

Petition for Modification of the Florida Power & Light Company Lauderdale Plant Site Certification for the Lauderdale Combustion Turbine Peaker Project Broward County, Florida



March 2015



**PETITION FOR MODIFICATION
FOR THE
FLORIDA POWER & LIGHT COMPANY
LAUDERDALE COMBUSTION TURBINE PEAKER PROJECT

BROWARD COUNTY, FLORIDA**

Submitted by:

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

March 2015

15-20938



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*** Board of Professional Engineers
Certificate of Authorization No. 00001670**



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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees centigrade
°F	degrees Fahrenheit
µg/m ³	micrograms per cubic meter
µPa	micropascals
µS/cm	microsiemens per centimeter
AADT	Annual Average Daily Traffic
AERMOD	American Meteorological Society and EPA Regulation Model
ANSI	American National Standards Institute
AORs	annual operating reports
APPZ	Avon Park Permeable Zone
BACT	Best Available Control Technology
BMPs	Best Management Practices
Btu/kWh	British thermal unit per kilowatt hour
Btu/lb	British thermal unit per pound
C&D	construction and demolition
CAA	Clean Air Act
CadnaA	Computer Aided Noise Abatement
CEM	continuous emission monitoring
CESQG	Conditionally Exempt Small Quantity Generator
cf/yr	cubic foot per year
CFR	Code of Federal Regulations
CH ₄	methane
CMS	continuous monitoring system
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	CO ₂ equivalent emissions
CT	combustion turbine
dB	decibel
dBA	A-weighted decibel
DHR	Division of Historical Resources
DLN	dry low-NO _x
ENP	Everglades National Park
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
F.S.	Florida Statutes
FAS	Floridan Aquifer System
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historical Resources
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FIU	Florida International University

FLL	Fort Lauderdale-Hollywood International [Airport]
FLM	Federal Land Manager
FLUCFCS	Florida Land Use, Cover, and Forms Classification System
FMSF	Florida Master Site File
FNAI	Florida Natural Areas Inventory
FNAI	Florida Natural Area Inventory
FPL	Florida Power & Light Company
FWC	Florida Fish & Wildlife Conservation Commission
GHG	greenhouse gas
GIS	geographical information system
gpd	gallons per day
gr/100 scf	grains per 100 standard cubic feet
GT	gas turbine unit
HAP	hazardous air pollutant
HFC	hydrofluorocarbons
HHV	high heating value
hp	horsepower
hr/yr	hour per year
HSH	highest, second highest
Hz	hertz
ICU	Intermediate Confining Unit
in/mth	inches per month
in/yr	inches per year
IWW	Industrial Wastewater
kg	kilogram
km	kilometer
kV	kilovolt
kW	kilowatt
L ₅₀	the SPL exceeded 50 percent of the time, based on any measurement period of not less than ten (10) minutes
L ₉₀	the SPL exceeded 90 percent of the time during the monitoring period
lb/MMBtu	pound per million British thermal units
lb/MW-hr	pound per megawatt-hour
L _{eq}	equivalent continuous sound level; the SPL averaged over the measurement period
LFA	Lower Floridan Aquifer
LHV	low heating value
L _{max}	the maximum SPL for the sampling period
L _{min}	the minimum SPL for the sampling period
L _n	the SPLs which were exceeded n percent of the time during the sampling period
L _w	octave band sound power levels
m	meters
MACT	maximum achievable control technology
MCU	Middle Confining Unit

mg/L	milligrams per liter
MMBtu/hr	million British thermal units per hour
MMcf/hr	million cubic feet per hour
MSW	municipal solid waste
MW	megawatt
N ₂ O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAVD 88	North American Vertical Datum of 1988
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGVD 29	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NO	nitrogen oxide
NO ₂	nitrogen dioxide
NOI	Notice of Intent
NO _x	nitrogen oxides
NSPS	New Source Performance Standards
NTU	Nephelometric Turbidity Units
NWS	National Weather Service
O ₂	oxygen
O ₃	ozone
OSHA	Occupational Safety and Health Administration
PFC	perfluorocarbons
PM	particulate matter
PM ₁₀	particulate matter with an aerodynamic diameter of 10 micrometers or less
PM _{2.5}	particulate matter with an aerodynamic diameter of 2.5 micrometers or less
ppbvd	parts per billion by volume dry
ppmvd	parts per million by volume dry
PPSA	Power Plant Siting Act
PSD	prevention of significant deterioration
PV	photovoltaic
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RICE	reciprocating internal combustion engines
RO/MB	reverse osmosis/mixed bed
SAM	sulfuric acid mist
SAS	Surficial Aquifer System
SCA	Site Certification Application
SCRAM	Support Center for Regulatory Air Models
SERs	Significant Emission Rates
SF ₆	sulfur hexafluoride
SFRPC	South Florida Regional Planning Council
SFWMD	South Florida Water Management District
SHPO	State Historic Preservation Office

SILS	significant impact levels
SMC	significant monitoring concentrations
SO ₂	sulfur dioxide
SPL	sound pressure level
SPL _i	individual SPL in data set
SR	State Road
SRPP	Strategic Regional Policy Plan
SWPPP	Stormwater Pollution Prevention Plan
TDS	total dissolved solids
TPY	tons per year
TSP	total suspended particulates
TTN	Technology Transfer Network
UF/BEBR	University of Florida, Bureau of Economic and Business Research
UFA	Upper Floridan Aquifer
ULSD	ultra-low sulfur distillate
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
VOC	volatile organic compound

SITE CERTIFICATION APPLICATION DEFINITIONS

1. “Lauderdale Plant” or “existing Plant” – refers to the existing Florida Power & Light Company (FPL) power plant, including Units 4 and 5 and the Gas Turbine (GT) Units 1 through 24 and all other structures located on the Lauderdale Plant Property.
2. “Lauderdale Plant Property” – refers to the approximately 392 acres of FPL-owned property.
3. “GT Units 1 through 24” – refers to the existing 1960s vintage gas turbine units and related appurtenances including fuel oil storage tanks and support structures located on the Lauderdale Plant Property.
4. “Gas Turbine Power Park - Port Everglades” consists of the 12 simple-cycle GTs and related appurtenances including, for example fuel oil storage tanks and support structures located on the Port Everglades Plant Property, which is in close proximity to the Lauderdale Plant Property.
5. “FPL Lauderdale Plant Combustion Turbine Peaker Project”, “Project”, or “CT Project” – refers to the entire “Project” for which FPL seeks certification, including decommissioning of 22 of the existing GTs, construction of five combustion turbines (CTs), the construction parking and laydown areas, and related activities as described in the Site Certification Petition for Modification. Two of the 24 existing GTs will be kept to provide black start capability and generation. The Project will also include a fire pump engine, a fire water tank, two ULSD oil tanks, and a demineralized water tank for NO_x control when firing ULSD oil.
6. “Project site” or “Site” – refers to the property where construction of the five CTs will occur, as the Site to be certified for the Lauderdale Plant CT Project, including the intake canal structure.
7. “Power Block” – refers to the area that will be occupied by the major equipment such as CTs, a steam turbine generator and selected appurtenances.
8. “construction use” – refers to FPL-owned property located within the existing Lauderdale Plant Property that will be used during construction of the Project for parking and construction laydown.
9. “construction” – refers to work to be performed as part of the Project, including decommissioning of 22 existing GT units, as well as construction of the five CTs, the construction parking and laydown areas, and related activities as described in the Site Certification Petition for Modification.
10. “decommissioning” – refers to all activities associated with bringing the 22 existing Lauderdale GT units out of service including fuel oil storage tanks, and support structures, as well as dismantlement of these facilities.
11. “Gas Turbine Power Park - Port Everglades” consists of the 12 simple-cycle GTs and related appurtenances including, for example fuel oil storage tanks and support structures located on the Port Everglades Plant Property.

1.0 INTRODUCTION AND GENERAL INFORMATION

This chapter introduces Florida Power & Light Company (FPL). It also provides an overview of the Lauderdale Plant Combustion Turbine (CT) Peaker Project (“Project”, “Peaker Project”, or “CT Project”), a summary of FPL’s electric system, and a summary of FPL’s public outreach program for the Project.

1.1 Introduction

FPL’s existing Lauderdale Plant is located in Broward County, Florida (see Figure 1.1-1) and includes two banks of 12 simple cycle gas turbines (GT1 through GT12 and GT13 through GT24). GT Units 1 through 12 began operation in August 1970, and the commercial in-service date for GT Units 13 through 24 was August 1972. Each bank of GTs has a nominal net capacity of 504 megawatts (MWs). GT Units 1 through 24 are authorized to operate on natural gas and distillate oil.

In close proximity to the Lauderdale Plant is the Port Everglades Plant that includes one bank of similarly designed simple cycle GTs that are authorized to operate on natural gas and distillate oil. These 12 GTs also have a nominal net capacity of 504 MWs and their commercial operation began in August 1971.

The existing 36 GTs located in Broward County are older generation GTs that are used to serve peak and emergency energy demands in a quick-start manner. Replacing the existing GTs with new, highly efficient combustion turbines (CTs) with lower NO_x emission rates will reduce potential air quality impacts and utilize less fuel than the existing GTs.

Decommissioning of 22 of the existing GTs at the Lauderdale Plant will be completed after the new CTs are operational in order to maintain peak service capability in south Florida. Two existing GTs will be kept for blackstart capability and generation. There will be no overlap of operation between 22 of the existing GTs and new CTs once the Project is complete. Port Everglades 12 CTs will be decommissioned and are not part of this modification and will be handled separately.

There will be significant benefits associated by the replacement of the GTs at both plants. The five new CTs will be more energy-efficient than the existing GTs and will provide cleaner energy to

FPL's customers. For the same amount of generation hourly, 30 to 40 percent less fuel will be used in the new CT units compared to the older GT units.

Air emission rates for NO_x with the Project will be approximately 90 percent lower than the existing GT emission rates, resulting in significantly lower air quality impacts. These air emissions benefits will occur at both the Lauderdale and Port Everglades Plants. In addition to lower air emissions, the maximum total air quality impacts for the Project are predicted to be well below and in compliance with the NAAQS. For pollutants such as NO₂, the Project's total air quality impacts are predicted to be significantly reduced by 40 percent or more compared to the existing GTs.

In this petition, FPL is proposing to modify the existing site certification for the Lauderdale Plant to allow the installation of five new CTs. Units 4 and 5 were certified under the Power Plant Siting Act (PPSA), Chapter 403, Part II, Florida Statutes (F.S.) in 1991 (PA 89-26) as the Lauderdale Repowering Project. There have been seven modifications of certification with the latest dated January 18, 2013 (PA 89-26G). In the original certification, the "Site" as defined by 403.503(28) F.S. consisted of the entire 392 acres of the Lauderdale Plant property. The Project will be located within the existing certified Site that contains certified components for Units 4 and 5. Certified components for both Units 4 and 5 and the Project are identified in this Petition for Modification. This petition is being submitted pursuant to Section 403.516, F.S., and Rule 62-17.211, Florida Administrative Code (F.A.C.). FPL is seeking approval of the Project under the PPSA, Chapter 403, Part II, F.S.

The format for this Petition for Modification follows the draft "*Application Instruction Guide: Electrical Power Plant Sites and Associated Facilities Electrical Transmission Lines*" issued by FDEP and revised September 1, 2009. In July 2013, FPL filed an Air Construction/Prevention of Significant Deterioration (PSD) Permit Application with FDEP for this Project.

1.2 The Applicant

FPL, a subsidiary of NextEra Energy, Inc., is the largest electric utility in Florida. FPL serves approximately 4.6 million customer accounts, approximately 9 million people, with a service territory in all or parts of 35 Florida counties (Figure 1.2-1).

FPL's existing generating resources are located at power plant sites (Figure 1.2-1) distributed geographically around its service territory, and also include partial ownership of two units located in

Jacksonville, Florida, and one unit in Georgia. The total summer system firm generating capability as of December 31, 2013 is 24,274 MW consisting of nuclear units (3,453 MW), coal units (897 MW), combined cycle units (13,999 MW), oil/gas fossil steam units (3,666 MW), CTs (316 MW), and GTs (1,908 MW) (FPL, 2014). In addition, there are two photovoltaic (PV) facilities with a generation capacity of 35 MW and a solar-thermal facility that is capable of producing steam that is equivalent to 75 MW. The solar-thermal facility is the world's first "hybrid" energy center to combine solar-thermal technology with an existing combined-cycle generation unit.

FPL's bulk transmission system is composed of approximately 6,734 circuit miles of transmission lines. Integration of the generation, transmission, and distribution system is achieved through FPL's approximately 589 substations (FPL, 2014).

The following information addresses the applicant identification requirements:

Applicant's Official Name:	<u>Florida Power & Light Company (FPL)</u>
Address:	<u>700 Universe Boulevard, Juno Beach, FL 33408</u>
Address of Official Headquarters:	<u>700 Universe Boulevard, Juno Beach, FL 33408</u>
Business Entity (corporation, partnership, co-operative):	<u>Corporation</u>
Name and Title of Chief Executive Officer:	<u>Eric Silagy, President</u>
Name, Address, and Phone Number of Official Representative responsible for obtaining certification:	<u>Matthew Raffenberg, Director of Environmental Licensing, Environmental Services Department, 700 Universe Boulevard, JES/JB, Juno Beach, FL 33408 Phone: (561) 691-2808 Fax: (561) 691-7070</u>
Site Location (county):	<u>Broward County</u>
Nearest Incorporated Cities:	<u>City of Dania Beach, City of Hollywood</u>
Latitude and Longitude:	<u>26° 04' 05"; 80° 11' 54".</u>
UTM Coordinates:	Northerly <u>2,883.3 kilometers (km) N;</u> Easterly <u>580.7 km E (Zone 17)</u>
Section, Township, Range: (Lauderdale Plant Property)	<u>Portion of Section 25, Township 50 South, Range 41 East and portions of Sections 1920 and 30, Township 50 South, Range 42 East</u>
Name Plate Generating Capacity:	<u>Five Nominal 200 MW Combustion Turbines</u>

1.3 Overview of the Project

The Project will consist of five CTs operated in simple cycle with associated stacks. The CTs are similar to, but much larger and more efficient than traditional jet engines. The CTs produce electrical energy by direct connection to an electric generator. The CTs being proposed for the Project are the General Electric (GE) 7FA.05 CTs. The GE FA.05 CT has higher mass flow and produces more generation than GE's previous model "F" Class CTs.

Each CT will utilize inlet air cooling consisting of evaporative cooling and wet compression. Evaporative cooling systems achieve adiabatic cooling using water in the form of water evaporated from a treated paper material. The evaporating water cools the inlet air stream when the water droplets are converted to water vapor. Inlet air temperature is reduced as heat is transferred at a rate of 1,075 British thermal units per pound (Btu/lb) of evaporated water. The result is a cooler, denser air stream. This allows additional power to be produced. Wet compression introduces water droplets near the compressor inlet resulting in increased power through compressed air cooling and mass flow. The CTs will operate up to a maximum of 3,390 hours per year (hr/yr) using natural gas and ultra-low sulfur distillate (ULSD) oil as fuel. ULSD oil will be used for up to the equivalent of 500 hr/yr per CT at base load conditions.

Natural gas will be transported to the facility via an existing pipeline. ULSD oil will be delivered to the facility by truck or pipeline and will be stored in ULSD oil storage tanks.

Two of the 24 existing GTs will be kept to provide black start capability and for additional generation in periods of maximum electric demand. The Project will also include a fire pump engine, a fire water tank, a ULSD oil tank, and a demineralized water tank for NO_x control when firing ULSD oil.

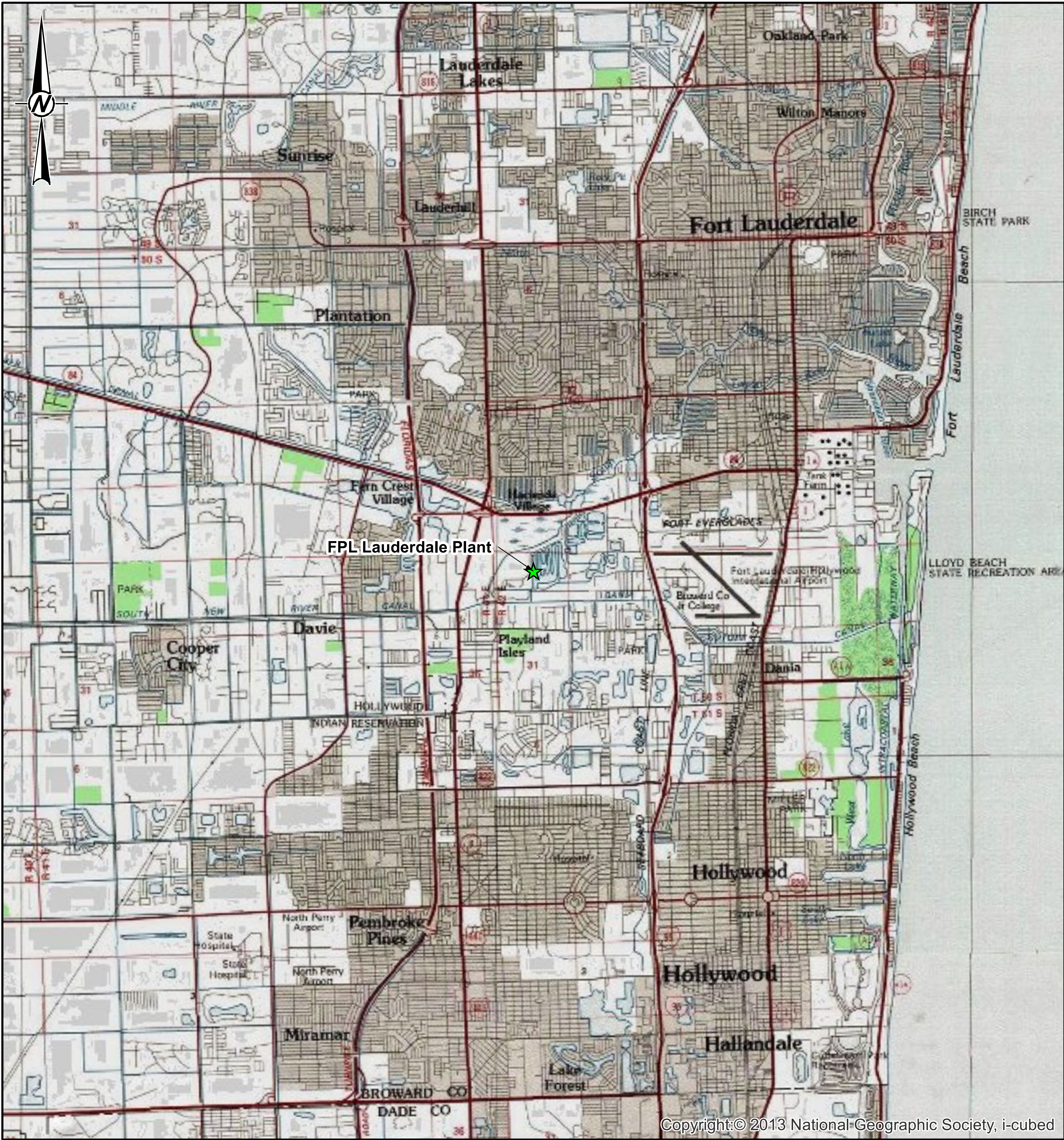
Decommissioning and dismantling of the existing GTs will be completed after the new CTs are operational. The Project will interconnect with FPL's transmission network through the existing adjacent system substation.

The Project is estimated to generate approximately \$126.0 million in tax revenue from 2017 to 2043. This is comprised of approximately \$37.8 million to the City of Dania Beach, approximately \$42.8 million to Broward County, and approximately \$45.4 million to the Broward County School District.

1.4 Summary of Public Outreach Program

FPL believes it is important to involve the community in the licensing process of projects as they are designed to generate and deliver clean and reliable power to customers. Representatives of FPL have been involved with the local community surrounding the Lauderdale Plant for many years. FPL uses several communication channels to seek constructive and collaborative dialogue with neighbors, to provide information on projects, and to gain input from the local community. FPL's goal is to ensure that interests and specific information needs particular to communities are taken into account.

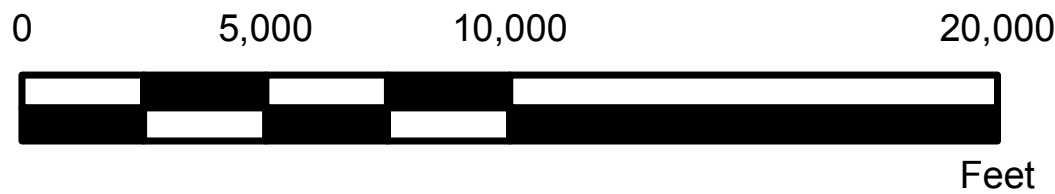
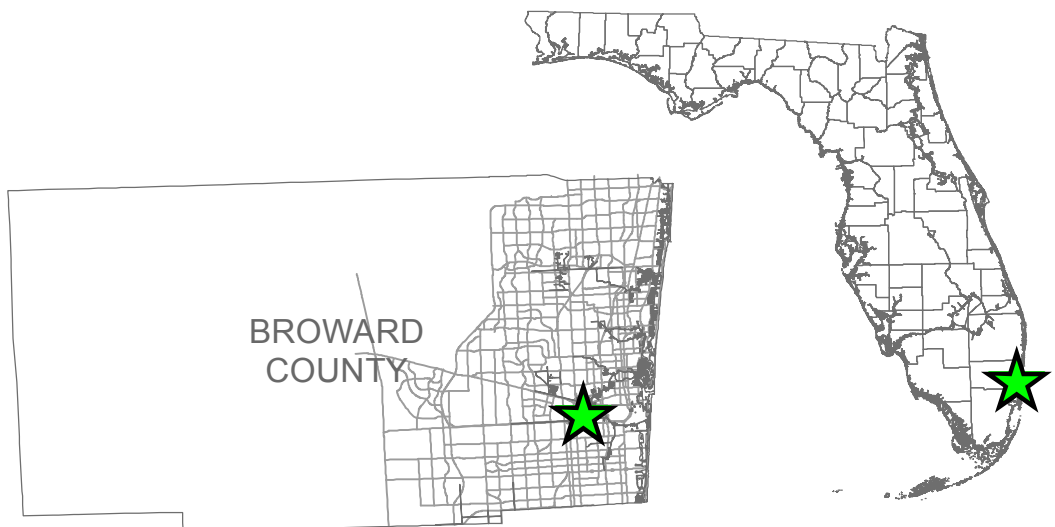
FPL is committed to responding to comments and questions in a timely manner. FPL's goal is to be the first and best source of information about the Project.



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LEGEND

★ Project Location



REFERENCE(S)
LAUDERDALE PLANT LOCATION, FPL, 2015

CLIENT
FPL

PROJECT
LAUDERDALE PLANT
CT PROJECT

TITLE
LOCATION MAP

CONSULTANT



YYYY-MM-DD 2015-03-11

DESIGNED NRL

PREPARED NRL

REVIEWED KFK

APPROVED KFK

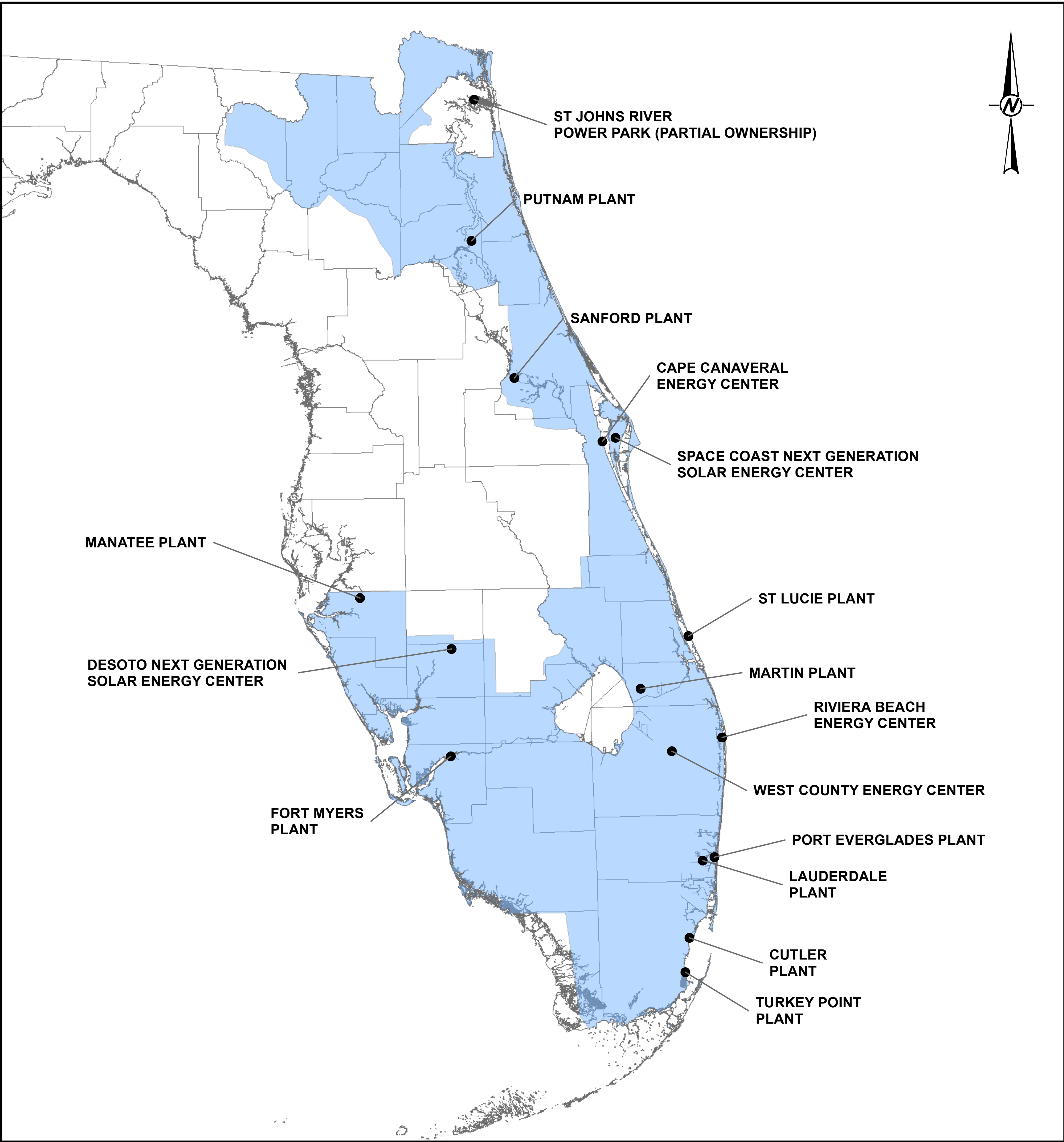
PROJECT NO.
1520938

CONTROL
A006

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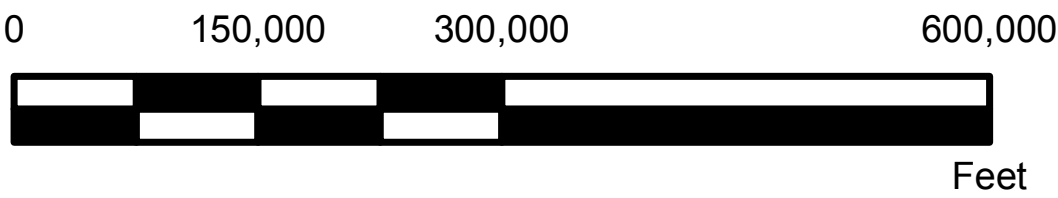
FIGURE
1-1.1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



LEGEND

- FPL Power Plants
- Approximate FPL Service Territory
- cntshr



REFERENCE(S)
POWER PLANTS, SERVICE TERRITORY, FPL 2007-2011

CLIENT
FPL

PROJECT
LAUDERDALE PLANT
CT PROJECT

TITLE
SERVICE TERRITORY AND
POWER PLANTS

CONSULTANT



YYYY-MM-DD 2015-03-11

DESIGNED NRL

PREPARED NRL

REVIEWED KFK

APPROVED KFK

PROJECT NO.
1520938

CONTROL
A004

REV.
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FIGURE
1.2-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A

2.0 NEED FOR THE PROPOSED FACILITY

A Need Determination from the Florida Public Service Commission is not required under Florida's Power Plant Siting Act for the Project. The Project does not meet the definition of "electric power plant" as defined in 403.503 (14), F.S., because it involves the addition of simple cycle CTs. A simple cycle CT is not a "steam or solar electrical generating facility using any process or fuel" as required by the definition of "electric power plant." Therefore, this Chapter is not applicable to the Project because there is not an expansion of steam or solar generation at the Site. FPL is seeking a modification of the Site Certification for the Lauderdale Repowering Project that would allow the location of the Project within the Certified Site boundary and associated interconnections to the existing system substation and water treatment facility.

3.0 SITE AND VICINITY CHARACTERIZATION

The existing FPL Lauderdale Plant is located within the Cities of Dania Beach and Hollywood in Broward County, Florida. The existing Site is situated within 392 acres of property owned by FPL. The existing Plant provides access from SW 24th Avenue and SW 42nd Street. SW 24th Avenue connects to SW 30th Avenue to the east of the Plant. Griffin Road and State Road (SR) 84 are connected to SW 30th Avenue from the south and north, respectively. Griffin Road and SR 84 are accessible from I-95 to the east and, SR 7/US 441 and Florida's Turnpike to the west. The Project will be located within the existing Lauderdale Plant boundaries.

Pursuant to FDEP Rule 62-17.211(1)(b)1, among other requirements, a petition for modification of a Site Certification shall contain "the anticipated effects of the proposed modification on the environment." As the Project involves the construction and operation of simple cycle CTs with limited environmental impacts, the information in this chapter focuses on those environmental aspects of the site and vicinity where potential impacts may occur. As a result, this chapter provides only site and vicinity characterization information that are relevant to those potential impacts presented in subsequent chapters.

3.1 Site and Associated Facilities Delineation

The Project for which FPL seeks certification includes construction and installation of five CTs and associated equipment, the construction parking and laydown areas and certain transmission-related activities, and the decommissioning of 22 of the existing GT units. FPL is seeking a modification of the Site Certification of the Lauderdale Repowering Project that allows the location of the Project within the Certified Site boundary and associated interconnections to the existing system substation and water treatment facility. Figure 3.1-1 presents the Certified Site Boundary of the Lauderdale Site, the certified components of the existing certified Units 4 and 5 and the boundary of the Project. Figure 3.1-2 shows the layout of the Project on an aerial photograph.

3.1.1 Existing Uses

The existing Lauderdale Plant includes two combined cycle units (Units 4 and 5) and two banks of 12 simple cycle gas turbines (GT1 through GT12 and GT13 through GT24). Units 4 and 5 have nominal capacity of 430 MW each. Unit 4 began commercial operation in May 1993 and Unit 5 began commercial operation in June 1993. GT Units 1 through 12 began operation in August 1970, and the commercial in-service date for GT Units 13 through 24 was August 1972. Each bank of GTs has a

nominal net capacity of 504 MW. GT Units 1 through 24 are authorized to operate pursuant to FDEP Final Title V Permit No. 0110037-007-AV on natural gas and distillate oil.

3.1.2 Adjacent Properties and Nearby Areas

The adjacent properties to the Lauderdale Site include residential properties to the south, the South Broward County Resource Recovery Facility to the west, Pond Apple Slough to the north and commercial properties to the east. The Dania Cut-off Canal is located along the southern boundary and the South New River Canal is located along the western and northern boundaries.

3.1.3 One Hundred Year Flood Zone

The FEMA Flood Plain Maps for Broward County were revised in August 2014. The Base Flood Elevation (BFE) for the site has been reduced from 8 NGVD 29 (6.4 NAVD 88) to 4.6 NGVD29 (3 NAVD 88). Most of the Lauderdale Site including the area for the Project is situated within Zone AH corresponding to areas of the shallow flooding with average depths of 1 to 3 feet (Refer to Figure 8 of Attachment B, Appendix 10.2.4.)

3.2 Social and Political Environment

The FPL Lauderdale Plant is located within the City of Dania Beach and City of Hollywood. The jurisdiction for the City of Hollywood is a small area south of SW 42nd Street in the eastern portion of the property (between theoretical SW 37th Avenue and SW 35th Avenue). The remainder of FPL's property is located in the City of Dania Beach. The site for the Project, with the exception of the temporary construction areas south of the cooling pond, is located entirely within the City of Dania Beach, Broward County, Florida.

3.2.1 Zoning and Land Use Plans

Applicable zoning and land use requirements are presented in the following subsections that summarize the applicable comprehensive plan and zoning requirements.

Strategic Regional Policy Plan for the South Florida Regional Planning Council

The FPL Fort Lauderdale property, situated in Broward County, is within the South Florida Regional Planning Council (SFRPC) planning area. The SFRPC is comprised of Broward, Miami-Dade, and Monroe Counties. The Strategic Regional Policy Plan (SRPP) for South Florida was prepared by the Council and adopted on June 7, 2004 as a policy document that guides SFRPC activities. The SRPP

does not create regulatory authority or authorize the adoption of agency rules, criteria, or standards not otherwise authorized by law.

Although the goals and policies of the SRPP are designed to implement regional, rather than site-specific land development, the Project will comply with applicable SRPP goals and policies. Specifically, there are three goals and four policies that will be addressed under the proposed Project:

Goal 4 (Infrastructure): Enhance the economic and environmental sustainability of the Region by ensuring the adequacy of its public facilities and services.

The Project will utilize the existing FPL property to replace the older electrical generating units with high-efficiency combustion turbine technology.

Goal 7 (Potable Water, Wastewater and Stormwater): Protect, conserve, and enhance the Region's water resources.

The Project will not adversely impact regional water resources.

Policy 8.3 (Transportation): Plan land use in and around airports and seaports to minimize unnecessary social, environmental, or economic conflicts and costs.

The Project is located in an existing land use classification compatible with utility infrastructure.

Goal 9 (Energy): Develop clean, sustainable and energy-efficient power generation and transportation systems.

The Project will modernize the existing aging electrical generating unit and will produce up to approximately 1,000 MW using a high-efficiency combustion turbine natural gas technology.

Policy 9.4 (Energy): Improve regional air quality through a reduction of transportation and electrical power generation related impacts.

The Project will use at least 30 percent less fuel than the existing GT units and will use advanced combustion technology and natural gas and ULSD oil, which will minimize air emissions. The

completed Project will be among the cleanest and most efficient fossil fuel-fired peaking units in the state.

Policy 14.1 (Natural Resources): Address environmental issues, including the health of our air, water, habitats, and other natural resources, that affect quality of life and sustainability of our Region.

The Project will minimize air emissions and reduce air quality impacts from the existing GTs. In addition, the Project will comply with all environmental standards including those for air quality, water quality and noise. Impacts to wetland have been minimized and will be mitigated according to local, state and federal requirements.

Policy 14.7 (Natural Resources): Restore, preserve, and protect the habitats of rare and state and federally listed species.

The potential for listed species utilization of the Project for foraging, roosting, or breeding is limited due to the surrounding industrial, commercial, and residential development. No negative impacts to threatened or endangered species are anticipated as a result of the Project.

Comprehensive Plan

Chapter 163, Part II, F.S., the Local Government Comprehensive Planning and Land Development Regulation Act, requires local governments to prepare and adopt a local comprehensive plan to regulate and govern future land uses and other land planning activities. Section 163.3194(1)(a), F.S. mandates that once a comprehensive plan has been adopted, all development actions issued by the local governments, as they relate to land covered in the plan, must be consistent with all provisions of the plan.

According to the City of Dania Beach Future Land Use Map, the FPL property is within the Utilities future land use designation. The Future Land Use Element defines Utilities to include electric power utilities. The existing and proposed use of the site for an electrical generating facility is and will remain consistent with the uses which are permitted by the city's Comprehensive Plan.

Zoning

The site is zoned General Industrial by the City of Dania Beach, a designation intended to provide for light and medium intensity industrial, research and assembly fabrication uses. The improvements made by the Project will consist of replacing mechanical equipment; specifically the approximately 45 year old gas turbine peaking units. The improvements will not require new or modification to existing habitable structures, parking, or staffing requirements and will be contained within the existing plant footprint. Based on discussions with the City of Dania Beach, no further action pertaining to future land use and zoning designations are required and the City of Dania Beach agreed that the proposed system improvements are in compliance with the Dania Beach future land use and zoning designations (confirmation letter to follow).

Both Broward County and the City of Dania Beach adopted comprehensive plans (Plans) that meet the requirements of the Local Government Comprehensive Planning and Land Development Regulations Act of 1985, Chapter 163, Part II, F.S. (Act). The future land use element of each plan, which includes a future land use map, assigns specific land uses to defined land use classifications. The Broward County Planning Council determined that the County Plan is the effective plan for the Site. The Project is consistent with and conforms to the County Plan.

On June 2, 2011, the Act was redesignated as the Community Planning Act. Although some provisions of the Act have been repealed and amended, comprehensive plans which were adopted prior to June 2, 2011 are still valid. The State Community Planning Act does not create regulatory authority that is not otherwise authorized by state law.

3.2.2 Cultural Resources

A desktop cultural resource survey was conducted in accordance with Chapter 267, F.S. (Florida Historical Resources Act), Chapter 1A-46 (Archaeological and Historical reporting Standards and Guidelines) to assist in identifying any previously recorded cultural resources and areas with the potential for containing unrecorded cultural resources within the site. A copy of the desktop cultural survey report is provided in Appendix 10.7.2 Cultural Resources. A brief description of the survey findings are provided in this section and a discussion of potential impacts from the Project are discussed in Section 5.9.

The survey consisted of researching and reviewing: the Florida Master Site File (FMSF), U.S. Geological Survey (USGS) quadrangle maps, previous cultural resource studies, property

appraiser data, historic plat maps and aerials. A reconnaissance visit was also conducted. The FMSF serves as an archive and repository of information about Florida's recorded cultural resources that are listed, eligible, or potentially eligible for the National Historic Preservation Act (NHPA) and resources with potential or confirmed human remains. The USGS quadrangle maps, historic plat maps, and historic aerials were reviewed to establish the pre-development environment and land use history of the Project site, as well as identify any potential historic resources within the area of the site. Previous investigations were reviewed to compile information about the types of historic and cultural features that could be expected to occur within the Project site.

The study determined that there were no previously recorded archaeological or historical sites within FPL's Lauderdale Plant property and the area for the Project has a low probability for archaeological sites and features.

Florida Division of Historical Resources (FDHR) was provided a copy of the cultural resource assessment and it concurred with the recommendations and findings of the report and found the report complete and sufficient in accordance with Chapter 1A-46 F.A.C. A copy of FDHR's letter is contained in Appendix 10.7.2.

3.3 Physical and Biological Environment

3.3.1 Geology and Hydrology

The geology and hydrology of the site vicinity are summarized below. The information presented in this section provides a summary of the geohydrologic baseline information and draws heavily upon previously published regional studies. The regional studies include, but are not limited to:

- Reese, R.S. and Richardson, E., 2008, Synthesis of the Hydrogeologic Framework of the Floridan Aquifer System and Delineation of a Major Avon Park Permeable Zone in Central and Southern Florida: U.S. Geological Survey Scientific Investigations Report 2007-5207, 60 pp., 4 pls., plus apps.
- Preliminary Hydrogeologic Framework, ASR Regional Study, Final Report [Ron Reese (USGS) and Emily Richardson (SFWMD), October 4, 2004].
- Reese, R.S. and Memberg, S.J., 2000. Hydrogeology and the Distribution of Salinity in Floridan Aquifer System, Palm Beach County, Florida, U.S. Geological Survey, Water Resources Investigations Report 99-4061.

A general description of the geology and hydrogeology of eastern Broward County, including the Lauderdale Plant, is provided below. The site lies in the physiographic region of the Atlantic Coastal Ridge (Fernald and Patton, 1984).

The following is a summary of the lithology and approximate thickness of each geologic unit anticipated at the site, based on regional geology.

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 top of the Cedar Keys Formation is found below the Boulder Zone. The massive anhydrite beds that form the base of the Floridan Aquifer System (FAS) are usually found 500 to 600 feet below the Boulder Zone (Reese and Memberg, 2000).

The Oldsmar Formation is limestone interbedded with dolomite. The Oldsmar Formation is approximately 1,100 to 1,500 feet thick in Broward County. The lower 300 to 600 feet 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. At the site, the top of the Boulder Zone is approximately –2,900 to –3,000 feet National Geodetic Vertical Datum of 1929 (NGVD 29) (Reese and Memberg, 2000).

The Avon Park Formation in Broward County is composed predominantly of limestone interbedded with dolostones. Cherty dolostones are typical in the lowermost Avon Park Formation. The Avon Park Formation is approximately 1,000 feet thick in the study area. In Broward County, the top of the Avon Park Formation is approximately –1,100 feet NGVD 29 to –1,200 feet NGVD 29. The upper portion of the Avon Park Formation is part of the Upper Floridan Aquifer (UFA). Confining units separate the UFA from the Lower Floridan Aquifer (LFA).

The Ocala Limestone overlies the Avon Park. The Ocala Limestone is micritic or chalky limestone, to a medium-grained calcarenitic limestone, to a coquinoid limestone. Regionally, this unit varies in thickness from 0 to 300 feet. This unit is 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. Clay beds in the Hawthorn Group function as the upper confining units for the FAS (Duncan et al., 1994). In the area of the site, this unit ranges from 600 to 700 feet in thickness and the top of the Hawthorn Group is approximately -350 feet NGVD 29. The top of the Hawthorn Group occurs at a poorly consolidated sand or sandy silt beneath the biogenic limestones of the Tamiami Formation.

The formation of Pleistocene age consists of alternating beds of Miami Oolite, Anastasia, Fort Thompson and Key Largo Formations of sandstone, shell and limestone, which are intermixed with the Pamlico Sands (Reese, 1994).

The undifferentiated deposits consist of unconsolidated shell beds, sandy clay, quartz sands, and sandy and shelly limestone. At the site, the thickness of the surficial aquifer is approximately 350 feet.

Information from a subsurface exploration performed in September 2013 in the areas impacted by the Project is presented in Attachment F of Appendix 10.2.4.

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, augured cast piles, stone columns, or other ground improvement methods to reduce settlement to acceptable levels.

3.3.2 Subsurface Hydrology

There are four major components to the subsurface hydrogeologic framework in southern Florida: the unconfined Surficial Aquifer System (SAS), which in coastal Broward County is part of the Biscayne Aquifer; the nearly impermeable sediments of the Hawthorn Group, which separates the SAS from

the Floridan Aquifer; the confined FAS, which includes both the UFA and the LFA; and the Boulder Zone, which is part of the LFA. These components are discussed further below.

The Biscayne Aquifer (surficial aquifer) is an unconfined aquifer that underlies approximately 4,000 square miles within Palm Beach, Broward, Miami-Dade, and Monroe Counties. In Broward County, the SAS is comprised primarily of sands, shell beds, and sandy limestone. In Broward County, the SAS varies in thickness from 200 to 350 feet. At the Lauderdale Plant, the SAS is between 250 and 300 feet thick.

The Intermediate Confining Unit (ICU) is present throughout the Broward County and consists of phosphatic clay, silt, sand, limestone, and dolomite deposits of the Hawthorn Group. The Hawthorn Group sediments serve as a confining unit separating the SAS from the FAS. In the vicinity of the site, the ICU is approximately 600 to 700 feet thick and well-confined.

The FAS in the vicinity of the site consists of the UFA, Middle Confining Unit (MCU), and LFA and ranges in age from Paleocene to Eocene. The uppermost permeable zones in the UFA occur in close association with an unconformity at the base of the Hawthorn Group. The top of the FAS near the site is approximately -950 feet NGVD 29. The thickness of the FAS near the site is between 2,800 and 2,900 feet. The MCU from -1,200 to -2,050 feet NGVD 29 is the primary confinement between the UFA and the LFA. The MCU contains a permeable zone, approximately 150 feet thick, called the Avon Park Permeable Zone (APPZ). In the area of the site, the APPZ is likely found between -1,400 and -1,650 feet NGVD 29. The LFA is approximately 1,700 feet thick and includes the Boulder Zone.

The MCU that separates the UFA and LFA consists of sediments from the Middle Eocene era with compositions similar to the UFA and LFA. Near the site, the top of the MCU is approximately -1,200 feet NGVD 29 and the total thickness is approximately 800 feet. The confining unit separating the UFA and the APPZ is approximately 200 feet thick. The confining unit separating the APPZ and the LFA is approximately 400 feet thick. Near the site, water in the APPZ has Total Dissolved Solids (TDS) concentrations between 5,000 milligrams per liter (mg/L) and 35,000 mg/L.

The LFA is below the MCU and above the sub-Floridan confining unit. The LFA consists of the thick complex sequence of limestone and dolostone. Near the coast, water in the LFA has TDS

concentrations of 35,000 mg/L or more. The top of the LFA is approximately –2,050 feet NGVD 29. The thickness is estimated to be 1,700 feet. The LFA also contains the Boulder Zone.

The deeply buried zone of cavernous permeability, called the Boulder Zone, is found in fractured dolomite in the LFA and underlies most of southern Florida. The top of the Boulder Zone is irregular and near the site the top is approximately –2,900 to –3,000 feet NGVD 29. The permeability of the Boulder Zone is extremely high because of its cavernous nature. 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 wastewaters. The Boulder Zone is overlain by approximately 700 feet of low permeability limestone and dolomite, which limits upward movement of injected fluids to shallower parts of the FAS.

3.3.3 Site Water Budget and Area Users

The Lauderdale Plant is located in southeast peninsular Florida, which has a climate characterized as mild subtropical. Temperatures in the vicinity [measured at Fort Lauderdale-Hollywood International Airport (FLL), Florida] range from an average low of approximately 57 degrees Fahrenheit (°F) in January to an average high of approximately 90°F in August, with an annual average of approximately 79°F.

The mean total annual rainfall in Fort Lauderdale, Florida, is 66.64 inches, with mean monthly totals ranging from 2.39 to 9.81 inches. Generally, the period of the year with the heaviest rainfall is from June to October, and 62 percent of the annual rainfall occurs during the wet season [<http://www.weather.com/weather/wxclimatology/monthly/graph/USFL0149>].

Mean annual type-A pan evaporation is 74.5 inches (SFWMD, DBHYDRO Database, Station S140 SPW E, 1985 to 2011). Average pan evaporation is less than 6 inches per month (in/mth) from October through February and between 6.5 and 8.7 in/mth between March and September. Mean annual potential evaporation is approximately 54 inches per year (in/yr) (SFWMD DBHYDRO Station S140W, 2005 to 2011). Mean annual lake evaporation in eastern Broward County is approximately 51 in/yr (Fernald & Patton, 1984). Evapotranspiration from plants and soil, which is less than lake evaporation, is approximately 39 to 42 in/yr (Fernald & Patton, 1984). Consequently, regional surface water runoff and surficial aquifer recharge combined is between 13 and 28 in/yr. In the area of the site, surficial aquifer recharge is limited due to the high percentage of directly

connected impervious area. Therefore, most of the excess rainfall (precipitation minus evapotranspiration) is removed as stormwater runoff.

The two major aquifers in Broward County are recharged from separate sources. The surficial aquifer is primarily supplied by rainfall in Broward and Palm Beach Counties. The UFA 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 one in/yr) recharges the SAS from the UFA due to the artesian pressures in the UFA.

There is a complex hydrologic interaction between the SAS and the extensive network of navigation channels, water supply and drainage canals in southeast Florida. These canals, levees, pumps, and water control structures that were constructed by the U.S. Army Corps of Engineers (USACE) as part of the Central and South Florida Flood Control Project are currently operated by SFWMD. The FAS is confined by more than 600 feet 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 one in/yr.

3.3.4 Surficial Hydrology

The surface water features that border the Lauderdale Plant are the Dania Cut-Off Canal to the south and the South New River Canal on the west and north. A cooling pond system of approximately 185 acres is located on the northeast portion of the Lauderdale Plant Property. The intake for the once-through condenser cooling system is on the Dania Cut-Off Canal and flows through the cooling pond system and connects in the northeast to the South Fork New River.

The flow of freshwater into the South New River Canal and South Fork New River is controlled by SFWMD at structures approximately one mile west of the Plant. Freshwater flows in the Dania Cut-Off Canal are from the South New River Canal. All surface waters adjacent to the Lauderdale Plant are tidally influenced.

The cooling pond system receives flow from the once-through condenser cooling system as well tidally from the South Fork New River. Surface water discharges resulting from the operation of the Lauderdale Plant are authorized by the Industrial Wastewater Facility Permit issued by FDEP (Permit No. FL0001503). There will be no change in surface water discharges currently authorized by FDEP as a result of the Project.

3.3.5 Vegetation/Land Use

The Lauderdale Plant Property and site are primarily occupied by electric power generating facilities, buildings, parking lots, and other infrastructure of the existing Lauderdale Plant [Florida Land Use, Cover and Forms Classification System (FLUCFCS)] 831 [Florida Department of Transportation (FDOT), 1999) and canals/cooling ponds (FLUCFCS 512). The area in the vicinity of the Project consists of mixed hardwood wetlands (FLUCFCS 617) and exotic hardwood wetlands. A land use map of the areas in the vicinity of the Project is presented in Appendix 10.2.4, Attachment B, Figure 7.

3.3.6 Ecology

3.3.6.1 Species Environmental Relationships

The following subsections summarize the flora and fauna in the vicinity of the Project. Appendix 10.7.1 presents a biological assessment for the Project.

Terrestrial Ecology Systems—Flora

The existing electric power facilities do not include areas of significant natural vegetative habitats. The forested wetlands within the area designated for the Project consist of a combination of native and nuisance exotic species, with a canopy comprised of the exotic species Australian pine (*Casuarina equisetifolia*) and melaleuca (*Melaleuca quinquenervia*), as well as the native species pond apple (*Annona glabra*) and red maple (*Acer rubrum*). The understory/shrub layer is dominated by the nuisance exotic species Brazilian pepper (*Schinus terebinthifolius*), with a variety of subdominant species including Carolina willow (*Salix caroliniana*), myrsine (*Myrsine cubana*), wax myrtle (*Myrica cerifera*), dahoon holly (*Ilex cassine*), coco plum (*Chrysobalanus icaco*), and the exotic species shoebutt ardisia (*Ardisia elliptica*). The groundcover consists of a variety of mainly native species such as swamp fern (*Blechnum serrulatum*), royal fern (*Osmunda regalis*), and sawgrass (*Cladium jamaicense*).

Terrestrial Ecology Systems—Fauna

Several exotic wildlife species were observed within or immediately surrounding the Project site, including green iguana (*Iguana iguana*), brown basilisk (*Basiliscus vittatus*), and Cuban brown anole (*Anolis sagrei*). Other non-listed species observed within or immediately surrounding the Project site include green tree frog (*Hyla cinerea*), anhinga (*Anhinga anhinga*), green heron (*Butorides virescens*), mourning dove (*Zenaida macroura*), Eurasian-collared dove (*Streptopelia decaocto*), pileated woodpecker (*Dryocopus pileatus*), northern cardinal (*Cardinalis cardinalis*), northern

mockingbird (*Mimus polyglottos*), chimney swift (*Chaetura pelagica*), Carolina wren (*Thryothorus ludovicianus*), starling (*Sturnus vulgaris*), and raccoon (*Procyon lotor*).

Aquatic Systems

The only aquatic systems that occur within the Lauderdale Plant Property are the existing cooling-water intake and discharge canals and cooling pond.

Threatened and Endangered Species

The probability of threatened or endangered (listed) species occurrence within the Project site was evaluated based upon the habitat preferences of listed species known to occur within Broward County, a field assessment for the presence of suitable habitat within the Project site, and the Florida Natural Areas Inventory (FNAI) geographical information system (GIS) database of documented listed species occurrences. No listed flora or fauna were identified during the pedestrian and vehicular transects conducted within the Project site on July 15 and August 15-16, 2013. No indications of nesting activity or burrows were observed within the Project site. The potential for listed species utilization of the Project site for foraging, roosting, or breeding is limited due to the surrounding industrial, commercial, and residential development, as well as the proximity of the FLL airport and the location of the Project site immediately within the flight path of large commercial passenger airplanes, resulting in significant and regular noise disturbance.

Flora

The data obtained from the FNAI did not include any documented occurrences of listed plant species within the area potentially impacted by the Project. Within a five-mile radius of the Lauderdale Plant property, the FNAI data includes historical occurrences of sea lavender, Atlantic Coast Florida lantana (*Lantana depressa* var. *floridana*), golden leather fern (*Acrostichum aureum*), large-flowered rosemary (*Conradina grandiflora*), silver palm (*Coccothrinax argentata*), and West Indies mahogany (*Swietenia mahogany*).

Fauna

Although no longer classified as threatened or endangered, the proximity of bald eagle (*Haliaeetus leucocephalus*) nests to the Project site was evaluated using the Florida Fish and Wildlife Conservation Commission (FWC) bald eagle nest database. The FWC database is current through the 2011-2012 nesting season. No documented bald eagle nests were located within 660 feet of the Project site. The closest documented nest (BO002) is approximately 15 miles southwest of the

Project site. In addition, wading bird rookery and nest colony records were researched using the FWC wading bird rookery and nest colony locator. The closest wood stork (*Mycteria americana*) colony (unnamed) is located approximately 10.5 miles from the Project site. The closest named colony (Colony #2B Melaleuca) is located approximately 10.9 miles from the Project site.

A review of the FNAI GIS database of documented listed species occurrences (see Appendix 10.2.4, ERP, Attachment B - Site Location Information, Figure 6 – Threatened and Endangered Species Map) resulted in a known manatee (*Trichechus manatus*) aggregation site within South New River Canal to the southwest of the Project site.

Terrestrial Systems

The greatest pre-existing stress to terrestrial systems of the Lauderdale Plant Property and surrounding area is the result of commercial and industrial development. The natural topography, soils, and hydrology are extensively altered as a result of the addition of fill material and topographic grading. Any natural ecosystems and wildlife habitat that may have previously been located at the existing plant facilities have been lost, and natural drainage features have been modified.

Aquatic Systems

Aquatic systems in the vicinity of the Lauderdale Plant Property are subjected to stress from numerous sources related to commercial, industrial and urban land use, development, and the construction and operation of water management systems. Pre-existing stresses include:

- Altered hydrology
- Altered salinity
- Elevated loads of nutrients and organic matter
- Input of contaminants
- Power plant intake/discharge
- Physical alterations
- Boating and fishing pressure

3.3.6.2 Measurement Programs

Terrestrial Ecology

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

Wetland Methodology

Within the area of the Lauderdale Plant Property, three agencies, the U.S. Army Corps of Engineers (USACE), FDEP and Broward County, have rules that apply to wetlands jurisdiction. To be jurisdictional, a wetland must ascribe to a minimum of two characteristics defined by rule: presence of vegetation listed as belonging in wetlands, having a certain defined hydrology, and/or the presence of hydric soils. The applicable characteristics for wetland determination as prescribed by the regulatory agencies were used.

3.3.7 Noise

3.3.7.1 Background Information

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 these levels.

Noise above certain levels can impact the health and welfare of plant employees, the general public and wildlife. 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 μPa .

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 10,000 Hz).

Noise has two different types of effects on people: the direct physical effects such as hearing loss and the less direct effects involving interference with activities such as sleep and conversation. In the

early 1970s, the EPA established numerical noise standards (EPA, 1974). The noise standards were developed without considering cost or technical feasibility. In developing these standards, the EPA drew upon a large body of survey data describing the degree of activity interference and resulting annoyance for a variety of noise levels. However, these standards were not meant to be pragmatic or realistic for short-term noise control purposes (Harris, 1991).

3.3.7.2 Local Noise Ordinances

There are no Florida or federal noise regulations applicable to the Project. The Project is located within the City of Dania Beach, which has a noise ordinance codified in Chapter 17, Article IV Noise, Sections 17-79 through 17-90, City of Dania Beach Code of Ordinances. Section 17-86 establishes maximum permissible sound levels for residential (noise sensitive areas and public space), multifamily dwelling, commercial (convention) and industrial receiving land uses. The maximum permissible sound level for residential land uses is 60 dBA during the period 7:00 a.m. to 10:00 p.m. (daytime) and 55 during the period 10:00 p.m. to 7:00 a.m. (nighttime). For multifamily land uses, the maximum permissible sound level is 50 dBA during the period 7:00 a.m. to 10:00 p.m. and 45 dBA during the period 10:00 p.m. to 7:00 a.m. A multifamily dwelling is defined in the ordinance as a building or other shelter that has been divided into separate units to house more than one family. The maximum permissible sound level for commercial land uses is 65 dBA during the period 7:00 a.m. to 10:00 p.m. and 60 dBA during the period 10:00 p.m. to 7:00 a.m. For industrial land uses the maximum permissible sound level is 75 dBA at all times. Construction activities are exempt from the maximum permissible sound levels except that the industrial sound level limits apply in all land use categories. The industrial sound level limit for industrial land use is 75 dBA. Section 17-88(f) provides a prohibition of construction noise operating within 50 meters (164 feet) of any residential or noise sensitive area between the of 9:00 p.m. to 7:00 a.m. on weekdays and Saturdays, and 9:00 p.m. to 8:00 a.m. on Sundays and holidays. Emergency work is excluded. The residential areas in the vicinity of the Project are greater than 50 meters from the construction activities.

Broward County has a noise ordinance that sets maximum allowable sound levels (Broward County, Code of Ordinances, Part II, Chapter 27 - Pollution Control, Article VII - Noise, Ordinance No. 2003-07). The ordinance identifies goals, applicability, prohibitions, and policies that are used to guide development with regards to noise in Broward County. The Broward County noise ordinance limits the maximum allowable sound levels measured at the receiving property boundary with governmental facilities, community service facilities, commercial/business facilities (shown in the table below).

MAXIMUM ALLOWABLE SOUND LEVELS

Receiving Property Category	Time	L ₅₀ Sound Level (dBA) ^a	L _{max} Sound Level (dBA)
Residential property, or residential portion of a multi use property	At all times	55	65
Government facilities, community service facilities, commercial/business facilities	At all times	65	75

^a L₅₀ equals the sound pressure level exceeded 50 percent of the time, based on any measurement period of not less than ten (10) minutes.

^b A source of sound shall not be considered in violation of the sound level limits set for in the table, if the measured sound level exceeds the background sound level by less than five (5) dBA.

Exemptions from the Broward County maximum allowable sound levels include the operation of motor vehicles on a public and private right of way; the operation of boats, ships or vessels on a waterway, and movement of aircraft. Operation of any tools or equipment used in construction, drilling, dredge and fill, or demolition work is exempt from the maximum allowable sound levels from 7:00 a.m. to 7:00 p.m. Routine maintenance of public service utilities is also exempt from the maximum allowable sound levels from 7:00 a.m. to 7:00 p.m.

3.3.7.3 Ambient Noise Measurements

Ambient noise monitoring was conducted in October 2013 to obtain baseline noise measurements for the Project. The equipment and procedures used to monitor the baseline noise levels conformed with the requirements for procedures, methods, and equipment specified by the American National Standards Institute (ANSI) (1993, R2008). Specifically, the noise measurements followed the ANSI S12.9/Part 3-1993 (R2008): “Quantities and Procedures for Description and Measurement of Environmental Sound, Part 3: Short-term Measurements with an Observer Present.”

Noise measurements were made using a sound level meter that was set to the slow response mode to obtain consistent, integrated, A-weighted SPLs. Concurrent one-third octave band frequencies were also measured at all monitoring locations. The octave band data from each monitoring location was measured and stored during each monitoring period. Both daytime and nighttime monitoring measurements were performed to accurately assess the baseline noise conditions.

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

- $L_{\max}$ - The maximum sound pressure level for the sampling period
- $L_{\min}$ - The minimum sound pressure level for the sampling period
- L_n - The sound pressure levels which were exceeded n percent of the time during the sampling period. For example, L_{90} is the level exceeded 90 percent of the time.

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

The SPL averages were calculated using the following formula:

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

where: N = number of observations, and
 SPL_i = individual SPL in data set.

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

The noise monitoring equipment used during the study included:

- 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 ½-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) (five feet) above grade. A windscreen was used because all measurements were taken outdoors. The microphone was positioned so that a random incidence response 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.

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. The calibration certificates are provided in Appendix 10.7.3.

3.3.7.4 Noise Monitoring Locations

Table 3.3-1 describes the locations where SPLs and octave band data were collected during the October 2013 ambient noise monitoring. The eight monitoring locations were selected to measure the existing baseline ambient noise levels at or near the Lauderdale Plant property boundary. SPL measurements were taken at monitoring locations 1 through 7 during the daytime and nighttime at durations of 15 minutes. At monitoring station 8, SPLs were obtained for a continuous 24-hour period.

3.3.7.5 Measured Ambient Sound Pressure Levels

Table 3.3-1 presents the existing baseline ambient sound pressure levels obtained in October 2013. SPL data shown in the tables for this section are integrated over the monitoring period, and reflect the "minimum," "maximum," "10th percentile," L_{90} (the SPL exceeded 90 percent of the time during the monitoring period), and "equivalent" noise levels.

The L_{eq} reflects the total noise energy over the monitoring periods at each location. As a result, loud transient noises such as noise from traffic, aircraft, insects, and barking dogs all influence the observed values. The more persistent the transient loud noises, the higher the L_{eq} . For this reason, a more appropriate indicator of background noise levels is the L_{90} , which is the sound pressure level exceeded 90 percent of the time. Transient noise is generally excluded unless almost continuous noise occurs during monitoring, such as along a heavily traveled highway. The L_{min} and L_{max} reflect the minimum and maximum observed sound pressure levels, respectively. When the magnitude of the L_{max} is close (within a few dBA) to the L_{eq} , the observed noise levels are typically influenced by a continuous source of noise. When the magnitude of the L_{min} is close (within a few dBA) to the L_{90} , the observed sound pressure levels typically indicate lower amounts of transient noises.

Units 4 through 5 were operating during all the periods when the daytime and nighttime noise monitoring was conducted. Several of existing GTs operated intermittently during some of the measurements as noted in Table 3.3-1.

The ambient daytime L_{eq} values observed in October 2013 are shown in Table 3.3-1. The measurements reflect the influence of air traffic from the FLL Airport, observations of other transient noise sources such as highway and local traffic, and the existing GTs operating during some measurements. The daytime L_{eq} for the property boundary monitoring locations in the vicinity of the plant (Monitoring Locations, 1, 2, 5 and 7) ranged from 64.1 dBA at Monitoring Location 1 to 52.9 dBA at Monitoring Location 7 during the morning. The highest L_{eq} observed was 68.6 dBA observed at Monitoring Location 6 that was a result of traffic on SR 7/US 441. The nighttime L_{eq} noise levels at boundary monitoring location in the vicinity of the Plant ranged from 56.0 dBA at Monitoring Location 5 to 50.3 dBA at Monitoring Location 3. The daytime and nighttime L_{eq} observed at Monitoring Locations 3 and 4 exceeded 60 dBA as a result of aircraft landings and traffic noise from I-595 and SR 84.

The L_{90} value excludes most of the transient noise and is more reflective of continuous noise sources. For the boundary monitoring locations the daytime L_{90} ranged from 57.4 dBA at Monitoring Location 5 to 50.3 dBA at Monitoring Location 7 during the morning. The nighttime L_{90} noise levels ranged from 55.1 dBA at Monitoring Location 6 to 48.6 dBA at Monitoring Location 3.

The observed L_{90} values that exclude transient noise sources at the monitoring locations are typical of an urban environment with industrial noise areas and heavily traveled transportation corridors that include major roadways and the influence of the FLL Airport. The monitoring location with the industrial areas had observed L_{90} values much less than 75 dBA. The monitoring locations within residential areas (Monitoring Locations 1, 5 and 7) had observed L_{90} that were less than 60 dBA during the daytime and 55 dBA and less during the nighttime.

The 24-hour SPLs observed at Monitoring Location 8 were 63.8 dBA for the L_{eq} and 56.9 for the L_{90} . The L_{min} during the 24-hour monitoring was 55.3 dBA, which was close to the observed L_{90} . This clearly demonstrated the influence of the transient noise sources in the area of the Lauderdale Plant. The noise from the Project, including baseline noise, is expected to comply with the City of Dania Beach sound level limits and does not increase current baseline noise levels by more than one decibel.

Table 3.3-1 FPL Lauderdale Plant, Measured Sound Pressure Levels, October 2013.

Site	Date	Time	Sound Levels (dBA)				Observations
			L _{min}	L _{max}	L ₉₀	L _{eq}	
1: Western Entrance Gate (from SW 42nd Avenue)	22-Oct-13	Daytime 1	51.6	82.1	53.6	61.5	Local car and truck traffic, aircraft landing, power plant audible
	22-Oct-13	Night	52.0	64.2	53.2	54.2	Truck braking offsite, offsite industrial noise-West, power plant audible, aircraft landing, some traffic noise. Peaker units - OFF.
	23-Oct-13	Daytime 2	52.2	84.7	54.7	64.1	Power plant audible, cars, aircraft takeoff, helicopter, industrial noise to NW, hedgetrimmer. Peaker units-Off
2: Eastern Entrance Gate (from SW 42nd Street)	22-Oct-13	Daytime 1	50.9	68.2	52.7	55.9	Aircraft landing, peaker units audible, road traffic to North, bird sounds
	22-Oct-13	Night	50.9	72.3	52.6	55.2	Aircraft landing, power plant audible, peaker units audible-slowng down
	23-Oct-13	Daytime 2	46.8	76.7	49.5	59.8	Power plant audible, gas flow pipes, UPS truck, small boat in nearby channel, aircraft takeoff. Peaker units - OFF.
3: North of site, located within site boundaries	22-Oct-13	Daytime 1	44.7	85.4	46.1	66.5	Aircraft-landing, wind, slight noise from power plant, sounds of nature. Peaker units - OFF.
	23-Oct-13	Night	45.0	88.5	47.0	66.7	Power plant audible, sounds of nature, some rain, aircraft landing, noise from power line. One combustion unit offline, Peaker units - OFF.
	23-Oct-13	Daytime 2	46.8	83.0	48.8	63.1	Traffic from I-595, aircraft takeoff, gas flow pipes, power plant audible, slight rain paused. 1 peaker unit - ON.
4: North of Project, located on Canel Rd, just off of I595 and SR 84	22-Oct-13	Daytime 1	62.3	84.9	64.3	68.1	Heavy traffic on SR-84 and I-595, local trafic, aircraft landing. Peaker units-ON.
	22-Oct-13	Night	52.6	89.9	57.0	65.3	Moderate-light local and SR-84 traffic, moderate-heavy I-595 traffic, aircraft landing, street sweepers. Peaker units - OFF.
	23-Oct-13	Daytime 2	53.8	83.3	58.0	65.9	Heavy traffic on I-595, moderate traffic SR-84, aircraft takeoff. Peaker units - OFF.
5: Neighborhood south of plant on SW 38th Terrace	22-Oct-13	Daytime 1	56.0	76.5	57.4	58.7	Peaker units audible, slight wind, aircraft landing.
	22-Oct-13	Night	53.8	71.2	55.1	56.0	Power plant audible, crickets, truck, aircraft landing. Peaker units - OFF.
	23-Oct-13	Daytime 2	54.0	76.9	56.6	60.8	Power plant audible, aircraft takeoff, people talking, truck start. Peaker units - OFF.
6: West of Project in U-Pull-it parking lot on SR-7	22-Oct-13	Daytime 1	55.1	83.2	62.0	68.6	Heavy traffic on SR-7, parking lot traffic, truck horn, loud music, motor engine. Peaker units - ON.
	22-Oct-13	Night	50.9	73.9	54.2	63.2	Moderate traffic on SR-7/US-441, aircraft landing, cricket noise. Peaker units - OFF.
	23-Oct-13	Daytime 2	50.5	81.0	57.2	67.9	Heavy traffic on SR-7, aircraft takeoff, car alarm-partial pause. Peaker units - OFF.
7: Neighborhood southwest of Project on SW 35th Ave.	22-Oct-13	Daytime 1	47.7	73.8	50.3	52.9	Power plant/peaker units audible, local truck and car traffic, aircraft landing.
	22-Oct-13	Night	46.9	59.5	48.6	50.3	Power plant audible, light local traffic, aircraft landing, AC unit start-up. Peaker units - OFF.
	23-Oct-13	Daytime 2	48.7	87.7	51.4	65.3	Power plant audible, lawnmower, aircraft takeoff. Peaker units - OFF.
8: 24-Hour Site: Onsite SW of Project	22-23 Oct 2013	24-Hour	55.3	88.7	56.9	63.8	Combustion and steam turbines, peaker units, aircraft landing/takeoff.

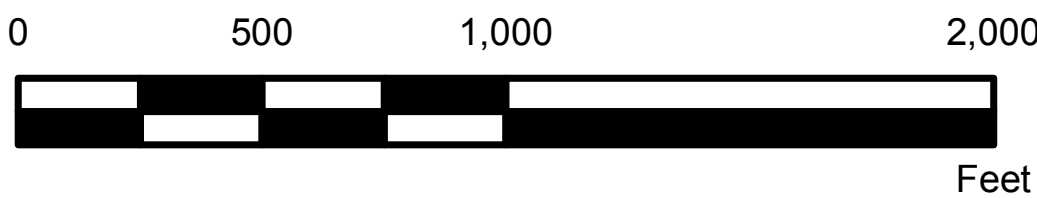
Source: Golder Associates Inc, 2013.





LEGEND

- Certified Area Components
- Lauderdale Plant Site Boundary



REFERENCE(S)
PROPOSED CERTIFIED AREA AND COMPONENTS, FPL/GOLDER ASSOCIATES INC., 2015

CLIENT
FPL

PROJECT
LAUDERDALE PLANT
CT PROJECT

TITLE
**CERTIFIED SITE AND
CERTIFIED COMPONENTS**

CONSULTANT



YYYY-MM-DD	2015-03-27
DESIGNED	NRL
PREPARED	NRL
REVIEWED	KFK
APPROVED	KFK

PROJECT NO.
1520938

CONTROL
A005

REV.
0

FIGURE
3.1-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A



LEGEND

- Property Boundary (Approximate)
- Proposed Facility Layout
- 230kV Overhead Transmission Line Route
- Construction Area
- Piping and Utility Corridor

Equipment Identification List

- 1 - Combustion Turbine Unit 6A
- 2 - Combustion Turbine Unit 6B
- 3 - Combustion Turbine Unit 6C
- 4 - Combustion Turbine Unit 6D
- 5 - Combustion Turbine Unit 6E
- 6 - Demineralized Storage Tank
- 7 - Black Start Diesel Generator
- 8 - Demineralized Water Trailers & Forwarding Pumps
- 9 - Service / Fire Water Tank
- 10 - Fuel Oil Sotrage Double Wall Tank
- 11 - Fuel Oil Unloading
- 12 - Combustion Turbine Exhaust Stack
- 13 - Gas Yard
- 14 - Control Vault
- 15 - Control Room
- 16 - Fuel Oil Forwarding

0 150 300 600
Feet

REFERENCE(S)
PROPERTY BOUNDARY (APPROXIMATE), BROWARD COUNTY PROPERTY APPRAISER, 2013.
CONSTRUCTION AREA, TEMPORARY CONSTRUCTION LAYDOWN AREAS, LINEAR FACILITIES,
FACILITY LAYOUT, FPL, 2015

CLIENT
FPL

PROJECT
LAUDERDALE PLANT
CT PROJECT

TITLE
CONCEPTUAL LAYOUT

CONSULTANT	YYYY-MM-DD	2015-03-19
DESIGNED	NRL	
PREPARED	NRL	
REVIEWED	KFK	
APPROVED	KFK	

Golder Associates

PROJECT NO. 1520938	CONTROL A003	REV. 0	FIGURE 3.1-2
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

4.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

4.1 Background

This chapter provides a description of the Project, a layout, key components and their operation, and proposed controls for air emissions and water discharges. Fuel specifications are provided for natural gas and ULSD oil. Estimates of the expected character, quality, and quantity of discharges and emissions from the Project are provided.

The existing Lauderdale Plant consists of two nominal 430 MW combined cycle units (Units 4 and 5) and 24 simple cycle GTs. Units 4 and 5 began operation in 1993.

The CTs will use low-NO_x combustion technology or equivalent when firing natural gas and water injection when firing ULSD oil to minimize formation of NO_x. Natural gas and ULSD oil will be used as fuel. While FPL envisions that the new CTs will be operated as peaking and emergency capacity like the existing GTs, FPL is seeking authorization for maximum operation of 3,390 hr/yr (base load equivalent hours) for each CT of which ULSD oil usage is up to 500 hr/yr (base load equivalent hours) for each CT. This is an accepted operating assumption for permitting simple-cycle CTs in Florida.

Two of the 24 existing GTs will be kept to provide black start capability and generation. Black start capability is necessary when electric power is not available to start the CTs. This primarily would occur during catastrophic events such as hurricanes. After the new CTs are installed and operational, 22 of the existing GTs will be dismantled.

The Project will be equipped with a 300 horsepower (hp) fire pump engine using ULSD oil. This engine will be used when necessary during catastrophic events such as fires. The fire pump engine will typically be operated only one to two hours per month for maintenance and reliability testing.

The Project will connect to the FPL transmission network through the existing 138 kilovolt (kV) and 230 kV switchyards located on the Lauderdale Plant site. No new offsite transmission lines are required to connect the Project to the existing transmission network.

4.2 Site Layout

The Project will be located as shown in Figure 4.2-1. The tallest structures will be the five 87 foot-high CT stacks.

4.3 Fuel

The fuel used in the CTs will be natural gas and ULSD oil (see Tables 4.3-1 and 4.3-2). The generating capacity of a CT is affected by ambient temperature, with increased temperature resulting in slightly less efficient electric production. Greater overall fuel consumption can occur at lower ambient temperatures. Therefore, for the purpose of calculating maximum hourly fuel use quantities, the following specific operating conditions were used for the CTs:

- 35 degrees Fahrenheit (°F) dry bulb turbine inlet temperature
- 60 percent relative humidity

The maximum heat input for the CTs being proposed for the Project is 2,089.1 MMBtu/hr, low heating value (LHV) [2,318.6 MMBtu/hr, high heating value (HHV)], when firing natural gas [100 percent capacity, 59 degrees Fahrenheit (°F) with evaporative cooling and wet compression]. The corresponding maximum fuel usage ranges from about 2.28 million cubic feet per hour (MMcf/hr) of natural gas for each CT. Maximum potential fuel usage at 59°F turbine inlet temperature ranges from about 3.8×10^{10} cubic feet per year (cf/yr) of natural gas for the Project operating 3,390 hr/yr.

ULSD oil use will be based on the equivalent of 500 hr/yr per CT at full load. The maximum fuel use is about 16,900 gallons per hour per CT at 59°F turbine inlet with evaporative cooling and wet compressions. The maximum annual usage rate of 42 million gallons for five CTs each operating for 500 hours.

Natural gas will be transported to the facility via existing pipeline. No onsite storage will be provided for natural gas. ULSD oil will be trucked or piped to the facility and stored in a new ULSD oil tank. The tank will be a double-walled, vertical fixed roof design (or equivalent), with a rated storage capacity of approximately 3.0 million gallons (about 70,000 barrels).

4.4 Air Emissions and Controls

4.4.1 Air Emissions Units

Air pollutants will be emitted from the CTs when firing natural gas and ULSD oil. The Project's air emission units are:

- Five simple cycle CTs
- One three-million-gallon ULSD oil storage tanks
- One fire water pump diesel engine

The maximum annual potential emissions for the Project include air emissions from the CT, emergency generators, and ULSD oil storage tanks. Table 4.4-1 presents the maximum annual potential emissions with the GE CTs. This tables addresses the criteria pollutants, as required, under new source review.

Annual emissions were based on maximum emissions for base load operation and ambient temperatures of 59°F using evaporative cooling and wet compression. The CT performance using evaporative cooling and wet compression is relatively constant from 59° F to 95° F (about 2%). The maximum emissions of all regulated air pollutants except sulfur dioxide (SO₂) are based on 2,890 hr/yr firing natural gas and 500 hr/yr firing ULSD oil. The maximum SO₂ emissions are based on natural gas firing for 3,390 hr/yr. The potential emissions are based on 100 percent load condition at a turbine inlet temperature of 59°F using evaporative cooling and wet compression, since this temperature represents a conservative basis for estimating annual emissions.

Table 4.4-1 presents the potential emissions due to the Project for regulated air pollutants and presents the PSD Significant Emission Rates (SERs). The PSD SERs are the emission thresholds to determine if PSD review will be required for modifications to major sources. If the PSD SER for a pollutant is not exceeded by this comparison, PSD review is not required for that pollutant.

As shown in this table, there are significant net emission increases for PSD pollutants. Therefore, PSD review is required for sulfur dioxide (SO₂), particulate matter (PM), particulate matter less than 10 microns (PM₁₀), particulate matter less than 2.5 microns (PM_{2.5}), and NO_x, carbon monoxide (CO), sulfuric acid mist (SAM), and greenhouse gas (GHG).

For GHGs, EPA promulgated regulations on June 30, 2010 related to Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule (75 FR 31514-31608). In EPA's promulgation, GHGs are defined to include an aggregate group of six GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Each of these GHGs has a specific Global Warming Potential that is calculated as "CO₂ equivalent emissions" or CO₂e that is equivalent to one ton of CO₂.

For the Project, the GHGs emitted are CO₂, CH₄, and N₂O with one ton of CH₄ equivalent to 25 tons of CO₂e and one ton of N₂O equivalent to 298 tons of CO₂e. GHGs were calculated based on the actual annual heat input and emission factors from 40 Code of Federal Regulations (CFR) Parts 75 and 98. These GHG emissions indicate the CO₂e rates for these pollutants. Recently, the Supreme Court issued a decision that indicated that GHG alone could not trigger PSD review. Rater, PSD for GHGs could only be triggered if PSD were required for other air pollutants (Case No. 12-1146). PSD review is required for GHG emissions greater than the listed PSD SER of 75,000 tons CO₂e if PSD is required for other PSD pollutants.

An Air Construction/PSD application was submitted by FPL to FDEP in 2013. The application included several CT manufacturers and included the GE 7FA.05 CT. FDEP issued Air Permit No. 0110037-011-AC (PSD-FL-423) in April 2014 for the Project that included the GE 7FA.05 CT. Appendix 10.2.5 contains a copy of the FDEP Permit. A revision to this FDEP Air Construction/PSD Permit is being submitted to FDEP to incorporate the latest information on the GE 7FA.05 CT, change in PSD applicability for SO₂, provide updated modeling analysis that includes operation of two existing GTs and to seek PSD approval for emissions of GHGs. This permit revision will be submitted separately.

4.4.2 Air Emission Controls

The use of clean fuels (natural gas and ULSD oil) and combustion controls will minimize air emissions of SO₂, sulfuric acid mist (SAM), PM/PM₁₀/PM_{2.5} and other fuel-bound contaminants and ensure compliance with applicable emission-limiting standards. Combustion controls will minimize the formation of NO_x and the formation of CO and volatile organic compounds (VOCs) by combustor design. Further NO_x reduction will be achieved by water injection during oil firing. The combination of these techniques has been determined to represent Best Available Control Technology (BACT) on previous projects based on an evaluation of economic, energy, and environmental impacts. The following subsections present a summary of BACT and practices for the Project.

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 injection) and/or staging combustion (a reducing atmosphere followed by an oxidizing atmosphere). Emissions of NO_x for the CTs are proposed at concentrations of 9 ppmvd conditions, corrected to 15 percent oxygen (O₂) when firing natural gas and 42 ppmvd corrected to 15 percent O₂ when firing ULSD oil.

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.

The expected CO stack emission rates at base load for the GE CTs when firing natural gas are 4 ppmvd corrected to 15 percent O₂ when firing gas, and 9 ppmvd corrected to 15 percent O₂ with ULSD oil firing at base load.

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

The expected VOC emission rates for the GE CTs at base load operation when firing natural gas are 1.4 ppmvw and 3.5 ppmvw for ULSD oil firing.

SO₂ emission rates are controlled and minimized by the very low sulfur content in the fuels, which will be a maximum of 2 grains per 100 standard cubic feet (gr/100 scf) sulfur for natural gas and 0.0015 percent sulfur by weight for ULSD oil.

The combination of these techniques has been determined to represent BACT on previous simple cycle projects based on an evaluation of economic, energy, and environmental impacts.

The Project, among other measures, will continue FPL's major efforts to reduce CO₂ emissions in FPL's system.

4.4.3 Control Technology Description

FDEP has adopted PSD rules in FDEP Rule 62-212.400, F.A.C. BACT review is part of the evaluation of control technology under the Florida PSD rules, and is required only for those pollutants that trigger PSD review. BACT is applicable to all pollutants for which PSD review is required and is pollutant specific. BACT 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 the energy, environmental, and economic impacts and other costs.

NO_x and SO₂ emissions from all stationary CTs with a heat input at peak load equal to 10.7 gigajoules per hour (10 MMBtu/hr) based on the lower heating value of the fuel fired, are limited per 40 CFR 60 Subpart KKKK adopted by reference by FDEP in Rule 62-204.800(8)(b)78 F.A.C. NO_x emissions for these new CTs (i.e., >850 MMBtu/hr) are limited by Subpart KKKK to 15 ppmvd corrected to 15 percent O₂ and 42 ppmvd corrected to 15 percent O₂ for natural gas and oil firing, respectively. SO₂ emissions are limited to using a fuel with a sulfur content of no greater than 0.05 percent and 20 gr/100 scf of sulfur for oil and natural gas firing, respectively. These requirements are summarized in Section 4.2. In addition to emission limitations, there are requirements for performance testing and monitoring in 40 CFR 60 Subpart KKKK. There are also applicable notification, reporting, and recordkeeping requirements in the general provisions of 40 CFR 60 Subpart A. The proposed emissions for CTs proposed for the Project will be well below the specified limits (see Section 4.0).

EPA has promulgated Maximum Achievable Control Technology (MACT) standards under the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations and applicability is based on whether a source is major or minor for hazardous air pollutants (HAPs). A facility is classified as a major source of HAPs when the maximum potential emissions for all emission units located at the facility exceed 10 tons per year (TPY) of a single HAP and 25 TPY for all HAPs. The Lauderdale Plant will remain a major source of HAPs due to the combined potential emissions of the Project along with the existing CTs associated with Units 4 and 5. The HAPs emissions for the project are less than the major source thresholds.

The NESHAP Subpart YYYY applies to the CTs being considered if the aggregate use of oil by existing and new turbines exceeds 1,000 hours during any calendar year. However, information

available from the equipment vendors indicate that the CTs being considered will meet the proposed MACT of 91 parts per billion by volume dry (ppbvd) corrected to 15 percent O₂ for formaldehyde. FDEP adopted this EPA rule by reference in Rule 62-204.800(11)(b)81, F.A.C.

The NESHAP Subpart ZZZZ addressing reciprocating internal combustion engines (RICE) applies to both major and area sources of HAPs. FDEP adopted this EPA rule by reference in Rule 62-204.800(11)(b)82, F.A.C. The method of compliance under this rule is demonstrating compliance with 40 CFR 60, Subpart IIII, which was previously cited in this section. The fire pump engine will meet the requirements of Subpart IIII.

The Project CTs will have two modes of operation (dual fuel) for which a BACT analysis has been performed. The results of the BACT analysis were contained in the Air Construction/PSD Permit Application concluded that the following emission limits constitute BACT for the Project:

- CTs—Natural Gas-Fired
 - The CTs will utilize state-of-the-art low-NO_x combustion technology which will achieve gas turbine exhaust NO_x levels of no greater than 9 ppmvd corrected to 15 percent O₂.
 - CO emissions will be limited to 4 ppmvd corrected to 15 percent O₂ at base load and good combustion practices will be utilized.
 - Emissions of PM₁₀ and PM_{2.5} will be limited by firing primarily natural gas and 10-percent opacity.
 - Emissions of SO₂ and SAM will be limited by the very low sulfur content in pipeline natural gas (no greater than 2 grains per 100 scf).
- CTs—ULSD Oil-Fired
 - The CT will utilize water injection to achieve gas turbine exhaust NO_x levels of no greater than 42 ppmvd corrected to 15 percent O₂.
 - CO emissions will be limited to 9 ppmvd corrected to 15 percent O₂ at base load and good combustion practices will be utilized.
 - Hours of operation will be limited to an equivalent to 500 hours per year per CT at base load.
 - Emissions of PM₁₀ and PM_{2.5} will be limited by firing ULSD oil and 10 percent opacity.
 - Emissions of SO₂ and SAM will be limited by the very low sulfur content in ULSD oil (0.0015% or 15 parts per million).
- Fire Pump Engine
 - Emissions meeting the applicable requirement of 40 CFR Subpart IIII, Stationary Compression Ignition Internal Combustion Engines.

- Hours of operation will be limited to supply water in the event of a fire and will operate like an emergency stationary RICE generator (100 hr/yr).
- Emissions of SO₂, SAM, PM₁₀ and PM_{2.5} will be limited by firing ULSD oil.

4.4.4 Design Data for Control Equipment

The control of air emissions for the Project are the use of clean fuels and pollution control technology inherent into the design of the CTs and the fire pump engine. These controls have been accepted as BACT by FDEP for similar projects.

4.4.5 Design Philosophy

The Project will replace the generation of existing 1970s vintage oil and natural gas-fired GTs with modern CTs that minimize air pollutant emissions by using the most fuel-efficient and pollution-preventing technologies. This concept has been incorporated with the CTs being considered for the Project. The CTs being considered for the Project are expected to achieve fuel conversion rates of less than 11,000 British thermal units per kilowatt hour (Btu/kWh) (at 59°F turbine inlet and baseload conditions, new and clean). In contrast, the GTs that are being replaced have an operating heat rate of about 17,000 Btu/kWh. By maximizing the megawatt output per unit of fuel consumed, the air pollutant emissions per MW output are minimized. The Project's NO_x emission rates will be reduced by approximately 90 percent on a pound per megawatt hour (lb/MWh) basis. In addition, the efficiency of CTs under consideration minimizes the emissions of CO₂.

Pollution prevention is incorporated in the design by the use of clean fuels and advanced combustion technology. Natural gas and ULSD oil will be used. Moreover, advanced dry low-NO_x (DLN) combustion technology will be used to minimize NO_x emissions while ensuring that CO and VOC emissions are within accepted limits.

4.5 Plant Water Use

Primary water uses for the Project are CT inlet cooling (evaporative cooling and wet compression) and NO_x injection water when firing ULSD, and fire protection. These water uses are intermittent depending on the climatological conditions and the use of ULSD oil. No water is required for NO_x control when firing natural gas and no water for equipment cooling is required. Raw water will continue to come from the existing water supply from Broward County. Potable water will continue to be obtained from City of Hollywood.

The storm water management system for the Project will be designed to meet local, regional, state, and federal permit requirements, which include the rules of the SFWMD, Broward County, City of Dania Beach, FDEP, and EPA. Section 4.8 below discusses the storm water for construction and operation of the Project and Appendix 10.8 Storm Water Management Plan provides detailed storm water calculations.

The water balance is presented schematically in Figure 4.5-1. Process water and fire protection water will be obtained from the existing sources. Subsections 4.5.1 through 4.5.4 below provide detailed descriptions of the Project's water uses.

4.5.1 Heat Dissipation System

There are no water requirements for cooling of the CTs while in operation. Cooling systems consist of a fin-fan cooling system for lubrication systems.

4.5.2 Domestic/Sanitary Wastewater

Sanitary wastewater from the Project will continue to be routed to the existing sewer system. No new restroom facilities will be constructed. Since the new CTs replace existing GTs, the number of employees is expected to remain the same with no increase in sanitary wastewater from the Lauderdale Plant.

4.5.3 Potable Water Systems

Potable water for human consumption will continue to be obtained from City of Hollywood. Potable water demand for human consumption will remain the same as for the existing Plant.

4.5.4 Process Water Systems

Raw water from the Broward County will continue to be used for process water treatment system influent and fire protection. These water demands will be consistent with existing Plant use. Water used for CT inlet air cooling and water injection for NO_x control when using ULSD oil will be demineralized water from the existing process water treatment system. Demineralized water will be stored in a new 6,750,000 gallon tank with an associated 500,000 gallon day tank.

4.5.4.1 Demineralized Water

The Project will require the use of demineralized water [i.e., conductivity < 0.1 microsiemen per centimeter (µS/cm)]. Demineralized water is required for:

- Makeup water to replace evaporative cooler and wet compression water use to maintain water quality
- Water injection into the CTs for NO_x control when firing ULSD

FPL will continue to use an existing reverse osmosis/mixed bed (RO/MB) demineralizer technology for process water treatment or trailer mounted RO/MB units using water from Broward County. The demineralized water will be pumped into a new 6,750,000 gallon onsite storage tank with an associated 500,000 gallon tank for daily use. RO reject water will continue to be mixed with the cooling water flow used for condenser cooling of Units 4 and 5. The evaporative cooler blowdown will be blended with other water uses/discharges.

4.5.4.2 General Service Water

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

4.6 Chemical and Biocide Waste

The wastewaters generated by the Project will include evaporative cooler blowdown, demineralized water treatment system wastewater, wash water, and equipment area storm water. Contact storm water will be treated in an oil/water separator and then routed to the storm water ponds. Water treatment wastewaters and non-hazardous, low volume wastewaters (e.g., wash water) will be treated if necessary and routed to the existing cooling system outfalls.

Table 4.6-1 presents a list of the waste streams associated with the Lauderdale Plant, their characterization, and proposed method of disposal. The following sections provide further information on the characteristics of these waste streams (see also Section 4.7).

Periodic offline washes of the CTs, using water or a detergent-water solution, will also produce wastewaters. CT offline wash wastewater will be managed by draining these wastewaters into a tank and transferring by a portable pump to tank trucks and managed according to applicable local, state, and federal rules and regulations.

4.7 Solid and Hazardous Wastes

All non-hazardous and hazardous wastes associated with the operation of the Project will be managed according to federal, state, and local regulations and FPL's "Waste Guidelines" (see Table 4.7-1). The Project may periodically generate hazardous waste [typically less than 100 kilograms (kg) per month], including spent solvents and other wastes. Potentially hazardous wastes will be collected and managed as hazardous waste until tested to determine their characteristics.

Solvent rags will be separated and either laundered or disposed of appropriately. If aerosol cans are punctured prior to disposal, the residual will be collected and managed as hazardous waste. Paint waste, polyvinyl chloride (PVC) cleaner, and PVC cement wastes will be minimized.

4.7.1 Solid Wastes

Solid wastes will be generated by the operation of the Project, but generally in small quantities. Such solid wastes will be limited to small amount of municipal solid waste (MSW), infrequent replacement of inlet air filters, operations and maintenance wastes, and solids from the water pretreatment process. An approved solid waste disposal contractor will dispose of all solid wastes. There will be no facilities requiring a permit under FDEP Rule 62-701.300(2), F.A.C. As a result, information required by this FDEP rule pertaining to waste containment design, leachate control, surface water control, geotechnical investigations, water quality monitoring plan, closure plan and long-term care, and financial assurance are not applicable.

4.7.2 Hazardous Wastes

FPL will operate the Project to minimize, if not eliminate, the generation of hazardous waste. Any hazardous waste associated with the Project will typically be less than 100 kg per month and may include spent solvents, CT cleaning wastes, and other wastes. Hazardous wastes, if any, will be collected onsite and disposed of by a licensed hazardous waste contractor. Hazardous waste will be managed according to applicable rules and regulations as is the current practice at the Lauderdale Plant.

4.8 Onsite Drainage System

4.8.1 Design Criteria and Applicable Regulations

The surface water management system for the Project will be designed to meet the requirements of applicable local, regional, state, and federal requirements, which include the rules of the SFWMD, Broward County, the City of Dania Beach, FDEP, and EPA. The basic design philosophy is that the required water quality treatment volume of storm water runoff from the Project will be treated by onsite dry detention, and the post vs. pre-development storm water runoff from a 25 Year / 72 Hour design storm event will be attenuated via an outfall weir of the detention pond.

The Project drainage system of catch basins, pipes, channels, and culverts will convey runoff to a storm water detention pond. Surface water and storm water management calculations that include the Project are presented in Appendix 10.2.4, Attachment F Storm Water Management Report.

4.8.2 Construction Site Drainage

Prior to commencement of construction, FPL will seek coverage for the construction of the Project under FDEP's Generic Permit for Stormwater Discharge from Large and Small Construction Activities. Since May 1, 2003, construction sites in Florida that will result in a disturbance of one acre or more are required to seek coverage under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities [FDEP Rule 62-621.300(4)(a), F.A.C.]. The Notice of Intent (NOI) will be submitted to FDEP at least two days prior to commencement of construction.

Prior to submitting the NOI for the construction permit, FPL will prepare a comprehensive Storm Water Pollution Prevention Plan (SWPPP), as required under the Generic Permit, addressing both the decommissioning of the existing GTs and the construction of the Project.

During construction, storm water will be managed by implementing the construction storm water management system before decommissioning begins. Storm water discharges will be controlled to meet the requirements of the Generic Permit for Construction, and appropriate pollution prevention techniques will be implemented to minimize erosion and sedimentation and properly manage storm water.

The conceptual construction drainage plan for the site is discussed in Attachment F of Appendix 10.2.4.

Prior to construction of the Project and decommissioning of existing GT units, silt fences or equivalent will be installed as necessary along the perimeter of areas where offsite runoff may occur in accordance with the SWPPP. The storm water detention pond will be installed and will serve as a sedimentation pond during construction of the Project and decommissioning of existing GT units. The storm water associated with decommissioning of existing GT units will be managed in compliance with the existing SWPPP and construction best management practices (BMPs). During construction, the extent of earth disturbances will be minimized as much as is practical in accordance with the SWPPP. Areas outside of cut and fill operations will be protected against unnecessary equipment traffic. Aggregate surfaced areas may be provided for roads, while limerock surfacing may be provided for the construction support areas.

Initially a perimeter berm will be established inside the wetland impact boundary. Once the perimeter berm has been established, removal of the soft compressible organic materials (muck) and associated dewatering activities will take place inside the perimeter berm. Water quality treatment will be provided inside the perimeter berms prior to offsite discharge. The storm water detention pond will be installed as site fill operations allow for the installation. The storm water detention pond will be used to provide water quality treatment during construction activities. Temporary erosion and sedimentation control measures will be designed to prevent sediment from being displaced. Construction personnel and equipment will enter the site over existing roads. Temporary construction entrances will be provided and maintained as required to minimize migration of sediment from construction areas onto public roads. Within the construction support areas, temporary swales, ditches, silt fences, turbidity barriers and synthetic bales will be provided as necessary to divert runoff to detention areas and/or temporary sedimentation ponds. If necessary, driveways leading to public roads that may be impacted by construction activities will be swept periodically to remove excess sediment tracked from the site. Sediment collected in the sedimentation ponds during construction will be removed as required, and properly disposed to maintain proper functioning of these measures. All temporary sediment and erosion control measures will be removed at the end of construction or when areas have been stabilized or incorporated into the permanent facilities.

4.8.3 Operational Site Drainage

At the completion of construction, the disturbed areas not used for the Project will be seeded and their runoff will be routed to the storm water detention pond. A detailed description of the pre-construction and post-construction site drainage features and associated modeling of design storm water runoff is presented in Appendix 10.2.4, Attachment F Storm Water Management Report.

Operational site storm water runoff that is from non-contact storm water areas (non-oil/water sources) will be handled by the new storm water management system. This storm water management system will provide the required water quality treatment, attenuation, and stage storage through the dry detention pond located on the site. The treated storm water will be released to the wetlands via the discharge structure at not erodible discharge rates.

Contact storm water oil/water sources will be routed to an oil/water separator via an oil/water waste piping system. Secondary containment will be provided at the source of large oil storage volumes (large transformers and oil storage tanks). Curb barriers and drains will be used at smaller oil/water sources. All oil/water separator effluent will be routed to the existing Plant waste water treatment system.

4.9 Heavy Equipment and Materials

4.9.1 Construction Materials and Equipment

Construction materials and equipment will be delivered to the Lauderdale Plant, including the construction parking and laydown areas, by existing roadways.

As necessary, additional clean fill materials suitable for the construction of the Project will be placed within the designated areas. Limestone and aggregate will be used as necessary for stabilization of the construction parking and laydown areas associated with the Project.

Equipment and component parts of the CTs will be unloaded and moved using portable cranes and trucks. Some of the heaviest items, such as the new CTs and transformers, may require special transport. Pollution control measures for the laydown areas will include runoff collection as discussed above in Section 4.8. As necessary, additional temporary access required for the construction support areas and the construction parking and laydown areas may be surfaced with aggregate/limerock with reasonable precautions taken to control fugitive dust (see Subsection 5.5.2).

4.9.2 Roads

Trucks and equipment associated with the construction of the Project will travel by existing roadways. The existing Lauderdale Plant provides construction access from SW 42nd Street that connects to SW 30th Avenue to the east. Griffin Road and SR 84 are connected to SW 30th Avenue from the south and north, respectively. Griffin Road and SR 84 are accessible from I-95 to the east

and, SR7/US441 and Florida's Turnpike to the west. Equipment may be delivered to the Project site by an existing road north of the cooling pond that connects to SW 30th Avenue. Maintenance may be conducted on this existing road prior to its use to assure safe transport of equipment.

4.9.3 Rail/Ship

Equipment that cannot be transported to the area by highway may be transported by rail or ship. Heavy components such as turbine sections, transformers, and generators may be routed to the Project site through Port Everglades or a nearby rail spur.

4.10 Associated Linear Facilities

New offsite linear facilities are not anticipated to be a part of the Project, although the Project may require reconductering and/or other upgrades to existing systems. The Project will connect to the FPL transmission network through the existing 230 kV and 138 kV system switchyards located on the Lauderdale Plant.

4.11 Emergency Disaster Preparedness Plans

FPL has comprehensive emergency disaster preparedness plans for both operational emergencies and natural disasters that can occur in Florida (e.g., hurricanes). FPL has been an industry leader in the preparation for hurricanes and in the recovery after a storm. FPL will continue with these efforts in the future, and enhance emergency preparedness plans for new projects.

TABLE 4.3-1
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) = 21,000 Btu/lb; 920 Btu/scf (approximate).
High Heating Value (HHV) = 23,300 Btu/lb; 1,020 Btu/scf (approximate).

Note: scf = standard cubic feet.
MM = million.

TABLE 4.3-2
TYPICAL ULTRA LOW SULFUR DISTILLATE 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) = 18,400 Btu/lb; 129,900 Btu/gallon (approximate). High Heating Value (HHV) = 19,500 Btu/lb; 137,700 Btu/gallon (approximate).	
Note: ppm = parts per million.	

Table 4.4-1: Summary of Maximum Potential Annual Emissions for the Lauderdale CT Project

Pollutant	Project Maximum Potential Annual Emissions (TPY)					PSD Applicability	
	5	Fire Pump Engine	1 Fuel Oil Storage Tank	SF ₆ Circuit Breakers	TOTAL	PSD Significant Emission Rate	PSD Review Required?
	CT ^a					(TPY)	
SO ₂	110	0.000	NA	NA	110.2	40	YES
PM	139	0.01	NA	NA	139.1	25	YES
PM ₁₀	139	0.01	NA	NA	139.1	15	YES
PM _{2.5}	139	0.01	NA	NA	139.1	10	YES
NO _x	1,009	0.22	NA	NA	1,009.1	40	YES
CO	217	0.09	NA	NA	216.7	100	YES
VOC (as methane)	35.0	0.03	1.10	NA	36.2	40	NO
Sulfuric Acid Mist	16.9	Neg.	NA	NA	16.9	7	YES
Lead	0.041	Neg.	NA	NA	0.0	0.6	NO
Greenhouse Gases (CO ₂ e)	2,472,760	19	NA	13	2,472,792	75,000	YES

^a Based on SC operation for: 3,390 hours (max).

Note: Neg.= negligible; NA= not applicable

Source: Golder, 2015.

**TABLE 4.6-1
PROJECT WASTE STREAMS, CHARACTERIZATION AND DISPOSAL METHOD**

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 according to existing IWW Permit. Refer to Sections 4.5.4 and 4.6.4.
Miscellaneous CT Drains	Based on analytical characterization of historical data	—	Treated with oil-water separator and treated directed to stormwater pond.
Waste Streams (Construction and Operations)			
Construction-Related Waste Water (e.g., backfilling, groundwater from dewatering, etc.)	Based on historical data	—	Disposed of depending on source. Refer to Chapter 5.
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.
Florescent Bulbs and Batteries	—	As per 40 CFR 273 EPA determination	Recycled as universal waste.
Oily Separated Waste Water	Based on analytical results	—	Separated water is routed to onsite ponds. 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.

Note: Wastes during dismantlement of GT Units 1 through 24 are discussed in Section 5.1.

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

GENERAL WASTE HANDLING GUIDELINES

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

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

Recycling (continued)

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

Non-Regulated Waste Disposal

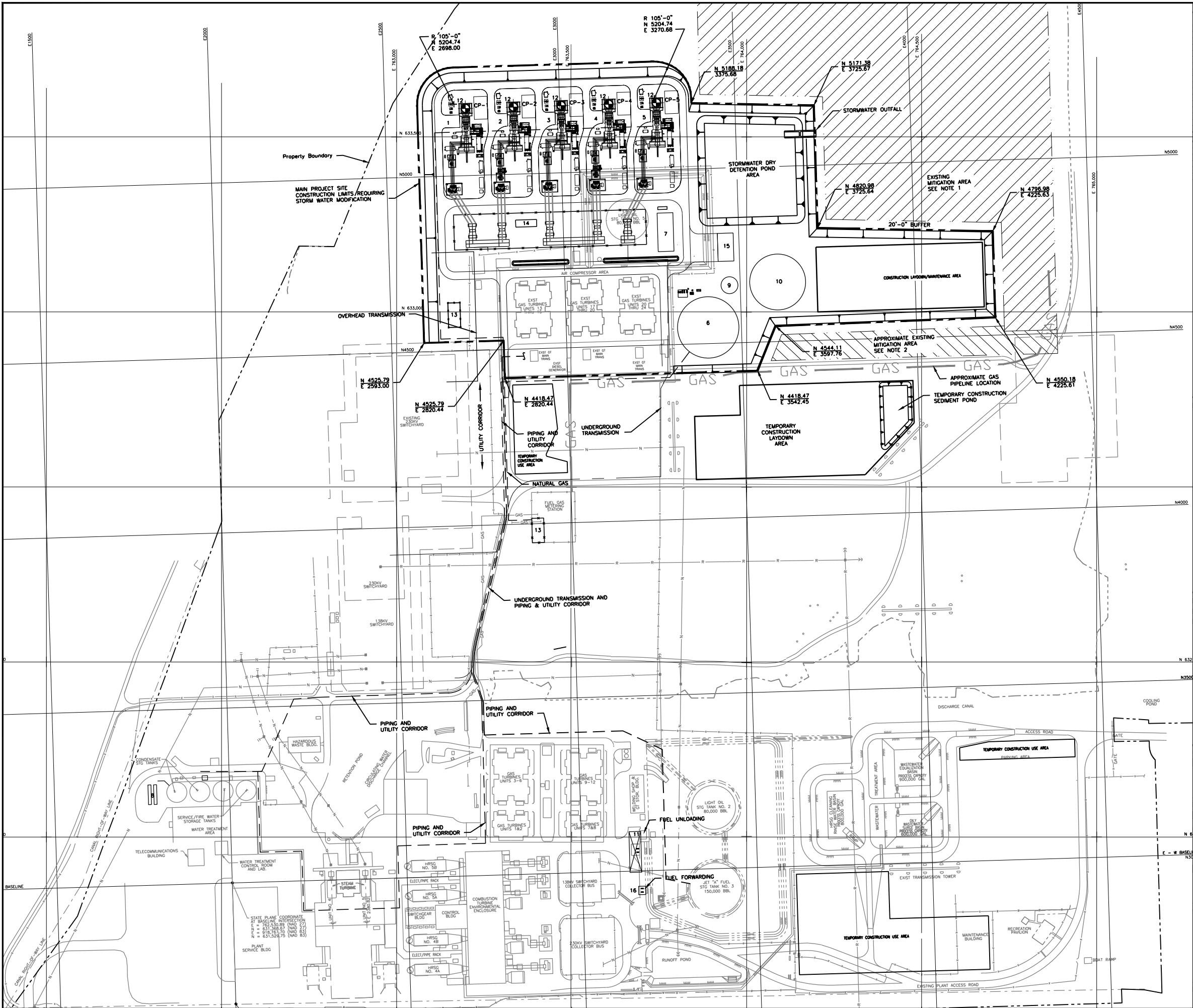
1. Normal trash: minimize and dispose, place into Plant dumpster.
2. Used oil: place into Accumulation Area designated for this purpose.
3. Solid oily waste: place into Solid Oily Waste Dumpster designated for this purpose.
4. Parts cleaning solution: use parts cleaner for all parts cleaning. For special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

Hazardous Waste Disposal*

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

*While accumulated onsite, hazardous waste drums must include the words “Hazardous Waste” and the accumulation start date. Drums used for satellite accumulation of hazardous waste may use words that identify the contents until moved to storage for disposal and then the words “Hazardous Waste” and the accumulation date(s) must be added.

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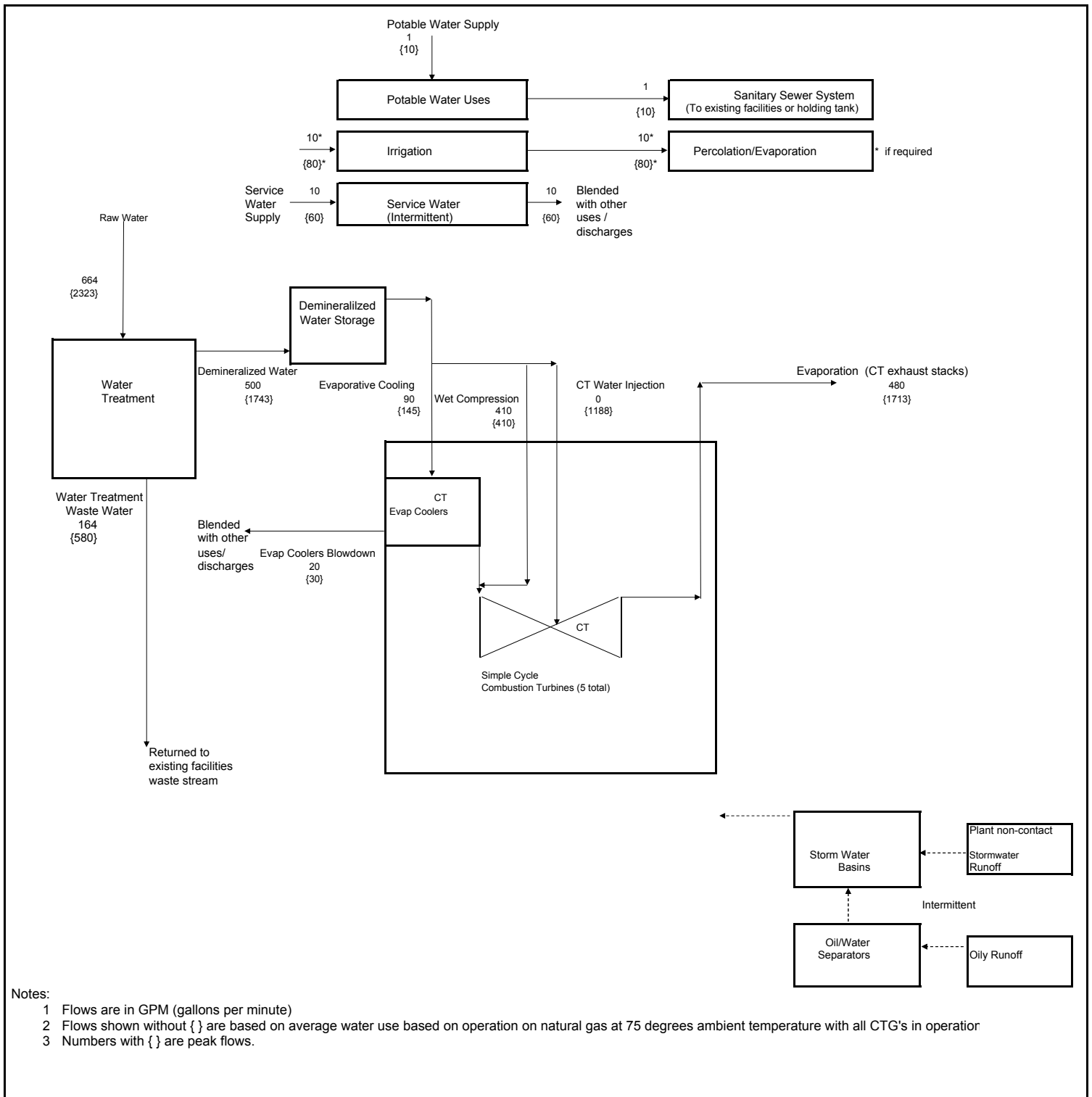


Figure 4.5-1
Preliminary Water Balance for Lauderdale Combustion Turbine Peaker Project



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

The following sections address the environmental effects of site preparation and construction of the Project, including the construction parking and laydown areas and decommissioning of existing GTs. The environmental effects are discussed with respect to impacts on land, surface water, groundwater, ecology, air quality, solid waste, landmarks and sensitive areas, and impacts on archaeological and historic sites.

5.1 Land Impacts

5.1.1 General Construction Impacts

The portions of the Lauderdale Plant property that will be affected by the construction of the Project are shown on Figures 3.1-2 and 4.2-1.

Construction of the new CTs will start prior to any decommissioning of the existing GTs. The existing GTs serve as emergency and peaking backup for FPL's system and are required to remain in-service until the new CTs can take their place. Therefore, the infrastructure of the existing GTs in the north bank of GTs will remain in service until sufficient capacity of the new CTs is operational (about 400 MW and two new CTs). At this time, some the existing GTs in the north bank will be dismantled to make room for infrastructure of the new CTs. The south bank of CTs will be dismantled after the Project becomes operational.

The areas to be used for Project construction, including the construction parking and laydown areas, will be cleared of vegetation, as necessary. Unsuitable soils will be removed and clean fill added, as necessary. The construction parking and laydown areas may be stabilized with rock, limestone, and shell. Other more lightly used areas may be seeded or sodded with grass to prevent erosion.

The construction parking and laydown areas may contain construction office trailers and portable structures. The latter are used to store construction materials and construction equipment, as well as areas for assembly of unit components. The number of trailers and portable structures would be based on the contractor requirements.

Construction contractors will be required to implement BMPs 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 applicable requirements. Construction contractors will be responsible for obtaining appropriate authorization for storage or laydown areas outside the Site.

Decommissioning activities will include dismantling of mechanical and electrical equipment and involve the use of construction equipment such as cranes and trucks. Materials will be transported offsite for recycling for beneficial reuse or disposed of in a licensed landfill.

During dismantlement, asbestos-containing insulation and other friable asbestos-containing materials and hazardous materials will be removed from the units. These materials will be identified prior to beginning dismantlement activities and disposed of according to applicable regulations. Utility and fuel systems, including oil, gas, and electrical systems will be disconnected and isolated, as applicable. Existing fuel oil delivery and storage infrastructure associated with the dismantlement of existing GT units will include, but is not limited to piping and tanks that will be drained and removed pursuant to applicable regulations.

Waste material (e.g., scrap metal) will be recycled or disposed of in accordance with local and state requirements (see Table 5.1-1). Concrete foundations may remain in place. Material that cannot be recycled will be disposed of in an approved landfill [i.e., a construction and demolition (C&D) or MSW Class I landfill, as appropriate]. Any hazardous waste will be managed according to applicable rules and regulations (see Table 5.1-1)

5.1.2 Roads

Site access for the construction of the Project will be via existing roadways and facility entrances from SW 42nd Street/SW 43rd Court or SW 30th Avenue. No equipment or heavy truck traffic will be directed through residential streets.

The construction workforce for the Project is expected to average approximately 150 workers. Peak construction is estimated at approximately 200 workers in mid-2016.

Fugitive dust generation from construction traffic will be minimized through the use of water sprinkling or other dust suppressant techniques.

5.1.3 Flood Zones

As recorded on the Flood Insurance Rate Map (FEMA, 2014), most of the Lauderdale Plant site including the area for the CT Project is situated within Zone AH. Zone AH corresponds to an area of shallow flooding with an average depth of 1 to 3 feet. (See Attachment B, Figure 8, in Appendix 10.2.4.) The Project site has also been reviewed against the new Broward County flood plain maps. Based on the proposed flood plain maps, The BFE for the Project site has been reduced from 8 NGVD 29 (6.4 NAVD 88) to 4.6 NGVD 29 (3 NAVD 88) and therefore the proposed changes present no adverse impacts.

5.1.4 Topography and Soils

The existing grade of the site for the new CTs varies from approximately six feet North American Vertical Datum of 1988 (NAVD88) in the developed areas and approximately zero feet (NAVD 88) in areas not previously used for the existing GTs. Soft organic materials (muck) in the areas for equipment and the Power Block will be removed down to a suitable subgrade. In areas designated for maintenance areas and construction laydown, sufficient amount of muck will be removed to provide suitable construction subgrades. Clean fill from commercial sources will be used after muck removal. The finished grade, which includes the Power Block and supporting facilities and equipment for the Project will be at the nominal site elevation of 10.5 feet (NAVD 88).

FPL will conduct environmental assessments and perform necessary remediation of impacted media (soil and groundwater) in accordance with applicable state, federal and local regulations. The assessments will be conducted within the Lauderdale Plant property for those areas associated with demolition of existing GT units. This includes, but is not limited to, the existing north and south bank of GTs, fuel oil delivery and storage infrastructure and maintenance areas. Removal of this existing infrastructure may involve the appropriate management of impacted media, including petroleum impacted media, solid waste, hazardous waste, and management of tank closures.

Current topographic features of the site reflect its historic use as a power plant site. No adverse impact to soil stability or bearing strength is anticipated from the Project. Slight settling may take place in areas of construction, but this will be minor and localized in extent due to the existing conditions.

Elevations of the land surface during construction will be approximately the same as the existing site elevation. As a result, no significant changes in topography will be observable from offsite locations

and site topography will not be affected by construction-related activities. Project work will involve the use of temporary construction cranes. The impacts on viewshed will not be significant, because the construction cranes and new structures will be lower in height than the existing structures (e.g., 150-foot-high stacks associated with Unit 4 and 5).

The temporary construction laydown and parking areas will remain at their existing elevations. During construction, the extent of earth disturbances will be minimized as much as is practical in accordance with the SWPPP as described in Subsection 4.8.2 above. Areas outside of cut and fill operations will be protected against unnecessary equipment traffic. Aggregate-surfaced areas may be provided for access, while limerock surfacing may be provided for the construction support areas.

5.2 Impact on Surface Water Bodies and Uses

5.2.1 Impact Assessment

No adverse impacts to surface waters are anticipated due to site preparation and construction. Construction water use, dewatering, and stormwater management are discussed below.

5.2.1.1 Construction Water Use

Water used during Project construction will be obtained from Broward County, stormwater ponds, dewatering effluent, or vendor-supplied sources. Construction water uses include soil improvement, fugitive dust control, potable and supply.

Potable water for consumption, emergency eyewash, and shower stations during construction will be obtained from the existing City of Hollywood potable water connection or contractor-supplied potable water.

Water from Broward County, stormwater ponds, or dewatering activities may be used as necessary to mitigate fugitive dust emissions during Project construction.

5.2.1.2 Construction Dewatering

Dewatering will primarily be necessary to allow the placement and compacting of fill as the majority of permanent structures will not extend into the groundwater.

The contractor will be responsible for dewatering in accordance with BMPs and jurisdictional requirements. The Contractor will determine the specific means and methods of dewatering groundwater in accordance with these requirements. Dewatering of surface water that enters excavations will be performed with turbidity filtered sumps and discharged to the stormwater dry detention basin prior to release. The dewatering effluent treatment system will be designed to ensure that any discharge to surface waters will meet applicable water quality standards, and the contractor will be required to monitor dewatering discharges from both excavations and groundwater to assure the discharge does not exceed 29 Nephelometric Turbidity Units (NTU) above background. Appendix 10.2.4, Attachment F describes the construction dewatering. Dewatering will be conducted pursuant to Conditions of Certification XXIXB.10, XXXIIIA.3., and II.B.2b. of PA 86-26G.

5.2.1.3 Construction Stormwater

Construction stormwater will be managed as described in Subsection 4.8.2 and Appendix 10.2.4, Attachment F, Stormwater Management Report. FPL will prepare a comprehensive SWPPP, as required under the FDEP Generic Permit for Stormwater Discharge from Large and Small Construction Activities, addressing construction. The SWPPP will be prepared to mitigate impacts due to stormwater during decommissioning and construction. As a result, no adverse impacts to surface waters due to site preparation and construction are anticipated.

5.2.2 Measuring and Monitoring Programs

Discharge of treated stormwater associated with construction activities will be monitored as necessary under applicable regulations.

5.3 Groundwater Impacts

5.3.1 Impact Assessment

Activities associated with the construction of the Project are not expected to produce any significant changes to groundwater quality, quantity, or levels in the vicinity of the site, construction parking and laydown areas. Dewatering will be confined to the localized area. As a result, no adverse impacts to groundwater resources or offsite wells will occur from dewatering activities.

Groundwater levels will not be significantly affected by modifications to soil percolation from the construction activities 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 groundwater levels, because the surface infiltration will affect only localized areas within the area of the Project and construction parking and laydown areas.

5.3.2 Measuring and Monitoring Programs

During construction dewatering, the effluent will be monitored as discussed above in Subsection 5.2.2.

5.4 Ecological Impacts

5.4.1 Impact Assessment

5.4.1.1 Terrestrial Systems

The terrestrial systems on the Lauderdale Plant Property have been previously impacted in connection with the construction of the Lauderdale Plant. Construction of the Project upon these previously impacted areas, which have been used for power plant operations for more than 70 years, will not cause significant adverse ecological impacts.

The site does not contain unique wildlife species and is not considered important wildlife habitat because of its disturbed nature (see Subsection 3.3.6.2, Pre-Existing Stresses, Terrestrial Systems).

No adverse impacts to federal or state listed terrestrial plants and animals are expected in association with the construction of the Project, due to the existing developed nature and lack of suitable habitat for listed species.

Fugitive dust generated by construction activities will be minimized through reasonable precautions to prevent unconfined emissions of PM (see Subsection 5.5.2). Any localized fugitive dust will not adversely affect offsite terrestrial systems in the vicinity.

Noise from construction activities is not anticipated to significantly affect wildlife in the vicinity of the site. Presently, the area experiences noise from industrial activities associated with activities within Port Everglades, transportation activities (aircraft from FLL Airport, motor vehicles on area roadways), and the operation of the existing Plant. No noise-sensitive wildlife is known to occur on the Lauderdale Plant Property or in its vicinity, since wildlife in the area would have been acclimated to noise associated with the existing plant operations and surrounding activities.

5.4.1.2 Aquatic Systems/Wetlands

No named wetlands, named surface waters, Outstanding Florida Waters, or Aquatic Preserves would be impacted by the proposed Project. Unavoidable wetland impacts associated with the Project include approximately 15.79 acres of permanent and 0.17 acres of temporary impact to mixed native and exotic wetland hardwoods [Florida Land Use, Cover, and Forms Classification System (FLUCFCS) 617/619]. Assumed secondary impacts to undisturbed wetlands adjacent to areas of fill comprise 2.25 acres.

Avoidance and minimization efforts focused upon utilization of previously-filled areas of the Lauderdale Plant property. With respect to the underground 138-kV transmission connection between the CTs and the existing switchyard and the demineralized water pipeline between the existing water treatment facility and the CTs, FPL proposes to install these facilities underneath or adjacent to existing upland pathways to the greatest extent practicable. With respect to access roads, FPL intends to utilize existing roadways for delivery of construction equipment to avoid constructing new roadways.

5.4.1.3 Endangered and Threatened Species

No negative impacts to threatened or endangered species are anticipated as a result of the Project.

Due to the lack of suitable wood stork foraging habitat, no adverse impacts are expected for wood storks. The USACE Wood Stork Effect Determination Key is provided in Appendix 10.2.4, Attachment G.

A review of the FNAI GIS database of documented listed species occurrences (Appendix 10.2.4, Attachment B - Site Location Information, Figure 6 – Threatened and Endangered Species Map) resulted in a known manatee (*Trichechus manatus*) aggregation site within South New River Canal to the southwest of the Project site. No in-water work is proposed; therefore no potential impacts to the manatee will occur.

5.4.2 Measuring and Monitoring Programs

5.4.2.1 Terrestrial Systems

No monitoring programs are needed due to the lack of habitat for protected species.

5.4.2.2 Aquatic Systems/Wetlands

The 0.17 acre of temporary wetland impact associated with transmission line and the water pipeline installation will be mitigated through in-situ restoration of wetlands. The upper layer of the soil horizon associated with the trench excavation will be scraped and placed in a spoil bank located on adjacent uplands, segregated from the spoil resulting from the further excavation of the trench. Following installation of the transmission line/pipeline segment, the upper layer of the soil horizon will be replaced and graded to restore wetland elevations allowing natural revegetation of the temporarily impacted work area from the native seed bank. No monitoring is proposed for these areas based on the small size and high likelihood of successful revegetation from adjacent wetlands.

5.5 Air Impacts

5.5.1 Air Emissions

Construction activities will result in the generation of fugitive PM₁₀ emissions and vehicle exhaust emissions. Fugitive PM₁₀ emissions will result primarily from onsite vehicular travel over paved and unpaved roads. Onsite construction 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, including the construction support area, primarily over paved surfaced roadways. Exposed land areas may also generate fugitive dust due to wind erosion.

Emissions of fugitive PM₁₀ from these activities are 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.

During the construction period, fugitive PM₁₀ emissions will result from site preparation by removing unsuitable soils and replacing the soils with fill and grading. Emissions will also result from exhaust of construction equipment such as trucks and graders. Construction equipment will produce emissions of CO, NO_x, VOC, PM₁₀, and SO₂. Estimated exhaust emissions were based on EPA emission factors for non-road diesel engines. CO, NO_x and VOC emissions were estimated using EPA Tier 3 non-road emission standards (40 CFR 89). EPA's Tier 3 emission standards were phased in from 2006 to 2008 and apply to engines from 11 to 750 hp. On June 29, 2004, EPA established Tier 4 non-road emission standards that will be phased in from 2008 to 2015 (69 Federal Register 38958-39273). Tier 4 establishes lower emission standards for PM and NO_x and the requirement to

use ULSD fuel. Some of the construction equipment will likely include engines meeting EPA Tier 4 emissions standards. EPA non-road diesel engine rules required the use of ULSD fuel in non-road engines starting in 2010 (EPA, 2008b). The use of ULSD fuel will minimize SO₂ and PM₁₀ emissions from any Tier 3 engines.

Fugitive PM₁₀ emissions may occur from wind erosion from open areas. 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 will also result from onsite construction traffic. Emissions will also result from construction equipment operating onsite with diesel and gasoline engines including cranes, trucks, compressors, etc.

Table 5.5-1 presents the estimated maximum air emissions during construction of the Project. Based on the EPA emission factors, the CO, NO_x, VOC, PM₁₀, and SO₂ emissions during construction are estimated to be 1.94, 2.28, 0.22, 1.53, and <0.01 tons, respectively, for site preparation and construction.

Reasonable precautions pursuant to FDEP Rule 62-296.320(4)(c)3, F.A.C., will be used to minimize fugitive particulate emissions.

5.5.2 Control Measures

A number of control measures will be implemented during the construction period to minimize air emissions and potential impacts pursuant to FDEP Rule 62-296.320(4)(c)3, F.A.C. The site consists of compacted soils that are difficult for wind to pick up, thereby reducing fugitive emissions due to wind. After grading, the untraveled or lightly used areas may be paved, provided with an erosion resistant covering, or vegetated to minimize fugitive PM and wind erosion. Watering on an as-needed basis will control fugitive dust from highly traveled areas.

5.6 Solid Wastes

Solid waste materials generated during Project construction will be disposed of in accordance with applicable rules and regulations. Construction and dismantlement 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 MSW) will be collected

in appropriate waste collection containers for disposal at an approved offsite location. Solid wastes from dismantlement will be managed according to Table 5.1-1.

As described in Section 4.6 and listed in Table 4.6-1, there are a variety of potential solid waste streams resulting from the construction and operation of the Project. During construction, the solid waste streams will be managed as presented in Table 4.6-1. Solvent rags will be separated and either laundered or disposed of appropriately. If aerosol cans are punctured prior to disposal, the residual contents 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 collected 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 4.7-1 with appropriate modifications to accommodate the construction of the Project.

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 used or created as part of their work. 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.

5.7 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. Construction activities will be contained within the existing plant property and follow applicable regulations, all traffic and equipment deliveries will remain on identified roadways, and practices will be maintained to reduce potential disruption to surrounding areas and eliminate unnecessary air, noise, and traffic impacts. Chapter 7.0 of this SCA provides information on income, employment, tax revenue, and service needs associated with the construction

workforce. This section focuses on workforce requirements and the impacts of construction-related traffic, housing, education, and noise.

5.7.1 Construction Workforce

The construction workforce for the Project is expected to average approximately 150 workers. Peak construction employment for the Project is estimated at approximately 200 workers in 2016. The construction workforce trade categories (by percentage) for the Project will be approximately as follows:

Trade Category	Percent
Laborers	12
Carpenters	6
Operators	5
Ironworkers	4
Millwrights	16
Pipefitters	19
Insulators	2
Electricians	22
Painters	1
Supervision	13
Total	100

FPL will promote employment of local workers by distributing Project information to the community about types of jobs and skills required, and local training opportunities. Notice of Project employment opportunities will appear in local media and FPL will sponsor or participate in area job fairs. Contractors will be solely responsible for hiring the construction workforce.

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

5.7.2 Transportation

Construction access will be via SW 42nd Street that connects to SW 30th Avenue to the east. SW 42nd Street is bisected by commercial development that includes numerous turning lanes to accommodate traffic along the route from SW 30th Avenue. The intersection of SW 42nd Street and SW 30th Avenue contains turning lanes that allow easy access to SW 42nd Street from Griffin Road to the south and

SR 84 to the north. Griffin Road and SR 84 are major arterials that connect to I-95 to the east and, SR 7/US441 and Florida's Turnpike to the west. Peak construction is estimated at approximately 200 workers for a short duration in 2016. The amount of construction workers is minor compared to the capabilities of the roads in the area and the existing traffic counts [peak construction traffic will be much less than one percent based on FDOT Annual Average Daily Traffic (AADT) 2013]. As a result, the additional traffic created by the peak construction workforce is not expected to degrade the operating conditions of the roadway networks in the area. Equipment may be delivered to the Project site by an existing road north of the cooling pond that connects to SW 30th Avenue.

5.7.3 Housing

An average of 150 construction workers will be required during Project construction, with a peak of 200 workers. Many of these workers will be employed for only a portion of the construction period due to the skill requirements throughout Project construction.

There is a significant labor pool of construction workers in Palm Beach, Broward, and Miami-Dade Counties, which is estimated to exceed 80,000 (UF/BEER, 2014). A portion of the construction labor will be specialized and potentially come from areas outside these three counties. Construction workers outside these counties may require temporary local accommodations. Although some of these workers could select permanent housing, generally owner-occupied for the duration of their stay, the majority is expected to live in temporary housing (e.g., renting). Still others could elect to reside in transitional housing, such as residential hotels, motels, rooms in private homes, or to bring their own housing in the form of campers and mobile homes. With an abundance of lodging accommodations (over 100,000 public lodging units), Broward County (UF/BEER, 2014) will be able to accommodate both the general and specialized construction workers during their temporary stay within the area.

5.7.4 Education

Because of the short duration of employment (based on anticipated skill requirements and construction activities), few workers associated with the Project are anticipated to permanently relocate with their families. As a result, there will be little in-migration of school-aged children resulting from Project construction. No significant adverse effects on local elementary, middle, or high school enrollment are, therefore, anticipated.

5.7.5 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. There are no residential land uses in the immediate area of the plant. The nearest residential locations that could potentially be impacted by the construction activities are northeast, northwest and west of the site at distances exceeding one kilometer (km).

Construction will require site preparation and erection of the CTs. The use of construction equipment such as dump trucks, cranes, graders, front-end loaders, and air compressors will be required. These sources have maximum noise levels ranging from approximately 70 to 90 A-weighted decibels (dBA) (measured at a distance of 50 feet).

The evaluation of noise impacts from Project construction activities was performed using results from a noise propagation computer program (Computer Aided Noise Abatement, CadnaA) to estimate noise source levels. Noise source levels are entered as octave band SPLs. 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 International Organization for Standards, ISO 9613-1, *Attenuation of Sound During Propagation Outdoors – Part 1: Calculation of the Absorption of Sound by the Atmosphere*. 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 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 numbers and types of construction equipment was assumed to calculate construction noise levels. Two types of construction activities were modeled; one during the daytime including weekends when several types of heavy equipment are operated and one during the nighttime including weekends when lighter

construction activities occur, such as mechanical and electrical installation that use much less heavy equipment.

Table 5.7-1 lists the major categories of equipment that will be used during the construction of the Project and their associated noise characteristics. Most of the heavy construction activities are expected to occur during the daytime hours, but some nighttime activities are expected and were included in the modeling results.

The noise levels resulting from these combinations of equipment were input as multiple sources into the model. Octave bands were estimated from *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (EPA, 1971). Only the atmospheric attenuation option was enabled during the noise modeling runs.

Table 5.7-2 presents the existing, modeled, and overall sound levels during construction. The difference between the existing sound level and overall sound level in dBA is also shown in the table. The results can be considered conservative, in that it is unlikely that all of the equipment would operate in accordance to their usage rate on the same day.

There are no State of Florida noise regulations that are applicable for the construction of the Project. The Project is located within the City of Dania Beach, which has a noise ordinance codified in Chapter 17, Article IV Noise, Sections 17-79 through 17-90, City of Dania Beach Code of Ordinances. Section 17-86 establishes maximum permissible sound levels for residential (noise sensitive areas and public space), multifamily dwelling, commercial (convention) and industrial receiving land uses.

Construction activities are exempt from the maximum permissible sound levels except that the industrial sound level limits apply in all land use categories. The industrial sound level limit for industrial land use is 75 dBA. Section 17-88(f) provide a prohibition of construction noise operating within 50 meters (164 feet) of any residential or noise sensitive area between the of 9:00 p.m. to 7:00 a.m. on weekdays and Saturdays, and 9:00 p.m. to 8:00 a.m. on Sundays and holidays. Emergency work is excluded. The residential areas are greater than 50 meters from the construction activities. Therefore, the sound level limit for industrial land uses would apply.

The results in Table 5.7-2 for the noise monitoring stations located in residential areas are all predicted to comply with the City of Dania Beach sound level limits.

5.8 Impact on Landmarks and Sensitive Areas

Project construction activities will be contained within the existing site and will meet all regulatory requirements for the activities and associated equipment. Construction activities will not result in changes to the accessibility or use of these facilities and construction traffic patterns will be kept to major thoroughfares and away from residential streets.

Emissions of fugitive PM resulting from site preparation and construction of the Project will be mitigated through BMPs. Construction noise is anticipated to be at or near existing noise levels. Visual impacts will be minor since the construction equipment such as cranes will be lower in height and less visible than the existing four stack associated with Units 4 and 5. Temporary cranes may be visible offsite from some vantage points. No use-related impacts are anticipated from Project construction at any other public recreational facilities since these areas are a considerable distance from the site.

5.9 Impact on Archaeological and Historic Sites

A desktop cultural resource survey was conducted by Archaeological and Historical Conservancy, Inc. in July 2013 of the Lauderdale Plant property in the area where the Project will be constructed. The survey included a review of relevant archives and literature that contained cultural resource reports for locations in Broward County, a review of information from the FMSF, a site reconnaissance visit, examination of U.S. Geological Survey (USGS) maps, and the collection and review of aerial photographs (color and black/white). The survey determined that there are no previously recorded archaeological sites within the Project site and there is a low probability for archaeological sites and features. Concurrence with the results from FDHR is provided in Appendix 10.7.2.

If historical or archaeological artifacts are discovered during construction, the appropriate agencies will be notified and proper procedures will be followed.

5.10 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 adverse influences on the environment or ecological systems of the site or adjacent areas.

5.11 Benefits from 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 150 workers during most of the construction period with approximately 200 workers during peak construction in 2016. 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, rental equipment (e.g., construction cranes, pumps), food services, and transportation services. Chapter 7.0 provides more detail on the social and economic benefits of the Project.

TABLE 5.1-1
POTENTIAL DECOMMISSIONING MATERIAL AND DISPOSAL OPTIONS

Potential Material	Potential Media and Location	Management Options
Asbestos	GT enclosures, cables and lines.	Asbestos will be abated consistent with the State's rules and by a licensed contractor in accordance with 469.003, F.S.
Lead Paint	GT enclosures, tanks, and miscellaneous structures.	Paint chips will be cut and drummed for characterization, if necessary, and proper disposal.
Tanks/Structure and Washwater	Tanks and structures on site that require washing prior to dismantling.	Decontaminated tanks cut for recycling and salvaged or disposed of as solid waste washwater characterized and disposed by an approved contractor.
Special Materials with Polychlorinated Biphenyls (PCBs)	PCB-containing ballasts, transformers, electrical equipment, caulk, concrete joints, cable insulation, flow meters, etc.	Characterized and disposed of in accordance with state/federal requirements.
Soil and Other Contaminated Media	No current knowledge of contamination.	Soil excavation will be conducted in accordance with FPL's spill response procedures and FDEP Bureau of Waste Cleanup requirements.
Ash, Concrete, Scrap Metal	GT enclosures, structures, etc.	Material will be recycled or disposed of in an approved landfill as appropriate.
Hazardous / Universal Wastes and Hazardous Materials	Multiple types of unused or spent media including batteries, lamps, thermostats and pesticides.	Recycled or reused, or stored and managed in accordance with FPL's waste management procedures and applicable regulations.

TABLE 5.5-1: ESTIMATED AIR EMISSIONS DURING SITE PREPARATION AND CONSTRUCTION OF PROJECT

Construction Activity	Type Operation	Amount	Units	Pollutant	Emissions	Units	Controls
Site Preparation							
Soil and Fill Placement	Batch Drop	85,409 tons		PM ₁₀	0.03 tons		High moisture material
Soil and Fill Movements	Unpaved Roads	622 VMT		PM ₁₀	0.14 tons		Watering as necessary
Compacting and Grading	Unpaved Roads	1,762 VMT		PM ₁₀	0.17 tons		Chemical dust suppressant
Equipment Emissions	Diesel Engines	12,728 gallons		PM ₁₀	0.04 tons		EPA Non-Road Tier 3
				NO _x	0.72 tons		EPA Non-Road Tier 3
				SO ₂	< 0.01 tons		EPA Non-Road Tier 3
				CO	0.69 tons		EPA Non-Road Tier 3
				VOC	0.08 tons		EPA Non-Road Tier 3
Open Areas	Wind Erosion	4 acres		PM ₁₀	0.17 TPY		Watering as necessary
Construction Worker On-site Traffic	Paved Roads	7,410 VMT/yr		PM ₁₀	0.90 TPY		Watering/Sweeping as necessary
Facilities Construction	Diesel Engines	33,280 gal/yr		PM ₁₀	0.07 TPY		EPA Non-Road Tier 3
				NO _x	1.56 TPY		EPA Non-Road Tier 3
				SO ₂	<0.01 TPY		EPA Non-Road Tier 3
				CO	1.25 TPY		EPA Non-Road Tier 3
				VOC	0.14 TPY		EPA Non-Road Tier 3

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

The following EPA emission factors were used to estimate emissions.

EPA, 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.

EPA, 2006a; AP-42, Section 13.2.1 Paved Roads.

EPA, 2006b; AP-42, Section 13.2.2 Unpaved Roads.

EPA, 2006c; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.

EPA, 2006d; AP-42, Section 13.2.5 Industrial Wind Erosion.

EPA, 2008; 40 CFR Part 89 Control of Emissions of New and In-use Compression Engines.

Table 5.7.-1. Construction Equipment Noise Sources

Equipment ID	Source Height	Levels at Octave Band Center Frequencies									dBA	Source
		31.5	63	125	250	500	1000	2000	4000	8000		
Dozer 1-CatD10/D11/D7 LGPa	2	0	103	115	106	107	103	101	97	87	109.1	Vendor Supplied - Cat_D10/D11/D7 LGPa
Compactor 1 - CAT 826G	2	0	112	119	117	115	110	105	99	93	115.6	Noise from Construction, EPA 1971 (Const_5)
Ford Tractor - 3930	2	0	107	104	102	103	100	97	95	97	105.3	Noise from Construction, EPA 1971 (Const_4)
Portable Light Gen - 1	1	0	103	111	106	99	99	94	89	85	103.6	Noise from Construction, EPA 1971 (Const_8)
Portable Light Gen - 2	1	0	103	111	106	99	99	94	89	85	103.6	Noise from Construction, EPA 1971 (Const_1)
Dump Truck	2	0	0	119	116	113	110	106	102	0	115.3	Noise from Construction, EPA 1971 (Const_1)
Excavator - Komatsu PC 300	2	68	81	93	97	99	100	100	94	88	105.0	Field Measurement @ Wolf Creek Landfill 102/20/11_gbm
Crane	2	0	112	119	117	115	110	105	99	93	115.6	Noise from Construction, EPA 1971 (Const_1)
Dump Truck Volvo A25E	2	67	72	86	92	98	99	98	94	88	103.9	Field Measurement Golder 12/20/11
Total Project Sound Power - all sources		70.4	115.9	124.4	121.6	119.4	115.3	111.4	106.5	100.3	121.0	



TABLE 5.7-2

**EXISTING, MODELED, AND OVERALL SOUND PRESSURE LEVELS FOR THE
CONSTRUCTION OF PROJECT AT THE EIGHT BACKGROUND LOCATIONS**

Monitoring Location	Time	Sound Pressure Levels (dBA)		
		Existing ^a	Modeled	Overall ^b
1: Western Entrance Gate (from SW 42nd Avenue)	Afternoon	54	45	54
	Night	53	45	54
	Morning	55	45	55
2: Eastern Entrance Gate (from SW 42nd Street)	Afternoon	53	52	55
	Night	53	52	55
	Morning	50	52	54
3: North of site, located within site boundaries	Afternoon	46	55	55
	Night	47	55	55
	Morning	49	55	56
4: North of Project, located on Canel Rd, just off of I595 and SR 84	Afternoon	64	45	64
	Night	57	45	57
	Morning	58	45	58
5: Neighborhood south of plant on SW 38th Terrace	Afternoon	57	50	58
	Night	55	50	56
	Morning	57	50	58
6: West of Project in U-Pull-it parking lot on SR-7	Afternoon	62	43	62
	Night	54	43	54
	Morning	57	43	57
7: Neighborhood southwest of Project on SW 35th Ave.	Afternoon	50	49	53
	Night	49	49	52
	Morning	51	49	53
8: 24-Hour Site: Onsite SW of Project	24-hour	57	52	58

^a L₉₀ sound levels collected October 2013.

^b Modeled results logarithmically added to the existing baseline measurements.

6.0 EFFECTS OF PLANT OPERATION

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

6.1 Effects of the Operation of the Heat Dissipation System

The Project consists of CTs that are operated in simple cycle mode and do not require a heat dissipation system. As a result, there are no associated cooling water uses, cooling water discharges or other heat dissipation impacts.

6.2 Effects of Chemical and Biocide Discharges

6.2.1 Industrial Wastewater Discharges

The operation of the Project will not require any additional industrial discharges. When firing ULSD oil, demineralized water will be required. Demineralized water will be obtained from the Lauderdale Plant's existing water treatment facility that includes an industrial discharge authorized by Industrial Wastewater (IWW) Permit FL0001503. Demineralized water for NO₂ control when firing ULSD oil will be supplied to a new 6.75 million gallon demineralized water tank. This tank will be supplied with demineralized water from the existing water treatment plant or by temporary water trailers over a period of time that accommodates all demineralized water requirements of the Lauderdale Plant's operation. Therefore, there will be a marginal increase in industrial wastewater as a result of the Project, but still well within the current authorization of the IWW Permit.

6.2.2 Cooling Tower Blowdown

The Lauderdale Plant will not have cooling towers. Therefore, there will not be any cooling tower blowdown.

6.2.3 Measurement Programs

The measurement program associated with the IWW Permit (see Appendix 10.2.2) will be adequate for measuring the physical and chemical parameters of waters that may be affected by operation of the Project.

6.3 Impacts on Water Supplies

6.3.1 Surface Water

There will be no surface water discharges required for the operation of the Project, other than storm water discharges from non-contact areas. The Project will require a marginal increase in demineralized water that will be obtained from the existing Lauderdale Plant's water treatment system. No increase in the authorized amount of wastewater discharge is required as a result of the Project. Therefore, the Project will have no adverse impact to surface water.

6.3.2 Groundwater

The Project will not use onsite groundwater or a new groundwater source for any purpose. The Project will continue to acquire water from existing water contracts with Broward County. Therefore, the Project will have no adverse impact to groundwater.

6.3.3 Drinking Water

The Project will continue to use municipal potable water from the City of Hollywood to provide drinking water for employees. There is no increase in employment at the Lauderdale Plant as a result of the Project and no associated potable water use increase for that purpose. Therefore, there will be no impact to drinking water sources from the Project.

6.3.4 Leachate and Runoff

Operation of the Project will not generate leachate and the stormwater management system has been designed to prevent direct discharge to surface waters. Therefore, there will be no adverse impact to water supplies due to runoff or leachate from the Project.

6.3.5 Measurement Programs

No additional monitoring or measurement programs are proposed.

6.4 Solid/Hazardous Waste Disposal Impacts

As discussed in Section 4.7 above, the potential solid and hazardous wastes associated with the operation of the Project will be handled according to the waste handling guidelines presented in Table 4.7-1.

6.4.1 Solid Waste

The operation of the Project will generate only minor amounts of solid wastes (e.g., used turbine inlet filters, operations and maintenance wastes, MSW, and water pretreatment solids). As explained in Section 4.7, all solid wastes generated during operation of the Project will be disposed of in appropriately licensed offsite landfills or by other approved methods. There will be no adverse impacts resulting from solid waste generated by the Project.

6.4.2 Hazardous Waste

The handling of any hazardous wastes resulting from the operation of the Project is described in Section 4.7. FPL will contract with an approved and licensed disposal company to transport and dispose of small quantities of hazardous waste at licensed facilities in a manner that complies with all federal, state, and local environmental regulations. The existing FPL Lauderdale Plant is a Conditionally Exempt Small Quantity Generator (CESQG) of hazardous waste and this is not expected to change with the operation of the Project. There will be no adverse impacts resulting from hazardous wastes generated by the Project.

6.5 Sanitary and Other Waste Discharges

Sanitary wastes from operation of the Project will be handled by the existing facilities. Quantities will remain approximately the same as there is no increase in employment as a result of the Project. There will be no adverse impacts from sanitary wastes generated by the Project.

6.6 Air Quality Impacts

As described in Section 1.0, the Project replaces 34 GTs located at the Lauderdale and Port Everglades Plants in Broward County. These existing units consist of two aero-derivative gas turbines coupled with a single gas flow driven turbine-electric generator that have low stack heights (less than 50 feet) and high NO_x emissions rates. The low stack heights in proximity to nearby property boundaries result in decreased dispersion properties and, when combined with high NO_x emission rates, result in elevated concentrations of NO₂ concentrations. The air quality analysis results conducted to support the FDEP Air Construction/PSD Permit conservatively reflect the net emissions increase of the overall Project's air quality impact without consideration of the air quality improvements made by retiring the existing GTs. This air quality improvement would occur both in the vicinity of the Project site and at Everglades National Park (ENP) and result in the expansion of the PSD Increments in the Class II areas in the Project's vicinity and at the ENP PSD Class I area.

6.6.1 Impact Assessment

An Air Construction/prevention of Significant Deterioration (PSD) application was submitted by FPL to FDEP in 2013 that contained detailed air quality analyses that evaluated compliance of the Project with all applicable air quality standards. FDEP issued Air Permit No. 0110037-011-AC (PSD-FL-423) in April 2014 for the Project based in part on the air modeling provided. Appendix 10.2.5 contains a copy of the FDEP Permit. A revision to this FDEP Air Construction/PSD Permit is being submitted to FDEP that includes an updated air quality impact analysis to confirm the previous analysis using specific design information for the GE 7FA.05 CTs. This application will be submitted separately to FDEP as a revision to FDEP Air Permit No. 0110037-011-AC (PSD-FL-423).

6.6.2 Monitoring Programs

6.6.2.1 Ambient Air Quality Monitoring

Based on the net emission changes from the proposed Project, pre-construction ambient monitoring analyses for PM₁₀, PM_{2.5}, NO₂, CO, and O₃ (based on NO_x or VOC emissions) may be required as part of the PSD application. Ambient monitoring analyses are not required if it can be demonstrated that the Project's maximum air quality impacts will not exceed the PSD significant monitoring concentrations and, for O₃, the Project's potential emissions will not exceed 100 TPY of NO_x or VOC emissions. The air modeling analysis to support FDEP Air Permit No. 0110037-011-AC (PSD-FL-423) demonstrated that air monitoring analysis is not required. This will be confirmed for the specific design information for the GE 7FA.05 CT as described in Section 6.6.1.

6.6.2.2 Air Emissions Monitoring

The CTs will be subject to New Source Performance Standards (NSPS) and the acid rain program (40 CFR 75) and therefore continuous monitoring will be required. Monitoring of fuel sulfur content will also be performed pursuant to these programs. Initial performance testing of the CTs for SO₂ and NO_x emissions will be conducted as required by Subpart KKKK.

Continuous monitoring systems (CMS) for SO₂ and NO_x are required for natural 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. NO_x emissions may be determined using procedures established in Appendix E, 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 CMS are specified (Part 75 Appendices A through I). The Part 75 CMS requirements, including QA/QC

procedures are, in general, more stringent than those specified in the NSPS for Subpart KKKK. New units are required to meet the requirements not later than 90 days after the unit commences commercial operation.

Initial and periodic compliance testing of pollutants emitted by the CTs will be conducted pursuant to the FDEP requirements as specified in the FDEP Air Construction/PSD Permit.

6.7 Noise Impacts

6.7.1 Methodology

The methodology for determining the potential noise impacts for the operation of the Project were developed using the CadnaA computer model, a computerized software program for calculation, presentation, assessment and prediction of environmental noise (DataKustik, 2008).

CadnaA 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, structures, 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 International Organization for Standardization, ISO 9613-1 *Attenuation of Sound During Propagation Outdoors - Part 1: Calculation of the Absorption of Sound by the Atmosphere*. The CadnaA path-specific attenuation can be specified to account for the effects of soil, 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.

The noise impacts for operation were evaluated using the sound power levels for the various types of sources associated with the Project. The noise resulting from the operation includes noise sources associated with the five CTs and associated electric generators, and transformers. The sound power levels used in the analysis for the CTs were based on information developed from manufactures that was field verified using actual field measurements of similar units. These sound power levels conservatively represent the actual noise levels seen in field measurements. The location of each

noise source was based on its location in the computerized site plan. The computerized drawing was imported into the CadnaA model for the noise analysis. The heights of the major structures were also input into CadnaA, developing a three-dimensional representation. Sources were input into CadnaA as point, area, and vertical area sources with appropriate dimensions.

The design of the Project includes components that mitigate noise from being emitted to the surrounding environment. The majority of the noise sources, such as the CTs, are located within enclosures that mitigate sounds emitted by equipment.

The L_w used in the analysis are presented in Table 6.7-1. There were 75 noise sources input to CadnaA that represented the noise sources associated with the Project. Noise sources such vent fans and transformers were input as point sources, while the larger equipment units were input as area sources. The sources listed in Table 6.7-1 are identified by the source name, type, number and height including horizontal and vertical areas. Sources inside structures were input as area sources that are horizontal. The vertical area noise sources represent sides of structures from which interior noise generated by the CT compressor, combustor and turbine exhaust can be emitted. The atmospheric attenuation was set at the CadnaA default value, which is ten degrees centigrade ($^{\circ}\text{C}$) (50°F) and 70 percent relative humidity. For southern Florida, the average temperature is much higher than the default value for attenuation. As a result, using a lower ambient temperature would produce conservative results since cooler temperatures result in denser air and greater transmission of noise. The ground attenuation for the area was set to represent mixed adsorption to reflect a mixture of paved surfaces, water, and vegetation. No vegetation or other structures that can act as barriers were inputs to the model. Therefore the predicted noises from the Project are conservative.

6.7.2 Impact Analysis

Table 6.7-2 presents the results of the noise modeling that includes the model results for the CTs, the existing background noise level, and overall SPLs at each noise monitoring location. The background noise levels are presented in Subsection 3.3.8. The L_{90} background noise levels were used in the analysis since the L_{90} , where the sound level is exceeded 90 percent of the time, excludes the majority of the transient noise sources, such as motor vehicles and aircraft. In contrast, the equivalent continuous sound level (L_{eq}) or the average sound pressure level, represents all the noise observed over the sampling period. As described in Section 3.3.8, there are a number of transient sources observed during the background monitoring such as motor vehicles, aircraft from FLL Airport and industrial activity in the Port. As a result, the L_{90} is a representative background for predicting the

contribution of the Project to noise levels in the vicinity of the site and is representative of the overall noise levels from an operating noise source.

There are no Florida noise regulations that are applicable for the operation of the Project. The Project is located within the City of Dania Beach, which has a noise ordinance codified in Chapter 17, Article IV Noise, Sections 17-79 through 17-90, City of Dania Beach Code of Ordinances. Section 17-86 establishes maximum permissible sound levels for residential (noise sensitive areas and public space), multifamily dwelling, commercial (convention) and industrial receiving land uses. The maximum permissible sound level for residential land uses is 60 dBA during the period 7:00 a.m. to 10:00 p.m. and 55 during the period 10:00 p.m. to 7:00 a.m. For multifamily land uses, the maximum permissible sound level is 50 dBA during the period 7:00 a.m. to 10:00 p.m. and 45 during the period 10:00 p.m. to 7:00 a.m. A multifamily dwelling is defined in the ordinance as a building or other shelter that has been divided into separate units to house more than one family. The maximum permissible sound level for commercial land uses is 65 dBA during the period 7:00 a.m. to 10:00 p.m. and 60 during the period 10:00 p.m. to 7:00 a.m. For industrial land uses the maximum permissible sound level is 75 dBA at all times. The overall noise levels included the noise determined from the CadnaA modeling results plus the L_{90} background.

As presented in Table 6.7-2, the maximum predicted SPLs from the Project is 49 dBA at Monitoring Location 1. When the background L_{90} is considered, the overall SPLs at Monitoring Location 1 are 56 dBA during the daytime and 55 dBA during the nighttime. Monitoring Location 1 is near a residential area with maximum permissible sound level of 60 dBA during the daytime and 55 dBA during the nighttime. At Monitoring Locations 5 and 7, also located in residential areas, the maximum predicted SPLs from the Project is 51 dBA and 50 dBA, respectively. The overall daytime and nighttime SPLs including the background L_{90} are 58 dBA and 56 dBA, respectively at Monitoring Location 5. At Monitoring Location 7, the overall SPLs is 54 dBA during the daytime and 52 dBA during the nighttime. The overall predicted SPLs in the residential areas including background are less than 60 dBA, which is the maximum permissible sound level in the City of Dania Beach noise ordinance. At Monitoring Locations 1 and 7, the overall predicted SPL during the nighttime is equal to or less than 55 dBA, which is the maximum permissible sound level in the City of Dania Beach's noise ordinance. While the predicted nighttime SPL at Monitoring Location 5 is 56 dBA, the Project's maximum contribution to overall SPL is 1.4 dBA. A difference of less than 3 dBA in SPLs is not noticeable by human hearing and the typical uncertainty in environmental noise observations due to temporal changes in noise sources is 3 dBA. In addition, as described previously, the predicted noise

levels are conservative since the operation of the CTs is assumed to occur at all times and certain model inputs did not include vegetation or buildings as barriers. For these reasons the operation of the CTs is not expected to exceed the City of Dania Beach maximum permissible sound levels in residential areas.

Monitoring Locations 2 and 6 are located near commercial areas with maximum predicted SPLs from the Project of 53 dBA and 45 dBA, respectively. When background SPLs at these locations are considered the overall predicted SPLs are less than the City of Dania Beach's maximum permissible sound level of 65 dBA during the daytime and 60 dBA during the nighttime.

The Lauderdale Plant and surrounding vicinity currently experiences noise associated with operation of the existing plant facilities, neighboring industrial facilities, and transportation (aircraft from FLL Airport and motor vehicles from area roadways). Based on the results of the background noise measurements and modeling, it is not expected that noise from the Project would exceed the maximum permissible sound levels in Section 17-86 of the City of Dania Beach noise ordinance.

6.8 Changes in Non-Aquatic Species Populations

6.8.1 Impacts

There will be no adverse impacts to non-aquatic species resulting from operation. Much of the existing site has been disturbed during prior construction of the existing facilities and used continuously over the more than 70 years of Lauderdale Plant operation.

There will be no adverse impacts to federal or state listed terrestrial plants or animals during the Project operations, due to the existing developed nature of the site. No long-term change in the populations of any non-aquatic threatened or endangered species is anticipated as a result of operation.

There will be no changes in wildlife populations, including listed species populations, as a result of operation. The noise and lighting impacts associated with the Project will be similar in magnitude and character when compared to the existing GTs. Operation of the Project will not deter the continued use by wildlife of undeveloped areas in the vicinity of the site.

6.8.2 Monitoring

Because no adverse impacts to non-aquatic species populations are anticipated, no monitoring program is proposed.

6.9 Other Plant Operation Effects

6.9.1 Operations Traffic

The operational workforce associated with the Project will remain unchanged. Since the number of employees will be the same, the number of traffic trips is not anticipated to increase. Because the number of daily and peak hour trips will not change as a result of the operation of the Project, no adverse impacts on traffic are anticipated.

6.9.2 Lighting

New outdoor area lighting will be provided for the Project, as required. Outdoor lighting will be necessary to satisfy OSHA requirements for worker safety, including lighting walkways, parking areas, and various equipment areas. Lighting is also necessary and required for security. Unconstrained lighting can cause light pollution and light trespass. Light pollution or sky glow is the term used to describe sky brightness caused by scattering of light in the atmosphere. Light trespass is the term used to describe light that strays from its intended purpose and becomes an annoyance. Since the land use to the east and west of the Lauderdale Plant is commercial and industrial with lighting for operations and security, the Project is not expected to cause light trespass to those adjoining properties. The land use south of the Lauderdale Plant is residential. However, the Project's location is in the northern portion of the site where any lighting associated with the CTs will be much less visible due the distance and the visual barriers from the existing Lauderdale Plant facilities such as structures associated with Units 4 and 5. As a result, no impacts from light trespass will occur in residential areas.

6.10 Archaeological Sites

No sites of historic or archaeological significance will be directly or indirectly impacted due to operation of the Project. No sites listed or eligible for listing in the *National Register of Historic Places* are located in close proximity to the Project. No direct or indirect impacts are anticipated from the operation of the project.

6.11 Resources Committed

The major irreversible and irretrievable commitments of national, state, and local resources due to the Project are the continued use of the existing site, the continued use of water for cooling and processes, and the continued use of fuels that include natural gas and ULSD oil. The continued use of these resources is more than offset by the higher efficiency of the Project and environmental improvements compared to the existing GT units.

The primary use of water by the Project will be for inlet cooling when firing natural gas or ULSD and air pollution control equipment (for NO_x control using water injection) when the CTs are firing ULSD oil (permitted for a maximum of 500 hours/year/CT). This use can be accommodated within the current raw water contract with Broward County.

Natural gas and ULSD oil will be consumed during the operation of the Project. With the use of CT technology, the consumption of fossil fuels will be 30 to 40 percent lower than the existing GT units for the same amount of electricity generated.

Table 6.7-1. Sound Pressure Levels for Noise Sources Associated with Operation of the Lauderdale CT Project

Equipment ID	Noise Source Type	Number of Sources	Levels at Octave Band Center Frequencies									dBA	dB	Source
			31.5	63	125	250	500	1000	2000	4000	8000			
GE Exhaust Diffuser with barriers	Lw	5	113	112	106	100	95	88	86	82	77	97.5	116.2	GE Power & Water_Lauderdale Peaker_7FA05_0315
GE Inlet Plenum	Lw	5	89	92	89	94	90	91	100	90	79	102.2	102.8	GE Power & Water_Lauderdale Peaker_7FA05_0315
GT TEWAC Generator	Lw	5	105	105	104	101	103	102	101	96	89	107.0	111.9	GE Power & Water_Lauderdale Peaker_7FA05_0315
GE Gas Turbine Exhaust Stack	Lw	5	132	128	122	121	118	115	104	88	69	119.5	134.1	GE Power & Water_Lauderdale Peaker_7FA05_0315
GE Inlet system with 8' Silencer	Lw	5	112	115	115	99	93	94	97	90	78	103.2	119.1	GE Power & Water_Lauderdale Peaker_7FA05_0315
Combustion Turbine Compartment All Units	Lw	5	111	113	107	106	103	101	106	102	97	110.2	117.1	GE Power & Water_Lauderdale Peaker_7FA05_0315
Stack Walls	Lw	5	115	106	101	90	85	70	57	37	11	88.7	115.7	Generic SCC6-500F Power Island_0319, 2012
Transformer	Lw	5	101	107	109	104	104	98	93	86	79	104.3	113.0	FPL Data (Tom Joseph)
GE Turbine Compartment Vent Fans	Lw	10	102	102	110	101	98	95	94	98	95	103.8	112.2	GE Power & Water_Lauderdale Peaker_7FA05_0315
GE Accessory Module	Lw	5	104	107	101	98	97	97	99	93	87	103.4	110.6	GE Power & Water_Lauderdale Peaker_7FA05_0315
GE LF/AA Module	Lw	5	104	107	101	98	97	97	99	93	88	103.5	110.6	GE Power & Water_Lauderdale Peaker_7FA05_0315
GE Cooling Water Module	Lw	5	99	99	113	105	104	104	94	89	91	107.1	114.8	GE Power & Water_Lauderdale Peaker_7FA05_0315

Lw = sound power level

TABLE 6.7-2**EXISTING, MODELED, AND OVERALL SOUND PRESSURE LEVELS FOR THE OPERATION OF PROJECT AT THE EIGHT BACKGROUND LOCATIONS**

Monitoring Location	Time	Sound Pressure Levels (dBA)		
		Existing ^a	Modeled	Overall ^b
1: Western Entrance Gate (from SW 42nd Avenue)	Afternoon	54	49	55
	Night	53	49	55
	Morning	55	49	56
2: Eastern Entrance Gate (from SW 42nd Street)	Afternoon	53	53	56
	Night	53	53	56
	Morning	50	53	54
3: North of site, located within site boundaries	Afternoon	46	56	57
	Night	47	56	57
	Morning	49	56	57
4: North of Project, located on Canel Rd, just off of I595 and SR 84	Afternoon	64	46	64
	Night	57	46	57
	Morning	58	46	58
5: Neighborhood south of plant on SW 38th Terrace	Afternoon	57	51	58
	Night	55	51	56
	Morning	57	51	58
6: West of Project in U-Pull-it parking lot on SR-7	Afternoon	62	45	62
	Night	54	45	55
	Morning	57	45	57
7: Neighborhood southwest of Project on SW 35th Ave.	Afternoon	50	50	53
	Night	49	50	52
	Morning	51	50	54
8: 24-Hour Site: Onsite SW of Project	24-hour	57	52	58

^a L₉₀ sound levels collected October 2013.

^b Modeled results logarithmically added to the existing baseline measurements.

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

The purposes of this chapter are to identify the direct and indirect economic and social benefits and costs of the Project based on both temporary (construction) and long-term (operation) time periods, with an emphasis on effects not directly concerned with the use of electricity.

Socioeconomic impacts may occur when a project directly or indirectly changes a population, housing stock, or economic activities within a given area. Construction activities could also have temporary direct and indirect impacts. In addition, an indirect effect upon a project area could result from the potential significant impacts involving land use/neighborhood character, traffic, and noise.

Direct effects are those that are the result of the construction or operation of the Project. Indirect effects are those that are the result of changes in the livelihood of the people and business interests in the vicinity of the Project who, because of their proximity, 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 are often made to assess the relative values of anticipated costs and benefits.

This chapter is divided into two parts: benefits and costs. Section 7.1 addresses the economic and social benefits of the Project, including analyses of the direct and indirect effects of Project construction and operation. Section 7.2 addresses the economic and social costs of the Project and includes analyses of the temporary and long-term indirect costs involving Project construction and operation. All costs and benefits are based on 2013 dollar values unless otherwise indicated. Washington Economic Group conducted the economic analysis.

7.1 Economic and Social Benefits

7.1.1 Direct Economic and Social Benefits

The Project is anticipated to benefit the economies of the City of Dania Beach, Broward County, and Florida. Direct benefits from construction will include construction workforce jobs and sales of equipment and materials. Direct benefits from operation include the capital expenditures, operation and maintenance expenditures and property tax revenues.

FPL estimates that the total Project capital costs will be approximately \$500 million. Principal components include the major equipment (\$300 million); materials (\$100 million); engineering, licensing and other costs (\$50 million); and labor (\$50 million).

Onsite construction activities are anticipated to begin in 2015 and conclude in 2016. Decommissioning of the existing GTs will start upon commercial operation of the new CTs. During the dismantlement of the existing GTs, workers will be employed who are specialized in removing recyclable materials and dismantling equipment, removing insulation, preparing structures for dismantlement, and material removal.

The peak construction workforce (2016) is estimated to be approximately 200 people, with an average construction workforce estimated at 150 people. The categories of workers anticipated over the Project construction period are presented below. The construction payroll for the Project is estimated to be \$30 million during the peak year (2016) with an annual average of \$24 million for the period 2015 through 2016.

Trade Category	Percent
Laborers	12
Carpenters	6
Operators	5
Ironworkers	4
Millwrights	16
Pipefitters	19
Insulators	2
Electricians	22
Painters	1
Supervision	<u>13</u>
Total	100

Due to the proximity of the site to the large labor markets in Broward, Palm Beach, and Miami-Dade Counties, the labor demand for the Project construction and operation is anticipated to be met by workers living in this area, as well as skilled labor from outside the area.

The Project will become operational in December 2016. The existing operational staff at the Lauderdale Plant will provide the operational and maintenance staff for the new CTs. This includes staff currently providing operating and maintenance on the existing GTs. Operation and maintenance

costs of the Project, excluding fuel costs, are estimated to be approximately \$1.3 million annually (2016 dollars).

The operation of the Project is expected to generate \$126.0 million in property tax revenue from 2017 to 2043. This is comprised of approximately \$37.8 million to the City of Dania Beach, approximately \$42.8 million to Broward County, and approximately \$45.4 million to the school district.

7.1.2 Economic Benefits of Construction

It is anticipated that the majority of the Project's expenditures, excluding major equipment, will be spent within Broward County and the surrounding communities, which includes the cities of Dania Beach and Hollywood. These expenditures 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, earnings, and tax revenues. These synergistic economic benefits of the Project will be enjoyed by other businesses whose sales will increase as a result of the Project. For example, sales could increase for commercial services including gas stations, convenience stores, and restaurants. If construction workers were to frequent businesses before, during, or after their workday, it would result in increased business to area merchants. During the construction period, area suppliers could also benefit by supplying needed materials such as concrete, stone, drainage piping, and other building materials that are normally manufactured or produced in the region. In addition, construction equipment may be rented locally.

There will be economic benefits from indirect and induced effects, including labor income and value-added effects. Indirect effects result from an increase in demand that results from the need for material inputs. Induced effects are the economic growth resulting from indirect effects. Value-added effects are the portions of business revenues that are available to pay compensation to workers, capital income, and indirect business taxes. Value-added effects are also the principal source of income to households and a key measure of the Project's contribution to the Broward County economy.

7.1.3 Fiscal Benefits to Local Governments

The net economic impact of the Project on the City of Dania Beach, Broward County, and other governmental entities, from years 2017 to 2046, is the difference between the total benefits and costs.

Operating revenues to government entities include *ad valorem* tax revenue, occupational licenses, building permit fees, utility taxes, state revenue proceeds, and charges for services (e.g., potable water and wastewater disposal) paid by FPL. Services are required for all residents who are working in the city and county. As a result, the City of Dania Beach and Broward County will incur costs for these services related to the Project and its employees.

Operating costs to government entities include costs for services such as financial and administrative expenses, emergency and disaster relief, legislative and executive expenses, and comprehensive planning. Both the city and county governments also receive capital revenues and pay capital expenses. Capital revenues are based on impact fees, and capital expenses are costs related to purchases for roads, fire rescue, law enforcement, etc.

Annual property taxes will accrue to the City of Dania Beach, Broward County, and the Broward County School District. These funds are then distributed to the various entities within the governmental jurisdictions. The operation is expected to generate \$126.0 million in property tax revenue from 2017 to 2043. The property tax revenues for the Project are estimated over the assumed life of the Project to be approximately \$37.8 million to the City of Dania Beach, approximately \$42.8 million to Broward County's general fund, and approximately \$45.4 million to the school district. Together, these economic benefits far outweigh the services that would be required by the operation of the Project and its employees.

7.1.4 Economic Benefits of Operation

The Project will have significant direct, indirect, and induced economic benefits of its ongoing operation. During operation, approximately \$1.3 million per year will be spent on operation (excluding fuel costs) and maintenance.

7.1.5 Environmental Benefits

Construction and operation of the Project will not cause any adverse environmental impacts or impacts to the recreational values of the area. Environmental impacts of Project construction will be minimized.

Most importantly, there will be significant benefits associated with the Project. The five new CTs will be more energy efficient than the existing GTs and will provide cleaner energy to FPL's

customers. For the same amount of generation hourly, from 30 to 40 percent less fuel will be used in the new CT units compared to the older GT units.

Air emission rates for NO_x with the Project will be approximately 90 percent lower than the existing GT emission rates, resulting in significantly lower air quality impacts. In addition to lower air emissions, the maximum total air quality impacts for the Project are predicted to be well below and in compliance with the NAAQS. For pollutants such as NO₂, the Project's total air quality impacts are predicted to be reduced by 40 percent or more when compared to the existing GTs.

7.2 Economic and Social Costs

7.2.1 Temporary External Costs

Over 80,000 construction workers reside within Broward, Palm Beach, and Miami-Dade Counties (UF/BEBR, 2014). Ample labor supply in many skilled areas for the Project exists within commuting distance. However, some especially skilled workers from outside the region will commute from longer distances and will choose to live in transient accommodations (i.e., motels and hotels). As is typical with construction projects of similar duration, it is not anticipated that workers will relocate to the immediate area and alter the demands on public facilities and services. Transient accommodations are plentiful in the area with over 30,000 units in transient apartment building, hotel and motel units in Broward County (UF/BEBR, 2014).

Since workers will predominately commute and not relocate permanently into the region, it is not anticipated that construction will create new or unusual impacts or demands on public facilities or services.

Labor demands associated with the construction and operation of the Project are not anticipated to create any labor shortages. Expenditures for equipment and materials and consumption by construction workers will boost incomes within the city, county, and surrounding counties. Population and housing impacts associated with the Project will be slight due to minimal in-migration expected into the area.

Temporary external social costs of the Project include the generation of traffic and noise during construction. At peak construction, the roadways utilized for the construction traffic associated with the Project will have a very minor influence on the level of service.

Construction-related activities will be contained within the Project site and the construction parking and laydown areas. Construction of the Project will not significantly impact residential, commercial, or recreational values and will improve the visual qualities in the vicinity of the site.

Although the local community may experience some minor temporary impacts during the construction period, overall socioeconomic impacts associated with the construction of the Project will be favorable.

7.2.2 Long-Term External Costs

The external social cost impacts of the Project's operation will be minimal and localized. The operation of the Project will not cause any adverse impacts to public or private facilities used for recreational purposes or impairment to recreational values, result in any deterioration of aesthetic and scenic values, or restrict access to areas of scenic values.

The operational workforce for the new CTs will be from the existing Lauderdale Plant staff. As a result, there will be no adverse impacts of the operation upon local services (e.g., schools, police, and transportation). The Project will result in modifications of the current FPL property values that will in turn increase the *ad valorem* revenue. The long-term revenue source that will be paid to the City of Dania Beach, Broward County, the School District, and other taxing authorities will be significantly greater than current sources and, with the operational practices to remain consistent with current practices, there will not be an increase of costs to the local government for public facilities or services.

FPL will minimize the Project's impacts on the environment and the community, and the Project's design will incorporate features such as noise attenuation and air pollution control equipment that reduce potential impacts.

8.0 SITE AND DESIGN ALTERNATIVES

This optional Chapter of this petition for modification is not included in this application because it is not anticipated that an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) is required for the Project.

9.0 ELECTRICAL TRANSMISSION LINES

The Lauderdale Plant already has the transmission infrastructure necessary to transfer the power from the electric generators associated with the Project to the transmission system. The Project may require reconductering and/or other upgrades to existing systems. The existing system switchyard has equipment to support both 230 kV and 138 kV voltage levels. Three CTs will be connected to the existing 138 kV system switchyard and two CTs will be connected to the existing 230 kV system switchyard. No new offsite transmission lines are required.