



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

May 20, 1992

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Gordon Hartman
Director, Environmental Affairs
Tropicana Products, Inc.
P. O. Box 338
Bradenton, Florida 34206

Re: Manatee County - A.P.
Tropicana Products, Inc.
AC 41-157745 (Gas Turbine & HRSG)
AC 41-159485/PSD-FL-136 (Auxiliary Boiler)
Permit Amendment

Dear Mr. Hartman:

The Department is in agreement with Mr. K. F. Kosky's request received on March 2, 1992, to increase the sulfur dioxide emission limit when firing natural gas in the gas turbine/HRSG and the auxiliary boiler (referenced above) located at Tropicana's facility in Bradenton. The Department will make the following changes:

Gas Turbine with Heat Recovery Steam Generator
AC 41-157745/PSD-FL-136

Specific Condition No. 3

FROM: The maximum allowable emissions shall not exceed:

Unit	NO _x		CO		PM/PM ₁₀		SO ₂		VOC	
	#/hr	TPY	#/hr	TPY	#/hr	TPY	#/hr	TPY	#/hr	TPY
GT	62.6	274.3	9.1	39.8	1.5	6.6	0.24	1.07	3.6	15.9
HRSG	10.4	39.9	14.56	55.8	0.25	0.95	0.06	0.23	4.16	15.9

Note: HRSG #/hr emissions are based on 104 MMBtu/hr heat input, and the TPY emissions are based on 91 MMBtu/hr average heat input.

TO: The maximum allowable emissions shall not exceed:

Unit	NO _x		CO		PM/PM ₁₀		SO ₂		VOC	
	#/hr	TPY	#/hr	TPY	#/hr	TPY	#/hr	TPY	#/hr	TPY
GT	62.6	274.3	9.1	39.8	1.5	6.6	1.20	*2.63	3.6	15.9
HRSB	10.4	39.9	14.56	55.8	0.25	0.95	0.29	*0.60	4.16	15.9

Note: HRSB #/hr emissions are based on 104 MMBtu/hr heat input, and the TPY emissions are based on 91 MMBtu/hr average heat input.

*Although the SO₂ limit in the natural gas is being increased from 0.24 to 1.2 lbs/hr for the gas turbine, annual emissions from this source shall not exceed 2.63 tons. Similarly, the SO₂ emissions from the HRSB duct burner shall neither exceed 0.29 lbs/hr nor 0.60 TPY. In order to demonstrate compliance with the annual SO₂ limitation, the applicant shall maintain an accurate record of SO₂ content for all natural gas shipments received for the entire life of this facility. The Department may require the applicant to verify the SO₂ content of the natural gas, independently, whenever deemed necessary. Proof of compliance with the annual SO₂ emission limitation shall be submitted each year along with the annual operation report.

Auxiliary Boiler
AC 41-159485/PSD-FL-136

Specific Condition No. 4

FROM: The maximum allowable auxiliary boiler emissions shall not exceed:

	Gas (8760 hrs/yr)		Oil (1440 hrs/yr)		Max. Emissions (1440 oil + 7320 gas)
	lbs/hr	TPY	lbs/hr	TPY	TPY
NO _x	15.7	68.9	31.4	22.6	80.2
CO	19.75	86.5	20.28	14.6	86.9
PM	0.38	1.66	7.87	5.66	7.03
PM ₁₀	0.23	1.0	4.7	3.4	4.2
SO ₂	0.09	0.39	47.2	34.0	34.33
VOC	1.88	8.2	1.93	1.39	8.27

Mr. Gordon Hartman
Page 3 of 4

TO: The maximum allowable auxiliary boiler emissions shall not exceed:

	Gas (8760 hrs/yr)		Oil (1440 hrs/yr)		Max. Emissions (1440 oil + 7320 gas)
	lbs/hr	TPY	lbs/hr	TPY	TPY
NO _x	15.7	68.9	31.4	22.6	80.2
CO	19.75	86.5	20.28	14.6	86.9
PM	0.38	1.66	7.87	5.66	7.03
PM ₁₀	0.23	1.0	4.7	3.4	4.2
SO ₂	0.44*	0.97*	47.2	34.0	34.81*
VOC	1.88	8.2	1.93	1.39	8.27

*Although the SO₂ limit in the natural gas is being increased from 0.09 to 0.44 lbs/hr the annual SO₂ emissions shall not exceed 0.97 tons. In order to demonstrate compliance with the annual SO₂ limitation the applicant shall maintain an accurate record of the SO₂ content for all natural gas shipments received, for the entire life of this facility. The Department may require the applicant to verify the SO₂ content in the natural gas, independently, whenever deemed necessary. Proof of compliance with the annual SO₂ limitation shall be submitted along with the annual operating report each year.

All other conditions for the permits referenced above remain as issued. This letter must be attached to each permit and shall become a part of the permits.

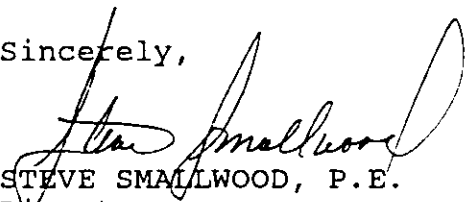
A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information:

- (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
- (b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
- (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
- (d) A statement of the material facts disputed by Petitioner, if any;
- (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
- (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and
- (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this intent in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

Sincerely,


STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

SS/MB/t

cc: B. Thomas, SW District
R. Baum, Manatee County

K. Kosky, P.E.
J. Harper, EPA

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3 and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt Fee will provide you the signature of the person delivered to and the date of delivery.

I also wish to receive the following services (for an extra fee):

- ☐ Addressee's Address
- ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Jordan Hartman, Inc.
Tropicana Products, Inc.
P.O. Box 338
Bradenton, FL 34206

4a. Article Number
P 710 058 479

4b. Service Type

<input type="checkbox"/> Registered	<input type="checkbox"/> Insured
<input checked="" type="checkbox"/> Certified	<input type="checkbox"/> COD
<input type="checkbox"/> Express Mail	<input type="checkbox"/> Return Receipt for Merchandise

7. Date of Delivery

5. Signature (Addressee)


6. Signature (Agent)


8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, November 1990 U.S. GPO: 1991-287-066 **DOMESTIC RETURN RECEIPT**

P 710 058 479

Certified Mail Receipt
 No Insurance Coverage Provided
 Do not use for International Mail
 (See Reverse)

Sent to: **Jordan Hartman**

Street & No.: **Tropicana**

P.O., State & ZIP Code: **Bradenton, FL**

Postage: \$

Certified Fee

Special Delivery Fee

Restricted Delivery Fee

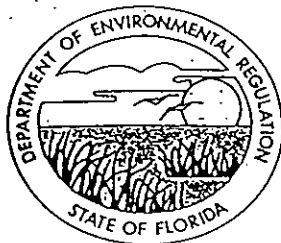
Return Receipt Showing to Whom & Date Delivered

Return Receipt Showing to Whom, Date, & Address of Delivery

TOTAL Postage & Fees: \$

Postmark or Date: **5-21-92**
AC 41-157745
159485

PS Form 3800, June 1990



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

May 29, 1991

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Thomas M. Moses, District Administrator
Reedy Creek Improvement District
P. O. Box 10170
Lake Buena Vista, Florida 32830

Re: AC 48-137740 - Gas Turbine/HRSG/Duct Burner
AC 48-105243 - EPCOT Diesel Generator No. 1
AC 48-106650 - EPCOT Diesel Generator No. 2

Dear Mr. Moses:

The Department is in agreement with your request received March 5, 1991, for increasing the sulfur dioxide emission limit when firing natural gas in the gas turbine/HRSG located at Central Energy plant at Bay Lake and also increasing the carbon monoxide emission limit from the two diesel generators at the EPCOT Center referenced above. The Department will make the following changes:

AC 48-137740
Gas Turbine and Heat Recovery Steam
Generator with Duct Burner

Specific Condition No. 5

The only change affects sulfur dioxide (SO₂) under "Gas Fired," in which the maximum allowable emissions limit is changed from 0.2 lb/hr and 0.8 TPY to 1.2 lbs/hr and 5.1 TPY.

AC 48-105243
EPCOT Center Diesel Generator No. 1

Specific Condition No. 2

The only change affects carbon monoxide, in which the maximum allowable emissions rate is changed from 1.5 lb/hr to 3.0 lbs/hr.

6/5-cc B. Kohl
B. Penn
E. Dodwin

Mr. Thomas M. Moses
Page 2 of 2

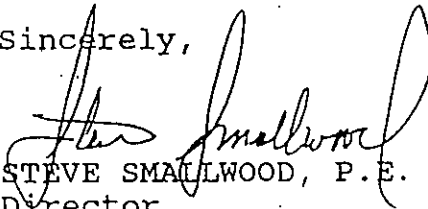
AC 48-106650
EPCOT Center Diesel Generator No. 2

Specific Condition No. 2

The only change affects carbon monoxide, in which the maximum allowable emissions rate is changed from 1.5 lb/hr to 3.0 lbs/hr.

All other conditions for the three permits referenced above remain as issued. This letter must be attached to each permit and shall become a part of the permits.

Sincerely,



STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

SS/MB/plm

c: C. Collins, Central Dist.
E. Godwin, P.E., RCES
K. F. Kosky, P.E., KBN



State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To: <u>Mirza B</u>	Location: _____
To: _____	Location: _____
To: _____	Location: _____
From: _____	Date: _____

Interoffice Memorandum

TO: Barry Andrews
Mirza Baig

THRU: Jim Pennington *JPD*

FROM: Mike Harley *MH*

DATE: June 4, 1991

SUBJ: Tropicana Products, Inc.--Combined Cycle Unit (AC 41-157745) and Auxiliary Boiler

On March 18, 1991, KBN asked the Department to amend the above referenced permits. The company's request has been reviewed and the following suggestions are offered.

1. The actual operation rate of a gas turbine is limited by the volume flow rate of gas rather than the mass flow rate of gas. In other words, the volume of gas passing through a turbine at the maximum operation rate is reasonably constant, but the mass of the gas varies in proportion to the ambient temperature. The mass emissions of the regulated pollutants are a function of the mass quantity of gas passing through the gas turbine and the mass quantity of fuel burned. Since a gas turbine most nearly approaches the maximum design operation rate as the weather becomes cooler and the ambient air becomes more dense, the emissions from the combined cycle unit should be tested during the coolest portion of the year. If the combined cycle unit is tested at a rate that is less than 90-100% of the maximum permitted operation rate, then the combined cycle unit should be restricted to the tested rate until it is retested and passes at a higher rate.
2. The requested emission changes should be reviewed to determine whether any of the applicable provisions of 40 CFR 60 Subpart Db would be violated. The permittee's projected increases in annual emissions are not acceptable. The Department usually evaluates the projected annual emission increases on the basis of maximum hourly emissions. If the permittee is willing to accept a set of federally enforceable restrictions to avoid PSD then some other value may be used. It appears that the requested emission increases would trigger PSD.

TO: Barry Andrews
Mirza Baig
DATE: June 4, 1991
PAGE: Two

3. The reported problems with the particulate emission test make it appropriate to ask the permittee to perform additional compliance testing. In addition, the requested increases in PM and PM₁₀ emissions provide the justification to request individual emission tests for both pollutants.
4. It is the permittee's responsibility to ensure that the heating value and contents of the fuel are maintained at levels that will result in compliance with the conditions of the affected permits. The requested increase in fuel sulfur content may be permissible providing the permittee is subject to the appropriate permit review procedure and measures are implemented to prevent a repeat. It is my understanding that this was the initial compliance test, so enforcement is not recommended at this time.
5. The company may elect to use either EPA Method 5, 5B, or 17 to measure particulate emissions. Either EPA Method 201 or 201A is recommended for the measurement of PM₁₀ emissions.

If you have any questions, please contact either me or Jim Pennington.

MDH/mdh



RECEIVED

MAR 18 1991

March 13, 1991

DER-BAQM

Mr. Clair H. Fancy, P.E.
Division of Air Regulation
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Tropicana Products, Inc.--Request for Modification of Construction Permits: Permit Number AC 41-157745 for the Gas Turbine (GT) and Heat Recovery Steam Generator (HRSG) and Permit Number AC 41-159485 for the Auxiliary Boiler

Dear Clair:

This correspondence presents a request on behalf of Tropicana Products, Inc., to change several conditions of the construction permits. These changes are a result of initial compliance tests performed for the GT/HRSG and auxiliary boiler. In addition, a clarification of FDER's policy of testing GTs is requested. The construction permits are valid through December 1, 1991.

For your information, the test results for the GT/HRSG duct burners and auxiliary boiler compared to the permitted amounts are presented in Tables 1 and 2, respectively. The results of the tests for each source as they relate to the permitted values are discussed in the following sections.

GAS TURBINE/HEAT RECOVERY STEAM GENERATOR

Clarification of Heat Input Testing Requirements for GT--Because a combustion turbine has air as its principal working fluid, ambient temperature affects the amount of heat input that can be achieved. The heat input for the GT during the test was 373.4 million British thermal units per hour (10^6 Btu/hr) compared to the permitted value of 425.5 10^6 Btu/hr. As noted in Table 2-2 of the prevention of significant deterioration (PSD) permit application, the maximum heat input will range from 425.5 10^6 Btu/hr for ISO design conditions, i.e., representative of winter conditions, to 373.7 10^6 Btu/hr during the summer. The compliance test was performed on September 6, 1990, under conditions representative of summer. Therefore, the heat input during the test was the maximum rate for the test conditions.

However, the performance is not within the 90 percent of the maximum heat input of 425.5 million Btu/hour. To achieve testing under a heat input of up to 90 percent of the maximum will require testing to be performed during the winter. This appears impractical since such conditions will be difficult to schedule due to changing meteorology and would likely create additional cost for tying up a testing team. Because the Tropicana GT/HRSG fires only natural gas and NO_x is



controlled at a specific ratio of steam to fuel, it appears pragmatic that testing be required at 90 percent of the maximum heat input for the specific temperature conditions during the test, i.e., summer, winter, or spring/fall. Therefore, Tropicana requests that specific condition be modified to include the following:

"Testing to determine compliance must be performed within 90 percent of the maximum heat input for the temperature conditions experienced during the compliance test."

Particulate Matter-- The particulate matter reported during the test of the GT alone exceeded the permitted emission rate of 1.5 pounds per hour (lb/hr). As stated in the test report, this was a result of oily material in the probe wash. Further communications with the testing firm suggest that the apparent particulate is likely due to impurities in the acetone used to wash the probe. The amount seems to vary with the acetone used and can account for all the reported particulate. The high flow rate and small particulate catch coupled with the potential contribution from the acetone make the results of this test questionable. In contrast, the tests performed with both the GT and HRSG duct burners operating met the permitted particulate emission rate of 1.75 lb/hr. Indeed, the reported emission rate of 1.34 lb/hr for both the GT and duct burners was less than the permitted particulate emission rate for the GT alone.

These results suggest uncertainties in the test method due to sampling large volumes of air with small amounts of particulate matter. To assure that the retest does not have any uncertainty associated with the test method, it is requested that the following modifications be made to Specific Conditions 3 and 5:

1. Change allowable PM/PM₁₀ emissions of Specific Condition 3 to 2 lb/hr (8.8 TPY) for the GT. This will increase PM/PM₁₀ emissions by 2.2 TPY which would increase total emissions of the project to 15.5 TPY for PM and 12.7 TPY for PM₁₀. Both are below the significant emission rates.
2. Change Specific Condition 5a to allow both EPA Method 5 and EPA Method 17 to be performed for determining compliance with PM and PM₁₀ conditions.

Sulfur Dioxide (SO₂)--The calculated SO₂ emissions exceed the permitted limit of 0.24 lb/hr. The construction permit application was prepared using AP-42 emission factors to estimate SO₂ emissions when burning natural gas (see Appendix C in the PSD application for calculations). This emission factor, 0.6 lb/10⁶ ft³ of gas, is lower than actual estimates of SO₂ emissions using data



obtained from Florida Gas Transmission Company (FGT). Several months of data from FGT have been summarized in Table 3. Since Tropicana Products, Inc., has no control of the sulfur in the natural gas and the amount is still relatively small, it is requested that Specific Condition 5 be adjusted as follows:

Gas Turbine

Maximum SO₂ emissions--1.2 lb/hr
(425.5 10⁶ Btu/hr x ft³/1,024 Btu x 1 gr/100 ft³ x 1 lb/7,000 gr
x 2 lb SO₂/lb S)

Average annual SO₂ emissions--2.63 TPY
(425.5 10⁶ Btu/hr x 1/1,024 Btu x 0.5 gr/100 ft³ x 1 lb/7,000 gr
x 2 lb SO₂/lb S x 4.38 TPY/lb/hr)

HRSB Duct Burner

Maximum SO₂ emissions--0.29 lb/hr
(104 10⁶ Btu/hr x 0.0028 lb SO₂/10⁶ Btu; emission factor from above)

Average annual SO₂ emissions--0.60 TPY
[97 10⁶ Btu/hr x 0.0014 lb SO₂/10⁶ Btu (emission factor from above) x
4.38 TPY/lb/hr]

Maximum and average sulfur contents of 1 gr/100 ft³ and 0.5 gr/100 ft³ were used to provide an adequate margin for the project.

AUXILIARY BOILER

Heat Input--The calculated heat input of the auxiliary boiler on natural gas firing was only slightly above (i.e., 0.8 percent) the permitted rate. This calculation was based on the higher heating value of natural gas (i.e., dry conditions), which was consistent with those presented in the permit application. However, at the actual (i.e., lower) heating value of natural gas (i.e., 1,010 Btu/ft³), the heat input would be calculated as 156.5 10⁶ Btu/hr, or within the permitted value. To assure that future calculations demonstrate compliance, it is requested that the heat input for the auxiliary boiler be rounded up to 160 10⁶ Btu/hr. As noted from the test report, the emissions for all pollutants except SO₂ were less than the permitted limits.

SO₂--As discussed previously, the actual sulfur in the natural gas is greater than the AP-42 emission factor. As a consequence, it is requested that the permit limits when firing natural gas be adjusted to the following:



Maximum SO₂ emissions--0.44 lb/hr
(157.4 10⁶ Btu/hr x 0.0028 lb SO₂/10⁶ Btu)

Average annual SO₂ emissions--0.97 TPY
(157.4 10⁶ Btu/hr x 0.0014 lb SO₂/10⁶ Btu x 4.38 TPY/lb/hr)

Increasing the operating permit limits for SO₂ for the GT/HRSG and auxiliary boiler will not affect PSD applicability. The new potential emissions from the GT/HRSG and auxiliary boiler will be 38.2 TPY, which is less than the PSD significant emission rate of 40 TPY.

If there are any questions, please call.

Sincerely,

A handwritten signature in cursive script that reads "Kennard F. Kosky".

Kennard F. Kosky, P.E.
Principal Engineer

cc: John Webb, Tropicana
Jeff Johns, Tropicana
Gordan Hartman, Tropicana
J. Harry Keins, P.E., FDER Tampa District

E. Andrews

R. Baum, Transco Co.

Table 1. Comparison of Tested and Permitted Emissions for Tropicana Gas Turbine and Heat Recovery Steam Generator (AC 41-157745)

Parameter	Units	Test Results	Permitted
<u>COMBUSTION TURBINE:</u>			
Capacity	kW	39.76	45.4 ^a
Heat Input	10 ⁶ Btu/hr	373.4 ^b 87.8%	425.5 ^a
Nitrogen Oxides	lb/hr	37.20	62.6
Carbon Monoxide	lb/hr	2.93	9.1
Volatile Organic Compounds	lb/hr	0.00	3.6
Particulate ^x	lb/hr	1.84 ^x	1.5
Visible Emissions	%	0.00	10
Sulfur Dioxide ^x	lb/hr	0.45 ^c ^x	0.24
<u>COMBUSTION TURBINE WITH DUCT BURNERS:</u>			
Capacity	kW	37.69	45.4 ^a
Heat Input - CT	10 ⁶ Btu/hr	356.02 ^b	425.5 ^a
- DB	10 ⁶ Btu/hr	95.97 ^b	104
Nitrogen Oxides - Total	lb/hr	40.69	73
- CT	lb/hr	35.49 ^d	62.6
- DB	lb/hr	5.20	10.4
Carbon Monoxide - Total	lb/hr	13.50	23.66
- CT	lb/hr	2.80 ^d	9.1
- DB	lb/hr	10.70	14.56
VOCs - Total	lb/hr	1.24	7.76
- CT	lb/hr	0.00	3.6
- DB	lb/hr	1.24	4.16
Particulate ^x - Total	lb/hr	1.34	1.75
- CT ^x	lb/hr	1.76 ^d ^x	1.5
- DB ^x	lb/hr	-0.42	0.25
Visible Emissions	%	0.00	10
Sulfur Dioxide ^x - Total	lb/hr	0.54 ^c ^x	0.30
- CT	lb/hr	0.43 ^c ^x	0.24
- DB	lb/hr	0.11 ^c ^x	0.06

^a Summer design conditions are 37.9 MW and 373.7 10⁶ Btu/hr and autumn design conditions are 41.7 MW and 408.9 10⁶ Btu/hr.

^b Based on the average high heating value (HHV) of gas; 1,024 Btu/ft³.

^c SO₂ calculated based on fuel input and an average sulfur content in gas of 0.43 gr/100 ft³.

^d Calculated based on heat input for GT and emissions from CT only test.

Table 2. Comparison of Tested and Permitted Emissions for Tropicana Auxiliary Boiler (AC 41-159485)

Parameter	Units	Test Results	Permitted
AUXILIARY BOILER WITH NATURAL GAS FIRING:			
Heat Input	10 ⁶ Btu/hr	158.7 ^a	157.4
Nitrogen Oxides	lb/hr	8.61	15.7
Carbon Monoxide	lb/hr	15.6	19.75
Volatile Organic Compounds	lb/hr	0.14	1.88
Particulate	lb/hr	--	0.23
Visible Emissions	%	0	10
Sulfur Dioxide ^x	lb/hr	0.17 ^b ^x	0.09
AUXILIARY BOILER WITH OIL FIRING:			
Heat Input	10 ⁶ Btu/hr	141.7 ^c	157.4
Nitrogen Oxides	lb/hr	15.4	31.4
Carbon Monoxide	lb/hr	0.62	20.28
Volatile Organic Compounds	lb/hr	0	1.93
Particulate	lb/hr	1.95	4.7
Visible Emissions	%	0	0
Sulfur Dioxide	lb/hr	13.0 ^d	47.2

^aBased on the average high heating value (HHV) of gas; 1,024 Btu/ft³.

^bSO₂ calculated based on fuel input and an average sulfur content in gas of 0.43 gr/100 ft³.

^cBased on HHV of oil of 141,700 Btu/gallon.

^dSO₂ calculated based on fuel input and 0.09% sulfur.

Table 3. Sulfur Content, Heat Content, and SO₂ Emission Factors for Natural Gas

Date	Sulfur Content (gr/100 cf)	Heat Content (Btu)	SO ₂ Emission Factor (lb/10 ⁶ Btu)	SO ₂ Emission Factor (lb/10 ⁶ cf)
2/6/90	0.30	1,031	0.00083	0.857
2/13/90	0.05	1,028	0.00014	0.143
2/20/90	0.35	1,025	0.00098	1.000
2/27/90	0.45	1,024	0.00126	1.286
3/6/90	0.45	1,025	0.00125	1.286
3/13/90	0.30	1,026	0.00084	0.857
3/20/90	0.35	1,026	0.00097	1.000
3/27/90	0.35	1,025	0.00098	1.000
4/3/90	0.60	1,026	0.00167	1.714
4/10/90	0.25	1,022	0.00070	0.714
4/17/90	0.40	1,026	0.00111	1.143
4/24/90	0.30	1,022	0.00084	0.857
5/1/90	0.40	1,020	0.00112	1.143
5/8/90	0.25	1,034	0.00069	0.714
5/15/90	0.20	1,023	0.00056	0.571
6/5/90	0.45	1,020	0.00126	1.286
6/12/90	0.40	1,018	0.00112	1.143
6/19/90	0.70	1,017	0.00197	2.000
6/26/90	0.45	1,019	0.00126	1.286
7/3/90	0.55	1,022	0.00154	1.571
7/10/90	0.35	1,022	0.00098	1.000
7/17/90	0.45	1,021	0.00126	1.286
7/30/90	0.30	1,021	0.00084	0.857
8/7/90	0.50	1,024	0.00140	1.429
8/14/90	0.45	1,022	0.00126	1.286
8/21/90	0.40	1,022	0.00112	1.143
8/28/90	0.70	1,022	0.00196	2.000
9/4/90	0.55	1,029	0.00153	1.571
9/11/90	0.40	1,025	0.00111	1.143
9/18/90	0.45	1,026	0.00125	1.286
9/25/90	0.40	1,026	0.00111	1.143
10/2/90	0.45	1,029	0.00125	1.286
10/9/90	0.45	1,025	0.00125	1.286
10/16/90	0.70	1,028	0.00195	2.000
10/28/90	0.80	1,024	0.00223	2.286
Average:	0.43	1,024	0.00119	1.216
Maximum:	0.80	1,034	0.00223	2.286
Minimum:	0.05	1,017	0.00014	0.143
Std. Dev.	0.15	4	0.00042	0.427

Source: Florida Gas Transmission Company, 1990.



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

June 12, 1991

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Kennard F. Kosky, P.E.
KBN Engineering & Applied Sciences, Inc.
1034 NW 57th Street
Gainesville, Florida 32605

Re: Manatee County - A.P.
Tropicana Products, Inc.
AC 41-157745 - Gas Turbine & HRSG
AC 41-159485 - Auxiliary Boiler

Dear Mr. Kosky:

The Department is in receipt of your letter dated March 13 requesting modification to the specific conditions of the above referenced projects to allow an increase in the PM/PM₁₀ and SO₂ emissions, along with a request to allow both EPA Method 5 and 17 for determining compliance with PM/PM₁₀ emissions and to modify the heat input testing requirements.

Before the Department can make a final decision on your requests, please clarify/satisfy some of the concerns raised by our Compliance Section staff (a copy of the memo is attached).

This letter must be attached to each permit and shall become a part of the permits.

Sincerely,

C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

CHF/MB/plm

Attachment

c: Gordan Hartman, TPI
J. Harry Kerns, P.E., SWD



State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To <u>Mirza B</u>	Location _____
To _____	Location _____
To _____	Location _____
From _____	Date _____

Interoffice Memorandum

TO: Barry Andrews
Mirza Baig

THRU: Jim Pennington *JPD*

FROM: Mike Harley *MH*

DATE: June 4, 1991

SUBJ: Tropicana Products, Inc.--Combined Cycle Unit (AC 41-157745) and Auxiliary Boiler

On March 18, 1991, KBN asked the Department to amend the above referenced permits. The company's request has been reviewed and the following suggestions are offered.

1. The actual operation rate of a gas turbine is limited by the volume flow rate of gas rather than the mass flow rate of gas. In other words, the volume of gas passing through a turbine at the maximum operation rate is reasonably constant, but the mass of the gas varies in proportion to the ambient temperature. The mass emissions of the regulated pollutants are a function of the mass quantity of gas passing through the gas turbine and the mass quantity of fuel burned. Since a gas turbine most nearly approaches the maximum design operation rate as the weather becomes cooler and the ambient air becomes more dense, the emissions from the combined cycle unit should be tested during the coolest portion of the year. If the combined cycle unit is tested at a rate that is less than 90-100% of the maximum permitted operation rate, then the combined cycle unit should be restricted to the tested rate until it is retested and passes at a higher rate.
2. The requested emission changes should be reviewed to determine whether any of the applicable provisions of 40 CFR 60 Subpart Db would be violated. The permittee's projected increases in annual emissions are not acceptable. The Department usually evaluates the projected annual emission increases on the basis of maximum hourly emissions. If the permittee is willing to accept a set of federally enforceable restrictions to avoid PSD then some other value may be used. It appears that the requested emission increases would trigger PSD.

TO: Barry Andrews
Mirza Baig
DATE: June 4, 1991
PAGE: Two

3. The reported problems with the particulate emission test make it appropriate to ask the permittee to perform additional compliance testing. In addition, the requested increases in PM and PM₁₀ emissions provide the justification to request individual emission tests for both pollutants.
4. It is the permittee's responsibility to ensure that the heating value and contents of the fuel are maintained at levels that will result in compliance with the conditions of the affected permits. The requested increase in fuel sulfur content may be permissible providing the permittee is subject to the appropriate permit review procedure and measures are implemented to prevent a repeat. It is my understanding that this was the initial compliance test, so enforcement is not recommended at this time.
5. The company may elect to use either EPA Method 5, 5B, or 17 to measure particulate emissions. Either EPA Method 201 or 201A is recommended for the measurement of PM₁₀ emissions.

If you have any questions, please contact either me or Jim Pennington.

MDH/mdh



RECEIVED

MAR 18 1991

March 13, 1991

DER-BAQM

Mr. Clair H. Fancy, P.E.
Division of Air Regulation
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Tropicana Products, Inc.--Request for Modification of Construction Permits: Permit Number AC 41-157745 for the Gas Turbine (GT) and Heat Recovery Steam Generator (HRSG) and Permit Number AC 41-159485, for the Auxiliary Boiler

Dear Clair:

This correspondence presents a request on behalf of Tropicana Products, Inc., to change several conditions of the construction permits. These changes are a result of initial compliance tests performed for the GT/HRSG and auxiliary boiler. In addition, a clarification of FDER's policy of testing GTs is requested. The construction permits are valid through December 1, 1991.

For your information, the test results for the GT/HRSG duct burners and auxiliary boiler compared to the permitted amounts are presented in Tables 1 and 2, respectively. The results of the tests for each source as they relate to the permitted values are discussed in the following sections.

GAS TURBINE/HEAT RECOVERY STEAM GENERATOR

Clarification of Heat Input Testing Requirements for GT--Because a combustion turbine has air as its principal working fluid, ambient temperature affects the amount of heat input that can be achieved. The heat input for the GT during the test was 373.4 million British thermal units per hour (10^6 Btu/hr) compared to the permitted value of 425.5×10^6 Btu/hr. As noted in Table 2-2 of the prevention of significant deterioration (PSD) permit application, the maximum heat input will range from 425.5×10^6 Btu/hr for ISO design conditions, i.e., representative of winter conditions, to 373.7×10^6 Btu/hr during the summer. The compliance test was performed on September 6, 1990, under conditions representative of summer. Therefore, the heat input during the test was the maximum rate for the test conditions.

However, the performance is not within the 90 percent of the maximum heat input of 425.5×10^6 Btu/hour. To achieve testing under a heat input of up to 90 percent of the maximum will require testing to be performed during the winter. This appears impractical since such conditions will be difficult to schedule due to changing meteorology and would likely create additional cost for tying up a testing team. Because the Tropicana GT/HRSG fires only natural gas and NO_x is



controlled at a specific ratio of steam to fuel, it appears pragmatic that testing be required at 90 percent of the maximum heat input for the specific temperature conditions during the test, i.e., summer, winter, or spring/fall. Therefore, Tropicana requests that specific condition be modified to include the following:

"Testing to determine compliance must be performed within 90 percent of the maximum heat input for the temperature conditions experienced during the compliance test."

Particulate Matter-- The particulate matter reported during the test of the GT alone exceeded the permitted emission rate of 1.5 pounds per hour (lb/hr). As stated in the test report, this was a result of oily material in the probe wash. Further communications with the testing firm suggest that the apparent particulate is likely due to impurities in the acetone used to wash the probe. The amount seems to vary with the acetone used and can account for all the reported particulate. The high flow rate and small particulate catch coupled with the potential contribution from the acetone make the results of this test questionable. In contrast, the tests performed with both the GT and HRSG duct burners operating met the permitted particulate emission rate of 1.75 lb/hr. Indeed, the reported emission rate of 1.34 lb/hr for both the GT and duct burners was less than the permitted particulate emission rate for the GT alone.

These results suggest uncertainties in the test method due to sampling large volumes of air with small amounts of particulate matter. To assure that the retest does not have any uncertainty associated with the test method, it is requested that the following modifications be made to Specific Conditions 3 and 5:

1. Change allowable PM/PM10 emissions of Specific Condition 3 to 2 lb/hr (8.8 TPY) for the GT. This will increase PM/PM10 emissions by 2.2 TPY which would increase total emissions of the project to 15.5 TPY for PM and 12.7 TPY for PM10. Both are below the significant emission rates.
2. Change Specific Condition 5a to allow both EPA Method 5 and EPA Method 17 to be performed for determining compliance with PM and PM10 conditions.

Sulfur Dioxide (SO₂)--The calculated SO₂ emissions exceed the permitted limit of 0.24 lb/hr. The construction permit application was prepared using AP-42 emission factors to estimate SO₂ emissions when burning natural gas (see Appendix C in the PSD application for calculations). This emission factor, 0.6 lb/10⁶ ft³ of gas, is lower than actual estimates of SO₂ emissions using data



obtained from Florida Gas Transmission Company (FGT). Several months of data from FGT have been summarized in Table 3. Since Tropicana Products, Inc., has no control of the sulfur in the natural gas and the amount is still relatively small, it is requested that Specific Condition 5 be adjusted as follows:

Gas Turbine

Maximum SO₂ emissions--1.2 lb/hr
(425.5 10⁶ Btu/hr x ft³/1,024 Btu x 1 gr/100 ft³ x 1 lb/7,000 gr
x 2 lb SO₂/lb S)

Average annual SO₂ emissions--2.63 TPY
(425.5 10⁶ Btu/hr x 1/1,024 Btu x 0.5 gr/100 ft³ x 1 lb/7,000 gr
x 2 lb SO₂/lb S x 4.38 TPY/lb/hr)

HRSB Duct Burner

Maximum SO₂ emissions--0.29 lb/hr
(104 10⁶ Btu/hr x 0.0028 lb SO₂/10⁶ Btu; emission factor from above)

Average annual SO₂ emissions--0.60 TPY
[97 10⁶ Btu/hr x 0.0014 lb SO₂/10⁶ Btu (emission factor from above) x
4.38 TPY/lb/hr]

Maximum and average sulfur contents of 1 gr/100 ft³ and 0.5 gr/100 ft³ were used to provide an adequate margin for the project.

AUXILIARY BOILER

Heat Input--The calculated heat input of the auxiliary boiler on natural gas firing was only slightly above (i.e., 0.8 percent) the permitted rate. This calculation was based on the higher heating value of natural gas (i.e., dry conditions), which was consistent with those presented in the permit application. However, at the actual (i.e., lower) heating value of natural gas (i.e., 1,010 Btu/ft³), the heat input would be calculated as 156.5 10⁶ Btu/hr, or within the permitted value. To assure that future calculations demonstrate compliance, it is requested that the heat input for the auxiliary boiler be rounded up to 160 10⁶ Btu/hr. As noted from the test report, the emissions for all pollutants except SO₂ were less than the permitted limits.

SO₂--As discussed previously, the actual sulfur in the natural gas is greater than the AP-42 emission factor. As a consequence, it is requested that the permit limits when firing natural gas be adjusted to the following:



Maximum SO₂ emissions--0.44 lb/hr
(157.4 10⁶ Btu/hr x 0.0028 lb SO₂/10⁶ Btu)

Average annual SO₂ emissions--0.97 TPY
(157.4 10⁶ Btu/hr x 0.0014 lb SO₂/10⁶ Btu x 4.38 TPY/lb/hr)

Increasing the operating permit limits for SO₂ for the GT/HRSG and auxiliary boiler will not affect PSD applicability. The new potential emissions from the GT/HRSG and auxiliary boiler will be 38.2 TPY, which is less than the PSD significant emission rate of 40 TPY.

If there are any questions, please call.

Sincerely,

A handwritten signature in cursive script that reads 'Kennard F. Kosky'.

Kennard F. Kosky, P.E.
Principal Engineer

cc: John Webb, Tropicana
Jeff Johns, Tropicana
Gordan Hartman, Tropicana
J. Harry Keins, P.E., FDER Tampa District

E. Andrews

R. Brown, Tropicana Co.

Table 1. Comparison of Tested and Permitted Emissions for Tropicana Gas Turbine and Heat Recovery Steam Generator (AC 41-157745)

Parameter	Units	Test Results	Permitted
<u>COMBUSTION TURBINE:</u>			
Capacity	kW	39.76	45.4 ^a
Heat Input	10 ⁶ Btu/hr	373.4 ^b 87.8%	425.5 ^a
Nitrogen Oxides	lb/hr	37.20	62.6
Carbon Monoxide	lb/hr	2.93	9.1
Volatile Organic Compounds	lb/hr	0.00	3.6
Particulate ^x	lb/hr	1.84 ^x	1.5
Visible Emissions	%	0.00	10
Sulfur Dioxide ^x	lb/hr	0.45 ^c ^x	0.24
<u>COMBUSTION TURBINE WITH DUCT BURNERS:</u>			
Capacity	kW	37.69	45.4 ^a
Heat Input - CT	10 ⁶ Btu/hr	356.92 ^b	425.5 ^a
- DB	10 ⁶ Btu/hr	95.97 ^b	104
Nitrogen Oxides - Total	lb/hr	40.69	73
- CT	lb/hr	35.49 ^d	62.6
- DB	lb/hr	5.20	10.4
Carbon Monoxide - Total	lb/hr	13.50	23.66
- CT	lb/hr	2.80 ^d	9.1
- DB	lb/hr	10.70	14.56
VOCs - Total	lb/hr	1.24	7.76
- CT	lb/hr	0.00	3.6
- DB	lb/hr	1.24	4.16
Particulate ^x - Total	lb/hr	1.34	1.75
- CT ^x	lb/hr	1.76 ^d ^x	1.5
- DB ^x	lb/hr	-0.42	0.25
Visible Emissions	%	0.00	10
Sulfur Dioxide ^x - Total	lb/hr	0.54 ^c ^x	0.30
- CT	lb/hr	0.43 ^c ^x	0.24
- DB	lb/hr	0.11 ^c ^x	0.06

^a Summer design conditions are 37.9 MW and 373.7 10⁶ Btu/hr and autumn design conditions are 41.7 MW and 408.9 10⁶ Btu/hr.

^b Based on the average high heating value (HHV) of gas; 1,024 Btu/ft³.

^c SO₂ calculated based on fuel input and an average sulfur content in gas of 0.43 gr/100 ft³.

^d Calculated based on heat input for GT and emissions from CT only test.

Table 2. Comparison of Tested and Permitted Emissions for Tropicana Auxiliary Boiler (AC 41-159485)

Parameter	Units	Test Results	Permitted
AUXILIARY BOILER WITH NATURAL GAS FIRING:			
Heat Input	10 ⁶ Btu/hr	158.7 ^a	157.4
Nitrogen Oxides	lb/hr	8.61	15.7
Carbon Monoxide	lb/hr	15.6	19.75
Volatile Organic Compounds	lb/hr	0.14	1.88
Particulate	lb/hr	--	0.23
Visible Emissions	%	0	10
Sulfur Dioxide ^x	lb/hr	0.17 ^b ^x	0.09
AUXILIARY BOILER WITH OIL FIRING:			
Heat Input	10 ⁶ Btu/hr	141.7 ^c	157.4
Nitrogen Oxides	lb/hr	15.4	31.4
Carbon Monoxide	lb/hr	0.62	20.28
Volatile Organic Compounds	lb/hr	0	1.93
Particulate	lb/hr	1.95	4.7
Visible Emissions	%	0	0
Sulfur Dioxide	lb/hr	13.0 ^d	47.2

^aBased on the average high heating value (HHV) of gas; 1,024 Btu/ft³.

^bSO₂ calculated based on fuel input and an average sulfur content in gas of 0.43 gr/100 ft³.

^cBased on HHV of oil of 141,700 Btu/gallon.

^dSO₂ calculated based on fuel input and 0.09% sulfur.

Table 3. Sulfur Content, Heat Content, and SO₂ Emission Factors for Natural Gas

Date	Sulfur Content (gr/100 cf)	Heat Content (Btu)	SO ₂ Emission Factor (lb/10 ⁶ Btu)	SO ₂ Emission Factor (lb/10 ⁶ cf)
2/6/90	0.30	1,031	0.00083	0.857
2/13/90	0.05	1,028	0.00014	0.143
2/20/90	0.35	1,025	0.00098	1.000
2/27/90	0.45	1,024	0.00126	1.286
3/6/90	0.45	1,025	0.00125	1.286
3/13/90	0.30	1,026	0.00084	0.857
3/20/90	0.35	1,026	0.00097	1.000
3/27/90	0.35	1,025	0.00098	1.000
4/3/90	0.60	1,026	0.00167	1.714
4/10/90	0.25	1,022	0.00070	0.714
4/17/90	0.40	1,026	0.00111	1.143
4/24/90	0.30	1,022	0.00084	0.857
5/1/90	0.40	1,020	0.00112	1.143
5/8/90	0.25	1,034	0.00069	0.714
5/15/90	0.20	1,023	0.00056	0.571
6/5/90	0.45	1,020	0.00126	1.286
6/12/90	0.40	1,018	0.00112	1.143
6/19/90	0.70	1,017	0.00197	2.000
6/26/90	0.45	1,019	0.00126	1.286
7/3/90	0.55	1,022	0.00154	1.571
7/10/90	0.35	1,022	0.00098	1.000
7/17/90	0.45	1,021	0.00126	1.286
7/30/90	0.30	1,021	0.00084	0.857
8/7/90	0.50	1,024	0.00140	1.429
8/14/90	0.45	1,022	0.00126	1.286
8/21/90	0.40	1,022	0.00112	1.143
8/28/90	0.70	1,022	0.00196	2.000
9/4/90	0.55	1,029	0.00153	1.571
9/11/90	0.40	1,025	0.00111	1.143
9/18/90	0.45	1,026	0.00125	1.286
9/25/90	0.40	1,026	0.00111	1.143
10/2/90	0.45	1,029	0.00125	1.286
10/9/90	0.45	1,025	0.00125	1.286
10/16/90	0.70	1,028	0.00195	2.000
10/28/90	0.80	1,024	0.00223	2.286
Average:	0.43	1,024	0.00119	1.216
Maximum:	0.80	1,034	0.00223	2.286
Minimum:	0.05	1,017	0.00014	0.143
Std. Dev.	0.15	4	0.00042	0.427

Source: Florida Gas Transmission Company, 1990.



STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

PM
3-29-91
Bradenton, FL

F. 1/4 Copy

March 27, 1991

RECEIVED

APR 1 1991

Mr. Clair H. Fancy, P.E.
Division of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

DER-BAQM

Subject: Manatee County response to the request for modification of Construction Permits for permits AC41-157745 Gas Turbine and heat recovery steam generator, and AC41-159485 Auxillary Boiler for Tropicana Products, Inc. in letter dated March 13, 1991.

Dear Mr. Fancy:

Clarification of Heat Input testing Requirements for GT

We agree with the proposed modification concerning compliance within 90% percent of maximum heat input based on outside temperature. This proposal is reasonable based on gas dynamics of a gas turbine engine.

Particulate Matter

We agree with items 1 and 2 as proposed. This is based on the emission levels are below significant emission rates.

Sulfur Dioxide

We do not agree with ;the emission limits as proposed. The original permit limit was calculated incorrectly because a factor of (2) two was missing (conversion factor for Sulfur to Sulfur Dioxide). This would have resulted in the original permit limits being establish at .5 lbs per hour. Based on this permit limit the emission testing would have shown that it had passed. We suggest it would be reasonable to use the maximum value of sulfur in the fuel (0.8 gr per 100 SCF) based on the actual testing to determine the emission limit. This then results in the maximum SO₂ emissions for the GT as .95 lbs/hr and the Duct Burner as .23 lbs/hr.

DISTRICT SIX

HRS MANATEE COUNTY PUBLIC HEALTH UNIT
410 SIXTH AVENUE EAST, BRADENTON, FLORIDA 34208-1986
(813) 748-0666 FAX-(813) 747-7347

LAWTON CHILES, GOVERNOR

Page 2
Manatee County Responce
March 27, 1991

Auxiliary Boiler

We agree with the increasing the heat input to 160 MBTU per hours as proposed. Again the SO₂ emission should not be based on the 1 gr per 100 SCF but on the 0.8 gr per 100 SCF as previously mentioned.

If there are any questions please call.

Sincerely,

A handwritten signature in cursive script, appearing to read "Rob Baum".

Rob Baum, P.E.
Air Quality Manager

RAB/maa

cc: Kenneth R. Rech, P.E., Director
Environmental Protection Division
Karen Collins, Environmental Service Coordinator
File



RECEIVED

MAR 18 1991

March 13, 1991

DER-BAQM

Mr. Clair H. Fancy, P.E.
Division of Air Regulation
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Tropicana Products, Inc.--Request for Modification of Construction Permits: Permit Number AC 41-157745 for the Gas Turbine (GT) and Heat Recovery Steam Generator (HRSG) and Permit Number AC 41-159485 for the Auxiliary Boiler

Dear Clair:

This correspondence presents a request on behalf of Tropicana Products, Inc., to change several conditions of the construction permits. These changes are a result of initial compliance tests performed for the GT/HRSG and auxiliary boiler. In addition, a clarification of FDER's policy of testing GTs is requested. The construction permits are valid through December 1, 1991.

For your information, the test results for the GT/HRSG duct burners and auxiliary boiler compared to the permitted amounts are presented in Tables 1 and 2, respectively. The results of the tests for each source as they relate to the permitted values are discussed in the following sections.

GAS TURBINE/HEAT RECOVERY STEAM GENERATOR

Clarification of Heat Input Testing Requirements for GT--Because a combustion turbine has air as its principal working fluid, ambient temperature affects the amount of heat input that can be achieved. The heat input for the GT during the test was 373.4 million British thermal units per hour (10^6 Btu/hr) compared to the permitted value of 425.5×10^6 Btu/hr. As noted in Table 2-2 of the prevention of significant deterioration (PSD) permit application, the maximum heat input will range from 425.5×10^6 Btu/hr for ISO design conditions, i.e., representative of winter conditions, to 373.7×10^6 Btu/hr during the summer. The compliance test was performed on September 6, 1990, under conditions representative of summer. Therefore, the heat input during the test was the maximum rate for the test conditions.

However, the performance is not within the 90 percent of the maximum heat input of 425.5 million Btu/hour. To achieve testing under a heat input of up to 90 percent of the maximum will require testing to be performed during the winter. This appears impractical since such conditions will be difficult to schedule due to changing meteorology and would likely create additional cost for tying up a testing team. Because the Tropicana GT/HRSG fires only natural gas and NO_x is



KBN ENGINEERING AND APPLIED SCIENCES, INC.

1034 Northwest 57th Street

Gainesville, Florida 32605

Mr. Clair H. Fancy, P.E.
Division of Air Regulation
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400





controlled at a specific ratio of steam to fuel, it appears pragmatic that testing be required at 90 percent of the maximum heat input for the specific temperature conditions during the test, i.e., summer, winter, or spring/fall. Therefore, Tropicana requests that specific condition be modified to include the following:

"Testing to determine compliance must be performed within 90 percent of the maximum heat input for the temperature conditions experienced during the compliance test."

Particulate Matter-- The particulate matter reported during the test of the GT alone exceeded the permitted emission rate of 1.5 pounds per hour (lb/hr). As stated in the test report, this was a result of oily material in the probe wash. Further communications with the testing firm suggest that the apparent particulate is likely due to impurities in the acetone used to wash the probe. The amount seems to vary with the acetone used and can account for all the reported particulate. The high flow rate and small particulate catch coupled with the potential contribution from the acetone make the results of this test questionable. In contrast, the tests performed with both the GT and HRSG duct burners operating met the permitted particulate emission rate of 1.75 lb/hr. Indeed, the reported emission rate of 1.34 lb/hr for both the GT and duct burners was less than the permitted particulate emission rate for the GT alone.

These results suggest uncertainties in the test method due to sampling large volumes of air with small amounts of particulate matter. To assure that the retest does not have any uncertainty associated with the test method, it is requested that the following modifications be made to Specific Conditions 3 and 5:

1. Change allowable PM/PM10 emissions of Specific Condition 3 to 2 lb/hr (8.8 TPY) for the GT. This will increase PM/PM10 emissions by 2.2 TPY which would increase total emissions of the project to 15.5 TPY for PM and 12.7 TPY for PM10. Both are below the significant emission rates.
2. Change Specific Condition 5a to allow both EPA Method 5 and EPA Method 17 to be performed for determining compliance with PM and PM10 conditions.

Sulfur Dioxide (SO₂)--The calculated SO₂ emissions exceed the permitted limit of 0.24 lb/hr. The construction permit application was prepared using AP-42 emission factors to estimate SO₂ emissions when burning natural gas (see Appendix C in the PSD application for calculations). This emission factor, 0.6 lb/10⁶ ft³ of gas, is lower than actual estimates of SO₂ emissions using data



obtained from Florida Gas Transmission Company (FGT). Several months of data from FGT have been summarized in Table 3. Since Tropicana Products, Inc., has no control of the sulfur in the natural gas and the amount is still relatively small, it is requested that Specific Condition 5 be adjusted as follows:

Gas Turbine

Maximum SO₂ emissions--1.2 lb/hr
(425.5 10⁶ Btu/hr x ft³/1,024 Btu x 1 gr/100 ft³ x 1 lb/7,000 gr
x 2 lb SO₂/lb S)

Average annual SO₂ emissions--2.63 TPY
(425.5 10⁶ Btu/hr x 1/1,024 Btu x 0.5 gr/100 ft³ x 1 lb/7,000 gr
x 2 lb SO₂/lb S x 4.38 TPY/lb/hr)

HRSG Duct Burner

Maximum SO₂ emissions--0.29 lb/hr
(104 10⁶ Btu/hr x 0.0028 lb SO₂/10⁶ Btu; emission factor from above)

Average annual SO₂ emissions--0.60 TPY
[97 10⁶ Btu/hr x 0.0014 lb SO₂/10⁶ Btu (emission factor from above) x
4.38 TPY/lb/hr]

Maximum and average sulfur contents of 1 gr/100 ft³ and 0.5 gr/100 ft³ were used to provide an adequate margin for the project.

AUXILIARY BOILER

Heat Input--The calculated heat input of the auxiliary boiler on natural gas firing was only slightly above (i.e., 0.8 percent) the permitted rate. This calculation was based on the higher heating value of natural gas (i.e., dry conditions), which was consistent with those presented in the permit application. However, at the actual (i.e., lower) heating value of natural gas (i.e., 1,010 Btu/ft³), the heat input would be calculated as 156.5 10⁶ Btu/hr, or within the permitted value. To assure that future calculations demonstrate compliance, it is requested that the heat input for the auxiliary boiler be rounded up to 160 10⁶ Btu/hr. As noted from the test report, the emissions for all pollutants except SO₂ were less than the permitted limits.

SO₂--As discussed previously, the actual sulfur in the natural gas is greater than the AP-42 emission factor. As a consequence, it is requested that the permit limits when firing natural gas be adjusted to the following:



Maximum SO₂ emissions--0.44 lb/hr
(157.4 10⁶ Btu/hr x 0.0028 lb SO₂/10⁶ Btu)

Average annual SO₂ emissions--0.97 TPY
(157.4 10⁶ Btu/hr x 0.0014 lb SO₂/10⁶ Btu x 4.38 TPY/lb/hr)

Increasing the operating permit limits for SO₂ for the GT/HRSG and auxiliary boiler will not affect PSD applicability. The new potential emissions from the GT/HRSG and auxiliary boiler will be 38.2 TPY, which is less than the PSD significant emission rate of 40 TPY.

If there are any questions, please call.

Sincerely,

A handwritten signature in cursive script, reading 'Kennard F. Kosky'.

Kennard F. Kosky, P.E.
Principal Engineer

cc: John Webb, Tropicana
Jeff Johns, Tropicana
Gordan Hartman, Tropicana
J. Harry Keins, P.E., FDER Tampa District
B. Andrews
R. Baum, Tropicana Co.

Table 1. Comparison of Tested and Permitted Emissions for Tropicana Gas Turbine and Heat Recovery Steam Generator (AC 41-157745)

Parameter	Units	Test Results	Permitted
COMBUSTION TURBINE:			
Capacity	kW	39.76	45.4 ^a
Heat Input	10 ⁶ Btu/hr	373.4 ^b	425.5 ^a
Nitrogen Oxides	lb/hr	37.20	62.6
Carbon Monoxide	lb/hr	2.93	9.1
Volatile Organic Compounds	lb/hr	0.00	3.6
Particulate	lb/hr	1.84	1.5
Visible Emissions	%	0.00	10
Sulfur Dioxide	lb/hr	0.45 ^c	0.24
COMBUSTION TURBINE WITH DUCT BURNERS:			
Capacity	kW	37.69	45.4 ^a
Heat Input - CT	10 ⁶ Btu/hr	356.92 ^b	425.5 ^a
- DB	10 ⁶ Btu/hr	95.97 ^b	104
Nitrogen Oxides - Total	lb/hr	40.69	73
- CT	lb/hr	35.49 ^d	62.6
- DB	lb/hr	5.20	10.4
Carbon Monoxide - Total	lb/hr	13.50	23.66
- CT	lb/hr	2.80 ^d	9.1
- DB	lb/hr	10.70	14.56
VOCs - Total	lb/hr	1.24	7.76
- CT	lb/hr	0.00	3.6
- DB	lb/hr	1.24	4.16
Particulate - Total	lb/hr	1.34	1.75
- CT	lb/hr	1.76 ^d	1.5
- DB	lb/hr	-0.42	0.25
Visible Emissions	%	0.00	10
Sulfur Dioxide - Total	lb/hr	0.54 ^c	0.30
- CT	lb/hr	0.43 ^c	0.24
- DB	lb/hr	0.11 ^c	0.06

^a Summer design conditions are 37.9 MW and 373.7 10⁶ Btu/hr and autumn design conditions are 41.7 MW and 408.9 10⁶ Btu/hr.

^b Based on the average high heating value (HHV) of gas; 1,024 Btu/ft³.

^c SO₂ calculated based on fuel input and an average sulfur content in gas of 0.43 gr/100 ft³.

^d Calculated based on heat input for GT and emissions from CT only test.

Table 2. Comparison of Tested and Permitted Emissions for Tropicana Auxiliary Boiler (AC 41-159485)

Parameter	Units	Test Results	Permitted
AUXILIARY BOILER WITH NATURAL GAS FIRING:			
Heat Input	10 ⁶ Btu/hr	158.7 ^a	157.4
Nitrogen Oxides	lb/hr	8.61	15.7
Carbon Monoxide	lb/hr	15.6	19.75
Volatile Organic Compounds	lb/hr	0.14	1.88
Particulate	lb/hr	--	0.23
Visible Emissions	%	0	10
Sulfur Dioxide	lb/hr	0.17 ^b	0.09
AUXILIARY BOILER WITH OIL FIRING:			
Heat Input	10 ⁶ Btu/hr	141.7 ^c	157.4
Nitrogen Oxides	lb/hr	15.4	31.4
Carbon Monoxide	lb/hr	0.62	20.28
Volatile Organic Compounds	lb/hr	0	1.93
Particulate	lb/hr	1.95	4.7
Visible Emissions	%	0	0
Sulfur Dioxide	lb/hr	13.0 ^d	47.2

^aBased on the average high heating value (HHV) of gas; 1,024 Btu/ft³.

^bSO₂ calculated based on fuel input and an average sulfur content in gas of 0.43 gr/100 ft³.

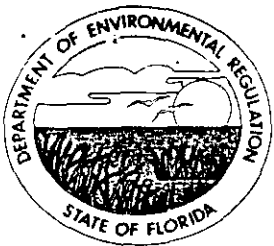
^cBased on HHV of oil of 141,700 Btu/gallon.

^dSO₂ calculated based on fuel input and 0.09% sulfur.

Table 3. Sulfur Content, Heat Content, and SO₂ Emission Factors for Natural Gas

Date	Sulfur Content (gr/100 cf)	Heat Content (Btu)	SO ₂ Emission Factor (lb/10 ⁶ Btu)	SO ₂ Emission Factor (lb/10 ⁶ cf)
2/6/90	0.30	1,031	0.00083	0.857
2/13/90	0.05	1,028	0.00014	0.143
2/20/90	0.35	1,025	0.00098	1.000
2/27/90	0.45	1,024	0.00126	1.286
3/6/90	0.45	1,025	0.00125	1.286
3/13/90	0.30	1,026	0.00084	0.857
3/20/90	0.35	1,026	0.00097	1.000
3/27/90	0.35	1,025	0.00098	1.000
4/3/90	0.60	1,026	0.00167	1.714
4/10/90	0.25	1,022	0.00070	0.714
4/17/90	0.40	1,026	0.00111	1.143
4/24/90	0.30	1,022	0.00084	0.857
5/1/90	0.40	1,020	0.00112	1.143
5/8/90	0.25	1,034	0.00069	0.714
5/15/90	0.20	1,023	0.00056	0.571
6/5/90	0.45	1,020	0.00126	1.286
6/12/90	0.40	1,018	0.00112	1.143
6/19/90	0.70	1,017	0.00197	2.000
6/26/90	0.45	1,019	0.00126	1.286
7/3/90	0.55	1,022	0.00154	1.571
7/10/90	0.35	1,022	0.00098	1.000
7/17/90	0.45	1,021	0.00126	1.286
7/30/90	0.30	1,021	0.00084	0.857
8/7/90	0.50	1,024	0.00140	1.429
8/14/90	0.45	1,022	0.00126	1.286
8/21/90	0.40	1,022	0.00112	1.143
8/28/90	0.70	1,022	0.00196	2.000
9/4/90	0.55	1,029	0.00153	1.571
9/11/90	0.40	1,025	0.00111	1.143
9/18/90	0.45	1,026	0.00125	1.286
9/25/90	0.40	1,026	0.00111	1.143
10/2/90	0.45	1,029	0.00125	1.286
10/9/90	0.45	1,025	0.00125	1.286
10/16/90	0.70	1,028	0.00195	2.000
10/28/90	0.80	1,024	0.00223	2.286
Average:	0.43	1,024	0.00119	1.216
Maximum:	0.80	1,034	0.00223	2.286
Minimum:	0.05	1,017	0.00014	0.143
Std. Dev.	0.15	4	0.00042	0.427

Source: Florida Gas Transmission Company, 1990.



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Bob Martinez, Governor

Dale Twachtmann, Secretary

John Shearer, Assistant Secretary

February 5, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Griscom Bettie, III
Tropicana Products, Inc.
P. O. Box 338
Bradenton, Florida 33506

Dear Mr. Bettie:

Re: Permit Amendment
Tropicana Products, Inc. Cogeneration Facility
Permit Nos. AC 41-157745 and AC 41-159485

The Department has reviewed your request received January 24, 1990 (attachment 10), to amend the above referenced permits' compliance test method for Volatile Organic Compounds (VOCs).

The Department is in agreement with your request and so the following shall be changed and added to the permits:

AC 41-157745, Gas Turbine and HRSG:

Specific Condition No. 5.f. Change

From: EPA Method 25 for VOC (I)

To: EPA Method 25A for VOC (I)

AC 41-159485, Auxilliary Boiler:

Specific Condition No. 6.f. Change

From: EPA Method 25 for VOC (I)

To: EPA Method 25A for VOC (I)

Attachment to be Added

10. KBN's letter received January 24, 1990.

Mr. Griscom Bettle, III
Page Two
February 5, 1990

This letter must be attached to the construction permit Nos. AC 41-157745 and AC 41-159485, and shall become a part of those permits.

Sincerely,



fr STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

DT/pr

c: B. Thomas, SW District
W. Priesmeyer, Manatee County
W. Aronson, EPA
K. Kosky, P.E., KBN