areas
Everglades National Park	Activities include swimming, camping, fishing, wildlife viewing, and hiking
Various wastewater treatment plants	Sewage treatment
Various water and flood management projects	Construction of levees, floodwalls, closure structures, and interior drainage structures

**EXHIBIT K. COMPARISON OF CUMULATIVE ENVIRONMENTAL IMPACTS BETWEEN
PROPOSED SITE AND ALTERNATIVE SITES**

Resource Category	Turkey Point Site	Glades	Martin	Okeechobee 2	St. Lucie
Land Use	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Water-Related					
Surface-water use	SMALL	MODERATE	MODERATE	MODERATE	SMALL
Groundwater use	SMALL	SMALL	SMALL	SMALL	SMALL
Surface-water quality	SMALL	MODERATE	MODERATE	MODERATE	MODERATE
Groundwater quality	SMALL	SMALL	SMALL	SMALL	SMALL
Ecology					
Terrestrial and wetland ecosystems	MODERATE to LARGE	MODERATE	MODERATE	MODERATE	MODERATE
Aquatic ecosystems	MODERATE	MODERATE	MODERATE	MODERATE	SMALL to MODERATE
Socioeconomics					
Physical impacts	SMALL adverse except for MODERATE beneficial impacts on roads	SMALL except for MODERATE impacts on roads and aesthetics	SMALL except for MODERATE impacts on roads and aesthetics	SMALL except for MODERATE impacts on roads and aesthetics	SMALL except for LARGE impacts on buildings and roads
Demography	SMALL	SMALL	SMALL	SMALL	SMALL, except for LARGE residential displacement impacts
Economic impacts on the community	SMALL and beneficial	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Glades County and School District	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Martin County and School District	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Okeechobee County and School District	SMALL and beneficial

EXHIBIT L. COMPARISON OF CUMULATIVE ENVIRONMENTAL IMPACTS BETWEEN PROPOSED SITE AND ALTERNATIVE SITES

Resource Category	Turkey Point Site	Glades	Martin	Okeechobee 2	St. Lucie
Infrastructure and community services	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic
Environmental Justice	None ^(a)	None ^(a)	None ^(a)	None ^(a)	None ^(a)
Historic and Cultural Resources	MODERATE	MODERATE	SMALL	MODERATE	SMALL
Air Quality					
Criteria pollutants	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Greenhouse gas emissions	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Nonradiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Radiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Postulated Accidents	SMALL	SMALL	SMALL	SMALL	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

What Alternatives Were Considered?

No ACTION

The no-action alternative would result in the combined licenses not being granted or the U.S. Army Corps of Engineers not issuing its permit. Upon such a denial, building and operation of the two units at the Turkey Point site would not occur and the predicted environmental impacts would not take place. If no other facility would be built or strategy implemented to take its place, the benefits of the additional electrical capacity and electricity generation to be provided would also not occur and the need for baseload power would not be met.

ALTERNATIVE SITES

Candidate areas for siting two new nuclear reactors were chosen after considering areas within FPL's service area using the following five exclusionary criteria: more than 10 mi from an adequate fresh or saltwater source, more than 10 mi from an adequate source of reclaimed water, high population density, dedicated land use, and critical habitat for Federally listed threatened and endangered species. FPL then used exclusionary and other criteria to identify

21 potential sites within the candidate areas. Using 9 weighted screening criteria, FPL performed more detailed evaluations of the potential sites and narrowed the field down to 10 candidate sites. FPL then used 34 weighted criteria to select its proposed and alternative sites. Turkey Point is the proposed site and the remaining four alternative sites examined in the draft environmental impact statement, shown in Exhibit M, are

- St. Lucie site (home to an existing nuclear power station), St. Lucie County, Florida
- Glades site, Glades County, Florida
- Martin site (home to existing fossil and solar-powered facilities), Martin County, Florida
- Okeechobee 2 site, Okeechobee County, Florida.

The review team compared the environmental impacts at the alternative sites with the impacts at the proposed site and concluded that none of the alternative sites was environmentally preferable to the proposed site. In such a case, the proposed site prevails.

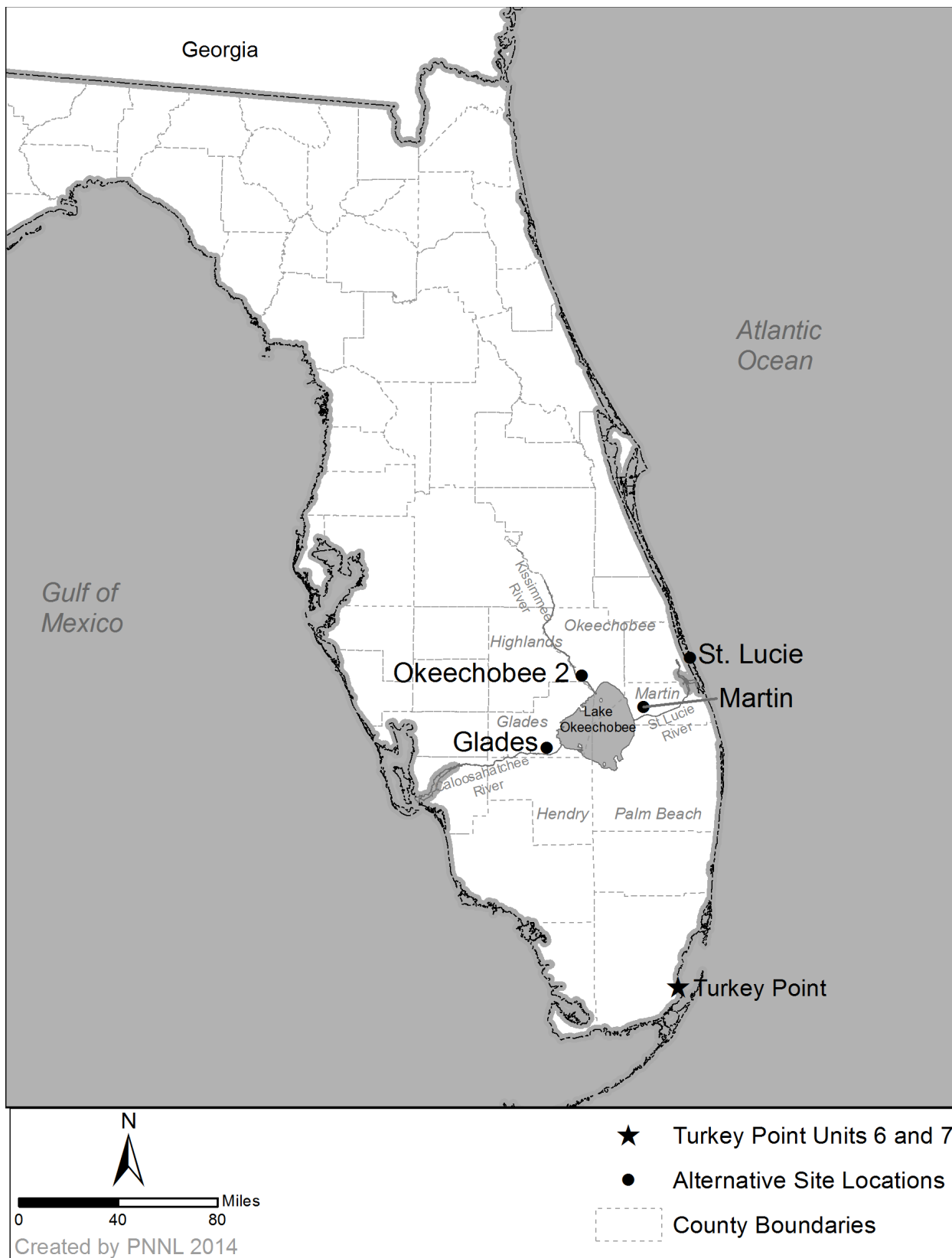


EXHIBIT M. LOCATIONS OF CANDIDATE SITES

ALTERNATIVE ENERGY SOURCES

To compare different types of energy sources with a two-unit nuclear plant, the review team analyzed other power-generation sources, a combination of sources, and power-generation technologies that are technically reasonable and available. The three primary energy sources for generating electric power in the United States are coal, natural-gas, and nuclear energy. Coal-fired plants are the primary source of baseload power generation in the United States. Natural gas combined-cycle power-generation plants are often used as intermediate generation sources, but can also be used for baseload power.

Renewable energy sources such as wind and solar power were considered as individual alternatives, but current technologies for these energy sources are not capable of reasonably producing baseload power similar to Turkey Point Units 6 and 7. With respect to wind energy, an offshore installation was assumed with more than 3,300 2 MW(e) wind turbines needed to produce a similar amount of power. Solar thermal technologies would require a large land area of between 6,600 to 17,600 ac for a facility with a rated output of 2,200 MW(e). The review team concluded that the solar and wind alternatives were not reasonable alternatives.

For the coal-fired generation alternative, the review team assumed the building and operation of four pulverized coal-fired units, each with a net capacity of 550 MW(e) at the Turkey Point site for a gross capacity of 2,200 MW(e). The effects of air emissions would be greater for a coal-fired plant than for Turkey Point Units 6 and 7 because of the release of carbon dioxide gas and other air pollutants. Coal combustion also generates waste in the form of ash. Disposal of the waste could noticeably affect land use, because of the acreage needed, and could affect groundwater quality. Other environmental effects and cumulative effects would be similar to those described for Turkey Point Units 6 and 7.

For the natural-gas-fired alternative, the review team assumed the building and operation of four natural-gas combined-cycle units, each with a net capacity of 550 MW(e) at the Turkey Point site for a gross capacity of 2,200 MW(e). Air emissions would be similar to those for a coal-fired plant, but in lower amounts. There may be fewer ecological impacts than for a new nuclear facility because less land would be needed. Building a new underground gas pipeline to the site could result in permanent loss of some ecological resources, but this impact could be minimized by putting the new line in an existing pipeline corridor. Other environmental effects and cumulative effects would be similar to those described for Turkey Point Units 6 and 7.

The review team also analyzed a combination of energy sources. Four combined-cycle, natural-gas-fired units with a total capacity of 1,915 MW(e) would be required in combination with conservation, and new solar and biomass capacity. Overall, this combination of alternatives would have environmental effects similar to the natural-gas-only alternative.

The review team concluded that none of the reasonable alternatives—coal, natural gas, and the combination of energy sources—would be environmentally preferable to the proposed Turkey Point Units 6 and 7.

ALTERNATIVE SYSTEM DESIGNS

The review team considered a variety of alternatives for heat-dissipation systems and cooling-water systems. About two-thirds of the heat from a commercial nuclear reactor is rejected as heat to the environment. The remaining one-third of the reactor's generated heat is converted into electricity. Normal heat-dissipation systems transfer this rejected heat into the atmosphere as evaporation and/or heated discharge water to mix with nearby waterbodies. The review team considered eight alternative heat-dissipation systems, but concluded that none was environmentally preferable to the proposed mechanical draft wet-tower cooling system. Each tower would be approximately 67 ft high and 246 ft in diameter. An artist rendering of these towers can be seen in the foreground of Exhibit D.

The review team also considered alternative water sources for the cooling-water system because withdrawal of water for this system has the potential to affect the environment. The proposed cooling-water system is a closed-loop system that relies on evaporative cooling from mechanical draft cooling towers and obtains treated makeup water from the City of Miami's wastewater treatment system. If the normal water supply from Miami is unable to meet plant needs, makeup water would be drawn from Biscayne Bay through radial collector wells under the bottom of the Bay. The review team considered other surface water and groundwater sources near the site, but found none of the alternatives to be environmentally preferable.

Cooling-water systems withdraw water (intake) from the source waterbody and return a slightly reduced volume of water to the receiving waterbody at a higher temperature (discharge). One of the main interactions a nuclear power plant has with the environment occurs at the intake and discharge structures. The review team considered three alternative intake and nine alternative discharge options, but found none of the alternatives to be environmentally preferable to the proposed action.

What Are the Unavoidable Environmental Impacts?

The National Environmental Policy Act requires that an environmental impact statement include information about any negative environmental effects that cannot be avoided if the nuclear plant is built and operated. These impacts are usually the building activities involved with clearing the land, excavating, filling wetlands, installing roads, and dredging. Exhibit N lists the negative environmental impacts from building and operating Turkey Point Units 6 and 7. The impacts discussed are based on information presented in Tables 10-1 and 10-2 of the environmental impact statement.

EXHIBIT N. UNAVOIDABLE IMPACTS

Environmental Resource		Unavoidable Impact	Impact Level
Land Use		The project would require a permanent commitment (through decommissioning) of approximately 585 ac of land on the Turkey Point site. Additional areas of land offsite would be occupied by rights-of-way accommodating various pipelines, transmission lines, and access roads. Transmission lines in urban areas and near the Everglades National Park could conflict with existing land uses. Onsite facilities would be in close proximity to Biscayne National Park.	Construction: MODERATE (NRC-authorized construction impact is SMALL) Operation: MODERATE
Water	Use	Limited withdrawal of small amounts of groundwater from the Biscayne aquifer from excavation dewatering when building the plants. Additional demand for potable water from the Miami-Dade Water and Sewer Department. Limited withdrawal of small amounts of groundwater from the Biscayne aquifer when radial collector wells are operated.	Construction: SMALL Operation: SMALL
	Quality	Cooling-tower drift deposition of small amounts of chemical contaminants on portions of Biscayne Bay.	Construction: SMALL Operation: SMALL
Ecology	Terrestrial	Permanent loss of mangroves and other wetland habitats and pine rockland and other upland habitats, habitat fragmentation by pipelines and transmission lines, and increased mortality risk to certain listed species. Rights-of-way maintenance activities in or near proposed critical habitat. Increased vehicle collision risk mortality to the Florida panther, vegetation-control effects on listed plants, and transmission system impacts on wood storks and Everglade snail kites.	Construction: MODERATE (NRC-authorized construction impact is SMALL) Operation: MODERATE
	Aquatic	Permanent loss of some onsite aquatic environments, some disturbance, and possible disturbance of manatees, Smalltooth Sawfish, Nassau Grouper, and sea turtles. 270 ac of permanent critical habitat loss and 211 ac that would be adversely affected for resident American crocodiles. During radial collector well operation, there would be noticeable increases in salinity above normal background variation, but they would be offset by increases in freshwater sheet flow. Additional crocodile takes may occur, and cooling-tower drift deposition effects are expected to be minor.	Construction: SMALL to MODERATE Operation: SMALL
Socio-economic	Physical Impacts	All adverse physical impacts are minor.	Construction: SMALL (adverse) to MODERATE (beneficial) Operation: SMALL

EXHIBIT N. UNAVOIDABLE IMPACTS (CONTD)

Environmental Resource	Unavoidable Impact	Impact Level
Demography	Minor impacts on the demographics of Miami-Dade County, and the communities of Homestead and Florida City.	Construction: SMALL Operation: SMALL
Economic Impact	None	Construction: SMALL Operation: SMALL
Infrastructure and Community Services	Noticeable but not destabilizing impacts on traffic near the plant during construction. All other infrastructure impacts are minor.	Construction: SMALL to MODERATE Operation: SMALL to MODERATE
Environmental Justice	There are no pathways by which minority or low-income populations would receive a disproportionately high and adverse impact.	Construction: NONE ^(a) Operation: NONE ^(a)
Historic and Cultural Resources	There would be indirect visual impacts on National Register-eligible built resources in the transmission line corridor. Specific impacts are to be determined, based on U.S. Army Corps of Engineers evaluation of impacts of transmission lines on cultural resources.	Construction: MODERATE (NRC-authorized construction impact is SMALL) Operation: SMALL
Meteorology and Air Quality	Slight increases in certain criteria pollutants and greenhouse gas emissions due to plant auxiliary combustion equipment (e.g., standby diesel generators), and plumes and drift deposition from cooling towers.	Construction: SMALL Operation: SMALL
Nonradiological Health	Minimal impacts from noise, occupational injuries, traffic accidents. Cooling tower and pump noise, minor increases in the potential for occupational injuries and traffic accidents.	Construction: SMALL Operation: SMALL
Radiological Health	Small doses to construction workers that would be less than NRC public dose limits. Small radiation doses to members of the public, below NRC and U.S. Environmental Protection Agency standards; ALARA [as low as reasonably achievable] doses to workers; and biota doses less than National Council on Radiation Protection and Measurements and International Atomic Energy Agency guidelines.	Construction: SMALL Operation: SMALL
Nonradioactive Waste	Minor decrease in available capacity of waste treatment and disposal facilities. Minor stormwater, wastewater, and atmospheric discharges. Minor discharges to atmosphere and minor impacts on groundwater from underground injection control discharges.	Construction: SMALL Operation: SMALL

What Are the Irreversible and Irretrievable Commitments of Resources?

The term “irreversible commitments of resources” refers to environmental resources that would be permanently changed and could not be restored at some later time by the building or operation activities authorized by the U.S. Nuclear Regulatory Commission and U.S. Army Corps of Engineers permitting and licensing decisions. Exhibit O lists the irreversible environmental resources from building and operating Turkey Point Units 6 and 7. The term “irretrievable commitments of resources” refers to environmental resources that would be used or consumed by the new units in such a way that they could not be recycled or restored for other uses. The review team expects that the use of building materials in the quantities needed for the Turkey Point Units 6 and 7 would be irretrievable, but would be of small significance with respect to the availability of such resources.

EXHIBIT O. IRREVERSIBLE COMMITMENTS

Environmental Resource	Irreversible Commitment
Land Use	Land uses attributable to Units 6 and 7 are effectively permanent for the foreseeable time horizon, but once the units cease operations and are decommissioned in accordance with NRC requirements, the land could be returned to other industrial and nonindustrial uses.
Water Use	Because the water in the Biscayne aquifer is replenished by infiltration of precipitation, the withdrawals of groundwater from the aquifer are reversible.
Ecological Resources	Construction activities would cause temporary and long-term changes to both the aquatic and terrestrial biota at the plant site and facilities.
Socioeconomics	No irreversible socioeconomic commitments would be made because resources would be reallocated for other purposes once the plant is decommissioned.
Historic and Cultural Resources	There are no known irreversible commitments of historical or cultural resources.
Air Quality	No irreversible commitments to air quality.

What Is in the Environmental Impact Statement?

CHAPTER 1 – INTRODUCTION

This introductory chapter defines the proposed action and the purpose of and need for the proposed action and provides a brief outline of the NRC and U.S. Army Corps of Engineers environmental review processes.

CHAPTER 2 – AFFECTED ENVIRONMENT

This chapter describes the location of Turkey Point Units 6 and 7 and the existing conditions at the site and surrounding area and provides the “baseline” for the analysis.

CHAPTER 3 – SITE LAYOUT AND PLANT DESIGN

This chapter describes the proposed site layout and the key plant characteristics that are used for the impact analysis of the proposed actions.

CHAPTER 4 – ENVIRONMENTAL IMPACTS OF CONSTRUCTION

This chapter describes the potential impacts from building Turkey Point Units 6 and 7 and the safeguards and controls that would limit the adverse impacts of building the new units.

CHAPTER 5 – ENVIRONMENTAL IMPACTS OF OPERATION

This chapter examines the potential impacts from operating Turkey Point Units 6 and 7 and the safeguards and controls that would limit the adverse impacts during operation over the 40-year license period.

CHAPTER 6 – FUEL CYCLE, TRANSPORTATION, AND DECOMMISSIONING

This chapter addresses the environmental impacts from (1) the uranium fuel cycle and solid-waste management, (2) the transportation of radioactive material, and (3) the decommissioning of Turkey Point Units 6 and 7.

CHAPTER 7 – CUMULATIVE IMPACTS

This chapter describes the cumulative impacts that may result when the effects of building and operating Turkey Point Units 6 and 7 are added to, or interact with, other past, present, and reasonably foreseeable future actions on the same resources.

CHAPTER 8 – NEED FOR POWER

This chapter discusses the staff’s evaluation of the need for baseload-generating capacity within the region of interest.

CHAPTER 9 – ALTERNATIVES

This chapter contains the evaluation of energy alternatives, site location alternatives, and nuclear plant design alternatives.

CHAPTER 10 – CONCLUSIONS AND RECOMMENDATIONS

The final chapter provides the staff's preliminary recommendation about whether the combined licenses should be issued to FPL.

What Are the Next Steps?

The draft environmental impact statement comment period closed on May 22, 2015. A mandatory hearing with the Commission will be held after the final safety evaluation report is published. As of the publication of this Reader's Guide, the Advisory Committee on Reactor Safeguards is expected to conclude the review of the advanced final safety evaluation report in May 2016. Publication of the final safety evaluation report is scheduled for October 2016. The USACE is a cooperating agency with the NRC in the development of the environmental impact statement. The U.S. Army Corps of Engineers will complete an independent evaluation of FPL's Department of Army permit application for this project. For additional information about the USACE review, please contact Megan Clouser, Senior Project Manager, at Megan.L.Clouser@usace.army.mil. For additional information about the NRC environmental review, please contact Alicia Williamson-Dickerson, Environmental Project Manager, at Alicia.Williamson@nrc.gov or visit the Nuclear Regulatory Commission's Turkey Point website at <http://www.nrc.gov/reactors/new-reactors/col/turkey-point.html>.





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