AP-42 Section Number: 1.8

Reference Number: 40

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

Talisman Sugar Corporation

December 1991

0501-TSC6

SOURCE TEST REPORT
for
PARTICULATE EMISSIONS

TWIN IMPINGEMENT WET SCRUBBER
BOILER NUMBER 5

TALISMAN SUGAR CORPORATION
SOUTH BAY, FLORIDA

DECEMBER 10, 1991

Prepared for:

KLEEMAN ENGINEERING
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Prepared by:

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287-91-09

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ACE
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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

1/15/1992

Date

1.0 INTRODUCTION

On December 10, 1991, Air Consulting and Engineering, Inc. (ACE), conducted particulate emission testing on the Wet Scrubber Outlet of Boiler 5 at Talisman Sugar Corporation located in South Bay, Florida.

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

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

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

Mr. Kleeman of Kleeman Engineering, Inc. coordinated testing and provided production data.

2.0 SUMMARY AND DISCUSSION OF RESULTS

Boiler Number 5 demonstrated compliance with the permit conditions.

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

Particulate emissions averaged 65.96 pounds per hour (lbs/Hr) and 0.264 pounds per million BTU (lbs/MMBTU) which is within the allowable emissions of 74.95 lbs/Hr and 0.300 lbs/MMBTU.

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

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

Table 1 Emission Summary
Boiler Number 5
Talisman Sugar Corporation
South Bay, Florida
December 10, 1991

Run Number	Flow Rate SCFMD	Stack Temp. °F	Stack Moisture %	Particulate Emissions lbs/Hr	Particulate Emissions lbs/MMBTU	Allowable Emissions lbs/Hr	Allowable Emissions lbs/MMBTU
1	53711	163	34.3	65.19	0.254	77.01	0.300
2	54659	164	35.5	66.63	0.276	72.32	0.300
3	51711	164	36.1	66.05	0.262	75.53	0.300
AVERAGE	53360	164	35.3	65.96	0.264	74.95	0.300

3.0 PROCESS DESCRIPTION AND OPERATION

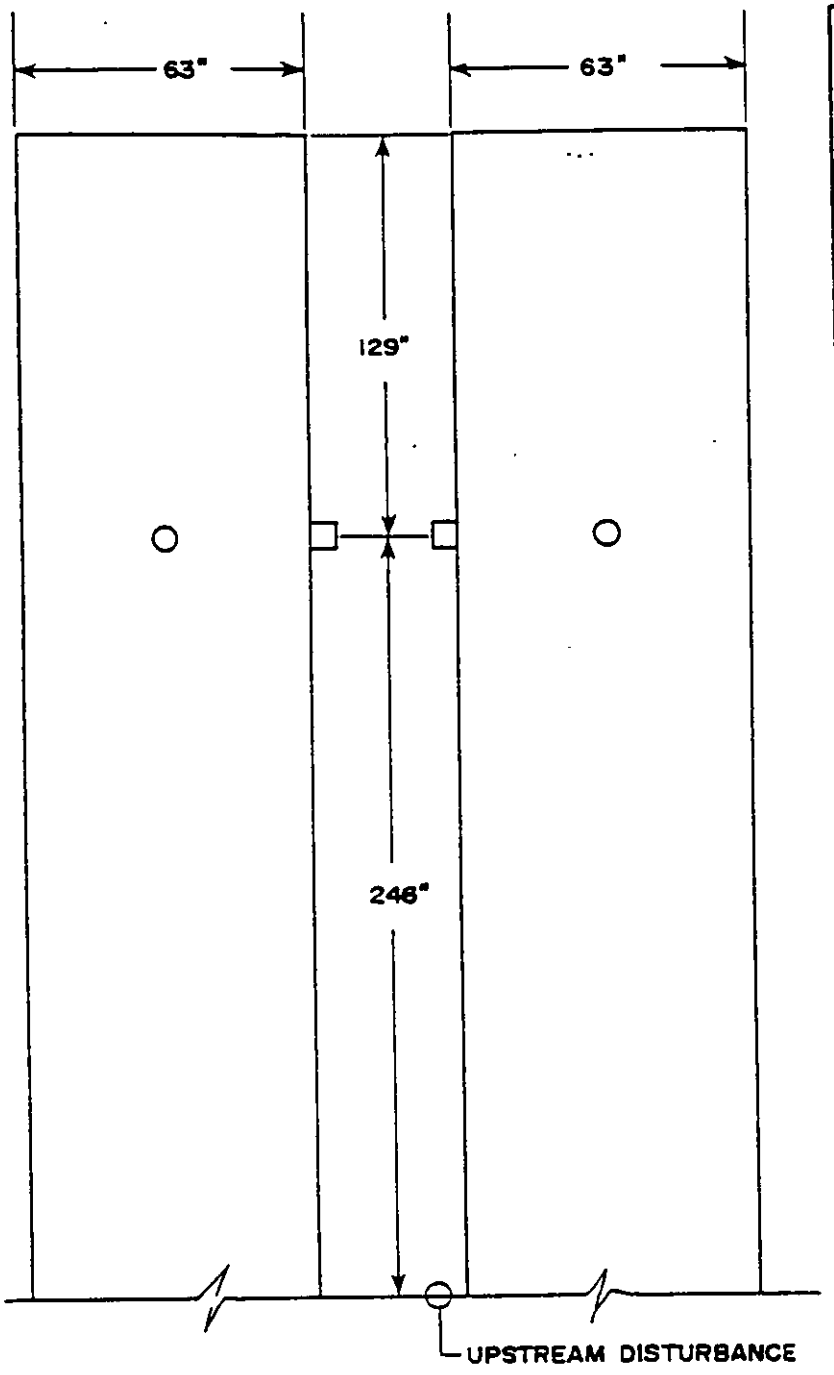
The Number 5 Boiler at Talisman Sugar Corporation is a traveling grate stoker design used primarily for bagasse fuel firing. Supplemental oil firing may also be utilized but was not used during the emission test series.

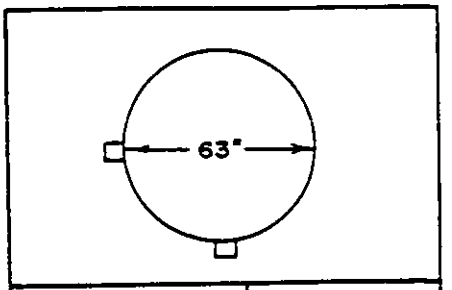
The Boiler averaged 128,783 pounds per hour (lbs/Hr) steam production over the test run period.

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

4.0 SAMPLING POINT LOCATION

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





TRAVERSE POINT NUMBER	INCHES INSIDE STACK WALL
1	1.3
2	4.2
3	7.4
4	11.2
5	15.8
6	22.4
7	40.6
8	47.3
9	51.8
10	55.6
11	58.8
12	61.7

NOTE: NOT TO SCALE

FIGURE 1.
SAMPLING POINT LOCATION
BOILER NO. 5
TALISMAN SUGAR CORPORATION
SOUTH BAY, FLORIDA

AIR CONSULTING and ENGINEERING

5.0 FIELD AND ANALYTICAL PROCEDURES

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

Particulate matter samples were collected by the particulate matter emission measurement method specified by the United States Environmental Protection Agency. A schematic diagram of the sampling train used is shown in Figure 2. All particulate matter captured from the nozzle to, and including, the filter was included in the calculation of the emission rate of particulate matter.

PREPARATION OF EQUIPMENT

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

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

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

TEST PROCEDURE

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

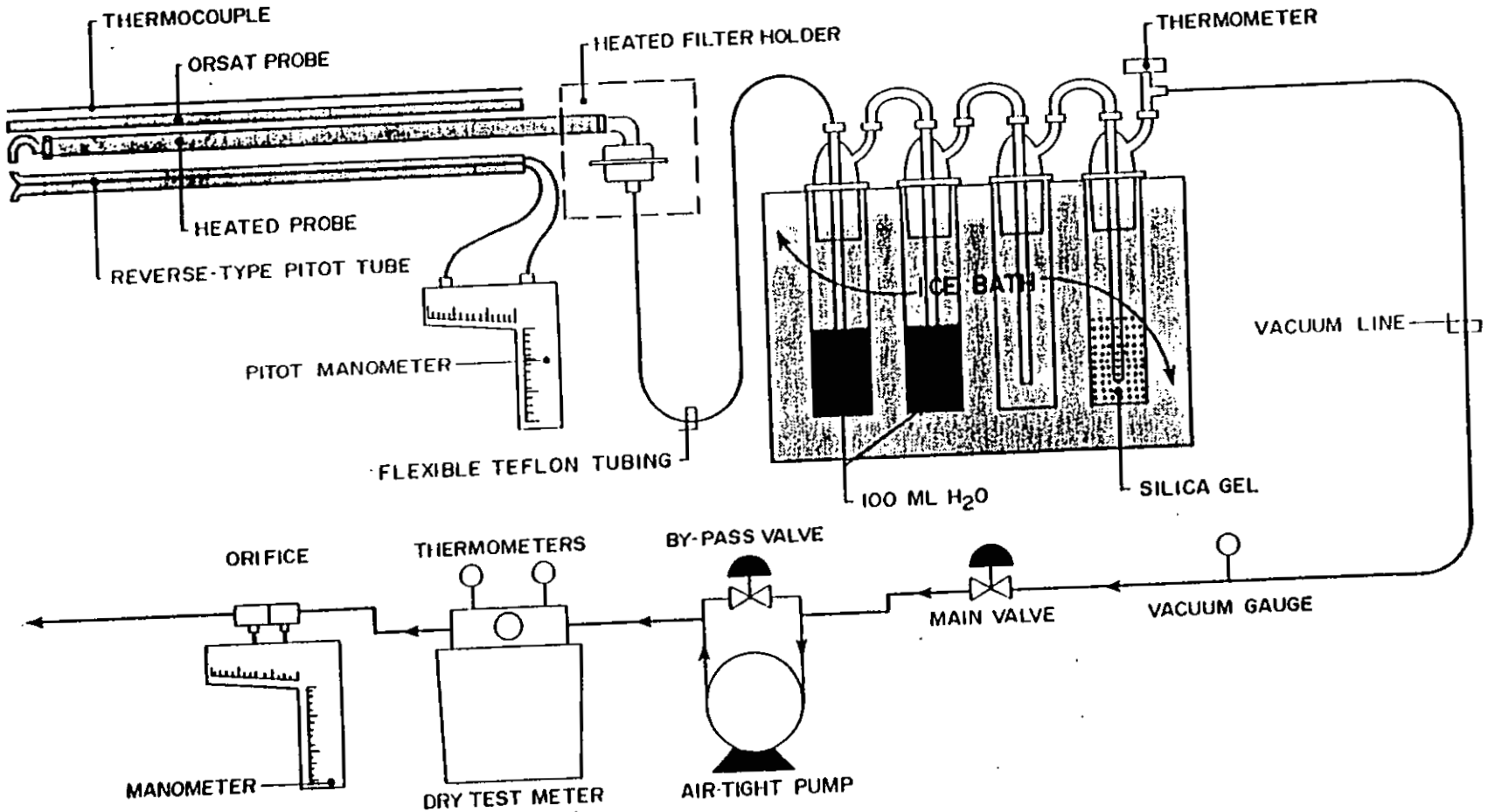


FIGURE 2
EPA METHOD 5 SAMPLING TRAIN

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

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

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

The gases sampled passed through the following components: a stainless steel nozzle and glass probe; a glass fiber filter; two impingers each with 100 ml

of distilled deionized water; one impinger dry; one impinger with 200 grams of silica gel; a flexible sample line; an air-tight pump; a dry test meter; and a calibrated orifice. The second impinger had a standard tip, while the first, third, and fourth impingers had modified tips with a 0.5 inch I.D. opening.

Sample recovery was accomplished by the following procedures:

1. The pre-tared filter was removed from its holder and placed in Container 1 and sealed. (This is usually performed in the lab.)
2. All sample-exposed surfaces prior to the filter were washed with acetone and placed in Container 2, sealed and the liquid level marked.
3. The volume of water from the first three impingers was measured for the purpose of calculating the moisture in the stack gas and then discarded.
4. The used silica gel from the fourth impinger was transferred to the original tared container and sealed.

LABORATORY ANALYSIS

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

1. The filter was dried at 105 degrees C for three hours, desiccated for a minimum of one hour, and weighed to the nearest 0.1 mg. A minimum of two such weighings six hours apart was made to determine constant weight.
2. The acetone from Container 2 was transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure, desiccated for 24 hours, and weighed to the nearest 0.1 mg. A minimum of two such weighings six hours apart were made to determine constant weight.
3. The used silica gel in its tared container was weighed to the nearest 0.1 gram.

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

DATA

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

APPENDIX A
COMPLETE EMISSION DATA
AND
SAMPLE CALCULATIONS

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: TALISMAN SUGAR CORPORATION
SOURCE: NUMBER 5 BOILER
DATE: 12-10-91

RUN NO.:	1	IMPINGER ml	395
BEGIN TIME:	925	SILICA GEL gms.	8.7
END TIME:	1106	PERCENT O2	6.00
TOTAL RUN TIME:	96.00 min.	PERCENT CO2	14.00
BAROMETRIC PRESSURE:	30.15 "Hg	"F" FACTOR	0
STACK PRESSURE:	30.15 "Hg.		
NOZZLE DIAMETER:	.227 inches	PARTICULATE	
METER CORR. FACTOR:	1.009		
FINAL METER:	78.472 cubic ft.	FILTER mg.	323.6
INITIAL METER:	41.814 cubic ft.	WASH mg.	13.1
STACK AREA:	43.300 sq. ft.		

STACK 1 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.180	0.424	.270	163	68
1-2	.160	0.400	.240	163	69
1-3	.320	0.566	.480	163	69
1-4	.180	0.424	.270	163	69
1-5	.230	0.480	.350	163	69
1-6	.280	0.529	.420	163	69
1-7	.480	0.693	.720	162	70
1-8	.590	0.768	.390	163	70
1-9	.510	0.714	.770	163	70
1-10	.370	0.608	.560	163	72
1-11	.270	0.520	.410	162	72
1-12	.200	0.447	.300	160	72
2-1	.200	0.447	.300	163	73
2-2	.190	0.436	.290	163	73
2-3	.190	0.436	.290	163	73
2-4	.170	0.412	.260	163	73
2-5	.160	0.400	.240	163	74
2-6	.180	0.424	.270	163	74
2-7	.550	0.742	.830	163	74
2-8	.600	0.775	.900	162	75
2-9	.690	0.831	1.040	163	76
2-10	.710	0.843	1.070	164	76
2-11	.740	0.860	1.110	163	77
2-12	.740	0.860	1.110	163	77
AVERAGES	0.370	0.585	0.558	163	72

EMISSION RESULTS

NOZZLE AREA(FT2)	:0.0002814		
AVG. VELOCITY HEAD	:--------	0.33 "H20	VOL. FLOW ACFM : 95784
AVG. STACK TEMP.:	---------	163 F	VOL. FLOW SCFMD : 53711
AVG. METER TEMP.:	---------	77 F	
AVG. ORIFICE DIFFERENTIAL:	---	0.54 "H20	PARTICULATE DATA :
METER STANDARD CUBIC FEET:	---	36.638	
% H20 VAPOR:	:--------	34.3	POUNDS PER HOUR: 65.185
GAS MOL. WT. DRY:	---------	30.48	POUNDS PER SCF : 0.0000202
GAS MOL. WT. WET:	---------	26.20	GRAINS/SCF: 0.142
% EXCESS AIR:	---------	39.68	GRAINS/SCF @ 8% O2 0.123
AVG. STACK VEL (FPS)	---------	36.87	GRAINS/SCF @50% EA 0.132
MMBTU INPUT:	---------	256.71	POUNDS PER MMBTU: 0.254
PERCENT ISOKINETIC :	---------	109.50	

STACK 2 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIFICE DIFF.	STACK TEMP.	METER TEMP.
1-1	.200	0.447	.300	164	78
1-2	.200	0.447	.300	163	78
1-3	.200	0.447	.300	163	79
1-4	.240	0.490	.360	163	79
1-5	.270	0.520	.410	163	80
1-6	.200	0.447	.300	163	80
1-7	.240	0.490	.360	163	80
1-8	.200	0.447	.300	164	80
1-9	.070	0.265	.110	165	81
1-10	.300	0.548	.450	164	81
1-11	.450	0.671	.680	164	81
1-12	.520	0.721	.780	164	81
2-1	.630	0.794	.950	162	83
2-2	.410	0.640	.620	164	83
2-3	.430	0.656	.650	164	83
2-4	.450	0.671	.680	163	83
2-5	.390	0.624	.590	163	83
2-6	.270	0.520	.410	164	84
2-7	.310	0.557	.470	164	84
2-8	.410	0.640	.620	164	84
2-9	.500	0.707	.750	163	85
2-10	.550	0.742	.830	164	85
2-11	.280	0.529	.420	164	85
2-12	.470	0.686	.710	163	85
					75
AVERAGES	0.341	0.571	0.515	164	82

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: TALISMAN SUGAR CORPORATION
SOURCE: NUMBER 5 BOILER
DATE: 12-10-91

RUN NO.:	2	IMPINGER ml	386
BEGIN TIME:	1215	SILICA GEL gms.	7.4
END TIME:	1354	PERCENT O2	6.00
TOTAL RUN TIME:	96.00 min.	PERCENT CO2	14.00
BAROMETRIC PRESSURE:	30.15 "Hg	"F" FACTOR	0
STACK PRESSURE:	30.15 "Hg.		
NOZZLE DIAMETER:	.227 inches	PARTICULATE	
METER CORR. FACTOR:	1.009	----------	
FINAL METER:	113.180 cubic ft.	FILTER mg.	304.4
INITIAL METER:	78.712 cubic ft.	WASH mg.	9.1
STACK AREA:	43.300 sq. ft.		

STACK 1 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.550	0.742	.660	162	81
1-2	.550	0.742	.660	162	81
1-3	.540	0.735	.650	164	81
1-4	.250	0.500	.300	163	81
1-5	.260	0.510	.310	163	81
1-6	.220	0.469	.260	163	81
1-7	.320	0.566	.380	165	81
1-8	.400	0.632	.480	164	81
1-9	.410	0.640	.490	164	81
1-10	.500	0.707	.600	164	81
1-11	.430	0.656	.520	162	81
1-12	.400	0.632	.480	162	81
2-1	.200	0.447	.240	165	82
2-2	.280	0.529	.340	165	82
2-3	.270	0.520	.320	165	82
2-4	.310	0.557	.370	165	82
2-5	.310	0.557	.370	165	82
2-6	.160	0.400	.190	164	82
2-7	.120	0.346	.140	165	83
2-8	.280	0.529	.340	164	83
2-9	.180	0.424	.220	165	83
2-10	.330	0.574	.400	164	84
2-11	.360	0.600	.430	164	84
2-12	.580	0.762	.700	164	84
AVERAGES	0.342	0.574	0.410	164	82

EMISSION RESULTS

NOZZLE AREA(FT2)	:0.0002614		
AVG. VELOCITY HEAD	:--------	0.36 "H2O	VOL. FLOW ACFM : 99311
AVG. STACK TEMP.:	---------	164 F	VOL. FLOW SCFMD : 54659
AVG. METER TEMP.:	---------	85 F	
AVG. ORIFICE DIFFERENTIAL:	---	0.45 "H2O	PARTICULATE DATA :
METER STANDARD CUBIC FEET:	---	34.019	----------
% H2O VAPOR:	:--------	35.5	POUNDS PER HOUR: 66.627
GAS MOL. WT. DRY:	---------	30.48	POUNDS PER SCF : 0.0000203
GAS MOL. WT. WET:	---------	26.05	GRAINS/SCF: 0.142
% EXCESS AIR:	---------	39.68	GRAINS/SCF @ 8% O2 0.123
AVG. STACK VEL.(FPS)	---------	38.23	GRAINS/SCF @50% EA 0.132
MMBTU INPUT:	---------	241.08	POUNDS PER MMBTU: 0.276
PERCENT ISOKINETIC	:---------	99.74	

STACK 2 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIFICE DIFF.	STACK TEMP.	METER TEMP.
1-1	.220	0.469	.260	164	85
1-2	.280	0.529	.340	165	85
1-3	.280	0.529	.340	165	86
1-4	.220	0.469	.260	165	86
1-5	.200	0.447	.240	165	86
1-6	.180	0.424	.220	165	86
1-7	.520	0.721	.620	164	87
1-8	.500	0.707	.600	163	87
1-9	.600	0.775	.720	164	87
1-10	.630	0.794	.760	164	87
1-11	.680	0.825	.820	163	87
1-12	.700	0.837	.840	164	87
2-1	.420	0.648	.500	163	88
2-2	.340	0.583	.410	163	88
2-3	.370	0.608	.440	164	88
2-4	.410	0.640	.490	163	88
2-5	.300	0.548	.360	164	88
2-6	.280	0.529	.340	164	89
2-7	.500	0.707	.600	163	89
2-8	.590	0.768	.710	164	89
2-9	.600	0.775	.720	163	90
2-10	.370	0.608	.440	165	90
2-11	.280	0.529	.340	164	90
2-12	.180	0.424	.220	164	90
					76
AVERAGES	0.402	0.621	0.483	164	87

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: TALISMAN SUGAR CORPORATION
SOURCE: NUMBER 5 BOILER
DATE: 12-10-91

RUN NO.:	3	IMPINGER ml	384
BEGIN TIME:	1445	SILICA GEL gms.	8.0
END TIME:	1625	PERCENT O2	6.00
TOTAL RUN TIME:	96.00 min.	PERCENT CO2	14.00
BAROMETRIC PRESSURE:	30.15 "Hg	"F" FACTOR	0
STACK PRESSURE:	30.15 "Hg.		
NOZZLE DIAMETER:	.227 inches	PARTICULATE	
METER CORR. FACTOR:	1.009		
FINAL METER:	147.060 cubic ft.	FILTER mg.	310.0
INITIAL METER:	113.400 cubic ft.	WASH mg.	8.0
STACK AREA:	43.300 sq. ft.		

Avg = 6.0

STACK 1 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.150	0.387	.180	164	87
1-2	.300	0.548	.360	163	87
1-3	.250	0.500	.300	162	87
1-4	.240	0.490	.290	162	87
1-5	.300	0.548	.360	162	87
1-6	.450	0.671	.540	162	87
1-7	.550	0.742	.660	162	87
1-8	.660	0.812	.790	163	87
1-9	.340	0.583	.410	163	87
1-10	.400	0.632	.480	163	87
1-11	.150	0.387	.180	163	87
1-12	.150	0.387	.180	162	87
2-1	.200	0.447	.240	162	87
2-2	.200	0.447	.240	162	87
2-3	.240	0.490	.290	163	88
2-4	.250	0.500	.300	163	88
2-5	.180	0.424	.220	163	88
2-6	.110	0.332	.130	163	88
2-7	.520	0.721	.620	163	88
2-8	.620	0.787	.740	163	88
2-9	.680	0.825	.820	163	88
2-10	.500	0.707	.600	163	89
2-11	.800	0.894	.960	163	89
2-12	.890	0.943	1.070	162	89
AVERAGES	0.380	0.592	0.457	163	88

EMISSION RESULTS

avg = 164

NOZZLE AREA(FT2)	:0.0002614			
AVG. VELOCITY HEAD	:--------	0.32 "H20	VOL. FLOW ACFM :	94882
AVG. STACK TEMP.:	---------	164 F	VOL. FLOW SCFMD :	51711
AVG. METER TEMP.:	---------	88 F		
AVG. ORIFICE DIFFERENTIAL:	---	0.42 "H20	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:	---	32.932		
% H20 VAPOR:	:--------	36.1	POUNDS PER HOUR:	66.048
GAS MOL. WT. DRY:	---------	30.48	POUNDS PER SCF :	0.0000213
GAS MOL. WT. WET:	---------	25.97	GRAINS/SCF:	0.149
% EXCESS AIR:	---------	39.68	GRAINS/SCF @ 8% 02	0.129
AVG. STACK VEL.(FPS)	---------	36.52	GRAINS/SCF @50% EA	0.139
MMBTU INPUT:	---------	251.78	POUNDS PER MMBTU:	0.262
PERCENT ISOKINETIC .	---------	102.06		

Avg = 53,360

STACK 2 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIFICE DIFF.	STACK TEMP.	METER TEMP.
1-1	.300	0.548	.360	162	90
1-2	.300	0.548	.360	162	90
1-3	.330	0.574	.400	163	91
1-4	.060	0.245	.070	165	91
1-5	.090	0.300	.110	164	91
1-6	.080	0.283	.090	164	91
1-7	.280	0.529	.340	164	91
1-8	.340	0.583	.410	164	91
1-9	.260	0.510	.310	164	91
1-10	.130	0.361	.160	164	91
1-11	.450	0.671	.540	165	92
1-12	.450	0.671	.540	166	92
2-1	.550	0.742	.660	166	92
2-2	.480	0.693	.580	166	92
2-3	.430	0.656	.520	165	92
2-4	.340	0.583	.410	165	93
2-5	.330	0.574	.400	164	93
2-6	.280	0.529	.340	166	93
2-7	.330	0.574	.400	166	93
2-8	.370	0.608	.440	166	93
2-9	.480	0.693	.580	166	93
2-10	.520	0.721	.620	163	93
2-11	.280	0.529	.340	164	90
2-12	.180	0.424	.220	164	90
					76
AVERAGES	0 318	0.548	0.383	165	91

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 TSSCIAS
PAGE 1 OF 3

PLANT Talisman Sugar Corporation
SOURCE Boiler #5
PLANT LOCATION South Bay, Florida
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES P.M.
DATE 12-10-91 RUN NO. 1
TIME START 0925 TIME END 1106
SAMPLE TIME 2 / 48 (min/pt)= 96 Total min
ASSUMED MOISTURE 30 % FDA .70
NOMOGRAPH C_f 1.5 PITOT CORR. .84
P_b 30.15 "Hg P_s 30.15 "Hg
WEATHER Clear TEMP. 44 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .227 .227 .228 = .227
STACK DIMENSIONS 63"
STACK AREA 43.3 ft² EFFECTIVE ____ ft²
STACK HEIGHT ____ ft.
STACK DIAMETER: UPSTRM. ____ DNSTRM. ____
PORT SIZE 4 in. NIPPLE LENGTH 6 in.
U CORD LENGTH 125"
REMARKS:

MAT'L PROCESSING RATE ____
GAS METER READINGS: FINAL 078.472 ft³
INITIAL 041.814 ft³
NET 36.658 ft³
FILTER NO. 3661 IMP. VOL. GAIN 395 ml.
SIL GEL NO. 6 WT. GAIN 8.7 ml.
TOTAL CONDENSATE 403.7 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2	14.0	14.0			14.0
% O_2	6.0	6.0			6.0
% CO					
% N_2					

F_O = ____ F_O RANGE = ____
ORSAT ANALYZER ____

LEAK CHECKS
PRE 0.007 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. 3
BOX OPERATOR Gautreaux PROBE HOLDER McFarland

PORT AND TRAVERSE POINT NUMBER South	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (FT.³)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	METER ORIFICE PRESS. DIFF. ("H_2O) ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. F	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1		0927	042.32	.18	.27	.27	163	248	62	68	2.0
2		0929	042.99	.16	.24	.24	163	248	60	69	2.0
3		0931	043.73	.32	.48	.48	163	253	56	69	2.0
4		0933	044.21	.18	.27	.27	163	253	56	69	2.0
5		0935	044.86	.23	.35	.35	163	250	56	69	2.0
6		0937	045.68	.28	.42	.42	163	250	56	69	2.0

AIR CONSULTING & ENGINEERING, INC.

TEST ID TSSC1AS

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (ft^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
South											
1-7		0939	046.42	.48	.72	.72	162	255	52	70	3.0
8		0941	047.46	.59	.89	.89	163	254	52	70	4.0
9		0943	048.41	.51	.77	.77	163	254	52	70	4.0
10		0945	049.14	.37	.56	.56	163	255	54	72	3.0
11		0947	049.90	.27	.41	.41	162	255	53	72	3.0
12		0949	050.50	.20	.30	.30	160	254	53	72	3.0
2-1		0953	051.05	.20	.30	.30	163	250	56	73	3.0
2		0955	051.62	.19	.29	.29	163	249	55	73	3.0
3		0957	052.30	.19	.29	.29	162	248	55	73	3.0
4		0959	052.80	.17	.26	.26	163	248	57	73	3.0
5		1001	053.31	.16	.24	.24	163	247	58	74	3.0
6		1003	053.93	.18	.27	.27	163	247	58	74	3.0
7		1005	054.05	.55	.83	.83	163	247	56	74	6.0
8		1007	055.80	.60	.90	.90	162	246	56	76	6.0
9		1009	056.83	.69	1.04/69	1.04	163	246	56	76	8.0
10		1011	057.92	.71	1.07	1.07	164	250	56	76	8.0
11		1013	059.14	.74	1.11	1.11	163	257	56	77	9.0
12		1015	060.28	.74	1.11	1.11	163	257	56	77	9.0
North											
1-1		1018	060.85	.20	.30	.30	164	264	58	78	4.0
2		1020	061.37	.20	.30	.30	163	259	57	78	5.0
3		1022	062.07	.20	.30	.30	163	258	56	79	5.0
4		1024	062.61	.24	.36	.36	163	226	56	79	5.0
5		1026	063.42	.27	.41	.41	163	228	57	80	6.0
6		1028	064.01	.20	.30	.30	163	243	57	80	5.0
7		1030	064.61	.24	.36	.36	163	248	57	80	5.0

AIR CONSULTING & ENGINEERING, INC.

TEST ID T55C1AS
PAGE 3 OF 3

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (ft^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP (°F)	SAMPLE BOX TEMP (°F)	LAST IMPINGER TEMP (°F)	DRY GAS METER TEMP (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
1-8		1032	065.26	.20	.30	.30	164	254	57	80	5.0
9		1034	065.58	.07	.11	.11	165	254	57	81	3.0
10		1036	066.12	.30	.45	.45	164	260	60	81	7.0
11		1038	067.01	.45	.68	.68	164	257	58	81	9.0
12		1040	068.03	.52	.78	.78	164	257	58	81	9.0
2-1		1042	069.30	.63	.95	.95	162	274	55	83	9.0
2		1044	070.10	.41	.62	.62	164	275	55	83	9.0
3		1046	070.81	.43	.65	.65	164	275	55	83	9.0
4		1048	071.70	.45	.68	.68	163	275	57	83	10.0
5		1050	072.64	.39	.59	.59	163	274	57	83	10.0
6		1052	073.35	.27	.41	.41	164	249	57	84	8.0
7		1054	074.15	.31	.47	.47	164	233	57	84	8.0
8		1056	074.85	.41	.62	.62	164	228	57	84	11.0
9		1058	075.71	.50	.75	.75	163	247	57	85	12.0
10		1100	076.72	.55	.83	.83	164	244	57	85	12.0
11		1102	077.41	.28	.42	.42	164	261	57	85	10.0
12		1104	078.47	.47	.71	.71	163	270	57	85	10.0

STACK SAMPLING FIELD DATA SHEET

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

TEST ID TS5C2AS
PAGE 1 OF 3

PLANT Talisman Sugar Corporation
SOURCE Boiler #5
PLANT LOCATION South Bay, Florida
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES P.M
DATE 12-10-91 RUN NO. 2
TIME START 1215 TIME END 1354
SAMPLE TIME 2 / 48 (min/pt)= 96 Total min
ASSUMED MOISTURE 34 % FDA .620
NOMOGRAPH C_f 1.2 PITOT CORR. .84
P_b 30.15 "Hg P_s 30.15 "Hg
WEATHER Clear TEMP. 75 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .227 .227 .228 = .227
STACK DIMENSIONS 63"
STACK AREA 43.3 ft² EFFECTIVE ft²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. DNSTRM.
PORT SIZE 4 in. NIPPLE LENGTH 60 in.
U CORD LENGTH 125'
REMARKS:

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 113.180 ft³
INITIAL 078.712 ft³
NET 34.468 ft³
FILTER NO. 3662 IMP. VOL. GAIN 386 ml.
SIL GEL NO. 44 WT. GAIN 7.4 ml.
TOTAL CONDENSATE 393.4 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2	14.0				
% O_2	6.0				
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE 0.00 cfm 15 "Hg POST 0.003 cfm 15 "Hg
METER BOX/PUMP GAS SAMPLE SYST.
ORSAT BAG
PITOT TUBE NO. PRE-TEST OK
POST-TEST(+) 0.03 / 15 H_2O/Sec
POST-TEST(−) 0.00 / 15 H_2O/Sec
PYROMETER NO. 3
BOX OPERATOR Gauthreaux PROBE HOLDER McFarland

PORT AND TRAVERSE POINT NUMBER North	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (FT.³)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	METER ORIFICE PRESS. DIFF. ("H_2O) ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. F	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1		1217	079.60	.55	.66	.66	162	262	64	81	2.0
2		1219	080.15	.55	.66	.66	162	262	64	81	2.0
3		1221	081.72	.54	.65	.65	164	261	60	81	2.0
4		1223	082.25	.25	.30	.30	163	264	60	81	2.0
5		1225	082.72	.26	.31	.31	163	265	59	81	2.0
6		1227	083.22	.22	.26	.26	163	261	59	81	2.0

AIR CONSULTING & ENGINEERING, INC.

TEST ID TS5C2AS

PORT AND TRAVERSE POINT NUMBER /COMMENTS	DISTANCE FROM INSIDE STACK WALL	CLOCK TIME	GAS METER READING (ft^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
North											
1-7		1229	083.92	.32	.38	.38	165	261	56	81	2.0
8		1231	084.65	.40	.48	.48	164	261	55	81	2.0
9		1233	085.31	.41	.49	.49	164	257	54	81	3.0
10		1235	086.25	.50	.60	.60	164	257	54	81	3.0
11		1237	087.11	.43	.52	.52	162	264	54	81	3.0
12		1239	087.85	.40	.48	.48	162	264	54	81	3.0
2-1		1242	088.40	.20	.24	.24	165	270	55	82	2.5
2		1244	089.02	.28	.34	.34	165	260	54	82	3.0
3		1246	089.64	.27	.32	.32	165	260	54	82	3.0
4		1248	090.35	.31	.37	.37	165	260	54	82	3.0
5		1250	091.00	.31	.37	.37	165	251	54	82	3.0
6		1252	091.52	.16	.19	.19	164	245	54	82	3.0
7		1254	092.01	.12	.14	.14	165	244	57	83	2.0
8		1256	092.56	.28	.34	.34	164	242	55	83	2.0
9		1258	093.05	.18	.22	.22	165	241	55	83	3.0
10		1300	093.75	.33	.40	.40	164	241	54	84	4.0
11		1302	094.55	.36	.43	.43	164	241	52	84	4.0
12		1304	095.40	.98	.70	.70	164	241	51	84	5.0
South											
1-1		1308	095.91	.22	.26	.26	164	253	55	85	4.0
2		1310	096.53	.28	.34	.34	165	253	54	85	4.0
3		1312	097.23	.28	.34	.34	165	248	54	86	5.0
4		1314	097.81	.22	.26	.26	165	249	54	86	4.0
5		1316	098.31	.20	.24	.24	165	250	54	86	4.0
6		1318	098.85	.18	.22	.22	165	252	55	86	4.0
7		1320	099.65	.52	.62	.62	164	251	55	87	6.0

AIR CONSULTING & ENGINEERING, INC.

TEST ID TSSC2AS

PAGE 3 OF 3

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (ft^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
South											
1-8		1329	100.50	.50	.60	.60	163	252	55	87	6.0
9		1329	101.43	.60	.72	.72	164	257	50	87	7.0
10		1333	102.33	.63	.76	.76	164	258	50	87	8.0
11		1339	103.40	.68	.82	.82	163	260	50	87	8.0
12		1337	104.45	.70	.84	.84	164	260	50	87	8.0
2-1		1333	105.16	.42	.50	.50	163	262	50	88	8.0
2		1335	106.20	.34	.41	.41	163	262	50	88	7.0
3		1337	106.31	.37	.44	.44	164	256	50	88	7.0
4		1339	107.33	.41	.49	.49	163	257	50	88	8.0
5		1341	108.00	.30	.36	.36	164	255	52	88	6.0
6		1343	108.62	.28	.34	.34	164	252	53	89	6.0
7		1345	109.46	.50	.60	.60	163	249	52	89	8.0
8		1346	110.35	.59	.71	.71	164	249	51	89	9.0
9		1348	111.27	.60	.72	.72	163	249	51	90	9.5
10		1350	112.00	.37	.44	.44	165	248	51	90	8.0
11		1352	112.70	.28	.34	.34	164	239	51	90	8.0
12		1354	113.18	.18	.22	.22	164	236	51	90	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 TS5C3AS
PAGE 1 OF 3

PLANT Talisman Sugar Corporation
SOURCE Boiler #5
PLANT LOCATION South Bay, Florida
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES P.M
DATE 12-10-91 RUN NO. 3
TIME START 1445 TIME END 1625
SAMPLE TIME 2 / 48 (min/pt)= 96 Total min
ASSUMED MOISTURE 30 % FDA .70
NOMOGRAPH C_f 1.2 PITOT CORR. .84
P_b 30.15 "Hg P_s 30.15 "Hg
WEATHER Clear TEMP. 78 °F
METER BOX NO. 6 H 1.91 Y 1.009
NOZZLE CAL. .227 .227 .228 = .227
STACK DIMENSIONS 63"
STACK AREA 43.3 ft² EFFECTIVE ____ ft²
STACK HEIGHT ____ ft.
STACK DIAMETER: UPSTRM. ____ DNSTRM. ____
PORT SIZE 4 in. NIPPLE LENGTH 6 in.
U CORD LENGTH 125"
REMARKS:

MAT'L PROCESSING RATE ____
GAS METER READINGS: FINAL 147.060 ft³
INITIAL 113.400 ft³
NET 33.660 ft³
FILTER NO. 3660 IMP. VOL. GAIN 384 ml.
SIL GEL NO. 100 WT. GAIN 8.0 ml.
TOTAL CONDENSATE ____ ml.

ORSAT

	1	2	3	4	AVG.
% CO_2	14.0	14.0			14.0
% O_2	6.0	6.0			6.0
% CO	-				
% N_2					

F_O = ____ F_O RANGE = ____
ORSAT ANALYZER ____

LEAK CHECKS
PRE 0.02 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. 3
BOX OPERATOR Gauthreaux PROBE HOLDER McFarland

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (FT³)	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)
South 1-1		1447	114.57	.15	.18	.18	164	275	62	87	2.0
2		1449	115.00	.30	.36	.36	163	265	61	87	2.0
3		1451	115.74	.25	.30	.30	162	250	60	87	2.0
4		1453	116.55	.24	.29	.29	162	247	60	87	2.0
5		1455	117.15	.30	.36	.36	162	247	60	87	2.0
6		1457	117.92	.45	.54	.54	162	247	60	87	2.0

AIR CONSULTING & ENGINEERING, INC.

TEST ID TSSC3AS

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (ft^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP (°F)	SAMPLE BOX TEMP (°F)	LAST IMPINGER TEMP (°F)	DRY GAS METER TEMP (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
South											
1-7		1459	118.65	.55	.66	.66	162	251	60	87	3.0
8		1501	119.44	.66	.79	.79	163	251	60	87	4.0
9		1503	120.20	.34	.41	.41	163	260	59	87	4.0
10		1505	121.01	.40	.48	.48	163	260	59	87	4.0
11		1507	121.52	.15	.18	.18	163	257	60	87	2.0
12		1509	122.07	.15	.18	.18	163	267	60	87	2.0
2-1		1512	122.58	.20	.24	.24	162	267	60	88	3.0
2		1514	122.91	.20	.24	.24	162	265	59	88	3.0
3		1516	123.10	.24	.29	.29	163	266	59	88	3.0
4		1518	123.70	.25	.30	.30	163	264	59	88	3.0
5		1520	124.32	.18	.22	.22	163	231	59	88	3.0
6		1522	124.91	.11	.13	.13	163	229	59	88	2.0
7		1524	125.50	.52	.62	.62	163	229	59	88	4.0
8		1526	126.45	.62	.74	.74	163	235	59	88	5.0
9		1528	127.31	.68	.82	.82	163	242	59	88	6.0
10		1530	128.10	.50	.60	.60	163	243	59	89	5.0
11		1532	129.01	.80	.96	.96	163	238	59	89	7.0
12		1534	130.21	.89	1.07	1.07	162	239	58	89	8.0
North											
1-1		1538	131.06	.30	.36	.36	162	273	59	90	5.0
2		1540	131.82	.30	.36	.36	162	270	58	90	5.0
3		1542	132.58	.33	.40	.40	163	264	58	91	5.0
4		1544	132.90	.06	.07	.07	165	263	58	91	2.0
5		1546	133.22	.09	.11	.11	164	265	58	91	2.0
6		1548	133.51	.08	.09	.09	164	264	58	91	2.0
7		1550	134.00	.28	.34	.34	164	264	58	91	5.0

AIR CONSULTING & ENGINEERING, INC.

TEST ID TS5C3AS

PORT AND TRAVERSE POINT NUMBER North	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (ft.^{3})	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
1-8		1552	134.80	.34	.41	.41	164	272	60	91	5.0
9		1554	135.40	.26	.31	.31	164	271	60	91	5.0
10		1556	135.90	.13	.16	.16	164	256	60	91	5.0
11		1558	136.71	.45	.54	.54	165	256	60	92	5.0
12		1600	137.64	.45	.54	.54	166	256	60	92	7.0
2-1		1603	138.41	.55	.66	.66	166	230	61	92	8.0
2		1605	139.20	.48	.58	.58	166	230	60	92	8.0
3		1607	140.10	.43	.52	.52	165	230	60	92	8.0
4		1609	140.80	.34	.41	.41	165	230	60	93	8.0
5		1611	141.41	.33	.40	.40	164	244	60	93	8.0
6		1613	142.14	.28	.34	.34	166	244	60	93	7.0
7		1615	142.70	.38	.40	.40	166	245	60	93	8.0
8		1617	143.60	.37	.44	.44	166	237	60	93	8.0
9		1619	144.30	.48	.58	.58	166	246	60	93	9.0
10		1621	145.10	.52	.62	.62	163	259	61	93	10.0
11		1623	146.10	.51	.61	.61	162	255	61	93	10.0
12		1625	147.06	.45	.54	.54	162	255	61	93	10.0

APPENDIX C

LABORATORY ANALYSIS

AIR CONSULTING & ENGINEERING, inc.

PARTICULATE LAB DATA

SOURCE Talisman #5C

PROBE RINSE	RUN 1	RUN 2	RUN 3	BLANK	
CONTAINER NUMBER	[illegible]	[illegible]	S-26	[illegible]	
TOTAL VOLUME (ml)	174	130	135	100	LIQUID LEVEL ✓
1st GROSS WEIGHT (g)	106.5021	103.5821	103.5499	110.6271	DATE & TIME: 12-10-91 23:55
2nd GROSS WEIGHT (g)	106.5021	103.5821	103.5500	110.6271	DATE & TIME: 12-11-91 5:18
AVERAGE GROSS WEIGHT (g)	106.5021	103.5821	103.5500	110.6271	
TARE WEIGHT (g)	106.4810	103.5730	103.5420	110.6271	
SUB NET WEIGHT (g)	[illegible]	0.0091	0.0080	0.0000	
ACETONE BLANK (g)	—	—	—	—	
TOTAL NET WEIGHT (mg)	[illegible]	9.1	8.0	0.0	

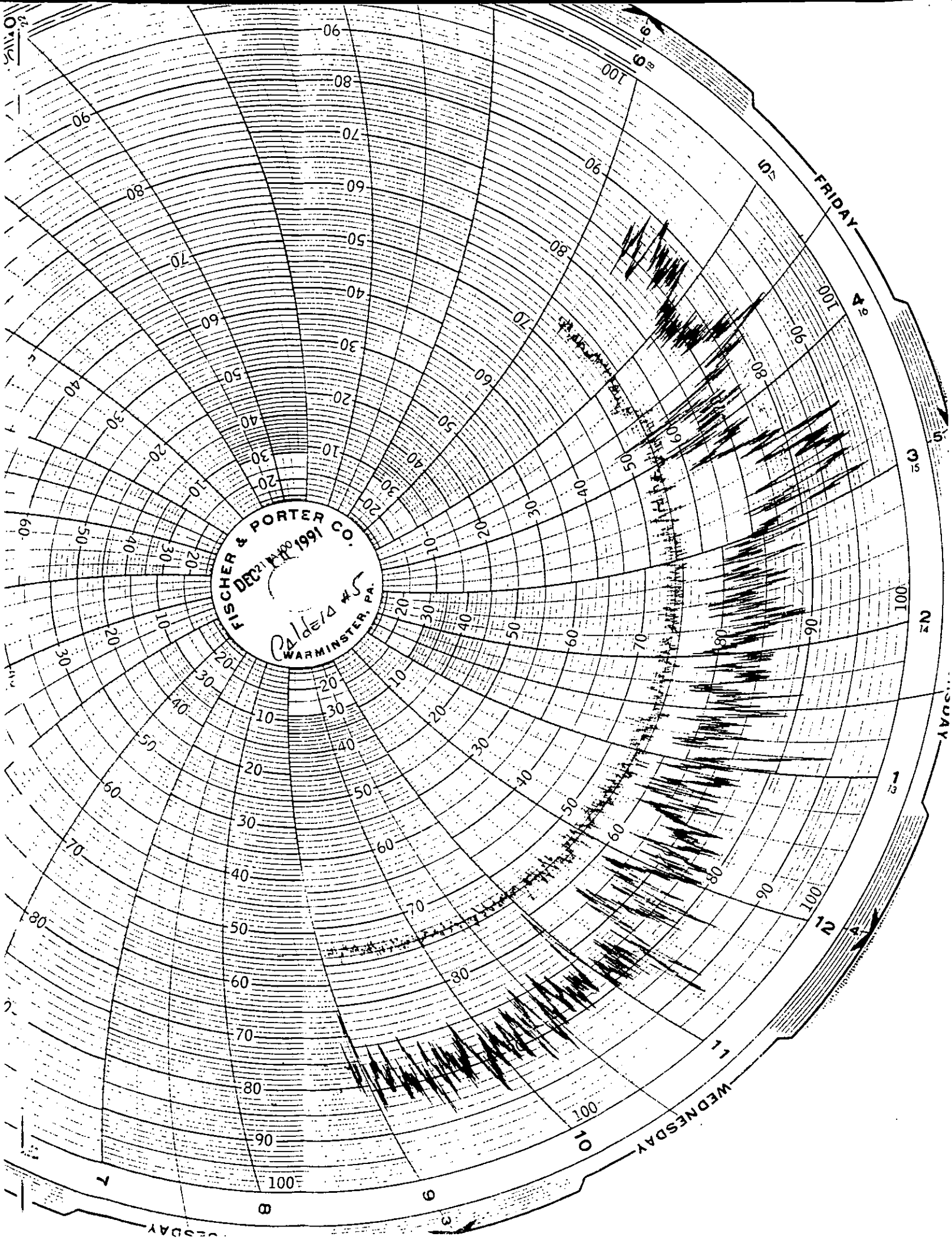
NOTE: In no case should a blank residue >0.01 mg/g or 0.001% of the weight of acetone used be subtracted from the sample weight.

FILTER	RUN 1	RUN 2	RUN 3	BLANK	
FILTER NUMBER	3661	3662	3660	2150	
1st GROSS WEIGHT (g)	0.7518	0.7269	0.7352	0.4015	DATE & TIME: 12-10-91 23:09
2nd GROSS WEIGHT (g)	[illegible]	0.7269	0.7352	0.4015	DATE & TIME: 12-11-91 5:34
AVERAGE GROSS WEIGHT (g)	0.7578	0.7269	0.7352	0.4015	
TARE WEIGHT (g)	[illegible]	0.4225	0.4252	0.4015	
SUB NET WEIGHT (g)	0.3236	0.3044	0.3100	0.0000	
TOTAL NET WEIGHT (mg)	323.6	304.4	310.0	0.0	

TARE BALANCE CHECK	1st GROSS WEIGHT BALANCE CHECK	2nd GROSS WEIGHT BALANCE CHECK
SEE LAB BOOK	0 ✓ 10.0g ✓	0 ✓ 10.0g ✓
	0.5 g ✓ 100.0g ✓	0.5g ✓ 100.0g ✓
	%RH 68 DATE 12-10-91	%RH 67 DATE 12-11-91
	Signature Christy L. Mck	Signature Christy L. Mck

APPENDIX D

PRODUCTION RATE CERTIFICATION


FISCHER & PORTER CO.
DEC 21 1991
WARMINSTER, PA.
FRIDAY
WEDNESDAY
TUESDAY

PROCESS DATA

INSTALLATION BOILER #5

COMPANY TALISMAN SUGAR CORP.

DATE DEC. 10, 1991

TYPE OF INSTALLATION BAGASSE BOILER

TYPE OF MATERIAL PROCESSED STEAM

TYPE OF FUEL USED BAGASSE

TYPE OF POLLUTION CONTROL SYSTEM VENTURI DUAL WET SCRUBBERS PLUS DRY COLLECTOR

	NORMAL	RUN 1	RUN 2	RUN 3
SCRUBBER WATER FLOW (GPM)	1200	1200	1200	1200
PRESSURE DROP (INCHES)	12	11.5	12.0	11.8

REPORTED BY FRANK KLEEMAN

BOILER DATA SHEET

COMPANY TALISMAN SUGAR CORP REPORTED BY FRANK KLEEMAN

DATE DEC. 10, 1991

INTEGRATOR FACTOR X100 BOILER NO. 5

FUEL OIL USED No 6 OIL

	TIME	INTEGRATOR	STEAM FLOW X 500	STEAM PRESSURE	TEMP.	FEED WATER TEMP.	FEED WATER PRESSURE
RUN 1	9 25	635935	92	295	562	257	380
	10 00	6717	90	295	564	257	390
	10 30	7384	85	295	561	258	380
	11 01	8052	88	295	560	258	390
	96 MINUTES	2117		295	562	258	385 AVG
	1.6 HRS.						
		2117 X 100 =	211,700				
		211,700 / 1.6 HRS =	132,300	LBS/HR			
RUN 2	12 15	639638	89	295	562	257	390
	12 55	640464	82	295	559	257	390
	1 30	1192	85	290	560	256	400
	1 51	1627	83	290	558	257	400
	96 MINUTES	1989		292	560	257	395 AVG
	1.6 HRS.						
		1989 X 100 / 1.6 =	124,300	LBS/HR			
RUN 3	2 45	642747	89	290	560	256	400
	3 15	3402	95	290	560	256	400

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	TALISMAN SUGAR CORPORATION	DATE:	12-10-91
LOCATION:	SOUTH BAY, FLORIDA	RUN NUMBER	1
SOURCE:	NUMBER 5 BOILER, SCRUBBER OUTLET	TIME:	0925-1101

TIME INTERVAL----------	96	MINUTES
OIL:		
FINAL OIL----------	N/A	
BEGIN OIL	N/A	
FACTOR----------	1	
STEAM:		
FINAL STEAM----------	638052	
BEGIN STEAM	635935	
FACTOR----------	100	
TEMPERATURE	562	DEGREES F
PRESSURE----------	295	PSIG
	310	PSIA
FEEDWATER:		
TEMPERATURE----------	257	DEGREES F
PRESSURE	380	PSIG
	395	PSIA
HEAT INPUT:		
STEAM----------	1292.7	BTU/LB
FEEDWATER	225.6	BTU/LB
NET STEAM----------	1067.1	BTU/LB
STEAM RATE	132313	LB/HR
BOILER EFFICIENCY----------	55.0	%
TOTAL FUEL HEAT INPUT	256.71	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)	256.71	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)----------	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION----------	77.01	LB/HR
TOTAL ACTUAL EMISSION	65.18	LB/HR
TOTAL ALLOWABLE EMISSION----------	0.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.254	LB/MMBTU

BOILER OPERATION PARAMETERS

PLANT TALISMAN SUGAR CORP. BOILER NUMBER 5

DATE 12-10-91 RUN NUMBER 1 OIL METER FACTOR NO OIL

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

SCRUBBER(S) GPM ___, ___

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

PH(if applicable) ___, ___

INITIAL INTEGRATOR 635935 FINAL INTEGRATOR 638052

132,300 LBS/HR

TIME	~~OIL~~	STEAM			FEEDWATER	
	METER READING	LBS.FLOW X 1500	TEMP.	PRESSURE	TEMP.	PRESSURE
925		92	562	295	257	350
1101						
96 MINUTES						

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	TALISMAN SUGAR CORPORATION	DATE:	12-10-91
LOCATION:	SOUTH BAY, FLORIDA	RUN NUMBER	2
SOURCE:	NUMBER 5 BOILER, SCRUBBER OUTLET	TIME:	1215-1351

TIME INTERVAL----------	96	MINUTES
OIL:		
FINAL OIL----------	N/A	
BEGIN OIL	N/A	
FACTOR----------	1	
STEAM:		
FINAL STEAM----------	641627	
BEGIN STEAM	639638	
FACTOR----------	100	
TEMPERATURE	561	DEGREES F
PRESSURE----------	295	PSIG
	310	PSIA
FEEDWATER:		
TEMPERATURE----------	257	DEGREES F
PRESSURE	380	PSIG
	395	PSIA
HEAT INPUT:		
STEAM----------	1292.2	BTU/LB
FEEDWATER	225.6	BTU/LB
NET STEAM----------	1066.6	BTU/LB
STEAM RATE	124313	LB/HR
BOILER EFFICIENCY----------	55.0	%
TOTAL FUEL HEAT INPUT	241.08	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)	241.08	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)----------	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION----------	72.32	LB/HR
TOTAL ACTUAL EMISSION	66.63	LB/HR
TOTAL ALLOWABLE EMISSION----------	0.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.276	LB/MMBTU

BOILER OPERATION PARAMETERS

PLANT TALISMAN SUGAR CORP. BOILER NUMBER 5

DATE 12-10-91 RUN NUMBER 2 OIL METER FACTOR No Oil

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

SCRUBBER(S) GPM _____, _____

OPERATOR SIGNATURE _____ SCRUBBER(S)H2O LEVEL _____, ____

Ph(if applicable) _____, _____

INITIAL INTEGRATOR 639638 FINAL INTEGRATOR ~~641989~~ 641627

124,300 LBS/HR

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS. FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
1215		89	562	295	257	390
1255		82	559	295	257	390
151		85	561	295	257	400
96 MINUTES			561	295	257	393 AVG.

~~146,938~~

AIR CONSULTING & ENGINEERING, INC.
Complete Emission Data

PLANT:	TALISMAN SUGAR CORPORATION	DATE:	12-10-91
LOCATION:	SOUTH BAY, FLORIDA	RUN NUMBER	3
SOURCE:	NUMBER 5 BOILER, SCRUBBER OUTLET	TIME:	1445-1641

TIME INTERVAL----------	116	MINUTES
OIL:		
FINAL OIL----------	N/A	
BEGIN OIL	N/A	
FACTOR----------	1	
STEAM:		
FINAL STEAM----------	645255	
BEGIN STEAM	642747	
FACTOR----------	100	
TEMPERATURE	560	DEGREES F
PRESSURE----------	290	PSIG
	305	PSIA
FEEDWATER:		
TEMPERATURE----------	256	DEGREES F
PRESSURE	400	PSIG
	415	PSIA
HEAT INPUT:		
STEAM----------	1292.1	BTU/LB
FEEDWATER	224.6	BTU/LB
NET STEAM----------	1067.5	BTU/LB
STEAM RATE	129724	LB/HR
BOILER EFFICIENCY----------	85.0	%
TOTAL FUEL HEAT INPUT	251.78	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)	251.78	MMBTUH

AVG = 249.86

ALLOWABLES:		
ALLOWABLE EMISSION (OIL)----------	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION----------	75.53	LB/HR
TOTAL ACTUAL EMISSION	66.05	LB/HR
TOTAL ALLOWABLE EMISSION----------	0.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.262	LB/MMBTU

BOILER OPERATION PARAMETERS

PLANT TALISMAN SUGAR CORP BOILER NUMBER 5

DATE 12-10-91 RUN NUMBER 3 OIL METER FACTOR No Oil

STEAM INTEGRATOR FACTOR x100 SCRUBBER(S) PRESS.DROP ___,___

OPERATOR SIGNATURE _____ SCRUBBER(S) GPM _____,_____

SCRUBBER(S)H2O LEVEL _____,____

Ph(if applicable) _____,_____

INITIAL INTEGRATOR 642747 FINAL INTEGRATOR 645255

TIME	OIL	STEAM			FEEDWATER	
	METER READING	LBS.FLOW	TEMP.	PRESSURE	TEMP.	PRESSURE
245	)	89	560	290	256	400
1641	)					

APPENDIX E

QUALITY ASSURANCE AND CHAIN OF CUSTODY

STANDARD METER CALIBRATION
Meter Number 1040616

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

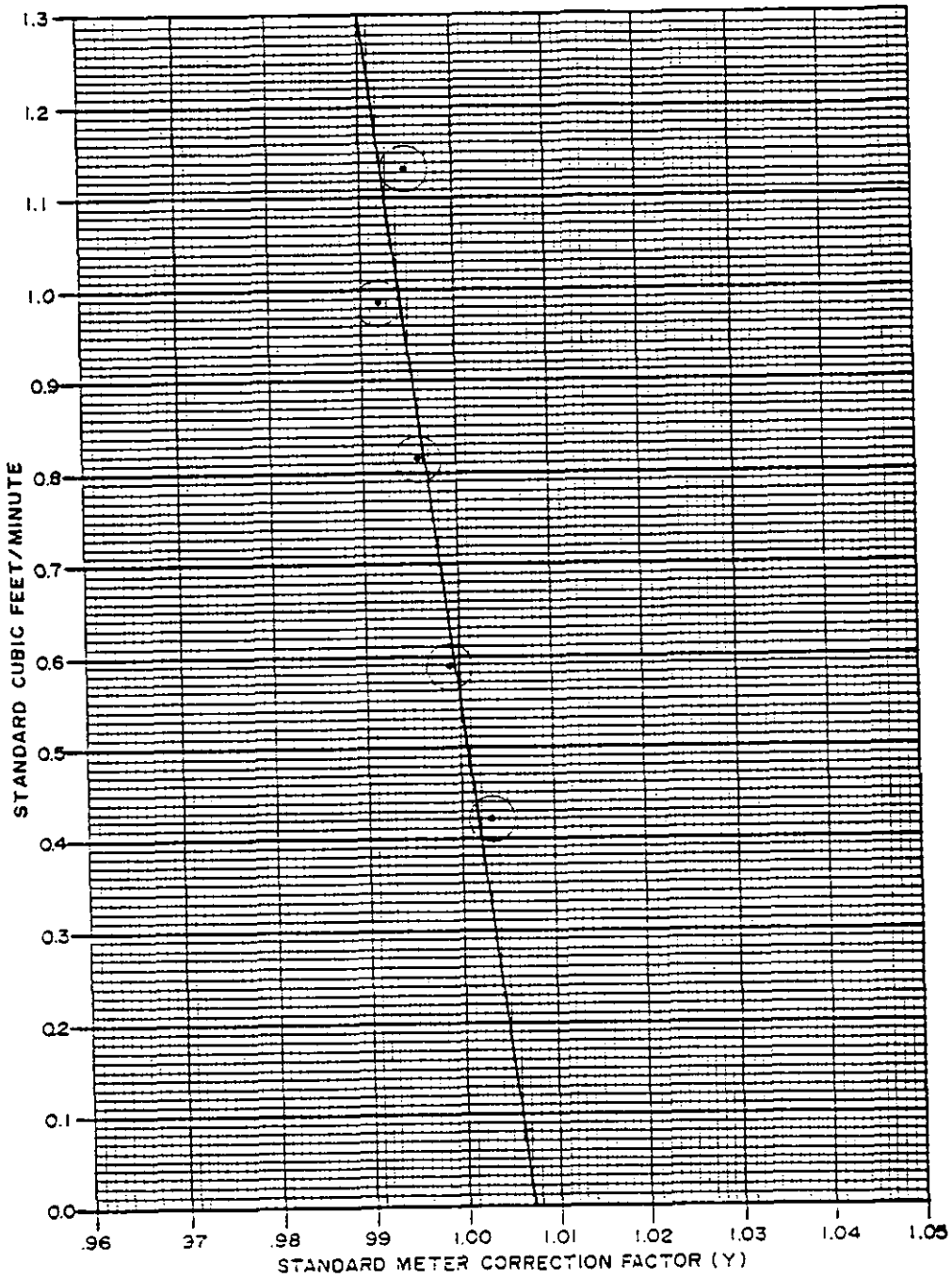
$$Y_a \times Y_s = Y$$

Y_a = actual ratio of field meter to standard meter

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

Y = corrected ratio of field meter

The dry standard meter was calibrated on June 11. 1991. and is checked and/or recalibrated at least annually.



STANDARD METER CALIBRATION CURVE

JUNE 11, 1991

AIR CONSULTING and ENGINEERING

AIR CONSULTING & ENGINEERING — STANDARD METER CALIBRATION

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

METER SERIAL NUMBER 10106 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 ft³	INITIAL	FINAL	ACTUAL ft³			
-.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
-.3	-.7	0.243	8.143	5.290	16.801	22.127	5.323	75	76	9
-.3	-.7	6.143	13.430	5.287	22.127	27.442	5.315	75	76	9
-.3	-.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	0.113	6.145	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: A. 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 0.500 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

ΔH1S	AVERAGE ΔH@	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. Gobel

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 TALISMAN SUGAR SOURCE ALL THERMOCOUPLE NUMBER ____ PYROMETER NUMBER ____

FLIGHT SERVICE Pb 30.48 In. Hg. ACE BAROMETER Pb 30.48 In. Hg.

ASTM GLASS THERMOMETER 150 °F / THERMOCOUPLE 150 °F ASTM GLASS THERMOMETER 68 °F / METER TEMP 68 °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 ft³	INITIAL	FINAL	ACTUAL ft³				
.56	.55	554.039	559.628	5.589	843.390	849.146	5.756	75 74	81 83	14	12
.51	.47	559.628	565.175	5.547	849.146	854.877	5.731	74 73	83 84	15	12
.67	.74	565.175	570.712	5.537	854.877	860.615	5.738	73 73	84 85	12	12

CALIBRATED BY: Cody Mitchell

DELTA H	Ya	SCFM	Ys	Y
1.885	0.986	0.402	1.000	0.986
1.867	0.987	0.373	1.000	0.987
1.935	0.985	0.466	0.999	0.984
MEAN:	1.896	0.986	1.000	0.986

air consulting and engineering

AIR CONSULTING & ENGINEERING, INC. PYROMETER CALIBRATION

DATE 9-4-90 PYROMETER NUMBER #3

SOURCE (SPECIFY)	GLASS THERMOMETER WITH NBS MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	32	34	2	0.4
AMBIENT	80	81	1	0.2
HOT OVEN	268	264	4	0.6

FDER - MAXIMUM 5° DIFFERENCE

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

CALIBRATED BY: Greg R Brown

AIR CONSULTING & ENGINEERING, INC. — PITOT TUBE CALIBRATION

DATE CALIBRATED 10-7-91

PITOT TUBE 59

IS PITOT TUBE ASSEMBLY LEVEL YES

ARE PITOT TUBE OPENINGS DAMAGED NO

α_1 = 0 °(<10°), α_2 = 1 °(<10°), β_1 = 2 °(<5°), β_2 = 1 °(<5°)

γ = 1 ° θ = 1 ° A = 1.165 in. = (Pa + Pb)

z = A sin γ = 0.017 in., <0.32/<1/8 in.

w = A sin θ = 0.017 in., <0.08/<1/32 in.

P_a 0.583 in. P_b 0.582 in. D_t .375

WAS CALIBRATION REQUIRED no

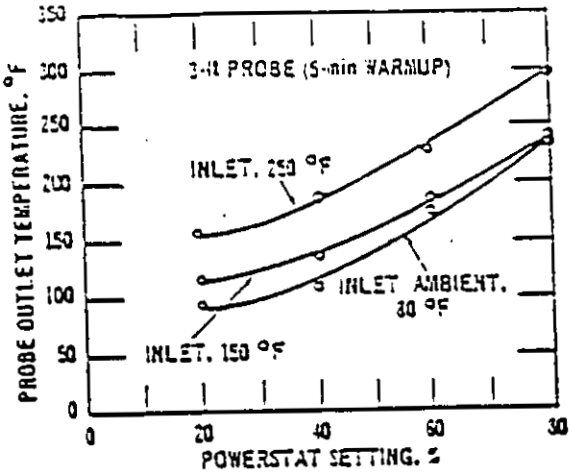
THERMOCOUPLE CALIBRATION

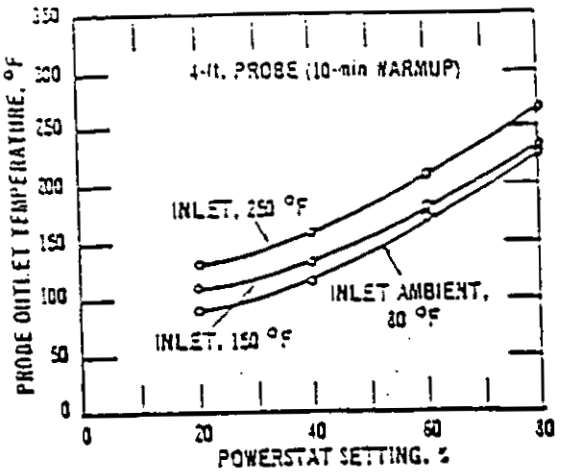
SOURCE (SPECIFY)	ASTM GLASS THERMOMETER WITH MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	42	42	0	0
AMBIENT	78	78	0	0
HOT OVEN	402	400	2	0.38

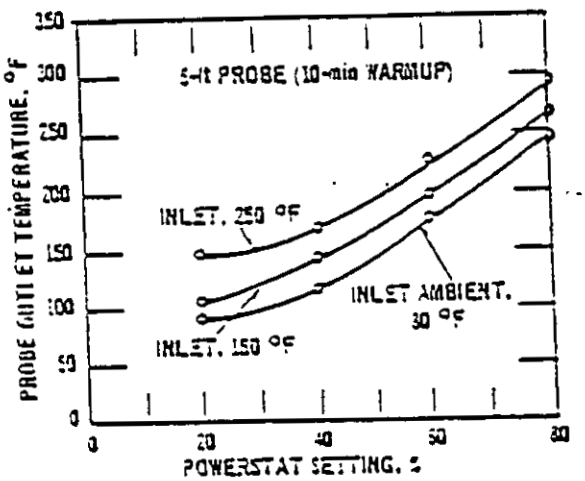
FDER - MAXIMUM 5° DIFFERENCE

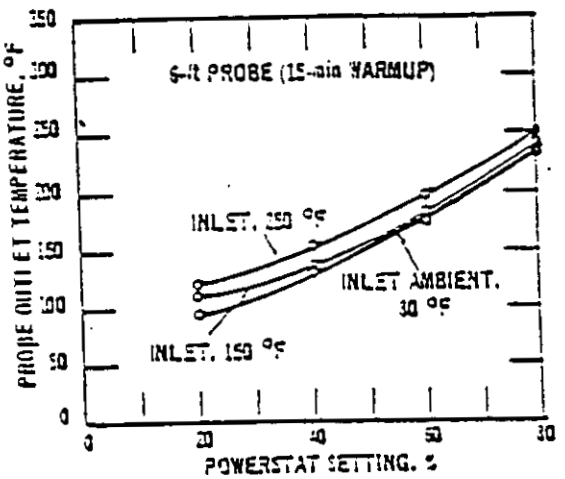
CALIBRATED BY: Sid Carter

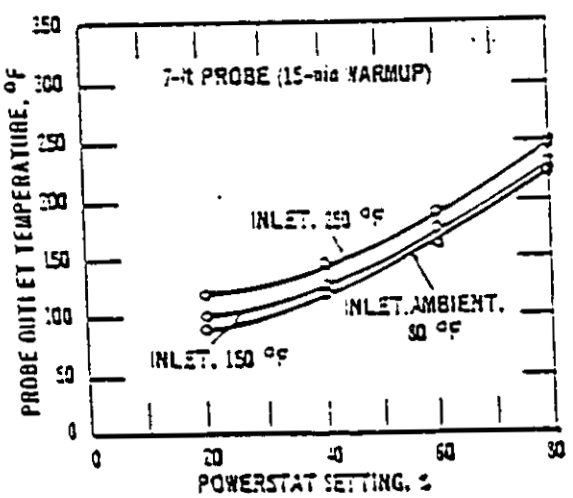
EPA $\left[\frac{\text{(REF. TEMP. °F + 460°) − (PYROMETER TEMP. °F + 460°)}}{\text{REF. TEMP. °F + 460°}}\right]$ 100 ≤ 1.5%











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 Talleman — TEST DATE 12-10-91
SOURCE NAME Boiler 5 — SAMPLE RECOVERED BY H. Hawthorne
TYPE OF SAMPLE Run — PARTICULATE ANALYSES BY Chris Tech

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	3661	—	DK Gray	
1	S-4	✓	clear	
2	3662	—	DK Gray	
2	S-14	✓	clear	
3	3660	—	Md Gray	
3	S-86	✓	clear	
ACETONE / WATER BLANK (CIRCLE)	S-44A	✓	clear	
FILTER BLANK				

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT. (g)	INIT. WT. (g)	NET WT. (g)	COLOR
1	6	208.2	200.0	8.2	Pink
2	47	207.1	200.0	7.1	Pink
3	100	207.6	200.0	7.6	Pink
			200.0		
			200.0		
			200.0		
			200.0		
			200.0		

APPENDIX F

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

AIR CONSULTING AND ENGINEERING, INC.

Stephen L. Neck, P.E.
Project Manager

Early McFarland
Field Participant

Gerard Gauthreaux
Field Participant

Christy Neck
Laboratory Analysis

Dagmar Neck
Report Preparation

Candace V. Taylor
Document Production

KLEEMAN ENGINEERING

Frank Kleeman
Test Coordinator
Production Data

FDER

Ken Tucker
Test Observer