



**TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION**

APPLICANT

Orlando Utilities Commission (OUC)
Reliable Plaza at 100 West Anderson Street
P.O. Box 3193
Orlando, Florida 32802

Stanton Energy Center
Facility ID No. 0950137

PROJECT

Project No. 0950137-041-AC
Application for Minor Source Air Construction Permit
Replacement of HP/IP Turbine on Unit 2

COUNTY

Orange, Florida

PERMITTING AUTHORITY

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

April 2013

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 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.

Glossary of Common Terms

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of this permit.

Facility Description and Location

This facility consists of two fossil fuel fired steam electric generating stations, emissions unit (E.U.) identification (ID) No. 001 (Unit No. 1) and 002 (Unit No. 2); in addition, there are Emission Units 025 and 026 (Stanton Unit A) that are nominal 170 MW, General Electric “F” Class (PG7241FA) combustion turbine-electrical generators, fired with pipeline natural gas or diesel fuel oil. Also, there are storage and handling facilities for solid fuels, fly ash, limestone, gypsum, slag, and bottom ash. It is categorized under Standard Industrial Classification Code No. 4911. The plant is located in Orange County at 5100 South Alafaya Trail, Orlando. The UTM Coordinates are: Zone 17, 483.6 km East and 3151.1 km North. Latitude is: 28° 29’ 17” North; and, Longitude is: 81° 10’ 03” West. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to Ambient Air Quality Standards (AAQS).

Facility Regulatory Categories

- The facility is 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 62-213, 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.

Project Description

This project is for the replacement of the high pressure and intermediate pressure (HP/IP) portions of the Stanton Energy Center Unit 2 steam turbine blades with improved technology. Unit No. 2 consists of a Babcock and Wilcox boiler/steam generator (Model RB 621) and steam turbine, which drives a generator with a nameplate rating of 468 MW. It is expected that this turbine replacement effort will increase the efficiency of Unit 2, providing an increase in power generation output capability without a corresponding increase in fuel consumption or annual generation potential. The turbine blades on the Unit 2 turbine generator harness the energy of the steam from the boiler and convert it to rotational energy, which in turn generates electricity. The turbine project involves replacing the existing HP/IP turbine blades with a new turbine blade design that features several thermal

performance and mechanical design improvements, including better blade materials, maximized aerodynamics, and advanced steam pressure and flow control. The Unit 2 turbine project is expected to increase operating efficiency, resulting in approximately 15.1 MW additional generation capacity, without any additional fuel usage or increase in energy output by the boiler. Because there will be no increase in heat input or annual hours of operation, air pollutant emissions from Unit 2 will see no increase after the turbine replacement relative to historical levels.

Processing Schedule

March 25, 2013: Received the application for a minor source air pollution construction permit (complete).

March 25, 2013: Application deemed complete.

2. PSD APPLICABILITY

General PSD Applicability

For areas currently in attainment with the Ambient Air Quality Standards (AAQS) or areas otherwise designated as unclassifiable, the Department regulates major stationary sources of air pollution in accordance with Florida's prevention of significant deterioration (PSD) preconstruction review program as defined in Rule 62-212.400, F.A.C. Under preconstruction review, the Department first must determine if a project is subject to the PSD requirements ("PSD applicability review") and, if so, must conduct a PSD preconstruction review. A PSD applicability review is required for projects at new and existing major stationary sources. In addition, proposed projects at existing minor sources are subject to a PSD applicability review to determine whether potential emissions *from the proposed project itself* will exceed the PSD major stationary source thresholds. A facility is considered a major stationary source with respect to PSD if it emits or has the potential to emit:

- 250 tons per year or more of any regulated air pollutant; or
- 100 tons per year or more of any regulated air pollutant and the facility belongs to one of the following 28 PSD-major facility categories: fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, coal cleaning plants (with thermal dryers), Kraft pulp mills, portland cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants, primary copper smelters, municipal incinerators capable of charging more than 250 tons of refuse per day, hydrofluoric, sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process), primary lead smelters, fuel conversion plants, sintering plants, secondary metal production plants, chemical process plants, fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input, petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels, taconite ore processing plants, glass fiber processing plants and charcoal production plants.

Once it is determined that a project is subject to PSD preconstruction review, the project emissions are compared to the "significant emission rates" defined in Rule 62-210.200, F.A.C. for the following pollutants: carbon monoxide (CO); nitrogen oxides (NO_x); sulfur dioxide (SO₂); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM₁₀); volatile organic compounds (VOC); lead (Pb); fluorides (F); sulfuric acid mist (SAM); hydrogen sulfide (H₂S); total reduced sulfur (TRS), including H₂S; reduced sulfur compounds, including H₂S; municipal waste combustor organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans; municipal waste combustor metals measured as particulate matter; municipal waste combustor acid gases measured as SO₂ and hydrogen chloride (HCl); municipal solid waste landfills emissions measured as non-methane organic compounds (NMOC); and mercury (Hg). In addition, significant emissions rate also means any emissions rate or any net emissions increase 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 µg/m³, 24-hour average.

If the potential emission equals or exceeds the defined significant emissions rate of a PSD pollutant, the project is considered "significant" for the pollutant and the applicant must employ the Best Available Control Technology

(BACT) to minimize the emissions and evaluate the air quality impacts. Although a facility or project may be *major* with respect to PSD for only one regulated pollutant, it may be required to install BACT controls for several “significant” regulated pollutants.

PSD Applicability for Project

This facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter carbon monoxide (CO), nitrogen oxides (NO_x), (PM/PM₁₀), sulfur dioxide (SO₂), or volatile organic compounds (VOC) exceeds 100 tons per year (TPY). This facility is within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. The facility is currently operating under Title V Air Operation Permit 0950137-037-AV, which expires on December 31, 2014.

Existing Equipment and Function

Stanton Energy Center Unit No. 2 consists of a Babcock and Wilcox boiler/steam generator (Model RB 621) and steam turbine, which drives a generator with a nameplate rating of 468 MW. The emission unit is fired primarily on bituminous coal and secondarily on No. 6 fuel oil and on-specification used oil for startup and flame stabilization, with a maximum heat input of 4,800 MMBtu per hour.

Proposed Turbine Blade Replacement

This project is for the replacement of the high pressure and intermediate pressure (HP/IP) portions of the Unit 2 steam turbine blades with improved technology. The turbine project involves replacing the existing HP/IP turbine blades with a new turbine blade design that features several thermal performance and mechanical design improvements, including better blade materials, maximized aerodynamics, and advanced steam pressure and flow control.

Applicant Analysis: Projected Emissions from Proposed Turbine Blade Replacement

In terms of PSD applicability, a project at an existing major source will not be subject to PSD review if it does not result in a significant emissions increase. In general, a project’s emissions increase is determined as the difference between its baseline actual emissions (BAE) and its future projected actual emissions (PAE). One is also allowed to consider excludable emissions (EE) when making this comparison.

The starting point for this type of analysis at the Stanton Energy Center is the determination of the baseline actual emissions (BAE) for Unit 2. For this analysis, the BAE emissions were determined using historical emissions data and the methodology set forth in the current PSD regulations. The historical emissions data were derived from continuous emissions monitoring system (CEMS) data for SO₂, NO_x, CO, and CO₂ and from annual operating reports (AOR) and stack tests for all other pollutants. The BAE period is chosen on a pollutant-by-pollutant basis as the 24-month period within the five year look-back period that has the highest emissions of that pollutant based on historical emissions data. The BAE period can be different for each pollutant. The five year look back period for this air permit application consists of data from January 2008 through December 2012. Table 1 illustrates the BAE for this project.

Once the BAE is established, the next step is to determine the EE based on the projected operation of the unit without the project. Essentially, the rules allow one to exclude from the emissions increase calculation those emission increases that would have occurred without the project. As will be discussed shortly, the EE can be considered an adjusted BAE and is subtracted from the PAE to determine the project emission increases. This project conservatively assumes that no adjustments to the baseline are made as Unit 2 would continue to operate as it has historically if the turbine were never replaced. Therefore, the EE are equal to the BAE which were shown in Table 1.

Once the BAE (and EE) are established, the next step is to determine the PAE values. In determining the PAE for each unit, one needs to differentiate between the projected increases due to *natural* demand growth versus the demand increases due to the *project*. However, since the project is not expected to increase demand growth upon

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Unit 2, the increase in operation due to demand growth caused by the project is non-existent (zero). This analysis also conservatively assumes that the unit will have a flat (zero) natural demand growth into the future essentially making the anticipated future annual heat input equal to the unit's baseline heat input.

Table 1. Baseline Actual Emissions

Pollutant	BAE Period	Unit 2 BAE (tpy)
NO _x	Aug 2008 – July 2010	2,609.25
SO ₂	July 2008 – June 2010	2,279.88
CO	Jan 2009 – Dec 2010	856.96
VOC	Aug 2008 – July 2010	16.24
PM	Dec 2009 – Nov 2011	383.17
PM ₁₀	Dec 2009 – Nov 2011	345.58
PM _{2.5}	Dec 2009 – Nov 2011	302.27
H ₂ SO ₄	Aug 2008 – July 2010	192.68
CO ₂	Aug 2008 – July 2010	3,316,701

The remaining step for determining the PAE then is to combine the projected annual heat input (equal to the baseline heat input) with the anticipated future emission factors. Anticipated emission factors in this case are equal to the baseline period average emission factors. Table 2 provides the project's PAE.

Once the BAE (EE) and PAE values are determined, the next step is to perform the calculations to determine the projected emissions increase (PEI) to compare with the PSD Significant Emission Rates (SER). Table 3 combines the data from the previous tables and makes the appropriate comparisons. As illustrated in the table, because the Unit 2 turbine upgrade will not lead to an increase in operation of the unit and/or increased fuel input, the BAE is equal to the PAE, and thus the PEI is non-existent (zero). Therefore, the proposed project will not cause a significant emissions increase, thus nullifying the requirement for major source PSD permitting.

Table 2. Projected Actual Emissions

Pollutant	PAE (tpy)
NO _x	2,609.25
SO ₂	2,279.88
CO	856.96
VOC	16.24
PM	383.17
PM ₁₀	345.58

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PM _{2.5}	302.27
H ₂ SO ₄	192.68
CO ₂	3,316,701

Table 3. Projected Emissions to Baseline Emissions Comparison

Pollutant	BAE (EE) (tpy)	PAE (tpy)	Project Emissions Increase (tpy)	PSD SER (tpy)	PSD Major Modification (Yes/No)
NO _x	2,609.25	2,609.25	0	40	No
SO ₂	2,279	2,279.88	0	40	No
CO	856.96	856.96	0	100	No
VOC	16.24	16.24	0	40	No
PM	383.17	383.17	0	25	No
PM ₁₀	345.58	345.58	0	15	No
PM _{2.5}	302.27	302.27	0	10	No
H ₂ SO ₄	192.68	192.68	0	7	No
CO ₂	3,316,701	3,316,701	0	75,000	No

Emissions Analysis

As shown in the above table, total project emissions will not exceed the Prevention of Significant Deterioration (PSD) significant emission rates; therefore, the project is not subject to a PSD preconstruction review.

3. DEPARTMENT REVIEW OF OUC ANALYSIS

PSD/NSR Applicability

The Department has reviewed the above discussion and rationale provided by OUC and agrees with the conclusion. Accordingly, this project is deemed not subject to the PSD/NSR requirements of Chapter 62-212.400, F.A.C. In sum, all project pollutant emission rate increases (tpy) are at zero and thus below the emissions thresholds.

State Requirements Applicability

The Department’s emission standards and general requirements are contained in Rule 62-210, F.A.C., Stationary Source General Requirements (air permitting), Rule 62-212, Stationary Source - Preconstruction Review, and Rule 62-296, F.A.C., Stationary Sources Emission Standards.

Replacement of HP/IP turbine blades on Unit 2 is subject to the requirements of Rule 62-296.320, F.A.C, General Pollutant Emission Limiting Standards.

Reporting and Recordkeeping

Because the Department believes that there will be no pollutant emission rate increases due to the turbine blade replacement project, no reporting or recordkeeping is required beyond notification to the Department's Central District Office two weeks prior to start of construction work on this project.

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. Tom Cascio 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 Blairstone Road, Tallahassee, Florida 32399-2400.