TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

JEA
21 West Church Street
Jacksonville, Florida 32202

Northside Generating Station
Facility ID No. 0310045

PROJECT

Project No. 0310045-040-AC
Application for Minor Source Air Construction Permit
Northside Generating Station, Byproduct Reuse Project

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

November 14, 2014

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

Northside Generating Station (NGS) and St. Johns River Power Park (SJRPP) comprise an electric power plant facility categorized under Standard Industrial Classification No. 4911. These existing facilities are located in Duval County at 4377 Heckscher Drive in Jacksonville, Florida. **Figure 1** shows the location of Duval County while **Figure 2** shows the location of the NGS. A satellite view of the NGS is shown in **Figure 3**. The NGS consists of three boilers and four combustion turbines. The UTM coordinates are Zone 17, 446.90 kilometers (km) East and 3359.15 km North. 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).

Figure 1. Location of Duval County.

Figure 2. Location of the NGS.

Figure 3. Satellite View of the NGS.

1.4. 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 (CAA).
- The facility is a Title V major source of air pollution in accordance with Chapter 62-213, F.A.C. because the potential emissions of at least one regulated pollutant exceed 100 tons/year. Key regulated pollutants include CO, NO_X, PM, PM_{10}, $PM_{2.5}$, SO_2, VOC and SAM.
- The facility is a major stationary source in accordance with Rule 62-212.400(PSD), F.A.C.
- The proposed project includes units subject to the NSPS of 40 CFR 60.
- The proposed project includes units subject to the NESHAP of 40 CFR 63.
- The project is subject to certification under the Florida Power Plant Siting Act, 403.501-518, F.S. and Chapter 62-17, F.A.C.

1.5. Project Description

JEA applied on August 25, 2014, to the Department for a minor source air construction (AC) permit. The applicant has requested permission to reintroduce a mixture of fly ash and bottom ash into NGS Units 1 and 2. Units 1 and 2 are circulating fluidized bed boilers, capable of burning coal, coal with latex, petroleum coke, biomass, natural gas, and landfill gas. The ash by-product will be obtained from on-site storage facilities, and it will consist of approximately 60% fly ash and 40% bottom ash. The reintroduction of ash is expected to assist both in operation of the circulating fluidized beds in the boilers and in the control of SO_2 emissions, since the ash have a significant available lime index, which may reduce the amount of limestone needed for SO_2 control.

NGS consists of three boilers and four combustion turbines. Units 1 and 2 are circulating fluidized bed boilers, fired by coal, coal coated with latex, petroleum coke, biomass, natural gas, and landfill gas. NGS Unit 3 is a pre-NSPS boiler fired by natural gas, landfill gas, No. 6 residual fuel oil, and used oil. The four NGS combustion

turbines are fired with low-sulfur fuel oil. SJRPP consists of two boilers, fired with pulverized coal, a blend of petroleum coke and coal, natural gas, No. 2 distillate fuel oil, and used oil.

This project involves only NGS Units 1 and 2.

1.6. Processing Schedule

August 25, 2014	Received the application for a minor source air pollution construction permit.
September 19, 2014	Request for additional information sent to JEA.
October 15, 2014	Received additional information; application complete.
November 14, 2014	Draft permit package issued.

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, 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. The project is located in Duval County, which is in an area that is currently in attainment with the state and federal AAQS or otherwise designated as unclassifiable.

The key requirement of a PSD review include: employment of Best Available Control Technology; a demonstration that the project will not cause or contribute to a violation of a state of federal AAQS or increment; and a demonstration that the project will not cause adverse impacts to Air Quality Related Values (AQRVs) such as visibility, soils and vegetation.

Commonly addressed PSD pollutants include: CO, NO_X, PM, PM_{10}, $PM_{2.5}$, SO_2, VOC, SAM, Pb, fluorides (F), and Hg. Greenhouse gases (GHGs) is defined at section 40 CFR 86.1818-12(a) as the aggregate group of gases including CO_2, nitrous oxide (N_2O), methane CH_4, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). GHGs is expressed as CO_2-equivalent (CO_2e).

2.2. Definition of a Major Stationary Source

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;
- For the special case of greenhouse gases (GHGs), the facility must first be shown to emit or have a PTE of 100,000 tons/year of GHGs as carbon dioxide equivalent (CO_2e) to (possibly) be subject to regulation.[1] The listed PSD major facility categories includes "fossil fuel-fired steam electric plants of more than 250 million BTU/hr heat input". The given category applies to the NGS/SJRPP facility. NGS/SJRPP is a major stationary source based on actual emissions of and potential to emit 100 tons/year or more of several individual PSD pollutants.

If emissions of GHGs expressed as CO_2e emissions are greater than 100,000 tons/year, then the total (unweighted) GHGs mass emissions are compared with the 100 and 250 tons/year thresholds to determine whether the source is a major stationary source.[2]

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[1] In making this calculation, the values listed in 40 CFR 98, Subpart A, Table A-1 are used to weight emissions by their respective Global Warming Potential (GWP). For example, the current GWP factors for four of the GHGs are: $CO_2 = 1$; $CH_4 = 25$; $N_2O = 298$ and $SF_6 = 22{,}800$.

[2] This procedure was held to be invalid at the federal level due to a U.S. Supreme Court opinion dated June 23, 2014. Link to Supreme Court Opinion The Department is reviewing the effects of the decision on its own rules. EPA issued guidance regarding implementation of the decision on July 24, 2014. Link to EPA Guidance

Once a new facility is considered a major stationary source based on one PSD pollutant, then other PSD pollutants are reviewed for PSD applicability based on the respective Significant Emission Rate (SER) defined and specified in Rule 62-210.200, F.A.C. Each pollutant projected to be emitted at a rate equal to or greater than its respective SER is also considered to be "*significant*" and subject to PSD preconstruction review, including a BACT determination.

Refer to **Table 1**. Although a new stationary source may be "major" for a single PSD pollutant, the project must include BACT controls for any PSD pollutant that exceeds the corresponding significant emission rates (SERs) listed in the table below.

TABLE 1- LIST OF SIGNIFICANT EMISSION RATES BY PSD-POLLUTANT. [1]

Pollutant	SER (tons/year)	Pollutant	SER (tons/year) [4]
CO	100	NO_X	40
$PM/PM_{10}/PM_{2.5}$	25/15/10	Ozone (VOC) [2]	40
$PM_{2.5}$ (NO_X)	40	$PM_{2.5}$ (SO_2)	40
Ozone (NO_X) [2]	40	SAM	7
SO_2	40	Pb	0.6
Hg [5]	0.1	Fluoride (F)	3
		GHGs (total mass basis)	0 [3]

1. Excluding pollutants specific to the Pulp and Paper industry and MSW landfills.
2. Ozone (O_3) is regulated by its precursors (VOC and NO_X). PSD for $PM_{2.5}$ can be triggered by its precursors (NO_X and SO_2).
3. Pursuant to 40 CFR 52.21(b)(23)(ii), pollutants with no SER listed at 40 CFR 52.21(b)(23)(i) have a SER of zero tons/year.
4. SER also means any emissions rate or any net emissions increase 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 $\mu g/m^3$, 24-hour average.
5. While federal PSD requirements do not include a SER for mercury, Rule 62-210.200(258)(a)(2), F.A.C., establishes this mercury SER for Florida.

2.3. Definition of Major Modification

"Major modifications" at major stationary sources are also subject to PSD review. According to Rule 62-210.200(Definitions), F.A.C., Major Modification (of a Major Stationary Source) is defined as follows:

(a) Any physical change in or change in the method of operation of a major stationary source that would result in a significant emissions increase of a PSD pollutant and a significant net emissions increase of that pollutant from the major stationary source. (Refer to Table 1 above)

(b) Any significant emissions increase from any emissions units or net emissions increase at a major stationary source that is significant for volatile organic compounds or nitrogen oxides shall be considered significant for ozone. (Refer to Table 1 above)

(c) through (d). These paragraphs are not relevant to this review

For a major modification of an existing major stationary source, the review must include a BACT determination for any PSD pollutant that exceeds the respective SER. The review must include demonstrations that the project will not cause or contribute to a violation of an AAQS or increment and that the project will not adversely affect AQRVs.

GHGs becomes subject to regulation at a major modification if project emissions as CO_2e are greater than 75,000 tons/year and mass GHGs exceed zero tons/year. The effects of the Supreme Court opinion about this provision on the Department's rules are also under review.

2.4. Previous Review and Pollution Controls

The original project to construct NGS Units 1 and 2 was subject to the requirements of 40 Code of Federal Regulations (CFR) Part 60, Subpart Da - Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978. These requirements include emissions limits for typical air pollutants as well as the Maximum Achievable Control Technology (MACT) for hazardous air

pollutants (HAP). Initial permitting of these units included a PSD review and a determination of Best Available Control Technology (BACT). These units began operation in 2002.

The control equipment for multi-pollutant control for NGS consists of the injection of limestone in the boilers, a spray dryer absorber (SDA), a fabric filter (FF) baghouse, and selective non-catalytic reduction (SNCR). This control equipment reduces emissions of SO_2, acid gases, nitrogen oxides (NO_x), particulate matter (PM), and HAP. Units 1 and 2 are also equipped with continuous emissions monitoring systems (CEMS) in the stack, to measure emissions of SO_2, NO_x, and CO, as well as a continuous opacity monitor.

2.5. PSD Applicability for New Project

This project permits the reinjection of a mixture of fly ash and bottom ash into the boilers. Since there is no change in the type or amount of fuel to be combusted in the boilers, and no change in the pollution control requirements at the boilers, emissions changes are expected to be minimal for all pollutants. No changes in emissions limits are requested by the permittee.

One pollutant which may possibly be affected by this project is mercury. If reintroduced fly ash were being recycled from the boiler, to the bag house, back to the boiler, etc., in an indefinite cycle, mercury would gradually accumulate in the system, possibly leading to mercury breakthrough of the baghouse system. However, in this project, a mixture of bottom ash and fly ash will be reinjected into the boilers; due to its volatility, mercury accumulation could occur through the fly ash route, but likely not the bottom ash route. Bed ash may cycle repeatedly through the system (as JEA is already permitted to reintroduce bed ash into the boilers), but fly ash will not be subsequently reintroduced again. The only fly ash that will be reintroduced into the boilers is fly ash that was generated prior to the beginning of the project. Therefore, a runaway mercury cycle is highly unlikely.

In order to better understand how mercury emissions are affected by by-product reintroduction, JEA will perform at least three Method 30B mercury stack tests over the course of this project. In addition to a baseline test before reintroduction begins, mercury stack tests will be performed approximately one month, three months, and six months after ash reintroduction begins. These tests will show how byproduct reintroduction affects mercury over the course of several months. These tests will also demonstrate that any changes in mercury emissions will be below the mercury SER, or in the unlikely scenario that the tests show appreciable increases in mercury emissions, they will allow JEA to terminate the project before reaching the SER for mercury.

It is also possible that SO_2 emissions may be affected by this project. The ash byproduct to be reintroduced into the boilers contains lime, which may reduce SO_2 emissions (or reduce the amount of limestone needed to achieve the same SO_2 emissions rate). Therefore, increased SO_2 emissions from this project are unlikely. This project would also be unlikely to appreciably affect emissions of NO_x or CO. Additionally, due to the presence of CEMS, any changes in emissions of these pollutants will be apparent in the continuous monitoring data, which would allow JEA to terminate or adjust the project in the unlikely event of an appreciable increase in SO_2, NO_x, or CO emissions.

Any emissions changes greater than the SERs in Table 1 due to the reintroduction of by-product into the boilers are extremely unlikely. Therefore, there is reasonable assurance that the SER values in Table 1 will not be exceeded, and PSD provisions are not triggered for this project.

3. DEPARTMENT REVIEW

On September 19, 2014, the Department issued a Request for Additional Information to JEA, who responded on October 15, 2014. The Department's questions and JEA's responses are below.

Question 1:

Rate of Byproduct Reintroduction: The application does not indicate how much byproduct JEA intends to reintroduce into Boilers 1 and 2, or the hourly or daily rate at which it intends to reintroduce the byproduct. Please identify the maximum rate (in pounds per hour) that byproduct will be reintroduced into the boilers as well as the maximum cumulative amount of byproduct (tons) that will be reintroduced over the course of the six-month reintroduction project. Also, please indicate the number of days over the course of the six month test period that JEA intends to reintroduce byproduct.

Response:

The maximum reinjection rate will be limited to the system limit of 160,000 lb/hr (per unit). Over the last three (3) months of operation on 100% coal, the units averaged 20,000 to 30,000 lb/hr (per unit) of limestone injection for bed level control. If we continue to burn 100% coal, the ash reintroduction rate will likely not exceed this average rate. However, once the fuel blend changes to a higher sulfur combination of coal and pet coke, the reinjection rate will increase and/or we would also have to use limestone.

During the six-month the (sic) period, the units could be running 24/7 and up to 180 days. Therefore, the cumulative amount of by-product re-injected could be as little as 43,000 tons and as much as 346,000 tons per unit over the 6-month period.

Question 2:

Byproduct Reintroduction Process: There is no information in the application on the physical process of byproduct reinjection. Please provide information on the method and point of byproduct injection into the boilers and the method of transport of byproduct from on-site storage to the boilers. Also, please describe any new temporary equipment, such as ducts, pipes, fans, conveyors, dust collectors, etc., that will be necessary. If a process flow diagram is necessary to describe this adequately, please provide one.

Response:

At present, the intent is to use the existing limestone injection system. See **Figure 4** *below. Limestone injection is into the boiler's fluidized bed to absorb and reduce SO_2 emissions. The by-products would be transported from onsite storage area to the limestone storage building, and loaded onto the conveyor system using front-end loaders. There will be no new ducts, pipes, fans, conveyors or dust collectors.*

Question 3:

Byproduct Metals Content: In determining the effect of byproduct reintroduction on emissions, it is necessary to understand the content of important metals in the byproduct to be reintroduced. Please provide information on the content of the following metals in the ash byproduct to be reintroduced: mercury, antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, and selenium.

Response:

See **Table 2**.

Figure 4. Simplified process flow diagram showing the proposed by-product reinjection process.

Question 4:

<u>Prevention of Mercury Breakthrough or Runaway Mercury Buildup</u>: The repeated reintroduction of the same unit of byproduct could potentially lead to an accumulation of mercury in the system. Please provide information on assuring that a unit of byproduct that is reintroduced to the boilers is not subsequently reintroduced again to the boilers. This may be as simple as providing a method for assuring that bottom ash and fly ash collected after reintroduction has commenced is segregated from the byproduct that has not yet been reintroduced.

Response:

We plan to use the existing by-products (known as EZBase or 305 materials), which are a combination of bed ash and fly ash (at a ratio of approximately 40/60) until they are depleted. However, as shown in ***Figure 4****, some of the bed ash may be re-injected repeatedly, along with the 305 materials. Our current Title V permit allows re-use of bottom ash or bed ash materials per Condition G.3 (at a design rate of 35 ton/hr for either unit) and we understand that there is no mercury accumulation concern with bed ash reuse. Upon reinjection of the 305 materials, the resulting bed ash may contain some fly ash. If necessary, we can monitor the mercury content of the bed ash materials from the bed ash silo regularly (e.g. monthly) during the 6-month test period, and submit the results to FDEP.*

TABLE 2 - ASH BYPRODUCT GRAB SAMPLE CHEMICAL ANALYSIS. (MEASUREMENTS MARKED WITH A "U" WERE BELOW THE DETECTION LIMIT.)

OLLECT_DAT	SAMPLE_SITE	SAMPLE_DESC	SAM_DESC2	MATRIX_DESC	PARAMETER	RESULT	UNITS	METHOD	QUALIFIERS	MDL	PQL	RDL
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Al2O3 (Aluminum Oxide)	2.3380	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Al2O3 (Aluminum Oxide)	2.0740	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Antimony	2.23 U	mg/kg	SW846 6010		2.23	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Antimony	2.21 U	mg/kg	SW846 6010		2.21	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Arsenic	2.55 U	mg/kg	SW846 6010		2.55	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Arsenic	2.53 U	mg/kg	SW846 6010		2.53	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	BaO (Barium Oxide)	0.92700	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	BaO (Barium Oxide)	0.93600	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Barium	54.2	mg/kg	SW846 6010		0.572	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Barium	61.1	mg/kg	SW846 6010		0.568	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Beryllium	0.550 U	mg/kg	SW846 6010		0.550	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Beryllium	0.547 U	mg/kg	SW846 6010		0.547	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Cadmium	0.619 U	mg/kg	SW846 6010		0.619	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Cadmium	0.615 U	mg/kg	SW846 6010		0.615	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Calcium	362300	mg/kg	SW846 6010		3.78	403	403
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Calcium	366080	mg/kg	SW846 6010		3.76	401	401
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	CaO (Calcium Oxide)	51.216	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	CaO (Calcium Oxide)	48.553	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Chromium	13.1	mg/kg	SW846 6010	I	0.208	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Chromium	13.6	mg/kg	SW846 6010	I	0.206	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Cobalt	5.35	mg/kg	SW846 6010	I	0.757	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Cobalt	5.66	mg/kg	SW846 6010	I	0.753	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Copper	0.539 U	mg/kg	SW846 6010		0.539	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Copper	0.536 U	mg/kg	SW846 6010		0.536	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Cr2O3 (Chromic Oxide)	-0.37200	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Cr2O3 (Chromic Oxide)	-0.36800	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	CuO (Cupric Oxide)	0.088000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	CuO (Cupric Oxide)	0.088000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Fe2O3 (Ferric Oxide)	0.80200	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Fe2O3 (Ferric Oxide)	0.81600	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Iron	3665.9	mg/kg	SW846 6010		3.30	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Iron	4024.7	mg/kg	SW846 6010		3.28	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	K2O (Potassium Oxide)	0.059000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	K2O (Potassium Oxide)	0.070000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Lead	2.42	mg/kg	SW846 6010	I	1.26	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Lead	3.90	mg/kg	SW846 6010	I	1.25	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Magnesium	4521.9	mg/kg	SW846 6010		1.95	40.3	40.3
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Magnesium	4615.7	mg/kg	SW846 6010		1.93	40.1	40.1
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Manganese	39.3	mg/kg	SW846 6010		0.556	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Manganese	41.5	mg/kg	SW846 6010		0.553	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Mercury	0.0587	mg/kg	SW846 7473				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Mercury	0.0644	mg/kg	SW846 7473				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	MgO (Magnesium Oxide)	0.88700	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	MgO (Magnesium Oxide)	0.83200	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Mn2O3 (Manganese Oxide)	0.0070000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Mn2O3 (Manganese Oxide)	0.0010000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Molybdenum	19.6	mg/kg	SW846 6010	I	0.383	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Molybdenum	22.2	mg/kg	SW846 6010		0.381	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Na2O (Sodium Oxide)	0.061000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Na2O (Sodium Oxide)	0.079000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Nickel	729.49	mg/kg	SW846 6010		0.283	40.3	40.3
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Nickel	781.44	mg/kg	SW846 6010		0.282	40.1	40.1
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	NiO (Nickel Oxide)	0.21200	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	NiO (Nickel Oxide)	0.21700	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	P2O5 (Phosphorus Pentoxide)	0.044000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	P2O5 (Phosphorus Pentoxide)	0.047000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	PbO (Lead Oxide)	-0.0030000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	PbO (Lead Oxide)	0.0050000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Potassium	350.99	mg/kg	SW846 6010		8.21	202	202
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Potassium	436.80	mg/kg	SW846 6010		8.16	200	200
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Selenium	1.95 U	mg/kg	SW846 6010		1.95	40.3	40.3
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Selenium	4.16	mg/kg	SW846 6010	I	1.94	40.1	40.1
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Silver	0.216 U	mg/kg	SW846 6010		0.216	10.1	10.1
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Silver	0.214 U	mg/kg	SW846 6010		0.214	10.0	10.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	SiO2 (Silicon Dioxide)	4.1080	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	SiO2 (Silicon Dioxide)	4.1040	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	SO3 (Sulfur Trioxide)	24.839	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	SO3 (Sulfur Trioxide)	26.248	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Sodium	461.85	mg/kg	SW846 6010		1.15	403	403
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Sodium	688.24	mg/kg	SW846 6010		1.14	401	401
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	SrO (Strontium Oxide)	0.11300	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	SrO (Strontium Oxide)	0.12200	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Strontium	764.54	mg/kg	SW846 6010		0.481	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Strontium	748.46	mg/kg	SW846 6010		0.478	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Thallium	2.31 U	mg/kg	SW846 6010		2.31	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Thallium	2.30 U	mg/kg	SW846 6010		2.30	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Tin	17.0	mg/kg	SW846 6010	I	3.43	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Tin	17.8	mg/kg	SW846 6010	I	3.41	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	TiO2 (Titanium Dioxide)	0.11300	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	TiO2 (Titanium Dioxide)	0.10100	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	V2O5 (Vanadium Pentoxide)	0.59000	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	V2O5 (Vanadium Pentoxide)	0.57500	%	XRF (Percent)				
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Vanadium	3458.2	mg/kg	SW846 6010		0.531	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Vanadium	3730.7	mg/kg	SW846 6010		0.528	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	Zinc	5.34	mg/kg	SW846 6010	I	0.568	20.2	20.2
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	Zinc	6.08	mg/kg	SW846 6010	I	0.564	20.0	20.0
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	ZnO (Zinc Oxide)	0.0030000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	ZnO (Zinc Oxide)	0.0030000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 #2 FLYASH/BEDASH	Ash ByProduct	ZrO2 (Zirconium Dioxide)	-0.061000	%	XRF (Percent)	U			
22-Sep-14	NS Gen. Sta	Fly Ash	305 # 1 FLYASH/BEDASH	Ash ByProduct	ZrO2 (Zirconium Dioxide)	-0.053000	%	XRF (Percent)	U			

By the test results in **Table 2**, the mercury content of the on-site byproduct is approximately 0.05 to 0.07 parts per million (ppm), which is similar to the mercury content of coal itself (generally between 0.04 and 0.25 ppm, according to a 2001 US Geological Survey study entitled "Mercury in U.S. Coal -- Abundance, Distribution, and Modes of Occurrence"). Table 2 also shows that the byproduct is approximately 50% lime (calcium oxide, or CaO) by mass, which would indicate that there is indeed available lime to assist in SO_2 emissions control.

No changes in permitted emissions are requested in this application. The emissions and emissions units that comprise the NGS/SJRPP facility are summarized in the facility's Title V operating permit (0310045-039-AV). This project is expected to have a minimal impact on emissions from NGS. This project will allow JEA to assess the effectiveness of byproduct reintroduction as a control strategy for SO_2. Mercury emissions should be only minimally affected by the one-time reuse of fly ash in Units 1 and 2. If appreciable changes in emissions do occur, they will be quantified by the Method 30B tests for mercury, or by the CEMS for SO_2, NO_x, or CO. This project should have almost no impact on emissions from NGS, while potentially enabling decreased use of limestone for SO_2 control. Monthly tests for mercury content in fly ash and bottom ash grab samples will provide information on the accumulation of mercury in fly ash and bottom ash, which may be necessary if JEA plans to resume the reintroduction of byproducts into the boilers after the completion of 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. John Dawson 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 850-717-9085, by e-mail at john.dawson@dep.state.fl.us, or at the Department's Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.