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: 37

Title: Source Test Report for Particulate and Volatile Organic Compound Emissions, Nominal 10% Soil Feed Impingement Wet Scrubber Boiler Number 3

December 1991

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TABLE OF CONTENTS

SECTION		PAGE
1.0	INTRODUCTION	1
2.0	SUMMARY AND DISCUSSION OF RESULTS	2
3.0	PROCESS DESCRIPTION AND OPERATION	4
4.0	SAMPLING POINT LOCATION	5
5.0	FIELD AND ANALYTICAL PROCEDURES	7
5.1	DETERMINATION OF OXYGEN IN EMISSIONS FROM STATIONARY SOURCES --EPA METHOD 3A	7
5.2	PARTICULATE MATTER SAMPLING AND ANALYSIS--EPA METHOD 5	7
5.3	DETERMIINATION OF TOTAL GASEOUS ORGANIC CONCENTRATION USING A FLAME IONIZATION ANALYZER--EPA METHOD 25A	11

APPENDICES

APPENDIX A--COMPLETE EMISSION DATA

APPENDIX B--FIELD DATA SHEETS

APPENDIX C--LABORATORY ANALYSIS

APPENDIX D--VOC STRIP CHART COPIES

APPENDIX E--PRODUCTION RATE CERTIFICATION

APPENDIX F--QUALITY ASSURANCE AND CHAIN OF CUSTODY

APPENDIX G--PROJECT PARTICIPANTS

LIST OF TABLES

TABLE		PAGE
1	*EMISSION SUMMARY*	3

LIST OF FIGURES

FIGURE		
1	*SAMPLING POINT LOCATION*	6
2	*EPA METHOD 5 SAMPLING TRAIN*	8
3	*EPA METHOD 25A RS55 FIA*	12

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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

1/23/1992

Date

1.0 INTRODUCTION

On December 17, 1991, Air Consulting and Engineering, Inc. (ACE), conducted particulate and Volatile Organic Compound (VOC) emission testing on the Wet Scrubber Outlet of Boiler 3 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 3 demonstrated compliance with the permit conditions.

Table 1 is a summary of the emission results.

Particulate emissions averaged 48.90 pounds per hour (lbs/Hr) and 0.160 pounds per million BTU (lbs/MMBTU) which is within the allowable emissions of 91.56 lbs/Hr and 0.30 lbs/MMBTU.

No oil was used during compliance testing.

Bagasse feed rate and soil feed rate averaged 43.60 and 3.68 tons per hour (TPH), respectively.

VOC as carbon averaged 350.27 lbs/Hr and 1.145 lbs/MMBTU at 8.4 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 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 3
U.S. Sugar Corporation - Bryant Mill
8.4% Soil Feed
Bryant, Florida
December 17, 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	0957-1105	637.5	0.965	285.83	34.90	0.118
2	1224-1332	819.0	1.199	369.28	65.76	0.214
3	1446-1553	867.0	1.271	395.70	46.05	0.148
AVERAGE	---	774.5	1.145	350.27	48.90	0.160

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

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

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

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

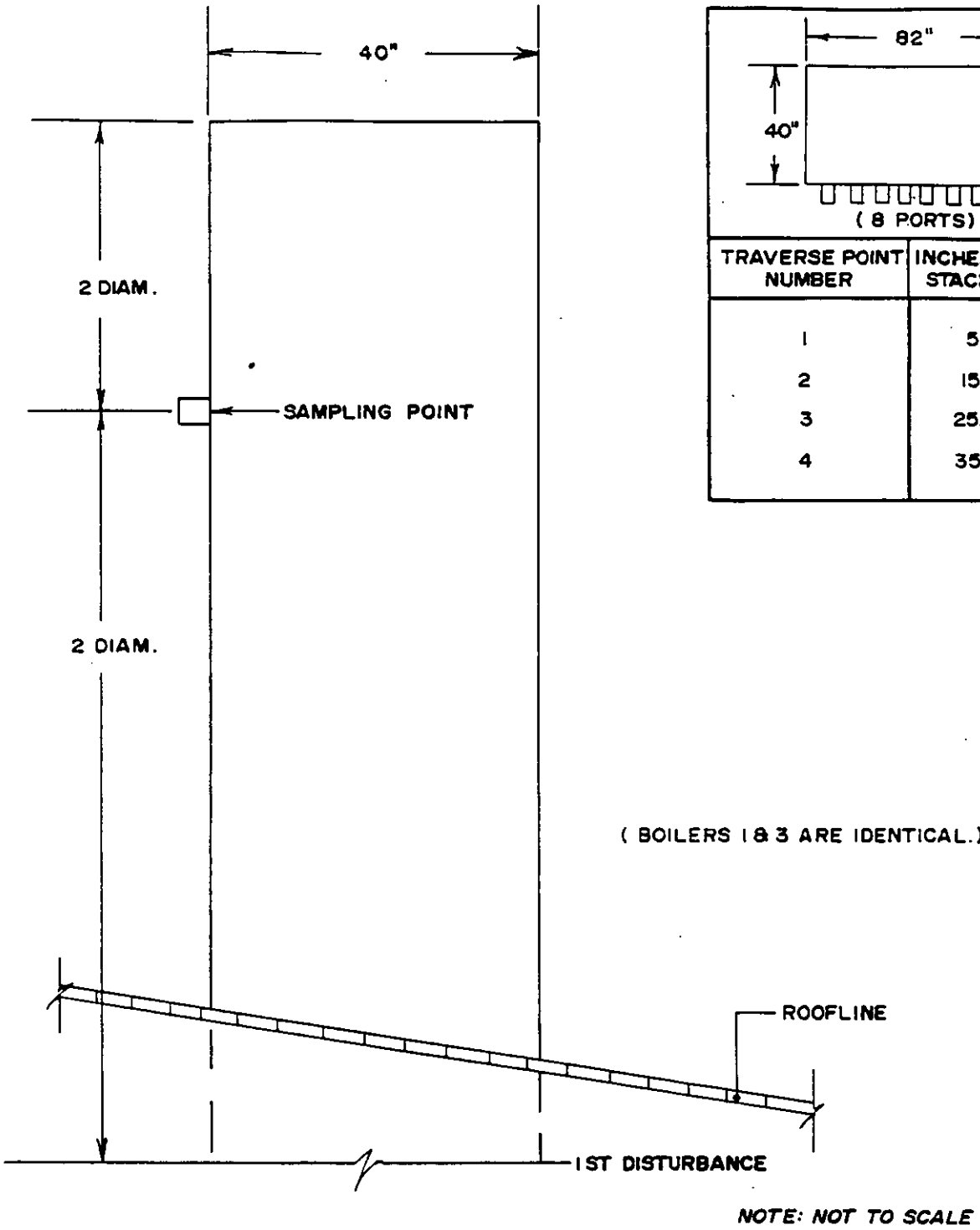
3.0 PROCESS DESCRIPTION AND OPERATION

The Number 3 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 153,751 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.

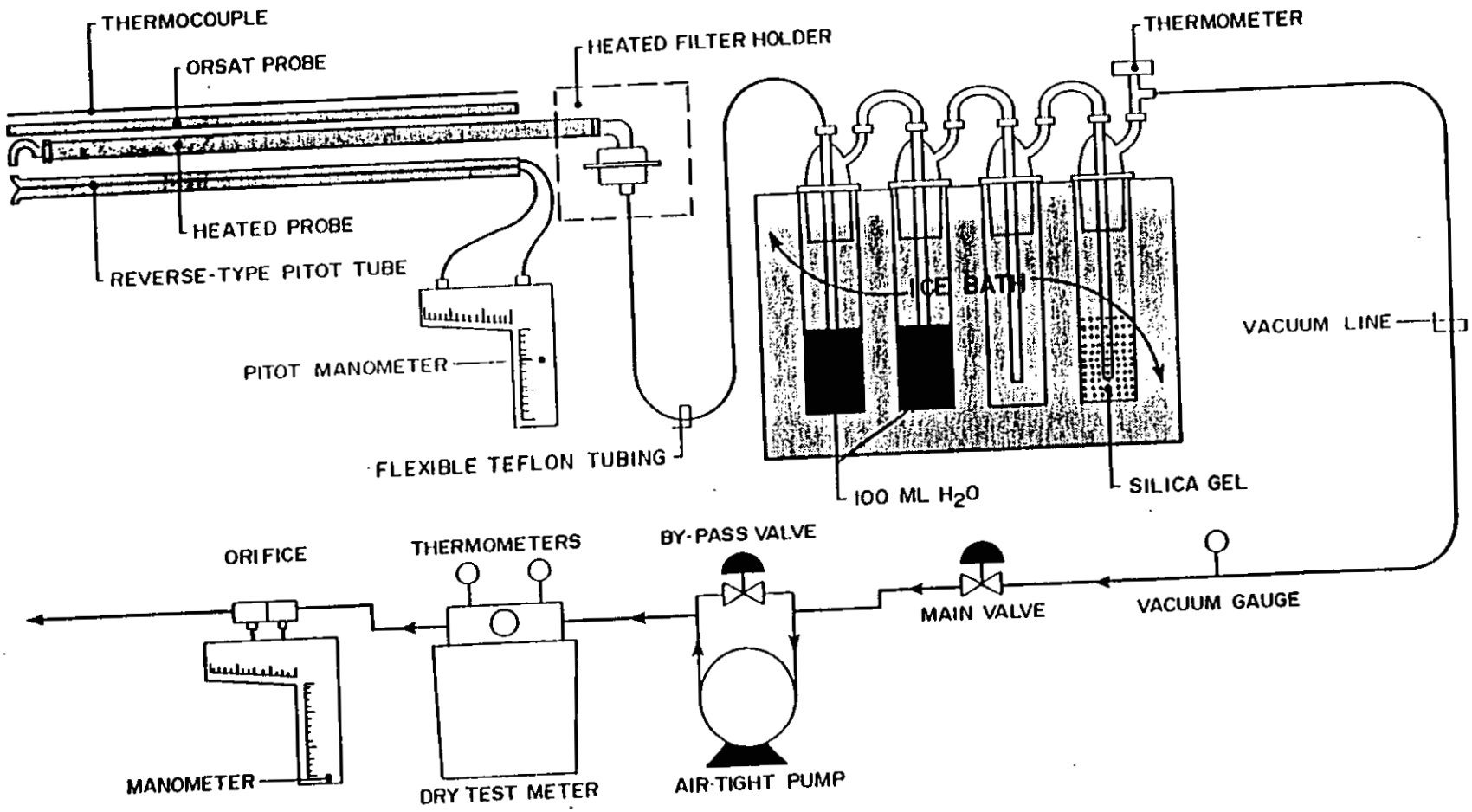

FIGURE 2
EPA METHOD 5 SAMPLING TRAIN

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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).

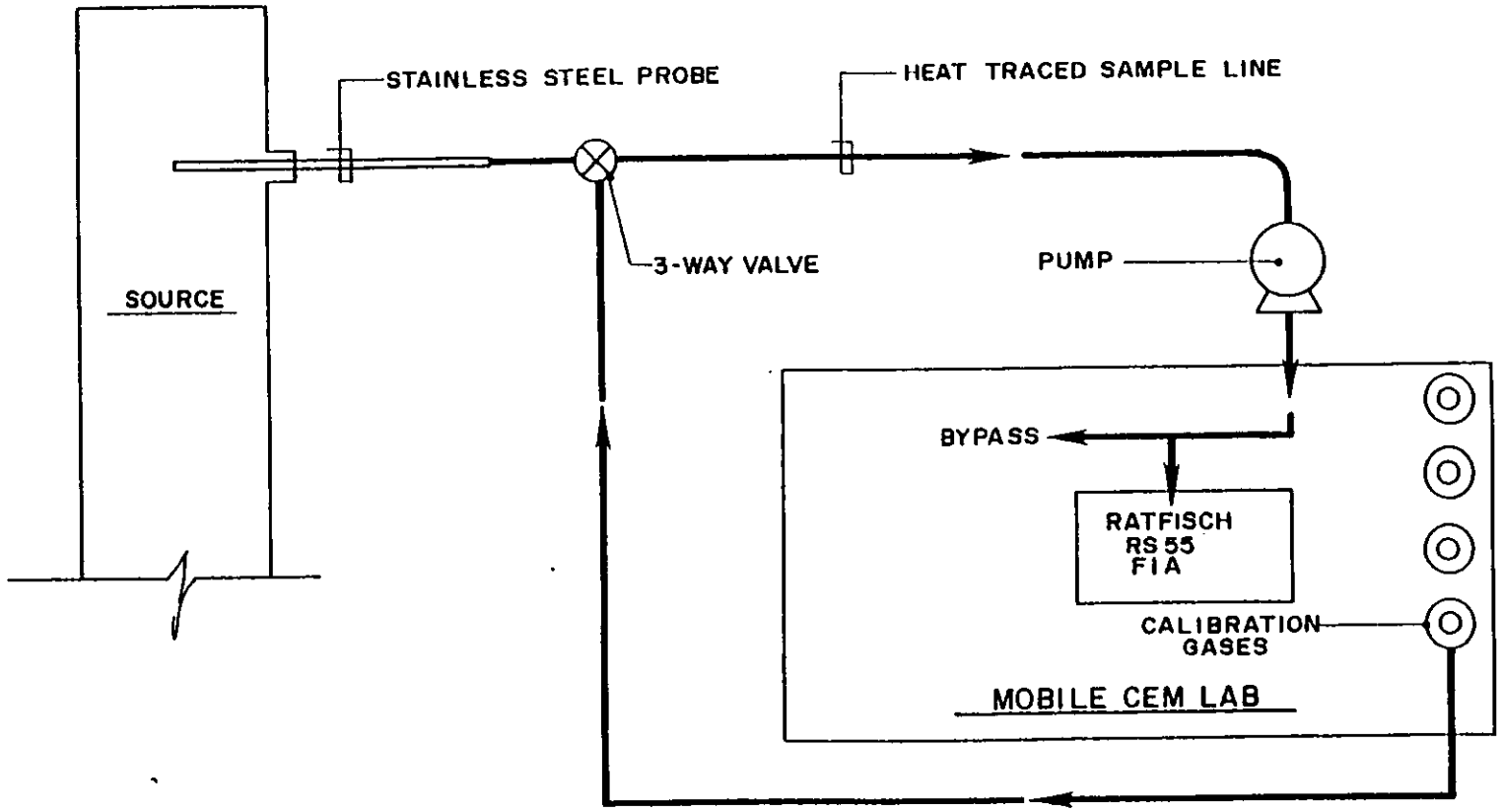

FIGURE 3
EPA-25A
RATFISCH RS55 FIA

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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 3 BOILER
DATE: 12-17-91

RUN NO.:	1	IMPINGER ml	301
BEGIN TIME:	957	SILICA GEL gms.	8.5
END TIME:	1105	PERCENT O2	10.0
TOTAL RUN TIME:	64.00 min.	PERCENT CO2	10.0
BAROMETRIC PRESSURE:	30.31 "Hg	"F" FACTOR	
STACK PRESSURE:	30.31 "Hg.		
NOZZLE DIAMETER:	.175 inches	PARTICULATE	
METER CORR. FACTOR:	1.009	---	
FINAL METER:	521.910 cubic ft.	FILTER mg.	100.1
INITIAL METER:	485.465 cubic ft.	WASH mg.	23.0
STACK AREA:	22.780 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	3.700	1.924	1.960	149	60
1-2	4.000	2.000	2.120	152	60
1-3	2.500	1.581	1.330	152	60
1-4	1.200	1.095	.640	154	61
2-1	4.000	2.000	2.120	156	61
2-2	4.000	2.000	2.120	155	61
2-3	3.300	1.817	1.750	155	63
2-4	1.500	1.225	.800	155	63
3-1	2.800	1.673	1.480	156	64
3-2	3.300	1.817	1.750	156	64
3-3	2.500	1.581	1.330	156	65
3-4	1.500	1.225	.800	156	66
4-1	2.500	1.581	1.330	157	67
4-2	3.400	1.844	1.800	155	67
4-3	3.000	1.732	1.590	155	69
4-4	1.500	1.225	.800	155	69
5-1	2.700	1.643	1.430	154	69
5-2	2.700	1.643	1.430	155	70
5-3	3.000	1.732	1.590	156	71
5-4	2.000	1.414	1.060	156	71
6-1	2.500	1.581	1.330	156	73
6-2	2.500	1.581	1.330	157	73
6-3	2.300	1.517	1.220	155	73
6-4	1.500	1.225	.800	156	74
7-1	1.800	1.342	.950	156	75
7-2	2.000	1.414	1.060	155	76
7-3	1.500	1.225	.80	155	76
7-4	1.10	1.049	.58	154	77
8-1	1.30	1.140	.69	154	78
8-2	1.10	1.049	.58	155	78
8-3	1.10	1.049	.58	153	78
8-4	.80	0.894	.42	153	78
AVERAGES	2.331	1.494	1.24	155	69

EMISSION RESULTS
RUN 1

NOZZLE AREA (FT2) :0.0001670				
AVG. VELOCITY HEAD :--------	2.23	"H20	VOL. FLOW ACFM :	128057
AVG. STACK TEMP.: ---------	155	F	VOL. FLOW SCFMD :	79916
AVG. METER TEMP.: ---------	69	F		
AVG. ORIFICE DIFFERENTIAL:---	1.24	"H20	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:---	37.289		---	
% H20 VAPOR: :--------	28.3		POUNDS PER HOUR:	34.897
GAS MOL. WT. DRY: ---------	30.00		POUNDS PER SCF :	0.0000073
GAS MOL. WT. WET: ---------	26.61		GRAINS/SCF:	0.051
% EXCESS AIR: ---------	89.93		GRAINS/SCF @ 8% 02	0.060
AVG. STACK VEL.(FPS)---------	93.69		GRAINS/SCF @50% EA	0.065
MMBTU INPUT: ---------	296.33		POUNDS PER MMBTU:	0.118
PERCENT ISOKINETIC :---------	99.43		LBS/MMBTU "F"FAC.:	

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: U. S. SUGAR CORPORATION-BRYANT
SOURCE: NUMBER 3 BOILER
DATE: 12-17-91

RUN NO.:	2	IMPINGER ml	315
BEGIN TIME:	1224	SILICA GEL gms.	8.1
END TIME:	1332	PERCENT O2	10.2
TOTAL RUN TIME:	64.00 min.	PERCENT CO2	9.7
BAROMETRIC PRESSURE:	30.31 "Hg	"F" FACTOR	
STACK PRESSURE:	30.31 "Hg.		
NOZZLE DIAMETER:	.175 inches	PARTICULATE	
METER CORR. FACTOR:	1.009	---	
FINAL METER:	560.017 cubic ft.	FILTER mg.	185.5
INITIAL METER:	522.541 cubic ft.	WASH mg.	43.9
STACK AREA:	22.780 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	4.300	2.074	2.280	153	80
1-2	4.300	2.074	2.280	154	80
1-3	4.000	2.000	2.120	155	80
1-4	2.000	1.414	1.590	155	81
2-1	3.500	1.871	1.860	157	81
2-2	4.000	2.000	2.120	157	82
2-3	3.300	1.817	1.750	158	82
2-4	1.700	1.304	.900	158	82
3-1	3.500	1.871	1.860	157	84
3-2	3.700	1.924	1.960	156	84
3-3	2.500	1.581	1.330	154	84
3-4	1.500	1.225	.800	155	84
4-1	2.200	1.483	1.660	154	85
4-2	3.000	1.732	1.590	155	85
4-3	3.000	1.732	1.590	155	86
4-4	1.500	1.225	.800	156	86
5-1	2.300	1.517	1.220	156	88
5-2	2.700	1.643	1.430	156	88
5-3	3.000	1.732	1.590	156	88
5-4	2.000	1.414	1.060	156	89
6-1	2.200	1.483	1.270	157	90
6-2	2.500	1.581	1.330	157	90
6-3	2.500	1.581	1.330	157	91
6-4	1.700	1.304	.900	157	91
7-1	1.500	1.225	.800	157	91
7-2	1.500	1.225	.800	156	93
7-3	2.000	1.414	1.06	157	93
7-4	1.10	1.049	.58	155	93
8-1	1.10	1.049	.58	155	94
8-2	1.20	1.095	.64	155	94
8-3	1.30	1.140	.58	155	94
8-4	.80	0.894	.42	153	95
AVERAGES	2.419	1.521	1.31	156	87

EMISSION RESULTS
RUN 2

NOZZLE AREA (FT2) :0.0001670				
AVG. VELOCITY HEAD :--------	2.31	"H2O	VOL. FLOW ACFM :	130792
AVG. STACK TEMP.: ---------	156	F	VOL. FLOW SCFMD :	80368
AVG. METER TEMP.: ---------	87	F		
AVG. ORIFICE DIFFERENTIAL:---	1.31	"H2O	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:---	37.085		---	
% H2O VAPOR: :--------	29.3		POUNDS PER HOUR:	65.759
GAS MOL. WT. DRY: ---------	29.97		POUNDS PER SCF :	0.0000136
GAS MOL. WT. WET: ---------	26.47		GRAINS/SCF:	0.095
% EXCESS AIR: ---------	94.30		GRAINS/SCF @ 8% O2	0.116
AVG. STACK VEL.(FPS)---------	95.69		GRAINS/SCF @50% EA	0.124
MMBTU INPUT: ---------	307.96		POUNDS PER MMBTU:	0.214
PERCENT ISOKINETIC :---------	98.33		LBS/MMBTU "F"FAC.:	

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: U. S. SUGAR CORPORATION-BRYANT
SOURCE: NUMBER 3 BOILER
DATE: 12-17-91

RUN NO.:	3	IMPINGER ml	304
BEGIN TIME:	1446	SILICA GEL gms.	8.5
END TIME:	1553	PERCENT O2	9.7
TOTAL RUN TIME:	64.00 min.	PERCENT CO2	10.2
BAROMETRIC PRESSURE:	30.31 "Hg	"F" FACTOR	
STACK PRESSURE:	30.31 "Hg.		
NOZZLE DIAMETER:	.175 inches	PARTICULATE	
METER CORR. FACTOR:	1.009	---	
FINAL METER:	598.613 cubic ft.	FILTER mg.	138.5
INITIAL METER:	560.410 cubic ft.	WASH mg.	21.0
STACK AREA:	22.780 sq. ft.		

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	3.700	1.924	1.960	155	91
1-2	3.700	1.924	1.960	154	92
1-3	3.000	1.732	1.590	155	92
1-4	2.400	1.549	1.270	155	92
2-1	4.000	2.000	2.120	155	92
2-2	4.000	2.000	2.120	155	92
2-3	3.500	1.871	1.860	155	92
2-4	1.500	1.225	.800	155	92
3-1	4.000	2.000	2.120	154	93
3-2	3.500	1.871	1.860	154	93
3-3	3.000	1.732	1.590	154	93
3-4	1.500	1.225	.800	155	93
4-1	2.500	1.581	1.330	155	94
4-2	3.000	1.732	1.590	155	94
4-3	3.000	1.732	1.590	154	94
4-4	2.000	1.414	1.060	155	94
5-1	2.000	1.414	1.060	155	95
5-2	2.700	1.643	1.430	155	95
5-3	3.000	1.732	1.590	155	95
5-4	2.000	1.414	1.060	155	95
6-1	2.000	1.414	1.060	156	96
6-2	2.500	1.581	1.330	155	97
6-3	2.500	1.581	1.330	158	97
6-4	1.700	1.304	.900	158	98
7-1	1.700	1.304	.900	159	98
7-2	1.700	1.304	.900	160	98
7-3	2.000	1.414	1.06	158	98
7-4	1.00	1.000	.53	158	98
8-1	1.00	1.000	.53	158	99
8-2	1.20	1.095	.64	158	99
8-3	1.20	1.095	.64	158	99
8-4	1.10	1.049	.58	158	99
AVERAGES	2.425	1.527	1.29	156	95

EMISSION RESULTS
RUN 3

NOZZLE AREA (FT2) :0.0001670				
AVG. VELOCITY HEAD :--------	2.33	"H20	VOL. FLOW ACFM :	130967
AVG. STACK TEMP.: ---------	156	F	VOL. FLOW SCFMD :	81350
AVG. METER TEMP.: ---------	95	F		
AVG. ORIFICE DIFFERENTIAL:---	1.29	"H20	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:---	37.268		---	
% H2O VAPOR: :--------	28.5		POUNDS PER HOUR:	46.054
GAS MOL. WT. DRY: ---------	30.03		POUNDS PER SCF :	0.0000094
GAS MOL. WT. WET: ---------	26.60		GRAINS/SCF:	0.066
% EXCESS AIR: ---------	85.75		GRAINS/SCF @ 8% O2	0.076
AVG. STACK VEL.(FPS)---------	95.82		GRAINS/SCF @50% EA	0.082
MMBTU INPUT: ---------	311.34		POUNDS PER MMBTU:	0.148
PERCENT ISOKINETIC :---------	97.62		LBS/MMBTU "F"FAC.:	

Avg O_2 = 10.0

Temp = 156

Flow = 80,545

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 USB3C1AS
PAGE 1 OF 2

PLANT United State Sugar Corp./Bryant
SOURCE Boiler #3
PLANT LOCATION Bryant, Florida
TYPE OF SAMPLING TRAIN EPA 5
TYPE OF SAMPLES P.M
DATE 12-17-91 RUN NO. 1
TIME START 0957 TIME END 1105
SAMPLE TIME 2 / 32 (min/pt)= 64 Total min
ASSUMED MOISTURE 30 % FDA .70
NOMOGRAPH C_p .53 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 88" x 40"
STACK AREA 22.78 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 521.910 ft.³
INITIAL 485.465 ft.³
NET 36.445 ft.³
FILTER NO. 3647 IMP. VOL. GAIN 301 ml.
SIL GEL NO. 120 WT. GAIN 8.5 ml.
TOTAL CONDENSATE 309.5 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					10.0
% O_2					10.0
% CO					
% N_2					

F_O = ____ F_O RANGE = ____
ORSAT ANALYZER ____

LEAK CHECKS
PRE 0.00 cfm 15 "Hg POST 0.012 cfm 12 "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 Gauthreaux 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)
1-1		0959	487.25	3.70	1.96	1.96	149	270	49	60	5.0
2		1001	488.61	4.00	2.12	2.12	152	270	49	60	5.0
3		1003	489.81	2.50	1.33	1.33	152	267	49	60	4.0
4		1005	490.36	1.20	.64	.64	154	265	49	61	2.0
2-1		1007	492.00	4.00	2.12	2.12	156	263	49	61	5.0
2		1009	493.47	4.00	2.12	2.12	155	262	49	61	5.0

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID US B3C1HS

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		1011	494.82	3.30	1.75	1.75	155	248	53	63	5.0
4		1013	495.85	1.50	.80	.80	155	257	53	63	5.0
3-1		1016	497.00	2.80	1.48	1.48	156	259	54	64	5.0
2		1018	498.41	3.30	1.75	1.75	156	258	54	64	6.0
3		1020	499.44	2.50	1.33	1.33	156	258	54	65	6.0
4		1022	500.42	1.50	.80	.80	156	265	57	66	4.0
4-1		1025	501.63	3.50	1.33	1.33	157	259	58	67	6.0
2		1027	503.02	3.40	1.80	1.80	155	258	58	67	8.0
3		1029	504.51	3.00	1.59	1.59	155	257	59	69	8.0
4		1031	505.32	1.50	.80	.80	155	255	59	69	5.0
5-1		1034	506.52	2.70	1.43	1.43	154	264	59	69	7.0
2		1036	507.75	2.70	1.43	1.43	155	258	59	70	8.0
3		1038	509.13	3.00	1.59	1.59	156	257	59	71	8.0
4		1040	510.30	2.00	1.06	1.06	156	254	59	71	6.0
6-1		1042	511.52	2.50	1.33	1.33	156	256	60	73	8.0
2		1044	512.61	2.50	1.33	1.33	157	256	60	73	8.0
3		1046	513.82	2.30	1.22	1.22	155	256	60	73	8.0
4		1048	514.80	1.50	.80	.80	156	258	60	74	6.0
7-1		1051	515.83	1.80	.95	.95	156	244	61	75	6.0
2		1053	516.89	2.00	1.06	1.06	155	243	61	76	7.0
3		1055	517.72	1.50	.80	.80	155	243	61	76	6.0
4		1057	518.81	1.10	.58	.58	154	243	61	77	6.0
8-1		1059	519.65	1.30	.69	.69	154	249	62	78	6.0
2		1061	520.43	1.10	.58	.58	155	248	62	78	5.0
3		1103	521.21	1.10	.58	.58	153	248	62	78	5.0
4		1105	521.91	.80	.42	.42	153	248	62	78	5.0

TEST ID 1/SB3C2AS

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 #3
PLANT LOCATION Bryant, Florida
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES P.M
DATE 12-17-91 RUN NO. 2
TIME START 1224 TIME END 1332
SAMPLE TIME 2 / 32 (min/pt)= 64 Total min
ASSUMED MOISTURE 30 % FDA .70
NOMOGRAPH C_f .53 PITOT CORR. .84
P_b 30.31 "Hg P_s 30.31 "Hg
WEATHER Clear TEMP. 72 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .175 .175 .175 = .175
STACK DIMENSIONS 82" x 40"
STACK AREA 22.78 ft^2 EFFECTIVE _____ ft^2
STACK HEIGHT _____ ft.
STACK DIAMETER: UPSTRM. _____ DNSTRM. _____
PORT SIZE _____ in. NIPPLE LENGTH _____ in.
U CORD LENGTH _____
REMARKS: _____

MAT'L PROCESSING RATE _____
GAS METER READINGS: FINAL 560.017 ft^3
INITIAL 522.541 ft^3
NET 37.476 ft^3
FILTER NO. 3648 IMP. VOL. GAIN 315 ml.
SIL GEL NO. 101 WT. GAIN 8.1 ml.
TOTAL CONDENSATE 323.1 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					9.75
% O_2					10.25
% CO					
% N_2					

F_O = _____ F_O RANGE = _____
ORSAT ANALYZER _____

LEAK CHECKS

PRE 0.01 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. _____
BOX OPERATOR _____ PROBE HOLDER _____

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)
1-1		1226	523.41	4.30	2.28	2.28	153	259	64	80	6.0
2		1228	524.50	4.30	2.28	2.28	154	259	57	80	6.0
3		1230	526.00	4.00	2.12	2.12	155	259	57	80	6.0
4		1232	529.00	2.00	1.59	1.59	155	259	57	81	6.0
2-1		1235	529.44	3.50	1.86	1.86	157	269	59	81	6.0
2		1237	530.62	4.00	2.12	2.12	157	268	60	82	6.0

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID USB3C2AS

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		1239	532.01	3.30	1.75	1.75	158	269	60	82	6.0
4		1241	533.11	1.70	.90	.90	158	262	60	82	4.0
3-1		1243	534.41	3.50	1.86	1.86	157	256	60	84	7.0
2		1245	535.81	3.70	1.96	1.96	156	256	60	84	8.0
3		1247	536.92	2.50	1.33	1.33	154	255	60	84	7.0
4		1249	538.08	1.50	.80	.80	155	253	60	84	6.0
4-1		1252	539.10	2.20	1.66	1.66	154	258	55	85	8.0
2		1254	540.52	3.00	1.59	1.59	155	257	54	85	9.0
3		1256	541.81	3.00	1.59	1.59	155	256	54	86	9.0
4		1258	542.92	1.50	.80	.80	156	256	54	86	6.0
5-1		1301	544.01	2.30	1.22	1.22	156	254	54	88	9.0
2		1303	545.12	2.70	1.43	1.43	156	255	53	88	9.0
3		1305	546.51	3.00	1.59	1.59	156	255	53	88	10.0
4		1307	547.77	2.00	1.06	1.06	156	254	53	89	9.0
6-1		1309	548.92	2.20	1.17 ~~1.66~~	1.17 ~~1.66~~	157	258	54	90	10.0
2		1311	550.22	2.50	1.33	1.33	157	258	54	90	11.0
3		1313	551.55	2.50	1.33	1.33	157	257	54	91	11.0
4		1315	552.78	1.70	.90	.90	157	257	54	91	9.0
7-1		1317	553.61	1.50	.80	.80	157	258	54	91	8.0
2		1319	554.50	1.50	.80	.80	156	261	55	93	8.0
3		1321	555.62	2.00	1.06	1.06	157	260	55	93	9.0
4		1323	556.61	1.10	.58	.58	155	258	55	93	7.0
8-1		1325	557.70	1.10	.58	.58	155	275	56	94	6.0
2		1327	558.32	1.20	.64	.64	155	262	56	94	8.0
3		1329	559.17	1.30	.69	.69	155	253	56	94	8.0
4		1331	560.01	1.10	.58	.58	155	247	54	95	7.0

STACK SAMPLING FIELD DATA SHEET

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

TEST ID USB3C3AS
PAGE 1 OF 2

PLANT United States Sugar Corp. / Bryant
SOURCE Boiler #3
PLANT LOCATION Bryant, Florida
TYPE OF SAMPLING TRAIN EPA 5
TYPE OF SAMPLES P.M.
DATE 12-17-91 RUN NO. 3
TIME START 1446 TIME END 1553
SAMPLE TIME 2 / 32 (min/pt) = 64 Total min
ASSUMED MOISTURE 30 % FDA .70
NOMOGRAPH C_f .53 PITOT CORR. .84
P_b 30.13 "Hg P_s 30.13 "Hg
WEATHER Clear 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 125'
REMARKS:

MAT'L PROCESSING RATE ____
GAS METER READINGS: FINAL 598.613 ft.³
INITIAL 560.410 ft.³
NET 38.203 ft.³
FILTER NO. 3649 IMP. VOL. GAIN 304 ml.
SIL GEL NO. 96 WT. GAIN 8.5 ml.
TOTAL CONDENSATE 312.5 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					10.2
% O_2					9.7
% CO					
% N_2					

F_O = ____ F_O RANGE = ____
ORSAT ANALYZER ____

LEAK CHECKS
PRE 0.015 cfm 15 "Hg POST 0.015 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. ATK3
BOX OPERATOR Southroaux 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)
1-1		1448	561.83	3.70	1.96	1.96	155	250	55	91	4.0
2		1450	563.01	3.70	1.96	1.96	154	250	55	92	4.0
3		1452	564.41	3.00	1.59	1.59	155	252	55	92	4.0
4		1454	565.92	2.40	1.27	1.27	155	255	55	92	4.0
2-1		1456	567.21	4.00	2.12	2.12	155	255	55	92	6.0
2		1458	569.00	4.00	2.12	2.12	155	255	55	92	6.0

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID USR3C3AS

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		1500	570.44	3.50	1.86	1.86	155	253	55	92	4.0
4		1502	571.32	1.50	.80	.80	155	253	55	92	4.0
3-1		1505	572.61	4.00	2.12	2.12	154	254	56	93	8.0
2		1507	574.21	3.50	1.86	1.86	154	254	56	93	8.0
3		1509	575.41	3.00	1.59	1.59	154	257	54	93	8.0
4		1511	576.53	1.50	.80	.80	155	258	54	93	4.0
4-1		1513	577.62	2.50	1.33	1.33	155	259	55	94	6.0
2		1515	579.10	3.00	1.59	1.59	155	260	55	94	8.0
3		1517	580.32	3.00	1.59	1.59	154	261	55	94	9.0
4		1519	581.57	2.00	1.06	1.06	155	262	55	94	7.0
5-1		1522	582.70	2.00	1.06	1.06	155	262	55	95	7.0
2		1524	583.82	2.70	1.43	1.43	155	267	52	95	9.0
3		1526	585.31	3.00	1.59	1.59	155	267	52	95	9.0
4		1528	586.44	2.00	1.06	1.06	155	262	53	95	8.0
6-1		1530	587.53	2.00	1.06	1.06	156	262	53	96	8.0
2		1532	588.75	2.50	1.33	1.33	155	260	53	97	9.0
3		1533	590.00	2.50	1.33	1.33	158	260	53	97	9.0
4		1535	591.01	1.70	.90	.90	158	259	53	98	8.0
7-1		1538	592.12	1.70	.90	.90	159	250	53	98	8.0
2		1540	593.14	1.70	.90	.90	160	250	53	98	8.0
3		1542	594.31	2.00	1.06	1.06	158	250	53	98	10.0
4		1544	595.20	1.00	.53	.53	158	249	53	98	6.0
8-1		1547	595.83	1.00	.53	.53	158	230	54	99	6.0
2		1549	597.00	1.20	.64	.64	158	230	54	99	7.0
3		1551	597.65	1.20	.64	.64	158	230	54	99	7.0
4		1553	598.57	1.10	.58	.58	158	235	54	99	7.0

EMISSION SUMMARY

FACILITY: US Sugar Corp
SOURCE: Boiler 3 — VOC
DATE: 12/17/91

TIME	~~MAXIMUM~~ Units	~~MINIMUM~~	AVERAGE
Run 1 · 0958	6.0	14.9	
— 1058	4.5	16.0	
	2.1	10.2	
	4.5	12.5	
	1.8	5.8	
	11.5	8.3	
	9.0	5.5	
	8.0	3.2	
	6.5	0	
	5.0	7.5	
	6.9	8.5	
	4.8	10.0	
	4.0	5.8	
	12.6	6.0	
	8.9	13.0	
	5.0	14.9	
	9.8	7.2	
	3.0	10.0	
	5.5	6.8	
	4.7	16.5	Average 8.50
	7.5	12.0	10,000 scfh 250 PPM
	20.4	15.0	

12.5 10.5
12.5 7.8
7.0 8.4
12.5

EMISSION SUMMARY

FACILITY: U.S. Sugar Corp.
SOURCE: Boiler 3 – VOC
DATE: 12/17/91

TIME	MAXIMUM	MINIMUM	AVERAGE
Run 2: 1224	7.0	14.2	
1324	3.5	11.0	
	1.5	12.5	
	0.5	14.0	
	2.5	18.2	
	1.5	8.5	
	6.8	9.1	
	5.0	12.5	
	3.2	8.5	
	9.5	8.7	
	2.5	12.8	
	3.5	12.8	
	4.0	13.5	
	6.2	16.5	
	22.4	14.2	
	12.5	12.5	
	18.0	13.7	
	12.0	15.7	
	14.6	13.0	Average 10.92
	12.0	8.5	10,000
	19.8	15.2	1092 PPM
	15.4	15.5	
	18.0	10.1	
	12.5	8.5	
	13.6	10.7	
	12.5		

EMISSION SUMMARY

FACILITY: U.S. Sugar Corp.
SOURCE: Boiler 3
DATE: 12/17/91

TIME	MAXIMUM	MINIMUM	AVERAGE
"Run 3: 1446	13.2	10.0	
1546	9.5	4.8	
	12.5	9.5	
	15.0	9.2	
	7.5	2.8	
	9.1	4.9	
	6.2	7.8	
	6.8	4.2	
	4.5	6.5	
	4.8	3.8	
	8.0	13.8	
	9.0	11.8	
	10.6	7.0	
	9.0	17.2	
	11.8	20.3	
	8.8	33.3	
	13.0	17.5	
	6.5	18.5	
	11.5	23.2	
	14.0	26.0	Average 11.56
	8.4	20.2	10,000 scfh
	9.8	14.0	1156 ppm
	11.0	17.5	
	13.8	23.5	
	8.5		
	7.5		

APPENDIX C

LABORATORY ANALYSIS

AIR CONSULTING & ENGINEERING, inc.

PARTICULATE LAB DATA

SOURCE U.S. Sugar-Bryant #3C

PROBE RINSE	RUN 1	RUN 2	RUN 3	BLANK
CONTAINER NUMBER	5-19	5-27	5-28	5-35
TOTAL VOLUME (ml)	199	210	151	100
1st GROSS WEIGHT (g)	104.3419	104.8639	103.6172	106.1651
2nd GROSS WEIGHT (g)	104.3421	104.8641	103.6171	106.1651
AVERAGE GROSS WEIGHT (g)	104.3420	104.8640	103.6172	106.1651
TARE WEIGHT (g)	104.3190	104.8201	103.5962	106.1651
SUB NET WEIGHT (g)	0.0230	0.0439	0.0210	0.0000
ACETONE BLANK (g)	-	-	-	-
TOTAL NET WEIGHT (mg)	23.0	43.9	21.0	0.0

LIQUID LEVEL ✓

DATE & TIME 12-19-91 12:30

DATE & TIME 12-20-91 10:20

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	3647	3648	3649	3147
1st GROSS WEIGHT (g)	0.5214	0.6039	0.5552	0.3994
2nd GROSS WEIGHT (g)	0.5212	0.6036	0.5551	0.3994
AVERAGE GROSS WEIGHT (g)	0.5213	0.6038	0.5552	0.3994
TARE WEIGHT (g)	0.4212	0.4183	0.4167	0.3994
SUB NET WEIGHT (g)	0.1001	0.1855	0.1385	0.0000
TOTAL NET WEIGHT (mg)	100.1	185.5	138.5	0.0

DATE & TIME 12-19-91 6:44

DATE & TIME 12-19-91 1:00

TARE BALANCE CHECK

SEE LAB BOOK

1st GROSS WEIGHT BALANCE CHECK

0 ✓ 10.0g ✓

0.5 g ✓ 100.0g ✓

%RH 68 DATE 12-19-91

Signature Christy L. Neck

2nd GROSS WEIGHT BALANCE CHECK

0 ✓ 100g —

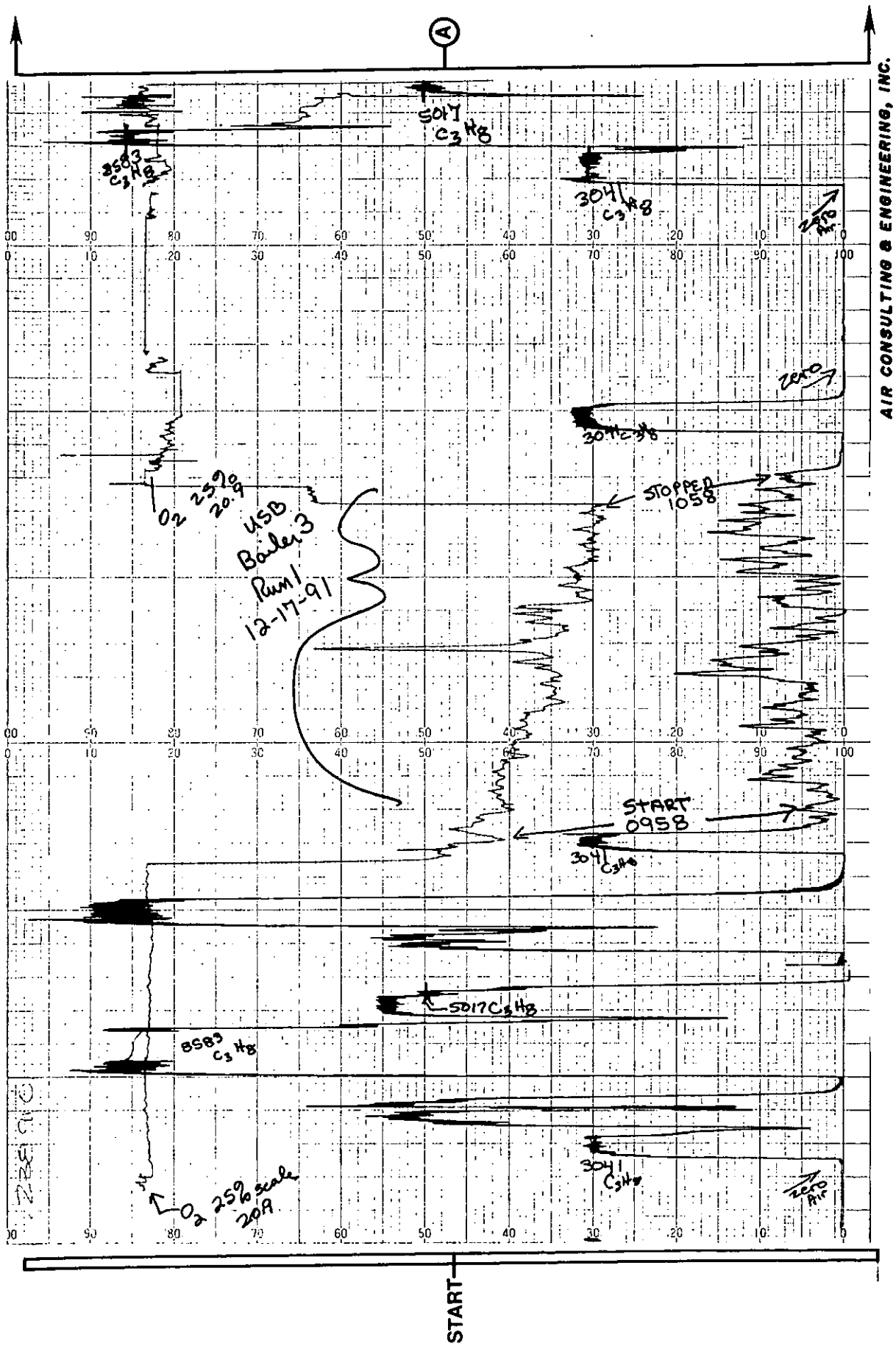
0.5g ✓ 100.0g ✓

%RH 66 DATE 12-20-91

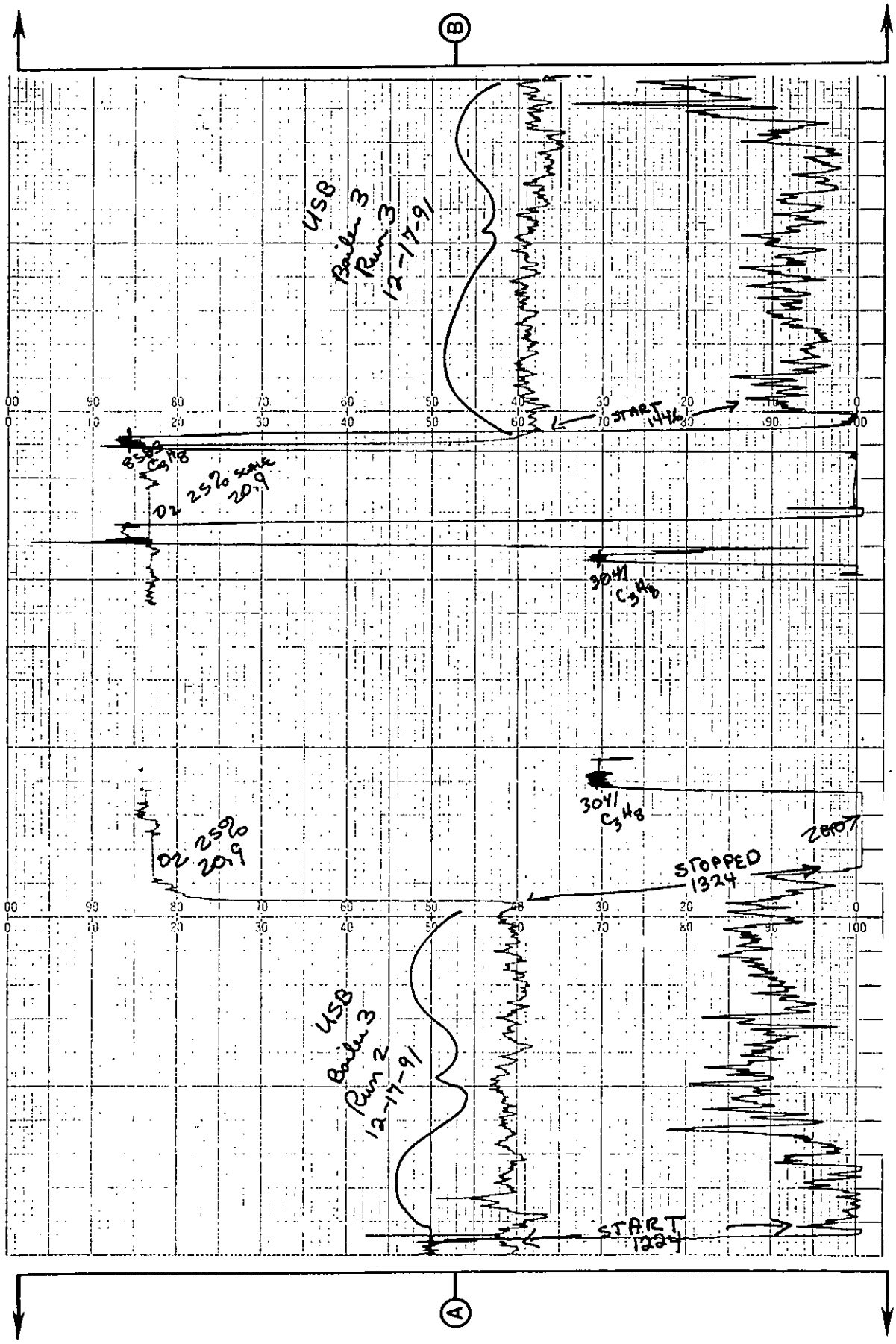
Signature Christy L. Neck

APPENDIX D

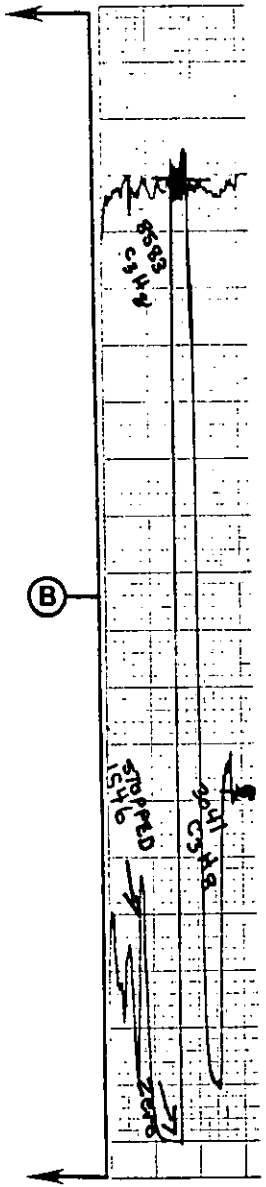
VOC STRIP CHART COPIES



AIR CONSULTING & ENGINEERING, INC.



AIR CONSULTING & ENGINEERING, INC.



end

APPENDIX E

PRODUCTION RATE CERTIFICATION

UNITED STATES SUGAR CORPORATION

BRYANT SUGAR HOUSE

DATE: 12-17-91

BOILER NO. 3

RUN	1	2	3
LOADS TO HOPPER	4	4	4
VOLUME OF LOAD YD^3	1.2	1.2	1.2
DENSITY OF LOAD $\#/FT^3$	56.5	57.0	58.0
WEIGHT OF SOILS BURNED IN RUN IN LBS.	7322.4	7387.2	7516.8

SIGNED: [illegible]

AMB/ls

12/19/91

(1)

12/17/91

To- Mr Blanchard
From - Andy
Sub. Soil Burning.
On first test today
we put 4 x 1.2 cys
in hopper.
WHT of 1 cft was 56.5 lbs.

$$4\,L \times 1.2\,\frac{YD^3}{L} = 4.8\,YD^3 \times 27 = 129.6\,FT^3$$

$$\times\, 56.5\,\frac{\#}{FT^3} = \frac{7{,}257.6}{2000} = 3.6\ TPH$$

(2)

12/17/91

To - Mr Blanchard
From - ANDY
Subj. Soil Burning
ON second Test
today we put
4 X 1.2 cyds in Hopper
to #3 Boiler
WGT of 1 cft. was 57.00 lbs

START FEEDING TO BOILER 12:45 PM
FINISHED 1:20 PM

$$4\,L \times 1.2\,\frac{YD^3}{L} = 4.8\,YD^3 \times 27$$

$$= 129.6\,\frac{FT^3}{} \times 57.00\,\frac{\#}{FT^3} = \frac{7387.2\,\#}{2000}$$

$$= 3.69\ TPH$$

(3)

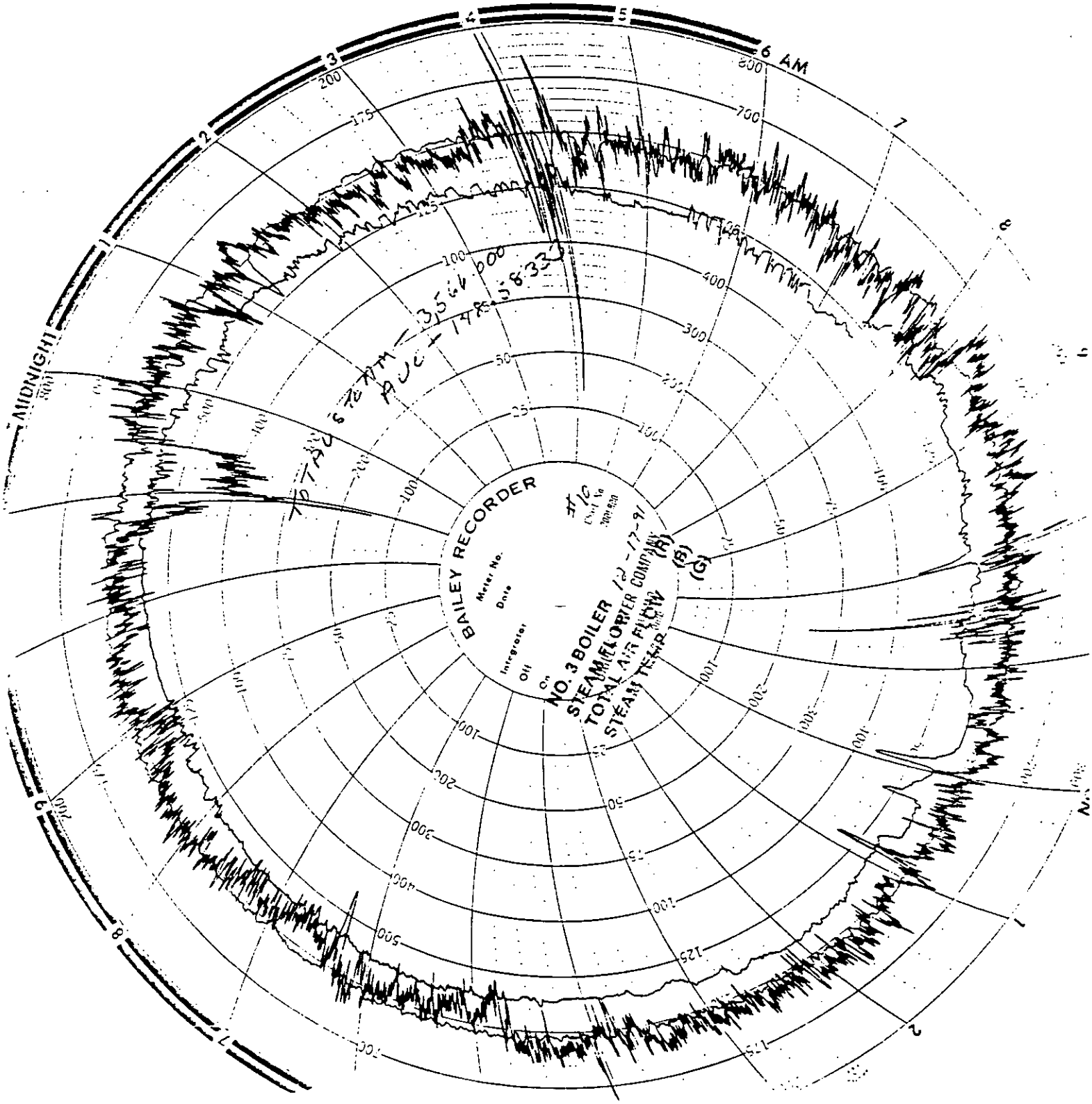
DATE 12-17-91
Boiler # 3
No of loads on Hopper 4
Vol. of Load 4.80 yd^3
Density of soil 58 lbs/cft

Run # 3

[illegible]
2 [illegible]

$4L \times 1.2 YD^3 = 4.8 YD^3 \times 27 = 129.6 FT^3$

$\times 58 \frac{\#}{FT^3} = \frac{7,516.8}{2000} = 3.75 TPH$



BAILEY RECORDER
Meter No.
Date
Integrator
Off
On
NO. 3 BOILER
STEAM FLOW
TOTAL AIR FLOW
STEAM TEMP
(R)
(B)
(G)
#10
12-17-91
6 AM
MIDNIGHT

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	12-17-91
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	1
SOURCE:	NUMBER 3 BOILER, SCRUBBER OUTLET	TIME:	0955-1111

TIME INTERVAL	76	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	91581	
BEGIN STEAM	91393	
FACTOR	1000	
TEMPERATURE	611	DEGREES F
PRESSURE	426	PSIG
	441	PSIA
FEEDWATER:		
TEMPERATURE	245	DEGREES F
PRESSURE	650	PSIG
	665	PSIA
HEAT INPUT:		
STEAM	1311.5	BTU/LB
FEEDWATER	213.4	BTU/LB
NET STEAM	1098.1	BTU/LB
STEAM RATE	148421	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	296.33	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)	296.33	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	88.90	LB/HR
TOTAL ACTUAL EMISSION	34.90	LB/HR
TOTAL ALLOWABLE EMISSION	.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.118	LB/MMBTU
BAGASSE FEED: @ 3500 BTU/LB	42.33	TPH

BOILER OPERATION PARAMETERS

PLANT United States Sugar Corp./Bryant

BOILER NUMBER 3

DATE 12-17-91 RUN NUMBER 1

OIL METER FACTOR No Oil

STEAM INTEGRATOR FACTOR 1000

SCRUBBER(S) PRESS.DROP 6.0,

SCRUBBER(S) GPM ,

OPERATOR SIGNATURE Jerry Mitchell

SCRUBBER(S)H2O LEVEL ,

Ph(if applicable) ,

INITIAL INTEGRATOR 091393

FINAL INTEGRATOR 091581

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS.FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
9:55		150,000	600	430	245	640
10:10		157,000	600	420	245	650
10:25		150,000	620	430	245	650
10:40		145,000	620	410	245	660
10:55		155,000	605	430	245	650
11:10		150,000	620	430	245	650
11:11		150,000	615	430	245	650

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	12-17-91
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	2
SOURCE:	NUMBER 3 BOILER, SCRUBBER OUTLET	TIME:	1223-1336

TIME INTERVAL	73	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	91954	
BEGIN STEAM	91764	
FACTOR	1000	
TEMPERATURE	600	DEGREES F
PRESSURE	428	PSIG
	443	PSIA
FEEDWATER:		
TEMPERATURE	250	DEGREES F
PRESSURE	643	PSIG
	658	PSIA
HEAT INPUT:		
STEAM	1303.0	BTU/LB
FEEDWATER	218.4	BTU/LB
NET STEAM	1084.6	BTU/LB
STEAM RATE	156164	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	307.96	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)	307.96	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	92.39	LB/HR
TOTAL ACTUAL EMISSION	65.76	LB/HR
TOTAL ALLOWABLE EMISSION	.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.214	LB/MMBTU
BAGASSE FEED: @ 3500 BTU/LB	43.99	TPH

BOILER OPERATION PARAMETERS

PLANT U.S. Sugar Corp / Bryant BOILER NUMBER 3

DATE 12-17-91 RUN NUMBER 2 OIL METER FACTOR No Oil

STEAM INTEGRATOR FACTOR 100 SCRUBBER(S) PRESS. DROP 6.0, ___

SCRUBBER(S) GPM ___, ___

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

Ph(if applicable) ___, ___

INITIAL INTEGRATOR 091764 FINAL INTEGRATOR 091954

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS. FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
1:23		150,000	600	440	248	640
1:38		160,000	600	430	250	640
1:53		145,000	600	430	250	650
1:08		150,000	600	420	250	640
1:23		160,000	600	420	250	650
1:36		160,000	600	430	250	640

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	U. S. SUGAR CORPORATION	DATE:	12-17-91
LOCATION:	BRYANT, FLORIDA	RUN NUMBER	3
SOURCE:	NUMBER 3 BOILER, SCRUBBER OUTLET	TIME:	1444-1556

TIME INTERVAL	72	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	92320	
BEGIN STEAM	92132	
FACTOR	1000	
TEMPERATURE	606	DEGREES F
PRESSURE	430	PSIG
	445	PSIA
FEEDWATER:		
TEMPERATURE	245	DEGREES F
PRESSURE	643	PSIG
	658	PSIA
HEAT INPUT:		
STEAM	1306.3	BTU/LB
FEEDWATER	213.3	BTU/LB
NET STEAM	1093.0	BTU/LB
STEAM RATE	156667	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	311.34	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)	311.34	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	93.40	LB/HR
TOTAL ACTUAL EMISSION	46.05	LB/HR
TOTAL ALLOWABLE EMISSION	.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.148	LB/MMBTU
BAGASSE FEED: @ 3500 BTU/LB	44.48	TPH

Avg 305.21

Avg = 43.6

BOILER OPERATION PARAMETERS

PLANT U.S. Sugar Corp. / Bryant

BOILER NUMBER 3

DATE 12-17-91 RUN NUMBER 3

OIL METER FACTOR No Oil

STEAM INTEGRATOR FACTOR 1000

SCRUBBER(S) PRESS. DROP 6.0,

SCRUBBER(S) GPM ,

OPERATOR SIGNATURE [signature]

SCRUBBER(S)H2O LEVEL 10.0,

Ph(if applicable) ,

INITIAL INTEGRATOR 092132

FINAL INTEGRATOR 092320

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS. FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
2:44		160,000	610	435	245	640
2:59		155,000	605	430	245	640
3:14		155,000	605	425	245	640
3:29		160,000	605	430	245	640
3:44		150,000	605	430	245	650
3:56		145,000	605	430	245	645

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:

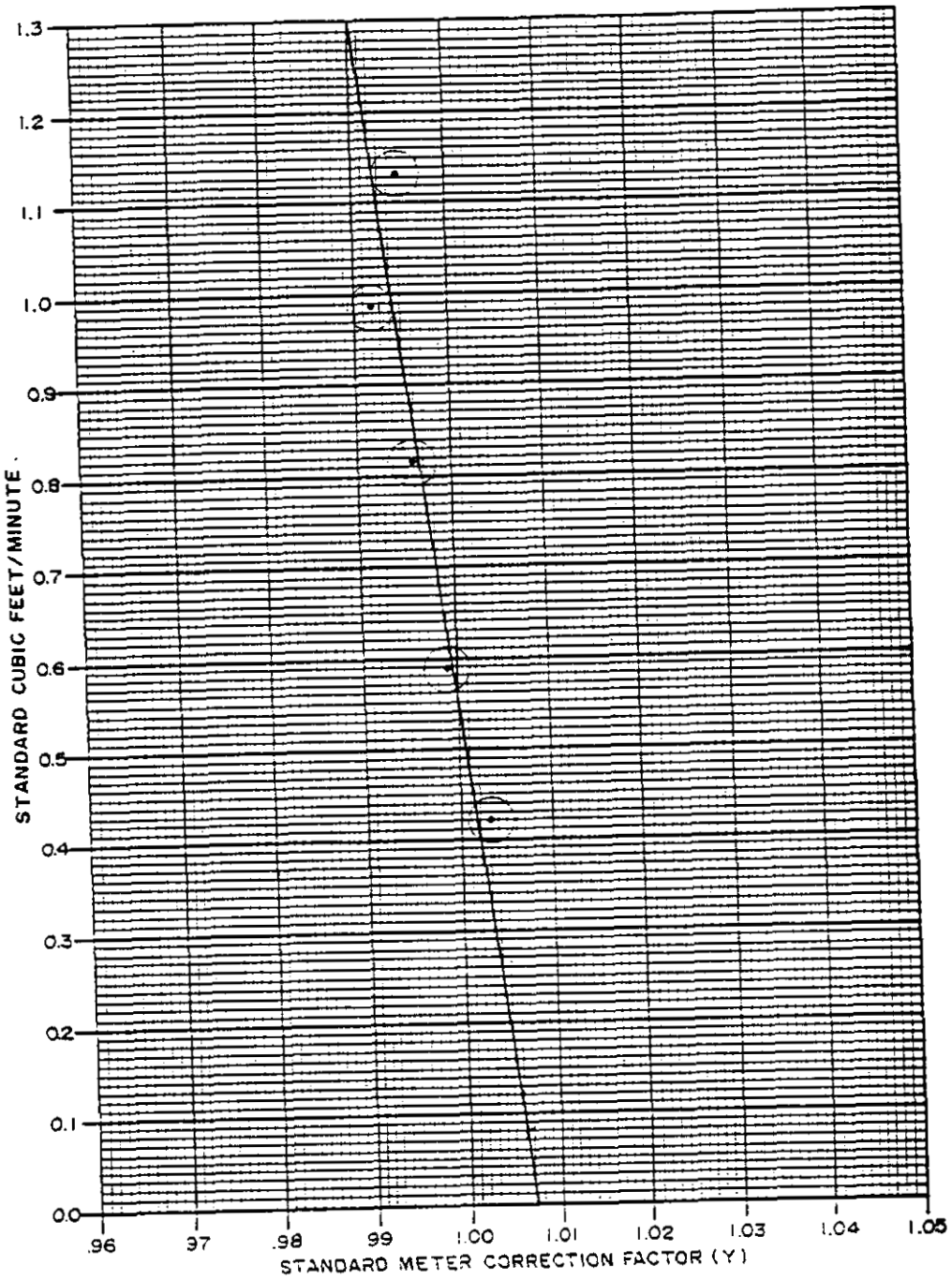
$$Y_a \times Y_s = Y$$

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
.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
.25	-.75	2.853	8.143	5.290	16.804	22.127	5.323	75	76	9
.25	-.75	8.143	13.430	5.287	22.127	27.442	5.315	75	76	9
.25	-.75	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: H. F. Habel

	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 0.000 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

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 McFarland

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

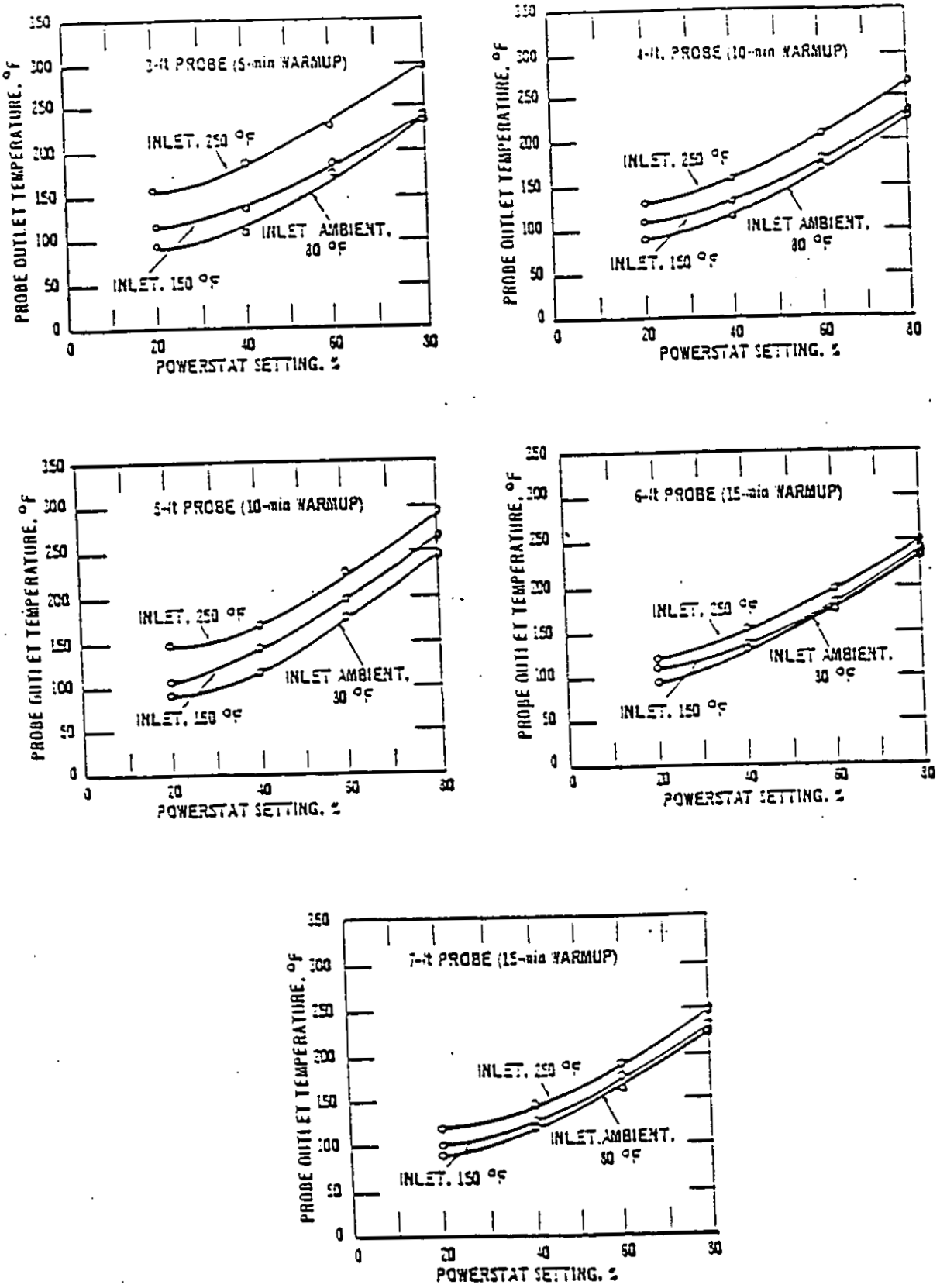
THERMOCOUPLE CALIBRATION

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 0.75; 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 12-17-91
SOURCE NAME Boiler 3 C SAMPLE RECOVERED BY G. Gautreaux
TYPE OF SAMPLE Pm PARTICULATE ANALYSES BY C. Neck

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	3647	—	Dk. Gray	
1	S-19	✓	clear	
2	3648	—	Dk. Gray	
2	S-27	✓	cloudy	
3	3649	—	Dk. Gray	
3	S-28	✓	clear	
ACETONE / WATER BLANK (CIRCLE)	S-35	✓	clear	
FILTER BLANK	3147	—	white	

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT. (g)	INIT. WT. (g)	NET WT. (g)	COLOR
1	120	208.5	200.0	8.5	OK
2	101	208.1	200.0	8.1	OK
3	96	208.5	200.0	8.5	OK
			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 #: ALM007858 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

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Air Consulting and Engineering

CONTINUOUS MONITOR ACCURACY CERTIFICATION

PLANT US Sugar Corporation
LOCATION Bryant, Florida
SOURCE ID Boiler 3
DATE 12/17/91

~~NOx~~ C3H8 CALIBRATION GAS 10,000 scale	MONITOR VALUE ppm	DIFFERENCE ppm	%SPAN
8583	8550	33	0.3
5017	5050	33	0.3
3041	3050	9	0.09

O_2 CALIBRATION GAS	MONITOR VALUE %	DIFFERENCE %	% SPAN
20.9	20.8	0.1	0.4

CO CALIBRATION GAS	MONITOR VALUE	DIFFERENCE	% SPAN

APPENDIX G

PROJECT PARTICIPANTS