

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



## EXAMPLE A

### NOTICE OF APPLICATION AND PRELIMINARY DECISION FOR AN AIR QUALITY PERMIT

PROPOSED AIR QUALITY PERMIT GHGPSDTX124

**APPLICATION AND PRELIMINARY DECISION.** DeCordova II Power Company LLC, 1601 Bryan Street, Dallas, Texas 75201-3401, has applied to the Texas Commission on Environmental Quality (TCEQ) for issuance of proposed Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) Air Quality Permit GHGPSDTX124, which would authorize a modification to add Combined Cycle optionality for the Simple Cycle Combustion Turbines Units 5 & 6 located at 4950 Power Plant Court, Granbury, Hood County, Texas 76048. This application was submitted to the TCEQ on December 19, 2014. The existing facility will emit greenhouse gases.

The executive director has determined that the emissions of air contaminants from the existing facility which are subject to PSD review will not violate any state or federal air quality regulations and will not have any significant adverse impact on soils, vegetation, or visibility. All air contaminants have been evaluated, and best available control technology will be used for the control of these contaminants.

The executive director has completed the technical review of the application and prepared a draft permit which, if approved, would establish the conditions under which the facility must operate. The permit application, executive director's preliminary decision, draft permit, and the executive director's preliminary determination summary will be available for viewing and copying at the TCEQ central office, the TCEQ Dallas/Fort Worth regional office, and at Hood County Library, 222 North Travis Street, Granbury, Hood County, Texas, beginning the first day of publication of this notice. The facility's compliance file, if any exists, is available for public review at the TCEQ Dallas/Fort Worth Regional Office, 2309 Gravel Drive, Fort Worth, Texas.

**INFORMATION AVAILABLE ONLINE.** The following documents are accessible through the Commission's Web site at [www.tceq.texas.gov/goto/cid](http://www.tceq.texas.gov/goto/cid): the executive director's preliminary decision which includes the draft permit, the executive director's preliminary determination summary, and, once available, the executive director's response to comments and the final decision on this application. You may access the Commissioners' Integrated Database (CID) using the above link and enter the permit number for this application. The Hood County Library, 222 North Travis Street, Granbury, Hood County, Texas, provides public access to the internet. The following link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For exact location, refer to application. <http://www.tceq.texas.gov/assets/public/hb610/index.html?lat=32.402777&lng=-97.699444&zoom=13&type=r>.

**PUBLIC COMMENT/PUBLIC MEETING.** You may submit public comments or request a public meeting about this application. The purpose of a public meeting is to provide the opportunity to submit comment or to

ask questions about the application. The TCEQ will hold a public meeting if the executive director determines that there is a significant degree of public interest in the application, if requested by an interested person, or if requested by a local legislator. A public meeting is not a contested case hearing. There is no opportunity to request a contested case hearing for this application. **You may submit additional written public comments within 30 days of the date of newspaper publication of this notice in the manner set forth in the AGENCY CONTACTS AND INFORMATION paragraph below.**

After the deadline for public comment, the executive director will consider the comments and prepare a response to all public comment. **The response to comments, along with the executive director's decision on the application will be mailed to everyone who submitted public comments or is on a mailing list for this application.**

**EXECUTIVE DIRECTOR ACTION.** The executive director may issue final approval of the application. The response to comments, along with the executive director's decision on the application will be mailed to everyone who submitted public comments or is on a mailing list for this application, and will be posted electronically to the CID.

**MAILING LIST.** In addition to submitting public comments, you may ask to be placed on a mailing list to obtain additional information on this application by sending a request to the Office of the Chief Clerk at the address below.

**AGENCY CONTACTS AND INFORMATION.** Public comments and requests must be submitted either electronically at [www.tceq.texas.gov/about/comments.html](http://www.tceq.texas.gov/about/comments.html), or in writing to the Texas Commission on Environmental Quality, Office of the Chief Clerk, MC-105, P.O. Box 13087, Austin, Texas 78711-3087. If you communicate with the TCEQ electronically, please be aware that your email address, like your physical mailing address, will become part of the agency's public record. For more information about this permit application or the permitting process, please call the Public Education Program toll free at 1-800-687-4040. Si desea información en Español, puede llamar al 1-800-687-4040.

Further information may also be obtained from DeCordova II Power Company LLC at the address stated above or by calling Mr. Paul Coon, Air Permitting Manager Environmental Services at (214) 875-8376.

Notice Issuance Date: July 26, 2016

## Special Conditions

Permit Number GHGPSDTX124

1. This permit covers only those sources of emissions listed in the attached table entitled “Emission Sources – Maximum Allowable Emission Rates (MAERT),” including planned maintenance, startup, and shutdown (MSS) activities, and those sources are limited to the emission limits on that table and other conditions specified in this permit.

### Federal Applicability

2. These facilities shall comply with applicable requirements of the EPA regulations on Standards of Performance for New Stationary Sources, Title 40 Code of Federal Regulations Part 60 (40 CFR Part 60):
  - A. Subpart A: General Provisions.
  - B. Subpart TTTT: Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units.

If any condition of this permit is more stringent than the regulations so incorporated, then for the purposes of complying with this permit, the permit shall govern and be the standard by which compliance shall be demonstrated.

3. This permit authorizes the following:
  - A. Two natural gas fired combustion turbines (CTGs) to operate in combined cycle from the following options:
    - (1) Two General Electric (GE) Model 7FA CTGs each rated at nominal gross capability of 210 gross megawatts (MW). Each CTG will have a duct burner (DB) fired heat recovery steam generator (HRSG) with a maximum heat input of 349.2 million British thermal units per hour (MMBtu/hr).
    - (2) Two Siemens Model SGT6-5000F CTGs each rated at nominal gross capability of 231 gross megawatts (MW). Each CTG will have a duct burner (DB) fired heat recovery steam generator (HRSG) with a maximum heat input of 500 million British thermal units per hour (MMBtu/hr).

### Combined Cycle - Emission Rates/Operating Specifications

4. Emissions from each CTG [Emission Point Number (EPNs): DC-CTHS5 and DC-CTHS6] during turbine load operations which may include DB and steam turbine contributions, shall not exceed the following limits based on a 12-month rolling average subject to the exclusions and specifications noted in the subparagraphs of this Special Condition:

Turbine Model	Gross Heat Rate (Btu/kWh)	Output Specific CO <sub>2</sub> Emission Rate (lb CO <sub>2</sub> /MWh)
GE	7,837	932
Siemens	8,123	966

Emissions associated with the activities listed below shall not be included in determining compliance with the performance standards listed above and shall be minimized through

the application of work practices. Emissions during all operating modes shall not exceed the carbon dioxide equivalent (CO<sub>2</sub>e) mass emission rates identified in the MAERT.

- A. A startup period for each CTG is defined as the period beginning when the CTG receives a “turbine start” signal and an initial flame detection signal is recorded in the plant’s control system and ending when the CTG achieves steady state operation in the low NO<sub>x</sub> operating mode, and the selective catalytic reduction (SCR) and oxidation catalytic (OC) systems achieve steady operation. A planned startup shall not exceed 240 minutes and shall be excluded.
  - B. A shutdown period for each CTG is defined as the period beginning when the CTG receives a “turbine stop” command the generator output drops below the minimum stable load and ending when a flame detection signal is no longer recorded in the plant’s control system. Each shutdown period shall not exceed 60 minutes and shall be excluded.
  - C. Emissions from simple cycle operations (EPNs: DC-CTS5 and DC-CTS6) are excluded.
  - D. Emissions from maintenance activities (Attachments A and B) authorized in Permit Number 107569 are excluded.
5. During MSS operations each CTG (EPNs: DC-CTHS5 and DC-CTHS6) on a one-hour block shall not exceed the following:

<b>Turbine Model</b>	<b>tons CO<sub>2</sub>/hr</b>
GE	154
Siemens	156

**Auxiliary Boiler (EPN: DC-ABS) – Emission Limitations and Operating Specifications**

- 6. The auxiliary boiler heat input shall not exceed 73.3 MMBtu/hr.
- 7. The auxiliary boiler heat input shall not exceed 293,200 MMBtu/yr.
- 8. The auxiliary boiler burner tips and convection tubes shall be inspected annually and cleaned as needed.
- 9. An automated air/fuel control system shall be installed, operated, and maintained on the auxiliary boiler.

**Emergency Equipment**

- 10. The emergency engine (EPN: DC-EDGV) and firewater pump (EPN: DC-DFPV) are each limited to 100 hours of non-emergency operation per year on a calendar year basis.

### **Initial Demonstration of Compliance (CTGs)**

11. After the first full calendar month of operation after the 180-day shakedown period, the permit holder shall compare that month's gross heat rate and output-specific CO<sub>2</sub> emission rate to the limits in Special Condition No. 4 and the MAERT. Within 45 days after collecting the data, the permit holder shall submit a report to the region identifying whether the data causes any concerns regarding the permit holder's ability to comply with the applicable limitations.

### **Continuous Demonstration of Compliance (CTGs)**

12. The permit holder shall during combined cycle operations monitor and calculate natural gas fuel flow, electricity output, GHG emissions, and the average heat rate from each CTG and each DB as specified in Special Condition Nos. 13 and 14.
13. Hourly Calculations
  - A. Fuel Flow
    - (1) The holder of this permit shall install, calibrate, maintain, and operate continuous fuel flow meters to measure and record, during all periods of operation, the hourly natural gas consumption of each CTG and DB.
    - (2) The fuel flow meters must meet the applicable requirements of 40 CFR Part 75, Appendix D and 40 CFR Part 60.
    - (3) The fuel flow meter must be accurate to  $\pm 2.0$  percent of the unit's maximum flow.
    - (4) The fuel flow data must be automatically recorded with a data acquisition and handling system.
  - B. Heat Input
    - (1) During all periods of operation calculate the hourly heat input in MMBtu/hr, consistent with Equation F-20 and the procedures for determining the HHV, in 40 CFR Part 75, Appendix F, §5.5.2.
    - (2) The fuel supply shall be sampled and analyzed for HHV monthly by the fuel supplier, owner, or operator of the facility. Verification of the fuel gross caloric value by the contractual supplier can be used to satisfy this requirement in lieu of fuel sampling and analyzing.
  - C. Carbon Dioxide (CO<sub>2</sub>) Emission Rate
    - (1) Calculate the hourly CO<sub>2</sub> emission rate in short tons per hour, during all periods of operation.
    - (2) Calculate the CO<sub>2</sub> emission rate in accordance with 40 CFR Part 75, Appendix G, Section 2.3, Equation G-4, using:
      - (a) the default emission factor of 118.9 lb CO<sub>2</sub>/MMBtu; or

- (b) a custom emission factor determined in accordance with 40 CFR Part 75, Appendix F, section 3.3.6, Equation F-7b.

D. Gross Electrical Output

- (1) Measure and record the hourly gross output (MWh) from each CTG/HRSG on an hourly basis.
- (2) The hourly gross electrical output for the steam turbine generator shall be apportioned to each CTG/HRSG based on the hourly proportion of each HRSG's thermal output to the steam generator.

E. Heat Rate

- (1) Calculate the hourly heat rate in Btu/kWh by dividing the hourly heat input by the corresponding gross electrical output.
- (2) Exclude periods of MSS as specified in Special Condition No. 4 of this permit and Attachments A and B of Permit No. 107569.
- (3) Exclude periods of simple cycle operations.

F. Output Specific CO<sub>2</sub> Emission Rate

- (1) Calculate the output-specific CO<sub>2</sub> emission rate in lb CO<sub>2</sub>/MWh by dividing the hourly CO<sub>2</sub> emission rate by the corresponding hourly gross output in MWh of the CTG/HRSG
- (2) Exclude periods of MSS as specified in Special Condition Nos. 4 and Attachments A/B of Permit No. 107569.

G. Methane (CH<sub>4</sub>) and Nitrous Oxide (N<sub>2</sub>O) Emissions

- (1) Calculate the CH<sub>4</sub> and N<sub>2</sub>O emission rates in short tons per hour during all periods of operation, using the following:
  - (a) Measured hourly heat input; and
  - (b) default emission factors Table C-2 of 40 CFR Part 98, Subpart C.

H. CO<sub>2</sub>e Emission Rate

- (1) CO<sub>2</sub>e emission rate, in short tons per hour, equals the sum of the CO<sub>2</sub> emissions and the CO<sub>2</sub>e-converted emissions of CH<sub>4</sub> and N<sub>2</sub>O. Include all periods of operation.
- (2) The CH<sub>4</sub> and N<sub>2</sub>O emission rates are converted to CO<sub>2</sub>e emissions using the Global Warming Potentials of 25 for CH<sub>4</sub> and 298 for N<sub>2</sub>O, from Table A-1 of 40 CFR Part 98, Subpart A, version effective January 1, 2015.

14. Hourly to 12-month Rolling Data

- A. Average heat rate and output-specific CO<sub>2</sub> emissions to show compliance with the limits of Special Condition No. 4 are calculated using the following:
- (1) Gross Heat Rate
    - (a) Monthly heat rate is the sum of the hourly heat input for the month, excluding periods of MSS, divided by the sum of the hourly gross output for the same hourly periods.
    - (b) At the end of each calendar month, add the monthly heat input to the monthly heat input for the preceding 11 operating months and divide the resulting sum by the gross output in kWh for the same period.
  - (2) Output-specific CO<sub>2</sub> Emissions
    - (a) Monthly output-specific CO<sub>2</sub> emissions are the sum of the hourly CO<sub>2</sub> emissions for the month, excluding periods of MSS, divided by the sum of the hourly gross output for the same hourly periods.
    - (b) At the end of each calendar month, add the monthly CO<sub>2</sub> emissions to the monthly CO<sub>2</sub> emissions for the preceding 11 months and divide the resulting sum by the gross output in MWh for the same period.
- B. Emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and CO<sub>2</sub>e in tons per year to show compliance with the limits of the MAERT.
- (1) Monthly emissions are the sum of the hourly emissions for that month and include all periods of operation.
  - (2) At the end of each calendar month, add the monthly emissions to the monthly emissions for the previous 11 months.

**Initial Demonstration of Compliance (Auxiliary Boiler)**

15. After the first full calendar month of operation after the 180-day shakedown period, the permit holder shall compare that month's CH<sub>4</sub>, N<sub>2</sub>O, and CO<sub>2</sub> emission rates to those specified in the MAERT. Within 45 days after collecting the data, the permit holder shall submit a report to the region identifying whether the data causes any concerns regarding the permit holder's ability to comply with the applicable limitations.

**Continuous Demonstration of Compliance (Auxiliary Boiler)**

16. The holder of this permit shall install, calibrate, maintain, and operate a continuous fuel flow meter to measure and record the hourly natural gas consumption of the auxiliary boiler.
- A. The fuel flow meter must meet the applicable requirements of 40 CFR Part 75, Appendix D and 40 CFR Part 60.
  - B. The fuel flow meter must be accurate to  $\pm 2.0$  percent of the unit's maximum flow.

- C. The fuel flow data must be automatically recorded with a data acquisition and handling system.
17. Auxiliary boiler calculations.
- A. Calculate hourly and 12-month rolling GHG emissions from the auxiliary boiler, for all periods of operation, using the measured fuel flow and the equations (converting metric tons to short tons) in 40 CFR Part 98 as follows:
  - B. Equation C-1, for CO<sub>2</sub>; and
  - C. Equation C-8, for CH<sub>4</sub> and N<sub>2</sub>O.

### **Continuous Demonstration of Compliance (Natural Gas Fugitives)**

18. The permit holder shall minimize emissions from pressurized components and equipment in natural gas service as follows:
- A. Piping and valves in natural gas service within the operating area must be checked monthly for leaks using audio, visual, and olfactory (AVO) sensing for natural gas leaks.
  - B. As soon as practicable following the detection of a leak, plant personnel shall take one or more of the following actions:
    - (1) Locate and isolate the leak, if necessary.
    - (2) Commence repair or replacement of the leaking component.
    - (3) Use a leak collection or containment system to control the leak until repair or replacement can be made if immediate repair is not possible.

### **Continuous Demonstration of Compliance (Circuit Breakers)**

19. The sulfur hexafluoride (SF<sub>6</sub>)-enclosed circuit breakers shall be designed to meet the latest American National Standards Institute (ANSI) C37.013 standard for high voltage circuit breakers. The circuit breakers must be guaranteed to achieve a SF<sub>6</sub> leak rate of 0.5% by weight or less annually. The circuit breakers must be in a totally enclosed, pressurized compartment equipped with an alarm that signals the plant control room in the event that any circuit breaker loses pressure to the extent that 10% of the SF<sub>6</sub> has leaked.
20. The permit holder shall equip the circuit breakers with a low pressure alarm and a low pressure lockout. As soon as practicable following the detection of a leak, plant personnel shall take one or more of the following actions:
- A. Locate and isolate the leak using a SF<sub>6</sub> leak collections or containment system to control the leak until repair or replacement can be made if immediate repair is not possible.
  - B. Commence repair or replacement of the leaking component.



### Recordkeeping Requirements

21. The following records shall be kept at the plant for the life of the permit. All records required in this permit shall be made available at the request of personnel from the TCEQ, EPA, or any air pollution control agency with jurisdiction:
  - A. A copy of this permit.
  - B. Permit application dated December 17, 2014, and subsequent representations submitted to the TCEQ.
  
22. The following information shall be maintained by the holder of this permit in a form suitable for inspection for a period of five years after collection and shall be made available upon request to representatives of the TCEQ, EPA, or any local air pollution control program having jurisdiction:
  - A. Records of fuel usage on an hourly and 12-month rolling average for the combustion turbines, duct burners, and auxiliary boiler.
  - B. Records of calibrations, preventative maintenance, and/or repairs performed on fuel gas flow meters.
  - C. For the combined cycle combustion turbine operations, records of the following:
    - (1) Hourly electricity generation in MW, kept hourly, monthly, and 12-month rolling average, including the MW generated from the steam turbine and its apportionment to the appropriate CTG.
    - (2) Hours of operation, identifying startup and shutdown periods.
    - (3) Monthly averages of CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub>, and CO<sub>2</sub>e hourly, monthly, and on a 12-month rolling average.
    - (4) Monthly averages of lb CO<sub>2</sub>/MWh on a 12-month rolling average.
    - (5) Natural gas HHV determinations.
  - D. For the auxiliary boiler, records of the following:
    - (1) Hours of operation.
    - (2) CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub> and CO<sub>2</sub>e emission rates on an hourly and rolling 12-month basis.
    - (3) Records of annual inspections, cleaning, repair/replacement of boiler tips and convection tubes.
    - (4) Records of calibrations, maintenance, and repair/replacement of the air/fuel system.
  - E. Records of AVO checks on the natural gas system and maintenance performed to any piping and valves.
  - F. For the circuit breakers, records of the following:
    - (1) Maintenance or leak repairs performed on SF<sub>6</sub> containing circuit breakers.

- (2) Monthly and 12-month rolling average of SF<sub>6</sub> emissions to demonstrate compliance with the MAERT.

Date:

DRAFT

Emission Sources - Maximum Allowable Emission Rates

Permit Number GHGPSDTX124

This table lists the maximum allowable emission rates of greenhouse gas (GHG) emissions, as defined in Title 30 Texas Administrative Code § 101.1, for sources of air contaminants on the applicant's property authorized by this permit. Any proposed increase in emission rates may require an application for a modification of the facilities authorized by this permit.

Air Contaminants Data

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates
			TPY (4)
<b>Turbine Option 1 – GE</b>			
DC-CTS5 DC-CTHS5	Unit 5 Turbine – GE 7FA.05 Combined Cycle	N <sub>2</sub> O (5)	2
		CH <sub>4</sub> (5)	24
		CO <sub>2</sub> (5)	1,283,747
		CO <sub>2</sub> e	1,285,052
DC-CTS6 DC-CTHS6	Unit 6 Turbine – GE 7FA.05 Combined Cycle	N <sub>2</sub> O (5)	2
		CH <sub>4</sub> (5)	24
		CO <sub>2</sub> (5)	1,283,747
		CO <sub>2</sub> e	1,285,052
<b>Turbine Option 2 – Siemens</b>			
DC-CTS5 DC-CTHS5	Unit 5 Turbine – Siemens SGT6-5000F(5)/(5)ee	N <sub>2</sub> O (5)	3
		CH <sub>4</sub> (5)	28
		CO <sub>2</sub> (5)	1,498,890
		CO <sub>2</sub> e	1,500,414
DC-CTS6 DC-CTHS6	Unit 6 Turbine – Siemens SGT6-5000F(5)/(5)ee	N <sub>2</sub> O (5)	3
		CH <sub>4</sub> (5)	28
		CO <sub>2</sub> (5)	1,498,890
		CO <sub>2</sub> e	1,500,414

## Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates
			TPY (4)
<b>Ancillary Emissions</b>			
DC-ABS	Auxiliary Boiler	N <sub>2</sub> O (5)	<1
		CH <sub>4</sub> (5)	<1
		CO <sub>2</sub> (5)	17,136
		CO <sub>2</sub> e	17154
DC-EDGV	Emergency Generator	N <sub>2</sub> O (5)	<1
		CH <sub>4</sub> (5)	<1
		CO <sub>2</sub> (5)	77
		CO <sub>2</sub> e	77
DC-DFPV	Fire Water Pump	N <sub>2</sub> O (5)	<1
		CH <sub>4</sub> (5)	<1
		CO <sub>2</sub> (5)	16
		CO <sub>2</sub> e	16
DC-NGFUG	Natural Gas Fugitives	CH <sub>4</sub> (5)	1
		CO <sub>2</sub> (5)	<1
		CO <sub>2</sub> e	33
DC-SF <sub>6</sub> FUG	SF <sub>6</sub> Insulated Equipment	SF <sub>6</sub> (5)	<1
		CO <sub>2</sub> e	23
DC-MSSFUG	Units 5 and 6 Planned Maintenance Activities Fugitives (5)	CH <sub>4</sub> (5)	6
		CO <sub>2</sub> (5)	<1
		CO <sub>2</sub> e	143

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.

(2) Specific point source name. For fugitive sources, use area name or fugitive source name.

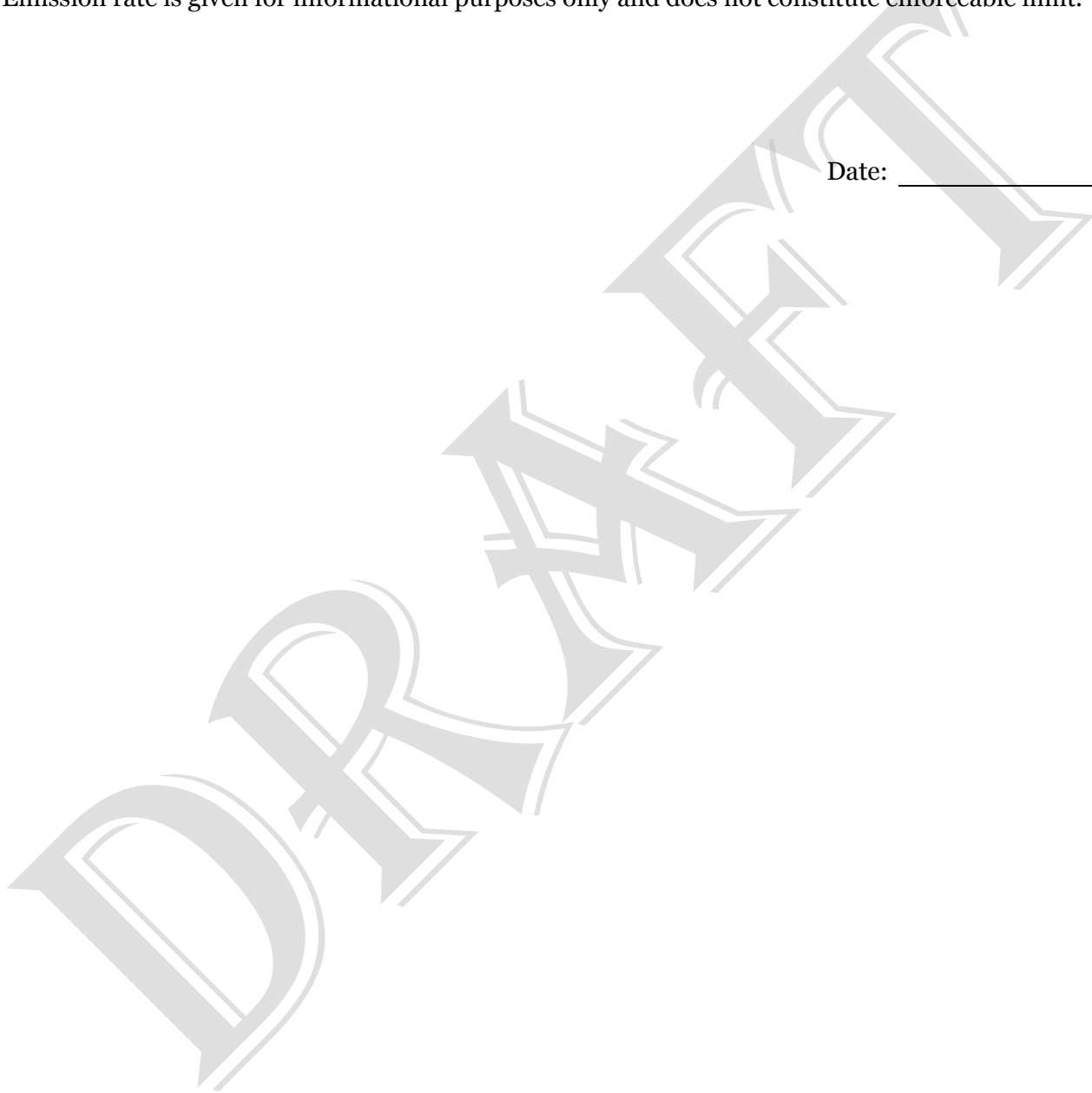
(3) CH<sub>4</sub> - methane

Emission Sources - Maximum Allowable Emission Rates

- CO<sub>2</sub> - carbon dioxide
- CO<sub>2e</sub> - carbon dioxide equivalents based on the following Global Warming Potentials (1/2015):  
CO<sub>2</sub> (1), N<sub>2</sub>O (298), CH<sub>4</sub> (25), and SF<sub>6</sub> (22,800).
- N<sub>2</sub>O - nitrous oxide
- SF<sub>6</sub> - sulfur hexafluoride

- (4) Compliance with annual emission limits (tons per year) is based on a 12 month rolling period. These annual limits apply only those emission rates associated with combined cycle operations including, MSS.
- (5) Emission rate is given for informational purposes only and does not constitute enforceable limit.

Date: \_\_\_\_\_



# **Preliminary Determination Summary**

DeCordova II Power Company LLC  
Permit Number GHGPSDTX124

## **I. Applicant**

DeCordova II Power Company LLC  
1601 Bryan St  
Dallas, Texas 75201-3401

## **II. Project Location**

DeCordova Steam Electric Station  
4950 Power Plant Ct  
Hood County  
Granbury, Texas 76048

## **III. Project Description**

DeCordova II Power Company LLC (DeCordova) owns the DeCordova Steam Electric Station (DeCordova Station) near Granbury, Hood County, Texas. The DeCordova Station currently consists of two combustion turbines (CTGs) authorized to operate in simple cycle. The simple cycle operations were authorized on August 29, 2013. The CTGs will be one of two options: General Electric or Siemens.

DeCordova is seeking to augment the electrical generating capability of the DeCordova Station by adding combined cycle operations. The new project will include an increase in the annual hours of operation for the CTGs, the installation of two duct burner (DB) fired heat recover steam generators (HRSGs), a steam turbine, an auxiliary boiler, an emergency generator, and a firewater pump.

### **Combustion Turbine and Heat Recovery Steam Generator**

The DeCordova Station, upon completion of this project, will consist of two natural gas-fired CTGs each equipped with a supplementary DB fired HRSG to operate in either simple cycle or combined cycle modes. The addition of combined cycle capabilities will result in an increase in the annual operating hours. There will be no increase in the currently authorized operating hours for the simple cycle operations.

The CTGs will be one of the following model options:

- (1) Two General Electric Model 7FA CTGs each rated at a nominal gross capability of 210 megawatts (MW). Each CTG will have a DB fired HRSG with a maximum heat input of 349.2 million British thermal units per hour (MMBtu/hr).

- (2) Two Siemens Model SGT6-5000F each rated at a nominal gross capability of 231 MW. Each CTG will have a DB fired HRSG with a maximum heat input of 500 MMBtu/hr.

### **Auxiliary Boiler**

The natural gas-fired auxiliary boiler will have a maximum heat input of 73.3 MMBtu/hr. The boiler will provide steam for CTG startups.

### **Emergency Equipment**

The emergency generator and firewater pump are each limited to 100 hours per year (hr/yr) of non-emergency operation per calendar year.

### **Storage Tanks**

The emergency equipment will be serviced by two diesel storage tanks.

### **Natural Gas Piping Fugitives**

Natural gas will be delivered to the site via pipeline and then metered and piped to the combustion turbines. The piping and fittings associated with the pipeline will be sources of fugitive emissions.

### **Maintenance, Startup and Shutdown**

Planned MSS activities are authorized in Permit Number 107569 and are identified in Attachments A and B. The GHG emission rates resulting from MSS activities are included in the ton per year emission rates listed on the Maximum Allowable Emission Rate Table (MAERT) for this permit.

## **IV. Greenhouse Gas (GHG) Emissions**

Emission sources for the proposed project consists of the increase in the annual hours operation for the CTGs, DB fired HRSGs, auxiliary boiler, firewater pump, circuit breakers, and equipment fugitives. The site is located in an attainment county and is a named major source.

The following table is the worst case turbine selection proposed in the application. The carbon dioxide equivalents (CO<sub>2</sub>e) are based on the following Global Warming Potentials (1/2015): CO<sub>2</sub> (1), N<sub>2</sub>O (298), CH<sub>4</sub> (25), and SF<sub>6</sub> (22,800).

<b>Air Contaminant</b>	<b>Proposed Allowable Emission Rates (tpy)</b>
N <sub>2</sub> O	6
CH <sub>4</sub>	57
CO <sub>2</sub>	3,015,010
SF <sub>6</sub>	<1
CO <sub>2</sub> e	3,018,128

## V. Federal Applicability

The DeCordova Station is located in Hood County which is classified as an attainment county. The site is a named major source with respect to the Prevention of Significant Deterioration (PSD) program.

The proposed project triggers PSD review for non-GHG NSR regulated pollutants. The non-GHG permits, Permit Numbers 107569 and PSDTX1432, were submitted on August 19, 2014 and are currently being reviewed.

As shown in the table below, because the project increase is more than 75,000 tpy of CO<sub>2</sub>e, PSD review is triggered for GHG emissions.

<b>Pollutant</b>	<b>Project Emission (tpy)</b>	<b>Major Source or Major Mod Trigger Level (tpy)</b>	<b>PSD Triggered Y/N</b>
CO <sub>2</sub> e	3,018,128	75,000	Y

## VI. Control Technology Review

The emission sources from the proposed project will consists of the increase in the annual hours of operation for the CTGs, the installation of two DB fired HRSGs, a steam turbine, an auxiliary boiler, an emergency generator, and a firewater pump. These sources account for approximately 99.8% of the GHG emissions. BACT was based on control of CO<sub>2</sub>.

DeCordova conducted a BACT analysis that was reviewed and verified by the TCEQ. It included the identification and evaluation of add-on controls, energy



efficient processes/practices, equipment design, and available control options for the turbines, auxiliary boiler, natural gas fugitives, and SF<sub>6</sub> insulated equipment. The evaluation included information from the Environmental Protection Agency's (EPA's) RACT/BACT/LAER Clearinghouse (RBLC), on-going permitting in Texas and other states. Only facilities that emit GHGs are in the BACT discussion below.

Carbon capture and storage (CCS) technology is currently in various stages of development and is not commercially available. There have been no CCS demonstration projects to date (and none planned) for natural gas-fired electric generating sites. The TCEQ searched the RBLC database and recently issued PSD permits for GHG emissions from natural gas-fired combined cycle (NGCC) power plants and found that none of the issued (or pending applications) proposed CCS as BACT. There are no currently operating NGCC power plants utilizing CCS. In all cases, CCS was ruled out as BACT due to technical infeasibility and/or economic impracticability.

### Combustion Combine Cycle Turbines

#### *GHG Emissions*

DeCordova selected the use of efficient CTG/HRSG technology, low carbon fuel, and good combustion, operating, maintenance, and work practices. Numerical and operations limitations have been included in the permit reflecting GHG controls proposed by DeCordova and is consistent with those found in the RBLC and recently issued GHG permits.

#### 1. Normal Operations

	<b>Turbine Model</b>	<b>Output Specific CO<sub>2</sub> Emission Rate (lb CO<sub>2</sub>/MWh)</b>
Option 1	GE	932
Option 2	Siemens	966

#### 2. MSS Operations

<b>Turbine Model</b>	<b>tons CO<sub>2</sub>/hr</b>
GE	154
Siemens	156

### **Other Emission Sources**

*Auxiliary Boiler* - the boiler will fire natural gas which has the lowest GHG emission factor of all available fossil fuels, be limited to a firing rate of 73.3 MMBtu/hr, and be limited to annual heat input of 293,200 MMBtu/yr on a rolling 12-month average. The startups and shutdowns are limited to 60 minutes each. BACT for CO<sub>2</sub> and methane is the use of natural gas as fuel and good combustion practices.

*Emergency Diesel-Fired Equipment* - BACT for the firewater pump engine and the emergency generator will be achieved through proper operation, maintenance, and limited hr/yr of operation. Each engine is limited to 100 hr/yr of non-emergency use.

*Natural Gas Process Fugitives* –The CTG enclosure is maintained under negative pressure, and any natural gas leaks from piping components within the CTG enclosure will be captured and not emitted to atmosphere. Fugitive GHG emissions will be calculated for all natural gas piping components on an annual basis to demonstrate compliance with the annual GHG emissions limit.

Leak detection and repair programs are applicable and available. Hand-held analyzers, remote sensing and audio, visual, and olfactory (AVO) detection methods are among the possible control methods. Based on the very small amount of emissions, the least costly of these methods, AVO programs, have been required in recent GHG permits. Piping and valves in natural gas service within the operating area must be checked monthly for leaks using AVO sensing for natural gas leaks.

*SF<sub>6</sub> Electrical Equipment* – The use state-of-the-art enclosed pressure SF<sub>6</sub> circuit breakers is BACT for SF<sub>6</sub>. The circuit breakers will be equipped with SF<sub>6</sub> pressure monitors and a low SF<sub>6</sub> alarm. In comparison to older circuit breakers containing SF<sub>6</sub>, modern circuit breakers are designed as totally enclosed-pressure systems with a far lower potential for SF<sub>6</sub> emissions.

## **VII. Air Quality Analysis**

EPA has stated that unlike the criteria pollutants for which EPA has historically issued PSD permits, there is no National Ambient Air Quality Standard (NAAQS) for GHGs, including no PSD increment. 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 [EPA's PSD and Title V Permitting Guidance for GHGs at 48]. Thus, EPA has concluded in other GHG PSD permitting actions it would not be meaningful to evaluate impacts of GHG emissions on a local community in the context of a single permit.

The TCEQ has determined that an air quality analysis would provide no meaningful data and has not required the applicant to perform one. As stated in the preamble to TCEQ's adoption of the GHG PSD program, the impacts review for individual air contaminants will continue to be addressed, as applicable, in the state's traditional minor and major NSR permits program per 30 TAC Chapter 116.

## **VIII. Conclusion**

DeCordova II Power Company LLC has demonstrated that this project meets all applicable rules, regulations and requirements of the Texas and Federal Clean Air Acts. The proposed facilities and controls represent BACT.

The Executive Director of the TCEQ proposes a preliminary determination of issuance of this permit for DeCordova II Power Company LLC to modify the DeCordova Steam Electric Station as proposed.