

Levy Nuclear Plant Units 1 and 2 Florida Site Certification Application

2.0 NEED FOR THE PROPOSED FACILITY

2.1 INTRODUCTION

This section of the SCA provides an introduction to PEF and discusses the LNP project and the need for the project and its associated facilities. A discussion of the need for the proposed project may also be found in the following ER chapter:

ER 8.0 Need for Power

PEF provides electricity and related services to more than 1.6 million customers in the state of Florida. PEF's retail service area in Florida spans about 20,000 square miles (mi.²) in central Florida, encompassing the cities of St. Petersburg and Clearwater and densely populated areas surrounding Orlando, Ocala, and Tallahassee. In Florida, PEF maintains more than 43,600 mi. of distribution and transmission lines in serving 1.6 million customers and a population of more than 5 million people. PEF further supplies electricity at retail to approximately 350 communities and at wholesale to approximately 21 municipalities, utilities, and power agencies in the State of Florida.

2.2 THE PROJECT

PEF proposes to build and operate two 1154 (nominal electrical) MWe advanced passive light water nuclear reactors (proposed Levy Nuclear Plant Unit 1 [LNP 1] and proposed Levy Nuclear Plant Unit 2 [LNP 2]). LNP 1 and 2 will be located in Levy County, Florida. The project also includes several new and expanded 500-kV and 230-kV electrical transmission lines and substations, a new rail line, new site access roads and new offsite cooling water disposal pipelines that will connect the LNP site to the existing CREC. The project is more fully described in the remaining portions of this application. PEF proposes to place LNP 1 in commercial service by June 2016 and LNP 2 in commercial service by June 2017. To this end, PEF is filing its application for site certification with the FDEP. PEF currently plans to file its COLA for LNP 1 and 2 with the NRC in the third quarter of 2008.

2.3 NEED FOR THE PROJECT

On March 11, 2008, PEF filed with the Florida Public Service Commission (FPSC) a petition for an affirmative determination of need for LNP 1 and LNP 2, together with the associated facilities, including transmission lines and substation facilities, needed to integrate LNP 1 and LNP 2 with PEF's transmission network for delivery of electrical power to PEF's customers. PEF expects the FPSC to make its determination of need for the project by early August 2008. Upon its issuance, a copy of the FPSC's final order will be forwarded to the FDEP.

As stated in PEF's petition to the FPSC, with LNP 1 and LNP 2, PEF will maintain its position as the most fuel-diverse utility in Florida, with 38 percent of total energy needs in 2018 met with nuclear generation and only 6 percent more natural gas generation than exists today. PEF and Florida will be less dependent

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on foreign sources of fossil fuels and supply reliability will be improved, making PEF and its customers less exposed than today to volatile fluctuations in fossil fuel prices. Additionally, PEF will have added substantial energy generation to its system with no greenhouse gas (GHG) or other emissions, improving PEF's and its customers' position in the face of current air emission regulations and future GHG emission costs.

With the 2006 Florida Renewable Energy Technologies and Energy Efficiency Act, 2008 Florida House Bill 7135, and subsequent executive and administrative actions, there has been a concerted effort to develop a comprehensive state plan to meet Florida's growing future energy needs. This plan focuses on energy efficiency to reduce energy demand, on renewable fuel and other domestic fuel sources, and on cleaner energy production through nuclear and gasified coal generation. Consistent with this plan, PEF has a balanced approach for meeting the needs of its customers with reliable, cost-effective electrical power over the next generation. PEF's balanced approach includes investing in existing renewable energy resources, increasing PEF's long-standing investment in energy efficiency and other load reduction or load management programs, and investing in future renewable energy and energy efficiency technologies.

Even with the increased investment in energy efficiency and renewable energy resources, these resources cannot satisfy all future customer needs for electrical power. PEF's balanced approach includes the need to plan for and build new generation resources to ensure that the electrical power needs of households and businesses in its service area are met. Continued plans for additional generation to meet customer needs are essential to maintaining the standard of living and robust economic opportunities the company's customers expect.

Florida, with a population of more than 17 million, is currently the fourth most populous state in the country. Florida's growth has been consistent and continues, with the State adding over 1,000 new residents a day. PEF's service territory has shared in this growth. During the past two decades, more than 600,000 homes and businesses have been added to PEF's system, and the company's customer base has grown by 157 percent since 1975, from 622,000 customers to about 1.7 million today. PEF will continue to share in Florida's population growth. Even with expected slower population growth based on more recent experience and due to recent economic conditions affecting the Florida housing and construction markets, for example, PEF's customer growth is still expected to average 1.8 percent between 2008 and 2017. Indeed, PEF has added on average 30,000 and 40,000 new customers (homes and businesses) to its service area over the last 3 years. That growth is equivalent to adding a medium-sized city. Florida homes and businesses are using more electricity, too. Florida's per-capita electricity use currently ranks third in the country.

PEF currently operates the most diverse mix of power plants in Florida to meet the electrical power needs of its customers. The company has a total summer and winter net capacity generation resource of approximately 9,293 MW and 10,285 MW, respectively. The summer capacity resources include utility purchased power (484 MW), non-utility purchased power (1,438 MW),

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combustion turbine (2,501 MW), nuclear (769 MW), fossil steam (3,899 MW), and combined cycle plants (2,134 MW). These capacity resources use nuclear, natural gas, coal, oil, and renewable fuel sources. Currently, these fuel sources account for 14 percent (nuclear), 30 percent (natural gas), 43 percent (coal), 10 percent (oil), and 3 percent (renewable) of PEF's energy generation.

On the non-generating resource side, PEF has been a leader in demand-side management (DSM) and implementing energy efficiency programs in the State of Florida since 1981 when the Florida Energy Efficiency and Conservation Act (FEECA) became effective. In fact, PEF has one of the most robust DSM and energy efficiency programs in the country. PEF is ranked third in the nation for load management peak demand reduction with a reduction of 17 percent of peak load, and PEF is ranked fourth in the nation for energy efficiency megawatt-hour (MWh) saved for utilities with 1.5 million customers or higher, based on the Department of Energy's 2006 data.

LNP 1 and LNP 2 will move PEF and the State of Florida to a generation supply paradigm that is more fuel diverse and more fuel independent, and thus less reliant on fossil fuels, particularly those from foreign fuel suppliers. With the addition of LNP 1 and LNP 2, by 2018 nuclear energy will represent 38 percent of the total energy generated on PEF's generation system. Without these nuclear generation units, however, fossil fuels will account for 85 percent of the electrical energy generation on PEF's system in 2018, and PEF will need as much as another decade to add nuclear generation to its system, thus leaving it and its customers dependent on fossil fuels for at least 85 percent of the electrical power generated for an even longer period of time. This generation supply paradigm, where PEF is for the next two decades predominantly relying on fossil fuels to generate electrical energy for its customers, in PEF's view, must be avoided for the benefit of PEF, its customers, and the State. The opportunity to move away from a predominant, fossil-fuel, generation supply paradigm is now, and LNP 1 and LNP 2 will provide PEF and Florida the opportunity to move towards a generation supply portfolio that is essential for the future energy needs and economic and environmental well-being of the State.

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3.0 SITE AND VICINITY CHARACTERIZATION

This chapter provides basic information on the physical, biological, and sociological characteristics of the area and region surrounding the LNP site that could potentially be affected by the construction and operation of the LNP. A detailed discussion of these characteristics is provided in the following ER section:

ER 2.0 Environmental Description

3.1 SITE AND ASSOCIATED FACILITIES DELINEATION

A detailed discussion of the geographical location of the site and the surrounding region is provided in the following ER section:

ER 2.1 Station Location

Maps illustrating the location of the LNP, the general layout, and the uses of the LNP are provided on the following ER figures:

ER Figure 1.1-1	LNP Site
ER Figure 2.1-1	Station Location Map
ER Figure 2.1-2	General Station Features

The LNP site has not been previously certified for power generation.

The LNP site is relatively large, with an approximate area of 3105 acres (exclusive of associated off-site or linear transmission and conveyance facilities), and the main plant components will be located near the geographic center of the site.

Discussions of the existing and proposed uses of the site are provided in the following ER sections:

ER 2.2.1	Site and Vicinity [Preconstruction]
ER 4.1	Land Use Impacts [During Construction]
ER 5.1	Land Use Impacts [Post-Construction]

Facilities associated with the LNP site are generally described in the following ER sections:

ER 2.1	Station Location
ER 2.2.2	Transmission Corridors and Off-Site Areas [Preconstruction]
ER 4.1.2	Transmission Corridors and Off-Site Areas [During Construction]
ER 5.1.2	Transmission Corridors and Off-Site Areas [Post-Construction]

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A comprehensive discussion of electric transmission facilities associated with the project is provided in SCA Chapter 9.

SCA Figure 3.1-1 shows the LNP site in relation to adjoining properties on a 1:24,000 scale topographic map. SCA Table 3.1-1 provides a map key and lists the corresponding property owners.

The majority of the LNP site and surrounding area is in a 100-year flood zone as described in the following ER section and shown on the following ER figure:

ER 2.3.1.2.1.4	Flood History
ER Figure 2.3-11	100-Year Flood Zones at LNP Site

3.2 SOCIAL AND POLITICAL ENVIRONMENT

The social and political environments of the LNP site and surrounding area are described in the following ER sections:

ER 2.2	Land
ER 2.2.1	Site and Vicinity
ER 2.2.2	Transmission Corridors and Off-Site Areas
ER 2.2.3	Region
ER 2.5	Socioeconomics
ER 2.5.1	Demographics
ER 2.5.2	Community Characteristics
ER 2.5.3	Historic Properties

3.2.1 GOVERNMENTAL JURISDICTIONS

SCA Figure 3.2.1-1 shows towns and cities within a 5-mile (mi.) radius of the site boundary. This figure also identifies the public land use areas (state and federal, special or recreational) by major type within a 5-mi. radius of the LNP. SCA Table 3.2-1 also identifies the ER section in which each area is discussed in more detail. SCA Figure 3.2.1-2 contains a 1:24,000 scale map of local, regional, state, or federal areas within approximately 1 mi. of the LNP site. Electric transmission line corridors are discussed in Chapter 9.

While the Florida Forever Program has multiple acquisitions planned around the LNP site, Felburn Park, owned by the Felburn Foundation and discussed in ER 2.2.1.4, is the only readily identifiable, major private landholding for which the current primary purpose is environmental protection within a 5-mi. radius.

3.2.2 ZONING AND LAND USE PLANS

Local land use and zoning plans that are relevant to population growth, housing, and changes in land use patterns are discussed in the following ER sections:

ER 2.2.1.5	Land Use Plans [Impacting Site and Vicinity]
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- ER 2.2.2.6** Land Use Plans [Impacting Transmission Corridors and Off-Site Areas]
- ER 2.5.2.2.2** Local and Regional Planning Organizations
- ER 2.5.2.3** Local Land Use and Zoning

The Levy County Comprehensive Plan, Levy County Future Land Use Map, and Levy County Zoning Ordinance serve as the local regulatory guidelines for consistency in the jurisdictional area in which the LNP site is proposed. Standards for the LNP site development suitability are outlined in the Comprehensive Plan's Goals, Objectives, and Policies, specifically the Future Land Use Element and Conservation Element. Changes to these documents were adopted by ordinance on March 18, 2008, with effective dates pending either a Florida Department of Community Affairs (FDCA) final order or the Administration Commission finding the amendment adopted by the Board of Commissioners to be in compliance with Section 163.3184 of the Florida Statutes, after which the site will be designated as public use. Public use provides for public buildings and grounds, including public utilities that are defined as gas, water, and electric, water power, well houses, electric substations, power generating facilities, sewerage, telephone facilities, utility poles and street lighting, and other similar equipment necessary for the furnishing of adequate public services. Once these ordinances are in effect, the project will be consistent with local plans. SCA Figure 3.2.2-1 shows interaction of the LNP with area land uses. The proposed location of the LNP site is not within the coastal zone and is consistent with the Coastal Management Element, Policy 5.14, of the Comprehensive Plan.

SCA Appendices 10.3 (Zoning Descriptions) and 10.5 (Land Use Plan Descriptions) identify the specific procedures taken to ensure compliance of the site and associated facilities with existing land use plans and zoning ordinances.

3.2.3 DEMOGRAPHY AND ONGOING LAND USE

Information on existing and future population growth (using appropriate government projections) within 5 mi. of the LNP site is provided in the following ER sections:

- ER 2.2** Land
- ER 2.2.1** Site and Vicinity
- ER 2.2.1.1** Land Use
- ER 2.2.2** Transmission Corridors and Off-Site Areas
- ER 2.5.1** Demographics

SCA Figures 3.2.3-1, 3.2.3-2, and 3.2.3-3 illustrate the existing and proposed land use designations within 5 mi. of the LNP site and within 1 mi. of the off-site areas, which are discussed further in SCA Section 4.10 (Associated Linear Facilities) of this document.

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A discussion of the nature and extent of projected land uses and recent trends, such as abnormal changes (sudden increases or decreases) in population and industrial patterns in the LNP vicinity, is provided in the following ER section:

ER 4.1.1.1 Long-term Land Use Restrictions and Physical Changes of Site and Vicinity

ER Subsection 4.1.1.1 discusses future land use components, such as developments of regional impact (DRI) and planned unit developments (PUD) that are also indicative of future development trends.

3.2.4 LEASES, EASEMENTS, TITLE, AGENCY WORKS

A general discussion of leases, easements, and titles that could be needed for construction of the LNP is provided in the following ER section:

ER 2.2.2.5 Easements, Title, and Agency Works

Easement requirements for transmission lines are discussed in SCA Chapter 9. SCA Table 3.2-2 provides a summary of potential crossings for which permissions may be required.

Approvals for crossing or use of federal or state road rights-of-way (ROWs) must be granted pursuant to the U.S. Department of Transportation (USDOT) or Florida Department of Transportation (FDOT) regulations. Approvals of crossings or use of county maintained road ROWs must be granted pursuant to the requirements of the respective county.

All crossings of state roads will conform to specifications contained in FDOT's *Utility Accommodation Manual* (2007). Post-certification submittals are customarily provided for the crossings or collocations with canals or works of the district under the jurisdiction of Florida's Water Management Districts (WMDs). Such works may include structures, impoundments, wells, streams, canals, or other watercourses officially adopted by the relevant WMD's governing board. Crossings or collocations with some of the canals may also require federal agency approvals.

3.2.5 REGIONAL SCENIC, CULTURAL AND NATURAL LANDMARKS

While not officially designated as landmarks, the following are natural and scenic areas within 5 mi. of the LNP site: The Goethe State Forest, Crystal River Preserve State Park, South Goethe Parcel, Marjorie Harris Carr Cross Florida Greenway State Recreation and Conservation Area, and the Withlacoochee River, recognized as an Outstanding Florida Water (OFW) (see SCA Table 3.2-1 for more information and cross references to the pertinent ER sections). There are no designated cultural landmarks within a 5-mi. radius of the LNP site (see SCA Section 3.2.6).

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3.2.6 ARCHAEOLOGICAL AND HISTORIC SITES

A detailed description of the cultural resource surveys that have been conducted at the LNP site and its associated facilities is located in the following ER section:

ER 2.5.3 Historic Properties

A review of the Florida Master Site File (FMSF) in October 2007 showed 38 previously surveyed archaeological sites within a 5-mi. radius of the LNP site: 29 in Levy County and 9 in Citrus County. Of the 38 previously surveyed sites, 9 sites were determined to be ineligible for listing in the National Register of Historic Places (NRHP) by the Florida State Historic Preservation Office (SHPO); 4 sites showed insufficient information to make a determination; 12 sites were recommended ineligible by the surveyor but had yet to be evaluated by the SHPO; 12 sites were not evaluated by the surveyor or the SHPO; and 1 archaeological site (LV0253) in Levy County was determined potentially eligible by the surveyors but was not evaluated by the SHPO (Florida Division of Historical Resources, Florida Master Site File, October 2007). The Tidewater site (LV0253) is 4 mi. from the LNP site and is not located within the Area of Potential Effect (APE). None of the previously surveyed sites have been determined eligible for listing in the NRHP. It is customary not to publish the locations of potentially sensitive archaeological sites.

Review of FMSF structure records showed three previously surveyed structures within 5 mi. of the LNP site. Additionally, four cemeteries in Levy County have been surveyed. See SCA Table 3.2.6-1 for additional information on the NRHP status of each surveyed structure. Twelve surveys have been conducted that are wholly or partially located within 5 mi. of the LNP site. See **ER Figure 2.5-13** for the locations of the previously recorded structures and surveys within a 10-mi. radius of the LNP site. Historic properties, as defined in 36 Code of Federal Regulations (CFR) 800.16 (l)(1), are properties listed or eligible for listing in the NRHP. The FMSF revealed that no structures, cemeteries, bridges, or districts have been recommended or determined eligible for listing in the NRHP within 5 mi. of the LNP site. Additionally, no properties have been found to have local significance within 5 mi. of the LNP site (Florida Division of Historical Resources, Florida Master Site File, October 2007).

3.2.7 SOCIAL AND ECONOMIC CHARACTERISTICS AND PUBLIC SERVICES

3.2.7.1 Social and Economic Characteristics

Detailed information on the social and economic characteristics of the area within 50 mi. of the LNP site is provided in the following ER sections:

- ER 2.5.2 Community Characteristics**
- ER 2.5.2.1 Economic Characteristics**
- ER 2.5.2.1.1 Economic Base**
- ER 2.5.2.1.2 Tax Structure and Distribution**

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ER 2.5.2.5 Housing Information

3.2.7.2 Area Public Service and Utilities

A detailed characterization of public services and utilities in the region surrounding the LNP site is provided in the following ER sections:

- ER 2.5.2** Community Characteristics
- ER 2.5.2.6** Educational System
- ER 2.5.2.7** Recreation and Aesthetics
- ER 2.5.2.8** Public Services and Facilities
- ER 2.5.2.8.1** Water and Wastewater Facilities
- ER 2.5.2.8.2** Police, Fire, Emergency Management Services, and
Medical Facilities Capabilities
- ER 2.5.2.9** Highways and Transportation Systems

Electricity in the area of the LNP site is provided by four companies: PEF, Central Florida Electric Cooperative (CFEC), Clay Electric Cooperative, and Sumter Electric Cooperative. The latter two cooperatives purchase power from the Seminole Electric Cooperative, while PEF and CFEC actually own and operate substations in Levy County (Levy County Comprehensive Plan, Chapter 7, Infrastructure, 1999). Florida Gas Utility provides natural gas and propane service to local customers.

Levy County operates a Class I Solid Waste Management Facility located north of the LNP site and approximately 3 mi. southeast of the Town of Bronson to serve the entire county area including the incorporated areas. Between 2001 and 2005 Levy received an average of 27,758 tons² of material to landfill annually (FDEP's 2005 Solid Waste Annual Report). The Levy County Comprehensive Plan notes that the facility is at 49 percent of design capacity and is not anticipated to reach full capacity until 2020, allowing the facility to accommodate the limited amounts of solid waste generated at LNP for local disposal.

3.3 PHYSICAL AND BIOLOGICAL ENVIRONMENT

Information regarding the physical and biological characteristics of the environment surrounding the LNP site that could be affected by the proposed project is provided in the following ER sections:

- ER 2.3** Water
- ER 2.4** Ecological Description
- ER 2.6** Geology
- ER 2.7** Meteorology and Air Quality

References to more specific information are provided in the following subsections.

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3.3.1 GEOLOGY AND HYDROLOGY

A brief description of the major geological and hydrological aspects of the LNP site and surrounding areas is provided in the following ER sections:

ER 2.3	Water
ER 2.3.1.5	Groundwater
ER 2.6	Geology

ER Section 2.3 contains information about the hydrology of the regional area and site; ER Subsection 2.3.1.3 describes the groundwater conditions and sources of the aquifer in the region and at the LNP site; and ER Section 2.6 describes the geology and testing results used to determine site suitability.

3.3.1.1 Geologic Description of the Site and Area

A general description of the regional geology and hydrology of the LNP site and the surrounding region is located in the following ER sections:

ER 2.3	Water
ER 2.6	Geology

3.3.1.1.1 Geomorphology

The LNP site is 7.9 mi. east of the Gulf of Mexico and 3 mi. north of the Withlacoochee River. The LNP site is under the jurisdiction of the Southwest Florida Water Management District (SWFWMD). The western portion of Levy County is a poorly drained, low relief region that is characterized by extensive swamps, marshes, and terraces formed by ancient sea-level high stands. The site lies within the Gulf Coastal Lowlands, characterized by broad, flat marine erosional plains, underlain by Eocene limestones, and covered by thin Pleistocene sands deposited by the regressing Gulf of Mexico.

The LNP site is located within the Limestone Shelf and Hammocks subzone, which is characterized as a highly karstic, erosional limestone plain overlain by sand dunes, ridges, and coast-parallel paleoshore sand belts associated with the Pleistocene-age Pamlico marine terrace.

The irregular, highly solutioned Eocene limestone underlying this subzone is covered by a blanket of Pleistocene sands of varying thickness. Near the coast, the limestone shelf is drowned by the coastal marshes. Inland, the limestone reaches an elevation of 20 feet [ft.] above mean sea level and is heavily forested. Drainage from the coastal hammocks occurs through numerous small creeks and sloughs, which empty into the coastal marshes.

3.3.1.1.2 Stratigraphy of Site Area

Based on information published by the Florida Geologic Survey, the oldest rocks penetrated within the site vicinity (25-mi. radius) and site area (5-mi. radius) are

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Paleozoic shales and quartzite pebble sands that are overlain by Triassic diabase. Overlying these sediments is a thick section of Cretaceous and Cenozoic carbonates (limestone and dolomite) that are overlain by undifferentiated Pleistocene- to Holocene-age surficial sands, clayey sands, and alluvium.

A geologic cross section illustrating the Cretaceous geologic units across central Florida (including Levy County) is shown on SCA Figure 3.3.1.1-1, and a geologic cross section illustrating the Middle Eocene to Holocene units through the site vicinity (Levy and Marion counties) is shown on SCA Figure 3.3.1.1-2. A geologic column in central and south Florida of the lithostratigraphic units from the Lower Cretaceous through to the Holocene is shown on SCA Figure 3.3.1.1-3.

Within the site vicinity, there are three deep wells (Robinson No. 1, J.T. Goethe No. 1, and JB & JT Ragland No. 1) that provide direct information on the deeper stratigraphy near the LNP site (SCA Figure 3.3.1.1-1). The well closest to the LNP site is the Robinson No. 1 well, located a few miles north of the LNP site. This well was drilled to a depth of 4609 ft., and the top of the Paleozoic surface was at a depth of 4377 ft. The well encountered approximately 232 ft. of Paleozoic sediment that was described as light gray, hard, quartzitic sandstone, locally interbedded with thin beds of hard, dark gray to black, somewhat silty, micaceous shale. Based on the fossil assemblage, the Paleozoic rocks are interpreted to be Lower Ordovician.

The J.T. Goethe No. 1 well is located approximately 15 mi. north of the LNP site. This well was drilled to a depth of 3997 ft., and the top of the Paleozoic surface was 3960 ft. below sea level. The well encountered approximately 37 ft. of gray quartzitic sandstone and micaceous black shales, similar material that was cored in the Robinson well.

The third well, the JB & JT Ragland No. 1 well, is located approximately 30 mi. west of the LNP site. This well was drilled to a total depth of 5850 ft., and the top of the Paleozoic surface was either 5810 or 5792 ft. below sea level.

3.3.1.1.3 Paleocene Rocks — Cedar Keys Formation

The Cedar Keys Formation of Levy County is composed of interbedded tan to gray, finely granular, fragmental, commonly very fossiliferous limestone and tan to brown, finely crystalline to chalky textured dolomite. Gypsum has completely filled the porosity of large sections and occurs irregularly as thin lenses. The limestone is rarely fossiliferous near the top and is dolomitized. The lower portion is more fossiliferous and some beds are completely composed of various microfaunas in a pasty limestone matrix.

The thickness of the Cedar Keys Formation in Levy County ranges from 600 ft. near the coast to 540 ft. near the LNP site. The Cedar Keys Formation is present from depths of 1750 to 2290 ft. in the Robinson No. 1 well, 1658 to 2190 ft. in the Goethe No. 1 well, and 1680 to 2280 ft. in the Ragland No. 1 well.

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3.3.1.1.3.1 Lower Eocene Rocks — Oldsmar Limestone

The Oldsmar Limestone is lithologically similar to the overlying and underlying formations. It was originally differentiated based on a specific faunal zone. It is generally composed of fragmental marine limestones, partially to completely dolomitized and containing irregular and rare lenses of chert, impregnations of gypsum, and thin shale beds. Fossils are common but are sometimes dolomitized and poorly preserved. The thickness of the Oldsmar Limestone is variable, depending on the extent of the dolomitization. The formation or faunal zone is 380 ft. thick near the coast and 500 ft. thick at the LNP site. The Oldsmar Limestone is present in southern Levy County from depths of 1250 to 1750 ft. in the Robinson No. 1 well, 945 to 1658 ft. in the Goethe No. 1 well, and 1300 to 1680 ft. in the Ragland No. 1 well.

3.3.1.1.3.2 Middle Eocene Rocks — Avon Park Formation

The Middle Eocene Avon Park Formation represents the oldest rocks exposed in Florida and underlies all of peninsular Florida (Boring W-15075 on SCA Figure 3.3.1.1-2). The top of the Avon Park Formation varies in depth from surface outcrops in southern Levy County, northern Citrus County, and along the crest of the Ocala platform, to nearly 150 ft. deep in northern and eastern Levy County. The total thickness of this unit is approximately 800 to 1000 ft.

As described by Scott (2001), the Avon Park Formation is cream to light brown or tan, poorly indurated (hardened) to well-indurated, variably fossiliferous, limestone (grainstone, packstone, and wackestone, with rare mudstone). These limestones are interbedded with tan to brown, very poorly indurated to well-indurated, very fine to medium crystalline, fossiliferous (molds and casts), and vuggy dolostones. The fossils present include mollusks, foraminifers, echinoids, algae, and carbonized plant remains. Accessory minerals include chert, pyrite, and gypsum, with gypsum becoming more abundant with depth.

As described by Arthur et al. (2001), the uppermost part of the Avon Park Formation within Levy, Citrus, and Marion counties varies between limestone and dolostone; dolostone predominates deeper within the unit, especially southward from these counties. Porosity in this formation is generally intergranular in the limestone. Fracture porosity occurs in the more densely recrystallized dolostone, and intercrystalline porosity is characteristic of sucrosic texture. Pinpoint vugs and fossil molds are present to a lesser extent.

The Avon Park Formation unconformably overlies the Lower to Middle Eocene Oldsmar Limestone. The top of Early Eocene rocks (the approximate base of the Avon Park Formation) is at approximate depths ranging from -1100 ft. to -1850 ft. National Geodetic Vertical Datum (NGVD) (Miller, 1986). The Avon Park Formation varies in thickness across the study area (Levy, Citrus, Marion, Sumter, Hernando, Pasco, and Polk counties), from 1000 ft. in Levy County to 1500 ft. in Pasco County (Miller, 1986). Arthur et al. (2001), in the study conducted in Levy, Marion, and Pascoe counties, found the top of the Avon Park

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Formation to range from approximately 10 ft. above NGVD to a depth of -425 ft. NGVD. At the site, the Avon Park Formation is overlain by undifferentiated sands and clays.

3.3.1.2 Detailed Site Lithologic Description

A general discussion of the lithology and aquifer properties of the LNP site and surrounding region are discussed in the following ER sections:

ER 2.3	Water
ER 2.6	Geology

An extensive network of more than 125 borings and monitoring wells were completed on the LNP site during a year-long subsurface investigation of the site to demonstrate suitability for the proposed nuclear-fueled power generating facility. This investigation was performed to address the safety-related structure performance, in accordance with the guidance in NRC Regulatory Guide 1.132 and as required by NRC for the LNP COLA. Detailed boring logs and geologic cross sections have been prepared to document the comprehensive investigation of the areas being proposed for development. Because this information is very extensive, voluminous, and beyond the scope of this SCA, it is not being submitted in its entirety as part of this application; however, the information is summarized in this SCA and detailed information can be provided upon request by the FDEP or other reviewing agency.

The location of the wells and borings that were completed on the LNP site are shown on SCA Figure 3.3.1.2-1. Four geologic cross sections through the LNP site are provided as a representative summary of the geology of the site, based on the numerous boreholes advanced at the site:

SCA Figure 3.3.1.2-3	N-S Cross Section at LNP 1
SCA Figure 3.3.1.2-2	N-S Cross Section at LNP 2

These cross sections provide detailed information about a large number of geologic borehole logs (as a continuous lithologic description from the land surface through the top of the rock), detailing the depth to and elevation of the top of each lithologic unit encountered and the thickness of each lithologic unit.

No clayey confining units were identified between the surficial aquifer and the Floridan aquifer from the detailed site investigations. As a result, measurements of Cation Exchange Capacity (CEC) were not performed. Because no on-site waste disposal systems are being constructed as part of the project, the primary objective of the geologic investigations was to evaluate the site in terms of its ability to safely support the proposed nuclear-fueled power generating units and demonstrate that it would meet the safety requirements of the NRC.

Because of the large number of boreholes on the site, detailed information is being provided for one borehole selected from the N-S geologic cross section for each LNP unit (as shown on SCA Figure 3.3.1.2-2 and SCA Figure 3.3.1.2-3).

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Detailed information for Boreholes A-17 and A-10 is provided in SCA Appendix 10.10, including driller's logs, location and approximate elevation, size and depth of the hole, date drilled, driller's name, method of drilling, and other general information recorded at the time of drilling (such as drilling rate or effort, loss of circulation, ground water level, method of sampling, depth at which samples were taken, and method of hole abandonment).

The field investigation activities were performed at the LNP site from January 2007 through December 2007. Laboratory tests were conducted on samples recovered during the field investigations following the retrieval of soil and rock samples. The field investigation activities are discussed further in the following subsections.

3.3.1.2.1.1 Soil Boring and Rock Coring

The program of soil boring and rock coring was completed in three phases: initial, main, and supplemental phases. They included the following field activities:

- Initial phase: Ten boreholes were advanced within the vicinity of the proposed plant layout to determine the site conditions and to provide basis for the main phase investigation.
- Main phase: Ninety boreholes for the two reactor units (proposed Levy Nuclear Plant Unit 1 [LNP 1] and proposed Levy Nuclear Plant Unit 2 [LNP 2]) were advanced during the main phase to obtain soil and rock samples for geologic characterization and for laboratory tests.
- Supplemental phase: This phase of the program included 15 additional explorations.

The investigation included boreholes designed to confirm the presence or absence of major cavities or karst features where zones of no recovery or rod drop occurred. The results of these supplemental explorations suggest that the maximum lateral dimensions of voids for each location investigated are at least 5 ft.; however, the identified voids are not located under or immediately adjacent to the proposed locations of the LNP 1 or LNP 2 nuclear islands.

Top of rock across the site was encountered between 26 and 139 ft., indicating a non-uniform rock site. Boreholes were generally advanced to depths that satisfy the LNP COLA Field Investigation Work Plan criteria for minimum depth below the foundation or into sound rock. Because intervals of highly weathered soft rock were encountered below these depths, additional boreholes were extended past the maximum depth of influence, as required in the LNP COLA Field Investigation Work Plan for soil sites, to further characterize these intervals.

3.3.1.2.1.2 Geophysical Logging

A series of geophysical logs were run on select test wells and borings. All of the logs were run on 14 boreholes and a portion of the logs were run on an additional

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4 boreholes. Logging included suspension PS velocity (borehole seismic), acoustic televiewer, induction electric, natural gamma, gamma-gamma (density), and neutron porosity logs.

The logs confirm the observations made during drilling of the boreholes. The soil profile is identified by low velocity signals on the suspension PS velocity log and an interval of elevated natural gamma counts associated with the transition from soil to weathered limestone and clay above the Floridan aquifer. The top of clean limestone is variable across the site. The weathered top of the Avon Park Limestone varies from about 40 feet below ground surface (ft bgs) to 140 ft bgs, averaging 70 ft bgs.

The gamma gamma density log shows moderate density down to about 200 ft bgs where density decreases. From there to about 300 ft bgs, density is low and neutron porosity is high. This interval is likely a high permeability interval of the Floridan aquifer. Below 300 ft bgs, the density increases slightly and porosity remains high but variable. Below 420 ft bgs, the density increases and porosity diminishes significantly. This zone is likely a low permeability interval of the Floridan aquifer and could indicate the middle semi-confining unit in the area.

The induction electric log shows little variability but at 415 and 425 ft bgs, high resistance was measured in several of the borings. The formation samples collected during drilling indicate a thick bed of lignite.

3.3.1.3 Geologic Maps

Descriptions of the site and regional geology at the LNP site are located in the following ER sections:

ER 2.3	Water
ER 2.6	Geology

Geologic column Isopach maps showing the top of formation and thickness are provided on SCA Figures 3.3.1.2-2 and 3.3.1.2-3. A fracture trace analysis of the site was performed and is further discussed in SCA Section 3.3.2.2, Karst Hydrogeology.

3.3.1.4 Bearing Strength

A comprehensive foundation suitability assessment was conducted for the LNP site, based on the results of a year-long site subsurface exploration program, geophysical testing, and an evaluation of regional and site geology. As a result of this assessment, the LNP site was determined to be a viable location for the plant, with no known fatal flaws. It is anticipated that the site can be successfully developed, employing proper engineering design and well-established construction techniques such as excavation/replacement and grouting. The improved site can adequately support the proposed generating units. This conclusion is further supported by the successful construction and operation of

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the Crystal River Nuclear Plant, which is located approximately 9 mi. from the LNP site in a similar geological setting.

3.3.2 SUBSURFACE HYDROLOGY

Physical, chemical, and hydrological characteristics (and their seasonal variations) of subsurface waters that will be affected by plant effluents or that will be affected by the construction or operation of the proposed plant and associated facilities are described in the following ER sections:

ER 2.3.1	Hydrology
ER 2.3.1.5	Groundwater
ER 2.3.3	Water Quality
ER 2.3.3.2	Groundwater

3.3.2.1 Subsurface Hydrologic Data for the Site

Surficial and bedrock aquifers associated with the LNP site are described in the following ER sections:

ER 2.3.1	Hydrology
ER 2.3.2	Water Use
ER 2.3.3	Water Quality

In addition, **ER Tables 2.3-15** and **2.3-16** provide information on aquifer performance, as derived from test wells constructed at the LNP site.

3.3.2.2 Karst Hydrogeology

A general discussion of Karst Hydrogeology of the site is provided in the following ER sections:

ER 2.3.1.5.1	Regional and Site Geology
ER 2.3.1.5.2	Regional Groundwater Systems
ER 2.6.1.4	Geologic Structures

An extensive and detailed review of existing fracture trace and surface faulting information has been performed as part of PEF's evaluation of the project site. The review included the comparison of fracture trends with features such as cypress domes and wetlands. Data used included information from the Florida Geological Survey, historical aerial photos, U.S. Geological Survey (USGS) reports, and LiDAR imaging flown over the site in 2007. In addition, a comprehensive Karst evaluation was performed to ensure site suitability for the proposed AP1000 reactors. The results of these evaluations did not identify any faults or major fracture trends on the LNP site; however, some localized trends were observed, with some apparent correlation to existing cypress domes and other surface features on the site.

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3.3.3 SITE WATER BUDGET AND AREA USES

The meteorology, climatology, and ambient air quality of the site, site vicinity, and the surrounding region are described in the following ER section:

ER 2.7 Meteorology and Air Quality

According to the *Water Resources Atlas of Florida*, average annual rainfall is 56 inches per year, pan evaporation is approximately 62 inches per year, and the evapotranspiration is about 40 inches per year (Fernald and Purdum, 1988). Average annual runoff is reported to be less than 10 inches per year, so the recharge to the surficial soils is between 2 to 12 inches per year (Fernald and Purdum, 1988).

The nature and amounts of present major water use are described in the following ER section:

ER 2.3.2 Water Use

The LNP site is located on old silviculture land that has been extensively modified by many years of planting and harvesting timber. No streams or ephemeral ditches are identifiable on-site. The runoff from stormwater moves primarily by overland sheet flow. Pockets of shallow wetlands collect runoff for longer periods, but when there is sufficient runoff volume, flow moves off-site primarily as sheet flow.

Groundwater well and surface water supply permit records were compiled for two distances around the property boundary of the LNP site. All permitted water users within a 5-mile radius beyond the LNP property boundary were compiled. This map includes all permitted water users, including public and private potable uses, irrigation, livestock, industrial, and fire protection use categories. Records from the SWFWMD and the Suwannee River Water Management District (SRWMD) were obtained. The well location data provides only Section, Township, and Range location data, so the number of wells located in each Section falling within the 5-mile radius beyond the LNP property boundary are shown on SCA Figure 3.3.3-1. The associated SCA Table 3.3.3-1 summarizes the well data obtained from the SWFWMD and SRWMD. It also summarizes permitted surface water withdrawal uses in the 5-mile radius, including five mining use permits and three irrigation use permits.

Public and private potable water supply wells within a 1-mile radius of the LNP property boundary were compiled using permitting records obtained from the SWFWMD. As with the 5-mile map, the number of wells located in each Section falling within the 1-mile radius beyond the LNP property boundary is shown in SCA Figure 3.3.3-2. The associated SCA Table 3.3.3-2 summarizes the well data obtained from the SWFWMD.

No significant confining layer occurs in the upper horizons of the soil; therefore, groundwater levels affect the storage capacity of rainfall in the upper soil layers.

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There are periods of time when the seasonal high groundwater table is at the ground surface (see **ER Section 2.3.1.5.4**, Groundwater Levels and Movement).

In support of the request for groundwater withdrawal at the LNP, PEF has prepared a Water Use Permit application form for review as part of this SCA (see SCA Appendix 10.9). Based on the results of the groundwater modeling performed, adjacent users of the Floridan aquifer are not expected to experience adverse impacts related to their ability to withdraw water.

3.3.4 SURFICIAL HYDROLOGY

3.3.4.1 Hydrologic Characterization

Hydrological characteristics (and their seasonal variations) of surface waters at the LNP site and in the surrounding area are described in the following ER sections:

ER 2.3.1 Hydrology
ER 2.3.3 Water Quality

Nearby surface waters are designated as Class III freshwater, except for Lake Rousseau and the lower reaches of the Withlacoochee River, which are considered Class II and are designated as Outstanding Florida Waters. The Gulf of Mexico is classified as Class III marine waters, but the area located in designated preserves is classified as Class II. Groundwater on site is classified as G-II.

Additional hydrological characteristics are described in the following ER sections:

ER 2.4.2 Aquatic Ecology
ER 2.4.2.2.2 Water Quality

There are no on-site bodies of waters, such as streams, canals, or ponds. The LNP site is highly disturbed timberland with predominantly overland flow. There are on-site cypress wetlands that are shallow and can store some runoff. However, these wetlands are generally isolated from each other and there is direct connection to off-site surface waters.

3.3.4.2 Measurement Programs

Measurement programs for background physical and chemical parameters of surface waters that could be affected during construction or operation of the LNP are described in the following ER sections:

ER 6.1 Thermal Monitoring
ER 6.3 Hydrological Monitoring
ER 6.4 Meteorological Monitoring
ER 6.5 Ecological Monitoring
ER 6.6 Chemical Monitoring

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Pre-application monitoring of surface waters has been conducted by CH2M HILL, which operates under a field sampling quality assurance plan that refers to the state Standard Operating Procedures. TestAmerica Inc. (Tallahassee) and Frontier Geosciences were used to analyze samples and are Florida-certified for the parameters tested (NELAC/NELAP No. E81005 for TestAmerica and No. E87575 for Frontier). Future sampling for baseline, construction, and operational monitoring will be conducted by entities with similar state quality assurance approvals for the collection and analysis of environmental data.

3.3.5 VEGETATION/LAND USE

The LNP site and surrounding area are characterized by broad, low flats interspersed with shallow depressions. Pine plantation is the predominant vegetative community type on-site and in the areas of the associated facilities. SCA Figure 3.3.5-1 shows the land use and vegetation of the site and associated facility at a scale of 1:12,000. Land uses and vegetation communities are described in the following ER sections:

- ER 2.2.1.1 Land Use
- ER 2.4.1.1.1 Existing Cover Types
- ER 2.4.1.2 Associated Facilities

3.3.6 ECOLOGY

Important flora and fauna identified on and in the vicinity of the LNP site and associated facilities include recreationally valuable species, as well as state and federally listed threatened and endangered species. These important species are addressed in the following ER sections:

- ER 2.4.1.1.3 Important Species
- ER 2.4.2.3.6.1 Threatened and Endangered Species

3.3.6.1 Species-Environmental Relationships

Wildlife species and their relationships to terrestrial and aquatic habitats on and in the vicinity of the LNP site are addressed in the following ER sections:

- ER 2.4.1.1.2 Wildlife Resources
- ER 2.4.1.1.3 Important Species
- ER 2.4.2.3.6 Important Species and Habitats

3.3.6.2 Preexisting Stresses

Natural ecosystems on and in the area surrounding the LNP site and associated facilities have been modified through a variety of anthropogenic and natural influences. The predominant pre-existing environmental stresses are associated with the prolonged silvicultural operations that altered landscape features and successional patterns on-site. These environmental stresses and others are discussed in the following ER sections:

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- ER 2.4.1.1.6** Preexisting Environmental Stresses
- ER 2.4.2.4** Biological and Anthropogenic Stressors

3.3.6.3 Measurement Programs

Pre-application ecological monitoring programs were designed and implemented to establish baseline characterizations of ecological resources on and in the vicinity of the LNP site and associated facilities. Pre-application monitoring for terrestrial and aquatic resources is addressed in the following ER sections:

- ER 6.5.1.1** Preapplication Terrestrial Ecology Monitoring
- ER 6.5.2.1** Preapplication Aquatic Ecology Monitoring

3.3.7 METEOROLOGY AND AMBIENT AIR QUALITY

The meteorology, climatology, and ambient air quality of the site, site vicinity, and the surrounding region are described in the following ER section:

- ER 2.7** Meteorology and Air Quality

3.3.7.1 Meteorology

The meteorology and climatology of the area surrounding the LNP site are discussed in the following ER sections:

- ER 2.7.1** General Climate
- ER 2.7.3** Severe Weather
- ER 2.7.3.6** Effects of Global Climate Change on Regional Climatology

In addition, site-specific meteorology of the project site, based on the results of a comprehensive on-site meteorological monitoring program, is described in the following ER section:

- ER 2.7.4** Local Meteorology

3.3.7.2 Ambient Air Quality

The ambient air quality of the region surrounding the LNP site is described in the following ER sections:

- ER 2.7.2** Regional Air Quality
- ER 2.7.3.5** Inversions and High Air Pollution Potential

3.3.7.2.1 Meteorological Monitoring

Progress Energy has conducted a comprehensive on-site meteorological monitoring program on the LNP project site since February 1, 2007. A description of this monitoring program is provided in the following ER sections:

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ER 2.7.5 On-Site Meteorological Measurements Program
ER 6.4 Meteorological Monitoring

3.3.8 AMBIENT NOISE

The LNP site is located within a sparsely developed rural area with no significant existing sources of noise other than rural roadways and highways, widely dispersed light commercial activities, and limited aircraft flyovers attributable to local airports in the region. The distance from the center of the site (where the main plant equipment will be located) to the nearest roadway (U.S. Highway 19) is approximately 1 mi. to the west. An ambient noise monitoring survey was performed to quantify ambient background noise levels in the vicinity of the project site. The background noise measurement survey was conducted in December 2007, with noise measurements being made over a 3-day period. Because of the large size of the project site and the relatively large distances between the main plant equipment and the facility boundaries, measurements were made at the north, east, and west boundaries of the main project site, as well as at the south end of the proposed pipeline corridor and heavy haul road near U.S. Highway 40 east. In addition, noise measurements were made in the vicinity of the proposed cooling water pump station adjacent to the Cross Florida Barge Canal (CFBC). The ambient background noise measurement program is described in detail in a report entitled "Noise Assessment of Proposed Levy Nuclear Plant", dated March 10, 2008. A copy of this report is provided as SCA Appendix 10.8.

The results of the background noise survey indicate that ambient noise levels in the area can be characterized as very low and typical for a rural area with few existing noise sources. More specifically, L_{eq} noise levels (that is, equivalent sound pressure levels averaged over the sampling period) and L_{90} noise levels (that is, the sound level exceeded 90 percent of the time during the measurement period excluding transient/anomalous noise levels) were observed to occur over the following ranges:

L_{eq}	20 to 40 dBA	(site boundaries away from roadways)
L_{90}	19 to 33 dBA	(site boundaries away from roadways)
L_{eq}	28 to 63 dBA	(site boundaries and locations near roadways)
L_{90}	21 to 42 dBA	(site boundaries and locations near roadways)

More details on the noise measurements, including tabulations of all measurements and charts illustrating noise levels as a function of time during the survey, are provided in the Noise Assessment Report (see SCA Appendix 10.8).

3.3.9 OTHER ENVIRONMENTAL FEATURES

No additional information required.

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3.3.10 REFERENCES

Arthur, J.D., R.A. Lee, and L. Li. 2001. "Lithostratigraphic and Hydrostratigraphic Cross Sections through Levy-Marion to Pasco Counties, Southwest Florida," Florida Geological Society Open-File Report 81.

Fernald, E.A. and E.D. Purdum, editors. 1998. *Water Resources Atlas of Florida*. Institute of Science and Public Affairs, Florida State University. Tallahassee, FL

Florida Division of Historical Resources, Florida Master Site File, Accessed October 2007.

Levy County Florida, Tax Assessors Office, 2008.

Miller, J.A. 1986. "Hydrogeologic Framework of the Floridan Aquifer System in Florida and in Parts of Georgia, Alabama, and South Carolina," Regional Aquifer-System Analysis, U.S. Geological Survey Professional Paper 1403-B (includes 33 plates).

Scott, T.M. 2001. "Text to Accompany the Geologic Map of Florida," Florida Geological Survey Open-File Report 80.

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**Table 3.1-1
LNP Adjacent Property Owners**

Map Key #	Parcel Number	Owner	Type
23199	0716170384000100	MCBRIDE ROBIN	Timberland site index 70 to 79
23200	0716170384200000	LEVINS RICHARD M & VONDA Z	Timberland site index 80 to 89
23202	0816170385000000	TIITF/AG FORESTRY	Forest, parks, recreational areas
25029	0716170384500000	SMITH DEBORAH & ROBERT K	Timberland site index 80 to 89
25030	1816170386800100	MCBRIDE ROBIN	Timberland site index 70 to 79
25031	1816170386800000	LEVINS RICHARD M & VONDA Z	Timberland site index 80 to 89
41798	2416160290400000	ROSS HAROLD	Timberland site index 80 to 89
41802	2416160290500000	LYBASS JAMES H JR FAMILY LLC	Timberland site index 70 to 79
46598	0716171436501600	BAYLESS MILDRED M - TRUSTEE-	Timberland site index 90 and above
46600	0716171436501600	BAYLESS MILDRED M - TRUSTEE-	Timberland site index 90 and above
46730	0816170384900000	TIITF/FORESTRY-DEPT OF AG	Forest, parks, recreational areas
46735	0716170384800000	ROBINSON LEVAUGHN F -TR-	Timberland site index 70 to 79
46748	1716170386600000	ROBINSON ESTATES INC	Timberland site index 70 to 79
46751	1816170386800100	MCBRIDE ROBIN	Timberland site index 70 to 79
46757	1316160286400000	ROBINSON LEVAUGHN F -LIFE EST-	Grazing land soil capability Class I
46763	1316160286500000	PROGRESS ENERGY FLORIDA	Timberland site index 80 to 89
46961	2016170387000000	ROBINSON ESTATES INC	Timberland site index 70 to 79
46976	2516160290900000	ROSS HAROLD	Timberland site index 80 to 89
46978	2916170388900000	ROBINSON ESTATES INC	Timberland site index 80 to 89
46995	2916170389000000	PROGRESS ENERGY FLORIDA	Timberland site index 70 to 79
47376	3216170389600000	PROGRESS ENERGY FLORIDA	Timberland site index 70 to 79
47380	3116170389400000	PROGRESS ENERGY FLORIDA	Timberland site index 70 to 79
48347	3616160299800000	ROSS HAROLD	Timberland site index 80 to 89

Source: (Levy County Florida, 2008).

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**Table 3.2-1
Local, Regional, State, or Federal Areas within a 5-Mi. Radius of the LNP
Site**

Feature Type	Present? (Yes / No)	Features	Environmental Report Reference Section
National parks, forests, seashores, wildlife refuges, wilderness areas, memorials, monuments, marine sanctuaries, estuarine sanctuaries	No	--	--
RARE (Roadless Area Review and Evaluation) areas	No	--	--
National wild and scenic rivers	No	--	--
Critical habitat of endangered species	No	--	--
State parks, forests, game management areas	Yes	Goethe State Forest Crystal River Preserve State Park	ER 2.2.1.4 Recreational and Visually Sensitive Areas ER 2.5.2.7 Recreation and Aesthetics
Areas of critical state concern	No		
Conservation and recreation lands	Yes	South Goethe Parcel (Florida Forever Priority Acquisition) Marjorie Harris Carr Cross Florida Greenway State Recreation and Conservation Area • Inglis Spillway (Day Use Area) • Inglis Island Trail • Felburn Park • Withlacoochee Bay Trail	ER 2.2.1.4 Recreational and Visually Sensitive Areas ER 2.5.2.7 Recreation and Aesthetics
Save Our Rivers lands	No	--	--
State archaeological landmarks, landmark zones, and Indian Reservations	No	--	--
Aquatic preserves, Outstanding Florida Waters (OFWs), Florida springs, Florida wild and scenic rivers	Yes	Withlacoochee River (OFW); Lake Rousseau (OFW)	ER 2.2.1.3 Waterways and Transportation Corridors
County parks or special management areas established by law	No	--	--
Military lands	No	--	ER 2.2.1.1 Land Use

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**Table 3.2-2
Potential Leases, Easements and ROW Potentially Affected**

Feature	Type	Potential Crossing Location
U.S. Highway 19	Road	Adjacent to Cross Florida Barge Canal
SR 40	Road	North of Inglis Lock
County Road 336	Road	East of LNP site
West Canal Berm Road	Road	To Be Determined
Cross Florida Barge Canal	Water	2.75 mi. west of U.S. Highway 19
Pipeline	Pipeline	To Be Determined
Railroad	Railroad	To Be Determined
State Lands	Public Lands	Various

**Table 3.2.6-1
Previously Surveyed Structures within a 5-Mi. Radius of the LNP Site**

Site ID#	Site Name	County	Property Type	Status
CI00338	Sportsman Fish Camp Log Cabin	Citrus	Residence	Not Evaluated by SHPO
CI00339	Fish Camp Cabin	Citrus	Residence	Not Evaluated by SHPO
LV00490	Mashburn House	Levy	Residence	Not Evaluated by SHPO
LV00661	Robinson Family Cemetery	Levy	Cemetery	Not Evaluated by SHPO
LV00659	King Family Cemetery	Levy	Cemetery	Not Evaluated by SHPO
LV00660	Priest Family Cemetery	Levy	Cemetery	Not Evaluated by SHPO
LV00675	Hawthorne Cemetery	Levy	Cemetery	Not Evaluated by SHPO

Source: (Florida Division of Historical Resources, 2007)

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**Table 3.3.3-1 (Sheet 1 of 8)
Water Management District Permitted Wells**

Number of Well Permits by Well Use Type												
County	Township	Range	Section	Public				Essential Services (Fire Protection)				Other
				Domestic	Supply	Irrigation	Industrial	Mining	Power	Livestock		
Citrus	16	18	31	1								
	17	16	3	1								
	17	16	4	11		3						28
	17	16	5	6		3						1
	17	16	8	3								24
	17	16	9							1		38
	17	16	10	6	1		1	1				10
	17	16	11	7	7	1						4
	17	16	12	36								7
	17	16	13	43			1					1
	17	16	14	1		1						
	17	16	15	2								2
	17	16	16	1								
	17	16	23			2						1
	17	16	24	30	1	1						
	17	17	1	100		2						6
	17	17	2	15								1
	17	17	7	10								20
	17	17	9	74	3	2						1
	17	17	10	109		1						2

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**Table 3.3.3-1 (Sheet 2 of 8)
Water Management District Permitted Wells**

		Number of Well Permits by Well Use Type										
County	Township	Range	Section	Domestic	Public Supply	Irrigation	Industrial	Mining	Power	Livestock	Essential Services (Fire Protection)	Other
Citrus cont.	17	17	11	75	4	2					1	16
	17	17	12	65		2						2
	17	17	13	26		1						1
	17	17	14	57	2	1						2
	17	17	15	115	2					1		2
	17	17	16	104		1						2
	17	17	17	22								3
	17	17	18	43								3
	17	17	19	103	1	1						7
	17	17	20	87								
	17	17	21	154			4			1		4
	17	17	22	85	1	1	2					1
Levy	17	18	6	99	2	2		1				9
	15	16	25									1
	15	16	26									1
	15	16	27									1
	15	17	19									1
	15	17	22	1								1

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**Table 3.3.3-1 (Sheet 3 of 8)
Water Management District Permitted Wells**

County	Township	Range	Section	Number of Well Permits by Well Use Type							Other
				Domestic	Public Supply	Irrigation	Industrial	Mining	Power	Livestock	Essential Services (Fire Protection)
Levy cont.	15	17	23	24							1
	15	17	24	14		1					
	15	17	25	40							
	15	17	26	17							
	15	17	27			1					
	15	17	29								1
	15	17	34	1							3
	15	17	35		1						
	15	17	36	1							
	16	16	1	5	1	1					
	16	16	2	4							
	16	16	3	11		1					3
	16	16	4	4		1					
	16	16	5	2		1					
	16	16	8	5							4
	16	16	10	1	1	1					
	16	16	12	6		1					
	16	16	13	12							4
	16	16	17								1

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**Table 3.3.3-1 (Sheet 4 of 8)
Water Management District Permitted Wells**

County	Township	Range	Section	Number of Well Permits by Well Use Type							Other							
				Domestic	Public Supply	Irrigation	Industrial	Mining	Power	Livestock		Essential Services (Fire Protection)						
Levy cont.	16	16	20	2														
	16	16	21	6														
	16	16	23	1		1												
	16	16	24	1		1												
	16	16	25	10	2													
	16	16	26	3	1													
	16	16	27	2														
	16	16	28	5														1
	16	16	29			1												
	16	16	32	12			1								1			9
	16	16	33	13		3	2											2
	16	16	34	71		1	2		1									3
	16	16	35	31		1	1					1						
	16	16	36	8														
	16	17	1	7														
	16	17	2	8		1												
	16	17	3	7		1	4											1
	16	17	4	5			1											
	16	17	5	7														2

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**Table 3.3.3-1 (Sheet 5 of 8)
Water Management District Permitted Wells**

County	Township	Range	Section	Number of Well Permits by Well Use Type							Essential Services (Fire Protection)	Other
				Domestic	Public Supply	Irrigation	Industrial	Mining	Power	Livestock		
Levy cont.	16	17	6	41	2	3						1
	16	17	7	11						1		
	16	17	8									3
	16	17	10	2								
	16	17	11	3								
	16	17	12	5								
	16	17	13	4								
	16	17	14	1								
	16	17	15	1								
	16	17	16	2								
	16	17	17	1								
	16	17	18	6								
	16	17	19	1								12
	16	17	21	4								7
	16	17	22	1								
	16	17	23	1								
	16	17	24	3								1
	16	17	25	3								
	16	17	26	6								

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**Table 3.3.3-1 (Sheet 6 of 8)
Water Management District Permitted Wells**

				Number of Well Permits by Well Use Type									
County	Township	Range	Section	Public			Essential Services (Fire Protection)						
				Domestic	Supply	Irrigation	Industrial	Mining	Power	Livestock	Other		
Levy cont.	16	17	27										3
	16	17	28	2									
	16	17	29	1									
	16	17	30	9									25
	16	17	31	5									
	16	17	32	4		1							
	16	17	33	45									
	16	17	34	101			3						2
	16	17	35	7									
	16	17	36	34	1	1							1
	17	16	1	44	4	4			1				12
	17	16	2	41		8					1		7
	17	16	3	55	7	5			1				39
	17	16	4	59	1	3							23
	17	16	5	36			4						39
	17	17	2	99			3						2
	17	17	3	54		1							1
	17	17	4	38		2							1
	17	17	5	23									2

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**Table 3.3.3-1 (Sheet 7 of 8)
Water Management District Permitted Wells**

Number of Well Permits by Well Use Type												
County	Township	Range	Section	Public				Essential Services (Fire Protection)				
				Domestic	Supply	Irrigation	Industrial	Mining	Power	Livestock	Other	
Levy cont.	17	17	6	33	2	2						1
	17	17	7	18	1							
	17	17	8	5								4
	17	17	9	1								
Marion	15	18	31	43								
	16	18	6	8		2						
	16	18	7	5								
	16	18	18	4								
	16	18	19	3	1							
Sumter	16	18	30	7		2						
	16	18	31	33		3						4
	16	21	33	57		42						2
	18	20	1	17								
	18	20	2	8		1						
	18	20	3	3								
	18	20	11	6		1						
	18	20	12	5								1

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**Table 3.3.3-1 (Sheet 8 of 8)
Water Management District Permitted Wells**

		Number of Well Permits by Well Use Type										
County	Township	Range	Section	Domestic	Public Supply	Irrigation	Industrial	Mining	Power	Livestock	Essential Services (Fire Protection)	Other
Sumter cont.	18	20	13	1								
	18	20	23	7								3
	18	20	24	12		1						
	18	20	25	4								1
	18	21	5	3								
	18	21	6	2								
	18	21	7	2								
Sumter Total				70		3						5
Total SWFWMD				41,484	995	4637	43	26	12	271	27	6175

Notes:

Domestic well use category includes permits for "Domestic" and "Repair Domestic" well use types.

Public Supply well use category includes permits for "Public Supply" and "Repair Public Supply" well use types.

Irrigation well use category includes permits for "Irrigation" and "Repair Irrigation" well use types.

Other well use category includes permits for "Air Conditioning Supply - Heat Pump", "Aquaculture", "Back Plugged", "Geothermal Well", "Grounding Rod", "Injection Well", "Observation or Monitor Well", "Plugged", "Recovery of Contaminants", "Repair or Deepen (Use not Specified)", "Return Air/Heat", "Sealing Water", "Test Well/Piezometer", and unspecified well use types.

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**Table 3.3.3-2 (Sheet 1 of 2)
Water Management District Permitted Wells within 1 Mi. of the LNP Site**

				Number of Well Permits by Well Use Type											
County	Township	Range	Section	Domestic	Public			Irrigation	Industrial	Mining	Power	Livestock	Essential Services (Fire Protection)	Other	
					Supply	Water	Water								
Levy	16	16	1	5	1			1							
	16	16	12	6				1							
	16	16	13	12										4	
	16	16	24	1				1							
	16	16	25	10	2										
	16	16	36	8											
	16	17	5	7										2	
	16	17	6	41	2			3						1	
	16	17	7	11								1			
	16	17	8											3	
	16	17	16	2											
	16	17	17	1											
	16	17	18	6											
	16	17	19	1										12	
	16	17	21	4										7	
	16	17	28	2											
	16	17	29	1											

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**Table 3.3.3-2 (Sheet 2 of 2)
Water Management District Permitted Wells within 1 Mi. of the LNP Site**

		Number of Well Permits by Well Use Type										
County	Township	Range	Section	Public				Essential				Other
				Domestic	Supply	Irrigation	Industrial	Mining	Power	Livestock	Services (Fire Protection)	
Levy cont.	16	17	30	9								25
	16	17	31	5								
	16	17	32	4		1						
	16	17	33	45								

Notes:

Domestic well use category includes permits for "Domestic" and "Repair Domestic" well use types.

Public Supply well use category includes permits for "Public Supply" and "Repair Public Supply" well use types.

Irrigation well use category includes permits for "Irrigation" and "Repair Irrigation" well use types.

Other well use category includes permits for "Air Conditioning Supply - Heat Pump", "Aquaculture", "Back Plugged", "Geothermal Well", "Grounding Rod", "Injection Well", "Observation or Monitor Well", "Plugged", "Recovery of Contaminants", "Repair or Deepen (Use not Specified)", "Return Air/Heat", "Sealing Water", "Test Well/Piezometer", and unspecified well use types.

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4.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

This chapter provides information on the operating plant and directly associated facilities, including all linear facilities except electrical transmission lines, which are addressed in Chapter 9 of the SCA. Estimates of the character and magnitude of the plant discharges and plant-related systems are described.

4.1 BACKGROUND

The LNP will consist of two pressurized water reactors (PWR), LNP 1 and 2. These units are based on the AP1000 standard design, as certified by the NRC. Since this is a standard design, much of the site equipment is specified by Westinghouse. The one major exception is the selection of reactor cooling technology. A discussion of plant cooling technology selection is located in the following ER section:

ER 9.4 Alternative Plant and Transmission Systems

4.2 SITE LAYOUT

Detailed descriptions of the site and the conceptual building layout, plant perimeter, makeup water intake structure and pumphouse, makeup water pipeline corridor, blowdown pipeline corridor, railroad corridor, and heavy haul road are provided in the following ER sections:

ER 2.1 Station Location

ER 2.3 Water

ER 3.1 External Appearance and Plant Layout

The visibility of the plant and visible emissions from the plant are described in the following ER sections:

ER 5.8.1.2 Air Quality

ER 5.8.1.3 Aesthetic Disturbances

Liquid and gaseous wastes, discharges, and emissions are described in the following ER sections:

ER 3.6 Nonradioactive Waste Management Systems

4.3 FUEL

A discussion on the proposed nuclear fuel and its characteristics is provided in the following ER section:

ER 3.2 Reactor Power Conversion System

Information regarding the transportation and storage of the nuclear fuel is provided in the following ER section:

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ER 3.8 Transportation of Radioactive Materials

Since the LNP is a nuclear-fueled power generating facility, fuel quality and use of alternative or supplemental fuels is not applicable for inclusion in this SCA.

The LNP will also use a relatively small amount of diesel fuel in its standby diesel generators, ancillary generators, and fire pump engines, primarily during non-emergency related maintenance and reliability testing events. The fuel that will be used will be high quality diesel fuel, with a low ash content and a very low sulfur content (i.e., 0.05 percent or less), consistent with the information in the LNP air permit application (refer to Appendix 10.2.5 Prevention of Significant Deterioration Permit Application). The diesel fuel will be stored in point-of-use storage tanks and delivered to the site on an as-needed basis by truck. More information is provided in the following sections of the ER:

- ER 3.6.3.1.1** Diesel Generators
- ER 3.6.3.1.2** Fuel Storage Tanks
- ER 3.6.3.1.3** Diesel-Driven Fire Pumps

4.4 AIR EMISSIONS AND CONTROLS

4.4.1 AIR EMISSIONS UNITS

As a nuclear-fueled power generating facility, the LNP will have few sources of air emissions. With the exception of some relatively small emergency power generating equipment that will be installed for use in the event of an unanticipated plant shutdown, the plant will not have any significant sources of emissions resulting from the combustion of fossil or other fuels.

The primary source of air emissions at the LNP will be the mechanical draft cooling towers, which will emit water vapor and particulate matter (PM) to the atmosphere. PM emissions from the cooling towers will consist of naturally occurring dissolved and suspended solids in the cooling tower circulating water that will be emitted with water droplets that become airborne as cooling tower "drift."

There will also be four diesel-powered standby emergency generators, four small ancillary diesel-powered generators, and two diesel-powered fire pumps. The diesel-powered emergency equipment will typically be operated less than 50 hours per year for non-emergency operations to perform reliability testing and maintenance. Descriptions of these air emissions units are provided in the following ER sections:

- ER 3.6.3.1** Gaseous Effluents
- ER 5.8.1.2** Air Quality

The air emissions from the LNP will be almost entirely due to the operation of the mechanical draft cooling towers. PM emissions from the cooling towers will

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exceed the State of Florida's Prevention of Significant Deterioration (PSD) review threshold of 250 tons per year (tpy); therefore, an air construction permit under the PSD permitting program will be required. The emissions of all other pollutants (that is, PM-10, sulphur dioxide [SO₂], nitrogen oxide [NO_x], carbon monoxide [CO], and volatile organic compound [VOC]) will not exceed the PSD permit thresholds, so PSD review will not be required for those pollutants. A more detailed discussion of the air emissions from the plant can be found in the facility's PSD permit application (see SCA Appendix 10.2.5).

4.4.2 AIR EMISSION CONTROLS

The primary source of emissions at the LNP will be the mechanical draft cooling towers, which will emit PM to the atmosphere. Although the primary (and the only visible) emissions from the cooling towers will be water vapor, PM emissions in the form of dissolved and suspended solids in the cooling tower circulating water system will be emitted as cooling tower "drift" (that is, water droplets that are entrained and forced into the exhaust stream of the cooling tower). The LNP will use the industry standard method for minimizing cooling tower drift loss to the atmosphere, employing high efficiency mist eliminators that are designed to coalesce and capture water droplets before they are emitted and return them to the circulating water.

The emergency generators and fire pump engines that will be installed at the LNP will incorporate industry-standard emission-efficient engines that will be specified to meet current U.S. Environmental Protection Agency (USEPA) requirements at the time of procurement of the equipment. The generators will not be subject to the National Emission Standard for Hazardous Air Pollutants (NESHAPs) for Stationary Reciprocating Internal Combustion Engines (RICE) under 40 CFR 63, Subpart ZZZZ, because the LNP will not be a major source of Hazardous Air Pollutant (HAP) emissions.

Because the LNP will not generate power by combusting any fuel, there will be no emissions of any greenhouse gas (including carbon dioxide [CO₂]) associated with power generation. The only fuel combustion will be limited to diesel fuel combustion associated with the testing and maintenance of emergency standby equipment. This equipment will be operated less than 50 hours per year for non-emergency use.

A more detailed description of the proposed emission controls is provided in the PSD permit application (see SCA Appendix 10.2.5).

4.4.3 BEST AVAILABLE CONTROL TECHNOLOGY

PM emissions from the mechanical draft cooling towers will be controlled by using high efficiency mist eliminators to limit the amount of "drift" leaving the towers. The mist eliminators will be designed to limit drift to 0.0005 percent of the circulating water flow rate in the towers. The use of high efficiency mist eliminators has been determined to be representative of Best Available Control Technology (BACT) for the type of cooling towers being proposed at the LNP.

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The emergency generators and fire pump engines will use clean low sulfur diesel fuel and good combustion techniques to minimize emissions. These engines will be purchased based on the specification that they will meet the USEPA non-road emission standards in force at the time of procurement, which at this time are specified in 40 CFR, Subpart IIII. Conformance with these standards is proposed as BACT for these engines.

A more detailed discussion of emission control technology and BACT is provided in the PSD permit application (see SCA Appendix 10.2.5).

4.4.4 DESIGN DATA FOR CONTROL EQUIPMENT

Additional discussion regarding emission control design is provided in the PSD permit application for the LNP (see SCA Appendix 10.2.5).

4.4.5 DESIGN PHILOSOPHY

As a nuclear-fueled power generating facility, combustion-related air emissions during plant operation are expected to be almost non-existent. The development of the LNP is a direct response to the push for new and cleaner generating capacity. The operation of the LNP will not emit any “greenhouse gases” or produce any significant emissions that will threaten or contribute to a degradation of ambient air quality at any location.

4.5 PLANT WATER USE

A detailed description of plant water use and water balance is provided in the following ER section:

ER 3.3 Plant Water Use

The vast majority of the water that will be used by the LNP will be for steam condenser cooling. Cooling tower makeup water from the Gulf of Mexico will be withdrawn from the Cross Florida Barge Canal (CFBC). Potable water will be needed for plant use and will be obtained from on-site groundwater sources. A portion of the groundwater will be demineralized for internal component needs. Wastewater (backwash and blowdown) from reactor and plant operations will be treated to technology based effluent limitations (FAC 62-600.420) and discharged to the cooling tower basin for reuse within the cooling towers. Discharge from the cooling tower (blowdown) will be into the Crystal River Energy Complex (CREC) discharge canal. Treated sanitary wastewater will also be discharged to the cooling water basin for reuse.

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4.5.1 HEAT DISSIPATION SYSTEM

4.5.1.1 System Design

Descriptions of the LNP cooling system are provided in the following ER sections:

- ER 3.3.1.1** Circulating Water System (Normal Plant Heat Sink)
- ER 3.4** Cooling System
- ER 5.3.2** Discharge System
- ER 5.3.2.1** Thermal Description and Physical Impacts
- ER 5.3.3** Atmospheric Heat Dissipation System
- ER 5.3.3.1** Heat Dissipation to the Atmosphere

No ponds will be used for cooling. The pipelines between LNP and the CREC discharge canal will be approximately 13 mi. long, resulting in a travel time of several hours. The blowdown pipeline will consist of two 54-inch diameter HDPE pipes with a design velocity of approximately 4 to 4.5 feet per second. While additional cooling will occur in the buried pipelines, this cooling is not needed to comply with the CREC permit limits.

4.5.1.2 Source of Cooling Water

The source, quantity, and quality of the cooling water are provided in the following ER sections:

- ER 2.3.3.1.4** Cross Florida Barge Canal [Water Quality]
- ER 3.4** Cooling System

The largest supply of cooling water will be saltwater from the Gulf of Mexico via the CFBC. A new intake structure will be constructed south of LNP and makeup water will be pumped to the cooling tower basins (see Appendix 10.2.2 for 316(b) analysis). However, additional cooling water is needed for the reactor turbines (called the service water system) and it cannot be saltwater. Freshwater from the groundwater supply will be used for the service water cooling system.

4.5.1.3 Dilution System

No dilution system is proposed. LNP cooling tower blowdown water will be pumped to the existing CREC discharge canal. The LNP discharge will be permitted to discharge into the CREC system as an internal point of discharge. The CREC discharge canal is currently permitted for discharge (Crystal River Plant Units 1, 2, and 3—Permit Number FL0000159, Crystal River Plant Unit 4 and 5—Permit Number FL0036366). The CREC point of discharge is located at latitude 28°58'00" N, longitude 82°41'40" W. One of the CREC permits will be modified to include the LNP discharge.

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4.5.1.4 Blowdown, Screened Organisms, and Trash Disposal

Descriptions of the blowdown system are contained in the following ER sections:

- ER 3.1.1.7 Blowdown Pipelines
- ER 3.4.1.3 Heat Generated, Dissipated to the Atmosphere, and
Released in Liquid Discharges

Organism and trash removal from the cooling water intake system (CWIS) will be performed in accordance with the requirements of the 316(b) and National Pollutant Discharge Elimination System (NPDES) Permits (see SCA Appendices 10.2.1 and 10.2.2, respectively). As currently designed, trash and screened organisms will be removed by a high pressure spray wash and deposited into a collection dumpster. Collected debris and organisms will be removed by a contractor and disposed of in a licensed landfill.

4.5.1.5 Injection Wells

No injection wells are proposed for the disposal of cooling water, boiler blowdown, or any other type of waste.

4.5.2 DOMESTIC/SANITARY WASTEWATER

Sanitary wastewater systems that will be used at the LNP are described in the following ER section:

- ER 3.6.2 Sanitary System Effluents

A package wastewater treatment plant will be designed to provide secondary treatment levels. During its operational stage the LNP population will be approximately 800 people. During its construction stage, up to 3,500 people may be at the site. Sanitary wastes during construction will be handled off-site prior to construction of on-site facilities.

4.5.3 POTABLE WATER SYSTEMS

Potable water systems that will be used at the LNP are described in the following ER sections:

- ER 2.3.2.3 Groundwater Use
- ER 3.3.1.4 Potable Water System
- ER 3.3.1.5 Potable Water System Operation
- ER 5.2.1.4 Groundwater

A site-specific raw water system will use groundwater from up to four water supply wells located north of LNP 2, supplying makeup to service water cooling tower, supply to fire water tanks, supply to a potable water tank, and supply to a demineralized water tank. Average daily use of 1.3 million gallons per day (mgd)

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is estimated, with a max use of 5.8 mgd. During its operational stage, the LNP population to be served by potable water will be approximately 800 people. During its construction stage, up to 3,500 people may be at the site.

4.5.4 PROCESS WATER SYSTEMS

Process water systems are described in the following ER sections:

- ER 3.3 Plant Water Use
- ER 3.6 Nonradioactive Waste Management Systems

Process water required for the LNP processes will be freshwater obtained from groundwater. This source will be treated by filtration and other processes to provide acceptable quality for the service water cooling system and for potable use. In addition, a portion of the freshwater needs to be demineralized for plant use. This system has not been designed at this time but is expected to be a combination of reverse osmosis membrane and electrodeionization systems. The wastes from the process water treatment systems will be treated in the settling basin prior to discharge into the cooling water system for further reuse. Expected chemicals resulting from the water treatment process are listed in [ER Table 3.3-3](#).

4.6 CHEMICAL AND BIOCIDES WASTE

Descriptions of plant waste streams and discharges from LNP operations are provided in the following ER section:

- ER 3.6.1 Effluents Containing Biocides or Chemicals

Note that discharges from the LNP site will be treated to meet 40 CFR 423.15 limitations for new source performance standards (NSPS). This requires that each waste stream meet the limitations set forth in this regulation prior to being combined with other flows for discharge.

4.7 SOLID AND HAZARDOUS WASTE

4.7.1 SOLID WASTES

Solid waste generated during plant operations is described in the following ER sections:

- ER 3.6.3.5 Solid Waste
- ER 5.5.1.2.1 Nonradioactive Solid Waste

Solid waste generated at the LNP site will be disposed of off-site at a permitted disposal landfill. Solid nonradioactive and nonhazardous waste may include office waste, aluminum cans, laboratory waste, glass, metals, and paper, and this waste will be collected from several on-site locations and deposited in dumpsters located throughout the site for vendor pickup and disposal.

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It is presently difficult to quantify the amount of these waste types that will be generated for the LNP. However, according to a study performed by the California Integrated Waste Management Board, employees typically generate approximately 4.8 kilograms (kg) (10.5 pounds [lb.]) of cold waste per employee per day, or conversely, 5.9 kg (13 lb.) of waste per 92 square meters (m²) (1000 square feet [ft.²]) of working area per day, in a commercial environment such as the LNP.

It is anticipated that approximately 800 people will be needed to operate the LNP, with an additional 800 workers needed every 18 months for 25 to 30 days to refuel the facility.

Using these estimates, the average annual amount of solid waste that will be generated is approximately 1617 tons.

$(800 \text{ employees} \times 10.5 \text{ lbs/day} \times 365 \text{ days/yr}) / 2000 \text{ lbs/ton} = 1533 \text{ tons/yr}$
 $(800 \text{ employees} \times 10.5 \text{ lb/day} \times 30 \text{ days} / 1.5 \text{ yrs}) / 2000 \text{ lbs/ton} = 84 \text{ tons/yr}$
Average annual amount of solid waste generated = $1533 + 84 = 1617 \text{ tons/yr}$

4.7.1.1 Prohibitions

Solid waste generated during plant operations will be collected in vendor provided containers and disposed of by vendors. There will be no on-site solid waste facilities that would be subject to Rule 62-701.300, F.A.C.

4.7.1.2 Waste Containment Design

Because no on-site waste disposal landfills will be associated with the LNP, waste containment design is not applicable to this project.

4.7.1.3 Leachate Control

There will be no on-site waste disposal, waste piles, or bulk storage areas requiring leachate management during the operation of the LNP.

4.7.1.4 Surface Water Control

There will be no on-site waste disposal, waste piles, or bulk storage areas requiring surface water control.

4.7.1.5 Geotechnical Investigation

Because no on-site waste disposal landfills will be associated with the LNP, geotechnical investigations associated with waste disposal are not applicable to this project.

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4.7.1.6 Water Quality Monitoring Plan

Because no on-site waste disposal landfills will be associated with the LNP, groundwater monitoring associated with waste disposal is not applicable to this project.

4.7.1.7 Closure Plan and Long-Term Care

Because no on-site waste disposal landfills will be associated with the LNP, closure associated with waste disposal is not applicable to this project.

4.7.1.8 Financial Assurance

Because no on-site waste disposal landfills will be associated with the LNP, financial assurance associated with waste disposal is not considered.

4.7.2 HAZARDOUS WASTE

Descriptions of the management and disposal of hazardous waste generated at the LNP are provided in the following ER sections:

ER 5.5.1.2.2	Hazardous Wastes
ER 5.5.3	Pollution Prevention and Waste Minimization Program

In addition to Resource Conservation and Recovery Act (RCRA) requirements, the Florida requirement for notification by hazardous waste generators will be complied with using Form 62-730.900(1)(b), FAC: 8700-12FL – Florida Notification of Regulated Waste Activity, effective date April 22, 2007.

4.8 ON-SITE DRAINAGE SYSTEM

The proposed on-site drainage system is described in the following ER sections:

ER 3.6.3.2	Stormwater
ER 5.2.1.5	Wetlands

SCA Figure 4.8-1 presents the conceptual grading and drainage of the LNP site, which is subdivided into Zones A through G. Zone A, located on the western side of LNP 2, drains west toward retention Pond A. Zone B, located north of LNP 2, drains north toward drainage ditches that direct flow toward retention Ponds A and C1. Zone C, located on the eastern side of LNP 2, drains north toward drainage ditches that direct flow toward retention Ponds B and C2. Zone D, located on the eastern side of LNP 1, drains east toward drainage ditches that direct flow toward retention Pond B. Zone E, located on the southern and western sides of LNP 1, drains south toward drainage ditches that direct flow to retention Pond B. Zone F, located northeast of LNP 1, drains east toward drainage ditches that direct flow toward retention Ponds B and C2. Zone G,

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located northeast of LNP 1, drains east toward drainage ditches that direct flow toward retention Pond B.

The LNP site is located in the SWFWMD. Treatment and management practices will conform to SWFWMD rules. An Environmental Resource Permit (ERP) application that addresses stormwater control is included as part of this SCA in Appendix 10.4.

4.9 HEAVY EQUIPMENT AND MATERIALS

Heavy equipment, such as cranes and plant components, will be shipped to the site by barge, rail, and/or truck. Limerock, aggregate, and soil to support site construction activities will be transported by rail car or truck. The specific methods to be employed have not yet been determined and will be contingent upon a number of factors, including availability for intended use, engineering feasibility, permitting, and relative cost.

Most of the fill material needed to create the power generation pad will be obtained on-site from excavations for the facilities. However, approximately 30 to 45 percent of the fill may need to be obtained from off-site borrow sources. This material needs to be a well-graded material that will be imported by truck from nearby sources. Fill will typically be excavated by backhoe and loaded into trucks and dumped, spread, and compacted at its final location. The fill requirements for the pad for LNP 1 are approximately 320,000 cubic yard and for LNP 2 are approximately 200,000 cubic yards.

The estimated total area of the developed portion of the site is estimated to be approximately 20 percent of the LNP site. Construction laydown areas have been preliminarily identified and are shown in the LNP 1 and 2 Site Plans located in the ERP (see SCA Appendix 10.4).

The adequacy of roads, railways, waterways, and bridges for the delivery of heavy equipment and materials will be determined prior to transport using engineering feasibility analyses, transportation studies, and detailed construction planning.

4.10 ASSOCIATED LINEAR FACILITIES

Linear facilities directly associated with the LNP will include the following:

- Heavy Haul Road – see SCA Section 4.10.1
- Cooling System Intake and Blowdown Pipelines – see SCA Section 4.10.2
- Railroad Spur – see SCA Section 4.10.3
- Access Roads – see SCA Section 4.10.4

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- Electrical transmission corridors – see SCA Chapter 9

4.10.1 HEAVY HAUL ROAD

4.10.1.1 Maps

The heavy haul road will provide a dedicated site access road for the delivery of major components of the LNP, including reactor vessels and major structural components. The road will be designed to accommodate the periodic delivery of particularly heavy and bulky components to the main reactor construction core area while minimizing impacts to existing area roads. The proposed route of the heavy haul road is shown on **ER Figure 2.1-2**.

4.10.1.2 Corridor

4.10.1.2.1 Description and Selection

The heavy haul road corridor was selected as the shortest direct route from the site construction area that avoids and/or minimizes wetland and ecological impacts. In addition, the heavy haul road was located to align with the electrical transmission corridor and connect to the Cross Florida Greenway Recreational Improvement Area (CFGRIA) access road located just south of County Road (CR) 40. The heavy haul road is collocated with the makeup and blowdown pipeline corridor. This collocation minimizes the total area of impact and is efficient for site access and egress. This corridor is shown on SCA Figure 4.10.1-1 and is described below.

The combined heavy haul road and pipeline corridor running from the plant site to the CFGRIA is 0.25 mi. in width. The width of the haul road ROW that will be developed within that corridor will be approximately 150 ft., including side slopes. The proposed corridor is slightly higher in elevation and has fewer wetland areas than other potential routes considered. The heavy haul road will connect to the CFGRIA access road and bridge just south of CR 40.

4.10.1.2.2 Social and Political Environment

The heavy haul road corridor is located entirely within Levy County. Information on governmental jurisdiction, zoning and land use, scenic cultural and natural landmarks, and archaeological sites in the site vicinity is provided in the following ER sections:

ER 2.5.2.2	Political Structure
ER 2.5.2.3	Local Land Use and Zoning
ER 2.5.2.4	Social Structure
ER 2.5.2.7	Recreation and Aesthetics
ER 2.5.3	Historic Properties
ER 2.5.3.2	Cultural Resource Investigations for the Property South of the LNP Site and Blowdown Pipeline Corridor
ER 2.5.3.3	Consultation

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ER 2.5.3.4 Previously Surveyed Properties

4.10.1.2.3 Biological and Physical Environment

Information describing vegetation, waters and wetlands, and current and proposed measurement and monitoring programs in the area of the proposed heavy haul road route is provided in the following ER sections:

- ER 2.4.1.2** Associated Facilities [Terrestrial Ecology]
- ER 2.4.2** Aquatic Ecology
- ER 2.4.2.3.6** Important Species and Habitats [Aquatic Ecology]
- ER 2.4.1.1.6** Preexisting Environmental Stresses [Terrestrial Ecology]
- ER 2.4.2.4** Biological and Anthropogenic Stressors [Aquatic Ecology]
- ER 6.5.1** Terrestrial Ecology and Land Use [Measurement and Monitoring Programs]
- ER 6.5.2** Aquatic Ecology [Measurement and Monitoring Programs]

4.10.1.3 Effects of ROW Preparation and Construction

The heavy haul road will be constructed by excavating existing soils to a depth of up to 2 ft. to remove organic matter. The roadway will then be backfilled with engineered soil and capped with a geotextile mat. Approximately 3 ft. of compacted gravel aggregate will cover the mat and form the road surface. The clearing and grubbed vegetation will be burned. Anything that cannot be burned will be hauled off-site to an approved upland disposal area. A joint application for an ERP for the LNP project is included in SCA Appendix 10.4.

No on-site disposal is anticipated. Solid waste generated during construction will be disposed of in an approved upland disposal facility. Construction waste may be taken to a temporary on-site spoils area prior to off-site disposal.

Information on potential changes to vegetation, wildlife, and aquatic species, impact on human populations, socioeconomic impacts, and archaeological features is provided in the following ER sections:

- ER 4.3.1.2** Associated Facilities [Terrestrial Ecosystems]
- ER 4.3.2** Aquatic Ecosystems
- ER 4.4** Socioeconomic Impacts
- ER 4.1.2.2** Off-Site Areas [Land Use Impacts]
- ER 4.1.3** Historic Properties

4.10.1.4 Post-Construction Impacts and Effects of Maintenance

The heavy haul roadway and associated stormwater systems will be maintained using established best management practices (BMPs). While the corridor will be collocated within a segment of the makeup and blowdown pipeline corridor, the ROW will be distinct, and multiple combined uses of the ROW are not under consideration.

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4.10.2 COOLING SYSTEM INTAKE AND BLOWDOWN PIPELINES

4.10.2.1 Maps

The proposed cooling water makeup pipeline corridor will be adjacent to the heavy haul road corridor as described in SCA Section 4.10.1. The cooling tower blowdown pipeline from the LNP site to CREC is shown on SCA Figure 4.10.2-1. The portion of the makeup and blowdown pipeline corridor between the LNP and the CFBC is also shown on **ER Figure 2.1-2**. The proposed pipeline corridor is located in Levy and Citrus counties.

4.10.2.2 Corridor

4.10.2.2.1 Description and Selection

The cooling water makeup and blowdown corridor was selected as the preferred alternative after an evaluation of several potential pipeline routes. This route provides direct access to the CFBC as a water source, as well as a partial route to the CREC discharge canal for the discharge of cooling tower blowdown water to the Gulf of Mexico. This routing of the makeup and blowdown pipelines was considered most favorable based on an assessment of both environmental and cost factors. In addition, portions of the pipeline corridor align with the electrical transmission corridor and heavy haul road, minimizing the area impacted and serving as an efficient method of combining various aspects of site access.

The makeup and blowdown corridor will contain four 54 in. diameter high-density polyethylene (HDPE) intake pipelines (two each for LNP 1 and LNP 2). The pipelines will run from the intake pumphouse at the CFBC to the cooling system pumps in the vicinity of the cooling towers. The corridor will also contain two 54 in. diameter HDPE blowdown lines (one each for LNP 1 and LNP 2) that will run from the cooling tower blowdown pumps to the discharge structure that will be located at the CREC discharge canal. The width of the pipeline ROW required to accommodate the six pipelines from the plant site to the CFBC will be about 150 ft. The width of the pipeline ROW (including an access roadway) between the CFBC pumphouse and the CREC discharge canal will be about 120 ft.

The proposed makeup and blowdown corridor is approximately 13 mi. in length and 0.25 mi. wide. It will extend south from the LNP site to the CFBC pumphouse, crossing the Inglis Lock Bypass Channel on an approximately 33-ft.-wide bridge about 8 ft. above the water surface, then in a westerly direction along the CFBC for 6 mi., then turning to the south along the western side of an existing PEF 230 kV transmission corridor, making westerly and then southerly turns near its southern terminus to enter the CREC and ultimately connect with the CREC discharge canal.

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4.10.2.2.2 Social and Political Environment

In the project vicinity, the Withlacoochee River serves as the boundary between Levy County to the north and Citrus County to the south. Approximately 5 mi. of the pipeline corridor is located in Levy County and 7.9 mi. in Citrus County. Approximately 10 mi. of the corridor are located on state lands managed by the Florida Office of Greenways and Trails (OGT). Information on governmental jurisdiction, zoning and land use, scenic, cultural, and natural landmarks, and archaeological sites in the vicinity of the proposed corridors is provided in the following ER sections:

- ER 2.5.2.2 Political Structure
- ER 2.5.2.3 Local Land Use and Zoning
- ER 2.5.2.4 Social Structure
- ER 2.5.2.7 Recreation and Aesthetics
- ER 2.5.3 Historic Properties
- ER 2.5.3.2 Cultural Resource Investigations for the Property South of the LNP Site and Blowdown Pipeline Corridor
- ER 2.5.3.3 Consultation
- ER 2.5.3.4 Previously Surveyed Properties

4.10.2.2.3 Biological and Physical Environment

Information describing vegetation, waters and wetlands, terrestrial and aquatic species, important ecological species, and current and proposed measurement and monitoring programs in the area of the proposed pipeline corridors is provided in the following ER sections:

- ER 2.4.1.1.6 Preexisting Environmental Stresses [Terrestrial Ecology]
- ER 2.4.1.2 Associated Facilities [Terrestrial Ecology]
- ER 2.4.2 Aquatic Ecology
- ER 2.4.2.3.6 Important Species and Habitats [Aquatic Ecology]
- ER 2.4.2.4 Biological and Anthropogenic Stressors [Aquatic Ecology]
- ER 6.5.1 Terrestrial Ecology and Land Use [Measurement and Monitoring Programs]
- ER 6.5.2 Aquatic Ecology (Measurement and Monitoring Programs)

4.10.2.3 Effects of ROW Preparation and Construction

All makeup and blowdown pipelines will be 54 in. outside diameter HDPE. All pipes will be installed using normal excavation and backfill techniques. Before any excavation occurs, all utilities in the area will be located and cleared. Pipelines will be buried to a minimum depth of 5 ft. Open cut techniques are proposed to cross State Road 40 East, following coordination with FDOT. All excavated areas will be restored to preconstruction contours and conditions. Pipelines will cross the Inglis Lock Bypass Channel on an approximate 33-ft.-wide utility bridge.

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For the subaqueous crossing of the CFBC, excavation and backfill will also be used, with the pipeline to be buried a minimum of 3 ft. below the depth of the canal bottom. Construction techniques and mitigative measures are identified further in the ERP application that has been prepared for the LNP project (see SCA Appendix 10.4).

Solid waste generated during construction will be disposed of in an approved upland disposal facility. Construction waste may be taken to a temporary on-site spoils area prior to for off-site disposal.

Information on potential changes to vegetation, wildlife and aquatic species, impact on human populations, socioeconomic impacts, and archaeological features is addressed in the following ER sections:

ER 4.1.2.2	Off-Site Areas
ER 4.1.3	Historic Properties
ER 4.3.1.2	Associated Facilities [Terrestrial Ecosystems]
ER 4.3.2.3	Cooling System Blowdown Discharge Pipeline [Aquatic Ecosystems]
ER 4.4	Socioeconomic Impacts
ER 4.4.2.6	Recreation

4.10.2.4 Post-Construction Impacts and Effects of Maintenance

Most of the proposed pipeline corridor is currently covered by sparse grasses with some low shrubs. The ROW area will be cleared prior to construction. Following construction, the ROW will be restored and maintained in a grassed condition to limit erosion.

There will be no public access to segments of the pipeline located on the site or along controlled corridors from the plant to the CFBC intake structure. Portions of the pipeline will be buried on land owned by the Florida Office of Greenways and Trails, and there will be minimal disruption of public access in these areas. Commercial fencing will be erected along the pipeline crossing of the Inglis Lock Bypass Channel and around the CFBC intake structure.

4.10.3 RAILROAD SPUR

4.10.3.1 Maps

The railroad spur will provide an effective method for the delivery of plant components and construction materials to the LNP site. The proposed railroad corridor is shown on SCA Figure 4.10.3-1. The proposed routing is also shown on **ER Figure 2.1-2**.

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4.10.3.2 Corridor

4.10.3.2.1 Description and Selection

The railroad spur will run from near the center of the LNP site, to a connection with the existing CSX railroad line at Dunnellon, partially along an abandoned rail bed currently owned by PEF. From the site boundary, the proposed corridor will run east along the southern boundary of Goethe State Forest, then in a generally northeasterly direction to a juncture with an existing CSX rail line north of Dunnellon, then following this path to Dunnellon. The proposed corridor crosses State Road 336 near the Levy-Marion county line and crosses U.S. Highway 41 north of Dunnellon. The width of the proposed railroad ROW is approximately 200 ft.

The rail corridor was selected as the most direct route that has the least impact on the environment and adjacent land owners. About 2 mi. of the rail corridor is located on-site. The length of the proposed line from the LNP site boundary to an interconnection point in Dunnellon is 10.8 mi.

4.10.3.2.2 Social and Political Environment

The proposed rail corridor is located in Levy and Marion counties. The western portion of the rail line, from the site boundary to the Levy county line, is 4.9 mi., while the eastern 5.9 mi. are located in Marion County. Information on governmental jurisdiction, zoning and land use, scenic, cultural and natural landmarks, and archaeological features is provided in the following ER sections:

- ER 2.5.2.2 Political Structure.
- ER 2.5.2.3 Local Land Use and Zoning
- ER 2.5.2.4 Social Structure
- ER 2.5.2.7 Recreation and Aesthetics
- ER 2.5.3 Historic Properties
- ER 2.5.3.2 Cultural Resource Investigations for the Property South of the LNP Site and Blowdown Pipeline Corridor
- ER 2.5.3.3 Consultation
- ER 2.5.3.4 Previously Surveyed Properties

4.10.3.2.3 Biological and Physical Environment

4.10.3.2.3.1 Vegetation

Information describing vegetation, waters and wetlands, terrestrial and aquatic species, important ecological species, and current and proposed measurement and monitoring programs in the area of the proposed rail corridor is provided in the following ER sections:

- ER 2.4.1.1.6 Preexisting Environmental Stresses [Terrestrial Ecology]
- ER 2.4.1.2 Associated Facilities [Terrestrial Ecology]
- ER 2.4.2.3.6 Important Species and Habitats [Aquatic Ecology]

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ER 2.4.2.4	Biological and Anthropogenic Stressors [Aquatic Ecology]
ER 6.5.1	Terrestrial Ecology and Land Use
ER 6.5.2	Aquatic Ecology

4.10.3.3 Effects of ROW Preparation and Construction

Standard construction techniques will be used for the rail spur and associated access roads. Construction will be in accordance with the standard specifications for the design and construction of roadways and private sidetracks.

In general, temporary and permanent sediment and erosion control measures will be installed within the limits of construction prior to disturbing the right-of-way area. The area where the rail spur subgrade will be located will be stripped of vegetation and topsoil prior to subgrade placement.

The rail line will be constructed by excavating existing soils to a depth of up to 2 ft. to remove organic matter. The rail line will then be backfilled with engineered soil and capped with a geotextile mat. Approximately 3 ft. of compacted gravel aggregate will cover the mat and form the surface upon which tracks will be laid. Construction techniques and mitigative measures are identified further in the ERP application (see SCA Appendix 10.4). The topsoil and organics will be removed and stockpiled to be reused as topsoil in grassed areas.

Solid waste generated during construction will be disposed of in an approved upland disposal facility. Construction waste may be taken to a temporary on-site spoils area prior to off-site disposal.

Information on potential changes to vegetation, wildlife and aquatic species, impact on human populations, socioeconomic impacts, and archaeological features is addressed in the following ER sections:

ER 4.1.2.2	Off-Site Areas
ER 4.1.3	Historic Properties
ER 4.3.1.2	Associated Facilities [Terrestrial Ecosystems]
ER 4.4	Socioeconomic Impacts
ER 4.4.2.6	Recreation

4.10.3.4 Post-Construction Impacts and Effects of Maintenance

4.10.3.4.1 Maintenance Techniques

Maintenance requirements are expected to be minimal due to limited track usage. They typically will involve weed control and routine inspections for track and rail soundness, switching integrity, and crossing equipment functionality. Maintenance will be in accordance with CSX Transportation's maintenance policies and performed under subcontract. Railroad operations will be performed by a short line rail operator.

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The LNP rail line will be dedicated to LNP operations, and multiple uses are not currently envisioned for this dedicated rail line. There will be no public usage of the rail lines.

4.10.4 SITE ACCESS ROADS

4.10.4.1 Description and Map Location

Two site access roads will be completed as part of the LNP. Both access roads will tie into U.S. Highway 19 west of the site and proceed east to the main plant area. Each access road will be about 65 ft. in width and will require an approximate ROW of 175 ft., including side slopes and swales. The site access roads are shown in the site plan included in the ERP application (see SCA Appendix 10.4). Access road corridors were selected to provide efficient site access and avoid wetland areas to the maximum practical extent.

4.10.4.1.1 Social and Political Environment

All access roads are located within Levy County. Information on governmental jurisdiction, zoning and land use, scenic, cultural and natural landmarks, and archaeological features is provided in the following ER sections:

- ER 2.5.2.2** Political Structure
- ER 2.5.2.3** Local Land Use and Zoning
- ER 2.5.2.4** Social Structure
- ER 2.5.2.7** Recreation and Aesthetics
- ER 2.5.3.2** Cultural Resource Investigations for the Property South of the LNP Site and Blowdown Pipeline Corridor
- ER 2.5.3.3** Consultation
- ER 2.5.3.4** Previously Surveyed Properties

4.10.4.1.2 Biological and Physical Environment

Information describing vegetation, waters and wetlands, terrestrial and aquatic species, important ecological species, and current and proposed measurement and monitoring programs in the vicinity of the proposed access roads is provided in the following ER sections:

- ER 2.4.1.1.6** Preexisting Environmental Stresses [Terrestrial Ecology]
- ER 2.4.1.2** Associated Facilities [Terrestrial Ecology]
- ER 2.4.2.3.6** Important Species and Habitats [Aquatic Ecology]
- ER 2.4.2.4** Biological and Anthropogenic Stressors [Aquatic Ecology]
- ER 6.5.1** Terrestrial Ecology and Land Use
- ER 6.5.2** Aquatic Ecology

4.10.4.2 Effects of ROW Preparation and Construction

The access roads will be constructed by excavating existing soils to a depth of up to 2 ft. to remove organic matter. The roadway will then be backfilled with

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engineered soil and capped with a geotextile mat. Approximately 3 ft. of compacted gravel aggregate will cover the mat and form the road surface. The surface of the access roads will include 9 inches of asphalt paving underlain by 12 inches of aggregate base.

An ERP application for the LNP project, including access roads, is included as SCA Appendix 10.4.

4.10.4.2.1 Solid Wastes

Solid waste generated during construction will be disposed of in an approved upland disposal facility. Construction waste may be taken to a temporary on-site spoils area prior to off-site disposal.

Information on potential changes to vegetation, wildlife and aquatic species, impact on human populations, socioeconomic impacts, and archaeological features is addressed in the following ER sections:

- ER 4.1.2.2 Off-Site Areas
- ER 4.1.3 Historic Properties
- ER 4.3.1.2 Associated Facilities [Terrestrial Ecosystems]
- ER 4.4.2.6 Recreation

4.10.4.3 Post-Construction Impacts and Effects of Maintenance

Maintenance activities will be those typical of secondary access roads. Roadways will be maintained and appropriately signed. Swales and stormwater management features will be maintained and meet all established BMPs and permit criteria.

Entry to the access roads will be strictly controlled to maintain site security. Open public access to this access road system will not be permitted.

4.11 EMERGENCY DISASTER PREPAREDNESS PLANS

An Emergency Disaster Preparedness Plan will be developed for the LNP and submitted to the Florida Department of Community Affairs for review and approval prior to commercial operation of the LNP.

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**5.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND PLANT
AND ASSOCIATED FACILITIES CONSTRUCTION**

This chapter discusses the expected environmental effects of site preparation and construction of the LNP and associated facilities. The construction of the LNP will result in an industrial facility, as described in SCA Chapter 4, which is similar in general appearance to most nuclear-fueled power generating facilities. The potential impacts from construction are discussed in the context of major on-site versus off-site (including transmission lines) LNP components.

SCA Chapter 5 refers to and builds on ER Chapter 4 (Environmental Impacts of Construction) to present the effects in terms of their physical impact on the resources and populations described in SCA Chapter 3 and in terms of compliance with agency requirements. SCA Chapter 5 addresses the environmental effects of construction and refers to the following ER sections:

ER 4.1	Land Use Impacts
ER 4.2	Water-Related Impacts
ER 4.3	Ecological Impacts
ER 4.4	Socioeconomic Impacts
ER 4.6	Measures and Controls to Limit Adverse Impacts during Construction
ER 10.0	Environmental Consequences of the Proposed Action

5.1 LAND IMPACT

5.1.1 GENERAL CONSTRUCTION IMPACTS

General construction impacts to land affected by construction are discussed in the following ER sections:

ER 4.1	Land Use Impacts
ER 4.1.1	The Site and Vicinity
ER 4.1.2	Transmission Corridors and Off-Site Areas
ER 4.6	Measures and Controls to Limit Adverse Impacts during Construction
ER 10.2.1.1	Land Use [Irreversible Environmental Commitments]
ER 10.3.1.1	Land Use [Construction Preemptions and Productivity]

Land uses (amount of land) expected to be affected by the construction of the LNP and associated facilities are summarized in the following ER sections:

ER 4.1.1.1.2.1	On-Site Land Use Changes
ER 4.1.1.1.2.2	Off-Site Indirect Land Use Changes

Explosives are not typically used for construction in the area and no use of explosives is anticipated for this project.

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Potential construction impacts, as well as measures and controls that will be employed, are summarized in the following ER section:

ER 4.6 Measures and Controls to Limit Adverse Impacts during Construction

Table 4.6-1 in ER Section 4.6 lists and summarizes potential impacts due to construction activities and the specific measures and controls that are expected to be implemented to mitigate those impacts.

5.1.2 ROADS

Information related to the potential use of nearby and regional roadways, including the estimated number of construction workers, the number of employees during operation, and the number of trips and trip routes that will be associated with the project, is provided in the following ER sections:

ER 4.4.2 Social and Economic Impacts
ER 4.4.2.1.1 Employment
ER 4.4.2.10 Transportation Facilities
ER 5.8.2 Social and Economic Impacts of Station Operation
ER 5.8.2.8 Transportation Facilities

A transportation study conducted in 2007 by Lincks and Associates, Inc. estimated the traffic associated with trips by commuting operations workers based on a trip generation rate of 2.38 trip ends per operations worker. Using this rate, it is estimated that at the operations stage, the project will attract 1840 daily trip ends associated with operations traffic. The study concludes that US-19 will operate at an acceptable level of service during the operations phase of the project.

Additional transportation impact analysis is pending and detailed information concerning access to state transportation facilities, which includes not only service roads but also proposed modifications to the state facility, such as median cuts, acceleration and deceleration lanes, improved design, signalization, and other features, will be provided upon conclusion of the final LNP and associated facilities design.

Information related to the potential impact of facility operations or construction activities on modal transportation, including the use of overweight or over-dimensional vehicles, rail, and shipping, will be provided upon conclusion of the final LNP and associated facilities design.

5.1.3 FLOOD ZONES

Compliance with local flood program regulations and information pertaining to land use during construction are described in the following ER sections:

ER 4.2.1.1 Freshwater Surface Water

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ER 4.6 Measures and Controls to Limit Adverse Impacts during Construction

The 100-year flood zone at the LNP site is discussed in the following ER section:

ER 2.3.1.2.1.4 Flood History

Detailed flood zone maps are provided in the Environmental Resource Permit application in Appendix 10.4.

5.1.4 TOPOGRAPHY AND SOILS

Construction-related alterations of the site topography or soils that might affect runoff, percolation rates, subsidence, sink hole formation, bearing strength, soil stability, aesthetics, or view are described in the following ER sections:

ER 4.1 Land Use Impacts
ER 4.2 Water-Related Impacts
ER 4.2.1 Hydrologic Alterations
ER 4.6 Measures and Controls to Limit Adverse Impacts during Construction

5.2 IMPACT ON SURFACE WATER BODIES AND USES

5.2.1 IMPACT ASSESSMENT

The impacts of site preparation and construction activities on surface water systems are described in the following ER sections:

ER 4.2 Water-Related Impacts
ER 4.3 Ecological Impacts
ER 4.6 Measures and Controls to Limit Adverse Impacts during Construction [**ER Table 4.6-1**]
ER 10.2.1.2 Hydrological and Water Use [Irreversible Environmental Commitments]
ER 10.3.1.4 Water [Construction Preemptions and Productivity]

A 316(b) Demonstration is included in SCA Appendix 10.2.2. This assessment demonstrates full compliance with applicable rules.

A joint application for an ERP is included in SCA Appendix 10.4. The main effects of constructing the LNP will be on those wetlands directly impacted. The sovereign lands that are anticipated to be affected are discussed in the ERP application. Applicable ERP permit criteria will be followed to minimize impacts during construction.

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5.2.2 MEASURING AND MONITORING PROGRAMS

Measurement and monitoring programs for the construction and operational phases of the LNP are described in the following ER sections:

ER 6.1	Thermal Monitoring
ER 6.3	Hydrological Monitoring
ER 6.4	Meteorological Monitoring
ER 6.5	Ecological Monitoring
ER 6.6	Chemical Monitoring

5.3 GROUNDWATER IMPACTS

5.3.1 IMPACT ASSESSMENT

The impacts of site preparation and construction activities on groundwater systems are described in the following ER sections:

ER 4.2	Water-Related Impacts
ER 4.2.1.4	Groundwater
ER 4.2.2	Water Use Impacts
ER 4.2.2.3	Groundwater Use
ER 4.6	Measures and Controls to Limit Adverse Impacts during Construction

A SWFWMD Water Use Permit application has been prepared for the LNP (see SCA Appendix 10.9). As part of the groundwater permitting requirements, groundwater flow modeling was performed using the District Wide Regulation Model, Version 2 (DWRM2). Two withdrawal scenarios were simulated: an average-day withdrawal of 1.58 mgd and a maximum-day withdrawal of 5.8 mgd. Under both scenarios, groundwater users of the bedrock aquifer on adjacent properties could experience a water level decline of up to 1 ft., which is not expected to cause any adverse impacts to their ability to withdraw water. Surficial aquifer drawdown in excess of 1 ft. is not expected to go beyond LNP site boundaries.

5.3.2 MEASURING AND MONITORING PROGRAMS

Measurement and monitoring programs for groundwater resources are described in the following ER sections:

ER 6.1.1.6	Groundwater [Preapplication Thermal Monitoring]
ER 6.1.2.5	Groundwater [Construction and Preoperational Thermal Monitoring]
ER 6.1.3.5	Groundwater [Operational Thermal Monitoring]
ER 6.3.1.6	Groundwater [Preapplication Hydrological Monitoring Program]
ER 6.3.2.5	Groundwater [Construction Hydrological Monitoring]
ER 6.3.3.5	Groundwater [Preoperational Hydrological Monitoring]

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ER 6.3.4.5	Groundwater [Operational Hydrological Monitoring]
ER 6.6.1.6	Groundwater [Preapplication Chemical Monitoring]
ER 6.6.2.6	Groundwater [Construction and Preoperational Chemical Monitoring]
ER 6.6.3.5	Groundwater [Operational Chemical Monitoring]

5.4 ECOLOGICAL IMPACTS

5.4.1 IMPACT ASSESSMENT

The effects of LNP and associated facility construction on terrestrial and aquatic ecological communities are discussed in the following ER sections:

ER 4.3.1	Terrestrial Ecosystems
ER 4.3.2	Aquatic Ecosystems
ER 10.2.1.3	Ecological [Irreversible Environmental Commitments]
ER 10.3.1.5	Terrestrial and Aquatic Ecosystems [Construction Preemptions and Productivity]

5.4.2 MEASURING AND MONITORING PROGRAMS

Monitoring programs for terrestrial and aquatic ecological communities are described in the following ER sections:

ER 6.5	Ecological Monitoring
ER 6.5.1	Terrestrial Ecology and Land Use
ER 6.5.2	Aquatic Ecology
ER 6.7.5	Ecological Monitoring [Summary of Monitoring Programs]

5.5 AIR IMPACTS

Air emissions associated with construction and measures to control the emissions are discussed in the following ER sections:

ER 4.4.1.2	Air Quality
ER 4.4.1.3	Visual Aesthetic Disturbances
ER 10.3.1.3	Air [Construction Preemptions and Productivity]

5.6 SOLID WASTES

Construction of the LNP will generate a variety of typical construction-related wastes. All solid waste generated during construction will be disposed at a permitted off-site landfill, either Class III – Construction and Demolition Debris (C&D) or Class I, as required under Florida regulations Chapter 62-701, F.A.C. Segregation and recycling of waste will be practiced to the greatest extent practical.

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5.7 IMPACT ON HUMAN POPULATIONS

Potential effects of site preparation and plant construction activities on human populations are discussed in detail in the following ER sections:

ER 4.4.1	Physical Impacts
ER 4.4.1.1	Noise
ER 4.4.1.2	Air Quality
ER 4.4.1.3	Visual Aesthetic Disturbances
ER 4.4.2	Social and Economic Impacts
ER 10.2.1.4	Socioeconomic [Irreversible Environmental Commitments]
ER 10.3.1.9	Socioeconomic [Construction Preemptions and Productivity]

To provide additional information on the potential noise impacts, a site-specific noise evaluation was conducted. This study is documented in a report entitled "Noise Assessment of Proposed Levy Nuclear Plant", dated March 10, 2008. A copy of this report is provided in SCA Appendix 10.8.

The following schedule assumptions, which are discussed further in **ER Subsection 4.4.2**, are used to bracket impacts associated with construction:

- Site preparation will take 18 months, commencing by 2010 or 2011.
- Construction will take 42 months, with the construction schedule staggered 1 year between units.
- Construction will be complete on LNP 1 in 2016 or 2017 and on LNP 2 in 2017 or 2018.
- PEF projects peak workforce to be 2700 workers during 2014.

5.8 IMPACT ON LANDMARKS AND SENSITIVE AREAS

While no areas within 5 mi. of the LNP site are specifically identified as natural, scenic, or cultural landmarks, a number of natural areas are valued as recreational areas. The potential impact of LNP construction on natural recreational areas is discussed in the following ER section:

ER 4.4.2.6	Recreation
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5.9 IMPACT ON ARCHAEOLOGICAL AND HISTORIC SITES

Potential impacts of construction on significant archaeological and historic sites are discussed in the following ER sections:

ER 4.1.3	Historic Properties
ER 4.6	Measures and Controls to Limit Adverse Impacts during Construction

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ER 10.3.1.8 Cultural Resources [Construction Preemptions and Productivity]

5.10 SPECIAL FEATURES

This application is being submitted for certification of a nuclear generating station. No unusual or special features will be associated with the construction of this facility.

5.11 BENEFITS FROM CONSTRUCTION

Beneficial effects of site preparation and plant construction activities on the region are discussed in detail in the following ER sections:

ER 4.4.2	Social and Economic Impacts
ER 10.4.1.4	Benefits of the Proposed Facility
ER 10.4.1.4.2	Local and State Economy
ER 10.4.1.4.3.1	Regional Productivity

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6.0 EFFECTS OF PLANT OPERATION

The environmental effects of plant operation are extensively discussed in ER Chapter 5 and specifically in the following sections of the ER:

ER 5.1	Land Use Impacts
ER 5.2	Water-Related Impacts
ER 5.3	Cooling System Impacts
ER 5.5	Environmental Impacts of Waste
ER 5.6	Transmission System Impacts
ER 5.8	Socioeconomic Impacts

Additionally, the following ER section describes facility operational impacts that could require mitigation, along with corresponding measures and controls that may be employed to limit potential adverse environmental impacts.

ER 5.10	Measures and Controls to Limit Adverse Impacts during Operation
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6.1 EFFECTS OF THE OPERATION OF THE HEAT DISSIPATION SYSTEM

The environmental effects of the operation of the heat dissipation system are described in the following ER sections:

ER 5.2.1	Hydrologic Alterations and Plant Water Supply
ER 5.2.1.3	Cross Florida Barge Canal [Hydrologic Alterations and Plant Water Supply]
ER 5.2.1.6	Gulf of Mexico [Hydrologic Alterations and Plant Water Supply]
ER 5.2.1.7	Conclusions
ER 5.2.2	Water Use Impacts
ER 5.3	Cooling System Impacts

Potential facility operational impacts that may require mitigation, along with corresponding measures and controls that may be employed to limit potential adverse environmental impacts are discussed in the following ER section:

ER 5.10	Measures and Controls to Limit Adverse Impacts during Operation
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A completed 316(b) Demonstration, which is part of the NPDES permit application included as SCA Appendix 10.2.2. The 316(b) Demonstration describes the proposed CWIS and its characteristics. A 316(a) Demonstration was not prepared, since the LNP will use a non-contact closed-cycle cooling system with mechanical draft cooling towers that will effectively reduce cooling water temperatures to the point where the blowdown effluent from the plant will meet applicable thermal discharge standards and limits.

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6.1.1 TEMPERATURE EFFECT ON RECEIVING BODY OF WATER

The temperature effects in the Gulf of Mexico from the operation of the LNP heat dissipation system are described in the following ER sections:

- ER 5.3.2** Discharge System
- ER 5.3.2.1** Thermal Description and Physical Impacts

The pipelines between the LNP and CREC discharge canal will be approximately 13 mi. long. It will take several hours for the discharge to reach the discharge point at the CREC discharge canal. While additional cooling of the discharge will occur in the pipelines, this cooling is not needed to comply with CREC thermal discharge limits. Although the LNP discharge is expected to have a lower temperature than the CREC discharge, the LNP discharge will be less than 5 percent of the existing CREC discharge volume; therefore, no significant change in the temperature of the discharge to the Gulf of Mexico will result. Consequently, no mixing zone for thermal compliance is necessary.

6.1.2 EFFECTS ON AQUATIC LIFE

The aquatic habitats and communities in the project area and the potential impacts of plant operation on these resources are extensively discussed in the following ER sections:

- ER 2.4.2** Aquatic Ecology
- ER 5.3** Cooling System Impacts
- ER 5.3.1.2** Aquatic Ecosystems [Intake System]
- ER 5.3.2.2** Aquatic Ecosystems [Discharge System]

Baseline aquatic community information, which includes descriptions of benthic invertebrates, phytoplankton, zooplankton, fisheries, macroalgae, seagrasses, threatened and endangered species, commercially and recreationally important species, and key indicator organisms, as well optimum or tolerance temperature ranges for species where available, is located in the following ER section:

- ER 2.4.2.3** Biological Characterization of the Cross Florida Barge Canal

Aquatic habitats potentially affected by operation of the LNP include freshwater streams, lakes, wetlands, and impoundments, the CFBC, and the Gulf of Mexico. Hydrologic alterations associated with these habitats are characterized in the following ER sections:

- ER 5.2.1** Hydrological Alterations and Plant Water Supply
- ER 5.2.1.1** Freshwater Streams
- ER 5.2.1.2** Lakes and Impoundments
- ER 5.2.1.3** Cross Florida Barge Canal
- ER 5.2.1.5** Wetlands
- ER 5.2.1.6** Gulf of Mexico

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Potential impacts to aquatic species associated with the CWIS are characterized in the following ER sections:

- ER 5.3.1.2** Aquatic Ecosystems
- ER 5.3.1.2.1** Increase in Salinity in Upper Reaches of the CFBC
- ER 5.3.1.2.2** Impingement Impacts
- ER 5.3.1.2.3** Entrainment Impacts

The operation of the LNP is not expected to have a significant impact on manatee population or habitat. Combining LNP and CREC discharges will result in a slightly greater discharge volume to the CREC discharge canal. The LNP discharge will have a lower temperature than the CREC discharge; however, no significant change in temperature is expected because the LNP discharge volume will be less than 5 percent of the existing CREC discharge volume. Because the blowdown characteristics are expected to be similar for both the CREC and the LNP discharge streams, no significant change in water quality from the combined discharge is expected.

Potential impacts to aquatic species associated with the cooling water discharge are characterized in the following ER section:

- ER 5.3.2.2** Aquatic Ecosystems

Measures and controls to limit adverse impacts to aquatic habitats and species are described in the following ER section:

- ER 5.10** Measures and Controls to Limit Adverse Impacts during Operation

6.1.3 BIOLOGICAL EFFECTS OF MODIFIED CIRCULATION

The analysis and assessment of biological changes that may occur in the CFBC as a result of the continuous withdrawal of cooling water from the canal, including potential impacts to water quality, water flow, and sediment migration, are described in the following ER sections:

- ER 5.2** Water Related Impacts
- ER 5.2.1.3** Cross Florida Barge Canal
- ER 5.3.1.1** Hydrodynamic Descriptions and Physical Impacts

An additional discussion of the zone of hydraulic influence and flow changes in the CFBC is located in the 316(b) Demonstration for the LNP (see SCA Appendix 10.2.2).

Measures and controls to limit adverse impacts to water quality and hydrology in the CFBC are described in the following ER section:

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ER 5.10 Measures and Controls to Limit Adverse Impacts during Operation

6.1.4 EFFECTS OF OFF-STREAM COOLING

The LNP is designed with two banks of mechanical draft cooling towers, one for each unit (LNP 1 and LNP 2). The potential effects of atmospheric discharges of water vapor from the cooling towers are described in the following ER sections:

ER 5.3.3 Atmospheric Heat Dissipation System
ER 5.3.3.1 Heat Dissipation to the Atmosphere
ER 5.3.4 Impacts on Members of the Public
ER 5.3.4.1 Thermophillic Microorganism Impacts

6.1.4.1 Visibility of Cooling Tower Vapor Plumes

An evaluation of the potential for the formation of visible vapor plumes from the mechanical draft cooling towers is discussed in the following ER sections:

ER 5.3.3.1.1 Length and Frequency of Elevated Plumes
ER 5.8.1.3 Aesthetic Disturbances

6.1.4.2 Plume Fogging and Icing at Ground Level

The assessment of the potential for ground level fogging or icing attributable to cooling tower operation is described in the following ER sections:

ER 5.3.3.1.2 Ground-Level Fogging and Icing
ER 5.3.3.2.2 Vapor Plumes and Icing

6.1.4.3 Cooling Tower Salt and Solids Deposition

The assessment of the potential for salt and solids deposition resulting from cooling tower emissions is discussed in the following ER sections:

ER 5.3.3.1.3 Solids Deposition
ER 5.3.3.2.1 Salt Drift

6.1.5 MEASUREMENT PROGRAM

Information relative to the measurement and monitoring programs associated with the heat dissipation system are described in the following ER sections:

ER 6.0 Environmental Measurements and Monitoring Programs
ER 6.1 Thermal Monitoring
ER 6.5 Ecological Monitoring
ER 6.6 Chemical Monitoring

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6.2 EFFECTS OF CHEMICAL AND BIOCIDES DISCHARGES

6.2.1 INDUSTRIAL WASTEWATER DISCHARGES

Potential impacts to water quality from the discharge of industrial wastewater to the CREC discharge canal and ultimately to the Gulf of Mexico are described in the following ER sections:

- ER 3.6.1** Effluents Containing Biocides or Chemicals
- ER 3.6.1.1** Circulating Water, Service Water, Potable Water, and Demineralized Water
- ER 3.6.1.2** Steam Generator Blowdown System
- ER 3.6.1.3** LNP Wastewater System
- ER 5.3.2.2** Aquatic Ecosystems
- ER 5.5.1.1** Impacts of Discharges on Water

A completed 316(b) Demonstration is included as part of the NPDES permit application for the LNP (see SCA Appendix 10.2.2). The NPDES permit application also addresses the use and effects of chemical and biocide discharges in the combined LNP wastewater discharge stream.

6.2.2 COOLING TOWER BLOWDOWN

Potential impacts of chemicals in cooling tower blowdown water discharged to the CREC discharge canal and ultimately to the Gulf of Mexico are described in the following ER sections:

- ER 3.6.1.2** Steam Generator Blowdown System
- ER 5.2.2.2** Gulf of Mexico, Cross Florida Barge Canal, and Crystal River Energy Complex Discharge Canal
- ER 5.3.2.2** Aquatic Ecosystems
- ER 5.5.1.1** Impacts of Discharges on Water

A completed 316(b) Demonstration is included as part of the NPDES permit application for the LNP (see SCA Appendix 10.2.2). The NPDES permit application also addresses the use and effects of chemical and biocide discharges in the cooling tower blowdown stream.

6.2.3 MEASUREMENT PROGRAMS

The information on measurement and monitoring programs for chemicals used in the operation of the LNP and treated and released to the environment is provided in detail in the following ER sections:

- ER 6.0** Environmental Measurements and Monitoring Programs
- ER 6.6** Chemical Monitoring
- ER 6.6.1** Preapplication Chemical Monitoring
- ER 6.6.2** Construction and Preoperational Chemical Monitoring
- ER 6.6.3** Operational Chemical Monitoring

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6.3 IMPACTS ON WATER SUPPLIES

6.3.1 SURFACE WATER

The environmental effects of plant operation on surface water flow are described in the following ER sections:

ER 5.2	Water-Related Impacts
ER 5.3	Cooling System Impacts
ER 5.10	Measures and Controls to Limit Adverse Impacts during Operation

6.3.2 GROUNDWATER

A brief summary of the monitoring programs to be used to protect the present and projected groundwater users in the vicinity of the LNP site based on this analysis follows. The objectives of the groundwater monitoring programs are to identify environmental impacts, including the hydrological and geochemical changes to groundwater, caused by the construction and operation of LNP 1 and LNP 2, and to identify alternatives or engineering measures that could be used to reduce any adverse effects that may be identified.

In general, the groundwater monitoring programs will consist of the following primary elements:

- A Preapplication Monitoring Program for groundwater will support the assessment of site acceptability and establish background conditions for groundwater prior to the construction and operation of LNP 1 and LNP 2.
- A Construction Monitoring Program for groundwater will monitor and be used to control potential effects caused by site preparation and construction activities.
- A Preoperational Monitoring Program will establish a baseline database for identifying and assessing environmental effects attributable to the operation of the LNP 1 and LNP 2.
- An Operational Monitoring Program will be implemented to document groundwater conditions and detect any unexpected effects to the groundwater system from the operation of LNP 1 and LNP 2. The Operational Monitoring Program is anticipated to extend throughout the life of the facility. Modifications to the monitoring program (for example, changes in monitoring locations, sampling frequency, or collection procedures) will be assessed regularly over the duration of the program.

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6.3.3 DRINKING WATER

The environmental effects of plant operation on drinking water from groundwater supplies are described in the following sections of the ER:

ER 2.3.2	Water Use
ER 2.3.2.3	Groundwater Use
ER 5.2	Water-Related Impacts
ER 5.2.1	Hydrologic Alterations and Plant Water Supply
ER 5.2.1.4	Groundwater
ER 5.2.2	Water Use Impacts
ER 5.2.2.3	Groundwater Use
ER 5.10	Measures and Controls to Limit Adverse Impacts during Operation

Since the cooling system will obtain surface water from the Gulf of Mexico via the CFBC, no effect on local groundwater supplies is expected to occur. There will be no discharges into any drinking water sources as a result of plant operation. Stormwater from impervious areas will be treated to meet SWFWMD criteria and comply with state water quality regulations. No on-site waste disposal systems are proposed.

PEF has prepared a Water Use Permit application for submittal to the SWFWMD (see SCA Appendix 10.9). The permit application includes groundwater flow modeling that was performed using the DWRM2. Withdrawal was simulated using average-day withdrawal of 1.58 mgd and maximum-day withdrawal of 5.8 mgd. Under both of these scenarios, groundwater levels in the aquifers beneath adjacent properties could decline by up to 1 ft. This amount of drawdown is not expected to cause any adverse impacts to local users in terms of water flow or quality.

The DWRM2 model was run with, and without, the PEF withdrawals and the water budgets for each simulation were compared. The upward movement of water from the Lower Floridan Aquifer (LFA) the Upper Floridan Aquifer (UFA) with PEF pumping was evaluated to estimate the magnitude of changes in vertical movement between model layers. At the average-day pumping rate of 1.58 mgd, there is an increase in upward flow of about 25 gallons per minute (gpm) from LFA into UFA within the entire model domain, approximately 400 mi.². Change in flow within this order of magnitude would subjectively indicate there should be no significant brackish water intrusion resulting from the vertical movement of LFA water as a result of pumping at PEF.

6.3.4 LEACHATE AND RUNOFF

The environmental effects of plant operation on leachate and runoff and any potential impacts are described in the following ER sections:

ER 5.2	Water-Related Impacts
ER 5.2.1.1	Freshwater Streams

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- ER 5.2.1.5** Wetlands
- ER 5.10** Measures and Controls to Limit Adverse Impacts during Operation

In general, the only runoff from the power generation site will be stormwater, which will be captured in on-site holding ponds for treatment or reused in the cooling tower system. Stormwater runoff from roads or other linear facilities will be treated in swales adjacent to them. Treatment will comply with state regulations for stormwater management.

Solid waste will be collected from several on-site locations and deposited in dumpsters located throughout the site. PEF will contract with an outside vendor that will perform weekly collections and disposal at a permitted off-site landfill. There will be no waste piles or bulk storage areas requiring leachate management during the operation of the LNP. Treated sanitary wastewater and treated industrial wastewater will be recycled into the cooling water system. Cooling system blowdown is pumped off-site for discharge into the CREC discharge canal.

6.3.5 MEASUREMENT PROGRAMS

Information on measurement and monitoring programs used for surface and groundwater is located in the following ER section:

- ER 6.3** Hydrological Monitoring

6.4 SOLID/HAZARDOUS WASTE DISPOSAL IMPACTS

6.4.1 SOLID WASTE

The impacts resulting from off-site disposal of solid waste are described in the following ER section:

- ER 5.5.1.2.1** Nonradioactive Solid Waste

6.4.2 HAZARDOUS WASTE

The issues related to the disposal of hazardous waste are described in the following ER sections:

- ER 5.5.1.2.2** Hazardous Wastes
- ER 5.5.3** Pollution Prevention and Waste Minimization Program

6.5 SANITARY AND OTHER WASTE DISPOSAL

Information on sanitary and other waste disposal during plant operation is provided in the following ER sections:

- ER 3.6.2** Sanitary System Effluents

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ER 5.5.1.4 Sanitary Waste
ER 5.5.2 Mixed Waste Impacts

6.6 AIR QUALITY IMPACTS

6.6.1 IMPACT ASSESSMENT

Because the LNP will have only low levels of emissions, its operation will not cause or contribute to a violation of any state or federal ambient air quality standard for any pollutant at any location. Although there will be PM emissions from the LNP's mechanical draft cooling towers, there are no ambient air quality standards for PM. Ambient air quality standards for PM exist only for PM-10 and PM-2.5 (PM <2.5 µm diameter). Of the other emissions that will be emitted by the facility, namely PM-10, SO₂, NO_x, CO, and VOC, none of these emissions will be emitted in "significant" quantities" (as defined by state and federal air quality regulations); therefore, their corresponding impacts on ambient air quality are considered to be insignificant.

6.6.2 MONITORING PROGRAMS

Because both the emissions of PM-10, SO₂, NO_x, CO, and VOC from the LNP and the air quality impacts attributable to facility operation will be insignificant, pre- and post-construction ambient air quality monitoring is not required.

PEF operates a meteorological monitoring station on the site. The station has operated continuously since February 1, 2007, and will continue operation through plant operation. A more detailed description of the meteorological monitoring program is provided in the following ER sections:

ER 2.7.5 On-Site Meteorological Measurements Program
ER 6.4 Meteorological Monitoring

6.7 NOISE

An assessment of noise impacts during plant operation is discussed in the following ER section:

ER 5.8.1.1 Noise

A more detailed assessment of ambient noise impacts during plant operation, as well as ambient background noise levels and impacts during construction, is presented in a report entitled "Noise Assessment of Proposed Levy Nuclear Plant," dated March 10, 2008. A copy of this report is provided in SCA Appendix 10.8.

6.8 CHANGES IN NON-AQUATIC SPECIES POPULATIONS

Potential changes in important non-aquatic species populations resulting from the operation of the LNP are described in the following ER section:

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ER 5.3.3.2 Terrestrial Ecosystems

6.9 OTHER PLANT OPERATION EFFECTS

The environmental effects of plant operation are summarized in the following ER section:

ER 5.10 Measures and Controls to Limit Adverse Impacts during Operation

6.10 ARCHAEOLOGICAL SITES

Information on potential operational effects on archaeological sites in the vicinity is provided in the following ER section:

ER 5.1.3 Historic Properties

There are no known archaeological or historic sites on the LNP site. It is unlikely that unidentified resources would be found during facility operation. During post-construction operation, land disturbance activities would cease in the vicinity of an inadvertent cultural resource discovery and the Florida SHPO would be notified.

6.11 RESOURCES COMMITTED

The irreversible commitments of state or local resources due to LNP plant operation are discussed in the following ER sections:

ER 10.2.1 Irreversible Environmental Commitments

ER 10.2.2 Irretrievable Material Commitments of Resources

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7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

A complete discussion of the environmental, social, and cost benefits of the proposed plant is provided in the following section of the ER:

ER 10.4 Benefit-Cost Balance

7.1 ECONOMIC AND SOCIAL BENEFITS

The economic and social benefits of the LNP project, including the construction and operation of the LNP, are discussed in the following ER sections:

ER 10.4.1 Benefits

ER 10.4.1.4 Benefits of the Proposed Facility

7.2 ECONOMIC AND SOCIAL COSTS

The economic and social costs of the LNP project are discussed in the following ER sections:

ER 10.2.1 Irreversible Environmental Commitments

ER 10.2.1.4 Socioeconomic

ER 10.4 Benefit-Cost Balance

ER 10.4.2 Costs

ER 10.4.2.1 Internal Costs

ER 10.4.2.2 Monetary – Construction

ER 10.4.2.3 Monetary – Operation

ER 10.4.2.4 External Costs

7.2.1 TEMPORARY EXTERNAL COSTS

The temporary external costs of the LNP project are discussed in the following ER sections:

ER 10.4.2 Costs

ER 10.4.2.4 External Costs

7.2.2 LONG-TERM EXTERNAL COSTS

The long-term external costs of the LNP project are discussed in the following ER sections:

ER 10.4.2 Costs

ER 10.4.2.4 External Costs

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8.0 SITE AND PLANT DESIGN ALTERNATIVES

This optional chapter of the SCA will not be submitted as part of this application. Results of assessments conducted to evaluate proposed technologies and to identify the preferred site for this project are summarized in ER Section 9.