

Florida Department of  
Environmental Protection

Memorandum

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TO: Clair Fancy, Chief, BAR  
THROUGH: Al Linero, Administrator - New Source Review Section *ay 5/24*  
FROM: Jeff Koerner, New Source Review Section *JK*  
DATE: May 24, 2001  
SUBJECT: Project No. 0990005-009-AC  
Draft Air Permit No. PSD-FL-169A  
Okeelanta Corporation, Sugar Mill and Refinery  
Conversion of Boiler No. 16 to Natural Gas

Attached for your review are the following items:

- Intent to Issue Permit and Public Notice Package;
- Technical Evaluation and Preliminary Determination;
- Draft Permit; and
- PE Certification

The Technical Evaluation and Preliminary Determination provides a detailed description of the project, the rule applicability, and the BACT determinations. The P.E. certification briefly summarizes proposed project and BACT determinations. Day #74 is June 4, 2001. I recommend your approval of the attached Draft Permit for this project.

CHF/AAL/jfk

Attachments

Florida Department of Environmental Protection  
 Division of Air Resources Management  
 Bureau of Air Regulation  
 New Source Review Section  
 2600 Blair Stone Road, MS #5505  
 Tallahassee, Florida, 32399-2400

**P.E. CERTIFICATION STATEMENT**

**PERMITTEE**

Okeelanta Corporation  
 21250 U.S. Highway 27  
 South Bay, FL 33493

Project No. 0990005-009-AC  
 Draft Permit No. PSD-FL-169A  
 Facility ID No. 0990005  
 SIC Nos. 2061, 2062, and 4911

**PROJECT DESCRIPTION**

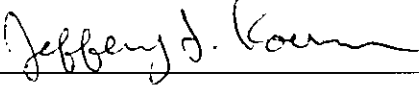
The applicant, Okeelanta Corporation, operates an existing sugar mill and sugar refinery located approximately six miles south of South Bay on U.S. 27 in Palm Beach County, Florida. Adjacent to the sugar mill and refinery is Okeelanta Power L.P.'s existing cogeneration plant, which fires biomass to produce steam for the mill and generate electricity for sale to the power grid. The applicant proposes to modify the burner system of existing mill Boiler No. 16 to accommodate natural gas as the primary fuel and very low sulfur distillate oil as an alternate fuel. This unit is a package steam boiler with a capacity of 150,000 pounds per hour of steam with a heat input of approximately 200 mmBTU per hour. The existing boiler was subject to PSD during initial construction and has a NOx CEMS and opacity COMS in accordance with the NSPS Subpart Db requirements for boilers.

The existing facility is a PSD-major source of air pollution located in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to a National Ambient Air Quality Standard (NAAQS). As such, BACT determinations are required for NOx and PM10 because emissions from the boiler exceed the PSD Significant Emission Rates for these pollutants. In addition, BACT determinations are required for emissions of PM and SO2 in accordance with Rule 62-296.406, F.A.C. (small boiler BACT). I recommend the following emissions standards as BACT for this project:

Pollutant	BACT Standards	BACT Controls
CO	CO (gas) ≤ 0.10 lb/mmBTU based on a 3-hour test average CO (oil) ≤ 0.11 lb/mmBTU based on a 3-hour test average	Efficient combustion of clean fuels (Avoids BACT determination.)
NOx	NOx (gas) ≤ 0.06 lb/mmBTU based on a 24-hour (daily) CEMS average NOx (oil) ≤ 0.12 lb/mmBTU based on a 24-hour (daily) CEMS average	Low NOx burners with flue gas recirculation (≈ 15%)
PM	Opacity (gas and oil) ≤ 10% based on a 6-minute COMS average, except for one 6-minute period per hour not to exceed 20% opacity PM (oil) ≤ 0.03 lb/mmBTU based on initial 3-hour test average	Efficient combustion of clean fuels
SO2	Efficient combustion of pipeline-quality natural gas and very low sulfur distillate oil (< 0.05% sulfur by weight)	Very low sulfur fuels

Our staff meteorologist reviewed the applicant's Air Quality Analysis and determined that the project would not result in any significant impacts. Therefore, the Department has reasonable assurance that the proposed project, as described in the application and subject to the conditions of the Draft Permit, will not cause or significantly contribute to a violation of any AAQS or PSD increment.

***I HEREBY CERTIFY*** that the air pollution control engineering features described in the above referenced application and subject to the proposed permit conditions provide reasonable assurance of compliance with applicable provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-4 and 62-204 through 62-297. However, I have not evaluated and I do not certify aspects of the proposal outside of my area of expertise (including but not limited to the electrical, mechanical, structural, hydrological, and geological features).

  
 \_\_\_\_\_  
 Jeffery F. Koerner, P.E.  
 Registration Number: 49441

5-24-01  
 \_\_\_\_\_  
 (Date)

**Golder Associates Inc.**

6241 NW 23rd Street, Suite 500  
Gainesville, FL 32653-1500  
Telephone (352) 336-5600  
Fax (352) 336-6603



May 31, 2001

Florida Department of Environmental Protection  
Bureau of Air Regulation, New Source Review Section  
2600 Blair Stone Road, MS 5500  
Tallahassee, Florida 32399-2400

Attention: Mr. A. A. Linero, P.E.

RE: OKEELANTA CORPORATION (ID NO. 0990005)  
OKEELANTA SUGAR AND REFINERY MILL  
BOILER NO. 16 PSD APPLICATION

Dear Mr. Linero:

Okeelanta Corporation submitted a prevention of significant deterioration (PSD) application to Florida Department of Environmental Protection (FDEP) to modify Boiler No. 16 at their sugar and refinery mill in March 2000. This application was submitted to obtain a construction permit to convert Boiler No. 16 into a dual fuel-fired boiler and to increase operating hours. Emission increases mandated PSD review for particulate matter (PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), and carbon monoxide (CO).

Upon further investigation and collaboration with the vendor of the new dual fuel-fired burner, it has been determined that the burner will be able to achieve lower CO emissions than what was reported in the PSD application. In the application, the maximum CO emissions were stated as 0.16 lb/MMBtu due to fuel oil firing and 0.15 lb/MMBtu due to natural gas firing, based on vendor guarantees. These emission rates resulted in a maximum annual emission rate of 140.90 tons per year.

It has now been determined that maximum CO emissions will not exceed 0.11 lb/MMBtu due to fuel oil firing and 0.10 lb/MMBtu due to natural gas firing. These lower limits are based in large part on previous CO testing performed on Boiler No. 16 while burning fuel oil, which demonstrated emissions lower than 0.10 lb/MMBtu. The new emission factors will lower the maximum annual CO emission rate for Boiler No. 16 to 96.19 tons per year.

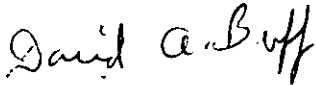
Okeelanta would like to update the PSD application to reflect the latest emission rates for the boiler. One page from the application form and four tables from the PSD report are affected by this change. These pages have been revised and are attached for your consideration. The increase in CO emissions will no longer exceed the PSD significant rate and no longer require PSD review. Okeelanta asks that the modeling analysis and the BACT review for CO presented in the original application be set aside, since they are no longer required.

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**RECEIVED**  
JUN 01 2001  
BUREAU OF AIR REGULATION

Please call or write if any questions about this change.

Sincerely,

GOLDER ASSOCIATES INC.



David A. Buff, P.E., Q.E.P.  
Principal Engineer  
Florida P. E. #19011  
SEAL

DB/jkw

Enclosures

cc: M. Capone  
J. Meriwether  
S. Watson

*Q. Kaerner*

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*C. Holladay*

*J. Goldmann, SED*

*D. Graziano, PBCHD*

EPA

NPS

**G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION**  
 (Regulated Emissions Units -  
 Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: <b>CO</b>	2. Total Percent Efficiency of Control:
3. Potential Emissions: <b>22.22</b> lb/hour <b>96.19</b> tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1      [ ] 2      [ ] 3      _____ to _____ tons/year	
6. Emission Factor: <b>0.11 lb/MMBtu</b>  Reference: <b>Manufacturer's Estimate</b>	7. Emissions Method Code:  <b>2</b>
8. Calculation of Emissions (limit to 600 characters):  <b>See Table 2-1 for calculations</b>	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):  <b>Emission factor based on fuel oil-firing.</b>	

Allowable Emissions Allowable Emissions \_\_\_\_\_ of \_\_\_\_\_

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions:  lb/hour      tons/year
5. Method of Compliance (limit to 60 characters):	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):	

Table 1-1. Net Emissions Increase for Modification to Okeelanta Boiler No. 16 (revised 5/30/01)

Pollutant	Net Increase in Emissions <sup>a</sup> (TPY)	PSD Significant Rate (TPY)	PSD Review Applies?
Particulate Matter (PM)	22.16	25	No
Particulate Matter (PM <sub>10</sub> )	22.16	15	Yes
Sulfur Dioxide	39.38	40	No
Nitrogen Oxides	113.77	40	Yes
Carbon Monoxide	96.19	100	No
Volatile Organic Compounds	27.73	40	No
Sulfuric Acid Mist	1.75	7	No
Lead	6.23E-03	0.6	No
Mercury	2.09E-03	0.1	No
Beryllium	2.04E-03	4.00E-04	Yes
Fluorides	--	3	No

<sup>a</sup> Since Boiler No. 16 has operated very little in the last several years, the current emissions from Boiler No. 16 were assumed to be zero. Thus, the net increase in emissions are equal to the future maximum emissions of Boiler No. 16.

Table 2-1. Future Maximum Emissions from Boiler No. 16, Okcelanta Corporation (revised 5/30/01)

Regulated Pollutant	Natural Gas Combustion						No. 2 Fuel Oil Combustion						Annual Emissions With Maximum Fuel Oil Firing <sup>d</sup> (TPY)	Maximum Annual Emissions Due to Any Combination <sup>e</sup> (TPY)
	Emission Factor (lb/10 <sup>3</sup> scf)	Emission Factor (lb/MMBtu)	Ref.	Activity Factor <sup>a</sup> (MMBtu/hr)	Hourly Emissions (lb/hr)	Annual Emissions <sup>b</sup> (TPY)	Emission Factor (lb/1000 gal)	Emission Factor (lb/MMBtu)	Ref.	Activity Factor <sup>a</sup> (MMBtu/hr)	Hourly Emissions (lb/hr)	Annual Emissions <sup>c</sup> (TPY)		
Particulate Matter (PM)	1.9	1.86E-03	1	211	0.39	1.72	--	0.032	4	202	6.46	21.76	22.16	22.16
Particulate Matter (PM <sub>10</sub> )	1.9	1.86E-03	1	211	0.39	1.72	--	0.032	4	202	6.46	21.76	22.16	22.16
Sulfur dioxide (SO <sub>2</sub> )	0.6	5.88E-04	1	211	0.12	0.54	7.85	0.058	5	202	11.66	39.25	39.38	39.38
Nitrogen oxides (NO <sub>x</sub> )	--	0.055	2	211	11.61	50.83	--	0.15	2	202	30.30	102.00	113.77	113.77
Carbon monoxide (CO)	--	0.10	2	211	21.10	92.42	--	0.11	2	202	22.22	74.80	96.19	96.19
VOC	--	0.03	2	211	6.33	27.73	--	0.03	2	202	6.06	20.40	26.82	27.73
Sulfuric acid mist (SAM)	--	3.60E-05	3	211	7.60E-03	0.03	--	0.0026	6	202	0.52	1.75	1.75	1.75
Lead (Pb)	5.E-04	4.90E-07	1	211	1.03E-04	4.53E-04	--	9.00E-06	5	202	1.82E-03	6.12E-03	6.23E-03	6.23E-03
Mercury (Hg)	2.6E-04	2.55E-07	1	211	5.38E-05	2.36E-04	--	3.00E-06	5	202	6.06E-04	2.04E-03	2.09E-03	2.09E-03
Beryllium (Be)	1.2E-05	1.18E-08	1	211	2.49E-06	1.09E-05	--	3.00E-06	5	202	6.06E-04	2.04E-03	2.04E-03	2.04E-03
Fluorides (F)	--	--	--	--	--	--	--	--	--	--	--	--	--	--

## References:

- Factors for natural gas combustion from AP-42, Tables 1.4-1, 1.4-2 and 1.4-4 (7/98). Factors were converted to lb/MMBtu by dividing by 1,020 Btu/scf.
- Proposed emission limits. Based on emission guarantees from vendor.
- Based on similar derivation of sulfuric acid mist from AP-42 for fuel oil. 5% of SO<sub>2</sub> becomes SO<sub>3</sub>, then take into account the ratio of sulfuric acid mist and gaseous sulfate molecular weights (98/80).
- Based on emission test results for Boiler No. 16.
- Factors for No. 2 fuel oil combustion, AP-42 Table 1.3-1, 1.3-3, and 1.3-10 (9/98). A heating value of 136,000 Btu/gal and a maximum sulfur content of 0.05% were used for the No. 2 fuel oil.
- The emission factor for SO<sub>2</sub> emissions from a No. 2 fuel fired boiler with low NO<sub>x</sub> burners (5.75 lb/10<sup>3</sup> gal where S is the sulfur content) was multiplied by the ratio of sulfuric acid mist and gaseous sulfate molecular weights (98/80).

## Footnotes:

- <sup>a</sup> The proposed maximum permitted heat input rate is 211 MMBtu/hr for natural gas and 202 MMBtu/hr for fuel oil.
- <sup>b</sup> Based on maximum proposed operation of 8,760 hours.
- <sup>c</sup> Based on maximum proposed limit for 0.05% sulfur fuel oil of 10,000,000 gallons/yr, equivalent to 6,733 hours per year at 202 MMBtu/hr (1,360,000 MMBtu/yr).
- <sup>d</sup> Based on emissions due to maximum fuel oil usage (10,000,000 gal/yr or 1,360,000 MMBtu/yr) and the remaining due to natural gas (427,697 MMBtu/yr).
- <sup>e</sup> Maximum emissions predicted for either natural gas combustion only, No. 2 fuel oil combustion only, or a combination of No. 2 fuel oil and natural gas combustion.

## Sample Calculations:

$$\text{Hourly Emissions} = \text{Emission Factor} \times \text{Activity Factor}$$

$$\text{Annual Emissions} = \text{Hourly Emissions} \times \text{hours of operation (hrs/yr)} / 2,000 \text{ (lb/ton)}$$

$$\text{Annual Emissions due to firing both fuels} = \text{Annual Emissions due to fuel oil} + [(\text{Hourly emissions due to natural gas} \times 8,760 \text{ hrs/yr} - 6,733 \text{ hrs/yr}) / 2,000 \text{ (lb/ton)}]$$

Table 3-3. Net Emissions Increase for Modification to Okeelanta Boiler No. 16 (revised 5/30/01)

Pollutant	Net Increase in Emissions <sup>a</sup> (TPY)	PSD Significant Rate (TPY)	PSD Review Applies?
Particulate Matter (PM)	22.16	25	No
Particulate Matter (PM <sub>10</sub> )	22.16	15	Yes
Sulfur Dioxide	39.38	40	No
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Volatile Organic Compounds	27.73	40	No
Sulfuric Acid Mist	1.75	7	No
Lead	6.23E-03	0.6	No
Mercury	2.09E-03	0.1	No
Beryllium	2.04E-03	4.00E-04	Yes
Fluorides	--	3	No

<sup>a</sup> Since Boiler No. 16 has operated very little in the last several years, the current emissions from Boiler No. 16 were assumed to be zero. Thus, the net increase in emissions are equal to the future maximum emissions of Boiler No. 16.



Table 5-6. Future Operating Parameters for Boiler No. 16, Okeelanta Corporation (revised 5/30/01)

Parameter	Value	
Stack Height	75 ft	
Stack Diameter	5 ft	
Gas Flow Rate	88,200 acfm	
Velocity	75 ft/s	
Temperature	410 deg. F	
Regulated Pollutant	Hourly Emissions	
	(lb/hr)	(g/s)
Particulate Matter (PM)	6.46	0.81
Particulate Matter (PM <sub>10</sub> )	6.46	0.81
Sulfur dioxide (SO <sub>2</sub> )	11.66	1.47
Nitrogen oxides (NO <sub>x</sub> )	30.30	3.82
Carbon monoxide (CO)	22.22	2.80
VOC	6.33	0.80
Sulfuric acid mist (SAM)	0.52	0.07
Lead (Pb)	1.82E-03	2.29E-04
Mercury (Hg)	6.06E-04	7.64E-05
Beryllium (Be)	6.06E-04	7.64E-05
Fluorides (Fl)	--	--