Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP-42 Section Number: 9.10.1.2

Reference Number: 8

Title: Particulate Emission Testing Performed For Monitor Bay Sugar Company, Bay City, Michigan, on the Pulp Dryer 3 Exhaust

Network Environmental, Inc.

Network Environmental, Inc.

October 1992

AP-42 Section 9.10.1.2
Reference 8
Report Sect.
Reference

Report of...

Particulate Emission Testing

performed for...

Monitor Sugar Company
Bay City, Michigan

on the

Pulp Dryer 3 Exhaust

October 12, 1992

022.06

Network Environmental, Inc.
Grand Rapids, MI

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INTRODUCTION

Network Environmental, Inc. was retained by the Monitor Sugar Company of Bay City, Michigan to perform an emission compliance study on the number three beet pulp dryer exhaust. The purpose of the testing was to document the particulate emissions from the dryer exhaust.

The testing was performed by Stephan K. Byrd, R. Scott Cargill, David D. Engelhardt, and Bertram J. Smith of Network Environmental, Inc. on October 12, 1992 by employing Michigan Department of Natural Resources (MDNR) Reference Method 5B. Mr. William Rogers, Jr. of the MDNR, Air Quality Division was present to observe the testing and source operation. Assisting in the study was Mr. Allan Sauer of the Monitor Sugar Company.

TABLE 1
PARTICULATE EMISSION SOURCE SUMMARY
#3 BEET PULP DRYER COMBINED EXHAUST
MONITOR SUGAR COMPANY
BAY CITY, MICHIGAN
OCTOBER 12, 1992

Stack Diameter, inches	Twin Stacks	66.00
Area of Stack, ft^2		2 x 23.76
Static Pressure in Stack, in. H_2O		-0.40
Stack Gas Temperature, °F		170
Dry Gas Composition:	% Oxygen	16.70
	% Carbon Dioxide	2.04
	% Carbon Monoxide	0.00
	% Nitrogen	81.26
Density, Wet @STP, lbs/ft^3		0.0652
Molecular Weight, Dry @STP, Lbs/mole		29.00
Average Gas Velocity, FPM		2,699
Stack Gas Flow Rate:	ACFM	128,249
	SCFM	103,612
	DSCFM	68,028
Lbs Particulate/1000 Lbs Gas		0.0511
Grains/ DSCF		0.0355
Lbs/Hr		20.68

SOURCE EMISSION TESTING

at

MONITOR SUGAR COMPANY

BAY CITY, MICHIGAN

PULP DRYER #3 NORTH

DATE: 10/12/92

Network Environmental, Inc.
P.O. Box 2021
Grand Rapids, MI 49501

Network Environmental, Inc.

EMISSION SOURCE SUMMARY

STANDARD ANALYSIS

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

STACK RADIUS, inches		33.0
AREA OF STACK, sq. ft.		23.76
STATIC PRESSURE IN STACK, in. H2O		0.51-
STACK GAS TEMPERATURE, deg. F		166
PERCENT MOISTURE AT TEST LOCATION		34.75
DRY GAS COMPOSITION:	% OXYGEN	16.20
	% CARBON DIOXIDE	2.60
	% CARBON MONOXIDE	0.00
	% NITROGEN	81.20
DENSITY, WET, @ STP, lbs./cu.ft.		0.0652
MOLECULAR WEIGHT, DRY, @ STP, lbs./mole		29.07
AVERAGE GAS VELOCITY, feet/min.		2802
STACK GAS FLOW RATE:	ACFM	66576
	SCFM	54138
	SCFM, DRY	35328

EMISSIONS:

LBS. PARTICULATE/1000 LBS. GAS, ACTUAL(1)	0.0502
LBS. PARTICULATE/1000 LBS. GAS, DRY(2)	0.0502
GRAINS/DSCF(4)	0.0351
LBS./HOUR	10.62

1. 'ACTUAL' MEANS AT THE CONDITIONS FOUND AT THE SAMPLING LOCATION.
2. 'DRY' INCLUDES ONLY THE NATURAL MOISTURE THAT WOULD BE EMITTED FROM THE PROCESS. MOISTURE ADDED OR SUBTRACTED BY THE COLLECTOR IS NOT INCLUDED.
3. 'WET' INCLUDES THE MOISTURE AS MEASURED AT THE SAMPLING LOCATION.
4. 'DSCF' IS UNDER TOTALLY DRY CONDITIONS, ALL MOISTURE REMOVED.

Network Environmental, Inc.

SUMMARY OF PARTICULATE EMISSIONS

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

SAMPLE NUMBER	1	2	3
STANDARD ANALYSIS			
E1. TOTAL WEIGHT COLLECTED, grams	0.096	0.095	0.103
E2. LBS. PARTICULATE/1000 LBS. GAS, ACTUAL(1)	0.051	0.050	0.049
E3. LBS. PARTICULATE/1000 LBS. GAS, DRY(2)	0.051	0.050	0.049
E6. GRAINS/DSCF(4)	0.037	0.034	0.034
E7. LBS./HOUR	10.64	10.21	11.00

1. 'ACTUAL' MEANS AT THE CONDITIONS FOUND AT THE SAMPLING LOCATION.
2. 'DRY' INCLUDES ONLY THE NATURAL MOISTURE THAT WOULD BE EMITTED FROM THE PROCESS. MOISTURE ADDED OR SUBTRACTED BY THE COLLECTOR IS NOT INCLUDED.
3. 'WET' INCLUDES THE MOISTURE AS MEASURED AT THE SAMPLING LOCATION.
4. 'DSCF' IS UNDER TOTALLY DRY CONDITIONS, ALL MOISTURE REMOVED.

Network Environmental, Inc.

SUMMARY OF EXHAUST GAS PARAMETERS

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

	SAMPLE NUMBER	1	2	3
G1.	STACK RADIUS, inches	33.0	33.0	33.0
G2.	AREA OF STACK, sq. ft.	23.76	23.76	23.76
G3.	BAROMETRIC PRESSURE, in. HG.	28.75	28.75	28.75
G4.	STATIC PRESSURE IN STACK, in. H2O	0.51-	0.51-	0.51-
G5.	STACK GAS TEMPERATURE, deg. F	168	165	164
G6.	AVG. SQRT VELOCITY PRESSURE OF POINTS SAMPLED	0.675	0.657	0.721
G7.	PERCENT MOISTURE AT TEST LOCATION	37.29	33.04	33.90
G8.	PERCENT MOISTURE BEFORE COLLECTOR	37.29	33.04	33.90
G9.	DRY GAS COMPOSITION: % OXYGEN	16.00	16.40	16.20
	% CARBON DIOXIDE	2.93	2.73	2.13
	% CARBON MONOXIDE	0.00	0.00	0.00
	% NITROGEN	81.07	80.87	81.67
G10.	PERCENT EXCESS AIR AT TEST LOCATION			
	DENSITY AND MOLECULAR WEIGHT OF STACK GAS:			
G11.	DRY, @ STP, lbs./cu.ft.	0.0753	0.0752	0.0749
G12.	WET, @ STP, lbs./cu.ft.	0.0645	0.0657	0.0653
G13.	WET, @ STACK CONDITIONS, lbs./cu.ft.	0.0522	0.0535	0.0533
G14.	MOLECULAR WEIGHT, DRY, @ STP, lbs./mole	29.12	29.10	29.00
G15.	AVERAGE GAS VELOCITY, feet/min.	2783	2678	2946
	STACK GAS FLOW RATE:			
G16.	STACK CONDITIONS, ACFM	66,117	63,616	69,994
G17.	STANDARD CONDITIONS, SCFM	53,512	51,804	57,097
G18.	STANDARD CONDITIONS, DRY SCFM	33,556	34,688	37,739

STANDARD TEMPERATURE AND PRESSURE (STP) = 29.92 inches HG, 70 deg. F

Network Environmental, Inc.

SUMMARY OF PARTICULATE TRAIN PARAMETERS

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

	SAMPLE NUMBER	1	2	3
P1.	NUMBER OF POINTS SAMPLED	12	12	12
P2.	DURATION OF SAMPLE, minutes	60.00	60.00	60.00
P3.	NOZZLE DIAMETER, inches	0.309	0.309	0.309
P4.	NOZZLE AREA, sq. ft.	0.00052	0.00052	0.00052
P5.	PITOT CALIBRATION FACTOR	0.860	0.860	0.860
P6.	METER CALIBRATION FACTOR	0.982	0.982	0.982
P7.	AVERAGE FILTER TEMPERATURE, deg. F	0	0	0
P8.	AVERAGE METER TEMPERATURE, deg. F	69.5	70.9	71.5
P9.	AVERAGE METER PRESSURE, inches of water	1.570	1.835	2.193
P10.	METER VOLUME, ACTUAL READING, cu.ft.	42.13	45.09	49.35
P11.	METER VOLUME, @ STP, cu.ft.	39.93	42.65	46.67
P12.	LIQUID VOLUME OF WATER CONDENSED, mls.	501.0	444.0	505.0
P13.	VAPOR VOLUME OF WATER CONDENSED, @ STP, cu.ft.	23.75	21.05	23.94
P14.	TOTAL GAS SAMPLED, @ STP, cu.ft.	63.68	63.70	70.60
P15.	WEIGHT OF GAS SAMPLED, DRY, lbs.	3.01	3.21	3.50
P16.	WEIGHT OF GAS SAMPLED, WET, lbs.	4.11	4.19	4.61
P17.	PERCENT ISOKINETICS	90.3	93.3	93.8

CONCENTRATION CONVERSION FACTORS:

P18.	50 % EXCESS AIR, AFTER COLLECTOR			
P19.	50 % EXCESS AIR, BEFORE COLLECTOR			
P20.	MOISTURE CONDITIONS BEFORE COLLECTOR	1.00	1.00	1.00

STANDARD TEMPERATURE AND PRESSURE (STP) = 29.92 inches HG, 70 deg. F

SOURCE EMISSION TESTING

at

MONITOR SUGAR COMPANY

BAY CITY, MICHIGAN

PULP DRYER #3 SOUTH

DATE: 10/12/92

Network Environmental, Inc.
P.O. Box 2021
Grand Rapids, MI 49501

Network Environmental, Inc.

EMISSION SOURCE SUMMARY

STANDARD ANALYSIS

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

STACK RADIUS, inches		33.0
AREA OF STACK, sq. ft.		23.76
STATIC PRESSURE IN STACK, in. H2O		0.28-
STACK GAS TEMPERATURE, deg. F		174
PERCENT MOISTURE AT TEST LOCATION		33.90
DRY GAS COMPOSITION:	% OXYGEN	17.24
	% CARBON DIOXIDE	1.42
	% CARBON MONOXIDE	0.00
	% NITROGEN	81.33
DENSITY, WET, @ STP, lbs./cu.ft.		0.0652
MOLECULAR WEIGHT, DRY, @ STP, lbs./mole		28.93
AVERAGE GAS VELOCITY, feet/min.		2596
STACK GAS FLOW RATE:	ACFM	61673
	SCFM	49474
	SCFM, DRY	32700

EMISSIONS:

LBS. PARTICULATE/1000 LBS. GAS, ACTUAL(1)	0.0520
LBS. PARTICULATE/1000 LBS. GAS, DRY(2)	0.0520
GRAINS/DSCF(4)	0.0359
LBS./HOUR	10.06

1. 'ACTUAL' MEANS AT THE CONDITIONS FOUND AT THE SAMPLING LOCATION.
2. 'DRY' INCLUDES ONLY THE NATURAL MOISTURE THAT WOULD BE EMITTED FROM THE PROCESS. MOISTURE ADDED OR SUBTRACTED BY THE COLLECTOR IS NOT INCLUDED.
3. 'WET' INCLUDES THE MOISTURE AS MEASURED AT THE SAMPLING LOCATION.
4. 'DSCF' IS UNDER TOTALLY DRY CONDITIONS, ALL MOISTURE REMOVED.

Network Environmental, Inc.

SUMMARY OF PARTICULATE EMISSIONS

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

SAMPLE NUMBER	1	2	3
STANDARD ANALYSIS			
E1. TOTAL WEIGHT COLLECTED, grams	0.102	0.117	0.111
E2. LBS. PARTICULATE/1000 LBS. GAS, ACTUAL(1)	0.053	0.052	0.051
E3. LBS. PARTICULATE/1000 LBS. GAS, DRY(2)	0.053	0.052	0.051
E6. GRAINS/DSCF(4)	0.036	0.036	0.035
E7. LBS./HOUR	9.99	10.46	9.72

1. 'ACTUAL' MEANS AT THE CONDITIONS FOUND AT THE SAMPLING LOCATION.
2. 'DRY' INCLUDES ONLY THE NATURAL MOISTURE THAT WOULD BE EMITTED FROM THE PROCESS. MOISTURE ADDED OR SUBTRACTED BY THE COLLECTOR IS NOT INCLUDED.
3. 'WET' INCLUDES THE MOISTURE AS MEASURED AT THE SAMPLING LOCATION.
4. 'DSCF' IS UNDER TOTALLY DRY CONDITIONS, ALL MOISTURE REMOVED.

Network Environmental, Inc.

SUMMARY OF EXHAUST GAS PARAMETERS

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

	SAMPLE NUMBER	1	2	3
G1.	STACK RADIUS, inches	33.0	33.0	33.0
G2.	AREA OF STACK, sq. ft.	23.76	23.76	23.76
G3.	BAROMETRIC PRESSURE, in. HG.	28.75	28.75	28.75
G4.	STATIC PRESSURE IN STACK, in. H2O	0.28-	0.28-	0.28-
G5.	STACK GAS TEMPERATURE, deg. F	176	174	174
G6.	AVG. SQRT VELOCITY PRESSURE OF POINTS SAMPLED	0.637	0.672	0.649
G7.	PERCENT MOISTURE AT TEST LOCATION	33.19	33.72	34.79
G8.	PERCENT MOISTURE BEFORE COLLECTOR	33.19	33.72	34.79
G9.	DRY GAS COMPOSITION: % OXYGEN	16.80	17.60	17.33
	% CARBON DIOXIDE	1.80	1.27	1.20
	% CARBON MONOXIDE	0.00	0.00	0.00
	% NITROGEN	81.40	81.13	81.47
G10.	PERCENT EXCESS AIR AT TEST LOCATION			
	DENSITY AND MOLECULAR WEIGHT OF STACK GAS:			
G11.	DRY, @ STP, lbs./cu.ft.	0.0749	0.0747	0.0747
G12.	WET, @ STP, lbs./cu.ft.	0.0655	0.0652	0.0649
G13.	WET, @ STACK CONDITIONS, lbs./cu.ft.	0.0524	0.0524	0.0521
G14.	MOLECULAR WEIGHT, DRY, @ STP, lbs./mole	28.97	28.92	28.89
G15.	AVERAGE GAS VELOCITY, feet/min.	2530	2670	2588
	STACK GAS FLOW RATE:			
G16.	STACK CONDITIONS, ACFM	60,105	63,439	61,475
G17.	STANDARD CONDITIONS, SCFM	48,120	50,943	49,359
G18.	STANDARD CONDITIONS, DRY SCFM	32,147	33,763	32,189

STANDARD TEMPERATURE AND PRESSURE (STP) = 29.92 inches HG, 70 deg. F

Network Environmental, Inc.

SUMMARY OF PARTICULATE TRAIN PARAMETERS

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

	SAMPLE NUMBER	1	2	3
P1.	NUMBER OF POINTS SAMPLED	12	12	12
P2.	DURATION OF SAMPLE, minutes	60.00	60.00	60.00
P3.	NOZZLE DIAMETER, inches	0.322	0.322	0.322
P4.	NOZZLE AREA, sq. ft.	0.00057	0.00057	0.00057
P5.	PITOT CALIBRATION FACTOR	0.830	0.830	0.830
P6.	METER CALIBRATION FACTOR	0.998	0.998	0.998
P7.	AVERAGE FILTER TEMPERATURE, deg. F	0	0	0
P8.	AVERAGE METER TEMPERATURE, deg. F	69.8	71.0	72.5
P9.	AVERAGE METER PRESSURE, inches of water	1.903	2.583	2.408
P10.	METER VOLUME, ACTUAL READING, cu.ft.	44.95	51.94	50.44
P11.	METER VOLUME, @ STP, cu.ft.	43.31	50.03	48.43
P12.	LIQUID VOLUME OF WATER CONDENSED, mls.	454.0	537.0	545.0
P13.	VAPOR VOLUME OF WATER CONDENSED, @ STP, cu.ft.	21.52	25.45	25.83
P14.	TOTAL GAS SAMPLED, @ STP, cu.ft.	64.83	75.48	74.26
P15.	WEIGHT OF GAS SAMPLED, DRY, lbs.	3.24	3.74	3.62
P16.	WEIGHT OF GAS SAMPLED, WET, lbs.	4.24	4.92	4.82
P17.	PERCENT ISOKINETICS	94.3	103.7	105.3
	CONCENTRATION CONVERSION FACTORS:			
P18.	50 % EXCESS AIR, AFTER COLLECTOR			
P19.	50 % EXCESS AIR, BEFORE COLLECTOR			
P20.	MOISTURE CONDITIONS BEFORE COLLECTOR	1.00	1.00	1.00

STANDARD TEMPERATURE AND PRESSURE (STP) = 29.92 inches HG, 70 deg. F

DISCUSSION OF RESULTS

The resulting combined exhaust particulate emission concentrations for the three samples were 0.052 Lbs/1000 Lbs for sample one, 0.051 Lbs/1000 Lbs for sample two, and 0.050 Lbs/1000 Lbs for sample three. The average exhaust particulate concentration was 0.051 Lbs/1000 Lbs.

The combined particulate mass emission rates were 20.63 Lbs/Hr for sample one, 20.67 Lbs/Hr for sample two, and 20.72 Lbs/Hr for sample three. The average mass emission rate was 20.68 Lbs/Hr.

SOURCE DESCRIPTION

The source tested was the number three beet pulp dryer. The rotary dryer is fired by natural gas and dries the pulp with direct contact. The pulp is fed into the dryer at the beginning of the rotary section. The pulp is passed through the rotary dryer where most of the moisture is removed. The particulate laden exhaust is then passed through a multiclone collector and then a scrubber for particulate removal before it is exhausted to the atmosphere through the twin exhaust stacks. Each exhaust stack is equipped with a scrubber.

Process operating information for the day of the sampling can be found in Appendix C.

SAMPLING AND ANALYTICAL PROTOCOL

The sampling locations were on the twin 66 inch I.D. exhaust stacks at a distance that meets the eight duct diameter downstream two duct diameter upstream requirement of U.S. EPA Reference Method 1.

Particulate

The particulate sampling and analysis were performed in accordance with MDNR Reference Method 5B, and the methods referenced therein. Three (3) samples, each sixty (60) minutes in duration, were collected simultaneously from the north and south exhausts. All the quality control and quality assurance requirements specified in the methods were incorporated in the sampling and analysis. No alterations were incorporated in the testing or analysis. Figure 1 shows a schematic of the particulate sampling train.

Exhaust Gas Parameters

The exhaust gas parameters (air flow rate, temperature, moisture, and density) were determined by employing U.S. EPA Reference Methods 1 through 4. All the quality control and quality assurance procedures specified in the methods were incorporated in the sampling and analysis. No alterations were incorporated in the sampling and analysis.

This report was prepared by:

David D. Engelhardt
Vice President

This report was reviewed by:

Stephan K. Byrd
President

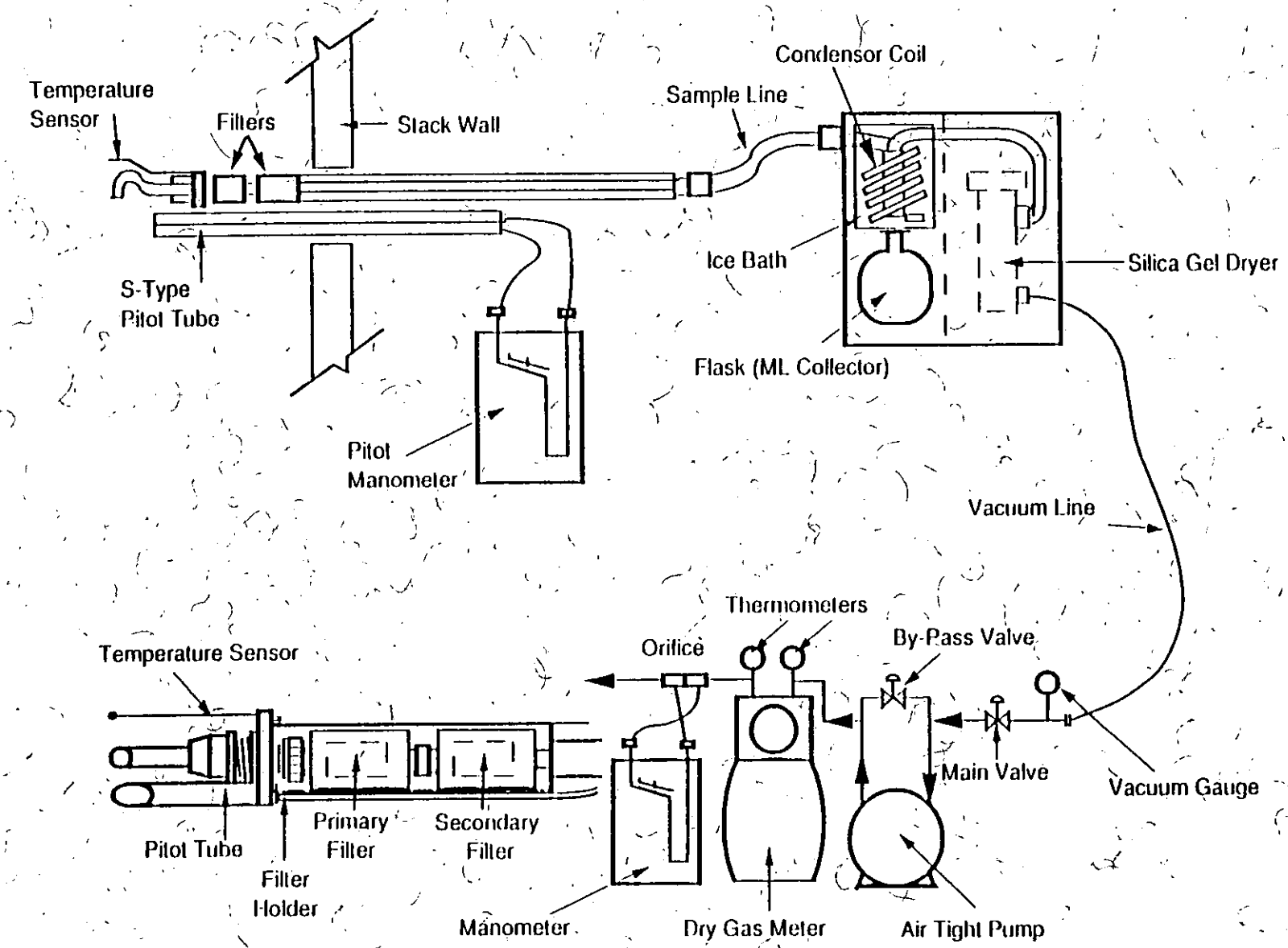


Figure 1

Particulate Sampling Train

APPENDIX A

FIELD DATA

Network Environmental, Inc.

PITOT TRAVERSE DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

RUN NUMBER:	1	% CARBON DIOXIDE:	
STACK RADIUS, in.:	33	% OXYGEN:	
GAS TEMPERATURE, Deg F:	205	% CARBON MONOXIDE:	
STATIC PRESSURE, in. H2O:	-.51	PITOT FACTOR:	.86
BAROMETRIC PRESSURE:	28.75		

PT. #	POINT LOCATION, INCHES	VELOCITY PRESSURE, INCHES OF WATER PORT 1	PORT 2
1	2.90	0.23	0.28
2	9.70	0.27	0.19
3	19.47	0.31	0.18
4	46.53	0.28	0.64
5	56.30	0.68	0.73
6	63.10	0.82	0.70

Network Environmental, Inc.

SAMPLING TRAIN DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

SAMPLE NUMBER:	1	IMPINGER BOX #:	1	GAS METER START:	8.84
TYPE OF TRAIN:	5B	FILTER SET #:	7	METER CAL. FACTOR:	.9815
NOZZLE DIA, in:	.3093	PRIM. FILTER #:	DH-378	CLOCK TIME START:	11:03
VENTURI NUMBER:		SEC. FILTER #:	BH-378	METER TIME START:	0
CONTROL BOX #:	3065	BAROMETRIC PRESS:	28.75	METER TIME STOP:	1
		PITOT CAL. FACTOR:	.86		

PORT	POINT	VELOCITY PRESSURE IN. H2O	RATE MTR PRESSURE IN. H2O	GAS METER READING CU. FT.	PUMP VAC. IN. HG	GAS METER TEMP., F IN	GAS METER TEMP., F OUT	STACK TEMP. F
2	1	0.39	1.27	12.010	4.00	68	67	171
	2	0.28	0.91	14.810	6.00	70	67	172
	3	0.18	0.59	17.130	5.50	70	66	169
	4	0.76	2.48	21.520	9.00	71	67	174
	5	0.81	2.64	26.160	8.00	72	67	172
	6	0.74	2.41	30.652	7.00	72	67	170
1	1	0.36	1.16	33.750	6.00	71	67	169
	2	0.23	0.74	36.320	5.50	72	67	165
	3	0.31	1.00	39.230	6.00	73	67	165
	4	0.32	1.03	42.200	6.00	74	68	164
	5	0.71	2.30	46.580	8.00	74	68	165
	6	0.71	2.30	50.972	7.00	75	69	165

Network Environmental, Inc.

SAMPLING TRAIN DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

SAMPLE NUMBER:	2	IMPINGER BOX #:	1	GAS METER START:	51.205
TYPE OF TRAIN:	5B	FILTER SET #:	5	METER CAL. FACTOR:	.9815
NOZZLE DIA, in:	.3093	PRIM. FILTER #:	DH-377	CLOCK TIME START:	12:34
VENTURI NUMBER:		SEC. FILTER #:	BH-377	METER TIME START:	0
CONTROL BOX #:	3065	BAROMETRIC PRESS:	28.75	METER TIME STOP:	1
		PITOT CAL. FACTOR:	.86		

PORT	POINT	VELOCITY PRESSURE IN. H2O	RATE MTR PRESSURE IN. H2O	GAS METER READING CU. FT.	PUMP VAC. IN. HG	GAS METER TEMP., F IN	OUT	STACK TEMP. F
2	1	0.34	1.35	54.580	4.00	68	68	164
	2	0.19	0.76	57.180	4.50	70	68	164
	3	0.18	0.72	59.680	5.00	71	68	165
	4	0.65	2.59	63.990	7.50	73	68	163
	5	0.81	3.23	69.100	7.00	73	68	163
	6	0.74	2.95	73.995	6.00	75	69	164
1	1	0.39	1.55	77.570	5.00	72	69	166
	2	0.24	0.96	80.500	3.50	73	68	165
	3	0.30	1.19	83.645	4.00	73	69	165
	4	0.30	1.19	86.850	4.00	75	69	165
	5	0.70	2.79	91.520	6.00	77	69	165
	6	0.69	2.75	96.292	6.00	78	70	166

Network Environmental, Inc.

SAMPLING TRAIN DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

SAMPLE NUMBER:	3	IMPINGER BOX #:	1	GAS METER START:	96.86
TYPE OF TRAIN:	5B	FILTER SET #:	1	METER CAL. FACTOR:	.9815
NOZZLE DIA, in:	.3093	PRIM. FILTER #:	DH-375	CLOCK TIME START:	13:58
VENTURI NUMBER:		SEC. FILTER #:	BH-375	METER TIME START:	0
CONTROL BOX #:	3065	BAROMETRIC PRESS:	28.75	METER TIME STOP:	1
		PITOT CAL. FACTOR:	.86		

PORT	POINT	VELOCITY PRESSURE IN. H2O	RATE MTR PRESSURE IN. H2O	GAS METER READING CU. FT.	PUMP VAC. IN. HG	GAS METER TEMP., F IN	GAS METER TEMP., F OUT	STACK TEMP. F
2	1	0.44	1.75	100.650	4.00	70	70	166
	2	0.28	1.11	103.720	4.50	72	70	165
	3	0.17	0.67	106.170	4.00	74	70	164
	4	0.80	3.19	111.130	9.00	75	70	165
	5	0.83	3.31	116.320	9.00	75	70	165
	6	0.78	3.11	121.352	8.00	76	70	163
1	1	0.42	1.67	125.080	5.50	72	70	164
	2	0.43	1.71	128.880	5.00	72	69	164
	3	0.29	1.15	132.080	4.00	73	69	164
	4	0.43	1.71	135.800	4.50	75	69	161
	5	0.86	3.43	140.940	6.00	74	69	161
	6	0.88	3.51	146.205	6.00	73	69	160

Network Environmental, Inc.

ORSAT ANALYSIS DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

DATE OF ANALYSIS: 10/12/92 METHOD: MULTIPOINT INTEGRATED SAMPLE

PART SMPL #	CONT #	RUN #	CARBON DIOXIDE			OXYGEN			CARBON MONOXIDE		
			FINAL	INIT.	%	FINAL	INIT.	%	FINAL	INIT.	%
1	1	1	3.0	0.0	3.0	19.0	3.0	16.0	19.0	19.0	0.0
		2	2.8	0.0	2.8	18.8	2.8	16.0	18.8	18.8	0.0
		3	3.0	0.0	3.0	19.0	3.0	16.0	19.0	19.0	0.0
2	2	1	2.8	0.0	2.8	19.2	2.8	16.4	19.2	19.2	0.0
		2	2.6	0.0	2.6	19.0	2.6	16.4	19.0	19.0	0.0
		3	2.8	0.0	2.8	19.2	2.8	16.4	19.2	19.2	0.0
3	3	1	2.0	0.0	2.0	18.2	2.0	16.2	18.2	18.2	0.0
		2	2.4	0.0	2.4	18.6	2.4	16.2	18.6	18.6	0.0
		3	2.0	0.0	2.0	18.2	2.0	16.2	18.2	18.2	0.0

Network Environmental, Inc.

LABORATORY ANALYSIS REPORT

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 NORTH

SAMPLING STAFF: BYRD/CARGILL

DATE SUBMITTED TO LAB: 10/14/92 RECEIVED BY: BJS

DATE REPORTED FROM LAB: 10/14/92 CHEMIST(S): BJS

PARTICULATE TRAIN SAMPLE NUMBER 1

LAB IDENT. NO.	SAMPLE IDENT. MARK	-----PARTICULATE WEIGHT GAIN, MGS.----- STD. ANAL.	ALT 1	ALT 2	CAPTURED WATER S. GEL GRAMS	CONDSR MLS.
1	DH-378	73.00			10.0	491.0
	BH-378	4.30				
	NW-1	18.50				
TOTALS		95.80	0.00	0.00	10.0	491.0

PARTICULATE TRAIN SAMPLE NUMBER 2

LAB IDENT. NO.	SAMPLE IDENT. MARK	-----PARTICULATE WEIGHT GAIN, MGS.----- STD. ANAL.	ALT 1	ALT 2	CAPTURED WATER S. GEL GRAMS	CONDSR MLS.
2	DH-377	72.00			14.0	430.0
	BH-377	9.50				
	NW-2	13.50				
TOTALS		95.00	0.00	0.00	14.0	430.0

PARTICULATE TRAIN SAMPLE NUMBER 3

LAB IDENT. NO.	SAMPLE IDENT. MARK	-----PARTICULATE WEIGHT GAIN, MGS.----- STD. ANAL.	ALT 1	ALT 2	CAPTURED WATER S. GEL GRAMS	CONDSR MLS.
3	DH-375	82.60			13.0	492.0
	BH-375	6.80				
	NW-3	13.50				
TOTALS		102.90	0.00	0.00	13.0	492.0

Network Environmental, Inc.

PITOT TRAVERSE DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

RUN NUMBER:	1	% CARBON DIOXIDE:	
STACK RADIUS, in.:	33	% OXYGEN:	
GAS TEMPERATURE, Deg F:	185	% CARBON MONOXIDE:	
STATIC PRESSURE, in. H2O:	-.28	PITOT FACTOR:	.83
BAROMETRIC PRESSURE:	28.75		

PT. #	POINT LOCATION, INCHES	VELOCITY PRESSURE, INCHES OF WATER PORT 1	PORT 2
1	2.90	0.34	0.47
2	9.70	0.50	0.52
3	19.47	0.43	0.12
4	46.53	0.22	0.54
5	56.30	0.48	0.58
6	63.10	0.70	0.60

Network Environmental, Inc.

SAMPLING TRAIN DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

SAMPLE NUMBER:	1	IMPINGER BOX #:	2	GAS METER START:	152.288
TYPE OF TRAIN:	5B	FILTER SET #:	19	METER CAL. FACTOR:	.9976
NOZZLE DIA, in:	.322	PRIM. FILTER #:	DH-386	CLOCK TIME START:	11:03
VENTURI NUMBER:		SEC. FILTER #:	BH-386	METER TIME START:	0
CONTROL BOX #:	3072	BAROMETRIC PRESS:	28.75	METER TIME STOP:	1
		PITOT CAL. FACTOR:	.83		

PORT	POINT	VELOCITY PRESSURE IN. H2O	RATE MTR PRESSURE IN. H2O	GAS METER READING CU. FT.	PUMP VAC. IN. HG	GAS METER TEMP., F IN	OUT	STACK TEMP. F
2	1	0.48	2.18	156.280	2.50	68	68	179
	2	0.50	2.27	160.380	3.50	69	67	177
	3	0.12	0.55	162.640	2.00	71	67	177
	4	0.35	1.60	166.010	4.00	71	67	177
	5	0.47	2.15	169.960	4.00	72	67	176
	6	0.50	2.28	174.155	5.00	72	68	178
1	1	0.43	1.96	177.940	3.50	71	68	177
	2	0.55	2.51	182.310	4.50	72	68	178
	3	0.38	1.75	185.990	3.50	73	68	174
	4	0.30	1.39	189.280	3.00	74	69	171
	5	0.41	1.89	193.070	3.50	74	69	173
	6	0.50	2.31	197.235	4.50	74	69	171

Network Environmental, Inc.

SAMPLING TRAIN DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

SAMPLE NUMBER:	2	IMPINGER BOX #:	2	GAS METER START:	197.656
TYPE OF TRAIN:	5B	FILTER SET #:	17	METER CAL. FACTOR:	.9976
NOZZLE DIA, in:	.322	PRIM. FILTER #:	DH-383	CLOCK TIME START:	12:34
VENTURI NUMBER:		SEC. FILTER #:	BH-383	METER TIME START:	0
CONTROL BOX #:	3072	BAROMETRIC PRESS:	28.75	METER TIME STOP:	1
		PITOT CAL. FACTOR:	.83		

PORT	POINT	VELOCITY PRESSURE IN. H2O	RATE MTR PRESSURE IN. H2O	GAS METER READING CU. FT.	PUMP VAC. IN. HG	GAS METER TEMP., F IN	OUT	STACK TEMP. F
1	1	0.38	2.10	201.590	2.50	70	70	173
	2	0.55	3.02	206.320	4.00	70	69	177
	3	0.41	2.25	210.540	3.50	72	69	178
	4	0.27	1.49	213.970	3.00	73	69	176
	5	0.69	3.85	219.100	4.50	73	69	168
	6	0.51	2.85	223.850	4.00	74	69	168
2	1	0.56	3.08	228.580	4.00	72	69	177
	2	0.52	2.86	233.220	6.00	72	69	176
	3	0.13	0.72	235.700	4.50	72	69	174
	4	0.40	2.21	239.650	8.00	73	70	174
	5	0.63	3.50	244.730	8.50	74	70	172
	6	0.55	3.07	249.598	8.00	77	70	172

Network Environmental, Inc.

SAMPLING TRAIN DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

SAMPLE NUMBER:	3	IMPINGER BOX #:	2	GAS METER START:	249.968
TYPE OF TRAIN:	5B	FILTER SET #:	15	METER CAL. FACTOR:	.9976
NOZZLE DIA, in:	.322	PRIM. FILTER #:	DH-382	CLOCK TIME START:	13:58
VENTURI NUMBER:		SEC. FILTER #:	BH-382	METER TIME START:	0
CONTROL BOX #:	3072	BAROMETRIC PRESS:	28.75	METER TIME STOP:	1
		PITOT CAL. FACTOR:	.83		

PORT	POINT	VELOCITY PRESSURE IN. H2O	RATE MTR PRESSURE IN. H2O	GAS METER READING CU. FT.	PUMP VAC. IN. HG	GAS METER TEMP., F IN	GAS METER TEMP., F OUT	STACK TEMP. F
2	1	0.51	2.79	254.530	3.00	72	72	181
	2	0.56	3.08	259.330	4.00	72	72	178
	3	0.12	0.66	261.730	2.00	74	71	178
	4	0.41	2.27	265.780	4.50	75	71	176
	5	0.50	2.78	270.360	5.00	76	71	173
	6	0.49	2.72	274.935	4.50	76	71	174
1	1	0.41	2.28	279.080	4.50	73	71	173
	2	0.55	3.05	283.790	6.00	73	71	174
	3	0.42	2.33	288.040	6.00	74	71	175
	4	0.24	1.34	291.340	4.50	74	71	169
	5	0.49	2.75	295.780	6.00	74	71	167
	6	0.51	2.85	300.412	6.50	73	70	168

Network Environmental, Inc.

ORSAT ANALYSIS DATA

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

DATE OF ANALYSIS: 10/12/92 METHOD: MULTIPOINT INTEGRATED SAMPLE

PART SMPL #	CONT #	RUN #	CARBON DIOXIDE			OXYGEN			CARBON MONOXIDE		
			FINAL	INIT.	%	FINAL	INIT.	%	FINAL	INIT.	%
1	1	1	1.8	0.0	1.8	18.6	1.8	16.8	18.6	18.6	0.0
		2	1.8	0.0	1.8	18.6	1.8	16.8	18.6	18.6	0.0
		3	1.8	0.0	1.8	18.6	1.8	16.8	18.6	18.6	0.0
2	2	1	1.4	0.0	1.4	19.0	1.4	17.6	19.0	19.0	0.0
		2	1.2	0.0	1.2	18.8	1.2	17.6	18.8	18.8	0.0
		3	1.2	0.0	1.2	18.8	1.2	17.6	18.8	18.8	0.0
3	3	1	1.2	0.0	1.2	18.6	1.2	17.4	18.6	18.6	0.0
		2	1.2	0.0	1.2	18.6	1.2	17.4	18.6	18.6	0.0
		3	1.2	0.0	1.2	18.4	1.2	17.2	18.4	18.4	0.0

Network Environmental, Inc.

LABORATORY ANALYSIS REPORT

COMPANY NAME: MONITOR SUGAR COMPANY TEST DATE: 10/12/92

COMPANY LOCATION: BAY CITY, MICHIGAN

SOURCE NAME: PULP DRYER #3 SOUTH

SAMPLING STAFF: ENGELHARDT/SMITH

DATE SUBMITTED TO LAB: 10/14/92 RECEIVED BY: BJS

DATE REPORTED FROM LAB: 10/15/92 CHEMIST(S): BJS

PARTICULATE TRAIN SAMPLE NUMBER 1

LAB IDENT. NO.	SAMPLE IDENT. MARK	-----PARTICULATE WEIGHT GAIN, MGS.----- STD. ANAL.	ALT 1	ALT 2	CAPTURED WATER S. GEL GRAMS	CONDSR MLS.
1	DH-386	79.60			10.0	444.0
	BH-386	7.40				
	NW-1	14.80				
TOTALS		101.80	0.00	0.00	10.0	444.0

PARTICULATE TRAIN SAMPLE NUMBER 2

LAB IDENT. NO.	SAMPLE IDENT. MARK	-----PARTICULATE WEIGHT GAIN, MGS.----- STD. ANAL.	ALT 1	ALT 2	CAPTURED WATER S. GEL GRAMS	CONDSR MLS.
2	DH-383	86.90			11.0	526.0
	BH-383	12.00				
	NW-2	18.40				
TOTALS		117.30	0.00	0.00	11.0	526.0

PARTICULATE TRAIN SAMPLE NUMBER 3

LAB IDENT. NO.	SAMPLE IDENT. MARK	-----PARTICULATE WEIGHT GAIN, MGS.----- STD. ANAL.	ALT 1	ALT 2	CAPTURED WATER S. GEL GRAMS	CONDSR MLS.
3	DH-382	89.10			11.0	534.0
	BH-382	9.40				
	NW-3	12.20				
TOTALS		110.70	0.00	0.00	11.0	534.0

APPENDIX B

CALCULATIONS

Network Environmental, Inc.

CALCULATION FORMULAS

MOISTURE TRAIN CALCULATIONS:

M1. BAROMETRIC PRESSURE, inches of Mercury

M2. DURATION OF SAMPLE, minutes

M3. METER CALIBRATION FACTOR

M4. AVERAGE METER TEMPERATURE, degrees F

M5. AVERAGE METER PRESSURE, inches of water

M6. METER VOLUME, ACTUAL, cubic feet

M7. METER VOLUME, STP, cubic feet

$$M7 = M3 * M6 * \frac{530}{M4 + 460} * \frac{M1 + .07355 * M5}{29.92}$$

M8. LIQUID VOLUME OF WATER CONDENSED, milliliters

M9. VAPOR VOLUME OF WATER CONDENSED, @ STP, cubic feet

$$M9 = M8 \bullet 0.0474$$

M10. TOTAL GAS SAMPLED, @ STP, cubic feet

$$M10 = M7 + M9$$

M11. PERCENT MOISTURE

$$M11 = \frac{M9}{M10} * 100$$

EXHAUST GAS CALCULATIONS:

G1. STACK DIMENSIONS, inches

G2. AREA OF STACK, square feet

$$G2\ (ROUND) = \frac{3.14159 * (DIA/2)^2}{144}$$

$$G2\ (RECT.) = \frac{WIDTH * LENGTH}{144}$$

G3. BAROMETRIC PRESSURE, inches of Mercury

G4. STATIC PRESSURE IN STACK, inches of water

G5. STACK GAS TEMPERATURE, degrees F

G6. AVG. SQRT VELOCITY PRESSURE OF POINTS SAMPLED

G7. PERCENT MOISTURE AT TEST LOCATION

$$G7 = \frac{P13}{P14} * 100$$

Network Environmental, Inc.

CALCULATION FORMULAS CONTINUED

G8. PERCENT MOISTURE BEFORE COLLECTOR

G9. DRY GAS COMPOSITION, %O2, %CO2, %CO, %N2

G10. PERCENT EXCESS AIR AT TEST LOCATION

$$G10 = 100 * \frac{\%O2 - 0.5 * \%CO}{.264 * \%N2 - \%O2 + .5 * \%CO}$$

G11. DENSITY, DRY, @STP, lbs./cu. ft.

$$G11 = \frac{.0827 * \%O2 + .1137 * \%CO2 + (\%CO + \%N2) * .0724}{100}$$

G12. DENSITY, WET, @STP, lbs./cu. ft.

$$G12 = G11 * \frac{100 - G7}{100} + .0465 * \frac{G7}{100}$$

G13. DENSITY, WET, @ STACK CONDITIONS, lbs./cu. ft.

$$G13 = G12 * \frac{530}{G5 + 460} * \frac{G3 + .07355 * G4}{29.92}$$

G14. MOLECULAR WEIGHT, DRY, lbs./mole

$$G14 = G11 * 386.9$$

G15. AVERAGE GAS VELOCITY, feet/minute

$$G15 = P5 * G6 * \frac{1096}{SQRT(G13)}$$

G16. STACK GAS FLOW RATE, ACFM

$$G16 = G2 * G15$$

G17. STACK GAS FLOW RATE, SCFM

$$G17 = G16 * \frac{530}{G5 + 460} * \frac{G3 + .07355 * G4}{29.92}$$

G18. STACK GAS FLOW RATE, DRY, DSCFM

$$G18 = G17 * \frac{100 - G7}{100}$$

Network Environmental, Inc.

CALCULATION FORMULAS CONTINUED

PARTICULATE TRAIN CALCULATIONS:

P1. NUMBER OF POINTS SAMPLED

P2. DURATION OF SAMPLE, minutes

P3. NOZZLE DIAMETER, inches

P4. NOZZLE AREA, square feet

$$P4 = \frac{3.14159 \bullet (P3/2)^2}{144}$$

P5. PITOT CALIBRATION FACTOR

P6. METER CALIBRATION FACTOR

P7. AVERAGE FILTER TEMPERATURE, degrees F

P8. AVERAGE METER TEMPERATURE, degrees F

P9. AVERAGE METER PRESSURE, inches of water

P10. METER VOLUME, ACTUAL, cubic feet

P11. METER VOLUME, @ STP, cubic feet

$$P11 = P10 * P6 * \frac{530}{P8 + 460} * \frac{G3 + .07355 \bullet P9}{29.92}$$

P12. LIQUID VOLUME OF WATER CONDENSED, milliliters

P13. VAPOR VOLUME OF WATER CONDENSED, @ STP, cubic feet

$$P13 = P12 * 0.0474$$

P14. TOTAL GAS SAMPLED, @ STP, cubic feet

$$P14 = P11 + P13$$

P15. WEIGHT OF GAS SAMPLED, DRY, pounds

$$P15 = P11 * G11$$

P16. WEIGHT OF GAS SAMPLED, WET, pounds

$$P16 = P14 \bullet G12$$

P17. PERCENT ISOKINETICS

$$P17 = \frac{100 \bullet 29.92 \bullet (G5 + 460) * P14}{530 \bullet (G3 + .07355 * G4) * P2 * P4 \bullet G15}$$

Network Environmental, Inc.

CALCULATION FORMULAS CONTINUED

CONCENTRATION CONVERSION FACTORS:

P18. 50 % EXCESS AIR, AFER COLLECTOR

$$P18 = \frac{G14 + 18 * G7/(100 - G7)}{.1826 * \%N2 - 2.0592 * \%O2 + G14 + 18 * G7/(100 - G7)}$$

P19. 50 % EXCESS AIR, BEFORE COLLECTOR

$$P19 = \frac{G14 + 18 * G7/(100 - G7)}{.1826 * \%N2 - 2.0592 * \%O2 + G14 + 18 * G8/(100 - G8)}$$

P20. MOISTURE BEFORE COLLECTOR

$$P20 = \frac{G14 + 18 * G7/(100 - G7)}{G14 + 18 * G8/(100 - G8)}$$

PARTICULATE EMISSION CALCULATIONS:

E1. TOTAL WEIGHT PARTICULATE COLLECTED, grams

E2. LBS. PARTICULATE/1000 LBS. GAS, ACTUAL

$$E2 = E1 * \frac{1000}{454 * P16}$$

E3. LBS. PARTICULATE/1000 LBS. GAS, DRY

$$E3 = E2 * P20$$

E4. LBS. PARTICULATE/1000 LBS. GAS, WET, 50% EA

$$E4 = E2 * P18$$

E5. LBS. PARTICULATE/1000 LBS. GAS, DRY, 50% EA

$$E5 = E2 * P19$$

E6. GRAINS/DRY STANDARD CUBIC FOOT

$$E6 = \frac{E1 \bullet 7000 \bullet 100}{454 * P14 * (100 - G7)}$$

E7. POUNDS/HOUR

$$E7 = \frac{G17 \bullet G12 \bullet 1000 \bullet E1 * .06}{454 \bullet P16}$$

E8. POUNDS/MILLION BTU

$$E8 = \frac{E7}{\text{CAPACITY, MM BTU/HR}}$$

APPENDIX C

PROCESS OPERATION DATA

3 TACKS TEST #1 11:05A.M-12:10P.M.
TEST #2 12:35-P.M-1:40P.M.
TEST #3 2:00PM - 3:30

MONITOR SUGAR COMPANY

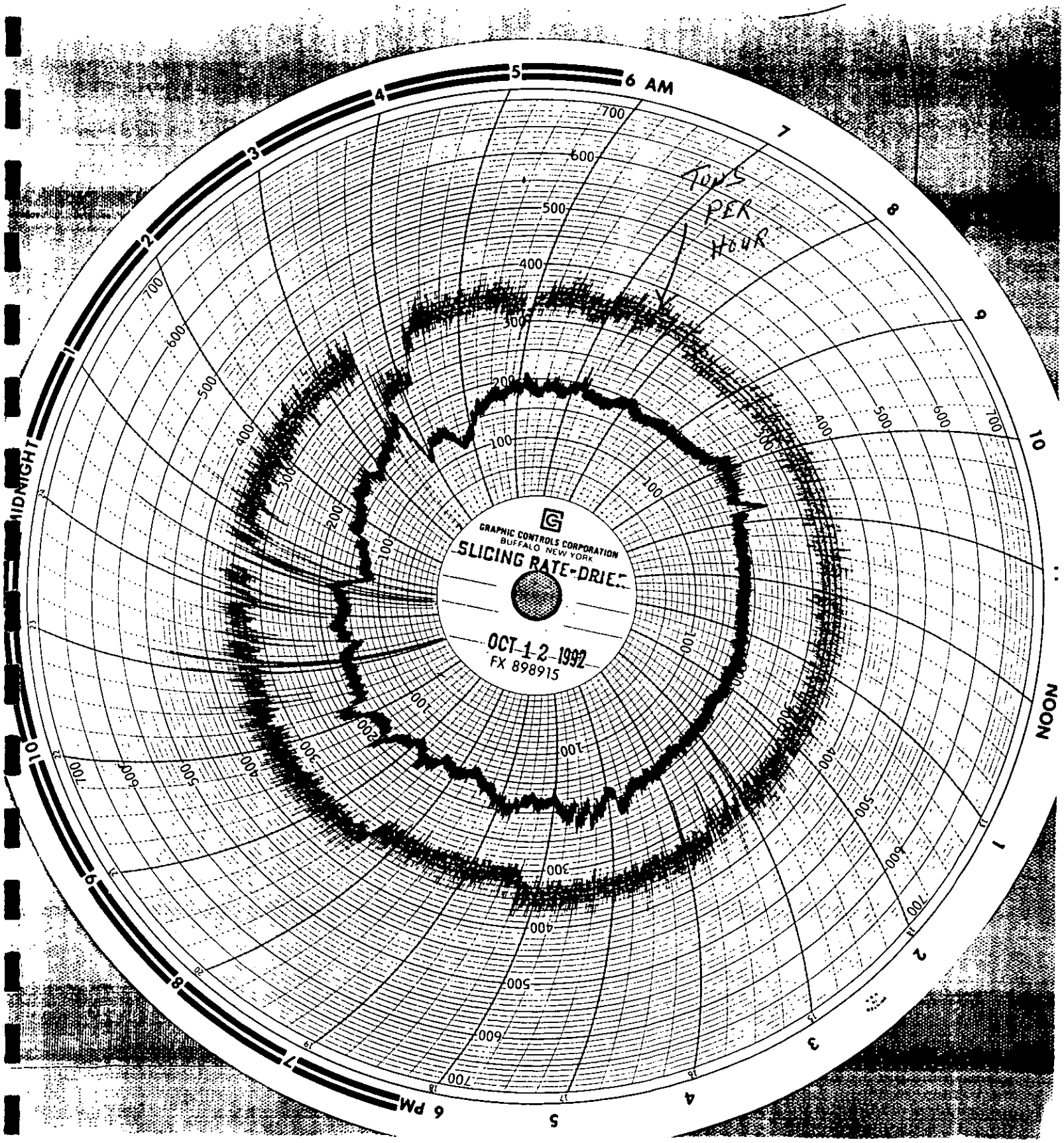
Operating Log
Pulp Driers Station

2913290

Day Ending: 10-12-92
Campaing Day: 19

Time	Inlet Temp. #1	Inlet Temp. #2	Inlet Temp. #3	Outlet Temp. #1	Outlet Temp. #2	Outlet Temp. #3	Moist. Plain #1	Moist. Plain #2	Moist. Plain #3	Moist. Pellets	Collectors Press. Drop #1	Collectors Press. Drop #2	Collectors Press. Drop #3	Collectors Press. Drop #4	Belt Scale Wet Pulp Ton/Hr.	Feed Conv. R.P.M. #1	Feed Conv. R.P.M. #2	Feed Conv. R.P.M. #3	Loading Scrolls % #1	Loading Scrolls % #2	Loading Scrolls % #3
7	780	950	820	168	145	125	10.1	10.1	10.1	9.9	4	4	4	4	68	235	220	100	60	41	50
8	[illegible]	970	820	168	145	125	10.6	12.6	12.4	10.2	4	4	4	4	70	235	220	100	58	41	52
9	740	940	810	168	145	125	15.0	12.6	11.0	10.1	4	4	4	4	67	210	195	100	58	40	52
10	820	940	830	168	145	125	14.1	13.5	14.3	10.3	4	4	4	4	78	235	210	100	58	41	52
11	700	940	830	168	145	125	10.6	12.6	11.8	10.3	4	4	4	4	79	235	210	100	60	41	50
12	660	930	820	168	145	125	11.0	12.8	11.0	10.1	4	4	4	4	67	235	210	100	60	41	50
1	680	920	840	168	145	125	11.0	10.6	10.8	10.1	4	4	4	4	63	235	210	100	60	41	50
2	620	920	880	168	145	125	9.2	12.6	11.8	9.9	4	4	4	4	69	235	210	100	58	41	58
3	600	900	800	170	145	125	9.6	11.3	11.3	10.6	4	4	3.5	3.25	63	235	210	100	56	40	56
4	680	900	820	170	145	125	11.1	12.8	13.1	10.0	4	4	3.5	3.75	65	235	210	100	58	42	50
5	700	900	840	170	145	125	10.2	12.8	11.6	10.2	4	4	3.5	3.75	79	235	210	100	58	42	52
6	700	880	840	170	145	125	9.3	13.7	12.8	9.8	4	4	3.5	3.75	79	235	210	100	60	42	52
7	700	900	840	170	145	125	10.2	11.1	9.6	10.3	4	4	3.5	3.75	64	235	210	100	58	40	52
8	700	900	740	170	145	125	8.7	9.8	7.2	10.6	4	4	3.5	3.75	50	235	210	100	58	42	54
9	700	900	760	170	145	125	9.6	10.0	10.2	9.8	4	4	3.5	3.75	51	235	210	100	58	42	48
10	680	920	820	170	145	125	7.0	9.6	9.8	10.5	4	4	3.5	[illegible]	65	235	210	80	58	42	52
11	720	920	860	170	145	125	8.5	11.0	10.5	9.2	4	4	3.5	3.75	64	235	210	98	58	42	50
12	620	920	880	165	145	125	11.1	9.6	8.9	8.9	4	4	3.5	3.75	60	235	210	98	56	40	52
1	/	900	880	/	145	125	/	8.2	9.5	9.2	/	4	3.5	[illegible]	51	/	210	98	/	40	52
2	620	930	860	165	145	125	8.0	11.0	9.5	9.5	4	4	3.5	[illegible]	40	240	170	80	50	40	58
3	600	980	920	165	145	125	10.5	11.6	10.2	9.5	4	4	3.5	3.75	62	240	210	98	48	40	58
4	/	940	840	165	145	125	8.0	11.0	10.3	9.2	4	4	3.5	[illegible]	72	240	180	98	48	40	54
5	/	1000	800	/	145	125	/	10.5	12.1	9.5	/	4	3.5	[illegible]	46	/	200	80	/	42	56
6	260	1000	880	165	145	125	13.0	12.8	13.0	[illegible]	4	4	3.5	[illegible]	49	240	200	98	60	42	50

FAC-042
(11-88)


GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
SLICING RATE-DRIER
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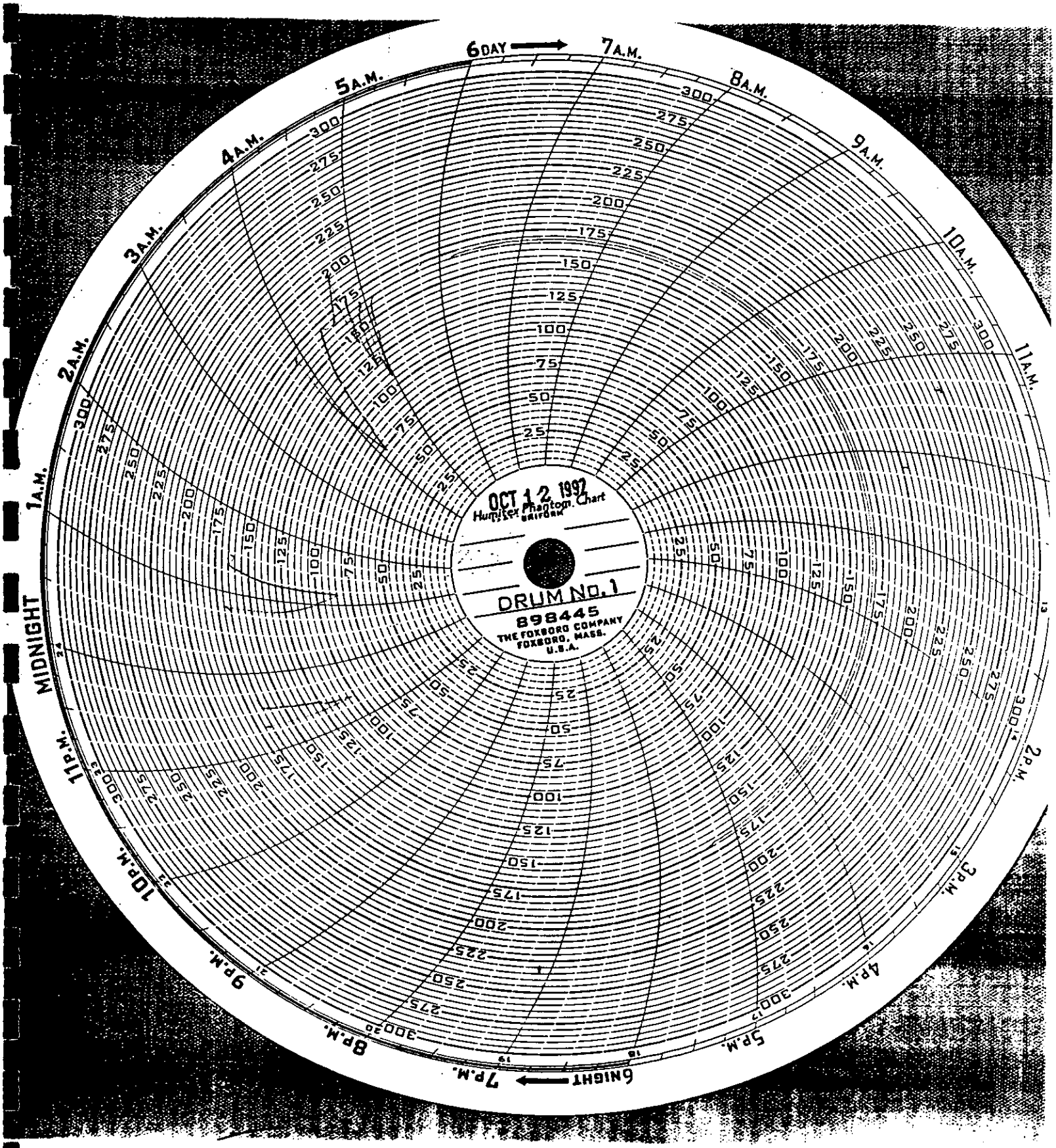
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3 P.M.
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9 P.M.
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11 P.M.
MIDNIGHT
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2 A.M.
3 A.M.
4 A.M.
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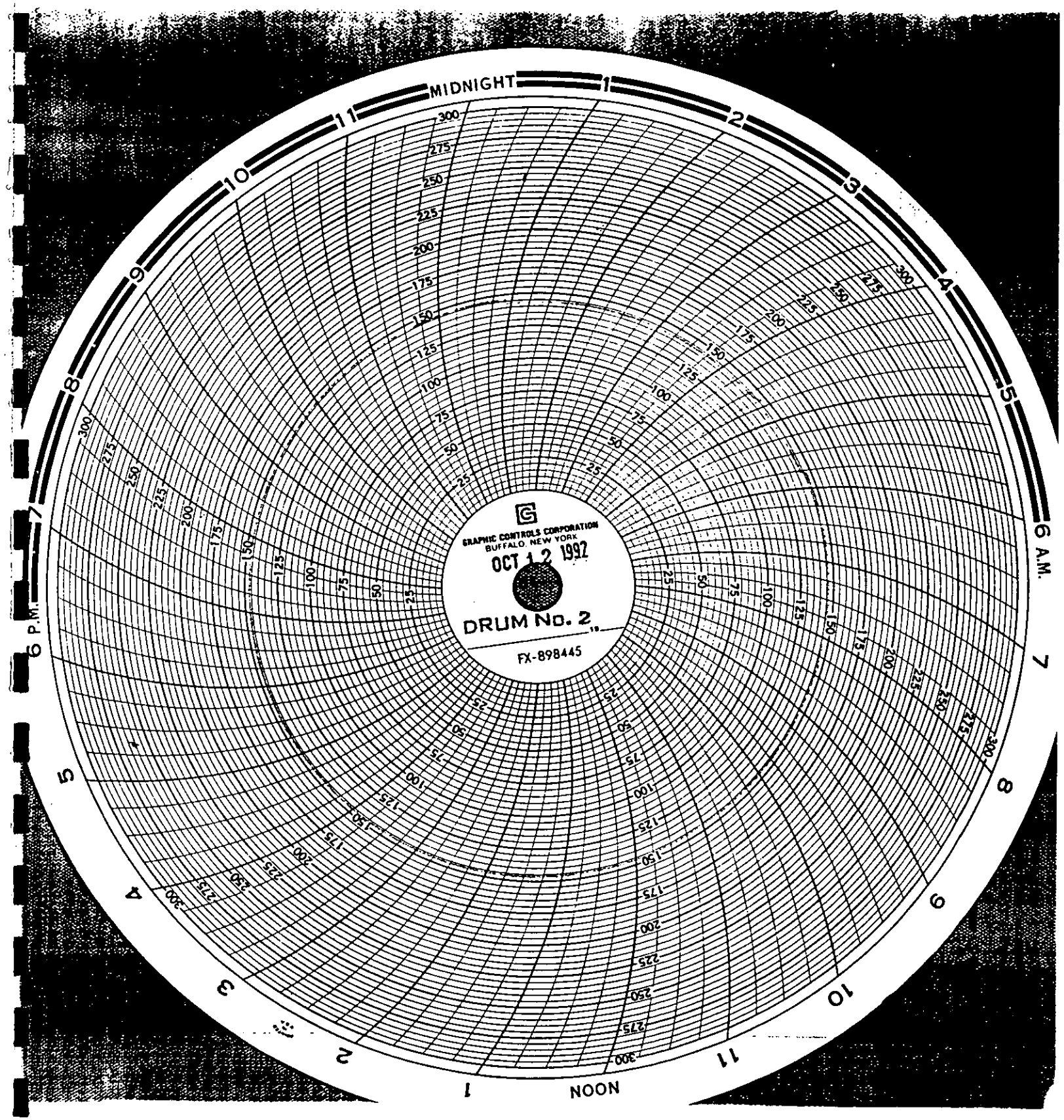
OCT 12 1997
Humitex Phantom Chart
DRUM No. 1
898445
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.


MIDNIGHT
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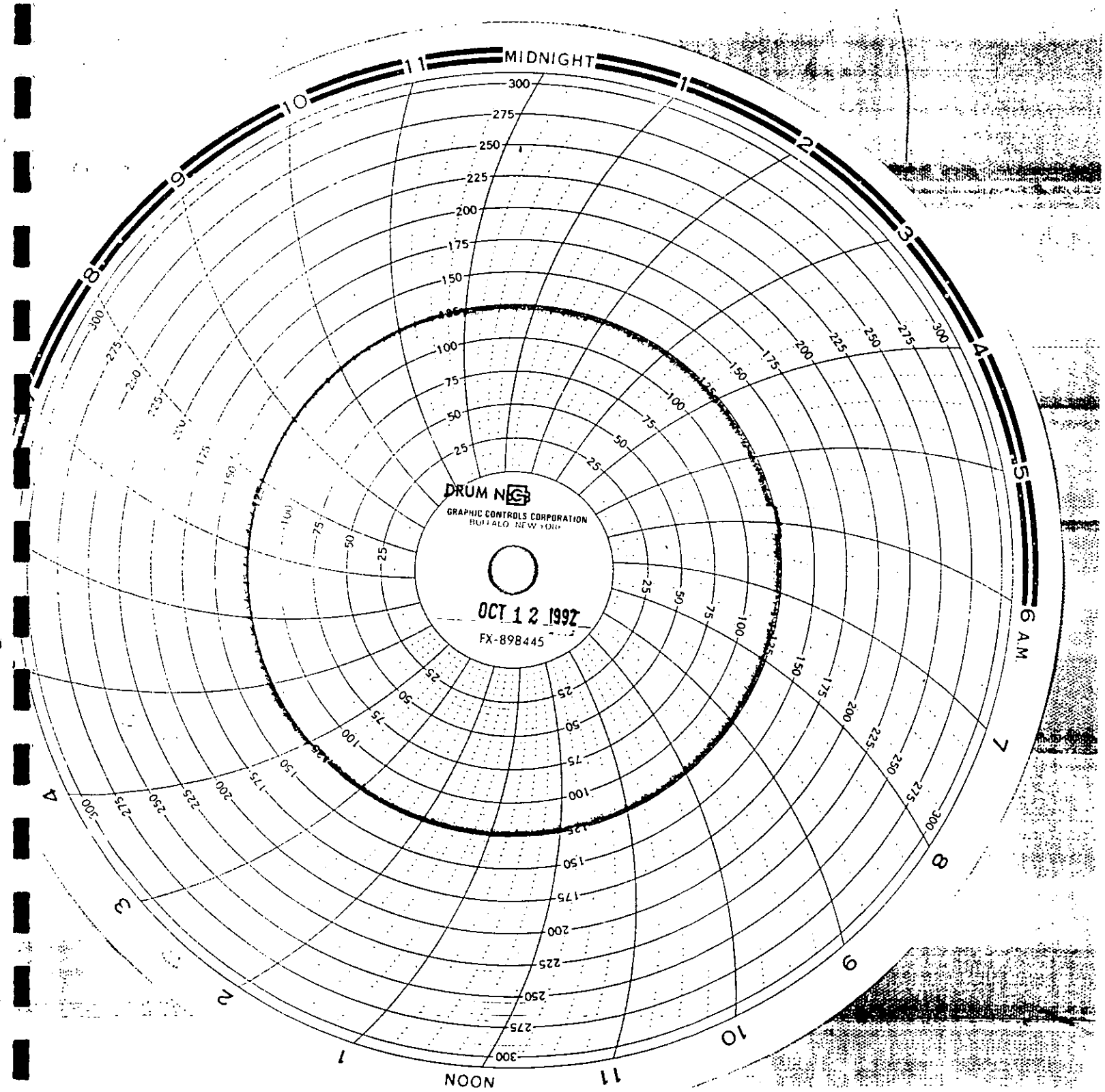
GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
OCT 12 1992
DRUM No. 2
FX-898445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DRUM NO
GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
OCT 12 1992
FX-898445

APPENDIX D

RAW DATA

NETWORK ENVIRONMENTAL, INC.

Date: 10/12/92

Clients:

Pitot Traverse Data Form

Proj. No.:

Plant: Monitor Sugar Co

Source: Pulp Dryer # 3 North

Staff: Cargill

Stack Size, Inches 66"

Barometric Pressure, "Hg 28.75

Gas Temperature, °F 168W 205D

Static Pressure, "H_2O -.51

Pitot Tube ☐ Standard ☒ S-Type

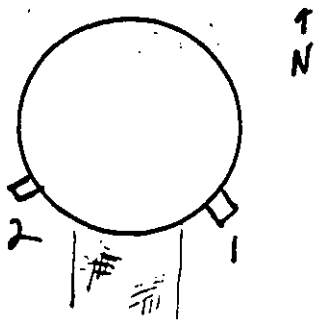
%O_2 _____ %CO_2 _____

.86 #1

Point Location Inches	1 Port	Velocity Pressure "H_2O	2 Port	Velocity Pressure "H_2O	Port	Velocity Pressure "H_2O	Port	Velocity Pressure "H_2O
	1	.23	1	.28	1		1	
	2	.27	2	.19	2		2	
	3	.31	3	.18	3		3	
	4	.28	4	.64	4		4	
	5	.68	5	.73	5		5	
	6	.82	6	.70	6		6	
	7		7		7		7	
	8		8		8		8	
	9		9		9		9	
	10		10		10		10	
	11		11		11		11	
	12		12		12		12	
	13		13		13		13	
	14		14		14		14	

Wall Thickness	
Zero Point	
Port Size/Type	4" Coupling

7.6956
0.6413



NETWORK ENVIRONMENTAL, INC.

Date: 10/12/92
Client:

Plant: Monitor Sugar Co.
Source: Dryer #3 North
Staff: Byrd / Cargill

Sample #: 1
Nozzle #: .3093
Rate Meter #:
Control Box #: 3065
Condenser Box #: 1
#1 = .84

Filter Set #: 7
Primary Filter #: DH-378
Secondary Filter #: BH-378
Type Train: 5B
Mls. H_2O Cond.: 491
3.27/3.24

Barometric Press: 28.75
Initial Gas Read: 008.84
Clock Meter Start: 11:03
Time Meter Start: 0
Time Meter Stop: 1

Port	Point	Vel Press "H_2O	P Venturi "H_2O	Gas Meter Reading	Pump Vac. "Hg	Meter Temp °F In	Meter Temp °F Out	Stack Temp °F	Box Temp °F	1 Gas Bag #
2	1	.39	1.27	012.01	0	66	67	168		Dryer # 5
					4	68	67	171		
	2	.28	.915	014.81	6	70	67	172		Notes
	3	.18	.588	017.13	5.5	70	66	169		Initial Leak Check
	4	.76	2.48	021.52	9	71	67	174		0.000 ft³/min @15" Hg
	5	.81	2.64	026.16	8	72	67	172		
	6	.74	2.41	030.652	7	72	67	170		
2	1	.36	1.16	033.75	6	71	67	169		Final Leak Check
	2	.23	.745	036.32	5.5	72	67	165		
	3	.31	1.00	039.23	6	73	67	165		0.000 ft³/min @10" Hg
	4	.32	1.03	042.20	6	74	68	164		
	5	.71	2.30	046.58	8	74	68	165		
	6	.71	2.30	050.972	7	75	69	165		

42.13

NETWORK ENVIRONMENTAL, INC.

Date: 10/12/92
Client:

Plant: Monitor Sugar Co.
Source: Dryer #3 North
Staff: Byrd / Cagle

Sample #: 2
Nozzle #: .3093
Rate Meter #:
Control Box #: 3065
Condenser Box #: 1
#1 = .86

Filter Set #: 5
Primary Filter #: DH-377
Secondary Filter #: BH-377
Type Train: STB
Mls. H_2O Cond.: 430
3.99

Barometric Press: 28.75
Initial Gas Read: 051.205
Clock Meter Start: 12:34
Time Meter Start: 0
Time Meter Stop: 1

Port	Point	Vel Press "H_2O	P Venturi "H_2O	Gas Meter Reading	Pump Vac. "Hg	Meter Temp °F In	Meter Temp °F Out	Stack Temp °F	Box Temp °F	2 Gas Bag #
2	1	.34	1.35	054.58	0 / 4	69 / 68	68 / 68	163 / 164		Dryer # 2
	2	.19	.758	057.18	4.5	70	68	164		Notes
	3	.18	.718	059.68	5	71	68	165		Initial Leak Check 0.000 ft³/min @15" Hg
	4	.65	2.59	063.99	7.5	73	68	163		
	5	.81	3.23	069.10	7	73	68	163		
	6	.74	2.95	073.995	6	75	69	164		
2	1	.39	1.55	077.57	5	72	69	166		
	2	.24	.957	080.50	3.5	73	68	165		
	3	.30	1.19	083.645	4	73	69	165		Final Leak Check 0.000 ft³/min 10" Hg
	4	.30	1.19	086.85	4	75	69	165		
	5	.70	2.79	091.52	6	77	69	165		
	6	.69	2.75	096.292	6	78	70	166		

45.08 cf

NETWORK ENVIRONMENTAL, INC.

Date: 10/12/92
Client:

Plant: Monitor Sugar Co
Source: Dryer #3 Natl
Staff: Boyd / Cayzell

Sample #: 3
Nozzle #: .3093
Rate Meter #:
Control Box #: 3065
Condenser Box #: 1
#1 = .86

Filter Set #: 1
Primary Filter #: DH-375
Secondary Filter #: BH-375
Type Train: EB
Mls. H_2O Cond.: 492

Barometric Press: 28.75
Initial Gas Read: 096.86
Clock Meter Start: 13:58
Time Meter Start: 0
Time Meter Stop: 1

Port	Point	Vel Press "H_2O	P Venturi "H_2O	Gas Meter Reading	Pump Vac. "Hg	Meter Temp °F In	Meter Temp °F Out	Stack Temp °F	Box Temp °F	3 Gas Bag #
2	1	.44	1.75	100.65	0	70	70	163		Dryer # 3
					4	70	70	166		
	2	.28	1.11	103.72	4.5	72	70	165		Notes
	3	.17	.67	106.17	4	74	70	164		Initial Leak check 0.000 ft³/min @15" Hg
	4	.80	3.19	111.13	9	75	70	165		
	5	.83	3.31	116.32	9	75	70	165		
	6	.78	3.11	121.352	8	76	70	163		
1	1	.42	1.67	125.08	5.5	72	70	164		Final leak check ft³/min
	2	.43	1.71	128.88	5	72	69	164		
	3	.29	1.15	132.08	4	73	69	164		
	4	.43	1.71	135.80	4.5	75	69	161		
	5	.86	3.43	140.94	6	74	69	161		
	6	.88	3.51	146.205	6	73	69	160		

49.345 ft³

NETWORK ENVIRONMENTAL INCORPORATED

Date: 10/12/92

Clients: Monitor Sugar

Pitot Traverse Data Form

Proj. No.:

Plant: Monitor Sugar - Bay City, MI

Source: Dryer #3 South

Staff: Engelhardt

Stack Size, Inches: 66" ϕ

Barometric Pressure, "Hg: 28.75

Gas Temperature, °F: 185 166 wet

Static Pressure, "H_2O: -0.28

Pitot Tube: ☐ Standard ☒ S-Type

%O_2 _____ %CO_2 _____

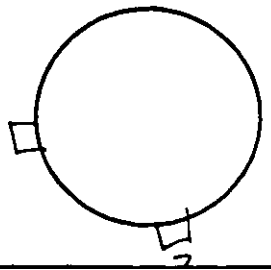
Pitot # 7 ≐ 0.83

Point Location Inches	1 Port	Velocity Pressure "H_2O	2 Port	Velocity Pressure "H_2O	Port	Velocity Pressure "H_2O	Port	Velocity Pressure "H_2O
	1	0.34	1	0.47	1		1	
	2	0.50	2	0.52	2		2	
	3	0.43	3	0.12	3		3	
	4	0.22	4	0.54	4		4	
	5	0.48	5	0.58	5		5	
	6	0.70	6	0.60	6		6	
	7		7		7		7	
	8		8		8		8	
	9		9		9		9	
	10		10		10		10	
	11		11		11		11	
	12		12		12		12	
	13		13		13		13	
	14		14		14		14	

Wall Thickness	
Zero Point	22"
Port Size/Type	4" coupling

19
10/11/12

V_s high = 3069
V_s low = 1271



NETWORK ENVIRONMENTAL INCORPORATED

Date: 10/12/92

Client: Monitor Sugar

Project #:

Plant Monitor Sugar - Bay City, MI

Source Dryer #3 - South

Staff Engelhaedt / Smith

Sample # 1 | Filter Set # 19 | Barometric Press 28.75

Nozzle # 0.322 | Primary Filter # DH-386 | Initial Gas Read 152.288

Rate Meter # — | Secondary Filter # BH-386 | Clock Meter Start 11:03

Control Box # 3072 | Type Train MDNR-5B | Time Meter Start 0

Condenser Box # 2 | Mls. H_2O Cond. 444 | Time Meter Stop 1

Yd = 0.9976 Pitot #7 = 0.83

Port	Point	Vel Press "H_2O	P Venturi "H_2O	Gas Meter Reading	Pump Vac. "Hg	Meter Temp °F In	Meter Temp °F Out	Stack Temp °F	Box Temp °F	Gas Bag # 1
2	1	0.48	2.18	156.28	2.5	68	68	179		Dryer # 10
	2	0.50	2.27	160.38	3.5	69	67	177		Notes
	3	0.12	0.55	162.64	2.0	71	67	177		Initial Leak Test
	4	0.35	1.60	166.01	4.0	71	67	177		0.000 ft³/min
	5	0.47	2.15	169.96	4.0	72	67	176		@ 15" Hg
	6	0.50	2.28	174.155	5.0	72	68	178		Final Leak Test
1	1	0.43	1.96	177.94	3.5	71	68	177		0.000 ft³/min
	2	0.55	2.51	182.31	4.5	72	68	178		@ 8" Hg
	3	0.38	1.75	185.99	3.5	73	68	174		
	4	0.30	1.39	189.28	3.0	74	69	171		
	5	0.41	1.89	193.07	3.5	74	69	173		
	6	0.50	2.31	197.235	4.5	74	69	171		END TEST AT 12:05

32.6%

NETWORK ENVIRONMENTAL INCORPORATED

Date: 10/12/92

Client: Monitor Sugar

Project #:

Plant Monitor Sugar - Bay City, MI.

Source Dryer #3 South

Staff Engelhaedt/Smith

Sample # 2

Filter Set # 17

Barometric Press 28.75

Nozzle # 0.322

Primary Filter # DH-353

Initial Gas Read 197.656

Rate Meter # —

Secondary Filter # BH-383

Clock Meter Start 12:34

Control Box # 3072

Type Train MDNR-5B

Time Meter Start 0

Condenser Box # 2

Mls. H_2O Cond. 526

Time Meter Stop 1

Y_d = 0.9976 Pitot #7 = 0.83

Port	Point	Vel Press "H_2O	P Venturi "H_2O	Gas Meter Reading	Pump Vac. "Hg	Meter Temp °F In	Meter Temp °F Out	Stack Temp °F	Box Temp °F	Gas Bag #2
1	1	0.38	2.10	201.59	2.5	70	70	173		Dryer # 11
	2	0.55	3.02	206.32	4.0	70	69	177		Notes
	3	0.41	2.25	210.54	3.5	72	69	178		Initial Leak Test
	4	0.27	1.49	213.97	3.0	73	69	176		0.010 ft³/min
	5	0.69	3.85	218.10	4.5	73	69	168		@ 18 "Hg
	6	0.51	2.85	223.850	4.0	74	69	168		Final Leak Test
2	1	0.56	3.08	228.58	4.0	72	69	177		0.005 ft³/min
	2	0.52	2.86	233.22	6.0	72	69	176		@ 10 "Hg
	3	0.13	0.72	235.70	4.5	72	69	174		
	4	0.40	2.21	239.65	8.0	73	70	174		
	5	0.63	3.50	244.73	8.5	74	70	172		
	6	0.55	3.07	249.598	8.0	77	70	172		END TEST AT 13:36
										15

NETWORK ENVIRONMENTAL INCORPORATED

Date: 10/12/92

Client: Monitor Sugar

Project #:

Plant Monitor Sugar - Bay City, MI

Source ~~[illegible]~~ Dryer #3 South

Staff Engelhardt/Smith

Sample # B

Nozzle # 0.322

Rate Meter # —

Control Box # 3072

Condenser Box # 2

Filter Set # 15

Primary Filter # DH-382

Secondary Filter # BH-382

Type Train MDNR-5B

Mls. H_2O Cond. 534

Barometric Press 28.75

Initial Gas Read 249.968

Clock Meter Start 13:58

Time Meter Start 0

Time Meter Stop 1

Yd = 0.9976 Pitot #7 = 0.83

Port	Point	Vel Press "H_2O	P Venturi "H_2O	Gas Meter Reading	Pump Vac. "Hg	Meter Temp °F In	Meter Temp °F Out	Stack Temp °F	Box Temp °F	Gas Bag # 3
2	1	0.51	2.79	254.53	3.0	72	72	181		Dryer # 12
	2	0.56	3.08	259.33	4.0	72	72	178		Notes
	3	0.42	0.66	261.73	2.0	74	71	178		Initial Leak Test
	4	0.41	2.27	265.78	4.5	75	71	176		0.000 ft³/min
	5	0.50	2.78	270.36	5.0	76	71	173		@ 16 "Hg
	6	0.49	2.72	274.935	4.5	76	71	174		Final Leak Test
1	1	0.41	2.28	279.08	4.5	73	71	173		0.000 ft³/min
	2	0.55	3.05	283.79	6.0	73	71	174		@ 7 "Hg
	3	0.42	2.33	288.04	6.0	74	71	175		
	4	0.24	1.34	291.34	4.5	74	71	169		
	5	0.49	2.75	295.78	6.0	74	71	167		
	6	0.51	2.85	300.412	6.5	73	70	168		END TEST AT: 15:01

NETWORK ENVIRONMENTAL INCORPORATED

Date: 10/7/92 Calibration Meter Identification: 001 Yds. 1.00

Meter Box Identification: 3065 Barometric Pressure (P_b): 29.20

	Orifice Reading (ΔH) in H_2O	Calibration Meter Gas Volume (V_{ds}) ft^3	Meter Box Meter Gas Volume (V_d) ft^3	Temperature: Calibration Meter Average (t_{ds}) °F	Temperature: Meter Box Meter Average (t_d) °F	Calibration Meter Pressure (Δp) in H_2O	Time (Θ) min.	Orifice Pressure Differential ($\Delta H@$)	Meter Box Meter Coefficient (Yd)	K_d
Stop	.5	1813.179	954.675	64.5	74	.30				
Start	.5	1807.920	949.24	64.5	68.5	.30	13	1.7328	.97884	.13504
Average	.5	5.259	5.435	64.5	71.25	.30				
Stop	1.0	1818.61	960.2525	64.5	76	.40				
Start	1.0	1813.524	955.035	64.5	70	.40	9	1.7746	.98811	.13340
Average	1.0	5.086	5.2175	64.5	73	.40				
Stop	2.0	1824.474	966.3525	64.5	76.5	.70				
Start	2.0	1819.021	960.6875	64.5	72	.70	7	1.8727	.97556	.13008
Average	2.0	5.453	5.665	64.5	74.25	.70				
Stop	3.0	1835.152	977.54	64.5	79	.95				
Start	3.0	1824.835	966.73	64.5	80	.95	11	1.9286	.97433	.12792
Average	3.0	10.317	10.81	64.5	79.5	.95				
Stop	4.0	1845.38	988.3125	64.5	81.5	1.2				
Start	4.0	1835.515	978.181	64.5	74.5	1.2	9	1.8975	.98880	.12951
Average	4.0	9.865	10.1315	64.5	78	1.2				
Stop	5.0	1855.212	998.8175	64.5	83	1.4				
Start	5.0	1845.555	988.795	64.5	80.5	1.4	8	1.9518	.98314	0.12760
Average	5.0	9.657	10.0195	64.5	81.75	1.4				
							Average	1.8597	.9815	.1306

$$Yd = Yds\left(\frac{Vds}{Vd}\right)\left[\frac{(td + 460)}{(tds + 460)}\right]\left[\frac{Pb}{\left(Pb + \left(\frac{\Delta H}{13.6}\right)\right)}\right] \qquad Kiso = \frac{27.40}{(Kd)^2}$$

$$K_d = Yds\left(\frac{Vds}{\Theta}\right)\sqrt{\frac{Pds}{Tds\ \Delta H}} \qquad Pds = \left[Pb + \left(\frac{\Delta P}{13.6}\right)\right] \qquad \Delta H@ = 0.0319\ \Delta H\left(\frac{td}{Pb}\right)\left[\frac{\Theta^2}{Yd^2 Vd^2}\right]$$

Kiso= 1606.622548

NETWORK ENVIRONMENTAL INCORPORATED

Date: 10/9/92 Calibration Meter Identification: #1 Yds. 1.000

Meter Box Identification: 3072 Barometric Pressure (P_b): 28.70

	Orifice Reading (Δ H) in H_2O	Calibration Meter Gas Volume (V_{ds}) ft^3	Meter Box Meter Gas Volume (V_d) ft^3	Temperature: Calibration Meter Average (t_{ds}) °F	Temperature: Meter Box Meter Average (t_d) °F	Calibration Meter Pressure (Δp) in H_2O	Time (Θ) min.	Orifice Pressure Differential (ΔH@)	Meter Box Meter Coefficient (Yd)	K_d
Stop	0.50	1967.210	105.095	66.5	80.0	-0.30				
Start	0.50	1961.904	99.776	66.5	76.5	-0.30	13	1.7225	1.0185	0.13471
Average	0.50	5.306	5.319	66.5	78.25	-0.30				
Stop	1.0	1972.680	110.591	66.5	80.0	-0.50				
Start	1.0	1967.646	105.538	66.5	76.5	-0.50	9	1.8391	1.0159	0.13051
Average	1.0	5.034	5.053	66.5	78.25	-0.50				
Stop	2.0	1978.724	116.721	66.5	80.0	-0.70				
Start	2.0	1973.294	111.216	66.5	76.0	-0.70	7	1.9230	1.0028	0.12795
Average	2.0	5.430	5.505	66.5	78.0	-0.70				
Stop	3.0	1989.966	128.221	66.5	81.5	-1.00				
Start	3.0	1979.545	117.555	66.5	76.0	-1.00	11	1.9411	0.9921	0.12754
Average	3.0	10.421	10.666	66.5	78.75	-1.00				
Stop	4.0	2001.802	140.450	66.5	81.5	-1.30				
Start	4.0	1990.978	129.262	66.5	75.5	-1.30	10	1.9937	0.9795	0.12615
Average	4.0	10.824	11.188	66.5	78.5	-1.30				
Stop	5.0	2013.097	152.100	66.5	81.5	-1.50				
Start	5.0	2002.331	140.963	66.5	76.0	-1.50	9	2.0498	0.9767	0.12466
Average	5.0	10.766	11.137	66.5	78.75	-1.50				
							Average	1.9116	0.9976	0.12859

$$Yd = Yds\left(\frac{Vds}{Vd}\right)\left[\frac{(td + 460)}{(tds + 460)}\right]\left[\frac{Pb}{\left(Pb + \left(\frac{\Delta H}{13.6}\right)\right)}\right] \qquad Kiso = \frac{27.40}{(Kd)^2}$$

$$K_d = Yds\left(\frac{Vds}{\Theta}\right)\sqrt{\frac{Pds}{Tds\ \Delta H}} \qquad Pds = \left[Pb + \left(\frac{\Delta P}{13.6}\right)\right] \qquad \Delta H@ = 0.0319\ \Delta H\left(\frac{td}{Pb}\right)\left[\frac{\Theta^2}{Yd^2 Vd^2}\right]$$

Kiso= 1657.149569

NETWORK ENVIRONMENTAL

Pitot tube calibration data.

PITOT TUBE IDENTIFICATION NUMBER: #1 DATE: 12/13/91

CALIBRATED BY: RSC

	"A" SIDE CALIBRATION			
RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(s)}$	DEVIATION $C_{p(s)} - \bar{C}_p(A)$
1	.235	.305	.87	.01
2	.23	.305	.86	0
3	.23	.305	.86	0
		$\bar{C}_p$ (SIDE A)	.86	.003

	"B" SIDE CALIBRATION			
RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(s)}$	DEVIATION $C_{p(s)} - \bar{C}_p(B)$
1	.23	.315	.85	0
2	.23	.31	.85	0
3	.23	.315	.85	0
		$\bar{C}_p$ (SIDE B)	.85	0

$$\text{AVERAGE DEVIATION} = \sigma(A \text{ OR } B) = \frac{\sum_{1}^{3} \left| C_p(s) - \bar{C}_p(A \text{ OR } B) \right|}{3} \longrightarrow \text{MUST BE} \leq 0.01$$

$$\left| \bar{C}_p(\text{SIDE A}) - \bar{C}_p(\text{SIDE B}) \right| \longrightarrow \text{MUST BE} \leq 0.01$$

NETWORK ENVIRONMENTAL

Pitot tube calibration data.

PITOT TUBE IDENTIFICATION NUMBER: #7 DATE: 12/5/91

CALIBRATED BY: BJS

"A" SIDE CALIBRATION				
RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(s)}$	DEVIATION $C_{p(s)} - \bar{C}_p(A)$
1	.23	.335	.82	0
2	.23	.335	.82	0
3	.23	.34	.81	.01
		$\bar{C}_p$ (SIDE A)	.82	.003

"B" SIDE CALIBRATION				
RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(s)}$	DEVIATION $C_{p(s)} - \bar{C}_p(B)$
1	.23	.32	.84	.01
2	.23	.33	.83	0
3	.23	.325	.83	0
		$\bar{C}_p$ (SIDE B)	.83	.003

$$\text{AVERAGE DEVIATION} = \sigma(\text{A OR B}) = \frac{\sum_{1}^{3} \left| C_p(s) - \bar{C}_p(\text{A OR B}) \right|}{3} \longleftarrow \text{MUST BE} \leq 0.01$$

$$\left| \bar{C}_p(\text{SIDE A}) - \bar{C}_p(\text{SIDE B}) \right| \longleftarrow \text{MUST BE} \leq 0.01$$

.825 Avg