File

RECEIVED

JAN 21 2000

BUREAU OF AIR REGULATION

CF Industries, Inc. (CFII)
Plant City Phosphate Complex
Title V Permit No. 0570005-007-AV
Construction Permit Application
A & B Phosphoric Acid Units
Attachment 1

P.O. Drawer L.
Plant City, Florida 33564-9007
Telephone: 813/782-1591

CF Industries, Inc.
Plant City Phosphate Complex

July 2, 1999

Mr. Jerry Kissel
Florida Department of
Environmental Protection
3804 Coconut Palm Drive
Tampa, FL 33619-8318

SUBJECT: COMPLIANCE TEST - "A" PAP
Permit No. 0570005-007-AV
Emission Unit 004

Dear Mr. Kissel:

Enclosed are duplicate copies of the two recent compliance tests conducted at CF Industries, Inc., Plant City Phosphate Complex, on "A" Phosphoric Acid Plant. The tests were performed at the rates specified in FDEP's letter dated May 26, 1999, and otherwise in accordance with the conditions of Air Permit No. 0570005-007-AV. The approved elevated operating rates and the extra testing were in support of a permit application submitted to the FDEP on June 11, 1999.

If there are any questions concerning the results, please give Michael Messina a call at 813-782-1591, ext. 290.

Sincerely,

Thomas A. Edwards
T.A. Edwards,
Superintendent, Environmental Affairs

TAE/JHF/gm
u:\envrpt\225960.doc
Enclosures

cc: J.M. Messina
T.V. Ortoski
Sterlin Woodard/HCEPC

PERMIT NO. 0570005-007-AV

EMISSION UNIT 004

CF INDUSTRIES, INC.

PLANT CITY PHOSPHATE COMPLEX

"A" PHOSPHORIC ACID PRODUCTION

PLANT CITY, FLORIDA

June 22 & 23, 1999

TEST CONDUCTED BY:

Laboratory
CF INDUSTRIES, INC.
Plant City Phosphate Complex
Plant City, Florida 33564

INTRODUCTION:

The Environmental Control Laboratory of CF Industries, Inc., Plant City Phosphate Complex, conducted emission tests at "A" Phosphoric Acid Production Facility in Plant City, Florida on June 22 and 23, 1999. Six sixty minute (60) test runs were performed. The purpose of the tests was to obtain emission data demonstrating compliance with the State of Florida DEP performance standards at operating rates applied for in a permit aplication submitted on June 11, 1999. All results were within the permitted limits.

The measurements were made for fluoride, opacity and moisture at the stack outlet to the atmosphere.

Complete results are given in APPENDIX "A".

PROCESS DESCRIPTION

Phosphoric Acid is made by reacting sulfuric acid with phosphate rock along with a given amount of water to make an acid slurry. The mixing of sulfuric acid, rock and water takes place in a continuous reactor.

The principal reaction takes place as follows:

$$Ca_3(PO_4)_2 + 3H_2SO_4 + 2\ H_2O \text{ ------> } 3\ CaSO_4 \cdot 2H_2O + 2H_3PO_4$$

Other Reactions as follows:

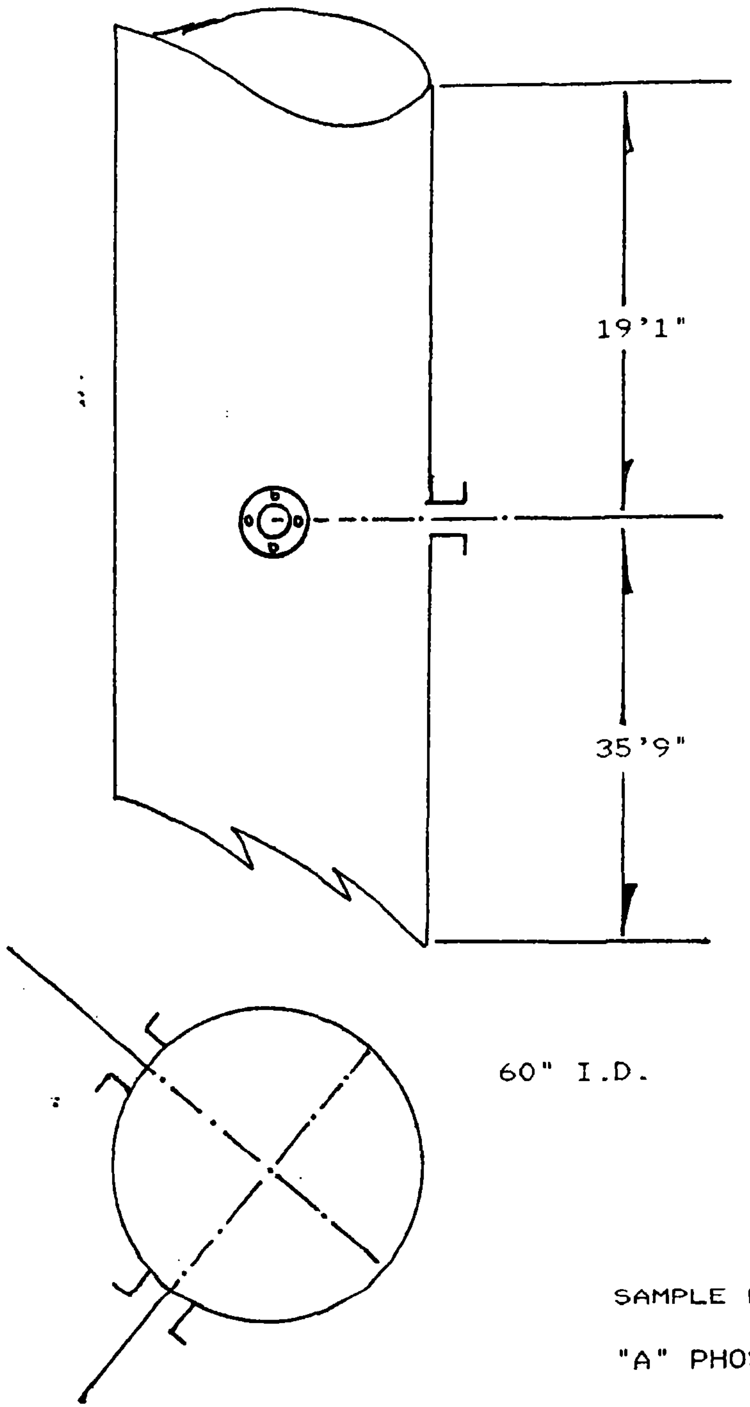
$$CaF_2 + H_2SO_4 + 2H_2O \text{ ------> } CaSO_4 \cdot 2\ H_2O + 2\ HF$$

$$4HF + SiO_2 \text{ ------> } SiF_4 + 2H_2O$$

The resulting Phosphoric Acid will be 28 to 30% P_2O_5 content. This 28 to 30% P_2O_5 Phosphoric Acid solution will be further concentrated by evaporators until the acid strength reaches 52 to 54% P_2O_5.

LOCATION OF SAMPLING POINTS

The sampling sites and number of traverse points were selected as per Figure 1-2 EPA Method 1 specified in 40 CFR 60, Appendix A.



Traverse Point Number	Distance from inside wall
1	1.56
2	4.92
3	8.76
4	13.56
5	20.52
6	39.48
7	46.44
8	51.24
9	55.08
10	58.44

FIGURE 1

SAMPLE POINT DESCRIPTION

"A" PHOSPHORIC ACID STACK

SAMPLING AND ANALYTICAL PROCEDURES

The methods described in EPA Methods 1, 2, 3, 4, 9 and 13B contained in 40 CFR 60, Appendix A and adopted by reference in Chapter 62-297.401 F.A.C. are used when testing during compliance by CF Industries, Inc.

APPENDIX "A"

EMISSION CALCULATIONS AND RESULTS

CF INDUSTRIES, INC.
PLANT CITY PHOSPHATE COMPLEX

SOURCE SAMPLING NOMENCLATURE SHEET

Pb	=	Barometric pressure, in Hg
Ps	=	Stack pressure, in Hg
As	=	Stack area, sq. ft.
As'	=	Effective area of positive stack gas flow, sq. ft.
Ts	=	Stack temperature 'R'
Tm	=	Meter temperature "R
Δ Pavg	=	Average square root of velocity head in. H_2O
Cp	=	S-typye pitot tube correction factor
Kp	=	85.48 ft/sec (lb mole - ^oR) 1/2
Ms	=	Molecular weight of gas at stack conditions
Md	=	Molecular weight of gas at dry conditions
Bwo	=	Proportion by volume of water vapor in gas stream
Vwstd	=	Volume of water vapor in gas sample
V_{ic}	=	Total volume of liquid collected in impinger & silica jel
PH_2O	=	Density of water 1 gm/ml
MH_2O	=	Molecular weight of water 18 lb/lb mole
R	=	Ideal gas constant, 28.83 in. Hg-cu ft/lb-mole ^oR
Tstd	=	Absolute temp. at standard conditions, 528 ^oR
Pstd	=	Absolute pressure at standard conditions, 29.92 in. Hg.
Vmstd	=	Volume of gas sample through dry gas meter (standard condtions) cu. ft.
Vm	=	Volume of gas sample through the dry gas meter (meter condition) cu. ft.
ΔH	=	Orifice pressure of sampling meter
S.T.P.	=	Standard condition, dry, 528 ^oR, 29.92 in. Hg
An	=	Sampling nozzle area, square feet
Vs	=	Velocity of stack gas, feet per second
Qs	=	Volumetric flow rate, dry basis, standard conditions, CFM
Cs	=	Concentration of particulate matter in stack gas, gr/SCF
Cf	=	Concentration of fluoride in stack gas gr/SCF
Mf	=	Total amount of fluoride collected, mg
Mn	=	Total amount of particulate matter collected, mg
I	=	Percent isokinetic volume sampled
0	=	Sampling time

$$Vwstd = 0.04707\ cuft/ml\ (V_1)$$

$$Vmstd = Vm \left(\frac{Tstd}{Tm} \right) \left(\frac{Pbar + \frac{\Delta H}{13.6}}{Pstd} \right)$$

$$Bwo = \frac{Vwstd}{Vwstd + Vmstd}$$

$$Ms = Md\ (1 - Bwo) + 18\ (Bwo)$$

$$Vs(avg) = Kp\ Cp\ \sqrt{P(avg)}\ \sqrt{\frac{460 + Ts}{Ms\ Ps}}$$

$$Qs = 60\ (1 - Bwo)\ Vs\ As \left(\frac{Tstd}{Ts} \right) \left(\frac{Ps}{Pstd} \right)$$

PERCENT ISOKINETIC

$$I = \frac{Ts\ (1.667) \left[(0.00267)\ V_1 + \left(\frac{Tstd}{Tm} \right) Pbar + \frac{\Delta H}{13.6} \right]}{\theta\ Vs\ Ps\ An}$$

$$Cs = 0.0154\ grs/mg\ \frac{Mf\ or\ Mn}{Vmstd}$$

$$lbs/hr = (Cs \times Qs \times 60)\ /\ 7000$$

$$lbs/day = lbs/hr \times 24\ hrs/day$$

J. H. Falls
3/15/93

A PAP

Permit No. 0570005-007-AV
Emission Unit 004

RUN NUMBER	1	2	3	4	5	6
DATE	22-Jun-99	22-Jun-99	22-Jun-99	23-Jun-99	23-Jun-99	23-Jun-99
TIME START	10:30 AM	12:15 PM	1:45 PM	10:20 AM	1:55 PM	3:25 PM
TIME END	11:45 AM	1:25 PM	3:00 PM	11:30 AM	3:05 PM	4:40 PM
BP, INCHES Hg	30.05	30.05	30.05	30.01	30.01	30.01
STACK PRESSURE, INCHES Hg	30.10	30.09	30.07	30.08	30.03	30.00
AVG.SQ.ROOT(VEL. HEAD) IN Hg	0.846	0.809	0.788	0.839	0.811	0.797
ORIFICE PRESS. OF METER, IN WATER	3.71	3.45	3.34	3.34	3.45	3.35
AVG STACK ,F	118.2	121.4	122.2	117.9	122.0	123.7
STACK, DRY BULB	118.2	121.4	122.2	117.9	122.0	123.7
METER TEMPERATURE, F	100.7	112.7	116.9	97.2	112.4	116.9
VOL. OF GAS, DM CONDITIONS, FT3	51.974	50.509	49.740	49.461	51.067	50.506
VOL. GAS, STP, DRY COND. FT3	49.602	47.164	46.095	47.395	47.647	46.745
STACK GAS MOISTURE, % VOLUME	7.89	8.38	8.33	7.39	8.26	8.66
MW OF STACK GAS, DRY COND.	28.85	28.85	28.85	28.85	28.85	28.85
MW OF STACK GAS, STACK COND.	27.99	27.94	27.95	28.05	27.95	27.91
PITOT CORRECTION FACTOR	0.84	0.84	0.84	0.84	0.84	0.84
STACK GAS VELOCITY, STACK COND. FT3/SEC	50.32	48.31	47.10	49.86	48.49	47.78
STACK AREA, FT2	19.63	19.63	19.63	19.63	19.63	19.63
EFFECTIVE STACK AREA, FT2	19.63	19.63	19.63	19.63	19.63	19.63
STACK GAS FLOW-RATE AT STP, SCFMD	50149	47610	46345	49952	47706	46624
NET TIME OF TEST, MINUTES	60	60	60	60	60	60
SAMPLE NOZZLE AREA, FT2	0.000324	0.000324	0.000324	0.000324	0.000324	0.000324
PERCENT ISOKINETIC	99.9	100.1	100.5	95.8	100.9	101.3
FLUORIDE, MG.	2.92	2.92	2.99	2.44	2.83	3.01
FLUORIDE, LB/HR	0.39	0.39	0.40	0.34	0.37	0.40
FLUORIDE, LB/DAY	9.35	9.34	9.52	8.15	8.98	9.51
FLUORIDE, LB/HR/LIMIT	**1.18**	**1.18**	**1.18**	**1.18**	**1.18**	**1.18**
FLUORIDE, LB/DAY/LIMIT	**28.3**	**28.3**	**28.3**	**28.3**	**28.3**	**28.3**
PRODUCTION RATE, TPH P2O5 (INPUT)	64.2	64.1	65.3	65.3	65.4	65.8
PRODUCTION RATE, TPH/TARGET	**65.0**	**65.0**	**65.0**	**65.0**	**65.0**	**65.0**
PRODUCTION RATE, TPD P2O5 (INPUT)	1541	1538	1567	1567	1570	1579
PRODUCTION RATE, TPD/TARGET	**1560**	**1560**	**1560**	**1560**	**1560**	**1560**
PHOSPHATE ROCK SLURRY,TPH	340.33	339.38	337.51	337.30	339.30	340.44
100% SULFURIC ACID, TPH	158.24	163.16	170.85	159.31	175.21	208.84
WATER, TPH	12.63	12.61	12.85	12.85	12.88	12.94
LBS F/TON OF P2O5 (INPUT)	0.006	0.006	0.006	0.005	0.006	0.006
LBS F/TON OF P2O5/LIMIT	**0.020**	**0.020**	**0.020**	**0.020**	**0.020**	**0.020**
VISIBLE EMISSIONS	0%					
VISIBLE EMISSIONS LIMIT	**20%**					

EMISSION CALCULATIONS

Date: June 22, 1999 Unit: A PAP Run no. 1

Vwstd = 0.04707 Cuft/ml x (v1)

= 0.04707 Cuft/ml x 90.3 ml

= **4.250** Cuft.

$$Vmstd = Vm \frac{[\ Tstd\ ]}{[Tm + 460]} \frac{[Pbar + (\wedge H / 13.6)]}{[\ Pstd\ ]} Yi$$

$$= 51.974 \text{ Cuft} \times \frac{[\ 528\ ]}{[460 + 100.7]} \times \frac{[(30.05 + (3.71/ 13.6))] \times 1.00}{[\ 29.92\ ]}$$

= **49.602** Cuft.

$$Bwo = \frac{Vwstd}{Vwstd + Vmstd}$$

$$\frac{4.250}{4.250 + 49.602} \times 100$$

7.89 %

Ms = Md (1 - Bwo) + 18 (Bwo)

= 28.85 x (1 - 0.0789) + 18 x 0.0789

= **27.99**

$$Vs\ (avg) = Kp\ Cp \sqrt{P(avg)} \sqrt{(460 + Ts) / (Ms\ Ps)}$$

$$= 85.48 \times .84 \times 0.8460 \times \sqrt{(460 + 118.2) / (27.99 \times 30.10)}$$

= **50.32** ft/sec

Qs = 60 (1 - Bwo) VsAs (Tstd / Ts) (Ps / Pstd)

= 60 (1 - 0.0789) x 50.32 x 19.63 x (528 / (460 + 118.2) x (30.10 / 29.92)

= **50,149** scfm

Cs = 0.0154 grs/mg x (total mg of sample) / Vmstd

= 0.0154 grs/mg x 2.92 mg / 49.602 cuft

= **0.0009** grs/cuft

lbs/hr = (Cs x Qs x 60 min/hr) / 7000 grs/lb

= (0.0009 x 50149 x 60) / 7000

= **0.39** lbs/hr Fluoride

lbs/day = lbs/hr x 24 hrs/day

= 0.39 x 24

= **9.35** lbs/day Fluoride

Percent Isokinetic:

$$I = \frac{Ts\ (1.667)\ ((0.00267)\ V1) + (Vm / Tm)\ ((Pbar + (\text{^}H / 13.6)))}{0\ Vs\ Ps\ An}$$

$$= \frac{(460 + 118.2)\ (1.667)\ ((0.00267 \times 90.3) + (51.974 / (460+100.7)) \times ((30.05 + (3.71 / 13.6)))}{60 \times 50.32 \times 30.10 \times 0.000324}$$

= **99.9** %

EMISSION CALCULATIONS

Date: June 23, 1999 | Unit: A PAP | Run no. 4

$$Vwstd = 0.04707 \text{ Cuft/ml} \times (v1)$$

$$= 0.04707 \text{ Cuft/ml} \times 80.4 \text{ ml}$$

$$= \mathbf{3.784} \text{ Cuft.}$$

$$Vmstd = Vm \frac{[\ Tstd\ ]}{[\ Tm + 460]} \frac{[\ Pbar + (\wedge H / 13.6)\ ]}{[\ Pstd\ ]} Yi$$

$$= 49.461 \text{ Cuft} \times \frac{[\ 528\ ]}{[460 + 97.2]} \times \frac{[(30.01 + (3.34/13.6))] \times 1.00}{[\ 29.92\ ]}$$

$$= \mathbf{47.395} \text{ Cuft.}$$

$$Bwo = \frac{Vwstd}{Vwstd + Vmstd}$$

$$\frac{3.784}{3.784 + 47.395} \times 100$$

$$\mathbf{7.39}\ \%$$

$$Ms = Md\ (1 - Bwo) + 18\ (Bwo)$$

$$= 28.85 \times (1 - 0.0739) + 18 \times 0.0739$$

$$= \mathbf{28.05}$$

$$Vs\ (avg) = Kp\ Cp \sqrt{P(avg)} \sqrt{(460 + Ts) / (Ms\ Ps)}$$

$$= 85.48 \times .84 \times 0.8390 \times \sqrt{(460 + 117.9) / (28.05 \times 30.08)}$$

$$= \mathbf{49.86} \text{ ft/sec}$$

$$Qs = 60\ (1 - Bwo)\ VsAs\ (Tstd / Ts)\ (Ps / Pstd)$$

$$= 60\ (1 - 0.0739) \times 49.86 \times 19.63 \times (528 / (460 + 117.9) \times (30.08 / 29.92)$$

$$= \mathbf{49{,}952} \text{ scfm}$$

Cs = 0.0154 grs/mg x (total mg of sample) / Vmstd

= 0.0154 grs/mg x 2.44 mg / 47.395 cuft

= **0.0008** grs/cuft

lbs/hr = (Cs x Qs x 60 min/hr) / 7000 grs/lb

= (0.0008 x 49952 x 60) / 7000

= **0.34** lbs/hr Fluoride

lbs/day = lbs/hr x 24 hrs/day

= 0.34 x 24

= **8.15** lbs/day Fluoride

Percent Isokinetic:

$$I = \frac{Ts\ (1.667)\ ((0.00267)\ V1) + (Vm / Tm)\ ((Pbar + (\wedge H / 13.6)))}{0\ Vs\ Ps\ An}$$

$$= \frac{(460 + 117.9)\ (1.667)\ ((0.00267 \times 80.4) + (49.461 / (460+97.2)) \times ((30.01 + (3.34 / 13.6)))}{60 \times 49.86 \times 30.08 \times 0.000324}$$

= **95.8** %

DATE 6-22-95 SAMPLING TIME: FROM 10:30AM TO 3:00PM

STATEMENT OF PROCESS WEIGHT:

COMPANY NAME CF INDUSTRIES, INC., PLANT CITY PHOSHATE COMPLEX
MAILING ADDRESS P.O. DRAWER L, PLANT CITY, FL. 33564
SOURCE IDENTIFICATION APAP PRODUCTION FACILITY
SOURCE LOCATION APAP PRODUCTION STACK

DATA ON OPERATING CYCLE TIME:

	Run # 1	Run # 2	Run # 3	
START OF OPERATION, TIME	10:30AM	12:15PM	1:45PM	
END OF OPERATION, TIME	11:45AM	1:25PM	3:00PM	
ELAPSED TIME	75 MIN.	70 MIN.	75 MIN	
IDLE TIME DURING CYCLE	0	0	0	

Type of Scrubber Liquid POND WATER

Liquid flow rate, gpm		Run # 1	Run # 2	Run # 3	
	Average	1870	1876	1868	
	High	1876	1876	1868	
	Low	1864	1876	1868	

Liquid water pressure, psig		Run # 1	Run # 2	Run # 3	
	Average	52	52	52	
	High	52	52	52	
	Low	52	52	52	

Total gas pressure drop, "w.g.		Run # 1	Run # 2	Run # 3	
	Average	11.25	11.5	11.5	
	High	11.5	11.5	11.5	
	Low	11.0	11.5	11.5	

DESIGN PROCESS RATING:

PROCESS WEIGHT RATE (INPUT) 1416 T/D PRODUCT(OUTPUT) T/D

DATA ON ACTUAL PROCESS RATE DURING OPERATION CYCLE:
(Include specifications on fossil fuels)

			Run # 1	Run # 2	Run # 3	
MATERIAL	PHOS ROCK SLURRY	RATE*,TPH	340.33	339.38	337.51	
MATERIAL	100% SULFURIC	RATE*,TPH	158.24	163.16	170.85	
MATERIAL	WATER	RATE*,TPH	12.63	12.61	12.85	
PRODUCT (TOTAL PROCESS WEIGHT RATE*)		RATE*,TPH	511.20	515.15	521.21	
INPUT RATE, TPH P2O5			64.19	64.10	65.31	
		TPD	1540.5	1538.5	1567.5	

*For phosphate process expressed as actual tons/hour and as tons of P2O5/hour.
For fossil fuel steam generators expressed as btu/hour heat input.
**For sulfuric acid plants expressed as 100% H2SO4/hour.

I certify that the above statement is true to the best of my knowledge and belief:

Signature [signature]

Title Prod'n Eng

06-16-94(jhf)

DATE 6-23-99 SAMPLING TIME: FROM 10:20 AM TO 4:40 PM

STATEMENT OF PROCESS WEIGHT:

COMPANY NAME CF INDUSTRIES, INC., PLANT CITY PHOSHATE COMPLEX
MAILING ADDRESS P.O. DRAWER L, PLANT CITY, FL. 33564
SOURCE IDENTIFICATION A PAP PRODUCTION FACILITY
SOURCE LOCATION A PAP PRODUCTION STACK

DATA ON OPERATING CYCLE TIME:

	Run # 1	Run # 2	Run # 3	
START OF OPERATION, TIME	10:20 AM	1:55 PM	3:25 PM	
END OF OPERATION, TIME	11:30 AM	3:05 PM	4:40 PM	
ELAPSED TIME	70 MIN.	70 MIN.	75 MIN.	
IDLE TIME DURING CYCLE	0	0	0	

Type of Scrubber Liquid Pond Water

Liquid flow rate, gpm					
	Average	1872.5	1833	1833	
	High	1875	1833	1833	
	Low	1870	1833	1833	

Liquid water pressure, psig					
	Average	52	52	52	
	High	52	52	52	
	Low	52	52	52	

Total gas pressure drop, "w.g.					
	Average	11.0	11.0	11.0	
	High	11.0	11.0	11.0	
	Low	11.0	11.0	11.0	

DESIGN PROCESS RATING:

PROCESS WEIGHT RATE (INPUT) 1416 T/D PRODUCT(OUTPUT) T/D

DATA ON ACTUAL PROCESS RATE DURING OPERATION CYCLE:
(Include specifications on fossil fuels)

		Run # 1	Run # 2	Run # 3	
MATERIAL Phos Rock Slurry	RATE*,TPH	337.30	339.30	340.44	
MATERIAL 100% Sulfuric	RATE*,TPH	159.31	175.21	208.84	
MATERIAL Water	RATE*,TPH	12.85	12.88	12.94	
TOTAL PROCESS WEIGHT RATE* PRODUCT Phosphoric Acid Slurry	RATE*,TPH	509.46	527.39	562.22	
INPUT RATE, TPH P2O5		65.29	65.44	65.79	
	TPD	1567	1570.5	1579	

*For phosphate process expressed as actual tons/hour and as tons of P2O5/hour.
For fossil fuel steam generators expressed as btu/hour heat input.
**For sulfuric acid plants expressed as 100% H2SO4/hour.

I certify that the above statement is true to the best of my knowledge and belief:

Signature [signature]

Title Prod'n Eng.

14.

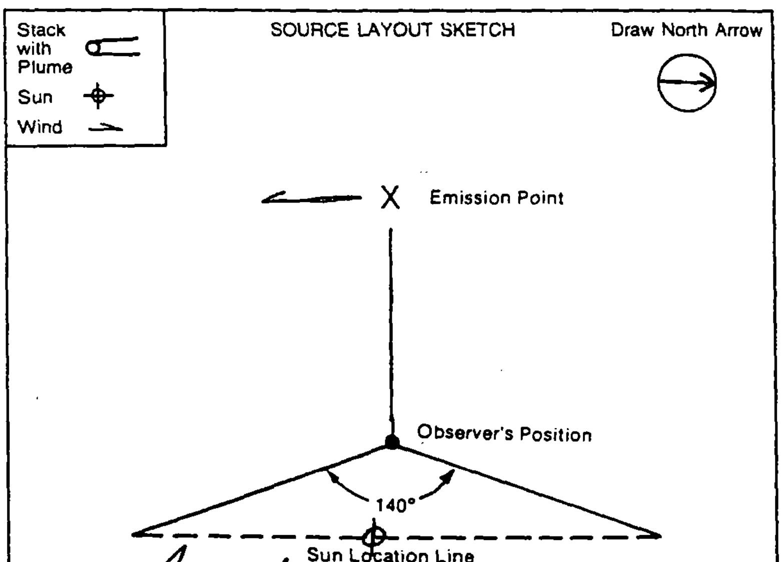
06-16-94(jhf)

VISIBLE EMISSION OBSERVATION FORM

No. 1

COMPANY NAME	CF Industries, Inc. Plant City Complex
STREET ADDRESS	10608 Paul Buchman Highway 10 miles north of Plant City
CITY	Plant City
STATE	FL
ZIP	33564
PHONE (KEY CONTACT)	(813) 782-1591 (Ext. 290)
SOURCE ID NUMBER	057000 004
PROCESS EQUIPMENT	A Phosphoric Acid Production Facility
OPERATING MODE	Normal
CONTROL EQUIPMENT	Packed bed scrubber with KinRay packing
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	Circular stack opening 5 feet in diameter
HEIGHT ABOVE GROUND LEVEL	85'
HEIGHT RELATIVE TO OBSERVER	Start ~85' End ~85'
DISTANCE FROM OBSERVER	Start ~200' End ~200'
DIRECTION FROM OBSERVER	Start W End W
DESCRIBE EMISSIONS	Start None End None
EMISSION COLOR	Start NA End NA
IF WATER DROPLET PLUME	Attached ☐ Detached ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	Start ~5' from stack End ~5' from stack
DESCRIBE PLUME BACKGROUND	Start Scattered sky End Scattered sky
BACKGROUND COLOR	Start Blue, gray, white End Blue, gray, white
SKY CONDITIONS	Start Scattered End Scattered
WIND SPEED	Start 4-8 mph End 8-12 mph
WIND DIRECTION	Start N End NW
AMBIENT TEMP	Start 87°F End 88°F
WET BULB TEMP	
RH, percent	72

SOURCE LAYOUT SKETCH



ADDITIONAL INFORMATION

Harold Falls
Chief Chemist

OBSERVATION DATE	START TIME	END TIME
6/22/99	1035	1105

MIN \ SEC	0	15	30	45	COMMENTS
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT)	Lloyd G. Camp
OBSERVER'S SIGNATURE	Lloyd G. Camp
DATE	6/22/99
ORGANIZATION	CF Industries, Inc. Plant City Complex
CERTIFIED BY	Eastern Technical Associates
DATE	2/24/99
CONTINUED ON VEO FORM NUMBER	2

VISIBLE EMISSION OBSERVATION FORM

No. 2

COMPANY NAME: CF Industries, Inc. Plant City Complex

STREET ADDRESS: 10608 Paul Buchman Highway
10 miles north of Plant City

CITY	STATE	ZIP
Plant City	FL	33564

PHONE (KEY CONTACT)	SOURCE ID NUMBER
(813)782-1591 (Ext. 290)	057000 004

PROCESS EQUIPMENT	OPERATING MODE
A Phosphoric Acid Production Facility	Normal

CONTROL EQUIPMENT	OPERATING MODE
Packed bed scrubber with Kin Ray packing	Normal

DESCRIBE EMISSION POINT: Circular stack opening 5 feet in diameter

HEIGHT ABOVE GROUND LEVEL	HEIGHT RELATIVE TO OBSERVER
85'	Start ~85' End ~85'

DISTANCE FROM OBSERVER	DIRECTION FROM OBSERVER
Start ~200' End ~200'	Start W End W

DESCRIBE EMISSIONS: Start None End None

EMISSION COLOR	IF WATER DROPLET PLUME
Start NA End NA	Attached ☐ Detached ☐

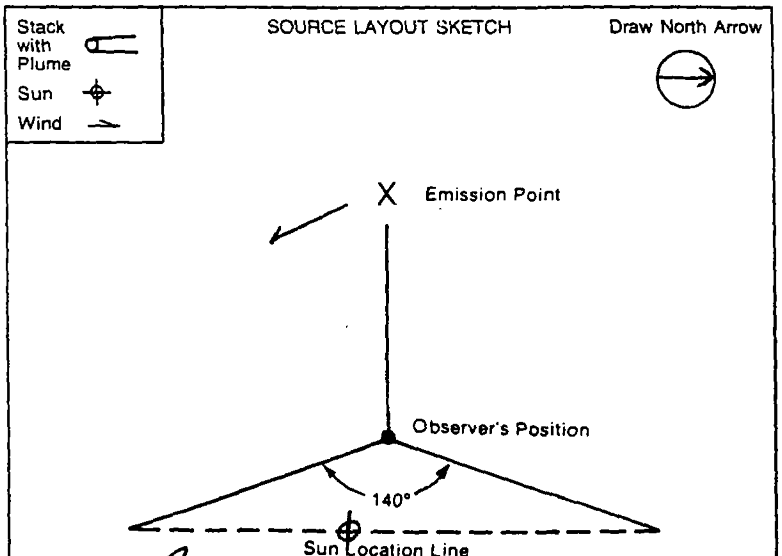
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start ~5' from stack End ~5' from stack

DESCRIBE PLUME BACKGROUND: Start Scattered sky End Scattered sky

BACKGROUND COLOR	SKY CONDITIONS
Start Blue, gray, white End Blue, gray, white	Start Scattered End Scattered

WIND SPEED	WIND DIRECTION
Start 8-12 mph End 10-14 mph	Start NW End NW

AMBIENT TEMP	WET BULB TEMP	RH, percent
Start 88°F End 89°F		66



ADDITIONAL INFORMATION: [signature] Chief Chemist

OBSERVATION DATE	START TIME	END TIME
6/22/99	1105	1135

MIN \ SEC	0	15	30	45	COMMENTS
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): Lloyd G. Camp

OBSERVER'S SIGNATURE	DATE
Lloyd G. Camp	6/22/99

ORGANIZATION: CF Industries, Inc. Plant City Complex

CERTIFIED BY	DATE
Eastern Technical Associates	2/24/99

CONTINUED ON VEO FORM NUMBER

APPENDIX "B"

FIELD DATA

C011

METHOD 5 FIELD DATA

Run 1

Plant Site: Plant City, FL
Sampling Location: A PAP

Date: 06/22/1999
Stack ID (in): 60.00

Pt	Time min	Volume ft3	System Vacuum inHg	Delta P inH2O	Delta H inH2O	Ti °F	To °F	Ts °F	Tf °F	Timp °F
1	3.0	2.585	2.52	0.756	3.578	87.08	87.56	115.12	244.47	67.16
2	6.0	5.301	2.81	0.802	3.878	88.94	88.18	116.35	244.70	56.23
3	9.0	8.011	2.87	0.794	3.884	90.90	89.24	117.24	245.54	54.51
4	12.0	10.249	2.09	0.540	2.879	92.40	90.35	117.44	244.81	58.03
5	15.0	11.846	1.27	0.273	2.083	93.33	91.67	117.58	245.67	62.49
6	18.0	14.749	3.36	1.003	4.563	94.52	92.68	117.74	245.43	62.18
7	21.0	17.866	3.61	1.033	4.886	96.88	93.94	117.77	244.76	58.43
8	24.0	20.770	3.13	0.893	4.330	99.15	95.63	118.46	245.72	59.83
9	27.0	23.525	2.82	0.797	3.972	100.97	97.33	118.41	245.26	60.76
10	30.0	26.113	2.49	0.698	3.553	102.49	98.88	118.43	245.49	61.10
11	33.0	28.494	2.08	0.605	3.131	103.54	103.13	114.94	240.62	60.88
12	36.0	31.139	2.55	0.763	3.651	105.03	103.73	118.84	247.18	54.47
13	39.0	33.845	2.69	0.752	3.792	106.54	104.70	119.43	243.71	55.58
14	42.0	35.999	1.88	0.475	2.711	107.63	105.64	119.73	245.81	58.06
15	45.0	37.517	1.16	0.232	1.998	108.18	106.52	119.70	244.44	61.72
16	48.0	39.902	2.21	0.609	3.164	108.74	107.21	119.49	245.89	60.50
17	51.0	42.927	3.27	0.939	4.543	109.95	107.92	119.40	244.70	58.70
18	54.0	46.007	3.35	0.961	4.659	111.41	108.75	119.36	245.20	59.48
19	57.0	49.116	3.42	0.984	4.762	112.94	109.81	119.30	245.67	60.04
20	60.0	51.974	2.90	0.820	4.102	114.27	110.93	119.23	244.75	60.78

‡C011©

METHOD 5 FIELD DATA

Run 2

Plant Site: Plant City, FL
Sampling Location: A PAP

Date: 06/22/1999
Stack ID (in): 60.00

Pt	Time	Volume	System Vacuum	Delta P	Delta H	Ti	To	Ts	Tf	Timp
	min	ft3	inHg	inH2O	inH2O	°F	°F	°F	°F	°F
1	3.0	2.501	2.07	0.652	3.270	111.05	110.91	118.42	240.91	68.03
2	6.0	5.112	2.28	0.694	3.487	111.15	110.67	120.95	246.80	57.74
3	9.0	7.655	2.23	0.654	3.343	111.44	110.53	121.28	244.74	56.96
4	12.0	9.647	1.53	0.393	2.409	111.59	110.42	121.33	244.84	60.83
5	15.0	10.832	0.82	0.139	1.604	111.44	110.37	121.02	245.76	64.99
6	18.0	13.606	2.65	0.893	4.060	111.40	110.32	121.03	245.37	63.04
7	21.0	16.606	2.92	0.914	4.415	112.22	110.49	120.98	245.46	62.98
8	24.0	19.438	2.62	0.805	3.972	112.93	110.77	120.73	245.49	63.36
9	27.0	22.148	2.42	0.739	3.691	113.81	111.37	120.87	245.54	62.80
10	30.0	24.522	1.95	0.562	2.981	114.32	111.97	120.70	245.48	62.69
11	33.0	26.833	1.88	0.572	2.914	112.54	111.99	119.17	239.90	64.62
12	36.0	29.376	2.21	0.646	3.356	113.20	112.25	121.48	247.26	58.60
13	39.0	32.028	2.37	0.702	3.541	113.95	112.55	121.97	244.54	59.46
14	42.0	34.269	1.86	0.502	2.734	114.25	112.67	122.39	244.86	62.16
15	45.0	36.018	1.38	0.391	2.315	114.20	112.82	122.35	244.28	64.66
16	48.0	38.454	2.13	0.580	3.107	114.45	113.09	121.79	246.80	59.98
17	51.0	41.394	2.87	0.885	4.270	114.98	113.33	122.99	244.28	55.33
18	54.0	44.431	3.00	0.928	4.471	115.87	113.66	123.14	246.04	54.77
19	57.0	47.559	3.17	0.979	4.707	116.89	114.21	122.96	244.33	55.34
20	60.0	50.509	2.88	0.874	4.273	117.68	114.77	122.71	244.52	56.22

‡C011©

METHOD 5 FIELD DATA

Run 3

Plant Site: Plant City, FL
Sampling Location: A PAP

Date: 06/22/1999
Stack ID (in): 60.00

Pt	Time min	Volume ft3	System Vacuum inHg	Delta P inH2O	Delta H inH2O	Ti °F	To °F	Ts °F	Tf °F	Timp °F
1	3.0	2.451	2.10	0.614	3.136	115.54	115.20	118.73	241.58	68.96
2	6.0	5.103	2.49	0.702	3.539	115.89	115.10	120.68	246.68	59.34
3	9.0	7.508	2.16	0.574	3.018	116.42	115.27	121.21	244.62	61.89
4	12.0	9.619	1.80	0.458	2.638	116.65	115.30	121.82	246.03	64.42
5	15.0	10.860	0.91	0.146	1.666	116.32	115.12	122.42	245.16	62.12
6	18.0	13.591	2.70	0.837	3.902	116.02	114.92	122.66	246.02	59.38
7	21.0	16.547	2.98	0.872	4.246	116.59	114.95	122.75	244.71	59.31
8	24.0	19.326	2.66	0.766	3.810	117.43	115.33	122.63	245.24	61.86
9	27.0	21.900	2.37	0.658	3.382	118.01	115.75	122.53	246.18	60.50
10	30.0	24.136	1.88	0.493	2.709	118.20	116.07	122.36	245.26	59.68
11	33.0	26.476	1.98	0.561	2.925	116.61	115.95	118.72	242.43	60.77
12	36.0	29.031	2.31	0.656	3.328	117.28	116.15	122.74	248.80	51.85
13	39.0	31.707	2.51	0.706	3.572	117.90	116.34	123.22	243.80	50.92
14	42.0	33.934	1.93	0.493	2.722	118.25	116.48	123.56	245.68	50.86
15	45.0	35.518	1.24	0.243	2.007	118.42	116.80	123.54	245.52	53.10
16	48.0	37.968	2.27	0.628	3.187	118.35	116.88	123.55	245.81	52.80
17	51.0	40.986	3.14	0.910	4.408	118.82	117.02	123.29	244.93	53.18
18	54.0	44.025	3.16	0.912	4.444	119.88	117.50	122.44	241.84	53.53
19	57.0	47.101	3.24	0.939	4.576	120.93	118.06	122.22	248.68	53.12
20	60.0	49.740	2.50	0.684	3.506	121.55	118.57	122.31	245.08	54.42

♦C011©

METHOD 5 FIELD DATA

Run 4

Plant Site: Plant City, FL
Sampling Location: A PAP

Date: 06/23/1999
Stack ID (in): 60.00

Pt	Time min	Volume ft3	System Vacuum inHg	Delta P inH2O	Delta H inH2O	Ti °F	To °F	Ts °F	Tf °F	Timp °F
1	3.0	2.541	2.42	0.732	3.450	85.51	85.92	114.72	239.36	65.53
2	6.0	5.227	2.78	0.789	3.739	87.03	86.57	117.77	246.12	58.67
3	9.0	7.864	2.69	0.748	3.586	88.70	87.61	118.44	244.34	59.47
4	12.0	10.092	2.03	0.527	2.747	90.30	88.90	118.55	243.35	62.27
5	15.0	11.586	1.14	0.231	1.909	91.32	90.00	118.19	245.32	64.46
6	18.0	14.413	3.10	0.921	4.187	92.51	90.94	117.98	244.89	61.35
7	21.0	17.517	3.57	1.028	4.769	94.69	92.15	117.81	245.49	57.69
8	24.0	20.402	3.06	0.875	4.182	96.65	93.51	118.19	244.98	54.89
9	27.0	23.074	2.65	0.753	3.675	98.17	94.92	118.37	245.03	54.25
10	30.0	25.502	2.23	0.609	3.117	99.10	96.00	118.24	245.05	55.80
11	33.0	28.024	2.34	0.695	3.334	98.57	97.85	117.64	239.52	59.66
12	36.0	30.718	2.66	0.752	3.666	100.11	98.35	117.76	246.41	54.03
13	39.0	33.359	2.60	0.726	3.549	101.55	99.25	117.90	244.59	54.36
14	42.0	35.561	1.96	0.498	2.694	102.51	100.17	118.17	245.36	56.19
15	45.0	37.100	1.20	0.239	1.951	102.91	101.04	118.28	245.73	58.19
16	48.0	39.643	2.49	0.711	3.433	103.46	101.73	118.25	245.63	56.50
17	51.0	42.682	3.33	0.960	4.537	104.80	102.42	118.02	245.31	55.65
18	54.0	44.378	1.24	1.008	1.525	106.41	103.79	118.11	245.42	57.65
19	57.0	46.792	2.52	0.987	3.188	108.36	105.60	118.01	245.49	57.43
20	60.0	49.461	2.66	0.715	3.636	110.92	106.87	118.16	245.17	56.21

‡C011©

METHOD 5 FIELD DATA

Run 5

Plant Site: Plant City, FL
Sampling Location: A PAP

Date: 06/23/1999
Stack ID (in): 60.00

Pt	Time min	Volume ft3	System Vacuum inHg	Delta P inH2O	Delta H inH2O	Ti °F	To °F	Ts °F	Tf °F	Timp °F
1	3.0	2.379	2.03	0.584	2.848	107.20	107.77	117.43	245.48	78.68
2	6.0	4.982	2.42	0.690	3.309	106.74	107.71	120.04	245.77	66.92
3	9.0	7.558	2.44	0.666	3.270	107.18	107.82	120.96	245.24	63.15
4	12.0	9.599	1.75	0.416	2.380	107.74	107.94	120.96	245.65	63.61
5	15.0	10.737	0.88	0.127	1.427	108.25	108.19	120.86	245.76	65.29
6	18.0	13.519	2.88	0.884	3.990	108.73	108.61	121.37	246.19	62.75
7	21.0	16.606	3.34	0.968	4.566	109.73	109.04	121.98	245.96	59.21
8	24.0	19.630	3.21	0.918	4.375	111.22	109.71	122.31	245.38	60.37
9	27.0	22.445	2.86	0.800	3.917	112.65	110.66	122.51	245.81	60.12
10	30.0	25.081	2.55	0.692	3.485	113.69	111.50	122.31	246.16	59.10
11	33.0	27.742	2.57	0.740	3.580	114.09	113.42	122.65	241.70	60.09
12	36.0	30.352	2.51	0.677	3.404	115.04	113.79	123.48	248.71	53.75
13	39.0	32.943	2.52	0.666	3.372	115.66	114.01	123.17	244.36	56.87
14	42.0	35.101	1.95	0.455	2.585	116.25	114.44	123.29	246.28	58.32
15	45.0	36.624	1.27	0.220	1.925	116.28	114.70	123.30	245.01	60.20
16	48.0	38.979	2.28	0.585	2.989	116.10	114.83	123.12	244.90	59.29
17	51.0	41.915	3.14	0.855	4.164	116.59	114.95	122.85	246.76	58.19
18	54.0	44.933	3.32	0.909	4.419	117.65	115.37	122.49	245.63	59.07
19	57.0	48.051	3.48	0.955	4.645	118.75	115.94	122.20	245.60	60.32
20	60.0	51.067	3.33	0.895	4.391	119.84	116.61	121.93	246.09	61.69

*C011©

METHOD 5 FIELD DATA

Run 6

Plant Site: Plant City, Fl
Sampling Location: A PAP

Date: 06/23/1999
Stack ID (in): 60.00

Pt	Time min	Volume ft3	System Vacuum inHg	Delta P inH2O	Delta H inH2O	Ti °F	To °F	Ts °F	Tf °F	Timp °F
1	3.0	2.633	2.33	0.706	3.482	116.48	115.94	121.87	244.39	64.48
2	6.0	5.283	2.41	0.691	3.507	116.91	115.86	122.03	245.43	55.93
3	9.0	7.937	2.49	0.695	3.523	117.37	115.91	122.49	245.51	57.30
4	12.0	10.057	1.76	0.433	2.541	117.54	115.91	122.54	245.85	61.24
5	15.0	11.773	1.40	0.351	2.246	117.30	115.88	122.57	245.78	66.25
6	18.0	14.617	2.78	0.797	3.958	117.50	115.93	123.31	245.89	57.39
7	21.0	17.670	3.10	0.923	4.453	118.14	116.09	123.77	245.95	54.63
8	24.0	20.535	2.76	0.806	3.978	118.88	116.37	123.87	244.30	56.03
9	27.0	23.214	2.47	0.703	3.553	119.26	116.56	123.79	246.51	56.58
10	30.0	25.549	1.99	0.535	2.864	119.24	116.67	123.62	245.25	56.67
11	33.0	28.152	2.32	0.696	3.420	117.00	116.11	123.70	238.16	56.82
12	36.0	30.830	2.46	0.710	3.542	117.33	116.07	124.65	248.47	50.97
13	39.0	33.458	2.42	0.682	3.423	117.59	115.91	124.63	242.14	53.44
14	42.0	35.683	1.90	0.482	2.658	117.85	116.09	124.77	247.52	57.04
15	45.0	37.074	1.08	0.183	1.782	117.39	115.88	124.54	243.03	62.07
16	48.0	39.214	1.85	0.471	2.569	117.00	115.75	124.50	247.10	60.69
17	51.0	41.924	2.61	0.736	3.637	117.09	115.74	124.75	245.06	56.45
18	54.0	44.841	2.95	0.840	4.103	117.65	115.85	124.52	246.00	55.91
19	57.0	47.919	3.20	0.937	4.496	118.20	115.98	124.27	244.66	57.07
20	60.0	50.506	2.42	0.650	3.339	118.69	116.25	124.03	245.05	59.04

‡☺‡C011☺

METHOD 5 LEAK TEST DATA

Plant Site: Plant City, FL Sampling Location: A PAP

Date: 06/22/1999 Stack ID: 004

Test	Leak Rate ft3/min	Sys Vac Pressure inHg	Initial Vol ft3	Final Vol ft3
Run #1: 1 10:20AM	0.01190	16.22	0.07200	0.08800
2 11:55AM	0.01190	6.64	52.00700	52.04200
Run #2: 3 12:05PM	0.01190	6.41	52.06100	52.08100
4 1:35PM	0.01190	6.64	50.54200	50.56600
Run #3: 5 1:40PM	0.01190	5.77	50.58500	50.60200
6 3:10PM	0.01190	6.61	49.77100	49.78800
7	0.00000	0.00	0.00000	0.00000
8	0.00000	0.00	0.00000	0.00000

*C011©

METHOD 5 LEAK TEST DATA

Plant Site: Plant City, FL

Sampling Location: A PAP

Date: 06/23/1999

Stack ID: 004

Test	Leak Rate ft3/min	Sys Vac Pressure inHg	Initial Vol ft3	Final Vol ft3
RUN #4 < 1 10:15AM EK	0.01190	16.28	0.07600	0.08400
2 11:40AM EK	0.01190	6.73	49.49300	49.50800
RUN #5 < 3 1:50PM EK	0.01190	5.81	49.52700	49.57400
4 3:15PM EK	0.01190	6.69	51.10100	51.11600
RUN #6 < 5 3:20PM EK	0.01330	5.90	51.13600	51.20900
6 4:45PM EK	0.01190	6.68	50.53700	50.70400
7	0.00000	0.00	0.00000	0.00000
8	0.00000	0.00	0.00000	0.00000

CF INDUSTRIES, INC.

PLANT CITY PHOSPHATE COMPLEX
LABORATORY ANALYSIS RECORD

DATE	22-Jun-99
TIME	10:30 - 11:45
STACK	A PAP
RUN	#1

MOISTURE CONTENTS

IMPINGER	#1	#2	#3	#4
WEIGHT AFTER RUN, GRAMS	727.7	676.3	582.1	891.7
WEIGHT BEFORE RUN, GRAMS	670.4	658.6	578.1	880.4
WEIGHT GAIN/LOSS, GRAMS	57.3	17.7	4.0	11.3
TOTAL WEIGHT GAIN, GRAMS	90.3			

SAMPLE SOLUTIONS ANALYSIS	F
VOLUME OF SAMPLE, ML	1000
CONCENTRATION, UG/ML	2.92
TOTAL WEIGHT POLLUTANT, MGS	2.92

ANALYST Lloyd D. Camp

padcomp.xls

CF INDUSTRIES, INC.

PLANT CITY PHOSPHATE COMPLEX
LABORATORY ANALYSIS RECORD

DATE	22-Jun-99
TIME	12:15 - 13:25
STACK	A PAP
RUN	#2

MOISTURE CONTENTS

IMPINGER	#1	#2	#3	#4
WEIGHT AFTER RUN, GRAMS	750.3	675.3	570.3	865.2
WEIGHT BEFORE RUN, GRAMS	685.0	659.4	568.7	856.4
WEIGHT GAIN/LOSS, GRAMS	65.3	15.9	1.6	8.8
TOTAL WEIGHT GAIN, GRAMS	91.6			

SAMPLE SOLUTIONS ANALYSIS	F
VOLUME OF SAMPLE, ML	1000
CONCENTRATION, UG/ML	2.92
TOTAL WEIGHT POLLUTANT, MGS	2.92

ANALYST Lloyd De Camp

padcomp.xls

CF INDUSTRIES, INC.

PLANT CITY PHOSPHATE COMPLEX
LABORATORY ANALYSIS RECORD

DATE	22-Jun-99
TIME	13:45 - 15:00
STACK	A PAP
RUN	#3

MOISTURE CONTENTS

IMPINGER	#1	#2	#3	#4
WEIGHT AFTER RUN, GRAMS	737.6	694.2	578.8	859.3
WEIGHT BEFORE RUN, GRAMS	675.5	678.2	575.5	851.7
WEIGHT GAIN/LOSS, GRAMS	62.1	16.0	3.3	7.6
TOTAL WEIGHT GAIN, GRAMS	89.0			

SAMPLE SOLUTIONS ANALYSIS	F
VOLUME OF SAMPLE, ML	1000
CONCENTRATION, UG/ML	2.99
TOTAL WEIGHT POLLUTANT, MGS	2.99

ANALYST Lloyd D. Camp

padcomp.xls

CF INDUSTRIES, INC.

PLANT CITY PHOSPHATE COMPLEX
LABORATORY ANALYSIS RECORD

DATE	23-Jun-99
TIME	10:20 - 11:30
STACK	A PAP
RUN	#4

MOISTURE CONTENTS

IMPINGER	#1	#2	#3	#4
WEIGHT AFTER RUN, GRAMS	735.1	673.5	575.7	865.5
WEIGHT BEFORE RUN, GRAMS	678.6	659.6	572.1	859.1
WEIGHT GAIN/LOSS, GRAMS	56.5	13.9	3.6	6.4
TOTAL WEIGHT GAIN, GRAMS	80.4			

SAMPLE SOLUTIONS ANALYSIS	F
VOLUME OF SAMPLE, ML	1000
CONCENTRATION, UG/ML	2.44
TOTAL WEIGHT POLLUTANT, MGS	2.44

ANALYST Floyd D. Camp

padcomp.xls

CF INDUSTRIES, INC.

PLANT CITY PHOSPHATE COMPLEX
LABORATORY ANALYSIS RECORD

DATE	23-Jun-99
TIME	13:55 - 15:05
STACK	A PAP
RUN	#5

MOISTURE CONTENTS

IMPINGER	#1	#2	#3	#4
WEIGHT AFTER RUN, GRAMS	738.3	673.7	587.7	878.0
WEIGHT BEFORE RUN, GRAMS	668.7	659.3	586.3	872.3
WEIGHT GAIN/LOSS, GRAMS	69.6	14.4	1.4	5.7
TOTAL WEIGHT GAIN, GRAMS	91.1			

SAMPLE SOLUTIONS ANALYSIS	F
VOLUME OF SAMPLE, ML	1000
CONCENTRATION, UG/ML	2.83
TOTAL WEIGHT POLLUTANT, MGS	2.83

ANALYST Lloyd B. Camp

padcomp.xls

CF INDUSTRIES, INC.

PLANT CITY PHOSPHATE COMPLEX
LABORATORY ANALYSIS RECORD

DATE	23-Jun-99
TIME	15:25 - 16:40
STACK	A PAP
RUN	#6

MOISTURE CONTENTS

IMPINGER	#1	#2	#3	#4
WEIGHT AFTER RUN, GRAMS	741.4	694.4	580.0	860.0
WEIGHT BEFORE RUN, GRAMS	675.2	677.8	576.3	852.4
WEIGHT GAIN/LOSS, GRAMS	66.2	16.6	3.7	7.6
TOTAL WEIGHT GAIN, GRAMS	94.1			

SAMPLE SOLUTIONS ANALYSIS	F
VOLUME OF SAMPLE, ML	1000
CONCENTRATION, UG/ML	3.01
TOTAL WEIGHT POLLUTANT, MGS	3.01

ANALYST Lloyd D. Camp

padcomp.xls

SAMPLE CHAIN OF CUSTODY

Plant Name CF INDUSTRIES, INC. PLANT CITY PHOSPHATE COMPLEX

Source Identification "A" PHOSPHORIC ACID PRODUCTION FACILITY

Date Sampled: JUNE 22, 1999 Sampling Time: 10:30 AM to 3:00 PM

Test for MOISTURE, FLUORIDE AND VISIBLE EMISSION

SAMPLE RECOVERY

Sample Run	Description
1	#1 COLD BOX ASSEMBLY
2	#2 COLD BOX ASSEMBLY
3	#3 COLD BOX ASSEMBLY

Person engaged in sample recoveries:

Signature [signature]

Title ANALYST II

Location at which recovery "A" PHOSPHORIC ACID STACK

Laboratory person receiving samples:

Signature Lloyd D. Camp

Title "A" CLASS TECHNICIAN

ANALYSIS

Constituent	Method	Date	Time	Signature(s)
MOISTURE	EPA METHOD 4	6/22/99	12:15 - 15:30	Lloyd D. Camp
FLUORIDE	EPA METHOD 13 B	6/22/99	12:35 - 15:54	Lloyd D. Camp
VISIBLE EMISSION	EPA METHOD 9	6/22/99	10:35 - 11:35	Lloyd D. Camp

custody.xls

SAMPLE CHAIN OF CUSTODY

Plant Name CF INDUSTRIES, INC. PLANT CITY PHOSPHATE COMPLEX

Source Identification "A" PHOSPHORIC ACID PRODUCTION FACILITY

Date Sampled: JUNE 23, 1999 Sampling Time: 10:20 AM to 4:40 PM

Test for MOISTURE AND FLUORIDE

SAMPLE RECOVERY

Sample Run	Description
1	#1 COLD BOX ASSEMBLY
2	#2 COLD BOX ASSEMBLY
3	#3 COLD BOX ASSEMBLY

Person engaged in sample recoveries:

Signature [signature]

Title ANALYST II

Location at which recovery "A" PHOSPHORIC ACID STACK

Laboratory person receiving samples:

Signature Lloyd D. Camp

Title "A" CLASS TECHNICIAN

ANALYSIS

Constituent	Method	Date	Time	Signature(s)
MOISTURE	EPA METHOD 4	6/23/99	12:00 - 17:10	Lloyd D. Camp
FLUORIDE	EPA METHOD 13B	6/23/99	13:02 - 17:40	Lloyd D. Camp

custody.xls

ANDERSEN
INSTRUMENTS INCORPORATED

DATE 7-14-98

TO WHOM IT MAY CONCERN:

THIS CERTIFIES THAT S-TYPE PITOT TUBES CONSTRUCTED AND CALIBRATED BY ANDERSEN INSTRUMENTS INC. COMPLY WITH PROCEDURES PROVIDED IN THE U.S. ENVIRONMENTAL PROTECTION AGENCY REFERENCE METHOD 2-DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE, VOL. 42, NO. 160 THURSDAY, AUGUST 18, 1977. ANDERSEN INSTRUMENTS INC. CERTIFIES THAT AT TIME OF SHIPMENT BASELINE COEFFICIENT VALUES OF 0.84 MAY BE ASSIGNED TO THE PITOT TUBES.

Nathan D. Canup

NATHAN D. CANUP
SERVICE MANAGER

ANDERSEN INSTRUMENTS INC.
A Subsidiary of Thermo Instruments Systems Inc.
500 TECHNOLOGY COURT, SMYRNA, GA 30082-5211, USA
TEL: 770 319 9999 - 800 241 6898 FAX: 770 319 0336

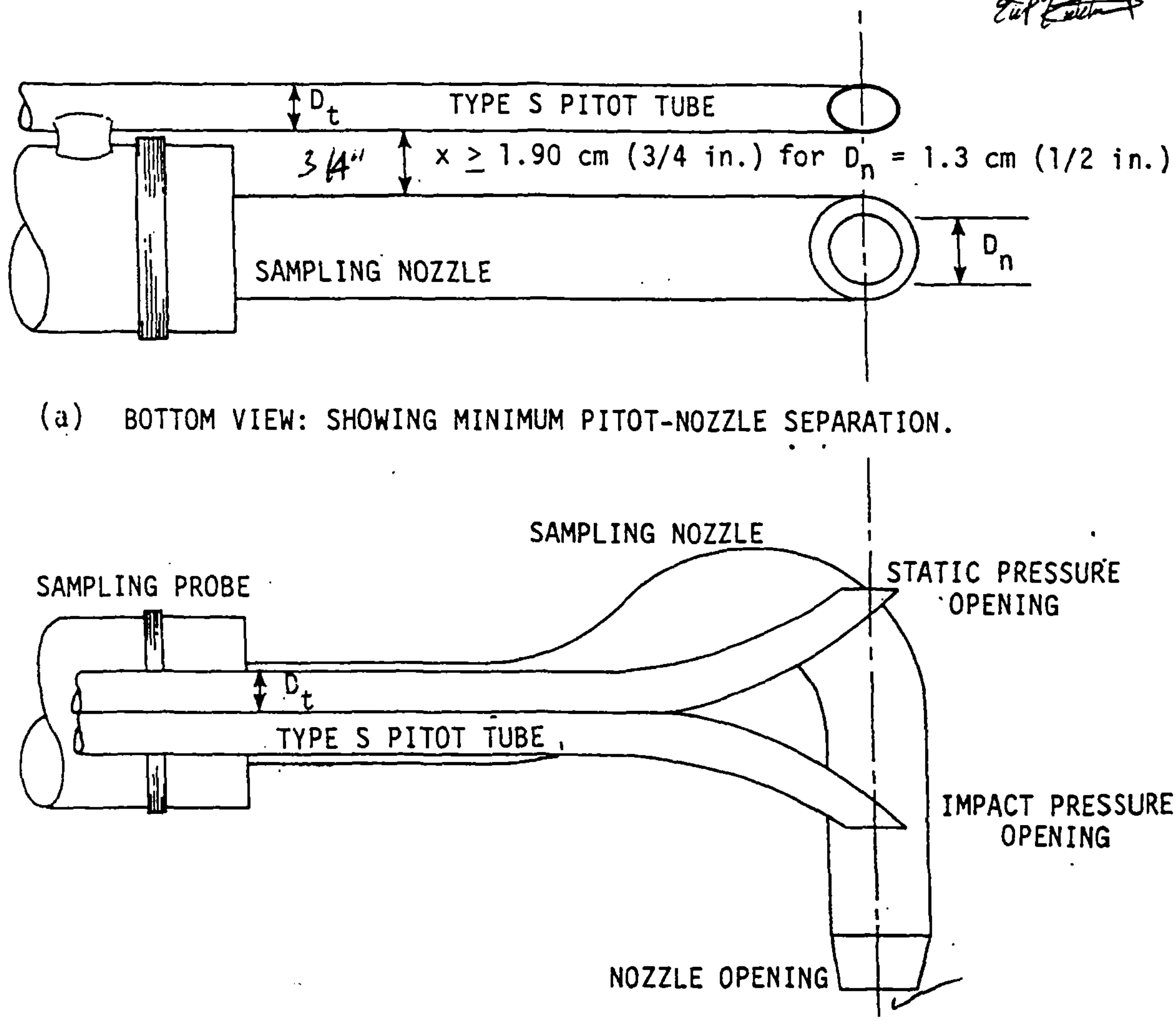
CF INDUSTRIES

TYPE S PITOT TUBE INSPECTION DATA FORM

PROBE SS 60-1 MANUFACTOR Anderson Instruments

PROBE LENGTH 6' DETACHABLE END PIECE SS N-02

6/16/99



(b) SIDE VIEW: TO PREVENT PITOT TUBE FROM INTERFERING WITH GAS FLOW STREAMLINES APPROACHING THE NOZZLE, THE IMPACT PRESSURE OPENING PLANE OF THE PITOT TUBE SHALL BE EVEN WITH OR DOWNSTREAM FROM THE NOZZLE ENTRY PLANE

Figure 2.1 Required pitot tube-sampling nozzle configuration to prevent aerodynamic interference; buttonhook-type nozzle; centers of nozzle and pitot opening aligned; in respect to flow direction, D_t between 0.48 and 0.95 cm (3/16 and 3/8 in.).

CF INDUSTRIES

TYPE S PITOT TUBE INSPECTION DATA FORM

PROBE SS 60-1 MANUFACTOR Anderson Instruments

PROBE LENGTH 6' DETACHABLE END PIECE SS N-02

6/10/99

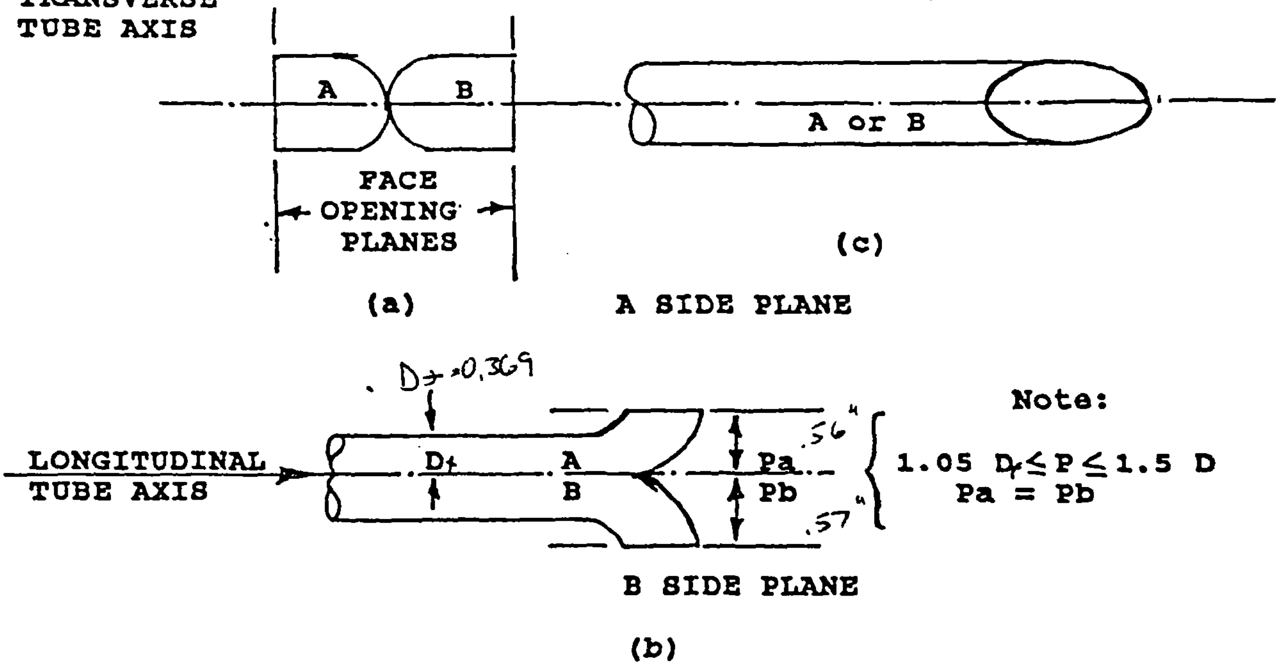
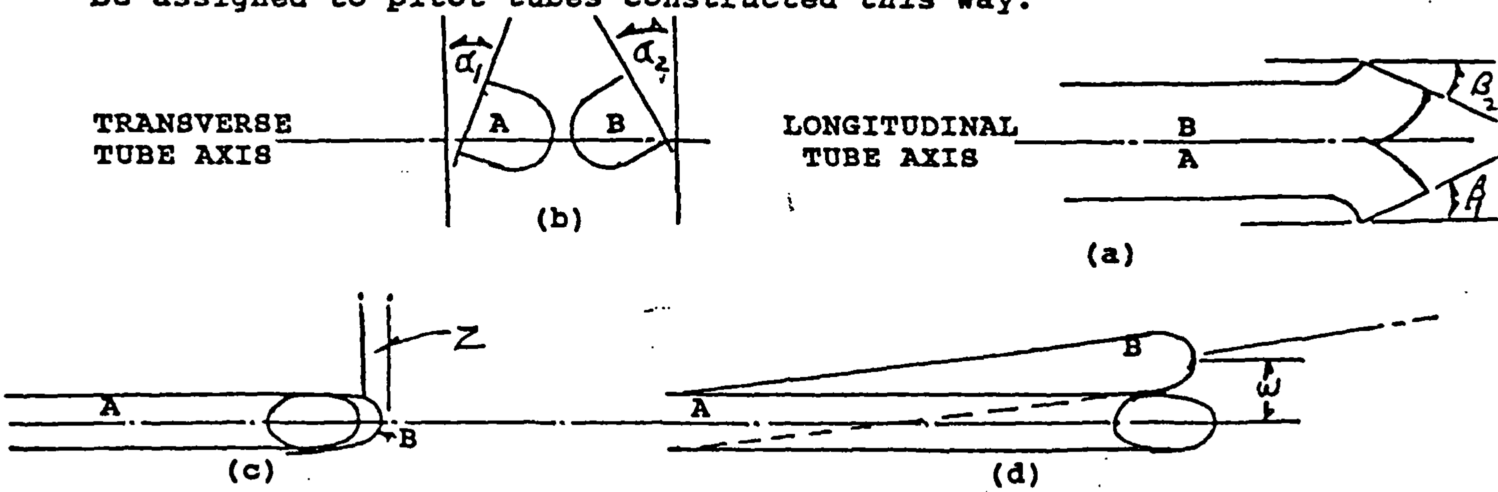


Figure 2.2 Properly constructed Type S pitot tube shown in: (a) end view: face opening planes perpendicular to transverse axis: (b) top view: face opening planes parallel to to longitudinal axis: (c) side view: both legs of equal length and centerlines coincident, when viewed from both sides. Baseline coefficient values of 0.84 may be assigned to pitot tubes constructed this way.



α_1 3° Less than 10°

α_2 4°

z < 1/32" Less than 0.32 cm (1/8 ")

β_1 2° Less than 5°

β_2 3°

ω < 1/32" ~~Less than 0.08 cm~~ (1/32")

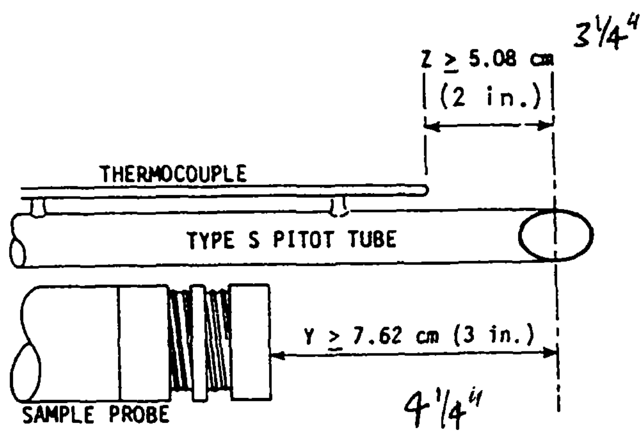
CF INDUSTRIES

TYPE S PITOT TUBE INSPECTION DATA FORM

PROBE SS 60-1 MANUFACTOR ANDERSON INSTRUMENTS

PROBE LENGTH 6' DETACHABLE END PIECE SS N-02

6/16/99



Required thermocouple and probe placement to prevent interference: D_t between 0.48 and 0.95 cm (3/16 and 3/8 in.).

CF INDUSTRIES, INC.
Plant City Phosphate Complex
LABORATORY ANALYSIS RECORD

"A" PAP Production Plant
June 22, 1999

CF Industries, Inc., Plant City Phosphate Complex, uses a Fischer Accumet Model 50 pH meter with selective ion concentration capacity. The instrument has micro-processor function which calculates efficiency of the Orion Model 96-09 fluoride electrode being used and alerts the user in case of electrode malfunction.

STANDARDS	**ELECTRODE EFFICIENCY** (See Technical Information Section)
0.1 μg/ml	0.9315
1.0 μg/ml	0.9922
2.0 μg/ml	

Quality Assurance Sample #1 - 0.38 μg/ml.
Analysis was 0.38 μg/ml.

Quality Assurance Sample #2 - 0.76 μg/ml.
Analysis was 0.77 μg/ml.

Quality Assurance Sample #3 - 1.90 μg/ml.
Analysis was 1.95 μg/ml.

J. Harold Falls
Chief Chemist, Laboratory

JHF/gm
9/89

CF INDUSTRIES, INC.
Plant City Phosphate Complex
LABORATORY ANALYSIS RECORD

"A" PAP Production Plant
June 23, 1999

CF Industries, Inc., Plant City Phosphate Complex, uses a Fischer Accumet Model 50 pH meter with selective ion concentration capacity. The instrument has micro-processor function which calculates efficiency of the Orion Model 96-09 fluoride electrode being used and alerts the user in case of electrode malfunction.

STANDARDS	**ELECTRODE EFFICIENCY** (See Technical Information Section)
0.1 μg/ml	0.9308
1.0 μg/ml	0.9827
2.0 μg/ml	

Quality Assurance Sample #1 - 0.38 μg/ml.
Analysis was 0.39 μg/ml.

Quality Assurance Sample #2 - 0.76 μg/ml.
Analysis was 0.75 μg/ml.

Quality Assurance Sample #3 - 1.90 μg/ml.
Analysis was 1.94 μg/ml.

J. Harold Falls
Chief Chemist, Laboratory

JHF/gm
9/89

Overview

The Model 50 is a state-of-the-art, microprocessor based meter. It features uniquely simple operation with an extensive range of capabilities. The sealed keypad incorporates both numeric and function keys, including a convenient Help function. The large liquid crystal display offers a simultaneous display of a variety of information, including measurement results, time/date, standardization data and status icons. The large display size permits user information to be conveyed in simple, complete sentences—not the cryptic prompts more typical for laboratory meters.

The Model 50 includes dual input channels. A novel split-screen option allows the display to simultaneous track both inputs when desired. In addition to pH and millivolt measurement, this model also performs analyses with ion selective electrodes by direct potentiometry. Additionally, the Model 50 offers four incremental methods: known addition and subtraction and analate addition and subtraction.

In pH operation, the meter may be set up to automatically recognize both Fisher color-coded buffers and NIST buffers, for maximum user convenience. Auto-recognized buffers are both identified and corrected by the meter for the temperature dependence of the buffer.

The Model 50 performs conductivity measurements in Siemens (mhos) or salinity units. Probes with a variety of cell constants may be accommodated through software setup. Alternatively, the Model 50 may be set up to measure resistivity (ohms).

It is recommended that the user first complete the _Installation_ instructions, then become familiar with _Controls and Connectors_, and finally consult the _Operation_ sections for procedures of interest.

Performance Characteristics

	Model 50
Ranges	-2 to 20 pH/pX -1800 to 1800 mV -5 to 105 °C 10^{-9} to 10^{9} Conc 0 to 40 ppt practical salinity 0 to 70 ppt NaCl equivalents 3 x 10^{4} µ-Siemens/cm 33 to ∞ Ω-cm
Resolution	0.1/0.01/0.001 pH 0.1 mV 0.1 °C 1, 2 or 3 significant figures ion 1, 2 or 3 significant figures conductivity
Relative Accuracy	+/-0.002 pH +/-0.1 mV @ 25 °C +/-0.2 °C

Ion Operation

The Model 50 allows ion concentrations to be determined conveniently in any desired units of concentration, such as molarity, ppm or mg/L, and using any one of several techniques. Prior to analyzing samples by any of the ion methods, the operator should consult the following sections on *Method Selection, Low-Level Correction, Ionic Strength Adjustors* and *Temperature Compensation*.

Method Selection

The Model 50 features a variety of methods for measuring ion concentrations in samples using ion selective electrodes (ISE's). Direct reading potentiometric methods offer speed and convenience, are applicable to wide ranges of sample concentrations and require no volumetric measurements. Conversely, sample-to-sample variations in ionic strength frequently require the use of an ionic strength adjusting buffer (ISA) with direct reading potentiometry.

Incremental methods offer a tolerance for samples of varying ionic strength and the ability to analyze samples containing complexing agents. One incremental method, analate subtraction, can even permit analyzing concentrations of ions to which no ion selective electrode directly responds. Conversely, volumetric measurements of both the sample and a standard increment are required by these methods. Additionally, the incremental methods are generally unworkable if sample concentrations are expected to vary over more than one or, at most two, orders of magnitude.

As a general rule, it is usually simplest to select direct reading unless prior knowledge about the sample indicates that incremental methods are to be preferred.

Low-Level Correction

With samples containing very low levels of the ion of interest (often referred to as the "mud zone"), electrode response fails to conform to the Nernstian model. In the mud zone, changes in electrode output (slope) successively decrease as the sample concentration is further reduced. A plot of electrode output in millivolts versus logarithm of the sample concentration then becomes increasingly non-linear at very low concentrations.

The Model 50 offers two approaches to correcting for non-Nernstian response with low-level samples. In the first, the actual non-linear response curve of the electrode is approximated by a series of linear segments. Up to five different standards may be used, spanning the entire range of concentrations anticipated for samples. The meter then stores in memory a series of slope values corresponding to each successive pair of standards. These slopes, and the corresponding standard values, may be viewed individually by means of the slope key.

In linear segment measurements, the meter first identifies the general concentration range of the current sample, then computes its exact concentration by applying the nearest or bracketing standards. Use of the *Linear Segments* option can increase accuracy with dilute samples near the limits of the electrode's operating range.

The *Blank* feature provides an alternative means for measuring low-level samples. With this approach, the non-linear response curve of the electrode is fit by a mathematical model which assumes that all samples and standards have a constant background level of the species of interest. This situation may occur, for example, if the electrode can "self-sense" due to the finite solubility of the solid state sensing element. Standardization is performed with two standards from the electrode's linear region, as well as a blank sample. Measuring with the *Blank* option substantially enhances accuracy with dilute samples when the assumption of a constant background is true and a stable blank can be prepared.

Ionic Strength Adjustors

Used directly, all selective ion electrodes respond to the *activity* of the ion of interest. The activity of an ion may be thought of as its effective concentration— a hybrid quantity derived from both the actual concentration of the ion as well as its mobility in the given solution.

In relatively dilute samples (typically less than 0.01 M), ions in the sample are relatively far removed from the influence of neighboring ions and act independently. In this event, ion activity and ion concentration are essentially identical. With more concentrated solutions, however, the presence of near neighbors acts to limit the mobility and effect of individual ions.

With increasing total ionic concentrations (ionic strength), ion activity becomes progressively diminished from actual ion concentration. This trend generally continues throughout the usable range of the electrode, although at extremely high concentrations, other effects may actually reverse it. In any event, in solutions of total ionic strength greater than perhaps 0.01 M, selective ion electrodes respond to an ion activity which may differ substantially from the ion concentration.

Slope

The slope S of an electrode is defined as the change in its output voltage resulting from a decade change in the activity of the ion to which it responds. From the Nernst equation, the slope at any temperature T is given by

$$S_T = \xi (2.303\ RT/F)$$

The quantity in the parentheses represents the slope for an ideal, monovalent, cation-sensing ISE (e.g., a pH or Na^+ ion electrode), and has a value of 59.16 mV at 25 °C.

Because of their temperature dependence, the raw slope values do not provide a convenient measure of an electrode's performance. Consequently, slope values are usually mathematically corrected ("referenced") to a temperature of 25 °C:

$$S_{25} = S_T (298.16/T)$$

The value of its temperature referenced slope reflects the condition of an ISE since it may be compared simply and directly with the theoretical value of 59.16 at 25 °C. The Model 50 reports slope values temperature referenced to 25 °C.

Efficiency Factor

Efficiency factor ξ is the actual slope value for an electrode, divided by its theoretical value. The efficiency factor for an electrode is thus easily interpretable in terms of its performance. For example, a pH electrode functioning ideally would exhibit an efficiency factor of exactly 1. Properly functioning, real pH electrodes typically will produce efficiency factors in the range of 0.90 to 1.05.

Efficiency factors for cation-sensing electrodes are positive, while those for anion-sensing electrodes are negative. Mathematically, the efficiency factor for an ideal electrode is always the reciprocal of the number of electrons exchanged in its electrode reaction, with the appropriate algebraic sign. Several examples appear in the table below:

ISE Type	Ideal Efficiency Factor
H_3O^+ (pH)	+ 1
F^-	- 1
Cl^-	- 1
Ca^{+2}	+ 0.5
S^{-2}	- 0.5

The efficiency factor for a real electrode, like its slope, may be determined experimentally from two-point (or more) standardization data.

Efficiency

A related quantity, frequently used instead of efficiency factor, is electrode efficiency. The efficiency of an electrode is simply its efficiency factor expressed as a percent by multiplying by 100 and ignoring algebraic sign.

On this scale, properly functioning pH electrodes typically exhibit efficiencies between 90 and 105%. The Model 50 automatically compute and display electrode efficiencies, as well slopes temperature referenced to 25 °C, when the slope/eff key is pressed.

pH Measurements

The pH of a solution is defined as

$$pH = -\log a_H$$

where a_H is the activity of the hydrogen ion in the solution. For hydrogen ions, the distinction between activity and concentration can usually be ignored.

Substituting the definitions of pH and slope into the Nernst equation, yields a working equation for computing sample pH:

$$E = E_o + S_T \text{ pH}$$

In practice, E_o and S_T may be determined through standardization with buffers of known pH. The pH value of a sample then may be calculated from this equation and the measured output E of the electrode when placed in the sample.

Ion Measurements

Ion measurements are complicated somewhat by the dependence of activity on the total ionic strength of the solution. For relatively dilute solutions, ion concentration and activity are essentially equivalent. However, to measure samples more concentrated than roughly 0.01 M, a special procedure is required to measure sample concentration directly.

Section 1

INTRODUCTION

1.1 Principle of Operation

The AST® Sampler is designed to sample gas stream effluents isokinetically in accordance with the U.S. Environmental Protection Agency (EPA) standards as outlined in the Code of Federal Regulations, Title 40, Part 60 (40CFR60), Appendix A . Stack gases are extracted through a nozzle and a heated probe into a heated filter chamber where the particulate is removed. The hot gases are then passed through a series of cold impingers where condensibles are removed and the gases are cooled before going to the pump, dry gas meter, and orifice.

The AST® Sampler is manufactured with all the mechanical hardware specified in 40CFR60 for EPA Methods 1, 2, 4 and 5. The AST® Sampler can be used with Andersen hardware to sample additional EPA Methods including methods 6, 8, 12, 13A, 13B, 17, 23, 26A, 29, 101, 101A, 103, 104, 108, 202, 315. Consult the Graseby Technical Sales Department or your local sales representative for application notes.

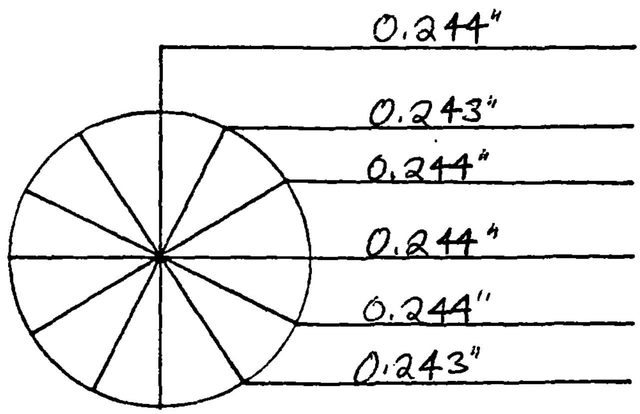
P.O. Drawer L.
Plant City, Florida 33564-9007
Telephone: 813/782-1591

CF Industries, Inc.
Plant City Phosphate Complex

PROBE NOZZLE CALIBRATION DATA

Nozzle Identification Number: 250-1

Calibrated by: Ernest Kretschman Date: 6/21/99



Instructions:

Measure to nearest 0.001"

Tolerance:

0.001" for mean of at least three readings.
Maximum deviation between readings ≤ 0.004".

Nozzle diameter, D_n: 0.244 In.

Nozzle area A_n: 0.000324 ft^2

$$A_n = \frac{\pi}{144}\left(\frac{D_n}{2}\right)^2$$

Exhibit N

ANNUAL GRASEBY STACKBOX THERMOCOUPLE CALIBRATIONS -UNIT #1200

DATE 7/13/98

FOR TEMPERATURES 0 TO 110 DEGREES C
NIST Traceable Thermometer # J96-258

FOR TEMPERATURES 110 TO 200 DEGREES C
NIST Traceable Thermometer # 90B-2024

Time: 1100-1530

Initial

Thermocouple		Ice Water Point			Ambient Point			Hot Water Point			Hot Oil Point		
		Thermocouple Reading (Degrees F)	NIST Reading Actual	NIST Reading Conversion to	Thermocouple Reading (Degrees F)	NIST Reading Actual	NIST Reading Conversion to	Thermocouple Reading (Degrees F)	NIST Reading Actual	NIST Reading Conversion to	Thermocouple Reading (Degrees F)	NIST Reading Actual	NIST Reading Conversion to
			Degrees C	Degrees F		Degrees C	Degrees F		Degrees C	Degrees F		Degrees C	Degrees F
[1] Stack	Probe 4.5 ft. #45-1	32.6	0.6	33.1	78.1	26.6	79.8	184.4	86.3	187.4	N/A	N/A	N/A
	Probe 6.0ft. #60-1	32.1	0.6	33.1	81.3	29.2	84.6	184.6	86.3	187.4	N/A	N/A	N/A
	Probe 10.5ft. #105-1	32.6	0.8	33.4	71.8	22.4	72.3	188.2	87.2	189.0	N/A	N/A	N/A
	Probe 11.0ft. #110-1	32.1	0.6	33.1	80.7	28.4	83.1	183.3	86.0	186.8	N/A	N/A	N/A
[2] Probe (Probe Liner Heater)	Probe 4.5 ft. #45-1	31.8	0.8	33.1	82.6	29.0	84.2	N/A	N/A	N/A	234.6	113.4	236.1
	Probe 6.0ft. #60-1	32.8	0.8	33.4	82.2	29.2	84.6	N/A	N/A	N/A	234.8	113.2	235.8
	Probe 10.5ft. #105-1	32.4	1.0	33.8	71.4	22.2	72.0	N/A	N/A	N/A	238.6	115.6	240.1
	Probe 11.0ft. #110-1	32.6	0.8	33.4	81.9	28.4	83.1	N/A	N/A	N/A	235.1	114.6	238.3
[3] Hot Box	Box	32.4	1.0	33.8	82.2	28.6	83.5	N/A	N/A	N/A	237.1	115.2	239.4
	Filter Exit	32.2	1.0	33.8	82.3	28.6	83.5	N/A	N/A	N/A	238.2	115.0	239.0
[4] Umbilical	Coldbox Exit	33.6	1.0	33.8	82.8	28.4	83.1	185.1	85.6	186.1	N/A	N/A	N/A
[5] DGM Inlet	Control Box	33.2	1.0	33.8	81.9	28.6	83.5	185.1	85.4	185.7	N/A	N/A	N/A
[6] DGM Exit	Control Box	33.2	1.0	33.8	82.5	28.6	83.5	185.1	85.4	185.7	N/A	N/A	N/A
[7] Spare	Ambient	32.8	0.2	33.8	82.1	28.6	83.5	185.1	85.2	185.4	N/A	N/A	N/A

NOTE:

10.5FT PROBE SENSOR REPAIRED & CALIBRATED 4/1/99

DRY GAS METER CALIBRATON

Anderson AST Meter Box

Meter Box Number: 1200 Barometric Pressure: 30.03

Date: 12/16/98 Dry Gas Test Meter#: Rockwell 631105

Initial [signature] Dry Gas AST Box Meter#: Schlumberger 1102

Flowrate Setting (CFM)	Gas Volume: DGM Test Meter (Vw) ft.^3	Gas Volume: AST Box Meter (Vd) ft.^3	Temperature: DGM Test Meter (Tw) Deg F	Temperature: AST Box Meter (Td) Deg F	AST Box Meter Delta H (" H2O)	Time (Theta) min.	Actual Flowrate (CFM)	Yi (Software) (Setpoint)	Delta H@ in. H2O
0.40	11.660	11.697	69.6	71.8	0.736	28.85	0.404	1.0000	2.512
0.50	7.500	7.556	69.6	74.2	1.152	14.83	0.506	1.0000	2.498
0.60	10.358	10.470	70.2	76.7	1.625	17.20	0.602	1.0000	2.477
0.70	31.644	32.310	70.2	82.3	2.232	45.40	0.697	1.0000	2.512
0.80	19.097	19.557	70.2	84.6	2.658	24.25	0.788	1.0000	2.333
0.90	14.301	14.684	70.7	86.1	3.237	16.18	0.884	1.0000	2.255
1.00	16.701	17.123	73.0	87.8	3.937	17.15	0.974	1.0000	2.271
1.10	7.302	7.491	73.0	88.3	4.722	6.87	1.063	1.0000	2.282
1.20	32.996	34.085	73.0	92.2	5.472	28.7	1.150	1.0000	2.247
							Average	1.0000	2.376
							Max. Diff.	0	0.136

$$Yi = \frac{Vw\ Pb\ (td + 460)}{Vd\ (Pb + Delta\ H/13.6)(Tw + 460)}$$

$$Delta\ H@ = \frac{.0317\ (Delta\ H)}{Pb\ (td + 460)}\ [(tw + 460)(theta)/Vw]^2$$

Where: Vw = Gas Volume passing through the std test meter, ft.^3.
Vd = Gas Volume passing through the dry gas meter, ft.^3.
Tw = Temperature of the gas in the std test meter, deg. F.
Td = Average temperature of the gas in the dry gas meter, deg.F.
Delta H = Pressure differential across orifice. in, H2O.
Yi = Ratio of accuracy of std test meter to dry gas meter for each run.
Y = Average ratio of accuracy of std test meter to dry gas meter.
Pb = Barometric pressure, in. Hg.
Theta = Time of calibration run, min.

ASTDGM98.WK4

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

WET TEST METER
CALIBRATION CHECK

Wet Test Meter No. P-576

Date: 3/29/98

Checked by: B. Nelson

TEST NO.	Gas Volume		Temperature		Cal. Factor
	Liquid Displacement (Ft^3)	Wet Test Meter (Ft^3)	Liquid Displacement (°F)	Wet Test Meter (°F)	
1	1.115	1.10	78	78	1.020
2	1.090	1.10	78	78	.991
3	1.088	1.10	78	78	.989
				Avg.	1.000

d:\WP60\FORMS\WETTEST2.CF

Standard Dry Gas Meter Calibration

GAS METER MANUF.	ROCKWELL	PERFORMED FOR	C.F. INDUSTRIES
MODEL #	175-S	DATE	2/12/99
SERIAL #	JA 631105	BAROMETRIC PRES.	30.22
WET TEST METER #	P - 576	LEAK CHECK	0.00 CFM at 15" Hg

	Gas Volume		Temperature						
Approximate Flowrate (CFM)	Wet Test Meter (Vw) (ft.^3)	Dry Gas Meter (Vd) (ft.^3)	Wet Test Meter (Tw) (Deg F)	Dry Gas Meter (Td) (Deg F)	Dry Gas Meter Delta P (" H2O)	Time (Theta) (min)	Flowrate (CFM)	DRY GAS METER COEFF. (Yds)	AVG. GAS METER COEFF. (Yds)
0.40	5.000	4.931	71.0	72.0	0.06	14.05	0.357	1.016	
0.40	5.000	4.921	71.0	72.0	0.06	14.02	0.358	1.014	1.016
0.40	5.000	4.905	71.0	72.0	0.06	14.04	0.358	1.017	
0.60	5.000	4.944	71.0	72.0	0.1	8.25	0.608	1.009	
0.60	5.000	4.949	71.0	73.0	0.1	8.21	0.611	1.006	1.008
0.60	5.000	4.931	71.0	73.0	0.1	8.18	0.614	1.010	
0.80	5.000	4.945	72.0	73.5	0.12	5.91	0.848	1.008	
0.80	5.000	4.936	72.0	73.5	0.12	5.96	0.841	1.010	1.009
0.80	5.000	4.942	72.0	73.5	0.12	5.97	0.839	1.009	
1.00	5.000	4.962	72.0	73.5	0.17	4.90	1.022	1.004	
1.00	5.000	4.957	72.0	73.5	0.17	4.86	1.031	1.005	1.005
1.00	5.000	4.962	72.0	73.5	0.17	4.86	1.031	1.004	
1.20	5.000	4.955	72.0	73.5	0.20	4.08	1.228	1.006	
1.20	5.000	4.955	72.0	73.5	0.20	4.09	1.225	1.006	1.006
1.20	5.000	4.953	72.0	73.5	0.20	4.09	1.225	1.006	

$$Q = \frac{Pb \times Vw \times 528}{(Tw + 460) \times Theta \times 29.92}$$

$$Yds = \frac{Vw}{Vd} \times \frac{(Td + 460)}{(Tw + 460)} \times \frac{Pb}{[Pb + (\text{delta } P/13.6)]}$$

where:

Vw = Gas Volume passing through the std test meter, ft.^3.
Vd = Gas Volume passing through the dry gas meter, ft^3
Tw = Temperature of the gas in the std test meter, deg. F.
Td = Average temperature of the gas in the dry gas meter, Deg F.
Delta H = Pressure differential across orifice, in. H20.
Yds = Dry gas meter coefficient.
Pb = Barometric pressure, in. Hg.
Theta = Time of calibration run, min.

STANDARD METER CALIBRATION CURVE

GAS METER MANUF.	ROCKWELL	PERFORMED FOR	C.F. INDUSTRIES
MODEL #	175-S	DATE	2/12/99
SERIAL #	JA 631105		

Flowrate (CFM)	DRY GAS METER COEFF. (Yds)
0.358	1.016
0.611	1.008
0.843	1.009
1.028	1.005
1.226	1.006

Regression Output:

Constant	72.47
Std Err of Y Est	0.18
R Squared	0.78
No. of Observations	5.00
Degrees of Freedom	3.00

X Coefficient(s)	-71.04
Std Err of Coef.	21.53

CALIBRATION CURVE

FLOW (CFM)	CORRECTION FACTOR
0.42	1.014
0.45	1.014
0.50	1.013
0.55	1.012
0.60	1.012
0.65	1.011
0.70	1.010
0.75	1.010
0.80	1.009
0.85	1.008
0.90	1.007
0.95	1.007
1.00	1.006
1.05	1.005
1.10	1.005
1.15	1.004
1.20	1.003

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test numbers ________ Date 6/24/99 Meter box number 1200 Plant A PAD

Barometric pressure, P_b = 30.02 in. Hg Dry gas meter number 1102 Pretest Y 1.000

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Dry test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Dry test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average (t_d),[a] °F	Time (Θ), min	Vacuum setting, in. Hg	Y_i	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
(.342 CFM) 3.08	12.739	13.0462	75.2°	87.7°	87.7°	87.7°	15.53	3.6	0.9917	(12.739)(30.02)(547.7) / (13.0462)(30.246)(535.2)
3.08	13.847	14.1061	75.2°	90.3°	90.3°	90.3°	16.80	3.6	1.0017	(13.847)(30.02)(550.3) / (14.1061)(30.246)(535.2)
3.08	13.706	14.0385	75.2°	92.9°	92.9°	92.9°	16.70	3.6	1.0029	(13.706)(30.02)(552.9) / (14.0385)(30.246)(535.2)
									Y = 0.9938	

Within ± 0.05Y
6/24/99, 11:15AM
[signature]

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d.

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in H_2O.

Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y $\pm$0.05Y

P_b = Barometric pressure, in. Hg.

Θ = Time of calibration run, min.

Dry test meter number Rockwell-JA631105

Quality Assurance Handbook M5-2.4A

APPENDIX "C"

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

CF INDUSTRIES, INC.

PLANT CITY PHOSPHATE COMPLEX

H.E. Morris	General Manager
R.C. May	Manager of Engineering
T.A. Edwards	Supt., Environmental Affairs
J.M. Messina	Chief of Environmental Affairs
J.H. Falls	Chief Chemist, Laboratory
J.I. Longest	Staff Chemist
T. Ortoski	Environmental Supervisor
E. Kretschmar	Analyst II
S. Willoughby	"A" Class Technician
L. Camp	"A" Class Technician
W. Cherry	"A" Class Technician

u:\envrpt\project participants.doc

TAE cc: HEM-
GMN/File
BCM
RGR

Department of Environmental Protection

Jeb Bush
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

David B. Struhs
Secretary

May 26, 1999

Mr. Thomas A. Edwards
Superintendent, Environmental Affairs
CF Industries, Inc.
P.O. Drawer L
Plant City, FL 33564-9007

Re: Compliance tests for A & B Phosphoric Acid Units, 0570005-007-AV

Dear Mr. Edwards:

This letter authorizes CF Industries, Inc., to temporarily operate A & B Phosphoric Acid Units at process rates approximately 10% beyond their current, maximum-permitted rates in order to conduct the annual compliance tests. Each unit's test must take no longer than 15 days (your letter indicates that each unit's test will take no longer than one week to complete), and each unit's production rate must be returned to the permitted range that existed before the test. Your estimates of the increases in emissions of fluoride indicate that existing limits will not be exceeded, even at the higher process rates. Test results at the temporary, higher rates will be used to support a subsequent application to modify the permit.

Notify the Hillsborough County Environmental Protection Commission of your schedule. If you have any questions, please contact Mr. Henry Gotsch, in our permitting division, at (813) 744-6100, ext. 113.

Sincerely,

[signature], P.E.

FOR W.C. Thomas, P.E.,
District Air Administrator
Southwest District

cc: Mr. Rick Kirby, HCEPC