

February 08 , 1996

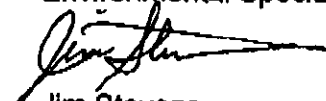
Mr. Al Linero
Director , Air Permitting
Department of Environmental Protection
Tallahassee FL.

Dear Al ,

As per our telephone conversation of today . I am sending you information that addresses the concerns about our permitted SO₂ limits. I have copied a letter from Air Consulting Engineering , our stack test team , and data from our CEM system on Unit 8 to show the calculated SO₂ values . There is a data sheet for system calculations for heat inputs from 550.620 through 611.168 MMBTU's . A copy of our permits that show our limits . Unit 7 data is similar to Unit 8 . Both are Oil and Gas units . Unit 8 is a 611 MMbtu unit and Unit 7 is a 470 MMbtu unit . Natural Gas is the Primary permitted fuel with Oil as a emergency / standby backup .

Fort Pierce Utilities would also like to see the compliance testing part of our permit changed due to Natural Gas firing of the units. We believe compliance testing for SO₂ and PM should not be required .

Fort Pierce Utilities Authority
Environmental Specialist



Jim Stevens



2108 N.W. 67th Place • Suite 4 • Gainesville, Florida • 32606
 (804) 335-1889 FAX (804) 335-1891

January 9, 1996

Ms. Raisa Neginsky
 Compliance Engineer III
 Florida Department of Environmental Protection
 Post Office Box 15425
 West Palm Beach, Florida 33416

**RE: Your letter of January 4, 1995 concerning Units 8 & 9
 Source Test Reports for Ft. Pierce Utility Authority**

Dear Ms. Neginsky:

I wish to address the concerns expressed in the referenced letter. Let me begin with a general observation regarding the sulfur content of the natural gas supplied to Florida customers. According to Mr. Michael Campo of the Florida Gas Transmission Company, gas analyses are now available on their bulletin board on a weekly basis for their customers to access. In the very near future these analysis will be made available on a daily basis. Their current Florida contract limits delivered total sulfur content to 10 grains per 100 cubic feet of gas (10 gr/CCF). The actual delivered gas averages about 0.25 gr/CCF. This includes the background sulfur content plus the reduced sulfur compounds added for odor safety reasons. There is therefore no need to test for SO₂ emissions during natural gas firing. At 0.25 gr/CCF the SO₂ emissions are calculated as follows:

$$\left(\frac{0.25 \text{ grains sulfur}}{100 \text{ cubic feet gas}} \right) \left(\frac{\text{lbs}}{7000 \text{ grains}} \right) \left(\frac{64.07 \text{ molecular weight SO}_2}{32.06 \text{ molecular weight S}} \right)$$

$$= 7.14 \times 10^{-7} \text{ lbs SO}_2/\text{CF natural gas at 14.73 psia and 60}^\circ\text{F.}$$

For Unit 8 which averaged about 575,000 SCF per hour fuel (see Appendix E of report) at ≈1035 BTU/SCF (595.1 MMBTUH) we have:

$$(570,000 \text{ SCFH Gas})(7.14 \times 10^{-7} \text{ lbs SO}_2/\text{CF}) = 0.407 \text{ lbs/Hr SO}_2$$

As you will note, this is much greater than the current permit allowable rate of 0.192 lbs/Hr SO₂.

Ms. Raisa Neginsky
 January 9, 1996
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Two things are readily apparent from this analysis. Emission limits for SO₂ should be raised and there is no need to test for SO₂ emissions on any of the sources fired with natural gas. Agreement with these two points would preclude the necessity for further debate regarding test methodology or audit samples.

However, anticipating that the need will still exist, I shall continue.

Unit 9 - SO₂

The permit for Unit 9 specifies EPA Method 20 as the NO_x/SO₂/O₂ test method. It further allows use of fuel analysis as proof of compliance with SO₂ allowable emissions. That option is taken. Applicable calculations are:

Allowable emission is 0.015% by volume at 15% O₂ dry basis. Stack gas flows from the test report averaged 20751 SCFMD at 16.0% O₂. Flow corrected to 15% O₂ is:

$$(20751) \left(\frac{20.9 - 16.0}{20.9 - 15.0} \right) = 172,373 \text{ SCFMD}$$

SO₂ allowable is: 172,373 x 0.00015 x 60 min/Hr = 1551 cubic feet/Hr SO₂

The density of SO₂ is calculated as:

$$\left(\frac{64.07 \text{ gms SO}_2}{22.4 \text{ liters}} \right) \left(\frac{492^\circ \text{R}}{528 \text{ R}} \right) \left(\frac{28.32 \text{ liters}}{\text{SCF}} \right) \left(\frac{\text{lbs}}{453.6 \text{ gms}} \right) = 0.166 \text{ lbs/SCF}$$

Allowable SO₂ emission is therefore: 0.166 lbs/SCF x 1551 CFH = 258.1 lbs/Hr SO₂

Using the attached fuel use data for September 26, 1995 between 1000 and 1600 hours, we have a natural gas usage rate of about 3.88 lbs/sec. The density for a typical analysis (attached) is calculated by (0.583)(0.076) = 0.0444 lbs/CF. The fuel flow is then calculated:

$$3.88 \text{ lbs/sec} \times \left(\frac{\text{CF}}{0.0444 \text{ lbs}} \right) \times 3600 \text{ sec/Hr} = 314,594 \text{ CFH}$$

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The heat input at 1031 BTU/CF = 324.35 MMBTUH

The downstream sulfur content (after odor control) is 0.28 gr/100 CF.

The SO₂ content will be 64.07/32.06 x 0.28 gr or 0.56 gr/100 CF

The SO₂ emission rate is calculated as:

$$(314594 \text{ CFH}) \left(\frac{0.56 \text{ grains}}{100 \text{ CF}} \right) \left(\frac{\text{lbs}}{7000 \text{ grains}} \right) = 0.252 \text{ lbs/Hr}$$

The allowable emission of 258.1 lbs/Hr SO₂ (NSPS and permit) is much greater (1000 times) than actual. Testing for SO₂ is therefore a frivolous exercise and the permit should be amended.

Unit 8 - SO₂

No SO₂ audit samples were requested or supplied by the FDEP within 30 days of the Unit 7 test. Audit samples were run for the unit 7 test of November 29, 1995 however and were deemed satisfactory by your office. The sample train used was the one allowed by option (1) of the attached excerpt from CFR Part 60, Appendix A, Method 6. The H₂O in the EPA Method 5 train is replaced with 3% peroxide and a non-reactive heated glass filter added at the probe exit. No isopropanol was used. This train is conservative in that all forms of gaseous sulfur emissions are reported as SO₂. SO₂ analysis is conducted consistent with EPA Method 8. Testing was performed correctly. The failure to obtain audit samples should not require a need to retest as we have already shown it is impossible to meet current emission restrictions. A retest that did indicate compliance emissions would be in error. The permitted allowable emissions for Units 7 and 8 should be revised and compliance should be dictated by a maximum fuel sulfur content. The emissions are really too low for accurate evaluation by EPA Method 6 or 8.

The correct SO₂ emission for the Unit 8 test should be the 0.353 lbs/Hr value. The 0.60 lbs/Hr value was erroneously calculated using the blank from Unit 9 (0.1 VTB) versus the Unit 8 blank (0.2 VTB). A sample calculation for Run 1 is as follows:

$$\text{SO}_2 \text{ lbs/SCF} = (7.065 \times 10^{-5})(\text{VT}-\text{VTB}) \left(\frac{\text{VS}}{\text{VA}} \right) (\text{N}) + \text{VS} =$$

$$(7.065 \times 10^{-5})(0.3 - 0.2) \left(\frac{400}{20} \right) (0.012987) + 41.309 = 4.40 \times 10^{-8} \text{ lbs/SCF}$$

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$$\text{lbs/Hr} = \text{lbs/SCF} \times \text{SCFMD} \times 60 = (4.40 \times 10^{-5})(151,987)(60) = 0.405 \text{ lbs/Hr}$$

Please contact me should you have additional questions regarding this matter.

Respectfully,

AIR CONSULTING AND ENGINEERING, INC.



Stephen L. Neck, P.E.

SLN/cvt

cc: Jim Stevens, Ft. Pierce Utility Authority

ACE File: 150 95 01

P.S. Please also note that PM testing for natural gas sources is an unnecessary exercise and can cause problems if a piece of boiler tube scale is captured.

PLANT USE ONLY

**FT.Pierce
Utilities Authority
Henry D. King Power Plant
Ft. Pierce, Fl.**

DAILEY REPORT Server #1

24 Hour Report For :10/28/95

Printed On :10/30/95

At :12:49:37 PM

HOUR	NOX lbmmBTU 1-Hr	NOX PPM 1-Hr	CO2 % 1-Hr	SO2 lb/hr 1-Hr	Gas Flow SCFH 1-Hr	Oil Flow GPH 1-Hr	Turbine MWGE 1-Hr
0	0.088	53.90	7.60	0.213	341,600		31.00
1	0.104	61.00	7.30	0.189	303,400		27.00
2	0.160	92.80	7.20	0.190	304,400		27.00
3	0.159	89.50	7.00	0.177	283,900		25.00
4	0.145	81.90	7.00	0.160	257,000		22.00
5	0.130	75.50	7.20	0.155	248,200		22.00
6	0.082	48.10	7.00	0.107	171,500		15.00
7	0.084	36.90	7.20	0.096	154,600		13.00
8	0.102	59.90	7.30	0.146	234,300		20.00
9	0.147	80.50	7.30	0.203	325,800		29.00
10	0.143	85.40	7.40	0.205	328,500		28.00
11	0.127	78.90	7.70	0.329	527,200		46.00
12	0.118	71.70	7.70	0.307	491,300		43.00
13	0.140	87.90	7.80	0.329	527,400		46.00
14	0.168	104.30	7.70	0.339	543,400		48.00
15	0.167	105.10	7.80	0.338	543,200		48.00
16	0.170	106.80	7.80	0.339	542,700		48.00
17	0.168	105.50	7.80	0.339	543,200		48.00
18	0.165	103.90	7.80	0.340	545,400		48.00
19	0.168	105.70	7.80	0.338	541,500		48.00
20	0.174	109.10	7.80	0.338	537,800		48.00
21	0.148	91.90	7.70	0.256	410,800		37.00
22	0.144	89.00	7.70	0.246	394,000		35.00
23	0.126	78.30	7.70	0.222	355,000		32.00
DAILY AVERAGE	0.138	83.64	7.51	0.246	394,004	0.00	34.79

FACTORS	FORMULAS
Fuel type = PIPELINE NATURAL GAS OR #6 FUEL OIL	
Emissions Limits :	

STATUS CODES:	
T = Plant Down	p = Probe Alarm
c = Calibration In Progress	& = Logged Off
\$ = Analyzer Out Of Control	r = Analyzer Recovery
m = Maintenance Mode	! = Insufficient Data For Calculation

Sheet

Gas Flows	Heat Input	SO ₂	Gas Flows	Heat Input	SO ₂	Gas Flows	Heat Input	SO ₂
532000	550.620	0.330372	566000	575.480	0.345278	580000	600.300	0.360180
532500	551.138	0.330683	566500	575.978	0.345587	580500	600.818	0.360491
533000	551.655	0.330993	567000	576.495	0.345897	581000	601.335	0.360801
533500	552.173	0.331304	567500	577.013	0.346208	581500	601.853	0.361112
534000	552.690	0.331614	568000	577.530	0.346518	582000	602.370	0.361422
534500	553.208	0.331925	568500	578.048	0.346829	582500	602.888	0.361733
535000	553.725	0.332235	569000	578.565	0.347139	583000	603.405	0.362043
535500	554.243	0.332546	569500	579.083	0.347450	583500	603.923	0.362354
536000	554.760	0.332856	570000	579.600	0.347760	584000	604.440	0.362664
536500	555.278	0.333167	570500	580.118	0.348071	584500	604.958	0.362975
537000	555.795	0.333477	571000	580.635	0.348381	585000	605.475	0.363285
537500	556.313	0.333788	571500	581.153	0.348692	585500	605.993	0.363596
538000	556.830	0.334098	572000	581.670	0.349002	586000	606.510	0.363906
538500	557.348	0.334409	572500	582.188	0.349313	586500	607.028	0.364217
539000	557.865	0.334719	573000	582.705	0.349623	587000	607.545	0.364527
539500	558.383	0.335030	573500	583.223	0.349934	587500	608.063	0.364838
540000	558.900	0.335340	574000	583.740	0.350244	588000	608.580	0.365148
540500	559.418	0.335651	574500	584.258	0.350555	588500	609.098	0.365459
541000	559.935	0.335961	575000	584.775	0.350865	589000	609.615	0.365769
541500	560.453	0.336272	575500	585.293	0.351176	589500	610.133	0.366080
542000	560.970	0.336582	576000	585.810	0.351486	590000	610.650	0.366390
542500	561.488	0.336893	576500	586.328	0.351797	590500	611.168	0.366701
543000	562.005	0.337203	577000	586.845	0.352107	591000	611.685	0.367011
543500	562.523	0.337514	577500	587.363	0.352418	591500	612.203	0.367322
544000	563.040	0.337824	578000	587.880	0.352728	592000	612.720	0.367632
544500	563.558	0.338135	578500	588.398	0.353039	592500	613.238	0.367943
545000	564.075	0.338445	579000	588.915	0.353349	593000	613.755	0.368253
545500	564.593	0.338756	579500	589.433	0.353660	593500	614.273	0.368564
546000	565.110	0.339066	570000	589.950	0.353970	594000	614.790	0.368874
546500	565.628	0.339377	570500	590.468	0.354281	594500	615.308	0.369185
547000	566.145	0.339687	571000	590.985	0.354591	595000	615.825	0.369495
547500	566.663	0.339998	571500	591.503	0.354902	595500	616.343	0.369806
548000	567.180	0.340308	572000	592.020	0.355212	596000	616.860	0.370116
548500	567.698	0.340619	572500	592.538	0.355523	596500	617.378	0.370427
549000	568.215	0.340929	573000	593.055	0.355833	597000	617.895	0.370737
549500	568.733	0.341240	573500	593.573	0.356144	597500	618.413	0.371048
550000	569.250	0.341550	574000	594.090	0.356454	598000	618.930	0.371358
550500	569.768	0.341861	574500	594.608	0.356765	598500	619.448	0.371669
551000	570.285	0.342171	575000	595.125	0.357075	599000	619.965	0.371979
551500	570.803	0.342482	575500	595.643	0.357386	599500	620.483	0.372290
552000	571.320	0.342792	576000	596.160	0.357696	600000	621.000	0.372600
552500	571.838	0.343103	576500	596.678	0.358007	600500	621.518	0.372911
553000	572.355	0.343413	577000	597.195	0.358317	601000	622.035	0.373221
553500	572.873	0.343724	577500	597.713	0.358628	601500	622.553	0.373532
554000	573.390	0.344034	578000	598.230	0.358938	602000	623.070	0.373842
554500	573.908	0.344345	578500	598.748	0.359249	602500	623.588	0.374153
555000	574.425	0.344655	579000	599.265	0.359559	603000	624.105	0.374463
555500	574.943	0.344966	579500	599.783	0.359870	603500	624.623	0.374774

PERMITTEE:
 J. H. P. Lamb
 Fort Pierce Utilities Authority
 Fort Pierce, Florida 34950

I.D. NUMBER: 50/WPB/56/0001
 PERMIT/CERTIFICATION NUMBER: AO 56-190275
 DATE OF ISSUE: MAY 7 - 1993
 EXPIRATION DATE: February 28, 1996

COPY

SPECIFIC CONDITIONS:

Compliance testing shall be conducted for the sources covered by this permit by September 1991 and annually thereafter in accordance with the methods specified below.

Emission limiting standards are as follows:

a) Units 6, 7, and 8

(1) Visible emissions shall not exceed 5% opacity while firing natural gas.

For Units 6 and 7, visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one two-minute period per hour during which opacity shall not exceed 40%.

For Unit 8 visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one six minute period per hour during which opacity shall not exceed 27%.

(2)

A) The emission limits for Units 6, 7 and 8 shall not exceed the following rates:

Parameter	Unit 6 lb/hr.	Unit 7 lb/hr.	Unit 8 lb/hr.
PM	0.4	0.568	0.945
SOx	12.38	0.1199	0.1917
NOx	1.31	104.35	173.20
VOC	0.0236	0.266	0.441
CO	0.15	7.589	12.59

B) The total emissions from combined Units 6, 7, and 8 shall not exceed:

Parameter	Tons/Yr.
PM	16.0
SOx	101.6
NOx	622.0
VOC	2.3
CO	45.3

Total combined heat input for the Units 6, 7, and 8 shall not exceed 4,534,930 MBtu per year.

PERMITTEE:
Mr. H. P. Lamb
Fort Pierce Utilities Authority
Fort Pierce, Florida 34950

I.D. NUMBER: 50/NPB/56/0003
PERMIT/CERTIFICATION NUMBER: AO 56-190275
DATE OF ISSUE: MAY 7 - 1993
EXPIRATION DATE: February 28, 1996

COPY

SPECIFIC CONDITIONS:

(3) Natural gas is the only permitted fuel for normal operation for Units 6, 7, and 8. Units 6, 7, and 8 are allowed to burn natural gas with a No. 6 fuel oil (0.8 lbs SOx/MBtu) as a standby fuel for up to a combined total of 400 hours per year, when necessary in order to avoid curtailing electric power service to its customers. FPUA must notify the DER within 24 hours after commencement of oil firing and furnish the following information:

- a. Duration or projected duration of the event.
- b. Quantity of fuel oil burned or projected to be burned.
- c. A description of significant circumstances precipitating the event, which shall include:
 - i. Availability of power for purchase
 - ii. Availability of electric transmission capacity relating to power purchases.
 - iii. Availability of natural gas
 - iv. Availability of FPUA generation sources.

(4) When burning fuel oil in Units 6, 7, and 8, the emission rates set forth in Specific Condition 2(a)2.A above shall not apply and the following rates shall apply to Units 6, 7, and 8:

Parameter	Unit 6 lb/MBTU	Unit 7 lb/MBTU	Unit 8 lb/MBTU
SOx	0.80	0.80	0.80
PM	n/a	0.1	0.1
VOC	n/a	n/a	n/a

(5) Unit 8

1. Continuous emission monitors are required for nitrogen oxides and oxygen.
2. Quarterly excess emissions reports pursuant to 40CFR60 shall be submitted to the Southeast District Office postmarked no later than the 30th day following the end of each calendar quarter.

(6) Diesels 1 and 2

Visible emissions shall not exceed 20 percent opacity while using No. 2 fuel oil.