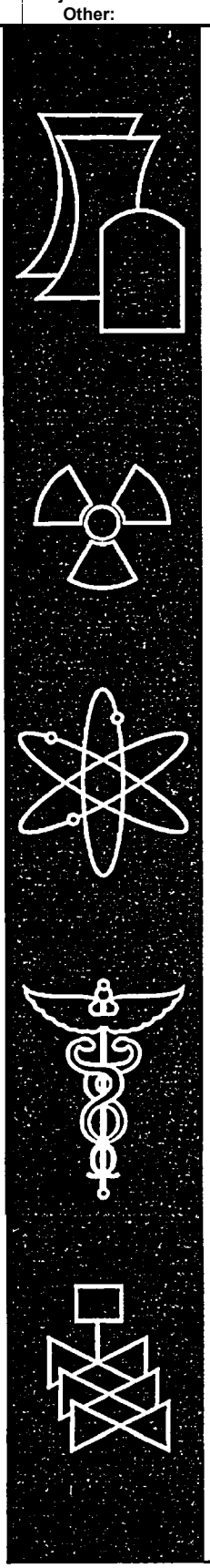
NRC-024
Submitted Nov. 10, 2015
NUREG-1437
Supplement 5



Generic Environmental Impact Statement for License Renewal of Nuclear Plants

Supplement 5

Regarding
Turkey Point Units 3 and 4

Final Report

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555-0001

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NUREG-1437
Supplement 5

Generic Environmental Impact Statement for License Renewal of Nuclear Plants

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Regarding Turkey Point Units 3 and 4

Final Report

Manuscript Completed: January 2002
Date Published: January 2002

Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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Abstract

The U.S. Nuclear Regulatory Commission (NRC) considered the environmental impacts of renewing nuclear power plant operating licenses (OLs) for a 20-year period in its *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2, and codified the results in 10 CFR Part 51. The GEIS (and its Addendum 1) identifies 92 environmental issues and reaches generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or to plants with specific design or site characteristics. Additional plant-specific review is required for the remaining issues. These plant-specific reviews are to be included in a supplement to the GEIS.

This Supplemental Environmental Impact Statement (SEIS) has been prepared in response to an application submitted to the NRC by the Florida Power & Light Company (FPL) to renew the OLs for Turkey Point Units 3 and 4 for an additional 20 years under 10 CFR Part 54. This SEIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. It also includes the staff's recommendation regarding the proposed action, and responses to comments received on Draft Supplement 5 to the GEIS.

Neither FPL nor the staff has identified information that is both new and significant for any of the issues for which the GEIS reached generic conclusions. In addition, the staff determined that information provided during the scoping process did not call into question the conclusions in the GEIS. Therefore, the staff concludes that the impacts of renewing the Turkey Point OLs will not be greater than impacts identified for these issues in the GEIS. For each of these issues, the GEIS conclusion is that the impact is of SMALL[(a)] significance (except for collective offsite radiological impacts from the fuel cycle and high-level waste and spent fuel, which were not assigned a single significance level).

Each of the remaining 23 issues that applies to Turkey Point Units 3 and 4 is addressed in this SEIS. For each applicable issue, the staff concludes that the significance of the potential environmental impacts of renewal of the OLs is SMALL. The staff also concludes that additional mitigation measures are not likely to be sufficiently beneficial as to be warranted. The staff determined that information provided during the scoping process did not identify any new issue that has a significant environmental impact.

The NRC staff recommends that the Commission determine that the adverse environmental impacts of license renewal for Turkey Point Units 3 and 4 are not so great that preserving the

(a) Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

option of license renewal for energy-planning decisionmakers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS; (2) the Environmental Report submitted by FPL; (3) consultation with Federal, State, and local agencies; (4) the staff's own independent review; and (5) the staff's consideration of public comments.

Contents

Figures

Tables

Tables

2.1.2 Reactor Systems

Turkey Point Units 3 and 4 are shown in Figure 2-3. Each unit is a pressurized LWR with three steam generators, which produce steam that turns turbines to generate electricity. Each unit, designed and fabricated by the Westinghouse Electric Corporation (AEC 1972), is capable of an output of 2300 MW(t), with a corresponding gross electrical output of approximately 795 MW(e). Onsite electrical power usage amounts to slightly more than 100 MW(e), leaving each unit with a reliable net summer rating of 693 MW(e) (FPL 2000a).

Each reactor containment structure is approximately 64 m (210 ft) tall and 39 m (124 ft) in diameter. Each is a dry containment structure designed to withstand environmental effects and the internal pressure and temperature accompanying a postulated loss-of-coolant accident or steam-line break. Together with its engineered safety features, each containment structure is designed to adequately retain fission products that escape from the reactor coolant system. Turkey Point Units 3 and 4 are licensed for fuel that is slightly enriched uranium dioxide, up to 4.5 percent by weight uranium-235 (FPL currently uses a maximum of 4.45 percent enrichment). FPL operates the reactors at an average fuel discharge burnup of approximately 45,000 megawatt-days per metric ton uranium (MWd/MTU). I

2.1.3 Cooling and Auxiliary Water Systems

Turkey Point Units 3 and 4 use three-loop cooling systems for heat dissipation. The primary loop is a sealed system that carries heat from the reactors to the steam generators. The secondary loop, which is also sealed, carries heat from the steam generators through the turbines to the condensers. The tertiary system carries heat from the condensers to a recirculating canal system where the heat is released to the environment. The temperature rise in the water from the recirculating canals across the condenser is about 10 C° (18 F°) during full power operation. The primary and secondary loops use treated freshwater; the tertiary loop uses saltwater.

FPL obtains about 0.044m^3/s (1.5 ft^3/s) of water from the Miami-Dade public water supply system's Newton water-treatment plant for uses related to Turkey Point Units 3 and 4. Most of this water is used as demineralizer makeup water for use in the primary and secondary cooling loops. A small fraction of the water is used as potable water and for fire protection. FPL does not withdraw either groundwater or surface water for makeup or potable water uses. Makeup water for the canal system comes from used process water (which is treated and released to the canal system), incident rainfall, stormwater runoff, and possibly groundwater infiltration. Sanitary wastewater is treated and then released to the groundwater through an injection well.

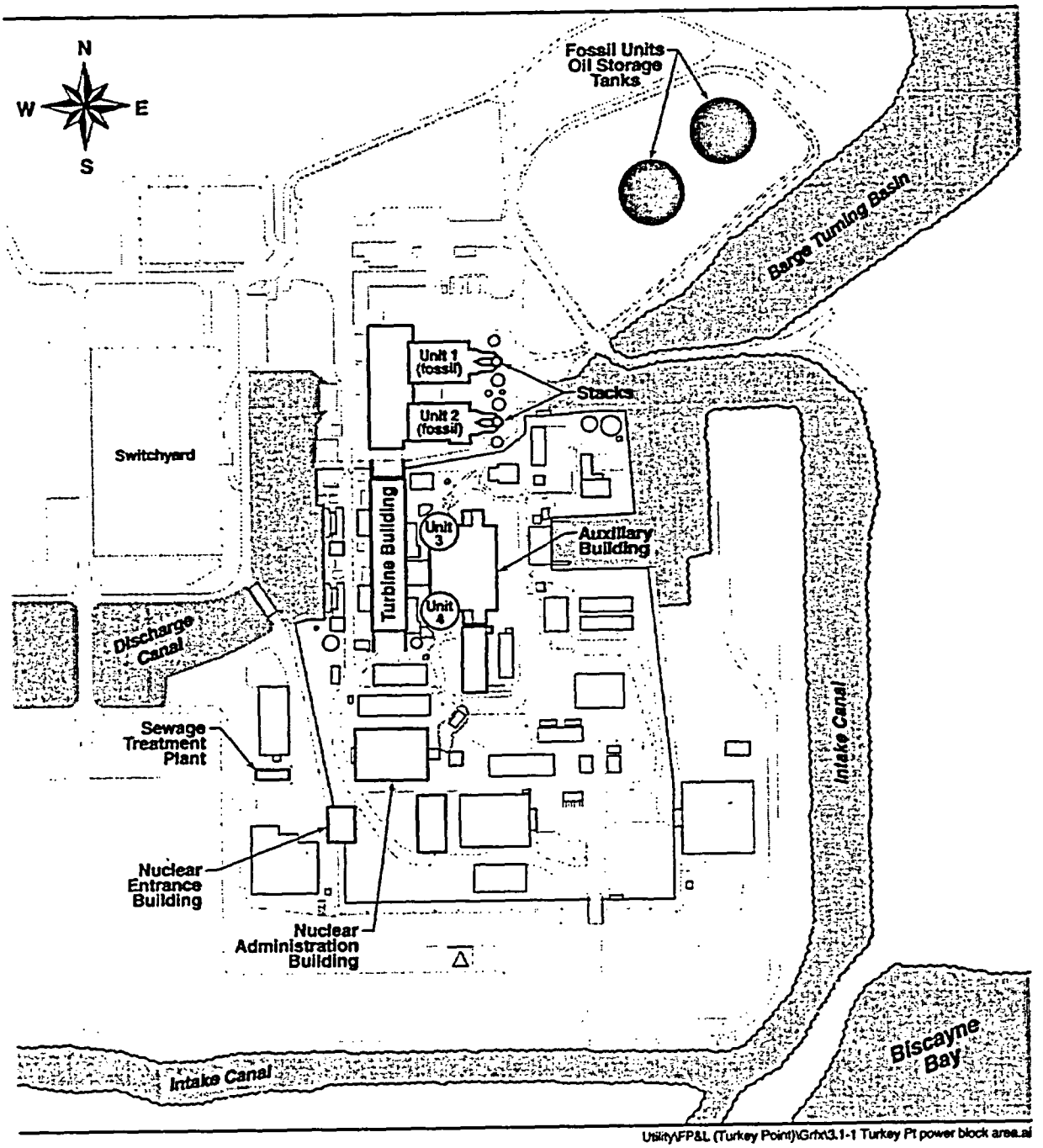

Figure 2-3. Turkey Point Site Powerblock Area

The cooling canal system, which services Turkey Point Units 1, 2, 3, and 4, covers about 2700 ha (6700 ac). It consists of 32 channels that carry warm water south from the plant and 8 channels that return water to the plant. The channels are about 60 m (200 ft) wide and have a water depth of 0.3 to 1 m (1 to 3 ft). They are separated by 27-m- (90-ft-) wide berms. In all, the total length of the channels is about 270 km (168 mi), and the effective water surface area is about 1560 ha (3860 ac). Flow in the cooling canal system attributable to Turkey Point Units 3 and 4 is about 82 m^3/s (1.3 million gpm). The closed canal system is shown in Figure 2-4.

Cooling water for the condenser is withdrawn from the closed cooling canal system. Traveling screens and strainers remove debris from the cooling water inflow. Large objects are prevented from entering the condenser first by bars with 7- to 10-cm (3- to 4-in.) on-center. These are raked periodically to remove trapped material, which is carted off for disposal. The water then flows through vertical traveling screens with a 2-cm (3/8-in.) mesh size to remove debris, which is routed to a collection basket. FPL does not use biocontrol chemicals in the circulating water system.

The canal system does not discharge directly to fresh or marine surface waters. However, an exchange of water between the canal system and groundwater is likely because the canals are unlined. An interceptor ditch is located along the west side of the canal system. During the dry season, when the natural groundwater gradient is from Biscayne Bay and Card Sound toward the Everglades, water is pumped from the interceptor ditch to the canal system to create an artificial groundwater gradient from the Everglades into the ditch. This prevents flow of hypersaline water from the cooling canals toward the Everglades. Maintenance of the cooling canal system includes mechanical removal of submerged, rooted marine plants on about a 3-year cycle and removal of terrestrial woody vegetation from the canal berms on a 10-year cycle.

2.1.4 Radioactive Waste Management Systems and Effluent Control Systems

FPL uses liquid, gaseous, and solid radioactive waste management systems to collect and process the liquid, gaseous, and solid wastes that are the by-products of the Turkey Point Units 3 and 4 operation. These systems reduce radioactive liquid, gaseous, and solid effluents before they are released to the environment. The Turkey Point Units 3 and 4 waste disposal system meets the design objectives of 10 CFR Part 50, Appendix I, and controls the processing, disposal, and release of radioactive liquid, gaseous, and solid wastes. Radioactive material in the reactor coolant is the source of gaseous, liquid, and solid radioactive wastes in LWRs. Radioactive fission products build up within the fuel as a consequence of the fission process.

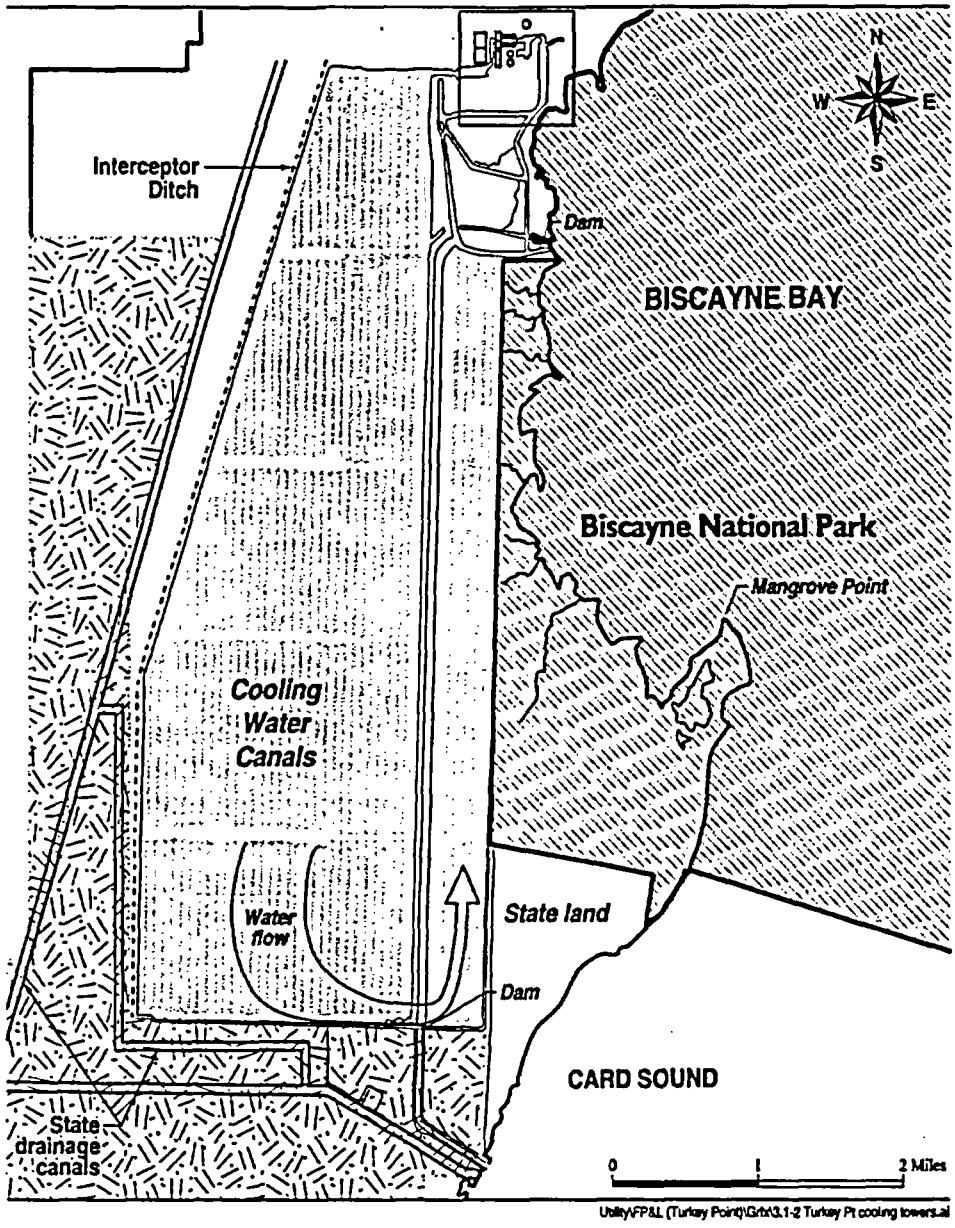

Figure 2-4. Turkey Point Site Cooling Canal System

These fission products are contained in the sealed fuel rods, but small quantities escape from the fuel rods and contaminate the reactor coolant. Neutron activation of the primary coolant system is also responsible for coolant contamination.

Nonfuel solid wastes result from treating and separating radionuclides from gases and liquids and from removing contaminated material from various reactor areas. Solid wastes also consist of reactor components, equipment, and tools removed from service, as well as contaminated protective clothing, paper, rags, and other trash generated from plant design and operations modifications and routine maintenance activities. Solid wastes may be shipped to a waste processor for volume reduction before disposal or they may be sent directly to the licensed burial site. Spent resins and filters are stored or packaged for shipment to an offsite processing or disposal facility.

Fuel rods that have exhausted a certain percentage of their fuel and are removed from the reactor core for disposal are called spent fuel. Turkey Point Units 3 and 4 currently operate on a staggered 18-month refueling cycle per unit, resulting in at least one refueling every year and two refuelings every third year. Spent fuel is stored onsite in the spent fuel pool in the Auxiliary Building (FPL 2000a).

The waste disposal system used for processing liquid, gaseous, and solid wastes is common to Units 3 and 4, with the exception of the reactor coolant drain tanks and reactor coolant drain tank pumps.

The Offsite Dose Calculation Manual (ODCM) describes the methods used for calculating radioactivity concentrations in the environment and the estimated potential offsite doses associated with liquid and gaseous effluents from Turkey Point Units 3 and 4 (FPL 1999a). The ODCM also specifies controls for release of liquid and gaseous effluents to ensure compliance with the following:

- The concentration of radioactive liquid effluents released from the site to the unrestricted area will not exceed 10 times the concentration specified in 10 CFR Part 20, Appendix B, Table 2, Column 2, for radionuclides other than dissolved or entrained gases. For dissolved or entrained noble gases, the concentration shall not exceed 7.4 Bq/mL (2 E-04 µCi/mL).

- The dose or dose commitment per reactor to a member of the public from any radioactive materials in liquid effluents released to unrestricted areas shall be limited to (1) less than or equal to 15 µSv (1.5 mrem) to the total body and less than or equal to 50 µSv (5 mrem) to any organ during any calendar quarter, and (2) less than or equal to 30 µSv (3 mrem) to the total body and less than or equal to 100 µSv (10 mrem) to any organ during any calendar year.

- The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to (1) less than or equal to 5 mSv/yr (500 mrem/yr) to the total body and less than or equal to 30 mSv (3000 mrem/yr) to the skin

due to noble gases, and (2) less than or equal to 15 mSv/yr (1500 mrem/yr) to any organ due to iodine-131, iodine-133, tritium, and for all radioactive materials in particulate form with half-lives greater than 8 days.

- The air dose per reactor to areas at and beyond the site boundary due to noble gases released in gaseous effluents shall be limited to (1) less than or equal to 50 μGy (5 mrad) for gamma radiation and less than or equal to 100 μGy (10 mrad) for beta radiation during any calendar quarter, and (2) less than or equal to 100 μGy (10 mrad) for gamma radiation and less than or equal to 200 μGy (20 mrad) for beta radiation during any calendar year.

- The dose to any individual member of the public from the nuclear facility operations will not exceed the maximum limits of 40 CFR Part 190 (<0.25 mSv [25 mrem]) and 10 CFR Part 20 (≤5 mSv [0.5 rem] in a year and ≤20 μSv [2 mrem] in any hour).

2.1.4.1 Liquid Waste Processing Systems and Effluent Controls

Potentially radioactive liquid wastes from the chemistry laboratory, containment sumps, floor drains, showers, and miscellaneous sources are collected in waste holdup tanks. Liquid from the reactor coolant loop drains, accumulators, and excess letdown are collected and transferred to the chemical and volume control system (CVCS). Liquids flow to the waste holdup tank by gravity, then are pumped to the waste monitor tank where the activity level of the liquid waste is determined and recorded prior to discharge through a radiation monitor (FPL 1999b).

Liquid requiring cleanup before being discharged to the environment is processed by the waste disposal demineralizer. The liquid from the waste disposal demineralizer is routed directly to one of the three radwaste facility waste monitor tanks. There are three discharge points from the units: steam generator blowdown from each unit and common radwaste monitor tank discharge. Liquid wastes in the waste monitor tanks are isolated and recirculated for at least one volume prior to sampling and discharge (FPL 1999b). Aliquots of representative pre-release samples from the waste disposal system are isotopically analyzed for gamma-emitting isotopes (FPL 2000b). The radiochemical analysis is the basis for recording the released activity; however, the radiation monitor provides surveillance over the operation by automatically closing the discharge control valve if the liquid activity level exceeds a preset value. The liquid effluents are a mixture from both Turkey Point Units 3 and 4. Therefore the measured releases from the common discharge point are apportioned equally to both Units 3 and 4. The dose limit per reactor is applied to the common discharge point when routine releases are made. This ensures that the dose limit of a single unit is not exceeded by the site (FPL 1999a).

The ODCM prescribes the alarm/trip setpoints for the liquid effluent radiation monitors, which are derived from 10 times the effluent concentration limits provided in 10 CFR Part 20, Appendix B, Table 2, Column 2. The alarm/trip setpoint for each liquid effluent monitor is based on the measurements of radioactivity in a batch of liquid to be released or in the continuous liquid discharge (FPL 1999a).

During 1999, there were 160 batch releases of liquid effluents for the 2 units in a total volume of 3500 m^3 (9.25 E+05 gal) of liquid. The liquid waste holdup capacity is approximately 130 m^3 (34,300 gal) in two waste holdup tanks, one located in the auxiliary building and one in the radwaste facility. The actual liquid waste generated is reported in the *Turkey Point Units 3 and 4 Annual Radioactive Effluent Release Report* (FPL 2000b).

2.1.4.2 Gaseous Waste Processing Systems and Effluent Controls

Radioactive gaseous wastes at Turkey Point are created during plant operation from degassing reactor-coolant discharge to the CVCS, displacement of cover gases, miscellaneous equipment vents, relief valves, and sampling operation and gas analysis for hydrogen and oxygen in cover gases. Most of the gas received by the waste disposal system is cover gas displaced from the CVCS holdup tanks as they fill with liquid. Gaseous wastes are stored in decay tanks for natural decay and then released through the monitored plant vent. The cover gas is reused to minimize the number of tank releases. The wastes are monitored and released at a permissible rate and activity as prescribed by the ODCM (FPL 1999a).

The quantity of radioactivity contained in each gas decay tank is restricted (1) to ensure that if an uncontrolled release of the tank's contents were to occur, the resulting total body exposure to an individual at the exclusion area boundary would not exceed 5 mSv (0.5 rem), and (2) to control the concentration of potentially explosive gases to below flammability limits. There are six welded carbon steel tanks used to contain the compressed waste gases (hydrogen, nitrogen, and fission gases) until they decay and are ready to be vented to the atmosphere (FPL 1999b).

The radioactive gaseous wastes are released through four monitored release points: (1) a common plant vent via a stack above the containment building, (2) the Unit 3 spent fuel pit vent, and (3) the condenser air ejector vents from each unit. If primary-to-secondary leakage occurs, then there can also be unmonitored radioactive airborne releases from the secondary steam systems of each unit. The quantity of material released from these unmonitored releases is accounted for using specific procedures (FPL 1999a). Monitored releases employ the following techniques to determine the radioactivity in airborne releases: (1) gamma spectrum analysis for fission and activation gases, (2) removal of particulate material by filtration and subsequent gamma spectrum analysis for strontium-89 and -90 and gross alpha analysis, (3) absorption of

halogen radionuclides on a charcoal filter and subsequent gamma spectral analysis, and (4) analysis of water vapor in a gas sample for tritium using liquid scintillation techniques (FPL 2000b).

The ODCM prescribes alarm/trip setpoints for the monitor and control instrumentation to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20 for gaseous effluents (FPL 1999a).

In 1999, there were 10 batch releases from Turkey Point Unit 3 and 11 batch releases from Unit 4 (FPL 2000b). The number of releases may vary from year to year, but this number of releases is representative of those releases. FPL does not anticipate any increase in gaseous releases during the renewal period.

2.1.4.3 Solid Waste Processing

Solid wastes from Turkey Point Units 3 and 4 consist of spent resin, filters, sludge, evaporator bottoms, dry compressible waste, irradiated components (control rods, etc.), and other noncompressible waste (FPL 1999b). Solid wastes are packaged in containers for removal to a disposal facility.

Solid waste from Turkey Point Units 3 and 4 is transported to Oak Ridge, Tennessee, and consigned to a licensed processing facility for volume-reduction and decontamination activities. The material that remains after volume reduction is transported by the processor to Barnwell, South Carolina, or Clive, Utah, depending on the activity limits. The material shipped directly to Barnwell is processed by Chem-Nuclear Services, Inc., and buried.

Disposal and transportation are performed in accordance with the applicable requirements of 10 CFR Part 61 and Part 71, respectively. There are no releases to the environment from radioactive solid wastes created at Turkey Point Units 3 and 4.

In 1999, Turkey Point Units 3 and 4 made 16 shipments of solid waste with a volume of 55 m^3 (1942 ft^3) and a total activity of 31 TBq (834.3 Ci) (FPL 2000b). These shipments are representative of the shipments made in the past 5 years and are not expected to change appreciably during the license renewal period.

2.1.5 Nonradioactive Waste Systems

The FPL nonradioactive waste system consists of a contact stabilization treatment plant for sanitary waste (FPL 2000a) located west of the powerblock area. The treated wastewater is disposed of through an approximately 25-cm (10-in.)-diameter, 15-m- (50-ft-) deep underground

injection well located next to the treatment facility. The residual wet sludge is disposed of at the Miami-Dade Water and Sewer Department's South District Wastewater Treatment Facility. FPL reports the average daily flow, carbonaceous biological oxygen demand, total suspended solids, fecal coliform bacteria, pH, total residual chlorine, and nitrate concentrations to the Florida Department of Environmental Protection (FDEP).

2.1.6 Plant Operation and Maintenance

Routine maintenance performed on plant systems and components is necessary for safe and reliable operation of a nuclear power plant. Maintenance activities conducted at Turkey Point include inspection, testing, and surveillance to maintain the current licensing basis of the plant and to ensure compliance with environmental and safety requirements. Certain activities can be performed while the reactor is operating. Others require that the plant be shut down. Long-term outages are scheduled for refueling and for certain types of repairs or maintenance, such as replacement of a major component. FPL refuels each of the Turkey Point nuclear units on a staggered 18-month schedule, resulting in at least one refueling every year and two refuelings every third year (FPL 2000a). A third of the core is offloaded at each refueling. Up to an additional 800 to 900 workers are onsite during a typical 30- to 40-day outage. FPL provided an appendix in the Updated Final Safety Analysis Report (UFSAR) regarding the aging management review to manage the effects of aging on systems, structures, and components in accordance with 10 CFR Part 54 (FPL 1999b). Chapter 3 and Appendix B of the Turkey Point license renewal application describe the programs and activities that will manage the effects of aging during the license renewal period (FPL 2000c). FPL expects to conduct the activities related to the management of aging effects during plant operation or normal refueling and other outages, but plans no outages specifically for the purpose of refurbishment. FPL has no plans to add additional full-time staff (non-outage workers) at the plant during the period of the renewed licenses.

2.1.7 Power Transmission System

Turkey Point Units 3 and 4 share a switchyard and transmission lines with Turkey Point Units 1 and 2. Eight transmission lines leave the Turkey Point site in two 101-m- (330-ft-) wide corridors. Seven of the lines leave the site in the transmission corridor going north to the Davis substation. These lines, which were placed in service in 1967 for Turkey Point Units 1 and 2, are listed in the Final Environmental Statement (FES; AEC 1972). The eighth line leaves the plant going west to Florida City. It was constructed in 1990. Four additional lines were constructed to connect the Davis substations at Doral, Levee, and Flagami.

The transmission lines are shown in Figure 2-5. The northbound transmission lines share a common corridor where possible. As a result, the total corridor length of about 92 km (57 mi) is shorter than the total transmission line length of about 320 km (200 mi). Statistics associated

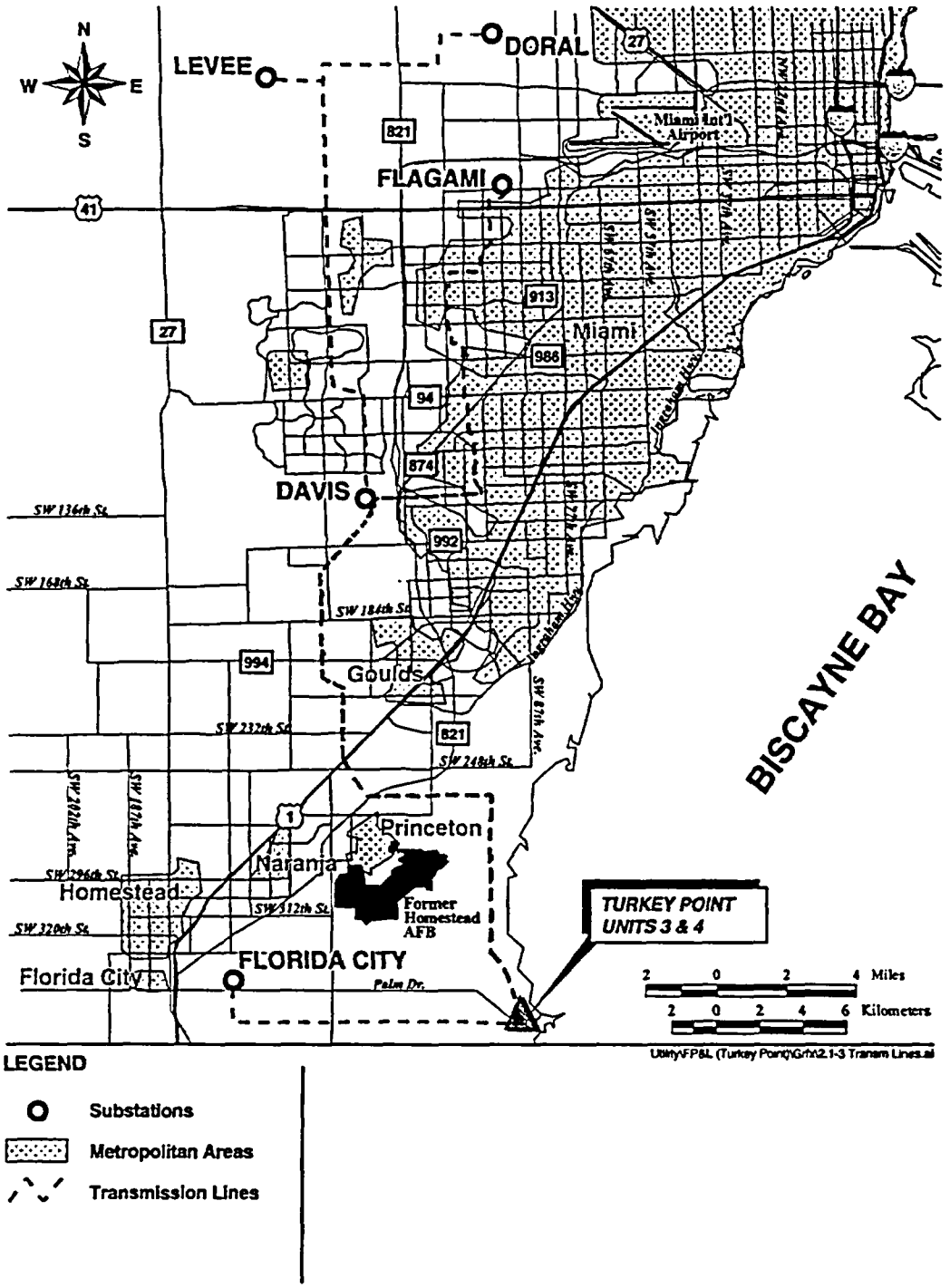

Figure 2-5. Turkey Point Transmission Lines

with the transmission lines are listed in Table 2-1. The statistics for the three substations north of the Davis substation (Flagami, Levee, and Doral) are only for the portions of the corridors north of the Davis substation; they do not include the distance from the Turkey Point switchyard to the Davis substation. Similarly, the statistics for the Doral substation are only from the point where the Levee and Doral lines separate. The statistics for the Levee line include the information for the corridor north of the Davis substation shared by the Levee and Doral lines.

FPL controls the Turkey Point transmission line corridors through a combination of ownership and easements. The corridors are maintained by a combination of trimming, mowing, and herbicide application. In wet areas, such as mangrove swamps, FPL maintains clearances by trimming trees at the 4.3-m (14-ft) level. Typically, this is only done at mid-span. Open, undeveloped areas are generally mowed about five times a year. These are the most common maintenance practices in the Florida City corridor and in the first 8 km (5 mi) of the Davis corridor. The remainder of the transmission line corridors are in areas of extensive agricultural land use. In these areas maintenance is generally limited to mowing at road crossings. Herbicides are used primarily to the control exotic species melaleuca (*Melaleuca leucodendron*) and Australian pine (*Casuarina equisetifolia*). FPL requires the use of State-licensed applicators for herbicides and only uses nonrestricted-use products.

Table 2-1. Turkey Point Transmission Line Corridors

Substation	Number of Lines	kV	Approximate Distance km	Approximate Distance (mi)	Corridor	Corridor Width m	Corridor Width (ft)	Corridor Area hectares	Corridor Area (acres)
Davis	7	230	31	(19)	N	101	(330)	313	(773)
Flagami	2	230	21	(13)	N	101	(330)	212	(524)
Levee	1	230	21	(13)	N	101	(330)	212	(524)
Doral	1	230	11	(7)	N	101	(330)	111	(274)
Florida City	1	230	8	(5)	W	101	(330)	81	(200)
Total			92	(57)				929	(2295)

Source: FPL 2000a.

2.2 Plant Interaction with the Environment

Sections 2.2.1 through 2.2.8 provide general descriptions of the environment as background information. They also provide detailed descriptions where needed to support the analysis of potential environmental impacts of refurbishment and operation during the renewal term, as discussed in Chapters 3 and 4. Section 2.2.9 describes the historic and archaeological resources in the area, and Section 2.2.10 describes possible impacts on other Federal project activities.

2.2.1 Land Use

Turkey Point Units 3 and 4 are located on the shore of Biscayne Bay in Florida's South Miami-Dade County. The plant site is approximately 40 km (25 mi) south of Miami. The nearest incorporated city limits are Homestead, which is approximately 15 km (9 mi) northwest of the plant site, and Florida City, which is approximately 13 km (8 mi) west of the plant site. The nearest community to the south is Key Largo, which is in Monroe County and is approximately 48 km (30 mi) by road from the plant site.

Biscayne Bay is a shallow, subtropical lagoon. The bay is a fairly recent geological formation. Portions of the bay have been modified and dredged. Average depths range from approximately 2 to 3 m (6 to 10 ft), except in deeper dredged areas and main channels. The bay is elongated in shape and located in a north-south trending direction (FDEP 2000).

Turkey Point Units 3 and 4 and associated structures and features, including the cooling canal system, occupy approximately 3200 ha (8000 ac). Two fossil-fuel units, Turkey Point Units 1 and 2, are located adjacent to Units 3 and 4. The fossil-fuel units also use the cooling canal system.

The Miami-Dade County Comprehensive Development Master Plan (Miami-Dade County 2000a) classifies the plant site as being in Environmental Protection Subarea F (Coastal Wetlands and Hammocks). Electrical generation and transmission facilities are permitted in this subarea (Miami-Dade County 2000a).

The South Florida Regional Planning Council has stated that renewal of the Turkey Point Units 3 and 4 operating licenses (OLs) is generally consistent with the goals and policies of the Strategic Regional Policy Plan for South Florida, particularly those regarding land use, public facilities, emergency preparedness, and natural resources of regional significance (Hulsey 2000).

Section 307(c)(3)(A) of the Coastal Zone Management Act [16 USC 1456(c)(3)(A)] requires that applicants for Federal licenses to conduct an activity in a coastal zone provide a certification that the proposed activity complies with the enforceable policies of the State's coastal zone program. All four Turkey Point Plant units are within the Florida coastal zone. The Florida Department of Community Affairs determined that renewal of the OLs for Turkey Point Units 3 and 4 is consistent with the Florida Coastal Management Program (Cantral 2000).

Land to the south and west of the site is in the Everglades Mitigation Bank where wetlands are created, restored, or enhanced to provide compensatory mitigation of wetland losses elsewhere. Under the joint Federally and State-operated mitigation bank program, lands can be publicly or privately owned. FPL owns the Everglades Mitigation Bank land, approximately 5300 ha (13,000 ac) of relatively undisturbed freshwater and estuarine wetlands. The U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency (EPA), the Natural Resources Conservation Service, the U.S. Fish and Wildlife Service (FWS), and the National Marine Fisheries Service (NMFS) provide guidance on the use of the mitigation bank to satisfy mitigation requirements of Section 404 of the Federal Water Pollution Control Act (also known as the Clean Water Act [CWA]) permit program, the wetland conservation provisions of the Food Security Act, the National Environmental Policy Act (NEPA), and several other statutory provisions. The FDEP, the South Florida Water Management District (SFWMD), and Miami-Dade County guide the mitigation bank program within Florida pursuant to the Florida Mitigation Banking Rule and other State authorities.

2.2.2 Water Use

The Newton water-treatment plant of the Miami-Dade Water and Sewer Department (MDWSD) provides Turkey Point Units 3 and 4 with approximately 0.044 m^3/s (1.5 ft^3/s) of process (primarily demineralizer water makeup), potable, and fire-protection water. This water comes from the Biscayne Aquifer, which occurs at or close to the ground surface and extends to a depth of about 21 m (70 ft) below the surface.

The Newton water-treatment plant has a treatment capacity of 9.5 m^3/s (330 ft^3/s). The treatment capacity can be increased to its permitted capacity of 10.9 m^3/s (380 ft^3/s) with additional supply wells. In 1998, the average daily demand for water from the Newton plant was 7.5 m^3/s (260 ft^3/s), and the peak demand was 8.2 m^3/s (290 ft^3/s).

Treated waste-process water is discharged into the cooling canal system. Sanitary wastewater is processed in an onsite treatment plant and is discharged to groundwater through a 25-cm-(10-in.-) diameter, 15-m (50-ft) injection well. The average flow to the injection well is about 0.0015 m^3/s (0.053 ft^3/s).

No water is withdrawn by FPL from surface water or groundwater for use as makeup water for the cooling canal system and no surface water flows into the canals. Evaporative losses from the cooling canal system are replenished by rainfall, plant storm water runoff, and treated process wastewater, which ultimately comes from the municipal supply. There also may be exchange of water between the cooling canal system and the groundwater beneath the canal. The Environmental Report (ER; FPL 2000a) suggests that groundwater may contribute to replenishing the evaporative losses from the canal, while the FES (AEC 1972) considered the impacts of a flow from the canals to Card Sound via the Biscayne Aquifer of 4.3 m^3/s (150 ft^3/s). FPL maintains an interceptor ditch to the west of the cooling canal system to control the westward movement of water seeping from the cooling canal system at times when the natural seaward groundwater gradient does not exist.

2.2.3 Water Quality

In accordance with the CWA, the water quality of plant effluent discharges is regulated through the National Pollution Discharge Elimination System (NPDES). The FDEP is the State of Florida agency delegated by the EPA to issue discharge permits in Florida.

Recharge of groundwater at the Turkey Point site varies seasonally between surface recharge during the rainy season and saline recharge from the ocean during the dry season. As a result, there is a large seasonal variation in the salinity of the groundwater near the surface at the Turkey Point site. However, below about 12 m (40 ft) into the acquifer, relatively high salinity (greater than 28 ppt) exists year round. Florida classifies the groundwater in this area as G-III based on its salinity. This classification is used to identify groundwater that has no reasonable potential as a future source of drinking water due to high total dissolved solids (FAC 62-520.430).

The current NPDES permit No. FL0001562 (FPL 2000a, Appendix E) issued by the FDEP authorizes discharges from the Turkey Point Plant of anything other than sanitary waste to the closed-cycle cooling canal system and from the cooling canal system to Class G-III groundwater. The NPDES permit does not authorize FPL's Turkey Point Plant to discharge to surface waters of the State. Discharges of other waste water, other than sanitary wastes, are either discharged directly into the closed cooling canal system or indirectly through settling basins. The closed cooling canal system, contained entirely on the FPL site, is not considered a surface water of the State. The NPDES permit requires periodic monitoring of discharges to the cooling canal system, but the permit does not place discharge limits on any parameter related to water quality.

FPL also has a permit issued by the FDEP to operate its sewage treatment facility and discharge treated effluent directly to Class G-III groundwater through an injection well. The permit limits average daily flow to the well to 0.0015 m^3/s (0.053 ft^3/s), sets effluent limitations, and specifies monitoring requirements. An application has been submitted to renew this permit.

2.2.4 Air Quality

Turkey Point site has a subtropical climate with mild dry winters and long warm summers with abundant rainfall. Climatological records for Miami are generally representative of the Turkey Point site, although the proximity of Turkey Point to Biscayne Bay tends to moderate temperatures and alter precipitation amounts and timing.[(a)] The record for Miami indicates that the dry season lasts from November through April, and the wet season from May through October. Normal daily maximum temperatures for Miami range from about 24°C (75°F) in January to a high of about 32°C (89°F) in July and August. Normal minimum temperatures range from about 15°C (59°F) in January to about 25°C (77°F) in August. Normal monthly precipitation ranges from 5 to 8 cm (2 to 3 in.) in the dry season to 15 to 23 cm (6 to 9 in.) in the wet season.

Thunderstorms occur on almost half of the days from June through September. Sustained hurricane winds are expected at the site about once every 6 to 7 years, and gale force winds can be expected to affect the area about twice as often (FPL 1999b). Based on statistics for the 30 years from 1954 through 1983 (Ramsdell and Andrews 1986), the probability of a tornado striking the site is expected to be about 6×10^{-5} per year.

The wind energy resource in Florida is limited. The annual average wind power in most of Florida is rated 1 on a scale of 1 through 7; in coastal areas, the rating is 2 at best (Elliott et al. 1986). Areas suitable for wind turbine applications have a rating of 3 or higher. No area in Florida is rated 3 or higher.

Most of the year, the region is under the influence of the Bermuda high-pressure system. High-pressure systems are generally associated with low winds and increased potential for air pollution. Turkey Point site is located within the South Florida Intrastate Air Quality Control Region. This region is designated as in attainment or unclassified for all criteria pollutants in 40 CFR 81.310, although Miami-Dade and Broward counties are maintenance areas for ozone. The Everglades National Park is designated in 40 CFR 81.407 as a mandatory Class I Federal

(a) Climatological data for Miami and Key West are available at http://www.ncdc.noaa.gov/ol/climate/climatedata.html