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: 49

Title: Particulate Emissions Testing, Atlantic Sugar Association Boiler #2

December 1991

Eastmount Engineering

Environmental Consultants — Air Quality Specialists

05 WI-ASA10

PARTICULATE EMISSIONS COMPLIANCE TEST REPORT

BOILER #2

PREPARED FOR: Atlantic Sugar Association
P. O. Drawer B
Belle Glade, Florida 33430

CONCERNING: Particulate Emissions Testing
Atlantic Sugar Association
Boiler #2
Belle Glade, Florida Facility
December 12, 1991

PREPARED BY: John Siderwicz
Environmental Engineer
Eastmount Engineering, Inc.
420 Main Street
Walpole, MA 02081

I hereby certify that the information presented in this report is accurate and true to the best of my knowledge.

John Siderwicz
John Siderwicz
Environmental Engineer

January 16, 1992
Date

CHAIN OF CUSTODY

All filters and washes were in my custody at all times during the testing on Unit #2 at Atlantic Sugar Association's Belle Glade, Florida facility. This includes the time from initial taring before the test until final analysis at Eastmount's Florida laboratory.

John Siderwicz
Environmental Engineer

TABLE OF CONTENTS

APPENDIX

I COMPENDIUM

Eastmount Engineering conducted a series of three EPA Method 5 test runs on December 12, 1991 to measure particulate emissions from Boiler #2 located at Atlantic Sugar Association's facility in Belle Glade, Florida.

The purpose of this test was to determine compliance with the rules of the Department of Environmental Regulation, Chapter 17-2.600 Air Pollution, Section 2.05 Prohibitive Acts, Subsection 6, Stationary Sources, Table II, Emission Limiting Standards.

All testing was conducted in strict accordance with the Environmental Protection Agency Reference Methods 1 through 5 as found in the Federal Register (40 CFR 60) as amended and were consistent with the State of Florida Department of Environmental Regulation's guidelines.

Results of the test indicate that the particulate emissions averaged 0.27 pounds per million Btu, 58.83 pounds per hour. These results are compared to the allowable emission limit of 0.30 pounds per million Btu, 78.7 pounds per hour.

During testing the boiler was burning bagasse as fuel and operating at an average of 112,313 pounds of steam per hour. This load is approximately 112.3 % of the permitted load of 100,000 pounds of steam per hour.

S. Joseph Mercadante, President, was in charge of and responsible for all stack testing. John Siderwicz, Environmental Engineer, was responsible for all field laboratory aspects of the program and all calculations as well as maintaining chain of custody of all samples. Mark Wescott and Patrick Wildman assisted with the engineering and technical aspects of the testing program. Mr. Sherrill Culliver of the Florida Department of Environmental Regulation observed the stack testing and boiler operations. Mr. E. Perez was resposible for boiler observations and acquisition of all pertinent process data.

II STACK SCHEMATIC

Atlantic Sugar Association
Unit #2

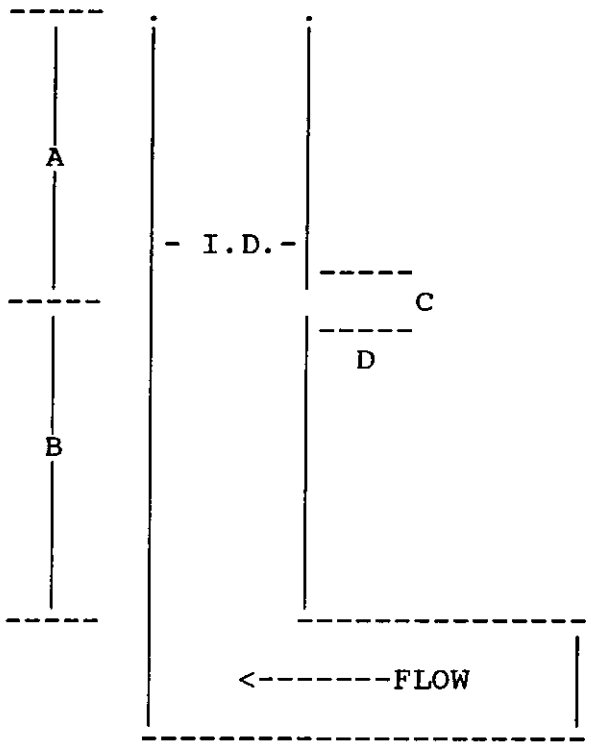
Belle Glade, Florida Facility

The following is a schematic of the stack which services boiler #2 at Atlantic Sugar Association's Belle Glade, Florida facility.

Defined are the sampling port locations, interior stack dimensions and distances from the ports to the nearest upstream and downstream interferences.

STACK SCHEMATIC

ATLANTIC SUGAR ASSOCIATION
Unit #2
Belle Glade, Florida Facility

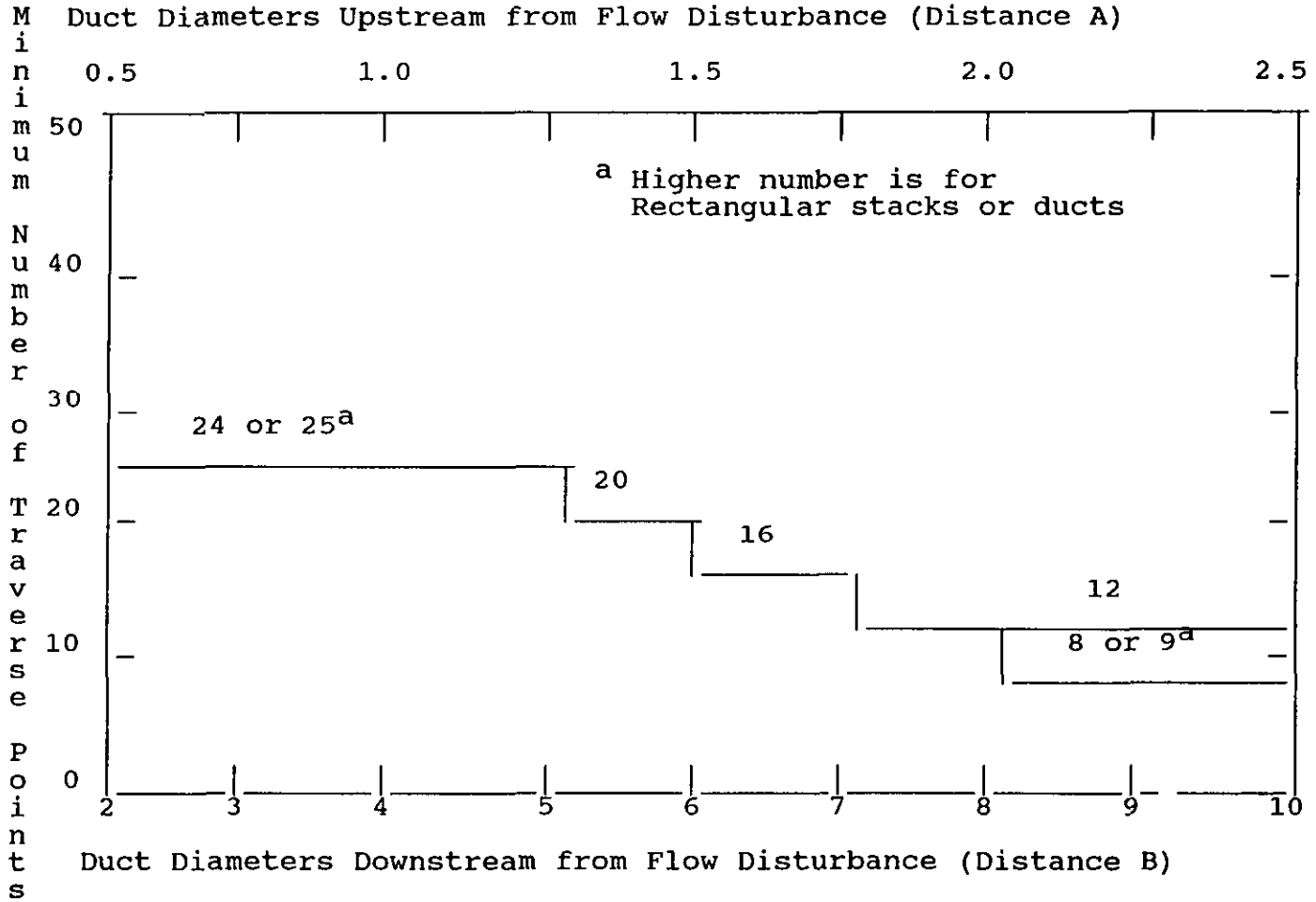


DISTANCE UPSTREAM FROM FLOW DISTURBANCE (A)	~ 58'
DISTANCE DOWNSTREAM FROM FLOW DISTURBANCE (B)	12'
DIAMETER OF PORT SLEEVE (C)	3.5"
LENGTH OF PORT SLEEVE (D)	3"
NUMBER OF PORTS	2
INTERNAL DIAMETER OF STACK AT SAMPLING PORTS	72"

SCHEMATIC NOT TO SCALE

III NUMBER OF TRAVERSE POINTS AND SAMPLING TIME PER POINT

ATLANTIC SUGAR ASSOCIATION
Unit #2
Belle Glade, Florida Facility



Minimum number of traverse points for particulate traverses.

Distance A = ~ 58' or 9.7 diameters.

Distance B = 12' or 2.0 diameters.

In accordance with Method 1, 12 traverse points were needed.

In order to sample for a minimum of one hour and draw at least 30 cubic feet, each traverse point was sampled for 5 minutes.

III NUMBER OF TRAVERSE POINTS (cont'd)

ATLANTIC SUGAR ASSOCIATION
Unit #2
Belle Glade, Florida Facility

% DIAMETER		STACK DIAMETER (INCHES)		PORT SLEEVE (INCHES)		PROBE MARKING (INCHES)
4.4	x	72	+	3	=	6.2
14.6	x	72	+	3	=	13.5
29.6	x	72	+	3	=	24.3
70.4	x	72	+	3	=	53.7
85.4	x	72	+	3	=	64.5
95.6	x	72	+	3	=	71.8

IV SAMPLING TRAIN AND TEST PROCEDURES

The following is a description of the sampling train and specifications of particulate collection media used in the tests.

1. EMISSION SAMPLING EQUIPMENT

The specific train used during this test is one manufactured by Research Appliance Company (RAC). The design specifications of this train meets all the requirements of Environmental Protection Agency's Method 5 as found in the Federal Regulations under Section 40 CFR 60 as amended. The following is a description of the individual pieces of equipment used:

Nozzle - The nozzle was of seamless stainless steel tubing construction of the button hook design. A range of sizes suitable for isokinetic sampling was available. All nozzles were calibrated before testing. A nozzle calibration sheet may be found in the calibration section of this report.

Probe - An 8 foot steel probe with a stainless steel liner was used.

Heating System - The filter temperature was maintained by enclosing the filter in a hot box capable of maintaining the temperature at 248 `F ±25`F. This temperature was monitored by use of a thermocouple in the hot box.

Pitot Tube - A type S pitot tube attached to the probe was used to monitor the stack gas velocity. Since the pitot tube meets all the dimensional criteria set forth in Method 2 of 40 CFR 60, a coefficient of 0.84 has been used.

Filter Holder - A borosilicate glass type filter holder with frit support was used.

Condenser - Four impingers connected in series, with ground glass leak-free fittings were used as the condenser. The first, third and fourth impingers were of the Greenburg-Smith design, modified by replacing the tip with a 1/2" glass tube extending to about 1/2" from the bottom of the flask. The second impinger was of the Greenburg-Smith design with the standard tip.

Metering System - A vacuum gauge, micromanometer, inclined manometer, leak-free pump, calibrated thermocouples and a calibrated dry gas meter were the basic components used to meter the dry gas through the system.

IV SAMPLING TRAIN AND TEST PROCEDURES (cont'd)

Gas Density Determination - An ORSAT type combustion analyzer, capable of measuring CO_2, O_2 and CO was used to determine the molecular weight of the flue gas. An integrated proportional sample was taken at each of the traverse points in order to assure that the total test span was covered. The ORSAT analysis was conducted immediately following each test run.

2. SAMPLING AND ANALYTICAL PROCEDURES

All sampling and analytical procedures were conducted in strict accordance with the methods prescribed in Methods 1 through 5 of the Code of Federal Regulations as found in 40 CFR 60 as amended. The following is the sequence of events that occur both prior to and during the actual stack test.

Traverse Points - The traverse points were calculated in accordance with Method 1 and the probe was marked accordingly.

Static Pressure - The static pressure was checked and recorded.

Preliminary Traverse - A preliminary traverse was conducted. Readings included the pressure drops and stack gas temperatures.

Nomograph - Once all of the above information had been obtained, the nomograph was set up for the actual test to correlate the isokinetic relationships.

Barometric Pressure - Barometric pressure was obtained by the use of an aneroid barometer at the test site.

Sampling Train Set-Up

(a) The pre-weighed filter was placed in the filter holder and visually checked.
(b) 100 ml of water was placed in the first two impingers.
(c) Approximately 200 grams of silica gel was placed in the fourth impinger. (Exact weights were logged on the field data sheets).
(d) Crushed ice was placed around the impingers.
(e) Once assembly of the entire train was completed, the probe and heater box were turned on.

Pre-test Leak Check - Once the heater box was at the desired temperature for testing, the system was leak checked at 15 inches of vacuum. A leakage rate of less than 0.02 CFM had to be achieved before testing commenced.

IV SAMPLING TRAIN AND TEST PROCEDURES (cont'd)

Final Check - Once everything was ready to go, the plant was checked to assure that it was running at desired capacity.

Sampling - Isokinetic sampling as described in Method 5 then took place.

Post-test Leak Check - Upon completion of each test run, the system was leak checked at the highest vacuum recorded during that run. All leak checks were less than 0.02 CFM and considered acceptable.

Sample Recovery - Because of the importance of proper sample recovery procedures, details of the sample recovery can be found in the Quality Control Procedures Section of this report.

Isokinetics - Once all sample recovery was completed and the amount of moisture collected had been determined, calculations were conducted to determine the percent isokinetics of the test run.

Operating Data Sheets - All pertinent operating data were logged throughout the testing period by plant personnel.

V ANALYTICAL AND QUALITY CONTROL PROCEDURES

The following is a description of the procedures used for maintaining the integrity of samples collected, including the chain of custody and quality control assurance of filters and acetone wash.

Pre-test preparation consisted of the filters being desiccated at 68˚ ± 10˚F at ambient pressure for at least twenty four (24) hours. At intervals of at least six (6) hours, the filters were re-weighed until a constant weight was achieved ± 0.5 mg change from the previous weighing. These pre-marked filters were then put into petri dishes and sealed. All filters used during testing were put into a carrying case for transport to the job site. A list of the filters and tare weights was available prior to testing.

After each test run, the filter and any particles which may have adhered to the filter holder gasket were carefully removed from the filter holder and placed into its identified petri dish container. This container was then labeled with the run number and date.

Taking care to see that particulate on the outside of the probe or other exterior surface did not get into the sample, particulate matter from the probe liner, nozzle, probe fittings, and front half of the filter holder were acetone washed into a sample container. This container was then sealed. The run number, date, and a mark indicating the level of the acetone wash in the bottle was recorded on the bottle.

Both the petri dish containing the filter and the bottle containing the acetone wash were transported to Eastmount Engineering's laboratory.

Once at the laboratory, each filter was weighed and then put back into its individual container. The container was then placed in a desiccator for at least twenty four (24) hours and then weighed. At intervals of at least six (6) hours, the filters were re-weighed until a constant weight was achieved ± 0.5 mg change from the previous weighing.

The levels marked on the bottles containing the acetone wash were checked to confirm that no leakage occurred during transport. The contents were then transferred into a pre-tared beaker and evaporated to dryness. Once this had been accomplished, the beaker was placed in a desiccator for at least twenty four (24) hours and then weighed. At intervals of at least six (6) hours, the beaker was re-weighed until a constant weight of ± 0.5 mg change from the previous weighing was achieved.

APPENDIX I

COMPUTER INPUT SHEETS

INPUT DATA SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C2
DATE : 12-12-91

Ds (FT)	6
Dn (IN)	.250
FILTER#	4476
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	385
IMP-2 (FIN)	138
IMP-3 (FIN)	7
IMP-4 (FIN)	514.6
% CO2	12.3
% O2	7.9
% CO	0
P BAR	30.08
P STK	-.35
NO. PTS	12
TEST LNGTH	60
END METER	1040.740
INT METER	993.500
BEGIN TIME:	11:51
END TIME:	13:01

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.76	.87	1.90	96	87	188
2	1.10	1.05	2.75	110	88	187
3	1.10	1.05	2.75	118	89	188
4	.79	.89	1.98	121	90	190
5	.75	.87	1.88	121	91	191
6	.73	.85	1.83	121	91	189
B1	.70	.84	1.75	103	91	182
2	.76	.87	1.90	116	92	188
3	.90	.95	2.25	122	92	183
4	1.00	1.00	2.50	125	93	188
5	1.00	1.00	2.50	124	93	187
6	.95	.97	2.38	125	93	184
AVERAGE	.88	.93	2.20	116.8	90.8	187.1

INPUT DATA SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C3
DATE : 12-12-91

Ds (FT)	6
Dn (IN)	.249
FILTER#	4472
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	285
IMP-2 (FIN)	292
IMP-3 (FIN)	8
IMP-4 (FIN)	523.7
% CO2	12.7
% O2	7.4
% CO	0
P BAR	30.01
P STK	-.35
NO. PTS	12
TEST LNGTH	60
END METER	90.151
INT METER	43.323
BEGIN TIME:	14:20
END TIME:	15:20

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.82	.91	2.05	84	80	188
2	1.00	1.00	2.50	98	80	189
3	1.10	1.05	2.75	106	82	189
4	.85	.92	2.16	109	83	186
5	.75	.87	1.88	111	84	188
6	.76	.87	1.90	111	85	185
B1	.67	.82	1.68	99	84	185
2	.75	.87	1.89	105	84	186
3	.88	.94	2.20	109	85	189
4	1.10	1.05	2.75	113	86	191
5	1.10	1.05	2.75	115	86	188
6	.99	.99	2.48	117	87	186
AVERAGE	.90	.94	2.25	106.4	83.8	187.5

INPUT DATA SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C4
DATE : 12-12-91

Ds (FT)	6
Dn (IN)	.250
FILTER#	4475
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	390
IMP-2 (FIN)	160
IMP-3 (FIN)	8
IMP-4 (FIN)	512.1
% CO2	12.8
% O2	7.3
% CO	0
P BAR	30.01
P STK	-.35
NO. PTS	12
TEST LNGTH	60
END METER	135.477
INT METER	90.460
BEGIN TIME:	16:15
END TIME:	17:20

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.48	.69	1.20	87	83	180
2	.72	.85	1.80	97	84	183
3	.82	.91	2.05	103	83	184
4	.95	.97	2.38	109	85	184
5	1.00	1.00	2.50	114	85	186
6	.94	.97	2.35	114	86	186
B1	.74	.86	1.85	105	85	183
2	.96	.98	2.40	113	86	185
3	1.10	1.05	2.75	117	87	188
4	.79	.89	1.98	117	87	185
5	.73	.85	1.83	119	88	184
6	.68	.82	1.70	120	89	184
AVERAGE	.83	.90	2.06	109.6	85.7	184.3

APPENDIX II

ISOKINETIC CALCULATION SHEETS

37

Atlantic Sugar Association, Inc.

P.O. BOX #1570

BELLE GLADE, FLORIDA 33430

Tel: (407) 996-6541 Fax: (407) 996-8021

January 29, 1992

Ms. Sherrill Culliver
Department of Environmental Regulation
2269 Bay Street
Ft. Myers, Fla. 33901

RE: Atlantic Sugar Association, Inc. - Boiler #2
Permit #AO50-189608

Dear Ms. Culliver:

Enclosed is a copy of the results for the Particulate Emissions testing performed on the above mentioned boiler on December 12, 1991.

The results of the test program indicate that Boiler #2 is in compliance with the Florida DER emission standards.

If you should have any questions, please do not hesitate to contact me.

Very truly yours,

Hector J. Cardentey
Environmental Director

HJD/ed

CC: S. Diego, General Manager
A. Pacheco, Plant Manager
A. Satyal, Palm Beach County Health Department
J. Mercadante, Eastmount Engineering

APIS - 0016 - 02

Facility: Atlantic Sugar Association
Belle Glade, Boi
Description - Boiler 2
Testing firm:- Eastmount Engs, Inc

A. Allowable emissions
1. 66.2 Lbs/HR
2. 66
3. 64.2
AV. 65.46
As = 28.3

INPUT SHEET - REV:09/13/83 - PAGE 2 OF 2

ENTER THE FOLLOWING:		2 RUN1	3 RUN2	4 RUN3
1. H2O	COLLECTED (ONLY VOL.MEASURED), ML:	330	385	358
2. H2O	COLLECTED (WEIGHED PART ONLY), GM:	14.6	23.7	12.4
3. M'N	PARTICULATE WEIGHT, GM:	.29998	.31074	.36069
4. V'M	VOLUME METERED, CF:	47.24	46.828	45.017
5. Y	DRY GAS METER CAL FACTOR:	.9765	.9765	.9765
6. RDP	AVG SQR DELTA P (WHEN SAMPLING):	.93	.94	.90
7. DH	AVG DELTA H, IN H2O:	2.20	2.25	2.06
8. T'M	AVG METER TEMP, DEG F:	103.8	95.1	97.6
9. T'S	AVG STACK TEMP, DEG F:	187.1	187.5	184.3
10. P'S*	STACK PRESS, *IN (wet. Hg.):	30.08	30.01	30.01
11. P'B	BAROMETRIC PRESS, IN HG:	30.08	30.01	30.01
13. D'N	ACTUAL NOZZLE DIAMETER, IN.:	.250	.249	.250
14. T	ACTUAL SAMPLE TIME, MIN:	60	60	60
15. C'P	PITOT TUBE COEFFICIENT:	.84	.84	.84
OPTION ENTRIES:				
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&CYC[(20)-VAL(SAMPLE PTS/T PTS]:	1	1	2

EPA ISA

E02/06/92

Revised

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
PARTICULATE STACK TEST VERIFICATION
EPA METHOD 5

FACILITY NAME: Atlantic Sugar Association APIS # 0006-02

COMPANY CONDUCTING TEST: Eastmount Engineering Inc. TEST DATE December 12,1991

SOURCE DESCRIPTION: Boiler2

STACK TEST DATA SUMMATION

		RUN1	RUN2	RUN3
1.H2O	(VOL.MEAS.),ML	330	385	358
2.H2O	(MASS MEAS.),GM	14.6	23.7	12.4
3.M'N	PARTICULATE WEIGHT, GM	.2999	.3107	.3606
4.V'M	VOLUME METERED,CF	47.24	46.828	45.017
5.Y	DRY GAS MTR. CALIB.FCTR.	.9765	.9765	.9765
6.RDP	AVG SQR D.P-SAMPLING	.93	.94	.9
7.DH	AVG DELTA H,IN.H2O	2.2	2.25	2.06
8.T'M	AVG MTR. TEMP,DEG.F	103.8	95.1	~~97.6~~
9.T'S	AVG STACK TEMP,DEG.F	187.1	187.5	184.3
10.P'S	STACK PRESS,''HG(ABS)	30.08	30.01	30.01
11.P'B	BAROMETRIC PRESS,''HG	30.08	30.01	30.01
13.D'N	ACTUAL NOZZLE DIAM,IN	.25	.249	.25
14.T	ACTUAL SAMPLE TIME,MIN	60	60	60
15.C'P	PITOT TUBE COEFFICIENT	.84	.84	.84
23.S/T	VALUE:SAMPLE PTS/TOT PTS	1	1	1

RUN	VOLUME SAMPLED DSCF	MOISTURE CONTENT PERCENT	STACK VEL FPS	FLOW RATE DSCF/H	PERCENT ISO-KINETIC	ACTUAL EMISS LB/HR	ALLOW EMISS LB/HR
1	43.65	27.09	59.89	3,647,757	99.35	55.247	65.460
2	43.85	30.50	61.09	3,536,886	103.76	55.242	65.460
3	41.94	29.36	58.20	3,441,259	101.20	65.213	65.460
MEAN	43.15	28.98	59.73	3,541,967	101.44	58.567	65.460

SUMMARY

GENERAL:
REVIEWED BY Raisa
ACTUAL A 'S = 28.3 SQ FT
LAMINAR FLOW ASSUMED (<10 DEG YAW) (OR <20 DER)
ALL REQUIRED LEAK TESTS ACCEPTABLE
ASSUMED M 'D=30.0 (COMBUSTION GASES)

COMMENT.....

RUN 1 :
ACTUAL A 'N = .0003409 SQ FT

COMMENT.....

RUN 2 :
ACTUAL A 'N = .0003382 SQ FT

COMMENT.....

RUN 3 :
ACTUAL A 'N = .0003409 SQ FT

COMMENT.....

ISOKINETIC CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C2
DATE : 12-12-91

TS ('F)=	187.1	% CO2=	12.3	VM (CF) =	47.240
TS ('R)=	647.1	% O2=	7.9	DELTA H (ABS)=	30.24
TM ('F)=	103.8	% CO=	0	PS (ABS) =	30.05
TM ('R)=	563.8	% N2=	79.8	SQRT DELTA P =	.934204
VI(TOT)=	344.6	CP=	.84	AREA NOZZLE =	.000341

Y = .9765

VM STD	=	$17.64 \frac{(VM)(Y)(DELTA\ H\ ABS)}{(TM)}$	= 43.64	DSCF
VW STD	=	.04707 (VI TOT)	= 16.22	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	= .271	
BWO	=	MOISTURE FROM STEAM TABLES	= .599	
VI TOT	=	ADJUSTED TO SATURATION VOLUME	= N/A	ML
1-BWO	=	1 - BWO	= .729	
Md (DRY)	=	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2)	= 30.28	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	= 26.95	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	= .89	
VS	=	85.49(CP)(G)(SQRT DELTA P)	= 60.0	FPS
H	=	0.002669 (VI TOT)	= .92	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	= 2.47	
K	=	(H) + (J)	= 3.39	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	= 99.3	

Eastmount Engineering Inc. • 420 Main Street • Walpole, MA 02081 • (508) 668-9005 • FAX (508) 668-4989

ISOKINETIC CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C3
DATE : 12-12-91

TS ('F)=	187.5	% CO2=	12.7	VM (CF) =	46.828
TS ('R)=	647.5	% O2=	7.4	DELTA H (ABS)=	30.18
TM ('F)=	95.1	% CO=	0	PS (ABS) =	29.98
TM ('R)=	555.1	% N2=	79.9	SQRT DELTA P =	.944113
VI(TOT)=	408.7	CP=	.84	AREA NOZZLE =	.000338

Y = .9765

VM STD	=	$17.64 \frac{(VM)(Y)(DELTA\ H\ ABS)}{(TM)}$	= 43.85	DSCF
VW STD	=	.04707 (VI TOT)	= 19.24	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	= .305	
BWO	=	MOISTURE FROM STEAM TABLES	= .601	
VI TOT	=	ADJUSTED TO SATURATION VOLUME=	N/A	ML
1-BWO	=	1 - BWO	= .695	
Md (DRY)	=	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2)	= 30.33	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	= 26.57	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	= .90	
VS	=	85.49(CP)(G)(SQRT DELTA P)	= 61.1	FPS
H	=	0.002669 (VI TOT)	= 1.09	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	= 2.49	
K	=	(H) + (J)	= 3.58	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	= 103.8	

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ISOKINETIC CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C4
DATE : 12-12-91

TS ('F)=	184.3 Avg=186	% CO2=	12.8 Avg=7.5	VM (CF) =	45.017
TS ('R)=	644.3	% O2=	7.3	DELTA H (ABS)=	30.16
TM ('F)=	97.6	% CO=	0	PS (ABS) =	29.98
TM ('R)=	557.6	% N2=	79.9	SQRT DELTA P =	.903982
VI(TOT)=	370.1	CP=	.84	AREA NOZZLE =	.000341

Y = .9765

VM STD	=	$\frac{17.64\ (VM)(Y)(DELTA\ H\ ABS)}{(TM)}$	= 41.94	DSCF
VW STD	=	.04707 (VI TOT)	= 17.42	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	= .293	
BWO	=	MOISTURE FROM STEAM TABLES	= .561	
VI TOT	=	ADJUSTED TO SATURATION VOLUME=	N/A	ML
1-BWO	=	1 - BWO	= .707	
Md (DRY)	=	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2)	= 30.34	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	= 26.72	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	= .90	
VS	=	85.49(CP)(G)(SQRT DELTA P)	= 58.2	FPS
H	=	0.002669 (VI TOT)	= .99	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	= 2.38	
K	=	(H) + (J)	= 3.37	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	= 101.3	

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APPENDIX III

ENTHALPY CALCULATION SHEETS

ENTHALPY CALCULATION SHEET

PLANT : ATLANTIC
LOCATION: UNIT 2

RUN #: C2
DATE : 12-12-91

STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
270	530	240
280	530	240
280	530	240
255	520	240
270	520	240
255	520	240

AVERAGE 268.3 PSIG 525.0

P ABS = 283.0 PSIA

ENTHALPY @ 500 'F AND 280 PSIA = 1260.0

ENTHALPY @ 550 'F AND 280 PSIA = 1289.1

ENTHALPY @ 525.0 'F AND 280 PSIA = 1274.6

ENTHALPY OF FEED WATER = 208.5

AVERAGE ENTHALPY = 1066.1 BTU/LB OF STEAM

ENTHALPY CALCULATION SHEET

PLANT : ATLANTIC
LOCATION: UNIT 2

RUN #: C3
DATE : 12-12-91

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	275	540	240
	265	540	240
	280	540	240
	270	530	240
	270	530	240
	260	540	240
AVERAGE	270.0 PSIG	536.7	
P ABS =	284.7 PSIA		

ENTHALPY @	500	'F AND	280	PSIA =	1260.0
ENTHALPY @	550	'F AND	280	PSIA =	1289.1
ENTHALPY @	536.7	'F AND	280	PSIA =	1281.3

ENTHALPY OF FEED WATER = 208.5

AVERAGE ENTHALPY = 1072.9 BTU/LB OF STEAM

ENTHALPY CALCULATION SHEET

PLANT : ATLANTIC
LOCATION: UNIT 2

RUN #: C4
DATE : 12-12-91

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	245	520	240
	250	520	240
	265	520	240
	270	530	240
	265	540	240
AVERAGE	259.0 PSIG	526.0	
P ABS =	273.7 PSIA		

ENTHALPY @	500	'F AND	280	PSIA =	1260.0
ENTHALPY @	550	'F AND	280	PSIA =	1289.1
ENTHALPY @	526.0	'F AND	280	PSIA =	1275.1

ENTHALPY OF FEED WATER = 208.5

AVERAGE ENTHALPY = 1066.7 BTU/LB OF STEAM

APPENDIX IV

HEAT INPUT CALCULATION SHEETS

HEAT INPUT CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C2
DATE : 12-12-91

	STEAM INTEGRATOR READINGS		TIME		INTEGRATOR FACTOR	
					100	
END	10193		13: 05			
BEGIN	8770		11: 50		LBS/HR STEAM	
NET	1423	X 100 /	75	MINS =	113840	

113840 LBS/HR STEAM / 55% EFF. = 206982 EQUIV.

206982 LBS/HR STEAM X 1066 BTU/LB = 220.7 BTU(e6)/HR

	OIL INTEGRATOR READINGS		TIME		GALS/HR	
END	0		13: 05			
BEGIN	0		11: 50			
NET	0	GALLONS	75	MINS =	0	GPH

0 GPH X 150,000 BTU/GAL (EST) = 0 BTU(e6)/HR

ALLOWABLE EMISSIONS

BAGASSE	220.7	-	0	X	.3	=	66.2 LBS/HR
OIL			0	X	.1	=	.0 LBS/HR
TOTAL						=	66.2 LBS/HR

HEAT INPUT CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C3
DATE : 12-12-91

	STEAM INTEGRATOR READINGS		TIME		INTEGRATOR FACTOR
END	2973		15: 35		100
BEGIN	1563		14: 20		LBS/HR STEAM
NET	1410	X 100 /	75	MINS =	112800

112800 LBS/HR STEAM / 55% EFF. = 205091 EQUIV.

205091 LBS/HR STEAM X 1073 BTU/LB = 220.0 BTU(e6)/HR

	OIL INTEGRATOR READINGS		TIME		GALS/HR
END	0		15: 35		
BEGIN	0		14: 20		
NET	0	GALLONS	75	MINS =	0 GPH

0 GPH X 150,000 BTU/GAL (EST) = 0 BTU(e6)/HR

ALLOWABLE EMISSIONS

BAGASSE	220.0	-	0	X	.3	=	66.0 LBS/HR
OIL			0	X	.1	=	.0 LBS/HR
TOTAL						=	66.0 LBS/HR

HEAT INPUT CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C4
DATE : 12-12-91

	STEAM INTEGRATOR READINGS		TIME		INTEGRATOR FACTOR
END	4822		17: 15		100
BEGIN	3719		16: 15		LBS/HR STEAM
NET	1103	X 100 /	60	MINS =	110300

110300 LBS/HR STEAM / 55% EFF. = 200545 EQUIV.

200545 LBS/HR STEAM X 1067 BTU/LB = 213.9 BTU(e6)/HR

	OIL INTEGRATOR READINGS		TIME		GALS/HR
END	0		17: 15		
BEGIN	0		16: 15		
NET	0	GALLONS	60	MINS =	0 GPH

0 GPH X 150,000 BTU/GAL (EST) = 0 BTU(e6)/HR

ALLOWABLE EMISSIONS

BAGASSE	213.9	-	0	X .3	=	64.2	LBS/HR
OIL			0	X .1	=	.0	LBS/HR
TOTAL					=	64.2	LBS/HR

APPENDIX V

EMISSION CALCULATION SHEETS

EMISSION CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C2
DATE : 12-12-91

	FILTER	BEAKER	BLANKS FILTER	BLANKS ACETONE
NO. :	4476	4	4473	8
FINAL:	.8719	71.9589	.5894	71.2367
TARE :	.5933	71.9359	.5895	71.2358
NET :	.2786	.0230	-.0001	.0009/200ML

VOLUME OF RINSE 360

WEIGHT = 301.60
RESIDUE = - 1.62

Mn = 299.98 Mg AS = 28.3 SQ FT

Qs = 3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS) = 3645608 DSCFH

CS = (2.205 X 10-6) (Mn) / (VM STD) = 1.516e-5 LBS/SCF

CS' = 0.0154 (Mn) / (VM STD) = .11 GRAINS /SCF

PMR = (QS) (CS) = 55.25 LBS/HR

LOAD= MILLIONS OF BTU / HOUR INPUT = 220.7 BTU e10 / HR

CS = LBS / MILLION BTu = .250 LBS/ BTu e6

EMISSION CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C3
DATE : 12-12-91

	FILTER	BEAKER	BLANKS FILTER	BLANKS ACETONE
NO. :	4472	5	4473	8
FINAL:	.8678	70.3369	.5894	71.2367
TARE :	.5963	70.296	.5895	71.2358
NET :	.2715	.0409	-.0001	.0009/200ML

VOLUME OF RINSE 370

WEIGHT = 312.40
RESIDUE = - 1.67

Mn = 310.74 Mg

AS = 28.3 SQ FT

Qs = 3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS) = 3532147 DSCFH

CS = (2.205 X 10-6) (Mn) / (VM STD) = 1.563e-5 LBS/SCF

CS′ = 0.0154 (Mn) / (VM STD) = .11 GRAINS /SCF

PMR = (QS) (CS) = 55.19 LBS/HR

LOAD= MILLIONS OF BTU / HOUR INPUT = 220.0 BTU e10 / HR

CS = LBS / MILLION BTu = .251 LBS/ BTu e6

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EMISSION CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 2

RUN #: C4
DATE : 12-12-91

	FILTER	BEAKER	BLANKS FILTER	BLANKS ACETONE
NO. :	4475	6	4473	8
FINAL:	.9145	69.9114	.5894	71.2367
TARE :	.5940	69.8695	.5895	71.2358
NET :	.3205	.0419	-.0001	.0009/200ML

VOLUME OF RINSE 380

WEIGHT = 362.40
RESIDUE = - 1.71

Mn = 360.69 Mg AS = 28.3 SQ FT

Qs = 3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS) = 3436713 DSCFH

Avg = 3,538,156

CS = (2.205 X 10-6) (Mn) / (VM STD) = 1.896e-5 LBS/SCF

CS' = 0.0154 (Mn) / (VM STD) = .13 GRAINS /SCF

PMR = (QS) (CS) = 65.17 LBS/HR

Avg = 218.2

LOAD= MILLIONS OF BTU / HOUR INPUT = 213.9 BTU e10 / HR

CS = LBS / MILLION BTu = .305 LBS/ BTu e6

APPENDIX VI

NOMENCLATURE SHEETS

NOMENCLATURE SHEET

PARTICULATE EMISSION TEST

Ar	Acetone residue - result of Blank evaporation.
AREA NOZZLE	Area of the nozzle in square feet.
AS	Area of the stack in square feet.
BDL	Below detectable limits
BWO	The amount of moisture in the flue gas.
% CO	Percent of carbon monoxide in the flue gas.
% CO2	Percent of carbon dioxide in the flue gas.
Cp	Pitot tube coefficient.
CS	The concentration in the stack in pounds per standard cubic foot.
Cs'	The concentration in the stack in grains per standard cubic foot.
DELTA H	The meter orifice differential.
DELTA H(ABS)	The meter orifice differential, absolute conditions in inches of mercury.
Dn (IN)	Diameter of the nozzle in inches.
DRY GAS IN	Temperature of the dry gas meter inlet degrees Fahrenheit.
DRY GAS OUT	Temperature of the dry gas meter outlet degrees Fahrenheit.
Ds (FT)	Diameter of the stack in feet.
E	The emission rate in pounds per million Btu derived by using F-Factor.
E (Heat Input)	The emission rate in pounds per million Btu derived by use of calculated heat input.
END METER	The dry gas meter reading at the end of the test.

NOMENCLATURE (cont'd)

F factor	The theoretical amount of air in dry standard cubic feet (DSCF) needed to combust a million Btu's worth of fuel.
Filter Catch	The amount of particulate captured on the filter during testing.
INT METER	The dry gas meter reading at the beginning of the test.
Md (DRY)	The dry molecular weight of the flue gas in pounds per pound mole.
MN	The amount of particulate collected by washing the nozzle, probe, and front half of the glassware, reported in milligrams.
MN'	The milligrams of particulate collected minus the blank.
Ms (WET)	Wet or actual molecular weight of the flue gas in pounds per pound mole.
% N2	The percent of nitrogen in the flue gas.
NO PTS	Number of traverse points.
% O2	Percent of oxygen in the flue gas.
P BAR	Barometric pressure at test location.
P STK	Static pressure of the stack in inches of water.
PMR	The emission rate in pounds per hour.
PS (ABS)	Absolute pressure conditions in the stack in inches of mercury.
Qs	The volumetric flow rate of the flue gas in dry standard cubic feet per hour.
SQ ROOT	The square root of each velocity head measurement.
SQRT DELTA P	The average of the square roots of the measured pressure drops.
Stack Temp or TS (°F)	The temperature of the stack in degrees Fahrenheit.

NOMENCLATURE (cont'd)

TS (`R)	The temperature of the stack in degrees Rankine.
T (Hot Box)	Temperature around the filter box, degrees Fahrenheit.
TM (`F)	Average temperature of the dry gas meter in degrees Fahrenheit.
TM (`R)	Average temperature of the dry gas meter in degrees Rankine.
VEL HEAD	The pressure drop measured across the pitot tubes.
VI (TOT)	The amount of water collected in the impingers in milliliters.
VM (CF)	The volume sampled through the dry gas meter in cubic feet.
VM STD	Volume sampled through the dry gas meter corrected to standard conditions.
VS	Velocity of the stack gas in feet per second.
VW STD	The amount of moisture collected, converted to standard cubic feet.
Y	Meter box calibration factor.
o	Sampling time in minutes.

APPENDIX VII

FIELD DATA SHEETS - UNIT OPERATING CONDITIONS

BOILER DATA SHEET

ATLANTIC SUGAR
UNIT #

RUN #: C-2 DATE: 12/12/91

TIME	11:50 AM	12:05 PM	12:20 PM	12:35 PM	12:50 PM	1:05 PM
STEAM PRESSURE	270	280	280	255	270	255
STEAM TEMPERATURE	530	530	530	520	520	520
STEAM INTEGRATOR	8770	9063	9354	9674	9946	10193
FUEL OIL PRESSURE	—	—	—	—	—	—
FUEL OIL TEMPERATURE	—	—	—	—	—	—
FUEL OIL INTEGRATOR	—	—	—	—	—	—
FEED WATER TEMPERATURE	240	240	240	240	240	240
% O2	—	—	—	—	—	—
SCRUBBER DIFFERENTIAL	5	5	5	5	5	5

READINGS TAKEN BY: _____

BOILER DATA SHEET

ATLANTIC SUGAR
UNIT #

RUN #: _____

DATE: 12/15/92

TIME	2:20 PM	2:35 PM	2:50	3:05 PM	3:20 PM	3:35 PM
STEAM PRESSURE	275	265	280	270	270	260
STEAM TEMPERATURE	540	540	540	530	530	540
STEAM INTEGRATOR	1563	1846	2115	2436	2696	2973
FUEL OIL PRESSURE	—	—	—	—	—	—
FUEL OIL TEMPERATURE	—	—	—	—	—	—
FUEL OIL INTEGRATOR	—	—	—	—	—	—
FEED WATER TEMPERATURE	240	240	240	240	240	240
% O2	—	—	—	—	—	—
SCRUBBER DIFFERENTIAL	5	5	5	5	5	5

READINGS TAKEN BY: _____

BOILER DATA SHEET

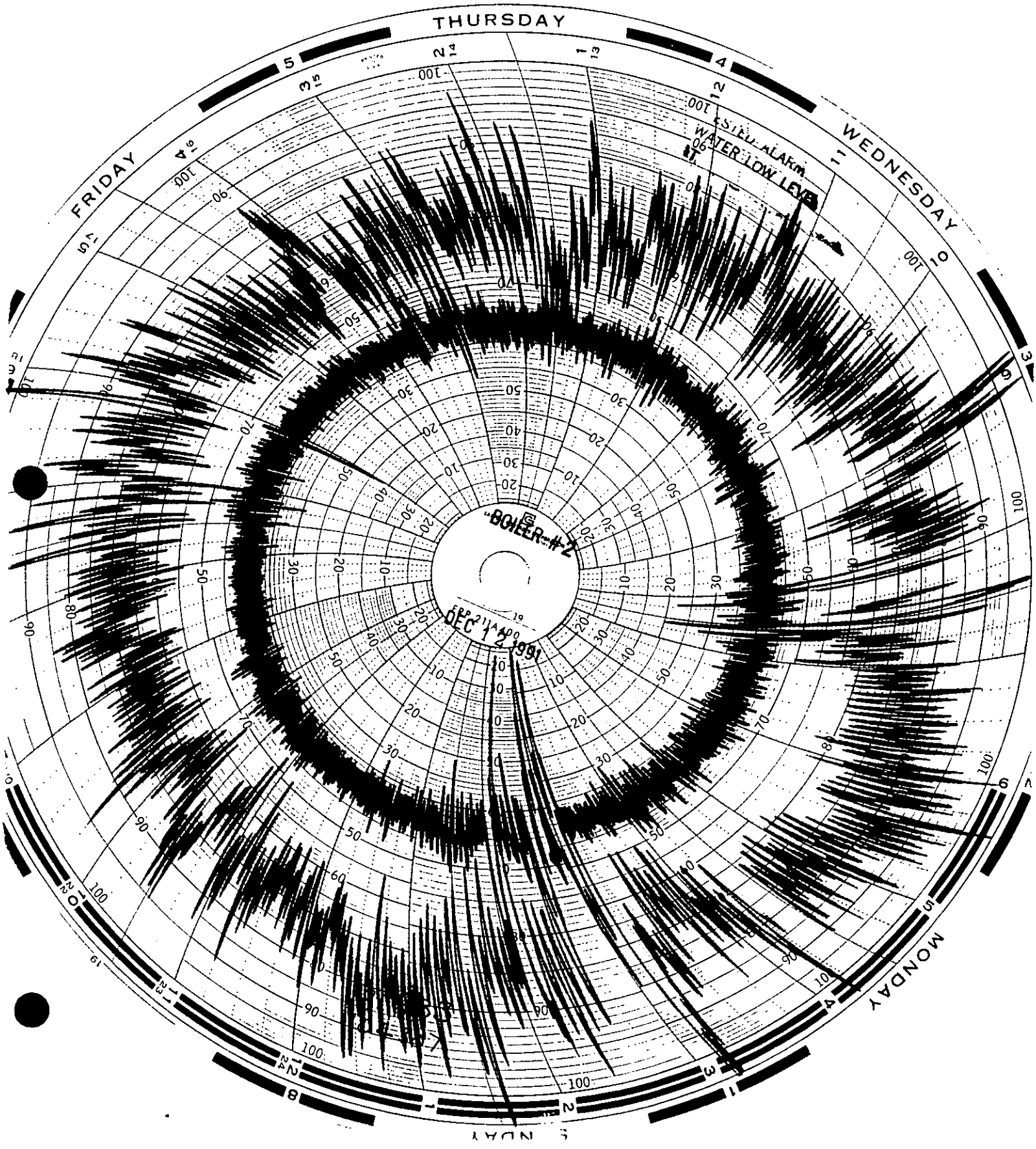
ATLANTIC SUGAR
UNIT #

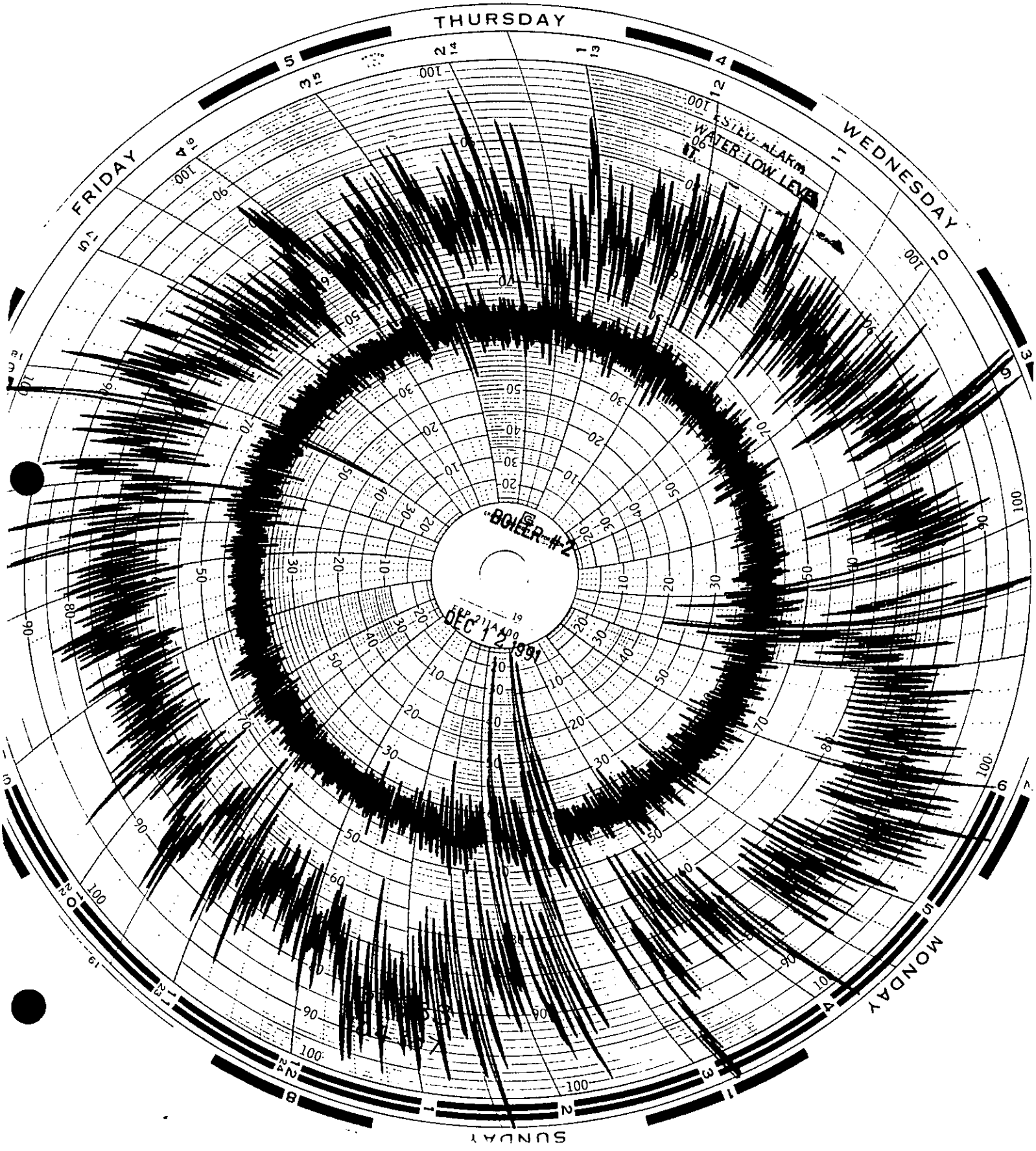
RUN #: C-4

DATE: 12/12/91

TIME	4:15 PM	4:30 PM	4:45 PM	5:00 PM	5:15 PM
STEAM PRESSURE	245	250	265	270	265
STEAM TEMPERATURE	550	570	570	530	510
STEAM INTEGRATOR	3719	3981	4256	4548	4822
FUEL OIL PRESSURE	—	—	—	—	—
FUEL OIL TEMPERATURE	—	—	—	—	—
FUEL OIL INTEGRATOR	—	—	—	—	—
FEED WATER TEMPERATURE	240	240	240	240	240
% O2	—	—	—	—	—
SCRUBBER DIFFERENTIAL	5	6	5	5	6

READINGS TAKEN BY: _____


THURSDAY
WEDNESDAY
FRIDAY
MONDAY
WATER LOW LEVEL
BOILER #2
DEC 12 1991


THURSDAY
WEDNESDAY
FRIDAY
MONDAY
SUNDAY
WATER LOW LEVEL
BOILER #2
DEC 12 1991

APPENDIX VIII

FIELD DATA SHEETS - STACK TESTING

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	Atlantic	Run #:	C-2
Location:	Unit #2	Date:	12/12/91
Ds (ft):	6.0	No. Points:	12
Dn (in):	.250	Test Length:	60
Filter #:	4476	End Meter Reading:	(5.4) 45T 40.740
Cp:	.84	Int Meter Reading:	993.500
P bar:	30.08	Begin Time:	1157
P stack:	-.35	End Time:	1301
IMP-1 (INT)	100	IMP-1 (FINAL)	385
IMP-2 (INT)	100	IMP-2 (FINAL)	139
IMP-3 (INT)	0	IMP-3 (FINAL)	7
IMP-4 (INT)	500	IMP-4 (FINAL)	514.6

	TEST 1	TEST 2	TEST 3
% CO2	12.3		
% O2	7.9		
% CO			

Project Director:	John Siderwicz	Field Laboratory:	J. Siderwicz
Meter Box Operator:	Mark Wescott	Chain of Custody:	J. Siderwicz
Probe Operator:	Pat Wildman	Plant Coordinator:	Ed Perez
Orsat Analyst:	S. Joe Mercadante	Agency Rep:	Sherrill Colliver

Comments:

FIELD DATA SHEET
TRAVERSE POINT INFORMATION

PAGE 1 OF 1

PLANT Atlantic

LOCATION Unit #2

SAMPLING TIME PER POINT 5 min.

RUN # C-2

DATE 12 DEC 91

993.50

TRAV. NO.	DELTA P	DELTA H	METER READING	DGM IN	DGM OUT	HOT BOX	IMPG TEMP	STACK TEMP	VAC
A1	.76	1.90	997.08	96	87	268	68	188	6.0
2	1.1	2.75	001.44	110	88	262	66	187	10.0
3	1.1	2.75	005.85	118	89	245	66	188	11.0
4	.79	1.98	009.67	121	90	240	66	190	13.0
5	.75	1.88	13.35	121	91	239	65	191	8.0
6	.73	1.83	16.97	121	91	259	66	189	8.0
B1	~~.70~~ .60	~~1.75~~ 1.5	2050	103	91	269	65	182	7.5
2	.76	1.90	24.15	116	92	261	64	188	9.0
3	.90	2.25	28.16	122	92	255	66	183	11.0
4	1.00	2.50	32.36	125	93	237	68	188	12.5
5	1.00	2.50	36.59	124	93	240	66	187	13.5
6	.95	2.38	40.74	125	93	238	67	184	13.5

COMMENTS: DELTA P x 2.5 = DELTA H

BOX # 10 Y = .9765 DELTA H @ = 2.11

START TIME : 1150

END TIME : 13:01

INITIAL LEAK CHECK 0.0 AT 15 INCHES HG

FINAL LEAK CHECK dead AT ____ INCHES HG

Pitot Leak Check dead at 5.0 " H_2O

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	Atlantic	Run #:	C3
Location:	Unit #2	Date:	12/12/91
Ds (ft):	6.0	No. Points:	12
Dn (in):	.252	Test Length:	60
Filter #:	4472	End Meter Reading:	90.151
Cp:	.84	Int Meter Reading:	43.323
P bar:	30.03	Begin Time:	1420
P stack:	-.35	End Time:	1520
IMP-1 (INT)	100	IMP-1 (FINAL)	285
IMP-2 (INT)	100	IMP-2 (FINAL)	292
IMP-3 (INT)	0	IMP-3 (FINAL)	8
IMP-4 (INT)	500	IMP-4 (FINAL)	523.7

	TEST 1	TEST 2	TEST 3
% CO2	12.7		
% O2	7.4		
% CO			

Project Director:	John Siderwicz	Field Laboratory:	J. Siderwicz
Meter Box Operator:	Pat Wildman	Chain of Custody:	J. Siderwicz
Probe Operator:	Mark Wescott	Plant Coordinator:	Ed Perez
Orsat Analyst:	S. Joe Mercadante	Agency Rep:	Sherrill Gilliver

Comments:

FIELD DATA SHEET
TRAVERSE POINT INFORMATION

PAGE 1 OF 1

SAMPLING TIME PER POINT 5 min.

PLANT Atlantic

RUN # C-3

LOCATION Unit #2

DATE 12 DEC 91

43.323 1 2 3 4 5

TRAV. NO.	DELTA P	DELTA H	METER READING	DGM IN	DGM OUT	HOT BOX	IMPG TEMP	STACK TEMP	VAC
A1	.82	2.05	047.1	84	80	256	65	188	4
2	1.0	2.50	51.4	98	80	257	64	189	5
3	1.1	2.75	55.4	106	82	260	67	189	6
4	.85	2.10	59.3	109	83	260	67	186	6
5	.75	1.88	63.0	111	84	262	68	188	6
6	.76	1.90	66.575	111	85	260	65	185	6
B1	.67	1.68	69.9	99	84	245	66	185	6
2	.75	1.89	73.4	105	84	270	67	186	7
3	.86	2.20	77.3	109	85	256	68	189	8
4	1.1	2.75	81.4	113	86	259	66	191	10.5
5	1.1	2.75	86.0	115	86	254	67	188	11.5
6	.99	2.48	90.151	117	87	258	67	186	12.0

COMMENTS: DELTA P x 2.5 = DELTA H

BOX # 10 Y = .9765 DELTA H @ = 2.11

START TIME : 1420

END TIME : ~~1450~~ 15:20 STD.

INITIAL LEAK CHECK 0.0 AT 15 INCHES HG

FINAL LEAK CHECK 0.0 AT 12 INCHES HG

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	Atlantic	Run #:	C-4
Location:	Unit #2	Date:	12-12-91
Ds (ft):	6.0	No. Points:	12
Dn (in):	.250	Test Length:	60
Filter #:	4475	End Meter Reading:	135.477
Cp:	.84	Int Meter Reading:	70.460
P bar:	30.01	Begin Time:	1615
P stack:	-.35	End Time:	1720
IMP-1 (INT)	100	IMP-1 (FINAL)	370
IMP-2 (INT)	100	IMP-2 (FINAL)	160
IMP-3 (INT)	0	IMP-3 (FINAL)	8
IMP-4 (INT)	500	IMP-4 (FINAL)	512.1

	TEST 1	TEST 2	TEST 3
% CO2	12.8		
% O2	7.3		
% CO			

Project Director:	Ellen Silverwise	Field Laboratory:	Ellen Silverwise
Meter Box Operator:	Pat Wilburn	Chain of Custody:	Ellen Silverwise
Probe Operator:	Mark Wood	Plant Coordinator:	Ed Pierce
Orsat Analyst:	J. De Hernandez	Agency Rep:	

Comments:

FIELD DATA SHEET
TRAVERSE POINT INFORMATION

PAGE 1 OF 1

SAMPLING TIME PER POINT 5 min

PLANT Atlantic

RUN # C-4

LOCATION Unit #2

DATE 12 Dec 91

90.460 1 2 3 4 5

TRAV. NO.	DELTA P	DELTA H	METER READING	OGM IN	OGM OUT	HOT BOX	IMPG TEMP	STACK TEMP	VAC
A'	.48	1.20	93.4	87	83	232	57	180	4.5
2	.72	1.80	96.8	97	84	246	62	183	6
3	.82	2.05	100.4	103	83	253	66	184	8
4	.96	2.38	104.4	109	85	250	67	184	10
5	1.0	2.50	108.5	114	85	254	67	186	12
6	.94	2.35	112.569	114	86	248	68	186	12.5
						~~248~~ PW			
B1	.74	1.85	115.9	105	85	268	65	183	8.5
2	.96	2.40	119.9	113	86	252	65	185	13.0
3	1.1	2.75	124.2	117	87	253	67	188	16.0
4	.79	1.98	128.1	117	87	269	67	185	14.0
5	.73	1.83	131.9	117	88	269	68	184	13.5
6	.68	1.70	135.477	120	89	266	65	184	13.0

COMMENTS: DELTA P x 2.5 = DELTA H

BOX # 10 Y = .9765 DELTA H @ = 2.11

START TIME : 16:15

END TIME : 17:20

INITIAL LEAK CHECK 0.0 AT 15 INCHES HG

FINAL LEAK CHECK 0.06 AT 16 INCHES HG

APPENDIX IX

EQUIPMENT CALIBRATION SHEETS

POST
METER BOX CALIBRATION SHEET

BOX #: 10 DATE: 12-19-91
BAR PRES: 30.16 VACUUM: 16.0 IN HG

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	10.00	10.331	2.17	.160	30.32	13.12
2	10.00	10.452	2.17	.160	30.32	13.17
3	10.00	10.550	2.17	.160	30.32	13.22

RUN #	TEMP WET	TEMP DRY INLET	TEMP DRY OUTLET	TEMP DRY (AVG)	Y	DELTA H @
1	68	104	71	88	.9993	2.00
2	69	115	75	95	.9985	2.00
3	69	120	79	100	.9981	1.99
				AVERAGE	.9986	2.00

ACTUAL % DEVIATION = .05%

ALLOWABLE % DEVIATION = 2.0%

PRE CALIBRATION Y = .9765

ACTUAL % DIFFERENCE = 2.21%

ALLOWABLE DIFFERENCE = 5.0%

FORMULAS:

$$Y = \frac{(V_w)(P_b)(T_d)}{(V_d)(P_{b\,ABS})(T_w)}$$

$$DELTA\ H @ = \frac{0.0317\ (DELTA\ H)}{(P_b)(T_d)} * \left[\frac{(T_w)(TIME)}{(V_w)}\right]^2$$

CALIBRATION BY: MARK WESCOTT

Eastmount Engineering Inc. • 420 Main Street • Walpole, MA 02081 • (508) 668-9005 • FAX (508) 668-4989

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test numbers Unit 2 Date 19 Dec. '11 Meter box number 10 Plant Atlantic

Barometric pressure, P_b = 30.16 in. Hg Dry gas meter number ______ Pretest Y .9705

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average (t_d),[a] °F	Time (Θ), min	Vacuum setting, in. Hg	Y_i	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
2.17	10	245.?35 / 255.966	68,68,68	93,106 112	69,71,75		13 55/60	[illegible]		
2.17	10	266.[illegible]	69,69,68	111,115 119	74,77,77		13 18/60	[illegible]		
2.17	10	276.965	68,69,69	117,121 [illegible]	77,79,80		13 [illegible]	[illegible]		
									Y =	

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d.

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in H_2O.

Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y $\pm$0.05Y

P_b = Barometric pressure, in. Hg.

Θ = Time of calibration run, min.

NOZZLE CALIBRATION SHEET

PROJECT NAME: Atlantic PROJECT NUMBER: 91-103

POINT#	NOZZLE#____	NOZZLE #1/4-12	NOZZLE#____	NOZZLE #____
1	.250	.248	____	____
2	.251	.251	____	____
3	.250	.248	____	____
AVG.	.250	.249	____	____

John Sidorwicz
CALIBRATED BY:

12DEC91
DATE:

APPENDIX X

LABORATORY RESULTS

South Florida
Environmental Services

LABORATORY

SUMMARY OF RESULTS

PROJECT NUMBER: 91-103
PROJECT NAME: ATLANTIC SUGAR ASSOCIATION
BOILER #2

ANALYST: M. WAYT
ANALYSIS: EPA METHOD 5

FILTER

SAMPLE DESCRIPTION	FILTER #	TEST DATE	TARE WEIGHT (g)	FINAL WEIGHT (g)
C-2	4476	12-12-91	0.5933	0.8719
C-3	4472	12-12-91	0.5963	0.8678
C-4	4475	12-12-91	0.5940	0.9145
BLANK	4473	12-12-91	0.5894	0.5895

WASH

SAMPLE DESCRIPTION	BKR#	TEST DATE	TARE WEIGHT	FINAL WEIGHT (g)	VOLUME (ml)
C-2	4	12-12-91	71.9359	71.9589	360
C-3	5	12-12-91	70.2960	70.3369	370
C-4	6	12-12-91	69.8695	69.9114	380
BLANK	8	12-12-91	71.2358	71.2367	200

6821 Vista Parkway North, West Palm Beach, FL 33411
Tel: 407-687-5300 Fax: 407-687-3676

METER BOX CALIBRATION SHEET

BOX NUMBER: 10
PRESS BAR : 30.22

DATE: 4 NOV 91
DUE: 4 MAY 92

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	5	5.234	.50	.0368	30.26	13.78
2	5	5.266	1.00	.0735	30.29	9.92
3	10	10.469	1.50	.1103	30.33	16.43
4	10	10.707	2.00	.1471	30.37	14.18
5	10	10.628	3.00	.2206	30.44	11.52
6	10	10.66	4.00	.2941	30.51	10.02

RUN #	TEMP WET (`F)	TEMP DRY INLET	TEMP DRY OUT	TEMP DRY (AVG)	Y	DELTA H @
1	65.3	81.7	80.0	80.9	.9824	2.03
2	65.7	80.7	79.7	80.2	.9733	2.11
3	65.3	81.7	79.3	80.5	.9793	2.17
4	65.0	87.7	80.0	83.9	.9628	2.14
5	65.0	101.0	81.3	91.2	.9806	2.09
6	65.0	106.0	82.3	94.2	.9806	2.09
				AVERAGE	.9765	2.11
				MAX % DEVIATION	1.40	
				ALLOWABLE % DEV	2.00	

FORMULAS:

$$Y = \frac{(V_w)(P_b)(T_d)}{(V_d)(P_b\ ABS)(T_w)}$$

$$\text{DELTA H @} = \frac{0.0317\ (\text{DELTA H})}{(P_b)(T_d)} * \left[\frac{(T_w)(\text{TIME})}{(V_w)}\right]^2$$

CALIBRATION BY: Mark Wescott
MARK WESCOTT

METER BOX CALIBRATION SHEET

BOX NUMBER: 4
PRESS BAR : 30.19

DATE: 4 NOV 91
DUE: 4 MAY 92

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	5	5.112	.50	.0368	30.23	14.42
2	5	5.121	1.00	.0735	30.26	9.83
3	10	10.299	1.50	.1103	30.30	15.90
4	10	10.33	2.00	.1471	30.34	13.63
5	10	10.34	3.00	.2206	30.41	11.98
6	10	10.359	4.00	.2941	30.48	9.82

RUN #	TEMP WET (`F)	TEMP DRY INLET	TEMP DRY OUT	TEMP DRY (AVG)	Y	DELTA H @
1	66.00	73.00	69.67	71.3	.9868	2.27
2	66.00	78.00	72.67	75.3	.9913	2.10
3	65.67	82.00	76.00	79.0	.9920	2.04
4	66.00	85.33	78.00	81.7	.9921	1.99
5	65.67	87.67	80.33	84.0	.9936	2.30
6	65.33	90.00	81.33	85.7	.9930	2.05
				AVERAGE	.9915	2.13

MAX % DEVIATION .47
ALLOWABLE % DEV 2.00

FORMULAS:

$$Y = \frac{(V_w)(P_b)(T_d)}{(V_d)(P_b\ ABS)(T_w)}$$

$$\text{DELTA H @} = \frac{0.0317\ (\text{DELTA H})}{(P_b)(T_d)} * \left[\frac{(T_w)(\text{TIME})}{(V_w)}\right]^2$$

CALIBRATION BY: Mark W Wescott
MARK WESCOTT

METER BOX CALIBRATION SHEET

BOX NUMBER: 11
PRESS BAR : 30.19

DATE: 15 OCT 91
DUE: 15 APR 92

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	5	5.168	.50	.0368	30.23	12.48
2	5	5.195	1.00	.0735	30.26	8.97
3	10	10.456	1.50	.1103	30.30	14.83
4	10	10.539	2.00	.1471	30.34	13.28
5	10	10.581	3.00	.2206	30.41	10.82
6	10	10.613	4.00	.2941	30.48	9.50

RUN #	TEMP WET (°F)	TEMP DRY INLET	TEMP DRY OUT	TEMP DRY (AVG)	Y	DELTA H @
1	71.0	82.7	76.0	79.3	.9815	1.71
2	69.7	95.3	77.0	86.2	.9900	1.73
3	69.0	107.0	79.0	93.0	.9961	1.75
4	69.0	114.7	82.7	98.7	.9972	1.86
5	69.0	114.3	85.0	99.7	.9926	1.84
6	68.7	114.7	86.3	100.5	.9893	1.89
				AVERAGE	.9911	1.80
				MAX % DEVIATION	.97	
				ALLOWABLE % DEV	2.00	

FORMULAS:

$$Y = \frac{(V_w)(P_b)(T_d)}{(V_d)(P_b\ ABS)(T_w)}$$

$$\text{DELTA H @} = \frac{0.0317\ (\text{DELTA H})}{(P_b)(T_d)} * \left[\frac{(T_w)(\text{TIME})}{(V_w)}\right]^2$$

CALIBRATION BY: JIM JARDIN

TRANSCAT

"CAL-LAB"

Certificate of Calibration

TRANSCAT certifies that this instrument has been calibrated to manufacturer's specifications using measurement standards traceable to the National Institute of Standards and Technology (NIST) and as required by The National Research Council of Canada, Division of Physics, within the limitations of the Council's calibrations services. TRANSCAT's calibration system meets or exceeds the requirements of MIL-STD-45662A.

Complete records of all work performed is maintained by TRANSCAT and is available upon request.

TEMPERATURE 68° F. RELATIVE HUMIDITY OF 59%.

Customer	:	EASTMONT ENGINEERING
Manufacturer	:	TRANSNATION
Model Number	:	1061
Serial Number	:	8277
Description	:	THERMOCOUPLE CALIBRA
Calibrated	:	08/02/91
Date Due	:	08/01/92
Repair Number	:	17-7047-00

ITEM RECEIVED IN TOLERANCE

ASSETS	MANUFACTURER	MODEL	DESCRIPTION	CALIBRATED	DATE DUE
2485	DATA PRECISION	8200	DC CALIB.	01/03/91	01/03/92
2486	FLUKE	9842A	DMM	03/13/91	03/13/92
2471	KAYE	140-4	ICE PT. REF.	03/14/91	03/13/92
2482	NBS	172144-K	STD THERMOCOUPLE	04/19/91	04/19/93

CAL-LAB MANAGER

1144 Lexington Ave. • Rochester • NY 14606 • 800-828-1470 - FAX 716-458-0543
P.O. Box 456 • Station A • Rexdale • Ontario M9W 5L4 • 800-268-4739 • FAX 416-675-1445

THERMOCOUPLE CALIBRATION SHEET

SET #: METER BOX #4 - IN DATE: 9/11/85

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE
32	27	1.02
63	57	1.15
204	201	.45
	MAXIMUM	1.15
	ALLOWABLE	1.50

SET #: METER BOX #4 - OUT DATE: 9/11/85

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE
32	27	1.02
63	57	1.15
204	202	.30
	MAXIMUM	1.15
	ALLOWABLE	1.50

CALIBRATION BY: C. LODI

Eastmount Engineering Inc., • 420 Main Street • Walpole, MA 02981 • (508) 668-9005 • FAX (508) 668-4989

THERMOCOUPLE CALIBRATION SHEET

SET #: METER BOX 10-IN DATE: 11/22/88

STANDARD ('F)	THERMOCOUPLE ('F)	% DEVIATION OF ABSOLUTE
32	28	.81
66	65	.19
212	217	.74
	MAXIMUM	.81
	ALLOWABLE	1.50

SET #: METER BOX 10-OUT DATE: 11/22/88

STANDARD ('F)	THERMOCOUPLE ('F)	% DEVIATION OF ABSOLUTE
32	30	.41
66	65	.19
212	216	.60
	MAXIMUM	.60
	ALLOWABLE	1.50

CALIBRATION BY: A. STRATTON

Eastmount Engineering Inc., • 420 Main Street • Walpole, MA 02981 • (508) 668-9005 • FAX (508) 668-4989

THERMOCOUPLE CALIBRATION SHEET

SET #: METER BOX 11-IN DATE: 08-11-86

STANDARD ('F)	THERMOCOUPLE ('F)	% DEVIATION OF ABSOLUTE
34	29	1.01
211	210	.15
404	403	.12
	MAXIMUM	1.01
	ALLOWABLE	1.50

SET #: METER BOX 11-OUT DATE: 08-11-86

STANDARD ('F)	THERMOCOUPLE ('F)	% DEVIATION OF ABSOLUTE
34	28	1.21
211	210	.15
404	401	.35
	MAXIMUM	1.21
	ALLOWABLE	1.50

CALIBRATION BY: G. ZWILLING

Eastmount Engineering Inc., • 420 Main Street • Walpole, MA 02981 • (508) 668-9005 • FAX (508) 668-4989

TEMPERATURE INDICATOR CALIBRATION FORM

INDICATOR S/N: 650 - 6 CAL DATE: 8 AUG 91

REFERENCE S/N:1061-8277 DUE DATE: 8 AUG 92

	REFERENCE SET POINT							
CHANNEL NO.	0	32	200	250	320	600	800	1000
1	0	33	199	249	320	600	800	1000
2	0	32	199	249	320	599	800	1000
3	0	32	199	249	320	599	800	1000
4	0	32	199	249	320	600	800	1001
5	0	32	199	250	320	600	800	1000
6	0	32	199	249	320	599	800	1000
7								
8								
9								
10								

% DIFF: .06

CALIBRATED BY____KIERAN NOLAN KN

TEMPERATURE INDICATOR CALIBRATION FORM

INDICATOR S/N: 650 - 7 CAL DATE: 13 SEP 91

REFERENCE S/N:1061-8277 DUE DATE: 13 SEP 92

	REFERENCE SET POINT							
CHANNEL NO.	0	32	200	250	320	600	800	1000
1	1	32	199	249	320	599	798	999
2	1	32	200	250	320	599	799	999
3	1	33	200	250	320	599	799	999
4	1	32	200	250	320	599	799	999
5	0	32	199	249	320	600	799	998
6	0	32	199	250	320	599	799	998
7								
8								
9								
10								

% DIFF: .04

CALIBRATED BY____KIERAN NOLAN KN

TEMPERATURE INDICATOR CALIBRATION FORM

INDICATOR S/N: 650 - 8 CAL DATE: 8 AUG 91

REFERENCE S/N:1061-8277 DUE DATE: 8 AUG 92

	REFERENCE SET POINT							
	0	32	200	250	320	600	800	1000
CHANNEL								
1	-1	32	199	249	319	599	799	999
2	0	31	199	249	320	599	800	1000
3	-1	31	199	249	320	599	800	1000
4	0	32	199	249	320	599	800	1000
5	0	32	199	249	320	600	799	1000
6	0	31	199	249	320	599	800	1000
7								
8								
9								
10								

% DIFF: .39

CALIBRATED BY____KIERAN NOLAN KN

TEMPERATURE INDICATOR CALIBRATION FORM

INDICATOR S/N: NEWPONT - 12 CAL DATE: 8 AUG 91

REFERENCE S/N: 1061-8277 DUE DATE: 8 AUG 92

	REFERENCE SET POINT							
	0	32	200	250	320	600	800	1000
CHANNEL NO.								
1	1	31	199	250	321	600	801	1002
2	0	31	199	250	321	600	801	1002
3	0	31	199	250	321	600	801	1002
4	0	31	199	250	321	600	801	1002
5	2	32	201	251	322	600	802	1003
6	0	31	199	250	321	600	801	1002
7	0	31	199	250	321	600	801	1002
8	0	31	199	250	321	600	801	1002
9	1	31	199	250	321	600	801	1002
10	0	31	199	250	321	600	801	1002

% DIFF: .37

CALIBRATED BY____KIERAN NOLAN KN

THERMOCOUPLE CALIBRATION SHEET

SET #: 7.75' - 9 DATE 3/6/91

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE (ABSOLUTE)
32	32	.00
212	213	.15
466	479	1.43
	MAXIMUM	1.43
	ALLOWABLE	1.50

CALIBRATION BY: Kieran Nolan

KIERAN NOLAN

THERMOCOUPLE CALIBRATION SHEET

SET #: 7.5'- 168 DATE 1/11/91

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE (ABSOLUTE)
32	33	.20
212	215	.45
495	505	1.09
	MAXIMUM	1.09
	ALLOWABLE	1.50

CALIBRATION BY: Kieran Nolan

KIERAN NOLAN

THERMOCOUPLE CALIBRATION SHEET

TC #: 4THIMP-210 DATE: 2/27/91

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE (ABSOLUTE)
32.0	32	.00
157.1	157	.02
212	214	.30
	MAXIMUM	.30
	ALLOWABLE	1.50

CALIBRATION BY: Kieran Nolan

KIERAN NOLAN

Eastmount Engineering Inc., • 420 Main Street • Walpole, MA 02981 • (508) 668-9005 • FAX (508) 668-4989

THERMOCOUPLE CALIBRATION SHEET

TC #: 4THIMP-191 DATE: 2/27/91

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE (ABSOLUTE)
32.0	32	.00
157.1	157	.02
212	214	.30
	MAXIMUM	.30
	ALLOWABLE	1.50

CALIBRATION BY: Kieran Nolan

KIERAN NOLAN

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THERMOCOUPLE CALIBRATION SHEET

TC #: 4THIMP-188 DATE: 1/25/91

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE (ABSOLUTE)
32.0	32	.00
139.0	138	.17
212	212	.00
	MAXIMUM	.17
	ALLOWABLE	1.50

CALIBRATION BY: 

KIERAN NOLAN

THERMOCOUPLE CALIBRATION SHEET

TC #: RAC - 2 - 170 DATE: 1/11/91

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE (ABSOLUTE)
32.0	32	.00
516.2	519	.29
212	213	.15
	MAXIMUM	.29
	ALLOWABLE	1.50

CALIBRATION BY: Kieran Nolan

KIERAN NOLAN

THERMOCOUPLE CALIBRATION SHEET

SET #: 8.5' - 6

DATE: 07/07/89

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE (ABSOLUTE)
87	86	.18
212	211	.15
430	436	.67
	MAXIMUM	.67
	ALLOWABLE	1.50

CALIBRATION BY: S. MacKay