



**TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION**

APPLICANT

Duke Energy Florida, LLC
4037 River Road
Live Oak, Florida 32060

Suwannee River Power Plant
Facility ID No. 1210003

PROJECT

Project No. 1210003-011-AC/PSD-FL-014B
Application for Minor Source Air Construction Permit
Increase in Permitted Peaker Operation

COUNTY

Suwannee 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

December 19, 2016

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 Suwannee River Power Plant is an existing electric power plant, which is categorized under Standard Industrial Classification Code No. 4911. The existing Suwannee River Power Plant is located in Suwannee County at 4037 River Road in Live Oak, Florida. The location of Suwannee County is shown in **Figure 1**, and a map of the area is shown in **Figure 2**. A satellite view of the facility is shown in **Figure 3**. The UTM coordinates of the existing facility are Zone 17, 290.5 kilometers (km) East, and 3362.2 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).

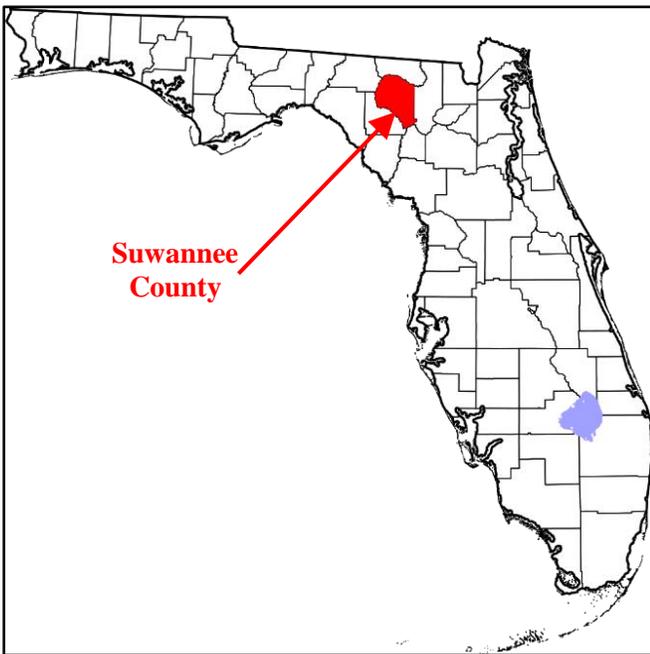


Figure 1. Location of Suwannee County.

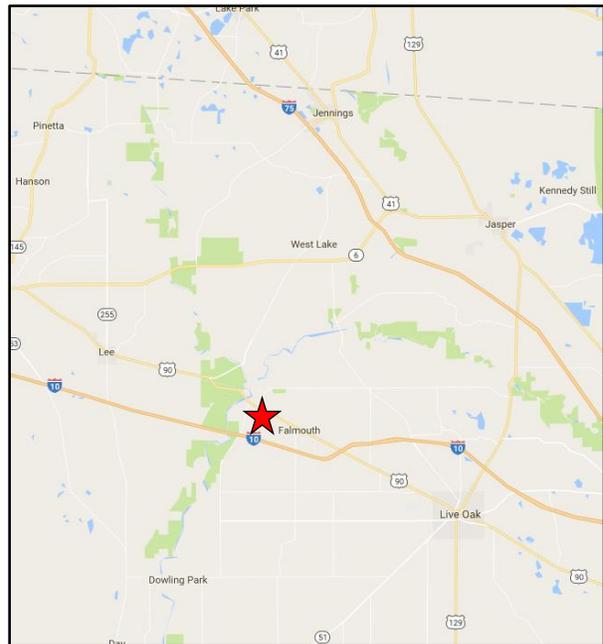


Figure 2. Location of Suwannee Power Plant.



Figure 3. Satellite View of Suwannee River Power Plant. (Peaking Units Outlined.)

1.4. Facility Regulatory Categories

- The facility is not 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.

1.5. Project Description

The Suwannee River Power Plant consists of three Twin-Pac simple-cycle combustion turbine peaking units, three fossil fuel steam-fired boilers, and a variety of insignificant and unregulated activities. The plant is operated by Duke Energy Florida, LLC (DEF). The peaking units are referred to as units CTP1, CTP2, and CTP3, and each of the peaking units includes two dual-fuel (natural gas and No. 2 fuel oil) aeroderivative combustion turbines coupled to one electric generator. The boilers are referred to as Unit Nos. 1, 2, and 3. This project involves only the three peaking units, not the boilers.

The peaking units have been in operation since 1980. Each simple-cycle unit is currently permitted to operate no more than 1,500 hours per year, regardless of fuel, under the units' original construction permit (Permit No. PSD-FL-014, issued by US EPA in 1979). DEF has requested that the limitation on permitted hours be replaced with a cap on emissions of nitrogen oxides (NO_x). DEF also requests that operation on fuel oil be limited to 1,500 hours per year. Emissions while operating on fuel oil would still count toward the NO_x cap. DEF expects greater need for generation from these units in the coming years, as other units at the facility are shut down. While DEF may shut down some or all the boilers at Suwannee soon, the shutdown of the boilers is not included in this present project.

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The following existing emissions units (EU) will be affected by this project.

EU No.	Description
004	CTEG Peaking Unit No. 1 (CTP1)
005	CTEG Peaking Unit No. 2 (CTP2)
006	CTEG Peaking Unit No. 3 (CTP3)

1.6. Processing Schedule

November 7, 2016 Department received the [application](#) for an air pollution construction permit.
November 23, 2016 Department received [revised application](#); application complete.
December 19, 2016 Department issued Draft Permit package.

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 (SO₂); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM₁₀); PM_{2.5}; 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

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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 microgram per cubic meter ($\mu\text{g}/\text{m}^3$), 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.

PSD applicability for a “modification” to an existing major stationary source is based on thresholds known as the significant emission rates (SER) as defined in Rule 62-210.200(282), F.A.C. Any “*net emissions increase*” as defined in Rule 62-210.200(210), 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. The SERs for the various PSD pollutants are listed in **Table 1**. Also, note that a project can trigger PSD for GHGs only if the project first triggers PSD for one of the other PSD pollutants; that is, a project cannot trigger PSD for only GHGs.

TABLE 1 - LIST OF SIGNIFICANT EMISSIONS RATES.

Pollutant	SER (TPY)	Pollutant	SER (TPY)
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	0.1	GHGs	75,000 (CO ₂ e) ³
1. Excluding fluoride and pollutants specific to the Pulp and Paper industry, MWCs, 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. “CO ₂ e” means carbon dioxide equivalents and refers to greenhouse gas (GHG) emissions. The calculation of GHG emissions is defined in 40 CFR 98, Subpart A, Table A-1.			

2.2. PSD Applicability for Project

This project entails a shift from a hard limit on the number of hours of operation of the peakers to a limit on emissions of NO_x. This would likely result in a substantial increase in the permitted hours of operation of the peaker units. No change in permitted fuels or capacity of the units is requested. However, an increase in the permitted hours of operation would likely lead to increased operation of the units.

In determining whether any possible increases in emissions exceed the SER values in **Table 1**, “baseline actual emissions” (BAE) are compared to “projected actual emissions” (PAE). For an existing emissions unit other than an electric utility steam generating unit, BAE is defined in Rule 62-210.200(28)(b), F.A.C., as “the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 10-year period immediately preceding the date a complete permit application is received by the Department.” This rule has several more provisions:

1. *The average rate shall include fugitive emissions to the extent quantifiable, and emissions associated with startups and shutdowns.*
2. *The average rate shall be adjusted downward to exclude any non-compliant emissions that occurred while the source was operating above an emission limitation that was legally enforceable during the consecutive 24-month period.*
3. *The average rate shall be adjusted downward to exclude any emissions that would have exceeded an emission limitation with which the major stationary source must currently comply,*

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had such major stationary source been required to comply with such limitations during the consecutive 24-month period.

4. For a PSD pollutant, when a project involves multiple emissions units, only one consecutive 24-month period must be used to determine the baseline actual emissions for all the emissions units being changed. A different consecutive 24-month period can be used for each PSD pollutant.

5. The average rate shall not be based on any consecutive 24-month period for which there is inadequate information for determining annual emissions, in tons per year, and for adjusting this amount if required by subparagraphs (b)2. and 3. above.

To determine BAE, the applicant used data from its predictive emissions monitoring system (PEMS) for NO_x, and emissions factors from either EPA’s AP-42 reports, the EPA Acid Rain Program, or the EPA Greenhouse Gas Reporting Program for all other pollutants.

The BAE values for the various PSD pollutants, as well as their corresponding 24-month periods, are listed in **Table 2**. Further details, including historic emissions, are given in the permit application.

TABLE 2 - SUMMARY OF BASELINE ACTUAL EMISSIONS (TONS PER YEAR).

Pollutant	BAE (tpy)	Baseline Period
SO ₂	28.4	July 2007 – June 2009
NO _x	167.6	Feb 2008 – Jan 2010
CO	27.5	Oct 2006 – Sep 2008
PM	1.70	Oct 2006 – Sep 2008
PM ₁₀	5.64	Oct 2006 – Sep 2008
PM _{2.5}	5.64	Oct 2006 – Sep 2008
VOC	1.51	Oct 2006 – Sep 2008
SAM	2.17	July 2007 – June 2009
Pb	0.0017	Feb 2008 – Jan 2010
Hg	0.00028	Oct 2006 – Sep 2008
GHGs	95,911	Oct 2006 – Sep 2008

After calculating baseline actual emissions, the applicant then calculated projected actual emissions. The PAE is defined by Rule 62-210.200(230), F.A.C. as the following:

The maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a PSD pollutant in any one of the 5 years following the date the unit resumes regular operation after the project, or in any one of the 10 years following that date, if the project involves increasing the emissions unit's design capacity or its potential to emit that PSD pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source. One year is one 12-month period. In determining the projected actual emissions, the Department:

(a) Shall consider all relevant information, including historical operational data, the company’s own representations, the company’s expected business activity and the company’s highest projections of business activity, the company’s filings with the State or Federal regulatory authorities, and compliance plans or orders, including consent orders; and

(b) Shall include fugitive emissions to the extent quantifiable and emissions associated with startups and shutdowns; and

(c) Shall exclude that portion of the unit’s emissions following the project that an existing unit could have accommodated during the consecutive 24-month period used to establish the

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baseline actual emissions and that are also unrelated to the particular project including any increased utilization due to product demand growth; or

(d) In lieu of using the method set out in paragraphs (a) through (c) above, may be directed by the owner or operator to use the emissions unit's potential to emit, in tons per year.

The projected actual emissions were calculated from the new requested cap on NO_x emissions. This calculation assumed 250 hours of operation on fuel oil for each turbine, then included however many hours of operation on natural gas led to NO_x emissions that equal the NO_x cap. The emissions factors used were the same as those used in calculating baseline actual emissions. The PAE values for the various PSD pollutants are summarized in **Table 3**. The projected actual emissions for NO_x equal the requested NO_x cap.

TABLE 3. SUMMARY OF PROJECTED ACTUAL EMISSIONS (TONS PER YEAR).

Pollutant	PAE (tpy)
SO ₂	141.8
NO _x	633
CO	111.8
PM	6.9
PM ₁₀	23.3
PM _{2.5}	23.3
VOC	6.47
SAM	10.9
Pb	0.0054
Hg	0.00110
GHGs	399,422

The PAE values summarized above have not yet taken into account item (c) in the definition of PAE, above, by which the portion of emissions that the turbines “could have accommodated” and that are unrelated to the project, due to factors such as product demand growth, are to be excluded from the PAE.

To determine the emissions that the units “could have accommodated” during the baseline period, the applicant analyzed historical peaking unit operating data and emissions. From the 24-month periods that were used to determine Baseline Actual Emissions (**Table 2**), the applicant chose the greatest monthly emissions to demonstrate what the units are capable of accommodating during periods of heavy demand. These highest-month emissions were multiplied by a factor of 12 to calculate their annual equivalent; this is deemed the “Demand Growth Scenario” in **Table 4**. An important caveat to this is that in no case may the emissions that the units “Could Have Accommodated” be greater than their current Potential to Emit (PTE). These quantities are summarized in **Table 4**.

TABLE 4 - DETERMINATION OF EXCLUDED DEMAND GROWTH.

Pollutant	Annual Emissions, Tons per Year			
	Baseline Actual (BAE)	Demand Growth Scenario	Current PTE	Excluded Demand Growth ¹
SO ₂	28.4	150.3	853	113.4
NO _x	167.6	735.6	603	435.7
CO	27.5	109.9	126.4	82.4
PM	1.70	6.72	7.2	5.02
PM ₁₀	5.64	21.93	20.0	14.31
PM _{2.5}	5.64	21.93	20.0	14.31

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VOC	1.51	5.36	3.5	1.98
SAM	2.17	11.5	65.3	8.7
Pb	0.0017	0.018	0.0233	0.0037
Hg	0.00028	0.0012	0.00200	0.00082
GHGs	95,911	365,646	272,048	176,137
1. Excluded Demand Growth = Lesser of (Demand Growth Scenario – BAE) or (Current PTE – BAE)				

As required by Rule 62-212.300(3)(a)1., F.A.C., the applicant included the documentation of the peaker usage and emissions estimates that were necessary to calculate the BAE, PAE, and excluded emissions due to demand growth. These are summarized in **Table 4** above and **Table 5**, below. The PSD applicability analysis for each pollutant is also summarized in **Table 5**.

The applicant’s requested NO_x cap equals the Baseline Actual Emissions, plus the excludable demand growth, plus 30 tons per year. This cap makes the increase in NO_x due to the project equal 30 tons per year, which is less than the significant emissions rate of 40 tons per year. A project increase of 30 tons per year, rather than 39 tons per year, was chosen in order to account for the uncertainties in the measurement method for NO_x emissions and variability in operations. There is no definitive “correct” value for this margin of safety below the significant emissions rate; rather, 30 tons per year was chosen for this particular project, based on the use of a large demand growth exclusion as well as the precision, accuracy, and representativeness of the annual NO_x stack test for each turbine.

TABLE 5 - SUMMARY OF THE PSD APPLICABILITY ANALYSIS.

Pollutant	Annual Emissions, Tons per Year					Subject to PSD?
	Baseline Actual (BAE)	Projected Actual (PAE)	Excluded Demand Growth	Project Increase ¹	SER	
SO ₂	28.4	141.8	113.4	-	40	No
NO _x	167.6	633.3	435.7	30	40	No
CO	27.5	111.8	82.4	1.9	100	No
PM (f) ²	1.70	6.9	5.02	0.2	25	No
PM ₁₀ (f+c)	5.64	23.3	14.31	3.3	15	No
PM _{2.5} (f+c)	5.64	23.3	14.31	3.3	10	No
VOC	1.51	6.47	1.98	3.0	40	No
SAM	2.17	10.9	8.7	-	7	No
Pb	0.0017	0.0054	0.0037	-	0.6	No
Hg	0.00028	0.00110	0.00082	-	0.1	No
GHGs	95,911	399,422	176,137	127,374	75,000	No ³
1. Project Increase = PAE – BAE – Excluded Demand Growth; Increase values only included if greater than zero. 2. (f) = filterable; (f+c) = filterable and condensable 3. Project does not trigger PSD for GHGs since no other pollutant is triggered.						

As shown in **Table 5**, this project does not trigger a PSD review. This is assured by the requested NO_x cap, which effectively limits operation of the units, to assure that any emissions increases due to the project are less than the significant emissions rates.

3. DEPARTMENT REVIEW

3.1. Brief Discussion of Emissions

These turbines are subject to state and federal emissions limits on NO_x and SO₂. This project does not affect these existing limits.

3.2. State Requirements

These units are already subject to BACT limits on NO_x and SO₂, dating back to their original installation. This project does not affect these limits.

3.3. Federal NSPS Provisions

These units are subject to limits on NO_x and SO₂ emissions under 40 CFR 60, Subpart GG, for stationary gas turbines. This project does not affect the applicability of these limits. By 40 CFR 60.14(e)(3), an increase in the hours of operation of an emissions unit *does not* in and of itself constitute a modification for the purposes of determining the applicability of New Source Performance Standards. This project increases the permitted hours of operation of the peaking units, but it does not entail an increase in the hourly rate of emissions. Therefore, this project is *not* considered a modification for the purposes of 40 CFR 60.

3.4. Federal NESHAP Provisions

These units are considered “existing stationary combustion turbines” under 40 CFR 63, Subpart YYYYY, the NESHAP for stationary combustion turbines. By 40 CFR 63.6090(b)(4), existing turbines are not subject to any requirements of the subpart.

3.5. Other Draft Permit Requirements

This project avoided PSD through the use of a cap on NO_x emissions. The permittee will be required to perform annual stack tests of NO_x emissions on both fuel oil and natural gas for each turbine to establish a turbine-specific, fuel-specific emissions factor. The emissions factor to be used in demonstrating compliance with the NO_x cap will be the average of the previous five years’ stack tests. That factor will be multiplied by fuel usage in order to determine monthly NO_x emissions, which will be summed to calculate a 12-month rolling total emissions of NO_x for the peakers. A 12-month rolling NO_x cap was chosen since the PAE for NO_x, which is the main factor that determines whether or not the project triggered PSD, is based on 12-month projections, not calendar year-based projections. A limit that is intended to provide reasonable assurance that the project emissions are less than the SER must then also be based on 12-month rolling emissions, rather than calendar year-based emissions.

The pre- and post-project PTEs for these emissions units are summarized in **Table 6**.

TABLE 6 - PRE- AND POST-PROJECT PTE (TPY) FOR PEAKER UNITS.

Pollutant	Combined PTE for all three Twin-Pack EUs	
	Pre-project PTE	Post-project PTE
SO ₂	853	1713
NO _x	603	633
CO	126.4	170
PM (f)	7.2	9.9
PM ₁₀ (f+c)	20.0	28.8
PM _{2.5} (f+c)	20.0	28.8
VOC	3.5	6.9
SAM	65.3	131.1
Pb	0.0233	0.024
Hg	0.00200	0.00237
GHG	272,048	442,434

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 the project engineer at the Department's Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400 at 850-717-9085 or by email John.Dawson@dep.state.fl.us.