AP-42 Section Number: 1.8

Reference Number: 47

Title: Atlantic Sugar Association Particulate Emissions Test Report Boiler #5

January 1991

Eastmount Engineering

Environmental Consultants — Air Quality Specialists

DSW1-ASA9

ATLANTIC SUGAR ASSOCIATION

COMPLIANCE PARTICULATE EMISSIONS TEST REPORT

BOILER #5

PREPARED FOR:

Atlantic Sugar Association
P.O Box 1570
Belle Glade, Florida 33430

CONCERNING:

Particulate Emissions Testing
Alantic Sugar Association
Boiler #5
Belle Glade, Florida Facility
January 10, 1991

PREPARED BY:

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Sean MacKay
Project Director

28 FEB 91
Date

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APPENDIX

1.0 COMPENDIUM

Eastmount Engineering Inc., conducted a Compliance Particulate Emissions Test Program on Unit #5 at Altatic Sugar Association's Belle Glade, Florida facility on January 10, 1991. The test program consisted of a series of three EPA Method 5 test runs.

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.

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

During testing the boiler was burning bagasse as fuel. Boiler No. 5 is rated at 135,000 pounds of steam per hour. Results of the test program indicate Boiler No. 5 to be in compliance with the Florida DER emission standards. The following table summarizes the emission results, emission standards and boiler operating conditions.

RUN#	DATE	EMISSION RATE #/MMBtu	EMISSION RATE #/HR	ALLOWABLE #MMBtu	ALLOWABLE #/HR	LOAD #/HR	% OF 135 KPH
1	01-10-91	.137	29.32	.150	32.20	112702	83.5%
2	01-10-91	.126	27.93	.150	33.35	116900	86.6%
3	01-10-91	.155	34.02	.150	32.93	115300	85.4%
3 RUN AVG.		.139	30.42	.150	32.83	114967	85.2%

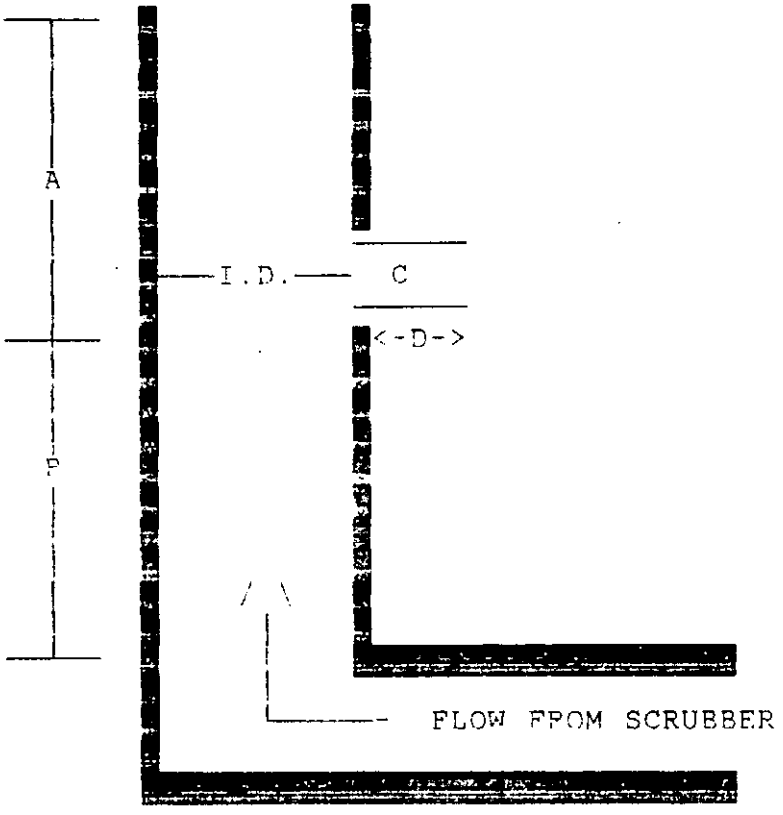
S. Joseph Mercadante, President, was in charge of and responsible for all stack testing including operating the meter box. Sean MacKay, Project Director, performed Method 9 testing (results may be found in Appendix VIII of this report), sample recovery and conducted all calculations. Bryan Gibson performed Orsat analysis. Mark Wescott positioned the probe at the proper traverse points and Michael Mercadante assisted where required. Mr. E. Perez was responsible for boiler operations and acquisition of all pertinent process data. Mr. Ajaya Satyal of the Palm Beach County Department of Health and Mr. Sherell Culliver of the Florida Department of Environmental Regulation observed the stack testing and boiler operations.

2.0 STACK SCHEMATIC

ATLANTIC SUGAR ASSOCIATION
UNIT # 5
BELLE GLADE, FLORIDA FACILITY

The following is a schematic of the stack which services Boiler #5 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.

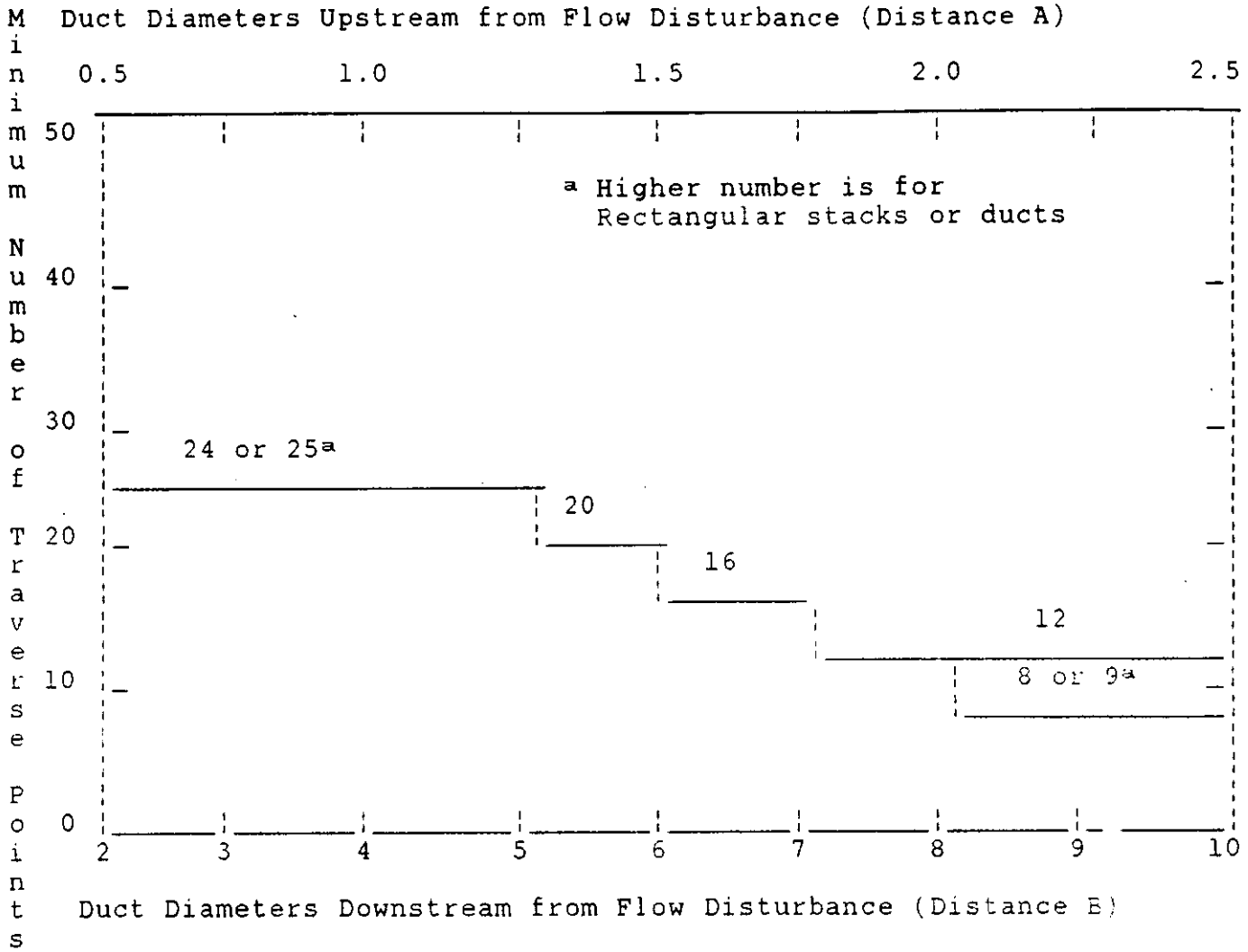


DISTANCE UPSTREAM FROM FLOW DISTURBANCE (A)	14.7'
DISTANCE DOWNSTREAM FROM FLOW DISTURBANCE (B)	59.3'
DIAMETER OF PORT SLEEVE (C)	3.5"
LENGTH OF PORT SLEEVE (D)	1.6"
NUMBER OF PORTS	2
INTERNAL DIAMETER OF STACK AT SAMPLING PORTS	5.5'

Drawing not to scale

3.0 NUMBER OF TRAVERSE POINTS AND SAMPLING TIME PER POINT

ATLANTIC SUGAR ASSOCIATION
UNIT # 5
BELLE GLADE, FLORIDA FACILITY



Minimum number of traverse points for particulate traverses.

Distance A = 14.2' or 2.6 diameters.

Distance B = 59.3' or 10.7 diameters.

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

In order to sample for a minimum of one hour and draw at least 30 cubic feet, each traverse point was sampled for 5.0 minutes.

3.0 NUMBER OF TRAVERSE POINTS AND SAMPLING TIME PER POINT

ATLANTIC SUGAR ASSOCIATION
UNIT # 5
BELLE GLADE, FLORIDA FACILITY

DIAMETER OF STACK: 5.5 FEET
PORT SLEEVE LENGTH: 1.6 INCHES

TRAVERSE POINT	DISTANCE % OF DIAMETER	DISTANCE (INCHES)	PROBE MARK (INCHES)
1	4.4	2.9	4.6
2	14.6	9.7	11.4
3	29.6	19.8	21.4
4	70.4	47.0	48.6
5	85.4	57.0	58.6
6	95.6	63.8	65.4

4.0 SAMPLING TRAIN AND ANALYTICAL 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 10 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.

4.0 SAMPLING TRAIN AND ANALYTICAL TEST PROCEDURES (cont.)

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 relation ships.

Barometric Pressure - Barometric pressure was obtained by 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.

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

4.0 SAMPLING TRAIN AND ANALYTICAL TEST PROCEDURES (cont.)

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.

5.0 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, thefilters 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.

All calculations were conducted in strict accordance with 40 CFR 60 (See Calculation Sheets in report).

APPENDIX I

COMPUTER INPUT SHEETS

INPUT DATA SHEET

PLANT: ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-1
DATE : 01-10-91

Ds (FT)	5.5
Dn (IN)	.257
FILTER#	3623
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	379
IMP-2 (FIN)	127
IMP-3 (FIN)	2
IMP-4 (FIN)	510.3
% CO2	13.9
% O2	5.9
% CO	1.4
P BAR	29.99
P STK	-.30
NO. PTS	12
TEST LNGTH	60
END METER	139.920
INT METER	103.200
BEGIN TIME:	10:45
END TIME:	13:05

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.36	.60	1.01	83	80	158
2	.44	.66	1.23	87	81	159
3	.44	.66	1.23	93	82	158
4	.46	.68	1.29	96	83	158
5	.47	.69	1.32	101	85	158
6	.44	.66	1.23	103	86	156
B1	.47	.69	1.32	81	81	158
2	.65	.81	1.82	88	81	158
3	.60	.77	1.68	98	82	157
4	.74	.86	2.07	104	84	158
5	.60	.77	1.68	108	85	155
6	.30	.55	.84	110	87	156
AVERAGE	.50	.70	1.39	96.0	83.1	157.4

INPUT DATA SHEET

PLANT: ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-2
DATE : 01-10-91

Ds (FT)	5.5
Dn (IN)	.250
FILTER#	3619
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	375
IMP-2 (FIN)	126
IMP-3 (FIN)	0
IMP-4 (FIN)	513.7
% CO2	14.3
% O2	5.5
% CO	.0
P BAR	29.98
P STK	-.30
NO. PTS	12
TEST LNGTH	60
END METER	175.695
INT METER	142.400
BEGIN TIME:	16:05
END TIME:	17:10

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.34	.58	.88	78	78	158
2	.40	.63	1.04	83	79	159
3	.42	.65	1.09	87	79	158
4	.50	.71	1.30	89	80	158
5	.50	.71	1.30	92	81	157
6	.36	.60	.84	92	82	157
B1	.42	.65	1.09	86	82	158
2	.50	.71	1.30	93	83	158
3	.55	.74	1.43	97	84	157
4	.46	.68	1.20	100	86	157
5	.30	.55	.78	100	87	158
6	.30	.55	.78	98	87	159
AVERAGE	.42	.65	1.09	91.3	82.3	157.8

INPUT DATA SHEET

PLANT: ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-3
DATE : 01-10-91

Ds (FT)	5.5
Dn (IN)	.250
FILTER#	3618
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	398
IMP-2 (FIN)	128
IMP-3 (FIN)	2
IMP-4 (FIN)	511.7
% CO2	13.1
% O2	6.9
% CO	.0
P BAR	29.98
P STK	-.30
NO. PTS	12
TEST LNGTH	60
END METER	212.834
INT METER	175.949
BEGIN TIME:	18:00
END TIME:	19:05

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.46	.68	1.06	84	83	159
2	.54	.73	1.24	90	84	158
3	.73	.85	1.68	94	84	158
4	.76	.87	1.75	98	85	158
5	.64	.80	1.47	101	86	159
6	.65	.81	1.49	102	88	158
B1	.53	.73	1.22	97	87	159
2	.67	.82	1.54	101	89	159
3	.64	.80	1.47	102	89	159
4	.61	.78	1.40	102	90	158
5	.55	.74	1.27	103	90	161
6	.48	.69	1.10	103	90	159
AVERAGE	.61	.78	1.39	98.1	87.1	158.8

APPENDIX II

ISOKINETIC CALCULATION SHEETS

ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 5

RUN #: COMP-1
DATE : 01-10-91

TS (`F)=	157.4	% CO2=	13.9	VM (CF) =	36.720
TS (`R)=	617.4	% O2=	5.9	DELTA H (ABS)=	30.09
TM (`F)=	89.5	% CO=	1.4	PS (ABS) =	29.97
TM (`R)=	549.5	% N2=	78.8	SQRT DELTA P =	.700226
VI(TOT)=	318.3	CP=	.84	AREA NOZZLE =	.000360

Y = .9863

VM STD	=	$\frac{(VM)(Y)(DELTA\ H\ ABS)}{(TM)}$ = 17.64	34.98	DSCF
VW STD	=	.04707 (VI TOT)	14.98	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	.300	
BWO	=	MOISTURE FROM STEAM TABLES	.303	
VI TOT	=	ADJUSTED TO SATURATION VOLUME	N/A	ML
1-BWO	=	1 - BWO	.700	
Md (DRY)	=	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2)	30.46	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	26.72	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	.88	
VS	=	85.49(CP)(G)(SQRT DELTA P)	44.2	FPS
H	=	0.002669 (VI TOT)	.85	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	1.98	
K	=	(H) + (J)	2.83	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	101.9	

ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 5

RUN #: COMP-2
DATE : 01-10-91

TS (`F)=	157.8	% CO2=	14.3	VM (CF) =	33.295
TS (`R)=	617.8	% O2=	5.5	DELTA H (ABS)=	30.06
TM (`F)=	86.8	% CO=	0	PS (ABS) =	29.96
TM (`R)=	546.8	% N2=	80.2	SQRT DELTA P =	.645693
VI(TOT)=	314.7		CP= .84	AREA NOZZLE =	.000341

Y = .9863

VM STD	=	$17.64 \frac{(VM)(Y)(DELTA\ H\ ABS)}{(TM)}$	= 31.85	DSCF
VW STD	=	.04707 (VI TOT)	= 14.81	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	= .317	
BWO	=	MOISTURE FROM STEAM TABLES	= .306	
VI TOT	=	ADJUSTED TO SATURATION VOLUME	= 302.9	ML
1-BWO	=	1 - BWO	= .694	
Md (DRY)	=	.44 (% CO2) + .32 (% O2) + .28 (% CO) + .28 (% N2)	= 30.51	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	= 26.90	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	= .88	
VS	=	85.49(CP)(G)(SQRT DELTA P)	= 40.6	FPS
H	=	0.002669 (VI TOT)	= .81	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	= 1.81	
K	=	(H) + (J)	= 2.61	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	= 108.2	

ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 5

RUN #: COMP-3
DATE : 01-10-91

TS (`F)=	158.8 (Avg=158)	% CO2=	13.1 (Avg=6.1)	VM (CF) =	36.885
TS (`R)=	618.8	% O2=	6.9	DELTA H (ABS)=	30.08
TM (`F)=	92.6	% CO=	0	PS (ABS) =	29.96
TM (`R)=	552.6	% N2=	80	SQRT DELTA P =	.775625
VI(TOT)=	339.7	CP=	.84	AREA NOZZLE =	.000341

Y = .9863

VM STD	=	$\frac{(VM)(Y)(DELTA\ H\ ABS)}{(TM)}$ = 17.64	=	34.94	DSCF
VW STD	=	.04707 (VI TOT)	=	15.99	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	=	.314	
BWO	=	MOISTURE FROM STEAM TABLES	=	.313	
VI TOT	=	ADJUSTED TO SATURATION VOLUME	=	338.7	ML
1-BWO	=	1 - BWO	=	.687	
Md (DRY)	=	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2)	=	30.37	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	=	26.52	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	=	.88	
VS	=	85.49(CP)(G)(SQRT DELTA P)	=	49.2	FPS
H	=	0.002669 (VI TOT)	=	.90	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	=	1.98	
K	=	(H) + (J)	=	2.88	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	=	98.8	

APPENDIX III

ENTHALPY CALCULATION SHEETS

ENTHALPY CALCULATION SHEET

PLANT : ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-1
DATE : 01-10-91

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	205	480	250
	200	480	250
	205	480	250
	200	480	250
	250	500	250
	240	490	250
	230	490	250
AVERAGE	218.6 PSIG	485.7	250.0
P ABS =	233.3 PSIA		1266.9 ~~1268.0~~

ENTHALPY @ 500 'F AND 220 PSIA = 1267.5

ENTHALPY @ 400 'F AND 220 PSIA = 1256.7

ENTHALPY @ 485.7 'F AND 220 PSIA = 1266.0

ENTHALPY OF FEED WATER = 218.48

AVERAGE ENTHALPY = 1047.5 BTU/LB OF STEAM

ENTHALPY CALCULATION SHEET

PLANT : ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-2
DATE : 01-10-91

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	200	480	250
	220	480	250
	220	480	250
	210	470	250
		470	250
AVERAGE	212.5 PSIG	476.0	250.0

P ABS = 227.2 PSIA

ENTHALPY @	500	'F AND	225	PSIA =	1267.1
ENTHALPY @	400	'F AND	225	PSIA =	1256.2
ENTHALPY @	476.0	'F AND	225	PSIA =	1264.5

ENTHALPY OF FEED WATER = 218.48

AVERAGE ENTHALPY = 1046.0 BTU/LB OF STEAM

ENTHALPY CALCULATION SHEET

PLANT : ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-3
DATE : 01-10-91

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	190	480	250
	230	480	250
	230	490	250
	210	500	250
	200	480	250
AVERAGE	212.0 PSIG	486.0	250.0
P ABS =	226.7 PSIA		

ENTHALPY @ 500 'F AND 225 PSIA = 1267.1

ENTHALPY @ 400 'F AND 225 PSIA = 1256.2

ENTHALPY @ 486.0 'F AND 225 PSIA = 1265.6

ENTHALPY OF FEED WATER = 218.48

AVERAGE ENTHALPY = 1047.1 BTU/LB OF STEAM

APPENDIX IV

HEAT INPUT CALCULATION SHEETS

HEAT INPUT CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-1
DATE : 01-10-91

	STEAM INTEGRATOR READINGS		TIME				INTEGRATOR FACTOR	
	FIRST HALF	SECOND HALF	FIRST HALF	SECOND HALF			100	
END	6896	8743	11:20	13: 5				
BEGIN	6229	8189	10:45	12: 35			LBS/HR STEAM	
NET	667	554	X 100	/ 65	MINS	=	112708	

112708 LBS/HR STEAM / 55% EFF. = 204923 EQUIV.

204923 LBS/HR STEAM X 1047 BTU/LB = 214.7 BTU(e6)/HR

	OIL INTEGRATOR READINGS		TIME				GALS/HR	
END	0		13: 5					
BEGIN	0		10: 45					
NET	0	GALLONS	65		MINS	=	0	GPH

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

ALLOWABLE EMISSIONS

BAGASSE	214.7	- 0	X	.15	=	32.2	LBS/HR
OIL		0	X	.1	=	.0	LBS/HR
TOTAL					=	32.2	LBS/HR

HEAT INPUT CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-2
DATE : 01-10-91

	STEAM INTEGRATOR READINGS		TIME		INTEGRATOR FACTOR		
					100		
END	3181		17: 5				
					LBS/HR STEAM		
BEGIN	2012		16: 5				
NET	1169	X	100 / 60	MINS	=	116900	

116900	LBS/HR STEAM /	55%	EFF. =	212545	EQUIV.
212545	LBS/HR STEAM X	1046	BTU/LB =	222.3	BTU(e6)/HR

	OIL INTEGRATOR READINGS		TIME		GALS/HR	
END	0		17: 5			
BEGIN	0		16: 5			
NET	0	GALLONS	60	MINS =	0	GPH

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

ALLOWABLE EMISSIONS

BAGASSE	222.3	-	0	X	.15	=	33.3 LBS/HR
OIL			0	X	.1	=	.0 LBS/HR
TOTAL						=	33.3 LBS/HR

EMISSION CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-1
DATE : 01-10-91

	SAMPLES		BLANKS	
	FILTER	BEAKER	FILTER	ACETONE
NO. :	3623	5	3752	9
FINAL:	.8142	70.304	.6402	72.5769
TARE :	.6156	70.2966	.6398	72.5766
NET :	.1986	.0074	.0004	.0003/200ML

VOLUME OF RINSE 325

WEIGHT = 206.00
RESIDUE = - .49

Mn = 205.51 Mg AS = 23.8 SQ FT

Qs = 3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS) = 2263757 DSCFH

CS = (2.205 X 10-6) (Mn) / (VM STD) = 1.295e-5 LBS/SCF

CS' = 0.0154 (Mn) / (VM STD) = .09 GRAINS /SCF

PMR = (QS) (CS) = 29.32 LBS/HR

LOAD= MILLIONS OF BTU / HOUR INPUT = 214.7 BTU e6 / HR

CS = LBS / MILLION BTu = .137 LBS/ BTu e6

ALLOWABLE = 32.20 LBS/HR

= .150 LBS/ BTu e6

EMISSION CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-2
DATE : 01-10-91

	SAMPLES		BLANKS	
	FILTER	BEAKER	FILTER	ACETONE
NO. :	3619	6	3752	9
FINAL:	.8072	69.8778	.6402	72.5769
TARE :	.6185	69.8705	.6398	72.5766
NET :	.1887	.0073	.0004	.0003/200ML

VOLUME OF RINSE 280

WEIGHT = 196.00
RESIDUE = - .42

Mn = 195.58 Mg AS = 23.8 SQ FT

Qs = 3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS) = 2062486 DSCFH

CS = (2.205 X 10-6) (Mn) / (VM STD) = 1.354e-5 LBS/SCF

CS' = 0.0154 (Mn) / (VM STD) = .09 GRAINS /SCF

PMR = (QS) (CS) = 27.93 LBS/HR

LOAD= MILLIONS OF BTU / HOUR INPUT = 222.3 BTU e6 / HR

CS = LBS / MILLION BTu = .126 LBS/ BTu e6

ALLOWABLE = 33.35 LBS/HR

= .150 LBS/ BTu e6

EMISSION CALCULATION SHEET

PLANT: ATLANTIC
LOCATION: UNIT 5

RUN #: COMP-3
DATE : 01-10-91

	SAMPLES		BLANKS	
	FILTER	BEAKER	FILTER	ACETONE
NO. :	3618	7	3752	9
FINAL:	.8303	72.5337	.6402	72.5769
TARE :	.6189	72.5263	.6398	72.5766
NET :	.2114	.0074	.0004	.0003/200ML

VOLUME OF RINSE 215

WEIGHT = 218.80
RESIDUE ▫ - .32

Mn = 218.48 Mg AS = 23.8 SQ FT

Qs = 3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS) = 2466754 DSCFH

Avg = 2,264,332

CS = (2.205 X 10-6) (Mn) / (VM STD) = 1.379e-5 LBS/SCF

CS' = 0.0154 (Mn) / (VM STD) = .10 GRAINS /SCF

PMR = (QS) (CS) = 34.02 LBS/HR Avg = 218.8

LOAD= MILLIONS OF BTU / HOUR INPUT = 219.5 BTU e6 / HR

CS = LBS / MILLION BTu = .155 LBS/ BTu e6

ALLOWABLE = 32.93 LBS/HR

= .150 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 Farenheight.
DRY GAS OUT	Temperature of the dry gas meter outlet degrees Farenheight.
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.
F factor	The theoretical amount of air in dry standard cubic feet (DSCF) needed to combust a million Btu's worth of fuel.

NOMENCLATURE (cont'd)

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 Farenheight.
TS (`R)	The temperature of the stack in degrees Rankine.
T (Hot Box)	Temperature around the filter box, degrees Farenheight.
TM (`F)	Average temperature of the dry gas meter in degrees Farenheight.

NOMENCLATURE (cont'd)

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 #5

RUN #: RUN 1

DATE: 01/10/91

				stop ↓	start ↓		
TIME	10 45 AM	11 00 AM	11 15 AM	11 20 AM	12 35 PM	12 50 PM	1 05 PM
STEAM PRESSURE	205	200	205	200	250	240	230
STEAM TEMPERATURE	480	480	480	480	500	490	490
STEAM INTEGRATOR	6229	6496	6781	6896	8189	8486	874=
FUEL OIL PRESSURE	–	–	–	–	–	–	–
FUEL OIL TEMPERATURE	–	–	–	–	–	–	–
FUEL OIL INTEGRATOR	–	–	–	–	–	–	–
FEED WATER TEMPERATURE	250	250	250	250	250	250	250
% O2	0.5	1.5	2	2	1.5	2	1.5
SCRUBBER DIFFERENTIAL	7	8	8	8	8	8	8

READINGS TAKEN BY: _____

BOILER DATA SHEET

ATLANTIC SUGAR
UNIT #

RUN #: 4T5-2

DATE: 01/10/91

TIME	4:05 PM	4:20 PM	4:35 PM	4:50 PM	5:05
STEAM PRESSURE	200	220	220	210	3181
STEAM TEMPERATURE	480	480	480	470	470
STEAM INTEGRATOR	2012	2305	2584	2875	3181
FUEL OIL PRESSURE	—	—	—	—	—
FUEL OIL TEMPERATURE	—	—	—	—	—
FUEL OIL INTEGRATOR	—	—	—	—	—
FEED WATER TEMPERATURE	250	250	250	250	250
% O2	1½	3	2	3	2
SCRUBBER DIFFERENTIAL	8	8	8	8	8

READINGS TAKEN BY: _____

BOILER DATA SHEET

ATLANTIC SUGAR
UNIT #

RUN #: RUN-3

DATE: 01/10/91

TIME	6:00 PM	6:15 PM	6:30 PM	6:45 PM	7:00 PM
STEAM PRESSURE	190	230	220	210	200
STEAM TEMPERATURE	480	500	490	480	480
STEAM INTEGRATOR	4150	4436	4728	5001	5303
FUEL OIL PRESSURE	—	—		—	
FUEL OIL TEMPERATURE	—	—		—	
FUEL OIL INTEGRATOR		—	—	—	
FEED WATER TEMPERATURE	250	250	250	250	250
% O2	2	3.5	3	1.5	2.5
SCRUBBER DIFFERENTIAL	8	8	8	8	8

READINGS TAKEN BY: _____

APPENDIX VIII

FIELD DATA SHEETS - STACK TESTING

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	ATLANTIC	Run #:	COMP-1
Location:	UNIT 5	Date:	10 JAN 91
Ds (ft):	5.5	No. Points:	12
Dn (in):	.257	Test Length:	60
Filter #:	3623	End Meter Reading:	139.920
Cp:	.84	Int Meter Reading:	103.200
P bar:	29.99	Begin Time:	10.45
P stack:	-.3	End Time:	13:05
IMP-1 (INT)	100 ML	IMP-1 (FINAL)	379
IMP-2 (INT)	100 ML	IMP-2 (FINAL)	127
IMP-3 (INT)	0 ML	IMP-3 (FINAL)	2
IMP-4 (INT)	500.0 g	IMP-4 (FINAL)	510.3

	TEST 1	TEST 2	TEST 3
% CO2	13.9		
% O2	5.9		
% CO	1.4		

Project Director:	S. MACKAY	Field Laboratory:	MacKay
Meter Box Operator:	J. MERCADANTE	Chain of Custody:	MacKay
Probe Operator:	M. WESCOTT	Plant Coordinator:	
39 ~~Orsat~~ Analyst:	B. GIBSON	Agency Rep:	SATYA / / CULLIVER

Comments:

TRAVERSE DATA SHEET

O2%

Page 1 of 1 Sampling time per point: 5

Plant: ATLANTIC Run #: Comp - 1

Location: UNIT #5 Date: 10 JAN 91

Trav. No.	Delta P	Delta H	Meter Reading 103.200	DGM In	DGM Out	Hot Box	Impg Temp	Stack Temp	Vac
A1	.36	1.01	106.0	83	80	268	58	158	8.0
2	.44	1.23	108.8	87	81	238	63	159	8.5
3	.44	1.23	111.6	93	82	260	63	158	9.0
4	.46	1.29	114.6	96	83	263	64	158	10.0
5	.47	1.32	117.7	101	85	266	65	158	12.0
6	.47	1.23	120.635	103	86	255	65	156	12.0
B1	.47	1.32	123.6	81	81	225	65	158	10.0
2	.65	1.82	126.9	88	81	261	67	158	13.0
3	.60	1.68	130.3	98	82	262	68	157	14.0
4	.74	2.07	133.9	104	84	257	69	158	15.0
5	.60	1.68	137.4	108	85	262	68	155	14.0
6	.30	0.84	139.920	110	87	255	67	156	9.0

Relationship: 2.8
Box #: 3 Y: .9863 Delta H@: 1.90
Start Time: 10:45 End Time: 13:05
Pre Leak Ck: .005 CFM @ 15 "Hg
Mid Leak Ck: ______ CFM @ ______ "Hg (Vol: ______)
Post Leak CK: .005 CFM @ 15 "Hg
Pitot Leak CK: 9000 @ 5 "H2O
Box Oper: [illegible] Probe Oper: M.W.

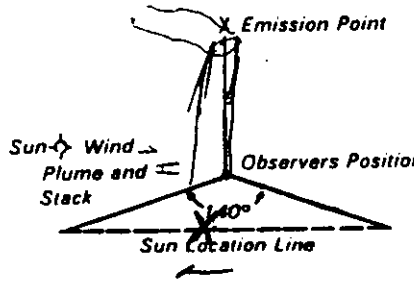
Stopped test during Port change - Problem with ~~[illegible]~~ Broken feeder. 11:23

Restart @ 12:35

Visible Emission Observation Form

SOURCE NAME	Atlantic Sugar
ADDRESS	P.O. DRAWER B
CITY	Belle Glade
STATE	FL
ZIP	33430
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	Bagasse Boiler
OPERATING MODE	
CONTROL EQUIPMENT	Impingement Scrubber
OPERATING MODE	
DESCRIBE EMISSION POINT START	STOP
HEIGHT ABOVE GROUND LEVEL START 100' STOP	HEIGHT RELATIVE TO OBSERVER START 100' STOP
DISTANCE FROM OBSERVER START 300 STOP	DIRECTION FROM OBSERVER START South STOP
DESCRIBE EMISSIONS START Steam Plume STOP	Steam Plume
EMISSION COLOR START Lt Gray STOP Same	PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☑	IF WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START 2' Above Stack STOP	
DESCRIBE BACKGROUND START PC Sky STOP	PC Sky
BACKGROUND COLOR START BLUE STOP	SKY CONDITIONS START PC STOP
WIND SPEED START 10-15 STOP	WIND DIRECTION START East STOP
AMBIENT TEMP. START 76 STOP	WET BULB TEMP. / RH,percent

Source Layout Sketch — Draw North Arrow



OBSERVATION DATE	START TIME	STOP TIME
10 JAN 91	1000	

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	5	5	5	5	31				
2	5	5	5	5	32				
3	5	5	5	5	33				
4	5	5	5	5	34				
5	5	5	5	5	35				
6	5	5	5	5	36				
7	5	5	5	5	37				
8	5	5	5	5	38				
9	5	5	5	5	39				
10	5	5	5	5	40				
11	5	5	5	5	41				
12	5	5	5	5	42				
13	5	5	5	5	43				
14	5	5	5	5	44				
15	5	5	5	5	45				
16	5	5	5	5	46				
17	5	5	5	5	47				
18	5	5	5	5	48				
19	5	5	5	5	49				
20	5	5	5	5	50				
21	5	5	5	5	51				
22	5	5	5	5	52	5	5	5	5
23	5	5	5	5	53	5	5	5	5
24	5	5	5	5	54	5	5	5	5
25	5	5	5	5	55	5	5	5	5
26	5	5	5	5	56	5	5	5	5
27	5	5	5	5	57	5	5	5	5
28	5	5	5	5	58	5	5	5	5
29	5	5	5	5	59	5	5	5	5
30	5	5	5	5	60	5	5	5	5

RAIN

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT)	Sean MacKay
OBSERVER'S SIGNATURE	Sean MacKay — DATE
ORGANIZATION	Eastmount Engineering
CERTIFIED BY	DATE
VERIFIED BY	DATE

COMMENTS: Plume folding over on itself

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE
TITLE — DATE

Quality Assurance Handbook M9-4.2

EASTMOUNT ENGINEERING, INC.
ENVIRONMENTAL ENGINEERS
AIR QUALITY SPECIALISTS

ADDITIONAL COMMENTS
STOP TEST @ 11:20, BROKEN CONVEYOR
RESTART @ 12:35, STARTED RAINING
@ 12:37

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	ATLANTIC	Run #:	COMP-2
Location:	UNIT #5	Date:	10 JAN 91
Ds (ft):	5.5	No. Points:	12
Dn (in):	.250	Test Length:	60
Filter #:	3619	End Meter Reading:	175.695
Cp:	.84	Int Meter Reading:	142.400
P bar:	29.98 -.3	Begin Time:	1605
P stack:	-.3	End Time:	1710
IMP-1 (INT)	100 ml	IMP-1 (FINAL)	375
IMP-2 (INT)	100 ml	IMP-2 (FINAL)	126
IMP-3 (INT)	0 ml	IMP-3 (FINAL)	0
IMP-4 (INT)	500.0g	IMP-4 (FINAL)	513.7

	TEST 1	TEST 2	TEST 3
% CO2	14.3		
% O2	5.5		
% CO	0		

Project Director:	S. MacKay	Field Laboratory:	MacKay/Mercadante
Meter Box Operator:	SJ Mercadante	Chain of Custody:	MacKay
Probe Operator:	M. Wescott	Plant Coordinator:	E. Perez
Orsat Analyst:	B. Gibson	Agency Rep:	Satya/Oliver

Comments:

TRAVERSE DATA SHEET

Page 1 of 1 | Sampling time per point: 5

Plant: ATLANTIC | Run #: Comp - 2

Location: UNIT 5 | Date: 10 JAN 91

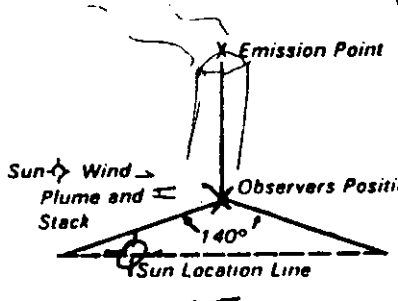
Trav. No.	Delta P	Delta H	Meter Reading	DGM In	DGM Out	Hot Box	Impg Temp	Stack Temp	Vac
		0.98	142.400						
A1	~~.39~~ .36	~~1.15~~ 1.06	144.9	78	78	248	66	158	3.0
2	.40	1.04	147.7	83	79	245	65	159	3.0
3	.42	1.09	150.4	87	79	245	67	158	3.0
4	.50	1.30	153.4	89	80	250	68	158	4.0
5	.50	1.30	156.3	92	81	248	65	157	4.0
6	.36	0.94	155.978	92	82	243	65	157	4.0
B1	.42	1.09	161.8	86	82	239	66	158	4.0
2	.50	1.30	164.8	93	83	230	65	158	5.0
3	.55	1.43	168.0	97	87	234	66	157	5.0
4	.46	1.20	170.9	100	86	247	68	157	5.0
5	.30	.78	173.2	100	87	260	68	158	4.0
6	.30	.78	175.695	98	87	258	69	159	4.0

Relationship: 2.6
Box #: 3 Y: .9863 Delta H@: 1.90
Start Time: 1605 End Time: 17:08
Pre Leak Ck: .005 CFM @ 17 "Hg
Mid Leak Ck: ~~0.00~~ CFM @ ~~5~~ "Hg (Vol: _____)
Post Leak CK: 0.00 CFM @ 5 "Hg
Pitot Leak CK: good @ 5 "H2O
Box Oper: SM Probe Oper: MW

Visible Emission Observation Form

SOURCE NAME: ATLANTIC SUGAR
ADDRESS: BROWER B
CITY: Belle Glade | STATE: FLA | ZIP: 33430
PHONE | SOURCE ID NUMBER
PROCESS EQUIPMENT: BAGASSE BOILER | OPERATING MODE
CONTROL EQUIPMENT: IMPINGEMENT SCRUBBER | OPERATING MODE
DESCRIBE EMISSION POINT: START STEAM PLUME STOP SAME
HEIGHT ABOVE GROUND LEVEL: START 100' STOP | HEIGHT RELATIVE TO OBSERVER: START 100' STOP
DISTANCE FROM OBSERVER: START 300' STOP | DIRECTION FROM OBSERVER: START NORTH STOP
DESCRIBE EMISSIONS: START STEAM PLUME STOP
EMISSION COLOR: START WHITE STOP | PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☑ | IF WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 2' ABOVE STACK STOP SAME
DESCRIBE BACKGROUND: START CLOUDS STOP CLOUDY
BACKGROUND COLOR: START WHITE STOP | SKY CONDITIONS: START CL STOP
WIND SPEED: START 10-15 STOP | WIND DIRECTION: START EAST STOP
AMBIENT TEMP.: START 78 STOP | WET BULB TEMP. | RH,percent

Source Layout Sketch — Draw North Arrow



OBSERVATION DATE | START TIME 1605 | STOP TIME 1710

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	5	5	5	5	31				
2	5	5	5	5	32		RAIN		
3	5	5	5	5	33				
4	5	5	5	5	34				
5	5	10	10	5	35				
6	5	5	5	5	36				
7	5	5	5	5	37	5	5	5	5
8	5	5	5	5	38	5	5	5	5
9	5	5	5	5	39	5	5	5	5
10	5	5	5	5	40	5	5	5	5
11	10	5	10	5	41	5	5	5	5
12	5	5	5	5	42	5	5	5	5
13	5	5	5	5	43	5	5	5	5
14	5	5	5	5	44	5	5	5	5
15	5	10	5	5	45	5	5	5	5
16	5	5	5	5	46	5	5	5	5
17	5	5	5	5	47	5	5	5	5
18	5	10	5	5	48	5	5	5	5
19	5	10	5	5	49	5	5	5	5
20					50	5	10	10	5
21		RAIN			51	5	5	5	5
22					52	5	5	5	5
23					53	5	5	5	5
24					54	5	5	5	5
25					55	5	5	5	5
26					56	5	5	5	5
27					57	5	10	5	5
28					58	5	5	5	5
29					59	5	5	5	5
30					60	5	5	5	5

AVERAGE OPACITY FOR HIGHEST PERIOD | NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS: MINIMUM | MAXIMUM
OBSERVER'S NAME (PRINT): SEAN MAC KAY
OBSERVER'S SIGNATURE: Sean MacKay | DATE: 10 JAN 91
ORGANIZATION: EASTMOUNT ENGINEERING
CERTIFIED BY: MASS. DEP | DATE
VERIFIED BY | DATE

COMMENTS: PLUME Rolling over on itself

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE | TITLE | DATE

Quality Assurance Handbook M9-4.2

EASTMOUNT ENGINEERING, INC.
ENVIRONMENTAL ENGINEERS
AIR QUALITY SPECIALISTS

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	ATLANTIC	Run #:	COMP-3
Location:	UNIT 5	Date:	10 JAN 91
Ds (ft):	5.5	No. Points:	12
Dn (in):	.250	Test Length:	60 min
Filter #:	3618	End Meter Reading:	212.834
Cp:	.84	Int Meter Reading:	175.949
P bar:	29.98	Begin Time:	18:00
P stack:	-.3	End Time:	19:05
IMP-1 (INT)	100 mL	IMP-1 (FINAL)	398
IMP-2 (INT)	100 mL	IMP-2 (FINAL)	128
IMP-3 (INT)	0 mL	IMP-3 (FINAL)	2
IMP-4 (INT)	500.0 g	IMP-4 (FINAL)	511.7

	TEST 1	TEST 2	TEST 3
% CO2	13.1		
% O2	6.9		
% CO	0		

Project Director:	S. MacKay	Field Laboratory:	MacKay
Meter Box Operator:	M. Mercadante	Chain of Custody:	MacKay
Probe Operator:	M. Wescott	Plant Coordinator:	E. Perez
Orsat Analyst:	S.J. Mercadante	Agency Rep:	Seaton/Culliver

Comments:

TRAVERSE DATA SHEET

Page 1 of 1 | Sampling time per point: 5

Plant: ATLANTIC | Run #: COMP-3

Location: UNIT 5 | Date: 10 JAN 91

O_2	Trav. No.	Delta P	Delta H	Meter Reading	DGM In (7)	DGM Out (6)	Hot Box (3)	Impg Temp (4)	Stack Temp (5)	Vac
				175.949						
	A1	.46	1.06	178.76	84	83	223	~~7~~ 65	159	4.0
4.8	2	.54	1.24	181.67	90	84	268	65	158	4.2
5.6	3	.73	1.68	184.85	94	84	252	67	158	5.0
	4	.76	1.75	188.21	98	85	251	68	158	6.0
4.8	5	.64	1.47	191.43	101	86	265	67	159	6.0
5.2	6	.65	1.49	194.542	102	88	265	68	158	6.2
5.4	B1	.53	1.22	197.53	97	87	260	65	159	6.2
	2	.67	1.54	200.78	101	89	259	65	159	7.3
5.4 4.8	3	.64	1.47	203.82	102	89	263	65	159	7.9
5.1	4	.61	1.40	206.99	103	90	264	66	158	8.0
4.8	5	.55	1.27	209.91	103	90	267	66	161	8.0
4.7	6	.48	1.10	212.534	103	90	268	67	159	8.1

Relationship: 2.3

Box #: 3 Y: .8863 Delta H@: 1.96

Start Time: 1800 End Time: 1905

Pre Leak Ck: .005 CFM @ 15 "Hg

Mid Leak Ck: _____ CFM @ _____ "Hg (Vol: _____)

Post Leak CK: .0 CFM @ 8 "Hg

Pitot Leak CK: good @ 5 "H2O

Box Oper: MM Probe Oper: MW

APPENDIX IX

EQUIPMENT CALIBRATION SHEETS

POST
METER BOX CALIBRATION SHEET

BOX #: 3 DATE: 2-11-91
PRES BAR: 30.04 VACUUM: 15IN HG

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	10.00	10.198	1.40	.103	30.14	16.22
2	10.00	10.336	1.40	.103	30.14	16.24
3	10.00	10.406	1.40	.103	30.14	16.26

RUN #	TEMP WET (`F)	TEMP DRY INLET	TEMP DRY OUT	TEMP DRY (AVG)	Y	DELTA H @
1	66.0	85.3	74.0	79.7	1.003	1.99
2	66.0	90.7	79.3	85.0	.9990	1.98
3	66.0	93.3	83.0	88.2	.9981	1.97
				AVERAGE	1.000	1.98

PRE CAL Y = .9863 % DIFFERENCE = 1.36 %

ALLOWABLE = 5.00 %

FORMULAS:

Y= DELTA H @=

$$\frac{(V_w)(P_b)(T_d)}{(V_d)(P_{b\,ABS})(T_w)} \qquad \frac{0.0317\,(\text{DELTA H})}{(P_b)(T_d)} * \left[\frac{(T_w)(\text{TIME})}{(V_w)}\right]^2$$

CALIBRATION BY: JIM JARDIN

METER BOX CALIBRATION SHEET

BOX NUMBER: #3
PRESS BAR : 30.20

DATE: 16 NOV 90
DUE: 16 MAY 91

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	5	5.084	.50	.0368	30.24	11.99
2	5	5.137	1.00	.0735	30.27	8.97
3	10	10.410	1.50	.1103	30.31	15.46
4	10	10.506	2.00	.1471	30.35	13.57
5	10	10.671	3.00	.2206	30.42	11.08
6	10	10.777	4.00	.2941	30.49	9.69

RUN #	TEMP WET (`F)	TEMP DRY INLET	TEMP DRY OUT	TEMP DRY (AVG)	Y	DELTA H @
1	74.0	79.4	88.2	83.8	1.000	1.58
2	74.0	96.8	82.5	89.6	.9994	1.75
3	74.0	101.3	85.5	93.4	.9918	1.94
4	74.0	103.8	88.3	96.0	.9862	1.98
5	74.0	108.3	90.5	99.4	.9745	1.97
6	74.0	110.3	91.5	100.9	.9652	2.00
				AVERAGE	.9863	1.87

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: MIKE RIDGE

THERMOCOUPLE CALIBRATION SHEET

SET #: METER BOX #3 DATE: 6-20-87

REFERENCE MERCURY/GLASS

STANDARD ('F)	THERMOCOUPLE ('F)	% DEVIATION OF ABSOLUTE
32	33	.20
67	70	.57
212	215	.45
	MAXIMUM % DEVIATION	.57
	ALLOWABLE % DEVIATION	1.50

SET #: METER BOX #3 DATE: 6-20-87

STANDARD ('F)	THERMOCOUPLE ('F)	% DEVIATION OF ABSOLUTE
32	29	.61
73	70	.56
212	211	.15
	MAXIMUM % DEVIATION	.61
	ALLOWABLE	1.50

CALIBRATION BY: G. ZWILLING

NOZZLE CALIBRATION SHEET

PROJECT NAME: Atlantic #5 PROJECT NUMBER: 90-104

POINT#	NOZZLE# 1/4-2	NOZZLE # 1/4-3	NOZZLE#____	NOZZLE #____
1	.256	.249	____	____
2	.258	.251	____	____
3	.257	.250	____	____
AVG.	.257	.250	____	____

Sean MacKay 10 JAN 91

CALIBRATED BY: DATE:

THERMOCOUPLE CALIBRATION SHEET

SET #: 8.5' - 7

DATE: 07/07/89

STANDARD ('F)	THERMOCOUPLE ('F)	% DIFFERENCE (ABSOLUTE)
87	86	.18
212	211	.15
415	420	.57
	MAXIMIUM	.57
	ALLOWABLE	1.50

CALIBRATION BY: S. MacKay

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

F-4184

DATE 10/3/91 FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
PARTICULATE STACK TEST VERIFICATION
EPA METHOD 5

FACILITY NAME: OKEELANTA APIS # 0005

COMPANY CONDUCTING TEST: EASTMOUNT ENG TEST DATE 1/10/1991

SOURCE DESCRIPTION: BOILER5

STACK TEST DATA SUMMATION

		RUN1	RUN2	RUN3
1.H2O	(VOL.MEAS.),ML	308	301	328
2.H2O	(MASS MEAS.),GM	10.3	13.7	11.7
3.M'N	PARTICULATE WEIGHT, GM	.2055	.1956	.2184
4.V'M	VOLUME METERED,CF	36.72	33.295	36.88
5.Y	DRY GAS MTR. CALIB.FCTR.	.9863	.9863	.9863
6.RDP	AVG SQR D.P-SAMPLING	.7	.65	.78
7.DH	AVG DELTA H,IN.H2O	1.39	1.09	1.39
8.T'M	AVG MTR. TEMP,DEG.F	89.5	86.8	92.6
9.T'S	AVG STACK TEMP,DEG.F	157.4	157.8	158.8
10.P'SG	STACK PRESS,''HG(GAUGE)	.3	.3	.3
11.P'B	BAROMETRIC PRESS,''HG	29.99	29.98	29.98
13.D'N	ACTUAL NOZZLE DIAM,IN	.257	.25	.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	34.99	29.95	44.16	2,293,977	100.79	29.701	32.670
2	31.85	30.25	41.06	2,121,417	104.82	28.722	32.670
3	34.93	30.99	49.39	2,521,064	96.75	34.746	32.670
MEAN	33.92	30.40	44.87	2,312,152	100.79	31.056	32.670

SUMMARY

GENERAL:
REVIEWED BY RAISA
ACTUAL A 'S = 23.8 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 = .0003602 SQ FT
P 'S = 30.29 IN HG
OVERSATURATED CONDITIONS: SATURATION MOISTURE ASSUMED/GIVEN PG.1

COMMENT.....

RUN 2 :
ACTUAL A 'N = .0003409 SQ FT
P 'S = 30.28 IN HG
OVERSATURATED CONDITIONS: SATURATION MOISTURE ASSUMED/GIVEN PG.1

COMMENT.....

RUN 3 :
ACTUAL A 'N = .0003409 SQ FT
P 'S = 30.28 IN HG
OVERSATURATED CONDITIONS: SATURATION MOISTURE ASSUMED/GIVEN PG.1

COMMENT.....

over 23.8 jan 1-10-91

Heat Value
214.7 222.3 219.5

INPUT SHEET - REV:09/13/88 - PAGE 2 OF 2

ENTER THE FOLLOWING:

		RUN1	RUN2	RUN3
1. H2O	COLLECTED (ONLY VOL.MEASURED), ML:	318.3	314.7	339.7
2. H2O	COLLECTED (WEIGHED PART ONLY), GM:	—	—	—
3. M'N	PARTICULATE WEIGHT, GM:	.2055	.1955	.2184
4. V'M	VOLUME METERED, CF:	36.720	33.295	36.885
5. Y	DRY GAS METER CAL FACTOR:	.9863	.9863	.9863
6. RDP	AVG SQR DELTA P (WHEN SAMPLING):	.70	.65	.78
7. DH	AVG DELTA H, IN H2O:	1.39	1.09	1.39
8. T'M	AVG METER TEMP, DEG F:	89.5	86.8	92.6
9. T'S	AVG STACK TEMP, DEG F:	157.4	157.8	158.8
10. P'S*	STACK PRESS, *IN ....(.....):	29.97	29.96	29.96
11. P'B	BAROMETRIC PRESS, IN HG:	29.98	29.98	29.98
13. D'N	ACTUAL NOZZLE DIAMETER, IN.:	.259	.259	.250
14. T	ACTUAL SAMPLE TIME, MIN:	60	60	60
15. C'P	PITOT TUBE COEFFICIENT:	.84	.84	.84

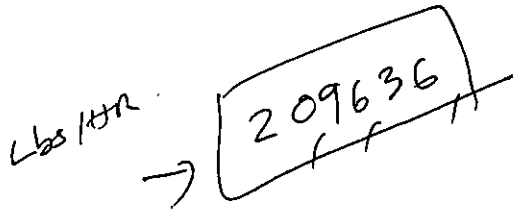
OPTION ENTRIES:

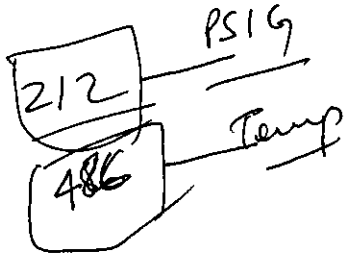
17.	ORSAT/FYRITE - %CO2:			
18.	ORSAT/FYRITE - %O2:			
20.	ORSAT/FYRITE (FOR C'S @ 50%E.A.) %CO:			
19.	SPECIFIC M'D ENTRIES:			
23.	CYCLONIC (10-20 DEG) - AVG COS(YAW):			
26.	CYC.(>20) - AVG[SQR D.P X COS(YAW)]:			
24.	PROCESS WT SOURCE - T/HR:			
22.	LB/TON REGULATED - T/HR:			
27.	LB/* REGULATED (* AS DEFINED) - */HR:			
28.	LAMBDA/CC(20)-VAL(SAMPLE PTS/TOT PTS):			

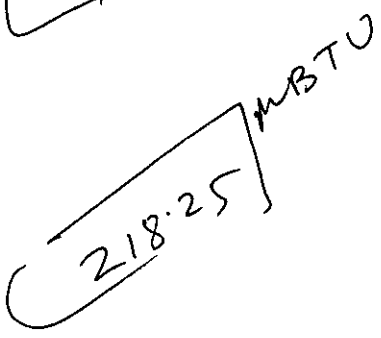
214.7
222.3
219.5
656.5 / 218.8
3

5303
4150

1153 X 180
115,380







500 —
250

1041

PASS

test 1/10/91

As = 23.8

Oklahoma Boiler 5

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

ENTER THE FOLLOWING:

	RUN1	RUN2	RUN3
1. H2O COLLECTED (ONLY VOL.MEASURED),ML:	308	301	328
2. H2O COLLECTED (WEIGHED PART ONLY),GM:	10.3	13.7	11.7
3. M'N PARTICULATE WEIGHT, GM:	.2055	.19558	.2184
4. V'M VOLUME METERED, CF:	36.720	33.245	36.885
5. Y DRY GAS METER CAL FACTOR:	.9863	.9863	.9863
6. RDP AVG SQR DELTA P (WHEN SAMPLING):	.70	.65	.78
7. DH AVG DELTA H, IN H2O:	1.39	1.09	1.39
8. T'M AVG METER TEMP, DEG F:	89.5	86.8	92.6
9. T'S AVG STACK TEMP, DEG F:	157.4	157.8	158.8
10. P'S* STACK PRESS, *IN ....(.....):	3	3	3
11. P'B BAROMETRIC PRESS, IN HG:	29.09	29.08	29.08
13. D'N ACTUAL NOZZLE DIAMETER, IN.:	.257	.250	.260
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	1
	32.67 38.2	33.35	32.93

32.2
33.39
32.93
80
32.6

run 1

2

3

279
27
9
308

275
26
301

298
28
328

10.3

13.7

11.7