UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4
Atlanta, Georgia

Preliminary Determination & Statement of Basis
Prevention of Significant Deterioration Permit PSD-EPA-4014
for Greenhouse Gas Emissions

for

Tampa Electric Company

Polk Power Station 2-5 Combined Cycle Conversion Project

September 2013

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1.0 Introduction

The Tampa Electric Company (TECO or "the applicant") has applied for a Prevention of Significant Deterioration (PSD) air permit for the emission of Greenhouse Gases (GHGs) pursuant to the Clean Air Act (CAA) from the U.S. Environmental Protection Agency Region 4 for the proposed Polk Power Station (PPS) 2-5 Combined Cycle Conversion Project (Project). TECO is proposing a major modification in which four (4) existing simple cycle combustion turbines (Units 2 through 5) will be modified to add higher-efficiency combined cycle operation, increasing the nominal generating capacity from 660 to 1,160 megawatts (MW). The combined cycle operation will include four (4) heat recovery steam generators (HRSGs) equipped with duct burners and arranged in a 4-on-1 configuration with a 500 MW nominal capacity steam turbine generator (STG). The Project will result in net significant emissions increases of sulfur dioxide (SO_2), particulate matter (PM), particulate matter with an aerodynamic diameter equal to or less than ten microns (PM_{10}), particulate matter with an aerodynamic diameter equal to or less than 2.5 microns ($PM_{2.5}$), nitrogen dioxides (NO_X), carbon monoxide (CO), sulfuric acid mist (SAM), volatile organic compounds (VOC), and GHGs. The net increase in GHG emissions will be 4,307,862 tons per year (TPY) on a carbon dioxide-equivalent (CO_2e) basis. The existing facility and Project are located approximately 13 miles southwest of the city of Bartow, in southwest Polk County, Florida.

The EPA Region 4 is the agency responsible for implementing and enforcing CAA requirements for GHG sources in Florida. For this Project, the State of Florida, through the Florida Department of Environmental Protection (FDEP), implements and enforces the PSD requirements for regulated pollutants other than GHGs. The EPA has completed review of the application and supplemental materials and is proposing to issue Permit No. PSD-EPA-R4014 to TECO for the Project, subject to the terms and conditions described in the permit. The draft permit incorporates the applicable requirements for GHGs from the federal PSD program.

This document serves as a fact sheet, preliminary determination and statement of basis for the draft permit. It provides an overview of the project, a summary of the applicable requirements, the legal and factual basis for the draft permit conditions, and the EPA's analysis of key aspects of the application and permit such as the best available control technology (BACT) analysis for GHG emissions. Additional information can be found in the draft permit accompanying this document as well as in the application materials and administrative record for this project, as discussed in Section 8.0.[1]

[1] The procedures governing the issuance of PSD permits are set forth at 40 CFR part 124, subparts A and C. *See* 40 CFR §§ 52.21(q) and 124.1. Accordingly, EPA has followed the procedures of 40 CFR part 124 in issuing this draft permit. This Preliminary Determination describes the derivation of the permit conditions and the reasons for them as provided in 40 CFR § 124.7, and also serves as a Fact Sheet as provided in 40 CFR § 124.8.

2.0 Applicant Information

2.1 Applicant Name and Address

Tampa Electric Company
PO Box 111
Tampa, FL 33601-0111

2.2 Facility Location

TECO is proposing to modify the existing Polk Power Station located approximately 13 miles southwest of the city of Bartow, in southwest Polk County, Florida (*see* Figure 1).

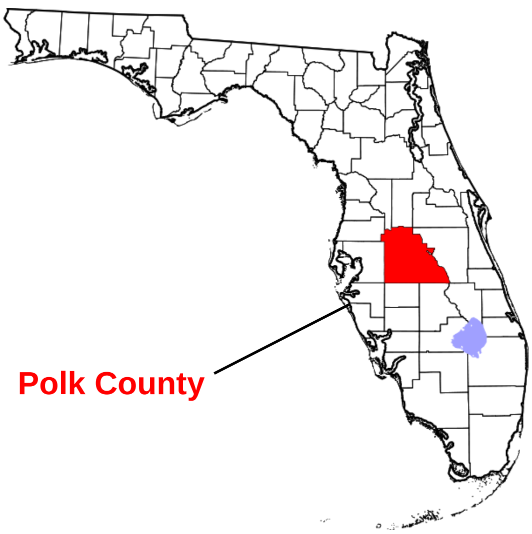

Figure 1 – Polk County in Florida

Figure 2 – Aerial View of Polk Power Station

3.0 Proposed Project

TECO has applied for a GHG PSD air permit pursuant to the CAA from the EPA Region 4 for the proposed Project. TECO is proposing a major modification which would modernize the existing Polk Power Station by adding higher-efficiency combined cycle combustion turbine technology. The PSD Application consists of modifying four (4) existing simple cycle combustion turbines, Units 2 through 5 (*see* Figure 2 above), to add combined cycle operation in a 4-on-1 configuration, increasing the total nominal capacity of the units from 660 to 1,160 MW (net).

The Project will result in significant emissions increases of SO_2, PM, PM_{10}, $PM_{2.5}$, NO_X, CO, VOC, SAM, and GHGs. The existing facility is situated on approximately 2,837 acres, approximately 13 miles southwest of the city of Bartow, in southwest Polk County, Florida (*see* Figure 1 above). It currently consists of a nominal 250 MW (net), solid fuel-based, integrated gasification and combined cycle plant (*see* Unit 1 in Figure 2 above) in addition to the four simple cycle combustions turbines. The existing facility is currently authorized to operate pursuant to FDEP title V air operating permit no. 1050233-026-AV.

The 4-on-1 configuration will consist of: four (4) existing General Electric 7FA.03 combustion turbines (CTs), each a nominal 165 MW (net) output; four (4) HRSGs, each equipped with duct burners; and one (1) nominal 500 MW (net) output STG. The HRSGs will utilize the waste heat from the CTs as well as natural gas-fired duct burners to produce the steam to be utilized in the STG. Other equipment to be added includes: a six-cell mechanical draft cooling tower, a 500 kilowatt (kW) diesel-fired emergency generator engine, a new transmission line, and existing line upgrades. The Project will increase the total generating capacity of the PPS site to a nominal 1,420 MW (net).

Each CT/HRSG unit will use pipeline-quality natural gas as the primary fuel with ultra-low sulfur diesel (ULSD) fuel oil used as a backup fuel (in CTs only). The CT/HRSG units may operate up to 8,760 hours per year per unit when firing natural gas, including up to an average of 4,000 hours per year per unit for natural gas-fired HRSG duct burner operation.

In keeping with previously permitted operational limits (*i.e.*, 4,380 hours per year of simple cycle operation per CT), simple cycle operation of the CTs will be limited to an average of 900 hours per year per CT with a replenishable, never-to-exceed allocation of 3,480 average hours per year per CT. The basics of this concept allow the applicant to "bank" (*i.e.*, to combine with the allocation balance) any remaining hours from the 900-hour limit as well as deplete the allocation balance for those rare instances when simple cycle operation exceeds the 900-hour limit due to peaking service or a forced/planned outage of the STG.

The CTs may also operate up to 3,000 hours per year combined (of which no more than 1,500 hours may be in simple cycle mode) but not more than 48 hours per day combined when firing ULSD fuel oil. Natural gas will be transported to the facility via pipeline; ULSD fuel oil will be delivered to the facility by truck or pipeline and will be stored in existing storage tank(s).

The Project is scheduled to commence construction in February 2014 with operation planned for January 2017. The emissions units to be used in the Project are further detailed in Section 5.0.

4.0 Legal Authority and Regulatory Applicability

4.1 EPA Jurisdiction

In 2010, the EPA established a federal implementation plan (FIP) to apply in each state that had not submitted, by their established deadline, a corrective state implementation plan (SIP) revision to apply the CAA PSD program to sources of GHGs. *See* 75 FR 82246 (Dec. 30, 2010). The State of Florida is subject to the FIP; therefore, the EPA is issuing this GHG PSD permit. FDEP is responsible for issuing a separate construction and title V operating permit for the Project for regulated pollutants other than GHGs.

4.2 Prevention of Significant Deterioration (PSD)

The PSD program, as set forth at 40 CFR § 52.21, is applicable to major sources such as this proposed project. The objective of the PSD program is to prevent significant adverse environmental impact from air emissions by a proposed new or modified source. The PSD program limits degradation of air quality to that which is not considered “significant.” The PSD program requires the utilization of BACT as determined on a case-by-case basis taking into account energy, environmental and economic impacts, and other costs.

Under the PSD regulations, a stationary source is “major” if, among other things, it emits or has the potential to emit (PTE) 100 or 250 TPY or more (depending on source category) of a “regulated New Source Review (NSR) pollutant” as defined in 40 CFR § 52.21(b)(50). *See* 40 CFR § 52.21(b)(l). “Potential to emit” is defined as the maximum capacity of a source to emit a pollutant under its physical and operational design. “Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is enforceable.” *See* 40 CFR § 52.21(b)(4).

Beginning on January 2, 2011, GHGs became subject to regulation under the PSD major source permitting program as a regulated NSR pollutant when emitted in amounts greater than certain applicability thresholds. GHGs are a single air pollutant defined in 40 CFR 52.21(b)(49)(i) as the aggregate group of the following six gases:

- Carbon dioxide (CO_2);
- Nitrous oxide (N_2O);
- Methane (CH_4);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulfur hexafluoride (SF_6).

Due to the nature of GHGs and their incorporation into the definition of “subject to regulation,” the determination of whether a source is emitting GHGs in an amount that triggers PSD applicability involves a calculation of the source’s CO_2e emissions as well as its GHG mass emissions. *See* 40 CFR § 52.21(b)(49). Consequently, when determining the applicability of PSD to GHGs, there is a two-part applicability process that evaluates both:

- The sum of the CO_2e emissions in TPY of the six GHGs, in order to determine whether the source’s emissions are a regulated NSR pollutant; and, if so;
- The sum of the mass emissions in TPY of the six GHGs, in order to determine if there is a major source or major modification of such emissions.

For PSD permits issued on or after July 1, 2011, PSD applies to the GHG emissions from an existing source if either of the following are true: (1) the modification is subject to PSD for another pollutant and the potential to emit GHGs is greater than or equal to 75,000 TPY on a CO_2e basis and greater than zero TPY on a mass basis; or (2) the potential emissions of GHGs from the new source would be equal to or greater than 100,000 TPY on a CO_2e basis and the GHG emissions from the modification are greater than or equal to 75,000 TPY CO_2e and greater than zero TPY on a mass basis.

Table 5-1 lists the PTE for each regulated NSR pollutant from the Project, as well as the significant emission rate for each regulated NSR pollutant. The permit application and Section 5.0 of this document contain information on the emissions factors used to determine the PTE for the Project. The Project is an existing PSD source with a PTE greater than 100,000 TPY CO_2e and the net increase in GHG emissions associated with the modification exceeds the threshold of 75,000 TPY CO_2e and is greater than zero TPY on a mass basis.

The EPA Region 4 applies the policies and practices reflected in the EPA document "PSD and Title V Permitting Guidance for Greenhouse Gases" (March 2011). Consistent with that guidance, we have not required the applicant to model or conduct ambient monitoring for GHGs, and we have not required any assessment of impacts of GHGs in the context of the additional impacts analysis or Class I area provisions of 40 CFR 52.21 (o) and (p), respectively. Instead, the EPA has determined that compliance with the selected BACT is the best technique that can be employed at present to satisfy the additional impacts analysis and Class I area requirements of the rules, with respect to emissions of GHGs. Section 6.0 of this document contains a discussion of the BACT analysis.

4.3 Title V

Upon issuance of this PSD permit, the State of Florida will incorporate these permit conditions into the existing title V permit for the facility.

4.4 New Source Performance Standards (NSPS)

On September 20, 2013, EPA signed a proposed NSPS that could influence the ultimate emission requirements for this source. The definition of BACT in PSD rules at 40 CFR 52.21(b)(12) states that "in no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61." Although this facility may be within the source category covered by the proposed NSPS, the proposed NSPS emission limits are not a controlling floor for BACT purposes since the proposed NSPS is not a final action and the proposed standard may change. However, the NSPS is an independent requirement that will apply to any source subject to the NSPS that commences construction after the date the NSPS is proposed (unless that source is covered by a transitional source exemption adopted in the NSPS). Thus, this facility may ultimately be subject to, and need to comply with, the NSPS after it is finalized, even if the emissions limits in the final permit are higher than the NSPS. *See* EPA, "PSD and Title V Permitting Guidance for Greenhouse Gases" (March 2011) at 25.

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5.0 Project Emissions

The maximum annual potential emissions for the Project include GHG emissions from the CT/HRSGs, emergency generator, circuit breakers, and fugitive natural gas leaks. Table 5-1 presents the respective annual potential emissions of each emissions unit as well as maximum annual Project emissions. Table 5-2 shows for which pollutants the Project is subject to PSD review.

Table 5-1 Project Potential to Emit (using GE 7FA.03 CTs)

Emission Unit Description	SO_2 (TPY)	PM[1] (TPY)	PM_{10}[2] (TPY)	$PM_{2.5}$[2] (TPY)	NO_X (TPY)	CO (TPY)	VOC (TPY)	SAM (TPY)	Lead (TPY)	GHGs[3] (as CO_2e) (TPY)
CTs/HRSGs with Duct Burners (4)	192.3	187.8	308.6	308.6	743.5	933.9	137.0	42.7	0.18	4,454,810
Cooling Tower	0	0.35	0.31	<0.1	0	0	-	0	0	-
Emergency Generator	<<0.1	<0.1	<0.1	<0.1	1.4	1.1	0.6	<<0.1	<<0.1	208
Circuit Breakers (18)	NA	NA	NA	NA	NA	NA	NA	NA	NA	85
Natural Gas Component Leaks	NA	NA	NA	NA	NA	NA	NA	NA	NA	32
TOTALS	**192.3**	**188.3**	**309.0**	**308.6**	**744.9**	**935.0**	**137.6**	**42.7**	**0.18**	**4,455,135**

[1]Filterable portion only.
[2]Filterable and condensable combined.
[3]Emissions from the circuit breakers reflect the removal of 11 existing circuit breakers and the addition of 18 new circuit breakers.

Table 5-2 Summary of Net Emissions Increases

Pollutant	Net Emissions Increase (TPY)	Significant Emission Rate (TPY)	PSD Review Required?
SO_2	192.3	40	Yes
PM[1]	188.3	25	Yes
PM_{10}[2]	309.0	15	Yes
$PM_{2.5}$[2]	308.6	10	Yes
NO_X	744.9	40	Yes
CO	935.0	100	Yes
VOC	137.6	40	Yes
SAM	42.7	7	Yes
Lead	0.18	0.6	No
GHGs (as CO_2e)	4,455,135	75,000 (subject-to-regulation threshold)	Yes

[1]Filterable portion only.
[2]Filterable and condensable combined.

The net emissions increases shown in Table 5-2 are conservative in that the values are based on the potential emissions from the CTs/HRSGs with duct burners; TECO did not account for the respective baseline actual emissions of the CTs operating in simple cycle mode as previously permitted.

5.1 Emission Unit Analysis

Emissions calculations for equipment used during operation of the Project were made based on the assumptions described below.

Unit ID: CTs/HRSGs with Duct Burners

The Project will include the modification of four (4) existing simple cycle CTs (each rated nominally at 165 MW) to add higher-efficiency, lower-emission combined cycle operation in a 4-on-1 configuration with a nominal capacity of 1,160 MW. The primary fuel source for the CTs will be natural gas with ULSD fuel oil serving as backup. The HRSG duct burners will only fire natural gas. Numerous operating scenarios (including simple cycle operation of the CTs) were evaluated by the applicant. However, maximum potential annual emissions for the CTs/HRSGs are based on the following: combined cycle operation at baseload conditions (100 percent load) with an ambient temperature of 59°F; each CT/HRSG would operate for 8,760 hours per year (of which, 8,010 hours per year is based on firing natural gas and the remaining 750 hours per year is based on firing ULSD fuel oil); and the duct burners of each HRSG would operate 4,000 hours per year.

Unit ID: Emergency Generator

The Project will include one (1) ULSD fuel oil-fired, 500-kW emergency generator to be used whenever electric power is not available. Maximum potential annual emissions are based on 500 hours of operation per EPA guidance. *See* EPA memorandum, "Calculating Potential to Emit (PTE) for Emergency Generators"; dated Sept. 6, 1995. In order to maintain compliance with 40 CFR part 60, subpart IIII and part 63, subpart ZZZZ, the emergency generator will be limited to 100 hours per year (approximately 2 hours per week) of non-emergency use (*e.g.*, maintenance and reliability testing).

Unit ID: Circuit Breakers

The Project will include 18 circuit breakers containing SF_6, with a guaranteed leak rate not to exceed 0.5 percent (by weight) per year. Each breaker will be state-of-the-art, totally-enclosed pressure systems equipped with low pressure alarms.

Unit ID: Component Leaks of Natural Gas

The Project will include additional piping components necessary to transmit natural gas to the duct burners of the HRSGs. These components are expected to have fugitive releases of methane. The potential emissions of methane as CO_2e were estimated using the methodology prescribed in 40 CFR part 98 [40 CFR § 98.233(r)].

5.2 Compliance Methodology (Monitoring, Recordkeeping, and Reporting)

The Permittee shall install, operate, and maintain continuous monitoring systems to monitor CO_2 emissions from the CTs. The Permittee shall use the procedures set forth in 40 CFR parts 75 (for continuous monitoring systems) and 98 (for calculation of GHG component pollutants) to demonstrate compliance with the specified GHG BACT limits. Apportioning of the STG output shall be based on the output of the individual CTs.

With respect to hourly limits for simple cycle operation and duct burner, ULSD fuel oil, and emergency generator usage, the Permittee shall monitor and record the respective number of hours on a monthly basis and then sum these monthly values each month to arrive at a total for the previous 12-month period. With respect to the circuit breakers and the piping components for natural gas transmission, the Permittee shall conduct (and record instances of) periodic inspections of leaks as well as timely repairs of any detected leaks.

6.0 Best Available Control Technology (BACT) and Recordkeeping Requirements

A major modification of a major stationary source subject to PSD requirements is required to apply BACT for each pollutant subject to regulation under the CAA that it would have the potential to emit in significant amounts. *See* 40 CFR § 52.21(j). Based on the emission inventory for the Project, summarized in Table 5-2, GHGs are regulated NSR pollutant that TECO has the potential to emit in quantities that equal or exceed the significant emission rate. Therefore, BACT must be determined for each new or modified emission unit which emits GHGs.

The 4-on-1 combined cycle unit is included in the source's PTE, as required by 40 CFR § 52.21(b)(4), and is subject to operating limits, monitoring, recordkeeping and reporting requirements to ensure they will not exceed the potential emissions assumed in the application and impact review. In addition, the application includes an emergency generator, circuit breakers, and natural gas transmission lines for the duct burners, which are necessary support equipment for the 4-on-1 combined cycle unit. These are also subject to operating limits, monitoring, recordkeeping and reporting requirements.

BACT is defined in the applicable permitting regulations at 40 CFR § 52.21(b)(12), in part, as:

> *an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event, shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61. If the Administrator determines that technological or economic limitations on the application of measurement technology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology.*

The CAA contains a similar BACT definition, although the 1990 CAA amendments added "clean fuels" after "fuel cleaning or treatment" in the above definition. *See* CAA § 169(3).

On December 1, 1987, the EPA issued a memorandum describing the top-down approach for determining BACT. *See, e.g., In re Prairie State Generating Co.*, 13 E.A.D. 1 (EAB 2006). In brief, the top-down approach provides that all available control technologies be ranked in descending order of control effectiveness. Each alternative is then evaluated, starting with the most stringent, until BACT is determined. The top-down approach consists of the following steps:

Step 1: Identify all available control technologies.

Step 2: Evaluate technical feasibility of options from Step 1 and eliminate options that are technically infeasible based on physical, chemical and engineering principles.

Step 3: Rank the remaining control technologies from Step 2 by control effectiveness, in terms of emission reduction potential.

Step 4: Evaluate the most effective controls from Step 3, considering economic, environmental and energy impacts of each control option. If the top option is not selected, evaluate the next most effective control option.

Step 5: Select BACT (the most effective option from Step 4 not rejected).

6.1 GHG BACT Analyses for 4-on-1 Combined Cycle Unit

Although the primary purpose of the Project is to modify existing simple cycle CTs to add more efficient combined cycle operation, full-time operation in combined cycle mode by the applicant is neither practical nor feasible. TECO is regulated by the Florida Public Service Commission and subject to Florida Statutes (Chapter 366) that include an obligation to provide electric service in a reliable manner. To meet this obligation, TECO designed the proposed modification in a way that retains the facility's existing ability to operate in simple cycle mode, particularly during episodes of peaking service (which requires quick-start simple cycle operation) and forced/planned outage of the STG (which is an integral component of combined cycle operation).

As mentioned in Section 3.0, TECO is retaining the ability to operate up to 4,380 hours per year per CT in simple cycle mode as previously permitted; however, each CT is now being limited to 900 hours per year with a replenishable, never-to-exceed allocation of 3,480 hours per year (*i.e.*, 900 + 3,480 = 4,380). TECO does not anticipate having to operate in simple cycle mode for extended periods (thus, the 900-hour limit); however, past data shows instances where the CTs exceeded 900 hours per year per CT on average (thus, the need for the 3,480 allocation).

<u>Step 1: Identify all available control technologies</u>

The applicant identified the following available control technologies for the proposed 4-on-1 combined cycle unit in their permit application dated October 2012, and in a letter dated December 19, 2012, responding to a request from the EPA for additional information:

1. Maximized Energy Efficiency
2. Carbon Capture and Storage (CCS)
3. Cleaner Fuels

In addition, the EPA considers the following to be available control technologies:

4. Catalytic Oxidation
5. Newer, More Efficient CTs

Maximized Energy Efficiency: Energy efficiency falls under the general category of lower polluting processes/practices. Applying technologies, measures and options that are energy efficient translates not only in the reduction of emissions of the particular regulated NSR air pollutant undergoing BACT review, but it also may achieve collateral reductions of emissions of other pollutants. There are different categories of energy efficient improvements:

- Technologies or processes that maximize the efficiency of the individual emissions unit, and

- Options that could reduce emissions by improving the utilization of thermal energy and electricity that is generated and used onsite.

When the efficiency of the power generation process is increased, less fuel is burned to produce the same amount of electricity. This provides the benefits of lower fuel costs and reduced air pollutant emissions (including CO_2). The applicant has proposed implementation of the following measures to maximize the overall energy efficiency of the Project:

- The addition of more efficient combined cycle operation to an existing simple cycle facility;
- Maximized CT efficiency through: CT inlet cooling, periodic burner tuning, insulating the CT (*e.g.*, with a blanket to reduce heat loss), and the use of instrumentation and controls to achieve high-efficiency/low-emissions performance;
- Maximized HRSG efficiency through: efficient heat exchanger design, insulating all gas path surfaces exposed to ambient air, periodic cleaning of heat exchanger surfaces, and minimizing steam venting and timely repair of leaks;
- Maximized plant-wide efficiency through: high steam temperature and pressure design and condensate drain operation; and
- Use of natural gas as primary fuel source with limited use of ULSD fuel oil.

The applicant did not specifically address the duct burners with respect to maximized energy efficiency. Nonetheless, the EPA believes that the duct burners fall under the measures specified for maximizing HRSG efficiency since they are an intricate component of the HRSG. Additional measures would include not only the efficient design of burner nozzles, but also the limitation to only burn natural gas.

CCS: CCS falls under the category of add-on controls, which are air pollution control technologies that remove pollutants from a facility's emissions stream. CCS is an add-on pollution control technology that is available for large CO_2 emitting facilities, including fossil fuel-fired power plants and industrial facilities with high purity CO_2 streams. CCS is composed of three main components: CO_2 capture and/or compression, transport, and storage.

Catalytic Oxidation: Catalytic oxidation technology, which is primarily designed to reduce CO emissions, will also reduce CH_4 emissions, but to a lesser extent. The amount of CO_2e reduced can be expected to be less that 0.05 percent (based on information related to Florida Power & Light's GHG permit application its Port Everglades facility). Furthermore, oxidation catalysts operate at elevated temperatures where excess oxygen in the exhaust reacts with CH_4 to form CO_2. The surface of an oxidation catalyst is typically a precious metal. Oxidation catalysts are susceptible to fine particles suspended in the exhaust gases that can foul and poison the catalyst. Catalyst poisoning reduces catalyst activity and pollutant removal efficiencies. Thus, catalytic oxidation, albeit not very practicable, is still technically feasible.

Cleaner Fuels: The use of natural gas as a fuel source is an inherently lower emitting practice than the use of fuel oil. The combustion of natural gas has the lowest emissions of GHGs of any fossil fuel and emits almost 30% less CO_2 than oil, and about 45% less CO_2 than coal on a lb/MMBtu basis.

Newer, More Efficient CTs: Even this option goes against the very nature of the Project (*i.e.*, modifying existing, less efficient, simple cycle CTs to add more efficient combined cycle operation), the replacement of existing CTs with newer, more efficient CTs is still a theoretically-available control technology.

Step 2: Eliminate technically infeasible control options

CCS: The EPA recognizes the logistical hurdles that the installation and operation of a CCS system presents and which sets this pollution technology apart from other add-on controls that are typically used to reduce emissions of other regulated pollutants. Logistical hurdles identified by the applicant for CCS include: obtaining contracts for offsite land acquisition (including the availability of land), the need for funding (including, for example, government subsidies), timing of available transportation infrastructure, developing a site for secure long term storage, and environmental permitting for underground GHG sequestration.

Based on the lack of commercial availability of "full-scale" CO_2 capture for a combined cycle CT plant, the applicant contends that CCS is technically infeasible. To support this position, the applicant presented an example of CO_2 capture having been achieved, but only on a much smaller scale (Bellingham Energy Center located in Bellingham, Massachusetts). The EPA considers this "small-scale" application as justification that CCS is still a technically feasible control option for combined cycle CT plants.

Cleaner Fuels: The use of natural gas as the sole fuel source, while most desirable, is associated with numerous technical challenges. The one key challenge presented by the applicant is its obligation to meet customer power demands on a continuous basis, including during periods of natural gas interruptions or curtailments. Based on the need for power production reliability and the potential for natural gas interruptions or curtailments, the use of natural gas as the sole fuel source is not considered technically feasible for the Project. However, limiting the use of ULSD fuel oil is technically feasible.

Step 3 & 4: Rank remaining control technologies and evaluation of impacts

CCS: The applicant projected excessive costs for CCS due to the volume of exhaust gases associated with combined cycle power plants, the low concentration of CO_2 in the exhaust gases, and the substantial energy penalty associated with CO_2 absorption, stripping, and compression. Using an annual cost of $103 per ton of CO_2 controlled obtained from another proposed project (El Paso Electric Company's Montana Power Station Project in Texas), the applicant estimates (assuming 85 percent capture) that CO_2 capture and compression for the Project would cost approximately $380 million annually. According to information provided by the applicant, the total cost of the Project will be approximately $700 million. Thus, the cost of CCS will be approximately 54 percent of the total cost of the Project and this fraction does not include costs related to transmission and storage. Therefore, based on this cost information, the EPA concurs with the applicant and has concluded that CCS is cost prohibitive for the Project.

Catalytic Oxidation: Based on the expectation above that catalytic oxidation would reduce CO_2e emissions by less than 0.05 percent, the maximum amount of CO_2e emissions that could be reduced for this Project would be approximately 2,227 tons per year, which amounts to only about 3 percent of the GHG threshold for PSD applicability. Considering this relatively small reduction benefit, the EPA expects the installation and annual operation of a catalytic oxidation system to be cost prohibitive.

Newer, More Efficient CTs: The existing GE 7FA.03 CTs are already very efficient units. They compare very favorably to the newer-generation units (GE 7FA.05) being proposed for another project in Florida (Shady Hills Generating Station located in Pasco County), particularly with respect to CO_2 emissions (which constitute approximately 99 percent of CO_2e). For instance, the difference in the CO_2e emission rate (in lb/MWh) for the GE7FA.03 and 7FA.05 is approximately 2.9 percent for a comparable

operating scenario (*i.e.*, simple cycle mode, natural gas-firing, 100 percent load, and 59°F). Since the difference in output based emission rates is relatively small, the EPA believes using newer (and slightly more efficient) CTs to be cost prohibitive given the minimal emissions reduction benefit compared to the expected substantial expense of purchasing (and installing) the newer CTs.
Therefore, based on the discussions in Steps 1 and 2, the only technically feasible control options for GHGs is maximized energy efficiency and limited use of ULSD fuel oil. There are no anticipated adverse environmental impacts associated with maximized energy efficiency and limited ULSD fuel oil usage constituting BACT.

<u>Step 5: Select BACT</u>

Based on the discussions above, the most effective control options for GHG emissions are maximized energy efficiency and the use of natural gas as the primary fuel source with limited use of ULSD fuel oil. With respect to the CTs, maximized energy efficiency is achieved via: CT inlet cooling, periodic burner tuning, insulating the unit, and the use of instrumentation/controls to achieve high-efficiency/low-emissions performance. With respect to the HRSGs, maximized energy efficiency is achieved via: efficient heat exchanger design, insulating all gas path surfaces exposed to ambient air, periodic cleaning of heat exchanger surfaces, and minimizing steam venting and timely repairs of steam leaks. The EPA concurs with the applicant that these control measures constitute BACT and result in the following proposed BACT emission limits.

TECO proposed the following gross output-based GHG BACT limits, averaged across the four CTs/HRSGs: 877 pounds (lb) of CO_2e per megawatt-hour (lb CO_2e/MWh) while operating in combined cycle mode, using natural gas, with or without duct burners; 1,235 lb CO_2e/MWh while operating in combined cycle mode using ULSD fuel oil; 1,320 lb CO_2e/MWh while operating in simple cycle mode and using natural gas; and 1,868 lb CO_2e/MWh while operating in simple cycle mode and using ULSD fuel oil. The averaging time for combined cycle operation using natural gas is 12-month rolling average whereas the other scenarios have an averaging time of 3 hours due to the expected infrequency of operating in such scenarios. The following margins apply: a 3.3 percent design margin to reflect equipment as actually constructed and installed; a six (6) percent margin for performance degradation over time; and a 0.5 percent margin for error introduced due to estimating heat rates, power generation rates, etc.; resulting in a compounded overall margin of compliance of 10 percent.

The EPA believes that BACT should apply on a per emission unit basis; therefore, the EPA concurs with the GHG BACT limits for the CTs/HRSGs as proposed by the applicant with the caveat that the respective limits apply to each CT/HRSG unit.

6.2 GHG BACT Analysis for Emergency Generator

<u>Step 1: Identify all available control technologies</u>

CCS is not practical for control of CO_2 emissions from the emergency generator due to the small amount of potential CO_2 emissions from the unit compared to the combined cycle system. Moreover, this unit is operated very intermittently, thus, making the addition of control equipment problematic. Therefore, CCS was not included as an available control technology in the following BACT analysis.

The use of cleaner fuels such as natural gas in the emergency generator is not considered an available control option since the primary purpose of this unit is to provide power in the case of an emergency (*e.g.*, severe weather events such as hurricanes or natural gas pipeline malfunctions), which may include

the interruption or curtailment of the natural gas supply.
The applicant identified the following available control technologies in their permit application dated October 2012, for the proposed emergency generator:

1. Maximized Energy Efficiency
2. Limited Operation

The emergency generator is designed to meet the applicable NSPS and National Emission Standards for Hazardous Air Pollutants for non-road engines (subparts IIII and ZZZZ, respectively); thus, this unit will maximize efficiency while meeting the required emissions standards. In conjunction with maximizing efficiency, the applicant also proposed proper maintenance and operating procedures.

The applicant has proposed to limit the operation of the emergency generator to 100 hours per year, excluding emergencies, for routine testing and maintenance purposes as BACT and in order to qualify as an emergency generator under the regulations cited above.

Step 2: Eliminate technically infeasible control options

There are no remaining technically infeasible control options to be eliminated.

Step 3 & 4: Rank remaining control technologies and evaluation of impacts

Based on the discussions in Steps 1 and 2, the technically feasible control options for GHG emissions from the emergency generator are energy efficiency through proper engine design, operation, and maintenance and limited operation. There are no anticipated adverse environmental impacts associated with energy efficiency and limited operation constituting BACT.

Step 5: Select BACT

The emergency generator accounts for less than 0.005 percent of the total potential GHG emissions of the Project based on 500 hours of operation. The operation of this unit will be limited to 100 hours, excluding emergencies, not as a BACT limit (since, fundamentally, such a limit must apply at all times), but as an operational limit so that the unit may comply with the previously cited regulations as an emergency engine. Therefore, given the limited use of this equipment and the relatively small amount of GHG emissions, the EPA has determined that work practice standards are more appropriate than a numeric BACT limit. Work practice standards to ensure proper operation and maintenance will constitute BACT.

6.3 GHG BACT Analysis for Circuit Breakers

Step 1: Identify all available control technologies

The applicant identified the following available control technologies in their permit application dated October 2012, and in a letter dated December 19, 2012, and for the proposed circuit breakers:

1. Minimization of SF_6 Emissions
2. Alternative Dielectric Fluids

Modern SF_6 circuit breakers are designed as totally enclosed-pressure systems with low potential SF_6

fugitive emissions. Leakage is typically guaranteed to be no more than 0.5 percent by weight. In addition, circuit breakers have low-pressure alarms that provide a warning when leaks occur. Furthermore, this equipment is routinely inspected to ensure proper operation since the equipment is necessary for safe operation of the Project.

Step 2: Eliminate technically infeasible control options

The use of alternative dielectric fluids is not practical for such high-voltage applications. Circuit breakers using SF_6 insulating gas are presently superior in their performance, particularly with respect to dielectric and arc quenching properties, to alternative systems that use dielectric oil or compressed air.

Step 3 & 4: Rank remaining control technologies and evaluation of impacts

Based on the discussions in Steps 1 and 2, the only technically feasible control option for SF_6 emissions from circuit breakers is the use of state-of-the-art enclosed pressure systems with leak detection alarms and periodic inspection. There are no anticipated adverse environmental impacts associated with the use of modern enclosed circuit breaker systems with alarms and periodic inspection.

Step 5: Select BACT

The most effective control option for fugitive SF_6 emissions from circuit breakers is the use of totally enclosed-pressure systems equipped with leak detection alarms and periodic inspection and maintenance, as required by the proposed permit. Since emissions of GHGs from the circuit breakers ideally should be zero in the absence of leakage, the EPA has also proposed BACT to be work practice standards to minimize leaks. This includes the use of the proposed leak detection and periodic inspection and maintenance practices.

6.4 GHG BACT Analysis for Component Leaks

Step 1: Identify all available control technologies

The applicant did not identify any control technologies for fugitive GHG emissions related to leaks from piping components delivering natural gas to the duct burners of the HRSGs. Nonetheless, the only feasible control technology for such emissions would be:

1. Minimize Leaks

Step 2: Eliminate technically infeasible control options

There are no technically infeasible control technologies to be eliminated.

Step 3 & 4: Rank remaining control technologies and evaluation of impacts

Based on the discussions in Steps 1 and 2, the only technically feasible control option is to minimize natural gas leaks from piping components.

Step 5: Select BACT

The most effective control option for fugitive GHG emissions related to leaks from piping components delivering natural gas to the duct burners of the HRSGs is the minimization of such leaks. The EPA has proposed BACT to be work practice standards to minimize leaks, including periodic inspection and immediate repairs of any detected leaks, as required by the proposed permit.

7.0 Additional Requirements

7.1 Endangered Species Act

Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies, in consultation with the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (FWS) (collectively, "the Services"), to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of a species listed as threatened or endangered, or result in the destruction or adverse modification of designated critical habitat of such species. *See* 16 U.S.C. §1536(a)(2); *see also* 50 CFR §§ 402.13 and 402.14. The federal agency is also required to confer with the Services on any action which is likely to jeopardize the continued existence of a species proposed for listing as threatened or endangered or which will result in the destruction or adverse modification of critical habitat proposed to be designated for such species. *See* 16 U.S.C. §1536(a)(4); *see also* 50 CFR 402.10. Further, the ESA regulations provide that where more than one federal agency is involved in an action, the consultation requirements may be fulfilled by a designated lead agency on behalf of itself and the other involved agencies. *See* 50 CFR § 402.07.

In accordance with Section 7 of the ESA, the EPA consults with the Services to ensure that the Project will not cause any protected species to be jeopardized. The EPA received concurrence from the FWS that our Section 7 ESA consultation requirements were met on January 16, 2013, and that the Project will not likely result in the take of any listed species.

7.2 Essential Fish Habitat of Magnuson-Stevens Act

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires federal agencies to consult with NOAA with respect to any action authorized, funded, or undertaken by the agency that may adversely affect any essential fish habitat identified under the MSA. The EPA received concurrence from the NMFS of NOAA that our MSA requirements were met on January 14, 2013, and concluded that the Project will not likely affect any species under the NMFS's authority based on the fact that the Project is located well inland.

7.3 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties. Section 106 requires the lead agency official to ensure that any federally funded, permitted, or licensed undertaking will have no effect on historic properties that are on or may be eligible for the National Register of Historic Places.

Following consultation with the EPA's Office of Enforcement and Compliance Assurance (OECA), NHPA compliance group, it has been determined that no sites of historic or archaeological significance will be directly or indirectly impacted due to construction and 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 existing site. If historical or archaeological artifacts are discovered during construction, OECA and FDEP will be notified and proper procedures will be followed.

7.4 Coastal Zone Management Act

According to the Coastal Zone Management Act of 1972 (CZMA), the State may develop and adopt a management program for its coastal zone in accordance with federal rules and regulations promulgated by the Secretary, after notice, and with the opportunity of full participation by relevant federal agencies, State agencies, local governments, regional organizations, port authorities, and other interested parties and individuals, public and private, which is adequate to carry out the purposes of the CZMA and is consistent with the policy declared in the CZMA.

The Florida Coastal Management Act (§380.205-380.27, Florida Statutes) requires that the Coastal Zone Management Section of FDEP be responsible for certification of consistency with the Florida Coastal Management Program for all federal licenses, permits, activities, and projects listed in §380.23(3)(c), Florida Statutes, when such activities are subject to federal consistency review and affect land or water use, are seaward of the jurisdiction of the state, or there is no State agency with sole jurisdiction for such consistency review. Pursuant to §380.23(3)(c)6., Florida Statutes, and based on the definition contained in §403.503(12) of the *Florida Electrical Power Plant Siting Act*, the Project requires the issuance of a final Site Certification (issued by the FDEP Office of Siting Coordination), which constitutes consistency with the CZMA. TECO has initiated the process of obtaining final Site Certification and expects to go before the Florida Power Plant Siting Board on October 15, 2013, seeking final approval. Issuance of the final permit will be contingent upon the issuance of the final Site Certification for the Project.

7.5 Executive Order 12898 - Environmental Justice

Executive Order (EO) 12898 (59 FR 7629 (Feb. 16, 1994)) establishes federal executive branch policy on environmental justice. Based on this Executive Order, the EPA's Environmental Appeals Board (EAB) has held that environmental justice issues must be considered in connection with the issuance of federal Prevention of Significant Deterioration (PSD) permits issued by the EPA Regional Offices [See, *e.g.*, *In re Prairie State Generating Company*, 13 E.A.D. 1, 123 (EAB 2006); *In re Knauf Fiber Glass*, Gmbh, 8 E.A.D. 121, 174-75 (EAB 1999)]. This permitting action, if finalized, authorizes emissions of GHG, controlled by what we have determined is the BACT for those emissions. It does not select environmental controls for any other pollutants. Unlike the criteria pollutants for which the EPA has historically issued PSD permits, there is no National Ambient Air Quality Standard (NAAQS) for GHGs. The global climate-change inducing effects of GHG emissions, according to the "Endangerment and Cause or Contribute Finding", are far-reaching and multi-dimensional (75 FR 66497). Climate change modeling and evaluations of risks and impacts are typically conducted for changes in emissions that are orders of magnitude larger than the emissions from individual projects that might be analyzed in PSD permit reviews. Quantifying the exact impacts attributable to a specific GHG source obtaining a permit in specific places and points would not be possible. *See* page 48 of the EPA's "PSD and Title V Permitting Guidance for Greenhouse Gases". Thus, we conclude it would not be meaningful to evaluate impacts of GHG emissions on a local community in the context of a single permit. Accordingly, we have determined an environmental justice analysis is not necessary for the permitting record.

7.6 Executive Order 13175 – Tribal Consultation

In accordance with EO 13175 and the EPA Policy on Consultation and Coordination with Indian Tribes, the Miccosukee Tribe of Indians of Florida (Miccosukee Tribe) and the Seminole Tribe of Florida

(Seminole Tribe) were offered the opportunity to consult regarding the EPA's consideration of the PSD permit application submitted by TECO. Neither Tribe requested formal consultation on the Project permit action. The EPA informed both tribes that regardless of whether they elected to consult on the permit application, they would also have the opportunity to submit comments during any forthcoming public comment period.

The objective of such consultation, in the EPA's view, is to improve the EPA's understanding of the perspectives of the Seminole and Miccosukee Tribes and to identify any issues or concerns they may have regarding the EPA's consideration of TECO's application. During the course of any consultation on this matter, the EPA can offer such things as education and outreach, solicitation of comments on the action, holding conference call(s) to discuss issues and concerns, and providing feedback through written communication explaining how the EPA considered any issues and concerns raised.

8.0 Public Participation

8.1 Opportunity for Public Comment

These proceedings are subject to the EPA's *Procedures for Decisionmaking*, set forth at 40 CFR part 124. As provided in part 124, the EPA is seeking public comment on the Project draft air permit (PSD-EPA-R4014) during the public comment period as specified in the public notice.

Any interested person may submit written comments on the draft permit during the public comment period. If you believe that any condition of the permit is inappropriate, you must raise all reasonably ascertainable issues and submit all reasonably available arguments supporting your position by the end of the comment period. Any documents supporting your comments must be included in full and may not be incorporated by reference unless they are already part of the record for this permit or consist of state or federal statutes or regulations, EPA documents of general applicability, or other generally available referenced materials.

Comments should focus on the proposed air quality permit and the GHG permit terms. Comments related to the other criteria pollutants and the preconstruction permitting under the jurisdiction of the State of Florida are outside the scope of this action. All timely comments will be considered in making the final decision, included in the record, and responded to by the EPA. The EPA may summarize the comments and group similar comments together in our response and will not respond to individual commenters directly.

All comments on the draft permit must be received by e-mail at R4GHGPermits@epa.gov, submitted electronically via www.regulations.gov (docket # EPA-R04-OAR-2013-0648), **or postmarked by October 25, 2013**. Comments sent by mail should be addressed to: USEPA Region 4, Air Permits Section, APTMD; 61 Forsyth Street, SW; Atlanta, GA 30303. An extension of the 30-day comment period may be granted if the request for an extension adequately demonstrates why additional time is required to prepare comments. Comments must be sent or delivered in writing to the address above. All comments will be included in the public docket without change and will be made available to the public, including any personal information provided, unless the comment includes Confidential Business Information or other information whose disclosure is restricted by statute. Information that you consider Confidential Business Information or otherwise protected should be clearly identified as such and should not be submitted through e-mail. If you send e-mail directly to the EPA, your e-mail address will be captured automatically and included as part of the public comment. Please note that an e-mail or postal address must be provided with your comments if you wish to receive direct notification of the EPA's final decision regarding the permit and responses to comments submitted during the public comment period.

For general questions on the draft permit, please contact: Mr. Art Hofmeister at (404) 562-9115 or hofmeister.art@epa.gov.

8.2 Public Hearing

The EPA will hold a public hearing if the Agency determines there is a significant degree of public interest in the draft permit. Public Hearing requests must be in writing and received by the EPA by October 8, 2013. Requests should be sent by e-mail to R4GHGPermits@epa.gov or by mail addressed to: USEPA Region 4, Air Permits Section, APTMD; 61 Forsyth Street, SW; Atlanta, GA 30303. Requests for a public hearing must state the nature of the issues proposed to be raised in the hearing. If a public hearing is held, you may submit oral and/or written comments on the draft permit at the public hearing. You do not need to attend the public hearing to submit written comments. If the EPA determines there is a significant degree of public interest, the EPA will hold a public hearing on October 25, 2013, at the location given in the public notice. If a public hearing is held, the public comment period will automatically be extended to the close of the public hearing. If no timely request for a public hearing is received, or the EPA determines that there is not a significant degree of public interest, *the hearing will be cancelled.* An announcement of cancellation will be posted on the EPA's website at: http://www.epa.gov/region4/air/permits/ghgpermits/ghgpermits.html, or you may call the EPA at the contact number above to determine if the public hearing will be held.

8.3 Administrative Record

The administrative record contains the application, supplemental information submitted by TECO, and correspondence, including emails, between TECO and its consultants and the EPA clarifying various aspects of TECO's application. The draft permit and the administrative record are available on www.regulations.gov (docket # EPA-R04-OAR-2013-0648) and the EPA's website at: http://www.epa.gov/region4/air/permits/ghgpermits/ghgpermits.html.

These web sites can be accessed through free internet services at local libraries. The draft permit and administrative record are also available for public review at the EPA Region 4 office at the address below. Please call in advance for available viewing times.

EPA Region 4 Office
61 Forsyth Street, SW
Atlanta, GA 30303
Phone: (404) 562-9043

To request a copy of the draft permit, preliminary determination or notice of the final permit action, please contact: Ms. Rosa Yarbrough, Permit Support Specialist, at (404) 562-9643 or yarbrough.rosa@epa.gov.

8.4 Final Determination

A decision to issue a final permit, or to deny the application for the permit, shall be made after all timely comments have been considered. Notice of the final decision shall be sent to each person who has submitted written comments or requested notice of the final permit decision, provided the EPA has adequate contact information.