

1.0 INTRODUCTION

This supplemental site certification application (SCA) is filed by Tampa Electric Company (Tampa Electric), the Applicant, for the proposed addition of electrical generating facilities at Tampa Electric's existing Polk Power Station (PPS) in Polk County, Florida. The PPS Site was previously certified as an electrical power plant site, with an ultimate site capacity of 1,150 megawatts (MW), in January 1994 (SCA No. PA 92-32) pursuant to the Florida Electrical Power Plant Siting Act (PPSA), Section 403.501 through 403.518, Florida Statutes (F.S.). The proposed additional generating facilities will be developed by converting the four existing simple cycle combustion turbine generators (CTGs) (currently known as Polk Units 2, 3, 4, and 5) at PPS to a nominal net 1,160-MW four-on-one combined cycle (CC) unit with the addition of four new heat recovery steam generators (HRSGs) and a new steam turbine generator (STG). In this SCA, the proposed project will be referred to as the Polk 2-5 Combined Cycle Conversion Project (hereafter referred to as Polk 2-5 Conversion Project or the Project).

This SCA follows the prescribed format of the Florida Department of Environmental Protection (FDEP) Application Instruction Guide: Electrical Power Plant Sites and Associated Facilities and Electrical Transmission Lines, FDEP Form Chapter 62-16.900, Florida Administrative Code (F.A.C.), revised September 1, 2009. This SCA has also been prepared in accordance with FDEP's procedural rules for implementing the PPSA, Chapter 62-17, F.A.C., effective February 16, 2012.

This SCA chapter identifies the Applicant, Tampa Electric, provides basic information on Tampa Electric, provides an introductory overview of the PPS Site and proposed Polk 2-5 Conversion Project, and describes the purpose of the SCA.

1.1 APPLICANT INFORMATION

1.1.1 APPLICANT IDENTIFICATION

Tampa Electric is the Applicant for the proposed Polk 2-5 Conversion Project additional generating facilities at its existing PPS Site. Table 1.1.1-1 provides basic identification information for Tampa Electric as prescribed under FDEP's SCA instruction guide.

Table 1.1.1-1. Applicant Information

Applicant's Official Name:	Tampa Electric Company
Address of Applicant:	702 North Franklin Street, Tampa, Florida 33602
Address of Official Headquarters:	702 North Franklin Street, Tampa, Florida 33602
Business Entity (corporation, partnership, cooperative):	Corporation
Name and Title of Chief Executive Officer:	Gordon L. Gillette, President
Name, Address, and Telephone Number of Official Representative Responsible for Obtaining Certification:	Paul L. Carpinone Director, Environmental, Health and Safety Tampa Electric Company 702 North Franklin Street Tampa, Florida 33602 Telephone: 813/228-4858
Site Location—County:	Polk County
Nearest Incorporated City:	City of Mulberry, 11 miles to the north
Latitude and Longitude:	Latitude: 27° 43' 43" Longitude: 81° 59' 23"
Universal Transverse Mercators (UTM), Northerly and Easterly:	Northerly: 3067.35 Easterly: 402.45
Section, Township, Range:	All or portions of Sections 1 through 4 and 7 through 12, Township 32 South, Range 23 East and Sections 34 and 35, Township 31 South, Range 23 East
Location of Any Directly Associated Transmission Facilities (Counties):	Polk and Hillsborough Counties, new single-circuit 230-kilovolt (kV) transmission line from PPS Site to Tampa Electric's existing Mines substation and to the new Aspen substation and then two new single-circuit 230-kV transmission lines from the Aspen substation to Tampa Electric's existing Fishhawk substation; upgrades to PPS to Pebbledale 230-kV transmission line
Name Plate Generating Capacity of Additional Unit:	1,160 MW (nominal net)
Ultimate Site Capacity:	Currently certified ultimate capacity at PPS is a nominal net 1,150 MW; Polk 2-5 Conversion Project will increase the nominal net ultimate capacity to 1,420 MW
Additional Information:	Project Name: Polk Power Station (Polk) 2-5 Conversion Project

Source: Tampa Electric, 2012.

1.1.2 TAMPA ELECTRIC INFORMATION

Tampa Electric is an investor-owned electric utility, headquartered in Tampa, Florida, that has supplied customers in the Tampa Bay area with electricity since 1899 and is regulated by the Florida Public Service Commission (PSC). Tampa Electric is the principal subsidiary of TECO Energy, Inc., an integrated energy-related holding company with core businesses in the utility sector, complemented by a family of related businesses, including Peoples Gas System and subsidiaries, engaged in coal mining and independent power.

Tampa Electric's west-central Florida electricity service territory covers approximately 2,000 square miles (mi²), including all of Hillsborough County and portions of Polk, Pasco, and Pinellas Counties (see Figure 1.1.2-1). Tampa Electric provides electricity service to more than 677,000 residential, commercial, industrial, and governmental customers. Tampa Electric's owned power supply resources have an electric generating capacity of approximately 4,700 MW (winter) and 4,300 MW (summer), including 18 units located at five generating stations: Big Bend, H.L. Culbreath Bayside, J.H. Phillips, PPS, and Partnership stations. These owned power supply resources consist of a diversity of generating technology and fueled units, including coal-fired steam units, natural gas-fired CC units, natural gas- and oil-fired CTG and internal combustion units, and a coal-fueled integrated gasification combined cycle (IGCC) unit (Polk Unit 1). The two diesel engine units at the J.H. Phillips Power Station were placed in long-term reserve standby in 2009. To provide flexibility in meeting its power supply needs, Tampa Electric also has various purchased power agreements with other Florida utilities and other entities, including cogeneration and renewable energy resources. Tampa Electric's electric transmission and distribution system is comprised of 214 substations, approximately 1,328 miles of transmission lines, and 11,026 miles of distribution lines.

1.2 OVERVIEW OF EXISTING PPS SITE AND FACILITIES

The proposed Polk 2-5 Conversion Project will be collocated and integrated with the existing facilities at Tampa Electric's PPS Site in Polk County, Florida. The following sections provide overviews of the PPS Site, existing facilities at the Site, and the proposed Polk 2-5 Conversion Project. Chapter 3.0 of this SCA provides more detailed descriptions of the PPS Site.



FIGURE 1.1.2-1.

TAMPA ELECTRIC'S SERVICE TERRITORY AND GENERATING STATION LOCATIONS

Source: Tampa Electric, 2012.

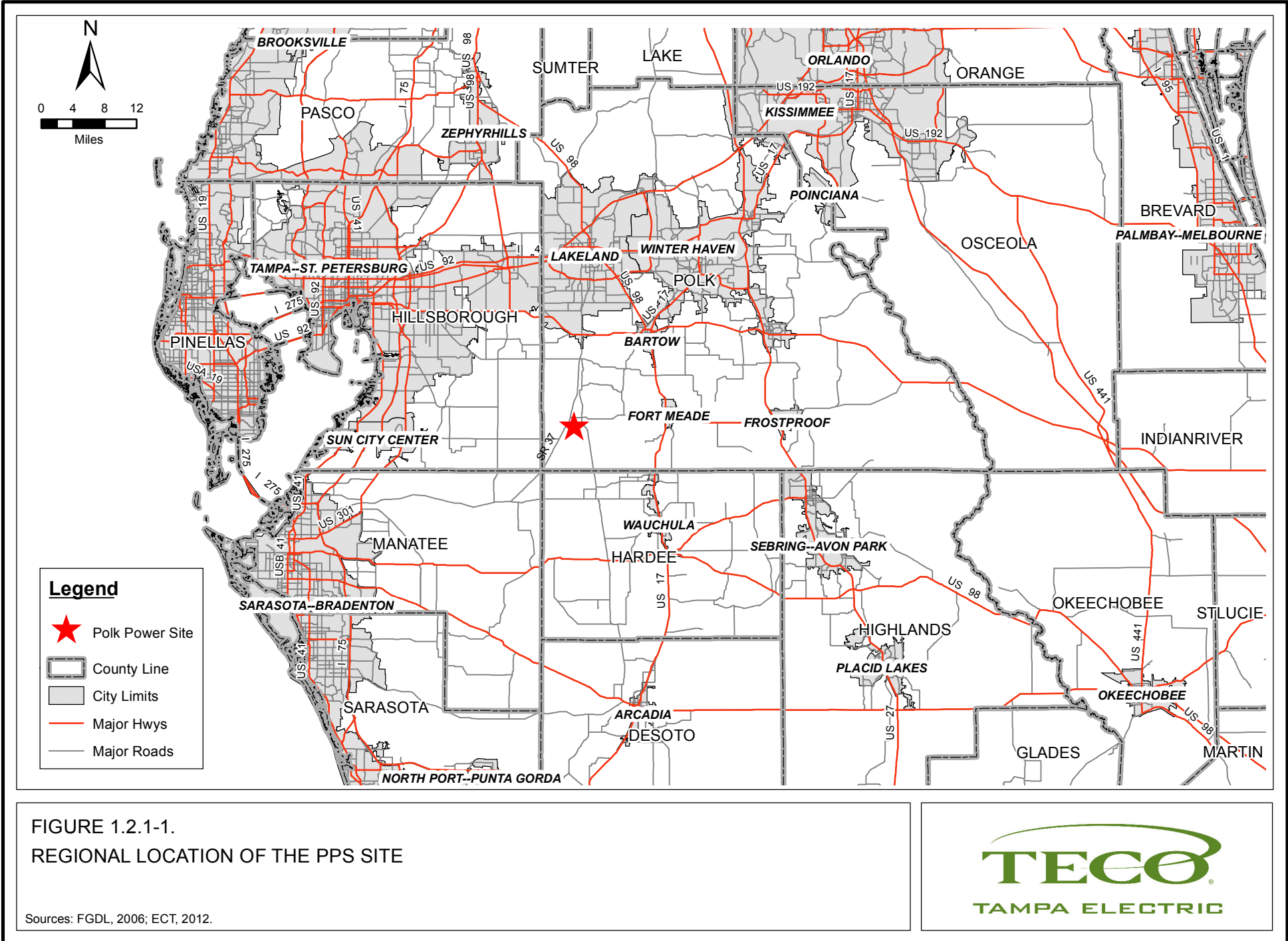


1.2.1 PPS SITE LOCATION AND DESCRIPTION

The Tampa Electric PPS Site is located in southwestern Polk County, approximately 11 miles south of the city of Mulberry, 17 miles south of the city of Lakeland, and 28 miles southeast of the city of Tampa. Figure 1.2.1-1 shows the location of the Site in the west-central Florida region, and Figure 1.2.1-2 provides a general vicinity map with the Site's approximate boundaries. The Site consists of approximately 4,348 acres and is bordered by the Hillsborough County line on the west; County Road (CR) 663 (Fort Green Road) on the east; and CR 630 and Bethlehem and Albritton Roads along the north. Several former phosphate clay settling areas and State Road (SR) 674 border the southern site boundary. SR 37 bisects the property, running in a southwest to northeast direction.

Prior to Tampa Electric's development of the Site for PPS, the Site property consisted primarily of mined phosphate lands with water-filled mine cuts between spoil piles. The specific portion of the Site containing the existing facilities, as well as the site area for the proposed Polk 2-6 Conversion Project facilities, is unmined land. In general, the majority of lands surrounding the Site and in the region have also been previously impacted by phosphate mining operations. As part of its property purchase agreements, Tampa Electric assumed responsibility for the reclamation of the mined lands in accordance with FDEP Mine Reclamation requirements (formerly Chapter 16C-16, F.A.C.; now Chapter 62C-16, F.A.C.) and Polk County Phosphate Mining Ordinance 88-19. Tampa Electric has reclaimed all mined lands in accordance with applicable requirements, and all reclaimed lands on the Site have been released under the applicable reclamation procedures.

The approximately 1,511-acre portion of the originally certified PPS Site located west of SR 37 currently contains no power plant-related facilities, and no facilities will be located on this property as part of the proposed Polk 2-5 Conversion Project. Tampa Electric donated this portion of the Site to the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida as a wildlife management/recreation area, and the deed was recorded on May 15, 2012. As part of this PPSA proceeding, Tampa Electric requests the existing certification for the PPS Site be amended to remove this approximately 1,511-acre area from the certified Site. The descriptions and analyses of the PPS Site presented in this SCA for the Polk 2-5 Conversion Project focus on the approximately 2,837-acre portion of the Site located east of SR 37.



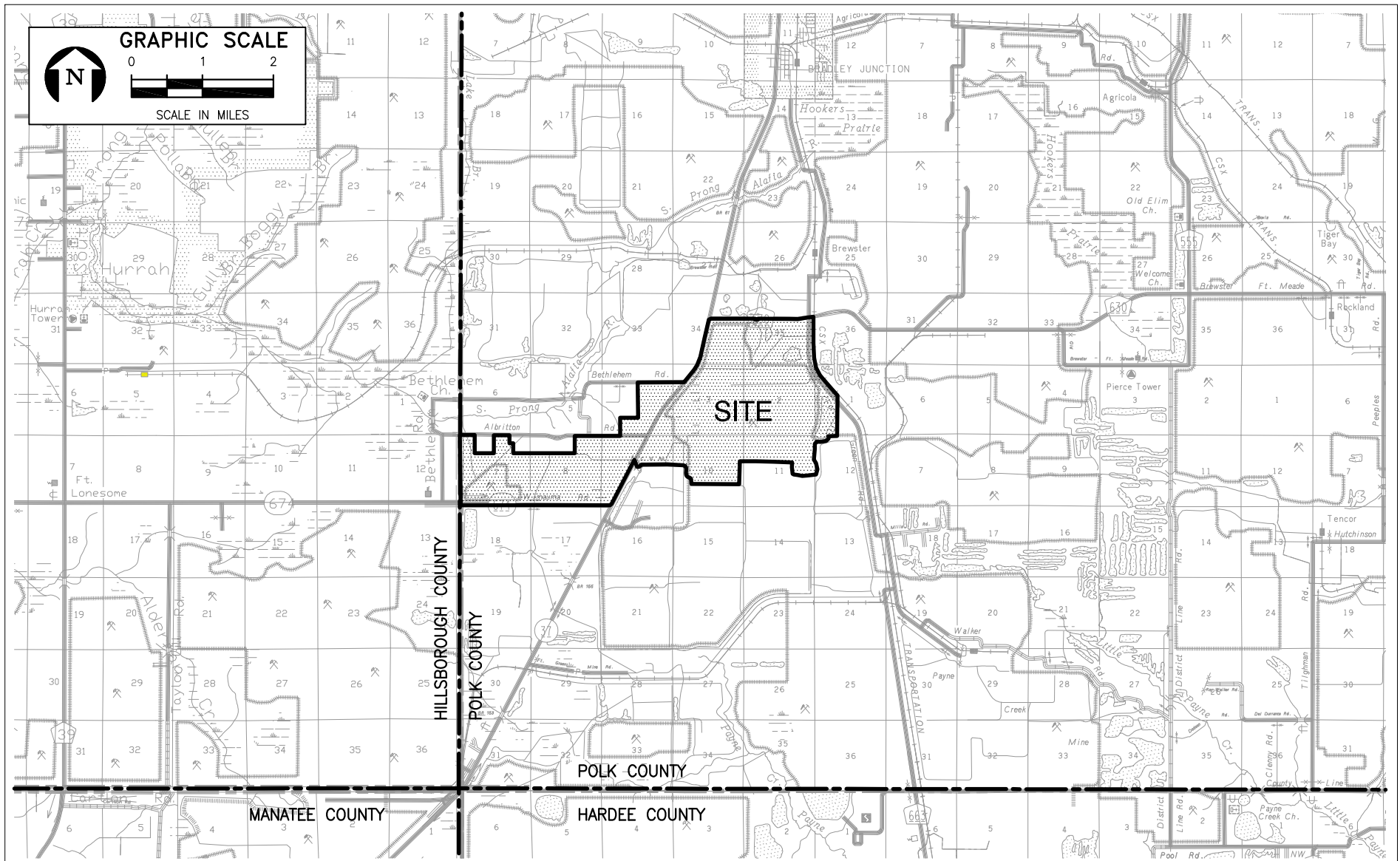


FIGURE 1.2.1-2.
GENERAL VICINITY MAP AND BOUNDARIES OF THE PPS SITE

Source: FDOT Map, 2000; ECT, 2012.



1.2.2 EXISTING FACILITIES AT THE PPS SITE

The PPS Site currently contains five electric generating units and associated facilities. Polk Unit 1 is a nominal net 260-MW IGCC facility that began commercial operation in the fall of 1996. Polk Unit 1 IGCC is fired with synthesis gas (syngas) produced by gasifying coal and other solid fuels. Distillate fuel oil is used for startup operations and as backup fuel for Unit 1. Currently, permitting efforts are underway to change the startup and backup fuel for Unit 1 to natural gas. The Polk Unit 1 electric generating unit consists of a nominal 190-MW CTG and a nominal net 70-MW HRSG and STG facility. Polk Units 2 through 5 are nominal 165-MW, simple cycle CTG facilities fueled primarily with natural gas with distillate fuel oil as backup for Units 2 and 3. Units 2 and 3 started commercial operation in July 2000 and May 2002, respectively. Unit 4 was placed in service in March 2007 and Unit 5 in May 2007.

IGCC represents state-of-the-art technology to cleanly and efficiently generate electricity using coal and other solid fuels. The technology integrates state-of-the-art environmental control systems to achieve lower air emissions compared to other, advanced coal-fired generating units. Polk Unit 1 was developed by Tampa Electric with funding support from the U.S. Department of Energy (DOE) under its Clean Coal Technology Program to demonstrate the commercialization of the IGCC technology. Tampa Electric has successfully operated Polk Unit 1 for more than 15 years.

Key supporting, existing facilities at the PPS Site include:

- Cooling reservoir.
- Oxygen-blown gasifier.
- Air separation unit.
- Sulfuric acid plant.
- Slag byproduct storage area.
- Switchyard

The existing approximately 755-acre (i.e., water surface) cooling reservoir was constructed by modifying previously mined-out areas. The cooling reservoir is currently primarily used for condenser and other cooling purposes for Polk Unit 1; however, the reservoir was designed during initial development to be capable of providing additional cooling capacity to support the future buildout of PPS.

The existing oxygen-blown gasifier facility is used to produce syngas for firing in Polk Unit 1. The existing air separation unit facility is used to separate air into its primary components: nitrogen and oxygen. The oxygen is used in the fuel gasification process as an oxidant, while the nitrogen is injected into the CTG to control

nitrogen oxides (NO_x) emissions, as well as provide power augmentation for Polk Unit 1.

Prior to firing in the Polk Unit 1 CTG, the syngas is treated to remove sulfur compounds. The resultant sulfur-laden gas (i.e., acid gas), which is removed from the syngas, is converted to commercial-grade sulfuric acid (H₂SO₄) in the existing sulfuric acid plant at the PPS Site. This H₂SO₄ byproduct is sold for offsite commercial uses. The existing PPS Site includes facilities for the temporary storage and shipment of the H₂SO₄ byproduct. Slag byproduct from the gasification process for Unit 1 is also currently sold for offsite commercial uses. For the existing Polk Unit 1 operations, noncommercial-grade slag is separated and temporarily stored in the existing lined 3-acre slag storage area to allow for beneficial reuse of high-carbon, off-spec slag and to manage off-spec slag until it can be appropriately disposed at an offsite, permitted landfill.

The existing PPS Site is served by four 230-kilovolt (kV) transmission circuits and onsite switchyard, a CSX Transportation, Inc. (CSX), railroad line, and a Florida Gas Transmission (FGT) natural gas pipeline. Plant process and cooling reservoir makeup water is currently supplied from four onsite groundwater wells, and process wastewater is treated and reused within the processes. Potable water is provided from the onsite wells and treatment facility. Sanitary wastewater is disposed through an existing septic system. Other existing onsite facilities include an administration building, control room, warehouse, and construction management building.

Two recent developments at the PPS Site include the RTI International (RTI) high-temperature syngas cleanup and temporary carbon capture project and the reclaimed water project. The RTI project involves the precommercial scale-up and demonstration of RTI-developed syngas cleanup technologies to remove sulfur, reduce trace contaminants, convert removed sulfur compounds to elemental sulfur in a slipstream of syngas from the Polk Unit 1 IGCC, as well as temporarily capture carbon in the form of carbon dioxide (CO₂) in the cleaned syngas. The RTI demonstration project has received financial support from DOE and will be operated by RTI for an approximately 18-month period beginning in the third quarter of 2013.

The reclaimed water project involves the treatment and use of reclaimed water as an alternative supply to groundwater for cooling reservoir makeup and plant process water at PPS. The reclaimed water will be provided from the city of Lake-

land's wetland treatment system, located east of the city of Mulberry, and pumped through an approximately 15-mile pipeline in to the PPS Site. On the Site, the reclaimed water will be treated by several processes in new water treatment facilities prior to being used as cooling reservoir makeup and process water. As part of the project, the concentrate wastewater from the reverse osmosis (RO) treatment process will be disposed by injection into two deep wells on the Site. The reclaimed water pipeline and treatment facilities are projected to be in operation in June 2014.

The reclaimed water pipeline was approved as Modification M of the PPS site certification in October 2011, and the RTI and onsite reclaimed water treatment facilities projects were approved as Modification N of the PPS site certification in September 2012. The construction, testing, and operation of the two deep injection wells are being permitted under the requirements of the FDEP underground injection control (UIC) program.

Tampa Electric's decision to locate the proposed Polk 2-5 Conversion Project at its existing PPS Site provides numerous synergies and economic and environmental benefits for development of the new power plant. Many of the existing facilities at the PPS Site will be integrated and used, with minor modifications as needed, to support the development and operation of the proposed Project. Examples of these positive synergies include collocation at a previously certified and locally accepted power plant site; use of the existing cooling reservoir; and use of the existing site infrastructure facilities such as existing access roads, natural gas pipeline interconnection, railroad, transmission line interconnection, potable water and sanitary wastewater disposal facilities, and administration and other building facilities. The integration and use of the existing facilities at the PPS Site will assist in minimizing potential environmental impacts of the proposed Polk 2-5 Conversion Project.

1.3 OVERVIEW OF POLK 2-5 CONVERSION PROJECT

Based on its integrated resource planning (IRP) process, Tampa Electric has determined the need for additional generating capacity in the early 2017 time frame. The results of Tampa Electric's IRP process have also determined that the most cost-effective and reliable alternative to meet its future power needs is the construction of the proposed Polk 2-5 Conversion Project at its existing PPS Site. The Project will be a state-of-the-art electric generating unit with advanced air emissions control and other environmental control systems.

The proposed Polk 2-5 Conversion Project will involve the conversion of the four existing simple cycle CTG units (i.e., Units 2 through 5) at PPS to CC operation. The proposed Project will be a four-on-one CC unit consisting of the four existing CTGs, four new HRSGs, and a new STG. The CC conversion will increase the nominal net generating capacity of the four existing units from 660 to 1,160 MW. Construction activities for the proposed Project are currently scheduled to begin in February 2014, and commercial operation is scheduled for January 2017.

The efficiency of electrical power generation is improved when a simple cycle CTG is combined with an HRSG and STG for CC operation. When CTG operate in simple cycle mode, the hot combustion gases are released to the atmosphere. In CC configuration, the hot gases from the CTG are used to produce steam in an HRSG, and the steam is then used to drive an STG to generate additional electricity without additional fuel input. Figure 1.3.0-1 provides a conceptual process flow diagram for the proposed Polk 2-5 Conversion Project.

As shown in the flow diagram, the four CTGs will be fired on natural gas as the primary fuel, with ultra-low sulfur diesel (ULSD) fuel oil as backup fuel. The Project includes the addition of fuel oil firing for Units 4 and 5. The four HRSGs will be designed with natural gas-fired duct burners for peaking operations. Also, evaporative coolers will be installed on the CTGs to increase power generation in warm weather by increasing the inlet air density to the CTGs. The proposed Project will be designed to allow the CTGs to be operated in simple cycle mode when the STG is out of service by using diverter dampers and bypass exhaust stacks. The CTGs may also be operated in simple cycle mode to meet peak power demands.

The CTGs will be equipped with dry low-NO_x combustors to control NO_x air emissions when firing natural gas and water injection capabilities when firing ULSD. The four HRSGs will be equipped with selective catalytic reduction (SCR) systems to further reduce NO_x emissions.

The proposed Polk 2-5 Conversion Project will be integrated into the existing PPS operations and designed to minimize the use of water and maximize the recycling/reuse of water. For the Project, the existing 755-acre cooling reservoir will be used for condenser cooling purposes similar to Unit 1 operations. A new six-cell mechanical draft cooling tower will be constructed to provide cooling for the proposed Project auxiliary systems. Also, the auxiliary cooling systems for Unit 1

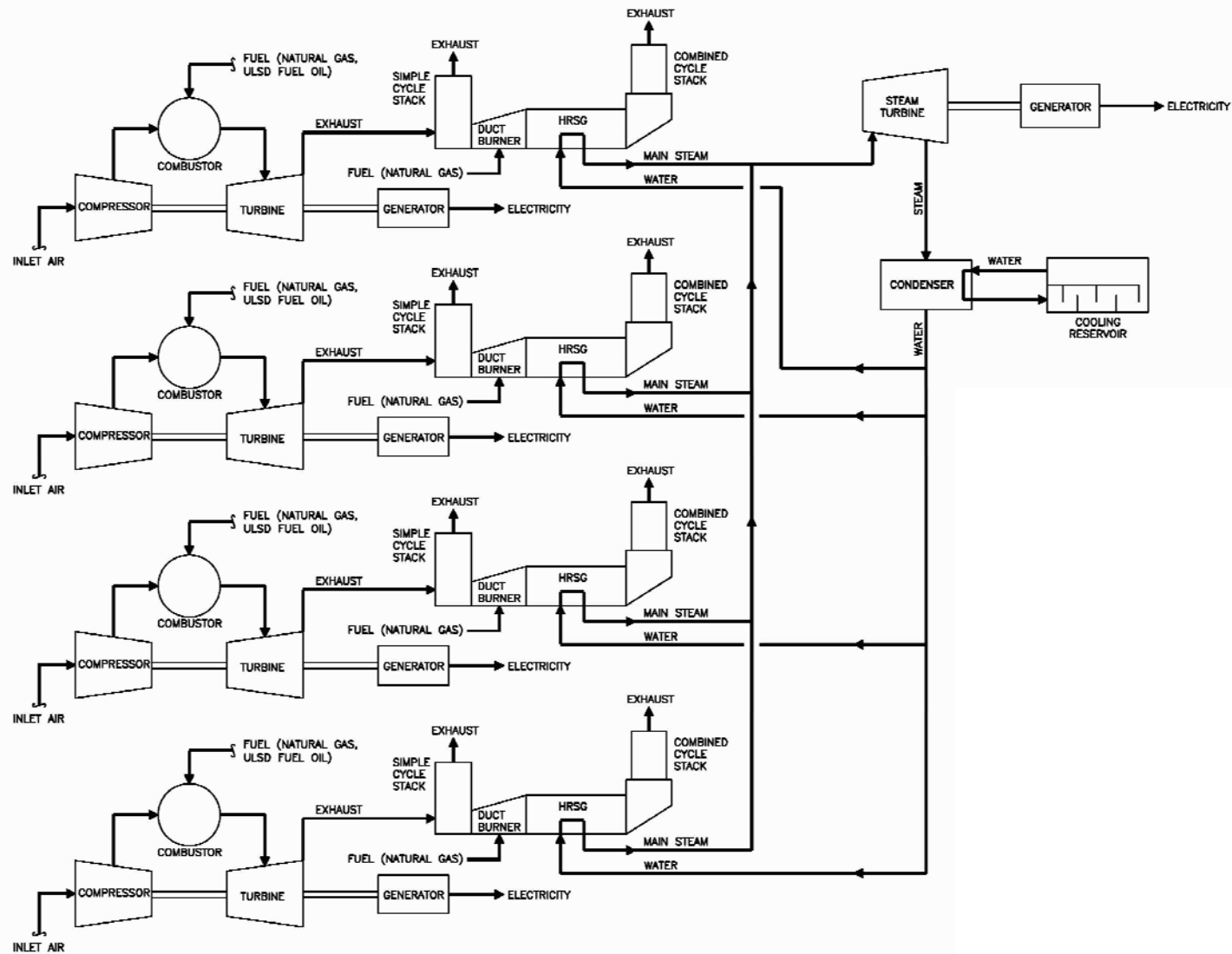


FIGURE 1.3.0-1.
CONCEPTUAL PROCESS FLOW DIAGRAM

Source: Black & Veatch, 2012.

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will be modified to use the new cooling tower instead of the reservoir. Blowdown from the cooling tower will be recycled to the cooling reservoir.

Currently, all water for existing PPS operations is provided by groundwater withdrawn from onsite wells. To minimize the use of groundwater and support future generation expansion at PPS, Tampa Electric is currently implementing a project to treat and use reclaimed water from the city of Lakeland as an alternative water supply for PPS operations. For the proposed Project, reclaimed water will be used, to the extent possible, as makeup water to the cooling reservoir and for the makeup water for the new cooling tower. Groundwater will continue to be used for a portion of the cooling reservoir makeup needs and for higher quality process water needs for both the proposed Polk 2-5 Conversion Project and Unit 1. Treated reclaimed water will also be used for a portion of the process water needs.

Many of the associated facilities needed for the proposed Polk 2-5 Conversion Project will be integrated and provided through the existing facilities at PPS. The existing onsite natural gas pipeline will provide the primary fuel for the Project, and backup ULSD will be provided by the existing onsite fuel oil storage facilities. The existing administration building, control room, warehouse, maintenance shop, access roads, potable water and sanitary wastewater systems, and other support facilities will serve the proposed Project with only minor modifications.

The proposed Project will require development of a new, approximately 27-mile offsite transmission line corridor. A new single-circuit, 230-kV transmission line will run south and west from the PPS Site to Tampa Electric's existing Mines substation in Hillsborough County just north of CR 674 and then run northeast to a new substation, known as the Aspen substation. From the Aspen substation, two single-circuit, 230-kV transmission lines will run north to Tampa Electric's existing Fishhawk substation. In addition, the Project will require the upgrade of a portion of the existing Tampa Electric single-circuit, 230-kV transmission line from the PPS substation to the Pebbledale substation in Polk County. Tampa Electric is seeking certification of the proposed corridors for these new transmission lines and upgrades within this PPSA proceeding. The new Aspen substation is not included for certification within this PPSA proceeding.

1.4 PURPOSE OF THE SITE CERTIFICATION APPLICATION

The licensing or permitting of power plants and associated facilities in Florida requires compliance with applicable federal, state, and local laws, regulations, and ordinances. The primary state law applicable to the licensing of the Polk 2-5 Conversion Project is the PPSA, Section 403.501-403.518, F.S.

The PPSA establishes the policy of the state to balance the need for new power plant facilities to meet growing power demands with the potential effects of the facility construction and operation on human health, welfare, and environmental resources of the state. To implement this policy, the PPSA establishes a centrally coordinated application, agency review, and approval process known as the site certification process. The certification proceedings are initiated by the applicant filing an SCA with FDEP and other agencies. FDEP administers and centrally coordinates the process with affected agencies, governmental entities, other parties, and the applicant. The process concludes with the approval or certification of the power plant and associated facilities by the Governor and Cabinet, sitting as the Siting Board, or by FDEP. The FDEP rules for implementing the PPSA are contained in Chapter 62-17, F.A.C.

To the extent possible, the procedures for federally approved or delegated permit programs are coordinated with the state SCA review procedures. These federally approved or delegated permit programs include New Source Review (NSR), Prevention of Significant Deterioration (PSD), National Pollutant Discharge Elimination System (NPDES), and UIC programs. FDEP is required to review and issue permits for these federally approved or delegated programs under the specific requirements of the programs. This SCA includes the applicable NSR/PSD and NPDES permit applications and supporting information for the proposed Project.

The PPS Site was originally certified pursuant to the PPSA in January 1994 (SCA No. PA 92-32). The final order for the initial certification authorized the construction and operation of Polk Unit 1 260-MW IGCC plant and associated facilities, subject to conditions of certification (COCs). The final order also included certification of an ultimate generating capacity for the Polk Site of 1,150 MW (nominal net). At the time of certification, Tampa Electric's power resource planning efforts indicated that the best combination of generating capacity additions to meet its customer needs in the 1995 through 2001 time frame consisted of the following:

<u>Original Ultimate Capacity PPS Generating Units</u>	<u>Nominal Net Capacity</u>
• Unit 1 IGCC unit	260 MW
• Two CC units (at 220 MW each)	440 MW
• Six CTG units (at 75 MW each)	<u>450 MW</u>
Total ultimate capacity	1,150 MW

Since the original certification of PPS, improvements in CTG electric generating technology and changes in Tampa Electric's power resource needs have changed the actual generating unit additions at PPS. The currently approved generating units at PPS are as follows:

<u>Current PPS Generating Units</u>	<u>Nominal Net Capacity</u>
• Unit 1 IGCC unit	260 MW
• Unit 2 CTG unit	165 MW
• Unit 3 CTG unit	165 MW
• Unit 4 CTG unit	165 MW
• Unit 5 CTG unit	<u>165 MW</u>
Total ultimate capacity	920 MW

The addition of the proposed 1,160-MW (nominal net) Project will increase the total, ultimate generating capacity at PPS to 1,420 MW (nominal net). Therefore, the overall purpose of this SCA and PPSA proceeding is to obtain certification for the construction and operation of the proposed Polk 2-5 Conversion Project, the proposed transmission line corridor from the PPS Site to the Fishhawk substation, and the proposed transmission line corridor for the upgrades for the PPS Site to Pebbledale substation and to increase the nominal net ultimate capacity at the PPS Site to 1,420 MW. Also, as part of this proceeding, Tampa Electric is requesting that existing certification be amended to remove the approximately 1,511-acre portion of the property west of SR 37 from the certified PPS Site. Based on this amendment, the certified PPS Site will be the approximately 2,837-acre property located east of SR 37.