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: 16

Title: Source Test Report for Particulate Emissions Twin Impingement Wet Scrubber Number 4 Boiler: Talisman Sugar Corporation

February 1991

SOURCE TEST REPORT
for
PARTICULATE EMISSIONS

TWIN IMPINGEMENT WET SCRUBBER
NUMBER 4 BOILER

TALISMAN SUGAR CORPORATION
SOUTH BAY, FLORIDA

FEBRUARY 11. 1991

PREPARED FOR:
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air consulting and engineering, Inc.

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.

Stephen L. Neck, P.E.

State of Florida
Registration No. 20020

3-23-91
Date

2nd SUBMITTAL

SEAL

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1.0 INTRODUCTION

Personnel from Air Consulting and Engineering,INC.(ACEI) performed annual source emission compliance testing for the Talisman Sugar Corporation in South Bay, Florida on February 11, 1991. Testing was performed at the Number 4 Boiler wet scrubber outlets.

Testing was designed to fulfill "specific conditions" of the current Florida Department of Environmental Regulation (FDER) operating permit.

Four United States Environmental Protection Agency (USEPA) Method 5 particulate matter (PM) test runs were conducted while the plant was documented to be operating within 10% of permitted production.

Mr. Frank Kleeman served as test coordinator and certified production rates. ACEI performed this work under subcontract to Kleeman Engineering, Inc.

Mr. Ken Tucker of the Florida Department of Environmental Regulation(FDER) witnessed most of the testing.

2.0 SUMMARY and DISCUSSION of RESULTS

Results of the emission testing are provided in Table 1. Complete emission data are located in the report appendices.

The source was found to be operating within full compliance of permit conditions. Stack emissions averaged 64.55 pounds per hour (LB/HR) and 0.271 pounds per million btu(LB/MMBTU) heat input against a "process rate" basis allowable emission of 0.300 LB/MMBTU. Permit conditions limit emissions to 0.10 LB/MMBTU from oil and 0.300 LB/MMBTU from bagasse firing. No oil was used during compliance testing.

Production rate summaries are provided in Appendix A. These data were taken from control room recordings of steam flow, temperature, and pressure as well as feedwater temperature and pressure(Appendix E). Steam integrator readings were recorded at the beginning and end of each particulate test run by Mr. Frank Kleeman.

Due to a cracked filter holder, the final leak check for test Run 3 was excessive. This test result has been excluded from the emission averages.

TABLE 1
EMISSION SUMMARY
TALISMAN SUGAR CORPORATION
NUMBER 4 BOILER
FEBRUARY 11, 1991

RUN NUMBER	TIME	ACTUAL EMISSIONS		ALLOWABLE EMISSIONS	
		LB/HR	LB/MMBTU	LB/HR	LB/MMBTU
1	0835-1014 39	62.79	0.265	71.20	0.300
2	1110-1246	63.84	0.259	73.86	0.300
3	1345-1521 36	26.64	0.110	72.36	0.300
4	1700-1839 39	67.01	0.289	69.51	0.300
AVERAGES *	38	64.55	0.271	71.52	0.300

* RUN 3 NOT INCLUDED

3.0 PROCESS DESCRIPTION AND OPERATION

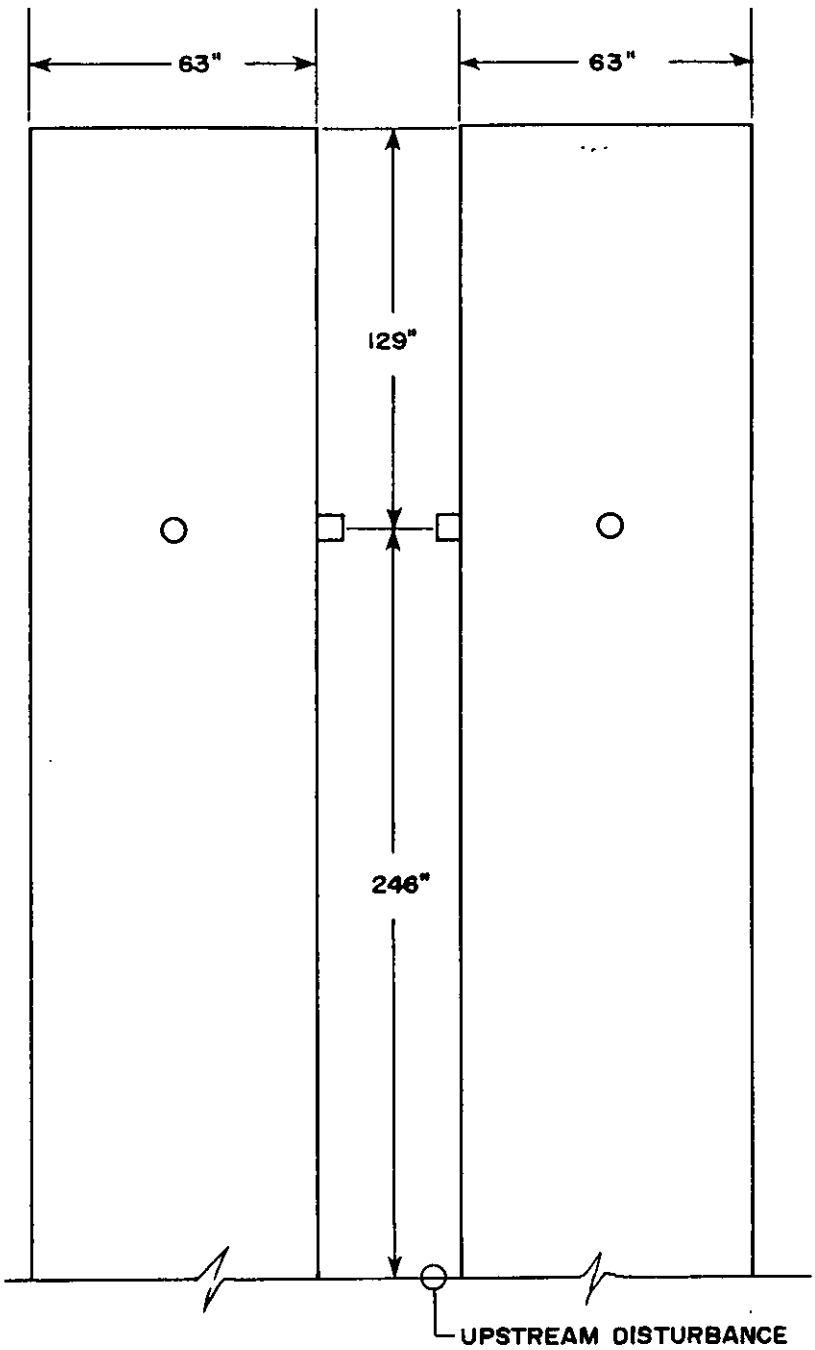
The Number 4 Boiler at the Talisman Sugar Corporation is a traveling grate stoker design used primarily for bagasse fuel firing. Supplemental oil firing may also be utilized but was not used during the emission test series.

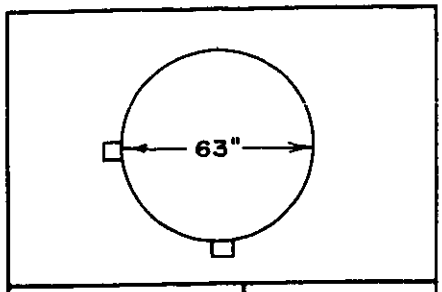
The boiler averaged 122,201 pounds per hour steam production over the Run Numbers 1, 2 and 4 test period.

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

4.0 SAMPLING POINT LOCATION

The sampling point location 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. 4
TALISMAN SUGAR CORPORATION
SOUTH BAY, FLORIDA

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5.0 FIELD and ANALYTICAL PROCEDURES- USEPA METHOD 5

Particulate matter samples were collected by the emission measurement method specified by the United States Environmental Protection Agency. A schematic diagram of the sampling train used is provided 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" glass fiber 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 value.

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 pror to the test program. All openings on the equipment were sealed while in transit to the test site.

3. IMPINGERS - The Greenburg-Smith impingers were cleaned, rinsed, and dried as in 2. The impingers were also sealed 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 dimensions at the point where the tests were to be performed. The stack temperature was determined using a bi-metallic thermocouple and calibrated

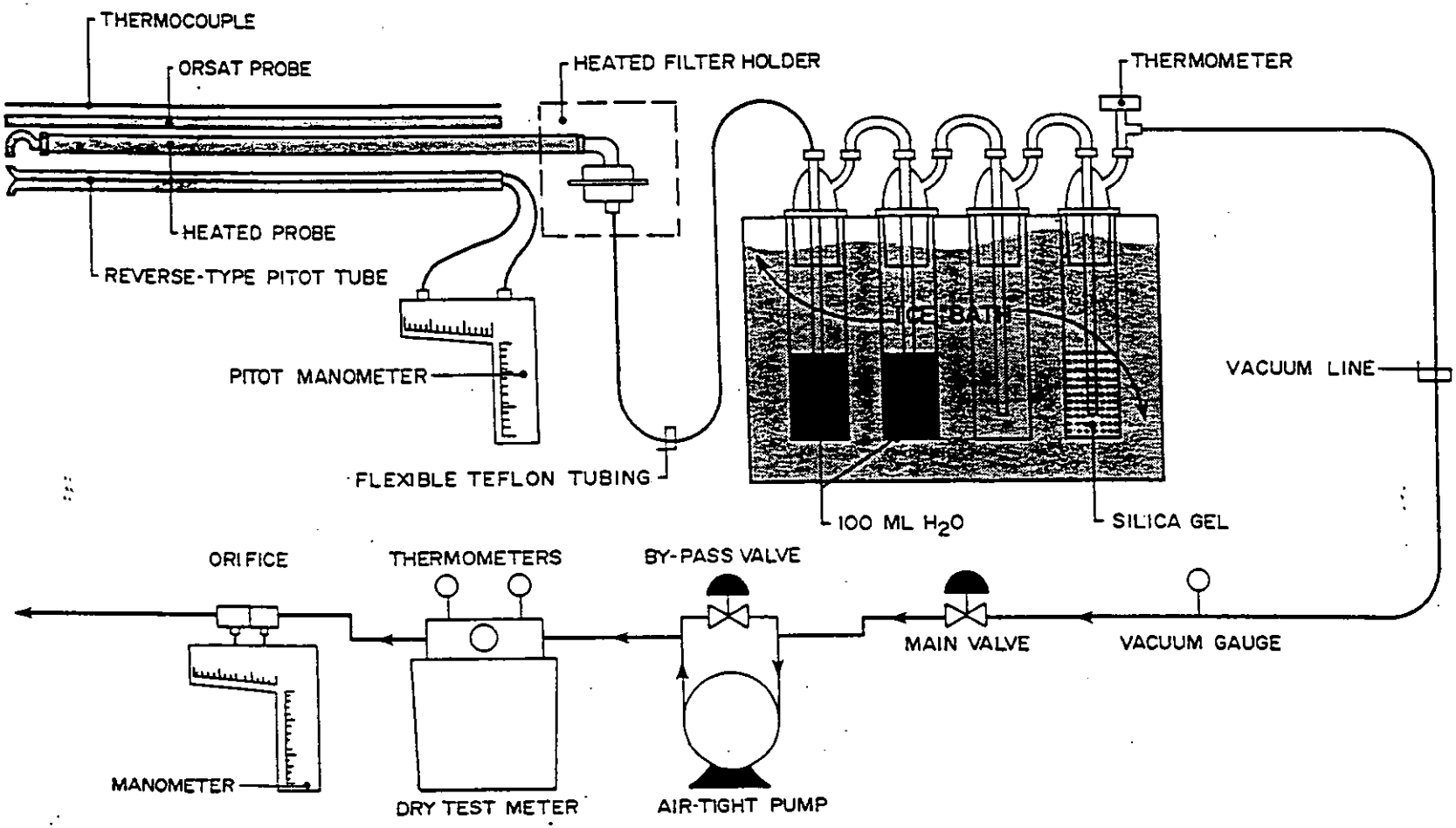

FIGURE 2
EPA METHOD 5 SAMPLING TRAIN

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pyrometer. Velocity head measurements were made with a calibrated type "s" pitot tube and an inclined manometer. Velocity head measurements of 0.05 inches H2O or less were measured using a micromonometer.

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 or downstream from flow disturbances.USEPA Methods 1 and 2 were utilized for this task.

Each particulate matter test run consisted of sampling for a specific amount of time at each 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 conducting the test run. The stack gas temperature was also measured at each traverse point. Together with assumed moisture and orsat knowledge as well as known nozzle area, calculations of "isokinetic" (equal energy or velocity) were quickly made and effected for each traverse point during the test run.

The gases sampled passed through the following components: a stainless steel nozzle and glass probe; a glass fiber filter; two impingers charged with 100 ml of distilled water each; one dry impinger; one impinger with 200 grams of silica gel desiccant; a flexible length of tubing; a leak free pump; a calibrated dry gas meter: and, finally, a calibrated flow orifice.

Sample recovery was accomplished in the following manner:

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. The container was then 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 content of the stack gases, then discarded.

4. The 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 either dried for two hours at 105 degrees C or desiccated for 24 hours at ambient temperature. Following desiccation, the filter was weighed to the nearest 0.1 mg. A minimum of two such weighings six hours apart were made with a variance of less than 0.5 mg.

2. The acetone from Container 2 was transferred to a tared beaker, evaporated to dryness, and weighed in the same manner as above.

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

The total sample weight included the weight gains from Sample Containers 1 and 2.

DATA

All relevent field and lab data sheets as well as emission calculations are provided in the report appendices.

APPENDIX A

COMPLETE EMISSION DATA

AND

SAMPLE CALCULATIONS

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Complete Emission Data

PLANT:	TALISMAN SUGAR CORPORATION	DATE:	2-11-91
LOCATION:	SOUTH BAY, FLORIDA	RUN NUMBER	1
SOURCE:	NUMBER 4 BOITER, SCRUBBER OUTLET	TIME:	0835-1011

TIME INTERVAL	96	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	5738	
BEGIN STEAM	3785	
FACTOR	100	
TEMPERATURE	575	DEGREES F
PRESSURE	285	PSIG
	300	PSIA
FEEDWATER:		
TEMPERATURE	260	DEGREES F
PRESSURE	420	PSIG
	435	PSIA
HEAT INPUT:		
STEAM	1298.1	BTU/LB
FEEDWATER	228.6	BTU/LB
NET STEAM	1069.5	BTU/LB
STEAM RATE	122063	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	237.35	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)	237.35	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	71.20	LB/HR
TOTAL ACTUAL EMISSION	60.91	LB/HR
TOTAL ALLOWABLE EMISSION	0.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.257	LB/MMBTU

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	TALISMAN SUGAR CORPORATION	DATE:	2-11-91
LOCATION:	SOUTH BAY, FLORIDA	RUN NUMBER	2
SOURCE:	NUMBER 4 BOITER, SCRUBBER OUTLET	TIME:	1110-1246

TIME INTERVAL	96	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	8983	
BEGIN STEAM	6960	
FACTOR	100	
TEMPERATURE	572	DEGREES F
PRESSURE	281	PSIG
	296	PSIA
FEEDWATER:		
TEMPERATURE	260	DEGREES F
PRESSURE	435	PSIG
	450	PSIA
HEAT INPUT:		
STEAM	1299.6	BTU/LB
FEEDWATER	228.6	BTU/LB
NET STEAM	1071.0	BTU/LB
STEAM RATE	126438	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	246.20	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)	246.20	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	73.86	LB/HR
TOTAL ACTUAL EMISSION	62.00	LB/HR
TOTAL ALLOWABLE EMISSION	0.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.252	LB/MMBTU

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	TALISMAN SUGAR CORPORATION	DATE:	2-11-91
LOCATION:	SOUTH BAY, FLORIDA	RUN NUMBER	3
SOURCE:	NUMBER 4 BOITER, SCRUBBER OUTLET	TIME:	1345-1521

TIME INTERVAL	96	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	92166	
BEGIN STEAM	90191	
FACTOR	100	
TEMPERATURE	579	DEGREES F
PRESSURE	282	PSIG
	297	PSIA
FEEDWATER:		
TEMPERATURE	260	DEGREES F
PRESSURE	440	PSIG
	455	PSIA
HEAT INPUT:		
STEAM	1303.4	BTU/LB
FEEDWATER	228.6	BTU/LB
NET STEAM	1074.8	BTU/LB
STEAM RATE	123438	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	241.21	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)	241.21	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	72.36	LB/HR
TOTAL ACTUAL EMISSION	25.14	LB/HR
TOTAL ALLOWABLE EMISSION	0.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.104	LB/MMBTU

AIR CONSULTING & ENGINEERING,INC.
Complete Emission Data

PLANT:	TALISMAN SUGAR CORPORATION	DATE:	2-11-91
LOCATION:	SOUTH BAY, FLORIDA	RUN NUMBER	4
SOURCE:	NUMBER 4 BOITER, SCRUBBER OUTLET	TIME:	1700-1838

TIME INTERVAL	98	MINUTES
OIL:		
FINAL OIL	0	
BEGIN OIL	0	
FACTOR	1	
STEAM:		
FINAL STEAM	996119	
BEGIN STEAM	994190	
FACTOR	100	
TEMPERATURE	585	DEGREES F
PRESSURE	270	PSIG
	285	PSIA
FEEDWATER:		
TEMPERATURE	260	DEGREES F
PRESSURE	450	PSIG
	465	PSIA
HEAT INPUT:		
STEAM	1307.6	BTU/LB
FEEDWATER	228.6	BTU/LB
NET STEAM	1079.0	BTU/LB
STEAM RATE	118102	LB/HR
BOILER EFFICIENCY	55.0	%
TOTAL FUEL HEAT INPUT	231.69	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)	231.69	MMBTUH
ALLOWABLES:		
ALLOWABLE EMISSION (OIL)	.10	LB/MMBTU
ALLOWABLE EMISSION (NON-OIL)	.30	LB/MMBTU
TOTAL ALLOWABLE EMISSION	69.51	LB/HR
TOTAL ACTUAL EMISSION	64.79	LB/HR
TOTAL ALLOWABLE EMISSION	0.300	LB/MMBTU
TOTAL ACTUAL EMISSION	0.280	LB/MMBTU

Avg 1,2,4 = 238

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COMPLETE EMISSION DATA

PLANT: TALISMAN SUGAR CORPORATION
SOURCE: NUMBER 4 BOILER
DATE: 2-11-91

RUN NO.:	1	IMPINGER ml	235
BEGIN TIME:	0835	SILICA GEL gms.	12.8
END TIME:	1014	PERCENT O2	7.50
TOTAL RUN TIME:	96.00 min.	PERCENT CO2	12.70
BAROMETRIC PRESSURE:	30.00 "Hg	"F" FACTOR	0
STACK PRESSURE:	30.00 "Hg.		
NOZZLE DIAMETER:	.205 inches	PARTICULATE	
METER CORR. FACTOR:	.994	---	
FINAL METER:	355.379 cubic ft.	FILTER mg.	217.8
INITIAL METER:	325.555 cubic ft.	WASH mg.	9.2
STACK AREA:	43.295 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	.520	154	5
1-2	.700	0.837	.660	153	5
1-3	.710	0.843	.660	154	5
1-4	.660	0.812	.620	154	5
1-5	.410	0.640	.390	155	5
1-6	.240	0.490	.230	155	5
1-7	.310	0.557	.290	154	5
1-8	.400	0.632	.380	154	5
1-9	.420	0.648	.400	157	5
1-10	.440	0.663	.410	155	5
1-11	.520	0.721	.490	150	5
1-12	.480	0.693	.450	150	5
2-1	.140	0.374	.130	155	5
2-2	.140	0.374	.130	154	5
2-3	.160	0.400	.140	154	5
2-4	.120	0.346	.110	154	6
2-5	.160	0.400	.140	155	6
2-6	.180	0.424	.170	155	6
2-7	.280	0.529	.260	155	6
2-8	.430	0.656	.400	154	6
2-9	.560	0.748	.530	155	6
2-10	.620	0.787	.580	154	6
2-11	.650	0.806	.550	154	6
2-12	.620	0.787	.580	150	6
AVERAGES	0.413	0.621	0.384	154	5

EMISSION RESULTS

NOZZLE DIA.(SQ.FT.):0.0002295

AVG. VELOCITY HEAD :---------	0.36 "H2O	VOL. FLOW ACFM :	9818
AVG. STACK TEMP.: ---------	154 F	VOL. FLOW SCFMD :	6075
AVG. METER TEMP.: ---------	65 F		
AVG. ORIFICE DIFFERENTIAL:---	0.37 "H2O	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:---	29.946	---	
% H2O VAPOR: :---------	28.2	POUNDS PER HOUR:	60.91
GAS MOL. WT. DRY: ---------	30.33	POUNDS PER SCF :	0.000016
GAS MOL. WT. WET: ---------	26.85	GRAINS/SCF:	0.11
% EXCESS AIR: ---------	55.28	GRAINS/SCF @ 8% O2	0.11
AVG. STACK VEL.(FPS)---------	37.80	GRAINS/SCF @50% EA	0.12
MMBTU INPUT: ---------	237.35	POUNDS PER MMBTU:	0.25
PERCENT ISOKINETIC :---------	96.85		

RUN 1 (cont.) STACK 2 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIFICE DIFF.	STACK TEMP.	METER TEMP.
1-1	.380	0.616	.360	153	66
1-2	.380	0.616	.360	154	67
1-3	.310	0.557	.290	154	67
1-4	.370	0.608	.350	154	68
1-5	.390	0.624	.370	154	68
1-6	.350	0.592	.330	155	69
1-7	.270	0.520	.250	155	69
1-8	.250	0.500	.230	155	70
1-9	.310	0.557	.290	155	70
1-10	.310	0.557	.290	155	71
1-11	.320	0.566	.300	154	71
1-12	.320	0.566	.300	155	72
2-1	.220	0.469	.210	155	72
2-2	.220	0.469	.210	154	73
2-3	.220	0.469	.210	155	73
2-4	.250	0.500	.250	155	73
2-5	.250	0.500	.250	155	74
2-6	.220	0.469	.250	155	74
2-7	.420	0.648	.420	155	75
2-8	.460	0.678	.460	155	75
2-9	.530	0.728	.580	155	75
2-10	.550	0.742	.600	154	76
2-11	.560	0.748	.600	155	76
2-12	.520	0.721	.600	154	76
AVERAGES	0.349	0.584	0.348	155	72

SAMPLE CALCULATIONS - RUN 1

NOZZLE AREA (FT.2)	(Dn/12)!2x3.1416/4	0.000229
AVG.VELOCITY HEAD:	(AVG.SQ.RT.)!2	38.96
METER STND. FT3:	(Mf-Mi)xMCFx(AVG.ORF.DIFF./13.6))/29.92)x(528/(Tm+460))	29.950
PERCENT H2O:	((IMP+SG)x(((IMP+SG)x.0474)+SCF)x100	
Mw DRY:	((O2%x.32)+CO2%x.44)+(100-(O2%+CO2)x.28	30.33
Mw WET:	(Mw DRYx(1-%H2O/100))+%H20x.18	26.85
% EXCESS AIR:	%O2/(((100-(%O2+%CO2))x.264)-%O2)*100	55.28
STACK VEL.(FPS):	85.49x.84x(AVG.SQ.RT.VEL.HD.)x((Ts+460)/(PsxMwWET))!.5	38.96
% ISOKINETIC:	((Ts+460)xSCFx2992)/(528xFPSxTIMExAn xPs x 60x(1-%O2/100)	94.06
VOL. FLOW (ACFM):	FPS x 60 x As	101206
STND. FLOW(SCFMD):	ACFMx528/(Ts+460)x(1-%H20/100)x(Ps/29.92)	62652
PARTICULATE LB/HR:	PROBE+FILTER mg./453600 x (SCFMD/SCF) x 60	62.813
PARTICULATE LB/SCF):	PROBE+FILTER mg./453600 /SCF	0.0000167
GRAINS/SCF:	LB/SCF x 7000	0.1170
GR/SCF @ 8% O2:	(12.9/(20.9-%O2))x GR/SCF	0.1126
GR/SCF @ 50% E.A.:	GR/SCF x ((100+ %E.A.)/150)	0.1211
LB/MMBTU:	(LB/HR)/(LB/MMBTUH)	0.000
LB/MMBTU "F" FACTOR:	LB/SCF x "F" FACTOR x (20.9/20.9-%O2)	0.000

NOTE: THESE ARE EXAMPLE CALCULATIONS. DERIVED SOLUTIONS FOR THIS CASE DIFFER FROM ACTUAL SOLUTIONS DUE TO DIFFERENCES IN INPUT DATA.

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: TALISMAN SUGAR CORPORATION
SOURCE: NUMBER 4 BOILER
DATE: 2-11-91

RUN NO.:	2	IMPINGER ml	305
BEGIN TIME:	1110	SILICA GEL gms.	12.8
END TIME:	1251	PERCENT O2	7.70
TOTAL RUN TIME:	96.00 min.	PERCENT CO2	12.50
BAROMETRIC PRESSURE:	30.00 "Hg	"F" FACTOR	0
STACK PRESSURE:	30.00 "Hg.		
NOZZLE DIAMETER:	.230 inches	PARTICULATE	
METER CORR. FACTOR:	.994	---	
FINAL METER:	393.410 cubic ft.	FILTER mg.	274.8
INITIAL METER:	355.640 cubic ft.	WASH mg.	21.3
STACK AREA:	43.295 sq. ft.		

STACK 1 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.640	0.800	1.100	153	7
1-2	.660	0.812	1.120	153	7
1-3	.690	0.831	1.170	154	7
1-4	.550	0.742	.940	153	7
1-5	.500	0.707	.850	154	7
1-6	.380	0.616	.650	154	7
1-7	.280	0.529	.480	154	7
1-8	.380	0.616	.650	154	7
1-9	.430	0.656	.730	154	7
1-10	.250	0.500	.420	154	7
1-11	.490	0.700	.830	154	7
1-12	.490	0.700	.830	155	7
2-1	.130	0.361	.220	154	8
2-2	.150	0.387	.240	153	8
2-3	.150	0.387	.240	154	8
2-4	.140	0.374	.240	154	8
2-5	.150	0.387	.240	155	8
2-6	.160	0.400	.270	154	8
2-7	.200	0.447	.340	155	8
2-8	.330	0.574	.560	154	8
2-9	.330	0.574	.560	154	8
2-10	.580	0.762	1.000	154	8
2-11	.600	0.775	1.000	154	8
2-12	.580	0.762	1.000	150	8
AVERAGES	0.385	0.600	0.653	154	7

EMISSION RESULTS

NOZZLE DIA.(SQ.FT.):0.0002889

AVG. VELOCITY HEAD	:--------	0.34 "H2O	VOL. FLOW ACFM :	9512
AVG. STACK TEMP.:	---------	154 F	VOL. FLOW SCFMD :	5812
AVG. METER TEMP.:	---------	82 F		
AVG. ORIFICE DIFFERENTIAL:---		0.60 "H2O	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:---		36.721	---	
% H2O VAPOR:	:--------	29.1	POUNDS PER HOUR:	61.99
GAS MOL. WT. DRY:	---------	30.31	POUNDS PER SCF :	0.000017
GAS MOL. WT. WET:	---------	26.72	GRAINS/SCF:	0.12
% EXCESS AIR:	---------	57.60	GRAINS/SCF @ 8% O2	0.12
AVG. STACK VEL.(FPS)	---------	36.62	GRAINS/SCF @50% EA	0.13
MMBTU INPUT:	---------	246.20	POUNDS PER MMBTU:	0.25
PERCENT ISOKINETIC :	---------	98.61		

RUN 2 (cont.) STACK 2 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIFICE DIFF.	STACK TEMP.	METER TEMP.
1-1	.310	0.557	.530	153	83
1-2	.350	0.592	.600	153	83
1-3	.330	0.574	.560	154	84
1-4	.340	0.583	.580	154	84
1-5	.360	0.600	.610	154	85
1-6	.360	0.600	.610	155	85
1-7	.240	0.490	.400	155	85
1-8	.220	0.469	.370	154	85
1-9	.240	0.490	.400	154	85
1-10	.280	0.529	.480	155	85
1-11	.320	0.566	.540	154	85
1-12	.320	0.566	.540	154	86
2-1	.240	0.490	.400	154	86
2-2	.240	0.490	.400	154	86
2-3	.240	0.490	.400	155	86
2-4	.230	0.480	.390	155	86
2-5	.230	0.480	.390	155	86
2-6	.210	0.458	.350	155	86
2-7	.330	0.574	.560	155	86
2-8	.430	0.656	.730	154	86
2-9	.470	0.686	.800	155	86
2-10	.530	0.728	.900	154	86
2-11	.530	0.728	.900	155	86
2-12	.480	0.693	.820	153	86
AVERAGES	0.326	0.565	0.553	154	85

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: TALISMAN SUGAR CORPORATION
SOURCE: NUMBER 4 BOILER
DATE: 2-11-91

RUN NO.:	3		IMPINGER ml	100
BEGIN TIME:	1345		SILICA GEL gms.	7.0
END TIME:	1535		PERCENT O2	7.70
TOTAL RUN TIME:	96.00	min.	PERCENT CO2	12.70
BAROMETRIC PRESSURE:	30.00	"Hg	"F" FACTOR	0
STACK PRESSURE:	30.00	"Hg.		
NOZZLE DIAMETER:	.230	inches	PARTICULATE	
METER CORR. FACTOR:	.994		---	
FINAL METER:	434.586	cubic ft.	FILTER mg.	102.6
INITIAL METER:	393.761	cubic ft.	WASH mg.	4.4
STACK AREA:	43.295	sq. ft.		

STACK 1 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.760	0.872	1.350	155	8
1-2	.760	0.872	1.350	155	8
1-3	.760	0.872	1.350	155	8
1-4	.700	0.837	1.260	158	8
1-5	.650	0.806	1.170	156	8
1-6	.280	0.529	.500	156	8
1-7	.280	0.529	.500	154	8
1-8	.320	0.566	.580	157	8
1-9	.420	0.648	.760	155	8
1-10	.520	0.721	.940	154	8
1-11	.460	0.678	.820	155	8
1-12	.460	0.678	.820	155	8
2-1	.100	0.316	.180	156	8
2-2	.050	0.224	.090	155	8
2-3	.080	0.283	.140	156	8
2-4	.140	0.374	.250	156	8
2-5	.130	0.361	.230	155	8
2-6	.190	0.436	.340	155	8
2-7	.270	0.520	.490	156	8
2-8	.420	0.648	.760	156	8
2-9	.470	0.686	.850	156	8
2-10	.570	0.755	1.000	156	9
2-11	.620	0.787	1.100	156	9
2-12	.620	0.787	1.100	155	9
AVERAGES	0.418	0.616	0.747	156	8

EMISSION RESULTS

NOZZLE DIA.(SQ.FT.):	0.0002889			
AVG. VELOCITY HEAD :	0.34	"H2O	VOL. FLOW ACFM :	9131
AVG. STACK TEMP.:	155	F	VOL. FLOW SCFMD :	6956
AVG. METER TEMP.:	89	F		
AVG. ORIFICE DIFFERENTIAL:	0.65	"H2O	PARTICULATE DATA :	
METER STANDARD CUBIC FEET:	39.160		---	
% H2O VAPOR:	11.5		POUNDS PER HOUR:	25.14
GAS MOL. WT. DRY:	30.34		POUNDS PER SCF :	0.000006
GAS MOL. WT. WET:	28.92		GRAINS/SCF:	0.04
% EXCESS AIR:	57.83		GRAINS/SCF @ 8% O2	0.04
AVG. STACK VEL.(FPS)	35.15		GRAINS/SCF @50% EA	0.04
MMBTU INPUT:	241.21		POUNDS PER MMBTU:	0.10
PERCENT ISOKINETIC :	87.87			

RUN 3 (cont.) STACK 2 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIFICE DIFF.	STACK TEMP.	METER TEMP.
1-1	.300	0.548	.540	155	91
1-2	.300	0.548	.540	154	91
1-3	.360	0.600	.650	156	91
1-4	.320	0.566	.580	155	91
1-5	.420	0.648	.760	155	91
1-6	.400	0.632	.720	155	92
1-7	.230	0.480	.410	155	92
1-8	.210	0.458	.380	154	92
1-9	.240	0.490	.380	154	92
1-10	.260	0.510	.470	154	92
1-11	.260	0.510	.470	155	92
1-12	.290	0.539	.520	155	93
2-1	.210	0.458	.380	154	93
2-2	.220	0.469	.400	154	93
2-3	.220	0.469	.400	155	93
2-4	.220	0.469	.400	158	93
2-5	.200	0.447	.360	155	93
2-6	.200	0.447	.360	156	93
2-7	.320	0.566	.580	155	93
2-8	.420	0.648	.760	155	93
2-9	.420	0.648	.760	155	93
2-10	.360	0.600	.650	155	93
2-11	.480	0.693	.860	155	93
2-12	.460	0.678	.830	155	93
AVERAGES	0.305	0.547	0.548	155	92

AIR CONSULTING and ENGINEERING
COMPLETE EMISSION DATA

PLANT: TALISMAN SUGAR CORPORATION
SOURCE: NUMBER 4 BOILER
DATE: 2-11-91

RUN NO.:	4		IMPINGER ml	315
BEGIN TIME:	1700		SILICA GEL gms.	7.3
END TIME:	1839		PERCENT O2	7.40
TOTAL RUN TIME:	96.00	min.	PERCENT CO2	12.70
BAROMETRIC PRESSURE:	30.00	"Hg	"F" FACTOR	0
STACK PRESSURE:	30.00	"Hg.		Avg 12.4
NOZZLE DIAMETER:	.230	inches	PARTICULATE	~7.5
METER CORR. FACTOR:	.994		---	
FINAL METER:	475.547	cubic ft.	FILTER mg.	300.8
INITIAL METER:	434.832	cubic ft.	WASH mg.	16.8
STACK AREA:	43.295	sq. ft.		

STACK 1 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIF. DIFF.	STACK TEMP.	METER TEMP.
1-1	.720	0.849	1.300	156	8
1-2	.750	0.866	1.350	155	8
1-3	.700	0.837	1.260	156	8
1-4	.520	0.721	.940	156	8
1-5	.400	0.632	.720	156	8
1-6	.250	0.500	.450	156	8
1-7	.240	0.490	.450	156	8
1-8	.330	0.574	.600	157	8
1-9	.350	0.592	.630	157	8
1-10	.400	0.632	.720	157	8
1-11	.460	0.678	.830	154	8
1-12	.460	0.678	.830	154	8
2-1	.130	0.361	.230	156	8
2-2	.130	0.361	.230	155	8
2-3	.200	0.447	.360	156	8
2-4	.200	0.447	.360	157	8
2-5	.220	0.469	.400	157	8
2-6	.160	0.400	.290	157	8
2-7	.280	0.529	.500	156	8
2-8	.460	0.678	.830	157	8
2-9	.550	0.742	1.000	157	8
2-10	.630	0.794	1.150	157	8
2-11	.730	0.854	1.300	156	8
2-12	.700	0.837	1.250	156	8
AVERAGES	0.415	0.624	0.749	156	8

EMISSION RESULTS

NOZZLE DIA.(SQ.FT.):	0.0002889			
AVG. VELOCITY HEAD :	0.36	"H2O	VOL. FLOW ACFM :	9830
AVG. STACK TEMP.:	156	F	VOL. FLOW SCFMD :	6089
AVG. METER TEMP.:	84	F		
AVG. ORIFICE DIFFERENTIAL:	0.69	"H2O	PARTICULATE DATA :	Avg 1,2,4 =5992
METER STANDARD CUBIC FEET:	39.482			
% H2O VAPOR:	27.9		POUNDS PER HOUR:	64.79
GAS MOL. WT. DRY:	30.33		POUNDS PER SCF :	0.000017
GAS MOL. WT. WET:	26.88		GRAINS/SCF:	0.12
% EXCESS AIR:	54.04		GRAINS/SCF @ 8% O2	0.11
AVG. STACK VEL.(FPS)	37.84		GRAINS/SCF @50% EA	0.12
MMBTU INPUT:	231.69		POUNDS PER MMBTU:	0.28
PERCENT ISOKINETIC :	101.21			

RUN 4 (cont.) STACK 2 DATA INPUTS

PORT-POINT	VELOCITY HEAD	SQUARE RT. VEL. HEAD	ORIFICE DIFF.	STACK TEMP.	METER TEMP.
1-1	.250	0.500	.450	156	85
1-2	.310	0.557	.560	156	85
1-3	.330	0.574	.600	155	85
1-4	.360	0.600	.650	155	85
1-5	.360	0.600	.650	155	85
1-6	.380	0.616	.680	155	85
1-7	.260	0.510	.470	156	85
1-8	.260	0.510	.470	156	85
1-9	.280	0.529	.500	156	86
1-10	.320	0.566	.580	156	86
1-11	.320	0.566	.580	156	86
1-12	.350	0.592	.630	156	86
2-1	.220	0.469	.400	156	85
2-2	.220	0.469	.400	156	85
2-3	.250	0.500	.450	156	86
2-4	.250	0.500	.450	156	85
2-5	.220	0.469	.400	156	85
2-6	.220	0.469	.400	156	85
2-7	.400	0.632	.720	156	85
2-8	.530	0.728	.950	156	85
2-9	.570	0.755	1.000	156	85
2-10	.570	0.755	1.000	156	86
2-11	.570	0.755	1.000	156	86
2-12	.570	0.755	1.000	156	87
AVERAGES	0.349	0.582	0.625	156	85

Avg 1, 2, 4
= 155

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 1
PAGE 1 OF 3

PLANT TALISMAN SUGAR CORPORATION
SOURCE NUMBER 4 BOILER
PLANT LOCATION SOUTH BAY, FLORIDA
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES PARTICULATES
DATE 2-11-91 RUN NO. 1
TIME START 0835 TIME END 1014
SAMPLE TIME 48 / 2 (min/pt)= 96 Total min
ASSUMED MOISTURE 30 % FDA .7
NOMOGRAPH C_f .94 PITOT CORR. .84
P_b 30.0 "Hg P_s 30.0 "Hg
WEATHER CLEAR TEMP. °F
METER BOX NO. 1 H 2.05 Y .994
NOZZLE CAL. .205 .206 .205 = .205
STACK DIMENSIONS 63" ϕ X 2
STACK AREA 43.295 ft.² EFFECTIVE ft.²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. DNSTRM.
PORT SIZE in. NIPPLE LENGTH in.
U CORD LENGTH ~~12 FT~~ 12.5
REMARKS:
TAL4C11
TSC4C1

7.5 237.97 mm
2.5
2.5
2.3 6
.6366
.4112
.2254
68.434 lb/hr
Ken Bryson
Jeff

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 355.379 ft.³
INITIAL 325.588 ft.³
NET ft.³
FILTER NO. 4003 IMP. VOL. GAIN 235 ml.
SIL GEL NO. 50 WT. GAIN 12.8 ml.
TOTAL CONDENSATE 247.8 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					12.7
% O_2					7.5
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE 0.00 cfm 25 "Hg POST 0.000 cfm 15 "Hg
METER BOX/PUMP ✓ GAS SAMPLE SYST.
ORSAT BAG
PITOT TUBE NO. 1601 PRE-TEST Ok
POST-TEST(+) 3.5 / 15 H_2O/Sec
POST-TEST(−) 4.4 / 15 H_2O/Sec
PYROMETER NO. 1
BOX OPERATOR Nick PROBE HOLDER Carlos

62.741 237.35 .205

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)
N-1-1		0837	326.3	.55	.52	.52	154	270	46	51	3.0
2		0839	327.05	.70	.64	.66	153	273	42	51	4.0
3		41	327.90	.71	.66	.66	154	273	43	51	4.0
4		43	328.7	.66	.62	.62	154	271	41	52	4.0
5		45	329.3	.41	.39	.39	155	270	42	52	3.0
6		0847	329.8	.24	.23	.23	155	275	44	53	3.0

AIR CONSULTING & ENGINEERING, INC.

TEST ID _____

PAGE 2 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. ("H₂O) CALC.	METER ORIFICE PRESS. DIFF. ("H₂O) ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
N-1-7		0849	330.32	.31	.29	.29	154	274	45	54	3.5
8		51	330.94	.40	.38	.38	154	270	45	54	4
9		53	331.6	.42	.40	.40	157	270	45	54	4
10		55	332.24	.44	.41	.41	155	274	45	55	4
11		57	332.95	.52	.49	.49	150	267	45	56	5
12		0859	333.66	.48	.45	.45	150	267	45	57	4.5
N-2-1		0901	334.07	.14	.13	.13	155	264	46	58	2.5
2		03	334.47	.14	.13	.13	154	268	47	58	3
3		05	334.86	.16	.14	.14	154	268	47	59	3
4		07	335.18	.12	.11	.11	154	273	48	60	3
5		09	335.57	.16	.14	.14	155	273	48	61	3.5
6		11	336.00	.18	.17	.17	155	273	48	61	3.5
7		13	336.54	.28	.26	.26	155	268	47	62	4
8		15	337.16	.43	.40	.40	154	267	47	63	5
9		17	337.95	.56	.53	.53	155	270	47	63	5
10		19	338.75	.62	.58	.58	154	270	46	64	5.5
11		21	339.54	.65	.61	.61	154	270	46	65	6
12		0923	340.—	.62	.58	.58	150	270	46	65	6
S-1-1		0927	340.9	.38	.36	.36	153	271	47	66	5
2		29	341.52	.38	.36	.36	154	270	47	67	5
3		31	342.1	.31	.29	.29	154	270	47	67	4.5
4		33	342.7	.37	.35	.35	154	270	47	68	5
5		35	343.44	.39	.37	.37	154	271	47	68	5.5
6		37	343.94	.35	.33	.33	155	271	47	69	5.5
7		39	344.49	.27	.25	.25	155	269	47	69	5.0

AIR CONSULTING & ENGINEERING, INC.

351.8

TEST ID 1

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. ("H₂O) CALC.	METER ORIFICE PRESS. DIFF. ("H₂O) ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
S-1-8		0941	345.10	.25	.23	.23	155	266	48	70	5
9		43	345.59	.31	.29	.29	155	271	48	70	5.5
10		45	346.2	.31	.29	.29	155	271	48	71	5.5
11		47	346.77	.32	.30	.30	154	271	48	71	5.5
12		0949	347.37	.32	.30	.30	155	273	48	72	6
S-2-1		0952	347.87	.22	.21	.21	155	271	48	72	5
2		54	348.36	.22	.21	.21	154	271	48	73	5
3		56	348.88	.22	.22	.22	155	270	48	73	5
4		58	349.40	.25	.25	.25	155	273	48	73	5.5
5		1000	349.92	.25	.25	.25	155	267	48	74	5.5
6		02	350.57	.22	.25	.25	155	268	49	74	6
7		04	351.17	.42	.42	.42	155	272	49	75	7
8		06	351.94	.46	.46	.46	155	273	49	75	8
9		08	352.81	.53	.58	.58	155	272	49	75	9
10		10	353.68	.55	.60	.60	154	274	49	76	9
11		12	354.50	.56	.60	.60	155	273	49	76	9.5
12		1014	355.374	.52	.60	.60	154	266	49	76	9.5

STACK SAMPLING FIELD DATA SHEET

TAL 4 C 11

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

TEST ID 2
PAGE 1 OF 3

PLANT Talisman Sugar Corp.
SOURCE Number 4 Boiler
PLANT LOCATION South Bay, Florida
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES PM
DATE 2-11-91 RUN NO. 2
TIME START 1110 TIME END 1251
SAMPLE TIME 48 / 2 (min/pt) = 96 Total min
ASSUMED MOISTURE 28 % FDA .72
NOMOGRAPH C_f 1.7 PITOT CORR.
P_b 30.00 "Hg P_g 30.00 "Hg
WEATHER CLEAR TEMP °F
METER BOX NO. 1 H .994 Y 2.05
NOZZLE CAL. .1230 .230 .230 = .230
STACK DIMENSIONS
STACK AREA ft.² EFFECTIVE ft.²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. DNSTRM.
PORT SIZE in. NIPPLE LENGTH in.
U CORD LENGTH
REMARKS:

8.0
8.2
7.4
7.5

.6284
.4014
.2770

65.742

246.22 mm

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 393.410 ft.³
INITIAL 355.640 ft.³
NET ft.³
FILTER NO. 2879 IMP. VOL. GAIN 805 ml.
SIL GEL NO. 18 WT. GAIN 8.8 ml.
TOTAL CONDENSATE 813.8 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					12.5
% O_2					7.7
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE 0.00 cfm 20 "Hg POST 0.00 cfm 27 "Hg
METER BOX/PUMP GAS SAMPLE SYST.
ORSAT BAG
PITOT TUBE NO. 1601 PRE-TEST OK
POST-TEST(+) 6.3 / 15 H_2O/Sec
POST-TEST(−) 6.3 / 15 H_2O/Sec
PYROMETER NO.
BOX OPERATOR Neek PROBE HOLDER Genso

63.844 246.20 .259

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)
N-1-1			356.83	.64	1.1	1.1	153	280	—	74	6
2	STOP FOR *	1116	357.86	.66	1.12	1.12	153	255	53	75	5
3	BOX TEMP	1118	358.95	.69	1.17	1.17	154	247	50	75	5.5
4		20	360.00	.55	.94	.94	153	243	50	75	5
5		22	360.95	.50	.85	.85	154	245	50	75	5
6		24	361.75	.38	.65	.65	154	243	51	75	5

AIR CONSULTING & ENGINEERING, INC.

.467

TEST ID 2

PAGE 2 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. ("H₂O) CALC.	METER ORIFICE PRESS. DIFF. ("H₂O) ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
N-1-7		1126	362.5	.28	.48	.48	~~245~~ 154	245	53	96	4.5
8		28	363.3	.38	.65	.65	154	251	54	77	5.0
9		30	364.2	.43	.73	.73	154	257	54	77	5.0
10		32	364.9	.25	.42	.42	154	258	54	78	5.0
11		34	365.8	.49	.83	.83	154	253	55	79	6.5
12		1136	366.72	.49	.83	.83	155	256	55	79	6.5
N-2-1		1139	367.22	.13	.22	.22	154	252	56	80	4.0
2		41	367.7	.15	.24	.24	153	250	56	80	4.0
3		43	368.25	.15	.24	.24	154	250	56	80	4
4		45	368.8	.14	.24	.24	154	245	57	81	4.5
5		47	369.31	.15	.24	.24	155	247	57	81	4.5
6		49	369.85	.16	.27	.27	154	248	57	81	4.5
7		51	370.47	.20	.34	.34	155	243	57	82	5
8		53	371.22	.33	.56	.56	154	242	57	82	6
9		55	372.00	.33	.56	.56	154	246	57	82	6.5
10		57	373.00	.58	1.0	1.0	154	252	57	82	8.5
11		59	374.00	.60	1.0	1.0	154	256	52	83	8.5
12		1201	375.0	.58	1.0	1.0	154	263	57	83	8.5
S-1-1		1204	375.73	.31	.53	.53	153	257	57	83	7.0
2		06	376.55	.35	.60	.60	153	254	58	83	7.0
3		08	377.30	.33	.56	.56	154	246	58	84	7.0
4		10	378.1	.34	.58	.58	154	243	58	84	7.5
5		12	378.9	.36	.61	.61	154	244	58	85	8
6		14	379.7	.36	.61	.61	155	244	59	85	8
7		16	380.35	.24	.40	.40	155	242	59	85	7.5

AIR CONSULTING & ENGINEERING, INC.

TEST ID 2

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) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
S-1-8		1218	380.03	.22	.37	.37	154	241	59	85	7
9		20	381.68	.24	.4	.40	154	239	59	85	7
10		22	382.43	.28	.48	.48	155	243	59	85	8
11		24	383.18	.32	.54	.54	154	246	59	85	8
12		1226	383.92	.32	.54	.54	154	245	59	86	8
S-2-1		1229	384.6	.24	.4	.4	154	245	60	86	7.5
2		31	385.28	.24	.4	.4	154	244	60	86	8
3		33	385.95	.24	.4	.4	155	243	60	86	8
4		35	386.62	.23	.39	.39	155	239	59	86	8
5		37	387.3	.23	.39	.39	155	236	59	86	8
6		39	387.94	.21	.35	.35	155	233	60	86	8
7		41	388.73	.33	.56	.56	155	234	60	86	9.5
8		43	389.58	.43	.73	.73	154	233	60	86	10.5
9		45	390.45	.47	.8	.8	155	230	60	86	11.5
10		47	391.45	.53	.9	.9	154	230	60	86	12.5
11		49	392.43	.53	.9	.9	155	229	60	86	13
12		1251	393.410	.48	.82	.82	153	226	60	86	13

STACK SAMPLING FIELD DATA SHEET

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

TEST ID 3
PAGE 1 OF 3

PLANT TALISMAN SUGAR CORPORATION
SOURCE NUMBER 4 BOILER
PLANT LOCATION SOUTH BAY, FL.
TYPE OF SAMPLING TRAIN PM
TYPE OF SAMPLES EPA-5
DATE 2-11-91 RUN NO. 3
TIME START 1345 TIME END 1535
SAMPLE TIME 48.2 (min/pt) = 96 Total min
ASSUMED MOISTURE 30 % FDA
NOMOGRAPH C_f 1.8 PITOT CORR. .84
P_b 30.0 "Hg P_s 30.0 "Hg
WEATHER CLEAR TEMP. °F
METER BOX NO. 1 H 2.05 Y .994
NOZZLE CAL. = .230
STACK DIMENSIONS 63" ϕ x 2
STACK AREA ft.² EFFECTIVE ft.²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. DNSTRM.
PORT SIZE in. NIPPLE LENGTH in.
U CORD LENGTH
REMARKS:

.5700
.4041
.1059

241.62 mm BTU

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 434.586 ft.³
INITIAL 393.761 ft.³
NET ft.³
FILTER NO. 2880 IMP. VOL. GAIN 200 ml.
SIL GEL NO. 16 WT. GAIN 7.0 ml.
TOTAL CONDENSATE 307.0 ml.

ORSAT

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

F_0 = F_0 RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE 0.00 cfm 27 "Hg POST cfm "Hg
METER BOX/PUMP GAS SAMPLE SYST.
ORSAT BAG
PITOT TUBE NO. 1601 PRE-TEST
POST-TEST(+) / H_2O/Sec
POST-TEST(−) / H_2O/Sec
PYROMETER NO.
BOX OPERATOR NECK PROBE HOLDER Cornaro

26.641 241.21 .110

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)
N-1-1		1347	394.96	.76	1.35	1.35	261	155	61	89	5
2		49	396.16	.76	1.35	1.35	261	155	55	83	5
3		51	398.4	.76	1.35	1.35	267	155	51	83	5
4		53	399.	.70	1.26	1.26	267	158	51	83	5
5		55	—	.63	1.17	1.17		156	50	84	
6		57	—	.28	.5	.5		156	58	85	

TS TANC

AIR CONSULTING & ENGINEERING, INC.

TEST ID 3

PAGE 2 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. ("H₂O) CALC.	METER ORIFICE PRESS. DIFF. ("H₂O) ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
N-1-7		1459	—	.28	.50	.50	154	261	50	85	4
8		1601	402.3	.32	.576	.576	157	260	50	85	4
9		1603	—	.42	.76	.76	155	258	51	86	4.5
10	MIC DOWN (*)	1605	404.0	.52	.94	.94	154	260	50	87	5
11		1418	405.—	.46	.82	.82	155	260	50	87	4.5
12		1420	405.93	.46	.82	.82	155	260	50	87	4.5
N-2-1		1423	—	.10	.18	.18	156	271	51	87	2
2		25	—	.05	.09	.09	155	271	51	87	2
3		27	407.	.08	.14	.14	156	270	52	87	2
4		29	~~407.6~~	.14	.25	.25	156	269	53	88	3
5		31	408 –	.13	.23	.23	155	270	53	88	3
6		33	409.27	.19	.34	.34	155	273	54	88	3
7		35	410.14	.26	.49	.49	156	274	55	88	3
8		37	411.07	.42	.76	.76	156	273	54	89	4
9		39	412.08	.47	.85	.85	156	271	53	89	4.5
10		41	413.10	.57	1.0	1.0	156	274	53	90	4.5
11		43	414.27	.62	1.1	1.1	156	267	52	90	5
12		1445	415.—	.62	1.1	1.1	155	267	52	90	5
S-1-1		1448	416.22	.30	.54	.54	155	265	54	91	3.5
2		50	417.03	.30	.54	.54	154	269	55	91	3.5
3		52	417.9	.36	.65	.65	156	270	54	91	4
4		54	418.76	.32	.58	.58	155	269	53	91	3.5
5		56	419.70	.42	.76	.76	155	269	53	91	4.5
6		58	420.61	.40	.72	.72	155	269	53	92	4
7		1500	421.3	.23	.41	.41	155	265	54	92	3

AIR CONSULTING & ENGINEERING, INC.

TEST ID 3

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) 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)
S-1-8		1502	421.94	.21	.38	.38	154	259	54	92	3
9		04	422.64	.24	.43	.43	154	257	55	92	3
10		06	423.38	.26	.47	.47	154	250	54	92	3
11		08	424.15	.26	.47	.47	155	250	54	92	3
12		1510	424.90	.29	.52	.52	155	252	54	93	3.5
S-2-1		1513	425.6	.21	.38	.38	154	256	55	93	3.5
2		1515	426.28	.22	.40	.40	154	260	55	93	3.0
3		17	427.0	.22	.40	.40	155	260	54	93	3.0
4		19	427.68	.22	.40	.40	158	257	55	93	3.0
5		21	428.4	.20	.36	.36	155	247	56	93	3.0
6		23	429.08	.20	.36	.36	156	248	55	93	3.0
7		25	429.91	.32	.58	.58	155	245	55	93	4.5
8		27	430.86	.42	.76	.76	155	244	54	93	4.5
9		29	431.82	.42	.76	.76	155	246	56	93	4.5
10		31	432.6	.36	.65	.65	155	247	54	93	4.5
11		33	433.7	.48	.86	.86	155	248	54	93	4.5
12		1535	434.586	.46	.83	.83	155	248	54	93	4.5

STACK SAMPLING FIELD DATA SHEET

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

TEST ID 4
PAGE 1 OF 3

PLANT TALISMAN SUGAR CORP.
SOURCE NUMBER 4 BOILER
PLANT LOCATION SOUTH BAY, FL.
TYPE OF SAMPLING TRAIN EPA-5
TYPE OF SAMPLES PM
DATE 2-11-91 RUN NO. 4
TIME START 1700 TIME END 1839
SAMPLE TIME 48.2 (min/pt) = 96 Total min
ASSUMED MOISTURE 20 % FDA
NOMOGRAPH C_f 1.8 PITOT CORR. .84
P_b 30.0 "Hg P_s 30.0 "Hg
WEATHER CLEAR TEMP. °F
METER BOX NO. 1 H 2.05 Y .994
NOZZLE CAL. = .230
STACK DIMENSIONS 63"Φ x 2
STACK AREA ft.² EFFECTIVE ft.²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. DNSTRM.
PORT SIZE in. NIPPLE LENGTH in.
U CORD LENGTH
REMARKS:

7.5
7.5
7.2
7.3

.7038
.4030
.3008

~~241.64~~ mm

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 478.847 ft.³
INITIAL 434.832 ft.³
NET ft.³
FILTER NO. 2881 IMP. VOL. GAIN 315 ml.
SIL GEL NO. 51 WT. GAIN 7.3 ml.
TOTAL CONDENSATE ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					12.7
% O_2					7.4
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE 0.00 cfm 15 "Hg POST 12 cfm 0.000 Hg
METER BOX/PUMP GAS SAMPLE SYST.
ORSAT BAG
PITOT TUBE NO. 1601 PRE-TEST O.K.
POST-TEST(+) 4.71 15 H_2O/Sec
POST-TEST(−) 3.71 15 H_2O/Sec
PYROMETER NO. 1
BOX OPERATOR PROBE HOLDER

.289 07.00 231.69

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)
N-1-1		1702	435.87	.72	1.3	1.3	156	244	55	80	5
2		04	437.0	.75	1.35	1.35	155	244	55	80	5.5
3		06	438.15	.70	1.26	1.26	156	244	53	80	5.5
4		08	439 –	.52	.94	.94	156	247	53	80	5.5
5		10	440.25	.40	.72	.72	156	257	53	80	5.0
6		12	440.96	.25	.45	.45	156	252	53	80	4.5

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID 4

PAGE 2 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) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
N-1-7		1714	441.65	.24	.45	.45	156	250	55	80	4.0
8		1716	442.-	.33	.6	.6	157	250	56	80	5.0
9		18	443.3	.35	.63	.63	157	241	56	80	5.0
10		20	444.2	.40	.72	.72	157	238	56	81	6
11		22	445.12	.46	.83	.83	154	236	57	81	6
12		1724	446.03	.46	.83	.83	154	238	57	82	6
N-2-1		1727	446.54	.13	.23	2.3	156	257	58	82	4
2		1729	447.06	.13	.23	.23	155	255	58	82	4
3		1731	447.73	.20	.36	.36	156	247	56	82	5
4		33	448.4	.20	.36	.36	157	235	56	83	5
5		35	449.1	.22	.40	.40	157	233	55	83	5.5
6		37	449.7	.16	.29	.29	157	229	54	83	5.0
7		39	450.45	.28	.50	.50	156	235	55	83	6.0
8		41	451.40	.46	.83	.83	157	246	53	84	7
9		43	452.4	.55	1.0	1.0	157	256	53	84	8
10		45	453.52	.63	1.15	1.15	157	258	53	84	9.5
11		47	454.70	.73	1.3	1.3	156	260	52	84	10.5
12		1749	455.87	.70	1.25	1.25	156	260	52	85	10
S-1-1		1752	456.-	.25	.45	.45	156	255	52	85	6.5
2		54	457.32	.31	.56	.56	156	257	52	85	7.5
3		56	458.14	.33	.6	.6	155	252	53	85	7.5
4		58	458.96	.36	.65	.65	155	247	53	85	8
5		1800	459.8	.36	.65	.65	155	246	54	85	8
6		02	460.6	.38	.68	.68	155	250	53	85	8.5
7		04	461.33	.26	.47	.47	156	250	53	85	7

AIR CONSULTING & ENGINEERING, INC.

TEST ID 4

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) CALC.	ACTUAL	STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
5-1-8		1806	462.02	.26	.47	.47	156	249	53	85	7.5
9		08	462.73	.28	.5	.5	156	252	53	86	7.5
10		10	463.6	.32	.58	.58	156	250	53	86	9
11		12	464.45	.32	.58	.58	156	248	53	86	9
12		0814	465.32	.35	.63	.63	156	247	53	85	9
5-2-1		0817	466.0	.22	.4	.4	156	246	53	85	7
2		19	466.68	.22	.4	.4	156	250	53	85	7
3		21	467.43	.25	.45	.45	156	255	53	85	8
4		23	468.2	.25	.45	.45	156	256	53	85	8.5
5		25	468.9	.22	.4	.4	156	251	53	85	8
6		27	469.61	.22	.4	.4	156	252	54	85	8
7		29	470.5	.40	.72	.72	156	252	53	85	10
8		31	471.5	.53	.95	.95	156	257	53	85	12.5
9		33	472.5	.57	1.0	1.0	156	251	53	86	12.5
10		35	473.5	.57	1.0	1.0	156	250	54	86	13
11		37	474.56	.57	1.0	1.0	156	257	54	86	13
12		0839	475.54	.57	1.0	1.0	156	256	54	87	13

APPENDIX C

LABORATORY ANALYSES

AIR CONSULTING & ENGINEERING, inc. — PARTICULATE LAB DATA

SOURCE TALISMAN SUGAR CORP. - #4 BOILER

(2/11/91)

PROBE RINSE	RUN 1	RUN 2	RUN 3	~~BLANK~~ 4	
CONTAINER NUMBER	534	575	532	535	
TOTAL VOLUME (ml)	175	200	150	175	LIQUID LEVEL ✓
1st GROSS WEIGHT (g)	103.5823	106.4574	104.7296	106.1853	DATE & TIME: 2/19/91-1350
2nd GROSS WEIGHT (g)	103.5828	106.4574	104.7301	106.1858	DATE & TIME: 2/20/91-
AVERAGE GROSS WEIGHT (g)	103.5826	106.4574	104.7299	106.1856	RH = 46 1300
TARE WEIGHT (g)	103.5734	106.4361	104.7255	106.1688	
SUB NET WEIGHT (g)	0.0092	0.0213	0.0044	0.0168	
ACETONE BLANK (g)	–	–	–	–	
TOTAL NET WEIGHT (mg)	9.2	21.3	4.4	16.8	

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~~ 4	
FILTER NUMBER	2035	2879	2880	2881	0915
1st GROSS WEIGHT (g)	0.6291	0.6764	0.5066	0.7038	DATE & TIME: 2/19/91
2nd GROSS WEIGHT (g)	0.6289	0.6760	0.5068	0.7038	DATE & TIME: 2/19/91
AVERAGE GROSS WEIGHT (g)	0.6290	0.6762	0.5067	0.7038	1530
TARE WEIGHT (g)	0.4112	0.4014	0.4041	0.4030	
SUB NET WEIGHT (g)	0.2178	0.2748	0.1026	0.3008	
TOTAL NET WEIGHT (mg)	217.8	274.8	102.6	300.8	

TARE BALANCE CHECK

SEE LAB BOOK

1st GROSS WEIGHT BALANCE CHECK

0 ✓ 10.0g ✓
0.5 g ✓ 100.0g ✓
%RH 46 DATE 2/19/91
Signature [illegible]

2nd GROSS WEIGHT BALANCE CHECK

0 ✓ 10.0g ✓
0.5g ✓ 100.0g ✓
%RH 40 DATE 2/19
Signature [illegible]

AIR CONSULTING & ENGINEERING, inc. PARTICULATE LAB DATA

SOURCE TALISMAN SUGAR CORP. - #4 BOILER

2/1/91

PROBE RINSE	RUN X	RUN	RUN	BLANK	
CONTAINER NUMBER				5836	
TOTAL VOLUME (ml)				100	LIQUID LEVEL
1st GROSS WEIGHT (g)				105.4473	DATE & TIME:
2nd GROSS WEIGHT (g)					DATE & TIME:
AVERAGE GROSS WEIGHT (g)					
TARE WEIGHT (g)				105.4462	
SUB NET WEIGHT (g)					
ACETONE BLANK (g)					
TOTAL NET WEIGHT (mg)					

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	RUN	RUN	BLANK	
FILTER NUMBER				3082	
1st GROSS WEIGHT (g)				0.4014	DATE & TIME:
2nd GROSS WEIGHT (g)				0.4014	DATE & TIME:
AVERAGE GROSS WEIGHT (g)				0.4014	
TARE WEIGHT (g)				0.4018	
SUB NET WEIGHT (g)				0.0004	
TOTAL NET WEIGHT (mg)				0.4	

TARE BALANCE CHECK

SEE LAB BOOK

1st GROSS WEIGHT BALANCE CHECK

0 _____ 10.0g _____

0.5 g _____ 100.0g _____

%RH _____ DATE _____

Signature _____

2nd GROSS WEIGHT BALANCE CHECK

0 _____ 10.0g _____

0.5g _____ 100.0g _____

%RH _____ DATE _____

Signature _____

APPENDIX D

QUALITY ASSURANCE

AND

CHAIN OF CUSTODY

AIR CONSULTING AND ENGINEERING, Inc.

SAMPLE RECOVERY AND CHAIN OF CUSTODY

PLANT NAME TALISMAN SUGAR CORP. TEST DATE 2/11/91

SOURCE NAME No. 4 BOILER SAMPLE RECOVERED BY C. HORGE

TYPE OF SAMPLE PART. PARTICULATE ANALYSES BY

SAMPLE RECOVERY

RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	5-14	✓	MED	
1	4003	–	BLK	
2	5.25	✓	"	
2	2879	–	"	
3	5-32	✓	"	
3	2880	–	"	
4	5-35	✓	"	
4	2881	–	"	
ACETONE / WATER BLANK (CIRCLE)	5-3L	✓	CLEAR	
FILTER BLANK	3082	–	WH.	

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT. (g)	INIT. WT. (g)	NET WT. (g)	COLOR
1	50	212.8	200.0	12.8	PINK
2	18	208.8	200.0	8.8	"
3	16	207.0	200.0	7.0	"
4	51	207.3	200.0	7.3	"
			200.0		
			200.0		
			200.0		
			200.0		

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 November 23, 1990, and is checked and/or recalibrated at least annually.

AIR CONSULTING & ENGINEERING — STANDARD METER CALIBRATION

DATE 11-23-90 LEAK CHECK 0.000 CFM at 12 in. Hg.

METER SERIAL NUMBER 1040616 (Sontn) BAROMETRIC PRESSURE 30.07 in. Hg.

STD GAS METER TEMPERATURE 67 °F/ ASTM GLASS THERMOMETER TEMPERATURE 69 °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			
-0.1	-1.1	0.000	5.333	5.333	272.003	277.309	5.306	70	67	12
-0.1	-1.1	5.333	10.664	5.331	277.309	282.600	5.291	70	67	12
-0.1	-1.1	10.664	15.982	5.318	282.600	287.877	5.277	70	67	12
-0.3	-1.9	0.000	5.490	5.490	288.149	293.623	5.474	70	67	9
-0.3	-1.9	5.490	12.799	7.309	293.623	300.898	7.275	70	67	12
-0.3	-1.9	12.799	18.278	5.479	300.898	306.359	5.461	70	67	9
-0.4	-2.5	0.000	5.160	5.160	306.712	311.863	5.151	70	67	7
-0.4	-2.5	5.160	10.321	5.161	311.863	317.017	5.154	70	67	7
-0.4	-2.5	10.321	15.488	5.167	317.017	322.173	5.156	70	67	7
-0.5	-3.7	0.000	7.481	7.481	322.562	330.068	7.506	70	67	8
-0.5	-3.7	7.481	14.039	6.558	330.068	336.655	6.587	70	67	7
-0.5	-3.7	14.039	19.649	5.610	336.655	342.278	5.623	70	67	6
-0.7	-5.3	0.000	5.639	5.639	342.648	348.279	5.631	70	67	5
-0.7	-5.3	5.639	11.268	5.629	348.279	353.889	5.610	70	67	5
-0.7	-5.3	11.268	16.889	5.621	353.889	359.498	5.609	70	67	5

CALIBRATED BY: G. F. Gabel

	Y	SCFM	Y	SCFM	Y	SCFM	Y	SCFM	Y	SCFM
Run 1	1.002	0.445	1.002	0.611	1.002	0.738	1.000	0.986	1.009	1.129
Run 2	1.005	0.445	1.004	0.610	1.002	0.738	0.999	0.986	1.011	1.127
Run 3	1.005	0.444	1.002	0.610	1.003	0.739	1.001	0.986	1.010	1.126
Average	1.004	0.444	1.003	0.610	1.002	0.738	1.000	0.986	1.010	1.127

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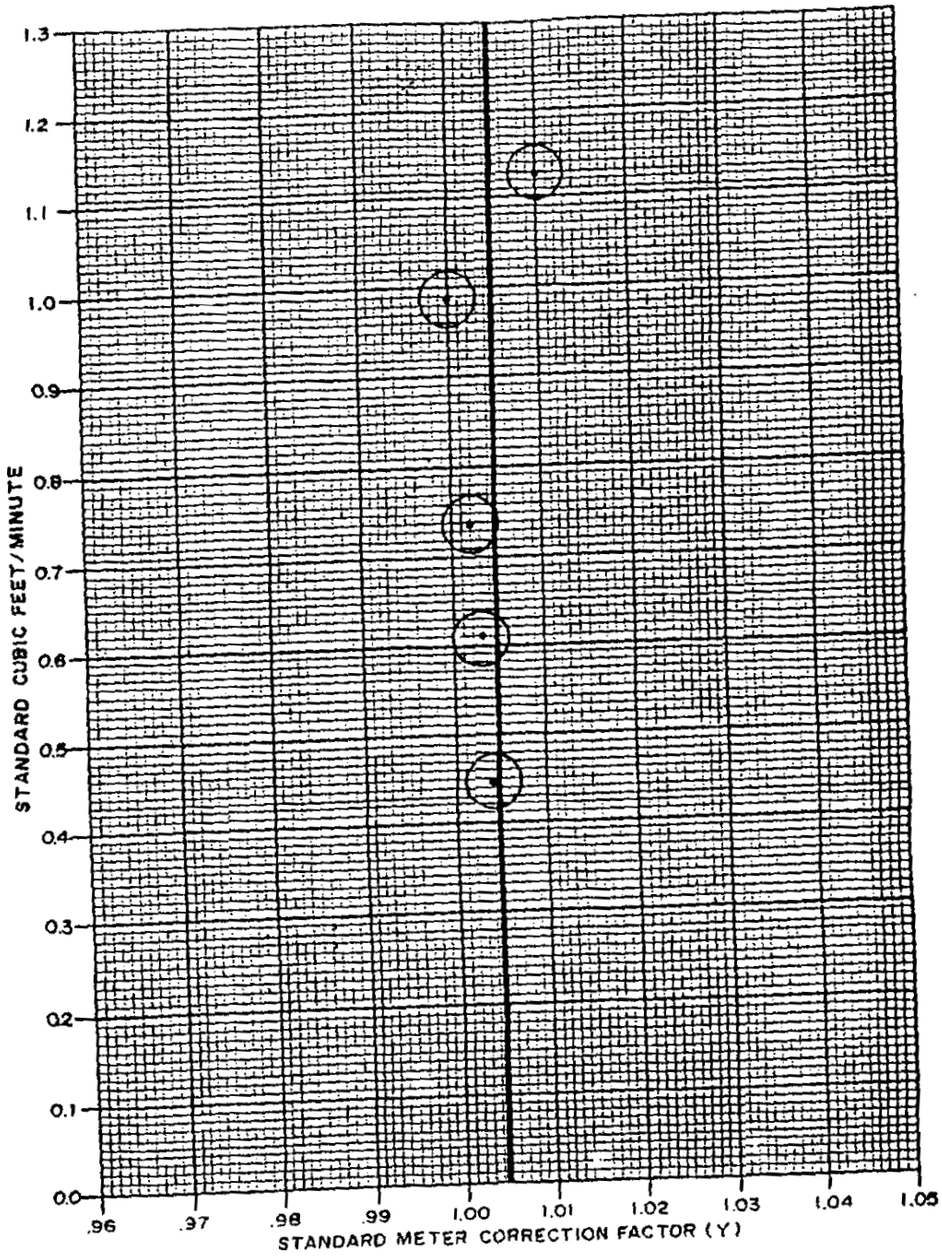


STANDARD METER CALIBRATION CURVE
METER SERIAL NO. 1040616 (SOUTH)
NOVEMBER 23, 1990

AIR CONSULTING
and
ENGINEERING

AIR CONSULTING & ENGINEERING, inc. POST TEST CALIBRATION

DATE 2-11-91 METER BOX NUMBER 1 LEAK CHECK 0.000 CFM at 29 in. Hg.

CLIENT U.S. SUGAR / TALISMAN SOURCE VARIOUS THERMOCOUPLE NUMBER 36 / 160 / PYROMETER NUMBER ~~64~~ 1

FLIGHT SERVICE Pb 30.11 in. Hg. ACE BAROMETER Pb 30.1 in. Hg.

ASTM GLASS THERMOMETER 160 / 160 °F / THERMOCOUPLE 160 / 160 °F ASTM GLASS THERMOMETER 64 °F / METER TEMP 64 °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				
-.5	2.1	513.835	508.00	5.835	193.300	199.452	6.152	~~64~~ 59 ~~66~~ 59	64 66	8	21
-.5	2.1	513.835	522.560	8.725	199.817	209.013	9.196	59 59	66 68	12	21
-.5	2.1	522.560	513.835	7.993	209.013	217.471	8.458	59 59	68 70	11	21

CALIBRATED BY: Stephen L. Neal

RUN NUMBER	SCFM	STANDARD M.C.F.	DELTA Ha	M.C.F.
1	0.75	1.005	2.135	0.959
2	0.74	1.005	2.140	0.963
3	0.74	1.005	2.135	0.963
AVERAGES	0.74	1.005	2.137	0.962

air consulting and engineering

AIR CONSULTING & ENGINEERING — ANNUAL METER CALIBRATION

DATE 6-7-90

LEAK CHECK 0.000 CFM at 12 in. Hg.

METER BOX NUMBER 1

BAROMETRIC PRESSURE 30.02 in. Hg.

DRY GAS METER TEMPERATURE 89 °F/ASTM GLASS THERMOMETER TEMPERATURE 90 °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				
-.07	0.5	206.539	214.496	7.957	719.311	727.244	7.933	85	85	21	21
-.15	1.25	215.308	221.239	5.931	728.042	733.952	5.910	85	86	10	
-.22	2.0	221.610	227.578	5.968	734.320	740.265	5.945	85	87	8	
-.32	2.75	228.029	233.291	5.262	740.708	745.940	5.232	86	88	6	
-.40	3.5	233.668	239.592	5.924	746.315	752.205	5.890	87	90	6	
-.50	4.25	240.117	245.527	5.410	752.724	758.112	5.388	87	91	5	

	DELTA H	Ya	SCFM	Ys	Y
	2.004	1.002	0.368	1.004	1.006
	2.041	1.002	0.577	0.998	1.000
	2.061	1.003	0.725	0.993	0.996
	2.054	1.003	0.851	0.989	0.992
	2.063	1.003	0.956	0.985	0.988
	2.082	1.001	1.048	0.983	0.984
MEAN:	2.051	1.002		0.992	0.994

CALIBRATED BY: H. F. Gebel

air consulting and engineering

PITOT TUBE CALIBRATION MEASUREMENTS

DATE CALIBRATED 4-9-90 PITOT TUBE 70

Pitot tube assembly level? ✓ Yes _____ No

Pitot tube openings damaged? _____ Yes (explain below) ✓ No

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

β_2 = 1 ° (<5°)

γ = 3 °, θ = 3 °, A = 0.869 in. = (Pa + Pb)

z = A sin γ = 0.045 in.; <0.32 / <1/8 in.

w = A sin θ = 0.045 in.; <0.08 / <1/32 in.

P_a .460 in. P_b .409 in. D_t = .375

Calibration required? _____ Yes ✓ No

THERMOCOUPLE CALIBRATION

Date 4-9-90 Thermocouple No. 70

Source (Specify)	ASTM Glass Thermometer With Mercury (°F)	Pyrometer (°F)	Degree Difference	% Difference
Ambient	72	72	0	0.00
Ice Bath	36	38	2	0.38
Oven	311	310	1	0.19

FDER - Maximum 5° difference

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

Calibrated by J. L. Carter

AIR CONSULTING & ENGINEERING, INC. PYROMETER CALIBRATION

DATE 7-10-90

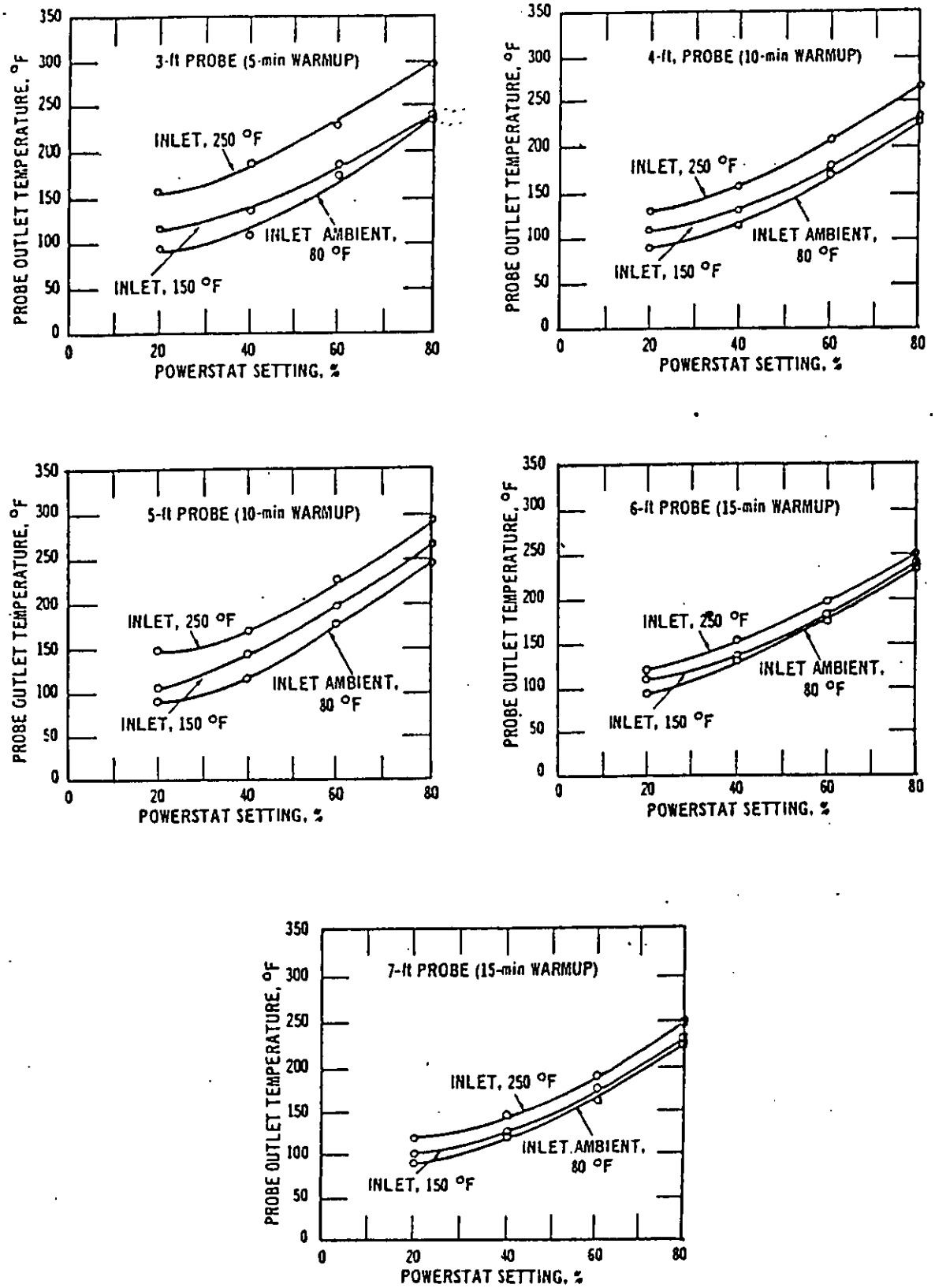
PYROMETER NUMBER METER BOX #1

SOURCE (SPECIFY)	GLASS THERMOMETER WITH NBS MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	32°	33°	1	.2%
AMBIENT	94°	96°	2	.4%
HOT OVEN	800°	800°	0	0

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: Larry J. Watts



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

Probe temperatures.

APPENDIX E

PRODUCTION RATE CERTIFICATION

BOILER DATA SHEET

COMPANY TALISMAN SUGAR REPORTED BY FRANK KLEEMAN

DATE 2-11-91

INTEGRATOR FACTOR X 100 BOILER NO. 4

FUEL OIL USED No OIL

	TIME	INTEGRATOR	LOG SCALE STEAM FLOW X1500	PRESSURE	TEMP.	FEED WATER TEMP.	FEED WATER PRESSURE
RUN 1	8:35	83785	82	287	572	260	420
	9:00	4304	80	287	573	260	420
	9:30	4914	85	286	573	260	420
	10:11	5738	84	280	578	260	420
.6 HRS.	96 MIN.	1953		285	575	260	420 AV
		1953 X 100 / 1.6 =	122,060 LBS/HR				
RUN 2	11:10	6960	82	280	577	260	420
	11:40	7619	85	285	565	260	440
	12:10	8244	84	275	570	260	440
	12:46	8983	82	285	576	260	440
.6 HRS.	96 MIN.	2023		281	572	260	435 AV
		2023 X 100 / 1.6 =	126,440 LBS/HR				
RUN 3	1:45	90191	80	285	580	260	440
MILL DOWN	2:05 20 MIN.	0586 395	82	280	575	260	440
	2:15	0799	87	275	570	260	440
	2:45	1437	84	280	585	260	440
	3:15	2056	82	288	582	260	440
	3:31 16 MIN	2379 1580	82	285	580	260	440
6 HRS	96 MIN.	1975		282	579	260	440 AV
		1975 X 100 / 1.6 =	123,440 LBS/HR				

BOILER OPERATION PARAMETERS

PLANT Talisman Sugar Corp. BOILER NUMBER 4

DATE 2-11-91 RUN NUMBER 4 OIL METER FACTOR 100

STEAM INTEGRATOR FACTOR _____ SCRUBBER(S) PRESS.DROP ____,____
SCRUBBER(S) GPM _____,_____
SCRUBBER(S)H2O LEVEL _____,_____
Ph(if applicable) _____,_____

OPERATOR SIGNATURE _____

INITIAL INTEGRATOR 994190 FINAL INTEGRATOR 996119

TIME	~~OIL~~ METER READING	STEAM LBS.FLOW	STEAM TEMP.	STEAM PRESSURE	FEEDWATER TEMP.	FEEDWATER PRESSURE
1700		120.000	586	275	260	450
1710			586	275	260	450
1720			584	275	260	450
1730			580	270	260	450
1740			572	240	260	450
1750			592	260	260	450
18:00			595	275	260	450
18:10			585	275	260	450
18:20			584	275	260	450
18:30			585	275	260	450
1838			<585>	<270>	<260>	<450>

PROCESS DATA INSTALLATION BOILER 4

COMPANY TALISMAN SUGAR CORP.

DATE 2-11-91

TYPE OF INSTALLATION BAGASSE BOILER

TYPE OF MATERIAL PROCESSED STEAM

TYPE OF FUEL USED BAGASSE

TYPE OF POLLUTION CONTROL SYSTEM DRY COLLECTOR + DUAL VENTURI WE SCRUBBE

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

REPORTED BY FRANK KLEEMAN

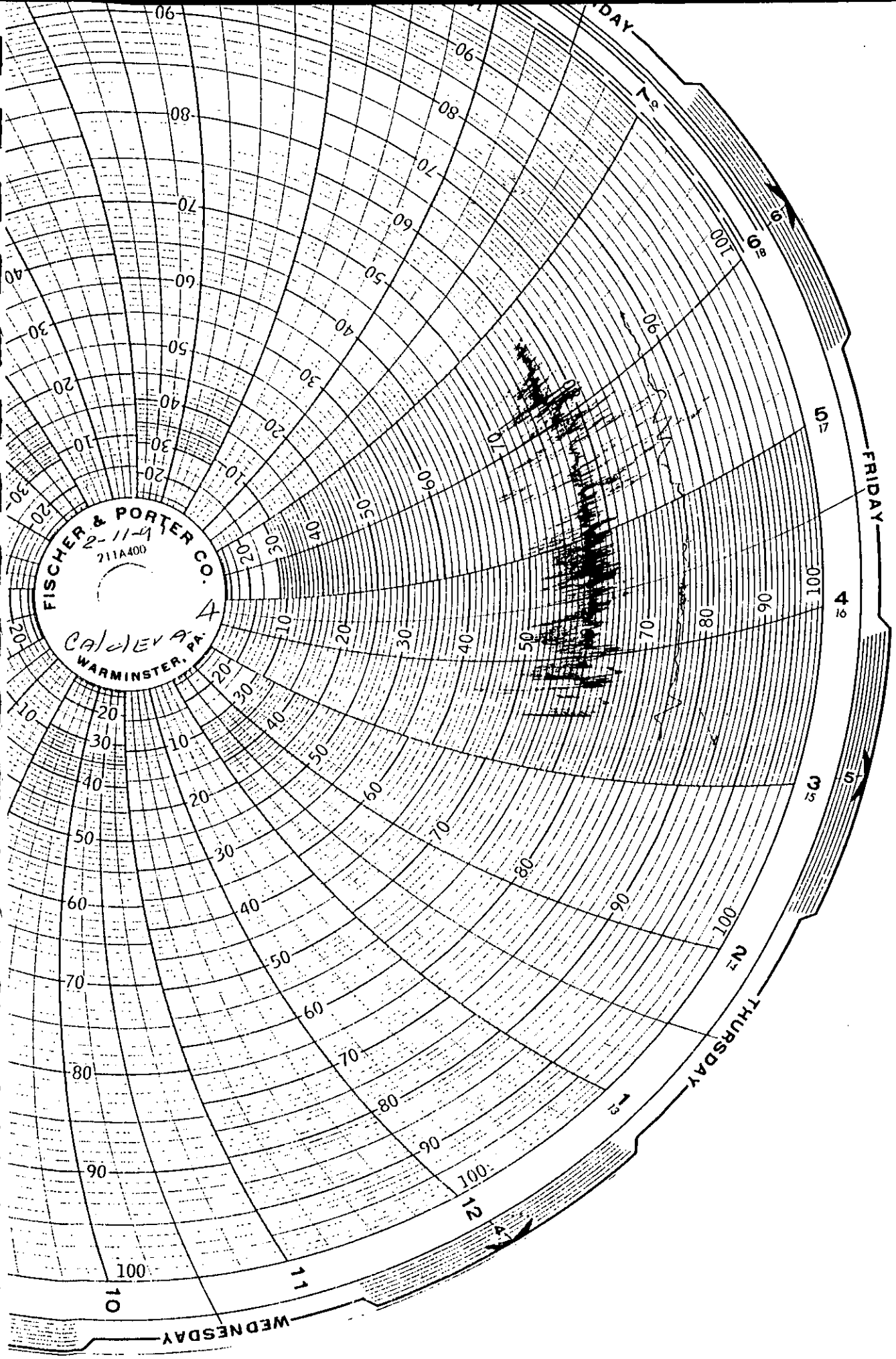
Run 4

GPM 1200

ΔP 11.5"

S. L. Neck

TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
FISCHER & PORTER CO.
WARRINGTON, PA.


FISCHER & PORTER CO.
2-11-9
211A400
Caldera 4
WARMINSTER, PA.
FRIDAY
THURSDAY
WEDNESDAY

APPENDIX F

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

ACEI:	
STEPHEN L. NECK, P.E.	FIELD TESTING REPORT PREPARTION
GERARD GAUTHREAUX	FIELD TESTING
KLEEMAN ENGINEERING, INC	
FRANK S. KLEEMAN, P.E.	PROJECT COORDINATOR
FDER	
KEN TUCKER	TEST OBSERVER
TSC	
ANGELO ARCHBOLD	TEST COORDINATOR

ATE ../../.. FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
PARTICULATE STACK TEST VERIFICATION
DER METHOD 5

FACILITY NAME: TALISMAN SUGAR CORP. APIS #

COMPANY CONDUCTING TEST: KLEEMAN TEST DATE 2 11 91

SOURCE DESCRIPTION: BOILER

STACK TEST DATA SUMMATION

		RUN1	RUN2	RUN3
1.H2O	(VOL.MEAS.),ML	235	305	315
2.H2O	(MASS MEAS.),GM	12.8	12.8	7.3
3.M'N	PARTICULATE WEIGHT, GM	.227	.296	.3176
4.V'M	VOLUME METERED,CF	29.824	37.77	40.715
5.Y	DRY GAS MTR. CALIB.FCTR.	.994	.994	.994
6.RDP	AVG SQR D.P-SAMPLING	.621	.6	.624
7.DH	AVG DELTA H,IN.H2O	.384	.653	.749
8.T'M	AVG MTR. TEMP,DEG.F	65	82	84
9.T'S	AVG STACK TEMP,DEG.F	154	154	156
0.P'S	STACK PRESS,''HG(ABS)	30	30	30
1.P'B	BAROMETRIC PRESS,''HG	30	30	30
3.D'N	ACTUAL NOZZLE DIAM,IN	.205	.23	.23
4.T	ACTUAL SAMPLE TIME,MIN	96	96	96
5.C'P	PITOT TUBE COEFFICIENT	.84	.84	.84
3.S/T	VALUE:SAMPLE PTS/TOT PTS	1	1	1

UN	VOLUME SAMPLED DSCF	MOISTURE CONTENT PERCENT	STACK VEL FPS	FLOW RATE DSCF/H	PERCENT ISO-KINETIC	ACTUAL EMISS LB/HR	ACTUAL EMISS LB/MBTU	ALLOW EMISS LB/MBTU
1	29.91	27.85	39.07	3,787,307	93.26	63.36	0.262	0.300
2	36.72	27.85	37.75	3,659,235	94.13	65.03	0.269	0.300
3	39.44	27.78	39.32	3,802,475	97.31	67.49	0.279	0.300
EAN	35.36	27.83	38.72	3,749,672	94.90	65.29	0.270	0.300

SUMMARY

GENERAL:
REVIEWED BY AS
ACTUAL A 'S = 43.295 SQ FT
LAMINAR FLOW ASSUMED (<10 DEG YAW) (OR <20 DER)
ACTUAL EMISS BASED ON HEAT INPUT = 241.58 MBTU/HR
ALL REQUIRED LEAK TESTS ACCEPTABLE
ASSUMED M 'D=30.0 (COMBUSTION GASES)

COMMENT.....

RUN 1 :
ACTUAL A 'N = .0002292 SQ FT
OVERSATURATED CONDITIONS: SATURATION MOISTURE ASSUMED/GIVEN PG.1

COMMENT.....

RUN 2 :
ACTUAL A 'N = .0002885 SQ FT
OVERSATURATED CONDITIONS: SATURATION MOISTURE ASSUMED/GIVEN PG.1

COMMENT.....

RUN 3 :
ACTUAL A 'N = .0002885 SQ FT

COMMENT.....

2-11-91

Boiler #4
ACE

Area 43.295

Ref 3

INPUT SHEET - REV:09/13/80 - PAGE 2 OF 2

ENTER THE FOLLOWING:

	RUN1	RUN2	RUN3
1. H2O COLLECTED (ONLY VOL.MEASURED),ML:	235	305	315
2. H2O COLLECTED (WEIGHED PART ONLY),GM:	12.8	12.8	7.3
3. M'N PARTICULATE WEIGHT, GM:	.227	.296	.317.6
4. V'M VOLUME METERED, CF:	29.824	37.77	40.715
5. Y DRY GAS METER CAL FACTOR:	.994	.994	.994
6. RDP AVG SQR DELTA P (WHEN SAMPLING):	.621	.600	.624
7. DH AVG DELTA H, IN H2O:	.384	.653	.749
8. T'M AVG METER TEMP, DEG F:	65	82	84
9. T'S AVG STACK TEMP, DEG F:	154	154	156
10. P'S* STACK PRESS, *IN ....(.....):	30.00	30.00	30.00
11. P'B BAROMETRIC PRESS, IN HG:	30.00	30.00	30.00
13. D'N ACTUAL NOZZLE DIAMETER, IN.:	.205	.230	.230
14. T ACTUAL SAMPLE TIME, MIN:	96	96	96
15. C'P PITOT TUBE COEFFICIENT:	.84	.84	.84
OPTION ENTRIES:	237.35	246.20	241.21
17. ORSAT/FYRITE - %CO2:	.....	.....	.....
18. ORSAT/FYRITE - %O2:	.....	.....	.....
28. ORSAT/FYRITE (FOR C'S @ 50%E.A.)-%CO:	.....	.....	.....
19. SPECIFIC M'D ENTRIES:	.....	.....	.....
20. CYCLONIC (10-20 DEG) - AVG COS(YAW):	.....	.....	.....
26. CYC.(>20) - AVG(SQR D.P X COS(YAW)):	.....	.....	.....
21. PROCESS WT SOURCE - T/HR:	.....	.....	.....
22. LB/TON REGULATED - T/HR:	.....	.....	.....
27. LB/* REGULATED (* AS DEFINED) - */HR:	.....	.....	.....
23. LAM&C/CC(20)-VAL(SAMPLE PTS/TOT PTS):	.....	.....	.....

@ 241.58