TECHNICAL EVALUATION
AND
PRELIMINARY DETERMINATION

APPLICANT

Duke Energy Florida, Inc. dba Duke Energy
1928 Mowry Road, Building 82
University of Florida
Gainesville, Florida 32611-2295

University of Florida Cogeneration Plant
Facility ID No. 0010001

PROJECT

Permit Revision No. 0010001-015-AC

Fuel Oil Limitation

COUNTY

Alachua 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

July 24, 2014

1. GENERAL PROJECT INFORMATION

1.1. Facility Description and Location

Duke Energy Florida, Inc. (DEF) operates the existing University of Florida (UF) Cogeneration (CoGen) Plant which is located within the city of Gainesville in Alachua County, Florida (see **Figure 1** and **Figure 2**). The facility address is 1928 Mowry Road, Building 82, Gainesville, Florida 32611. The UTM coordinates are Zone 17, 369.39 kilometers (km) East, and 3279.29 km North. The facility is an electrical power generating plant with a Standard Industrial Classification Code (SIC) of No. 4911.

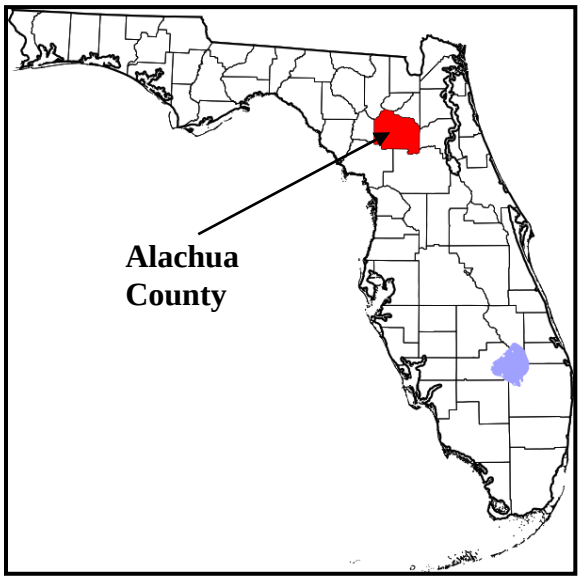

Figure 1 – Alachua County in Florida.

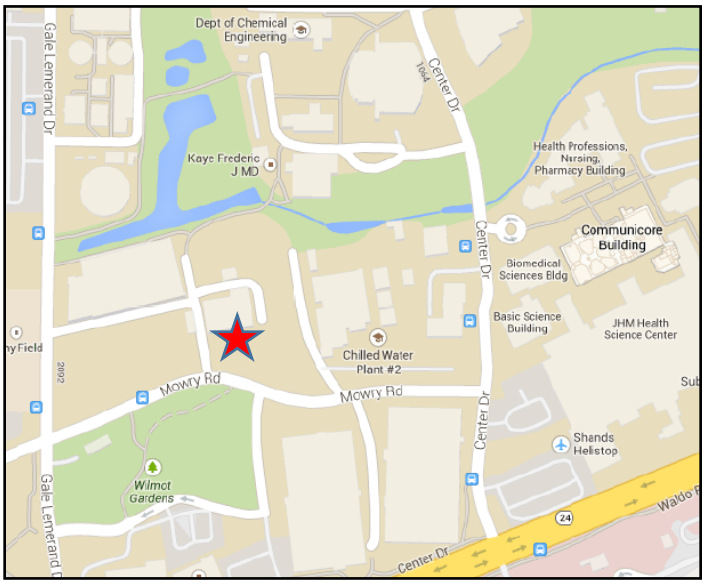

Figure 2 – Location of UF CoGen Plant.

Figure 3 – Satellite View of UF CoGen Plant.

Figure 3 above shows a satellite view of the UF CoGen planet while **Figure 4 and Figure 5** below show two views of the combustion turbine (CT) at the plant.

Figure 4 – View 1 of the CT at the Plant. **Figure 5 - View 2 of the CT at the Plant.**

The UF CoGen Plant consists of one nominal 48 megawatt General Electric LM6000-PC-ESPRINT Combustion Turbine (CT) with one Heat Recovery Steam Generator (HRSG) and Duct Burner (DB) system comprising a combined cycle unit. In addition, there are two Backup Steam Boilers. The CT utilizes spray intercooling to maximize throughput, thus reducing supplemental firing of the DB system for meeting steam and power requirements. Emissions from the CT and DB system are vented through the HRSG stack. NO_X emissions are controlled with steam injection. Compliance is demonstrated with a NO_X CEMS. The steam boilers, each having a separate exhaust stack, are used as back-up sources of steam and to provide supplemental steam during periods of high steam demand.

A summary of the regulated existing emission units at the UF CoGen Plant is given in below. The emission unit affected by this permitting action is highlighted in turquoise in the table.

TABLE 1. EMISSION UNITS AT THE UF COGEN PLANT.

EU No.	Brief Description
002	No. 4 Backup Steam Boiler
003	No. 5 Backup Steam Boiler
005	Duct Burner System with HRSG
007	Combustion Turbine

1.2. Primary Regulatory Categories

1.2.1. Federal Regulations

The U.S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40, Code of Federal Regulations, Part 60 (40 CFR 60) that identifies New Source Performance Standards (NSPS) for a variety of industrial activities. 40 CFR 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP). 40 CFR 63 specifies NESHAP provisions based on the Maximum Achievable Control Technology (MACT) for given source categories.

Federal regulations adopted by reference are given in Rule 62-204.800, F.A.C. State regulations approved by EPA are given in 40 CFR 52, Subpart K – Florida; also known as the State Implementation Plan (SIP) for Florida. The following federal regulations apply to the UF CoGen Plant and this project.

- The facility **is not** a major source of hazardous air pollutants (HAP).
- The facility has 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.
- This project (as discussed below) **does not** trigger a PSD review and a requirement to conduct Best Available Control Technology (BACT) determinations pursuant to Department Rule 62-212.400, F.A.C.
- The proposed project includes units subject to Clean Air Interstate Rule (CAIR).
- The proposed project includes units subject to the New Source Performance Standards (NSPS) of Title 40 Code of federal regulations (CFR) Part 60.
- The proposed project includes units subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 63.

1.2.2. State 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 air quality regulations as part of the Florida Administrative Code (F.A.C.), which includes the applicable chapters contained in **Table 2**.

TABLE 2. APPLICABLE RULES FROM THE F.A.C.

Chapter	Description
62-4	Permits
62-204	Air Pollution Control – General Provisions
62-210	Stationary Sources of Air Pollution – General Requirements
62-212	Stationary Sources – Preconstruction Review
62-213	Operation Permits for Major Sources (Title V) of Air Pollution
62-296	Stationary Sources – Emission Standards
62-297	Stationary Sources – Emissions Monitoring

1.3. Project Description

DEF states that the boilers (EU 002 and 003) are exempt from 40 CFR Part 63 Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters (major source Boiler MACT) because they intend to operate them as "natural gas boilers" as defined in the subpart (Gas 1 units). DEF has requested that permit No. 0010001-011-AC be revised to reflect that natural gas is the primary fuel and that if fuel oil firing is limited to 48 hours per calendar year for periodic testing the units will be exempt from Boiler MACT. Also, DEF has requested that it be indicated in the permit that fuel oil firing is not limited during periods of gas curtailment or gas supply interruptions. Because the UF CoGen site is supplied by a single natural gas pipeline, examples of periods of gas interruptions include, pressure testing of the gas supply pipeline, maintenance and repair of gas valves and gas leak repair. If a back-up boiler exceeds the fuel oil firing limitations and no longer meets the definition of "gas-fired boiler" contained in 40 CFR Part 63 Subpart JJJJJJ, the boiler shall comply with all the requirements of the subpart with in the deadlines delineated in this subpart.

1.4. Application Processing Schedule

- May 16, 2014 Application for an Air Construction Permit Revision received. Application was deemed complete.
- July 24, 2014 Draft permit package missed.

2. PSD APPLICABILITY

2.1. General PSD Applicability

For areas currently in attainment with the state and federal AAQS or areas otherwise designated as unclassifiable, the Department regulates major stationary sources of air pollution in accordance with Florida's 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 (SO_2); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM_{10}); volatile organic compounds (VOC); lead (Pb); fluorides (F); sulfuric acid mist (SAM); hydrogen sulfide (H_2S); total reduced sulfur (TRS), including H_2S; reduced sulfur compounds, including H_2S; municipal waste combustor organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans; municipal waste combustor metals measured as PM; municipal waste combustor acid gases measured as SO_2 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 $\mu g/m^3$, 24-hour average. According to state and federal rules, six greenhouse gases (GHG), are also subject to PSD review.

If the potential emission 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.

2.2. PSD Applicability for Project

The project will revise permit conditions related to reflect the limited use of fuel oil in the boilers (Units 002 and 003) at the facility. There will be no emissions increases and the project is not subject to PSD preconstruction review.

3. DEPARTMENT REVIEW

3.1. Response to Requested Revisions

The applicant requested changes to previous air construction permits as explained below:

The Department agrees with this revision request. To effect these changes, the specific condition of one prior air construction permit is revised as follows:

The following changes are made to permit No. 0010001-011-AC:

Specific Condition **7.** of 0010001-011-AC is changed as follows:

7. Authorized Fuel: The combustion turbine, HRSG duct burners, and backup steam boilers are authorized to fire natural gas with a maximum sulfur content of grains per 100 scf of natural gas (annual average based on vendor data). The backup steam boilers are authorized to fire No. 2 fuel oil with a maximum sulfur content of 0.5% by weight. The backup boilers are exempt from the requirements of NESHAP, Subpart JJJJJJ as long fuel oil firing is limited to 48 hours per calendar year for periodic testing. Fuel oil firing is not limited during periods of gas curtailment or gas supply interruptions. Because the UF CoGen site is supplied by a single natural gas pipeline examples of periods of gas interruptions include, pressure testing of the gas supply pipeline, maintenance and repair of gas valves and gas leak repair. If a back-up boiler exceeds the fuel oil firing limitations and no longer meets the definition of "gas-fired boiler" contained in this subpart, the boiler shall comply with all the requirements of the subpart with in the deadlines delineated in 40 CFR Part 63 Subpart JJJJJJ. [Rules 62-210.200(PTE), 62-212.400(12), 62-296.406, F.A.C., and 40 CFR 60.333(b)]

Specific Condition **16.** of 0010001-011-AC is changed as follows:

16. Annual Compliance Tests: During each federal fiscal year (October 1st to September 30th), the combined cycle combustion turbine system shall be tested to demonstrate compliance with the CO ~~and visible emissions~~ standards. Due to safety considerations, stack testing while firing the duct burner when there is no demand for steam would require dumping excess steam, which presents a safety issue given the existing configuration. Therefore, subsequent periodic testing for CO emissions may be with the duct burner on or off, as dictated by the system demand. ~~Visible emissions for each backup steam boiler shall be conducted only if No. 2 fuel oil is fired for more than 400 hours during the federal fiscal year.~~ *{Permitting Note:* A *safety evaluation of the steam vent system indicated that it did not meet code and was deemed unsafe; therefore, it was dismantled.}* [Rules 62-4.070(3) and 62-297.310(7), 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.

Tom Cascio is the project engineer responsible for reviewing the application and drafting the permit revision. Additional details of this analysis may be obtained by contacting him by telephone at 850/717-9077 or by e-mail at tom.cascio@dep.state.fl.us in the Department's Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.