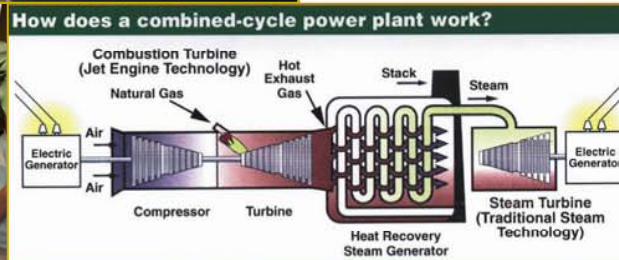


West County energy center

Unit 3



SITE CERTIFICATION APPLICATION

VOLUME I OF III



**SITE CERTIFICATION APPLICATION
WEST COUNTY ENERGY CENTER
UNIT 3**

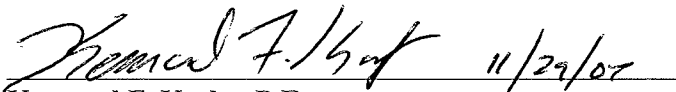
VOLUME 1 OF 3

Submitted by:

**Florida Power & Light Company
700 Universe Boulevard
Juno Beach, Florida 33408**

December 2007

0738-7652


Kennard F. Kosky, P.E.
Professional Registered Engineer No. 14996

**Golder Associates Inc.*
6241 NW 23rd Street, Suite 500
Gainesville, Florida 32653-1500
*Board of Professional Engineers
Certificate of Authorization No. 00001670**

SEAL

765

APPLICANT INFORMATION

Please supply the following information:

Applicant's Official Name Florida Power and Light Company (FPL)

Address 700 Universe Boulevard, Juno Beach, FL 33408

Address of Official Headquarters 700 Universe Boulevard, Juno Beach, FL 33408

Business Entity (corporation, partnership, co-operative) Corporation

Names, owners, etc. Florida Power and Light Company (an investor-owned electric utility)

Name and Title of Chief Executive Officer Armando J. Olivera, President

Name, Address, and Phone Number of Official Representative responsible for obtaining certification
Barbara Linkiewicz, Environmental Licensing Manager, New Generation Projects, Environmental Services, 700 Universe Boulevard, Juno Beach, FL 33408 Phone: (561) 691-7518 Fax: (561) 691-7049

Site Location (county) 20505 State Road 80, Loxahatchee, Palm Beach County, FL 33470

Nearest Incorporated City Wellington, FL (about 0.1 mile south of nearest boundary)

Latitude and Longitude 26°41' 42.4" 80°22' 29.1" (HRSG Stack Unit 3; 2nd stack toward north; approx. center of power blocks).

UTMs: Northerly 2,952.654 km N

Easterly 562.202 km E (Zone 17)

Section, Township, Range Portions of Sections 29 and 32 of Township 43S, Range 40E

Location of any directly associated transmission facilities (counties) Not Applicable

Name Plate Generating Capacity Site Certification: Unit 3 Nominal 1,250 MW (2011).

Capacity of Proposed Additions and Ultimate Site Capacity (where applicable):

Remarks (additional information that will help identify the applicant):

Project Name: West County Energy Center (WCEC) Unit 3

EXHIBIT A

LEGAL DESCRIPTION

Part of Parcel I in Sections 29 and 32, Township 43 South, Range 40 East, Palm Beach County, Florida described as follows: Commencing at the Northwest corner of Section 29, Township 43 South, Range 40 East, Palm Beach County, Florida, thence South 88°52'46" East 745.00 feet along the North line of Section 29 to the East right-of-way line of the Florida Power & Light Company corridor as recorded in O.R.B. 2222, Page 1696, thence South 0°49'13" West 589.00 feet along a line parallel with the West line of said Section 29, along the East right-of-way line of the aforementioned Florida Power & Light Company corridor to the Southwest corner of the East 900 feet of the West 1,645 feet of the North 589 feet of said Section 29 and the point of beginning of Parcel II, thence South 88°52'46" East 1,200.00 feet along the South line of the East 900 feet of the West 1,645 feet of the North 589 feet of said Section 29 and its Easterly extension, thence South 0°49'13" West 4,658.85 feet along a line parallel with East right-of-way line of the Florida Power & Light company corridor, to the North line of Section 32, Township 43 South, Range 40 East, thence South 0°56'55" West 3,378.92 feet along a line parallel with the East right-of-way line of the aforesaid Florida Power & Light Company corridor to the North right-of-way line of State Road 80 thence North 88°28'14" West 1,100.09 feet along said right-of-way line of State Road 80, to the East right-of-way line of the Florida Power & Light Company corridor, thence North 0°56'55" East 880.76 feet along a line parallel with said West line of Section 32, Township 43 South, Range 40 East, thence North 89°03'05" West 100.00 feet at right angles to the preceding course, then North 0°56'55" East 2,501.94 feet along the East right-of-way line of Florida Power & Light Company corridor to the South line of Section 29, Township 43 South, Range 40 East, thence North 0°49'13" East 4,647.51 feet along said right-of-way line to the Point of Beginning.

Parcel = Approximately 220 acres.

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LIST OF ACRONYMS AND ABBREVIATIONS

AADT	Average Annual Daily Traffic
AAQS	Ambient Air Quality Standards
ANSI	American National Standard Institute
AP	Agricultural Production
API	American Petroleum Institute
BACT	Best Available Control Technology
BOCC	Board of County Commissioners
Btu/lb	British thermal units per pound
°C	degrees Celsius
CAA	Clean Air Act
CALPUFF	California Puff Model
CEM	continuous emission monitoring
CFR	Code of Federal Regulations
cfs	cubic feet per second
Cl	chloride
cm	centimeter
CO	carbon monoxide
CO ₂	carbon dioxide
CT	combustion turbine
dB	decibel
dBA	A-weighted decibel
DEM	Digital Elevation Model
DLN	dry-low NO _x
EPA	U.S. Environmental Protection Agency
ERP	Environmental Resource Permit
°F	degrees Fahrenheit
F.A.C.	Florida Administrative Code
FADS	Florida Acid Deposition Study
FAS	Floridan Aquifer System
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FFWCC	Florida Fish and Wildlife Conservation Commission
FLM	Federal Land Manager
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FNAI	Florida Natural Area Inventory
FPL	Florida Power & Light Company
FPSC	Florida Public Service Commission
F.S.	Florida Statutes

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

FSA	Florida Statistical Abstract
ft	foot
ft ²	square foot
ft ² /day	square feet per day
ft-bgs	feet below ground surface
ft-bsl	feet below sea level
ft-msl	feet above mean sea level
GE	General Electric
GEP	good engineering practice
gpd	gallons per day
gpm	gallons per minute
H ₂ O	water vapor
HRSG	heat recovery steam generator
HSH	highest, second-highest
Hz	hertz
I	Interstate Highway
ICU	intermediate confining unit
IRP	integrated resource planning
ISCST	Industrial Source Complex Short Term
IWAQM	Interagency Workgroup on Air Quality Models
kg	kilogram
kg/km ² -mo	kilograms per square kilometer per month
km	kilometer
kV	kilovolt
kWh	kilowatt hour
lb/hr	pounds per hour
lb/yr	pounds per year
LECRWSP	Lower East Coast Regional Water Supply Plan
LFA	Lower Floridan Aquifer
LOS	Level of Service
LOSA	Lake Okeechobee Service Area
m	meter
mgd	million gallons per day
mg/L	milligrams per liter
MHI	Mitsubishi Heavy Industries
mi ²	square mile
MM4	Mesoscale Model – Generation 4
MM5	Mesoscale Model – Generation 5
MMBtu/hr	million British thermal units per hour
MMcf/hr	million cubic feet per hour

LIST OF ACRONYMS AND ABBREVIATIONS

(continued)

mph	miles per hour
msl	mean sea level
MW	megawatt
Na ⁺	sodium
NEPA	National Environmental Policy Act
NGVD	National geodetic vertical datum
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NP	National Park
NPS	National Park Service
NSPS	New Source Performance Standards
NWR	National Wildlife Refuge
NWS	National Weather Service
O ₂	oxygen
O ₃	ozone
OFW	Outstanding Florida Waters
Pa	pascal
Pb	lead
PBA	Palm Beach Aggregates, Inc.
PDD	Planned Development District
PM	particulate matter
PM _{2.5}	particulate matter with an aerodynamic diameter of 2.5 micrometers or less
PM ₁₀	particulate matter with an aerodynamic diameter of 10 micrometers or less
ppm	parts per million
ppmvd	parts per million-dry conditions
ppt	parts per thousand
PSD	Prevention of Significant Deterioration
psf	pounds per square foot
ROW	right-of-way
RR	rural residential
RSA	rural service area
S	sulfur
SA	Special Agriculture
SAS	Surficial Aquifer System
SCA	Site Certification Application
SCR	selective catalytic reduction
SCRAM	Support Center for Regulatory Air Models
SFWMD	South Florida Water Management District

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

SHPO	State Historic Preservation Officer
SIP	site implementation plan
SO ₂	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasure
SPL	sound pressure level
SWA	Solid Waste Authority
TDS	total dissolved solids
TDD	Traditional Development District
TIP	Transportation Improvement Program
TPY	tons per year
TRB	Transportation Research Board
TTN	Technical Transfer Network
UIC	underground injection control
UFA	Upper Floridan Aquifer
µg/m ³	micrograms per cubic meter
µg/gdw	micrograms per gram dry weight
µm	micrometer
µPa	micropascal
USA	urban service area
USACE	U.S. Army Corps of Engineers
USDW	underground source of drinking water
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound

1.0 NEED FOR POWER AND THE PROPOSED FACILITIES

This chapter of the Site Certification Application (SCA) introduces Florida Power & Light Company (FPL or the Company), discusses the additional generating capacity needed to supply electricity to FPL's customers starting in 2011, and describes the self-build option identified by FPL to meet that need.

1.1 Introduction – The Project

FPL proposes to construct and operate a new natural gas-fired combined cycle generating unit providing 1,250 megawatts (MW) (nominal) of electric generation in 2011 ("Unit 3" or the "Project") at the West County Energy Center ("WCEC") site comprising approximately 220 acres located in unincorporated Palm Beach County ("Site") (Figure 1.1.0-1). Construction and operation of WCEC Units 1 and 2 at the Site was approved by the Governor and Cabinet acting as the Siting Board in December 2006. WCEC Units 1 and 2 are presently under construction and are scheduled to come in-service in 2009 and 2010, respectively.

The Site was initially identified as a Potential Site for future electric generation by FPL in its Ten Year Power Plant Site Plan 2004–2013 (FPL, 2004) and has been identified as a Preferred Site in FPL's 2005, 2006, and 2007 Ten Year Power Plant Site Plans. The Siting Board recognized the WCEC site's suitability for generation in addition to WCEC Units 1 and 2 through its "ultimate site capacity" approval in December 2006. The design chosen for WCEC Units 1 and 2 was the most efficient combined cycle configuration available, with 1,250 MW per unit (nominal). The same design will be used for WCEC Unit 3, providing total site generating capacity in excess of the previously-approved "ultimate site capacity". The Site has been approved by Palm Beach County for up to 3,800 MW (nominal) of electric generation.

FPL is seeking approval of WCEC Unit 3 under the Florida Electrical Power Plant Siting Act (PPSA), Chapter 403, Part II, Florida Statutes (F.S.). The PPSA provides a centralized review process for new electrical generating facilities in Florida, involving a balancing of "the increasing demand for electrical power plants with the broad interests of the public." The Florida Public Service Commission (FPSC) is the sole forum for the determination of need for a proposed facility. The Florida Department of Environmental Protection (FDEP) acts as the coordinator for the



remainder of the site certification process, with input from various State, regional, and local agencies, along with interested citizens. Ultimate disposition of the SCA is by either the Governor and Cabinet sitting as the Siting Board or the Secretary of the FDEP.

In accordance with the FPSC's "Bid Rule" [Rule 25-22.082, Florida Administrative Code (F.A.C.)], FPL plans to issue a Request for Proposals (RFP) in late 2007 for the purpose of soliciting proposals for firm capacity and energy starting in the January 2011 to June 2012 time frame from non-FPL supply side resources. This RFP will seek alternatives that can be compared to FPL's self-build option – i.e., the Project constituting FPL's "next planned generating unit". The eligible proposals submitted to FPL in response to the RFP will be evaluated against the Project.

After a comprehensive evaluation of power purchase alternatives presented in the responses to the RFP, if FPL determines that the Project is the best, most cost-effective option to meet the needs of its customers starting in 2011, FPL will submit a Petition to Determine Need for the Project to the FPSC pursuant to Section 403.519, F.S. That Petition, along with supporting documentation, will address the manner in which WCEC Unit 3 will meet the need for electric system reliability and integrity and the need for adequate electricity at reasonable cost, whether the Project is the most cost-effective alternative available, and whether there is conservation available to mitigate the need for all or a portion of the Project. Section 1.5 contains a summary of FPL's capacity needs and its Request for Proposal process.

This SCA is filed with the FDEP pursuant to Chapter 62-17, F.A.C. The SCA describes the Project and addresses its environmental and socioeconomic aspects by presenting information on the existing natural and human environment, the new facilities to be constructed and operated, and the impacts of those facilities on those environments.

1.2 The Applicant

FPL, the principal subsidiary of FPL Group, Inc., is the largest electric utility in Florida. FPL serves more than 8.6 million people (approximately 4.4 million customer accounts) along the eastern seaboard and the southern and southwestern portions of Florida. FPL serves customers in all or parts of 35 Florida counties (see Figure 1.2.0-1).



FPL's existing generating resources are located at 15 power plant sites (Figure 1.2.0-1) distributed geographically around the service territory, and also include partial ownership of two units located in Jacksonville and one unit in Georgia. The current generating facilities consist of nuclear steam units, coal units, combined cycle units, fossil steam units, combustion turbines, and diesel units. This diverse mix of generating technologies and fuels provides operating reliability, flexibility, and the opportunity to minimize fuel costs, while meeting the needs of FPL customers for reliable electric service.

FPL's bulk transmission system is composed of 6,620 circuit miles of transmission lines. Integration of the generation, transmission, and distribution system is achieved through FPL's 542 substations.

1.3 Overview of the Project

FPL must add generating resources in the future to provide continued reliable and cost-effective service to its customers and to meet future load growth. FPL has determined that the best self-build option to meet the need projected to start in 2011 involves construction of a new combined cycle generating unit at the WCEC Site.

WCEC Unit 3 will use the same design as WCEC Units 1 and 2, consisting of three new combustion turbines (CTs), with associated heat recovery steam generators (HRSGs), and one new steam turbine/electric generator (ST). The CTs are similar to, but larger and more efficient than, traditional jet engines. They produce electrical energy by direct connection to an electric generator. The exhaust heat from the CTs, which would otherwise be wasted energy released to the atmosphere, will be routed through the HRSGs, which act as boilers to produce steam for the new turbine generator, which produces additional electricity. The HRSGs will have duct burners to optimize the new unit's generating capacity. Natural gas will be the primary fuel for the new unit, with ultra low-sulfur light oil as a backup fuel for the CTs. The primary water source for the Project will be reclaimed water, and a cooling tower for WCEC Unit 3 will be added as part of the Project. The new generating unit will join WCEC Units 1 and 2 as the most efficient electric generators in the FPL system.

Protecting the environment, while providing safe, reliable, and adequate power to its customers, is of great importance to FPL. WCEC Unit 3 will include state-of-the-art emissions controls and will comply with all applicable regulatory standards.



1.4 FPL's Resource Planning Process

FPL uses an integrated resource planning (IRP) process in order to determine when new resources are needed, the magnitude of the resources needed, and the type of resources that should be added. The timing and type of potential new power plants are determined as part of this process. A description of FPL's IRP process is contained in FPL's Ten-Year Power Plant Site Plan 2007–2016.

Four basic steps are fundamental to FPL's resource planning process:

- Step 1: Determine the magnitude and timing of FPL's resource needs.
- Step 2: Identify which resource options and resource plans can meet the determined magnitude and timing of these resource needs (i.e., identify competing options and resource plans).
- Step 3: Determine the economics for the total utility system with each of the competing options and resource plans.
- Step 4: Select a resource plan and commit, as needed, to near-term options.

1.5 Need for the Project

1.5.1 FPL's Capacity Needs

FPL's IRP process work in 2007 resulted in a projection that FPL will have a need for additional resources starting in 2011 and that this capacity need will increase in every year thereafter. This part of the IRP process is generally called a "reliability assessment," and it is designed to determine both the magnitude and timing of FPL's resource needs. It is a forecast of how many megawatts of load reduction, new capacity, or a combination of both load reduction and new capacity options are needed, and when these megawatts are needed to meet FPL's customers' demand for electricity with the required reserve margin.

In the reliability assessment portion of its recent IRP work, FPL started with a load forecast. The primary drivers to develop these forecasts are demographic trends, weather, economic conditions, and prices of electricity. In addition, the resulting forecasts are an integration of economic evaluations, inputs of local economic development boards, weather assessments from NOAA, and inputs from FPL's own customer service planning areas. In the area of demographics, population trends by county and housing characteristics, such as housing starts, housing size, and vintage of



homes, are assessed. In its load forecast FPL is projecting that it will begin serving a portion of Lee County's load in January 2010 and will begin serving the entire Lee County load starting in January 2014. FPL also updates several databases, including: delivered fuel price projections, current financial and economic assumptions, and power plant capability and reliability assumptions.

During its recent IRP work, FPL also utilized three other major assumptions regarding: 1) near-term construction capacity additions; 2) short-term, firm capacity purchase additions; and 3) long-term Demand Side Management (DSM) implementation.

The first of these assumptions is based on FPL's addition of near-term capacity through the construction of several new generating units and enhancement of generating capacity at existing generating units. WCEC Unit 1 will provide a nominal 1,219 MW (net) in 2009, and WCEC Unit 2 will provide an additional nominal 1,219 MW (net) in 2010. In addition, FPL has recently filed for FPSC approval of a total of 414 MW increased capacity at FPL's existing four nuclear units in the 2011 and 2012 time frame. This 414 MW of uprated nuclear capacity is in addition to capacity projected in FPL's 2007 Site Plan.

The second of these assumptions involves short-term, firm capacity purchase additions. These firm capacity purchases are from a combination of utility and independent power producers. Information regarding the total capacity and duration of purchases currently under contract is presented in FPL's 2007 Site Plan. In addition to the purchase amounts presented in the 2007 Site Plan, for capacity planning purposes FPL is assuming that 143 MW of renewable purchase contracts currently set to expire in the 2009–2011 time frame will be extended. Also, FPL assumes that 144 MW of new renewable purchase offerings submitted to FPL in response to FPL's 2007 Renewable Energy Request for Proposals will be added. These 287 MW of renewable purchases are in addition to capacity projected in FPL's 2007 Site Plan.

The third of these assumptions involves DSM. Since 1994, FPL's resource planning work has used the DSM capacity called for in FPL's FPSC-approved DSM Goals and DSM Plan in its analyses. In FPL's most recent planning work, its new DSM Goals that address the years 2005 through 2014, approved by the FPSC in August 2004, were included in the FPL's reliability assessment. Also included in the reliability assessment were over 500 MW of additional cost-effective DSM through



2014 that has been identified, and approved by the FPSC as part of DSM Plan, since the time the DSM Goals were approved.

All of these assumptions were included in the reliability assessment that led to a projection that FPL needs additional capacity starting in 2011 and increasing every year thereafter. This projection is based on a dual-planning criteria of a minimum peak period reserve margin of 20 percent (FPL applies this to both summer and winter peaks) and a maximum loss-of-load probability (LOLP) of 0.1 day per year. Both of these criteria are commonly used throughout the utility industry.

FPL's planning work showed that with no additional resources beyond its existing generating units and purchases, plus the new purchases, DSM implementation, WCEC Units 1 and 2 and the uprated nuclear capacity mentioned above, FPL would fall below its summer reserve margin criterion of 20 percent starting with the summer of 2011. FPL projects that approximately 214 MW of additional resources will be needed by the summer of 2011 and that this capacity need will increase every year thereafter.

Consequently, FPL determined that it needs to add new resources starting in 2011. FPL has chosen to begin the licensing process in 2007 for WCEC Unit 3 to ensure that it will continue to provide reliable electric service to its customers.

1.5.2 Other Considerations

FPL's integrated resource planning work also seeks to address other system considerations. One such system concern is the need to maintain a balance between electrical load in the Southeastern Florida (Palm Beach, Broward, and Miami-Dade Counties) region and generating capacity located within this region. Maintaining this balance assists in regard to economic dispatch of FPL's generating units and in regard to system reliability by having generating units closer to the load centers.

Due to on-going population growth, and the corresponding growth in electrical load, either new generating capacity in the region and/or new transmission capacity into the region must be added to maintain this balance. The imbalance has been temporarily addressed by the recent addition of a new combined cycle generating unit in 2007 at FPL's existing Turkey Point site. WCEC Units 1 and 2, plus the proposed uprated nuclear capacity at Turkey Point Units 3 and 4, will serve to further



address this concern. The addition of WCEC Unit 3 will also serve to address this imbalance for additional years.

1.5.3 FPL's Request for Proposals

A new combined cycle unit such as WCEC Unit 3 falls under the FPSC's "Bid Rule" (Rule 25-22.082, F.A.C.). This rule requires electric utilities seeking to build such units to first solicit bids from interested parties in order to determine whether the utility's construction of this unit is the most economical alternative available. Consequently, FPL plans to issue a Request for Proposals in late 2007. The RFP will be announced in advertisements and press releases in numerous national and Florida newspapers and trade publications.

After a comprehensive evaluation of all eligible proposals, if FPL determines that the Project is the best, most cost-effective option to meet all or a portion of the needs of its customers, FPL will submit a Petition to Determine Need to the FPSC. That Petition, along with supporting documentation, will address the manner in which WCEC Unit 3 will meet the need for electric system reliability and integrity and the need for adequate electricity at reasonable cost, whether the Project is the most cost-effective alternative available, and whether there is conservation available to mitigate the need for the Project.

1.6 Benefits of the Project

The Project will provide the most cost-effective, reliable, self-build resource to meet FPL customers' incremental capacity needs starting in 2011, while providing additional relief to the on-going system concern of maintaining a balance between electrical demand and generation in the Southeastern Florida region.

The Project also provides positive economic benefits including increased employment and local expenditures for equipment and services during construction and operation of the units. Reclaimed water will be used as the primary water source for the Project, thereby reducing the environmental impacts to ground and surface waters in the area.



1.7 Summary of Public Outreach Program

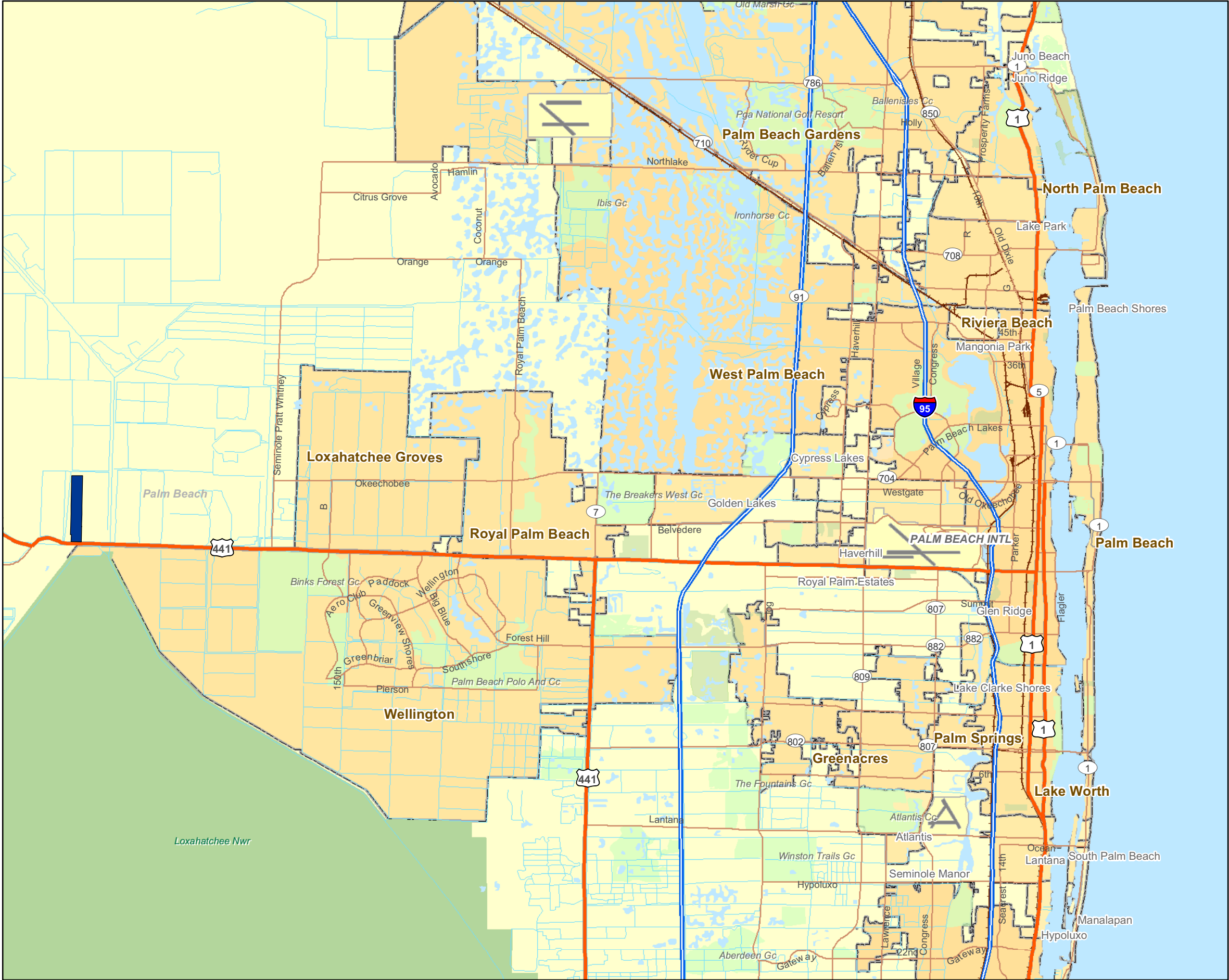
Representatives of FPL have been involved with the local community for many years, including providing ongoing communication about the Company's activities and plans. FPL believes it is important to involve the community in the development of projects that are designed to generate and deliver power to its customers.

The goal of the WCEC Outreach Program is to provide opportunities to share information with neighbors and other interested parties to obtain their views and address their concerns. FPL initiated the WCEC Outreach Program in 2005 with the licensing of Units 1 and 2. Outreach for Units 1 and 2 consisted of conducting numerous presentations to homeowners' associations, chambers of commerce, and civic clubs. Open houses were held in the neighborhoods of Loxahatchee and Royal Palm Beach. Articles about the Unit 1 and 2 Project were developed for homeowners' association newsletters and a Project brochure was created.

The WCEC Unit 3 Outreach Program has already begun to residents who live near the plant, as well as state, regional and local government officials and staff. Once the application is filed, FPL will expand the outreach program, not only to those communities within 5 miles of the plant, but also to additional communities and groups in the county. Primary activities include continued dialogue with citizens through one-on-one discussions, group meetings, presentations, and other opportunities as may be of interest to residents. Activities are focused on listening to people's needs, issues, and concerns. Available opportunities for the public to initiate communications with FPL include a web site (www.fpl.com/westcounty), a toll free number (1-800-581-3990), and an email address (west_county_email@fpl.com). FPL is committed to responding to people's comments and questions in a timely manner and learning how to best communicate with them. FPL's goal is to be the first and best source of information about the Project.



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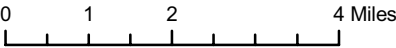


LEGEND

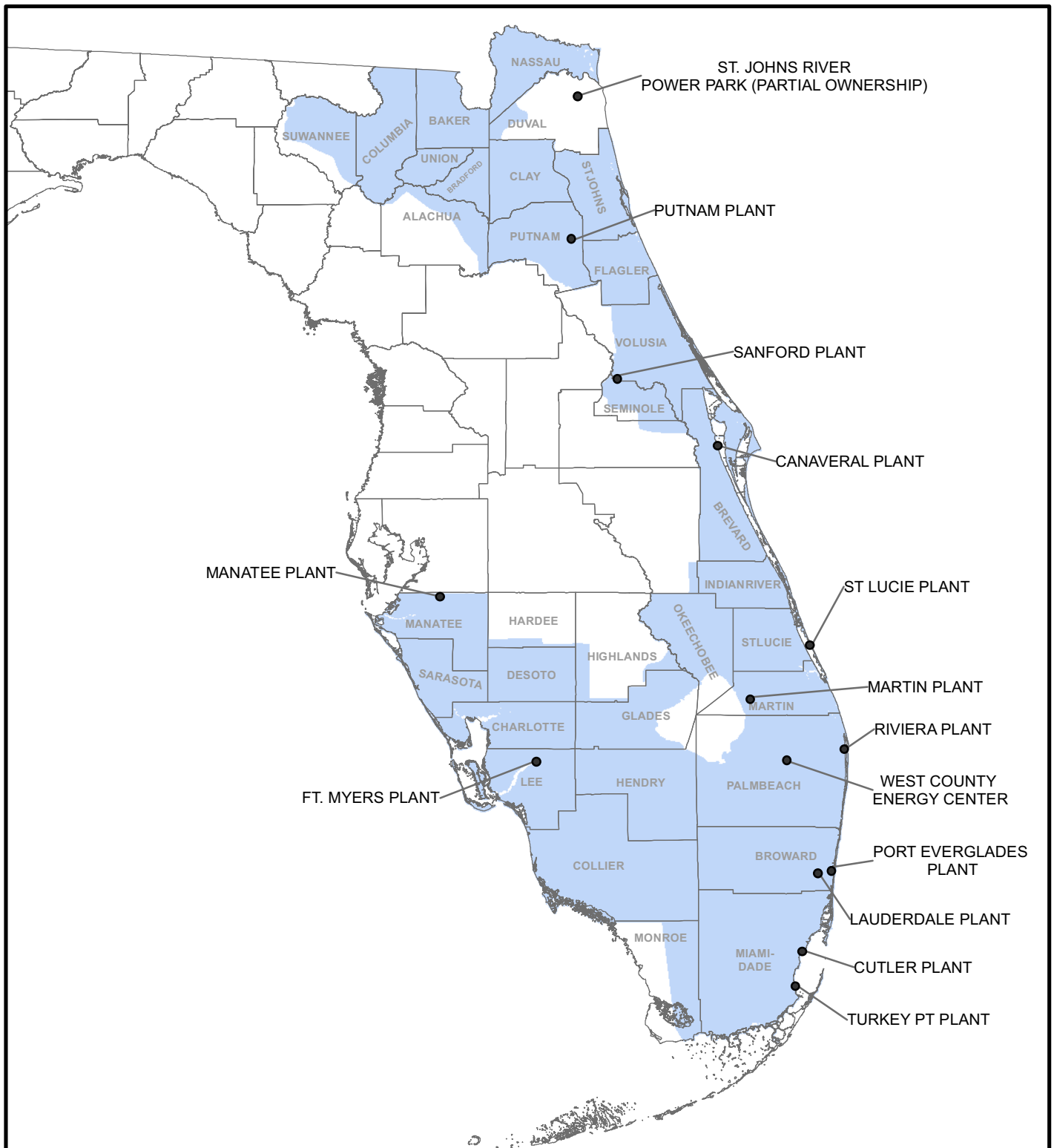
 FPL West County Energy Center

REFERENCE

1. ESRI Media Kit Data and Maps.
2. WCEC Location FPL.
3. Loxahatchee NWR US Fish and Wildlife Service 7/10/2002.
4. Wellington Boundary, Village of Wellington 11/14/07



PROJECT		WEST COUNTY ENERGY CENTER	
TITLE		SITE LOCATION	
	PROJECT No. 073-87652		SCALE AS SHOWN
	DESIGN	KK	11/13/07
	GIS	RL	11/14/07
	CHECK	NV	11/14/07
		REVIEW	KK
			11/19/07
		FIGURE 1.1.0-1	



LEGEND

- FPL Power Plants
- FPL Service Territory

REFERENCE

1. Power plant locations, & service area, FPL, 2007

0 37.5 75 150 Miles



PROJECT				WEST COUNTY ENERGY CENTER			
TITLE				SERVICE TERRITORY			
				PROJECT No. 073-87685		SCALE AS SHOWN	REV. 0
				DESIGN	KK	11/28/07	FIGURE 1.2.0-1
				GIS	RL	11/28/07	
				CHECK	SM	11/28/07	
				REVIEW	KK	11/28/07	

2.0 SITE VICINITY CHARACTERIZATION

2.1 Site Location

The West County Energy Center (WCEC) is located on approximately 220 acres in unincorporated Palm Beach County (the Site) (Figure 2.1.0-1). The Site is located north of State Road 80 (also known as Southern Boulevard, U.S. Highway 441 and U.S. Highway 98) and 3 miles west of Pratt-Whitney Road in Sections 29 and 32, Township 43 South and Range 40 East. Figures 2.1.0-2 through 2.1.0-5 present recent oblique aerial photographs taken in October 2007.

2.1.1 Existing Site Uses

Units 1 and 2 of the WCEC were approved in 2006 for two combined-cycle units (PA 05-47). The entire 220-acre site was certified in the 2006 approval. Through this application, FPL is seeking certification for Unit 3, an additional 1,250-MW (nominal) combined-cycle unit. Units 1 and 2 of the WCEC are currently under construction.

2.1.2 Adjacent Properties and Nearby Areas

The land uses adjacent to the Site are predominantly agriculture, mining, and additional utility infrastructure. (See Figures 2.1.0-2 through 2.1.0-5 for recent aerial views of the Site and nearby areas.) FPL's Corbett Substation is located north of, and adjacent to, the Site. FPL's existing 500 kV transmission corridor is located adjacent to the western boundary of the Site. Ongoing mining activities conducted by Palm Beach Aggregates, Inc. (PBA) are north and east of the Site.

PBA has entered into an agreement with the South Florida Water Management District (SFWMD) to construct water storage ponds near the Site. The SFWMD water-storage ponds extend eastward to the L8 Canal.

The Village of Wellington is the closest municipality to the Site and is located south of the Site and State Road 80. Loxahatchee Groves, the second closest municipality to the Site, is located approximately 4.5 miles east of the Site. Other residential neighborhoods in the vicinity of the Site are shown in Figure 2.1.2-1. The closest residence is in the Deer Run subdivision and is approximately 0.7 miles northeast of the northeast corner of the Site.

2.1.3 Uses Within the Site

Units 1 and 2, currently under construction, will be able to produce 1,250 MW (nominal) each. Unit 3 will be the same design (i.e., 3-on-1 combined-cycle configuration) as WCEC Units 1 and 2.



The 3-on-1 configuration will consist of three G-class CTs and associated HRSGs and a new steam electric turbine. The steam electric turbine for this particular configuration will be the same nominal capacity and include a mechanical draft cooling tower for condenser cooling. The facilities to be located on the Site are depicted in Figure 2.1.3-1.

The power block area for Unit 3 will occupy approximately 30 acres while approximately 45 acres will be used for the new electrical switchyard and construction facilities.

2.1.4 One Hundred-Year Flood Zone

Prior to the construction of WCEC, the site was elevated with soil excavated by PBA from adjacent areas. The current elevation of the Site is nominally 25 feet with respect to the national geodetic vertical datum (NGVD) of 1929, above the 100-year floodplain, while the surrounding areas are within the 100-year floodplain.

2.1.5 Property Delineation

Boundary survey maps of the Site are presented in Figures 2.1.5-1a, 2.1.5-1b, and 2.1.5-1c.

2.2 Socio-Political Environment

2.2.1 Governmental Jurisdictions

The Site is located in unincorporated Palm Beach County. The Village of Wellington is the closest municipality to the Site, according to the Palm Beach County Planning and Zoning Department's Municipal Boundaries Map, and its closest boundary is south of the Site and State Road 80. The Town of Loxahatchee Groves, which was incorporated in 2006, is the second closest municipality to the Site, approximately 4.5 miles east of the eastern Site boundary. Figure 2.2.1-1 depicts an area map showing a 1-mile radius around the proposed stack location. Figure 2.2.1-2 depicts an area map with 1-, 2-, 3-, 4-, and 5-mile radii around the proposed stack location.

The Loxahatchee National Wildlife Refuge's (NWR) northern boundary is located approximately 0.3 mile south of the southernmost Site boundary. The Loxahatchee NWR is described in Subsection 2.2.5.

2.2.2 Zoning and Land Use Plans

During the initial site certification proceeding for the WCEC, the Power Plant Siting Board entered a final order on March 17, 2005 determining the 220-acre WCEC Site to be in compliance with the land use plans and zoning ordinances of unincorporated Palm Beach County, pursuant to section

403.508(2), F.S. (2005). See Appendix 10.3. FPL has subsequently proposed to increase the onsite generating capacity at the WCEC Site from the previously identified capacity of 3300 MW to 3800 MW due to the greater generating capacity of the planned unit using the previously-approved fuels, but without increasing the total number of planned units on the Site (i.e., three combined cycle units), and without enlarging the Site's boundaries. The Palm Beach County Board of County Commissioners approved, on November 29, 2007, an amendment to the previous county-issued amended Development Order for the WCEC site to allow for an increase in the capacity of the onsite generating units from 3300 to 3800 MW. The Board's decision reflects its determination that the WCEC site remains consistent with the County's adopted comprehensive plan and in compliance with the County's zoning regulations, among other matters (see Appendix 10.3).

2.2.2.1 Future Land Use

The Site is located in unincorporated Palm Beach County. Palm Beach County has adopted a Comprehensive Plan to meet the requirements of the Local Government Comprehensive Planning and Land Development Regulation Act, Chapter 163, Part II, Florida Statutes, and Chapter 9J-5, Florida Administrative Code. The Plan was last revised in August, 2007.

The Directions, Goal, Objectives, and Policies of Palm Beach County's Future Land Use Element reflects the long term planning directions of the BOCC. Under that Element, the Site has a Future Land Use designation of RR 10. Under Future Land Use Policy 2.2.1-d, which applies to the Site, allowed non-residential uses in the Transportation and Utilities Future Land Use designations are also allowed in residential land use areas, including RR 10, when criteria established in the Comprehensive Plan are met, as determined by the BOCC. On January 3, 2002 and on November 29, 2007, the BOCC issued amended Development Orders approving use of the Site for a power plant, both reflecting the County's determination that these established criteria have been met (see Appendix 10.2).

2.2.2.2 Zoning

To ensure that all development in unincorporated Palm Beach County is consistent with the Comprehensive Plan, compatible with surrounding uses, served by adequate public facilities, and sensitive to natural resources, the County has established a series of zoning districts and overlays. Each district has its own purpose and permitted uses, conditional uses, special uses, and other regulations that control the use of land. Under the zoning regulations, there are 14 overlays, 18 standard zoning districts, six Planned Development Districts, and three Traditional Development Districts established.



The Site is located in the Specialized Agriculture (SA) Zoning District, but this zoning district has been eliminated by County Ordinance 2003-067, which provided that the previous SA zoning district would thereafter correspond to the Agriculture Production (AP) district in the Glades Zoning Overlay Tier, within which the Site is located. Therefore, the Site is subject to the Palm Beach County AP zoning regulations. Electrical power plants were and remain an allowed use in the SA and AP Districts, subject to conditional use approvals. There have been several development orders that affect the Site and adjacent properties that have been issued as conditional use approvals, including the most recent one approved on November 29, 2008. These have been in the form of several development approvals for the Site through previous petitions for development approval, including the recent approval of the Site for use for 3,800 MW (see Appendix 10.2).

2.2.3 Demography and Ongoing Land Use

From 2000 to 2005, the population of Palm Beach County increased 11.9 percent. The median population projection for all of Palm Beach County for 2015 indicates continued growth, with an estimated population of about 1,556,100. Census Tract 79.03 surrounds the Site, encompassing a large area extending into the Loxahatchee NWR. The 2000 census count for Census Tract 79.03 is 5,629. Census Tract 78.08 borders the eastern side of Census Tract 79.03 and is within 5 miles of the Site. For Census Tract 78.08, the 2000 census count was 4,139. Census Tract 77.21 is southeast of the Site and also within 5 miles. For Census Tract 77.21, the 2000 census count was 4,781.

The table below shows the existing populations using the data projections from the latest Florida Statistical Abstract [University of Florida, Bureau of Economic and Business Research (UF/BEBR), 2006]. The Village of Wellington was estimated to have 53,429 residents in the year 2005, while the entire county was estimated to have 1,265,900 residents (UF/BEBR, 2006). Wellington's population increased 39.8 percent from 2000 to 2005. In 5 years the Village of Wellington grew more than 39 percent, while Palm Beach County grew almost 12 percent.

	Census 2000	Estimate 2005	Percentage Change
Palm Beach County	1,131,191	1,265,900	11.91
Village of Wellington	38,216	53,429	39.81
Unincorporated	521,447	559,438	7.29

Existing land use patterns in the vicinity of the Site are depicted in Figure 2.2.3-1. Land use adjacent to the Site's property boundary includes mining, agricultural, utility infrastructure and undeveloped land. The predominant land uses out to a 5-mile radius from the Site are mining, agricultural,

conservation and urban/residential. The closest residential property is located about 0.7 mile to the northeast of the Site. Other land uses in this radius include the Loxahatchee NWR, located 0.3 mile south of the site, and the Sheriff's Shooting Range Training Facility which is located approximately 0.3 mile southwest of the Site.

2.2.4 Easements, Title, Agency Works

No new easements, title, or agency works approvals are required for WCEC Unit 3.

2.2.5 Regional Scenic, Cultural, and Natural Landmarks

The Loxahatchee NWR's northern boundary is located approximately 0.3 mile south of the Site boundary. The Loxahatchee NWR is State-owned land that was established in 1951 as a National Wildlife Refuge and is managed by the U.S. Fish and Wildlife Service (USFWS). The Loxahatchee NWR comprises over 221 square miles. The Refuge offers many recreational opportunities for outdoor enthusiasts, including walking trails, a canoe trail, a bike trail, boat ramps, a fishing platform, observation towers, a butterfly garden, and a Visitors Center.

The northern portion of the Loxahatchee NWR closest to the Site provides a public access point that includes a boat ramp, dock, and restrooms. The main public access point to the Loxahatchee NWR is located west of Boynton Beach on Lee Road west of U.S. 441, approximately 20 miles southeast of the Site. This public access contains the Headquarters Area for the Loxahatchee NWR and includes a visitors' center, administration office, walking trails, observation areas, a boardwalk, a boat ramp, a bike trail, and a canoe trail.

2.2.6 Archaeological and Historical Sites

The Florida Master Site File (FMSF) lists no previously recorded cultural resources within the Site boundaries. The FMSF does list five previously recorded archaeological sites within 5 miles of the project area.

2.2.7 Socioeconomics and Public Services

2.2.7.1 Labor Force

The total labor force in Palm Beach County for 2005 was 613,839, with employment of 588,998. Unemployment in 2005 was 24,841, or 4 percent. For the State of Florida, the unemployment rate was 3.8 percent, and the U.S. unemployment rate was 5.1 percent. Average monthly private-sector employment by major industry groups in Palm Beach County for 2005 is depicted below:

Major Industry Group	Employment	Major Industry Group	Employment
Agriculture, Forestry, and Hunting	7,738	Professional Scientific and Technical Services	34,589
Mining	44	Information	10,928
Construction	41,945	Real Estate, Rental and Leasing	14,120
Manufacturing	19,430	Management Companies and Enterprises	8,410
Transportation, Warehousing	7,717	Administration and Support	58,999
Wholesale Trade	20,566	Educational Services	7,129
Retail Trade	69,789	Other Services	21,339
Finance and Insurance	24,374		
Unclassified	749		

The Retail Trade and Administration and Support industry groups provided the most employment in Palm Beach County with about 12 and 10 percent, respectively, of total county-wide employment. The Construction industry provided about 42,000 jobs. The County's 2005 employment increased over 2004 employment for seven of the specific major industry groups.

Statewide, construction employment is estimated to increase from 546,810 in 2005 to 660,509 in 2013 (UF/BEBR, 2006).

2.2.7.2 General Income

Palm Beach County had an estimated per-capita personal income of \$44,518 in 2004 compared to the State of Florida and U.S. per-capita personal income of \$31,469 and \$33,050, respectively (UF/BEBR, 2006). This income level ranked first among the 67 counties in Florida. Approximately 99.2 percent of earned income in the County is derived from non-farm origins.

Median household income in Palm Beach County was \$42,979 in 2003 (UF/BEBR, 2006). This income level ranked the county eighth out of 67 Florida counties in median household income, and represents a household income level that is approximately 9 percent higher than the statewide average (UF/BEBR, 2006). Average wage and salary earnings in Palm Beach County in 2004 were \$44,518 (UF/BEBR, 2006), which was higher than the statewide average of \$31,469.

2.2.7.3 Housing

The total number of housing units in Palm Beach County and Wellington in the 2000 Census is shown below by occupancy type:

	Palm Beach County	Wellington
Renter-Occupied	120,151	2,305
Owner-Occupied	354,024	10,586
Other	82,253	1,414
Total	556,428	14,305

Transient accommodation in Palm Beach County is substantial. A total of 1,644 lodgings exist, representing 85,960 lodging units. The total number of apartment building, rooming house, rental, condominium, and transient apartment building units in the County totaled 69,985 in 2006 (UF/BEBR, 2006).

2.2.8 Area Public Service and Utilities

2.2.8.1 Education

Public education in Florida is operated on a countywide basis. Each county's respective school district establishes educational policies and staffing requirements. Palm Beach County had a total enrollment of 171,620 for the 2004-2005 school year. Palm Beach County schools employed approximately 21,877 full-time employees in the early part of 2007 (School District of Palm Beach County).

A total of 185 elementary and secondary schools exist in the county. The closest public school to the Site is Loxahatchee Groves Elementary, located approximately 5.3 miles east of the Site according to the Palm Beach County School District. There are no existing public schools within 5 miles of the Site.

2.2.8.2 Transportation

The Site is located north of State Road 80 (also known as Southern Boulevard, U.S. Highway 441 and U.S. Highway 98). State Road 80 is a major east-west corridor that traverses the middle of Palm Beach County. State Road 80 in the vicinity of the site is a four-lane, divided, major arterial highway. Access to the Site for Unit 3 is from State Road 80 by a private road constructed by PBA. This road is the same as for Units 1 and 2. FPL also has a service road to the Corbett Substation along the 500-kilovolt transmission corridor on the west side of the Site, which will serve as an alternative access to the Site.

The latest Average Annual Daily Traffic (April 30, 2007) for Station 0019, which is the closest traffic count station to the east of the project entrance, is 5,800 in an eastbound direction and 6,100 in a

westbound direction. These counts represent an overall 6-percent increase in Eastbound traffic and a 3-percent increase in Westbound traffic since the initial WCEC submittal in 2005.

2.2.8.3 *Medical Facilities*

Palm Beach County has 21 hospitals. Emergency medical transport is provided within Palm Beach County by emergency medical technicians stationed at most of the county's fire stations. Licensed medical practitioners in Palm Beach County include 3,589 physicians, 1,775 dentists and dental hygienists, 4,313 health practitioners, 15,345 nurses, and 1,526 opticians and pharmacists (Florida Statistical Abstract, 2006).

Palms West Hospital in Loxahatchee is a health care provider located approximately 8 miles east of the Site. Palms West is a 175-bed facility that provides emergency facilities and services as well as numerous surgical and non-surgical programs. The Emergency Medical Service Division of Palm Beach County Fire and Rescue Department provides emergency medical transport services throughout the County, including the Site.

2.2.8.4 *Firefighting Facilities*

The Palm Beach County Fire and Rescue Department provides service in the vicinity of the Site as well as response to hazardous material incidents. During 2006, the Palm Beach Fire and Rescue Department responded to a total of 100,053 calls. Sixty-nine percent of the total service calls were for medical rescue. There are 44 stations, with a daily firefighter staffing minimum of 247.

The fire station closest to the Site, Station 20, is located 6 miles east of the Site. Station 20 has two rescue engines, one of which is equipped with a >1,000-gallon per minute (gpm) top-mount pump and carries 750 gallons of water. This unit also functions as an Advanced Life Support Paramedic Unit. Station 20 also has a Brush 20 all-wheel-drive truck, which is capable of pumping 500 gallons of water per minute. The truck carries 750 gallons of water.

2.2.8.5 *Police Protection*

The Palm Beach County Sheriff's Department provides law enforcement in the unincorporated areas of the county, including the Site.

2.2.8.6 *Recreation Facilities*

Palm Beach County and the surrounding region offer many recreational activities. The Palm Beach Parks and Recreation Department manages over 8,000 acres and 74 facilities (64 county-operated and 10 leased to municipalities). According to the Palm Beach County Parks and Recreation Department, the closest county recreation facility is Loxahatchee Groves Park, which is approximately 9 miles east of the Site. The closest municipal park is Aero Club Park in the Village of Wellington, which is approximately 5.2 miles southeast. The Sheriff's Shooting Range Training Facility is located approximately 0.3 mile southwest of the Site.

Lion Country Safari is a private animal attraction that is located approximately 2 miles northeast of the Site. This attraction has over 900 animals in the drive-through preserve and an exhibit area.

The recreational facilities of the Loxahatchee NWR are described in Subsection 2.2.5.

2.2.8.7 *Electricity and Gas*

Electricity is provided to Palm Beach County businesses and residents by FPL and City of Lake Worth Utilities. Natural gas is supplied to Palm Beach County by a Florida Gas Transmission (FGT) pipeline and distributed to commercial and residential customers by TECO Peoples Gas and Florida Public Utilities Company. The natural gas lateral to the Site for Units 1 and 2 has been sized to accommodate the demand for natural gas for Unit 3 by Gulfstream Natural Gas System.

2.2.8.8 *Water Supply Facilities*

Potable water in Palm Beach County is obtained from the surficial and Floridan aquifers and surface water. Residents in Palm Beach County obtain potable water from a variety of water systems, including governmental or private systems or individual wells. The government and private wells are regulated by FDEP and SFWMD. The Site is located within the Palm Beach County Water Utilities Department Service Area. Palm Beach County is currently extending service to the Site.

Palm Beach County Water Utilities Department obtains the majority of its water from the underground surficial aquifer through well fields. There are four water treatment plants located in Palm Beach County. Each of the four water treatment plants has associated well fields and water quality monitoring programs.

2.2.8.9 *Sewage Treatment Facilities*

The Site is located within the Palm Beach County Water Utilities Department Service Area. Palm Beach County businesses and residents are generally served by septic tanks or regional facilities.



Septic tanks provide service to individual residences or small developments, mostly in rural areas. Regional facilities are large systems that serve areas of densely populated development. There are two regional facilities that serve the majority of businesses and residences in Palm Beach County.

2.2.8.10 Solid Waste Disposal

The Solid Waste Authority (SWA) of Palm Beach County is responsible for solid waste collection, transport, and disposal in the unincorporated portions of the county. SWA has several facilities located throughout all parts of the county. SWA offers one landfill, five transfer stations, one waste energy facility, and several recycling centers. The North County Regional Disposal Facility is located approximately 15 miles northeast of the WCEC at 6554-B North Jog Road, West Palm Beach.

2.3 Bio-Physical Environment

2.3.1 Geohydrology

The geology and hydrogeology of the Site vicinity has been extensively studied. The general geology and hydrogeology of Palm Beach County was presented in “Hydrogeology and the Distribution of Salinity in the Floridan Aquifer System, Palm Beach County, Florida” (Reese and Memberg, 2000). As an interim product of the Aquifer Storage and Recovery (ASR) Regional Study, Ron Reese (USGS) and Emily Richardson (SFWMD) prepared a report entitled “Preliminary Hydrogeologic Framework” (Reese and Richardson, October 2004). The objective of this study was to synthesize previous major regional works on the Floridan Aquifer System (FAS) into a single comprehensive view of the hydrostratigraphy and hydraulic properties of the FAS from Orlando to Key West. Site-specific subsurface information was presented in a Preliminary Geotechnical Investigation performed at the Site (Golder, 2002) and in a letter regarding compliance with a backfill agreement between PBA and FPL (BCI, 2004). Recent site-specific geohydrologic information on the Upper Floridan Aquifer (UFA) system and the Lower Floridan Aquifer (LFA), down to and including the Boulder Zone, was obtained from two exploratory wells (EW-1 and EW-2) that were constructed for FPL in accordance with Underground Injection Control (UIC) permits (McNabb Hydrogeologic Consulting, Inc., June 2007). Exploratory well EW-1 was drilled to a depth of 2,510 feet below pad level (ft-bpl) at the north end of the Site. Exploratory well EW-2 was drilled to a depth of 3,410 ft-bpl at the south end of the Site.

The information presented in this Section draws heavily upon these previous studies and provides a brief summary of the geohydrologic baseline information.



2.3.1.1 *Geologic Description of the Site Vicinity*

The generalized geology and hydrogeology for Palm Beach County, including the Site, is shown in Figure 2.3.1-1. Based upon review of the U.S. Geological Survey (USGS) Loxahatchee, Florida, quadrangle map, dated 1971 and photo-revised 1984, the Site has a natural ground surface elevation of approximately 12 feet above mean sea level (ft-msl) NGVD. The Site was filled prior to the approval of WCEC to an elevation of approximately 25 feet NGVD. According to the Soil Survey of Palm Beach County Area, Florida, published by the U.S. Department of Agriculture, Soil Conservation Service (SCS), the Site (prior to development) was occupied by Holopaw fine sand. This is nearly level, poorly drained sand that has loamy subsoil at a depth of 40 to 72 inches. Under natural conditions, the water table (i.e., absent drainage improvements) was near the ground surface.

According to Dr. H.K. Brooks' publication "Guide to the Physiographic Divisions of Florida" (1981), the Site lies near the somewhat gradual transition between the Eastern Flatwoods District (Green Ridge-Loxahatchee Karst) and the Gold Coast and Florida Bay District (Everglades, Andytown Ridges and Sloughs). The Green Ridge-Loxahatchee Karst is described as poorly drained open flatwoods with cypress strands and heads, while the Andytown Ridges and Sloughs is a freshwater marsh with varying thickness of peat.

Rock units ranging in age from Paleocene to recent underlay the Site. Formations and groups discussed in this report include (from oldest to youngest): the Cedar Keys Formation of Paleocene age; Oldsmar Formation of early Eocene age; Avon Park Formation of middle Eocene age; Ocala Limestone of Late Eocene age; Suwannee Limestone of early Oligocene age; Hawthorn Group of Miocene and late Oligocene age; and the Tamiami Formation of Pliocene (Reese and Memberg, 2000).

The uppermost unit underlying the Site is primarily composed of unconsolidated sand and marl, with localized lenses of shell and limestone. Previous studies indicate that these sediments are part of the Fort Thompson Formation and Pamlico Sand deposited during the Pleistocene Epoch (Miller, 1986).

The following is a summary of the lithology and approximate thickness of each geologic unit anticipated at the Site, based on well logs and cross sections completed for nearby well installations. Figures 2.3.1-2 and 2.3.1-3 show regional geologic cross sections.

In general, the Cedar Keys Formation is subdivided by lithologic character and corresponding geophysical log characteristics into six units (Winston, 1994). In descending order they are: Unit A, characterized by a preponderance of anhedral and cryptocrystalline dolomite; euhedral dolomite is

subordinate. Unit B is characterized by the presence of numerous relic grain textures in chalky to microcrystalline euhedral dolomite. Unit C is predominately anhydrite, with subordinate chalky to very fine microcrystalline euhedral dolomite. Unit D is characterized by a predominance of relic grains in a chalky to very fine microcrystalline euhedral dolomite, with few thin bedded anhydrites. Units E and F are similar in texture to Unit D, but contain fewer beds of relic grain texture.

The Oldsmar Limestone is highly fractured and cavernous dolomite. The Oldsmar Formation is about 1,000 to 1,200 ft thick in the study area, and its lithology is predominantly micritic limestone. At the Site, the top of the Oldsmar Limestone is 2,665 feet below ground surface (ft-bgs). The lower, approximately 300- to 600-ft section of the Oldsmar Formation, locally called the Boulder Zone, is predominantly dolomite and contains massively bedded, cavernous, or fractured dolomite of high permeability and dense, recrystallized dolomite of low permeability. The top of this formation is located approximately 2,800 ft-bgs.

The Avon Park Formation is about 1,700 ft thick at the Site and is composed predominantly of micritic or chalky to fine-grained limestone with low permeability. This geologic unit is characterized on gamma-ray logs as having relatively low natural radioactivity, generally less than 20 to 30 American Petroleum Institute (API) standard units. Porosity can be as high as 50 percent at or near the top of the formation and gradually decreases with depth, as shown by porosity type well logs, which indicate total porosity. Based on data from exploratory well EW-2, this unit occurs between 975 and 2,665 ft-bgs. The upper portion of the Avon Park Formation (between 975 and approximately 1,650 ft-bgs) is part of the Upper Floridan Aquifer. Confining units between 1,650 and 1,950 ft-bgs (called the lower middle confining unit MC2 by Reese & Richardson, 2004) separate the Upper Floridan Aquifer from the Lower Floridan Aquifer. The first permeable zone in the Lower Floridan Aquifer (LFA-PZ1) is found between 1,950 and 2,150 ft-bgs. The lowermost Underground Source of Drinking Water (USDW -- defined by total dissolved solids concentration of 10,000 mg/l) was found at the Site to be 1,950 ft-bgs. In other words, the USDW is found at the top of the LFA-PZ1, and the salinity transition zone occurs within LFA-PZ1. The confining units in the lower portion of the Avon Park Formation, between 2,150 and 2,665 ft-bgs, serve as the primary confinement between the USDW and the Boulder Zone.

The Ocala Limestone overlies the Avon Park. Regionally, this unit varies in thickness from 0 to 300 ft. At the Site (well EW-2), the Ocala Limestone is about 30 ft thick and occurs from 945 to 975 ft-bgs. This unit is part of the Upper Floridan Aquifer.

The Suwannee Limestone is moderately indurate, very porous calcarenite, interbedded with sandy phosphatic limestones and dolomites. Regionally, this formation varies in thickness from 0 to 150 ft. At the Site, this unit is approximately 30 ft thick and occurs from 915 to 945 ft-bgs. This unit is also part of the UFA.

Rocks of Miocene age at the Site belong to the Hawthorn Group. The Hawthorn Group is divided into lower carbonate and upper clastic sequences. The lower carbonate sequence is composed of poorly to moderately indurate phosphatic micrites and dolomites. The upper clastic sequence is composed primarily of greenish-gray phosphatic silts interbedded with coarse sand and sandstones. The base of the Hawthorn Group occurs at the contact between the Suwannee Limestone and the Lower Hawthorn/Tampa Limestone. In Palm Beach County, the top of the Hawthorn Group occurs at a poorly consolidated sand or sandy silt beneath the biogenic limestones of the Tamiami Formation.

The Tamiami Formation at the Site is thin and difficult to distinguish from the younger biogenic limestones of the Fort Thompson Limestone, which unconformably overlies the Tamiami Formation. The formation is of Pleistocene age and consists of alternating beds of marine shells and freshwater limestones, which are intermixed with the Pamlico Sands (Miller, 1986).

2.3.1.2 Detailed Site Lithologic Description

A detailed lithology was developed for the Site based on numerous borings made at the time of a preliminary geotechnical investigation at the Site (Golder, 2002). The preliminary investigation performed in 2002 included advancing 36 borings to depths of 15 to 80 ft-bgs. The borings included Standard Penetration Testing and soil sampling. The investigation also included performing laboratory testing, installing piezometers, conducting shallow aquifer performance tests, and performing geophysical testing.

Based on the results of the preliminary investigation, the subsurface soils at the Site consisted of topsoil and peat “muck” to a depth of approximately 6 ft-bgs. This layer was underlain by a layer of loose to very loose sand to depths of up to 15 ft-bgs. This layer was underlain by interlayered limestone and loose to very loose sand to depths of about 30 ft-bgs. A layer of dense to very dense well-graded sand was encountered for the remainder of the depth investigated.

Since the time of the preliminary geotechnical investigation, significant grading operations have been performed at the Site. As part of the grading operations, the organic soils were excavated and removed from the Site. Evaluation of the grading operations and additional borings were performed within the Site (BCI, 2004). Prior to placement of backfill material, the foundation conditions were

inspected and areas of unsuitable material, consisting of either organic soils or soft clayey soils, were excavated and removed from the Site. The backfill material, consisting of well-graded sand and shell, was placed hydraulically by dredging a sand layer beneath previously mined areas adjacent to the Site (BCI, 2004).

During and subsequent to backfilling operations, several geotechnical investigations have been performed to evaluate the load-bearing capacity of the Site (Ardaman & Associates, Inc., 2006). The borings indicated the subsurface conditions to be relatively homogeneous, consisting of a surficial layer of medium dense to dense sand fill intermixed with shell, underlain by a very loose to loose layer of sand fill with shell. In several of the borings, a soft clay layer, up to 1 ft in thickness, was encountered at the bottom of the sand fill. It was reported that the relative densities of the fill materials are gradually increasing with time due to consolidation as excess pore water pressure dissipates and drainage occurs. Underlying the clay is a 12-foot-thick layer of partially cemented gravel shells and sand with some silt and clay. Beyond the gravel layer are medium to dense sands.

2.3.1.3 *Bearing Strength*

The Site is suitable for the Project from a geotechnical standpoint. Lightly loaded structures could be supported on shallow foundations established in structural fill. Paving for access roads or parking areas could also be supported by structural fill. Heavily loaded structures will be supported on deep foundations such as piles, drilled shafts, stone columns, or other ground improvement methods to limit settlement to acceptable levels.

2.3.2 *Subsurface Hydrology*

2.3.2.1 *Subsurface Hydrologic Data for the Site Aquifers*

There are four major components to the subsurface hydrogeologic framework of southern Florida: the unconfined surficial aquifer system; the nearly impermeable sediments of the Hawthorn Group, which separates the surficial aquifer from the UFA; the confined Floridan Aquifer System, which includes both the UFA and the LFA; and the Boulder Zone, which is part of the LFA. These components are discussed further below.

2.3.2.2 *Surficial Aquifer System*

The uppermost part of the Surficial Aquifer System (SAS) is primarily composed of unconsolidated sand and marl, with localized lenses of shell and limestone. Previous studies indicate that these sediments are part of the Fort Thompson Formation and Pamlico Sand deposited during the Pleistocene Epoch (Miller, 1986). The surficial aquifer system in the vicinity of the Site is approximately 200 ft thick. Sixteen slug tests were conducted at the Site in the vicinity of the power

block (Golder, 2002). The tests were conducted at three locations and two depth intervals (10 to 20 ft-bgs and 45 to 50 ft-bgs). The measured hydraulic conductivities in the shallow interval ranged from 43.2 to 172.8 feet per day (ft/day), with an average value of 91.8 ft/day and a geometric mean value of 76.1 ft/day (n=9). The measured hydraulic conductivities in the deeper interval ranged from 11.5 to 126.7 ft/day, with an average value of 62.9 ft/day and a geometric mean value of 27.6 ft/day (n=7).

2.3.2.3 Intermediate Confining Beds

The Intermediate Confining Beds are present throughout the County and consist of clay-rich, fine-grained deposits of the Hawthorn Group. The clay-rich lithologies form a confining unit that separates the Surficial Aquifer System from the deeper artesian Floridan Aquifer System. The Intermediate Confining Unit (ICU) is approximately 700 ft thick at the Site and extends to approximately 900 ft-bgs. The calibrated groundwater flow model developed by Lukasiewicz (1992) used a vertical hydraulic conductivity of 3.1×10^{-4} ft/day for the ICU. This would equate to a leakance coefficient of approximately 0.5×10^{-6} feet per day per foot (ft/day/ft), for a 700-ft-thick ICU. The calibrated groundwater flow model developed by Sepulveda (2002) suggests a range for the leakance coefficient of from 10^{-6} to 10^{-5} ft/day/ft.

2.3.2.4 Floridan Aquifer

The FAS in the vicinity of the Site consists of the Upper Floridan Aquifer (UFA), middle confining unit, and Lower Floridan Aquifer (LFA) and ranges in age from Paleocene to Oligocene. Included at its top is part of a lowermost Hawthorn Group unit referred to as the basal Hawthorn unit. The thickness of this basal unit is variable, ranging from about 30 to 355 ft; areas where this unit is thick were paleotopographic lows during deposition of the unit. The uppermost permeable zones in the UFA occur in close association with an unconformity at the base of the Hawthorn Group; however, the highest of these zones can be up in the basal unit. Based on data from the two exploratory wells, the top of the UFA, at the Site, is between 850 and 900 ft-bgs and the base of the UFA is approximately 1,650 ft-bgs. The lower Middle Confining Unit (MC2) is from 1,650 to 1,925 ft-bgs and the LFA-PZ1 is from 1,925 to 2,100 ft-bgs. The Lower Confining Unit (LCU) from 2,100 to 2,800 ft-bgs is the primary confinement between the Boulder Zone and the USDW.

Based on an aquifer test from Lake Lytal Park, which is located approximately 17 miles east of the Site, the transmissivity and storage coefficient for the UFA are 34,400 square feet per day (ft²/day) and .0036, respectively (Lukasiewicz, *et al.*, 2001). The calibrated model developed by Lukasiewicz (1992) suggests UFA transmissivities of 100,000 ft²/day to 200,000 ft²/day in north-central Palm

Beach County and a storage coefficient of 0.004. The model developed by Sepulveda (2002) used transmissivities of 50,000 to 100,000 ft²/day in the UFA.

A map provided in the report by Reese and Richardson (2004) shows the transmissivity of the UFA, in the area of the Site, to be between 10,000 and 30,000 ft²/day. In this report, however, the UFA and the Middle Floridan aquifer (MFA) were separated. The transmissivity of the MFA, as provided by Reese & Richardson (2004), could be an order of magnitude greater than the UFA; but the values are not well established in the area of the Site. It should be noted, while the MFA designation has been used in several previous studies, the designation is not formally recognized. Since water in the MFA is fresh to brackish, in most areas of the state and the USDW is usually at or below the base of the MFA, the MFA is considered by many professional geologists and engineers to be a “lower permeable zone” of the UFA. This definition is used in the SCA.

Water in the UFA, at the Site, is brackish [$1,000 < \text{total dissolved solids (TDS)} < 10,000$]. A lower zone of water with salinity similar to that of seawater (saline-water zone) is present in the lower portions of the LFA. The brackish-water and saline-water zones are separated by a transition zone (typically 100 to 200 ft thick) in which salinity rapidly increases with depth. The transition zone has been defined by using a salinity of 10,000 milligrams per liter (mg/L) of dissolved-solids concentration (about 5,240 mg/L of chloride concentration) at its top and 35,000 mg/L of dissolved-solids concentration (about 18,900 mg/L of chloride concentration) at its base. The base of the brackish-water zone and the top of the saline-water zone were estimated by means of resistivity geophysical logs. The base of the brackish-water zone ranges from about 1,600 feet below sea level (ft-bsl) near the coast to almost 2,200 ft-bsl in extreme southwestern Palm Beach County. In an area that is peripheral to Lake Okeechobee, the boundary rises to perhaps as shallow as 1,800 ft-bsl. At the Site, based on the exploratory well data, the base of the brackish-water zone is between 1,930 ft-bgs and 1,960 ft-bgs.

At the Site, within the UFA, chloride concentrations range from 1,000 to 1,500 mg/L. Through the lower middle confining unit between the UFA and the LFA, chloride concentrations increase to approximately 4,500 mg/L. Through the LFA-PZ1, the chloride concentrations increase to 19,500 mg/L (i.e., seawater).

Boulder Zone

The deeply buried zone of cavernous permeability, called the Boulder Zone, is developed in fractured dolomite in the LFA and underlies most of southern Florida. The top of the Boulder Zone is irregular

and has been identified as shallow as about 2,100 ft-bsl and as deep as about 3,100 ft-bsl in Palm Beach County (Reese and Memberg, 2000). At the Site, it is approximately 2,800 ft-bgs (McNabb, 2007). The permeability of the Boulder Zone is extremely high because of its cavernous nature; transmissivity is approximately 10^7 ft²/day (Reese and Memberg, 2000). This anomalous permeability, which prevents pressure buildup in injection wells, coupled with the fact that the Boulder Zone contains saltwater, makes it a commonly used zone for receiving injected waste waters. The Boulder Zone at the Site is overlain by 600 to 700 ft of low-permeability limestone and dolomite, which retard the upward movement of injected fluids to shallower parts of the FAS that contain water that is less saline, although still brackish.

2.3.2.5 Karst Hydrogeology

Karst terrains develop in areas underlain by carbonate rocks such as limestone. They often have drainage systems that are reflected on the surface as sinkholes, springs, disappearing streams, or even caves (<http://www.dep.state.fl.us/geology/geologictopics/sinkhole.htm>).

According to Map Series No. 10, Sinkhole Type, Development, and Distribution in Florida, (William C. Sinclair and J.W. Stewart, USGS, 1985), the Site is located in Area II, where the cover is reported to be 30 to 200 ft thick. In these areas, sinkholes are reported to be few, shallow, of small diameter, and develop gradually. Furthermore, within the prior borings drilled at the Site, indicators of karst geology such as voids or loss of circulation were not encountered within 200 ft of the surface.

2.3.3 Site Water Budget and Area Users

2.3.3.1 Site Water Budget

Climate and Meteorology

The Site is located in south-central peninsular Florida, which has a climate characterized as mild subtropical. Temperatures in the vicinity (measured at Loxahatchee, Florida) range from an average low of about 51.6 degrees Fahrenheit (°F) in January, to an average high of about 91.6°F in August, with an annual average of about 73.1°F. The highest temperature recorded was 103°F and the lowest was 24°F at Loxahatchee.

As shown in Table 2.3.3-1, the mean total annual rainfall in Loxahatchee, Florida, is 62.62 inches; with mean monthly totals ranging from 2.33 to 9.40 inches. Generally, the period of the year with the heaviest rainfall is from June to October.

Mean total annual evaporation at Structure S5A, as shown in Table 2.3.3-1, is 61.95 inches, with mean monthly totals ranging from 3.13 to 6.98 inches (SFWMD, DBHYDRO Database; 2007).

Groundwater Resources

The two major aquifers in Palm Beach County are recharged by separate sources. The shallow aquifer, from the ground surface to 180 ft below sea level, is primarily supplied by rainfall in Palm Beach County. A small amount of recharge to the shallow aquifer results from seepage of water used for agricultural irrigation. The Upper Floridan (artesian) Aquifer, 900 to 1,650 ft-bgs at the Site, is supplied by rainfall in the topographically high areas centered in Polk and Highlands Counties. A very small amount of water flow (i.e., less than 1 inch per year) recharges the surficial aquifer from the Floridan aquifer due to the artesian pressures in the Floridan aquifer.

Surface Water Resources

The Site is located approximately 20 miles east of the southern end of Lake Okeechobee and approximately 20 miles west of the Atlantic Ocean. Lake Okeechobee, which covers an area of about 740 mi², is connected ultimately to the Atlantic Ocean and the Gulf of Mexico by numerous canals including the West Palm Beach Canal.

Other surface waters in the vicinity of the Site include: SFWMD L8 reservoirs directly east of the Site, PBA ponds west and northwest of the Site, the L8 Canal, which is located east of the Site; L10/L12 Canal, which is south of the Site; the West Palm Beach Canal (C-51); and Water Conservation Area 1. These water resources are discussed in the Water Alternatives Analysis (Appendix 10.7). There is no surface water body located on the Site.

Groundwater/Surface Water Interactions

There is a complex hydrologic interaction between the Surficial Aquifer System and the extensive network of water supply and drainage canals in southeast Florida. These canals, levees, pumps, and water control structures were constructed by the U.S. Army Corps of Engineers (USACE) as part of the Central and South Florida Flood Control Project; they are currently operated by the SFWMD. The FAS is confined by more than 600 ft of low-permeability sediments. Therefore, there is very little interaction between the Floridan and the surficial aquifers. The upward recharge of the surficial aquifer from the FAS is approximately 1 inch per year.

Area Users

Surface water and groundwater use in the vicinity of the Site is regulated by SFWMD. Information gathered from SFWMD was used to prepare the following summary of water uses near the Site.

Figure 2.3.3-1 and Table 2.3.3-2 show the permitted surface and groundwater uses within 5 miles of the Site, most of which are for agricultural irrigation and industrial purposes. Sources of water used

for these purposes include L8 and C-51 Canals, the surficial aquifer, and small lakes/ponds. SFWMD provided the permit data. The SFWMD permit data for water supplies located within 5 miles of the Site are shown in Figure 2.3.3-1. There are no Floridan Aquifer water supply wells within 5 miles of the Site. The closest well using water from the UFA is approximately 15 miles from the Site. There are 10 permitted surficial aquifer public supply wells within 1 mile of the Site.

2.3.4 Surficial Hydrology

2.3.4.1 Hydrologic Characterization

Prominent surface water features near the Site include Lake Okeechobee, the L10/L12 Canal, the S5A Pump Station, the L8 Canal, the L8 reservoirs, the C51 (West Palm Beach) Canal, PBA ponds, and Water Conservation Area 1. These surface water resources are discussed further below and in the Water Alternatives Analysis (Appendix 10.7).

According to an agreement with the SFWMD, PBA mining activities created a water storage reservoir east of the Site. PBA mined down to an elevation sufficient to provide the water volume desired by SFWMD. The SFWMD L8 reservoirs extend eastward to the L8 Canal, and will pump water from and to the L8 Canal.

2.3.4.2 Streamflow Data

The L10/L12 Canal is the nearest major surface water to the Site and is designated by the State of Florida as Class III water. It runs southeast from Lake Okeechobee and connects to Water Conservation Area 1 and the C51 Canal near Pump Station S5A, which is located less than 1 mile southeast of the Site. Based on USGS data from Station No. 02278450, the average flow for the L10/L12 Canal for the period of record from 1957 to 2003 was approximately 409 cubic feet per second (cfs). Maximum flows in the Canal exceeded 4,000 cfs. Table 2.3.4-1 shows the mean monthly discharge in the L10/L12 Canal, the L8 Canal, and the C-51 Canal for the period of record. The canal system is managed by the SFWMD to provide water supply, flood control, and environmental protection. Because the L10/L12 Canal is part of the SFWMD system, the District manages flow and water levels in the canal 1) by releasing water from Lake Okeechobee, 2) by water control structures on the West Palm Beach Canal, and 3) by pumping at the S5A pump station. Consequently, about 40 percent of the time, the flow in the L10/L12 Canal is zero or negative (i.e., the flow is west toward Lake Okeechobee).

The L8 Canal, which is Class III water, also originates in Lake Okeechobee and flows southeast to control structure 5A at the West Palm Beach Canal. East of the Site, the L8 Canal runs in a north-

south direction. Table 2.3.4-1 shows the mean monthly discharge in the L8 Canal, for the period of record, at USGS Station No. 02278550.

The C-51 Canal starts east of structure S-5A, at the point where the L8 Canal crosses the L12 Canal. The C-51 Canal receives flow from L8, L10/L12, and runoff from the drainage basin east and northeast of Water Conservation Area 1. The C-51 Canal discharges to tide at Lake Worth Lagoon. Table 2.3.4-1 shows the average monthly flow at structure S-155A, which is located near State Road 7 (US 441). Monthly average flows in the C-51 at S-155A peak in September and are minimum in January. The annual average flow to tide at S-155A is 292 cfs (see Table 2.3.4-1).

2.3.4.3 *Water Quality*

Extensive water quality analyses are available from SFWMD for samples taken at Pump Station S5A. In addition, samples were recently taken from the L10/L12 Canal near S5A. Table 2.3.4-2 presents historical water quality data available from SFWMD for the L10/L12 Canal from December 1998 through November 2003. Table 2.3.4-3 presents the recent water quality data from SFWMD for the L10/L12 Canal taken near the WCEC inlet location in the L12 canal, and the analytical results of three samples obtained from the intake location on the L10/L12 Canal in 2005. Table 2.3.4-4 presents water quality data for the C-51 Canal.

2.3.5 Vegetation/Land Use

A vegetation/land use survey of the Site and surrounding areas was completed in January 2005 and updated in August 2007 utilizing the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT, 1999). The resulting vegetation/land use map of the Site is found in Figure 2.3.5-1. Vegetative communities in and adjacent to the Site are discussed in detail in Subsection 2.3.6.1.

Vegetation/land use within the 220-acre Site consists of cleared open land (FLUCFCS Code 190) and utilities under construction (FLUCFCS 839). The surrounding vicinity includes improved pasture (FLUCFCS Code 211), the existing Corbett substation (FLUCFCS Code 831), canals (FLUCFCS Code 510), ditches (FLUCFCS Code 511), Brazilian pepper (FLUCFCS Code 422), herbaceous wetlands (FLUCFCS Code 641), the Arthur R. Marshall Loxahatchee NWR, located approximately 0.3 mile to the south of the Site, and a residential subdivision northeast of the Site. The Site was previously utilized for mining, is currently devoid of vegetation, and has been covered with fill material to a nominal elevation of 25 feet NGVD. Units 1 and 2 are currently under construction, with Unit 3 being the subject of this Site Certification Application.

2.3.6 Ecology

2.3.6.1 *Species-Environmental Relationships*

The following subsections include descriptions of important flora and fauna within the Site and surrounding vicinity, including the Loxahatchee NWR. This discussion includes information related to the presence of important wildlife species and the value of the vegetative habitats present. Representative photographs of vegetative communities within the vicinity are found in Appendix 10.5.1. The following descriptions of the flora and fauna at or near the Site follow the FLUCFCS-Level III codes.

Terrestrial Ecology Systems—Flora (within the Site)

Utilities Under Construction (FLUCFCS Code 839)

Prior to construction of WCEC Units 1 and 2, the entire Site was cleared of vegetation, graded, and filled to a nominal elevation of 25 feet NGVD. WCEC Units 1 and 2 are currently under construction at the 220-acre Site.

Terrestrial Ecology Systems – Flora (Adjacent to the Site)

The areas surrounding the Site include improved pasture (FLUCFCS Code 211), the existing FPL Corbett Substation (FLUCFCS Code 831), canals (FLUCFCS Code 510), ditches (FLUCFCS Code 511), Brazilian pepper (FLUCFCS Code 422), and herbaceous wetlands (FLUCFCS Code 641). The Arthur R. Marshall Loxahatchee NWR is located to the south of the WCEC. Dominant species and quality of each vegetative community/land use type are described below.

Mining (FLUCFCS 160)

PBA mining activities occur northwest and west of the Site.

Improved Pasture (FLUCFCS 211)

Improved pasture is located to the west of the Site, within the transmission line right-of-way (ROW) (Appendix 10.5.1, Photograph 3). Portions of the pasture are actively utilized for cattle grazing. The vegetation is dominated by bahia grass (*Paspalum notatum*), Bermuda grass (*Cynodon dactylon*), with occasional Brazilian pepper (*Schinus terebinthifolius*) and agricultural weeds, including ragweed (*Ambrosia artemisiifolia*) and shrubby false buttonweed (*Spermacoce verticillata*).

Canals (FLUCFCS 510)

The SFWMD L10/L12 canal is located immediately south of State Road 80 (Appendix 10.5.1, Photograph 4). Vegetation along the banks of the canal include cabbage palm (*Sabal palmetto*),

Brazilian pepper, elderberry (*Sambucus canadensis*), torpedo grass (*Panicum repens*), and common reed (*Phragmites australis*).

Ditches (FLUCFCS 511)

Man-made drainage ditches are found on the western boundary of the filled Site (Appendix 10.5.1, Photograph 5) and within the cattle pasture located within the transmission line ROW west of the substation access road (Appendix 10.5.1, Photograph 6).

Vegetation occurring in these areas include Brazilian pepper, leather fern (*Acrostichum danaeifolium*), sedges (*Cyperus* spp.), common reed, elderberry, cabbage palm, maidenhair sedge (*Eleocharis* sp.), paragrass (*Urochloa mutica*), primrose willow (*Ludwigia peruviana* and *L. octovalvis*), and maidencane (*Panicum hemitomon*).

Brazilian Pepper (FLUCFCS 422)

The disturbed area between the filled Site and the FPL Corbett Substation access road contains the exotic invasive species Brazilian pepper (Appendix 10.5.1, Photograph 7), as well as a variety of weedy species including ragweed, shrubby false buttonweed, dogfennel (*Eupatorium capillifolium*), groundsel tree (*Baccharis halimifolia*), sandmat (*Chamaesyce* sp.), Juba's bush (*Iresine diffusa*), and beggarticks (*Bidens alba*).

Reservoir (FLUCFCS 532)

The SFWMD L8 reservoir is located east of the Site.

Herbaceous Wetland (FLUCFCS 641)

Disturbed, low-quality herbaceous wetland areas are found between the filled Site and the FPL Corbett Substation access road (Appendix 10.5.1, Photograph 8). Although no standing water was present and soils are disturbed, these areas support wetland vegetation dominated by common reed, elderberry, maidencane, and primrose willow, with subdominant species including cattail (*Typha latifolia*), leather fern, Brazilian pepper, climbing hempvine (*Mikania scandens*), and bushy bluestem (*Andropogon glomeratus*).

Electrical Utilities (FLUCFCS 831)

The existing FPL Corbett Substation is located north of the Site and includes transformers and switch gear for the 230- and 500-kV transmission systems.

Loxahatchee National Wildlife Refuge – Vegetative Communities

The 147,392-acre Loxahatchee NWR is 0.3 mile south of the Site. The L-7 Canal and the L-40 Canal form the western and eastern edges of the Loxahatchee NWR, respectively, while the southern boundary is formed by the Hillsboro Canal and CR 827. The refuge, which contains the State-owned Water Conservation Area 1, is managed by the US Fish and Wildlife Service. The Everglades Agricultural Area is located to the northwest of the refuge. Densely populated urban areas lie to the east of the refuge along the Atlantic coast, while Water Conservation Areas 2 and 3 and the Everglades National Park (NP) are to the south/southwest of the refuge.

The portion of the Loxahatchee NWR located nearest the WCEC site is dominated by freshwater tree islands, marsh, shrubs, and cattails (*Typha latifolia*). Exotic species have extensively colonized the northern, southeastern, and western portions of the Loxahatchee, most notably melaleuca (*Melaleuca quinquenervia*), Brazilian pepper (*Schinus terebinthifolius*), Old World climbing fern (*Lygodium microphyllum*), water lettuce (*Pistia stratioides*), and water hyacinth (*Eichhornia crassipes*). According to the Loxahatchee NWR Comprehensive Conservation Plan (USFWS 2000), the nuisance species cattail dominates the western/southwestern portion of the Loxahatchee NWR. The following discusses the dominant vegetative communities of the Loxahatchee NWR, as described in the Comprehensive Conservation Plan.

Tree Islands

Tree islands comprise approximately 20 percent of the interior of the Loxahatchee NWR and are common in the northern portion of the refuge, ranging in size from less than 1 acre to greater than 300 acres. Typical island vegetation includes a canopy of redbay (*Persea borbonia*) and dahoon holly (*Ilex cassine*), a midstory of wax myrtle, buttonbush (*Cephalanthus occidentalis*) and cocoplum (*Chrysobalanus icaco*), and numerous ferns in the understory. A vast number of tree islands have been impacted by invasive exotic plants, including melaleuca, Brazilian pepper, and old world climbing fern.

Marshes – Sloughs

Much of the Loxahatchee NWR marsh communities are classified as sloughs, relatively deep marsh communities that contain an average of 1–3 feet of standing water, depending upon the season. Dominant vegetation within the marsh communities includes floating-leaved species of lilies (*Nymphaeae* sp., *Nymphoides* sp., and *Nuphar* sp.) and submergent plants such as bladderwort (*Utricularia* sp.).

Wet Prairies

Wet prairies are infrequently inundated communities with hydric soils supporting low herbaceous vegetation such as beakrushes (*Rhynchospora* sp.), St. John's wort (*Hypericum* sp.), sedges (*Cyperus* sp.), spike rushes (*Eleocharis* sp.), yellow-eyed grass (*Xyris* sp.), and redroot (*Lachnanthes caroliniana*). Wet prairies are the most prevalent vegetative community (approximately 50 percent land coverage) in much of the central and eastern portions of the Loxahatchee NWR, and are generally found between sawgrass marshes and sloughs.

Sawgrass

Sawgrass marsh comprises approximately 25 percent of the Loxahatchee NWR, and is characterized by near solid stands of sawgrass (*Cladium jamaicense*). Other species are commonly interspersed amongst the sawgrass, including species common to tree islands, wax myrtle and dahoon holly.

Cypress Swamp

An approximately 400-acre cypress swamp is located on the eastern edge of the Loxahatchee NWR, with a canopy of pond cypress (*Taxodium ascendens*), pond apple, myrsine, lichens and a variety of ferns. Bromeliads of the genus *Tillandsia* are commonly found within the canopy of the cypress swamp.

Cattail

The nuisance species cattail (*Typha* sp.) has spread within the Loxahatchee NWR, likely in response to nutrient inputs. According to the Loxahatchee NWR Comprehensive Conservation Plan, cattails can be found surrounding wading bird colonies, roost tree islands, and alligator holes, in response to the intense pulse of nutrients deposited by the concentration of nesting birds. Other areas of cattail proliferation include the Loxahatchee NWR perimeter canal, in response to years of artificially high levels of nutrients (phosphorous) in the water.

Terrestrial Ecology Systems—Fauna

The wildlife habitat within the Site has been severely altered by past agricultural, mining excavation and filling activities. Vegetation within the Site has been cleared and the entire Site covered with fill material to a nominal elevation of 25 feet NGVD and above the surrounding vicinity, which does not provide suitable habitat for wildlife. Vegetative communities adjacent to the Site are also disturbed

and do not provide quality wildlife habitat. Species observed within the vicinity of the Site are described below.

Common avian species were observed within the improved pasture and Brazilian pepper area west of the Site. These include cattle egret, eastern meadowlark (*Sturnella magna*), killdeer (*Charadrius vociferous*), yellow-rumped warbler (*Dendroica coronata*), and mourning dove (*Zenaida macroura*). Ditches associated with the improved pasture area, while containing no canopy component, still do provide foraging areas for wading birds. Species observed on the banks of these man-made ditches include little blue heron (*Egretta caerulea*) and great blue heron (*Ardea herodias*). Although not observed during the field reconnaissance, it is expected that the L10/L12 Canal is utilized by wading birds for foraging and also provides habitat for the American alligator (*Alligator mississippiensis*).

Threatened and Endangered Species—Flora and Fauna

Plant and animal species designated by the USFWS, the Florida Fish and Wildlife Conservation Commission (FWCC), and the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened, species of special concern, commercially exploited, or under review, were included in this category.

No threatened or endangered species were observed or are expected to utilize the cleared and filled Site. A number of wetland dependent animal species (e.g., wading birds) have the potential to use the drainage ditches and canals in the vicinity of the Site for resting and feeding. These species are common to the area and use other similar habitats that are found throughout the surrounding region.

Threatened and Endangered Species—Methodology

Literature and agency surveys were undertaken to determine the species that could potentially be present in the habitats found on the Site. Primary sources of information are the Florida Natural Areas Inventory (FNAI) database (1997); Florida Committee on Rare and Endangered Plants and Animals (FCREPA) reports; Preservation of Native Flora of Florida Law, Rule Chapter 5B-40, F.A.C.; the Regulated Plant Index (5B-40.0055); and Notes on Florida's Endangered and Threatened Plants, FDACS, Division of Plant Industry, Bureau of Entomology, Nematology and Plant Pathology – Botany Section, Contribution No. 38, Addition 2, Gainesville. A Site Specific Data Report was also obtained from FNAI. In addition, previous reports of surveys conducted in and near the Site were reviewed.

Plant and Animal Surveys

Because of the rareness and seasonality of threatened and endangered species, either multiseason surveys or an evaluation of threatened and endangered species habitat conditions are necessary to determine their presence or absence on the Site. An evaluation of the habitat conditions was used to determine the presence or absence of threatened and endangered species. Based on the literature review, federally and state listed species whose ranges include the Site were identified.

Flora—Threatened, endangered, and/or plant species of special concern that occur within Palm Beach County are listed in Table 2.3.6-1. Due to the impacted nature of the Site, no suitable habitat for listed plant species exists within the Site. The FNAI database review did not result in any occurrences of listed plant species adjacent to the Site, nor were any occurrences noted in the Site Specific Data Report obtained from FNAI (Appendix 10.5.1).

Fauna—Threatened, endangered, and/or animal species of special concern that occur within Palm Beach County are listed in Table 2.3.6-1. No unique habitats for threatened and endangered species occur on the Site. The surrounding improved pasture and associated ditches provide low-quality, but suitable habitat for wading birds, including the little blue heron, which is not listed federally by the USFWS but is classified as a species of special concern by the FFWCC. In addition to the little blue heron, it is likely that other wading birds classified by the State as species of special concern may occasionally utilize the pasture ditches and canal to forage, including the white ibis (*Eudocimus alba*), snowy egret (*Egretta thula*), and tricolor heron (*Egretta tricolor*). The L10/L12 Canal provides suitable habitat for the American alligator, classified by the FFWCC as a species of special concern and classified as threatened by the USFWS due to similarity in appearance with the federally endangered American crocodile (*Crocodylus acutus*).

The FNAI database review and Site Specific Data Report did not result in any occurrences of listed animal species at the Site (Appendix 10.5.1). However, several documented occurrences of listed species were noted in the vicinity of the Site. The closest documented occurrence of listed species according to the FNAI database is approximately 3 miles to the west on the north side of State Road 80, where a colony of wading birds was identified by the FFWCC Breeding Bird Atlas Project during 1986–1991. The closest documented occurrence of listed species according to the FNAI Site Specific Data Report is approximately 2 miles to the northeast of the L8 Canal, where a Florida Pine Snake (*Pituophis melanoleucus mugitus*; State Species of Special Concern) was observed (date unknown).

Loxahatchee National Wildlife Refuge – Threatened and Endangered Species

There are at least 63 plant or animal species listed by the FFWCC and/or USFWS as endangered, threatened, or of special concern known to occur or that could occur within the Loxahatchee NWR (USFWS 2000). These species include wading birds such as the wood stork and Florida sandhill crane, raptors such as the snail kite and bald eagle, and other species including the eastern indigo snake and the tropical curly-grass fern (USFWS, 2002). The following is a description of threatened or endangered species utilization of the Loxahatchee NWR as described in the Comprehensive Conservation Plan:

High numbers (up to 300 per day) of wood storks have been observed foraging on the refuge interior and impoundments when the water levels are very low. Wood storks have been recorded as nesting on the refuge twice; successfully in 1990, during an extreme drought (Fish and Wildlife Service 1990; Maffai and Jelks 1991) and unsuccessfully in the drought of 1999 (Fish and Wildlife Service 1999c). The refuge has appropriate nesting habitat for wood storks and some impoundments could be managed for optimal foraging year-round. Little blue and tricolored herons, white ibis, limpkins, and snowy egrets regularly forage, roost, and nest on the refuge. While the refuge has traditionally been a productive area for snowy egrets in south Florida, nesting success has declined in recent years. The reddish egret has been rarely observed on the refuge. While it is not unusual to see immature roseate spoonbills in the impoundments during very low water levels, they are not known to nest on the refuge. One of the rare times (1999) they were observed nesting, the effort was unsuccessful. In the 1970s, Florida sandhill cranes were observed in good numbers in the refuge interior, however, they are now rarely observed and only two nests have been recently observed, one in 1996, and another in 1999. Five reintroduced whooping cranes were briefly observed near the western edge of the refuge in 1998.

The Everglades snail kite has had poor nesting success on the refuge with a total of only 7 nests observed from 1976 to 1997. However in 1998, 18 Everglades snail kite nests were found and approximately 1/3 of the nests were thought to be successful (Fish and Wildlife Service 1998). The bird is mobile, moving from one watershed (or conservation area) to another as foraging conditions change. Bald eagles are not seen often, but a couple are observed perched in trees on or near the refuge every 2 or 3 years. In November 2007, a mating pair of bald eagles were observed in the northern portion of the Loxahatchee NWR several miles from the Site. Arctic peregrine falcons are routinely observed foraging and resting in the refuge interior during the fall and spring migration.

The American alligator appears to be doing well on the refuge. In 1999, a long term survey was initiated to determine the abundance, nesting success, and health of this species. Alligators of all sizes were observed in both survey routes, with larger alligators observed in the canal survey. Many pods of young of several size classes were observed along the interior survey route indicating that alligator nesting is occurring on a regular basis in the interior.

Occasional sightings of the Florida panther or an escaped captive mountain lion have been noted in the refuge's annual narratives and biological observations but never confirmed. Tropical curly-grass fern was found in 1972 by Taylor Alexander on tree islands near the airboat trail, but its status is currently unknown.

2.3.6.2 *Pre-Existing Stresses*

Terrestrial Systems

The greatest pre-existing stress to terrestrial systems of the Site and surrounding area is the result of past agricultural and mining activities. The natural topography, soils, and hydrology of the Site are extensively altered as a result of the addition of fill material and topographic grading. The natural ecosystems and wildlife habitat previously located at the Site have been lost, and natural drainage features have been modified.

Aquatic Systems

Aquatic systems in the vicinity of the Site are subjected to stress from numerous sources. Pre-existing stresses include:

1. Channelization and dredging,
2. Water management practices for the L10/L12 Canal,
3. Agricultural development,
4. Mining, and
5. Highway construction and operation.

Historical agricultural and mining activities in the area have resulted in the loss of wetlands through ditching and dewatering.

2.3.6.3 Measurement Programs

Terrestrial Ecology

Terrestrial ecological resources were evaluated through Site reconnaissance, agency review, previous studies, and literature searches. Vegetative communities, wildlife utilization, and potential for threatened and endangered wildlife occurrence were addressed during several reconnaissance surveys.

Threatened and Endangered Species–Methodology

Prior to the field surveys, literature and agency surveys were undertaken to determine the species that could potentially be present in the habitats found on the Site. Primary sources of information are the FNAI database, FCREPA reports, Preservation of Native Flora of Florida Law, Rule Chapter 5B-40, F.A.C., the Regulated Plant Index (5B-40.0055), and Notes on Florida's Endangered and Threatened Plants, FDACS.

Wetland Methodology

Three agencies, USACE, FDEP, and SWFMD have rules that apply to wetlands. To be jurisdictional, a wetland must ascribe to three characteristics defined by rule: presence of vegetation listed as belonging in wetlands, having a certain defined hydrology, and the presence of hydric soils. The applicable characteristics for wetland determination as prescribed by the regulatory agencies were used.

2.3.7 Meteorological and Ambient Air Quality

2.3.7.1 Meteorology

Meteorological data collected at existing monitoring stations were used to describe the local and regional climatology in the vicinity of the proposed Site. The closest existing meteorological station to this proposed plant Site with complete data is the National Weather Service (NWS) station located at the Palm Beach International Airport, situated approximately 30 kilometers (km) (18 miles) east of the Site. The NWS has recorded weather observations for more than 50 years at this station. These data are the most complete for and representative of the region surrounding the Site. FDEP has approved the use of these meteorological data in previous air permit applications for this area, including WCEC Units 1 and 2.

The climate in the vicinity of the Site is subtropical with a marine influence from the Atlantic Ocean. The monthly and annual average temperatures for this area are presented in Table 2.3.7-1. The annual average temperature is approximately 75°F with monthly average temperatures varying from a maximum of 90°F to a minimum of 57°F. Record extreme temperatures range from a low of 27°F to a record high of 101°F. During the summertime, temperatures rarely exceed 100°F due to the high

relative humidity with subsequent cloud cover formation and the abundant convective-type (e.g., thunderstorms) precipitation.

The monthly and annual average precipitation data are presented in Table 2.3.7-2. Approximately 64 percent of the annual precipitation falls during the six warmest months, May through October. The average annual precipitation is approximately 61 inches, but this has varied from as little as 39 inches to more than 86 inches in the past 30 years. The majority of rain is in the form of short-lived convection showers (e.g., thunderstorms). Large amounts of rain are also produced during the late summer or fall when tropical storms or hurricanes may pass near the Site. These events may result in heavy downpours that reach torrential proportions; 24-hour amounts from 6 to more than 10 inches are not uncommon.

Monthly and annual average relative humidities, which indicate the amount of moisture in the air at a given temperature, are presented in Table 2.3.7-2 for the morning hours of 1:00 a.m. and 7:00 a.m. and early afternoon and evening hours of 1:00 p.m. and 7:00 p.m. The highest humidities are coincident with the coolest ambient temperatures, which generally occur at 7:00 a.m., or near dawn. The lowest humidities coincide with the highest ambient temperatures.

Annual and seasonal windroses for the 5-year period from 2001 through 2005 are given in Figures 2.3.7-1 through 2.3.7-5. A summary of the seasonal and annual average wind direction and wind speed, including calm conditions, is presented in Table 2.3.7-3. As shown in these figures, the predominant winds during the year are from the east. The predominant easterly winds occur because the Site lies entirely within the trade wind belt (i.e., below 30 degrees N latitude). Also, because of the location of the Atlantic Ocean, the easterly winds are reinforced due to the moderate to strong late afternoon sea breezes that occur on days with strong land heating and produce localized onshore winds. The data for this period were also used in the air quality impact analyses.

Except during the passage of tropical storms or hurricanes, high wind speeds generally do not occur. During the winter and spring, there are usually a few days when wind speeds are greater than 30 miles per hour (mph).

Atmospheric stability is a measure of the atmosphere's capability to disperse pollutants and potentially reduce ground-level concentrations. During the daytime with strong solar heating, the atmosphere can disperse pollutants very quickly for a relatively short period of time. This condition is considered as very unstable and generally occurs infrequently during the year. During the nighttime under clear skies and light wind speeds, the atmosphere is considered stable with minimal

potential to disperse pollutants. During the day or night when wind speeds are moderate to high, pollutants are dispersed at moderate rates (i.e., dispersion rates that are lesser than those during unstable conditions but greater than those during stable conditions). This condition is considered neutral and occurs frequently throughout the year. The seasonal and annual average occurrences of atmospheric stability classes for this area for 2001 to 2005 are shown in Table 2.3.7-4. During the summer months, unstable conditions occur nearly 28 percent of the time due to strong solar heating, whereas unstable stability occurs only 7 percent of the time in the winter months. Neutral stability occurs most frequently during the winter months due to the higher wind speeds that occur in this season. The occurrence of stable stability is nearly uniform throughout the year.

The mixing height is a parameter used to define the vertical height to which pollutants can disperse and, therefore, is used in estimating the volume of air in which pollutants are emitted and can be dispersed. In general, the higher the mixing height, the greater the potential for pollutants to be dispersed and for ground-level concentrations to be reduced.

The seasonal and annual average morning and afternoon mixing heights estimated for this area for 2001 to 2005 are listed in Table 2.3.7-5. The highest afternoon mixing heights occur in the spring and the lowest morning mixing heights occur in summer.

Thunderstorms are the most frequent of severe storms, occurring an average of 79 days per year as reported by the NWS at Palm Beach International Airport. These storms occur throughout the year, but about 87 percent occur from May through October.

Hurricanes and tornadoes are other types of severe weather that can occur at the Site, but the probability of a hurricane or tornado passing over the Site is low.

In the 80-km (50-mile) coastal strip from West Palm Beach to Fort Lauderdale, there is about a 20-percent chance that a tropical storm will pass over the area during any given year (Gale Research Co., 1980). For storms of hurricane strength (i.e., wind speeds exceeding 73 mph), the chance decreases to about 16 percent with a 7-percent chance that the winds will be greater than 124 mph (i.e., wind speeds of a great hurricane).

Statistics compiled by the severe local storms branch of the national severe storms forecast center (Paulz, 1969) show that three tornadoes were spotted within the 1 degree latitude by 1 degree longitude square centered near the Site from 1955 to 1967. This averages less than one tornado per year. The tornado recurrence interval for any specific point location within the 1 degree square was

estimated by the methodology of Thom (1963). The recurrence interval, r , is equal to $1/p$ where p is the probability of a tornado striking within the 1 square mile area and is estimated as follows:

$$p = (2.8209 \times t) / a$$

where: t = mean annual frequency of tornadoes occurring, and

a = area of the 1° square (mi²).

In this analysis, t was assumed to be 1.3 based on data collected from 1953 to 1962 and was estimated to be 4,240 mi². Therefore, the mean recurrence interval for a tornado striking a point within this square is more than 1,000 years. The month during which tornadoes occur most frequently is June.

2.3.7.2 Ambient Air Quality

Ambient Standards

The National and Florida Ambient Air Quality Standards (AAQS) are presented in Table 2.3.7-6. Primary National AAQS were promulgated to protect the public health, and secondary National AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in compliance with AAQS are designated as attainment areas. Pollutants for which AAQS have been established are referred to as criteria pollutants. These pollutants include particulate matter with an aerodynamic particle size of 10 micrometers (µm) or less (PM₁₀), sulfur dioxide (SO₂), carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), and lead (Pb).

Palm Beach County is classified as an attainment area for all criteria pollutants (Rule 62-204.340, F.A.C.). Adjacent counties, such as Martin and Broward Counties, are also classified as attainment areas for all criteria pollutants.

On July 18, 1997 the U.S. Environmental Protection Agency (EPA) promulgated revisions to the National AAQS for O₃ and particulate matter (PM) (62 Federal Register No. 138). The O₃ standard was modified to be 0.08 parts per million (ppm) for an 8-hour average concentration. This standard is achieved when the 3-year average concentration of the 4th highest value is 0.08 ppm or less. The 1-hour average AAQS will no longer apply to an area 1 year after the effective date of the designation of that area for the 8-hour ozone AAQS.

The revised PM AAQS included two new PM_{2.5} standards (PM_{2.5} represents PM with an aerodynamic diameter of 2.5 µm or less); a short-term 24-hour average standard and an annual average standard. In October 2006, EPA promulgated revised AAQS for PM₁₀ and PM_{2.5} [Federal Register, October 17,

2006 (71 FR 61144)]. For PM_{10} , the annual standard was revoked and the 24-hour standard was retained. The 24-hour $PM_{2.5}$ standard was revised to 35 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) from $65 \mu\text{g}/\text{m}^3$ in the promulgated 1997 AAQS. The 24-hour $PM_{2.5}$ standard is based on a 3-year average of the 98th percentile of 24-hour average concentrations that must not exceed $35 \mu\text{g}/\text{m}^3$ (from population-orientated monitors) and a 3-year average of annual average concentrations that must not exceed $15 \mu\text{g}/\text{m}^3$ (from a single or community-orientated monitor). These AAQS are effective December 18, 2006.

The FDEP has not yet adopted the revised O_3 or $PM_{2.5}$ AAQS. Based on evaluations performed by FDEP and EPA, Palm Beach County has been designated an attainment area for the revised 1997 O_3 AAQS [Federal Register, April 30, 2004 (69 FR 23996)] as well as an attainment area for the 1997 $PM_{2.5}$ AAQS [Federal Register, January 5, 2005 (70 FR 944)]. Although FDEP and EPA have not yet designated areas for $PM_{2.5}$ in Florida based on the 2006 $PM_{2.5}$ AAQS, monitoring data collected over the last several years indicate that Palm Beach County and adjoining counties would be classified as attainment of the $PM_{2.5}$ AAQS. These standards must be implemented in the 2007 to 2008 timeframe with a revision to the State Implementation Plan.

In promulgating the 1977 Clean Air Act (CAA) Amendments, Congress specified that certain increases above an air quality *baseline concentration* level of SO_2 and PM concentrations would constitute *significant deterioration* for sources located in attainment areas. The magnitudes of the allowable increases, or prevention of significant deterioration (PSD) increments, depend on the classification of the area in which a new source (or modification) will be located or have an impact. Three PSD increment classifications were designated based on criteria established in the 1977 CAA Amendments. Initially, Congress designated areas as either Class I (national parks, national wilderness areas, and memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres) or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. EPA then promulgated as regulations the requirements for classifications and area designations.

On October 17, 1988, EPA promulgated regulations to prevent significant deterioration due to nitrogen oxides (NO_x) emissions and established PSD increments for NO_2 concentrations. The EPA class designations and allowable PSD increments are presented in Table 2.3.7-6. Florida has adopted the EPA allowable increments for PM_{10} , SO_2 , and NO_2 .

Palm Beach County is classified as a Class II area (Rule 62-204.340, F.A.C.) since it is an attainment area for all pollutants. The nearest Class I area to the Site is the Everglades NP located about 102 km (64 miles) to the south.

Existing Air Pollutant Sources

The Site is located in a rural area of Palm Beach County, which has a minimal number of air pollution sources. Existing major sources with SO₂, PM, or NO_x emissions greater than 100 tons per year (TPY) and within 25 km (16 miles) of the Site include Pratt & Whitney (United Technologies), Palm Beach Resource Recovery, Atlantic Sugar Association, and Osceola Farms. In general, other major air pollution sources are located more than 30 km (19 miles) from the Site.

FDEP issued the final permit for WCEC Units 1 and 2 on January 10, 2007 (DEP File No. 0990646-001-AC; PSD-FL-354). During the evaluation of the permit application, air quality impact analyses were evaluated by FDEP for compliance with ambient air quality standards and PSD Increments, and additional impact analysis requirements. The FDEP concluded that WCEC Units 1 and 2 would comply with all applicable state and federal air pollution regulations.

Existing Ambient Air Quality

Ambient air quality monitoring data have been collected in Palm Beach County for more than 20 years. Air monitoring data currently are collected for SO₂, PM₁₀, NO₂, O₃, and CO. These data are generally representative of air quality for areas in the County with more industrial development than that around the proposed Site. Thus, the measured air quality data from these sites provide a conservative indication of air quality around the Site.

A summary of the maximum pollutant concentrations measured in Palm Beach County from 2005 through 2007 is presented in Table 2.3.7-7. These data indicate that the maximum air quality concentrations measured in the region are well below applicable standards.

2.3.7.3 Measurement Programs

All information (i.e., meteorology and air quality data) was compiled from offsite monitoring stations maintained and operated by FDEP or cooperating governmental agencies (i.e., NWS). No significant changes in these programs are anticipated after the construction of WCEC Unit 3.

Meteorological data were obtained from the NWS surface and upper-air stations at the Palm Beach International Airport and Miami, respectively. These data were obtained for a 5-year period from 2001 through 2005 from which the joint frequency of wind direction, wind speed, and atmospheric

stability and a 5-year average of mixing heights were developed. Since 1986, the wind sensors at the Palm Beach International Airport have been located 33 ft above grade. Regular surface observations are taken just before each hour, 7 days per week. Upper-air soundings are conducted twice per day at 7:00 a.m. and 7:00 p.m., Eastern Standard Time.

A PSD preconstruction ambient air monitoring analysis was developed for WCEC Unit 3 as part of the licensing planning to satisfy PSD requirements. Since the estimated increase in potential emissions due to the Project exceeds the significant emission rates for regulated pollutants, including SO₂, PM₁₀, NO_x, CO, and volatile organic compounds (VOCs), an ambient air monitoring analysis is required for these pollutants (O₃ in the case of NO_x and VOC emissions). However, monitoring is not required for any air pollutants except ozone since the WCEC Unit 3 impacts of applicable pollutants are predicted to be below the *de minimis* impact levels for certain pollutants (e.g., CO). For those pollutants, an exemption from monitoring is provided for impacts less than *de minimis* impact levels [Rule 62-212.400(3)(e), F.A.C.]. Available monitoring data recently collected from regional monitoring sites were used to support the impact evaluation and O₃ concentrations, and are included in the Air Permit/PSD Application (Appendix 10.1.5).

2.3.8 Noise

2.3.8.1 Background

Sound propagation involves three principal components: a noise source, a person or a group of people, and the transmission path. While two of these components, the noise source and the transmission path, are easily quantified (i.e., by direct measurements or through predictive calculations), the effect of noise on humans is the most difficult to determine due to the varying responses of humans to the same or similar noise patterns. The perception of sound (noise) by humans is very subjective, and just as for odors and taste, it is very difficult to predict a response from any particular individual to another.

The magnitude of noise levels or loudness is referred to as sound pressure level (SPL) with units in decibels (dB). Decibels are calculated as a logarithmic function of SPL in air to a reference effective pressure, which is considered the hearing threshold, or:

$$\text{SPL} = 20 \log_{10} (P_e/P_o)$$

where: P_e = measured effective pressure of sound wave in micropascals (μPa), and

P_o = reference effective pressure of 20 pascals (Pa).



To account for the effect of how the human ear perceives sound pressure, at moderate to low levels, SPLs are adjusted for frequency (or pitch). One of the most commonly used frequency filters is the A-weighting (dBA), which adjusts measurements for the approximated response of the human ear to low-frequency SPLs [i.e., below 1,000 hertz (Hz)] and high-frequency SPLs (i.e., above 1,000 Hz).

There are no State of Florida noise regulations that are applicable for the construction and operation to the proposed Project. There are noise standards in the Palm Beach County Land Development Code (Article 5, Chapter E, Section 3, Subsection B) that prohibit noise levels from any source of sound above specified sound level limits. These noise standards apply to residential and commercial lands that receive the noise and are specified based on whether the receiving land use is in the Rural Service Area (RSA) or Urban Service Area (USA); the Site is located in the RSA of Palm Beach County. For residential land uses in the RSA and USA, the sound level limit is 60 dBA when the noise source is fixed mechanical equipment. Other sound sources impacting residential receiving land in the RSA are limited to 55 dBA between 7 a.m. and 8 p.m. (day), and 50 dBA from 8 p.m. to 7 a.m. (night). For commercial land uses in the USA and RSA, the sound level limit is 70 dBA. Construction noise is exempt except for “excessive noise” between 10 p.m. and 7 a.m. These sound level limits are exceeded if measurements exceed the specified value for more than 10 percent of the measurement period, which shall not be less than 10 minutes. Measurements must be measured within the boundary of the receiving land use by a Type 2 or equivalent sound level meter. The maximum sound levels apply to the source of the sound.

2.3.8.2 Noise Measurement Procedures

Ambient noise monitoring was performed in August 2001, December 2004, and August 2007 to assess the existing ambient noise levels in the Site and its vicinity. The noise monitoring conducted in August 2001 was for the initial planning of an electric generating power facility at the Site. The noise monitoring conducted in December 2004 and August 2007 was performed to obtain noise measurements at similar locations as the earlier study. Together, these noise measurements provide information on the baseline noise levels in the area during both the daytime and nighttime periods. The equipment used to monitor the baseline noise levels operated in the slow response mode to obtain accurate, integrated, A-weighted sound pressure levels. A windscreen was used because all measurements were taken outdoors. The microphone was positioned so that a random incidence response, as specified by the American National Standard Institute (ANSI), was achieved. The sound level meter and octave band analyzer were calibrated immediately prior to and just after the sampling period to provide a quality control check of the sound level meter’s operation during monitoring.

Integrated SPL data consisting of the following noise parameters were collected at each location:

L_{eq} = The sound pressure level averaged over the measurement period; this parameter is the continuous steady sound pressure level that would have the same total acoustic energy as the real fluctuating noise over the same time period.

L_{90} = The sound level exceeded 90 percent of the time during the monitoring period.

L_{10} = The sound level exceeded 10 percent of the time during the monitoring period.

The SPL data were analyzed and reported in both dB and dBA. The louder the sound, the higher the decibel value.

The SPL averages were calculated using the following formula:

$$\text{Average SPL} = 10 \text{ Log } \frac{\sum_{i=1}^N 10^{(\text{SPL}_i/10)}}{N}$$

where: N= number of observations, and

SPL_i = individual sound pressure level in data set.

The SPLs and octave band data were collected during each monitoring event, using measurement techniques set forth by American National Standards Institute (ANSI) S12.9-1993/Part 3, 1993.

The noise monitoring equipment used during the study included:

- Continuous Noise Monitoring Equipment
- Larson Davis Model 824 Precision Integrating Sound Level Meter with Real Time Frequency Analyzer
- Larson Davis Model PRM902 Microphone Preamplifier
- Larson Davis Model 2560 Prepolarized 1/2-inch Condenser Microphone
- Windscreen, tripod, and various cables
- Sound Level Meter Calibration Unit
- Larson Davis Model CAL200 Sound Level Calibrator, 94/114 dB at 1,000 Hz.

Monitoring was conducted using the sound level meter mounted on a tripod at a height of 1.5 meters (m) (5 ft) above grade. Local meteorological conditions (wind speed, wind direction, temperature, and relative humidity) were measured during the monitoring periods. The operator recorded detailed

field notes during monitoring and included major noise sources in the area. The Larson Davis sound level meter complies with Type I--Precision requirements set forth for sound level meters and for one-third octave filters.

2.3.8.3 Noise Monitoring Locations

During the 2001 noise study the SPLs and octave band data were collected at four locations within the Site and two locations offsite. The four onsite monitoring locations (Noise Monitoring Locations 1, 2, 3, and 4) were selected to delineate the noise levels at or near the proposed Project's Power Block boundary. Noise Monitoring Location 5 is east of the northern portion of the Site on Canal L8. This site is located along Canal L8 and adjacent to the closest residential community. Monitoring Location 6 was located south of the Site on the right-of-way for State Road 80. Noise monitoring was performed at the six sites during the daytime and nighttime.

For the noise study conducted in August 2007, SPLs and octave band data were collected at two locations within the Site and three locations offsite. Monitoring locations 1-4 and 2-3 are located at or near the locations of Unit 1 and Unit 3 respectively. Monitoring location 5 is the same as described above and location 7 is on Canal L8 directly east of where Unit 3 is to be built. Monitoring Site 8 is located near the entrance gate to the Loxahatchee NWR which is just south of State Road 80 from the site.

2.3.8.4 Existing Ambient Sound Pressure Level Conditions

The L_{eq} (equivalent sound pressure level averaged for the sampling period), as well as the L_{90} and L_{10} , during each monitoring event at each location are presented in Table 2.3.8-1. Figure 2.3.8-1 presents the monitoring locations. Charts of the octave band measurements and noise levels as a function of time are provided in Appendix 10.5.2 along with the calibration certificates for the monitoring equipment.

The daytime and nighttime ambient noise levels, measured as L_{eq} , L_{90} , and L_{10} for each of the monitoring sites are summarized in Table 2.3.8-1. The L_{eq} noise levels for the onsite monitoring locations ranged from 44.1 to 70.5 dBA. The highest L_{eq} noise level of 70.5 dBA was observed in August 2007 and was a result of the construction activities for Unit 1. This construction was not present when the 2001 or 2004 noise measurements were obtained. The daytime L_{eq} observed at Noise Monitoring Location 5 was 44.1 dBA in 2001, 54.8 dBA in 2004, and 50.7 dBA in 2007. The daytime L_{eq} noise levels at Locations 7 and 8 were 45.6 dBA and 59.8 dBA respectively.

The onsite nighttime L_{eq} noise levels ranged from 41.0 dBA at Location 2-3 to 64.1 dBA at Location 1-4. Construction activities at Unit 1 were again the dominant noise source affecting site 1-4. The observed nighttime L_{eq} at Noise Monitoring Location 5 was 52.0 dBA in 2001 and 53.8 dBA in 2007. The 24-hour L_{eq} noise level observed at Noise Monitoring Location 4 was 52.8 dBA. The nighttime L_{eq} noise levels at Locations 7 and 8 were 50.4 dBA and 52.9 dBA, respectively.

The L_{eq} noise levels reflect the total noise energy over the monitoring periods at each location. As a result, loud transient noises such as noise from traffic, aircraft, gunshots, and barking dogs all influence the observed values. The more persistent the transient loud noises the higher the L_{eq} noise levels. For this reason, a more appropriate indicator of background noise levels is the L_{90} , which is the noise level exceeded 90 percent of the time. Transient noise is generally excluded unless almost continuous, as along a heavily traveled highway. The daytime L_{90} noise levels for the onsite monitoring locations ranged from 39.7 to 61.3 dBA. The daytime L_{90} at Monitoring Location 5 were 42.7 dBA in 2001, 52.6 dBA in 2004, and 45.9 dBA in 2007. The L_{90} noise levels along State Road 80 at Location 6 were 69.5 dBA and reflect almost continuous traffic. The daytime L_{90} noise levels at Locations 7 and 8 were 40.0 dBA and 54.0 dBA respectively.

The onsite nighttime L_{90} noise levels ranged from 38.4 dBA at Location 2-3 to 63.6 dBA at Location 1-4. The nighttime L_{90} noise level observed at Monitoring Location 5 was 49.9 dBA in 2001 and 50.6 dBA in 2007 and due primarily to noise from frogs and insects along the adjacent L8 Canal. The 24-hour L_{90} noise level measured onsite was 42.8 dBA. The nighttime L_{90} noise levels at Locations 7 and 8 were 46.5 dBA and 50.8 dBA respectively.

The results of the noise monitoring indicated that there are transient sounds influencing the observed sound pressure levels in the vicinity of Site 5, which is the monitoring site nearest the residential area northeast of the Site. The L_{90} observed in 2001 better reflects a background noise level than that observed in 2004 or 2007 due to onsite activities. In 2004, heavy truck traffic and mining activities were occurring during the measurement period and resulted in a L_{90} of 52.6 dBA. In 2007, heavy construction activities were occurring at Unit 1 during the measurement period and resulted in a L_{90} of 45.9 dBA. In contrast, the observed L_{90} in 2001 was 42.8 or almost 10 dBA lower than that observed in 2004 and over 3 dBA lower than in 2007. For this reason, the daytime background used in the noise impact analyses on Units 1, 2, and 3 was 42.8 dBA. As mentioned previously, the observed L_{90} for nighttime was heavily influenced by insects and frogs. This influence can be observed in the frequency spectrum obtained during monitoring and resulted in higher L_{90} values in the nighttime. Sound pressure levels in the octave ranges of 800, 1,000, and 1,250 hertz represent

noise from frogs, while noise in the octave ranges from 2,500 to 6,300 hertz represent noise from insects (see Appendix 10.5.3 for Octave Band Spectra). Indeed, the sound pressure levels in these frequency bands during the daytime were much lower. To better represent a background noise level without transient noises, the sound pressure levels in the octave bands influenced by frogs and insects were made equal to the daytime observations. The background noise level in dBA was then recalculated without these transient noises. The resulting nighttime L_{90} is 40 dBA, which is generally more representative of nighttime conditions in a primarily rural area. A nighttime background of 40 dBA was used in the noise impact analyses for WCEC Unit 3, as well as for Units 1 and 2.

The maximum predicted sound level impact for WCEC Units 1 and 2 at the nearest residence were predicted to 46.2 dBA. A noise level of this magnitude would be lower than quantitative noise standards established in the Palm Beach County Unified Land Development Code. The maximum sound levels applicable to the WCEC are 55 dBA during the daytime (7 a.m. to 8 p.m.) and 50 dBA during the nighttime (8 p.m. to 7 a.m.). The maximum predicted noise level does not include background, which can be variable depending upon the activities in the area. Background noise levels can be the dominant source of noise. The background values used to calculate the total noise level were 42.7 and 40.0 dBA for daytime and nighttime, respectively. The maximum predicted impacts of WCEC Units 1 and 2 with background are calculated to be 47.8 dBA during the daytime and 47.1 dBA during the nighttime.

TABLE 2.3.3-1.
MEAN MONTHLY TEMPERATURE, PRECIPITATION, AND EVAPORATION

Month	Temperature¹ (1948-1988)	Precipitation¹ (1948-1988)	Evaporation¹ (1957-2004)
January	63.9	2.48	3.35
February	65.0	2.57	3.84
March	68.3	3.20	5.58
April	71.6	2.94	6.60
May	76.0	5.65	6.98
June	79.4	9.40	6.27
July	80.8	7.77	6.36
August	81.2	7.30	6.23
September	80.1	9.35	5.22
October	76.0	6.49	4.71
November	70.1	3.14	3.69
December	65.5	2.33	3.13
Annual	73.1	62.62	61.95

Notes: ¹ Loxahatchee monitoring station is approximately 5 miles east of the Site.

Source: SFWMD, 2007.

TABLE 2.3.3-2

WATER USE PERMITS WITHIN 5 MILES OF FPL WEST COUNTY ENERGY CENTER

PERMIT NUMBER	PROJECT NAME	FACILITY ID	FACILITY TYPE	FACILITY NAME	WATER USE	SOURCE	SECTION	TWP	RGE	X COORD	Y COORD
50-08056-W	PALM BEACH AGGREGATES	216039	WELL	Well 1	IRR	Surficial Aquifer System	32	43	40	862248	856459
50-07898-W	FIRE STATION 22	213824	WELL	Well 1	IRR	Surficial Aquifer System	1	43	40	880980	880491
50-07843-W	RIVERA NURSERY	212834	WELL	Well 1	IRR	Surficial Aquifer System	25	43	40	883505	863052
50-07813-W	LSP NURSERY	198340	WELL	W-2	IND	Surficial Aquifer System	13	43	40	885214	873440
50-07562-W	WEST COUNTY ENERGY PLANT	194558	WELL	S-1	IND	Surficial Aquifer System	32	43	40	860001	856523
50-07371-W	NANETTE SEXTON'S PROPERTIES	192219	WELL	W-1	PWS	Surficial Aquifer System	15	43	40	869850	872081
50-07259-W	DEWAR NURSERIES	190751	WELL	1	IRL	Surficial Aquifer System	32	42	40	864353	885317
50-07115-W	ABEL (NURSERY)	182857	WELL	WELL 1	IRR	Surficial Aquifer System	9	43	40	867052	876863
50-06896-W	CANKER WASH STATION	171134	WELL	Well 2	IND	Surficial Aquifer System	12	43	40	882050	878927
50-06620-W	JAMES CLAPPERTON	158666	WELL	2	IRR	Surficial Aquifer System	13	44	40	880539	838620
50-06620-W	JAMES CLAPPERTON	158669	WELL	1	IRR	Surficial Aquifer System	13	44	40	880523	838741
50-06583-W	ADONEL CONCRETE BATCH PLANT	157332	WELL	Well 1	PWS	Surficial Aquifer System	32	43	40	861978	856085
50-06321-W	SANCTUARY GARDENS	146459	WELL	1	IRR	Surficial Aquifer System	36	43	40	882030	855185
50-06271-W	DALWHINNIE SOUTH	145072	WELL	B	LIV	Surficial Aquifer System	16	43	40	864738	873025
50-06271-W	DALWHINNIE SOUTH	145072	WELL	B	PWS	Surficial Aquifer System	16	43	40	864738	873025
50-06194-W	KJELLECUP BARN	141274	WELL	1	OTR	Surficial Aquifer System	16	43	40	867767	871721
50-06150-W	PALM BEACH AGGREGATES	139369	WELL	W-1	PWS	Surficial Aquifer System	17,20,28,29,32,33	43	40	861423	863932
50-06150-W	PALM BEACH AGGREGATES	139370	WELL	W-2	PWS	Surficial Aquifer System	17,20,28,29,32,33	43	40	860851	856819
50-06150-W	PALM BEACH AGGREGATES	139377	WELL	W-3	PWS	Surficial Aquifer System	17,20,28,29,32,33	43	40	861169	866155
50-06150-W	PALM BEACH AGGREGATES	139378	WELL	W-4	PWS	Surficial Aquifer System	17,20,28,29,32,33	43	40	860523	869418
50-06150-W	PALM BEACH AGGREGATES	148765	WELL	W-5	PWS	Surficial Aquifer System	17,20,28,29,32,33	43	40	860426	856873
50-06150-W	PALM BEACH AGGREGATES	148766	WELL	W-6	PWS	Surficial Aquifer System	17,20,28,29,32,33	43	40	869521	855321
50-05217-W	PUMP STATION 319	113236	WELL	1	PWS	Surficial Aquifer System	1	44	40	885313	853999
50-04842-W	GENESIS NURSERY CORPORATION	105700	WELL	1	IRR	Surficial Aquifer System	30	43	41	885486	860103
50-04824-W	LAS FARMS OF P B	105327	WELL	1	IRR	Surficial Aquifer System	19	43	41	885939	863380
50-04745-W	PARADISE PALMS INC	103744	WELL	1	PWS	Surficial Aquifer System	17	43	41	886264	865302
50-04745-W	PARADISE PALMS INC	103745	WELL	2	PWS	Surficial Aquifer System	17	43	41	886264	865302
50-04745-W	PARADISE PALMS INC	103746	WELL	3	IRR	Surficial Aquifer System	17	43	41	886264	865302
50-04685-W	TEMPORARY CONCRETE BATCH PLANT	101756	WELL	1	IRR	Surficial Aquifer System	32	43	40	861700	856500
50-04685-W	TEMPORARY CONCRETE BATCH PLANT	101756	WELL	1	IND	Surficial Aquifer System	32	43	40	861700	856500
50-04654-W	PBSO TRAINING FACILITY AND COMM TOWER	100724	WELL	1	IRR	Surficial Aquifer System	31	43	40	855337	854795
50-04627-W	ALFONSO NODAL	184984	WELL	Well 1	IRR	Surficial Aquifer System	8	43	40	862090	878601
50-04627-W	ALFONSO NODAL	184986	WELL	Well 2	IRR	Surficial Aquifer System	8	43	40	862369	878720
50-04551-W	APOSTOLIC CHURCH	32666	WELL	1	PWS	Surficial Aquifer System	36	43	40	882054	855299
50-04360-W	RESEARCH AND EVALUATION FACILITY (FPL CORBETT SUBSTATION)	30683	WELL	6	IRR	Surficial Aquifer System	36,6,31,34	42	42	859974	864184
50-04360-W	RESEARCH AND EVALUATION FACILITY (FPL CORBETT SUBSTATION)	30689	WELL	9	IRR	Surficial Aquifer System	36,6,31,34	42	42	885591	852388
50-04360-W	RESEARCH AND EVALUATION FACILITY (FPL CORBETT SUBSTATION)	173053	WELL	13	IRR	Surficial Aquifer System	36,6,31,34	42	42	860014	864173
50-04242-W	JEHOVAHS WITNESSES	29755	WELL	1	IRR	Surficial Aquifer System	36	43	40	882149	856872
50-04220-W	MEADOWLANDS NURSERY	29735	WELL	1	IRR	Surficial Aquifer System	9	43	40	864536	875863
50-04216-W	HANKS IXORA RANCH	29596	WELL	1	IRR	Surficial Aquifer System	34	42	40	874995	885649
50-04189-W	DOWNERS DRIVE PARK	29138	WELL	PUMP STATION	IRR	Surficial Aquifer System	24	43	40	881490	863971
50-03624-W	TROPICAL FISH FARM	21380	WELL	1	#N/A	Surficial Aquifer System	9	43	40	865715	875873
50-03458-W	WEST PALM BEACH FIELD STATION	111208	WELL	S-5A-1	PWS	Surficial Aquifer System	32	43	40	862184	854824
50-03458-W	WEST PALM BEACH FIELD STATION	111209	WELL	S-5A-2	PWS	Surficial Aquifer System	32	43	40	860580	854973
50-03458-W	WEST PALM BEACH FIELD STATION	111210	WELL	S-5A-3	PWS	Surficial Aquifer System	32	43	40	861542	854952
50-03458-W	WEST PALM BEACH FIELD STATION	111211	WELL	S-5A-4	PWS	Surficial Aquifer System	32	43	40	861051	854931
50-03458-W	WEST PALM BEACH FIELD STATION	196229	WELL	S-5A-5	PWS	Surficial Aquifer System	32	43	40	863428	854959
50-03276-W	PBSO LAW ENFORCEMENT TRAINING FACILITY	3936	WELL	1	PWS	Surficial Aquifer System	31	43	40	858137	854662
50-02852-W	CALLERY-JUDGE GROVE PACKING PLANT	20940	WELL	E1	IND	Surficial Aquifer System	12	43	40	881630	879687
50-00605-W	LION COUNTRY SAFARI	26872	WELL	1	PWS	Surficial Aquifer System	23	43	40	878637	866062
50-00605-W	LION COUNTRY SAFARI	27036	WELL	2	PWS	Surficial Aquifer System	23	43	40	878937	865862
50-00599-W	THREE BROTHERS FARMS, INC	13863	WELL	W2	IRR	Surficial Aquifer System	31	43	41	886860	857758
50-00374-W	CHIMP MANAGEMENT FACILITY	13853	WELL	1	IRR	Surficial Aquifer System	23	43	40	879926	868430

TABLE 2.3.3-2

WATER USE PERMITS WITHIN 5 MILES OF FPL WEST COUNTY ENERGY CENTER

PERMIT NUMBER	PROJECT NAME	FACILITY ID	FACILITY TYPE	FACILITY NAME	WATER USE	SOURCE	SECTION	TWP	RGE	X COORD	Y COORD
50-00374-W	CHIMP MANAGEMENT FACILITY	13854	WELL	4	IRR	Surficial Aquifer System	23	43	40	875313	867772
50-00374-W	CHIMP MANAGEMENT FACILITY	13855	WELL	5	IRR	Surficial Aquifer System	23	43	40	875102	866929
50-00374-W	CHIMP MANAGEMENT FACILITY	24927	WELL	2	IRR	Surficial Aquifer System	23	43	40	879853	867964
50-00374-W	CHIMP MANAGEMENT FACILITY	29285	WELL	3	IRR	Surficial Aquifer System	23	43	40	880008	867479
50-00374-W	CHIMP MANAGEMENT FACILITY	104155	WELL	Well No. 1	IND	Surficial Aquifer System	23	43	40	875690	867119
50-04220-W	MEADOWLANDS NURSERY	41920	PUMP	1	IRR	SFWMD Canal (L-8) Tieback	9	43	40	864539	875510
50-04685-W	TEMPORARY CONCRETE BATCH PLANT	147178	PUMP	1	IND	SFWMD Canal (L-8)	32	43	40	863553	856784
50-04627-W	ALFONSO NODAL	100257	PUMP	Pump 1	IRR	SFWMD Canal (L-8)	8	43	40	862209	878452
50-02564-W	INDIAN TRAIL GROVES	38772	PUMP	#1	IRR	SFWMD Canal (L-8)	14-16,22-26,36	42	39	857445	884484
50-01207-W	DEER RUN III - WHITE FENCES	38734	PUMP	2	IRR	SFWMD Canal (L-8)	15,16	43	40	864430	874441
50-00566-W	SEMINOLE RANCH	37331	PUMP	1	IRR	SFWMD Canal (L-8)	36	42	39	856266	884912
50-00566-W	SEMINOLE RANCH	37332	PUMP	2	IRR	SFWMD Canal (L-8)	36	42	39	856346	884816
50-00017-W	LEON MOSS RANCH, INC	37177	PUMP	1	IRR	SFWMD Canal (L-8)	35,36	42	39	855567	885618
50-01630-W	ROTH FARMS	39690	PUMP	312	IRR	SFWMD Canal (L-13)	31	43	40	854125	853176
50-01630-W	ROTH FARMS	44651	CULVERT	1	IRR	SFWMD Canal (L-13)	31	43	40	854125	853172
50-00437-W	NEW HOPE SUGAR COMPANY	37318	PUMP	A	IRR	SFWMD Canal (L-12)	3,10	43	39	843835	874957
50-00161-W	NEW HOPE SUGAR COMPANY	37223	PUMP	A	IRR	SFWMD Canal (L-12)	2,11-15,22-27,36	43	39	846674	861483
50-01929-W	CITRUS GROVE	38757	PUMP	A	IRR	SFWMD Canal (C-51)	2,11	44	40	875125	854726
50-01854-W	FLEMING PROPERTY	37881	PUMP	1	IRR	SFWMD Canal (C-51)	22,27,34	43	40	872154	855078
50-00894-W	LEONARD LAND COMPANY	37707	PUMP	1	IRR	SFWMD Canal (C-51)	22,26,27,34,35	43	40	872170	855102
50-00599-W	THREE BROTHERS FARMS, INC	37557	PUMP	P2	IRR	SFWMD Canal (C-51)	31	43	41	886678	857560
50-00599-W	THREE BROTHERS FARMS, INC	37558	PUMP	P3	IRR	SFWMD Canal (C-51)	31	43	41	886211	857845
50-00599-W	THREE BROTHERS FARMS, INC	37559	PUMP	P4	IRR	SFWMD Canal (C-51)	31	43	41	886116	857592
50-00574-W	PALM BEACH AGGREGATES	37554	PUMP	P-1	IRR	SFWMD Canal (C-51)	27,28,33,34	43	40	864459	855703
50-00574-W	PALM BEACH AGGREGATES	37555	PUMP	P-2	IRR	SFWMD Canal (C-51)	27,28,33,34	43	40	867073	855702
50-00458-W	DIAMOND C SUGAR COMPANY	37552	PUMP	2	IRR	SFWMD Canal (C-51)	34,35	43	40	874434	854702
50-00374-W	CHIMP MANAGEMENT FACILITY	37542	PUMP	P1	IRR	SFWMD Canal (C-51)	23	43	40	880081	867927
50-00372-W	CONRAD FARMS INC	35682	PUMP	Pump 1	IRR	SFWMD Canal (C-51)	25,36	43	40	885444	862182
50-00324-W	GREEN PEPPER FARMS, INC	37538	PUMP	1	IRR	SFWMD Canal (C-51)	35,36	43	40	884948	854343
50-00324-W	GREEN PEPPER FARMS, INC	37539	PUMP	2	IRR	SFWMD Canal (C-51)	35,36	43	40	885079	854343
50-00143-W	SUCROSE GROWERS	37522	PUMP	1	IRR	SFWMD Canal (C-51)	32-34	43	40	868800	854967
50-00143-W	SUCROSE GROWERS	37523	PUMP	1	IRR	SFWMD Canal (C-51)	32-34	43	40	868980	854876
50-00021-W	SEMINOLE WATER CONTROL DISTRICT	37509	PUMP	1	IRR	SFWMD Canal (C-51)	34-36	42	40	880968	855130
50-07259-W	DEWAR NURSERIES	190752	PUMP	1	IRR	On-site Lake(s)/Pond(s)	32	42	40	864349	885309
50-05941-W	HIGH SCHOOL NNN	133186	PUMP	Pump 1	IRR	On-site Lake(s)/Pond(s)	12	43	40	880813	877565
50-05941-W	HIGH SCHOOL NNN	133187	PUMP	Pump 2	IRR	On-site Lake(s)/Pond(s)	12	43	40	880853	878301
50-04242-W	JEHOVAHS WITNESSES	41967	PUMP	2	IRR	On-site Lake(s)/Pond(s)	36	43	40	882251	856865
50-03829-W	SOUTHERN LANDSCAPE AND NURSERY INC	40231	PUMP	A	IRR	On-site Lake(s)/Pond(s)	36	43	40	880131	857671
50-03829-W	SOUTHERN LANDSCAPE AND NURSERY INC	40232	PUMP	B	IRR	On-site Lake(s)/Pond(s)	36	43	40	880131	857671
50-03829-W	SOUTHERN LANDSCAPE AND NURSERY INC	40233	PUMP	C	IRR	On-site Lake(s)/Pond(s)	36	43	40	880488	857671
50-03829-W	SOUTHERN LANDSCAPE AND NURSERY INC	40234	PUMP	D	IRR	On-site Lake(s)/Pond(s)	36	43	40	880488	857671
50-03829-W	SOUTHERN LANDSCAPE AND NURSERY INC	40235	PUMP	E	IRR	On-site Lake(s)/Pond(s)	36	43	40	880488	857671
50-07467-W	LAZY F	193205	PUMP	Pump 1	IRR	On-site Lake(s)	27,28,33,34	43	34	867307	856919
50-07467-W	LAZY F	193206	PUMP	Pump 2	IRR	On-site Lake(s)	27,28,33,34	43	34	866912	859575
50-07467-W	LAZY F	193207	PUMP	Pump 3	IRR	On-site Lake(s)	27,28,33,34	43	34	866912	861157
50-02380-W	SUMMER CREEK AND GOLDEN LAKES	37892	PUMP	5	IRR	On-site Lake(s)	29	43	42	837065	858802
50-02380-W	SUMMER CREEK AND GOLDEN LAKES	37893	PUMP	6	IRR	On-site Lake(s)	29	43	42	836875	858866
50-06583-W	ADONEL CONCRETE BATCH PLANT	157347	PUMP	Pump 1	IND	On-site Canal(s)	32	43	40	861835	856012
50-06583-W	ADONEL CONCRETE BATCH PLANT	157348	PUMP	Pump 2	IND	On-site Canal(s)	32	43	40	861829	856010
50-06271-W	DALWHINNIE SOUTH	145070	PUMP	1	IRR	On-site Canal(s)	16	43	40	864984	873619
50-05901-W	LOT 17 OF WHITE FENCES EQUESTRIAN ESTATES	131191	PUMP	1	IRR	On-site Canal(s)	16,17	43	40	865010	872185
50-04523-W	KIM LEANG YI ITH PROPERTY	42948	PUMP	1	IRR	On-site Canal(s)	9	43	40	869043	880225
50-02564-W	INDIAN TRAIL GROVES	38779	PUMP	27	IRR	On-site Canal(s)	14-16,22-26,36	42	39	869553	883398

TABLE 2.3.3-2

WATER USE PERMITS WITHIN 5 MILES OF FPL WEST COUNTY ENERGY CENTER

PERMIT NUMBER	PROJECT NAME	FACILITY ID	FACILITY TYPE	FACILITY NAME	WATER USE	SOURCE	SECTION	TWP	RGE	X COORD	Y COORD
50-02564-W	INDIAN TRAIL GROVES	38780	PUMP	28	IRR	On-site Canal(s)	14-16,22-26,36	42	39	865562	881386
50-02564-W	INDIAN TRAIL GROVES	38785	PUMP	25	IRR	On-site Canal(s)	14-16,22-26,36	42	39	867627	888630
50-02564-W	INDIAN TRAIL GROVES	38787	PUMP	29	IRR	On-site Canal(s)	14-16,22-26,36	42	39	868165	881368
50-02564-W	INDIAN TRAIL GROVES	38788	PUMP	26	IRR	On-site Canal(s)	14-16,22-26,36	42	39	867627	886114
50-00021-W	SEMINOLE WATER CONTROL DISTRICT	44410	CULVERT	C-1	IRR	M-1 CANAL	34-36	42	40	869916	881490
50-02380-W	SUMMER CREEK AND GOLDEN LAKES	37889	PUMP	3	IRR	LWDD Canal (E-2)	29	43	42	835900	859990
50-02380-W	SUMMER CREEK AND GOLDEN LAKES	37890	PUMP	4	IRR	LWDD Canal (E-2)	29	43	42	835905	858585
50-00435-W	HUNDLEY JOHN L & PATRICIA K HUNDLEY & HUNDLEY FARMS INC	37315	PUMP	1	IRR	Cross Canal	31-34	43	39	833399	852935
50-02564-W	INDIAN TRAIL GROVES	38789	PUMP	8	IRR	CANAL	14-16,22-26,36	42	39	859299	884535
50-02564-W	INDIAN TRAIL GROVES	38790	PUMP	9	IRR	CANAL	14-16,22-26,36	42	39	859594	884569
50-02564-W	INDIAN TRAIL GROVES	38791	PUMP	10	IRR	CANAL	14-16,22-26,36	42	39	865024	884847
50-02564-W	INDIAN TRAIL GROVES	38792	PUMP	11	IRR	CANAL	14-16,22-26,36	42	39	865215	884405
50-00319-W	SUGAR FARM CO-OP	40674	PUMP	1	IRR	CANAL	17-22,27,28,33,34	43	39	841014	853038
50-00319-W	SUGAR FARM CO-OP	40675	PUMP	2	IRR	CANAL	17-22,27,28,33,34	43	39	841138	853193
50-04888-W	CHELBY FARMS	106735	WELL	1	IRR	Biscayne Aquifer	14	43	40	879470	873787

Note: See Figure 2.3.3-1 for Location Reference

Source: SFWMD, RegDBD 2007

TABLE 2.3.4-1.
MEAN MONTHLY FLOW IN L10/L12 CANAL, L8 CANAL, AND C-51 CANAL

Month	Mean Monthly Flows (cfs)		
	L10/L12 Canal ¹	L8 Canal ²	C-51 Canal ³
January	333	117	97
February	271	71	144
March	295	105	285
April	234	98	164
May	288	86	161
June	513	119	244
July	536	166	239
August	671	178	272
September	762	248	640
October	502	251	551
November	265	134	440
December	233	74	260
Annual Average	409	138	292

¹ Source: USGS Station No. 02278450, West Palm Beach Canal, Above S-5a, Near Loxahatchee, Florida. Period of Record October 1957 through September 2003.

² Source: USGS Station No. 02278550, Levee 8 Canal at West Palm Beach Canal, Near Loxahatchee, Florida. Period of Record October 1957 through September 2003.

³ Source: SFWMD DBHYDRO Database S-155A structure, C-51 Canal, Period of Record 25 March 2004 to 15 October 2007.

Source: SFWMD, 2007.

**TABLE 2.3.4-2.
HISTORICAL WATER QUALITY FOR L10/L12 CANAL**

Constituent (units)	No. of Samples	Average	Std. Dev.	Maximum	Minimum
Alkalinity as CaCO ₃ (mg/L)	124	232	88	447	101
Ammonia as N (mg/L)	286	< 0.217	0.307	2.305	< 0.009
Arsenic (µg/L)	27	< 2.87	1.5	5.9	< 1.5
Cadmium (µg/L)	33	< 0.45	0.47	2.95	< 0.3
Calcium (mg/L)	96	82	31	140	35
Chloride (mg/L)	123	145	59	345	44
Color (PCU)	118	105	53	232	30
Copper (µg/L)	32	< 2.1	1.6	9.6	< 1
Dissolved Oxygen (mg/L)	271	4.25	2.41	13.51	0.16
Hardness (mg/L as CaCO ₃)	88	292	115	501	123
Iron Total (µg/L)	79	548	677	4,119	44
Lead (µg/L)	26	< 0.9	0.4	2.7	< 0.8
Magnesium (mg/L)	90	23.3	9.6	43.0	7.4
Mercury (µg/L)	17	< 0.2	0.00	< 0.2	< 0.2
Nitrate as N (mg/L)	119	0.441	0.351	2.060	0.006
Nitrate + Nitrite as N (mg/L)	288	< 0.458	0.440	2.818	< 0.004
Nitrite as N (mg/L)	124	< 0.065	0.061	0.315	< 0.004
O-Phosphate as P (mg/L)	158	0.068	0.041	0.243	0.004
pH (SU)	270	7.53	0.30	8.48	6.21
Phosphate, Total as P (mg/L)	432	0.13	0.07	0.46	0.02
Potassium (mg/L)	82	8.28	2.27	13.78	3.12
Silica (mg/L)	78	18.3	8.3	36.8	0.7
Silver (µg/L)	9	< 0.05	0.01	0.07	< 0.05
Specific Conductance (µS/cm)	271	1,013	366	1,940	24
Sodium (mg/L)	82	94	43	254	31
Sulfate (mg/L)	119	71	29	155	16
TDS (mg/L)	117	678	233	1,190	274
Temperature (°C)	271	25.0	4.2	32.7	13.8
TKN as N (mg/L)	294	2.59	1.16	8.46	0.89
TSS (mg/L)	81	18	22	134	1
Turbidity (NTU)	124	14.1	18.4	136.5	1.3
Zinc (µg/L)	31	< 4.3	1	8	< 2.4

Notes

Non detects are included in average at detection limit.

5-year period of record: December 1998 through November 2003.

Data source: SFWMD DBHYDRO.

**TABLE 2.3.4-3.
WATER QUALITY DATA FOR L10/L12 CANAL**

Constituent (units)	SFWMD Data ¹	1/4/2005	1/28/2005	2/10/2005
Alkalinity as CaCO ₃ (mg/L)	307		210	130
Alkalinity (Bicarbonate) (mg/L)			210	130
Aluminum (mg/L)		0.97	0.43	1.8
Ammonia as N (mg/L)	0.026		< .1	< .1
Antimony (µg/L)		< 5.0	< 5.0	< 5.0
Arsenic (µg/L)	5.9		8.1	4.8
Barium (µg/L)		39	45	40
Beryllium (µg/L)		< .1	< .1	< .1
BOD (5-day) (mg/L)		< 2	4.3	< 2
BOD - Soluble (mg/L)		< 2	< 2	< 2
Cadmium (µg/L)	0.77		< .5	< .6
Calcium (mg/L)		101	63	45
Chloride (mg/L)	214		110	58
Chromium (µg/L)		< 5	< 5	< 5
COD (mg/L)		54	97	24
Copper (µg/L)	9.6		< 5	< 5
Cyanide (mg/L)		< .005	< .005	< .005
Dissolved Oxygen (mg/L)	3.03			7.92
Fluoride (mg/L)		0.24	0.34	0.2
Hardness (mg/L as CaCO ₃)	200		250	170
Iron - Dissolved (µg/L)			410	2,200
Iron Total (µg/L)	1,080		530	2,000
Lead (µg/L)	< .8		3.1	3.6
Lead - Dissolved (µg/L)		< 3	< 3	< 3
Magnesium (mg/L)		13	19	15
Manganese (mg/L)			0.008	0.018
Mercury (µg/L)	< .02		< .13	< .13
Molybdenum (µg/L)		< 5	< 5	< 5
Nickel (µg/L)		< 2	< 2	2.3
Nitrate as N (mg/L)	0.548		1.8	1
Nitrate + Nitrite as N (mg/L)			0.89	0.79
Nitrite as N (mg/L)		0.83	0.1	< .02
Nitrogen as N (total) (mg/L)		1.76	5.59	2.19
O-Phosphate as P (mg/L)	0.081		0.12	0.13
Oil & Grease (mg/L)		< 1.7	< 1.7	< 1.7
pH (SU)	7.56		8.1	7.65
Phenols (mg/L)			< .01	< .01
Phosphate, Total as P (mg/L)	0.11		0.17	0.17
Potassium (mg/L)		7.2	8.1	6
Selenium (µg/L)		12	< 5	< 5
Silica (mg/L)	14.7		0.7	8
Silver (µg/L)	0.07		< 2	
Sulfate (mg/L)	106		59	36
Sulfide (mg/L)			< 1	< 2
TDS (mg/L)	921		550	380
Temperature (°F)	74.12			64.11
Thallium (µg/L)		< 10	< 10	< 10
TKN as N (mg/L)		0.93	4.7	1.4
TSS (mg/L)	38		< 3	11
Turbidity (NTU)	3.2		23	46
Vanadium (µg/L)		< 5		6.9
Zinc (µg/L)	< 4		7	5.8

Notes

¹ SFWMD data consists of the recent results from SFWMD data collected from S5A sampling point between January 2000 and November 2003.

Blanks indicate no data available.

TABLE 2.3.4-4
WATER QUALITY DATA FOR C-51 CANAL

Constituent	Units	Count	Average	Std. Dev.	Maximum	Minimum
ALKALINITY, TOT, CaCO ₃	mg/l	633	177	71.13	418	4
AMMONIA-N	mg/l	628	< 0.174	0.24	3.10	0.01
ARSENIC, TOTAL	ug/l	20	< 2.03	0.92	4.40	0.79
CADMIUM, TOTAL	ug/l	20	< 0.249	0.12	0.50	0.07
CALCIUM	mg/l	396	74	22.77	165	12
CARBON, TOTAL ORGANIC	mg/l	3	21	7.41	29	14
CHLORIDE	mg/l	632	114	70	510	4
COBALT, TOTAL	mg/l	2	1.36	1.33	2.31	0
COLOR	PCU	318	96	51	240	1
COPPER, DISSOLVED	ug/l	117	< 2.42	2.06	10.00	< 1
COPPER, TOTAL	ug/l	20	< 1.93	1.04	4.09	< 0.42
DISSOLVED OXYGEN	mg/l	722	4.84	2.02	10.70	0.70
FIXED SUSPENDED SOLIDS	mg/l	1	6.00		6.00	6.00
HARDNESS AS CaCO ₃	mg/l	376	245	76	487	33
IRON, TOTAL	ug/l	74	658	891	5070	46
KJELDAHL NITROGEN, DIS	mg/l	25	1.82	0.73	3.70	1.00
KJELDAHL NITROGEN, TOTAL	mg/l	637	1.80	0.89	11.10	0.40
LEAD, DISSOLVED	ug/l	1	1.90		1.90	1.90
LEAD, TOTAL	ug/l	19	< 1.19	1.41	6.13	< 0.36
MAGNESIUM	ug/l	380	14.70	7.83	35.17	0.20
MANGANESE, TOTAL	ug/l	2	20.30	12.98	29.48	11.12
MERCURY, TOT, ULTRATRACE	ug/l	27	3.35	1.72	7.30	1.30
MERCURY, TOTAL	ug/l	17	< 0.19		< 0.3	< 0.1
METH MERCURY, TOT ULTRATR	ug/l	25	0.15	0.06	0.33	0.05
NITRATE+NITRITE-N	mg/l	634	< 0.387	0.48	3.61	< 0.003
NITRATE-N	mg/l	566	0.373	0.48	3.52	0.004
NITRITE-N	mg/l	597	< 0.032	0.05	0.52	< 0.004
PH, FIELD	SU	712	7.37	0.37	8.65	5.50
PH, LAB	SU	11	7.86	0.28	8.08	7.10
PHOSPHATE, DISSOLVED AS P	mg/l	208	0.078	0.13	1.20	0.01
PHOSPHATE, ORTHO AS P	mg/l	654	0.061	0.10	1.23	0.00
PHOSPHATE, TOTAL AS P	mg/l	883	0.119	0.11	1.36	0.01
POTASSIUM	mg/l	378	5.10	2.61	16.25	0.29
SILICA	mg/l	201	9.65	4.53	27.20	1.37
SODIUM	mg/l	378	83	49	270	5
SP CONDUCTIVITY, FIELD	uS/cm	721	736	349	2420	90
SP CONDUCTIVITY, LAB	uS/cm	30	1052	230	1500	390
STRONTIUM, DISSOLVED	ug/l	6	1713	1070	2980	340
SULFATE	mg/l	368	48	23	123	2
TEMP	deg C	732	25	4	33	13
TOTAL DISSOLVED SOLIDS	mg/l	1	370		370	370
TOTAL SUSPENDED SOLIDS	mg/l	110	12.48	16.45	113.00	1.00
TURBIDITY	NTU	469	12.17	20.33	243.00	0.70
VOLATILE SUSPENDED SOLIDS	mg/l	1	10.50		10.50	10.50
ZINC, TOTAL	ug/l	20	< 13.834		< 40	< 4

Notes: Non-detects are included in average at detection limit.

Data Source: SFWMD DBHYDRO

Source: Golder, 2007

TABLE 2.3.6-1
THREATENED, ENDANGERED, AND SPECIES OF SPECIAL CONCERN KNOWN TO
OCCUR WITHIN PALM BEACH COUNTY, FLORIDA (FLORIDA NATURAL AREAS
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Scientific Name	Common Name	Federal Status	State Status
FISH			
<i>Bairdiella sanctaeluciae</i>	striped croaker	SC	N
<i>Microphus brachyurus</i>	opossum pipefish	SC	N
AMPHIBIANS AND REPTILES			
<i>Rana capito</i>	gopher frog	N	LS
<i>Alligator mississippiensis</i>	American alligator	T(S/A)	LS
<i>Caretta caretta</i>	loggerhead	LT	LT
<i>Chelonia mydas</i>	green turtle	LE	LE
<i>Crocodylus acutus</i>	American crocodile	LE	LE
<i>Dermochelys coriacea</i>	leatherback	LE	LE
<i>Drymarchon corais couperi</i>	eastern indigo snake	LT	LT
<i>Eretmochelys imbricata</i>	hawksbill	LE	LE
<i>Gopherus polyphemus</i>	gopher tortoise	N	LS
<i>Lepidochelys kempii</i>	Kemp's ridley	LE	LE
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	N	LS
BIRDS			
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	LT	LT
<i>Aramus guarauna</i>	limpkin	N	LS
<i>Athene cunicularia floridana</i>	Florida burrowing owl	N	LS
<i>Caracara cheriway</i>	crested caracara	LT	LT
<i>Charadrius melodus</i>	pipin plover	LT	LT
<i>Egretta caerulea</i>	little blue heron	N	LS
<i>Egretta thula</i>	snowy egret	N	LS
<i>Egretta tricolor</i>	tricolored heron	N	LS
<i>Eudocimus albus</i>	white ibis	N	LS

TABLE 2.3.6-1
THREATENED, ENDANGERED, AND SPECIES OF SPECIAL CONCERN KNOWN TO
OCCUR WITHIN PALM BEACH COUNTY, FLORIDA (FLORIDA NATURAL AREAS
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Scientific Name	Common Name	Federal Status	State Status
<i>Falco peregrinus</i>	peregrine falcon	N	LE
<i>Falco sparverius paulus</i>	southeastern American kestrel	N	LT
<i>Grus canadensis pratensis</i>	Florida sandhill crane	N	LT
<i>Haematopus palliatus</i>	American oystercatcher	N	LS
<i>Mycteria americana</i>	wood stork	LE	LE
<i>Pandion haliaetus</i>	osprey	N	LS
<i>Pelecanus occidentalis</i>	brown pelican	N	LS
<i>Picoides borealis</i>	red-cockaded woodpecker	LE	LT
<i>Platalea ajaja</i>	roseate spoonbill	N	LS
<i>Rostrhamus sociabilis plumbeus</i>	snail kite	LE	LE
<i>Rynchops niger</i>	black skimmer	N	LS
<i>Sterna antillarum</i>	least tern	N	LT
MAMMALS			
<i>Peromyscus floridanus</i>	Florida mouse	N	LS
<i>Puma concolor coryi</i>	Florida panther	LE	LE
<i>Sciurus niger shermani</i>	Sherman's fox squirrel	N	LS
<i>Trichechus manatus</i>	manatee	LE	LE
<i>Ursus americanus floridanus</i>	Florida black bear	N	LT
PLANTS			
<i>Acrostichum aureum</i>	golden leather fern	N	LE
<i>Argusia gnaphalodes</i>	sea lavender	N	LE
<i>Asimina tetramera</i>	four-petal pawpaw	LE	LE
<i>Calopogon multiflorus</i>	many-flowered grass pink	N	LE
<i>Chamaesyce cumulicola</i>	sand-dune spurge	N	LE
<i>Cladonia perforata</i>	perforate reindeer lichen	LE	LE

TABLE 2.3.6-1
THREATENED, ENDANGERED, AND SPECIES OF SPECIAL CONCERN KNOWN TO
OCCUR WITHIN PALM BEACH COUNTY, FLORIDA (FLORIDA NATURAL AREAS
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Scientific Name	Common Name	Federal Status	State Status
<i>Coccothrinax argenta</i>	silver palm	N	LT
<i>Coccothrinax argentata</i>	silver palm	N	LE
<i>Conradina grandiflora</i>	large-flowered rosemary	N	LE
<i>Crossopetalum rhacoma</i>	rhacoma	N	LE
<i>Cucurbita okeechobeensis</i> ssp <i>okeechobeensis</i>	Okeechobee gourd	LE	LE
<i>Cyrtopodium punctatum</i>	cow-horned orchid	N	LE
<i>Dennstaedtia bipinnata</i>	hay scented fern	N	LE
<i>Epidendrum nocturnum</i>	night-scented orchid	N	LE
<i>Euphorbia pinetorum</i>	rockland painted-leaf	N	LE
<i>Glandularia maritima</i>	coastal vervain	N	LE
<i>Ionopsis utricularioides</i>	delicate ionopsis	N	LE
<i>Jacquemontia reclinata</i>	beach jacquemontia	LE	LE
<i>Lantana depressa</i> var <i>floridana</i>	Atlantic Coast Florida lantana	N	LE
<i>Lechea cernua</i>	nodding pinweed	N	LT
<i>Lechea divaricata</i>	pine pinweed	N	LE
<i>Linum carteri</i> var <i>smallii</i>	Carter's large-flowered flax	N	LE
<i>Myrcianthes fragrans</i> var <i>simpsonii</i>	twinberry	N	LT
<i>Nemastylis floridana</i>	fall-flowering ixia	N	LE
<i>Okenia hypogaea</i>	burrowing four-o'clock	N	LE
<i>Oncidium bahamense</i>	dancing-lady orchid	N	LE
<i>Panicum abscissum</i>	cutthroat grass	N	LE
<i>Polygala smallii</i>	tiny polygala	LE	LE
<i>Polyrrhiza lindenii</i>	ghost orchid	N	LE
<i>Pteris bahamensis</i>	Bahama brake	N	LE

TABLE 2.3.6-1
THREATENED, ENDANGERED, AND SPECIES OF SPECIAL CONCERN KNOWN TO
OCCUR WITHIN PALM BEACH COUNTY, FLORIDA (FLORIDA NATURAL AREAS
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Scientific Name	Common Name	Federal Status	State Status
<i>Spiranthes torta</i>	southern ladies'-tresses	N	LE
<i>Tephrosia angustissima</i> var <i>curtissii</i>	coastal hoary-pea	N	LE
<i>Thrinax morrisii</i>	brittle thatch palm	N	LE
<i>Tillandsia flexuosa</i>	banded wild-pine	N	LE
<i>Zephyranthes simpsonii</i>	rain lily	N	LT
<i>Cladonia perforata</i>	perforate reindeer lichen	LE	LE

Federal and State Status

C = Candidate for listing.

LE = Listed as Endangered.

LS = Listed as Species of Special Concern.

LT = Listed as Threatened.

N = Not listed.

T(S/A) = Threatened due to Similarity of Appearance.

TABLE 2.3.7-1
MONTHLY AND ANNUAL AVERAGE TEMPERATURES
MEASURED AT PALM BEACH INTERNATIONAL AIRPORT

Month	Daily Temperatures (°F)^a			Extremes (°F)^b	
	Average	Maximum	Minimum	Maximum	Minimum
January	66.2	75.1	57.3	89	27
February	67.2	76.3	58.2	90	32
March	70.6	79.2	61.9	94	30
April	73.8	82.1	65.4	99	43
May	78.2	85.9	70.5	96	51
June	81.2	88.5	73.8	98	61
July	82.5	90.1	75.0	101	66
August	82.8	90.1	75.4	99	65
September	81.7	88.7	74.7	97	66
October	78.1	85.0	71.2	95	46
November	73.1	80.4	65.8	91	36
December	68.3	76.4	60.1	90	28
Annual	75.3	83.2	67.4	101	27

^a 30-year period of record, climatological normal, 1971 to 2000.

^b 69-year period of record, 1938 to 2006.

Source: National Oceanic and Atmospheric Administration (NOAA), 2006.

TABLE 2.3.7-2
MONTHLY AND ANNUAL AVERAGE PRECIPITATION AND RELATIVE HUMIDITY
MEASURED AT PALM BEACH INTERNATIONAL AIRPORT

Month	Precipitation (inches)			Humidity (%) hour (LT)^a			
	Average^a	Maximum^b	Minimum^b	1 a.m.	7 a.m.	1 p.m.	7 p.m.
January	3.75	11.18	0.22	82	84	59	73
February	2.55	8.71	0.29	81	84	57	70
March	3.68	16.78	0.33	79	82	56	68
April	3.57	18.26	0.04	77	80	55	66
May	5.39	15.22	0.39	80	80	59	71
June	7.58	20.09	1.07	85	84	65	76
July	5.97	17.74	1.22	85	85	64	75
August	6.65	13.52	1.73	85	86	64	76
September	8.10	29.40	1.77	85	87	66	78
October	5.46	18.74	0.56	81	84	62	75
November	5.55	14.63	0.23	81	84	62	74
December	3.14	11.69	0.06	82	84	61	74
Year	61.39	29.40	0.04	82	84	61	73

Note: LT = local time.

^a 30-year period of record, climatological normal, 1971 to 2000.

^b 67-year period of record, 1940 to 2006.

Source: NOAA, 2006.

TABLE 2.3.7-3
SEASONAL AND ANNUAL AVERAGE WIND DIRECTION AND WIND SPEED
MEASURED AT PALM BEACH INTERNATIONAL AIRPORT^a

Season	Average Wind Speed (mph)	Calm (%)	Prevailing Wind Direction
Winter	9.0	9.6	East
Spring	9.6	9.2	East
Summer	7.7	16.3	East-southeast
Fall	9.3	9.7	East
Annual	8.9	11.2	East

^a 5-year period of record, 2001 to 2005. The data for this period were also used in the air quality impact analyses for the Project.

Source: NOAA, 2001-2005.

TABLE 2.3.7-4
SEASONAL AND ANNUAL AVERAGE ATMOSPHERIC STABILITY CLASSES
DETERMINED AT PALM BEACH INTERNATIONAL AIRPORT^a

Season	Occurrence (%) of Stability Class					
	Very Unstable	Moderately Unstable	Slightly Unstable	Neutral	Slightly Stable	Moderately Stable
Winter	0.0	1.0	5.7	62.7	18.1	12.5
Spring	0.1	2.2	13.9	57.3	16.9	9.6
Summer	0.5	6.1	20.9	35.0	19.1	18.5
Fall	0.0	2.3	11.3	53.8	18.4	14.2
Annual	0.2	2.9	13.0	52.1	18.1	13.7

^a 5-year period of record, 2001-2005. The data for this period were also used in the air quality impact analyses for the Project.

Source: NOAA, 2001-2005.

TABLE 2.3.7-5
SEASONAL AND ANNUAL AVERAGE MORNING AND AFTERNOON MIXING
HEIGHTS DETERMINED AT PALM BEACH INTERNATIONAL AIRPORT^a

Season	Mixing Height (m)	
	Morning	Afternoon
Winter	853	1,835
Spring	1,248	2,342
Summer	849	2,168
Fall	1,025	2,055
Annual	995	2,101

^a 5-year period of record, 2001 to 2005. The data for this period were also used in the air quality impact analyses for the Project. Mixing heights based on surface temperatures and upper-air data from the NWS stations at Palm Beach International Airport and Miami, respectively.

Source: NOAA, 2001-2005.

TABLE 2.3.7-6
NATIONAL AND STATE AAQS, ALLOWABLE PSD INCREMENTS, AND SIGNIFICANT IMPACT LEVELS

Pollutant	Averaging Time	National AAQS ($\mu\text{g}/\text{m}^3$)		Florida AAQS ^a ($\mu\text{g}/\text{m}^3$)	PSD Increments ($\mu\text{g}/\text{m}^3$) ^a		Significant Impact Levels ^b ($\mu\text{g}/\text{m}^3$)	
		Primary Standard	Secondary Standard		Class I	Class II	Class I	Class II
Particulate Matter ^c (PM ₁₀)	Annual Arithmetic Mean	50	50	50	4	17	0.2	1
	24-Hour Maximum	150	150	150	8	30	0.3	5
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	2	20	0.1	1
	24-Hour Maximum	365	NA	260	5	91	0.2	5
	3-Hour Maximum	NA	1,300	1,300	25	512	1.0	25
Carbon Monoxide	8-Hour Maximum	10,000	10,000	10,000	NA	NA	NA	500
	1-Hour Maximum	40,000	40,000	40,000	NA	NA	NA	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	0.1	1
Ozone ^d	1-Hour Maximum ^e	235	235	235	NA	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	15	NA	NA	NA	NA

Note: Particulate matter (PM₁₀) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
 NA = Not applicable, i.e., no standard exists.

^a Short-term maximum concentrations are not to be exceeded more than once per year, except for PM₁₀ and O₃ AAQS which are based on expected exceedances.

^b Maximum concentrations are not to be exceeded.

^c On October 17, 2006, EPA promulgated revised PM₁₀ and PM_{2.5} AAQS; the PM_{2.5} AAQS had been promulgated on July 18, 1997. For PM₁₀, the annual standard was revoked and the 24-hour standard was retained. The 24-hour PM_{2.5} standard was revised to 35 $\mu\text{g}/\text{m}^3$ based on the 3-year averages of the 98th percentile values. The annual PM_{2.5} standard of 15 $\mu\text{g}/\text{m}^3$, based on 3-year averages at community monitors, was retained. The FDEP has not yet adopted the revised standards which must be implemented in the 2007–2008 timeframe.

^d On July 18, 1997, EPA promulgated revised AAQS for ozone. The O₃ standard was modified to be 0.08 ppm (160 $\mu\text{g}/\text{m}^3$) for the 8-hour average; achieved when the 3-year average of 99th percentile values is 0.08 ppm or less. The FDEP has not yet adopted the revised standards which must be implemented in the 2007–2008 timeframe.

^e 0.12 ppm; achieved when the expected number of days per year with concentrations above the standard is fewer than 1.

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978.
 40 CFR 50; 40 CFR 52.21.
 Florida Chapter 62.204, F.A.C.

TABLE 2.3.7-7
SUMMARY OF MAXIMUM PM₁₀, O₃, NO₂, CO, AND SO₂ CONCENTRATIONS MEASURED IN PALM BEACH COUNTY
AND REPRESENTATIVE OF THE WCEC UNIT 3 PROJECT, 2005 THROUGH 2007

AIRS/ Saroad Site No.	Operator	Location	Measurement Period		Concentration								24-Hour		Annual
					1-Hour		3-Hour		8-Hour		8-Hour 3-year Average				
			Year	Months	Highest	2nd Highest	Highest	2nd Highest	Highest	2nd Highest	4th Highest	Highest	2nd Highest	Average	
PM ₁₀ ^a		Florida AAQS			NA	NA	NA	NA	NA	NA	NA	NA	150 µg/m³	50 µg/m³	
12-099-0008 0240-008-G01	FDEP	Belle Glade/ 3875 State Road 80	2007	Jan-Jun	NA	NA	NA	NA	NA	NA	NA	33	27	18.9	
			2006	Jan-Dec	NA	NA	NA	NA	NA	NA	NA	52	42	20.1	
			2005	Jan-Dec	NA	NA	NA	NA	NA	NA	NA	41	38	17.6	
Ozone ^b		Florida AAQS			NA	0.12 ppm	NA	NA	NA	NA	0.08 ppm	NA	NA	NA	
12-099-0009	FDEP	Royal Palm Beach/ 980 Crestwood Blvd. N. Wastewater Treatment Plant	2007	Jan-Jun	0.068	0.066	NA	NA	NA	NA	0.066	NA	NA	NA	
			2006	Jan-Dec	0.101	0.093	NA	NA	NA	NA	0.067	NA	NA	NA	
			2005	Jan-Dec	0.080	0.079	NA	NA	NA	NA	0.066	NA	NA	NA	
Nitrogen dioxide		Florida AAQS			NA	NA	NA	NA	NA	NA	NA	NA	0.053 ppm		
12-099-1004 4760-004-G01	FDEP	Palm Beach/ 3700 Belvedere Road	2007	Jan-Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0103	
			2006	Jan-Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0096	
			2005	Jan-Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0086	
Carbon monoxide		Florida AAQS			NA	35 ppm	NA	NA	NA	9 ppm	NA	NA	NA		
12-099-1004 4760-004-G01	FDEP	Palm Beach/ 3700 Belvedere Road	2007	Jan-Jun	2.7	1.8	NA	NA	1.0	1.0	NA	NA	NA	NA	
			2006	Jan-Dec	5.8	2.8	NA	NA	1.9	1.8	NA	NA	NA	NA	
			2005	Jan-Dec	4.3	3.4	NA	NA	2.7	2.2	NA	NA	NA	NA	
Sulfur dioxide		Florida AAQS			NA	NA	NA	0.5 ppm	NA	NA	NA	NA	0.1 ppm	0.02 ppm	
12-099-3004 4760-004-G01	FDEP	Riviera Beach/ 1050 15th Street	2007	Jan-Jun	NA	NA	0.002	0.002	NA	NA	NA	0.001	0.001	0.0015	
			2006	Jan-Dec	NA	NA	0.003	0.002	NA	NA	NA	0.002	0.002	0.0011	
			2005	Jan-Dec	NA	NA	0.003	0.003	NA	NA	NA	0.003	0.003	0.0012	

Note: NA = not applicable.
AAQS = ambient air quality standard.

^a On October 17, 2006, EPA promulgated revised PM₁₀ and PM_{2.5} AAQS; the PM_{2.5} AAQS had been promulgated on July 18, 1997. For PM₁₀, the annual standard was revoked and the 24-hour standard was retained. The 24-hour PM_{2.5} standard was revised to 35 µg/m³ based on the 3-year averages of the 98th percentile values. The annual PM_{2.5} standard of 15 µg/m³, 3-year averages at community monitors, was retained. As of September 2007, Florida DEP has not yet adopted the revised standards.

^b On July 18, 1997, EPA promulgated revised AAQS for ozone. The O₃ standard was modified to be 0.08 ppm for the 8-hour average; achieved when the 3-year average of 99th percentile values is 0.08 ppm or less. As of September 2007, Florida DEP has not yet adopted the revised standards.

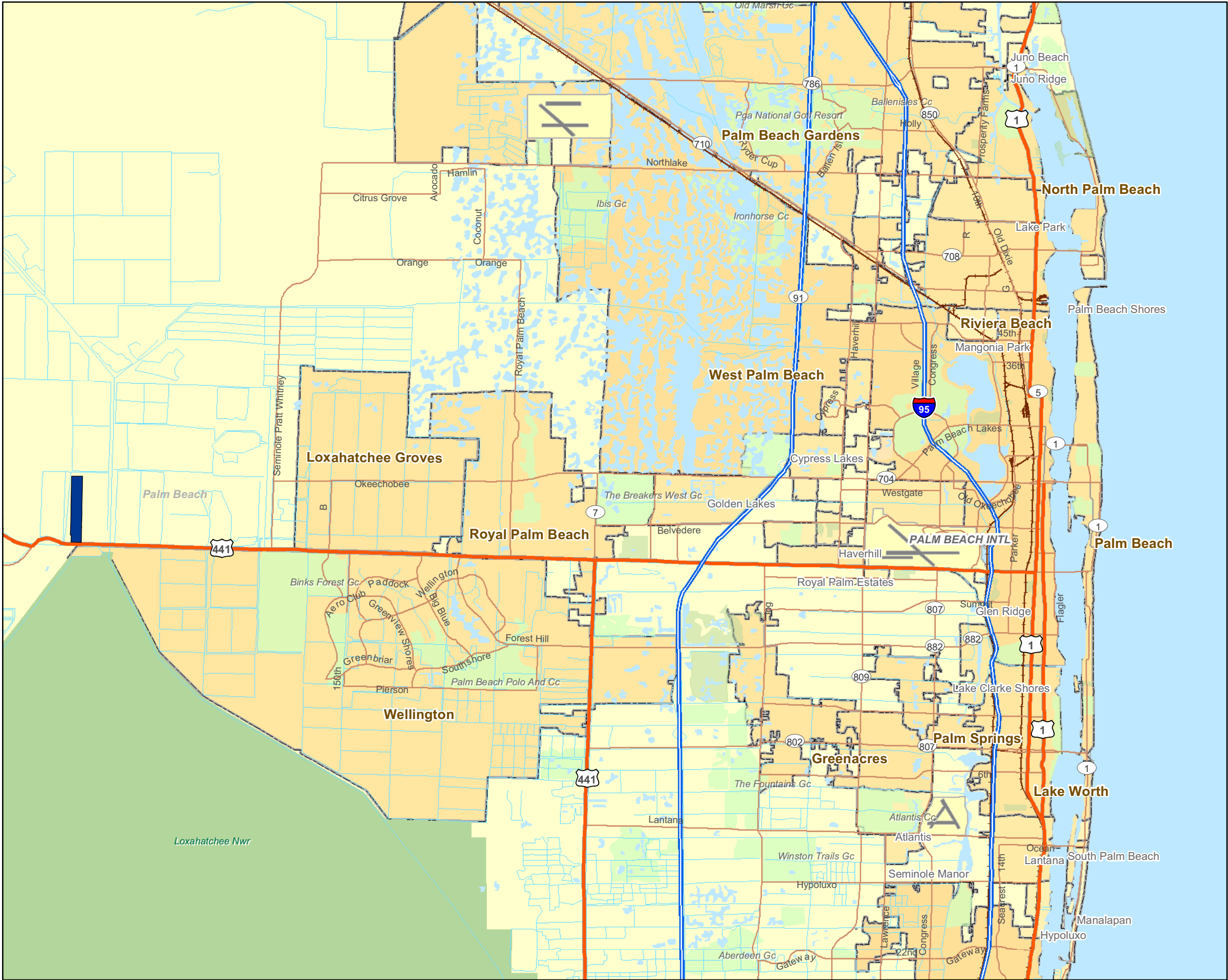
TABLE 2.3.8-1
BASELINE NOISE MONITORING, FPL WEST COUNTY ENERGY CENTER

Date	Monitoring Site		Period	Sound Levels			Comments/Notes
	ID*	Descriptor		L ₉₀	L _{eq}	L ₁₀	
8/29/2001	1	PA, West of Unit 1	Day	41.0	46.8	51.1	Aircraft high above site, distant traffic noise on State Road 80, distant thunder.
8/29/2001	1	PA, West of Unit 1	Night	42.7	45.4	46.8	Distant traffic on State Road 80, insects, aircraft high above Site.
	2	PA, West of Unit 2	Day	41.6	45.5	48.1	Aircraft high above site, distant traffic on State Road 80, PBA truck/equipment noise.
8/29/2001	2	PA, West of Unit 2	Night	46.2	48.3	50.0	Distant traffic on State Road 80, insects, aircraft high above Site.
	3	PA, East of Unit 1	Day	40.3	44.6	47.6	Aircraft high above site, birds, dogs barking, PBA truck/equipment noise.
8/29/2001	3	PA, East of Unit 1	Night	42.2	43.9	45.6	Distant traffic on State Road 80, insects, equipment beeper, aircraft high above Site.
	4	PA, East of Unit 1	Day	39.7	44.1	44.3	Distant traffic on State Road 80, PBA truck noise, aircraft high above Site.
8/29/2001	4	PA, East of Unit 1	Night	39.9	41.7	42.9	Distant traffic on State Road 80, insects.
	5	Canal L8/T-Line	Day	42.7	44.1	45.8	Aircraft high above Site, birds, traffic/equipment noise in residential area.
8/29/2001	5	Canal L8/T-Line	Night	49.9	52.0	53.2	Frogs, Distant traffic on State Road 80, insects, aircraft high above Site, dog barking.
	4	PA, East of Unit 1	24-hour	42.8	52.8	56.8	Refer to noise spectrum in Appendix 10.5.2.
12/10/2004	1-2 (A)	PA, Center for Unit 1	Day	45.3	48.5	51.0	Traffic along non-paved road, gunshots from shooting range, aircraft.
12/10/2004	6 (B)	State Road 80, North ROW	Day	59.5	73.1	78.2	Heavy traffic along State Road 80.
12/10/2004	5 (C)	Canal L8/T-Line	Day	52.6	54.8	55.5	Birds, distant truck traffic, mining south of Indian Trails Subdivision.
8/23/2007	1-4	North of Unit 1	Day	61.3	70.5	68.1	Heavy construction near-by; bulldozer, trucks, crane, generators
8/23/2007	1-4	North of Unit 1	Night	63.6	64.1	64.8	Lighter construction; generators, trucks, vehicles.
8/23/2007	2-3	Near Unit 3	Day	51.1	59.0	64.2	Light truck traffic.
8/23/2007	2-3	Near Unit 3	Night	38.4	41.0	44.8	Insects, thunder, and cows.
8/23/2007	5	Canal L8/T-Line	Day	45.9	50.7	55.5	Noise from plant to the west, insects, planes, on-site construction
8/23/2007	5	Canal L8/T-Line	Night	50.6	53.8	55.4	Insect noise and thunder.
8/23/2007	7	Canal L East of Unit 3	Day	40.0	45.6	47.9	Insect noise, construction, airplane.
8/23/2007	7	Canal L East of Unit 3	Night	46.5	50.4	52.7	Insect noise, thunder, traffic.
8/23/2007	8	At gate to Wildlife Refuge	Day	54.0	59.8	63.9	Traffic, Insect noise, plant operations.
8/23/2007	8	At gate to Wildlife Refuge	Night	50.8	52.9	56	Insect noise and traffic.

*Letters in parentheses are the monitoring site ID used in Appendix 10.5.2 for the monitoring conducted in 2004.

Note: PA = Project Area; PBA = Palm Beach Aggregates.

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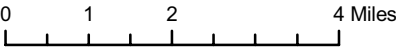


LEGEND

 FPL West County Energy Center

REFERENCE

1. ESRI Media Kit Data and Maps.
2. WCEC Location FPL
3. Loxahatchee NWR US Fish and Wildlife Service 7/10/2002.
4. Wellington Boundary, Village of Wellington 11/14/07



PROJECT			
WEST COUNTY ENERGY CENTER			
TITLE			
SITE LOCATION			
	PROJECT No. 073-87652		SCALE AS SHOWN
	DESIGN	KK	11/13/07
	GIS	RL	11/14/07
	CHECK	NV	11/14/07
	REVIEW	KK	11/19/07
FIGURE 2.1.0-1			



Figure 2.1.0-2. WCEC Site showing Units 1 and 2 under construction.
View from the north to the south.



Figure 2.1.0-3. WCEC Site showing Units 1 and 2 under construction.
View from southwest to northeast.

Source: Aerodynamic LLC, Golder; 2007.

07387652\Rpts\SCA\Ch2\Figure 2.1.0-2&3.doc





Figure 2.1.0-4. WCEC Site showing Units 1 and 2 under construction. View from northeast to southwest.

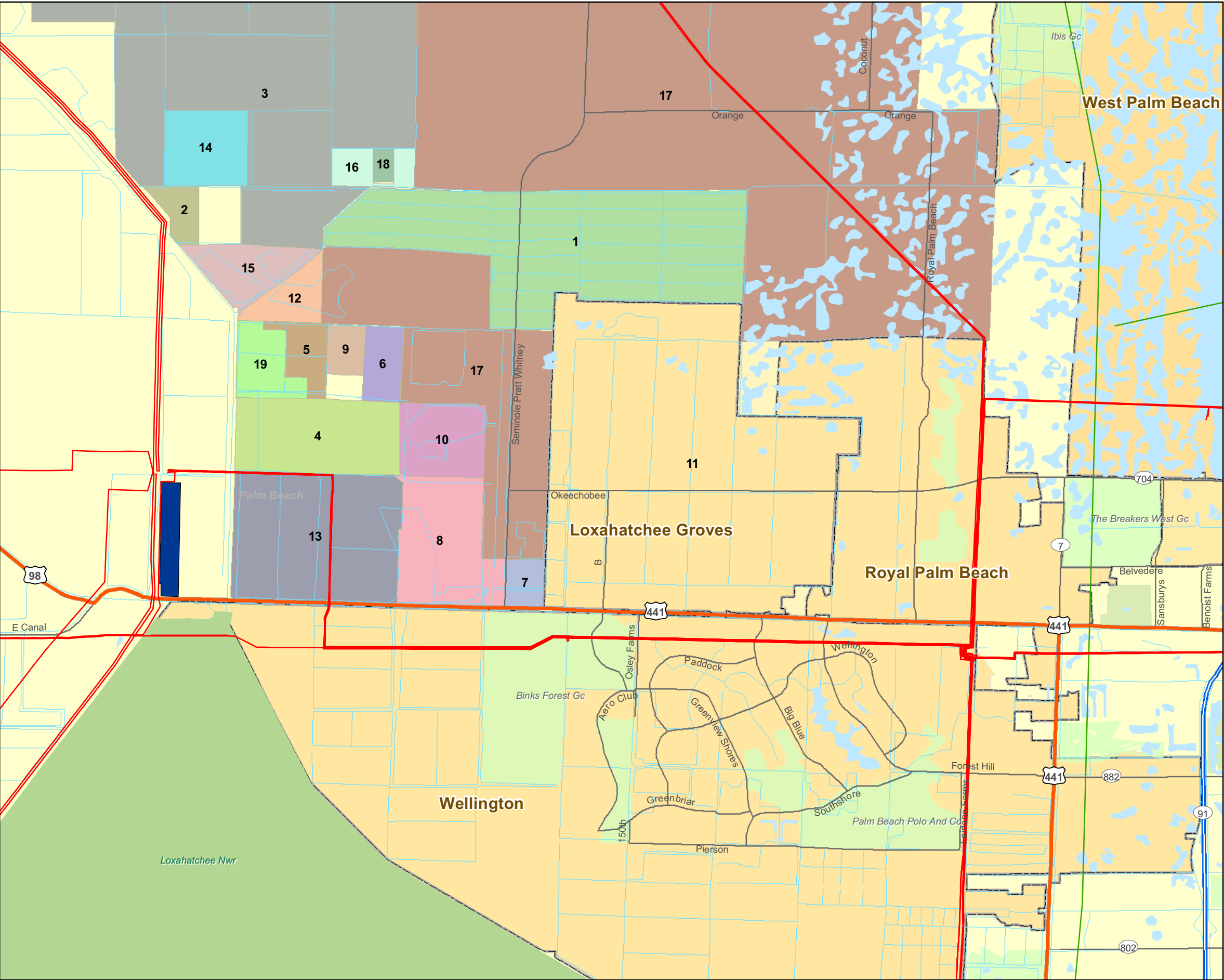


Figure 2.1.0-5. WCEC Site showing Units 1 and 2 under construction. View from northwest to southeast.

Source: Aerodynamic LLC, Golder; 2007.

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LEGEND

- Natural Gas Lines

Existing Transmission

FPL West County Energy Center
- Communities**

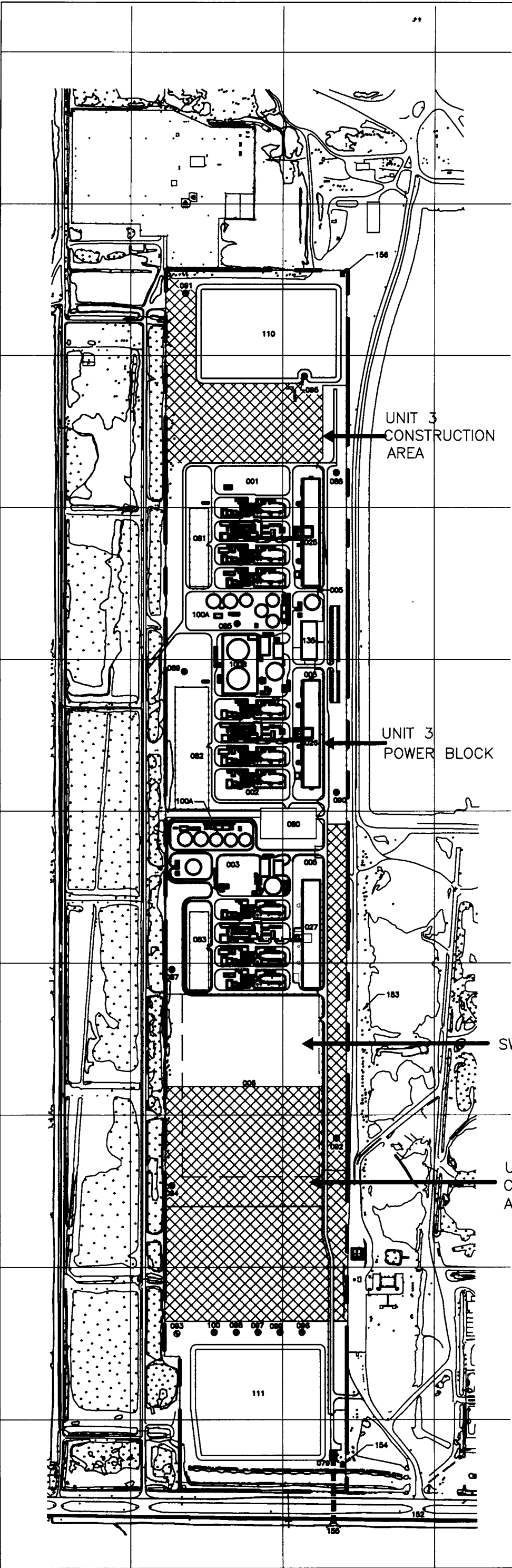
 - 1 - CALLERY JUDGE GROVES
 - 2 - CANAL PINE ACRES
 - 3 - CYPRESS GROVES
 - 4 - DEER RUN
 - 5 - DEER RUN PLAT 2
 - 6 - DELWOOD
 - 7 - ENTRADA ACRES
 - 8 - FOX TRAIL
 - 9 - LAS FLORES RANCHOS
 - 10 - LION COUNTRY SAFARI
 - 11 - LOXAHATCHEE GROVES
 - 12 - MANDELL
 - 13 - PALM BEACH AGGREGATES
 - 14 - SANTA ROSA GROVES
 - 15 - SUNNY URBAN MEADOWS
 - 16 - TALL PINE ACRES
 - 17 - THE ACREAGE
 - 18 - WAITE SUBDIVISION
 - 19 - WHITE FENCES EQUESTRIAN ESTATES

REFERENCE

- ESRI Media Kit Data and Maps.
- WCEC Location FPL
- Loxahatchee NWR US Fish and Wildlife Service 2007
- Wellington Boundary, Village of Wellington 11/14/07.
- Communities FPL



PROJECT		FPL West County Energy Center	
TITLE		COMMUNITIES IN THE VICINITY OF THE PROJECT	
	PROJECT No. 073-87652		SCALE AS SHOWN
	DESIGN	KK	11/13/07
	GIS	RL	11/21/07
	CHECK	NV	11/21/07
	REVIEW	KK	11/21/07
FIGURE 2.1.2-1			REV. 0



ID	FACILITY
001	Unit 1 Power Block Area
002	Unit 2 Power Block Area
003	Unit 3 Power Block Area
005	Motorized Slide Gate
006	Switchyard
025	Unit 1 Cooling Tower
026	Unit 2 Cooling Tower
027	Unit 3 Cooling Tower
079	Raw Water Pump Structure
080	FPL Gas Yard
081	230-kv Collector Yard (Unit 1)
082	230-kv Collector Yard (Unit 2)
083	230-kv Collector Yard (Unit 3)
085	Potable Water Well PW-1
086	Potable Water Well PW-2
087	Floridan Aquifer Well FAW-1
088	Floridan Aquifer Well FAW-2
089	Floridan Aquifer Well FAW-3
090	Floridan Aquifer Well FAW-4
091	Floridan Aquifer Well FAW-5
092	Floridan Aquifer Well FAW-6
093	Floridan Aquifer Well FAW-7
094	Floridan Aquifer Well FAW-8
095	Floridan Aquifer Monitoring Well FAMW-1
096	Deep Injection Well MW-1
097	Deep Injection Well MW-2
098	Deep Injection Well MW-3
099	Dual Zone Monitoring Well DZMW-1
100	Dual Zone Monitoring Well DZMW-2
100A	Water Treatment Area
100B	Fuel Oil Area
110	North Stormwater Pond
111	South Stormwater Pond
135	Admin/Control/Warehouse Building
152	Southern Blvd.
153	Palm Beach Aggregate
154	Palm Beach County Utility Connection
155	Raw water Intake Structure

- INDICATES WELLS
- ▨ INDICATES CONSTRUCTION AREA

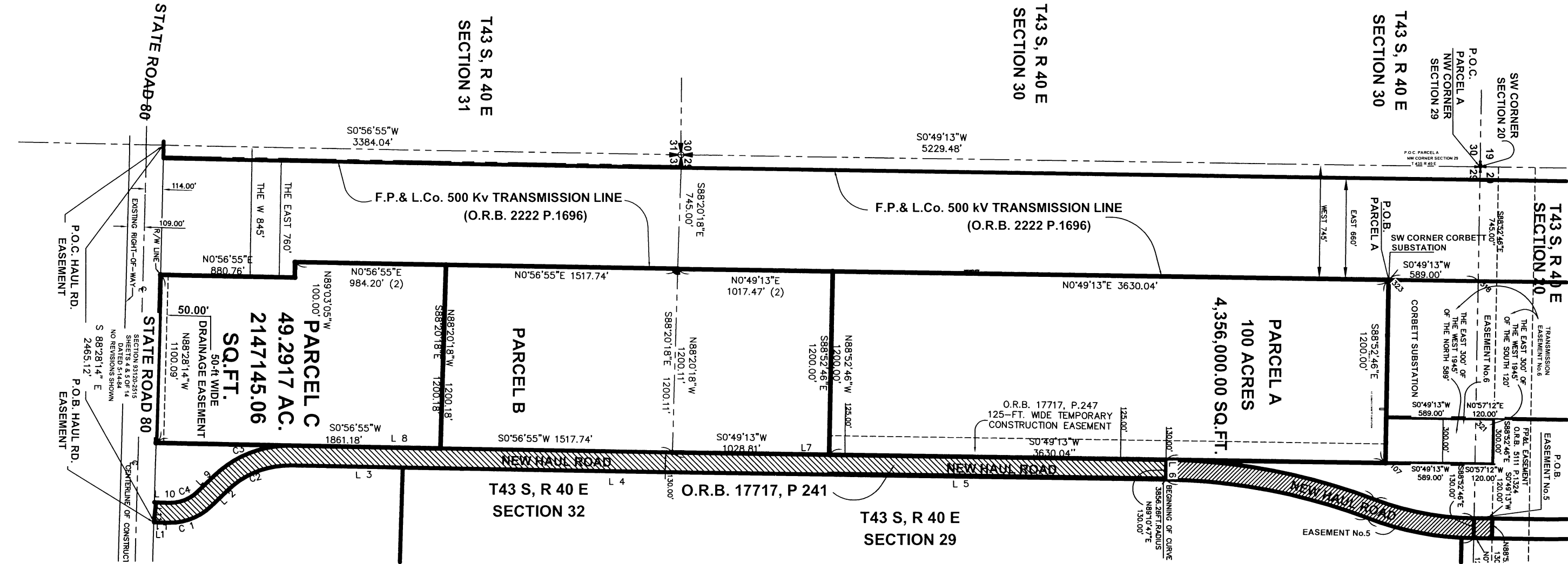


FIGURE 2.1.3-1 SITE LAYOUT
WEST COUNTY ENERGY CENTER

Sources: West County Power Partners, LLC; Golder; 2007.



FPL



ABBREVIATIONS:
(c) indicates computed quantity
(cl) indicates closure
(d) indicates description
(m) indicates measured quantity
(p) indicates plat
C/L indicates centerline
R/W indicates right-of-way
T indicates Township
R indicates Range
O.R.B. indicates Official Record Book
P.O.B. indicates point of beginning
P.O.C. indicates point of commencement
---P- indicates power line
----T- indicates telephone line

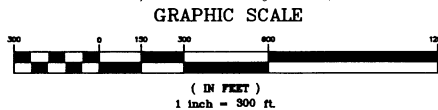
CURVE DATA
R indicates radius
T indicates tangent
CH indicates chord
L indicates arc length
Δ indicates central angle

LINE TABLE			
LINE	BEARING	LENGTH	
L1	N0°56'55"E	100.00	
L2	N44°03'05"W	150.14	
L3	N0°56'55"E	729.83	
L4	N0°56'55"E	1761.41	
L5	N0°49'13"E	3230.44	
L6	N89°10'47"W	130.00	
L7	S0°49'13"W	3228.53	
L8	S0°56'55"W	2492.86	
L9	S44°03'05"E	150.14	
L10	S0°56'55"W	100.00	
L11	S88°28'14"E	130.01	

CURVE TABLE HAUL ROAD				
CURVE	LENGTH	RADIUS	DELTA	ANGLE
C1	306.28	389.97	45°00'00"	
C2	454.75	579.00	45°00'00"	
C3	556.85	709.00	45°00'00"	
C4	204.18	259.97	45°00'00"	

LEGEND CORNERS SET OR FOUND
POINT NO. DESCRIPTION
323 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
107 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
108 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
109 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
317 5/8" IRON ROD LB 3411 FOUND, GOOD LINE & DISTANCE
110 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
111 5/8" IRON ROD LB 3411 SET
105 5/8" IRON ROD LB 3411 SET 11.00' OFFSET SOUTH
314 5/8" IRON ROD LB 3411 SET 11.00' OFFSET SOUTH
315 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
316 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE

ACCESS EASEMENT PARCEL (No.5) SCHEDULE A.
THIS DESCRIPTION IS LISTED UNDER THE FOLLOWING TITLE INSURANCE POLICY POLICY No. 7210609-358092, DATED JUNE 13, 2006.
A parcel of land lying in Section 20, Township 43 South, Range 40 East, Palm Beach County, Florida, said Parcel being a part of the South 120 feet of said Section 20, described as follows:
Commencing at the Southwest corner of said Section 20, Thence South 88°52'46" East 2300.00 feet along the South line of said Section 20, to the Point of Beginning on the West right-of-way line of the New Haul Road, thence continue South 88°52'46" East 130.00 feet along said Section line, thence North 0°49'13" East 120.00 feet along the East right-of-way line of the New Haul Road to the North line of the South 120 feet of said Section 20, thence North 88°52'46" West 130.00 feet along the North line of the South 120 feet of said Section 20, to the West right-of-way line of the New Haul Road,
Thence South 0°49'13" West 120.00 feet along said West right-of-way line to the Point of Beginning.
Together with a parcel of land lying in Section 29, Township 43 South, Range 40 East, Palm Beach County, Florida described as follows:
Commencing at the Northwest corner of Section 29, Township 43 South, Range 40 East, thence South 88°52'46" East 2300.00 feet to the Point of Beginning on the West right-of-way line of the New Haul Road, thence South 0°49'13" West 0.88 feet to the beginning of a curve concave to the West having a radius of 1920.00 feet, thence Southwesterly 669.07 feet along the arc of said curve, which is the same as the West right-of-way line of the New Haul Road, through a central angle of 19°57'58" to a point of reverse curvature and the beginning of a curve concave to the East, having a radius of 3986.26 feet, thence Southwesterly and South 1389.11 feet along the arc of said curve through a central angle of 19°57'58" to the North line of an easement recorded in Official Record Book 17717, Page 241, thence North 89°10'47" East 130.00 feet along the North line of said easement recorded in Official Record Book 17717, Page 241, which is a radial line, to the East right-of-way line of the New Haul Road and the beginning of a curve Concave to the East, having a radius of 3856.26 feet, thence Northerly and Northeasterly 1343.81 feet along the arc of said curve through a central angle of 19°57'58" to a point of reverse curvature and the beginning of a curve concave to the West, having a radius of 2050.00 feet, thence Northeasterly 714.37 feet along the arc of said curve which is the same as the East right-of-way line of the New Haul Road, through a central angle of 19°57'58" to a point on the North line of said Section 29, thence North 88°52'46" West 130.00 feet along the North line of said Section 29, to the Point of Beginning.
TRANSMISSION EASEMENT PARCEL (No.6)
THIS DESCRIPTION IS LISTED UNDER THE FOLLOWING TITLE INSURANCE POLICY POLICY No. 7210609-358092, DATED JUNE 13, 2006.
A parcel of land lying in Section 20, Township 43 South, Range 40 East., Said parcel described as being the East 300 feet, of the West 1945 feet of the South 120 feet, of said Section 20 as measured along the South and West lines thereof.
Together with a parcel of land lying in Section 29, Township 43 South, Range 40 East, Said parcel described as being the East 300 feet, of the West 1945 feet, of the North 589 feet, of said Section 29, as measured along the North and West lines thereof.
Said lands situate in Palm Beach County, Florida and containing 212,700 square feet



FLIGHT DATE: JANUARY 2, 2007

DATE	8-15-07				
SCALE	1"=300'				
DRAWN	PAG				
FB No.	43-40	1	CHANGED FONT COLOR, PARCEL A	PAG	10-09-07
CHECKED	FG	NO.	REVISIONS	BY	DATE

EASEMENT PARCEL (HAUL ROAD)
DESCRIPTION: PART OF THE 130 FEET WIDE EASEMENT FOR THE NEW HAUL ROAD, TO PROVIDE INGRESS AND EGRESS TO PARCELS A, B, AND C. DESCRIBED IN O.R.B. 17717, P.241 EXHIBIT B
THIS DESCRIPTION IS LISTED UNDER THE FOLLOWING TITLE INSURANCE POLICY: 7210609-358092 DATED JUNE 13, 2006.
"Commencing at the intersection of the West line of Section 32, Township 43 South, Range 40 East with the North right-of-way line of State Road 80, thence South 88°28'14" East 2465.12 feet along said right-of-way line to the Point of Beginning on the East line of the 130 feet wide easement,
thence North 0°56'55" East 100.00 feet along a line parallel with the West line of said Section 32, to the beginning of a curve concave to the West having a radius of 389.97 feet.
Thence Northwesterly 306.28 feet along the arc of said curve through a central angle of 45°00'00" to the end of said curve, at a tangent line to said curve,
thence North 44°03'05" West 150.14 feet along a tangent to the preceding curve, to the beginning of a curve concave to the Northeast having a radius of 579.00 feet,
Thence Northwesterly and North 454.75 feet along the arc of said curve through a central angle of 45°00'00" to the end of said curve, at a tangent line to said curve,
thence North 0°56'55" East 729.83 feet along a tangent to said curve,
thence North 0°56'55" East 1761.41 feet along a line parallel with the West line of said Section 32 to the South line of Section 29, Township 43 South, Range 40 East,
thence North 0°49'13" East 3230.44 feet along a line parallel with the West line of said Section 29 to the beginning of a curve concave to the East, having a radius of 3856.26 feet,
Thence North 89°10'47" West 130.00 feet along a radial line, to the West line of the 130.00 feet wide easement, thence South 0°49'13" West 3228.53 feet along a line parallel with the West line of said Section 29, to the North line of Section 32, Township 43 South, Range 40 East,
thence South 0°56'55" West 2492.86 feet along a line parallel with the West line of said Section 32, to the beginning of a curve concave to the Northeast, having a radius of 709.00 feet,
Thence Southeasterly 556.85 feet along the arc of said curve through a central angle of 45°00'00" to the end of said curve and a tangent line to said curve,
Thence South 44°03'05" East 150.14 feet along said tangent, to the beginning of a curve concave to the Southwest having a radius of 259.97 feet,
Thence Southwesterly 204.18 feet along the arc of said curve through a central angle of 45°00'00" to the end of said curve and a tangent line to said curve,
Thence South 0°56'55" West 100.00 feet to the North right-of-way line of State Road 80,
Thence South 88°28'14" East 130.01 feet along said right-of-way line to the Point of Beginning."

ABSTRACTED SURVEY:

"I have reviewed Chicago Title Insurance Policy No. 7210609-358092 Dated June 13, 2006
This survey shows all easements and rights-of-way as follows:
O.R.B. 17717, PAGE 241, O.R.B. 17717 PAGE 247, and O.R.B. 19739, PAGE 967.

C:\images\pedro-sign.jpg

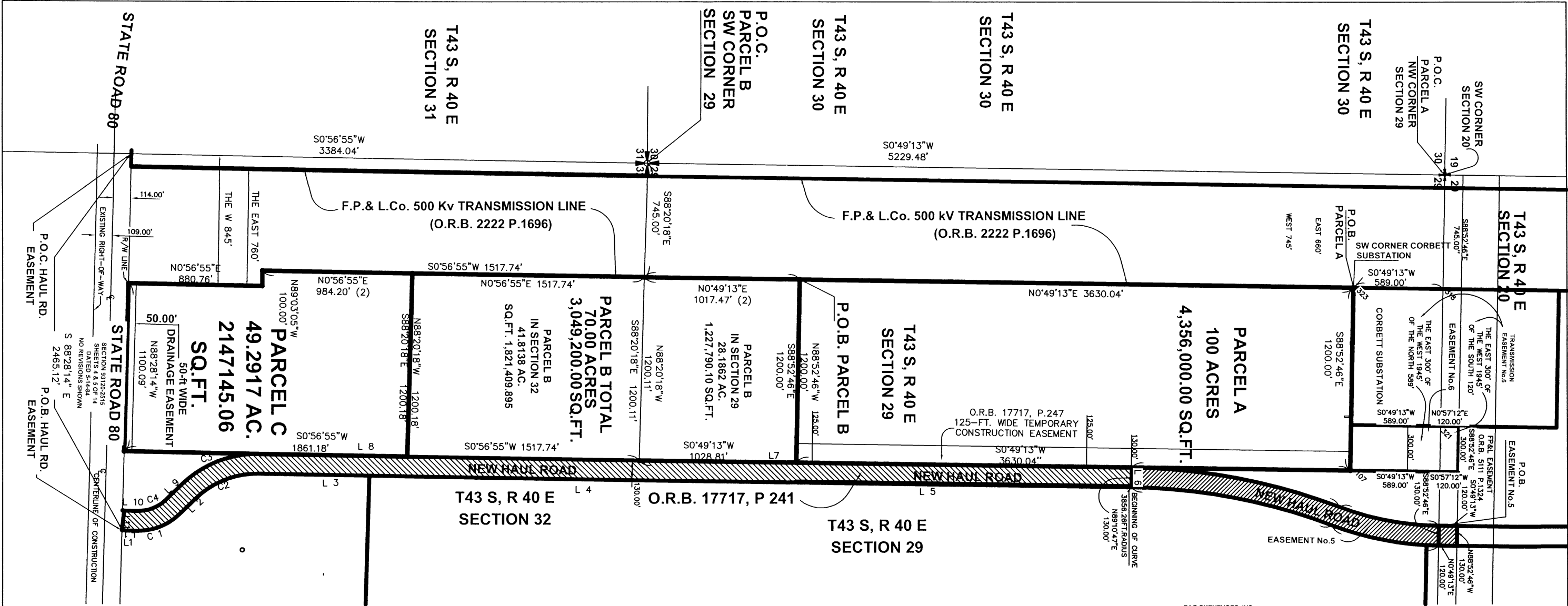
Pedro A. Gonzalez, P.S.M.
Florida License No. 2287

PAG SURVEYORS, INC.
CERTIFICATE OF AUTHORIZATION NO. LB 3411
1016 SOUTHEAST 4TH STREET
BELLE GLADE, FL 33430-4330
BOUNDARY SURVEY FOR: FLORIDA POWER & LIGHT CO.
DATE: AUGUST 15, 2007 WORK ORDER NUMBER: 07110A
The survey of the property shown and described hereon was executed according to the description furnished by client, which is shown transcribed verbatim. No search of the public records was made by PAG SURVEYORS, INC.
PAG SURVEYORS, INC. has no knowledge of any recorded or unrecorded instruments other than the ones furnished by client and shown under DESCRIPTION.
The boundaries shown on this survey reflect only those called for in the description and may not necessarily be the same as the lines of ownership. DESCRIPTIONS: from Chicago Title Insurance Company's Title Insurance Policy No. 7210609-358092, dated June 13, 2006.
OPTION PARCEL A:
"A parcel of land lying in Section 29, Township 43 South, Range 40 East, Palm Beach County, Florida, described as follows:
Commencing at the Northwest corner of said Section 29, Township 43 South, Range 40 East,
Thence South 88°52'46" East 745.00 feet along the North line of said Section 29 to the East line of Florida Power & Light Company 500 Kv transmission line corridor as recorded in ORB 2222, P. 1696, public records of Palm Beach County, Florida,
Thence South 0°49'13" West 589.00' along said East line, which is the same West line of the Florida Power & Light Company's Corbett Substation to the Southwest corner of said Corbett Substation and the Point of Beginning,
thence South 88°52'46" East 1200.00 feet along the South line of said Corbett Substation and its Easterly extension to a point on a line parallel with the West line of Section 29, Township 43 South, Range 40 East,
thence South 0°49'13" West 3630.04 feet along said parallel line to a point on a line parallel with the North line of said Section 29, thence North 88°52'46" West 1200.00 feet along said line parallel with the North line of Section 29, to the East line of the Florida Power & Light Co. 500Kv transmission line corridor,
Thence North 0°49'13" East 3630.04 feet along said F P & L Co. East line to the Point of Beginning."

SURVEYOR'S NOTES:
1. This survey shows descriptions provided by Florida Power & Light Company, contained in Chicago Title Insurance Company's Policy No. 7210609-358092 dated June 13, 2006.
2. The Northwest corner of Section 29, Township 43 South, Range 40 East position in Florida State Plane Coordinate System, East Zone, on the 1983 North American Datum, 1990 Adjustment is: Y (Northing) 864107.403, X (Easting) 858910.1950.
3. Bearings and distances shown on this survey are measured between found and/or set monuments.
4. Option Parcel A contains 100.00 Acres (4,356,000 square feet)

ACCURACY: The present use of the subject lands is Rural.
The Minimum Technical Standards set forth by the Florida State Board of Professional Surveyors and Mappers (61G17-6 FAC) require a minimum relative distance accuracy for this type of survey of 1 foot in 5,000 feet. This survey meets said requirements. This report and the map of boundary survey are not valid without the signature and the embossed seal of the Florida Licensed Professional Surveyor and Mapper whose name appears below.
BASIS OF BEARINGS: Bearings shown on this plat of survey and description are Grid Bearings of the Florida State Plane Coordinate System, East Zone, on the 1983 North American Datum, 1990 Adjustment derived from our GPS survey using as control Palm Beach County GPS Monument S.O.U.P. The West line of Section 29, Township 43 South Range 40 East bears South 0°49'13" West and all other bearings are relative thereto.

PAG SURVEYORS, INC. 1016 SOUTHEAST 4TH STREET BELLE GLADE, FL 33430-4330 PHONE (561) 996-6615 L.B. 3411	SEAL	DATE	8-15-07					BOUNDARY SURVEY FOR: FIGURE 2.1.5-1a. FPL WCEC UNIT 3 PROPERTY SURVEY PALM BEACH COUNTY FLORIDA	SHEET NO.	1	1
		SCALE	1"=300'						OF		
		DRAWN	PAG						WORK ORDER NO.		
		FB No.	43-40	1	CHANGED FONT COLOR, PARCEL A	PAG	10-09-07		07-3-110A		
		CHECKED	FG	NO.	REVISIONS	BY	DATE				



ABBREVIATIONS:

- (c) indicates computed quantity
(cl) indicates closure
(d) indicates description
(m) indicates measured quantity
(p) indicates plat
C/L indicates centerline
R/W indicates right-of-way
T indicates Township
R indicates Range
O.R.B. indicates Official Record Book
P.O.B. indicates point of beginning
P.O.C. indicates point of commencement
— P- indicates power line
— T- indicates telephone line

CURVE DATA

- R indicates radius
T indicates tangent
CH indicates chord
L indicates arc length
Δ indicates central angle

LEGEND CORNERS SET OR FOUND
POINT No. DESCRIPTION

- 323 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
107 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
108 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
109 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
106 5/8" IRON ROD LB 3411 FOUND, GOOD LINE & DISTANCE
317 5/8" IRON ROD LB 3411 FOUND, GOOD LINE & DISTANCE
110 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
111 5/8" IRON ROD LB 3411 SET
105 5/8" IRON ROD LB 3411 SET 11.00' OFFSET SOUTH
314 5/8" IRON ROD LB 3411 SET 11.00' OFFSET SOUTH
315 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
316 FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE

LINE TABLE		
LINE	BEARING	LENGTH
L1	N0°56'55"E	100.00'
L2	N44°03'05"W	150.14'
L3	N0°56'55"E	729.83'
L4	N0°56'55"E	1761.41'
L5	N0°49'13"E	3230.44'
L6	N89°10'47"W	130.00'
L7	S0°49'13"W	3228.53'
L8	S0°56'55"W	2492.86'
L9	S44°03'05"E	150.14'
L10	S0°56'55"W	100.00'
L11	S88°28'14"E	130.01'

CURVE TABLE HAUL ROAD			
CURVE	LENGTH	RADIUS	DELTA ANGLE
C1	306.28	389.97	45°00'00"
C2	454.75	579.00	45°00'00"
C3	556.85	709.00	45°00'00"
C4	204.18	259.97	45°00'00"

ACCESS EASEMENT PARCEL (No.5) SCHEDULE A.

THIS DESCRIPTION IS LISTED UNDER THE FOLLOWING TITLE INSURANCE POLICY POLICY No.7210609-358092, DATED JUNE 13, 2006.

A parcel of land lying in Section 20, Township 43 South, Range 40 East, Palm Beach County, Florida, said Parcel being a part of the South 120 feet of said Section 20, described as follows:
Commencing at the Southwest corner of said Section 20, Thence South 88°52'46" East 2300.00 feet along the South line of said Section 20, to the Point of Beginning on the West right-of-way line of the New Haul Road, thence continue South 88°52'46" East 130.00 feet along said Section line, thence North 0°49'13" East 120.00 feet along the East right-of-way line of the New Haul Road to the North line of the South 120 feet of said Section 20, thence North 88°52'46" West 130.00 feet along the North line of the South 120 feet of said Section 20, to the West right-of-way line of the New Haul Road.

Thence South 0°49'13" West 120.00 feet along said West right-of-way line to the Point of Beginning.
Together with a parcel of land lying in Section 29, Township 43 South, Range 40 East, Palm Beach County, Florida described as follows:

Commencing at the Northwest corner of Section 29, Township 43 South, Range 40 East, thence South 88°52'46" East 2300.00 feet to the Point of Beginning on the West right-of-way line of the New Haul Road, thence South 0°49'13" West 0.68 feet to the beginning of a curve concave to the West having a radius of 1920.00 feet, thence Southwesterly 669.07 feet along the arc of said curve, which is the same as the West right-of-way line of the New Haul Road, through a central angle of 19°57'58" to a point of reverse curvature and the beginning of a curve concave to the East, having a radius of 3856.26 feet, thence Southwesterly and South 1389.11 feet along the arc of said curve through a central angle of 19°57'58" to the North line of an easement recorded in Official Record Book 17717, Page 241, thence North 89°10'47" East 130.00 feet along the North line of said easement recorded in Official Record Book 17717, Page 241, which is a radial line, to the East right-of-way line of the New Haul Road and the beginning of a curve Concave to the East, having a radius of 3856.26 feet, thence Northerly and Northeasterly 1343.81 feet along the arc of said curve through a central angle of 19°57'58" to a point of reverse curvature and the beginning of a curve concave to the West, having a radius of 2050.00 feet, thence Northeasterly 714.37 feet along the arc of said curve which is the same as the East right-of-way line of the New Haul Road, through a central angle of 19°57'58" to a point on the North line of said Section 29, thence North 88°52'46" West 130.00 feet along the North line of said Section 29, to the Point of Beginning.

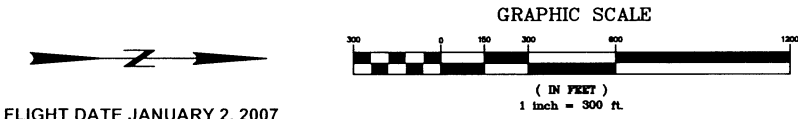
TRANSMISSION EASEMENT PARCEL (No.6)

THIS DESCRIPTION IS LISTED UNDER THE FOLLOWING TITLE INSURANCE POLICY POLICY No.7210609-358092, DATED JUNE 13, 2006.

A parcel of land lying in Section 20, Township 43 South, Range 40 East., Said parcel described as being the East 300 feet, of the West 1945 feet of the South 120 feet, of said Section 20 as measured along the South and West lines thereof.

Together with a parcel of land lying in Section 29, Township 43 South, Range 40 East.
Said parcel described as being the East 300 feet, of the West 1945 feet, of the North 589 feet, of said Section 29, as measured along the North and West lines thereof.

Said lands situate in Palm Beach County, Florida and containing 212,700 square feet



EASEMENT PARCEL (HAUL ROAD)

DESCRIPTION: PART OF THE 130 FEET WIDE EASEMENT FOR THE NEW HAUL ROAD, TO PROVIDE INGRESS AND EGRESS TO PARCELS A, B, AND C. DESCRIBED IN O.R.B. 17717, P.241 EXHIBIT B
This description is listed under the following Title Insurance Policy: 7210609-358092
Dated June 13, 2006.

"Commencing at the intersection of the West line of Section 32, Township 43 South, Range 40 East with the North right-of-way line of State Road 80, thence South 88° 28'14" East 2465.12 feet along said right-of-way line to the Point of Beginning on the East line of the 130 feet wide easement;

thence North 0° 56'55" East 100.00 feet along a line parallel with the West line of said Section 32, to the beginning of a curve concave to the West having a radius of 389.97 feet .
Thence Northwesterly 306.28 feet along the arc of said curve through a central angle of 45 °00'00" to the end of said curve, at a tangent line to said curve.

thence North 44°03'05" West 150.14 feet along a tangent to the preceding curve, to the beginning of a curve concave to the Northeast having a radius of 579.00 feet.

Thence Northwesterly and North 454.75 feet along the arc of said curve through a central angle of 45 °00' 00" to the end of said curve, at a tangent line to said curve.

Thence North 0°56'55" East 729.83 feet along a tangent to said curve,

thence North 0°56'55" East 1761.41 feet along a line parallel with the West line of said Section 32 to the South line of Section 29, Township 43 South, Range 40 East,

thence North 0° 49'13" East 3230.44 feet along a line parallel with the West line of said Section 29 to the beginning of a curve concave to the East, having a radius of 3856.26 feet,

Thence North 89°10'47" West 130.00 feet along a radial line, to the West line of the 130.00 feet wide easement, thence South 0°49'13" West 3228.53 feet along a line parallel with the West line of said Section 29, to the North line of Section 32, Township 43 South, Range 40 East,

thence South 0°56'55" West 2492.86 feet along a line parallel with the West line of said Section 32, to the beginning of a curve concave to the Northeast, having a radius of 709.00 feet,

Thence Southeasterly 556.85 feet along the arc of said curve through a central angle of 45 °00'00" to the end of said curve and a tangent line to said curve.

Thence South 44° 03'05" East 150.14 feet along said tangent, to the beginning of a curve concave to the Southwest having a radius of 259.97 feet,

Thence Southwesterly 204.18 feet along the arc of said curve through a central angle of 45 °00'00" to the end of said curve and a tangent line to said curve,

Thence South 0°56'55" West 100.00 feet to the North right-of-way line of State Road 80.

Thence South 88° 28'14" East 130.01 feet along said right-of-way line to the Point of Beginning."

ABSTRACTED SURVEY:

"I have reviewed Chicago Title Insurance Policy No.7210609-358092

Dated June 13, 2006

This survey shows all easements and rights-of-way as follows:

O.R.B. 17717, PAGE 241, O.R.B. 17717 PAGE 247, and

O.R.B. 19739, PAGE 967.

C:\images\pedro-sign.jpg

Pedro A. Gonzalez, P.S.M.
Florida License No. 2287

PAG SURVEYORS, INC.

CERTIFICATE OF AUTHORIZATION NO. LB 3411
1016 SOUTHEAST 4TH STREET BELLE GLADE, FL 33430-4330
BOUNDARY SURVEY FOR: FLORIDA POWER & LIGHT Co.

DATE AUGUST 15, 2007. WORK ORDER No. 071108

The survey of the property shown and described hereon was executed according to the description furnished by client, which is shown transcribed verbatim. No search of the public records was made by PAG SURVEYORS, INC.
PAG SURVEYORS, INC. has no knowledge of any recorded or unrecorded instruments other than the ones furnished by client and shown under DESCRIPTIONS.

The boundaries shown on this survey reflect only those called for in the description and may not necessarily be the same as the lines of ownership.

DESCRIPTIONS: from Chicago Title Insurance Company's Title Insurance Policy
No.7210609-358092, dated June 13, 2007.

OPTION PARCEL B:

DESCRIPTION: A parcel of land lying in Sections 29 and 32, Township 43 South, Range 40 East, Palm Beach County, Florida, described as follows:

Commencing at the Southwest corner of said Section 29, Township 43 South, Range 40 East,
Thence South 88 degrees 20'18" East 745.00 feet along the South line of said Section 29 to the East line of Florida Power & Light Company's 500 Kv Transmission Line Corridor as recorded in ORB 2222, P 1696, Public Records of Palm Beach County, Florida.
Thence North 0 degrees 49'13" East 1017.47' along said East line, to the Point of Beginning of the hereinafter Parcel B,
Thence South 88 degrees 52'46" East 1200.00 feet along a line parallel with the North line of Section 29, Township 43 South, Range 40 East, said line being the same as the South line of Parcel A, to a point,
Thence South 0 degrees 49'13" West 1028.81 feet along a line parallel with the East line of said Florida Power & Light Co. Corridor to a point on the South line of said Section 29,
Thence into Section 32, Township 43 South, Range 40 East, South 0 degrees 56'55" West 1517.74 feet along a line parallel with the East line of the Florida Power & Light Co. Corridor,
Thence North 88 degrees 20'18" West 1200.18 feet along a line parallel with the North line of Section 32, to the East line of the Florida Power & Light Co. 500kv transmission line Corridor,
Thence North 0 degrees 56'55" East 1517.74 feet along said F P & L Co. East line to a point on the South line of Section 29, Township 43 South, Range 40 East,
thence into Section 29, Township 43 South, Range 40 East North 0 degrees 49'13" East 1017.47 feet along the East line of the Florida Power & Light Co. Corridor, to the Point of Beginning.

SURVEYOR'S NOTES:

- This survey shows descriptions provided by Florida Power & Light Company, contained in Chicago Title Insurance Company's Policy No. 7210609-358092.
- The Southwest corner of Section 29, Township 43 South, Range 40 East position in Florida State Plane Coordinate System, East Zone on the 1983 North American Datum, 1990 Adjustment is: Y (Northing) 858878.462, X (Easting) 858835.340.
- Bearings and distances shown on this survey are measured between found and/or set monuments.
- Option Parcel B Containing: 70.00 Acres (3,049,200 square feet)

ACCURACY: The present use of the subject lands is Rural.

The Minimum Technical Standards set forth by the Florida State Board of Professional Surveyors and Mappers (61G17-6 FAC) require a minimum relative distance accuracy for this type of survey of 1 foot in 5,000 feet. This survey meets said requirements. This report and the map of boundary survey are not valid without the signature and the embossed seal of the Florida Licensed Professional Surveyor and Mapper whose name appears below.

BASIS OF BEARINGS: Bearings shown on this plat of survey and description are Grid Bearings of the Florida State Plane Coordinate System, East Zone, on the 1983 North American Datum, 1998 Adjustment derived from our GPS survey using as control Palm Beach County GPS Monument SOUP. The West line of Section 29, Township 43 South Range 40 East bears North 0°49'13" East and all other bearings are relative thereto.

PAG SURVEYORS, INC.

L.B. 3411

1016 SOUTHEAST 4TH STREET
BELLE GLADE, FL 33430-4330 PHONE (561) 996-6615

SEAL

DATE	8-15-07		
SCALE	1"=300'		
DRAWN	PAG		
FB No.	43-40	1	CHANGED FONT COLOR, PARCEL A
CHECKED	FG	NO.	REVISIONS

BY	DATE
PAG	10-09-07

BOUNDARY SURVEY FOR:

FIGURE 2.1.5-1b. FPL WCEC UNIT 3 PROPERTY SURVEY

PALM BEACH COUNTY

FLORIDA

SHEET NO.

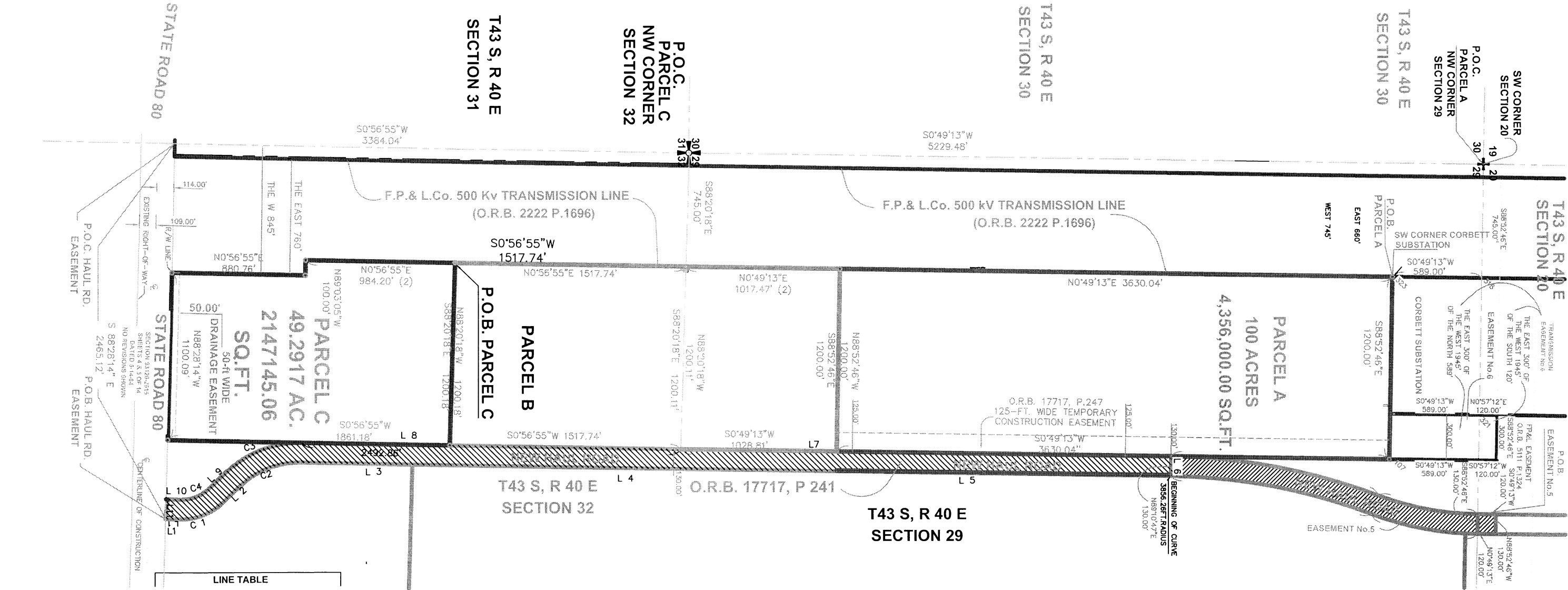
1

1

OF

WORK ORDER NO.

07-3-110B



ABBREVIATIONS:
(c) indicates computed quantity
(cl) indicates closure
(d) indicates description
(m) indicates measured quantity
(p) indicates plat
C/L indicates centerline
R/W indicates right-of-way
T indicates Township
R indicates Range
O.R.B. indicates Official Record Book
P.O.B. indicates point of beginning
P.O.C. indicates point of commencement
— P - indicates power line
—T- indicates telephone line

CURVE DATA
R indicates radius
T indicates tangent
CH indicates chord
L indicates arc length
Δ indicates central angle

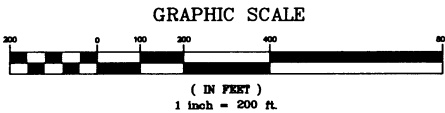
LEGEND CORNERS SET OR FOUND	
POINT No.	DESCRIPTION
323	FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
107	FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
108	FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
109	FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
106	5/8" IRON ROD LB 3411 FOUND, GOOD LINE & DISTANCE
317	5/8" IRON ROD LB 3411 FOUND, GOOD LINE & DISTANCE
110	FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
111	5/8" IRON ROD LB 3411 SET
105	5/8" IRON ROD LB 3411 SET 11.00' OFFSET SOUTH
314	5/8" IRON ROD LB 3411 SET 11.00' OFFSET SOUTH
315	FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE
316	FOUND CONCRETE MONUMENT, P.R.M. LB 3300, GOOD LINE & DISTANCE

LINE TABLE		
LINE	BEARING	LENGTH
L1	N0°56'55"E	100.00'
L2	N44°03'05"W	150.14'
L3	N0°56'55"E	729.83'
L4	N0°56'55"E	1761.41'
L5	N0°49'13"E	3230.44'
L6	N89°10'47"W	130.00'
L7	S0°49'13"W	3228.53'
L8	S0°56'55"W	2492.86'
L9	S44°03'05"E	150.14'
L10	S0°56'55"W	100.00'
L11	S88°28'14"E	130.01'

CURVE TABLE HAUL ROAD				
CURVE	LENGTH	RADIUS	DELTA	ANGLE
C1	306.28	389.97'		45°00'00"
C2	454.75	579.00'		45°00'00"
C3	556.85'	709.00'		45°00'00"
C4	204.18'	259.97'		45°00'00"

ACCESS EASEMENT PARCEL (No.5) SCHEDULE A.
THIS DESCRIPTION IS LISTED UNDER THE FOLLOWING TITLE INSURANCE POLICY POLICY No. 7210609-358092, DATED JUNE 13, 2006.
A parcel of land lying in Section 20, Township 43 South, Range 40 East, Palm Beach County, Florida, said Parcel being a part of the South 120 feet of said Section 20, described as follows:
Commencing at the Southwest corner of said Section 20; Thence South 88°52'46" East 2300.00 feet along the South line of said Section 20, to the Point of Beginning on the West right-of-way line of the New Haul Road, thence continue South 88°52'46" East 130.00 feet along said Section line, thence North 0°49'13" East 120.00 feet along the East right-of-way line of the New Haul Road to the North line of the South 120 feet of said Section 20, thence North 88°52'46" West 130.00 feet along the North line of the South 120 feet of said Section 20, to the West right-of-way line of the New Haul Road,
Thence South 0°49'13" West 120.00 feet along said West right-of-way line to the Point of Beginning.
Together with a parcel of land lying in Section 29, Township 43 South, Range 40 East, Palm Beach County, Florida described as follows:
Commencing at the Northwest corner of Section 29, Township 43 South, Range 40 East, thence South 88°52'46" East 2300.00 feet to the Point of Beginning on the West right-of-way line of the New Haul Road, thence South 0°49'13" West 0.68 feet to the beginning of a curve concave to the West having a radius of 1920.00 feet, thence Southwesterly 669.07 feet along the arc of said curve, which is the same as the West right-of-way line of the New Haul Road, through a central angle of 19°57'58" to a point of reverse curvature and the beginning of a curve concave to the East, having a radius of 3986.26 feet, thence Southwesterly and South 1389.11 feet along the arc of said curve through a central angle of 19°57'58" to the North line of an easement recorded in Official Record Book 17717, Page 241, thence North 89°10'47" East 130.00 feet along the North line of said easement recorded in Official Record Book 17717, Page 241, which is a radial line, to the East right-of-way line of the New Haul Road and the beginning of a curve Concave to the East, having a radius of 3856.26 feet, thence Northerly and Northeasterly 1343.81 feet along the arc of said curve through a central angle of 19°57'58" to a point of reverse curvature and the beginning of a curve concave to the West, having a radius of 2050.00 feet, thence Northeasterly 714.37 feet along the arc of said curve which is the same as the East right-of-way line of the New Haul Road, through a central angle of 19°57'58" to a point on the North line of said Section 29, thence North 88°52'46" West 130.00 feet along the North line of said Section 29, to the Point of Beginning.

TRANSMISSION EASEMENT PARCEL (No.6)
THIS DESCRIPTION IS LISTED UNDER THE FOLLOWING TITLE INSURANCE POLICY POLICY No. 7210609-358092, DATED JUNE 13, 2006.
A parcel of land lying in Section 20, Township 43 South, Range 40 East., Said parcel described as being the East 300 feet, of the West 1945 feet of the South 120 feet, of said Section 20 as measured along the South and West lines thereof.
Together with a parcel of land lying in Section 29, Township 43 South, Range 40 East.
Said parcel described as being the East 300 feet, of the West 1945 feet, of the North 589 feet, of said Section 29, as measured along the North and West lines thereof.
Said lands situate in Palm Beach County, Florida and containing 212,700 square feet



EASEMENT PARCEL (HAUL ROAD)
DESCRIPTION: PART OF THE 130 FEET WIDE EASEMENT FOR THE NEW HAUL ROAD, TO PROVIDE INGRESS AND EGRESS TO PARCELS A, B, AND C. DESCRIBED IN O.R.B. 17717, P.241 EXHIBIT B
THIS DESCRIPTION IS LISTED UNDER THE FOLLOWING TITLE INSURANCE POLICY: 7210609-358092 DATED JUNE 13, 2006.
"Commencing at the intersection of the West line of Section 32, Township 43 South, Range 40 East with the North right-of-way line of State Road 80, thence South 88° 28'14" East 2455.12 feet along said right-of-way line to the Point of Beginning on the East line of the 130 feet wide easement,
thence North 0° 56'55" East 100.00 feet along a line parallel with the West line of said Section 32, to the beginning of a curve concave to the West having a radius of 389.97 feet ,
Thence Northwesterly 306.28 feet along the arc of said curve through a central angle of 45 °00'00" to the end of said curve, at a tangent line to said curve,
thence North 44°03'05" West 150.14 feet along a tangent to the preceding curve, to the beginning of a curve concave to the Northeast having a radius of 579.00 feet,
Thence Northwesterly and North 454.75 feet along the arc of said curve through a central angle of 45 °00'00" to the end of said curve, at a tangent line to said curve,
thence North 0°56'55" East 729.83 feet along a tangent to said curve,
thence North 0°56'55" East 1761.41 feet along a line parallel with the West line of said Section 32 to the South line of Section 29, Township 43 South, Range 40 East,
thence North 0° 49'13" East 3230.44 feet along a line parallel with the West line of said Section 29 to the beginning of a curve concave to the East, having a radius of 3986.26 feet,
Thence North 89°10'47" West 130.00 feet along a radial line, to the West line of the 130.00 feet wide easement,
thence South 0°49'13" West 3228.53 feet along a line parallel with the West line of said Section 29, to the North line of Section 32, Township 43 South, Range 40 East,
thence South 0°56'55" West 2492.86 feet along a line parallel with the West line of said Section 32, to the beginning of a curve concave to the Northeast, having a radius of 709.00 feet,
Thence Southeasterly 556.85 feet along the arc of said curve through a central angle of 45 °00'00" to the end of said curve and a tangent line to said curve,
Thence South 44° 03'05" East 150.14 feet along said tangent, to the beginning of a curve concave to the Southwest having a radius of 259.97 feet,
Thence Southwesterly 204.18 feet along the arc of said curve through a central angle of 45 °00'00" to the end of said curve and a tangent line to said curve,
Thence South 0°56'55" West 100.00 feet to the North right-of-way line of State Road 80,
Thence South 88° 28'14" East 130.01 feet along said right-of-way line to the Point of Beginning."

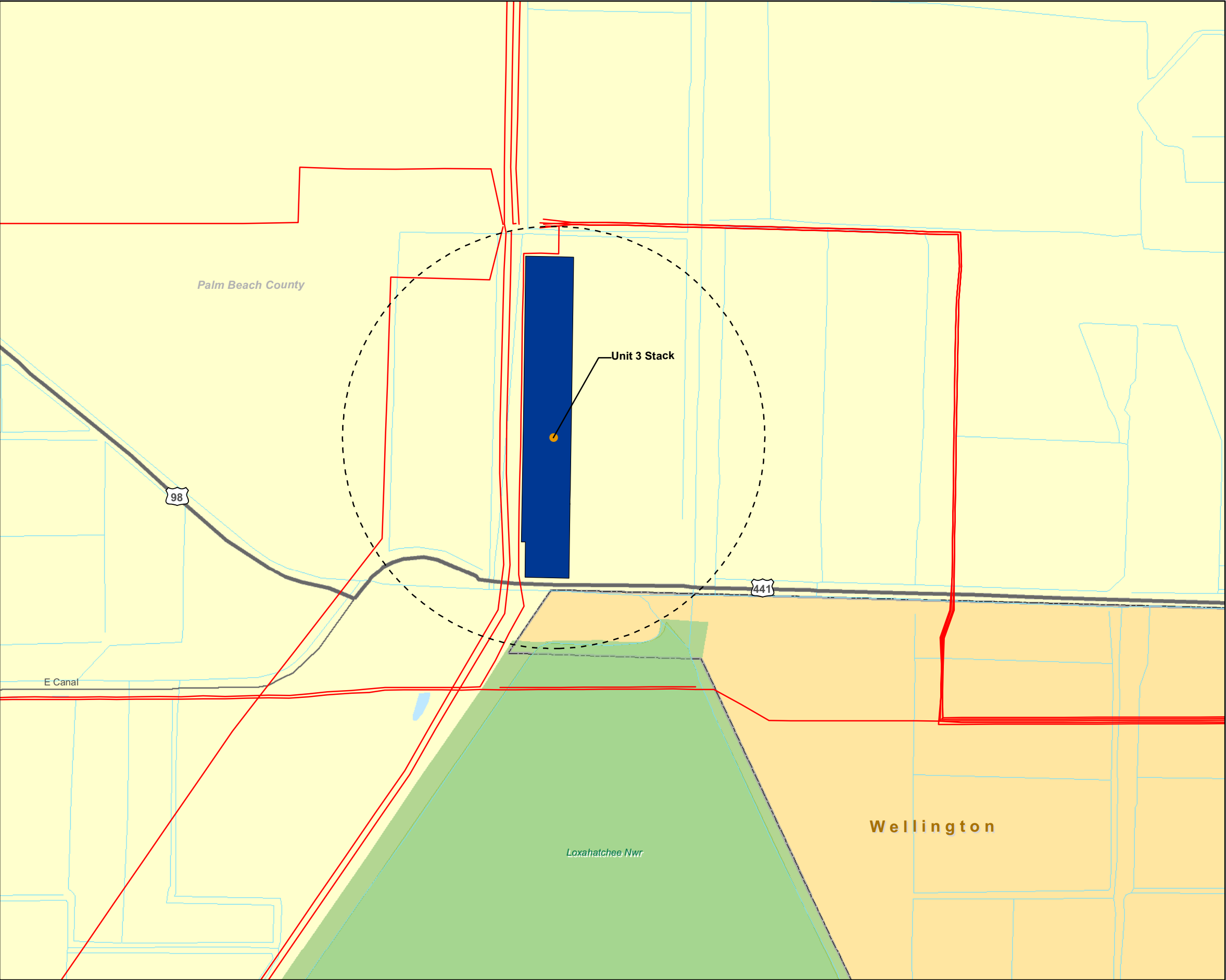
ABSTRACTED SURVEY:
"I have reviewed Title Commitment No 2605023
Dated: May 8, 2006
It does not show any of the following easements which are pertinent to Parcel C:
This survey shows all easements and rights-of-way as follows:
O.R.B. 17717, PAGE 241, O.R.B. 17717 PAGE 247, and
O.R.B. 19739, PAGE 967.

C:\images\pedro-sign.jpg
Pedro A. Gonzalez, P.S.M.
Florida License No. 2287

PAG SURVEYORS, INC.
CERTIFICATE OF AUTHORIZATION No. LB 3411
1016 SOUTHEAST 4TH STREET
BELLE GLADE, FL 33430-4330
REPORT OF BOUNDARY SURVEY FOR: FLORIDA POWER & LIGH T Co.
DATE OF SURVEY: 8-15-07, WORK ORDER No. 07110C
The survey of the property shown and described hereon was executed according to the description furnished by client, which is shown transcribed verbatim. No search of the public records was made by PAG SURVEYORS, INC.
PAG SURVEYORS, INC. has no knowledge of any recorded or unrecorded instruments other than the ones furnished by client and shown under DESCRIPTION.
The boundaries shown on this survey reflect only those called for in the description and may not necessarily be the same as the lines of ownership.
DESCRIPTIONS: From Chicago Title insurance Company's Title Insurance Policy No. 7210609-358092, dated June 13, 2006.
A parcel of land lying in Section 32, Township 43 South, Range 40 East, Palm Beach County, Florida, described as follows:
Commencing at the Northwest corner of said Section 32, Township 43 South, Range 40 East,
Found concrete monument, certified corner record No. 19903.
Thence South 88°20'18" East 745.00 feet along the North line of said Section 32 to the East line of Florida Power & Light Company's 500 Kv transmission line corridor as recorded in ORB 2222, P. 1696, public records of Palm Beach County, Florida.
thence South 0°56'55" West 1517.74' along said East line, to the Point of Beginning of Parcel C,
thence South 88°20'18" East 1200.18' feet along a line parallel with the North line of said Section 32 to a point,
thence South 0°56'55" West 1861.18 feet along a line parallel with the East line of the Florida Power & Light Co. corridor to a point on the North right-of-way line of State Road 80, Section 93120-2515 sheet 5 of 14 sheets, dated 5-4-84, no revisions shown,
thence North 88°28'14" West 1100.09 feet along said right-of-way line to the East right-of-way line of the Florida Power & Light Company's 500Kv transmission line corridor as recorded in ORB 2222, P. 1696, public records of Palm Beach County, Florida.
thence North 0°56'55" East 880.76 feet along said right-of-way line,
thence North 89°03'05" West 100.00 feet along said right-of-way line,
thence North 0°56'55" East 984.20 feet along said right-of-way line to the Point of Beginning.
Subject to a 50-foot wide drainage easement for Palm Beach Aggregates, Inc. over the South 50 feet of the above described Parcel C.
SURVEYOR'S NOTES:
1. This survey shows descriptions provided by Florida Power & Light Company, contained in Chicago Title Insurance Company's Title Insurance Policy No.7210609-358092, dated June 13, 2006.
2. The Northwest corner of Section 32, Township 43 South, Range 40 East position in Florida State Plane Coordinate System, East Zone on the 1983 North American Datum, 1990 Adjustment is: Y (Northing) 858878.462, X (Easting) 858835.340.
3. Bearings and distances shown on this survey are measured between found and/or set monuments.
4. Option Parcel C contains 49.292 Acres (2,147,145 square feet)
BASIS OF BEARINGS: Bearings shown on this plat of survey and description are Grid Bearings of the Florida State Plane Coordinate System, East Zone, on the 1983 North American Datum, 1998 Adjustment derived from our GPS survey using as control Palm Beach County GPS Monument SQUIP. The West line of Section 32 Township 43 South Range 40 East bears South 0°56'55" West and all other bearings are relative thereto.
ACCURACY: The present use of the subject lands is Rural. The Minimum Technical Standards set forth by the Florida State Board of Professional Surveyors and Mappers (61G17-6 FAC) require a minimum relative distance accuracy for this type of survey of 1 foot in 5,000 feet. This survey meets said requirements.
This report and the map of boundary survey are not valid without the signature and the embossed seal of the Florida Licensed Professional Surveyor and Mapper whose name appears below.

PAG SURVEYORS, INC. 1016 SOUTHEAST 4TH STREET BELLE GLADE, FL 33430-4330 PHONE (561) 996-6615 L.B. 3411	SEAL	DATE	8-15-07																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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LEGEND

- FPL West County Energy Center
- 1 Mile Buffer
- Existing Transmission
- Unit 3 Stack Location (Approximate)

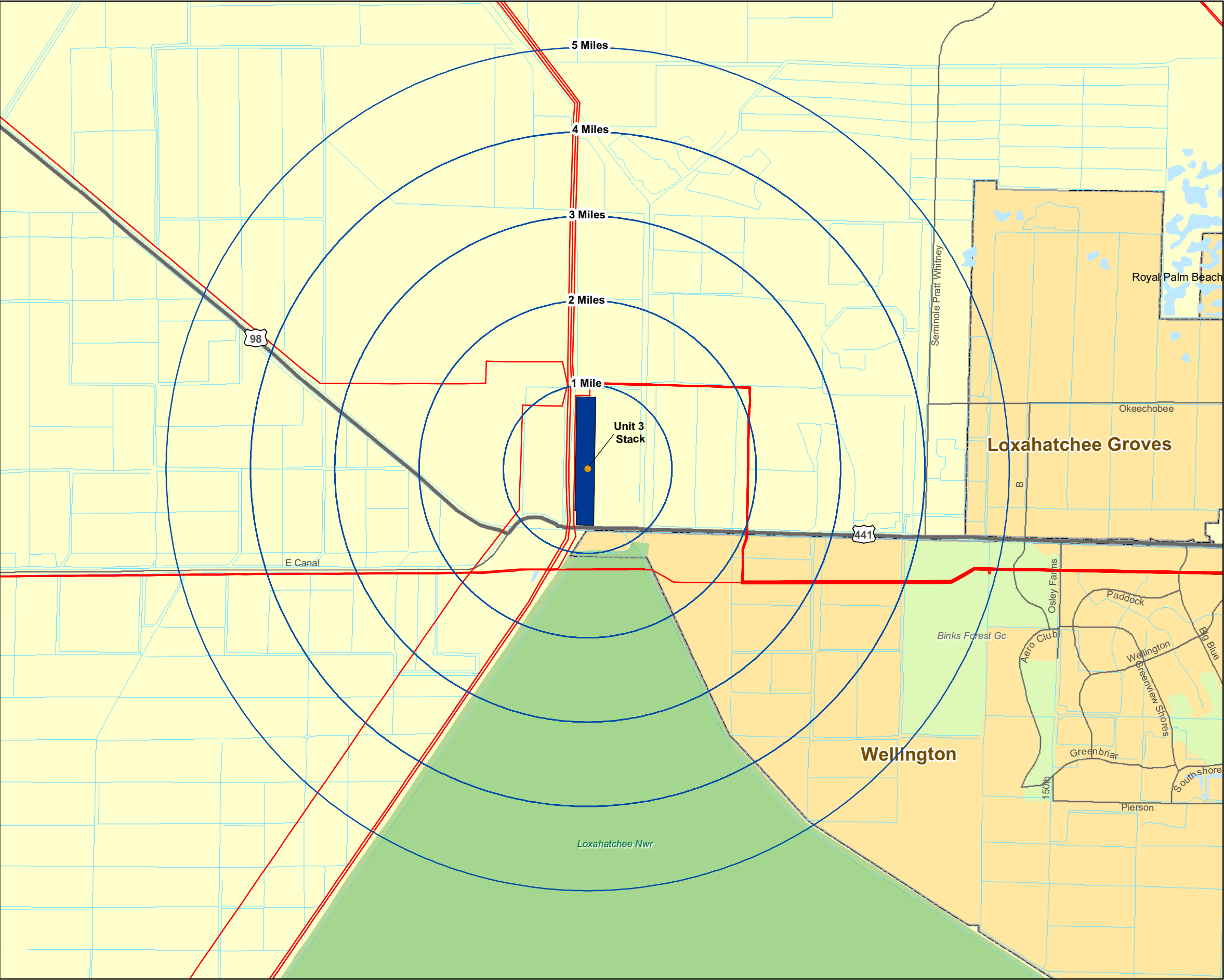
REFERENCE

- ESRI Media Kit Data and Maps.
- WCEC Location & Unit 3 Stack Location FPL
- Loxahatchee NWR US Fish and Wildlife Service 2007
- Wellington Boundary, Village of Wellington 11/14/07.



PROJECT				WEST COUNTY ENERGY CENTER			
TITLE				GOVERNMENTAL JURISDICTIONS: 1-MILE RADIUS FROM WCEC UNIT 3 STACK			
				PROJECT No. 073-87652		SCALE AS SHOWN	REV. 0
				DESIGN	KK	11/13/07	
				GIS	RL	11/21/07	
				CHECK	NV	11/21/07	
				REVIEW	KK	11/21/07	
				FIGURE 2.2.1-1			

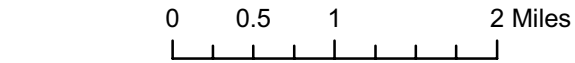
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LEGEND

- FPL West County Energy Center
- Radius Distance from Unit 3 Stack
- Existing Transmission
- Unit 3 Stack Location (Approximate)

- REFERENCE**
1. ESRI Media Kit Data and Maps.
 2. WCEC Location & Unit 3 Stack Location FPL
 3. Loxahatchee NWR US Fish and Wildlife Service 2007
 4. Wellington Boundary, Village of Wellington 11/14/07



N

PROJECT

WEST COUNTY ENERGY CENTER

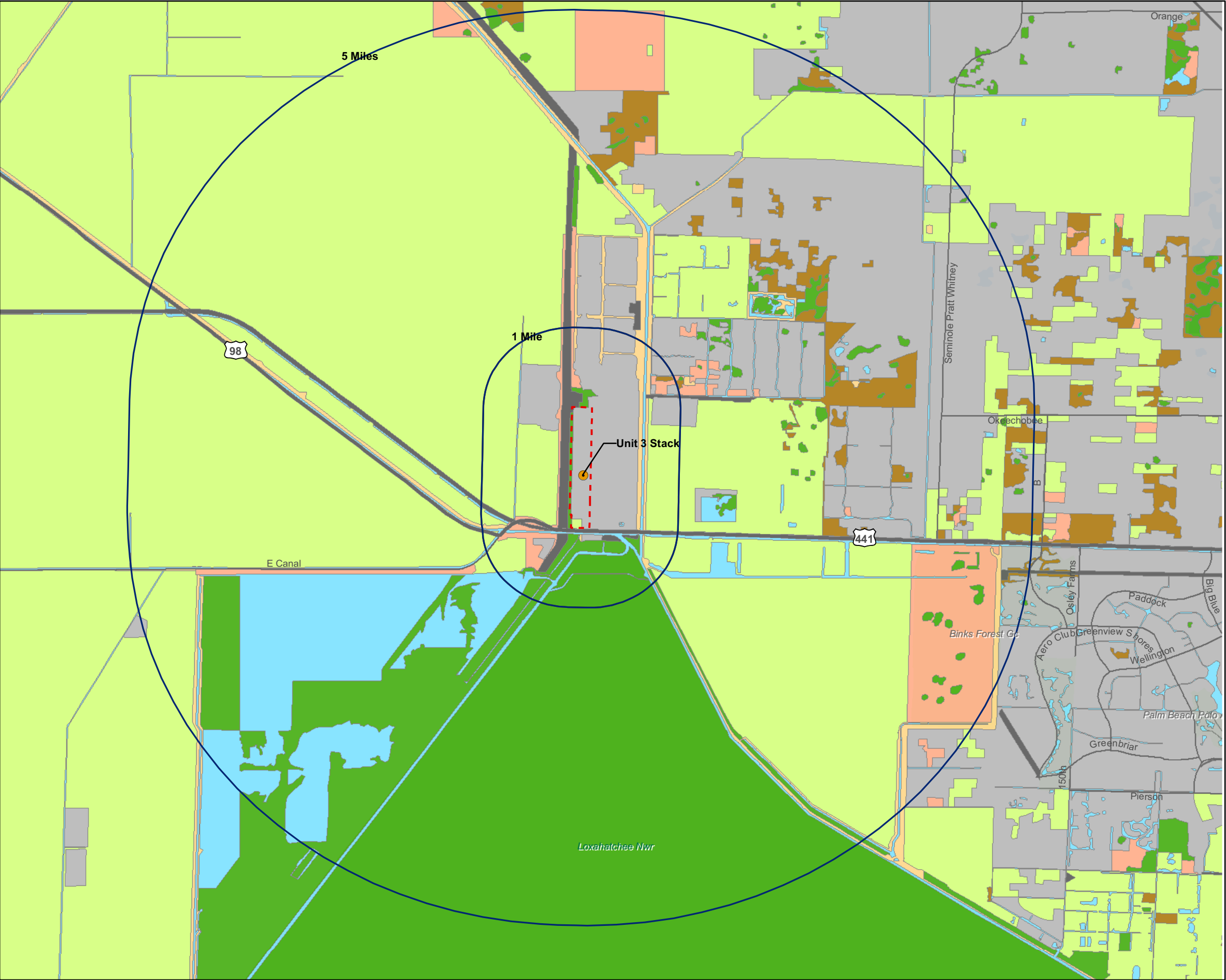
TITLE

GOVERNMENTAL JURISDICTIONS:
1, 2, 3, 4, AND 5-MILE RADIUS FROM WCEC UNIT 3 STACK

PROJECT No. 073-87652		SCALE AS SHOWN	REV. 0
DESIGN	KK 11/28/07	FIGURE 2.2.1-2	
GIS	RL 11/29/07		
CHECK	TZ 11/29/07		
REVIEW	KK 11/29/07		

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Project: 7.1\2005\GIS\ArcMap\Templates\911MyProject.mxd? - Plot: 7.1\2005\GIS\ArcMap\Templates\911MyProject.pdf?



LEGEND

FPL West County Energy Center

Unit 3 Stack Location (Approximate)

Land Use

- 100 - URBAN AND BUILT UP
- 200 - AGRICULTURE
- 300 - RANGELAND
- 400 - UPLAND FOREST
- 500 - WATER
- 600 - WETLANDS
- 700 - BARREN LAND
- 800 - TRANSPORTATION, COMMUNICATIONS AND UTILITIES

REFERENCE

1. Land use SFWMD 2004 & 1999. 2. WCEC & Stack Location FPL

0 0.5 1 2 Mile

PROJECT		WEST COUNTY ENERGY CENTER	
TITLE		1-MILE AND 5-MILE RADII EXISTING LAND USE	
	PROJECT No. 073-87652		SCALE AS SHOWN
	DESIGN	KK	11/13/07
	GIS	RL	11/21/07
	CHECK	NV	11/21/07
	REVIEW	KK	11/21/07

FIGURE 2.2.3-1

Series	Geologic Unit		Approximate thickness (feet)	Lithology	Hydrogeologic unit		Approximate thickness (feet)		
HOLOCENE	PAMLICO SAND		0-50	Quartz sand with shelly intervals	SURFICIAL AQUIFER SYSTEM		150-380		
PLEISTOCENE	ANASTASIA FORMATION		0-200	Quartz sand, shell, and coquina					
	FT. THOMPSON FORMATION		0-40	Alternating marine molluscan limestone and freshwater marl					
PLIOCENE	TAMIAMI FORMATION		0-200	Sandy, shelly limestone, calcareous sandstone, quartz sand, and clayey sand	INTERMEDIATE CONFINING UNIT		600-700		
MIOCENE AND LATE OLIGOCENE	HAWTHORN GROUP		600-800	Clay, marl, dolosilt, micritic limestone, clayey sand, silt, and phosphate grains					
				Micritic limestone to marl, chert nodules, some phosphate grains					
				Limestone, dolomite, shell, sand, sandstone, and calcareous clay or silt, abundant phosphate grains in places					
		MARKER UNIT	90-130		FLORIDAN AQUIFER SYSTEM	LOWER HAWTHORN PRODUCING ZONE		10-180	
		BASAL HAWTHORN UNIT	30-355			UPPER FLORIDAN AQUIFER		500-700 ?	
EARLY OLIGOCENE	EOCENE GROUP	SUWANNEE LIMESTONE	0-150	Fossiliferous, calcarenitic limestone		MIDDLE CONFINING UNIT		0?-900	
EOCENE		LATE	OCALA LIMESTONE	0-300					
		MIDDLE	AVON PARK FORMATION	900-1,200		Fine-grained, micritic to fossiliferous limestone and dolomite			
		EARLY	?	DOLomite UNIT		0-900	?	LOWER FLORIDAN AQUIFER	BOULDER ZONE
		OLDSMAR FORMATION	1,100-1,500	Fine-grained, micritic to fossiliferous limestone, dolomitic limestone, and dense dolomite		SUB-FLORIDAN CONFINING UNIT		1,500?	
PALEOCENE		CEDAR KEYS FORMATION		500-600					
				1,500?	Massive anhydrite beds				

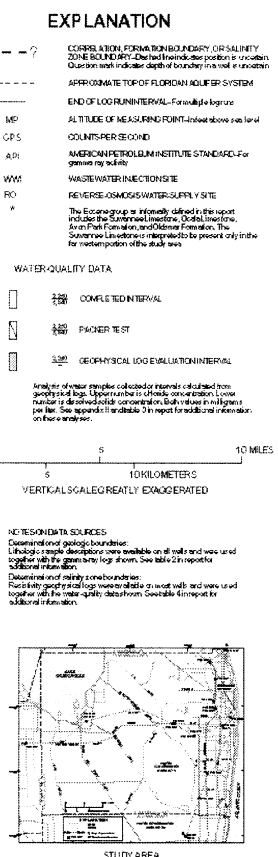
Figure 2.3.1-1.
Generalized Geology and Hydrogeology of Palm Beach County
FPL West County Energy Center, Palm Beach County, Florida

Source: Reese & Memberg, 2000 (USGS Report 99-4061); Golder, 2007.





Source: Reese & Memberg, 2000 (USGS Report 99-4061); Golder, 2007.



Source: Reese & Memberg, 2000 (USGS Report 99-4061); Golder, 2007.

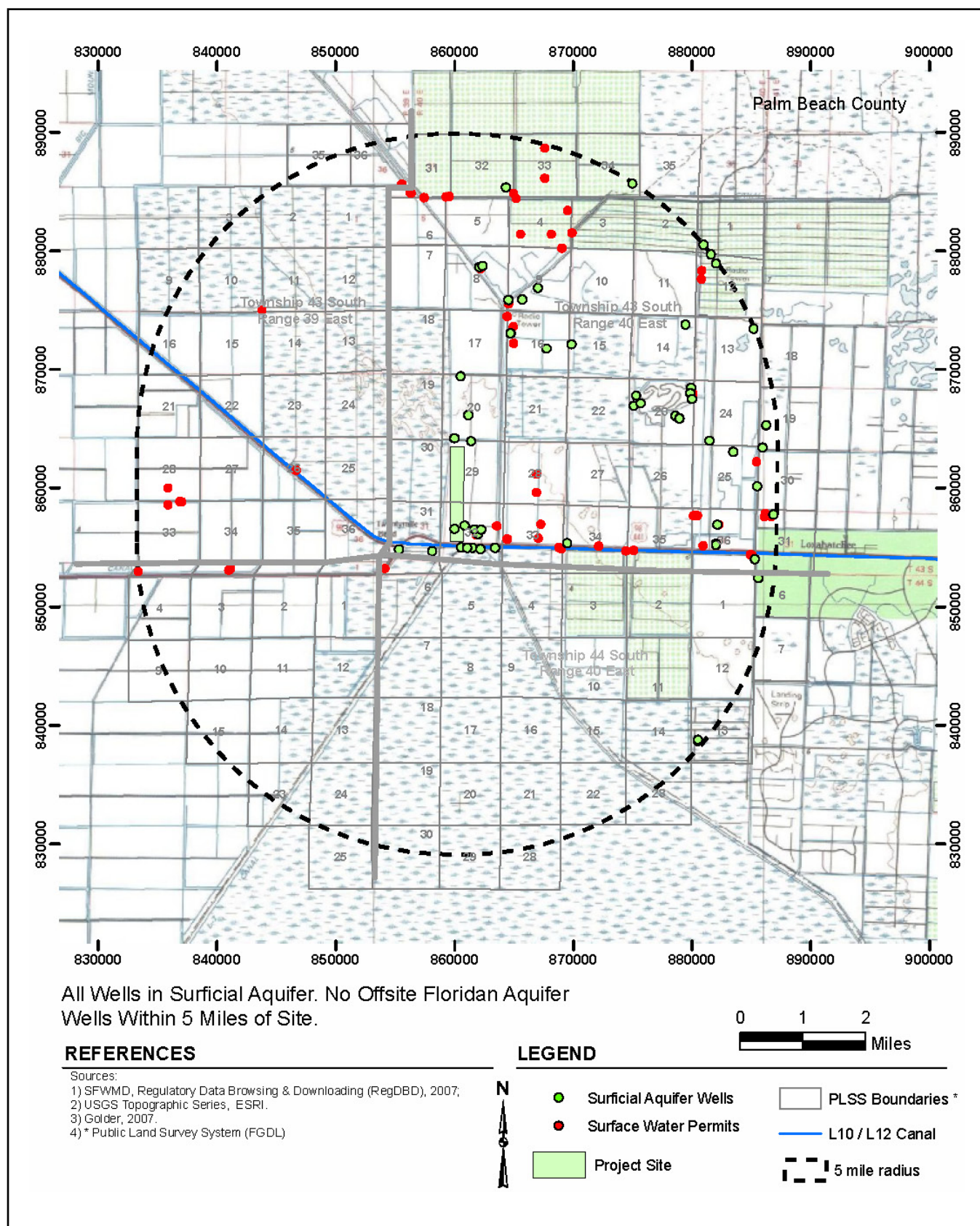


Figure 2.3.3-1.
Water Use Permits Within 5 Miles of the Site

Source: SFWMD; Golder, 2007.





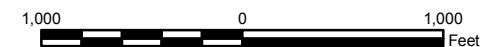
LEGEND

Land Cover

- | | |
|-------------------------|------------------------------------|
| 160 - Mining | 511 - Ditches |
| 190 - Open Land | 532 - Reservoirs |
| 211 - Improved Pastures | 641 - Freshwater Marshes |
| 422 - Brazilian Pepper | 831 - Electric Power Facilities |
| 510 - Canals | 839 - Utilities Under Construction |

REFERENCE

Golder Associates, 2007
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17



PROJECT		West County Energy Project			
TITLE		Land Cover			
	PROJECT No. 073-87652			SCALE AS SHOWN	REV. 0
	DESIGN	CC	17 Aug. 2007	FIGURE 2.3.5-1	
	GIS	AB	08 Nov. 2007		
	CHECK	CC	08 Nov. 2007		
	REVIEW	KB	08 Nov. 2007		

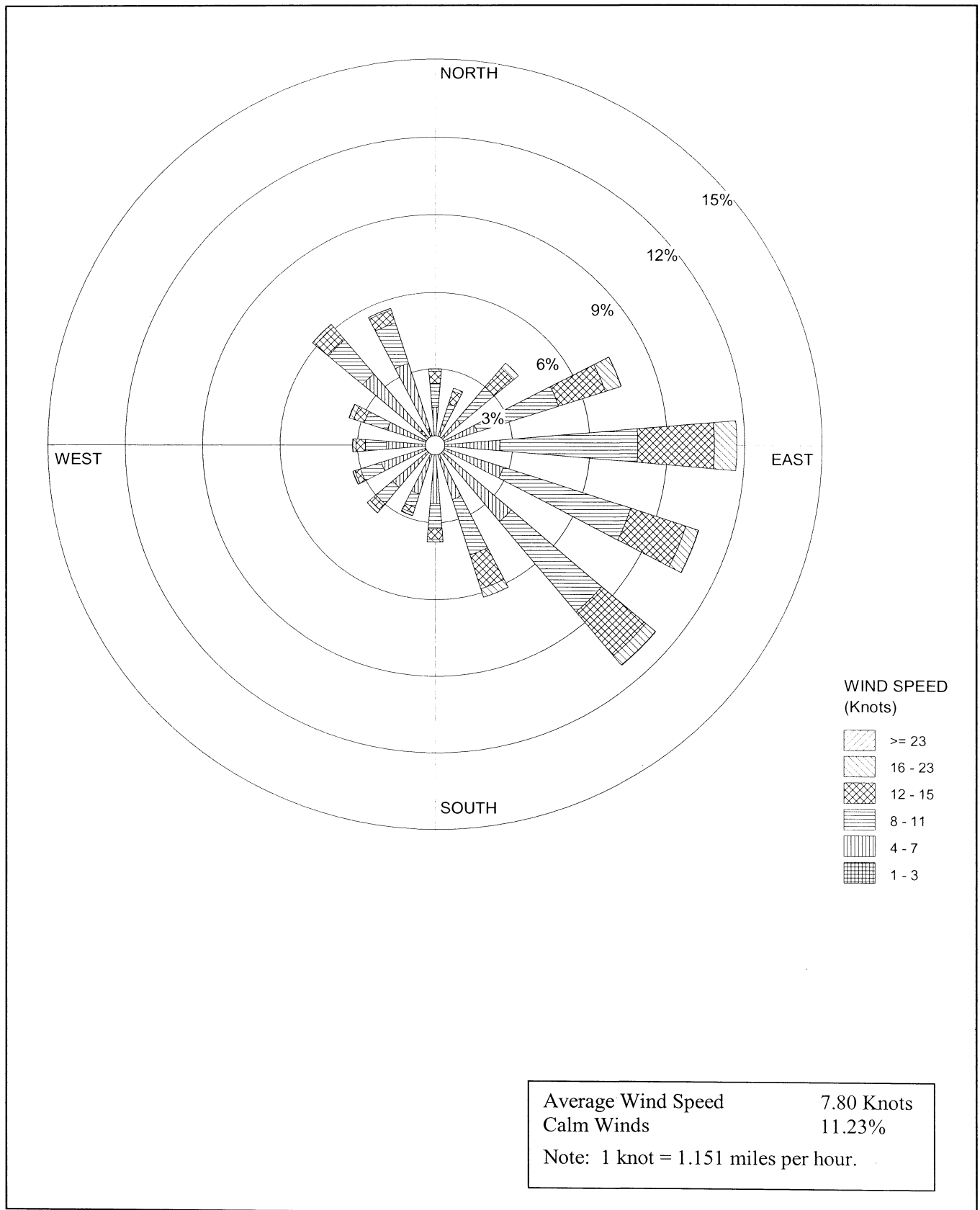


Figure 2.3.7-1.

Annual Wind Rose for 2001 to 2005

At Palm Beach International Airport, Florida (Station No. 12844)

FPL West County Energy Center, Palm Beach County, Florida

Source: National Climatic Data Center, 2001–2005; Golder, 2007.



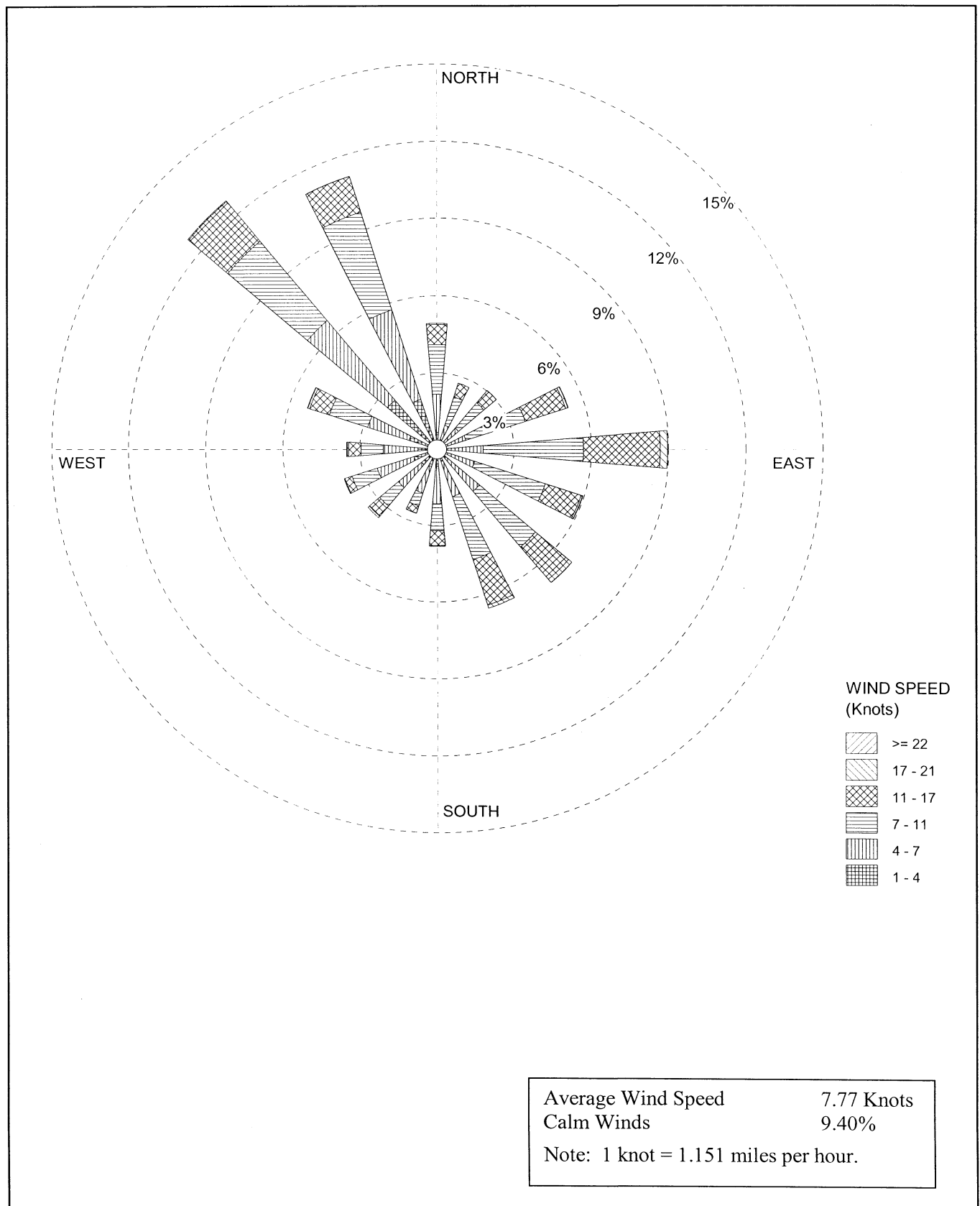


Figure 2.3.7-2.
 Winter Wind Rose for 2001 to 2005
 At Palm Beach International Airport, Florida (Station No. 12844)
 FPL West County Energy Center, Palm Beach County, Florida

Source: National Climatic Data Center, 2001–2005; Golder, 2007.



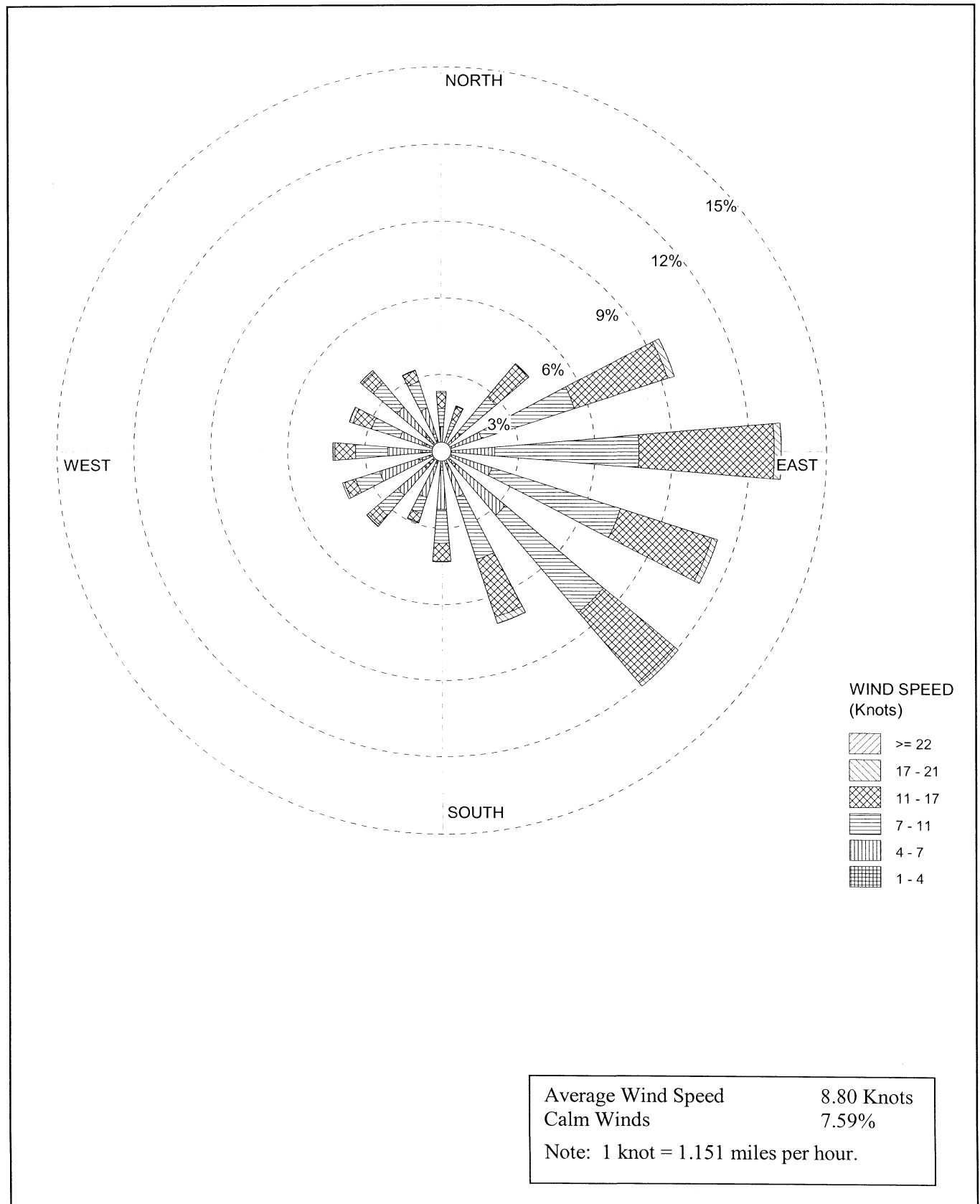


Figure 2.3.7-3.

Spring Wind Rose for 2001 to 2005

At Palm Beach International Airport, Florida (Station No. 12844)

FPL West County Energy Center, Palm Beach County, Florida

Source: National Climatic Data Center, 2001–2005; Golder, 2007.



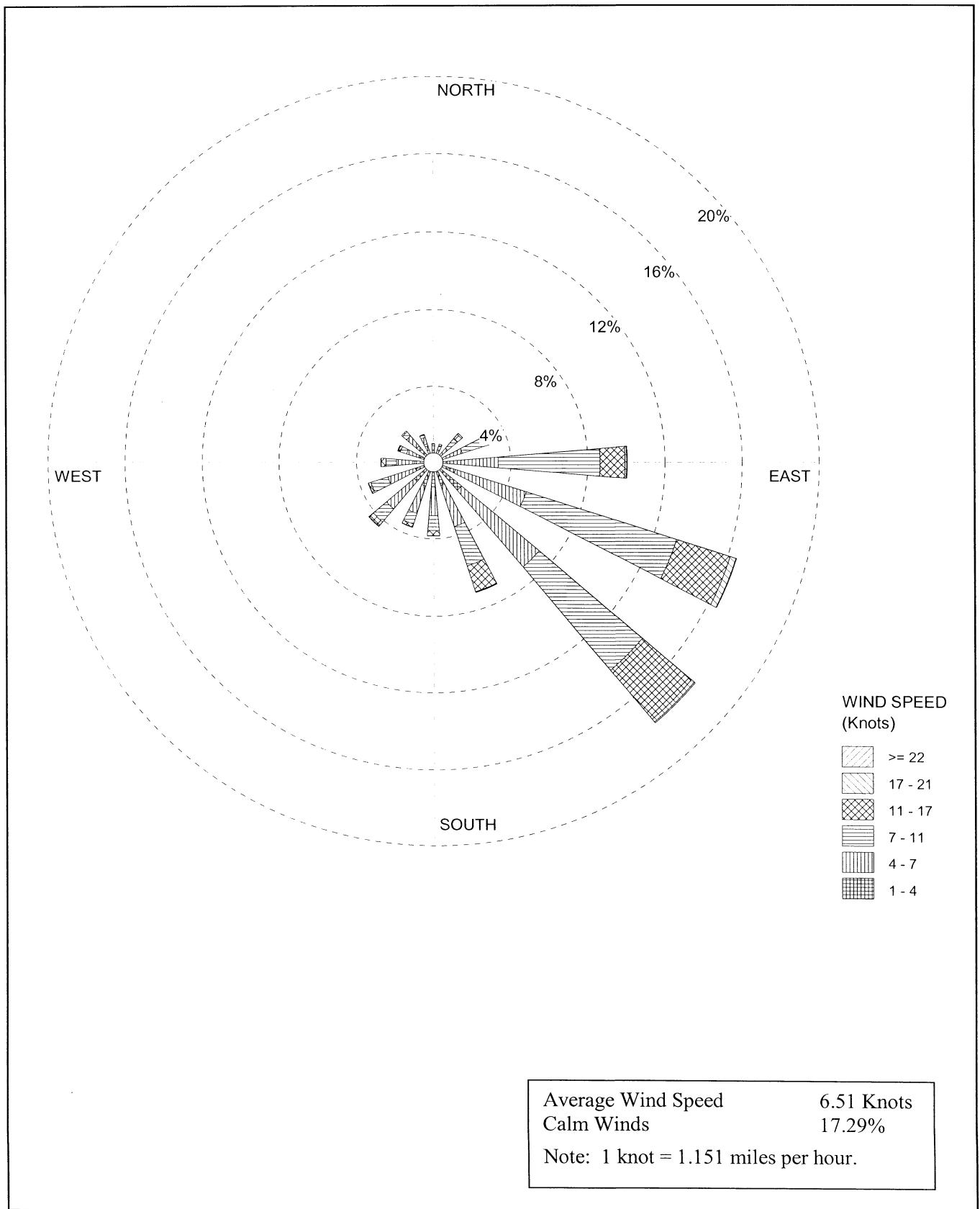


Figure 2.3.7-4.
 Summer Wind Rose for 2001 to 2005
 At Palm Beach International Airport, Florida (Station No. 12844)
 FPL West County Energy Center, Palm Beach County, Florida
 Source: National Climatic Data Center, 2001–2005; Golder, 2007.



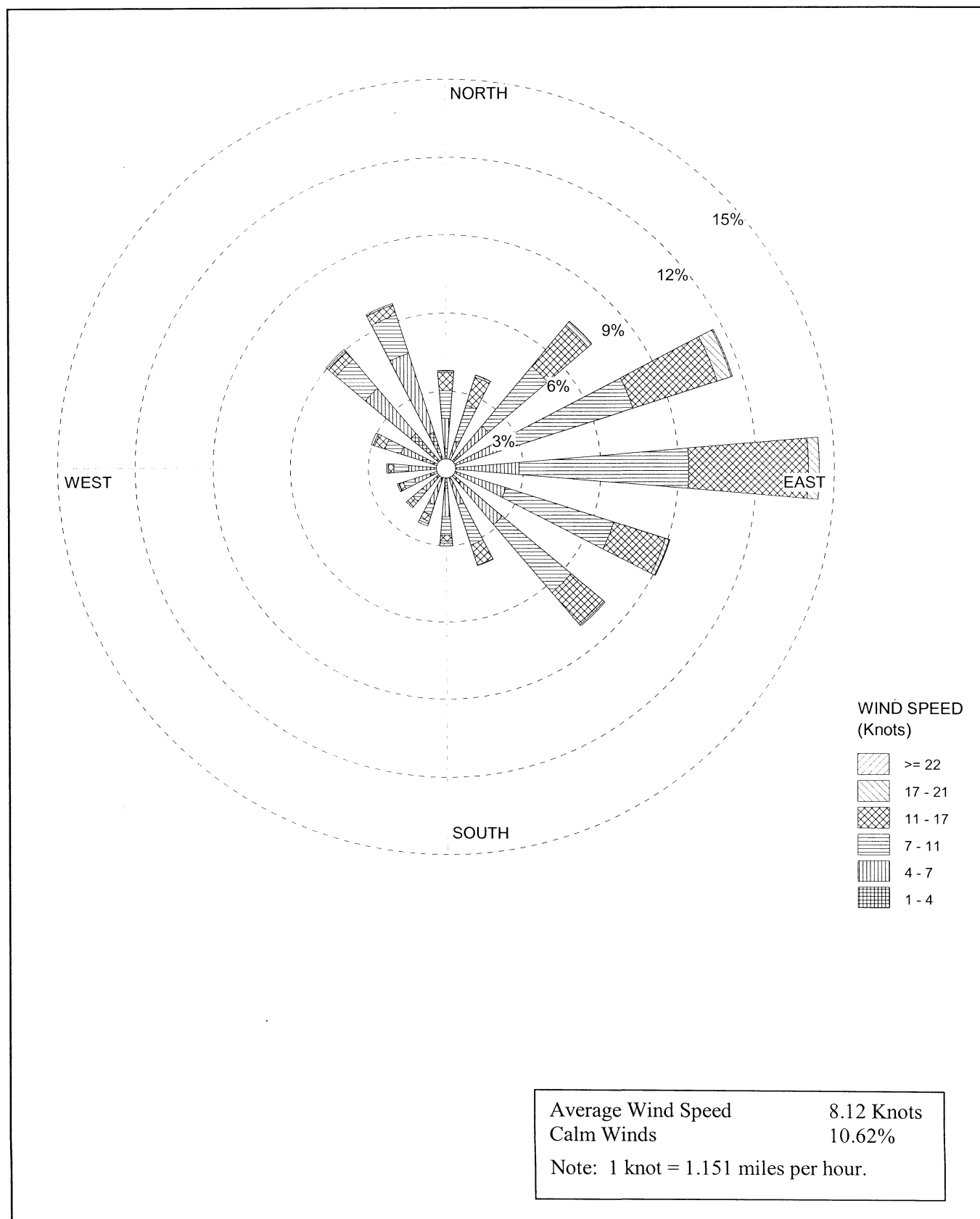


Figure 2.3.7-5.
 Fall Wind Rose for 2001 to 2005
 At Palm Beach International Airport, Florida (Station No. 12844)
 FPL West County Energy Center, Palm Beach County, Florida

Source: National Climatic Data Center, 2001–2005; Golder, 2007.





LEGEND

 Noise Monitoring Locations

REFERENCE

Golder Associates, 2007
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

1,000 0 1,000
 Feet

PROJECT		West County Energy Project			
TITLE		Noise Monitoring Locations			
	PROJECT No. 073-87652			SCALE AS SHOWN	REV. 0
	DESIGN	DB	09 Nov. 2007	FIGURE 2.3.8-1	
	GIS	AB	09 Nov. 2007		
	CHECK	DB	09 Nov. 2007		
	REVIEW	KK	09 Nov. 2007		

3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

3.1 Background

Site Certification for the West County Energy Center (WCEC) was approved by the Siting Board in December 2006, and consisted of two nominal 1,250-MW combined cycle units. This chapter provides a description of WCEC Unit 3, including the Unit 3 layout, key components of Unit 3 and their operation, and proposed controls for air emissions and water discharges. Fuel specifications are provided for natural gas and ultra low-sulfur light oil. Estimates of the expected character, quality, and quantity of discharges and emissions from the Project are provided.

Location of the new combined cycle unit at the WCEC Site and selection of the combined cycle technology will maximize the beneficial use of the WCEC Site while minimizing environmental, land use, and cost impacts otherwise associated with development of the Project. WCEC Units 1 and 2 are currently under construction on the 220-acre Site, which was previously associated with mining activities resulting in a disturbed, backfilled property. Unit 3 will benefit from the infrastructure being constructed for Units 1 and 2, since all units will utilize common facilities wherever possible. These include the access roads, L10/L12 Canal inlet structure and on-site intake structure, gas yard, UFA well system, water treatment facilities, UIC well system, ultra low sulfur oil storage tanks, administration, control, and warehouse building. These facilities will be upgraded as necessary to accommodate the requirements of Unit 3.

The Project, for which full Site Certification is being sought, consists of one nominal 1,250-MW “3-on-1” combined cycle unit. The “3-on-1” unit will consist of three nominal 250-MW “G” Class advanced CTs and three HRSGs, which will utilize the waste heat from the CTs to produce steam to be utilized in a single steam turbine generator. The “G” Class CTs will be Mitsubishi Power Systems (MPS) M501G CTs.

Unit 3 will have a total nominal generating capacity of 1,250 MW. Duct burners are proposed for each HRSG and are fired during peak demand periods to achieve the total nominal generating capacity. Duct firing will be limited to an equivalent of 2,880 hours per CT per year at the maximum firing rate.



Each CT unit will utilize evaporative cooling for inlet air cooling. Evaporative cooling systems achieve adiabatic cooling using water in the form of water evaporated from a woven material. The evaporated water extracts the latent heat of vaporization from the inlet air stream when the water droplet is converted to water vapor. Heat is removed at a rate of 1,075 British thermal units per pound (Btu/lb) of water. The result is a cooler, more moisture-laden air stream. This allows additional power to be produced more efficiently. Generally, an 8°F average decrease in temperature would result in a 3.0-percent increase in power and an associated 1.2-percent decrease in heat rate. Thus, while power increases, the production of power is more efficient with concomitant lower emissions per MW-hour generated.

The CTs will use natural gas as the primary fuel with ultra low-sulfur distillate “light oil” used as a backup fuel. The HRSG duct burners will fire natural gas only. Gas for Unit 3 will be transported to the Project through a natural gas lateral by natural gas suppliers such as Gulfstream Natural Gas System or Florida Gas Transmission. Ultra low-sulfur light oil will be trucked to the Site and stored in the tanks being constructed for Units 1 and 2. When firing natural gas, NO_x emissions will be controlled using dry low-NO_x (DLN) combustion technology and selective catalytic reduction (SCR). Demineralized water is utilized during firing of ultra low-sulfur light oil to reduce the combustion temperature and the generation of NO_x emissions from the CT. Water injection and SCR will be used to reduce NO_x emissions when firing ultra low-sulfur light oil. This design maximizes control of air emissions while balancing economic, environmental, and energy impacts [see Section 3.4 for a description of the control technology and a summary of best available control technology (BACT)].

Primary water uses for the Project will be for condenser cooling, CT inlet air cooling, NO_x injection water, steam cycle makeup, and service water. Condenser cooling for the steam cycle portion of the Project will be accomplished using a mechanical draft cooling tower. The inlet structure being constructed for Units 1 and 2 will be used for Unit 3, if water from the L10/L12 Canal is available.

Reclaimed water will be the primary water source for Unit 3, as long as the reclaimed water meets the quantity and quality requirements necessary to operate WCEC Unit 3 within regulatory approvals. Reclaimed water will be used for cooling system makeup, and may be used for process and service water (including fire protection), and landscape irrigation. Reclaimed water used by WCEC Unit 3 will meet all of the relevant requirements of Chapter 62-610, F.A.C., including but not limited to the requirements for cooling water applications found in Section 62-610.668.

Stormwater runoff that collects in onsite retention ponds may be recycled by pumping the water to the cooling towers, thus eliminating runoff to surface waters and minimizing water demands on other sources. When the SFWMD determines that excess surface water is available from the L10/L12 Canal beyond the allocation for Units 1 and 2, WCEC Unit 3 may also use water from this canal as a secondary source for cooling, process, and service water.

If reclaimed water cannot meet the quality or quantity requirements for operations, the UFA and potable water supplied by Palm Beach County will be backup water sources for Unit 3 cooling, process, and service water. Potable water for WCEC employees will be supplied by the WCEC potable water system. This system was authorized by the Site Certification for WCEC Units 1 and 2.

Unit 3 will be designed to avoid direct discharge to surface waters in the same manner as Units 1 and 2. Non-contact stormwater runoff in the power block area will be routed to the onsite stormwater retention ponds. Non-contact stormwater outside the power block will also be collected and routed to a stormwater pond, designed to meet federal, state, regional, and local requirements (see Section 3.8). All non-hazardous wastewaters will be treated as appropriate and discharged to the Boulder Zone of the lower Floridan aquifer (injection zone) through the UIC well system.

Unit 3 will be connected to the existing transmission network through a connection to a new switchyard on the Site south of Unit 3. Existing transmission lines will be connected to the new switchyard to export the energy from Unit 3. No new offsite transmission lines are required to connect the Project to FPL's existing transmission network.

3.2 Site Layout

Unit 3 will be located on the existing 220-acre Site, south of Unit 2 (Figure 3.2.0-1). A typical profile of a CT/HRSG train is shown in Figure 3.2.0-2. Within the Site, approximately 30 acres will be utilized for the Unit 3 Power Block containing the CT/HRSG trains, steam turbine/electric generator, cooling tower, and other facilities. About 45 acres south and east of Unit 3 will be used for the construction (laydown, parking, and construction trailers). A new switchyard will be constructed south of Unit 3.

Stormwater will be handled for Unit 3 in the same manner as Units 1 and 2. Non-contact stormwater runoff from the Site will be drained into the stormwater retention ponds. Contact stormwater runoff



from the power block and equipment areas will be treated and also routed to the stormwater retention pond. No point-source discharge of stormwater runoff will be required. Stormwater runoff that is collected in the retention pond will be released by a combination of percolation, evaporation, and diversion for use as cooling tower makeup.

3.3 Fuel

The primary fuel used by the CTs and for HRSG duct firing will be natural gas, delivered to the Site by a natural gas supplier. Typical properties of natural gas are shown in Table 3.3.0-1. The heat content is typically 20,835 Btu/lb [lower heating value (LHV)] with a maximum sulfur content of 2 grains per 100 standard cubic feet (gr/100 scf) of gas.

Ultra low-sulfur light oil will be used as a backup fuel for an equivalent of 500 hours/year per CT at baseload conditions. Typical properties of ultra low-sulfur light oil are shown in Table 3.3.0-2. The heat content is typically 18,367 Btu/lb (LHV) with a maximum sulfur content of 0.0015 percent by weight.

No onsite storage will be provided for natural gas. Ultra low-sulfur light oil will be stored in the two 6.3-million-gallon tanks constructed for Units 1 and 2. Ultra low-sulfur light oil will be delivered to the Site by truck.

The generating capacity of a combined cycle plant is affected by ambient temperature, with increased temperature resulting in less efficient electric production. Greater overall fuel consumption will occur at lower ambient temperatures. For the purpose of calculating maximum hourly fuel use quantities representative of a nominal 1,250-MW combined cycle unit, the following operating conditions for the CTs were used:

- 35°F dry-bulb turbine inlet temperature,
- 60-percent relative humidity,
- 38 feet NGVD elevation, and
- 20,835-Btu/lb and 950 Btu/scf heating value (LHV) of natural gas and 18,367-Btu/lb and 129,900 Btu/gallon heating value (LHV) for ultra low-sulfur light oil.

The maximum heat input for each CT associated with Unit 3 is 2,471 MMBtu/hr (LHV) for each CT when firing natural gas (100-percent capacity, 35°F). The corresponding maximum fuel usage is about 2.65 million cubic feet per hour (MMcf/hr) of natural gas for each CT. Maximum potential fuel usage at 59°F turbine inlet temperature would be about 6.56×10^{10} cf/yr of natural gas for three CTs.

The HRSG duct burners associated with each CT/HRSG train will have a maximum firing rate of 475 MMBtu/hr (HHV) or 428 MMBtu/hr (LHV). The maximum annual fuel usage for the duct burners is based on 2,880 hours/year at this heat input. The maximum potential annual fuel usage for the duct burners is calculated to be about 4 billion scf/year.

Ultra low-sulfur light oil use will be limited to the equivalent of 500 hours per year per CT at full load. The maximum fuel use is about 16,300 gallons/hr/CT at 59°F turbine inlet and would require an annual usage of 24.4 million gallons for three CTs each operating for 500 hours and a turbine inlet temperature of 59°F.

3.4 Air Emissions Controls

3.4.1 Air Emissions Types and Sources

Air pollutants will be emitted from the CT/HRSGs when firing natural gas and ultra low-sulfur light oil. Air emissions result from either the combustion process or impurities in the fuel. Tables 3.4.1-1 and 3.4.1-2 present the performance and maximum estimated emission rates of regulated pollutants for each CT/HRSG stack when firing natural gas and ultra low-sulfur light oil, respectively. The maximum estimated emission rates were determined using the manufacturer's information for the equipment proposed for the Project. The design parameters are provided in Tables 3.4.1-1 and 3.4.1-2 for operating loads of 100 percent (baseload) and 75 percent, and a range of turbine inlet temperatures. Appendix 10.1.5, the PSD Application, presents the basis for the emission rates and maximum annual emissions of regulated and non-regulated pollutants.

During combustion, two primary types of NO_x are formed: fuel NO_x and thermal NO_x. Fuel NO_x emissions are formed through the oxidation of a portion of the nitrogen contained in the fuel. Thermal NO_x emissions are generated through the oxidation of a portion of the nitrogen contained in the combustion air. NO_x formation can be limited by lowering combustion temperatures (through



water or steam injection) and/or staging combustion (a reducing atmosphere followed by an oxidizing atmosphere, known as dry NO_x control).

Carbon monoxide (CO) is formed by incomplete combustion of fuel. High combustion temperatures, adequate excess air, and good fuel/air mixing during combustion will minimize CO formation. CO formation is limited by ensuring complete efficient combustion of the fuel in the turbines. Recent improvements in CT combustor technology allow for both reduced NO_x emissions and low CO emissions.

Emissions of NO_x for the Project are proposed at concentrations of 2.0 parts per million-dry conditions (ppmvd), corrected to 15-percent oxygen (O₂) or less when firing natural gas and 8 ppmvd corrected to 15-percent O₂ or less when firing ultra low-sulfur light oil.

The level of NO_x control establishes emission rates for CO, since DLN combustors will be used when firing gas. The proposed CO emission rates when firing natural gas are 4.1 ppmvd corrected to 15-percent O₂ at baseload operation and 7.6 ppmvd corrected to 15-percent O₂ with maximum duct firing.

When firing ultra low-sulfur light oil, the CO emissions are established by the use of water injection for NO_x control. The proposed CO emission rates for oil firing at baseload conditions are 8 ppmvd corrected to 15-percent O₂.

Maximum SO₂ emission rates are controlled and minimized by the very low sulfur content in the fuels, which will be 2 grains sulfur/100 scf for natural gas and 0.0015-percent sulfur by weight for ultra low sulfur light oil.

Table 3.4.1-3 presents the potential PM/PM₁₀ emissions from the mechanical draft cooling tower. PM emissions are emitted from the mechanical draft cooling tower in the form of drift. Cooling tower drift will be controlled through the use of mist eliminators that will be designed to limit drift to 0.0005 percent of the circulating water rate of the cooling tower. The information presented in Table 3.4.1-3 is for a 26-cell cooling tower design.

Unit 3 will be equipped with two, 100-percent capability, 2,250-kW emergency generators. These emergency generators will be used when electric power cannot be transmitted into the FPL

transmission system and is unavailable to the Site. This primarily would occur during catastrophic events such as hurricanes. Appendix 10.1.5 contains emissions and manufacturer's information for the emergency generators proposed for the Project. Normally these emergency generators would be operated 1 to 2 hours per month for maintenance and reliability testing.

The Project will include one natural gas-fired fuel heater and a spare in the gas yard. These heaters will utilize a heat transfer fluid for heating the natural gas and be fired with only natural gas. The manufacturer will be Hanover Compression Company or equivalent. These heaters will have a heat input of 10 MMBtu/hr or less and will be used as necessary to heat natural gas above the dew point. Only one gas heater will be necessary for the operation of WCEC Unit 3.

The auxiliary boilers associated with Units 1 and 2 will be used as necessary for Unit 3 startup. The combustor for the MPS 501G requires steam for combustor cooling, which normally comes from the HRSG.

Table 3.4.1-4 presents the annual potential emissions for the Project. Annual emissions were based on emissions expected for baseload and ambient temperatures of 59°F. The maximum emissions are based on 8,260 hours firing natural gas and 500 hours per year firing oil. Natural gas firing includes 2,880 hours with maximum duct firing. The potential emissions are based on the 59°F turbine inlet temperature at 100-percent load condition since it represents a conservative average when the annual average temperatures are slightly higher than 70°F. Table 3.4.1-4 compares the WCEC Unit 3 net emission increases to the PSD significant emission rates, which are thresholds for PSD review for modifications to major sources. PSD review is required for emissions of a pollutant greater than the listed PSD significant emission rate. PSD review requires a determination of BACT.

3.4.2 Air Emission Controls

The use of clean fuel, i.e., natural gas, combustion controls, and air pollution control equipment will minimize air emissions and ensure compliance with applicable emission-limiting standards. Using clean fuels will minimize emissions of SO₂, PM/PM₁₀, and other fuel-bound contaminants. Combustion controls will minimize the formation of NO_x and the formation of CO and VOCs by combustor design. Further NO_x reduction will be achieved by SCR. The combination of these techniques are proposed for this Project and have been determined to represent BACT on previous projects based on an evaluation of economic, energy, and environmental impacts. The following

subsection presents a summary of the Air Pollution Control Technology and BACT analysis, which is presented in the PSD permit application in Appendix 10.1.5.

3.4.3 Control Technology Description and Best Available Control Technology

BACT review is required under FDEP and federal rules pertaining to PSD. Federal regulations are codified in 40 Code of Federal Regulations (CFR) Part 51.166, and FDEP has adopted PSD rules in Rule 62-212.400, F.A.C. The BACT review is part of the evaluation of control technology under the Florida PSD rules. BACT is applicable to all pollutants for which PSD review is required and is pollutant specific. It is an emission limitation that is based on the maximum degree of reduction for each regulated pollutant, which is determined to be appropriate after taking into account energy, environmental, economic impacts, and other costs. BACT cannot be any less stringent than the federal New Source Performance Standards (NSPS) applicable to the source under evaluation.

The FDEP and EPA have established a policy for BACT review in which the most stringent control alternatives are evaluated first. The alternatives are either rejected based on technological, environmental, energy, or economic reasons or are proposed as BACT. This procedure is referred as the “top-down” approach. For the Project, BACT is applicable for emissions of PM and PM₁₀, SO₂, NO_x, CO, VOCs, and sulfuric acid mist (SAM).

EPA updated NSPS for Stationary Combustion Turbines that will commence construction after February 18, 2005. The Subpart KKKK requirements apply to units with a gross capacity of greater than 1 MW. The Subpart KKKK requirements applicable to combustion turbines greater than 30 MW apply to CT/HRSG trains associated with WCEC Unit 3. The NO_x emissions are limited to 15 ppm corrected to 15-percent oxygen or 0.43 lb/MW-hr for gas-firing and 42 ppm corrected to 15-percent oxygen or 1.3 lb/MW-hr for light oil firing. For SO₂ emissions, the proposed Subpart KKKK requirements limit emissions to 0.9 lb/MW-hr or a potential total sulfur content equivalent to 0.06 lb/MMBtu if multiple fuels are fired.

Appendix 10.1.5 of the SCA contains a complete PSD application for Unit 3. The PSD application includes the BACT evaluation for the Project and addresses those pollutants for which BACT is applicable. A discussion of the environmental, economic, and energy aspects of alternative control techniques and methods are included. The remainder of this section briefly describes those control technologies that are proposed for Unit 3.



3.4.3.1 Nitrogen Oxides

DLN combustor technology has been offered and installed by CT manufacturers to reduce NO_x emissions by inhibiting thermal NO_x formation through premixing fuel and air prior to combustion and providing pre-mix combustion to reduce flame temperatures. The DLN combustors have premixed fuel zones plus a standard diffusion flame pilot burner for startup. Low-NO_x levels are achieved by introducing fuel primarily to the pre-mix zones and reducing the amount of fuel being combusted from the pilot nozzle.

When firing natural gas, NO_x emissions will be controlled using DLN combustors to 15 ppmvd (corrected to 15-percent O₂). When firing ultra low-sulfur light oil, water injection will be utilized to reduce NO_x emissions to 42 ppmvd (corrected to 15-percent O₂).

NO_x emissions will be further controlled by SCR systems when firing either natural gas or ultra low-sulfur light oil. SCR is a post-combustion process where NO_x in the gas stream is reacted with ammonia in the presence of a catalyst to form nitrogen and water. The reaction occurs typically between about 320 and 400 degrees Celsius (°C) (600 and 750°F). These temperatures occur within the HRSG where the SCR catalyst and ammonia injection grid is installed. Ammonia will be stored onsite in tank(s). The SCR system will be designed for additional NO_x reduction. Flue gas NO_x emissions when firing natural gas will be reduced to 2.0 ppmvd, corrected to 15-percent O₂. When firing ultra low-sulfur light oil, SCR will reduce NO_x emissions by 80 percent or more to 8 ppmvd corrected to 15-percent O₂ or less.

The recent permitting trend for combined cycle units is the use of DLN combustors and SCR. Based on the ability to control NO_x to low emission levels, an emission level of 2.0 ppmvd corrected to 15-percent O₂ is proposed for the Project when firing natural gas and is equal to or lower than BACT determinations made in EPA Region IV for similarly designed projects.

3.4.3.2 Carbon Monoxide

The proposed BACT emission rates are based upon the CTs selected for the Project. The CTs will utilize advanced combustion technology, and the proposed emission rates are consistent with those established as BACT for these turbines. The proposed BACT CO emission rates when firing natural gas are 4.1 ppmvd corrected to 15-percent O₂ at baseload operation and 8 ppmvd corrected to 15-percent O₂ with maximum duct firing.

3.4.3.3 Sulfur Oxides (SO_2 and H_2SO_4 Mist)

Post-combustion controls for SO_2 emissions comprise various wet and dry flue gas desulfurization (FGD) processes. However, FGD alternatives are not feasible for use on CT facilities due to high pressure drops across the control device. The only feasible control for combined cycle units is clean fuels, i.e., natural gas and ultra low-sulfur light oil. The ultra low-sulfur light oil proposed for the Project will be limited to 0.0015-percent. Additionally, SAM production will be limited by the use of low-sulfur fuels.

3.4.3.4 Particulate Matter and Other Regulated Pollutants

Post-combustion alternatives such as baghouses, scrubbers, and electrostatic precipitators are not feasible due to the high pressure drops associated with the CTs and the small amount of PM reduction, which would occur since the CT PM emissions are minimal (i.e., these emissions are already lower than most baghouses emit). Clean-burning fuels that have low PM and trace contaminant contents are proposed as BACT for the Project.

PM emissions will be emitted from the mechanical draft cooling tower in the form of drift. Cooling tower drift will be controlled through the use of mist eliminators that will be designed to limit drift to 0.0005-percent of the circulating water rate of the cooling tower. Table 3.4.1-3 presents information on the cooling tower and potential PM and PM_{10} from drift.

3.4.4 Design Data for Control Equipment

Design data for the air pollution control equipment are presented in Section 4.0 of Appendix 10.1.5 (PSD Application).

Emissions of other pollutants for the Project are expected to be minimal and require no additional control technology. Therefore, analysis of alternative emission controls for these other pollutants is not necessary.

3.4.5 Design Philosophy

The Project minimizes air pollutant emissions by using the most efficient and pollution-preventing technology. This concept has been incorporated with the selection of a combined cycle process utilizing advanced CTs. Combined cycle plants can be expected to achieve fuel conversion rates of 6,582 Btu/kilowatt hours (kWh) (75°F, baseload), as opposed to values in the 9,000- to 10,000-Btu/kWh range for more conventional generating plants. This is an improvement of about

30 percent. Thus, by maximizing the megawatt output per unit of fuel consumed, the air pollutant emissions per megawatt output are minimized. In addition, the efficiency of Unit 3 and the use of natural gas minimizes the emissions of carbon dioxide (see Section 5.6). Pollution prevention is incorporated in the design by the use of clean fuels and combustion technology. Natural gas and ultra low-sulfur light oil will be used. Moreover, advanced DLN combustion technology will be used to minimize NO_x emissions while ensuring that CO and VOC emissions are within accepted limits. SCR will be installed to further reduce NO_x emissions. Taken together, the design of the Project will incorporate features that will make the Project one of the most efficient and lowest polluting power plants in the State of Florida.

3.5 Plant Water Use

The water uses for the Project will be for condenser cooling water, CT inlet cooling, NO_x injection water when firing ultra low sulfur light oil, steam cycle makeup, and service water. Reclaimed water will be the primary water source for Unit 3, as long as the reclaimed water meets the quantity and quality requirements necessary to operate WCEC Unit 3 within regulatory approvals. Reclaimed water will be used for cooling system makeup, and may be used for process and service water (including fire protection), and for landscape irrigation. Reclaimed water used by WCEC Unit 3 will meet all of the applicable requirements of Chapter 62-610, F.A.C.

Stormwater runoff that collects in onsite retention ponds may be recycled by pumping the water to the cooling towers, thus eliminating runoff to surface waters and minimizing water demands on other sources. Water used as makeup to a closed-cycle recirculating cooling system for heat dissipation will be treated by chemical softening to reduce water use.

When the SFWMD determines that excess surface water is available from the L10/L12 Canal beyond the allocation for Units 1 and 2, WCEC Unit 3 may also use water from this canal as a secondary source for cooling, process and service water. Water from the L10/L12 Canal, when available, will be obtained from an inlet installed on the canal during the construction of WCEC Units 1 and 2 (refer to Figure 3.2.0-1 for location).

If reclaimed water cannot meet the quality or quantity requirements for operations, the UFA and potable water supplied by Palm Beach County will be backup water sources for Unit 3 cooling, process, and service water. Potable water for WCEC employees will be supplied by the WCEC



potable water system. This system was authorized by the Site Certification for WCEC Units 1 and 2. Therefore, no additional groundwater allocation is required for WCEC Unit 3.

The Water Alternative Analysis in Appendix 10.7 discusses these water sources in greater detail. Up to three new UFA wells may be constructed within the Site for Unit 3 backup supply (refer to Figure 3.2.0-1 for approximate location).

General plant service water, fire protection water, and process water will be obtained from the water sources discussed above. Process water uses will include demineralized water use in the CT inlet air inlet evaporative cooling system, NO_x injection system (for ultra low-sulfur light oil firing), HRSG steam cycle makeup, and general service water use for washdowns.

The WCEC Unit 3 water balance is presented schematically in Figure 3.5.0-1. As shown in the figure, reclaimed water will be used as the primary source. While the specific water quality is not yet available for reclaimed water, the water quality for the source of the reclaimed water anticipated to be used is presented in Appendix 10.5.3. The water quality of the reclaimed water will meet the applicable requirements of Chapter 62-610, F.A.C. The design water quality is presented in Tables 3.5.0-1 and 3.5.0-2, for Floridan aquifer and surface water, respectively. The water quality in Tables 3.5.0-1 and 3.5.0-2 envelope the water quality expected to be used. This information on water quality has been derived from information described in Subsection 2.3.4. The following subsections (3.5.1 through 3.5.4) provide more detailed descriptions of WCEC Unit 3 water uses.

3.5.1 Circulating Water Heat Rejection System

A rectangular wet mechanical draft cooling tower, located within the Power Block, will be used to reject the Project heat load of about 2.4 billion Btu/hr to the atmosphere. Makeup water will be pre-treated to remove scale-causing chemicals (e.g., calcium, magnesium, and sulfate). Cooling tower blowdown will be routed to the UIC well system (refer to Figure 3.2.0-1 for locations). Table 3.4.1-3 presents design information on the cooling tower.

3.5.2 Domestic/Sanitary Wastewater

Restroom facilities are being installed during the construction of Units 1 and 2 to handle domestic/sanitary wastewater. A package sanitary treatment system meeting the requirements of Chapter 64E-6 F.A.C. and Palm Beach County ECR-1 is being installed. The Project will connect to these facilities. Treated sanitary wastewater will be routed to the UIC well system.



3.5.3 Potable Water Systems

Potable water for the Project will be obtained from the system associated with Units 1 and 2.

3.5.4 Process Water Systems

Process water treatment for the Project may be common to the facilities for Units 1 and 2. The Project will install an additional portable reverse osmosis/mixed bed (RO/MB) demineralizer system for process water treatment using water from the Units 1 and 2 raw water tank or the tank that will be installed for reclaimed water. The demineralized water will be pumped into the storage tank for Units 1 and 2 to store process water. When UFA is used for process water, an RO pre-treatment system will be used prior to the RO/MB system. RO reject will be mixed with the cooling tower blowdown for disposal in the UIC well system while regeneration of the mixed bed systems will be offsite.

3.5.4.1 *Demineralized Water*

The Project will require the use of demineralized water [i.e., conductivity < 0.1 microsiemens per centimeter ($\mu\text{S}/\text{cm}$)]. Demineralized water is required for:

- Makeup to replace blowdown from the HRSG (necessary to maintain a low dissolved solids content in the HRSG),
- Makeup to replace miscellaneous steam losses in the steam cycle;
- Emergency makeup water,
- Injection into the CTs for NO_x control when firing ultra low-sulfur light oil, and
- CT air inlet evaporative cooling system feed.

Water from the primary, secondary and backup water sources will be used as process water treatment system influent and may be used as service water.

3.5.4.2 *General Service Water*

General service water uses, including seal water, cleaning and flushing water, and fire protection water, will be provided by the service water system.

3.5.5 Water Supply Alternatives

An evaluation of possible alternative water supply strategies for the Project is provided in Appendix 10.7.

3.6 Chemical and Biocide Waste

The wastewaters generated by the Project will include HRSG blowdown, Process Water Treatment System wastewater, groundwater pretreatment wastewaters, cooling tower blowdown, and equipment area storm and wash waters. HRSG blowdown will be quenched with cooling tower blowdown or recycled to the cooling tower basin. Contact area stormwater and wash waters will be passed through an oil/water separator and then released to the stormwater ponds. Cooling tower and HRSG blowdown, water treatment wastewaters, non-hazardous low-volume wastewaters (e.g., lab drains) and treated sanitary wastewater will be routed to the UIC well system. Depending upon the water quality, some wastewaters such as HRSG blowdown and low-volume wastewater may be recycled to the cooling tower basin.

The principal uses of chemicals and biocides will be for steam cycle water quality control, chemical cleaning of the HRSG and pre-HRSG piping systems, and conditioning of water in the cooling tower.

Table 3.6.0-1 presents a list of the waste streams associated with the Project, their characterization and proposed method of disposal. The following sections provide further information on the characteristics of these waste streams (see also Section 3.7).

3.6.1 Cooling System Water Chemical Treatment

Intermittent shock chlorination or other oxidizing or non-oxidizing biocides will be used to prevent biofouling of the heat rejection system. A chlorine solution will be fed into the cooling tower.

A scale inhibitor will be fed to the circulating water system to control the formation of calcium carbonate scales. These scales can adhere to heat transfer surfaces and impair cooling condenser performance. Sulfuric acid will be added to the circulating water system to reduce alkalinity in the circulating water makeup, thus reducing the likelihood of scale formation. In addition, a polymer may be added to the circulating water system to help hold suspended solids in suspension. An anti-foam agent may be used to reduce the potential for foam generation.

Cooling tower makeup water may be pretreated by chemical softening prior to addition to the cooling tower basin.

3.6.2 Steam Cycle Water Treatment

The steam-condensate-feedwater cycle will be chemically treated to prevent corrosion or scaling of the condensate piping and the HRSG preboiler piping and drums. The steam cycle water will be treated with ammonia or an amine for pH control. Sodium phosphate will be fed to the HRSGs for control of pH and hardness. Residual phosphate in the HRSG will react with hardness to form a nonadherent precipitate that can be removed through boiler blowdown.

3.6.3 Sanitary Wastewater Treatment

The sanitary system for the Project will utilize the system being constructed for WCEC Units 1 and 2.

3.6.4 Makeup Water Demineralization

As discussed in Section 3.5.4, the makeup water to the steam cycle will be demineralized using portable RO/MB type demineralizer trains and any pre-treatment RO for UFA water. The resulting RO reject will be routed to the UIC well system. Regeneration of the mixed bed ion exchange units will be performed offsite.

3.6.5 Chemical Cleaning

The HRSG and preboiler piping will be chemically cleaned initially during commissioning and also periodically during the life of the plant. The chemicals used will not be permanently stored onsite but will be delivered to the Site by a licensed contractor at the time of the scheduled periodic cleanings. The chemical cleaning solutions to be used for acid and alkaline cleaning of the HRSG must be consistent with the HRSG manufacturer's recommendations. Chemicals typically used in HRSG and feedwater pipe cleaning include the following:

- Inhibited citric acid,
- Aqueous ammonia,
- Organic chelates, such as EDTA,
- Disodium phosphate,
- Trisodium phosphate,

- Nonfoaming wetting agents, and
- Foam inhibitors.

Wastewaters will consist of the cleaning solutions and material removed during the cleaning process. Chemical cleaning is an infrequent maintenance operation; it does not contribute to the liquid wastes produced by the normal operation of the plant.

Chemical cleaning wastes will be maintained onsite and tested and, if non-hazardous, will be routed to the UIC well system with the other wastewaters. Hazardous wastes will be managed according to applicable rules and regulations.

3.6.6 Miscellaneous Drains

Wastewater can result from draining a storage tank or from cleaning and maintenance operations such as washdown of storage areas. Waste water from these processes are expected to be non-hazardous and will be contained prior to being discharged to the Boulder Zone via the UIC well system. Flows from the miscellaneous plant drains will be intermittent and will not normally contribute to the wastewater flows. Periodic off-line washes of the CTs using water or a detergent-water solution will also produce wastewaters. These wastewaters will be collected in a local sump and routed to the UIC well system.

3.7 Solid and Hazardous Waste

All non-hazardous and hazardous wastes associated with the Project will be managed according to federal, State, and local regulations and FPL's "Waste Guidelines" with appropriate modifications to accommodate the construction Project (see Table 3.7.0-1). The Project may generate hazardous waste periodically [less than 100 kilograms (kg)/month], including spent solvents, boiler chemical cleaning wastes, and other wastes. These wastes will be collected and managed as hazardous waste until tested to determine their characteristics.

The same types of wastes mentioned above are expected to be generated during construction and will be managed under the same guidelines. Solvent rags will be collected and laundered. Residual waste from punctured aerosol cans will be collected and managed as hazardous waste. Paint waste,

polyvinyl chloride (PVC) cleaner, and PVC cement wastes will be minimized by implementation of programs requiring use of all material prior to issuance of additional material.

3.7.1 Solid Waste

Solid wastes will be generated by the Project but generally in small quantities. Solid wastes will be limited to municipal solid waste and infrequent replacement of inlet air filters. Solids from water pretreatment process will also be generated. An approved solid waste disposal contractor will dispose of all solid wastes.

3.7.2 Hazardous Waste

Potential hazardous waste associated with the Project combined with WCEC Units 1 and 2 will be less than 100 kg/month and may include chemical cleaning of the boilers, spent solvents, HRSG chemical cleaning wastes, and other wastes. Any wastes, if hazardous, will be collected onsite and disposed of by a licensed hazardous waste contractor. Hazardous waste will be managed according to applicable rules and regulations.

3.8 Site Drainage

3.8.1 Design Criteria and Applicable Regulations

The surface water management system for the Project will be incorporated into the design for WCEC Units 1 and 2. This system has been designed to meet the requirements of all applicable local, regional, state, and federal requirements, which include the rules of the SFWMD, Palm Beach County, FDEP, and EPA. The basic design philosophy is that the stormwater runoff from the Project of a 100-year, 72-hour storm event will be retained onsite with no offsite discharge.

The Project drainage system of catch basins, pipes, channels, swales, and culverts will convey runoff to stormwater retention ponds. The stormwater management plan and design calculations including a Stormwater Pollution Prevention Plan (SWPPP) for WCEC Units 1 and 2 have been approved by FDEP (see Appendix 10.4). WCEC Unit 3 will be incorporated in the overall Site stormwater management system. Preliminary surface water and stormwater management calculations that include WCEC Unit 3 are presented in Appendix 10.6.

3.8.2 Construction Site Drainage

Figure 3.8.2-1 presents the construction drainage plan that includes the Project. Prior to construction activities associated with the Project, a silt fence will be installed along the perimeter of areas to be used for new construction laydown, parking, and trailers and where runoff to offsite areas is expected. Stormwater retention ponds have already been installed in the northern and southern portions of the Site and will serve as sedimentation ponds during construction of WCEC Unit 3.

During construction, the extent of earth disturbances associated with the Project will be minor since construction activities associated with Units 1 and 2 are occurring on the Site.

Temporary erosion and sedimentation control measures will be as necessary for the Project to prevent sediment from being displaced and carried offsite by construction runoff. Construction personnel and equipment will enter the Site over paved roads. Existing construction entrances will be used and maintained as required to minimize migration of sediment from construction areas onto public roads. Sediment collected in the sedimentation ponds and erosion control devices (e.g., staked silt fence, hay bales, inlet/outlet protection) during construction will be maintained as necessary to insure proper functioning of these measures. All temporary sediment and erosion control measures will be removed at the end of construction. The SWPPP for stormwater discharge from construction activities being implemented for the construction of WCEC Units 1 and 2 will be updated and followed for the construction of WCEC Unit 3.

3.8.3 Operational Site Drainage

Figure 3.8.3-1 presents the operation drainage plan for the Site with Unit 3. At the completion of construction, areas not occupied by facilities will be seeded and runoff will be routed to the existing stormwater retention ponds. Non-contact stormwater runoff from the Site will be drained into the stormwater retention ponds. Contact stormwater runoff from the Power Block and equipment areas will be routed through an oil/water separator and also routed to the stormwater retention ponds. Stormwater runoff from the potentially oil-contaminated areas (containment areas for transformers, oil tanks, and other oil-containing or handling equipment) will also be routed through an oil/water separator and then routed to the stormwater ponds.

Generally, drainage will be directed away from structures and routed to the stormwater collection system. The CT/HRSG Power Block area will be graded with moderate slopes for effective drainage. Site runoff will be conveyed to stormwater retention ponds through a drainage system of

pipes, channels, swales, and culverts. No point-source discharge of stormwater runoff will be provided or required for the Project. Stormwater runoff that is collected in the retention ponds will either percolate, evaporate, or be used as cooling tower makeup.

3.9 Materials Handling

3.9.1 Construction Materials and Equipment

Construction materials and equipment will be delivered to the Site by existing roadways. The existing PBA road and the Corbett Substation access road will be used during construction of the Project.

Surface materials suitable for the Power Block and structures associated with the Project have already been placed on the 220-acre Site. This material is primarily sand and shell, quarried from the nearby PBA operations. Construction laydown areas associated with Units 1 and 2 will be used to the greatest extent possible for the Project. For any new laydown areas, limestone and aggregate may be used for laydown areas and internal roads associated with the Project.

Equipment and component parts of the combined cycle units will be unloaded and moved around the Site using portable cranes and trucks. Some of the heaviest items such as the new CTs, new steam turbines, electric generators, HRSGs, and transformers may require special transport. Pollution control measures for the laydown areas will include runoff collection as is described in Section 3.8. As necessary, additional roads required for the Project's construction laydown areas will be surfaced with aggregate/limerock and may be treated with dust palliative to reduce dust. Alternatively, water sprays may be used, as required, to control dust due to traffic.

3.9.2 Roads

Construction trucks associated with the construction of WCEC Units 1 and 2 travel to the Site using State Road 80 and access roads. These routes will continue to be used for the construction of Unit 3. From the existing access roads, construction trucks will be directed to the Project construction laydown areas.

TABLE 3.3.0-1
TYPICAL NATURAL GAS COMPOSITION

Composition	Mole %
Nitrogen (N ₂)	0.27 - 0.45
Helium (He)	0.01
Carbon Dioxide (CO ₂)	0.44 - 0.88
Methane (CH ₄)	96 - 97.0
Ethane (C ₂ H ₆)	1.8 - 2.6
Propane (C ₃ H ₈)	0.16 - 0.29
Butane (C ₄ H ₁₀)	0.011 - 0.017
Pentanes (C ₅ H ₁₂)	0.007 - 0.03
Hexanes (C ₆ H ₁₄)	0.03
Heptanes (C ₇ H ₁₆)	0.01
Octanes (C ₈ H ₁₈)	0.0
Argon, Oxygen (Ar, O ₂)	0.0
Sulfur (S)	2 grains per 100 scf
Water Vapor (H ₂ O)	0.6 lb/MMscf
Low Heating Value (LHV) - 20,835 Btu/lb; 950 Btu/scf High Heating Value (HHV) - 23,127 Btu/lb; 1,055 Btu/scf Note: scf = standard cubic feet MM = million	

TABLE 3.3.0-2
EXPECTED ULTRA LOW-SULFUR LIGHT OIL COMPOSITION

Elements	Maximum
Carbon Residue	0.35 % on 10% Bottoms
Water and Sediment	0.05 %
Ash	0.01 %
Vanadium	0.5 ppm
Sodium and potassium	0.5 ppm
Lead	1 ppm
Calcium	2 ppm
Sulfur	0.0015 wt. %
Low Heating Value (LHV) - 18,367 Btu/lb; 129,900 Btu/gallon High Heating Value (HHV) - 19,469 Btu/lb; 137,694 Btu/gallon Note: ppm = parts per million	

TABLE 3.4.1-1
STACK, OPERATING, AND EMISSION DATA FOR THE COMBUSTION TURBINES/HRSGS AND DUCT BURNERS
FOR WCEC UNIT 3 OPERATION—NATURAL GAS COMBUSTION

Parameter	Operating and Emission Data ^a for Ambient Temperature							
	Combustion Turbine/ HRSG				Combustion Turbine/ HRSG/ Duct Burner			
	35 °F	59 °F	75 °F	95 °F	35 °F	59 °F	75 °F	95 °F
<u>CT/HRSG Stack Data (ft)</u>								
Height	149	149	149	149	149	149	149	149
Diameter	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
<u>100 Percent Load</u>								
Temperature (°F)	196	195	195	195	186	185	185	184
Velocity (ft/sec)	62.5	59.6	57.6	55.2	62.0	59.1	57.2	54.7
Maximum Hourly Emissions per Unit								
SO ₂ lb/hr	15.1	14.3	13.7	13.0	17.7	16.9	16.3	15.6
PM/PM ₁₀ lb/hr	8.0	7.2	7.0	6.6	11.5	10.8	10.6	10.2
NO _x lb/hr	21.5	20.5	19.8	19.0	25.5	24.3	23.6	22.6
CO lb/hr	26.9	25.6	24.7	23.7	59.1	56.3	54.5	52.2
VOC (as methane) lb/hr	4.5	4.3	4.1	4.0	7.1	6.8	6.6	6.3
Sulfuric Acid Mist lb/hr	2.9	2.8	2.7	2.5	3.8	3.7	3.6	3.4
<u>75 Percent Load</u>								
Temperature (°F)	184	185	186	187	NA	NA	NA	NA
Velocity (ft/sec)	50.1	48.4	47.3	45.8	NA	NA	NA	NA
Maximum Hourly Emissions per Unit								
SO ₂ lb/hr	11.5	11.0	10.6	10.2	NA	NA	NA	NA
PM/PM ₁₀ lb/hr	6.0	5.9	5.8	5.7	NA	NA	NA	NA
NO _x lb/hr	16.2	15.6	15.2	14.6	NA	NA	NA	NA
CO lb/hr	49.4	47.4	46.2	44.5	NA	NA	NA	NA
VOC (as methane) lb/hr	3.4	3.2	3.2	3.1	NA	NA	NA	NA
Sulfuric Acid Mist lb/hr	2.24	2.14	2.06	1.97	NA	NA	NA	NA

^a Refer to Appendix 10.1.5, Subappendix A for detailed information on basis of pollutant emission rates and operating data.
Duct firing is assumed for 100% operating load. No duct firing is assumed for loads less than 100%.

Source: MPS, 2007 - CT Performance Data; Golder Associates, 2007.

TABLE 3.4.1-2
STACK, OPERATING, AND EMISSION DATA FOR THE COMBUSTION TURBINES/HRSGS
FOR WCEC UNIT 3 OPERATION—ULTRA LOW SULFUR LIGHT OIL COMBUSTION

		Operating and Emission Data ^a for Ambient Temperature			
		Combustion Turbine/ HRSG			
Parameter		35 °F	59 °F	75 °F	95 °F
CT/HRSG Stack Data (ft)					
Height		149	149	149	149
Diameter		22	22	22	22
100 Percent Load					
Temperature (°F)		359	357	355	354
Velocity (ft/sec)		77.6	73.9	71.3	68.1
Maximum Hourly Emissions per Unit					
SO ₂	lb/hr	3.7	3.5	3.3	3.1
PM/PM ₁₀	lb/hr	38.0	35.9	34.9	32.8
NO _x	lb/hr	78.5	75.2	73.0	69.4
CO	lb/hr	47.8	45.8	44.4	42.3
VOC (as methane)	lb/hr	20.5	19.6	19.0	18.1
Lead	lb/hr	0.031	0.030	0.028	0.027
Sulfuric Acid Mist	lb/hr	0.71	0.67	0.64	0.61
75 Percent Load					
Temperature (°F)		350	348	346	345
Velocity (ft/sec)		74.3	71.4	69.5	66.8
Maximum Hourly Emissions per Unit					
SO ₂	lb/hr	2.9	2.7	2.6	2.5
PM/PM ₁₀	lb/hr	36.8	35.7	34.7	32.7
NO _x	lb/hr	57.9	56.0	53.9	51.4
CO	lb/hr	37.2	35.9	34.3	33.3
VOC (as methane)	lb/hr	15.9	15.4	14.7	14.3
Lead	lb/hr	0.025	0.023	0.023	0.022
Sulfuric Acid Mist	lb/hr	0.56	0.53	0.51	0.49

^a Refer to Appendix 10.1.5, Subappendix A for detailed information on basis of pollutant emission rates and operating data.

Source: MPS, 2007 - CT Performance Data; Golder Associates, 2007.

TABLE 3.4.1-3
PHYSICAL, PERFORMANCE, AND EMISSIONS DATA FOR WCEC UNIT 3
MECHANICAL DRAFT COOLING TOWER

Parameter	WCEC 3 x 1
<u>Physical Data</u>	
Number of Cells	26
Deck Dimensions, ft	
Length	702
Width	96
Height	49
Stack Dimensions	
Height, ft	63
Stack Top Effective Inner Diameter, per cell, ft	35
Effective Diameter, all cells, ft	178.5
<u>Performance Data</u>	
Discharge Velocity, ft/min	1,411
Circulating Water Flow Rate (CWFR), gal/min	303,810
Design hot water temperature, °F	91.9
Design cold water temperature, °F	75.8
Heat Rejected, million Btu/hr	2,400
Design Air Flow Rate per cell, acfm	1,358,000
Liquid/ Gas (Air Flow) (L/G) Ratio	1.130
Hours of operation	8,760
Temperature of Exit Air, °F	96.9
<u>Emission Data</u>	
Drift Rate ^a (DR), percent	0.0005
Total Dissolved Solids (TDS) Concentration ^b , maximum ppm	35,000
Solution Drift ^c (SD), lb/hr	760.1
PM Drift ^d , lb/hr	26.6
tons/year	116.5
PM ₁₀ Drift ^e	
PM ₁₀ Emissions, lb/hr	1.17
tons/year	5.1

^a Drift rate is the percent of circulating water.

^b A TDS of 35,000 results in maximum PM emissions.

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

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

^e PM₁₀ based on a TDS of 4,000 ppm. See Joel Reisman and Gordon Frisbie,
Calculating Realistic PM₁₀ Emissions from Cooling Towers, in Appendix 10.1.5, Subappendix A.

Sources: FPL, Golder; 2007.

**TABLE 3.4.1-4
SUMMARY OF MAXIMUM POTENTIAL ANNUAL EMISSIONS FOR THE WCEC UNIT 3 PROJECT**

Pollutant	Annual Emissions (tons/year)				TOTAL	PSD Significant Emission Rate (tons/year)	PSD Review Required?
	3 CTs/HRSGs with Duct Burners	Cooling Tower	Emergency Generator (2 for WCEC)	Natural Gas Heater (2 for WCEC)			
SO ₂	199	NA	0.02	0.47	199	40	Yes
PM	132	116.5	1.4	0.16	250	25	Yes
PM ₁₀	132	5.1	1.4	0.16	139	15	Yes
NO _x	327	NA	24.34	8.30	359	40	Yes
CO	484	NA	29.98	6.97	521	100	Yes
VOC (as methane)	78.4	NA	3.53	0.46	82	40	Yes
Sulfuric Acid Mist	40.4	NA	NA	NA	40.4	7	Yes
Lead	0.022	NA	NA	NA	0.02	0.6	No

Source: MPS, 2007 - CT Performance Data; Golder, 2007.

**TABLE 3.5.0-1
UPPER FLORIDAN AQUIFER WATER QUALITY**

Parameter	Units	Count	Average¹	95%UCL²	6 cycles³
ALKALINITY, TOT, CaCO ₃	mg/l	52	142.81	150	901
ALUMINUM, DISSOLVED	ug/l	3	4.00	4.00	24
ANTIMONY, DISSOLVED	ug/l	3	4.67	5.33	32
ARSENIC, TOTAL	ug/l	3	5.07	10	60
BARIUM, DISSOLVED	ug/l	42	21.78	24	143
BERYLLIUM, DISSOLVED	ug/l	3	0.10	0.10	0.6
CADMIUM, DISSOLVED	ug/l	3	0.97	1.56	9.4
CALCIUM	mg/l	49	148	168	1007
CHLORIDE	mg/l	52	2253	2826	16955
CHROMIUM, DISSOLVED	ug/l	3	0.70	0.70	4.2
COBALT, TOTAL	ug/l	3	1.33	2.00	12
COPPER, TOTAL	ug/l	5	201	568	3411
DISSOLVED OXYGEN	mg/l	18	1.73	2.40	>5
FLUORIDE	mg/l	45	0.97	1.04	6.2
HARDNESS AS CaCO ₃	mg/l	47	1143	1397	<5310
IRON, DISSOLVED	ug/l	39	186	295	1771
LEAD, DISSOLVED	ug/l	3	0.80	0.80	4.8
MAGNESIUM	mg/l	51	186	230	1381
MANGANESE, DISSOLVED	ug/l	40	20.46	26	155
MERCURY, TOTAL	ug/l	4	0.21	0.40	2.4
NICKEL, DISSOLVED	ug/l	3	0.50	0.50	3.0
PH, FIELD	std units	53	7.57	7.66	Neutral
PH, LAB	std units	3	7.83	8.23	Neutral
POTASSIUM	mg/l	50	54	70	422
SELENIUM, TOTAL	ug/l	3	4.73	10	60
SILICA	mg/l	38	13.74	14	84
SILVER, TOTAL	ug/l	3	1.00	1.00	6.0
SODIUM	mg/l	48	1383	1770	10621
SP CONDUCTIVITY, FIELD	uS/cm	52	7317	8767	52604
STRONTIUM, DISSOLVED	ug/l	44	14337	15835	95010
SULFATE	mg/l	52	471.00	536	3215
TEMPERATURE	deg C	54	24.28	25	NA
THALLIUM, TOTAL	ug/l	3	1.43	2.31	14
TOTAL DISSOLVED SOLIDS	mg/l	47	4519	5571	33424
TOTAL SUSPENDED SOLIDS	mg/l	3	25.00	50	301
TURBIDITY	NTU	4	5.98	11	65
VANADIUM, TOTAL	ug/l	3	1.60	4.02	24
ZINC, DISSOLVED	ug/l	3	4.00	4.00	24

Notes

¹ Average concentration based on 16 Upper Floridan wells located in Palm Beach County

² 95th Percentile Upper Confidence Limit of the mean based on available data.

³ Cycle values are estimates based on 95% UCL

NA- Not applicable - cycle concentrations are not applicable.

Neutral - pH concentration to be adjusted

Sources: SFWMD DBHYDRO, 2007; Golder, 2007.

TABLE 3.5.0-2
L10/L12 WATER QUALITY

Parameter (units)	Maximum ¹	6 cycles ²
Alkalinity as CaCO ₃ (mg/l)	307	<1842
Alkalinity (Bicarbonate) (mg/L)	210	<1260
Aluminum (mg/L)	1.8	10.8
Ammonia as N (mg/L)	<.1	ND
Antimony (ug/L)	<5.0	<30
Arsenic (ug/L)	8.1	48.6
Barium (ug/L)	45	270
Beryllium (ug/L)	<.1	<.6
BOD (5-day) (mg/L)	4.3	NA
BOD - Soluble (mg/L)	<2	NA
Cadmium (ug/L)	0.77	4.62
Calcium (mg/L)	101	606
Chloride (mg/L)	214	1284
Chromium (ug/L)	<5	<30
COD (mg/L)	97	NA
Copper (ug/L)	9.6	57.6
Cyanide (mg/L)	<.005	<.030
Dissolved Oxygen (mg/L)	7.92	>5
Fluoride (mg/L)	0.34	2.04
Hardness (mg/L as CaCO ₃)	250	<1500
Iron - Dissolved (ug/L)	2200	13200
Iron Total (ug/L)	2000	12000
Lead (ug/L)	3.6	21.6
Lead - Dissolved (ug/L)	<3	<18
Magnesium (mg/L)	19	114
Manganese (mg/L)	0.018	0.108
Mercury (ug/L)	<.13	<.78
Molybdenum (ug/L)	<5	<30
Nickel (ug/L)	2.3	13.8
Nitrate as N (mg/L)	1.8	ND
Nitrate + Nitrite as N (mg/L)	0.89	ND
Nitrite as N (mg/L)	0.83	ND
Nitrogen as N (total) (mg/L)	5.59	ND
O-Phosphate as P (mg/L)	0.13	ND
Oil & Grease (mg/L)	<1.7	<10.2
pH (SU)	8.1	Neutral
Phenols (mg/L)	<.01	<.06
Phosphate, Total as P (mg/l)	0.17	ND
Potassium (mg/L)	8.1	48.6
Selenium (ug/L)	12	72
Silica (mg/L)	14.7	88.2
Silver (ug/L)	0.07	0.42
Sulfate (mg/L)	106	636
Sulfide (mg/L)	<2	<12
TDS (mg/l)	921	4605
Temperature (F)	86.9	NA
Thallium (ug/L)	<10	<50
TKN as N (mg/L)	4.7	ND
TSS (mg/L)	38	<228
Turbidity (NTU)	46	<276
Vanadium (ug/L)	6.9	41.4
Zinc (ug/L)	7	42

Note:

¹ Source water maximum concentration.

² Cycle values are estimates and based on maximum concentrations.

ND - Not Determined - concentration relationship is not linear.

NA - Not Applicable - cycle concentrations are not applicable.

Neutral - pH concentration to be adjusted .

Source: SFWMD, 2005; FPL, 2007; Golder, 2007.

TABLE 3.6.0-1
WEST COUNTY ENERGY CENTER WASTE STREAMS, CHARACTERIZATION AND DISPOSAL METHOD (Page 1 of 2)

Waste Streams (Process Water Systems)	Non Hazardous Basis for Characterization	Hazardous Basis for Characterization	Disposal Management Process
Demineralized Water RO Reject	Based on analytical characterization of historical data		Disposed of as industrial wastewater into UIC injection well.
Demineralization Wastewater	Based on analytical characterization of historical data		Disposed of by approved disposal contractor.
Heat Recovery Steam Generator Blowdown	Based on analytical characterization of historical data		Disposed of as industrial wastewater into UIC injection well.
Pretreatment Wastewater	Based on analytical characterization of historical data		Disposed of as industrial wastewater into UIC injection well.
Cooling Tower Blowdown	Based on analytical characterization of historical data		Disposed of as industrial wastewater into UIC injection well.
Cooling System Water (Biocide Addition Chlorine, Scale Inhibitor, Pretreatment Chemicals)	Based on analytical characterization by vendor supplying chemical		Disposed of as industrial wastewater into UIC injection well.
Steam Cycle Water Treatment (Hydrazine, Ammonia, Sodium Phosphate)	Based on analytical characterization by historical data		Chemicals breakdown in steam cycle, any residual chemicals are disposed of by plant blowdown or boiler drain into UIC injection well.
Heat Recovery and Steam Generator as Well as Pre-boiler Piping Chemical Cleaning	Based upon analytical waste stream characterization.	Based upon analytical waste stream characterization	If non-hazardous, will be disposed into UIC injection well. If hazardous, then disposed of by a licensed approved contractor.
Miscellaneous Drains	Based on analytical characterization of historical data		Disposed of as industrial wastewater into UIC injection well.

TABLE 3.6.0-1
WEST COUNTY ENERGY CENTER WASTE STREAMS, CHARACTERIZATION AND DISPOSAL METHOD (Page 2 of 2)

Waste Streams (Construction and Operations)	Non Hazardous Basis for characterization	Hazardous Basis for characterization	Disposal Management Process
Construction-Related Waste Water (e.g., ammoniated process water for hydrostatic testing and backfilling, groundwater from dewatering and production wells, steam blow quench water, etc.)	Based on historical data		Disposed of as industrial wastewater into UIC injection well.
Water Pretreatment Solid Waste	Based on analytical results		Disposed of by an approved disposal contractor.
Rags	As per EPA in 40 CFR 279		Recycled via laundering by FDEP-approved vendor or disposed of in landfill.
Punctured Aerosol Cans	As per EPA characterization letter		Disposed of by an approved scrap metal contractor.
Captured Paint Residuals from Punctured Aerosol Cans		Analytical data from waste characterization	As hazardous waste in accordance with 40 CFR, Part 261.
X-ray Weld Testing			Process does not generate waste chemicals onsite. Vendor is responsible for their waste generation.
Florescent Bulbs and Batteries		As per 40 C.F.R. 273 EPA determination	Recycled as universal waste.
Oily Separated Waste Water	Based on analytical results		Separated water is routed into UIC injection well. Oil is disposed of by an approved waste disposal contractor
Oily Solid Wastes	As per EPA in 40 CFR 279		Disposed of by an approved waste disposal contractor.



TABLE 3.7.0-1
FPL GENERAL WASTE HANDLING GUIDELINES (Page 1 of 2)

GENERAL WASTE HANDLING GUIDELINES

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

WASTE HANDLING INSTRUCTIONS

Recycling

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

TABLE 3.7.0-1**FPL GENERAL WASTE HANDLING GUIDELINES (Page 2 of 2)****Recycling (continued)**

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

Non-Regulated Waste Disposal

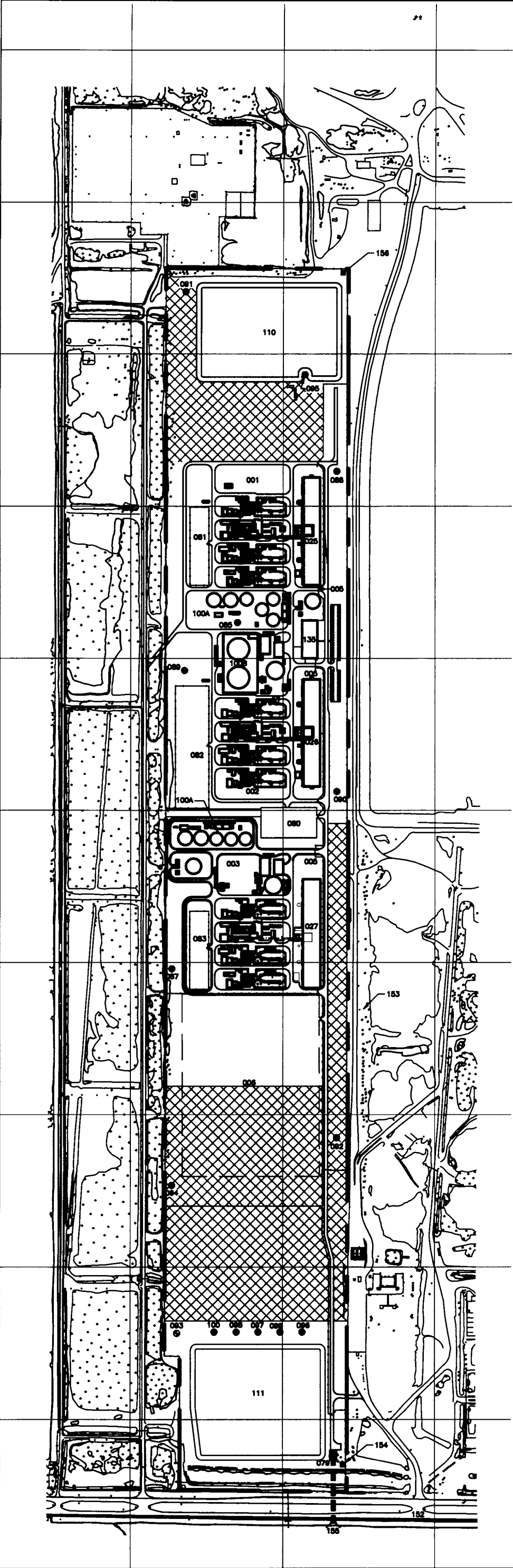
1. Normal trash: minimize and dispose, place into plant dumpster.
2. Used oil: place into Accumulation Area designated for this purpose.
3. Solid oily waste: place into Solid Oily Waste Dumpster designated for this purpose.
4. Parts cleaning solution: use parts cleaner for all parts cleaning. For special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

Hazardous Waste Disposal *

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

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





ID	FACILITY
001	Unit 1 Power Block Area
002	Unit 2 Power Block Area
003	Unit 3 Power Block Area
005	Motorized Slide Gate
006	Switchyard
025	Unit 1 Cooling Tower
026	Unit 2 Cooling Tower
027	Unit 3 Cooling Tower
079	Raw Water Pump Structure
080	FPL Gas Yard
081	230-kv Collector Yard (Unit 1)
082	230-kv Collector Yard (Unit 2)
083	230-kv Collector Yard (Unit 3)
085	Potable Water Well PW-1
086	Potable Water Well PW-2
087	Floridan Aquifer Well FAW-1
088	Floridan Aquifer Well FAW-2
089	Floridan Aquifer Well FAW-3
090	Floridan Aquifer Well FAW-4
091	Floridan Aquifer Well FAW-5
092	Floridan Aquifer Well FAW-6
093	Floridan Aquifer Well FAW-7
094	Floridan Aquifer Well FAW-8
095	Floridan Aquifer Monitoring Well FAMW-1
096	Deep Injection Well MW-1
097	Deep Injection Well MW-2
098	Deep Injection Well MW-3
099	Dual Zone Monitoring Well DZMW-1
100	Dual Zone Monitoring Well DZMW-2
100A	Water Treatment Area
100B	Fuel Oil Area
110	North Stormwater Pond
111	South Stormwater Pond
135	Admin/Control/Warehouse Building
152	Southern Blvd.
153	Palm Beach Aggregate
154	Palm Beach County Utility Connection
155	Raw water Intake Structure

-  INDICATES WELLS
-  INDICATES CONSTRUCTION AREA



FIGURE 3.2.0-1 SITE LAYOUT
WEST COUNTY ENERGY CENTER

Sources: West County Power Partners, LLC; Golder; 2007.



FPL

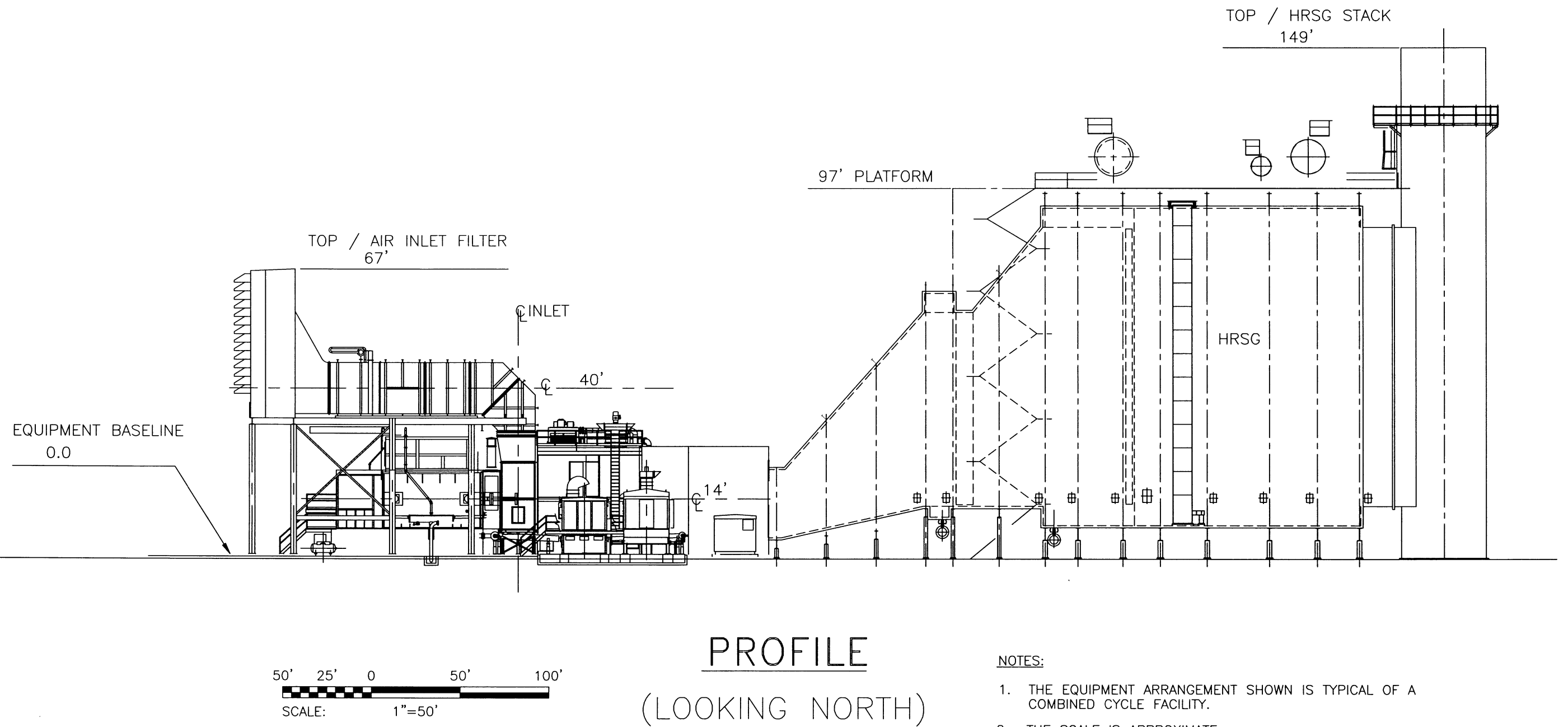


Figure 3.2.0-2. Profile of Combustion Turbine and Heat Recovery Steam Generator

Source: Black & Veatch, 2001; FPL, 2005; and Golder, 2005.

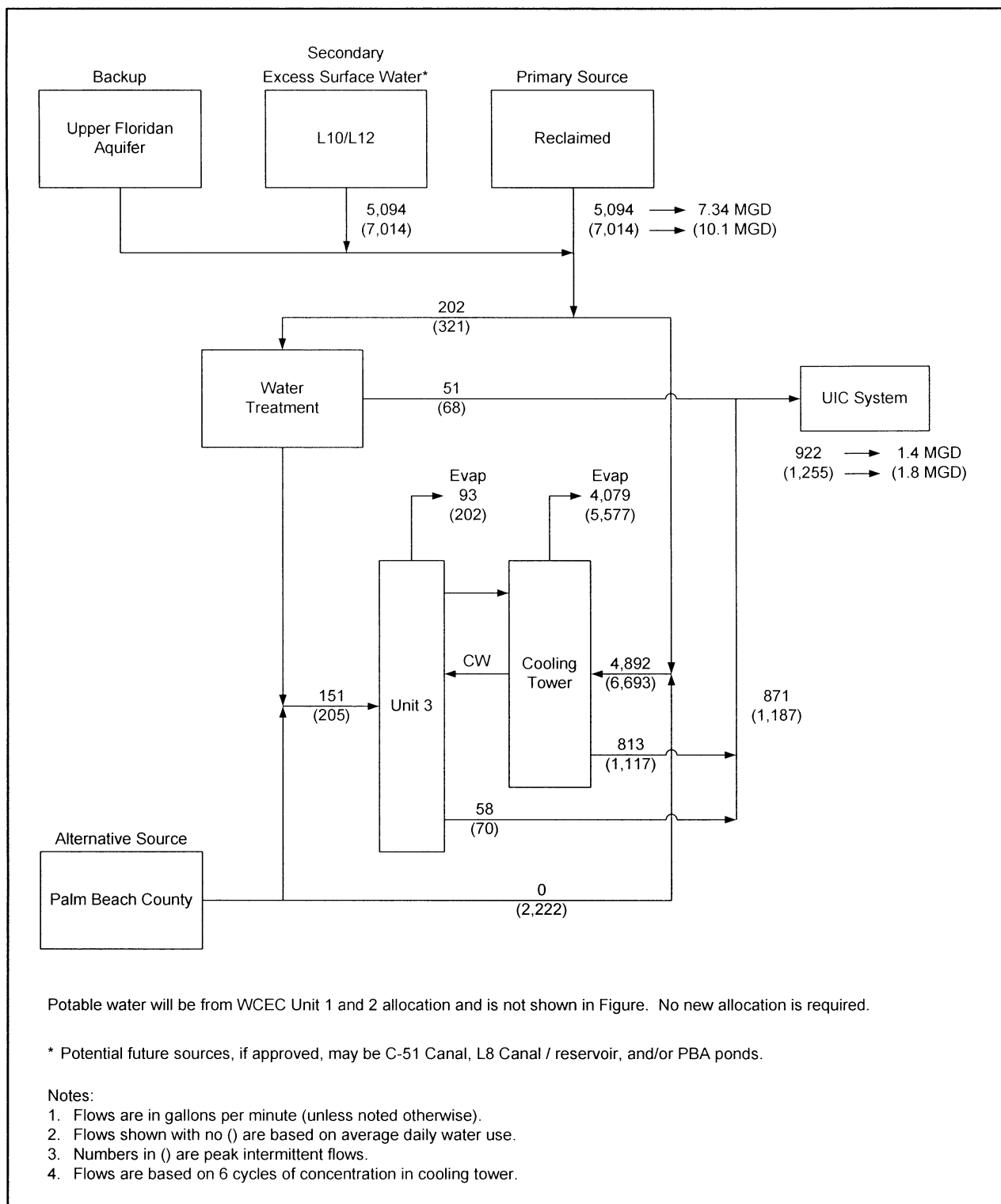


Figure 3.5.0-1
Water Balance for WCEC Unit 3

Filename:

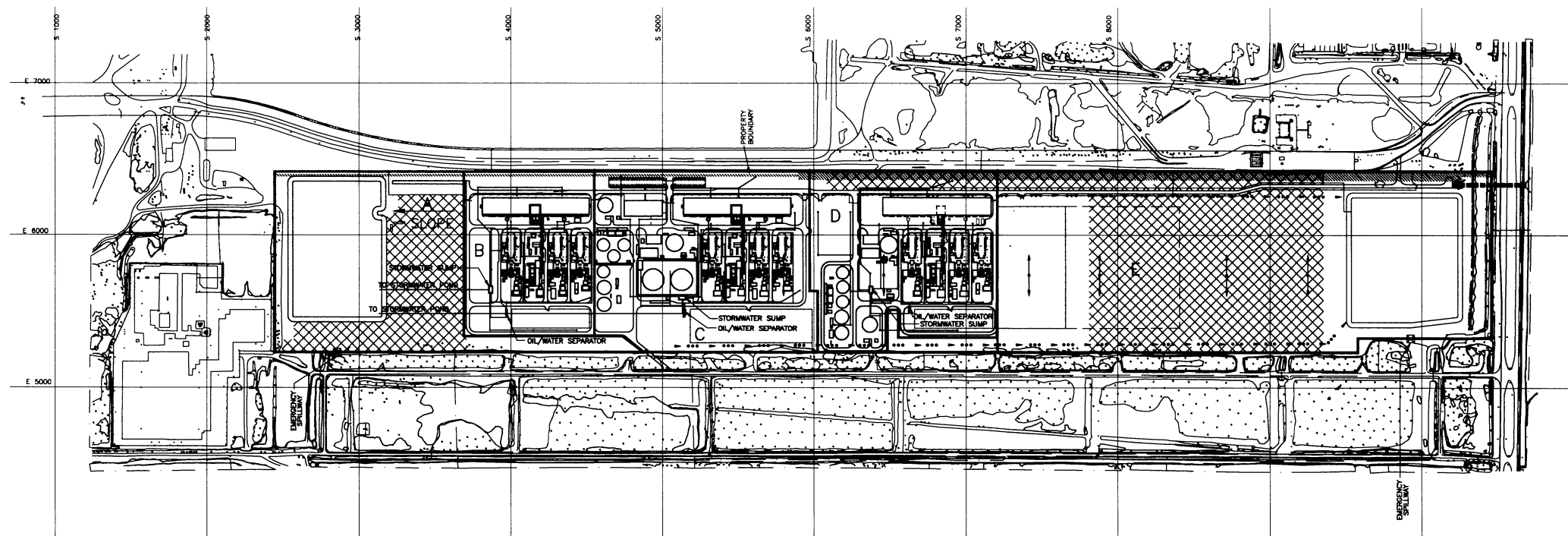
Figure 3.5.0-1.vsd

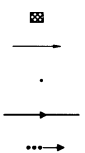
Date: 11/29/07



FPL

FACILITIES <u>LEG</u> END	
PROJECT BASIN ID	DESCRIPTION
A	OVERLAND FLOWS TO NORTH STORM WATER POND
B	UNIT 1 AREA – PUMPED TO NORTH STORM WATER POND
C	UNIT 2/ COMMON AREA – PUMPED TO NORTH STORM WATER POND
D	UNIT 3 AREA – PUMPED TO SOUTH STORM WATER POND
E	OVERLAND FLOW TO SOUTH STORM WATER POND

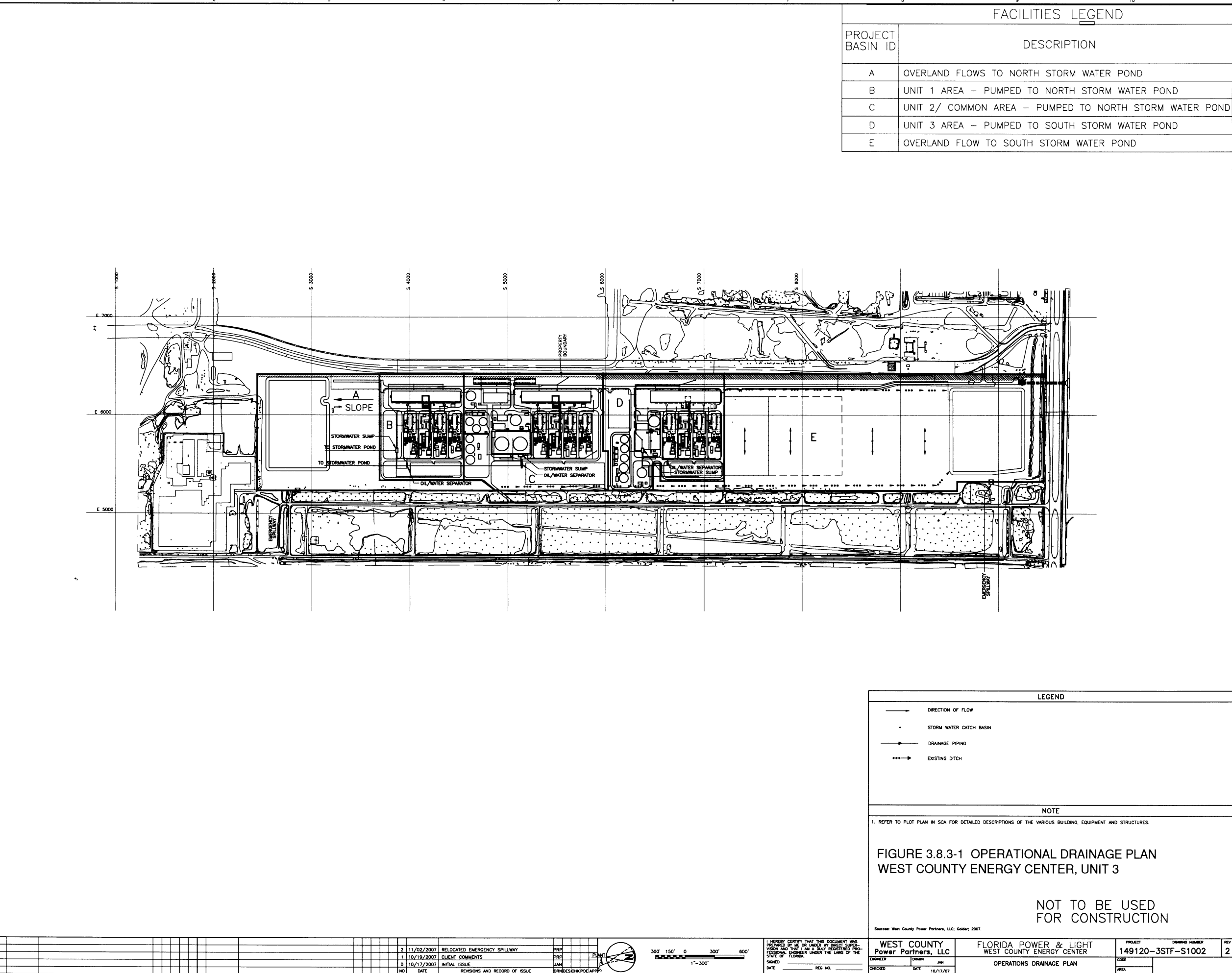


LEGEND  INDICATES CONSTRUCTION AREA DIRECTION OF FLOW STORM WATER CATCH BASIN DRAINAGE PIPING EXISTING DITCH			
NOTES			
1. REFER TO PLOT PLAN IN SCA FOR DETAILED DESCRIPTIONS OF THE VARIOUS BUILDING, EQUIPMENT AND STRUCTURES. 2. PLOT BOUNDARIES AND INTERNAL DRAINAGE DIVIDES SHALL BE GRADED TO MINIMUM ELEVATION 24.0FT. IN AREAS DESIGNATED FOR CONSTRUCTION LAYDOWN, THE CONTRACTOR SHALL PROVIDE DITCHES AND SWALES TO DIVERT RUNOFF INTO THE STORMWATER RETENTION PONDS AND/OR TEMPORARY SEDIMENTATION PONDS, IF NECESSARY.			
FIGURE 3.8.2-1 CONSTRUCTION DRAINAGE PLAN WEST COUNTY ENERGY CENTER, UNIT 3			
NOT TO BE USED FOR CONSTRUCTION			
Sources: West County Power Partners, LLC; Golder; 2007.			

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4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

4.1 Land Impacts

4.1.1 General Construction Impacts

The portions of the Site that will be affected by the construction of WCEC Unit 3 are shown in Figure 3.2.0-1. Prior to the construction of WCEC Units 1 and 2, the entire 220 acres were filled to a nominal elevation of 25 ft NGVD with shell and sand quarried from nearby PBA mining activities. As a result, no areas of the Site require clearing of vegetation or substantive filling for the construction of WCEC Unit 3. Construction laydown and parking areas, which may be heavily traveled, may be stabilized with rock. Other more lightly traveled areas may be seeded or sodded with grass to prevent erosion.

The Power Block for WCEC Unit 3 will include the CTs and associated HRSGs, steam turbine generator, cooling tower, and collector yard, (see Figure 3.2.0-1). Facilities common with WCEC Units 1 and 2 include the administration, control room, and warehouse building, gas yard, water treatment area, L10/L12 inlet and intake with water pipeline, parking lot and roads, ultra low-sulfur light oil tanks, stormwater ponds, parking, and road connection to PBA Road and construction access roads. For WCEC Unit 3, the gas yard will be expanded, and a new electrical switchyard will be added.

No explosives for blasting will be used for construction of the Project.

Access to the Site is by public roads; State Road 80, a four-lane divided highway, is located immediately south of the Site. Two roads connected to State Road 80 will be used for the construction of the Project. The two roads include a permanent private paved road east of the Site (referred to as PBA Road) and a road west of the Site connecting State Road 80 with the Corbett Substation (referred to as Corbett Substation access road). Construction traffic will be directed from these access roads onto the construction parking/laydown areas for the Project. Fugitive dust generation from traffic will be minimized through paving, placing of sod in areas not utilized for construction, the use of water sprinkling, or other dust-suppressant techniques.

The existing grade of the Site is nominally 25 ft NGVD and about 15 ft above the surrounding land areas. The finished grade of the Project, which includes the Power Block and the equipment, will remain at the existing nominal site elevation of 25 ft NGVD. Construction laydown and parking areas will remain at the existing Site elevation.

Prior to the construction of Unit 3, the construction trailers for Units 1 and 2 will be relocated.

Site preparation will be minimal due to the existing character and structural stability of the backfilled material. Areas will be graded and some minor amounts of rock fill will be used to help support the plant foundations, piping, electrical duct banks, trenches, and manholes. Foundations required to support heavy loads (i.e., such as building columns, CTs, and generators) are expected to be spread foundations supported by pilings or stone columns.

Dewatering for the construction of WCEC Unit 3 is not anticipated except for deep structures. Dewatering could be required for excavations below 15 ft-msl for circulating water pipes due to local water elevations. Such dewatering will be localized and last for less than 1 year. Based on the location and limited duration of dewatering, no offsite impacts to groundwater are anticipated (see Section 4.3). There will be no impacts to the underlying deeper aquifers because excavation and dewatering activities will be limited to a very small, shallow area.

As described in Section 3.6 and listed in Table 3.6.0-1, there are a variety of potential waste streams resulting from the construction and operation of the Project. During construction of the Project, the waste streams will be managed as presented in Table 3.6.0-1. Solvent rags will be collected and recycled or disposed of in a landfill. Residual waste from punctured aerosol cans will be collected and managed as hazardous waste. Paint waste, PVC cleaner, and PVC cement wastes will be minimized by implementation of programs requiring use of all material prior to issuance of additional material. All hazardous wastes will be stored onsite and disposed of by a licensed hazardous waste contractor. All non-hazardous waste will be managed according to the Waste Handling Guidelines identified in Table 3.7.0-1 with appropriate modifications to accommodate the construction of the Project.

Water needed during the construction will be obtained from Palm Beach County, the surficial aquifer, L8 reservoirs, and/or PBA ponds. Water associated with the hydrostatic testing of HRSGs, piping, and tank systems after installation will be obtained from the plant water system and will be



contained onsite. Chemicals such as ammonia may be added to the water used for hydrostatic testing to meet manufacturer's specifications for pH control. Any wastewater will be routed to the UIC well system. If no chemicals are added, hydrostatic test water will be either routed to the stormwater ponds or allowed to percolate and/or evaporate onsite.

The WCEC water system or portable water treatment systems will provide water for chemical cleaning of the HRSG and steam piping, as well as for steam blow processes. Chemical cleaning involves cleaning the HRSG to clean the piping systems (see Subsection 3.6.5). The steam blow process involves cleaning steam-piping systems to remove accumulated weld spatter, slag, filings, and other debris. If this material is not removed prior to steam turbine operation, the steam turbine will be damaged by the metal particles, which would strike the blades and steam path at very high velocities. Blowing through the piping system with steam removes this material, along with rust, grease, and other fabrication and construction residues prior to commencement of combined cycle operation. The steam blow process requires treated water and may require additional portable water treatment systems for a short time period. The auxiliary boilers for WCEC Units 1 and 2 or a temporary boiler will be used to generate steam for cleaning. Non-hazardous wastewaters will be routed to the UIC well system.

Solid waste materials will be disposed of in accordance with applicable rules and regulations. Construction and demolition wastes, such as scrap wood and metal, will be transferred to a specified storage area on the Site where they will be separated and stockpiled for salvage and recycling. General waste materials (i.e., typical of municipal solid wastes) will be collected in appropriate waste collection containers for disposal at an approved offsite location.

During construction, the construction labor force will use portable chemical toilets and/or permitted holding tanks. A licensed contractor will pump all sanitary sewage from the portable toilets and holding tanks as needed and transport the waste to an approved disposal facility.

Potable water for consumption during construction will be obtained from the WCEC water system or contractor-supplied potable water. Potable water for emergency eyewash and shower stations associated with the Project will be obtained initially from temporary systems and subsequently connected permanently to the WCEC potable water system.

Used oil from construction vehicles and equipment will be collected in appropriate containers and transported offsite for recycling or disposal at an approved facility. The approved disposal facility will be an existing facility that has been previously permitted for commercial recycling or disposal of used oils.

Individual contractors will be responsible for handling any hazardous materials required to perform their tasks and any resulting hazardous wastes. This responsibility includes the proper recordkeeping, transportation, storage, handling, and offsite disposal of such wastes. Contractors will be required to coordinate with FPL and provide documentation of all activities related to hazardous material and/or wastes.

It is anticipated that onsite construction activities for the Project will begin by May 2009 and be completed by June 2011. The peak employment is expected to occur in the summer of 2010 and will be about 1,000 construction workers and management. Construction employment will average about 475 workers from about November 2009 through October 2010.

4.1.2 Roads

Construction traffic will use State Road 80 to access PBA Road and the Corbett Substation access road. PBA road is an asphalt-paved road along the eastern boundary of the Site and Corbett Substation Access road is a gravel road. Separate onsite asphalt driveways connect the Site to these access roads. Construction traffic for WCEC Unit 3 will be directed to either the parking or laydown areas.

4.1.3 Flood Zones

While the Site as shown in the current FEMA flood zone map is within the 100-year floodplain, the elevation of the Site is above the 100-year floodplain. Construction of the Project will not adversely impact adjacent surface water flood elevations or flows and will not cause any adverse flooding or related impacts to offsite property.

4.1.4 Topography and Soils

Current topographic features for the area occupied by WCEC Unit 3 reflect the sand and shell from previous PBA activities. The existing grade is nominally 25 ft NGVD and varies by about ± 1 ft. Areas associated with WCEC Unit 3 will be graded as necessary with structural fill (rock) placed in areas as needed.



No adverse impact is anticipated to soil stability or bearing strength because spread foundations, pilings, or stone columns will be used; therefore, overall settling of the land area will be negligible. Slight settling may take place in areas of construction, but this will be minor and localized in extent due to the existing conditions.

The areas affected by construction do not include any areas designated as Prime and Unique Farmland.

Site topography will not be affected by construction-related activities and there will be no effect on existing aesthetics or view shed. There is an existing visual barrier along the southern portion of the Site adjacent to State Road 80. This barrier, which has been planted with grass and trees, is about 30 ft above the elevation of State Road 80. Elevations of the land surface after construction will be the same as the existing elevation; no significant changes in topography will be observable from offsite locations.

Construction activities associated with WCEC Unit 3 will alter runoff in several parts of the Site; however, no adverse effects are anticipated from this alteration. Surface water runoff from the Power Block, construction parking, and laydown areas will be directed to existing stormwater ponds.

Groundwater levels will not be significantly affected by modifications to soil percolation from construction activities at the Site due to the proximity of surface water and the interconnection between these surface water bodies and the surficial aquifer. Slight changes in percolation rates will have negligible impacts on water levels, because the surface infiltration affects only localized areas within the area of WCEC Unit 3 construction activities.

4.2 Impact on Surface Water Bodies and Uses

4.2.1 Impact Assessment

Due to the existing nature of the Site and the absence of any discharges offsite, the surrounding surface waters will not be affected by Site preparation and construction activities. Figure 3.2.0-1 presents the land areas that will be impacted by construction. The focus of this impact evaluation is on potential discharges from these land areas to nearby surface water features.



4.2.1.1 *Surficial Hydrology—Physical and Chemical Impacts*

For the construction of WCEC Unit 3, the existing stormwater ponds located in the northern and southern portions of the Site will be used. Stormwater runoff from construction activities, including the construction laydown and parking areas, will be routed to these existing stormwater ponds. Offsite impacts will be prevented and controlled through proper design and placement of runoff control features. Any effluent from onsite dewatering will be routed to the stormwater ponds or otherwise controlled onsite and allowed to percolate or evaporate. Construction water such as flush water, hydrostatic testing water, or other high volume water may be routed to the UIC well system, or treated as necessary and routed to the stormwater ponds or otherwise allowed to percolate or evaporate.

Erosion during construction will be controlled by grading, construction of ditches and embankments, maintenance of relatively flat grades, and other appropriate erosion control techniques. Sedimentation will be controlled during construction by use of additional sediment control basins and traps, filter berms, silt fence, straw bales, and other applicable devices as appropriate.

Runoff collected in the sediment control ponds will be allowed to percolate or evaporate. Based on the zero discharge design associated with the Site, no adverse impacts to surface waters are anticipated.

Impacts from the use of chemicals for cleanup of chemical, oil, or grease spillage will be mitigated through proper handling and disposal practices. Construction contractors will be required to implement environmental control practices (e.g., designating specific areas for fueling and maintenance) to minimize any spills. These areas will be located so that any spills, if they do occur, will not be adjacent to any surface waters. If any spills occur, cleanup will be expedited with ultimate disposal in an approved facility. When appropriate, such materials will be handled to conform with FPL's Spill Prevention Control and Countermeasure (SPCC) plans and hazardous waste management procedures. In addition, construction-specific procedures will be developed and implemented by individual contractors.

4.2.1.2 *Aquatic Systems*

There are no aquatic systems on the Site. As described in Subsection 4.2.1.1, the potential for impacts to aquatic systems outside of the Site will be minimized through the use of appropriate construction techniques to control erosion, sedimentation, and surface runoff.



4.2.2 Measuring and Monitoring Programs

Stormwater associated with construction activities will be retained onsite and no monitoring is proposed. Silt fences at the perimeter of active construction areas will be maintained during construction.

4.3 Groundwater Impacts

4.3.1 Physical And Chemical Impacts

Activities associated with the construction of WCEC Unit 3 are not expected to produce any significant changes to groundwater quality, quantity, or levels in the vicinity of the Site. Dewatering, if required during construction, will be confined to localized areas. Consequently, the zone of influence for the dewatering activities will be confined to small areas associated with the Power Block. As a result, no impacts to groundwater resources or offsite wells will occur from dewatering activities.

Construction workforce potable water will come from the WCEC water system or contractor-supplied potable water. The potable water system meets the requirements of Chapter 62-555, F.A.C., and Palm Beach County ECR-II.

As discussed in Subsection 4.2.1.1, construction contractors will be required to implement practices to minimize spills. Maintenance and refueling will be performed only in designated areas. Any spills will be cleaned up and wastes disposed of in accordance with the applicable requirements.

4.3.2 Measuring And Monitoring Program

During construction dewatering, any applicable measuring and monitoring programs as specified by SFWMD will be conducted.

4.4 Ecological Impacts

4.4.1 Impact Assessment

4.4.1.1 Terrestrial Systems

The terrestrial systems on the entire 220-acre Site were cleared and filled in connection with previous PBA activities. The construction activities in these areas will not cause adverse ecological impacts.



The Site's 220 acres of altered terrestrial systems (see Subsection 2.3.6, Pre-Existing Stress, Terrestrial Systems) do not contain unique wildlife species and are not considered important wildlife habitats because of their disturbed nature.

No adverse impacts to federally- or state-listed terrestrial plants and animals are expected, due to the existing developed nature of the terrestrial habitat within the Site. The sand- and shell-covered Site does not provide suitable habitat for listed plants or animals.

Fugitive dust generated by construction activities will be minimized through Best Management Practices (BMPs) (see Subsection 4.5.2). Any localized fugitive dust will not adversely affect the terrestrial systems surrounding the Site.

Noise from construction activities will not affect wildlife in the vicinity of the Site. Presently, the area experiences noise associated with operation of the existing PBA activities, and wildlife that occurs in the vicinity of the Site, such as birds, is acclimated to such activities. No noise-sensitive wildlife is known to occur in the Site or its vicinity since wildlife in the area would have been acclimated to noise associated with the existing PBA operations.

No adverse impacts to wildlife resources in the area are expected to occur as a result of construction.

4.4.1.2 *Aquatic Systems/Wetlands*

The proposed Project will have no impacts to aquatic or wetland systems.

4.4.1.3 *Endangered and Threatened Species*

The Site does not contain any habitat suitable for endangered or threatened species. No impacts to offsite endangered or threatened species are expected to occur.

4.4.2 Measuring And Monitoring Programs

4.4.2.1 *Terrestrial Systems*

No monitoring programs will be undertaken because no important terrestrial systems will be affected by construction activities proposed for the Project.

4.4.2.2 *Aquatic Systems/Wetlands*

No monitoring programs will be undertaken because no important aquatic/wetland systems will be affected by construction activities proposed for the Project.

4.5 Air Impacts

4.5.1 Air Emissions

Construction activities will result in the generation of fugitive PM emissions and vehicle exhaust emissions. Fugitive PM emissions will result primarily from vehicular travel over paved and unpaved roads. Vehicular traffic will include heavy-equipment traffic and traffic due to construction workers entering and leaving the Site. Construction personnel and equipment will enter the Site primarily over surfaced roadways. Exposed land areas may also generate fugitive dust due to wind erosion. There will be no open burning since there will be no land clearing activities.

Emissions of fugitive PM from these activities are extremely difficult to quantify because of their variable nature. They can only be estimated since emissions are dependent upon a number of factors, including specific activities conducted, level of activity, meteorological conditions, and control measures utilized. Table 4.5.1-1 shows the estimated maximum air emissions during construction of WCEC Unit 3.

Fugitive PM₁₀ emissions may occur from wind erosion from open areas around the Site. The areas subject to wind erosion will generally be small due to the nature of construction activities and control measures taken, such as seeding. Fugitive PM₁₀ emissions from wind erosion have been estimated to be a total of 1.2 tons during the 2-year construction period.

Fugitive PM₁₀ emissions will also result from operating within the Site. Based on the average construction workforce, PM₁₀ emissions from paved and unpaved roads have been estimated to be a total of 0.7 tons during the 2-year construction period. Reasonable precautions will be made to limit the amount of fugitive emissions from paved and unpaved roads (e.g., watering).

The foundations and other structures will require concrete. Due to the volume of concrete required for the Project, a temporary concrete batch plant may be located at the Site. The concrete batch plant emissions are expected to be controlled using fabric filters for cement loading. PM₁₀ emissions from the concrete batch plant have been estimated to be about 2.8 tons during the construction period. The



use of an onsite concrete batch plant will have the advantage of bringing in concrete materials (i.e., cement, aggregate, etc.) in bulk shipments. This will reduce the air emissions from vehicle traffic (i.e., cement mixing trucks) entering and leaving the Site.

Emissions will also result from onsite construction equipment operating with diesel and gasoline engines including cranes, trucks, compressors, etc. This equipment will produce emissions of CO, NO_x, VOC, PM, and SO₂. Exhaust emissions were based on EPA emission factors (AP-42) for diesel engines. Based on the EPA emission factors and the estimated maximum number of vehicles, the CO, NO_x, VOC, PM₁₀, and SO₂ emissions are estimated to be 2.99, 3.10, 0.34, 0.17, and 0.19 tons per year (TPY), respectively, over the 2-year construction period. These levels of emissions will not cause significant impacts to air quality in the vicinity of the Site.

4.5.2 Control Measures

A number of control measures will be implemented during the construction period to minimize air emissions and potential impacts. The Site consists of compacted coarse sand and shell that is difficult for wind to pick up, thereby reducing air emissions due to wind. After grading, the untraveled or lightly traveled areas will be either paved or vegetated to minimize fugitive PM and wind erosion. Heavily traveled unpaved construction laydown areas and unpaved roads may be stabilized with rock. Watering on an as-needed basis will control fugitive dust from highly traveled areas. The entrance roads have been paved to minimize dust emissions from vehicles entering the Site.

4.6 Impact on Human Populations

Construction projects can affect human populations by altering demographic patterns; by placing demands on infrastructure elements such as housing, transportation, and educational facilities; by contributing noise to the environment; and by creating inconveniences due to the movement of workers, materials, and machinery. Due to the likely patterns of local employment and daily commuting, the Project's demographic impact is expected to be small. Chapter 7.0 of this SCA provides information on income, employment, tax revenue, and service needs associated with the construction workforce. This section is, therefore, limited to a discussion of workforce requirements and the relatively minor impacts of Project-related traffic, housing, education, and noise.

4.6.1 Construction Workforce

The construction workforce for the Project is expected to average approximately 350 workers over the 2-year construction period. Construction is anticipated to commence in May 2009 and conclude in June 2011. Peak construction is estimated at approximately 1,000 workers in mid-2010 and will result in workforce skills as follows:

Trade	Percent	Trade	Percent
Laborers	12	Pipefitters	19
Carpenters	6	Insulators	2
Operators	5	Electricians	22
Ironworkers	4	Painters	1
Millwrights	10	Supervision	13
Boilermakers	6		

The majority of the construction workers are expected to commute to the Site from within a commuting distance of up to 100 miles, primarily from locations within Palm Beach, Broward, and Miami-Dade Counties. Contractors will be responsible for hiring the construction workforce. A more detailed discussion of the workforce, payrolls, and economic impacts of the workforce is found in Chapter 7.0.

4.6.2 Transportation

Traffic associated with Project construction will affect area roadways on a temporary basis for the duration of the construction period. Peak use of State Road 80 for Project construction traffic will flow west during the morning peak hour, away from the urbanized areas of Palm Beach County. The opposite will occur in the evening peak hour, when construction traffic will flow in a predominantly easterly direction toward the urban areas. Thus, construction traffic in the Project vicinity will flow in the opposite direction of peak hour directional traffic for the typical commuter.

A traffic impact analysis was recently conducted to determine impacts during the construction period when the peak construction workforce will be present onsite (Florida Design Consultants, 2007). The annual average daily traffic (AADT) counts were obtained. These counts represent background conditions at the time when traffic counts were taken. Traffic forecasts from the Florida Department of Transportation's (FDOT) 2005 Traffic Information CD was used to obtain background traffic during the year in which peak construction will occur (2010). Traffic counts on the PBA Road were based on a previous traffic study prepared by Yvonne Ziel Traffic Consultants for PBA.



The Site is located north of State Road 80, which in this area is concurrent with U.S Highway 98, U.S Highway 441, and Southern Boulevard. State Road 80 is a major east-west corridor that traverses the middle of Palm Beach County. State Road 80 in the vicinity of the Site is a four-lane, divided, major arterial highway. Access to the WCEC for Unit 3 is from State Road 80 by a private road constructed by PBA. This road is the same as for Units 1 and 2. FPL also has a service road to the Corbett Substation along the 500-kilovolt transmission corridor on the west side of the Site, which will serve as an additional access to the Site.

The latest AADT (April 30, 2007) for Station 0019, which is the closest traffic count station to the east of the Project entrance, is 5,800 in an east direction and 6,100 in a west direction. These counts represent an overall 6-percent increase in eastbound traffic and a 3-percent increase in westbound traffic since the initial WCEC submittal in 2005.

Construction of the Project will take place over a 2-year period and will require the use of several area roadways. During construction, there will be an average of 350 workers and a maximum of approximately 1,000 construction workers onsite. The workers will generally be onsite between the hours of 7:00 a.m. and 4:00 p.m. Delivery trucks will also be expected to arrive at the Site daily during this timeframe to bring in materials and equipment. Most of the deliveries, however, are expected to arrive after the work shift begins or later during the day and will not have a significant impact in the morning or evening peak hours. Worst-case construction traffic impacts have been calculated for the peak hour when the peak construction workforce is present in 2010.

The peak-hour traffic departing from the Site is expected to include a worst-case condition of 100 percent of the peak construction workers and one-eighth of the delivery trips (delivery arrivals are expected throughout the day). Assuming this temporal/distribution and a trip generation rate of 1.2 construction employees per trip (an appropriate carpooling ratio acceptable to FDOT), the total trip generation from the Project construction during the peak hour results in 841 exiting vehicles; 833 from the construction employees and 8 for delivery and miscellaneous activities. By using the peak construction workforce estimate, the projected impacts represent worse-case conditions.

The roadway that will be impacted the most by Project construction traffic is State Road 80, which connects the Site with Palm Beach County and its municipalities. Estimated traffic assignment from the Site to this roadway was based upon the location of logical trip ends traveling east and west on



State Road 80 for the traffic generated by the Project. To cover a range in travel directions, from 85 to 65 percent of the Project trips will depart the Site and travel east on State Road 80, while the remaining 15 to 35 percent would travel west on State Road 80. Traffic would continue to access local communities including many of the municipalities in Palm Beach County, including Belle Glade.

Information was obtained from the FDOT and Palm Beach County Traffic Engineering Department regarding the existing road lanes, the Level of Service (LOS) standard that applies to the road segment, and existing peak-hour traffic volumes. The baseline conditions described in Subsection 2.2.5, and the projected peak-hour background traffic plus construction traffic, were used to generate the maximum peak-hour traffic volumes and are summarized in Table 4.6.2 1. The LOS for the total traffic volume has been determined using FDOT Generalized Level of Service Tables for Rural Undeveloped and Urbanized Areas (see FDOT's Quality and Level of Service Handbook, 2002). As indicated in Table 4.6.2-1, all road segments that will be impacted by construction traffic will continue to operate at or above the state-wide minimum LOS standards.

The intersection of PBA Road and State Road 80 adjacent to the Site will be affected by construction traffic as the anticipated construction traffic enters and departs from State Road 80. The operation of the PBA Road entrance on State Road 80 has been reviewed using the Highway Capacity Software (HCS). Analysis was first completed assuming a stop sign would control the southbound movement on PBA Road, while State Road 80 would not stop. The results of this analysis indicated that the southbound approach on PBA Road at a stop sign would operate at LOS F. The intersection was next analyzed assuming that it would be controlled during the timeframe analyzed (i.e., the period when construction employment peaks).

When the intersection at PBA Road and State Road 80 is controlled for the morning peak hour, it is projected that LOS B conditions will exist. In the p.m. peak hour, it is projected that a controlled intersection will operate at LOS C. The impacts on the intersection are primarily to the construction workers leaving the site during afternoon peak hours, rather than to non-project related traffic on State Road 80. Without controls at the intersection, substantial delays would occur to traffic exiting the Site and turning east onto State Road 80.

Traffic control will be implemented as necessary at the intersection during the morning arrivals and afternoon departures of peak construction traffic to maintain an adequate level-of-service pursuant to Rule 14-94 F.A.C. Traffic control will be handled by a traffic management specialist(s) (e.g., local off-duty police officers) hired for the peak construction period. This impact is considered to be temporary and will occur during the portion of the construction period when construction employment is at its peak.

4.6.3 Housing

An average of 350 employees will be required during Project construction, and employment will peak at 1,000 employees. Many of these employees will be employed for only a portion of the construction period due to the changing skill requirements of the construction project. There is a significant labor pool of construction workers in Palm Beach County, estimated at over 30,000, and an additional 40,000 in the adjoining counties. There are abundant lodging accommodations (over 80,000 public lodging units) in Palm Beach County.

4.6.4 Education

Because of the short duration of employment, few workers will relocate with their families. As a result, there will be little immigration of school-aged children resulting from Project construction. No significant adverse effects on local elementary, middle, or high school enrollment are anticipated.

4.6.5 Construction Noise Impacts

The impacts of noise on human populations are dependent upon the proximity of institutional and residential land uses to construction activities and the type and extent of noise sources. The nearest residential location that could potentially be impacted by noise from the proposed facility construction area is located approximately 0.7 mile northeast of the northern boundary of the Site. This residence is located in the Deer Run neighborhood. The property east of the Site and the L8 Canal is currently not in residential use.

Construction of the Project will require installation of foundations and erection of major components of the combined cycle unit such as the CTs, HRSGs, steam turbines, and cooling system. The use of construction equipment, such as dump trucks, cranes, bulldozers, graders, front-end loaders, and air compressors will be required. These sources have maximum noise levels ranging from about 70 to 90 dBA (measured at a distance of 50 ft).



The evaluation of noise impacts from construction activities was performed using previous results from noise propagation computer programs to estimate noise source levels (CADNA A). Noise source levels are entered as octave band sound power levels. The user can specify coordinates, either rectangular or polar. All noise sources are assumed to be point sources; line sources can be simulated by several point sources. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the ANSI Method for the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1999). Path-specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Direction source characteristics and reflection can be simulated using path-specific attenuation. Attenuation due to barriers can be calculated using the coordinates and height of the barrier. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs (filtered to approximate human hearing) are calculated. Background noise levels can be incorporated into the program and are used to calculate overall SPLs.

The model was performed to predict the maximum noise levels produced by a combination of likely noise sources with and without background noise levels. A conservative estimate of the number and types of construction equipment was assumed to calculate construction noise levels.

Table 4.6.5-1 lists the major categories of equipment that will be used during the construction of WCEC Unit 3 and their associated noise characteristics. For the purpose of the construction noise impact analyses, all of the equipment was conservatively assumed to be operating simultaneously at peak power. These heavy construction activities are expected to occur during the daytime hours. Most of the heavy construction activities will occur during the first 6 to 8 months of construction.

The noise levels resulting from these combinations of equipment were input as multiple sources to the model. Octave bands were estimated from *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (EPA, 1971). It is unlikely that all the equipment would be operating simultaneously and continuously; therefore, this impact assessment is conservative. Background SPL values were incorporated into the model to calculate impacts at the residential location identified in Subsection 2.3.8. Only the atmospheric attenuation option was enabled during the noise modeling runs.

The maximum noise level resulting from construction of the Project is estimated to be 31.6 dBA at the nearest residence, not including contributions from background noise. As presented in Subsection 2.3.8, the background SPLs used in the impact analyses were 42.7 and 40.0 dBA for the daytime and nighttime, respectively. The background values were used to calculate the total noise levels. The total noise levels during the construction of the Project are estimated to be 43.0 dBA at the nearest residence during the daytime and 40.6 dBA during the nighttime (Table 4.6.5-2).

The construction activities associated with the Project are predicted to meet the requirements under the Palm Beach County Unified Land Development Code, Article 5, Chapter E, Section 3.B. For construction, the Unified Land Development Code prohibits excessive noise from 10 p.m. to 7 a.m. Excessive noise is defined “as noise that disturbs a reasonable person of normal sensitivity”. Heavy construction activities associated with the Project, as represented by the predicted noise concentrations, are expected to occur during the daytime hours. Mechanical and electrical installation activities may occur at night; however, these activities have minimum noise levels much lower than those predicted in Table 4.6.5-2. It should be noted that the predicted noise levels would be less than 55 dBA during the daytime (7 a.m. to 8 p.m.) and 50 dBA during the nighttime (8 p.m. to 7 a.m.), applicable to residential land use for operational noise. Taking together the predicted noise levels and the construction periods, construction noise levels are not expected to adversely impact the nearest residential receptor identified in the vicinity of the Site. The noise estimates are conservative and include only atmospheric attenuation. The actual or measured noise levels due to construction are expected to be lower than predicted.

During the initial startup of the Project, steam blows will be conducted to clean piping. Steam blows result in elevated noise levels for short durations. Notification will be made to those locations that may be able to notice elevated noise levels.

4.7 Impacts on Landmarks and Sensitive Areas

Construction-related impacts to landmarks and sensitive areas will be minor and will not result in any changes to accessibility or use, or adverse impacts to wildlife. The closest landmark or sensitive area within a 5-mile radius of the Project (refer to Subsection 2.2.5) is the Loxahatchee NWR. The closest point of public access of this wildlife refuge that is open for public use is located south of the

WCEC Unit 3 location and south of State Road 80. These areas will not experience any significant changes in air quality, noise level, water quality, or visual characteristics perceptible to their users.

No use-related impacts are anticipated at any other public recreational facilities since these areas are a considerable distance from the Site.

Occasional construction noise may be heard near the Site during the Project construction period. The noise is anticipated to be infrequent and of short duration and will primarily occur during the daytime. Visual impacts will be minor since the closest public viewpoint is either from State Road 80 or at about a 0.7-mile distance at the nearest residential area. There are also landscaped barriers between the Site and State Road 80 as well as along the eastern portion of the L8 Canal that will serve as visual obstructions to the areas used for construction. The majority of the construction activities will not be visible from any public recreational areas. Temporary cranes may be visible offsite from some vantage points.

4.8 Impact on Archaeological and Historic Sites

Results of a search of the Florida Master Site File conducted for the Site lists no previously recorded archeological sites or standing structures. The original grade was partially mined, excavated, and backfilled with sand and shell to bring the current grade up to a nominal elevation of 25 ft NGVD. A letter from the Florida Department of State, Division of Historical Resources in June 2004 indicated that there were no previously recorded cultural resources on the Site (see Appendix 10.5.3).

4.9 Special Features

There will be no unusual products, raw materials, solid waste disposal, incinerator effluents, or residues produced during construction of the Project that will have influence on the environment or ecological systems of the Site or adjacent areas.

4.10 Benefits of Construction

The construction phase of the Project will contribute both short- and long-term economic benefits to the surrounding region. Construction benefits will include construction employment that will average several hundred over the 2-year construction period. Construction wages will increase the



demand for goods and services in the region. Direct purchases of construction materials will have both direct and indirect economic benefits. This includes construction materials (e.g., concrete and steel for foundations), rental equipment (e.g., construction cranes, pumps), food services, and transportation services.

4.11 Variances

No variances from applicable standards of any State, regional, or local government agencies due to the construction of the Project are required or requested as part of this SCA.

TABLE 4.5.1-1
MAXIMUM ESTIMATED AIR EMISSIONS DURING CONSTRUCTION OF FPL WCEC UNIT 3

Construction Activity	Type Operation	Amount	Units	Pollutant	Emissions	Units	Controls
Open Areas	Wind Erosion	10 acres		PM ₁₀	1.2 tons		Watering
Vehicle Traffic	Paved Roads	16,295 VMT		PM ₁₀	0.2 tons		Watering as necessary
	Unpaved Roads	16,295 VMT		PM ₁₀	0.5 tons		Watering
Concrete Batch Plant	Concrete Batching	100,600 tons		PM ₁₀	2.8 tons		Fabric Filter, watering
Installation	IC Engines	55,210 gallons/yr		PM ₁₀	0.17 tons/yr		EPA Non-Road Tier 3
				NO _x	3.10 tons/yr		EPA Non-Road Tier 3
				SO ₂	0.19 tons/yr		EPA Non-Road Tier 3
				CO	2.99 tons/yr		EPA Non-Road Tier 3
				VOC	0.34 tons/yr		EPA Non-Road Tier 3

Note: VMT = vehicle miles traveled; acres based on open areas at any one time.

Sources: USEPA, 1992 Fugitive Dust Background and Technical Information Document for Best Available Control Measures;

Section 2.3.1.3.3, Wind Emissions from Continuously Active Piles.

USEPA, 2001; AP-42, Section 11.12 Concrete Batching.

USEPA, 2004; Exhaust and Crankcase Emissions Factors for Nonroad Engine Modeling-Compression Ignition.

TABLE 4.6.2-1
LEVEL OF SERVICE (LOS) FOR ROADWAY LINKS DURING PEAK CONSTRUCTION TRAFFIC
FPL WEST COUNTY ENERGY CENTER UNIT 3 (2010)

Location	Peak Hour	WCEC 3 Empl Split	Direction	Backgrd ¹	PBA	WCEC 3		Total ²	LOS ^{3,4}
						Empl	Truck		
S.R. 80 west of PBA Road	AM	15/85	EB	468	18	125	1	612	B
			WB	640	17		1	658	B
	AM	35/65	EB	468	18	292	1	779	B
			WB	640	17		1	658	B
	PM	15/85	EB	713	30		1	744	B
			WB	477	39	125	1	642	B
	PM	35/65	EB	713	30		1	744	B
			WB	477	39	292	1	809	B
S.R. 80 east of PBA Road	AM	15/85	EB	468	149		7	624	B
			WB	640	166	708	7	1521	C
	AM	35/65	EB	468	149		7	624	B
			WB	640	166	542	7	1355	B
	PM	15/85	EB	713	349	708	7	1777	D
			WB	477	266		7	750	B
	PM	35/65	EB	713	349	542	7	1611	C
			WB	477	266		7	750	B

¹ Background traffic based on 2005 FDOT Traffic Forecasts.

² Background traffic, PBA and peak construction traffic.

³ LOS using FDOT Quality/Level of Service Handbook Table 4-8 for Transitioning Areas

⁴ Level of Service:

LOS A	Completely free-flow conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles and operations are constrained only by the geometric feature of the highway and by driver preferences.
LOS B	Free flow, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as LOS A, but drivers have slightly less freedom to maneuver. Minor disruptions are easily absorbed, although local deterioration will be more obvious.
LOS C	Influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles. Minor disruptions can cause serious local deterioration on service.
LOS D	Ability to maneuver is severely restricted due to traffic congestion. Travel speed is reduced by the increasing volume. Only minor disruptions can be absorbed.
LOS E	Operations at or near capacity, an unstable level. Disruptions cannot be dissipated readily.
LOS F	Forced or breakdown flow. Vehicles arrive at a rate greater than the rate at which they are discharged. The demand exceeds the computed capacity of the planned facility.

Sources: Florida Design Consultants, Golder; 2007.

TABLE 4.6.5-1
SUMMARY OF CONSTRUCTION NOISE SOURCES ASSOCIATED WITH HEAVY CONSTRUCTION ACTIVITIES

Source	Modeled Source Height ^a (m)	Sound Power Level (dB) for Octave Band Center Frequency (Hz)									Overall Sound Power Level	
		31.5	63	125	250	500	1K	2K	4K	8K	(dB)	(dBA)
Front End Loader 1	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Truck 1	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3
Truck 2	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3
Front end Loader 2	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Bulldozer 1	1.8	0.0	106.6	103.6	101.6	102.6	99.6	96.6	94.6	96.6	105.3	110.9
Bulldozer 2	1.8	0.0	106.6	103.6	101.6	102.6	99.6	96.6	94.6	96.6	105.3	110.9
Crane 1	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Crane 2	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Welder 1	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Welder 2	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Welder 3	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Welder 4	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7

^a Source height used for modeling analysis only and does not necessarily represent the physical height of the source.
Source: Golder, 2007.

TABLE 4.6.5-2
BASELINE SOUND LEVELS AND SOUND LEVEL IMPACTS (dBA) OF CONSTRUCTION
OF THE FPL WCEC UNIT 3

Baseline Site	Location	Time	Baseline Sound Levels^a (dBA)	Total Sound Level Construction Impacts (dBA)
5	Nearest Residence	Day	42.7	43.0
		Night	40.0	40.6

^aBased on L₉₀. Nighttime observations for background were adjusted for transient sounds (see discussion in Subsection 2.3.9 and Appendix 10.5.2 for octave band charts).

Source: Golder, 2007.

5.0 EFFECTS OF PLANT OPERATION

As discussed in this chapter, operation of WCEC Unit 3 will comply with all applicable regulatory standards, and impacts will be minimized through available and reasonable methods.

5.1 Effects of the Operation of the Heat Dissipation System

Heat is a necessary byproduct of the generation of electricity. While a significant portion of the thermal energy produced from the fuel is converted to electrical energy by the turbine generators, a portion is absorbed by cooling water flowing through the condenser tubes. WCEC Unit 3 will have a closed-cycle recirculating heat dissipation system, utilizing a rectangular wet mechanical draft cooling tower. Reclaimed water will be used for Unit 3 cooling system makeup. Reclaimed water used by WCEC Unit 3 will meet all of the relevant requirements of Chapter 62-610, F.A.C., including but not limited to the requirements for cooling water applications found in Rule 62-610.668, F.A.C. Stormwater runoff that collects in onsite retention ponds may be recycled by pumping the water to the cooling towers, thus eliminating runoff to surface waters and minimizing water demands on other sources. When the SFWMD determines that excess surface water is available from the L10/L12 Canal beyond the allocation for Units 1 and 2, WCEC Unit 3 may also use water from this canal as a secondary source for cooling, process, and service water.

Blowdown from the cooling towers will be discharged to the Boulder Zone of the Lower Floridan Aquifer (LFA) through the UIC well system. Stormwater will be retained onsite and may be reused in the cooling tower. Since there will be no surface water discharge of industrial wastewater or stormwater, the facility will not require a National Pollutant Discharge Elimination System (NPDES) permit. Therefore, Section 316 of the Clean Water Act (CWA) is not applicable. Notwithstanding, as discussed in greater detail below, there will be no significant impacts to surface water resources from operation of the L10/L12 inlet structure and the heat dissipation system.

5.1.1 Temperature Effect on Receiving Body of Water

There will be no temperature effect on any surface water body from operation of the heat dissipation system.

5.1.2 Effects on Aquatic Life

Since reclaimed water will be the primary water source used for cooling, no significant adverse effects upon aquatic life are anticipated during operation of WCEC Unit 3. WCEC's inlet structure at the L10/L12 Canal, currently under construction for WCEC Units 1 and 2, will use screening and diversion technologies to minimize impacts to aquatic organisms that may be in the canal when water is withdrawn. Furthermore, the inlet structure has been designed to ensure that maximum velocities are less than 0.5 feet per second (fps). Therefore, no significant impact to aquatic life is expected when the secondary water source on the L10/L12 canal is used. Impingement and entrainment are discussed further below.

5.1.2.1 *Impingement and Entrainment*

The L10/L12 Canal is not considered valuable habitat for spawning; therefore, entrainment of eggs and larvae is not anticipated to be significant. In addition, the eggs of warm freshwater species that inhabit the Canal system are demersal, or attached to bottom substrate rather than floating within the water column, and some species also guard their nests, eggs, and fry, which further reduce the probability of entrainment. The average flow in the L10/L12 Canal is approximately 12 times the average WCEC withdrawal rate (all 3 Units), and peak flows in the Canal are approximately 87 times the average withdrawal rate for WCEC (all 3 Units). In addition, water from the L10/L12 Canal will only be withdrawn when approved by SFWMD, which will likely be during high flow periods. Consequently, entrainment impacts will be limited. Furthermore, the inlet structure will utilize a low-intake velocity (maximum through-screen velocity of 0.5 fps at the minimum ambient source water surface elevation), which will reduce the probability of impingement, and further reduce impacts to aquatic biota. For the above reasons, impingement and entrainment impacts from the intake should be minimal and should not impact the aquatic biological community.

5.1.2.2 *Thermal Effects*

Cooling tower blowdown will be routed to the Boulder Zone through the UIC well system; therefore, no thermal effects upon the aquatic life within the L10/L12 Canal, or any other surface water body, will occur.

5.1.3 Biological Effects of Modified Circulation

The primary water source for WCEC Unit 3 will be reclaimed water. Water from the L10/L12 Canal will only be withdrawn when approved by SFWMD, which will likely be during high flow periods.

Therefore, no significant biological effects of modified circulation are anticipated. No thermal impacts will occur to the L10/L12 Canal, and the adherence to the low-inlet velocity and screening systems will minimize impingement and/or entrainment of aquatic organisms.

5.1.4 Effects of Offstream Cooling

Reclaimed water used by the plant will meet all of the relevant requirements of Chapter 62-610, F.A.C., including but not limited to the requirements for cooling water applications found in Rule 62-610.668, F.A.C. The potential impacts of the mechanical draft cooling towers were addressed by performing plume dispersion analyses that predicted impacts with respect to:

- Plume length;
- Plume height;
- Plume fogging;
- Plume icing; and
- Salt [from total dissolved solids (TDS)] deposition.

Two air quality dispersion models were used in these analyses to address air quality impacts for the WCEC Unit 3 Project. These models are:

- The California Puff (CALPUFF) model; and
- The American Meteorological Society and EPA Regulatory Model (AERMOD) dispersion model.

The CALPUFF model (version 5.8) was used to determine the fogging and icing potential due to the cooling towers. The CALPUFF model can be configured to analyze the fogging and icing impacts due to emissions from sources, such as the cooling towers, with the use of a pre-processor program called the Cooling Tower Emissions Processor (CTEMISS) and post-processor programs.

The AERMOD dispersion model (version 07026) was used to determine potential salt deposition due to the cooling towers.

Both air dispersion models were also used to predict ambient pollutant concentrations for the Project and are described in more detail in Section 5.6 and Appendix 10.1.5, PSD Permit Application.

The following sections present the methods and assumptions used in these models to address the effects of off-stream cooling due to the cooling towers.

5.1.4.1 *Cooling Tower Visibility*

The visible plume from a cooling tower is a result of the mixing of the saturated exhausts from the cooling tower with the ambient air, and the resultant mixture is beyond its ability to accommodate the entrained moisture as a gas. At this point, the moisture in the mixture condenses and forms a visible water vapor plume. The ability for air to accommodate water as a gas depends on the temperature. For example, at an ambient temperature of 90°F, the air is capable of accommodating almost 6 times more water vapor (as mass) than at 40°F. With a wet mechanical draft cooling tower proposed for WCEC Unit 3, plumes are typically more visible and at greater plume lengths during the winter months than during the summer.

The CTEMISS program was used to create a variable emission rate file for CALPUFF for water vapor within the plume from the cooling towers. The CTEMISS program reads fixed inputs, such as emissions characteristics (exit velocity, exit temperature, and water emission rate) and building data. Meteorological data in the format accepted by the Industrial Source Complex Short-term (ISCST) model are used. CALPUFF models the dispersion of the water contained in the plume and provides cloud information in a specialized format for further analysis. CALPUFF output is provided to the FOG.DAT file and can be run in either 'plume mode' or 'receptor mode.'

Five years of surface meteorological data from the Palm Beach International Airport for 2001 through 2005 were used in the CTEMISS pre-processor. The surface and mixing height data were first processed using EPA's PCRAMMET processor to create ISCST model-compatible meteorological data, which are read by the CTEMISS model.

The stack data and meteorological data used to determine potential fogging and icing impacts are identical to those used in the air dispersion modeling and presented in Section 5.6.

The emission rate file created by the CTEMISS program was used and the CALPUFF model was run in both plume and receptor modes. The CALPUFF model created a FOG.DAT file, which was then processed using the post-processor programs, POSTPM2 and SUMPOST, which operate on the fog plume-mode output to characterize visible plume height and length statistics. POSTRM2 operates on

the fog receptor-mode output to characterize the frequency of possible fogging and icing events at specific locations.

In the plume mode, information on the plume heights and plume lengths are generated for each hour. The program provides output that excludes hours when fog, clouds, and/or precipitation are occurring. In the receptor mode, discrete receptors were placed around the Site.

The results from running CALPUFF in the plume mode are presented in Table 5.1.4-1 for all hours and daylight hours, except those when fog, clouds and/or precipitation are occurring. This table presents the information for each season (winter, spring, summer, and fall) and annually. The primary factors in the visible appearance of the plume are the height and length of the plume.

Visible vapor plumes from the WCEC Unit 3 cooling tower will remain close to each of the towers, i.e., within 200 m. The results for all hours (including night time hours) indicate that, for the majority of the time, plume heights and lengths will be less than 200 m and 100 m, respectively. Plumes of greater height and length are predicted to occur primarily during the winter season, while during the summer, plumes are predicted to be lower in height and shorter in length. For example, plume lengths greater than 1,000 m are predicted to occur for about 71 hours during the winter, while during the summer no plumes greater than 1,000 m are predicted to occur.

For the daytime hours, the frequency of a visible plume is even less. As shown in Table 5.1.4-1, plume lengths greater than 1,000 m during the winter are predicted to occur about 17 hours; while during the summer, plume lengths in excess of 1,000 m are not predicted to occur.

The analyses indicate that visible plumes will occur infrequently. The visible plumes from the cooling will primarily remain on the Site.

The model predicts that no surface fogging or icing events will occur. As a result, ground-level fogging or any other plume effect is not predicted to occur on nearby roadways.

5.1.4.2 Cooling Tower Deposition

The estimated drift emission spectrum for the WCEC Unit 3 cooling tower is presented in Table 5.1.4-2. The maximum impacts are based on the TDS in the circulating water of 35,000 parts per million (ppm) based on using water from the UFA. This represents a worst case using the water

supply from the UFA as cooling tower makeup and envelopes the potential cooling tower deposition impacts. Other alternative water sources have lower TDS concentrations, which would result in lower quantities of cooling tower drift. For example, using reclaimed water or water from the L10/L12 Canal with 6 cycles of concentration, the TDS concentration would be about 7 times lower. Since cooling tower deposition is directly proportional to the TDS concentration, the impacts using surface water would be many times lower than the maximum predicted deposition.

The maximum monthly salt deposition predicted from the cooling towers to locations offsite is presented in Table 5.1.4-3. The table shows the monthly salt deposition over the 5-year period for which the analysis was performed. The average deposition of an area with a radius of 10 km and the maximum salt deposition over several distances are presented in Table 5.1.4-3. In addition, the maximum deposition in the extreme northern portion of the Loxahatchee National Wildlife Refuge (NWR), was determined and is presented in this table. The monthly annual deposition from the cooling towers averaged over an area within 10 km of the cooling towers is predicted to range from 36 to 40 kilograms per square kilometer per month ($\text{kg}/\text{km}^2\text{-month}$). The maximum monthly deposition of $299 \text{ kg}/\text{km}^2\text{-month}$ is predicted along the property boundary of the Site, at a distance of about 409 m to the west-northwest from the cooling towers. At a distance of 2,000 m, the maximum monthly deposition decreases to $47 \text{ kg}/\text{km}^2\text{-month}$; at a distance of 3,000 m, the maximum monthly deposition decreases to $27 \text{ kg}/\text{km}^2\text{-month}$. The maximum predicted deposition rates are close to the cooling tower with about a 10-fold decrease at a distance of 2,000 m. The majority of deposition will occur over previously impacted areas. The maximum salt deposition in the extreme northern portion of the Loxahatchee NWR was predicted to range from 9 to $12 \text{ kg}/\text{km}^2\text{-month}$.

Southern Florida is a peninsula, which has a subtropical climate influenced by the trade winds coming from the Atlantic Ocean. As a result there is a natural background of salt deposition. Several studies have been conducted to determine deposition, including the Florida Acid Deposition Study (FADS) that conducted studies in the mid-1980s and the Florida Atmospheric Mercury Study (FAMS) that conducted studies in the mid-1990s. FADS measured major anions and cations in dry and wet deposition, while FAMS measured the major anions and cations in wet deposition. According to data collected as part of FADS (1986), which measured deposition over many locations in Florida, background mineral deposition in south Florida ranges from approximately 400 to $600 \text{ kg}/\text{km}^2\text{-month}$. The component of salt deposition (i.e., NaCl) is about 1/4 of the background mineral deposition. The average predicted deposition impacts within 10 km are about 10 times lower than

background deposition, as shown in Table 5.1.3-3. At distances of 2 to 3 kilometers the maximum predicted impacts are also more than 10 times lower than background deposition. At the extreme northern portion of the Loxahatchee NWR, the predicted deposition is more than 40 times lower than background deposition. At locations in Loxahatchee NWR farther from WCEC Unit 3 the deposition impacts would be even lower. The maximum impacts that occur near WCEC Unit 3 are about two-thirds to one-half of the background deposition and would be localized. The nearby deposition is also diluted by rainfall, which averages 61.39 inches per year. Thus, the maximum predicted deposition of 299 kg/km²-month, when diluted by rainfall, would result in an increase in average TDS concentration of 2.3 mg/L, well under the TDS in rainfall.

Potential impacts to vegetation and soil may result from deposition of cooling tower drift. A majority of available research on the impacts of deposition from cooling towers is from the use of makeup water that contains appreciable quantities of salt [i.e., sodium (Na⁺) and chloride (Cl⁻)]. Several plant species are considered to have very low resistance to salt. These species are flowering dogwood (*Cornus florida*), American sycamore (*Platanus occidentalis*), sassafras (*Sassafras albidum*), and arrowwood (*Viburnum dentatum*). Several studies have been conducted with dogwood because it is a reliable bioindicator of salt damage. The leaf injury threshold of dogwood has been calculated to be 750 kg/km²-mo (Curtis *et al.*, 1976), 517 kg/km²-mo (Davis, 1979), and 375 kg/km²-mo (Freudenthal and Beals, 1978). In addition to flowering dogwood, Townsend (1980) found that American sycamore was equally sensitive to sodium chloride. McCune *et al.* (1977) found that white ash was more susceptible than dogwood to saline cooling tower drift.

Environmental factors, other than salt drift concentration, can affect species response to cooling tower drift. Grattan *et al.* (1981) reported that a low relative humidity increased the tolerance of pepper, soybean, and tomato plants to Na⁺ and Cl⁻ uptake. No injury symptoms were apparent on any species at any salt deposition level when relative humidity was maintained at approximately 70 percent; however, in the presence of dew or 100-percent relative humidity, plant injury was linearly related to the amount of salt deposition on leaves.

Temperature influences ion absorption rates, with absorption rates decreasing as temperature decreases (Smith and Robinson, 1971). Rainfall amounts also influence symptomatic response of plants to salt drift. Mulchi and Armbruster (1981) observed that above-normal amounts of rainfall delayed the onset of foliar symptoms, whereas below normal amounts of rainfall tended to promote

the onset of symptoms and to enhance the magnitude of symptom expression for both corn and soybeans.

Susceptibility to foliar injury from saline aerosols also varies with the developmental stage of the leaf. McCune *et al.* (1977) found that younger leaves of deciduous woody species were more sensitive to saline aerosols than older leaves; whereas, year-old needles of conifers were more susceptible to saline aerosols. Grattan *et al.* (1981) reported that young tomato and pepper leaves (<3 cm in length) were more severely injured than older, fully developed leaves.

Taking together the low deposition rates, area of deposition impact, and quality of the drift particles, no effect to offsite vegetation from cooling tower drift is anticipated.

Vegetation can be affected by absorbing salts that accumulate in the soil. Accumulation will occur if the annual deposition rate of salt exceeds the rate at which salt is leached from the soil by rainfall. Cooling tower drift deposition from WCEC Unit 3 would be greatly diluted by rainfall. As previously noted, the maximum predicted deposition of 299 kg/km²-month would result in an increase in the average TDS concentration of 2.3 mg/L when dilution from rainfall is taken into account. This concentration is less than the TDS in rainfall and much less than the TDS concentration in nearby surface waters. TDS concentration in the L10/L12 Canal is in excess of 100 mg/L. At locations farther from the cooling tower any soil accumulation would be even less since deposition rates drop significantly with distance. Species tolerance to salt spray does not necessarily parallel known plant tolerances to soil salinity, but is governed by the rate of foliar absorption (Grattan *et al.*, 1981). Given the low deposition rates, combined with rainfall and the type of compounds in the drift particles, impacts are not anticipated by accumulation in the soils.

5.1.5 Measurement Program

Since no significant impact to surface water quality is expected from WCEC Unit 3, no additional monitoring of surface water is proposed. Because there are no significant adverse ecological impacts due to the proposed WCEC Unit 3 heat dissipation system, no biological monitoring is proposed.

Surface water intake and Floridan aquifer back up supply well withdrawals will be measured and reported to the SFWMD as required by consumptive use permitting rules and regulations.

5.2 Effects of Chemical and Biocide Discharges

WCEC's wastewaters will be injected into the Boulder Zone of the LFA at a depth of about 2,800 feet below sea level.

5.2.1 Industrial Wastewater Discharges

Wastewaters associated with WCEC were identified in Section 3.6 and delineated in Table 3.6.0-1. Table 3.6.0-1 presents waste streams, their characterization, and disposal method. All non-hazardous industrial wastewater, including process wastewater and cooling tower blowdown, will be discharged through the UIC well system. Contact stormwater will be collected and treated in an oil/water separator and then routed to the onsite stormwater retention ponds. Therefore, there will be no industrial wastewater or stormwater discharge to surface waters and no impact to surface water quality from the WCEC.

5.2.2 Cooling Tower Blowdown

Cooling tower blowdown makes up the majority of wastewater and will be mixed with other non-hazardous industrial wastewater streams prior to injection in the WCEC UIC well system.

The WCEC UIC well system is being developed under permits issued by FDEP for this federally approved program. FPL constructed and tested an exploratory well to determine site-specific stratigraphy, water quality profiles, potentiometric pressures, and important aquifer parameters. FPL received a permit for a dual zone monitoring well. FPL has submitted applications to convert exploratory well EW-2 to an injection well (IW-1) and to construct a second injection well (IW-2). FDEP issued notices of intent to issue permits for these applications. Each injection well will have a design capacity of about 7 MGD. The UIC well system for the WCEC Site was part of the original SCA for WCEC and the impacts for all three units were addressed in the SCA. The UIC well system included in the original SCA had a combined injection design capacity for all three units. Therefore, Unit 3 will not require any additional UIC well system capacity beyond those considered in the original SCA. As demonstrated in the original WCEC SCA, the WCEC UIC well system will not impact underground sources of drinking water (USDW).

5.2.3 Measurement Programs

An aquifer monitoring program, including a dual-zone monitoring well, will be included as part of the WCEC UIC well system.



5.3 Impacts on Water Supplies

In general, the Project has three water demand requirements:

1. Makeup water to replace cooling tower evaporation and blowdown,
2. Process water, which is used primarily to make demineralized water for steam system makeup and for air emissions control, and
3. Potable water for use by employees.

A water-use diagram for Unit 3 is presented in Section 3.5 of this SCA. The table below summarizes the water demand requirements for WCEC, after the addition of the Unit 3 Project.

WCEC (Based on three CC units)	Annual Average (MGD)	Monthly Maximum (MG)	Maximum Daily (MG)
Cooling Tower	7.045	298.78	9.638
Process Water	0.291	14.32	0.462
Potable Water ¹	0.011	0.36	0.012
Total Operational Water	7.348	313.46	10.112
Construction Phase Only	0.433	40.0	1.29

¹ Water source is WCEC potable water system. One-third of the existing allocation is shown; no new allocation is required.

The primary source for cooling tower makeup water and process water for WCEC Unit 3 will be reclaimed water. Reclaimed water used by WCEC Unit 3 will meet all of the relevant requirements of Chapter 62-610, F.A.C., including but not limited to the requirements for cooling water applications found in Rule 62-610.668, F.A.C. Stormwater runoff that collects in onsite retention ponds may be recycled by pumping the water to the cooling towers, thus eliminating runoff to surface waters and minimizing water demands on other sources. When the SFWMD determines that excess surface water is available from the L10/L12 Canal beyond the allocation for Units 1 and 2, WCEC Unit 3 may also use water from this canal as a secondary source for cooling, process, and service water. If reclaimed water cannot meet the quality or quantity requirements for operations, the UFA and potable water supplied by Palm Beach County will be backup water sources for Unit 3 cooling,

process, and service water. Potable water for WCEC employees will be supplied by the WCEC potable water system, which was authorized by the Site Certification for WCEC Units 1 and 2.

5.3.1 Surface Water

Surface water resources in the area of the Site are discussed in Section 2.3 and Appendix 10.7. Reclaimed water will be the primary water source for Unit 3 and will be used for cooling system makeup, and may be used for process and service water (including fire protection), and for landscape irrigation. The reclaimed water used by WCEC Unit 3 will meet all of the relevant requirements of Chapter 62-610, F.A.C., including but not limited to the requirements for cooling water applications found in Rule 62-610.668, F.A.C. Only when the SFWMD determines that excess surface water is available from the L10/L12 Canal beyond the allocation for Units 1 and 2, will WCEC Unit 3 use surface water from this canal as a secondary source for cooling, process, and service water. Palm Beach County is providing 3.2 MGD of potable water to WCEC. This water source may be used as an alternative water source for the potable water system. It also will be used, along with water from the UFA, as a backup source for cooling, process, and service water, if the reclaimed water system can not meet the quantity and quality requirements of the Project. There will be no industrial wastewater or stormwater discharge to surface waters. Therefore, no impacts to surface water supplies from the operation of Unit 3 are expected.

5.3.2 Groundwater

Groundwater resources in the vicinity of the Site are described in Section 2.3 of the SCA and in Appendix 10.7. The UFA and potable water supplied by Palm Beach County will be backup water sources for Unit 3 cooling, process, and service water, only if reclaimed water cannot meet the quality or quantity requirements for operations. Therefore, an additional allocation of groundwater from the UFA is not required. Notwithstanding, hydrologic simulation modeling of the UFA originally conducted for the WCEC Unit 1 and 2 SCA (using the MODFLOW model) suggest that an additional temporary withdrawal for WCEC Unit 3 from the UFA will not likely cause harm to existing legal users, the environment, or the resource. Use of the surficial aquifer for potable water supply was authorized by the Site Certification for WCEC Units 1 and 2. Therefore, no additional groundwater allocation is required for WCEC Unit 3, and no impacts to groundwater supplies are expected.

5.3.3 Drinking Water

There will be no discharges to drinking water sources from WCEC Unit 3. Process wastewater and stormwater will be recycled and reused to the maximum degree practicable. All industrial wastewater will be discharged to the UIC well system located below the lowermost aquifer containing a USDW. No impacts to drinking water are expected. No impacts to drinking water sources are expected from the WCEC.

5.3.4 Runoff and Leachate

Operation of WCEC Unit 3 will not generate leachate. WCEC Unit 3 has been designed to eliminate direct discharge to surface waters. All contact stormwater will be routed through an oil/water separator and then routed to the stormwater retention ponds. Non-contact stormwater runoff will be collected and routed to stormwater retention ponds. The stormwater retention system will be designed to meet applicable standards. Therefore, no impacts to water supplies are expected due to runoff or leachate.

5.3.5 Measurement Programs

Withdrawals from surface water intake, surficial aquifer supply wells, and Floridan aquifer supply wells will be measured and reported to the SFWMD as required by consumptive use permitting rules and regulations. An aquifer monitoring program, as required by the rules and regulations of the UIC program, will be conducted.

5.4 Impacts from Disposal of Byproducts and Solid and Hazardous Wastes

As discussed in Section 3.7, the potential solid and hazardous waste associated with the operation of WCEC Unit 3 will be handled according to the waste handling guidelines presented in Table 3.7.0-1.

5.4.1 Solid Waste

As explained in Section 3.7, all solid wastes generated during plant operations will be disposed of in offsite licensed landfills or by other approved methods. The operation of WCEC Unit 3 will generate minor amounts of solid wastes (e.g., used turbine inlet filters, municipal solid waste, and water pretreatment solids). There will be no adverse impacts resulting from solid waste generated by WCEC Unit 3.

5.4.2 Hazardous Waste

The handling of hazardous wastes for WCEC Unit 3 is described in detail in Section 3.7. FPL will contract with an approved disposal company to transport and dispose of small quantities hazardous waste at licensed facilities in a manner that complies with environmental regulations. Therefore, no impacts are anticipated from hazardous wastes generated from the operation of WCEC Unit 3.

5.5 Sanitary and Other Waste Discharges

Sanitary wastes will be routed to a package treatment unit and the effluent routed to the UIC well system. Waste streams, their characterization, and disposal method are presented in Table 3.6.0-1.

5.6 Air Quality Impacts

This section presents a summary of the air quality requirements, air modeling methodology, and results of air quality impact analyses for the Project. Detailed information is contained in Appendix 10.1.5, Air Construction and PSD Application.

5.6.1 Impact Assessment

5.6.1.1 *Regulatory Applicability*

Under federal and State of Florida Prevention of Significant Deterioration (PSD) review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and a pre-construction permit issued. The EPA has promulgated PSD regulations under 40 CFR Part 51.166. Florida's PSD rules are codified in Rule 62-212.400, F.A.C.

A “major facility” is defined as any one of 28 named source categories that have the potential to emit 100 TPY or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under the CAA. “Potential to emit” means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. Once a new emission unit is determined to be a “major facility” for any regulated pollutant, all pollutants emitted in amounts greater than the PSD significant emission rates are subject to PSD review.

The WCEC is classified as a major facility because it is one of the named source categories and has the potential to emit more than 100 TPY of at least one regulated pollutant. WCEC Unit 3 Project is classified as a modification under FDEP’s PSD rules and PSD review is required for several

pollutants since the emissions from the Project are greater than the PSD significant emission rate for several regulated pollutants.

Annual emissions for WCEC Unit 3 are presented in Table 3.4.1-4 and are compared to the PSD significant net emission increase thresholds. Based on the proposed emissions for WCEC Unit 3, PSD review is required for each of the following regulated pollutants:

- Particulate matter (PM) as total suspended particulates (TSP),
- Particulate matter with aerodynamic diameter of 10 microns or less (PM₁₀),
- Sulfur dioxide (SO₂),
- Nitrogen dioxide (NO₂),
- Carbon monoxide (CO),
- Volatile organic compounds (VOCs), and
- Sulfuric acid mist.

The use of natural gas and ultra low-sulfur light oil results in extremely low quantities of mercury and lead. For example, the emissions of mercury are 50 times lower than review thresholds in FDEP's PSD regulations. This level of emission is considered negligible.

Palm Beach County has been designated as an attainment area for all criteria pollutants [i.e., ozone (O₃), PM₁₀, SO₂, CO, and NO₂]. Thus, the air quality in Palm Beach County meets all standards established by the federal and State governments to protect public health (with an adequate margin of safety) and welfare. Projections made by FDEP for the new O₃ and PM_{2.5} standards indicate that Palm Beach County would be in compliance when these standards are adopted. All of Palm Beach County is classified as a PSD Class II area for PM₁₀, SO₂, and NO₂.

PSD review is used to determine whether significant air quality deterioration will result from new or modified facilities. The following analyses related to PSD are required for each pollutant emitted in significant amounts:

- Control technology review,
- Source impact analysis,
- Air quality analysis (monitoring),

- Source information, and
- Additional impact analyses.

The control technology review requirements of the federal and State PSD regulations require that all applicable federal and State emission-limiting standards be met, and that Best Available Control Technology (BACT) be applied to control emissions from the sources. The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the proposed facility. BACT must, as a minimum, demonstrate compliance with NSPS for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on balancing environmental benefits with energy, economic, and other impacts.

The FDEP performs BACT reviews based on EPA's regulations and guidance in which the most stringent control alternatives are evaluated to identify the "best available control technology" and a related appropriate emissions limitation for each pollutant requiring a BACT determination. This procedure is referred to as the "top down" approach. EPA's BACT guidelines establish a specific five-step analytical process for conducting a BACT determination. The five steps consist of: 1) identifying the potentially applicable control technologies for the proposed process or source, 2) evaluating the technical options for feasibility taking into consideration source specific factors, 3) comparing the remaining control technologies based on effectiveness, 4) evaluating the remaining options taking into consideration energy, environmental and economic impacts, and 5) selecting BACT based on the above analyses.

A source impact analysis must be performed for criteria pollutants to address compliance with Ambient Air Quality Standards (AAQS) and PSD Class II and I increments. These analyses may be limited to the new source if the net increases in impacts as a result of the new source are below significant impact levels. The significant impact levels are threshold levels that are used to determine the level of air impact analyses required for a project. If the new source's impacts are

predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance.

An air quality monitoring analysis must be performed that contains an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. The regulations also include an exemption that excludes or limits the pollutants for which an air quality analysis must be conducted if the air quality impacts for the proposed source are predicted to be less than the *de minimis* levels.

Source information must be provided to adequately describe the Project. The general type of information required for WCEC Unit 3 is presented in Section 3.4.

Additional analyses of the proposed sources' impacts on soils, vegetation, and visibility, especially as they affect air quality related values (AQRVs) in PSD Class I areas, must be performed. Air quality impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed.

The following sections describe the methods and assumptions used to determine the air quality impacts of the WCEC Unit 3 Project.

5.6.1.2 *Analysis Approach and Assumptions*

General Modeling Approach

The general modeling approach for the WCEC Unit 3 Project followed the EPA and FDEP modeling guidelines for determining compliance with AAQS and PSD increments. For all criteria pollutants that will be emitted in excess of the PSD significant emission rate due to a proposed project, a significant impact analysis is performed to determine whether the emission and/or stack configuration changes due to the Project alone will result in predicted impacts that are in excess of the EPA significant impact levels.

If Project-only impacts are above the significant impact levels in the vicinity of the facility, then two additional and more detailed air modeling analyses are required. The first analysis demonstrates

compliance with federal and Florida AAQS, and the second analysis demonstrates compliance with allowable PSD Class II and I increments.

In general, when model predictions are used to determine compliance with AAQS and PSD increments, current policies stipulate that the highest annual average and highest, second-highest (HSH) short-term (i.e., 24 hours or less) concentrations are to be compared to the applicable standard when a 5-year period of meteorological data is used. The HSH concentration is calculated for a receptor field by:

1. Eliminating the highest concentration predicted at each receptor,
2. Identifying the second-highest concentration at each receptor, and
3. Selecting the highest concentration among these second-highest concentrations.

This approach is consistent with the air quality standards, which generally allow a short-term average concentration to be exceeded once per year at each receptor. Determining compliance with the 24-hour AAQS for PM₁₀, the highest of the sixth-highest concentration predicted in 5 years (i.e., H6H), instead of the HSH concentration predicted for each year, is used to compare to the applicable 24-hour AAQS.

The AAQS analysis is a cumulative source analysis that evaluates whether the concentrations from all sources will comply with the AAQS. These concentrations include the modeled impacts from sources at the Site and from other nearby facility sources added to a background concentration. The background concentration accounts for sources not included in the modeling analysis.

The PSD increment analysis is a cumulative source analysis that evaluates whether the concentrations for increment-affecting sources will comply with the allowable PSD increments. These concentrations include the modeled impacts from PSD increment-affecting sources at WCEC, plus PSD increment-affecting sources at other facilities.

Air Quality Models

The selection of air quality models to calculate air quality impacts for WCEC Unit 3 must be based on the models' ability to simulate impacts in areas surrounding the Site as well as at the PSD Class I area of the Everglades National Park (NP), located about 102 km from the Site. Two air quality

dispersion models have been used in these analyses to address air quality impacts for the WCEC. These models are:

- The American Meteorological Society and EPA Regulatory Model (AERMOD) dispersion model, and
- California Puff model (CALPUFF).

The AERMOD dispersion model (Version 07026) is available on the EPA's Internet web site, Support Center for Regulatory Air Models (SCRAM), within the Technology Transfer Network (TTN). The EPA and FDEP recommend that the AERMOD model be used to predict pollutant concentrations at receptors located within 50 km from a source. The AERMOD model calculates hourly concentrations based on hourly meteorological data. The AERMOD model is applicable for most applications since it is recognized as containing the latest scientific algorithms for simulating plume behaviour in all types of terrain.

The AERMOD model was used to predict the maximum pollutant concentrations due to WCEC Unit 3 in nearby areas surrounding the Site. The AERMOD model was also used to predict the maximum pollutant concentrations due to the emissions from WCEC Unit 3 together with appropriate background sources. The predicted concentrations were then compared to the applicable AAQS and PSD Class II increments.

At distances beyond 50 km from a source, the CALPUFF model is recommended for use by the EPA and the Federal Land Manager (FLM). The CALPUFF model [Version 5.8 (i.e., latest EPA-approved version)] is a long-range transport model applicable for estimating the air quality impacts in areas that are more than 50 km from a source. The CALPUFF model is maintained by the EPA on the SCRAM internet website. The methods and assumptions used in the CALPUFF model are based on the latest recommendations for modeling analysis as presented in the following reports:

- The Interagency Workgroup on Air Quality Models (IWAQM), *Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998); and
- The *Federal Land Manager's Air Quality Relative Values Workgroup (FLAG) Phase I Report* (December 2000).

The CALPUFF model was used to perform a significant impact analysis and potentials impact on regional haze, total nitrogen deposition, and sulfur deposition levels for the Project at the PSD Class I area of Everglades NP. In addition, CALPUFF was used to determine nitrogen and sulfur deposition levels in the Loxahatchee NWR.

For modeling analyses that will undergo regulatory review, such as PSD permit applications, the following model features are recommended by EPA for rural mode and are referred to as the regulatory default options in the AERMOD model and, where applicable, the CALPUFF model:

1. Final plume rise at all receptor locations,
2. Stack-tip downwash,
3. Buoyancy-induced dispersion,
4. Default wind speed profile coefficients for rural mode,
5. Default vertical potential temperature gradients, and
6. Calm wind processing.

The EPA regulatory default options are used to address maximum impacts.

Meteorological Data

Meteorological data used in the AERMOD model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the NWS office located at the Palm Beach International (PBI) Airport. The 5-year period of meteorological data from 2001 through 2005 was used in the analysis. The NWS office at PBI is located approximately 30 km (18 miles) east of the Site and is the closest primary weather station to the study area considered to have meteorological data representative of the project site.

Based on modeling guidance by EPA, a comparison of the average land use parameters at PBI and the WCEC Site was performed. The land use parameters include albedo, Bowen Ratio, and surface roughness. Although the average albedo and Bowen ratio for the two sites are considered similar, the surface roughness values are somewhat different. Therefore, while the wind direction and wind speed frequencies are considered quite representative of the WCEC Site, the average surface roughness value at PBI is considered to be less representative of that at the WCEC Site. It should be

noted that in spite of the very flat terrain that is characteristic of south Florida, such differences in land use within even 30 km are not uncommon or unexpected in this area. Since all of south Florida's major airports are located within the fringe of the large urbanized coastal area, the average surface roughness at these areas is generally much greater than those found in the more remote, rural areas such as the WCEC Site.

Consequently, unless a project site is very close to where surface observations are measured, the two sites are not necessarily going to share all of the same meteorological and land use characteristics. As such, the PBI meteorological data were selected for the proposed WCEC Project, and, in spite of some data differences noted previously, the PBI data are considered the most representative and are readily available for modeling of the WCEC Site. It should be noted that the PBI meteorological data have been approved by the FDEP and used for numerous air modeling studies submitted as part of air construction permits approved for sources located in Palm Beach County.

To assess the potential effect that the differences in land use values between the PBI and WCEC Site may have on the maximum predicted concentrations in the vicinity of the WCEC Site, the PBI meteorological data were processed with the land use values developed for the WCEC Site. An air modeling analysis was then performed using these data and the results compared with those predicted using the PBI land use values. These results indicate that, for the WCEC Site, incorporation of the Project Site's land use parameters in the air modeling analysis result in predicted air quality impacts that are lower than those predicted with the PBI land use parameters. While such results are project specific, the difference in average surface roughness between the WCEC Site and PBI appears to result in conservatively higher air quality impacts using the PBI values.

For CALPUFF, the air modeling analysis was conducted using the latest meteorological and geophysical databases which have been developed for use by the National Park Service (NPS). The NPS developed these datasets using CALMET Version 5.8 and were provided by the FDEP on a portable hard drive. The Florida domain has 4-km spacing and covers the period from 2001 to 2003. The FDEP and FLM have recommended their use for PSD projects.

Emission Inventory

WCEC Unit 3 Sources – Emission rates for regulated pollutants and stack and operating parameters used in the air modeling analysis for the WCEC Unit 3 covered the operating range that includes the



operating loads and turbine inlet temperatures for the CTs. The stack, operating, and emission data for firing natural gas and ultra low-sulfur “light” oil used in the air dispersion modeling are those presented in SCA Appendix 10.1.5.

In an effort to obtain the maximum air quality impacts for a range of possible operating conditions, the air modeling used a range of emission rates and stack parameter data to predict air quality impacts.

The emission and stack operating parameters are presented for 2 operating loads and 35°F, 59°F, and 95°F ambient temperatures for the CTs firing natural gas and oil. A total of 12 modeling scenarios were considered for combined cycle configuration with the CTs operating for the following conditions:

- CTs firing natural gas for ambient temperatures of 35, 59, and 95°F at:
 - 100 percent operating load, including duct-firing
 - 75 percent operating load
- CTs firing light oil for ambient temperatures of 35, 59, and 95°F at:
 - 100 percent operating load
 - 75 percent operating load

The stack height for WCEC Unit 3 stacks will be 149 ft. Because the proposed stack heights are less than Good Engineering Practice (GEP), building downwash effects were included in the modeling analysis.

Additional analyses were performed for SO₂, NO_x, and PM₁₀ emissions to address the combined impact of the CTs and other Project sources. For SO₂ and NO_x impacts, modeling was performed that included the CTs and gas heater with the operating load that produced the maximum CT impact from the generic impact analysis. For PM₁₀ impacts, modeling was performed that included the CTs, gas heater, and cooling tower.

Background Sources – The maximum pollutant impacts for WCEC Unit 3 are predicted to be less than the significant impact levels for all pollutants and averaging periods except for SO₂ and PM₁₀ for the 24-hour averaging period (see Subsection 5.6.1.3). As a result, cumulative source impact

analyses are required to demonstrate compliance with the 24-hour average SO_2 and PM_{10} AAQS and PSD Class II Increments. For these analyses, the SO_2 and PM_{10} emissions from the project and background sources are required to be modeled.

Data for background sources of SO_2 and PM_{10} were obtained from FDEP and were supplemented with current and available historical information. Facilities located within WCEC Unit 3's significant impact areas including WCEC Units 1 and 2 were modeled explicitly (considered the modeling area).

Facilities within the significant impact areas plus 50 km were considered to be in the screening area. All facilities and groups of facilities in the screening area were evaluated using the North Carolina screening technique. Based on this technique, facilities whose annual emissions (i.e., tons per year) are less than the threshold quantity, Q , are eliminated from the modeling analysis. Q is equal to $20 \times (D - \text{SIA})$, where D is the distance in kilometers from the facility to the Site and SIA is the significant impact area. Before elimination based on the 20D approach, facilities in the screening area were sorted by direction and distance to check the close proximity of the facilities to one another. Facilities that were found to be within approximately 3 degrees of one another direction-wise and within approximately 5 km of one another distance-wise were grouped, their potential emissions were summed and then compared to the threshold quantity Q . Facilities that already satisfied the 20D criteria for inclusion were excluded from the source groups.

In addition, the source inventories were evaluated to identify facilities beyond the screening area and up to 100 km of the Site. Facilities in this area that have the potential to emit more than 1,000 TPY were also modeled.

The maximum WCEC Unit 3 impacts at the PSD Class I area of the Everglades NP are predicted to be less than the proposed PSD Class I significant impact levels for all averaging periods for SO_2 , PM_{10} , and NO_2 . As a result, cumulative PSD Class I source impact analyses are not required.

Receptor Locations

To determine the maximum impact for all pollutants and averaging times in the vicinity of WCEC Unit 3, concentrations were predicted at receptors located in detailed receptor grids centered on the proposed unit, the modeling origin, and extended from the property boundary out to 10 km.

The Site is nominally 25 ft NGVD. Although the terrain around the immediate vicinity is flat, receptor elevations were included at each receptor in the analysis.

Along the property boundary, a Cartesian receptor grid was used to predict concentrations for the WCEC at 119 receptors spaced at 50-m intervals. In addition, a general Cartesian grid was used to predict concentrations beyond the property boundary out to 10 km. More than 3,500 receptors were used in the analysis to determine the maximum impacts for WCEC Unit 3.

For addressing compliance with the SO₂ and PM₁₀ AAQS and PSD Class II Increments, the 24-hour average SO₂ and PM₁₀ concentrations were predicted out to 1.0 and 1.5 km, respectively, from WCEC Unit 3, based on the Project's significant impact distance. Concentrations were predicted at ambient air locations.

Modeling refinements were performed, as needed, by employing a Cartesian receptor grid with a maximum spacing of 100 m centered on the receptor and for the year during which the maximum impact was predicted.

The Project's impacts at the PSD Class I area of the Everglades NP were predicted in an array of 901 discrete receptors. These receptors were obtained from the NPS.

Background Concentrations

For these analyses, total air quality impacts are predicted for the modeled sources that are added to a non-modeled background concentration. The non-modeled background concentrations are estimated from representative ambient air quality monitoring data obtained from air monitoring stations.

The background SO₂ concentrations developed for the Project were based on monitoring data collected at the SO₂ monitoring station located in Riviera Beach in Palm Beach County (AIRS number 12-099-3004), approximately 47 km (29 miles) to the northeast of the Site. This is nearest SO₂ monitor located to the project site. The nearest PM₁₀ monitoring station to the Site is located in Belle Glade (AIRS number 12-099-0008), approximately 28 km (17 miles) to the west of the project site. Both stations are operated by the Palm Beach County Health Department and measure concentrations according to EPA procedures. The monitors are located in areas that have similar or more commercial and industrial activities than are present near the project site. As such, the monitoring data are considered to be representative of background air quality near the Site.

Based on data collected from 2004 to 2006, the 24-hour average SO₂ and PM₁₀ concentrations of 8 and 42 µg/m³, respectively, were selected to represent background concentrations since they were the HSH 24-hour concentrations measured during that period.

5.6.1.3 Model Results

WCEC Unit 3 Impacts

The maximum SO₂, NO₂, CO, and PM₁₀ concentrations predicted for WCEC Unit 3 are presented in Table 5.6.1-1. The modeling results indicate that the maximum concentrations due to the Project are predicted to be less than the significant impact levels for all pollutants, except SO₂ and PM₁₀ for the 24-hour averaging period.

As a result, additional modeling analyses were conducted for SO₂ and PM₁₀ to demonstrate compliance with 24-hour average SO₂ and PM₁₀ AAQS and PSD Class II increments. Since the 24-hour average SO₂ impacts are predicted to be higher for natural gas firing with duct firing than that for light oil firing, these modeling analyses were performed only for firing natural gas. Since the 24-hour average PM₁₀ impacts are predicted to be higher for light oil firing than that for natural gas firing, these modeling analyses were performed only for CTs firing light oil.

The maximum SO₂, NO_x, and PM₁₀ concentrations predicted for WCEC Unit 3 at the PSD Class I area of the Everglades NP are given in Table 5.6.1-2. The maximum impacts at the PSD Class I area of the Everglades NP are predicted to be less than the proposed PSD Class I significant impact levels for all averaging times for SO₂, PM₁₀, and NO₂.

As a result, cumulative source impact analyses are not required to demonstrate compliance with the PSD Class I increments for these pollutants.

Cumulative Impacts for AAQS and PSD Increment Analyses

A summary of the results of the cumulative SO₂ and PM₁₀ AAQS analysis for the 24-hour average PM₁₀ concentrations is presented in Table 5.6.1-3. The cumulative impacts are the total air quality impacts due to the WCEC and other modeled sources added to a non-modeled background concentration. For SO₂, the highest, second-highest total 24-hour average SO₂ concentration is predicted to be 44 µg/m³, which is below the 24-hour average AAQS of 260 µg/m³. The highest, sixth-highest total 24-hour average PM₁₀ concentration is predicted to be 79 µg/m³, which is below the 24-hour average AAQS of 150 µg/m³.

A summary of the results of the cumulative PSD Class II increment analyses for the 24-hour average SO₂ and PM₁₀ concentrations is presented in Table 5.6.1-4. The highest, second highest 24-hour average SO₂ concentration of PSD increment consuming sources is predicted to be 29 µg/m³, which is well below the allowable 24-hour PSD Class II increment of 91 µg/m³.

The HSH 24-hour average PM₁₀ concentration of PSD increment consuming sources is predicted to be 25 µg/m³, which is below the allowable 24-hour PSD Class II increment of 30 µg/m³.

5.6.1.4 Additional Impact Analysis

Impacts Due To Direct Growth

WCEC Unit 3 is needed to meet the growth in load demand expected from FPL customers in 2011 and beyond. FPL is obligated to provide reliable and adequate electric service to meet its customers' demand. Additional growth as a direct result of the additional electric power provided by WCEC Unit 3 is not expected.

Construction of the Project will occur over a 24-month period requiring an average of approximately 350 workers during that time. It is anticipated that many of these construction personnel will be drawn from surrounding metropolitan areas and will commute to the job site.

The Project will employ a total of 10 to 15 operational workers. The operational workforce will also include annual contracted maintenance workers to be hired for periodic routine services. It is expected that most of these workers will be contracted from outside the region. The workforce needed to operate WCEC Unit 3 represents a small fraction of the population already present in the immediate area. Therefore, while there would be a very slight increase in vehicular traffic in the area, the effect on air quality levels would be minimal.

There are also expected to be no air quality impacts due to associated industrial/commercial growth given the location of the Project. The existing infrastructure should be more than adequate to provide any support services that the additional requirements from WCEC Unit 3 might require.

Impacts on Soils, Vegetation, Wildlife, and Visibility

The potential effects of WCEC Unit 3 on soils, vegetation, wildlife, and visibility in the local vicinity of the Site and in the PSD Class I area of the Everglades NP were analyzed. Certain air pollutants in acute concentrations or chronic exposures can impact soils, vegetation, and wildlife. Based on

available literature, soils impacts can result from SO₂ and NO₂ deposition creating an acidic reaction or lowering of soil pH. Vegetation is sometimes affected by acute exposures to high concentrations of pollutants often resulting in foliar damage. Lower dose exposure over longer periods of time or chronic exposure can often affect physiological processes within plants causing internal and external damage.

Maximum predicted concentrations of SO₂, PM₁₀, NO₂, and CO from WCEC Unit 3 in the vicinity of the Site are lower than the EPA Class II Increments for all pollutants and the cumulative impacts for PM₁₀ and SO₂ were demonstrated to be less than the AAQS. No detrimental effects on soils or vegetation are expected to occur in the vicinity of the Site, since WCEC Unit 3's impacts are less than the Class II Increments, which are more stringent than the AAQS. In addition, based on an evaluation of the literature for effects from SO₂, acid rain (sulfuric acid mist), NO₂, CO, and combinations of these pollutants, the air quality impacts as a result of WCEC Unit 3 are not expected to result in impacts that cause harm to soils and vegetation.

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National AAQS. This occurs in non-attainment areas, of which there are none in Florida. Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning equipment, unique meteorological conditions, or startup operations. Under these conditions, chronic effects (e.g., particulate contamination) and acute effects (e.g., injury to health) have been observed. For impacts on wildlife, the lowest threshold values of SO₂, NO₂, and particulates that are reported to cause physiological changes are up to orders of magnitude higher in concentration, than maximum concentrations predicted from operation of WCEC Unit 3. Combined with the fact that impacts are below the secondary AAQS, no adverse effects on wildlife due to SO₂, NO₂, and particulate impacts from WCEC Unit 3 are expected.

Maximum concentrations of SO₂, PM₁₀, and NO₂ at the PSD Class I area of the Everglades NP are not expected to cause detrimental effects on vegetation and wildlife since the impacts are less than the significant impact levels.

No adverse visibility impairment is expected from WCEC Unit 3 in the immediate vicinity of the Site due to the type and quantities of emissions from the WCEC Unit 3 Project. Opacity levels from the

combustion exhausts will be low and are typically at or approaching zero. Emissions of PM_{10} and SO_2 will also be low due to the primary use of low-sulfur content natural gas, the cleanest fuel commercially available. As a result, the Project will not adversely affect visual qualities in the area.

WCEC Unit 3 will emit PM, NO_x , and SO_2 with potential impacts to regional haze in the Everglades NP PSD Class I area. For the Project, the maximum impact on visibility at the Everglades NP is predicted to be less than the FLM criteria. Therefore, the Project is not expected to have an adverse impact on regional haze in the Everglades NP.

Impacts Due to Deposition in the Loxahatchee NWR

The total sulfur and nitrogen deposition due to the operation of WCEC Unit 3 was determined using CALPUFF. The maximum deposition within the Loxahatchee NWR and the average over the entire area is presented in Table 5.6.1-5 for the 3 year period evaluated with CALPUFF.

The maximum total sulfur deposition in the Loxahatchee NWR was predicted to be 0.0825 kilograms per hectare per year (kg/ha/yr), while the average deposition over the entire Loxahatchee NWR was predicted to be 0.0103 kg/ha/yr, or 8 times lower than the predicted maximum. Sulfur deposition occurs due to sulfur in the atmosphere as a result of both man-made emissions and natural sources. The latter includes sulfur included as sulfate as a natural component of sea salt, which can be a considerable portion of deposition. As previously discussed, background deposition of various major anions and cations are available for south Florida from the FADS as wet and dry deposition and the FAMS as wet deposition. The total wet and dry sulfur deposition in south Florida for FADS ranges from 4.9 to 5.6 kg/ha/yr, over 60 times higher than the maximum predicted deposition due to WCEC Unit 3 and over 475 times higher than the average deposition due to WCEC Unit 3 across the Loxahatchee NWR. The contribution from sea salt to wet sulfur deposition is 0.7 kg/ha/yr, considerably higher than the maximum and average predicted sulfur deposition in the Loxahatchee NWR. The predicted total sulfur deposition due to WCEC Unit 3 in the Loxahatchee NWR, when rainfall is considered, would result in average concentrations of 2 parts per billion (as sulfate) which is 4 orders of magnitude lower than the concentrations of sulfate in surface waters in the vicinity of the Loxahatchee NWR. As a result, the impact from sulfur deposition due to WCEC Unit 3 to the Loxahatchee NWR is considered insignificant.

The maximum total nitrogen deposition in the Loxahatchee NWR was predicted to be 0.0252 kg/ha/yr for 2003, while the average deposition over the entire Loxahatchee NWR was predicted to be 0.0049 kg/ha/yr also for 2003 or 5 times lower than the predicted maximum. Nitrogen deposition occurs due to nitrogen compounds in the atmosphere as a result of both man-made emissions and natural sources. The total wet and dry nitrogen deposition in south Florida for FADS ranges from 3.4 to 3.8 kg/ha/yr, over 130 times higher than the maximum predicted deposition due to WCEC Unit 3 and about 700 times higher than the average deposition due to WCEC Unit 3 across the Loxahatchee NWR. The predicted total nitrogen deposition due to WCEC Unit 3 in the Loxahatchee NWR, when rainfall is considered, would result in average concentrations of about 1 part per billion (as nitrate), which is 500 times lower than the concentrations of nitrate in surface waters in the vicinity of the Loxahatchee NWR. As a result, the impact from nitrate deposition due to WCEC Unit 3 in the Loxahatchee NWR is considered insignificant.

The soils of the Loxahatchee NWR are generally classified as histosols. Histosols (peat soils) are organic and have extremely high buffering capacities based on their CEC, base saturation, and bulk density. Therefore, they would be relatively insensitive to atmospheric inputs. The soils in the Loxahatchee NWR overlay limestone. The direct connection of these soils with subsurface limestone tends to neutralize any acidic inputs. Moreover, the groundwater table is highly buffered due to the interaction with subsurface limestone formations, which results in high alkalinity (as CaCO_3). The relatively low sensitivity of the soils to acid inputs, coupled with the extremely low ground-level concentrations of air pollutants projected for the Loxahatchee NWR from the WCEC Unit 3 emissions, precludes any significant impact on soils.

Impacts Due to Deposition in the Everglades NP

The use of the cleanest fuels and latest pollution prevention and control technology for WCEC Unit 3 will result in low levels of air emissions. An evaluation of atmospheric deposition of these low air emissions levels has determined that potential impacts will be minimal in the Everglades NP as a result of the operation of WCEC Unit 3. The maximum nitrogen and sulfur depositions predicted for the Project in the PSD Class I area of the Everglades NP are predicted to be below the FLM deposition analysis threshold for nitrogen and sulfur. Additional deposition below the FLM threshold is considered to be insignificant.

The maximum predicted deposition, as acid inputs (e.g., HNO_3 and H_2SO_4), are extremely small compared to the buffering capacity of the soils in the Everglades NP. The dominant soils of the Everglades NP include organic histosols with extremely high buffering capacities and sandy entisols overlying limestone, which provide a buffer to acidic inputs. These soils are resistant to acidic atmospheric inputs. The averaging buffering capacity of histosols is 765,000 equivalents/hectare (eq/ha) (FADS, 1986). The groundwater table is highly buffered due to the interaction with subsurface limestone formations, which results in high alkalinity (as CaCO_3). The relatively low sensitivity of the soils to acid inputs coupled with the extremely low ground-level concentrations of contaminants projected for the Everglades NP from WCEC Unit 3 emissions precludes any impact on soils. Similarly, the total annual sulfur and nitrogen deposition rates at the Everglades NP as a result of WCEC Unit 3 are not expected to alter soil and/or groundwater pH that may result in adverse effects on vegetation. The phytotoxic effects on the Everglades NP from proposed WCEC Unit 3's emissions are predicted to be insignificant.

Greenhouse Gas Emissions (CO_2)

The use of natural gas combined with the most efficient combined cycle technology available through the MPS Frame G combustion turbines will result in one of the lowest greenhouse gas emissions (GHG) emitting fossil fuel-fired generating units in the United States. Indeed, the emissions on a pound per megawatt-hour (lb/MWhr) basis will be about 30 percent lower than the proposed California standard. WCEC Unit 3 will be part of FPL's overall generation fleet, which includes many other low GHG emitting fossil fuel-fired units and nuclear generating units. Nuclear additions (uprates for existing nuclear units and new nuclear units) are part of FPL's GHG emission strategy. A discussion of FPL Group's and FPL's commitment to lower GHG emissions and the strategy to meet Florida's goals are presented in Appendix 10.8.

5.6.2 Monitoring Programs

5.6.2.1 *Ambient Air Quality Monitoring*

Pre- and post-construction ambient air quality monitoring is not required for this WCEC Unit 3 since the air quality impacts are less than the *de minimis* monitoring thresholds. Air quality concentrations at and in the region of the Site comply and are anticipated to continue to comply with all applicable ambient standards.



5.6.2.2 Air Emissions Monitoring

WCEC Unit 3 will be subject to the applicable NSPS for the CTs and the duct burners (40 CFR Part 60, Subpart KKKK) and acid rain program (40 CFR 75). Continuous monitoring will be required pursuant to applicable NSPS. Monitoring of fuel sulfur content will also be performed pursuant to the NSPS. Initial performance testing of the CTs for SO₂ and NO_x emissions will be conducted as required by Subpart KKKK.

Continuous emission monitoring (CEM) for SO₂ and NO_x is required for gas- and oil-fired affected units in accordance with the provisions of 40 CFR 75. SO₂ emissions may be determined using procedures established in Appendix D, 40 CFR Part 75. CO₂ emissions must also be determined either through CEM (e.g., as a diluent for NO_x monitoring) or calculation. Alternate procedures, test methods, and quality assurance/quality control (QA/QC) procedures for CEM are specified (Part 75 Appendices A through I). The CEM requirements, including QA/QC procedures are, in general, more stringent than those specified in the NSPS for Subpart GG. New units are required to meet the requirements not later than 90 days after the unit commences commercial operation. WCEC Unit 3 will be required to either install CEMs for NO_x or to meet the Part 75 requirements.

Initial and periodic compliance testing of pollutants emitted by WCEC Unit 3 will be conducted pursuant to the FDEP requirements as specified in the FDEP Air Construction PSD Permit in accordance with Chapter 62-297.401, F.A.C.

5.7 Noise Impacts

Sound propagation involves three principal components: a noise source, a person or a group of people, and the transmission path. While two of these components, the noise source and the transmission path, are easily quantified (i.e., direct measurements or through predictive calculations), the effects of noise upon humans is the most difficult to determine due to the varying responses of humans to the same or similar noise patterns. The perception of sound (noise) by humans is very subjective, and just like odors and taste, is very difficult to predict a response from one individual to another.

The noise predictions for WCEC were developed using the CADNA A computer model. The noise impacts of the WCEC were evaluated using the sound power levels (L_w) (see Appendix 10.5.2) for the various equipment associated with the WCEC. The sound power levels also represent worst-case

far-field noise guarantees, which are typical of the equipment suppliers being considered for the WCEC. The location of each noise source was based on its location in the computerized plot plan (see Figure 3.2.0-1). The computerized drawing was imported into the CADNA A model for the noise analysis.

CADNA A is an environmental noise propagation computer program that was developed to assist with noise propagation calculations for major noise sources and projects. Noise sources are entered as octave band sound power levels, L_w . Locations of the noise sources, buildings, and receptors are input directly on the base map and can be edited throughout the modeling process. All noise sources are assumed to be a point, line, area or vertical area source, and can be specified by the user. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1999). Path-specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Directional source characteristics and reflection can be simulated using path-specific attenuation. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs are calculated.

Because noise from WCEC Unit 3 will be additive to the noise generated by WCEC Units 1 and 2, levels for all three WCEC units were predicted. Figure 5.7.0-1 presents the predicted noise levels for WCEC Units 1, 2, and 3. The closest current residential use to the Site is located about 1 mile northeast of the power block for WCEC Unit 3. The property east of the Site and the L8 Canal is currently not in residential use. The maximum sound levels applicable to residential use are 55 dBA during the daytime (7 a.m. to 8 p.m.) and 50 dBA during the nighttime (8 p.m. to 7 a.m.). The maximum predicted noise levels shown in Figure 5.7.0-1 do not include background, which can be variable depending upon the activities in the area. The background values used to calculate the total noise level were 42.7 and 40.0 dBA for daytime and nighttime, respectively (see Section 2.3.8). Table 5.7.0-1 presents the maximum predicted impacts combined with background noise levels for the nearest residential use and at a location directly east of the L8 Canal and WCEC Site. The background noise levels in Table 5.7.0-1 included both transient noise (i.e., L_{90}) and overall noise levels (i.e., L_{eq}). The maximum impacts at the nearest residential use with background are calculated to be 48 dBA during the daytime and 47 dBA during the nighttime. For the closest location east of

the L8 Canal and the WCEC Site, the maximum impacts with background are calculated to be 51 dBA during the daytime and 50 dBA during the nighttime (see Table 5.7.0-1). Noise levels of this magnitude comply with the quantitative noise standards established in the Palm Beach County Unified Land Development Code.

Intermittent noise sources during routine startup, testing and maintenance, and emergency conditions will include steam venting. Such activities would not normally occur simultaneously and would last for a short duration. The noise impacts of these conditions would not be expected to cause a nuisance.

5.8 Changes to Non-Aquatic Species Population

5.8.1 Impacts

The area for WCEC Unit 3 is void of vegetative communities, and does not provide habitat for wildlife. Due to the existing nature of the WCEC Site, construction and operation of WCEC Unit 3 will not result in the reduction of any populations of non-aquatic species.

5.8.1.1 Impacts

No adverse impacts to non-aquatic species are anticipated during operation of WCEC Unit 3 as the Site does not provide suitable habitat for wildlife. No adverse impacts to federal- or state-listed terrestrial plants or animals are expected, due to the existing developed nature of the habitat within the Site. The sand and shell-covered Site does not provide suitable habitat for listed plants or animals.

Noise from operation of WCEC will not affect wildlife in the vicinity of the Site or the Loxahatchee NWR. Presently, the area experiences noise associated with operation of the existing PBA activities and State Road 80, and wildlife that occurs in the vicinity of the Site, such as birds, is acclimated to such activities. No noise-sensitive wildlife is known to occur in the Site or its vicinity since wildlife in the area would have been acclimated to noise associated with the existing PBA activities and the noise generated by State Road 80. As evidenced by the baseline noise monitoring, the noise generated by State Road 80 dominates the noise south of the Site and the WCEC contribution is predicted to be small in that direction.

5.8.2 Monitoring

Because no significant impacts to non-aquatic species populations are anticipated, no monitoring program is proposed.

5.9 Other Plant Operation Effects

5.9.1 Operations Traffic

Impacts to area roadways resulting from operation of WCEC Unit 3 will be minimal since the employment increase is very small, with no more than about 5 employees working during any shift for WCEC Unit 3 compared to about 20 for WCEC Units 1 and 2. In addition to employee traffic, fuel oil and ammonia deliveries and maintenance activities will also generate additional trips.

Most of the fuel used to operate WCEC will be delivered by natural gas pipeline. When light oil is used the maximum amount to be delivered represents no more than about six deliveries per hour. Ammonia deliveries for WCEC are estimated to occur between 80 to 280 times per year or between 0.25 to 0.75 trips per day. Delivery of water treatment chemicals and transport of water treatment solids for WCEC will generate about 15 trips per day for all three units. Non-routine plant maintenance activities are infrequent and of short duration and were not included in the operation traffic impact assessment.

As a result of the estimates described above, a worst-case scenario of operational traffic for WCEC indicates that up to 40 trips per peak hour could be expected (25 operations employees, 12 fuel oil truck trip ends, 1 ammonia truck trip end, and 2 water treatment chemical delivery / solids disposal trips). These impacts were evaluated for a year 2011 buildout that represents the first year of commercial operation for Unit 3.

The roadway that will be impacted the most by Project operation traffic is State Road 80, which connects the Site with Palm Beach County and its municipalities. The year 2011 background traffic volumes were determined from FDOT Traffic Forecasts obtained from FDOT. Estimated traffic assignment from the Site to this roadway was based upon PBA and WCEC operational traffic. The direction of traffic, to and from PBA Road, on State Road 80 was the same as that used to analyze construction traffic. Traffic would continue to access local communities including many of the municipalities in Palm Beach County, including Belle Glade.

The year 2011 background peak hour two-way traffic volumes and operation traffic volumes were combined to provide a projection of year 2011 total traffic. The total traffic volume on State Road 80 was analyzed to determine the anticipated operating conditions for the two roadway segments and the intersection of State Road 80 and PBA Road. The results of the analysis determined that these roadway segments will continue to operate at or above FDOT's LOS standard. No improvements are required to accommodate the traffic impacts from traffic resulting from the operation of WCEC.

5.10 Archaeological Sites

No sites of historic or archaeological significance will be impacted due to operation of WCEC Unit 3. No sites listed, or eligible for listing, in the *National Register of Historic Places* are located in close proximity to the Site. No direct or indirect impacts are anticipated from any operation aspect of the WCEC. The Site has received clearance from the Florida Department of State, Division of Historical Resources (see Appendix 10.5.3).

5.11 Resources Committed

The major irreversible and irretrievable commitments of national, State, and local resources due to WCEC Unit 3 are the use of land, the consumptive use of water, natural gas, ultra low-sulfur light oil, ammonia, and PSD increment.

The WCEC Unit 3 Power Block will be located on about 30 acres of the existing WCEC 220-acre Site. The entire Site has already been significantly impacted by previous mining activities.

The consumption of water by the proposed WCEC Unit 3 will be for condenser cooling, pollution control equipment (NO_x control when firing ultra low-sulfur light oil), other process water requirements, and potable water.

WCEC Unit 3 will consume PSD increment for several pollutants (NO_x, PM₁₀, and SO₂). However, the magnitude of increment consumption is very low compared to the PSD Class I and Class II increments.



Natural gas and light oil will be consumed during the operation of WCEC Unit 3. The amounts are described in Section 3.3. This is an irreversible and irretrievable commitment of a national energy resource for the production of electricity for FPL customers.

Ammonia will be required for the operation of the WCEC Unit 3's SCR system. While ammonia will be consumed, emissions of NO_x will be substantially reduced (greater than 80 percent) as a result.

WCEC Unit 3 will effectively utilize national, State, and local resources, given the production of efficient electric power, low environmental impacts, and the use of an existing and previously impacted site.

5.12 Variances

No variances from any applicable standards of any State, regional, or local government agency are being requested as part of this application.

**TABLE 5.1.4-1
VISIBLE WATER VAPOR PLUME HEIGHT AND LENGTH FOR THE WCEC UNIT 3 COOLING TOWER**

Conditions	<u>Winter</u>		<u>Spring</u>		<u>Summer</u>		<u>Fall</u>		<u>Annual</u>	
	hours/year	%	hours/year	%	hours/year	%	hours/year	%	hours/year	%
ALL HOURS									8760	100.00%
ALL HOURS EXCEPT EXISTING FOG/CALM	2026	23.13%	2162	24.68%	2196	25.07%	2157	24.62%	8541	97.50%
Plume Height (m)										
>0 <200	2024	23.11%	2162	24.68%	2196	25.07%	2156	24.61%	8538	97.47%
>200 <400	2	0.03%	0	0.00%	0	0.00%	1	0.01%	3	0.04%
>400 <600	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
>600 <1000	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
>1000	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Plume Length (m)										
>0 <100	1047	11.95%	1524	17.40%	1600	18.26%	1439	16.43%	5611	64.05%
>100 <300	743	8.48%	540	6.16%	503	5.74%	604	6.89%	2389	27.27%
>300 <500	90	1.03%	52	0.60%	38	0.43%	56	0.64%	237	2.71%
>500 <1000	75	0.86%	39	0.44%	55	0.63%	51	0.58%	220	2.51%
>1000 <3000	43	0.49%	5	0.06%	0	0.00%	4	0.04%	52	0.60%
>3000 <5000	17	0.19%	1	0.02%	0	0.00%	3	0.03%	21	0.24%
>5000	11	0.12%	0	0.00%	0	0.00%	0	0.00%	11	0.13%
DAYLIGHT HOURS									5027	57.39%
Plume Height (m)										
0 <200	1108	12.64%	1324	15.11%	1376	15.71%	1216	13.89%	5024	57.35%
>200 <400	2	0.03%	0	0.00%	0	0.00%	1	0.01%	3	0.04%
>400 <600	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
>600 <1000	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
>1000 <3000	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Plume Length (m)										
0 <100	605	6.91%	971	11.08%	1038	11.84%	844	9.64%	3458	39.47%
>100 <300	431	4.92%	325	3.71%	315	3.59%	339	3.87%	1410	16.10%
>300 <500	39	0.44%	20	0.23%	13	0.15%	23	0.26%	95	1.09%
>500 <1000	19	0.22%	6	0.06%	11	0.12%	9	0.11%	45	0.51%
>1000 <3000	12	0.13%	2	0.03%	0	0.00%	0	0.00%	14	0.16%
>3000 <5000	3	0.03%	0	0.00%	0	0.00%	1	0.01%	4	0.04%
>5000	2	0.02%	0	0.00%	0	0.00%	0	0.00%	2	0.02%

Source: ??????

TABLE 5.1.4-2
ESTIMATED DRIFT EMISSION SPECTRUM FOR
WCEC UNIT 3 COOLING TOWER

Particle Size Range (micrometers)	Total in Size Range (percent)
0 - 10	0.5
10 - 15	5.1
15 - 20	29.3
20 - 25	24.6
25 - 35	25.2
35 - 65	9.7
65 - 150	5.5

Source: "Calculating Realistic PM Emissions from Cooling Towers",
Frisbie and Gordon, 2001.

TABLE 5.1.4-3
MONTHLY MINERAL DEPOSITION PREDICTED FOR WCEC UNIT 3
COOLING TOWER

Period		Deposition		Location	
		g/m ² /month	kg/km ² /month	Distance (m)	Direction (degree)
2001	Average	0.039	39	Area within 10 km	
	Maximum	0.265	265	305	251
		0.046	46	2,001	267
		0.026	26	3,000	268
		0.009	9	Loxahatchee NWR	
2002	Average	0.037	37	Area within 10 km	
	Maximum	0.299	299	409	317
		0.036	36	2,000	323
		0.021	21	3,000	268
		0.010	10	Loxahatchee NWR	
2003	Average	0.036	36	Area within 10 km	
	Maximum	0.206	206	409	317
		0.037	37	1,999	307
		0.019	19	3,000	323
		0.010	10	Loxahatchee NWR	
2004	Average	0.040	40	Area within 10 km	
	Maximum	0.266	266	375	311
		0.047	47	2,001	267
		0.027	27	3,000	268
		0.009	9	Loxahatchee NWR	
2005	Average	0.038	38	Area within 10 km	
	Maximum	0.289	289	409	317
		0.038	38	2,001	267
		0.022	22	3,000	268
		0.012	12	Loxahatchee NWR	

Source: Golder, 2007.

TABLE 5.6.1-1
MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR WCEC UNIT 3 PROJECT
COMPARED TO EPA CLASS II SIGNIFICANT IMPACT LEVELS

Pollutant	Averaging Time	Concentration (ug/m ³)			EPA Class II Significant Impact Levels (ug/m ³)
		Natural Gas	Fuel Oil	Maximum	
<u>CTs Only</u> ^a					
SO ₂	Annual	0.58	0.05	0.58	1
	24-Hour	6.20	0.62	6.20	5
	3-Hour	9.98	1.65	9.98	25
PM ₁₀	Annual	0.38	0.58	0.39	1
	24-Hour	4.04	6.79	6.79	5
NO ₂	Annual	^c 0.62	0.89	0.64	1
CO	8-Hour	29.5	17.0	29.5	500
	1-Hour	39.1	24.2	39.1	2,000
<u>CTs and Fuel Heater</u> ^b					
SO ₂	Annual	0.58	NM	0.58	1
	24-Hour	6.20	NM	6.20	5
	3-Hour	9.96	NM	9.96	25
NO ₂	Annual	^c NM	NM	0.94	1
<u>CTs, Fuel Heater and Cooling Tower</u>					
PM ₁₀	Annual	NM	0.63	0.63	1
	24-Hour	NM	7.00	7.00	5

^a Maximum annual average concentrations are based on prorating the maximum impacts for each operation by the following maximum number of hours requested for that operation:

Pollutant	Hours for Each Operation		
	Combined Cycle Natural Gas	Combined Cycle Fuel Oil	Total
	with Duct-Firing		
SO ₂	8,760	0	8,760
PM ₁₀	8,260	500	8,760
NO ₂	8,260	500	8,760

^b Maximum annual average concentrations are based on same assumptions as footnote ^a except NO₂ impacts includes CTs firing natural gas for 8,260 hours/year, with 2,880 hours/year of duct-firing, and firing oil for 500 hours.

^c NO_x to NO₂ conversion factor based on EPA Modeling Guidelines: 75 %.

Note: NM = Not Modeled.

TABLE 5.6.1-2
SUMMARY OF MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR WCEC UNIT 3
COMPARED TO THE EPA CLASS I SIGNIFICANT IMPACT LEVELS AT THE PSD CLASS I AREA OF THE EVERGLADES NATIONAL PARK

Pollutant	Averaging Time	Maximum Predicted Concentration (µg/m³) ^a						EPA Class I Significant Impact Levels (µg/m³)	
		Natural Gas ^b			Fuel Oil ^c				Maximum ^d
		2001	2002	2003	2001	2002	2003		
SO ₂	Annual	0.0016	0.0019	0.0022	0.0003	0.0003	0.0003	0.0022	0.1
	24-Hour	0.042	0.041	0.043	0.007	0.007	0.008	0.04	0.2
	3-Hour	0.16	0.13	0.14	0.029	0.020	0.025	0.16	1.0
PM ₁₀	Annual	0.0008	0.0010	0.0012	0.0033	0.0037	0.0041	0.0012	0.2
	24-Hour	0.020	0.020	0.024	0.081	0.086	0.10	0.10	0.3
NO ₂	Annual	0.0014	0.0016	0.0018	0.0032	0.0032	0.0033	0.0018	0.1

^a Based on the CALPUFF model using 2001, 2002, and 2003 surface and upper air meteorological data.

^b Based on 100 % operating load with duct firing at 35 °F. Duct firing based on natural gas-fired duct burner with maximum heat input rate of 475 MMBtu/hr (HHV) for the CTs.

^c Based on 100 % operating load at 35 °F.

^d Maximum annual average concentration are based on prorating the maximum impacts for each operation by the following maximum number of hours requested for that operation:

Pollutant	Hours for Each Operation		
	Natural Gas	Fuel Oil	Total
SO ₂	8,760	0	8,760
PM ₁₀	8,260	500	8,760
NO ₂	8,260	500	8,760

TABLE 5.6.1-3
MAXIMUM PREDICTED 24-HOUR AVERAGE SO₂ AND PM₁₀ IMPACTS
COMPARED TO THE AAQS
SCREENING AND REFINED ANALYSES

Averaging Time and Rank	Analysis	Maximum Concentration (µg/m ³) ^a			Receptor Location		Time Period (YYMMDDHH)	AAQS (µg/m ³)
		Total	Modeled Sources	Background	UTM- East (m)	UTM- North (m)		
<u>SO₂</u> ^b								
24-Hour, HSH	Screening	43.2	35.2	8	562,276	2,951,842	01020824	260
		39.4	31.4	8	562,277	2,951,890	02120824	
		41.9	33.9	8	562,276	2,951,842	03041524	
		41.7	33.7	8	562,276	2,951,842	04010824	
		44.1	36.1	8	562,277	2,951,890	05010424	
	Refined	44.1	36.1	8	562,277	2,951,890	05010424	
<u>PM₁₀</u> ^c								
24-Hour, H6H	Screening	79.1	37.1	42	562,929	2,951,560	02112424	150
	Refined	79.1	37.1	42	562,929	2,951,560	02112424	

N YYMMDDHH = Year, Month, Day, Hour Ending

H6H = Highest, sixth-highest

HSH = Highest, second-highest

^a Concentrations are based on concentrations predicted using five years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Palm Beach International Airport and Miami, respectively.

^b Based on firing natural gas with duct firing.

^c Based on oil-firing.

TABLE 5.6.1-4
MAXIMUM PREDICTED 24-HOUR AVERAGE SO₂ AND PM₁₀ IMPACTS
COMPARED TO THE PSD CLASS II INCREMENT
SCREENING AND REFINED ANALYSES

Averaging Time and Rank	Analysis	Modeled Concentration ^a (µg/m ³)	Receptor Location		Time Period (YYMMDDHH)	PSD Class II Increment (µg/m ³)
			UTM- East (m)	UTM- North (m)		
<u>SO₂</u> ^b 24-Hour, HSH	Screening	28.6	562,278	2,951,987	01101224	91
		23.1	562,278	2,951,988	02051224	
		24.6	562,278	2,951,987	03102524	
		25.4	562,278	2,951,988	04051324	
		26.6	562,278	2,951,938	05010124	
	Refined	28.6	562,278	2,951,987	01101224	
	Screening	24.6	562,929	2,951,560	01120324	30
		22.6	562,881	2,951,562	02112424	
		21.0	563,025	2,951,557	03012624	
		21.1	562,929	2,951,560	04112124	
		21.5	562,278	2,951,938	05110124	
	Refined	24.6	562,929	2,951,560	01120324	

Note:

YYMMDDHH = Year, Month, Day, Hour Ending

H6H = Highest, sixth-highest

HSH = Highest, second-highest

^a Concentrations are based on concentrations predicted using five years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Palm Beach International Airport and Miami, respectively.

^b Based on firing natural gas with duct firing.

^c Based on oil-firing.

TABLE 5.6.1-5
MAXIMUM ANNUAL SULFUR AND NITROGEN DEPOSITION PREDICTED FOR WCEC UNIT 3
AT THE LOXAHATCHEE NATIONAL WILDLIFE REFUGE

Species		Total Deposition (Wet & Dry)					
		2001		2002		2003	
		(g/m ² /s)	(kg/ha/yr) ^a	(g/m ² /s)	(kg/ha/yr) ^a	(g/m ² /s)	(kg/ha/yr) ^a
Nitrogen (N) Deposition ^b	Average	1.23E-11	0.0039	1.20E-11	0.0038	1.56E-11	0.0049
	Maximum	7.78E-11	0.0245	6.29E-11	0.0198	8.00E-11	0.0252
Sulfur (S) Deposition ^b	Average	3.22E-11	0.0102	2.32E-11	0.0073	3.27E-11	0.0103
	Maximum	2.61E-10	0.0825	1.82E-10	0.0573	2.44E-10	0.0770

^a Conversion factor is used to convert g/m²/s to kg/hectare (ha)/yr with the following units:

$$\begin{aligned}
 & \text{g/m}^2/\text{s} \times 0.001 \text{ kg/g} \\
 & \times 10,000 \text{ m}^2/\text{hectare} \\
 & \times 3,600 \text{ sec/hr} \\
 & \times 8,760 \text{ hr/yr} = \text{kg/ha/yr} \\
 & \text{or} \\
 & \text{g/m}^2/\text{s} \times 3.154\text{E}+08 = \text{kg/ha/yr}
 \end{aligned}$$

^b For N deposition, based on each CT firing natural gas with duct firing for 8,260 hours and firing oil for 500 hours.
 For S deposition, based on each CT firing natural gas with duct firing for 8,760 hours.

Source: Golder, 2007.

TABLE 5.7.0-1**SOUND LEVEL IMPACTS (DBA) FOR THE OPERATION OF THE FPL WEST COUNTY ENERGY CENTER**

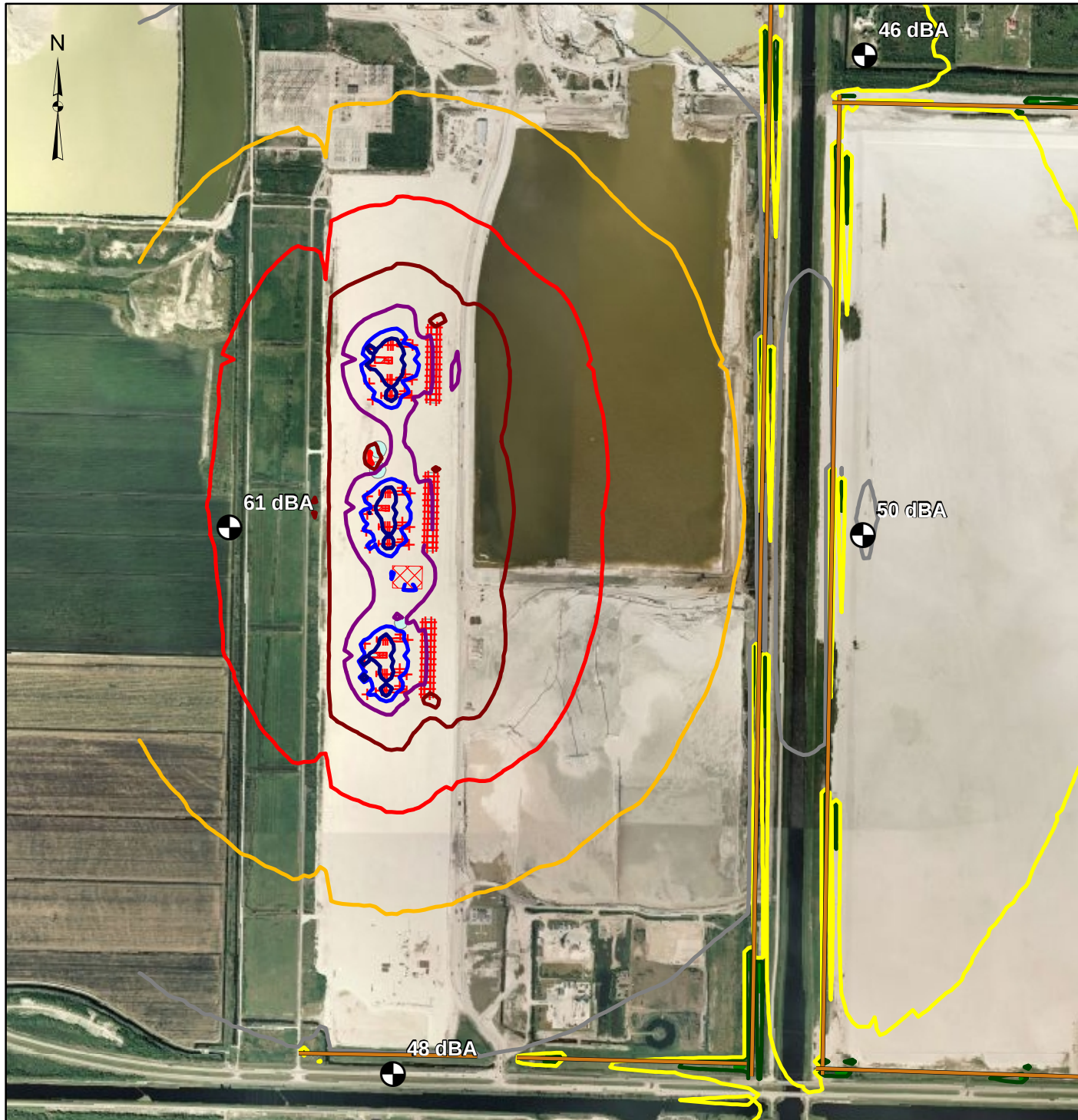
Site and Location	Time	Baseline Sound Levels (dBA)^a	Total Predicted Sound Levels (dBA)	Palm Beach County Noise Limit
Nearest residence-L8 Canal ^b	Day	42.7	48	55
	Night	40.0	47	50
East of L8 Canal ^c	Day	42.7	51	55
	Night	40.0	50	50

^aBased on L₉₀. Nighttime observations for background were adjusted for transient sounds (see discussion in Section 2.3.8).

^bLocated 5,200 ft northeast of the center of the power block for Unit 1.

^c Located about 4,400 ft east of the center of the power block for Unit 2. The land east of the L8 Canal and the WCEC Site is not currently used as residential.

Source: Golder, 2007.

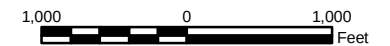


LEGEND

-  Receiver
-  Noise Sources
-  Embankment
-  Building
- Noise Impact Contours**
 -  > 30 dB
 -  > 35 dB
 -  > 40 dB
 -  > 45 dB
 -  > 50 dB
 -  > 55 dB
 -  > 60 dB
 -  > 65 dB
 -  > 70 dB
 -  > 75 dB
 -  > 80 dB
 -  > 85 dB

REFERENCE

Source: Cadna A
 Projection: Transverse Mercator Datum: NAD 27 Coordinate System: UTM Zone 17



PROJECT		FPL West County Energy Center	
TITLE		Units 1, 2 & 3 Noise Impact Contours	
	PROJECT No. 073-87852	SCALE AS SHOWN	REV. 0
	DESIGN AB 17 Oct. 2007	FIGURE 5.7.0-1	
	GIS AB 17 Oct. 2007		
	CHECK DB 17 Oct. 2007		
	REVIEW KK 17 Oct. 2007		

6.0 TRANSMISSION LINES

The Project will not require certification of any associated linear facilities, such as electrical transmission lines or rail lines. Therefore, Chapter 6 is not necessary for this application.

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

7.1 Socio-Economic Benefits

The purposes of this chapter are to:

- Identify the economic and social effects of construction and operation of the Project, and
- Quantify the Project benefits and costs to the groups affected in the area surrounding the site as well as other people and businesses in Palm Beach County and the State of Florida.

Socio-economic effects can be classified as either direct or indirect effects. Direct effects are those that are the direct result of the construction or operation of the Project. Indirect costs and benefits affect people and business interests in the vicinity of the Project who, because of their proximity to the site, may experience changes in their local environment, such as increased spending by the Project construction and operation personnel. Many of these effects are difficult to measure, and qualitative assumptions must be made to assess the relative values of expected costs and benefits.

This chapter is divided into two parts. Section 7.1 deals with socio-economic benefits and consists of an analysis of the Project construction and operational expenditures. Section 7.2 addresses temporary and long-term indirect costs involving the construction and operational personnel's use of private and public services in the vicinity of the site. All cost and benefit values are based on 2011 dollar values.

7.1.1 Direct Socio-Economic Benefits

The Project is expected to benefit the economies of Palm Beach County and surrounding areas. Direct benefits from the Project include employment opportunities created by the construction and operation of the Project. Construction of WCEC Unit 3 is anticipated to begin in 2009 and conclude in 2011. The peak construction workforce is estimated to be about 1,000 people with an average construction workforce estimated at 350 employees over a 2-year period. Construction employment during the period November 2009 through October 2010 will average about 475 workers and management staff. Employment opportunities will result from construction job opportunities as well



as jobs indirectly generated through the purchase of goods and services in the area. Additionally, with the addition of approximately 10 to 15 full-time equivalent jobs for the operation of WCEC Unit 3, the labor demands associated with the operation of the Project will not create labor shortages. Due to the proximity of the Site to large labor markets in the South Florida metropolitan areas, the labor demand for both construction and operation is expected to be met by workers in these areas. Population and housing impacts from construction and operation will be minimal because little migration into the area is anticipated.

The construction cost for the Project will be about \$800 million. The major cost associated with construction will be the major equipment (about \$300 million), labor (about \$100 million), and materials (about \$250 million). The remaining cost is associated with engineering, licensing, contingencies, and other miscellaneous costs.

Direct economic benefits of construction of the Project will also result from the purchase of materials and equipment. About \$20 to 30 million will be for materials and equipment purchased or leased within the State.

Among the primary direct benefits of the Project will be the increase in skilled job opportunities within the region associated with both plant construction and operation. Construction employment is expected to peak at approximately 1,000 workers. The total construction payroll for this facility is estimated at \$100 million, which will be paid over the 2-year construction period. The approximate type of workers over the 2-year construction period are presented in the following table.

Estimated Construction Workforce

Cost Component	Percent
Laborers	12
Carpenters	6
Operators	5
Ironworkers	4
Millwrights	10
Boilermakers	6
Pipefitters	19
Insulators	2
Electricians	22
Painters	1
Supervision	13
Total	100

Ongoing operation of the Project will employ approximately 10 to 15 people. Assuming average wages of \$65,000 annually per person, the additional annual operational payroll will be approximately \$650,000 to \$975,000. Other fixed operational costs, excluding fuel costs, would be about \$4,000,000 annually, which would generally be expended in the region.

Based on the first 5 years of operation, an estimated \$1,000,000 in sales taxes will be paid to the State of Florida. These taxes will be placed in the State's general fund and will be available for any use deemed appropriate by the State. These figures are based on current sales tax rates.

7.1.2 Indirect Economic Benefits

The purchase of goods and services to support the construction of the Project is anticipated to occur over a 2-year period beginning in 2009 and ending in 2011. It is expected that the majority of the \$100 million in construction wages paid by for the Project will be spent within Palm Beach County and the surrounding region. These wages will create additional demands for goods and services. As this money is spent, it will create a multiplier effect within the area, thereby generating additional jobs and earnings. These earnings are indirect or secondary benefits of the Project, which will be enjoyed by other companies whose payroll will increase from the construction of the Project. Materials such as concrete, stone, drainage piping, and other building materials are normally manufactured or produced in the region. Rental of construction equipment would also be obtained locally.



The direct wages from ongoing operations will also generate indirect economic benefits. The direct wages will be spent mostly within the region and will increase the demand for goods and services. Using a typical economic multiplier for this effect, wages paid direct to plant personnel will indirectly generate at least \$550,000 annually in additional earnings (wages and benefits) in the region.

7.1.3 Other Economic Benefits

The major operating costs for WCEC Unit 3 are associated with fuel, water treatment chemicals, and ammonia. These costs not only include the cost of the commodity but the cost of transportation to the Site. For example, natural gas will be transported to the Site by a regional pipeline. In addition, the alternate fuel, light oil, and ammonia will be transported by truck to the Site. Some of the payments for both the commodity and transportation will benefit the region through additional employment, taxes and materials.

7.1.4 Other Environmental Benefits

The Project maximizes beneficial use of the existing WCEC Site, thereby minimizing impact. This minimizes the potential environmental impacts associated with the generation of electrical power through the use of existing facilities [i.e., WCEC infrastructure (ultra low-sulfur light oil tanks, administrative, control, and warehouse building, etc.), water treatment area, developed site, stormwater ponds, access roads, and transmission lines]. This directly avoids impacts to wetlands and wildlife habitat. Reclaimed water will be used as the primary water source for the Project, thereby minimizing the environmental impacts to ground and surface waters in the area.

7.1.5 Summary of Benefits

Overall impacts to the economy associated with construction and operation of the Project are expected to be positive. Labor demands associated with the construction and operation of the Project are not expected to create any labor shortages. Expenditures for field materials and consumption by newly hired workers will boost incomes in Palm Beach and surrounding counties. Population and housing impacts associated with the Project will be slight due to minimal in-migration into the area.

Construction and operation of WCEC Unit 3 will have direct and indirect economic benefits to the local communities, the region and the state.



Although the local community may experience some temporary impacts during the peak construction periods, overall, socioeconomic impacts associated with the construction and operation of the Project will be favorable. Most importantly, WCEC Unit 3 will provide about 1,250 MW of needed generation capacity in southern Florida using highly efficient natural gas combined cycle technology from an existing site. The area designated for the Power Block for WCEC Unit 3 is relatively small (about 30 acres) compared to the amount of power generated. The use of reclaimed water as the primary water source reduces the potential environmental impacts to ground and surface water resources in the area.

7.2 Socio-Economic Costs

7.2.1 Temporary External Costs

Over 70,000 construction workers reside within the region, with the majority of these in Palm Beach, Broward, and Miami-Dade Counties. Ample labor supply exists within commuting distance and thus a labor surplus exists within the region. Consequently, construction should have no adverse effect on permanent housing.

As is typical with some construction projects, some workers commuting from longer distances may choose to live in transient accommodations (motels, hotels) on a weekly basis, returning to their permanent homes and families on weekends. Transient accommodations are plentiful in the area.

Since workers will mostly be commuting and not relocating permanently into the region, it is not anticipated that construction will create any new or unusual impacts or demands on public facilities or services.

Temporary external costs include the generation of construction traffic and noise from delivery trucks. Project construction will last approximately 2 years with a peak period of about 12 months from November 2009 through October 2010. The roadways utilized for the construction traffic associated with the Project will continue to operate at an acceptable level of service and impacts from construction traffic entering and leaving the Site on State Road 80 will be mitigated as necessary by using traffic management specialists (off-duty law enforcement officers) to maintain an adequate level of service.



Construction of the Project will not significantly impact the recreational values and visual qualities in the vicinity of the Site.

7.2.2 Long-Term External Costs

The Project's external cost impacts will be minimal and localized. The Site is located adjacent to the existing FPL transmission system, which will minimize the interconnection requirements to FPL's electric transmission and distribution system. There will be no adverse impacts to public or private facilities used for recreational purposes. The operation of WCEC Unit 3 will not cause any impairment to recreational values, result in any deterioration of aesthetic and scenic values, or restrict access to areas of scenic values. WCEC Unit 3 also will not displace persons from the land, cause loss of income, or result in any significant costs to local government.

The operational workforce is expected to be approximately 10 to 15 employees. As a result, the impacts of the operation of WCEC Unit 3 to local services (e.g., schools, police, transportation) are expected to be minimal.

FPL will minimize the Project's impacts on the environment and the community. Accordingly, the Project design incorporates features that reduce the visual and other impacts to the local community. These major features include the low profile, noise attenuation, and air pollution control equipment. There are minimal transportation impacts to the local roadways during operation.

The use of these features and methods, combined with the location for the Project, will ensure minimal impacts to the community. For example, the location of WCEC Unit 3 is well buffered from the borders of the Site by distance and raised berms. The Power Block area for WCEC Unit 3 is approximately 1 mile from the closest residence. Both the location of WCEC Unit 3 on the Site and the design features for the Project will minimize the impacts to aesthetics, ambient noise levels and transportation.

8.0 SITE AND DESIGN ALTERNATIVES

This optional Chapter of the SCA will not be submitted as part of this application because it is not anticipated that an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) would be required for the Project. Information on FPL's integrated resource planning process, projected resource additions, and a discussion of preferred and potential site locations can be found in FPL's Ten Year Power Plant Site Plan 2007-2016 (FPL, 2007).

9.0 COORDINATION

State, regional, and local governmental agencies were contacted by FPL representatives to inform these agencies about the West County Energy Center Unit 3 and to solicit input regarding the Project. The Agency staff contacted is listed below:

Florida Department of Environmental Protection, Siting Office (Tallahassee)

Michael Halpin
Cindy Mulkey
Toni Sturtevant

Florida Department of Environmental Protection, Bureau of Air Regulations (Tallahassee)

Trina Vielhauer
Deborah Nelson
Teresa Heron
Al Linero

Florida Department of Environmental Protection, Southeast District Office (West Palm Beach)

Timothy Gray

Florida Fish and Wildlife Conservation Commission (Tallahassee)

Mary Ann Poole

Florida Department of Community Affairs

Paul Darst

Florida Department of Transportation

Connie Mitchell
Leon Biegalski

South Florida Water Management District

Steve Bell
Steve Memberg
James Golden

U.S. Fish and Wildlife Service

John Wrublik

Palm Beach County

Barbara Alterman

Treasure Coast Regional Planning Counsel

Michael Busha



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