9.5.3 Meat Rendering Plants

Total Hydrocarbon emissions of the blood drier stack

TRC Environmental Corporation for IBP, Inc. (Storm Lake, IA)

August 1996

1996 (post section publication) source test data.

April 1, 1998

Mr. Mark Stone
Air Quality Bureau
Iowa Department of Natural Resources
7900 Hickman Road
Urbandale, IA 50322

RE: IBP, inc. - Storm Lake, Iowa
VOC Test Report

Dear Mr. Stone:

This letter replaces my original letter dated February 13, 1998, for the VOC test report for the above referenced facility. Please find enclosed a copy of that report. The testing was conducted on September 11, 1997, by TRC Environmental Corporation. Volatile organic carbon testing was completed per the Iowa Compliance Sampling Manual and witnessed by yourself. As shown in the detailed testing report on page 3, the average VOC (Total Hydrocarbons as Methane) emission rate from the natural gas fired blood system was 0.081 lbs/hr as methane.

If you have any questions concerning the testing results or procedures used, please contact me at 402-241-3647 or you may contact Mr. Scott Miller, TRC Project Manager, at 630-810-1122.

Sincerely,

Rechelle Kruse
Air Pollution Control Engineer

Enclosure

c: Bob O'Brien (without test report)
Paul Dean (with test report)
Dallas Safriet (with test report)

RK98-468/SL-Stack Test

TRC Environmental Corporation

98207-E04-04

FINAL REPORT

TOTAL HYDROCARBON EMISSIONS OF THE BLOOD DRIER STACK

Prepared for

IBP, Inc.
Storm Lake, Iowa

Prepared by

TRC ENVIRONMENTAL CORPORATION
1307 Butterfield Road, Suite 420
Downers Grove, IL 60515
TELEPHONE (630) 810-1122
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TRC Project No. 22214-0000-00007

[redacted]

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LIST OF ACRONYMS AND ABBREVIATIONS

acfm	actual cubic feet per minute
afmp	actual feet per minute
CEM	continuous emission monitor
CEMS	continuous emission monitoring system
cf	cubic feet
CO_2	carbon dioxide
dscf	dry standard cubic feet
EPA	Environmental Protection Agency
• F	degrees Fahrenheit
ft	feet
in H_2O	inches of water
in Hg	inches of mercury
lb/hr	pounds per hour
O_2	oxygen
ppm (v)	parts per million volume
QA/QC	Quality Assurance/Quality Control
scfm	standard cubic feet per minute
THC	total hydrocarbons
TRC	TRC Environmental Corporation
VOC	volatile organic compound

PROGRAM SUMMARY

The IBP, Inc. facility located in Storm Lake, Iowa has a Blood Drier in their rendering operations. TRC Environmental Corporation (TRC) was contracted by IBP, Inc. to conduct VOC emissions emission rates testing on the Blood Drier. Testing was performed only after the Iowa Environmental Protection Agency (IEPA) reviewed and approved the test protocol. The major objectives of the test program were to collect representative flue gas samples and determine the emission rates of volatile organic compounds (VOC's) at the Blood Drier.

TRC accomplished this objective through the use of acceptable protocols performed by trained and experienced staff. IBP, Inc. personnel were responsible for maintaining the proper operations during the emission test series. The emission test program was conducted on September 11, 1997. The emission tests included sampling for total non-methane hydrocarbons (THC), volumetric flow rate, and moisture content of the Blood Drier flue gas following USEPA Methods 1 (sampling location selection), 2 (flow rate), 3 (CO_2 and O_2 for Molecular Weight), 4 (moisture), and 25A (Total Hydrocarbons and Methane).

SECTION I

INTRODUCTION

1.1 Project Scope

The IBP, Inc. facility operates a natural gas Blood Drier at its Storm Lake, Iowa facility. The gas stream enters the Blood Drier, gets scrubbed with water, and then exits to the atmosphere.

TRC was contracted by IBP, Inc. to conduct total non-methane hydrocarbon emission testing. The major objective of the test program was to collect representative flue gas samples and determine emission rates of VOC's for the Blood Drier. Three 1-hour tests were conducted on the exhaust gas before the scrubber. Flow rates, CO_2 and O_2 for molecular weight, and moisture was performed simultaneously with the THC testing.

1.2 Sampling Locations

Sampling for THC was conducted on the Blood Drier. The inside stack dimensions were measured to be 19.5"; therefore, the stack area equals 452.2 square inches. Stack gas velocity, moisture, and volumetric flow rates were measured simultaneously with the THC sampling. The required number of sample points and the sample point locations for the velocity traverse were calculated according to 40 CFR Part 60, Appendix A, Method 1.

SECTION 2

SUMMARY OF RESULTS

On September 11, 1997, testing was conducted to determine emission rates of the Blood Drier at the IBP, Inc. plant in Storm Lake, Iowa. All testing was completed without incident in strict accordance with the approved source test protocol. Tests were witnessed by a representative of the Iowa EPA Air Pollution Control Division.

Table 2-1 summarizes the data collected on September 11, 1997 at the IBP, Inc. plant located in Storm Lake, Iowa.

Raw field data sheets are located in Appendix A, this includes CEM's data sheets, CEM's one minute averages, strip chart trending data, volumetric flow rate data sheets, and moisture data sheets.

Process data recorded by IBP, Inc. is located in Appendix B.

Equipment calibration data sheets are located in Appendix C.

Example calculations can be found in Appendix D.

All test procedures were conducted as stated in Section 3. No anomalous data is reported.

Table 2-1 Summary of Emission Test Data for the Emission rates of the Blood Drier

Blood Drier EMISSION RATE RESULTS			
	TEST #1	TEST #2	TEST #3
Total Hydrocarbons Lbs/Hr as Methane	.067	.093	.082

AVG = .081 lbs/hr as methane

SECTION 3

FIELD SAMPLING PROCEDURES

3.1 Field Sampling Summary

After consideration of the program requirements, TRC provided a team of two experienced professionals to conduct the field effort. The personnel and their responsibilities during this test program were as follows:

David A. Wells - Team Leader and Continuous Emission Monitoring (CEM) Operator
Thomas Lundin - Moistures and Volumetric Flow Rate Measurements

3.1.1 Pre-Sampling Preparation

Equipment was inspected for proper operation and durability prior to calibration. All calibrations were performed prior to and at the conclusion of the emissions test program as shown below:

- Pitot tubes (QA Handbook Section 3.12, pp. 1-13 and USEPA Reference Method 2) - measured for appropriate spacing and dimensions or calibrated in a wind tunnel. Rejection criteria given on the calibration sheet. Post-test check to inspect for damage.

- Thermocouples (QA Handbook Section 3.4,2,pp. 15-18) - verified against a mercury-in-glass thermometer at three points including the anticipated measurement range. Acceptance limits - impinger ±2• F; DGM ±5.4• F; stack ±1.5 percent of stack temperature.

- Field barometer (QA Handbook Section 3.4.2, pp. 18-19) - compared against a mercury-in-glass barometer or use the airport station's barometric pressure and correct for elevation. Acceptance criteria - ± 0.02 in. Hg; post-test check - same.

- Dry gas meters (QA Handbook Section 3.4.2, pp. 1-12 and USEPA Method 5 Section 5.3) - calibrated against a wet test meter. Acceptance criteria - pretest $Y_i = Y \pm 0.2$; post test $Y = \pm 0.05\ Y_i$.

3.2 Sampling Methods

3.2.1 Flow Rate Measurements

Velocity measurements at the sampling locations were made following EPA Reference Methods 1 and 2 simultaneously with the total hydrocarbon sampling. A Type-S pitot tube with an attached water manometer was used to measure the exhaust velocities at the sampling ports. An attached Type-K thermocouple with remote digimite was used to determine gas temperature.

3.2.2 CO_2 and O_2 Measurement

Tedlar Bag$_{@}$ flue gas samples were taken concurrently with the VOC sampling. A Fyrite analyzer was used to determine percent by volume of O_2 and CO_2.

3.2.3 Moisture Measurement

Moisture was measured simultaneously on the exhaust using the impinger train technique stated in USEPA Method 4 for each test run. After completion of each test run the volumes of the first, second, and third impingers were measured and recorded. The silica gel from the last impinger was returned to its original container and weighed to obtain a final weight.

3.2.4 Total Hydrocarbons

TRC conducted total hydrocarbons (THC) monitoring at the Blood Drier following (USEPA RM25A). TRC followed procedures outlined in the EPA publication 340/1-83-016 regarding setup and operation of its THC analyzer.

The THC analyzer system consists of three subsystems: sample acquisition, sample analysis, and a data acquisition system. The sample acquisition sample line is designed to deliver a representative sample of the stack gas stream to the sample analysis subsystem. A heat traced sample line was used to eliminate in-line condensation prior to the THC analyzer.

Sample analysis was achieved using a JUM VE-7 total hydrocarbon analyzer. Accurate interpretation of each analyzers response requires the systematic calibration of the instrument against gases of known concentrations. A calibration equation is determined from a linear regression of known gas concentrations versus instrument response. The equation used to convert instrument signal to concentration units follows:

$$Concentration = m\ (response) + b$$

where: m = slope of calibration curve
response = instrument signal (volts)
b = y-intercept of calibration curve

The data acquisition subsystem consists of an ESC 8800 Datalogger and an Esterline Angus strip chart recorder. The average total hydrocarbon concentration for each test run was calculated from average measurements recorded at one-minute intervals over the entire duration of each test run. Once the THC system was set up it was connected to a power source and brought on line. Sample line and signal wires were run between the sampling and THC system location, and the sample probe was selected and placed in the stack facing away from the gas stream.

The initial phase of the instrumental analysis method required the calibration of the THC analyzer system. Prior to the start of the first test run, system calibration using zero and an upscale propane in nitrogen gas was performed. Following these initial system checks, further calibrations were performed at the end of each test run using a zero and an upscale propane in nitrogen gas.

3.2.5 Methane

TRC conducted total hydrocarbons (THC) monitoring at the Blood Drier following (USEPA RM25A). TRC followed procedures outlined in the EPA publication 340/1-83-016 regarding setup and operation of its Methane analyzer.

The methane analyzer system consists of three subsystems: sample acquisition, sample analysis, and a data acquisition system. The sample acquisition sample line is designed to deliver a representative sample of the stack gas stream to the sample analysis subsystem. A heat traced sample line was used to eliminate in-line condensation prior to the methane analyzer.

Sample analysis was achieved using a California Analytical 300M-HFID methane analyzer. Accurate interpretation of each analyzers response requires the systematic calibration of the instrument against gases of known concentrations. A calibration equation is determined from a linear regression of known gas concentrations versus instrument

The data acquisition subsystem consists of an ESC 8800 Datalogger and an Esterline Angus strip chart recorder. The average methane concentration for each test run was calculated from average measurements recorded at one-minute intervals over the entire duration of each test run. Once the methane system was set up it was connected to a power source and brought on line. Sample line and signal wires were run between the sampling and methane system location, and the sample probe was selected and placed in the stack facing away from the gas stream.

The initial phase of the instrumental analysis method required the calibration of the methane analyzer system. Prior to the start of the first test run, system calibration using zero, high, mid, and low range methane gasses was performed. Following these initial system checks, further calibrations were performed at the end of each test run using a zero and high range methane in air gas.

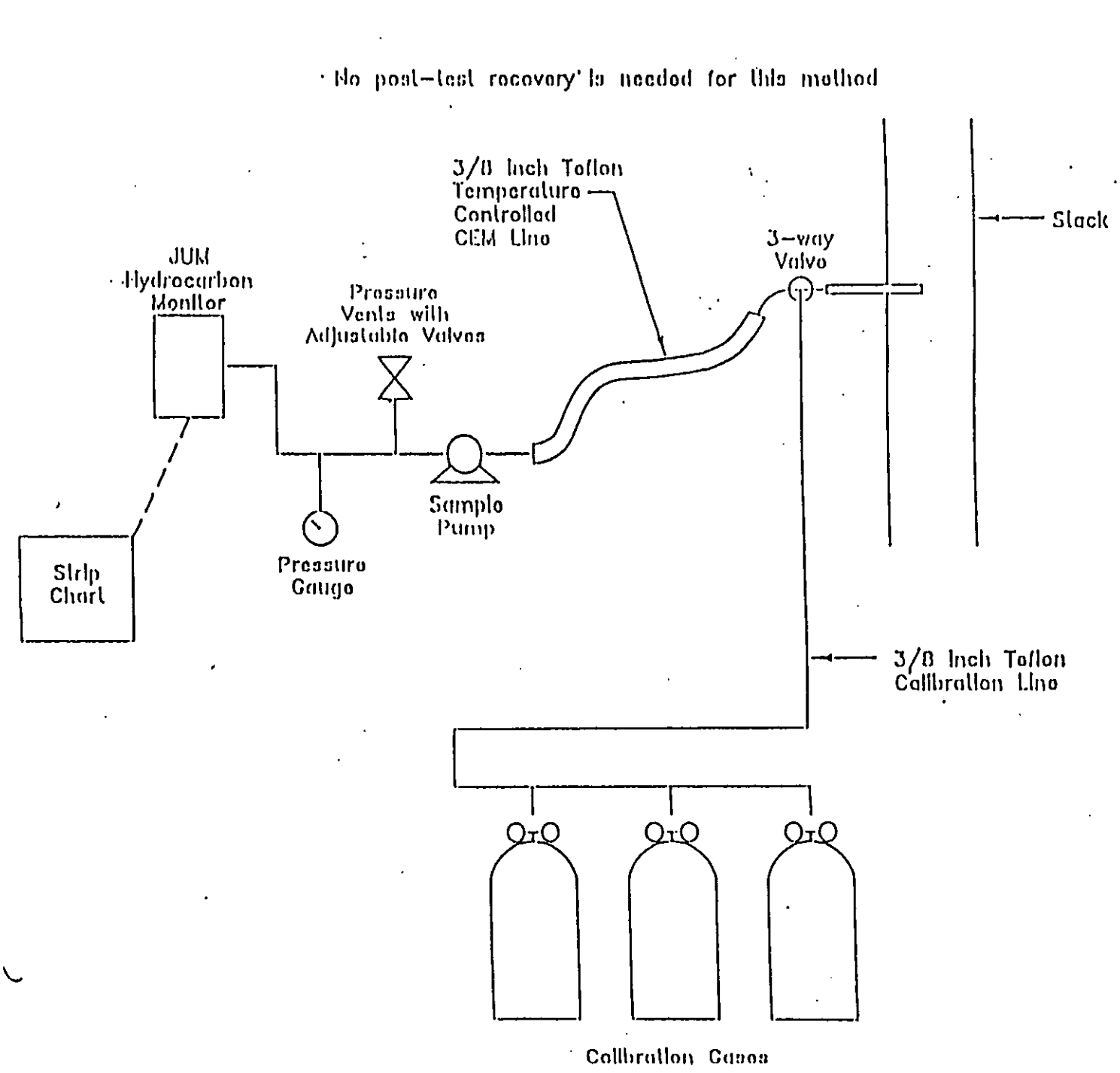


Figure 3-1 Method 25A Sampling Train

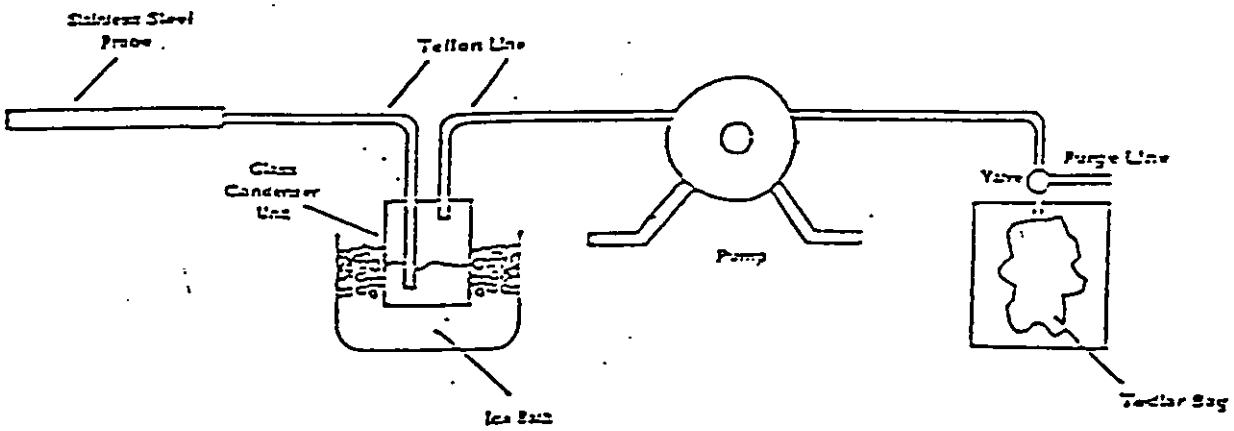


Figure 3-2 Method 2 and 4 Sampling

SECTION 4
DATA REPORTING

4.1 Data Reporting

A flow chart depicting the measurement data reporting scheme is shown in Figure 4-1. Figure 4-2 presents the analytical data validation and reporting scheme routinely used at TRC.

All data was reported in standard units depending on the measurement and the ultimate use of the data. The bulk of the data was computer processed and reported as follows:

- Gas Properties:
  a. Moisture %
  b. Flow rate, dscfm and acfm
  c. Pressure, in. Hg
  d. Temperature, • F

- ppmv Total non-methane Hydrocarbons:
- lbs/hr as Methane.

Results of the testing conducted at the IBP plant on the Blood Drier are contained in Table 4-1.

Table 4-1. Test Results - Blood Drier

IBP Storm Lake, IA	Blood Drier			
Run No.	1	2	3	
Date	Sept 11, 1997	Sept 11, 1997	Sept 11, 1997	
Start Time	10:05	11:38	12:58	
Stop Time	11:05	12:38	13:58	AVERAGES
Barometric Pressure, in. Hg	29.05	29.05	29.05	29.05
Net Sampling Time, minutes	30.0	30.0	30.0	30.0
Volume Metered, cf	23.330	24.61	24.54	24.160
Avg. DGM Temp, F	68.3	84.30	95.80	82.8
AVG Delta H, in of H2O	2.00	2.00	2.00	2.00
AVG Delta H, in of Hg	0.1471	0.1471	0.1471	0.1471
DGM Calibration Factor	1.002	1.002	1.002	1.002
Volume of Gas Collected, dscf	22.792	23.335	22.788	22.972
Total Water Collected, mL	140.5	135.0	135.5	137.0
Volume of Water Vapor, scf	6.625	6.365	6.389	6.460
Moisture, %	22.5	21.4	21.9	21.9
Dry Mole Fraction, 100-%M	0.7748	0.7857	0.7810	0.7805
CO2 at Stack, % dry	2.0	2.0	2.0	2.0
O2 at Stack, % dry	19.5	19.5	19.5	19.5
CO + N2, % dry	78.5	78.5	78.5	78.5
Dry Molecular Weight, lb/lb mole	29.10	29.10	29.10	29.10
Wet Molecular Weight, lb/lb mole	26.60	26.72	26.67	26.66
Stack Diameter, in	24	24	24	
Stack Area, sq. in. (@ pitot meas. location)	452.2	452.2	452.2	452.2
Static Pressure, in. of H2O	1.90	2.00	2.00	1.97
Stack Pressure, in. of Hg	29.19	29.20	29.20	29.19
Avg. Stack Temp., F	191.8	190.9	191.4	191.4
Avg. Sqroot of Delta P	0.4078	0.4126	0.4279	0.4161
SDE Average	10.411	10.527	10.921	10.620
Pitot Coefficient	0.84	0.84	0.84	0.84
Stack Gas Velocity, afpm	1610.1	1624.0	1686.5	1640.2
Stack Flowrate, wet acfm	5,056	5,099	5,296	5,150
Stack Flowrate, dry scfm	3,096	3,171	3,272	3,180
Stack Flowrate, dry scf/hr	185,739	190,288	196,290	
Stack Flowrate, wet scf/hr	2.3972E+05	2.4219E+05	2.5132E+05	
Total Hydrocarbons ppmv as CH4	8.68	11.80	10.11	10.20
Total Hydrocarbons Lb/Hr as CH4	0.067	0.093	0.082	0.081

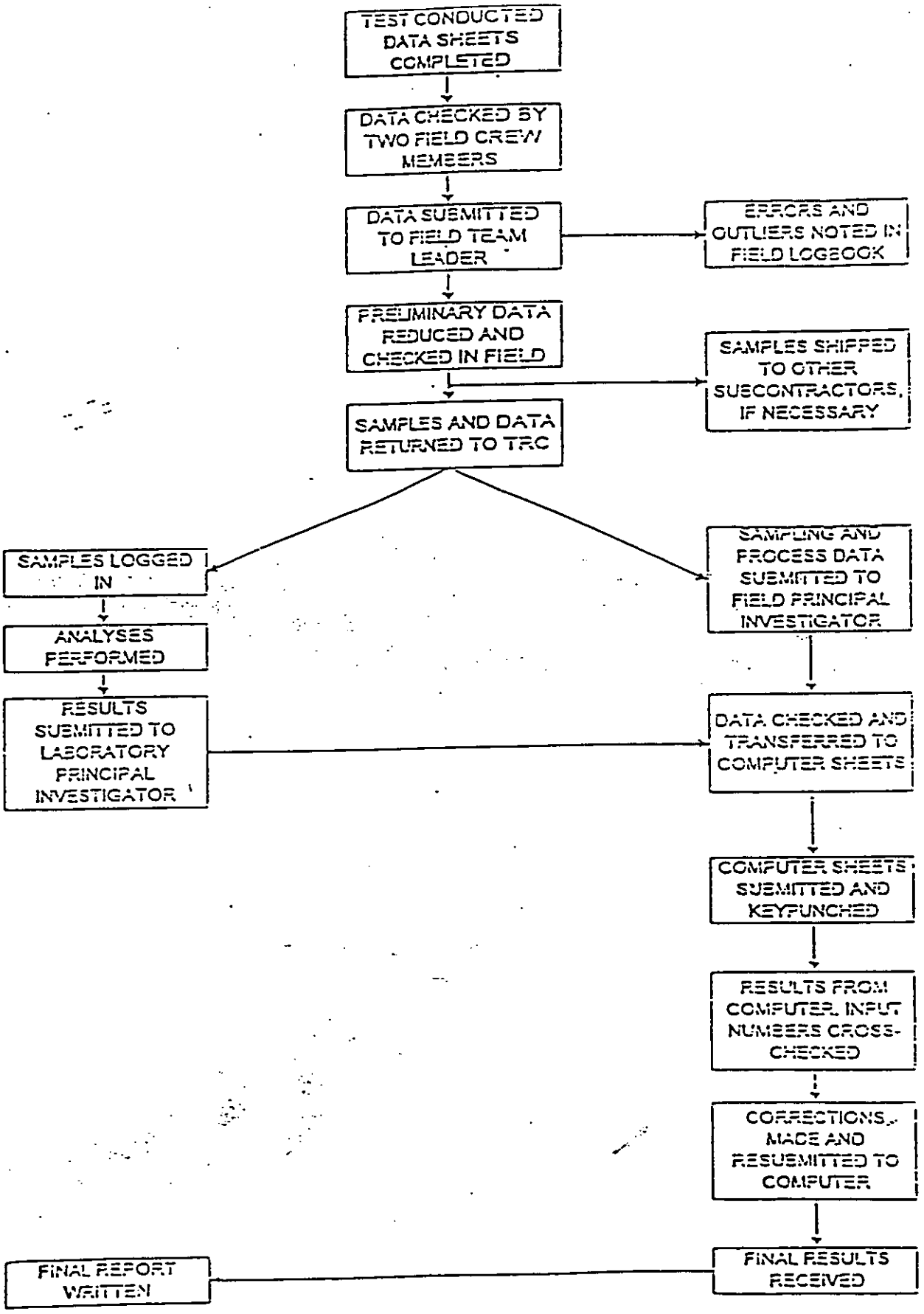


Figure 4-1. Measurement Data Flow Scheme

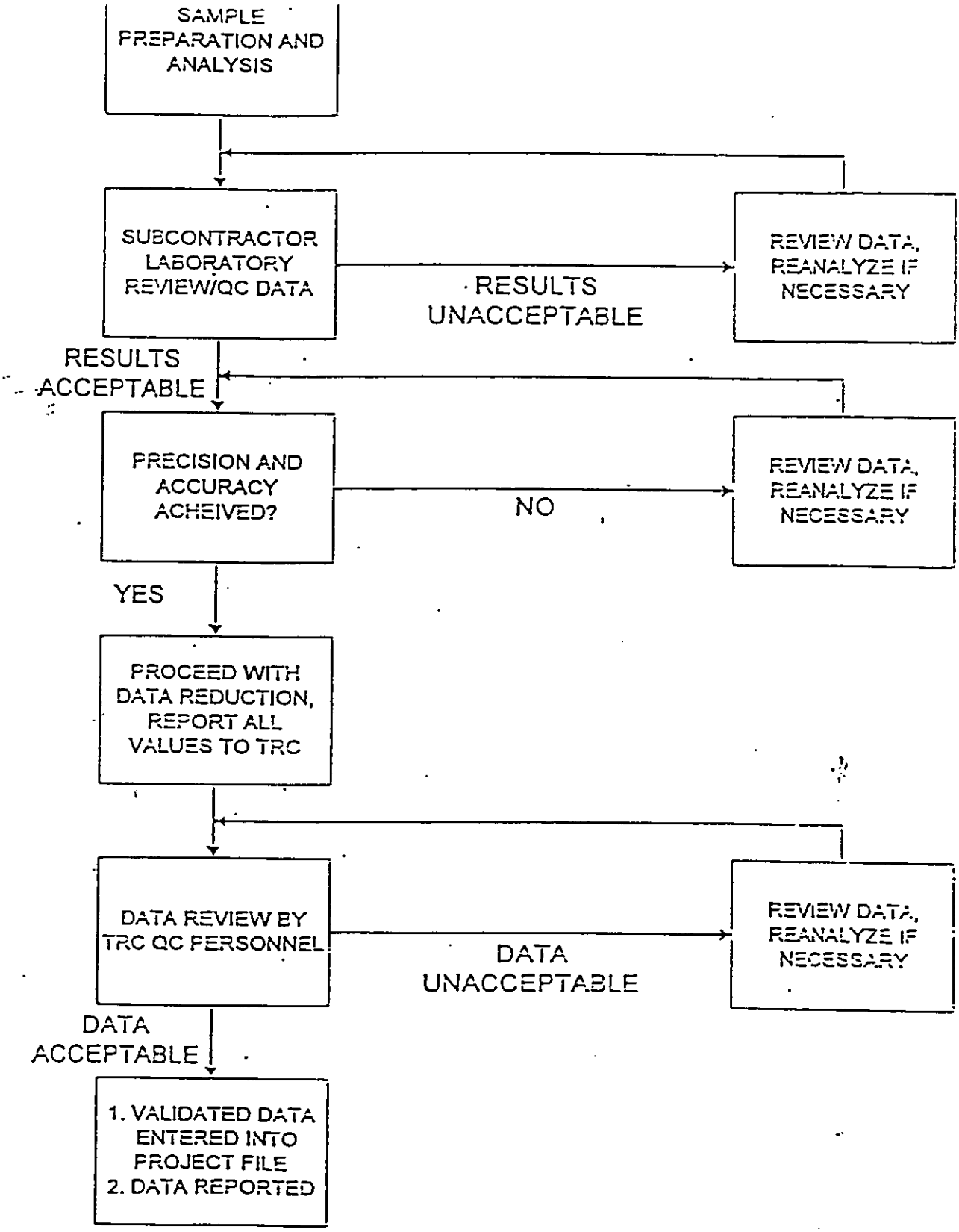


Figure 4-2. Analytical Data Report Scheme

APPENDIX A

RAW FIELD DATA SHEETS AND DATA LOGGER PRINTOUTS

Traverse Point Location for Circular and Rectangular Ducts

Project No.: 22214-07

Client: ZBB

Date: 9-11-97

Sampling Location: Blood Dryer Outlet

Internal Stack Diameter: 19.5

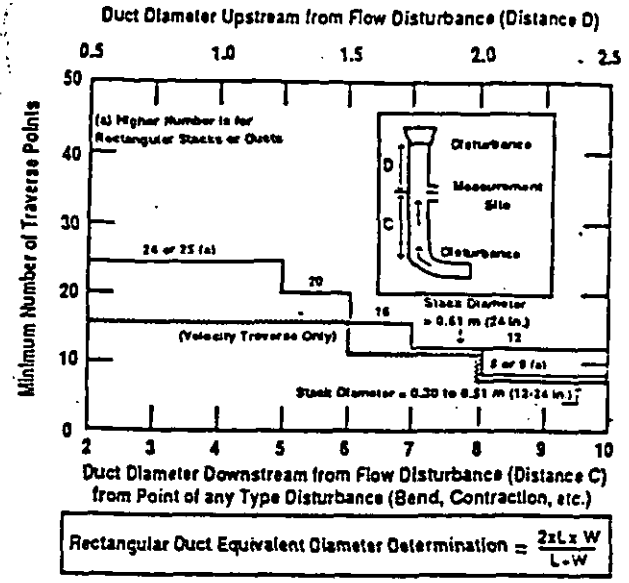
Nipple Length: 3"

Total Stack Diameter: 22.5

Nearest Upstream Disturbance (C): 54" (2.4)

Nearest Downstream Disturbance (D): 18" (.8)

Calculator: J. Lucas



Rectangular Duct Equivalent Diameter Determination = $\frac{2 \times L \times W}{L + W}$

Traverse Point Number	1 Fraction of Stack ID (1/100)	2 Stack ID	3 Traverse Point (1 x 2=Point)	4 Nipple Length	5 Traverse Point Inside of Far Wall to Outside of Port Nipple (3 + 4 = Point)
1	.021	19.5		3"	3.4
2	.067			↓	4.3
3	.118				5.3
4	.177				6.45
5	.250				7.88
6	.356				9.9
7	.644				15.6
8	.750				17.6
9	.823				19.0
10	.882				20.2
11	.933				21.2
12	.979				22.1
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

Location of Traverse Points in Circular Stacks

	4	6	8	10	12	14	16	18	20	22	24
1	5.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.3	94.5
23											96.8
24											98.9

Location of Traverse Points in Rectangular Stacks

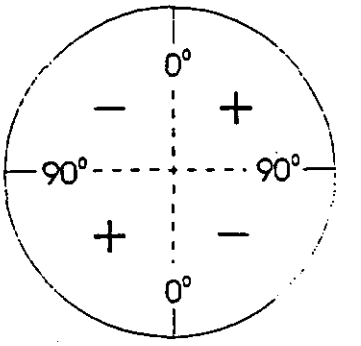
	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

TRC

FORM 75-4

CYCLONIC FLOW CHECK

DATE 9/11/97
PLANT NAME IBP STORM LAKE
UNIT NUMBER Blood Sys Before Scrubber
CALCULATOR DW
CHECKED BY _____ DATE _____



PITOT ANGLE

POINT NUMBER	ANGLE OF PITOT AT NULL READING (DEGREES)	ROTATION TO ANGLE FOR POINT FLOW MEASURMENT (DEGREES)	ΔP AT FLOW ANGLE	TEMP AT POINT
1	15	CC (+)		
2	20	" +		
3	16	" +		
4	18	" +		
5	18	" +		
6	15	" +		
7	17	" +		
8	18	+		
9	18	+		
10	20	+		
11	17	+		
12	18	+		
1	17	+		
2	18	+		
3	18	+		
4	17	+		
5	15	+		
6	15	+		
7	16	+		
8	17	+		
9	18	+		
10	18	+		
11	20	+		
12	19	+		
AVERAGE				

IBP Storm Lake, IA Blood Drier

Run No.	1	2	3	
Date	Sept 11, 1997	Sept 11, 1997	Sept 11, 1997	
Start Time	10:05	11:38	12:58	
Stop Time	11:05	12:38	13:58	AVERAGES
Barometric Pressure, in. Hg	29.05	29.05	29.05	29.05
Net Sampling Time, minutes	30.0	30.0	30.0	30.0
Volume Metered, cf	23.330	24.61	24.54	24.160
Avg. DGM Temp, F	68.3	84.30	95.80	82.8
AVG Delta H, in of H2O	2.00	2.00	2.00	2.00
AVG Delta H, in of Hg	0.1471	0.1471	0.1471	0.1471
DGM Calibration Factor	1.002	1.002	1.002	1.002
Volume of Gas Collected, dscf	22.792	23.335	22.788	22.972
Total Water Collected, mL	140.5	135.0	135.5	137.0
Volume of Water Vapor, scf	6.625	6.365	6.389	6.460
Moisture, %	22.5	21.4	21.9	21.9
Dry Mole Fraction, 100-%M	0.7748	0.7857	0.7810	0.7805
CO2 at Stack, % dry	2.0	2.0	2.0	2.0
O2 at Stack, % dry	19.5	19.5	19.5	19.5
CO + N2, % dry	78.5	78.5	78.5	78.5
Dry Molecular Weight, lb/lb mole	29.10	29.10	29.10	29.10
Wet Molecular Weight, lb/lb mole	26.60	26.72	26.67	26.66
Stack Diameter, in	24	24	24	
Stack Area, sq. in. (@ pitot meas. location)	452.2	452.2	452.2	452.2
Static Pressure, in. of H2O	1.90	2.00	2.00	1.97
Stack Pressure, in. of Hg	29.19	29.20	29.20	29.19
Avg. Stack Temp., F	191.8	190.9	191.4	191.4
Avg. Sqroot of Delta P	0.4078	0.4126	0.4279	0.4161
SDE Average	10.411	10.527	10.921	10.620
Pitot Coefficient	0.84	0.84	0.84	0.84
Stack Gas Velocity, afpm	1610.1	1624.0	1686.5	1640.2
Stack Flowrate, wet acfm	5,056	5,099	5,296	5,150
Stack Flowrate, dry scfm	3,096	3,171	3,272	3,180
Stack Flowrate, dry scf/hr	185,739	190,288	196,290	
Stack Flowrate, wet scf/hr	2.3972E+05	2.4219E+05	2.5132E+05	
Total Hydrocarbons ppmv as CH4	8.68	11.80	10.11	10.20
Total Hydrocarbons Lb/Hr as CH4	0.067	0.093	0.082	0.081

Run 1

DATE:	**Sept 11, 1997**	**CLIENT REP:**	**Rechelle Kruse**
PLANT:	**IBP**	**WITNESSED?:**	**yes**
VOC TYPE	***CH4***	***BURNER TYPE:***	***N/A***
OPERATOR:	**SM, DW**	**GENERATOR TYPE:**	**N/A**
TEST LOCATION:	**Blood Drier**	**O2 GENERATOR TYPE:**	**N/A**

CALIBRATION GASES

O2	CO2	CH4	S02	NOx	THC outlet
0	0	0	0	0	0
N/A	N/A	29.12	N/A		30
N/A	N/A	47.83	N/A		59.67
		83.35			77.7

END TIME	SAMPLE POINT	O2 %	CO2 %	SO2 ppm	THC Outlet ppm	CH4 ppm	NOx ppm	COMMENTS a
10:05	1	19.5	2		15.329	6.069		
11:05								
	AVERAGES	19.5	2	ERR	15.33	6.069	ERR	

Barometric Pres: 29.05

EFFLUENT GAS CONCENTRATION, WET BASIS, PPM

	O2	CO2	SO2	THC Outlet	CH4	NOx
PRE ZERO	0		0	0.05	0.05	0
POST ZERO	0		0	0.8	0.08	0
ACT SPAN	N/A	N/A	N/A	30	29.12	N/A
PRE SPAN	0		0	30.5	29	0
POST SPAN	0		0	31	28.8	0
GAS CONC.	ERR	ERR	ERR	14.74	6.06	ERR

EFFLUENT GAS CONC CALCULATION

GAS CONC. = (Avg Stk Conc - Avg Zero Cal) * (Span Conc/(Avg Span Cal - Avg Zero Cal))

IBP STORM LAKE
9/11/97
VOC's + CH4
0-100 SCALE

```
CN#R1>
01   4.520    4.599
02   15.62    15.70
03   .3023    .3114
04   .0000D   .0000D
05    0000D   .0000D
06    0028D  -.0028D
07  -.0055D  -.0004D

 Thr - 09/11/97  DAY= 254 10:04:02

01   4.496    4.520
02   15.57    15.62
03   .3168    .3023
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0014D  -.0028D
07  -.0017D  -.0055D

Thr - 09/11/97  DAY= 254 10:05:02

01   4.730    4.496
02   15.86    15.57
03   .3020    .3168
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0014D  -.0014D
07  -.0031D  -.0017D

Thr - 09/11/97  DAY= 254 10:06:03

01   4.449    4.730
02   15.77    15.86
03    3059    .3020
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0014D  -.0014D
07  -.0014D  -.0031D

Thr - 09/11/97  DAY= 254 10:07:02

01   4.494    4.449
02   15.65    15.77
03   .2972    .3059
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0017D  -.0014D
07  -.0024D  -.0014D

 Thr - 09/11/97  DAY= 254 10:08:02

01   5.127    4.494
02   15.27    15.65
03   .3097    .2972
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0038D  -.0017D
07  -.0021D  -.0024D

Thr - 09/11/97  DAY= 254 10:09:02

01   .174     5.127
02   15.64    15.27
03   .2901    .3097
04   .0000D   .0000D
05   .0000D   .0000D
```

23.976
93.76

```
01   4.914 -  5.174
02   15.59 /  15.64
03   .3179    .2901
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0014D  -.0017D
07   0024D   -.0021D

Thr - 09/11/97  DAY= 254 10:11:02

01   4.818 -  4.914
02   15.38 /  15.59
03   .3077    .3179
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0017D  -.0014D
07  -.0038D  -.0024D

Thr - 09/11/97  DAY= 254 10:12:02

01   5.032 -  4.818
02   15.34 /  15.38
03   .3067    .3077
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0017D  -.0017D
07  -.0028D  -.0038D

Thr - 09/11/97  DAY= 254 10:13:02

01   5.261 -  5.032
02   15.23 /  15.34
03   .3108    .3067
04   0000D    .0000D
05   0000D    .0000D
06  -.0028D  -.0017D
07  -.0028D  -.0028D

Thr - 09/11/97  DAY= 254 10:14:02

01   5.510 -  5.261
02   15.11    15.23
03   .2942    .3108
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0028D  -.0028D
07  -.0014D  -.0028D

Thr - 09/11/97  DAY= 254 10:15:03

01   5.156 -  5.510
02   15.00 -  15.11
03   .3104    .2942
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0024D  -.0028D
07  -.0041D  -.0014D

Thr - 09/11/97  DAY= 254 10:16:03

01   4.962 -  5.156      64,803 - 5.174 = 59.629
02   .36 -    15.00      215.41
03   .3186    .3104
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0011D  -.0024D
07  -.0014D  -.0041D
```

```
02  14.22    14.36
03  .3219    .3186
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0007D  -.0011D
07 -.0004D  -.0014D

T'   - 09/11/97  DAY= 254 10:18:02

01  5.316⁻   5.055⁻
02  13.73⁻   14.22⁻
03  .2871    .3219
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0007D  -.0007D
07 -.0007D  -.0004D

Thr - 09/11/97  DAY= 254 10:19:02

01  5.193⁻   5.316
02  13.80⁻   13.73
03  .3080    .2871
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0038D  -.0007D
07 -.0028D  -.0007D

Thr - 09/11/97  DAY= 254 10:20:02

01  5.529⁻   5.193
02  14.01⁻   13.80
03  .3009    .3080
04  .0000D   .0000D
05  .0000D   .0000D
06  .0021D  -.0038D
07  .0031D  -.0028D

Thr - 09/11/97  DAY= 254 10:21:02

01  5.373⁻   5.529
02  13.88⁻   14.01
03  .2952    .3009
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0004D  -.0021D
07 -.0024D  -.0031D

Thr - 09/11/97  DAY= 254 10:22:02

01  5.192⁻   5.373
02  13.90⁻   13.88
03  .2976    .2952
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0021D  -.0004D
07 -.0028D  -.0024D

Thr - 09/11/97  DAY= 254 10:23:02

01  5.318⁻   5.192    ~~101.799~~ 96.605
02  14.07⁻   13.90    313.02
03  .3124    .2976
04  .0000D   .0000D
05  .0000D   .0000D
06  .0004D  -.0021D
07 -.0031D  -.0028D

Thr - 09/11/97  DAY= 254 10:24:02
```

```
01   5.316   5.318
02   14.34   14.07
03   .2978    .3124
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0017D   .0004D
07   0017D   -.0031D

Thr - 09/11/97  DAY= 254 10:25:03

01   4.974   5.316
02   14.13   14.34
03   .3021    .2978
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0011D  -.0017D
07  -.0007D  -.0017D

Thr - 09/11/97  DAY= 254 10:26:02

01   5.147   4.974
02   14.88   14.13
03   .3125    .3021
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0014D  -.0011D
07  -.0027D  -.0007D

Thr - 09/11/97  DAY= 254 10:27:03

01   5.590   5.147
02   15.68   14.88
03   .3043    .3125
04    0000D   .0000D
05    )000D   .0000D
06  -.0017D  -.0014D
07  -.0024D  -.0027D

Thr - 09/11/97  DAY= 254 10:28:03

01   6.355   5.590
02   16.72   15.68
03   .3111    .3043
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0014D  -.0017D
07  -.0017D  -.0024D

Thr - 09/11/97  DAY= 254 10:29:02

01   6.274   6.355
02   17.04   16.72
03   .3236    .3111
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0028D  -.0014D
07  -.0021D  -.0017D

Thr - 09/11/97  DAY= 254 10:30:02

01   8.551   6.274
02   .00     17.04
03   .3374    .3236
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0000D  -.0028D
07  -.0018D  -.0021D
```

136-812
422.81

01 5.987 6.958
02 16.51 16.71
03 .3074 .3225
04 .0000D .0000D
05 .0000D .0000D
06 -.0024D -.0017D
07 -.0021D -.0037D

Thr - 09/11/97 DAY= 254 10:33:03

01 6.215 5.987
02 16.61 16.51
03 .3101 .3074
04 .0000D .0000D
05 .0000D .0000D
06 -.0028D -.0024D
07 -.0024D -.0021D

Thr - 09/11/97 DAY= 254 10:34:02

01 5.614 6.215
02 16.13 16.61
03 .3179 .3101
04 .0000D .0000D
05 .0000D .0000D
06 -.0028D -.0028D
07 -.0021D -.0024D

Thr - 09/11/97 DAY= 254 10:35:02

01 6.246 5.614
02 16.84 16.13
03 .3179 .3179
04 .0000D .0000D
05 .0000D .0000D
06 -.0011D -.0028D
07 -.0011D -.0021D

Thr - 09/11/97 DAY= 254 10:36:02

01 6.129 6.246
02 17.61 16.84
03 .3196 .3179
04 .0000D .0000D
05 .0000D .0000D
06 -.0014D -.0011D
07 -.0024D -.0011D

Thr - 09/11/97 DAY= 254 10:37:02

01 5.643 6.129
02 17.27 17.61
03 .3165 .3196
04 .0000D .0000D
05 .0000D .0000D
06 -.0021D -.0014D
07 -.0038D -.0024D

Thr - 09/11/97 DAY= 254 10:38:02

01 12.30 5.643 193.904
02 16.44 17.27 556.93
03 .3185 .3165
04 .0000D .0000D
05 .0000D .0000D
06 -.0021D -.0021D
07 -.0021D -.0038D

```
02  15.29    16.44
03  .3219    .3185
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0028D  -.0021D
07 -.0021D  -.0021D

 T   - 09/11/97  DAY= 254 10:40:02

01  5.831 ⌐ 6.522 ⌐
02  15.07 ⌐ 15.29 ⌐
03  .3158    .3219
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0004D  -.0028D
07 -.0017D  -.0021D

Thr - 09/11/97  DAY= 254 10:41:02

01  6.323 ⌐ 5.831
02  15.46 ⌐ 15.07
03  .3080    .3158
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0017D  -.0004D
07 -.0017D  -.0017D

Thr - 09/11/97  DAY= 254 10:42:02

01  7.491 ⌐ 6.323
02  25.48 ⌐ 15.46
03  .3189    .3080
04  .0000D   .0000D
05  .0000D   .0000D
06  0011D  -.0017D
07  0018D  -.0017D

Thr - 09/11/97  DAY= 254 10:43:02

01  8.265 ⌐ 7.491
02  29.68 ⌐ 25.48
03  .3290    .3189
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0017D  -.0011D
07 -.0014D  -.0018D

 Thr - 09/11/97  DAY= 254 10:44:02

01  8.795 ⌐ 8.265
02  30.18 ⌐ 29.68
03  .3000    .3290
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0007D  -.0017D
07 -.0011D  -.0014D

Thr - 09/11/97  DAY= 254 10:45:02

01  6.698 ⌐ 8.795      243.829
02  20.33 ⌐ 30.18      708.42
03   3121    .3000
04  0000D   .0000D
05  .0000D   .0000D
06 -.0014D  -.0007D
07 -.0014D  -.0011D

Thr - 09/11/97  DAY= 254 10:46:02
```

```
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0007D -.0014D
07 -.0017D -.0014D

Thr - 09/11/97  DAY= 254 10:47:02

01   .299-  5.803-
02  16.22-  20.45-
03  .3111   .3233
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0028D -.0007D
07 -.0014D -.0017D

Thr - 09/11/97  DAY= 254 10:48:02

01  5.812-  6.299
02  13.33-  16.22
03  .3104   .3111
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0014D -.0028D
07 -.0021D -.0014D

Thr - 09/11/97  DAY= 254 10:49:02

01  5.455-  5.812
02  12.13-  13.33
03  .3179   .3104
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0027D -.0014D
07 -.0017D -.0021D

Th  - 09/11/97  DAY= 254 10:50:02

01  5.693-  5.455
02  11.70-  12.13
03  .3260   .3179
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0014D -.0027D
07 -.0021D -.0017D

Thr - 09/11/97  DAY= 254 10:51:02

01  13.31-  5.693
02  11.29-  11.70
03  .3057   .3260
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0014D -.0014D
07 -.0017D -.0021D

Thr - 09/11/97  DAY= 254 10:52:02

01  6.548-  13.31
02  12.54-  11.29
03  .3155   .3057
04  .0000D  .0000D
05   0000D  .0000D
06( )007D -.0014D
07 -.0021D -.0017D

Thr - 09/11/97  DAY= 254 10:53:02
```

292.749
806.08

```
06 -.0007D -.0007D
07 -.0007D -.0021D

Thr - 09/11/97  DAY= 254 10:54:03

01  5.365  5.815
02  12.01  12.29
03   3223   .3319
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0017D -.0007D
07 -.0017D -.0007D

Thr - 09/11/97  DAY= 254 10:55:02

01  5.631  5.365
02  10.98  12.01
03  .3331   .3223
04  .0000D  .0000D
05  .0000D  .0000D
06  .0004D -.0017D
07 -.0007D -.0017D

Thr - 09/11/97  DAY= 254 10:56:02

01  5.923  5.631
02  10.62  10.98
03  .3229   .3331
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0004D  .0004D
07 -.0011D -.0007D

Thr - 09/11/97  DAY= 254 10:57:02

01   .303  5.923
02  10.74  10.62
03  .3148   .3229
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0011D -.0004D
07 -.0014D -.0011D

Thr - 09/11/97  DAY= 254 10:58:03

01  5.971  6.303
02  10.72  10.74
03  .3185   .3148
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0007D -.0011D
07 -.0011D -.0014D

Thr - 09/11/97  DAY= 254 10:59:02

01  11.25  5.971      345.
02  10.94  10.72
03  .3179   .3185
04  .0000D  .0000D
05  .0000D  .0000D
06  .0011D -.0007D
07   0004D -.0011D

Thr - 09/11/97  DAY= 254 11:00:03

01  6.190  11.25                345,197
02  10.90  10.94
03  .3199   .3179      894.826  895.28
```

```
Thr - 09/11/97  DAY= 254 11:01:03

01  6.183   6.190
02  13.28   10.90
03  .3324    .3199
04  .0000D   .0000D
05   0000D   .0000D
06  .0028D  -.0014D
07 -.0024D  -.0014D

Thr - 09/11/97  DAY= 254 11:02:03

01  6.159   6.183
02  14.16   13.28
03  .3124    .3324
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0014D  -.0028D
07 -.0024D  -.0024D

Thr - 09/11/97  DAY= 254 11:03:02

01  5.744   6.159
02  12.37   14.16
03  .3270    .3124
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0021D  -.0014D
07 -.0017D  -.0024D

Thr - 09/11/97  DAY= 254 11:04:02

01  6.934   5.744
02   5.65   12.37
03   3087    .3270
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0011D  -.0021D
07 -.0007D  -.0017D

Thr - 09/11/97  DAY= 254 11:05:02
EPEAT READ 00
```

VOC's 15.329

CH4 6.069

370.217 (61)
950.74 (61)
-15.64
935.10

STOP R1

MOISTURE DETERMINATION

Plant Name: IBP Stormlake Unit: Blood	Ambient Temperature: 75°F
Date: 9/11/97	Barometric Pressure: (BP): 29.05 Elevation: ground
Sampling Location: Before Scrubs Elevation: ground	Probe Length & Type: 3' SS
Run Number: 1	Meter Box Number: 1 Gamma: (Y): 1.0017
Operator: DW, TL Reviewer:	Leak Check: Pre-test: 0.005 Post-test: 0.003

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading (Ft³)	DELTA H (in H₂O)	Impinger Temperature (F°)	Gas Meter Temperature INLET °F	Gas Meter Temperature OUTLET °F	Pump Vacuum (Hg")
1	0	10:05	424.184	2.0	66	66	65	6.5
			428.0	↓	63	66	65	8.0
	10		431.9		58	69	65	8.0
			435.8		57	72	66	8.0
	20		439.6		59	74	67	9.0
			443.5		61	72	68	9.0
	30	10:35	447.514					
			Vm = 23.330	ΔH = 2.0		Avg.:	Avg.:	

T_m = 68.3

Analytical Data

	Impinger #1 Weight g	Impinger #2 Weight g	Impinger #3 Weight g	Silica Gel Weight g	
Final	204	122	4	213.5	
Initial	100	100	—	~~200~~ 203	
Net Gain	104 +	22 +	4 +	10.5 =	V_t (grams) Total 140.5

Moisture Calculation:

Net volume of gas through dry gas meter at meter conditions = V_m = 23.330 cu. ft.

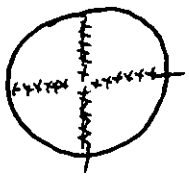
Average absolute meter temperature (T_m + 460) = 528.3 °R

$$\text{Percent moisture} = M = \frac{4.707\,(\text{ml})}{.04707\,(\text{ml}) + \frac{17.64\,(Y)\,(Vm)\,(BP)}{(Tm + 460)}}$$

TRC

REF: CFR 60, App. A, Method

VELOCITY TRAVERSE

Plant: IBP STORM LAKE	Date: 9/11/97
Unit Number: BLOOD	Stack Diameter (in.): 22.5
Load Condition: NORM	Stack Gauge Pressure ("H$_2$0): +.08
Run No.: 1	Operators: DW, TL
Project No.: 22214-7	
Barometric Pressure at Ground Level ("Hg): 29.05	
Pitot Tube ID: 321	
Pitot Tube Coefficient: .84	Port Change Pitot Leak Check — Pass / Fail
Estimated Stack CO_2%: 20 O_2%: 15.5 H_2O%: —	Port #1 — —
Platform Elevation (feet): 5'	Port #2 — —
Schematic of Stack Cross Section: N ↑	Port #3 — —
	Port #4 — —
	$\sqrt{\Delta P_{avg}}$ = .4078
	$T_{s\,avg}$ = 191.8

Traverse Point Number	Velocity Head (In H$_2$0)	Stack Temp. (F)
1	.11	192
2	.12	191
3	.13	191
4	.14	191
5	.14	191
6	.14	192
7	.18	192
8	.20	192
9	.21	192
10	.23	192
11	.24	193
12	.24	193
Average:		

Traverse Point Number	Velocity Head (In H$_2$0)	Stack Temp. (F)
1	.16	191
2	.20	191
3	.20	191
4	.19	191
5	.18	192
6	.15	191
7	.15	192
8	.17	192
9	.18	192
10	.18	192
11	.11	193
12	.10	193
Average:		

Reference: 40 CFR 60, Appendix A, Method 2

TRC

Run 2

DATE:	Sept 11, 1997	**CLIENT REP:**	Rechelle Kruse
PLANT:	IBP	**WITNESSED?:**	yes
VOC TYPE	CH4	**BURNER TYPE:**	N/A
OPERATOR:	SM, DW	**GENERATOR TYPE:**	N/A
TEST LOCATION:	Blood Drier	**O2 GENERATOR TYPE:**	N/A

CALIBRATION GASES

O2	CO2	CH4	S02	NOx	THC outlet
0	0	0	0	0	0
N/A	N/A	29.12	N/A		30
N/A	N/A	47.83	N/A		59.67
		83.35			77.7

END TIME	SAMPLE POINT	O2 wet	CO2 %	SO2 ppm	THC Outlet ppm	CH4 ppm	NOx ppm	COMMENTS a
11:38	1	19.5	2		15	2.961		
12:38								
	AVERAGES	19.5	2	ERR	15.00	2.961	ERR	

Barometric Pres: 29.05

EFFLUENT GAS CONCENTRATION, WET BASIS, PPM

	O2	CO2	THC Inlet	THC Outlet	CH4	NOx
PRE ZERO	0		0	0.8	0.08	0
POST ZERO	0		0	1.8	1.3	0
ACT SPAN	N/A	N/A	N/A	30	29.12	N/A
PRE SPAN	0		0	31	28.8	0
POST SPAN	0		0	29.8	29.5	0
GAS CONC.	ERR	ERR	ERR	14.124	2.324	ERR

EFFLUENT GAS CONC CALCULATION

GAS CONC. = (Avg Stk Conc - Avg Zero Cal) * (Span Conc/(Avg Span Cal - Avg Zero Cal))

IBP Storm Lake, IA
Run 2 VOC's + CH4
0-100
9/11/97
Blood System

```
01   3.260   6.276
02   31.88   50.00
03   .3202   .3090
04   .0000D  .0000D
05   .0000D  .0000D
06  -.0007D -.0004D
07   .0021D -.0007D

Thr - 09/11/97  DAY= 254 11:38:02  - START R2

01   3.030   3.260
02   26.50   31.88
03   .3155   .3202
04   .0000D  .0000D
05   .0000D  .0000D
06  -.0014D -.0007D
07  -.0017D -.0021D

Thr - 09/11/97  DAY= 254 11:39:03

01   2.406   3.030
02   23.12   26.50
03   .3251   .3155
04   .0000D  .0000D
05   .0000D  .0000D
06  -.0018D -.0014D
07  -.0021D -.0017D

Thr - 09/11/97  DAY= 254 11:40:02

01   3.730   2.406
02   29.34   23.12
03   .3189   .3251
04   .0000D  .0000D
05   .0000D  .0000D
06  -.0007D -.0018D
07  -.0017D -.0021D

Thr - 09/11/97  DAY= 254 11:41:02

01   2.264   3.730
02   21.55   29.34
03   .3196   .3189
04   .0000D  .0000D
05   .0000D  .0000D
06  -.0014D -.0007D
07  -.0024D -.0017D

Thr - 09/11/97  DAY= 254 11:42:02

01   2.090   2.264
02   19.53   21.55
03   .3388   .3196
04   .0000D  .0000D
05   .0000D  .0000D
06  -.0014D -.0014D
07  -.0007D -.0024D

Thr - 09/11/97  DAY= 254 11:43:02

01   2.165   2.090
02   3.35    19.53
03   .3209   .3388
04   .0000D  .0000D
05   .0000D  .0000D
06  -.0011D -.0014D
07  -.0014D -.0007D
```

180.27

Thr - 09/11/97 DAY= 254 11:44:02

01	2.386	2.165
02	17.97	18.35
03	.3216	.3209
04	.0000D	.0000D
05	.0000D	.0000D
06	.0007D	-.0011D
07	-.0028D	-.0014D

Thr - 09/11/97 DAY= 254 11:45:14

01	2.234	2.386
02	17.22	17.97
03	.3189	.3216
04	.0000D	.0000D
05	.0000D	.0000D
06	-.0031D	-.0007D
07	-.0024D	-.0028D

Thr - 09/11/97 DAY= 254 11:46:02

01	2.190	2.234
02	14.97	17.22
03	.3138	.3189
04	.0000D	.0000D
05	.0000D	.0000D
06	-.0000D	-.0031D
07	-.0021D	-.0024D

Thr - 09/11/97 DAY= 254 11:47:02

01	2.033	2.190
02	14.08	14.97
03	.3301	.3138
04	.0000D	.0000D
05	.0000D	.0000D
06	-.0014D	-.0000D
07	-.0024D	-.0021D

Thr - 09/11/97 DAY= 254 11:48:02

01	2.580	2.033
02	15.96	14.08
03	.3158	.3301
04	.0000D	.0000D
05	.0000D	.0000D
06	-.0004D	-.0014D
07	-.0011D	-.0024D

Thr - 09/11/97 DAY= 254 11:49:02

01	3.437	2.580
02	20.11	15.96
03	.3125	.3158
04	.0000D	.0000D
05	.0000D	.0000D
06	-.0007D	-.0004D
07	-.0017D	-.0011D

Thr - 09/11/97 DAY= 254 11:50:02

01	3.233	3.437	36.948
02	19.51	20.11	300.09
03	.3280	.3125	
04	.0000D	.0000D	
05	.0000D	.0000D	

```
01   2.634   3.233
02   15.55   19.51
03   .3205    .3280
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0007D  -.0007D
07    0004D  -.0000D

Thr - 09/11/97  DAY= 254 11:52:03

01   2.340   2.634
02   13.84   15.55
03   .3192    .3205
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0004D  -.0007D
07  -.0011D  -.0004D

Thr - 09/11/97  DAY= 254 11:53:02

01   1.937   2.340
02   12.32   13.84
03   .3206    .3192
04   .0000D   .0000D
05   .0000D   .0000D
06   .0000D  -.0004D
07  -.0011D  -.0011D

Thr - 09/11/97  DAY= 254 11:54:02

01   2.012   1.937
02   11.41   12.32
03   .3307    .3206
04    0000D   .0000D
05    0000D   .0000D
06  -.0007D   .0000D
07  -.0024D  -.0011D

Thr - 09/11/97  DAY= 254 11:55:02

01   2.103   2.012
02   10.76   11.41
03   .3236    .3307
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0004D  -.0007D
07  -.0011D  -.0024D

Thr - 09/11/97  DAY= 254 11:56:02

01   2.044   2.103
02   10.85   10.76
03   .3292    .3236
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0014D  -.0004D
07  -.0007D  -.0011D

Thr - 09/11/97  DAY= 254 11:57:03

01   2.102   2.044
02   10.70   10.85
03   .3246    .3292
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0007D  -.0014D
07  -.0014D  -.0007D
```

52-12
385.52

02 10.59 10.70
03 .3273 .3246
04 .0000D .0000D
05 .0000D .0000D
06 -.0011D -.0007D
07 -.0028D -.0014D

T - 09/11/97 DAY= 254 11:59:02

01 2.448 2.313
02 10.83 10.59
03 .3148 .3273
04 .0000D .0000D
05 .0000D .0000D
06 -.0007D -.0011D
07 -.0011D -.0028D

Thr - 09/11/97 DAY= 254 12:00:02

01 2.507 2.448
02 11.48 10.83
03 .3429 .3148
04 .0000D .0000D
05 .0000D .0000D
06 -.0017D -.0007D
07 -.0014D -.0011D

Thr - 09/11/97 DAY= 254 12:01:02

01 2.715 2.507
02 11.49 11.48
03 .3199 .3429
04 .0000D .0000D
05 .0000D .0000D
06 -.0007D -.0017D
07 -.0021D -.0014D

Thr - 09/11/97 DAY= 254 12:02:03

01 2.405 2.715
02 11.19 11.49
03 .3260 .3199
04 .0000D .0000D
05 .0000D .0000D
06 -.0011D -.0007D
07 -.0014D -.0021D

Thr - 09/11/97 DAY= 254 12:03:02

01 4.825 2.405
02 11.27 11.19
03 .3216 .3260
04 .0000D .0000D
05 .0000D .0000D
06 -.0004D -.0011D
07 -.0021D -.0014D

Thr - 09/11/97 DAY= 254 12:04:02

01 3.414 4.825
02 10.70 11.27
03 .3226 .3216
04 .0000D .0000D
05 .0000D .0000D
06 -.0007D -.0004D
07 -.0021D -.0021D

72-747
403.07

Thr - 09/11/97 DAY= 254 12:05:02

04 .0000D .0000D
05 .0000D .0000D
06 -.0021D -.0007D
07 .0007D -.0021D

Thr - 09/11/97 DAY= 254 12:06:02

01 .921 2.024
02 -0.35 10.78
03 .3192 .3376
04 -.0004D .0000D
05 -.0004D .0000D
06 -.0017D -.0021D
07 -.0007D .0007D

Thr - 09/11/97 DAY= 254 12:07:02

01 1.904 1.921
02 10.73 10.35
03 .3470 .3192
04 .0000D -.0004D
05 .0000D -.0004D
06 -.0011D -.0017D
07 -.0004D -.0007D

Thr - 09/11/97 DAY= 254 12:08:02

01 2.259 1.904
02 11.55 10.73
03 .3252 .3470
04 -.0004D .0000D
05 -.0004D .0000D
06 -.0034D -.0011D
07 -.0014D -.0004D

T - 09/11/97 DAY= 254 12:09:02

01 4.765 2.259
02 22.95 11.55
03 .3321 .3252
04 .0000D -.0004D
05 .0000D -.0004D
06 -.0011D -.0034D
07 -.0011D -.0014D

Thr - 09/11/97 DAY= 254 12:10:03

01 2.924 4.765
02 16.22 22.95
03 .3135 .3321
04 .0000D .0000D
05 .0000D .0000D
06 -.0011D -.0011D
07 -.0021D -.0011D

Thr - 09/11/97 DAY= 254 12:11:03

01 2.524 2.924 91-068
02 13.36 16.22 559.01
03 .3206 .3135
04 .0000D .0000D
05 .0000D .0000D
06 .0017D -.0011D
07 .0024D -.0021D

Thr - 09/11/97 DAY= 254 12:12:02

01 2.207 2.524

06 -.0011D -.0017D
07 -.0007D -.0024D

Thr - 09/11/97 DAY= 254 12:13:02

01 2.164⌐ 2.207⌐
02 11.59⌐ 12.43⌐
03 .3263 .3267
04 .0004D .0000D
05 -.0004D .0000D
06 -.0011D -.0011D
07 -.0014D -.0007D

Thr - 09/11/97 DAY= 254 12:14:02

01 2.103⌐ 2.164
02 11.32⌐ 11.59
03 .3209 .3263
04 -.0004D -.0004D
05 -.0004D -.0004D
06 -.0021D -.0011D
07 -.0017D -.0014D

Thr - 09/11/97 DAY= 254 12:15:03

01 2.357⌐ 2.103
02 11.67⌐ 11.32
03 .3331 .3209
04 .0000D -.0004D
05 .0000D -.0004D
06 -.0000D -.0021D
07 -.0000D -.0017D

Thr - 09/11/97 DAY= 254 12:16:02

01 .658⌐ 2.357
02 26.74⌐ 11.67
03 .3357 .3331
04 -.0004D .0000D
05 -.0004D .0000D
06 -.0014D -.0000D
07 -.0007D -.0000D

Thr - 09/11/97 DAY= 254 12:17:02

01 13.83+⌐ 6.658
02 43.91⌐ 26.74
03 .3193 .3357
04 -.0004D -.0004D
05 -.0004D -.0004D
06 -.0004D -.0014D
07 -.0007D -.0007D

Thr - 09/11/97 DAY= 254 12:18:02

01 4.357⌐ 13.83+
02 25.40⌐ 43.91
03 .3263 .3193
04 -.0007D -.0004D
05 -.0007D -.0004D
06 -.0004D -.0004D
07 -.0007D -.0007D

Thr - 09/11/97 DAY= 254 12:19:02

01 2.094⌐ 4.357 126.83
02 12.55⌐ 25.40 714.62
03 .3294 .3263

Thr - 09/11/97 DAY= 254 12:20:02

01	2.207	2.094
02	12.01	12.55
03	.3426	.3294
04	-.0004D	.0000D
05	.0004D	.0000D
06	.0014D	-.0011D
07	-.0007D	-.0011D

Thr - 09/11/97 DAY= 254 12:21:02

01	2.896	2.207
02	13.49	12.01
03	.3206	.3426
04	-.0004D	-.0004D
05	-.0004D	-.0004D
06	-.0007D	-.0014D
07	-.0021D	-.0007D

Thr - 09/11/97 DAY= 254 12:22:02

01	4.258	2.896
02	19.32	13.49
03	.3169	.3206
04	.0000D	-.0004D
05	.0000D	-.0004D
06	-.0011D	-.0007D
07	-.0011D	-.0021D

Thr - 09/11/97 DAY= 254 12:23:02

01	2.457	4.258
02	15.85	19.32
03	.3270	.3169
04	.0000D	.0000D
05	.0000D	.0000D
06	-.0014D	-.0011D
07	-.0024D	-.0011D

Thr - 09/11/97 DAY= 254 12:24:02

01	2.201	2.457
02	10.51	15.85
03	.3304	.3270
04	.0000D	.0000D
05	.0000D	.0000D
06	-.0014D	-.0014D
07	-.0007D	-.0024D

Thr - 09/11/97 DAY= 254 12:25:02

01	2.268	2.201
02	9.987	10.51
03	.3223	.3304
04	.0000D	.0000D
05	.0000D	.0000D
06	-.0014D	-.0014D
07	-.0017D	-.0007D

Th - 09/11/97 DAY= 254 12:26:02

01	2.252	2.268	145.377
02	9.818	9.987	805.605
03	.3185	.3223	
04	.0000D	.0000D	
05	.0000D	.0000D	

```
01  2.496  2.252
02  9.570  9.818
03  .3084   .3185
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0011D -.0011D
07  .0014D  .0007D

Thr - 09/11/97  DAY= 254 12:28:02

01  2.489  2.496
02  9.496  9.570
03  .3057   .3084
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0004D -.0011D
07 -.0004D -.0014D

Thr - 09/11/97  DAY= 254 12:29:02

01  2.563  2.489
02  9.237  9.496
03  .3239   .3057
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0027D -.0004D
07 -.0027D -.0004D

Thr - 09/11/97  DAY= 254 12:30:03

01  2.580  2.563
02  9.030  9.237
03  .3087   .3239
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0014D -.0027D
07 -.0014D -.0027D

Thr - 09/11/97  DAY= 254 12:31:02

01  7.305  2.580
02  9.423  9.030
03  .3121   .3087
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0044D -.0014D
07 -.0004D -.0014D

Thr - 09/11/97  DAY= 254 12:32:02

01  4.243  7.305
02  10.64  9.423
03  .3280   .3121
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0014D -.0044D
07 -.0024D -.0004D

Thr - 09/11/97  DAY= 254 12:33:02

01  3.000  4.243
02  0.15  10.64
03  .3275   .3280
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0024D -.0014D
07 -.0014D -.0024D
```

170.053
873.151

```
02  9.804    10.15
03  .2962    .3275
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0017D  -.0024D
07 -.0007D  -.0014D

T  - 09/11/97  DAY= 254 12:35:02

01  2.482    2.405
02  10.47    9.804
03  .3101    .2962
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0017D  -.0017D
07 -.0028D  -.0007D

Thr - 09/11/97  DAY= 254 12:36:02

01  2.825    2.482
02  10.67    10.47
03  .3158    .3101
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0021D  -.0017D
07 -.0014D  -.0028D

Thr - 09/11/97  DAY= 254 12:37:02

01  2.857    2.825
02  10.69    10.67        914.785 (61)
03  .3301    .3158
04  .0000D   .0000D
05  .0000D   .0000D
06   0017D  -.0021D
07  .0024D  -.0014D

Thr - 09/11/97  DAY= 254 12:38:02  - Stop RZ

01  2.889    2.857
02  11.11    10.69
03  .3292    .3301
04  .0000D   .0000D
05  .0000D   .0000D
06 -.0004D  -.0017D
07 -.0011D  -.0024D

Thr - 09/11/97  DAY= 254 12:39:03
```

RZ VOC'S	CH4
15.00	2.961

MOISTURE DETERMINATION

Plant Name: IBP Storm Lake Unit: Blood	Ambient Temperature: 75°F
Date: 9/11/97	Barometric Pressure: (BP): 29.05 Elevation: ground
Sampling Location: Before Scrub Elevation:	Probe Length & Type: 3' SS
Run Number: 2	Meter Box Number: 1 Gamma: (Y): 1.0017
Operator: DW, TL Reviewer:	Leak Check: Pre-test: 0.00 Post-test: 0.00

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading (Ft^3)	DELTA H ($in\ H_2O$)	Impinger Temperature (F°)	Gas Meter Temperature INLET °F	Gas Meter Temperature OUTLET °F	Pump Vacuum ($in\ Hg$)
1	0	1135	447.738	2.0	66	81	77	8.0
			451.9	↓	53	83	78	8.0
	10		456.0		52	88	80	8.0
			460.0		54	90	81	8.0
	20		464.0		59	93	82	8.0
			468.2		58	95	83	8.0
	30	1205	472.347					
			Vm = 24.609	ΔH = 2.0		Avg.:	Avg.:	

T_m = 84.3

Analytical Data

	Impinger #1 Weight g	Impinger #2 Weight g	Impinger #3 Weight g	Silica Gel Weight g	
Final	216	112	2	218.5	135.0
Initial	100	100	—	213.5	
Net Gain	116 +	12 +	2 +	5 =	V_t (grams) Total

Moisture Calculation:

Net volume of gas through dry gas meter at meter conditions = V_m = 24.609 cu. ft.

Average absolute meter temperature (T_m + 460) = 544.3 °R

27.4%

$$\text{Percent moisture} = M = \frac{4.707\,(\text{ml})}{.04707\,(\text{ml}) + \frac{17.64\,(Y)\,(Vm)\,(BP)}{(Tm + 460)}}$$

REF: CFR 60, App. A, Method

TRC

Plant: IBP Storm Lake	Date: 9/11/97
Unit Number: Blr D	Stack Diameter (in.): 72.5
Load Condition: Norm	Stack Gauge Pressure ("H$_2$0): .08
Run No.: 2	Operators: DW, TL
Project No.: 22214-7	
Barometric Pressure at Ground Level ("Hg): 29.05	
Pitot Tube ID: 321	
Pitot Tube Coefficient: .84	Port Change Pitot Leak Check — Pass / Fail
Estimated Stack CO_2%: 20 O_2%: 19.5 H_2O%:	Port #1 — Pass / Fail
Platform Elevation (feet): 5'	Port #2 — Pass / Fail
Schematic of Stack Cross Section: R1	Port #3 — Pass / Fail
	Port #4 — Pass / Fail
	$\sqrt{\Delta P}_{avg}$ = .4126
	T_{stack} = 190.9

Traverse Point Number	Velocity Head (In H$_2$0)	Stack Temp. (F)
1	.12	191
2	.13	192
3	.13	192
4	.13	192
5	.14	191
6	.14	191
7	.19	191
8	.22	192
9	.24	191
10	.25	191
11	.24	190
12	.20	190
Average:		

Traverse Point Number	Velocity Head (In H$_2$0)	Stack Temp. (F)
1	.20	190
2	.20	190
3	.20	191
4	.18	191
5	.15	191
6	.13	191
7	.13	191
8	.15	191
9	.17	191
10	.17	190
11	.17	190
12	.15	190
Average:		

Reference: 40 CFR 60, Appendix A, Method 2

TRC

Run 3

DATE:	**Sept 11, 1997**	**CLIENT REP:**	**Rechelle Kruse**
PLANT:	**IBP**	**WITNESSED?:**	**N/A**
VOC TYPE	**CH4**	**BURNER TYPE:**	**N/A**
OPERATOR:	**SM, DW**	**GENERATOR TYPE:**	**N/A**
TEST LOCATION:	**Blood Drier**	**O2 GENERATOR TYPE:**	**N/A**

CALIBRATION GASES

O2	CO2	CH4	S02	NOx	THC outlet
0	0	0	0	0	0
N/A	N/A	29.12	N/A		30
N/A	N/A	47.83	N/A		59.67
		83.35			77.7

END TIME	SAMPLE POINT	O2 wet	CO2 ppm	SO2 ppm	THC Outlet ppm	CH4 ppm	NOx ppm	COMMENTS a
12:58	1	19.5	2		13.333	4.313		
13:58								
	AVERAGE	19.5	2	ERR	13.33	4.313	ERR	

Barometric Pres: 29.05

EFFLUENT GAS CONCENTRATION, WET BASIS, PPM

	O2	CO2		THC Outlet	CH4	NOx
PRE ZERO	0		0	0.3	1.3	0
POST ZER	0		0	1.2	2.1	0
ACT SPAN	N/A	N/A		30	29.12	N/A
PRE SPAN	0		0	30.1	29.5	0
POST SPA	0		0	30.3	30.1	
GAS CON	ERR	ERR	ERR	12.818	2.708	ERR

EFFLUENT GAS CONC CALCULATION

GAS CONC. = (Avg Stk Conc - Avg Zero Cal) * (Span Conc/(Avg Span Cal - Avg Zero Cal))

IBP STORM LAKE, IA
BLOOD SYSTEM VOLUSTAT
9/11/97 0-100 SCALE

```
01  3.054 ~ 3.107
02  16.21 ~ 14.40
03  .3114   .3006
04 -.0028D -.0011D
05 -.0031D -.0011D
06 -.0007D -.0021D
07  .0014D -.0021D

Thr - 09/11/97  DAY= 254 12:58:02  -START  RUN 3

01  3.253 ~ 3.054
02  19.03 ~ 16.21
03  .3355   .3114
04 -.0021D -.0028D
05 -.0028D -.0031D
06 -.0011D -.0007D
07 -.0007D -.0014D

Thr - 09/11/97  DAY= 254 12:59:02

01  4.257 ~ 3.253
02  27.03 ~ 19.03
03  .3341   .3355
04 -.0014D -.0021D
05 -.0024D -.0028D
06 -.0011D -.0011D
07 -.0011D -.0007D

Thr - 09/11/97  DAY= 254 13:00:03

01  4.451 ~ 4.257
02  34.12 ~ 27.03
03  .3223   .3341
04 -.0004D -.0014D
05 -.0004D -.0024D
06 -.0014D -.0011D
07 -.0024D -.0011D

Thr - 09/11/97  DAY= 254 13:01:02

01  4.052 ~ 4.451
02  39.66 ~ 34.12
03  .3175   .3223
04  .0004D -.0004D
05  .0000D -.0004D
06 -.0004D -.0014D
07 -.0017D -.0024D

Thr - 09/11/97  DAY= 254 13:02:03

01  3.957 ~ 4.052
02  44.39 ~ 39.66
03  .3097   .3175
04  .0000D  .0004D
05  .0000D  .0000D
06  .0004D -.0004D
07 -.0004D -.0017D

Thr - 09/11/97  DAY= 254 13:03:02

01  3.401 ~ 3.957      26.425
02  5.24 ~ 44.39       206.68
03  .3229   .3097
04  .0000D  .0000D
05  .0000D  .0000D
06 -.0024D  .0004D
07 -.0014D -.0004D
```

```
02   23.01    26.24
03   .3263    .3229
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0031D  -.0024D
07  -.0034D  -.0014D

Thr - 09/11/97  DAY= 254 13:05:03

01   2.878    3.246
02   18.11    23.01
03   .3267    .3263
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0017D  -.0031D
07  -.0017D  -.0034D

Thr - 09/11/97  DAY= 254 13:06:03

01   2.532    2.878
02   13.37    18.11
03   .3202    .3267
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0011D  -.0017D
07  -.0021D  -.0017D

Thr - 09/11/97  DAY= 254 13:07:02

01   3.167    2.532
02   11.58    13.37
03   .3216    .3202
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0007D  -.0011D
07  -.0011D  -.0021D

Thr - 09/11/97  DAY= 254 13:08:02

01   3.331    3.167
02   12.06    11.58
03   .3257    .3216
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0024D  -.0007D
07  -.0014D  -.0011D

Thr - 09/11/97  DAY= 254 13:09:02

01   2.207    3.331
02   10.57    12.06
03   .3259    .3257
04   .0000D   .0000D
05   .0000D   .0000D
06  -.0034D  -.0024D
07  -.0017D  -.0014D

Thr - 09/11/97  DAY= 254 13:10:03

01   2.745    2.207    46.531
02   10.79    10.57    306.17
03   .3169    .3259
04   .0000D   .0000D
05  -.0004D   .0000D
06   .0004D  -.0034D
07  -.0028D  -.0017D

Thr - 09/11/97  DAY= 254 13:11:02
```

05 -.0011D -.0004D
06 -.0034D .0004D
07 -.0024D -.0028D

Thr - 09/11/97 DAY= 254 13:12:02

01 .261 2.986
02 3.21 9.431
03 .3037 .3118
04 -.0007D -.0011D
05 -.0007D -.0011D
06 -.0011D -.0034D
07 -.0031D -.0024D

Thr - 09/11/97 DAY= 254 13:13:02

01 4.815 4.261
02 14.89 13.21
03 .3085 .3037
04 -.0000D -.0007D
05 -.0004D -.0007D
06 -.0014D -.0011D
07 -.0021D -.0031D

Thr - 09/11/97 DAY= 254 13:14:03

01 4.682 4.815
02 14.33 14.89
03 .3182 .3085
04 -.0014D -.0000D
05 -.0021D -.0004D
06 -.0007D -.0014D
07 -.0021D -.0021D

Th - 09/11/97 DAY= 254 13:15:02

01 4.738 4.682
02 17.34 14.33
03 .3111 .3182
04 -.0017D -.0014D
05 -.0014D -.0021D
06 -.0000D -.0007D
07 -.0034D -.0021D

Thr - 09/11/97 DAY= 254 13:16:02

01 5.221 4.738
02 17.60 17.34
03 .3263 .3111
04 -.0034D -.0017D
05 -.0028D -.0014D
06 -.0021D -.0000D
07 -.0031D -.0034D

Thr - 09/11/97 DAY= 254 13:17:02

01 3.669 5.221 76.903
02 12.95 17.60 405.921
03 .3213 .3263
04 -.0045D -.0034D
05 -.0045D -.0028D
06 .0024D -.0021D
07 .0007D -.0031D

Thr - 09/11/97 DAY= 254 13:18:02

01 3.382 3.669

06 -.0014D -.0024D
07 -.0011D -.0007D

Thr - 09/11/97 DAY= 254 13:19:02

01 3.407 3.382
02 7.839 9.563
03 .3165 .3294
04 -.0021D -.0058D
05 -.0024D -.0055D
06 -.0017D -.0014D
07 -.0014D -.0011D

Thr - 09/11/97 DAY= 254 13:20:03

01 3.451 3.407
02 6.832 7.839
03 .3111 .3165
04 -.0007D -.0021D
05 -.0007D -.0024D
06 -.0011D -.0017D
07 -.0014D -.0014D

Thr - 09/11/97 DAY= 254 13:21:02

01 3.059 3.451
02 7.304 6.832
03 .3141 .3111
04 -.0041D -.0007D
05 -.0044D -.0007D
06 -.0017D -.0011D
07 -.0017D -.0014D

Thr - 09/11/97 DAY= 254 13:22:02

01 .089 3.059
02 7.250 7.304
03 .3003 .3141
04 -.0000D -.0041D
05 -.0004D -.0044D
06 -.0017D -.0017D
07 -.0024D -.0017D

Thr - 09/11/97 DAY= 254 13:23:02

01 3.448 3.089
02 8.305 7.250
03 .3098 .3003
04 -.0024D -.0000D
05 -.0027D -.0004D
06 -.0014D -.0017D
07 -.0014D -.0024D

Thr - 09/11/97 DAY= 254 13:24:02

01 3.609 3.448
02 8.319 8.305
03 .3006 .3098
04 -.0014D -.0024D
05 -.0017D -.0027D
06 -.0028D -.0014D
07 -.0017D -.0014D

Thr - 09/11/97 DAY= 254 13:25:02

01 3.074 3.609 103,422
02 7.923 8.319 469.256
03 .3016 .3006

Thr - 09/11/97 DAY= 254 13:26:02

[redacted] 4.179 - 3.074
2 9.853 - 7.923
[redacted] .2932 .3016
[redacted] -.0000D -.0007D
5 0004D -.0004D
6 0004D -.0004D
[redacted] -.0021D -.0011D

Thr - 09/11/97 DAY= 254 13:27:02

[redacted] 5.668 - 4.179
[redacted] 18.15 - 9.853
03 .3321 .2932
[redacted] -.0007D -.0000D
[redacted] -.0014D -.0004D
06 -.0004D -.0004D
07 -.0024D -.0021D

[redacted]Thr - 09/11/97 DAY= 254 13:28:02

01 7.309 - 5.668
[redacted] 23.30 - 18.15
03 .3304 .3321
04 -.0021D -.0007D
[redacted] -.0017D -.0014D
[redacted] -.0004D -.0004D
07 -.0000D -.0024D

[redacted]Thr - 09/11/97 DAY= 254 13:29:02

01 6.375 - 7.309
02 21.47 - 23.30
[redacted] 3382 .3304
04 -.0034D -.0021D
05 -.0034D -.0017D
[redacted] -.0014D -.0004D
[redacted] -.0017D -.0000D

Thr - 09/11/97 DAY= 254 13:30:02

[redacted] 4.522 - 6.375
02 16.55 - 21.47
[redacted] .3226 .3382
[redacted] -.0017D -.0034D
05 -.0028D -.0034D
06 -.0017D -.0014D
[redacted] -.0017D -.0017D

Thr - 09/11/97 DAY= 254 13:31:02

[redacted] 4.510 - 4.522
02 11.77 - 16.55
03 .3223 .3226
[redacted] -.0014D -.0017D
[redacted] -.0004D -.0028D
06 -.0021D -.0017D
07 -.0011D -.0017D

[redacted]Thr - 09/11/97 DAY= 254 13:32:02

01 [redacted].523 - 4.510 139.238
[redacted] 8.425 - 11.77 578.774
03 .3229 .3223
04 -.0058D -.0014D
[redacted] -.0065D -.0004D

01 3.653 3.523
02 7.650 8.425
03 .3246 .3229
04 -.0038D -.0058D
05 -.0028D -.0065D
06 -.0017D -.0011D
07 .0014D -.0021D

Thr - 09/11/97 DAY= 254 13:34:02

01 3.730 3.653
02 8.218 7.650
03 .3135 .3246
04 -.0044D -.0038D
05 -.0041D -.0028D
06 -.0004D -.0017D
07 -.0007D -.0014D

Thr - 09/11/97 DAY= 254 13:35:02

01 3.331 3.730
02 8.039 8.218
03 .3101 .3135
04 -.0041D -.0044D
05 -.0041D -.0041D
06 -.0000D -.0004D
07 -.0017D -.0007D

Thr - 09/11/97 DAY= 254 13:36:02

01 2.978 3.331
02 7.846 8.039
03 .3287 .3101
04 .0041D -.0041D
05 .0058D -.0041D
06 -.0017D -.0000D
07 -.0007D -.0017D

Thr - 09/11/97 DAY= 254 13:37:02

01 10.44 2.978 CH4 spike
02 9.951 7.846
03 .3294 .3287
04 -.0035D -.0041D
05 -.0072D -.0058D
06 -.0000D -.0017D
07 .0004D -.0007D

Thr - 09/11/97 DAY= 254 13:38:02

01 4.778 10.44
02 9.786 9.951
03 .3389 .3294
04 -.0071D -.0035D
05 -.0077D -.0072D
06 -.0017D -.0000D
07 -.0034D .0004D

Thr - 09/11/97 DAY= 254 13:39:03

01 .123 4.778 172.271
02 .066 9.786 639.33
03 .3355 .3389
04 -.0075D -.0071D
05 -.0092D -.0077D
06 -.0021D -.0017D
07 -.0028D -.0034D

02 8.443 9.066
03 .3162 .3355
04 -.0065D -.0075D
05 -.0065D -.0092D
06 -.0007D -.0021D
07 -.0011D -.0028D

Thr - 09/11/97 DAY= 254 13:41:02

01 4.284 4.164
02 8.720 8.443
03 .3202 .3162
04 -.0071D -.0065D
05 -.0054D -.0065D
06 -.0011D -.0007D
07 -.0031D -.0011D

Thr - 09/11/97 DAY= 254 13:42:03

01 4.362 4.284
02 10.18 8.720
03 .3301 .3202
04 -.0072D -.0071D
05 -.0075D -.0054D
06 -.0014D -.0011D
07 -.0028D -.0031D

Thr - 09/11/97 DAY= 254 13:43:02

01 4.773 4.362
02 11.54 10.18
03 .3412 .3301
04 -.0095D -.0072D
05 -.0105D -.0075D
06 -.0004D -.0014D
07 -.0021D -.0028D

Thr - 09/11/97 DAY= 254 13:44:02

01 5.511 4.773
02 16.06 11.54
03 .3355 .3412
04 -.0085D -.0095D
05 -.0075D -.0105D
06 -.0021D -.0004D
07 -.0028D -.0021D

Thr - 09/11/97 DAY= 254 13:45:02

01 4.399 5.511
02 10.26 16.06
03 .3272 .3355
04 -.0084D -.0085D
05 -.0074D -.0075D
06 -.0031D -.0021D
07 -.0007D -.0028D

Thr - 09/11/97 DAY= 254 13:46:02

01 4.068 4.399 303.932
02 8.965 10.26 713.498
03 .3240 .3272
04 -.0085D -.0084D
05 -.0065D -.0074D
06 -.0017D -.0031D
07 -.0011D -.0007D

Thr - 09/11/97 DAY= 254 13:47:02

04 -.0075D -.0085D
05 -.0055D -.0065D
06 -.0017D -.0017D
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Thr - 09/11/97 DAY= 254 13:48:02

01 .053 4.380
02 .081 9.813
03 .3299 .3229
04 -.0061D -.0075D
05 -.0087D -.0055D
06 -.0017D -.0017D
07 -.0004D -.0007D

Thr - 09/11/97 DAY= 254 13:49:03

01 6.075 4.053
02 8.139 9.081
03 .3158 .3299
04 -.0085D -.0061D
05 -.0075D -.0087D
06 -.0011D -.0017D
07 -.0007D -.0004D

Thr - 09/11/97 DAY= 254 13:50:02

01 9.651 6.075
02 7.457 8.139
03 .3290 .3158
04 -.0089D -.0085D
05 -.0075D -.0075D
06 -.0007D -.0011D
07 -.0007D -.0007D

Thr - 09/11/97 DAY= 254 13:51:02

01 4.702 9.651
02 7.995 7.457
03 .3263 .3290
04 -.0112D -.0089D
05 -.0122D -.0075D
06 -.0011D -.0007D
07 -.0011D -.0007D

Thr - 09/11/97 DAY= 254 13:52:02

01 4.451 4.702
02 10.04 7.995
03 .3179 .3263
04 -.0061D -.0112D
05 -.0068D -.0122D
06 -.0007D -.0011D
07 -.0007D -.0011D

Thr - 09/11/97 DAY= 254 13:53:03

01 5.499 4.451 242.643
02 11.71 10.04 768.652
03 .3311 .3179
04 -.0065D -.0061D
05 -.0065D -.0068D
06 -.0004D -.0007D
07 -.0017D -.0007D

Thr - 09/11/97 DAY= 254 13:54:02

01 5.399 5.499

06 -.0014D -.0004D
07 -.0014D -.0017D

Thr - 09/11/97 DAY= 254 13:55:02

01 5.229 5.399
02 11.02 12.46
03 .3311 .3334
04 -.0072D -.0082D
05 -.0062D -.0085D
06 -.0031D -.0014D
07 -.0011D -.0014D

Thr - 09/11/97 DAY= 254 13:56:02

01 5.201 5.229
02 11.88 11.02
03 .3429 .3311
04 -.0061D -.0072D
05 -.0074D -.0062D
06 -.0004D -.0031D
07 -.0004D -.0011D

RUN 3
VOC's 13.333
CH_4 4.313

Thr - 09/11/97 DAY= 254 13:57:03

01 4.605 5.201
02 9.310 11.88
03 .3287 .3429
04 -.0075D -.0061D
05 -.0079D -.0074D
06 -.0004D -.0004D
07 -.0007D -.0004D

263,077 (61)
813.322 (61)

Thr - 09/11/97 DAY= 254 13:58:02 -STOP R3

RM 5-6
MOISTURE DETERMINATION

Plant Name: IBP Stamlake Unit: Blood	Ambient Temperature: 75°F
Date: 9/11/97	Barometric Pressure: (BP): 29.05 Elevation: ground
Sampling Location: Before Scrubber Elevation: ground	Probe Length & Type: 3' SS
Run Number: 2	Meter Box Number: 1 Gamma: (Y): 1.0017
Operator: DW, TC Reviewer:	Leak Check: Pre-test: 0.00 Post-test: 0.00

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading (Ft³)	DELTA H (in H₂O)	Impinger Temperature (F°)	Gas Meter Temperature INLET °F	Gas Meter Temperature OUTLET °F	Pump Vacuum (Hg")
1	0	1258	472.632	2.0	65	96	92	6.0
			476.6	↓	61	97	91	6.0
	10		480.5		63	98	92	6.0
			484.8		64	100	92	6.0
	20		489.1		66	102	93	6.0
			493.6		67	103	94	6.0
	30	1328	497.172					
			Vm = 24.540	ΔH = 2.0		Avg.:	Avg.:	

T_m = 95.8

Analytical Data

	Impinger #1 Weight g	Impinger #2 Weight g	Impinger #3 Weight g	Silica Gel Weight g	
Final	214	112	3	223.5	135.5
Initial	100	100	—	217	
Net Gain	114 +	12 +	3 +	6.5 =	V_t (grams) Total

Moisture Calculation:

Net volume of gas through dry gas meter at meter conditions = V_m = 24.540 cu. ft.

Average absolute meter temperature (T_m + 460) = 555.8 °R

$$\text{Percent moisture} = M = \frac{4.707\,(\text{ml})}{.04707\,(\text{ml}) + \frac{17.64\,(Y)\,(Vm)\,(BP)}{(Tm + 460)}}$$

TRC

REF: CFR 60, App. A, Method

VELOCITY TRAVERSE

Plant: IBP STARKVILLE	Date: 9/11/97
Unit Number: Blr D	Stack Diameter (in.): 27.5
Load Condition: Normal	Stack Gauge Pressure ("H_2O):
Run No.: 3	Operators: DW, TL
Project No.: 22214-7	
Barometric Pressure at Ground Level ("Hg): 29.05	
Pitot Tube ID: 321	
Pitot Tube Coefficient: .84	Port Change Pitot Leak Check — Pass / Fail
Estimated Stack CO_2%: ___ O_2%: ___ H_2O%: ___	Port #1 — ___ — ___
Platform Elevation (feet): 5'	Port #2 — ___ — ___
Schematic of Stack Cross Section: R1	Port #3 — ___ — ___
	Port #4 — ___ — ___
	$\sqrt{\Delta p_{avg}}$ = .4279
	T_{Savg} = 191.4

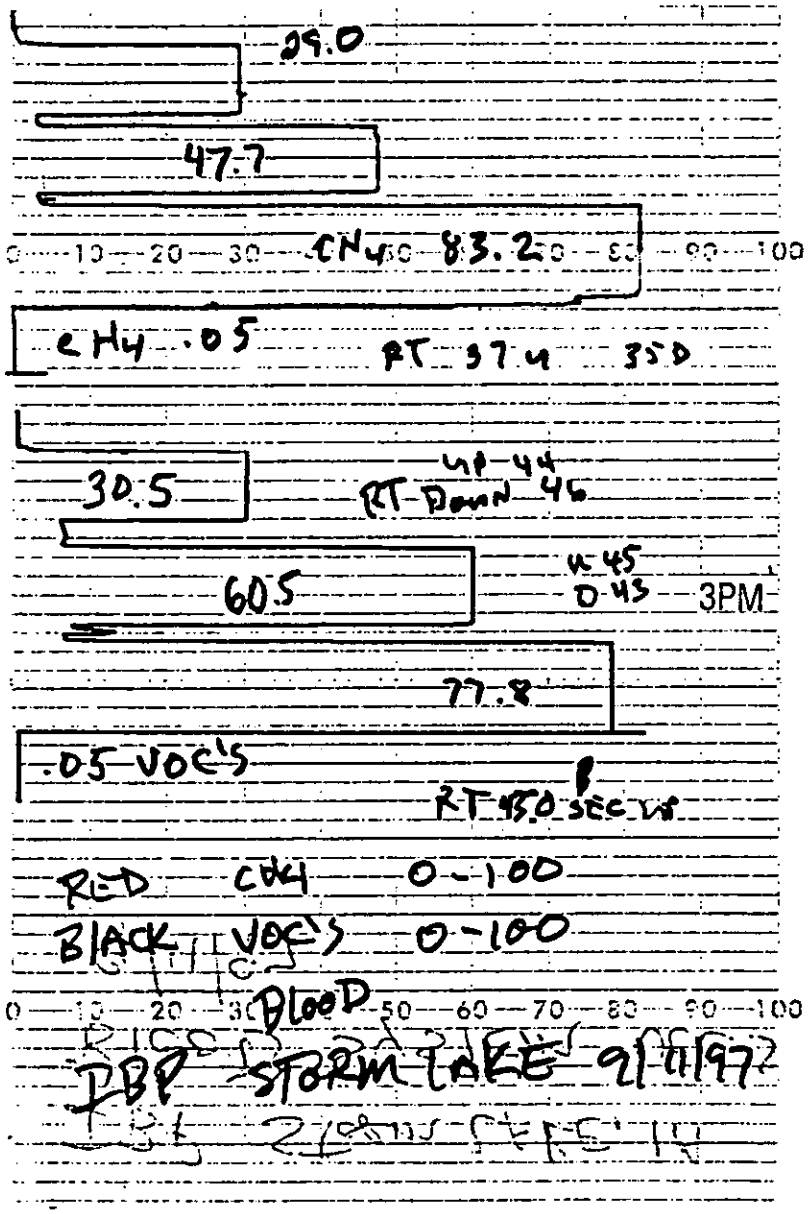
Traverse Point Number	Velocity Head (In H_2O)	Stack Temp. (F)
1	.14	191
2	.14	191
3	.14	192
4	.15	192
5	.15	192
6	.15	191
7	.21	191
8	.24	191
9	.26	192
10	.26	192
11	.26	191
12	.19	190
Average:		

Traverse Point Number	Velocity Head (In H_2O)	Stack Temp. (F)
1	.23	191
2	.24	191
3	.22	191
4	.19	191
5	.17	191
6	.15	192
7	.15	193
8	.16	192
9	.17	192
10	.17	192
11	.17	191
12	.14	191
Average:		

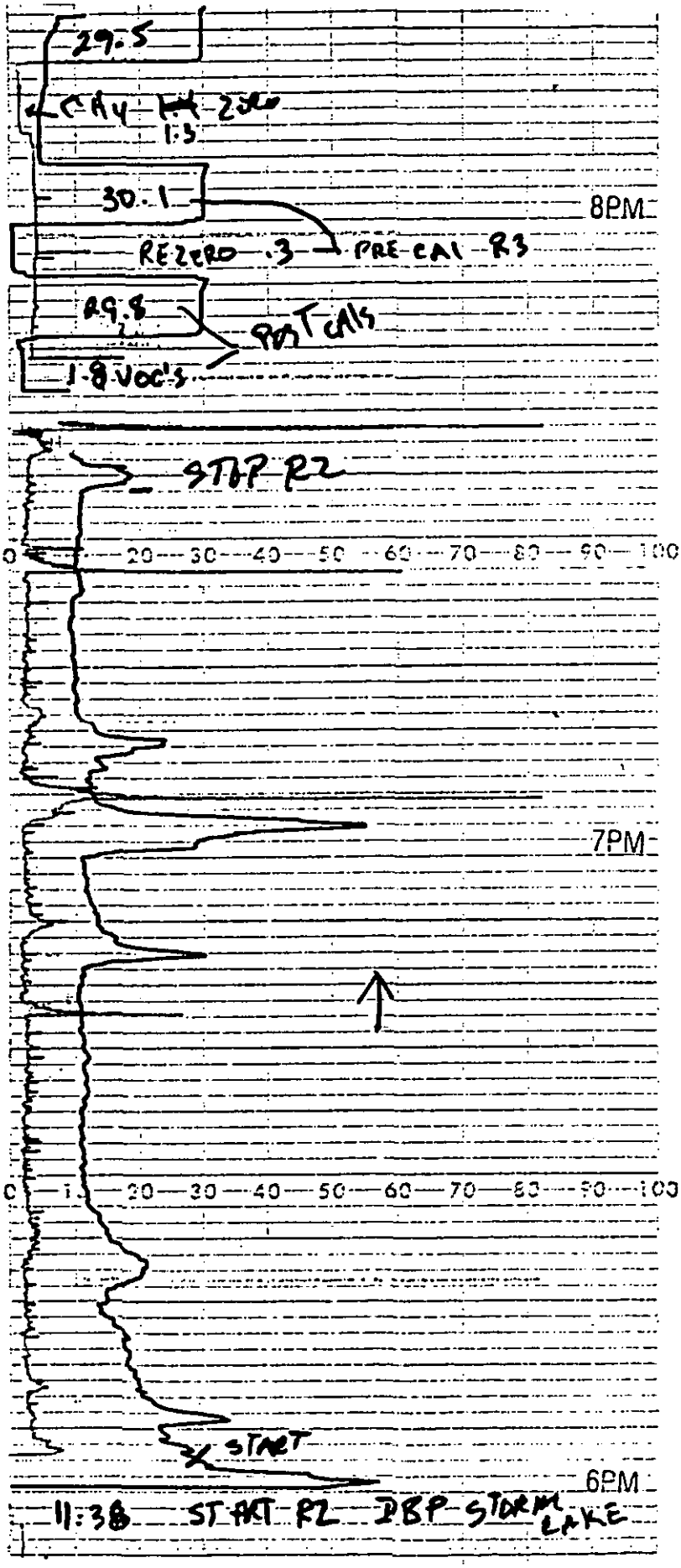
Reference: 40 CFR 60, Appendix A, Method 2

TRC

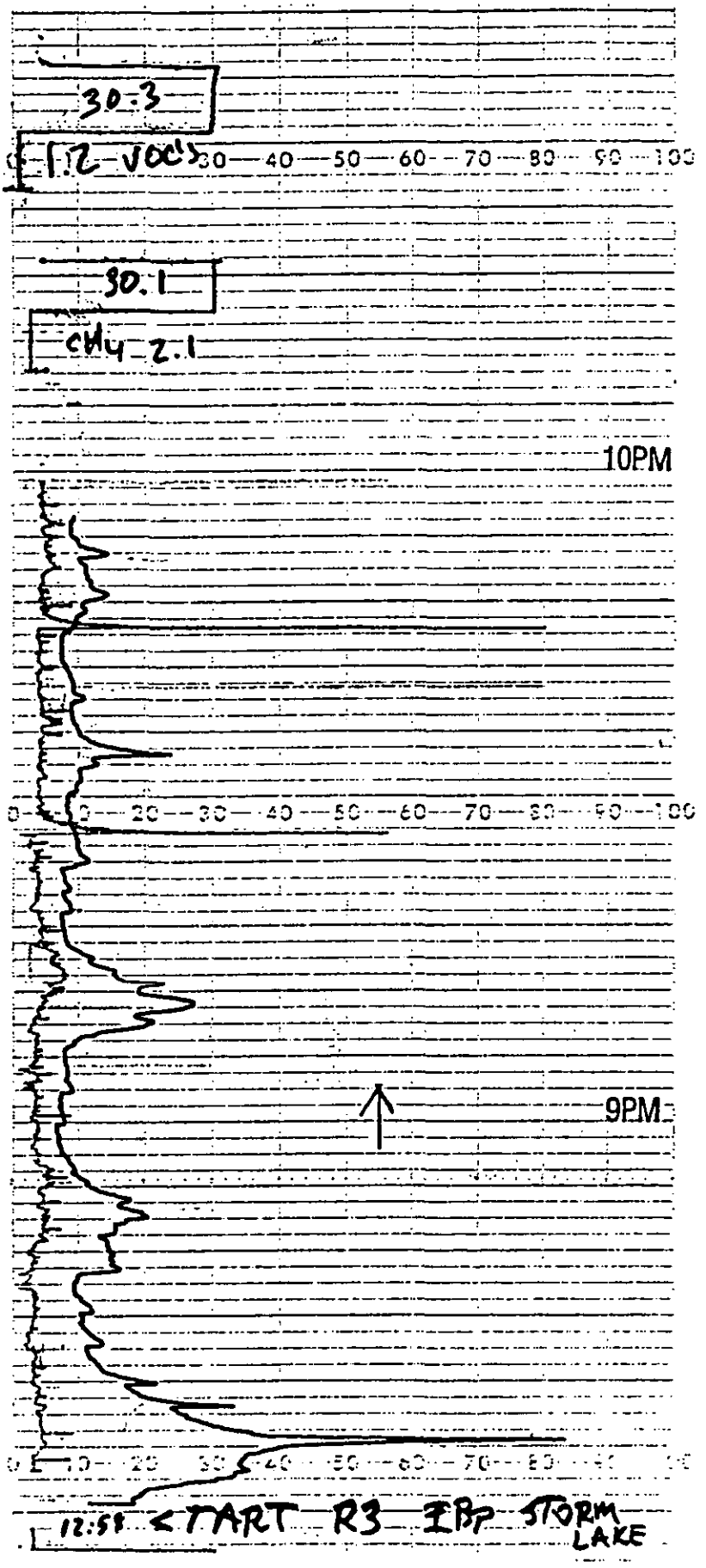
linearity 0-100 SCALE



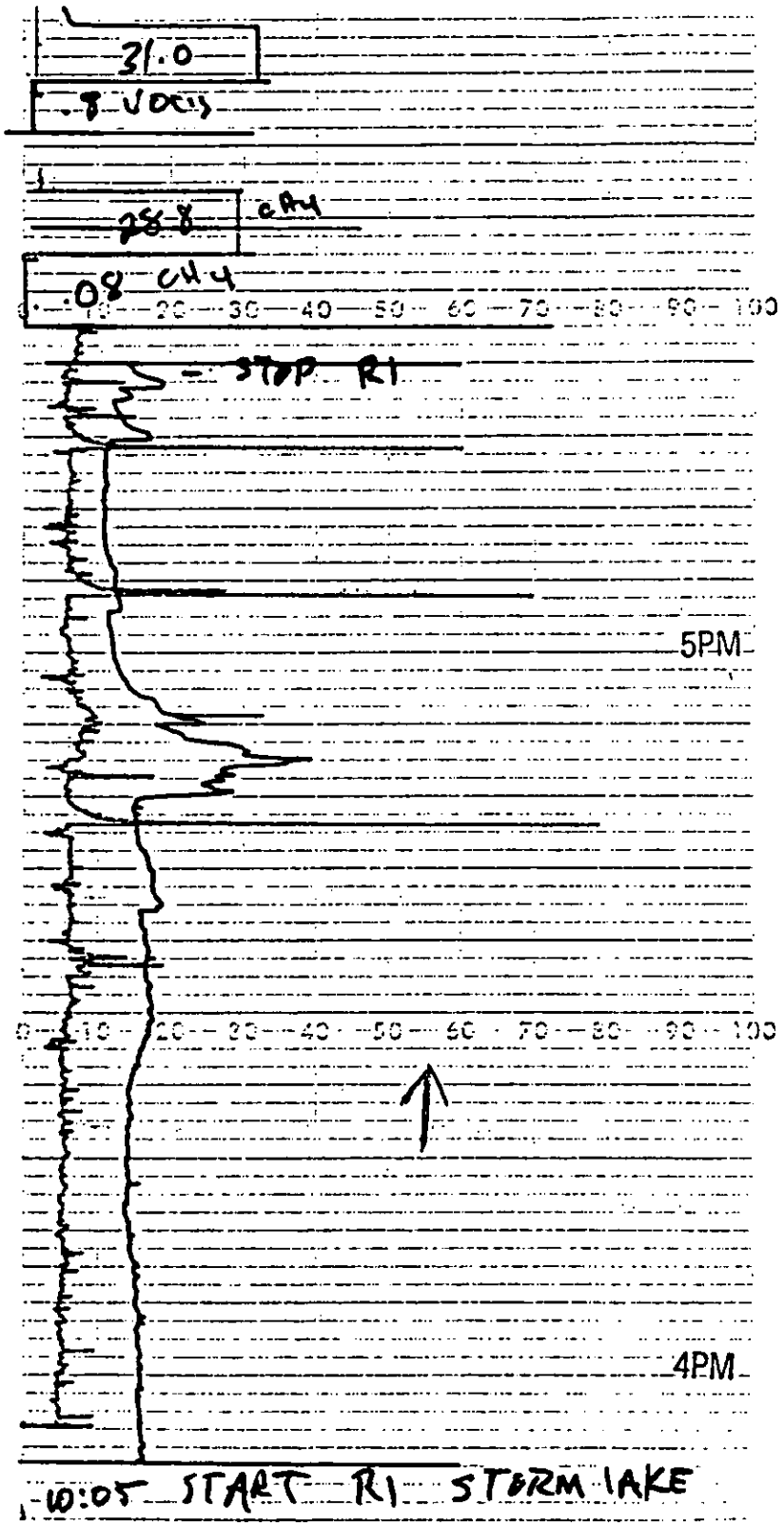
RUN 1 0-100 SCALE



RUN 2 0-100 SCALE



RUN 3 0-100 SCALE



APPENDIX B

PROCESS DATA

IBP - STORM LAKE
DAILY PRODUCTION STATS
W/E: 09-13-97

	MON	TUE	9/10 WED	9/11 THURS	9/12 FRI	9/13 SAT	SUN	TOTAL
HRS KILLED A	8.00	8.00	8.00	8.00	8.00	8.25	0.00	48.25
HRS KILLED B	8.00	7.75	8.00	8.00	7.75	7.50	0.00	47.00
HRS CUT A	5.50	7.50	8.00	8.00	8.00	8.00	0.00	45.00
HRS CUT B	5.25	8.00	8.00	7.75	8.00	7.50	0.00	44.50
HEAD KILLED: A	6386	8996	8951	6986	6891	6535	0	40725
HEAD KILLED: B	5844	5629	5642	5783	5649	5518	0	34065
CONDEMNS	2	2	2	5	9	2	0	22
HOT WEIGHT	2329206	2368289	2376137	2400644	2349641	2305071	0	14126987
LIVE WT.	3140455	3192761	3203126	3237858	3166295	3121623	0	19082118
HOG COST	1706389	1710265	1714058	1738228	1668389	1641961	0	10177290
HOG FRT.	970	1327	1352	1479	1672	2753	0	9553
I/P FREIGHT	0	0	0	0	0	0	0	0
CRACKS	147000	179180	172200	146274	173080	133680	0	951414
BLOOD	15282	20056	17630	15958	15087	15056	0	99051
LARD	103980	153980	174430	170257	171680	172620	0	946907
GREASE	149300	107908	137880	131020	97040	139600	0	762728
BLOOD PLASMA	67700	64840	62940	65940	63620	66540	0	391480
LIQUID BLOOD	0	0	0	0	0	0	0	0
OFFAL : A	32822	36553	36442	36492	37796	32617	0	212724
OFFAL : B	31823	31845	32016	32759	29047	27785	0	185075
HASH GUTS	0	0	0	0	0	0	0	0
MUCOS/	0	0	0	0	0	0	0	0
A: O/S CARC HEAD	0	0	0	0	0	0	0	0
O/S CARC WGHT	0	0	0	0	0	0	0	0
O/S CARC $	0	0	0	0	0	0	0	0
B: O/S CARC HEAD	0	0	0	0	0	0	0	0
O/S CARC WGHT	0	0	0	0	0	0	0	0
O/S CARC $	0	0	0	0	0	0	0	0
CUT : A	715666	1032339	1094396	1070146	1091068	1104521	0	6108125
CUT : B	549419	795022	829538	822296	800827	796418	0	4593321
SHIP REV.	0	0	0	0	0	0	0	0
SHIP COST	0	0	0	0	0	0	0	0
SAT COLD MEAT b	6317							
COLD MEAT : A	5246	8974	8852	8181	8378	8113	0	47744
COLD MEAT : B	8933	9877	9734	9529	9394	9216	0	56683
HEAD CUT : A	4687	6849	7316	7143	7348	7396	0	40740
COLD WGHT : A	894295	1280863	1351121	1329294	1361243	1369772	0	7586578
COLD WGHT : B	656606	971416	1023591	1012889	957504	996448	0	5618134
CARRYOVER HEAD	0	222	0	0	262	0	0	484
TOTAL HEAD CUT	8216	11986	12845	12591	12502	12793	0	70933
TOTAL COLD WT	22886	22523	23747	23420	23187	23662	0	139405
HOT BOX SHRINK	1.46%	1.50%	1.38%	1.44%	1.39%	1.36%	0.00%	
BLOOD YIELD	1.25	1.59	1.40	1.25	1.20	1.25	ERR	
OFFAL YIELD A	0.09	0.17	-0.02	-0.10	0.27	0.04	0.00	
OFFAL YIELD B	0.40	0.47	0.43	0.33	0.20	0.06	0.00	
CUT YIELD A	4.40	4.11	6.06	4.99	4.77	5.04	0.00	
CUT YIELD B	6.25	6.79	6.06	5.82	9.01	5.18	0.00	
PLANT DRESS YIELI	74.31	74.34	74.38	74.35	74.55	74.19	0.00	
FLOOR YIELD	74.31	74.40	74.41	74.39	74.65	74.18	0.00	

10188843 — RENDERING

WTD	MON	TUE	WED
127986	19772	24100	23181
28804	4444	5633	5127
219777	24129	35734	40485
148586	28896	20740	26497
17930	3101	2970	2883
0	0	0	0

541072 TOTAL VALUE

IBP - STORM LAKE

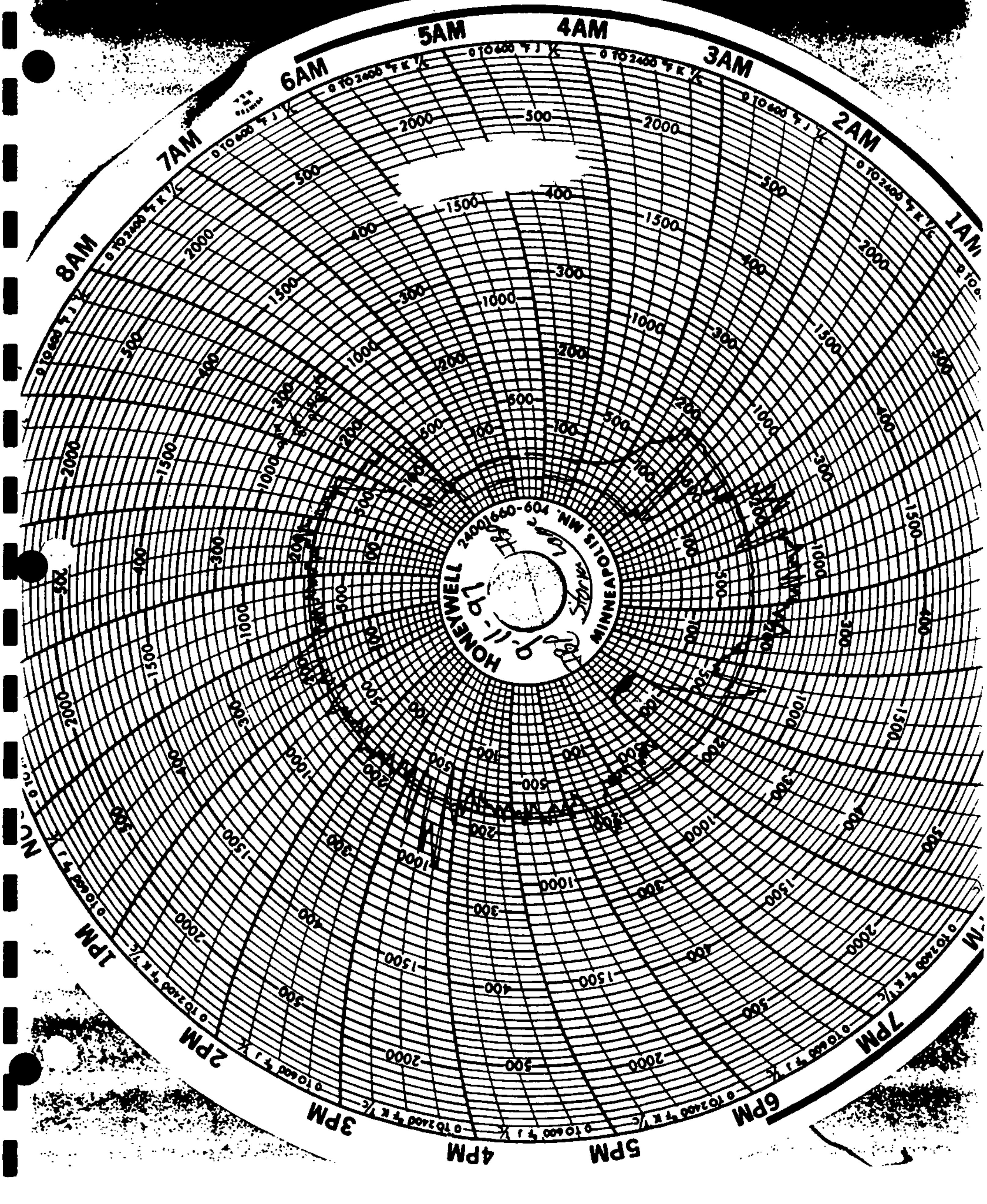
174 OTHER ASSUMPTIONS

RENDERING VALUES		KILL $/HD	INVEN
CRACKS	2.59%	6.56	13.45
LARD	1.76%	4.45	23.21
GREASE	1.96%	4.96	19.22
TOTAL		15.96	17.96
BLOOD PLASMA			4.58
COLD MEAT			63.82
BLOOD VALUE			29.06
LIQUID BLOOD			3.44

KILL COST

Post-it® Fax Note 7671	Date	# of pages ▶
To Rochelle	From Shelly	
Co./Dept.	Co. St. Acct	
Phone #	Phone #	
Fax #	Fax #	

** TOTAL PAGE.001 **


HONEYWELL
MINNEAPOLIS, MN.
24001660-604
1AM
2AM
3AM
4AM
5AM
6AM
7AM
8AM
NOON
1PM
2PM
3PM
4PM
5PM
6PM
7PM
0 TO 2400 °F K ½
0 TO 600 °F J ½

Pork Blood - Fuel Heated - Natural Gas
Storm Lake Blood VOC Test
Natural Gas

Tested September 11, 1997 at Storm Lake, Iowa on a Duske Blood Drye

Test #1	0.067	
Test #2	0.093	
Test #3	0.082	
	0.081	
Head hd/day	12,769	
Blood Operation Hours	16.5	
Blood Yield lbs/hd	1.25	
	lbs/hr	tons/hr
Blood Processed	967.35	0.48
	lb/ton	
Emisson Factor	0.152	
Heat Capacity MMBtu/hr	2.63	
Emission Factor VOC- NG	2.78E-06	
VOC emission from Combus	0.007311	
VOC emission from blood	0.073355	

APPENDIX C

EQUIPMENT CALIBRATION

PRETEST DRY GAS METER CALIBRATION DATA FORM (ENGLISH UNITS)

METER BOX NUMBE 1

DRY GAS METER NUMBER: 1197397

DATE: *07/02/97*

tEFERENCE TEST METER NUMBER 27865

DELTA-H@	0	0.5	1	1.5	2	2.5	3	3.5	4
Vwr	427.276	432.620	440.052	449.010	455.391	471.452	478.198	483.646	489.274
Vdr	672.985	678.390	685.928	695.018	701.492	717.813	724.688	730.249	735.975
Tw		71	72	72	72	73	73	73	74
Tdi		77	82	87	89	91	93	94	95
Tdo		75	77	79	81	84	85	86	86
Td(AVE)		76	79.5	83	85	87.5	89	90	90.5
THETA		13.1	13.0	13.0	8.0	18.0	7.0	5.1	5.0
VAC.		1	1	1	1	1	1	1	1
Yi		0.9968	0.9973	1.0020	1.0046	1.0045	1.0031	1.0020	1.0031
DELTA-H@i		1.7163	1.7564	1.8017	1.7864	1.7829	1.8290	1.7336	1.7895
Vw		5.344	7.432	8.958	6.381	16.061	6.746	5.448	5.628
Vd		5.405	7.538	9.09	6.474	16.321	6.875	5.561	5.726
Vd/Min.		0.4141762	0.5798462	0.6992308	0.80925	0.9067222	0.9821429	1.0903922	1.1452

Y(AVE)	**1.0017**
DELTA-H@(AVE)	**1.7745**
Pbar	28.97

CALIBRATED BY **D.W.**

Vwr=REFERENCE TEST METER READING

/dr=DRY GAS METER READING

Vw=GAS VOLUME PASSING THROUGH THE REFERENCE TEST METER, CUBIC FEET

Vd=GAS VOLUME PASSING THROUGH THE DRY GAS METER, CUBIC FEET

Tw=TEMPERATURE OF THE GAS IN THE REFERENCE TEST METER, DEGREES F

Tdi=TEMPERATURE OF THE INLET GAS OF THE DRY GAS METER, DEGREES F

Tdo=TEMPERATURE OF THE OUTLET GAS OF THE DRY GAS METER, DEGREES F

Td=AVERAGE TEMPERATURE OF THE GAS IN THE DRY GAS METER, DEGREES F

DELTA-H=PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. WATER

Yi=RATIO OF ACCURACY OF REFERENCE TEST METER TO DRY GAS METER FOR EACH RUN

Y=AVERAGE RATIO OF ACCURACY OF REFERENCE TEST METER TO DRY GAS METER

DELTA-H@i=ORIFICE PRESSURE *DIFFERENTIAL THAT EQUATES TO 0.75 cfm OF AIR*
AT 68 DEGREES F AND 29.92 INCHES OF Hg., INCHES OF WATER

DELTA-H@=AVERAGE ORIFICE PRESSURE DIFFERENTIAL THAT EQUATES TO 0.75 cfm OF AIR
AT 68 DEGREES F AND 29.92 INCHES OF Hg.,INCHES OF WATER

TOLERENCE OF Yi=PLUS OR MINUS 0.020 FROM Y

TOLERENCE OF DELTA-H@i=PLUS OR MINUS 0.20 FROM DELTA-H@

Pbar=BAROMETRIC PRESSURE,in. Hg.

THETA=TIME OF CALIBRATION RUN, Min.

Thermocouple Calibration Form

Meter Box #1

Thermocouple Number	Temperature Reading #1	Reference Temp #1	Temperature Reading #2	Reference Temp #2	Temperature Reading #3	Reference Temp #3
1	72	73	180	181	289	286
2	72	73	179	181	290	286
3	73	73	181	181	290	286
4	74	73	180	181	289	286
5	73	73	180	181	289	286
6	40	39	73	74	107	108
7	39	39	72	74	107	108

Calibrated By: SRM
Date: 4-8-96

Criteria:Absolute temp reading cant excede 1.5% of Absolute reference temp

PRETEST DRY GAS METER CALIBRATION DATA FORM (ENGLISH UNITS)

METER BOX NUMBER 1

DRY GAS METER NUMBER 1197397

DATE 09/30/97

REFERENCE TEST METER NUMBER 27865

DELTA-H		2.00	2.00	2.00					
Vwr	495.749	508.304	514.499	518.461					
Vdr	753.179	765.880	772.168	776.184					
Tw		70	70	70					
Tdi		79	81	83					
Tdo		71	72	74					
Td(AVE)-		75.0	76.5	78.5					
THETA		16.0	8.0	5.0					
VAC.		5.0	10.0	15.0					
Yi		0.9928	0.9923	0.9974					
DELTA-H@i		1.8508	1.8951	1.8032					
Vw		12.555	6.195	3.962					
Vd		12.701	6.288	4.016					
Vd/Min.		0.7938	0.7860	0.8032					

Y(AVE)	0.9942		
DELTA-H@(AVE)	1.8497	CALIBRATED BY	DW
Pbar	29.21		

Vwr=REFERENCE TEST METER READING

Vdr=DRY GAS METER READING

Vw=GAS VOLUME PASSING THROUGH THE REFERENCE TEST METER, CUBIC FEET

Vd=GAS VOLUME PASSING THROUGH THE DRY GAS METER, CUBIC FEET

Tw=TEMPERATURE OF THE GAS IN THE REFERENCE TEST METER, DEGREES F

Tdi=TEMPERATURE OF THE INLET GAS OF THE DRY GAS METER, DEGREES F

Tdo=TEMPERATURE OF THE OUTLET GAS OF THE DRY GAS METER, DEGREES F

Td=AVERAGE TEMPERATURE OF THE GAS IN THE DRY GAS METER, DEGREES F

DELTA-H=PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. WATER

Yi=RATIO OF ACCURACY OF REFERENCE TEST METER TO DRY GAS METER FOR EACH RUN

Y=AVERAGE RATIO OF ACCURACY OF REFERENCE TEST METER TO DRY GAS METER

DELTA-H@i=ORIFICE PRESSURE DIFFERENTIAL THAT EQUATES TO 0.75 cfm OF AIR AT 68 DEGREES F AND 29.92 INCHES OF Hg., INCHES OF WATER

DELTA-H@=AVERAGE ORIFICE PRESSURE DIFFERENTIAL THAT EQUATES TO 0.75 cfm OF AIR AT 68 DEGREES F AND 29.92 INCHES OF Hg.,INCHES OF WATER

TOLERENCE OF Yi=PLUS OR MINUS 0.020 FROM Y

TOLERENCE OF DELTA-H@i=PLUS OR MINUS 0.20 FROM DELTA-H@

Pbar=BAROMETRIC PRESSURE,in. Hg.

THETA=TIME OF CALIBRATION RUN, Min.

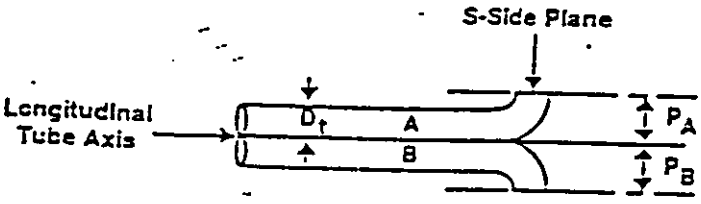
Type S Pitot Inspection Form

Pitot Tube No. 321

Tubing Diameter, D_t 3/8 in. $\left(\frac{3}{16} < D_t < \frac{3}{8}\right)$

Pitot Tube Assembly Level? (Yes) No

Pitot Tube Opening Damaged? Yes (No)

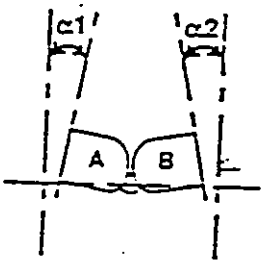


Note: $1.05\ D_t < P < 1.50\ D_t$

$P_A = P_B$

P_A = 7/16 in.

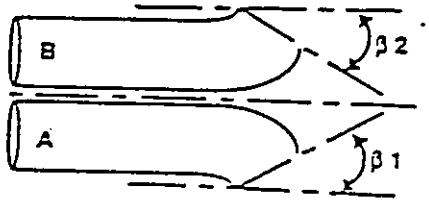
P_B = 7/16 in.



α 1 = 1 °

α 2 = 0 °

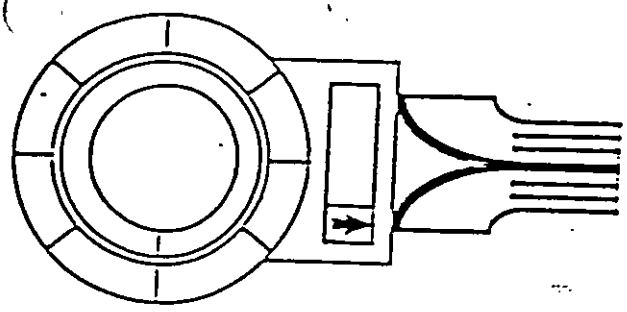
(< 10°)

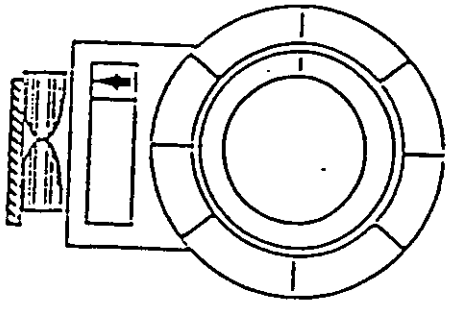


β 1 = 0 °

β 2 = 0 °

(< 5°)





Level Position to find γ = 0

Z = A' sin γ 0 In. (< 1/8 In.)

Level Position to find θ = 0

W = A' sin θ 0 In. (< 1/32 In.)

Comments: _____

Checked by: DW

Date: 5/17/97

Calibration Required? NO

D_t = External Tube Diameter

A' = Distance Between Tips (P_A - P_B) inches

BAROMETER CALIBRATION FORM

Barometer # 1
Cal'd Against Hg BAROMETER

DATE	REFERENCE BAROMETER (in. Hg.)	DIAL BAROMETER (in. Hg.)	DIFFERENCE
8/12/97	29.36	29.37	+.01
9/29/97	28.72	28.71	-.01

APPENDIX D

EXAMPLE CALCULATIONS

CALCULATION FORMULAS

Linearity Percent Difference = $\frac{\text{Analyzer Response - Cylinder Value}}{\text{Span}} \times 100$

Bias System Bias = $\frac{\text{System Response - Analyzer Response}}{\text{Span}} \times 100$

Drift System Drift = $\frac{\text{System Response - Previous System Response}}{\text{Span}} \times 100$

Moisture Moisture = $\frac{100 \times \text{Volume water vapor (scf)}}{\text{(Volume Gas (dscf) + Volume water vapor)}}$

Stack Area Area = 3.14 x Radius^2

AFPM Actual Feet per Minute = 5130 x .84 x SDE Avg x (1 / (stack pres. Hg x wet MW)) ^.5

ACFM Actual Cubic Feet/Min = AFPM x Stack Area (sqaure feet)

DSCFM Dry Std. Cubic Feet/Min = $\frac{\text{(ACFM x 528 x Dry Mole Fraction x Stack pres. Hg)}}{\text{(29.92 x (Stack Temperature + 460))}}$

DSCF/HR Dry Std. Cubic Feet/Hr = SCFM x 60 min

Humidity Humidity (gal H2O/gal. air) Taken From Chart (Wet bulb / Dry bulb temps)

EFFLUENT GAS CONC CALCULATION

GAS CONC. = (Avg Stk Conc - Avg Zero Cal) x (Span Conc/(Avg Span Cal - Avg Zero Cal))

LBS/HR CH4 Pounds per Hour as Methane = PPMv (VOC's less Methane) x 16.01 x DSCFM x 1.554E-7

LBS/HR Carbon Pounds per Hour as Carbon = PPMv (VOC's less Methane) x 12.01 x DSCFM x 1.554E-7

Since the stack gas total hydrocarbon concentrations will be measured as methane and the stack methane gas will be measured, the methane fraction can be subtracted straight out of the stack gas concentrations.

The calibration of the FID (JUM) analyzer will be with Propane as a Methane concentration. The following is an example:

FID (JUM): Propane ($C_3 H_8$) = 17 ppm. There are three Carbons in propane. Calibrate as 51 ppm CH_4.
FID (CAI): Methane (CH_4) = 50 ppm. There is only one Carbon in methane. Calibrate as 50 ppm CH_4.

Propane equivalent to Methane would be 17 x 3 = 51 ppm as methane.

80 ppm (JUM) - 60 ppm (CAI) = 20 ppm total hydrocarbons as methane.

The final test results will be reported in lbs/hr as CH4.