TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Hardee Power Partners
(A Subsidiary of Invenergy, LLC)

6695 North County Road 663
Bowling Green, Florida 33834

Hardee Power Station
Facility ID No. 0490015

PROJECT

Project No. 0490015-015-AC
Application for Minor Source Air Construction Permit
Revision to Annual Performance Test Requirements

COUNTY

Hardee County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Office of permitting and Compliance
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

September 2012

1. GENERAL PROJECT INFORMATION

1.1. 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 Chapters 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 in Rule 62-204.800, F.A.C.

1.2. Facility Description and Location

The Hardee Power Station is an existing power plant, which is categorized under Standard Industrial Classification Code No. 4911. The existing power plant is located in Hardee County at 6695 North County Road 663 in Bowling Green, Florida. The map coordinates are: UTM Zone 17, 405.02 km East and 3057.18 km North; Latitude 27° 38’13” North, and Longitude 81°57’45” West. 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 Hardee Power Station has a nominal capacity of 370 megawatt (MW) and consists of the following equipment:

- Units CT-1A (EU-001) and CT-1B (EU-002) comprise a “two-on-one” combined cycle system. Each unit is a General Electric Model No. PG-7111EA combustion turbine (CT) with a nominal capacity of 75 MW. The exhaust gas from each combustion turbine passes through an unfired heat recovery steam generator (HRSG) to produce steam, which is delivered to a common steam-electrical generator set rated at a nominal capacity of 70 MW. Each combustion turbine fires natural gas as the primary fuel and distillate oil as a restricted auxiliary fuel. Each unit is equipped with water injection to reduce nitrogen oxides (NO_X) emissions. Each unit is also equipped with a bypass stack to bypass the HRSG if necessary.
- Unit CT-2A (EU-003) is a simple cycle combustion turbine consisting of a General Electric Model No. PG-7111EA with a nominal capacity of 75 MW. The unit fires natural gas as the primary fuel and distillate oil as a restricted auxiliary fuel. It is equipped with water injection to reduce NO_X emissions.
- Unit CT-2B (EU-005) is a simple cycle combustion turbine consisting of a General Electric Model No. PG-7121EA with a nominal capacity of 75 MW. The unit fires natural gas as the primary fuel and distillate oil as a restricted auxiliary fuel. The unit incorporates dry low-NO_X combustors for firing natural gas to prevent the formation of NO_X emissions. It is equipped with water injection to reduce NO_X emissions when firing distillate oil. The unit is also equipped with a continuous emissions monitoring system (CEMS) to determine continuous compliance with the NO_X standards.

The plant includes a 4.4 million gallon storage tank (EU-004) for distillate oil as well as other miscellaneous unregulated and insignificant activities.

1.3. Facility Regulatory Categories

- The facility is a major source of hazardous air pollutants (HAP).
- Unit CT-2B is 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 major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

1.4. Project Description

The requested revisions to the previous air construction permits for Unit CT2-B including:

- Reduction of annual carbon monoxide (CO) and visible emissions compliance testing requirements when operating less than 400 hours on natural gas; and
- Allowance for excess emissions related to tuning of the DLN combustors.

The applicant requested concurrent processing of a Title V air operation permit revision (Project No. 0490015-016-AV) to reflect the changes made in the present underlying air construction permit revision.

1.5. Processing Schedule

08/17/2012: Department received complete application for an air construction permit and a Title V air operation permit revision.

09/19/2012: Distributed Intent to Issue Air Permit package.

2. PSD APPLICABILITY

2.1. General PSD Applicability

The Department regulates major stationary sources in accordance with Florida's PSD program pursuant to Rule 62-212.400(PSD), 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.

Commonly addressed PSD pollutants in the power industry include: NO_X, carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM), PM smaller than 10 micrometers (µm) (PM_{10}), PM smaller than 2.5 µm ($PM_{2.5}$), volatile organic compounds (VOC), sulfuric acid mist (SAM), lead (Pb), fluorides (F), and mercury (Hg).

Additional PSD pollutants that are more common to certain other industries include: hydrogen sulfide (H_2S), TRS including H_2S, reduced sulfur compounds (RSC) including H_2S, municipal waste combustor (MWC) organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans (dioxin/furan), MWC metals measured as PM; MWC acid gases measured as SO_2 and HCl, and municipal solid waste (MSW) landfill emissions as non-methane organic compounds (NMOC).

As defined in Rule 62-210.200(Definitions), F.A.C., a stationary source is a "major stationary source" (major PSD source) if it emits or has the potential to emit (PTE):

- 250 tons per year (tons/year) or more of any PSD pollutant; <u>or</u>
- 100 tons/year or more of any PSD pollutant <u>and</u> the facility belongs to one of the 28 listed PSD major facility categories.

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 given category applies to the Hardee Power Station because the HRSGs associated with Units CT-1A and CT-1B (EU-001 and EU-002) produce steam that is used in a steam turbine-electric generator. The Hardee Power Station is a major stationary source based on actual emissions of and potential to emit 100 tons/year or more of several individual PSD pollutants.

For major stationary sources such as the Hardee Power Station, PSD applicability for modification projects is based on thresholds known as the significant emission rates (SER) as defined in Rule 62-210.200 (Definitions), F.A.C. Any "net emissions increase" as defined in Rule 62-210.200 (Definitions), F.A.C. of a PSD pollutant from the project that equals or exceeds the respective SER is considered "significant".

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 km 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" (i.e. emits or has the potential to emit 100 or 250 tons/year as applicable) for only one PSD pollutant, a project must include Best Available Control Technology (BACT) for any PSD pollutant increase in that equals or exceeds the corresponding significant emission rate given in Table1.

Table 1. List of Significant Emission Rates by PSD-Pollutant Relevant to the Facility [2]

Pollutant	SER (tons/year)	Pollutant	SER (tons/year)
PM	25	PM_{10}	15
$PM_{2.5}$	10	$PM_{2.5}$ (NO_X) [1]	40
$PM_{2.5}$ (SO_2) [1]	40	CO	100
SO_2	40	NO_X	40
Ozone (NO_X) [1]	40	Ozone (VOC) [1]	40
Sulfuric acid mist (SAM)	7	fluoride	3
mercury	0.1	lead	0.6

1. $PM_{2.5}$ is also regulated through precursors (NO_X and SO_2); Ozone (O_3) is regulated through precursors (VOC and NO_X).
2. There is federal SER of 75,000 tons/year for Greenhouse Gases (GHG) as carbon dioxide equivalent (CO_2e) that has not been incorporated into Department rules.

According to 40 CFR 52.21, six greenhouse gases (GHG), are also subject to regulation at new stationary sources that will emit or have the potential to emit 100,000 tons/year (SER equal to 75,000 tons/year) expressed as the carbon dioxide equivalent emissions (CO_2e). This requirement has not been incorporated into Department rules but is a separate requirement of the EPA.

2.2. PSD Applicability for Project

The project consists of a revision to permit conditions related to annual performance testing. There will be no emissions increases and the project is not subject to PSD preconstruction review. Because the revisions are being made to a PSD air construction permit a 30-day comment period will be specified concurrent with the 30-day comment period for the draft/proposed Title V permit.

3. DEPARTMENT REVIEW

3.1. Response to Requested Revisions

The applicant requested a revision (Project No. 0490015-016-AV) of a performance test condition contained in the facility Title V air operation permit (Permit No. 0490015-011-AV) that was issued in 2009. The change requires a similar and concurrent revision (Project No. 0490015-015-AC) to the underlying construction permit condition, as explained below in this Technical Evaluation and Preliminary Determination and the Statement of Basis.

The "*Condition No.*" refers to the condition as contained in Title V air operation Permit No. 0490015-011-AV.

1. *Condition B.12*: This condition defines circumstances under which excess emissions are allowed and prohibited for Unit CT-2B. The applicant requests addition of limited events called "tuning" for the dry low NO_X (DLN) combustors.

   Response: The requested change for Unit CT-2B is acceptable and has been implemented at CTs throughout the State that incorporate DLN for the control of NO_X when burning natural gas in lean premix combustion mode. Units CT1-A, CT1-B and CT2-A operate only in diffusion flame mode and tuning is not applicable to those units regardless of fuel The underlying air construction permit and the latest facility Title V operation permit will be revised accordingly.

2. *Condition B.15*: This condition requires annual performance tests for CO and visible emissions when firing natural gas in Unit CT-2B. The condition also requires annual performance tests for CO and VOC only if low sulfur distillate fuel oil is fired in Unit 2-B for more than 400 hours during the preceding federal fiscal year. The applicant requests a revision that will require annual performance testing when firing natural gas only if natural gas is fired in Unit 2-B for more than 400 hours during the preceding fiscal year.

   Response: Under Project Nos. 0490015-012-AC (PSD-140C) and 0490015-011-AV, the Department clarified that annual performance tests for are required pollutants subject to annual testing on Units CT-1A, CT-1B and CT-2A only for the fuel(s) fired for 400 hours or more during the preceding federal fiscal year. The requested change for Unit CT-2B is acceptable and will further harmonize the testing requirements applicable to the four units. The underlying air construction permit and the latest facility Title V operation permit will be revised.

3.2. Revised Air Construction Permit Conditions

Based on the preceding discussion, the Department compiled the approved revisions, which are presented as full conditions for the affected permit. The revised conditions are shown in ~~strikethrough~~ (for deletions) and <u>double underline</u> (additions) format. The numeration is preserved from the original Unit CT-2A air construction permit [0490025-002-AC (PSD-FL-140A)].

<u>Permit No. 0490025-012-AC /PSD-FL-140C (that previously revised Permit PSD-FL-140A), Combustion Turbine CT-2B</u>

21. <u>Excess Emissions Allowed</u>:

    <u>(a)</u> Excess emissions resulting from startup, shutdown, or malfunction of the combustion turbine shall be permitted provided that best operational practices are adhered to and the duration of excess emissions shall be minimized. Excess emissions resulting from startup to simple cycle mode shall not exceed one (1) hour. In no case shall excess emissions from startup, shutdown, and malfunction exceed two hours in any calendar day. If excess emissions occur due to malfunction, the owner or operator shall notify the Compliance Authority within one (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem.

    <u>(b)</u> <u>Excess emissions resulting from combustion system tuning of the combustion turbine shall be permitted provided that best operational practices are adhered to and the duration of excess emissions shall be minimized. Excess emissions shall not exceed a total of 15 hours per tuning session. The Compliance Authority shall be notified of the schedule for conducting each tuning session at least 15 days prior to the tuning session. Within 45 days of completing each tuning session, a report summarizing the hourly NO_X emissions shall be submitted.</u>

    [Applicant Request, Vendor Data and Rule 62-210.700, F.A.C.]

Permit No. 0490025-012-AC/PSD-FL-140C, Combustion Turbine CT-2B

30. Annual Performance Tests: Annual compliance tests shall be conducted during each federal fiscal year (October 1 to September 30) for CO and visible emissions ~~from the combustion turbine shall be conducted when firing natural gas~~. The permittee shall conduct the annual compliance test for each fuel that is fired for more than 400 hours per year in the preceding federal fiscal year. ~~In addition, the permittee shall conduct the annual compliance tests for CO and visible emissions when firing low sulfur distillate oil if low sulfur distillate oil is fired for more than 400 hours in the preceding federal fiscal year. Tests required on an annual basis shall be conducted at least once during each federal fiscal year (October 1st to September 30th).~~ The CEMS data shall be used to demonstrate continuous compliance with the concentration-based NO_X emissions standards. When requested by the Department, the permittee shall determine the NO_X mass emission rate (lb/hour) from CEMS data to demonstrate compliance with the corresponding permit limits. [Rule 62-297.310(7)(a)4., F.A.C.]

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. Al Linero is the project engineer responsible for reviewing the application and drafting the air construction permit revision. 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.