Background Report Reference

AP-42 Section Number: 10.6.1

Background Report Section: 4

Reference Number: 60

Title: Results Of The July 11-13, 1995 Air Air Emission Compliance Tests At the Louisian Pacific Waferboard Plant In Tomahawk, Wisconsin

Interpoll Laboratories, Inc.

July 1995

Interpoll Laboratories, Inc.
4500 Ball Road N.E.
Circle Pines, Minnesota 55014-1819

TEL: (612) 786-6020
FAX: (612) 786-7854

4-60

RESULTS OF THE JULY 11 - 13, 1995 AIR EMISSION COMPLIANCE TESTS AT THE LOUISIANA PACIFIC WAFERBOARD PLANT IN TOMAHAWK, WISCONSIN

Submitted to:

LOUISIANA PACIFIC CORPORATION
P.O. Box 190
Tomahawk, Wisconsin 54487

Attention:

Brion Petts

Approved by:

Daniel J. Despen
Manager
Stationary Source Testing Department

Report Number 5-6006
July 18, 1995
KE/kce

TABLE OF CONTENTS

ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	dry standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (°F)	degrees Fahrenheit
DIA.	diameter
FP	finished product for plant
FT/SEC	feet per second
g	gram
GPM	gallons per minute
GR/ACF	grains per actual cubic foot
GR/DSCF	grains per dry standard cubic foot
g/dscm	grams per dry standard cubic meter
HP	horsepower
HRS	hours
IN.	inches
IN.HG.	inches of mercury
IN.WC.	inches of water
LB	pound
LB/DSCF	pounds per dry standard cubic foot
LB/HR	pounds per hour
LB/10^6BTU	pounds per million British Thermal Units heat input
LB/MMBTU	pounds per million British Thermal Units heat input
LTPD	long tons per day
MW	megawatt
mg/Nm^3	milligrams per dry standard cubic meter
ug/Nm^3	micrograms per dry standard cubic meter
microns (um)	micrometer
MIN.	minutes
ng	nanograms
ohm-cm	ohm-centimeter
PM	particulate matter
PPH	pounds per hour
PPM	parts per million
ppmC	parts per million carbon
ppm,d	parts per million, dry
ppm,w	parts per million, wet
ppt	parts per trillion
PSI	pounds per square inch
SQ.FT.	square feet
TPD	tons per day
ug	micrograms
v/v	percent by volume
w/w	percent by weight
<	≤ (when following a number)

Standard conditions are defined as 68°F (20°C) and 29.92 IN. of mercury pressure.

g:\stack\wp\misc\abbrev.frm

1 INTRODUCTION

During the Period July 11 - 13, 1995 Interpoll Laboratories personnel conducted air emission compliance tests on the Dryers and Thermal Oil Heater at the Louisiana Pacific Corporation (LP) Waferboard Plant located in Tomahawk, Wisconsin. Testing was also conducted on the Press to gather data for permit revisions and establish informational data. On-site testing was performed by B. Aschenbach and T. Hansen. Coordination between testing activities and plant operation was provided by Brion Petts of LP. The test was witnessed by Biren Patel and Aaron Rosinski of the Wisconsin DNR.

The Dryers tested are Model 1260 TNW/L dryers manufactured by MEC Company. Particulate emissions from each dryer are controlled by a set of multicyclones installed in series with a E-TUBE wet electrostatic precipitator. Cleaned flue gas is emitted to the atmosphere by a 100-foot high radial steel stack which has a diameter of 59 inches.

The press vents tested are the exhaust from general ventilators positioned over the board press and unloader. The press and unloader vent exhausts are emitted to the atmosphere via a common stack which has a diameter of 62.5 inches.

The Thermal Oil Heater tested was manufactured by GEKA in 1992. It is equipped with a ram-type stoker and is fired with a mixture of wet bark and wood. The unit has a design heat input capacity of 30 10^6BTU/HR. Particulate emissions from the GEKA are controlled by a large diameter cyclone in series with a fabric filter dust collector manufactured by C.E. Preheater. The baghouse has a pulsed air cleaning system. Cleaned flue gas is emitted to the atmosphere by a 75-foot high radial steel stack which has a diameter of 42 inches.

Particulate evaluations on the Press Vent were performed in accordance with EPA Methods 2-5, CFR Title 40, Part 60, Appendix A (revised July 1, 1994). A preliminary determination of the gas linear velocity profile was made before the first particulate determination to allow selection of the appropriate nozzle diameter for isokinetic sample withdrawal. An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to isokinetically extract particulate samples by means of a

heated glass-lined probe. Condensible particulate material samples were collected in the back half of the Method 5 sampling train and analyzed in accordance with EPA Method 202.

Gas composition, carbon monoxide and oxides of nitrogen determinations were performed in accordance with Methods 3A, 7E and 10. A slip stream of sample gas was withdrawn from the exhaust gas stream using a heated stainless steel probe equipped with a filter to remove interfering particulate material. The particulate-free gas was transported to the analyzers by means of a heat-traced probe and filter assembly. After passing through the filter, the gas passed through a chilled condenser-type moisture removal system. The particulate-free dry gas was then transported to the analyzers with the excess exhausted to the atmosphere through a calibrated orifice which was used to ensure that the flow from the stack exceeds the requirements of the analyzers. A three-way valve on the probe was used to introduce standard gas for the "system bias check".

The analog response of the analyzers was recorded with a data logger and strip chart recorder as backup. The analyzers were calibrated with Scott Specialty and National Specialty Gases EPA Protocol 1 or Certified Master standard gases. The instrument was calibrated before and after each run as per EPA Methods 3A, 7E and 10. The sample probe was moved through a three-point traverse (1/6, 3/6, 5/6 of the stack diameter) to measure oxides of nitrogen and carbon monoxide concentrations.

Particulate testing on the Press Vent was conducted from two test ports oriented at 90 degrees on the stack. These test ports are located 3.85 stack diameters downstream of the nearest flow disturbance and 3.85 diameters upstream of the stack exit. A 24-point traverse was used to collect the particulate samples. Each traverse point was sampled 2.5 minutes for a total sampling time of 60 minutes per run.

Volumetric flow rate testing at the Dryer Stack was conducted from two test ports oriented at 90 degrees on the stack. These test ports are located 5.0 stack diameters downstream of the nearest flow disturbance and 5.0 stack diameters upstream of the stack exit. A 20-point traverse was used to measure the flow rate.

Volumetric flow rate testing at the Thermal Oil Heater Stack was also conducted from two test ports oriented at 90 degrees on the stack. These test ports are located 6.1 stack

diameters from the nearest flow disturbance and 2.3 diameters from the stack exit. A 16-point traverse was used measure the flow rate.

A 3-point traverse was used at each test site to collect samples for oxides of nitrogen and carbon monoxide analyses. Each traverse point was sampled 20 minutes for a total sampling time of 60 minutes per run.

The important results of the test are summarized in Section 2. Detailed results are presented in Section 3. Field data and all other supporting information are presented in the appendices.

2 SUMMARY AND DISCUSSION

The important results of the air emission compliance tests are summarized in Tables 1 - 4. A summary of the concentrations and emission rates is presented below:

Parameter	LIMIT	MEASURED
PRESS VENT		
Particulate (LB/HR)		
Press (dry + wet)	6.82	21.5
Press (dry)	-	5.04
Carbon monoxide (LB/TON FP)	0.2	0.45
Carbon monoxide (LB/HR)	2.52	4.84
DRYER STACK		
Oxides of Nitrogen (LB/HR)	10.6	10.1
Carbon monoxide		
Wood-fired (LB/TDF)	21.8	2.13
NG-fired (LB/10^6BTU)	0.69	0.13
GEKA		
Oxides of Nitrogen (LB/HR)	7.85	0.46
Carbon Monoxide (LB/TDF)	7.5	0.52

No difficulties were encountered in the field by Interpoll Labs or in the laboratory evaluation of the samples which were conducted by Interpoll Labs. On the basis of this fact and a complete review of the entire data and results, it is our opinion that the results reported herein are accurate and closely reflect the actual values which existed at the time the test was performed.

Table 1a. Summary of the Results of the July 13, 1995 Particulate Emission Compliance Test on the Press Vent at the Louisiana-Pacific OSB Plant in Tomahawk, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-13-95	07-13-95	07-13-95
Time runs were done	(HRS)	915/1016	1105/1206	1335/1436
Process rate	(TON FP/HR)	10.9	10.9	10.9
Volumetric flow				
actual	(ACFM)	108004	107819	110413
standard	(DSCFM)	92137	91680	93272
Gas temperature	(DEG-F)	105	109	110
Moisture content	(%V/V)	3.43	3.15	3.62
Gas composition	(%V/V,dry)			
carbon dioxide		0.03	0.03	0.03
oxygen		20.90	20.90	20.90
nitrogen		79.07	79.07	79.07
Isokinetic variation	(%)	98.6	99.3	100.0
Particulate concentration				
actual	(GR/ACF)	.008213	.004086	.003933
standard	(GR/DSCF)	.009631	.004807	.004658
Part. emission rate	(LB/HR)	7.61	3.78	3.72

Note: Dry Catch Only

Table 1b Summary of the Results of the July 13, 1995 Particulate Emission Compliance Test on the Press Vent at the Louisiana-Pacific OSB Plant in Tomahawk, Wisconsin.

ITEM	Run 1	Run 2	Run 3
Date of test	07-13-95	07-13-95	07-13-95
Time runs were done (HRS)	915/1016	1105/1206	1335/1436
Process rate (TON FP/HR)	10.9	10.9	10.9
Volumetric flow			
actual (ACFM)	108004	107819	110413
standard (DSCFM)	92137	91680	93272
Gas temperature (DEG-F)	105	109	110
Moisture content (%V/V)	3.43	3.15	3.62
Gas composition (%V/V,dry)			
carbon dioxide	0.03	0.03	0.03
oxygen	20.90	20.90	20.90
nitrogen	79.07	79.07	79.07
Isokinetic variation (%)	98.6	99.3	100.0
Particulate concentration			
actual (GR/ACF)	.0298	.0336	.006111
standard (GR/DSCF)	.0349	.0396	.007236
Part. emission rate (LB/HR)	27.56	31.08	5.79

Note: Dry + Method 202 Condensible Particulate Material

Table 3. Summary of the Oxides of Nitrogen Emission Determinations at the Louisiana Pacific Waferboard Plant in Tomahawk, Wisconsin.

Time	Concentration (ppm,d)	Emission Rate (LB/HR)	Emission Rate (LB/TDF)
(Dryer 7/12/95 - Wood fired)			
0745-0845	26	10.9	4.49
0900-1000	24	9.86	4.06
1145-1245	24	9.64	3.96
Avg.	25	10.1	4.17
(GEKA 7/12/95)			
1955-2055	50	4.44	4.31
2110-2210	45	3.71	3.60
2225-2325	41	3.46	3.36
Avg.	45	3.37	3.76

Note: TDF = Tons Dry Fuel (Dryer test - 2.43 TDF/HR, GEKA Test 1.03 TDF/HR)

Table 4. Summary of the Carbon Monoxide Emission Determinations at the Louisiana Pacific Waferboard Plant in Tomahawk, Wisconsin.

Time	Concentration (ppm,d)	Emission Rate (LB/HR)	(LB/TDF)	Emission Factor (LB/TFP)	(LB/10^6BTU)
(Dryer 7/11/95 - Natural gas fired)					
0800-0900	10.4	2.70			0.11
0920-1020	11.7	2.94			0.13
1040-1140	13.6	3.49			0.14
Avg.	11.9	3.04			0.13
(Dryer 7/12/95 - Wood fired)					
0745-0845	20.2	5.17	2.13		
0900-1000	17.2	4.25	1.75		
1145-1245	22.0	5.40	2.22		
Avg.	19.8	4.94	2.03		
(GEKA 7/12/95)					
1955-2055	10.2	0.54	0.52	-	0.022
2110-2210	7.80	0.40	0.39	-	0.018
2225-2325	8.80	0.45	0.44	-	0.020
Avg.	8.93	0.46	0.45	-	0.020
(Press 7/13/95)					
0915-1015	12.9	5.18	-	0.48	
1105-1205	13.6	5.44	-	0.50	
1335-1436	9.60	3.91	-	0.36	
Avg.	12.0	4.84	-	0.45	

Note: TDF = Tons Dry Fuel (Dryer test - 2.43 TDF/HR, GEKA Test 1.03 TDF/HR) TFP = Tons Finished Product (Press Test, 10.9 TFP/HR)

3 AIR EMISSION RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition and moisture are presented first followed by the computer printout of the particulate, oxides of nitrogen and carbon monoxide results. Preliminary measurements including test port locations are given in the appendices.

The results have been calculated on a personal computer using programs written in Extended BASIC specifically for source testing calculations. EPA-published equations have been used as the basis of the calculation techniques in these programs.

The emission rates have been calculated using the product of the concentration times flow method.

3.1 Results of Orsat and Moisture Determinations

Test No. 1
Dryer Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-11-95	07-11-95	07-11-95
Dry basis (orsat)			
carbon dioxide.....	1.05	1.00	1.04
oxygen.....	19.70	19.74	19.63
nitrogen.....	79.25	79.26	79.33
Wet basis (orsat)			
carbon dioxide.....	0.87	0.82	0.86
oxygen.....	16.35	16.20	16.29
nitrogen.....	65.78	65.05	65.84
water vapor.....	17.00	17.93	17.01
Dry molecular weight.....	28.96	28.95	28.95
Wet molecular weight.....	27.09	26.99	27.09
Specific gravity.....	0.936	0.932	0.936
FO	1.143	1.160	1.221

Test No. 3
Thermal Oil Heater Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-12-95	07-12-95	07-12-95
Dry basis (orsat)			
carbon dioxide.....	6.16	6.11	6.24
oxygen.....	14.18	14.41	14.29
nitrogen.....	79.66	79.48	79.47
Wet basis (orsat)			
carbon dioxide.....	6.02	5.97	6.10
oxygen.....	13.86	14.09	13.97
nitrogen.....	77.85	77.72	77.71
water vapor.....	2.27	2.21	2.22
Dry molecular weight.....	29.55	29.55	29.57
Wet molecular weight.....	29.29	29.30	29.31
Specific gravity.....	1.012	1.012	1.013
FO	1.091	1.062	1.059

Test No. 4
Press Vent Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-13-95	07-13-95	07-13-95
Dry basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
nitrogen.....	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.18	20.24	20.14
nitrogen.....	76.36	76.58	76.21
water vapor.....	3.43	3.15	3.62
Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.47	28.50	28.45
Specific gravity.....	0.983	0.984	0.983
Water mass flow.....(LB/HR)	9189	8367	9813

3.2 Results of Particulate Determinations

Test No. 4
Press Vent Stack

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	07-13-95	07-13-95	07-13-95
Time run start/end.....(HRS)	915/1016	1105/1206	1335/1436
Static pressure.....(IN.WC)	-1.70	-1.70	-1.70
Cross sectional area (SQ.FT)	21.31	21.31	21.31
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	16.0	17.0	18.0
desiccant.....(GRAMS)	20.0	16.0	21.0
total.....(GRAMS)	36.0	33.0	39.0
Total particulate material..			
.....collected(grams)	0.1080	0.1226	0.0230
Gas meter coefficient.....	0.9996	0.9996	0.9996
Barometric pressure..(IN.HG)	28.43	28.43	28.43
Avg. orif.pres.drop..(IN.WC)	2.26	2.36	2.42
Avg. gas meter temp..(DEF-F)	89.1	90.5	99.2
Volume through gas meter....			
at meter conditions...(CF)	51.99	52.20	54.35
standard conditions.(DSCF)	47.74	47.83	49.03
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.185	.185	.185
Avg.stack gas temp ..(DEG-F)	105	109	110
Volumetric flow rate.....			
actual.....(ACFM)	108004	107819	110413
dry standard.....(DSCFM)	92137	91680	93272
Isokinetic variation.....(%)	98.6	99.3	100.0
Particulate concentration...			
actual.....(GR/ACF)	0.02975	0.03362	0.00611
dry standard.....(GR/DSCF)	0.03489	0.03955	0.00724
Particle mass rate...(LB/HR)	27.555	31.081	5.785

3.3 Results of Oxides of Nitrogen Determinations

Interpoll Labs Report No. 5-6006
Louisiana-Pacific Corporation
Tomahawk, Wisconsin

Test No. 2
Dryer Stack (Wood-fired)

Results of Oxides of Nitrogen Determinations——————————Method7E

	Run 1	Run 2	Run 3	
Date of run	07-12-95	07-12-95	07-12-95	
Time run start/end (HRS)	0745-0845	0900-1000	1145-1245	
Total sampling time (MIN)	60	60	60	
Moisture content (%V/V)	15.64	18.46	18.95	17.68
Oxygen Content (%V/V)	19.04	19.10	18.71	
Volumetric flow rate (DSCFM)	58697	56619 acfm	56281	57199
Oxides of Nitrogen concentration (ppm,dry)	25.9	24.3	23.9	
Oxides of Nitrogen emission rate (LB/HR)	10.9	9.86	9.64	

Interpoll Labs Report No. 5-6006
Louisiana-Pacific Corporation
Tomahawk, Wisconsin

Test No. 3
GEKA Stack

Results of Oxides of Nitrogen Determinations——————————Method7E

	Run 1	Run 2	Run 3
Date of run	07-12-95	07-12-95	07-12-95
Time run start/end (HRS)	1955-2055	2110-2210	2225-2325
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	2.27	2.21	2.22
Oxygen Content (%V/V)	14.18	14.41	14.29
Volumetric flow rate (DSCFM)	12328	11625	11721
Oxides of Nitrogen concentration (ppm,dry)	50.3	44.5	41.2
Oxides of Nitrogen emission rate (LB/HR)	4.44	3.71	3.46

3.4 Results of Carbon Monoxide Determinations

Test No. 1
Dryer Stack (NG)

Results of CO Determinations ----------Method 10

	Run 1	Run 2	Run 3
Date of run	07-11-95	07-11-95	07-11-95
Time run start/end.....(HRS)	0800-0900	0920-1020	1040-1140
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content.....(%V/V)	17.00	17.93	17.01
O2 Concentration.....(%V/V)	19.70	19.74	19.63
Volumetric flow rate (DSCFM)	59543	57517	58781 58619
CO concentration.....			
(GR/DSCF).....	0.0053	0.0060	0.0069
(MG/DSCM).....	12.12	13.63	15.84
(PPM-WET).....	8.63	9.60	11.29
(PPM-DRY).....	10.40	11.70	13.60
CO emission rate.....(LB/HR)	2.701	2.935	3.487

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Test No. 2
Dryer Stack (Wood-fired)

Results of CO Determinations ----------Method 10

	Run 1	Run 2	Run 3
Date of run	07-12-95	07-12-95	07-12-95
Time run start/end.....(HRS)	0745-0845	0900-1000	1145-1245
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content.....(%V/V)	15.64	18.46	18.95
O2 Concentration.....(%V/V)	19.04	19.10	18.71
Volumetric flow rate (DSCFM)	58697	56619	56281
CO concentration.....			
(GR/DSCF).....	0.0103	0.0088	0.0112
(MG/DSCM).....	23.53	20.04	25.63
(PPM-WET).....	17.04	14.02	17.83
(PPM-DRY).....	20.20	17.20	22.00
CO emission rate.....(LB/HR)	5.171	4.247	5.400

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Test No. 3
Thermal Oil Heater Stack

Results of CO Determinations ----------Method 10

	Run 1	Run 2	Run 3
Date of run	07-12-95	07-12-95	07-12-95
Time run start/end.....(HRS)	1955-2055	2110-2210	2225-2325
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content.....(%V/V)	2.27	2.21	2.22
O2 Concentration.....(%V/V)	14.18	14.41	14.29
Volumetric flow rate (DSCFM)	12328	11625	11721
CO concentration.....			
(GR/DSCF).....	0.0052	0.0040	0.0045
(MG/DSCM).....	11.88	9.09	10.25
(PPM-WET).....	9.97	7.63	8.60
(PPM-DRY).....	10.20	7.80	8.80
CO emission rate.....(LB/HR)	0.548	0.395	0.450
CO emission factor.....(LB/MMBTU)	0.022	0.018	0.020

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Test No. 4
Press Vent Stack

Results of CO Determinations ----------Method 10

	Run 1	Run 2	Run 3
Date of run	07-13-95	07-13-95	07-13-95
Time run start/end.....(HRS)	0915-1016	1105-1206	1335-1436
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content.....(%V/V)	3.43	3.15	3.62
O2 Concentration.....(%V/V)	20.90	20.90	20.90
Volumetric flow rate (DSCFM)	92137	91680	93272
CO concentration.....			
(GR/DSCF).....	0.0066	0.0069	0.0049
(MG/DSCM).....	15.03	15.84	11.18
(PPM-WET).....	12.46	13.17	9.25
(PPM-DRY).....	12.90	13.60	9.60
CO emission rate.....(LB/HR)	5.184	5.438	3.905

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

4 RESULTS OF FUEL ANALYSES

INTERPOLL LABORATORIES, INC.
Fuel Laboratory
(612) 786-6020

7/31/95

Client: L.P. TOMAHAWK

Laboratory Log Number: 6006-01-9208

Source: Dryer

Sample Identification: WOOD

Ultimate Analysis WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			3.65
Ash		0.72	0.70
Carbon	50.12	49.76	47.94
Hydrogen	6.01	5.97	5.75
Nitrogen	0.30	0.30	0.29
Oxygen (calculated)	43.54	43.22	41.64
Sulfur	0.03	0.03	0.03
Heating Value, BTU/LB	8082	8023	7730

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

9726

INTERPOLL LABORATORIES, INC.
Fuel Laboratory
(612) 786-6020

7/31/95

Client: L.P. TOMAHAWK

Laboratory Log Number: 6006-02-9209

Source: Dryer

Sample Identification: BARK

Ultimate Analysis WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			38.71
Ash		3.73	2.29
Carbon	52.14	50.19	30.76
Hydrogen	6.11	5.88	3.60
Nitrogen	0.81	0.78	0.48
Oxygen (calculated)	40.88	39.35	24.12
Sulfur	0.06	0.06	0.06
Heating Value, BTU/LB	8455	8139	4988

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

9860

APPENDIX A

RESULTS OF VOLUMETRIC FLOW RATE DETERMINATIONS

Test No. 1
Dryer Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-11-95
Time of Determination.....(HRS)	800
Barometric pressure.....(IN.HG)	28.62
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	20
Shape of duct.....	Round
Stack diameter.....(IN)	59
Duct area.....(SQ.FT)	18.99
Direction of flow.....	UP
Static pressure.....(IN.WC)	-1.04
Avg. gas temp.....(DEG-F)	133
Moisture content.....(% V/V)	17.00
Avg. linear velocity.....(FT/SEC)	74.1
Gas density.....(LB/ACF)	.05976
Molecular weight.....(LB/LBMOLE)	28.96
Mass flow of gas.....(LB/HR)	302848
Volumetric flow rate.....	
actual.....(ACFM)	84456
dry standard.....(DSCFM)	59543

Test No. 1
Dryer Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-11-95
Time of Determination.....(HRS)	920
Barometric pressure.....(IN.HG)	28.62
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	20
Shape of duct.....	Round
Stack diameter.....(IN)	59
Duct area.....(SQ.FT)	18.99
Direction of flow.....	UP
Static pressure.....(IN.WC)	-1.13
Avg. gas temp.....(DEG-F)	135
Moisture content.....(% V/V)	17.93
Avg. linear velocity.....(FT/SEC)	72.7
Gas density.....(LB/ACF)	.05931
Molecular weight.....(LB/LBMOLE)	28.95
Mass flow of gas.....(LB/HR)	294684
Volumetric flow rate.....	
actual.....(ACFM)	82803
dry standard.....(DSCFM)	57517

5-6006
Pacific
awk, WI

Test No. 1
Dryer Stack

Results of Volumetric Flow Rate Determination-------Method 2		Method 2
Date of Determination.....	07-11-95	07-12-95
Time of Determination.....(HRS)	1040	745
Barometric pressure.....(IN.HG)	28.62	28.52
Pitot tube coefficient.....	.84	.84
Number of sampling ports.....	2	2
Total number of points.....	20	20
Shape of duct.....	Round	Round
Stack diameter.....(IN)	59	59
Duct area.....(SQ.FT)	18.99	18.99
Direction of flow.....	UP	UP
Static pressure.....(IN.WC)	-1.14	-1.04
Avg. gas temp.....(DEG-F)	133	135
Moisture content.....(% V/V)	17.01	15.64
Avg. linear velocity.....(FT/SEC)	73.2	72.4
Gas density.....(LB/ACF)	.05974	.05986
Molecular weight.....(LB/LBMOLE)	28.95	29.05
Mass flow of gas.....(LB/HR)	298954	296230
Volumetric flow rate.....		
actual.....(ACFM)	83406	82478
dry standard.....(DSCFM)	58781	58697

83555

Test No. 2
Dryer Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-12-95
Time of Determination.....(HRS)	900
Barometric pressure.....(IN.HG)	28.52
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	20
Shape of duct.....	Round
Stack diameter.....(IN)	59
Duct area.....(SQ.FT)	18.99
Direction of flow.....	UP
Static pressure.....(IN.WC)	-1.05
Avg. gas temp.....(DEG-F)	136
Moisture content.....(% V/V)	18.46
Avg. linear velocity.....(FT/SEC)	72.4
Gas density.....(LB/ACF)	.05909
Molecular weight.....(LB/LBMOLE)	29.06
Mass flow of gas.....(LB/HR)	292331
Volumetric flow rate.....	
actual.....(ACFM)	82451
dry standard.....(DSCFM)	56619

Test No. 2
Dryer Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-12-95
Time of Determination.....(HRS)	1145
Barometric pressure.....(IN.HG)	28.52
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	20
Shape of duct.....	Round
Stack diameter.....(IN)	59
Duct area.....(SQ.FT)	18.99
Direction of flow.....	UP
Static pressure.....(IN.WC)	-1.06
Avg. gas temp.....(DEG-F)	137
Moisture content.....(% V/V)	18.95
Avg. linear velocity.....(FT/SEC)	72.5
Gas density.....(LB/ACF)	.05889
Molecular weight.....(LB/LBMOLE)	29.07
Mass flow of gas.....(LB/HR)	291859
Volumetric flow rate.....	
actual.....(ACFM)	82595
dry standard.....(DSCFM)	56281

Test No. 3
GEKA Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-12-95
Time of Determination.....(HRS)	1955
Barometric pressure.....(IN.HG)	28.43
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	16
Shape of duct.....	Round
Stack diameter.....(IN)	42
Duct area.....(SQ.FT)	9.62
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.24
Avg. gas temp.....(DEG-F)	348
Moisture content.....(% V/V)	3.98
Avg. linear velocity.....(FT/SEC)	35.8
Gas density.....(LB/ACF)	.04688
Molecular weight.....(LB/LBMOLE)	29.55
Mass flow of gas.....(LB/HR)	58200
Volumetric flow rate.....	
actual.....(ACFM)	20690
dry standard.....(DSCFM)	12328

Test No. 3
GEKA Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-12-95
Time of Determination.....(HRS)	2110
Barometric pressure.....(IN.HG)	28.43
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	16
Shape of duct.....	Round
Stack diameter.....(IN)	42
Duct area.....(SQ.FT)	9.62
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.26
Avg. gas temp.....(DEG-F)	351
Moisture content.....(% V/V)	16.06
Avg. linear velocity.....(FT/SEC)	38.8
Gas density.....(LB/ACF)	.04447
Molecular weight.....(LB/LBMOLE)	29.55
Mass flow of gas.....(LB/HR)	59770
Volumetric flow rate.....	
actual.....(ACFM)	22402
dry standard.....(DSCFM)	11625

Test No. 3
GEKA Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-12-95
Time of Determination.....(HRS)	2225
Barometric pressure.....(IN.HG)	28.43
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	16
Shape of duct.....	Round
Stack diameter.....(IN)	42
Duct area.....(SQ.FT)	9.62
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.24
Avg. gas temp.....(DEG-F)	348
Moisture content.....(% V/V)	16.01
Avg. linear velocity.....(FT/SEC)	39.0
Gas density.....(LB/ACF)	.04467
Molecular weight.....(LB/LBMOLE)	29.57
Mass flow of gas.....(LB/HR)	60271
Volumetric flow rate.....	
actual.....(ACFM)	22490
dry standard.....(DSCFM)	11721

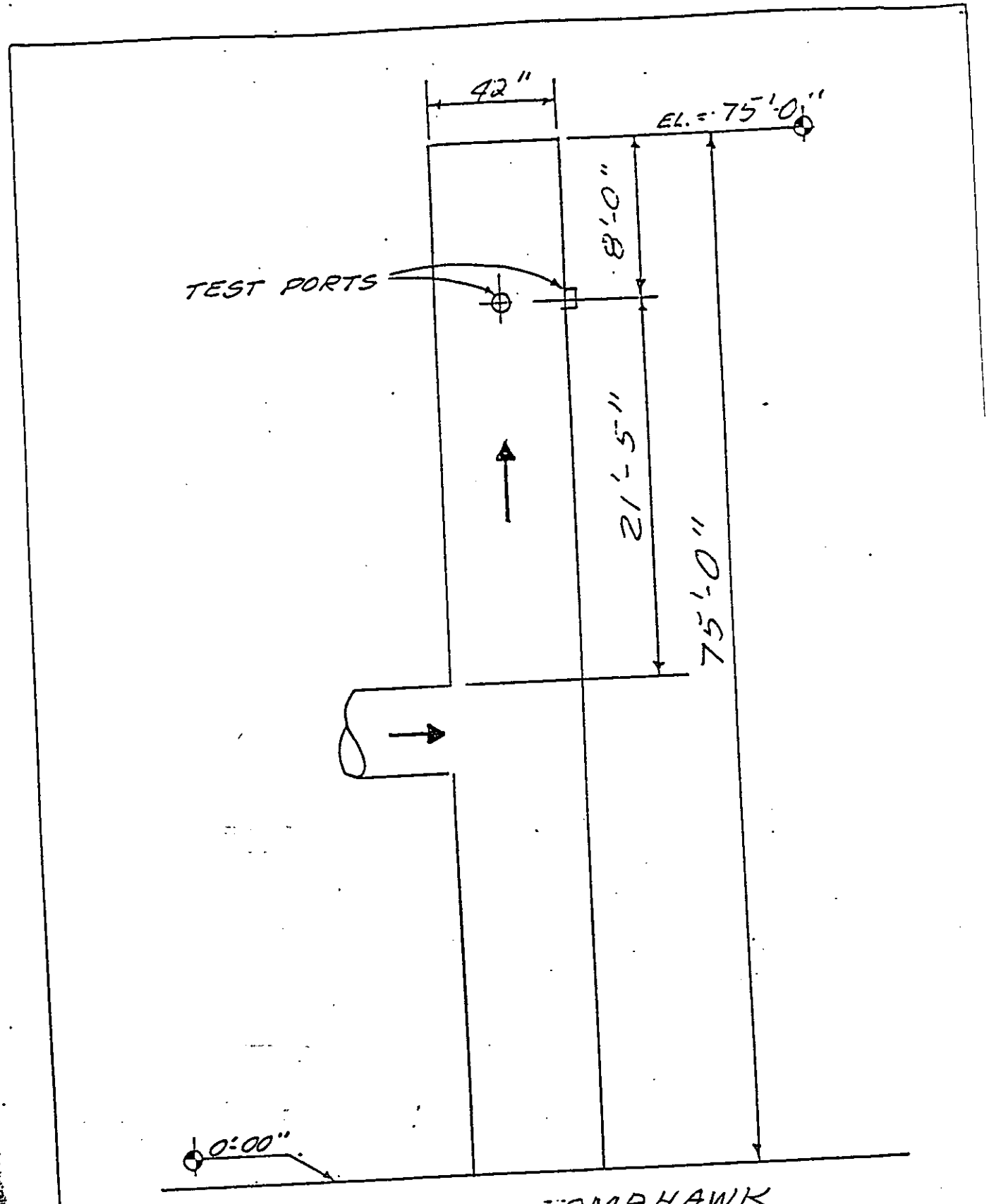
Test No. 4
Press Vent Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-13-95
Time of Determination.....(HRS)	900
Barometric pressure.....(IN.HG)	28.43
Pitot tube coefficient.....	.84
Number of sampling ports.....	1
Total number of points.....	12
Shape of duct.....	Round
Stack diameter.....(IN)	62.5
Duct area.....(SQ.FT)	21.31
Direction of flow.....	UP
Static pressure.....(IN.WC)	-1.7
Avg. gas temp.....(DEG-F)	104
Moisture content.....(% V/V)	3.60
Avg. linear velocity.....(FT/SEC)	81.9
Gas density.....(LB/ACF)	.06542
Molecular weight.....(LB/LBMOLE)	28.84
Mass flow of gas.....(LB/HR)	410891
Volumetric flow rate.....	
actual.....(ACFM)	104674
dry standard.....(DSCFM)	89370

APPENDIX B

LOCATION OF TEST PORTS

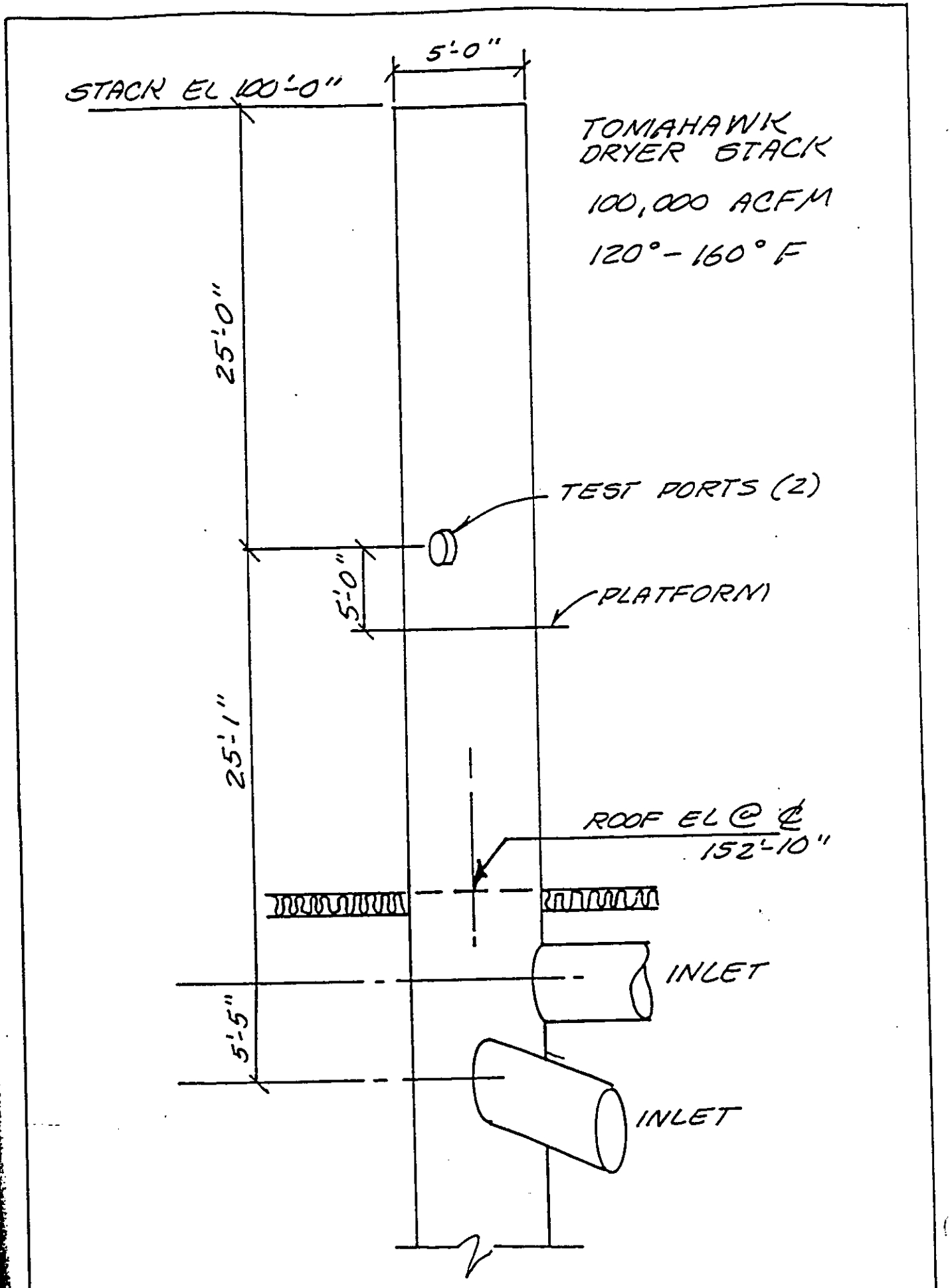


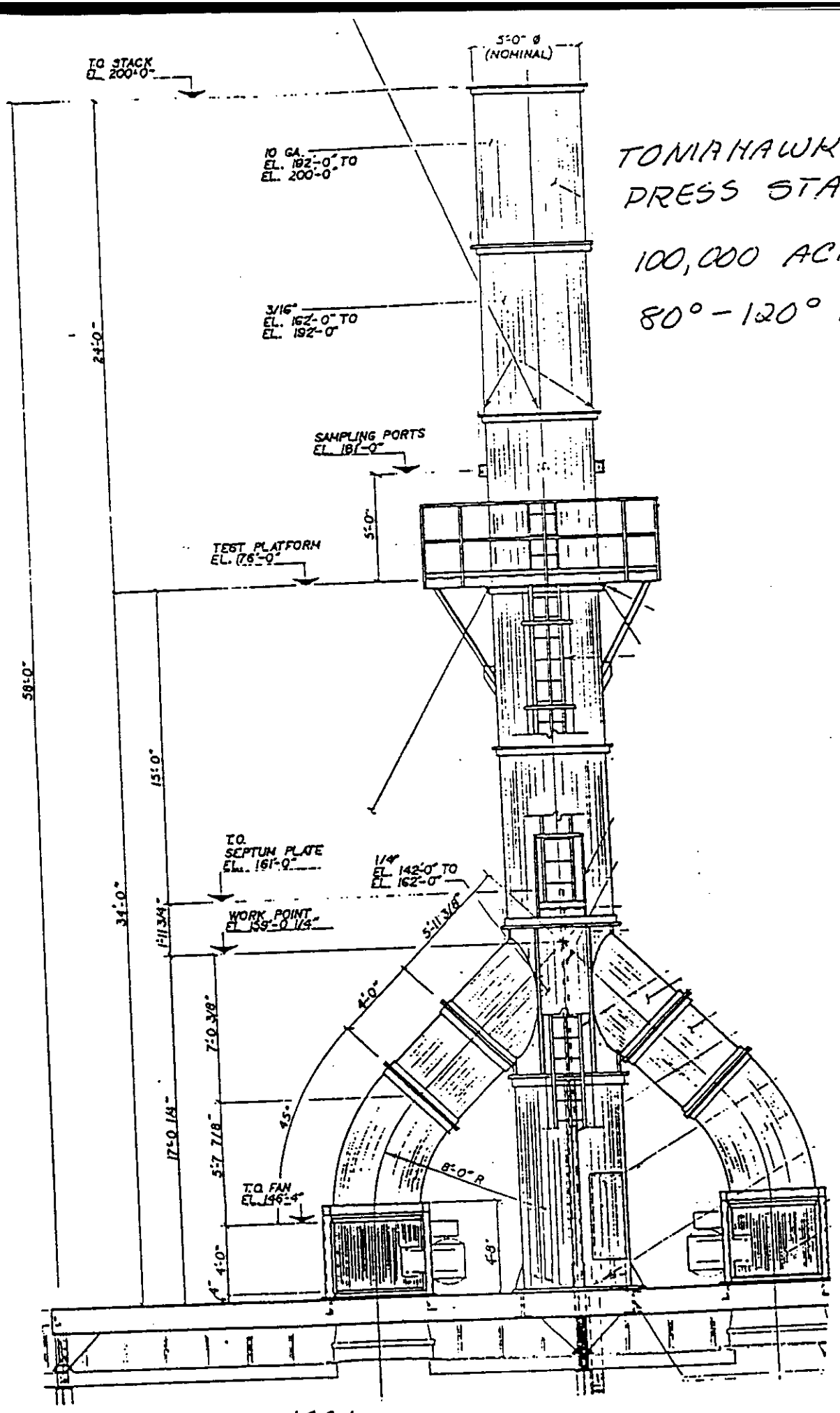
L-P TOMAHAWK
THERMAL OIL HEATER STACK

20,000 - 32,600 ACFM

250 - 350° F

N.T.S.


5'-0"
STACK EL 100'-0"
TOMAHAWK
DRYER STACK
100,000 ACFM
120° - 160° F
25'-0"
TEST PORTS (2)
5'-0"
PLATFORM
25'-1"
ROOF EL @ ℄
152'-10"
INLET
5'-5"
INLET



TOMAHAWK, W
DRESS STACK

100,000 ACFM

80° - 120° F

FLOOR EL = 100'

APPENDIX C

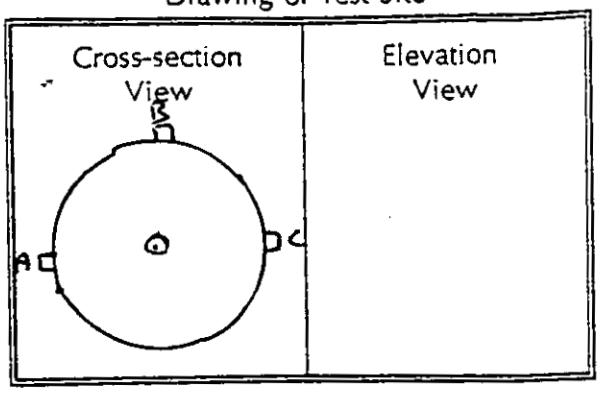
FIELD DATA SHEETS

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP/Tomahawk
Source: Dryer Stack
Test: 1 Run 1 Date 7-11-95
Stack Dimen.: 59 IN.
Dry Bulb: 133 °F Wet bulb: ____ °F
Manometer: ☐ Reg. ☐ Exp ☒ Elec.
Barometric Pressure: 28.62 IN.HG
Static Pressure: -1.04 IN.WC
Operators: B Ashenbach T Hansen
Pitot No.: 27U-8 C_p: .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 4.25 IN.		Time Start: 0800 HRS	
B-1	.026	1.534	5.754	1.28	
2	.082	4.838	9.088	1.36	
3	.146	8.614	12.864	1.48	
4	.226	13.334	17.584	1.58	
5	.342	20.178	24.428	1.53	
6	.658	38.822	43.072	1.63	
7	.774	45.666	49.916	1.52	
8	.854	50.386	54.636	1.30	
9	.918	54.162	58.412	1.26	
10	.974	57.466	61.716	1.09	
C-1				1.14	
2				1.42	
3				1.56	
4				1.46	
5				1.58	
6				1.47	
7				1.39	
8				1.43	
9				1.34	
10				1.14	
		Avg $\sqrt{P}$	1.1769		
		ST	133		
		FPS	74.01213		
		ACFM	84311.19		
		DSCFM	59441.35		
Temp. Meas. Device & S/N: PDT 33				Time End: 0900 HRS	

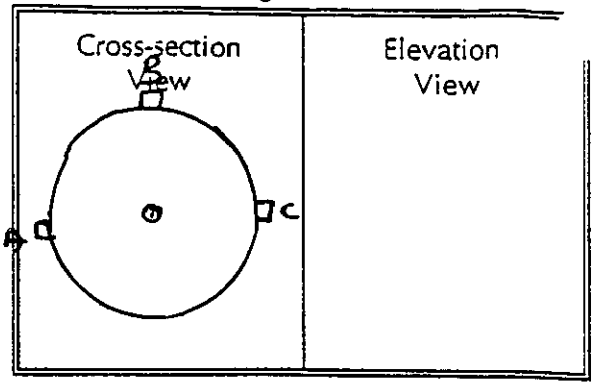
R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job CP/ Tomahawk
Source Dryer STACK
Test 1 Run 2 Date 2-11-95
Stack Dimen. 59 IN.
Dry Bulb 135 °F Wet bulb ____ °F
Manometer ☐ Reg. ☐ Exp ☑ Elec.
Barometric Pressure 28.60 IN.HG
Static Pressure -1.13 IN.WC
Operators B Anderson M T Hansen
Pitot No. 72-8 C_p .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 4.25 IN.		Time Start: 0920 HRS	
C - 1				1.18	
2				1.29	
3				1.37	
4				1.35	
5				1.33	
6				1.42	
7				1.38	
8				1.36	
9				1.32	
10				1.09	
B - 1				1.07	
2				1.32	
3				1.37	
4				1.40	
5				1.49	
6				1.46	
7				1.26	
8				1.48	
9				1.49	
10				1.15	
		Avg $\sqrt{P}$	1.1515		
		ST	135		
		FPS	72.68837		
		ACFM	82803.72		
		DSCFM	57516.7		
Temp. Meas. Device & S/N: PDT 33				Time End: 1020 HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

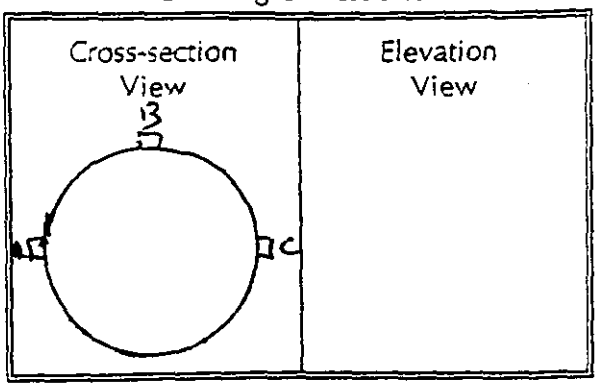
032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP / Tomahawk
Source: Dryer Stack
Test: 1 Run 3 Date 7-11-95
Stack Dimen.: 59 IN.
Dry Bulb: 133 °F Wet bulb: ____ °F
Manometer: ☐ Reg. ☐ Exp ☒ Elec.
Barometric Pressure: 28.62 IN.HG
Static Pressure: -1.14 IN.WC
Operators: B Asselbach T Hansen
Pitot No.: 27-8 C_p .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 4.25 IN.		Time Start: 1040 HRS	
C - 1				1.17	
2				1.32	
3				1.49	
4				1.43	
5				1.32	
6				1.47	
7				1.42	
8				1.39	
9				1.25	
10				1.11	
B - 1				1.19	
2				1.40	
3				1.42	
4				1.48	
5				1.51	
6				1.41	
7				1.43	
8				1.38	
9				1.34	
10				1.22	
		Avg $\sqrt{\Delta P}$	1.164092		
		ST	133		
		PBS	73.21785		
		ACFM	83406.38		
		DSCFM	58781.2		
Temp. Meas. Device & S/N: PDT 33				Time End: 1140 HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LP / Tomahawk
Source Dryer Stack
Date 7-11-95 Test 1 Run 1
Wet Bulb ____
Dry Bulb ____

Operator(s) BA TH
Meter Box No. CON 1 Gasmeter Coef. .9950
ΔH@ — in.WC Bar.Press 28.62
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☒
Post Test: .010 cfm at 15 in.WC ☒

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(0800	782.860)									
1	5	783.063	1000 cc	2	133	236	—	—	68	—	—
1	10	783.214	1000 cc	2	133	238	—	—	68	—	—
1	15	783.423	1000 cc	2	133	240	—	—	68	—	—
1	20	783.635	1000 cc	2	133	237	—	—	68	—	—
2	25	783.841	1000 cc	2	133	242	—	—	68	—	—
2	30	784.028	1000 cc	2	133	242	—	—	68	—	—
2	35	784.226	1000 cc	2	133	240	—	—	68	—	—
2	40	784.430	1000 cc	2	133	238	—	—	68	—	—
3	45	784.620	1000 cc	2	133	241	—	—	68	—	—
3	50	784.825	1000 cc	2	133	243	—	—	68	—	—
3	55	785.017	1000 cc	2	133	245	—	—	68	—	—
3	60	785.225	1000 cc	2	133	243	—	—	68	—	—
	(0800	)									
	θ - 60	V_m - 2.365	ΔH - 1000cc		$\bar{t}_s$ - 133				$\bar{t}_m$ - 68		

Condensate Data: Free Moisture

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	210	200	10
Desiccant	1558	1553	5
		Total	15

Preliminary Results of SO_2 Concentration Determination		
V_{std} -	2.25	DSCF
Moisture Gravimetric -	17.00	%v/v
Moisture Psychrometric -		%v/v
SO_2, DRY -		PPM
SO_2, WET -		PPM
LB/MMBtu -		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job CP / Tomahawk
Source Dryer STACK
e 2-11-95 Test 1 Run 2
Wet Bulb ____
Dry Bulb ____

Operator(s) GA TH
Meter Box No. CEM 1 Gasmeter Coef. .9950
ΔH@ ____ in.WC Bar.Press 28.62 in.Hg
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☒
Post Test: 0.0 cfm at 15 in.WC ☒

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(0920)	(785.300)									
1	5	785.500	1000 cc	2	135	237	—	—	68	—	—
1	10	785.698	1000 cc	2	135	240	—	—	68	—	—
1	15	785.893	1000 cc	2	135	243	—	—	68	—	—
1	20	786.088	1000 cc	2	135	241	—	—	68	—	—
2	25	786.283	1000 cc	2	135	239	—	—	68	—	—
2	30	786.471	1000 cc	2	135	240	—	—	68	—	—
2	35	786.661	1000 cc	2	135	241	—	—	68	—	—
2	40	786.853	1000 cc	2	135	240	—	—	68	—	—
3	45	787.050	1000 cc	2	135	243	—	—	68	—	—
3	50	787.243	1000 cc	2	135	241	—	—	68	—	—
3	55	787.437	1000 cc	2	135	237	—	—	68	—	—
3	60	787.622	1000 cc	2	135	240	—	—	68	—	—
	(1020)										
	θ = 60	V_m 2.322	ΔH = 1000 cc		$\bar{t}$ = 135				$\bar{t}$ = 68		

Condensate Data: Free Moisture

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	210	200	10
Desiccant	1390	1377	3
		Total	13

Preliminary Results of SO_2 Concentration Determination		
V_{std} =	2.20	DSCF
Moisture Gravimetric =	17.95	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job CP / Tomahawk
Source Dryer Stack
Date 7-11-95 Test 1 Run 3
Wet Bulb _____
Dry Bulb _____

Operator(s) SA TH
Meter Box No. CEM 1 Gasmeter Coef. .9950
ΔH@ — in.WC Bar.Press 28.62

Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☒
Post Test: 0.0 cfm at 15 in.WC ☒

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(1040)	(787.700)									
1	5	787.881	1000 cc	2	133	239	—	—	68	—	—
1	10	788.091	1000 cc	2	133	241	—	—	68	—	—
1	15	788.274	1000 cc	2	133	247	—	—	68	—	—
1	20	788.476	1000 cc	2	133	247	—	—	68	—	—
2	25	788.673	1000 cc	2	133	246	—	—	68	—	—
2	30	788.860	1000 cc	2	133	250	—	—	68	—	—
2	35	789.066	1000 cc	2	133	248	—	—	68	—	—
2	40	789.255	1000 cc	2	133	245	—	—	68	—	—
3	45	789.456	1000 cc	2	133	247	—	—	68	—	—
3	50	789.645	1000 cc	2	133	251	—	—	68	—	—
3	55	789.848	1000 cc	2	133	249	—	—	68	—	—
3	60	790.044	1000 cc	2	133	250	—	—	68	—	—
	(1140)										
	θ = 60	V_m = 2.344	ΔH = 2000 cc		$\bar{t}_s$ = 133				$\bar{t}_m$ = 68		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	308	200	8
Desiccant	1560	1558	2
		Total	10

Preliminary Results of SO_2 Concentration Determination		
V_{ms} =	2.23	DSCF
Moisture Gravimetric =	17.01	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: CPI Tomahawk
Source: Dryer Stack
Test: 2 Run: A Date: 7-12-95
Stack Dimen.: 59 IN.
Dry Bulb: 135 °F Wet bulb: 134 °F
Manometer: ☐ Reg. ☐ Exp ☒ Elec.
Barometric Pressure: 28.52 IN.HG
Static Pressure: -1.04 IN.WC
Operators: G Bachenberg Troy Hansen
Pitot No.: 27W-8 C_p: .84

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 4.25 IN.		Time Start: 0745 HRS	
C-1				1.12	
2				1.32	
3				1.32	
4				1.42	
5				1.42	
6				1.39	
7				1.41	
8				1.32	
9				1.29	
10				1.14	
B-1				1.19	
2				1.39	
3				1.41	
4				1.43	
5				1.46	
6				1.45	
7				1.40	
8				1.34	
9				1.28	
10				1.16	
		Avg √P	1.15342		
		ST	135		
		FPS	72.46978		
		ACFM	82554.21		
		DSCFM	58750.91		

Temp. Meas. Device & S/N: PDT 33
Time End: 0845 HRS

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job CP/ Tomahawk
Source Dryer Stack
Test 2 Run 2A Date 7-12-95
Stack Dimen. 59 IN.
Dry Bulb 136 °F Wet bulb ____ °F
Manometer ☐ Reg. ☐ Exp ☑ Elec.
Barometric Pressure 28.52 IN.HG
Static Pressure -1.05 IN.WC
Operators B Schubert & T Hansen
Pitot No. 27-8 C_p .84

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 4.75 IN.		Time Start: 0900 HRS	
1				1.15	
2				1.28	
3				1.32	
4				1.41	
5				1.40	
6				1.38	
7				1.38	
8				1.35	
9				1.29	
10				1.16	
1				1.16	
2				1.27	
3				1.37	
4				1.37	
5				1.41	
6				1.33	
7				1.38	
8				1.40	
9				1.29	
10				1.14	
		Avg $\sqrt{P}$	1.14451		
		ST	136		
		FPS	72.37531		
		ACFM	82446.6		
		DSCFM	56616.34		

Temp. Meas. Device & S/N: PDT 33
Time End: 1000 HR

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: CD / Tomahawk
Source: Dryer Stack
Test: 2 Run: 3A Date:
Stack Dimen.: 59 IN.
Dry Bulb: 37 °F Wet bulb: °F
Manometer: ☐ Reg. ☐ Exp ☑ Elec.
Barometric Pressure: 28.52 IN.HG
Static Pressure: -1.06 IN.WC
Operators: B Bekebrede - T Hansen
Pitot No.: 27-8 C_p: .84

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 4.25 IN.		Time Start: 1145 HRS	
C-1				1.13	
2				1.29	
3				1.33	
4				1.35	
5				1.39	
6				1.40	
7				1.35	
8				1.32	
9				1.31	
10				1.13	
B-1				1.18	
2				1.29	
3				1.38	
4				1.40	
5				1.42	
6				1.42	
7				1.38	
8				1.39	
9				1.28	
10				1.16	
		Avg $\sqrt{P}$	1.114173		
		T_S	1.37		
		FPS	22.47606		
		ACFM	82561.36		
		DSCFM	56758.6		

Temp. Meas. Device & S/N: PDT 33
Time End: 1245 HRS

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job CP / Tomahawk
Source Dryer Stack
Date 7-12-95 Test 2 Run 1A
Wet Bulb
Dry Bulb

Operator(s) SA TH
Meter Box No. CEM 1 Gasmeter Coef. .9950
ΔH@ — in.WC Bar.Press 28.52
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC
Post Test: 0.0 cfm at 15 in.WC

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(0745)	(794.975)									
	5	795.212	1000cc	2		240	—	47	68	—	—
	10	795.400	1000cc	2		243	—	45	68	—	—
	15	795.588	1000cc	2		239	—	43	68	—	—
	20	795.802	1000cc	2		241	—	43	68	—	—
	25	795.992	1000cc	2		243	—	41	68	—	—
	30	796.222	1000cc	2		240	—	39	68	—	—
	35	796.390	1000cc	2		241	—	39	68	—	—
	40	796.558	1000cc	2		250	—	37	68	—	—
	45	796.726	1000cc	2		245	—	39	68	—	—
	50	796.985	1000cc	2		247	—	38	68	—	—
	55	797.193	1000cc	2		250	—	38	68	—	—
	60	797.385	1000cc	2		248	—	39	68	—	—
	(0845)										
	θ = 60	V_m = 2.410	ΔH = 1000cc		$\bar{t}$ =				$\bar{t}_m$ = 68		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	206	200	6
Desiccant	1561	1558	3
		Total	9

Preliminary Results of SO_2 Concentration Determination		
V_{std} =	2.28	DSCF
Moisture Gravimetric =	15.64	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LP / Tomahawk
Source Dryer Stack
Date 7-12-95 Test 2 Run 2A
Wet Bulb ____
Dry Bulb ____

Operator(s) BA TH
Meter Box No. CEM 1 Gasmeter Coef. .9950
ΔH@ — in.WC Bar.Press 28.52 in.Hg
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☒
Post Test: 0.0 cfm at 15 in.WC ☒

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(0900)	(797.463)									
1	5	797.650	1000cc	2		245	-	39	68	—	—
1	10	797.852	1000cc	2		247	-	39	68	—	—
1	15	798.052	1000cc	2		250	-	42	65	—	—
1	20	798.241	1000cc	2		246	-	41	68	—	—
2	25	798.430	1000cc	2		237	-	40	68	—	—
2	30	798.640	1000cc	2		240	-	38	68	—	—
2	35	798.848	1000cc	2		238	-	37	68	—	—
2	40	799.039	1000cc	2		240	-	37	68	—	—
3	45	799.231	1000cc	2		237	-	39	68	—	—
3	50	799.440	1000cc	2		240	-	38	68	—	—
3	55	799.634	1000cc	2		238	-	41	68	—	—
3	60	799.838	1000cc	2		240	-	40	68	—	—
	(1000)										
	θ = 60	V_m = 2.375	ΔH = 1000cc		$\bar{t}$ =				$\bar{t}_m$ = 68		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	208	200	8
Desiccant	1395	1390	5
		Total	13

Preliminary Results of SO_2 Concentration Determination		
V_{std} =	2.25	DSCF
Moisture Gravimetric =	18.46	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

091294-G:\STACK\WP\FORMS\S-287AL

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LP / Tomahawk
Source Dryer Stack
Date 7-12-95 Test 2 Run 3a
Wet Bulb ____
Dry Bulb ____

Operator(s) SA TH
Meter Box No. Can 1 Gasmeter Coef. .9950
ΔH@ — in.WC Bar.Press 28.52
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☒
Post Test: 6.0 cfm at 15 in.WC ☒

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(1145)	(799.884)									
1	5	800.091	1000 cc	2		247	—	45	68	—	—
1	10	800.278	1000 cc	2		251	—	43	68	—	—
1	15	800.476	1000 cc	2		250	—	43	68	—	—
1	20	800.673	1000 cc	2		244	—	40	68	—	—
2	25	800.868	1000 cc	2		247	—	39	68	—	—
2	30	801.063	1000 cc	2		247	—	38	68	—	—
2	35	801.254	1000 cc	2		250	—	39	68	—	—
2	40	801.452	1000 cc	2		244	—	41	68	—	—
3	45	801.650	1000 cc	2		248	—	39	68	—	—
3	50	801.845	1000 cc	2		250	—	40	68	—	—
3	55	802.031	1000 cc	2		249	—	38	68	—	—
3	60	802.228	1000 cc	2		250	—	40	68	—	—
	(1245)										
	θ - 60	V_m - 2.344	ΔH - 1000 cc		$\bar{t}$ -				$\bar{t}_m$ - 68		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	209	200	9
Desiccant	1420	1417	3
		Total	12

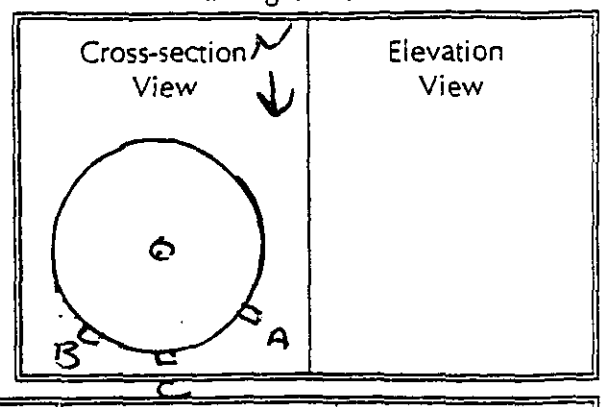
Preliminary Results of SO_2 Concentration Determination		
V_{wsd} -	2.22	DSCF
Moisture Gravimetric -	18.95	%v/v
Moisture Psychrometric -		%v/v
SO_2, DRY -		PPM
SO_2, WET -		PPM
LB/MMBtu -		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: UP / Tomahawk
Source: GE14 STACK
Test: 3 Run 6 Date 7-12-95
Stack Dimen.: 42 IN.
Dry Bulb: 332 °F Wet bulb: 146 °F
Manometer: ☐ Reg. ☐ Exp ☒ Elec.
Barometric Pressure: 28.43 IN.HG
Static Pressure: -.28 IN.WC
Operators: B Aschenbach T Hansen
Pitot No.: DW-4 C_p .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 1.25 IN.		Time Start: 0730 HRS	
B -1				.29	
2				.33	
3				.31	
4				.26	
5				.31	
6				.25	
7				.23	
8				.23	
A -1				.22	
2				.26	
3				.25	
4				.24	
5				.33	
6				.28	
7				.29	
8				.21	
9					
		ACFM	21152		
		DSCFM	12050		

Temp. Meas. Device & S/N: PDT 33
Time End: 0740 HRS

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: CP / Tomahawk
Source: GEICA STACK
Test: 3 Run: 1 Date: 7-12-95
Stack Dimen.: 42 IN.
Dry Bulb: 348 °F Wet bulb: 147 °F
Manometer: ☐ Reg. ☐ Exp ☒ Elec.
Barometric Pressure: 28.93 IN.HG
Static Pressure: -.24 IN.WC
Operators: G Aschenbrenner T Thomsen
Pitot No.: 270-4 C_p: .84

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 1.75 IN.		Time Start: 1955 HRS	
B-1	.032	1.344	3.094	.19	
2	.105	4.41	6.16	.23	
3	.194	8.148	9.898	.26	
4	.323	13.566	15.316	.26	
5	.677	28.434	30.184	.28	
6	.806	33.852	35.602	.27	
7	.895	37.590	39.340	.25	
8	.968	40.656	42.406	.19	
B-1				.24	
2				.30	
3				.34	
4				.34	
5				.29	
6				.26	
7				.22	
8				.19	
		Avg $\sqrt{P}$	.548183		
		ST	348		
		FPS	35.84185		
		ACFM	20690.32		
		DSCFM	12328.13		

Temp. Meas. Device & S/N: PDT 33
Time End: 2055 HRS

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job EPI Tomahawk
Source Geico Stack
Test 3 Run 2 Date 7-12-93
Stack Dimen. 42 IN.
Dry Bulb 351 °F Wet bulb ____ °F
Manometer ☐ Reg. ☐ Exp ☒ Elec.
Barometric Pressure 28.43 IN.HG
Static Pressure -.26 IN.WC
Operators S Bachtold T Hansen
Pitot No. 27J-4 C_p .84

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 1.25 IN.		Time Start: 2110 HRS	
A-1				.22	
2				.27	
3				.29	
4				.31	
5				.34	
6				.36	
7				.32	
8				.23	
B-1				.28	
2				.33	
3				.35	
4				.33	
5				.28	
6				.24	
7				.22	
8				.20	
		Avg $\sqrt{\Delta P}$	.5323305		
		ΔT	351		
		FPS	36.80781		
		ACFM	22402.47		
		DSCFM	11625.27		

Temp. Meas. Device & S/N: PDT 33
Time End: 2210 HRS

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job CP / Tomahawk
Source Geka Stack
Test 3 Run 3 Date 7-12-95
Stack Dimen. 42 IN.
Dry Bulb 348 °F Wet bulb _____ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.43 IN.HG
Static Pressure -.24 IN.WC
Operators S Stachlech T Hansen
Pitot No. 220-4 C_p .84

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 1.75 IN.		Time Start: 2225 HRS	
C 1				.22	
2				.26	
3				.28	
4				.28	
5				.34	
6				.35	
7				.31	
8				.27	
B - 1				.24	
2				.34	
3				.35	
4				.36	
5				.30	
6				.26	
7				.24	
8				.22	
		Avg √P	.535594		
		ST	348		
		FPS	38.95443		
		ACFM	22487.12		
		DSCFM	11720.05		

Temp. Meas. Device & S/N: PDT 33
Time End: 2325 HRS

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LD/ Tomahawk
Source Glock Stack
Date 7-12-95 Test 3 Run 1
Wet Bulb
Dry Bulb 332

Operator(s) SA TH
Meter Box No. Leal Gasmeter Coef. .9950
ΔH@ — in.WC Bar.Press 28.43 in.Hg
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☒
Post Test: 0.0 cfm at 15 in.WC ☒

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(955)	(802.321)									
1	5	802.500	1000 cc	2		243	—	48	68	—	—
1	10	802.718	1000 cc	2		248	—	45	68	—	—
1	15	802.902	1000 cc	2		251	—	43	68	—	—
1	20	803.105	1000 cc	2		251	—	40	68	—	—
2	25	803.314	1000 cc	2		248	—	38	68	—	—
2	30	803.509	1000 cc	2		250	—	37	68	—	—
2	35	803.710	1000 cc	2		251	—	39	68	—	—
2	40	803.911	1000 cc	2		247	—	41	68	—	—
3	45	804.110	1000 cc	2		250	—	38	68	—	—
3	50	804.315	1000 cc	2		247	—	39	68	—	—
3	55	804.511	1000 cc	2		248	—	37	68	—	—
3	60	804.724	1000 cc	2		250	—	39	68	—	—
	(2055)										
	θ = 60	V_m = 1.403	ΔH = 1000 cc		$\bar{t}$ =				$\bar{t}_m$ = 68		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	202	200	2
Desiccant	1395	1395	0
		Total	2

Preliminary Results of SO_2 Concentration Determination		
V_{sd} =	2.27	DSCF
Moisture Gravimetric =	3.98	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LP/ Tomahawk
Source GEICA STACK
Date 7-12-95 Test 3 Run 2
Wet Bulb ____
Dry Bulb ____

Operator(s) SA TH
Meter Box No. Com 1 Gasmeter Coef. .9950
ΔH@ — in.WC Bar.Press 28.43 in
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC
Post Test: 0.0 cfm at 15 in.WC

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(2110)	(804.826)									
1	5	805.018	1000 cc	2		248	—	39	68	—	—
1	10	805.210	1000 cc	2		256	—	37	68	—	—
1	15	805.400	1000 cc	2		257	—	40	68	—	—
1	20	805.600	1000 cc	2		250	—	38	68	—	—
2	25	805.797	1000 cc	2		247	—	37	68	—	—
2	30	805.999	1000 cc	2		251	—	39	68	—	—
2	35	806.190	1000 cc	2		247	—	41	68	—	—
2	40	806.350	1000 cc	2		250	—	40	68	—	—
3	45	806.575	1000 cc	2		247	—	40	68	—	—
3	50	806.772	1000 cc	2		251	—	37	68	—	—
3	55	806.971	1000 cc	2		248	—	37	68	—	—
3	60	807.168	1000 cc	2		250	—	39	68	—	—
	(2210)										
	0-60	V_m = 2.342	ΔH = 1000 cc		$\bar{t}$ =				$\bar{t}_m$ = 68		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	204	200	4
Desiccant	1399	1394	5
		Total	9

Preliminary Results of SO_2 Concentration Determination		
V_{ms} =	2.21	DSCF
Moisture Gravimetric =	16.06	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LPI Tomahawk
Source Geca Stack
Date 2-12-95 Test 3 Run 3
Wet Bulb
Dry Bulb

Operator(s) JA TH
Meter Box No. Cem 1 Gasmeter Coef. .9950
ΔH@ — in.WC Bar.Press 28.43 in.Hg
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☒
Post Test: ____ cfm at ____ in.WC ☐

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/ In	Gas/ Out	O_2 (%v/v)
	(2225)	(807.280)									
1	5	807.474	1000 cc	2		245	—	37	68	—	—
1	10	807.669	1000 cc	2		247	—	38	68	—	—
1	15	807.864	1000 cc	2		250	—	39	68	—	—
1	20	808.065	1000 cc	2		248	—	41	68	—	—
2	25	808.263	1000 cc	2		252	—	37	65	—	—
2	30	808.461	1000 cc	2		250	—	36	68	—	—
2	35	808.659	1000 cc	2		246	—	39	68	—	—
2	40	808.849	1000 cc	2		250	—	41	68	—	—
3	45	809.051	1000 cc	2		249	—	38	68	—	—
3	50	809.234	1000 cc	2		248	—	39	68	—	—
3	55	809.444	1000 cc	2		250	—	37	68	—	—
3	60	809.631	1000 cc	2		250	—	39	68	—	—
	(2305)										
	60	V_m = 2.357	ΔH = 1000 cc		$\bar{t}$ =				$\bar{t}_m$ = 68		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers			
Condenser	204	200	4
Desiccant	1359	1395	5
		Total	9

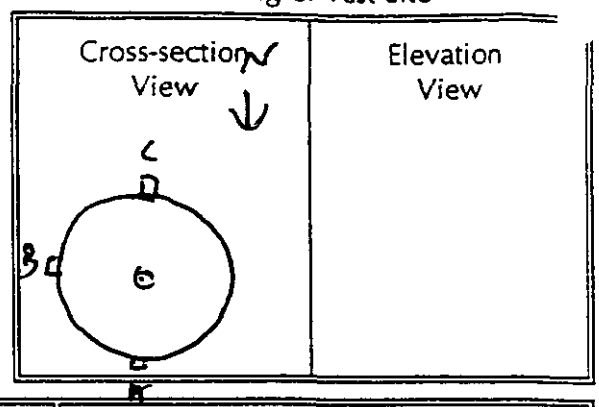
Preliminary Results of SO_2 Concentration Determination		
V_{std} =	2.32	DSCF
Moisture Gravimetric =	16.01	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: CI / Tomahawk
Source: Press Vent Stack
Test: 4 Run: 3 Date:
Stack Dimen.: 62.5 IN.
Dry Bulb: 104 °F Wet bulb: 85 °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 29.43 IN.HG
Static Pressure: -1.70 IN.WC
Operators: B Ackenbach T Hansen
Pitot No.: 27-C6 C_p: .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 3 IN.		Time Start:	HRS
B-1	.021	1.31	4.31	1.90	
2	.067	4.19	7.19	1.70	
3	.118	7.37	10.37	2.00	
4	.177	11.06	14.06	2.00	
5	.250	15.62	18.62	2.00	
6	.356	22.25	25.25	1.95	
7	.644	46.25	49.25	2.10	
8	.750	46.87	49.87	2.20	
9	.823	51.44	54.44	2.10	
10	.882	55.12	58.12	1.95	
11	.933	58.31	61.31	~~1.~~ 1.40	
12	.979	61.18	64.18	1.30	
1					
2					
3			Avg ΔP	1.86	
4					
5					
6					
7					
8					
9					
10					
11					
12					

Temp. Meas. Device & S/N:

Time End: HRS

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CP / Tomahawk Date 7-13-95 Test C1 Run 1
Source Press Vent Stack No. of traverse points 24
Method 5/202 Filter holder: Glass Filter type: 4" 6PT

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑
Post test: 0.0 cfm at 16 IN. HG (vac) ☑

Particulate Catch Data:

No. of filters used: (1) 7844

Recovery solvent(s)
☒ acetone
☒ other(s) MECL

No. of probe wash bottles: (1)
Sample recovered by: SA TH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	506	490	16
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1439	1419	20
Total			36

Integrated Gas Sampling Data:

Bag Pump No. 279 Box No. 10 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0.0 cc/min at 22 IN.HG
Time start: (HRS) Time end: (HRS)
Sampling rate: 400 cc/min Operator: SA

S/N of O_2 Analyzer used to monitor train outlet: 5

052394-G:\STACK\WP\FORMS\S-0046RR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: CP / Tomahawk
Source: Press Vent Stack
Date: 7-13-95 Test #1 Run 1

Operators: BA TH
Meter Box No. 8 ΔH@ 1.84 in.WC
Gasmeter Coeff. .9996

Nozzle No. S-3
Nozzle Dia. .185 in.
Bar. Press. 26.43 in.Hg

Pitot No. 270-6
C_p .84
H_2O 5 %

Traverse Point No	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(0915)	(466.10)											
B -12	2.5	468.06	1.65	1.79	8.01	8	110	235	227	49	85	82	20.9
11	5	470.03	1.80	1.91	0.00	8.5	110				89	82	20.9
10	7.5	472.11	2.00	2.26	2.16	10	110	240	230	45	91	82	20.9
9	10	474.47	2.10	2.37	4.37	12	110				91	83	21.4
8	12.5	476.74	2.10	2.39	6.60	12	106	239	233	45	92	82	21.5
7	15	486.85	1.90	2.15	8.71	10	109				92	82	21.4
6	17.5	481.02	2.00	2.29	0.89	11	104	240	235	43	92	83	21.4
5	20	483.17	2.10	2.41	3.13	12	101				93	83	21.5
4	22.5	485.50	2.10	2.41	5.36	12	103	241	237	41	93	84	21.5
3	25	487.65	2.15	2.48	7.63	12	100				94	83	21.4
2	27.5	489.86	1.90	2.19	9.77	11	100	241	235	40	94	84	21.4
1	30	491.96	1.80	2.08	1.85	10	100				94	84	21.3
A -12	30.5	493.94	1.60	1.83	3.80	8	105	239	235	42	94	84	21.2
11	35	495.93	1.80	2.03	5.86	8.5	114				95	85	21.2
10	37.5	498.16	2.10	2.39	8.09	12	109	241	240	39	96	85	21.3
9	40	500.40	2.10	2.39	0.32	12	111				97	86	21.4
8	42.5	502.51	1.80	2.06	2.40	10	108	245	237	41	97	86	21.5
7	45	504.59	1.80	2.06	4.48	10	107				97	86	21.5
6	47.5	506.82	2.05	2.39	6.71	12	98	241	240	40	97	86	21.5
5	50	509.07	2.15	2.45	8.98	12	101				97	86	21.5
4	52.5	511.34	2.20	2.53	1.28	12	104	237	241	39	97	86	21.5
3	55	513.63	2.45	2.82	3.70	13	104				97	86	21.5
2	57.5	515.85	1.90	2.20	5.85	11	100	241	245	38	97	86	21.5
1	60	518.09	2.00	2.33	8.06	11.5	98				97	86	21.5
	(1016)												
	0-60	V_m = 51.99		2.26 ΔH =							Avg. 89.1		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job EP / Tomahawk Date 2-13-95 Test 4 Run 2
Source Press Heat Stack No. of traverse points 24
Method 5-202 Filter holder: Glass Filter type: 4" GFF

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0.0 cfm at 16 IN. HG (vac) ☒

Particulate Catch Data:
No. of filters used: 1) 7845

Recovery solvent(s)
☑ Acetone
☑ Other(s) MEK

No. of probe wash bottles: 1)
Sample recovered by: BA TH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	507	490	17
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1415	1399	16
Total			33

Integrated Gas Sampling Data:

Bag Pump No. 27B Box No. 10 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0.0 cc/min at 22 IN.HG
Time start: (HRS) Time end: (HRS)
Sampling rate: 400 cc/min Operator: BA

S/N of O_2 Analyzer used to monitor train outlet: 5

052394-G:\STACK\WP\FORMS\S-0046RR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job LP / Tomahawk
Source Process Vent Stack
Date 7-13-95 Test 1 Run 2

Operators BA TH
Meter Box No. 8 ΔH@ 1.84 in.WC
Gasmeter Coeff. .9996

Nozzle No. S-3
Nozzle Dia. .185 in.
Bar. Press. 28.43 in.Hg

Pitot No. 27-6
C_p .84
H_2O 4 %

Traverse Point No	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1105)	(518.50)											
A-12	2.5	519.83	.75	.87	9.84	3	110	234	246	42	84	84	20.8
11	5	521.50	1.96	2.16	1.95	9	114				86	84	20.8
10	7.5	524.15	2.20	2.52	4.23	13	110	235	250	41	87	84	21.2
9	10	526.45	2.05	2.34	6.44	11	108				88	85	21.1
8	12.5	528.64	1.96	2.17	8.56	11	113	238	256	40	89	85	21.1
7	15	530.77	1.85	2.13	0.67	10	109				90	85	21.1
6	17.5	532.97	2.00	2.32	2.86	11	106	240	253	41	91	85	21.1
5	20	535.23	2.20	2.53	5.15	12	111				92	86	21.1
4	22.5	537.48	2.35	2.73	7.54	13	106	237	250	39	95	86	21.1
3	25	539.86	2.50	2.90	9.99	13	107				92	86	21.1
2	27.5	542.29	2.20	2.56	2.30	12	106	240	249	40	93	87	21.1
1	30	544.39	2.10	2.46	4.56	12	102				93	87	21.1
B-12	32.5	546.33	1.40	1.63	6.41	7	105	237	253	42	93	87	20.9
11	35	548.02	.90	1.04	7.85	5	110				94	87	20.9
10	37.5	550.24	2.10	2.43	6.14	13	111	239	251	41	98	87	20.9
9	40	552.48	2.10	2.43	2.39	13	112				99	88	20.9
8	42.5	554.70	2.30	2.68	4.76	13	110	241	249	39	98	88	20.9
7	45.0	556.91	2.00	2.31	6.96	11	114				99	88	20.9
6	47.5	559.20	2.10	2.46	9.23	13	107	239	251	41	100	89	20.9
5	50	561.52	2.05	2.39	1.47	13	110				100	89	20.9
4	52.5	563.80	2.15	2.50	3.77	13	112	241	255	39	100	90	20.9
3	55	566.08	2.20	2.58	6.09	13	108				100	89	20.9
2	57.5	568.40	2.20	2.59	8.42	13	105	240	253	40	100	90	20.9
1	60	570.70	2.10	2.48	0.71	13	108				100	90	20.9
	(1206)												
	θ = 60	V_m = 52.20		2.80 ΔH =							98.5 Avg. =		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CP / Tomahawk
Date 2-13-95 Test C1 Run 3
Source Press Vent Stack
No. of traverse points 24
Method 5-202 Filter holder: Glass
Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0.0 cfm at 15 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used:

C1) 7908

Recovery solvent(s)

☒ Acetone
☒ Other(s) MCL

No. of probe wash bottles: C1)
Sample recovered by: BA TH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	504	486	18
Impinger No. 2			
Impinger No. 3			
Condenser	1460	1439	21
Desiccant			
Total			39

Integrated Gas Sampling Data:

Bag Pump No. 273
Box No. 10 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar
Size: 44 L
Pretest leak check: OC
cc/min at 12 IN.HG
Time start:
(HRS) Time end: (HRS)
Sampling rate: 400
cc/min Operator: BA

S/N of O_2 Analyzer used to monitor train outlet: 5

052394-G:\STACK\WP\FORMS\S-0046RR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: EPI / Tomahawk
Source: Pilot Heat Stack
Date: 2-13-95 Test #1 Run 3

Operators: SA TH
Meter Box No. 5 ΔH@ 1.84 in.WC
Gasmeter Coeff. .9996

Nozzle No. 5-3
Nozzle Dia. .185 in.
Bar. Press. 28.43 in.Hg

Pitot No. 77-6
C_p .84
H_2O 3.5 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1335)	(571.10)											
B-12	2.5	573.16	1.70	1.98	3.13	8	112	235	264	50	94	93	20.9
11	5	575.31	2.00	2.30	5.33	11	120				95	94	20.9
10	7.5	577.61	2.00	2.36	7.55	11.5	108	240	258	46	96	94	20.9
9	10	579.79	2.20	2.55	9.89	12	110				97	94	20.9
8	12.5	582.05	2.26	2.61	2.23	12	106	242	260	44	98	95	20.9
7	15	584.35	2.05	2.42	4.49	11.5	110				99	95	20.9
6	17.5	586.62	2.00	2.35	6.71	11.0	113	239	258	43	99	95	20.9
5	20	588.89	1.95	2.30	8.97	11	112				99	95	20.9
4	22.5	591.18	2.10	2.49	1.21	12	108	240	261	41	100	95	20.9
3	25	593.49	2.10	2.48	3.50	12	111				101	95	20.9
2	27.5	595.78	2.05	2.43	5.76	12	108	242	259	39	101	96	20.9
1	30	598.09	1.95	2.33	7.98	11.5	105				102	96	20.9
A-12	32.5	600.37	1.90	2.25	0.17	11	110	238	261	41	101	96	20.9
11	35	602.64	2.10	2.47	2.46	12	113				102	97	20.9
10	37.5	604.89	2.15	2.52	4.77	12	116	245	255	40	103	97	20.9
9	40	607.11	2.00	2.37	7.02	11	110				104	97	20.9
8	42.5	609.33	1.90	2.27	9.21	11	108	243	257	38	104	98	20.9
7	45	611.57	2.00	2.37	1.45	11.5	113				105	98	20.9
6	47.5	613.80	2.00	2.38	3.70	11.5	110	245	257	40	106	98	20.9
5	50	616.03	2.10	2.49	6.01	12	113				108	99	20.9
4	52.5	618.29	2.15	2.56	8.35	12	107	247	253	39	109	99	20.9
3	55	620.62	2.30	2.77	0.78	14	106				110	99	20.9
2	57.5	622.95	2.10	2.51	3.10	12.5	111	245	256	40	110	99	20.9
1	60	625.45	2.10	2.53	5.42	12.5	107				109	99	20.9
	(1436)												
	0-60	V_m - 54.35		ΔH - 1.92							Avg. -	99.2	

APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Solvent Rinse Data Reporting Sheet

☒ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job	LP/Tomahawk	Source/Site	Press vent / Stack
Date Submitted	7-	Test No.	4
Date of Analysis	7-17-95	Technician	B.O.
Transport Leakage ☐	None ☒ ml	Solvent	Acetone

Test: 4	Run: 0	Dish No:	807
Log No: 6006-03P		Dish + Sample Wt:	46.0306 g
Volume of Solvent	100 ml	Dish Tare Wt:	46.0304 g
*Solvent Residue	2.0 ug/ml	Sample Wt:	0.0002 g
Test: 4	Run: 1	Dish No:	810
Vol. of Solvent	110 ml	Dish + Sample Wt:	45.2790 g
Log Number -04P		Dish Tare Wt:	45.2509 g
Comments		Sample Wt:	0.0281 g
Test: 4	Run: 2	Dish No:	817
Vol. of Solvent	90 ml	Dish + Sample Wt:	46.6486 g
Log Number -05P		Dish Tare Wt:	46.6364 g
Comments		Sample Wt:	0.0122 g
Test: 4	Run: 3	Dish No:	818
Vol. of Solvent	90 ml	Dish + Sample Wt:	45.9144 g
Log Number -06P		Dish Tare Wt:	45.9029 g
Comments		Sample Wt:	0.0115 g

*Solvent Residue 2.0 ug/ml = [(Sample Wt. 0.0002 g) (10^6)]/Vol. of Sol. 100 ml

EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

	RUN	RUN 1	RUN 2	RUN 3
Results of Solvent Rinse g	D-2	0.0279	0.0120	0.0113

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Filter Gravimetrics Reporting Sheet

Fiter Type: ☒ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other_____

Job	LP/Tomahawk	Source/Site	Press Vent/Stack
Date Submitted	7-	Test No.	4
Date of Analysis	7-17-95	Technician	B.D.

Test: 4	Run: 0	Filter No:	7939	
Field Blank:		Filter Type:	4"GF	
Log No: 6006-03F		Filter + Sample Wt:	.9620	g
Color:		Filter Tare Wt:	.9620	g
		Sample Wt:	0.0000	g
Test: 4	Run: 1	Filter No:	7844	
Log No: -04F		Filter Type:	4"GF	
Color:		Filter + Sample Wt:	.9962	g
		Filter Tare Wt:	.9943	g
		Sample Wt:	0.0019	g
Test: 4	Run: 2	Filter No:	7845	
Log No: -05F		Filter Type:	4"GF	
Color:		Filter + Sample Wt:	1.0032	g
		Filter Tare Wt:	1.0003	g
		Sample Wt:	0.0029	g
Test: 4	Run: 3	Filter No:	7908	
Log No: -06F		Filter Type:	4"GF	
Color:		Filter + Sample Wt:	.9490	g
		Filter Tare Wt:	.9455	g
		Sample Wt:	0.0035	g

		RUN	RUN 1	RUN 2	RUN 3
Results of Filter Analysis	g		0.0019	0.0029	0.0035

		RUN	RUN 1	RUN 2	RUN 3
Total Mass	g				

EPA Method 202 Calculations — Report No. 5-6006

Job: Louisiana Pacific Tomahawk — PRESS VENT

Date: 13-Jul-95

RUN	Vic (ml)	Sulfate (mg/ml)	Mc (mg)	Mr (mg)	Mi (mg)	Mo (mg)	Mb (mg)	CPM (mg)	ENTER IN COMPUTER (g)
1	211	1.10E-03	0.04	5.3	5.26	68.7	0.6	73.36	0.073357
2	210	2.00E-04	0.01	3.7	3.69	100.9	0.6	103.99	0.103992
3	208	1.70E-04	0.01	3.2	3.19	2.5	0.6	5.09	0.005093

EPA Method 201A/202 Totals

RUN	Probe (mg)	Filter (mg)	CPM (mg)	Total (mg)
1	27.9	1.9	73.36	103.1573
2	12	2.9	103.99	118.8923
3	11.3	3.5	5.09	19.89349

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Impinger Catch Data Reporting Sheet

Protocol: ☐Minnesota ☐Wisconsin ☐Iowa ☒EPA Method 202 ☐Other

Job: Tom Lark | Source/Site: Press vent/stack
Date Submitted: 7-14-95 | Test No.: 4
Date of Analysis: 7-24-95 | Technician: J Lorenz

	Solvent Phase	Aqueous Phase
Test: 4 Run: 0	Dish No: 853	Dish No: 828
Log No: 6006-03I	Dish + Sample Wt: 47.4008 g	Dish + Sample Wt: 45.6233 g
Color & Appearance:	Dish Tare Wt: 47.4007 g	Dish Tare Wt: 45.6229 g
	Fraction Wt: .0001 g	Fraction Wt: .0004 g
Comments: Field Blk	Smpl Vol: 202 ml, Alqt: 177 ml, Factor: 1.141	Smpl Vol: 202 ml, Alqt: 177 ml, Factor: 1.141
	Sample Wt: .0001 g	Sample Wt: .0005 g
Test: 4 Run: 1	Dish No: 869	Dish No: 829
Log No: -04I	Dish + Sample Wt: 47.3956 g (J.L. 7-26-95)	Dish + Sample Wt: 45.6971 g
Color & Appearance:	Dish Tare Wt: 47.3958 g	Dish Tare Wt: 45.6924 g
	Fraction Wt: .0606 g	Fraction Wt: .0047 g
Comments: liquid residue in dish	Smpl Vol: 211 ml, Alqt: 186 ml, Factor 1.134	Smpl Vol: 211 ml, Alqt: 186 ml, Factor 1.134
	Sample Wt: .0687 g	Sample Wt: .0053 g
* Test: 4 Run: 2	Dish No: ~~875~~ 845	Dish No: 830
Log No: -05I	Dish + Sample Wt: (J.L. 7-27-95) 45.5022 g	Dish + Sample Wt: 43.3563 g
Color & Appearance:	Dish Tare Wt: ~~38.9884~~ 45.4133 g	Dish Tare Wt: 43.3526 g
	Fraction Wt: .0889 g	Fraction Wt: .0037 g
Comments: white, waxy residue in dish	Smpl Vol: 210 ml, Alqt: 185 ml, Factor 1.135	Smpl Vol: 210 ml, Alqt: 185 ml, Factor 1.135
	Sample Wt: 0.1009 g	Sample Wt: .0042 g
Test: 4 Run: 3	Dish No: 875	Dish No: 844
Log No: -06I	Dish + Sample Wt: 38.9905 g	Dish + Sample Wt: 45.0241 g
Color & Appearance:	Dish Tare Wt: 38.9883 g	Dish Tare Wt: 45.0209 g
	Fraction Wt: .0022 g	Fraction Wt: .0032 g
Comments:	Smpl Vol: 208 ml, Alqt: 183 ml, Factor 1.137	Smpl Vol: 208 ml, Alqt: 183 ml, Factor 1.137
	Sample Wt: .0025 g	Sample Wt: .0036 g

* Solvent phase transferred to 2nd dish (#845) to assure no particulate contamination.

Note: Factor = Sample Volume/Aliquot Volume

Blank Solvent Wt. .0001 g

	RUN 0 Field Blank	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	.0001	.0686	.1008	.0024
Results of Aqueous Phase g	.0005	.0048 (J.L. 7-27-95)	.0037	.0031

Interpoll Laboratories, Inc.
(612)786-6020

Ion Chromatography Laboratory

Due 7/31/95

DIONEX MODEL 4000i WITH ANION MICRO MEMBRANE SUPRESSION

Analyst: MJG Date of Analysis: 7/25/95

Job: LP Tomahawk Source: Press Vent Site: Stack

Chromatography Conditions

Column		Flow Rate	Eluent	Flow Rate	Suppressor Acid
	AS3	ml/min	2.4 mM Na_2CO_3 & 3.0 mM $NaHCO_3$	ml/min	12.5 mM Sulfuric Acid
X	AS4A	2 ml/min	1.8 mM Na_2CO_3 & 1.7 mM $NaHCO_3$	ml/min	
	AS5	ml/min	100 mM NaOH	X	Isocratic
		ml/min			Gradient(List program below)

Gradient Program	Time (Min.)									
Eluent	0.0									
% A										
% B										

Results of Sulfate Determination

Sample Name	Interpoll Log Number	Tot. Sample Volume (ml)	Dilution	Solution Conc.(ug/ml)	Total ug Sulfate	meq of Sulfate
4/0	6006-03	202	1.0	0.18	36	0.00075
4/1	-04	211	1.0	1.1 ~~1732~~ 230		0.0048
4/2	-05	210	1.0	0.20	42	0.00088
4/3	-06	208	1.0	0.17	35	0.00073

Total ug = (Sample Vol.) x (Dilution) x (Solution Conc.)
meq = Total ug / 48000

LSC-08RR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: CP / Tomahawk | Source: Kiln Exit | Site: Stack | Log No.: 6056
Field Engineer: BJS | Date of Test: 7-13-95 | Test No.: 4 | No. of Runs: 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
4	Probe Wash: ☒Acetone ☐ $MeCl_2$	☐DI Water ☐_____	☒EPA M-5 ☐EPA M-29	☐EPA M-201A ☐_____		
4	Filter: ☒" Glass ☐SS Thimble	☐Pallflex ☐2.5" Glass	☒EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
4 DF 4 MeCl	Impingers: ☒DI Water ☐3% H_2O_2 ☐1N NaOH ☐2,4-DNPH	☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☒MeCl	☐MN Protocol ☒WI Protocol ☒EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☐_____		
3	Integrated Gas: ☒Tedlar Bag	☐_____	☒EPA M-3 ☐_____	☐EPA M-10		CO Analysis
—	Oxides of Nitrogen:		☐EPA M-7A ☐_____			
—	Fuel Lab: ☐Fuel Sample	☐Aggregate	☐Per S 0161			
—	Particle Sizing:		☐X-Ray Sdgraph ☐_____	☐Cascade Imp		
—	Miscellaneous:	☐_____	☐_____			

Fuel Type: Coal: ☐Bituminous ☐Anthracite ☐Lignite | Wood: ☐Wood Waste ☐Dust ☐Bark | Oil: ☐Waste Oil ☐No. 2 ☐No. 6 | Misc: ☐Natural Gas ☐RDF ☐_____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
[signature]	[signature]	7/14/95 1100

033094-G:\STACK\WP\FORMS\S-278.2

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job LP/Tonawanda Source Stack Site STACK Log No. 6006
Field Engineer BAB Date of Test 7/12-95 Test No. 2 No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
____	**Probe Wash:** ☐ Acetone ☐ $MeCl_2$	☐DI Water ☐____	☐EPA M-5 ☐EPA M-29	☐EPA M-201A ☐____		
____	**Filter:** ☐ 4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
1	**Impingers:** ☐DI Water ☐3%H_2O_2 ☐1N NaOH ☐2,4-DNPH	☐H_2SO_4 ☐HNO_3/H_2O_4 ☐$KMnO_4/H_2SO_4$ ☐____	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐A Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☐____		
1	**Integrated Gas:** ☐Tedlar Bag	☐____	☐EPA M-3 ☐____	☐EPA M-10		
1	**Oxides of Nitrogen:**		☐EPA M-7A ☐____			
1	**Fuel Lab:** ☑Fuel Sample	☐Aggregate	☑Per S-0163			
	Particle Sizing:		☐X-Ray Sdgraph ☐____	☐Cascade Imp		
	Miscellaneous:	☐____	☐____			

Fuel Type: Coal: ☐Bituminous ☐Anthracite ☐Lignite
Wood: ☒Wood Waste ☐Dust ☐Bark
Oil: ☐Waste Oil ☐No. 2 ☐No. 6
Misc: ☐Natural Gas ☐RDF ☐____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
	BeBoy, F-Torpoll	7/14/95 1100

033094-GASTACK\WP\FORMS\S-278.2

D-7

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job LP/Tonchuk Source CEKA Site STACK Log No. 6006
Field Engineer BRS Date of Test 2-10-95 Test No. 3 No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
1	Probe Wash: ☐ Acetone ☐ $MeCl_2$	☐DI Water ☐_____	☐EPA M-5 ☐EPA M-29	☐EPA M-201A ☐_____		
1	Filter: ☐ 4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
___	Impingers: ☐DI Water ☐3%H_2O_2 ☐1N NaOH ☐2,4-DNPH	☐H_2SO_4 ☐HNO_3/H_2O_2 ☐$KMnO_4/H_2SO_4$ ☐_____	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☐_____		
1	Integrated Gas: ☐Tedlar Bag	☐_____	☐EPA M-3 ☐_____	☐EPA M-10		
1	Oxides of Nitrogen:		☐EPA M-7A ☐_____			
1	Fuel Lab: ☒Fuel Sample	☐Aggregate	☒Per S-0163			
1	Particle Sizing:		☐X-Ray Sdgraph ☐_____	☐Cascade Imp		
1	Miscellaneous:	☐_____	☐_____			

Fuel Type: Coal: ☐Bituminous ☐Anthracite ☐Lignite Wood: ☐Wood Waste ☐Dust ☒Bark Oil: ☐Waste Oil ☐No. 2 ☐No. 6 Misc: ☐Natural Gas ☐RDF ☐_____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
[signature] Interpoll	[signature], Interpoll	2/14/95 1100

033094-GASTACK\WP\FORMS\S-278.2

APPENDIX E

CONTINUOUS EMISSION MONITOR PRINTOUTS

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT11
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
192	08:01:00	5.4	16.1	1.07	19.63
192	08:02:00	5.4	13.4	1.10	19.57
192	08:03:00	5.3	13.0	1.07	19.65
192	08:04:00	5.4	12.1	1.04	19.69
192	08:05:00	5.5	11.7	1.01	19.78
192	08:06:00	5.3	11.4	0.97	19.87
192	08:07:00	5.5	13.2	0.97	19.87
192	08:08:00	5.8	11.1	0.98	19.87
192	08:09:00	6.2	10.7	1.01	19.77
192	08:10:00	6.2	9.9	1.06	19.70
192	08:11:00	5.7	12.0	1.07	19.64
192	08:12:00	5.7	11.6	1.06	19.67
192	08:13:00	5.8	10.5	1.06	19.67
192	08:14:00	5.9	10.6	1.04	19.72
192	08:15:00	6.1	10.6	1.05	19.70
192	08:16:00	6.8	12.8	0.93	19.96
192	08:17:00	8.5	10.2	0.99	19.83
192	08:18:00	8.8	7.6	1.00	19.82
192	08:19:00	8.1	9.8	1.00	19.83
192	08:20:00	6.7	11.6	1.10	19.62
192	08:21:00	6.1	14.3	1.08	19.64
192	08:22:00	6.2	9.5	1.08	19.63
192	08:23:00	6.4	9.8	1.07	19.65
192	08:24:00	6.5	12.2	1.04	19.70
192	08:25:00	6.8	12.3	1.04	19.74
192	08:26:00	6.9	12.9	1.02	19.77
192	08:27:00	7.0	13.1	1.01	19.78
192	08:28:00	7.2	11.2	1.03	19.75
192	08:29:00	7.3	9.2	1.03	19.75
192	08:30:00	7.6	8.1	1.03	19.74
192	08:31:00	7.5	11.2	1.03	19.74
192	08:32:00	7.6	12.3	1.06	19.70
192	08:33:00	7.5	10.8	1.04	19.72
192	08:34:00	8.5	11.2	1.05	19.73

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT11
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
192	08:35:00	8.6	9.7	1.06	19.70
192	08:36:00	8.7	9.2	1.06	19.70
192	08:37:00	8.7	10.3	1.10	19.60
192	08:38:00	8.7	9.8	1.07	19.66
192	08:39:00	8.7	9.4	1.06	19.67
192	08:40:00	8.8	9.3	1.10	19.60
192	08:41:00	8.9	10.3	1.07	19.67
192	08:42:00	9.1	9.4	1.09	19.61
192	08:43:00	9.0	9.0	1.07	19.68
192	08:44:00	9.0	9.1	1.06	19.68
192	08:45:00	9.0	8.8	1.07	19.69
192	08:46:00	9.0	9.4	1.04	19.75
192	08:47:00	9.0	9.9	1.07	19.67
192	08:48:00	9.3	9.1	1.07	19.69
192	08:49:00	9.3	8.9	1.05	19.72
192	08:50:00	9.3	7.8	1.08	19.66
192	08:51:00	9.3	6.8	1.06	19.70
192	08:52:00	9.3	6.2	1.09	19.63
192	08:53:00	9.4	9.3	1.09	19.65
192	08:54:00	9.4	10.7	1.11	19.59
192	08:55:00	9.3	7.6	1.11	19.60
192	08:56:00	9.3	10.5	1.09	19.66
192	08:57:00	9.2	10.1	1.08	19.66
192	08:58:00	9.3	7.5	1.07	19.69
192	08:59:00	9.5	9.2	1.07	19.69
192	09:00:00	9.5	8.5	1.08	19.67
	Run Average	7.7	10.4	1.05	19.70

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT12
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
192	09:21:00	7.4	11.6	1.06	19.62
192	09:22:00	7.5	11.9	1.05	19.64
192	09:23:00	7.5	11.6	1.07	19.61
192	09:24:00	7.6	12.3	1.07	19.62
192	09:25:00	7.6	12.5	1.08	19.57
192	09:26:00	7.6	13.9	1.08	19.60
192	09:27:00	7.7	15.3	1.08	19.59
192	09:28:00	7.9	10.6	1.10	19.56
192	09:29:00	7.9	11.2	1.10	19.54
192	09:30:00	8.1	14.5	1.15	19.45
192	09:31:00	7.9	14.6	1.14	19.46
192	09:32:00	7.8	11.3	1.12	19.49
192	09:33:00	7.6	10.0	1.07	19.62
192	09:34:00	7.6	10.7	1.05	19.64
192	09:35:00	7.6	13.4	1.01	19.73
192	09:36:00	7.6	10.6	1.00	19.76
192	09:37:00	7.5	9.6	0.97	19.82
192	09:38:00	7.9	13.7	1.01	19.75
192	09:39:00	7.9	13.5	1.01	19.76
192	09:40:00	7.9	10.6	1.04	19.67
192	09:41:00	7.6	10.6	0.93	19.89
192	09:42:00	7.8	12.1	0.90	19.95
192	09:43:00	7.5	44.6	0.89	19.98
192	09:44:00	7.5	21.9	0.88	19.99
192	09:45:00	7.7	19.9	0.89	19.98
192	09:46:00	8.0	12.2	0.91	19.94
192	09:47:00	8.3	12.9	0.93	19.88
192	09:48:00	8.3	10.1	0.95	19.85
192	09:49:00	8.4	9.2	0.94	19.87
192	09:50:00	8.2	12.0	0.94	19.87
192	09:51:00	8.2	16.1	0.94	19.88
192	09:52:00	8.2	12.1	0.93	19.89
192	09:53:00	8.2	10.7	0.94	19.87
192	09:54:00	8.1	15.4	0.93	19.88

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT12
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
192	09:55:00	8.3	15.2	0.93	19.88
192	09:56:00	8.3	10.5	0.94	19.86
192	09:57:00	8.5	12.3	0.95	19.85
192	09:58:00	8.4	12.7	0.95	19.84
192	09:59:00	8.6	8.9	1.00	19.74
192	10:00:00	8.4	7.8	0.97	19.80
192	10:01:00	8.5	9.1	0.97	19.79
192	10:02:00	8.3	10.5	0.93	19.88
192	10:03:00	8.5	7.0	0.94	19.84
192	10:04:00	8.7	9.7	0.95	19.85
192	10:05:00	8.9	8.1	0.97	19.79
192	10:06:00	9.1	5.6	1.01	19.72
192	10:07:00	9.2	9.8	1.05	19.62
192	10:08:00	9.2	8.4	1.03	19.66
192	10:09:00	9.1	6.6	1.02	19.70
192	10:10:00	9.1	9.6	1.03	19.69
192	10:11:00	8.9	8.8	1.00	19.73
192	10:12:00	9.0	6.2	1.02	19.69
192	10:13:00	9.0	7.7	1.02	19.69
192	10:14:00	9.0	10.7	1.05	19.63
192	10:15:00	9.0	9.4	1.02	19.68
192	10:16:00	9.0	6.9	1.04	19.65
192	10:17:00	9.1	10.2	1.01	19.72
192	10:18:00	8.9	9.2	1.04	19.66
192	10:19:00	8.9	8.7	1.07	19.57
192	10:20:00	8.9	10.9	1.03	19.64
	Run Average	8.3	11.7	1.00	19.74

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT13
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
192	10:41:00	9.1	13.8	1.04	19.74
192	10:42:00	9.1	12.6	1.04	19.72
192	10:43:00	9.1	12.2	1.04	19.72
192	10:44:00	9.1	14.2	1.02	19.73
192	10:45:00	9.3	12.3	1.02	19.73
192	10:46:00	9.5	10.5	1.02	19.72
192	10:47:00	9.5	13.8	1.05	19.67
192	10:48:00	9.5	15.3	1.03	19.68
192	10:49:00	9.4	12.6	1.03	19.69
192	10:50:00	9.3	14.5	1.03	19.68
192	10:51:00	9.2	18.6	1.01	19.72
192	10:52:00	9.0	17.1	1.01	19.73
192	10:53:00	9.0	14.8	0.99	19.77
192	10:54:00	9.5	13.1	0.99	19.74
192	10:55:00	9.6	16.0	1.01	19.72
192	10:56:00	9.6	17.7	0.99	19.74
192	10:57:00	9.5	16.0	1.00	19.72
192	10:58:00	9.5	12.9	1.01	19.71
192	10:59:00	9.6	11.0	1.01	19.69
192	11:00:00	9.7	11.0	1.06	19.61
192	11:01:00	9.6	15.4	1.07	19.56
192	11:02:00	9.4	18.4	1.07	19.55
192	11:03:00	9.5	24.2	1.02	19.68
192	11:04:00	9.6	14.6	1.05	19.61
192	11:05:00	9.5	11.9	1.01	19.71
192	11:06:00	9.4	13.5	1.00	19.71
192	11:07:00	9.6	13.7	1.08	19.58
192	11:08:00	9.5	20.2	1.02	19.65
192	11:09:00	9.6	14.9	1.04	19.60
192	11:10:00	9.6	15.2	1.07	19.58
192	11:11:00	9.9	13.6	1.05	19.62
192	11:12:00	10.1	13.6	1.04	19.62
192	11:13:00	10.1	13.2	1.03	19.65
192	11:14:00	10.1	13.1	1.02	19.65

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT13
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
192	11:15:00	10.3	10.5	1.05	19.60
192	11:16:00	10.4	10.7	1.04	19.65
192	11:17:00	10.6	13.5	1.03	19.63
192	11:18:00	10.8	14.6	1.06	19.60
192	11:19:00	10.8	13.5	1.04	19.62
192	11:20:00	10.9	9.4	1.05	19.59
192	11:21:00	10.9	9.7	1.05	19.58
192	11:22:00	11.0	11.2	1.06	19.57
192	11:23:00	10.8	13.3	1.03	19.64
192	11:24:00	10.7	10.7	1.01	19.68
192	11:25:00	10.8	17.6	1.05	19.60
192	11:26:00	10.8	14.8	1.05	19.62
192	11:27:00	10.8	16.2	1.00	19.66
192	11:28:00	10.9	11.6	1.01	19.70
192	11:29:00	11.2	8.0	1.00	19.69
192	11:30:00	11.4	8.2	1.05	19.60
192	11:31:00	11.2	12.6	1.08	19.55
192	11:32:00	11.0	11.1	1.09	19.48
192	11:33:00	10.9	11.2	1.13	19.45
192	11:34:00	10.7	16.8	1.13	19.40
192	11:35:00	10.6	14.1	1.15	19.37
192	11:36:00	10.4	12.9	1.11	19.45
192	11:37:00	10.4	15.1	1.10	19.46
192	11:38:00	10.3	12.3	1.07	19.54
192	11:39:00	10.2	12.2	1.03	19.62
192	11:40:00	10.3	10.6	1.05	19.58
	Run Average	10.0	13.6	1.04	19.63

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT21A
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	07:47:00	23.1	28.8	1.82	19.04
193	07:48:00	23.0	25.2	1.82	19.06
193	07:49:00	23.6	24.8	1.81	19.09
193	07:50:00	22.9	26.7	1.86	19.02
193	07:51:00	23.8	29.1	1.78	19.10
193	07:52:00	23.2	21.7	1.85	19.04
193	07:53:00	23.9	26.6	1.83	19.03
193	07:54:00	23.5	21.8	1.83	19.06
193	07:55:00	24.1	27.7	1.83	19.03
193	07:56:00	24.8	22.6	1.79	19.12
193	07:57:00	24.1	25.5	1.84	19.00
193	07:58:00	24.7	23.4	1.77	19.13
193	07:59:00	24.0	24.2	1.84	19.01
193	08:00:00	25.2	20.6	1.74	19.16
193	08:01:00	24.7	17.3	1.86	19.01
193	08:02:00	25.0	23.0	1.78	19.09
193	08:03:00	25.3	16.8	1.80	19.10
193	08:04:00	24.8	20.0	1.85	19.00
193	08:05:00	24.6	21.3	1.82	19.05
193	08:06:00	24.5	21.3	1.88	18.98
193	08:07:00	24.1	24.8	1.87	18.97
193	08:08:00	24.3	25.7	1.85	18.99
193	08:09:00	25.4	22.2	1.80	19.06
193	08:10:00	25.6	20.0	1.82	19.05
193	08:11:00	26.1	21.6	1.83	19.03
193	08:12:00	26.3	19.9	1.77	19.09
193	08:13:00	26.5	14.3	1.83	19.04
193	08:14:00	26.6	18.4	1.80	19.05
193	08:15:00	26.2	17.2	1.83	19.04
193	08:16:00	26.0	22.1	1.86	18.98
193	08:17:00	26.5	24.9	1.80	19.05
193	08:18:00	26.8	21.2	1.84	19.02
193	08:19:00	26.4	23.3	1.84	19.00
193	08:20:00	27.0	19.9	1.83	19.02

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT21A
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	08:21:00	26.2	20.3	1.88	18.94
193	08:22:00	26.5	23.4	1.86	18.98
193	08:23:00	26.4	21.2	1.86	18.99
193	08:24:00	26.7	22.6	1.83	19.01
193	08:25:00	26.4	21.2	1.89	18.93
193	08:26:00	26.3	22.6	1.85	18.98
193	08:27:00	26.6	20.7	1.87	18.96
193	08:28:00	26.7	21.0	1.85	18.98
193	08:29:00	27.7	17.4	1.74	19.14
193	08:30:00	27.5	12.8	1.76	19.11
193	08:31:00	27.3	12.8	1.72	19.18
193	08:32:00	27.9	11.9	1.73	19.16
193	08:33:00	27.3	13.1	1.80	19.05
193	08:34:00	27.7	14.3	1.75	19.13
193	08:35:00	27.6	14.8	1.80	19.07
193	08:36:00	27.4	18.3	1.84	19.00
193	08:37:00	27.4	17.2	1.86	18.97
193	08:38:00	27.6	18.9	1.85	18.96
193	08:39:00	26.8	18.0	1.83	18.99
193	08:40:00	27.4	16.0	1.83	19.03
193	08:41:00	27.2	15.0	1.83	19.02
193	08:42:00	27.4	16.6	1.81	19.06
193	08:43:00	27.7	15.1	1.85	19.00
193	08:44:00	27.7	17.2	1.82	19.02
193	08:45:00	28.1	13.0	1.82	19.05
193	08:46:00	27.4	15.3	1.87	18.95
	Run Average	25.9	20.2	1.82	19.04

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT22A
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	09:01:00	22.5	19.3	1.91	19.13
193	09:02:00	22.3	18.2	1.89	19.15
193	09:03:00	22.8	18.8	1.88	19.17
193	09:04:00	22.9	14.6	1.84	19.23
193	09:05:00	22.1	16.8	1.92	19.12
193	09:06:00	22.9	21.4	1.87	19.18
193	09:07:00	22.7	18.2	1.86	19.22
193	09:08:00	22.9	20.6	1.82	19.25
193	09:09:00	23.1	17.2	1.84	19.25
193	09:10:00	23.0	20.1	1.87	19.19
193	09:11:00	23.1	19.5	1.86	19.22
193	09:12:00	22.9	20.1	1.89	19.16
193	09:13:00	23.8	20.4	1.86	19.20
193	09:14:00	23.9	18.7	1.89	19.18
193	09:15:00	23.5	19.3	1.89	19.16
193	09:16:00	23.9	18.2	1.83	19.24
193	09:17:00	24.0	15.8	1.81	19.28
193	09:18:00	23.2	17.8	1.82	19.25
193	09:19:00	23.4	16.0	1.83	19.25
193	09:20:00	23.4	18.6	1.86	19.21
193	09:21:00	23.3	21.0	1.86	19.20
193	09:22:00	23.2	19.4	1.87	19.18
193	09:23:00	22.7	19.4	1.89	19.16
193	09:24:00	23.3	19.3	1.86	19.18
193	09:25:00	23.7	16.8	1.83	19.25
193	09:26:00	23.6	17.3	1.90	19.16
193	09:27:00	23.4	17.1	1.88	19.17
193	09:28:00	23.8	17.7	1.87	19.19
193	09:29:00	23.5	17.8	1.87	19.17
193	09:30:00	23.9	16.2	1.86	19.21
193	09:31:00	23.7	17.6	1.87	19.17
193	09:32:00	23.8	16.9	1.82	19.24
193	09:33:00	24.2	15.8	1.84	19.23
193	09:34:00	24.0	17.0	1.85	19.21

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT22A
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	09:35:00	24.0	15.2	1.81	19.27
193	09:36:00	24.0	15.3	1.82	19.26
193	09:37:00	24.0	16.2	1.86	19.20
193	09:38:00	23.9	15.6	1.86	19.20
193	09:39:00	24.6	15.5	1.85	19.20
193	09:40:00	23.8	14.9	1.89	19.16
193	09:41:00	24.2	17.9	1.85	19.21
193	09:42:00	24.4	15.5	1.94	19.09
193	09:43:00	24.4	19.0	1.90	19.12
193	09:44:00	24.5	15.6	1.92	19.12
193	09:45:00	24.5	18.3	1.92	19.07
193	09:46:00	24.8	14.6	1.85	19.22
193	09:47:00	24.8	14.3	1.89	19.16
193	09:48:00	24.9	15.4	1.86	19.18
193	09:49:00	24.8	13.2	1.84	19.22
193	09:50:00	25.1	13.6	1.83	19.25
193	09:51:00	24.7	14.2	1.87	19.19
193	09:52:00	25.2	14.8	1.83	19.26
193	09:53:00	25.2	12.8	1.88	19.19
193	09:54:00	25.0	13.9	1.90	19.15
193	09:55:00	25.1	15.7	1.91	19.15
193	09:56:00	25.1	16.4	1.93	19.12
193	09:57:00	24.6	18.0	1.94	19.10
193	09:58:00	24.8	19.6	1.93	19.12
193	09:59:00	24.7	19.3	1.92	19.12
193	10:00:00	48.7	16.9	1.21	13.99
	Run Average	24.3	17.2	1.86	19.10

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT23A
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	11:46:00	25.0	22.3	2.02	18.72
193	11:47:00	24.8	21.1	2.08	18.67
193	11:48:00	24.7	21.6	2.07	18.69
193	11:49:00	24.7	22.5	2.13	18.63
193	11:50:00	23.8	26.5	2.11	18.63
193	11:51:00	24.7	26.0	2.04	18.70
193	11:52:00	23.8	26.4	2.23	18.55
193	11:53:00	23.8	34.2	2.20	18.54
193	11:54:00	23.6	32.0	2.22	18.53
193	11:55:00	24.1	33.6	2.10	18.62
193	11:56:00	24.9	25.5	2.06	18.69
193	11:57:00	25.0	24.3	2.07	18.67
193	11:58:00	25.1	22.2	2.05	18.70
193	11:59:00	24.7	23.0	2.11	18.63
193	12:00:00	24.6	24.8	2.04	18.70
193	12:01:00	24.3	24.0	2.08	18.67
193	12:02:00	23.9	29.4	2.12	18.62
193	12:03:00	23.6	30.7	2.16	18.59
193	12:04:00	23.7	33.8	2.14	18.60
193	12:05:00	23.7	31.0	2.05	18.69
193	12:06:00	24.2	27.0	2.06	18.68
193	12:07:00	24.4	24.3	2.05	18.69
193	12:08:00	24.8	22.0	1.99	18.76
193	12:09:00	24.6	19.4	2.01	18.75
193	12:10:00	24.0	22.2	2.05	18.69
193	12:11:00	24.5	21.5	1.98	18.77
193	12:12:00	24.4	17.0	1.99	18.76
193	12:13:00	24.1	19.5	2.01	18.73
193	12:14:00	24.3	22.0	2.00	18.74
193	12:15:00	23.9	20.6	1.99	18.76
193	12:16:00	23.5	20.2	2.04	18.70
193	12:17:00	23.7	23.5	2.05	18.68
193	12:18:00	23.7	23.8	2.01	18.72
193	12:19:00	23.9	22.5	1.98	18.77

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT23A
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Dryer Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	12:20:00	23.2	20.2	1.97	18.80
193	12:21:00	23.3	19.9	1.97	18.79
193	12:22:00	23.9	19.5	1.98	18.79
193	12:23:00	23.8	20.4	1.99	18.75
193	12:24:00	23.9	19.0	1.99	18.77
193	12:25:00	23.1	20.8	2.03	18.71
193	12:26:00	23.7	20.5	2.00	18.75
193	12:27:00	23.7	19.6	1.97	18.78
193	12:28:00	23.7	18.2	2.00	18.74
193	12:29:00	23.5	19.7	1.96	18.79
193	12:30:00	22.8	18.6	2.01	18.74
193	12:31:00	23.4	20.9	1.98	18.76
193	12:32:00	23.2	16.4	2.00	18.77
193	12:33:00	23.2	19.0	2.01	18.72
193	12:34:00	24.1	18.6	1.97	18.78
193	12:35:00	23.9	15.8	1.94	18.82
193	12:36:00	24.0	13.6	1.95	18.82
193	12:37:00	23.5	14.8	1.99	18.75
193	12:38:00	23.6	16.7	1.96	18.78
193	12:39:00	23.1	15.3	1.96	18.78
193	12:40:00	23.0	17.2	1.96	18.79
193	12:41:00	22.9	16.3	2.00	18.74
193	12:42:00	23.0	20.8	1.98	18.74
193	12:43:00	23.5	16.2	1.99	18.78
193	12:44:00	22.9	20.7	2.07	18.65
193	12:45:00	23.2	21.6	1.98	18.74
	Run Average	23.9	22.0	2.03	18.71

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT31
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

GEKA Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	19:56:00	51.8	11.1	6.45	13.86
193	19:57:00	54.0	10.2	6.54	13.78
193	19:58:00	53.3	8.8	6.09	14.23
193	19:59:00	52.2	8.5	5.86	14.54
193	20:00:00	54.3	8.7	6.26	14.15
193	20:01:00	55.3	10.1	6.20	14.15
193	20:02:00	56.9	12.3	6.37	14.01
193	20:03:00	56.7	12.9	6.14	14.14
193	20:04:00	55.8	12.7	6.26	14.15
193	20:05:00	54.2	14.6	6.13	14.19
193	20:06:00	54.8	13.0	6.36	14.04
193	20:07:00	53.1	10.1	6.36	13.93
193	20:08:00	53.1	8.7	6.42	13.93
193	20:09:00	51.7	9.1	6.38	13.93
193	20:10:00	50.3	9.4	5.99	14.34
193	20:11:00	52.0	9.3	6.14	14.26
193	20:12:00	50.2	11.1	6.11	14.22
193	20:13:00	55.3	10.1	6.50	13.87
193	20:14:00	52.9	11.2	6.19	14.07
193	20:15:00	49.2	6.7	5.95	14.46
193	20:16:00	48.4	7.6	6.28	14.07
193	20:17:00	46.7	7.4	6.15	14.21
193	20:18:00	49.4	11.2	6.59	13.71
193	20:19:00	45.6	10.7	6.34	13.93
193	20:20:00	45.9	8.9	6.19	14.20
193	20:21:00	46.5	8.5	6.09	14.24
193	20:22:00	48.0	11.2	5.82	14.58
193	20:23:00	50.4	11.6	6.50	13.84
193	20:24:00	47.7	12.4	6.09	14.25
193	20:25:00	48.4	13.8	6.36	13.99
193	20:26:00	46.9	14.1	6.15	14.18
193	20:27:00	49.2	14.6	6.36	13.95
193	20:28:00	49.0	17.3	5.86	14.45
193	20:29:00	51.0	11.9	5.99	14.46

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT31
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

GEKA Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	20:30:00	51.3	11.0	5.85	14.45
193	20:31:00	53.5	10.4	6.17	14.28
193	20:32:00	47.3	9.7	6.19	14.12
193	20:33:00	46.9	9.7	6.39	13.90
193	20:34:00	49.1	7.3	5.71	14.57
193	20:35:00	52.1	7.8	5.66	14.86
193	20:36:00	47.9	12.2	6.23	14.05
193	20:37:00	49.2	11.0	5.99	14.41
193	20:38:00	47.8	10.8	6.13	14.19
193	20:39:00	49.7	8.7	6.33	14.02
193	20:40:00	50.1	7.5	5.99	14.27
193	20:41:00	50.8	7.0	5.64	14.78
193	20:42:00	50.1	9.9	5.73	14.64
193	20:43:00	51.4	10.8	6.16	14.24
193	20:44:00	50.3	9.5	6.44	13.93
193	20:45:00	47.8	10.0	6.41	13.80
193	20:46:00	48.8	7.7	6.07	14.29
193	20:47:00	49.7	8.7	6.09	14.26
193	20:48:00	46.6	8.2	5.99	14.34
193	20:49:00	49.5	7.8	6.29	14.06
193	20:50:00	50.4	10.2	5.84	14.43
193	20:51:00	49.8	7.9	5.59	14.90
193	20:52:00	49.8	11.4	6.39	13.91
193	20:53:00	48.0	12.4	6.66	13.65
193	20:54:00	45.9	9.5	6.44	13.75
193	20:55:00	44.9	7.4	5.69	14.61
	Run Average	50.3	10.2	6.16	14.18

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT32
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

GEKA Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	21:11:00	46.0	8.2	6.15	14.31
193	21:12:00	46.9	9.8	6.58	13.78
193	21:13:00	43.3	7.2	6.29	14.15
193	21:14:00	45.8	5.8	6.17	14.24
193	21:15:00	43.5	6.4	6.27	14.21
193	21:16:00	50.2	5.5	6.21	14.25
193	21:17:00	46.9	5.9	5.84	14.63
193	21:18:00	47.8	5.7	5.60	14.91
193	21:19:00	47.8	7.0	5.86	14.73
193	21:20:00	45.4	12.5	6.08	14.40
193	21:21:00	44.9	11.7	6.52	13.97
193	21:22:00	44.9	9.1	6.14	14.31
193	21:23:00	44.2	8.0	6.33	14.16
193	21:24:00	41.7	7.6	6.17	14.29
193	21:25:00	43.6	7.4	6.24	14.31
193	21:26:00	42.7	7.2	6.13	14.33
193	21:27:00	43.0	4.7	5.88	14.64
193	21:28:00	45.4	5.3	6.02	14.51
193	21:29:00	44.3	8.7	5.86	14.66
193	21:30:00	45.1	10.7	6.25	14.34
193	21:31:00	46.5	11.6	6.47	14.03
193	21:32:00	45.1	13.1	6.33	14.11
193	21:33:00	48.3	11.3	6.28	14.19
193	21:34:00	42.9	6.9	5.94	14.56
193	21:35:00	41.7	4.4	6.20	14.38
193	21:36:00	40.8	6.5	6.03	14.47
193	21:37:00	40.8	5.7	6.18	14.40
193	21:38:00	41.3	6.3	6.19	14.32
193	21:39:00	42.2	6.6	6.43	14.06
193	21:40:00	43.3	7.0	6.16	14.44
193	21:41:00	47.8	8.1	6.26	14.14
193	21:42:00	44.8	7.9	5.70	14.83
193	21:43:00	43.1	5.4	5.73	14.91
193	21:44:00	44.7	7.3	5.90	14.63

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT32
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

GEKA Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	21:45:00	48.0	9.6	6.14	14.47
193	21:46:00	47.9	9.4	6.20	14.35
193	21:47:00	49.6	8.2	6.22	14.28
193	21:48:00	50.9	7.4	5.74	14.77
193	21:49:00	49.0	9.2	5.60	15.02
193	21:50:00	45.2	7.3	6.16	14.41
193	21:51:00	41.8	7.7	5.87	14.66
193	21:52:00	43.3	5.7	6.10	14.49
193	21:53:00	45.2	7.6	5.95	14.52
193	21:54:00	47.1	10.8	5.89	14.79
193	21:55:00	45.1	11.2	6.19	14.32
193	21:56:00	43.4	7.3	6.24	14.31
193	21:57:00	44.0	5.2	6.12	14.36
193	21:58:00	44.2	9.4	5.91	14.67
193	21:59:00	42.3	10.1	6.29	14.24
193	22:00:00	43.1	9.8	5.99	14.53
193	22:01:00	44.0	8.7	6.16	14.41
193	22:02:00	42.3	8.5	6.12	14.40
193	22:03:00	44.6	8.1	6.27	14.28
193	22:04:00	42.7	5.8	6.20	14.29
193	22:05:00	43.3	4.8	6.23	14.33
193	22:06:00	40.8	5.2	6.23	14.29
193	22:07:00	41.6	6.1	6.24	14.34
193	22:08:00	39.8	7.3	6.21	14.29
193	22:09:00	42.8	6.7	5.86	14.69
193	22:10:00	42.2	8.3	6.11	14.42
	Run Average	44.5	7.8	6.11	14.41

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT33
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

GEKA Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	22:26:00	39.3	7.5	6.24	14.28
193	22:27:00	39.5	7.9	6.21	14.32
193	22:28:00	42.0	6.3	6.26	14.20
193	22:29:00	41.2	4.1	6.34	14.24
193	22:30:00	40.2	5.6	6.35	14.12
193	22:31:00	42.2	7.5	6.18	14.38
193	22:32:00	39.7	8.6	6.26	14.21
193	22:33:00	40.0	7.7	6.18	14.40
193	22:34:00	39.5	8.9	6.17	14.34
193	22:35:00	41.6	5.8	6.05	14.54
193	22:36:00	38.3	7.4	6.30	14.19
193	22:37:00	39.7	7.5	6.09	14.47
193	22:38:00	38.4	9.1	6.47	14.03
193	22:39:00	39.4	8.3	6.24	14.30
193	22:40:00	39.2	8.5	6.39	14.13
193	22:41:00	40.7	9.5	6.06	14.44
193	22:42:00	40.1	6.9	6.08	14.50
193	22:43:00	39.5	8.3	6.14	14.42
193	22:44:00	41.2	12.1	6.28	14.26
193	22:45:00	41.3	12.4	6.32	14.26
193	22:46:00	39.6	10.0	6.57	13.87
193	22:47:00	39.1	8.5	6.24	14.31
193	22:48:00	40.9	7.1	6.29	14.20
193	22:49:00	43.5	7.2	5.84	14.72
193	22:50:00	45.3	8.9	6.35	14.26
193	22:51:00	42.5	8.6	6.29	14.20
193	22:52:00	41.6	9.8	6.35	14.15
193	22:53:00	42.3	7.7	6.07	14.45
193	22:54:00	42.9	7.3	6.52	14.00
193	22:55:00	40.5	7.2	6.29	14.16
193	22:56:00	41.6	5.4	6.35	14.18
193	22:57:00	40.8	6.0	6.15	14.36
193	22:58:00	41.3	5.6	6.01	14.60
193	22:59:00	42.0	8.8	6.24	14.26

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT33
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

GEKA Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	23:00:00	41.4	9.6	6.43	14.09
193	23:01:00	42.4	9.4	6.49	13.95
193	23:02:00	42.8	8.5	6.50	14.01
193	23:03:00	41.3	8.4	6.23	14.23
193	23:04:00	43.0	10.0	5.81	14.76
193	23:05:00	44.4	11.9	6.17	14.40
193	23:06:00	44.2	12.7	6.05	14.52
193	23:07:00	40.9	11.9	6.34	14.20
193	23:08:00	41.5	9.3	6.28	14.25
193	23:09:00	39.6	9.6	6.38	14.09
193	23:10:00	41.2	9.4	6.34	14.20
193	23:11:00	43.0	11.2	6.28	14.20
193	23:12:00	44.1	8.8	6.47	14.02
193	23:13:00	41.0	9.0	6.19	14.29
193	23:14:00	42.4	8.5	6.16	14.47
193	23:15:00	41.7	9.3	6.37	14.11
193	23:16:00	39.4	11.4	6.13	14.35
193	23:17:00	41.0	9.8	6.22	14.35
193	23:18:00	40.6	9.2	6.14	14.39
193	23:19:00	40.8	12.2	6.14	14.43
193	23:20:00	40.9	8.9	6.48	14.01
193	23:21:00	39.2	9.4	6.30	14.18
193	23:22:00	42.7	10.7	6.36	14.14
193	23:23:00	41.5	8.6	5.90	14.65
193	23:24:00	42.6	9.2	5.94	14.71
193	23:25:00	41.3	11.4	6.03	14.45
	Run Average	41.2	8.8	6.24	14.29

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT41
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Press Vent Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) CO (ppmv)	O2 (%v/v)
194	09:16:00	13.4	20.82
194	09:17:00	10.8	20.83
194	09:18:00	10.9	20.83
194	09:19:00	11.9	20.83
194	09:20:00	16.0	20.83
194	09:21:00	14.5	20.82
194	09:22:00	14.1	20.83
194	09:23:00	12.5	20.83
194	09:24:00	10.2	20.83
194	09:25:00	11.0	20.82
194	09:26:00	12.2	20.83
194	09:27:00	14.6	20.83
194	09:28:00	15.6	20.83
194	09:29:00	15.5	20.83
194	09:30:00	17.7	20.83
194	09:31:00	13.7	20.83
194	09:32:00	13.5	20.83
194	09:33:00	12.8	20.83
194	09:34:00	11.1	20.84
194	09:35:00	9.6	20.83
194	09:36:00	11.6	20.83
194	09:37:00	12.2	20.83
194	09:38:00	12.1	20.83
194	09:39:00	14.4	20.83
194	09:40:00	14.2	20.83
194	09:41:00	9.8	20.83
194	09:42:00	8.4	20.83
194	09:43:00	9.3	20.83
194	09:44:00	9.8	20.83
194	09:45:00	11.9	20.83
194	09:46:00	12.4	20.83
194	09:47:00	11.2	20.84
194	09:48:00	12.7	20.85
194	09:49:00	10.9	20.85

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT41
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Press Vent Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) CO (ppmv)	O2 (%v/v)
194	09:50:00	12.3	20.85
194	09:51:00	12.4	20.85
194	09:52:00	10.3	20.85
194	09:53:00	8.3	20.85
194	09:54:00	8.8	20.85
194	09:55:00	10.7	20.86
194	09:56:00	13.7	20.85
194	09:57:00	12.9	20.84
194	09:58:00	10.1	20.84
194	09:59:00	8.3	20.84
194	10:00:00	9.1	20.84
194	10:01:00	12.4	20.84
194	10:02:00	15.4	20.84
194	10:03:00	17.4	20.84
194	10:04:00	16.4	20.83
194	10:05:00	14.4	20.83
194	10:06:00	12.8	20.84
194	10:07:00	16.1	20.83
194	10:08:00	17.0	20.83
194	10:09:00	15.6	20.84
194	10:10:00	13.5	20.83
194	10:11:00	15.8	20.83
194	10:12:00	17.3	20.83
194	10:13:00	15.3	20.84
194	10:14:00	15.7	20.83
194	10:15:00	15.1	20.83
194	10:16:00	16.3	20.83
	Run Average	12.9	20.83

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT42
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Press Vent Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) CO (ppmv)	O2 (%v/v)
194	11:06:00	12.8	20.79
194	11:07:00	12.8	20.78
194	11:08:00	13.5	20.79
194	11:09:00	13.0	20.79
194	11:10:00	12.2	20.78
194	11:11:00	13.8	20.78
194	11:12:00	14.3	20.78
194	11:13:00	13.3	20.79
194	11:14:00	12.8	20.78
194	11:15:00	11.8	20.79
194	11:16:00	10.5	20.78
194	11:17:00	10.6	20.78
194	11:18:00	11.2	20.78
194	11:19:00	14.1	20.78
194	11:20:00	14.7	20.78
194	11:21:00	15.6	20.78
194	11:22:00	14.2	20.77
194	11:23:00	15.7	20.77
194	11:24:00	14.9	20.77
194	11:25:00	13.5	20.77
194	11:26:00	15.2	20.77
194	11:27:00	16.3	20.77
194	11:28:00	17.6	20.77
194	11:29:00	16.0	20.77
194	11:30:00	11.6	20.77
194	11:31:00	10.2	20.77
194	11:32:00	9.9	20.77
194	11:33:00	13.2	20.77
194	11:34:00	11.0	20.77
194	11:35:00	12.2	20.77
194	11:36:00	15.2	20.77
194	11:37:00	17.2	20.77
194	11:38:00	12.1	20.77
194	11:39:00	9.5	20.77

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT42
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Press Vent Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) CO (ppmv)	O2 (%v/v)
194	11:40:00	9.3	20.77
194	11:41:00	11.9	20.76
194	11:42:00	10.7	20.76
194	11:43:00	10.8	20.76
194	11:44:00	11.9	20.76
194	11:45:00	12.7	20.76
194	11:46:00	12.0	20.75
194	11:47:00	11.8	20.75
194	11:48:00	13.0	20.75
194	11:49:00	13.0	20.75
194	11:50:00	13.4	20.75
194	11:51:00	13.9	20.75
194	11:52:00	15.6	20.74
194	11:53:00	15.5	20.74
194	11:54:00	15.0	20.75
194	11:55:00	16.2	20.74
194	11:56:00	15.6	20.74
194	11:57:00	16.9	20.74
194	11:58:00	19.8	20.74
194	11:59:00	17.9	20.73
194	12:00:00	16.2	20.74
194	12:01:00	15.9	20.74
194	12:02:00	16.2	20.73
194	12:03:00	14.4	20.73
194	12:04:00	12.8	20.74
194	12:05:00	12.9	20.73
194	12:06:00	14.1	20.73
	Run Average	13.6	20.76

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT43
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Press Vent Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) CO (ppmv)	O2 (%v/v)
194	13:36:00	12.7	20.80
194	13:37:00	13.2	20.79
194	13:38:00	12.9	20.79
194	13:39:00	11.8	20.79
194	13:40:00	12.8	20.79
194	13:41:00	16.1	20.79
194	13:42:00	12.7	20.79
194	13:43:00	11.1	20.80
194	13:44:00	9.9	20.80
194	13:45:00	10.1	20.79
194	13:46:00	9.8	20.79
194	13:47:00	9.1	20.79
194	13:48:00	9.2	20.79
194	13:49:00	11.7	20.79
194	13:50:00	12.9	20.79
194	13:51:00	12.4	20.79
194	13:52:00	12.3	20.79
194	13:53:00	11.5	20.79
194	13:54:00	11.4	20.79
194	13:55:00	13.3	20.79
194	13:56:00	13.1	20.78
194	13:57:00	14.7	20.78
194	13:58:00	13.0	20.78
194	13:59:00	11.6	20.78
194	14:00:00	9.6	20.78
194	14:01:00	8.1	20.78
194	14:02:00	9.4	20.78
194	14:03:00	8.0	20.78
194	14:04:00	7.0	20.78
194	14:05:00	5.2	20.78
194	14:06:00	4.6	20.78
194	14:07:00	8.2	20.78
194	14:08:00	9.9	20.78
194	14:09:00	9.6	20.78

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1995 -

File Name: LPT43
Job Number: 5-6006
Client: Louisiana - Pacific
Location: Tomahawk, Wisconsin

Press Vent Stack -- Run 3

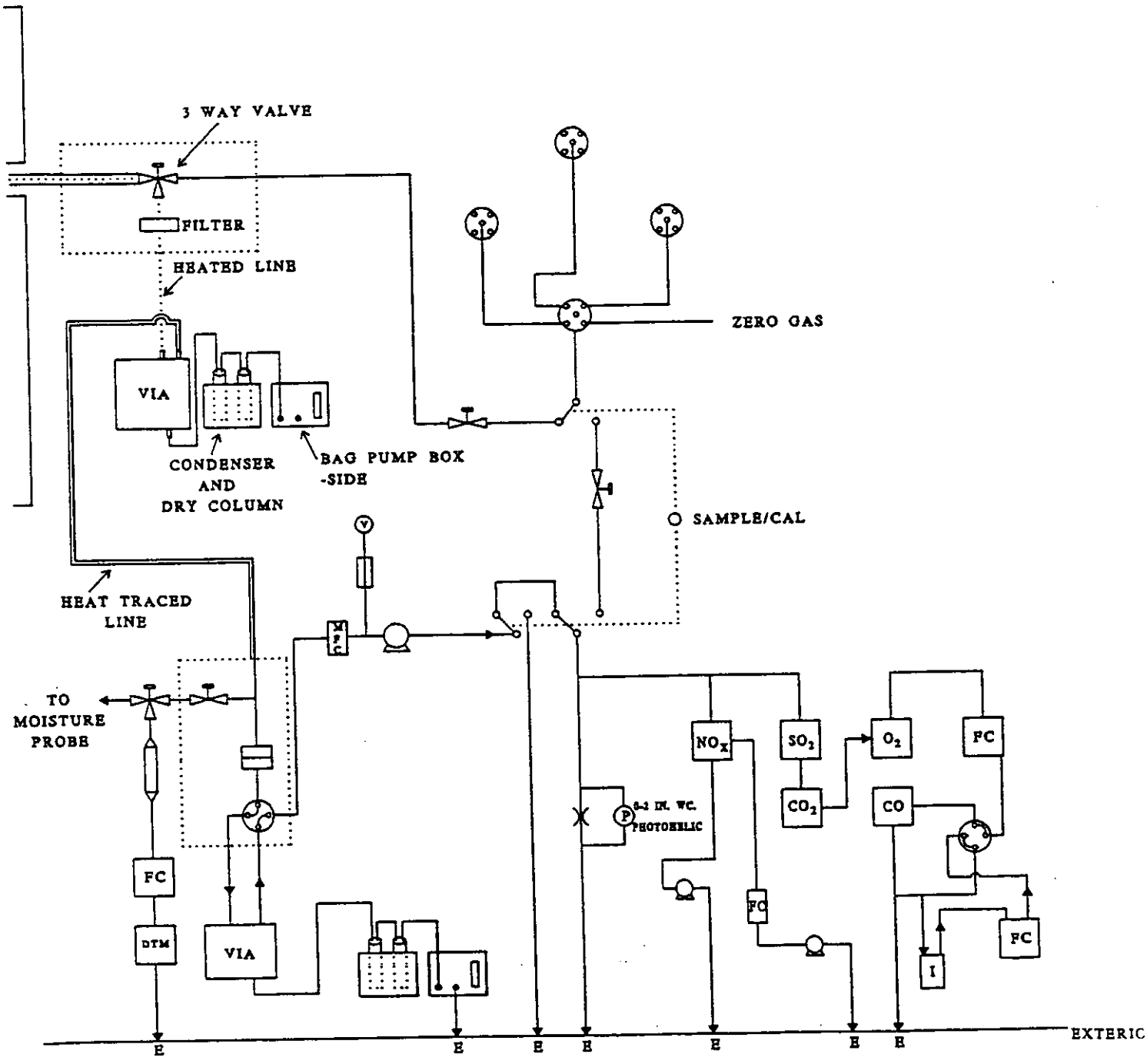
Julian Date	Time (Hrs)	Conc. (dry basis unless noted) CO (ppmv)	O2 (%v/v)
194	14:10:00	9.7	20.77
194	14:11:00	10.1	20.78
194	14:12:00	9.2	20.78
194	14:13:00	7.7	20.77
194	14:14:00	6.4	20.77
194	14:15:00	6.3	20.77
194	14:16:00	6.1	20.77
194	14:17:00	7.0	20.78
194	14:18:00	8.3	20.78
194	14:19:00	9.7	20.77
194	14:20:00	7.7	20.77
194	14:21:00	9.0	20.77
194	14:22:00	9.6	20.77
194	14:23:00	9.8	20.77
194	14:24:00	7.6	20.77
194	14:25:00	6.1	20.77
194	14:26:00	6.2	20.77
194	14:27:00	4.9	20.77
194	14:28:00	4.4	20.76
194	14:29:00	4.9	20.77
194	14:30:00	7.4	20.76
194	14:31:00	9.4	20.77
194	14:32:00	9.4	20.77
194	14:33:00	10.8	20.77
194	14:34:00	11.3	20.77
194	14:35:00	10.3	20.77
194	14:36:00	8.0	20.77
	Run Average	9.6	20.78

APPENDIX F

ANALYZER SPECIFICATIONS

Interpoll Laboratories
(612) 786-6020

CEM TRAILER



E = EXHAUST
FC = FLOW CONTROL
I = IMPINGER (METHOD 10a)

CEMTRA

Servomex

1420
Oxygen Analyser
Instruction Manual

Ref : 01420/001A/0

Order as part No. 01420001A

was (7982-2842)

INTERPOLL LABORATORIES
4500 BALL ROAD N.E.
CIRCLE PINES, MN 55014-1819
(612) 786-6020

1.3 Sampling System

The sampling system of the analyser includes a combination filter/automatic flow control device, designed to keep a constant flow of sample gas through the measuring cell for varying input pressures and to prevent the entrance of particulate matter into the measuring cell. Excess flow is vented to the by-pass.

1.4 Specification

Performance Specification (typical)

Repeatability:	Better than +/-0.2% O2 under constant conditions.
Drift:	Less than 0.2% O2 per week under constant conditions. (Excluding variation due to barometric pressure changes; reading is proportional to barometric pressure.)

Outputs

Display:	3 1/2 digit LCD reading 0.0 to 100.0% oxygen with overrange capability.
Output:	0 to 1V (non-isolated) for 0 to 100% oxygen available on 'D' type connector located on the back panel of the instrument. Output impedance is less than 10 ohms.
Option:	4 - 20mA isolated, Max impedance 500 ohms.
Flow alarm output:	Change over relay contact rated at 3A/115V ac, 1A/240V ac or 1A/28V dc. 4 sets of single pole changeover contacts. Alarm becomes active when sample gas flow through the analyser fails.

Sample requirements

Condition:	Clean, dry gas with dew point 5 deg C below ambient temperature.
Inlet pressure:	0.5 to 3psig (3.5 to 21kPa). Inlet pressure changes within this range will change the reading by less than 0.1% O2. May be operated up to 10psig (70kPa) with degraded stability.
Flowrate:	1.5 to 6 litres/minute approximately depending on sample pressure.
Filtering:	0.6 micron replaceable filter integral to the automatic flow control device.

Response time:	Less than 15 secs. to 90% at an inlet pressure of 3psig (21kPa).
Inlet/vent connections:	1/4 inch OD tube (stainless steel) suitable for 6mm ID flexible tubing or 1/4 inch OD compression fittings.
Materials exposed to the sample:	Stainless steel, Pyrex glass, brass, platinum, epoxy resin, Viton, polypropylene and glass fibre filter.

Physical Characteristics

Case:	Steel and aluminium finished in epoxy powder paint.
Case classification:	IP 20 (IEC 529) when fitted into the Servomex 1400 series 19 inch case.
Dimensions:	See Figure 2.1.
Weight:	10Kg (22lb) approximately.

Electrical

AC Supply:	110 to 120V AC or 220 to 240V AC, +/-10%, 48 to 62Hz. Voltage selected by a voltage selector integral to the IEC supply plug.
Power required:	15VA maximum.

Environmental Limits

Operating ambient temperature:	0 to +40 deg C (32 to 104 deg F)
Storage temp. range:	-20 to +70 deg C (-4 to 158 deg F)
Relative humidity:	0-85%, non-condensing.

SPECIFICATIONS FOR ACS MODEL 3300 CO_2 NDIR

Measuring principle	NDIR single beam method
Measurable gas components and measuring range	0 - 20%
Reproducibility	±0.5% of full scale
Stability	Zero drift; ±% of full scale/24H Span drift; ±% of full scale/24H
Noise	0.5% of full scale
Ambient temperature	-5 to 45°C
Ambient humidity	Less than 90% RH
Response time (90% of final reading)	Electrical system; 2 sec, 3 sec, 5 sec (selectable with connector) Response of actual gas; Within 15 sec (depending on cell length)
Indicator	100 linear division
Output signal	OUTPUT 1; DC 0 - 1 V OUTPUT 2; DC 0 - 10 mV or DC 0 - 100 mV or DC 0 - 1 V or DC 4 - 20 mA (Allowable load resistance 500Ω max.)
Linearity	Better than ±2% of full scale (when linearizer is used)
Power supply	AC 115 V ± 10%, 60 Hz

Power consumption	Approx. 30 VA
Materials of gas-contacting parts	Measuring cell; SUS304 Window; CaF2 Piping; Polyethylene
Sample gas flow rate	1ℓ/min ± 0.5ℓ/min
Sample gas temperature	0 to 55°C
Purging gas flow rate	1ℓ/min (to be flowed as occasion demands)
Warmup time	Approx. 2 hours
External dimensions	200 x 250 x 541 (H x W x D) mm
Weight	Approx. 11 kg
Finish Color	MUNSELL N1.5

Remarks: For combinations of measuring ranges for the dualcomponent analyzer, inquiry should be made to the manufacturer.

SPECIFICATIONS FOR MODEL 10A
ROCK MOUNTED CHEMILUMINESCENT
NO-NO_x GAS ANALYZER

Sensitivity	Each instrument is equipped with the following ranges: 0 - 2.5 ppm 0 - 10 ppm 0 - 25 ppm 0 - 100 ppm 0 - 250 ppm 0 - 1000 ppm 0 - 2500 ppm 0 - 10000 ppm
Accuracy	Derived from the NO or NO_2 calibration gas, ±1% of fullscale
Response time (0-90%) Typical	1.5 seconds - NO Mode 1.7 seconds - NO_x Mode
Output	0 - 10mV and 0 - 10V
Zero Drift	Negligible after 1/2-hour warm-up
Linearity	±1% of full scale
Input Power Requirements	115v/50Hz; 115v/60Hz

SPECIFICATIONS FOR ACS MODEL 3300 CO NDIR

Measuring principle	NDIR single beam method
Operating ranges	0 - 500 ppm 0 - 1000 ppm
Reproducibility	±0.5% of full scale
Stability	Zero drift; ±% of full scale/24H Span drift; ±% of full scale/24H
Noise	0.5% of full scale
Ambient temperature	-5 to 45°C
Ambient humidity	Less than 90% RH
Response time (90% of final reading)	Electrical system; 2 sec, 3 sec, 5 sec (selectable with connector) Response of actual gas; Within 15 sec (depending on cell length)
Indicator	100 linear division
Output signal	OUTPUT 1; DC 0 - 1 V OUTPUT 2; DC 0 - 10 mV or DC 0 - 100 mV or DC 0 - 1 V or DC 4 - 20 mA (Allowable load resistance 500Ω max.)
Linearity	Better than ±2% of full scale (when linearizer is used)
Power supply	AC 115 V ± 10%, 60 Hz

Power consumption	Approx. 30 VA
Materials of gas-contacting parts	Measuring cell; SUS304 Window; CaF2 Piping; Polyethylene
Sample gas flow rate	1ℓ/min ± 0.5ℓ/min
Sample gas temperature	0 to 55°C
Purging gas flow rate	1ℓ/min (to be flowed as occasion demands)
Warmup time	Approx. 2 hours
External dimensions	200 x 250 x 541 (H x W x D) mm
Weight	Approx. 11 kg
Finish Color	MUNSELL N1.5

Remarks: For combinations of measuring ranges for the dualcomponent analyzer, inquiry should be made to the manufacturer.

APPENDIX G

MEASUREMENT SYSTEMS PERFORMANCE SPECIFICATIONS

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP / Tomahawk
Source: Dryer Stack
Test: 1 Run ___ Date: 7-11-95 - 7-12-95
Stack Dimen.: 59.0 IN.
Dry Bulb ___ °F Wet bulb ___ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ___ IN.HG
Static Pressure ___ IN.WC
Operators: B Aschenbach Troy Hansen
Pitot No.: 6" Inst C_p ___

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 475 IN.		Time Start: HRS	
1	.16	9.44	14.19		
2	.50	29.5	34.25		
3	.83	48.97	56.72		
Temp. Meas. Device & S/N:				Time End: HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC
(612) 786-6020

NOx Cal Drift Check

Job LP / Tomahawk Source Dryer
Test 1 Run _____ Date 2-11-95 Site STACK
Operator BOB

Run	C̄	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}	
N.G.									
1	7.56	Zero Gas	0	3	1	2			080
0715		Upscale	86.7	86	86		0		085
2	11.81	Zero Gas	0	1	6	5			092
0902		Upscale	86.7	86	87		1		1010
3	13.66	Zero Gas	0	6	5	1			1040
1022		Upscale	86.7	87	89		2		1135
4		Zero Gas	0	5	4	1			
1142		Upscale	86.7	89	87		2		
Wood									
1		Zero Gas	0	4	3	1			125
1233		Upscale	86.7	87	88		1		
2	30.13 ~~+7.80~~ 10	Zero Gas	0	3	4	1			144
1352		Upscale	86.7	88	89		1		153
3	29.70	Zero Gas	0	4	3	1			
1547		Upscale	86.7	89	87		2		
4	25.86	Zero Gas	0	3	1	2			074
0720		Upscale	86.7	87	86		1		084
5		Zero Gas	0	1	1	0			090
1001		Upscale	86.7	86	91		5		095
6		Zero Gas	0	1	1	0			
		Upscale	86.7	91	86		5		
7		Zero Gas	0	1	1	0			114
1130		Upscale	86.7	86	85		1		1244
8		Zero Gas	0	1	1	0			
		Upscale	86.7	85	84		1		

Must be within 5% or the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO Cal Drift Check

Job CP/Tomahawk Source Dryer
Test 1 Run ____ Date 7-11-95 Site STACK
Operator BJS

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}
				Initial	Final			
1	10.52	Zero Gas	0	3	1	2		
		Upscale	150	146	145		1	
2	8.21	Zero Gas	0	1	2	1		
		Upscale	150	145	145		0	0
3	10.0	Zero Gas	0	2	2	0		0
		Upscale	150	145	146		1	
4		Zero Gas	0	2	2	0		0
		Upscale	150	146	145		1	
1	17.8	Zero Gas	0	2	0	2		
		Upscale	150	145	145		0	
2	13.18	Zero Gas	0	0	1	1		
		Upscale	150	145	145		0	
3		Zero Gas	0	1	0	1		
		Upscale	150	145	144		1	
4	20.31	Zero Gas	0	0	1	1		
		Upscale	150	144	145		1	
5		Zero Gas	0	1	3	2		
		Upscale	150	145	148		3	
6		Zero Gas	0	3	2	1		
		Upscale	150	146	147		1	
7		Zero Gas	0	2	1	1		
		Upscale	150	147	146		1	
8		Zero Gas	0	1	2	1		
		Upscale	150	146	144		2	

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

O2 Cal Drift Check

Job LP/Tomahawk Source Dryer
Test 1 Run _____ Date 7-12-95 Site STACK
Operator SCB

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}
				Initial	Final			
1	19.7	Zero Gas	0	.1	0	.1		
		Upscale	13.5	13.8	13.7		.1	
2	19.74	Zero Gas	0	0	0	0		0
		Upscale	13.5	13.7	13.8		.1	
3	19.63	Zero Gas	0	0	0	0		0
		Upscale	13.5	13.8	13.7		.1	
4		Zero Gas	0	0	0	0		0
		Upscale	13.5	13.7	13.7		0	0
1	19.16	Zero Gas	0	0	0	0		
		Upscale	13.5	13.7	13.8		.1	
2	19.36	Zero Gas	0	0	0	0		0
		Upscale	13.5	13.8	13.8		0	
3		Zero Gas	0	0	0	0		
		Upscale	13.5	13.6	13.8		0	
4		Zero Gas	0	0	.1	.1		
		Upscale	13.5	13.8	13.8		0	
5		Zero Gas	0	.1	0	.1		
		Upscale	13.5	13.8	13.6		.2	
6		Zero Gas	0	0	0	0		
		Upscale	13.5	13.6	13.6		0	
7		Zero Gas	0	0	0	0		
		Upscale	13.5	13.6	13.6		0	
8		Zero Gas	0	0	0	0		
		Upscale	13.5	13.6	13.5		.1	

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO_2 Cal Drift Check

Job LP / Tomahawk Source Dryer
Test 1 Run _____ Date 7- -95 Site STACK
Operator BOB

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}
				Initial	Final			
1	1.05	Zero Gas	0	.1	0	.1		
		Upscale	10.7	10.5	10.6		.1	
2	1.00	Zero Gas	0	0	.1	.1		
		Upscale	10.7	10.6	10.7		.1	
3	1.04	Zero Gas	0	.1	0	.1		
		Upscale	10.7	10.7	10.5		.2	
4		Zero Gas	0	0	.1	.1		
		Upscale	10.7	10.5	10.6		.1	
1	2.00	Zero Gas	0	.1	0	.1		
		Upscale	10.7	10.6	10.7		.1	
2	2.00	Zero Gas	0	.1	.3	.2		
		Upscale	10.7	10.7	10.8			
3		Zero Gas	0	.3	.1	.2		
		Upscale	10.7	10.8	10.7		<.1	
4		Zero Gas	0	.1	.1	0		
		Upscale	10.7	10.7	10.8		.1	
5		Zero Gas	0	.1	0	.1		
		Upscale	10.7	10.8	10.5		.3	
6		Zero Gas	0	0	0	0		
		Upscale	10.7	10.5	10.5		0	
7		Zero Gas	0	0	.1	<.1		
		Upscale	10.7	10.5	10.5		0	
8		Zero Gas	0	.1	0	.1		
		Upscale	10.7	10.5	10.4		-.1	

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP / Tomahawk
Source GEKA Stack
Test 3 Run Date
Stack Dimen. 42 IN.
Dry Bulb °F Wet bulb °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure IN.HG
Static Pressure IN.WC
Operators B Richenbach, Trent Hansen
Pitot No. C_p

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 1.75 IN.		Time Start:	HRS
1	.16	6.72	8.47		
2	.50	21.00	22.75		
3	.83	34.86	36.61		

Temp. Meas. Device & S/N:

Time End: HRS

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC
(612) 786-6020

VOC Cal Drift Check

Job LP Tomahawk
Test 3 Run _____ Date 2-12-95
Operator BAB

Source GEISA
Site STACK

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1		Zero Gas	0	1	1	0		
		Upscale	86.7	84	86		2	
2		Zero Gas	0	1	1	0		
		Upscale	86.7	86	84			
3		Zero Gas	0	1	2	1		
		Upscale	86.7	84	86		2	
4		Zero Gas	0	2	2	0		
		Upscale	86	86	85		1	
5		Zero Gas	0	2	1	1		
		Upscale	86	85	84		1	
6		Zero Gas	0	1	1	0		
		Upscale	86	84	83		1	
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

1710
1955
2054
2110
2056
2207
2225
0911
2324
2351

Must be within 5% of the span for the zero or upscale cal. gas.

070695-G:\STACK\WP\FORMS\S-359

INTERPOLL LABORATORIES, INC
(612) 786-6020

40 Cal Drift Check

Job LP Tomahawk Source GEKA
Test 3 Run _____ Date 7-12-95 Site STACK
Operator BCB

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}
				Initial	Final			
1		Zero Gas	0	1	2	1		
		Upscale	150	145	146		1	
2		Zero Gas	0	2	2	0		
		Upscale	150	146	146		0	
3		Zero Gas	0	2	2	0		
		Upscale	150	144	144		0	
4		Zero Gas	0	2	2	0		
		Upscale	150	144	144		0	
5		Zero Gas	0	2	1	1		
		Upscale	150	144	141		0	
6		Zero Gas	0	1	2	1		
		Upscale	150	144	143		1	
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

O_2 Cal Drift Check

Job LP / Tomahawk Source GEKA
Test 3 Run ____ Date 7-12-95 Site STACK
Operator BD

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}
				Initial	Final			
1		Zero Gas	0	0	0	0		
		Upscale	13.5	13.5	13.5		0	
2		Zero Gas	0	0	0	0		
		Upscale	13.5	13.5	13.5		0	
3		Zero Gas	0	0	0	0		
		Upscale	13.5	13.5	13.4		-.1	
4		Zero Gas	0	0	0	0		
		Upscale	13.5	13.4	13.4		0	
5		Zero Gas	0	0	0	0		
		Upscale	13.5	13.4	13.5			
6		Zero Gas	0	0	0	0		
		Upscale	13.5	13.5	13.6		.1	
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO_2 Cal Drift Check

Job LP / Tomahawk Source Gerdau
Test 3 Run _____ Date 7-12-95 Site Street
Operator Bob

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}
				Initial	Final			
1		Zero Gas	0	0	0	0		
		Upscale	10.7	10.4	10.5		.1	
2		Zero Gas	0	0	.2	.2		
		Upscale	10.7	10.5	10.6		.1	
3		Zero Gas	0	.2	.2	0		
		Upscale	10.7	10.6	10.5		.1	
4		Zero Gas	0	-.2	.2	0		
		Upscale	10.7	10.5	10.5		0	
5		Zero Gas	0	.2	.2	0		
		Upscale	10.7	10.5	10.5		0	
6		Zero Gas	0	.2	.2	0		
		Upscale	10.7	10.5	10.6		-.1	
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP / Tomahawk
Source: Press Vent Stacks
Test: 4 Run __ Date: 7-13-95
Stack Dimen.: 62.5 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ____ IN.HG
Static Pressure ____ IN.WC
Operators: B Achenbach T Hansen
Pitot No.: 6" Dust C_p ____

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 3	IN.	Time Start:	HRS
1	.16	10.00	13.00		
2	.50	31.25	34.25		
3	.83	51.87	54.87		
Temp. Meas. Device & S/N:				Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO Cal Drift Check

Job CP / Tomahawk Source Press Vent
Test 4 Run ____ Date 2-13-95 Site Stack
Operator BOB

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}	
				Initial	Final				
1		Zero Gas	0	2	2	0			0915
		Upscale	150	143	144		1		1014
2		Zero Gas	0	2	2	0			1105
1039		Upscale	150	144	146		2		1104
3		Zero Gas	0	2	2	0			1330
1226		Upscale	150	146	146		0		1933
4		Zero Gas	0	2	2	0			
1458		Upscale	150	146	144		2		
5		Zero Gas	0						
		Upscale							
6		Zero Gas	0						
		Upscale							
7		Zero Gas	0						
		Upscale							
8		Zero Gas	0						
		Upscale							
9		Zero Gas	0						
		Upscale							
10		Zero Gas	0						
		Upscale							
11		Zero Gas	0						
		Upscale							
12		Zero Gas	0						
		Upscale							

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

O2 Cal Drift Check

Job LPI Tomahawk Source Press Vent
Test 4 Run _____ Date 7-13-95 Site Stack
Operator BJB

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}
				Initial	Final			
1		Zero Gas	0	0	0	0		
		Upscale	13.5	13.6	13.6		0	
2		Zero Gas	0	0	0	0		
		Upscale	13.5	13.6	13.4		.2	
3		Zero Gas	0	0	0	0		
		Upscale	13.5	13.4	13.30		.1	
4		Zero Gas	0	0	0	0		
		Upscale	13.5	13.3	13.4		.1	
5		Zero Gas	0					
		Upscale						
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

070695-G:\STACK\WP\FORMS\S-559

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO_2 Cal Drift Check

Job CP / Tomahawk Source Press Chart
Test CP Run _____ Date 7-13-95 Site Stack
Operator Gary

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		C_o	C_m	C_{gas}
				Initial	Final			
1		Zero Gas	0	.2	.2	0		
		Upscale	10.7	10.6	10.6		0	
2		Zero Gas	0	.2	0	.2		
		Upscale	10.7	10.0	10.5		.1	
3		Zero Gas	0	0	.1			
		Upscale	10.7	10.5	10.6		.1	
4		Zero Gas	0	.1	.2	.1		
		Upscale	10.7	10.6	10.4		.2	
5		Zero Gas	0					
		Upscale						
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Instrumental Analysis Preliminary Field Calculations

Job LP / Tomahawk

Technician GES

Source Press Hoist Stacks

Date of Test 7-13-95

Run No.	Moist. Cont. (%)	SO_2, PPM		NO_x, PPM		CO, PPM		O_2, %v/v		CO_2, %v/v		F_o	LB/MMBTU			Flows	LB/HR		
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet		SO_2	NO_x	CO	SCFH	SO_2	NO_x	CO
1						12.78		20.83		0									5.14
2						13.63		20.76		0									5.34
3						9.65		20.78		0									3.92

G-15

012095-G:\STACK\WP\FORMS\S-420-9

APPENDIX H

CALIBRATION GAS CERTIFICATION SHEETS

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, N.C. 27713
(919) 544-3772

TO: TWIN CITY OXYGEN

CERTIFICATE OF ANALYSIS

DATE REPORTED: 11/10/94 REFERENCE #:88-34977

MATERIAL SUBMITTED:OXYGEN, CARBON DIOXIDE IN NITROGEN, CERTIFIED CYL. #CC36114

INFORMATION REQUESTED:RATIO ANALYSIS

METHOD OF ANALYSIS:OXYGEN ANALYZER

RESULT OF INVESTIGATION:

COMPONENT	SPECIFICATION	CONCENTRATION
OXYGEN	13.5%	13.5%
CARBON DIOXIDE	11%	10.7%
NITROGEN		BALANCE

AUTHORIZED SIGNATURE

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, N.C. 27713
(919) 544-3772

TO: TWIN CITY OXYGEN

CERTIFICATE OF ANALYSIS

DATE REPORTED: 12/13/93 REFERENCE #:88-28413

MATERIAL SUBMITTED:CARBON DIOXIDE AND OXYGEN IN NITROGEN, CERTIFIED CYL. #CC112272

INFORMATION REQUESTED:RATIO ANALYSIS

METHOD OF ANALYSIS:INFRARED AND OXYGEN ANALYZERS

RESULT OF INVESTIGATION:

COMPONENT	SPECIFICATION	CONCENTRATION
CO2	17%	16.4%
O2	21%	21.2%
N2		BALANCE

Laura Hamilton
AUTHORIZED SIGNATURE

"THIS REPORT STATED ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY, THE INFORMATION REQUESTED; HOWEVER, IN CONNECTION WITH ITS RENDERING OF THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE."

Interpoll Laboratories, Inc.
(612) 786-6020

CERTIFICATE OF ANALYSIS FOR
NO STANDARD GASES FOR METHOD 7E

Vendor: National Specialty Gases
Cylinder No: CC114264
Date of Preparation: 6-11-93
Label: 86.7 ppm NOx
Blend Specification: _____

Results Of Analyses Of Standard Gas (by Method 7A)

Date of Analysis	Run	NO in N_2 (ppm)
8-10-93	1	88.57
	2	88.65
	3	88.37
	4	
	5	
	6	
	Avg	88.53

Analyst: Bob Aschenbach

☒ Results are within 10% of the vendor tag value; use tag value.
☐ Results are not within 10% of the vendor tag value; conduct another set of triplicate analyses.
☐ Results of six consecutive analyses within ± 10% of the average; relabel as above.
☐ All results not within ± 10% of the average; perform another set of triplicate analyses.

Approved by,

August 16, 1993
Date

Dr. Perry Lonnes

S-431

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1993 -

File Name: CG5
Job Number: 3-3333
Client: Interpoll Laboratories Inc.
Location: Circle Pines, Minnesota

CC114264 - 86.7 ppm NOx -- Run 1 - 3

Julian Date	Time (Hrs)		NOx (ppmv)
222	11:19:00		88.6
222	11:19:30	Run 1	88.5
222	11:20:00		88.7
222	11:20:30		88.5
222	11:21:00		59.5
222	11:21:30		1.7
222	11:22:00		1.5
222	11:22:30		181
222	11:23:00		233
222	11:23:30		203
222	11:24:00		113
222	11:24:30		89.3
222	11:25:00		88.8
222	11:25:30	Run 2	88.7
222	11:26:00		88.5
222	11:26:30		88.5
222	11:27:00		176
222	11:27:30		233
222	11:28:00		157
222	11:28:30		2.2
222	11:29:00		1.7
222	11:29:30		1.5
222	11:30:00		29.9
222	11:30:30		88.1
222	11:31:00		88.1
222	11:31:30		88.4
222	11:32:00		88.3
222	11:32:30	Run 3	88.4
222	11:33:00		88.4
222	11:33:30		88.5

Conc. (dry basis unless noted)

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-24727CYLINDER #:CC114264 CYL. PRESSURE:2000PSIG

EXPIRATION DATE: 6-11-95 LAST ANALYSIS DATE: 6-11-93

CUSTOMER: TWIN CITY P.O.# 59810
METHOD: EPA PROTOCOL # 13.0.4.G-1

STANDARD:

SRM #: 1684B

CYL #: CLM2226

CONC.: 95.2PPM

INSTRUMENT:
BECKMAN
COMPONENT: CHEMILUMINESCENT

MODEL #: 951A

SERIAL #: 0101572

LAST CAL.: 4-2-93

COMPONENT: NO	REPLICATE CONC.	
MEAN CONC:86.7PPM	DATE: 6-4-93	DATE: 6-11-93
	86.2PPM	87.0PPM
	86.6PPM	87.1PPM
	86.1PPM	86.9PPM

COMPONENT:	REPLICATE CONC.	
MEAN CONC:	DATE:	DATE:

COMPONENT:	REPLICATE CONC.	
MEAN CONC:	DATE:	DATE:

BALANCE GAS:N2

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-26556 CYLINDER #:CC63681 CYL. PRESSURE:2000PSIG

EXPIRATION DATE: 9/9/95 LAST ANALYSIS DATE:9/9/93

CUSTOMER:TWIN CITY OXYGEN P.O.# 6232
METHOD: EPA PROTOCOL # 1 3.0.4. G-1

STANDARD:

SRM #:1685B

CYL #:CLM4908

CONC.:244.4PPM

INSTRUMENT:

COMPONENT: BECKMAN CHEMILUMINESCENT

MODEL #: 951A

SERIAL #: 0101572

LAST CAL.: 9/1/93

COMPONENT:	NO	REPLICATE CONC.	
MEAN CONC:	142PPM	DATE: 9/2/93	DATE: 9/9/93
		141PPM	142PPM
		142PPM	141PPM
		143PPM	142PPM

COMPONENT:	NO2	REPLICATE CONC.	
MEAN CONC:	1.07PPM	DATE:	DATE:

COMPONENT:		REPLICATE CONC.	
MEAN CONC:		DATE:	DATE:

BALANCE GAS:N2

Scott Specialty Gases

a division of Scott Environmental Technology, Inc.

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Shipped From : Sc ichigan

Our Project # : 538035

Your P.O. # : 40142

Expiration Date : 12-22-93

Cylinder Number : ALM014793

Cylinder Pressure 1900 psig

1 of 1 Component(s)

stomer :
GENEX
C/O AES BARBER POINT COAL
91-086 KAOMI LOOP
EWA BEACH HI 96707

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES
PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Procedure # G1
Protocol # 1

File # PO 3626

Certified Accuracy 1 % NBS Traceable

ANALYZED CYLINDER		REFERENCE STD			INSTRUMENTATION		
COMPONENT	CERTIFIED CONC.	SRM # (CRM #)	CYLINDER NUMBER	CONC.	INSTR/MODEL/SERIAL #	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
CARBON MONOXIDE	150.5 PPM	1680	AAL16199	475.00 PPM	BECKMAN	6-3-92	NON-DISPERSIVE INFRARED
		2636	ALM013383	243.40 PPM	951A		
					270-082899B		

BALANCE GAS : NITROGEN

FIRST ANALYSIS DATE : 6-16-92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	(mV)	RESULTS PPM
.00	56.80	150.20	475.00 PPM	175.00	475.00
.00	56.80	150.20		175.00	475.00
.00	56.80	150.20		175.00	475.00

CALCULATED RESULTS 150.20, 150.20, 150.20

AVERAGE : 150.20 PPM

SECOND ANALYSIS DATE : 6-22-92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	(mV)	RESULTS PPM
0.00	57.00	150.74	475.00 PPM	175.00	475.00
0.00	57.00	150.74		175.00	475.00
0.00	57.00	150.74		175.00	475.00

CALCULATED RESULTS 150.74, 150.74, 150.74

AVERAGE : 150.74 PPM

CALIBRATION CURVE 2 nd DEGREE

SRM # (CRM #)	CONC. PPM	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
1680	475.00	100	175.00	475.00	0.00
2636	243.40	51	91.60	244.14	0.30
GMIS	240.40	51	89.90	239.52	-0.37
1679	96.67	20	36.80	96.86	0.19
	0.00	0	0.00	0.00	0.00
		0		0.0000	0.00
		0		0.00	0.00
2636	243.4	LOW	91.60	244.14	0.00
1680	475.00	HIGH	175.00	475.00	0.00

G1 = G10 MANUFACTURER'S INTERNAL STANDARD

Analyst : Don Fiehler

Approved By : C Shaders

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, N.C. 27713
(919) 544-3772

TO: TWIN CITY OXYGEN

CERTIFICATE OF ANALYSIS

DATE REPORTED: 4-20-93 REFERENCE #: 88-23715

MATERIAL SUBMITTED: CARBON MONOXIDE IN NITROGEN, CERTIFIED CYLINDER#CC109767

INFORMATION REQUESTED: RATIO ANALYSIS

METHOD OF ANALYSIS: INFRARED

RESULT OF INVESTIGATION:

COMPONENT	SPECIFICATION	CONCENTRATION
CARBON MONOXIDE	300 PPM	312 PPM
NITROGEN		BALANCE

Richard Sykes
AUTHORIZED SIGNATURE

APPENDIX I

PROCESS RATE INFORMATION

STACK TESTING PERFORMED FOR

LOUISIANA-PACIFIC CORPORATION

AT THEIR ORIENTED STRANDBOARD FACILITY

LOCATED NEAR TOMAHAWK WISCONSIN

ON JULY 11, 12, & 13, 1995

TEST SCHEDULE / PROCESS DATA SUMMARY

TOMAHAWK WI

				TESTING TIMES (military)		
DATE	*TFP @ HR.*	*TDF @ HR.*	*POLLUTANT*	*RUN # 1*	*RUN # 2*	*RUN # 3*
DRYERS OUTLET TESTING (WOOD)						
			CO	7:45-8:45	9:00-10:00	11:45-12:45
July 12, '95	11.9	2.43	NOX			
DRYERS OUTLET TESTING (GAS)						
July 11, '95	11.5	36.18mmBTU	CO	8:00-9:00	9:20-10:20	10:40-11:40
THERMAL OIL HEATER (BARK)						
			CO	19:55-20:55	21:10-22:10	22:25-23:25
July 12, '95	11.0	1.03	NOX			
PRESS						
			CO	9:15-10:15	11:05-12:05	13:35-14:35
July 13, '95	10.9	2.42	TSP			

PRETEST INFORMATION FOR TOMAHAWK, WISCONSIN

1. Description of the air pollution control equipment associated with the process:

THERMAL OIL HEATER

a) Particulate emissions from the GEKA thermal oil heater are controlled by a cyclone installed in series with a baghouse.

b) The baghouse is designed to operate at a pressure drop of 2 to 6 inches of water column.

c) The maximum design airflow through the stack is 32,600 acfm. The rated heat input capacity of the heater is 30mm BTUs. Control efficiencies of the cyclone and baghouse are estimated to be 50% and 99% respectively.

d) Collected material is presently stored temporarily on site. In the future this material will be either landfilled or spread as a soil amendment.

DRYER

a) Particulate emissions from each MEC dryer are controlled by a set of multicyclones installed in series with a E-TUBE wet electrostatic precipitator.

b) Specific multicyclone operating parameters are not monitored. The wet electrostatic precipitator operates within the following ranges:

voltage - 45 to 65 kv

amperage - 50 to 600 ma

spark rate - up to 300 sparks per minute

c) The maximum design airflow through the stack is 100,000 acfm. The rated heat

input capacity of each burner is 32mm BTUs. Control efficiencies of the multicyclones and wet electrostatic precipitators are estimated to be 60% and 90% respectively.

d) Collected material is mixed with bark and sold or burned in the thermal oil heater.

2. Diagrams of the sampling trains are enclosed in the attachments.

3. Descriptions of the sampling and analysis procedures are enclosed in the attachments.

4. Sketches indicating the flow of the exhaust gases through the equipment are enclosed in the attachments.

5. a) Elevation views of each stack are shown in the attachments.

b) Cross-sectional views of each stack are provided in the attachments.

6. Estimated flue gas conditions are indicated on the attached stack drawings.

7. PROCESS AND CONTROL EQUIPMENT OPERATING DATA

a) THERMAL OIL HEATER OPERATING DATA:

1) Design heat input is 30mm BTU's per hour. Operating heat input will be determined by f factor. Heat output will be estimated based on an efficiency of 66%.

2) Type of fuel to be burned is green wood bark and fines.

3) Acfm of exhaust gas through the thermal oil heater will be determined.

4) Tons of fuel burned in the thermal oil heater on a dry basis during testing will be determined [redacted] by a calibrated conveyor scale and will be adjusted for moisture content as stated in the operating permit under "Conditions Applicable to B03, S03" Sec. 3. Brian Pett 6-14-95

5) Plant production rate during testing will be determined from board weights and press charts.

6) Thermal oil heater operating parameters to be recorded during testing include the following:

•refractory temperature

•incoming oil temperature

•outgoing oil temperature

[redacted] 6-14-95

•thermal oil temperature setpoint

7) Thermal oil heater control equipment operating parameters to be recorded during testing include the following:

•baghouse pressure drop

b. DRYER OPERATING DATA

1) The moisture content of wet and dry wafers will be recorded during testing.

2) It is anticipated that the plant will process a minimum of 99% green wood and a maximum of 1% dry dead wood.

3) It is anticipated that the plant will process approximately 90% hardwood and 10% softwood as required by the air emission permit during testing.

4) The dryer inlet and outlet temperatures during testing will be recorded.

5) Design airflow rate is 80,000 acfm. Actual airflow rate will be determined during testing.

6) The fuels to be burned during testing are dry fines and natural gas as described in Table 1. Waste oil is not used as a fuel for this process. Liquid resin waste is not used as a fuel for this process.

7) The heat content of the dry fines fuel will be determined by analysis.

8) The dryer drums are 12' in diameter and 60' long.

9) Dryer production rate (lbs of dy material produced per hour) will be determined as follows:

$$\frac{\textit{pounds of dryer production}}{HR} = \frac{\textit{tons of finished product/HR} \times 2000\ \textit{lbs}}{1-(\textit{board trim \%} + \textit{fines \%})}$$

The maximum permitted production rate is 7,674 tons of finished product per month This is equivalent to 10.3 tons per hour for a 31 day month.The maximum permitted hourly production rate is 12.6 tons of finished product per hour. At an estimated 7% board trim and 8% fines, each dryer is required to produce 14,800 lbs. per hour of material to reach the maximum hourly permitted plant production rate.

The design rate of each dryer is estimated to be 29,105 lbs per hour of dry material.

The test rate is anticipated to be greater than or equal to 90% of the maximum hourly permit rate.

10) The level of the dry bins will be recorded before and after testing.

11) Additional dryer operating parameters to be recorded during testing include:

•Wet bin feed rate

12) Additional electrostatic precipitator operating parameters to be recorded during testing include:

•Voltage

•Amperage

•Quench chamber inlet temperature

•Quench chamber outlet temperature

c) PRESS OPERATING DATA

1) Nominal board thickness will be recorded

2) The number of sheet produced per hour will be determined by multiplying the number of press loads (as recorded on the press chart).

3) Pounds of resin used per hour will be recorded.

4) Pounds of wax used per hour will be recorded.

5) Type of resin used will be recorded.

6) Press temperature will be recorded.

7) There are two exhaust fans with a design airflow of 100,000 acfm. Actual acfm will be determined during sampling.

[redacted]

8. [redacted] B. Potts 6-14-95

9. The names and titles of testing personal are not available at this time. Testing will be preformed by Interpoll Laboratories, Inc.

10. Procedures for maintaining sample integrity and chain of custody are provided in the attachments. Interpoll Laboratories' QA-QC manual will be followed. Due to size of this document it is not included here but can be provided on request.

11. Calibration sheets will be provided prior to testing.

12. Filter lists will be provided prior to testing.

BOARD WEIGHTS IN TONS

TOMAHAWK WI

DRYERS ON GAS JULY 11, 1995

1	Hours during testing (military)	5
2	Pressloads during testing	77
3	Mats per Pressload	8
4	Finished Product Boards per Pressload	32
5	Weight of Mats (untrimmed)*	117,040
6	Weight of Finished Product (trimmed)**	107,092
7	Trim Percentage	8.50%
8	Thickness Average **	0.430
9	Pounds per cubic foot (average)**	37.90
10	*TFP per hour (Avg. from 7:00am to 6:00pm)*	11.5

* Taken from conveyor scale tapes using every ninth board for an average weight of the mats.

** "Unit Information Sheet" (attached)

Percentage of fines (taken from last stack test) is 8.0%

DRYER TESTING (GAS)

TOMAHAWK WI			Testing Date 07/11/95
Data Time: Start	8.00 **Stop**	9.00 **Total Hrs.**	1.00
Data Time: Start	9.20 **Stop**	10.20 **Total Hrs.**	1.00
Data Time: Start	10.40 **Stop**	11.40 **Total Hrs.**	1.00
Pollutants Testing For:		***Total Data Hours:***	3.00

A.) ***TOTAL DRYER(S) PRODUCTION RATE***

1	lbs. of Dryer Production per Hour *	25,400

* (Pounds Finished Prod. - (% Trim, Fines) / Hours of Testing)

2	Fines Percentage	8.00%
3	Trim Percentage	8.50%
4	Moisture Content of Incoming Wood Flakes (Avg. from 2 samples)	50.90%
5	Moisture Content of Wood Flakes After Drying	6.15%

B.) ***FACE DRYER PRODUCTION RATE (55%)***

1	lbs of Dryer Production per Hour	13,970

C.) ***CORE DRYER PRODUCTION RATE (45%)***

1	lbs of Dryer Production per Hour	11,430

D.) ***FACE DRYER FUEL BURNING RATE***

1	Natural Gas Correction Factor	2.695
2	Meter Reading * 100	29600
3	Hours The Meter was Recorded during Testing 7am - 11am	4
4	Total BTU'S	79,772
5	Total mmBTU's	79.77
6	mmBTU's per hour Average	**19.94**
7	Moisture Content of Wood Flakes After Drying	6.80%
8		
9	Average Inlet Temperature (Fahrenheight)	870
10	Average Outlet Temperature (Fahrenheight)	240

E.) ***CORE DRYER FUEL BURNING RATE***

1	Natural Gas Correction Factor	2.695
2	Meter Reading * 100	24100
3	Hours The Meter was Recorded during Testing 7am - 11am	4
4	Total BTU'S	64,950
5	Total mmBTU's	64.95
6	mmBTU's per hour Average	**16.24**
7	Moisture Content of Wood Flakes After Drying	5.50%
8		
9	Average Inlet Temperature (Fahrenheight)	632
10	Average Outlet Temperature (Fahrenheight)	233

F.) ***TOTAL DRYER(S) FUEL BURNING RATE ON GAS***

Average mmBTU Input per Hour **36.18**

7:00 am Readings

751548 921048

GAS METER READINGS (HOURLY)	
FACE	CORE
751598	921094
751669	921153
751696	921174
751774	921232
751844	921289
751900	921334
751900	921334

88.4
88.7
91.0
100.3
110.3
119.3
160.0

So Use 7:00 - 11:00 for Average

FACE
751844
-751548
296.00
x 2.695
79,772
÷ 1,000
79.77 mmBTU
÷ 4 hours
19.94 mmBTU AVG.

CORE
921289
-921048
241.00
x 2.695
649.50
÷ 1000
64.95 mmBTU
÷ 4 hr.
16.24 mmBTU AVG.

90 90 90 90 90 90 90 90 90 90 90 90 90 90 90 90

DRYER OPERATOR'S REPORT
LOUISIANA-PACIFIC CORP.
TOMAHAWK WI

Oper: LES
Crew: C
Date: 7-11-95
Shift: 1ST

	FACE DRYER						CORE DRYER						
TIME	OUTLT TEMP.	INLET TEMP.	FEED SPEED	FUEL COUNTS	M.COST. HOUR	M.COST. 1/2 HR.	OUTLT TEMP.	INLET TEMP.	FEED SPEED	FUEL COUNTS	M.COST. HOUR	M.COST. 1/2 HR.	CO RDNG.
07:00	226	801	49	~~85207~~ 0	8.9	~~8.4~~	242	630	33	~~66447~~ 0	4	4.0	314
08:00	236	874	47	0	8.8	5.8	236	655	35	0	4.8	9.5	81
09:00	244	913	47	0	5.8	5.6	232	620	35	0	5.9	4.3	
10:00	239	821	46	0	~~4.1~~ 7.2	7.6	232	598	33	0	4.8	6.0	73
11:00	241	886	47	0	6.4	6.2	231	620	34	0	4.9	5.5	74
12:00	234	774	57	118	4.7	5.3	224	851	39	82	4.2	4.5	106
01:00	229	949	62	636	5.4	7.2	224	947	42	464	5.2	5.0	76
02:00	245	868	51	1193	6.0	5.8	246	906	30	857	5.3	3.9	70
03:00	236	743	55	1699	6.8	6.4	228	894	37	1220	6.2	6.9	71
04:00	234	754	55	2166	8.0	6.4	227	855	37	1558	5.2	5.3	76
05:00	235	761	62	2697	6.8	7.4	230	893	37	1912	5.6	5.9	77
06:00	239	869	64	3311	6.4	6.8	226	888	39	2300	5.8	5.2	79
AVG.	237	835	53	3311	6.7	6.7	232	779	36	2300	5.2	5.5	99

Face "ID" Fan Load	~~75~~ 65	Wet Bin Lvl.	FULL	Core "ID" Fan Load	65	Wet Bin Lvl.	FULL	LOG COUNT
Face E-Tube Fan Load	75	Dry Bin Lvl.	50	Core E-Tube Fan Load	75	Dry Bin Lvl.	50	4739

NATURAL GAS USAGE		Furnace Cleaned	
Include Time in Minutes: FACE:	Include Time in Minutes: CORE:	Face	Core
0700 - 1145	0700 - 1145		

DOWNTIME	
Include Time in Minutes: FACE:	Include Time in Minutes: CORE:
~~-145~~	~~-1145~~

dryopsht

EMISSIONS TEST 95 — READINGS EVERY TEN MINUTES

DRYER DATA SHEET — BIN LEVELS EVERY THIRTY MINUTES

TOMAHAWK WI — FLAKE MOISTURE EVERY HOUR

Date: 7-11-95

Employee Recording Data: J TEAL

FUEL CALIBRATION 5.2

FUEL CALIBRATION 5.8

TIME	FACE OUTLET SET POINT	FACE FEED RATE	FACE DRYER INLET TEMP.	FACE DRYER OUTLET TEMP.	FACE FUEL COUNT	FACE DRY BIN LEVEL	FACE WET BIN LEVEL	FACE OUTLET FLAKE MOISTURE	CORE OUTLET SET POINT	CORE FEED RATE	CORE DRYER INLET TEMP.	CORE DRYER OUTLET TEMP.	CORE FUEL COUNT	CORE DRY BIN LEVEL	CORE WET BIN LEVEL	CORE OUTLET FLAKE MOISTURE
7:15	226	51	926	226	X	60%	100%	8.4	240	40	755	237	X	60%	100%	4.0
7:30	226	45	879	229					236	35	842	239				
7:40	235	45	842	237					236	35	657	233				
7:50	238	45	843	239		70%	100%		235	35	629	237	X	70%	100%	
8:00	238	47	837	237					234	35	632	233				
8:10	238	47	858	238					232	35	651	231				
8:20	245	47	871	245	X	65%	100%	8.8	234	35	697	233	X	70%	100%	4.8
8:30	245	47	882	244				5.8	234	35	630	234				5.5
8:40	245	47	917	245					232	35	620	232				
8:50	244	47	885	243	X	60%	100%		232	35	622	231	X	55%	100%	
9:00	244	47	913	244				5.8	232	35	620	232				
9:10	244	47	885	246				5.8	232	37	645	233				5.9
9:20	241	47	898	241	X	70%	100%		232	37	648	234	X	60%	100%	
9:30	241	47	906	241				5.6	232	37	647	231				4.3
9:40	241	40	830	242					231	33	643	231				
9:50	240	40	789	240	X	75%	100%		230	33	593	229		80%	100%	
10:00	240	40	833	239					230	33	599	232				
10:10	240	45	843	241					230	33	608	231				
10:20	243	45	879	244	X	55%	100%	7.2	230	33	607	230	X	60%	100%	4.8
10:30	243	45	850	242				7.6	230	33	607	232				6.0
10:40	244	45	879	243					230	33	611	232				
10:50	244	45	892	244	X	55%	100		230	33	616	232	X	50%	100	
11:00	243	47	872	241				6.5	230	34	619	231				5.9
11:10	243	47	919	243					230	34	626	229				

stktstdt

from 7 to 11 = AVG. 870 240 1668 632 233 5.5

Pg 1H 1-15

EMISSIONS TEST 95
DRYER DATA SHEET
TOMAHAWK WI

READINGS EVERY TEN MINUTES
BIN LEVELS EVERY THIRTY MINUTES
FLAKE MOISTURE EVERY HOUR

Date: 7-11-95
Employee Recording Data: J. TEAL

FUEL CALIBRATION 5.2

FACE

TIME	OUTLET SET POINT	FEED RATE	DRYER INLET TEMP.	DRYER OUTLET TEMP.	FUEL COUNT	DRY BIN LEVEL	WET BIN LEVEL	OUTLET FLAKE MOISTURE
11:20	243	47	885	243	x	55%	100	6.2
11:30	243	47	882	244				
11:40	243	47	889	244	Done	with Corn		
11:50	231	49	709	254		55%	100%	OK 10:00 4.7
12:00	234	57	779	235				
12:10	233	59	907	232				
12:20	233	59	884	235		55%	100%	5.3
12:30	233	62	947	231				
1250	233	62	915	234	545			
1:00	231	62	954	229	645	55%	100%	5.4
1:10	228	62	955	228	741			
1:20	228	62	969	227	823			
1:30	228	62	966	226	923	60%	100%	7.2
1:40	227	61	965	228	1012			
1:50	227	61	964	227	1102			
2:00	238	51	877	245	1190	60%	100%	6.0
2:10	244	51	763	245	1268			
2:20	236	55	769	234	1343			5.8
2:30	236	55	819	235	1435	60%	100%	5.8
2:40	236	55	901	235	1519			
2:45	236	55	868	236	1556	START OF DAY		

FUEL CALIBRATION 5.8

CORE

OUTLET SET POINT	FEED RATE	DRYER INLET TEMP.	DRYER OUTLET TEMP.	FUEL COUNT	DRY BIN LEVEL	WET BIN LEVEL	OUTLET FLAKE MOISTURE
230	34	630	230	x	45%	100%	5.5
230	36	627	227				
230	36	625	231	Done	with Corn		
228	39	721	236		40%	100%	OK 10:00 4.7
228	39	853	223				
225	40	873	227				
223	40	861	225		35%	100%	4.5
223	43	903	218				
222	44	989	223	398			
221	42	934	224	475	40%	100%	5.2
221	42	907	222	534			
221	43	890	220	589			
221	43	944	219	663	40%	100%	5.0
222	41	942	223	727			
222	41	927	221	792			
235	30	916	246	856	50%	100%	5.3
234	37	880	233	911			
226	37	828	226	964			5.8
226	37	860	226	1029	50%	100%	6.2
224	37	885	226	1090			
224	37	895	223	1114			

stktstdt

Pg 15 of 16

EMISSIONS TEST 95
DRYER DATA SHEET
TOMAHAWK WI

READINGS EVERY TEN MINUTES
BIN LEVELS EVERY THIRTY MINUTES
FLAKE MOISTURE EVERY HOUR

Date: 9-1-95
Employee Recording Data: J. TEAL

FUEL CALIBRATION 5.2

FACE

TIME	OUTLET SET POINT	FEED RATE	DRYER INLET TEMP.	DRYER OUTLET TEMP.	FUEL COUNT	DRY BIN LEVEL	WET BIN LEVEL	OUTLET FLAKE MOISTURE
2:50	236	55	837	237	1603	60%	100%	6.8
3:00	236	55	750	236	1685			6.4
3:10	236	55	725	237	1786			
3:20	236	55	731	237	1852	60%	100%	
3:30	236	55	708	237	1938			
3:40	236	55	789	236	2023			
3:45	236	55	780	236	2059	60%	100%	END OF #2 TEST.
3:50	236	55	747	237	2116			
4:00	236	55	773	234	2187	55%	100%	8.0
4:10	236	55	761	237	2269			
4:20	236	56	785	235	2358			
4:30	236	56	733	236	2444	40%	50%	6.4
4:40	236	58	713	233	2527			
4:50	236	60	737	239	2620			
5:00	236	62	760	235	2699	55%	50%	6.8
5:10	236	62	819	235	2797			
5:20	236	62	937	236	2890			
5:30								

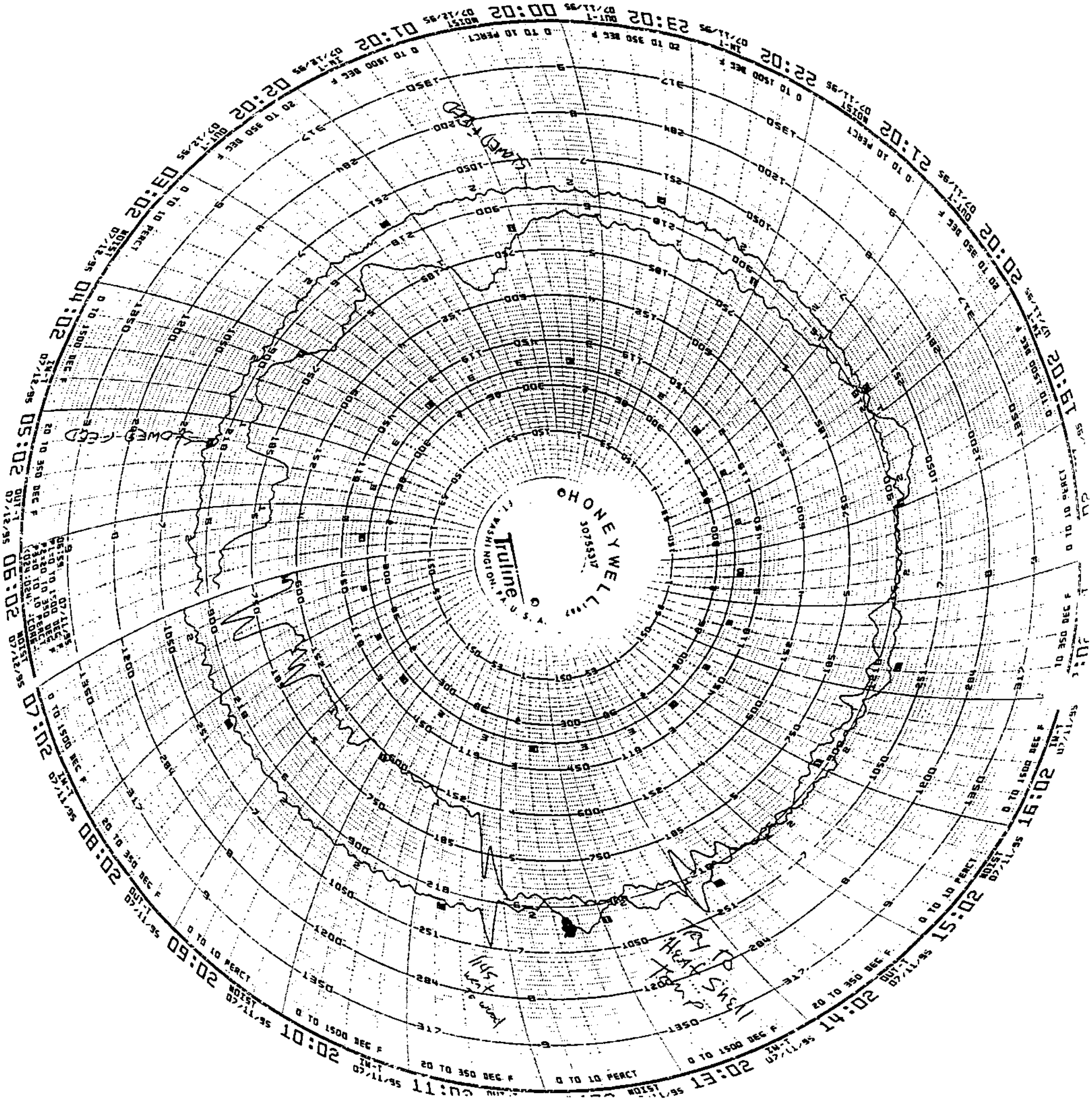
FUEL CALIBRATION 5.8

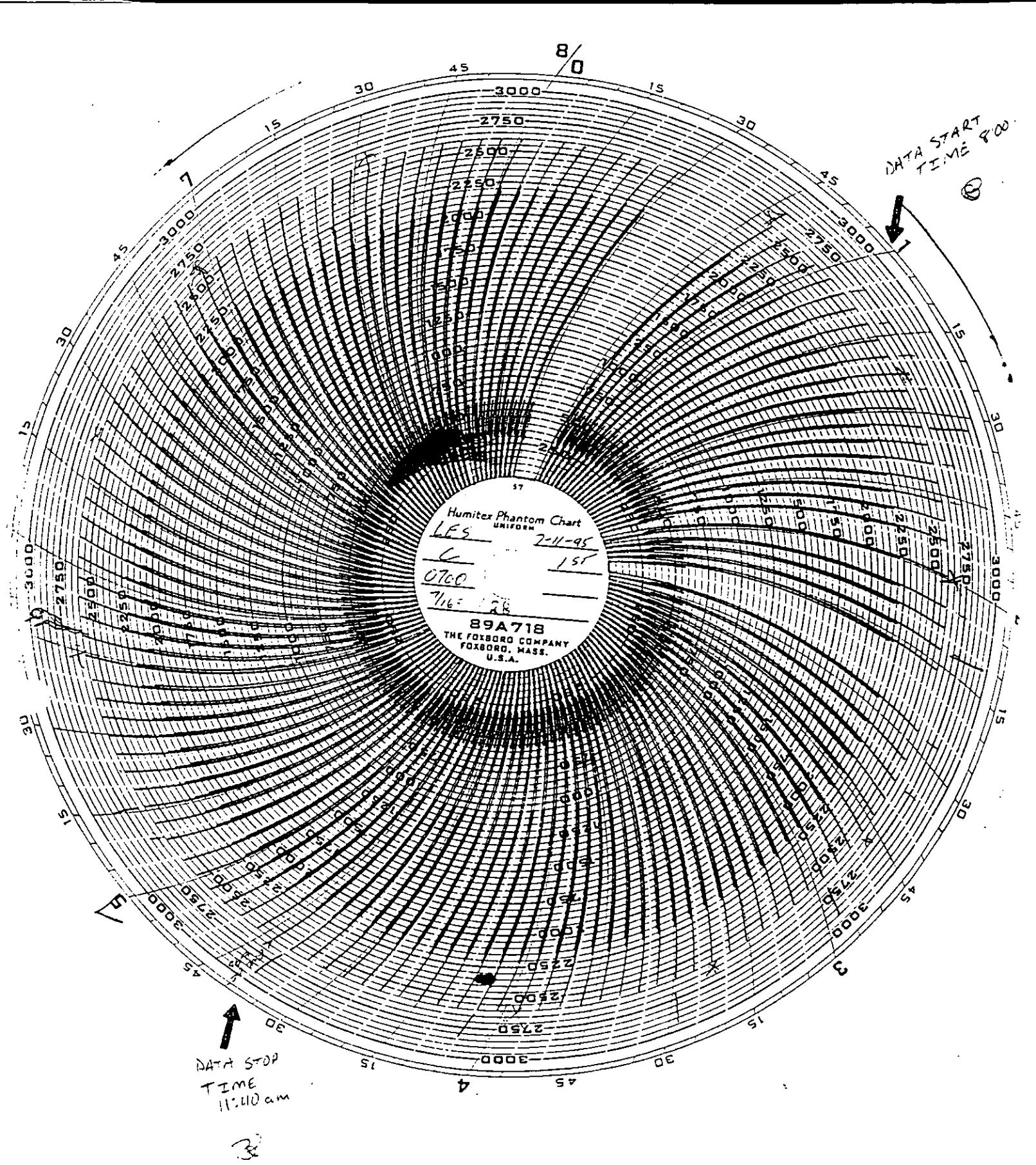
CORE

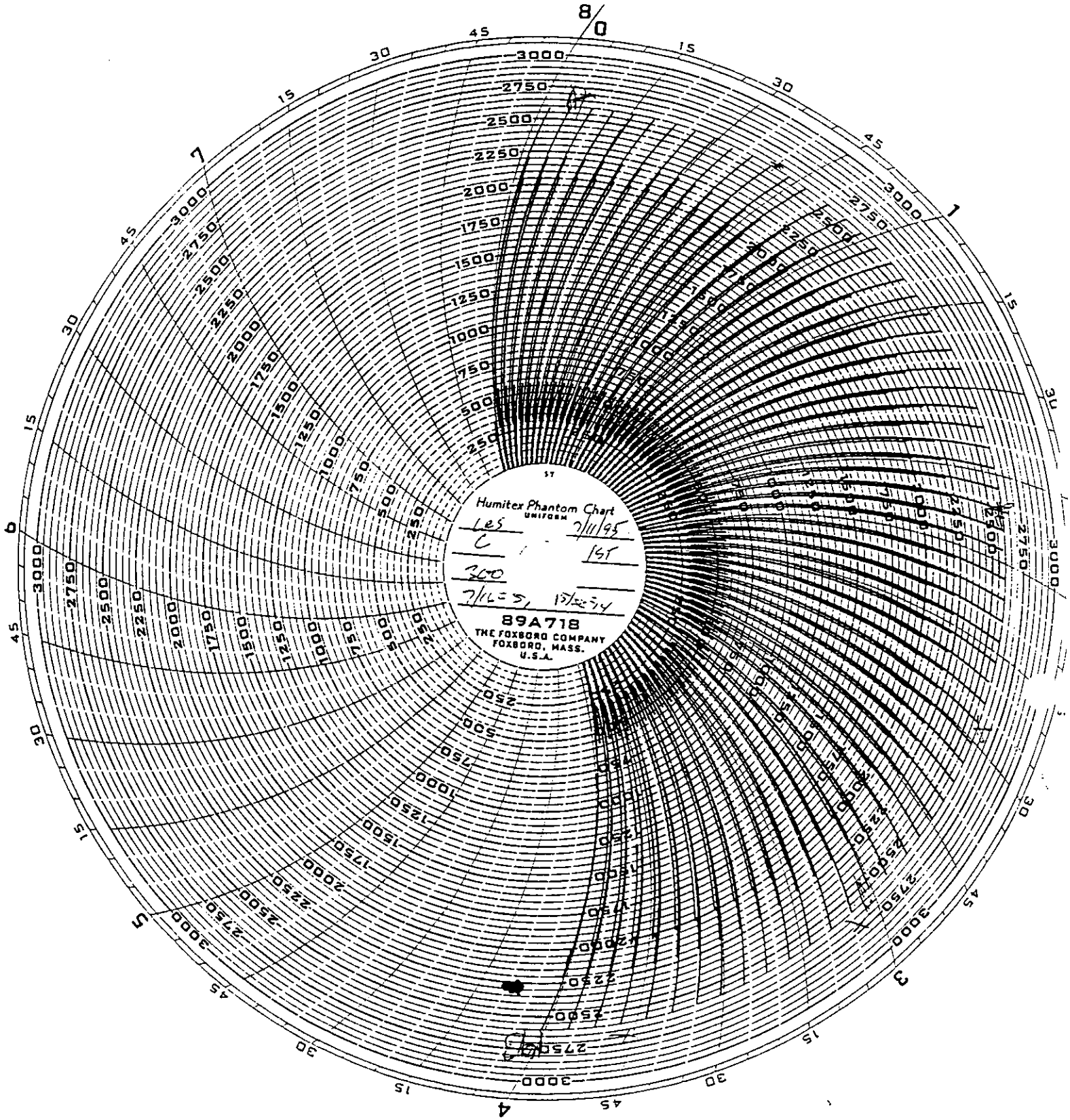
OUTLET SET POINT	FEED RATE	DRYER INLET TEMP.	DRYER OUTLET TEMP.	FUEL COUNT	DRY BIN LEVEL	WET BIN LEVEL	OUTLET FLAKE MOISTURE
225	37	902	223	11:50	50%	100%	6.2
226	37	898	228	1210			6.7
226	37	906	225	1286			
226	37	885	227	1334	50%	100%	
226	37	893	228	1400			
226	37	871	227	1458			
226	37	862	227	1482	50%	100%	
226	37	869	225	1524			
226	37	850	227	1572			
226	37	850	227	1572	50%	100%	5.2
226	37	840	225	1624			
226	37	869	223	1680			
228	37	865	222	1736	50%	50%	5.3
226	37	883	225	1797			
228	37	823	223	1856			
228	37	882	230	1911	40%	50%	5.6
228	37	878	234	1980			
228	37	883	229	2039			

stktstdt

HONEY WELL
Trulline
FT. WASHINGTON, PA. U.S.A.
IN-T
OUT-T
MOIST
0 TO 10 PERCT
0 TO 1500 DEG F
20 TO 350 DEG F
07/11/95
07/12/95


HONEYWELL
Truline


8/0
DATA START TIME 8:00
Humitex Phantom Chart
UNIFORM
LES
2-11-95
C
1 ST
0700
89A718
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
DATA STOP TIME 11:40 am


Humiter Phantom Chart
UNIFORM
Les
7/11/95
C
1ST
200
7/11 = 5, 15/22 = 14
89A718
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

LOUISIANA-PACIFIC
TOMAHAWK WI

PRESS REPORT

Date: 7-11-95
Operator: LES
Crew: C
Shift: 1 ST

PRODUCTION EFFICIENCY

SIZE	TIME FROM	TIME TO	Total Time	Down Time	Production Efficiency In Percent	PL	PRODUCTION FOOTAGE
7/16	0700	0848	108	13	88	28	33452
7/16	0848	1758	~~610~~ 550	16	97	151	180~~400~~
15/32	1758	1900	62	0	100	14	17920
			720	29		193	231771

DOWNTIME

FROM	TO	TOTAL	REASON
51	744	13	TSF Screw Plug
854	858	4	Ver Blender Stop
920	929	9	~~Hit~~ Board stuckin UnLoader
1210	1212	2	Charge formers
1658	1659	1	Charge formers

PERMIT PRESSLOAD LIMITATIONS

SIZE	PRESSLOADS ALLOWED PER HOUR	LINE SPEED SET	LINE PRESSLOADS PER HOUR
7/16	17.48	820	17.5
7/16	17.48	800	17.1
15/32	15.73	656	14.0

HAMMERMILL DUMPED	ANCILLARY
	Press Temp.
0700-1212	Blow Down
158-205	Former
305-314	FCOS
325-347	Spin flush
500-530	

E-Tubes Shutdown
FACE
FACE
CORE
CORE

E – TUBE REPORT

LOUISIANA – PACIFIC CORP.
TOMAHAWK WI

Date:	7-11-95
Shift:	DAY
Crew:	C
By:	Doug

SURFACE E – TUBE	7	8	9	10	11	12	1	2	3	4	5	6
Quench Ch. Inlet Temp.	205.1	212.6	221.5	217.3	228.6	215.9	207.8	214.2	213.5	213.5	214.0	213.2
Quench Ch. Outlet Tem.	124.6	129.2	133.0	130.4	131.1	135.2	139.6	135.3	136.9	137.9	136.5	140.4
Primary Current	80	80	90	80	70	50	50	60	60	50	50	60
Precipatator Voltage	52	52	52	54	54	50	50	50	52	50	50	50
Precipatator Current	340	350	340	360	290	180	210	240	210	160	190	300
Spark Rate	30.2	29.8	29.9	29.9	29.9	29.7	29.8	29.8	29.8	29.7	29.8	29.7
Strip Chart Recorder	X	X	X	X	X	X	X	X	X	X	X	X

CORE E – TUBE	7	8	9	10	11	12	1	2	3	4	5	6
Quench Ch. Inlet Temp.	217.8	214.9	212.1	212.3	212.3	212.5	205.7	220.3	209.1	213.4	210.9	212.7
Quench Ch. Outlet Tem.	128.5	133.9	133.8	133.5	131.8	135.7	137.2	130.2	134.1	132.8	132.9	134.4
Primary Current	80	70	70	80	80	50	40	60	40	50	60	50
Precipatator Voltage	50	52	50	54	54	54	52	54	54	52	54	52
Precipatator Current	300	250	270	330	320	170	150	240	150	150	250	170
Spark Rate	30.1	29.9	29.8	30.0	29.8	29.8	30.0	30.0	30.0	29.9	29.9	29.9
Strip Chart Recorder	X	X	X	X	X	X	X	X	X	X	X	X

etube

EMISSIONS TEST 95

E-TUBE READINGS

TOMAHAWK WI

Date: 7/11/95

Employee Recording Data: C. King

TAKEN EVERY THIRTY MINUTES

	FACE				CORE			
TIME	QUENCH CHAMBER INLET	QUENCH CHAMBER OUTLET	KV	MA	QUENCH CHAMBER INLET	QUENCH CHAMBER OUTLET	KV	MA
0730	217.1	139.4	50	300	206.1	132.2	48	220
0800	213	129.7	51	345	213.7	134.3	52	240
0830	218.3	130.7	50	360	218.3	133.2	52	250
910	222	133.2	50	350	212	135.4	52	255
935	220.6	131	52	340	214.2	134.9	52	290
1005	211.4	130.4	51	340	211.8	133.3	53	310
1035	220.6	132.0	50	340	213.1	131.7	54	335
1100	223.1	133.6	50	310	213.3	132.2	55	280
1135	222.6	133.3	49	320	213.2	135.1	48	230
1205	219.4	135.3	50	210	214.9	136.3	53	180
1230	211.7	136.7	48	200	207.1	136.7	52	190
1300	215.5	138.4	48	200	208.7	136.4	52	180
1330	209.0	138.5	49	210	205.4	136.7	54	180
1400	213.8	135.0	49	240	219.6	130.6	53	260
1430	213.6	136.9	50	180	211.6	133.3	52	210
1457	214.1	136.3	50	240	212.2	134.0	54	170
1532	218.3	136.1	50	230	212.7	134.0	50	195
1600	215.9	135.9	49	200	212.5	133.7	49	170
1630	214.3	136.9	49	240	210.1	133.5	49	210
1700	213.9	137.1	49	210	214.1	134.2	51	191

stktstdt

UNIT INFORMATION SHEET

PAPER FILTERS
OK? Yes
CHANGED NO
INITIALS GMG

DATE: 7-11-95
SHIFT: 1st
CREW: C
FOREMAN: Jeff Roberts

#	Time	# PCS	AVG HGT	LBS	LBS/ FT CU	AVG THICK	#	Time	# PCS	AVG HGT	LBS	LBS/ FT CU	AVG THICK
1	0715	90	38 7/8	4052	39.1	.432	46	1515	90	38 3/4	3916	37.9	.431
2	0727	"	39 1/4	4007	38.3	.436	47	1524	"	39 1/8	4002	38.4	.435
3	0752	"	39	3968	38.2	.433	48	1536		38.625	3986	38.7	.429
4	0800	"	39.375	4009	38.2	.438	49	1547		38.75	3934	38.1	.431
5	0815	"	39 1/8	3967	38.0	.435	50	1556		38.75	3872	37.5	.431
6	0823		39 7/8	3995	37.6	.443	51	1604		38.75	3876	37.5	.431
7	0834		39.5	3991	37.9	.439	52	1621		38 5/8	3853	37.4	.429
8	0844		38 7/8	3967	38.3	.432	53	1625		38 7/8	3856	37.2	.432
9	0854		39.0	3924	37.7	.433	54	1634		38.75	3855	37.3	.431
10	0905		38.625	3911	38.0	.429	55	1645		38 3/4	3866	37.4	.431
11	0917		38.25	3824	37.5	.425	56	1654		38.75	3869	37.4	.431
12	0935		38 3/8	3925	38.4	.426	57	1709		38.75	3845	37.2	.431
13	0951		38.75	3841	38.1	.431	58	1716		38.75	3839	37.2	.431
14	0959		38.625	3889	37.8	.429	59	1726		38.625	3830	37.2	.429
15	1008		38.5	3918	38.2	.428	60	1734		38.75	3852	37.3	.431
16	1020		38 5/8	3947	38.3	.429	61	1745		38.875	3906	37.7	.432
17	1029		38 3/4	3958	38.3	.431	62	1756	"	38.75	3911	37.8	.431
18	1038		38 1/2	3924	38.2	.428	63	1807	90	38.825	3948	38.1	.432
19	1050		38.25	3919	38.4	.425	64	1821	82	39.125	3823	36.6	.477
20	1100		38.5	3932	38.3	.428	65	1832		39.125	3973	38.1	.477
21	1109		38 1/2	3918	38.5	.424	66	1843		39 1/4	4109	39.3	.479
22	1121		38.0	3927	38.8	.422	67	1857		39 5/8	4268	40.4	.483
23	1128		38.0	3920	38.7	.422	68						
24	1136		38 5/8	3903	37.9	.429	69						
25	1147		38.5	3879	37.8	.428	70					OVER	
26	1159		38.5	3830	37.3	.428	71						
27	1209		38.5	3831	37.3	.428	72						
28	1221		38.75	3881	37.6	.431	73						
29	1228		38 3/8	3890	38.0	.426	74						
30	1240		38 3/4	3901	37.8	.431	75						
31	1246		38.25	3896	38.2	.425	76	2:00	91	~~Yield Grade~~			
32	1257		38.625	3908	37.9	.429	77						
33	1310		38.375	3864	37.8	.426	78	~~1641~~	~~110~~	~~3/8 to Grade~~			
34	1323		38.375	3916	38.3	.426	79						
35	1330		38.50	3934	38.3	.428	80						
36	1337		38.375	3954	38.6	.426	81	0820	1	.433	45	39.1	
37	1347		38.625	3926	38.1	.429	82	0900	1	.440	47	40.2	
38	1359		38.625	3899	37.9	.429	83	0936	1	.432	46	40.4	
39	1408		38.50	3900	37.9	.427	84	1200	1	~~.438~~	44	38.6	
40	1416		38.75	3859	37.3	.431	85	0935	1		193		
41	1430		39.0	3862	37.1	.433	86	0943	32	14 3/4	1355		
42	1440		38.75	3844	37.2	.431	87	1311	90	38.875	4091	39.5	.432
43	1449		38.75	3911	37.8	.431	88	1512	1	431	44	38.6	
44	1459		38 3/4	3931	38.0	.431	89	1813	18	8	818		
45	1505	90	38 7/8	3880	37.4	.432	90	1816	61	26 7/8	2686		

I-26

Pg. 25

BOARD WEIGHTS IN TONS

TOMAHAWK WI

1	Hours during testing (military)	6
2	Pressloads during testing	102
3	Mats per Pressload	8
4	Finished Product Boards per Pressload	32
5	Weight of Mats (untrimmed)*	157,896
6	Weight of Finished Product (trimmed)**	144,040
7	Trim Percentage	8.78%
8	Thickness Average **	0.432
9	Pounds per cubic foot (average)**	38.31
10	*Tons of Finished Product per Hour (6 / 1)*	11.9

* Taken from conveyor scale tapes using every ninth board for an average weight of the mats.

** "Unit Information Sheet" (attached)

Percentage of fines (taken from last stack test) is 8.0%

DRYER TESTING (WOOD)

TOMAHAWK WI				Testing Date 7/12/95
Test Time: Start	7.45 **Stop**	8.45 **Total Hrs.**		1.00
Test Time: Start	9.00 **Stop**	10.00 **Total Hrs.**		1.00
Test Time: Start	11.45 **Stop**	12.45 **Total Hrs.**		1.00
Pollutants Testing For: CO, NOX		***Total Test Hours:***		3.00

A.) ***TOTAL DRYER(S) PRODUCTION RATE***

1	lbs. of Dryer Production per Hour *	28,600

* (Pounds Finished Prod. - (% Trim, Fines) / Hours of Testing)

2	Fines Percentage	8.00%
3	Trim Percentage	8.78%
4	Moisture Content of Incoming Wood Flakes (Avg. from 2 samples)	50.90%
5	Moisture Content of Wood Flakes After Drying	6.50%

B.) ***FACE DRYER PRODUCTION RATE (55%)***

1	lbs of Dryer Production per Hour	15,730

C.) ***CORE DRYER PRODUCTION RATE (45%)***

1	lbs of Dryer Production per Hour	12,870

D.) ***FACE DRYER FUEL BURNING RATE***

1	Fuel Calibration (lbs per Count)	5.2
2	Total Counts During Testing (From 7am - 2pm)	3727
3	Hours During Testing	7
4	Ttl. lbs of Fuel Burned During Testing (D1*D2)	19,380
5	lbs of Fuel Burned per Hour (D4/D3)	2,769
6	Tons of Fuel Burned per Hour (D5/2000)	1.38
7	Estimated BTU Content per Pound of Dry Fuel	8600
8	Estimated mmBTU Input per Hour (D5*D7)/1,000,000	23.81
9	Average Inlet Temperature (Fahrenheight)	817
10	Average Outlet Temperature (Fahrenheight)	237

E.) ***CORE DRYER FUEL BURNING RATE***

1	Fuel Calibration (lbs per Count)	5.8
2	Total Counts During Testing (From 7am - 2pm)	2533
3	Hours During Testing	7
4	Ttl. lbs of Fuel Burned During Testing (E1*E2)	14,691
5	lbs of Fuel Burned per Hour (E4/E3)	2,099
6	Tons of Fuel Burned per Hour (E5/2000)	1.05
7	Estimated BTU Content per Pound of Dry Fuel	8,600
8	Estimated mmBTU Input per Hour (E5*E7)/1,000,000	18.05
9	Average Inlet Temperature (Fahrenheight)	884
10	Average Outlet Temperature (Fahrenheight)	228

F.) ***TOTAL DRYER(S) FUEL BURNING RATE***

	Estimated mmBTU Input per Hour (D8+E8)	41.86

DRYER OPERATOR'S REPORT
LOUISIANA-PACIFIC CORP.
TOMAHAWK WI

Oper:	L.E.S
Crew:	C
Date:	7-12-95
Shift:	1st

	FACE DRYER						CORE DRYER						
TIME	OUTLT TEMP.	INLET TEMP.	FEED SPEED	FUEL COUNTS	# CONST. HOUR	# CONST. 1/2 HR.	OUTLT TEMP.	INLET TEMP.	FEED SPEED	FUEL COUNTS	# CONST. HOUR	# CONST. 1/2 HR.	CO RDNG.
07:00	238	754	57	0	6.8	6.6	226	896	35	0	6.6	6.2	77
08:00	239	779	57	538	6.9	6.9	227	847	35	363	5.6	5.2	74
09:00	236	815	56	1077	7.4	8.6	228	843	35	720	5.0	6.4	0 MEL
10:00	236	789	56	1571	7.1	6.2	228	879	35	1067	5.0	7.0	68
11:00	235	933	56	2132	6.9	6.5	228	889	35	1421	6.4	5.6	73
12:00	238	868	56	2722	7.8	6.8	228	928	35	1821	5.3	7.2	82
01:00	240	816	56	3204	5.9	6.6	230	914	35	2164	6.5	6.8	65
02:00	240	833	56	3728	7.5	6.2	234	884	34	2535	6.1	5.4	68
03:00	238	914	63	4292	6.2	7.0	229	968	41	2915	5.8	4.8	90
04:00	239	837	63	4864	6.6	6.6	230	947	41	3310	5.2	5.4	81
05:00	240	789	58	5357	7.8	6.8	230	802	37	3642	5.4	5.4	73
06:00	240	762	58	5879	6.0	6.4	229	869	37	4000	5.5	6.2	70
AVG.	238	824	57.6	5879	6.9	6.8	229	889	36.4	4000	5.7	6.0	75

Face "ID" Fan Load	65	Wet Bin Lvl.	50	Core "ID" Fan Load	65	Wet Bin Lvl.	50	LOG COUNT
Face E-Tube Fan Load	75	Dry Bin Lvl.	60	Core E-Tube Fan Load	70	Dry Bin Lvl.	50	5492

NATURAL GAS USAGE		Furnace Cleaned	
Include Time In Minutes: FACE:	Include Time In Minutes: CORE:	Face	Core

DOWNTIME	
Include Time In Minutes: FACE:	Include Time In Minutes: CORE:

dryopsht

MISSIONS TEST 95
DRYER DATA SHEET
OMAHAWK WI

READINGS EVERY TEN MINUTES
BIN LEVELS EVERY THIRTY MINUTES
FLAKE MOISTURE EVERY HOUR

Date: 7-12-95
Employee Recording Data: Daniel Wisnewski

FUEL CALIBRATION 5.2

FUEL CALIBRATION 5.8

TIME	FACE OUTLET SET POINT	FACE FEED RATE	FACE DRYER INLET TEMP.	FACE DRYER OUTLET TEMP.	FACE FUEL COUNT	FACE DRY BIN LEVEL	FACE WET BIN LEVEL	FACE OUTLET FLAKE MOISTURE	CORE OUTLET SET POINT	CORE FEED RATE	CORE DRYER INLET TEMP.	CORE DRYER OUTLET TEMP.	CORE FUEL COUNT	CORE DRY BIN LEVEL	CORE WET BIN LEVEL	CORE OUTLET FLAKE MOISTURE
3:20	240	63	936	242	4486	60%	90%	6.2	230	41	956	237	3039	50%	90%	5.8
3:30	240	63	884	242	4579			7.0	230	41	940	228	3099			4.8
3:40	240	63	261	243	4676				230	41	957	229	3170			
:30	240	59	876	241	5111	60%	50%	6.6	230	36	907	233	3485	70%	50%	5.4
4:40	240	55	839	241	5196				230	33	878	231	3552			
4:50	240	55	819	242	5284				230	33	797	231	3594			
5:00	240	58	791	240	5358	60%	50%	6.6	230	37	803	230	3642	70%	50%	5.2
5:10	240	58	801	241	5454			7.8	230	37	862	228	3700			5.4
5:20	240	58	781	240	5531				230	37	846	231	3763			
5:30	240	58	797	241	5624	60%	50%	6.8	230	37	871	230	3824	75%	50%	5.4
5:40	240	58	814	240	5722				230	37	866	228	3890			
5:50	240	58	785	241	5719				230	37	873	229	3944			
6:00	240	58	760	240	5872	60%	90%	6.0	230	37	860	229	3994	70%	90%	5.5
6:10	240	58	726	240	5960				230	37	874	229	4051			
6:20	240	58	806	240	6064				230	37	854	231	4127			
6:30	240	58	708	240	6141	50%	95%	6.4	230	37	871	229	4178	60%	95%	6.2
6:40	240	58	732	242	6232				230	37	872	229	4240			
6:50	240	58	678	240	6322				230	37	894	229	4298			
7:00	240	58	761	239	6402	60%	90%	6.6	230	37	907	229	4354	70%	90%	5.8
7:10	240	58	865	241	6501				230	38	934	231	4426			
7:20	240	58	850	240	6601				230	38	928	231	4498			
7:30	240	58	864	240	6672	60%	75%	7.0	230	38	919	229	4548	65%	75%	
7:40	240	58	849	241	6782				230	38	933	231	4629			
7:50	240	58	825	240	6865				230	38	931	231	4689			

stkstdt

EMISSIONS TEST 95 — READINGS EVERY TEN MINUTES

DRYER DATA SHEET — BIN LEVELS EVERY THIRTY MINUTES

TOMAHAWK WI — FLAKE MOISTURE EVERY HOUR

Date: 7/12/95

Employee Recording Data: D. Dan

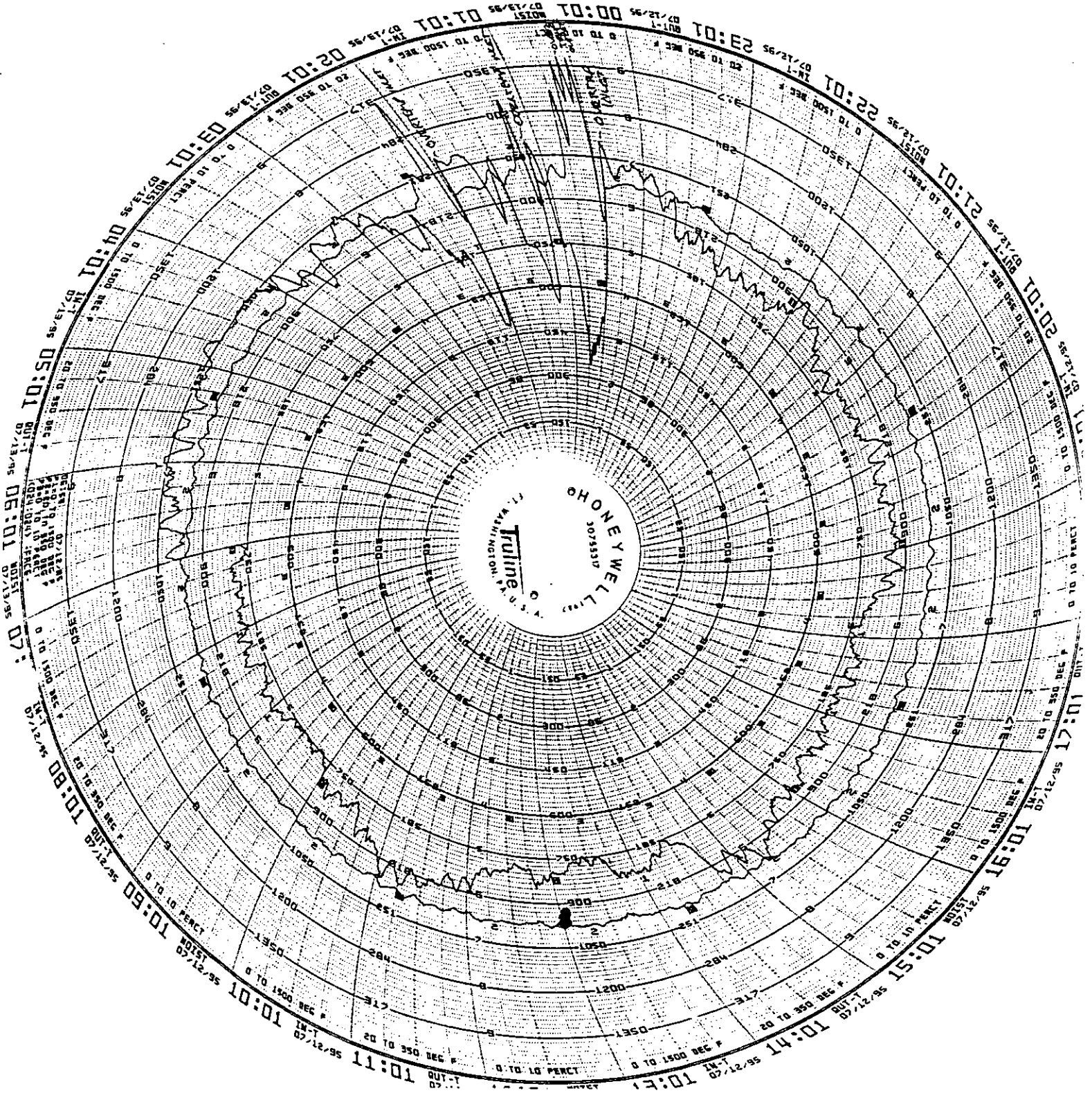
FUEL CALIBRATION 5.2 — ***FACE*** — FUEL CALIBRATION 5.8 — ***CORE***

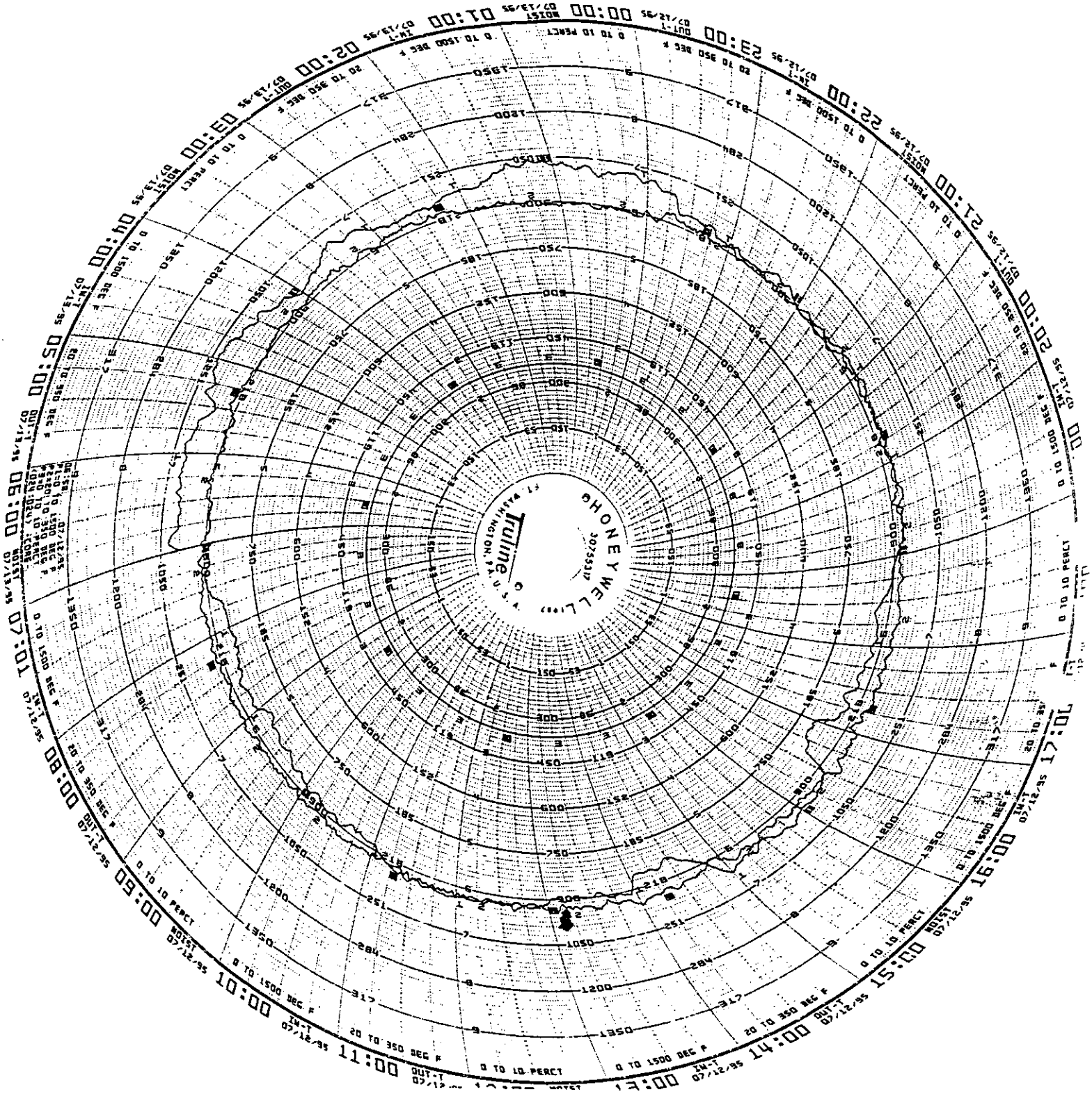
TIME	OUTLET SET POINT	FEED RATE	DRYER INLET TEMP.	DRYER OUTLET TEMP.	FUEL COUNT	DRY BIN LEVEL	WET BIN LEVEL	OUTLET FLAKE MOISTURE	OUTLET SET POINT	FEED RATE	DRYER INLET TEMP.	DRYER OUTLET TEMP.	FUEL COUNT	DRY BIN LEVEL	WET BIN LEVEL	OUTLET FLAKE MOISTURE
7:55	240	58	870	240	6920	60%	75%	6.9	230	38	923	232	4728	60%	75%	5.2
8:10	240	58	882	239	7040			6.9	230	38	930	228	4804			5.4
8:30	240	58	822	238	7209			6.5	230	38	924	230	4833			5.6
9:00	238	58	811	239	7448	60%	80%	6.8	229	38	926	230	5112	60%	80%	5.4
9:30	235	58	823	234	7697			5.8	227	38	906	228	5292			5.8
10:00	235	58	857	236	7959			6.2	227	38	908	225	5467			5.2
10:30	234	58	824	230	8199	60%	80%	6.8	225	38	921	226	5647	60%	80%	5.8
11:00	230	58	863	229	8553			7.6	226	38	920	226	5894			5.6
11:30	235	58	852	235	8791	60%	90%	6.4	228	38	938	229	6069	60%	80%	5.8

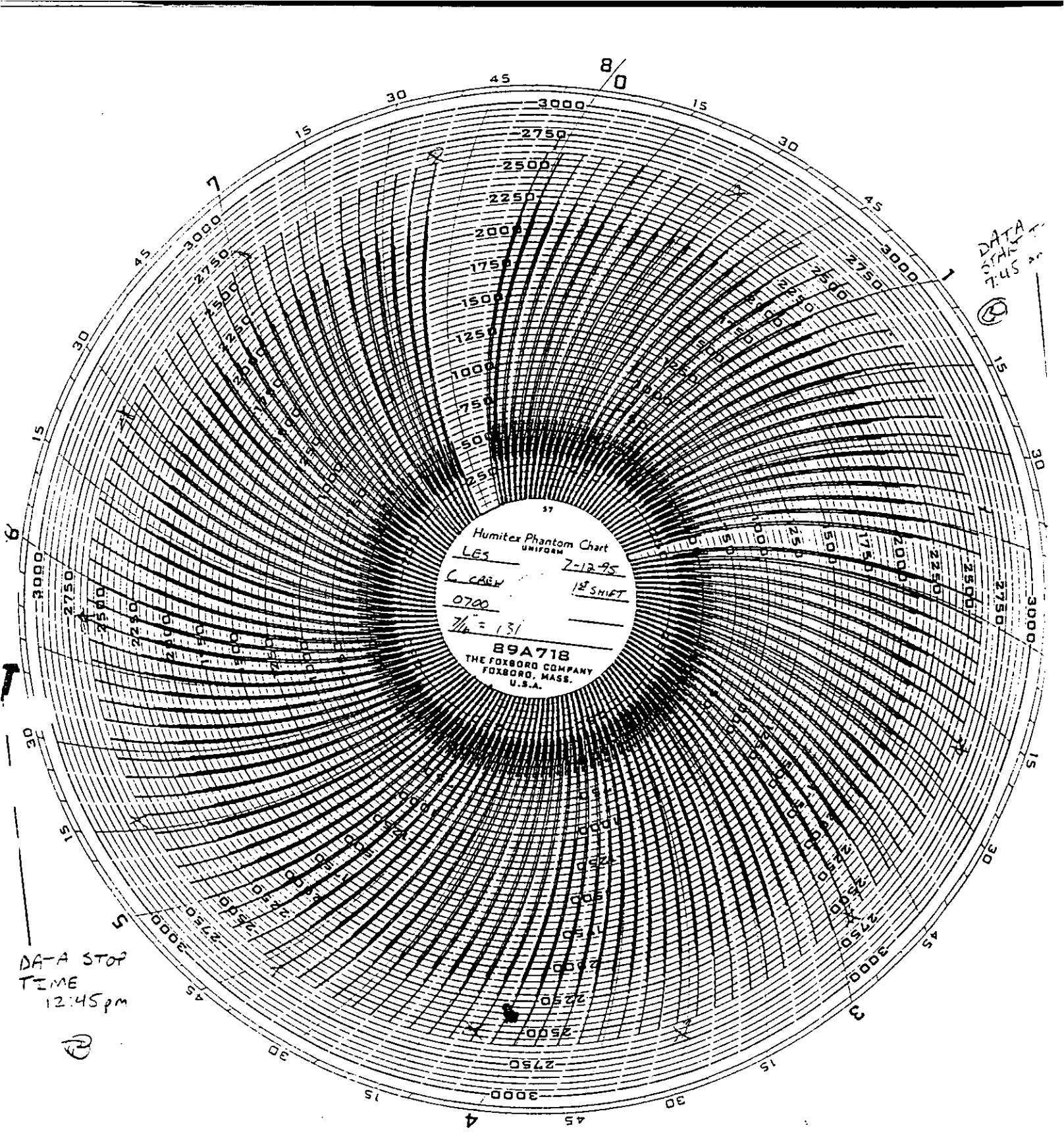
stktstdt

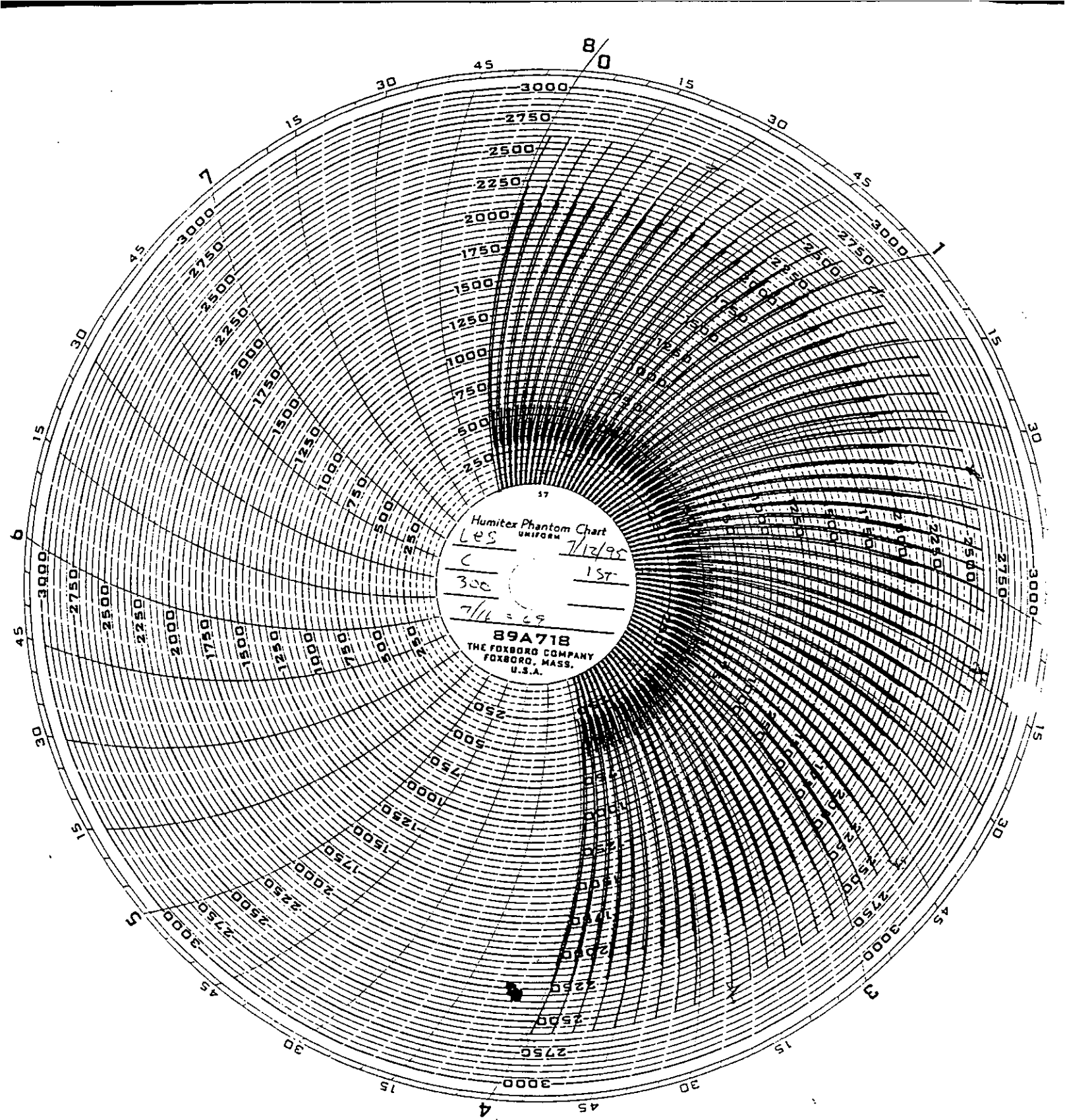
1/11/11

Pg. 31 I-32


Truline
HONEYWELL
IN-T
OUT-T
MOIST
0 TO 10 PERCT
0 TO 350 DEG F
0 TO 1500 DEG F
07/12/95
07/13/95


HONEY WELL
Fluline
0 TO 10 PERCT
0 TO 1500 DEC F
20 TO 350 DEC F
07/12/95
07/13/95


Humitex Phantom Chart
UNIFORM
LES
7-12-95
C CREW
1ST SHIFT
0700
7/16" = 1SI
89A718
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
DATA START 7:45 AM
DATA STOP TIME 12:45 pm


Humitex Phantom Chart
UNIFORM
LES
7/12/95
C
1ST
300
7/12-69
89A718
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

LOUISIANA-PACIFIC
TOMAHAWK WI

PRESS REPORT

Date: 7-12-95
Operator: LES
Crew: C
Shift: 1st

PRODUCTION EFFICIENCY

SIZE	TIME FROM	TIME TO	Total Time	Down Time	Production Efficiency In Percent	PL PRODUCTION FOOTAGE	
7/16	0700	1900	720	22	96.4	200	238,940
				22			

DOWNTIME

FROM	TO	TOTAL	REASON
~~	955	5	loader tripped / Replaced Relay.
214	219	2	Change formers
241	256	15	change Dry Bins

PERMIT PRESSLOAD LIMITATIONS

SIZE	PRESSLOADS ALLOWED PER HOUR	LINE SPEED SET	LINE PRESSLOADS PER HOUR
7/16	17.48	800	17.1

HAMMERMILL DUMPED	ANCILLARY	
730-751	Press Temp.	218
757-809	Blow Down	1030
820-836	Former	1040
925-945	FCOS	1045
1035-1046	Spin flush	
1109-1123	112-132	342-400 542-610
	248-301	435-500

E-Tubes Shutdown
FACE
FACE
CORE
CORE

E – TUBE REPORT

Date: 7-12-95
Shift: DAY
Crew: C
By: DOUG C

LOUISIANA – PACIFIC CORP.
TOMAHAWK WI

SURFACE E – TUBE	7	8	9	10	11	12	1	2	3	4	5	6
Quench Ch. Inlet Temp.	212.6	211.8	211.3	211.1	212.1	210.8	213.3	215.3	215.5	218.0	217.0	215.5
Quench Ch. Outlet Tem.	136.8	138.1	136.9	137.3	139.4	138.3	137.0	138.0	141.5	139.9	137.5	138.3
Primary Current	60	60	60	60	50	50	50	40	50	70	60	50
Precipatator Voltage	50	48	50	50	50	50	50	50	50	48	48	50
Precipatator Current	240	240	250	210	220	200	210	170	220	250	200	180
Spark Rate	30.0	29.9	29.9	29.9	30.0	29.8	29.9	32.8	29.8	29.7	30.0	29.8
Strip Chart Recorder	X	X	X	X	X	X	X	X	X	X	X	X

CORE E – TUBE	7	8	9	10	11	12	1	2	3	4	5	6
Quench Ch. Inlet Temp.	212.7	211.7	209.9	210.0	210.1	210.3	212.6	213.7	213.3	213.4	215.5	214.4
Quench Ch. Outlet Tem.	133.9	133.2	133.8	134.2	135.1	136.4	135.4	133.2	137.1	138.5	133.3	134.8
Primary Current	40	40	30	50	50	30	50	60	40	40	60	40
Precipatator Voltage	52	48	52	50	52	52	54	50	52	52	52	52
Precipatator Current	170	170	140	190	220	120	180	200	160	170	240	210
Spark Rate	30.0	30.1	29.9	29.9	30.0	29.9	30.0	29.9	29.8	30.0	30.0	30.0
Strip Chart Recorder	X	X	X	X	X	X	X	X	X	X	X	X

etube

EMISSIONS TEST 95

E-TUBE READINGS

TOMAHAWK WI

Date: 7-12-95

Employee Recording Data:

TAKEN EVERY THIRTY MINUTES

	FACE				CORE			
TIME	QUENCH CHAMBER INLET	QUENCH CHAMBER OUTLET	KV	MA	QUENCH CHAMBER INLET	QUENCH CHAMBER OUTLET	KV	MA
700	212.5	136.2	50	230	~~210.4~~	134.1	48	180
730	212.1	136.8	44.6	179.7	211.0	134.9	44.87	120.7
800	212.2	138.5	41.68	188.6	211.0	133.5	46.57	161
900	~~242~~.0	138.1	46.10	175.2	210	133.5	43.97	~~129~~ 123.5
1000	~~24~~.0	136.6	46.47	170.0	210.7	134.8	46.70	148.6
1100	211.9	139.3	41.55	166.7	210.1	135.4	47.99	146.1
1200	210.9	137.9	46.19	173.8	210.2	136.2	48.70	123.8
1300	213.3	136.9	46.59	172.0	212.3	136.0	45.6	141.5
1400	213.8	137.5	44.96	~~150.1~~ 167.6	214.3	134.9	47.11	144.7
1500	213.8	140.5	46.63	174.6	210.2	137.4	48.66	103.1
1600	216.9	139.7	45.88	195.3	214.4	138.5	51.5	119.6
1700	216.7	138.4	45.15	192.7	215.5	132.7	49.73	181.3
1880	214.4	138.5	47.71	130.1	214.7	134.4	47.89	160.8
1800	215.4	138.7	45.61	130.1	214.5	134.8	46.96	130.1
1830	214.9	138.9	46.72	176.2	214.1	135.4	46.84	142.0
1900	215.8	140.4	45.97	154.2	213.1	136.1	50.20	123.4
1930	216.3	140.4	47.39	166.7	215.3	137.1	47.32	137.7
20:00	216.8	139.7	46.74	183.2	214.4	137.8	47.88	180.6
2030	217.1	139.1	47.44	213.3	213.9	137.6	46.72	138.4
2100	216.4	137.9	48.68	200.5	213.4	137.6	49.91	131.1
2130	213.5	138.8	47.05	196.3	212.9	136.8	50.12	150.4
2200	213.8	140.0	47.03	229.3	211.5	137.0	47.22	183.3
2230	210.1	139.1	46.95	166.0	210.0	137.7	41.55	132.8
2300	207.8	140.0	46.04	166.8	210.8	137.5	49.0	144.6

stktstdt

UNIT INFORMATION SHEET

PAPER FILTERS	
OK?	YES
CHANGED	7/10
INITIALS	DL

DATE:	7-12-95
SHIFT:	1st
CREW:	C.
FOREMAN:	Jeff Roberts

7/6 Stack testing

#	Time	# PCS	AVG HGT	LBS	LBS/ FT CU	AVG THICK	#	Time	# PCS	AVG HGT	LBS	LBS/ FT CU	AVG THICK
1	0715	90	39 1/8	4101	39.3	.435	46	1502	90	38 1/8	3935	38.0	.432
2	0724		39.0	4110	39.5	.433	47	1512	↑	38 5/8	3995	38.8	.429
3	0735	↓	39	4090	39.3	.433	48	1528		39	3996	38.4	.433
4	0745	↓	39.25	4074	38.9	.436	49	1531		38.875	4003	38.6	.432
5	0759		39 1/8	3984	38.2	.435	50	1545		38.75	4011	38.8	.431
6	0808		38 3/4	3966	38.4	.431	51	1557		38.875	4046	39.0	.432
7	0814		38.625	3949	38.3	.429	52	1605		38.75	4000	38.7	.431
8	0826		38.875	3935	38.0	.432	53	1611		39	3958	38.1	.433
9	0835		38 7/8	3946	38.1	.432	54	1627		38 3/4	3939	38.1	.431
10	0847		38.75	3927	38.0	.431	55	1639		38 3/4	3942	38.1	.431
11	0857		38 7/8	3962	38.2	.432	56	1645		38 3/4	3911	37.8	.431
12	0910		39.125	4031	38.6	.435	57	1654		38 5/8	3833	37.2	.429
13	0920		39	4068	39.1	.433	58	1709		38 3/4	3783	36.6	.431
14	0930		39 1/8	4079	39.1	.435	59	1711		38 3/4	3857	37.3	.431
15	0941		39 1/8	4062	38.9	.435	60	1724		38 3/4	3871	37.5	.431
16	0956		39 1/4	4053	38.7	.435	61	1730		38 3/4	3845	37.2	.431
17	0958		38 3/4	4031	39.1	.431	62	1739		38 3/4	3874	37.5	.431
18	1008		39.0	3979	38.3	.433	63	1760		38 7/4	3868	37.4	.431
19	1019		38.875	3946	38.1	.432	64	1801		38 5/8	3855	37.4	.429
20	1027		38.75	3903	37.8	.431	65	1811		38 5/8	3861	37.5	.429
21	1037		38.75	3921	37.0	.431	66	1819		39	3926	37.6	.433
22	1049		38.75	3878	37.5	.431	67	1830		38 3/4	3949	38.2	.431
23	1058		39.0	3963	38.1	.433	68	1840		39	4017	38.6	.433
24	1107		38.875	3956	38.2	.432	69	1849	↓	38 7/8	4041	39.0	.432
25	1118		39.0	4050	38.9	.433	70	1858	90	39	4026	38.7	.433
26	1127		38.875	4050	39.1	.432	71					AVG.	.432
27	1139		38 3/4	4035	39.0	.431	72						
28	1148		39 1/8	4052	38.5	.439	73				AVG.	38.39	
29	1157		38 3/4	3959	38.2	.431	74						
30	1207		38 7/8	3956	38.2	.432	75			AVG. BOARD	WGHT	44.13	
31	1219		38 3/4	3983	38.5	.431	76						
32	1229		38 3/4	3948	38.2	.431	77						
33	1238		38.75	3949	38.2	.431	78						
34	1250		38.5	3947	38.4	.428	79						
35	1303		38.5	3943	38.4	.428	80						
36	1307		38.625	3947	38.3	.429	81						
37	1318		39 1/8	3978	38.1	.435	82						
38	1328		38 5/8	3940	38.3	.429	83						
39	1338		38 7/8	4008	38.7	.432	84	755	1	434	45	39.1	
40	1348		38 3/4	3984	38.6	.431	85	830	1	427	43	38.1	
41	1358	↓	38 7/8	4003	38.6	.432	86	1100	1	427	44	38.9	
42	1411	90	39 1/8	4027	38.6	.435	87	1431	1	433	45	39.1	
43	1417	91	39 1/4	4082	39.0	.431	88	1503	1	431	44	38.6	
44	1428	90	38 5/8	4035	39.2	.429	89	1730	1	438	45	38.8	
45	1443	90	38 3/4	4019	38.9	.431	90						

Q.C. 43 — Q.C. Test Board

BOARD WEIGHTS IN TONS

TOMAHAWK WI

GEKA ON BARK JULY 12, 1995

1	Hours during testing (military)	4.67
2	Pressloads during testing	83
3	Mats per Pressload	8
4	Finished Product Boards per Pressload	32
5	Weight of Mats (untrimmed)*	111987
6	Weight of Finished Product (trimmed)*	102740
7	Trim Percentage	8.26%
8	Thickness Average	0.432
9	Pounds per cubic foot (average)	38.62
10	*TFP per hour*	11.0

*Using figures from July's density formulation sheet.

Percentage of fines (taken from last stack test) is 8.0%

THERMAL OIL HEATER (GEKA)

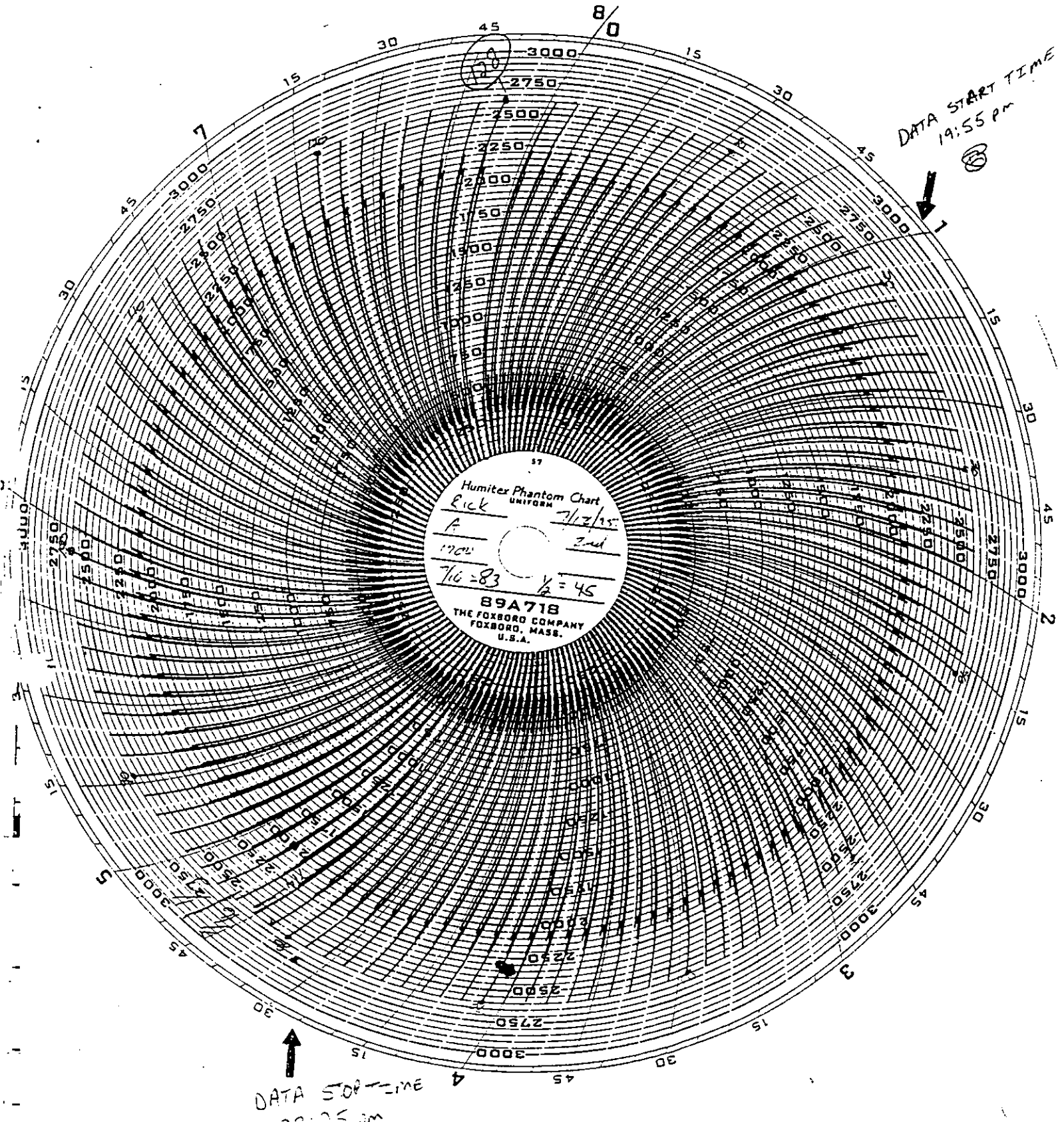
TOMAHAWK WI | Testing Date 7/12/95

Test Time: Start	19.55 **Stop**	20.55 **Total Hrs.**	1.00
Test Time: Start	21.10 **Stop**	22.10 **Total Hrs.**	1.00
Test Time: Start	22.25 **Stop**	23.25 **Total Hrs.**	1.00
Pollutants Testing For: CO, NOX		***Total Test Hours:***	3.00

GEKA FUEL BURNING RATE

Tons of Fuel* (wet)	20.7
Pounds of Fuel (wet)	41,400
Hours During Data Collection (All of Second Shift)	12
Pounds of Fuel (wet) Burned per Hour	3,450
Moisture Content of Fuel* (Average)	40.35%
Pounds of Fuel (dry) Burned per Hour	2,058
Estimated BTU Content of Dry Fuel per Pound	9000
Estimated mmBTU Input per Hour	18.52
Tons of Dry Fuel Burned per Hour	1.03

1.73 tons


DATA START TIME
19:55 pm
DATA STOP TIME
23:25 pm
Humitex Phantom Chart
UNIFORM
Rick
7/12/95
A
2nd
7/16 = 83
½ = 45
89A718
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

GEKA REPORT

LOUISIANA - PACIFIC
TOMAHAWK WI

Date:	7-12-95
Shift:	Night
Crew:	A
By:	Kent

Readings	
Bark Feed Hours Bin:	3 1/4 Hrs
Clark Bin Level:	80 %

Primary Oil Flow			
# 1 Suction	—	# 1 Dschrge	—
# 2 Suction	47	# 2 Dschrge	122
FLOW RATE:	.25		

GEKA SCALE CONVEYOR	
Beginning of Shift	320.1
End of Shift	340.8
Total Used on Shift	20.7

Grate Speed			
#1	690	#2	730
Feed Oil	491	Return Oil	470
Furnace Temp.			1232
Steamchest OK ?			ok
Spaceheat Pump # 1			829.1
Spaceheat Pump # 2			—
Suction	14	Dschrg	48

Baghouse			Cyclone
Time	Press.	Temp.	Pressure
7200	3.9	390	5.25
11:30	4.9	396	5.5
5:45	4.4	390	4.25

Primary Air Flow	.4
ID Fan	.15

Temp. Set Points & Readings	
Geka	490
Space Heating	0
Steamchest	0

Emergency Deisel	
Fuel Level	OK
Oil Level	OK
Start & Run, Day Shift	OK
Thermal Oil Level	.1
Geka Deashed ?	Yes
Ashpit Cleaned ?	No
Inlet Temp.	NA
Outlet Temp.	NA

Gas Usage, Actual Time From - To

0

Gas Meter Readings

	Geka	Core	Face
Start	74214	921334	751900
Stop	74214	921334	751905
Used	0	0	5

gekar

EMISSIONS TEST 95

Date: 7-12-95

THERMAL OIL HEATER DATA SHEET

Employee Recording Data:

TOMAHAWK WI READINGS TAKEN HOURLY EXCEPT SCALE

TIME	OIL TEMP. IN	OIL TEMP. OUT	FURNACE TEMP.	AIR FLOW	SCALE HOURLY	SCALE 1/2 HR.	BARK MOIST.	PRESSR. DROP
700	491.5	470.0	1436	0.4	300.1	300.9		4.7
~~800~~ 800	491.3	490.0	1416	0.3	301.9	~~300.9~~ 302.4	39.7	4.6
900	489.8	490.0	1420	0.3	302.8	~~302.8~~ 303.4	39.3	3.9
1000	490.8	490.0	1445	0.3	304.3	304.9	~~37.9~~	~~4.3~~
1100	489.9	~~480.8~~ 470.9	1426	0.4	305.4	306	39.7	4.3
12.00	489.3	470.1	1444	0.4	306.5	307.5	39.8	4.1
1300	488.8	446.9	1556	0.5	308.8	309.8	39.5	4.5
1400	490.1	449.5	1568	0.5	311.2	312.3	38.7	5.4
1500	487.1	455.0	1611	04	313.1	313.8	40.4	4.4
1600	485.7	448.4	1617	07	314.9	315.7	41.4	4.6
1700	494.6	447.7	1642	0.5	317.1	318.4	38.8	3.0
1806	491.3	450.3	1642	0.4	319.7	319.8	40.9	2.6
1900	488.4	448.1	1490	0.5	321.4	322.3	43.4	3.9
2000	491.7	450.6	1583	0.4	324.4	325.0	39.4	4.5
2100	492.8	457.3	1614	0.4	326.4	327.3	44.9	5.1
2200	490.9	450.3	1624	0.4	328.7	329.5	39.8	4.1
2300	492.6	449.9	1662	0.4	330.8	331.7	39.6	4.9
						AVG.	40.35	%M.C.
		2ND shift =		20.7	Tons Wet bark	x 59.65%	= 12.35	TDBF
				12.35 ÷	12 hr.	= 1.03	TDBF per hour.	

THERMAL OIL DUE TO E TEST

brightening

R L 9

stktstdt

BOARD WEIGHTS IN TONS

TOMAHAWK WI

PRESS JULY 13, 1995

1	Hours during testing (military)	7
2	Pressloads during testing	123
3	Mats per Pressload	8
4	Finished Product Boards per Pressload	32
5	Weight of Mats (untrimmed)*	190798
6	Weight of Finished Product (trimmed)**	174758
7	Trim Percentage	8.41%
8	Thickness Average **	0.431
9	Pounds per cubic foot (average)**	38.63
10	*TFP per hour (Avg. from 7:00am to 3:00pm less 1 hr.)*	10.9

* Taken from conveyor scale tapes using every ninth board for an average weight of the mats.

** "Unit Information Sheet" (attached)

Percentage of fines (taken from last stack test) is 8.0%

PRESS TESTING

TOMAHAWK WI				Testing Date 07/13/95
Test Time: Start	9.15 **Stop**	10.15 **Total Hrs.**	1.00	
Test Time: Start	11.05 **Stop**	12.05 **Total Hrs.**	1.00	
Test Time: Start	13.35 **Stop**	14.35 **Total Hrs.**	1.00	
Pollutants Testing For: CO, PM		***Total Test Hours:***	3.00	

1	lbs. of Dryer Production per Hour	29600
2	Weight of Finished Product (trimmed)	174758

PLANT PRODUCTION RATE

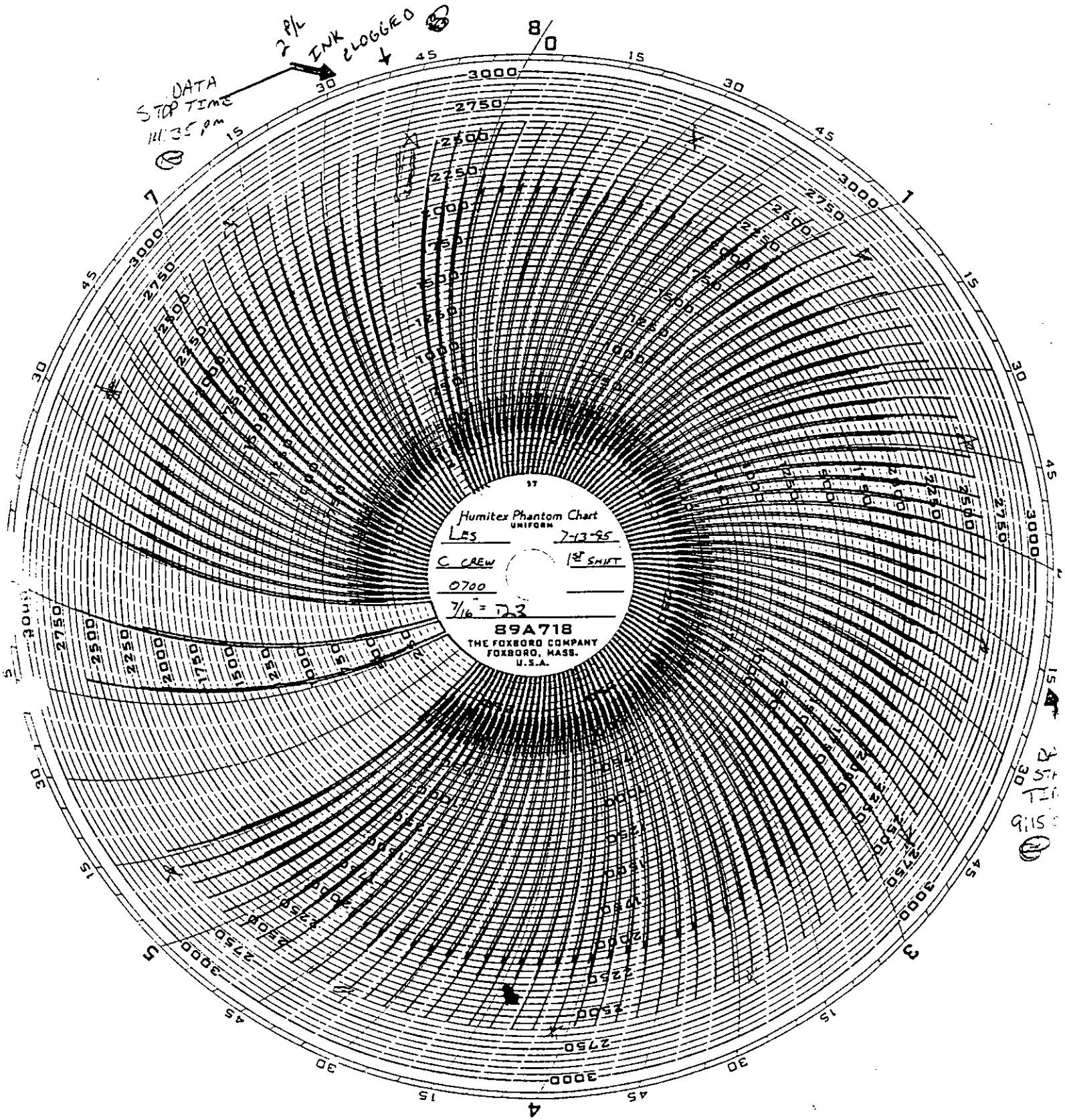
1	Data Hours (From 7am to 3pm less 1 hour downtime)	7
2	Pressloads	123
3	No. of Boards Produced (Pressloads x 8 boards per load).	984
4	Pounds of Finished Product	152,205
5	Pounds of Finished Product per Hour (No. 4 / No. 1)	21,744
6	Tons of Finished Product per Hour (No. 5 / 2000)	10.9

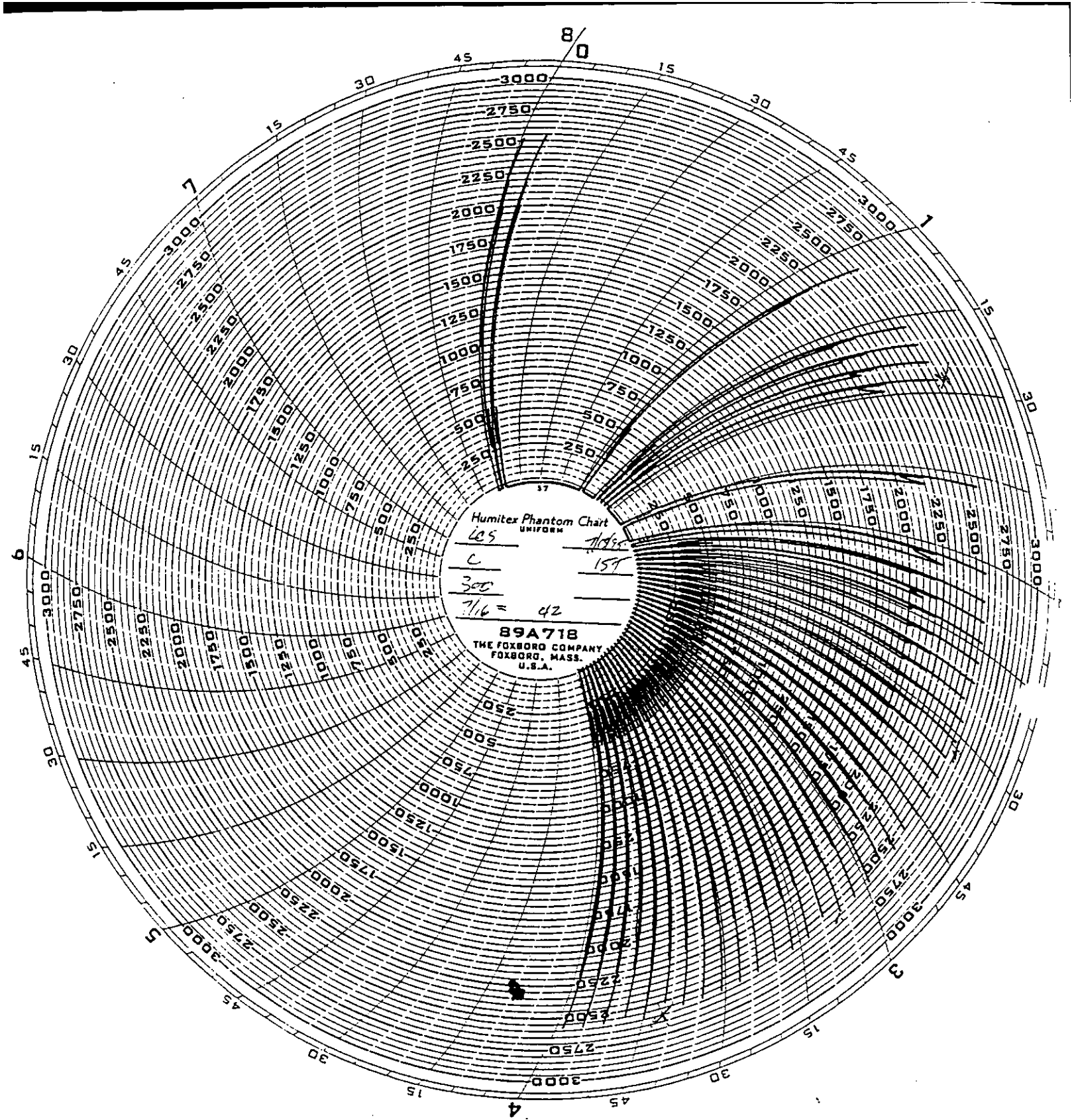
RESIN & WAX USAGE

1	Data Hours (From 7am to 2:30pm)	7.5
2	Pressloads from 7am to 2:30pm	115
3	Pounds of MDI resin used during testing	1605
4	Pounds of Liquid Phenolic Resin used during testing (100% Solids)	4070
5	Pounds of wax used during testing (100% Solids)	1456

RESIN & WAX USAGE AS PERCENTAGE OF FINISHED PRODUCT

1	Percentage of MDI resin used during testing	0.92%
2	Percentage of Liquid Phenolic Resin used during testing (100% Solids)	2.33%
3	Percentage of wax used during testing (100% Solids)	0.83%


2 P/L
INK
CLOGGED
DATA
STOP TIME
11:35 pm
8/0
7
1
5
3
4
Humitex Phantom Chart
UNIFORM
LES
7-13-95
C CREW
1st SHIFT
0700
7/16" = 1.3
89A718
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.


Humitex Phantom Chart
UNIFORM
89A718
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

LOUISIANA-PACIFIC

TOMAHAWK WI

PRESS REPORT

Date:	7-13-95
Operator:	LES
Crew:	C
Shift:	1ST

PRODUCTION EFFICIENCY

SIZE	TIME FROM	TIME TO	Total Time	Down Time	Production Efficiency In Percent	PRODUCTION FOOTAGE
7/16	0700	1900	720	153	78.8	165/ 197,126

DOWNTIME

FROM	TO	TOTAL	REASON	
11	1244	27	Blow Down Press	1 HOUR TAKEN INTO ACCOUNT WHEN DOING TPP ED
1246	1255	11	Ripped Core Dry Box Rake Bricks	
1314	1335	21	" "	
367	403	56	Wipe Down Press	
405	415	10	Air Pull Press	NOT COUNTED
430	458	28	Resin Pump Drive went OUT	

PERMIT PRESSLOAD LIMITATIONS

SIZE	PRESSLOADS ALLOWED PER HOUR	LINE SPEED SET	LINE PRESSLOADS PER HOUR
7/16	17.48	800	17.1

HAMMERMILL DUMPED	ANCILLARY
702-726	Press Temp.
809-830	Blow Down
911-936	Former
1130-1254	FCOS
30-500	Spin flush

E-Tubes Shutdown	
FACE	320 – 416
FACE	
CORE	1200 – 115
CORE	320 – 416

THIS PAGE INTENTIONALLY LEFT BLANK

UNIT INFORMATION SHEET

PAPER FILTERS	
OK ?	YES
CHANGED	No
INITIALS	

DATE : 7-13-95
SHIFT : 1st
CREW : C
FOREMAN : Jeff Roberts

#	Time	# PCS	AVG HGT	LBS	LBS/ FT CU	AVG THICK	#	Time	# PCS	AVG HGT	LBS	LBS/ FT CU	AVG THICK
1	0708	90	38 1/8	4118	40.5	.424	46	1624	90	38 7/8	3976	38.5	.431
2	0715		38 3/4	4125	39.9	.431	47	1728		38 3/4	4083	39.5	.431
3	0726		38 5/8	4100	39.8	.429	48	1757		38.875	3997	38.6	.432
4	0739		38 1/2	4070	39.6	.428	49	1800		39.125	4007	38.4	.435
5	0751		38 3/4	4058	39.3	.431	50	1758		38 3/4	3977	38.5	.431
6	0757		38 5/8	4072	39.5	.429	51	1809		38 3/4	3986	38.6	.431
7	0807		38 1/2	4038	39.3	.428	52	1819		38 7/8	3969	38.3	.432
8	0815		38 1/2	4001	39.0	.428	53	1829		38 3/4	3928	38.0	.431
9	0826		38 1/2	3966	38.6	.428	54	1837		38 5/8	3874	37.6	.429
10	0838		38 3/4	3953	38.3	.431	55	1854		38 3/4	3844	37.2	.431
11	0846		38 7/8	3941	38.3	.429	56	1856		38 3/4	3925	38.0	.431
12	0856		38 7/8	3964	38.5	.429	57						
13	0907		38 3/4	3934	38.1	.431	58						
14	0921		39	3961	38.1	.433	59						
15	0926		38 3/4	3948	38.2	.431	60						
16	0940		38 1/2	3955	38.5	.428	61						
17	0945		38.75	3966	38.4	.431	62						
18	0959		38.75	3980	38.5	.431	63	TTL	5041	TTL	223823	= AVG. WHGT.	44.401
19	1006		38.75	3970	38.4	.431	64						
20	1019		38 7/8	3946	38.3	.429	65				AVG.	38.67	
21	1030		38 5/8	3964	38.5	.429	66						
22	1036		38 3/4	4016	38.9	.431	67					AVG.	.431
23	1047		39	4056	39.0	.433	68						
24	1057		39	4130	39.7	.433	69						
25	1106		39 1/8	4090	39.2	.435	70						
QC 26	1113	91	39	4094	39.4	.433	71						
27	1125		39	4025	38.7	.433	72						
28	1132		39	4010	38.6	.433	73						
29	1142		38 3/4	4020	38.9	.431	74						
30	1158		38 3/4	3996	38.7	.431	75						
31	1203		38 5/8	3966	38.5	.429	76						
32	1213		38 7/8	3942	38.0	.432	77						
33	1252		38 3/4	3910	37.8	.431	78						
34	1322		39	3904	37.5	.433	79						
35	1331		38 3/4	4002	38.7	.431	80						
36	1341		39	2988	38.3	.433	81						
37	1358		39	4042	38.9	.433	82						
38	1403		38 1/2	4031	39.3	.428	83	815	1	429	45	39.5	
39	1417		38 5/8	3996	38.8	.429	84	1100	1	435	45	39.1	
40	1421		38.5	3955	38.5	.428	85	1400	1	424	44	39.3	
41	1436		38 3/4	4005	38.8	.431	86	1716	128	440	6838		
42	1443		38 7/8	4041	39.0	.432	87	1800	1	429	44	39.3	
43	1457		39	4026	38.7	.433	88	1230	32		1535		
44	1504		38 1/8	3988	38.5	.432	89						
45	1528	90	39	3994	38.4	.433	90		4-Grade - Already Been Weigh				

1/16

Q.C Test Board

E-Grade

Q.C E-Grade

EMISSIONS TEST 95

RESIN & WAX USAGE

TOMAHAWK WI

Date: 7-13-95

Employee Recording Data: Daniel Wisniewski

TAKEN EVERY 30 MINUTES

TIME	MDI @ 100% TOTALIZER READINGS	CORE WAX @ 58% TOTALIZER READINGS	FACE WAX @ 58% TOTALIZER READINGS	PHENOLIC @ 57% TOTALIZER READINGS
7:30	122	76	110	1760
8:05	278	173	251	1720
8:50	449	282	411	2008
9:15	533	336	489	2390
9:45	648	410	596	2915
10:15	764	484	707	3456
11:00	945	602	877	4275
11:15	1001	638	929	4525
1145	1119	715	1037	5042
12:05	1195	766	1110	5389
1:35	1375	883	1255	6084
2:05	1498	965	1373	6649
2:35	1605	1036	1475	7140

stktstdt

APPENDIX J

PROCEDURES

Method 3A——Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrumental Analyzer Procedure)

1. Applicability and Principle

1.1 **Applicability.** This method is applicable to the determination of oxygen (O_2) and carbon dioxide (CO_2) concentrations in emissions from stationary sources only when specified within the regulations.

1.2 **Principle.** A sample is continuously extracted from the effluent stream; a portion of the sample stream is conveyed to an instrumental analyzer(s) for determination of O_2 and CO_2 concentration(s). Performance specifications and test procedures are provided to ensure reliable data.

2. Range and Sensitivity

Same as Method 6C, Sections 2.1 and 2.2, except that the span of the monitoring system shall be selected such that the average O_2 or CO_2 concentration is not less than 20 percent of the span.

3. Definitions

3.1 **Measurement System.** The total equipment required for the determination of the O_2 or CO_2 concentration. The measurement system consists of the same major subsystems as defined in Method 6C, Sections 3.1.1, 3.1.2, and 3.1.3.

3.2 Span, Calibration Gas, Analyzer Calibration Error, Sampling System Bias, Zero Drift, Calibration Drift, Response Time, and Calibration Curve. Same as Method 6C, Sections 3.2 through 3.8, and 3.10.

3.3 **Interference Response.** The output response of the measurement system to a component in the sample gas, other than the gas component being measured.

4. Measurement System Performance Specifications

Same as Method 6C, Sections 4.1 through 4.4.

5. Apparatus and Reagents

5.1 **Measurement System.** Any measurement system for O_2 or CO_2 that meets the specifications of this method. A schematic of an acceptable measurement system is shown in Figure 6C-1 of Method 6C. The essential components of the measurement system are described below:

5.1.1 **Sample Probe.** A leak-free probe, of sufficient length to traverse the sample points.

5.1.2 **Sample Line.** Tubing, to transport the sample gas from the probe to the moisture removal system. A heated sample line is not required for systems that measure the O_2 or CO_2 concentration on a dry basis, or transport dry gases.

5.1.3 Sample Transport Line, Calibration Value Assembly, Moisture Removal System, Particulate Filter, Sample Pump, Sample Flow Rate Control, Sample Gas Manifold, and Data Recorder. Same as Method 6C, Sections 5.1.3 through 5.1.9, and 5.1.11, except that the requirements to use stainless steel, Teflon, and nonreactive glass filters do not apply.

5.1.4 **Gas Analyzer.** An analyzer to determine continuously the O_2 or CO_2 concentration in the sample gas stream. The analyzer shall meet the applicable performance specifications of Section 4. A means of controlling the analyzer flow rate and a device for determining proper sample flow rate (e.g., precision rotameter, pressure gauge downstream of all flow controls, etc.) shall be provided at the analyzer. The requirements for measuring and controlling the analyzer flow rate are not applicable if data are presented that demonstrate the analyzer is insensitive to flow variations over the range encountered during the test.

5.2 **Calibration Gases.** The calibration gases for CO_2 analyzers shall be CO_2 in N_2 or CO_2 in air. Alternatively, CO_2/SO_2, O_2/SO_2, or $O_2/CO_2/SO_2$ gas mixtures in N_2 may be used. Three calibration gases, as specified Section 5.3.1 through 5.3.3 of Method 6C, shall be used. For O_2 monitors that cannot analyze zero gas, a calibration gas concentration equivalent to less than 10 percent of the span may be used in place of zero gas.

6. Measurement System Performance Test Procedures

Perform the following procedures before measurement of emissions (Section 7).

6.1 **Calibration Concentration Verification.** Follow Section 6.1 of Method 6C, except if calibration gas analysis is required, use Method 3 and change the acceptance criteria for agreement among Method 3 results to 5 percent (or 0.2 percent by volume, whichever is greater).

6.2 **Interference Response.** Conduct an interference response test of the analyzer prior to its initial use in the field. Thereafter, recheck the measurement system if changes are made in the instrumentation that could alter the interference response (e.g., changes in the type of gas detector). Conduct the interference response in accordance with Section 5.4 of Method 20.

6.3 Measurement System Preparation, Analyzer Calibration Error, and Sampling System Bias Check. Follow Sections 6.2 through 6.4 of Method 6C.

7. Emission Test Procedure

7.1 **Selection of Sampling Site and Sampling Points.** Select a measurement site and sampling points using the same criteria that are applicable to tests performed using Method 3.

7.2 **Sample Collection.** Position the sampling probe at the first measurement point, and begin sampling at the same rate as used during the sampling system bias check. Maintain constant rate sampling (i.e., ± 10 percent) during the entire run. The sampling time per run shall be the same as for tests conducted using Method 3 plus twice the system response time. For each run, use only those measurements obtained after twice the response time of the measurement system has elapsed to determine the average effluent concentration.

7.3 **Zero and Calibration Drift Test.** Follow Section 7.4 of Method 6C.

8. Quality Control Procedures

The following quality control procedures are recommended when the results of this method are used for an emission rate correction factor, or excess air determination. The tester should select one of the following options for validating measurement results:

8.1 If both O_2 and CO_2 are measured using Method 3A, the procedures described in Section 4.4 of Method 3 should be followed to validate the O_2 and CO_2 measurement results.

8.2 If only O_2 is measured using Method 3A, measurements of the sample stream CO_2 concentration should be obtained at the sample by-pass vent discharge using an Orsat or Fyrite analyzer, or equivalent. Duplicate samples should be obtained concurrent with at least one run. Average the duplicate Orsat or Fyrite analysis results for each run. Use the average CO_2 values for comparison with the O_2 measurements in accordance with the procedures described in Section 4.4 of Method 3.

8.3 If only CO_2 is measured using Method 3A, concurrent measurements of the sample stream CO_2 concentration should be obtained using an Orsat or Fyrite analyzer as described in Section 8.2. For each run, differences greater than 0.5 percent between the Method 3A results and the average of the duplicate Fyrite analysis should be investigated.

9. Emission Calculation

For all CO_2 analyzers, and for O_2 analyzers that can be calibrated with zero gas, follow Section 8 of Method 6C, except express all concentrations as percent, rather than ppm.

For O_2 analyzers that use a low-level calibration gas in place of a zero gas, calculate the effluent gas concentration using Equation 3A-1.

$$C_{gas} = \frac{C_{ma} - C_{oa}}{C_m - C_o} - (\overline{C} - C_m) + C_{ma} \quad Eq.\ 3A-1$$

Where:

C_{gas} = Effluent gas concentration, dry basis, percent.
C_{ma} = Actual concentration of the upscale calibration gas, percent.
C_{oa} = Actual concentration of the low-level calibration gas, percent.
C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, percent.
C_o = Average of initial and final system calibration bias check responses for the low-level gas, percent.

$\overline{C}$ = Average gas concentration indicated by the gas analyzer, dry basis, percent.

10. Bibliography

Same as bibliography of Method 6C.

Particulate Loading and Emission Rates

The particulate emission rates were determined per EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 1992). In this procedure a preliminary velocity profile of the gases in the flue is obtained by means of a temperature and velocity traverse. On the basis of these values, sampling nozzles of appropriate diameter are selected to allow isokinetic sampling, a necessary prerequisite for obtaining a representative sample.

The sampling train consists of a heated glass-lined sampling probe equipped with a Type S pitot and a thermocouple. The probe is attached to a sampling module which houses the all-glass in line filter holder in a temperature controlled oven. The sampling module also houses the impinger case and a Drierite filled column. The sampling module is connected by means of an umbilical cord to the control module. The control module houses the dry test gas meter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples are collected as follows: The sample gas is drawn through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter where particulates are removed. The sample gas is then passed through an ice-cooled impinger train and a desiccant-packed column which absorbs remaining moisture. The sample gas then passes through a vacuum pump followed by a dry test gas meter. The gas meter integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides real time flow rate data.

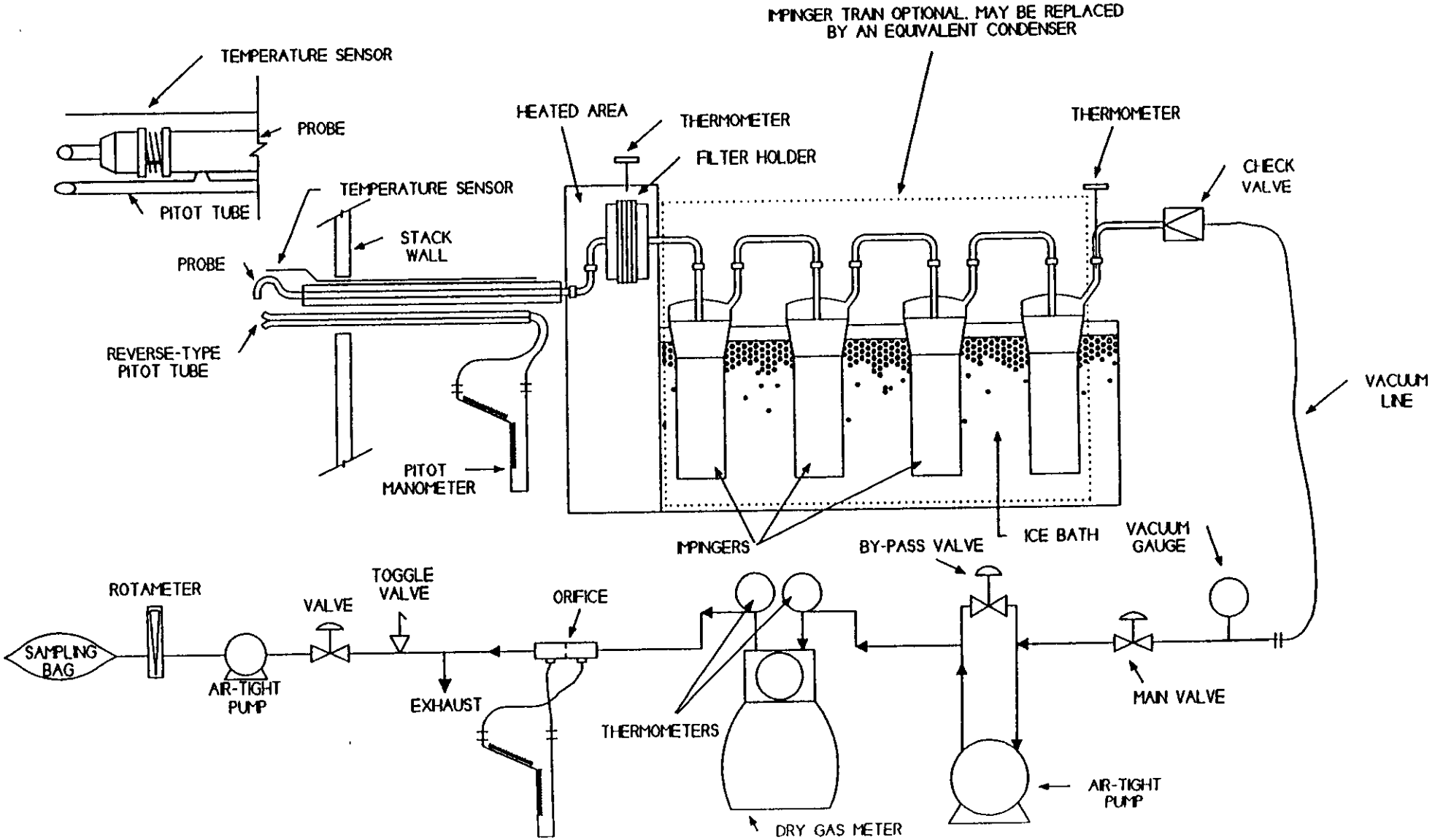
A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each test point maintaining isokinetic sampling conditions. Nomographs are used for rapid determination of the sampling rate.

Particulate Loading and Emission Rates

When sampling is complete the filter is removed with tweezers and placed in a clean container. The nozzle, pitot tube and inlet side of the filter holder are quantitatively washed with acetone and the washings are stored in a second container. A brush is often used in the cleaning step to help dislodge deposits. The samples are returned to the laboratory where they are logged in and analyzed. The volume of the acetone rinse ("probe wash") is noted and the rinse is transferred to a tared 120 cc porcelain evaporating dish. The acetone is then evaporated off at 97 - 105 °F. At this elevated temperature condensation of atmospheric moisture is prevented. The acetone-free sample is then dried at 105 °C for 30 minutes, cooled in a desiccator over Drierite, and weighed to the nearest 0.01 mg. The filter sample is transferred to a 6 inch watch glass and dried at 105 °C for two hours. The filter and watch glass are then cooled in a desiccator and the filter weighed to the nearest 0.01 mg. All weighings are performed in a balance room where the relative humidity is maintained at less than 50%. Microscopic examination of the samples is performed if any unusual characteristics are observed. The weight of the acetone rinse blank is subtracted from the samples. The Drierite column is weighed on-site and the water absorbed by the Drierite is added to the condensate to give the total amount of absorbed water.

Interpoll Laboratories
(612) 786-6020

PARTICULATE SAMPLING TRAIN



ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 51

[AD-FRL-3977-4]

Preparation, Adoption, and Submittal of State Implementation Plans, Method for Measurement of Condensible Particulate Emissions From Stationary Sources

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Method 202 for the measurement of condensible particulate matter (CPM) was proposed in the Federal Register on October 12, 1990, at (55 FR 41546). This action promulgates this method. On April 17, 1990 at (55 FR 14246) EPA promulgated two methods for measuring particulate matter (PM) with an aerodynamic diameter of 10 μm or less (PM_{10}). Since CPM emissions form very fine particles in the PM_{10} size range and are considered PM_{10} emissions, the Agency is adding a method for measuring CPM emissions from stationary sources to appendix M in 40 CFR part 51. The purpose of this

rule is to provide the States with a method for measuring CPM.

EFFECTIVE DATE: December 17, 1991.

ADDRESSES: Background Information Document. The Background Information Document for the promulgated test methods may be obtained from Candace Sorrell or Peter Westlin, MD–19, U.S. EPA, Research Triangle Park, North Carolina 27711, telephone number (919) 541–1064. Please refer to "Summary of Comments and Responses for Method 202."

Docket. Docket No. A–90–03, containing materials relevant to this rulemaking, is available for public inspection and copying between 8:30 a.m. to 12 Noon and 1:30 to 3:30 p.m., Monday through Friday, at EPA's Air Docket Section, Waterside Mall, room M1500, 1st Floor, Gallery 1, 401 M Street SW., Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Candace Sorrell or Peter Westlin, Emission Measurement Branch (MD–19), Technical Support Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541–1064.

SUPPLEMENTARY INFORMATION:

I. The Rulemaking

The EPA is proposing to add a method for measuring CPM emissions to appendix M in 40 CFR part 51 to provide a method that States can use in their State implementation plans.

II. Public Participation

The opportunity to hold a public hearing on November 2, 1990 at 10 a.m. was presented in the proposal notice, but no one desired to make an oral presentation. The public comment period was from October 12, 1990 to December 17, 1990.

III. Significant Comments and Changes to the Proposed Rulemaking

Six comment letters were received from the proposal rulemaking. A detailed discussion of these comments is contained in the background document entitled "Summary of Comments and Responses for Method 202" which is referred to in the ADDRESSES section of this preamble. The major comments raised in these letters and the Agency's responses follow.

One commenter suggests that EPA determine the chemical composition of the material collected in the sampling train to verify that it will form ambient condensibles.

The EPA believes that material will collect in the impingers only by condensation or dissolution. Dissolved gases will evaporate during analysis and will not be measured unless the gases react to form a solid or liquid while they are in solution. The EPA has designed Method 202 to prevent the formation of reaction materials from dissolved gases. The EPA believes that any remaining material collected and measured by Method 202 represents the material that would condense in the ambient air. Additional analysis of chemical composition is not necessary.

Another comment raises the concern that the method may collect some portion of the sulfur dioxide (SO_2) as condensible.

The dissolution of SO_2 in water does not lead immediately to the formation of sulfuric acid (H_2SO_4), but tends to lower the solution pH, which further inhibits sulfate or H_2SO_4 formation. The method includes a purging procedure which effectively removes SO_2 before significant oxidation occurs. No additional revisions are necessary.

The commenter feels that if EPA is allowing Method 202 to be used in conjunction with Method 201 or 201A or another dry catch procedure to determine the total PM_{10} measurement, the combined methods should be tested for precision.

The imprecision associated with combining Method 202 with Method 201 or 201A or any other dry catch procedure is not additive because each train provides a separate measurement. Since the total precision associated with the combined methods cannot be larger than the least precise sampling method, a precision evaluation of a combined sampling system is unnecessary.

A commenter suggests that EPA add specific language to the applicability section of the method stating that Method 202 cannot be used on wet sources. He notes that Method 17 is excluded from use on wet sources, and Methods 201 and 201A are not recommended for wet sources.

The EPA agrees that Method 202 with an in-stack filter is not recommended for wet sources, and such a statement has been added to the applicability. However, a heated Method 5 filter could be used in Method 202 instead of the in-stack filter which would allow application to wet sources.

One commenter requests that EPA clearly state that Method 202 should not be used for assessing compliance with emission limits set on the basis of data derived from a different measurement approach.

The EPA agrees that a violation must be shown, in the first instance, by means of measurements made with the applicable test method. Once such a showing is made, however, section 113(e) of the Clean Air Act allows the Agency to rely on any credible evidence including evidence other than the applicable test method, to establish the duration of the period of noncompliance for the purposes of assessing a penalty.

A commenter believes that the sampling collection efficiency and method precision may be affected by the sampling conditions such as impinger temperature and sampling flow rate and the method should address this possibility.

The EPA agrees that the nature of material in the sample gas may affect collection efficiency. For example, a field demonstration of Method 202 on an oil-fired boiler resulted in about 75 percent impinger collection efficiency. This collection efficiency can be improved with the addition of a second filter place between the second and third impinger. This option has been included in the method with a discussion of applicability.

The commenter feels the 1-hour nitrogen (N_2) purge is too long. He believes the majority of the SO_2 is removed in the first few minutes. He suggests the method be revised to reduce the purge time in conjunction with maintaining the sample under dry conditions and analyzing it within 72 hours.

The EPA does not agree with reducing the purge time. Laboratory tests have shown that a 1-hour purge time is necessary to ensure the adequate removal of SO_2 from the impinger solution.

Another commenter suggests that the method should be revised to give credit for ammonium sulfate ($(NH_4)_2SO_4$) dihydrate and other condensible particulate matter formed in the stream due to ammonia (NH_3) injection used to enhance the efficiency of a control device.

The EPA does not agree. The condensible particulate matter formed in the gas stream due to NH_3 injection is emitted to the atmosphere. The EPA believes that condensible particulate matter emitted from the source should be counted as such even if it is a result of a pollution-control technique.

The commenter suggests that EPA consider an alternative to MeCl$_2$ consistent with the Montreal Protocol.

The EPA investigated the effectiveness of a chloroform-ether extraction during the method development phase. The chloroform-ether was not as effective as the MeCl$_2$ in removing organic materials; the chloroform-ether procedure

found to be acceptable for organic extraction. The method has been revised to allow a chloroform-ether extraction.

The commenter supports the exclusion of ammonium chloride as a condensible; however, he expresses concern about $(NH_4)_2SO_4$ forming in the impingers.

The N_2 purge removes SO_2 before significant oxidation occurs. If NH_3 is present in the flue gas, the $(NH_4)_2SO_4$ formed in the impingers would not be counted as a condensible, although the H_2SO_4, which reacted with NH_3, would be counted as a condensible. Method 202 corrects for the NH_3 by measuring the sulfate using an IC analysis and subtracting out the ammonium ion (NH_4^+) mass.

The commenter agrees that the NH_3 added during the titration should be subtracted from the final weight. However, he does not agree with adding back in the water removed by the acid-base reaction.

Because H_2SO_4 is hygroscopic, the H_2SO_4 mass found in the atmosphere would have the water attached to it. The method has been revised to allow the source to correct for only the NH_4^+ or for both NH_4^+ and water as an option depending on the basis for the regulation.

A. Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of this proposed rulemaking. The principle purposes of the docket are to: (1) Allow interested parties to identify and locate documents so that they can effectively participate in the rulemaking process, and (2) serve as the record in case of judicial review except for interagency review materials (Section 307(d)(7)(A)).

B. Office of Management and Budget Review

Under Executive Order 12291, EPA must judge whether a regulation is "major" and, therefore, subject to the requirement of a regulatory impact analysis. This rulemaking would not result in any of the adverse economic effects set forth in Section 1 of the Order as grounds for finding a "major rule." It will neither have an annual effect on the economy of $100 million or more, nor will it result in a major increase in costs or prices. There will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of U.S.-based enterprises to compete with foreign-based enterprises in domestic or export markets. This rulemaking was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291.

C. Regulatory Flexibility Act Compliance

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that this attached rule, if promulgated, will not have any economic impact on small entities because no additional costs will be incurred.

This rule does not contain any information collection requirements subject to OMB review under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*

Dated: December 6, 1991.

F. Henry Habicht II,

Acting Administrator.

List of Subjects in 40 CFR Part 51

Administrative practice and procedure.
Air pollution control.
Carbon Monoxide.
Inter-governmental relations.
Lead.
Nitrogen dioxide.
Ozone.
Particulate matter.
Reporting and recordkeeping requirements.
Sulfur Oxides.
Volatile Organic Compounds.

The EPA amends title 40, chapter I, part 51 of the Code of Federal Regulations as follows:

PART 51—[AMENDED]

1. The authority citation for part 51 continues to read as follows:

Authority: Section 110 of the Clean Air Act as amended (42 U.S.C. 7410).

2. Appendix M, to part 51 Table of Contents is amended by adding an entry to read as follows:

Method 202—Determination of Condensible Particulate Emissions From Stationary Sources

3. By adding Method 202 to Appendix M to part 51 to read as follows:

Method 202—Determination of Condensible Particulate Emissions From Stationary Sources

1. Applicability and Principle

1.1 Applicability. 1.1.1 This method applies to the determination of condensible particulate matter (CPM) emissions from stationary sources. It is intended to represent condensible matter as material that condenses after passing through a filter and as measured by this method (Note: The filter catch can be analyzed according to the appropriate method).

1.1.2 This method may be used in conjunction with Method 201 or 201A if the probes are glass-lined. Using Method 202 in conjunction with Method 201 or 201A, only the impinger train configuration and analysis is addressed by this method. The sample train operation and front end recovery and analysis shall be conducted according to Method 201 or 201A.

1.1.3 This method may also be modified to measure material that condenses at other temperatures by specifying the filter and probe temperature. A heated Method 5 out-of-stack filter may be used instead of the in-stack filter to determine condensible emissions at wet sources.

1.2 Principle. 1.2.1 The CPM is collected in the impinger portion of a Method 17 (appendix A, 40 CFR part 60) type sampling train. The impinger contents are immediately purged after the run with nitrogen (N_2) to remove dissolved sulfur dioxide (SO_2) gases from the impinger contents. The impinger solution is then extracted with methylene chloride ($MeCl_2$). The organic and aqueous fractions are then taken to dryness and the residues weighed. The total of both fractions represents the CPM.

1.2.2 The potential for low collection efficiency exist at oil-fired boilers. To improve the collection efficiency at these type of sources, an additional filter placed between the second and third impinger is recommended.

2. Precision and Interference

2.1 Precision. The precision based on method development tests at an oil-fired boiler and a catalytic cracker were 11.7 and 4.8 percent, respectively.

2.2 Interference. Ammonia. In sources that use ammonia injection as a control technique for hydrogen chloride (HCl), the ammonia interferes by reacting with HCl in the gas stream to form ammonium chloride (NH_4Cl) which would be measured as CPM. The sample may be analyzed for chloride and the equivalent amount of NH_4Cl can be subtracted from the CPM weight. However, if NH_4Cl is to be counted as CPM, the inorganic fraction should be taken to near dryness (less than 1 ml liquid) in the oven and then allowed to air dry at ambient temperature to prevent any NH_4Cl from vaporizing.

3. Apparatus

3.1 Sampling Train. Same as in Method 17, section 2.1, with the following exceptions noted below (see Figure 202-1). *Note:* Mention of trade names or specific products does not constitute endorsement by EPA.

3.1.1 The probe extension shall be glass-lined or Teflon.

3.1.2 Both the first and second impingers shall be of the Greenburg-Smith design with the standard tip.

3.1.3 All sampling train glassware shall be cleaned prior to the test with soap and tap water, water, and rinsed using tap water, water, acetone, and finally, $MeCl_2$. It is important to completely remove all silicone grease from areas that will be exposed to the $MeCl_2$ during sample recovery.

3.2 Sample Recovery. Same as in Method 17, section 2.2, with the following additions:

3.2.1 N_2 Purge Line. Inert tubing and fittings capable of delivering 0 to 28 liters/min of N_2 gas to the impinger train from a

standard gas cylinder (see Figure 202–2). Standard 0.95 cm (¾-inch) plastic tubing and compression fittings in conjunction with an adjustable pressure regulator and needle valve may be used.

3.2.2 Rotameter. Capable of measuring gas flow at 20 liters/min.

3.3 Analysis. The following equipment is necessary in addition to that listed in Method 17, section 2.3:

3.3.1 Separatory Funnel. Glass, 1-liter.

3.3.2 Weighing Tins. 350-ml.

3.3.3 Dry Equipment. Hot plate and oven with temperature control.

3.3.4 Pipets. 5-ml.

3.3.5 Ion Chromatograph. Same as in Method 5F, Section 2.1.6.

4. Reagents

Unless otherwise indicated, all reagents must conform to the specifications established by the Committee on Analytical Reagents of the American Chemical Society. Where such specifications are not available, use the best available grade.

4.1 Sampling. Same as in Method 17, section 3.1, with the addition of deionized distilled water to conform to the American Society for Testing and Materials Specification D 1193–74, Type II and the omittance of section 3.1.4.

4.2 Sample Recovery. Same as in Method 17, section 3.2, with the following additions:

4.2.1 N_2 Gas. Zero N_2 gas at delivery pressures high enough to provide a flow of 20 liters/min for 1 hour through the sampling train.

4.2.2 Methylene Chloride. ACS grade. Blanks shall be run prior to use and only methylene chloride with low blank values (0.001 percent) shall be used.

4.2.3 Water. Same as in section 4.1.

4.3 Analysis. Same as in Method 17, section 3.3, with the following additions:

4.3.1 Methylene Chloride. Same as section 4.2.2.

4.3.2 Ammonium Hydroxide. Concentrated (14.8 M) NH_4OH.

4.3.3 Water. Same as in section 4.1.

4.3.4 Phenolphthalein. The pH indicator solution, 0.05 percent in 50 percent alcohol.

5. Procedure

5.1 Sampling. Same as in Method 17, section 4.1, with the following exceptions:

5.1.1 Place 100 ml of water in the first three impingers.

5.1.2 The use of silicone grease in train assembly is not recommended because it is very soluble in $MeCl_2$ which may result in sample contamination. Teflon tape or similar means may be used to provide leak-free connections between glassware.

5.2 Sample Recovery. Same as in Method 17, section 4.2 with the addition of a post-test N_2 purge and specific changes in handling of individual samples as described below.

5.2.1 Post-test N_2 Purge for Sources Emitting SO_2. (Note: This step is recommended, but is optional. With little or no SO_2 is present in the gas stream, i.e., the pH of the impinger solution is greater than 4.5, purging has been found to be unnecessary.) As soon as possible after the post-test leak check, detach the probe and filter from the impinger train. Leave the ice in the impinger box to prevent removal of moisture during the purge. If necessary, add more ice during the purge to maintain the gas temperature below 20 °C. With no flow of gas through the clean purge line and fittings, attach it to the input of the impinger train (see Figure 202–2). To avoid over- or under-pressurizing the impinger array, slowly commence the N_2 gas flow through the line while simultaneously opening the meter box pump valve(s). When using the gas cylinder pressure to push the purge gas through the sample train, adjust the flow rate to 20 liters/min through the rotameter. When pulling the purge gas through the sample train using the meter box vacuum pump, set the orifice pressure differential to $\Delta H_@$ and maintain an overflow rate through the rotameter of less than 2 liters/min. This will guarantee that the N_2 delivery system is operating at greater than ambient pressure and prevents the possibility of passing ambient air (rather than N_2) through the impingers. Continue the purge under these conditions for 1 hour, checking the rotameter and ΔH value(s) periodically. After 1 hour, simultaneously turn off the delivery and pumping systems.

5.2.2 Sample Handling.

5.2.2.1 Container Nos. 1, 2, and 3. If filter catch is to be determined, as detailed in Method 17, section 4.2.

5.2.2.2 Container No. 4 (Impinger Contents). Measure the liquid in the first three impingers to within 1 ml using a clean graduated cylinder or by weighing it to within 0.5 g using a balance. Record the volume or weight of liquid present to be used to calculate the moisture content of the effluent gas. Quantitatively transfer this liquid into a clean sample bottle (glass or plastic); rinse each impinger and the connecting glassware, including probe extension, twice with water, recover the rinse water, and add it to the same sample bottle. Mark the liquid level on the bottle.

5.2.2.3 Container No. 5 ($MeCl_2$ Rinse). Follow the water rinses of each impinger and the connecting glassware, including the probe extension with two rinses of $MeCl_2$; save the rinse products in a clean, glass sample jar. Mark the liquid level on the jar.

5.2.2.4 Container No. 6 (Water Blank). Once during each field test, place 500 ml of water in a separate sample container.

5.2.2.5 Container No. 7 ($MeCl_2$ Blank). Once during each field test, place in a separate glass sample jar a volume of $MeCl_2$ approximately equivalent to the volume used to conduct the $MeCl_2$ rinse of the impingers.

5.3 Analysis. Record the data required on a sheet such as the one shown in Figure 202–3. Handle each sample container as follows:

5.3.1 Container Nos. 1, 2, and 3. If filter catch is analyzed, as detailed in Method 17, section 4.3.

5.3.2 Container Nos. 4 and 5. Note the level of liquid in the containers and confirm on the analytical data sheet whether leakage occurred during transport. If a noticeable amount of leakage has occurred, either void the sample or use methods, subject to the approval of the Administrator, to correct the final results. Measure the liquid in Container No. 4 either volumetrically to ±1 ml or gravimetrically to ±0.5 g. Remove a 5-ml aliquot and set aside for later ion chromatographic (IC) analysis of sulfates. (Note: Do not use this aliquot to determine chlorides since the HCl will be evaporated during the first drying step; Section 8.2 details a procedure for this analysis.)

5.3.2.1 Extraction. Separate the organic fraction of the sample by adding the contents of Container No. 4 ($MeCl_2$) to the contents of Container No. 4 in a 1000-ml separatory funnel. After mixing, allow the aqueous and organic phases to fully separate, and drain off most of the organic/$MeCl_2$ phase. Then add 75 ml of $MeCl_2$ to the funnel, mix well, and drain off the lower organic phase. Repeat with another 75 ml of $MeCl_2$. This extraction should yield about 250 ml of organic extract. Each time, leave a small amount of the organic/$MeCl_2$ phase in the separatory funnel ensuring that no water is collected in the organic phase. Place the organic extract in a tared 350-ml weighing tin.

5.3.2.2 Organic Fraction Weight Determination (Organic Phase from Container Nos. 4 and 5). Evaporate the organic extract at room temperature and pressure in a laboratory hood. Following evaporation, desiccate the organic fraction for 24 hours in a desiccator containing anhydrous calcium sulfate. Weigh to a constant weight and report the results to the nearest 0.1 mg.

5.3.2.3 Inorganic Fraction Weight Determination. (Note: If NH_4Cl is to be counted as CPM, the inorganic fraction should be taken to near dryness (less than ml liquid) in the oven and then allow to air dry at ambient temperature. If multiple acid emissions are suspected, the ammoni titration procedure in section 8.1 may preferred.) Using a hot plate, or equivalent, evaporate the aqueous phase to approximately 50 ml; then, evaporate to dryness in a 105 °C oven. Redissovle the residue in 100 ml of water. Add five drops o phenolphthalein to this solution; then, add concentrated (14.8 M) NH_4OH until the sample turns pink. Any excess NH_4OH w be evaporated during the drying step. Evaporate the sample to dryness in a 105 °C oven, desiccate the sample for 24 hours, weigh to a constant weight, and record th results to the nearest 0.1 mg. (Note: The addition of NH_4OH is recommended, but is optional when little or no SO_2 is present in the gas stream, i.e., when the pH of the impinger solution is greater than 4.5, the addition of NH_4OH is not necessary.)

5.3.2.4 Analysis of Sulfate by IC to Determine Ammonium Ion (NH_4^+) Retair the Sample. (Note: If NH_4OH is not adde omit this step.) Determine the amount of sulfate in the aliquot taken from Containe No. 4 earlier as described in Method 5F (appendix A, 40 CFR part 60). Based on SO_4^{-2} analysis of the aliquot, calculate t correction factor to subtract the NH_4^+ retained in the sample and to add the combined water removed by the acid-b reaction (see section 7.2).

5.3.3 Analysis of Water and M (Container Nos. 6 and 7). Analyze sample blanks as described above in se 5.3.2.3 and 5.3.2.2, respectively.

5.3.4 Analysis of Acetone Blank (Container No. 8). Same as in Method 17, section 4.3.

6. Calibration

Same as in Method 17, section 5, except for the following:

6.1 IC Calibration. Same as Method 5F, section 5.

6.2 Audit Procedure. Concurrently, analyze the audit sample and a set of compliance samples in the same manner to evaluate the technique of the analyst and the standards preparation. The same analyst, analytical reagents, and analytical system shall be used both for compliance samples and the EPA audit sample. If this condition is met, auditing of subsequent compliance analyses for the same enforcement agency within 30 days is not required. An audit sample set may not be used to validate different sets of compliance samples under the jurisdiction of different enforcement agencies, unless prior arrangements are made with both enforcement agencies.

6.3 Audit Samples. Audit Sample Availability. Audit samples will be supplied only to enforcement agencies for compliance tests. The availability of audit samples may be obtained by writing:

Source Test Audit Coordinator (MD–77B), Quality Assurance Division, Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle, Park, NC 27711

or by calling the Source Test Audit Coordinator (STAC) at (919) 541–7834. The request for the audit sample must be made at least 30 days prior to the scheduled compliance sample analysis.

6.4 Audit Results. Calculate the audit sample concentration according to the calculation procedure described in the audit instructions included with the audit sample. Fill in the audit sample concentration and the analyst's name on the audit response form included with the audit instructions. Send one copy to the EPA Regional Office or the appropriate enforcement agency and a second copy to the STAC. The EPA Regional Office or the appropriate enforcement agency will report the results of the audit to the laboratory being audited. Include this response with the results of the compliance samples in relevant reports to the EPA Regional Office or the appropriate enforcement agency.

7. Calculations

Same as in Method 17, section 6, with the following additions:

7.1 Nomenclature. Same as in Method 17, section 6.1 with the following additions.

C_{cpm} = Concentration of the CPM in the stack gas, dry basis, corrected to standard conditions, g/dscm (g/dscf).

$C_{SO_4^{-2}}$ = Concentration of SO_4^{-2} in the sample, mg/ml.

m_b = Sum of the mass of the water and $MeCl_2$ blanks, mg.

m_c = Mass of the NH_4^+ added to sample to form ammonium sulfate, mg.

m_i = Mass of inorganic CPM matter, mg.

m_o = Mass of organic CPM, mg.

m_s = Mass of dried sample from inorganic fraction, mg.

V_s = Volume of aliquot taken for IC analysis, ml.

V_{ic} = Volume of impinger contents sample, ml.

7.2 Correction for NH_4^+ and H_2O. Calculate the correction factor to subtract the NH_4^+ retained in the sample based on the IC SO_4^{-2} and if desired, add the combined water removed by the acid-base reaction.

$$m_c = K\ C_{so_4^{-2}}\ V_{ic} \qquad \text{Eq. 202–1}$$

where:

K = 0.0205, when correcting for NH_4^+ and H_2O.

= 0.1840, when only correcting for NH_4^+.

7.3 Mass of Inorganic CPM.

$$m_i = m_s - \frac{V_{ic}}{V_{ic} - V_s} - m_c \qquad \text{Eq. 202–2}$$

7.4 Concentration of CPM.

$$C_{cpm} = \frac{m_o + m_i - m_b}{Vm_{std}} \qquad \text{Eq. 202–3}$$

8. Alternative Procedures

8.1 Determination of NH_4^+ Retained in Sample by Titration.

8.1.1 An alternative procedure to determine the amount of NH_4^+ added to the inorganic fraction by titration may be used. After dissolving the inorganic residue in 100 ml of water, titrate the solution with 0.1 N NH_4OH to a pH of 7.0, as indicated by a pH meter. The 0.1 N NH_4OH is made as follows: Add 7 ml of concentrated (14.8 M) NH_4OH to 1 liter of water. Standardize against standardized 0.1 N H_2SO_4 and calculate the exact normality using a procedure parallel to that described in section 5.5 of Method 6 (appendix A, 40 CFR part 60). Alternatively, purchase 0.1 N NH_4OH that has been standardized against a National Institute of Standards and Technology reference material.

8.1.2 Calculate the concentration of SO_4^{-2} in the sample using the following equation.

$$CSO_4 = \frac{48.03\ V_t\ N}{100} \qquad \text{Eq. 202–4}$$

where

N = Normality of the NH_4OH, mg/ml.

V_t = Volume of NH_4OH titrant, ml.

48.03 = mg/meq.

100 = Volume of solution, ml.

8.1.3 Calculate the CPM as described in section 7.

8.2 Analysis of Chlorides by IC. At the conclusion of the final weighing as described in section 5.3.2.1, redissolve the inorganic fraction in 100 ml of water. Analyze an aliquot of the redissolved sample for chlorides by IC using techniques similar to those described in Method 5F for sulfates. Previous drying of the sample should have removed all HCl. Therefore, the remaining chlorides measured by IC can be assumed to be NH_4Cl, and this weight can be subtracted from the weight determined for CPM.

8.3 Air Purge to Remove SO_2 from Impinger Contents. As an alternative to the post-test N_2 purge described in section 5.2.1, the tester may opt to conduct the post-test purge with air at 20 liter/min. Note: The use of an air purge is not as effective as a N_2 purge.

8.4 Chloroform–ether Extraction. As an alternative to the methylene chloride extraction described in section 5.3.2.1, the tester may opt to conduct a chloroform–ether extraction. Note: The Chloroform–ether was not as effective as the $MeCl_2$ in removing the organics, but it was found to be an acceptable organic extractant. Chloroform and diethylether of ACS grade, with low blank values (0.001 percent), shall be used. Analysis of the chloroform and diethylether blanks shall be conducted according to Section 5.3.3 for $MeCl_2$.

8.4.1 Add the contents of Container No. 4 to a 1000-ml separatory funnel. Then add 75 ml of chloroform to the funnel, mix well, and drain off the lower organic phase. Repeat two more times with 75 ml of chloroform. Then perform three extractions with 75 ml of diethylether. This extraction should yield approximately 450 ml of organic extraction. Each time, leave a small amount of the organic/$MeCl_2$ phase in the separatory funnel ensuring that no water is collected in the organic phase.

8.4.2 Add the contents of Container No. 5 to the organic extraction. Place approximately 300 ml of the organic extract in a tared 350-ml weighing tin while storing the remaining organic extract in a sample container. As the organic extract evaporates, add the remaining extract to the weighing tin.

8.4.3 Determine the weight of the organic phase as described in Section 5.3.2.2.

8.5 Improving Collection Efficiency. If low impinger collection efficiency is suspected, the following procedure may be used.

8.5.1 Place an out-of-stack filter as described in Method 8 between the second and third impingers.

8.5.2 Recover and analyze the filter according to Method 17, Section 4.2. Include the filter holder as part of the connecting glassware and handle as described in sections 5.2.2.2 and 5.2.2.3.

8.5.3 Calculate the Concentration of CPM as follows:

$$C_{cpm} = \frac{m_o + m_i + m_f - m_b}{Vm_{std}} \qquad \text{Eq. 202–5}$$

where:

m_f = amount of CPM collected on out-of-stack filter, mg.

8.6 Wet Source Testing. When testing at a wet source, use a heated out-of-stack filter as described in Method 5.

9. Bibliography

1. DeWees, W.D., S.C. Steinsberger, G.M. Plummer, L.T. Lay, C.D. McAlister, and R.T.

Shigehara. "Laboratory and Field Evaluation of the EPA Method 5 Impinger Catch for Measuring Condensible Matter from Stationary Sources." Paper presented at the 1989 EPA/AWMA International Symposium on Measurement of Toxic and Related Air Pollutants. Raleigh, North Carolina. May 1–5, 1989.

2. DeWees, W.D. and K.C. Steinsberger. "Method Development and Evaluation of Draft Protocol for Measurement of Condensible Particulate Emissions." Draft Report. November 17, 1989.

3. Texas Air Control Board, Laboratory Division. "Determination of Particulate in Stack Gases Containing Sulfuric Acid and/or Sulfur Dioxide." *Laboratory Methods for Determination of Air Pollutants*. Modified December 3, 1978.

4. Nothstein, Greg. Masters Thesis. University of Washington. Department of Environmental Health. Seattle, Washington.

5. "Particulate Source Test Procedures Adopted by Puget Sound Air Pollution Control Agency Board of Directors." Puget Sound Air Pollution Control Agency. Engineering Division. Seattle, Washington. August 11, 1983.

6. Commonwealth of Pennsylvania. Department of Environmental Resources. Chapter 139, Sampling and Testing, [illegible] Rules and Regulations. Part I. Depa[illegible]n: Environmental Resources. Subpart C. Protection of Natural Resources. Article Air Resources). January 8, 1960.

7. Wisconsin Department of Natural Resources. *Air Management Operations Handbook. Revision 3*. January 11, 1988.

BILLING CODE [illegible]

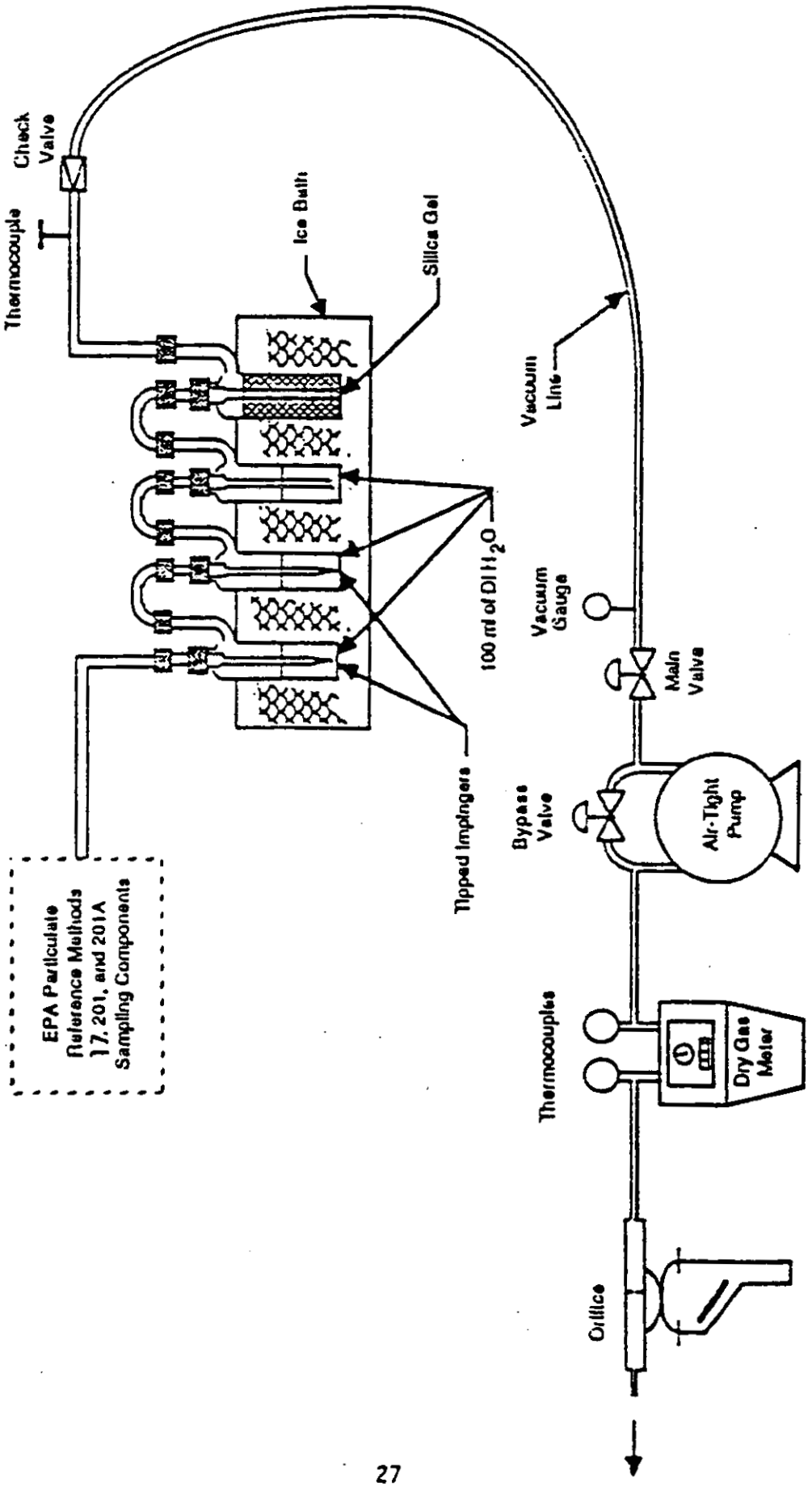


Figure 202-1. , Schematic of condensible particulate sampling train.

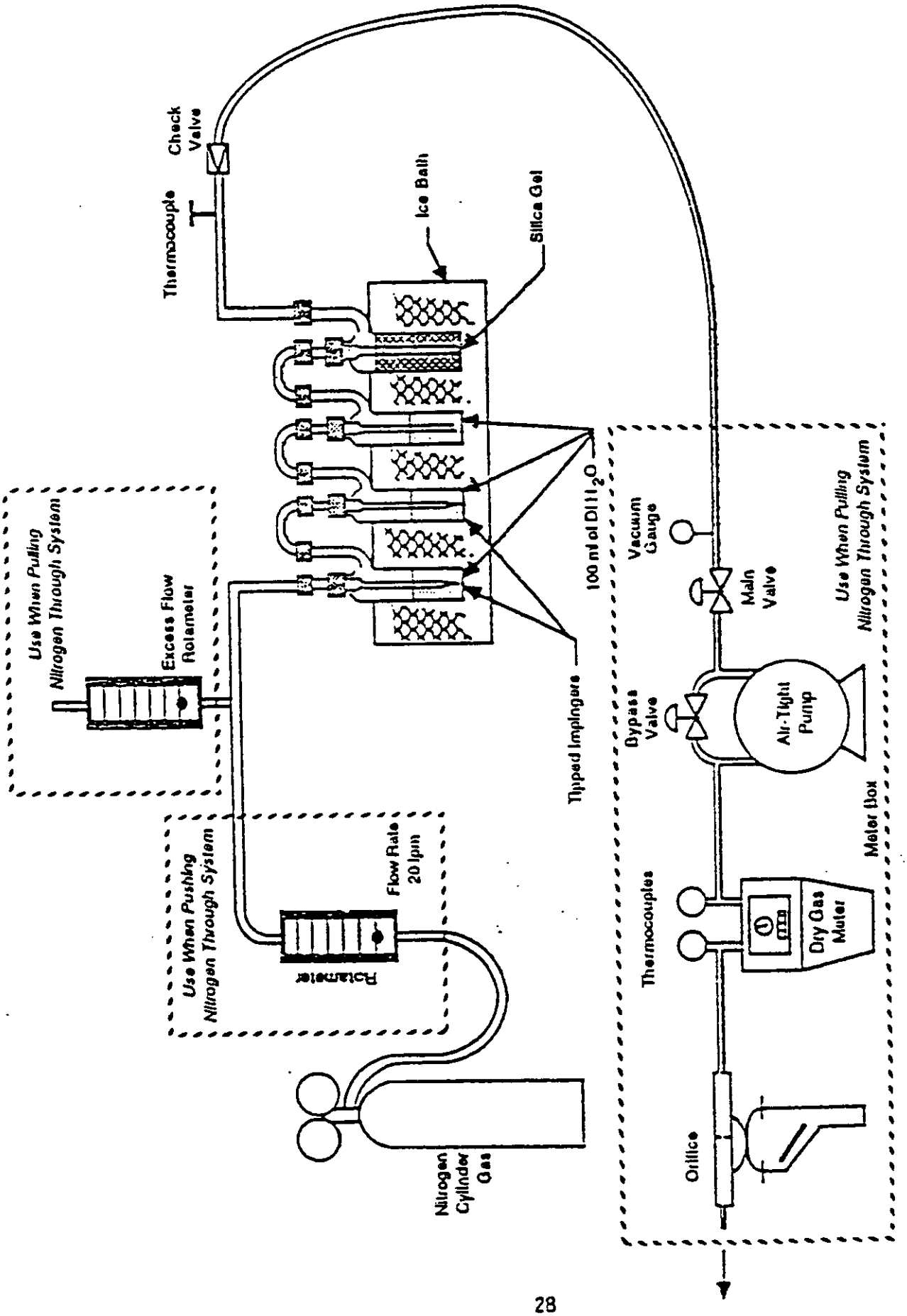


Figure 202-2. Schematic of post-test nitrogen purge system.

Moisture Determination

Volume or weight of liquid in impingers: _____ ml or g

Weight of moisture in silica gel: _____ g

Sample Preparation (Container No. 4)

Amount of liquid lost during transport: _____ ml

Final volume: _____ ml

pH of sample prior to analysis: _____

Addition of NH_4OH required: _____

Sample extracted 2X with 75 ml $MeCl_2$?: _____

For Titration of Sulfate

Normality of NH_4OH: _____ N

Volume of sample titrated: _____ ml

Volume of titrant _____ ml

Sample Analysis

Container number	Weight of condensible particulate, mg		
	Final weight	Tare weight	Weight gain
4 (Inorganic)			
4 & 5 (Organic)			

Total: _____

Less Blank: _____

Weight of Condensible Particulate: _____

Figure 202-3. Analytical data sheet.

[FR Doc. 91-29957 Filed 12-18-91; 8:45 am]

BILLING CODE 6560-50-M

Method 7E—Determination of Nitrogen Oxides Emissions From Stationary Sources (Instrumental Analyzer Procedure)

1. Applicability and Principle

1.1 **Applicability.** This method is applicable to the determination of nitrogen oxides (NO_x) concentrations in emissions from stationary sources only when specified within the regulations.

1.2 **Principle.** A gas simple is continuously extracted from a stack, and a portion of the sample is conveyed to an instrumental chemiluminescent analyzer for determination of NO_x concentration. Performance specifications and test procedures are provided to ensure reliable data.

2. Range and Sensitivity

Same as Method 6C, Sections 2.1 and 2.2.

3. Definitions

3.1 **Measurement System.** The total equipment required for the determination of NO_x concentration. The measurement system consists of the following major subsystems:

3.1.1 **Sample Interface, Gas Analyzer, and Data Recorder.** Same as Method 6C, Sections 3.1.1, 3.1.2, and 3.1.3.

3.1.2 **NO_2 to NO Converter.** A device that converts the nitrogen dioxide (NO_2) in the sample gas to nitrogen oxide (NO).

3.2 Span, Calibration Gas, Analyzer Calibration Error, Sampling System Bias, Zero Drift, Calibration Drift, and Response Time. Same as Method 6C, Sections 3.2 through 3.8.

3.3 **Interference Response.** The output response of the measurement system to a component in the sample gas, other than the gas component being measured.

4. Measurement System Performance Specifications

Same as Method 6C, Sections 4.1 through 4.4.

5. Apparatus and Reagents

5.1 **Measurement System.** Any measurement system for NO_x that meets the specifications of this method. A schematic of an acceptable measurement system is shown in Figure 6C-1 of Method 6C. The essential components of the measurement system are described below:

5.1.1 Sample Probe, Sample Line, Calibration Valve Assembly, Moisture Removal System, Particulate Filter, Sample Pump, Sample Flow Rate Control, Sample Gas Manifold, and Data Recorder. Same as Method 6C, Sections 5.1.1 through 5.1.9, and 5.1.11.

5.1.2 NO_2 to NO Converter. That portion of the system that converts the nitrogen dioxide (NO_2) in the sample gas to nitrogen oxide (NO). An NO_2 to NO converter is not necessary if data are presented to demonstrate that the NO_2 portion of the exhaust gas is less than 5 percent of the total NO_x concentration.

5.1.3 NO_x Analyzer. An analyzer based on the principles of chemiluminescence, to determine continuously the NO_x concentration in the sample gas stream. The analyzer shall meet the applicable performance specifications of Section 4. A means of controlling the analyzer flow rate and a device for determining proper sample flow rate (e.g., precision rotameter, pressure gauge downstream of all flow controls, etc.) shall be provided at the analyzer.

5.2 NO_x Calibration Gases. The calibration gases for the NO_x analyzer shall be NO in N_2. Three calibration gases, as specified in Sections 5.3.1 through 5.3.3. of Method 6C, shall be used. Ambient air may be used for the zero gas.

6. Measurement System Performance Test Procedures

Perform the following procedures before measurement of emissions (Section 7).

6.1 Calibration Gas Concentration Verification. Follow Section 6.1 of Method 6C, except if calibration gas analysis is required, use Method 7, and change all 5 percent performance values to 10 percent (or 10 PPM, whichever is greater).

6.2 Interference Response. Conduct an interference response test of the analyzer prior to its initial use in the field. Thereafter, recheck the measurement system if changes are made in the instrumentation that could alter the interference response (e.g., changes in the gas detector). Conduct the interference response in accordance with Section 5.4 of Method 20.

6.3 Measurement System Preparation, Analyzer Calibration Error, and Sample System Bias Check. Follow Sections 6.2 through 6.4 of Method 6C.

6.4 NO_2 to NO Conversion Efficiency. Unless data are presented to demonstrate that the NO_2 concentration within the sample stream is not greater than 5 percent of the NO_x concentration, conduct an NO_2 to NO conversion efficiency test in accordance with Section 5.6 of Method 20.

7. Emission Test Procedure

7.1 **Selection of Sampling Site and Sampling Points.** Select a measurement site and sampling points using the same criteria that are applicable to tests performed using Method 7.

7.2 **Sample Collection.** Position the sampling probe at the first measurement point, and begin sampling at the same rate as used during the system calibration drift test. Maintain constant rate sampling (i.e., ± 10 percent) during the entire run. The sampling time per run shall be the same as the total time required to perform a run using Method 7, plus twice the system response time. For each run, use only those measurements obtained after twice the response time of the measurement system has elapsed, to determine the average effluent concentration.

7.3 **Zero and Calibration Drift Test.** Follow Section 7.4 of Method 6C.

8. Emission Calculation

Follow Section 8 of Method 6C.

9. Bibliography

Same as bibliography of Method 6C.

Method 10—Determination of Carbon Monoxide Emissions From Stationary Sources

1. Principle and Applicability

1.1 **Principle.** An integrated or continuous gas sample is extracted from a sampling point and analyzed for carbon monoxide (CO) content using a Luft-type nondispersive infrared analyzer (NDIR) or equivalent.

1.2 **Applicability.** This method is applicable for the determination of carbon monoxide emissions from stationary sources only when specified by the test procedures for determining compliance with new source performance standards. The test procedure will indicate whether a continuous or an integrated sample is to be used.

2. Range and Sensitivity

2.1 **Range.** 0 to 1,000 PPM.

2.2 **Sensitivity.** Minimum detectable concentration is 20 PPM for a 0 to 1,000 PPM span.

3. Interferences

Any substance having a strong absorption of infrared energy will interfere to some extent. For example, discrimination ratios for water (H_2O) and carbon dioxide (CO_2) are 3.5 percent H_2O per 7 PPM CO and 10 percent CO_2 per 10 PPM CO, respectively, for devices measuring in the 1,500 to 3,000 PPM range. For devices measuring in the 0 to 100 PPM range, interference ratios can be as high as 3.5 percent H_2O per 25 PPM CO and 10 percent CO_2 per 50 PPM CO. The use of silica gel and ascarite traps will alleviate the major interference problems. The measured gas volume must be corrected if these traps are used.

4. Precision and Accuracy

4.1 **Precision.** The precision of most NDIR analyzers is approximately ± 2 percent of span.

4.2 **Accuracy.** The accuracy of most NDIR analyzers is approximately ± 5 percent of span after calibration.

5. Apparatus

5.1 **Continuous Sample** (Figure 10-1).

5.1.1 **Probe.** Stainless steel or sheathed Pyrex\1\ glass, equipped with a filter to remove particulate matter.

5.1.2 **Air-Cooled Condenser or Equivalent.** To remove any excess moisture.

5.2 **Integrated Sample** (Figure 10-2).

5.2.1 **Probe.** Stainless steel or sheathed Pyrex glass, equipped with a filter to remove particulate matter.

5.2.2 **Air-Cooled Condenser or Equivalent.** To remove any excess moisture.

5.2.3 **Valve.** Needle valve, or equivalent, to adjust flow rate.

5.2.4 **Pump.** Leak-free diaphragm type, or equivalent, to transport gas.

5.2.5 **Rate Meter.** Rotameter, or equivalent, to measure a flow range from 0 to 1.0 liter per min (0.035 cfm).

5.2.6 **Flexible Bag.** Tedlar, or equivalent, with a capacity of 60 to 90 liters (2 to 3 ft^3). Leak-test the bag in the laboratory before using by evacuating bag with a pump followed by a dry gas meter. When evacuation is complete, there should be no flow through the meter.

5.2.7 **Pitot Tube.** Type S, or equivalent, attached to the probe so that the sampling rate can be regulated proportional to the stack gas velocity when velocity is varying with the time or a sample traverse is conducted.

5.3 **Analysis** (Figure 10-3).

5.3.1 **Carbon Monoxide Analyzer.** Nondispersive infrared spectrometer, or equivalent. This instrument should be demonstrated, preferably by the manufacturer, to meet or exceed manufacturer's specifications and those described in this method.

5.3.2 **Drying Tube.** To contain approximately 200 g of silica gel.

5.3.3 **Calibration Gas.** Refer to section 6.1.

5.3.4 **Filter.** As recommended by NDIR manufacturer.

|_See_CFR_paper_publication_for_illustration_18A

5.3.5 **CO_2 Removal Tube.** To contain approximately 500 g of ascarite.

5.3.6 **Ice Water Bath.** For ascarite and silica gel tubes.

5.3.7 **Valve.** Needle valve, or equivalent, to adjust flow rate

5.3.8 **Rate Meter.** Rotameter or equivalent to measure gas flow rate of 0 to 1.0 liter per min (0.035 cfm) through NDIR.

5.3.9 **Recorder** (optional). To provide permanent record of NDIR readings.

6. Reagents

6.1 **Calibration Gases.** Known concentration of CO in nitrogen (N_2) for instrument span, prepurified grade of N_2 for zero, and two additional concentrations corresponding approximately to 60 percent and 30 percent span. The span concentration shall not exceed 1.5 times the applicable source performance standard. The calibration gases shall be certified by the manufacturer to be within ± 2 percent of the specified concentration.

|_See_CFR_paper_publication_for_illustration_19A

6.2 **Silica Gel.** Indicating type, 6 to 16 mesh, dried at 175°C (347°F) for 2 hours.

6.3 **Ascarite.** Commercially available.

7. Procedure

7.1 **Sampling.**

7.1.1 **Continuous Sampling.** Set up the equipment as shown in Figure 10-1 making sure all connections are leak free. Place the probe in the stack at a sampling point and purge the sampling line. Connect the analyzer and begin drawing sample into the analyzer. Allow 5 minutes for the system to stabilize, then record the analyzer reading as required by the test procedure. (See section 7.2 and 8). CO_2 content of the gas may be determined by using the Method 3 integrated sample procedure, or by weighing the ascarite CO_2 removal tube and computing CO_2 concentration from the gas volume sampled and the weight gain of the tube.

7.1.2 **Integrated Sampling.** Evacuate the flexible bag. Set up the equipment as shown in Figure 10-2 with the bag disconnected. Place the probe in the stack and purge the sampling line. Connect the bag, making sure that all connections are leak free. Sample at a rate proportional to the stack velocity. CO_2 content of the gas may be determined by using the Method 3 integrated sample procedures, or by weighing the ascarite CO_2 removal tube and computing CO_2 concentration from the gas volume sampled and the weight gain of the tube.

7.2 **CO Analysis.** Assemble the apparatus as shown in Figure 10-3, calibrate the instrument, and perform other required operations as described in section 8. Purge analyzer with N_2 prior to introduction of each sample. Direct the sample stream through the instrument for the test period, recording the readings. Check the zero and span again after the test to assure that any drift or malfunction is detected. Record the sample data on Table 10-1.

8. Calibration

Assemble the apparatus according to Figure 10-3. Generally an instrument requires a warm-up period before stability is obtained. Follow the manufacturer's instructions for specific procedure. Allow a minimum time of 1 hour for warm-up. During this time check the sample conditioning apparatus, i.e., filter, condenser, drying tube, and CO_2 removal tube, to ensure that each component is in good operating condition. Zero and calibrate the instrument according to the manufacturer's procedures using, respectively, nitrogen and the calibration gases.

Table 10-1—Field data

Comments

Location ———————————

Test ———————————

Date ———————————

Operator ———————————

Clock time	Rotameter setting, liters per minute (cubic feet per minute)

---

9. Calculation

Calculate the concentration of carbon monoxide in the stack using Equation 10-1.

$$C_{CO\ stack} = C_{CO\ NDIR}(1-F_{CO2}) \qquad \text{Eq. 10-1}$$

Where:

$C_{CO\ stack}$ = Concentration of CO in stack, PPM by volume (dry basis).
$C_{CO\ NDIR}$ = Concentration of CO measured by NDIR analyzer, PPM by volume (dry basis).
$F_{CO\ 2}$ = Volume fraction of CO_2 in sample, i.e., percent CO_2 from Orsat analysis divided by 100.

10. Alternative Procedures

10.1 **Interference Trap.** The sample conditioning system described in Method 10A, sections 2.1.2 and 4.2, may be used as an alternative to the silica gel and ascarite traps.

11. Bibliography

1. McElroy, Frank, The Intertech NDIR-CO Analyzer, Presented at 11th Methods Conference on Air Pollution, University of California, Berkeley, CA. April 1, 1970.

2. Jacobs, M. B., et al., Continuous Determination of Carbon Monoxide and Hydrocarbons in Air by a Modified Infrared Analyzer, J. Air Pollution Control Association, 9(2): 110-114. August 1959.

3. MSA LIRA Infrared Gas and Liquid Analyzer Instruction Book, Mine Safety Appliances Co., Technical Products Division, Pittsburgh, PA.

4. Models 215A, 315A, and 415A Infrared Analyzers, Beckman Instruments, Inc., Beckman Instructions 1635-8, Fullerton, CA. October 1967.

5. Continuous CO Monitoring System, Model A5611, Intertech Corp., Princeton, NJ.

6. UNOR Infrared Gas Analyzers, Bendix Corp., Ronceverte, WV

Agenda

A. Performance Specifications for NDIR Carbon Monoxide Analyzers

Range (minimum)	0—1000 PPM.
Output (minimum)	0—10mV.
Minimum detectable sensitivity	20 PPM.
Rise time, 90 percent (maximum)	30 seconds.
Fall time, 90 percent (maximum)	30 seconds.
Zero drift (maximum)	10% in 8 hours.
Span drift (maximum)	10% in 8 hours.
Precision (minimum)	± 2% of full scale.
Noise (maximum)	± 1% of full scale.
Linearity (maximum deviation)	2% of full scale.
Interference rejection ratio	CO_2—1000 to 1, H_2O—500 to 1.

B. Definitions of Performance Specifications.

Range——The minimum and maximum measurement limits.

Output——Electrical signal which is proportional to the measurement; intended for connection to readout or data processing devices. Usually expressed as millivolts or milliamps full scale at a given impedance.

Full scale——The maximum measuring limit for a given range.

Minimum detectable sensitivity——The smallest amount of input concentration that can be detected as the concentration approaches zero.

Accuracy——The degree of agreement between a measured value and the true value; usually expressed as ± percent of full scale.
Time to 90 percent response——The time interval from a step change in the input concentration at the instrument inlet to a reading of 90 percent of the ultimate recorded concentration.
Rise Time (90 percent)——The interval between initial response time and time to 90 percent response after a step increase in the inlet concentration.
Fall Time (90 percent)——The interval between initial response time and time to 90 percent response after a step decrease in the inlet concentration.
Zero Drift——The change in instrument output over a stated time period, usually 24 hours, of unadjusted continuous operation when the input concentration is zero; usually expressed as percent full scale.
Span Drift——The change in instrument output over a stated time period, usually 24 hours, of unadjusted continuous operation when the input concentration is a stated upscale value; usually expressed as percent full scale.
Precision——The degree of agreement between repeated measurements of the same concentration, expressed as the average deviation of the single results from the mean.
Noise——Spontaneous deviations from a mean output not caused by input concentration changes.
Linearity——The maximum deviation between an actual instrument reading and the reading predicted by a straight line drawn between upper and lower calibration points.

Method 10A—Determination of Carbon Monoxide Emissions in Certifying Continuous Emission Monitoring Systems at Petroleum Refineries

1. Applicability and Principle

1.1 **Applicability.** This method applies to the measurement of carbon monoxide (CO) at petroleum refineries. This method serves as the reference method in the relative accuracy test for nondispersive infrared (NDIR) CO continuous emission monitoring systems (CEMS's) that are required to be installed in petroleum refineries on fluid catalytic cracking unit catalyst regenerators [40 CFR Part 60.105(a)(2)].

1.2 **Principle.** An integrated gas sample is extracted from the stack, passed through an alkaline permanganate solution to remove sulfur and nitrogen oxides, and collected in a Tedlar bag. The CO concentration in the sample is measured spectrophotometrically using the reaction of CO with p-sulfaminobenzoic acid.

1.3. **Range and Sensitivity.**

1.3.1 **Range.** Approximately 3 to 1800 PPM CO. Samples having concentrations below 400 PPM are analyzed at 425 nm, and samples having concentrations above 400 PPM are analyzed at 600 nm.

1.3.2 **Sensitivity.** The detection limit is 3 PPM based on three times the standard deviation of the mean reagent blank values.

APPENDIX K

CALCULATION EQUATIONS

METHOD 2
CALCULATION EQUATIONS

$$\overline{V_s} = 85.49\ C_p\ (\sqrt{\Delta p})_{avg}\ \sqrt{\frac{T_{s(avg)}}{P_s\ M_s}}$$

$$Q_{s,\,d} = 60\ (1\ -B_{ws})\ \overline{V_s}\ A\ (\frac{528}{T_{s\ (avg)}})\ (\frac{P_s}{29.92})$$

$$Q_a = 60\ \overline{V_s}\ A$$

$$\dot{m}_g = \frac{4.995\ Q_{s,\,d}\ G_d}{1\ -\ B_{ws}}$$

$$RH^* = 100\ (vp_{twb}\ -\ 0.0003641\ P_s\ (T_{db}\ -\ T_{wb}))/vp_{tdb}$$

$$B^*_{ws} = RH(vp_{tdb})/P_s$$

$$\rho = \frac{4.585\ x\ 10^{-2}\ P_s M_s}{T_s\ (avg)}$$

*Alternate equations for calculating moisture content from wet bulb and dry bulb data.

SYMBOLS

A	=	Cross Sectional area of stack, SQ. FT.
A_n	=	Cross sectional area of nozzle, SQ. FT.
B_{ws}	=	Water vapor in gas stream, proportion by volume
C_p	=	Pitot tube coefficient, dimensionless
C_a	=	Concentration of particulate matter in stack gas, wet basis, GR/ACF
C_s	=	Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF
EA	=	Excess air, percent by volume
γ	=	Dry test meter correction factor, dimensionless
G_d	=	Specific gravity (relative to air), dimensionless
I	=	Isokinetic variation, percent by volume
M_d	=	Molecular weight of stack gas, dry basis, g/g - mole.
$\dot{m}_g$	=	Mass flow of wet flue gas, LB/HR
$\dot{m}_p$	=	Particulate mass flow, LB/HR
M_s	=	Molecular weight of stack gas, wet basis, g/g mole.
M_p	=	Total amount of particulate matter collected, g
P_{bar}	=	Atmospheric pressure, IN. HG. (uncompensated)
P_g	=	Stack static gas pressure, IN. WC.
P_s	=	Absolute pressure of stack gas, IN. HG.
P_{std}	=	Standard absolute pressure, 29.92 IN. HG.
A_a	=	Actual volumetric stack gas flow rate, ACFM
$Q_{s,d}$	=	Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM
RH	=	Relative humidity, %

T_{db}	=	Dry bulb temperature of stack gas, °F
T_{wb}	=	Wet bulb temperature of stack gas, °F
$T_{m(avg)}$	=	Absolute average dry gas meter temperature, °R
$T_{s(avg)}$	=	Absolute average stack temperature, °R
T_{std}	=	Standard absolute temperature, 528 °R (68 °F)
θ	=	Total sampling time, min.
V_{lc}	=	Total volume of liquid collected in impingers and silica gel, ml
V_m	=	Volume of gas sample as measured by dry gas meter, CF
$V_{m(std)}$	=	Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF
$V_{w(std)}$	=	Volume of water vapor in the gas sample corrected to standard conditions, SCF
$\bar{V}_s$	=	Average actual stack gas velocity, FT/SEC
vp_{tdb}	=	Vapor pressure at T_{db}, IN. HG.
vp_{twb}	=	Vapor pressure at T_{wb}, IN. HG.
$\overline{\Delta H}$	=	Average pressure differential across the orifice meter, IN. WC.
ΔP	=	Velocity pressure of stack gas, IN. WC.
γ	=	Dry test meter correction coefficient, dimensionless
ρ	=	Actual gas density, LB/ACF

METHOD 3
CALCULATION EQUATIONS

$$\%EA = \frac{100(\%O_2 - 0.5\%\ CO)}{0.264\%\ N_2 - \%O_2 + 0.5\%\ CO}$$

$$M_d = 0.44(\%CO_2) + 0.32\ (\%O_2) + 0.28\ (\%N_2 + \%CO)$$

$$M_s = M_d\ (1 - B_{ws}) + 0.18\ B_{ws}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

METHOD 5
CALCULATION EQUATIONS

$$V_{m(std)} = 17.65\ V_m\ \gamma\ \left(\frac{P_{bar} + \overline{\Delta H}/13.6}{T_{m(avg)}}\right)$$

$$V_{w(std)} = 0.0472\ V_{lc}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$I = 0.0944\ \left(\frac{T_{s(avg)}\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (I - B_{ws})}\right)$$

$$C_s = \frac{15.43\ M_p}{V_{m(std)}}$$

$$C_a = \frac{272.3\ M_p\ P_s}{T_{s(avg)}\ (V_{w(std)} + V_{m(std)})}$$

$$(\dot{m}_p)_i = 8.5714\ x\ 10^{-3}\ C_s\ Q_{s,d}$$

$$(\dot{m}_p)_2 = \frac{1.3228 \times 10^{-1} M_p A}{\theta A_n}$$

$$\dot{m}_p = \frac{(\dot{m}_p)_1 + (\dot{m}_p)_2}{2}$$

CALCULATION EQUATIONS

METHOD 10

$$CO\cdot PPM\cdot DRY = CO_{CO_2} - free, dry, avg\ (1 - CO_2, d/100)$$

$$CO\cdot PPM\cdot WET = CO\cdot PPM\cdot DRY\ (1 - MC/100)$$

$$GR/DSCF = 5.0885\ X\ 10^{-4}\ (CO\cdot PPM\cdot DRY)$$

$$mg/dscm = 1.165\ (CO\cdot PPM\cdot DRY)$$

$$\dot{m} = 8.5714\ x\ 10^{-3}\ (GR/DSCF)\ (Q_{s,d})$$

$$E = \frac{2.9857\ x\ 10^{-3}\ F_d\ (GR/DSCF)}{20.9 - O_{2,d}}$$

where:

CO_{CO_2} - *free, dry, avg*

= average of two determinations of carbon monoxide on a dry, CO_2 - free integrated flue gas sample reported in ppm by volume

$CO_{2,d}$ = carbon dioxide concentration of flue gas on a dry percent by volume basis

$O_{2,d}$ = oxygen concentration of flue gas on a dry percent by volume basis

G:\STACK\WP\METHODS\EQ.M10

MC	=	moisture content of flue gas on a percent by volume basis
CO·PPM·DRY	=	carbon monoxide concentration in ppm by volume on a dry basis
CO·PPM·WET	=	carbon monoxide concentration in ppm by volume on a wet or actual basis
GR/DSCF	=	concentration of carbon monoxide in flue gas on a grains per dry standard cubic foot basis (68 °F, 29.92 IN. HG.)
mg/dscm	=	concentration of carbon monoxide in flue gas on a milligrams per dry standard cubic meter basis (60 °F, 29.92 IN. HG.)
$\dot{m}$	=	emissions or mass rate of carbon monoxide on a LB/HR basis
$Q_{s,d}$	=	volumetric flow rate of flue gas in dry standard cubic feet per minute
E	=	emission factor of carbon monoxide in pounds of carbon monoxide emitted per million BTU heat input (LB/MMBTU)
F_d	=	F-Factor of respective fuel in dry standard cubic feet of exhaust gas at 0% oxygen per million BTU of heat input (DSCF/MMBTU)

G:\STACK\WP\METHODS\EQ.M10

APPENDIX L

SAMPLING TRAIN CALIBRATION DATA

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job CP / Tomahawk Date 7-13-95

Operator BB Module No. 8

Instructions:
Operate the control module at a flow rate equal to ΔH@ for 10 minutes before attaching the umbilical.

Record the following data:

Bar press 28.44 in.Hg θ = .9996 ΔH@ 1.84 in.WC.

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(456.06)		
2.5	459.97	94	79
5.0	461.94	95	79
7.5	463.90	96	81
10	465.89	98	81
	V_m = 7.89	Avg(t_m) = 87.875	°F

Calculate Y_{cm} as follows:

$$Y_{cm} = \frac{1.786}{\theta\ V_m}\ \left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cm} = \frac{1.786}{(7.89)\ (.9996)}\ \left[\frac{(87.875) + 460}{28.43}\right]^{0.5}$$

$$Y_{cm} = .9941$$

If Y_{cm} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

Interpoll Laboratories, Inc.
(612) 786-620

Meter Box Calibration and Usage Status

Date of Report: July 14, 1995

Meter Box No. : 8 (Rockwell Dry Test Meter Serial No. 964547)

Date of Last Calibration: May 12, 1995
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
June 13, 1995	5-5703	770.80	915.70	144.90	144.90
June 16, 1995	5-5702	925.90	1059.80	133.90	278.80
June 22, 1995	5-5763	1071.10	1182.14	111.04	389.84
June 27, 1995	5-5898	1242.60	1325.60	83.00	472.84
July 07, 1995	5-5966	1343.20	1455.61	112.41	585.25
July 13, 1995	5-6006	1466.10	1625.45	159.35	744.60

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: July 14, 1995

Meter Box No. : CEM Trailer (Rockwell Dry Test Meter Serial No. 964554)

Date of Last Calibration: October 11, 1994
Calibration Technician: D. Van Hoever
Wet Test Meter No.: American Meter AL-17

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
November 15, 1994	4-4337	736.610	752.485	15.875	15.875
December 06, 1994	4-4477	752.518	760.437	7.919	23.794
January 05, 1994	4-4630	760.315	763.608	3.293	27.087
January 18, 1994	5-4697	763.637	774.970	11.333	38.420
February 07, 1995	5-4810	774.990	782.804	7.814	46.234
July 11, 1995	5-6006	782.860	809.631	26.771	73.005

* Total volume through meter since last calibration.

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Meter Calibration Sheet EPA/Method 5

Date 5-12-95
Bar. Press. 28.88 IN.HG
Wet Test Meter No. AL-20

Control Module No. 8
Serial No. DTM 96547
Technician E Tenwalding

ΔH (IN.WC) Nominal	ΔH (IN.WC) Actual	Gas Volume Wet Test Meter (ft^3)	* Cal. Index ϕ (%)	* Diff. Wet Test Meter ΔP_w (IN.WC.)	Gas Volume Dry Test Meter (ft^3) V_{di}	Gas Volume Dry Test Meter (ft^3) V_{df}	Gas Temperatures Wet Test t_w (°F)	Gas Temperatures Dry Test t_{di} (°F)	Gas Temperatures Dry Test t_{do} (°F)	Time θ (Min/Sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
0.5	.5	2	99.85	0.01	741.200	743.235	68.5	77	70	5/05	.9917	1.86	
1.2	1.2	3	99.91	0.025	938.000	941.014	69	76	69	4/57	.9979	1.82	
2.0	2.0	3	99.93	0.055	743.500	746.537	68.5	83	71	3/47	.9977	1.82	
3.3	3.3	5	100.00	0.09	747.000	752.056	68.0	87	72	4/56	1.0018	1.82	
4.7	4.7	5	100.02	0.12	752.500	757.527	68.0	91	73	4/11	1.0088	1.86	
		2	3	4	5	6	7	8	9	10	11/12 Avg	.9996	1.84	

Positive leak check performed by
Meter was in tolerance
Approved by

Meter was not in tolerance
Meter was not in tolerance
Date 5/24/95

☐: readjusted linkage
☐: changed dry test meter

*Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

031794-G:\STACK\WP\FORMS\S-0102RR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Minimodule Calibration Sheet/Flow Rate Range 0-0.13 CFM/(0-4 LPM)

Date 10/11/94
Bar. Press. 29.24 IN.HG
Wet Test Meter No. AL-17 (.05 CF/FEV)

Meter Box No. TR 1
Serial No. DTM 964554
Technician D. VAN Hoeven

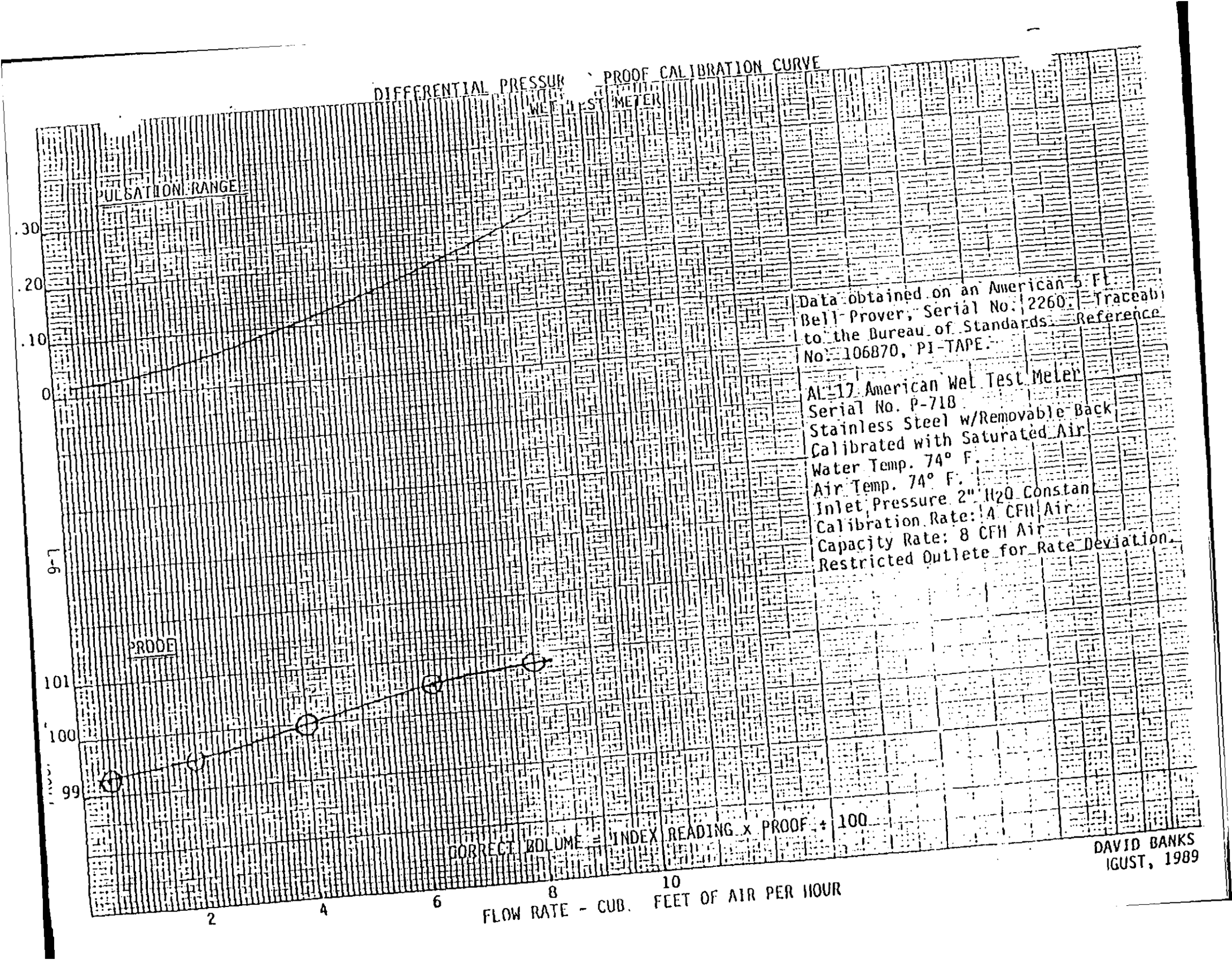
Rota-meter Reading (cc/Min)	ΔP_d (IN.WC)	Gas Volume Wet Test Meter (ft^3)	** Cal Index ϕ (%)	Diff. Wet Test Meter ΔP_w (IN.WC)	Gas Volume Dry Test Meter (ft^3) V_{di}	Gas Volume Dry Test Meter (ft^3) V_{df}	Gas Temperature Wet Test t_w (°F)	Gas Temperature Dry Test t_{di} (°F)	Gas Temperature Dry Test	Time θ (Min/Sec)	Meter Coeff. Y	Rota-meter Coeff. Z
1000	.001	.3	99.55	0.04	5.922	6.223	68	68			.9956	
1000	.001	.2	99.55	0.04	5.721	5.922	68	68			.9940	
1000	.001	.3	99.55	0.04	6.223	6.524	68	68			.9956	
1	2	3	4	5	6	7	8	9		10/11 Avg.	.9950	

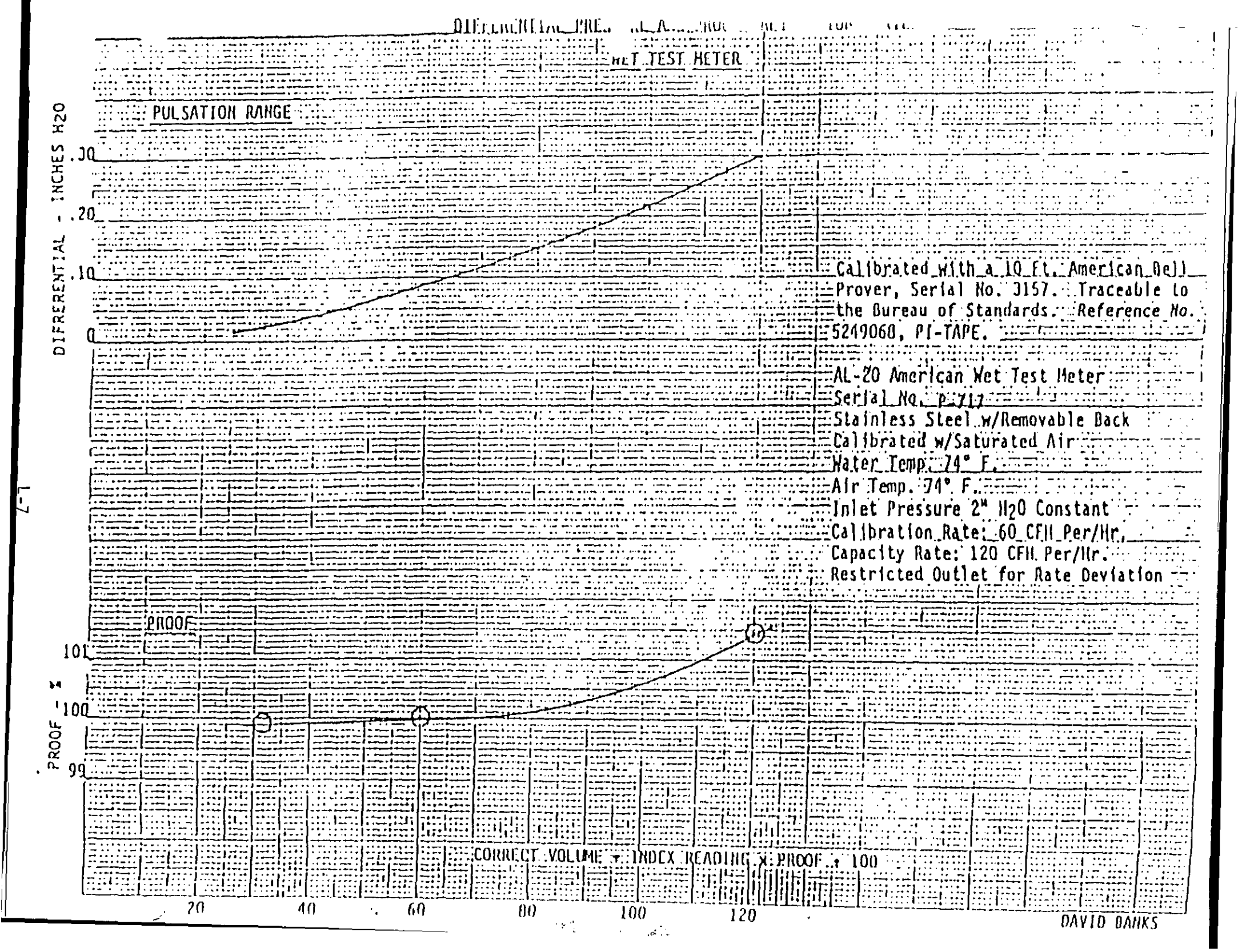
Meter was in tolerance ☒
Meter was not in tolerance ☐: readjusted linkage
Meter was not in tolerance ☐: changed dry test meters
Approved by Daniel K. Day Date 10/12/94

Gas Meter Bimetallic Therm. Calibration/Verification *
☐ ≥ ± 5°F (Out of control)
☒ ≤ ± 5°F (In control) — NA temp Corrected
☐ Recalibrated
☐ No action required

*Verified against mercury in glass thermometer or calibrated platinum resistance thermometer.

*Based on AL-17 wet test meter calibration in Aug. 1989 against Bell Prover (NBS Traceable) - Carl Poe Co.


DIFFERENTIAL PRESSUR
PROOF CALIBRATION CURVE
WET TEST METER
PULSATION RANGE
.30
.20
.10
0
PROOF
101
100
99
Data obtained on an American 5 Ft.
Bell-Prover, Serial No. 2260. Traceab
to the Bureau of Standards. Reference
No. 106870, PI-TAPE.
AL-17 American Wet Test Meter
Serial No. P-718
Stainless Steel w/Removable Back
Calibrated with Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H2O Constan
Calibration Rate: 4 CFH Air
Capacity Rate: 8 CFH Air
Restricted Outlete for Rate Deviation.
CORRECT VOLUME = INDEX READING x PROOF ÷ 100
2
4
6
8
10
FLOW RATE - CUB. FEET OF AIR PER HOUR
DAVID BANKS
IGUST, 1989


DIFFERENTIAL PRE... ...ET TEST METER
PULSATION RANGE
DIFFERENTIAL - INCHES H2O
.30
.20
.10
0
Calibrated with a 10 Ft. American Bell Prover, Serial No. 3157. Traceable to the Bureau of Standards. Reference No. 5249060, PI-TAPE.
AL-20 American Wet Test Meter
Serial No. P 717
Stainless Steel w/Removable Back
Calibrated w/Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H2O Constant
Calibration Rate: 60 CFH Per/Hr.
Capacity Rate: 120 CFH Per/Hr.
Restricted Outlet for Rate Deviation
PROOF
101
100
99
PROOF - %
CORRECT VOLUME = INDEX READING X PROOF ÷ 100
20
40
60
80
100
120
DAVID BANKS

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-13-95 Nozzle Number 5-3

Technician: Bob Aschenbach

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.185
2	.185
3	.185
Average:	.185

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Temperature Measurement Device Calibration Sheet

Unit Under Test:

Vendor	Omega		
Model	HH61	Serial Number	74JX0223
Range	0 - 2500 °F	Thermocouple Type	K
Date of Calibration	3-31-95	Technician	BOB A
Method of Calibration:		PDT No.	33

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100°F) ± 1 degree (for negative temperatures add ± 2 degrees). *The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.*

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-2.3	-2.3	-.5
100	100	97.1	2.9	.51
200	200	199.1	.9	.13
300	300	297.3	2.7	.35
400	400	397	3	.34
500	500	497	3	.31
600	600	599	1	.09
700	700	698	2	.17
800	800	800	0	0
900	900	899	1	.07
1000	1000	999	1	.06
1100	1100	1098	2	.12
1200	1200	1199	1	.06
1300	1300	1298	2	.11
1400	1400	1400	0	0
1500	1500	1499	1	.05
1600	1600	1601	1	.04
1700	1700	1699	1	.04
1800	1800	1802	2	.08
1900	1900	1899	1	.04
2000	2000	2000	0	0
2100	2100	2097	3	.11
		Averages:	1.28	.099

OF = off scale response by unit under test (°F)

% dev = 100 Δt/(460 + t)

☒ Unit in tolerance

☐ Unit was not in tolerance: recalibrated - See new calibration sheet.

011995-G:\STACK\WP\FORMS\S-433

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No 27-4

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .02
9. W <.0625" .01

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = _____

Date of Inspection: 4-7-94

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 27-6

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .01
9. W <.0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = _____

Date of Inspection: 4-7-94

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 27-8

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" 0
9. W <.0625" .01

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = _____

Date of Inspection: 1-7-94

Inspected by: E Crowley

CFR Title 40 Part 60 Appenidix A Method 2

S-348

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 3-31-95
Technician Bob A
Mercury Column Barometer No. No 1 Lab
Aneroid Barometer No. 13723029

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P_{ba} - P_{bm})
29.33	77	.127	29.213	29.22	.01

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. _____

Has problem been alleviated? Yes/No. How? _____

Note: Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20 - 30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.