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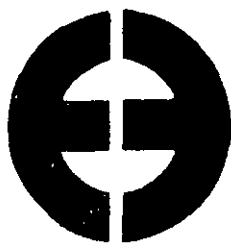
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AP-42 Section Number: 1.8

Reference Number: 53

Title: Okeelanta Corporation Compliance
Particulate Emissions Test Report
Boiler #14

January 1992



Eastmount Engineering

Environmental Consultants — Air Quality Specialists

Ref 41
OSW -026

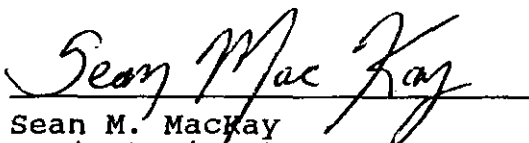
OKEELANTA CORPORATION
COMPLIANCE PARTICULATE EMISSIONS TEST REPORT
BOILER #14

PREPARED FOR: Okeelanta Corporation
Okeelanta Sugar Division
South Bay, Florida 33493

CONCERNING: Particulate Emissions Testing
Okeelanta Corporation
Boiler #14
South Bay Florida Facility
January 10 & 13, 1992

PREPARED BY: Sean M. MacKay
Project Director
Eastmount Engineering, Inc.
420 Main Street
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I hereby certify that the information presented in this report is accurate and true to the best of my knowledge.


Sean M. MacKay
Project Director

JANUARY 29, 1992
Date

RAISA

41
EPA-5

STACK TEST REVIEW DATA INPUT FORM

January
TEST DATE: 10, 13, 1992

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FACILITY: OKelaanta Sugar Division South Bay APIS #: 0005-14

DESCRIPTION: Boiler 14

TESTING FIRM: East mount Engineering, Inc.

PERMIT EMISSION LIMIT: 200 LB/MMBTU OR 58.25 LB/HR

AVERAGE HEAT INPUT: 291.26 MMBTU/HR

A's (AREA OF STACK): 44.2 FT²

293.2
+ 290.2
290.4

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MEASURED PARAMETERS

	Run-1	Run-2	Run-3
1. H ₂ O impingers (V'i), milliliters	<u>234</u>	<u>297</u>	<u>302</u>
2. H ₂ O filter, grams	<u>11.4</u>	<u>10.0</u>	<u>8.4</u>
3. M'n (particulate weight), grams	<u>.204</u>	<u>.1756</u>	<u>.1734</u>
4. V'm (gas volume metered), FT ³	<u>34.02</u>	<u>33.68</u>	<u>32.618</u>
5. Y (dry gas calibration factor)	<u>.9911</u>	<u>.9911</u>	<u>.9911</u>
6. RDP (average square root dP)	<u>.60</u>	<u>.60</u>	<u>.57</u>
7. dH (average delta H), inches H ₂ O	<u>.980</u>	<u>.98</u>	<u>.90</u>
8. T'm (average meter temperature), F	<u>90.3</u>	<u>91.9</u>	<u>87.2</u>
9. T's (average stack temperature), F	<u>151.5</u>	<u>146.3</u>	<u>149</u>
10. P's (stack pressure, abs.) inches Hg	<u>29.99</u>	<u>30.00</u>	<u>30.00</u>
11. P'b (barometric pressure, abs.) inches Hg	<u>29.97</u>	<u>30.00</u>	<u>30.0</u>
13. D'n (nozzle dia.), inches	<u>.260</u>	<u>.260</u>	<u>.260</u>
14. Sample Time, minutes	<u>60</u>	<u>60</u>	<u>60</u>
15. C'p (pitot tube coefficient)	<u>.84</u>	<u>.84</u>	<u>.84</u>
23. S/T (sample pts./total pts.)	<u>1</u>	<u>1</u>	<u>1.0</u>

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Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

1.0 COMPENDIUM

Eastmount Engineering conducted a Compliance Particulate Emissions Test Program on Unit #14 at Okeelanta Corporation's South Bay, Florida facility on January 10 and 13, 1992. The test program consisted of a series of three EPA Method 5 tests.

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, 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 #14 has a maximum rated capacity of 150,000 pounds of steam per hour. Results of the test program indicate Boiler #14 to be in compliance with the Florida DER emission standard. The following table summarizes the emission results, the emission standards, and the boiler operating conditions.

RUN #	DATE	EMISSION RATE		ALLOWABLE		LOAD	% OF 150 KPH
		LB/MMBtu	LB/HR	LB/MMBtu	LB/HR	LB/HR	
1	01-10-92	.179	52.59	.200	58.64	144,880	96.6%
2	01-10-92	.165	47.92	.200	58.04	143,104	95.4%
3	01-13-92	.157	45.65	.200	58.08	142,560	95.0%
3 RUN AVG.		.167	48.72	.200	58.25	143,515	95.7%

Sean MacKay, Project Director, was in charge of the emissions test program. S. Joseph Mercadante was responsible for all stack testing, conducted all calculations and maintained chain of custody of all samples. Patrick Wildman operated the meter box and assisted in the field laboratory. Mark Wescott located the probe at the proper traverse point locations and assisted where required. Mr. Kenneth Tucker of the Florida Department of Environmental Regulation observed the stack testing and boiler operations. Mr. Alberto Padrone was the boiler room superintendent and acted as liaison between Okeelanta Corporation and the Florida DER. Mr. George Devane was responsible for boiler operations and acquisition of all pertinent process data.

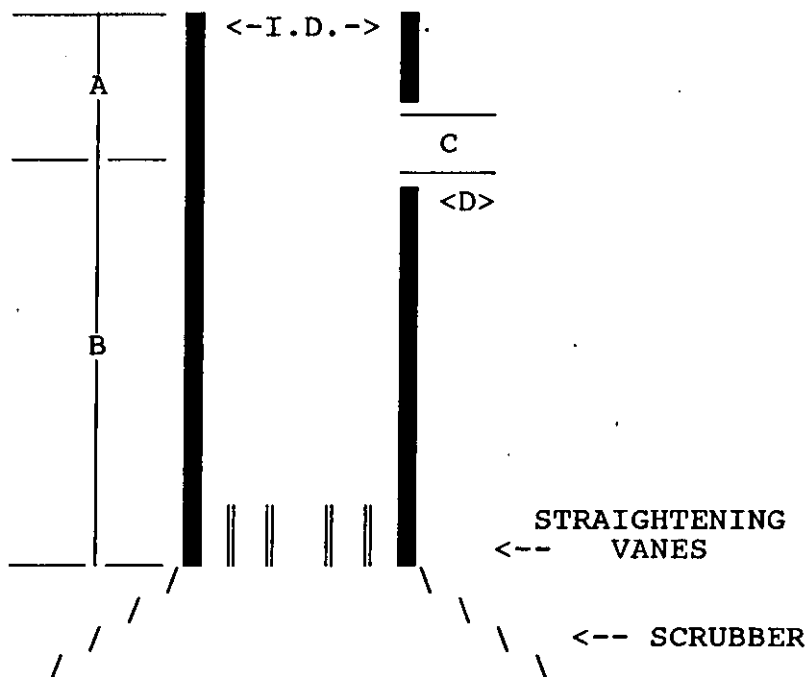
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Particulate Emissions Test Report

2.0 STACK SCHEMATIC

OKEELANTA CORPORATION
Boiler #14
South Bay, Florida Facility

The following is a schematic of the stack which services Boiler #14 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.



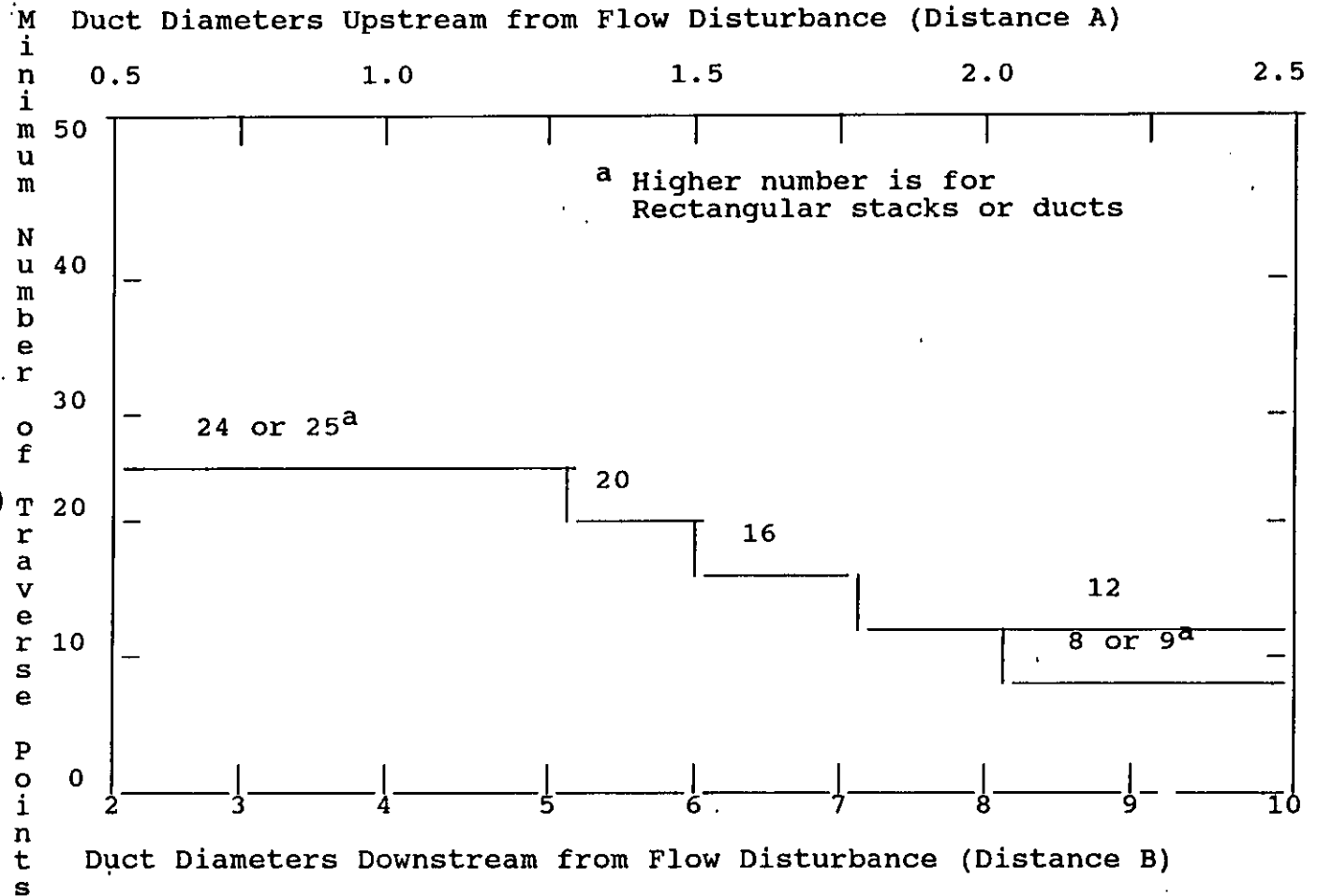
DISTANCE UPSTREAM FROM FLOW DISTURBANCE (A)	4'
DISTANCE DOWNSTREAM FROM FLOW DISTURBANCE (B)	16'
DIAMETER OF PORT SLEEVE (C)	4"
LENGTH OF PORT SLEEVE (D)	3.5"
NUMBER OF PORTS	2
INTERNAL DIAMETER OF STACK AT SAMPLING PORTS	7.5'

SCHEMATIC NOT TO SCALE

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

3.0 TRAVERSE POINT LOCATIONS AND SAMPLING TIME PER POINT

OKEELANTA CORPORATION
Boiler #14
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.

Okeelanta Corporation - Boiler #14
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3.0 TRAVERSE POINT LOCATIONS AND SAMPLING TIME PER POINT (cont)

OKEELANTA CORPORATION
Boiler #14
South Bay, Florida Facility

DIAMETER OF STACK: 7.5 FEET
PORT SLEEVE LENGTH: 3.5 INCHES

TRAVERSE POINT	DISTANCE % OF DIAMETER	DISTANCE (INCHES)	PROBE MARKING (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.

4.1 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 - A 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 $\pm$ 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 was 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, 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.

Okeelanta Corporation - Boiler #14
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4.0 SAMPLING TRAIN AND ANALYTICAL TEST PROCEDURES (cont.)

Gas Density Determination - An ORSAT type combustion analyzer, capable of measuring CO₂, O₂ 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.

4.2 SAMPLING AND ANALYTICAL PROCEDURES

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

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

Static Pressure - The static pressure was checked and recorded.

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

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

Barometric Pressure - Barometric pressure was obtained by 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.

Okeelanta Corporation - Boiler #14
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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 $68 \pm 10^\circ\text{F}$ at ambient pressure for at least twenty four (24) hours. At intervals of at least six (6) hours, the filters were re-weighed until a constant weight was achieved ± 0.5 mg change from the previous weighing. These pre-marked filters were then put into petri dishes and sealed. All filters used during testing were put into a carrying case for transport to the job site. A list of the filters and tare weights was available prior to testing.

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

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

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

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

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

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

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX I
COMPUTER INPUT SHEETS

RUN #: CT1
DATE : 01-10-92

INPUT DATA SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT2
DATE : 01-10-92

Ds (FT)	7.5							
Dn (IN)	.260							
FILTER#	4415	TRAV	DELT	SQ	DELTA	DRYGAS	DRYGAS	STACK
PIT COEFF	.84	PT	P	ROOT	H	IN	OUT	TEMP
		B1	.28	.53	.76	83	82	140
IMP-1 (INT)	100	2	.29	.54	.78	85	82	146
		3	.30	.55	.81	81	80	143
IMP-2 (INT)	100	4	.32	.57	.86	85	81	143
		5	.37	.61	1.00	88	80	141
IMP-3 (INT)	0	6	.38	.62	1.03	91	81	148
		7	.40	.63	1.08	95	82	148
IMP-4 (INT)	500.0	8	.43	.66	1.16	96	81	146
		9	.43	.66	1.16	99	82	147
IMP-1 (FIN)	291	10	.41	.64	1.11	103	82	147
		11	.40	.63	1.08	105	83	147
IMP-2 (FIN)	105	12	.40	.63	1.08	106	83	146
IMP-3 (FIN)	1	A1	.29	.54	.78	95	83	147
		2	.29	.54	.78	100	83	149
IMP-4 (FIN)	510.0	3	.32	.57	.86	103	84	147
		4	.34	.58	.92	105	84	147
% CO2	10.8	5	.37	.61	1.00	107	85	147
		6	.35	.59	.95	108	85	150
% O2	9.4	7	.38	.62	1.03	109	86	148
		8	.38	.62	1.03	111	86	149
% CO	0	9	.41	.64	1.11	112	87	145
		10	.38	.62	1.03	113	87	147
P BAR	30.00	11	.42	.65	1.13	113	87	147
		12	.38	.62	1.03	113	88	146
P STK	-.28							
NO. PTS	24							
TEST LNGTH	60							
END METER	300.875							
INT METER	267.195							
BEGIN TIME:	11:45							
END TIME:	14:05							
AVERAGE			.36	.60	.98	100.3	83.5	146.3

INPUT DATA SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT3
DATE : 01-13-92

Ds (FT)	7.5							
Dn (IN)	.260							
FILTER#	4416	TRAV	DELT	SQ	DELTA	DRYGAS	DRYGAS	STACK
PIT COEFF	.84	PT	P	ROOT	H	IN	OUT	TEMP
		B1	.20	.45	.54	76	76	149
IMP-1 (INT)	100	2	.21	.46	.57	78	77	151
		3	.27	.52	.73	80	77	149
IMP-2 (INT)	100	4	.28	.53	.76	83	77	151
		5	.29	.54	.78	85	77	150
IMP-3 (INT)	0	6	.30	.55	.81	90	77	150
		7	.37	.61	1.00	89	77	149
IMP-4 (INT)	500.0	8	.38	.62	1.03	93	78	150
		9	.37	.61	1.00	95	77	149
IMP-1 (FIN)	285	10	.37	.61	1.00	97	78	150
		11	.30	.55	.81	98	78	147
IMP-2 (FIN)	115	12	.31	.56	.84	97	78	148
IMP-3 (FIN)	2	A1	.30	.55	.81	88	78	149
		2	.29	.54	.78	94	80	147
IMP-4 (FIN)	508.4	3	.31	.56	.84	97	80	147
		4	.35	.59	.95	100	80	147
% CO2	10.5	5	.37	.61	1.00	102	80	149
		6	.39	.62	1.05	103	81	149
% O2	9.7	7	.42	.65	1.13	105	82	148
		8	.45	.67	1.22	106	82	150
% CO	0	9	.25	.50	.68	106	82	149
		10	.47	.69	1.27	106	83	150
P BAR	30.00	11	.33	.57	.89	108	84	149
		12	.41	.64	1.11	107	83	150
P STK	-.28							
NO. PTS	24							
TEST LNGTH	60							
END METER	333.730							
INT METER	301.112							
BEGIN TIME:	10:00							
END TIME:	11:15							
AVERAGE			.33	.57	.90	95.1	79.3	149.0

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX II

ISOKINETIC CALCULATION SHEETS

ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT1
DATE : 01-10-92

TS (°F) = 151.5	% CO2 = 11.9	VM (CF) = 34.020
TS (°R) = 611.5	% O2 = 8.2	DELTA H (ABS) = 30.04
TM (°F) = 90.3	% CO = 0	PS (ABS) = 29.95
TM (°R) = 550.3	% N2 = 79.9	SQRT DELTA P = .599165
VI (TOT) = 245.4	CP = .84	AREA NOZZLE = .000369

	Y = .9911	
VM STD = 17.64	(VM) (Y) (DELTA H ABS) ----- (TM)	= 32.47 DSCF
VW STD = .04707 (VI TOT)		= 11.55 CF
BWO =	VW STD ----- VW STD + VM STD	= .262
BWO =	MOISTURE FROM STEAM TABLES	= .262
VI TOT =	ADJUSTED TO SATURATION VOLUME=	245.2 ML
1-BWO = 1 - BWO		= .738
Md (DRY) =	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2) -----	= 30.24 LBS/LB MOLE
Ms (WET) =	MD (1-BWO) + 18 (BWO) -----	= 27.03 LBS/LB MOLE
G =	SQRT (TS / PS / MS)	= .87
VS =	85.49 (CP) (G) (SQRT DELTA P)	= 37.4 FPS
H =	0.002669 (VI TOT)	= .65
J =	(DELTA H ABS) (VM) (Y) / (TM)	= 1.84
K =	(H) + (J)	= 2.49
% ISO =	(TS) (K) (1.667) ----- (TIME) (VS) (PS) (AN)	= 102.6

ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT2
DATE : 01-10-92

TS (°F) = 146.3	% CO2 = 10.8	VM (CF) = 33.680	
TS (°R) = 606.3	% O2 = 9.4	DELTA H (ABS) = 30.07	
TM (°F) = 91.9	% CO = 0	PS (ABS) = 29.98	
TM (°R) = 551.9	% N2 = 79.8	SQRT DELTA P = .601450	
VI(TOT) = 207.0	CP = .84	AREA NOZZLE = .000369	
		Y = .9911	
VM STD = 17.64	(VM) (Y) (DELTA H ABS) ----- (TM)	= 32.09	DSCF
VW STD = .04707	(VI TOT)	= 9.74	CF
BWO =	VW STD ----- VW STD + VM STD	= .233	
BWO =	MOISTURE FROM STEAM TABLES	= .230	
VI TOT =	ADJUSTED TO SATURATION VOLUME	= 203.8	ML
1-BWO =	1 - BWO	= .770	
Md (DRY) =	.44 (% CO2) +.32 (% O2) +.28 (% CO) +.28 (% N2) -----	= 30.10	LBS/LB MOLE
Ms (WET) =	MD (1-BWO) + 18 (BWO) -----	= 27.32	LBS/LB MOLE
G =	SQRT (TS / PS / MS)	= .86	
VS =	85.49 (CP) (G) (SQRT DELTA P)	= 37.2	FPS
H =	0.002669 (VI TOT)	= .54	
J =	(DELTA H ABS) (VM) (Y) / (TM)	= 1.82	
K =	(H) + (J)	= 2.36	
% ISO =	(TS) (K) (1.667) ----- (TIME) (VS) (PS) (AN)	= 96.9	

ISOKINETIC CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT3
DATE: 01-13-92

TS (°F) = 149.0 Avg = 149 % CO2 = 10.5 VM (CF) = 32.618
 TS (°R) = 609.0 % O2 = 9.7 Avg = 9.1 DELTA H (ABS) = 30.07
 TM (°F) = 87.2 % CO = 0 PS (ABS) = 29.98
 TM (°R) = 547.2 % N2 = 79.8 SQRT DELTA P = .573870
 VI (TOT) = 210.4 CP = .84 AREA NOZZLE = .000369

Y = .9911

VM STD = 17.64 (VM) (Y) (DELTA H ABS) / (TM) = 31.33 DSCF
 VW STD = .04707 (VI TOT) = 9.90 CF
 BWO = $\frac{\text{VW STD}}{\text{VW STD} + \text{VM STD}}$ = .240
 BWO = MOISTURE FROM STEAM TABLES = .246
 VI TOT = ADJUSTED TO SATURATION VOLUME = N/A ML
 1-BWO = 1 - BWO = .760
 Md (DRY) = $\frac{.44 (\% \text{ CO}_2) + .32 (\% \text{ O}_2) + .28 (\% \text{ CO}) + .28 (\% \text{ N}_2)}{}$ = 30.07 LBS/LB MOLE
 Ms (WET) = $\frac{\text{MD} (1-\text{BWO}) + 18 (\text{BWO})}{}$ = 27.17 LBS/LB MOLE
 G = $\sqrt{\text{TS} / \text{PS} / \text{MS}}$ = .86
 VS = 85.49 (CP) (G) (SQRT DELTA P) = 35.6 FPS
 H = 0.002669 (VI TOT) = .56
 J = (DELTA H ABS) (VM) (Y) / (TM) = 1.78
 K = (H) + (J) = 2.34
 % ISO = $\frac{(\text{TS}) (K) (1.667)}{(\text{TIME}) (VS) (PS) (AN)}$ = 100.4

Okeelanta Corporation - Boiler #14
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APPENDIX III

ENTHALPY CALCULATION SHEETS

ENTHALPY CALCULATION SHEET

PLANT : OKEELANTA
LOCATION: UNIT 14

RUN #: CT1
DATE : 01-10-92

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	355	660	260
	360	660	
	345	660	
	350	660	
	350	660	
	350	660	
AVERAGE	351.7 PSIG	660.0	260.0
P ABS =	366.4 PSIA		
ENTHALPY @	700 'F AND	370 PSIA =	1363.6
ENTHALPY @	600 'F AND	370 PSIA =	1309.1
ENTHALPY @	660.0 'F AND	370 PSIA =	1341.8
ENTHALPY OF FEED WATER =		228.76	
AVERAGE ENTHALPY =		1113.0	BTU/LB OF STEAM

ENTHALPY CALCULATION SHEET

PLANT : OKEELANTA
LOCATION: UNIT 14

RUN #: CT2
DATE : 01-10-92

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	350	660	260
	350	660	
	350	660	
	360	660	
	360	670	
	355	670	
	350	670	
AVERAGE	353.6 PSIG	664.3	260.0
P ABS =	368.3 PSIA		
ENTHALPY @	700 'F AND	370 PSIA =	1363.6
ENTHALPY @	600 'F AND	370 PSIA =	1309.1
ENTHALPY @	664.3 'F AND	370 PSIA =	1344.1
ENTHALPY OF FEED WATER =		228.76	
AVERAGE ENTHALPY =		1115.4	BTU/LB OF STEAM

ENTHALPY CALCULATION SHEET

PLANT : OKEELANTA
LOCATION: UNIT 14

RUN #: CT3
DATE : 01-13-92

	STEAM PRESSURE	STEAM TEMPERATURE	FEED WATER TEMPERATURE
	345	670	260
	345	670	
	340	670	
	345	670	
	355	670	
	350	670	
AVERAGE	346.7 PSIG	670.0	260.0
P ABS =	361.4 PSIA		
ENTHALPY @	700 'F AND	360 PSIA =	1365.6
ENTHALPY @	600 'F AND	360 PSIA =	1310.6
ENTHALPY @	670.0 'F AND	360 PSIA =	1349.1
ENTHALPY OF FEED WATER =		228.76	
AVERAGE ENTHALPY =		1120.3	BTU/LB OF STEAM

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX IV

HEAT INPUT CALCULATION SHEETS

HEAT INPUT CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT1
DATE: 01-10-92

	<u>STEAM INTEGRATOR READINGS</u>	<u>TIME</u>	<u>INTEGRATOR FACTOR</u>
END	963976	11: 0	100
BEGIN	962165	9: 45	<u>LBS/HR STEAM</u>
NET	1811	X 100 / 75	MINS = 144880
144880	LBS/HR STEAM	/ 55% EFF. =	263418 EQUIV.
263418	LBS/HR STEAM	X 1113 BTU/LB =	293.2 BTU(e6)/HR

	<u>OIL INTEGRATOR READINGS</u>	<u>TIME</u>	<u>GALS/HR</u>
END	0	11: 0	
BEGIN	0	9: 45	
NET	0	GALLONS 75	MINS = 0 GPH
0 GPH	X 150,000 BTU/GAL (EST) =	0	BTU(e6)/HR

ALLOWABLE EMISSIONS

BAGASSE	293.2	-	0	X	.2	=	58.6	LBS/HR
OIL			0	X	.1	=	.0	LBS/HR
TOTAL						=	58.6	LBS/HR
							.200	LB/MMBTU

HEAT INPUT CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT2
DATE: 01-10-92

	STEAM INTEGRATOR READINGS	TIME	INTEGRATOR FACTOR
	-----	----	-----
END	965094 968131	11: 47 14:05	100
BEGIN	965070 966557	11: 45 13:00	LBS/HR STEAM
	-----	-----	-----
NET	24 1574 X 100 / 67	MINS =	143104

143104 LBS/HR STEAM / 55% EFF. = 260190 EQUIV.

260190 LBS/HR STEAM X 1115 BTU/LB = 290.2 BTU(e6)/HR

	OIL INTEGRATOR READINGS	TIME	GALS/HR
	-----	----	-----
END	0	11: 47 14:05	
BEGIN	0	11: 45 13:00	
	---	-----	
NET	0 GALLONS	67 MINS =	0 GPH

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

ALLOWABLE EMISSIONS

BAGASSE	290.2	-	0	X	.2	=	58.0	LBS/HR
OIL			0	X	.1	=	.0	LBS/HR
TOTAL						=	58.0	LBS/HR
							.200	LB/MMBTU

HEAT INPUT CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT3
DATE: 01-13-92

	<u>STEAM INTEGRATOR READINGS</u>	<u>TIME</u>	<u>INTEGRATOR FACTOR</u>
END	58112	11: 15	100
BEGIN	56330	10: 0	<u>LBS/HR STEAM</u>
NET	1782	X 100 / 75	MINS = 142560

142560 LBS/HR STEAM / 55% EFF. = 259200 EQUIV.

259200 LBS/HR STEAM X 1120 BTU/LB = 290.4 BTU(e6)/HR

	<u>OIL INTEGRATOR READINGS</u>	<u>TIME</u>	<u>GALS/HR</u>
END	0	11: 15	
BEGIN	0	10: 0	
NET	0	GALLONS 75	MINS = GPH

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

ALLOWABLE EMISSIONS

BAGASSE	290.4	-	0	X	.2	=	58.1	LBS/HR
OIL			0	X	.1	=	.0	LBS/HR
TOTAL						=	58.1	LBS/HR
							.200	LB/MMBTU

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX V

PARTICULATE EMISSION CALCULATION SHEETS

PARTICULATE EMISSION CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT1
DATE: 01-10-92

	SAMPLES		BLANKS	
	FILTER	BEAKER	FILTER	ACETONE
NO. :	4414	112	4419	8
FINAL:	.7447	64.6478	.6084	71.2369
TARE :	.5927	64.5950	.6086	71.2361
NET :	.1520	.0528	-.0002	.0008/200ML
			VOLUME OF RINSE	
WEIGHT =	204.80			130
RESIDUE =	-.52			
Mn =	204.28	Mg	AS =	44.2 SQ FT
Qs =	3600 (1-BWO) (VS) (AS) (17.64) (PS) / (TS)		=	3791173 DSCFH
CS =	(2.205 X 10 ⁻⁶) (Mn) / (VM STD)		=	1.387e-5 LBS/SCF
CS' =	0.0154 (Mn) / (VM STD)		=	.10 GRAINS / SCF
PMR =	(QS) (CS)		=	52.59 LBS/HR
LOAD=	MILLIONS OF BTU / HOUR INPUT		=	293.2 BTU e6 / HR
E =	LBS / MILLION BTu		=	.179 LBS/ BTu e6
ALLOWABLE			=	58.64 LBS/HR
			=	.200 LBS/ BTu e6

PARTICULATE EMISSION CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT2
DATE: 01-10-92

	SAMPLES FILTER	BEAKER	BLANKS FILTER	ACETONE
NO. :	4415	113	4419	8
FINAL:	.7540	65.4725	.6084	71.2369
TARE :	.5925	65.4574	.6086	71.2361
NET :	.1615	.0151	-.0002	.0008/200ML

WEIGHT =	176.60		VOLUME OF RINSE	230
RESIDUE =	.92			
Mn =	175.68	Mg	AS =	44.2 SQ FT
Qs =	3600 (1-BWO) (VS) (AS) (17.64) (PS) / (TS)		=	3968802 DSCFH
CS =	(2.205 X 10 ⁻⁶) (Mn) / (VM STD)		=	1.207e-5 LBS/SCF
CS' =	0.0154 (Mn) / (VM STD)		=	.08 GRAINS / SCF
PMR =	(QS) (CS)		=	47.92 LBS/HR
LOAD=	MILLIONS OF BTU / HOUR INPUT		=	290.2 BTU e6 / HR
E =	LBS / MILLION BTu		=	.165 LBS / BTu e6
ALLOWABLE			=	58.04 LBS/HR
			=	.200 LBS / BTu e6

PARTICULATE EMISSION CALCULATION SHEET

PLANT: OKEELANTA
LOCATION: UNIT 14

RUN #: CT3
DATE: 01-13-92

	SAMPLES		BLANKS	
	FILTER	BEAKER	FILTER	ACETONE
NO. :	4416	114	4419	8
FINAL:	.7552	65.0209	.6084	71.2369
TARE :	.5951	65.0066	.6086	71.2361
NET :	.1601	.0143	-.0002	.0008/200ML
			VOLUME OF RINSE	
WEIGHT =	174.40		230	
RESIDUE =	- .92			
Mn =	173.48	Mg	AS =	44.2 SQ FT
Qs =	3600(1-BWO) (VS) (AS) (17.64) (PS) / (TS)		=	3739156 DSCFH
CS =	(2.205 X 10 ⁻⁶) (Mn) / (VM STD)		=	1.221e-5 LBS/SCF
CS' =	0.0154 (Mn) / (VM STD)		=	.09 GRAINS/SCF
PMR =	(QS) (CS)		=	45.65 LBS/HR
LOAD=	MILLIONS OF BTU / HOUR INPUT		=	290.4 BTU e6 / HR
E =	LBS / MILLION BTu		=	.157 LBS/BTu e6
ALLOWABLE			=	58.08 LBS/HR
			=	.200 LBS/BTu e6

Aug = 3833,044

Aug = 291.3

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX VI
NOMENCLATURE SHEETS

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

NOMENCLATURE SHEET

PARTICULATE EMISSIONS 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.

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

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NOMENCLATURE (cont'd)

TM ($^{\circ}$ 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.

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX VII

FIELD DATA SHEETS - UNIT OPERATING CONDITIONS

CAPACITY 150,000
INT. FACTOR 100
RUN 1 14-1

BOILER 1 14

POLLUTION COMPLIANCE TESTING
DATE: 1-10-92
TESTED BY: Eastmont Eng.

TIME	OIL METER		STEAM		READING LBS/HR.	FEED WATER		BOILER PRESSURE DROP					
	NOVA	SOVA	NOVA	SOVA		TEMP.	TEMP.	OVERFIRE AIR PRESS.	AIR HEATER AIR OUT	UNDERGRATE AIR PRESS.	WIND BOX PRESSURE	FURNACE PRESSURE	BLR. OUTLET PRESSURE
9:45	*NO meter	meter	355	660	149,000	660	260	25	4.0	0	0	0	0
10:00			360	660	149,000	660	"	0	0	0	0	0	0
10:15			345	660	150,000	650	"	0.3	0.3	0.3	0.3	0.3	0.3
10:30			350	660	145,000	650	"	3.6	3.5	3.6	3.6	3.6	3.6
10:45			350	660	145,000	640	"	3.5	3.8	3.4	3.5	3.8	3.8
11:00			350	660	145,000	640	"						
BOILER TEMPERATURE													
								BOILER OUTLET	850	850	800	800	800
								AIR HEATER GAS OUT					
								AIR HEATER AIR OUT	680	680	680	680	680
								I.D. FAN	420	420	420	420	420
								S.H. STEAM TEMP.	660	660	660	660	660
PANEL SETTINGS													
								FURNACE PRESSURE					
								F.D. FAN PRESSURE					
								BAGASSE FEED	60				
								UNDERGRATE AIR					
								OVERFIRE AIR					

TEST RESULTS

OIL USED	NONE	GALS.
TOTAL TEST TIME	18 11	MIN.
INTERGRATOR TIME	144 880	P.P.H.
CHART READING	860,000	TOTAL
CHART AVERAGE	143,333	P.P.H.
I.D. FAN TURBINE	4400	RPM
STACK TEMPERATURE	151	°F
GRATE TEMPERATURE	600	°F
SCRUBBER WATER	500	G.P.H.

COMMENTS:

- "B" "B" "B"
 (1) Mill speed 85 F.P.H.
 (2) Using no oil burner
 (3) oil meter and burner damaged by fire, beyond use - no reading

Allowed =

Actual =

PLANT READINGS BY George Park
 % OF CAPACITY

CAPACITY 150,000
 INT. FACTOR 1.00
 RUN 14-2

SOLID 1 14

COLLECTION CONDUCTANCE REPORT
 DATE: 1-10-92
 TESTED BY: Eastwood E99

TIME	STEAM INTEGRATOR	OIL METER	STEAM PRESS.	TEMP.	READING TSP/HR.	FEED WATER PRESS.	TEMP.	OVERHEAT AIR PRESS.	STEAM PRESSURE DROP
11:45	965020	meter	350	660	145,000	640	260°	24	25
11:47	965094	meter	350	660	—	—	—	3.8	4.0
11:00	966559	meter	350	660	145,000	650	260°	0	0
1:15	966910		360	660	135,000	650	—	0	0
1:30	967269		360	620	140,000	660	—	0	0
1:45	967631		355	620	150,000	650	—	0	0
2:05	968131		350	670	150,000	650	—	0	0

TEST RESULTS Smoking

OIL USED	None	CALC.
TOTAL TEST TIME	67	MIN.
INTEGRATOR TIME	1	COUNT
INTEGRATOR STEAM	143104	2.2 H
CHART READING	865,000	TOTAL
CHART AVERAGE	144,166	P.P.H.
L.D. FAN TURBINE	4400	RPM
STACK TEMPERATURE	480	°F
GATE TEMPERATURE	480	°F
SCRUBBER WATER	550	G.P.H.

COMMENTS:

- (1) Mill speed 85 "B" 85 F.P.H.
- (2) Using no oil burner - no meter
- (3) stopped test 11:47 plugged chule
- (4) 12:40 B mill stop - reclear ok.
- (5) Restart test 1:00 PM.

PANEL SETTINGS

TURBINE PRESSURE	
F.D. FAN PRESSURE	
BAGASSE FEED	604
UNDERGRATE AIR	
OVERFIRE AIR	

Flowed =
 Actual =

PLANT READINGS BY George B. B.

1 OF CAPACITY

CAPACITY 150,000
INT. FACTOR 100
RUN 1 14-3

BOILER 1 14

POLLUTION CONTROL TESTING
DATE: 1-13-92
TESTED BY: EASTMONT ENG.

TIME	STEAM INTEGRATOR	OIL METER		STEAM		READING LBS/HR.	FEED WATER		BOILER PRESSURE DROP
		NO.	SOURCE	PRESS.	TEMP.		PRESS.	TEMP.	
AM									
10:00	056330	NO	OUT	345	670	145,000	640	260°	OVERFIRE AIR PRESS. 23" 23" 23" 23"
10:15	056690			345	670	145,000	630	"	AIR HEATER AIR OUT 3.9 4.0 4.0 3.9
10:30	057052			340	670	140,000	630	"	UNDERGRATE AIR PRESS. 0 0 0 0
10:45	057408			345	670	145,000	630	"	WIND BOX PRESSURE 0 0 0 0
11:00	057760			355	670	140,000	660	"	FURNACE PRESSURE 5.5 5.5 5.5 5.5
11:15	058112			350	670	140,000	660	"	BLR. OUTLET PRESSURE — — — —
									DUST COLLECTOR OUT. 3.4 3.6 3.5 3.6
									SCRUBBER DIFF. 9.0 9.0 8.5 9.0
					</				

TEST RESULTS

OIL USED	NONE	GALS.
TOTAL TEST TIME	178A	MINS.
INTERGRATOR TIME	75	COUNT
INTERGRATOR STEAM	142,560	P.P.H.
CHART READING	850,000	TOTAL
CHART AVERAGE	142,500	P.P.H.
I.D. FAN TURBINE	4400	RPM
STACK TEMPERATURE	149	°F
GRATE TEMPERATURE	580	°F
SCRUBBER WATER	54	G.P.H.

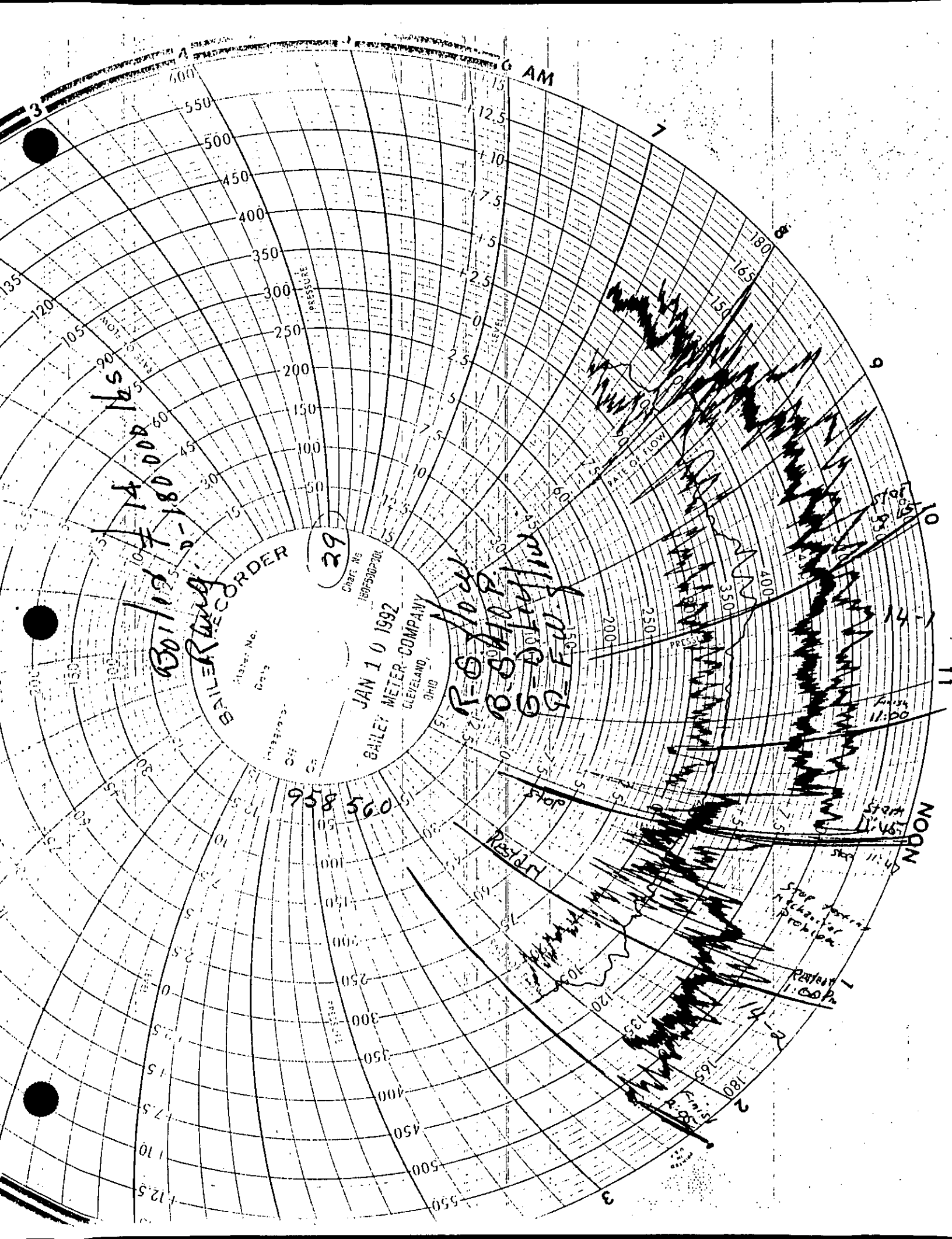
COMMENTS: "A" "B"

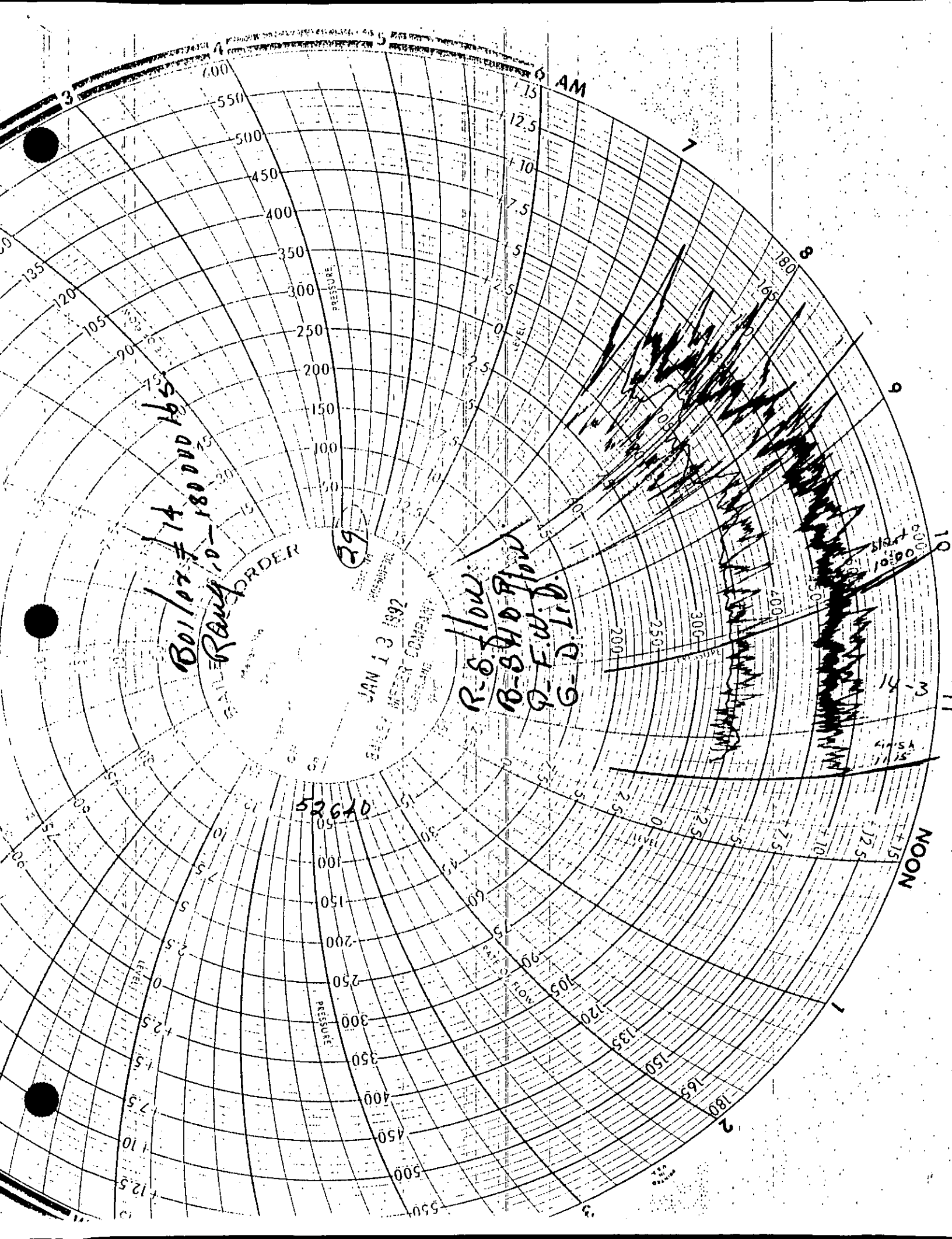
- (1) Mill speed 85 35 F.P.H.
- (2) using no oil burners.
- (3) oil burner not operational.

Allowed =

Actual =

PLANT READINGS BY *Long Doherty*
% OF CAPACITY





Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX VIII

FIELD DATA SHEETS - STACK TESTING

FIELD DATA SHEET
GENERAL INFORMATION

Plant: OKEECHUBA
Location: UNIT 14
Ds (ft): 7.5
Dn (in): .260
Filter #: 4414
Cp: 0.84
P bar: 29.97
P stack: -0.28

Run #: CT14-1
Date: JUN 10, 1992
No. Points: 24
Test Length: 60 min
End Meter Reading: 267.021
Int Meter Reading: 233.001
Begin Time: 09:45
End Time: 11:00

IMP-1 (INT) 100
IMP-2 (INT) 100
IMP-3 (INT) 0
IMP-4 (INT) 500.0

IMP-1 (FINAL) 314
IMP-2 (FINAL) 118
IMP-3 (FINAL) 2
IMP-4 (FINAL) 511.4

TEST 1
% CO2 11.9
% O2 8.2
% CO 0

TEST 2

TEST 3

Project Director: S. Mackay
Meter Box Operator: P. Williams
Probe Operator: M. Wascott
Orsat Analyst: S.J. Merchante

Field Laboratory: S.J. Merchante
Chain of Custody: S.J. Merchante
Plant Coordinator: G. Devane
Agency Rep: K. Tucker

Comments:

FIELD DATA SHEET

TRAVERSE POINT INFORMATION

PAGE 1 OF 2

SAMPLING TIME PER POINT 2 1/2

PLANT Okeelanta

RUN # C-1

LOCATION Unit #14

DATE 10 Jan 92

% O₂

TRAV. NO.	DELTA P	DELTA H	METER READING	DGM IN	DGM OUT	HOT BOX	IMPG TEMP	STACK TEMP	VAC
1	.27	.729	234.5	77	78	248	65	153	1
2	.31	.837	235.8	81	77	253	60	151	1
3	.33	.891	237.0	83	77	250	60	152	1
4	.36	.912	238.5	83	77	240	60	154	1
5	.41	1.11	240.0	89	78	256	58	153	1
6	.42	1.13	241.5	93	78	247	60	153	1
7	.41	1.11	243.0	97	79	255	60	152	1
8	.43	1.16	244.5	100	78	248	62	154	1
9	.45	1.22	246.0	103	80	263	63	152	1
10	.42	1.13	247.6	104	80	250	62	151	1
11	.43	1.16	249.1	105	80	252	63	152	1
12	.17	.46	250.179	105	80	252	63	152	0

COMMENTS:

DELTA P = 2.8 - DELTA H

BOX # 11 Y = 7911 DELTA H @ = 1.80

START TIME: 9:45

END TIME:

INITIAL LEAK CHECK .003 AT 15 INCHES HG

FINAL LEAK CHECK AT INCHES HG

FIELD DATA SHEET

TRAVERSE POINT INFORMATION

PAGE 2 OF 2
 PLANT Okelanta
 LOCATION Unit 14

SAMPLING TIME PER POINT 2 1/2
 RUN # C-1
 DATE 10 Jan 92

% O₂

TRAV. NO.	DELTA P	DELTA H	METER READING	DGM IN	DGM OUT	HOT BOX	IMPG TEMP	STACK TEMP	VAC
A1	.25	.68	251.3	96	82	244	57	147	0
2	.27	.73	252.5	98	83	253	51	152	0
3	.33	.89	253.2	103	81	260	54	147	0
4	.33	.89	255.1	104	83	256	57	149	0
5	.38	1.03	256.5	105	82	244	57	150	0
6	.40	1.08	257.9	107	82	244	57	151	0
7	.43	1.16	259.5	109	83	265	59	153	1
8	.44	1.19	260.0	110	83	251	59	154	1
9	.44	1.19	262.6	111	83	251	59	154	1
10	.40	1.08	264.1	111	84	252	59	153	1.5
11	.46	1.24	265.7	111	84	258	60	147	2
12	.22	.54	268.02	111	85	249	60	151	0

COMMENTS: DELTA P = 2.7 DELTA H = 1.80
 BOX # 11 Y = .9911
 START TIME : _____
 END TIME : _____
 INITIAL LEAK CHECK _____ AT _____ INCHES HG
 FINAL LEAK CHECK .002 AT 5 INCHES HG

FIELD DATA SHEET
GENERAL INFORMATION

Plant: <u>OKEE/ANTA</u>	Run #: <u>CT 14-2</u>
Location: <u>UNIT 14</u>	Date: <u>1-10-92</u>
Ds (ft): <u>7.5</u>	No. Points: <u>24</u>
Dn (in): <u>.260</u>	Test Length: <u>60</u>
Filter #: <u>4415</u>	End Meter Reading: <u>300.875</u>
Cp: <u>.84</u>	Int Meter Reading: <u>267.195</u>
P bar: <u>-.28 30.00</u>	Begin Time: <u>11:45</u>
P stack: <u>-.28</u>	End Time: <u>14:05</u>
IMP-1 (INT) <u>100 mL</u>	IMP-1 (FINAL) <u>291</u>
IMP-2 (INT) <u>100 mL</u>	IMP-2 (FINAL) <u>105</u>
IMP-3 (INT) <u>0 mL</u>	IMP-3 (FINAL) <u>1.0</u>
IMP-4 (INT) <u>500.0g</u>	IMP-4 (FINAL) <u>520.0</u>

	TEST 1	TEST 2	TEST 3
% CO2	<u>10.8</u>		<u>2</u>
% O2	<u>9.4</u>		
% CO	<u>0</u>		

Project Director: <u>S. MACKAY</u>	Field Laboratory: <u>S.J. MERRIMUTE</u>
Meter Box Operator: <u>P. WILSON</u>	Chain of Custody: <u>S.J. MERRIMUTE</u>
Probe Operator: <u>M. WESCOTT</u>	Plant Coordinator: <u>B. DEVANE</u>
Orsat Analyst: <u>S.J. MERRIMUTE</u>	Agency Rep: <u>K. TUCKER</u>

Comments: See check moisture against screen table

Need Blank For Units 14 + 15

FIELD DATA SHEET

TRAVERSE POINT INFORMATION

PAGE 1 OF 2

SAMPLING TIME PER POINT 2 1/2

PLANT Okeelanta

RUN # C-2

LOCATION Unit 14

DATE 10 Jan 92

TRAV. NO.	DELTA P	DELTA H	METER READING	DGM IN	DGM OUT	HOT BOX	IMPQ TEMP	STACK TEMP	VAC
B 1	.28	.756	268.4	83	82	261	65	140	0
2	.29	.783	269.5	85	82	256	60	146	0
3	.30	.810	270.8	81	80	263	65	143	0
4	.32	.864	272.1	85	81	261	64	143	0
5	.37	.999	273.5	88	80	259	63	141	0
6	.38	1.03	275.0	91	81	256	64	148	0
7	.40	1.08	276.4	95	82	273	65	148	1
8	.43	1.16	278.0	96	81	249	66	146	2
9	.43	1.16	279.5	99	82	269	67	147	2
10	.41	1.11	280.0	103	82	270	67	147	2
11	.40	1.08	282.5	105	83	263	66	147	2
12	.40	1.08	284.052	106	83	260	66	146	2

COMMENTS:

DELTA P * 2.7 - DELTA H
 BOX # 11 Y = .7911 DELTA H @ - 1.80
 START TIME : 11:45
 END TIME :
 INITIAL LEAK CHECK .008 AT 15 INCHES HG
 FINAL LEAK CHECK AT INCHES HG

EASTMOUNT ENGINEERING INC. • 420 MAIN STREET • NALPOLE, MA 02081 • (508) 668-9005

stop test 3:36 - plant
 Free Problem

FIELD DATA SHEET

TRAVERSE POINT INFORMATION

PAGE 2 OF 2

SAMPLING TIME PER POINT 2 1/2

PLANT OKelanta

RUN # C-2

LOCATION Unit 14

DATE 10 Jan 92

TRAV. NO.	DELTA P	DELTA H	METER READING	DGM IN	DGM OUT	HOT BOX	IMPG TEMP	STACK TEMP	VAC
A 1	.29	.78	285.2	95	83	270	62	147	.5
2	.29	.78	286.5	100	83	260	58	149	.5
3	.32	.86	287.7	103	84	254	58	147	1
4	.34	.92	289.1	105	84	260	60	147	2
5	.37	^{PW} 1.0	290.5	107	85	259	60	147	2
6	.35	.95	291.9	108	85	266	61	150	2
7	.38	1.03	293.4	109	86	262	65	148	3
8	.38	1.03	294.8	111	86	255	66	149	3.5
9	.41	1.11	296.3	112	87	254	67	145	4
10	.38	1.03	297.8	113	87	252	66	147	4
11	.42	1.13	299.3	113	87	252	65	147	4
18	.38	1.03	300.875	113	88	251	66	146	4

COMMENTS:

DELTA P * 2.7 = DELTA H

BOX # 11 Y = .9911 DELTA H B = 1.80

START TIME: 11:45

END TIME: 14:05

INITIAL LEAK CHECK .008 AT 15 INCHES HG

FINAL LEAK CHECK .002 AT 5 INCHES HG

FIELD DATA SHEET
GENERAL INFORMATION

Plant: OKEE/ANTA
Location: UNIT 14
Ds (ft): 7.5
Dn (in): .260
Filter #: 4416
Cp: .84
P bar: 30.00
P stack: -.28

IMP-1 (INT) 100
IMP-2 (INT) 100
IMP-3 (INT) 0
IMP-4 (INT) 500

TEST 1
% CO₂ 10.5
% O₂ 9.7
% CO 0

Project Director: S. MacKay
Meter Box Operator: P. Wilman
Probe Operator: M. Wescott
Orsat Analyst: S.J. Mercadante

Comments:

Run #: Comp-3
Date: 1-13-92
No. Points: 24
Test Length: 60 min
End Meter Reading: 333,730
Int Meter Reading: 301.112
Begin Time: 10:00
End Time: 11:15

IMP-1 (FINAL) 285
IMP-2 (FINAL) 115
IMP-3 (FINAL) 2
IMP-4 (FINAL) 500.4

TEST 2

TEST 3

Field Laboratory: Mercadante
Chain of Custody: Mercadante
Plant Coordinator: G. Devane
Agency Rep: K. Tucker

FIELD DATA SHEET

TRAVERSE POINT INFORMATION

PAGE 1 OF 2

SAMPLING TIME PER POINT 2 1/2

PLANT Okeetanta

RUN # C-3

LOCATION Unit #14

DATE 13 Jan 92

TRAV. NO.	DELTA P	DELTA H	METER READING	DGM IN	DGM OUT	HOT BOX	IMPG TEMP	STACK TEMP	VAC
<u>B1</u>	<u>.20</u>	<u>.54</u>	<u>302.4</u>	<u>76</u>	<u>76</u>	<u>253</u>	<u>67</u>	<u>149</u>	<u>0</u>
<u>2</u>	<u>.21</u>	<u>.57</u>	<u>303.5</u>	<u>78</u>	<u>77</u>	<u>253</u>	<u>66</u>	<u>151</u>	<u>0</u>
<u>3</u>	<u>.27</u>	<u>.73</u>	<u>304.7</u>	<u>80</u>	<u>77</u>	<u>261</u>	<u>64</u>	<u>149</u>	<u>0</u>
<u>4</u>	<u>.28</u>	<u>.76</u>	<u>305.9</u>	<u>83</u>	<u>77</u>	<u>259</u>	<u>64</u>	<u>151</u>	<u>0</u>
<u>5</u>	<u>.29</u>	<u>.78</u>	<u>307.1</u>	<u>85</u>	<u>77</u>	<u>261</u>	<u>64</u>	<u>150</u>	<u>0</u>
<u>6</u>	<u>.30</u>	<u>.81</u>	<u>308.3</u>	<u>90</u>	<u>77</u>	<u>264</u>	<u>65</u>	<u>150</u>	<u>0</u>
<u>7</u>	<u>.37</u>	<u>1.00</u>	<u>309.8</u>	<u>89</u>	<u>77</u>	<u>259</u>	<u>63</u>	<u>149</u>	<u>0</u>
<u>8</u>	<u>.38</u>	<u>1.03</u>	<u>311.2</u>	<u>93</u>	<u>78</u>	<u>257</u>	<u>64</u>	<u>150</u>	<u>0</u>
<u>9</u>	<u>.37</u>	<u>1.00</u>	<u>312.6</u>	<u>95</u>	<u>77</u>	<u>255</u>	<u>64</u>	<u>149</u>	<u>0</u>
<u>10</u>	<u>.37</u>	<u>1.00</u>	<u>314.0</u>	<u>97</u>	<u>78</u>	<u>255</u>	<u>64</u>	<u>150</u>	<u>0</u>
<u>11</u>	<u>.30</u>	<u>.81</u>	<u>315.3</u>	<u>98</u>	<u>78</u>	<u>257</u>	<u>65</u>	<u>147</u>	<u>0</u>
<u>12</u>	<u>.31</u>	<u>.84</u>	<u>316.561</u>	<u>97</u>	<u>78</u>	<u>254</u>	<u>65</u>	<u>148</u>	<u>0</u>

COMMENTS:

DELTA P * 2.7 = DELTA H
 BOX # 11 Y = .9911 DELTA H @ = 1.80
 START TIME : _____
 END TIME : _____
 INITIAL LEAK CHECK .004 AT 15 INCHES HG.
 FINAL LEAK CHECK _____ AT _____ INCHES HG.

FIELD DATA SHEET

TRAVERSE POINT INFORMATION

PAGE 2 OF 2

SAMPLING TIME PER POINT 2 1/2

PLANT Okeelanta

RUN # C-3

LOCATION Unit 14

DATE 13 Jan 92

TRAV. NO.	DELTA P	DELTA H	METER READING	DGM IN	DGM OUT	HOT BOX	IMPG TEMP	STACK TEMP	VAC
A 1	.30	.81	318.2	88	78	258	64	149	0
2	.29	.78	319.6	94	80	249	62	147	0
3	.31	.84	320.9	97	80	254	63	147	0
4	.35	.95	322.2	100	80	257	63	147	0
5	.37	1.00	323.6	102	80	256	63	149	1
6	.39	1.05	325.1	103	81	254	63	149	1.5
7	.42	1.13	326.6	105	82	257	64	148	2
8	.45	1.22	328.1	106	82	253	64	150	2
9	.25	.68	329.4	106	82	259	66	149	0
10	.47	1.27	330.8	106	83	268	67	150	3
11	.33	.89	332.3	108	84	248	67	149	2
12	.41	1.11	333.730	107	83	250	67	150	3

COMMENTS:

DELTA P x 2.7 = DELTA H
 BOX # 11 Y = .9911 DELTA H B = 1.80
 START TIME: 10:00
 END TIME: 11:15
 INITIAL LEAK CHECK .009 AT 15 INCHES HG
 FINAL LEAK CHECK .002 AT 5 INCHES HG

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX IX
LABORATORY RESULTS

**LABORATORY
SUMMARY OF RESULTS**

PROJECT NUMBER: 91-102
PROJECT NAME: OKEELANTA CORPORATION
BOILER #14

ANALYST: M. WAYT
ANALYSIS: EPA METHOD 5

FILTER

SAMPLE DESCRIPTION	FILTER #	TEST DATE	TARE WEIGHT (g)	FINAL WEIGHT (g)
C-1	4414	1-10-92	0.5927	0.7447
C-2	4415	1-10-92	0.5925	0.7540
C-3	4416	1-10-92	0.5951	0.7552
BLANK	4419	1-10-92	0.6086	0.6084

WASH

SAMPLE DESCRIPTION	BKR#	TEST DATE	TARE WEIGHT (g)	FINAL WEIGHT (g)	VOLUME (ml)
C-1	112	1-10-92	64.5950	64.6478	130
C-2	113	1-10-92	65.4574	65.4725	230
C-3	114	1-10-92	65.0066	65.0209	230
BLANK	8	1-10-92	71.2361	71.2369	200

Okeelanta Corporation - Boiler #14
Particulate Emissions Test Report

APPENDIX X

EQUIPMENT CALIBRATION SHEETS

POST
METER BOX CALIBRATION SHEET

BOX #: 11
PRES BAR: 29.98

DATE: 27 JAN 92
VACUUM: 16 IN Hg

RUN #	VOLUME WET	VOLUME DRY	DELTA H	DELTA H /13.6	PRES BAR (ABS)	TIME (MINS)
1	10.00	10.217	2.00	.147	30.13	12.54
2	10.00	10.320	2.00	.147	30.13	12.58
3	10.00	10.324	2.00	.147	30.13	12.59

RUN #	TEMP WET (°F)	TEMP DRY INLET	TEMP DRY OUT	TEMP DRY (AVG)	Y	DELTA H @
1	69.0	108.0	86.3	97.2	1.026	1.80
2	69.0	123.7	88.7	106.2	1.032	1.80
3	69.0	127.7	91.3	109.5	1.038	1.80
AVERAGE					1.032	1.80
MAX % DEV					.59	
ALLOWABLE % DEV					2.00	

PRE CAL Y = .9911 % DIFFERENCE = 3.95 %
ALLOWABLE = 5.00 %

FORMULAS:

Y=

DELTA H @=

$$\frac{(V w) (P b) (T d)}{(V d) (P b \text{ ABS}) (T w)} = \frac{0.0317 (\text{DELTA H})}{(P b) (T d)} * \left[\frac{(T w) (\text{TIME})^2}{(V w)} \right]$$

CALIBRATION BY:

Sean Mackay
SEAN MACKAY

METER BOX CALIBRATION SHEET

BOX NUMBER: 11
PRESS BAR : 30.19

DATE: 15 OCT 91
DUE: 15 APR 92

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

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

MAX % DEVIATION .97
ALLOWABLE % DEV 2.00

FORMULAS:

Y=

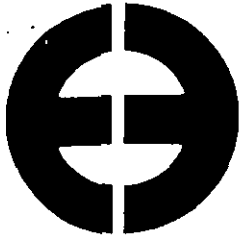
DELTA H @=

$$\frac{(V\ w) (P\ b) (T\ d)}{(V\ d) (P\ b\ ABS) (T\ w)}$$

$$\frac{0.0317 (DELTA\ H)}{(P\ b) (T\ d)} * \frac{(T\ w) (TIME)^2}{(V\ w)}$$

CALIBRATION BY:


JIM JARDIN



Sean

Eastmount Engineering

Environmental Consultants — Air Quality Specialists

WET TEST METER CALIBRATION

WET TEST METER:- Model AL-19, Serial No. P-468

BELL PROVER :- Chain Compensated Gasometer
Warren E. Collins Inc.
Serial NO. 2874
Factor 133.2 cc/mm

(Maintained by E.P.A. region 1)

CALIBRATED BY :- Anthony Stratton and Kieran Nolan

DATE CALD. :- March 28 1991

DATE DUE :- March 28 1992

RESULTS :-

-----	RUN #	C.F.M.	% DIFF.
	1	.55	+ .31
	2	.55	+ .20
	3	.55	+ .10
	-----	-----	-----
AVERAGE :-		.55	+ .20

NOZZLE CALIBRATION SHEET

PROJECT NAME: ORIELANTA Corp

PROJECT NUMBER: 91-102

POINT# NOZZLE # 1/4-5 NOZZLE # 1/4-13 NOZZLE # 5/16-14 NOZZLE # 5/16-3

1 .265 .260 .310 .315

2 .264 .258 .310 .314

3 .266 .261 .310 .313

AVG. .265 .260 .310 .314

SEAN MACKAY
CALIBRATED BY:

DEC 9, 1991
DATE:

TRANSCAT

"CAL-LAB"

Certificate of Calibration

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

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

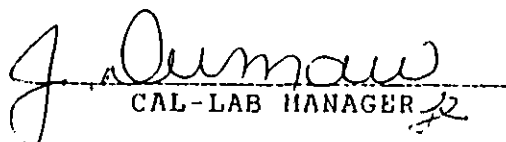
TEMPERATURE 68° F.

RELATIVE HUMIDITY OF 59%.

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

ITEM RECEIVED IN TOLERANCE

ASSETS	MANUFACTURER	MODEL	DESCRIPTION	CALIBRATED	DATE DUE
2485	DATA PRECISION	9200	DC CALIB.	01/03/91	01/03/92
2486	FLUKE	9842A	DNM	03/13/91	03/13/92
2471	KAYE	140-4	ICK FT. REZ.	03/14/91	03/13/92
2482	NBS	172144-K	STD THERMOCOUPLE	04/19/91	04/19/93


CAL-LAB MANAGER

THERMOCOUPLE CALIBRATION SHEET

SET #: METER BOX 11-IN

DATE: 08-11-86

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

SET #: METER BOX 11-OUT

DATE: 08-11-86

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

CALIBRATION BY:

G. ZWILLING

THERMOCOUPLE CALIBRATION SHEET

SET #: 7.75' - 9

DATE 3/6/91

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

CALIBRATION BY:

Kieran Nolan

KIERAN NOLAN

TEMPERATURE INDICATOR CALIBRATION FORM

INDICATOR S/N: 650 - 6

CAL DATE: 8 AUG 91

REFERENCE S/N:1061-8277

DUE DATE: 8 AUG 92

CHANNEL NO.	REFERENCE SET POINT							
	0	32	200	250	320	600	800	1000
1	0	33	199	249	320	600	800	1000
2	0	32	199	249	320	599	800	1000
3	0	32	199	249	320	599	800	1000
4	0	32	199	249	320	600	800	1001
5	0	32	199	250	320	600	800	1000
6	0	32	199	249	320	599	800	1000
7								
8								
9								
10								
% DIFF:	.06							

CALIBRATED BY _____ KIERAN NOLAN *KN*

TEMPERATURE INDICATOR CALIBRATION FORM

INDICATOR S/N: 650 - 7

CAL DATE: 13 SEP 91

REFERENCE S/N:1061-8277

DUE DATE: 13 SEP 92

CHANNEL NO.	REFERENCE SET POINT							
	0	32	200	250	320	600	800	1000
1	1	32	199	249	320	599	798	999
2	1	32	200	250	320	599	799	999
3	1	33	200	250	320	599	799	999
4	1	32	200	250	320	599	799	999
5	0	32	199	249	320	600	799	998
6	0	32	199	250	320	599	799	998
7								
8								
9								
10								
% DIFF:	.04							

CALIBRATED BY _____ KIERAN NOLAN *KN*

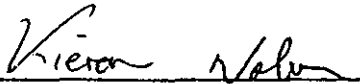
THERMOCOUPLE CALIBRATION SHEET

TC #: 4THIMP-210

DATE: 2/27/91

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

CALIBRATION BY:



KIERAN NOLAN

THERMOCOUPLE CALIBRATION SHEET

TC #: RAC - 2 - 170

DATE: 1/11/91

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

CALIBRATION BY:

Kieran Nolan

KIERAN NOLAN

THERMOCOUPLE CALIBRATION SHEET

SET #: 8.5' - 6

DATE: 07/07/89

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

CALIBRATION BY: S. MacKay