4.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

This chapter presents a description of Turkey Point Units 6 & 7 and directly associated non-linear facilities. The character and magnitude of plant usages and discharges and plant-related systems are described herein. The associated linear facilities (transmission lines, pipelines, and roads) are described in Chapter 9.0.

4.1 Background

FPL proposes to construct and operate two approximately 1,100-MW (net) nuclear units on the existing approximately 11,000-acre Turkey Point plant property located in unincorporated Miami-Dade County, Florida, and referred to as the Turkey Point Units 6 & 7 Project ("Project"). The Project includes Turkey Point Units 6 & 7, and several directly associated non-linear facilities: nuclear administration building, training building and parking area; an FPL reclaimed water treatment facility and treated reclaimed water delivery pipelines; radial collector wells and delivery pipelines; and the equipment barge unloading area~~; and the FPL-owned fill source~~.

The Turkey Point Plant is an existing electric generating facility that began operations in the 1960s. An approximately 5,900-acre industrial wastewater facility was constructed within the Turkey Point plant property in the 1970s to support the operation of Turkey Point Units 1 through 4 for condenser and auxiliary equipment cooling. Units 1 through 5 use the industrial wastewater facility for wastewater treatment. Units 6 & 7 will not utilize the industrial wastewater facility for cooling water or wastewater treatment, except that stormwater will continue to be routed to this facility.

Units 6 & 7 comprise two approximately 1,100-MW (net) nuclear units, six circulating water cooling towers, a makeup water reservoir, a switchyard, and other support facilities. FPL has selected the Westinghouse AP1000 as the plant design for the Project, a design certified by the NRC under 10 CFR 52. The new design incorporates the latest technology and more advanced safety features than today's plants, which have already achieved record safety levels. The size of the components to support operation is based on the AP1000 design.

4.2 Site Layout

The Westinghouse AP1000 units and support facilities are designed around a Westinghouse standardized unit approach. The location of the units will be directly south of the existing Units 3 and 4 in the northeast portion of the existing industrial wastewater facility, with Biscayne Bay to the east. An aerial photograph of the proposed Plant Area showing the existing generating units (Units 1 through 5) in the background is provided in Figure 4.2-1. Figure 4.2-2 shows the proposed Site plot plan with major structures identified and topographical map information. A conceptual illustration of Units 6 & 7 with the existing Units 1 through 5 is provided in Figure 4.2-3. Figure 4.2-4 shows the proposed plant profile and Figure 4.2-5 shows a conceptual illustration in proportion to the surroundings.

The principal structures for the Westinghouse AP1000 are the nuclear island, turbine building, annex building, diesel generator building, and radwaste building.

The structures that make up the nuclear island include the containment building, shield building, and auxiliary building. The foundation for the nuclear island will be an integral basemat that supports these buildings. The containment building will be a free-standing steel containment vessel with elliptical upper and lower heads. It will be surrounded by the shield building. The shield building will be a structure that, in conjunction with the internal structures of the containment building, provides the required shielding for the reactor coolant system and the other radioactive systems and components housed in the containment.

The auxiliary building will be a reinforced concrete structure that wraps around approximately 70 percent of the circumference of the shield building. The primary function of the auxiliary building is to provide protection and separation for the mechanical and electrical equipment located outside of the containment building. The main control room will be contained within the auxiliary building. The auxiliary building will provide protection to safety-related equipment from the consequences of a postulated either internal or external event. The auxiliary building will also provide shielding for the radioactive equipment and piping that is housed within the building.

The turbine building will be a rectangular steel column and beam structure with its long axis oriented radially from the containment. The turbine building will house the turbine, generator, and associated mechanical and electrical systems.

The annex building will be a combination reinforced concrete and steel-framed structure with insulated metal siding. The annex building will provide the main personnel entrance to the power block. The building also will contain the control support area, a machine shop, the ancillary diesel generators, other electrical equipment, and various heating, ventilation, and air-conditioning systems.

The diesel generator building will be a single-story, steel-frame structure with insulated metal siding. The building will house two standby diesel generators to provide backup power in the event of disruption of the normal power source.

The radwaste building will be a steel-framed structure. The radwaste building will house low-level liquid radwaste holdup tanks and processing system. The building will include facilities for segregated storage of various categories of waste before processing, for processing by mobile systems, and for storing processed waste in shipping and disposal containers.

Additional plant structures on the Site will include cooling towers, makeup water reservoir, blowdown sump, tanks, warehouses, other offices and buildings, parking areas, sanitary waste treatment plant, Clear Sky substation, and transmission towers. The cooling tower blowdown and other wastewater streams, except stormwater, will be discharged into the Boulder Zone using deep injection wells.

Each unit will include two standby diesel generators, two ancillary diesel generators, and one diesel-driven fire pump. The standby diesel generators will be located in the diesel generator building. The ancillary diesel generators will be in the annex building. The diesel-driven fire pump will be located in the diesel-driven fire pump enclosure. During normal operation of the plant, the operation of this equipment will be infrequent and typically limited to periodic testing.

An existing ten-meter meteorological tower is located within the Site and west of the plant area. This meteorological tower is part of the ongoing meteorological monitoring program for the Turkey Point Units 3 and 4 and may be used for Units 6 & 7. Prior to Turkey Point Units 6 & 7 operation, FPL will relocate the meteorological monitoring system to a previously affected area on the Turkey Point plant property.

Proposed off-Site associated non-linear facilities include: nuclear administration building, training building and parking area; an FPL reclaimed water treatment facility and treated reclaimed water delivery pipelines; radial collector wells and delivery pipelines; and the equipment barge unloading area;~~ and the FPL-owned fill source~~ (see Figure 3.1.2-1). The plot plan for the FPL reclaimed water treatment facility is presented in Figure 4.2-6.

4.3 Fuel

The reactor of each unit will contain 157 mechanically identical fuel assemblies. A fuel assembly consists of 264 fuel rods in a 17-by-17 square array. The fuel rods consist of enriched uranium, in the form of cylindrical pellets of sintered uranium dioxide contained in ZIRLO™ tubing, with an initial fuel cycle enrichment of 2.35 to 4.45 weight percent U-235. The average concentration of U-235 in reloads is 4.54 weight percent.

The total weight of uranium dioxide is 211,588 pounds. Reload core designs, as well as the initial cycle design, are anticipated to operate approximately 18 months between refueling, accumulating an average burnup of discharged fuel of approximately 50,553 megawatt-days per metric ton of uranium (MWD/MTU), with a cycle burnup of approximately 21,000 MWD/MTU. The ZIRLO™ tubing is plugged and seal-welded at the ends to encapsulate the fuel. An axial blanket comprised of fuel pellets with reduced enrichment may be placed at each end of the enriched fuel pellet stack to reduce the neutron leakage and to improve fuel use.

New fuel assemblies will be transported to the Turkey Point Units 6 & 7 by truck, from a fuel fabrication facility, in accordance with U.S. Department of Transportation (DOT) and NRC regulations. The truck shipments will not exceed 73,000 pounds as governed by federal or state gross vehicle weight restrictions.

Spent fuel assemblies being discharged will remain in the spent fuel pool for a minimum of five years while short half-life isotopes decay. The spent fuel pool in each unit has the capacity to store 889 fuel assemblies. The spent fuel pools are located in the auxiliary building for each Unit. Each refueling offload is approximately 64 fuel assemblies. Therefore, each spent fuel storage pool has the capacity for 11 refueling offloads, representing approximately 18 years' storage, plus a full-core offload for each unit.

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After a sufficient decay period, the fuel would be transferred to an on-site independent spent fuel storage installation facility or an off-site disposal facility. Packaging of the fuel for off-site shipment will comply with the applicable DOT and NRC regulations for transportation of radioactive material. The U.S. Department of Energy (DOE) is responsible for spent fuel transportation from reactor sites to a repository under the Nuclear Waste Policy Act of 1982, as amended. FPL has executed a standard spent nuclear fuel disposal contract with DOE for Units 6 & 7.

Ultra low-sulfur diesel fuel (with a sulfur content of 0.0015 percent or less) will be used in four standby diesel generators (two for each unit) and four smaller ancillary diesel generators (two for each unit) to provide standby power to various plant system electrical loads when other sources of power are not available. These generators will be for standby use only and will only operate for testing purposes to assure reliability and for maintenance. Additionally, each unit will have a diesel-driven fire pump.

Diesel fuel will be delivered to the Site by truck as needed and stored in aboveground storage tanks. Four aboveground 60,000-gallon diesel fuel oil storage tanks will be installed to provide fuel for the standby diesel generators. Each tank will be on a continuous concrete slab within a concrete dike to contain spills and prevent damage to the environment and seepage into the groundwater. Four aboveground 1,300-gallon standby diesel generator day tanks will be installed in the standby diesel generator buildings (one in each diesel generator building). Two aboveground 650-gallon diesel fuel storage tanks will be installed in the annex buildings (one in each unit) to provide the fuel for the ancillary generators. Two aboveground 240-gallon diesel fuel storage tanks will be installed in the diesel-driven fire pump enclosures (one for each unit). The tanks and associated connections will be constructed, operated, and maintained according to the applicable requirements of Chapter 62-762, F.A.C.

4.4 Air Emissions and Controls

4.4.1 Air Emission Units

The emission units associated with the Project will include circulating water cooling towers and service water system cooling towers, standby diesel generators, ancillary diesel generators, diesel fire pumps, diesel fuel storage tanks, and general purpose diesel engines. The circulating water cooling towers and service water system cooling towers will be operated continuously to support Turkey Point Units 6 & 7 operation. The standby diesel generators, ancillary diesel generators, and diesel fire pump engines will provide backup power to critical systems and will normally be operated about four hours per month for reliability and maintenance. The fuel used in the diesel engines will be ultra low-sulfur diesel fuel oil. There will be diesel storage tanks to support these engines. General purpose diesel engines will be used in various types of equipment to support the operation of the Project, including support of the refueling and maintenance cycle of the nuclear units. Refueling and maintenance activities will occur about every 18 months, alternating between Units 6 & 7.

The Project will have six circulating water cooling towers to support the operation of the nuclear units, with three towers for each unit. PM will be emitted from the circulating water cooling towers in the form of drift. Drift consists of small water droplets containing the minerals in the cooling tower circulating water. The estimated amount of minerals in the circulating water is based on the total dissolved solids (TDS) in the cooling water. The minerals can become PM and PM_{10} emissions when the water within the drift droplets evaporates in the atmosphere. Circulating water cooling tower drift will be controlled through the use of mist eliminators that will be designed to limit drift to 0.0005 percent of the circulating water rate of the cooling towers. Table 4.4-1 presents information on the cooling towers and potential PM and PM_{10} from drift. The emissions of PM and PM_{10} as drift from the main cooling towers will depend upon the quality of water used as makeup and the cycles of concentration of the cooling water in the circulating water system (CWS).

Two sources of water are proposed as makeup to the CWS to replace water from evaporation, drift, and blowdown. The primary source will be reclaimed water from the MDWASD South District Wastewater Treatment Plant, conveyed via pipelines to an FPL reclaimed water treatment facility on the Turkey Point plant property. The FPL reclaimed water treatment facility will further treat the reclaimed water for use in the cooling system. The maximum TDS for treated reclaimed water in the circulating water is estimated to be 4,000 parts per million by weight (ppmw). A TDS of 4,000 ppmw results in the maximum potential emissions of PM_{10} for this water source.

The secondary makeup water source will come from radial collector wells, substratum collectors of saltwater that will recharge from below Biscayne Bay, with a maximum TDS concentration in the circulating water of 65,000 ppmw. A TDS of 65,000 ppmw results in the maximum potential emissions of PM for this water source. The calculations for PM and PM_{10} emissions from the circulating water cooling towers are presented in Appendix 10.7.5.

The Project will also include one two-cell service water system cooling tower for each nuclear unit. The service water system cooling towers will utilize potable water obtained from Miami-Dade County. The expected TDS concentration in this water source is low. Consequently, TDS concentration in the circulating water will be low. Table 4.4-2 presents the maximum potential emissions for the service water system cooling towers. The maximum PM and PM_{10} emissions are based on a TDS concentration of 4,000 ppmw in the circulating water. During normal operation, the circulating water rate for the service water system cooling towers would be 10,500 gallons per minute (gpm) using one cell. Under startup and cool down operation, the circulating water rate could be as high as 21,000 gpm. The design parameters for the cooling towers have been estimated based on design of the mechanical cooling tower for Turkey Point Unit 5, which has a similar per-cell heat rejection rate. The maximum potential emissions were conservatively based on the design circulating water rate of 21,000 gpm.

Each unit will be equipped with two nominal 4,000-kilowatt (kW) standby diesel generators and two nominal 35-kW ancillary diesel generators. These generators will be used when electric power is not available to Turkey Point Units 6 & 7. There will also be one fire pump diesel engine associated with each unit. The potential emissions for these diesel engines are based on 96 hours of operation per year per engine or about eight hours per month. Normally, these generators would be operated four hours per month for maintenance and reliability testing.

During operation and refueling/maintenance cycles, there will be various general purpose diesel engines used in other equipment such as cranes, compressors, etc. The general purpose diesel engines would be classified as an "emission unit" under FDEP rules [Rule 62-210.200(125), F.A.C.] and were included in the total emissions for the Turkey Point Units 6 & 7 Project. The EPA emission factors contained in EPA publication AP-42, *Compilation of Air Pollutant Emission Factors,* were used to estimate emissions for general purpose engines. EPA has established emission standards for these engines as non-road diesel engine limits in 40 CFR 89, which become more stringent for engines manufactured in the future. EPA's non-road regulations require lower emission limits than the emission rates in EPA's emission factors. Since, by the time Unit 6 begins operation in 2018, many of the diesel engines in equipment used on the plant area will meet EPA's non-road diesel engine limits in 40 CFR 89, the emission estimates, as calculated using EPA's AP-42 emission factors, are conservative.

Table 4.4-3 presents estimated information on performance and emissions from the standby and ancillary generators, fire pump engines, and general purpose diesel engines. The basis for the potential emissions from diesel engines is presented in Appendix 10.2.5.

There will be twelve diesel fuel storage tanks associated with the Project. Each standby generator will have a 60,000-gallon storage tank and a 1,300-gallon day tank. Ancillary generators associated with each unit will have a 650-gallon tank. Each diesel fire pump will have a 240-gallon tank. The VOC emissions from all tanks based on the EPA Tanks Program is calculated to be 0.02 ton per year (TPY). Appendix 10.2.5, Air Construction Permit Application/PSD Report contains copies of the output of the EPA Tanks Program.

A summary of the maximum total potential annual emissions estimated for the Project is shown in Table 4.4-4. The information in this table represents a conservative estimate of potential emissions for the Project. The potential emissions for the Project are based on the range of operating conditions for the cooling towers, a higher than required operation for the standby and ancillary diesel generators and fire pump engines, and a conservative estimate of emissions from general purpose engines. Together, the potential emissions would envelope the Project's emissions.

4.4.2 Air Emission Controls

Operation of Units 6 & 7 would displace a considerable amount of NO_x, SO_2, and CO_2 emissions going forward, with the amount varying depending upon the type of alternative generation displaced such as natural gas combined-cycle (NGCC) or integrated coal gasification combined-cycle (IGCC). The annual avoided CO_2 emissions with the operation of Turkey Point Units 6 & 7, depending upon the alternative oil/gas-fired generation displaced for the same amount of generation, would be at least 7 million tons per year of CO_2 emissions. These CO_2 emissions will be avoided with the operation of Turkey Point Units 6 & 7 compared with oil/gas-fired generation options. Over a 40-year period of operation, Turkey Point Units 6 & 7 will avoid at least 266 million tons of CO_2.

Over a 40-year period of operation, Turkey Point 6 & 7 will also avoid from about 21,300 to 49,200 tons of NO_x and from about 14,200 to 75,400 tons of SO_2. In contrast, the support equipment for Turkey Point Units 6 & 7 will emit less than 1,500 tons of NO_x and less than one ton of SO_2 over a 40-year period of operation.

The control technology for the emission units associated with Turkey Point Units 6 & 7 will be based on demonstrated and available control technologies to minimize air emissions. For the circulating water and service water cooling towers, high-efficiency drift eliminators are proposed for controlling PM/PM_{10} emissions. High-efficiency drift eliminators minimize PM emissions by inertial impaction. Examples of high-efficiency drift eliminator configurations include herringbone (blade-type), wave form, and cellular (or honeycomb) designs. The cellular units generally are the most efficient. This technology is a commercially proven technique to reduce PM/PM_{10} emissions. The drift rate will be limited to 0.0005 percent of the water circulation rate.

On July 11, 2006, the EPA promulgated final *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*. The new rules are contained in 40 CFR 60, Subpart IIII, and in Parts 85, 89, 94, 1039, 1065, and 1068, and were effective on September 11, 2006. The rule applies to engines that are constructed, reconstructed, or modified after the New Source Performance Standards (NSPS) were proposed (July 11, 2005). The pollutants regulated under this rule include NO_x, PM, PM_{10}, $PM_{2.5}$, CO, and non-methane hydrocarbons (NMHCs).

To meet the Subpart IIII emission limits, manufacturers will utilize combustion controls to minimize the formation of air pollutants, ultra low-sulfur diesel fuel with a sulfur content of 0.0015 percent, proper maintenance, and catalyzed diesel particulate filters. The latter is installed by the manufacturer if the engine cannot meet the emission standards through the use of combustion controls and ultra low-sulfur diesel fuel alone. Catalyzed diesel particulate filters are particulate filters combined with either base metal or precious metal catalyst. Particulate removal is from 80 to greater than 90 percent for available particulate filters. Base metal catalysts control CO and NMHC by 50 percent, while precious metal catalysts control NMHC by 90 percent (EPA, 2008a).

The diesel engines necessary to support the standby diesel generators, ancillary diesel generators and fire pump engines will be purchased from manufacturers whose engines meet the EPA's NSPS Subpart IIII emission limits.

4.4.3 Control Technology

The performance and dimensions of the circulating water cooling towers are based on SPX Cooling Technologies F41010A-6.6-12 Plus design or equivalent. Each tower will have 12 cells with 33.67-ft-diameter cooling fan stacks. The circulation water rate for each tower is about 210,000 gpm.

The mist eliminators will be three-pass Marley cellular type (Model TU12C) or equivalent constructed of polyvinyl chloride that will limit drift to 0.0005 percent of the circulating water rate.

The standby and ancillary generators and fire pump engines will meet the requirements of 40 CFR 60, Subpart IIII.

4.4.4 Design Philosophy

The Turkey Point Units 6 & 7 Project will minimize air pollutant emissions by using nuclear fuel to generate electric power. This includes avoiding emissions of PM, SO_2, NO_x, CO, and VOC. Moreover, at least 7 million tons per year of CO_2 will be avoided by the Project that would otherwise be emitted if equivalent oil/gas-fired (i.e., NGCC or IGCC) generation were used. The circulating water cooling towers will be equipped with high-efficiency drift or mist eliminators to minimize emissions of PM to 0.0005 percent of the circulating water; this is over 99.99-percent control of potential drift emissions based on the circulating water flow. The diesel engines necessary to support the generators and fire pump engines will be purchased from manufacturers whose engines meet the EPA's NSPS Subpart IIII emission limits. The large magnitude of the air emissions avoided by Turkey Point Units 6 & 7 is clearly a significant environmental benefit for Florida's future from an air emission perspective.

4.5 Plant Water Use

Plant water use calculations for Units 6 & 7 are based on two AP1000 units. Consumption and treatment requirements are determined from the AP1000 Design Control Document (DCD) water quality guidelines and site characteristics. The water for the various plant water needs will be obtained from a reclaimed water supply, a saltwater supply, and a potable water supply.

Reclaimed water will be used as makeup water to the CWS. The maximum makeup reclaimed water rate for the CWS is based on maintaining four cycles of concentration in the CWS cooling towers. The makeup, blowdown, evaporation, and drift flow rates for reclaimed water are provided in Table 4.5-1.

The secondary makeup water source will be saltwater from radial collector wells, which may constitute 100 percent of required makeup water under some conditions. The maximum makeup saltwater rate to the CWS is based on maintaining 1.5 cycles of concentration in the cooling towers. The makeup, blowdown, evaporation, and drift flow rates for saltwater are provided in Table 4.5-2.

When reclaimed water is not available in sufficient quantity for the CWS, a combination of reclaimed water and saltwater will be used as a source of cooling water. The ratio of water supplied by the two makeup water sources will vary based on the availability of reclaimed water from the MDWASD. The makeup water and the blowdown rates for this combined usage will be within the flow rates identified in Tables 4.5-1 and 4.5-2.

Potable water will be used as makeup water for the service water system. The maximum makeup water rate for the service water system is based on maintaining four cycles of concentration in the cooling towers. The estimated evaporation water loss during normal conditions and cooldown conditions from the service water cooling towers for two units is provided in Tables 4.5-1 and 4.5-2.

The potable water supply will also provide water to the potable water system, fire protection system, demineralized water treatment system, and other miscellaneous uses.

Tables 4.5-1 and 4.5-2 show a normal and maximum case of water use. Normal values listed are expected limiting values for normal plant operation with the two units in operation. Maximum values are those expected for extreme conditions with the two units in operation. Fire water usage is based on monthly average use required to maintain fire protection system availability. Tables 4.5-1 and 4.5-2 are used in conjunction with the flow diagram shown in Figure 4.5-1.

4.5.1 Heat Dissipation System

4.5.1.1 System Design

Circulating Water System

Each AP1000 unit will have a CWS that will be used to dissipate $7{,}540\times10^6$ British thermal units per hour (Btu/hr) as condenser heat load, 86×10^6 Btu/hr as turbine building cooling water heat load, and 1.61×10^6 Btu/hr as condenser vacuum pump heat load, for a total of $7{,}628\times10^6$ Btu/hr for one unit. The waste heat rejected from the condenser, turbine building closed cooling water heat exchangers, and condenser vacuum pump seal water heat exchangers would be 1.53×10^{10} Btu/hr for two units. Six mechanical draft cooling towers will be required to dissipate the waste heat load for the two units. The mechanical draft cooling towers will operate with approximately a 7.1°F approach temperature, and provide a less than 91°F return temperature at design ambient conditions. The flows for the evaporation, blowdown, makeup, and drift are presented in Table 4.5-1 (reclaimed water for makeup to the CWS) and Table 4.5-2 (saltwater for makeup to the CWS).

The CWS will consist of three 33-1/3-percent-capacity circulating water pumps, three mechanical draft cooling towers, and associated piping, valves, and instrumentation for each unit. The CWS pump flow rate will be approximately 660,100 gpm per unit. Flow through the condenser will be 631,100 gpm. The maximum blowdown for each unit is approximately 29,000 gpm. The water will be pumped through the condenser, turbine building closed cooling water heat exchangers, and condenser vacuum pump seal water heat exchangers (all in parallel), and then to the mechanical draft cooling towers to dissipate heat to the atmosphere.

Service Water System

Each unit will have a service water system to provide cooling water to the component cooling water system heat exchangers located in the turbine building. The service water system will consist of a dedicated closed-cycle system with a mechanical draft cooling tower to dissipate heat during normal conditions, shutdown, or other operating conditions. Service water will be pumped to the component cooling water heat exchangers for heat removal.

The service water cooling towers are estimated to have evaporation water loss of approximately 366 gpm during normal conditions and approximately 1,248 gpm during cooldown conditions for two units. Blowdown flow from the service water towers will be discharged to the CWS cooling tower basin at a maximum flow rate of up to approximately 415 gpm for two units. The blowdown would be directed to the wastewater retention basin as necessary. A maximum makeup water flow rate of approximately 1,664 gpm for two units will be required to accommodate a maximum of approximately 624 gpm per unit evaporation rate and approximately 208 gpm per unit blowdown rate.

Drift loss will be minimal for the service water system cooling towers. Maximum proposed service water system blowdown and makeup rates are based on maintaining four cycles of concentration in the cooling tower.

The service water system will have a cooling tower that is a rectilinear mechanical draft structure for each unit. The cooling tower is a counterflow, induced-draft tower and is divided into two cells. Each cell uses one fan, located in the top portion of the cell, to draw air upward through the fill counter to the downward flow of water. Each fan is driven by a two-speed electrical motor through a gear reducer. During normal power operation, one cell is inactive and water flow to that cell is shut off by a motor-operated isolation valve. One operating service water pump supplies flow to the operating cell. When the service water system is used to support plant shutdown cooling, both tower cells are normally placed in service along with both service water pumps, for increased cooling capacity.

The service water tower will maintain a maximum 93.5°F return temperature to the component CWS heat exchangers during normal operation mode. Temperature rise through the component CWS heat exchangers will be approximately 20°F during normal operation and 33°F during cool-down operation.

During normal operation, the service water system has a flow of approximately 10,500 gpm and will dissipate approximately 103×10^6 Btu/hour for each unit. During plant cool-down operation, the service water system will have a maximum flow of approximately 21,000 gpm and dissipate approximately 346×10^6 Btu/hr for each unit.

4.5.1.2 Source of Cooling Water

Cooling water use for Turkey Point Units 6 & 7 is based on two AP1000 units at the Site. Turkey Point Units 6 & 7 will use cooling water makeup from a reclaimed water source (primary source for circulating water system), a saltwater source (secondary source for circulating water system), and a potable water source (service water system). The water sources are presented below by the system in which the water is used.

Circulating Water System

Reclaimed water from the MDWASD will be the primary source of CWS cooling tower makeup and will be treated at the FPL reclaimed water treatment facility. The FPL reclaimed water treatment facility will provide nutrient removal, continuous water quality monitoring, flow equalization and metering, de-chlorination, disinfection, and pumping facilities. FPL reclaimed water treatment facility will include pumps, trickling filters, clarifiers, deep bed filters, and solids-handling equipment to reduce the levels of iron, magnesium, oil and grease, total suspended solids, nutrients, and silica to usable levels for the circulating water system. This treatment will occur before storage in the makeup water reservoir. The makeup water for the circulating water cooling towers will be treated to prevent biofouling in the raw water supply piping to the CWS cooling towers. Treated reclaimed water will be conveyed to the Site via delivery pipelines.

Saltwater will be the secondary source of CWS cooling tower makeup and will be supplied by radial collector wells. There will be four 33 1/3 percent radial collector wells (30,000 gpm capacity per well). Three wells would meet the makeup water requirements for the circulating water systems; the fourth would be an installed spare. Two 50 percent pumps (15,000 gpm capacity per pump) in each well caisson will transfer the saltwater to the circulating water systems via delivery pipelines to the Site. Each radial collector well will consist of a central reinforced concrete caisson extending below ground level.

Laterals will project from the caissons below Biscayne Bay. The laterals will be advanced horizontally a distance of up to 900 ft beneath Biscayne Bay and installed to a depth of approximately 40 ft. Portions of the radial collector well laterals may extend beyond FPL property on sovereign submerged lands in Biscayne Bay Aquatic Preserve. The laterals will not extend beneath BNP. A conceptual design for a typical radial collector well is illustrated in Figure 4.5-2. The wells will be designed and sited to induce recharge from Biscayne Bay. The radial collector wells area is shown in Figure 4.5-3.

Service Water System

The potable water from the MDWASD will be supplied to a raw water storage tank that will provide water to the service water system. The raw water storage tank is common to both units. Two 100 percent raw water ancillary transfer pumps for each unit will transfer the required makeup water to the service water system.

The water quality data for the reclaimed water supply, saltwater supply, and potable water are provided in Table 4.5-3.

4.5.1.3 Dilution System

There will be no thermal dilution of the CWS blowdown prior to discharge to the deep injection wells.

4.5.1.4 Blowdown, Screened Organisms, and Trash Disposal

The blowdown from the CWS will be discharged to a common lined blowdown sump basin. The lined blowdown sump basin will discharge to the deep injection wells described in Subsection 4.5.1.5. There will be no point source discharge to surface waters for the CWS. The service water system will discharge to the CWS.

The CWS and service water system do not have surface water intake structures. Therefore, there will be no organisms collected on intake screens or trash collected at an intake structure.

4.5.1.5 Deep Injection Wells

The cooling tower blowdown and other Site wastewater streams, except stormwater, will be collected in a lined blowdown sump and will be discharged to the deep injection wells. Biocides and chemical additives in the discharge stream are addressed in detail in Subsection 4.6. The deep injection wells will meet the requirements established by FDEP and Chapter 62-528, F.A.C.

The injection wells will be installed in accordance with the FDEP and any local requirements. The operation of the injection wells may create areas of high pressure in the vicinity of the injection points. In these areas, waters with salinity less than that of the natural waters within the Boulder Zone will be buoyant and have a tendency toward upward migration. Therefore, dual-zone monitoring wells (required by FDEP) will be installed within 150 ft of each Class I deep injection well. Each monitoring well will be installed to monitor for upward fluid migration through the confining unit overlying the injection zone. Groundwater monitoring data, including groundwater elevation data and chemical data, will be collected and submitted to FDEP in accordance with the injection permit FPL would obtain from FDEP.

The maximum sump discharge flow for two units when 100 percent reclaimed water is used would be approximately 12,914 gpm, and the maximum sump discharge flow for two units for 100 percent saltwater would be approximately 58,922 gpm.

The wastewater discharged to the deep injection wells will not be hazardous as defined by Chapter 62-730, F.A.C. The quality of the water that will be discharged via the deep injection wells is presented in Subsections 4.6-2 and 4.6-3.

Figure 4.5-4 presents a conceptual diagram of a typical injection well. To provide technical information that will support the construction of the injection wells, an exploratory well will be constructed. The exploratory well will be constructed to provide detailed information on the lithology, hydrogeology, and other geologic parameters specific to the Site. An application for a permit to construct an exploratory well and a dual-zone monitoring well has been submitted to FDEP separate from the Site certification process and is included as Appendix 10.2.8, along with additional information. The proposed locations of the injection wells and monitoring wells are shown on Figure 4.2-2.

4.5.2 Domestic/Sanitary Wastewater

The Turkey Point Plant currently does not have service from MDWASD for sanitary wastes and uses septic tanks for isolated facilities and a package sanitary wastewater treatment plant with UIC disposal approved by FDEP and DERM for the remaining facilities. FPL has met with MDWASD and determined service to the Site is approximately eight miles away and no extension of service near the Site is planned. During the meeting, MDWASD confirmed that providing waste water treatment service to the Turkey Point plant from their nearest facility was not appropriate. Therefore, for Units 6 & 7, sanitary treatment will be provided by a new package sanitary treatment plant located on the Site. The sanitary treatment plant would be designed to process sanitary wastes from Units 1 through 7 and will be designed and operated in compliance with applicable FDEP and DERM rules.

Units 6 & 7 will have a sanitary drainage system that will collect sanitary waste from plant restrooms and locker room facilities and carry this waste to the sanitary treatment plant where it will be processed. The sanitary drainage system will not service facilities in radiologically controlled areas.

For Units 6 & 7, the sanitary treatment plant will be designed to accommodate 50 gallons per person per day for 500 people during normal operation per unit and 1,000 people during plant shutdown per unit. The sanitary treatment plant will also be designed to accommodate the sanitary effluent from Units 1 through 5. The design flows for the sanitary system are shown in Tables 4.5-1 and 4.5-2.

4.5.3 Potable Water Systems

The potable water system provides a water supply for domestic use and human consumption. Water provided from the MDWASD potable water supply will be fed to the potable water distribution system for each unit. The water will not need treatment by FPL. The estimated potable water flows are presented in Tables 4.5-1 and 4.5-2.

4.5.4 Process Water Systems

4.5.4.1 Demineralized Water Treatment System

Each unit will have a demineralized water treatment system that will receive potable water from the MDWASD, process the water to remove ionic impurities, and provide demineralized water for other systems for plant operation.

The demineralized water treatment system is a water purification system consisting of filters, pumps, reverse osmosis (RO) units, an electrodeionization unit, and associated piping, valves, and instrumentation. The estimated demineralized water treatment system flows are presented in Tables 4.5-1 and 4.5-2. The systems that use demineralized water are identified in Figure 4.5-1.

Primary demineralization is achieved by a two-pass RO system that consists of two identical RO units that normally operate in series. The influent to the RO unit is pumped from the raw water system through the cartridge filters to the suction of the RO feed pump. The feed pump moves the water through the first unit of RO membranes, where approximately 90 percent of the ionic impurities are removed. The product water from the first unit flows to the suction of the feed pump associated with the second RO unit. Approximately 90 percent of the remaining ionic impurities are removed by the second RO unit.

The product water from the second RO unit flows to the electrodeionization system for secondary demineralization. The electrodeionization unit removes approximately 90 percent of the remaining ionic impurities and also removes dissolved CO_2 gas.

A pH adjustment chemical is added to adjust the pH of the RO influent. The pH is maintained within the operating range of the RO membranes to inhibit scaling and corrosion. A dilute antiscalant, which is chemically compatible with the pH adjustment chemical feed, is metered into the RO influent water to increase the solubility of salts (that is, decrease scale formation on the membranes). Both the pH adjustment chemical and antiscalant are injected into the demineralized water treatment process from the turbine island chemical feed system. Examples of the chemical types and frequency of use for the demineralized treatment system are presented in Table 4.6-4.

The wastewater effluent from the demineralized water treatment system (ultra filtration reject, RO reject, and electrodeionization reject) will be discharged to a lined wastewater retention basin and ultimately discharged to the deep injection well system. The chemicals and concentrations from the wastewater effluent are part of the chemicals and concentrations tables presented in Subsection 4.6.

4.5.4.2 Additional Water Uses

The MDWASD potable water supply will provide water for the fire protection water and equipment/floor washdown water. The estimated fire protection and equipment/floor washdown flows are presented in Tables 4.5-1 and 4.5-2.

4.5.5 Variances

FPL requests that the final certification for this Project include approval for the use of the on-Site package sanitary treatment plant and the other on-site cooling water and wastewater treatment and disposal facilities described in this application, including a variance from Miami-Dade County Code, Section 24-43.1(6). § 403.511(2)(b)1, F.S.; Rule 62-17.051(3)(a), F.A.C. FPL is seeking approval for the use of the on-Site package sanitary treatment plant and the other on-site cooling water and wastewater treatment and disposal facilities described in this application, in lieu of connecting the Project to a public sanitary sewer line for treatment and disposal of these waters by the County. Section 24-43.1(6) of the Miami-Dade County Code requires connection to the County sewer lines where the facility is within a feasible distance of public sanitary sewers. Under Section 24-5 of the Miami-Dade Code, “feasible distance” is determined by dividing the gross floor area (GFA) by fifteen to derive the linear distance that would be considered feasible for a sewer hookup. Under the site plan approved by Miami-Dade County, the relevant GFA was identified as 673,000 square feet, making the maximum feasible distance 44,867 linear ft, or approximately 8.5 miles. The distance from the Turkey Point plant property to the nearest public sewer line connection is approximately eight miles. Therefore, it is within a feasible distance as defined by the Miami-Dade County Code.

FPL meets the County’s criteria for a variance from this sewer hookup requirement under Section 24-12 of the Miami-Dade County Code and the PPSA. A variance may be granted where compliance with a County Code provision “will not be detrimental to the public health, welfare and safety and will not create a nuisance and will not materially increase the level of pollution” in the County. The on-Site wastewater treatment facilities will be modern treatment facilities located entirely on the Turkey Point plant property. There will be no off-site disposal of cooling waters or wastewaters. The treatment facilities will be constructed and operated in accordance with regulations applicable to such facilities and, therefore, will not be detrimental to the public health, welfare, or safety and will not materially increase the level of pollution. These on-Site facilities will be capable of disposing of high volumes of wastewater and cooling water blowdown, including potentially-saline water, which could not be conveyed, treated or disposed in the County’s sewer system. The on-Site treatment and disposal facilities likewise will not have adverse off-site effects such as noise or odor, and thus, will not create a nuisance. For these reasons, under Section 24-12 of the Miami Dade Code and Section 403.511(2)(b)1, F.S., a variance from the “feasible distance” requirement for sanitary sewer hookups in County Code Section 24-43.1(6) is appropriate.

FPL already utilizes an approved existing sewage/sanitary treatment plant on the Turkey Point plant property. The new sanitary treatment plant would both replace the existing treatment plant and will be designed to also serve Units 6 & 7. Other Project treatment and disposal facilities will serve the large volumes of cooling waters and wastewaters in full compliance with state and federal requirements. Finally, since Units 6 & 7 will not go into service until 2018, it is not certain that the County would have adequate conveyance or treatment capacity at that time to convey, treat or dispose of the large volumes of potentially-saline cooling waters and wastewaters of up to 90 MGD from the Turkey Point plant facilities. Under these circumstances, construction and operation of an on-Site package domestic wastewater treatment plant and other on-site cooling water and wastewater treatment and disposal facilities is clearly preferable to the County, its wastewater customers and FPL than connection of the Project to public sewer lines for treatment and disposal of these liquid wastewaters

Pursuant to Rule 62-17.051(3)(a), F.A.C., FPL requests that the following condition of certification, or such other similar condition as may be deemed appropriate, be included as part of any final certification for the Project:

> *"FPL is granted a variance from Miami-Dade County Code Section 24-43.1(6) and is not required to connect the Project to public sewer lines."*

4.6 Chemical and Biocide Waste

4.6.1 Chemicals or Biocides

Proper water chemistry for plant operation requires the treatment of potable water, reclaimed water, and saltwater that will be used in the various plant water systems such as circulating water, service water, and demineralized water systems.

The waste effluent from the plant demineralized water systems, sanitary waste treatment plant, FPL reclaimed water treatment facility, filter backwash, and other nonradioactive drains throughout the plant will be collected in a lined blowdown sump along with the blowdown from the circulating water and service water systems. The combined wastestream will be pumped to the deep injection wells. The combined wastestream chemical characterization will be controlled through engineering design and operational procedures to meet the requirements established in the underground injection control permits. The wastestream characterization and disposal method are listed in Table 4.6-1. A description of the deep injection wells is provided in Subsection 4.5.1.5.

The effluent wastestream constituents and concentrations in the lined blowdown sump are identified in Table 4.6-2 for a reclaimed water supply as makeup to the CWS and Table 4.6-3 for a saltwater supply as makeup to the CWS. The characterization of the CWS blowdown to the lined blowdown sump is based on two makeup water cases that use either 100 percent reclaimed or 100 percent saltwater supply. Saltwater from radial collector wells would be used as makeup for the CWS when reclaimed water is not available in sufficient quantity and/or quality. Constituents in the wastestream, in the case of combined reclaimed and saltwater supply, would be within the rates and limits described for each individual water supply.

Examples of the water treatment chemicals used in the CWS, service water system, reclaimed water treatment facility, steam generator blowdown system, and demineralized water system are identified in Table 4.6-4. Table 4.6-4 shows the chemicals that will be used in each system and the frequency of use. The CWS chemicals are based on two cases of makeup water supply: 100 percent reclaimed water or 100 percent saltwater.

4.6.2 Liquid Effluents

The wastewater system will collect and process liquid effluent from equipment and floor drains from nonradioactive building areas, and will be capable of handling the anticipated flow of wastewater during normal plant operation and during plant outages. A process diagram and flow rates of the water system are addressed in Subsection 4.5. The wastewater system will:

- Remove oil and/or suspended solids from miscellaneous wastestreams generated from the plant;
- Collect system flushing wastes during startup before treatment and discharge;
- Collect and process fluid drained from equipment or systems during maintenance or inspection activities; and
- Direct nonradioactive equipment and floor drains that may contain oily waste to the building sumps and transfer their contents for disposal in accordance with applicable regulations and permit specifications.

Wastes from the turbine building floor and equipment drains (which include laboratory and sampling sink drains, oil storage room drains, the main steam-isolation valve compartment, auxiliary building penetration area, and the auxiliary building HVAC room) are collected in the two turbine building sumps. Drainage from the diesel generator building sumps, the auxiliary building nonradioactive sump, and the annex building sump is also collected in the turbine building sumps. The turbine building sumps provide a temporary storage capacity and a controlled source of fluid flow to the oil/water separator.

The turbine building sump pumps route the wastewater from either of the two sumps to the oil/water separator for removal of oily waste. The diesel fuel oil area sump pump also discharges wastewater to the oil/water separator. The oil/water separator has a small reservoir for storage of the separated oily waste that flows by gravity to the waste oil storage tank. A bypass line allows for the oil/water separator to be out of service for maintenance. The bypass goes around the oil/water separator and the water can be held in the wastewater retention basin. The water in the basin can be diverted back to the oil/water separator when it returns to operation or to the oil/water separator for the other unit. The waste oil storage tank provides temporary storage before shipment for off-site disposal.

The wastewater from the oil/water separator and the condenser waterbox drains by gravity to a lined wastewater retention basin for settling of suspended solids and any required treatment, before discharge. The wastewater basin transfer pumps route the basin effluent to the lined blowdown sump where it would be combined with the cooling tower blowdown streams as part of the final plant effluent described in Subsection 4.6.1.

Stormwater runoff will be routed to the existing industrial wastewater facility as described in Subsection 4.8.

4.7 Solid and Hazardous Waste

All non-hazardous and hazardous wastes associated with the Project will be managed according to federal, state, and local regulations and FPL's "Waste Guidelines" with appropriate modifications to accommodate the Project (see Table 4.7-1). Solid and potentially hazardous waste generated from the Project will be properly characterized based on process knowledge or analytical tests to ensure proper waste management and disposal. The second column of Table 4.6-1 includes the basis for characterization (process knowledge or analytical testing) for each wastestream. The Project may generate hazardous waste periodically, including expired chemicals, paints, spent solvents, cleaning wastes, and other wastes. These wastes will be collected and managed as hazardous waste until tested to determine their characteristics.

The same types of wastes mentioned above are expected to be generated during construction and will be managed under the same guidelines. Solvent rags will be collected and laundered. Residual waste from punctured aerosol cans will be collected and managed as hazardous waste. Paint waste, polyvinyl chloride (PVC) cleaner, and PVC cement wastes will be minimized by implementation of programs requiring use of all material prior to issuance of additional material.

Any wastes, if hazardous, will be collected on-site and disposed of by a licensed hazardous waste contractor as is the current practice for hazardous wastes generated from Turkey Point Units 1 through 5. Hazardous waste will be managed according to Chapter 62-730, F.A.C., and other applicable rules and regulations as is the current practice for hazardous wastes generated from Turkey Point Units 1 through 5.

4.7.1 Solid Waste

Solid wastes will be generated by the Project but generally in small quantities. Solid wastes will be limited to municipal solid waste and infrequent solid wastes from operations and outages (e.g., metal, containers, filters, pallets, etc.). The solid waste collected from the periodic cleaning of cooling basins, forebay screens, and catch basin screens will be disposed of in a permitted landfill.

The FPL reclaimed water treatment facility will generate an estimated 435 tons per day of solid waste (i.e., treatment solids) from the continuous treatment of reclaimed water. Solid waste disposal for the Project will utilize an approved contractor to dispose of all solid waste, as is the current practice for the solid wastes generated from Turkey Point Units 1 through 5.

The Project will not require a dedicated solid waste disposal facility meeting the requirements of Chapters 62-701, F.A.C. As a result, information related to Solid Waste Disposal Facilities required by Chapter 62-701, F.A.C., such as prohibitions, waste containment design, leachate control, surface water control, geotechnical investigations, water quality monitoring, closure plan and long-term care, and financial assurance, is not applicable to the Project.

4.7.2 Hazardous Waste

A designated Hazardous Waste Storage Area will be created during construction. Any drums placed in the Hazardous Waste Storage Area will be properly labeled and dated. Satellite Accumulation Drum Areas may also be used.

Potential hazardous waste associated with the Project on an annual basis is estimated to be about 1,200 kilograms (kg) (2,600 pounds) based on the hazardous waste generation from Turkey Point Units 3 and 4 for 2007. The total generation of hazardous waste in 2007 for Turkey Point Units 1 through 5 was about 2,190 kg (4,817 pounds). The total hazardous waste generated in 2007 included about 460 kg (1,012 pounds) from Units 1 and 2, about 1,200 kg (2,640 pounds) from Units 3 and 4, and about 530 kg (1,165 pounds) from the construction of Turkey Point Unit 5. For 2006, the total hazardous waste generation from the Turkey Point Plant was about 1,660 kg (3,653 pounds). Based on the current and future generation of hazardous waste, the status of Turkey Point Plant as a Small Quantity Generator (SQG) will not change as a result of the Project. Monthly hazardous waste generation will be monitored to demonstrate the actual hazardous waste generator status.

The hazardous waste periodically generated by the Project may include paints, expired chemicals, cleaning agents, spent solvents, and other wastes. The hazardous wastes generated by the Project will vary monthly.

4.8 On-Site Drainage System

4.8.1 Design Criteria and Applicable Regulations

The surface water management system for the Turkey Point Units 6 & 7 Project will be designed to meet all the applicable local, regional, state, and federal regulations. Stormwater runoff from the Units 6 & 7 plant area will be routed for treatment into the existing industrial wastewater facility. The design rainfall event based on 25-year, 72-hour storm is approximately 12.6 inches. The Units 6 & 7 plant area drainage system will consist of catch basins, pipes, swales, and culverts that will convey runoff to the industrial wastewater facility. A conceptual stormwater management plan and drainage calculations for the Project are presented in Appendix 10.8.

4.8.2 Construction Site Drainage

For any associated non-linear facilities for which stormwater will not be routed to the industrial wastewater facility, applicable regulations will be met through design and construction of required stormwater facilities. These facilities may include laydown and parking areas, FPL reclaimed water treatment facility, radial collector wells, and the equipment barge unloading area~~, and the FPL-owned fill source area~~. During construction, the extent of earth disturbances will be minimized as much as is practical. Areas outside of cut and fill operations will be protected against unnecessary equipment traffic. Aggregate-surfaced areas will be provided for roads, while surfacing will be provided for the parking areas.

Prior to beginning any earth disturbing activities, a silt fence will be installed along the perimeter of areas to be used for parking and trailers, as well as areas where runoff to off-site areas is expected. The silt fence will contain sediments from construction runoff. Along the perimeter of areas that will be filled and are presently tidal where silt fence may not be appropriate, an impermeable barrier (e.g., Fabriform, soil, cement bags, or sheet piling) will be placed along the perimeter to prevent tidal circulation and to keep the sediment within the construction area. Temporary erosion and sedimentation control measures will be designed to prevent the sediment from being displaced and carried off-site by the construction runoff. Silt fences, as well as inlet and outlet protection at catch basins, culverts, and sediment basins, as necessary, will be used to assist in the sediment control. As necessary, the sediment collected during the construction will be removed. All temporary sediment and erosion control measures will be removed at the end of construction. The surface water runoff from the FPL reclaimed water treatment facility at the existing condition flows to the surrounding area. In addition to the temporary erosion and sedimentation control measures discussed above, retention or detention ponds will be installed to capture runoff during construction. Temporary sediment basins will be installed to detain sediment-laden runoff from the disturbed areas.

The construction activities for the radial collector wells would be performed in accordance with the required local, state, and federal guidelines and accepted industry practices. Construction requirements for the installation of the wells and delivery pipelines to the Units 6 & 7 plant area would cause temporary changes in the surface water drainage in the vicinity of the wells and pipeline route during the construction activities. Sedimentation barriers and sedimentation traps would be installed to minimize the potential impacts to the surface water bodies. The drainage characteristics will be restored to preconstruction conditions once the construction activities are completed.

4.8.3 Operational Site Drainage

Stormwater runoff from the Units 6 & 7 plant area and other areas that currently drain to the existing industrial wastewater facility will continue to be routed to this facility. The industrial wastewater facility has the capacity to receive this stormwater. Runoff from the potentially oil-contaminated areas (containment area for transformers, and other oil-containing or handling equipment) will first be directed through an oil/water separator and then routed to the industrial wastewater facility.

Drainage from the Units 6 & 7 plant area will be directed away from the power block structures and routed to the industrial wastewater facility. Runoff from the power block will flow away from the center and into the catch basins provided on the north, south, east, and west sides of the power block. The Clear Sky substation and operations parking areas will be graded with moderate slopes for effective drainage. Runoff will flow to swales in the northern and southern perimeters of the substation. The operations parking areas will be graded to provide effective drainage to swales on the northern and western sides and to catch basins on the southern side. Stormwater runoff in the swales will flow to retaining walls and will be released to the industrial wastewater facility via downspouts. Water that may come in contact with oil (e.g., parking lots and equipment) will be routed to oil/water separators. The makeup water reservoir is located south of the power block, where precipitation will be collected in the reservoir and will not contribute to the Units 6 & 7 plant area runoff for any conditions up to the design storm. The operational stormwater design is included in Appendix 10.8.

The FPL reclaimed water treatment facility will be located northwest of the Site. The location of the FPL reclaimed water treatment facility is a flat area consisting of poorly drained and saturated soil under natural conditions; therefore, the runoff would remain as sheetflow in all directions. Non-contact stormwater runoff from the FPL reclaimed water treatment facility would be directed to the surrounding area. The facility will provide retention or detention with filtration of the first 0.5 inch of runoff in accordance with applicable regulations.

4.9 Heavy Equipment and Materials

4.9.1 Construction Materials and Equipment

There will be two primary methods to bring material and equipment to the Site: barge and truck. Rail may be used as a backup. Because neither the barge nor the rail unloading area is located on the Site, large components and modules using this mode of transportation will be trucked to the Site using specialized heavy haul vehicles. It is anticipated that most construction materials will be trucked to the Site following normal commercial practices.

Equipment and component parts will be unloaded and moved around using portable cranes and trucks. Heavy haul roads will be used to transport equipment and component parts from the equipment barge unloading area to the Site.

Pollution control measures for laydown areas and roads will include runoff collection as is described in Subsection 4.8.

4.9.2 Roads

Construction traffic (workers and fill trucks, equipment and material deliveries) for the Turkey Point Units 6 & 7 Project will be kept separate from normal traffic flows for Units 1 through 5 operations personnel, where feasible. To facilitate this, existing Miami-Dade County SW 359th Street, which runs in an east-to-west manner, will be improved and extended to SW 137th Avenue/Tallahassee Road from the Site. SW 328th Street/North Canal Drive will be improved from SW 137th Avenue/Tallahassee Road to SW 117th Avenue and a small portion of SW 344th Street/Palm Drive south of the Homestead Speedway will be improved. In addition, SW 117th Avenue and SW 137th Avenue/Tallahassee Road, which run in a north-to-south manner, will be improved and extended between SW 344th Street/Palm Drive and SW 359th Street. New bridge(s) for SW 359th Street and the roadway connecting SW 359th Street to the plant access roads will be required over the existing L-31E Canal to permit access to the Site from the west.

The roadway improvements are uniquely required to support the safe and efficient construction of the facility, but are not necessary post-construction. This application identifies and offers mitigation for the impacts of the construction-period roadway improvements. FPL will work with appropriate agencies and stakeholders to determine and create the optimal disposition of the improved public rights-of-way.

Security checkpoints will be installed on roads as necessary to meet NRC requirements. The locations of the checkpoints will be on previously affected areas or areas involving construction of roadways.

The existing heavy haul roads originating at the existing barge turning basin northeast of the Site will be improved. The roads will have a total length of approximately two miles from the equipment barge unloading area to the Units 6 & 7 plant area, or approximately four acres. Improvements of these and other roadways will start at the barge turning basin and extend generally west between Unit 5 and Units 1 and 2. The roadways will then extend generally south and cross over two new heavy haul bridges: one at the discharge canal and the other at the main cooling return canal. The heavy haul roads will then terminate at three locations on the Site to allow for large component delivery and placement. The existing heavy haul roads will not have to be widened, but will require resurfacing to accommodate transport and/or trucks. There will be no increase in impervious surfaces as a result of the minor upgrades. Culverts will be installed under the heavy haul roads where required to maintain drainage patterns.

A temporary bridge will be required over the main cooling discharge canal and a permanent bridge over the L-31E Canal on the west side of the Site to permit preliminary site preparation work, and during construction to permit delivery of materials until the heavy haul bridges are completed. The temporary bridge will be removed after completion of the heavy haul bridges.

Structurally unsuitable materials, or materials excavated during construction, will be transported to the spoils area or reused. Fill material will be obtained from ~~an FPL-owned fill source, other~~ regional sources, or reused material. All fill material will be trucked to the project area via existing roads. Plans for earthwork and materials disposal are discussed in SCA Chapter 5.0.

Roads are described in more detail in Section R9.0.

4.9.3 Rail

Rail is not considered as a primary transportation mode for some components and modules, but it could be used as an alternative if the equipment barge unloading area were not available. The applicable permits and clearances would be obtained if this option were used.

4.9.4 Barge

Components and modules will be transported to the plant property by barge. Expansion of the existing equipment barge unloading area will be required to accommodate deliveries for Units 6 & 7. It is expected that approximately 80 barge trips per unit over a six year period will be needed to deliver large components. The expansion of the existing barge unloading area is addressed in Subsection 5.1. Details about material handling by barge are discussed in Appendix 10.7.1.2.

4.10 Associated Linear Facilities

The Turkey Point Units 6 & 7 Project includes associated linear facilities for the transmission lines and transmission system upgrades, reclaimed water pipelines from the MDWASD South District Wastewater Treatment Plant to the FPL reclaimed water treatment facility, potable water pipelines, and upgrades to existing roads. Sections W9.0, E9.0, P9.0, R9.0, and D9.0 provide information on the west transmission line corridor, the east transmission line corridor, the reclaimed water pipelines, the roadway improvements, and the potable water pipelines, respectively.

4.11 Emergency Disaster Preparedness Plans

FPL has comprehensive emergency disaster preparedness plans for both operational emergencies and natural disasters that can occur in Florida (e.g., hurricanes). FPL has been an industry leader in the preparation for hurricanes and in the recovery after a storm. FPL will continue with these efforts in the future, and enhance emergency preparedness plans for new projects like Turkey Point Units 6 & 7. The existing Turkey Point Plant currently has an emergency plan. This emergency plan will be updated based on the design and operation of Turkey Point Units 6 & 7.

TABLE 4.4-1
ESTIMATED PHYSICAL, PERFORMANCE, AND EMISSIONS DATA FOR THE CIRCULATING WATER COOLING TOWERS FOR TURKEY POINT UNITS 6 & 7

Parameter	Circulating Water Cooling Towers
Physical Data	
Number of Towers per Unit	3
Number of Cells per Tower	12
Cell Diameter, ft	33.67
Cell Stack Height, ft (fan stack height is 14 feet)	66.5
Tower Dimensions	
Height to Fan Deck, ft	53
Length, ft	259
Width, ft	240.7
Performance Data	
Discharge Velocity, ft/min per cell	1,982
Circulating Water Flow Rate (CWFR), gal/min (3 Cooling Towers)	631,100
Design hot water temperature, °F	115.4
Design cold water temperature, °F	91
Heat Rejected, million Btu/hr	7,628
Evaporation at Design Conditions, gal/min (3 Cooling Towers)	12,723
Design Air Flow Rate per cell, acfm	1,764,500
Liquid/ Gas (Air Flow) (L/G) Ratio	1.272
Hours of operation	8,760
Temperature of Exit Air, °F	104.7
Emission Data	
Drift Rate[a] (DR), percent	0.0005
Total Dissolved Solids (TDS) Concentration[b], maximum ppmw	65,000
Solution Drift[c] (SD), lb/hr	1,656.6
PM Drift[d], lb/hr	107.7
tons/year/unit (3 towers)	471.6
tons/year (6 towers)	943.3
PM_{10} Drift[e]	
PM_{10} Emissions, lb/hr	2.42
tons/year/unit (3 towers)	10.6
tons/year (6 towers)	21.2

[a] Drift rate is the percent of circulating water.

[b] A TDS of 65,000 ppmw based on maximum design TDS.

[c] Includes water and based on circulating water flow rate and drift rate (CWFR x DR x 8.75 lb/gal x 60 min/hr; for 65,000 ppmw TDS; 8.34 lb/gal used for maximum PM_{10}).

[d] PM calculated based on total dissolved solids and solution drift (TDS x SD).

[e] PM_{10} based on Calculating Realistic PM_{10} Emissions from Cooling Towers, Joel Riesman and Gordon Frisbie (2001). TDS of 4,000 ppmw results in the maximum PM_{10} emissions. See Appendix 10.2.5 PSD/Air Construction Application.

TABLE 4.4-2

ESTIMATED PHYSICAL, PERFORMANCE, AND EMISSIONS DATA FOR THE SERVICE WATER SYSTEM COOLING TOWERS FOR TURKEY POINT UNITS 6 & 7

Parameter	Normal Operation	Cooldown
Physical Data		
Number of Cells Operating per Unit	1	2
Deck Dimensions, ft		
Length	108	108
Width	48	48
Height	49	49
Stack Dimensions		
Height, ft	63	63
Stack Top Effective Inner Diameter, per cell, ft	35	35
Effective Diameter, all cells, ft	35.0	49.5
Performance Data		
Discharge Velocity, ft/min per cell	1,411	1,411
Maximum Circulating Water Flow Rate (CWFR), gal/min	10,500	21,000
Design hot water temperature, °F	105.2	105.2
Design cold water temperature, °F	86.9	86.9
Maximum Heat Rejected, million Btu/hr per cell	103	173
Design Air Flow Rate per cell, acfm (maximum)	1,358,000	1,358,000
Liquid/ Gas (Air Flow) (L/G) Ratio	1.85	1.85
Hours of operation	8,760	8,760
Temperature of Exit Air, °F	96.9	96.9
Emission Data		
Drift Rate[a] (DR), percent	0.0005	0.0005
Total Dissolved Solids (TDS) Concentration[b], maximum ppmw	4,000	4,000
Solution Drift[c] (SD), lb/hr	26.3	52.5
PM Drift[d], lb/hr	0.11	0.21
tons/year/unit	0.46	0.92
tons/year (TP 6 & 7)	0.92	1.84
PM_{10} Drift[e]		
PM_{10} Emissions, lb/hr	0.04	0.08
tons/year/unit	0.18	0.35
tons/year (TP 6 & 7)	0.35	0.71

[a] Drift rate is the percent of circulating water.

[b] A TDS of 4,000 ppmw results in maximum PM_{10} emissions.

[c] Includes water and based on circulating water flow rate and drift rate (CWFR x DR x 8.34 lb/gal x 60 min/hr).

[d] PM calculated based on total dissolved solids and solution drift (TDS x SD).

[e] PM_{10} based on Calculating Realistic PM_{10} Emissions from Cooling Towers, Joel Reisman and Gordon Frisbie. See Appendix 10.2.5 PSD/Air Construction Application.

TABLE 4.4-3
ESTIMATED PERFORMANCE AND EMISSION DATA FOR DIESEL GENERATORS AND GENERAL PURPOSE DIESEL ENGINES ASSOCIATED WITH TURKEY POINT UNITS 6 & 7 PROJECT

Parameter		Standby Diesel Generators	Ancillary Diesel Generators	Diesel Fire Pump Engines	General Purpose Engines	Total
Performance						
Number for TP 6 & 7		4	4	2	Various	
Rating (kW)		4,100	36			
Rating (hp)		5,831	51	330	<600	
Fuel		Diesel	Diesel	Diesel	Diesel	
Fuel Heat content (Btu/lb) (HHV)		19,300	19,300	19,300	19,300	
Fuel density (lb/gal)		7.0	7.0	7.0	7.0	
Heat input (MMBtu/hr)[a] (MMBtu)[b] (HHV)		39.12	0.39	2.32	8,106	
Fuel usage (gallons/hr)		289.6	2.9	17.2		
Maximum operation (hours)		96	96	96		
Maximum fuel usage (gallons/yr/unit)		27,802	278	1,651		
Maximum fuel usage (gallons/yr)[c]		111,206	1,114	3,302	60,000	
Stack Parameters						
Number of Stacks		2	1	1		
Exhaust Flow (cfm; each stack)		16,428	311	1,750		
Stack Velocity (ft/sec; each stack)		60	60	60		
Exhaust Temperature (°F; each stack)		874	1,040	744		
Stack Height (ft; each stack)		40	93	17		
Stack Diameter (ft; each stack)		2.41	0.33	0.79		
Emissions						
SO_2 -	Basis (%S)	0.0015%	0.0015%	0.0015%	0.0015%	
	Conversion of S to SO_2	100	100	100		
	Molecular weight SO_2/ S (64/32)	2	2	2		
	Emission rate (lb/hr)	0.06	6.09E-04	3.61E-03		
	(tpy/diesel engine)	0.003	2.92E-05	1.73E-04		
	(tpy/plant)	0.012	1.17E-04	3.47E-04	0.006	0.018
NO_x -	Basis (g/hp-hr)[a] (lb/MMBtu)[b]	6.9	6.9	6.8	4.41	
	Emission rate (lb/hr)	88.7	0.78	4.95		
	(tpy/diesel engine)	4.26	0.037	0.237		
	(tpy)	17.031	0.150	0.475	17.87	35.529
CO -	Basis (g/hp-hr)[a] (lb/MMBtu)[b]	8.5	8.5	2.6	0.95	
	Emission rate (lb/hr)	109.3	1.0	1.9		
	(tpy/diesel engine)	5.24	0.046	0.091		
	(tpy)	20.980	0.184	0.182	3.85	25.196
VOC -	Basis (g/hp-hr)[a] (lb/MMBtu)[b]	1.0	1.0	1.0	0.36	
	Emission rate (lb/hr)	12.9	0.11	0.73		
	(tpy/diesel engine)	0.62	0.005	0.035		
	(tpy)	2.468	0.022	0.070	1.46	4.019
PM/PM_{10} -	Basis (g/hp-hr)[a] (lb/MMBtu)[b]	0.4	0.4	0.4	0.31	
	Emission rate (lb/hr)	5.1	0.05	0.29		
	(tpy/diesel engine)	0.25	0.002	0.014		
	(tpy)	0.987	0.009	0.028	1.26	2.280

[a] For standby generators and ancillary generators; emissions based on 40 CFR Part 60 Subpart IIII

[b] For general purpose engines; emissions based on AP-42 Section 3.3 Gasoline and Diesel Industrial Engines; Table 3.3-1.

[c] For general purpose engines the annual usage based on usages from FPL St. Lucie Nuclear Plant, FDEP Annual Operating Reports with margin.

TABLE 4.4-4
MAXIMUM POTENTIAL ANNUAL EMISSIONS ASSOCIATED WITH TURKEY POINT UNITS 6 & 7

Pollutant	Annual Emissions (tons/year)								
	Units 6 & 7 Cooling Towers	Service Water Cooling Towers	Standby Diesel Generators	Ancillary Diesel Generators	Diesel Fire Pump Engines	General Purpose Diesel Engines	Diesel Fuel Tanks	Total	PSD Significant Emission Rates
Particulate Matter	943.29	1.84	0.99	0.01	0.03	1.26	--	947.41	25
PM_{10}	21.21	0.71	0.99	0.01	0.03	1.26	--	24.20	15
Sulfur Dioxide	--	--	0.01	0.00	0.00	0.01	--	0.02	40
Nitrogen Oxides	--	--	17.03	0.15	0.47	17.87	--	35.53	40
Carbon Monoxide	--	--	20.98	0.18	0.18	3.85	--	25.20	100
Volatile Organic Compounds	--	--	2.47	0.02	0.07	1.46	0.02	4.04	40

Note:
Refer to Tables 4.4-1 through 4.4-3 for specific emission unit information.

TABLE 4.5-1 (SHEET 1 OF 3)
PLANT WATER USE 100% RECLAIMED WATER

Stream Number	Stream Description[a]	Normal Case (gpm)[b,c]	Maximum Case (gpm)[b,c]	Notes
1	MDWASD Potable Water Supply	936	2,553	
2	MDWASD Potable Water Supply to Power Plant Users	448	889	
3	Potable Water Influent	35	70	
4	Potable Water Effluent	35	70	
5	Sanitary Waste to Blowdown Sump	48	95	
6	MDWASD Potable Water Supply to Demineralized Water Treatment/Miscellaneous Users	413	819	
7	MDWASD Potable Water Supply to Fire Water and Equipment/Floor Washdown	20	20	
8	Equipment/Floor Washdown Influent	10	10	
9	Equipment/Floor Washdown Effluent	10	10	
10	Fire Water Influent	10	10	(d)
11	Fire Water Effluent	10	10	
12	Ultrafiltration Unit Influent	393	799	
13	Ultrafiltration Unit Effluent/RO Influent	353	719	
14	RO Effluent/Electrodeionization Unit Influent	247	503	
15	Electrodeionization Unit Effluent/Demineralized Water Tank Influent	234	477	
16	Demineralized Water Tank Effluent/Demineralized Water Users Influent	234	477	
17	Ultrafiltration Reject	40	80	
18	RO Unit Reject	106	216	
19	Electrodeionization Unit Reject	13	26	
20	Demineralized Water Treatment Combined Reject Stream	159	322	
21	Liquid Radwaste Effluent	3	150	(e)
22	Treated Liquid Radwaste Effluent	3	150	(e)
23	Not Used			
24	Not Used			
25	Demineralized Water User Effluent to Turbine Building Drain System	231	327	
26	Turbine Building Drain System Effluent	251	347	
27	Oil/Water Separator Effluent	251	347	

TABLE 4.5-1 (SHEET 2 OF 3)
PLANT WATER USE 100% RECLAIMED WATER

Stream Number	Stream Description[a]	Normal Case (gpm)[b,c]	Maximum Case (gpm)[b,c]	Notes
28	Miscellaneous Low Volume Waste	410	669	
29	MDWASD Potable Water Supply Makeup to Service Water System	488	1,664	(f)
30	Service Water System Cooling Tower Evaporation	366	1,248	(f)
31	Service Water System Cooling Tower Drift	1	1	(g)
32	Service Water System Cooling Tower Blowdown	121	415	(f), (h)
33	Alternate Blowdown from Service Water System Cooling Towers	0	0	
34	Wastewater Retention Basin Effluent to Blowdown Sump	410	669	
35	Service Water System Blowdown to Circulating Water System	121	415	(h)
36	Reclaimed Water to FPL reclaimed water treatment facility	50,481	50,187	(i)
37	FPL reclaimed water treatment facility Effluent to Makeup Water Reservoir	40,686	40,392	(i)
38	Makeup Water Reservoir Effluent	40,686	40,392	(i)
39	Reclaimed Water Makeup to Circulating Water System	38,400	38,400	(j)
40	Saltwater Supply from Radial Collector Wells	0	0	(i)
41	Saltwater Makeup to Circulating Water System	0	0	(i)
42	Circulating Water System Cooling Tower Evaporation	28,800	28,800	(j)
43	Circulating Water System Cooling Tower Drift	7	7	(g)
44	Circulating Water System Cooling Tower Blowdown	9,714	10,008	(j)
45	Reclaimed Water Dilution	2,286	1,992	(i)
46	Saltwater Dilution	0	0	(i)
47	Alternate Dilution Supply for Liquid Radwaste Discharge	2,286	1,992	(e), (i)
48	FPL reclaimed water treatment facility Bypass to Blowdown Sump	0	0	
49	FPL reclaimed water treatment facility Effluent to Future FPL Users	9,739	9,739	
50	Blowdown Sump Effluent	12,458	12,764	
51	Discharge to Deep Injection Wells	12,461	12,914	
52	FPL reclaimed water treatment facility Waste	0	0	(k)
53	FPL reclaimed water treatment facility Solid Waste	56	56	(i)
54	Units 1 through 5 Sanitary Waste	13	25	

TABLE 4.5-1 (SHEET 3 OF 3)
PLANT WATER USE 100% RECLAIMED WATER

(a) Streams are shown in Figure 4.5-1.

(b) The flow rate values [in gallons per minute (gpm)] are for two AP1000 units.

(c) Flows are not necessarily concurrent. Maximum case is defined as the maximum overall water use for Turkey Point Units 6 & 7. Some streams are affected by other stream flow rates and not all streams will be at maximum flow conditions. For example, dilution supply for liquid radwaste discharge flow is inversely proportional to circulating water system cooling tower blowdown. Additional information is provided in Note (e).

(d) Fire water use is based on monthly average use required to maintain fire protection system availability.

(e) The short-term liquid radwaste discharge flow may be up to 150 gpm (for two units). However, given the liquid radwaste activity level, the discharge flow rate will be controlled to be compatible with the available dilution flow.

(f) The service water cooling towers are assumed operating at four cycles of concentration. Flows are determined by weather conditions and water chemistry.

(g) The service water system and circulating water system cooling tower drifts are conservatively assumed to be 0.0005 percent of the cooling tower water flow.

(h) Concentrated blowdown from the service water system will be routed to the circulating water system. The blowdown from the circulating water system will therefore include the additional input from the service water system blowdown.

(i) The circulating water cooling towers are assumed operating at four cycles of concentration. Flows are determined by weather conditions and water chemistry.

(j) During maximum flow for overall water use, MDWASD potable water supply makeup to the service water system increases while makeup to circulating water system is unchanged. This results in more service water system blowdown to circulating water system and thus, more circulating water system cooling tower blowdown. Since alternate dilution supply for liquid radwaste discharge is inversely proportional to circulating water system cooling tower blowdown, there would be less reclaimed water dilution and saltwater dilution. Additionally, since makeup to circulating water system is unchanged and the alternate dilution supply for liquid radwaste discharge is decreased, less reclaimed water supply and saltwater supply are required.

(k) Wastewater will be recirculated within the FPL reclaimed water treatment facility. Discharge would occur when facility drains are required.

TABLE 4.5-2 (SHEET 1 OF 3)
PLANT WATER USE 100% SALTWATER

Stream Number	Stream Description[a]	Normal Case (gpm)[b,c]	Maximum Case (gpm)[b,c]	Notes
1	MDWASD Potable Water Supply	936	2,553	
2	MDWASD Potable Water Supply to Power Plant Users	448	889	
3	Potable Water Influent	35	70	
4	Potable Water Effluent	35	70	
5	Sanitary Waste to Blowdown Sump	48	95	
6	MDWASD Potable Water Supply to Demineralized Water Treatment/Miscellaneous Users	413	819	
7	MDWASD Potable Water Supply to Fire Water and Equipment/Floor Washdown	20	20	
8	Equipment/Floor Washdown Influent	10	10	
9	Equipment/Floor Washdown Effluent	10	10	
10	Fire Water Influent	10	10	(d)
11	Fire Water Effluent	10	10	
12	Ultrafiltration Unit Influent	393	799	
13	Ultrafiltration Unit Effluent/RO Influent	353	719	
14	RO Effluent/Electrodeionization Unit Influent	247	503	
15	Electrodeionization Unit Effluent/Demineralized Water Tank Influent	234	477	
16	Demineralized Water Tank Effluent/ Demineralized Water Users Influent	234	477	
17	Ultrafiltration Reject	40	80	
18	RO Unit Reject	106	216	
19	Electrodeionization Unit Reject	13	26	
20	Demineralized Water Treatment Combined Reject Stream	159	322	
21	Liquid Radwaste Effluent	3	150	(e)
22	Treated Liquid Radwaste Effluent	3	150	(e)
23	Not Used			
24	Not Used			
25	Demineralized Water User Effluent to Turbine Building Drain System	231	327	
26	Turbine Building Drain System Effluent	251	347	
27	Oil/Water Separator Effluent	251	347	
28	Miscellaneous Low-Volume Waste	410	669	
29	MDWASD Potable Water Supply Makeup to Service Water System	488	1,664	(f)

TABLE 4.5-2 (SHEET 2 OF 3)
PLANT WATER USE 100% SALTWATER

Stream Number	Stream Description[a]	Normal Case (gpm)[b,c]	Maximum Case (gpm)[b,c]	Notes
30	Service Water System Cooling Tower Evaporation	366	1,248	(f)
31	Service Water System Cooling Tower Drift	1	1	(g)
32	Service Water System Cooling Tower Blowdown	121	415	(f), (h)
33	Alternate Blowdown from Service Water System Cooling Towers	0	0	
34	Wastewater Retention Basin Effluent to Blowdown Sump	410	669	
35	Service Water System Blowdown to Circulating Water System	121	415	(h)
36	Reclaimed Water to FPL reclaimed water treatment facility	0	0	(i)
37	FPL reclaimed water treatment facility Effluent to Makeup Water Reservoir	0	0	(i)
38	Makeup Water Reservoir Effluent	0	0	(i)
39	Reclaimed Water Makeup to Circulating Water System	0	0	
40	Saltwater Supply from Radial Collector Wells	86,400	86,400	(i)
41	Saltwater Makeup to Circulating Water System	86,400	86,400	(i)
42	Circulating Water System Cooling Tower Evaporation	28,800	28,800	
43	Circulating Water System Cooling Tower Drift	7	7	(g)
44	Circulating Water System Cooling Tower Blowdown	57,714	58,008	(j)
45	Reclaimed Water Dilution	0	0	(i)
46	Saltwater Dilution	0	0	(i)
47	Alternate Dilution Supply for Liquid Radwaste Discharge	0	0	(e), (i)
48	FPL reclaimed water treatment facility Bypass to Blowdown Sump	0	0	
49	FPL reclaimed water treatment facility Effluent to Future FPL Users	0	0	
50	Blowdown Sump Effluent	58,172	58,772	
51	Discharge to Deep Injection Wells	58,175	58,922	
52	FPL reclaimed water treatment facility Waste	0	0	(j)
53	FPL reclaimed water treatment facility Solid Waste	0	0	(i)
54	Units 1 through 5 Sanitary Waste	13	25	

TABLE 4.5-2 (SHEET 3 OF 3)
PLANT WATER USE 100% SALTWATER

(a) Streams are shown in Figure 4.5-1.

(b) The flow rate values (in gpm) are for two AP1000 units.

(c) Flows are not necessarily concurrent. Maximum case is defined as the maximum overall water use for Turkey Point Units 6 & 7. Some streams are affected by other stream flow rates, not all streams will be at maximum flow conditions. For example, dilution supply for liquid radwaste discharge flow is inversely proportional to circulating water system cooling tower blowdown. Additional information is provided in Note (e).

(d) Fire water use is based on monthly average use required to maintain fire protection system availability.

(e) The short-term liquid radwaste discharge flow may be up to 150 gpm (for two units). However, given the liquid radwaste activity level, the discharge flow rate will be controlled to be compatible with the available dilution flow.

(f) The service water cooling towers are assumed operating at four cycles of concentration. Flows are determined by weather conditions and water chemistry.

(g) The service water system and circulating water system cooling tower drifts are conservatively assumed to be 0.0005 percent of the cooling tower water flow.

(h) Concentrated blowdown from the service water system will be routed to the circulating water system. The blowdown from the circulating water system will therefore include the additional input from the service water system blowdown.

(i) The circulating water cooling towers are assumed operating at one and a half cycles of concentration. Flows are determined by weather conditions and water chemistry.

(j) Wastewater will be recirculated within the FPL reclaimed water treatment facility. Discharge would occur when facility drains are required.

TABLE 4.5-3
WATER QUALITY DATA FOR SOURCES OF COOLING WATER

Constituent Name	Concentration (mg/L)		
	Miami-Dade Potable Water Supply (MDPWS)	Reclaimed Water	Saltwater
Ammonia as N	No Data	26.23	0.0373
BOD	No Data	No Data	<100
Boron	No Data	No Data	5.82
Bromide	0.01	No Data	112
Chromium +6	No Data	0.02	No Data
Fluoride	0.1	0.75	<0.300
Alkalinity, total as $CaCO_3$	No Data	232	136
Nitrate as N	2	4.89	0.047
Sulfate	29	100	2840
TOC	1.3	36	4.26
TDS	318	960	34300
TSS	5	42.4	8.8
Phosphorous	0.19	2.9	0.702
Phosphate	0.57	11.3	0.637
Aluminum	<0.038	0.924	<0.046
Antimony	<0.00070	0.0075	<0.0055
Arsenic	<0.00090	0.004	<0.0046
Barium	0.0112	0.57	0.0099
Beryllium	<0.00010	0.02856	<0.00067
Cadmium	<0.00037	0.0022	<0.00057
Chromium	<0.00099	0.02	<0.0011
Copper	0.0116	0.013	<0.0096
Iron	<0.020	1.23	<0.045
Lead	<0.00010	0.0344	<0.0062
Nickel	<0.0011	0.0268	<0.0052
Selenium	<0.00090	0.011	0.0128
Silver	<0.0010	0.005	<0.0032
Zinc	<0.00665	0.198	<0.141
Calcium	87	73.5	529
Magnesium	3.7	82.5	1760
Manganese	<0.00040	0.116	<0.036
Potassium	No Data	No Data	546
Sodium	18	130	12900
Silica as SiO_2	4.1	9.22	0.113
Chloride	35	369	20200
Nitrite as N	<0.012	1.23	0.065
Conductivity (μmhos/cm)	561	1695	17600
pH (standard units)	7.1	7.8	8.2
Total Residual Chlorine	2	0	No Data
Thallium	<0.00040	0.0019	No Data
Mercury	<0.000065	0.002	<0.00013

TABLE 4.6-1
UNITS 6 & 7 WASTESTREAMS, CHARACTERIZATION AND DISPOSAL METHOD
SHEET 1 OF 3

Wastestreams (Construction and Operations)	Non Hazardous Basis for Characterization	Hazardous Basis for Characterization	Disposal Management Process
Demineralized Water Reject (Reverse Osmosis Reject, Electrodeionization Reject, Ultra Filtration Reject, Back Flushes) (See Table 3.6-4 for chemical additions)	Based on analytical characterization of historical data	Not Applicable	Disposed of as industrial wastewater in the deep injection wells.
FPL Reclaimed Water Treatment Facility (See Table 3.6-4 for chemical additions)	Based on analytical characterization by vendor supplying chemical	Not Applicable	The majority of the wastestream will be recycled in the system. A small portion may be disposed of as industrial wastewater in the deep injection wells.
Service Water System Blowdown (See Table 3.6-4 for chemical additions)	Based on analytical characterization of historical data	Not Applicable	Disposed of as industrial wastewater in the deep injection wells.
Circulating Cooling System Water Blowdown (See Table 3.6-4 for chemical additions)	Based on analytical characterization by vendor supplying chemical	Not Applicable	Disposed of as industrial wastewater in the deep injection wells.
Equipment/Floor and Wash Drains	Based on analytical characterization of historical data	Not Applicable	Disposed of as industrial wastewater in the deep injection wells.
Fire Water (discharge for testing)	Based on analytical characterization of historical data	Not Applicable	Water will be routed to the existing industrial wastewater facility via the stormwater system.
Miscellaneous Drains	Based on analytical characterization of historical data	Not Applicable	Disposed of as industrial wastewater in the deep injection wells.
Oil/Water Separator (Located In Turbine Buildings)	Based on analytical results	Not Applicable	Separated water is routed to the deep injection wells. Oil is disposed of by a licensed waste disposal contractor.
Treated Sanitary Wastes	Based on generation process knowledge	Not Applicable	Liquid discharge is disposed of as wastewater in the deep injection wells.
Component Cooling System Water (CCS)	Based on generation process knowledge	Not Applicable	Disposed of as industrial wastewater in the deep injection wells.
Liquid Radwaste Effluent (includes low volume wastes)	Based on generation process knowledge	Not Applicable	Disposed of as industrial wastewater in the deep injection wells.
Stormwater (During Plant Operations) • Site • Nuclear Administration Building, Training Building, and Parking Area	Based on generation process knowledge	Not Applicable	Contact Water will be sent through an oil/water separator and the water will be released to the existing industrial wastewater facility. Oil is disposed of by a licensed waste disposal contractor.
Stormwater (During Plant Construction)	Based on generation process knowledge	Not Applicable	Disposed of as industrial wastewater in the existing industrial wastewater facility.

TABLE 4.6-1
UNITS 6 & 7 WASTESTREAMS, CHARACTERIZATION AND DISPOSAL METHOD
SHEET 2 OF 3

Wastestreams (Construction and Operations)	Non Hazardous Basis for Characterization	Hazardous Basis for Characterization	Disposal Management Process
Construction-Related Wastewater (e.g., concrete batch plant wastewater, water from radial collector well development, process water for hydrostatic testing, flushing and backfilling, steam blow quench water, etc.including maintenance related materials such as leak tracing dyes)	Based on generation process knowledge	Not Applicable	Wastewater will be routed to the existing industrial wastewater facility and/or disposed as industrial wastewater in the deep injection wells.
Construction-Related Wastewater Dewatering	Based on generation process knowledge	Not Applicable	Wastewater will be routed to the existing industrial wastewater facility.
Water Pretreatment Solid Waste	Based on analytical results	Not Applicable	Off-site disposal of by an approved disposal contractor.
Expired Lab Chemicals	Based on chemical knowledge	Based on chemical knowledge	Offered for use to other Departments. Disposed of in a secure landfill if non-hazardous. If hazardous, materials are disposed of by an approved hazardous waste contractor.
Photo Waste from X-Ray Film Development	Not Applicable	Based on generation process knowledge.	Off-site disposal of by an approved hazardous waste disposal contractor.
Spent Anti-Freeze	Not Applicable	Not Applicable	Recycled by a licensed approved contractor.
Chromate Containing Waste	Not Applicable	EPA classification Hazardous Waste Code D007	Off-site licensed hazardous waste disposal facility.
Solvent Rags	As per EPA in 40 CFR 279	As per EPA in 40 CFR 279	Recycled via laundering by FDEP-approved vendor or disposed of in landfill.
Punctured Aerosol Cans	As per EPA characterization letter	Not Applicable	Off-site disposal of by an approved scrap metal contractor.
Paint and Solvent Wastes: Captured Paint and Other Residuals From Punctured Aerosol Cans	Not Applicable	Analytical data from waste characterization	As hazardous waste in accordance with 40 CFR 261.
X-ray Weld Testing	Not Applicable	Not Applicable	Process does not generate waste chemicals onsite. Vendor is responsible for their waste generation.
Florescent Bulbs and Batteries	Not Applicable	Universal Waste as per 40 CFR 273 EPA determination	Recycled as universal waste by a licensed contractor.
Oily Solid Wastes	As per EPA in 40 CFR 279	Not Applicable	Off-site disposal of by an approved waste disposal contractor.
Used Oil	Based on analytical results	Based on analytical results	Recycled as used oil if meets the requirements. If hazardous, then disposed of by a licensed approved contractor.

TABLE 4.6-1
UNITS 6 & 7 WASTESTREAMS, CHARACTERIZATION AND DISPOSAL METHOD
SHEET 3 OF 3

Wastestreams (Construction and Operations)	Non Hazardous Basis for Characterization	Hazardous Basis for Characterization	Disposal Management Process
Oil From Equipment In Radiological Controlled Areas	Based on generation process knowledge	Based on generation process knowledge	Off-site disposal at an NRC licensed incinerator facility.
Oil Filters	Based on generation process knowledge	Based on generation process knowledge.	Off-site disposal of by an approved waste disposal contractor.
Spent Bead Blasting Media	Based on analytical results	Based on analytical results	If non-hazardous, will be disposed off-site as non-hazardous waste. If hazardous, then disposed of by a licensed approved contractor.
Sand Blast Media (Parts Cleaning)	Based on generation process knowledge	Not Applicable	Off-site disposal of by an approved waste disposal contractor.
Scrap Metal	Not Applicable	Not Applicable	Recycled by a licensed approved contractor.
Process Stream Filters	Based on analytical results or Based on generation process knowledge	Based on analytical results or Based on generation process knowledge	If non-hazardous, will be disposed off-site as non-hazardous waste licensed approved contractor. If hazardous, will be disposed of by a licensed approved contractor. If non-hazardous and radioactive, will be disposed by a NRC licensed radioactive waste facility. If hazardous and radioactive, will be disposed by a NRC licensed hazardous radioactive waste facility.
Lead Acid Batteries	Not Applicable	Managed as per 40 CFR 266.80 EPA Determination	Recycled by a licensed approved contractor.
Domestic Sewage Treatment Plant Solids	Based on generation process knowledge	Not Applicable	Off-site disposal of by an approved waste disposal contractor.
Dry Active Waste (DAW)	Based on generation process knowledge	Based on generation process knowledge	Off-site disposal at a licensed radioactive waste volume reduction facility.
Sludges (ie. Steam Generator, Sump Basins, Cooling Basins)	Based on analytical results	Based on analytical results	If non-hazardous, will be disposed off-site as non-hazardous waste licensed approved contractor. If hazardous, will be disposed of by a licensed approved contractor. If non-hazardous and radioactive, will be disposed by a NRC licensed radioactive waste facility. If hazardous and radioactive, will be disposed by a NRC licensed hazardous radioactive waste facility.
Process Stream Resins	Based on generation process knowledge	Based on generation process knowledge	If non-hazardous, will be disposed off-site as non-hazardous waste licensed approved contractor. If hazardous, will be disposed of by a licensed approved contractor. If non-hazardous and radioactive, will be disposed by a NRC licensed radioactive waste facility. If hazardous and radioactive, will be disposed by a NRC licensed hazardous radioactive waste facility.

TABLE 4.6-2
RECLAIMED WATER ESTIMATED CONSTITUENTS AND CONCENTRATIONS DISCHARGED TO INJECTION WELLS [(a)]

Constituent Name	Concentration (mg/L)
Ammonia as N	No Data
BOD	No Data
Boron	No Data
Bromide	No Data
Hexavalent Chromium	0.065
Fluoride	2.46
Alkalinity, total as $CaCO_3$	72
Nitrate as N	16.1
Sulfate	484.0
Total Organic Compounds	118
Total Dissolved Solids	2721
Total Suspended Solids	33.6
Phosphorous	0.73
Phosphate	2.40
Aluminum	3.02
Antimony	0.0245
Arsenic	0.0131
Barium	1.86
Beryllium	0.0933
Cadmium	0.00718
Chromium	0.0653
Copper	0.0433
Iron	1.63
Lead	0.112
Nickel	0.088
Selenium	0.0359
Silver	0.0163
Zinc	0.646
Calcium	355
Magnesium	63
Manganese	0.379
Sodium	462
Silica as SiO_2	26.4
Chloride	1247
Nitrite as N	4.02
Conductivity (µmhos/cm)	5577
pH (standard units)	7.89
Total Residual Chlorine	2
Thallium	0.00620
Mercury	0.00653

(a) The information provided is based on the case of makeup water for the circulating system of 100 percent from MDWASD.

TABLE 4.6-3
SALTWATER ESTIMATED CONSTITUENTS AND CONCENTRATIONS DISCHARGED TO INJECTION WELLS [(a)]

Constituent Name	Concentration (mg/L)
Ammonia as N	No Data
BOD	(b)
Boron	8.65
Bromide	166
Hexavalent Chromium	No Data
Fluoride	0.00162
Alkalinity, total as $CaCO_3$	149
Nitrate as N	0.102
Sulfate	4272
Total Organic Compounds	6.350
Total Dissolved Solids	57030
Total Suspended Solids	13.3
Phosphorous	1.05
Phosphate	1.110
Aluminum	(b)
Antimony	(b)
Arsenic	(b)
Barium	0.0149
Beryllium	(b)
Cadmium	(b)
Chromium	(b)
Copper	0.0002
Iron	(b)
Lead	(b)
Nickel	(b)
Selenium	0.019
Silver	(b)
Zinc	(b)
Calcium	787
Magnesium	2615
Manganese	(b)
Sodium	19164
Silica as SiO_2	0.234
Chloride	30009
Nitrite as N	0.0966
Conductivity (µmhos/cm)	26154
pH (standard units)	7.89
Total Residual Chlorine	No Data
Thallium	No Data
Mercury	(b)

(a) The information provided is based on the case of makeup water for the circulating system of 100 percent from on-site radial collector wells.

(b) Makeup water constituent values were below detectable limits.

TABLE 4.6-4
EXAMPLES OF CHEMICALS ADDED TO LIQUID EFFLUENT STREAMS

System	Chemical-Type/Specific	Frequency of Use
FPL Reclaimed Water Treatment Facility	Ferric Chloride	Continuous
	Polymer	Continuous
	Lime	Continuous
	Sulfuric Acid	Continuous
	Methanol	Continuous
	Sodium Bisulfite	Continuous
Circulating Water System (b)	Proprietary Scale Inhibitor, High Stress Polymer, Phosphinosuccinic Oligomer	Continuous
	Sodium Hypochlorite	Shock treatment 30 minutes per day
Circulating Water System (a)	Sodium Hypochlorite	Shock treatment 30 minutes per day
	Sodium Hypochlorite	Continuous
	Sulfuric Acid	Continuous
	Proprietary scale Inhibitor, High Stress Polymer	Continuous
	Proprietary Scale Inhibitor, Sodium Salt of Phosphonomethylate Diamine	Continuous
	Proprietary Scale Inhibitor, Silicate Inhibiting Polymer	Intermittent – during transition
Demineralizer Water System	Sulfuric Acid	Continuous
	Proprietary Scale Inhibitor, Phosphoric Acid	Continuous
	Sodium Bisulfite	Continuous
Service Water	Sodium Hypochlorite	Shock treatment 30 minutes per day
	Sulfuric Acid	Continuous
	Proprietary Phosphoric Acid Scale Inhibitor	Continuous
	Proprietary Dispersant, High Stress Polymer	Continuous
Steam Generator Blowdown System	Oxygen Scavenging/Morpholine	Used as Needed
	pH Adjustment/Carbohydrazide	Used as Needed
	pH Adjustment/Hydrazine	Used as Needed

(a) The information provided is based on the case of makeup water for the circulating system of 100 percent from MDWASD.

(b) The information provided is based on the case of makeup water for the circulating system of 100 percent from on-site radial collector wells.

TABLE 4.7-1
FPL GENERAL WASTE HANDLING GUIDELINES (Page 1 of 2)

GENERAL WASTE HANDLING GUIDELINES

1. All effort should be taken to reduce and/or eliminate waste generation.
2. All effort should be taken to reuse and/or recycle wastes.
3. Label all containers so that contents can easily be determined and products used.
4. If waste is hazardous due to a hazardous constituent in the original product, try to substitute with a non-hazardous product, if feasible.
5. If waste is generated, see attached list for disposal options and instructions.
6. If waste is hazardous and is required to be placed into satellite accumulation drums, contact Environmental Plant Leader.
7. If waste cannot be identified, contact Environmental Plant Leader.

WASTE HANDLING INSTRUCTIONS
<u>Recycling</u>

1. Cardboard: flatten and place in designated area.
2. Pallets (poor condition) and scrap wood: place in designated area.
3. White paper and file stock: place in designated bin.
4. Aluminum cans: place in designated bin marked “Aluminum Cans”.
5. Metal scrap: place in “metal” designed dumpster.
6. Empty drums (poor condition): empty, crush and place in “metal” dumpster.
7. Fluorescent bulbs (intact): place into original box and store in Universal Waste Storage Area.
8. Lead acid batteries: place on pallet in Hazardous Waste Area.
9. Dry alkaline cell batteries: place in appropriate designated universal waste bin.
10. Ni Cad batteries (includes all communication type batteries, i.e., cell phone/pager batteries): place in appropriately labeled universal waste bin.
11. Empty aerosol cans: puncture with can puncturing device and place can into scrap metal drum designated for this purpose. Residual materials in drum are managed as Hazardous Waste.

TABLE 4.7-1

FPL GENERAL WASTE HANDLING GUIDELINES (Page 2 of 2)

Recycling (continued)

12. Used oil filters: drain filters for at least 24 hours and place drained oil filters into appropriate drums. Do not put plastic bags into drum.
13. Metal shavings: place in designated scrap metal drum.
14. Mercury liquid: notify Environmental Plant Leader.

Non-Regulated Waste Disposal

1. Normal trash: minimize and dispose, place into plant dumpster.
2. Used oil: place into Accumulation Area designated for this purpose.
3. Solid oily waste: place into Solid Oily Waste Dumpster designated for this purpose.
4. Parts cleaning solution: use parts cleaner for all parts cleaning. For special parts cleaning applications, see Environmental Plant Leader for instructions. Also contact Environmental Plant Leader when parts cleaning fluid is spent.

Hazardous Waste Disposal *

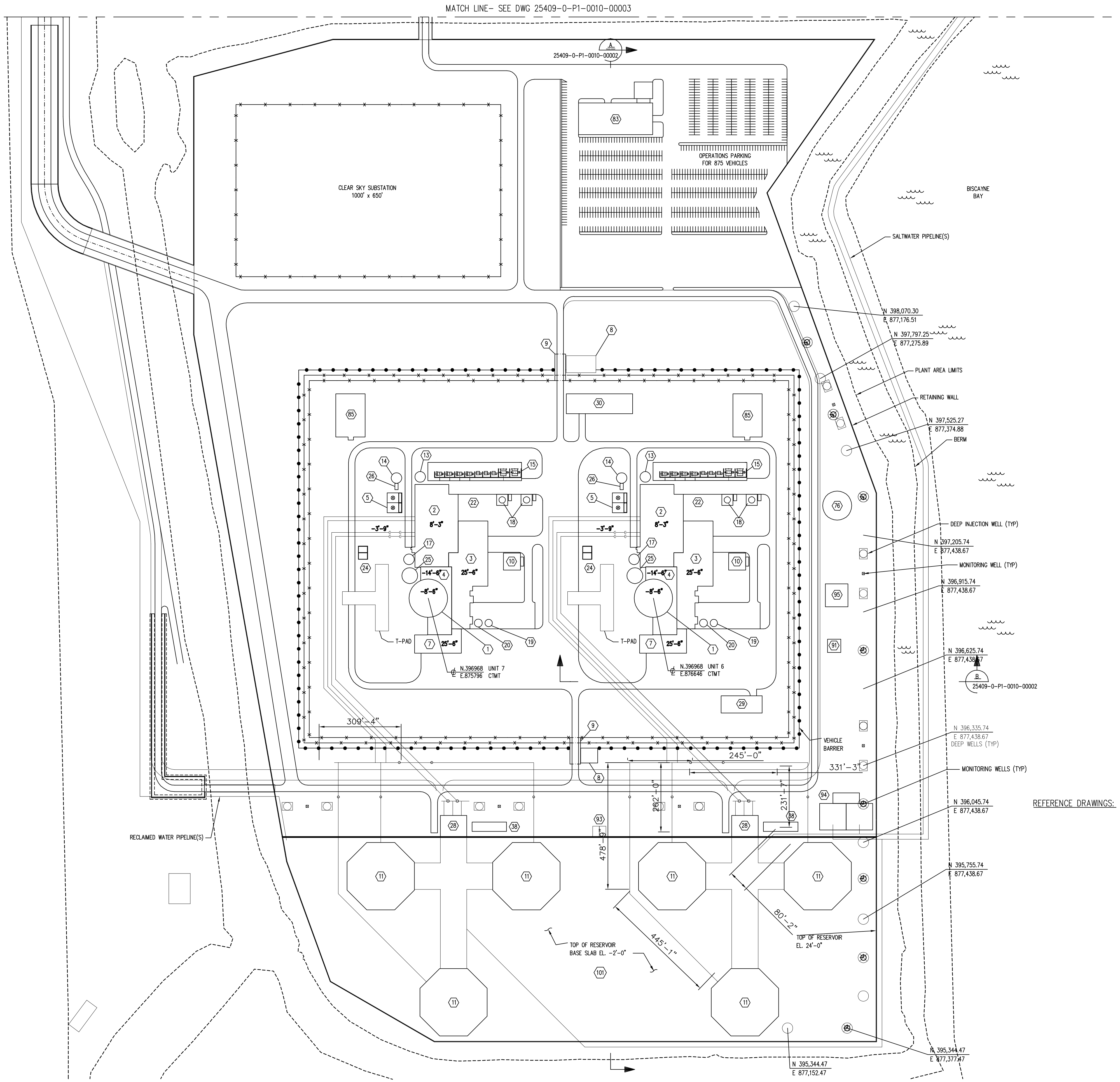
1. Solvent-contaminated rags: place into "Solvent Rag" Satellite Accumulation Drum Area. When full, place in Hazardous Waste Area unless rag laundering program has been implemented. Where rag laundering program has been implemented, place rags into designated bins.
2. Solid paint cleanup material: place into Satellite Accumulation Drum Area. When full, place in Hazardous Waste Area.
3. Laboratory waste: place in Satellite Accumulation Drum Area. This drum is for use by on-shift production personnel performing water chemistry. When full, place in Hazardous Waste Area.
4. Outdated lab chemicals: these chemicals will be lab packed by the Environmental Plant Leader.
5. Aerosol can waste (punctured and non-punctured): collect in Satellite Accumulation Drum Area. When full, place in Hazardous Waste Area.
6. Waste paint-related material: place in Satellite Accumulation Drum Area. When full, place in Hazardous Waste Area.
7. Bead blasting material: place in drum designated for this purpose. When full, place in Hazardous Waste Area.

***When full, all hazardous waste drums must be labeled "Hazardous Waste" with the accumulation start date.**

Figure 4.2-1
Conceptual Illustration of Turkey Point Units 6 & 7 Site

Rev. 0

FPL



LEGEND

1. CONTAINMENT/SHIELD BUILDING
2. TURBINE BUILDING
3. ANNEX BUILDING
4. AUXILIARY BUILDING
5. SWS COOLING TOWERS
7. RADWASTE BUILDING
8. SECURITY BUILDING
9. SALLY PORT
10. DIESEL GENERATOR BUILDING
11. MECHANICAL DRAFT COOLING TOWERS
13. FIRE WATER/CLEARWELL STORAGE TANK
14. FIRE WATER STORAGE TANK
15. TRANSFORMER AREA
17. CONDENSATE STORAGE TANK
18. DIESEL GENERATOR STORAGE TANKS
19. DEMINERALIZED WATER STORAGE TANK
20. BORIC ACID STORAGE TANK
22. TURBINE BUILDING LAYDOWN AREA
24. WASTE WATER RETENTION BASIN
25. PASSIVE CONTAINMENT COOLING ANCILLARY WATER STORAGE TANK
26. DIESEL DRIVEN FIRE PUMP/ENCLOSURE
28. CIRCULATING WATER PUMPHOUSE
29. WAREHOUSE
30. MAINTENANCE SHOP/OFFICE
38. ELECTRICAL BUILDING
76. RAW WATER STORAGE TANK
81. DELETED
82. DELETED
83. CENTRAL RECEIVING
85. SERVICE BUILDING
91. SANITARY WASTE TREATMENT FACILITY
93. RECLAIMED WATER PUMP STRUCTURE
94. BLOWDOWN SUMP
95. PGS BULK GAS STORAGE AREA
101. MAKEUP WATER RESERVOIR

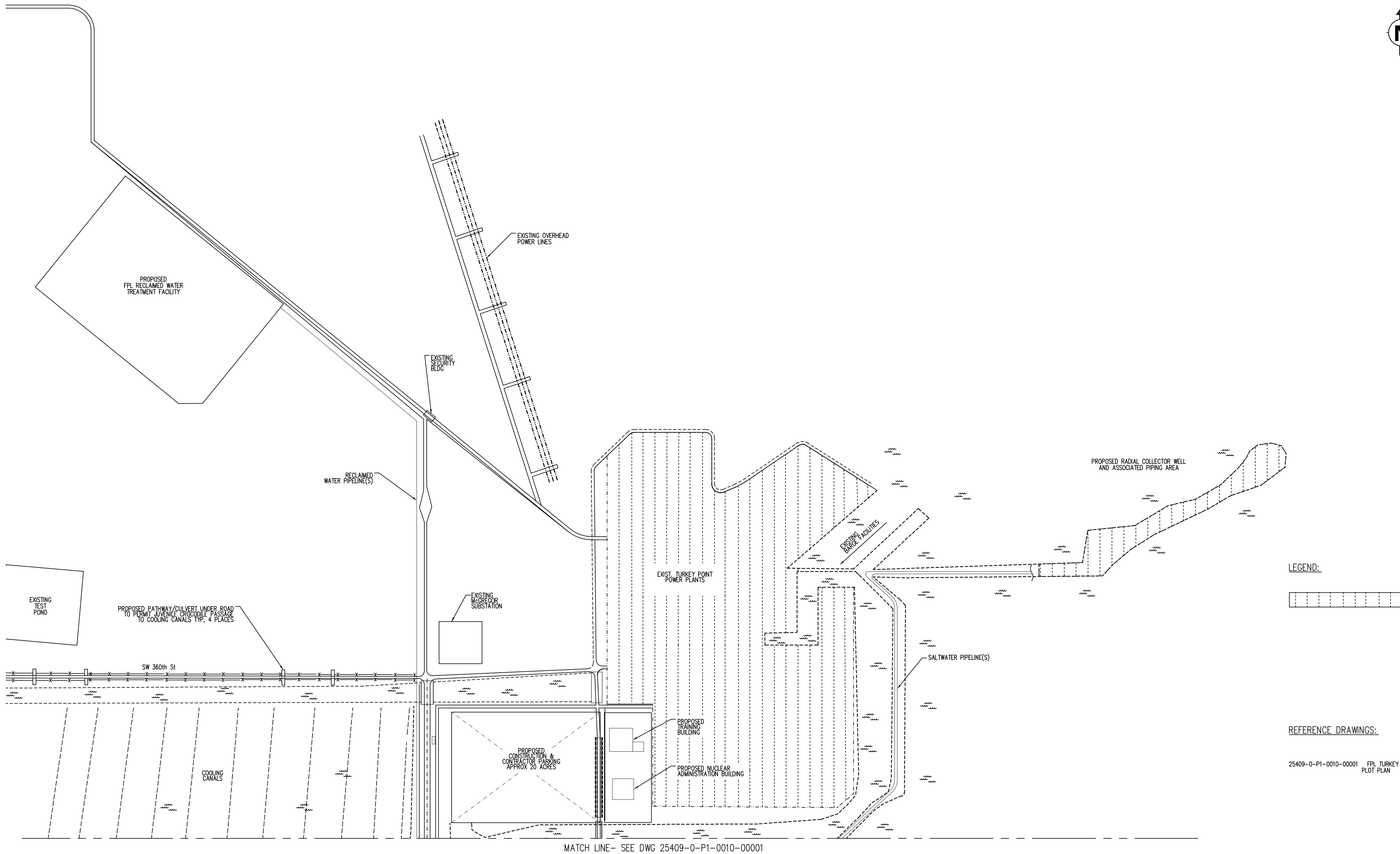
REFERENCE DRAWINGS:

25409-0-P1-0010-00002 FPL TURKEY POINT COL PROJECT PLOT PLAN SECTION VIEWS

25409-0-P1-0010-00003 FPL TURKEY POINT COL PROJECT PLOT PLAN

PROJECT	TURKEY POINT UNITS 6 & 7 PROJECT
TITLE	**PLOT PLAN** SHEET 1 OF 2
FILE No. 08387584C002	**FIGURE**
REV. 0	**4.2-2**
PLOT PLAN 06/14/2009	

FPL



LEGEND:

TURKEY POINT POWER SITE

REFERENCE DRAWINGS:

25409-0-P1-0010-00001 FPL TURKEY POINT COL PROJECT PLOT PLAN

PROJECT

TURKEY POINT UNITS 6 & 7 PROJECT

TITLE

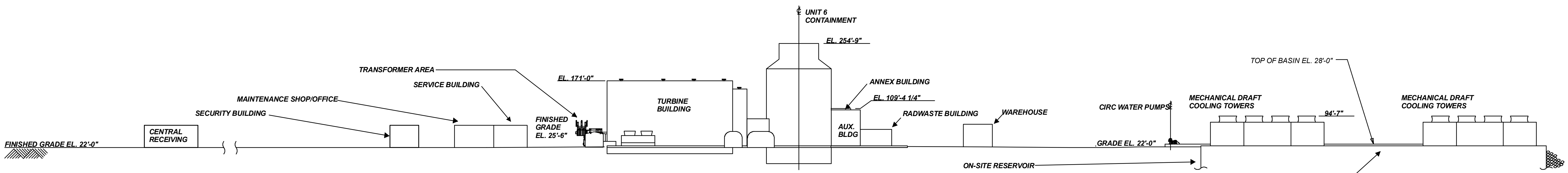
PLOT PLAN
SHEET 2 OF 2

FPL

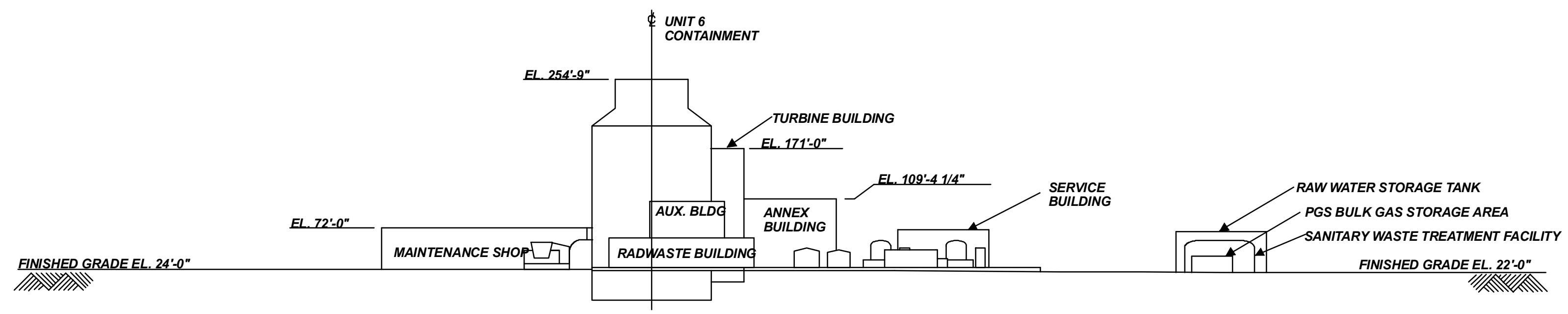
FILE NO.	08387584C003	**FIGURE 4.2-2**
REV.	0	
PLOT DATE	06/14/2009	

Figure 4.2-3
Conceptual Illustration of Turkey Point Units 6 & 7 with Existing Units 1 through 5

Rev. 0



SECTION A - FACING EAST



SECTION B - FACING NORTH

LEGEND

REFERENCES

PROJECT

TURKEY POINT UNITS 6 & 7
PROJECT

TITLE

CONCEPTUAL ILLUSTRATION: PLANT PROFILE WITH
UNITS 6 & 7

FPL

FILE 09387584C002

REV. 0

PLOT DATE 06/12/2009

FIGURE

4.2-4

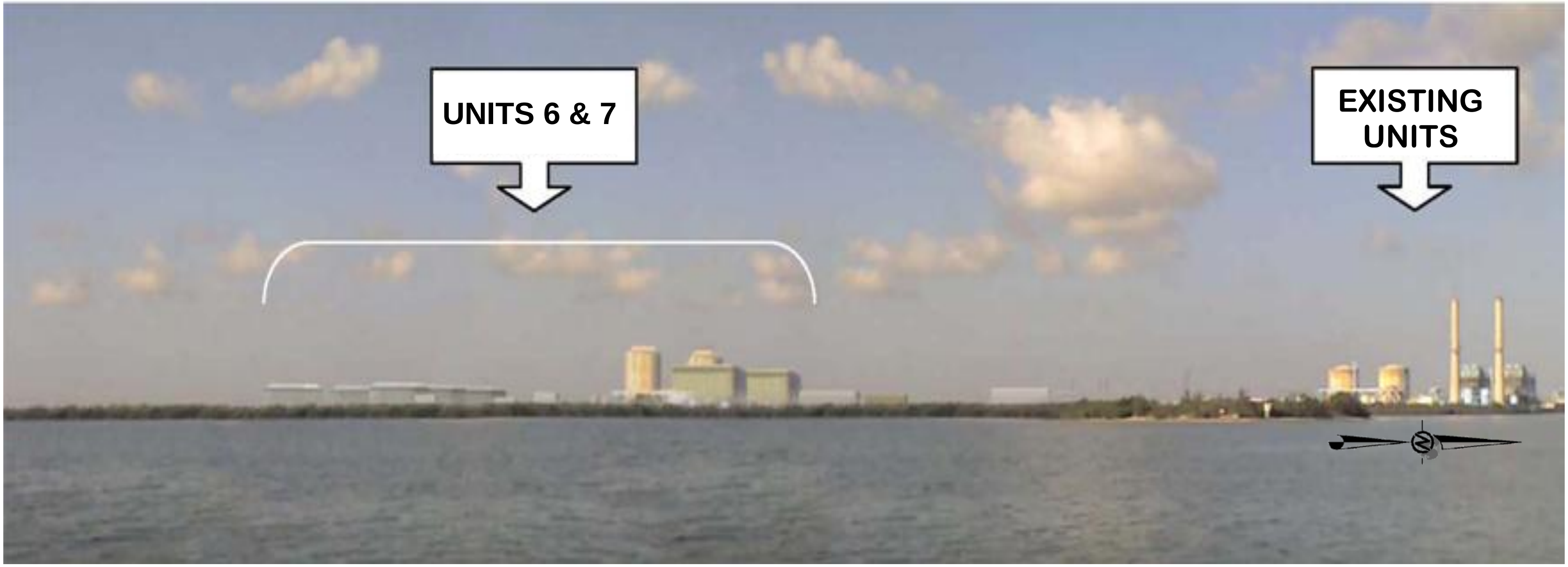


Figure 4.2-5
Conceptual Illustration of Profile of Turkey Point Units 6 & 7 and Existing Units

Rev. 0

FPL

LEGEND

PS - PUMP STATION

E - ELECTRICAL

TF - TRICKLING FILTER

SCB - SOLIDS CONTACT BASIN

MCF - MAINTENANCE / CONTROL FACILITY

ES - COVERED EQUIPMENT STORAGE

CS - CHEMICAL STORAGE WITHIN SECONDARY CONTAINMENT

LS - LIME SILO

SF - SLAKER FACILITY

SL - COVERED SLUDGE LOADING AREA

CHEMICAL UNLOADING AREA STORMWATER ROUTED TO BACK WASH BASIN AND THEN ADDED TO PROCESS FLOW

REFERENCES

PROJECT

TURKEY POINT UNITS 6 & 7 PROJECT

TITLE

PLOT PLAN OF RECLAIMED WATER TREATMENT FACILITY

FPL

FILE No. 08387584C001

REV. 0

PLOT DATE 6/14/2009

FIGURE

4.2-6

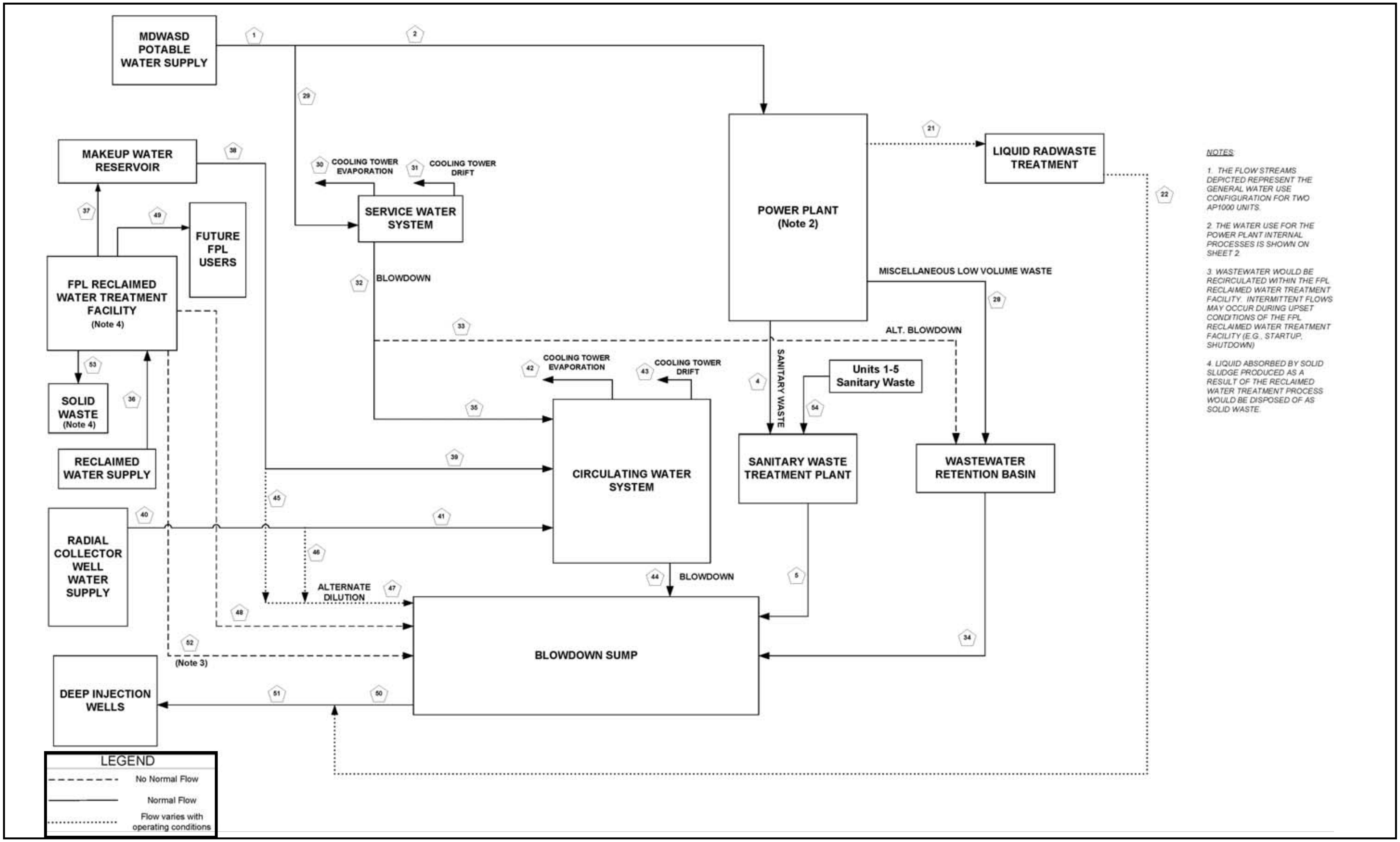


Figure 4.5-1
Water Balance Diagram
(Sheet 1 of 2)
Rev. 0

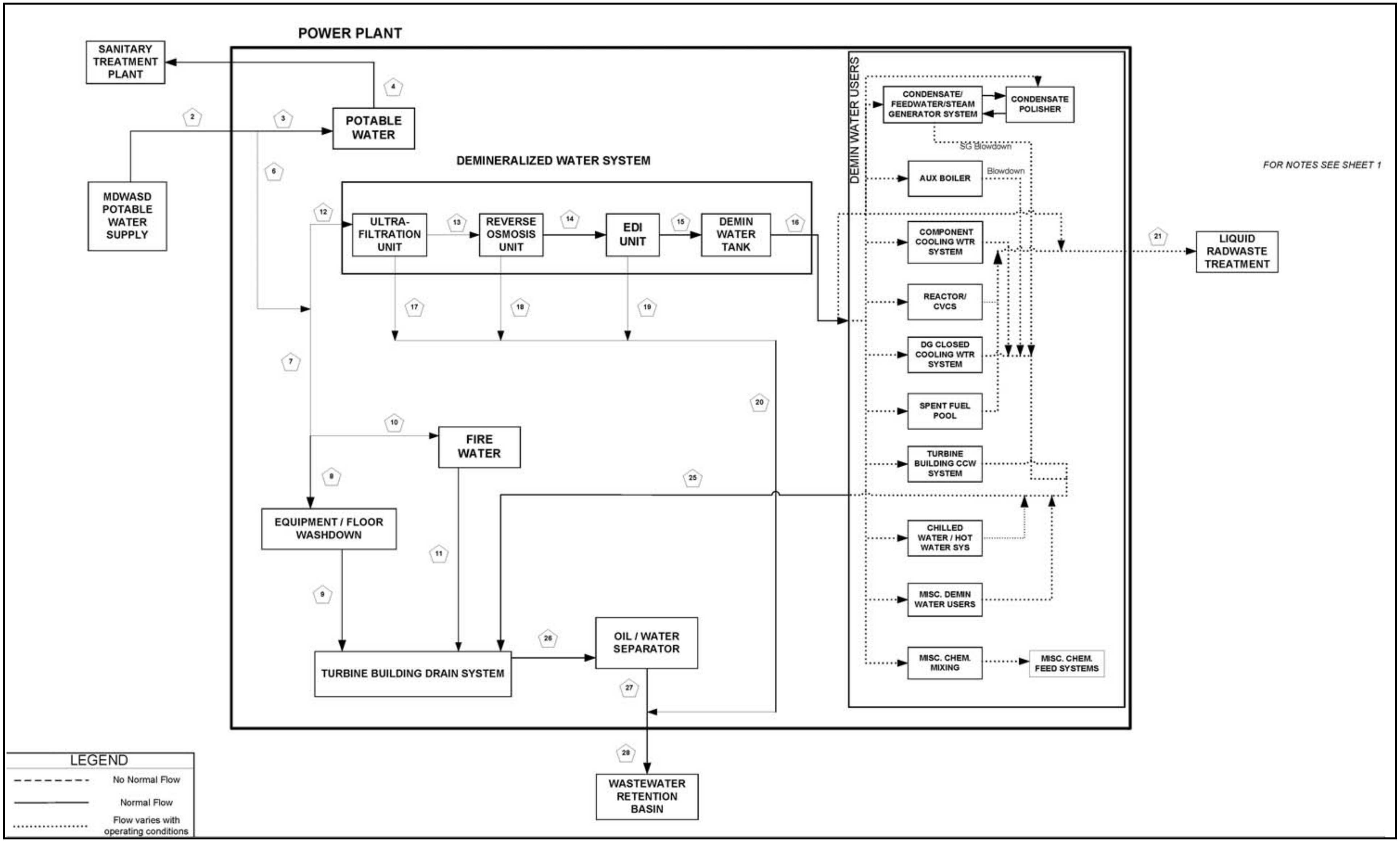


Figure 4.5-1
Water Balance Diagram
(Sheet 2 of 2)
Rev. 0

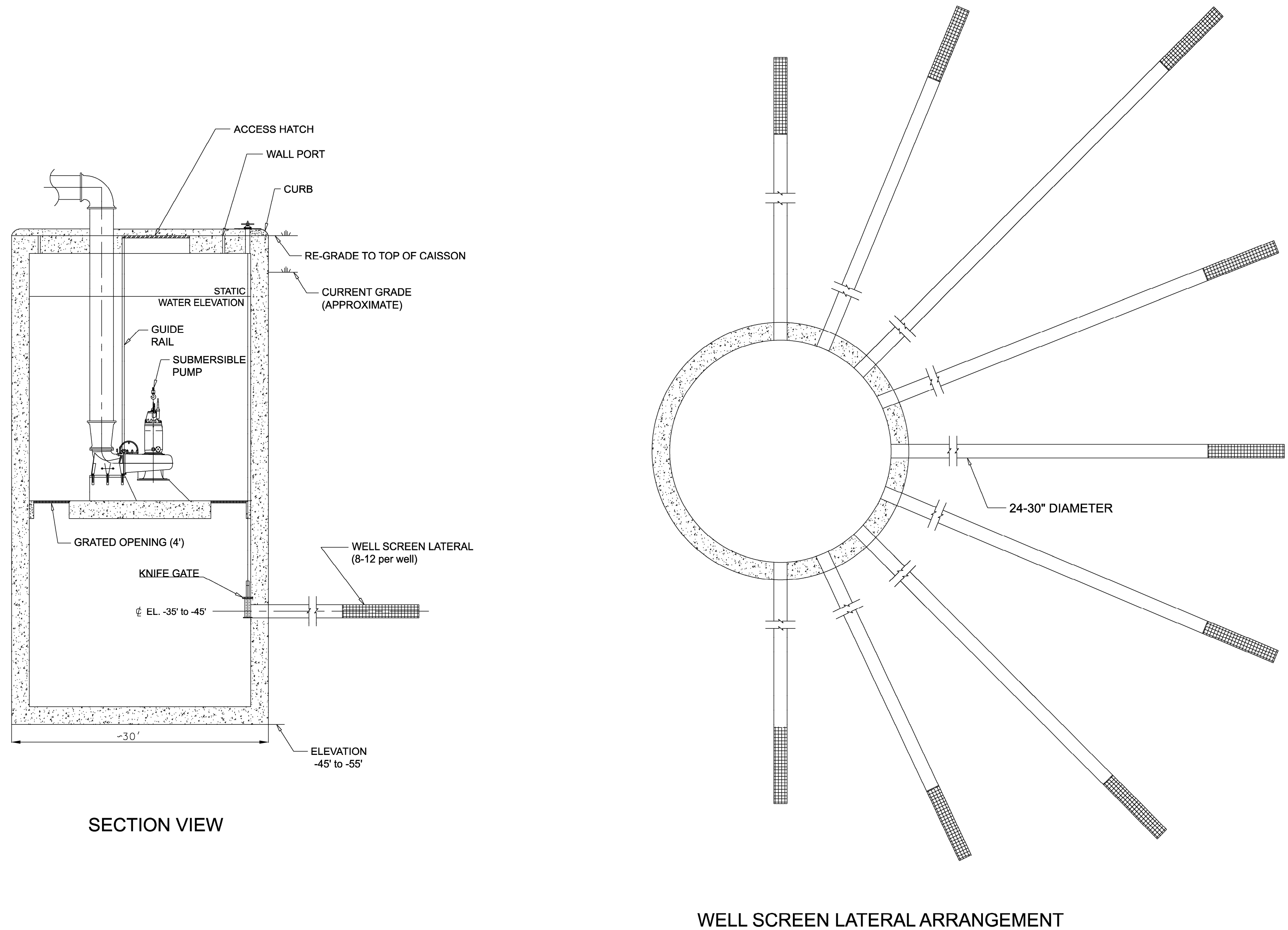


Figure 4.5-2
Typical Radial Collector Well Conceptual Design

Rev. 0

FPL

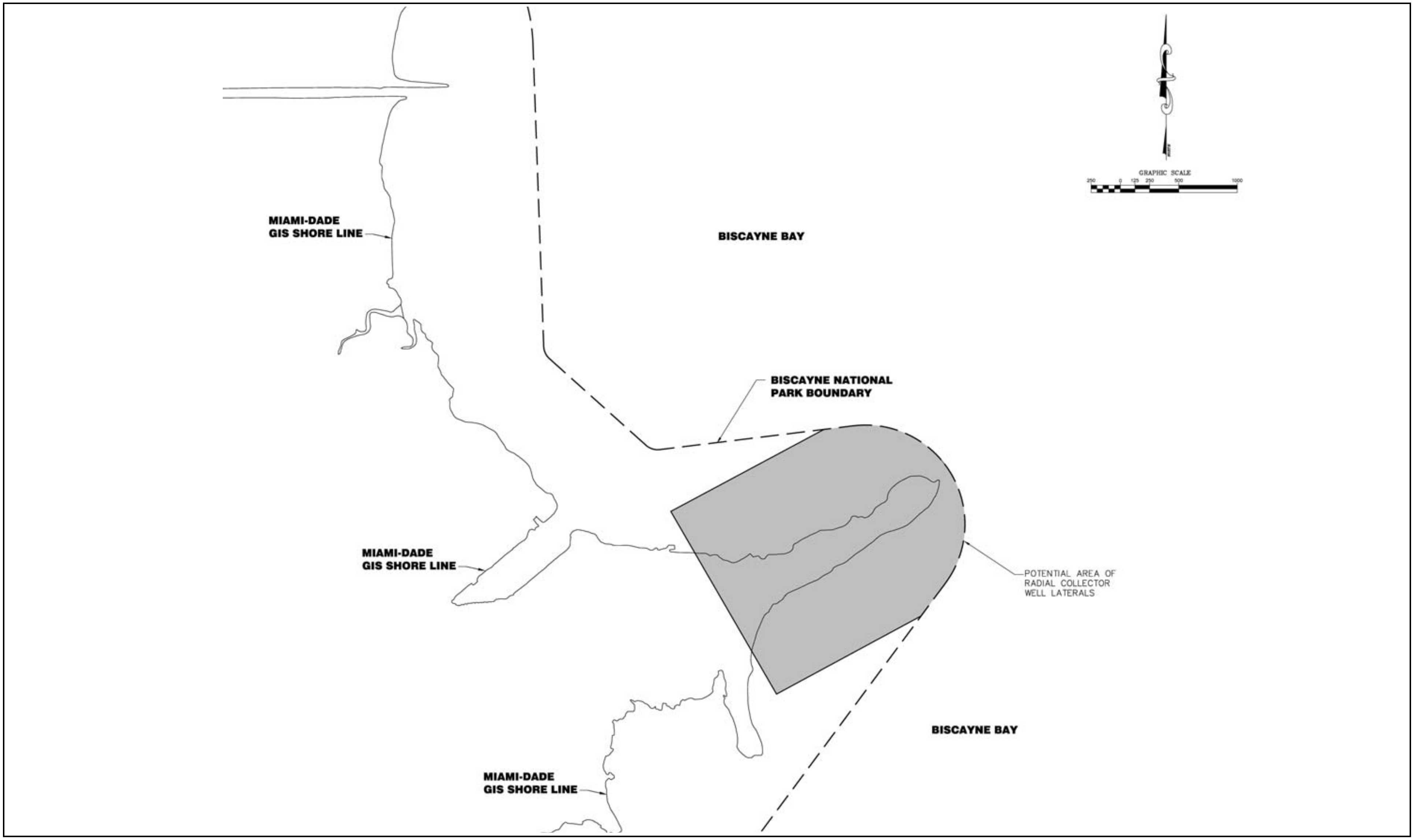


Figure 4.5-3
Potential Area of Radial Collector Well Laterals

Rev. 0

FPL

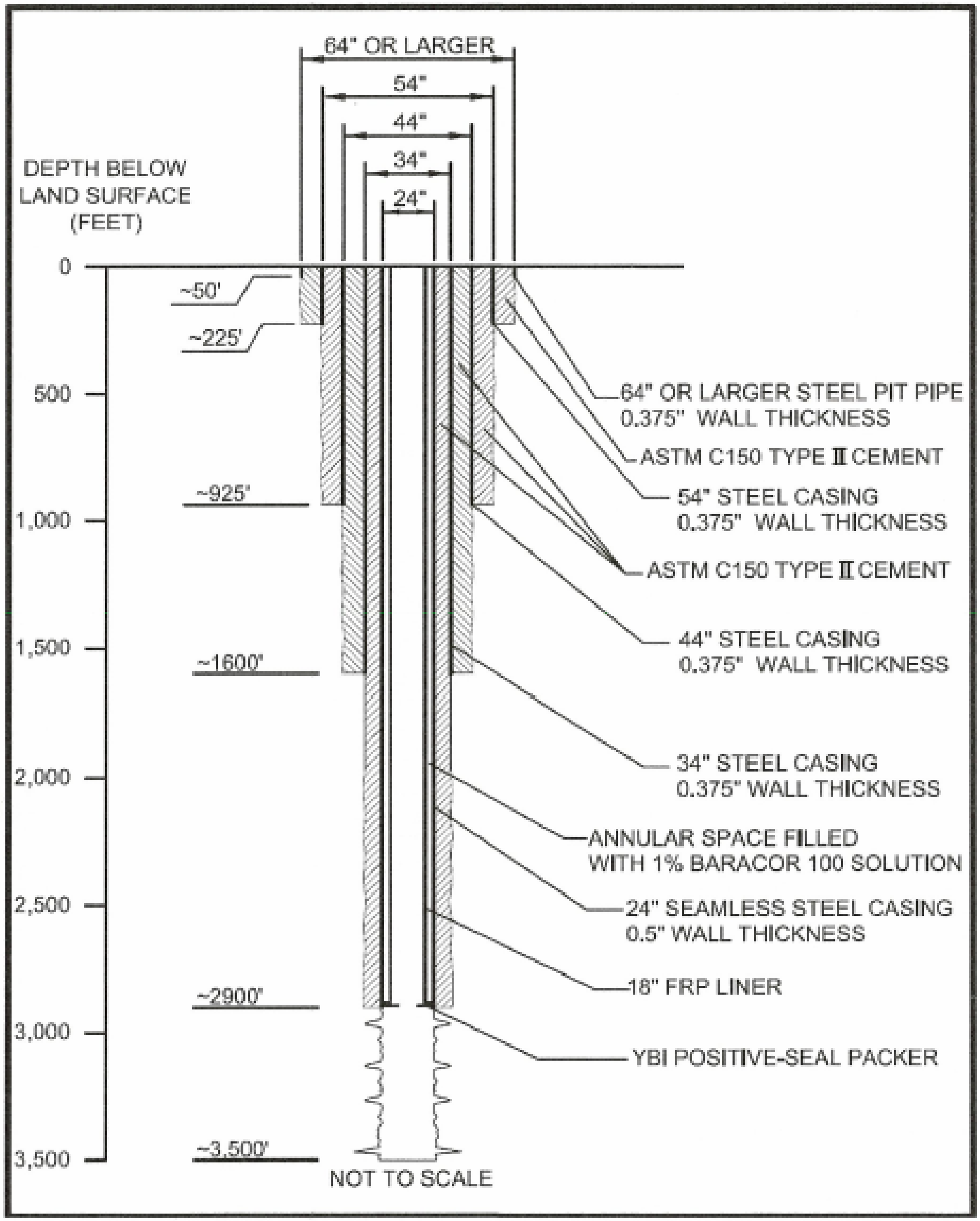


Figure 4.5-4
Typical Injection Well Design

Rev. 0