




Florida Department of
Environmental Protection

Memorandum

To: Jeff Koerner, Office of Permitting and Compliance 
Through: Al Linero, P.E., Chemicals and Combustion Key Industry Group 
From: Tammy McWade, Chemicals and Combustion Key Industry Group 
Date: October 27, 2011
Subject: Draft Minor Source Air Construction Permit
Project No. 1050233-027-AC
Tampa Electric Company, Polk Power Station Unit 1
HTSC and CCS Demonstration Project

Attached for your review is a draft minor air construction permit package for the existing Polk Power Station, which is located in Polk County at 9995 State Road 37 South in Mulberry, Florida. Briefly, the draft permit authorizes the installation and operation of a temporary pre-commercial scale demonstration project consisting of a high-temperature syngas cleanup (HTSC) system and an integrated carbon capture and sequestration (CCS) system at the existing coal-based integrated gasification and combined cycle Unit 1. The attached Technical Evaluation and Preliminary Determination provides a detailed description of the project and the rationale for permit issuance. The project is not considered a new source review reform project. Day 90 of the permitting time clock is November 10, 2011. I recommend your approval of the attached draft permit package.

Attachments

JFK/gpd/ttm

P.E. CERTIFICATION STATEMENT

PERMITTEE

Tampa Electric Company
P.O. Box 111
Tampa, FL 33601-0111

Draft Permit No. 1050233-027-AC
Polk Power Station Unit 1
HTSC and CCS Demonstration Project
Polk County, Florida

PROJECT DESCRIPTION


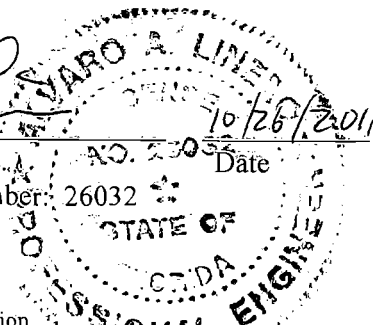
Tampa Electric Company operates the existing Polk Power Station, which is an existing electric power plant located in Polk County at 9995 State Road 37 South in Mulberry, Florida. Tampa Electric Company proposes to construct and operate a temporary pre-commercial scale demonstration project consisting of a high-temperature synthetic gas (syngas) cleanup system (HTSC) and an integrated carbon capture and sequestration system (CCS). These cleanup systems will be integrated with the existing integrated coal gasification combined-cycle (IGCC) Unit 1. The HTSC system will include the following processes: a high-temperature desulfurization process to remove more than 99.9% of sulfur in the syngas; a trace contaminant removal process that will reduce arsenic, selenium and mercury concentrations in the syngas; and a direct sulfur recovery process that will convert the sulfur dioxide (SO₂) to commercial-grade elemental sulfur. The high level of sulfur removal in the high-temperature desulfurization process will provide a syngas stream, which will undergo the water gas shift reaction to convert the methane (CH₄) and carbon monoxide (CO) components to hydrogen (H₂) and carbon dioxide (CO₂). Thereafter, activated methyldiethanolamine (aMDEA) will be used to capture 90% of the CO₂ in the cleaned syngas for subsequent geological sequestration.

Emission sources associated with this demonstration project includes two small heaters, one sorbent storage hopper, one regenerator fines storage bin and one amine surge drum. The demonstration project will result in the following potential emissions: 3.5 tons/year (TPY) of carbon monoxide (CO); 6.5 TPY of nitrogen oxides (NO_x); 1 TPY of particulate matter (PM), PM with a mean particle diameter of 10 microns or less (PM₁₀) and PM with a mean particle diameter of 2.5 microns or less (PM_{2.5}); 0.7 TPY of sulfur dioxide (SO₂); and 0.4 TPY of volatile organic compounds (VOC).

The demonstration project is planned to commence construction in March 2012 and be completed by April 2013. The goal for the operation phase is to achieve at least 8,000 hours of operation for an approximate 18 month demonstration period, which is expected to be completed in the third quarter of 2015.

This project is subject to the general preconstruction review requirements in Rule 62-212.300, Florida Administrative Code (F.A.C.) and is not subject to the preconstruction review requirements for major stationary sources in Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality. The Department's full review of the project and rationale for issuing the draft permit is provided in the Technical Evaluation and Preliminary Determination.

I HEREBY CERTIFY that the air pollution control engineering features described in the above referenced application and subject to the proposed permit conditions provide reasonable assurance of compliance with applicable provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-4 and 62-204 through 62-297. However, I have not evaluated and I do not certify any other aspects of the proposal (including, but not limited to, the electrical, civil, mechanical, structural, hydrological, geological, and meteorological features).


A. A. Linero, P.E.
Registration Number: 26032
Date: 10/26/2011




Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

Sent by Electronic mail – Received Receipt Requested

kasheffield@tecoenergy.com

Karen Sheffield, Director

Polk Power Station

Tampa Electric Company

Post Office Box 111

Tampa, Florida 33601-0111

Re: Project No. 1050233-027-AC

Tampa Electric Company, Polk Power Station Unit 1

High Temperature Syngas Cleanup and CO₂ Capture

and Sequestration Demonstration Project

Dear Ms. Sheffield:

On August 12, 2011, you submitted an application requesting authorization to install and operate a temporary pre-commercial scale demonstration project consisting of a high-temperature syngas cleanup system and an integrated carbon capture and sequestration system at Polk Power Station Unit 1. The existing facility is located in Polk County at 9995 State Road 37 South, in Mulberry, Florida.

Enclosed are the following documents: the Written Notice of Intent to Issue Air Permit; the Public Notice of Intent to Issue Air Permit; the Technical Evaluation and Preliminary Determination; and the Draft Permit. The Public Notice of Intent to Issue Air Permit is the actual notice that you must have published in the legal advertisement section of a newspaper of general circulation in the area affected by this project. If you have any questions, please contact the project engineer, Tammy McWade, at 850/717-9086.

Sincerely,

Jeffery F. Koerner, Program Administrator
Office of Permitting and Compliance
Division of Air Resource Management

10-27-11

(Date)

Enclosures

JFK/aal/ttm

WRITTEN NOTICE OF INTENT TO ISSUE AIR PERMIT

*In the Matter of an
Application for Air Permit by:*

Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Project No. 1050233-027-AC
Minor Air Construction Permit

Authorized Representative:

Karen Sheffield, Director, Polk Power Station

Polk Power Station Unit 1
HTSC/CCS Demonstration Project
Polk County, Florida

Facility Location: Tampa Electric Company operates the existing Polk Power Station, which is located in Polk County at 9995 State Road 37 South, in Mulberry, Florida.

Project: The applicant proposes to install and operate a temporary pre-commercial demonstration project consisting of a high-temperature syngas cleanup system (HTCS) and an integrated carbon capture and sequestration (CCS) system at the Polk Power Station Unit 1. Details of the project are provided in the application and the enclosed Technical Evaluation and Preliminary Determination.

Permitting Authority: Applications for air construction permits are subject to review in accordance with the provisions of Chapter 403, Florida Statutes (F.S.) and Chapters 62-4, 62-210 and 62-212 of the Florida Administrative Code (F.A.C.). Per 403.061(18), F.S., the Florida Department of Environmental Protection has the power and the duty to encourage and conduct studies, investigations, and research relating to pollution and its causes, effects, prevention, abatement, and control. The proposed project is not exempt from air permitting requirements and an air permit is required to perform the proposed work. The Office of Permitting and Compliance is the Permitting Authority responsible for making a permit determination for this project. The Permitting Authority's physical address is: 111 South Magnolia Drive, Suite #4, Tallahassee, Florida. The Permitting Authority's mailing address is: 2600 Blair Stone Road, MS #5505, Tallahassee, Florida 32399-2400. The Permitting Authority's telephone number is 850/717-9000.

Project File: A complete project file is available for public inspection during the normal business hours of 8:00 a.m. to 5:00 p.m., Monday through Friday (except legal holidays), at address indicated above for the Permitting Authority. The complete project file includes the Draft Permit, the Technical Evaluation and Preliminary Determination, the application, and the information submitted by the applicant, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Permitting Authority's project review engineer for additional information at the address or phone number listed above.

Notice of Intent to Issue Permit: The Permitting Authority gives notice of its intent to issue an air permit to the applicant for the project described above. The applicant has provided reasonable assurance that operation of the proposed equipment will not adversely impact air quality and that the project will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297, F.A.C. The Permitting Authority will issue a Final Permit in accordance with the conditions of the proposed Draft Permit unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, F.S. or unless public comment received in accordance with this notice results in a different decision or a significant change of terms or conditions.

Public Notice: Pursuant to Section 403.815, F.S. and Rules 62-110.106 and 62-210.350, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Public Notice of Intent to Issue Air Permit (Public Notice). The Public Notice shall be published one time only as soon as possible in the legal advertisement section of a newspaper of general circulation in the area affected by this project. The newspaper used must meet the requirements of Sections 50.011 and 50.031, F.S. in the county where the activity is to take place. If you are uncertain that a newspaper meets these requirements, please contact the Permitting Authority at above address or phone number. Pursuant to Rule 62-110.106(5) and (9), F.A.C., the applicant shall provide proof of publication to the Permitting Authority at the above address within 7 days of publication. Failure to publish the notice and provide proof of publication may result in the denial of the permit pursuant to Rule 62-110.106(11), F.A.C.

WRITTEN NOTICE OF INTENT TO ISSUE AIR PERMIT

Comments: The Permitting Authority will accept written comments concerning the proposed Draft Permit for a period of 14 days from the date of publication of the Public Notice. Written comments must be received by the Permitting Authority by close of business (5:00 p.m.) on or before the end of the 14-day period. If written comments received result in a significant change to the Draft Permit, the Permitting Authority shall revise the Draft Permit and require, if applicable, another Public Notice. All comments filed will be made available for public inspection.

Petitions: A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed with (received by) the Department's Agency Clerk in the Office of General Counsel of the Department of Environmental Protection, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. Petitions filed by the applicant or any of the parties listed below must be filed within 14 days of receipt of this Written Notice of Intent to Issue Air Permit. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S., must be filed within 14 days of publication of the attached Public Notice or within 14 days of receipt of this Written Notice of Intent to Issue Air Permit, whichever occurs first. Under Section 120.60(3), F.S., however, any person who asked the Permitting Authority for notice of agency action may file a petition within 14 days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

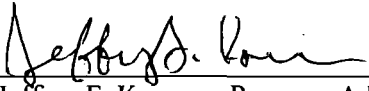
A petition that disputes the material facts on which the Permitting Authority's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner; the name, address and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of when and how each petitioner received notice of the agency action or proposed decision; (d) A statement of all disputed issues of material fact. If there are none, the petition must so state; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action including an explanation of how the alleged facts relate to the specific rules or statutes; and, (g) A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the agency to take with respect to the agency's proposed action. A petition that does not dispute the material facts upon which the Permitting Authority's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Permitting Authority's final action may be different from the position taken by it in this Written Notice of Intent to Issue Air Permit. Persons whose substantial interests will be affected by any such final decision of the Permitting Authority on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation: Mediation is not available in this proceeding.

WRITTEN NOTICE OF INTENT TO ISSUE AIR PERMIT

Executed in Tallahassee, Florida.



Jeffery F. Koerner, Program Administrator
Office of Permitting and Compliance
Division of Air Resource Management

10-27-11

Date

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Written Notice of Intent to Issue Air Permit package (including the Written Notice of Intent to Issue Air Permit, the Public Notice of Intent to Issue Air Permit, the Technical Evaluation and Preliminary Determination and the Draft Permit) was sent by electronic mail, or a link to these documents made available electronically on a publicly accessible server, with received receipt requested before the close of business on 10/27/11 to the persons listed below.

- Ms. Karen Sheffield, TECO: kasheffield@tecoenergy.com
- Mr. Paul L. Carpinone, TECO: plcarpinone@tecoenergy.com
- Mr. Byron Burrows, TECO: btburrows@tecoenergy.com
- Mr. Thomas W. Davis, P.E., ECT: tdavis@ectinc.com
- Ms. Cindy Zhang-Torres, P.E., DEP SWD: cindy.zhang-torres@dep.state.fl.us
- Ms. Cindy Mulkey, DEP Siting Office: cindy.mulkey@dep.state.fl.us
- Ms. Heather Ceron, EPA Region 4: ceron.heather@epa.gov
- Ms. Lynn Scarce, DEP OPC Reading File: lynn.scarce@dep.state.fl.us
- Ms. Barbara. Friday, DEP PP Reading File: barbara.friday@dep.state.fl.us

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated agency clerk, receipt of which is hereby acknowledged.



(Clerk) 10/27/11
(Date)

PUBLIC NOTICE OF INTENT TO ISSUE AIR PERMIT

Florida Department of Environmental Protection
Division of Air Resource Management, Office of Permitting and Compliance
Draft Air Permit No. 1050233-027-AC
Tampa Electric Company, Polk Power Station Unit 1
Polk County, Florida

Applicant: The applicant for this project is Tampa Electric Company (TECO). The applicant's authorized representative and mailing address is: Karen Sheffield, Director, TECO Polk Power Station, Post Office Box 111, Tampa, Florida 33601-0111.

Facility Location: TECO owns and operates the existing Polk Power Station (PPS), which is located in Polk County at 9995 State Road 37 South, in Mulberry, Florida.

Project: TECO PPS Unit 1 is an existing solid fuel-based integrated gasification and combined cycle (IGCC) with a nominal electrical generating capacity of 260 megawatts. The primary solid fuels are coal and petroleum coke. The applicant proposes to construct and operate a temporary pre-commercial scale demonstration project consisting of a high-temperature synthetic gas (syngas) cleanup system and an integrated carbon capture and sequestration system. These cleanup systems will be integrated with Unit 1 and will treat approximately 20 percent of the syngas prior to combustion.

The high-temperature syngas cleanup system will include the following processes: a high-temperature desulfurization process to remove more than 99.9% of sulfur in the syngas; a trace contaminant removal process that will reduce arsenic, selenium and mercury concentrations in the syngas; and a direct sulfur recovery process that will convert the sulfur dioxide (SO₂) to commercial-grade elemental sulfur. The high level of sulfur removal in the high-temperature desulfurization process will provide a syngas stream which will undergo the water gas shift reaction to convert water (H₂O) and carbon monoxide (CO) to hydrogen (H₂) and carbon dioxide (CO₂). Thereafter, activated methyldiethanolamine (aMDEA) will be used to capture 90% of the CO₂ in the cleaned syngas for subsequent geological sequestration.

Emission sources associated with this demonstration project include two small heaters, one sorbent storage hopper, one regenerator fines storage bin and one amine surge drum. The demonstration project will result in the following potential emissions: 3.5 tons/year (TPY) of CO; 6.5 TPY of nitrogen oxides (NO_x); 1 TPY of particulate matter (PM), PM with a mean particle diameter of 10 microns or less (PM₁₀) and PM with a mean particle diameter of 2.5 microns or less (PM_{2.5}); 0.7 TPY of sulfur dioxide (SO₂); and 0.4 TPY of volatile organic compounds (VOC).

The demonstration project is planned to commence construction in March 2012 and be completed by April 2013. The goal for the operation phase is to achieve at least 8,000 hours of operation during an approximate 18 month demonstration period, which is expected to be completed in the third quarter of 2015.

Permitting Authority: Applications for air construction permits are subject to review in accordance with the provisions of Chapter 403, Florida Statutes (F.S.) and Chapters 62-4, 62-210 and 62-212 of the Florida Administrative Code (F.A.C.). The proposed project is not exempt from air permitting requirements and an air permit is required to perform the proposed work. The Permitting Authority responsible for making a permit determination for this project is the Office of Permitting and Compliance in the Department of Environmental Protection's Division of Air Resource Management. The Permitting Authority's physical address is: 111 South Magnolia Drive, Suite #4, Tallahassee, Florida. The Permitting Authority's mailing address is: 2600 Blair Stone Road, MS #5505, Tallahassee, Florida 32399-2400. The Permitting Authority's phone number is 850-717-9000.

Project File: A complete project file is available for public inspection during the normal business hours of 8:00 a.m. to 5:00 p.m., Monday through Friday (except legal holidays), at the physical address indicated above for the Permitting Authority. The complete project file includes the Draft Permit, the Technical Evaluation and Preliminary Determination, the application and information submitted by the applicant (exclusive of confidential records under Section 403.111, F.S.). Interested persons may contact the Permitting Authority's project engineer for additional information at the address and phone number listed above. In addition, electronic copies of these documents are available on the following web site by entering the facility number (1050233) where indicated:

(Public Notice to be Published in the Newspaper)

<http://www.dep.state.fl.us/air/emission/apds/default.asp> .

Notice of Intent to Issue Air Permit: The Permitting Authority gives notice of its intent to issue an air construction permit to the applicant for the project described above. The applicant has provided reasonable assurance that operation of proposed equipment will not adversely impact air quality and that the project will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297, F.A.C. The Permitting Authority will issue a Final Permit in accordance with the conditions of the proposed Draft Permit unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, F.S. or unless public comment received in accordance with this notice results in a different decision or a significant change of terms or conditions.

Comments: The Permitting Authority will accept written comments concerning the proposed Draft Permit for a period of 14 days from the date of publication of the Public Notice. Written comments must be received by the Permitting Authority by close of business (5:00 p.m.) on or before the end of this 14-day period. If written comments received result in a significant change to the Draft Permit, the Permitting Authority shall revise the Draft Permit and require, if applicable, another Public Notice. All comments filed will be made available for public inspection.

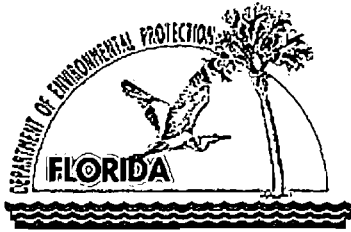
Petitions: A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed with (received by) the Department's Agency Clerk in the Office of General Counsel of the Department of Environmental Protection at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S. must be filed within 14 days of publication of this Public Notice or receipt of a written notice, whichever occurs first. Under Section 120.60(3), F.S., however, any person who asked the Permitting Authority for notice of agency action may file a petition within 14 days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the Permitting Authority's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address and telephone number of the petitioner; the name address and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial rights will be affected by the agency determination; (c) A statement of when and how the petitioner received notice of the agency action or proposed decision; (d) A statement of all disputed issues of material fact. If there are none, the petition must so state; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action including an explanation of how the alleged facts relate to the specific rules or statutes; and, (g) A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the agency to take with respect to the agency's proposed action. A petition that does not dispute the material facts upon which the Permitting Authority's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Permitting Authority's final action may be different from the position taken by it in this Public Notice of Intent to Issue Air Permit. Persons whose substantial interests will be affected by any such final decision of the Permitting Authority on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation: Mediation is not available for this proceeding.

(Public Notice to be Published in the Newspaper)



**TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION**

APPLICANT

Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Polk Power Station Unit 1
Solid Fuel-based Integrated Gasification and Combined Cycle (IGCC)
Facility ID No. 1050233

PROJECT

Project No. 1050233-027-AC
Application for Minor Source Air Construction Permit
Temporary High Temperature Syngas Cleanup and
Carbon Capture and Sequestration Demonstration Project

COUNTY

Polk County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Office of Permitting and Compliance
Chemicals and Combustion Key Industry Group
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

October 27, 2011

1. GENERAL PROJECT INFORMATION

Air Pollution Regulations

Projects at stationary sources with the potential to emit air pollution are subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The statutes authorize the Department of Environmental Protection (Department) to establish regulations regarding air quality as part of the Florida Administrative Code (F.A.C.), which includes the following applicable chapters: 62-4 (Permits); 62-204 (Air Pollution Control – General Provisions); 62-210 (Stationary Sources – General Requirements); 62-212 (Stationary Sources – Preconstruction Review); 62-213 (Operation Permits for Major Sources of Air Pollution); 62-296 (Stationary Sources - Emission Standards); and 62-297 (Stationary Sources – Emissions Monitoring). Specifically, air construction permits are required pursuant to Rules 62-4, 62-210 and 62-212, F.A.C.

In addition, the U. S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 specifies New Source Performance Standards (NSPS) for numerous industrial categories. Part 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP) based on specific pollutants. Part 63 specifies NESHAP based on the Maximum Achievable Control Technology (MACT) for numerous industrial categories. The Department adopts these federal regulations on a quarterly basis in Rule 62-204.800, F.A.C.

Facility Description and Location

The Tampa Electric Company (TECO) Polk Power Station (PPS) is an electric power facility consisting of five key electrical generating units (Units 1 – 5). The facility is categorized under Standard Industrial Classification Code No. 4911. The existing Polk Power Station is located in Polk County at 9995 State Road 37 South in Mulberry, Florida. The UTM coordinates are Zone 17, 402.45 kilometers (km) East, and 3067.35 km North. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to state and federal Ambient Air Quality Standards (AAQS).



Unit 1 consists of a nominal 260 megawatt (MW – net, electrical) solid fuel-based integrated gasification and combined cycle (IGCC) including: a nominal 192 MW (gross) syngas/No. 2 fuel oil-fired General Electric (GE) 7FA combustion turbine-electrical generator (CTG) designated as Emission Unit (EU) 001; a heat recovery steam generator (HRSG); a nominal 123 MW (gross) steam turbine-electrical generator (STG); a solid fuel handling system designated as EU-005; an entrained flow solid fuel gasification system designated as EU-006; an oxygen plant; a synthetic gas (syngas) cleanup and sulfur recovery system; a sulfuric acid plant designated as EU-004. There is also a 120 million Btu per Hour (mmBtu/hr) auxiliary boiler designated as EU-003. Approximately 65 MW are consumed by the oxygen plant and process auxiliary equipment which is the difference between net and gross power production.

Figure 1 - TECO PPS Unit 1 IGCC

Units 2, 3, 4 and 5 (EU 009 through 012) consist of natural gas or natural gas/fuel oil-fired GE 7FA simple cycle CTGs.

Facility Regulatory Categories

- The facility is not a major source of hazardous air pollutants (HAP).

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

- The facility operates units subject to the acid rain provisions of the Clean Air Act.
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is a major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.
- The facility operates units subject to the New Source Performance Standards in Part 60, Title 40 of the Code of Federal Regulations (CFR).

Project Description

On August 12, 2011, the Department received an application from Tampa Electric Company (TECO) to install and operate a pre-commercial scale demonstration high-temperature syngas cleanup system (HTSC) and an integrated carbon dioxide (CO₂) capture and sequestration (CCS) system at Polk Power Station Unit 1. The project will receive United States Department of Energy funding. The demonstration project will include a high-temperature desulfurization process, trace contaminant removal process and direct sulfur recovery process. These cleanup systems will support Unit 1 and will treat approximately 20 to 30 percent (%) of the syngas prior to its combustion. Emission sources associated with this demonstration project includes two small heaters, one sorbent storage hopper, one regenerator fines storage bin and one amine surge drum.

A slipstream of syngas from the IGCC plant will be treated in the cleanup systems to simulate commercial operations. The high-temperature desulfurization process will remove 99.9 % of the sulfur in the syngas. The trace contaminant removal process will reduce arsenic, selenium and mercury concentrations in the syngas. The direct sulfur recovery process will convert sulfur dioxide (SO₂) to commercial grade elemental sulfur. The high level of sulfur removal in the high-temperature desulfurization process will provide a syngas stream which will undergo the water gas shift reaction to convert water (H₂O) and carbon monoxide (CO) to hydrogen (H₂) and CO₂. Thereafter, activated methyldiethanolamine (aMDEA) will be used to capture up to 90% of the CO₂ in the cleaned syngas. A pressurized pipeline will transfer the compressed CO₂ to an onsite injection well for injection and sequestration in a saline aquifer within a deep and naturally capped geologic formation.

The demonstration project is planned to commence construction in March 2012 and be completed by April 2013. The goal for the operation phase is to achieve at least 8,000 hours of operation during the approximate 18 month demonstration period, which is expected to be completed in the third quarter of 2015.

Processing Schedule

08/12/11 Received the application for a minor source air pollution construction permit, application complete.

2. PSD APPLICABILITY

General PSD Applicability

The Department regulates major stationary sources in accordance with Florida's PSD program pursuant to Rule 62-212.400, F.A.C. PSD preconstruction review is required in areas that are currently in attainment with the state and federal Ambient Air Quality Standards (AAQS) or areas designated as "unclassifiable" for these regulated pollutants.

PSD pollutants include: CO; nitrogen oxides (NO_x); sulfur dioxide (SO₂); particulate matter (PM); PM smaller than 10 micrometers (PM₁₀); volatile organic compounds (VOC); lead (Pb); Fluorides (F); sulfuric acid mist (SAM); total reduced sulfur (TRS), including H₂S; municipal waste combustor (MWC) organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans (D/F); MWC metals measured as PM; MWC acid gases measured as SO₂ and hydrogen chloride (HCl); and

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

mercury (Hg).

As defined in Rule 62-210.200(179)(a)1, F.A.C., a “major stationary source” is any of 28 listed stationary sources of air pollutants which emits, or has the potential to emit, 100 tons per year (TPY) or more of any PSD pollutant. [Link to Rule 62-210, F.A.C.](#)

The list given in the citation includes the category of “fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input”. The Polk Power Station is a major stationary source based on its actual emissions and its potential to emit PSD pollutants. The major stationary source threshold for source categories not on the cited list is 250 TPY or more of any PSD pollutant.

For major stationary sources, PSD applicability is based on emissions thresholds known as the significant emission rates (SER) as defined in Rule 62-210.200, (Definitions) F.A.C. Emissions of PSD pollutants from the project that equal or exceed these SER are considered “significant”. BACT must be employed to minimize emissions of each PSD pollutant and an air quality impact analysis must be conducted for the PSD pollutants for which AAQS are defined. SER also means any emissions rate or any net emissions increase of a PSD pollutant associated with a major stationary source or major modification which would construct within 10 kilometers of a Class I area and have an impact on such area equal to or greater than 1 gram per cubic meter, 24-hour average.

Although a facility may be “major” for only one PSD pollutant, a project must include BACT controls for any PSD pollutant that exceeds the corresponding SER given in Table 1.

Table 1 – List of SER by PSD-Pollutant ^{1,4}

Pollutant	SER (TPY)	Pollutant	SER (TPY)
CO	100	NO _x	40
PM/PM ₁₀ ²	25/15	Ozone (VOC) ³	40
Ozone (NO _x) ³	40	SAM	7
SO ₂	40	F	3
Pb	0.6	TRS	10
H ₂ S	10	Hg	0.1

1. Excluding those defined exclusively for MWC and MSW landfills.
2. PM with a diameter less than 2.5 micrometers (PM_{2.5}) is also a PSD pollutant, but an SER has not yet been defined in the Department’s rules. It is regulated by its precursors and surrogates (e.g. PM/PM₁₀ ammonia, SO₂ and NO_x).
3. Ozone (O₃) is regulated by its precursors (VOC and NO_x).
4. There is a federal SER of 75,000 TPY for Greenhouse Gases (GHG) as CO₂ equivalent (CO₂e) that has not been incorporated into Department rules.

PM_{2.5} is also a Federal PSD pollutant and the Department is in the process of adopting a SER of 10 TPY. Refer to [Link to PM_{2.5} Rule](#). Until the rule is finalized, projects in Florida are not subject to a SER for PM_{2.5}.

PSD Applicability for Project

The demonstration project will be located in Polk County, which is in an area that is currently in attainment with (or designated as unclassifiable for) the state and federal Ambient Air Quality Standards (AAQS). The applicant provided the following PSD applicability analysis summarizing the proposed project emissions. The projected actual emissions are based on worst-case emissions produced by two process heaters. Emissions associated with the storage hopper and bin are also included in the emissions of PM/PM₁₀. No emissions increases are projected from the existing IGCC Unit 1 (i.e. the CTG and associated equipment). As shown in the following table, total project emissions will not exceed the PSD significant emissions rates; therefore, the project is not subject to PSD preconstruction review.

Table 2 - Applicant's Annual Emission Summary and PSD Applicability Analysis

Pollutant	Annual Emissions (TPY)		Subject to PSD?
	Projected	Actual	
CO	3.5		No
NO _x	6.5		No
PM/PM ₁₀	1.12		No
SO ₂	0.7		No
VOC	0.4		No

3. PROJECT REVIEW

Existing Process with Low-Temperature Syngas Cleanup System (LTCS)

The following figure shows the present Unit 1 configuration.

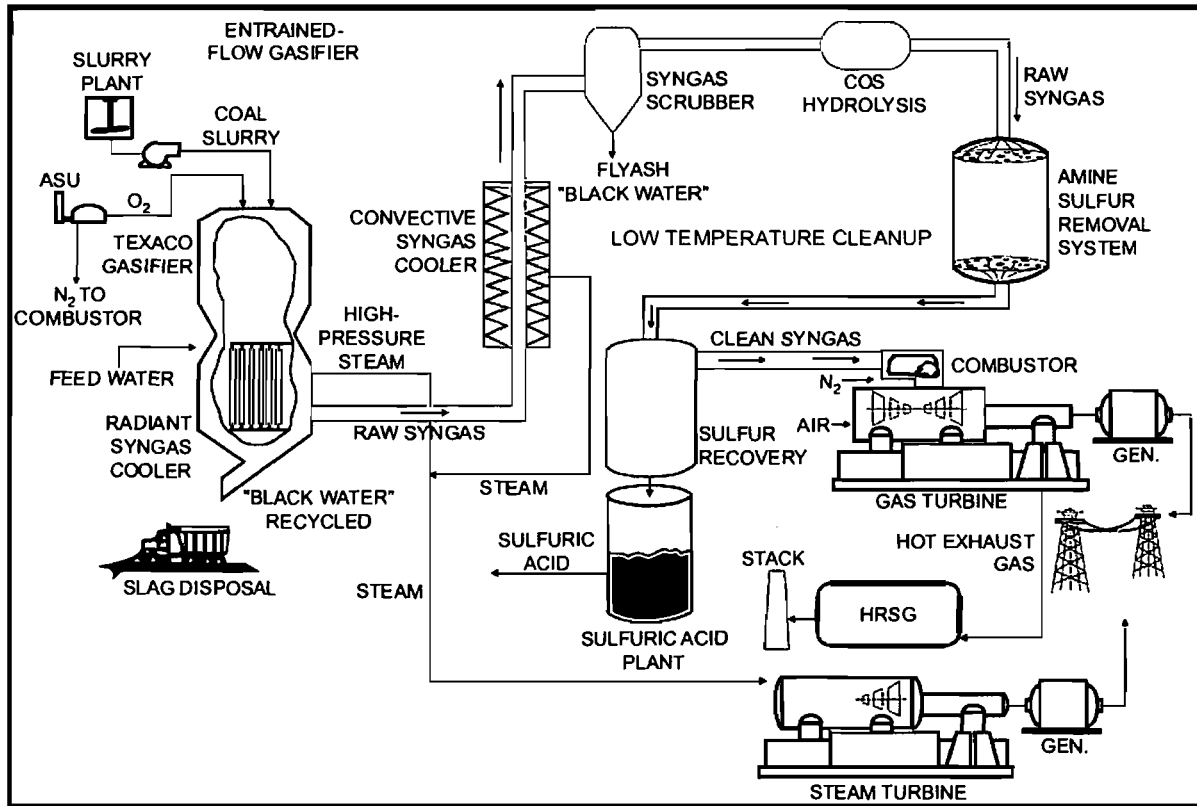


Figure 2 – Process Flow Diagram for the Existing TECO PPS Unit 1 IGCC with LTCS

Following is an explanation of the process:

An air separation unit (ASU) cryogenically separates ambient air into its major constituents, oxygen (O₂) and nitrogen (N₂). The O₂ stream is used in the gasifier and a small amount is consumed in the sulfuric acid plant (SAP). Most of the N₂ produced goes to the CTG to dilute the syngas for NO_x abatement and to increase power production as the N₂ expands through the CTG.

Solid fuels - primarily coal and petroleum coke (petcoke) and water are processed in a rod mill to produce a solids/water slurry. The slurry is injected along with O₂ into the gasifier, which operates at roughly 25 times atmospheric pressure. Partial oxidation of the feedstock generates temperatures in the range of 2,400 - 2,700 Fahrenheit (°F) and transforms the slurry water into steam.

The heat, pressure, and steam break the bonds between feedstock constituents and initiate chemical reactions that produce syngas consisting primarily of hydrogen (H_2) and carbon monoxide (CO). Sulfur contained in the fuel is converted to hydrogen sulfide (H_2S) and carbonyl sulfide (COS). Ash is removed from the bottom of the gasifier as an inert, glassy slag (frit). The remaining portion of the ash (flyash) is either entrained in the raw gas stream or separates with the frit.

{Note that with all carbon present as compressed gases and without N_2 , it is easier to consider ways to remove the carbon during cleanup rather than after combustion/expansion when massive amounts of N_2 and excess air are present.}

The raw gas stream produced in the gasifier passes first through a radiant syngas cooler (RSC) just below the gasifier and then through two parallel fire-tube convective syngas coolers (CSC). The RSC together with the CSC produce much of the IGCC system high-pressure steam and drop the raw gas temperature to a range of 700–800°F. Flyash and hydrogen chloride (HCl) are removed from the raw gas in an intensive water scrubbing step in syngas scrubbers.

COS in the raw gas stream is converted through hydrolysis to H_2S . Nearly all the remaining heat in the raw gas stream is recovered by pre-heating clean syngas and boiler feedwater. A reactor containing a circulating methyldiethanolamine (MDEA) solution strips H_2S from the raw gas stream. The H_2S is sent to a sulfur recovery system that oxidizes the H_2S to produce roughly 200 tons per day (TPD) of 98% pure sulfuric acid.

{Note that the sulfur removal occurs after significant cooling of the syngas, which is then reheated by a complex system of heat exchangers. If the sulfur removal could be accomplished with less cooling and reheat, this would eliminate some expensive systems and improve overall system efficiency.}

The flyash removed from the raw gas stream contains significant amounts of carbon and is recycled to the slurry preparation system. The “grey” process water resulting from the flyash separation is used in the syngas scrubbers.

The main products of combustion in the CTG are water (H_2O) and carbon dioxide (CO_2). The N_2 from the ASU (and which is reintroduced into the CTG) and excess air processed through the CTG compressor and expanded in the rotor section are the other main components in the exhaust gas along with small amounts of air pollutants and noble gases like argon (Ar).

High-Temperature Cleanup System (HTCS) and Carbon Capture and Sequestration

During the original operation of TECO PPS Unit 1 (mid-1990’s) it was recognized that a hot cleanup system could improve the thermodynamic efficiency of the process. A demonstration project was included during the early IGCC operation using a 10% gaseous slipstream as shown in Figure 2.

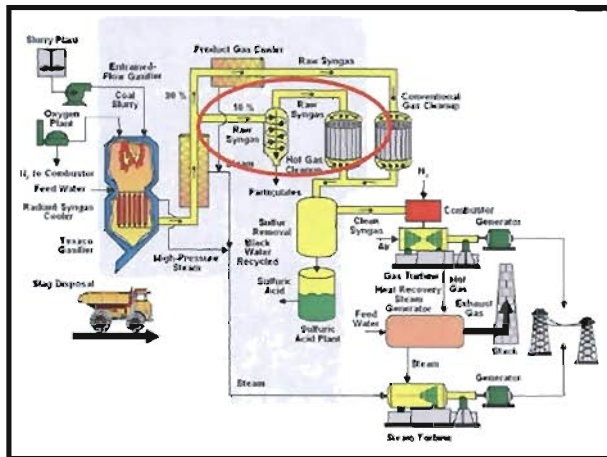


Figure 2 - Previous Hot Cleanup Demonstration

The stream was drawn prior to the product gas cooler (equivalent of convective syngas cooler in Figure 2). The system suffered from pluggage and stress corrosion. TECO dedicated most of its efforts to more critical parts of the process that required attention such as development of a COS hydrolysis step and improving gasifier refractory liners.

Since then, a number of new methods have been developed to accomplish higher temperature cleanup and there is renewed interest in commercializing such processes.

The purposes of the project presently proposed by TECO are: to demonstrate a higher temperature cleanup of the syngas than presently practiced with a benefit to the overall efficiency of Unit 1; and to demonstrate a carbon capture and sequestration (CCS) process to reduce CO₂ greenhouse gas (GHG) emissions.

The proposed project syngas cleanup and CO₂ capture and sequestration systems will include the following steps:

- High-temperature desulfurization;
- Trace contaminant removal;
- Direct sulfur recovery;
- Water gas shift reaction of the primary syngas constituents ($\text{CO} + \text{H}_2\text{O} = \text{CO}_2 + \text{H}_2$);
- Low temperature gas cooling.
- Activated amine CO₂ capture; and
- CO₂ compression and drying system.

The project will use a process developed by Research Triangle Institute (RTI) International, which will be integrated with the existing TECO PPS Unit 1 IGCC as shown in Figure 3.

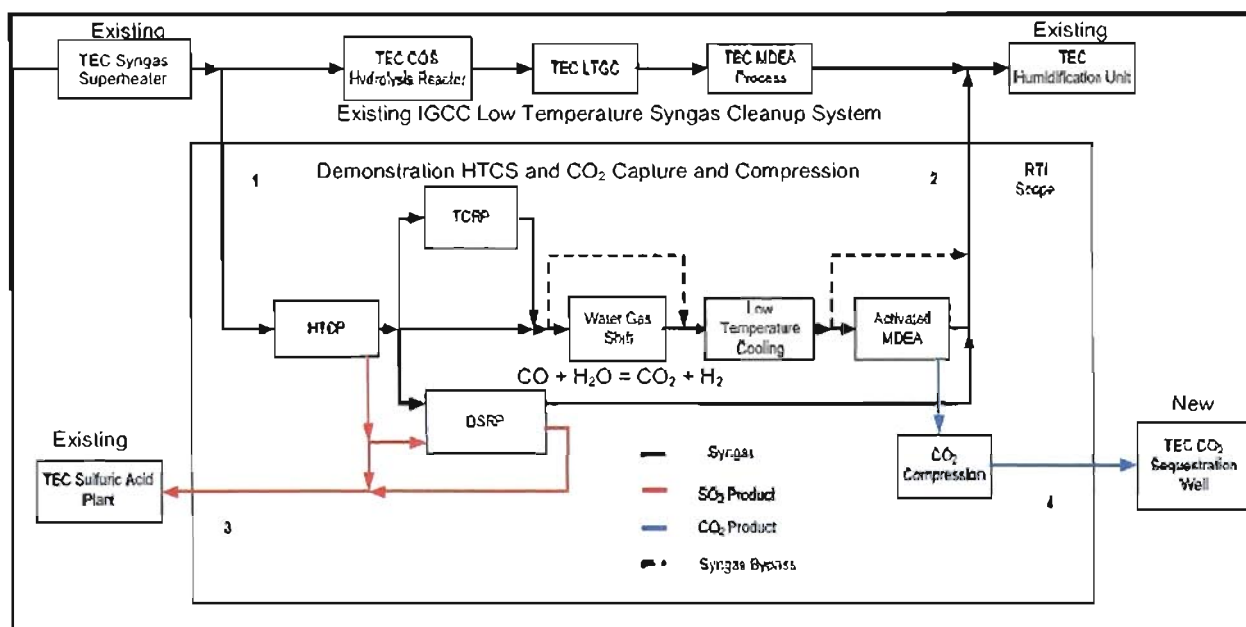


Figure 3 – Process Flow Diagram of HTCS, CCS and Integration with TECO PPS Unit 1 IGCC

Although RTI calls its process “Warm Syngas Cleanup Technology” it actually incorporates high temperature desulfurization and the high temperature terminology will be used in this review. The inner box includes the new components for the HTCS. For further information about the RTI process refer to the following link: [Link to RTI](#)

The flows of raw and treated syngas taken from and returned to the Unit 1 IGCC are indicated as Flows 1 and 2, respectively. The flows of sulfur/SO₂ and compressed CO₂ to TECO are shown as Flows 3 and 4. The HTCS includes the following components:

High-Temperature Desulfurization Process

The proposed technology will begin with a 50 MW slip stream consisting of untreated syngas (Flow 1) coming from the IGCC plant at a flow rate of 2 million standard cubic feet/hour (mscf/hour). A process

heater is used to start up the high-temperature desulfurization process by heating the absorber and regenerator systems. The process heater fires propane, natural gas and ultra-low sulfur diesel (ULSD) fuel oil. During startups, the regenerator is further preheated by direct injection of ULSD fuel oil into the regenerator above its auto-ignition temperature to preheat the regenerator. The untreated syngas initially introduced into the absorber and regenerator gases is sent to the existing flare until the absorber is online.

The untreated syngas contains a H₂S concentration of approximately 7,200 parts per million by volume (ppmv). The high temperature desulfurization process system consists of two coupled transport reactors, the first serving as the sulfur absorber and the second as the sorbent regenerator. The sulfur absorber utilizes chemical reactions with the RTI International proprietary sorbent to remove H₂S and COS from the syngas to produce a syngas with a total sulfur concentration of less than 10 ppmv.

In the sorbent regenerator reactor, the sorbent is regenerated by oxidizing the sulfur compounds to produce a flue gas stream containing SO₂. Most of this stream is directed to the existing PPS SAP. As part of the proposed project, a small portion of this SO₂ stream is routed to the direct sulfur recovery system. This process removes more than 99.9% of the sulfur in the syngas.

Trace Contaminant Removal Process

A slip stream of the desulfurized syngas from the high-temperature desulfurization process is further treated by the trace contaminant removal process. This process consists of three fixed-bed reactors for removing arsenic, selenium and mercury contaminant from the syngas. The mercury reactor is protected by a sulfur guard bed. The treated syngas (Flow 2) is then recombined with the main desulfurized syngas stream.

Direct Sulfur Recovery Process

The SO₂ rich slipstream from the high-temperature desulfurization process generator is converted into approximately 5 TPD of commercial grade elemental sulfur. The SO₂ in the slipstream is converted by reducing it with H₂ and CO with the sulfur product then condensed out of the slipstream. After analyzing the quality of the elemental sulfur, the sulfur product is oxidized using air to create an SO₂ stream (Flow 3), which is sent to the existing PPS SAP. A propane fired heater, vented to the atmosphere, is operated continuously to provide the required heat for this process.

Carbon Capture and Sequestration (CCS) System

The carbon capture step will produce up to 300,000 TPY of high-quality CO₂, which is suitable for geologic sequestration at the Polk Power Station site. The high temperature/high pressure IGCC process with an ASU employed by TECO lends itself to removal of carbon from the fuel prior to combustion. Essentially the energy contained in the CO is made available as additional energy from H₂ by means of the water gas shift reaction described below. The CCS system includes the following components:

Water Gas Shift Reactor System

The water gas shift reactor system (Fuel Gas CO₂ Cleanup in Figure 4) converts CO in the desulfurized syngas from the high-temperature desulfurization process to CO₂.

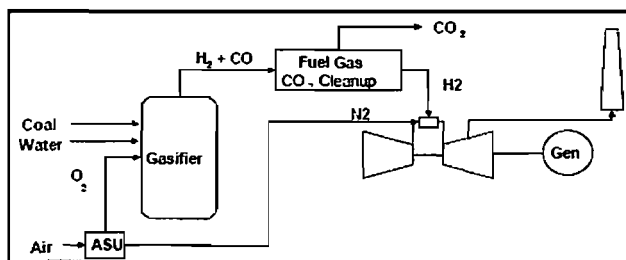


Figure 4 – Pre-combustion CO₂ Removal

The hydrogen bound in water is converted to H₂. The system consists of three fixed-bed reactors operating in parallel and uses conventional commercial catalyst technologies.

The syngas is mixed and preheated with steam provided from the IGCC facility to the reactor inlet temperature of 650 °F with water injected to control the temperature. In the reactors, CO and H₂O are shifted to CO₂ and H₂.

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The syngas provided to the CTG (after further cleaning) will, therefore, contain more H₂ and less CO compared with the syngas presently combusted.

Low-Temperature Gas Cooling System

The low-temperature gas cooling system cools the shifted gas stream from the water gas shift reactor system from approximately 650 to 100 °F in the boiler steam drums and a heat exchanger with cooling feedwater provided by the existing IGCC cooling system. The cooling process generates steam that is routed to the IGCC system. Condensate is also separated from the gas stream and routed to the IGCC system.

Activated Amine CO₂ Capture System

The activated amine CO₂ capture system separates CO₂ from H₂ in the cooled shifted syngas for subsequent absorption by aMDEA in the amine absorber. The aMDEA process technology is commercially available. The absorbed CO₂ is separated from the amine in a regenerator/separation drum and the high-quality CO₂ stream is sent to the CO₂ compression station. The separated H₂-rich stream is sent to the IGCC syngas stream for firing in the combustion turbine.

CO₂ Compression and Drying System

The captured CO₂ stream from the amine system is compressed in a five-stage compression station to 1,500 pounds per square inch gauge (psig). The CO₂ exits the compression station as a supercritical fluid, which is then cooled to approximately 100 °F in coolers. The CO₂ stream is then dried, and the condensate treated and sent to the IGCC system. The compressed CO₂ (Flow 4) is sent to the new TECO deep well injection sequestration system.

CO₂ Deep Well Injection Sequestration System

The compressed CO₂ at a temperature of 120 °F would be transferred through an approximately 2,100-ft, 6-inch stainless steel, pressurized (1,500 psig) pipeline to the injection well for injection and sequestration in a deep saline aquifer geologic formation under the Polk Power Station site. Up to 300,000 TPY of CO₂ would be sequestered during the demonstration period for the proposed project. A vent stack will be installed to vent the captured CO₂ during startups, shutdowns and malfunction of the CO₂ deep well sequestration system. Table 3 summarizes the estimated composition of the CO₂ stream to be sequestered.

Table 3 - Sequestered CO₂ Stream

Composition	CO ₂ Stream (molar %)
CO ₂	99.44
H ₂	0.50
CO	0.05
N ₂	0.01
H ₂ S	<100 ppmv
COS	<10 ppmv
H ₂ O	<15 ppmv
O ₂	---

The target CO₂ injection zone is a deep saline carbonate (dolomite/limestone) reservoir system extending between 4,200 and 8,000 feet below the land surface. Based on site-specific testing and geological information available the following relevant observations were made regarding the injection zone:

- A laterally continuous, thick (more than 1,000 feet) low permeability confining unit (cap rock) is present.
- Fractures, faults, or folds potentially serving as traps or migration pathway are not present.
- Major horizontal variation in depositional environment (and hence the carbonate strata) are not expected.
- The nearest penetration of the confining unit is located approximately 10 miles away.
- Suitable zones for CO₂ storage with horizontal porosity and permeability are present.
- Vertical variations of porosity and permeability are expected to enhance CO₂ storage capacity.
- West-central Florida is seismically stable and experiences little seismic activity.

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- The hydrodynamic (physical) and geochemical properties are favorable for long-term CO₂ storage.

Therefore, the injection zone is both viable and well suited for the purpose of the proposed CO₂ sequestration demonstration project.

TECO is planning a dual-use for the injection well. After the CO₂ sequestration project has been completed, the IW-2 well will be used for the disposal of wastewater from the power plant operations.

Emissions

During the approximate 18-month operation phase, the following emissions sources associated with temporary operation of the proposed demonstration project will include two small process heaters, one sorbent storage hopper, one regenerator fines storage bin and one amine surge drum. Table C summarizes the estimated potential emissions based on the applicants estimated hours of operation of some of this equipment versus the worst case scenario with both of the process heaters operating continuously (8,760 hours/year).

Table 4 - Estimated Potential Emissions

Pollutant	Potential Emissions (TPY)	
	During Limited Hours of Operation	Assuming Continuous Hours of Operation
CO	3.5	9.3
NO _x	6.5	17.3
PM/PM ₁₀	1.1	2.9
SO ₂	0.7	1.9
VOC	0.4	1.0

Based even on the worst case scenario, the impacts on ambient air quality of these temporary, intermittent and minor level of emissions associated with this project will be minimal.

A description of these emissions sources associated with this temporary demonstration project includes:

Process Heaters

High-Temperature Desulfurization Process Startup Heater

The startup heater will have the following specifications:

- The maximum heat input rate is 23.75 mmBtu/hr.
- The heater will fire propane, natural gas and ULSD fuel oil.
- The ULSD fuel oil will have a maximum sulfur content of 0.0015%.
- The requested maximum hours of operation will be 2,820 hours/year; approximately 32% of the time.

This process heater will be used to start the high-temperature desulfurization process by heating the absorber and regenerator systems. Emissions produced by the combustion of the dual fuels in the heater will be exhausted to ambient air at 400 °F through a 60-foot tall exhaust stack at a volumetric flow rate of 10,340 actual cubic feet per minute (acfm).

Direct Sulfur Recovery Process Tailgas Recycle Heater

The tailgas recycle heater will have the following specifications:

- The maximum heat input rate is 2.1 million British thermal unit (mmBtu)/hour.
- The heater will fire only propane.
- The maximum hours of operation will be 8,760 hours/year; continuously.

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

Emissions produced by the combustion of the propane heater will be exhausted to ambient air at 400 °F through a 0.5 feet diameter by 60-feet tall exhaust stack at a volumetric flow rate of 750 acfm.

New Source Performance Standards (NSPS) Provisions

The process heaters are not subject to applicable NSPS provisions in 40 Code of Federal Regulations (CFR) 60 for Subpart Dc (Standards of Performance for Small Industrial-Commercial –Institutional Steam Generating Units) as defined in §60.41c “*Steam Generating Unit*,” which excludes process heaters in the definition. “*Process Heaters*” are defined as, “a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst.”

National Emission Standards for Hazardous Air Pollutants (NESHAP) Provisions

The demonstration project process heaters do not meet the definition of an “*industrial boiler*” as defined in §63.11237 of the NESHAP provisions in 40 CFR 63 for Subpart JJJJJ (National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources). An “*industrial boiler*” is defined as a boiler used in manufacturing, processing, mining, and refining or any other industry to provide steam, hot water, and/or electricity. The heaters do not provide steam, hot water, and/or electricity; therefore are not subject to the applicable NESHAP provisions as defined in Subpart JJJJJ.

Flare

The existing flare is a standard open flare that is currently used as an emergency safety device and is the only control device associated with the gasification system. The open flare is currently used to burn gas from the process during startup, shutdown and emergencies. The flare stack is 150 feet and the exit temperature of the exhaust gas is 1,830 °F. Emissions from the flare’s pilot flame are currently negligible. The open flare is subject to an opacity standard of 20%.

The flare will operate during initial startup of this high-temperature desulfurization process. The untreated syngas initially introduced into the absorber and regenerator gases will be sent to the existing flare until the absorber is online. The flare will be used to oxidize intermittent emissions associated with startups, shutdowns and malfunctions of the demonstration project equipment. The flare will operate under the current regulated performance restrictions and emission standards, pursuant to air construction Permit No.PSD-FL-194.

Miscellaneous Equipment

- High-temperature desulfurization process unit sorbent hopper will operate for approximately 104 hours per year. Intermittent emissions of particulate matter are estimated to be 0.10 TPY. The sorbent hopper will be equipped with a cartridge-type filter to control PM emissions.
- Amine (aMDEA) surge drum will operate for approximately 12 hours per year. Due to the low vapor pressure of aMDEA (less than 0.0002 pound per square inch absolute at 68 °F) and the limited duration of venting, VOC emissions from the amine surge drum will be negligible.
- The high-temperature desulfurization process unit regenerator system regenerator fines bin will operate approximately 104 hours per year. Intermittent emissions of particulate matter are estimated to be 0.10 TPY. The regenerator fines bin will also be equipped with a cartridge-type filter to control PM emissions.

State Regulations

According to Section 403.061(18), F.S., the department has the power and the duty to encourage and conduct studies, investigations, and research relating to pollution and its causes, effects, prevention, abatement, and control. The project is the largest demonstration of a HTSC system and an integrated CCS system on an IGCC installation.

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

The applicant could have requested exemption from permitting based on one or more provisions under Department rules 62-4.040 and 62-210.300, Florida Administrative Code (F.A.C.). However, the applicant decided to pursue a permit for the project.

The facility will continue to operate under its existing air construction and facility Title V operation permits. The most recent applicable permit is Title V Permit No. 1050233-026-AV available at:

[Link to Title V Permit](#)

Construction-Related Activities Resulting in Secondary Emissions

Emissions from the temporary construction of the high-temperature syngas cleanup system and an integrated CO₂ capture and sequestration system and related activities are considered *secondary emissions*, which are defined in Rule 62-210.200, F.A.C. as, “The emissions which occur as a result of the construction or operation of a facility or a modification to a facility, but which are not discharged into the atmosphere from the facility itself. Secondary emissions may include but are not limited to emissions from ships or trains coming to or leaving a new or modified facility and emissions from any off-site support facility which would not otherwise be constructed or increase its emissions except as a result of the construction or operation of the new or modified facility. Secondary emissions must be specific, well-defined, quantifiable, and impact the same general area as the facility or modification which causes the secondary emissions.” As provided in the definition of *potential to emit*, “Secondary emissions are not included when determining the potential to emit of an emission unit or facility.” BACT determinations are not required for activities related to construction since emissions will be temporary and occur before the permanent emissions units are fully operational.

4. PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. No air quality modeling analysis is required because the project does not result in a significant increase in emissions. Tammy McWade is the project engineer responsible for reviewing the application and drafting the permit. Additional details of this analysis may be obtained by contacting the project engineer at the Department’s Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.



Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

PERMITTEE

Tampa Electric Company
P.O. Box 111
Tampa, FL 33601-0111

Air Permit No. 1050233-027-AC
Permit Expires: December 31, 2015
Minor Air Construction Permit

Authorized Representative:
Karen Sheffield, Director Polk Power Station

Polk Power Station
HTSC/CCS Demonstration Project

PROJECT

This is the final air construction permit, which authorizes the installation and operation of a high-temperature syngas cleanup system (HTSC) and an integrated carbon capture and sequestration (CCS) system. The proposed work will be conducted at the existing Polk Power Station, which is a electrical generating plant categorized under Standard Industrial Classification No. 4911. The existing facility is located in Polk County at 9995 State Route 37 South in Mulberry, Florida. The UTM coordinates are Zone 17, 402.45 km East, and 3067.35 km North.

This final permit is organized into the following sections: Section 1 (General Information); Section 2 (Administrative Requirements); Section 3 (Emissions Unit Specific Conditions). As noted in the Final Determination provided with this final permit, only minor changes and clarifications were made to the draft permit.

STATEMENT OF BASIS

This air pollution construction permit is issued under the provisions of: Chapter 403 of the Florida Statutes (F.S.) and Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297 of the Florida Administrative Code (F.A.C.). The permittee is authorized to conduct the proposed work in accordance with the conditions of this permit. This project is subject to the general preconstruction review requirements in Rule 62-212.300, F.A.C. and is not subject to the preconstruction review requirements for major stationary sources in Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

Executed in Tallahassee, Florida

(DRAFT)

Jeffery F. Koerner, Program Administrator
Office of Permitting and Compliance
Division of Air Resource Management

(Date)

DRAFT PERMIT

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Final Air Permit package (including the Final Determination and Final Permit) was sent by electronic mail, or a link to these documents made available electronically on a publicly accessible server, with received receipt requested before the close of business on _____ (DRAFT) _____ to the persons listed below.

- Ms. Karen Sheffield, TECO: kasheffield@tecoenergy.com
- Mr. Paul L. Carpinone, TECO: plcarpinone@tecoenergy.com
- Mr. Byron Burrows, TECO: btburrows@tecoenergy.com
- Mr. Thomas W. Davis, P.E., ECT: tdavis@ectinc.com
- Ms. Cindy Zhang-Torres, P.E., DEP SWD: cindy.zhang-torres@dep.state.fl.us
- Ms. Cindy Mulkey, DEP Siting Office: cindy.mulkey@dep.state.fl.us
- Ms. Heather Ceron, EPA Region 4: ceron.heather@epa.gov
- Ms. Lynn Scarce, DEP PC Reading File: lynn.scarce@dep.state.fl.us
- Ms. Barbara Friday, DEP PP Reading File: barbara.friday@dep.state.fl.us

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated agency clerk, receipt of which is hereby acknowledged.

(DRAFT)

(Clerk)

(Date)

SECTION 1. GENERAL INFORMATION (DRAFT)

FACILITY DESCRIPTION

Polk Power Station is an electric power plant, which is categorized under Standard Industrial Classification Code No. 4911. The existing Polk Power Station is located in Polk County at 9995 State Road 37 South in Mulberry, Florida. The UTM coordinates are Zone 17, 402.45 km East, and 3067.35 km North. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to state and federal Ambient Air Quality Standards (AAQS).

The facility is an integrated gasification combined-cycle (IGCC) plant consisting of Unit 1 (EU 001) a 260 megawatt (MW) (electric) combined cycle combustion turbine, which fires synthesis gas (syngas) produced from gasification of solid fuels including coal and petroleum coke (petcoke) or No. 2 fuel oil; an auxiliary boiler (EU 003), which fires No. 2 fuel oil; a sulfuric acid plant (EU 004); a solid fuel handling system (EU 005); a solid fuel gasification system (EU 006); Units 2 and 3 (EU 009 and 010) are two nominal 165 MW simple cycle gas turbines firing either natural gas or No. 2 fuel oil; and, Units 4 and 5 (EU 011 and 012) are two nominal 165 MW simple cycle gas turbines that fire only natural gas.

PROPOSED PROJECT

The project consists of installation and operation a pre-commercial scale demonstration high-temperature syngas cleanup system (HTSC) and an integrated carbon dioxide (CO₂) capture and sequestration (CCS) system at the Polk Power Station. The demonstration project will include a high-temperature desulfurization process, trace contaminant removal process and direct sulfur recovery process. These cleanup systems will be integrated with the existing IGCC Unit 1. Emission sources associated with this demonstration project includes two small heaters, one sorbent storage hopper, on regenerator fines storage bin and one amine surge drum.

A slipstream of syngas from the IGCC plant will be treated in the cleanup systems to simulate commercial operations. The high-temperature desulfurization process will remove 99.9 percent (%) of the sulfur in the syngas. The trace contaminant removal process will reduce arsenic, selenium and mercury concentrations in the syngas. The direct sulfur recovery process will convert sulfur dioxide (SO₂) to commercial-grade elemental sulfur. The high level of sulfur removal in the high-temperature desulfurization process will provide a syngas stream from which activated methyldiethanolamine (aMDEA) will be used to capture up to 90% of the CO₂ in the cleaned syngas. A pressurized pipeline will transfer the compressed CO₂ to an onsite injection well for injection and sequestration in a deep saline aquifer geologic formation.

The demonstration project is planned to commence construction in March 2012 and be completed by April 2013. The goal for the operation phase is to achieve at least 8,000 hours of operation during the approximate 18 month demonstration period, which is expected to be completed in the third quarter of 2015.

This project will add the following emissions units.

EU No.	Emission Unit Description
015	High-Temperature Syngas Cleanup System (HTSC) and Carbon Capture and Sequestration System (CCS)

FACILITY REGULATORY CLASSIFICATION

- The facility is not a major source of hazardous air pollutants (HAP).
- The facility operates units subject to the acid rain provisions of the Clean Air Act.
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is a major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.
- The facility operates units subject to the New Source Performance Standards in Part 60, Title 40 of the Code of Federal Regulations (CFR).

SECTION 2. ADMINISTRATIVE REQUIREMENTS (DRAFT)

1. Permitting Authority: The permitting authority for this project is the Office of Permitting and Compliance, Division of Air Resource Management, Florida Department of Environmental Protection (Department). The Office of Permitting and Compliance mailing address is 2600 Blair Stone Road (MS #5505), Tallahassee, Florida 32399-2400.
2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Southwest District Office at: 13051 N. Telecom Parkway, Temple Terrace, Florida 33637-0926.
3. Applicable Regulations, Forms and Application Procedures: Unless otherwise specified in this permit, the construction and operation of the subject emissions units shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of: Chapter 403, F.S.; and Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296 and 62-297, F.A.C. Issuance of this permit does not relieve the permittee from compliance with any applicable federal, state, or local permitting or regulations.
4. New or Additional Conditions: For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]
5. Modifications: The permittee shall notify the Compliance Authority upon commencement of construction. No new emissions unit shall be constructed and no existing emissions unit shall be modified without obtaining an air construction permit from the Department. Such permit shall be obtained prior to beginning construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]
6. Source Obligation:
 - (a) At such time that a particular source or modification becomes a major stationary source or major modification (as these terms were defined at the time the source obtained the enforceable limitation) solely by exceeding its projected actual emissions, then the requirements of subsections 62-212.400(4) through (12), F.A.C., shall apply to the source or modification as though construction had not yet commenced on the source or modification. [Rule 62-212.400(12), F.A.C.]
7. Application for Title V Permit: This permit authorizes construction of the permitted emissions units and initial operation to determine compliance with Department rules. A Title V air operation permit is required for regular operation of the permitted emissions unit. The permittee shall apply for a Title V air operation permit at least 90 days prior to expiration of this permit, but no later than 180 days after commencing operation. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the appropriate Permitting Authority with copies to the Compliance Authority. [Rules 62-4.030, 62-4.050, 62-4.220 and Chapter 62-213, F.A.C.]

SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS (DRAFT)

B. HTSC and CCS System Demonstration Project (EU 015)

This section of the permit addresses the following emissions units.

EU No.	Emission Unit Description
015	High-Temperature Syngas Cleanup System (HTSC) and Carbon Capture and Sequestration System (CCS)

{Permitting Note: The temporary cleanup systems will be integrated with the existing integrated coal gasification combined-cycle (IGCC) Unit 1 to remove more than 99.9% of sulfur in the synthetic gas (syngas) slipstream and capture 90% of the carbon dioxide (CO₂) in the clean syngas slipstream for subsequent geological sequestration. The demonstration project is planned to commence construction in March 2012 and be completed by April 2013. The goal for the operation phase is to achieve at least 8,000 hours of operation during the approximate 18 month demonstration period, which is expected to be completed in the third quarter of 2015.

COMPLIANCE WITH EXISTING PERMIT CONDITIONS

1. Existing Permits: This permit supplements all existing valid permits. The permittee shall continue to comply with all applicable conditions from valid air construction and facility Title V operation permits.
[Permit No. 1050233-026-AV]

EQUIPMENT

2. High-Temperature Syngas Cleanup System: The permittee is authorized to install and operate the following processes:
 - a. High-temperature desulfurization process;
 - b. Trace contaminant removal process; and
 - c. Direct sulfur recovery process.[Application No. 1050233-027-AC]
3. Carbon Capture and Sequestration System: The permittee is authorized to install and operate the following processes:
 - a. Water gas shift reactor system;
 - b. Low-temperature gas cooling system.
 - c. Activated amine CO₂ capture system.
 - d. CO₂ compression and drying system.
 - e. CO₂ deep well injection sequestration system.[Application No. 1050233-027-AC]
4. High-Temperature Desulfurization Process Startup Heater: The permittee is authorized to install and operate the startup process heater that will fire propane, natural gas and ultra-low sulfur diesel (ULSD) fuel oil with a design heat input rate of approximately 24 million British thermal units (MMBtu)/hour.
[Application No. 1050233-027-AC]
5. Direct Sulfur Recovery Process Tailgas Recycle Heater: The permittee is authorized to install and operate the tailgas recycle heater that will fire only propane with a design heat input rate of approximately 2 MMBtu/hour. [Application No. 1050233-027-AC]
6. Miscellaneous Ancillary Equipment: The permittee is authorized to install and operate the adsorber sorbent hopper, aMDEA surge drum and regenerator fines bin. [Application No. 1050233-027-AC]

PERFORMANCE RESTRICTIONS

7. Hours of Operation: The hours of operation for the temporary high-temperature syngas cleanup system and integrated CO₂ capture and sequestration system are not limited (8,760 hours per year).

Friday, Barbara

From: Friday, Barbara
Sent: Thursday, October 27, 2011 1:27 PM
To: 'kashfield@tecoenergy.com'
Cc: 'btburrows@tecoenergy.com'; Zhang-Torres; Mulkey, Cindy; Scearce, Lynn; 'plcarpinone@tecoenergy.com'; 'tdavis@ectinc.com'; 'ceron.heather@epa.gov'; McWade, Tammy; Linero, Alvaro
Subject: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC
Attachments: 1050233-027-AC-DSignedWrittenNoticeofIntentpdf.pdf

Tracking:	Recipient	Delivery	Read
	'kashfield@tecoenergy.com'		
	'btburrows@tecoenergy.com'		
	Zhang-Torres	Delivered: 10/27/2011 1:27 PM	
	Mulkey, Cindy	Delivered: 10/27/2011 1:27 PM	
	Scearce, Lynn	Delivered: 10/27/2011 1:27 PM	
	'plcarpinone@tecoenergy.com'		
	'tdavis@ectinc.com'		
	'ceron.heather@epa.gov'		
	McWade, Tammy	Delivered: 10/27/2011 1:27 PM	
	Linero, Alvaro	Delivered: 10/27/2011 1:27 PM	Read: 10/27/2011 1:27 PM

Dear Ms. Sheffield:

Attached is the official **Notice of Draft Permit** for the project referenced below. Click on the link displayed below to access the permit project documents and send a "reply" message verifying receipt of the document(s) provided in the link; this may be done by selecting "Reply" on the menu bar of your e-mail software, noting that you can view the documents, and then selecting "Send".

Note: We must receive verification that you are able to access the documents. Your immediate reply will preclude subsequent e-mail transmissions to verify accessibility of the document(s).

Attention: Tammy McWade

Owner/Company Name: TAMPA ELECTRIC COMPANY
Facility Name: POLK POWER STATION
Project Number: 1050233-027-AC
Permit Status: DRAFT
Permit Activity: CONSTRUCTION
Facility County: POLK

Click on the following link to access the permit project documents:

http://ARM-PERMIT2K.dep.state.fl.us/adh/prod/pdf_permit_zip_files/1050233.027.AC.D_pdf.zip

The Office of Permitting and Compliance is issuing electronic documents for permits, notices and other correspondence in lieu of hard copies through the United States Postal System, to provide greater service to the applicant and the engineering community. Access these documents by clicking on the link provided above, or search for other project documents using the "Air Permit Documents Search" website at <http://www.dep.state.fl.us/air/emission/apds/default.asp>.

Permit project documents addressed in this email may require immediate action within a specified time frame. Please open and review the document(s) as soon as possible, and verify that they are accessible. Please advise this office of any changes to your e-mail address or that of the Engineer-of-Record. If you have any problems opening the documents or would like further information, please contact the Florida Department of Environmental Protection, Office of Permitting and Compliance.

Note: The attached document is in Adobe Portable Document Format (pdf). Adobe Acrobat Reader can be downloaded for free at the following internet site: <<http://www.adobe.com/products/acrobat/readstep.html>> .

Regards,

Barbara Friday

Office of Permitting and Compliance (OPC)

Division of Air Resources Management

850-717-9095

Please take a few minutes to share your comments on the service you received from the department by clicking on this link. [DEP Customer Survey](#).

Friday, Barbara

From: Sheffield, Karen A. [kashffield@tecoenergy.com]
Sent: Friday, October 28, 2011 7:03 AM
To: Friday, Barbara
Cc: Burrows, Byron T.
Subject: RE: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

I have received the documents provided in the link below. Thank you. Karen Sheffield

From: Friday, Barbara [mailto:Barbara.Friday@dep.state.fl.us]
Sent: Thursday, October 27, 2011 1:27 PM
To: Sheffield, Karen A.
Cc: Burrows, Byron T.; Zhang-Torres; Mulkey, Cindy; Searce, Lynn; Carpinone, Paul L.; 'tdavis@ectinc.com'; 'ceron.heather@epa.gov'; McWade, Tammy; Linero, Alvaro
Subject: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Dear Ms. Sheffield:

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Attention: Tammy McWade

Owner/Company Name: TAMPA ELECTRIC COMPANY
Facility Name: POLK POWER STATION
Project Number: 1050233-027-AC
Permit Status: DRAFT
Permit Activity: CONSTRUCTION
Facility County: POLK

Click on the following link to access the permit project documents:

http://ARM-PERMIT2K.dep.state.fl.us/adh/prod/pdf_permit_zip_files/1050233.027.AC.D_pdf.zip

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this office of any changes to your e-mail address or that of the Engineer-of-Record. If you have any problems opening the documents or would like further information, please contact the Florida Department of Environmental Protection, Office of Permitting and Compliance.

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Regards,

Barbara Friday

Office of Permitting and Compliance (OPC)

Division of Air Resources Management

850-717-9095

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NOTICE: This email is intended only for the individual(s) to whom it is addressed and may contain confidential information. If you have received this email by mistake, please notify the sender immediately, delete this email from your system and do not copy or disclose it to anyone else. Although we take precautions to protect against viruses, we advise you to take your own precautions to protect against viruses as we accept no liability for any which remain.

Friday, Barbara

From: Burrows, Byron T. [BTBurrows@tecoenergy.com]
To: Friday, Barbara
Sent: Thursday, October 27, 2011 1:38 PM
Subject: Read: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Your message was read on Thursday, October 27, 2011 1:38:06 PM (GMT-05:00) Eastern Time (US & Canada).

Friday, Barbara

From: Microsoft Exchange
To: 'tdavis@ectinc.com'
Sent: Thursday, October 27, 2011 1:27 PM
Subject: Relayed: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Delivery to these recipients or distribution lists is complete, but delivery notification was not sent by the destination:

'tdavis@ectinc.com'

Subject: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Sent by Microsoft Exchange Server 2007

Friday, Barbara

From: Tom Davis [tdavis@ectinc.com]
Sent: Thursday, October 27, 2011 2:01 PM
To: Friday, Barbara
Subject: RE: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Dear Ms. Friday,

I have received and can access the documents referenced in your email below.

Thanks.

From: Friday, Barbara [mailto:Barbara.Friday@dep.state.fl.us]
Sent: Thursday, October 27, 2011 1:27 PM
To: 'kasheffield@tecoenergy.com'
Cc: 'btburrows@tecoenergy.com'; Zhang-Torres; Mulkey, Cindy; Searce, Lynn; 'plcarpinone@tecoenergy.com'; 'tdavis@ectinc.com'; 'ceron.heather@epa.gov'; McWade, Tammy; Linero, Alvaro
Subject: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Dear Ms. Sheffield:

Attached is the official **Notice of Draft Permit** for the project referenced below. Click on the link displayed below to access the permit project documents and send a "reply" message verifying receipt of the document(s) provided in the link; this may be done by selecting "Reply" on the menu bar of your e-mail software, noting that you can view the documents, and then selecting "Send".

Note: We must receive verification that you are able to access the documents. Your immediate reply will preclude subsequent e-mail transmissions to verify accessibility of the document(s).

Attention: Tammy McWade

Owner/Company Name: TAMPA ELECTRIC COMPANY
Facility Name: POLK POWER STATION
Project Number: 1050233-027-AC
Permit Status: DRAFT
Permit Activity: CONSTRUCTION
Facility County: POLK

Click on the following link to access the permit project documents:

http://ARM-PERMIT2K.dep.state.fl.us/adh/prod/pdf_permit_zip_files/1050233.027.AC.D_pdf.zip

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Permit project documents addressed in this email may require immediate action within a specified time frame. Please open and review the document(s) as soon as possible, and verify that they are accessible. Please advise this office of any changes to your e-mail address or that of the Engineer-of-Record. If you have any problems

opening the documents or would like further information, please contact the Florida Department of Environmental Protection, Office of Permitting and Compliance.

Note: The attached document is in Adobe Portable Document Format (pdf). Adobe Acrobat Reader can be downloaded for free at the following internet site: <<http://www.adobe.com/products/acrobat/readstep.html>> .

Regards,

Barbara Friday

Office of Permitting and Compliance (OPC)

Division of Air Resources Management

850-717-9095

Please take a few minutes to share your comments on the service you received from the department by clicking on this link. [DEP Customer Survey](#).

Friday, Barbara

From: Microsoft Exchange
To: Zhang-Torres; Mulkey, Cindy; Linero, Alvaro; Searce, Lynn
Sent: Thursday, October 27, 2011 1:27 PM
Subject: Delivered: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Your message has been delivered to the following recipients:

Zhang-Torres

Mulkey, Cindy

Linero, Alvaro

Searce, Lynn

Subject: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Sent by Microsoft Exchange Server 2007

Friday, Barbara

From: Zhang-Torres
To: Friday, Barbara
Sent: Thursday, October 27, 2011 3:44 PM
Subject: Read: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Your message was read on Thursday, October 27, 2011 3:44:03 PM (GMT-05:00) Eastern Time (US & Canada).

Friday, Barbara

From: Searce, Lynn
To: Friday, Barbara
Sent: Friday, October 28, 2011 8:03 AM
Subject: Read: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Your message was read on Friday, October 28, 2011 8:03:22 AM (GMT-05:00) Eastern Time (US & Canada).

Friday, Barbara

From: Mulkey, Cindy
To: Friday, Barbara
Sent: Thursday, October 27, 2011 1:46 PM
Subject: Read: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Your message was read on Thursday, October 27, 2011 1:45:38 PM (GMT-05:00) Eastern Time (US & Canada).

Friday, Barbara

From: Linero, Alvaro
To: Friday, Barbara
Sent: Thursday, October 27, 2011 1:27 PM
Subject: Read: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Your message was read on Thursday, October 27, 2011 1:27:25 PM (GMT-05:00) Eastern Time (US & Canada).

Friday, Barbara

From: Microsoft Exchange
To: McWade, Tammy
Sent: Thursday, October 27, 2011 1:27 PM
Subject: Delivered: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Your message has been delivered to the following recipients:

McWade, Tammy

Subject: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Sent by Microsoft Exchange Server 2007

Friday, Barbara

From: McWade, Tammy
To: Friday, Barbara
Sent: Thursday, October 27, 2011 1:36 PM
Subject: Read: Tampa Electric Company, Polk Power Station Unit 1 - 1050233-027-AC

Your message was read on Thursday, October 27, 2011 1:35:51 PM (GMT-05:00) Eastern Time (US & Canada).