AP-42 Section Number: 1.8

Reference Number: 36

Title: Source Test Report for Particulate Emissions Impingement Wet Scrubber Boiler Number 5

March 1992

65W1-US5C-9

SOURCE TEST REPORT
for
PARTICULATE EMISSIONS

IMPINGEMENT WET SCRUBBER
BOILER NUMBER 5
BRYANT, FLORIDA

MARCH 5, 1992

Prepared for:

U.S. SUGAR CORPORATION
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238-91-11

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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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

3/30/1992

Date

1.0 INTRODUCTION

On March 5, 1992, Air Consulting and Engineering, Inc. (ACE), conducted particulate testing on the Wet Scrubber Outlet of Boiler 5 at Bryant Sugar Mill, located in Bryant, 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 (particulate) was utilized for the emission testing.

Mr. Sterling Jordan of the FDER observed a portion of the testing.

Mr. Peter Barquin of U.S. Sugar Corporation (U.S. Sugar) served as project director and Mr. Augusto Blanchard coordinated testing and provided the scrubber data.

2.0 SUMMARY AND DISCUSSION OF RESULTS

Boiler Number 5 demonstrated compliance with the permit conditions.

Table 1 is a summary of the emission results.

Particulate emissions averaged 58.70 pounds per hour (lbs/Hr) and 0.109 pounds per million BTU (lbs/MMBTU) which is within the allowable emissions of 80.86 lbs/Hr and 0.15 lbs/MMBTU.

According to permit conditions the maximum allowable emission rate is 87.5 lbs/Hr.

No oil was used during compliance testing.

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. Steam integrator readings were recorded at the beginning and end of each particulate run.

Table 1 Emission Summary
Boiler Number 5
U.S. Sugar Corporation - Bryant Mill
Bryant, Florida
March 5, 1992

Run Number	Time	Particulate Emission lbs/Hr	Particulate Emission lbs/MMBTU	Allowable Particulate Emission lbs/Hr	Allowable Particulate Emission lbs/MMBTU
1	0806-0908	60.76	0.114	80.12	0.15
2	0949-1051	58.05	0.109	80.18	0.15
3	1221-1323	58.70 57.30	0.109 0.104	80.86	0.15
AVERAGE	---	58.70	0.109 0.109	80.86	0.15

$$\text{lbs/MMBTU} = \frac{\text{lbs/Hr}}{\text{Fuel Heat Input (MMBTU/Hr)}}$$

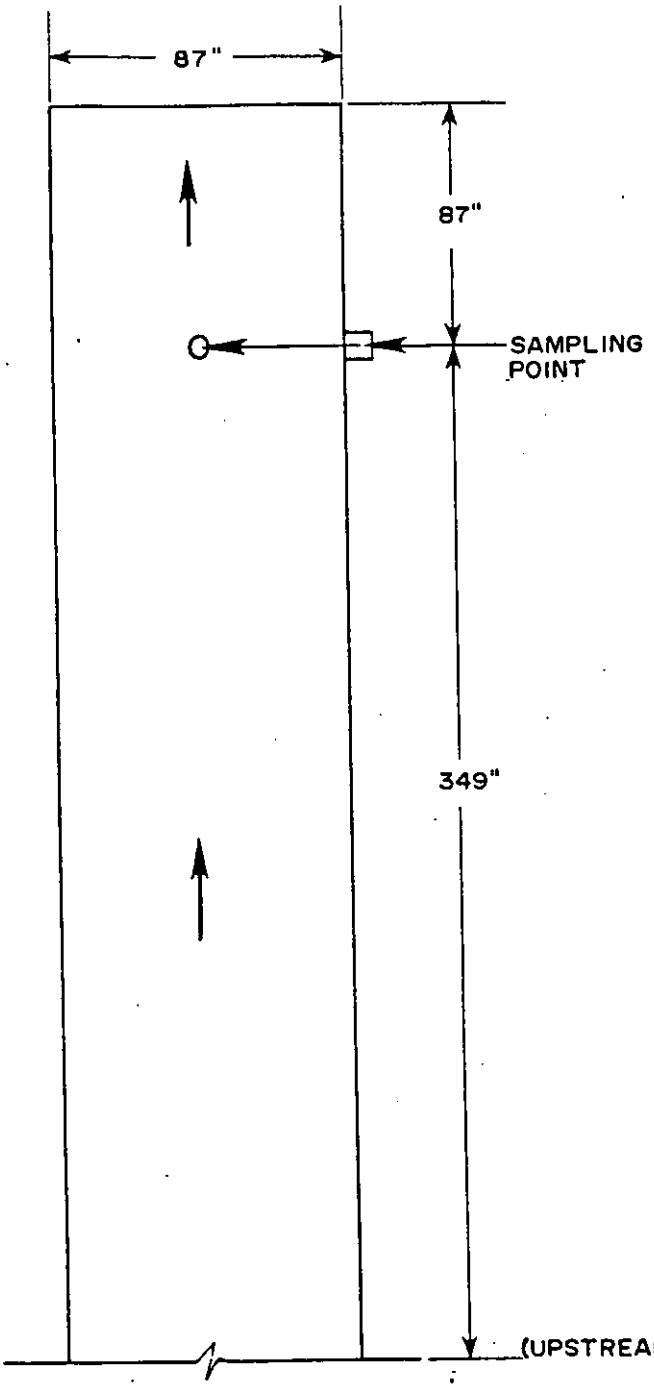
3.0 PROCESS DESCRIPTION AND OPERATION

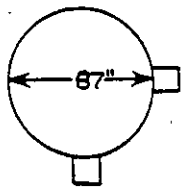
The Number 5 Boiler at U.S. Sugar's Bryant plant is a vibrating grate stoker design used primarily for bagasse fuel firing. Supplemental oil firing was not used during the emission test series. The boiler averaged 242,174 pounds per hour steam production over the three run test period.

Steam integrators and other production monitoring devices were rigorously calibrated prior to the production season.

4.0 SAMPLING POINT LOCATION

Figure 1 is a schematic of the exhaust stack with sampling point locations.





TRAVERSE POINT NUMBER	INCHES INSIDE STACK WALL
1	1.9
2	5.8
3	10.3
4	15.4
5	21.8
6	30.9
7	56.1
8	65.3
9	71.6
10	76.7
11	81.2
12	85.1

NOT TO SCALE

FIGURE 1.
SAMPLING POINT LOCATION
BRYANT-BOILER NO. 5
U.S. SUGAR CORPORATION
PAHOKEE, 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

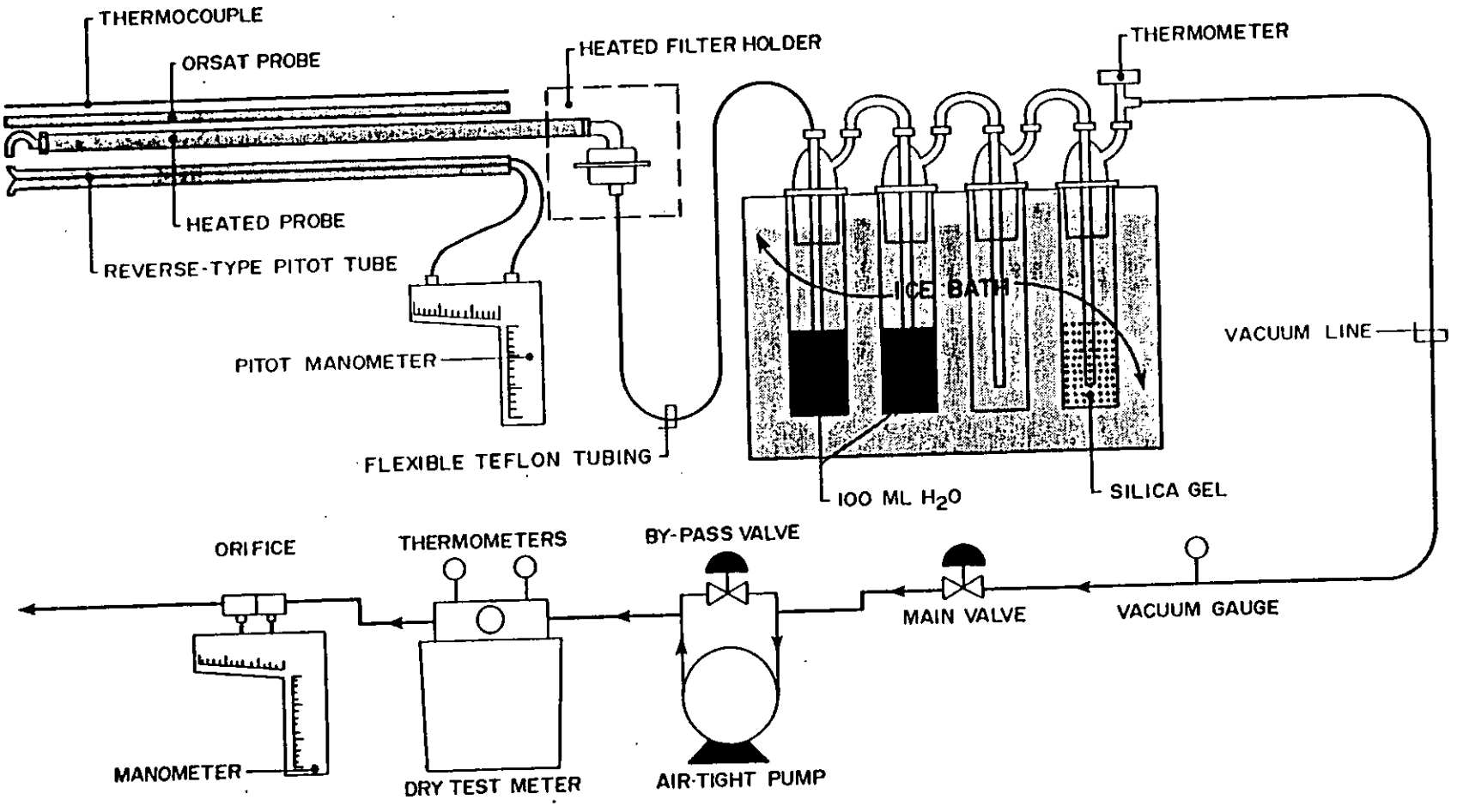

FIGURE 2
EPA METHOD 5 SAMPLING TRAIN

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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 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 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: UNITED STATES SUGAR CORPORATION / BRYANT, FLORIDA
SOURCE: NUMBER 5 BOILER SCRUBBER OUTLET
DATE: 3-05-92

RUN NO.:	1		IMPINGER ml	232
BEGIN TIME:	806		SILICA GEL gms.	6.2
END TIME:	908		PERCENT O2	9.8
TOTAL RUN TIME:	60.00	min.	PERCENT CO2	10.8
BAROMETRIC PRESSURE:	29.90	"Hg	"F" FACTOR	
STACK PRESSURE:	29.90	"Hg.		
NOZZLE DIAMETER:	0.175	inches	PARTICULATE	
METER CORR. FACTOR:	1.009		---	
FINAL METER:	65.615	cubic ft.	FILTER mg.	103.6
INITIAL METER:	31.737	cubic ft.	WASH mg.	8.6
STACK AREA:	41.283	sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	1.500	1.225	0.840	161	68
1-2	2.400	1.549	1.340	160	68
1-3	2.500	1.581	1.400	160	68
1-4	2.000	1.414	1.120	162	68
1-5	2.300	1.517	1.290	162	69
1-6	2.000	1.414	1.120	162	70
1-7	2.000	1.414	1.120	162	71
1-8	1.500	1.225	0.840	162	72
1-9	1.800	1.342	1.010	163	72
1-10	1.500	1.225	0.840	163	72
1-11	1.500	1.225	0.840	166	73
1-12	1.500	1.225	0.840	163	74
2-1	1.100	1.049	0.620	157	75
2-2	1.100	1.049	0.620	160	76
2-3	1.100	1.049	0.620	160	76
2-4	1.300	1.140	0.730	161	77
2-5	1.300	1.140	0.730	162	78
2-6	1.500	1.225	0.840	162	78
2-7	3.000	1.732	1.680	162	79
2-8	3.000	1.732	1.680	162	80
2-9	3.500	1.871	1.960	163	81
2-10	3.500	1.871	1.960	163	82
2-11	2.500	1.581	1.400	163	83
2-12	3.000	1.732	1.680	162	83
AVERAGES	---	1.397	1.130	162	75

RUN 1

NOZZLE AREA(SQ.FT.):	0.0001670			
AVG. VELOCITY HEAD :	---	1.95 "H2O	VOL. FLOW ACFM :	217733
AVG. STACK TEMP.:	---	162 F	VOL. FLOW SCFMD :	138478
AVG. METER TEMP.:	---	75 F		
AVG. ORIFICE DIFFERENTIAL:	---	1.13 "H2O	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:	---	33.825	---	
% H2O VAPOR:	---	25.1	POUNDS PER HOUR:	60.759
GAS MOL. WT. DRY:	---	30.12	POUNDS PER SCF :	0.0000073
GAS MOL. WT. WET:	---	27.08	GRAINS/SCF:	0.051
% EXCESS AIR:	---	86.86	GRAINS/SCF @ 8% O2	0.059
AVG. STACK VEL.(FPS)	---	87.90	GRAINS/SCF @50% EA	0.064
MMBTU INPUT:	---	534.15	POUNDS PER MMBTU:	0.114
PERCENT ISOKINETIC :	---	100.62	LBS/MMBTU"F"FACTOR	0.000

SAMPLE CALCULATIONS - RUN 1

NOZZLE AREA (FT.2)	(Dn/12)!2x3.141604	0.000167
AVG.VELOCITY HEAD:	(AVG.SQ.RT.)!2	87.90
METER STND. FT3:	(Mf-Mi)xMCFx(AVG.ORF.DIFF./13.6))/29.92)x(528/(Tm+460))	38.825
PERCENT H2O:	((IMP+SG)x(((IMP+SG)x.0474)+SCF)x100	
Mw DRY:	((O2%x.32)+CO2%x.44)+(100-(O2%+CO2)x.28	30.12
Mw WET:	(Mw DRYx(1-%H2O/100))+%H2Ox0.18	27.08
% EXCESS AIR:	%O2/(((100-(%O2+%CO2))x.264)-%O2)*100	86.86
STACK VEL.(FPS):	85.49x.84x(AVG.SQ.RT.VEL.HD.)x((Ts+460)/(PsxMwWET))!.5	87.90
% ISOKINETIC:	((Ts+460)xSCFx2992)/(528xFPSxTIMEx An xPs x 60x(1-%O2/100)	100.62
VOL. FLOW (ACFM):	FPS x 60 x As	217733
STND. FLOW(SCFMD):	ACFMx528/(Ts+460)x(1-%H2O/100)x(Ps/29.92)	138478
PARTICULATE LB/HR:	PROBE+FILTER mg./453600 x (SCFMD/SCF) x 60	60.759
PARTICULATE LB/SCF):	PROBE+FILTER mg./453600 /SCF	0.0000073
GRAINS/SCF:	LB/SCF x 7000	0.0512
GR/SCF @ 8% O2:	(12.9/(20.9-%O2))x GR/SCF	0.0592
GR/SCF @ 50% E.A.:	GR/SCF x ((100+ %E.A.)/150)	0.0638
LB/MMBTU:	(LB/HR)/(LB/MMBTUH)	0.114
LB/MMBTU "F" FACTOR:	LB/SCF x "F" FACTOR x (20.9/20.9-%O2)	0.000

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: UNITED STATES SUGAR CORPORATION / BRYANT, FLORIDA
SOURCE: NUMBER 5 BOILER SCRUBBER OUTLET
DATE: 3-05-92

RUN NO.:	2	IMPINGER ml	230
BEGIN TIME:	949	SILICA GEL gms.	11.0
END TIME:	1051	PERCENT O2	10.2
TOTAL RUN TIME:	60.00 min.	PERCENT CO2	10.3
BAROMETRIC PRESSURE:	29.90 "Hg	"F" FACTOR	
STACK PRESSURE:	29.90 "Hg.		
NOZZLE DIAMETER:	0.175 inches	PARTICULATE	
METER CORR. FACTOR:	1.009		
FINAL METER:	100.953 cubic ft.	FILTER mg.	94.9
INITIAL METER:	65.922 cubic ft.	WASH mg.	10.9
STACK AREA:	41.283 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	3.500	1.871	1.960	162	83
1-2	3.500	1.871	1.960	162	83
1-3	3.500	1.871	1.960	163	84
1-4	3.000	1.732	1.680	162	84
1-5	2.800	1.673	1.570	162	84
1-6	2.000	1.414	1.120	162	86
1-7	1.100	1.049	0.620	161	87
1-8	1.100	1.049	0.620	161	87
1-9	1.300	1.140	0.730	161	87
1-10	1.100	1.049	0.620	162	87
1-11	1.000	1.000	0.560	161	88
1-12	0.920	0.959	0.520	160	88
2-1	1.300	1.140	0.730	154	89
2-2	1.300	1.140	0.730	159	89
2-3	1.300	1.140	0.730	160	90
2-4	1.300	1.140	0.730	161	91
2-5	1.500	1.225	0.840	161	91
2-6	1.500	1.225	0.840	160	91
2-7	2.500	1.581	1.400	160	92
2-8	3.000	1.732	1.680	162	92
2-9	3.500	1.871	1.960	162	93
2-10	3.500	1.871	1.960	161	94
2-11	3.000	1.732	1.680	161	94
2-12	3.000	1.732	1.680	162	95
AVERAGES	----------	1.425	1.203	161	89

RUN 2

NOZZLE AREA(SQ.FT.):	0.0001670			
AVG. VELOCITY HEAD :	--------	2.03 "H20	VOL. FLOW ACFM :	222231
AVG. STACK TEMP.:	---------	161 F	VOL. FLOW SCFMD :	141400
AVG. METER TEMP.:	---------	89 F		
AVG. ORIFICE DIFFERENTIAL:	---	1.20 "H20	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:	---	34.090		
% H20 VAPOR:	:--------	25.1	POUNDS PER HOUR:	58.047
GAS MOL. WT. DRY:	---------	30.06	POUNDS PER SCF :	0.0000068
GAS MOL. WT. WET:	---------	27.03	GRAINS/SCF:	0.048
% EXCESS AIR:	---------	94.55	GRAINS/SCF @ 8% O2	0.058
AVG. STACK VEL.(FPS)	---------	89.72	GRAINS/SCF @50% EA	0.062
MMBTU INPUT:	---------	534.50	POUNDS PER MMBTU:	0.109
PERCENT ISOKINETIC :	---------	99.31	LBS/MMBTU"F"FACTOR	0.000

SAMPLE CALCULATIONS - RUN 2

NOZZLE AREA (FT.2)	(Dn/12)!2x3.141604	0.000167
AVG.VELOCITY HEAD:	(AVG.SQ.RT.)!2	89.72
METER STND. FT3:	(Mf-Mi)xMCFx(AVG.ORF.DIFF./ 13.6))/29.92)x(528/(Tm+460))	34.090
PERCENT H2O:	((IMP+SG)x(((IMP+SG)x.0474)+ SCF)x100	
Mw DRY:	((O2%x.32)+CO2%x.44)+(100-(O2%+CO2)x.28	30.06
Mw WET:	(Mw DRYx(1-%H2O/100))+%H2Ox0.18	27.03
% EXCESS AIR:	%O2/(((100-(%O2+%CO2))x.264)-%O2)* 100	94.55
STACK VEL.(FPS):	85.49x.84x(AVG.SQ.RT.VEL.HD.)x((Ts +460)/(PsxMwWET))!.5	89.72
% ISOKINETIC:	((Ts+460)xSCFx2992)/(528xFPSxTIMEx An xPs x 60x(1-%O2/100)	99.31
VOL. FLOW (ACFM):	FPS x 60 x As	222231
STND. FLOW(SCFMD):	ACFMx528/(Ts+460)x(1-%H2O/100)x (Ps/29.92)	141400
PARTICULATE LB/HR:	PROBE+FILTER mg./453600 x (SCFMD/ SCF) x 60	58.047
PARTICULATE LB/SCF):	PROBE+FILTER mg./453600 /SCF	0.0000068
GRAINS/SCF:	LB/SCF x 7000	0.0479
GR/SCF @ 8% O2:	(12.9/(20.9-%O2))x GR/SCF	0.0577
GR/SCF @ 50% E.A.:	GR/SCF x ((100+ %E.A.)/150)	0.0621
LB/MMBTU:	(LB/HR)/(LB/MMBTUH)	0.109
LB/MMBTU "F" FACTOR:	LB/SCF x "F" FACTOR x (20.9 /20.9-%O2)	0.000

COMPLETE EMISSION DATA

PLANT: UNITED STATES SUGAR CORPORATION / BRYANT, FLORIDA
SOURCE: NUMBER 5 BOILER SCRUBBER OUTLET
DATE: 3-05-92

RUN NO.:	3	IMPINGER ml	235
BEGIN TIME:	1221	SILICA GEL gms.	6.1
END TIME:	1323	PERCENT O2	10.0 Avg
TOTAL RUN TIME:	60.00 min.	PERCENT CO2	10.6 : 10.0
BAROMETRIC PRESSURE:	29 90 "Hg	"F" FACTOR	
STACK PRESSURE:	29.90 "Hg.		
NOZZLE DIAMETER:	0.175 inches	PARTICULATE	
METER CORR. FACTOR:	1.009	----------	
FINAL METER:	136.604 cubic ft.	FILTER mg.	96.9
INITIAL METER:	101.335 cubic ft.	WASH mg.	8.1
STACK AREA:	41.283 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	3.800	1.949	2.130	159	91
1-2	3.000	1.732	1.680	161	91
1-3	3.500	1.871	1.960	162	91
1-4	3.000	1.732	1.680	162	91
1-5	2.300	1.517	1.290	162	91
1-6	2.000	1.414	1.120	162	91
1-7	1.300	1.140	0.730	162	92
1-8	1.100	1.049	0.620	162	92
1-9	1.300	1.140	0.730	162	92
1-10	1.100	1.049	0.620	162	92
1-11	1.100	1.049	0.620	162	92
1-12	0.900	0.949	0.500	162	93
2-1	1.100	1.049	0.620	157	94
2-2	1.200	1.095	0.670	160	94
2-3	1.200	1.095	0.670	162	94
2-4	1.100	1.049	0.620	162	94
2-5	1.300	1.140	0.730	162	95
2-6	1.300	1.140	0.730	162	95
2-7	2.500	1.581	1.400	163	96
2-8	3.500	1.871	1.960	163	97
2-9	3.500	1.871	1.960	163	97
2-10	3.500	1.871	1.960	163	98
2-11	3.700	1.924	2.070	162	98
2-12	3.000	1.732	1.680	163	98
AVERAGES	----------	1.417	1.198	162	94

RUN 3

NOZZLE AREA(SQ.FT.):0.0001670

AVG. VELOCITY HEAD	:---------	2.01 "H20	VOL. FLOW ACFM	: 220993
AVG. STACK TEMP.:	---------	162 F Avg=	VOL. FLOW SCFMD	: 140327
AVG. METER TEMP.:	---------	94 F 162		
AVG. ORIFICE DIFFERENTIAL:	---	1.20 "H20	PARTICULATE DATA	: Avg = 140,068
METER STANDARD CUBIC FEET:	---	34.011	----------	
% H2O VAPOR:	:---------	25.2	POUNDS PER HOUR:	57.304
GAS MOL. WT. DRY:	---------	30.10	POUNDS PER SCF :	0.0000068
GAS MOL. WT. WET:	---------	27.05	GRAINS/SCF:	0.048
% EXCESS AIR:	---------	91.23	GRAINS/SCF @ 8% O2	0.056
AVG. STACK VEL.(FPS)	---------	89.22	GRAINS/SCF @50% EA	0.061
MMBTU INPUT:	---------	548.44	POUNDS PER MMBTU:	0.104
PERCENT ISOKINETIC :	---------	99.84	LBS/MMBTU"F"FACTOR	0.000

NOZZLE AREA (FT.2)	(Dn/12)!2x3.141604	0.000167
AVG.VELOCITY HEAD:	(AVG.SQ.RT.)!2	89.22
METER STND. FT3:	(Mf-Mi)xMCFx(AVG.ORF.DIFF./13.6))/29.92)x(528/(Tm+460))	34.011
PERCENT H2O:	((IMP+SG)x(((IMP+SG)x.0474)+SCF)x100	
Mw DRY:	((O2%x.32)+CO2%x.44)+(100-(O2%+CO2)x.28	30.10
Mw WET:	(Mw DRYx(1-%H2O/100))+%H2Ox0.18	27.05
% EXCESS AIR:	%O2/(((100-(%O2+%CO2))x.264)-%O2)*100	91.23
STACK VEL.(FPS):	85.49x.84x(AVG.SQ.RT.VEL.HD.)x((Ts+460)/(PsxMwWET))!.5	89.22
% ISOKINETIC:	((Ts+460)xSCFx2992)/(528xFPSxTIMExAn xPs x 60x(1-%O2/100)	99.84
VOL. FLOW (ACFM):	FPS x 60 x As	220993
STND. FLOW(SCFMD):	ACFMx528/(Ts+460)x(1-%H2O/100)x(Ps/29.92)	140327
PARTICULATE LB/HR:	PROBE+FILTER mg./453600 x (SCFMD/SCF) x 60	57.304
PARTICULATE LB/SCF):	PROBE+FILTER mg./453600 /SCF	0.0000068
GRAINS/SCF:	LB/SCF x 7000	0.0476
GR/SCF @ 8% O2:	(12.9/(20.9-%O2))x GR/SCF	0.0564
GR/SCF @ 50% E.A.:	GR/SCF x ((100+ %E.A.)/150)	0.0607
LB/MMBTU:	(LB/HR)/(LB/MMBTUH)	0.104
LB/MMBTU "F" FACTOR:	LB/SCF x "F" FACTOR x (20.9/20.9-%O2)	0.000

APPENDIX B

FIELD DATA SHEETS

STACK SAMPLING FIELD DATA SHEET

ACE AIR CONSULTING & ENGINEERING, INC.
2106 N. W. 67th PLACE · Suites 9 & 10
GAINESVILLE, FLORIDA · 32606

TEST ID USBSCIAS
PAGE 1 OF 2

PLANT USSC - Bryant
SOURCE Boiler #5
PLANT LOCATION Bryant
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES P.M.
DATE 03-05-92 RUN NO. 1
TIME START 0806 TIME END 0908
SAMPLE TIME 2.5 / 24 (min/pt) = 60 Total min
ASSUMED MOISTURE 26 % FDA .74
NOMOGRAPH C_p .56 PITOT CORR. .84
P_b 29.90 "Hg P_g 29.90 "Hg
WEATHER Ptly Cldy TEMP. 76 °F
METER BOX NO. 6 H 1.91 Y
NOZZLE CAL. .175 .175 .175 .175 .175
STACK DIMENSIONS 87"
STACK AREA 41.283 ft² EFFECTIVE 41.283 ft²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. DNSTRM.
PORT SIZE in. NIPPLE LENGTH in.
U CORD LENGTH 200'
REMARKS: Observers: Sterling Jordan - DER / Ft. Myers
David Brown - HRS / P. Beach County
Raisa Nepinsky - HRS / P. Beach County

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 065.615 ft³
INITIAL 031.737 ft³
NET 33.878 ft³
FILTER NO. 1072 IMP. VOL. GAIN 232 ml.
SIL GEL NO. 28 WT. GAIN 6.2 ml.
TOTAL CONDENSATE 238.2 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					10.8
% O_2					9.7
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE 0.00 cfm 15 "Hg POST 0.008 cfm 20 "Hg
METER BOX/PUMP OK GAS SAMPLE SYST. OK
ORSAT BAG OK
PITOT TUBE NO. 90 PRE-TEST OK
POST-TEST(+) 0.00 @ 6" / 15 H_2O / Sec
POST-TEST(-) 0.00 @ 6 / 15 H_2O / Sec
PYROMETER NO. ATK 3
BOX OPERATOR Southerour 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_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)
1-1			033.24	1.50	.84	.84	161	256	49	68	4.0
2		0811	034.57	2.40	1.34	1.34	160	255	48	68	7.0
3			036.12	2.50	1.40	1.40	160	255	47	68	7.0
4		0816	037.61	2.00	1.12	1.12	162	254	44	68	6.0
5			039.13	2.30	1.29	1.29	162	265	48	69	7.0
6		0821	040.42	2.00	1.12	1.12	162	265	49	70	7.0

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID USB5C1AS

PAGE 2 OF 2

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_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
1-7			041.94	2.00	1.12	1.12	162	244	48	71	7.5
8		0826	043.21	1.50	.84	.84	162	262	49	72	5.5
9			044.52	1.80	1.01	1.01	163	263	49	72	6.0
10		0831	045.82	1.50	.84	.84	163	262	49	72	5.0
11			047.07	1.50	.84	.84	166	268	49	73	5.5
12		0836	048.10	1.50	.84	.84	163	269	50	74	6.0
			049.42	1.10	.62	.62	157	260	51	75	4.0
2-1		0843	050.51	1.10	.62	.62	160	262	50	76	5.0
2			051.55	1.10	.62	.62	160	239	50	76	5.0
3		0848	052.71	1.30	.73	.73	161	263	51	77	5.0
4			053.85	1.30	.73	.73	162	264	51	78	6.0
5		0853	055.21	1.50	.84	.84	162	247	51	78	7.0
6			056.89	3.00	1.68	1.68	162	243	50	79	13.0
7		0858	058.52	3.00	1.68	1.68	162	240	50	80	13.0
8			060.41	3.50	1.96	1.96	163	238	52	81	14.5
9		0903	062.21	3.50	1.96	1.96	163	239	52	82	15.0
10			064.21	2.50	1.40	1.40	163	245	52	83	12.5
11		0908	065.61	3.00	1.68	1.68	162	245	51	83	14.5
12											

STACK SAMPLING FIELD DATA SHEET

ACE AIR CONSULTING & ENGINEERING, INC.
2106 N. W. 67th PLACE · Suites 9 & 10
GAINESVILLE, FLORIDA · 32606

TEST ID USBS#2AS
PAGE 1 OF 2

PLANT USSC - Bryant
SOURCE Boiler #5
PLANT LOCATION Bryant, Florida
TYPE OF SAMPLING TRAIN EPA - 5
TYPE OF SAMPLES P.M
DATE 03-05-92 RUN NO. 2
TIME START 0949 TIME END 1051
SAMPLE TIME 2.5 / 24 (min/pt) = 60 Total min
ASSUMED MOISTURE 26 % FDA .74
NOMOGRAPH C_p .56 PITOT CORR. .84
P_b 29.90 "Hg P_g 29.96 "Hg
WEATHER MSTLY CLDY TEMP. 80 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .175 .175 .175 .175
STACK DIMENSIONS 87"
STACK AREA 41.283 ft² EFFECTIVE 41.283 ft²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. DNSTRM.
PORT SIZE In. NIPPLE LENGTH In.
U CORD LENGTH
REMARKS: Sterling Jordan DER # Myers
DAVID BROWN > HRS PALM BCH CO
RAISA NEGINSKY

Permit Limit
MAX 87.5 #/hr particulate
on Boiler #5
show this Figure in the report

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 100.953 ft³
INITIAL 065.922 ft³
NET 35.031 ft³
FILTER NO. 1071 IMP. VOL. GAIN 230 ml.
SIL GEL NO. 15 WT. GAIN 11.0 ml.
TOTAL CONDENSATE 241 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					10.2S
% O_2					10.2S
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE 0.005 cfm 15 "Hg POST 0.00 cfm 19 "Hg
METER BOX/PUMP OK GAS SAMPLE SYST. OK
ORSAT BAG OK
PITOT TUBE NO. 90 PRE-TEST OK
POST-TEST(+) 0.00 @ 6" / 15 H_2O/Sec
POST-TEST(-) 0.00 @ 5" / 15 H_2O/Sec
PYROMETER NO. ~~ATK~~ 3
BOX OPERATOR Gauthney 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_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)
1-1		0949	067.61	3.50	1.96	1.96	162	227	48	83	10.0
2		0954	069.52	3.50	1.96	1.96	162	228	48	83	10.0
3		0959	071.65	3.50	1.96	1.96	163	230	48	84	10.0
4		1004	073.21	3.00	1.68	1.68	162	241	51	84	10.0
5		1009	074.84	2.80	1.57	1.57	162	240	51	84	9.0
6		1014	076.39	2.00	1.12	1.12	160	251	52	86	7.0

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID USBSC2AS

PAGE 2 OF 2

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_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
1-7		~~1009~~	077.55	1.10	.62	.62	161	278	56	87	4.0
8		1009	078.61	1.10	.62	.62	161	274	56	87	4.5
9		~~1014~~	080.20	1.30	.73	.73	161	256	55	87	5.5
10		1014	080.90	1.10	.62	.62	162	251	56	87	5.0
11		~~1019~~	081.84	1.00	.56	.56	161	253	57	88	5.0
12		1019	083.05	.92	.52	.52	160	255	57	88	5.0
			084.04	1.30	.73	.73	154	253	57	89	5.0
2-1		1026	085.31	1.30	.73	.73	159	248	56	89	5.0
2			086.44	1.30	.73	.73	160	235	56	90	5.0
3		1031	087.61	1.30	.73	.73	161	259	57	91	6.0
4			088.91	1.50	.84	.84	161	249	57	91	7.0
5		1036	090.12	1.50	.84	.84	160	248	57	91	7.0
6			091.75	2.50	1.40	1.40	160	262	57	92	11.0
7		1041	093.52	3.00	1.68	1.68	162	265	57	92	13.0
8			095.50	3.50	1.96	1.96	162	263	57	93	15.0
9		1046	097.25	3.50	1.96	1.96	161	252	56	94	15.0
10			099.18	3.00	1.68	1.68	161	244	57	94	14.0
11		1051	100.95	3.00	1.68	1.68	162	243	57	95	14.5
12											

STACK SAMPLING FIELD DATA SHEET

ACE AIR CONSULTING & ENGINEERING, INC.
2106 N. W. 67th PLACE · Suites 9 & 10
GAINESVILLE, FLORIDA · 32606

TEST ID USBR5R3AS
PAGE 1 OF 2

PLANT USSC - Bryant
SOURCE Boiler #5
PLANT LOCATION Bryant
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES AM
DATE 03-05-92 RUN NO. 3
TIME START 1221 TIME END 1323
SAMPLE TIME 2.5 / 24 (min/pt)= 60 Total min
ASSUMED MOISTURE 26 % FDA .74
NOMOGRAPH C_f .56 PITOT CORR. .84
P_b 29.90 "Hg P_s 29.90 "Hg
WEATHER Msthy Cldy TEMP. 85 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .175 .175 .175 .175
STACK DIMENSIONS 87"
STACK AREA 41.283 ft² EFFECTIVE 41.283 ft²
STACK HEIGHT ____ ft.
STACK DIAMETER: UPSTRM. ____ DNSTRM. ____
PORT SIZE ____ in. NIPPLE LENGTH ____ in.
U CORD LENGTH 200'
REMARKS:

MAT'L PROCESSING RATE ____
GAS METER READINGS: FINAL 136.604 ft³
INITIAL 101.335 ft³
NET ____ ft³
FILTER NO. 1070 IMP. VOL. GAIN 295 ml.
SIL GEL NO. 129 WT. GAIN 61 ml.
TOTAL CONDENSATE 241.1 ml.

ORSAT

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

F_O = ____ F_O RANGE = ____
ORSAT ANALYZER ____

LEAK CHECKS
PRE 0.018 cfm 20 "Hg POST 0.005 cfm 16 "Hg
METER BOX/PUMP OK GAS SAMPLE SYST. OK
ORSAT BAG OK
PITOT TUBE NO. 90 PRE-TEST OK
POST-TEST(+) 0.00 @6" / 15 H_2O/Sec
POST-TEST(-) 0.00 @4" / 15 H_2O/Sec
PYROMETER NO. AYK3
BOX OPERATOR Southerland 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_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)
1-1			103.73	3.80	2.13	2.13	159	244	56	91	11.0
2		1226	105.11	3.00	1.68	1.68	161	238	54	91	8.0
3			107.05	3.50	1.96	1.96	162	238	56	91	10.0
4		1231	108.75	3.00	1.68	1.68	162	239	58	91	9.0
5			110.41	2.30	1.29	1.29	162	259	59	91	8.0
6		1236	111.81	2.00	1.12	1.12	162	273	58	91	7.0

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID USBSC3AS

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_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
1-7			113.01	1.30	.73	.73	162	264	58	92	5.0
8		1241	114.11	1.10	.62	.62	162	256	58	92	6.0
9			115.33	1.30	.73	.73	162	255	58	92	5.5
10		1246	116.51	1.10	.62	.62	162	249	59	92	4.5
11			117.54	1.10	.62	.62	162	247	59	92	4.5
12		1251	118.60	.90	.50	.50	162	250	60	93	4.0
			119.64	1.10	.62	.62	157	256	63	94	5.0
2-1		1258	120.74	1.80	.67	.67	160	240	62	94	5.0
2			121.95	1.20	.67	.67	162	230	62	94	5.0
3		1303	123.13	1.10	.62	.62	162	238	63	94	5.0
4			124.35	1.30	.73	.73	162	260	62	95	6.5
5		1308	125.42	1.30	.73	.73	162	260	62	95	6.5
6			127.12	2.50	1.40	1.40	163	248	60	96	10.0
7		1313	128.85	3.50	1.96	1.96	163	247	60	97	14.0
8			130.71	3.50	1.96	1.96	163	246	61	97	14.0
9		1318	132.57	3.50	1.96	1.96	163	253	61	98	14.5
10			134.61	3.70	2.07	2.07	162	243	62	98	16.0
11		1323	136.60	3.00	1.68	1.68	163	245	62	98	14.0
12											

APPENDIX C
LABORATORY ANALYSIS

AIR CONSULTING & ENGINEERING, inc.

PARTICULATE LAB DATA

SOURCE U.S Sugar - Bryant SC

PROBE RINSE	RUN 1	RUN 2	RUN 3	BLANK
CONTAINER NUMBER	S-6	S-21	S-32	S-44A
TOTAL VOLUME (ml)	150	190	300	100
1st GROSS WEIGHT (g)	103.1438	104.3122	104.7335	110.1524
2nd GROSS WEIGHT (g)	103.1438	104.3121	104.7331	
AVERAGE GROSS WEIGHT (g)	103.1438	104.3121	104.7333	110.1524
TARE WEIGHT (g)	103.1352	104.3012	104.725	110.1524
SUB NET WEIGHT (g)	0.0086	0.0109	0.0081	0.0000
ACETONE BLANK (g)	-	-		
TOTAL NET WEIGHT (mg)	8.6	10.9	8.1	0.0

LIQUID LEVEL ✓

DATE & TIME: 3-8-92 16:51

DATE & TIME: 3-19-92 12:00

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	1072	1071	1070	1001
1st GROSS WEIGHT (g)	0.5158	0.5233	0.5002	0.4998
2nd GROSS WEIGHT (g)	0.5158	0.5233	0.5002	0.4998
AVERAGE GROSS WEIGHT (g)	0.5158	0.5233	0.5002	0.4998
TARE WEIGHT (g)	0.4122	0.4112	0.4092	0.4998
SUB NET WEIGHT (g)	0.1036	0.1121	0.0910	0.0000
TOTAL NET WEIGHT (mg)	103.6	112.1	91.0	0.0

DATE & TIME: 3-8-92 07:47

DATE & TIME: 3-8-92 16:21

TARE BALANCE CHECK

SEE LAB BOOK

1st GROSS WEIGHT BALANCE CHECK

0 ✓ 10.0g -

0.5g ✓ 100.0g ✓

%RH 69 DATE 3-8-92

Signature Christy L. Mick

2nd GROSS WEIGHT BALANCE CHECK

0 ✓ 10.0g -

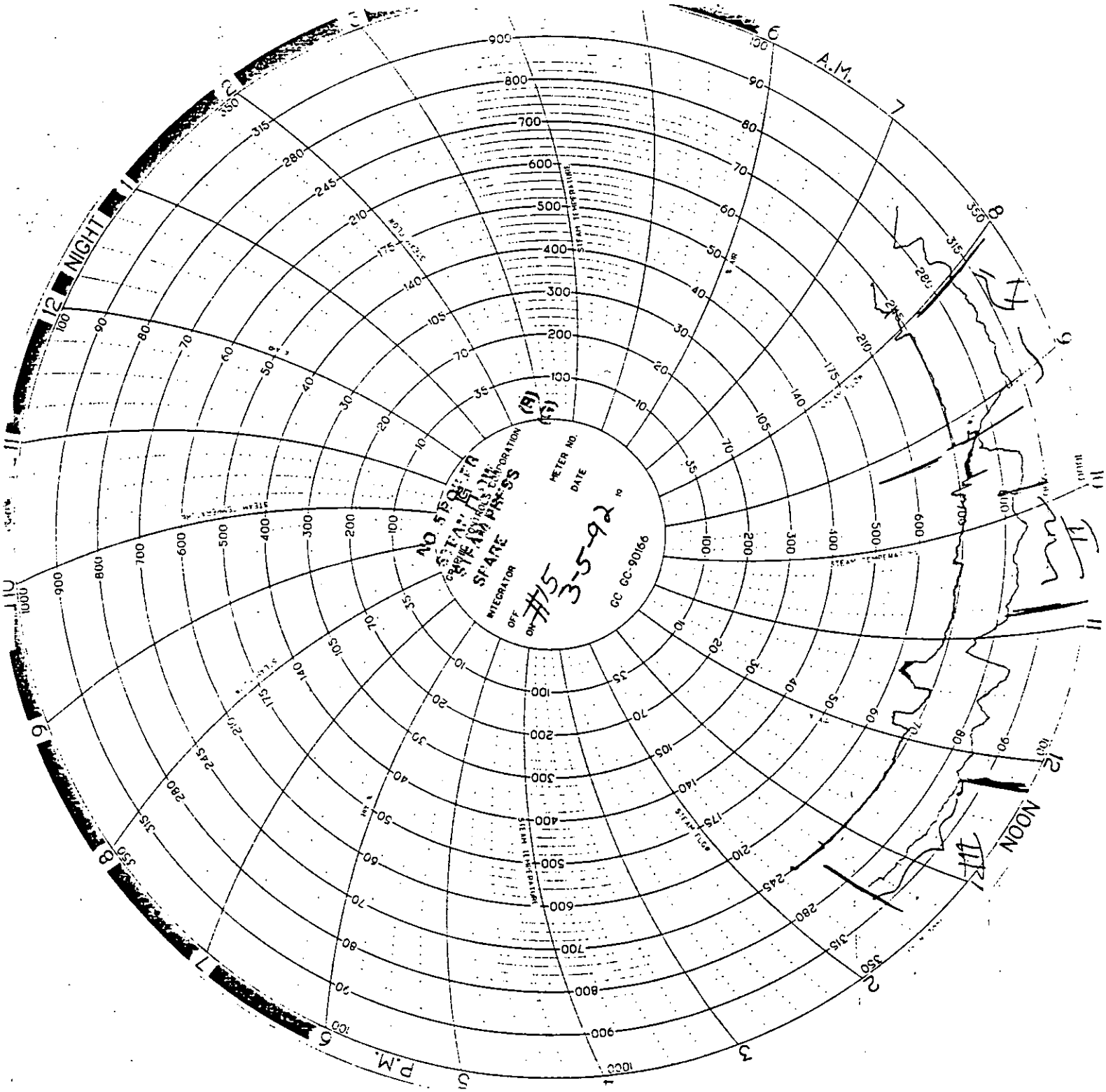
0.5g ✓ 100.0g ✓

%RH 76 DATE 3-19-92

Signature Christy L. Mick

APPENDIX D

PRODUCTION AND BOILER DATA


NIGHT
A.M.
NOON
P.M.
METER NO.
DATE
3-5-92
#15
INTEGRATOR
OFF
ON
GC GC-90166
STEAM PRESS
STEAM TEMPERATURE
STEAM FLOW

BRYANT BOILER #5

DATE: 3-5-92

	TIME	ΔP"	WATER PSI	FLOW GPM	PH
RUN 1	8:03	9 1/2 - 9 3/4	43	600	7.3
	8:18	9 1/2 - 9 3/4	42	600	7.0
	8:33	9 1/2 - 9 3/4	43	590	7.1
	8:47	9 1/2 - 9 3/4	42	590	7.1
	9:03	9 1/2 - 9 3/4	42	585	7.0
	9:18	9 1/2 - 9 3/4	42	585	7.1
RUN 2	9:47	9 1/2 - 9 3/4	40	570	7.2
	10:02	9 1/2 - 9 3/4	40	550	7.2
	10:17	9 1/4 - 9 1/2	41	580	7.1
	10:32	9 1/4 - 9 3/4	41	570	7.1
	10:47	9 1/4 - 9 3/4	41	570	7.1
	10:57	9 1/2 - 9 3/4	41	560	7.1
RUN 3	12:20	9 1/2 - 9 3/4	41	580	6.8
	12:35	9 1/4 - 9 1/2	41	590	7.2
	12:50	9 1/2 - 9 3/4	41	585	6.9
	1:05	9 1/2 - 9 3/4	41	590	7.1
	1:20	9 1/4 - 9 1/2	41	600	7.2
	1:29	9 1/4 - 9 1/2	41	590	7.2

AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	3-05-92
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	1
SOURCE:	NUMBER 5 BOILER, SCRUBBER OUTLET	TIME:	0803-913

TIME INTERVAL	70	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	868219	
BEGIN STEAM	868139	
FACTOR	3500	
TEMPERATURE	900	DEGREES F
PRESSURE	856	PSIG
	871	PSIA
FEEDWATER:		
TEMPERATURE	260	DEGREES F
PRESSURE	1260	PSIG
	1275	PSIA
HEAT INPUT:		
STEAM	1452.7	BTU/LB
FEEDWATER	228.6	BTU/LB
NET STEAM	1224.1	BTU/LB
STEAM RATE	240000	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	534.15	MMBTUH
STEAM CALIBRATION FACTOR	1.00	
OIL	0.00	GPH
OIL	150000	BTU/GAL
TOTAL HEAT INPUT (OIL)	0.00	MMBTUH
TOTAL HEAT INPUT (NON-OIL)	534.15	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	0.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	0.15	LB/MMBTU
TOTAL ALLOWABLE EMISSION	80.12	LB/HR
TOTAL ACTUAL EMISSION	60.76	LB/HR
TOTAL ALLOWABLE EMISSION	0.150	LB/MMBTU
TOTAL ACTUAL EMISSION	0.114	LB/MMBTU

BOILER OPERATION PARAMETERS

PLANT USSC - Bayant

BOILER NUMBER 5

DATE 3-05-92 RUN NUMBER 1

OIL METER FACTOR NO OIL

STEAM INTEGRATOR FACTOR 3500

SCRUBBER(S) PRESS.DROP ___, ___

SCRUBBER(S) GPM ___, ___

OPERATOR'SIGNATURE ___

SCRUBBER(S)H2O LEVEL ___, ___

Ph(if applicable) ___, ___

INITIAL INTEGRATOR 868139

FINAL INTEGRATOR 868219

0803 0913

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS.FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
8:03	031946	245	900	850	260	1260
8:18		245	900	850	260	1260
8:33		245	900	860	260	1260
8:48		245	900	860	260	1260
9:03		245	900	860	260	1260
9:						

AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	3-05-92
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	2
SOURCE:	NUMBER 5 BOILER, SCRUBBER OUTLET	TIME:	0947-1057

TIME INTERVAL	70	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	868340	
BEGIN STEAM	868260	
FACTOR	3500	
TEMPERATURE	899	DEGREES F
PRESSURE	837	PSIG
	852	PSIA
FEEDWATER:		
TEMPERATURE	260	DEGREES F
PRESSURE	1260	PSIG
	1275	PSIA
HEAT INPUT:		
STEAM	1453.5	BTU/LB
FEEDWATER	228.6	BTU/LB
NET STEAM	1224.9	BTU/LB
STEAM RATE	240000	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	534.50	MMBTUH
STEAM CALIBRATION FACTOR	1.00	
OIL	0.00	GPH
OIL	150000	BTU/GAL
TOTAL HEAT INPUT (OIL)	0.00	MMBTUH
TOTAL HEAT INPUT (NON-OIL)	534.50	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	0.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	0.15	LB/MMBTU
TOTAL ALLOWABLE EMISSION	80.18	LB/HR
TOTAL ACTUAL EMISSION	58.05	LB/HR
TOTAL ALLOWABLE EMISSION	0.150	LB/MMBTU
TOTAL ACTUAL EMISSION	0.109	LB/MMBTU

BOILER OPERATION PARAMETERS

PLANT USSC - Bryant BOILER NUMBER 5

DATE 3-05-92 RUN NUMBER 2 OIL METER FACTOR NO OIL

STEAM INTEGRATOR FACTOR 3500 SCRUBBER(S) PRESS. DROP ___, ___

SCRUBBER(S) GPM ___, ___

OPERATOR SIGNATURE ___ SCRUBBER(S) H2O LEVEL ___, ___

Ph(if applicable) ___, ___

INITIAL INTEGRATOR 868260 FINAL INTEGRATOR 868340

0947 1057

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS. FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
9:47	031946	245	900	850	260	1260
10:02		245	900	840	260	1260
10:17		244	900	840	260	1260
10:22		244	900	825	260	1260
10:47		244	895	830	260	1260
10:			899	837	260	1260

AV

AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	3-05-92
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	3
SOURCE:	NUMBER 5 BOILER, SCRUBBER OUTLET	TIME:	1220-1329

TIME INTERVAL	69	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	868513	
BEGIN STEAM	868432	
FACTOR	3500	
TEMPERATURE	900	DEGREES F
PRESSURE	850	PSIG
	865	PSIA
FEEDWATER:		
TEMPERATURE	260	DEGREES F
PRESSURE	1260	PSIG
	1275	PSIA
HEAT INPUT:		
STEAM	1452.2	BTU/LB
FEEDWATER	228.6	BTU/LB
NET STEAM	1223.6	BTU/LB
STEAM RATE	246522	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	548.44	MMBTUH
STEAM CALIBRATION FACTOR	1.00	
OIL	0.00	GPH
OIL	150000	BTU/GAL
TOTAL HEAT INPUT (OIL)	0.00	MMBTUH
TOTAL HEAT INPUT (NON-OIL)	548.44	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	0.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	0.15	LB/MMBTU
TOTAL ALLOWABLE EMISSION	82.27	LB/HR
TOTAL ACTUAL EMISSION	57.30	LB/HR
TOTAL ALLOWABLE EMISSION	0.150	LB/MMBTU
TOTAL ACTUAL EMISSION	0.104	LB/MMBTU

AVG 539.03

BOILER OPERATION PARAMETERS

PLANT USSC- BRYANT

BOILER NUMBER 5

DATE 03-05-92 RUN NUMBER 3

OIL METER FACTOR NO OIL

STEAM INTEGRATOR FACTOR 3500

SCRUBBER(S) PRESS.DROP ____, ____

SCRUBBER(S) GPM ____, ____

SCRUBBER(S)H2O LEVEL ____, ____

Ph(if applicable) ____, ____

OPERATOR SIGNATURE ____

INITIAL INTEGRATOR 868432

1220

FINAL INTEGRATOR 868513

1329

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS. FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
1220	03946	245	900	840	260	1260
1235		245	900	850	260	1260
1250		245	900	860	260	1260
105		246	900	850	260	1260
120		245	900	850	260	1260
		245	900	850	260	1260
			900	850	260	1260 AV

APPENDIX E

QUALITY ASSURANCE

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:

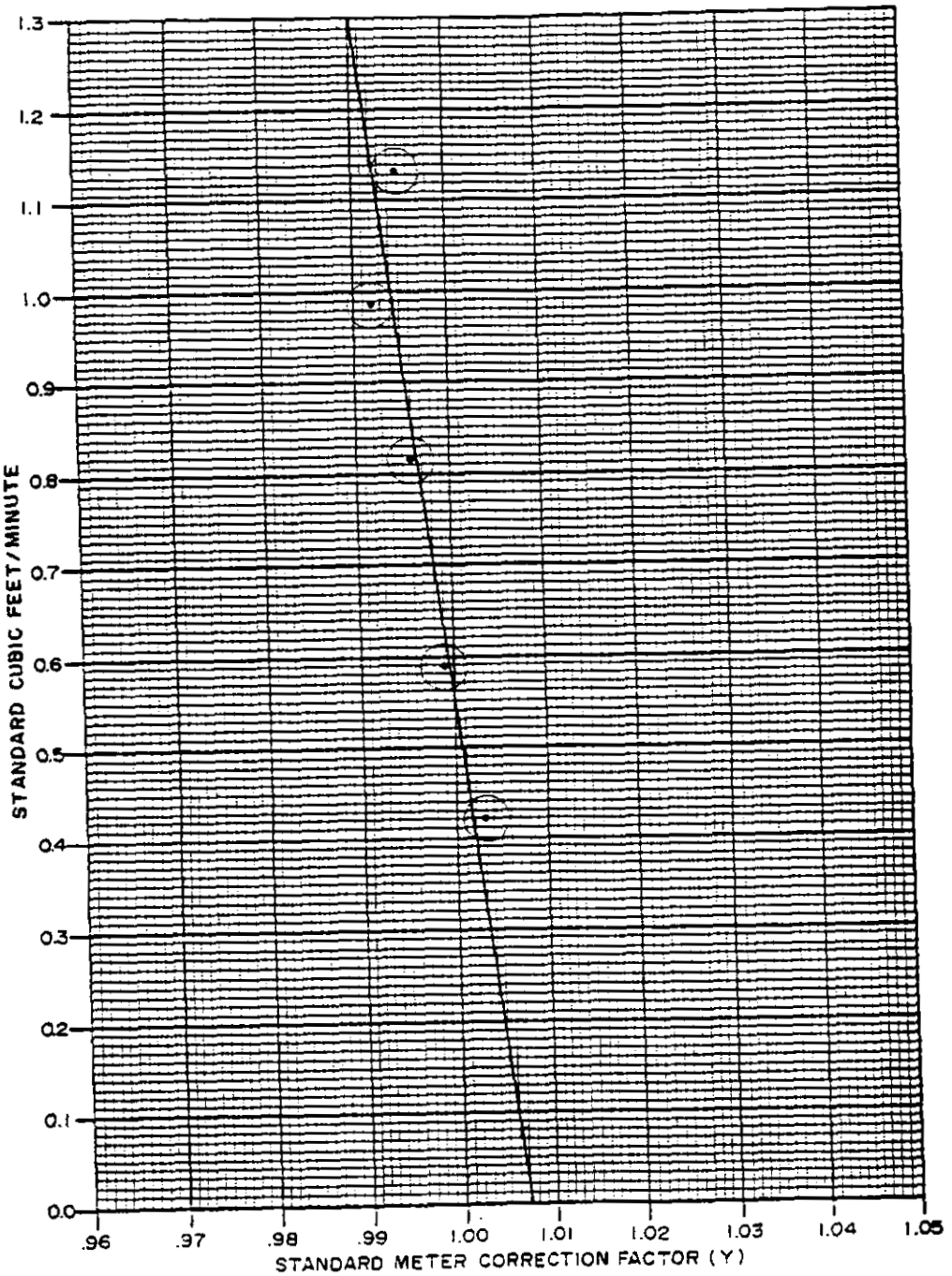
$$Y_a \times Y_s = Y$$

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 12- In. Hg.

METER SERIAL NUMBER 1040616 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 WET TEST METER (°F)	TEMP OF STD METER (°F)	TIME (Minutes)
		INITIAL	FINAL	ACTUAL ft^3	INITIAL	FINAL	ACTUAL ft^3			
-.3	-.60	6.042	11.553	5.511	0.003	5.500	5.497	74	74	13
-.3	-.60	1.553	7.032	5.479	5.500	10.979	5.479	75	75	13
-.3	-.60	7.032	12.509	5.477	10.979	16.450	5.471	75	75	13
-.35	-.96	2.353	8.143	5.290	16.804	22.127	5.323	75	76	9
-.35	-.96	8.143	13.430	5.287	22.127	27.442	5.315	75	76	9
-.35	-.96	3.430	8.703	5.273	27.442	32.753	5.311	75	77	9
-.4	-1.6	9.252	14.995	5.743	33.311	39.123	5.812	76	78	7
-.4	-1.6	4.995	10.713	5.718	39.123	44.909	5.786	76	78	7
-.4	-1.6	0.713	6.445	5.732	44.909	50.707	5.798	76	78	7
-.55	-2.1	6.941	12.917	5.976	51.214	57.292	6.078	76	78	6
-.55	-2.1	2.917	8.898	5.981	57.292	63.375	6.083	76	78	6
-.55	-2.1	8.898	14.873	5.975	63.375	69.452	6.077	76	78	6
-.7	-2.7	5.278	10.988	5.710	69.866	75.663	5.797	76	78	5
-.7	-2.7	0.988	6.708	5.720	75.663	81.474	5.811	76	78	5
-.7	-2.7	6.708	12.386	5.678	81.474	87.247	5.773	76	78	5

CALIBRATED BY: G. F. Mabel

	Y	SCFM	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	0.995	1.132
Run 2	1.001	0.419	0.999	0.584	0.996	0.810	01992	0.989	0.995	1.134
Run 3	1.003	0.419	0.999	0.582	0.996	0.812	0.992	0.988	0.994	1.126
Average	1.003	0.420	0.999	0.593	0.996	0.812	1.992	0.988	0.995	1.131

air consulting and engineering

AIR CONSULTING & ENGINEERING — ANNUAL METER CALIBRATION

DATE 10-3-91

LEAK CHECK 0.000 CFM at 15 In. Hg.

METER BOX NUMBER 6

BAROMETRIC PRESSURE 29.94 In. Hg

DRY GAS METER TEMPERATURE 82 °F/ASTM GLASS THERMOMETER TEMPERATURE 82 °F

ΔH	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				
-.08	0.5	65.936	72.128	6.192	550.514	556.690	6.176	81	82	16	16
-.13	1.0	72.551	78.148	5.597	557.102	562.651	5.549	81	82	10	
-.18	1.5	78.417	84.504	6.087	562.914	568.942	6.028	81	83	9	
-.24	2.0	84.709	90.083	5.374	569.145	574.456	5.311	81	83	7	
-.35	3.0	90.361	96.007	5.646	574.724	580.290	5.566	81	84	6	
-.46	4.0	96.243	101.631	5.388	580.521	585.818	5.297	81	85	5	

DELTA H	Ya	SCFM	Ys	Y
1.909	1.003	0.378	1.004	1.007
1.825	1.008	0.547	1.001	1.009
1.871	1.010	0.661	1.000	1.009
1.937	1.011	0.750	0.998	1.009
1.930	1.013	0.919	0.996	1.008
1.959	1.015	1.052	0.994	1.008
MEAN:	1.905	1.010	0.999	1.009

CALIBRATED BY: H. F. Gabel

AIR CONSULTING & ENGINEERING, inc. — POST TEST CALIBRATION

DATE 3-9-92 METER BOX NUMBER 6 LEAK CHECK 0.00 CFM at 20 in. Hg.

CLIENT U.S. SUGAR / BRYANT SOURCE #2 BOILER THERMOCOUPLE NUMBER 48 PYROMETER NUMBER ~~AK-3~~

FLIGHT SERVICE Pb _____ in. Hg. ACE BAROMETER Pb 29.87 in. Hg.

ASTM GLASS THERMOMETER 157 °F / THERMOCOUPLE 156 °F ASTM GLASS THERMOMETER 70 °F / METER TEMP 70 °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				
~~2.8~~	1.9	764.376	771.800	7.424	307.640	315.155	7.515	77 ~~78~~ (77.5)	79 83 (81)	10	20
2.8	1.9	771.800	779.287	7.487	315.155	322.768	7.613	~~78~~ 79 (78.5)	83 86 (84.5)	10	20
2.75	1.9	779.287	786.766	7.479	322.268	330.399	7.631	79 ~~80~~ (79.5)	86 89 (87.5)	10	20

CALIBRATED BY: Early McFarland

DELTA H	Ya	SCFM	Ys	Y
1.954	0.990	0.728	0.998	0.988
1.916	0.990	0.733	0.998	0.988
1.916	0.990	0.731	0.998	0.988
MEAN:	1.929	0.990	0.998	0.988

air Consulting and Engineering

AIR CONSULTING & ENGINEERING, INC. — PITOT TUBE CALIBRATION

DATE CALIBRATED 11-4-91

PITOT TUBE 90

IS PITOT TUBE ASSEMBLY LEVEL YES

ARE PITOT TUBE OPENINGS DAMAGED NO

α_1 = 2.5 °(<10°), α_2 = 1.0 °(<10°), β_1 = 2.5 °(<5°), β_2 = 1.0 °(<5°)

γ = 3.0 ° θ = 2.0 ° A = 1.15 in. = (Pa + Pb)

z = A sin γ = 0.060 in.; <0.32/<1/8 in.

w = A sin θ = 0.040 in.; <0.08/<1/32 in.

P_a 0.575 in. P_b 0.575 in. D_t .375

WAS CALIBRATION REQUIRED NO

THERMOCOUPLE CALIBRATION

SOURCE (SPECIFY)	ASTM GLASS THERMOMETER WITH MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	36	36	0	0
AMBIENT	58	58	0	0
HOT OVEN	415	416	1	0.19

FDER - MAXIMUM 5° DIFFERENCE

CALIBRATED BY: L.J Carter

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

AIR CONSULTING & ENGINEERING, INC. — PYROMETER CALIBRATION

DATE 8-25-91

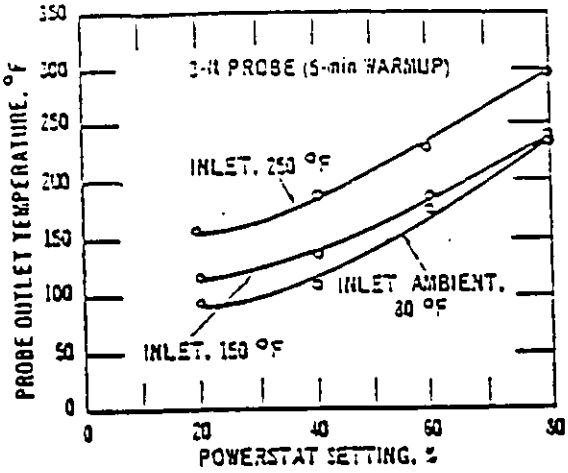
PYROMETER NUMBER Atkins #3

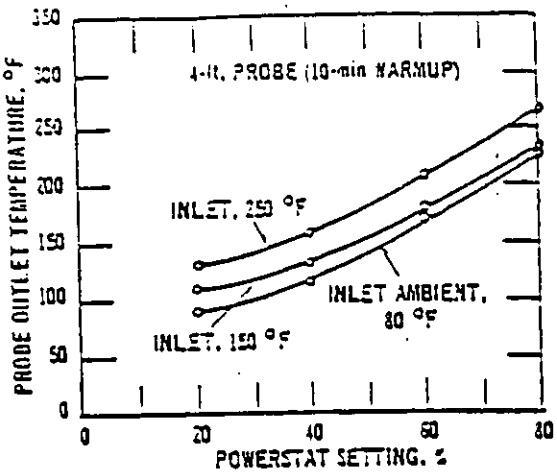
SOURCE (SPECIFY)	GLASS THERMOMETER WITH NBS MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	35	37	2	0.4
AMBIENT	88	89	1	0.2
HOT OVEN	345	348	3	0.5

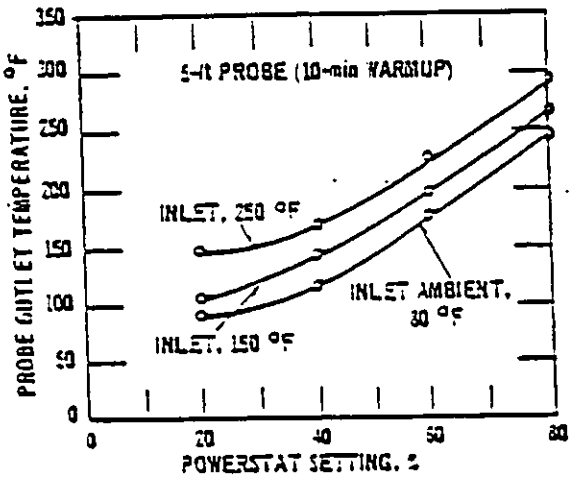
FDER - MAXIMUM 5° DIFFERENCE

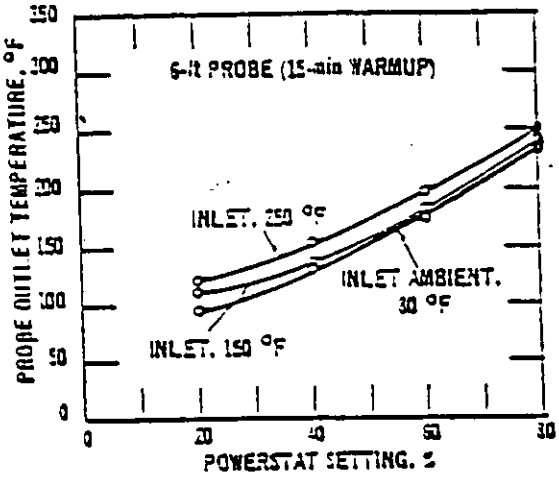
EPA $\left[\frac{(\text{REF. TEMP. °F} + 460°) - (\text{PYROMETER TEMP. °F} + 460°)}{\text{REF. TEMP. °F} + 460°}\right] 100 \leq 1.5\%$

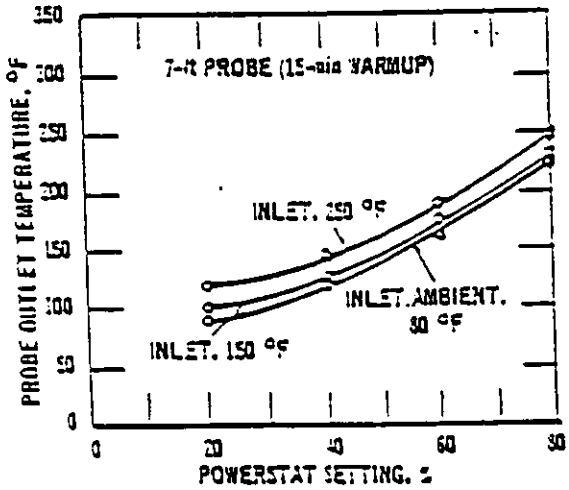
CALIBRATED BY: J. D Carter











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 U. S. Sugar - Bryant TEST DATE 3-5-92
SOURCE NAME Baker #5 SAMPLE RECOVERED BY G. Gautreaux
TYPE OF SAMPLE Pm PARTICULATE ANALYSES BY C. Peck

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	1072	-	DK. Black	
1	S-6	✓	clear	
2	1071	-	DK. Black	
2	S-21	✓	clear	
3	1070	-	DK. Black	
3	S-32	✓	clear	
ACETONE / WATER BLANK (CIRCLE)	S-44A	✓	clear	
FILTER BLANK	1060	-	white	

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT. (g)	INIT. WT. (g)	NET WT. (g)	COLOR
1	28	206.2	200.0	6.2	ok
2	15	211.0	200.0	11.0	ok
3	129	206.1	200.0	6.1	ok
			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

U.S. SUGAR CORPORATION

Peter Barquin
Project Director

Augusto Blanchard
Project Coordinator

FDER

Sterling Jordan
Test Observer

PALM BEACH COUNTY

Raisa Neginsky
Test Observer

David Brown
Test Observer