AP-42 Section Number: 1.8

Reference Number: 59

Title: Okeelanta Corporation Particulate Emissions Test Report Boiler #10

January 1991

Eastmount Engineering

Environmental Consultants — Air Quality Specialists

OKEELANTA CORPORATION

COMPLIANCE PARTICULATE EMISSIONS TEST REPORT

BOILER #10

PREPARED FOR:

Okeelanta Corporation
Okeelanta Sugar Division
South Bay, Florida 33493

CONCERNING:

Particulate Emissions Testing
Okeelanta Corporation
Boiler #10
South Bay Florida Facility
January 29 & 30, 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 #10 at Okeelanta Corporation's South Bay, Florida facility on January 29 and 30, 1991. The test program consisted of a series of three EPA Method 5 test runs. A series of four Method 5 tests were performed on the December 18 and 19, 1990. Results of this December testing lead Eastmount to believe that the steam production was actually higher than the steam production shown on the chart. As a result, Ernesto Alfonso of Okeelanta Corporation performed a complete loop calibration of the steam flow and measurement system. A 6.75 % error was found and corrected. Eastmount then re-tested Unit #10 on January 29 and 30, 1991. A full description of the calibration on the flow measurement system can be found in Appendix IX of this report. Results of the December, 1990 testing are available upon request.

All testing was conducted in strict accordance with the Environmental Protection Agency's 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. 10 is rated at 125,000 pounds of steam per hour. Results of the test program indicate Boiler No. 10 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 125 KPH
1	01-29-91	.194	37.03	.200	38.10	93171	74.5%
2	01-30-91	.183	37.60	.200	41.15	101100	80.9%
3	01-30-91	.192	37.43	.200	39.08	96000	76.8%
3 RUN AVG.		.190	37.35	.200	39.44	96757	77.4%

1.0 COMPENDIUM (cont.)

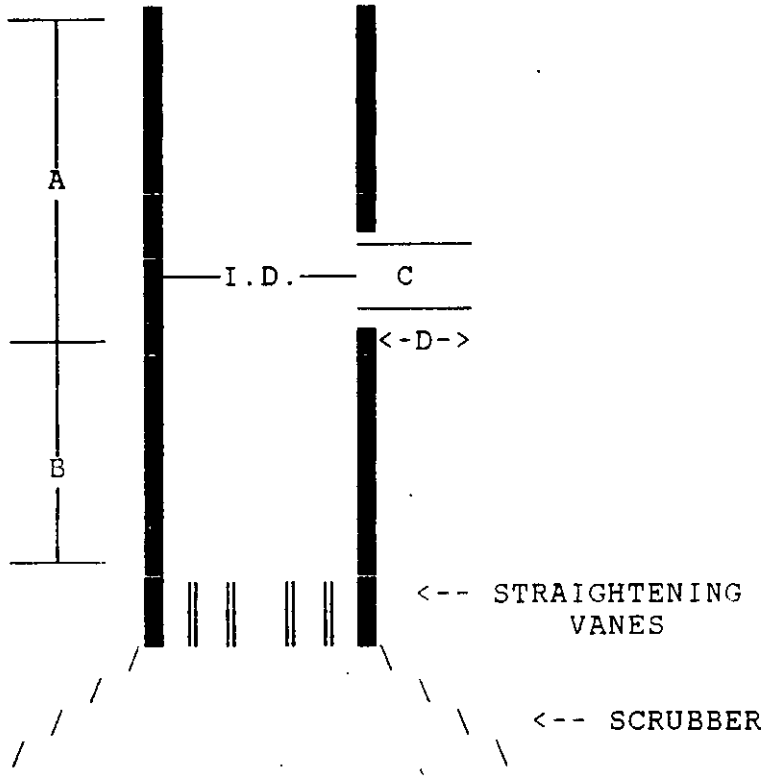
Sean MacKay, Project Director, was in charge of and responsible for all stack testing, conducted all calculations and maintained chain of custody of all samples. Brian Gibson operated the meter box and performed the field laboratory aspects of the program. Mark Wescott located the probe at the proper traverse point locations and assisted where required. Mr. Kenneth Tucker and Mr. Sherrel Culliver of the Florida Department of Environmental Regulation observed the stack testing and boiler operations. Mr. Alberto Padrone was the boiler room superintendent. Mr. George Devane was responsible for boiler operation and acquisition of all pertinent process data.

2.0 STACK SCHEMATIC

OKEELANTA CORPORATION
UNIT # 10
SOUTH BAY, FLORIDA FACILITY

The following is a schematic of the stack which services Boiler #10 at Okeelanta Corporation's South Bay, Florida facility.

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

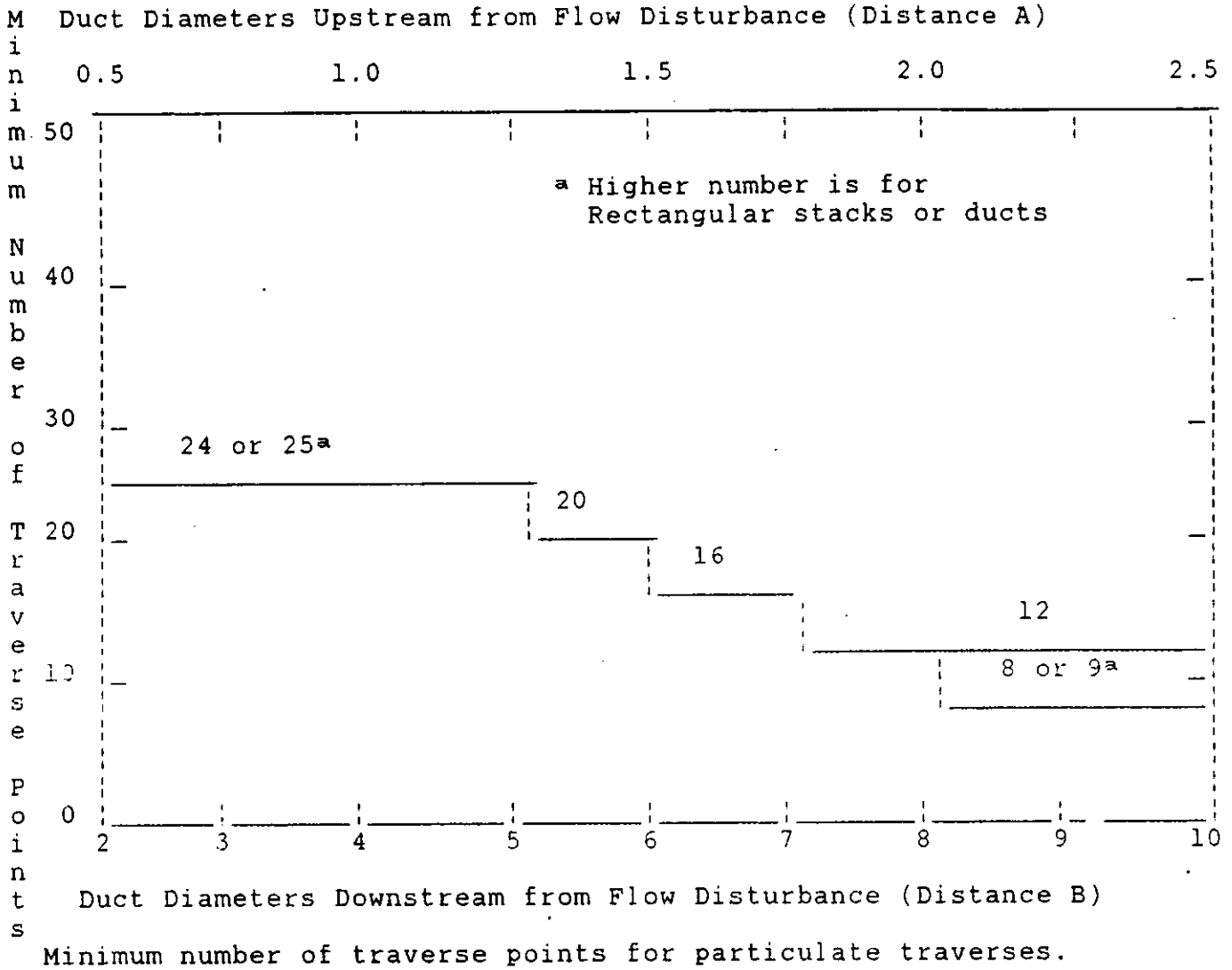


DISTANCE UPSTREAM FROM FLOW DISTURBANCE (A)	4'
DISTANCE DOWNSTREAM FROM FLOW DISTURBANCE (B)	16'
DIAMETER OF PORT SLEEVE (C)	4"
LENGTH OF PORT SLEEVE (D)	3.5"
NUMBER OF PORTS	2
INTERNAL DIAMETER OF STACK AT SAMPLING PORTS	7.5'

Drawing not to scale

3.0 NUMBER OF TRAVERSE POINTS AND SAMPLING TIME PER POINT

OKEELANTA CORPORATION
UNIT # 10
SOUTH BAY, FLORIDA FACILITY



Minimum number of traverse points for particulate traverses.

Distance A = 4' or 0.5 diameters.

Distance B = 16' or 2.1 diameters.

In accordance with Method 1, 24 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 2.5 minutes.

3.0 NUMBER OF TRAVERSE POINTS AND SAMPLING TIME PER POINT

OKEELANTA CORPORATION
UNIT # 10
SOUTH BAY, FLORIDA FACILITY

DIAMETER OF STACK: 7.5 FEET
PORT SLEEVE LENGTH: 3 INCHES

TRAVERSE POINT	DISTANCE % OF DIAMETER	DISTANCE (INCHES)	PROBE MARK (INCHES)
1	2.1	1.9	5.4
2	6.7	6.0	9.5
3	11.8	10.6	14.1
4	17.7	15.9	19.4
5	25.0	22.5	26.0
6	35.6	32.0	35.5
7	64.4	57.9	61.5
8	75.0	67.5	71.0
9	82.3	74.1	77.6
10	88.2	79.4	82.9
11	93.3	84.0	87.5
12	97.9	88.1	91.6

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: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-1
DATE : 01-29-91

Ds (FT)	7.5
Dn (IN)	.250
FILTER#	3614
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	254
IMP-2 (FIN)	116
IMP-3 (FIN)	2
IMP-4 (FIN)	516.0
% CO2	10.3
% O2	9.9
% CO	0
P BAR	30.08
P STK	.20
NO. PTS	24
TEST LNGTH	60
END METER	525.848
	.235
INT METER	486.800
BEGIN TIME:	14:30
END TIME:	15:40

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.80	.89	2.48	81	79	140
2	.71	.84	2.20	82	79	139
3	.56	.75	1.74	84	80	139
4	.40	.63	1.24	85	80	140
5	.21	.46	.65	85	80	140
6	.11	.33	.34	85	81	139
7	.27	.52	.84	86	81	140
8	.54	.73	1.67	87	82	140
9	.65	.81	2.02	90	82	140
10	.77	.88	2.39	91	83	139
11	.83	.91	2.57	92	83	140
12	.90	.95	2.79	93	84	139
B1	.77	.88	2.39	91	85	140
2	.75	.87	2.33	92	85	140
3	.62	.79	1.92	93	86	140
4	.47	.69	1.46	93	86	139
5	.33	.57	1.02	93	86	139
6	.21	.46	.65	92	86	140
7	.14	.37	.43	91	87	141
8	.23	.48	.71	90	86	140
9	.45	.67	1.39	92	87	138
10	.66	.81	2.05	92	87	139
11	.92	.96	2.85	93	88	138
12	1.02	1.01	3.16	96	88	140
AVERAGE	.56	.72	1.72	89.5	83.8	139.5

INPUT DATA SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-2
DATE : 01-30-91

Ds (FT)	7.5
Dn (IN)	.250
FILTER#	3613
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	258
IMP-2 (FIN)	116
IMP-3 (FIN)	1
IMP-4 (FIN)	514.9
% CO2	10.1
% O2	10.1
% CO	0
P BAR	30.08
P STK	.20
NO. PTS	24
TEST LNGTH	60
END METER	569.222
	.274
INT METER	530.800
BEGIN TIME:	09:30
END TIME:	11:20

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.80	.89	2.48	76	75	141
2	.85	.92	2.64	78	75	140
3	.60	.77	1.86	82	76	140
4	.42	.65	1.30	83	77	140
5	.21	.46	.65	83	78	141
6	.10	.32	.31	82	78	140
7	.26	.51	.81	83	78	141
8	.53	.73	1.64	84	79	140
9	.65	.81	2.02	86	79	143
10	.76	.87	2.36	87	80	140
11	.81	.90	2.51	89	81	141
12	.87	.93	2.70	90	82	141
B1	.67	.82	2.08	82	82	139
2	.70	.84	2.17	82	84	140
3	.60	.77	1.86	82	84	138
4	.45	.67	1.40	83	86	139
5	.34	.58	1.05	83	86	141
6	.23	.48	.71	83	87	141
7	.12	.35	.37	83	86	142
8	.20	.45	.62	83	87	141
9	.37	.61	1.15	83	86	141
10	.70	.84	2.17	83	85	141
11	.87	.93	2.70	84	88	143
12	1.00	1.00	3.10	84	91	141
AVERAGE	.55	.71	1.69	83.3	82.1	140.6

INPUT DATA SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-3
DATE : 01-30-91

Ds (FT)	7.5
Dn (IN)	.250
FILTER#	3615
PIT COEFF	.84
IMP-1 (INT)	100
IMP-2 (INT)	100
IMP-3 (INT)	0
IMP-4 (INT)	500.0
IMP-1 (FIN)	274
IMP-2 (FIN)	116
IMP-3 (FIN)	2
IMP-4 (FIN)	516.5
% CO2	10.4
% O2	9.8
% CO	0
P BAR	30.06
P STK	.20
NO. PTS	24
TEST LNGTH	60
END METER	608.511
	.22
INT METER	569.488
BEGIN TIME:	12:20
END TIME:	13:30

TRAV PT	VEL HEAD	SQ ROOT	DELTA H	DRYGAS IN	DRYGAS OUT	STACK TEMP
A1	.83	.91	2.57	83	83	140
2	.78	.88	2.42	83	87	141
3	.59	.77	1.83	83	88	142
4	.38	.62	1.18	83	89	140
5	.24	.49	.74	84	89	143
6	.11	.33	.34	84	88	144
7	.28	.53	.87	84	89	143
8	.52	.72	1.61	85	90	143
9	.70	.84	2.17	85	91	144
10	.83	.91	2.57	86	93	144
11	.90	.95	2.79	87	95	143
12	.93	.96	2.88	88	96	143
B1	.72	.85	2.23	88	92	143
2	.75	.87	2.32	89	94	141
3	.64	.80	1.98	89	95	141
4	.43	.66	1.33	89	96	142
5	.32	.57	.99	89	95	142
6	.21	.46	.65	89	94	141
7	.14	.37	.43	90	94	142
8	.25	.50	.77	90	94	142
9	.38	.62	1.18	90	95	142
10	.63	.79	1.95	91	97	141
11	.86	.93	2.67	91	98	143
12	.97	.98	3.01	91	100	143
AVERAGE	.56	.72	1.73	87.1	92.6	142.2

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APPENDIX II

ISOKINETIC CALCULATION SHEETS

ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-1
DATE : 01-29-91

TS (`F)=	139.5	% CO2=	10.3	VM (CF)	= 38.813
TS (`R)=	599.5	% O2=	9.9	DELTA H (ABS)	= 30.21
TM (`F)=	86.7	% CO=	0	PS (ABS)	= 30.09
TM (`R)=	546.7	% N2=	79.8	SQRT DELTA P	= .719206
VI(TOT)=	188.0	CP=	.84	AREA NOZZLE	= .000341

Y = 1.001

VM STD	=	$17.64 \frac{(VM)(Y)(DELTA\ H\ ABS)}{(TM)}$	= 37.87	DSCF
VW STD	=	.04707 (VI TOT)	= 8.85	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	= .189	
BWO	=	MOISTURE FROM STEAM TABLES	= .193	
VI TOT	=	ADJUSTED TO SATURATION VOLUME	= N/A	ML
1-BWO	=	1 - BWO	= .811	
Md (DRY)	=	.44 (% CO2) + .32 (% O2) + .28 (% CO) + .28 (% N2)	= 30.04	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	= 27.76	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	= .85	
VS	=	85.49(CP)(G)(SQRT DELTA P)	= 43.8	FPS
H	=	0.002669 (VI TOT)	= .50	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	= 2.15	
K	=	(H) + (J)	= 2.65	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	= 98.3	

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ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-2
DATE : 01-30-91

TS (`F)=	140.6	% CO2=	10.1	VM (CF)	□ 38.148
TS (`R)=	600.6	% O2=	10.1	DELTA H (ABS)=	30.20
TM (`F)=	82.7	% CO=	0	PS (ABS) =	30.09
TM (`R)=	542.7	% N2=	79.8	SQRT DELTA P =	.712366
VI(TOT)=	189.9	CP=	.84	AREA NOZZLE □	.000341

Y = 1.001

VM STD	=	$17.64 \frac{(VM)(Y)(DELTA\ H\ ABS)}{(TM)}$	= 37.49	DSCF
VW STD	=	.04707 (VI TOT)	= 8.94	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	= .193	
BWO	=	MOISTURE FROM STEAM TABLES	□ .198	
VI TOT	=	ADJUSTED TO SATURATION VOLUME	= N/A	ML
1-BWO	=	1 - BWO	= .807	
Md (DRY)	=	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2)	= 30.02	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	= 27.71	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	= .85	
VS	=	85.49(CP)(G)(SQRT DELTA P)	= 43.4	FPS
H	=	0.002669 (VI TOT)	= .51	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	= 2.13	
K	=	(H) + (J)	= 2.63	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	= 98.6	

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ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-3
DATE : 01-30-91

Avg = 141

Avg = 9.9

TS (`F)=	142.2	% CO2=	10.4	VM (CF) =	38.803
TS (`R)=	602.2	% O2=	9.8	DELTA H (ABS)=	30.19
TM (`F)=	89.9	% CO=	0	PS (ABS) =	30.07
TM (`R)=	549.9	% N2=	79.8	SQRT DELTA P =	.720924
VI(TOT)=	208.5	CP=	.84	AREA NOZZLE =	.000341

Y = 1.001

VM STD	=	$17.64 \frac{(VM)(Y)(DELTA\ H\ ABS)}{(TM)}$	=	37.62	DSCF
VW STD	=	.04707 (VI TOT)	=	9.81	CF
BWO	=	$\frac{VW\ STD}{VW\ STD + VM\ STD}$	=	.207	
BWO	=	MOISTURE FROM STEAM TABLES	=	.207	
VI TOT	=	ADJUSTED TO SATURATION VOLUME	=	208.4	ML
1-BWO	=	1 - BWO	=	.793	
Md (DRY)	=	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2)	=	30.06	LBS/LB MOLE
Ms (WET)	=	MD (1-BWO) + 18 (BWO)	=	27.56	LBS/LB MOLE
G	=	SQRT (TS / PS / MS)	=	.85	
VS	=	85.49(CP)(G)(SQRT DELTA P)	=	44.1	FPS
H	=	0.002669 (VI TOT)	=	.56	
J	=	(DELTA H ABS)(VM)(Y) /(TM)	=	2.13	
K	=	(H) + (J)	=	2.69	
% ISO	=	$\frac{(TS)\ (K)\ (1.667)}{(TIME)\ (VS)\ (PS)\ (AN)}$	=	99.4	

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APPENDIX III

ENTHALPY CALCULATION SHEETS

ENTHALPY CALCULATION SHEET

PLANT : OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-1
DATE : 01-29-91

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	350	680	260
	355	680	
	340	680	
	335	680	
	340	680	
	345	680	
AVERAGE	344.2 PSIG	680.0	260.0

P ABS = 358.9 PSIA

ENTHALPY @	700	'F AND	360	PSIA =	1364.1
ENTHALPY @	600	'F AND	360	PSIA =	1309.9
ENTHALPY @	680.0	'F AND	360	PSIA =	1353.3

ENTHALPY OF FEED WATER = 228.65

AVERAGE ENTHALPY = 1124.6 BTU/LB OF STEAM

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ENTHALPY CALCULATION SHEET

PLANT : OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-2
DATE : 01-30-91

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	340	660	260
	340	670	
	350	680	
	340	670	
	350	680	
	330	660	
	350	670	
	350	670	
	340	670	
AVERAGE	343.3 PSIG	670.0	260.0

P ABS = 358.0 PSIA

ENTHALPY @	700	'F AND	360	PSIA =	1364.1
ENTHALPY @	600	'F AND	360	PSIA =	1309.9
ENTHALPY @	670.0	'F AND	360	PSIA =	1347.8

ENTHALPY OF FEED WATER = 228.65

AVERAGE ENTHALPY = 1119.2 BTU/LB OF STEAM

ENTHALPY CALCULATION SHEET

PLANT : OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-3
DATE : 01-30-91

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	355	670	260
	350	670	
	345	670	
	355	670	
	355	680	
	350	670	
AVERAGE	351.7 PSIG	671.7	260.0

P ABS = 366.4 PSIA

ENTHALPY @	700	'F AND	370	PSIA =	1363.6
ENTHALPY @	600	'F AND	370	PSIA =	1309.1
ENTHALPY @	671.7	'F AND	370	PSIA =	1348.2

ENTHALPY OF FEED WATER = 228.65

AVERAGE ENTHALPY = 1119.5 BTU/LB OF STEAM

APPENDIX IV

HEAT INPUT CALCULATION SHEETS

HEAT INPUT CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-1
DATE : 01-29-91

	STEAM INTEGRATOR READINGS		TIME		INTEGRATOR FACTOR		
END	508097		15: 40		100		
BEGIN	507010		14: 30		LBS/HR STEAM		
NET	1087	X	100 / 70	MINS =	93171		

93171 LBS/HR STEAM / 55% EFF. = 169403 EQUIV.

169403 LBS/HR STEAM X 1125 BTU/LB = 190.5 BTU(e6)/HR

	OIL INTEGRATOR READINGS		TIME		GALS/HR	
END	0		14: 40			
BEGIN	0		13: 30			
NET	0	GALLONS	70	MINS =	0	GPH

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

ALLOWABLE EMISSIONS

BAGASSE	190.5	-	0	X	.2	=	38.1 LBS/HR
OIL			0	X	.1	=	.0 LBS/HR
TOTAL						=	38.1 LBS/HR

HEAT INPUT CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-2
DATE : 01-30-91

STEAM INTEGRATOR READINGS			TIME			INTEGRATOR FACTOR
						100
525800	526143	526552	10:30	10: 50	11:20	
						LBS/HR STEAM
524822	525945	526380	9:30	10: 40	11:10	
978	198	172	X 100	/ 80	MINS =	101100

101100 LBS/HR STEAM / 55% EFF. = 183818 EQUIV.

183818 LBS/HR STEAM X 1119 BTU/LB = 205.7 BTU(e6)/HR

OIL INTEGRATOR READINGS		TIME		GALS/HR
END	0	14: 40		
BEGIN	0	13: 30		
NET	0 GALLONS	80	MINS =	0 GPH

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

ALLOWABLE EMISSIONS

BAGASSE	205.7	-	0	X	.2	=	41.1 LBS/HR
OIL			0	X	.1	=	.0 LBS/HR
TOTAL						=	41.1 LBS/HR

HEAT INPUT CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-3
DATE : 01-30-91

	STEAM INTEGRATOR READINGS		TIME		INTEGRATOR FACTOR
					100
END	528541		13: 30		LBS/HR STEAM
BEGIN	527421		12: 20		
NET	1120	X 100 /	70	MINS =	96000

96000 LBS/HR STEAM / 55% EFF. = 174545 EQUIV.

174545 LBS/HR STEAM X 1120 BTU/LB = 195.4 BTU(e6)/HR

	OIL INTEGRATOR READINGS		TIME		GALS/HR
END	0		14: 40		
BEGIN	0		13: 30		
NET	0	GALLONS	70	MINS =	0 GPH

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

ALLOWABLE EMISSIONS

BAGASSE	195.4	-	0	X	.2	=	39.1 LBS/HR
OIL			0	X	.1	=	.0 LBS/HR
TOTAL						=	39.1 LBS/HR

APPENDIX V

EMISSION CALCULATION SHEETS

EMISSION CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-1
DATE : 01-29-91

	SAMPLES		BLANKS	
	FILTER	BEAKER	FILTER	ACETONE
NO. :	3614	200	3611	211
FINAL:	.7324	78.4936	.6265	79.1329
TARE :	.6138	78.4846	.6264	79.1327
NET :	.1186	.0090	.0001	.0002/200ML

VOLUME OF RINSE 265

WEIGHT = 127.60
RESIDUE = - .27

Mn = 127.34 Mg AS = 44.2 SQ FT

Qs =	3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS)	= 4994189	DSCFH
CS =	(2.205 X 10-6) (Mn) / (VM STD)	= 7.414e-6	LBS/SCF
CS' ▫	0.0154 (Mn) / (VM STD)	= .05	GRAINS /SCF
PMR ▫	(QS) (CS)	= 37.03	LBS/HR
LOAD=	MILLIONS OF BTU / HOUR INPUT	= 190.5	BTU e6 / HR
CS =	LBS / MILLION BTu	= .194	LBS/ BTu e6
ALLOWABLE		= 38.10	LBS/HR
		= .200	LBS/ BTu e6

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EMISSION CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-2
DATE : 01-30-91

	SAMPLES		BLANKS	
	FILTER	BEAKER	FILTER	ACETONE
NO. :	3613	205	3611	211
FINAL:	.7341	75.8671	.6265	79.1329
TARE :	.6114	75.8598	.6264	79.1327
NET :	.1227	.0073	.0001	.0002/200ML

VOLUME OF RINSE 290

WEIGHT = 130.00
RESIDUE = - .29

Mn = 129.71 Mg AS = 44.2 SQ FT

Qs =	3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS)	= 4928368	DSCFH
CS =	(2.205 X 10-6) (Mn) / (VM STD)	= 7.628e-6	LBS/SCF
CS' =	0.0154 (Mn) / (VM STD)	= .05	GRAINS /SCF
PMR =	(QS) (CS)	= 37.60	LBS/HR
LOAD=	MILLIONS OF BTU / HOUR INPUT	= 205.7	BTU e6 / HR
CS ▫	LBS / MILLION BTu	= .183	LBS/ BTu e6
ALLOWABLE		= 41.15	LBS/HR
		= .200	LBS/ BTu e6

EMISSION CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 10

RUN #: C 10R-3
DATE : 01-30-91

	SAMPLES		BLANKS	
	FILTER	BEAKER	FILTER	ACETONE
NO. :	3615	209	3611	211
FINAL:	.7387	76.3050	.6265	79.1329
TARE :	.6124	76.3009	.6264	79.1327
NET :	.1263	.0041	.0001	.0002/200ML

VOLUME OF RINSE 185

WEIGHT = 130.40
RESIDUE = - .19

Mn = 130.22 Mg AS = 44.2 SQ FT

Qs = 3600(1-BWO)(VS)(AS)(17.64)(PS)/(TS) = 4903763 DSCFH

Avg = 4,942,107

CS = (2.205 X 10-6) (Mn) / (VM STD) = 7.633e-6 LBS/SCF

CS' = 0.0154 (Mn) / (VM STD) = .05 GRAINS /SCF

PMR = (QS) (CS) = 37.43 LBS/HR

LOAD= MILLIONS OF BTU / HOUR INPUT = 195.4 BTU e6 / HR

Avg = 197.2

CS = LBS / MILLION BTu = .192 LBS/ BTu e6

ALLOWABLE = 39.08 LBS/HR

= .200 LBS/ BTu e6

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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

CAPACITY 125,000
INT. FACTOR 100
RUN # 10R-1

BOILER # 10

POLLUTION COMPLIANCE TESTING
DATE: 1-29-91
TESTED BY: Eastmount Eng

TIME	STEAM INTERGRATOR	OIL METER North	OIL METER South	STEAM PRESS.	STEAM TEMP.	CHART READING LBS/HR.	FEED WATER PRESS.	FEED WATER TEMP.
PM 2:30	507010	1133350	107766	350	680	97,500	640	260
2:45	507240			355	680	108,000	640	"
3:00	507479			340	680	100,000	630	"
3:15	507710			335	680	100,000	660	"
(60) 3:30	507937			340	680	97,500	680	"
3:40	508097	1133350	107766	345	680	93,000	660	"
		None	None					

BOILER PRESSURE DROP

OVERFIRE AIR PRESS.					
AIR HEATER AIR OUT					
UNDERGRATE AIR PRESS.					
WIND BOX PRESSURE	1-3	1-2	1-2	1-2	
FURNACE PRESSURE	-20	-15	-15	-20	
BLR. OUTLET PRESSURE					
DUST COLLECTOR OUT.					
SCRUBBER DIFF.	15%	16%	16%	16%	

BOILER TEMPERATURE

BOILER OUTLET					
AIR HEATER GAS OUT					
AIR HEATER AIR OUT					
I.D. FAN	530	540	530	540	
S.H. STEAM TEMP.	680	680	680	680	

PANEL SETTINGS

FURNACE PRESSURE					
F.D. FAN PRESSURE	45	45	45	85	
BAGASSE FEED					
UNDERGRATE AIR					
OVERFIRE AIR					

TEST RESULTS

OIL USED	None	GALS.
TOTAL TEST TIME	70	MINS.
INTERGATOR TIME	1087	COUNT
INTERGRATOR STEAM	93,171	P.P.H.
CHART READING	596,000	TOTAL
CHART AVERAGE	99,333	P.P.H.
I.D. FAN TURBINE	4800	RPM
STACK TEMPERATURE	139	°F
GRATE TEMPERATURE		°F
SCRUBBER WATER	est 1000	G.P.M.

COMMENTS:

	"A"	"B"	
(1) Mill speed	~~80~~	~~80~~	F.P.M.

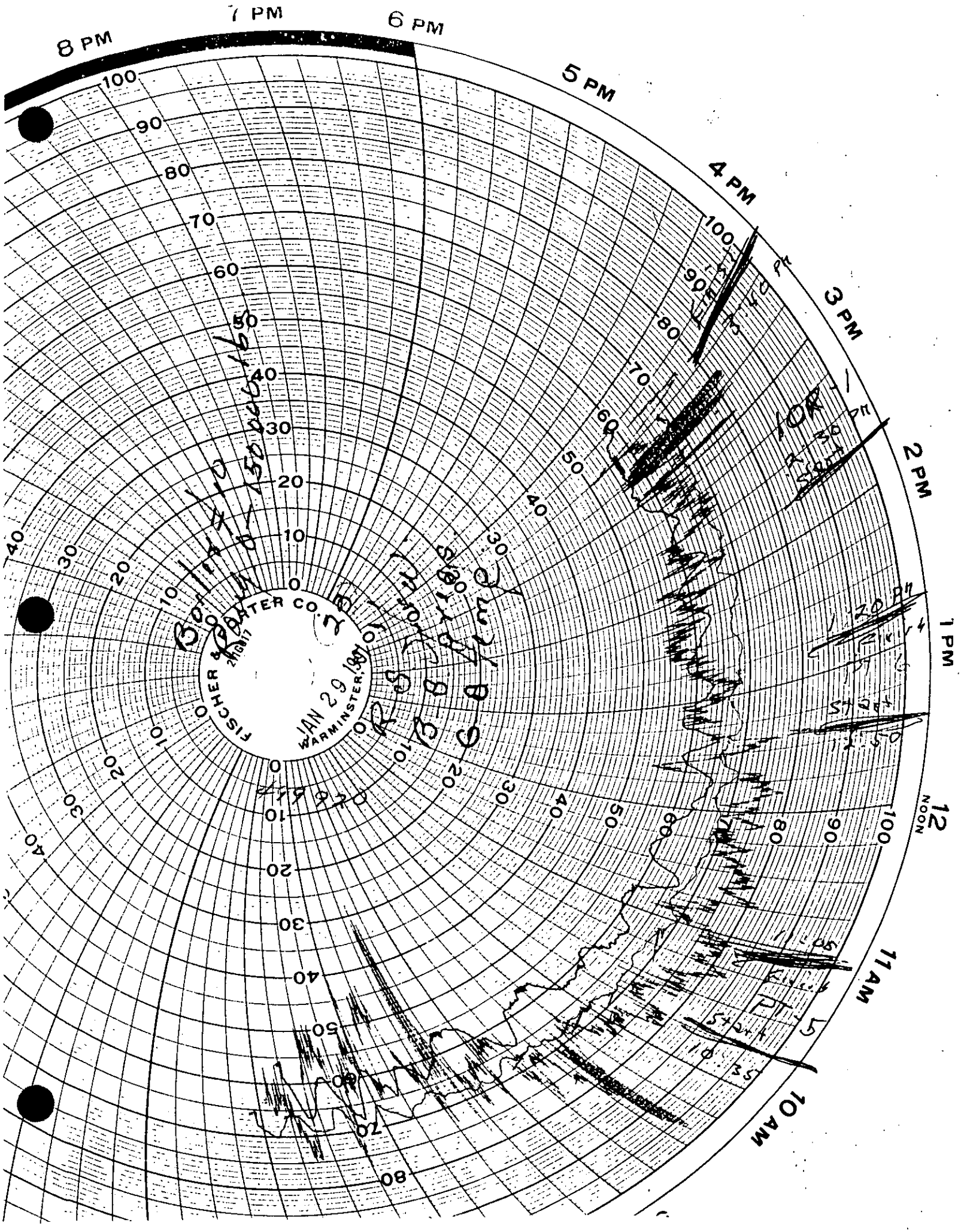
(2) using no oil burners

Allowed =

Actual =

PLANT READINGS BY

% OF CAPACITY


8 PM
7 PM
6 PM
5 PM
4 PM
3 PM
2 PM
1 PM
12 NOON
11 AM
10 AM
FISCHER & PORTER CO.
WARMINSTER, PA.
JAN 29 1991

CAPACITY 125,000
INT. FACTOR 100
RUN # 10R-2

BOILER # 10

POLLUTION COMPLIANCE TESTING
DATE: 1-30-91
TESTED BY: Eastmount Eng

TIME	STEAM INTERGRATOR	OIL METER North	OIL METER South	STEAM PRESS.	STEAM TEMP.	CHART READING LBS/HR.	FEED WATER PRESS.	FEED WATER TEMP.
AM 9:30	524822	1133540	107768	340	660	97,500	630	260
9:48	525058			340	670	100,000	650	"
10:00	525296			350	680	96,000	650	"
10:15	525562	None		340	670	102,000	630	"
Mill Stop 10:30	525800 (278)	1133540	107768	350	680	97,500	650	"
Restart 10:40	rest 525945	1133540	107768	330	660	90,000	620	"
10:50	526143 (198)	None		350	670	90,000	640	"
Restart 11:10	rest 526380	1133540	107768	350	670	100,000	640	"
11:20	526552 (172)	1133540	107768	340	670	90,000	640	"
		None						

BOILER PRESSURE DROP

OVERFIRE AIR PRESS.	—				
AIR HEATER AIR OUT (23)	3.0	3.2	3.1	3.0	3.0
UNDERGRATE AIR PRESS.	—				
WIND BOX PRESSURE	1.4	1.4	1.4	1.4	1.4
FURNACE PRESSURE	-.10	.10	.15	.15	.20
BLR. OUTLET PRESSURE					
DUST COLLECTOR OUT.					
SCRUBBER DIFF.	15.5	15.5	15.5	15.5	15.0

BOILER TEMPERATURE

BOILER OUTLET					
AIR HEATER GAS OUT					
AIR HEATER AIR OUT					
I.D. FAN	530	530	530	530	520
S.H. STEAM TEMP.	660	670	680	670	662

PANEL SETTINGS

FURNACE PRESSURE					
F.D. FAN PRESSURE	45%	—	—	—	—
BAGASSE FEED					
UNDERGRATE AIR					
OVERFIRE AIR					

TEST RESULTS

OIL USED	None	GALS.
TOTAL TEST TIME	80	MINS.
INTERGATOR TIME	1348	COUNT
INTERGRATOR STEAM	101,100	P.P.H.
CHART READING	863000	TOTAL
CHART AVERAGE	95,888	P.P.H.
I.D. FAN TURBINE	4800	RPM
STACK TEMPERATURE	140	°F
GRATE TEMPERATURE		°F
SCRUBBER WATER	est 1000	G.P.M.

COMMENTS:

	"A"	"B"	
(1) Mill speed	80	80	F.P.M.

(2) using no oil burner
(3) "A" Mill stop 10:30 (5 min)
(4) Hot box short out (25 min)
(5) "A" Mill stop 10:50 (5 min)

Intergrator 928
1st stop 198
finish 172
1348

Allowed =

Actual =

PLANT READINGS BY

% OF CAPACITY

CAPACITY 125,000
INT. FACTOR 100
RUN # 10R-3

BOILER # 10

POLLUTION COMPLIANCE TESTING
DATE: 1-30-91
TESTED BY: Eastmount Env

TIME	STEAM INTERGRATOR	OIL METER North	OIL METER South	STEAM PRESS.	STEAM TEMP.	CHART READING LBS/HR.	FEED WATER PRESS.	FEED WATER TEMP.
PM 12:20	527421	1133540	107768	355	670	90,000	640	260°
12:35	527665			350	670	99,000	640	"
12:50	527905			345	670	95,000	660	"
1:05	528141			355	670	99,000	650	"
1:20	528378			355	680	90,000	640	"
1:30	528541	1133540	107768	350	670	92,500	630	"
		None						

BOILER PRESSURE DROP

OVERFIRE AIR PRESS.						
AIR HEATER AIR OUT PRESS	3.1	3.1	3.1	3.1	3.1	
UNDERGRATE AIR PRESS.						
WIND BOX PRESSURE	1.4	1.4	1.4	1.4	1.4	
FURNACE PRESSURE	.10	.15	.20	.15	.15	
BLR. OUTLET PRESSURE						
DUST COLLECTOR OUT.						
SCRUBBER DIFF.	15	15	15	15	15	

BOILER TEMPERATURE

BOILER OUTLET					
AIR HEATER GAS OUT					
AIR HEATER AIR OUT					
I.D. FAN	530	540	540	540	540
S.H. STEAM TEMP.	670	670	680	670	680

PANEL SETTINGS

FURNACE PRESSURE					
F.D. FAN PRESSURE	45	45	45	45	45
BAGASSE FEED					
UNDERGRATE AIR					
OVERFIRE AIR					

TEST RESULTS

OIL USED	None	GALS.
TOTAL TEST TIME	70	MINS.
INTERGATOR TIME	1120	COUNT
INTERGRATOR STEAM	96000	P.P.H.
CHART READING	520,500	TOTAL
CHART AVERAGE	95083	P.P.H.
I.D. FAN TURBINE	4800	RPM
STACK TEMPERATURE	142	°F
GRATE TEMPERATURE		°F
SCRUBBER WATER	est 1000	G.P.M.

COMMENTS:

	"A"	"B"	
(1) Mill speed	80	80	F.P.M.

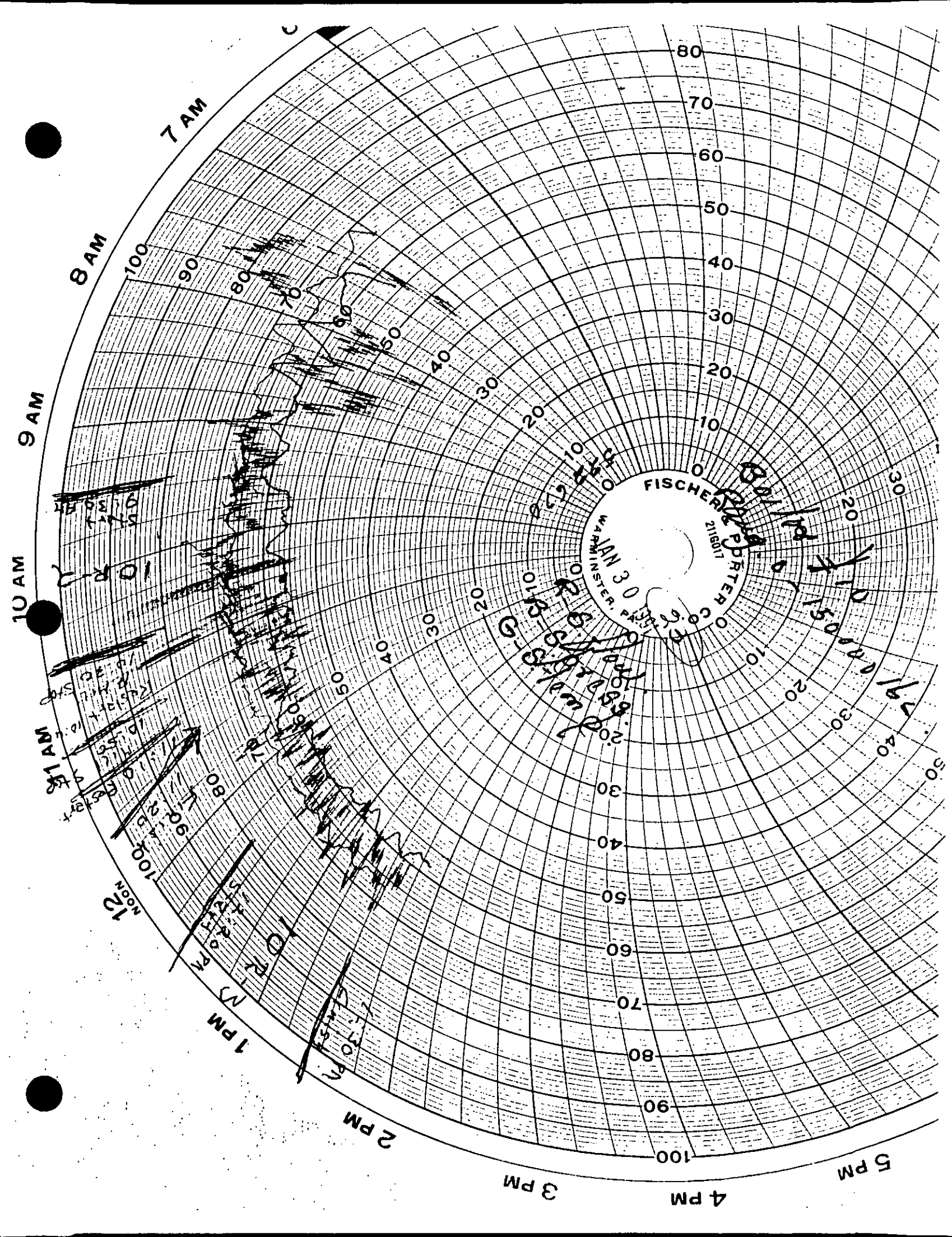
(2) using no oil burners

Allowed =

Actual =

PLANT READINGS BY George Dalla

% OF CAPACITY


7 AM
8 AM
9 AM
10 AM
11 AM
12 NOON
1 PM
2 PM
3 PM
4 PM
5 PM
FISCHER & PORTER CO.
WARMINSTER, PA.
JAN 30

APPENDIX VIII

FIELD DATA SHEETS - STACK TESTING

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	OKEELANTA	Run #:	COMP 10R-1
Location:	UNIT 10	Date:	29 JAN 91
Ds (ft):	7.5	No. Points:	24
Dn (in):	.250	Test Length:	60 MIN
Filter #:	3614	End Meter Reading:	525.848
Cp:	.84	Int Meter Reading:	486.309
P bar:	30.08	Begin Time:	1430
P stack:	+.2	End Time:	1540
IMP-1 (INT)	100 ML	IMP-1 (FINAL)	254
IMP-2 (INT)	100 ML	IMP-2 (FINAL)	116
IMP-3 (INT)	0 ML	IMP-3 (FINAL)	2
IMP-4 (INT)	500.0g	IMP-4 (FINAL)	516.0g

	TEST 1	TEST 2	TEST 3
% CO2	1.3		
% O2	9.9		
% CO	0		

Project Director:	S. MacKay	Field Laboratory:	B. GIBSON
Meter Box Operator:	S. MacKay	Chain of Custody:	S. MacKay
Probe Operator:	M. Wescott	Plant Coordinator:	G. DEVANE
Orsat Analyst:	S. MacKay	Agency Rep:	C. Culliver

Comments:

TRAVERSE DATA SHEET

Page 1 of 2 — Sampling time per point: 2.5

Plant: OKEELANTA — Run #: COMP 10R-1

Location: UNIT 10 — Date: 29 JAN 91

O2	Trav. No.	Delta P	Delta H	Meter Reading	DGM In	DGM Out	Hot Box	Impg Temp	Stack Temp	Vac
				486.800						
	A1	.80	2.48	489.87	81	79	249	62	140	2
9.7	2	.71	2.20	491.06	82	79	262	61	139	2
	3	.56	1.74	492.83	84	80	267	61	139	1
	4	.40	1.24	494.24	85	80	253	62	140	1
10.0	5	.21	.65	495.33	85	80	250	63	140	1
	6	.11	.34	496.08	85	81	259	64	139	1
10.3	7	.27	.84	497.17	86	81	263	62	140	1
	8	.54	1.67	498.81	87	82	260	60	140	2
	9	.65	2.02	500.60	90	82	264	59	140	2
10.3	10	.77	2.39	502.51	91	83	261	60	139	3
	11	.83	2.57	504.55	92	83	260	61	140	3
9.8	12	.90	2.79	506.604	93	84	256	61	139	4

Relationship: 3.1

Box #: 4 Y: 1.001 Delta H@: 2.03

Start Time: 1430 End Time: _____

Pre Leak Ck: .0 CFM @ 15 "Hg

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

Post Leak CK: _____ CFM @ _____ "Hg

Pitot Leak CK: good @ 5 "H2O

Box Oper: SM Probe Oper: MW

TRAVERSE DATA SHEET

Page 2 of 2

Sampling time per point: 2.5

Plant: OKEELANTA

Run #: COMP 10R-1

Location: UNIT 10

Date: 29 JAN 91

	Trav. No.	Delta P	Delta H	Meter Reading 506.839	DGM In	DGM Out	Hot Box	Impg Temp	Stack Temp	Vac
9.9	B1	.77	2.39	508.78	91	85	245	63	140	3
	2	.75	2.33	510.68	92	85	252	61	140	3
	3	.62	1.92	512.54	93	86	251	62	140	2
10.1	4	.47	1.46	514.07	93	86	258	64	139	2
	5	.33	1.02	515.38	93	86	260	64	139	1
10.0	6	.21	.65	516.40	92	86	265	60	140	1
	7	.14	.43	517.25	91	87	262	59	141	1
	8	.23	.71	518.30	90	86	261	59	140	1
	9	.45	1.39	519.82	92	87	262	57	138	2
10.3	10	.66	2.05	521.59	92	87	266	57	139	3
	11	.92	2.85	523.67	93	88	252	56	138	5
9.9	12	1.02	3.16	525.848	96	88	242	56	140	6

Relationship: 3,1

Box #:_____ Y:_____ Delta H@:_____

Start Time:_____ End Time:_____

Pre Leak Ck:_____ CFM @_____"Hg

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

Post Leak CK:_____ CFM @_____"Hg

Pitot Leak CK:_____ @_____"H2O

Box Oper:_____ Probe Oper:_____

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	OKEELANTA	Run #:	COMP 10R-2
Location:	UNIT 10	Date:	30 JAN 91
Ds (ft):	7.5 ft	No. Points:	24
Dn (in):	.250	Test Length:	60 MIN
Filter #:	3613	End Meter Reading:	569.222
Cp:	.84	Int Meter Reading:	530.800
P bar:	30.08	Begin Time:	09:30
P stack:	±.2	End Time:	11.20
IMP-1 (INT)	100 ML	IMP-1 (FINAL)	258
IMP-2 (INT)	100 ML	IMP-2 (FINAL)	116
IMP-3 (INT)	0 ML	IMP-3 (FINAL)	1
IMP-4 (INT)	500.0g	IMP-4 (FINAL)	BC 514.9

	TEST 1	TEST 2	TEST 3
% CO2	10.1		
% O2	10.1		
% CO	0		

Project Director:	SEAN MacKay	Field Laboratory:	GIBSON/MacKay
Meter Box Operator:	BRIAN GIBSON	Chain of Custody:	S. MacKay
Probe Operator:	M. WESCOTT	Plant Coordinator:	G. DEVANE
Orsat Analyst:	S. MacKAY	Agency Rep:	C. CULLIVER

Comments: A' mill stopped twice during Testing

TRAVERSE DATA SHEET

Page 2 of 2 | Sampling time per point: 2.5

Plant: OKEELANTA | Run #: Comp 10R-2

Location: Unit 10 | Date: 30 Jan 91

	Trav. No.	Delta P	Delta H	Meter Reading	DGM In	DGM Out	Hot Box	Impg Temp	Stack Temp	Vac
				550,548						
10.0	B 1	.67	2,08	552.4	82	82	240	68	139	2
	2	,70	2,17	554.3	82	84	245	60	140	2
10,7	3	.60	1.86	556,1	82	84	243	64	138	2
	4	.45	1.40	557,6	83	86	248	63	139	1
10,5	5	,34	1,05	559,0	83	86	271	64	141	1
	6	,23	0.71	560,1	83	87	248	65	141	1
10.0	7	.12	0.37	560,9	83	86	271	66	142	1
	8	.20	,62	561.8	83	87	245	67	141	1
10,5	9	,37	1.15	563,2	83	86	241	67	141	2
	10	,70	2.17	565.0	83	85	246	63	141	3
9.7	11	,87	2.70	567,6	84	88	260	63	143	5
	12	1.0	3.1	569.222	84	91	261	65	141	5
10.23%										

Relationship: 3.1
Box #: 4 Y: 1.001 Delta H@: 2.03
Start Time: 1025 End Time: ~~1055~~
Pre Leak Ck: N/A CFM @ N/A "Hg
Mid Leak Ck: 0 CFM @ 15 "Hg (Vol: N/A)
Post Leak CK: 0 CFM @ 5 "Hg
Pitot Leak CK: @ "H2O
Box Oper: Gibson Probe Oper: Wescott

1110 Start
T+ 4.18 stop Restart 1040 T+20.23 stop

TRAVERSE DATA SHEET

Page 1 of 2

Sampling time per point: 2.5

Plant: OKEELANTA

Run #: COMP 10R-2

Location: UNIT 10

Date: 30 JAN 91

	Trav. No.	Delta P	Delta H	Meter Reading	DGM In	DGM Out	Hot Box	Impg Temp	Stack Temp	Vac
				530.800						Ø
10.5	A1	.80	2.48	532.9	76	75	265	68	141	2
	2	.85	2.64	534.9	78	75	267	67	140	2
10.0	3	.60	1.86	536.6	82	76	269	68	140	2
	4	.42	1.30	538.2	83	77	267	68	140	1
10.1	5	.21	.65	539.2	83	78	266	67	141	1
	6	.10	.31	540.0	82	78	261	68	140	1
10.4	7	.26	.81	541.0	83	78	255	67	141	1
	8	.53	1.64	542.5	84	79	260	66	140	1
9.6	9	.65	2.02	544.3	86	79	268	60	143	1.5
	10	.76	2.36	546.2	87	80	269	58	140	2
9.5	11	.81	2.51	548.2	89	81	267	60	141	3
	12	.87	2.70	550.274	90	82	262	61	141	3
10.0%										
19.47 cuft										

Relationship: 3.1

Box #: 4 Y: 1.001 Delta H@: 2.03

Start Time: 0930 End Time: _____

Pre Leak Ck: Ø CFM @ 16 "Hg

Mid Leak Ck: Ø CFM @ 4 "Hg (Vol: _____)

Post Leak CK: N/A CFM @ N/A "Hg

Pitot Leak CK: OK @ 7.5 "H2O

Box Oper: Gibson Probe Oper: Wescott

FIELD DATA SHEET

GENERAL INFORMATION

Plant:	OKEELANTA	Run #:	Comp 10R-3
Location:	UNIT 10	Date:	31 JAN 91
Ds (ft):	7.5	No. Points:	24
Dn (in):	.250	Test Length:	60 min
Filter #:	3615	End Meter Reading:	608.511
Cp:	.84	Int Meter Reading:	569.488
P bar:	30.06	Begin Time:	12:20
P stack:	-.2	End Time:	13:36
IMP-1 (INT)	100 mL	IMP-1 (FINAL)	274
IMP-2 (INT)	100 mL	IMP-2 (FINAL)	116
IMP-3 (INT)	0 mL	IMP-3 (FINAL)	2
IMP-4 (INT)	500.0 g	IMP-4 (FINAL)	516.5

	TEST 1	TEST 2	TEST 3
% CO2	10.4		
% O2	9.8		
% CO	0		

Project Director:	S. MacKay	Field Laboratory:	S. MacKay / Gibson
Meter Box Operator:	B. Gibson	Chain of Custody:	MacKay
Probe Operator:	M. Wescott	Plant Coordinator:	G. Devane
Orsat Analyst:	S. MacKay	Agency Rep:	C. Culliver

Comments:

TRAVERSE DATA SHEET

Page 1 of 2 — Sampling time per point: 2.5

Plant: Okeelanta — Run #: CR-3

Location: Unit 10 — Date: 30 Jan 91

	Trav. No.	Delta P	Delta H	Meter Reading (569,488 B / 567,488)	DGM In	DGM Out	Hot Box	Impg Temp	Stack Temp	Vac
10.2	A 1	.83	2.57	571.6	83	83	240	68	140	2
	2	.78	2.42	573.5	83	87	256	68	141	2
10.0	3	.59	1.83	575.4	83	88	252	67	142	1
	4	.38	1.18	576.9	83	89	252	67	140	1
9.5	5	.24	0.74	577.5	84	89	249	68	143	1
	6	.11	.34	578.6	84	88	261	66	144	1
10.0	7	.28	.87	579.7	84	89	268	66	143	1
	8	.52	1.61	581.3	85	90	270	64	143	1
9.5	9	.70	2.17	583.2	85	91	243	64	144	2
	10	.83	2.57	585.2	86	93	268	63	144	2
10.4	11	.90	2.79	587.3	87	95	268	64	143	3
	12	.93	2.88	589.340	88	96	240	64	143	3

Relationship: 3.1

Box #: 4 Y: 1.001 Delta H@: 2.03

Start Time: 1220 End Time: _____

Pre Leak Ck: 0 CFM @ 15 "Hg

Mid Leak Ck: 0 CFM @ 5 "Hg (Vol: _____)

Post Leak CK: N/A CFM @ N/A "Hg

Pitot Leak CK: _____ @ _____ "H2O

Box Oper: Gibson Probe Oper: Wescott

289.594

TRAVERSE DATA SHEET

Page 2 of 2 — Sampling time per point: 2.5

Plant: Okeelanta — Run #: CR-3

Location: Unit 10 — Date: 30 Jan 91

	Trav. No.	Delta P	Delta H	Meter Reading	DGM In	DGM Out	Hot Box	Impg Temp	Stack Temp	Vac
				589.660						
9.5	B1	.72	2.23	591.6	88	92	245	64	143	2
	2	.75	2.32	593.5	89	94	258	63	141	2
10.0	3	.64	~~1.98~~ 1.78	595.4	89	95	266	63	141	2
	4	.43	1.33	597.0	89	96	241	63	142	1
9.5	5	.32	.99	598.2	89	95	260	65	142	1
	6	.21	.65	599.2	89	94	255	66	141	1
9.5	7	.14	.43	600.0	90	94	254	65	142	1
	8	.25	.77	601.1	90	94	242	62	142	1
9.75	9	.38	1.18	602.5	90	95	267	60	142	2
	10	.63	1.95	604.3	91	97	254	59	141	3
9.5	11	.86	2.67	606.3	91	98	248	58	143	4
	12	.97	3.01	608.51	91	100	257	60	143	5

Relationship: 3.1
Box #: 4 Y: 1.001 Delta H@: 2.03
Start Time: 1300 End Time: 1330
Pre Leak Ck: N/A CFM @ N/A "Hg
Mid Leak Ck: Ø CFM @ 15 "Hg (Vol: N/A)
Post Leak CK: Ø CFM @ 5 "Hg
Pitot Leak CK: Ø @ 7.5 "H2O
Box Oper: Gibson Probe Oper: Wescott

APPENDIX IX

EQUIPMENT CALIBRATION SHEETS

OKEELANTA CORPORATION
6 MILES SOUTH OF SOUTH BAY
POST OFFICE BOX 86
SOUTH BAY, FLORIDA 33493

TELEPHONE: (407) 996-9072 TELEX: 803444

Eastmount Engineering Inc.
Environmental Engineers

Febuary 06, 1991

S. Joseph Mercadante President

Subject: Okeelanta Sugar Corporation
Boiler Unit 10, 150,000 lbs/hr

In recent days while testing for compliance; you found some discrepancies between your test, and the steam production shown in the chart.

Following that day, we proceeded to a complete loop calibration of the steam flow and measurement, based on the attached spec. sheet.

Before re-calibration: Overall span was 142" H_2O

On a 0 to 100% chart showed:

D/P cell trans in H_2O:	0	68"	103"	120"	137"
Chart in %:	0	50	75	87.5	93
Eng. Units in ;bs/h:		75,000	108,500	126,750	145,000
After Correction:	0	68"	103"	120"	137"
		75,000	112,500	131,250	150,000

LBS/HR errors at chart's

75%= 4,000 lbs/hr
87.5= 4,500 lbs/hr
100 = 5,000 lbs/hr

Total Average= 4,500 lbs/hr

Error in % = 6.75

Ernesto Alfonso
Instrument Department Head

EA/jh

OFFICE CALCULATION SHEET

engineers & designers

PROJECT: OKEELANTA - C & W

ORIFICE PLATE NUMBER _____ COMPUTED BY J.J.M.

TRANSMITTER NUMBER _____ DATE Jan. 8/80

SERVICE BOILER N° 10 & 11

			Engl	Metr	
0.	Unit system? 0=English; 1=Metric; 2=SI		0.0		
1.	Service? 0=Liquid; 1=Gas, steam		1.0		
2.	Tap type? 1=Fl; 2=Rad; 3=VC; 4=Cor; 5=Pipe.		1.0		
3.	Computed? 4=ΔP; 5=W; 6=d.		4.0		
4.	oMeter differential - maximum	ΔP	in.WC		137 Dry
5.	oFlowrate	W	lb/h		150,000.0000
6.	oOrifice hole diameter	d	in.		8.1165
7.	Pipe inside diameter	D	in.		11.7500
8.	Fluid flowing density	ρ_f	lb/ft³		1/1.6040
9.	Fluid flowing viscosity	μ	cP		0.0260
10.	Fluid specific heat ratio (1)	k	–	–	1.3000
11.	Absolute upstream pressure (1)	P_1	psia		389.7(350)
12.	Fluid flowing temperature	T	°		650
13.	Thermal expansion coefficient x 10^6 (2)	α	$°C^{-1}$		
14.	Drain/Venthole diameter (3)	d_h	in.		
15.	Temperature correction coefficient	F_t			1.0130
16.	Drain/Vent hole correction coefficient	F_h			
17.	Reynold's number correction coefficient	F_r			
18.	β ratio within $0.15 \leq \beta \leq 0.75$ limits? 0=Y; 1=N				
19.	For compressible fluids: $\Delta P \leq 25\% P_1$? 0=Y; 1=N				
20.	Orifice flow coefficient	$K\beta^2 - S$			0.3270
21.	β ratio = d/D	β			0.6908
22.	Gas expansion factor (4)	Y_1			0.9980
23.	Pipe Reynold's number at 100% of W	R_D			$>3 \times 10^6$
24.					
25.	Upstream - Downstream / SCHEDULE		21.17 – 9.00 20.33 – 18.17		/ SCH. 3
26.	Straightening Vanes				Yes

Notes: (1). Not required for liquids: enter 0.

(2). If unknown: enter 0; program assumes 17 for 316 SS.

POST
METER BOX CALIBRATION SHEET

BOX #: 4 DATE: 2-11-91
PRES BAR: 30.02 VACUUM: 10IN HG

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	10.00	10.089	1.95	.143	30.16	13.39
2	10.00	10.353	1.95	.143	30.16	13.73
3	10.00	10.333	1.95	.143	30.16	13.73

RUN #	TEMP WET (`F)	TEMP DRY INLET	TEMP DRY OUT	TEMP DRY (AVG)	Y	DELTA H @
1	65.0	85.7	80.0	82.8	1.020	1.87
2	65.0	87.7	81.7	84.7	.9973	1.96
3	65.0	88.7	82.3	85.5	1.001	1.96
				AVERAGE	1.006	1.93

PRE CAL Y = 1.0010 % DIFFERENCE = .50 %

ALLOWABLE = 5.00 %

FORMULAS:

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

CALIBRATION BY: S. MacKAY

METER BOX CALIBRATION SHEET

BOX NUMBER: 4
PRESS BAR : 30.04

DATE: 10 SEPT 1990
DUE: 10 MAR 1991

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	5	5.037	.50	.0368	30.08	13.80
2	5	5.043	1.00	.0735	30.11	9.55
3	10	10.190	1.50	.1103	30.15	15.34
4	10	10.273	2.00	.1471	30.19	13.46
5	10	10.330	3.00	.2206	30.26	11.69
6	10	10.400	4.00	.2941	30.33	9.64

RUN #	TEMP WET (°F)	TEMP DRY INLET	TEMP DRY OUT	TEMP DRY (AVG)	Y	DELTA H @
1	69.3	82.3	77.3	79.8	1.011	2.09
2	69.7	83.7	78.3	81.0	1.010	2.00
3	70.0	86.7	80.3	83.5	1.003	1.93
4	70.0	89.3	82.7	86.0	.9979	1.97
5	69.3	91.7	83.3	87.5	.9940	2.21
6	69.0	94.7	85.3	90.0	.9900	1.99
				AVERAGE	1.001	2.03
				MAX % DEVIATION	1.10	
				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: From Computer Disk BC H 13-Feb-90

SCOTT LAWTON

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

CARL POE CO., INC. 99 REINERMAN ST. • HOUSTON, TEXAS 77007 • 713-861-3816

February 19, 1990

Eastmount Engineering
420 Main
Walpole, MA 02081

Dear Sirs:

This is to certify that your AL-19 American Wet Test Meter, serial no.P-468, has been calibrated with an American five foot bell prover, serial no. 2260. It is traceable to the Bureau of Standards, reference no. 106870, PI-TAPE.

Test Results are as follows:

FLOW RATE	% OF ERROR
60 CFH	+0.3%
30 CFH	0.0%
15 CFH	0.0%

Sincerely,

CARL POE CO., INC.

Carl W. Poe
CWP/mp

THERMOCOUPLE CALIBRATION SHEET

SET #: 8'-1 DATE: 10-25-85

REFERENCE MERCURY/GLASS

STANDARD ('F)	THERMOCOUPLE ('F)	ABSOLUTE OF % DEVIATION
74	72	.37
210	205	.75
400	409	1.05
	MAXIMUM DEVIATION	1.05
	ALLOWABLE	1.50

SET #: 8.5'-1 DATE: 11-15-85

STANDARD ('F)	THERMOCOUPLE ('F)	ABSOLUTE OF % DEVIATION
66	63	.57
170	170	0
211.5	215	.52
	MAXIMUM DEVIATION	.57
	ALLOWABLE	1.50

CALIBRATION BY: G. ZWILLING

NOZZLE CALIBRATION SHEET

PROJECT NAME: OKEE/ANTA PROJECT NUMBER: 90 102

POINT#	NOZZLE# 19/64-1	NOZZLE # 1/4-2	NOZZLE#____	NOZZLE #____
1	.305	.256	____	____
2	.305	.258	____	____
3	.305	.257	____	____
AVG.	.305	.257	____	____

SEAN MacKAY — CALIBRATED BY:

3 DEC 90 — DATE:

NOZZLE CALIBRATION SHEET

PROJECT NAME: OKEELANTA PROJECT NUMBER: 90-102

POINT#	NOZZLE# 5/16-3	NOZZLE # 5/16-14	NOZZLE# 1/4-3	NOZZLE # 1/4-1
1	.316	.313	.251	.250
2	.314	.312	.249	.251
3	.315	.311	.250	.251
AVG.	.315	.312	.250	.251

SEAN MacKAY — CALIBRATED BY:

3 DEC 90 — DATE:

DATE 04/24/91

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

FACILITY NAME: OKEELANTA APIS #

COMPANY CONDUCTING TEST: EASTMOUNT TEST DATE 1 29 91

SOURCE DESCRIPTION: BOILER 10

STACK TEST DATA SUMMATION

		RUN1	RUN2	RUN3
1.H2O	(VOL.MEAS.),ML	188	189.9	208.5
2.H2O	(MASS MEAS.),GM	0	0	0
3.M'N	PARTICULATE WEIGHT, GM	.1273	.1297	.1302
4.V'M	VOLUME METERED,CF	38.813	38.148	38.803
5.Y	DRY GAS MTR. CALIB.FCTR.	1.001	1.001	1.001
6.RDP	AVG SQR D.P-SAMPLING	.72	.71	.72
7.DH	AVG DELTA H,IN.H2O	1.72	1.69	1.73
8.T'M	AVG MTR. TEMP,DEG.F	86.7	82.7	89.9
9.T'S	AVG STACK TEMP,DEG.F	139.5	140.6	142.2
10.P'SG	STACK PRESS,''HG(GAUGE)	.2	.2	.2
11.P'B	BAROMETRIC PRESS,''HG	30.08	30.08	30.06
13.D'N	ACTUAL NOZZLE DIAM,IN	.25	.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	ACTUAL EMISS LB/MBTU	ALLOW EMISS LB/MBTU
1	37.87	18.94	43.69	5,020,845	97.80	37.21	0.189	0.200
2	37.49	19.25	43.15	4,930,964	98.60	37.60	0.191	0.200
3	37.61	20.57	43.96	4,924,664	99.05	37.58	0.191	0.200
MEAN	37.66	19.59	43.60	4,958,824	98.48	37.46	0.190	0.200

SUMMARY

GENERAL:
REVIEWED BY AS
ACTUAL A 'S = 44.2 SQ FT
LAMINAR FLOW ASSUMED (<10 DEG YAW) (OR <20 DER)
ACTUAL EMISS BASED ON HEAT INPUT = 196.966 MBTU/HR
ALL REQUIRED LEAK TESTS ACCEPTABLE
ASSUMED M 'D=30.0 (COMBUSTION GASES)

COMMENT.....

RUN 1 :
ACTUAL A 'N = .0003409 SQ FT
P 'S = 30.28 IN HG

COMMENT.....

RUN 2 :
ACTUAL A 'N = .0003409 SQ FT
P 'S = 30.28 IN HG

COMMENT.....

RUN 3 :
ACTUAL A 'N = .0003409 SQ FT
P 'S = 30.26 IN HG
OVERSATURATED CONDITIONS: SATURATION MOISTURE ASSUMED/GIVEN PG.1

COMMENT.....

OKEELANTA CORPORATION
6 MILES SOUTH OF SOUTH BAY
POST OFFICE BOX 86
SOUTH BAY, FLORIDA 33493

TELEPHONE: (407) 996-9072 TELEX: 803444

March 9, 1991

Palm Beach County Health Dept.
Division of Environmental Service
901 Evernia Street
P.O. Box 29
West Palm Beach, FL 33402

Attn: Mr. Randall Miller

Ref: Emission Test Reports

Dear Mr. Miller,

Please find attached the remaining of the emission test reports for boilers 10, 12, 14 and 15. The test reports for boilers 4, 5, 6 and 11 were previously mailed to you on February 27, 1991.

Please let me know if you need further information.

Sincerely,

P. A. Carreño
Director of Mill &
Refinery Operations

xc: Arthur Kirstein, III
Frank Fernandez
Roger King
Pedro Alvarez
David Knowls, Ft. Myers DER W/attachments

Boiler #10
Okeelanta 1-29-91

44.2

INPUT SHEET - REV:09/13/93 - PAGE 2 OF 2

ENTER THE FOLLOWING:

		RUN1	RUN2	RUN3
1. H2O	COLLECTED (ONLY VOL.MEASURED), ML:	.....	.....	.....
2. H2O	COLLECTED (WEIGHED PART ONLY), GM:	188.0	189.9	208.5
3. M'N	PARTICULATE WEIGHT, GM:	.1273	.1297	.1302
4. V'M	VOLUME METERED, CF:	38.813	38.803	38.803
5. Y	DRY GAS METER CAL FACTOR:	1.001	1.001	1.001
6. RDP	AVG SQR DELTA P (WHEN SAMPLING):	.72	.71	.72
7. DH	AVG DELTA H, IN H2O:	1.72	1.69	1.73
8. T'M	AVG METER TEMP, DEG F:	86.7	82.7	89.9
9. T'S	AVG STACK TEMP, DEG F:	139.5	140.6	142.2
10. P'S*	STACK PRESS, *IN ....(..HG..):	.20	.20	.20
11. P'B	BAROMETRIC PRESS, IN HG:	30.08	30.08	30.06
13. D'N	ACTUAL NOZZLE DIAMETER, IN.:	.250	.250	.250
14. T	ACTUAL SAMPLE TIME, MIN:	60	60	60
15. C'P	PITOT TUBE COEFFICIENT:	.84	.84	.84
OPTION ENTRIES:		190.5	205	195.4
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:	.....	.....	.....
29.	LAMBDA/CC(20) VAL(SAMPLE PTS/TOT PTS):	.....	.....	.....

196.966