Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP-42 Section Number: 1.8

Reference Number: 35

Title: Source Test Report for Particulate and Volatile Organic Compound Emissions, Nominal 10% Soil Feed Impingement Wet Scrubber Boiler Number 1

December 1991

05001-1155C8

SOURCE TEST REPORT
for
PARTICULATE AND VOLATILE ORGANIC COMPOUND EMISSIONS

NOMINAL 10% SOIL FEED
IMPINGEMENT WET SCRUBBER
BOILER NUMBER 1
BRYANT, FLORIDA

DECEMBER 19, 1991

Prepared for:

U.S. SUGAR CORPORATION
SOUTH W.C. OWEN AVENUE
CLEWISTON, FLORIDA 33440

Prepared by:

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

238-91-01

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ACE
AIR CONSULTING
& ENGINEERING, INC.

2106 N.W. 67th Place • Suite 4 • Gainesville, Florida • 32606
(904) 335-1889 FAX (904) 335-1891

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

1/23/1992

Date

1.0 INTRODUCTION

On December 19, 1991, Air Consulting and Engineering, Inc. (ACE), conducted particulate and Volatile Organic Compound (VOC) emission testing on the Wet Scrubber Outlet of Boiler 1 at the 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 and EPA Method 25A were utilized for the emission testing.

A Ratfisch Model 55S Total Hydrocarbon analyzer and a Teledyne 320P were used for the testing.

Mr. Ken Tucker 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 production data.

2.0 SUMMARY AND DISCUSSION OF RESULTS

Boiler Number 1 demonstrated compliance with the permit conditions.

Table 1 is a summary of the emission results.

Particulate emissions averaged 40.92 pounds per hour (lbs/Hr) and 0.142 pounds per million BTU (lbs/MMBTU) which is within the allowable emissions of 86.56 lbs/Hr and 0.30 lbs/MMBTU.

No oil was used during compliance testing.

Bagassee feed rate and soil feed rate averaged 41.22 and 3.98 tons per hour (TPH), respectively.

Total VOC as carbon averaged 227.55 lbs/Hr and 0.788 lbs/MMBTU at 9.65 percent soil feed. This value agrees closely with the 1991 performed background test. VOC emissions are based on multiplying observed total hydrocarbon averages by a factor of 0.75 which represents the historical ratio of non-methane organics.

Complete emission summaries, field data sheets and laboratory data are presented in Appendices A, B, and C, respectively. Strip chart copies are located in Appendix D.

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

Table 1 Emission Summary
Boiler Number 1
U.S. Sugar Corporation - Bryant Mill
9.65% Soil Feed
Bryant, Florida
December 19, 1991

Run Number	Time	VOC Emission as Carbon ppm	VOC Emission as Carbon lbs/MMBTU	VOC Emission as Carbon lbs/Hr	Particulate Emissions lbs/Hr	Particulate Emissions lbs/MMBTU
1	0838-0945	301.3	0.542	157.27	46.99	0.162
2	1136-1242	407.7	0.732	208.72	26.37	0.093
3	1411-1518	612.6	1.091	316.67	49.40	0.170
AVERAGE		440.5	0.788	227.55	40.92	0.142

Note: VOC values include a 0.75 non-methane factor of total hydrocarbons

$$\% \text{ soil feed} = \frac{\text{soil (TPH)}}{\text{bagasse (TPH)}} \times 100\%$$

$$\text{lbs/Hr carbon} = \text{ppm } (2.595 \times 10^{-9})\ 12.011\ (3)\ \text{SCFMD } (60)$$

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

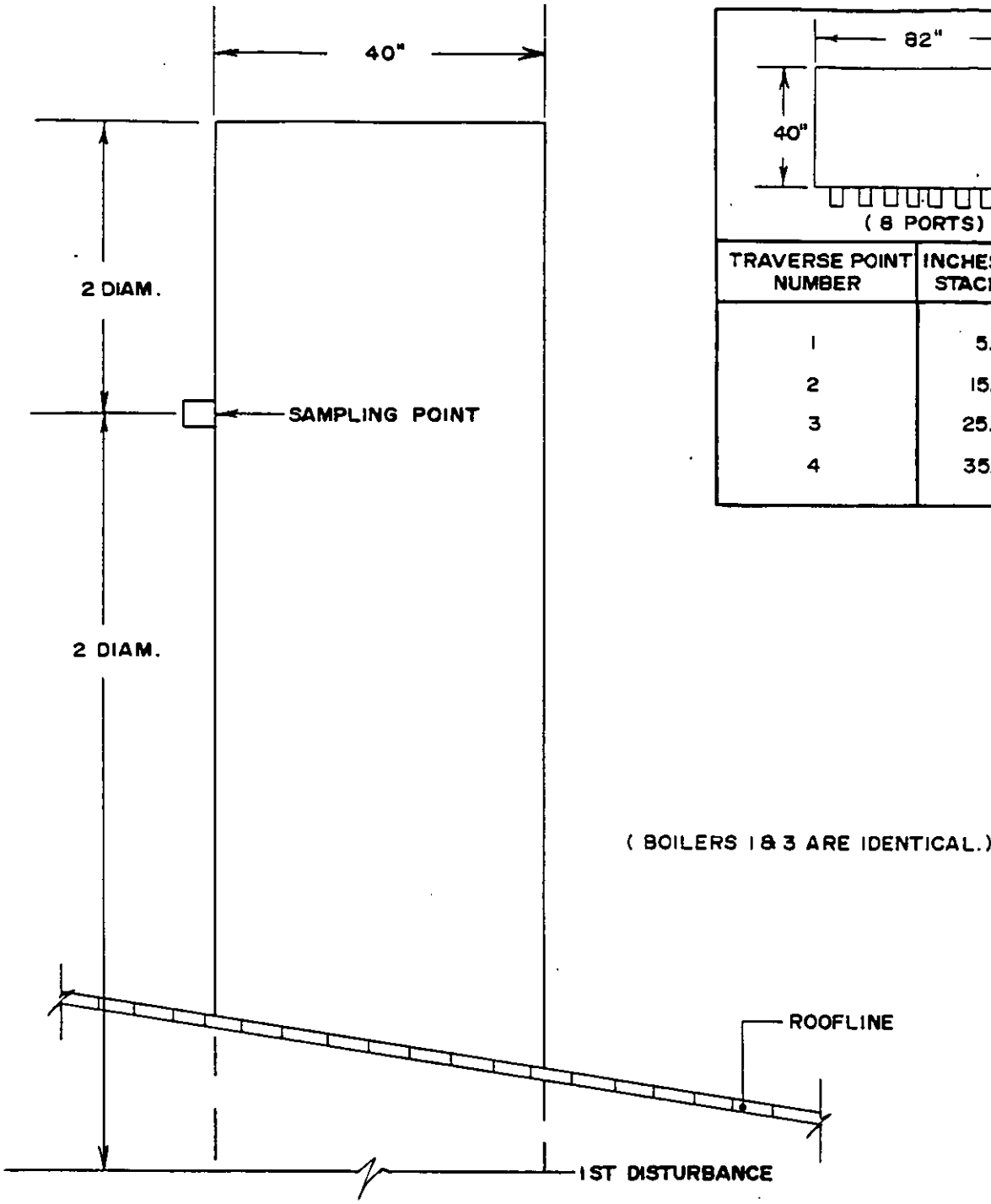
3.0 *PROCESS DESCRIPTION AND OPERATION*

The Number 1 Boiler at U.S. Sugar's Bryant plant is a traveling grate stoker design used primarily for bagasse fuel firing. Supplemental oil firing was not used during the emission test series. The boiler averaged 146,936 pounds per hour 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

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



TRAVERSE POINT NUMBER	INCHES INSIDE STACK WALL
1	5.0
2	15.0
3	25.0
4	35.0

FIGURE 1.
SAMPLING POINT LOCATION
BOILER NO.S 1 & 3
U.S. SUGAR CORPORATION - BRYANT
BRYANT, FLORIDA

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5.0 FIELD AND ANALYTICAL PROCEDURES

5.1 Determination of Oxygen in Emissions From Stationary Sources (Instrumental Analyzer Procedure) --EPA METHOD 3A

A sample is continuously extracted from the effluent stream. A portion of the sample stream is conveyed to an instrumental analyzer, a Teledyne Model 320P O_2 analyzer, for determination of O_2 concentrations.

The sample gas is transported via tubing from a leak-free probe to the moisture removal system and then to the analyzer.

5.2 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.

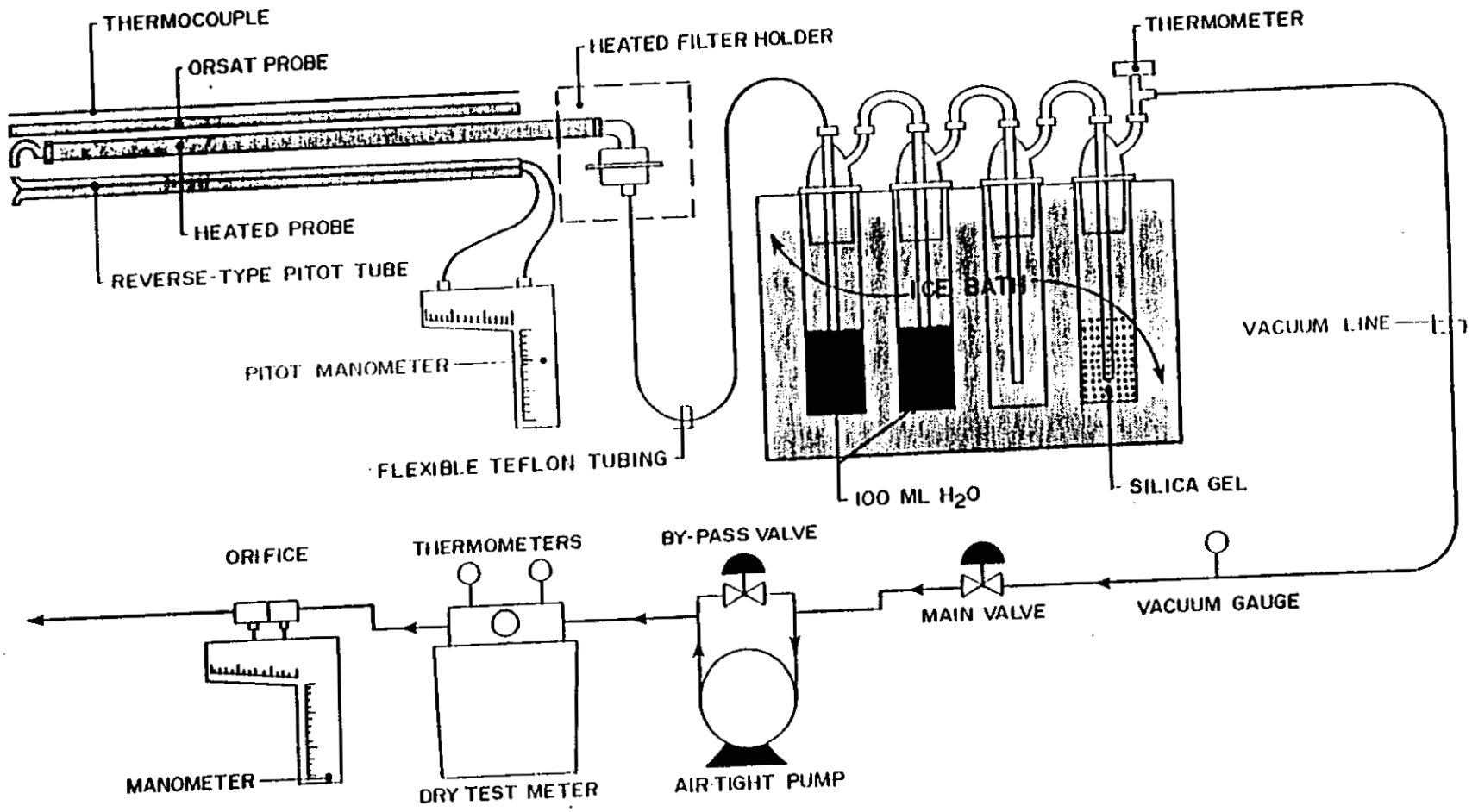

FIGURE 2
EPA METHOD 5 SAMPLING TRAIN

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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 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.

5.3 Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer--EPA Method 25A

A Flame Ionization Analyzer (FIA) is used to monitor Volatile Organic Compounds (VOC) concentrations based on propane calibrations. Results are reported as ppm carbon. A Ratfisch Model RS55 analyzer with heated components was used for the testing.

A schematic of the sample system is provided in Figure 3. Sample gases are continuously removed through a probe and heat traced TEFLON sample line maintained at approximately 300°F. They pass through a non-reactive diaphragm sample pump and are then directed to the analyzer and analyzer bypass through a second heat traced line. Propane calibration gases are injected through a motorized three-way valve at the probe exit so that they "see" the same sample system as source gases. Three calibration gases plus a zero air gas are utilized for the sample range of interest (0 - 100 ppm, 0 - 1000 ppm, and 0 - 10000 ppm).

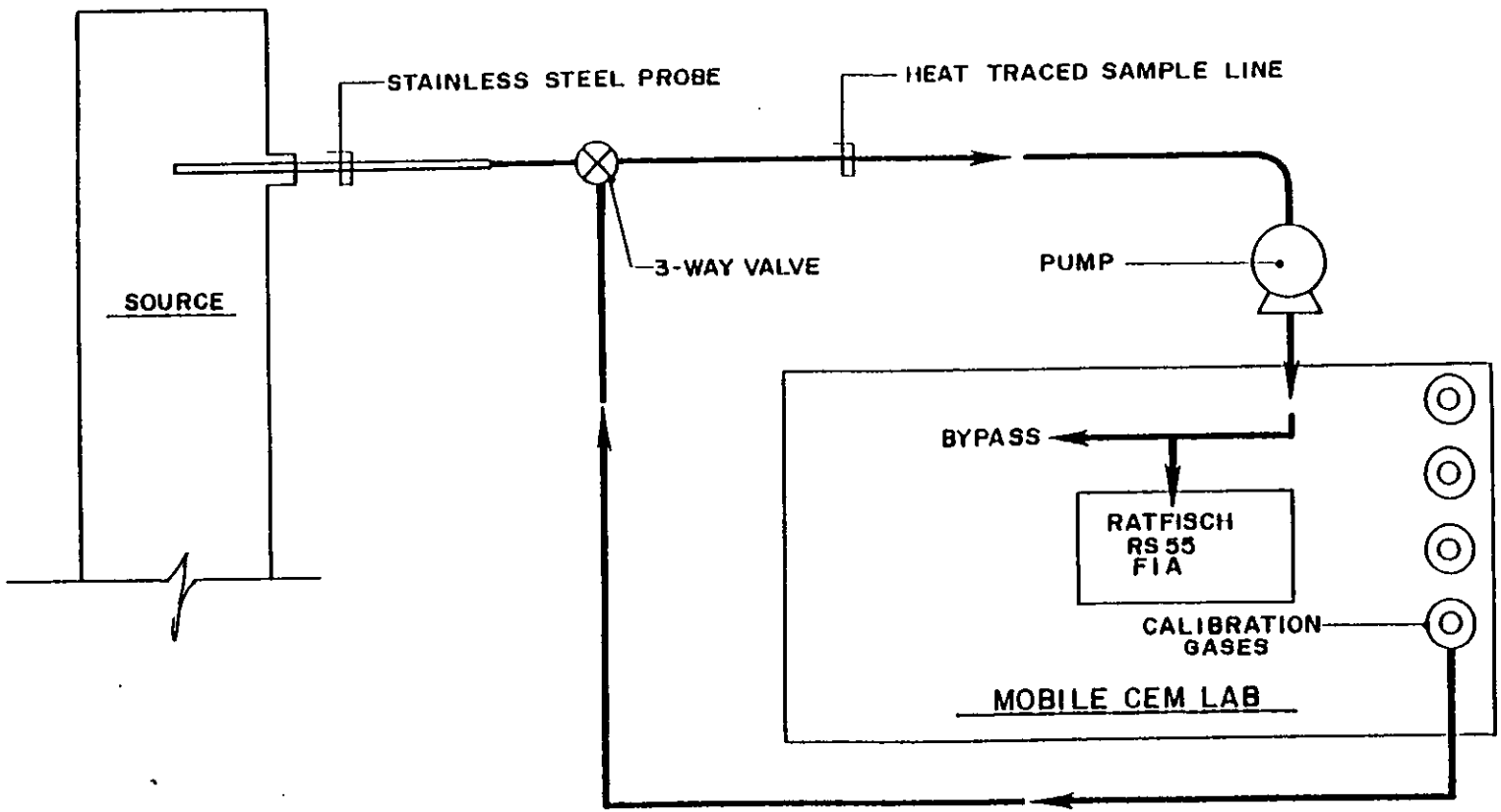

FIGURE 3
EPA-25A
RATFISCH RS55 FIA

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Before testing a calibration error test is conducted after adjustment of zero and span gas values by injecting the remaining two gases into the sample system. These gases must demonstrate a linearity of within 5% of the calibration gas values.

After each test run (or hourly), a propane and zero gas are injected to demonstrate the drift rate. Both gases should demonstrate a drift of $\leq 3\%$ of range.

Since all source gases are sampled on a wet basis, final concentrations must be divided by the source dry gas fraction to correct values to a dry gas basis. Total mass emissions as carbon are then determined by multiplying these concentrations by the source standard hourly flow rate.

APPENDIX A
COMPLETE EMISSION DATA

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COMPLETE EMISSION DATA

PLANT: U. S. SUGAR CORPORATION-BRYANT
SOURCE: NUMBER 1 BOILER
DATE: 12-19-91

RUN NO.:	1	IMPINGER ml	300
BEGIN TIME:	838	SILICA GEL gms.	13.0
END TIME:	945	PERCENT O2	10.2
TOTAL RUN TIME:	64.00 min.	PERCENT CO2	8.5
BAROMETRIC PRESSURE:	30.31 "Hg	"F" FACTOR	N/A
STACK PRESSURE:	30.31 "Hg.		
NOZZLE DIAMETER:	.175 inches	PARTICULATE	
METER CORR. FACTOR:	1.009		
FINAL METER:	726.881 cubic ft.	FILTER mg.	154.2
INITIAL METER:	683.514 cubic ft.	WASH mg.	14.6
STACK AREA:	22.780 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	6.000	2.449	3.600	152	66
1-2	5.000	2.236	3.000	151	66
1-3	4.000	2.000	2.400	151	66
1-4	3.500	1.871	2.100	151	67
2-1	6.200	2.490	3.720	154	67
2-2	5.500	2.345	3.300	153	68
2-3	5.000	2.236	3.000	152	68
2-4	3.500	1.871	2.100	153	68
3-1	5.500	2.345	3.300	153	68
3-2	5.500	2.345	3.300	153	69
3-3	5.000	2.236	3.000	153	69
3-4	3.500	1.871	2.100	153	70
4-1	4.500	2.121	2.700	153	72
4-2	4.500	2.121	2.700	153	72
4-3	4.000	2.000	2.400	153	72
4-4	3.000	1.732	1.800	153	73
5-1	3.000	1.732	1.800	153	73
5-2	3.000	1.732	1.800	153	73
5-3	3.500	1.871	2.100	152	74
5-4	2.300	1.517	1.380	151	74
6-1	1.500	1.225	.900	153	74
6-2	2.000	1.414	1.200	153	74
6-3	2.000	1.414	1.200	152	75
6-4	1.500	1.225	.900	150	75
7-1	1.000	1.000	.600	152	75
7-2	1.000	1.000	.600	152	75
7-3	1.300	1.140	.78	152	76
7-4	.90	0.949	.54	153	75
8-1	.50	0.707	.30	151	76
8-2	.50	0.707	.30	152	76
8-3	.70	0.837	.42	151	76
8-4	.50	0.707	.30	152	76
AVERAGES	3.106	1.670	1.86	152	72

EMISSION RESULTS
RUN 1

NOZZLE AREA (FT2)	:0.0001670			
AVG. VELOCITY HEAD	:--------	2.79 "H2O	VOL. FLOW ACFM :	142302
AVG. STACK TEMP.:	---------	152 F	VOL. FLOW SCFMD :	93044
AVG. METER TEMP.:	---------	72 F		
AVG. ORIFICE DIFFERENTIAL:	---	1.86 "H2O	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:	---	44.209		
% H2O VAPOR:	:--------	25.2	POUNDS PER HOUR:	46.993
GAS MOL. WT. DRY:	---------	29.77	POUNDS PER SCF :	0.0000084
GAS MOL. WT. WET:	---------	26.81	GRAINS/SCF:	0.059
% EXCESS AIR:	---------	91.52	GRAINS/SCF @ 8% O2	0.071
AVG. STACK VEL.(FPS)	---------	104.11	GRAINS/SCF @50% EA	0.075
MMBTU INPUT:	---------	290.23	POUNDS PER MMBTU:	0.162
PERCENT ISOKINETIC :	---------	101.25	LBS/MMBTU "F"FAC.:	

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COMPLETE EMISSION DATA

PLANT: U. S. SUGAR CORPORATION-BRYANT
SOURCE: NUMBER 1 BOILER
DATE: 12-19-91

RUN NO.:	2	IMPINGER ml	319
BEGIN TIME:	1136	SILICA GEL gms.	7.7
END TIME:	1242	PERCENT O2	10.4
TOTAL RUN TIME:	64.00 min.	PERCENT CO2	8.5
BAROMETRIC PRESSURE:	30.31 "Hg	"F" FACTOR	N/A
STACK PRESSURE:	30.31 "Hg.		
NOZZLE DIAMETER:	.175 inches	PARTICULATE	
METER CORR. FACTOR:	1.009		
FINAL METER:	770.254 cubic ft.	FILTER mg.	85.9
INITIAL METER:	727.040 cubic ft.	WASH mg.	8.8
STACK AREA:	22.780 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	4.000	2.000	2.400	151	73
1-2	4.000	2.000	2.400	151	72
1-3	3.500	1.871	2.100	151	73
1-4	4.000	2.000	2.400	152	73
2-1	6.000	2.449	3.600	153	74
2-2	5.300	2.302	3.180	152	74
2-3	5.000	2.236	3.000	151	75
2-4	5.000	2.236	3.000	152	75
3-1	5.500	2.345	3.300	151	76
3-2	5.000	2.236	3.000	150	77
3-3	4.000	2.000	2.400	151	78
3-4	3.500	1.871	2.100	151	78
4-1	4.300	2.074	2.580	153	79
4-2	4.300	2.074	2.580	153	79
4-3	3.500	1.871	2.100	153	80
4-4	3.000	1.732	1.800	153	82
5-1	3.500	1.871	2.100	155	83
5-2	3.500	1.871	2.100	154	83
5-3	3.000	1.732	1.800	154	83
5-4	2.000	1.414	1.200	153	84
6-1	2.000	1.414	1.200	153	84
6-2	2.000	1.414	1.200	154	84
6-3	2.000	1.414	1.200	154	84
6-4	1.500	1.225	.900	153	85
7-1	1.100	1.049	.660	155	86
7-2	1.200	1.095	.720	154	86
7-3	1.200	1.095	.72	155	86
7-4	1.00	1.000	.60	154	86
8-1	.70	0.837	.42	154	86
8-2	.70	0.837	.42	158	86
8-3	.70	0.837	.42	158	86
8-4	.60	0.775	.36	157	86
AVERAGES	3.019	1.662	1.81	153	81

EMISSION RESULTS
RUN 2

NOZZLE AREA (FT2)	:0.0001670			
AVG. VELOCITY HEAD	:--------	2.76 "H2O	VOL. FLOW ACFM	: 142050
AVG. STACK TEMP.:	---------	153 F	VOL. FLOW SCFMD	: 91250
AVG. METER TEMP.:	---------	81 F		
AVG. ORIFICE DIFFERENTIAL:	---	1.81 "H2O	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:	---	43.339		
% H2O VAPOR:	:--------	26.4	POUNDS PER HOUR:	26.374
GAS MOL. WT. DRY:	---------	29.78	POUNDS PER SCF :	0.0000048
GAS MOL. WT. WET:	---------	26.67	GRAINS/SCF:	0.034
% EXCESS AIR:	---------	95.26	GRAINS/SCF @ 8% O2	0.042
AVG. STACK VEL.(FPS)	---------	103.93	GRAINS/SCF @50% EA	0.044
MMBTU INPUT:	---------	284.99	POUNDS PER MMBTU:	0.093
PERCENT ISOKINETIC :	---------	101.21	LBS/MMBTU "F"FAC.:	

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: U. S. SUGAR CORPORATION-BRYANT
SOURCE: NUMBER 1 BOILER
DATE: 12-19-91

RUN NO.:	3	IMPINGER ml	314
BEGIN TIME:	1411	SILICA GEL gms.	9.7
END TIME:	1513	PERCENT O2	10.5
TOTAL RUN TIME:	64.00 min.	PERCENT CO2	8.5
BAROMETRIC PRESSURE:	30.31 "Hg	"F" FACTOR	N/A
STACK PRESSURE:	30.31 "Hg.		
NOZZLE DIAMETER:	.175 inches	PARTICULATE	
METER CORR. FACTOR:	1.009		
FINAL METER:	814.314 cubic ft.	FILTER mg.	147.3
INITIAL METER:	770.576 cubic ft.	WASH mg.	28.8
STACK AREA:	22.780 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	4.500	2.121	2.700	152	82
1-2	4.000	2.000	2.400	152	82
1-3	4.000	2.000	2.400	152	82
1-4	3.000	1.732	1.800	152	82
2-1	6.000	2.449	3.600	152	82
2-2	5.000	2.236	3.000	152	82
2-3	4.500	2.121	2.700	154	83
2-4	3.500	1.871	2.100	153	83
3-1	5.500	2.345	3.300	151	83
3-2	5.000	2.236	3.000	153	83
3-3	4.500	2.121	2.700	154	84
3-4	3.000	1.732	1.800	154	84
4-1	5.000	2.236	3.000	154	84
4-2	4.000	2.000	2.400	153	85
4-3	3.500	1.871	2.100	153	86
4-4	3.000	1.732	1.800	153	86
5-1	3.500	1.871	2.100	153	86
5-2	4.000	2.000	2.400	154	87
5-3	3.000	1.732	1.800	154	87
5-4	2.300	1.517	1.380	153	87
6-1	2.000	1.414	1.200	154	88
6-2	2.000	1.414	1.200	154	88
6-3	2.000	1.414	1.200	152	88
6-4	1.500	1.225	.900	153	88
7-1	1.500	1.225	.900	153	89
7-2	1.700	1.304	1.020	153	89
7-3	1.500	1.225	.90	152	89
7-4	1.00	1.000	.60	153	89
8-1	.60	0.775	.36	152	89
8-2	.70	0.837	.42	152	89
8-3	.80	0.894	.48	152	89
8-4	.80	0.894	.48	153	89
AVERAGES	3.028	1.673	1.82	153	86

EMISSION RESULTS
RUN 3

NOZZLE AREA (FT2)	:0.0001670			
AVG. VELOCITY HEAD	:--------	2.80 "H2O	VOL. FLOW ACFM	: 142911
AVG. STACK TEMP.:	---------	153 F	VOL. FLOW SCFMD	: 92140
AVG. METER TEMP.:	---------	86 F		
AVG. ORIFICE DIFFERENTIAL:	---	1.82 "H2O	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:	---	43.443		
% H2O VAPOR:	:--------	26.1	POUNDS PER HOUR:	49.404
GAS MOL. WT. DRY:	---------	29.78	POUNDS PER SCF :	0.0000089
GAS MOL. WT. WET:	---------	26.70	GRAINS/SCF:	0.063
% EXCESS AIR:	---------	97.50	GRAINS/SCF @ 8% O2	0.078
AVG. STACK VEL.(FPS)	---------	104.56	GRAINS/SCF @50% EA	0.082
MMBTU INPUT:	---------	290.37	POUNDS PER MMBTU:	0.170
PERCENT ISOKINETIC :	---------	100.47	LBS/MMBTU "F"FAC.:	

Avg O_2 = 10.4
Temp = 153
Flow = 92,145

APPENDIX B

FIELD DATA SHEETS

TEST ID SE-A5

PAGE 1 OF 2

STACK SAMPLING FIELD DATA SHEET

ACE AIR CONSULTING & ENGINEERING, INC.

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

PLANT United States Sugar Corp / Bryant
SOURCE Boiler #1
PLANT LOCATION Bryant, Florida
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES P.M.
DATE 12-19-91 RUN NO. 1
TIME START 0838 TIME END 0945
SAMPLE TIME 2 / 32 (min/pt) = 64 Total min
ASSUMED MOISTURE 25 % FDA .75
NOMOGRAPH C_f .60 PITOT CORR. .84
P_b 30.31 "Hg P_s 30.31 "Hg
WEATHER Clear TEMP. 65 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .175 .175 .175 = .175
STACK DIMENSIONS 82" X 40"
STACK AREA 22.780 ft^2 EFFECTIVE _____ ft^2
STACK HEIGHT _____ ft.
STACK DIAMETER: UPSTRM. _____ DNSTRM. _____
PORT SIZE _____ in. NIPPLE LENGTH _____ in.
U CORD LENGTH 125
REMARKS:

MAT'L PROCESSING RATE _____
GAS METER READINGS: FINAL 726.881 ft^3
INITIAL 683.514 ft^3
NET 43.367 ft^3
FILTER NO. 3643 IMP. VOL. GAIN 300 ml.
SIL GEL NO. 2 WT. GAIN 13.0 ml.
TOTAL CONDENSATE 313.0 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					8.5
% O_2					10.25
% CO					
% N_2					

F_O = _____ F_O RANGE = _____
ORSAT ANALYZER _____

LEAK CHECKS
PRE 0.015 cfm 15 "Hg POST _____ cfm _____ "Hg
METER BOX/PUMP _____ GAS SAMPLE SYST. _____
ORSAT BAG _____
PITOT TUBE NO. _____ PRE-TEST OK
POST-TEST(+) _____ / _____ H_2O/Sec
POST-TEST(−) _____ / _____ H_2O/Sec
PYROMETER NO. ATK 3
BOX OPERATOR Southreaux 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.	ACTUAL	STACK GAS TEMP (°F)	SAMPLE BOX TEMP (°F)	LAST IMPINGER TEMP F	DRY GAS METER TEMP (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
West											
1-1		0840	686.00	6.00	3.60	3.60	152	271	44	66	10.0
2		0842	687.61	5.00	3.00	3.00	151	271	43	66	10.0
3		0844	689.20	4.00	2.40	2.40	151	273	43	66	9.0
4		0846	690.71	3.50	2.10	2.10	151	273	43	67	9.0
2-1		0849	692.44	6.20	3.72	3.72	154	272	43	67	14.0
2		0851	694.40	5.50	3.30	3.30	153	246	45	68	14.0

AC AIR CONSULTING & ENGINEERING, INC.

TEST ID USBICIAS

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.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
2-3		0853	696.22	5.00	3.00	3.00	152	257	54	68	14.0
4		0855	697.90	3.50	2.10	2.10	153	258	54	68	12.0
3-1		0857	699.43	5.50	3.30	3.30	153	258	54	68	15.0
2		0859	702.00	5.50	3.30	3.30	153	258	54	69	16.0
3		0901	703.80	5.00	3.00	3.00	153	258	54	69	18.0
4		0903	705.71	3.50	2.10	2.10	153	248	54	70	17.0
4-1		0905	706.31	4.50	2.70	2.70	153	243	55	72	18.0
2		0907	707.91	4.50	2.70	2.70	153	243	55	72	18.0
3		0909	709.51	4.00	2.40	2.40	153	244	56	72	16.0
4		0911	711.02	3.00	1.80	1.80	153	245	57	73	13.0
5-1		0913	712.61	3.00	1.80	1.80	153	246	58	73	13.0
2		0915	713.83	3.00	1.80	1.80	153	246	58	73	13.0
3		0917	715.21	3.50	2.10	2.10	152	250	59	74	14.0
4		0919	716.58	2.30	1.38	1.38	151	240	60	74	12.0
6-1		0922	717.46	1.50	.90	.90	153	238	60	74	9.0
2		0924	718.65	2.00	1.20	1.20	153	243	61	74	10.0
3		0926	719.81	2.00	1.20	1.20	152	243	62	75	11.0
4		0928	721.00	1.50	.90	.90	150	244	62	75	10.0
7-1		0930	721.70	1.00	0.60	.60	152	245	63	75	8.0
2		0932	723.10	1.00	.60	.60	152	246	63	75	8.0
3		0934	723.48	1.30	.78	.78	152	249	63	76	8.5
4		0936	724.47	.90	.54	.54	153	250	63	75	8.0
8-1		0938	724.94	.50	.30	.30	151	263	63	76	6.0
2		0940	725.48	.50	.30	.30	152	263	64	76	6.0
3		0942	726.35	.70 ~~.40~~	.42	.42	157	262	60	76	7.0
4		0944	726.88	.50	.30	.30	152	260	60	76	6.0

TEST ID 3B1-1S

PAGE 1 OF 2

STACK SAMPLING FIELD DATA SHEET

ACE AIR CONSULTING & ENGINEERING, INC.

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

PLANT United States Sugar Corp. / Bryant
SOURCE Boiler #1
PLANT LOCATION Bryant, Florida
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES P.M.
DATE 12-19-91 RUN NO. 2
TIME START 1136 TIME END 1242
SAMPLE TIME 2 / 32 (min/pt) = 64 Total min
ASSUMED MOISTURE 25 % FDA .75
NOMOGRAPH C_f .60 PITOT CORR. .84
P_b 30.31 "Hg P_s 30.31 "Hg
WEATHER Clear/windy TEMP. 78 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .175 .175 .175 = .175
STACK DIMENSIONS 82" X 40"
STACK AREA 22.780 ft² EFFECTIVE _____ ft²
STACK HEIGHT _____ ft.
STACK DIAMETER: UPSTRM. _____ DNSTRM. _____
PORT SIZE _____ in. NIPPLE LENGTH _____ in.
U CORD LENGTH 12.5'
REMARKS:

MAT'L PROCESSING RATE _____
GAS METER READINGS: FINAL 770.254 ft³
INITIAL 727.040 ft³
NET 43.214 ft³
FILTER NO. 3640 IMP. VOL. GAIN 319 ml.
SIL GEL NO. 100 WT. GAIN 7.7 ml.
TOTAL CONDENSATE _____ ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					8.5
% O_2					10.44
% CO					
% N_2					

F_O = _____ F_O RANGE = _____
ORSAT ANALYZER _____

LEAK CHECKS
PRE 0.01 cfm 15 "Hg POST 0.002 cfm 16 "Hg
METER BOX/PUMP _____ GAS SAMPLE SYST. _____
ORSAT BAG _____
PITOT TUBE NO. _____ PRE-TEST OK
POST-TEST(+) 0.00 / 15 H_2O/Sec
POST-TEST(−) 0.03 / 15 H_2O/Sec
PYROMETER NO. ATK3
BOX OPERATOR Gouthreaux PROBE HOLDER McFarland

PORT AND TRAVERSE POINT NUMBER WEST	DISTANCE FROM INSIDE STACK WALL /COMMENTS	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		1138	728.61	4.00	2.40	2.40	151	242	49	73	5.0
2		1140	730.15	4.00	2.40	2.40	151	247	45	72	5.0
3		1142	731.65	3.50	2.10	2.10	151	247	45	73	5.0
4		1144	733.51	4.00	2.40	2.40	152	246	47	73	5.0
2-1		1146	735.11	6.00	3.60	3.60	153	246	49	74	8.0
2		1148	736.90	5.30	3.18	3.18	152	243	49	74	8.0

AC AIR CONSULTING & ENGINEERING, INC.

TEST ID USBIC2115

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)
2-3		1150	739.52	5.00	3.00	3.00	151	243	51	75	8.0
4		1152	740.64	5.00	3.00	3.00	152	243	51	75	8.0
3-1		1155	742.34	5.50	3.30	3.30	151	243	51	76	9.0
2		1157	744.12	5.00	3.00	3.00	150	242	51	77	9.0
3		1159	745.85	4.00	2.40	2.40	151	241	51	78	7.0
4		1201	747.35	3.50	2.10	2.10	151	248	52	78	6.0
4-1		1202	749.20	4.30	2.58	2.58	153	254	52	79	8.0
2		1204	750.71	4.30	2.58	2.58	153	248	52	79	8.0
3		1206	752.22	3.50	2.10	2.10	153	245	52	80	7.0
4		1208	753.77	3.00	1.80	1.80	153	250	53	82	7.0
5-1		1210	755.20	3.50	2.10	2.10	155	243	52	82	8.0
2		1212	756.90	3.50	2.10	2.10	154	243	52	83	8.0
3		1214	758.05	3.00	1.80	1.80	154	243	52	83	8.0
4		1216	759.38	2.00	1.20	1.20	153	254	53	84	6.0
6-1		1218	760.51	2.00	1.20	1.20	153	255	52	84	6.0
2		1220	761.71	2.00	1.20	1.20	154	255	52	84	6.0
3		1222	762.80	2.00	1.20	1.20	154	255	52	84	6.0
4		1224	763.91	1.50	.90	.90	153	259	53	85	6.0
7-1		1228	764.80	1.10	.66	.66	155	260	53	86	5.0
2		1230	765.65	1.20	.72	.72	154	260	53	86	5.0
3		1232	766.50	1.20	.72	.72	155	249	52	86	6.0
4		1234	767.52	1.00	.60	.60	154	237	52	86	5.0
8-1		1236	768.11	.70	.42	.42	154	237	52	86	5.0
2		1238	768.81	.70	.42	.42	158	237	52	86	5.0
3		1240	769.52	.70	.42	.42	158	235	52	86	5.0
4		1242	770.25	.60	.36	.36	157	235	52	86	5.0

STACK SAMPLING FIELD DATA SHEET

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

TEST ID USMIC3h
PAGE 1 OF 2

PLANT United States Sugar Corp. / Bryant
SOURCE Boiler #1
PLANT LOCATION Bryant, Florida
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES P.M
DATE 12-19-91 RUN NO. 3
TIME START 1411 TIME END 1518
SAMPLE TIME 2 / 32 (min/pt) = 64 Total min
ASSUMED MOISTURE 25 % FDA .75
NOMOGRAPH C_f .6 PITOT CORR. .84
P_b 30.31 "Hg P_g 30.31 "Hg
WEATHER Pty cldy \ windy TEMP. 80 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .175 .175 .175 = .175
STACK DIMENSIONS 82" x 40
STACK AREA 22.780 ft² EFFECTIVE _____ ft²
STACK HEIGHT _____ ft.
STACK DIAMETER: UPSTRM. _____ DNSTRM. _____
PORT SIZE _____ in. NIPPLE LENGTH _____ in.
U CORD LENGTH 125'
REMARKS:

MAT'L PROCESSING RATE _____
GAS METER READINGS: FINAL 814.314 ft.³
INITIAL 770.576 ft.³
NET 43.738 ft.³
FILTER NO. 3641 IMP. VOL. GAIN 314 ml.
SIL GEL NO. 19 WT. GAIN 9.7 ml.
TOTAL CONDENSATE 323.7 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					8.5
% O_2					10.4
% CO					
% N_2					

F_O = _____ F_O RANGE = VOC 816.8
ORSAT ANALYZER _____

LEAK CHECKS
PRE 0.003 cfm 15 "Hg POST 0.00 cfm 15 "Hg
METER BOX/PUMP _____ GAS SAMPLE SYST. _____
ORSAT BAG _____
PITOT TUBE NO. _____ PRE-TEST OK
POST-TEST(+) 0.00 / 15 H_2O/Sec
POST-TEST(−) 0.00 / 15 H_2O/Sec
PYROMETER NO. ~~ATK~~ 3
BOX OPERATOR Gouthreaux PROBE HOLDER McFarland

PORT AND TRAVERSE POINT NUMBER West	DISTANCE FROM INSIDE STACK WALL /COMMENTS	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		1413	772.31	4.50	2.70	2.70	152	243	53	82	6.0
2		1415	773.70	4.00	2.40	2.40	152	243	48	82	6.0
3		1417	775.23	4.00	2.40	2.40	152	242	48	82	6.0
4		1419	776.90	3.00	1.80	1.80	152	242	50	82	6.0
2-1		1421	778.50	6.00	3.60	3.60	152	242	50	82	10.0
2		1423	780.31	5.00	3.00	3.00	152	242	50	82	10.0

AC AIR CONSULTING & ENGINEERING, INC.

TEST ID USBIC3A

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)
2-3		1425	782.10	4.50	2.70	2.70	154	251	53	83	9.0
4		1427	783.87	3.50	2.10	2.10	153	250	53	83	8.0
3-1		1429	785.62	5.50	3.30	3.30	155	248	53	83	12.0
2		1431	787.22	5.00	3.00	3.00	153	248	53	83	12.0
3		1433	788.99	4.50	2.70	2.70	154	250	53	84	12.0
4		1435	790.77	3.00	1.80	1.80	154	250	54	84	10.0
4-1		1438	792.32	5.00	3.00	3.00	154	244	54	84	12.0
2		1440	794.00	4.00	2.40	2.40	153	245	54	85	11.0
3		1442	795.51	3.50	2.10	2.10	153	248	54	86	10.0
4		1444	797.10	3.00	1.80	1.80	153	247	54	86	10.0
5-1		1446	798.51	3.50	2.10	2.10	153	237	54	86	11.0
2		1448	800.00	4.00	2.40	2.40	154	235	54	87	12.0
3		1450	801.43	3.00	1.80	1.80	154	240	54	87	10.0
4		1452	802.89	2.30	1.38	1.38	153	245	54	87	10.0
6-1		1454	804.10	2.00	1.20	1.20	154	248	54	88	9.0
2		1456	805.10	2.00	1.20	1.20	154	246	54	88	9.0
3		1458	806.22	2.00	1.20	1.20	152	245	55	88	9.0
4		1500	807.40	1.50	.90	.90	153	256	53	88	8.0
7-1		1503	808.33	1.50	.90	.90	153	256	53	89	8.0
2		1505	809.41	1.70	1.02	1.02	153	256	53	89	9.0
3		1507	810.40	1.50	.90	.90	152	253	52	89	8.0
4		1509	811.41	1.00	.60	.60	153	252	52	89	7.0
8-1		1512	812.15	.60	.36	.36	152	252	52	89	6.0
2		1514	812.76	.70	.42	.42	152	248	52	89	6.0
3		1516	813.45	.80	.48	.48	152	248	52	89	6.0
4		1518	814.31	.80	.48	.48	153	232	51	89	6.0

APPENDIX C

LABORATORY ANALYSIS

AIR CONSULTING & ENGINEERING, inc.

PARTICULATE LAB DATA

SOURCE US Sugar Bryant

PROBE RINSE	RUN 1	RUN 2	RUN 3	BLANK
CONTAINER NUMBER	1	8	9	20
TOTAL VOLUME (ml)	160	170	125	110
1st GROSS WEIGHT (g)	98.1417	107.0619	105.4727	98.1658
2nd GROSS WEIGHT (g)	98.1421	107.0621	105.4730	98.1655
AVERAGE GROSS WEIGHT (g)	98.1419	107.0622	105.4729	98.1657
TARE WEIGHT (g)	98.1273	107.0534	105.4441	98.1653
SUB NET WEIGHT (g)	0.0146	0.0088	0.0288	0.0004
ACETONE BLANK (g)	—	—	—	—
TOTAL NET WEIGHT (mg)	14.6	8.8	28.8	0.4

LIQUID LEVEL ✓

DATE & TIME: 12/26/91 1515

DATE & TIME: 12/27/91 1030

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	3643	3640	3641	3149
1st GROSS WEIGHT (g)	0.5732	0.5077	0.5674	0.4018
2nd GROSS WEIGHT (g)	0.5732	0.5075	0.5673	0.4019
AVERAGE GROSS WEIGHT (g)	0.5732	0.5076	0.5674	0.4019
TARE WEIGHT (g)	0.4190	0.4217	0.4201	0.4019
SUB NET WEIGHT (g)	0.1542	0.0859	0.1473	0.0000
TOTAL NET WEIGHT (mg)	154.2	85.9	147.3	0.0

DATE & TIME: 12/26/91 1515

DATE & TIME: 12/27/91 1030

TARE BALANCE CHECK

SEE LAB BOOK

1st GROSS WEIGHT BALANCE CHECK

0 — 10.0g 10.0000

0.5g 0.5003 100.0g 99.9998

%RH 45 DATE 12/26/91

Signature Charles P Swearingen

2nd GROSS WEIGHT BALANCE CHECK

0 — 100g 10.0000

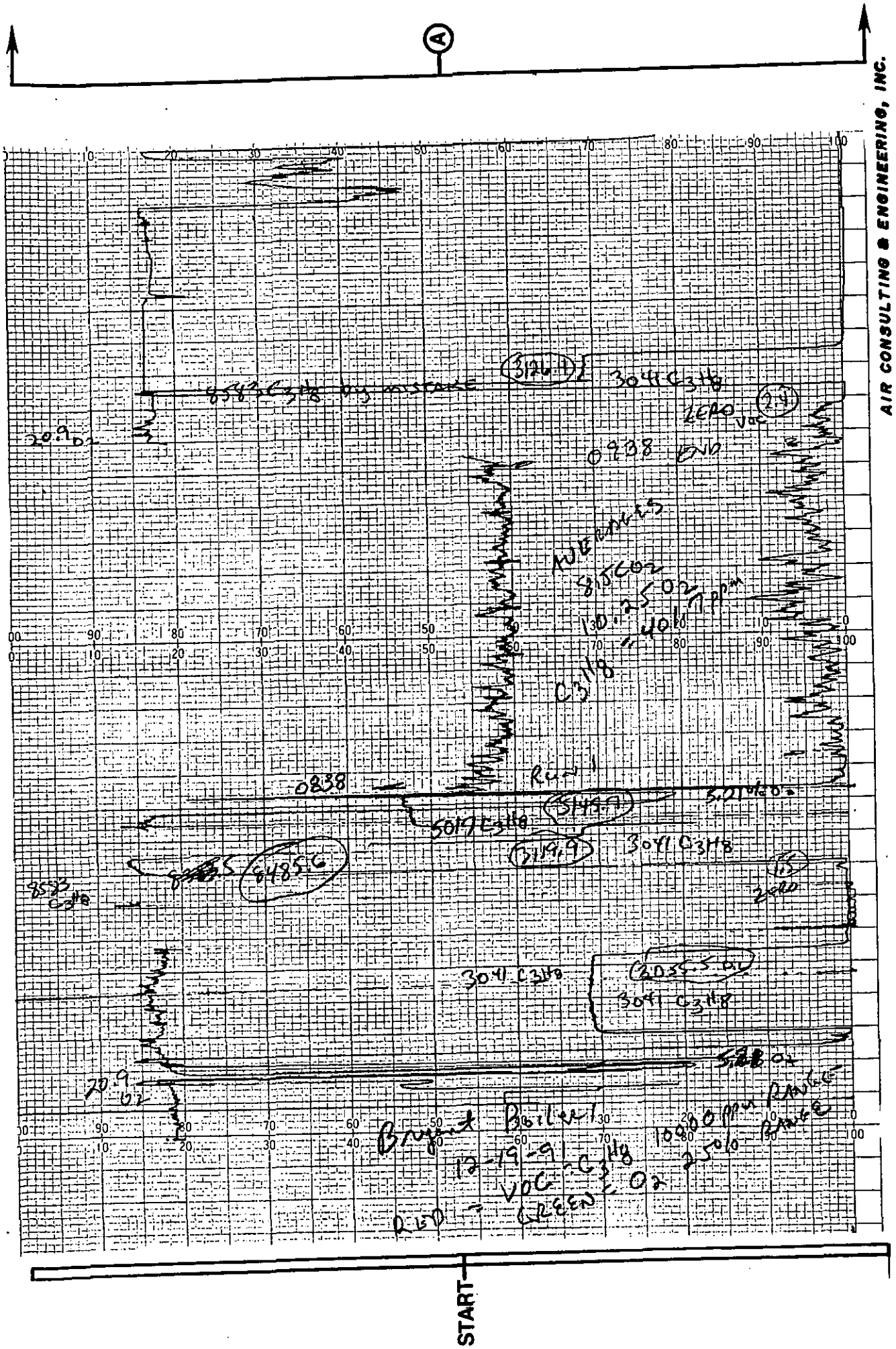
0.5g 0.5003 100.0g 99.9998

%RH 44 DATE 12/27/91

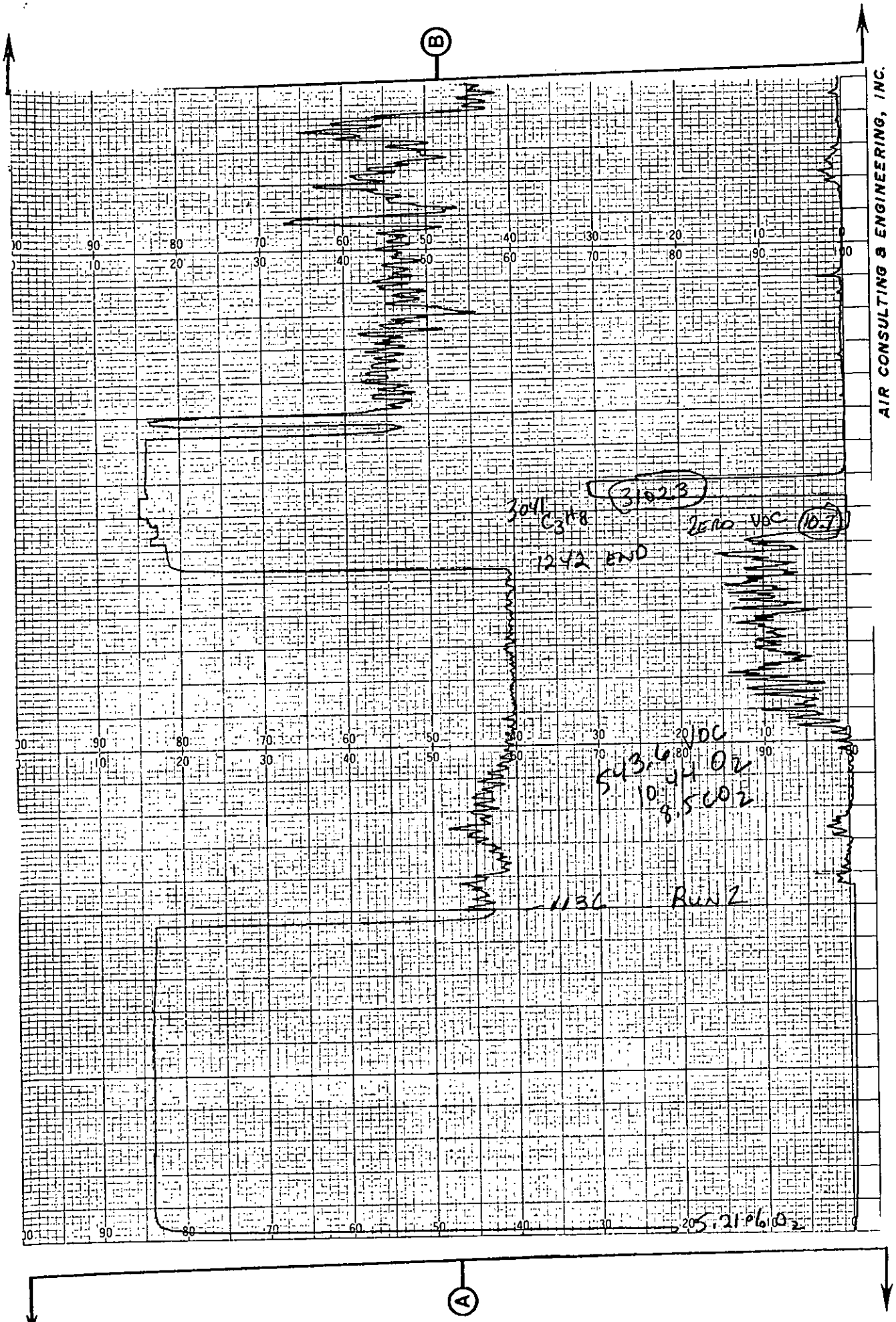
Signature Charles P Swearingen

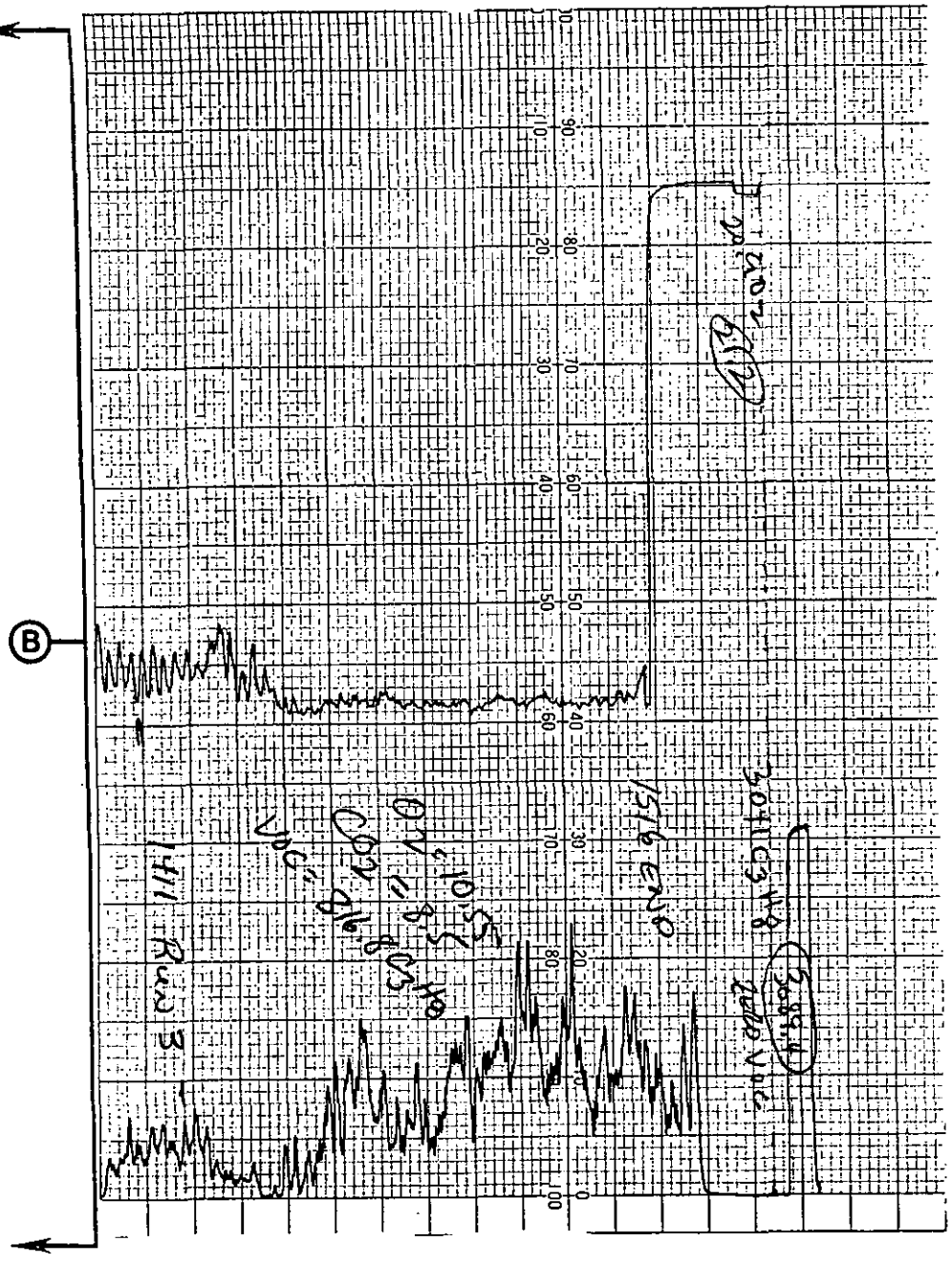
APPENDIX D

VOC STRIP CHART COPIES



A
START
AIR CONSULTING & ENGINEERING, INC.
8583 C3H8 by mistake
3126.4
3041 C3H8
ZERO VOC
2.4
20.9 O2
0938 END
AVERAGES
8.5 CO2
10.25 O2
C3H8 = 40 ppm
0838
Run 1
5.21% O2
5149.7
5017 C3H8
3119.9
3041 C3H8
8485.6
8583 C3H8
ZERO
3041 C3H8
3055.5 O2
3041 C3H8
20.9 O2
Bryant Boiler 1
12-19-91
10000 ppm RANGE
25% RANGE
RED = VOC = C3H8
GREEN = O2


B
A
AIR CONSULTING & ENGINEERING, INC.
3041 C_3H_8
31023
ZERO VOC
10.7
1242 END
543.6 VOC
10.44 O_2
8.5 CO_2
1136 RUN 2
5.21 % O_2



en

APPENDIX E

PRODUCTION RATE CERTIFICATION

UNITED STATES SUGAR CORPORATION

BRYANT SUGAR HOUSE

DATE: 12-19-91

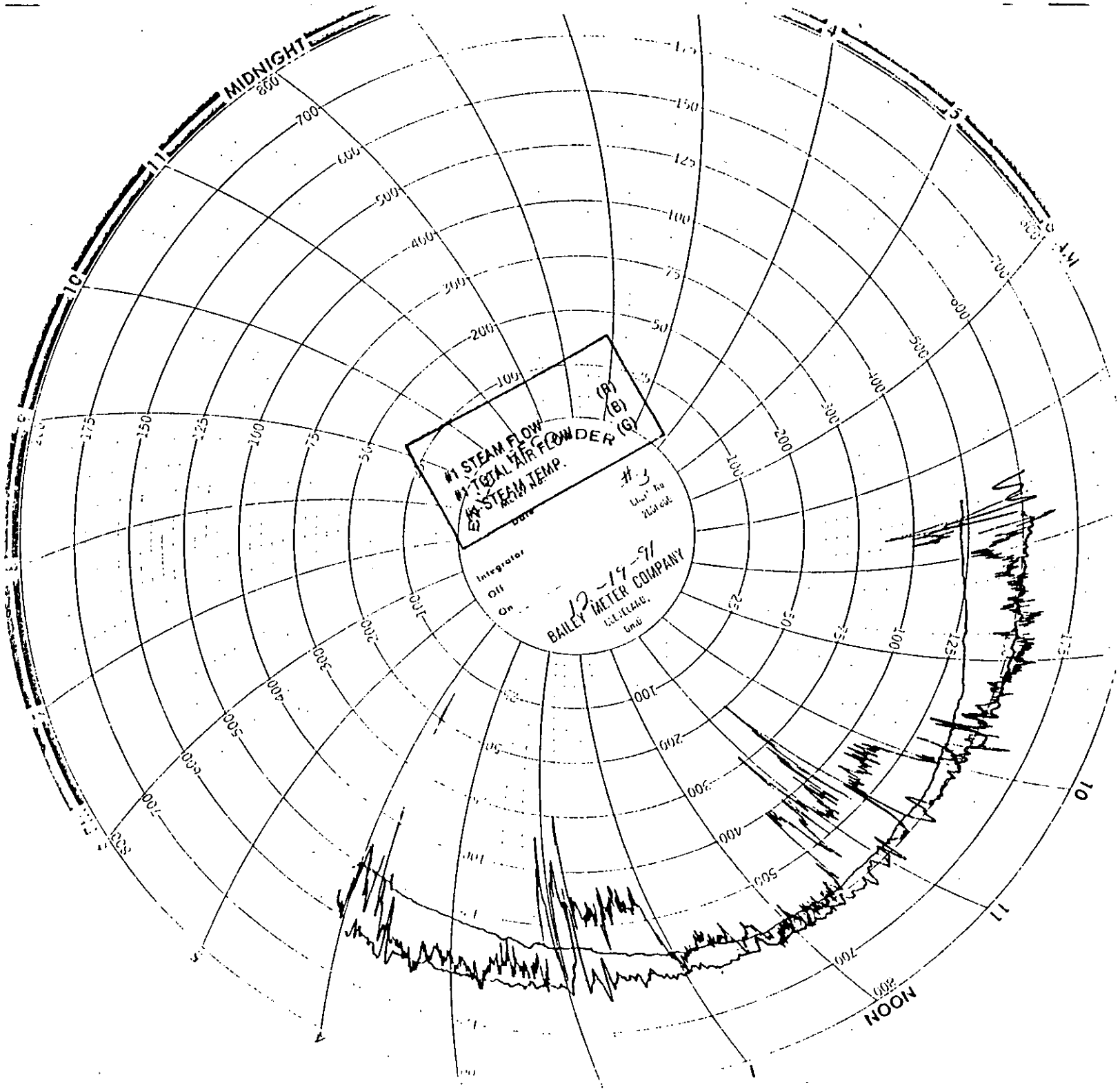
BOILER NO. 1

RUN	1	2	3
LOADS TO HOPPER	4	4	4
VOLUME OF LOAD YD^3	1.2	1.2	1.2
DENSITY OF LOAD $\#/FT^3$	61.5	59.5	63.0
WEIGHT OF SOILS BURNED IN RUN IN LBS.	7970.4	7711.2	8164.8

SIGNED: [illegible]

AMB/ls

12/19/91


MIDNIGHT
NOON
#1 STEAM FLOW (R)
#1 TOTAL AIR FLOW (B)
#1 STEAM TEMP. (G)
#3
Integrator
Off
On
12-19-91
BAILEY METER COMPANY
CLEVELAND, OHIO

AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	12-19-91
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	1
SOURCE:	NUMBER 1 BOILER, SCRUBBER OUTLET	TIME:	0836-0949

TIME INTERVAL	73	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	684521	
BEGIN STEAM	684340	
FACTOR	1000	
TEMPERATURE	605	DEGREES F
PRESSURE	422	PSIG
	437	PSIA
FEEDWATER:		
TEMPERATURE	265	DEGREES F
PRESSURE	645	PSIG
	660	PSIA
HEAT INPUT:		
STEAM	1306.0	BTU/LB
FEEDWATER	233.0	BTU/LB
NET STEAM	1073.0	BTU/LB
STEAM RATE	148767	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	290.23	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)	290.23	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	87.07	LB/HR
TOTAL ACTUAL EMISSION	46.99	LB/HR
TOTAL ALLOWABLE EMISSION	.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.162	LB/MMBTU
BAGASSE FEED: @ 3500 BTU/LB	41.46	TPH

BOILER OPERATION PARAMETERS

PLANT United States Sugar Corp./Bryant BOILER NUMBER 1

DATE 12-19-91 RUN NUMBER 1 OIL METER FACTOR NO OIL

STEAM INTEGRATOR FACTOR 1000 SCRUBBER(S) PRESS.DROP 6,

SCRUBBER(S) GPM ,

OPERATOR SIGNATURE [signature] SCRUBBER(S)H2O LEVEL ,

Ph(if applicable) ,

INITIAL INTEGRATOR 684340 FINAL INTEGRATOR 684521

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS.FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
8:36		155,000	600	410	265	650
8:51		157,000	603	420	265	650
9:06		150,000	603	420	265	640
9:21		145,000	605	420	265	640
9:36		152,000	600	430	265	650
9:49		145,000	620	430	265	640

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	12-19-91
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	2
SOURCE:	NUMBER 1 BOILER, SCRUBBER OUTLET	TIME:	1134-1246

TIME INTERVAL----------	72 MINUTES
OIL:	
FINAL OIL----------	0
BEGIN OIL	0
FACTOR----------	1
STEAM:	
FINAL STEAM----------	684897
BEGIN STEAM	684723
FACTOR----------	1000
TEMPERATURE	613 DEGREES F
PRESSURE----------	422 PSIG
	437 PSIA
FEEDWATER:	
TEMPERATURE----------	262 DEGREES F
PRESSURE	643 PSIG
	658 PSIA
HEAT INPUT:	
STEAM----------	1311.0 BTU/LB
FEEDWATER	230.0 BTU/LB
NET STEAM----------	1081.0 BTU/LB
STEAM RATE	145000 LB/HR
BOILER EFFICIENCY----------	55.0 %
TOTAL FUEL HEAT INPUT	284.99 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)	284.99 MMBTUH
ALLOWABLES:	
ALLOWABLE EMISSION (OIL)----------	.10 LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30 LB/MMBTU
TOTAL ALLOWABLE EMISSION----------	85.50 LB/HR
TOTAL ACTUAL EMISSION	26.37 LB/HR
TOTAL ALLOWABLE EMISSION----------	.300 LB/MMBTU
TOTAL ACTUAL EMISSION	0.093 LB/MMBTU
BAGASSE FEED: @ 3500 BTU/LB ----------	40.71TPH

26.3

BOILER OPERATION PARAMETERS

PLANT United States Sugar Corp/Bryant

BOILER NUMBER 1

DATE 12-19-91 RUN NUMBER 2

OIL METER FACTOR No Oil

STEAM INTEGRATOR FACTOR 1000

SCRUBBER(S) PRESS.DROP ~~11.5~~ 6.0

SCRUBBER(S) GPM _____, _____

OPERATOR SIGNATURE [signature]

SCRUBBER(S)H2O LEVEL _____, _____

Ph(if applicable) _____, _____

INITIAL INTEGRATOR 684723

FINAL INTEGRATOR 684897

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS.FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
11:34		145,000	620	420	265	640
11:49		145,000	610	430	265	640
12:04		155,000	610	420	260	640
12:19		152,000	600	420	260	640
12:34		140,000	620	420	260	650
1246		145,000	620	425	260	650
			613	422	262	643

AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	12-19-91
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	3
SOURCE:	NUMBER 1 BOILER, SCRUBBER OUTLET	TIME:	1410-1521

TIME INTERVAL	71	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	685238	
BEGIN STEAM	685064	
FACTOR	1000	
TEMPERATURE	618	DEGREES F
PRESSURE	420	PSIG
	435	PSIA
FEEDWATER:		
TEMPERATURE	260	DEGREES F
PRESSURE	643	PSIG
	658	PSIA
HEAT INPUT:		
STEAM	1314.7	BTU/LB
FEEDWATER	228.6	BTU/LB
NET STEAM	1086.1	BTU/LB
STEAM RATE	147042	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	290.37	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)	290.37	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	87.11	LB/HR
TOTAL ACTUAL EMISSION	49.40	LB/HR
TOTAL ALLOWABLE EMISSION	.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.170	LB/MMBTU
BAGASSE FEED: @ 3500 BTU/LB	41.48	TPH

Avg = 288.53

Avg = 41.22

BOILER OPERATION PARAMETERS

PLANT United States Sugar Corp. / Bryant

BOILER NUMBER 1

DATE 12-19-91 RUN NUMBER 3

OIL METER FACTOR No Oil

STEAM INTEGRATOR FACTOR 1000

SCRUBBER(S) PRESS.DROP 6,

SCRUBBER(S) GPM ,

OPERATOR SIGNATURE [signature]

SCRUBBER(S)H2O LEVEL ,

Ph(if applicable) ,

INITIAL INTEGRATOR 685064

FINAL INTEGRATOR 685238

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS.FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
2:10		145,000	610	420	260	640
2:25		145,000	620	420	260	640
2:40		155,000	620	420	260	640
2:55		150,000	620	420	260	640
3:10		150,000	620	420	260	650
3:21		150,000	620	420	260	650
		AV	~~620~~ 618	420	260	643

APPENDIX F

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:

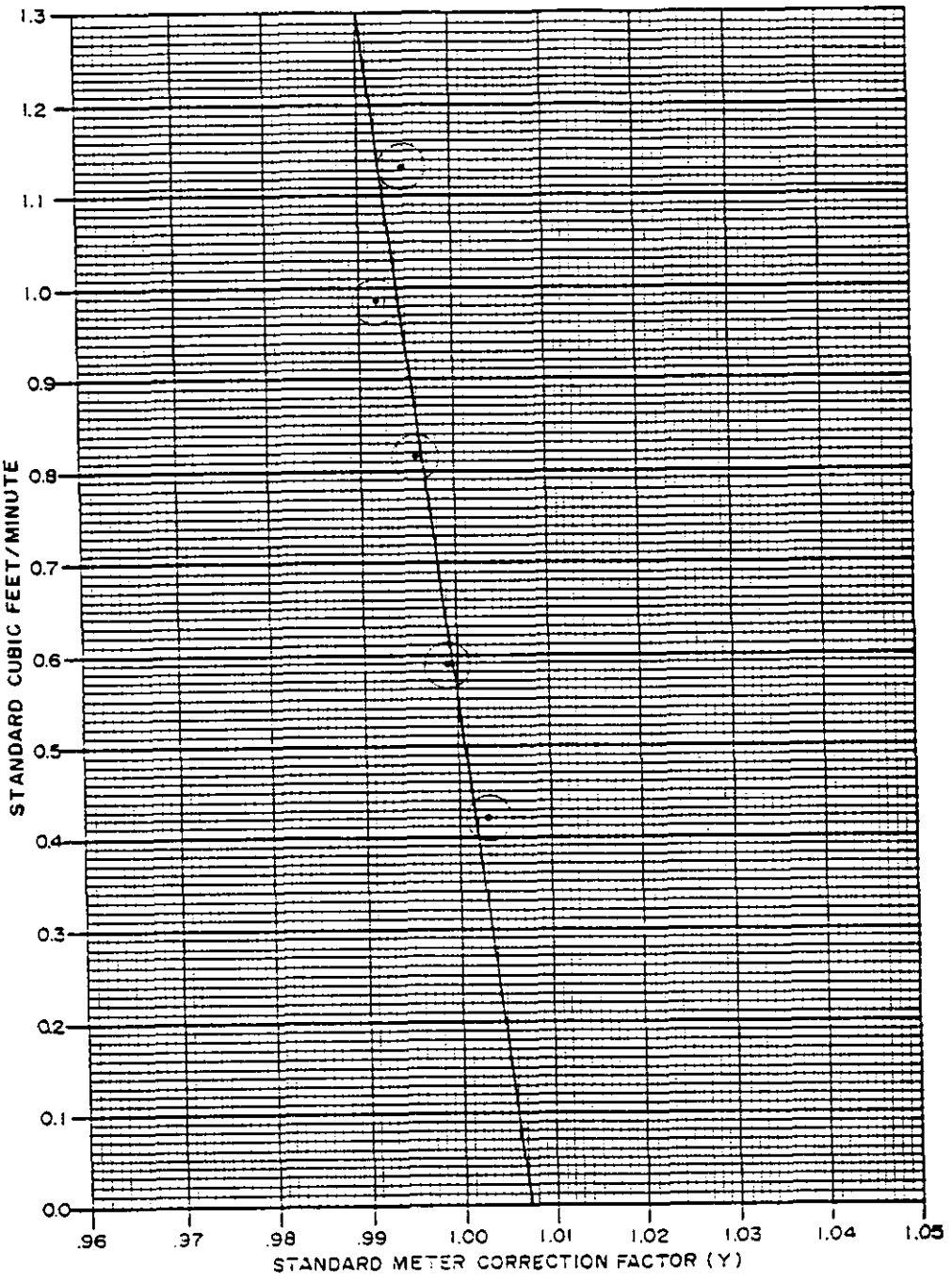
$$Y_a \times Y_s = Y$$

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 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
[illegible]	-.60	1.553	7.032	5.479	5.500	10.979	5.479	75	75	13
[illegible]	-.60	7.032	12.509	5.477	10.979	16.450	5.471	75	75	13
[illegible]	[illegible]	2.853	8.143	5.290	16.804	22.127	5.323	75	76	9
[illegible]	[illegible]	8.143	13.430	5.287	22.127	27.442	5.315	75	76	9
[illegible]	-.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. Gabel

	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	0.992	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	0.583	0.996	0.812	0.992	0.988	0.995	1.131

air consulting and engineering

AIR CONSULTING & ENGINEERING — ANNUAL METER CALIBRATION

DATE 10-3-91

LEAK CHECK 0.500 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

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				
-.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. Hebel

AIR CONSULTING & ENGINEERING, inc. POST TEST CALIBRATION

DATE 12-20-91 METER BOX NUMBER 6 LEAK CHECK 0.00 CFM at 12 in. Hg.

CLIENT U.S. SUGAR CORP./BRYANT SOURCE 1 & 3 Boilers THERMOCOUPLE NUMBER ____ PYROMETER NUMBER ____

FLIGHT SERVICE Pb 30.48 in. Hg. ACE BAROMETER Pb: ____ in. Hg.

ASTM GLASS THERMOMETER ____ °F / THERMOCOUPLE ____ °F ASTM GLASS THERMOMETER ____ °F / METER TEMP ____ °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				
.92	1.3	571.097	577.216	6.119	861.009	867.332	6.323	73 72	85 85	10	11
.92	1.3	577.216	583.294	6.078	867.332	873.612	6.280	72 72	85 86	10	11
.92	1.3	583.294	589.317	6.023	873.612	879.848	6.236	72 72	86 86	10	11

CALIBRATED BY: Gary McFalan

DELTA H	Ya	SCFM	Ys	Y
1.875	0.988	0.619	0.999	0.987
1.897	0.990	0.615	0.999	0.989
1.932	0.988	0.609	0.999	0.987
MEAN: 1.901	0.989		0.999	0.988

air consulting and engineering

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: Sid Carter

AIR CONSULTING & ENGINEERING, INC. — PITOT TUBE CALIBRATION

DATE CALIBRATED 10-7-91 PITOT TUBE 48

IS PITOT TUBE ASSEMBLY LEVEL YES ARE PITOT TUBE OPENINGS DAMAGED no

α_1 = 2 °(<10°), α_2 = 0 °(<10°), β_1 = 2.5 °(<5°), β_2 = 3 °(<5°)

γ = 0 ° θ = 1.5 ° A = 1.045 in. = (Pa + Pb)

z = A sin γ = 0.018 in.; <0.32/<1/8 in.

w = A sin θ = 0.027 in.; <0.08/<1/32 in.

P_a 0.522 in. P_b 0.522 in. D_t .375

WAS CALIBRATION REQUIRED no

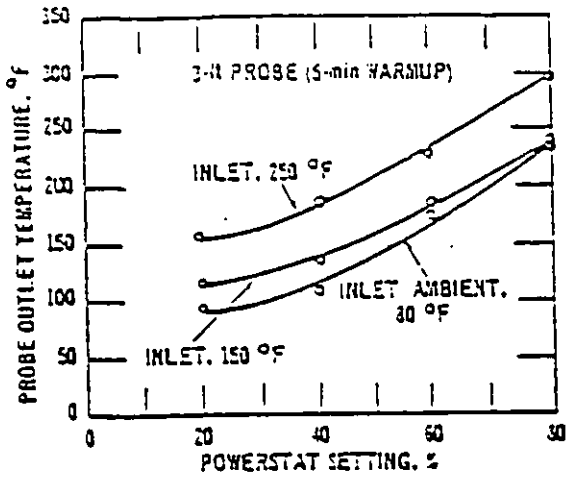
THERMOCOUPLE CALIBRATION

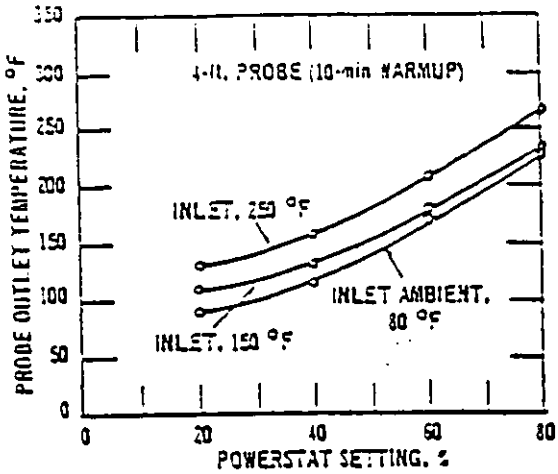
SOURCE (SPECIFY)	ASTM GLASS THERMOMETER WITH MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	41	42	1	0.19
AMBIENT	70	70	0	0
HOT OVEN	410	411	1	0.19

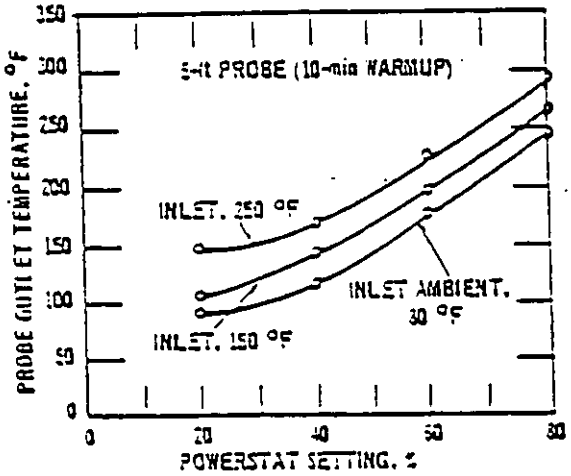
FDER - MAXIMUM 5° DIFFERENCE

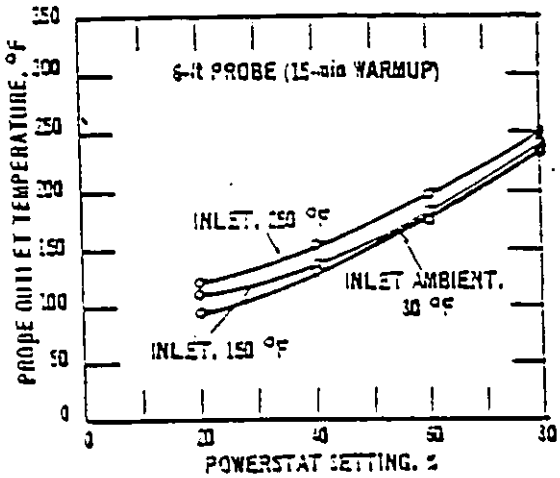
CALIBRATED BY: S. L. Carter

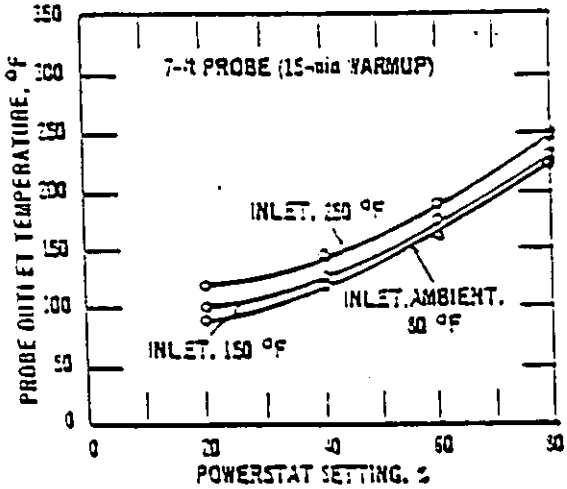
EPA $\left[\frac{(\text{REF. TEMP. °F} + 460°) - (\text{PYROMETER TEMP. °F} + 460°)}{\text{REF. TEMP. °F} + 460°}\right] 100 \leq 1.5\%$











NOTE: Flow rate held constant at 0.25; 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 12-19-91
SOURCE NAME Boiler # 1 SAMPLE RECOVERED BY G. Hawthorne
TYPE OF SAMPLE Pm PARTICULATE ANALYSES BY C. Lick

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	3643	–	md. Gray	
1				
2	3640	–	DK. Gray	
2				
3	3641	–	DK Gray	
3				
ACETONE / WATER BLANK (CIRCLE)				
FILTER BLANK				

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT. (g)	INIT. WT. (g)	NET WT. (g)	COLOR
1	2	213.0	200.0	13.0	OK
2	100	207.7	200.0	7.7	OK
3	19	209.7	200.0	9.7	OK
			200.0		
			200.0		
			200.0		
			200.0		
			200.0		

AIR CONSULTING AND ENGINEERING, Inc.

SAMPLE RECOVERY AND CHAIN OF CUSTODY

PLANT NAME U.S. Sugar Bryant TEST DATE 12-19-91

SOURCE NAME Boiler 1 SAMPLE RECOVERED BY

TYPE OF SAMPLE Particulate PARTICULATE ANALYSES BY Sneeringer

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	3643	NA	Black	
1	1	✓		
2	3640	NA		
2	8	✓		
3	3641	NA		
3	9	✓	✓	
ACETONE/WATER BLANK (CIRCLE)	20	✓	colorless	
FILTER BLANK	3149	NA	white	

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT. (g)	INIT. WT. (g)	NET WT. (g)	COLOR
			200.0		
			200.0		
			200.0		
			200.0		
			200.0		
			200.0		
			200.0		
			200.0		

ALPHAGAZ
DIVISION OF LIQUID AIR CORPORATION

01-Jul-91
Gator Oxygen

P.O.# G290
Gainesville, FL

CERTIFICATION OF CYLINDER # CC78919

COMPONENT:	MEAN CONCENTRATION:
Propane	3041 +/- 48 ppm
Air Ultra Zero	Balance

Cylinder pressure: 2000 psi
Expiration date: 30-Dec-92

This mixture was prepared and analyzed following EPA Revised Traceability Protocol No.1, Section 3.0.4, per Procedure G1. The concentration of the Propane was determined by direct comparison with NBS SRM, 2647a, Sample No.: 104-32-B, S/N FF-26889, 2446 +/- 24 ppm Propane in Nitrogen, dated Dec. 13, 1988. The analysis was performed on a Varian 3700 FID using a DB-1 Capillary, 30m x 0.25mm, 50cc/min. splitter flow on a 1ml loop. The last multipoint range calibration was done on June 20, 1991.

Sue Whitchel
Analyst

2445 South Street • P.O. Box 5548 • Long Beach, CA 90805 • Phone (213) 492-5300 • Fax (213) 492-5349

Scott Specialty Gases

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

SCOTT SPECIALTY GASES, INC. 12/05/89

CERTIFICATE OF ANALYSIS

AIR CONSULTING & ENGR
SUITE #4
2106 NW 67TH PLACE
GAINESVILLE FL 32606-0000
ATTN: STEVE NECK

PROJECT #: 01-15192
PO #: F0122

CYLINDER #: ALM007SSB ANALYTICAL ACCURACY: +-1%

COMPONENT	REQUESTED CONCENTRATION		ANALYSIS 1 (MOLES)	U/M
PROPANE	5000.0	PPM	5060.0	PPM
AIR	BALANCE	GAS		N/A

NOTES: GRAVIMETRIC MASTER GAS
NBS TRACEABLE

DATE OF ANALYSIS: 12/01/89

ANALYST: TOM SASSAMAN APPROVED BY: MARK S. SIRINIDES

THE ONLY LIABILITY OF THIS COMPANY FOR GAS WHICH FAILS TO COMPLY WITH THIS ANALYSIS SHALL BE THE REPLACEMENT THEREOF BY THE COMPANY WITHOUT EXTRA COST

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

SCOTT SPECIALTY GASES, INC. 12/05/89

CERTIFICATE OF ANALYSIS

AIR CONSULTING & ENGR
SUITE #4
2106 NW 67TH PLACE
GAINESVILLE FL 32606-0000
ATTN: STEVE NECK

PROJECT #: 01-15192
PO #: F0122

CYLINDER #: 1L3709 ANALYTICAL ACCURACY: +-1%

COMPONENT	REQUESTED CONCENTRATION		ANALYSIS 1 (MOLES)	U/M
PROPANE	8500.0	PPM	8470.0	PPM
AIR	BALANCE GAS			N/A

NOTES: GRAVIMETRIC MASTER GAS
NBS TRACEABLE

DATE OF ANALYSIS: 12/01/89

ANALYST: TOM SASSAMAN APPROVED BY: MARK S. SIRINIDES

THE ONLY LIABILITY OF THIS COMPANY FOR GAS WHICH FAILS TO COMPLY WITH THIS ANALYSIS SHALL BE THE REPLACEMENT THEREOF BY THE COMPANY WITHOUT EXTRA COST

Air Consulting and Engineering

CONTINUOUS MONITOR ACCURACY CERTIFICATION

PLANT US Sugar Corporation
LOCATION Bryant Florida
SOURCE ID Boiler 1
DATE 12/19/91

~~NO_x~~ C_3H_8 CALIBRATION GAS	MONITOR VALUE ppm	DIFFERENCE ppm	%SPAN
8583	8485.6	97.4	0.97
5017	5145.7	128.7	1.29
3041	3119.9	78.9	0.79

O_2 CALIBRATION GAS	MONITOR VALUE %	DIFFERENCE %	% SPAN
20.9	20.9	0	0

CO CALIBRATION GAS	MONITOR VALUE	DIFFERENCE	% SPAN

APPENDIX G

PROJECT PARTICIPANTS

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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

Ken Tucker
Test Observer

PALM BEACH COUNTY

Jeffrey K. Koerner
Test Observer

David Brown
Test Observer