TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

JEA
21 West Church Street
Jacksonville, Florida 32202

Northside Generating Station, St. Johns River Power Park
& Separation Technologies Facility

Facility ID No. 0310045

PROJECT

Project No. 0310045-041-AC/PSD-FL-010J
Application for Minor Source Air Construction Permit

Removal of Fabric Filter (DC-3)

COUNTY

Duval 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

Telephone: (850) 717-9000
Fax: (850) 717-9097

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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. 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.

1.3. Facility Description and Location

The applicant (JEA) operates the existing Northside Generating Station (NGS), St. Johns River Power Park (SJRPP) and Separation Technologies (ST) (NGS/SJRPP/ST) Facility which is located in Duval County at 4377 Heckscher Drive, Jacksonville, Florida. These co-located enterprises are considered to be a single contiguous "facility" for air permitting purposes. The UTM Coordinates are: Zone 17, 446.90Kilometer (km) East and 3359.150 km North. Latitude is: 30° 21' 52" North; and, Longitude is: 81° 37' 25" West. The facility is an electrical power generating plant with a Standard Industrial Classification Code (SIC) of No. 4911. The location of the facility in Florida is shown in **Figure 1** while a view of the SJRPP is shown in **Figure *2***. **Figure 3** shows a satellite view of the SJRPP.

Figure 1. Location of the Facility.

Figure 2. View of St. Johns River Power Park.

1.3.1. <u>NGS and SJRPP</u>:

The NGS portion of the combined facility consists of three boilers and four combustion turbines. NGS Boiler No. 3 is an existing, pre-NSPS boiler with a nominal rating of 564 megawatts (MW) fired by natural gas, landfill gas, No. 6 residual fuel oil, and used oil. Emissions from the NGS Boiler No. 3 are uncontrolled.

NGS circulating fluidized bed (CFB) Boilers No. 1 and No. 2 are fired by coal, coal coated with latex, petroleum coke, and landfill gas. Each NGS CFB boiler is equipped with a selective non-catalytic reduction (SNCR) system to

reduce nitrogen oxides (NO_X) emissions, limestone injection to reduce sulfur dioxide (SO_2) emissions, fabric filter baghouses to reduce particulate matter (PM) emissions, while practicing good combustion practices (GCP) to minimize NO_X, carbon monoxide (CO) and volatile organic compound (VOC) emissions. There are also four pre-NSPS distillate fuel oil-fired combustion turbines (CT) having a nominal rating of 52.5 MW each and are referred to as NGS CT Nos. 3, 4, 5 and 6. Emissions of SO_2 from the NGS CT Nos. 3, 4, 5 and 6, are controlled by firing low sulfur fuel oil.

Figure 3. Satellite View of the St. Johns River Power Park.

The SJRPP portion of the combined facility consists of two boilers. Boilers No. 1 and No. 2 are fired by pulverized coal, a blend of petroleum coke and coal, natural gas, new No. 2 distillate fuel oil (startup and low-load operation), and "on-specification" used oil. Emissions from these boilers are controlled by an electrostatic precipitator for PM, a limestone scrubber for SO_2, and low-NO_X burners for NO_X. Air Construction Permit No. 0310045-017-AC authorized the installation of selective catalytic reduction (SCR) systems and ammonia injection systems on the existing SJRPP Boiler Nos. 1 and 2 to further control NO_X. However, the Department did not require the installation of this equipment nor does the Department require its operation. The SJRPP and NGS facilities also include coal, petroleum coke, limestone and fly ash handling activities, of which various control devices, control strategies, and control techniques are required.

1.3.2. Separations Technology, LLC:

ST has constructed, owns and operates a fly ash processing system on a portion of leased property at the JEA SJRPP facility. The purpose of the equipment is to remove the residual carbon and ammonia from the JEA SJRPP fly ash leaving a saleable product. The fly ash processing system includes two fly ash receiving bins, a carbon separation unit, a clean-up vacuum, a fly ash surge bin, a mineral additive storage bin, and a gas-fired dryer. The particulate emissions generated from handling of the fly ash are collected from each source using pulse jet fabric filters. ST's triboelectric carbon separation technology partitions fly ash into mineral-rich and carbon-rich fractions. The mineral-rich fly ash can then be sold as a usable product. The carbon-rich fly ash is returned to the JEA SJRPP fly ash storage silos for eventual disposal at the onsite landfill.

A list of the regulated emission units (EU) at the NGS/SJRPP/ST facility is given in **Table 1**.

TABLE 1 – LIST OF REGULATED EMISSION UNITS AT THE NGS/SJRPP/ST FACILITY.

E.U. ID No.	Brief Description
003	NGS: Boiler No. 3
006	NGS: Combustion Turbine No. 3
007	NGS: Combustion Turbine No. 4
008	NGS: Combustion Turbine No. 5
009	NGS: Combustion Turbine No. 6
016	SJRPP: Boiler No. 1
017	SJRPP: Boiler No. 2
022	SJRPP: Bottom Ash, Fly Ash and Gypsum Handling and Storage Operations
023	SJRPP: Fuel and Limestone Handling and Storage Operations
024	SJRPP: Cooling Towers (2)
026	NGS: Circulating Fluidized Bed Boiler No. 2
027	NGS: Circulating Fluidized Bed Boiler No. 1
028	NGS: Materials Handling and Storage Operations
029	NGS: Crusher House/Building Baghouse Exhaust (DC1)
031	NGS: Fuel Silos Dust Collectors (DC2 and DC3)
033	NGS: Limestone Dryer/Mills Building
034	NGS: Limestone Prep Building Dust Collectors
035	NGS: Limestone Silos Bin Vent Filters
036	NGS: Fly Ash Transport Blower Discharge
037	NGS: Fly Ash Silos Bin Vents
038	NGS: Bed Ash Silos Bin Vents
042	NGS: AQCS Pebble Lime Silo Bin Vent
044	ST: Separator A Filter - Receiver Vent
045	ST: Separator B Filter - Receiver Vent
046	ST: Separator Dust Collector Vent
047	ST: Clean-up Vacuum Vent
048	ST: Fly Ash Surge Bin Vent
049	ST: Mineral Additive Storage Bin Vent
050	ST: Gas-fired Dryer Stack
051	NGS: Fly Ash Slurry Mix System Vents
052	NGS: Bed Ash Slurry Mix System Vents
053	NGS: Bed Ash Surge Hopper Bin Vents
055	NGS: Two Emergency Generators Supporting NGS Units 1 and 3 (Engines 1 & 2)
056	NGS: Two Black Start Engines Used Solely to Start Up NGS Units 1 and 3 (Engines 3 & 4)
057	NGS: Two Emergency Fire Pumps (Engines 5 & 6)
058	SJRPP: Emergency Generator (Engine 7)
059	SJRPP: Emergency Fire Pump (Engine 8)

The facility also consists unregulated emission units and insignificant activities.

1.4. Facility Regulatory Categories

- This facility is a major source of hazardous air pollutants (HAP).
- This facility operates units subject to the acid rain provisions of the Clean Air Act (CAA).
- This facility operates units subject to Clean Air Interstate Rule (CAIR).
- 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.
- The facility does operate units subject to the New Source Performance Standards (NSPS) of 40 CFR 60.

- The facility does operate units subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 63.

1.5. Project Description

The project will revise a specific condition of previously issued air construction permit PSD-FL-010C, for the fuel and limestone handling and storage operations at the facility and will stipulate new specific conditions as part of Permit No. 0310045-041-AC (PSD-FL-010J). The revised and new permit conditions are related to the removal of the fabric filter baghouse (DC-3) in the fuel handling building (EU 023l), which is associated with the SJRPP Fuel and Limestone Handling and Storage Operations (EU 023). A new condition will require the installation of water mist spray bars at several transfer points within the fuel handling building. These spray bars were proposed by JEA in its permit application. The transfer points where the water spray bars will be installed were identified as the important contributors of fugitive emissions within the building during a recent industrial hygiene/process safety inspection. Finally, several new conditions will require that JEA employ regular house cleaning measures and best management practices to minimize generation of fugitive dust and maintain the low level within the building. These measures should offset the removal of the baghouse and thereby any increase in PM emissions should be minimal.

A complete description of this project by the applicant's consultant is given in the application available at: http://Link to JEA Application

1.6. Processing Schedule

- 09/16/2014 Received the application for a minor air construction permit, application complete.
- 10/28/2014 Draft permit package issued.

1.7. Relevant Documents

- Permit No. PSD-FL-010C.

2. PSD APPLICABILITY

2.1. General PSD Applicability

For areas currently in attainment with the 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:

- 5 tons per year or more of lead;
- 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 particulate matter; 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); mercury (Hg); and greenhouse gases (GHG). 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.

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.

2.2. PSD Applicability for Project

The project will revise permit conditions related to the removal of the fabric filter baghouse (DC-3) in the fuel handling building (EU 023l) associated with the SJRPP Fuel and Limestone Handling and Storage Operations (EU 023). There will insignificant emissions increases of PM as a result of the project; therefore, the project is not subject to PSD preconstruction review (see **subsection 3.1** below).

3. DEPARTMENT REVIEW

JEA submitted an application requesting authorization to remove the fabric filter baghouse (DC-3). JEA has determined that this baghouse (**Figure 4**) is not needed to control emissions of PM since the transfer points in the building are partially enclosed and the characteristics of the coal do not generate large quantities of fugitive dust. Also, the baghouse is located on the top of the building and is difficult to service (**Figure 5**) and due to its location does not draw a significant amount of fugitive dust (PM). To control emissions of PM, JEA is proposing to install water mist spray bars at several transfer points within the building, employ regular house cleaning measures and best management practices to minimize the generation of fugitive dust.

Figure 4. Fabric Filter Baghouse.

Figure 5. Location of the Baghouse.

3.1. Fuel and Limestone Handling and Storage Operations

The coal receiving, storage and transfer systems at the coal and petroleum coke storage yard support the operation of the two SJRPP power boilers with fugitive PM emissions generated from the coal and limestone handling and storage systems. Emissions of PM are controlled using fabric filter baghouse systems, water sprays, wetting agents, and full enclosures or partial enclosures, covers and wind screens, where appropriate and required by permit with visible emissions limits used for compliance purposes.

Currently, there are six transfer points and two coal crushers within the fuel handling building that are serviced by baghouse DC-3. However, the nature of the coal and transfer points within the fuel handling building results in minimum fugitive emissions. This building is partially enclosed and most of the equipment within the building is enclosed or partially enclosed to help limit the amount fugitive dust generated within the building. PM is effectively controlled through the existing enclosed system. With the addition of water spray bars at several transfer points within the building, employ regular house cleaning measures, best management practices and the other fugitive dust control measures cited in the previous paragraph, the Department agrees with JEA that the baghouse DC-3 in no longer needed.

The conclusion that baghouse DC-3 is no longer need to control fugitive dust (PM) emission is supported by the emissions calculations **Table 2**. This table presents PM emissions from the fuel handling building with baghouse DC-3 and without the baghouse using EPA's AP-42 Emission Factors for materials handling and storage operations.

For calculating emissions without the fabric filter, 87.7% control efficiency was assumed based on a wind speed of 1 mph (reduced wind speed due to building enclosure) through the building in contrast to the 5 mph factor in the AP-42 emission factor for batch drop processes (Equation 1 of AP-42 Section 13.2.4).

The AP-42 emission factor (Section 11.19.2) for rock crushing was used to estimate emissions for the coal crushing. The transfer and crushing of coal is almost entirely enclosed and shielded directly from the wind with most of the equipment enclosed.

The emission calculations without the fabric filter shows the maximum potential PM emission rate is less than 2.5 tons/year which is less than the criteria for insignificant activities in Rule 62-213.430(6)(b)3.b., F.A.C. Moreover, the actual moisture content in the coal is approximately 12% or higher which significantly reduces fugitive emissions relative to the potential emissions (the batch drop emission factor is reduced by about 70% using a moisture content of 12%).

TABLE 2- PM EMISSION CALCULATIONS.

EMISSIONS ESTIMATION EQUATIONS			
Transfer Point Emissions w/o DC-3 (lb/hr) = k x 0.0032 x Material Transferred (tph) x $(U/5)^{1.3}$ / $(M/2)^{1.4}$ x [(100 - CF)/100] x A			
Transfer Point Emissions w/o DC-3 (tpy) = k x 0.0032 x Material Transferred (tpy) x $(U/5)^{1.3}$ / $(M/2)^{1.4}$ x [(100 - CF)/100] x (1 ton/2000 lb)			
Source: Section 13.2.4 - Aggregate Handling and Storage Piles, AP-42, November 2006.			
Crusher Emissions w/o DC-3 (lb/hr) = EF (lb/ton) x Material Crushed (tph) x [(100 - CE)/100]			
Crusher Emissions w/o DC-3 (tpy) = EF (lb/ton) x Material Crushed (tpy) x [(100 - CE)/100] x (1 ton/2000 lb)			
Crusher Emission Factors (lb/ton) based on AP-42 Table 11.19.2-2 for Tertiary Rock Crushing.PM = 0.0054; PM_{10} = 0.0024; $PM_{2.5}$ = 0.0004 based on 15% of PM as PM from WRAP Fugitive Dust Handbook, Section 11.1 (Mineral Product Industry), September 2006.			
INPUT DATA			
Parameter	**Value**	**Units**	**Source**
Mean Wind Speed	8.4	mph	Average Wind Speed Jacksonville from NWS.

PM Size Multiplier (K)	0.74	for PM_{30}	AP-42, Sec. 13.2.4; 11/06.
	0.35	for PM_{10}	AP-42, Sec. 13.2.4; 11/06.
	0.053	for $PM_{2.5}$	AP-42, Sec. 13.2.4; 11/06.
Coal Crushing Emission Factor (EF)	0.0054	lb/ton for PM	AP-42, Sec. 11.19.2-2; 8/04; PM_{10} = 0.0024, $PM_{2.5}$ = 0.0004
Coal Moisture Content (M)	5	% wt. (minimum)	PSD-FL-C-010(C)
Control Efficiency (CE) for Enclosure	87.7	% (minimum)	Assumes 1.0 miles/hour (mph) and wind speed factor in batch drop equation
Existing DC-3 emissions	0.24	lb/hr	Table 6 of PSD-FL-010(C)

Emission Points in Transfer House		**Potential Coal Throughput**		
Equipment	**Description**	**(ton/hr)**	**(ton/yr)**	**Basis**
C-2	Conveyor from Rotary Car Dumper	4,000	**3,229,286**	6,144 MMBtu/hr; 11,000 Btu/lb, 66% of total
C-3	Conveyor from Emergency Reclaim Hoppers	2,000	**538,214**	6,144 MMBtu/hr; 11,000 Btu/lb, 11% of total
C-4a	Conveyor to Stacker/Reclaimer	4,000	**1,125,357**	6,144 MMBtu/hr; 11,000 Btu/lb, 23% of total
C-4b	Conveyor from Stacker/Reclaimer	2,000	**562,679**	Assumes 50% of C-4a
Crushers	Crushers (2)	2,500	**4,892,858**	Sum of C-2, C-3 and C-4a
C-7	Conveyor to Tripper Floor	1,250	**2,446,429**	50% of total to Crushers
C-8	Conveyor to Tripper Floor	1,250	**2,446,429**	50% of total to Crushers

Notes: (1) annual throughput (ton/yr) was estimated by assuming two boilers operating at maximum capacity of 6,144 MMBtu/hr, with an average coal heating value of 11,000 Btu/lb; Storage capacity is assumed to be 100,000 tons. (2) Enclosures include wind guards around the transfer points as well as the transfer building. (3) Water sprays also exist and can be used as needed.

EMISSIONS CALCULATIONS

Potential Emissions without DC-3

Emission Points	**lb/hr**			**tpy**		
	PM	**PM_{10}**	**$PM_{2.5}$**	**PM**	**PM_{10}**	**$PM_{2.5}$**
C-2	0.6362	0.3009	0.0456	0.257	0.121	0.018
C-3	0.3181	0.1504	0.0228	0.043	0.020	0.003
C-4a	0.6362	0.3009	0.0456	0.089	0.042	0.006
C-4b	0.3181	0.1504	0.0228	0.045	0.021	0.003
Crushers	1.6660	0.7404	0.1111	1.630	0.725	0.109
C-7	0.1988	0.0940	0.0142	0.195	0.092	0.014
C-8	0.1988	0.0940	0.0142	0.195	0.092	0.014
Totals	**2.6998**	**1.2294**	**0.1851**	**2.45**	**1.11**	**0.17**

Potential Emissions with DC-3

Emission Point	**lb/hr**			**tpy**		
	PM	**PM_{10}**	**$PM_{2.5}$**	**PM**	**PM_{10}**	**$PM_{2.5}$**
DC-3	**0.24**	**0.11**	**0.02**	**0.15**	**0.48**	**0.08**

Note: Potential Emissions with DC-3 based on SJRPP Materials Handling and Storage Operations PSD Permit Update, May 3, 1999 (basis for PSD-FL-010(C))

This permit does not authorize any new construction or increases in allowable operating limitations or emissions limits. This permit supplements all existing valid air permits. Except as specified below, the permittee shall continue to comply with all applicable conditions from valid air construction and operation permits. The proposed project involves no physical changes and no obvious operational changes to the facility. It does not involve any maintenance, repair or replacement tasks. [Rule 62-4.070(3), F.A.C.]

3.2. Permit Conditions

The Department agrees to the removal of baghouse DC-3 from the fuel handling building (EU 023l) and PSD-FL-010C, Table 6 Part B will be modified accordingly. In addition new permit conditions contained in Permit No. 0310045-041-AC (PSD-FL-010J) with stipulate the following:

1. Conduct an annual testing requirement of 5% opacity limit on the fuel handling building to be demonstrated by EPA Method 22;

2. Installation of the water spray bars throughout the fuel handling building as proposed by the JEA; and

3. Revise the Dust Control Plan to include the installation of the water spray bars, regular house cleaning measures and best management practices to minimize generation of fugitive dust.

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.

Yousry (Joe) Attalla is the project engineer responsible for reviewing the application and drafting the permit. Additional details of this analysis may be obtained by contacting him by telephone at (850) 717-9078 or by e-mail at yousry.attalla@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.