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AP-42 Section Number: 1.8

Reference Number: 30

Title: Source Test Report for Particulate
Emissions Twin Impingement Wet
Scrubber Boiler Number 8: Sugar
Cane Growers Cooperative of Florida
Airport Road

November 1991

1000 1000-1000-7

**SOURCE TEST REPORT
for
PARTICULATE EMISSIONS**

**IMPINGEMENT WET SCRUBBER
BOILER NUMBER 8**

NOVEMBER 27, 1991

Prepared for:

**SUGAR CANE GROWERS
COOPERATIVE OF FLORIDA
AIRPORT ROAD
BELLE GLADE, FLORIDA 33430-0666**

Prepared by:

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236-91-04

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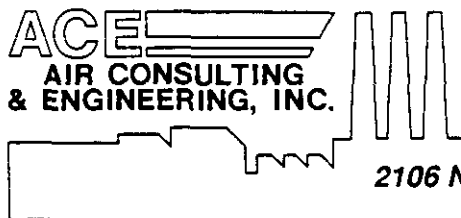
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REPORT CERTIFICATION

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.

Dagmar Neck
Dagmar Neck

12/31/91
Date

1.0 INTRODUCTION

On November 27, 1991, Air Consulting and Engineering, Inc. (ACE), conducted particulate emission testing on the Wet Scrubber Outlet of Boiler 8 at Sugar Cane Growers Cooperative of Florida (Sugar Cane Growers) located in Belle Glade, Florida.

Testing was performed to demonstrate compliance with the current Florida Department of Environmental Regulation (FDER) operating permit.

United States Environmental Protection Agency (EPA) Method 5 was utilized for the emission testing.

Mr. Ken Tucker of the FDER observed a portion of the testing.

Mr. Blas Marin of Sugar Cane Growers coordinated testing and provided production data.

2.0 SUMMARY AND DISCUSSION OF RESULTS

Boiler Number 8 demonstrated compliance with the permit conditions.

Table 1 is a summary of the emission results and flue gas parameters.

Particulate emissions averaged 52.00 pounds per hour (lbs/Hr) and 0.111 pounds per million BTU (lbs/MMBTU) which is within the allowable emissions of 68.70 lbs/Hr and 0.147 lbs/MMBTU.

Complete emission summaries, field data sheets and laboratory data are presented in Appendices A, B, and C, respectively.

Production rate summaries are provided in Appendix D. This data was obtained from control room recordings of steam flow, temperature, and pressure as well as feed water temperature and pressure. Residue integrator and oil meter readings were recorded at the beginning and end of each particulate run.

Table 1 Emission Summary
 Boiler Number 8
 Sugar Cane Growers Cooperative of Florida
 Belle Glade, Florida
 November 27, 1991

Run Number	Flow Rate SCFMD	Stack Temp. °F	Stack Moisture %	<u>Particulate Emissions</u>		<u>Allowable Emissions</u>	
				lbs/Hr	lbs/MMBTU	lbs/Hr	lbs/MMBTU
1	100969	155	28.0	62.98	0.138	66.51	0.146
2	97548	155	28.5	44.50	0.093	69.81	0.147
3	96014	156	29.3	48.53	0.102	69.77	0.147
AVERAGE	98177	155	28.6	52.00	0.111	68.70	0.147

3.0 PROCESS DESCRIPTION AND OPERATION

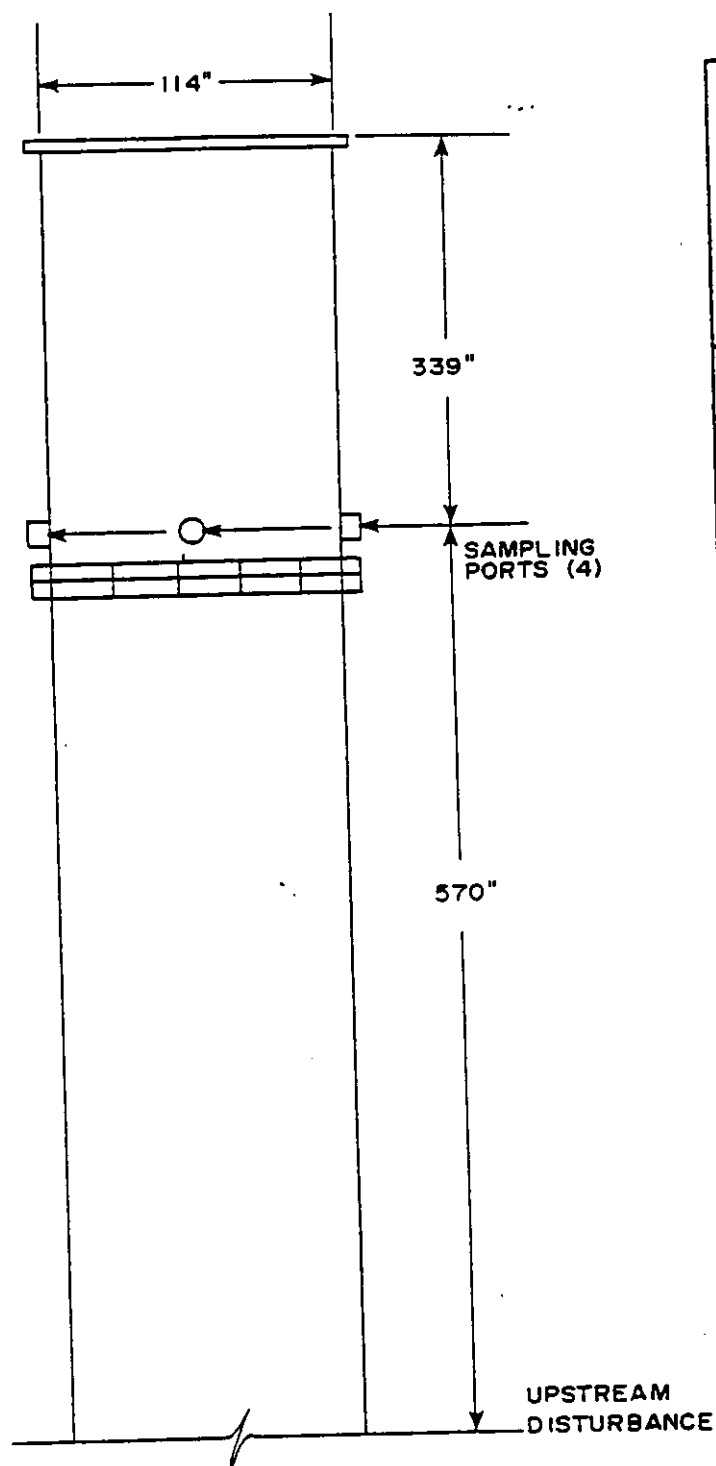
The Number 8 Boiler at Sugar Cane Growers is a spreader stoker design used primarily for residue fuel firing. Supplemental oil firing was also utilized for the emission test. The boiler averaged 240,616 lbs/Hr steam production over the three run test period.

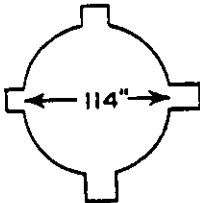
Oil meters, steam integrators, and other production monitoring devices were rigorously calibrated prior to the production season.

4.0 SAMPLING POINT LOCATION

The sampling point location (Figure 1) is a single scrubber outlet stack, 114" in diameter. The stack has four sample ports 90 degrees apart. The ports are located 570" from an upstream disturbance and 339" from the outlet.

Twenty-four test points were sampled on each stack for each test run. The traverse were located as shown below. The stack configuration is such that there was no reason to evaluate the presence of cyclonic flow.



	
TRAVERSE POINT NUMBER	INCHES INSIDE STACK WALL
1	2.9
2	9.3
3	16.7
4	25.8
5	39.0

NOTE: NOT TO SCALE

FIGURE 1.
SAMPLING POINT LOCATION
BOILER NO. 8
SUGARCANE GROWERS COOP OF FLORIDA

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5.0 FIELD AND ANALYTICAL PROCEDURES

5.1 Particulate Matter Sampling and Analysis--EPA Method 5 (Glass Probe)

Particulate matter samples were collected by the particulate matter emission measurement method specified by the United States Environmental Protection Agency. 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, AND SAMPLING PROBE** - The nozzle, filter holder, and sampling probe were washed vigorously with soapy water and brushes, rinsed with distilled water and acetone, 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 particulate matter sample runs, certain stack and stack gas parameters were measured. These preliminary measurements

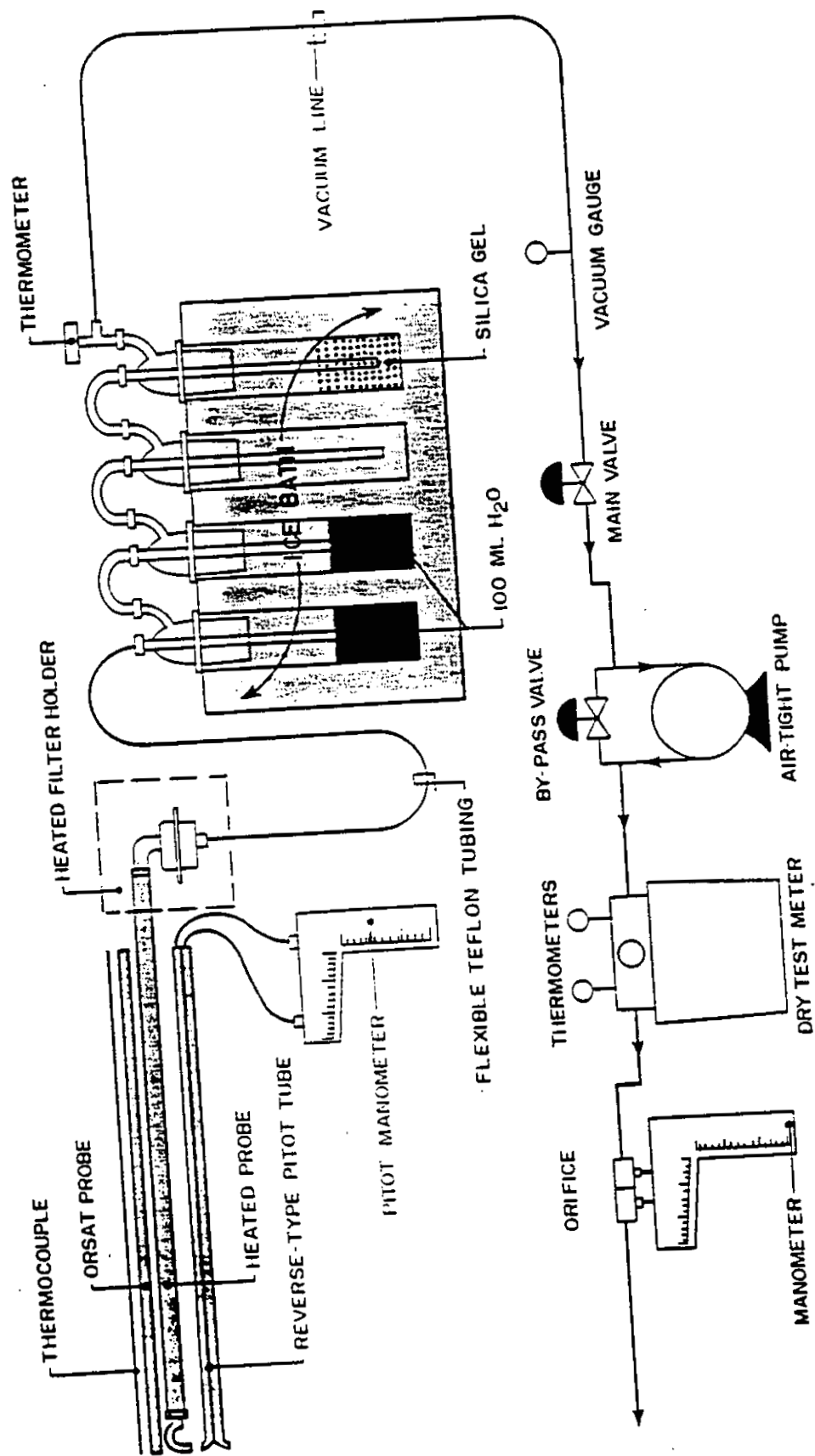


FIGURE 1.
EPA METHOD 5 SAMPLING TRAIN

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included the average 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 H₂O 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 particulate matter test run consisted of sampling for a specific amount of 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 glass probe; a glass fiber filter; two impingers each with 100 ml

of distilled deionized water; 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 water from the first three impingers was measured for the purpose of calculating the moisture in the stack gas and then discarded.
4. The used silica gel from the fourth impinger was transferred to the original tared container and sealed.

LABORATORY ANALYSIS

The three 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 transferred 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. The used silica gel in its tared container was weighed to the nearest 0.1 gram.

The total sample weight included the weight of material collected on the filter plus the weight of material collected in the nozzle, sampling probe, and front half of the filter holder.

DATA

The field data sheets, calculation sheets, and nomenclature definitions are included in the appendices of this report.

APPENDIX A
COMPLETE EMISSION DATA

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COMPLETE EMISSION DATA

PLANT: SUGAR CANE GROWERS COOPERATIVE OF FLORIDA
SOURCE: NUMBER 8 BOILER
DATE: 11-27-91

RUN NO.:	1	IMPINGER ml	328
BEGIN TIME:	1142	SILICA GEL gms.	9.5
END TIME:	1250	PERCENT O2	6.0
TOTAL RUN TIME:	60.00 min.	PERCENT CO2	13.5
BAROMETRIC PRESSURE:	30.34 "Hg	"F" FACTOR	N/A
STACK PRESSURE:	30.34 "Hg.		
NOZZLE DIAMETER:	.300 inches	PARTICULATE	
METER CORR. FACTOR:	1.004		
FINAL METER:	504.000 cubic ft.	FILTER mg.	183.2
INITIAL METER:	462.500 cubic ft.	WASH mg.	71.4
STACK AREA:	70.880 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	DRIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.390	0.624	2.010	153	77
1-2	.370	0.608	1.910	153	77
1-3	.410	0.640	2.120	155	78
1-4	.340	0.583	1.750	155	78
1-5	.300	0.548	1.550	154	79
2-1	.420	0.648	2.580	158	81
2-2	.320	0.566	1.650	158	81
2-3	.450	0.671	2.320	155	81
2-4	.400	0.632	2.060	153	82
2-5	.350	0.592	1.810	153	82
3-1	.380	0.616	1.960	158	84
3-2	.400	0.632	2.060	156	84
3-3	.350	0.592	1.810	158	84
3-4	.340	0.583	1.750	155	85
3-5	.300	0.548	1.550	153	86
4-1	.430	0.656	2.090	156	87
4-2	.460	0.678	2.070	157	87
4-3	.380	0.616	1.950	157	87
4-4	.350	0.592	1.800	154	88
4-5	.280	0.529	1.440	151	88

AVERAGES	-----	0.608	1.912	155	83
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NOZZLE AREA(SQ. FT.):	0.0004909		
AVG. VELOCITY HEAD	0.37 "H2O	VOL. FLOW ACFM	161038
AVG. STACK TEMP.:	155 F	VOL. FLOW SCFMD	100969
AVG. METER TEMP.:	83 F		
AVG. DRIFICE DIFFERENTIAL:	1.91 "H2O	PARTICULATE DATA	
METER STANDARD CUBIC FEET:	41.266		
% H2O VAPOR:	28.0	POUNDS PER HOUR:	62.982
GAS MOL. WT. DRY:	30.40	POUNDS PER SCF	0.0000104
GAS MOL. WT. WET:	28.93	GRAINS/SCF:	0.073
% EXCESS AIR:	39.34	GRAINS/SCF @ 8% O2	0.063
AVG. STACK VEL. (FPS):	37.87	GRAINS/SCF @ 50% EA	0.068
MMBTU INPUT:	455.74	POUNDS PER MMBTU:	0.138
PERCENT ISOKINETIC	98.36	LB8/MMBTU "F" FACTOR	0.000

SAMPLE CALCULATIONS - RUN 1

NOZZLE AREA (FT. ²):	$(D_n/12)^2 \times 3.1416/4$	0.000491
AVG. VELOCITY HEAD:	$(AVG. SQ. RT.)/2$	37.87
METER STND. FT3:	$(M_f - M_i) \times MCF \times (AVG. DRF. DIFF. / 13.6) / 29.92 \times (528 / (T_m + 460))$	41.266
PERCENT H2O:	$((IMP + SG) \times (((IMP + SG) \times .0474) + SCF) \times 100$	
Mw DRY:	$((O_2\% \times .32) + CO_2\% \times .44) + (100 - (O_2\% + CO_2\%) \times .28$	30.40
Mw WET:	$(Mw DRY \times (1 - \%H_2O/100)) + \%H_2O \times .18$	26.93
% EXCESS AIR:	$\%O_2 / (((100 - (\%O_2 + \%CO_2)) \times .264) - \%O_2) \times 100$	39.34
STACK VEL. (FPS):	$85.49 \times .84 \times (AVG. SQ. RT. VEL. HD.) \times ((T_s + 460) / (P_s \times MwWET))^{1.5}$	37.87
% ISO KINETIC:	$((T_s + 460) \times SCF \times 2992) / (528 \times FPS \times TIME \times A_n \times P_s \times 60 \times (1 - \%O_2/100))$	98.36
VOL. FLOW (ACFM):	$FPS \times 60 \times A_s$	161038
STND. FLOW (SCFMD):	$ACFM \times 528 / (T_s + 460) \times (1 - \%H_2O/100) \times (P_s / 29.92)$	100969
PARTICULATE LB/HR:	$PROBE + FILTER \text{ mg.} / 453600 \times (SCFMD / SCF) \times 60$	62.982
PARTICULATE LB/SCF:	$PROBE + FILTER \text{ mg.} / 453600 / SCF$	0.0000104
GRAINS/SCF:	$LB/SCF \times 7000$	0.0728
GR/SCF @ 8% O ₂ :	$(12.9 / (20.9 - \%O_2)) \times GR/SCF$	0.0630
GR/SCF @ 50% E.A.:	$GR/SCF \times ((100 + \%E.A.) / 150)$	0.0676
LB/MMBTU:	$(LB/HR) / (LB/MMBTUH)$	0.138
LB/MMBTU "F" FACTOR:	$LB/SCF \times "F" \text{ FACTOR} \times (20.9 / 20.9 - \%O_2)$	0.000

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COMPLETE EMISSION DATA

PLANT: SUGAR CANE GROWERS COOPERATIVE OF FLORIDA
SOURCE: NUMBER 3 BOILER
DATE: 11-27-91

RUN NO.:	2	IMPINGER ml	335
BEGIN TIME:	1343	SILICA GEL gms.	9.5
END TIME:	1452	PERCENT O2	8.0
TOTAL RUN TIME:	60.00 min.	PERCENT CO2	13.5
BAROMETRIC PRESSURE:	30.34 "Hg	"F" FACTOR	N/A
STACK PRESSURE:	30.34 "Hg.		
NOZZLE DIAMETER:	.300 inches	PARTICULATE	
METER CORR. FACTOR:	1.004		
FINAL METER:	546.246 cubic ft.	FILTER mg.	141.8
INITIAL METER:	504.340 cubic ft.	WASH mg.	0.0
STACK AREA:	70.880 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.430	0.656	2.220	155	86
1-2	.430	0.656	2.220	155	86
1-3	.370	0.608	1.910	156	86
1-4	.330	0.574	1.700	155	86
1-5	.300	0.548	1.550	155	86
2-1	.420	0.648	2.580	156	88
2-2	.370	0.608	1.910	155	88
2-3	.350	0.592	1.810	155	88
2-4	.280	0.529	1.440	155	89
2-5	.260	0.510	1.340	154	89
3-1	.430	0.656	2.220	156	89
3-2	.390	0.624	2.010	156	92
3-3	.370	0.608	1.910	156	92
3-4	.350	0.592	1.810	154	92
3-5	.300	0.548	1.550	156	93
4-1	.410	0.640	2.120	155	94
4-2	.350	0.592	1.810	156	94
4-3	.300	0.548	1.550	156	94
4-4	.300	0.548	1.550	156	95
4-5	.280	0.529	1.440	156	95
AVERAGES	-----	0.591	1.833	155	90

RUN 2

NOZZLE AREA(SQ.FT.):	0.0004909		
AVG. VELOCITY HEAD	0.35 "H2O	VOL. FLOW ACFM	156726
AVG. STACK TEMP.:	155 F	VOL. FLOW SCFMD	97548
AVG. METER TEMP.:	90 F		
AVG. ORIFICE DIFFERENTIAL:	1.83 "H2O	PARTICULATE DATA:	
METER STANDARD CUBIC FEET:	41.116		
% H2O VAPOR:	28.5	POUNDS PER HOUR:	44.500
GAS MOL. WT. DRY:	30.40	POUNDS PER SCF:	0.0000076
GAS MOL. WT. WET:	26.87	GRAINS/SCF:	0.053
% EXCESS AIR:	39.34	GRAINS/SCF @ 8% O2	0.046
AVG. STACK VEL.(FPS):	36.85	GRAINS/SCF @50% EA	0.049
MMBTU INPUT:	476.42	POUNDS PER MMBTU:	0.093
PERCENT ISOKINETIC:	101.44	LEB/MMBTU"F"FACTOR	0.000

SAMPLE CALCULATIONS - RUN 2

NOZZLE AREA (FT. ²)	$(D_n/12)^2 \times 3.1416/4$	0.000491
AVG. VELOCITY HEAD:	$(AVG. SQ. RT.)/2$	36.85
METER STND. FT3:	$(M_f - M_i) \times MCF \times (AVG. ORF. DIFF. / 13.6) / 29.92 \times (528 / (T_m + 460))$	41.116
PERCENT H2O:	$((IMP + SG) \times (((IMP + SG) \times .0474) + SCF) \times 100$	
Mw DRY:	$((O_2\% \times .32) + CO_2\% \times .44) + (100 - (O_2\% + CO_2\%) \times .28$	30.40
Mw WET:	$(Mw DRY \times (1 - \%H_2O/100)) + \%H_2O \times .18$	26.87
% EXCESS AIR:	$\%O_2 / (((100 - (\%O_2 + \%CO_2)) \times .264) - \%O_2) \times 100$	39.34
STACK VEL. (FPS):	$85.49 \times .84 \times (AVG. SQ. RT. VEL. HD.) \times ((T_s + 460) / (P_s \times MwWET))^{1.5}$	36.85
% ISOKINETIC:	$((T_s + 460) \times SCF \times 2992) / (528 \times FPS \times TIME \times A_n \times P_s \times 60 \times (1 - \%O_2/100))$	101.44
VOL. FLOW (ACFM):	$FPS \times 60 \times A_s$	156726
STND. FLOW (SCFMD):	$ACFM \times 528 / (T_s + 460) \times (1 - \%H_2O/100) \times (P_s / 29.92)$	97548
PARTICULATE LB/HR:	$PROBE + FILTER \text{ mg. } / 453600 \times (SCFMD / SCF) \times 60$	44.500
PARTICULATE LB/SCF:	$PROBE + FILTER \text{ mg. } / 453600 / SCF$	0.0000076
GRAINS/SCF:	$LB/SCF \times 7000$	0.0532
GR/SCF @ 8% O ₂ :	$(12.9 / (20.9 - \%O_2)) \times GR/SCF$	0.0461
GR/SCF @ 50% E.A.:	$GR/SCF \times ((100 + \%E.A.) / 150)$	0.0494
LB/MMBTU:	$(LB/HR) / (LB/MMBTUHR)$	0.093
LB/MMBTU "F" FACTOR:	$LB/SCF \times "F" \text{ FACTOR} \times (20.9 / 20.9 - \%O_2)$	0.000

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COMPLETE EMISSION DATA

PLANT: SUGAR CANE GROWERS COOPERATIVE OF FLORIDA
SOURCE: NUMBER 8 BOILER
DATE: 11-27-91

RUN NO.:	3	IMPINGER ml	343
BEGIN TIME:	1539	SILICA GEL gms.	8.5
END TIME:	1647	PERCENT O2	7.0
TOTAL RUN TIME:	60.00 min.	PERCENT CO2	13.0
BAROMETRIC PRESSURE:	30.34 "Hg	"F" FACTOR	N/A
STACK PRESSURE:	30.34 "Hg.		
NOZZLE DIAMETER:	.300 inches	PARTICULATE	
METER CORR. FACTOR:	1.004		
FINAL METER:	587.701 cubic ft.	FILTER mg.	146.8
INITIAL METER:	546.570 cubic ft.	WASH mg.	5.8
STACK AREA:	70.880 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.400	0.632	2.060	157	91
1-2	.340	0.583	1.750	156	90
1-3	.330	0.574	1.700	155	91
1-4	.250	0.500	1.290	155	91
1-5	.230	0.480	1.190	150	91
2-1	.440	0.663	2.270	156	91
2-2	.400	0.632	2.060	158	91
2-3	.390	0.624	2.010	157	91
2-4	.350	0.592	1.810	158	91
2-5	.280	0.529	1.440	156	92
3-1	.390	0.624	2.010	158	93
3-2	.370	0.608	1.910	157	93
3-3	.320	0.566	1.550	156	93
3-4	.300	0.548	1.550	158	93
3-5	.280	0.529	1.440	154	93
4-1	.420	0.648	2.170	157	94
4-2	.440	0.663	2.270	157	94
4-3	.400	0.632	2.060	157	94
4-4	.350	0.592	1.810	158	94
4-5	.280	0.529	1.440	156	95
AVERAGES		0.588	1.794	156	92

RUN 3

NOZZLE AREA(SQ.FT.):	0.0004909		
AVG. VELOCITY HEAD	0.35 "H2O	VOL. FLOW ACFM	156407
AVG. STACK TEMP.:	156 F	VOL. FLOW SCFMD	96014
AVG. METER TEMP.:	92 F		
AVG. ORIFICE DIFFERENTIAL:	1.79 "H2O	PARTICULATE DATA:	
METER STANDARD CUBIC FEET:	40.198		
% H2O VAPOR:	29.3	POUNDS PER HOUR:	48.529
GAS MOL. WT. DRY:	30.36	POUNDS PER SCF:	0.0000084
GAS MOL. WT. WET:	26.73	GRAINS/SCF:	0.059
% EXCESS AIR:	49.58	GRAINS/SCF @ 8% O2	0.055
AVG. STACK VEL.(FPS)	36.78	GRAINS/SCF @50% EA	0.059
MMBTU INPUT:	476.22	POUNDS PER MMBTU:	0.102
PERCENT ISCKINETIC	100.76	LEB/MMBTU"F"FACTOR	0.000

Handwritten:
Avg
O₂: 6.2
Temp = 155
Flow = 98,177

SAMPLE CALCULATIONS - RUN 3

NOZZLE AREA (FT.2)	$(Dn/12)^2 \times 3.1416/4$	0.000491
AVG. VELOCITY HEAD:	$(AVG. SQ. RT.)^2$	36.78
METER STND. FT3:	$(Mf-Mi) \times MCF \times (AVG. ORF. DIFF. / 13.6) / 29.92 \times (528 / (Tm+460))$	40.198
PERCENT H2O:	$((IMP+SG) \times (((IMP+SG) \times .0474) + SCF) \times 100$	
Mw DRY:	$((O2\% \times .32) + CO2\% \times .44) + (100 - (O2\% + CO2\%) \times .28$	30.36
Mw WET:	$(Mw DRY \times (1 - \%H2O/100)) + \%H2O \times .18$	26.73
% EXCESS AIR:	$\%O2 / (((100 - (\%O2 + \%CO2)) \times .264) - \%O2) \times 100$	49.58
STACK VEL. (FPS):	$85.49 \times .84 \times (AVG. SQ. RT. VEL. HD.) \times ((Ts + 460) / (Ps \times MwWET))^{.5}$	36.78
% ISO KINETIC:	$((Ts + 460) \times SCF \times 2992) / (528 \times FPS \times TIME \times An \times Ps \times 60 \times (1 - \%O2/100))$	100.76
VOL. FLOW (ACFM):	$FPS \times 60 \times As$	156407
STND. FLOW (SCFMD):	$ACFM \times 528 / (Ts + 460) \times (1 - \%H2O/100) \times (Ps / 29.92)$	96014
PARTICULATE LB/HR:	$PROBE + FILTER \text{ mg.} / 453600 \times (SCFMD / SCF) \times 60$	48.529
PARTICULATE LB/SCF:	$PROBE + FILTER \text{ mg.} / 453600 / SCF$	0.0000084
GRAINS/SCF:	$LB/SCF \times 7000$	0.0590
GR/SCF @ 8% O2:	$(12.9 / (20.9 - \%O2)) \times GR/SCF$	0.0547
GR/SCF @ 50% E.A.:	$GR/SCF \times ((100 + \%E.A.) / 150)$	0.0588
LB/MMBTU:	$(LB/HR) / (LB/MMBTUH)$	0.102
LB/MMBTU "F" FACTOR:	$LB/SCF \times "F" \text{ FACTOR} \times (20.9 / 20.9 - \%O2)$	0.000

APPENDIX B
FIELD DATA SHEETS

STACK SAMPLING FIELD DATA SHEET

PLANT Sugar Cane Growers Corp. of Florida
 SOURCE Boiler #8
 PLANT LOCATION Belle Glade, Florida
 TYPE OF SAMPLING TRAIN EPA-5
 TYPE OF SAMPLES P.M.
 DATE 11-27-91 RUN NO. 1
 TIME START 1142 TIME END 1250
 SAMPLE TIME 3 / 20 (min/pt) = 60 Total min
 ASSUMED MOISTURE 30 % FDA 70
 NOMOGRAPH C_p 5.16 PITOT CORR. .84
 P_b 30.34 "Hg P_s 30.34 "Hg
 WEATHER Ply cldy TEMP 70 °F
 METER BOX NO. 1 H 2.15 V 1.004
 NOZZLE CAL. .300 .299 .301 .300
 STACK DIMENSIONS 114"
 STACK AREA 10.88 ft² EFFECTIVE ft²
 STACK HEIGHT ft
 STACK DIAMETER: UPSTRM. DNSTRM.
 PORT SIZE 8 in. NIPPLE LENGTH 8 in.
 U CORD LENGTH 200
 REMARKS:



2106 N. W. 67th PLACE - Suites 9 & 10
 GAINESVILLE, FLORIDA 32606

TEST ID SC8CLAS
 PAGE 1 OF 2

MAT'L PROCESSING RATE
 GAS METER READINGS: FINAL 504.000 ft³
 INITIAL 462.500 ft³
 NET 41.500 ft³
 FILTER NO. 3523 IMP. VOL. GAIN 328 ml.
 SIL GEL NO. 50 WT. GAIN 9.5 ml.
 TOTAL CONDENSATE 3375 ml.

ORSAT

	1	2	3	4	AVG.
% CO ₂	12.5	13.5	14.5	13.5	13.5
% O ₂	7.0	6.0	5.0		6.0
% CO					
% N ₂					

F_O = _____ F_O RANGE = _____

ORSAT ANALYZER _____

LEAK CHECKS

PRE 0.00 cfm 15 "Hg POST 0.00 cfm 22 "Hg
 METER BOX / PUMP _____ GAS SAMPLE SYST. _____
 ORSAT BAG _____ PRE-TEST OK
 PITOT TUBE NO. 0.00 / 15 H₂O / Sec
 POST-TEST (+) 0.00 / 15 H₂O / Sec
 POST-TEST (-) 0.00 / 15 H₂O / Sec
 PYROMETER NO. 2
 BOX OPERATOR Sam H. HARRIS PROBE HOLDER McKendall

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL / COMMENTS	CLOCK TIME	GAS METER READING (FT ³)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H ₂ O") CALC. ACTUAL	STACK GAS TEMP (°F)	SAMPLE BOX TEMP (°F)	LAST IMPINGING TEMP °F	DRY GAS METER TEMP (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1		1145	465.12	.39	2.01	153	235	48	77	10.0
2		1148	466.20	.37	1.91	155	228	47	77	10.0
3		1151	468.89	.41	2.12	155	242	49	78	11.0
4		1154	470.90	.34	1.75	155	243	50	78	10.0
5		1157	472.85	.30	1.55	154	246	53	79	10.0

[illegible]

STACK SAMPLING FIELD DATA SHEET

PLANT Sugar Cane Growers Coop. of Florida
 SOURCE Boiler #8
 PLANT LOCATION Belle Glade, Fla.
 TYPE OF SAMPLING TRAIN EPR-5
 TYPE OF SAMPLES P.M.
 DATE 11-27-91 RUN NO. 2
 TIME START 1343 TIME END 1452
 SAMPLE TIME 3 / 20 (min/pt) = 60 Total min
 ASSUMED MOISTURE 30 % FDA 84.70
 NOMOGRAPH C, 5.16 PITOT CORR. .84
 P_b 30.34 "Hg P_s 30.34 "Hg
 WEATHER Clear TEMP 78 °F
 METER BOX NO. 1 H 2.15 V 1.004
 NOZZLE CAL. .300 .299 .301 = .300
 STACK DIMENSIONS 114
 STACK AREA 10.88 ft² EFFECTIVE 112
 STACK HEIGHT ft
 STACK DIAMETER: UPSTRM. DNSTRM.
 PORT SIZE 8 in. NIPPLE LENGTH 8 in.
 U CORD LENGTH 200
 REMARKS:



2106 N. W. 67th PLACE, SUITES 9 & 10
 GAINESVILLE, FLORIDA 32606

TEST ID SC8CAR5
 PAGE 1 OF 2

MAT'L PROCESSING RATE
 GAS METER READINGS: FINAL 546.246 ft³
 INITIAL 504.340 ft³
 NET 41.906 ft³
 FILTER NO. 3524 IMP. VOL. GAIN 335 ml.
 SIL GEL NO. 28 WT. GAIN 9.5 ml.
 TOTAL CONDENSATE 344.5 ml.

ORSAT

	1	2	3	4	AVG.
% CO ₂	11.5	14.0	14.0		13.5
% O ₂	8.0	6.0	6.0		6.0
% CO					
% N ₂					

F₀ = FO RANGE = FO

ORSAT ANALYZER FO

LEAK CHECKS

PRE 0.00 cfm 20 "Hg POST 0.00 cfm 20 "Hg
 METER BOX/PUMP GAS SAMPLE SYST.

ORSAT BAG PRE-TEST OK

PITOT TUBE NO. PRE-TEST OK
 POST-TEST (+) 0.00 / 15 H₂O/Sec
 POST-TEST (-) 0.00 / 15 H₂O/Sec
 PYROMETER NO. 2

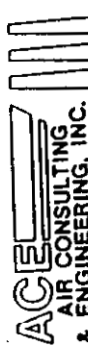
BOX OPERATOR SAUNDERS PROBE HOLDER McFarland

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL / COMMENTS	CLOCK TIME	GAS METER READING (FT. ³)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H ₂ O") 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		1346	506.62	.43	2.22 2.22	155	260	54	86	10.0
2		1349	508.83	.43	2.22 2.22	155	260	54	86	10.0
3		1352	510.91	.37	1.91 1.91	156	252	56	86	10.0
4		1355	512.90	.33	1.70 1.70	155	252	56	86	10.0
5		1358	515.62	.20	1.55 1.55	155	253	56	86	10.0

[illegible]

STACK SAMPLING FIELD DATA SHEET

PLANT Sugar Cane Growers Coop. of Florida
 SOURCE Bailer # 8
 PLANT LOCATION Belle Glade, Florida
 TYPE OF SAMPLING TRAIN EPA-5
 TYPE OF SAMPLES P.M.
 DATE 11-27-91 RUN NO. 3
 TIME START 1539 TIME END 1647
 SAMPLE TIME 3 / 20 (min/pt) = 60 Total min
 ASSUMED MOISTURE 30 % FDA 70
 NOMOGRAPH 5.16 PITOT CORR. .84
30.34 "Hg P₈ 30.34 "Hg
 WEATHER Clear TEMP 81 °F
 METER BOX NO. 1 H 2.15 V 1.004
 NOZZLE CAL. 300 .299 .301 .300
 STACK DIMENSIONS 114"
 STACK AREA 70.88 ft² EFFECTIVE 112
 STACK HEIGHT ft
 STACK DIAMETER: UPSTRM. DNSTRM.
 PORT SIZE 8 in. NIPPLE LENGTH 8 in.
 U CORD LENGTH 200
 REMARKS:



2106 N. W. 67th PLACE - SUITES 9 & 10
 GAINESVILLE, FLORIDA 32606

TEST ID SC8C3AS
 PAGE 1 OF 2

MAT'L PROCESSING RATE 584.701 #3
 GAS METER READINGS: FINAL 546.570 #3
 INITIAL 41.131 #3
 NET 41.131 #3
 FILTER NO. 3527 IMP. VOL. GAIN 343 ml.
 SIL GEL NO. 130 WT. GAIN 8.5 ml.
 TOTAL CONDENSATE 351.5 ml.

ORSAT

	1	2	3	4	AVG.
% CO ₂	11.0	13.5	13.8		13.0
% O ₂	8	6.5	6.0		7.0
% CO					
% N ₂					

F₀ = FO RANGE = FO

ORSAT ANALYZER FO

LEAK CHECKS

PRE 0.00 cfm 17 "Hg POST FO cfm "Hg
 METER BOX/PUMP FO GAS SAMPLE SYST. FO
 ORSAT BAG FO
 PITOT TUBE NO. FO PRE-TEST OK
 POST-TEST (+) FO H₂O/Sec FO
 POST-TEST (-) FO H₂O/Sec FO
 PYROMETER NO. 2

BOX OPERATOR Matthew PROBE HOLDER McFarland

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL / COMMENTS	CLOCK TIME	GAS METER READING (FT ³)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H ₂ O") 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		1541	550.12	.40	2.06 2.06	157	256	50	91	9.0
2		1544	551.40	.34	1.75 1.75	156	260	52	90	8.5
3		1547	553.40	.33	1.70 1.70	155	265	55	91	8.0
4		1550	555.35	.25	1.29 1.29	155	271	55	91	8.0
5		1553	556.84	.23	1.19 1.19	150	272	56	91	8.0

[illegible]

APPENDIX C
LABORATORY ANALYSIS

AIR CONSULTING & ENGINEERING, inc.

PARTICULATE LAB DATA

SOURCE Sugar Grower's Co-Op #8

PROBE RINSE	RUN 1	RUN 2	RUN 3	BLANK
CONTAINER NUMBER	195	210	135	130
TOTAL VOLUME (ml)	107.3269	104.3451	108.8040	114.4950
1st GROSS WEIGHT (g)	107.3269	104.3451	108.8040	114.4950
2nd GROSS WEIGHT (g)	107.3269	104.3451	108.8040	114.4950
AVERAGE GROSS WEIGHT (g)	107.3269	104.3451	108.8040	114.4950
TARE WEIGHT (g)	107.3269	104.3451	108.8040	114.4950
SUB NET WEIGHT (g)	107.3269	104.3451	108.8040	114.4950
ACETONE BLANK (g)	107.3269	104.3451	108.8040	114.4950
TOTAL NET WEIGHT (mg)	107.3269	104.3451	108.8040	114.4950

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	3523	3524	3527	3473
1st GROSS WEIGHT (g)	0.4202	0.4202	0.4202	0.4202
2nd GROSS WEIGHT (g)	0.4202	0.4202	0.4202	0.4202
AVERAGE GROSS WEIGHT (g)	0.4202	0.4202	0.4202	0.4202
TARE WEIGHT (g)	0.4202	0.4202	0.4202	0.4202
SUB NET WEIGHT (g)	0.4202	0.4202	0.4202	0.4202
TOTAL NET WEIGHT (mg)	0.4202	0.4202	0.4202	0.4202

1st GROSS WEIGHT
BALANCE CHECK

2nd GROSS WEIGHT
BALANCE CHECK

TARE
BALANCE CHECK

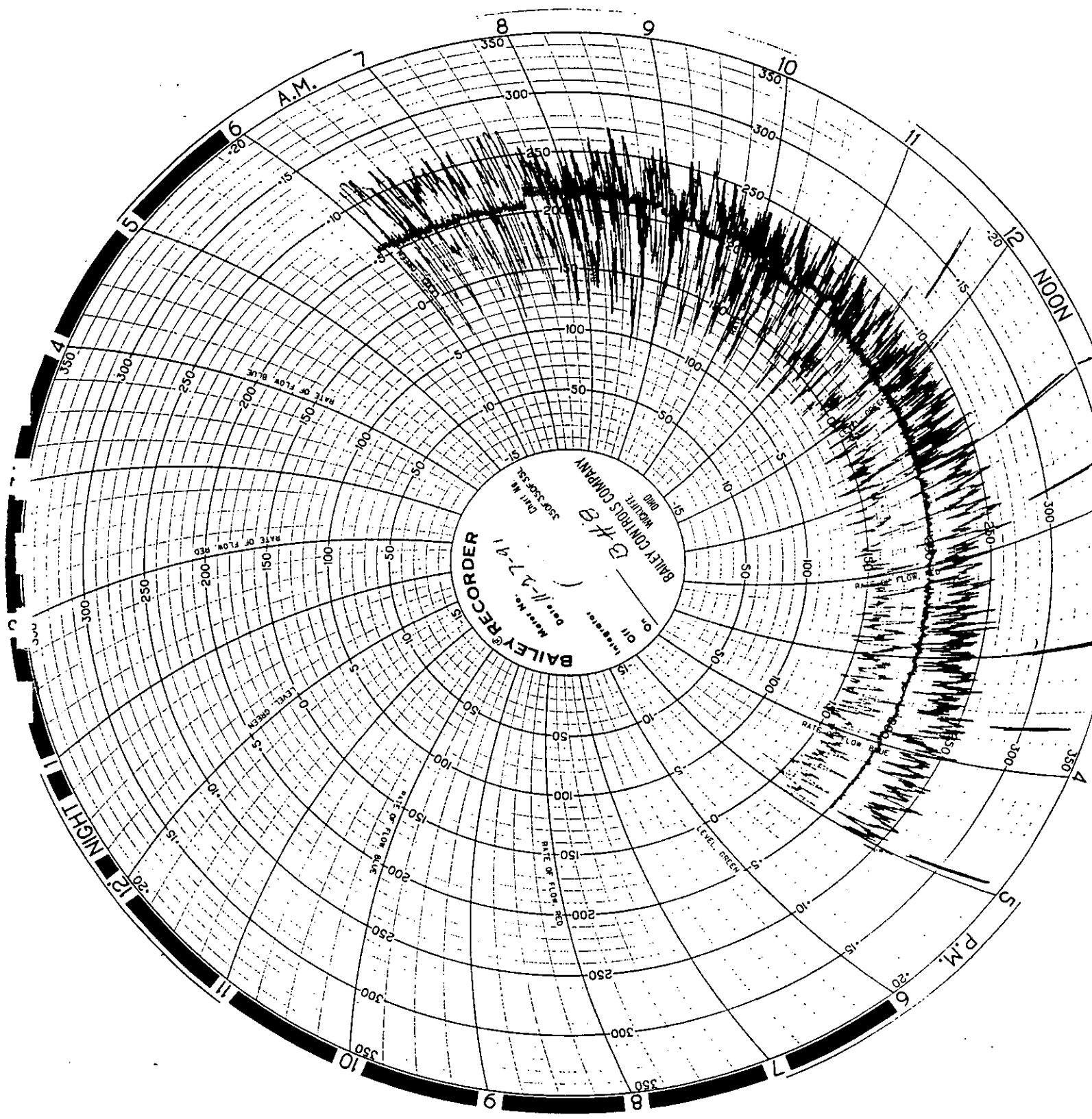
SEE LAB BOOK

0 ☒ 10.0g ☒
0.5g ☒ 100.0g ☒
%RH 68 DATE 11-30-91
Signature Christy S. Neek

0 ☒ 100g ☒
0.5g ☒ 100.0g ☒
%RH 69 DATE 12-1-91
Signature Christy S. Neek

APPENDIX D

PRODUCTION RATE CERTIFICATION



AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT: SUGAR CANE GROWERS COOPERATIVE DATE: 11-27-91
LOCATION: BELLE GLADE, FLORIDA RUN NUMBER 1
SOURCE: NUMBER 8 BOILER, SCRUBBER OUTLET TIME: 1138-1255

TIME INTERVAL----- 77 MINUTES

OIL:

FINAL OIL----- 4527
BEGIN OIL----- 4210
FACTOR----- 1

STEAM:

FINAL STEAM----- 860517
BEGIN STEAM----- 860431
FACTOR----- 3500
TEMPERATURE----- 590 DEGREES F
PRESSURE----- 428 PSIG
443 PSIA

FEEDWATER:

TEMPERATURE----- 260 DEGREES F
PRESSURE----- 600 PSIG
615 PSIA

HEAT INPUT:

STEAM----- 1297.3 BTU/LB
FEEDWATER----- 228.6 BTU/LB
NET STEAM----- 1068.7 BTU/LB
STEAM RATE----- 234545 LB/HR
BOILER EFFICIENCY----- 55.0 %
TOTAL FUEL HEAT INPUT----- 455.74 MMBTUH
STEAM CALIBRATION FACTOR----- 1.00

OIL----- 247.01 GPH
OIL----- 150000 BTU/GAL

TOTAL HEAT INPUT (OIL)----- 37.05 MMBTUH
TOTAL HEAT INPUT (NON-OIL)----- 418.69 MMBTUH

ALLOWABLES:

ALLOWABLE EMISSION (OIL)----- .10 LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)----- .15 LB/MMBTU
TOTAL ALLOWABLE EMISSION----- 66.51 LB/HR
TOTAL ACTUAL EMISSION----- 62.98 LB/HR
TOTAL ALLOWABLE EMISSION----- 0.146 LB/MMBTU
TOTAL ACTUAL EMISSION----- 0.138 LB/MMBTU

105545
3.705
62.9

AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT: SUGAR CANE GROWERS COOPERATIVE	DATE: 11-27-81
LOCATION: BELLE GLADE, FLORIDA	RUN NUMBER 2
SOURCE: NUMBER 8 BOILER, SCRUBBER OUTLET	TIME: 1337-1458

TIME INTERVAL----- 81 MINUTES

OIL:

FINAL OIL-----	4981
BEGIN OIL-----	4683
FACTOR-----	1

STEAM:

FINAL STEAM-----	680659
BEGIN STEAM-----	680565
FACTOR-----	3500
TEMPERATURE-----	600 DEGREES F
PRESSURE-----	423 PSIG
	438 PSIA

FEEDWATER:

TEMPERATURE-----	260 DEGREES F
PRESSURE-----	600 PSIG
	615 PSIA

HEAT INPUT:

STEAM-----	1303.8 BTU/LB
FEEDWATER-----	228.6 BTU/LB
NET STEAM-----	1075.2 BTU/LB
STEAM RATE-----	243704 LB/HR
BOILER EFFICIENCY-----	55.0 %
TOTAL FUEL HEAT INPUT-----	476.42 MMBTUH ✓
STEAM CALIBRATION FACTOR-----	1.00

OIL-----	220.74 GPH ✓
OIL-----	150000 BTU/GAL

TOTAL HEAT INPUT (OIL)-----	33.11 MMBTUH ✓
TOTAL HEAT INPUT (NON-OIL)-----	443.31 MMBTUH ✓

ALLOWABLES:

ALLOWABLE EMISSION (OIL)-----	.10 LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)-----	.15 LB/MMBTU }

TOTAL ALLOWABLE EMISSION-----	69.81 LB/HR
TOTAL ACTUAL EMISSION-----	44.50 LB/HR

TOTAL ALLOWABLE EMISSION-----	0.147 LB/MMBTU }
TOTAL ACTUAL EMISSION-----	0.093 LB/MMBTU }

BOILER OPERATION PARAMETERS:

PLANT Sugar Cane Growers Coop. of Fla.

BOILER NUMBER 8

DATE 11-27-91 RUN NUMBER 2

OIL METER FACTOR 1

STEAM INTEGRATOR FACTOR 3500

SCRUBBER(S) PRESS.DROP 10, 11

OPERATOR SIGNATURE ESL

SCRUBBER(S) GFM _____, _____

SCRUBBER(S)H2O LEVEL_____,____

Ph(if applicable)_____,_____

INITIAL INTEGRATOR 680565

FINAL INTEGRATOR 680659

[illegible]

AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT:	SUGAR CANE GROWERS COOPERATIVE	DATE:	11-27-91
LOCATION:	BELLE GLADE, FLORIDA	RUN NUMBER	3
SOURCE:	NUMBER 3 BOILER, SCRUBBER OUTLET	TIME:	1537-1652

TIME INTERVAL----- 75 MINUTES

OIL:

FINAL OIL-----	5399
BEGIN OIL-----	5122
FACTOR-----	1

STEAM:

FINAL STEAM-----	680788
BEGIN STEAM-----	680701
FACTOR-----	3500
TEMPERATURE-----	600 DEGREES F
PRESSURE-----	423 PSIG
	438 PSIA

FEEDWATER:

TEMPERATURE-----	260 DEGREES F
PRESSURE-----	600 PSIG
	615 PSIA

HEAT INPUT:

STEAM-----	1303.8 BTU/LB
FEEDWATER-----	228.6 BTU/LB
NET STEAM-----	1075.2 BTU/LB
STEAM RATE-----	243600 LB/HR
BOILER EFFICIENCY-----	55.0 %
TOTAL FUEL HEAT INPUT-----	476.22 MMBTUH
STEAM CALIBRATION FACTOR-----	1.00

OIL-----	221.60 GPH
OIL-----	150000 BTU/GAL

Avg
229.78

TOTAL HEAT INPUT (OIL)-----	33.24 MMBTUH
TOTAL HEAT INPUT (NON-OIL)-----	442.98 MMBTUH

34.47
434.99

ALLOWABLES:

ALLOWABLE EMISSION (OIL)-----	.10 LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)-----	.15 LB/MMBTU

469.46

TOTAL ALLOWABLE EMISSION-----	69.77 LB/HR
TOTAL ACTUAL EMISSION-----	48.53 LB/HR

TOTAL ALLOWABLE EMISSION-----	0.147 LB/MMBTU
TOTAL ACTUAL EMISSION-----	0.102 LB/MMBTU

14

BOILER NUMBER 8

OIL METER FACTOR _____

SCRUBBER(S) PRESS DROP____,____

SCRUBBER(S) GPM _____

SCRUBBER(S)H2O LEVEL_____,____

PH(if applicable) _____, _____

INITIAL INTEGRATOR 680701

FINAL INTEGRATOR 680788

[illegible]

APPENDIX E
QUALITY ASSURANCE
AND
CHAIN OF CUSTODY

STANDARD METER CALIBRATION
Meter Number 1040616

Air Consulting and Engineering, Inc. (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:

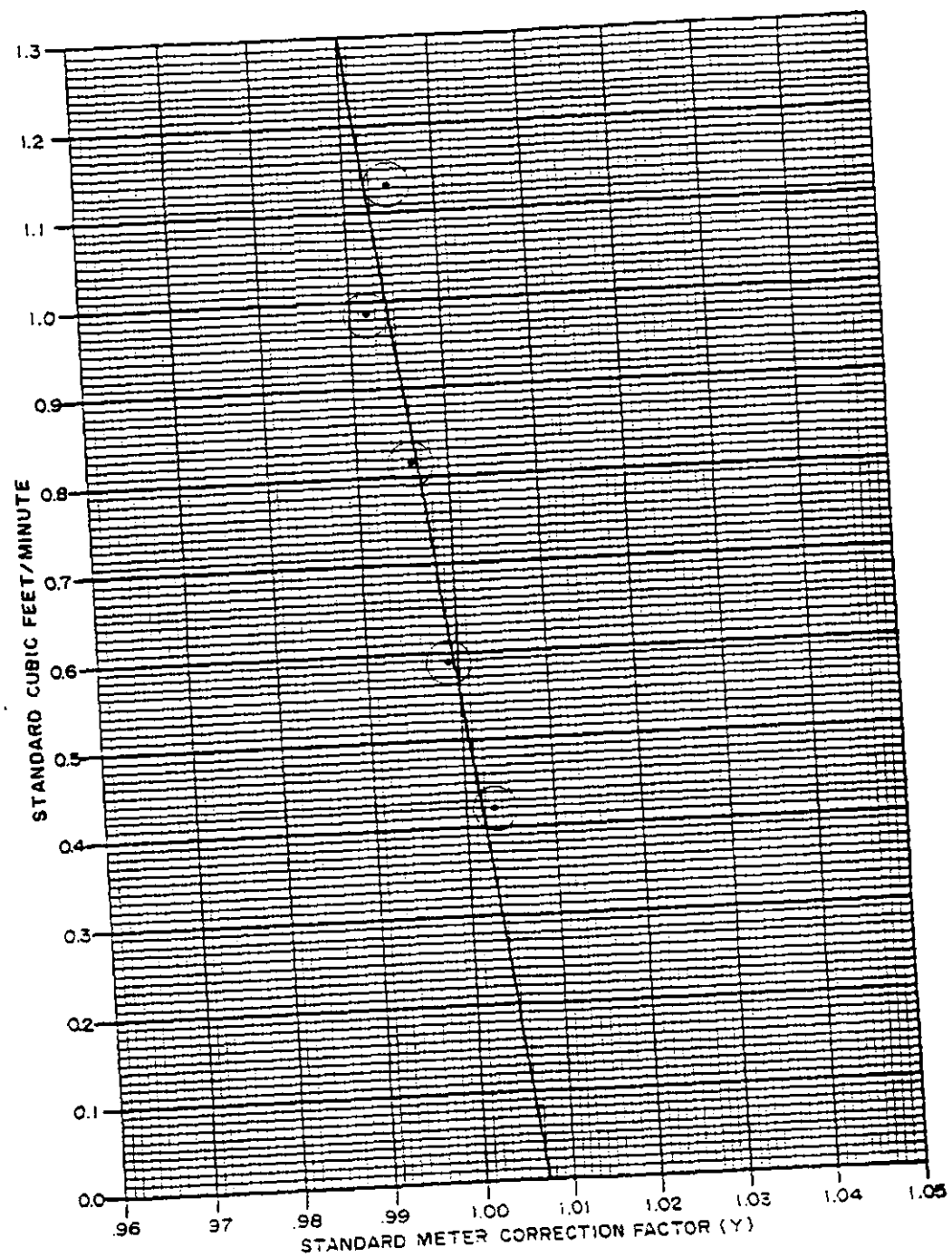
$$Y_a \times Y_s = Y$$

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 June 11, 1991, and is checked and/or recalibrated at least annually.



STANDARD METER CALIBRATION
CURVE

JUNE 11, 1991

AIR CONSULTING
and
ENGINEERING

AIR CONSULTING & ENGINEERING STANDARD METER CALIBRATION

DATE 6-13-91 LEAK CHECK 0.000 CFM at 10 In. Hg.

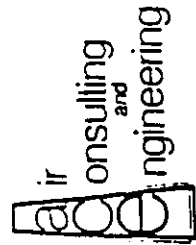
METER SERIAL NUMBER 10010611 BAROMETRIC PRESSURE 30.12 In. Hg.

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. OF STD METER (°F)	TIME (Minutes)
		INITIAL	FINAL	ACTUAL ft ³	INITIAL	FINAL	ACTUAL ft ³		
-3	-60	6.012	11.553	5.511	0.003	5.500	5.497	74	13
-3	-60	1.553	7.032	5.479	5.500	10.979	5.479	75	13
-3	-60	1.032	10.509	5.477	10.979	16.450	5.471	75	13
-3	-60	0.263	8.143	5.290	16.804	22.127	5.323	76	9
-3	-60	6.143	13.430	5.287	22.127	27.412	5.315	76	9
-3	-60	3.430	8.703	5.273	27.412	32.753	5.311	77	9
-4	-1.6	9.252	14.995	5.743	33.311	39.123	5.812	78	7
-4	-1.6	4.995	10.713	5.718	39.123	44.909	5.786	78	7
-4	-1.6	0.113	6.445	5.732	44.909	50.701	5.798	78	7
-5	-2.1	6.941	12.917	5.976	51.214	57.292	6.018	78	6
-5	-2.1	2.917	8.898	5.981	57.292	63.375	6.083	78	6
-5	-2.1	8.898	14.813	5.975	63.375	69.452	6.077	78	6
-5	-2.1	5.278	10.988	5.710	69.452	75.663	5.797	78	5
-7	-2.7	0.988	6.708	5.720	75.663	81.474	5.811	78	5
-7	-2.7	6.708	12.386	5.678	81.474	87.247	5.773	78	5

CALIBRATED BY: S. F. Zlabec

	Y	SCFM	Y	SCFM	Y	SCFM	Y	SCFM
Run 1	1.004	0.422	0.998	0.584	0.996	0.814	0.992	0.988
Run 2	1.001	0.419	0.999	0.584	0.996	0.810	0.992	0.989
Run 3	1.003	0.419	0.999	0.582	0.996	0.812	0.992	0.988
Average	1.003	0.420	0.999	0.583	0.996	0.812	0.992	0.988
								1.131



AIR CONSULTING & ENGINEERING

ANNUAL METER CALIBRATION

DATE 6-14-91

LEAK CHECK 0.000 CFM at 14 in. Hg.

METER BOX NUMBER #1

BAROMETRIC PRESSURE 30.10 in. Hg.

DRY GAS METER TEMPERATURE 87 °F/ASTM GLASS THERMOMETER TEMPERATURE 88 °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				
-06	.5	977.651	983.301	5.650	884.756	890.239	5.483	87	88	15	15
-12	1.0	971.708	977.548	5.840	878.739	884.547	5.808	86	87	11	11
-16	1.5	985.835	993.630	7.795	892.764	900.523	7.759	88	89	12	12
-23	2.0	993.630	1000.397	6.767	900.523	907.262	6.739	88	89	9	9
-33	3.0	1000.397	1006.790	6.393	907.262	913.626	6.364	89	90	7	7
-47	4.0	1007.008	1012.339	5.331	913.950	919.144	5.194	89	91	5	5

DELTA H	Y _a	SCFM	Y _s	Y
2.026	1.031	0.366	1.000	1.031
2.036	1.005	0.516	0.998	1.003
2.048	1.003	0.630	0.996	0.999
2.038	1.001	0.729	0.994	0.995
2.076	0.999	0.884	0.991	0.990
2.027	1.020	1.032	0.988	1.008
MEAN:	2.042	1.010	0.995	1.004

CALIBRATED BY:

Greg R. Row

AIR CONSULTING & ENGINEERING, inc.

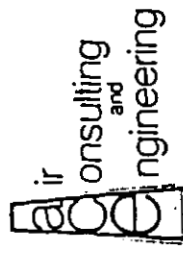
POST TEST CALIBRATION

DATE 11-28-91 METER BOX NUMBER 1 LEAK CHECK 0.000 CFM at 20 in. Hg.
 CLIENT SUGAR CANE GROWERS Co-op SOURCE ALL THERMOCOUPLE NUMBER 47K 2 PYROMETER NUMBER 88
 FLIGHT SERVICE Pb 30.18 in. Hg. ACE BAROMETER Pb 30.30 in. Hg.
 ASTM GLASS THERMOMETER 150 °F / THERMOCOUPLE 150 °F ASTM GLASS THERMOMETER 75 °F / METER TEMP 76 °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				
1.2	1.2	396.050	410.553	14.503	589.332	604.342	15.010	75 76 75.5	75 79 77	27	23
1.1	1.8	411.748	447.738	35.99	605.777	642.838	37.061	77 79 78	79 91 85	56	15
1.2	2.0	448.113	484.770	36.657	643.230	681.586	38.356	79 79 77	91 93 92	52	18.5

CALIBRATED BY: S. A. Dush

STANDARD M.C.F.	DELTA Ha	M.C.F.
1.005	2.338	0.971
1.005	2.464	0.979
1.005	2.230	0.979
1.005	2.344	0.976



air consulting and engineering

AIR CONSULTING & ENGINEERING, INC. PYROMETER CALIBRATION

DATE 10-1-90 PYROMETER NUMBER Atkins #2

SOURCE (SPECIFY)	GLASS THERMOMETER WITH NBS MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	<u>42</u>	<u>41</u>	<u>1</u>	<u>0.2</u>
AMBIENT	<u>88</u>	<u>88</u>	<u>0</u>	<u>0.0</u>
HOT OVEN	<u>345</u>	<u>344</u>	<u>1</u>	<u>0.2</u>

FDER - MAXIMUM 5° DIFFERENCE

$$\text{EPA} \left[\frac{(\text{REF. TEMP } ^\circ\text{F} + 460^\circ) - (\text{PYROMETER TEMP } ^\circ\text{F} + 460^\circ)}{\text{REF. TEMP } ^\circ\text{F} + 460^\circ} \right] 100 \leq 1.5\%$$

CALIBRATED BY: S. J. Carter

AIR CONSULTING & ENGINEERING, INC.

PITOT TUBE CALIBRATION

DATE CALIBRATED 10-4-91

PITOT TUBE 88

IS PITOT TUBE ASSEMBLY LEVEL YES

ARE PITOT TUBE OPENINGS DAMAGED NO

$\alpha_1 = \underline{2}^\circ (<10^\circ)$, $\alpha_2 = \underline{0}^\circ (<10^\circ)$, $\beta_1 = \underline{0}^\circ (<5^\circ)$, $\beta_2 = \underline{1}^\circ (<5^\circ)$

$\gamma = \underline{2}^\circ$, $\theta = \underline{1}^\circ$, $A = \underline{1.035} \text{ in.} = (P_a + P_b)$

$z = A \sin \gamma = \underline{0.036} \text{ in.} < 0.32 / < 1/8 \text{ in.}$

$w = A \sin \theta = \underline{0.018} \text{ in.} < 0.08 / < 1/32 \text{ in.}$

$P_a \underline{0.512} \text{ in.}$ $P_b \underline{0.512} \text{ in.}$ $D_t \underline{375}$

WAS CALIBRATION REQUIRED NO

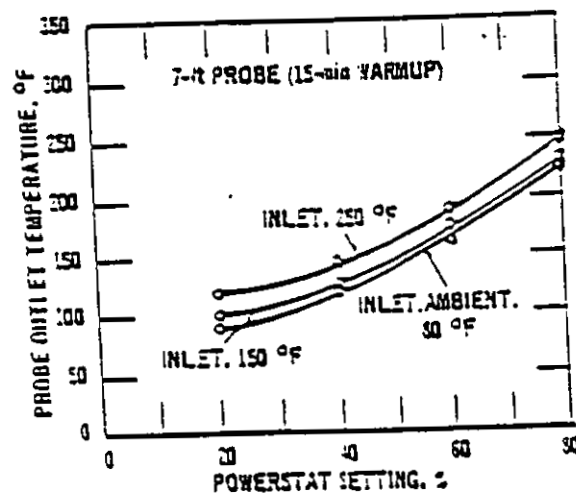
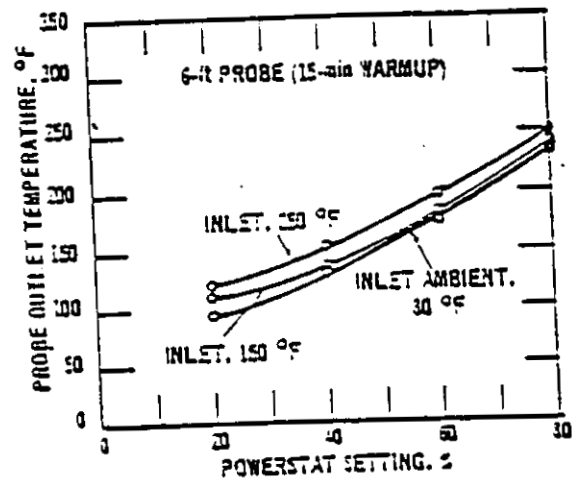
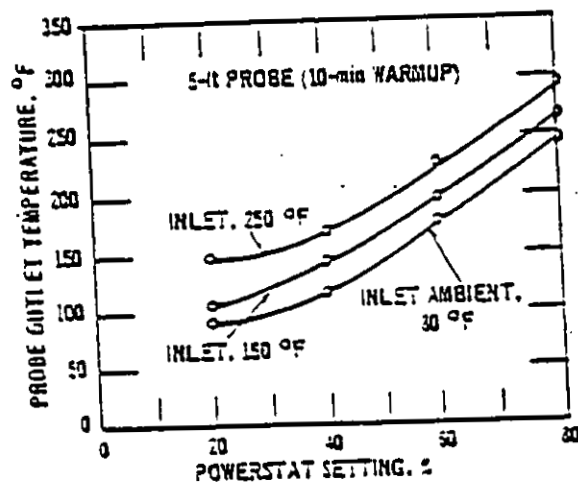
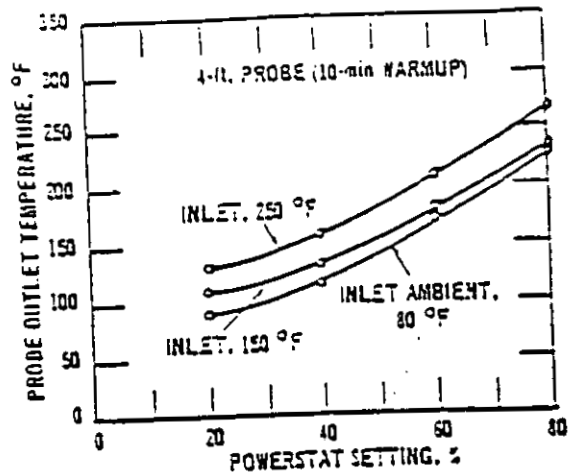
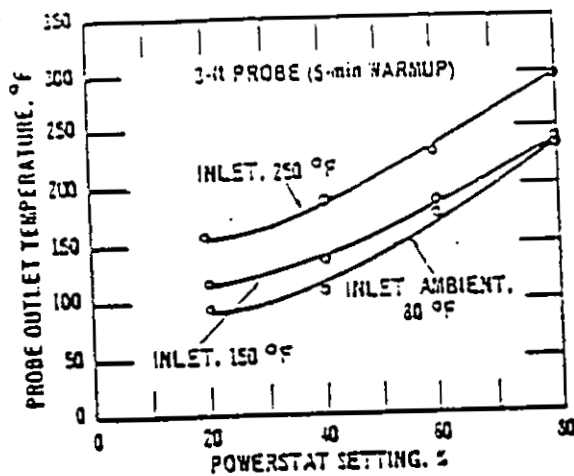
THERMOCOUPLE CALIBRATION

SOURCE (SPECIFY)	ASTM GLASS THERMOMETER WITH MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	<u>44</u>	<u>45</u>	<u>1</u>	<u>0.19</u>
AMBIENT	<u>77</u>	<u>78</u>	<u>1</u>	<u>0.19</u>
HOT OVEN	<u>345</u>	<u>346</u>	<u>1</u>	<u>0.19</u>

FDER - MAXIMUM θ° DIFFERENCE

CALIBRATED BY: _____

EPA $\left[\frac{(\text{REF. TEMP. } ^\circ\text{F} + 460^\circ) - (\text{PYROMETER TEMP. } ^\circ\text{F} + 460^\circ)}{\text{REF. TEMP. } ^\circ\text{F} + 460^\circ} \right] 100 \leq 1.5\%$



NOTE: Flow rate held constant at 0.75; 50% change in flow rate has little effect on probe temperature.

Probe temperatures.

AIR CONSULTING AND ENGINEERING, Inc.

SAMPLE RECOVERY AND CHAIN OF CUSTODY

PLANT NAME Sugar Growers' Inc. TEST DATE 11-27-91
SOURCE NAME No. 8 Boiler SAMPLE RECOVERED BY GG
TYPE OF SAMPLE Pm PARTICULATE ANALYSES BY CN

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	3523	-	Md. Gray	
1	S-404	✓	Clear	
2	3524	-	OK. Gray	
2	S-12	✓	Clear	
3	3527	-	DK Gray	
3	S-394	✓	clear	
	S-054	✓	clear	
ACETONE / WATER BLANK (CIRCLE)	3473	-	White	
FILTER BLANK				

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT. (g)	INIT. WT. (g)	NET WT. (g)	COLOR
1	50	209.2	200.0	9.2	Pink
2	28	209.6	200.0	9.6	Pink
3	130	208.3	200.0	8.3	Pink
			200.0		
			200.0		
			200.0		
			200.0		
			200.0		

APPENDIX F
PROJECT PARTICIPANTS

PROJECT PARTICIPANTS
AIR CONSULTING AND ENGINEERING, INC.

Stephen L. Neck, P.E.
Project Manager

Gerard Gauthreaux
Field Testing

Early McFarland
Field Testing

Christy Neck
Laboratory Analysis

Dagmar Neck
Report Preparation

Candace V. Taylor
Document Production

SUGAR CANE GROWERS

Jose Alvarez
Test Coordinator

Blas Marin
Test Coordinator

FDER

Ken Tucker
Test Observer

Sterling Jordan
Test Observer

PALM BEACH COUNTY

Jeffrey K. Koerner
Test Observer

David Brown
Test Observer