Please return to file
AC29-49694
PSD-FL-088

INTRODUCTION

EMISSION REPORT
and
PROCESS INFORMATION

IMC FERTILIZER, INC.

IMC LONESOME

NO 1 DRYER

MAY 25 and 26, 1988

PERMIT NOS: AO29-111119

AC29-49694

PSD-FL-088

Prepared by: C D Turley

C. D. Turley

July 8, 1988

INTRODUCTION

This report consists of two combined portions. The process information prepared by IMC and the emission results from tests conducted by Air Consulting and Engineering, Inc. The VOC testing was conducted to comply with the original Section 114(a) request made by the USEPA on February 2, 1987. The remaining testing was done in compliance with the FDER Operating Permit AO29-111119.

The VOC test constitutes the fifth attempt to measure the hydrocarbon emissions from the Lonesome Dryers. This test confirms that it is not practical to attempt to measure hydrocarbons at concentrations of less than 1 ppm as propane in stack conditions with an excess of a 30% moisture content. These partial results confirm the previous partial results that there is approximately a concentration of 1 ppm in this source. These partial results also confirm that Reference Method 25A is not an applicable means of measuring these emissions under the test conditions. To the satisfaction of IMC, this and the previous test attempts demonstrate that there are emissions at less than 1 ppm from the Lonesome Dryers which comply with existing and modified VOC limitations.

This Section Contains the following:

1. Summary Chronological Table showing all related measurements and the existing and modified permit limitations.

2. Visible Emission Evaluation and calculation page for 5/25.

3. Visible Emission Evaluation and calculation page for 5/26.

4. Process Weight Statement.

5. Process Field Measurement sheets(7).

6. Fuel Analysis Results.

7. Scale Calibration Results.

The subsequent section contains the complete Source Test Report prepared by Air Consulting and Engineering, Inc.

Chronological sequence of testing and production measurements

date	time	activity	tph	gph	mm B/h	stack scfm	Part pph	NOx ppm	NOx pph	OSO pph	fuel %s	red.	VOC stack ppm	VOC stack pph	scrubber psi	scrubber pH	drop " HOH
5/25	901	Rock sample	94														
	1032	VOC run 21 mins		1010	152	87081							0.8	0.5			
	1208	Dryer down 15 mins															
	1242	Scale tons 3457	526														
	1244	Oil rdg 332742x10		1010	152										70	4.3	23 *
	1314	NOx 1 60 mins	526	1010	152	87081		90	56.2		1.63%						
	1331	VOC run 36 mins	526	1010		87081							0.8	0.5			
	1400	Oil sample 12A									1.63%						
	1453	VOC run 60 mins	526	1010		87081							0.0	0.0			
	1528	Oil rdg 333018x10		1010											70	4.4	23 *
	1604	NOx 2 60 mins	526	997	150	99846		87	62.2		1.65%						
	1605	VE avg=0% 60 mins															
	1654	VOC run 15 mins	526	997	150	99846							0.5	0.3			
	1700	Oil sample 13A									1.65%						
	1716	Oil rdg 333196x10	526	997	150												
	1723	Rock sample															
	1734	VOC run 10 mins	526	997	150	99846							0.7	0.5			
	1735	Oil rdg 333229x10		997	150												
	1750	Part3,NOx3 60 mins	526	1053	159	87563	19.5	85	53.3		1.75%						
	1800	Oil sample 14A									1.75%						
	1802	VOC run 10 mins	526	1053	159	87563							0.3	0.2			
	1856	VOC run 14 mins	526	1053	159	87563							0.4	0.2			
	1907	Scale tons 6831	526		159										70	4.9	23 *
	1909	Oil rdg 333394x10		1053	159												
5/26	933	Scale tons 1031	588														
	935	Rock sample	92														
	939	Oil rdg 333622x10		1042													
	957	OSO run 1 20 mins	588	1042	158	81295				90.8	1.70%	69%					
	1034	Part4,NOx4 60 mins	588	1042		81295	15.4	79	46.0								
	1051	OSO run 2 20 mins	588	1042	158	81295				95.7	1.70%	67%					
	1053	VOC run 6 mins	588	1042		81295							1.8	1.0			
	1055	Oil sample 15A									1.70%						
	1126	VOC run 5 mins	588	1042		81295							0.3	0.2			
	1133	OSO run 3 20 mins	588	1042	158	81295				89.4	1.70%	69%					
	1147	VOC run 15 mins	588	1042		81295							0.3	0.2			
	1221	OSO run 4 20 mins	588	1042	158	80450				74.1	1.70%	75%					
	1230	VOC run 15 mins	588	1042		80450							0.2	0.1	70	4.3	20
	1244	Part run 5 60 mins	588	1042		80450	15.1										
	1255	VE avg=5% 60 mins															
	1303	OSO run 5 20 mins	588	1042	158	80450				79.3	1.70%	73%					
	1313	VOC run 15 mins	588	1042		80450							0.5	0.3			
	1342	OSO run 6 20 mins	588	1042	158	80450				92.5	1.70%	68%					
	1405	Rock sample															
	1416	VOC run 19 mins	588	1042		80450							0.5	0.3			
	1420	Scale tons 3845	588														
	1420	Oil rdg 334110x10		1042													
						18392 Btu/lb											
			552	wet		0.986 density											
		Avearge	488	1034	156		16.6	85	54.4	87	1.7%	70%	0.5	0.3			
		Permit Limits	450	dry			25.0	81	56.6	172	1.7%			1.2			
		Modified Limits			177		25.0		82.3	172	2.5%	80%		1.7			

* Reading Corrected

VISIBLE EMISSION OBSERVATION	START 4 : 00 PM	DOWN TIME FROM : TO :	ℓ READING :
	END 5 : 00 PM		

MIN	00	15	30	45	MIN	00	15	30	45	MIN	00	15	30	45
0:	0	0	0	0	20:	0	0	0	0	40:	0	0	0	0
1:	0	0	0	0	21:	0	0	0	0	41:	0	0	0	0
2:	0	0	0	0	22:	0	0	0	0	42:	0	0	0	0
3:	0	0	0	0	23:	0	0	0	0	43:	0	0	0	0
4:	0	0	0	0	24:	0	0	0	0	44:	0	0	0	0
5:	0	0	0	0	25:	0	0	0	0	45:	0	0	0	0
6:	0	0	0	0	26:	0	0	0	0	46:	0	0	0	0
7:	0	0	0	0	27:	0	0	0	0	47:	0	0	0	0
8:	0	0	0	0	28:	0	0	0	0	48:	0	0	0	0
9:	0	0	0	0	29:	0	0	0	0	49:	0	0	0	0
10:	0	0	0	0	30:	0	0	0	0	50:	0	0	0	0
11:	0	0	0	0	31:	0	0	0	0	51:	0	0	0	0
12:	0	0	0	0	32:	0	0	0	0	52:	0	0	0	0
13:	0	0	0	0	33:	0	0	0	0	53:	0	0	0	0
14:	0	0	0	0	34:	0	0	0	0	54:	0	0	0	0
15:	0	0	0	0	35:	0	0	0	0	55:	0	0	0	0
16:	0	0	0	0	36:	0	0	0	0	56:	0	0	0	0
17:	0	0	0	0	37:	0	0	0	0	57:	0	0	0	0
18:	0	0	0	0	38:	0	0	0	0	58:	0	0	0	0
19:	0	0	0	0	39:	0	0	0	0	59:	0	0	0	0

PLANT: LONESOME STACK: NO. 1 DRYER SCRUBBER

PERMIT NO: A029-11119 STACK HT: 125' STACK DIA: 96"

PLUME COLOR: White PLUME TYPE: Trailing

BACKGROUND COLOR: GREY SKY CONDITIONS: OVERCAST (% 100)

WIND DIRECTION: WSW WIND SPEED: 10-15 AMBIENT TEMPERATURE: 85°F

DISTANCE TO STACK: 150' DIRECTION TO STACK: N

OBSERVER: J. Tanner DATE: 5/25/88

VARIOUS

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

THIS IS TO CERTIFY THAT

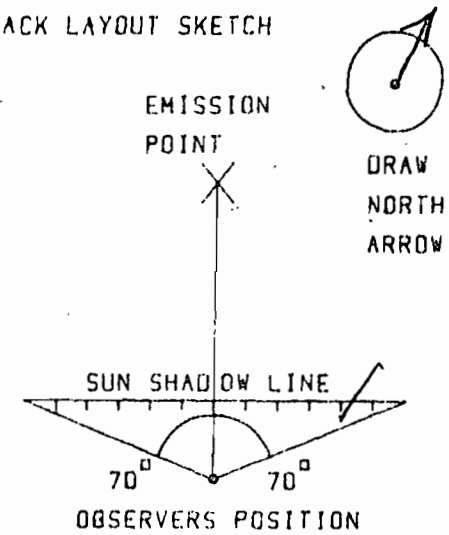
JERRY E. TANNER, has completed the STATE OF FLORIDA visible emissions evaluation training and is a qualified observer of visible emissions as specified by EPA reference method 9.

THIS CERTIFICATE EXPIRES Sep 7, 1988

Michael R. Clark — CERTIFICATE OFFICER

J. Tanner — BEARER'S SIGNATURE

STACK LAYOUT SKETCH



INTERNATIONAL MINERALS AND CHEMICAL CORPORATION

PROCESS INFORMATION AND CALCULATION

PLANT: LONESOME STACK: NO. 1 DRYER SCRUBBER

TYPE OF CONTROL DEVICE: SCRUBBER

TYPE OF EMISSION TEST: Visible TESTER: J. TANNER

DATE: 5/25/88 SAMPLING TIME: 60 MIN.

PERMIT NO.: A029-111119 ASP ORDER NO.:

THE OPERATION OF THIS SYSTEM HAS BEEN VERIFIED DURING THE TIME OF TESTING AS PER THE SUBMITTED PROCEDURE RELATIVE TO THE ABOVE ASP ORDER.

SIGNED:

PROCESS CALCULATION

SOURCE OF INFORMATION:

AVG PROCESS RATE: MATERIAL: Phosphate Rock

EMISSION STANDARD: ALLOWABLE: 10%

CALCULATED BY: DATE:

PROCESS STATEMENT

I CERTIFY THAT THE ABOVE STATEMENT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

SIGNATURE:

TITLE:

DATE:

VISIBLE EMISSION RESULT CALCULATION

TEST DATE:5/25/88
PERMIT:AO29-111119

SOURCE: No. 1 Dryer Scrubber

Rdgs: min\sec	00	15	30	45
0:	0	0	0	0
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
31:	0	0	0	0
32:	0	0	0	0
33:	0	0	0	0
34:	0	0	0	0
35:	0	0	0	0
36:	0	0	0	0
37:	0	0	0	0
38:	0	0	0	0
39:	0	0	0	0
40:	0	0	0	0
41:	0	0	0	0
42:	0	0	0	0
43:	0	0	0	0
44:	0	0	0	0
45:	0	0	0	0
46:	0	0	0	0
47:	0	0	0	0
48:	0	0	0	0
49:	0	0	0	0
50:	0	0	0	0
51:	0	0	0	0
52:	0	0	0	0
53:	0	0	0	0
54:	0	0	0	0
55:	0	0	0	0
56:	0	0	0	0
57:	0	0	0	0
58:	0	0	0	0
59:	0	0	0	0

Max 6 Minute Average	0.0%
Overall Average	0.0%
Test Length (minutes)	60
Process Weight Rate TPH	0

Individual 6 minute Averages

min\sec	00	15	30	45
5:				0.0
6:	0.0	0.0	0.0	0.0
7:	0.0	0.0	0.0	0.0
8:	0.0	0.0	0.0	0.0
9:	0.0	0.0	0.0	0.0
10:	0.0	0.0	0.0	0.0
11:	0.0	0.0	0.0	0.0
12:	0.0	0.0	0.0	0.0
13:	0.0	0.0	0.0	0.0
14:	0.0	0.0	0.0	0.0
15:	0.0	0.0	0.0	0.0
16:	0.0	0.0	0.0	0.0
17:	0.0	0.0	0.0	0.0
18:	0.0	0.0	0.0	0.0
19:	0.0	0.0	0.0	0.0
20:	0.0	0.0	0.0	0.0
21:	0.0	0.0	0.0	0.0
22:	0.0	0.0	0.0	0.0
23:	0.0	0.0	0.0	0.0
24:	0.0	0.0	0.0	0.0
25:	0.0	0.0	0.0	0.0
26:	0.0	0.0	0.0	0.0
27:	0.0	0.0	0.0	0.0
28:	0.0	0.0	0.0	0.0
29:	0.0	0.0	0.0	0.0
30:	0.0	0.0	0.0	0.0
31:	0.0	0.0	0.0	0.0
32:	0.0	0.0	0.0	0.0
33:	0.0	0.0	0.0	0.0
34:	0.0	0.0	0.0	0.0
35:	0.0	0.0	0.0	0.0
36:	0.0	0.0	0.0	0.0
37:	0.0	0.0	0.0	0.0
38:	0.0	0.0	0.0	0.0
39:	0.0	0.0	0.0	0.0
40:	0.0	0.0	0.0	0.0
41:	0.0	0.0	0.0	0.0
42:	0.0	0.0	0.0	0.0
43:	0.0	0.0	0.0	0.0
44:	0.0	0.0	0.0	0.0
45:	0.0	0.0	0.0	0.0
46:	0.0	0.0	0.0	0.0
47:	0.0	0.0	0.0	0.0
48:	0.0	0.0	0.0	0.0
49:	0.0	0.0	0.0	0.0
50:	0.0	0.0	0.0	0.0
51:	0.0	0.0	0.0	0.0
52:	0.0	0.0	0.0	0.0
53:	0.0	0.0	0.0	0.0
54:	0.0	0.0	0.0	0.0
55:	0.0	0.0	0.0	0.0
56:	0.0	0.0	0.0	0.0
57:	0.0	0.0	0.0	0.0
58:	0.0	0.0	0.0	0.0
59:	0.0	0.0	0.0	0.0

VISIBLE EMISSION RESULT CALCULATION

TEST DATE:5/26/88

SOURCE: No. 1 Dryer Scrubber

PERMIT:AO29-111119

Rdgs: min\sec	00	15	30	45
0:	5	5	5	5
1:	5	5	5	5
2:	5	5	10	5
3:	5	5	5	5
4:	5	5	5	5
5:	5	5	5	5
6:	5	5	5	5
7:	5	5	5	5
8:	5	5	5	5
9:	5	5	5	5
10:	5	5	5	5
11:	5	5	5	5
12:	5	5	5	5
13:	5	5	5	5
14:	5	5	5	5
15:	5	5	5	5
16:	5	5	5	5
17:	5	5	5	5
18:	5	5	5	5
19:	5	5	5	5
20:	5	5	5	5
21:	5	5	5	5
22:	5	5	5	5
23:	5	5	5	5
24:	5	5	5	5
25:	5	5	5	5
26:	5	5	5	5
27:	5	5	5	5
28:	5	5	5	5
29:	5	5	5	5
30:	5	5	5	5
31:	5	5	5	5
32:	5	5	5	5
33:	5	5	5	5
34:	5	5	5	5
35:	5	5	5	5
36:	5	5	5	5
37:	5	5	5	5
38:	5	5	5	5
39:	5	5	5	5
40:	5	5	5	5
41:	5	5	5	5
42:	5	5	5	5
43:	5	5	5	5
44:	5	5	5	5
45:	5	5	5	5
46:	5	5	5	5
47:	5	5	5	5
48:	5	5	5	5
49:	5	5	5	5
50:	5	5	5	5
51:	5	5	5	5
52:	5	5	5	5
53:	5	5	5	5
54:	5	5	5	5
55:	5	5	5	5
56:	5	5	5	5
57:	5	5	5	5
58:	5	5	5	5
59:	5	5	5	5

Max 6 Minute Average 5.2%

Overall Average 5.0%

Test Length (minutes) 60

Process Weight Rate TPH 0

Individual 6 minute Averages

min\sec	00	15	30	45
5:				5.2
6:	5.2	5.2	5.2	5.2
7:	5.2	5.2	5.2	5.2
8:	5.2	5.2	5.0	5.0
9:	5.0	5.0	5.0	5.0
10:	5.0	5.0	5.0	5.0
11:	5.0	5.0	5.0	5.0
12:	5.0	5.0	5.0	5.0
13:	5.0	5.0	5.0	5.0
14:	5.0	5.0	5.0	5.0
15:	5.0	5.0	5.0	5.0
16:	5.0	5.0	5.0	5.0
17:	5.0	5.0	5.0	5.0
18:	5.0	5.0	5.0	5.0
19:	5.0	5.0	5.0	5.0
20:	5.0	5.0	5.0	5.0
21:	5.0	5.0	5.0	5.0
22:	5.0	5.0	5.0	5.0
23:	5.0	5.0	5.0	5.0
24:	5.0	5.0	5.0	5.0
25:	5.0	5.0	5.0	5.0
26:	5.0	5.0	5.0	5.0
27:	5.0	5.0	5.0	5.0
28:	5.0	5.0	5.0	5.0
29:	5.0	5.0	5.0	5.0
30:	5.0	5.0	5.0	5.0
31:	5.0	5.0	5.0	5.0
32:	5.0	5.0	5.0	5.0
33:	5.0	5.0	5.0	5.0
34:	5.0	5.0	5.0	5.0
35:	5.0	5.0	5.0	5.0
36:	5.0	5.0	5.0	5.0
37:	5.0	5.0	5.0	5.0
38:	5.0	5.0	5.0	5.0
39:	5.0	5.0	5.0	5.0
40:	5.0	5.0	5.0	5.0
41:	5.0	5.0	5.0	5.0
42:	5.0	5.0	5.0	5.0
43:	5.0	5.0	5.0	5.0
44:	5.0	5.0	5.0	5.0
45:	5.0	5.0	5.0	5.0
46:	5.0	5.0	5.0	5.0
47:	5.0	5.0	5.0	5.0
48:	5.0	5.0	5.0	5.0
49:	5.0	5.0	5.0	5.0
50:	5.0	5.0	5.0	5.0
51:	5.0	5.0	5.0	5.0
52:	5.0	5.0	5.0	5.0
53:	5.0	5.0	5.0	5.0
54:	5.0	5.0	5.0	5.0
55:	5.0	5.0	5.0	5.0
56:	5.0	5.0	5.0	5.0
57:	5.0	5.0	5.0	5.0
58:	5.0	5.0	5.0	5.0
59:	5.0	5.0	5.0	5.0

INTERNATIONAL MINERALS AND CHEMICAL CORPORATION

PROCESS INFORMATION AND CALCULATION

PLANT: IMC FT. LONESOME MINE STACK: NO. 7 DRYER SCRUBBER

TYPE OF CONTROL DEVICE: WET SCRUBBER

TYPE OF EMISSION TEST: PARTICULATE TESTER:

DATE: 5/25+26/88 SAMPLING TIME:

PERMIT NO.: A029-111119 ASP ORDER NO.:

THE OPERATION OF THIS SYSTEM HAS BEEN VERIFIED DURING THE TIME OF TESTING AS PER THE SUBMITTED PROCEDURE RELATIVE TO THE ABOVE ASP ORDER.

SIGNED:

PROCESS CALCULATION

SOURCE OF INFORMATION:

488 tph dry
1034 gph no 6 oil

AVG PROCESS RATE: MATERIAL: PHOSPHATE ROCK

EMISSION STANDARD: ALLOWABLE:

CALCULATED BY: DATE:

PROCESS STATEMENT

I CERTIFY THAT THE ABOVE STATEMENT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

SIGNATURE: X Ronald Thomas

TITLE: Prep. Supt.

DATE: July 7, 1988

OPERATING PARAMETER LOG for TEST: DATE 5/26 DRYER NO ____ BY _____

TIME	PRESSURE PSI	TIME	FLOW GPM	TIME	U/F pH	TIME	DELTA P in HOH	TIME	U/F TEMP
12:31	70	12:28	500	12:34	4.3	12:30	20	12:31	128
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	

48 2
3
-46
2

10:30 1522
12:30 2721
1199
2:30 3948

TIME	INLET TEMP	TIME	OIL METER	TIME	OIL LEVEL	TIME	SCALE TONS	TIME	FLAME PATTERN
12:30	190	09:07	333566	12:36	74.25"	09:06	0749	:	
:		09:39	333622	:		09:38	1031	:	
:		11:15	333790	:		11:14	1972	:	
:		11:54	333854	:		11:54	2346	:	
:		12:25	333912	:		12:26	2693	:	
:		12:44	333942	:		12:44	2859	:	
:		12:55	333963	:		14:20	3845	:	
:		14:20	334110	:		:		:	
:		:		:		:		:	
:		:		:		:		:	

52.5
46.6
5

52.5
51.7
.8

TIME	INLET WET BULB	OUT OVEN TIME	LOCATION	MOISTURE DETERMINATON WTS TARE	INITIAL	FINAL	TIME	BIN LEVEL 1	2	3	4
:		11:19	IN	2.5	52.5	46.6	:				
:		11:17	OUT	2.5	52.5	51.7	:				
:		14:47	IN	2.5	52.5	46.6	:				
:		14:48	OUT	2.5	52.5	51.7	:				
:		:	IN				:				
:		:	OUT				:				
:		:	IN				:				
:		:	OUT				:				
:		:	IN				:				
:		:	OUT				:				

IN OVEN
0855
0904
1400
1415

11.8 %
1.6 %
11.8%
2.6%

52.5
51.2
1.3

OPERATING PARAMETER LOG for TEST: DATE 5-25 DRYER NO 1 BY _____

TIME	PRESSURE PSI	TIME	FLOW GPM	TIME	U/F pH	TIME	DELTA P In HOH	TIME	U/F TEMP
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	

TIME	INLET TEMP	TIME	OIL METER	TIME	OIL LEVEL	TIME	SCALE TONS	TIME	FLAME PATTERN
:		12:00		:		:		:	
:		1:00	332762	:		:		:	
:		2:00	332863	:		:		:	
:		3:00	332968	:		:		:	
:		4:00	333066	:		:		:	
:		5:00	333170	:		:		:	
:		6:00	333265	:		:		:	
:		7:00	333371	:		:		:	
:		:		:		:		:	
:		:		:		:		:	

TIME	INLET WET BULB	TIME	LOCATION	MOISTURE DETERMINATON WTS TARE	INITIAL	FINAL	TIME	BIN LEVEL 1	2	3	4
:		:	IN				1:		65	84	
:		:	OUT				2:		62	82	
:		:	IN				3:		60	76	
:		:	OUT				4:		58	65	
:		:	IN				5:		54	55	
:		:	OUT				6:		52	50	
:		:	IN				7:		50	45	
:		:	OUT				:				
:		:	IN				:				
:		:	OUT				:				

TESTING PARAMETER LOG for TEST: DATE 5/25 DRYER NO ____ BY ____________

MARK STRIP CHARTS in CONTROL ROOM (time and for runs) rev 5/23/88

TIME	EVENT LOG
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
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:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	

TIME	NOx ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

TIME	OSO ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

TIME	VOC ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

ROCK TEMPERATURE OUT

TIME	BELT OUT	METER
9:35	76°C	200°F
17:23	84°C	208°F
:		
:		

TIME	
:	
:	
:	
:	
:	

TIME SO2 NOx runs	SAMPLE	TIME	SAMPLE (SO2) runs
:	OIL	:	U/F
:	OIL	:	U/F
:	OIL	:	U/F
1/day :	FEED	:	IN
:	FEED	:	IN
:	FEED	:	IN

TIME	OO 1	OO 2	OO 3
:			
:			
:			
:			
:			
:			
:			

TIME	OCO 1	OCO 2	OCO 3
:			
:			
:			
:			
:			
:			
:			

TIME	T AMB	TIME	T ROCK IN
:		9:35	26°C
:		17:17	26°C
:		:	
:		:	

With moisture SO 's

TESTING PARAMETER LOG for TEST: DATE 5/25 DRYER NO ____ BY ____

MARK STRIP CHARTS in CONTROL ROOM (time and for runs) rev 5/23/88

TIME	EVENT LOG
10:30	0.8 ppn VOC
12:00	60ppm NOx
:	fuel varying
12:08	Dryer down
:	9
:	15 mins
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	
:	

TIME	NOx ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

TIME	OSO ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

TIME	VOC ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

ROCK TEMPERATURE OUT

TIME	BELT	METER
:		
:		
:		
:		

TIME	
:	
:	
:	
:	
:	
:	

TIME	SAMPLE	TIME	SAMPLE
:	OIL	:	U/F
:	OIL	:	U/F
:	OIL	:	U/F
:	FEED	:	IN
:	FEED	:	IN
:	FEED	:	IN

TIME	OO 1	OO 2	OO 3
:			
:			
:			
:			
:			
:			
:			

TIME	OCO 1	OCO 2	OCO 3
:			
:			
:			
:			
:			
:			
:			

TIME	T AMB	TIME	T ROCK IN
:		:	
:		:	
:		:	
:		:	

OPERATING PARAMETER LOG for TEST: DATE 5-25 DRYER NO 1 BY _____

TIME	PRESSURE PSI	TIME	FLOW GPM	TIME	U/F pH	TIME	DELTA P In HOH	TIME	U/F TEMP
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	

TIME	INLET TEMP	TIME	OIL METER	TIME	OIL LEVEL	TIME	SCALE TONS	TIME	FLAME PATTERN
:		12:00		:		:		:	
:		1:00	3302112	:		:		:	
:		2:00	3302212	:		:		:	
:		3:00	3302312	:		:		:	
:		4:00	3302666	:		:		:	
:		5:00	3302720	:		:		:	
:		6:00	3302845	:		:		:	
:		7:00	3302971	:		:		:	
:		:		:		:		:	
:		:		:		:		:	

TIME	INLET WET BULB	TIME	LOCATION	MOISTURE DETERMINATON WTS TARE	INITIAL	FINAL	TIME	BIN LEVEL 1	2	3	4
:		:	IN				1:		65	24	
:		:	OUT				2:		62	82	
:		:	IN				3:		60	76	
:		:	OUT				4:		52	61	
:		:	IN				5:		51	55	
:		:	OUT				6:		52	50	
:		:	IN				7:		50	45	
:		:	OUT				:				
:		:	IN				:				
:		:	OUT				:				

OPERATING PARAMETER LOG for TEST: DATE 5-26 DRYER NO 1 BY _____

TIME	PRESSURE PSI	TIME	FLOW GPM	TIME	U/F pH	TIME	DELTA P in HOH	TIME	U/F TEMP
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	
:		:		:		:		:	

TIME	INLET TEMP	TIME	OIL METER	TIME	OIL LEVEL	TIME	SCALE TONS	TIME	FLAME PATTERN
:		8:55	333644	:		10:30	1522	:	
:		9:55	333653	:		12:30	2721	:	
:		10:55	333748	:		2:30	3587	:	
:		11:55	333864	:		3:00	4225	:	
:		12:55	333963	:		4:00	4865	:	
:		1:55	334068	:		4:45	5354	:	
:		2:55	334173	:		:		:	
:		3:55	334276	:		:		:	
:		~~3~~ 4:45	334364	:		:		:	
:		:		:		:		:	

TIME	INLET WET BULB	TIME	LOCATION	MOISTURE DETERMINATON WTS TARE	INITIAL	FINAL	TIME	BIN LEVEL 1	2	3	4
:		:	IN				10:30	41			
:		:	OUT				12:30	27			
:		:	IN				2:30	15			
:		:	OUT				3:00	12			
:		:	IN				3:10		53		
:		:	OUT				4:00		47		
:		:	IN				4:45		40		
:		:	OUT				:				
:		:	IN				:				
:		:	OUT				:				

TESTING PARAMETER LOG for TEST: DATE 5/26 DRYER NO ____ BY ____________
MARK STRIP CHARTS in CONTROL ROOM (time and for runs) rev 5/23/88

TIME	EVENT LOG
:	
:	
:	
:	
:	
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:	
:	
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:	
:	
:	
:	
:	
:	
:	
:	

VOC
Runs
1 0.15
2 0.1
3 0.6
4 0.2

TIME	NOx ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

TIME	OSO ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

TIME	VOC ppm	RUN
:		1 START
:		1 MID
:		1 END
:		2 START
:		2 MID
:		2 END
:		3 START
:		3 MID
:		3 END

ROCK TEMPERATURE OUT

TIME	BELT	METER
09:01	92°C	199°F
14:05	82°C	188°F
:		
:		

TIME	
:	
:	
:	
:	
:	
:	

TIME	SAMPLE	TIME	SAMPLE
:	OIL	:	U/F
:	OIL	:	U/F
:	OIL	:	U/F
:	FEED	:	IN
:	FEED	:	IN
:	FEED	:	IN

TIME	CO 1	CO 2	CO 3
:			
:			
:			
:			
:			
:			
:			

TIME	OCO 1	OCO 2	OCO 3
:			
:			
:			
:			
:			
:			
:			

TIME	T AMB	TIME	T ROCK IN
:		08:55	27°C
:		14:00	27°C
:		:	
:		:	

PEMBROKE LABORATORIES, INC.

(813) 285-8742 (813) 533-0969
Mailing address: 528 Gooch Rd., Ft. Meade, FL. 33841

IMC Noralyn
P. O. Box 867
Bartow, Florida 33830

Date Received: 05-31-88

Date Reported: 06-20-88

Attn: Mr. J. N. Allen

P.O. #UCP8543

Lab Numbers		MC-6057	MC-6058	MC-6059	MC-6060
Sample I.D.		12A	13A	14A	15A
BTU/lb		18434.	18376.	18408.	18351.
Density	@ 23oC	0.983	0.986	0.986	0.990
Carbon	%	86.84	86.66	86.76	86.41
Hydrogen	%	10.09	10.30	9.99	10.73
Nitrogen	%	0.34	0.39	0.37	0.40
Oxygen	%	0.94	1.25	1.09	0.92
Sulfur	%	1.63	1.65	1.75	1.70
Ash	%	<0.0012	0.058	0.0019	0.014

Thank you for this opportunity to serve you!

Respectfully submitted,

KATHRYN E. GARRISON
Laboratory Supervisor

ALLAN E. SCHREIBER
Vice President

Laboratory I.D. 84172

BELT SCALE TEST REPORT

Best Available Copy

USER & LOCATION: LONESome PREP

DATE: 3-11-93 CONVEYOR NO.: #1 WEIGH FEEDER TEST BY: Williams/BEERY

TEST LENGTH: 465 FEET: 15 REVOLUTIONS: 7 MIN. 18 SEC. TIME

TEST CHAIN CAL CON: NA TONS R-CAL: NA TONS

STATIC WTS. TEST TONS = 26.38

FUNCTION	AS FOUND	AS LEFT		
TOTAL	NA	NA		
ZERO	9129	9224		
SPAN	26695	26817		
TEST DUR	4772	4772		
~~CAL CON~~ TEST TONS		26.40		

ZERO BALANCE TEST

TEST NO.	1	2	3	4	5	6
READING AFTER	9223	9221	9223			
READING START	9129	9223	9224			
DIFFERENCE	94	2	1			
ERROR IN %	1.0%	.02%	.01%			
ZERO NO.	9223	9223	9224			

SPAN TEST

TEST NO.	2	2	3	4	5	6
READING AFTER	26776	26857	26837	26817		
READING START	26695	26776	26857	26837		
REG ~~CAL CON~~ TEST TONS	26.30	26.30	26.40	26.40		
~~CAL CON~~ TEST TONS	26.38	26.38	26.38	26.38		
DIFFERENCE	.08	.08	.02	.02		
ERROR IN %	.3%	-.3%	.07%	.07%		
SPAN NO.	26776	26857	26837	26817		

COMMENTS:

air consulting and engineering

SOURCE TEST REPORT

for

OXIDES OF NITROGEN, SULFUR DIOXIDE,
PARTICULATE, AND
VOLATILE ORGANIC COMPOUND EMISSIONS

at

INTERNATIONAL MINERALS AND CHEMICAL CORPORATION
NUMBER 1 ROCK DRYER
FT. LONESOME MINE
BRADLEY, FLORIDA

FDER PERMIT NO. A029-111119
PSD-FL-088

MAY 25-26, 1988

Prepared for:

INTERNATIONNAL MINERALS AND CHEMICAL CORPORATION
POST OFFICE BOX 867
BARTOW, FLORIDA 33830

Prepared by:

AIR CONSULTING AND ENGINEERING, INC.
2106 N.W. 67th PLACE, SUITE 4
GAINESVILLE, FLORIDA 32606
(904) 335-1889

191-88-01

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To the best of my knowledge, all applicable field and analytical procedures comply with Florida Department of Environmental Regulation requirements and all test data and plant operating data are true and correct.

Stephen L. Neck

Stephen L. Neck. P.E.

State of Florida
Registration No. 20020

July 6, 1988

Date

SEAL

1.0 INTRODUCTION

Personnel from Air Consulting and Engineering, Inc. (ACE) performed Environmental Protection Agency (EPA) reference Method 7E continuous emission monitoring (CEM) for oxides of nitrogen (NO_x), EPA Method 6 SO_2, EPA Method 5 for particulate matter, and EPA Method 25A for Volatile Organic Compounds (VOC) emission measurements at International Minerals and Chemical Corporation's (IMC) Lonesome Mine Number 1 rock dryer. This work was performed on May 25-26, 1988, under contract to IMC.

Mr. Mike Silcott of the Hillsborough County Environmental Protection Commission observed testing.

Mr. Dave Turley of IMC served as test coordinator and compiled production rate data. This data as well as allowable emission calculations are not included in this submittal.

2.0 SUMMARY AND DISCUSSION OF RESULTS

Results of the NO_x, SO_2, and particulate emission testing are summarized in Tables 1 and 2. Complete emission data are provided in Appendix A. Discussion of individual parameters (including VOC) is provided below.

2.1 Particulate Emission Testing

ACE was contracted to perform EPA Method 7E for NO_x, EPA Method 6 for SO_2, and EPA Method 25A for VOC testing. Upon arrival at the site, however, it was felt that deteriorating weather conditions might limit the time available for the IMC particulate test crew to test both this source and another source scheduled for the same production period. Since available product storage capacity would only allow about 20 hours of dryer run-time inculding start-ups with no further production scheduled for the forseeable future, it was decided that ACE should perform the particulate testing in conjunction with the aforementioned tests. Unfortunately, the longer glass probe necessary for the particulate traverse had been utilized the prior weekend for a moisture run on a glass furnace source. The high heat had vaporized glue in the glass fiber tape used to secure nicrome wire (heating material) to the probe and a high temperature expansion at the nozzle/probe interface had severely contaminated the probe with a heavy viscous organic deposit. The present ACE test team was not aware of this prior event.

Table 1 Emission Summary
IMC-Lonesome Mine
Unit 1
May 25-26. 1988

Date	Time	Run Number	Volumetric Flow SCFMD	Particulate Emissions lb/Hr	NO_x Emissions ppm_d	NO_x Emissions lb/Hr~	SO_2 Emissions ppm_d	SO_2 Emissions lb/Hr
5/25/88	1314-1512	1	87081	39.64	90	56.15	94	81.40
	1604-1728	2	99846	27.75	87	62.23	90	89.11
	1750-1909	3	87563	19.46	85	53.32	85	73.89
5/26/88	1034-1149	4	81295	15.44	79	46.01	--	---
	1244-1359	5	80450	15.11	--	---	--	---
	0957-1017	1S	81295	---	--	---	112	90.81
	1051-1111	2S	81295	---	--	---	118	95.67
	1133-1153	3S	81295	---	--	---	110	89.38
	1221-1241	4S	80450	---	--	---	92	74.09
	1303-1323	5S	80450	---	--	---	99	79.27
	1342-1402	6S	80450	---	--	---	115	92.54
AVERAGE	-----	--	87247*	16.67**	85	54.43	102	85.13

~ NO_x lb/Hr = (1.194×10^{-7}) (ppm_d) (SCFMD) (60)

* Average Runs 1 through 5

** Average Runs 3. 4. and 5

Table 2 Summary of EPA Method 25 VOC Testing
IMC-Lonesome Mine
Unit 1
May 25-26. 1988

Date	Time	Stack ppm as C_3H_8	Ambient ppm as C_3H_8	Drift Values Begin ppm	Drift Values End ppm
5/25/88	1032-1053	0.8	0.95	9.45	Not Performed
	1331-1407	0.8	1.00	9.45	8.60
	1453-1553	0.0	1.20	5.00	7.20
	1654-1709	0.5	1.00	3.00	3.40
	1734-1744	0.7	1.00	5.00	5.40
	1802-1812	0.3	1.20	5.00	5.40
	1856-1908	0.4	1.15	3.00	3.00
5/26/88	1053-1059	1.8	1.30	3.00	3.50
	1126-1131	0.3	1.10	3.00	3.40
	1147-1202	0.3	1.30	3.15	3.15
	1230-1245	0.2	1.25	5.00	4.90
	1313-1328	0.5	1.05	2.85	2.75
	1416-1435	0.5	1.30	3.10	3.10

Initial acetone washing of the probe did not sufficiently cleanse the contamination, therefore, biasing the particulate test Runs 1 and 2 probe wash portions of the catch (NOTE: Appendix B--Laboratory Analysis). The problem was not discovered until samples were inspected by the field team leader while test Run 3 was in progress. It was then decided to void the first two test runs for this reason. Although results for these runs are presented in Table 1, they are not included in the particulate emission averages.

2.2 Sulfur Dioxide Testing

The sulfur dioxide testing for test Runs 1-3 was performed in the same train as particulate. Although the EPA allows this modification, the Florida Department of Environmental Regulation (FDER) has thus far failed to sanction this practice (for some reason known only to them). To avoid potential regulatory complications, it was decided to retest SO_2 on May 26, 1988, using a separate test train and an additional crew was brought in for this purpose. All SO_2 results are provided in Table 1 and all results are incorporated in the emission averages.

2.3 Oxides of Nitrogen (NO_x) Testing

EPA Method 7E NO_x emission data (as well as SO_2 data) were reported in terms of mass emissions (pounds per hour) through use of the EPA Method 5 flow

data corresponding to the test times as near as possible. The EPA Method 5 Run 2 was out of line with the other EPA Method 5 flow determinations (18.7% higher than the average of Runs 1, 3, 4, and 5). As this value adversely impacted Run 2 NO_x emissions on a mass basis, a fourth test run was conducted for insurance purposes. All test results are included in the emission averages.

2.4 Volatile Organic Compound (VOC) Testing

Several attempts of EPA Method 25A VOC testing on a wet basis have been performed on this source. Three separate Flame Ionization Detector (FID) instruments have been used for this application. A Byron Model 215 was used on both a dry and a wet test series. Dry test results were excellent, but it was feared that some VOC may have been lost to the sample system (although zero and span drift checks failed to reveal any such problems). The wet test attempt using the Byron was unsucessful as condensate occurred in unheated portions of the instrument. A Ratfitch RS 55 was abandoned prior to field use because it did not have the sensitively for a 0-10 ppm propane range (compliance to be established at less than 2 ppm). A Jum Model 3-100 was used in the latest attempt. Results are provided in Table 2. This table reflects all available data collected during the test period. The data has not been averaged or mass quantified as none of it can be rigorously defended quantitatively. Although no condensate was

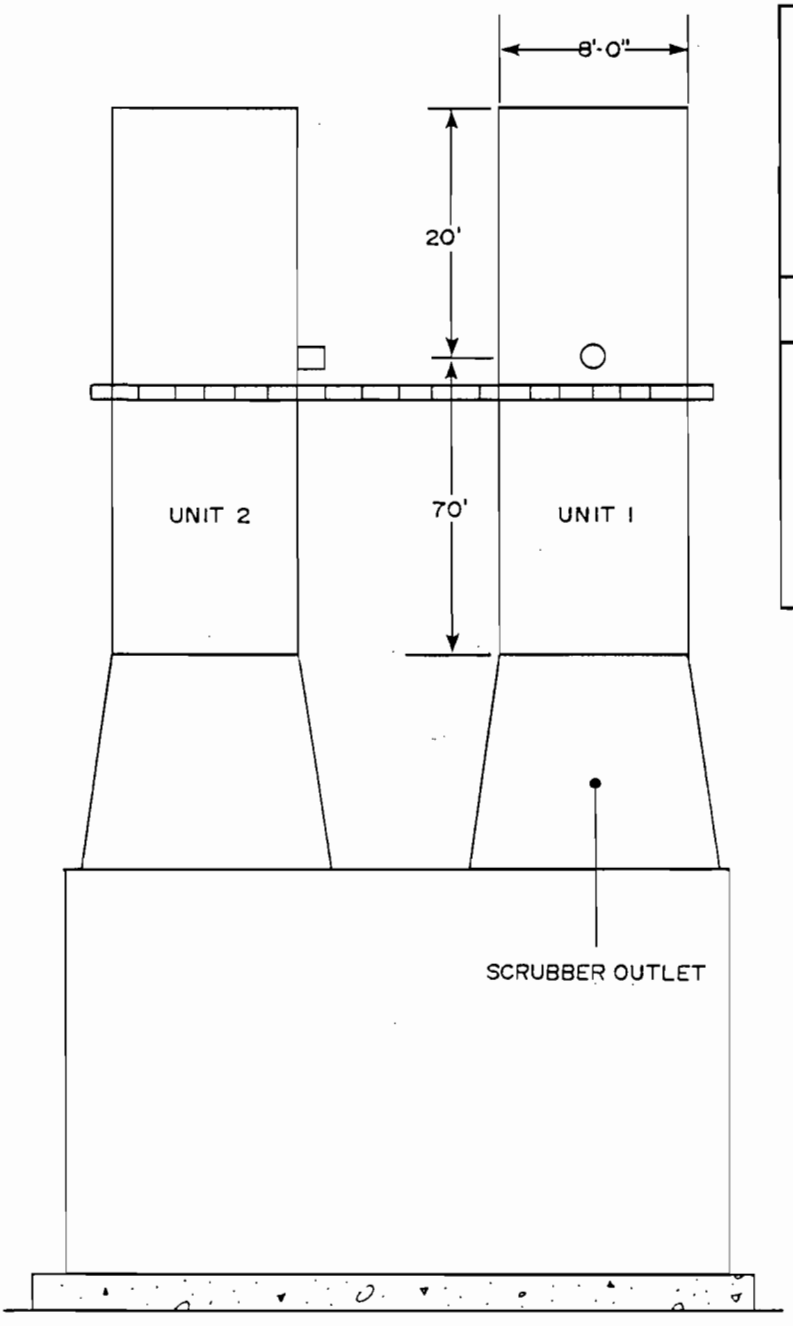
experienced, there were a lot of problems with flame-outs and drift as a review of the Appendix C strip chart data will reveal (the original strip chart is provided as an attachment for clarity). Although the instrument appeared to work very well on calibration gases (several four point calibrations provided) and ambient air, severe drift problems occurred when sampling source gases. From a review of the data and discussion with FID manufacturers, it appears that the high moisture content of the source gases tends to dampen the ionization response of the detector and produce a negative drift. Generally speaking, analyzer response would return to pre-test conditions following a sufficient dry gas purge period following each test attempt. Although perhaps a premature conclusion, it is very doubtful that a 33% moisture gas stream can be successfully analyzed by EPA Method 25A on a 0-10 ppm range.

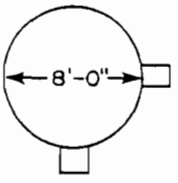
3.0 PROCESS DESCRIPTION AND OPERATION

Units 1 and 2 are utilized to dry phosphate rock using Number 6 fuel oil as a combustion source. The dryers are a fluidized bed design and emissions are controlled by an Entoleter Certrifield Wet Scrubber.

4.0 SAMPLING POINT LOCATION

The sampling point location and outlet duct schematic are provided in Figure 1.





TRAVERSE POINT NUMBER	INCHES INSIDE STACK WALL
1	4.125
2	14.00
3	28.38
4	67.56
5	81.94
6	91.83

FIGURE 1.
SAMPLING POINT LOCATION
UNIT 1
INTERNATIONAL MINING AND CHEMICAL CORP
FORT LONESOME, FLORIDA

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5.0 FIELD AND ANALYTICAL PROCEDURES

5.1 Particulate Matter and Sulfur Dioxide (SO_2) Sampling and Analysis (EPA Method 5/6)

Particulate matter and SO_2 samples were collected by the emission measurement method specified by the United States Environmental Protection Agency (EPA). Hydrogen peroxide (H_2O_2) was used as the collection media for SO_2. A schematic diagram of the sampling train used is shown in Figure 2. All particulate matter captured from the nozzle to, and including, the filter was included in the calculation of the emission rate of particulate matter.

PREPARATION OF EQUIPMENT

1. FILTERS - Gelman type "A" filters were placed in a drying oven for two hours at 105 degrees C, removed and placed in a standard desiccator containing indicating silica gel, allowed to cool for two hours, and weighed to the nearest 0.1 mg. The filters were then re-desiccated for a minimum of six hours and weighed to a constant weight (less than 0.5 mg change from previous weighing). The average of the two constant weights was used as the tare weight.

2. NOZZLE, FILTER HOLDER, FLEXIBLE TEFLON® TUBING, AND SAMPLING PROBE - The nozzle, filter holder, flexible Teflon® tubing, and sampling probe were washed vigorously with soapy water and brushes, rinsed with acetone and distilled water, and dried prior to the test program. All openings on the sampling equipment were sealed while in transit to the test site.

3. IMPINGERS - The Greenburg-Smith impingers were cleaned with a warm soapy water solution and brushes, rinsed with distilled water and acetone, and dried. The impingers were sealed tightly during transit.

TEST PROCEDURE

Prior to performing the actual sample runs, certain stack and stack gas parameters were measured. These preliminary measurements included the average

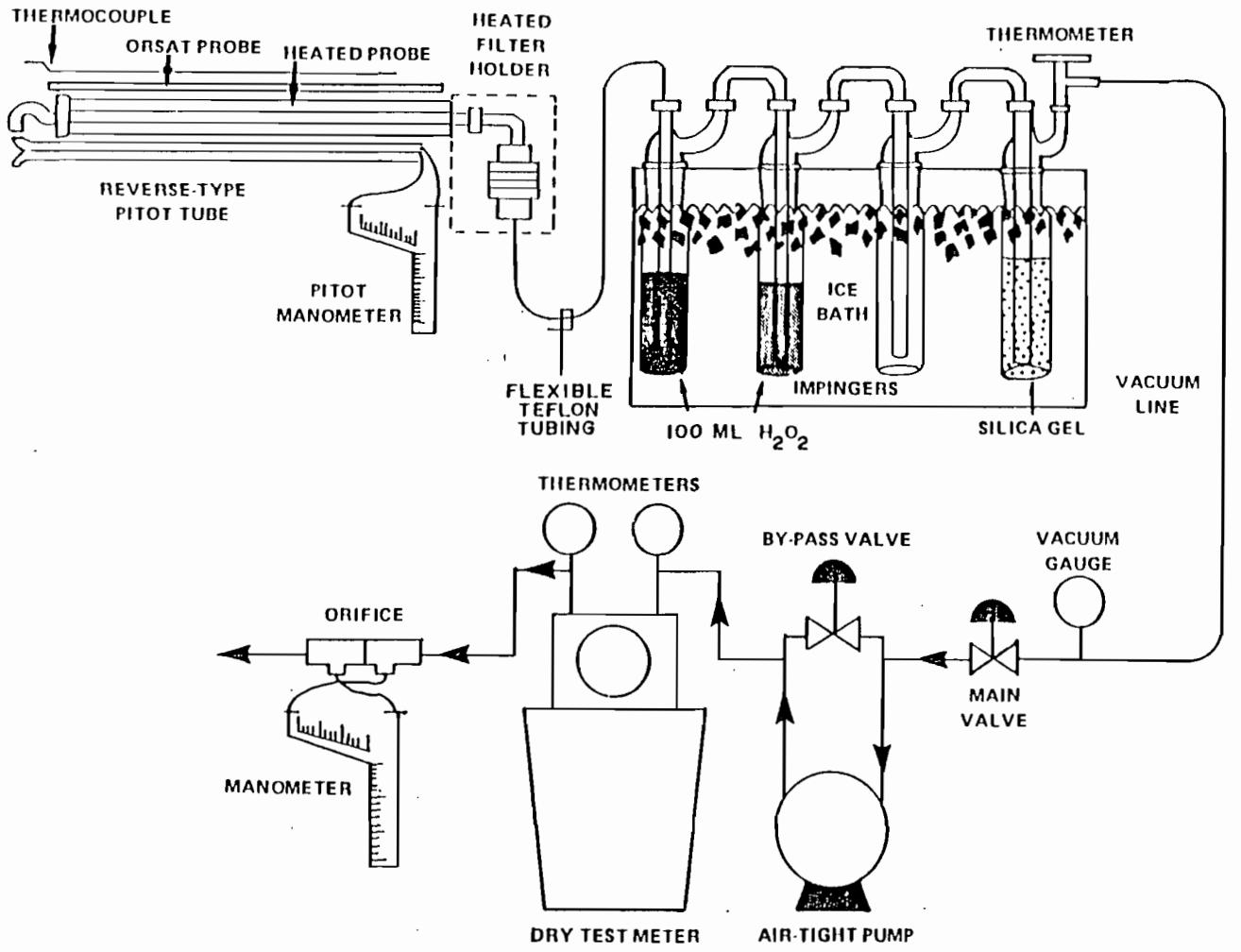

FIGURE 2

EPA METHOD 5/6 SAMPLING TRAIN

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gas temperature, the stack gas velocity head, the stack gas moisture content, and the stack dimensions at the point where the tests were being performed. The stack gas temperature was determined by using a bi-metallic thermocouple and calibrated pyrometer. Velocity head measurements were made with calibrated type "S" pitot tube and an inclined manometer. Velocity head measurements of 0.05 inches H_2O or less were measured utilizing a micromanometer.

The sampling traverse points were selected so that a representative sample could be extracted from the gas stream. The traverse points were located in the center of equal areas, the number of which were dependent upon the distance upstream and downstream from flow disturbances.

Each test run consisted of sampling for a specific time at each traverse point. The type "S" pitot tube was connected to the sampling probe so that an instantaneous velocity head measurement could be made at each traverse point while making the test run. The stack gas temperature was also measured at each traverse point. Nomographs were used to calculate the isokinetic sampling rate at each traverse point during each test run.

The gases sampled passed through the following components: a stainless steel nozzle and pyrex glass probe; a glass fiber filter; flexible Teflon® tubing; two impingers each with 100 ml of three percent hydrogen peroxide; one impinger dry; one impinger with 200 grams of silica gel; a flexible sample line; an air-tight pump; a dry test meter; and a calibrated orifice. The second impinger had a standard tip, while the first, third, and fourth

impingers had modified tips with a 0.5 inch I.D. opening. Sample recovery was accomplished by the following procedures:

1. The pre-tared filter was removed from its holder and placed in Container 1 and sealed. (This is usually performed in the lab.)

2. All sample-exposed surfaces prior to the filter were washed with acetone and placed in Container 2, sealed and the liquid level marked.

3. The volume of condensate from the first three impingers was measured for calculating stack gas moisture and then placed in Container 3. All sample exposed surfaces from the rear half of the filter holder through the dry trap impinger were thoroughly washed with distilled-deionized water and the washings were also placed in Container 3. The container was sealed and the liquid level marked.

4. The used silica gel from the fourth impinger was transferred to its original container and sealed.

LABORATORY ANALYSIS

The four sample containers from each sample run were analyzed according to the following procedures:

1. The filter was dried at 105 degrees C for three hours, desiccated for a minimum of one hour, and weighed to the nearest 0.1 mg. A minimum of two such weighings six hours apart was made to determine constant weight.

2. The acetone from Container 2 was tranferred to a tared beaker and evaporated to dryness at ambient temperature and pressure, desiccated for 24 hours, and weighed to the nearest 0.1 mg. A minimum of two such weighings six hours apart were made to determine constant weight.

3. A sample aliquot was taken and added to isopropanol in a 20/80 ratio. Thorin indicator was added and the solution was titrated to a pink endpoint using nominal 0.0100 normal barium perchlorate. Replicate titrations were made until results agreed within 1% or 0.2 ml. Blanks were titrated in the same fashion.

4. The used silica gel in its tared container was weighed to the nearest gram.

5.2 Oxides of Nitrogen (NO_x) Testing--EPA Method 7E

Thermo Electron Model 10 AR analyzer was utilized for the 7E testing. NBS (National Bureau of Standards) calibration gases were introduced at the sampling interface using a three-way motorized valve. The gases are then pulled through an ice-chilled H_2O knock-out trap attached to the end of a sample probe through approximately 150 feet of 1/4" O.D. Teflon® tubing to a filtered pump and manifold system. All testing and Q/A procedures were conducted in accordance with EPA Method 7E and documentation is provided in Appendix C.

5.3 Volatile Organic Compound (VOC) Testing--EPA Method 25A

A heat trace line was utilized to bring a moisture laden sample to a JUM 3-100 FID analyzer with heated pump and analytical system. The instrument was calibrated on a 0-10 ppm C_3H_8 range using zero air, 3, 5, and 9.45 propane in air calibration gases introduced through a three-way valve at the sample interface.

APPENDIX A

PARTICULATE AND SO_2 EMISSION DATA

Table 1

Summary of Particulate Matter Emissions

IMC FERTILIZER INC
FORT LONESOME, FLORIDA
DRYER UNIT 1
Dates: 5/25/88 , 5/26/88

Run No.	Stack Gas Flow Rate (SCFMD)	Stack Gas Temperature (Deg F)	Stack Gas Moisture (%)	Particulate Matter Conc. (gr/SCF)	Particulate Matter Emission Rate (Lbs/Hr)
1	87081	163	31.4	0.0531	39.64
2	99846	162	32.5	0.0324	27.75
3	87563	165	33.6	0.0259	19.46
4	81295	162	34.2	0.0222	15.44
5	80450	165	34.4	0.0219	15.11
Avg	87247	164	33.2	0.0311	23.48

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Complete Emission Results

Plant:	IMC FERTILIZER INC		
Location:	FORT LONESOME. FLORIDA	Date:	5/25/88
Stack:	DRYER UNIT 1	Run 1	From 1314 - 1512

Y Factor	0.990		Nozzle Diameter	0.236	In
Total Time	72.00	Min	Nozzle Area	0.000304	Sq Ft
Stack Area	50.270	Sq Ft	Barometric Pressure	29.72	''Hg
Stack Temperature	163	Deg F	Meter Temperature	86	Deg F
Stack Pressure	29.73	''Hg	Meter Orifice Diff	0.831	''H2O
Stack SQR Vel Head	0.769	''H2O	Meter Volume	34.201	cf
			Condensate Vol	316.70	ml

1.	Volume Water Vapor Sampled	14.948	SCF
2.	Volume Standard Dry Gas Sampled	32.601	SCF
3.	Total Standard Sample Volume	47.549	SCF
4.	Percent Water	31.438	
5.	Percent Dry Air	68.562	
6.	Molecular Weight of Dry Stack Gas	29.016	
7.	Molecular Weight of Wet Stack Gas	25.553	
8.	Specific Gravity Stack Gas	0.89	
9.	Percent Oxygen [0.2]	13.80	
10.	Percent Carbon Dioxide [CO.2]	2.90	
11.	Percent Excess Air	168.473	
12.	Velocity of Stack	49.997	FPS
13.	Actual Volumetric Flow	150800	ACFM
14.	Dry Volumetric Flow	103392	ACFMD
15.	Standard Volumetric Flow	87081	SCFMD
16.	Emission Rate	0.0531	gr/SCF
17.	Emission Rate	0.0307	gr/ACF
18.	Emission Rate	39.64	Lbs/Hr
19.	Percent Isokinetic	86.0	
20.	SO2 Concentration	0.00001558	Lbs/SCF
21.	SO2 Emission Rate	81.40	Lbs/Hr
22.	SO2 Parts per Million [Dry Basis]	93.85	
23.	SO2 Parts per Million [Wet Basis]	64.35	

Probe/Nozzle Wash	87	Mg
Filter	25.2	Mg
Total	112.200	Mg

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Complete Emission Results

Plant:	IMC FERTILIZER INC		
Location:	FORT LONESOME. FLORIDA	Date:	5/25/88
Stack:	DRYER UNIT 1	Run 2	From 1604 - 1728

Y Factor	0.990		Nozzle Diameter	0.236	In
Total Time	72.00	Min	Nozzle Area	0.000304	Sq Ft
Stack Area	50.270	Sq Ft	Barometric Pressure	29.72	''Hg
Stack Temperature	162	Deg F	Meter Temperature	88	Deg F
Stack Pressure	29.73	''Hg	Meter Orifice Diff	1.291	''H2O
Stack SQR Vel Head	0.893	''H2O	Meter Volume	43.134	cf
			Condensate Vol	418.10	ml

1.	Volume Water Vapor Sampled	19.734	SCF
2.	Volume Standard Dry Gas Sampled	41.018	SCF
3.	Total Standard Sample Volume	60.753	SCF
4.	Percent Water	32.483	
5.	Percent Dry Air	67.517	
6.	Molecular Weight of Dry Stack Gas	29.052	
7.	Molecular Weight of Wet Stack Gas	25.462	
8.	Specific Gravity Stack Gas	0.88	
9.	Percent Oxygen [O.2]	13.50	
10.	Percent Carbon Dioxide [CO.2]	3.20	
11.	Percent Excess Air	158.988	
12.	Velocity of Stack	58.135	FPS
13.	Actual Volumetric Flow	175347	ACFM
14.	Dry Volumetric Flow	118389	ACFMD
15.	Standard Volumetric Flow	99846	SCFMD
16.	Emission Rate	0.0324	gr/SCF
17.	Emission Rate	0.0185	gr/ACF
18.	Emission Rate	27.75	Lbs/Hr
19.	Percent Isokinetic	94.4	
20.	SO2 Concentration	0.00001488	Lbs/SCF
21.	SO2 Emission Rate	89.11	Lbs/Hr
22.	SO2 Parts per Million [Dry Basis]	89.61	
23.	SO2 Parts per Million [Wet Basis]	60.50	

Probe/Nozzle Wash	60.4	Mg
Filter	25.8	Mg
Total	86.200	Mg

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Complete Emission Results

Plant:	IMC FERTILIZER INC		
Location:	FORT LONESOME, FLORIDA	Date:	5/25/88
Stack:	DRYER UNIT 1	Run 3	From 1750 - 1909

Y Factor	0.990		Nozzle Diameter	0.236	In
Total Time	72.00	Min	Nozzle Area	0.000304	Sq Ft
Stack Area	50.270	Sq Ft	Barometric Pressure	29.72	''Hg
Stack Temperature	165	Deg F	Meter Temperature	89	Deg F
Stack Pressure	29.73	''Hg	Meter Orifice Diff	1.018	''H2O
Stack SQR Vel Head	0.797	''H2O	Meter Volume	38.526	cf
			Condensate Vol	392.50	ml

1.	Volume Water Vapor Sampled	18.526	SCF
2.	Volume Standard Dry Gas Sampled	36.534	SCF
3.	Total Standard Sample Volume	55.060	SCF
4.	Percent Water	33.647	
5.	Percent Dry Air	66.353	
6.	Molecular Weight of Dry Stack Gas	29.044	
7.	Molecular Weight of Wet Stack Gas	25.328	
8.	Specific Gravity Stack Gas	0.88	
9.	Percent Oxygen [O.2]	13.70	
10.	Percent Carbon Dioxide [CO.2]	3.10	
11.	Percent Excess Air	165.763	
12.	Velocity of Stack	52.121	FPS
13.	Actual Volumetric Flow	157208	ACFM
14.	Dry Volumetric Flow	104312	ACFMD
15.	Standard Volumetric Flow	87563	SCFMD
16.	Emission Rate	0.0259	gr/SCF
17.	Emission Rate	0.0144	gr/ACF
18.	Emission Rate	19.46	Lbs/Hr
19.	Percent Isokinetic	95.9	
20.	SO2 Concentration	0.00001406	Lbs/SCF
21.	SO2 Emission Rate	73.89	Lbs/Hr
22.	SO2 Parts per Million [Dry Basis]	84.73	
23.	SO2 Parts per Million [Wet Basis]	56.22	

Probe/Nozzle Wash	28.7	Mg
Filter	32.7	Mg
Total	61.400	Mg

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Complete Emission Results

Plant:	IMC FERTILIZER INC		
Location:	FORT LONESOME. FLORIDA	Date:	5/26/88
Stack:	DRYER UNIT 1	Run 4	From 1034 - 1149

Y Factor	0.990		Nozzle Diameter	0.236	In
Total Time	72.00	Min	Nozzle Area	0.000304	Sq Ft
Stack Area	50.270	Sq Ft	Barometric Pressure	29.82	''Hg
Stack Temperature	162	Deg F	Meter Temperature	86	Deg F
Stack Pressure	29.83	''Hg	Meter Orifice Diff	0.958	''H2O
Stack SQR Vel Head	0.743	''H2O	Meter Volume	37.488	cf
			Condensate Vol	395.20	ml

1.	Volume Water Vapor Sampled	18.653	SCF
2.	Volume Standard Dry Gas Sampled	35.851	SCF
3.	Total Standard Sample Volume	54.505	SCF
4.	Percent Water	34.223	
5.	Percent Dry Air	65.777	
6.	Molecular Weight of Dry Stack Gas	29.060	
7.	Molecular Weight of Wet Stack Gas	25.275	
8.	Specific Gravity Stack Gas	0.88	
9.	Percent Oxygen [O.2]	13.70	
10.	Percent Carbon Dioxide [CO.2]	3.20	
11.	Percent Excess Air	166.294	
12.	Velocity of Stack	48.449	FPS
13.	Actual Volumetric Flow	146133	ACFM
14.	Dry Volumetric Flow	96121	ACFMD
15.	Standard Volumetric Flow	81295	SCFMD
16.	Emission Rate	0.0222	gr/SCF
17.	Emission Rate	0.0123	gr/ACF
18.	Emission Rate	15.44	Lbs/Hr
19.	Percent Isokinetic	101.4	

Probe/Nozzle Wash	29.3	Mg
Filter	22.2	Mg
Total	51.500	Mg

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Complete Emission Results

Plant:	IMC FERTILIZER INC		
Location:	FORT LONESOME, FLORIDA	Date:	5/26/88
Stack:	DRYER UNIT 1	Run 5	From 1244 - 1359

Y Factor	0.990		Nozzle Diameter	0.236	In
Total Time	72.00	Min	Nozzle Area	0.000304	Sq Ft
Stack Area	50.270	Sq Ft	Barometric Pressure	29.82	''Hg
Stack Temperature	165	Deg F	Meter Temperature	91	Deg F
Stack Pressure	29.83	''Hg	Meter Orifice Diff	0.953	''H2O
Stack SQR Vel Head	0.741	''H2O	Meter Volume	37.409	cf
			Condensate Vol	393.20	ml

1.	Volume Water Vapor Sampled	18.559	SCF
2.	Volume Standard Dry Gas Sampled	35.427	SCF
3.	Total Standard Sample Volume	53.986	SCF
4.	Percent Water	34.378	
5.	Percent Dry Air	65.622	
6.	Molecular Weight of Dry Stack Gas	29.340	
7.	Molecular Weight of Wet Stack Gas	25.442	
8.	Specific Gravity Stack Gas	0.88	
9.	Percent Oxygen [O.2]	13.50	
10.	Percent Carbon Dioxide [CO.2]	5.00	
11.	Percent Excess Air	168.413	
12.	Velocity of Stack	48.290	FPS
13.	Actual Volumetric Flow	145653	ACFM
14.	Dry Volumetric Flow	95581	ACFMD
15.	Standard Volumetric Flow	80450	SCFMD
16.	Emission Rate	0.0219	gr/SCF
17.	Emission Rate	0.0121	gr/ACF
18.	Emission Rate	15.11	Lbs/Hr
19.	Percent Isokinetic	101.2	

Probe/Nozzle Wash	29.1	Mg
Filter	21.2	Mg
Total	50.300	Mg

SULFUR DIOXIDE CONCENTRATIONS

Plant Name: IMC
Stack: Dryer 1
Date: 5/26/88
Barometric Pressure: 29.72 in. Hg

Delta H: 1.542
Y: 1.007
Normality: 0.00976

RUN	1	2	3	4	5	6
METER VOLUME ACTUAL,CUB.FT	11.276	11.784	11.802	11.868	11.793	11.440
METER PRESSURE,IN H_2O	29.83	29.83	29.83	29.83	29.83	29.83
METER TEMPERATURE,°F	82.5	85	87	89	92	92
VM STD (SCF)	10.978	11.419	11.395	11.417	11.283	10.946
M1 VTB	0.1	0.1	0.1	0.1	0.1	0.1
M1 VT	11.73	13.93	10.2	9.88	12.05	12.28
VOLUME SOLUTION	510	470	600	520	450	500
VOLUME ALIQUOT	20	20	20	20	20	20
LB/SCF (10^{-5})	1.862	1.962	1.832	1.535	1.642	1.917
PPM STD	112	118	110	92	99	115
SCFMD	81295	81295	81295	80450	80450	80450
LB/HR	90.81	95.67	89.38	74.09	79.27	92.54

$$VMSTD = (VM)\ (Y)\ \frac{TSTD}{TM}\ \frac{PBAR}{PSTD}$$

$$LB/SCF = 7.061 \times 10^{-5}\ \frac{(VT-VTB)\ (N)\ (VSOLN/VA)}{VMSTD}$$

$$PPM\ STD = LB/SCF\ (6.024 \times 10^{6})$$

Plant: IMC FERTILIZER INC
Date: 5/25/88
Stack: DRYER UNIT 1
Run Number: 1

Average SQR Velocity Head = 0.7689
Velocity Head Inputs:

0.6200	0.7100	0.6200	0.4800	0.5200	0.7000	0.6600
0.4700	0.6000	0.3900	0.7000	0.6800		

Average Orifice Pressure = 0.8308
Orifice Pressure Inputs:

0.8600	0.9800	0.8600	0.6600	0.7200	0.9700	0.9100
0.6600	0.8500	0.5500	0.9900	0.9600		

Average Stack Temperature = 163
Stack Temperature Inputs:

159	156	164	167	167	163	163
164	163	163	162	164		

Average Meter Temperature = 86
Meter Temperature Inputs:

80	81	82	83	86	86	87
88	88	89	90	90		

Plant: IMC FERTILIZER INC
Date: 5/25/88
Stack: DRYER UNIT 1
Run Number: 2

Average SQR Velocity Head = 0.8930
Velocity Head Inputs:

0.7000	0.6800	0.7000	0.8300	0.8200	1.1000	0.5500
0.5600	0.8700	0.9000	1.1000	0.8700		

Average Orifice Pressure = 1.2908
Orifice Pressure Inputs:

1.1200	1.0900	1.1200	1.3300	1.3100	1.7600	0.8800
0.9000	1.3900	1.4400	1.7600	1.3900		

Average Stack Temperature = 162
Stack Temperature Inputs:

160	161	161	161	161	161	161
162	163	164	165	165		

Average Meter Temperature = 88
Meter Temperature Inputs:

87	87	87	87	87	88	88
88	88	88	89	89		

Plant: IMC FERTILIZER INC
Date: 5/25/88
Stack: DRYER UNIT 1
Run Number: 3

Average SQR Velocity Head = 0.7967
Velocity Head Inputs:

0.6500	0.6800	0.4800	0.6500	0.5800	0.6400	0.5400
0.6200	0.7200	0.7200	0.6800	0.6800		

Average Orifice Pressure = 1.0183
Orifice Pressure Inputs:

1.0400	1.0900	0.7700	1.0400	0.9300	1.0200	0.8600
0.9900	1.1500	1.1500	1.0900	1.0900		

Average Stack Temperature = 165
Stack Temperature Inputs:

164	163	165	164	165	165	167
165	166	166	165	165		

Average Meter Temperature = 89
Meter Temperature Inputs:

88	88	88	89	89	89	90
90	89	89	89	89		

Plant: IMC FERTILIZER INC
Date: 5/26/88
Stack: DRYER UNIT 1
Run Number: 4

Average SQR Velocity Head = 0.7425
Velocity Head Inputs:

0.5200	0.5200	0.7000	0.7000	0.5500	0.5500	0.5200
0.5200	0.5000	0.5000	0.4500	0.4500	0.6600	0.6600
0.6000	0.6000	0.5400	0.5400	0.5400	0.5400	0.5600
0.5600	0.5000	0.5000				

Average Orifice Pressure = 0.9583
Orifice Pressure Inputs:

0.9000	0.9000	1.2000	1.2000	0.9600	0.9600	0.9000
0.9000	0.8600	0.8600	0.7800	0.7800	1.1500	1.1500
1.0500	1.0500	0.9400	0.9400	0.9400	0.9400	0.9600
0.9600	0.8600	0.8600				

Average Stack Temperature = 162
Stack Temperature Inputs:

161	160	160	160	161	161	160
161	160	161	161	161	162	162
163	164	165	165	165	165	165
165	165	165				

Average Meter Temperature = 86
Meter Temperature Inputs:

80	80	81	81	82	82	82
83	84	85	86	86	87	87
88	88	89	89	90	90	91
91	91	92				

Plant: IMC FERTILIZER INC
Date: 5/26/88
Stack: DRYER UNIT 1
Run Number: 5

Average SQR Velocity Head = 0.7408
Velocity Head Inputs:

0.6600	0.6600	0.5800	0.5800	0.5500	0.5500	0.5500
0.5500	0.5200	0.5200	0.4600	0.4600	0.6200	0.6200
0.5800	0.5800	0.5400	0.5400	0.5400	0.5400	0.5200
0.5200	0.4800	0.4800				

Average Orifice Pressure = 0.9525
Orifice Pressure Inputs:

1.1500	1.1500	1.0000	1.0000	0.9600	0.9600	0.9600
0.9600	0.9000	0.9000	0.8000	0.8000	1.0500	1.0500
1.0000	1.0000	0.9400	0.9400	0.9400	0.9400	0.9000
0.9000	0.8300	0.8300				

Average Stack Temperature = 165
Stack Temperature Inputs:

163	162	163	163	163	163	164
165	166	165	166	166	167	167
167	166	166	167	167	167	167
167	166	167				

Average Meter Temperature = 91
Meter Temperature Inputs:

89	89	89	89	90	90	90
90	91	91	92	92	92	92
92	92	92	93	93	93	93
93	93	94				

Plant: IMC FERTILIZER INC
Date: 5/25/88
Stack: DRYER UNIT 1

An Nozzle Area
An = ((0.236000 / 12) ^) x (3.1415927 / 4) = 0.000304 Sq Ft

Vm Meter Volume
Vm = 1006.301 - 972.1 = 34.201 cf

Vwv Volume Water Vapor Sampled
Vwv = 0.0472 x 316.7 = 14.948 SCF

VMstd Volume Standard Dry Gas Sampled
VMstd = 34.201 x 0.990 x (528 / 86 + 460) x ((29.72 +
(0.83 / 13.6)) / 29.92)) = 32.601 SCF

Vt Total Standard Sample Volume
Vt = 14.948 + 32.601 = 47.549 SCF

W Percent Water
W = 14.948 / 47.549 = 31.438 %

FDA Percent Dry Air
FDA = 1 - 0.314 = 68.562 %

Md Molecular Weight of Dry Stack Gas
Md = (0.44 x 2.9 %CO.2) + (0.32 x 13.8 %O.2) +
(0.28 x (83.3 %N.2 + 0 %CO))
Md = 29.016

Ms Molecular Weight of Wet Stack Gas
Ms = (29.016 x 0.686) + (18 x 0.314) = 25.553

SG Specific Gravity Stack Gas
SG = 25.553 / 28.84

Ea Percent Excess Air

$$Ea = \frac{((13.8\ \%O.2)-(0\ \%CO / 2) \times 100)}{[(.264 \times (83.3\ \%N.2)) - (13.8\ \%O.2)-(0\ \%CO / 2)]}$$

Ea = 168.473

Vs Velocity of Stack
Vs = 85.49 x 0.84 x 0.769) x SQR((163 + 460) /
(29.73 x 25.553)) = 49.997 FPS

Plant: IMC FERTILIZER INC
Date: 5/25/88
Stack: DRYER UNIT 1

Qa Actual Volumetric Flow
Qa = (50.270 x 49.997 x 60) = 150800 ACFM

Qd Dry Volumetric Flow
Qd = (150800 x 0.686) = 103392 ACFMD

Qsd Standard Volumetric Flow
Qsd = 60 x 0.686 x 49.997 x 50.270 x (528 / (163 + 460) x
(29.73 / 29.92) = 87081 SCFMD

ESTP Emission Rate
gr/SCF = (15.43 x (87.000 + 25.200)) / (32.601)
gr/SCF = 0.0531

Lbs/Hr Emission Rate
Lbs/Hr = (0.0531 x 7000 x 87081 x 60) = 39.64

I Percent Isokinetic
I = [(163 + 460) x 32.601 x 29.92 x 100] /
[528 x 49.997 x 72 x 0.000304 x 29.73 x 60 x 0.686]
I = 86.0 %

CSO SO2 Concentration
CSO = 0.0000706 x 0.00976 x (9.20 - 0.10) x (810 / 10)
CSO = 0.00001558 Lbs/SCF

Em SO2 Emission Rate
Em = (0.0000156 x 87081 x 60) = 81.40 Lbs/Hr

PpmD SO2 Parts per million [Dry Basis]
PpmD = (0.000015580 x 9225000) = 93.85

PpmW SO2 Parts per million [Wet Basis]
PpmW = (93.9 x 0.686) = 64.35

APPENDIX B

PARTICULATE AND SO_2
FIELD DATA SHEETS
LABORATORY ANALYSIS
QUALITY ASSURANCE DATA

STACK SAMPLING FIELD DATA SHEET

Air Consulting and Engineering
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GAINESVILLE, FLORIDA 32606

TEST ID R-1
PAGE 1 OF 2

PLANT IMC SOURCE DRYER UNIT-1
PLANT LOCATION FORT LONESOME, FL.
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES PART. / SO2
DATE 5/25/80 RUN NO. 1
TIME START 1314 TIME END 1512
SAMPLE TIME 6/12 min/pt 72 60 Total min
BAR PRESS 29.72 "Hg STACK PRESS. 29.73 "Hg
ASSUMED MOISTURE 35 % FDA .65
WEATHER OVERCAST TEMP. 75 °F
METER BOX NO. 1 ΔH 1.97 Y 0.990
NOMOGRAPH C_f 1.38 PITOT CORR. FACTOR .84
NOZZLE CALIBRATION .235 .236 .236 = .236
STACK DIMINSIONS 8'
STACK AREA _____ (EFFECTIVE _____ ft^2)
STACK HEIGHT @ 100 ft.
STACK DIAMETER: UPSTREAM _____ DOWNSTREAM _____
PORT SIZE _____ in. NIPPLE LENGTH 3"
U CORD LENGTH: 150
REMARKS:

DOWN - 19 MIN
4 MIN

1.38
5.75
ΔP = .79 → 35.55

MAT'L PROCESSING RATE _____
GAS METER READINGS: FINAL 1006.301 $ft.^3$
INITIAL 972.100 $ft.^3$
NET 34.201 $ft.^3$
IMPINGERS VOL. GAIN 310 ml.
SILICA GEL NO. 9 WT. GAIN 67
FILTER NO. 97 / 511 TOTAL CONDENSATE 316.7 ml.

ORSAT

	1	2	3	4	AVG
% CO_2	2.9				
% O_2	13.8				
% CO					
% N_2					

F_O _____ F_O RANGE _____
LEAK CHECKS: METER BOX/PUMP _____
ORSAT BAG _____ GAS SAMPLE SYSTEM _____
ORSAT ANALYZER NECK
PRE-TEST 0.00 CFM 25 "Hg POST-TEST 0.00 CFM 18 "Hg
BOX OPERATOR HODGE PROBE HOLDER CARTER
PYROMETER NO. 1 PITOT TUBE NO. 918
PITOT TUBE LEAK CHECK: PRETEST OK
POST-TEST(+) ~~479.1~~ H_2O 15 SEC
POST-TEST(−) ~~587.2~~ H_2O 13 SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1	4 2/16"	DOWN 1315 UP 1324	975.99	.62	.86	.86	159	270	59	80	5.5
2	14	DOWN 1339 UP 1349	978.10	.71	1.09	1.10	156	243	54	81	8.0
3	28 3/8	1354	981.04	.62	.86	.86	164	235	56	82	7.0
4	67 9/16	1400	985.62	.48	.66	.66	167	267	57	83	5.5
5	81 13/16	DOWN 1426 UP 1429	988.29	.52	.72	.72	167	228	57	86	6.5
6	91 13/16	1431	989.46	.70	.97	.97	163	255	59	86	8.5

T_s = 163
.78

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PAGE 2 OF 2
RUN NO. R-1

1.41/3.78 1.38/3.75 972.1

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
2.1		1438	992.42	.66	.91	.91	163	263	60	87	9.0
2		1444	994.95	.47	.66	.66	164	265	59	88	7.0
3	DOWN 1450/1454	1450	997.85	.60	.85	.85	163	234	60	88	9.0
4		1500	1000.25	.39	.55	.55	163	270	62	89	6.0
5		1506	1003.20	.54	.76	.76	162	269	61	90	8.5
6		1512	1006.301	.68	.96	.96	164	258	60	90	11.5 -76

$\sqrt{\Delta P}$ = .77

CALC = 34.927
ACT = 34.201

STACK SAMPLING FIELD DATA SHEET

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TEST ID R-2
PAGE 1 OF 2

PLANT IMC SOURCE DRYER-UNIT 1
PLANT LOCATION FT. LONESOME
TYPE OF SAMPLING TRAIN EPA-5/6
TYPE OF SAMPLES PART./SO_2
DATE 5/25/88 RUN NO. 2
TIME START 1604 TIME END 1728
SAMPLE TIME 6/12 min/pt 72 Total min
BAR PRESS. 29.73/2 "Hg STACK PRESS. ~~29.82~~ 29.73 "Hg
ASSUMED MOISTURE 31 % FDA .69
WEATHER OVERCAST TEMP. 88 °F
METER BOX NO. 1 ΔH 1.97 Y 0.990
NOMOGRAPH C_f _____ PITOT CORR. FACTOR .84
NOZZLE CALIBRATION .235 .236 .236 = .236
STACK DIMINSIONS _____
STACK AREA _____ (EFFECTIVE _____ ft^2)
STACK HEIGHT _____ ft.
STACK DIAMETER: UPSTREAM _____ DOWNSTREAM _____
PORT SIZE _____ in. NIPPLE LENGTH _____
U CORD LENGTH: _____
REMARKS: _____

1.60/4.05
37.439 → .77

MAT'L PROCESSING RATE _____
GAS METER READINGS: FINAL 49.734 $ft.^3$
INITIAL 6.600 $ft.^3$
NET 43.134 $ft.^3$
IMPINGERS VOL. GAIN 410 ml.
SILICA GEL NO. 33 WT. GAIN 8.1
FILTER NO. 1512 TOTAL CONDENSATE 418.1 ml.

ORSAT	1	2	3	4	AVG
% CO_2	3.2				
% O_2	13.5				
% CO					
% N_2					

F_O _____ F_O RANGE _____
LEAK CHECKS: METER BOX/PUMP _____
ORSAT BAG _____ GAS SAMPLE SYSTEM _____
ORSAT ANALYZER NECK
PRE-TEST 0.00 CFM 25 "Hg POST-TEST 0.00 CFM 20 "Hg
BOX OPERATOR HOYLE PROBE HOLDER CARTER
PYROMETER NO. 1 PITOT TUBE NO. 118
PITOT TUBE LEAK CHECK: PRETEST OK
POST-TEST(+) 5.3 H_2O 15 SEC
POST-TEST(−) 5.6 H_2O 15 SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.) UP 1616	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1	DOWN 1407	1619	9.43	.70	1.12	1.12	160	246	59	87	12.5
2		1625	13.01	.68	1.09	1.09	161	252	55	87	13.0
3		1631	16.78	.70	1.12	1.12	161	254	54	87	12.5
4		1637	20.31	.83	1.33	1.33	161	260	55	87	13.0
5		1643	23.85	.82	1.31	1.31	161	265	56	87	13.0
6		1649	27.32	1.1	1.76	1.76	161	231	58	88	13.0

.84

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RUN NO. R-2

45.93
49.708

1.60/4.05 6.600

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	METER ORIFICE PRESS. DIFF. ("H_2O) ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
2-1		1658	29.76	.55	.88	.88	~~236~~ 161	238	59	88	5.0
2		1704	33.16	.56	.90	.90	162	243	58	88	5.0
3		1710	37.65	.87	1.39	1.39	163	242	57	88	8.0
4		1716	41.99	.90	1.44	1.44	164	250	57	88	9.5
5		1722	46.10	1.1	1.76	1.76	165	234	58	89	7.5
6		1728	49.734	.87	1.39	1.39	165	251	59	89	7.0 .89
				$\sqrt{\Delta P}$ =							
					CALC	~~49.854~~/43.254					

STACK SAMPLING FIELD DATA SHEET

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TEST ID R-3
PAGE 1 OF 2

PLANT IMC SOURCE DRYER-UNIT 1
PLANT LOCATION FT. LONESOME
TYPE OF SAMPLING TRAIN EPA-6
TYPE OF SAMPLES PART./SO_2
DATE 5/25/88 RUN NO. R-3
TIME START 1750 TIME END
SAMPLE TIME 6/12 min/pt 72 Total min
BAR PRESS. 29.75 "Hg STACK PRESS. 29.92 "Hg
ASSUMED MOISTURE 31 % FDA .69
WEATHER OVERCAST TEMP. 85 °F
METER BOX NO. 1 ΔH 1.97 Y 0.990
NOMOGRAPH C_f PITOT CORR. FACTOR .84
NOZZLE CALIBRATION .235 .236 .236 = .236
STACK DIMINSIONS
STACK AREA (EFFECTIVE ft^2)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS:

160/4.05

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 88.926 $ft.^3$
INITIAL 50.400 $ft.^3$
NET 38.526 $ft.^3$
IMPINGERS VOL. GAIN 385 ml.
SILICA GEL NO. 29 WT. GAIN 7.5
FILTER NO. 1541 TOTAL CONDENSATE 392.5 ml.

ORSAT

	1	2	3	4	AVG
% CO_2	3.1				
% O_2	13.7				
% CO					
% N_2					

F_O F_O RANGE
LEAK CHECKS: METER BOX/PUMP
ORSAT BAG GAS SAMPLE SYSTEM
ORSAT ANALYZER NECK
PRE-TEST 0.00 CFM 25 "Hg POST-TEST CFM "Hg
BOX OPERATOR HODGE PROBE HOLDER CARTER
PYROMETER NO. 1 PITOT TUBE NO. 118
PITOT TUBE LEAK CHECK: PRETEST OK
POST-TEST(+) 6.2 H_2O 15 SEC
POST-TEST(−) 5.1 H_2O 15 SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)	
1-1		1756	53.79	.65	1.04	1.04	~~230~~ 164	230	60	88	5.0	
2		1802	57.18	.68	1.09	1.09	163	247	58	88	5.0	
3		1808	60.01	.48	.77	.77	165	254	42	88	4.0	
4		1814	62.82	.65	1.04	1.04	164	255	41	89	4.0	
5		1820	65.91	.58	.93	.93	165	254	41	89	4.5	
6		1826	69.17	.64	1.02	1.02	165	254	42	89	5.0	.78

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PAGE 2 OF 2
RUN NO. R-3

89-072
69-354

1.60/4.05 50.4

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	METER ORIFICE PRESS. DIFF. ("H_2O) ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
2-1		1834	72.14	.54	.86	.86	~~76~~ 167	267	42	90	4.5
2		1840	75.34	.62	.99	.99	165	270	47	90	5.0
3		1846	78.73	.72	1.15	1.15	166	261	49	89	5.5
4		1852	82.15	.72	1.15	1.15	166	250	52	89	5.5
5		1858	85.56	.68	1.09	1.09	165	272	53	89	5.5
6		1904	88.926	.68	1.09	1.09	165	255	56	89	6.0 .81

$\overline{\sqrt{\Delta P}} = .796$

CALC. - 38.672
ACT. - 38.526

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PAGE 1 OF 2

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PLANT IMC SOURCE Dryer 1
PLANT LOCATION Ft Lonesome
TYPE OF SAMPLING TRAIN EPA 5
TYPE OF SAMPLES PART
DATE 5-26-88 RUN NO. 4
TIME START 1034 TIME END 1149
SAMPLE TIME 6/12 min/pt 72 Total min
BAR PRESS. 29.82 "Hg STACK PRESS. 29.83 "Hg
ASSUMED MOISTURE 32 % FDA
WEATHER Cloudy TEMP. 80 °F
METER BOX NO. 1 ΔH 1.97 Y .990
NOMOGRAPH C_f 1=1.825 PITOT CORR. FACTOR .84
NOZZLE CALIBRATION = .236
STACK DIMINSIONS 8' ID
STACK AREA 50.27 (EFFECTIVE 50.27 ft^2)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS: Mile ~~[illegible]~~ Hillsborough County Silcott

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 130.296 $ft.^3$
INITIAL 92.808 $ft.^3$
NET 37.488 $ft.^3$
IMPINGERS VOL. GAIN 385 ml.
SILICA GEL NO. 30 WT. GAIN 10.2
FILTER NO. 1477 TOTAL CONDENSATE 395.2 ml.

ORSAT

	1	2	3	4	AVG
% CO_2	3.2	3.2	3.2		
% O_2	13.7	13.7	13.7		
% CO					
% N_2					

F_O F_O RANGE
LEAK CHECKS: METER BOX/PUMP ✓
ORSAT BAG ✓ GAS SAMPLE SYSTEM ✓
ORSAT ANALYZER ✓
PRE-TEST 0.000 CFM 18 "Hg POST-TEST 2.01 CFM 10 "Hg
BOX OPERATOR Burnette PROBE HOLDER Carter
PYROMETER NO. 1 PITOT TUBE NO. 115
PITOT TUBE LEAK CHECK: PRETEST ✓
POST-TEST(+) 4.8 H_2O 15 SEC
POST-TEST(-) 8.6 H_2O 15 SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1		1034	94.280	.52	.90		161	260	66	80	4
1		1037	95.800	.52	.90		160	269	61	80	4
2		1040	97.560	.70	1.20		160	272	55	81	5
2		1043	99.370	.70	1.20		160	271	55	81	5
3		1046	100.920	.55	.96		161	271	58	82	4
3		1049	[illegible]	.55	.96		161	274	59	82	4

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PAGE 2 OF 2
RUN NO. 4

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD 7.34	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
4		1052	104,000	.52	.90		160	273	58	82	4
4		1055	105,510	.52	.90		161	270	60	83	4
5		1058	107,010	.50	.86		160	273	63	84	4
5		1101	108,450	.50	.86		161	272	63	85	4
6		1104	109,870	.45	.78		161	274	63	86	3.5
6		1107	111,272	.45	.78		161	273	63	86	3.5
1		1113	112,000	.66	1.15		162	260	69	87	5
1		1116	114,720	.66	1.15		162	247	65	87	5
2		1119	116,360	.60	1.05		163	231	63	88	5
2		1122	117,960	.60	1.05		164	254	63	88	5
3		1125	119,520	.54	.94		165	255	65	89	4.5
3		1128	121,090	.54	.94		165	254	65	89	4.5
4		1131	122,640	.54	.94		165	244	65	90	4.5
4		1134	124,190	.54	.94		165	254	65	90	4.5
5		1137	125,780	.56	.96		165	228	65	91	4.5
5		1140	127,390	.56	.96		165	229	64	91	4.5
6		1143	128,920	.50	.86		165	235	64	91	4.5
6		1146	130,296	.50	.86		165	238	64	92	4.5
	END	1149									

STACK SAMPLING FIELD DATA SHEET

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PLANT INK SOURCE Dryer 1
PLANT LOCATION Ft Lauderdale
TYPE OF SAMPLING TRAIN EPA 5
TYPE OF SAMPLES PART
DATE 5-26-88 RUN NO. 5
TIME START 1244 TIME END 1359
SAMPLE TIME 6/12 min/pt 72 Total min
BAR PRESS. 29.82 "Hg STACK PRESS 29.83 "Hg
ASSUMED MOISTURE 33 % FDA
WEATHER Cloudy TEMP. 85 °F
METER BOX NO. 1 ΔH 1.97 Y .990
NOMOGRAPH C_f 1=1.725 PITOT CORR. FACTOR .84
NOZZLE CALIBRATION .236
STACK DIMINSIONS 8' ID
STACK AREA 50.27 (EFFECTIVE 50.27 ft²)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS: 200

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 169.418 ft.³
INITIAL 132.009 ft.³
NET 37.409 ft.³
IMPINGERS VOL. GAIN 385 ml.
SILICA GEL NO. 85 WT. GAIN 8.2
FILTER NO. ~~1447~~ 1356 TOTAL CONDENSATE 393.2 ml.

ORSAT

	1	2	3	4	AVG
% CO_2	5.0	5.0	5.0		
% O_2	13.5	13.5	13.5		
% CO					
% N_2					

F_O F_O RANGE
LEAK CHECKS: METER BOX/PUMP ✓
ORSAT BAG ✓ GAS SAMPLE SYSTEM ✓
ORSAT ANALYZER ✓
PRE-TEST 0.000 CFM 20 "Hg POST-TEST 0.000 CFM 12 "Hg
BOX OPERATOR Burnette PROBE HOLDER Carter
PYROMETER NO. 1 PITOT TUBE NO. 118
PITOT TUBE LEAK CHECK: PRETEST OK
POST-TEST(+) 6.1 H_2O 15 SEC
POST-TEST(-) 4.4 H_2O 15 SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1		1244	133.710	.66	1.15		163	251	69	89	4
1		1247	135.430	.66	1.15		162	271	60	89	4
2		1250	137.020	.58	1.00		163	268	56	89	4
2		1253	138.630	.58	1.00		163	271	57	89	4
3		1256	140.210	.55	.96		165	269	58	90	4
[illegible]		[illegible]	[illegible]	.55	.96		163	265	58	90	4

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RUN NO. 5

32.0

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ($"H_2O$) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
4		1302	143.340	.55	.96		164	263	59	90	4
4		1305	144.910	.55	.96		165	267	59	90	4
5		1308	146.430	.52	.90		166	248	59	91	4
5		1311	147.950	.52	.90		165	235	58	91	4
6		1314	149.380	.46	.80		166	247	59	92	3.5
6		1317	150.814	.46	.80		166	257	59	92	3.5
1		1323	152.400	.62	1.05		167	263	63	92	4.5
1		1326	154.025	.62	1.05		167	270	60	92	4.5
2		1329	155.640	.58	1.00		167	270	58	92	4.5
2		1332	157.220	.58	1.00		166	269	58	92	4.5
3		1335	158.800	.54	.94		166	265	59	92	4.5
3		1338	160.350	.54	.94		167	272	59	93	4.5
4		1341	161.920	.54	.94		167	270	59	93	4.5
4		1344	163.460	.54	.94		167	264	59	93	4.5
5		1347	164.990	.52	~~.70~~	.90	167	268	60	93	4.5
5		1350	166.520	.52	.90		167	270	61	93	4.5
6		1353	167.950	.48	.83		166	269	61	93	4
6		1356	169.418	.48	.83		167	266	62	94	4
	END	1359									

STACK SAMPLING FIELD DATA SHEET

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TEST ID R-1
PAGE 1 OF 2

PLANT IMC SOURCE DRYER-UNIT 1
PLANT LOCATION FORT LONESOME, FL.
TYPE OF SAMPLING TRAIN
TYPE OF SAMPLES SO_2
DATE 5/26 RUN NO. 1
TIME START 0950 TIME END 1017
SAMPLE TIME 4/5 min/pt 20 Total min
BAR PRESS. 29.72 "Hg STACK PRESS. "Hg
ASSUMED MOISTURE 31 % FDA .69
WEATHER CLOUDY TEMP. 75 °F
METER BOX NO. 3 ΔH 1.542 Y 1.009
NOMOGRAPH C_f PITOT CORR. FACTOR .84
NOZZLE CALIBRATION =
STACK DIMINSIONS
STACK AREA (EFFECTIVE ft^2)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS:

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 350.876 $ft.^3$
INITIAL 339.600 $ft.^3$
NET 11.276 $ft.^3$
IMPINGERS VOL. GAIN 87 ml.
SILICA GEL NO. 20 WT. GAIN 3.2
FILTER NO. 1528 TOTAL CONDENSATE 90.2 ml.

ORSAT	1	2	3	4	AVG
% CO_2					
% O_2					
% CO					
% N_2					

F_O F_O RANGE
LEAK CHECKS: METER BOX/PUMP
ORSAT BAG GAS SAMPLE SYSTEM
ORSAT ANALYZER
PRE-TEST 0.09 CFM 22 "Hg POST-TEST 0.09 CFM 25.5 "Hg
BOX OPERATOR HODGE PROBE HOLDER —
PYROMETER NO. 3 PITOT TUBE NO. 64
PITOT TUBE LEAK CHECK: PRETEST OK
POST-TEST(+) H_2O SEC
POST-TEST(−) H_2O SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1		1002	342.56	.55	1.0	1.0	165	252	59	82	1.5
2		1007	345.50		1.0	1.0	165	259	58	82	1.0
3		1012	347.70		1.0	1.0	166	250	60	83	1.5
4		1017	350.876		1.0	1.0	165	271	60	83	2.0

STACK SAMPLING FIELD DATA SHEET

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TEST ID R-2
PAGE 1 OF 1

PLANT JMC SOURCE DRYER-UNIT 1
PLANT LOCATION FORT LONESOME, FL.
TYPE OF SAMPLING TRAIN
TYPE OF SAMPLES SO_2
DATE 5/26 RUN NO. 2
TIME START 1051 TIME END 1111
SAMPLE TIME 5/4 min/pt 20 Total min
BAR PRESS. "Hg STACK PRESS. "Hg
ASSUMED MOISTURE % FDA
WEATHER CLOUDY TEMP. 80 °F
METER BOX NO. 3 ΔH 1.542 Y 1.009
NOMOGRAPH C_f PITOT CORR. FACTOR
NOZZLE CALIBRATION
STACK DIMINSIONS
STACK AREA (EFFECTIVE ft^2)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS:

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 363.045 $ft.^3$
INITIAL 351.261 $ft.^3$
NET 11.784 $ft.^3$
IMPINGERS VOL. GAIN 110 * ml.
SILICA GEL NO. 59 WT. GAIN 3.2
FILTER NO. 1528 TOTAL CONDENSATE 113.2 ml.

ORSAT

	1	2	3	4	AVG
% CO_2					
% O_2					
% CO					
% N_2					

F_0 F_0 RANGE
LEAK CHECKS: METER BOX/PUMP
ORSAT BAG GAS SAMPLE SYSTEM
ORSAT ANALYZER
PRE-TEST 0.00 CFM 25 "Hg POST-TEST 0.00 CFM 22 "Hg
BOX OPERATOR HODGE PROBE HOLDER
PYROMETER NO. 3 PITOT TUBE NO. 64
PITOT TUBE LEAK CHECK: PRETEST
POST-TEST(+) H_2O SEC
POST-TEST(−) H_2O SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
		1056	354.20		1.0	1.0	165	226	60	84	1.0
		1101	357.18		1.0	1.0	162	238	59	85	1.0
		1106	360.11		1.0	1.0	163	235	60	85	1.0
		1111	363.045		1.0	1.0	163	225	60	85	1.0

STACK SAMPLING FIELD DATA SHEET

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TEST ID R-3
PAGE 1 OF 1

PLANT IMC SOURCE DRYER-UNIT 1
PLANT LOCATION FORT LONESOME, FL.
TYPE OF SAMPLING TRAIN
TYPE OF SAMPLES SO2
DATE 5/26/88 RUN NO. 3
TIME START 1133 TIME END
SAMPLE TIME 5/4 min/pt 20 Total min
BAR PRESS. "Hg STACK PRESS. "Hg
ASSUMED MOISTURE % FDA
WEATHER CLOUDY TEMP. 85 °F
METER BOX NO. 3 ΔH 1.542 Y 1.009
NOMOGRAPH C_f — PITOT CORR. FACTOR
NOZZLE CALIBRATION = —
STACK DIMINSIONS
STACK AREA (EFFECTIVE ft^2)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS:

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 375.302 $ft.^3$
INITIAL 363.500 $ft.^3$
NET 11.802 $ft.^3$
IMPINGERS VOL. GAIN 110 ml.
SILICA GEL NO. 89 WT. GAIN 2.7
FILTER NO. 1528 TOTAL CONDENSATE 112.7 ml.

ORSAT

	1	2	3	4	AVG
% CO_2					
% O_2					
% CO					
% N_2					

F_O F_O RANGE
LEAK CHECKS: METER BOX/PUMP
ORSAT BAG GAS SAMPLE SYSTEM
ORSAT ANALYZER
PRE-TEST 0.00 CFM 25 "Hg POST-TEST 0.01 CFM 19 "Hg
BOX OPERATOR HAYE PROBE HOLDER —
PYROMETER NO. 3 PITOT TUBE NO. 64
PITOT TUBE LEAK CHECK: PRETEST
POST-TEST(+) — H_2O SEC
POST-TEST(−) — H_2O SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
		1138	366.45		1.0	1.0	164	272	60	86	2.0
		1143	369.41		1.0	1.0	164	264	52	87	2.0
		1148	372.36		1.0	1.0	163	264	54	87	2.0
		1153	375.302		1.0	1.0	163	261	57	87	2.0

STACK SAMPLING FIELD DATA SHEET

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TEST ID R4
PAGE 1 OF 1

PLANT IMC SOURCE DRYER-UNIT 1
PLANT LOCATION FORT LONESOME, FL
TYPE OF SAMPLING TRAIN
TYPE OF SAMPLES SO2
DATE 5/26/88 RUN NO. 4
TIME START 1221 TIME END 1241
SAMPLE TIME 5/4 min/pt 20 Total min
BAR PRESS. "Hg STACK PRESS. "Hg
ASSUMED MOISTURE % FDA
WEATHER CLOUDY/CLEAR TEMP. 88 °F
METER BOX NO. 3 ΔH 1.542 Y 1.009
NOMOGRAPH C_f PITOT CORR. FACTOR
NOZZLE CALIBRATION =
STACK DIMINSIONS
STACK AREA (EFFECTIVE ft^2)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS:

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 387.968 $ft.^3$
INITIAL 376.100 $ft.^3$
NET 11.868 $ft.^3$
IMPINGERS VOL. GAIN 112 ml.
SILICA GEL NO. 74 WT. GAIN 3.0
FILTER NO. 1528 TOTAL CONDENSATE 115.0 ml.

ORSAT

	1	2	3	4	AVG
% CO_2					
% O_2					
% CO					
% N_2					

F_0 F_0 RANGE
LEAK CHECKS: METER BOX/PUMP
ORSAT BAG GAS SAMPLE SYSTEM
ORSAT ANALYZER
PRE-TEST 0.00 CFM 22 "Hg POST-TEST CFM "Hg
BOX OPERATOR HODGE PROBE HOLDER
PYROMETER NO. 3 PITOT TUBE NO.
PITOT TUBE LEAK CHECK: PRETEST
POST-TEST(+) — H_2O SEC
POST-TEST(−) — H_2O SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
		1226	379.08		1.0	1.0	165	259	60	89	7.0
		1231	382.06		1.0	1.0	164	260	59	89	7.0
		1236	385.01		1.0	1.0	164	256	61	89	7.0
		1241	387.968		1.0	1.0	164	252	63	89	7.5

STACK SAMPLING FIELD DATA SHEET

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TEST ID R-5
PAGE 1 OF 1

PLANT IMC SOURCE DRYER-UNIT 1
PLANT LOCATION FORT LONESOME, FL
TYPE OF SAMPLING TRAIN
TYPE OF SAMPLES SO_2
DATE 5/26/88 RUN NO. R-5
TIME START 1303 TIME END 1323
SAMPLE TIME 5/4 min/pt 20 Total min
BAR PRESS. "Hg STACK PRESS. "Hg
ASSUMED MOISTURE % FDA
WEATHER CLEAR TEMP. 88 °F
METER BOX NO. 3 ΔH 1.542 Y 1.009
NOMOGRAPH C_f — PITOT CORR. FACTOR —
NOZZLE CALIBRATION =
STACK DIMINSIONS
STACK AREA (EFFECTIVE ft^2)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS:

MAT'L PROCESSING RATE —
GAS METER READINGS: FINAL 400.293 $ft.^3$
INITIAL 388.500 $ft.^3$
NET 11.793 $ft.^3$
IMPINGERS VOL. GAIN 110 ml.
SILICA GEL NO. 1353 WT. GAIN 3.7
FILTER NO. 5 TOTAL CONDENSATE 113.7 ml.

ORSAT	1	2	3	4	AVG
% CO_2					
% O_2					
% CO					
% N_2					

F_O — F_O RANGE —
LEAK CHECKS: METER BOX/PUMP
ORSAT BAG — GAS SAMPLE SYSTEM —
ORSAT ANALYZER —
PRE-TEST 0.00 CFM 20 "Hg POST-TEST CFM "Hg
BOX OPERATOR HAZE PROBE HOLDER —
PYROMETER NO. 3 PITOT TUBE NO. 64
PITOT TUBE LEAK CHECK: PRETEST —
POST-TEST(+) H_2O SEC
POST-TEST(−) H_2O SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
		1308	391.35		1.0	1.0	165	241	50	92	1.5
		1313	394.37		1.0	1.0	165	241	53	92	1.5
		1318	397.34		1.0	1.0	165	262	60	92	1.5
		1323	400.293		1.0	1.0	165	260	61	92	1.5

STACK SAMPLING FIELD DATA SHEET

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TEST ID R-6
PAGE 1 OF 1

PLANT IMC SOURCE DRYER-UNIT 1
PLANT LOCATION FORT LONESOME, FL.
TYPE OF SAMPLING TRAIN
TYPE OF SAMPLES SO_2
DATE 5/26/88 RUN NO. R-6
TIME START 1342 TIME END 1402
SAMPLE TIME 5/4 min/pt 20 Total min
BAR PRESS. "Hg STACK PRESS. "Hg
ASSUMED MOISTURE % FDA
WEATHER CLEAR TEMP. 95 °F
METER BOX NO. ΔH Y
NOMOGRAPH C_f PITOT CORR. FACTOR
NOZZLE CALIBRATION =
STACK DIMINSIONS
STACK AREA (EFFECTIVE ft^2)
STACK HEIGHT ft.
STACK DIAMETER: UPSTREAM DOWNSTREAM
PORT SIZE in. NIPPLE LENGTH
U CORD LENGTH:
REMARKS:

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 416.614 $ft.^3$
404.700 INITIAL ~~404.902~~ $ft.^3$
NET 11.44 $ft.^3$
IMPINGERS VOL. GAIN 109 ml.
SILICA GEL NO. 47 WT. GAIN 3.3
FILTER NO. 1353 TOTAL CONDENSATE 112.3 ml.

ORSAT	1	2	3	4	AVG
% CO_2					
% O_2					
% CO					
% N_2					

F_0 F_0 RANGE
LEAK CHECKS: METER BOX/PUMP
ORSAT BAG GAS SAMPLE SYSTEM
ORSAT ANALYZER
PRE-TEST 0.00 CFM 20.0 "Hg POST-TEST 0.00 CFM 29.9 Hg
BOX OPERATOR HOGE PROBE HOLDER
PYROMETER NO. 3 PITOT TUBE NO. 64
PITOT TUBE LEAK CHECK: PRETEST
POST-TEST(+) H_2O SEC
POST-TEST(−) H_2O SEC

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL (IN.)	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
		1347	407.74		1.0	1.0	163	262	46	92	7.0
		1352	410.70		1.0	1.0	164	268	48	92	7.0
		1357	413.65		1.0	1.0	164	272	55	92	7.0
		1402	416.614		1.0	1.0	163	266	59	92	7.0

PAGE 1

AIR CONSULTING & ENGINEERING — PARTICULATE LAB DATA

SOURCE IMC, Dryer: Unit 1

PROBE RINSE	RUN 1	RUN 2	RUN 3	BLANK	
CONTAINER NUMBER	45	26	46	3	
TOTAL VOLUME (ml)	260	230	175	100	LIQUID LEVEL —
1st GROSS WEIGHT (g)	105.8303	99.9413	105.8421	98.0973	DATE & TIME: 5/31/88 900
2nd GROSS WEIGHT (g)	105.8304	99.9417	105.8425	98.0973	DATE & TIME: 5/31/88 1600
AVERAGE GROSS WEIGHT (g)	105.8304	99.9415	105.8423	98.0973	
TARE WEIGHT (g)	105.7434	99.8811	105.8136	98.0969	
SUB NET WEIGHT (g)	0.0870	0.0604	0.0287	0.0004	
ACETONE BLANK (g)	—	—	—	—	
TOTAL NET WEIGHT (mg)	87.0	60.4	28.7	0.4	

NOTE: In no case should a blank residue >0.01 mg/g or 0.001% of the weight of acetone used be subtracted from the sample weight.

FILTER	RUN 1	RUN 2	RUN 3	BLANK	
FILTER NUMBER	1511	1512	1541		
1st GROSS WEIGHT (g)	.4402	.4391	.4383		DATE & TIME: 5/31/88 900
2nd GROSS WEIGHT (g)	.4402	.4393	.4384		DATE & TIME: 5/31/88 1600
AVERAGE GROSS WEIGHT (g)	.4402	.4392	.4384		
TARE WEIGHT (g)	.4150	.4134	.4057		
SUB NET WEIGHT (g)	0.0252	0.0258	0.0327		
ACETONE BLANK (g)	—	—	—		
TOTAL NET WEIGHT (mg)	25.2	25.8	32.7		

TARE BALANCE CHECK

SEE LAB BOOK

1st GROSS WEIGHT BALANCE CHECK

0 — 10.0 g 10.0000
0.5 g .5000 100.0 g 100.0000
%RH 46 DATE 5/31/88
Signature [illegible]

2nd GROSS WEIGHT BALANCE CHECK

0 — 10.0 g 10.0000
0.5 g .5000 100.0 g 100.0000
%RH 44 DATE 5/31/88
Signature [illegible]

PAGE 2

AIR CONSULTING & ENGINEERING — PARTICULATE LAB DATA

SOURCE: T.MC, Dryer Unit 1

PROBE RINSE	RUN 4	RUN 5	RUN ___	BLANK	
CONTAINER NUMBER	50	66			
TOTAL VOLUME (ml)	200	200			LIQUID LEVEL ✓
1st GROSS WEIGHT (g)	107.2027	103.0615			DATE & TIME:
2nd GROSS WEIGHT (g)	107.2030	103.0619			DATE & TIME:
AVERAGE GROSS WEIGHT (g)	107.2029	103.0617			
TARE WEIGHT (g)	107.1736	103.0326			
SUB NET WEIGHT (g)	0.0293	0.0291			
ACETONE BLANK (g)	—	—			
TOTAL NET WEIGHT (mg)	29.3	29.1			

NOTE: In no case should a blank residue >0.01 mg/g or 0.001% of the weight of acetone used be subtracted from the sample weight.

FILTER	RUN 4	RUN 5	RUN ___	BLANK	
FILTER NUMBER	1477	1356		1591	
1st GROSS WEIGHT (g)	.4325	.4100		.4046	DATE & TIME:
2nd GROSS WEIGHT (g)	.4328	.4101		.4046	DATE & TIME:
AVERAGE GROSS WEIGHT (g)	.4327	.4101		.4046	
TARE WEIGHT (g)	.4105	.3889		.4043	
SUB NET WEIGHT (g)	0.0222	0.0212		0.0003	
ACETONE BLANK (g)	—	—		—	
TOTAL NET WEIGHT (mg)	22.2	21.2		0.3	

SAME AS PAGE 1

TARE BALANCE CHECK	1st GROSS WEIGHT BALANCE CHECK	2nd GROSS WEIGHT BALANCE CHECK
SEE LAB BOOK	0 ____ 10.0 g ____	0 ____ 10.0 g ____
	0.5 g ____ 100.0 g ____	0.5 g ____ 100.0 g ____
	%RH ____ DATE ____	%RH ____ DATE ____
	Signature ____	Signature ____

AIR CONSULTING AND ENGINEERING

SO_2
LAB DATA

Plant Name IMC (Dryer 1) Date Analyzed 6/1/88

Analyzed By Dagmar Neeb

Stack	Sample No.	V.T.	V.T.B.	N.	V.Soln.	V.A.	
Audit	samples				1		
A 00262		39.0	0.1	.00536	100	20	1589.6 mg/meq
A 03372		9.35	"	"	100	10	756 mg/meq

V.T. = Volume of Barium perchlorate titrant used for sample (ml)
V.T.B. = Volume of Barium perchlorate titrant used for blank (ml)
N. = Normality of Barium perchlorate
V.Soln. = Total solution volume
V.A. = Volume of sample aliquot titrated (ml)

AIR CONSULTING AND ENGINEERING

SO_2
LAB DATA

Plant Name IMC (Dryer 1) Date Analyzed 6/1/88

Analyzed By Dagmar Nock

Stack	Sample No.	V.T.	V.T.B.	N.	V.Soln.	V.A.
5/25	Run 1	6.2/6.3	0.1	0.0053	810	3ml
	2	8.25/8.1			730	
	3	7.2/7.2			670	
5/26	Run 1	4.8/4.7			510	
	2	4.65/4.7			470	
	3	3.6/3.5			600	
	4	3.6/3.5			520	
	5	4.05/4.1			450	
	6	3.9/3.8			500	
	H_2O_2 Blank	0.1/0.1				20ml

V.T. = Volume of Barium perchlorate titrant used for sample (ml)
V.T.B. = Volume of Barium perchlorate titrant used for blank (ml)
N. = Normality of Barium perchlorate
V.Soln. = Total solution volume
V.A. = Volume of sample aliquot titrated (ml)

AIR CONSULTING AND ENGINEERING

SO_2
LAB DATA

Plant Name IME Date Analyzed 6/13/88

Analyzed By D. Neck

ESE STANDARDIZED SOLUTION

Stack	Sample No.	V.T.	V.T.B.	N.	V.Soln.	V.A.	
	A03372	11.5	.1	.0101	100	20	877.8 mg/m³
	A00262	24.25	"	↓	100	20	1859.6 mg/l

V.T. = Volume of Barium perchlorate titrant used for sample (ml)
V.T.B. = Volume of Barium perchlorate titrant used for blank (ml)
N. = Normality of Barium perchlorate
V.Soln. = Total solution volume
V.A. = Volume of sample aliquot titrated (ml)

AIR CONSULTING AND ENGINEERING

SO_2
LAB DATA

Plant Name IMC Date Analyzed 6/13/80

Analyzed By D. Neck

ACE STANDARDIZED SOLUTION

Stack	Sample No.	V.T.	V.T.B.	N.	V.Soln.	V.A.	
	A03372	10.6	.1	.00976	100	20	781.3 mg/m³
	A00262	21.6	"	"	100	20	1599.9 mg/m³

V.T. = Volume of Barium perchlorate titrant used for sample (ml)
V.T.B. = Volume of Barium perchlorate titrant used for blank (ml)
N. = Normality of Barium perchlorate
V.Soln. = Total solution volume
V.A. = Volume of sample aliquot titrated (ml)

AIR CONSULTING AND ENGINEERING

SO_2
LAB DATA

Plant Name IMC Date Analyzed 6/13/88

Analyzed By D. Neale

ACE STANDARDIZED SOLUTION

Stack	Sample No.	V.T.	V.T.B.	N.	V.Soln.	V.A.
5/25	Run 1	9.15/9.25	0.1	.00976	810	10ml
	2	12.3/12.15			730	
	3	11.2/11.25			670	
5/26	Run 1	11.7/11.75			510	20 ml
	* 2	13.95/13.9			470	
	3	10.3/10.2 10.1			600	
	4	9.85/9.9			520	
	5	12.0/12.1			450	
	6	10.25/12.3			500	

V.T. = Volume of Barium perchlorate titrant used for sample (ml)
V.T.B. = Volume of Barium perchlorate titrant used for blank (ml)
N. = Normality of Barium perchlorate
V.Soln. = Total solution volume
V.A. = Volume of sample aliquot titrated (ml)

* endpoint was difficult to read.

STANDARD METER CALIBRATION

Air Consulting and Engineering (ACE) uses a dry gas meter for the calibration standard. This meter has been calibrated against a wet test meter in triplicate. This data was used to generate a standard meter calibration curve (see next page). Field meter calibrations are corrected to this curve using the following formula:

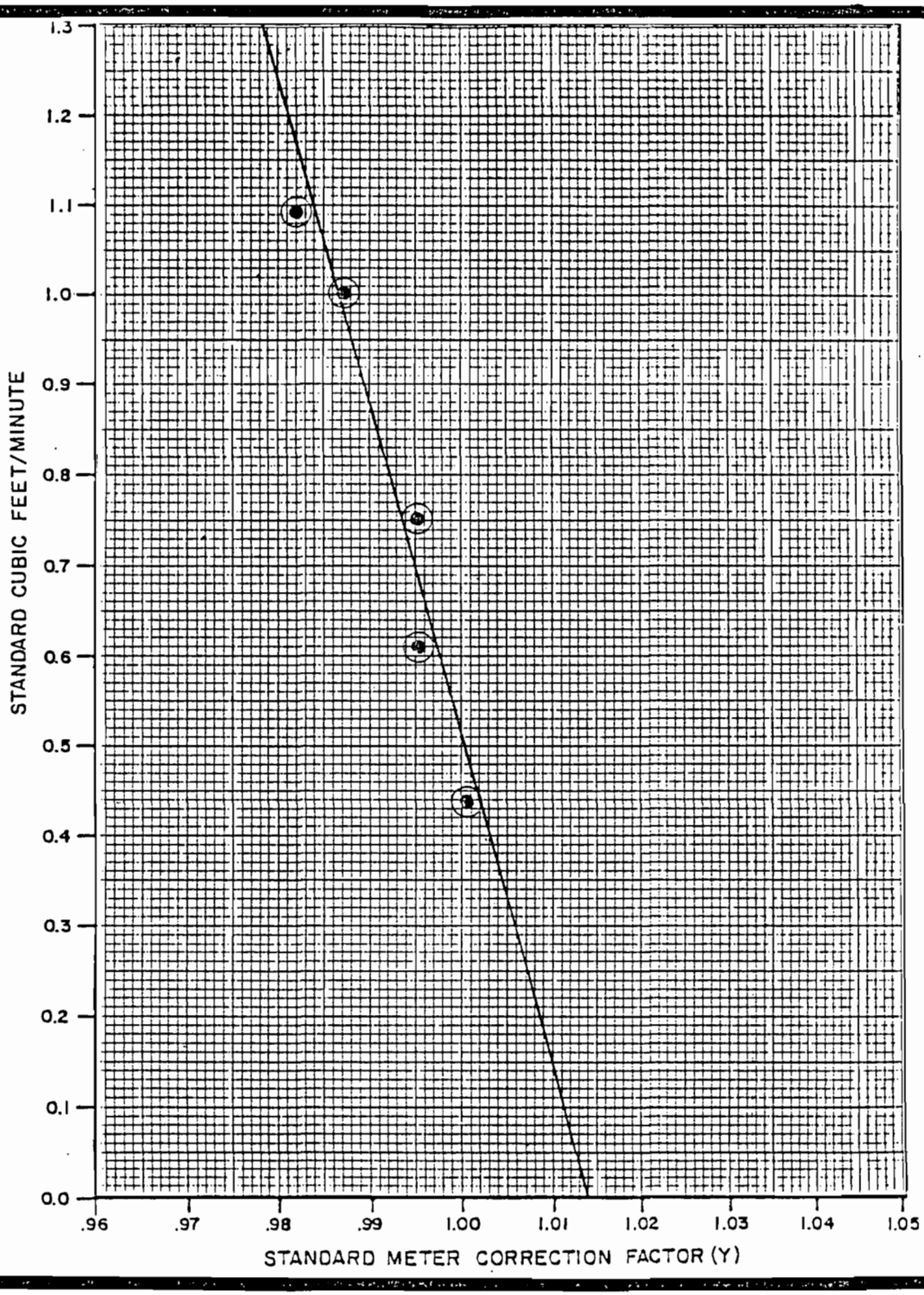
$$Y_a \times Y_s = Y$$

Y_a = actual ratio of field meter to standard meter

Y_s = ratio of standard meter to wet test meter at a given flow rate (from Calibration Curve)

Y = corrected ratio of field meter

The dry standard meter was calibrated on March 4, 1988, and is checked and/or recalibrated at least annually.



STANDARD METER CALIBRATION CURVE

MARCH 4, 1988

AIR CONSULTING and ENGINEERING

AIR CONSULTING & ENGINEERING — STANDARD METER CALIBRATION

DATE 3/4/88

LEAK CHECK 0.000 CFM at 17 In. Hg.

METER BOX NUMBER STANDARD

BAROMETRIC PRESSURE 30.25 In. Hg.

STD GAS METER TEMPERATURE 74 °F/ ASTM GLASS THERMOMETER TEMPERATURE 74 °F

WET ΔH	STD ΔH	GAS VOLUME, WET TEST METER			GAS VOLUME, STD GAS METER			TEMP. WET TEST METER (°F)	TEMP. OF STD. METER (°F)	TIME (Minutes)
		INITIAL	FINAL	ACTUAL ft^3	INITIAL	FINAL	ACTUAL ft^3			
-0.10	-0.57	6.000	11.000	5.000	568.620	573.603	4.983	74.5	74	11.4
-0.10	-0.57	11.000	16.000	5.000	573.603	578.582	4.979	74.5	74	11.45
-0.10	-0.57	16.000	21.000	5.000	578.582	583.572	4.990	74.5	74	11.47
-0.15	-0.86	9.000	15.000	6.000	632.511	638.551	6.040	74.5	74	9.775
-0.15	-0.86	15.000	20.020	5.020	638.551	643.605	5.054	74.5	74	8.2
-0.15	-0.86	0.020	8.005	7.985	643.605	651.644	8.039	74.5	74	13.05
-0.15	-1.2	9.000	14.000	5.000	551.508	556.541	5.033	74.5	73.5	6.6
-0.15	-1.2	14.000	19.000	5.000	556.541	561.572	5.031	74.5	73.5	6.63
-0.15	-1.2	19.000	25.000	6.000	561.572	567.620	6.048	74.5	73.5	8.0
-0.20	-1.8	0.000	5.003	5.003	613.207	618.294	5.087	74.5	74	4.94
-0.20	-1.8	5.003	10.998	5.995	618.294	624.385	6.091	74.5	74	5.938
-0.20	-1.8	10.998	16.998	6.000	624.385	630.496	6.111	74.5	74	5.948
-0.30	-2.45	7.000	12.008	5.008	589.698	594.822	5.124	74.5	74	4.194
-0.30	-2.45	12.008	18.000	5.992	594.822	600.948	6.126	74.5	74	5.03
-0.30	-2.45	18.000	27.005	9.005	600.948	610.159	9.211	74.5	74	7.547

CALIBRATED BY: Stephen L. Deck

	Y	SCFM	Y	SCFM	Y	SCFM	Y	SCFM	Y	SCFM
Test 1	1.004	0.438	0.995	0.613	0.995	0.757	0.987	1.012	0.983	1.193
Test 2	1.005	0.436	0.995	0.612	0.995	0.753	0.988	1.009	0.984	1.191
Test 3	1.003	0.435	0.995	0.611	0.993	0.749	0.986	1.008	0.983	1.193
Average	1.004	0.436	0.995	0.612	0.995	0.753	0.987	1.010	0.983	1.192

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AIR CONSULTING & ENGINEERING — ANNUAL METER CALIBRATION

DATE 5-6-88 LEAK CHECK 0.000 CFM at 15 in. Hg.

METER BOX NUMBER 1 BAROMETRIC PRESSURE 30.08 in. Hg.

DRY GAS METER TEMPERATURE 69 °F/ASTM GLASS THERMOMETER TEMPERATURE 69 °F

ΔHS	AVERAGE ΔHD	GAS VOLUME, STANDARD METER			GAS VOLUME, DRY GAS METER			TEMP. STD. METER	TEMP. OF DRY METER	TIME (Minutes)	TIMER
		INITIAL	FINAL	ACTUAL ft^3	INITIAL	FINAL	ACTUAL ft^3				
-0.1	0.5	936.809	945.319	8.510	575.434	583.804	8.370	69	70	23	23
-.18	1.0	945.624	950.960	5.336	584.111	589.456	5.345	69	71	10	10
-.25	1.5	951.543	956.790	5.247	590.038	595.318	5.280	69	71	8	8
-.43	2.5	957.307	963.200	5.893	595.833	601.775	5.942	69	71	7	7
-.61	3.5	963.935	969.903	5.968	602.514	608.532	6.018	69	72	6	6
-.76	4.5	970.317	975.888	5.571	608.942	614.574	5.632	69	72	5	5

	Delta-H	SCFM	Y_m	Y_m	Y
	2.031	0.371	1.018	1.004	1.022
	1.949	0.536	1.000	0.989	0.999
	1.934	0.659	0.994	0.996	0.990
	1.955	0.846	0.990	0.991	0.981
	1.955	1.000	0.990	0.987	0.977
	2.002	1.120	0.986	0.983	0.969
Mean:	1.971				0.990

CALIBRATED BY: George F. Habel

AIR CONSULTING & ENGINEERING — POST TEST CALIBRATION

DATE 5-31-88 METER BOX NUMBER 1 LEAK CHECK 0.000 CFM at 15 In. Hg.

CLIENT IMC SOURCE DRYER 1 THERMOCOUPLE NUMBER 118 PYROMETER NUMBER 1

FLIGHT SERVICE Pb 30.05 In. Hg. ACE BAROMETER Pb 30.10 In. Hg.

ASTM GLASS THERMOMETER 163 °F / THERMOCOUPLE 160 °F ASTM GLASS THERMOMETER 85 °F / METER TEMP 87 °F

ΔHS	AVERAGE ΔHD	GAS VOLUME, STANDARD METER			GAS VOLUME, DRY GAS METER			TEMP STANDARD METER	TEMP OF DRY METER	TIME (Minutes)	MAX. VACUUM In. Hg
		INITIAL	FINAL	ACTUAL ft^3	INITIAL	FINAL	ACTUAL ft^3				
.37	1.97	557.623	563.073	5.450	269.736	275.116	5.380	84	85	7	13
.37	1.97	563.073	568.525	5.452	275.116	280.493	5.377	85	85	7	13
.37	1.97	568.525	~~578.964~~ 573.964	5.439	280.493	285.868	5.375	85	86	7	13

Delta-H	Y	SCFM
1.862	1.009	0.760
1.867	1.008	0.758
1.873	1.008	0.757

Mean: 1.867 1.008

CALIBRATED BY: S. A. Cutler

AIR CONSULTING & ENGINEERING — ANNUAL METER CALIBRATION

DATE 3-15-88 LEAK CHECK 0.000 CFM at 15 In. Hg.

METER BOX NUMBER 3 BAROMETRIC PRESSURE 30.09 In. Hg.

DRY GAS METER TEMPERATURE 63 °F/ASTM GLASS THERMOMETER TEMPERATURE 63 °F

ΔHS	AVERAGE ΔHD	GAS VOLUME, STANDARD METER			GAS VOLUME, DRY GAS METER			TEMP. STD. METER	TEMP. OF DRY METER	TIME (Minutes)	TIMER
		INITIAL	FINAL	ACTUAL ft^3	INITIAL	FINAL	ACTUAL ft^3				
-0.1	0.5	56.754	70.929	14.175	208.218	222.473	14.255	57	63	33	33
-0.15	1.0	71.259	95.141	23.882	222.808	246.691	23.883	58	66	41	41
-0.20	1.5	95.509	100.588	5.079	247.049	252.105	5.056	58	67	7	7
-0.35	2.0	100.940	107.576	6.636	252.456	259.042	6.586	60	67	8	8
-0.55	3.0	108.455	114.575	6.120	259.912	265.957	6.045	60	68	6	6
-0.70	4.0	115.255	122.309	7.054	266.621	273.566	6.945	60	68	6	6

	Delta-H	SCFM	Y_a	Y_m	Y
	1.458	0.441	1.005	1.000	1.005
	1.583	0.597	1.013	0.996	1.009
	1.527	0.744	1.019	0.992	1.011
	1.569	0.848	1.017	0.989	1.006
	1.552	1.043	1.022	0.984	1.006
	1.556	1.203	1.023	0.980	1.003
Mean:	1.541				1.007

CALIBRATED BY: George T. Hebel

AIR CONSULTING & ENGINEERING — POST TEST CALIBRATION

DATE 5-31-88 METER BOX NUMBER 3 LEAK CHECK 0.000 CFM at 15 In. Hg.

CLIENT IMC SOURCE DRYER 1 THERMOCOUPLE NUMBER 118 PYROMETER NUMBER 3

FLIGHT SERVICE Pb 30.05 In. Hg. ACE BAROMETER Pb 30.00 In. Hg.

ASTM GLASS THERMOMETER 164 °F / THERMOCOUPLE 164 °F ASTM GLASS THERMOMETER 84 °F / METER TEMP 86 °F

ΔHS	AVERAGE ΔHD	GAS VOLUME, STANDARD METER			GAS VOLUME, DRY GAS METER			TEMP. STANDARD METER	TEMP. OF DRY METER	TIME (Minutes)	MAX. VACUUM In. Hg.
		INITIAL	FINAL	ACTUAL ft^3	INITIAL	FINAL	ACTUAL ft^3				
.34	1.542	644.098	649.378	5.280	470.230	475.352	5.122	88	90	7	7.5
.34	1.542	649.378	654.699	5.321	475.352	480.526	5.174	88	90	7	7.5
.34	1.542	654.699	660.069	5.370	480.526	485.746	5.220	90	92	7	7.5

	Delta-H	Y	SCFM
	1.566	1.030	0.728
	1.542	1.027	0.734
	1.520	1.028	0.738
Mean:	1.543	1.028	

CALIBRATED BY: S.L. Carte

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PYROMETER CALIBRATION

Date 9/9/87 Pyrometer No. ACE 1 (#1 Meter Box)

Source (Specify)	Glass Thermometer With NBS Mercury (°F)	Pyrometer (°F)	Degree Difference	% Difference
ICE BATH	36	36	0	0.0
AMBIENT	77	78	1	0.2
BOILING WATER	211	210	1	0.2
HOT OIL BATH	324	322	2	0.3

FDER - Maximum 5° difference

EPA $\left[\frac{(\text{Ref. temp. °F} + 460) - (\text{Pyrometer temp. °F} + 460)}{\text{Ref. temp. °F} + 460}\right] 100 \leq 1.5\%$

Calibrated by George F. Gabel

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PYROMETER CALIBRATION

Date 9/9/87 Pyrometer No. ACE 3 (#3 Meter Box)

Source (Specify)	Glass Thermometer With NBS Mercury (°F)	Pyrometer (°F)	Degree Difference	% Difference
ICE BATH	38	38	0	0.0
AMBIENT	82	80	2	0.4
HOT OVEN	359	355	4	0.5

FDER - Maximum 5° difference

EPA $\left[\frac{(\text{Ref. temp. °F} + 460) - (\text{Pyrometer temp. °F} + 460)}{\text{Ref. temp. °F} + 460}\right] 100 \leq 1.5\%$

Calibrated by Greg R. Brown

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SAMPLE RECOVERY AND CHAIN OF CUSTODY

PLANT NAME IMC

SOURCE NAME Dryer Unit 1

DATE 5/27/88 TYPE OF SAMPLE Filter

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1511	✓ R-1		TAN	
1512	✓ R-2		TAN	
1541	✓ R-3		TAN	
~~1~~01477	✓ R-4		TAN	
1356	✓ R-5		TAN	
ACETONE BLANK				
WATER BLANK				
FILTER BLANK	1591		White	

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT (g)	INITIAL WT (g)	NET WEIGHT (g)	COLOR
1	9	206.7	200.0	6.7	Blue-Pink
2	33	208.1	200.0	8.1	"
3	29	207.5	200.0	7.5	"

SAMPLE RECOVERED BY R. Mack

PARTICULATE ANALYSIS BY Pat A. Burnett

Air Consulting and Engineering

SAMPLE RECOVERY AND CHAIN OF CUSTODY

PLANT NAME THC

SOURCE NAME Dryer Unit 1

DATE 5/27/88 TYPE OF SAMPLE Acetone Wash

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	45	✓	medium brown	
2	26	✓	brown	
3	46	✓	beige	
4	50	✓	"	
5	66	✓	"	
ACETONE BLANK	3	✓	clear	
WATER BLANK		n/a		
FILTER BLANK				

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT (g)	INITIAL WT (g)	NET WEIGHT (g)	COLOR
4	30	210.2	200.0	10.2	Blue-Pink
5	85	208.2	200.0	8.2	"

SAMPLE RECOVERED BY [illegible]

PARTICULATE ANALYSIS BY [illegible]

Air Consulting and Engineering

SAMPLE RECOVERY AND CHAIN OF CUSTODY

PLANT NAME IMC

SOURCE NAME Dryer Unit 2

DATE 5/27/88 TYPE OF SAMPLE SO2

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
5/25 Run 1		✓	Clear	
2		✓		
3		✓		
5/26 Run 1		✓		
2		✓		
3		✓		
4		✓		
5		✓		
6		✓		
~~ACETONE~~ H2O2 BLANK				
WATER BLANK				
FILTER BLANK				

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT (g)	INITIAL WT (g)	NET WEIGHT (g)	COLOR

SAMPLE RECOVERED BY D. Neck

PARTICULATE ANALYSIS BY

APPENDIX C

NO_x CONCENTRATION CALCULATIONS
STRIP CHART REDUCTIONS
NO_x QUALITY ASSURANCE

Air Consulting and Engineering

CONTINUOUS MONITOR ACCURACY CERTIFICATION

PLANT IMC
LOCATION LONESOME MINE
SOURCE ID UNIT 1
DATE 5-25/26-88

NO_x CALIBRATION GAS 5-25-88	MONITOR VALUE ppm	DIFFERENCE ppm	%SPAN
234.6	234.6	0	0
149.9	151.2	1.3	0.4
ZERO	0	0	0
149.9 BIAS	137.7	12.2	4.1

~~NO~~ O_x 5-26-88 CALIBRATION GAS	MONITOR VALUE ppm	DIFFERENCE ppm	% SPAN
234.6	234.6	0	0
149.9	149.9	0	0
86.2	86.2	0	0
ZERO	0.6	0.6	0.2
BIAS CHECK	83.4	2.8	1.0

~~NO~~ O_x 5-25-88 CALIBRATION GAS	MONITOR VALUE	DIFFERENCE	% SPAN
ZERO	0	0	0
86.2	86.2	0	0
50.8	50.8	0	0

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CONTINUOUS MONITOR DRIFT CERTIFICATION

PLANT: IMC
LOCATION: LONESOME MINE
SOURCE ID: UNIT 1 DRYER
DATE: 5-25/26-88
GAS ID: NO_x

RUN NUMBER	TIME	SPAN DRIFT			% SPAN	ZERO DRIFT			% SPAN
		INITIAL	FINAL	DRIFT		INITIAL	FINAL	DRIFT	
1	1453-1553	138	138	0	0	1.5	0	1.5	0.5
2	1700-1800	230.4	230.4	0	0	0	0	0	0
3	1808-1908	230.4	227.4	3.0	1.0	0	0	0	0
4	1042-1142	80.4	78.6	1.8	0.6	0.6	1.5	0.9	0.3

EMISSION SUMMARY

FACILITY: IMC - LONESOME MINE
SOURCE: UNIT 1 DRYER
DATE: 5-25-89

RUN 1
NO_x AVERAGES

	PPM		
1453-1455	85		
1455-1457	84		
1457-1459	84		
1459-1501	84		
1501-1503	84		
1503-1505	84		
1505-1507	83		
1507-1509	83		
1509-1511	83		
1511-1513	83		
1513-1515	83		
1515-1517	83		
1517-1519	83		
1519-1521	82		
1521-1523	82		
1523-1525	82		
1525-1527	82		
1527-1529	82		
1529-1531	82		
1531-1533	82		
1533-1535	82		
1535-1537	82		

EMISSION SUMMARY

FACILITY: IMC - LONESOME
SOURCE: UNIT 1 DRYER
DATE: 5-25-88

RUN 1 NOx

1537-1539	82		
1539-1541	82		
1541-1543	82		
1543-1545	82		
1545-1547	82		
1547-1549	82		
1549-1551	81		
1551-1553	81		
C = AVERAGE ANALYZER PPM = 83			
C_o = AVG. ZERO BIAS		$\frac{1.5+0}{2}$	= 0.75
C_m = AVG CAL BIAS		= $\frac{138+138}{2}$	= 138 ppm
C_{ma} = CAL GAS CONCENTRATION = 149.9			
	$C_{gas} = (83 - 0.75)\left(\frac{149.9}{138 - 0.75}\right)$		
	= 90 ppm		

EMISSION SUMMARY

FACILITY: IMC - LONESOME MINE
SOURCE: UNIT 1 DRYER
DATE: 5-25-88

RUN 2 NOx AVERAGES

1700 - 1702	84		
1702 - 1704	80		
1704 - 1706	86		
1706 - 1708	86		
1708 - 1710	86		
1710 - 1712	86		
1712 - 1714	86		
1714 - 1716	86		
1716 - 1718	86		
1718 - 1720	86		
1720 - 1722	86		
1722 - 1724	86		
1724 - 1726	86		
1726 - 1728	86		
1728 - 1730	86		
1730 - 1732	85		
1732 - 1734	84		
1734 - 1736	84		
1736 - 1738	84		
1738 - 1740	84		
1740 - 1742	84		
1742 - 1744	84		

EMISSION SUMMARY

FACILITY: IMC - LONESOME MINE
SOURCE: UNIT 1 DRYER
DATE: 5-25-88

1744-1746	84		
1746-1748	84		
1748-1750	85		
1750-1752	85		
1752-1754	85		
1754-1756	85		
1756-1758	85		
1758-1800	85		
$C =$	85		
C_o	$\frac{0+0}{2} = 0$		
C_m	$\frac{230.4+230.4}{2} = 230.4$		
C_{max}	$= 234.6$		
	$C_{gas} =$	$(85-0)\left(\frac{234.6}{230.4-0}\right)$	$= 87$ ppm

EMISSION SUMMARY

FACILITY: IMC - LONESOME MINE
SOURCE: UNIT 1 DRYER
DATE: 5-25-88

RUN 3. NOx AVERAGES

1808 - 1810	88		
1810 - 1812	88		
1812 - 1814	87		
1814 - 1816	86		
1816 - 1818	84		
1818 - 1820	83		
1820 - 1822	83		
1822 - 1824	83		
1824 - 1826	83		
1826 - 1828	83		
1828 - 1830	83		
1830 - 1832	83		
1832 - 1834	83		
1834 - 1836	83		
1836 - 1838	83		
1838 - 1840	83		
1840 - 1842	83		
1842 - 1844	83		
1844 - 1846	83		
1846 - 1848	83		
1848 - 1850	83		
1850 - 1852	83		

EMISSION SUMMARY

FACILITY: IMC-LONESOME MINE
SOURCE: UNIT 1 DRYER
DATE: 5-25-88

RUN 3 NO_x AVERAGES

1852-1854	83		
1854-1856	83		
1856-1858	82		
1858-1900	81		
1900-1902	81		
1902-1904	81		
1904-1906	82		
1906-1908	81		
$C =$	83 ppm		
C_o	$= \frac{0+0}{2} = 0$		
C_m	$= \frac{230.4 + 227.4}{2} = 229$		
C_{ma}	$= 234.6$ ppm		
	$C_{gas} = (83-0)\left(\frac{234.6}{229}\right) = 85$ ppm		

EMISSION SUMMARY

FACILITY: IMC - LONESOME MINE
SOURCE: UNIT 1 DRYER
DATE: 5-26-88

RUN 4 NOx AVERAGES

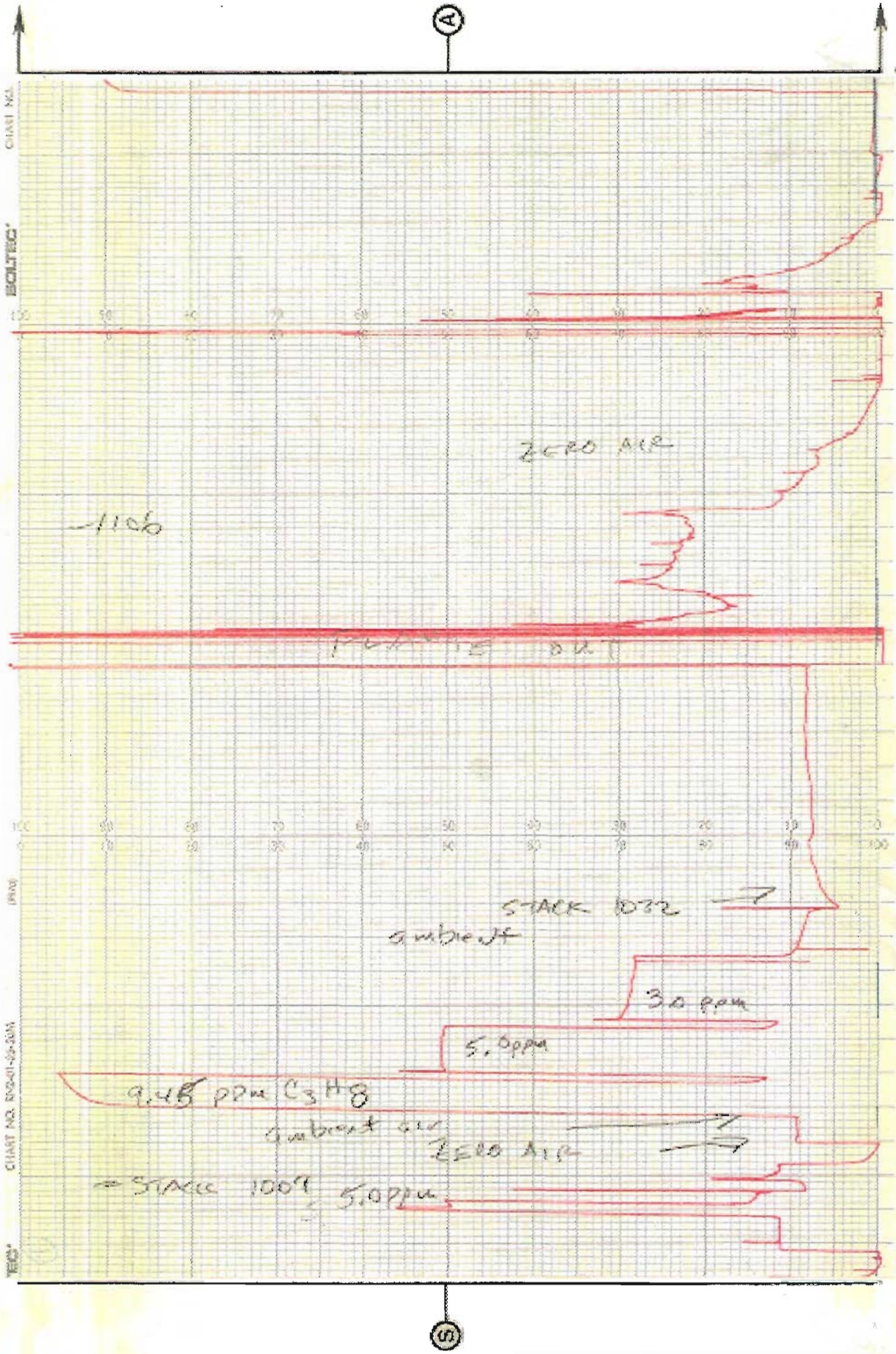
1042 - 1044	74		
1044 - 1046	74		
1046 - 1048	74		
1048 - 1050	75		
1050 - 1052	75		
1052 - 1054	75		
1054 - 1056	75		
1056 - 1058	75		
1058 - 1100	75		
1100 - 1102	75		
1102 - 1104	74		
1104 - 1106	74		
1106 - 1108	74		
1108 - 1110	72		
1110 - 1112	72		
1112 - 1114	72		
1114 - 1116	69		
1116 - 1118	69		
1118 - 1120	69		
1120 - 1122	69		
1122 - 1124	69		
1124 - 1126	69		

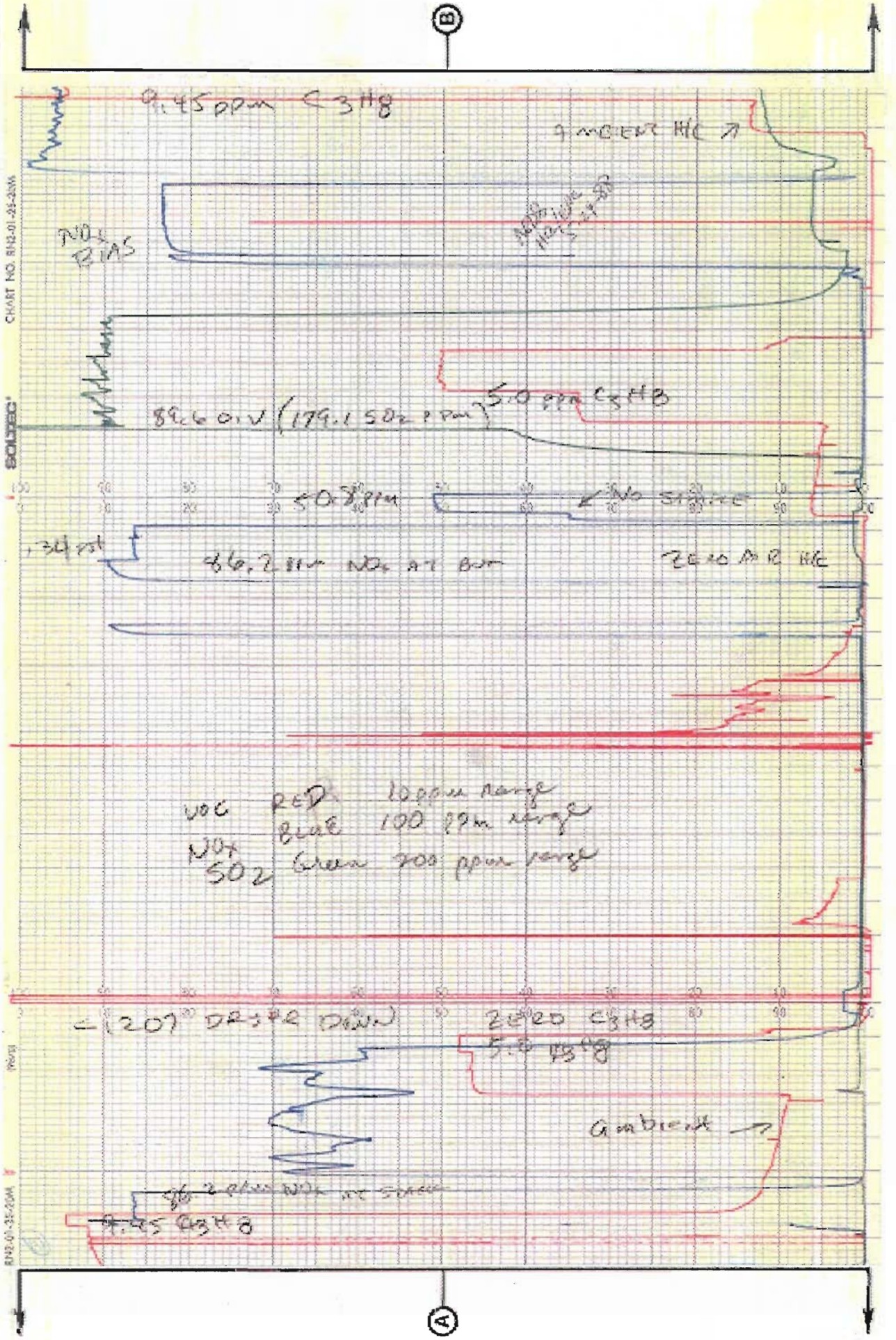
EMISSION SUMMARY

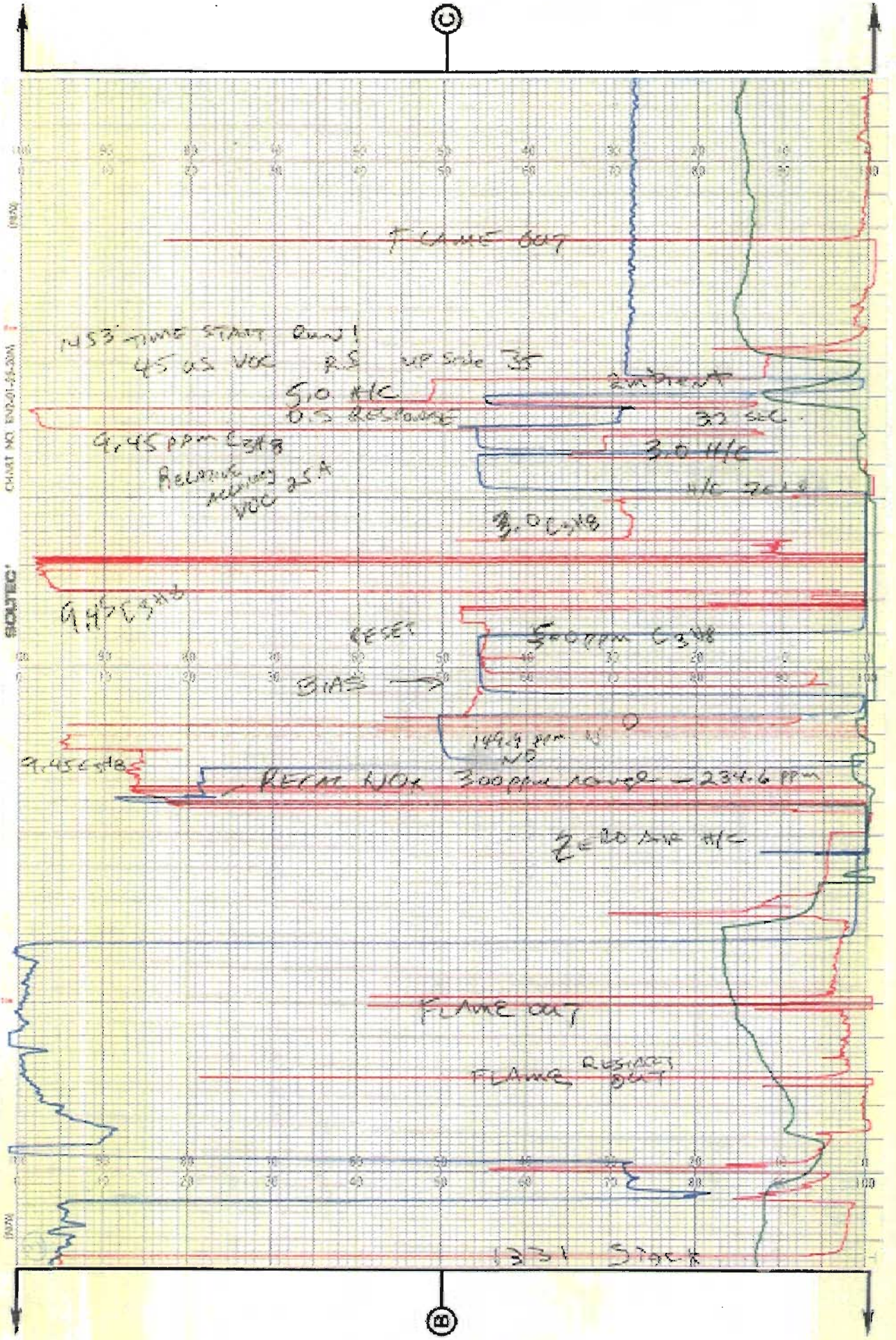
FACILITY: IMC - LONESOME MINE
SOURCE: UNIT 1 DRYER
DATE: 5-26-88

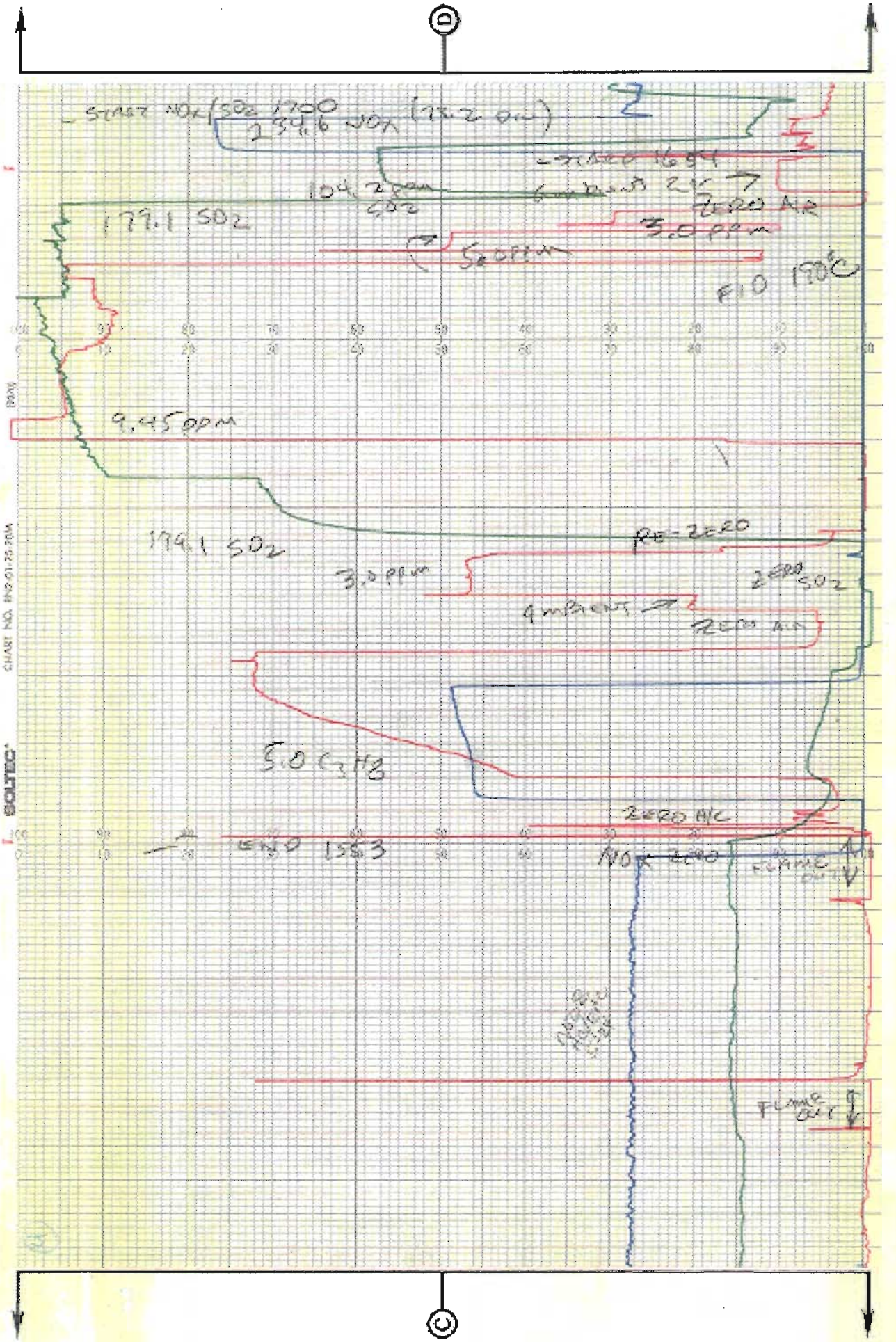
RUN 4 NO_x AVERAGES

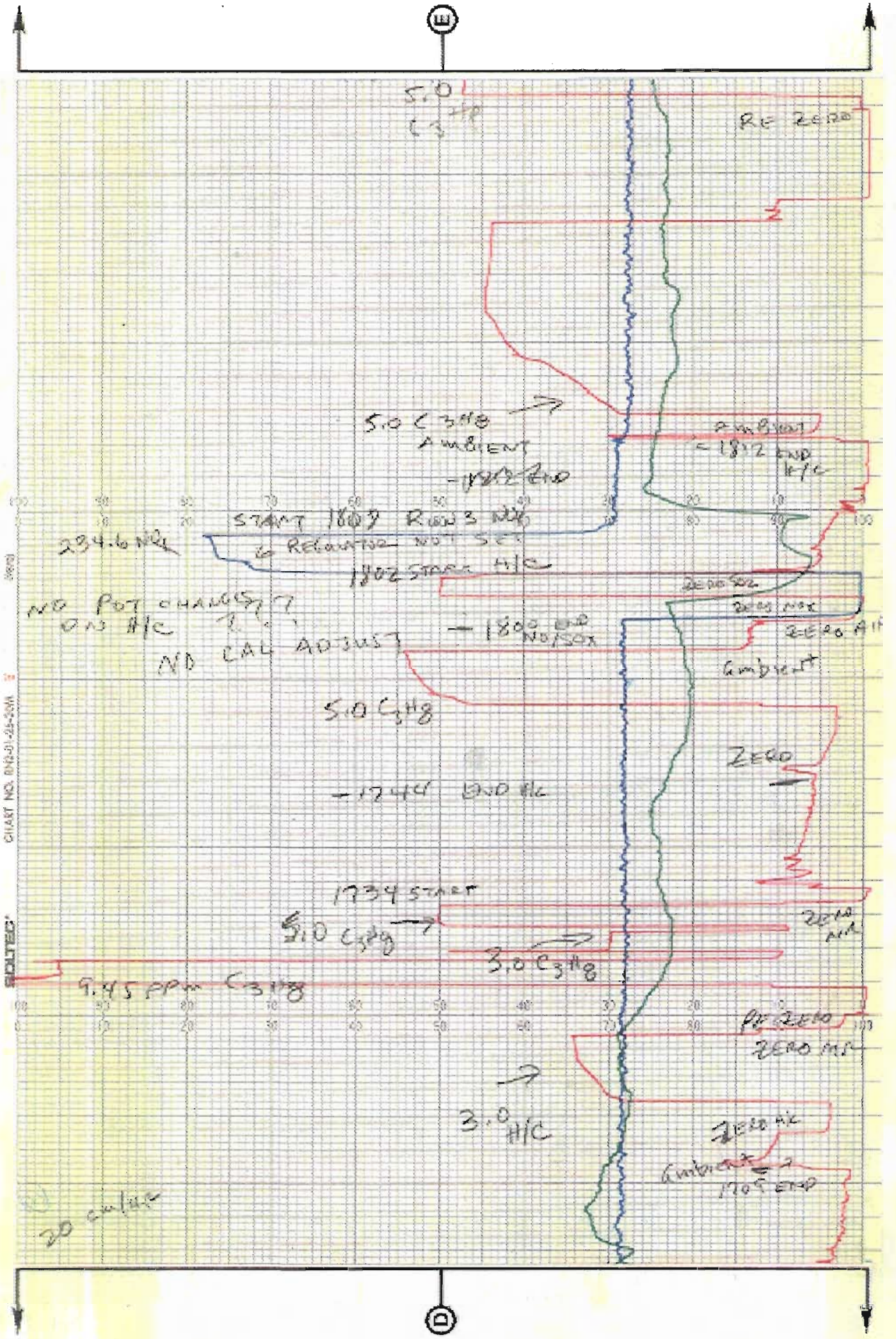
1126 - 1128	71		
1128 - 1130	72		
1130 - 1132	72		
1132 - 1134	74		
1134 - 1136	75		
1136 - 1138	75		
1138 - 1140	74		
1140 - 1142	74		
	C = 73 PPM		
C_o =	$\frac{0.6 + 1.5}{2}$ = 0.10		
C_m =	$\frac{80.4 + 78.6}{2}$ = 79.5		
C_{ma} =	86.2 ppm		
	$C_{gas} = (73 - .10)\left(\frac{86.2}{79.5}\right) = 79$ ppm		

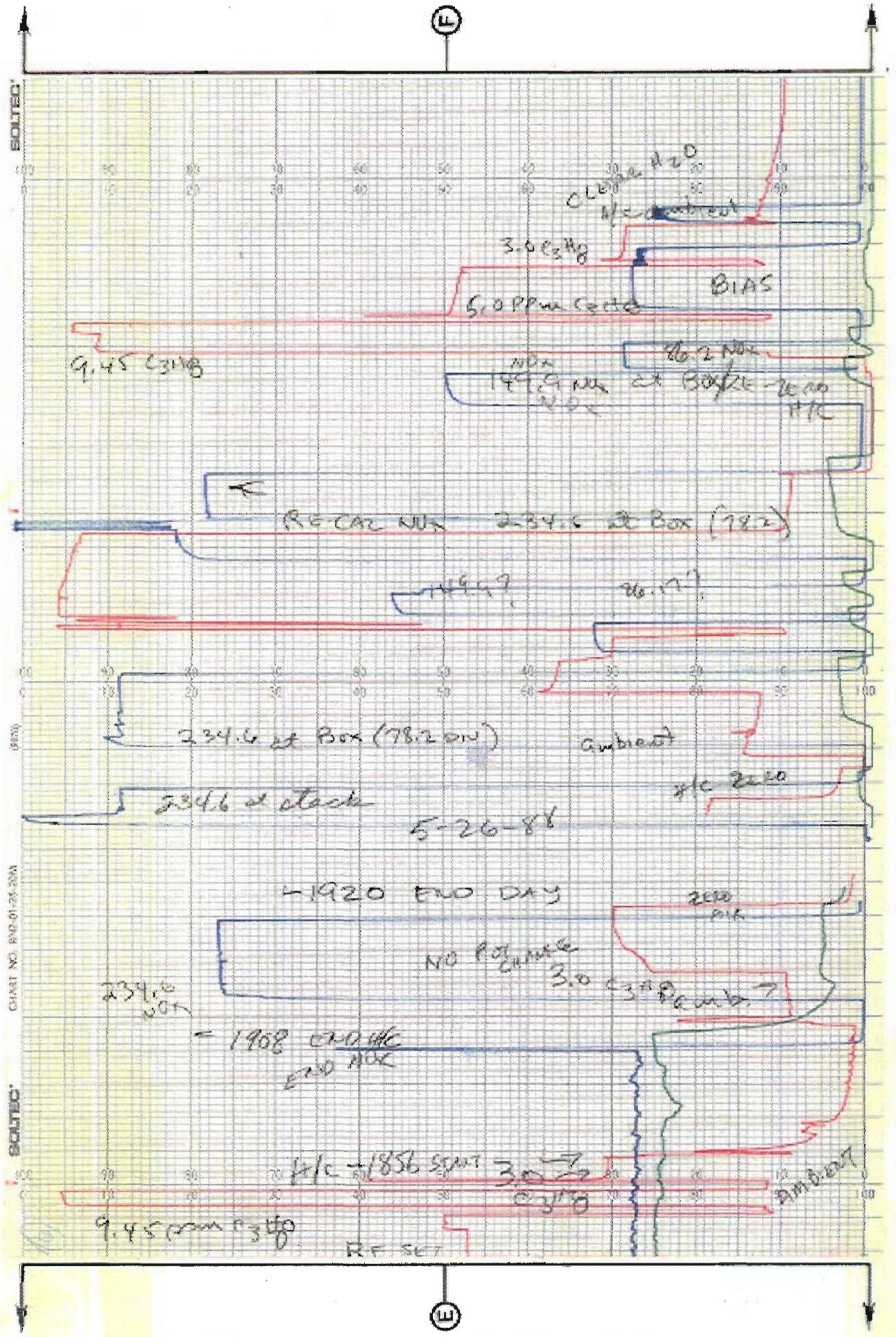

A
CHART NO.
BOLTECO
ZERO AIR
-1106
STACK 1032
subject
30 ppm
5.0ppm
9.45 ppm C3H8
ambient air
ZERO AIR
STACK 1009
5.0ppm
B

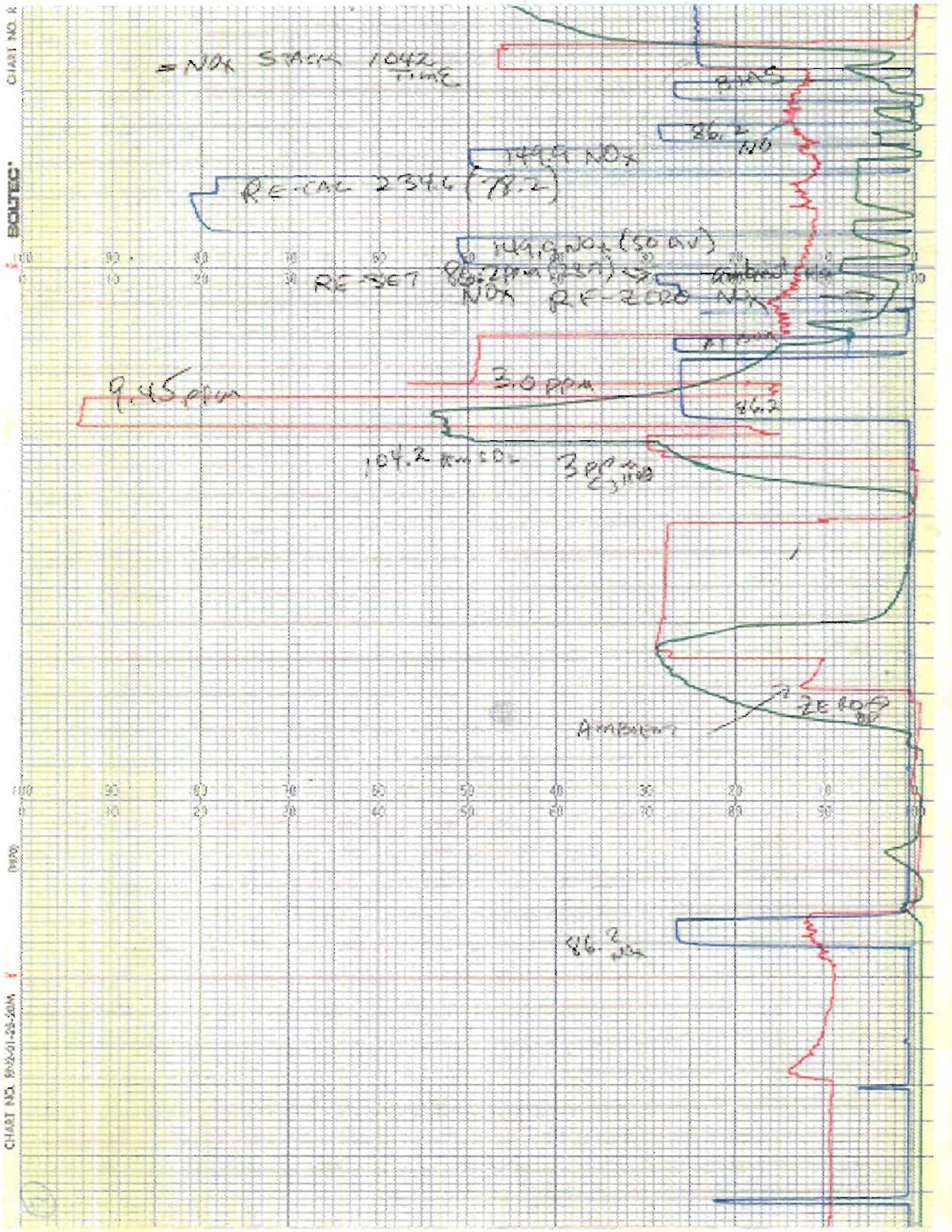

B
9.45 ppm C3H8
AMBIENT HC
NOx BIAS
89.6 O2 V (179.1 SO2 ppm)
5.0 ppm C3H8
50.8 ppm
NO SIGNAL
34 psi
66.2 ppm NOx at burn
ZERO AIR HC
VOC RED 10 ppm range
BLUE 100 ppm range
NOx
SO2 Green 200 ppm range
(207° DRYER DOWN)
ZERO C3H8
5.0 ppm C3H8
Ambient
9.45 C3H8
A

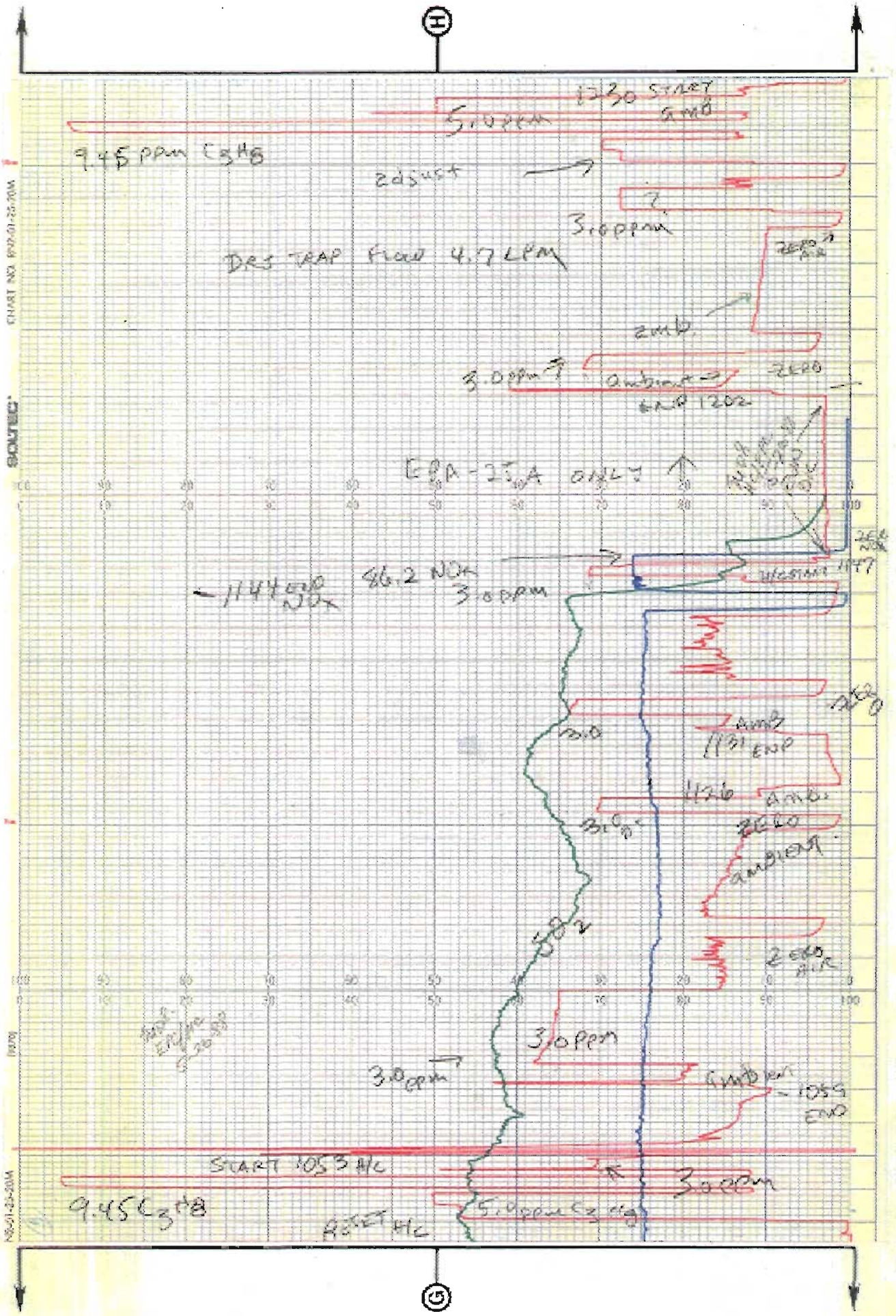

C
FLAME OUT
1453 time start Run!
45 as VOC
RS up scale 35
5.0 H/C
0.5 Resolution
Ambient
32 sec
9.45 ppm C3H8
Relaxing
Mixing
VOC
25A
3.0 H/C
H/C zero
3.0 C3H8
9.45 C3H8
RESET
500 ppm C3H8
BIAS
149.9 ppm NO
NO
9.45 C3H8
REPM NOx 300 ppm range — 234.6 ppm
Zero Air H/C
FLAME OUT
FLAME OUT
Restart
1351 Start
B
CHART NO. EN2-01-04-20N
SOLTEC

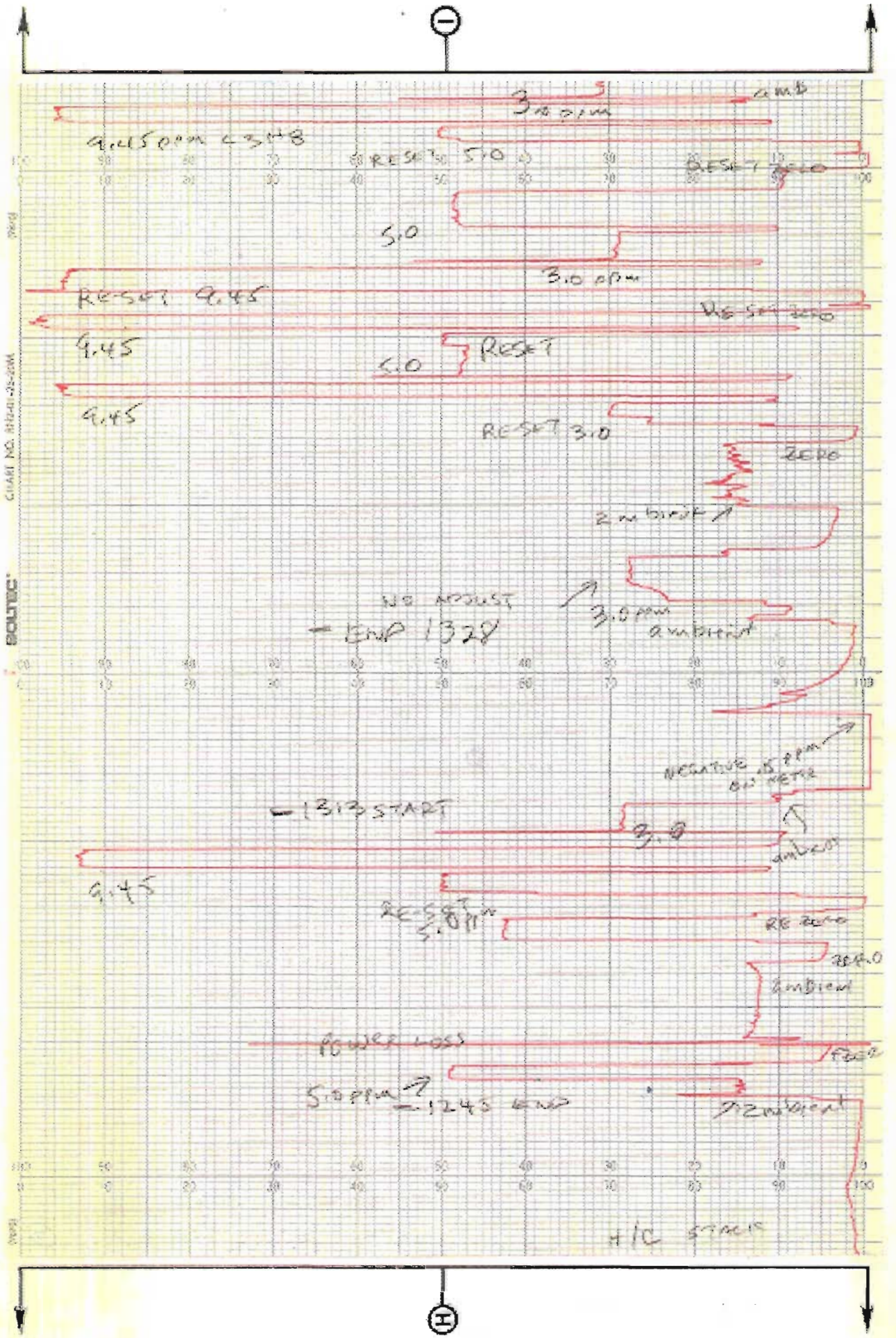

START NOx (SO2 1700
134.6 NOx (12.2 O2)
179.1 SO2
104.2 ppm SO2
ZERO AIR
3.0 ppm
5.0 ppm
F10 190°C
9.45 ppm
179.1 SO2
RE-ZERO
3.0 ppm
ZERO SO2
AMBIENT
ZERO AIR
5.0 C3H8
ZERO HC
END 1553
NOx ZERO
FURNACE OUT
FURNACE OUT
CHART NO. ENG-01-25-90M
SOLTEC

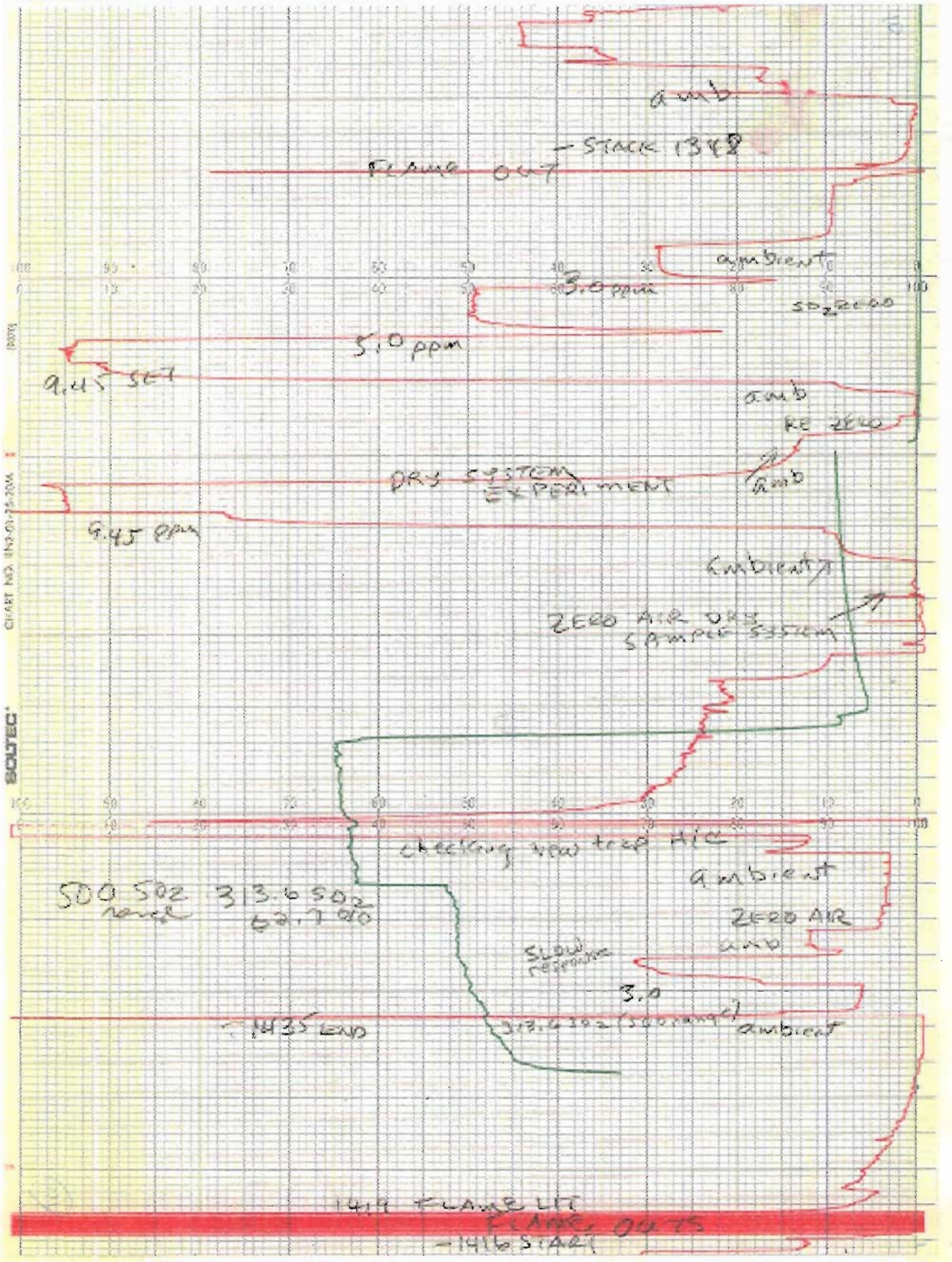

5.0 C3H8
RE ZERO
5.0 C3H8
AMBIENT
-1812 END
AMBIENT
-1812 END H/C
START 1807 RUN 3 NOX
234.6 NOX
RELAYING NOT SET
1802 START H/C
ZERO SO2
ZERO NOX
NO POT CHANGES
ON H/C
-1800 END NO/SOX
ZERO AIR
NO CAL ADJUST
Ambient
5.0 C3H8
ZERO
-1744 END H/C
1734 START
5.0 C3H8
ZERO AIR
3.0 C3H8
9.45 PPM C3H8
RE ZERO
ZERO MS
3.0 H/C
ZERO H/C
Ambient
1705 END
20 cylinder
CHART NO. 8N3-01-25-3WA
SOLTEC

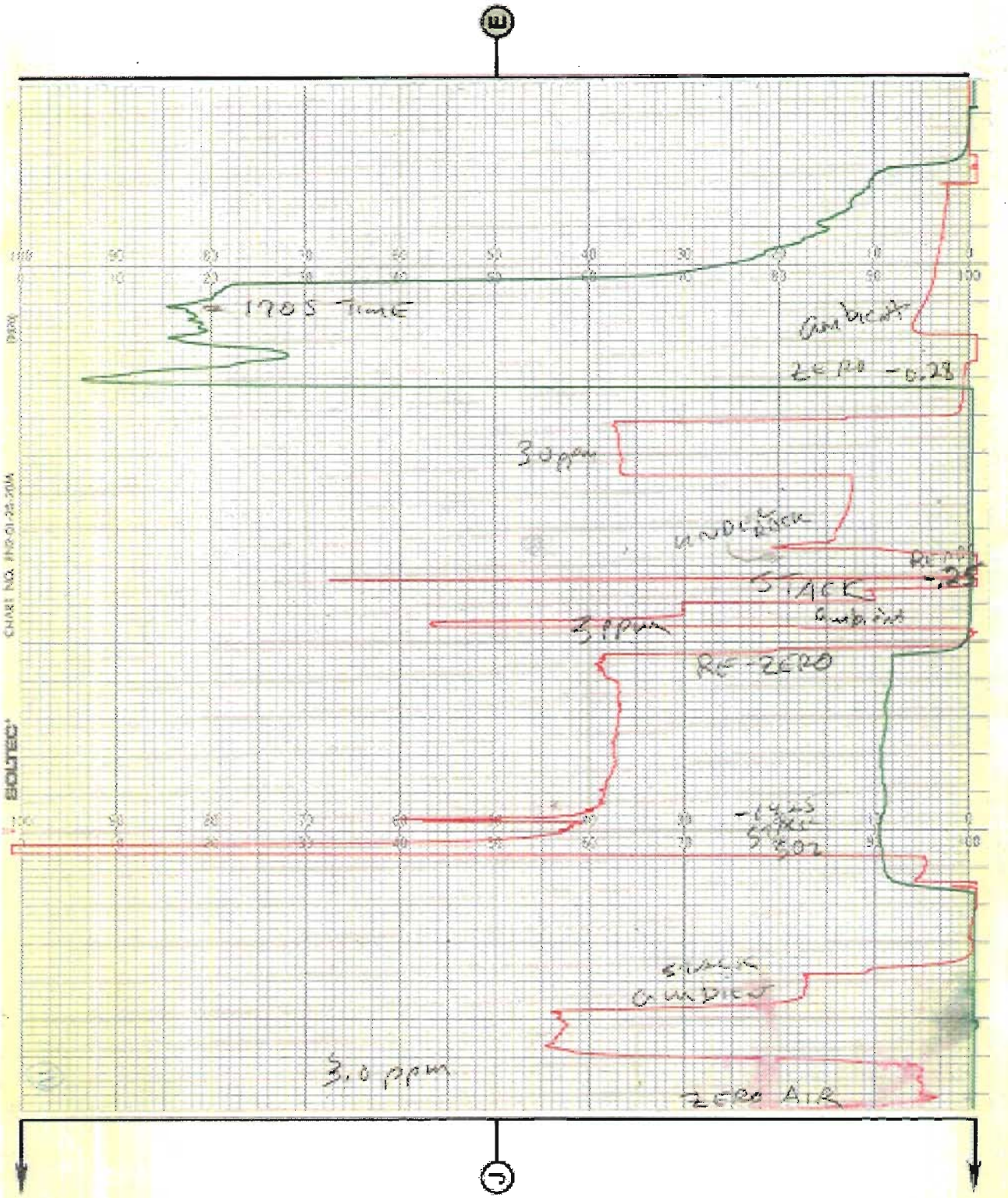

SOLTEC
3.0 C3H8
BIAS
5.0 PPM C3H8
9.45 C3H8
RE-CAL NOx
234.6 at Box (78.2)
234.6 at Box (78.2 ON)
ambient
234.6 at stack
5-26-86
1920 END DAY
NO RO CHANGE
3.0 C3H8 amb
1908 END HC
END NOx
H/C 1856 START
3.0 C3H8
AMBIENT
9.45 ppm C3H8
RE SET
CHART NO. RND-01-25-30M


NOx STACK 1042
TIME
86.2
149.9 NOx
RE-CAL 234.6 (78.2)
149.9 NOx (50 AV)
RE-SET
NOx RE-ZERO NOx
9.45 ppm
3.0 ppm
86.2
104.2 ppm CO
AMBIENT
ZERO
86.2 ppm
BOLTEC
CHART NO. R
CHART NO. 89-02-01-26-50/A


1230 START
5.0 ppm
9.45 ppm C3H8
2ds set
3.0 ppm
DRS TRAP Flow 4.7 LPM
ZERO AIR
2mb
3.0 ppm
ambient
END 1202
EPA-25A ONLY
1147 END
46.2 NOx
3.0 ppm
1147 END
SO2
1131 END
1126 amb
ZERO
AMBIENT
ZERO AIR
3.0 ppm
3.0 ppm
ambient
1055 END
START 1053 HC
3.0 ppm
9.45 C3H8
5.0 ppm C3H8
RESET HC


3.0 ppm
9.45 ppm 1348
RESET 5.0
RESET ZERO
5.0
3.0 ppm
RESET 9.45
RESET ZERO
9.45
5.0
RESET
9.45
RESET 3.0
ZERO
2 m bias
NO ADJUST
3.0 ppm ambient
END 1328
NEGATIVE 15 ppm ON METER
1313 START
3.0
ambient
9.45
RESET 5.0 ppm
RESET ZERO
3.0
ambient
POWER LOSS
RESET
5.0 ppm
1245 END
2 m bias
H/C START
BOLTEC
CHART NO. 812-01-35-2014


amb
STACK 1348
FLAME OUT
ambient
3.0 ppm
SO2 zero
5.0 ppm
9.45 SET
amb
RE ZERO
DRY SYSTEM EXPERIMENT
amb
9.45 ppm
ambient
ZERO AIR DRY SAMPLE SYSTEM
SOLTEC
checking new trap HIC
ambient
500 SO2 range
313.6 SO2
ZERO AIR
amb
SLOW response
3.0
1435 END
313.6 SO2 (500 range)
ambient
1419 FLAME LIT
FLAME OUTS
1416 START


E
= 170S TIME
Ambient
ZERO -0.28
30ppm
Analyzer Back
STACK
Ambient
3ppm
RE-ZERO
SO2
Ambient
3.0 ppm
ZERO AIR
BOLTECH
CHART NO. H2-01-28-2004
F

Copy Stuckneck

Air Products & Chemicals, Inc.
Specialty Gas
5837 W. 5th Street
P. O. Box 6874
Jacksonville, FL 32236
Ph. (904) 781-8450

ANALYTICAL REPORT

SAMPLE OF: PROPANE IN AIR DATE: 12/11/86 PAGE: 1

SHIPPER NO: CUSTOMER ORDER NO.:

SAMPLE DATE: 12/10/86 REQUESTED BY: APCI - Jacksonville

REMARKS:

ANALYTICAL METHOD		ANALYST	ANALYTICAL METHOD		ANALYST
Electrolytic Cell (O2 Trace)			Gas Chromatography	X	EH
Infrared Horiba			Infrared Spectroscopy		
Ion Mobility for N2 in Ar			C.G. Flame Ionization Unit	X	MS
Dew Point			Chemiluminescence		
Hydrogen Flame Analyzer (THC)			Paramagnetic		
Wet Analysis			Gravimetric		
Flame Photometer					

ANALYSIS

LAB NO.	CYL. NO.	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
CJ-2318-86	SG860161	Propane	9.0	9.45	Molar ppm
		Oxygen	21.0	20.7	Molar %
CJ-2319-86	SG860103	Propane	1000	1010	Molar ppm
		Oxygen	21.0	20.8	Molar %

CERTIFICATION

This analysis has been performed utilizing the analytical method(s) stated and is correct to within the analytical accuracies of this (these) method(s).

W. C. Lowe

Authorized Signature

CC: Cylinder
File

FORM 3906-1 (10/84)

Scott Specialty Gases

PLUMSTEADVILLE, PA. 18949 PHONE: (215) 766-8861 TWX: 510-665-9344

Date: 3-27-87
Our Project No.: 338458
Your P.O. No.: 87102

AIR CONSULTING AND ENGINEERING
ATTN: STEVE NECK
2106 NW 67TH PLACE
SUITE 4
GAINESVILLE, FL 32606

Gentlemen:

Thank you for choosing Scott for your Specialty Gas needs. The analyses for the gases ordered, as reported by our laboratory, are listed below. Results are in volume percent, unless otherwise indicated.

ANALYTICAL REPORT

Cyl. No. AAL-1988 Analytical Accuracy ±1%

Component	Concentration
CARBON MONOXIDE	14.99 PPM
NITROGEN	BALANCE
NBS TRACEABLE	

Cyl. No. AAL-771 Analytical Accuracy ±1%

Component	Concentration
CARBON MONOXIDE	6.114 PPM
NITROGEN	BALANCE
NBS TRACEABLE	

Cyl. No. AAL-2618 Analytical Accuracy ±1%

Component	Concentration
NITRIC OXIDE	86.17 PPM
NITROGEN	BALANCE
NBS TRACEABLE	

Cyl. No. AAL-12822 Analytical Accuracy ±1%

Component	Concentration
NITRIC OXIDE	50.75 PPM
NITROGEN	BALANCE
NBS TRACEABLE	

Analyst John L. Sanson
JOHN SANSON

Approved By F. Nevill
FRANCIS E. NEVILL

ANALYTICAL REPORT – cont'd

AIR CONSULTING
ATTN: STEVE NECK

Date: 3/27/87
Our Project No.: 338458
Your P.O. No.: 87102

Cyl. No. AAL-14506 Analytical Accuracy ±1%

Component	Concentration
PROPANE	4.998 PPM
AIR	BALANCE
NBS TRACEABLE	

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. AAL-11220 L Analytical Accuracy ±1%

Component	Concentration
PROPANE	3.001 PPM
AIR	BALANCE
NBS TRACEABLE	

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Analyst John T. Sanson
JOHN SANSON

Approved By [signature]
FRANCIS E. NEVILL

CERTIFIED REFERENCE MATERIALS EPA PROTOCOL GASES
ACUBLEND® CALIBRATION & SPECIALTY GAS MIXTURES PURE GASES
ACCESSORY PRODUCTS CUSTOM ANALYTICAL SERVICES

Scott Specialty Gases

PLUMSTEADVILLE, PA. 18949 PHONE: 215-766-8861 TWX: 510-665-9344

AIR CONSULTING & ENGINEERING
ATTN: STEVE NECK
2106 NW 67TH PLACE
GAINESVILLE, FL 32606

Date Shipped 1/27/88
Our Project No: 343202
Your P.O. No: 87127
Page 1 of 1

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

(Concentrations are in mole % or ppm)

Cylinder Number AAL-20757 Certified Accuracy ±1 % NBS Traceable Analysis Dates: First 1/18/88 Last 1/26/88

Cylinder Pressure: 1900 PSIG

COMPONENTS	CERTIFIED CONC	EXPIRATION DATE	ANALYTICAL PRINCIPLE	PRIMARY STANDARD NBS/SRM's	REPLICATE CONCENTRATIONS FIRST	SECOND
NITRIC OXIDE	234.6 PPM	7/26/89	CHEMILUMINESCENT	1687/1686	234.2 PPM	234.4 PPM
NITROGEN	BALANCE				235.1 PPM	234.4 PPM
					234.8 PPM	234.4 PPM

Cylinder Number _____ Certified Accuracy _____ % NBS Traceable Analysis Dates: First _____ Last _____

COMPONENTS	CERTIFIED CONC	EXPIRATION DATE	ANALYTICAL PRINCIPLE	PRIMARY STANDARD NBS/SRM's	REPLICATE CONCENTRATIONS FIRST	SECOND

*We hereby certify the cylinder gas has been analyzed according to EPA Protocol No: 1 Procedure G-1

Analyst Tom Sassaman TOM SASSAMAN Approved By Mark S. Sirinides MARK S. SIRINIDES

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

Scott Specialty Gases

PLUMSTEADVILLE, PA. 18949 PHONE: (215) 766-8861 TWX: 510-665-9344

Date: 1/27/88
Our Project No.: 343202
Your P.O. No.: 87127

AIR CONSULTING & ENGINEERING
ATTN: STEVE NECK

Gentlemen:

Thank you for choosing Scott for your Specialty Gas needs. The analyses for the gases ordered, as reported by our laboratory, are listed below. Results are in volume percent, unless otherwise indicated.

ANALYTICAL REPORT

Cyl. No. AAL-20762 Analytical Accuracy ±1%

Component	Concentration
NITRIC OXIDE	149.9 PPM
NITROGEN	BALANCE
NBS TRACEABLE	

Cyl. No. AAL-1965 Analytical Accuracy ±2%

Component	Concentration
PROPANE	50.01 PPM
AIR	BALANCE

Cyl. No. AAL-20767 Analytical Accuracy ±1%

Component	Concentration
NITRIC OXIDE	77.67 PPM
NITROGEN	BALANCE
NBS TRACEABLE	

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Analyst Tom Sassaman
TOM SASSAMAN

Approved By Mark S. Sirinides
MARK S. SIRINIDES

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

LED

PROJECT PARTICIPANTS

ACE

Stephen L. Neck, P.E.	C.E.M. Field Testing Report Preparation
Peter F. Burnette	Field Particulate Testing Laboratory Analysis
J. Colleen Hodge	Field Testing
Sidney J. Carter	Field Testing Post Test Calibrations
Dagmar A. Neck	SO2 Analysis
Karie L. Philman	Document Production

IMC. INC.

Dave Turley	Project Coordinator Process Production Monitoring

HCEPC

Mike Silcott	Test Observer

APPENDIX D

PROJECT PARTICIPANTS