9.5.3 Meat Rendering Plants

Compliance emissions testing of the Supercooker at IBP, Inc. Dakota City, NE

TRC Environmental Corporation for IBP, Inc.

July 1998

1998 (post section publication) source test data.

September 21, 1998

Mr. Dave Meierhenry
Air Quality Compliance Section
Nebraska Department of Environmental Quality
P. O. Box 98922
Lincoln, NE 68509-8922

RE: IBP, inc., Dakota City, Nebraska
Inedible Cooking System VOC, SOx, NOx, CO and PM Test Report

Dear Mr. Meierhenry:

Please find enclosed a copy of the Test Report for VOC, SOx, NOx, CO and PM testing conducted at the IBP Dakota City facility. The testing was conducted on July 22, 1998 by TRC Environmental Corporation. VOC, SOx, NOx, CO and PM testing was completed per the Nebraska Compliance Sampling Methods and was approved through protocol submittals.

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

Sincerely,

Rechelle Kruse
Air Pollution Control Engineer

c: Tom Trosper (w/o test report)
Angela Gogel (w/test report)
Dallas Seifert (w/test report)

RK98-574/DC-Stack Test

Summary:

IBP created a project to quantify VOC emissions from their rendering processes including blood dryers, edible dryers, and inedible cookers for both beef and pork. The testing was conducted on all three systems under various heating conditions. The intent was to quantify VOC emissions for natural gas system as well as steam systems and to prove or disprove the difference in VOCs from products developed in fuel fired vs. steam heated processes.

VOC, SOx, NOx, CO, and PM data was obtained at the outlet of the first packed bed. Testing was conducted at the outlet of the first packed bed due to previous problems in September 1997 sampling at the outlet of the condenser. SOx, NOx, and CO data were also obtained at the outlet of the condenser prior to the first packed bed as well.

Emission Data:

Inedible Steam Cooker

Test Data Outlet of Condenser

	VOC	SOx	NOx	CO	PM
Test #1	No data taken	0.0562	0.0143	0.0365	No data taken
Test #2	No data taken	0.0346	0.0055	0.0358	No data taken
Test #3	No data taken	0.1098	0.0092	0.0236	No data taken
Average	---	0.0669	0.0097	0.0320	---

Test Data Outlet of First Packed Bed

	VOC	SOx	NOx	CO	PM
Test #1	0.833	0.0728	0.0362	0.0216	0.643
Test #2	0.940	0.0401	0.0537	0.0334	0.299
Test #3	0.663	0.0751	0.0149	0.0366	0.205
Average	0.812	0.063	0.035	0.031	0.382

Comparing the difference in the results from the outlet of the condenser to the outlet of the first packed bed for SOx, NOx, and CO within the error of the data there is really no change (control efficiency) attributable to the scrubbing of the packed bed scrubber. For practical reasons, IBP will assume the SOx, NOx, and CO are the same through the system taking no efficiencies due to scrubbers. SOx, NOx, and CO data were obtained to compare with the test results obtained by National By-Products in there December 1994 emission tested conducted in Des Moines, Iowa. TRC has reviewed the test report generated from the National By-Products and has summarized in a letter specific reasons for invalidating the results of that December test (Attachment A).

The Results of December 1994 National By-Products Tests
Samples Taken after Ventrui Scrubber Before Boiler Incineration

	VOC	SOx	NOx	CO	PM
Test #1	2.60	0.26	0.10	0.03	0.51
Test #2	2.58	0.19	0.13	0.08	0.67
Test #3	3.00	0.19	0.12	0.06	0.45
Average	2.73	0.21	0.12	0.06	0.54

Overall in comparison, the data obtained at IBP showed to much lower for all pollutants and much more reasonable. SOx, NOx, and CO pollutants are formed from combustion and with the system being steam heated it is difficult to justify the presence of combustion pollutants.

Process Information During Test:	Head Kill	3,657 hd/day
	Inedible Yield	39 lbs/hd finished crax
	Inedible Operation Hours	13

Total Inedible Crax Processed: [(3,657 hd/day) x (39 lbs/hd)]/13 hrs/day = 10,971 lbs/hr finished crax
(10,971 lbs/hr) x (1 ton/2,000 lbs) = 5.49 tons/hr finished crax

Inedible Crax **VOC** Emission Factor:	Crax Processed	5.49 tons/hr
	VOC Emissions from Inedible Cooking	0.812 lbs/hr

0.812 lbs/hr/5.49 tons/hr = 0.15 lbs/ton finished crax

Inedible Crax **SOx** Emission Factor:	Crax Processed	5.49 tons/hr
	SOx Emissions from Inedible Cooking	0.0669 lbs/hr

0.0669 lbs/hr/5.49 tons/hr = 0.012 lbs/ton finished crax

Inedible Crax **NOx** Emission Factor:	Crax Processed	5.49 tons/hr
	NOx Emissions from Inedible Cooking	0.0349 lbs/hr

0.0349 lbs/hr/5.49 tons/hr = 0.006 lbs/ton finished crax

Inedible Crax **CO** Emission Factor:	Crax Processed	5.49 tons/hr
	CO Emissions from Inedible Cooking	0.0320 lbs/hr

0.0320 lbs/hr/5.49 tons/hr = 0.006 lbs/ton finished crax

Inedible Crax **PM** Emission Factor:	Crax Processed	5.49 tons/hr
	PM Emissions from Inedible Cooking	0.3823 lbs/hr

0.3823 lbs/hr/5.49 tons/hr = 0.07 lbs/ton finished crax

VOC data obtained from the Lexington facility on July 21, 1998

Test Data:	Test #1	1.184 lbs/hr
	Test #2	0.890 lbs/hr
	Test #3	0.928 lbs/hr
	Average	1.00 lbs/hr

Process Information During Test:	Head Kill	4,665 hd/day
	Inedible Yield	39.6 lbs/hd finished crax
	Inedible Operation	20 hrs

Total Inedible Crax Processed: [(4,645 hd/day) x (39.6 lbs/hd)]/20 hrs/day = 9,236.7 lbs/hr finished crax
(9,236.7 lbs/hr) x (1 ton/2,000 lbs) = 4.62 tons/hr finished crax

Inedible Crax Emission Factor:	Crax Processed	4.62 tons/hr
	VOC Emissions from Blood Drying	1.00 lbs/hr

1.00 lbs/hr/4.62 tons/hr = 0.23 lbs/ton finished crax

VOC Emission Factor Average of Dakota City and Lexington data: (0.15+0.23)/2 = 0.19 lb/ton finished crax.

Summary Table of Emission Factors Generated

	VOC, lb/ton finished crax	SOx, lb/ton finished crax	NOx, lb/ton finished crax	CO, lb/ton finished crax	PM, lb/ton finished crax
Emission Factor	0.19	0.012	0.006	0.006	0.070

These emission factors generated by IBP will be used to estimate emissions from steam cooking beef inedible crax and will supersede those emission factors generated by National By Products.

Attachment A

TRC Summary of Test Report and National By Products December 1994 Test Report

TRC

September 17, 1998

Ms. Rechelle Kruse
Air Pollution Control Engineer
IBP, Inc
P.O.Box 515 MD #34
Dakota City, NE. 68731

Re: Review of CES test report dated January 5,1995

Dear Rechelle:

At your request I have reviewed the test report performed by Comprehensive Emission Services (CES) on the Dupps 320U Continuous Cooker at the National By-Products plant in Des Moines, Iowa.

First and foremost I am under the assumption that this is a complete test report as submitted by CES. My comments in this review are based upon my assumption that this is the complete report.

Particulate Sampling

1) According to the Preliminary Velocity sheet located in Appendix B cyclonic flow checks performed were only performed at points 4, 5 & 6 which indicate a 40 & 45 degree null angle. Where are points 1,2 &3 ? According to Method 5 if cyclonic flow is >20 degrees corrective action must be taken prior to performing a Method 5 test. This alone would void all performed tests.

2) According to the Method 5 data sheets oven temperatures were not applicable (N/A). I would like to see were this is stated in the method. Probe temperatures were only monitored at various points on Run #1, at one point on Run #2 and were never logged on Run #3. According to the method they need to be logged at each point. Also the method states that the temperature must be maintained at 247 degrees +/- 25 degrees. Run #1 Point #2B shows a temperature of 219 degrees which is below the allowed temperature.

3) According to Figure 2 on page 7 the stack diameter is 30 inches, all field data reflects a 22 inch stack. This could just be a typing error.

TRC Environmental Corporation
1307 Butterfield Road, Suite 412 • Downers Grove, Illinois 60515
Telephone 630-810-1122 • Fax 630-810-1494

Continuous Emission Monitoring data (CEMS)

1) All of the scales used for measuring NO_x, CO, SO_2 and THC are incorrect for the concentrations monitored. I assume NO_x was calibrated on a 0-1000 ppm scale using a 1010 high gas, 415 mid gas and a 221 low gas to measure 10 ppm or less. This is unacceptable. The drift alone was higher than the concentrations measured. The SO_2 was calibrated on the 0-500 ppm scale to measure 31 ppm or less this is unacceptable. The zero calibrations alone on SO_2 are half of the measured concentrations. CO was measured on 0-1000 ppm scale, concentrations of CO were less than 20 ppm. Once again drift alone was higher than most concentrations observed. THC was calibrated on the 0-100 ppm scale measuring concentrations as high as 336 ppm. This is also unacceptable. Reference Method 25 should have been used or 0-1000 ppm span range.

2) I did not see any of the Protocol 1 gas certifications in any of the Appendices.

3) I did not see any of the calibration drift correction calculations in any part of the report.

4) I did not see in the report what the actual scales for the testing was, I had to assume based on cal gases what scale was used.

Process data

1) Raw material used relates to what kind of raw material. If the raw material used was a mix of different animal scraps it is very hard to compare this to strictly beef products. It basically compares apples to oranges when it comes to emission rates.

In closing I feel that this is very weak data and should not be used when determining actual emission rates for this type of source. If you or anyone else has comments in regard to this letter please feel free to contact me at (630) 810-1122.

Sincerely,

Scott R. Miller

Scott R. Miller
Manager, Measurements Division

EMISSION TEST REPORT
on
The Dupps 320U Continuous Cooker
at the
NATIONAL BY-PRODUCTS
facility in Des Moines, Iowa
on
September 20, 1995

Conducted
By

Comprehensive Emission Services
1112 Maple
West Des Moines, Iowa 50265
(515) 225-7372

Project No. 6995

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PREFACE

This report summarizes the results of the data collected on an emission demonstration test at the National Byproducts facility in Des Moines, Iowa. To the best of our knowledge the data contained in this report is accurate and complete. Any questions concerning this report should be directed to Mr. Douglas J. Ostrander, or Mr. Timothy C. Titus. Mr. Ostrander and Mr. Titus may be reached by phone at (515) 225-7372.

Tim Titus
Test Leader

Mark Titus
Reviewed By

Date: September 29, 1995

INTRODUCTION

An emission test was conducted by Comprehensive Emission Services on the Dupps 320U Continuous Cooker vapors after the Venturi Scrubber prior to the boiler incinerator at the National By-Products facility in Des Moines, Iowa. Three Iowa Method 5 sampling runs with backhalf were performed. Three Continuous Emission Monitoring (CEM) runs were also conducted in accordance with Method 25A. The testing fulfills the requirements for testing on source #00445 established in the Polk County Construction Permit #704. The testing was performed on September 20, 1995.

Coordinating the field test were:

Tim Titus - Comprehensive Emission Services
Todd Ferrell - National By-Products

Conducting the field test were:

Steve Dinsmore - Comprehensive Emission Services
Tim Titus - Comprehensive Emission Services

The appendices to this report contain the following information and data:

Appendix A: Example Calculations
Appendix B: Labotatory Data Forms
Appendix C: Field Data Forms
Appendix D: Pretest Calibrations
Appendix E: Posttest Calibrations
Appendix F: Process Data
Appendix G: CEM Data Forms

SUMMARY OF RESULTS

Table 1 summarizes the test results for testing on the Dupps 320U Continuous Cooker vapors after the Venturi scrubber prior to the boiler incinerator. The test runs was completed on September 20, 1995.

These values are not blank corrected.

Table 1
Summary of Test Results

		Run 1	Run 2	Run 3
Particulate Net Weight	g	0.0113	0.0209	0.0120
Particulate Emissions	gr/dscf	0.0049	0.0080	0.0046
Particulate Emission Rate	lb/hr	0.06 .26 TPY	0.10 .44 TPY	0.06 .26 TPY
THC Emission Rate	lb/hr	2.40 10.5 TPY	3.11 13.6 TPY	2.39 10.5 TPY
Flow Rate	dscfm	1,317	1,496	1,479
Production Weight	lb/hr	35,344	35,344	35,344

.0034 lb/ton .0049 lb/ton

SAMPLING AND ANALYTICAL PROCEDURES

Sampling Procedures

Particulate emissions were determined by U.S. Environmental Protection Agency (EPA) Methods 1, 2, 3, 4, and Iowa Method 5. These methods are titled:

- Method 1 - "Sample and Velocity Traverse for Stationary Sources"
- Method 2 - "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)"
- Method 3 - "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air and Dry Molecular weight"
- Method 4 - "Determination of Moisture Content in Stack Gases"
- Method 5 - "Determination of Particulate Emissions From Stationary Sources"

These methods appear in detail in Title 40, Code of Federal Regulations (CFR), Part 60 Appendix A, and in the Iowa Compliance Sampling Manual.

The sampling apparatus is shown in Figure 1 on page 6. All equipment was calibrated at the Comprehensive Emission Services' office prior to shipment to the test site.

The continuous emission monitoring emissions were determined by U.S. Environmental Protection Agency (EPA) Method 25A. This method is titled:

- Method 25A - "Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer.

This Method appears in detail in Title 40 Code of Federal Regulations (CFR), Part 60, Appendix A.

Sampling Locations

A total of 12 sample points were used for determining particulate emissions. The sample time per point was five minutes for a total sampling time of 60 minutes per test run. The stack sampling point locations are shown in Figure 2 on page 7.

Analytical Procedures

Particulate

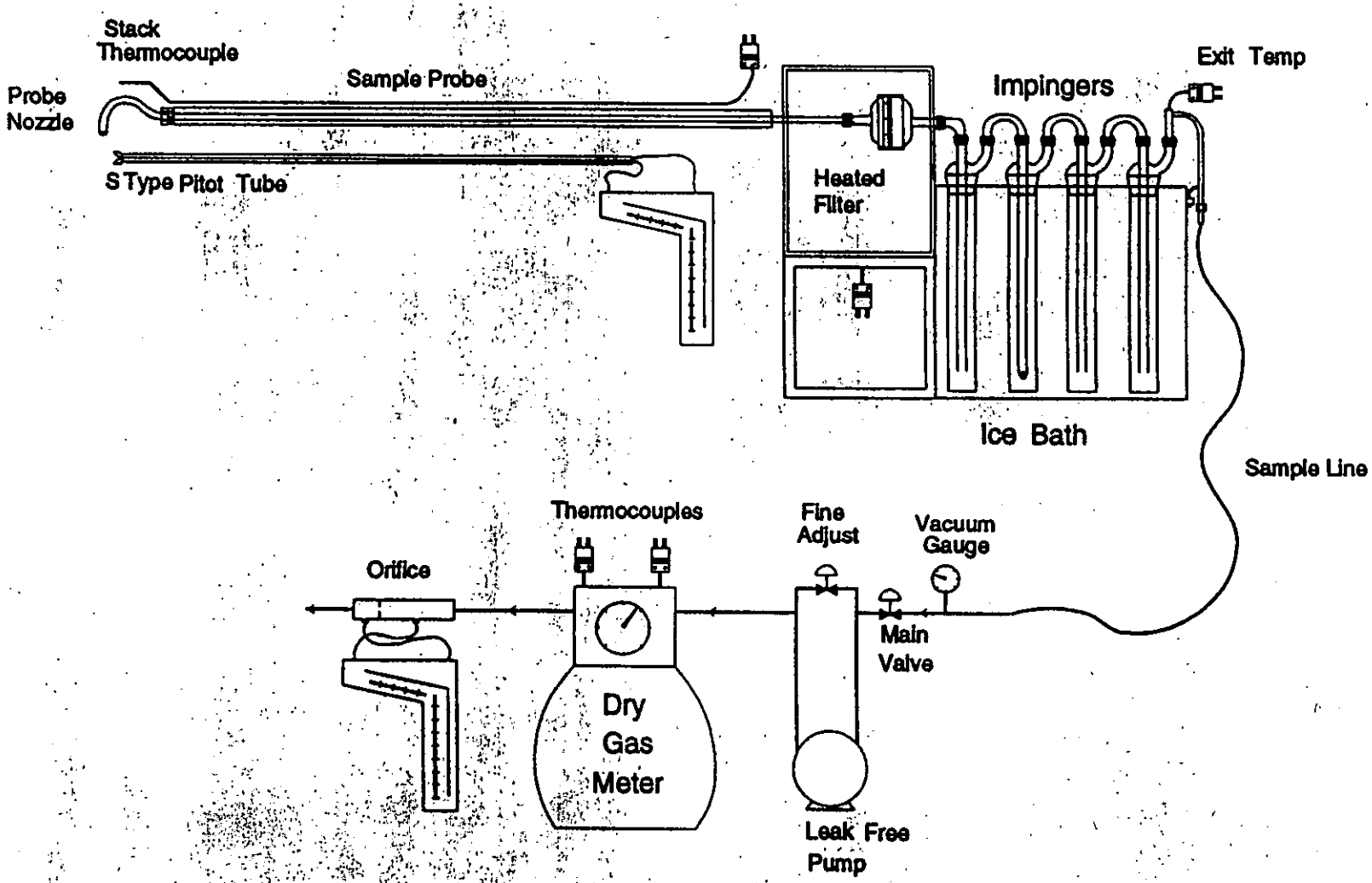
The particulate emission rate was determined following procedures detailed in Title 40, CFR, Part 60. Particulate samples collected on Whatman glass fiber filters were analyzed gravimetrically. The probe and nozzles were rinsed with acetone. The rinse was transferred to tared beakers and evaporated to dryness. The impinger solutions were analyzed for organic and inorganic particulate using Methylene Chloride. The organic and inorganic solutions were transferred to tared beakers and evaporated to dryness. The beakers and filters were desiccated for 24 hours and weighted to a constant weight. The weight differentials were combined to determine total particulate matter.

Stack Gas Monitoring System

A Gas Sample for the reference CEM system was continuously extracted from the stack through a stainless steel sample probe. The extracted sample was pulled through a series of heated filters to remove any particulate matter. The filters were heated to a temperature high enough to prevent condensation of any moisture in the gas stream. After the filters, a Teflon line was used to transfer the sample to the analyzers. So that the stack gases were measured on a dry basis, the moisture was removed from the sample gas stream by a series of refrigeration dryers. The flow of the stack gas sample was regulated at a constant rate to minimize drift.

Calibration Procedure

At the start of the day, the CEM monitors were checked for calibration error by introducing zero, mid-range, and high-range EPA Protocol 1 gases to the measurement system at a point upstream of the analyzers. Comprehensive Emission Services refers to the calibration error test as the instrument calibration. After the instrument calibration, each protocol gas was introduced into the sampling system to determine the sampling system bias. The gas was injected into the sampling valve located at the outlet of the sampling probe. The bias test was conducted before and after each consecutive test run by introducing zero and upscale calibration gases for each monitor. The upscale calibration gases used for the CEM bias tests were the calibration gases which most closely approximates the effluent concentration monitored during the test runs.



Schematic of Method 5 Sampling Train

Figure 1

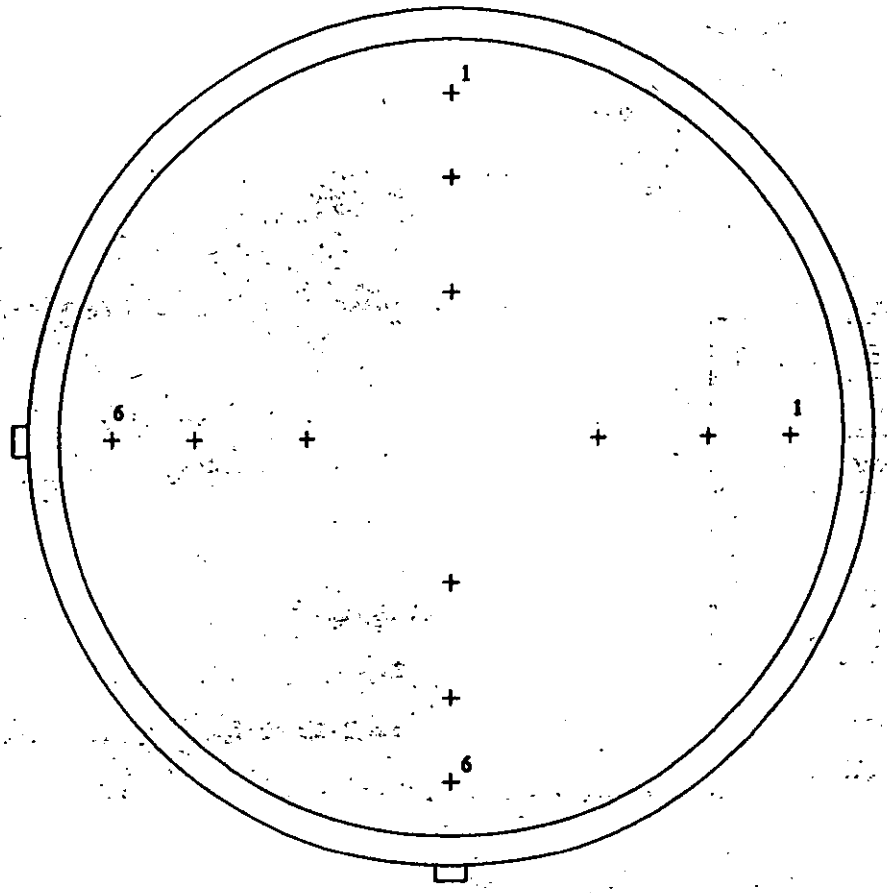


Figure 2

Location of Traverse Points

Stack Inside Diameter 30.0 inches

Point	Distance from Stack Wall Inches
1	21.03
2	18.79
3	15.49
4	6.51
5	3.21
6	0.97

TEST RESULTS

Table 2
Particulate Emission Results

Parameters	Unit of Measure	Run 1	Run 2	Run 3
Particulate Emissions				
Actual	gr/dscf	0.0049	0.0080	0.0046
Weight	grams	0.0113	0.0209	0.0120
Particulate Emission Rate				
Emission Rate	lb/hr	0.06	0.10	0.06
Stack Flow Rates				
Actual	acfm	1,371	1,556	1,538
Standard Conditions	dscfm	1,317	1,496	1,479
Velocity	ft/min	519	589	583
Sampling Results				
Isokinetics	%	97.9	97.3	97.6
Sampling Volume	dscf	35.750	40.374	40.019
Avg. Stack Temperature	°(F)	76	75	76
Avg. Sq Root Delta P	inches H_2O	0.1522	0.1728	0.1709
Avg. Delta H	Inches H_2O	1.03	1.31	1.28
Avg. Meter Temperature	°(F)	82.5	85.9	87.0
Oxygen	%	21.0	21.0	21.0
Carbon Dioxide	%	0.0	0.0	0.0
Moisture Collected	ml	27.1	54.6	28.2
Moisture	% H_2O	3.0	2.9	3.0
Start Time	HH:MM	22:16	1:00	14:28
Sampling Time	min.	60.0	60.0	60.0

Table 3
Continuous Emission Monitor Results

Parameters	Unit of Measure	Run 1	Run 2	Run 3
THC Emissions				
Concentration	ppm	266.60	303.40	236.30
Emission Rate	lb/hr	2.40	3.11	2.39

Appendix A

Example Calculation

NOMENCLATURE

Symbol	Description
acfm	Actual cubic feet per minute
A_s	Area of stack
B_{ws}	Percent water
C_p	Pitot tube calibration coefficient
C_{sd}	Concentration of particulate dry basis, standard conditions
D_n	Diameter of nozzle
dscfm	Dry standard cubic feet per minute
gr/dscfm	Grains per dry standard cubic feet per minute
ID	Inside diameter of stack
M_d	Molecular weight, dry stack gas
M_s	Molecular weight, stack gas
Q_{sd}	Stack flow rate, dry standard conditions
P_b	Barometric pressure
P_s	Stack pressure
SP	Static pressure
T_m	Average meter temperature
T_s	Temperature of stack gas
V_i	Initial meter reading
V_f	Final meter reading
V_m	Volume meter, actual
$V_{m\,std}$	Volume meter, standard conditions
V_s	Average stack gas velocity
W_c	Total moisture collected
$W_{t\,grain}$	Total particulate matter collected
Y	Meter correction factor
θ	Sampling time
% H_2O	Percent moisture by volume
% CO_2	Percent carbon dioxide by volume, dry
% O_2	Percent oxygen by volume, dry
% I	Percent isokinetic
ΔH	Pressure drop across orifice meter
ΔP	Gas velocity pressure

PARTICULATE CALCULATION EQUATIONS
Run 1

1. Volume meter

$$V_m = (V_f - V_i)\ Y$$

$$= (163.487 - 126.100)\ 0.976$$

$$= 36.490\ ft^3$$

2. Volume meter, standard conditions (70°, 29.92 in. Hg)

$$V_{m_{(STD)}} = \frac{17.7\ V_m \left(P_b + \frac{\Delta H}{13.6}\right)}{T_m + 460}$$

$$= \frac{17.7\ (36.490) \left(29.95 + \frac{1.03}{13.6}\right)}{82.5 + 460}$$

$$= 35.750\ ft^3$$

3. Percent moisture by volume

$$B_{ws} = \frac{100 \times 0.04707\ (W_c)}{0.04707\ (W_c) + V_{m_{(STD)}}}$$

$$= \frac{100 \times 0.04707\ (27.1)}{0.04707\ (27.1) + 35.750}$$

$$= 3.0\ \%$$

4. Molecular weight, dry stack gas

$$M_d = 0.16\ (\%CO_2) + 0.04\ (\%O_2) + 28.0$$

$$= 0.16\ (0.0) + 0.04\ (21.0) + 28.0$$

$$= 28.84$$

5. Molecular weight, stack gas

$$M_s = M_d \left(1 - \frac{B_{ws}}{100}\right) + 18 \left(\frac{B_{ws}}{100}\right)$$

$$= 28.84 \left(1 - \frac{3.0}{100}\right) + 18 \left(\frac{3.0}{100}\right)$$

$$= 28.52$$

6. Stack Pressure

$$P_s = P_b + \frac{SP}{13.6}$$

$$= 29.95 + \frac{0.20}{13.6}$$

$$= 29.96 \text{ inch. Hg}$$

7. Velocity of stack gas

$$V_s = 60 \times 85.49\ C_p \sqrt{\frac{T_s + 460}{P_s \times M_s}} \left(\sqrt{\Delta p}\right)_{avg}$$

$$= 60 \times 85.49\ (0.84) \sqrt{\frac{76 + 460}{29.96 \times 28.52}}\ (0.1522)$$

$$= 519 \text{ ft/min}$$

8. Percent isokinetic

$$\% \text{ I} = \frac{100\ (T_s + 460)\ V_{m_{(STD)}}}{17.7\ \theta\ V_s\ P_s \left(1 - \frac{B_w}{100}\right) \pi \left(\frac{D_n}{24}\right)^2}$$

$$= \frac{100\ (76 + 460)\ 35.750}{17.7\ (60)\ (519)\ 29.96 \left(1 - \frac{3.0}{100}\right) \pi \left(\frac{0.473}{24}\right)^2}$$

$$= 97.9\ \%$$

9. Area of stack

$$A_s = \pi \left(\frac{ID}{24}\right)^2$$

$$= \pi \left(\frac{22}{24}\right)^2$$

$$= 2.64 \text{ ft}^2$$

10. Stack volummetric flow rate actual conditions

$$Q_a = V_S A_s$$

$$= (519)\ (2.64)$$

$$= 1{,}371 \text{ acfm}$$

11. Stack volummetric flow rate, standard conditions (70°, 29.92 in. Hg)

$$Q_{std} = \frac{17.7 \times V_S A_s P_s \left(1 - \frac{B_{ws}}{100}\right)}{T_s + 460}$$

$$= \frac{17.7\ (60)(519)\ (2.64)\ (29.96)\left(1 - \frac{3.0}{100}\right)}{76 + 460}$$

$$= 1{,}317 \text{ dscfm}$$

12. Grains per dry standard cubic feet

$$C_{std} = \frac{15.43\ Wt_{gain}}{V_{m_{(STD)}}}$$

$$= \frac{15.43\ (0.0113)}{35.750}$$

$$= 0.0049 \text{ gr/dscf}$$

13. Emission rate

$$\text{lb/hr} = \frac{60\ Wt_{gain}\ (Q_s)}{453.5924\ V_{m_{(STD)}}}$$

$$= \frac{60\ (0.0113)\ (1{,}317)}{453.5924\ (35.750)}$$

$$= 0.06\ \text{lb/hr}$$

Appendix B

Laboratory Data Forms

Project Number: 6995
Plant Name: National By-products
Date: 9/21/95
Analysis Type: _____

CES Comprehensive Emission Services

Run 1

Type	Identification Number	Final Weight	Tare Weight	Net Weight	
Filter	F238	3.0370	3.0364	0.0006	
Probe Rinse (ml)	B439	77.2168	77.2156	0.0012	0.0018
Organic (ml)	B445	77.4629	77.4587	0.0042	
Inorganic	D160	175.2589	175.2536	0.0053	
			Total Net Weight	0.0113	

Run 2

Type	Identification Number	Final Weight	Tare Weight	Net Weight	
Filter	F239	3.0546	3.0542	0.0004	
Probe Rinse (ml)	B440	66.3829	66.3745	0.0084	0.0088
Organic (ml)	B446	66.2503	66.2402	0.0001	
Inorganic	D161	167.6561	167.6441	0.0120	
			Total Net Weight	0.0209	

Run 3

Type	Identification Number	Final Weight	Tare Weight	Net Weight	
Filter	F240	3.0087	3.0083	0.0004	
Probe Rinse (ml)	B441	64.8021	64.8004	0.0017	0.0021
Organic (ml)	B447	66.9781	66.9745	0.0036	
Inorganic	D162	176.9161	176.9098	0.0063	
			Total Net Weight	0.0120	

Blanks

Type	Identification Number	Final Weight	Tare Weight	Net Weight
Water Blank (ml)				
Acetone Blank (ml)				
$MeCl_2$ Blank (ml)				

Identification
F = 3 inch filter P = 47mm filter B = 150ml Beaker C = 250ml Beaker D = 400ml Beaker

FINAL WEIGHT
WEIGHING SHEET

Time		9:00	17:30						
Date		9/24/93	9/24						
Analyst		TT	TJ						
ID No.	Run	Weighing (grams)					Average Final Weight	Tare Weight	Net Weight
		1	2	3	4	5			
D157		170.9704	170.9709				170.9707		
D158		162.1061	162.1065				162.1063		
D159		163.1979	163.1983				163.1982		
D160		175.2588	165.2590				175.2589		
D161		167.6559	167.6563				167.6561		
D162		176.9159	176.9163				176.9161		
F238		3.0370	3.0370				3.0370		
F239		3.0546	3.0546				3.0546		
F240		3.0087	3.0087				3.0087		
C183		103.7995	103.7996				103.7996		
C184		105.8621	105.8624				105.8623		
C185		110.7181	110.7185				110.7183		
B443		77.4627	77.4630				77.4629		

Notes:

CES COMPREHENSIVE EMISSION SERVICES

FINAL WEIGHT
WEIGHING SHEET

Time		9:00	17:30						
Date		9/24/93	9/24/93						
Analyst		TT	TT						
ID No.	Run	Weighing (grams)					Average Final Weight	Tare Weight	Net Weight
		1	2	3	4	5			
B439		77.2166	77.2169				77.2168		
B440		68.3829	68.3828				68.3829		
B441		64.8020	64.8021				64.8021		
B442		66.1427	66.1429				66.1428		
B443		65.1814	65.1817				65.1816		
B444		67.2815	67.2820				67.2818		
B445									
B446		66.2503	66.2503				66.2503		
B447		66.9779	66.9782				66.9781		

Notes:

CES Comprehensive Emission Services

TARE WEIGHT
WEIGHING SHEET

Time	18:15	8:30				
Date	6/2/95	6/03/95				
Analyst	[illegible]	JH				
ID No.	Weighing (grams)					Average
	1	2	3	4	5	
F228	3.0619	3.0619				3.0619
F 229	3.0735	3.0735				3.0735
F 230	3.0772	3.0772				3.0772
F 231	3.0416	3.0414				3.0415
F 232	3.0749	3.0747				3.0748
F 233	3.0673	3.0672				3.0673
F 234	3.0461	3.0461				3.0461
F 235	3.0542	3.0542				3.0542
F 236	3.0520	3.0520				3.0520
F 237	3.0327	3.0327				3.0327
F 238	3.0363	3.0364				3.0364
F 239	3.0541	3.0543				3.0542
F 240	3.0081	3.0085				3.0083

Notes:

CES Comprehensive Emission Services

TARE WEIGHT
WEIGHING SHEET

Time	14:30	10:45				
Date	6/26	6/27/93				
Analyst	B.T.	TT				
ID No.	Weighing (grams)					Average
	1	2	3	4	5	
B 432	66.8488	66.8485				66.8487
B 433	66.5309	66.5305				66.5307
B 434	66.8182	66.8178				66.8180
B 435	65.6810	65.6807				65.6809
B 436	77.0182	77.0178				~~77.1880~~ 77.0180
B 437	77.9539	77.9537				77.9538
B 438	65.6883	65.6879				65.6881
B 439	77.2157	77.2154				77.2156
B 440	66.3746	66.3744				66.3745
B 441	64.8004	64.8003				64.8004
B 442	66.1429	66.1427				66.1428
B 443	65.1817	65.1815				65.1816

Notes:

CES Comprehensive Emission Services

TARE WEIGHT
WEIGHING SHEET

Time	10:30	17:00				
Date	6/27	6/27/95				
Analyst	TT	TT				
ID No.	Weighing (grams)					Average
	1	2	3	4	5	
B 444	67.2823	67.2822				67.2823
B 445	77.4587	77.4587				77.4587
B 446	66.2404	66.2400				66.2402
B 447	66.9746	66.9744				66.9745
B 448	75.6973	75.6970				75.6972
B 449	72.7291	72.7289				72.7290
B 450	66.4193	66.4191				66.4192
B 451	76.9283	76.9280				76.9282
B 452	66.6757	66.6755				66.6756
B 453	64.8040	64.8038				64.8039
B 454	65.5583	65.5581				65.5582
B 455	63.0605	63.0603				63.0604

Notes:

CES Comprehensive Emission Services

TARE WEIGHT
WEIGHING SHEET

Time	9:20	15:00	7:00	15:30		
Date	9/12/95	9/12	9/13/95	9/13/95		
Analyst	TT	TT	TT	TT		
ID No.	Weighing (grams)					Average
	1	2	3	4	5	
D157	170.9703	170.9733	170.9708	170.9706		170.9707
158	162.1057	162.1090	162.1059	162.1059		162.1059
159	163.1981	163.2022	163.1984	163.1985		163.1985
160	175.2531	175.2569	175.2535	175.2536		175.2536
161	167.6437	167.6471	167.6440	167.6441		167.6441
162	176.9094	176.9128	176.9099	176.9097		176.9098
163	178.3508	178.3524	178.3504	178.3507		178.3506
164	166.2714	166.2748	166.2712	166.2713		166.2713
165	167.0834	167.0863	167.0834	167.0833		167.0834
166	162.2681	162.2712	162.2681	162.2681		162.2681
167	177.4390	177.4415	177.4399	177.4397		177.4398
168	170.6276	170.6300	170.6277	170.6276		170.6276

Notes:

CES Comprehensive Emission Services

Appendix C

Field Data Forms

Run No.	1	
Location: NBP		
Date:	9/19/95	
Project #		
% Isokinetic=	97.9	
Initial Meter Volume (Cubic Feet)=	126.100	
Final Meter Volume (Cubic Feet)=	163.487	
Meter Factor=	0.976	
Final Leak Rate (cu Ft/min)=	0.002	
Net meter Volume (Cubic Feet)=	36.490	
Gas Volume (Dry Std Cubic Feet 70 Deg)=	35.750	
Barometric Pressure (in Hg) =	29.95	
Static Pressure (Inches H2O)=	0.20	
Stack Pressure (in Hg)=	29.96	
Percent Oxygen =	21.00	
Percent Carbon Dioxide=	0.00	
Moisture Collected(ml)=	27.1	
Percent Water=	3.0	Saturated
Average Meter Temperature (F)=	82.5	
Average Delta H (in H2O)=	1.03	
Average Delta P (inches H2O)=	0.0238	
Average Stack Temp (F)=	76	
Dry Molecular Weight=	28.84	
Wet Molecular Weight=	28.52	
Sampling Time (Minutes)=	60.0	
Nozzle Diameter(Inches)=	0.473	
Stack Diameter (Inches)=	22.00	
Stack Area (Square Feet) =	2.64	
Pitot Coefficient=	0.84	
Average Square Root of Delta P (inches H2O)=	0.1522	
Stack Velocity (Actual, ft/min)=	519	
Flow Rate (Actual, Cubic ft/min)=	1,371	
Flow Rate (Std, Dry, Cubic ft/min 70 Deg)=	1,317	
Particulate Loading - Front Half		
Particulate Weight Net (g)=	0.0018	
Paticulate Loading, Dry Std. 70 Deg (gr/scf)=	0.0008	
Emission Rate (lb/hr)=	0.01	
Particulate Loading - Total Catch Including Impingers		
Particulate Weight Net (g)=	0.0113	
Particulate Loading, Dry Std. 70 Deg (gr/scf)=	0.0049	
Emission Rate (lb/hr)=	0.06	
Percent Impinger Catch=	84.07	

Run No.	2	
Location: NBP		
Date:	9/19/95	
Project #		
% Isokinetic=	97.3	
Initial Meter Volume (Cubic Feet)=	178.400	
Final Meter Volume (Cubic Feet)=	220.860	
Meter Factor=	0.976	
Final Leak Rate (cu Ft/min)=	0.002	
Net meter Volume (Cubic Feet)=	41.441	
Gas Volume (Dry Std Cubic Feet 70 Deg)=	40.374	
Barometric Pressure (in Hg) =	29.95	
Static Pressure (Inches H2O)=	0.20	
Stack Pressure (in Hg)=	29.96	
Percent Oxygen =	21.00	
Percent Carbon Dioxide=	0.00	
Moisture Collected(ml)=	54.6	
Percent Water=	2.9	Saturated
Average Meter Temperature (F)=	85.9	
Average Delta H (in H2O)=	1.31	
Average Delta P (inches H2O)=	0.0304	
Average Stack Temp (F)=	75	
Dry Molecular Weight=	28.84	
Wet Molecular Weight=	28.52	
Sampling Time (Minutes)=	60.0	
Nozzle Diameter(Inches)=	0.473	
Stack Diameter (Inches)=	22.00	
Stack Area (Square Feet) =	2.64	
Pitot Coefficient=	0.84	
Average Square Root of Delta P (inches H2O)=	0.1728	
Stack Velocity (Actual, ft/min)=	589	
Flow Rate (Actual, Cubic ft/min)=	1,556	
Flow Rate (Std, Dry, Cubic ft/min 70 Deg)=	1,496	
Particulate Loading - Front Half		
Particulate Weight Net (g)=	0.0088	
Paticulate Loading, Dry Std. 70 Deg (gr/scf)=	0.0034	
Emission Rate (lb/hr)=	0.04	
Particulate Loading - Total Catch Including Impingers		
Particulate Weight Net (g)=	0.0209	
Particulate Loading, Dry Std. 70 Deg (gr/scf)=	0.0080	
Emission Rate (lb/hr)=	0.10	
Percent Impinger Catch=	57.89	

Run No.	3	
Location: NBP		
Date:	9/19/95	
Project #		
% Isokinetic=	97.6	
Initial Meter Volume (Cubic Feet)=	221.700	
Final Meter Volume (Cubic Feet)=	263.877	
Meter Factor=	0.976	
Final Leak Rate (cu Ft/min)=	0.003	
Net meter Volume (Cubic Feet)=	41.165	
Gas Volume (Dry Std Cubic Feet 70 Deg)=	40.019	
Barometric Pressure (in Hg) =	29.95	
Static Pressure (Inches H2O)=	0.20	
Stack Pressure (in Hg)=	29.96	
Percent Oxygen =	21.00	
Percent Carbon Dioxide=	0.00	
Moisture Collected(ml)=	28.2	
Percent Water=	3.0	Saturated
Average Meter Temperature (F)=	87.0	
Average Delta H (in H2O)=	1.28	
Average Delta P (inches H2O)=	0.0296	
Average Stack Temp (F)=	76	
Dry Molecular Weight=	28.84	
Wet Molecular Weight=	28.52	
Sampling Time (Minutes)=	60.0	
Nozzle Diameter(Inches)=	0.473	
Stack Diameter (Inches)=	22.00	
Stack Area (Square Feet) =	2.64	
Pitot Coefficient=	0.84	
Average Square Root of Delta P (inches H2O)=	0.1709	
Stack Velocity (Actual, ft/min)=	583	
Flow Rate (Actual, Cubic ft/min)=	1,538	
Flow Rate (Std, Dry, Cubic ft/min 70 Deg)=	1,479	
Particulate Loading - Front Half		
Particulate Weight Net (g)=	0.0021	
Paticulate Loading, Dry Std. 70 Deg (gr/scf)=	0.0008	
Emission Rate (lb/hr)=	0.01	
Particulate Loading - Total Catch Including Impingers		
Particulate Weight Net (g)=	0.0120	
Particulate Loading, Dry Std. 70 Deg (gr/scf)=	0.0046	
Emission Rate (lb/hr)=	0.06	
Percent Impinger Catch=	82.50	

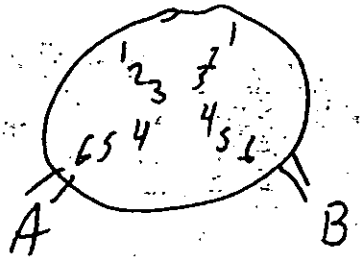
CES COMPREHENSIVE EMISSION SERVICES

Project Number 6995
Run Number 1
Date 9/19/95
Sample Type
Plant Watson By-Product
Location Dryer Coolers

Project Leader Tim Timms
Meter Operator TT
Lab Person TT
Support Personnel Steve Dinsmore

Assumed Moisture % 4
Minutes Per Point (min.) 5
Sampling Time (min.) 60
Meter Factor Y .976
Meter ΔH@ 1.525
Pitot Coefficient Cp .84
Stack Axis 1 (inch.) 22
Stack Axis 2 (inch.) 22
Barometric Pressure (in. Hg) 29.95
Static Pressure (in. H_2O) 0.20
Nozzle Diameter (inch.) .473

Meter Number 1
Oven Number 1
Umbilical Number 50'
Pitot Number 3A
Probe Number 3A
Probe Length 3' Glass
Nozzle Type Glass



Schematic of Testing Location

Initial Meter Volume (ft^3)	~~125.000~~ 126.100		
Final Meter Volume (ft^3)	163.487		
Leak Rate Before	.003	CFM@	≥ 15 in. Hg
Leak Rate After	.002	CFM@	5 in. Hg
Pitot Leak Check	pass	Before	pass After

RECOVERY DATA

Orsat

Trial	%CO_2	%CO_2+%O_2	%O_2
1	0.0		21.0
2	0.0		21.0
3			
Avg	0.0		21.0

Impingers

	Final	Initial	Difference
Impinger 1	110	100	10
Impinger 2	105	100	5
Impinger 3	1	0	1
Impinger 4	767.3	756.2	11.1
Condition/Color		Total	27.1

Notes:

Filter Number: F238

Field Data Sheet

Run No. 1
Project No. 6993
Location NRP
Date 9/19/95
Operator TT
Start Time ~~1026~~ 22:16
Stop Time

Traverse Point	Sample Time (min)	Dry Gas Meter ft³ Initial 126.100	Velocity Head ΔP, in. H_2O	Stack Temp. °F	Dry Gas Meter Temp. °F Inlet	Dry Gas Meter Temp. °F Outlet	Orifice ΔH in H_2O	Pump VAC in. Hg	Oven Temp. °F	Exit Temp. °F	Probe Temp. °F
A1	5	129.6	.03	74	74	74	1.3	2	250	245	60
2	10	133.2	.03	74	82	74	1.3	2	250	245	58
3		—	.025	74	86	74	1.1	2	249	249	59
4	20	138.75	.01	74	89	76	.43	1	248	253	63
5		141.25	.015	74	86	76	.65	1	251	253	66
6	30	144.677	.03	75	88	77	1.3	2	252	255	63
B1		148.1	.03	76	78	78	1.3	2	250	253	66
2	10	151.5	.03	75	93	78	1.3	2	250	251	61
3		—	.025	76	94	79	1.1	2	250	250	60
4	20	157.6	.02	79	95	80	.86	2	250	242	64
5		160.3	.015	80	94	80	.65	2	242	242	66
6	30	163.487	.025	78	93	81	1.1	2	249	259	65

Notes:

CES Comprehensive Emission Services

COMPREHENSIVE EMISSION SERVICES

Project Number 6993 | Project Leader Tim Titus
Run Number 2 | Meter Operator TT
Date 9/20/95 | Lab Person TT
Sample Type TSP | Support Personnel Steve Diasmore
Plant NBP
Location Coolers

Assumed Moisture % 4 | Meter Number 1
Minutes Per Point (min.) 5 | Oven Number 1
Sampling Time (min.) 60 | Umbilical Number 501
Meter Factor Y .976 | Pitot Number 3
Meter ΔH@ 1.525 | Probe Number 3A
Pitot Coefficient Cp .84 | Probe Length 3' glass
Stack Axis 1 (inch.) 22 | Nozzle Type glass
Stack Axis 2 (inch.) 22
Barometric Pressure (in. Hg) 29.95
Static Pressure (in. H_2O) .20
Nozzle Diameter (inch.) .473

SCR
TM
1

Schematic of Testing Location

Initial Meter Volume (ft^3)	176.400		
Final Meter Volume (ft^3)	220.660		
Leak Rate Before	.002 CFM@	≥15	in. Hg
Leak Rate After	.002 CFM@	10	in. Hg
Pitot Leak Check	pass Before	pass	After

RECOVERY DATA

Orsat

Trial	%CO_2	%CO_2+%O_2	%O_2
1	0.0		21.0
2	0.0		21.0
3			
Avg	0.0		21.0

Impingers

	Final	Initial	Difference
Impinger 1	126	100	26
Impinger 2	110	100	10
Impinger 3	4	0	4
Impinger 4	790	775.4	14.6
Condition/Color		Total	54.6

Notes:

Filter Number: P209

Field Data Sheet

Run No. 2
Project No. 6993
Location Cooper
Date 9/20/93
Operator TT
Start Time 1:00

Stop Time

Traverse Point	Sample Time (min)	Dry Gas Meter (ft³)	Velocity Head ΔP in. H_2O	Stack Temp. °F	Dry Gas Meter Temp. °F		Orifice ΔH in H_2O	Pump VAC. in. Hg	Oven Temp. °F	Exit Temp. °F	Probe Temp. °F
					Inlet	Outlet					
		Initial 192.400									
B1		192.2	.035	80	79	79	1.5	4	246	65	252
2	10	185.8	.03	81	90	79	1.3	4	254	62	252
3		189.5	.035	78	89	79	1.5	4	254	62	253
4	20	192.0	.03	78	92	79	1.3	4	250	59	250
5		196.7	.035	78	93	80	1.5	4	247	60	246
6	30	199.475	.015	76	95	81	.65	3	250	61	251
			—	76	82	81	1.5				
A1		203.1	.035	~~81~~	~~76~~	~~82~~	~~81~~	4	251	65	250
2	10	206.8	.033	73	92	81	1.5	4	252	58	250
3		—	.035	71	94	82	1.5	4	245	59	250
4	20	—	.035	72	96	82	1.5	4	252	59	248
5		218.1	.03	72	97	83	1.3	4	248	59	250
6	30	220.860	.015	72	97	83	.66	3	253	61	250

Notes:

Comprehensive Emission Services

COMPREHENSIVE EMISSION SERVICES

Project Number 6993
Run Number 3
Date 9/20/93
Sample Type TSP
Plant HRP
Location Coolers

Project Leader Tim Titus
Meter Operator TT
Lab Person TT
Support Personnel Steve Dinsmore

Assumed Moisture % 4
Minutes Per Point (min.) 5
Sampling Time (min.) 60
Meter Factor Y 1.76
Meter ΔH@ 1.525
Pitot Coefficient Cp .84
Stack Axis 1 (inch.) 22
Stack Axis 2 (inch.) 22
Barometric Pressure (in. Hg) 29.95
Static Pressure (in. H_2O) -.20
Nozzle Diameter (inch.) .473

Meter Number 1
Oven Number 1
Umbilical Number 501
Pitot Number 3
Probe Number 3A
Probe Length 8' glass
Nozzle Type glass

Schematic of Testing Location

Initial Meter Volume (ft^3)	221.7			
Final Meter Volume (ft^3)	763.877			
Leak Rate Before	.003	CFM@	≥ 15	in. Hg
Leak Rate After	.003	CFM@	6	in. Hg
Pitot Leak Check	pass	Before	pass	After

RECOVERY DATA

Orsat

Trial	%CO_2	%CO_2+%O_2	%O_2
1	0.0		21.0
2	0.0		21.0
3			
Avg	0.0		21.0

Impingers

	Final	Initial	Difference
Impinger 1	114	100	14
Impinger 2	104	100	4
Impinger 3	2	0	2
Impinger 4	701.4	673.2	8.2
Condition/Color		Total	28.2

Notes:

Filter Number: F240

Field Data Sheet

Run No. 3
Project No. 6993
Location
Date 9/20/95
Operator
Start Time 14:26
Stop Time

Traverse Point	Sample Time (min)	Dry Gas Meter Reading (ft³) Initial	Velocity Head ΔP, in. H₂O	Stack Temp. °F	Dry Gas Meter Temp. °F Inlet	Dry Gas Meter Temp. °F Outlet	Orifice ΔH in H₂O	Pump VAC. in. Hg	Oven Temp. °F	Exit Temp. °F	Probe Temp. °F
A1		—	.035	76	81	81	1.5	3	244	65	257
2	10	229.1	.035	77	90	81	1.5	3	256	58	257
3		732.5	.03	76	92	81	1.3	3	256	58	257
4	20	236.2	.03	77	93	81	1.3	3	250	58	251
5		239.99	.035	77	95	81	1.5	3	250	58	242
6	30	243.002	.02	77	96	81	.87	3	249	60	250
			—								
B1		246.5	.03	77	83	81	1.3	3	245	64	252
2	10	250.3	.035	75	85	82	1.5	3	256	60	252
3		254.2	.035	72	96	82	1.5	3	244	58	251
4	20	257.9	.030	73	96	82	1.3	3	245	59	250
5		261.2	.025	73	96	82	1.1	3	247	58	248
6	30	263.877	.015	74	97	83	0.66	3	249	58	247

Notes:

CES Comprehensive Emission Services

Appendix D

Pretest Calibrations

METER CALIBRATION

Operator	T.T	K Factor	0.6426
Date	Sept 18, 1995	Meter Number	1
Previous Y Factor	0.979	Orifice Number	2

		RUN 1	RUN 2
Meter Volume			
Final	Cubic Feet	105.948	111.944
Inital	Cubic Feet	100.000	106.000
Net	Cubic Feet	5.948	5.944
Meter Temperature			
Inlet			
Initial	Deg. F	63.0	64.0
Final	Deg. F	64.0	65.0
Outlet			
Initial	Deg. F	62.0	63.0
Final	Deg. F	63.0	64.0
Avg. Meter Temp	Deg. F	63.0	64.0
Time	sec	420.0	420.0
Meter Delta H	inches H2O	2.00	2.00
Barometric Pressure	inches Hg	30.25	30.25
Room Temperature			
Initial	Deg. F	64.0	64.0
Final	Deg. F	64.0	65.0
Avg.Room Temperature	Deg. F	64.0	64.5
Pump Vacuum	inches Hg	21	21
Vcr (std)	dscf	5.944	5.941
Vm (std)	dscf	6.098	6.082
Y Factor		0.975	0.977
Delta H@		1.524	1.526
Average Y		0.976	
Average Delta H@		1.525	
+/- 2% Criteria			
Percent of Avg Y		0.11	
		PASS	
+/- 5% Criteria			
Percent of Final Y		0.33	

CONSOLE WORK SHEET

Operator: TI

K Factor: .6426

Date: 9/16/93

Meter I.D. 1

Previous Y Factor: .979

Orifice Number: 2

		Run Number	
METER VOLUME	Units	1	2
Final	ft³	105.948	111.944
Inital	ft³	100.000	106.000
Meter Temperature			
INLET			
Initial	°F	63.0	64.0
Final	°F	64.0	65
OUTLET			
Initial	°F	62	63
Final	°F	63	64
Time	sec	420	420
Meter ΔH	in. H_2O	2.0	2.0
Barometric Pressure	in. Hg	3.25	
Room Temperature			
Initial	°F	64	64
Final	°F	64	65
Pump Vacuum	In. Hg	21	21

CES COMPREHENSIVE EMISSION SERVICES

ORFICE BRACKETING

Operator	T.T.	BRACKET ORFICES:	
Date	18-Sep-95	Orifice No. 1	3
		K Factor	0.3271
		Orifice No. 2	2
Meter Y Factor	0.976	K Factor	0.6426

		ORFICE #1	ORFICE #2
Meter Volume			
Final	Cubic Feet	123.690	117.942
Inital	Cubic Feet	118.000	112.000
Net	Cubic Feet	5.690	5.942
Meter Temperature			
Inlet			
Initial	Deg. F	63.0	64.0
Final	Deg. F	63.0	64.0
Outlet			
Initial	Deg. F	60.0	62.0
Final	Deg. F	61.0	63.0
Avg. Meter Temp	Deg. F	61.8	63.3
Time	sec	780.0	420.0
Meter Delta H	inches H2O	0.53	2.00
Barometric Pressure	inches Hg	30.25	30.25
Room Temperature			
Initial	Deg. F	63.0	64.0
Final	Deg. F	63.0	64.0
Avg.Room Temperature	Deg. F	63.0	64.0
Pump Vacuum	inches Hg	24	20
Vcr (std)	dscf	5.625	5.944
Vm (std)	dscf	5.827	6.089
Y Factor (brackets)		0.965	0.976
+/- 2% Criteria			
Percent of Y		1.10	0.02
		PASS	PASS

BRACKETING WORK SHEET

Operator: TT

Date: 9/18/93

Previous Y Factor 0.976

Meter I.D. 1

K Factor No. 1 .3271

K Factor No. 2 .6421

METER VOLUME	Units	1	2
Final	ft^3	123.690	117.942
Initial	ft^3	118.000	112.000
Meter Temperature			
INLET			
Initial	°F	63	64
Final	°F	63	64
OUTLET			
Initial	°F	60	62
Final	°F	61	63
Time	sec	760	420
Meter ΔH	in. H_2O	.53	2.0
Barometric Pressure	in. Hg	30.25	~~30.10~~ 30.25
Room Temperature			
Initial	°F	63	64
Final	°F	63	64
Pump Vacuum	in. Hg	24	20

CES Comprehensive Emission Services

Appendix E

Postest Calibrations

METER CALIBRATION

Operator	J.T.	K Factor	0.6426
Date	Sepy-25-95	Meter Number	1
Previous Y Factor	0.976	Orifice Number	2

		RUN 1	RUN 2
Meter Volume			
Final	Cubic Feet	399.658	405.950
Inital	Cubic Feet	393.700	400.000
Net	Cubic Feet	5.958	5.950
Meter Temperature			
Inlet			
Initial	Deg. F	64.0	67.0
Final	Deg. F	66.0	69.0
Outlet			
Initial	Deg. F	63.0	65.0
Final	Deg. F	64.0	66.0
Avg. Meter Temp	Deg. F	64.3	66.8
Time	sec	420.0	420.0
Meter Delta H	inches H2O	2.10	2.10
Barometric Pressure	inches Hg	30.00	30.00
Room Temperature			
Initial	Deg. F	68.0	67.0
Final	Deg. F	68.0	69.0
Avg.Room Temperature	Deg. F	68.0	68.0
Pump Vacuum	inches Hg	19	19
Vcr (std)	dscf	5.873	5.873
Vm (std)	dscf	6.045	6.008
Y Factor		0.971	0.977
Delta H@		1.629	1.625
Average Y		0.974	
Average Delta H@		1.627	
+/- 2% Criteria			
Percent of Avg Y		0.31	
		PASS	
+/- 5% Criteria			
Percent of Final Y		0.16	
		PASS	

CONSOLE WORK SHEET

Operator: J.T.

K Factor: 0.6426

Date: 9-25-95

Meter I.D. 1

Previous Y Factor: 0.976

Orifice Number: II

		Run Number	
METER VOLUME	Units	1	2
Final	ft^3	399.654	405.950
Inital	ft^3	393.800	400.000
Meter Temperature			
INLET			
Initial	°F	64	67
Final	°F	66	69
OUTLET			
Initial	°F	63	65
Final	°F	64	66
Time	sec	420	420
Meter ΔH	in. H_2O	2.1	2.1
Barometric Pressure	in. Hg	30.00	30.00
Room Temperature			
Initial	°F	68	67
Final	°F	68	69
Pump Vacuum	in. Hg	19	19

CES Comprehensive Emission Services

ORFICE BRACKETING

Operator	J.T.		BRACKET ORFICES:	
Date	Sept-25-95		Orifice No. 1	2
			K Factor	0.6426
			Orifice No. 2	3
Meter Y Factor	0.974		K Factor	0.3271
			ORFICE #1	*ORFICE #2*
Meter Volume				
Final	Cubic Feet		412.159	418.035
Inital	Cubic Feet		406.200	412.300
Net	Cubic Feet		5.959	5.735
Meter Temperature				
Inlet				
Initial	Deg. F		70.0	71.0
Final	Deg. F		72.0	71.0
Outlet				
Initial	Deg. F		66.0	68.0
Final	Deg. F		68.0	69.0
Avg. Meter Temp	Deg. F		69.0	69.8
Time	sec		420.0	780.0
Meter Delta H	inches H2O		2.10	0.53
Barometric Pressure	inches Hg		30.00	30.00
Room Temperature				
Initial	Deg. F		69.0	69.0
Final	Deg. F		69.0	69.0
Avg.Room Temperature	Deg. F		69.0	69.0
Pump Vacuum	inches Hg		19	24
Vcr (std)	dscf		5.867	5.546
Vm (std)	dscf		5.992	5.736
Y Factor (brackets)			0.979	0.967
+/- 2% Criteria				
Percent of Y			0.53	0.73
		PASS		PASS

BRACKETING WORK SHEET

Operator: J.T.

Date: 9-25-95

Previous Y Factor 0.974

Meter I.D. 1

K Factor No. 1 0.6426 #2

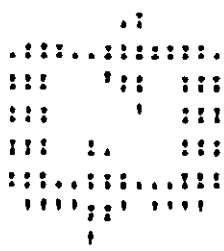
K Factor No. 2 0.3271 #2

METER VOLUME	Units	1	2
Final	ft³	412.159	418.035
Initial	ft³	406.200	412.300
Meter Temperature			
INLET			
Initial	°F	70	71
Final	°F	72	71
OUTLET			
Initial	°F	66	68
Final	°F	68	69
Time	sec	420	780
Meter ΔH	in. H_2O	2.1	0.53
Barometric Pressure	in. Hg	30.00	30.00
Room Temperature			
Initial	°F	69	69
Final	°F	69	69
Pump Vacuum	in. Hg	19	24

CES Comprehensive Emission Services

Appendix F

Process Data



NATIONAL
BY-PRODUCTS, INC.

1020 Locust St.
P.O. Box 615
Des Moines, IA 50303
515-286-2166

FAX: 515-288-1007

TO: Mr. Timothy C. Titus

WITH: Comprehensive Emission Services, West Des Moines

FAX NUMBER: (515) 225 - 7894

DATE: September 26, 1995

FROM: J. Todd Ferrell - Plant Coordinator

NO. OF PAGES: 2

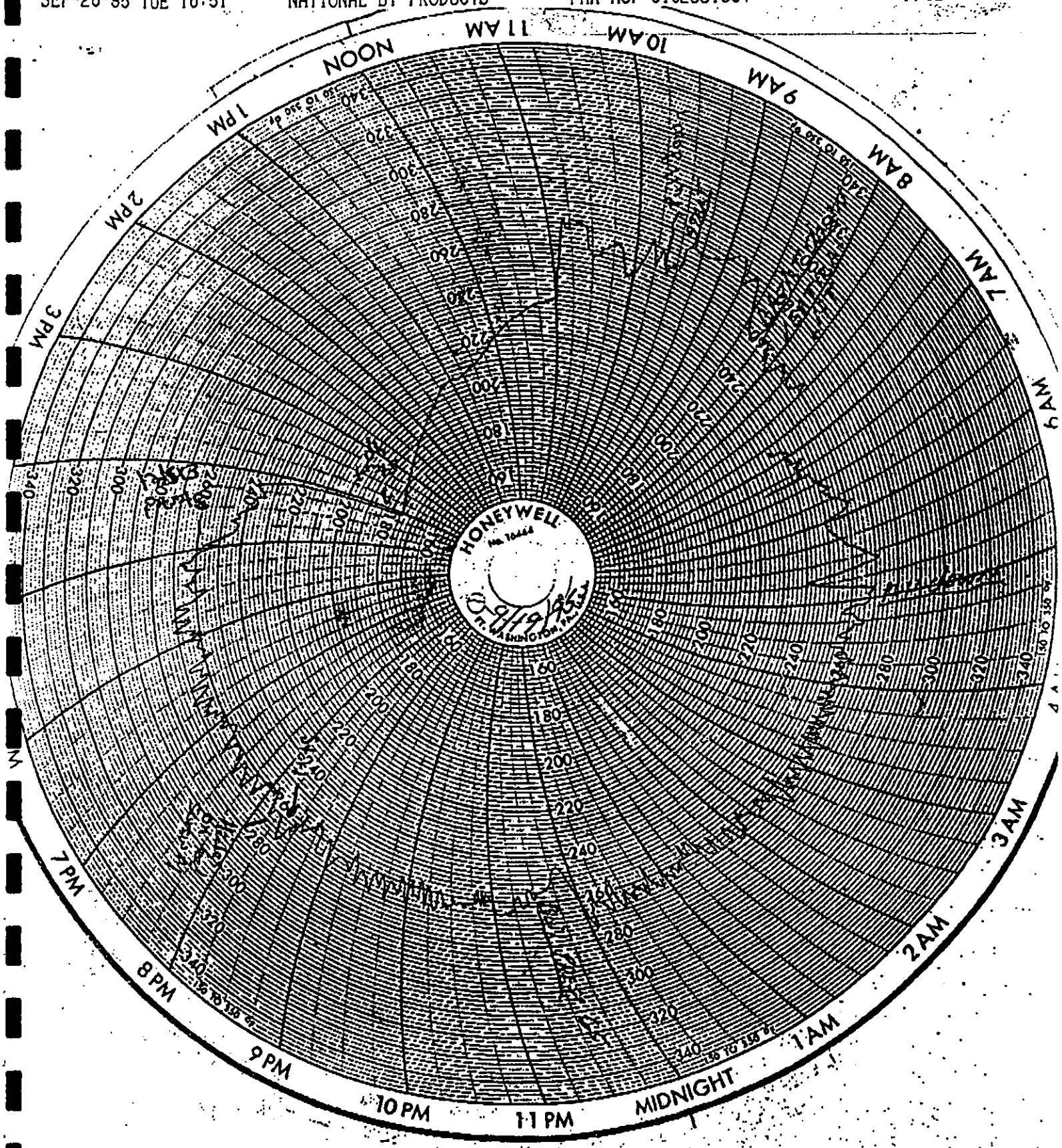
SUBJECT: Attached is the Dupps 320U cooker temperature recorder chart for the processing period starting on 9-19-95 afternoon and finishing up the morning of 9-20-95 at the Des Moines N.B.P. plant

For your emission tests:

Begin Processing time : 5:10 PM
End Processing Time: 4:50 AM
Processing Time: 11 hours, 40 minutes (11.67)
Raw Material processed: 412,460 pounds
Raw Material processing rate: 35,344 lb.s/hr.
Raw Material processing rate: 17.7 tons/hr.

Any questions please call.

cc: Mr. Paul Bohlig - Treasurer, Des Moines
Mr. Bob Bushnell - Plant Superintendent, Des Moines
Mr. Del Lane - Regional Manager, Des Moines
Mr. Mark Myers - District Manager, Des Moines



National By-Products, Inc
Des Moines, IA
9-19-95 → 9-20-95 Pipeline

NATIONAL
BY-PRODUCTS, INC.

1020 Locust St.
P.O. Box 615
Des Moines, IA 50303
515-288-2166

FAX: 515-288-1007

TO:	Mr. Timothy C. Titus
WITH:	Comprehensive Emission Services, West Des Moines
FAX NUMBER:	(515) 225 - 7894
DATE:	September 26, 1995
FROM:	J. Todd Ferrell - Plant Coordinator
NO. OF PAGES:	2

SUBJECT: Attached is the Dupps 320U cooker temperature recorder chart for the processing period starting on 9-19-95 afternoon and finishing up the morning of 9-20-95 at the Des Moines N.B.P. plant.

For your emission tests:

Begin Processing time : 5:10 PM
End Processing Time: 4:50 AM
Processing Time: 11 hours, 40 minutes (11.67)
Raw Material processed: 412,460
Raw Material processing rate: 35,344
Raw Material processing rate: 17.7

Any questions please call.

cc: Mr. Paul Bohlig - Treasurer, Des Moines
Mr. Bob Bushnell - Plant Superintendent, Des Moines
Mr. Del Lane - Regional Manager, Des Moines

Appendix G

CEM DATA

"Comprehensive Emission Services"
"National By-Products "
"Des Moines, Iowa"
"DATE 09-19-1995 " Run 1
"TIME 21:51:43 "

" Time ""	VOC "
"sec/day ""	ppm "
22:08:00	236.5
22:09:00	250.58
22:10:00	245.59
22:11:00	257.27
22:12:00	273.3
22:13:00	294.32
22:14:00	299.9
22:15:00	303.42
22:16:00	291.32
22:17:00	288.71
22:18:00	275.09
22:19:00	282.62
22:20:00	271.73
22:21:00	285.21
22:22:00	286.14
22:23:00	292.39
22:24:00	281.08
22:25:00	276.43
22:26:00	266.5
22:27:00	266.25
22:28:00	261.75
22:29:00	265.63
22:30:00	257.62
22:31:00	260.01
22:32:00	249.77
22:33:00	252.33
22:34:00	245.96
22:35:00	246.42
22:36:00	242.75
22:37:00	255.3
22:38:00	250.93
22:39:00	255.59
22:40:00	256.16
22:41:00	252.71
22:42:00	255.44
22:43:00	247.92
22:44:00	258.65
22:45:00	254.6
22:46:00	265.36
22:47:00	266.91
22:48:00	271.14
22:49:00	277.07
22:50:00	278.05
22:51:00	284.4
22:52:00	276.44
22:53:00	270.32
22:54:00	280.09
22:55:00	287.7
22:56:00	284.4
22:57:00	310.15

		Zero	Span	DSCFM
Average	268.9	10.7	252.95	1317
Corrected for Cal	268.6			
lb/hr	2.40			

"Comprehensive Emission Services"
"National By-Products "
"Des Moines, Iowa"
"DATE 09-19-1995 " Run 2
"TIME 23:51:04 "

" Time ""	VOC "
"sec/day ""	ppm "
00:04:00	303.27
00:05:00	285.28
00:06:00	299.25
00:07:00	379.51
00:08:00	415.84
00:09:00	394.32
00:10:00	351.28
00:11:00	349.49
00:12:00	320.55
00:13:00	314.51
00:14:00	304.73
00:15:00	270.45
00:16:00	242.43
00:17:00	212.61
00:18:00	221.59
00:19:00	280.42
00:20:00	316.8
00:21:00	350.59
00:22:00	362.12
00:23:00	327.99
00:24:00	293.07
00:25:00	275.71
00:26:00	279.79
00:27:00	297.26
00:28:00	285.1
00:29:00	292.5
00:30:00	278.5
00:31:00	286.75
00:32:00	280.47
00:33:00	244.95
00:34:00	227.8
00:35:00	219.17
00:36:00	263.69
00:37:00	305.26
00:38:00	299.63
00:39:00	311.99
00:40:00	297.19
00:41:00	287.9
00:42:00	262.32
00:43:00	225.71
00:44:00	218.09
00:45:00	289.74
00:46:00	329.97
00:47:00	329.05

00:48:00	328.43
00:49:00	309.17
00:50:00	312.31
00:51:00	300.59
00:52:00	303.44
00:53:00	294.86
00:54:00	273.6
00:55:00	251.76
00:56:00	269.18
00:57:00	329.31
00:58:00	330.54
00:59:00	338.67
01:00:00	321.01
01:01:00	317.71
01:02:00	310.04
01:03:00	307.93
01:04:00	320.11
01:05:00	320.28
01:06:00	333.14
01:07:00	329.52
01:08:00	289.5
01:09:00	307.7
01:10:00	336.51
01:11:00	329.6
01:12:00	337.63
01:13:00	320.55
01:14:00	317.85
01:15:00	299.6
01:16:00	305.5
01:17:00	290.98
01:18:00	299.99
01:19:00	291.24
01:20:00	299.81
01:21:00	291.59
01:22:00	293.72
01:23:00	309.58
01:24:00	307.84
01:25:00	321.75
01:26:00	318.36
01:27:00	320.25
01:28:00	314.56
01:29:00	326.31
01:30:00	349.46
01:31:00	351.91
01:32:00	362.6
01:33:00	348.36
01:34:00	356.36
01:35:00	336.34
01:36:00	336.36
01:37:00	323.08
01:38:00	344.19

01:39:00	333.08
01:40:00	338.35
01:41:00	322.16
01:42:00	322.36
01:43:00	312.93
01:44:00	310.87
01:45:00	304.61
01:46:00	304.96
01:47:00	300.24
01:48:00	293.73
01:49:00	296.75
01:50:00	311.59
01:51:00	307.89
01:52:00	326.86

		Zero	Span	DSCFM
Average	307.4	20.4	257	1496
Corrected for Cal	303.4			
lb/hr	3.11			

"Comprehensive Emission Services"
"National By-Products "
"Des Moines, Iowa"
"DATE 09-20-1995 " Run 3
"TIME 02:26:34 "

" Time ""	VOC "
"sec/day ""	ppm "
02:28:00	255.02
02:29:00	252.06
02:30:00	269.63
02:31:00	249.26
02:32:00	210.63
02:33:00	194.65
02:34:00	182.53
02:35:00	203.96
02:36:00	300.59
02:37:00	321.69
02:38:00	313.72
02:39:00	288.41
02:40:00	263.42
02:41:00	235.24
02:42:00	219.43
02:43:00	235.95
02:44:00	263.73
02:45:00	270.46
02:46:00	259.01
02:47:00	243.97
02:48:00	232.99
02:49:00	209.12
02:50:00	183.64
02:51:00	171.6
02:52:00	193.48
02:53:00	227.27
02:54:00	231.79
02:55:00	234.7
02:56:00	221.52
02:57:00	210.41
02:58:00	200.62
02:59:00	194.12
03:00:00	201.51
03:01:00	236.99
03:02:00	272.29
03:03:00	276.23
03:04:00	256.41
03:05:00	238.57
03:06:00	235.01
03:07:00	243.24
03:08:00	289.51
03:09:00	319.29
03:10:00	323.63
03:11:00	326.66
03:12:00	228.38

		Zero	Span	DSCFM
Average	244.3	21.75	257.3	1479
Corrected for Cal	236.3			
lb/hr	2.39			

"Comprehensive Emission Services" lcal
"National By-Products "
"Des Moines, Iowa"
"DATE 09-19-1995 "
"TIME 20:48:54 "

" Time ""	VOC "		
"sec/day ""	ppm "		
20:49:09	851.54		
20:49:24	852.46	853.0	High
20:49:39	853.59		
20:49:54	851.71		
20:50:09	642.23		
20:50:24	539.56		
20:50:39	546.13		
20:50:54	552.31	552.1	Mid
20:51:09	557.85		
20:51:24	452.8		
20:51:39	250.61		
20:51:54	250.36		
20:52:09	247.57		
20:52:24	249.37	248.5	Low
20:52:39	219.61		
20:52:54	18.36		
20:53:09	2.65		
20:53:24	0.56		
20:53:39	-0.04		
20:53:54	-0.43	0.4	Zero
20:54:09	1.31		

Range 1000 ppm

5 Standards

250.1

558.2

849.6

F_1 1,317

F_2 1,496

F_3 1,479

"Comprehensive Emission Services" Cal 1 & 2
"National By-Products "
"Des Moines, Iowa"
"DATE 09-19-1995 "
"TIME 23:41:54 "

" Time ""	VOC "		
"sec/day ""	ppm "		
23:42:15	265.7		
23:42:30	261.97		
23:42:45	261.79		
23:43:00	258.53	257.4	Low
23:43:15	257.91		
23:43:30	255.65		
23:43:45	257.5		
23:44:00	255.75		
23:44:15	248.56		
23:44:30	42.02		
23:44:45	22.98		
23:45:00	21.13	21.0	Zero
23:45:15	20.78		
23:45:30	42.08		
23:45:45	254.44		
23:46:00	558.54		
23:46:15	557.64		
23:46:30	558.12		
23:46:45	559.91	558.9	Mid
23:47:00	558.56		
23:47:15	456.2		

"Comprehensive Emission Services" Cal 2 & 3
"National By-Products "
"Des Moines, Iowa"
"DATE 09-20-1995 "
"TIME 02:21:04 "

" Time ""	VOC "		
"sec/day ""	ppm "		
02:21:19	559.12		
02:21:34	558.85	558.7	Mid
02:21:49	558.64		
02:22:04	231.56		
02:22:19	25.13		
02:22:34	18.76		
02:22:49	20.64		
02:23:04	19.87	19.8	Zero
02:23:19	61.58		
02:23:34	194.35		
02:23:49	285.19		
02:24:04	282.13		
02:24:19	266.57		
02:24:34	256.93	256.6	Low
02:24:49	256.32		
02:25:04	250.8		

"Comprehensive Emission Services"
"National By-Products "
"Des Moines, Iowa" Cal After 3
"DATE 09-19-1995 "
"TIME 03:27:08
" Time "" VOC "
"sec/day "" ppm "

03:28:15	564.32		
03:28:30	568.14		
03:28:45	557.84		
03:29:00	558.21	560.7	Mid
03:29:15	566.12		
03:29:30	565.14		
03:29:45	555.14		
03:30:00	547.45		
03:30:15	258.41		
03:30:30	259.78		
03:30:45	258.8		
03:31:00	257.95	258.0	Low
03:31:15	257.12		
03:31:30	252.31		
03:31:45	217.35		
03:32:00	69.92		
03:32:15	23.74		
03:32:30	24.56		
03:32:45	23.89		
03:33:00	22.73	23.7	High
03:33:15	22.31		

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (810) 589-2950 FAX:(810) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL 60067

Assay Laboratory
Scott Specialty Gases, Inc
1290 Combermere
Troy, MI 48083

Purchase Order : 11785-71500
Scott Project # : 569024

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number : ALM047523
Cylinder Pressure + : 1900 psig
Certificate Date : 8/8/94
Previous Certificate Date : None
Expiration Date : 8/8/97

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	250.1 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

+Do not use when cylinder pressure is below 150 psig.
*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM 2646	10/14/95	AAL18426	973.2 ppm Propane in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Beckman/400/1002059	8/4/94	Flame Ionization Detection

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components
Propane

First Triad Analysis

Date: 8/8/94 Response Units: mv

Z1=0.00	R1=97.30	T1=25.00
R2=97.30	Z2=0.00	T2=25.00
Z3=0.00	T3=25.00	R3=97.30

Avg. Conc. of Cust. Cyl. 250.1 ppm

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx²+Dx³+Ex⁴

r=1.00000	NTRM 2646
Constants:	A=0.049241000
B=10.002000000	C=0.000000000
D=0.000000000	E=0.000000000

Special Notes

Don Eckley Jr

Analyst

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (810) 589-2950 FAX:(810) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL 60067

Assay Laboratory
Scott Specialty Gases, Inc
1290 Combermere
Troy, MI 48083

Purchase Order : 11785-71500
Scott Project # : 569024

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number : ALM047565
Cylinder Pressure + : 1900 psig
Certificate Date : 8/8/94
Previous Certificate Date : None
Expiration Date : 8/8/97

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	558.2 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

+Do not use when cylinder pressure is below 150 psig.
*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM 2646	10/14/95	AAL18426	973.2 ppm Propane in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Beckman/400/1002059	8/4/94	Flame Ionization Detection

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components
Propane

First Triad Analysis

Date: 8/8/94 Response Units: mv

Z1=0.00	R1=97.30	T1=55.80
R2=97.30	Z2=0.00	T2=55.80
Z3=0.00	T3=55.80	R3=97.30

Avg. Conc. of Cust. Cyl. 558.2 ppm

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx^2+Dx^3+Ex^4

r=1.00000	NTRM 2646
Constants:	A=0.049241000
B=10.002000000	C=0.000000000
D=0.000000000	E=0.000000000

Special Notes

Don Eichler Jr

Analyst

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (810) 589-2950 FAX:(810) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL 60067

Assay Laboratory
Scott Specialty Gases, Inc
1290 Combermere
Troy, MI 48083

Purchase Order : 12021-71500
Scott Project # : 570587

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number : ALM005524 **Certificate Date :** 9/7/94 **Expiration Date :** 9/7/97
Cylinder Pressure + : 1900 psig **Previous Certificate Date :** None

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	849.6 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

+Do not use when cylinder pressure is below 150 psig.
*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM 2646	10/14/95	AAL18426	973.2 ppm Propane in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Propane : Beckman/400/1002059	8/15/94	Flame Ionization Detection

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components: Propane

First Triad Analysis

Date: 9/7/94 Response Units: mv
Z1=0.00 R1=97.30 T1=65.00
R2=97.30 Z2=0.00 T2=64.90
Z3=0.00 T3=64.90 R3=97.30
Avg. Conc. of Cust. Cyl. 849.6 ppm

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx^2+Dx^3+Ex^4
r=1.00000 NTRM 2646
Constants: A=0.049241000
B=10.002000000 C=0.000000000
D=0.000000000 E=0.000000000

Special Notes

Analyst

TRC

TRC Project No. 22214-12

July 1998

TEST REPORT

Compliance Emission Testing of the Supercooker at IBP,Inc. Dakota City, Nebraska

Prepared for

IBP, Inc.
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Prepared by

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A Field Sampling Data Sheets
B Sample Calculations
C Process Data
D Laboratory Data
E Equipment Calibration Sheets

SECTION 1.0
INTRODUCTION

1.1 OVERVIEW

IBP, Inc. (IBP) operates a rendering plant located in Dakota City, Nebraska. This test program determined the emission rates of a number of pollutants from the Supercooker.

TRC Environmental Corporation (TRC) of Downers Grove, Illinois was retained by IBP to provide sampling and analytical support to determine the actual emission rates of the Supercooker.

IBP had emissions testing conducted for particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), Carbon Monoxide (CO), and total gaseous non-methane organics (TGNMO) as carbon.

Sampling and analysis procedures described in this document were conducted using procedures deemed acceptable by the NDEQ and the USEPA. TRC was responsible for the collection and analysis of all flue gas samples.

1.2 SCOPE OF WORK

The test program approach involved conducting a series of three test runs on two sources. Each test determined the concentration and emission rates for O_2, CO_2, NO_x, SO_2, CO, TGNMO, and PM. Velocity and moisture were only determined during testing on the outlet of the first packed bed scrubber for each run. Previous flow and moisture data was used on the Supercooker condenser outlet. Table 1-1 presents the sampling locations and the parameters tested at each location.

The results of the test program are presented in a format acceptable to the NDEQ.

The required measurement parameters and test methods used to accomplish these objectives were:

- 40 CFR Part 60, Appendix A, USEPA Reference Methods (RM)
  - RM 1 & 2 - Velocity and Flowrate
  - RM 3A - Oxygen and Carbon Dioxide
  - RM 4 - Moisture
  - RM 5 - Particulate Matter
  - RM 6C - Sulfur Dioxide
  - RM 7E - Oxides of Nitrogen
  - RM 10 - Carbon Monoxide
  - RM 25- Total Hydrocarbons

TABLE 1-1. SAMPLING LOCATIONS AND TEST PARAMETERS

Sampling Location	Parameters
Supercooker Condenser Outlet	O_2, CO_2, NO_x, SO_2, CO
First Packed bed scrubber outlet	O_2, CO_2, NO_x, SO_2, CO, TGNMO, PM

SECTION 2.0
SUMMARY OF RESULTS

2.1 SUMMARY OF RESULTS

All data are being reported without qualification. All tests on this unit are reported without any anomaly. Previous flow and moisture data was used to calculate lb/hr emission rates on the condenser outlet.

Testing was performed at the outlet of the first packed bed scrubber initially. This location was picked because of its ability to meet Method 1 criteria. It was discovered during this series of tests that this particular location had two unidentified sources also piped into the packed bed scrubber system. At the discretion of the NDEQ observer three one hour tests were also performed at the condenser outlet location for O_2, CO_2, NO_x, SO_2, CO. Previous flowrate and moisture data was deemed acceptable to determine and compare emission rate results from the two locations.

The emission rates calculated were virtually identical except for the NO_x lb/hr. It is determined that the two unidentified source are contributing to the higher NO_x lb/hr number. Table 2-1 summarizes the findings of the test series conducted on July 21,1998. Supporting data can be found on the field sampling data sheets in Appendix A.

Table 2-1 Summary of Results

Location	NO_x lb/hr	SO_2 lb/hr	CO lb/hr	TGNMO lb/hr	PM lb/hr
Condenser Outlet	.0097	.0669	.0320	N/A	N/A
Scrubber Outlet	.0349	.0627	.0305	.8122	.3820

SECTION 3.0
PROCESS DESCRIPTION AND OPERATION

3.1 GENERAL PLANT ACTIVITIES

IBP operates a slaughter, processing, plant at Dakota City, Nebraska. The Inedible Supercooker is used to cook raw inedible meat and bone, to produce crax and tallow. Inedible tallow is sold as a product, and inedible crax is blended with LoPro from the edible system to produce inedible meat and bone meal. Flue gas from the inedible Supercooker was tested for O_2, CO_2, NO_x, SO_2, CO, TGNMO, and PM prior to exhausting to the atmosphere.

The plant was operated at normal operating conditions during the series of emission testing. Supporting process data can be found in Appendix C.

SECTION 4.0
SAMPLING LOCATIONS

4.1 FIRST PACKED BED SCRUBBER OUTLET

This location was chosen because of its ability to meet Reference Method 1 criteria. The location was a rooftop location. The sampling ports were 90 degrees offset of each other. The inside stack diameter was 26.0 inches. The ports were located 15 ft upstream and 21 inches downstream of a disturbance. TRC determined the sampling traverse points in accordance with EPA Method 1. A copy of the data sheet can be found in Appendix A.

4.2 CONDENSER OUTLET

Sampling was conducted on Supercooker condenser outlet exhaust. The inside stack dimension was measured to be 6 inches in diameter; therefore, the stack area equals 28.3 square inches. TRC utilized the flowrate and moisture from testing conducted in September of 1997 by TRC Environmental Corporation.

SECTION 5.0
SAMPLING PROCEDURES

5.1 OVERVIEW

This section describes the procedures that TRC followed during the field sampling program. Throughout the program TRC followed EPA Reference Methods 40 CFR Part 60 Appendix A. Any deviations from the specified test methods are fully documented and approved by the NDEQ observer.

The remainder of this section is divided into several subsections: Field Program Description, Presampling Activities, and Onsite Sampling Activities.

5.2 FIELD PROGRAM DESCRIPTION

The field sampling was conducted by TRC during July 1998. The units operated in their normal seasonal operating range. Each test run was 60 minutes in length and consisted of a velocity traverse and effluent sampling as specified for O_2, CO_2, SO_2, CO, NO_x, TGNMO and PM.

The test methods utilized were in accordance with 40 CFR Parts 60, Appendix A and are as follows:

- Method 1 and 2 - Velocity Profile
- Method 3A - O_2 and CO_2
- Method 4 - Percent Moisture
- Method 5 - Particulate Matter
- Method 6C - SO_2
- Method 7E - NO_x
- Method 25 - Total Gaseous Non-Methane Organics as carbon

5.3 PRESAMPLING ACTIVITIES

Presampling activities include equipment calibration, precleaning of the sample train glassware, and other miscellaneous tasks. Each of these activities are described or referenced in the following subsections. Other presampling activities include team meetings, equipment packing, and finalization of all details leading up to the coordinated initiation of the sampling program.

5.3.1 Equipment Calibration

TRC follows an orderly program of positive actions to prevent the failure of equipment or instruments during use. This preventative maintenance and careful calibration helps to ensure accurate measurements from field and laboratory instruments.

Once the equipment has gone through the cleaning and repair process it is then calibrated. All equipment that is scheduled for field use is cleaned and checked prior to calibration. Once the equipment has been calibrated, it is packed and stored to ensure the integrity of the equipment. An adequate supply of spare parts is taken in the field to minimize downtime from equipment failure.

Inspection and calibration of the equipment is a crucial step in ensuring the successful completion of the field effort. All equipment is inspected for proper operation and durability prior to calibration. Calibration of the following equipment is conducted in accordance with the procedures outlined in EPA documents entitled "*Quality Assurance Handbook for Air Pollution Measurement Systems; Volume III - Stationary Source Specific Methods*" (EPA-600/4-77-027b) and 40 CFR Part 60 Appendix A. All calibrations will be performed prior to test program.

- Probe Nozzles (QA Handbook, Vol III, Section 3.4.2, pp. 19) - average three ID measurements of nozzle; difference between high and low ≤ 0.1 mm. Recalibrates, reshape and sharpen when nozzle becomes nicked, dented, or corroded.

- Pitot tubes (QA Handbook, Vol III, Section 3.1.2, pp. 1-13) - measured for appropriate spacing and dimensions or calibrated in a wind tunnel. Rejection criteria given on the calibration sheet. Post-test check - inspect for damage.

- Thermocouples (QA Handbook, Vol III, Section 3.4.2, pp. 12-18) - 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.

- Dry gas meters (EPA 40 CFR Part 60, Method 5, Section 5.3) - calibrated against a wet test meter. Acceptance criteria - pretest $Y_i = Y = \pm 0.02$; post test $Y = \pm 0.05\ Y_i$.

- Field barometer (QA Handbook, Vol III, Section 3.4.2, pp. 18-19) - compared against a mercury-in-glass barometer or use Airport Station BP and corrected for elevation. Acceptance criteria - $\pm$ 0.02 in. Hg; post-test check - same.

- Analytical balances (QA Handbook, Vol III, Section 3.4.2, pp. 19) - Acceptance criteria - calibrate with Standard Class-S weights within $\pm$ 0.5 g of stated value. Rejection criteria: Have manufacturer recalibrates or adjust.

- Method 25 rotometers - (QA Handbook Section 3.17.2, pp. 4-8) - calibrated against a standard bubble meter. Acceptance criteria - pretest $Y_i = 0.05Y$; post-test check - average 3 run theoretical volume $\pm$ 10% of average 3 run actual volume.

5.3.2 Glassware Preparation

Sample train glassware and sample containers did require specialized precleaning to avoid contamination of the sample from the collection container or devices. The sample train glassware necessary for the Method 5sampling was precleaned using an alconox soap and water wash with a tap water rinse. Deionized water was used for final rinsing followed by air drying. The glassware was then sealed with parafilm.

5.3.3 Sample Media Preparation

All reagents were checked in accordance with TRC's existing QC Program to minimize the probability of using contaminated solvents. This includes the use of spectro-grade solvents from the same lot and the collection and analysis of the appropriate blanks.

5.3.4 Continuous Emissions Monitoring

TRC conducted continuous emissions monitoring at each source as specified by the permit for oxygen (EPA Method 3A), carbon dioxide (EPA Method 3A), oxides of nitrogen (EPA Method 7E), sulfur dioxide (EPA Method 6C) and carbon monoxide (EPA Method 10) during all test conditions. TRC did follow procedures outlined in the EPA Publication 340/1-83-016 regarding setup and operation of its Transportable Continuous Emissions Monitoring System (TCEMS).

The TCEMS consists of three subsystems: sample acquisition/conditioning, sample analysis, and a data acquisition system. Sample acquisition/conditioning is designed to deliver a representative sample of the stack gas stream to the sample analysis subsystem. Since the gas stream must be clean and dry for the O_2, CO_2, SO_2, CO, and NO_x analyzers, a glass fiber filter and noncontact moisture condenser was used for particulate and moisture removal. The sample line was heat-traced to eliminate inline condensation prior to the condenser.

In each case, accurate interpretation of analyzer response requires the systematic calibration of the instrument against gases of known concentrations.

The data acquisition subsystem consists of a Campbell 21X digital data logger designed to receive and log instrument signals (raw voltages) at user defined intervals. The resulting values are instantaneously accessible. Once the system is set up, the TCEM is connected to a power source and brought online. Sample line and signal wires are strung between the sampling and TCEM locations, and the probe is placed in the duct at the sampling location.

Prior to insertion of the probe into the stack, the sample/acquisition system is leak checked by the following procedure:

a. plug probe;
b. observe that flow in rotameter reaches zero Lpm;
c. observe vacuum; and
d. confirm that sample vacuum during sampling does not exceed vacuum attained during leak check.

The initial phase of instrumental analysis methods requires calibration of all involved monitors. At the beginning of each day, direct instrument calibrations for zero and upscale gases were performed prior to initiation of testing by direct calibration gas injection. System calibrations were performed both prior to and following each run using zero and one upscale gas concentration. This is accomplished by directing calibration gas through the sample line and conditioning system to assess system bias. Following completion of the required runs, final system calibrations were performed. These procedures allow for determination of initial and final system bias, as well as system drift. Typical calibration gas values and instrument range settings are listed below:

TABLE 5-1 Analyzer Calibrations Gases

Analyzer	Range	Conc.	High	Mid	Low	Zero
NO_x	0 - 100	ppm	84.3	46.0	NA	nitrogen
O_2	0 - 25	%	18.0	10.2	NA	nitrogen
CO_2	0 - 20	%	17.7	9.9	NA	nitrogen
CO	0-100	ppm	86.9	30.3	N/A	nitrogen
SO_2	0-100	ppm	88.7	45.1	N/A	nitrogen

These analyzer ranges were adjusted on the first day of test after preliminary measurements are taken.

Calibration gases used were EPA Protocol 1, traceable to the National Institute of Standards and Technology (NIST). The measurement system performance specifications as stated in 40 CFR 60 Appendix A, for Methods 3A, 6C, 7E, and 10 are listed below and were the performance criteria for this program.

Table 5-2 Performance Criteria.

	Performance Criteria		
Procedure	Nox / SO_2 M7E/ M6C	O_2/CO_2 M3A	CO M10
Zero Drift, % of range	< ± 3	< ± 3	< ± 3
Calibration Drift, % of range	< ± 3	< ± 3	< ± 3
Response time, seconds	≤ 60	≤ 60	≤ 60
Interference Response, % of range	< ± 2	< ± 2	NA
NO_2 to NO Converter, % efficiency	> 90	NA	NA
Calibration Error, % of cal gas	< ± 2	< ± 2	< ± 5

5.3.5 NO_2 to NO Conversion Efficiency

The NO_2 to NO converter was checked in the following manner. A mid-level NO gas was introduced into a 30 liter Tedlar bag and diluted one-to-one (1:1) with air. The bag was then hooked up to the sampling system and drawn through the system for 30 minutes. The converter check did meet the method requirements. A copy of the converter check can be found in Appendix E.

5.4 ONSITE SAMPLING ACTIVITIES

Onsite sampling activities included the determination of the response time of the TCEM system at four sources. A copy of this data sheet can be found in Appendix E.

5.4.1 Determination of the TCEM System Response Time

After the TCEM system is set up, response time was determined. Zero gas was introduced at the TCEM system calibration gas valve assembly until a stable zero response was achieved. Once achieved, the calibration gas valve at the manifold was switched to the high span gas. Response Time is the recorded time it takes the analyzer to respond to within 90% of the cal gas value. This upscale response was conducted three times. A down scale response time was also conducted three times starting at a high span calibration value and switching to the zero span gas.

5.4.2 EPA Methods 1 and 2 for Velocity Measurements and Cyclonic Flow

Velocity traverses were conducted at the scrubber outlet sampling location with an S-type pitot assembly in accordance with EPA Reference Methods 1 and 2. An S-type pitot tube with an attached inclined manometer was used to measure the exhaust velocities. An attached Type-K thermocouple with remote digital display was used to determine the flue gas temperature. During the compliance test program, velocity measurements were conducted during each test run. The required number of velocity measurements points for each sampling location were determined following EPA Method 1.

A cyclonic flow check was conducted on the outlet duct in accordance with Section 2.4 of EPA Method 1. This procedure is referred to as the nulling technique. An S-type pitot tube connected to an inclined manometer is used in this method. The pitot tube is positioned at each traverse

point so that the face openings of the pitot tube are perpendicular to the stack cross-sectional plane. This position is called the "0° reference". The velocity pressure (ΔP) measurement are noted. If the ΔP reading is zero, the cyclonic angle is recorded as 0°. If the ΔP reading is not zero, the pitot tube is rotated clockwise or counter clockwise until the ΔP reading becomes zero. This angle is then measured with a leveled protractor and reported to the nearest degree. After this null technique is applied at each traverse point, the average of the cyclonic angles is calculated. If this average is less than 20°, the flow condition in the source is acceptable to test. Cyclonic flow was not present in any of the sources tested. Supporting data sheets can be found in Appendix A.

5.4.3 EPA Methods 3A for Flue Gas Molecular Weight

Oxygen and carbon dioxide concentrations were determined according to EPA Reference Method 3A, "*Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)*".

These concentrations are needed to calculate the molecular weight of the gas streams for calculating the volumetric flow of each sampling location.

5.4.4 EPA Method 4 for Moisture

Moisture was determined according to EPA Reference Method 4, "*Determination of Moisture Content in Stack Gases*". The principle of this method is to remove the moisture from the sample stream either volumetrically or gravimetrically. Method 4 was used in conjunction with the Method 5 sampling trains.

5.4.5 EPA Method 5 for Particulate Matter

Particulate matter was determined according to EPA Method 5, "*Determination of Particulate Emissions From Stationary Sources*".

The sampling train consisted of a heated, glass-lined probe, with a stainless steel button-hook nozzle. A thermocouple and S-type pitot tube were attached to the probe for measurement of gas temperature and velocity measurements. The sample gas passed through the probe assembly to a heated glass filter holder assembly containing a quartz fiber filter and a Teflon frit support. The filter holder was maintained at 248°F ± 25°F throughout each test run. Downstream of the

heated filter, the sample gas passed through a series of four ice-cooled impingers kept below 68°F to enable condensation of entrained moisture. The first and second impingers contained 100 mL DI water . The third impinger was empty. The fourth impinger contained 200 grams of silica gel. The impingers were followed by a Nutech Model 2010 dry gas meter, pump, and calibrated orifice meter.

Sampling was conducted under isokinetic (± 10 percent) conditions with readings of flue gas parameters recorded at every sampling point during the traverse.

Leak checks of the entire Method 5 sampling train were performed before and after each sampling run. All leak checks and leakage rates are documented on the relevant field test data sheet. The acceptance criteria for the Method 5 train is a leak rate of ≤ 0.02 cfm at the highest vacuum obtained during the run.

Following the completion of each test run, the Method 5 train was transported to a recovery area onsite. The sample recovery sequence was as follows:

- Remove the sampling train to the recovery area.
- Note the condition of the train (i.e., filter condition, impinger contents color, silica gel color, etc.).
- Sample No. 1 - Disassemble the filter housing and transfer the filter to its original glass petri dish. Seal the container with Teflon[R] tape and label it with the appropriate sample information.
- Sample No. 2 - The front half of the train, nozzle, probe, and front-half filter housing, were brush-rinsed with acetone into an amber glass container with a Teflon-lined cap. The rinse procedure was performed three times after which the container was sealed and labeled.
- Sample No. 3 - The contents of the first, second and third impingers were measured for volume and transferred to a clean polyethylene container. The impingers, right angle, and U-tubes were rinsed with distilled deionized water into the sample container. The container was then sealed and labeled.

- The silica gel is returned to its original container and weighed to obtain a final weight.

- All containers were checked to ensure proper sealing, proper labeling, and that all liquid levels were marked. All samples were then logged onto the chain-of-custody record.

The Method 5 train resulted in the following samples:

- Filter
- Front-Half Acetone Rinse
- Back-Half DI water

5.4.6 Emissions Testing for O_2, CO_2, SO_2, CO and NO_x

TRC conducted continuous emissions monitoring for oxygen (EPA Method 3A), carbon dioxide (EPA Method 3A), sulfur dioxide (EPA Method 6C), oxides of nitrogen (EPA Method 7E) and carbon monoxide (EPA Method 10).

The sampling train starts with a heated (248°F ± 25°F) stainless-steel sampling probe and filter box. The sample stream was then drawn through heated (248°F ± 25°F) Teflon® sample line and a sample conditioner to remove the moisture from the gas stream. The sample was then drawn through Teflon® tubing by a leak-free Teflon® double diaphragm pump to a stainless-steel sample manifold with an atmospheric by-pass rotameter. The O_2, CO_2, SO_2, CO, and NO_x analyzers did draw samples from this manifold.

All TCEMS data was recorded as averages by a Campbell 21X digital data logger designed to receive and log instrument signals. The results will be expressed in ppm for SO_2, CO, NO_x and in percent for O_2 and CO_2.

5.4.7 Emissions Testing for TGNMO

Total hydrocarbons were determined in accordance with EPA Method 25, "*Determination of Total Gaseous Organic Concentration*". Single point sampling was conducted.

5.4.7.1 USEPA Method 25 Train for Total Gaseous Non-Methane Organics

TGNMO sampling as conducted following the criteria of USEPA Reference Test Method 25. Flue gas was sampled from the scrubber exhaust at a constant rate through a heated probe and filter and a chilled condensate trap by means of an evacuated sample tank. The heated probe and oven were kept at a temperature of $\geq 265°F$ and $250 \pm 5°F$ respectively during the sampling. After completion of each test run, the trap and tank were sealed, labeled and documented on the chain-of-custody record. All traps were kept under dry ice until the moment of analysis. Three one-hour tests were conducted. A schematic representation of the sampling train is included as Figure 3-1.

Leak checks on the Method 25 train were performed before each sampling run. All leak checks and leakage rates are documented on the relevant field test data sheet. Copies of the field data sheets and summary calculations are included in Appendix A.

SECTION 6.0
ANALYTICAL PROCEDURES AND CALCULATIONS

This section delineates the analytical procedures and calculations which were used during the IBP Compliance Test Program.

6.1 ANALYTICAL PROCEDURES

6.1.1 Particulate Matter

Particulate sampling was accomplished by following the procedures in EPA Method 5. The sampling of particulate was done with the use of an EPA Method 5 sampling train. Particulate analysis was conducted by TRC Environmental Corporation.

All filters for the test program were labeled on the back side with an identification number. The filters were desiccated to a constant weight. The filters were then placed in glass petri dishes and sealed with Teflon® tape. An identification label is placed on the dish. The beakers used for the dry down of the acetone rinse were cleaned and dried in an oven at 225°F. The beakers were desiccated to a constant weight.

The front-half acetone rinse was air dried in a tared beaker and then desiccated and weighed to a constant weight. The filter is desiccated and weighed to constant weight. The sum of the net weights for the probe wash and filter catch is used to calculate the concentration of particulate matter in gr/dscf. The emission rate in lbs/hr was also calculated.

6.2 CALCULATIONS

6.2.1 Flowrates and Isokinetics

Calculations for the determination of gas velocity at stack conditions (afpm), gas volumetric flow rate at stack conditions (acfm), and gas volumetric flow rate at standard conditions (dscfm) and percent isokinetics can be found in Appendix B.

6.2.2 Particulate Matter - Grains per Dry Standard Cubic Foot

Emission rates in terms of grains per dry standard cubic feet (gr/dscf) were calculated using the pollutant emission rate in terms of milligrams (mg) divided by the volume of gas collected (dscf).

$$\text{gr/dscf} = 0.0154 \times \left[\text{mg} \div \left\{ \frac{528 \times (Y) \times (VM) \times (PB + PM)}{29.92 \times (TM + 460)} \right\} \right]$$

where:

dscf	=	Dry standard cubic feet at 68°F (528°R) and 29.92 inches Hg
0.0154	=	0.0154 grains per milligram
Y	=	Dry gas meter calibration factor
VM	=	Volume metered, ft^3
PB	=	Barometric Pressure, inches Hg
PM	=	Average Orifice Pressure Drop, inches Hg (Avg. ΔH inches $H_2O \div 13.6$)
TM	=	Average Dry Gas Temperature at Meter, °F

6.2.3 Particulate Matter - Pounds Per Hour

Emission rates in terms of pounds per hour (lbs/hr) were calculated using the particulate matter emission rate in terms of grains per dry standard cubic feet (gr/dscf), outlet stack flowrate - dscfm (Qs), 60 minutes/hour, divided by 7000 grains in a pound (gr/lb).

$$\text{lbs/hr} = \frac{\text{gr/dscf} \times Qs \times 60}{7000}$$

6.2.4 SO_2, NO_x and CO - Pounds Per Hour

Emission rates in terms of pounds per hour (lbs/hr) were calculated using the emission rate in terms of micrograms per dry standard cubic foot (μg/dscf), flowrate - dscfm (Qs), 60 minutes/hour, divided by 453,600,000 μg/lb.

$$\text{lbs/hr} = (\text{ppmv})(\text{mw})(\text{dscfm})(1.554 \text{ X } 10^{-7})$$

NO_x molecular weight = 46
SO2 molecular weight= 64
CO molecular weight= 28

6.2.5 TGNMO - Pounds Per Hour

Emission rates in terms of pounds per hour (lbs/hr) THCs were calculated using the pollutant emission rate in terms of parts per million (ppm/dry), flowrate - dscfm (Qs), molecular weight of the pollutant (MW), 60 minutes/hour, divided by 385.3 x 10^6 dscf/lb-mole @ 68°F (20°C).

$$\text{lbs/hr} = \frac{\text{ppm} \times \text{Qs} \times \text{MW} \times 60}{385.3 \times 10^6}$$

where:

TGNMO as carbon molecular weight = 12

SECTION 7.0
QUALITY ASSURANCE

7.1 OVERVIEW

TRC Environmental Corporation management is fully committed to an effective Quality Assurance/Quality Control Program whose objective is the delivery of a quality product. For much of TRC's work, that product is data resulting from field measurements, sampling and analysis activities, engineering assessments, and the analysis of gathered data for planning purposes. The Quality Assurance Program works to provide complete, precise, accurate, representative data in a timely manner for each project, considering both the project's needs and budget constraints.

This section highlights the specific QA/QC procedures to be followed on this test program.

7.2 FIELD QUALITY CONTROL SUMMARY

7.2.1 Calibration Gases

All calibration gases used to conduct instrument calibrations were prepared in accordance with EPA Protocol 1, or are traceable to NIST.

7.2.2 Instrument Calibrations

All instrument calibrations did meet the performance criteria defined in 40 CFR 60 Appendix A, Methods 3A,6C, 7E and 10.

7.2.3 Calibration Procedures

Calibration of the field sampling equipment were performed prior to the field sampling effort. Copies of the calibration sheets were submitted to the field team leader to take onsite and for the project file. Calibrations were performed as described in the EPA publications "*Quality Assurance Handbook for Air Pollution Measurement Systems; Volume III - Stationary Source Specific Methods*" (EPA-600/4-77-027b) and EPA 40 CFR Part 60 Appendix A. Equipment calibrated includes the sample metering system, nozzles, thermocouples, and pitot tubes. All

calibrations were available for review at the test program. Copies of the equipment calibration forms can be found in Appendix E.

7.2.4 Equipment Leak Checks

Prior to sampling, each sampling train were leak checked according to the procedures outlined in EPA Reference Method 5. During the course of a test run, a leak check were conducted before and after every test. Final leak checks were performed to ensure that no leaks developed in the train during the course of the test run. All leakage rates, were recorded on the appropriate field data sheet.

7.2.5 Cyclonic Flow Check

The presence of cyclonic flow within the source was checked during preliminary traverses prior to sampling, in accordance with Section 2.4 of EPA Method 1. Cyclonic flow was not detected above 20 degrees in any of the sources tested.

7.2.6 Method Blanks

One Method blank for the Method 5 and Method 25 sampling trains was taken during the field sampling program. This is to ensure sample quality and integrity.

7.3 SAMPLE CHAIN OF CUSTODY

The chain-of-custody of the samples were initiated and maintained as follows:

- Each sample was collected, labeled, sealed, and the liquid level marked on appropriate samples.
- The sample were then recorded on the sample chain-of-custody form.
- Custody of the samples is retained by TRC.

7.4 DATA REDUCTION, VALIDATION, AND REPORTING

Specific QC measures were used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in all projects.

7.4.1 Field Data Reduction

Data sheets were checked in the field by the field team leader and one other team member to insure they were completed prior to transport to the office. Data was not calculated in the field.

7.4.2 Laboratory Analysis Data Reduction

Analytical results were reduced to concentration units specified by the analytical procedures, using the equation provided in the analytical procedures.

7.4.3 Data Validation

TRC supervisory and QC personnel did use validation methods and criteria appropriate to the type of data and the purpose of the measurement. Records of all data was maintained, including that judged to be an "outlying" or spurious value. The persons validating the data did have sufficient knowledge of the technical work to identify questionable values.

Field sampling data was validated by the Field Team Leader and/or the QC Coordinator based on their review of the adherence to an approved sampling protocol and written sample collection procedure.

The following criteria was used to evaluate the field sampling data:

- Use of approved test procedures;
- Proper operation of the process being tested;
- Use of properly operating and calibrated equipment;
- Leak checks conducted before and after tests;
- Use of reagents conforming to QC specified criteria;
- Proper chain-of-custody maintained.

The criteria listed below was used to evaluate the analytical data:

- Use of approved analytical procedures;
- Use of properly operating and calibrated instrumentation;
- Acceptable results from analyses of QC samples (i.e., the reported values should fall within the 95 percent confidence interval for these samples).

7.4.4 Data Reporting

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

- Exhaust Gas Stream
  - Gas Properties:
    a. Moisture, dscf and percent by volume
    b. Flow rate, dscfm and acfm
    c. Pressure, mm of Hg
    d. Temperature, °F
  - Particulate:
    a. gr/dscf and gr/ascf
    b. lbs/hr
  - Gas Pollutants/Diluents
    a. O_2, percent
    b. CO_2, percent
    d. NO_x, SO_2 and CO ppmvd, lbs/hr
    e. TGNMO, ppmc, lbs/hr

7.5 EXCEPTIONS

Any deviations from the test plan were approved by the NDEQ on-site observer when present, and are documented in the report.

APPENDIX A
FIELD SAMPLING DATA SHEETS

IBP Dakota City, NE SuperCooker

Run No.	1	2	3	
Date	22-Jul-98	22-Jul-98	22-Jul-98	
Start Time	10:30	18:10	20:20	
Stop Time	11:32	19:13	21:23	AVERAGES
Nozzle Diameter, in.	0.244	0.244	0.244	
Barometric Pressure, in. Hg	29.05	29.05	29.05	29.05
Net Sampling Time, minutes	60.0	60.0	60.0	60.00
Volume Metered, cf	45.869	46.943	44.968	45.927
Avg. DGM Temp, F	76.4	92.7	86.4	85.2
AVG Delta H, in of H2O	1.77	1.86	1.74	1.79
AVG Delta H, in of Hg	0.1301	0.1368	0.1283	0.1317
DGM Calibration Factor	0.982	0.982	0.982	0.982
Volume of Gas Collected, dscf	43.246	42.963	41.618	42.609
Total Water Collected, mL	47.0	46.0	57.0	50.0
Volume of Water Vapor, scf	2.216	2.169	2.688	2.358
Moisture, %	4.9	4.8	6.1	5.2
Dry Mole Fraction, 100-%M	0.9513	0.9519	0.9393	0.9475
CO2 at Stack, % dry	0.20	0.10	0.10	0.13
O2 at Stack, % dry	20.10	20.20	20.20	20.17
CO + N2, % dry	79.70	79.70	79.70	79.70
Dry Molecular Weight, lb/lb mole	28.84	28.82	28.82	28.83
Wet Molecular Weight, lb/lb mole	28.31	28.30	28.17	28.26
Excess Air at Stack, %	2136.5	2402.5	2402.5	2313.8
Stack Area, sq. in.	530.9	530.9	530.9	530.9
Static Pressure, in. of H2O	-12.25	-12.25	-12.25	-12.25
Stack Pressure, in. of Hg	28.15	28.15	28.15	28.15
Avg. Stack Temp., F	80.5	89.7	97.7	89.3
Avg. Sqroot of Delta P	0.7226	0.7396	0.7236	0.7286
SDE Average	16.799	17.340	17.088	17.076
Pitot Coefficient	0.84	0.84	0.84	0.84
Stack Gas Velocity, afpm	2564.5	2647.3	2615.1	2609.0
Stack Flowrate, wet acfm	9,455	9,760	9,641	9,619
Stack Flowrate, dry scfm	8,266	8,396	8,067	8,243
Isokinetics, %	99.0	96.8	97.6	97.8
PARTICULATE DATA -- FRONT HALF ONLY				
Front Half Rinse (FHACE), mg	23.7	10.6	6.7	13.7
Particulate Filter (PF), mg	1.8	1.0	1.3	1.4
Organic, mg	1.1	0.8	0.8	0.9
Total Disolved Solids, mg	3.0	0.7	5.8	3.2
Total Particulate Collected, mg	25.5	11.6	8.0	15.0
Grain Loading, gr/dscf	0.0091	0.0042	0.0030	0.0054
Grain Loading, gr/acf	0.0079	0.0036	0.0025	0.0047
Grain Loading, gr/dscf @ 7% O2	0.0063	0.0029	0.0020	0.0037
Emission Rate, lb/Hr	0.643	0.299	0.205	0.382

IBP / DC **Tests performed after 1st packed bed scrubber prior to 2nd bed**

Run No.	**SC-1**	**SC-2**	**SC-3**	
Date	**July 22,1998**	**July 22,1998**	**July 22,1998**	
Start Time	**1030**	**1810**	**2020**	
Stop Time	**1130**	**1910**	**2120**	**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	45.869	46.943	44.968	45.927
Avg. DGM Temp, F	76.4	92.700	86.400	85.2
AVG Delta H, in of H2O	2.00	2.000	2.000	2.00
AVG Delta H, in of Hg	0.1471	0.1471	0.1471	0.1471
DGM Calibration Factor	0.982	0.982	0.982	0.982
Volume of Gas Collected, dscf	43.271	42.978	41.645	42.631
Total Water Collected, mL	47.0	46.0	57.0	50.0
Volume of Water Vapor, scf	2.216	2.169	2.688	2.358
Moisture, %	4.87	4.80	6.06	5.25
Dry Mole Fraction, 100-%M	0.9513	0.9520	0.9394	0.9475
CO2 at Stack, % dry	0.2	0.1	0.1	0.1
O2 at Stack, % dry	20.1	20.2	20.2	20.2
CO + N2, % dry	79.7	79.7	79.7	79.7
Dry Molecular Weight, lb/lb mole	28.83	28.83	28.83	28.83
Wet Molecular Weight, lb/lb mole	28.30	28.31	28.17	28.26
Stack Diameter, in	26	26	26	26.00
Stack Area, sq. in. (@ pitot meas. location)	530.9	530.9	530.9	530.9
Static Pressure, in. of H2O	-12.25	-12.25	-12.25	-12.25
Stack Pressure, in. of Hg	28.15	28.15	28.15	28.15
Avg. Stack Temp., F	80.5	89.7	97.7	89.3
Avg. Sqroot of Delta P	0.7226	0.7396	0.7236	0.7286
SDE Average	16.799	17.340	17.088	17.076
Pitot Coefficient	0.84	0.84	0.84	0.84
Stack Gas Velocity, afpm	2564.8	2647.1	2614.8	2608.9
Stack Flowrate, wet acfm	9,456	9,760	9,641	9,619
Stack Flowrate, dry scfm	8,268	8,396	8,067	8,243
Stack Flowrate, dry scf/hr	496,056	503,758	483,993	494602.45
Stack Flowrate, wet scf/hr	5.2146E+05	5.2918E+05	5.1523E+05	521956.25
NOx Lb/Hr	0.0362	0.0537	0.0149	0.0349
SO2 Lb/Hr	0.0728	0.0401	0.0751	0.0627
CO Lb/Hr	0.0216	0.0334	0.0366	0.0305
TGNMO Lb/Hr	0.833	0.940	0.663	0.8122

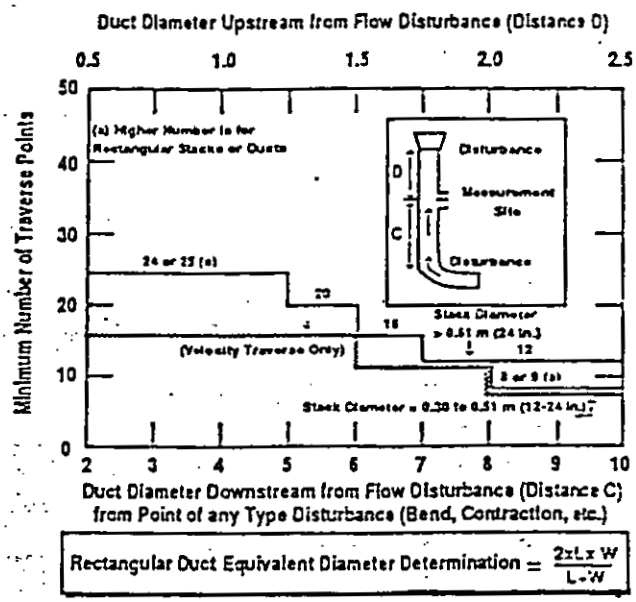
IBP/DC Condenser Outlet prior to packed bed **Flow data from previous testing used to calculate Lb/Hr**

Run No.	**SC-4**	**SC-5**	**SC-6**	
Date	**July 22,1998**	**July 22/23,1998**	**July23,1998**	
Start Time	**2202**	**2335**	**102**	
Stop Time	**2302**	**35**	**202**	**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	15.415	15.415	15.415	15.415
Avg. DGM Temp, F	84.8	84.8	84.8	84.8
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	0.982	0.982	0.982	0.982
Volume of Gas Collected, dscf	14.318	14.318	14.318	14.318
Total Water Collected, mL	8.7	8.7	8.7	8.7
Volume of Water Vapor, scf	0.410	0.410	0.410	0.410
Moisture, %	2.79	2.79	2.79	2.79
Dry Mole Fraction, 100-%M	0.9721	0.9721	0.9721	0.9721
CO2 at Stack, % dry	5.1	4.9	2.6	4.2
O2 at Stack, % dry	19.0	19.2	19.8	19.3
CO + N2, % dry	75.9	75.9	77.6	76.5
Dry Molecular Weight, lb/lb mole	29.57	29.55	29.21	29.45
Wet Molecular Weight, lb/lb mole	29.25	29.23	28.90	29.13
Stack Diameter, in	6	6	6	6.00
Stack Area, sq. in. (@ pitot meas. location)	28.3	28.3	28.3	28.3
Static Pressure, in. of H2O	-10.40	-10.40	-10.40	-10.40
Stack Pressure, in. of Hg	28.29	28.29	28.29	28.29
Avg. Stack Temp., F	73.8	73.8	73.8	73.8
Avg. Sqroot of Delta P	0.7346	0.7346	0.7346	0.7346
SDE Average	16.972	16.972	16.972	16.972
Pitot Coefficient	0.84	0.84	0.84	0.84
Stack Gas Velocity, afpm	2542.7	2543.6	2558.1	2548.1
Stack Flowrate, wet acfm	499	499	502	500
Stack Flowrate, dry scfm	454	454	457	455
Stack Flowrate, dry scf/hr	27,231	27,240	27,396	27288.91
Stack Flowrate, wet scf/hr	2.8011E+04	2.8021E+04	2.8181E+04	28070.74
NOx Lb/Hr	0.0143	0.0055	0.0092	0.0097
SO2 Lb/Hr	0.0562	0.0346	0.1098	0.0669
CO LbHr	0.0365	0.0358	0.0236	0.0320

Traverse Point Location for Circular and Rectangular Ducts

Project Number: 22214-0000-00012
Client: IBP
Date: 7/21/98
Sampling Location: CONDENSOR OUTLET
Internal Stack Diameter: 26"
Nipple Length: 2.5
Total Stack Diameter: 28.5
Nearest Upstream Disturbance (C): 15' (180")
Nearest Downstream Disturbance (D): ~~24'~~ 21'
Calculator: DW

Traverse Point Number	Fraction of Stack ID (1 / 100)	Stack ID	Traverse Point (1 x 2 = Point)	Nipple Length	Traverse Point Location includes nipple
1	.021	26"	.55	2.5"	3.05
2	.067		1.74	"	4.24
3	.118		3.07	"	5.57
4	.177		4.60	"	7.10
5	.250		6.50	"	9.00
6	.356		9.26	"	11.76
7	.644		16.74	"	19.24
8	.750		19.50	"	22.0
9	.823		21.4	"	23.9
10	.882		22.93	"	25.43
11	.933		24.26	"	26.76
12	.979		25.55	"	27.95
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					



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

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	1.3	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										98.9	94.5
23											96.8
24											98.9

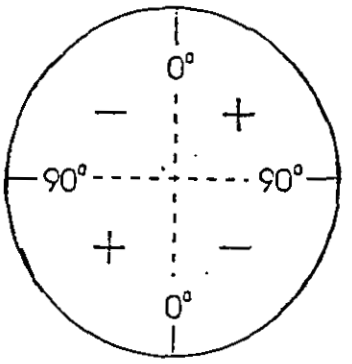
Location of Traverse Points in Rectangular Stacks

	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	15.7	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	5.0	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	85.4	79.2
11										95.5	87.5
12											95.8

FORM 75-4

CYCLONIC FLOW CHECK

DATE 7/22/98
PLANT NAME FBP
UNIT NUMBER CONDENSOR OUTLET
CALCULATIONS PERFORMED BY DW
CALCULATIONS REVIEWED BY
REVIEW DATE

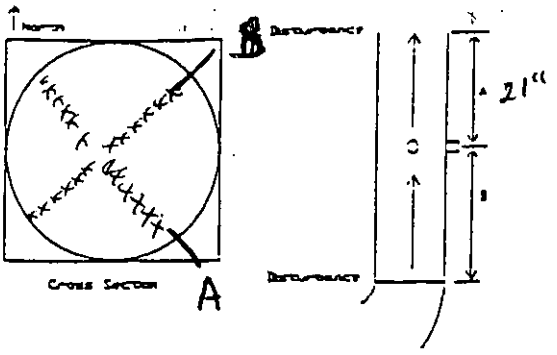


PITOT ANGLE

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	7	Clockwise		
2	0	—		
3	10	Clockwise		
4	13	Clockwise		
5	5	"		
6	2	"		
7	11	Counterclockwise		
8	0	"		
9	1	"		
10	4	"		
11	0	—		
12	2	"		
1	5	Clockwise		
2	10	Clockwise		
3	15	"		
4	15	"		
5	8	"		
6	8	"		
7	4	Counterclockwise		
8	5	"		
9	8	"		
10	3	"		
11	3	"		
12	15	"		
AVERAGE	6.42°			

TRC

PARTICULATE FIELD DATA



Plant IBP DAKOTA CITY
Date 7/22/98
Location DAKOTA CITY
Operator DW
Source Super Cooker COMB. OUT
Run No. 1
Sample Box
Meter Box 4
Meter dH @ 1.8069
Y = .9821
Time Start 10:30
K = 3.34 @ 75/80

Ambient Temperature 75°F
Barometric Pressure 29.05
Assumed Moisture % ~~2.0~~ 4.0
Probe Length, in. 5' eff
Nozzle Diameter, in. .245, .245, .243
Stack Diameter, in. 26"
Probe Heater Setting 248 ± 25
Oven Heat Setting 248 ± 25
Pitot Coefficient .84
Filter No. 585
Filter Tare Wgt. 601.6
K = 3.58 @ 80/80 = 3.35 @ 80/85

Pre-Test Leak Check
Meter .001 @ 15" Hg
Pitot 0.0 @ 3" H2O
Orsat N/A

Point No.	Time	Static Pressure +/- in. H2O	Ts F	dP in. H2O	Sqr Rt dP	dH in. H2O	Vm ft³	Tm Inlet F	Tm Outlet F	Oven Temp. F	Imp Outlet Temp F	Vacuum (in Hg)	PROBE HEAT
A 1	0	-12.25	80	.50		1.67	717.153	73	73	251	64	5	260
2			80	.56		1.87	718.9	72	72	251	63	6	260
3	5		80	.58		1.94	720.8	73	72	249	61	6	254
4			80	.60		2.00	722.7	76	74	251	50	6	251
5	10		80	.60		2.00	724.8	77	73	255	55	6	253
6			81	.61		2.04	726.9	78	74	250	56	6	251
7	15		80	.56		1.87	728.8	80	75	251	58	6	255
8			80	.46		1.55	730.8	81	76	250	58	6	257
9	20		79	.65		2.20	732.5	82	76	250	58	6	257
10			80	.41		1.39	734.6	83	77	250	59	4	258
11	25		80	.45		1.52	736.4	84	78	251	59	4	259
12			79	.40		1.35	738.2	85	78	250	60	4	260
1	30		81	.48		1.62	739.8	80	77	251	55	5	257
2			80	.50		1.69	742.0	81	77	251	56	6	255
3	35		82	.54		1.83	744.0	81	77	250	56	6	257
4			81	.56		1.89	746.1	82	78	251	59	6	260
5	40		81	.57		1.93	747.8	82	78	250	57	6	254
6			80	.57		1.93	750.0	83	79	249	57	6	256
7	45		80	.59		1.99	751.9	83	78	248	60	6	255
8			78	.47		1.59	753.9	83	79	250	61	5	258
9	50		80	.40		1.35	755.8	85	80	250	63	4	259
10			94	.36		1.22	757.4	87	82	250	67	4	251
11	55		83	.53		1.79	759.1	89	84	251	66	5	261
12			84	.66		2.23	760.9	91	85	250	67	5	258
	60						763.022						
Avg.			805		.7226	1.7692	45.869	76.4					

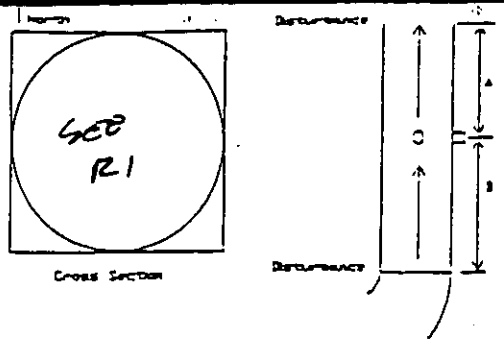
Time End 11:32

Volume of Liquid Water Collected	Impinger Volume ml 1	2	3	4	Silica Gel Weight g
Final	120	116	4		207
Initial	100	100	—	—	200
Liquid Collected	20	16	4		7
Total Volume Collected					

Post-Test Leak Check
Meter .001 @ 11" Hg
Pitot 0.0 @ 3" H2O
Orsat CEMS

TRC

PARTICULATE FIELD DATA



Plant IBP
Date 7/22/98
Location DAKOTA CITY
Operator DW
Source Sugar Cooker Cond. Exit
Run No. 2
Sample Box
Meter Box 4
Meter dH @ 1.8068
Y = .9821
Time Start 18:10

Ambient Temperature 85°F
Barometric Pressure 29.00
Assumed Moisture % 4.0
Probe Length, in. 5' 6"
Nozzle Diameter, in. .244
Stack Diameter, in. 26"
Probe Heater Setting 248 ± 25
Oven Heat Setting 248 ± 25
Pitot Coefficient .84
Filter No. 586
Filter Tare Wgt. 601.2

K = 3.37 @ 90/90 K = 3.40 @ 95/90 K = 3.43 100/90

Pre-Test Leak Check
Meter .001 @ 15" Hg
Pitot 0.0 @ 3" H2O
Orsat N/A (Comms)

Point No.	Time	Static Pressure +\- in. H2O	Ts °F	dP in. H2O	Sqr. Rt. dP	dH in. H2O	Vm cf	Tm Inlet °F	Tm Outlet °F	Oven Temp. °F	Imp. Outlet Temp. °F	Vacuum (in Hg)	PROBE HEAT
1	0	-12.25	91	.50		1.70	765.600	93	92	250	65	15	256
2			85	.53		1.80	767.3	93	92	250	60	10	255
3	5		85	.57		1.94	769.5	93	92	249	57	10	258
4			86	.58		1.97	771.6	94	92	251	54	9	260
5	10		87	.59		2.00	773.6	94	92	250	61	8	256
6			88	.61		2.07	775.6	94	91	251	62	8	252
7	15		87	.61		2.07	777.7	93	90	250	62	6	260
8			85	.60		2.02	779.8	94	90	250	63	6	256
9	20		87	.51		1.72	781.8	93	89	251	62	5	261
10			87	.55		1.85	783.6	95	91	250	65	5	260
11	25		89	.50		1.70	785.6	96	92	250	66	5	261
12			88	.47		1.58	787.4	96	92	250	67	5	261
1	30		90	.52		1.77	789.2	93	91	250	65	5	261
2			93	.56		1.90	791.2	94	91	249	65	6	257
3	35		94	.59		2.00	793.0	95	92	250	65	6	254
4			93	.60		2.04	795.1	96	92	251	66	6	256
5	40		93	.62		2.11	797.1	94	90	250	65	7	253
6			94	.62		2.11	799.2	93	89	250	66	14	253
7	45		94	.59		2.00	801.3	94	90	250	67	10	259
8			95	.48		1.63	803.3	94	90	250	65	7	255
9	50		94	.44		1.50	805.1	96	92	251	65	7	261
10			92	.45		1.53	806.9	95	92	250	67	8	261
11	55		88	.54		1.84	808.7	95	91	250	67	7	260
12			87	.53		1.80	810.6	95	91	250	68	7	253
	60						812.543						
Avg.			89.7	.5483	.7396	1.8604	46.943	92.7					

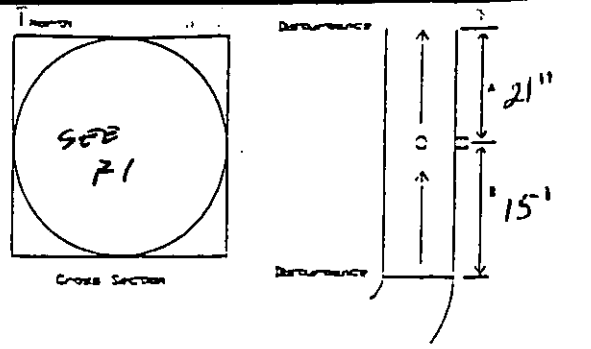
Time End 19:13

Volume of Liquid Water Collected	Impinger Volume ml 1	2	3	4	Silica Gel Weight g
Final	122	113	5	—	206
Initial	100	100	—	—	200
Liquid Collected	22	13	5		6
Total Volume Collected			46		

Post-Test Leak Check
Meter .001 @ 15" Hg
Pitot 0.0 @ 3" H2O
Orsat N/A (Comms)

TRC

PARTICULATE FIELD DATA



Plant IBP
Date 7/22/96
Location DAKOTA CITY
Operator DW
Source SUPER CONTROL COND. OUT
Run No. 3
Sample Box
Meter Box 4
Meter dH @ 1.8068
Y = .9821
Time Start 20:20

Ambient Temperature 80°F
Barometric Pressure 29.00
Assumed Moisture % 4.0
Probe Length, in. 5' 2A
Nozzle Diameter, in. .244
Stack Diameter, in. 26"
Probe Heater Setting 248 I 25
Oven Heat Setting 248 I 25
Pitot Coefficient .84
Filter No. 470
Filter Tare Wgt. 604.3

Pre-Test Leak Check
Meter .015 @ 15" Hg
Pitot 0.0 @ 3" H2O
Orsat N/A

K = 3.37 @ 90/90 3.34 @ 85/90 K = 3.31 85/95 K = 3.31 @ 90/100

PROBE HEAT

Point No.	Time	Static Pressure +/- in. H2O	Ts F	dP in. H2O	Sqr Rt dP	dH in. H2O	Vm ft.	Tm Inlet F	Tm Outlet F	Oven Temp. F	Imp Outlet Temp. F	Vacuum (in Hg)	
1	0	-12.25	97	.51		1.69	812.902	86	85	251	67	11	256
2			99	.54		1.79	814.7	88	86	251	60	11	259
3	5		101	.58		1.92	816.8	88	86	250	56	11	259
4			100	.60		2.00	818.8	90	87	250	52	9	260
5	10		101	.61		2.02	820.7	90	86	251	53	9	257
6			101	.62		2.05	822.7	91	87	250	55	8	259
7	15		100	.63		2.09	824.8	91	86	250	55	8	260
8			101	.58		1.92	826.8	91	86	250	56	7	255
9	20		102	.51		1.69	828.7	91	85	249	56	5	258
10			95	.36		1.19	830.7	90	85	250	59	4.5	259
11	25		92	.54		1.79	832.3	90	85	249	57	6	259
12			90	.51		1.69	834.1	90	85	250	56	5	260
1	30		100	.51		1.69	836.0	87	83	249	54	5	255
2			101	.51		1.69	837.8	87	83	250	57	5	259
3	35		100	.54		1.79	839.5	87	84	249	56	5	258
4			102	.54		1.79	841.3	88	83	250	57	5	255
5	40		100	.57		1.89	843.3	88	83	250	57	6	261
6			100	.61		2.02	845.3	88	83	251	57	7	259
7	45		100	.57		1.89	847.3	88	83	250	57	5	251
8			96	.51		1.69	849.2	88	83	250	58	5	250
9	50		93	.47		1.56	851.1	88	83	249	59	4	249
10			92	.42		1.39	852.8	88	83	251	58	4	250
11	55		92	.41		1.36	854.6	87	83	250	58	4	260
12			90	.38		1.26	856.3	87	83	249	59	4	251
	60						857.870						
Avg.			97.7	.5038	.7236	1.7442	44.968	86.4					

Time End 21:23

Volume of Liquid Water Collected	Impinger Volume ml 1	2	3	4	Silica Gel Weight g
Final	142	110	—		205
Initial	100	100	—	—	200
Liquid Collected	42	10	0		
Total Volume Collected					

Post-Test Leak Check
Meter .012 @ 15" Hg
Pitot 0.0 @ 3" H2O
Orsat N/A

TRC

Method 25 Field Data

Client: IBP
Location: DAKOTA CITY
Date: 7/22/98

Project Number: 22214-0000-00012
Sample Location: Super Cooker Condenser out
Run Number: 1
Operator: DW

Tank Number: 290 Trap Number: GGC Sample ID: R1

	Tank Vacuum Manometer (mm/cm Hg)	Tank Vacuum Gauge (mm/cm Hg/in Hg)	Barometric Pressure (mm/cm Hg/in. Hg)	Ambient Temperature C / (F)
Pretest	731.5 mm	30	737.9 mm	74
Post Term	75.0 mm	3.0	737.9 mm	80

Pretest Leak Rate (mm/cm Hg/in Hg/5 min): 4 mm Hg 5 min

Clock Time	Sample Time	Gauge Vacuum mm/cm Hg	Flowmeter Setting ml / cm	Temperature Probe (C) / F	Temperature Box (C) / F	Comments
10:30	0	30	60	132	125	
	5	27.5	60	132	125	Normal
	10	25.0	60	134	120	Probe
	15	22.0	60	135	120	heat set
	20	20.0	60	134	120	to 135 C
	25	17.5	60	134	122	
	30	15.0	60	133	121	Box heat
	35	13.0	60	135	121	set to
	40	11.0	60	135	121	120 C
	45	9.0	60	135	121	
	50	7.0	60	133	120	
	55	5.0	60	133	121	
1032	60	3.0	60	134	122	

TRC
ENVIRONMENTAL

Method 25 Field Data

Client: IBP
Location: Dakota City, NE
Date: 7-22-98

Project Number: 22214-12
Sample Location: Super Cooker Cons. out
Run Number: 2
Operator: DW

Tank Number: 294 Trap Number: FFW Sample ID: R-2

	Tank Vacuum Manometer (mm/cm Hg)	Tank Vacuum Gauge (mm/cm Hg/in Hg)	Barometric Pressure (mm/cm Hg/in. Hg)	Ambient Temperature C / F
Pretest	734.06	30.0	736.6	75.0
Post Term	53.3	1.5	736.6	75.0

Pretest Leak Rate (mm/cm Hg/in Hg/5 min): 2.5 mm / 5 min

Clock Time	Sample Time	Gauge Vacuum mm/cm Hg	Flowmeter Setting ml / cm	Temperature Probe (C/F)	Temperature Box (C/F)	Comments
6:11 pm	0	28.0	60	134	127	
	5	26.0	60	134	118	Normal
6:21	10	24.0	60	134	120	Probe
	15	21.5	60	134	122	heat set
6:31	20	18.5	60	134	122	to 135 C
	25	16.0	60	131	121	
6:41 start 6:43	30	14.0	60	134	121	Box heat
	35	11.5	60	134	121	set to
6:53	40	9.5	60	134	121	120 C
	45	7.5	60	134	121	
7:03	50	5.5	60	134	120	
	55	3.5	60	134	121	
7:13	60	1.5	60	134	121	

TRC
ENVIRONMENTAL

Method 25 Field Data

Client: IBP
Location: DAKOTA CITY, NE
Date: 7/22/98

Project Number: 22214-12
Sample Location: SUPER COOLER COND OUT
Run Number: 3
Operator: DW

Tank Number: 295 Trap Number: GGB Sample ID: R3

	Tank Vacuum		Barometric Pressure	Ambient Temperature
	Manometer (mm/cm Hg)	Gauge (mm/cm Hg/in Hg)	(mm/cm Hg/in. Hg)	C / (F)
Pretest	734.1	30.0	736.6	75
Post Term	67.7	3.5	736.6	75

Pretest Leak Rate (mm/cm Hg/in Hg/5 min): 2.5 mm Hg / 5 min

Clock Time	Sample Time	Gauge Vacuum mm/cm Hg	Flowmeter Setting (ml) / cm	Temperature Probe (C) / F	Temperature Box (C) / F	Comments
20:20	0	30.0	60	134	120	
	5	27.5	60	134	121	Normal
20:30	10	25.0	60	134	124	Probe
	15	23.0	60	134	124	heat set
20:40	20	20.5	60	134	121	to 135 C
	25	18.5	60	134	120	
20:50 start / 20:53 stop	30	16.0	60	134	120	Box heat
	35	14.0	60	134	121	set to
21:03	40	11.5	60	134	120	120 C
	45	9.5	60	134	120	
21:13	50	7.5	60	134	120	
	55	5.5	60	134	120	
21:23	60	3.5	60	134	120	

TRC
ENVIRONMENTAL

Run 1

DATE:	**July 22,1998**	**CLIENT REP:**	**R.KRUSE**
PLANT:	**IBP / DC**	**WITNESSED?:**	**N/A**
FUEL TYPE:	**Steam**	**BURNER TYPE:**	**N/A**
OPERATOR:	**SM/DW**	**GENERATOR TYPE:**	**N/A**
TEST LOCATION:	**SUPER COOKER**	**O2 GENERATOR TYPE:**	**N/A**

CALIBRATION GASES

O2	CO2	CO	S02	THC	NOx
0	0	0	0	0	0
10.2	9.9	30.3	45.1	N/A	46
18	17.7	86.9	88.7	N/A	84.3

END TIME	SAMPLE POINT	O2 %	CO2 %	CO ppm	SO2 ppm	THC ppm	NOx ppm
1050	1	20.1	0.07	1.53	1.2		0.5
1110	2	19.89	0.11	2.18	1.2		0.5
1130	3	20.03	-0.03	1.94	1		0.5
	AVERAGE	20.01	0.05	1.88	1.13	#DIV/0!	0.50

rometric Pres: 29.05

EFFLUENT GAS CONCENTRATION, % or PPM

	O2	CO2	CO	SO2	THC	NOx
PRE ZERO	0.1	0	1.5	0.3		-0.3
POST ZER	0.1	-0.2	1.1	0.3		0.1
ACT SPAN	18	17.7	30.3	45.1	N/A	46
PRE SPAN	18	17.6	31	43.4		45
POST SPA	17.8	17.5	30.5	42.1		44.9
GAS CONC.	**20.13**	**0.15**	**0.60**	**0.89**	**#DIV/0!**	**0.61**
GAS CONC.	19.15	0.14	0.57	0.84	#DIV/0!	0.58

F-factor (Fc)----- N/A

scf/10e6 btu

lb/hr NOx **0.036**

lb/hr SO2 **0.073**

lb/hr CO **0.022**

Stack Flowrate- 5.2146E+05 (wet,scf/hr)

EFFLUENT GAS CONC CALCULATION

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

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 10:30/10:50
MOISTURE = 3.6%

RUN NUMBER: 1 PAGE 1
OPERATOR: MILLER
MEASUREMENT DATE:
10:50/11:10 11:10/11:30
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
10:33:00	0.4	0.4	1.2	1.2	0.06	0.06	20.11	19.39	1.34	1.29
10:34:00	0.5	0.5	1.2	1.2	0.06	0.06	20.10	19.38	1.23	1.18
10:35:00	0.5	0.5	1.2	1.2	0.05	0.05	20.10	19.37	1.38	1.33
10:36:00	0.5	0.5	1.3	1.2	0.05	0.05	20.09	19.37	1.50	1.44
10:37:00	0.4	0.4	1.2	1.1	0.06	0.05	20.12	19.39	1.64	1.59
10:38:00	0.4	0.4	1.2	1.2	0.05	0.05	20.11	19.38	1.33	1.28
10:39:00	0.5	0.5	1.2	1.1	0.06	0.05	20.09	19.36	1.38	1.33
10:40:00	0.4	0.4	1.2	1.1	0.06	0.06	20.12	19.40	1.69	1.63
10:41:00	0.4	0.4	1.1	1.1	0.06	0.06	20.12	19.40	1.99	1.92
10:42:00	0.6	0.5	1.2	1.1	0.06	0.06	20.08	19.36	1.85	1.78
10:43:00	0.5	0.5	1.2	1.1	0.07	0.07	20.09	19.37	1.78	1.71
10:44:00	0.5	0.4	1.1	1.1	0.06	0.06	20.10	19.38	1.73	1.66
10:45:00	0.4	0.4	1.1	1.1	0.07	0.07	20.12	19.39	1.64	1.58
10:46:00	0.5	0.5	1.2	1.1	0.08	0.08	20.08	19.36	1.39	1.34
10:47:00	0.4	0.4	1.2	1.1	0.08	0.08	20.11	19.38	1.63	1.57
10:48:00	0.4	0.4	1.1	1.0	0.08	0.08	20.10	19.37	1.39	1.34
10:49:00	0.4	0.4	1.1	1.1	0.09	0.08	20.07	19.35	1.30	1.25
10:50:00	0.5	0.5	1.1	1.1	0.08	0.08	20.07	19.35	1.41	1.36
MEAN	0.5	0.4	1.2	1.1	0.07	0.06	20.10	19.38	1.53	1.48
10:53:00	0.5	0.4	1.2	1.1	0.09	0.09	20.09	19.37	1.73	1.67
10:54:00	0.5	0.4	1.2	1.1	0.08	0.08	20.09	19.36	1.58	1.52
10:55:00	0.5	0.5	1.2	1.2	1.56	1.50	16.82	16.22	4.71	4.54
10:56:00	0.5	0.5	1.2	1.2	0.07	0.07	20.10	19.38	1.98	1.91
10:57:00	0.5	0.4	1.2	1.2	0.07	0.06	20.10	19.38	2.02	1.95
10:58:00	0.5	0.5	1.2	1.2	0.06	0.06	20.07	19.35	2.07	2.00
10:59:00	0.6	0.6	1.2	1.1	0.05	0.04	20.07	19.34	1.81	1.75
11:00:00	0.5	0.5	1.2	1.2	0.04	0.04	20.08	19.36	2.13	2.05
11:01:00	0.6	0.6	1.2	1.1	0.01	0.01	20.06	19.34	1.95	1.88
11:02:00	0.6	0.5	1.2	1.1	0.03	0.02	20.07	19.35	2.02	1.94
11:03:00	0.6	0.5	1.2	1.2	0.01	0.01	20.06	19.34	1.94	1.87
11:04:00	0.5	0.5	1.2	1.1	0.00	0.00	20.07	19.35	2.15	2.08
11:05:00	0.6	0.6	1.1	1.1	-0.00	-0.00	20.05	19.32	1.98	1.91
11:06:00	0.5	0.5	1.1	1.1	-0.01	-0.01	20.07	19.35	2.33	2.24
11:07:00	0.6	0.6	1.2	1.1	-0.01	-0.01	20.05	19.33	2.25	2.17
11:08:00	0.5	0.5	1.1	1.1	-0.01	-0.01	20.06	19.34	2.17	2.09

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 10:30/10:50
MOISTURE = 3.6%

RUN NUMBER: 1 PAGE 2
OPERATOR: MILLER
MEASUREMENT DATE:
10:50/11:10 11:10/11:30
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
11:09:00	0.5	0.5	1.0	1.0	-0.01	-0.01	20.05	19.33	2.21	2.13
11:10:00	0.5	0.5	1.1	1.1	-0.02	-0.02	20.06	19.34	2.21	2.13
MEAN	0.5	0.5	1.2	1.1	0.11	0.11	19.89	19.18	2.18	2.10
11:13:00	0.6	0.5	1.0	1.0	-0.03	-0.03	20.03	19.31	2.03	1.96
11:14:00	0.4	0.4	1.0	1.0	-0.03	-0.03	20.07	19.34	2.07	2.00
11:15:00	0.5	0.4	0.9	0.9	-0.03	-0.03	20.05	19.33	2.24	2.16
11:16:00	0.6	0.5	1.0	1.0	-0.03	-0.03	20.02	19.30	1.97	1.90
11:17:00	0.4	0.4	1.0	0.9	-0.03	-0.03	20.05	19.32	2.24	2.15
11:18:00	0.4	0.4	1.0	0.9	-0.03	-0.03	20.05	19.32	2.04	1.97
11:19:00	0.5	0.5	1.0	0.9	-0.03	-0.03	20.03	19.31	1.92	1.85
11:20:00	0.4	0.4	1.0	0.9	-0.03	-0.03	20.06	19.34	2.01	1.93
11:21:00	0.4	0.4	1.0	0.9	-0.03	-0.03	20.05	19.33	2.05	1.98
11:22:00	0.5	0.5	1.0	0.9	-0.03	-0.03	20.03	19.31	1.94	1.87
11:23:00	0.5	0.5	1.0	0.9	-0.03	-0.03	20.01	19.29	1.60	1.55
11:24:00	0.4	0.4	1.0	1.0	-0.03	-0.03	20.05	19.33	1.90	1.83
11:25:00	0.5	0.4	0.9	0.9	-0.03	-0.03	20.02	19.30	1.82	1.75
11:26:00	0.6	0.6	0.9	0.9	-0.03	-0.03	20.00	19.28	1.66	1.60
11:27:00	0.5	0.5	0.9	0.9	-0.03	-0.03	20.00	19.28	1.72	1.66
11:28:00	0.4	0.4	0.9	0.9	-0.03	-0.03	20.03	19.31	1.93	1.86
11:29:00	0.5	0.5	0.9	0.8	-0.03	-0.03	20.00	19.28	1.80	1.73
11:30:00	0.5	0.5	1.0	0.9	-0.02	-0.02	20.01	19.29	1.87	1.81
MEAN	0.5	0.5	1.0	0.9	-0.03	-0.03	20.03	19.31	1.94	1.87

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
10:29:00	1.3	12.7	0.1	4.1	0.4	3.8	20.1	805.0	1.3	13.4	22.2
Start 10:30:00	1.3	12.7	0.1	3.4	0.6	5.5	20.1	805.0	1.4	14.1	22.2
10:31:00	1.2	12.4	0.1	3.4	0.4	4.5	20.1	804.0	1.3	13.4	22.2
10:32:00	1.3	12.7	0.1	4.1	0.3	3.4	20.1	805.0	1.5	14.8	22.2
10:33:00	1.1	11.4	0.1	3.4	0.5	4.8	20.1	804.0	1.3	12.7	22.2
10:34:00	1.2	12.0	0.1	3.4	0.4	4.5	20.1	804.0	1.1	11.0	22.3
10:35:00	1.3	12.7	0.1	2.8	0.6	5.5	20.1	804.0	1.5	14.8	22.3
10:36:00	1.2	11.7	0.1	2.8	0.4	4.1	20.1	803.0	1.5	15.1	22.3
10:37:00	1.2	12.0	0.1	2.8	0.4	4.1	20.1	805.0	1.6	16.2	22.3
10:38:00	1.1	11.4	0.1	2.8	0.5	5.2	20.1	804.0	1.3	12.7	22.3
10:39:00	1.2	11.7	0.1	2.8	0.4	4.5	20.1	804.0	1.5	15.5	22.3
10:40:00	1.1	11.0	0.1	3.1	0.4	4.5	20.1	805.0	1.8	17.5	22.4
10:41:00	1.1	11.4	0.1	3.4	0.4	4.5	20.1	804.0	2.3	22.7	22.4
10:42:00	1.3	12.7	0.1	2.8	0.7	6.5	20.1	804.0	1.6	15.8	22.4
10:43:00	1.2	12.0	0.1	3.4	0.4	4.5	20.1	804.0	1.8	17.9	22.4
10:44:00	1.1	11.4	0.1	3.4	0.4	4.1	20.1	804.0	1.8	17.9	22.4
10:45:00	1.1	11.4	0.1	3.4	0.4	4.1	20.1	804.0	1.6	15.8	22.4
10:46:00	1.2	12.0	0.1	4.1	0.5	5.2	20.1	803.0	1.4	14.4	22.4
10:47:00	1.1	11.4	0.1	4.1	0.3	3.4	20.1	804.0	1.6	16.2	22.5
10:48:00	1.1	11.4	0.1	3.4	0.4	4.1	20.1	804.0	1.3	12.7	22.5
10:49:00	1.1	11.0	0.1	4.1	0.4	4.5	20.1	803.0	1.3	12.7	22.5
10:50:00	1.1	11.4	0.1	4.8	0.6	5.8	20.1	803.0	1.5	14.8	22.5
10:51:00	1.0	10.0	0.1	4.5	0.4	3.8	20.1	804.0	1.7	17.2	22.5
10:52:00	1.2	12.0	0.1	4.8	0.6	6.2	20.1	802.0	1.4	14.4	22.6
10:53:00	1.2	11.7	0.1	4.8	0.4	4.1	20.1	804.0	1.7	17.2	22.6
10:54:00	1.2	12.0	0.1	4.1	0.5	4.8	20.1	803.0	1.5	15.1	22.6
10:55:00	1.3	12.7	0.1	4.1	0.6	6.2	20.1	803.0	1.9	18.9	22.6
10:56:00	1.2	12.0	0.1	3.8	0.4	3.8	20.1	804.0	1.9	19.3	22.6
10:57:00	1.1	11.4	0.1	3.4	0.5	4.8	20.1	804.0	2.1	20.6	22.6
10:58:00	1.2	12.0	0.1	2.8	0.6	5.5	20.1	802.0	2.1	21.0	22.7
10:59:00	1.3	12.7	0.0	2.1	0.5	5.2	20.1	804.0	1.9	18.6	22.7
11:00:00	1.2	12.0	0.0	0.7	0.6	6.2	20.1	802.0	2.2	21.7	22.7
11:01:00	1.1	10.7	0.0	0.7	0.6	5.5	20.1	802.0	1.8	18.2	22.8
11:02:00	1.2	12.0	0.0	0.7	0.6	5.5	20.1	804.0	2.1	21.3	22.8
11:03:00	1.1	11.4	0.0	0.0	0.6	5.5	20.1	802.0	1.9	18.9	22.8
11:04:00	1.1	10.7	-0.0	-0.3	0.6	5.5	20.1	803.0	2.1	21.3	22.9
11:05:00	1.1	11.4	0.0	0.0	0.6	6.2	20.1	802.0	2.1	21.3	22.9
11:06:00	1.2	11.7	-0.0	-0.3	0.5	5.2	20.1	803.0	2.4	24.1	22.9
11:07:00	1.1	11.4	-0.0	-0.7	0.6	5.8	20.1	802.0	2.0	19.9	22.9
11:08:00	1.2	11.7	-0.0	-0.7	0.4	4.1	20.1	803.0	2.1	21.3	23.0
11:09:00	1.1	10.7	-0.0	-1.4	0.4	4.5	20.1	803.0	2.1	20.6	23.0
11:10:00	1.1	11.4	-0.0	-1.4	0.4	4.1	20.1	803.0	2.3	22.7	23.0
11:11:00	1.1	11.4	-0.0	-0.7	0.4	3.8	20.1	803.0	2.2	22.0	23.0
11:12:00	1.0	10.0	-0.0	-1.4	0.6	6.2	20.0	801.0	2.1	21.3	23.0

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
11:13:00	1.0	10.3	-0.0	-1.4	0.4	4.5	20.1	802.0	1.9	19.3	23.1
11:14:00	1.1	10.7	-0.0	-1.7	0.5	4.8	20.1	803.0	2.1	21.3	23.1
11:15:00	1.0	10.0	-0.0	-1.7	0.5	4.8	20.0	801.0	2.3	22.7	23.1
11:16:00	0.9	9.3	-0.0	-1.7	0.5	5.2	20.0	801.0	1.9	18.6	23.1
11:17:00	1.0	10.0	-0.0	-0.7	0.6	5.5	20.0	800.0	2.3	22.7	23.2
11:18:00	1.0	10.0	-0.0	-1.4	0.4	4.5	20.1	802.0	2.3	22.7	23.2
11:19:00	0.9	9.3	-0.0	-1.4	0.4	4.1	20.1	802.0	1.8	17.9	23.2
11:20:00	0.9	9.3	-0.0	-1.4	0.3	3.4	20.1	802.0	2.0	20.3	23.3
11:21:00	0.9	9.3	-0.0	-1.4	0.5	4.8	20.1	802.0	2.0	20.3	23.3
11:22:00	0.9	9.3	-0.0	-1.4	0.6	6.2	20.0	800.0	1.8	17.5	23.3
11:23:00	0.9	8.6	-0.0	-1.4	0.4	3.8	20.0	801.0	1.6	16.2	23.4
11:24:00	1.0	10.3	-0.0	-1.4	0.4	4.5	20.1	802.0	2.0	19.9	23.4
11:25:00	0.9	9.3	-0.0	-1.4	0.5	4.8	20.0	800.0	1.6	16.5	23.4
11:26:00	1.0	10.0	-0.0	-1.4	0.6	6.2	20.0	800.0	1.6	16.5	23.4
11:27:00	0.9	9.3	-0.0	-1.4	0.5	5.2	20.0	801.0	1.9	19.3	23.5
11:28:00	1.0	10.0	-0.0	-1.4	0.5	5.2	20.0	800.0	1.7	17.2	23.5
11:29:00	0.9	8.6	-0.0	-0.7	0.5	4.8	20.0	801.0	2.0	20.3	23.5
11:30:00	0.9	9.3	-0.0	-1.0	0.6	5.8	20.0	799.0	1.6	16.5	23.5
11:31:00	0.9	9.3	-0.0	-1.0	0.6	6.2	20.0	799.0	1.6	16.5	23.5
11:32:00	0.6	6.2	-0.2	-8.9	0.2	1.7	0.2	8.9	55.6	556.0	23.6
11:33:00	0.6	5.8	-0.2	-8.9	0.1	1.0	0.1	5.5	1.4	13.8	23.6
11:34:00	0.4	4.5	-0.2	-8.9	0.1	0.7	0.1	4.8	1.2	12.0	23.6
11:35:00	0.3	3.4	-0.2	-8.9	0.1	1.4	0.1	2.8	1.1	10.7	23.7
11:36:00	0.4	4.5	-0.2	-8.9	43.2	432.2	0.1	2.8	0.9	8.6	23.7
11:37:00	0.4	4.5	-0.2	-8.9	44.9	449.4	0.1	3.4	1.4	14.1	23.7
11:38:00	0.3	3.4	-0.2	-8.9	0.5	4.8	0.1	3.4	2.7	27.2	23.7
11:39:00	0.3	3.1	-0.2	-8.6	0.2	2.1	0.1	2.1	30.5	304.7	23.8
11:40:00	0.4	3.8	17.3	864.0	0.1	1.0	17.7	708.0	29.3	292.6	23.8
11:41:00	0.4	4.1	17.5	873.0	0.0	0.3	17.8	712.0	0.9	9.3	23.8
11:42:00	0.4	3.8	17.5	876.0	0.0	0.3	17.7	709.0	0.6	5.5	23.8
11:43:00	6.5	65.0	0.1	4.8	0.0	0.3	0.4	14.4	1.0	9.6	23.8
11:44:00	30.1	300.9	-0.0	-1.4	0.1	0.7	0.1	3.8	1.3	13.4	23.8
11:45:00	35.1	350.7	-0.1	-2.8	0.0	0.3	0.1	3.1	1.2	12.4	23.9
11:46:00	37.6	375.8	-0.1	-3.4	0.1	0.7	0.1	2.4	1.3	13.4	23.9
11:47:00	39.2	392.0	-0.1	-4.1	0.0	0.3	0.1	2.1	1.3	13.4	23.9
11:48:00	40.7	407.4	-0.1	-4.8	0.0	0.3	0.0	1.7	1.4	14.4	23.9
11:49:00	41.7	417.0	-0.1	-5.2	0.0	0.0	0.1	2.4	1.6	16.2	23.9
11:50:00	42.1	421.1	-0.1	-5.5	-0.0	-0.3	0.1	2.4	1.8	17.5	24.0

Re-CAL Between R1- & 2 Zero & High Gas

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
17:35:30	2.0	20.3	-0.0	-2.1	0.3	2.7	0.1	5.2	1.3	13.1	28.5
17:36:30	2.1	21.0	-0.0	-2.1	42.6	425.9	0.1	3.8	1.0	10.3	28.5
17:37:30	2.1	21.0	0.0	2.1	9.6	95.5	0.9	35.7	1.6	16.5	28.5
17:38:30	19.7	196.8	-0.0	-2.4	0.3	3.4	0.1	4.5	1.5	15.1	28.5
17:39:30	31.8	317.7	-0.0	-2.4	0.3	2.7	0.1	2.4	1.1	11.3	28.5
17:40:30	9.0	90.0	-0.1	-2.7	0.3	3.1	0.0	1.0	1.1	11.3	28.5
17:41:30	2.2	22.3	-0.1	-2.7	0.2	2.1	0.0	1.0	-0.1	-1.4	28.4
17:42:30	2.1	21.0	0.0	0.0	0.2	1.7	0.0	1.0	-0.2	-1.7	28.4
17:43:30	-0.3 Zero	-3.1	0.0 Zero	0.0	0.1 Zero	1.4	0.0 Zero	1.0	-0.1 Zero	-0.7	28.4
17:44:30	82.4	824.0	0.0	0.0	0.5	5.5	0.0	1.0	0.3	2.7	28.3
17:45:30	88.8 Span	888.0	0.0	0.0	0.5	5.2	0.0	1.7	0.5	5.5	28.3
17:46:30	1.8	17.5	17.8	888.0	-0.2	-2.1	17.9	716.0	0.1	1.0	28.3
17:47:30	-0.0	-0.3	17.7	886.0	-0.1	-1.4	17.9	717.0	-0.5	-5.5	28.2
17:48:30	-0.3	-3.4	17.8 Span	888.0	-0.2	-2.1	18.0 Span	720.0	-0.2	-2.1	28.2
17:49:30	-0.3	-3.1	0.1	6.2	-0.3	-2.7	0.2	7.9	3.8	37.8	28.1
17:50:30	-0.4	-3.8	0.1	4.8	-0.2	-1.7	0.0	1.7	28.1	280.6	28.1
17:51:30	-0.5	-4.8	0.1	4.8	-0.2	-2.4	0.0	1.7	29.9 Span	298.5	28.1
17:52:30	-0.3	-3.1	0.1	4.5	-0.3	-2.7	0.1	2.4	13.3	132.6	28.1
17:53:30	1.7 Zero	16.8	0.1 Zero	4.8	-0.2	-2.4	0.1	3.8	25.5	255.2	28.0
17:54:30	0.9 Zero Bias	9.3	0.1 Zero Bias	4.8	-0.3 Zero Bias	-2.7	0.1 Zero Bias	3.8	1.2 Zero Bias	11.7	28.0
17:55:30	0.5	5.2	0.1	4.8	-0.3	-2.7	0.1	3.4	1.2	11.7	28.0
17:56:30	0.4	4.1	0.1	4.5	42.4	423.5	0.1	3.8	1.1	10.6	27.9
17:57:30	0.4	4.5	0.1	4.5	42.7	426.9	0.1	3.4	1.4	14.1	27.9
17:58:30	21.0	210.2	0.1	4.5	0.1	1.0	0.1	3.1	1.6	15.8	27.9
17:59:30	37.7	376.8	0.1	4.5	0.1	0.7	0.0	1.7	1.1	11.3	27.9
18:00:30	40.0 Span Bias	400.5	0.1	4.5	0.0	0.3	0.1	3.4	1.2	11.7	27.9
18:01:30	41.2 Span Bias	411.8	0.1	4.1	-0.0	-0.3	0.1	3.4	1.2	12.0	27.9
18:02:30	16.1	161.1	17.5 Span	875.0	0.0	0.0	18.0 Span	721.0	1.5	15.5	27.9
18:03:30	3.6	36.1	17.7 Span Bias	883.0	0.0	0.3	18.0 Span Bias	719.0	0.8	7.9	27.9
18:04:30	2.4	23.7	0.4	17.5	0.1	1.0	0.5	18.5	0.5	4.8	27.8
18:05:30	1.5	15.1	0.2	9.3	0.1	1.4	0.1	3.4	30.3 Span Bias	302.6	27.8

Run 2

DATE:	**July 22,1998**	**CLIENT REP:**	**R.KRUSE**
PLANT:	**IBP / DC**	**WITNESSED?:**	**N/A**
FUEL TYPE:	**Steam**	**BURNER TYPE:**	**N/A**
OPERATOR:	**SM/DW**	**GENERATOR TYPE:**	**N/A**
TEST LOCATION:	**SUPER COOKER**	**O2 GENERATOR TYPE:**	**N/A**

CALIBRATION GASES

O2	CO2	CO	S02	THC	NOx
0	0	0	0	0	0
10.2	9.9	30.3	45.1	N/A	46
18	17.7	86.9	88.7	N/A	84.3

END TIME	SAMPLE POINT	O2 %	CO2 %	CO ppm	SO2 ppm	THC ppm	NOx ppm
1830	1	20.17	0.25	1.84	1.20		0.90
1850	2	20.12	0.25	1.67	1.00		0.80
1910	3	20.13	0.22	1.71	0.90		0.50
	AVERAGES	20.14	0.24	1.74	1.03	#DIV/0!	0.73

arometric Pressure: 29.05

EFFLUENT GAS CONCENTRATION, % or PPM

	O2	CO2	CO	SO2	THC	NOx
PRE ZERO	0.1	0.1	1.2	0.9		-0.3
POST ZER	0.1	0.1	0.5	0.3		0.1
ACT SPAN	18	17.7	30.3	45.1	N/A	46
PRE SPAN	18	17.6	30.3	41.2		42.7
POST SPA	18	17.6	30.4	41.3		42.8
GAS CONC.(	**20.15**	**0.14**	**0.91**	**0.48**	**#DIV/0!**	**0.89**
GAS CONC.(	19.18	0.13	0.87	0.46	#DIV/0!	0.85

F-factor (Fc)----- N/A

scf/10e6 btu

lb/hr NOx **0.054**

lb/hr SO2 **0.040**

lb/hr CO **0.033**

Stack Flowrate- 5.2918E+05 (wet,scf/hr)

EFFLUENT GAS CONC CALCULATION

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

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 18:10/18:30
MOISTURE = 5%

RUN NUMBER: 2 PAGE 1
OPERATOR: MILLR
MEASUREMENT DATE:
18:30/18:50 18:50/19:10
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
18:13:00	0.6	0.6	1.0	1.0	0.27	0.26	20.30	19.28	1.63	1.55
18:14:00	0.8	0.7	1.1	1.0	0.27	0.25	20.24	19.23	1.61	1.53
18:15:00	0.8	0.7	1.0	0.9	0.27	0.25	20.23	19.22	1.53	1.46
18:16:00	0.8	0.8	1.1	1.1	0.27	0.25	20.22	19.21	1.87	1.77
18:17:00	0.8	0.8	1.1	1.1	0.27	0.25	20.18	19.17	1.52	1.45
18:18:00	0.8	0.8	1.2	1.1	0.27	0.25	20.19	19.18	1.52	1.45
18:19:00	0.8	0.8	1.1	1.1	0.27	0.25	20.20	19.19	1.90	1.81
18:20:00	0.9	0.8	1.2	1.1	0.26	0.25	20.18	19.17	1.94	1.84
18:21:00	0.8	0.8	1.1	1.1	0.26	0.25	20.19	19.18	2.00	1.90
18:22:00	0.9	0.9	1.2	1.1	0.26	0.25	20.14	19.13	1.64	1.56
18:23:00	0.9	0.9	1.2	1.1	0.26	0.25	20.15	19.14	1.66	1.58
18:24:00	0.9	0.9	1.2	1.1	0.26	0.25	20.16	19.15	2.16	2.05
18:25:00	1.0	0.9	1.2	1.2	0.26	0.25	20.13	19.12	1.83	1.74
18:26:00	1.0	0.9	1.3	1.2	0.26	0.25	20.15	19.15	2.19	2.08
18:27:00	1.0	1.0	1.3	1.2	0.26	0.25	20.12	19.11	2.01	1.91
18:28:00	1.0	1.0	1.3	1.2	0.27	0.26	20.13	19.12	2.15	2.04
18:29:00	1.0	1.0	1.4	1.3	0.27	0.26	20.13	19.12	2.00	1.90
18:30:00	1.1	1.1	1.4	1.3	0.27	0.25	20.10	19.10	2.02	1.91
MEAN	0.9	0.8	1.2	1.1	0.27	0.25	20.17	19.17	1.84	1.75
18:33:00	1.1	1.0	1.4	1.4	0.26	0.24	20.13	19.12	2.13	2.02
18:34:00	1.1	1.0	1.3	1.3	0.26	0.24	20.11	19.10	1.91	1.82
18:35:00	1.0	1.0	1.3	1.3	0.26	0.25	20.14	19.13	2.15	2.04
18:36:00	1.0	1.0	1.3	1.2	0.26	0.25	20.13	19.12	1.83	1.74
18:37:00	1.1	1.0	1.2	1.2	0.26	0.25	20.11	19.10	1.96	1.86
18:38:00	1.1	1.0	1.3	1.2	0.26	0.25	20.11	19.10	1.72	1.64
18:39:00	0.7	0.7	1.0	0.9	0.21	0.20	20.15	19.14	1.81	1.72
18:40:00	0.6	0.6	0.8	0.8	0.22	0.21	20.15	19.14	1.65	1.57
18:41:00	0.6	0.6	0.8	0.8	0.23	0.22	20.15	19.14	1.64	1.56
18:42:00	0.6	0.6	0.8	0.8	0.22	0.21	20.10	19.10	1.47	1.40
18:43:00	0.6	0.6	0.7	0.7	0.24	0.23	20.11	19.10	1.18	1.12
18:44:00	0.5	0.5	0.7	0.7	0.25	0.23	20.13	19.12	1.43	1.36
18:45:00	0.5	0.5	0.7	0.7	0.24	0.23	20.13	19.12	1.36	1.29
18:46:00	0.5	0.5	0.7	0.7	0.24	0.23	20.13	19.12	1.41	1.34
18:47:00	0.5	0.5	0.8	0.7	0.24	0.23	20.13	19.12	1.47	1.40
18:48:00	0.6	0.5	0.8	0.8	0.28	0.27	20.12	19.11	1.39	1.32

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 18:10/18:30
MOISTURE = 5%

RUN NUMBER: 2 PAGE 2
OPERATOR: MILLR
MEASUREMENT DATE:
18:30/18:50 18:50/19:10
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
18:49:00	0.7	0.7	1.0	0.9	0.27	0.26	20.10	19.10	1.86	1.76
18:50:00	0.7	0.7	1.0	0.9	0.26	0.24	20.13	19.12	1.74	1.65
MEAN	0.8	0.7	1.0	0.9	0.25	0.24	20.12	19.12	1.68	1.59
18:53:00	0.8	0.8	1.1	1.1	0.24	0.23	20.14	19.13	2.09	1.99
18:54:00	0.8	0.7	1.1	1.1	0.25	0.24	20.13	19.12	1.88	1.79
18:55:00	0.8	0.8	1.1	1.1	0.22	0.21	20.12	19.11	2.04	1.94
18:56:00	0.6	0.5	0.8	0.8	0.20	0.19	20.14	19.13	1.78	1.69
18:57:00	0.6	0.6	0.9	0.8	0.21	0.20	20.11	19.10	1.42	1.35
18:58:00	0.6	0.5	0.8	0.8	0.22	0.21	20.12	19.11	1.45	1.38
18:59:00	0.5	0.5	0.9	0.8	0.22	0.21	20.13	19.13	1.68	1.59
19:00:00	0.5	0.5	0.9	0.8	0.23	0.22	20.13	19.12	1.65	1.57
19:01:00	0.5	0.5	0.9	0.8	0.23	0.21	20.13	19.12	1.80	1.71
19:02:00	0.5	0.4	0.9	0.8	0.22	0.21	20.14	19.13	1.72	1.63
19:03:00	0.5	0.5	0.8	0.8	0.22	0.21	20.13	19.12	1.75	1.66
19:04:00	0.5	0.5	0.8	0.8	0.22	0.21	20.13	19.12	1.67	1.58
19:05:00	0.5	0.5	0.8	0.8	0.22	0.21	20.13	19.12	1.60	1.52
19:06:00	0.4	0.4	0.8	0.7	0.22	0.21	20.13	19.12	1.61	1.53
19:07:00	0.4	0.4	0.7	0.7	0.22	0.21	20.15	19.14	1.78	1.69
19:08:00	0.5	0.5	0.8	0.7	0.22	0.21	20.11	19.11	1.48	1.41
19:09:00	0.4	0.4	0.8	0.8	0.22	0.21	20.14	19.13	1.80	1.71
19:10:00	0.5	0.4	0.8	0.8	0.21	0.20	20.11	19.10	1.47	1.39
MEAN	0.5	0.5	0.9	0.8	0.22	0.21	20.13	19.12	1.71	1.62

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
18:08:00	1.4	13.7	0.3	14.4	0.4	3.8	20.6	822.0	1.5	15.5	27.8
18:09:00	1.2	11.7	0.3	14.1	0.5	4.8	20.4	817.0	1.5	15.5	27.8
18:10:00	1.1	11.0	0.3	14.1	0.5	5.2	20.4	815.0	1.5	15.1	27.8
18:11:00	1.1	10.6	0.3	13.7	0.6	6.2	20.3	813.0	1.3	13.1	27.8
18:12:00	0.9	9.3	0.3	13.7	0.7	6.5	20.3	812.0	1.4	13.7	27.7
18:13:00	1.1	10.6	0.3	13.4	0.7	6.5	20.3	811.0	1.8	17.9	27.7
18:14:00	1.1	10.6	0.3	13.4	0.8	8.2	20.2	809.0	1.5	15.1	27.7
18:15:00	1.1	10.6	0.3	13.4	0.8	7.9	20.3	810.0	1.8	17.5	27.6
18:16:00	1.2	11.7	0.3	13.4	0.8	7.9	20.2	808.0	1.8	17.5	27.6
18:17:00	1.2	11.7	0.3	13.4	0.9	9.3	20.2	808.0	1.4	14.4	27.6
18:18:00	1.1	10.6	0.3	13.1	0.7	6.9	20.2	808.0	1.7	16.8	27.6
18:19:00	1.2	11.7	0.3	13.4	0.9	9.3	20.2	807.0	1.9	18.9	27.6
18:20:00	1.2	11.7	0.3	13.4	0.9	8.6	20.2	807.0	2.0	19.6	27.6
18:21:00	1.1	11.3	0.3	13.1	0.8	8.2	20.2	807.0	1.9	18.9	27.5
18:22:00	1.2	12.0	0.3	13.1	1.0	10.3	20.1	805.0	1.6	16.5	27.5
18:23:00	1.2	11.7	0.3	13.1	0.8	7.9	20.2	807.0	1.8	17.5	27.5
18:24:00	1.3	12.7	0.3	13.1	1.0	10.3	20.1	805.0	2.2	21.6	27.5
18:25:00	1.2	11.7	0.3	13.1	0.9	8.6	20.1	806.0	1.9	18.5	27.5
18:26:00	1.3	13.4	0.3	13.1	1.1	10.6	20.1	806.0	2.3	23.0	27.4
18:27:00	1.3	13.4	0.3	13.1	1.0	10.3	20.1	805.0	1.8	18.2	27.4
18:28:00	1.3	12.7	0.3	13.7	1.0	10.3	20.1	804.0	2.1	21.0	27.4
18:29:00	1.5	14.8	0.3	13.4	1.2	11.7	20.1	805.0	2.3	22.7	27.4
18:30:00	1.3	12.7	0.3	13.1	1.0	10.0	20.1	804.0	1.8	17.9	27.4
18:31:00	1.4	14.1	0.3	13.4	1.1	11.3	20.1	806.0	2.2	22.0	27.3
18:32:00	1.5	14.8	0.3	13.1	1.2	12.0	20.1	804.0	1.7	17.2	27.3
18:33:00	1.4	14.1	0.3	12.7	1.1	11.0	20.1	805.0	2.1	21.3	27.3
18:34:00	1.3	13.4	0.3	12.7	1.1	10.6	20.1	805.0	2.1	20.6	27.3
18:35:00	1.3	13.4	0.3	13.1	1.0	10.0	20.1	805.0	1.9	19.2	27.2
18:36:00	1.3	12.7	0.3	13.1	1.1	10.6	20.1	805.0	1.8	17.9	27.2
18:37:00	1.2	12.0	0.3	12.7	1.0	10.0	20.1	803.0	1.8	17.5	27.2
18:38:00	1.2	12.0	0.3	12.7	1.1	10.6	20.1	805.0	1.7	17.2	27.2
18:39:00	0.8	7.9	0.2	11.0	0.7	6.5	20.1	806.0	1.6	16.5	27.2
18:40:00	0.9	8.6	0.2	11.3	0.5	5.5	20.1	806.0	1.5	15.1	27.2
18:41:00	0.9	8.6	0.2	12.0	0.7	6.9	20.1	805.0	1.7	16.8	27.2
18:42:00	0.8	7.9	0.2	11.3	0.5	5.2	20.1	804.0	1.3	13.4	27.1
18:43:00	0.7	6.9	0.2	12.4	0.5	5.2	20.1	805.0	1.2	11.7	27.1
18:44:00	0.7	7.2	0.2	12.4	0.5	5.5	20.1	804.0	1.2	12.0	27.1
18:45:00	0.7	7.2	0.2	12.0	0.6	5.8	20.1	804.0	1.2	12.4	27.1
18:46:00	0.7	7.2	0.2	12.0	0.6	5.8	20.1	804.0	1.3	13.4	27.1
18:47:00	0.8	8.2	0.2	12.0	0.5	4.8	20.1	804.0	1.8	17.5	27.1
18:48:00	0.9	9.3	0.3	15.1	0.7	6.5	20.1	805.0	1.6	16.1	27.0
18:49:00	0.9	9.3	0.3	12.7	0.7	6.9	20.1	804.0	1.8	17.9	27.0
18:50:00	1.1	11.0	0.2	12.4	0.7	7.2	20.1	806.0	2.0	20.3	27.0
18:51:00	1.1	11.3	0.3	12.7	0.9	8.6	20.1	804.0	1.6	16.5	27.0

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
18:52:00	1.2	12.0	0.2	12.4	0.7	7.2	20.1	806.0	2.0	19.6	27.1
18:53:00	1.1	11.3	0.2	12.4	0.9	9.3	20.1	804.0	2.0	20.3	27.0
18:54:00	1.2	12.0	0.2	12.4	0.7	6.9	20.1	806.0	2.2	22.3	27.0
18:55:00	0.9	9.3	0.2	10.0	0.7	6.9	20.1	805.0	1.7	17.2	27.0
18:56:00	0.9	8.6	0.2	10.3	0.6	5.8	20.1	804.0	1.6	16.5	27.0
18:57:00	0.8	7.9	0.2	11.0	0.5	5.2	20.1	805.0	1.3	13.4	27.0
18:58:00	0.7	7.2	0.2	11.3	0.6	6.2	20.1	804.0	1.4	14.4	26.9
18:59:00	0.9	8.6	0.2	11.0	0.5	5.2	20.1	804.0	1.5	15.1	26.9
19:00:00	0.8	8.3	0.2	11.3	0.5	4.8	20.1	806.0	1.8	18.2	26.9
19:01:00	0.9	8.6	0.2	11.3	0.4	4.1	20.1	806.0	2.0	20.3	26.9
19:02:00	0.9	8.6	0.2	11.3	0.4	3.8	20.1	806.0	1.8	18.2	26.9
19:03:00	0.8	7.9	0.2	11.3	0.5	4.8	20.1	806.0	1.9	18.9	26.9
19:04:00	0.9	8.6	0.2	11.0	0.3	3.4	20.1	806.0	1.9	18.9	26.8
19:05:00	0.6	6.2	0.2	10.6	0.5	4.8	20.1	806.0	1.7	17.2	26.8
19:06:00	0.7	7.2	0.2	11.0	0.4	4.5	20.1	805.0	1.6	16.1	26.8
19:07:00	0.7	6.5	0.2	11.0	0.3	3.4	20.1	806.0	1.6	16.5	26.8
19:08:00	0.8	7.9	0.2	11.0	0.5	5.2	20.1	805.0	1.6	16.5	26.8
19:09:00	0.9	8.6	0.2	10.6	0.3	2.7	20.1	805.0	1.8	17.5	26.7
19:10:00	0.7	6.9	0.2	10.6	0.5	4.8	20.1	805.0	1.6	15.8	26.7
19:11:00	0.8	7.9	0.2	10.6	0.3	3.4	20.1	806.0	1.8	17.5	26.7
19:12:00	0.7	6.5	0.2	10.6	0.4	4.5	20.1	804.0	1.4	13.7	26.7
19:13:00	0.5	5.5	0.1	4.8	0.2	1.7	0.2	7.9	25.8	258.0	26.7
19:14:00	0.5	5.2	0.1	4.5	0.2	1.7	0.1	3.4	0.7	6.9	26.6
19:15:00	0.4	4.1	0.1	4.1	0.1	1.4	0.1	4.8	1.0	9.6	26.6
19:16:00	0.3	2.7	0.1	3.4	0.1	1.0	0.1	2.4	0.5	5.2	26.6
19:17:00	0.4	4.5	0.1	2.7	42.5	425.4	0.1	2.7	0.7	7.2	26.6
19:18:00	0.4	4.1	0.1	2.7	42.8	428.4	0.1	4.1	1.3	13.1	26.6
19:19:00	8.1	80.7	0.0	2.1	0.3	3.1	0.1	3.1	1.0	10.0	26.6
19:20:00	29.6	296.5	0.0	1.7	0.2	2.1	0.1	2.7	0.9	8.9	26.6
19:21:00	35.8	358.3	0.0	1.4	0.1	0.7	0.1	3.4	1.4	13.7	26.5
19:22:00	38.8	387.9	0.0	1.0	0.0	0.3	0.1	3.1	1.3	12.7	26.5
19:23:00	40.4	404.4	0.0	0.7	0.1	0.7	0.0	1.7	0.9	8.6	26.5
19:24:00	41.3	412.6	0.0	0.7	-0.0	-0.3	0.1	3.1	1.2	11.7	26.5
19:25:00	14.0	139.8	0.0	0.3	0.1	0.7	0.1	2.7	4.2	41.6	26.5
19:26:00	3.8	37.8	0.0	0.0	0.1	0.7	0.0	1.7	30.4	304.1	26.4
19:27:00	2.3	23.4	17.5	873.0	0.0	0.0	18.1	725.0	25.2	252.2	26.4
19:28:00	1.8	17.5	17.6	880.0	-0.0	-0.3	18.0	720.0	0.3	3.4	26.4

Run 3

DATE:	July 22,1998	CLIENT REP:	R.KRUSE
PLANT:	IBP / DC	WITNESSED?:	N/A
FUEL TYPE:	Steam	BURNER TYPE:	N/A
OPERATOR:	SM/DW	GENERATOR TYPE:	N/A
TEST LOCATION:	SUPER COOKER	O2 GENERATOR TYPE:	N/A

CALIBRATION GASES

O2	CO2	CO	S02	THC	NOx
0	0	0	0	0	0
10.2	9.9	30.3	45.1	N/A	46
18	17.7	86.9	88.7	N/A	84.3

END TIME	SAMPLE POINT	O2 %	CO2 %	CO ppm	SO2 ppm	THC ppm	NOx ppm
2040	1	20.23	0.17	1.68	0.80		0.30
2100	2	20.22	0.15	1.73	0.70		0.20
2120	3	20.23	0.12	1.60	0.70		0.20
	AVERAGES	20.23	0.15	1.67	0.73	#DIV/0!	0.23

Barometric Pressure: 29.05

EFFLUENT GAS CONCENTRATION, % or PPM

	O2	CO2	CO	SO2	THC	NOx
PRE ZERO	0.1	0.1	0.5	0.3		0.1
POST ZER	0.1	-0.1	0.8	0.3		0.1
ACT SPAN	18	17.7	30.3	88.7	N/A	84.3
PRE SPAN	18	17.6	30.4	41.3		42.8
POST SPA	18.1	17.6	30.1	41.4		44.3
GAS CONC.	**20.18**	**0.15**	**1.04**	**0.94**	**#DIV/0!**	**0.26**
GAS CONC.	18.96	0.14	0.98	0.88	#DIV/0!	0.24

F-factor (Fc)----- N/A

scf/10e6 btu

lb/hr NOx **0.015**

lb/hr SO2 **0.075**

lb/hr CO **0.037**

Stack Flowrate- 5.1523E+05 (wet,scf/hr)

EFFLUENT GAS CONC CALCULATION

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

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 20:20/20:40
MOISTURE = 5%

RUN NUMBER: 3 PAGE 1
OPERATOR: MILLER
MEASUREMENT DATE:
20:40/21:00 21:00/21:20
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
20:23:00	0.3	0.3	0.7	0.7	0.17	0.16	20.25	19.24	1.83	1.73
20:24:00	0.3	0.3	0.8	0.8	0.17	0.16	20.26	19.25	1.98	1.88
20:25:00	0.4	0.4	0.8	0.7	0.17	0.16	20.22	19.21	1.66	1.57
20:26:00	0.4	0.4	0.8	0.8	0.17	0.16	20.23	19.21	1.54	1.46
20:27:00	0.4	0.4	0.8	0.7	0.17	0.16	20.22	19.21	1.52	1.44
20:28:00	0.3	0.3	0.8	0.7	0.17	0.16	20.25	19.23	1.82	1.73
20:29:00	0.3	0.3	0.8	0.7	0.17	0.16	20.25	19.24	1.74	1.65
20:30:00	0.4	0.4	0.8	0.7	0.17	0.16	20.23	19.21	1.53	1.45
20:31:00	0.3	0.3	0.8	0.8	0.17	0.16	20.23	19.21	1.65	1.57
20:32:00	0.2	0.2	0.7	0.7	0.16	0.16	20.24	19.23	1.84	1.75
20:33:00	0.3	0.3	0.8	0.8	0.16	0.16	20.22	19.21	1.46	1.39
20:34:00	0.4	0.4	0.8	0.7	0.17	0.16	20.20	19.19	1.47	1.40
20:35:00	0.3	0.3	0.7	0.7	0.16	0.16	20.23	19.22	1.54	1.46
20:36:00	0.3	0.3	0.7	0.7	0.17	0.16	20.22	19.21	1.76	1.68
20:37:00	0.3	0.3	0.8	0.8	0.17	0.16	20.23	19.22	1.78	1.69
20:38:00	0.3	0.3	0.8	0.8	0.17	0.16	20.20	19.19	1.57	1.49
20:39:00	0.3	0.3	0.8	0.7	0.17	0.16	20.24	19.23	1.86	1.76
20:40:00	0.2	0.2	0.8	0.7	0.17	0.16	20.22	19.21	1.60	1.52
MEAN	0.3	0.3	0.8	0.7	0.17	0.16	20.23	19.22	1.68	1.59
20:43:00	0.3	0.2	0.7	0.7	0.16	0.15	20.22	19.21	1.82	1.73
20:44:00	0.3	0.2	0.7	0.7	0.17	0.16	20.22	19.21	1.74	1.65
20:45:00	0.3	0.2	0.8	0.7	0.16	0.15	20.22	19.21	1.75	1.67
20:46:00	0.3	0.3	0.8	0.7	0.16	0.15	20.22	19.21	1.71	1.62
20:47:00	0.2	0.2	0.8	0.8	0.16	0.15	20.23	19.22	1.86	1.76
20:48:00	0.3	0.3	0.8	0.7	0.16	0.15	20.20	19.19	1.66	1.58
20:49:00	0.2	0.2	0.8	0.7	0.15	0.14	20.25	19.23	1.95	1.86
20:50:00	0.2	0.2	0.8	0.7	0.15	0.14	20.22	19.21	1.74	1.65
20:51:00	0.3	0.3	0.8	0.7	0.15	0.14	20.22	19.21	1.72	1.64
20:52:00	0.2	0.2	0.8	0.7	0.14	0.13	20.23	19.22	1.82	1.73
20:53:00	0.2	0.2	0.8	0.7	0.13	0.12	20.23	19.21	1.66	1.58
20:54:00	0.2	0.2	0.7	0.7	0.14	0.13	20.22	19.21	1.46	1.39
20:55:00	0.2	0.2	0.7	0.7	0.15	0.14	20.22	19.21	1.65	1.57
20:56:00	0.3	0.2	0.7	0.6	0.14	0.14	20.22	19.21	1.84	1.75
20:57:00	0.2	0.2	0.7	0.7	0.14	0.13	20.23	19.22	1.68	1.60
20:58:00	0.2	0.2	0.7	0.7	0.14	0.14	20.22	19.21	1.70	1.62

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 20:20/20:40
MOISTURE = 5%

RUN NUMBER: 3 PAGE 2
OPERATOR: MILLER
MEASUREMENT DATE:
20:40/21:00 21:00/21:20
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
20:59:00	0.2	0.2	0.8	0.7	0.15	0.14	20.23	19.21	1.71	1.63
21:00:00	0.3	0.3	0.7	0.7	0.15	0.14	20.20	19.19	1.58	1.50
MEAN	0.2	0.2	0.7	0.7	0.15	0.14	20.22	19.21	1.73	1.64
21:03:00	0.2	0.2	0.7	0.6	0.14	0.13	20.23	19.22	1.69	1.60
21:04:00	0.2	0.2	0.7	0.6	0.14	0.13	20.22	19.21	1.67	1.58
21:05:00	0.2	0.2	0.7	0.6	0.14	0.13	20.22	19.21	1.71	1.63
21:06:00	0.2	0.2	0.7	0.6	0.14	0.13	20.24	19.23	1.77	1.68
21:07:00	0.2	0.2	0.7	0.6	0.14	0.13	20.24	19.23	1.72	1.63
21:08:00	0.3	0.2	0.8	0.7	0.14	0.13	20.22	19.21	1.48	1.40
21:09:00	0.3	0.3	0.7	0.7	0.14	0.13	20.22	19.21	1.43	1.36
21:10:00	0.2	0.2	0.7	0.6	0.13	0.12	20.23	19.21	1.56	1.49
21:11:00	0.2	0.2	0.6	0.6	0.13	0.12	20.23	19.22	1.72	1.63
21:12:00	0.2	0.2	0.6	0.6	0.12	0.12	20.22	19.21	1.71	1.63
21:13:00	0.2	0.2	0.7	0.7	0.12	0.12	20.22	19.21	1.36	1.30
21:14:00	0.2	0.2	0.7	0.6	0.12	0.11	20.22	19.21	1.39	1.32
21:15:00	0.2	0.2	0.7	0.6	0.12	0.11	20.24	19.23	1.71	1.62
21:16:00	0.1	0.1	0.7	0.7	0.11	0.11	20.24	19.23	1.58	1.50
21:17:00	0.2	0.2	0.6	0.6	0.11	0.10	20.22	19.21	1.42	1.35
21:18:00	0.1	0.1	0.6	0.5	0.10	0.09	20.26	19.25	1.76	1.67
21:19:00	0.1	0.1	0.6	0.6	0.10	0.09	20.25	19.24	1.64	1.56
21:20:00	0.2	0.2	0.6	0.6	0.09	0.09	20.23	19.22	1.44	1.37
MEAN	0.2	0.2	0.7	0.6	0.12	0.12	20.23	19.22	1.60	1.52

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
20:06:00	0.8	7.9	0.2	7.6	0.3	3.4	20.2	808.0	1.9	18.9	25.6
20:07:00	0.7	7.2	0.2	7.9	0.3	3.4	20.2	807.0	1.5	15.5	25.6
20:08:00	0.7	6.9	0.2	7.9	0.3	3.1	20.2	808.0	1.7	17.2	25.6
20:09:00	0.9	8.6	0.2	8.3	0.2	2.4	20.2	809.0	2.0	19.9	25.6
20:10:00	0.6	6.2	0.2	8.3	0.4	3.8	20.2	809.0	1.9	18.6	25.6
20:11:00	0.7	7.2	0.1	7.2	0.2	1.7	20.2	809.0	1.8	17.9	25.6
20:12:00	0.8	8.3	0.2	7.9	0.3	3.1	20.2	808.0	1.8	17.9	25.6
20:13:00	0.7	7.2	0.2	7.6	0.3	2.7	20.2	809.0	1.9	18.6	25.5
20:14:00	0.8	8.3	0.2	7.6	0.1	1.4	20.3	810.0	1.9	18.6	25.5
20:15:00	0.7	6.5	0.2	7.6	0.3	3.1	20.2	809.0	1.9	18.6	25.5
20:16:00	0.6	5.8	0.2	7.9	0.2	2.1	20.3	810.0	2.0	19.9	25.5
20:17:00	0.7	7.2	0.2	7.9	0.2	2.4	20.3	810.0	2.0	19.9	25.4
20:18:00	0.7	6.5	0.2	8.6	0.4	3.8	20.2	808.0	1.5	15.5	25.4
20:19:00	0.7	6.5	0.2	8.9	0.2	2.4	20.3	810.0	2.0	20.3	25.4
20:20:00	0.7	6.9	0.2	8.3	0.3	3.1	20.3	810.0	2.0	19.9	25.4
20:21:00	0.9	9.3	0.2	8.3	0.3	3.1	20.2	809.0	1.7	16.8	25.4
20:22:00	0.7	6.9	0.2	8.3	0.3	3.4	20.3	810.0	1.9	18.9	25.3
20:23:00	0.7	7.2	0.2	8.6	0.3	3.4	20.3	810.0	1.9	18.6	25.3
20:24:00	0.8	7.9	0.2	8.3	0.4	3.8	20.2	809.0	2.0	19.9	25.3
20:25:00	0.7	7.2	0.2	8.9	0.4	4.1	20.2	809.0	1.4	14.4	25.2
20:26:00	0.9	8.6	0.2	8.3	0.3	3.4	20.2	809.0	1.5	15.5	25.2
20:27:00	0.8	7.6	0.2	8.6	0.4	3.8	20.2	809.0	1.5	15.1	25.1
20:28:00	0.8	8.3	0.2	8.3	0.3	2.7	20.3	811.0	2.0	19.9	25.1
20:29:00	0.7	7.2	0.2	8.3	0.3	3.1	20.2	809.0	1.6	15.8	25.1
20:30:00	0.9	8.9	0.2	8.3	0.4	3.8	20.2	809.0	1.5	15.1	25.1
20:31:00	0.9	8.6	0.2	8.3	0.2	2.4	20.3	810.0	1.9	18.9	25.1
20:32:00	0.8	7.6	0.2	8.3	0.3	3.1	20.2	809.0	1.6	16.5	25.0
20:33:00	0.9	8.6	0.2	8.3	0.3	3.4	20.2	808.0	1.4	14.4	25.0
20:34:00	0.7	6.9	0.2	8.3	0.3	3.4	20.2	808.0	1.4	14.4	25.0
20:35:00	0.7	7.2	0.2	7.9	0.2	2.1	20.3	811.0	1.8	18.2	25.0
20:36:00	0.7	7.2	0.2	8.3	0.3	2.8	20.2	808.0	1.5	14.8	24.9
20:37:00	0.8	7.9	0.2	8.6	0.4	4.5	20.2	808.0	1.8	17.9	24.9
20:38:00	0.9	8.6	0.2	8.3	0.2	2.1	20.2	809.0	1.5	15.5	24.9
20:39:00	0.8	8.3	0.2	8.3	0.3	2.8	20.2	808.0	1.9	19.3	24.9
20:40:00	0.7	6.5	0.2	8.3	0.2	2.4	20.3	810.0	1.8	17.5	24.9
20:41:00	0.7	7.2	0.2	7.9	0.3	2.8	20.2	808.0	1.5	15.5	24.8
20:42:00	0.8	7.6	0.2	7.9	0.2	2.4	20.3	810.0	1.8	18.2	24.8
20:43:00	0.7	6.5	0.2	8.3	0.3	2.8	20.2	808.0	1.6	15.8	24.8
20:44:00	0.7	7.2	0.2	8.3	0.3	3.1	20.2	808.0	1.6	15.8	24.7
20:45:00	0.7	7.2	0.2	7.9	0.3	3.4	20.2	808.0	1.7	17.2	24.7
20:46:00	0.8	7.9	0.2	8.3	0.2	1.7	20.2	808.0	1.5	15.5	24.7
20:47:00	0.7	7.2	0.2	8.3	0.3	3.4	20.2	808.0	2.0	19.6	24.6
20:48:00	0.9	8.6	0.2	7.6	0.2	2.1	20.2	809.0	1.6	15.8	24.6
20:49:00	0.8	7.6	0.2	7.6	0.3	3.1	20.2	809.0	2.0	19.9	24.6

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
20:50:00	0.7	7.2	0.1	6.9	0.2	2.1	20.3	810.0	1.8	18.2	24.6
20:51:00	0.8	7.9	0.2	7.6	0.2	2.1	20.3	810.0	1.6	15.8	24.5
20:52:00	0.7	7.2	0.1	6.5	0.3	2.8	20.3	810.0	2.0	19.6	24.5
20:53:00	0.7	7.2	0.1	6.5	0.2	2.4	20.2	809.0	1.8	17.9	24.5
20:54:00	0.7	6.9	0.1	7.2	0.2	1.7	20.3	810.0	1.6	16.2	24.5
20:55:00	0.7	7.2	0.1	6.9	0.2	2.1	20.3	810.0	1.6	15.8	24.4
20:56:00	0.7	6.5	0.1	7.2	0.3	2.8	20.2	808.0	1.6	16.2	24.4
20:57:00	0.6	6.2	0.2	7.6	0.2	2.4	20.3	810.0	1.9	18.6	24.4
20:58:00	0.8	7.6	0.2	7.6	0.1	0.7	20.3	810.0	1.7	16.8	24.3
20:59:00	0.9	8.6	0.1	6.9	0.2	2.4	20.2	809.0	1.9	18.9	24.3
21:00:00	0.7	6.9	0.2	7.6	0.3	3.4	20.2	808.0	1.3	13.4	24.3
21:01:00	0.8	7.9	0.1	7.2	0.3	2.8	20.2	808.0	1.6	16.5	24.2
21:02:00	0.6	6.2	0.2	7.6	0.2	2.4	20.3	810.0	1.9	18.6	24.2
21:03:00	0.7	7.2	0.1	6.9	0.1	1.0	20.3	810.0	1.9	19.3	24.2
21:04:00	0.7	6.5	0.1	6.9	0.2	2.1	20.3	810.0	1.9	18.6	24.2
21:05:00	0.7	7.2	0.1	6.9	0.3	2.8	20.2	808.0	1.4	14.4	24.2
21:06:00	0.7	6.5	0.1	6.9	0.1	1.0	20.3	810.0	1.8	17.5	24.2
21:07:00	0.8	7.9	0.1	6.9	0.3	2.8	20.2	809.0	1.5	14.8	24.2
21:08:00	0.7	7.2	0.1	6.5	0.2	2.1	20.2	809.0	1.4	14.4	24.2
21:09:00	0.7	6.5	0.1	6.9	0.3	2.8	20.2	808.0	1.5	14.8	24.2
21:10:00	0.8	7.6	0.1	6.5	0.3	2.8	20.2	809.0	1.6	16.5	24.2
21:11:00	0.6	5.8	0.1	6.5	0.2	1.7	20.3	810.0	1.9	18.9	24.2
21:12:00	0.7	6.5	0.1	6.2	0.2	2.4	20.2	808.0	1.5	15.5	24.1
21:13:00	0.7	6.9	0.1	6.2	0.2	1.7	20.2	809.0	1.3	13.1	24.1
21:14:00	0.7	6.5	0.1	5.8	0.3	2.8	20.2	809.0	1.5	14.8	24.1
21:15:00	0.8	7.6	0.1	5.5	0.1	1.0	20.3	810.0	1.8	17.9	24.0
21:16:00	0.5	5.2	0.1	5.5	0.2	2.1	20.2	809.0	1.3	13.1	24.0
21:17:00	0.5	5.2	0.1	4.8	0.2	2.1	20.2	809.0	1.6	16.5	23.9
21:18:00	0.6	5.8	0.1	4.8	0.1	0.7	20.3	810.0	1.8	17.5	23.9
21:19:00	0.7	6.5	0.1	4.8	0.2	1.7	20.2	809.0	1.4	14.4	23.8
21:20:00	0.6	5.8	0.1	4.8	0.1	1.0	20.3	811.0	1.8	17.9	23.8
21:21:00	0.7	6.5	0.1	5.5	0.2	2.1	20.2	809.0	1.4	14.1	23.7
21:22:00	0.7	7.2	0.1	4.8	0.2	2.4	20.2	809.0	1.4	14.1	23.7
21:23:00	0.7	6.5	0.1	4.8	0.2	2.1	20.2	809.0	1.4	14.4	23.6
21:24:00	0.7	6.9	0.1	4.8	0.3	2.8	20.2	809.0	1.4	14.4	23.6
21:25:00	0.6	6.2	0.1	4.8	0.2	2.1	20.2	809.0	1.4	13.8	23.6
21:26:00	0.6	5.8	0.1	4.1	0.1	1.4	20.3	810.0	1.6	15.8	23.6
21:27:00	0.7	7.2	0.1	4.5	0.3	2.8	20.2	809.0	1.5	14.8	23.5
21:28:00	0.6	6.2	0.1	4.1	0.2	1.7	20.2	809.0	1.6	15.8	23.5
21:29:00	0.6	6.2	0.1	4.1	0.2	1.7	20.3	812.0	1.5	15.5	23.5
21:30:00	0.7	6.5	-0.1	-3.4	0.2	2.4	1.1	45.0	3.3	33.3	23.5
21:31:00	0.5	4.8	-0.1	-3.4	0.1	1.0	0.2	6.5	1.8	17.9	23.5
21:32:00	0.3	3.4	-0.1	-3.4	0.1	1.0	0.1	3.1	0.8	7.9	23.4
21:33:00	0.4	3.8	-0.1	-3.4	44.0	440.1	0.1	2.4	1.0	10.3	23.5
21:34:00	0.3	2.8	-0.1	-3.4	44.3	442.5	0.1	4.1	1.5	14.8	23.4

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
21:35:00	3.7	37.1	-0.1	-3.4	0.3	2.8	0.1	3.1	1.1	10.7	23.5
21:36:00	23.6	235.8	-0.1	-3.4	0.2	2.1	0.1	2.1	1.0	10.0	23.5
21:37:00	31.9	319.4	-0.1	-3.4	0.1	0.7	0.1	2.1	1.3	12.7	23.4
21:38:00	35.9	358.9	-0.1	-3.8	0.1	0.7	0.0	1.7	1.1	10.7	23.4
21:39:00	38.3	383.3	-0.1	-3.4	-0.1	-0.7	0.1	3.8	1.1	10.7	23.5
21:40:00	40.2	401.9	-0.1	-3.8	0.0	0.3	0.1	2.4	1.6	15.8	23.5
21:41:00	41.4	414.3	-0.1	-4.1	0.1	0.7	0.0	1.7	1.2	12.4	23.5
21:42:00	34.3	342.8	17.2	858.0	-0.1	-1.4	17.1	684.2	1.4	14.1	23.5
21:43:00	4.2	42.3	17.5	877.0	-0.1	-1.0	18.2	728.0	0.4	3.8	23.4
21:44:00	2.6	25.8	17.6	879.0	-0.1	-1.0	18.1	725.0	0.7	6.5	23.4
21:45:00	2.0	20.3	0.2	11.7	-0.1	-1.0	0.6	23.7	0.4	4.1	23.4
21:46:00	1.5	14.8	0.1	2.8	-0.0	-0.3	0.1	3.4	30.1	300.8	23.3

Run 4

DATE:	July 22,1998	CLIENT REP:	R.KRUSE
PLANT:	IBP / DC	WITNESSED?:	N/A
FUEL TYPE:	Steam	BURNER TYPE:	N/A
OPERATOR:	SM/DW	GENERATOR TYPE:	N/A
TEST LOCATION:	SUPER COOKER	O2 GENERATOR TYPE:	N/A

CALIBRATION GASES

O2	CO2	CO	SO2	THC	NOx
0	0	0	0	0	0
10.2	9.9	30.3	45.1	N/A	46
18	17.7	86.9	88.7	N/A	84.3

END TIME	SAMPLE POINT	O2 %	CO2 %	CO ppm	SO2 ppm	THC ppm	NOx ppm
2222	1	19.21	4.84	16.6	13.6		5.9
2242	2	19.15	5.12	18.05	12.4		5.3
2302	3	19.19	5.07	21.59	10.4		4.3
	AVERAGES	19.18	5.01	18.75	12.13	#DIV/0!	5.17

Barometric Pres: 29.05

EFFLUENT GAS CONCENTRATION, % or PPM

	O2	CO2	CO	SO2	THC	NOx
PRE ZERO	0.1	-0.1	0.8	0.3		0.1
POST ZERO	0.1	0	0.9	1.7		1.7
ACT SPAN	18	17.7	30.3	45.1	N/A	46
PRE SPAN	18.1	17.6	30.1	41.4		44.3
POST SPAN	18.2	17.6	30.2	41.2		46.5
GAS CONC.	19.03	5.07	18.51	12.46	#DIV/0!	4.41
GAS CONC.	18.50	4.93	17.99	12.11	#DIV/0!	4.29

F-factor (Fc)----- N/A

scf/10e6 btu lb/hr SO2 0.056

lb/hr NOx 0.014 lb/hr CO 0.037

Stack Flowrate- 2.8011E+04 (wet,scf/hr)

EFFLUENT GAS CONC CALCULATION

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

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 22:02/22:22
MOISTURE = 5%

RUN NUMBER: 4 PAGE 1
OPERATOR: MILLER
MEASUREMENT DATE:
22:22/22:42 22:42/23:02
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
22:05:00	6.2	5.9	13.4	12.7	4.82	4.58	19.25	18.29	17.39	16.52
22:06:00	6.1	5.8	13.5	12.9	4.77	4.53	19.28	18.32	17.65	16.77
22:07:00	6.0	5.7	13.6	13.0	4.76	4.52	19.28	18.32	17.75	16.87
22:08:00	6.2	5.9	13.5	12.9	4.84	4.60	19.25	18.29	17.94	17.05
22:09:00	6.0	5.7	13.6	12.9	4.77	4.53	19.27	18.31	17.45	16.58
22:10:00	6.0	5.7	13.6	12.9	4.66	4.42	19.28	18.32	16.82	15.98
22:11:00	6.0	5.7	13.8	13.1	4.76	4.52	19.25	18.29	16.56	15.73
22:12:00	6.0	5.7	13.8	13.1	4.58	4.36	19.26	18.30	16.26	15.45
22:13:00	6.1	5.8	13.7	13.1	4.72	4.49	19.22	18.26	15.91	15.11
22:14:00	5.8	5.5	13.8	13.1	4.80	4.56	19.21	18.25	16.05	15.24
22:15:00	6.1	5.8	13.9	13.2	4.78	4.55	19.18	18.22	16.08	15.28
22:16:00	5.9	5.6	13.9	13.2	4.87	4.63	19.16	18.20	16.32	15.50
22:17:00	5.9	5.6	13.7	13.0	4.92	4.67	19.14	18.18	16.11	15.30
22:18:00	5.9	5.6	13.4	12.8	5.03	4.78	19.13	18.17	15.95	15.15
22:19:00	5.7	5.4	13.4	12.7	5.08	4.83	19.15	18.20	16.47	15.65
22:20:00	5.8	5.5	13.3	12.6	4.97	4.72	19.17	18.21	16.35	15.53
22:21:00	5.6	5.4	13.3	12.6	4.96	4.71	19.13	18.17	15.70	14.91
22:22:00	5.7	5.4	13.4	12.8	5.02	4.77	19.14	18.18	15.84	15.05
MEAN	5.9	5.7	13.6	12.9	4.84	4.60	19.21	18.25	16.60	15.77
22:25:00	5.6	5.4	13.2	12.5	5.16	4.90	19.12	18.16	17.45	16.57
22:26:00	5.4	5.1	12.8	12.1	5.23	4.97	19.11	18.16	17.07	16.21
22:27:00	5.7	5.4	13.1	12.5	5.28	5.01	19.10	18.15	17.75	16.87
22:28:00	5.5	5.2	13.0	12.4	5.19	4.93	19.12	18.16	17.55	16.67
22:29:00	5.4	5.2	12.9	12.2	5.21	4.95	19.11	18.16	17.26	16.39
22:30:00	5.5	5.2	12.9	12.3	5.41	5.14	19.09	18.13	17.64	16.76
22:31:00	5.4	5.1	12.9	12.2	5.26	4.99	19.11	18.15	17.81	16.92
22:32:00	5.5	5.2	12.9	12.2	5.04	4.79	19.17	18.21	17.39	16.52
22:33:00	5.3	5.1	12.6	11.9	4.83	4.59	19.25	18.28	16.98	16.13
22:34:00	5.3	5.0	12.5	11.9	4.92	4.67	19.20	18.24	17.12	16.26
22:35:00	5.4	5.2	12.3	11.7	4.98	4.73	19.17	18.21	17.39	16.52
22:36:00	5.2	5.0	12.3	11.7	5.01	4.76	19.16	18.20	17.99	17.09
22:37:00	5.3	5.0	12.1	11.5	5.04	4.79	19.17	18.21	18.61	17.68
22:38:00	5.1	4.9	11.9	11.3	5.03	4.77	19.17	18.22	19.42	18.45
22:39:00	5.2	4.9	11.7	11.1	5.18	4.92	19.11	18.15	19.57	18.60
22:40:00	5.2	4.9	11.3	10.8	5.14	4.88	19.15	18.19	19.27	18.30

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 22:02/22:22
MOISTURE = 5%

RUN NUMBER: 4 PAGE 2
OPERATOR: MILLER
MEASUREMENT DATE:
22:22/22:42 22:42/23:02
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
22:41:00	4.8	4.6	11.1	10.5	4.98	4.73	19.19	18.23	19.35	18.38
22:42:00	5.0	4.8	10.9	10.3	5.23	4.97	19.19	18.23	19.43	18.46
MEAN	5.3	5.1	12.4	11.7	5.12	4.86	19.15	18.19	18.05	17.15
22:45:00	4.9	4.6	10.8	10.2	5.18	4.92	19.15	18.20	20.66	19.62
22:46:00	4.8	4.6	10.9	10.3	5.25	4.99	19.12	18.16	20.78	19.74
22:47:00	4.7	4.5	10.7	10.2	5.09	4.83	19.20	18.24	20.81	19.77
22:48:00	4.5	4.3	10.4	9.9	5.11	4.86	19.20	18.24	20.72	19.68
22:49:00	4.5	4.3	10.2	9.7	5.23	4.97	19.13	18.17	20.55	19.53
22:50:00	4.4	4.2	10.4	9.9	5.24	4.97	19.16	18.20	21.09	20.03
22:51:00	4.4	4.2	10.2	9.7	5.04	4.79	19.17	18.21	20.78	19.74
22:52:00	4.4	4.1	10.2	9.6	5.11	4.85	19.19	18.23	20.54	19.52
22:53:00	4.3	4.1	10.1	9.6	5.26	5.00	19.13	18.17	21.15	20.09
22:54:00	4.2	4.0	10.2	9.7	5.15	4.89	19.18	18.22	21.91	20.81
22:55:00	4.1	3.9	10.1	9.6	5.22	4.96	19.16	18.20	21.91	20.82
22:56:00	4.2	4.0	10.4	9.9	5.13	4.87	19.15	18.19	22.51	21.38
22:57:00	4.2	4.0	10.4	9.9	4.96	4.71	19.19	18.23	22.61	21.48
22:58:00	4.0	3.8	10.2	9.7	4.83	4.59	19.26	18.30	22.01	20.91
22:59:00	4.1	3.9	10.3	9.8	5.02	4.77	19.24	18.28	22.35	21.23
23:00:00	4.0	3.8	10.7	10.1	4.81	4.57	19.27	18.30	23.04	21.88
23:01:00	3.9	3.7	10.6	10.1	4.80	4.56	19.30	18.33	22.68	21.55
23:02:00	3.9	3.7	10.6	10.0	4.79	4.55	19.32	18.35	22.74	21.60
MEAN	4.3	4.1	10.4	9.9	5.07	4.81	19.19	18.23	21.59	20.51

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
22:02:00	13.1	131.0	4.8	239.3	5.7	57.4	19.3	772.0	17.0	169.9	22.9
22:03:00	13.2	132.0	4.6	231.0	6.4	63.6	19.3	772.0	16.8	167.5	22.9
22:04:00	13.4	133.8	4.8	239.3	6.2	61.9	19.3	770.0	17.4	174.3	22.9
22:05:00	13.4	134.4	4.7	235.2	5.7	57.1	19.3	771.0	17.5	174.7	22.9
22:06:00	13.6	136.2	4.7	233.8	6.4	64.3	19.3	771.0	17.4	174.3	22.9
22:07:00	13.5	135.1	4.6	228.3	5.5	55.4	19.3	773.0	18.0	179.5	22.9
22:08:00	13.6	135.8	4.6	230.4	6.5	64.6	19.3	771.0	18.2	181.6	22.9
22:09:00	13.6	136.2	4.8	240.4	6.1	60.5	19.3	770.0	17.5	175.4	22.9
22:10:00	13.6	135.8	4.7	234.5	5.8	58.1	19.2	769.0	16.9	168.8	22.9
22:11:00	14.0	139.9	5.0	247.6	6.5	65.0	19.2	769.0	16.6	166.1	22.9
22:12:00	13.8	137.9	4.6	230.7	5.5	55.0	19.3	771.0	15.9	158.9	22.8
22:13:00	13.9	138.6	4.9	246.9	6.4	64.3	19.1	766.0	15.7	156.5	22.8
22:14:00	13.7	136.9	4.9	245.5	5.7	57.1	19.2	767.0	16.0	160.2	22.8
22:15:00	13.9	139.3	4.6	228.3	5.9	58.8	19.3	770.0	16.1	161.3	22.7
22:16:00	13.9	138.6	4.7	233.8	6.2	62.2	19.2	767.0	16.5	164.7	22.7
22:17:00	13.6	135.8	4.9	246.5	5.5	55.4	19.1	765.0	16.2	161.6	22.7
22:18:00	13.5	134.8	5.0	251.0	6.1	61.2	19.1	766.0	16.0	160.2	22.7
22:19:00	13.4	133.8	5.1	255.1	5.3	53.3	19.1	766.0	16.5	165.4	22.6
22:20:00	13.4	133.8	5.2	258.6	6.1	60.5	19.1	766.0	16.3	162.6	22.6
22:21:00	13.4	134.1	5.1	253.1	5.7	57.4	19.1	765.0	15.2	151.6	22.6
22:22:00	13.4	134.1	5.0	252.0	5.3	53.3	19.2	767.0	16.1	160.9	22.6
22:23:00	13.2	131.7	5.3	266.8	6.0	59.8	19.1	765.0	16.1	161.3	22.6
22:24:00	13.4	134.4	5.2	261.3	5.4	53.7	19.1	763.0	17.3	173.3	22.5
22:25:00	13.0	130.3	5.0	252.4	5.9	58.8	19.2	767.0	17.4	174.0	22.5
22:26:00	13.1	131.0	5.3	264.8	5.2	52.3	19.1	763.0	17.1	170.9	22.5
22:27:00	13.0	130.3	5.4	270.3	5.6	56.0	19.1	764.0	17.5	175.0	22.4
22:28:00	12.7	127.2	5.4	268.6	5.8	57.8	19.1	763.0	17.1	171.3	22.4
22:29:00	13.0	130.3	4.9	245.5	5.1	51.2	19.1	765.0	17.6	176.4	22.4
22:30:00	12.9	129.0	5.1	255.2	5.7	56.7	19.1	766.0	17.9	179.2	22.4
22:31:00	12.9	129.0	5.2	260.7	5.1	50.9	19.1	764.0	18.3	182.9	22.4
22:32:00	12.9	129.0	5.1	253.8	5.1	51.2	19.2	767.0	16.9	168.8	22.4
22:33:00	12.3	122.8	5.0	250.3	5.6	56.0	19.3	770.0	16.8	168.2	22.3
22:34:00	12.6	126.2	4.9	244.5	5.0	49.5	19.2	768.0	17.6	176.1	22.3
22:35:00	12.1	120.7	5.4	269.6	5.6	56.4	19.1	766.0	17.6	176.1	22.3
22:36:00	12.2	122.1	4.9	244.8	5.2	52.3	19.2	767.0	18.3	183.3	22.3
22:37:00	12.1	120.7	4.9	246.9	5.0	49.5	19.2	768.0	19.2	192.2	22.3
22:38:00	11.7	117.3	5.1	255.8	5.5	54.7	19.1	766.0	19.6	195.7	22.3
22:39:00	11.5	115.2	5.1	255.2	4.8	48.5	19.1	764.0	19.8	198.4	22.3
22:40:00	11.2	112.1	5.1	253.8	5.4	53.7	19.2	767.0	19.1	191.2	22.3
22:41:00	10.9	109.4	5.2	261.3	4.6	46.4	19.2	767.0	19.1	190.5	22.3
22:42:00	10.7	107.3	5.2	261.3	5.2	51.6	19.2	768.0	19.6	196.4	22.3
22:43:00	10.9	108.7	5.1	255.2	5.2	51.6	19.1	766.0	20.7	207.4	22.3
22:44:00	10.4	103.5	4.6	228.0	4.4	43.7	19.3	772.0	20.6	206.3	22.4
22:45:00	11.1	110.7	5.0	248.3	5.2	52.3	19.1	766.0	21.3	213.2	22.4

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
22:46:00	10.9	109.4	5.5	273.0	4.4	44.4	19.1	765.0	20.7	207.0	22.4
22:47:00	10.6	105.6	5.1	252.8	4.9	48.8	19.2	769.0	20.7	207.4	22.4
22:48:00	10.5	105.2	4.8	238.7	4.5	44.7	19.2	769.0	21.0	210.1	22.3
22:49:00	10.4	104.2	5.3	265.5	4.3	43.3	19.1	764.0	20.4	204.3	22.3
22:50:00	10.4	103.9	5.3	265.5	4.6	46.4	19.2	767.0	21.2	212.2	22.3
22:51:00	10.2	101.5	5.0	250.3	4.0	39.5	19.2	768.0	20.4	203.9	22.3
22:52:00	10.1	100.8	5.1	253.8	4.6	46.1	19.1	766.0	20.8	208.0	22.2
22:53:00	10.2	101.5	5.3	264.8	4.2	42.3	19.1	765.0	21.6	215.6	22.2
22:54:00	10.1	100.8	5.5	274.8	4.0	39.9	19.1	766.0	21.8	217.7	22.1
22:55:00	10.3	103.2	5.5	275.1	4.5	45.0	19.1	764.0	21.9	218.7	22.1
22:56:00	10.5	105.2	4.9	244.2	3.9	38.5	19.2	768.0	22.5	224.9	22.1
22:57:00	10.4	103.5	5.0	249.3	4.4	44.4	19.2	768.0	22.4	223.9	22.1
22:58:00	10.3	102.8	5.0	250.3	3.9	38.9	19.3	772.0	22.3	222.9	22.1
22:59:00	10.7	107.0	5.1	255.2	4.0	39.5	19.2	769.0	23.3	232.5	22.1
23:00:00	10.6	106.3	4.7	235.9	4.2	42.0	19.3	772.0	22.7	227.0	22.1
23:01:00	10.6	106.3	4.8	240.0	3.6	35.8	19.3	772.0	23.2	232.1	22.1
Strt 23:02:00	10.7	107.3	4.8	238.0	4.1	40.9	19.3	772.0	22.8	228.4	22.1
23:03:00	10.4	104.5	4.8	239.4	3.5	35.4	19.3	773.0	22.6	226.3	22.1
23:04:00	9.4	93.5	0.2	8.9	3.0	30.3	20.3	811.0	21.9	218.7	22.1
23:05:00	3.2	32.3	0.0	1.4	2.3	22.7	0.3	12.7	0.6	5.5	22.1
23:06:00	1.8	17.5	0.0	0.0	1.7 2nd	16.5	0.1	3.4	0.9	8.9	22.1
23:07:00	1.7 2nd	16.9	-0.0 2nd	-0.7	1.8	17.5	0.1 2nd	3.8	0.9 2nd	8.6	22.1
23:08:00	1.5	15.5	-0.0	-0.7	45.9	458.7	0.1	4.1	1.0	10.0	22.1
23:09:00	1.4	13.8	-0.0	-1.4	46.5 Spn	464.6	0.1	3.8	1.2	12.4	22.0
23:10:00	1.6	15.8	-0.0	-1.4	1.8	17.9	0.1	2.1	1.5	15.1	22.0
23:11:00	9.8	98.0	-0.0	-1.4	1.3	13.1	0.1	4.1	1.4	14.1	22.0
23:12:00	23.6	235.6	-0.0	-1.4	1.5	15.5	0.1	2.1	1.3	13.4	22.0
23:13:00	31.1	310.9	-0.0	-2.1	1.2	11.7	0.1	2.4	1.7	16.5	22.0
23:14:00	35.4	353.9	-0.0	-2.1	1.3	13.4	0.1	3.1	1.2	11.7	22.0
23:15:00	38.2	381.7	-0.0	-2.4	1.1	10.7	0.1	3.4	1.6	16.2	22.0
23:16:00	40.0	400.3	-0.1	-2.8	1.1	11.4	0.1	3.4	1.5	15.1	22.0
23:17:00	41.2 Spn	412.3	-0.1	-2.8	1.2	12.4	0.0	1.4	1.4	14.4	22.0
23:18:00	42.1	421.3	0.2	11.0	0.9	8.9	0.2	7.6	1.7	17.2	22.0
23:19:00	12.1	121.4	-0.1	-2.8	1.1	11.0	0.1	3.1	30.2 Spn	301.6	21.9
23:20:00	7.6	76.0	16.8	840.0	0.8	8.3	14.9	597.4	30.4	304.0	21.9
23:21:00	5.3	53.3	17.6	878.0	1.0	9.6	18.3	733.0	2.6	26.5	21.9
23:22:00	4.5	45.4	17.6 Spn	880.0	1.0	10.3	18.2 Spn	728.0	0.5	4.8	21.9

Run 5

DATE:	July 22,1998	CLIENT REP:	R.KRUSE
PLANT:	IBP / DC	WITNESSED?:	N/A
FUEL TYPE:	Steam	BURNER TYPE:	N/A
OPERATOR:	SM/DW	GENERATOR TYPE:	N/A
TEST LOCATION:	SUPER COOKER	O2 GENERATOR TYPE:	N/A

CALIBRATION GASES

O2	CO2	CO	SO2	THC	NOx
0	0	0	0	0	0
10.2	9.9	30.3	45.1	N/A	46
18	17.7	86.9	88.7	N/A	84.3

END TIME	SAMPLE POINT	O2 %	CO2 %	CO ppm	SO2 ppm	THC ppm	NOx ppm
2350	1	19.51	4.35	17.16	9.10		3.20
15	2	19.34	5.09	18.41	8.55		3.10
35	3	19.35	5.21	19.56	7.90		2.70
	AVERAGES	19.40	4.88	18.38	8.52	#DIV/0!	3.00

Barometric Pressure: 29.05

EFFLUENT GAS CONCENTRATION, % or PPM

	O2	CO2	CO	SO2	THC	NOx
PRE ZERO	0.1	0	0.9	1.7		1.7
POST ZERO	0.1	0	0.9	2		1
ACT SPAN	18	17.7	30.3	45.1	N/A	46
PRE SPAN	18.2	17.6	30.2	41.2		46.5
POST SPAN	18.2	17.7	30	40.9		45.9
GAS CONC.(	19.19	4.90	18.14	7.67	#DIV/0!	1.69
GAS CONC.(	18.66	4.76	17.63	7.46	#DIV/0!	1.65

F-factor (Fc)----- N/A

scf/10e6 btu

lb/hr NOx 0.005

lb/hr SO2 0.035

lb/hr CO 0.036

Stack Flowrate- 2.8021E+04 (wet,scf/hr)

EFFLUENT GAS CONC CALCULATION

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

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 23:30/23:50
MOISTURE = 5%

RUN NUMBER: 5 PAGE 1
OPERATOR: MILLER
MEASUREMENT DATE:
23:50/23:59 /
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
23:33:00	2.9	2.8	8.7	8.3	3.85	3.65	19.74	18.75	14.83	14.09
23:34:00	3.1	2.9	9.1	8.6	3.92	3.72	19.70	18.72	15.80	15.01
23:35:00	3.0	2.8	9.0	8.5	3.75	3.57	19.73	18.74	15.59	14.81
23:36:00	3.1	3.0	9.1	8.6	3.82	3.63	19.72	18.73	15.84	15.05
23:37:00	3.1	2.9	9.1	8.6	3.94	3.74	19.67	18.69	15.75	14.96
23:38:00	3.3	3.1	9.2	8.8	3.99	3.79	19.58	18.60	16.27	15.45
23:39:00	3.3	3.1	9.3	8.8	4.12	3.91	19.54	18.56	16.64	15.81
23:40:00	3.2	3.1	9.4	8.9	4.17	3.96	19.55	18.57	17.16	16.31
23:41:00	3.3	3.2	9.4	8.9	4.22	4.01	19.51	18.54	17.64	16.76
23:42:00	3.2	3.0	9.1	8.6	4.37	4.15	19.49	18.51	17.74	16.85
23:43:00	3.3	3.1	9.1	8.7	4.47	4.25	19.45	18.48	18.07	17.17
23:44:00	3.2	3.1	9.3	8.8	4.62	4.39	19.42	18.45	18.41	17.48
23:45:00	3.3	3.1	9.2	8.7	4.58	4.35	19.40	18.43	17.80	16.91
23:46:00	3.4	3.2	9.1	8.6	4.96	4.71	19.35	18.38	17.83	16.94
23:47:00	3.2	3.0	9.3	8.8	4.79	4.55	19.36	18.39	18.48	17.56
23:48:00	3.2	3.1	9.1	8.6	4.77	4.54	19.35	18.38	18.16	17.26
23:49:00	3.2	3.0	9.1	8.6	5.01	4.76	19.31	18.35	18.56	17.63
23:50:00	3.2	3.0	8.9	8.5	5.04	4.79	19.31	18.34	18.78	17.84
MEAN	3.2	3.0	9.1	8.7	4.35	4.13	19.51	18.54	17.16	16.31
23:53:00	3.1	3.0	8.8	8.3	5.23	4.96	19.28	18.31	19.00	18.05
23:54:00	3.1	2.9	8.6	8.2	5.60	5.32	19.23	18.26	19.42	18.45
23:55:00	3.0	2.9	8.7	8.2	5.38	5.12	19.28	18.32	19.86	18.87
23:56:00	3.1	2.9	8.6	8.2	5.50	5.23	19.25	18.29	19.78	18.79
23:57:00	2.9	2.8	8.3	7.9	5.35	5.08	19.28	18.32	19.58	18.60
23:58:00	3.0	2.8	8.1	7.7	5.55	5.28	19.27	18.31	19.09	18.14
23:59:00	3.0	2.8	8.3	7.9	5.58	5.30	19.24	18.28	20.14	19.13
MEAN	3.0	2.9	8.5	8.1	5.45	5.18	19.26	18.30	19.54	18.56

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-22-1998
START/END TIMES: 00:03/00:15
MOISTURE = 5%

RUN NUMBER: 5 PAGE 1
OPERATOR: MILLER
MEASUREMENT DATE:
00:15/00:35 /
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
00:06:00	3.0	2.9	8.8	8.3	4.82	4.58	19.43	18.46	17.07	16.22
00:07:00	3.0	2.8	8.8	8.3	4.71	4.48	19.45	18.48	17.09	16.24
00:08:00	2.9	2.8	8.5	8.0	4.52	4.29	19.48	18.51	16.67	15.83
00:09:00	2.9	2.8	8.7	8.3	4.64	4.41	19.45	18.48	16.82	15.98
00:10:00	3.0	2.8	8.5	8.1	4.67	4.43	19.42	18.45	16.41	15.59
00:11:00	3.1	2.9	8.7	8.2	4.63	4.40	19.41	18.44	17.18	16.32
00:12:00	3.0	2.8	8.6	8.1	4.72	4.48	19.40	18.43	17.45	16.58
00:13:00	3.0	2.9	8.4	8.0	4.89	4.64	19.38	18.41	17.39	16.52
00:14:00	2.8	2.7	8.5	8.1	4.67	4.44	19.44	18.47	18.48	17.56
00:15:00	2.8	2.7	8.3	7.9	5.03	4.78	19.36	18.39	18.35	17.43
MEAN	3.0	2.8	8.6	8.1	4.73	4.49	19.42	18.45	17.29	16.42
Avg	3.10		8.55		5.09		19.34		18.41	
00:18:00	2.8	2.7	8.5	8.1	5.08	4.82	19.34	18.37	19.34	18.37
00:19:00	2.7	2.6	8.2	7.8	5.23	4.97	19.34	18.37	18.85	17.91
00:20:00	2.7	2.6	8.2	7.8	4.96	4.71	19.39	18.42	19.79	18.80
00:21:00	2.8	2.7	7.9	7.5	5.28	5.01	19.29	18.33	19.16	18.20
00:22:00	2.7	2.6	7.9	7.5	5.45	5.17	19.25	18.29	19.31	18.35
00:23:00	2.6	2.5	8.0	7.6	4.99	4.74	19.39	18.42	20.17	19.16
00:24:00	2.6	2.5	7.8	7.4	5.31	5.04	19.31	18.34	18.72	17.78
00:25:00	2.6	2.4	7.7	7.3	5.35	5.08	19.34	18.37	18.86	17.91
00:26:00	2.5	2.4	7.8	7.4	5.27	5.00	19.35	18.38	19.61	18.63
00:27:00	2.6	2.5	7.8	7.4	5.52	5.25	19.26	18.30	19.56	18.58
00:28:00	2.6	2.5	7.6	7.2	5.36	5.09	19.34	18.37	20.09	19.08
00:29:00	2.6	2.4	7.6	7.3	5.44	5.17	19.32	18.35	20.25	19.24
00:30:00	2.7	2.5	7.8	7.4	5.23	4.97	19.35	18.38	20.61	19.58
00:31:00	2.7	2.5	7.7	7.3	4.93	4.68	19.39	18.42	19.28	18.32
00:32:00	2.6	2.4	7.6	7.2	5.16	4.90	19.39	18.42	18.93	17.99
00:33:00	2.7	2.6	7.8	7.4	5.31	5.05	19.34	18.37	20.12	19.11
00:34:00	2.6	2.5	8.0	7.6	5.07	4.82	19.41	18.44	20.30	19.28
00:35:00	2.7	2.5	7.8	7.4	4.94	4.69	19.42	18.45	19.17	18.21
MEAN	2.7	2.5	7.9	7.5	5.21	4.95	19.35	18.38	19.56	18.58

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

	TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
start	23:30:00	8.5	84.9	3.7	184.3	2.6	26.1	19.8	793.0	15.0	150.3	21.8
	23:31:00	8.7	87.0	3.8	189.8	3.1	31.3	19.7	789.0	14.9	148.9	21.8
	23:32:00	8.7	86.7	3.9	196.7	3.0	29.9	19.7	788.0	14.4	144.5	21.8
	23:33:00	9.0	90.1	3.9	195.7	2.8	27.5	19.7	789.0	14.8	147.9	21.9
	23:34:00	9.2	92.2	3.9	196.0	3.3	32.7	19.7	789.0	16.0	160.3	21.9
	23:35:00	9.1	91.1	3.7	186.1	2.9	28.5	19.7	789.0	15.7	156.5	21.9
	23:36:00	9.0	90.4	3.9	194.7	3.3	33.0	19.7	789.0	15.8	157.5	22.0
	23:37:00	9.1	91.1	3.9	197.4	3.2	32.0	19.7	787.0	16.0	160.3	22.0
	23:38:00	9.2	91.8	4.2	208.8	3.1	31.3	19.6	782.0	16.7	166.8	22.0
	23:39:00	9.4	94.2	4.2	209.1	3.5	34.7	19.6	782.0	16.9	168.5	22.1
	23:40:00	9.3	93.2	4.6	230.4	3.1	31.0	19.5	778.0	16.6	166.5	22.1
	23:41:00	9.3	93.2	4.2	211.2	3.4	34.4	19.5	781.0	17.3	173.0	22.1
	23:42:00	9.0	90.4	4.5	225.6	3.3	32.7	19.5	778.0	17.9	179.2	22.1
	23:43:00	9.2	91.5	4.7	233.2	3.1	31.0	19.5	778.0	18.4	183.7	22.1
	23:44:00	9.2	91.5	4.9	244.2	3.5	34.7	19.4	775.0	18.1	180.9	22.1
	23:45:00	9.1	91.1	4.5	225.6	3.0	30.3	19.4	776.0	17.8	177.8	22.0
	23:46:00	9.2	91.8	5.0	249.0	3.4	34.0	19.4	775.0	18.3	183.0	22.0
	23:47:00	9.2	91.5	4.4	219.4	3.2	32.0	19.4	774.0	18.9	188.5	22.0
	23:48:00	9.2	91.8	4.8	239.4	3.0	30.3	19.4	776.0	18.5	185.4	22.0
	23:49:00	9.1	91.1	4.9	245.9	3.2	32.3	19.4	774.0	18.5	184.7	21.9
	23:50:00	8.8	88.4	5.5	273.1	3.1	30.6	19.2	769.0	18.4	184.0	21.9
	23:51:00	9.2	91.5	5.2	260.0	3.4	34.0	19.3	771.0	19.4	193.6	21.9
	23:52:00	9.0	90.1	5.2	258.0	3.1	30.6	19.3	771.0	19.3	192.6	21.9
	23:53:00	8.6	85.6	5.1	255.2	2.9	28.9	19.3	773.0	19.1	190.9	21.8
	23:54:00	8.7	87.0	5.9	297.5	3.4	33.7	19.1	765.0	19.3	193.3	21.8
	23:55:00	8.5	85.3	5.5	273.1	2.9	28.5	19.3	771.0	19.6	196.0	21.8
	23:56:00	8.5	84.9	5.1	257.3	3.1	31.3	19.4	774.0	20.4	204.0	21.8
	23:57:00	8.2	82.2	5.1	255.9	2.9	29.2	19.3	771.0	19.6	196.0	21.8
	23:58:00	8.3	82.9	5.8	289.6	2.9	28.5	19.3	770.0	19.3	193.3	21.8
	23:59:00	8.3	82.5	5.7	285.5	3.3	32.7	19.2	768.0	19.5	195.4	21.8
	00:00:00	8.3	82.9	5.8	287.5	2.8	27.5	19.2	769.0	18.7	187.1	21.8

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
00:03:00	8.5	84.9	4.9	244.9	2.8	28.2	19.4	777.0	18.0	179.5	21.8
00:04:00	8.7	87.4	4.7	235.9	3.1	30.6	19.5	778.0	18.1	180.6	21.8
00:05:00	8.8	88.4	5.2	258.0	2.8	27.5	19.4	775.0	16.8	168.2	21.9
00:06:00	8.7	87.0	4.7	235.9	3.2	32.3	19.4	777.0	17.0	169.9	21.9
00:07:00	8.6	85.6	4.4	220.1	2.8	28.2	19.5	780.0	17.1	171.3	21.9
00:08:00	8.4	83.9	5.1	256.6	2.9	28.9	19.4	774.0	16.2	162.3	21.9
00:09:00	8.4	83.9	4.7	232.5	3.1	31.0	19.5	780.0	17.1	170.6	22.0
00:10:00	8.6	86.3	4.6	231.8	2.8	27.9	19.4	776.0	17.1	170.6	22.0
00:11:00	8.6	85.6	4.9	245.6	3.3	32.7	19.4	775.0	17.3	173.3	22.1
00:12:00	8.4	83.6	5.2	258.6	3.1	30.6	19.4	774.0	17.8	177.5	22.1
00:13:00	8.5	85.3	5.6	279.3	3.0	29.9	19.3	771.0	17.4	174.4	22.1
00:14:00	8.5	84.9	4.6	230.8	3.0	29.6	19.5	778.0	17.9	179.2	22.1
00:15:00	8.5	84.9	5.0	251.4	2.6	26.1	19.4	774.0	19.0	190.2	22.1
00:16:00	8.4	83.6	5.1	256.6	3.1	30.6	19.3	772.0	18.4	184.4	22.1
00:17:00	8.7	87.0	5.1	255.9	2.8	27.9	19.3	770.0	18.8	188.1	22.1
00:18:00	8.4	83.6	5.4	267.6	2.7	27.2	19.3	773.0	18.4	184.0	22.1
00:19:00	8.4	83.6	5.5	274.5	3.0	29.6	19.3	770.0	18.6	186.1	22.1
00:20:00	7.8	78.1	5.2	262.1	2.5	25.1	19.4	775.0	19.0	190.2	22.1
00:21:00	7.9	78.8	4.9	246.3	2.9	28.5	19.3	773.0	20.0	199.8	22.1
00:22:00	8.2	82.2	5.3	264.8	2.5	25.1	19.3	771.0	19.8	197.8	22.1
00:23:00	7.7	77.4	5.0	249.7	2.6	26.1	19.4	774.0	18.7	187.1	22.1
00:24:00	7.8	78.1	5.0	250.4	2.7	26.8	19.4	774.0	19.4	194.3	22.0
00:25:00	7.6	76.0	5.8	292.3	2.4	24.1	19.3	771.0	19.2	192.2	22.0
00:26:00	7.5	74.6	5.1	257.2	2.7	27.2	19.3	773.0	19.5	194.7	22.0
00:27:00	7.8	78.1	5.7	283.4	2.5	25.1	19.3	770.0	20.4	204.0	22.0
00:28:00	7.6	76.0	5.7	286.8	2.8	27.5	19.3	770.0	19.3	193.3	21.9
00:29:00	7.7	77.4	6.0	297.8	2.8	28.2	19.2	769.0	20.1	201.2	21.9
00:30:00	7.7	76.7	5.5	273.1	2.6	26.1	19.3	771.0	19.5	194.7	21.8
00:31:00	7.4	74.3	5.0	249.7	2.8	27.5	19.4	775.0	18.7	186.8	21.7
00:32:00	7.5	75.3	5.2	262.1	2.4	23.7	19.4	776.0	19.7	196.7	21.7
00:33:00	7.9	78.8	4.8	241.4	2.8	27.9	19.4	777.0	20.8	208.4	21.6
00:34:00	7.9	79.1	4.8	239.0	2.6	25.8	19.5	779.0	20.2	201.9	21.6
00:35:00	7.7	77.4	4.5	227.0	2.5	25.5	19.4	777.0	19.2	192.3	21.6
00:36:00	4.7	47.1	0.2	12.0	2.2	22.4	20.5	820.0	15.2	151.7	21.5
00:37:00	2.7	27.2	0.0	1.4	1.1	11.0	0.3	11.0	33.4	334.0	21.5
00:38:00	2.2	21.7	0.0	1.4	1.2	11.7	0.1	5.5	1.4	14.1	21.5
00:39:00	2.0	20.3	0.0	0.7	1.0	10.0	0.1	3.1	0.9	8.9	21.5
00:40:00	2.0	19.6	0.0	0.0	45.9	458.5	0.1	2.4	0.9	8.9	21.4
00:41:00	1.8	17.9	17.5	877.0	1.2	11.7	18.2	728.0	1.3	13.1	21.4
00:42:00	1.9	18.6	17.7	883.0	0.8	7.6	18.2	727.0	0.8	8.3	21.4
00:43:00	2.0	19.6	0.3	13.8	1.0	9.6	0.7	28.5	0.7	6.5	21.3
00:44:00	1.6	15.8	0.1	4.8	0.9	8.6	0.1	4.1	30.0	300.3	21.3
00:45:00	1.7	17.2	0.1	2.8	0.7	6.9	0.1	4.1	23.9	239.1	21.2
00:46:00	2.2	22.0	0.0	2.1	0.9	8.6	0.1	3.4	1.6	15.8	21.2

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
00:47:00	4.5	45.1	0.0	1.4	0.7	6.9	0.0	1.7	1.3	13.4	21.2
00:48:00	9.2	92.2	0.0	1.4	0.9	8.9	0.1	2.1	1.4	13.8	21.1
00:49:00	14.4	144.1	0.0	0.7	0.6	5.8	0.1	3.4	1.8	17.5	21.1
00:50:00	19.5	195.0	0.0	0.0	0.6	6.2	0.1	2.4	1.6	15.8	21.1
00:51:00	24.0	240.4	-0.0	-0.3	0.7	6.5	0.1	3.4	1.7	16.5	21.1
00:52:00	14.6	145.5	-0.0	-0.7	0.6	5.8	0.1	4.5	1.2	12.0	21.1
00:53:00	27.1	271.4	-0.0	-1.7	0.8	7.6	0.1	3.1	1.4	14.1	21.0
00:54:00	32.9	328.5	-0.0	-2.1	0.5	5.2	0.1	3.1	1.5	15.1	21.0
00:55:00	35.6	355.7	-0.1	-2.8	0.8	7.9	0.0	1.7	1.4	14.1	21.0
00:56:00	38.0	380.1	-0.1	-3.4	0.8	7.9	0.0	1.7	1.4	13.8	21.0
00:57:00	39.7	396.9	-0.1	-4.1	0.7	7.2	0.0	1.7	1.3	13.4	21.0
00:58:00	40.9	409.0	-0.1	-4.8	0.9	8.9	0.0	1.4	1.4	13.8	21.0

Run 6

DATE:	July 22,1998	**CLIENT REP:**	R.KRUSE
PLANT:	IBP / DC	**WITNESSED?:**	N/A
FUEL TYPE:	Steam	**BURNER TYPE:**	N/A
OPERATOR:	SM/DW	**GENERATOR TYPE:**	N/A
TEST LOCATION:	SUPER COOKER	**O2 GENERATOR TYPE:**	N/A

CALIBRATION GASES

O2	CO2	CO	SO2	THC	NOx
0	0	0	0	0	0
10.2	9.9	30.3	45.1	N/A	46
18	17.7	86.9	88.7	N/A	84.3

END TIME	SAMPLE POINT	O2 %	CO2 %	CO ppm	SO2 ppm	THC ppm	NOx ppm
122	1	19.83	3.40	12.13	10.60		2.60
142	2	19.64	3.72	15.27	12.80		2.90
202	3	20.26	0.62	9.94	14.30		2.00
	AVERAGES	19.91	2.58	12.45	12.57	#DIV/0!	2.50

Barometric Pressure: 29.05

EFFLUENT GAS CONCENTRATION, % or PPM

	O2	CO2	CO	SO2	THC	NOx
PRE ZERO	0.1	0	0.9	2		1
POST ZERO	0.1	-0.1	1.1	2.2		1
ACT SPAN	18	17.7	30.3	88.7	N/A	84.3
PRE SPAN	18.2	17.7	30	40.9		45.9
POST SPAN	18.1	17.6	30.3	40.1		45.8
GAS CONC.	19.76	2.63	11.90	24.18	#DIV/0!	2.82
GAS CONC.	19.20	2.56	11.57	23.50	#DIV/0!	2.74

F-factor (Fc)----- N/A

scf/10e6 btu

lb/hr NOx 0.009

lb/hr SO2 0.110

lb/hr CO 0.024

Stack Flowrate- 2.8181E+04 (wet,scf/hr)

EFFLUENT GAS CONC CALCULATION

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

UNIT: COOKER
TODAYS DATE: 07-24-1998
START/END TIMES: 01:02/01:22
MOISTURE = 5%

OPERATOR: MILLER
MEASUREMENT DATE:
01:22/01:42 01:42/02:02
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
01:05:00	2.2	2.1	9.2	8.8	3.40	3.23	19.97	18.97	12.07	11.47
01:06:00	2.4	2.2	10.0	9.5	3.45	3.28	19.92	18.92	12.44	11.81
01:07:00	2.4	2.3	9.8	9.3	3.47	3.30	19.91	18.92	11.93	11.34
01:08:00	2.5	2.4	10.2	9.7	3.33	3.17	19.90	18.90	12.53	11.90
01:09:00	2.5	2.4	10.1	9.6	3.47	3.30	19.86	18.87	11.99	11.39
01:10:00	2.6	2.4	10.4	9.9	3.19	3.03	19.90	18.91	12.17	11.56
01:11:00	2.5	2.3	10.4	9.9	3.41	3.24	19.87	18.88	11.79	11.20
01:12:00	2.7	2.5	10.3	9.8	3.35	3.18	19.85	18.85	11.50	10.93
01:13:00	2.6	2.5	10.8	10.3	3.20	3.04	19.85	18.86	11.97	11.37
01:14:00	2.7	2.6	10.9	10.4	3.43	3.26	19.82	18.83	11.51	10.94
01:15:00	2.7	2.5	10.7	10.2	3.15	3.00	19.88	18.88	11.53	10.96
01:16:00	2.7	2.6	11.0	10.4	3.37	3.20	19.79	18.80	11.67	11.08
01:17:00	2.7	2.6	10.9	10.3	3.34	3.17	19.81	18.82	11.95	11.35
01:18:00	2.8	2.6	10.9	10.3	3.58	3.40	19.73	18.74	11.73	11.15
01:19:00	2.8	2.6	11.2	10.7	3.47	3.30	19.75	18.76	12.66	12.03
01:20:00	2.8	2.7	11.4	10.8	3.56	3.38	19.71	18.72	12.76	12.12
01:21:00	2.8	2.7	11.6	11.1	3.68	3.49	19.67	18.68	12.68	12.05
01:22:00	2.8	2.7	11.8	11.2	3.43	3.26	19.73	18.75	13.39	12.72
MEAN	2.6	2.5	10.6	10.1	3.40	3.23	19.83	18.84	12.13	11.52
01:25:00	2.8	2.7	11.8	11.2	3.71	3.53	19.66	18.67	13.02	12.37
01:26:00	2.8	2.6	11.6	11.0	3.61	3.43	19.67	18.69	13.28	12.62
01:27:00	2.9	2.7	11.4	10.9	3.80	3.61	19.66	18.68	13.84	13.15
01:28:00	2.8	2.7	11.7	11.1	3.83	3.64	19.65	18.67	13.88	13.18
01:29:00	2.9	2.8	11.6	11.0	3.80	3.61	19.66	18.68	13.84	13.15
01:30:00	2.8	2.7	11.7	11.1	3.93	3.73	19.66	18.68	14.23	13.52
01:31:00	2.8	2.7	12.0	11.4	3.69	3.50	19.65	18.67	14.83	14.09
01:32:00	3.0	2.8	11.8	11.2	4.07	3.87	19.58	18.60	14.56	13.84
01:33:00	2.9	2.8	12.0	11.4	4.15	3.94	19.54	18.56	14.96	14.21
01:34:00	2.9	2.8	12.1	11.5	4.03	3.83	19.58	18.60	15.55	14.77
01:35:00	2.8	2.7	12.0	11.4	4.03	3.83	19.58	18.60	15.55	14.77
01:36:00	3.0	2.9	12.5	11.9	4.39	4.17	19.46	18.49	15.89	15.10
01:37:00	2.9	2.8	12.7	12.0	4.32	4.11	19.49	18.52	16.47	15.65
01:38:00	2.7	2.6	12.4	11.8	4.14	3.93	19.54	18.56	16.41	15.59
01:39:00	2.8	2.6	12.4	11.8	4.30	4.09	19.50	18.52	16.47	15.64
01:40:00	3.1	3.0	17.5	16.6	3.79	3.60	19.58	18.60	18.95	18.00

PLANT: IBP DAKOTA CITY
UNIT: COOKER
TODAYS DATE: 07-24-1998
START/END TIMES: 01:02/01:22
MOISTURE = 5%

RUN NUMBER: 6 PAGE 2
OPERATOR: MILLER
MEASUREMENT DATE:
01:22/01:42 01:42/02:02
RESPONSE TIME = 2 MIN

TIME MIN ENDING	NOx CONC DRY ppm	NOx CONC WET ppm	SO2 CONC DRY ppm	SO2 CONC WET ppm	CO2 CONC DRY %	CO2 CONC WET %	O2 CONC DRY %	O2 CONC WET %	CO CONC DRY ppm	CO CONC WET ppm
01:41:00	2.7	2.6	17.4	16.5	1.86	1.77	20.00	19.00	18.42	17.50
01:42:00	2.7	2.5	16.0	15.2	1.49	1.42	20.13	19.12	15.14	14.38
MEAN	2.9	2.7	12.8	12.2	3.72	3.53	19.64	18.66	15.27	14.51
01:45:00	2.5	2.3	14.8	14.0	1.03	0.97	20.24	19.22	10.55	10.03
01:46:00	2.3	2.2	14.8	14.0	0.97	0.92	20.24	19.23	10.21	9.70
01:47:00	2.4	2.3	15.8	15.0	0.99	0.94	20.22	19.21	10.80	10.26
01:48:00	2.2	2.1	16.0	15.2	0.95	0.91	20.25	19.24	11.68	11.09
01:49:00	2.2	2.1	15.4	14.6	0.79	0.75	20.27	19.26	10.63	10.10
01:50:00	2.2	2.1	14.4	13.6	0.67	0.64	20.24	19.23	10.24	9.72
01:51:00	1.9	1.8	13.6	13.0	0.62	0.59	20.29	19.28	10.48	9.96
01:52:00	2.0	1.9	14.1	13.4	0.61	0.58	20.28	19.27	11.20	10.64
01:53:00	2.0	1.9	14.5	13.7	0.60	0.57	20.25	19.23	10.38	9.86
01:54:00	2.0	1.9	14.5	13.8	0.57	0.54	20.26	19.25	9.48	9.00
01:55:00	2.0	1.9	14.3	13.6	0.54	0.51	20.26	19.25	8.96	8.51
01:56:00	2.0	1.9	14.5	13.7	0.50	0.48	20.26	19.25	8.78	8.34
01:57:00	2.0	1.9	14.3	13.6	0.47	0.44	20.27	19.25	8.61	8.18
01:58:00	1.9	1.8	14.1	13.4	0.43	0.41	20.26	19.25	8.63	8.20
01:59:00	1.8	1.8	13.9	13.2	0.39	0.37	20.27	19.26	8.74	8.30
02:00:00	1.9	1.8	13.1	12.5	0.34	0.32	20.25	19.24	9.05	8.59
02:01:00	1.6	1.5	12.6	12.0	0.31	0.29	20.29	19.28	9.68	9.20
02:02:00	1.7	1.6	12.4	11.7	0.30	0.29	20.28	19.27	10.65	10.12
MEAN	2.0	1.9	14.3	13.6	0.62	0.59	20.26	19.25	9.94	9.44

TESTING OF THE SUPER COOKER AT DAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
01:02:00	10.6	105.6	2.6	128.6	1.6	16.2	20.2	809.0	12.0	119.7	20.9
01:03:00	8.2	82.2	3.2	157.9	2.0	20.0	20.1	805.0	10.2	101.5	20.9
01:04:00	8.9	89.1	3.4	171.3	2.1	21.0	20.0	798.0	11.8	118.3	20.9
01:05:00	9.4	94.2	3.1	154.1	2.2	22.4	20.0	800.0	12.4	123.5	20.8
01:06:00	9.9	98.7	3.1	155.5	2.3	23.4	20.0	799.0	12.9	129.3	20.8
01:07:00	10.4	103.9	3.6	178.2	2.4	23.7	19.9	795.0	11.9	119.4	20.8
01:08:00	9.8	98.0	3.3	163.7	2.6	25.8	20.0	798.0	12.6	125.9	20.8
01:09:00	10.8	108.0	3.3	163.1	2.4	24.1	19.9	794.0	12.3	122.5	20.7
01:10:00	10.2	101.8	3.1	155.5	2.6	26.5	20.0	798.0	11.6	116.3	20.7
01:11:00	10.6	106.3	3.0	150.7	2.3	22.7	19.9	796.0	12.2	121.8	20.7
01:12:00	10.9	108.7	3.6	180.9	2.7	26.8	19.8	792.0	11.6	116.3	20.7
01:13:00	10.9	109.0	3.4	169.9	2.8	27.9	19.9	794.0	11.7	116.6	20.6
01:14:00	11.2	112.2	3.3	166.5	2.6	26.1	19.8	791.0	11.3	112.8	20.6
01:15:00	10.3	102.9	3.4	170.6	2.9	28.9	19.8	792.0	10.6	106.3	20.6
01:16:00	10.9	108.7	3.1	153.4	2.4	24.1	19.9	796.0	12.7	127.3	20.6
01:17:00	10.7	107.0	3.0	148.6	2.6	26.5	19.9	795.0	12.2	121.8	20.6
01:18:00	11.5	114.6	3.2	157.6	2.8	27.5	19.8	793.0	12.7	126.6	20.5
01:19:00	11.4	113.5	3.5	174.8	2.6	26.1	19.8	791.0	13.0	129.7	20.5
01:20:00	11.6	115.9	3.1	156.2	2.9	28.9	19.8	791.0	12.9	129.0	20.5
01:21:00	12.4	123.5	3.7	185.1	2.7	26.8	19.6	786.0	13.3	133.1	20.5
01:22:00	10.9	109.4	3.5	176.8	2.9	29.2	19.8	790.0	12.8	128.3	20.5
01:23:00	12.1	121.4	3.5	176.8	3.0	29.6	19.7	787.0	13.6	136.2	20.4
01:24:00	11.4	113.9	3.7	186.5	2.6	26.5	19.6	785.0	11.9	118.7	20.4
01:25:00	11.9	119.4	3.2	159.6	2.9	28.9	19.8	790.0	13.4	134.5	20.4
01:26:00	11.5	115.2	3.5	173.4	2.5	25.5	19.7	789.0	13.7	137.3	20.4
01:27:00	11.4	113.5	3.9	195.4	3.0	30.3	19.6	785.0	13.8	138.3	20.4
01:28:00	11.8	117.7	3.7	186.5	2.9	29.2	19.7	787.0	14.2	142.1	20.4
01:29:00	11.8	118.0	4.0	198.2	2.9	28.5	19.6	784.0	13.4	133.8	20.4
01:30:00	12.0	120.1	4.3	214.0	3.1	31.0	19.6	783.0	14.4	143.5	20.5
01:31:00	11.7	117.3	3.7	183.7	2.6	26.1	19.7	787.0	14.4	143.5	20.5
01:32:00	12.1	121.1	4.0	198.2	3.1	31.0	19.6	783.0	15.1	151.0	20.5
01:33:00	12.4	124.2	4.0	200.2	3.0	29.6	19.5	781.0	15.1	150.7	20.5
01:34:00	12.2	121.8	4.5	226.4	2.8	27.9	19.5	780.0	15.0	149.7	20.6
01:35:00	12.1	120.8	4.1	203.0	3.1	31.0	19.5	781.0	14.9	149.0	20.6
01:36:00	12.8	127.6	4.5	226.4	2.8	28.2	19.5	779.0	16.7	167.2	20.7
01:37:00	12.8	127.6	4.4	218.8	2.9	28.5	19.5	780.0	16.0	160.3	20.7
01:38:00	12.2	122.1	4.6	229.8	3.0	29.9	19.5	778.0	16.0	160.3	20.8
01:39:00	12.6	125.6	4.3	217.4	2.6	25.8	19.5	779.0	16.6	166.5	20.8
01:40:00	18.7	186.8	2.7	132.8	3.1	31.3	19.8	793.0	21.3	213.0	20.9
01:41:00	16.6	166.2	1.6	81.2	2.5	24.8	20.1	803.0	16.5	165.1	20.9
01:42:00	15.6	155.8	1.4	68.8	2.5	25.1	20.2	807.0	14.6	145.9	21.0
01:43:00	15.0	150.3	1.2	60.2	2.6	26.5	20.2	808.0	12.3	123.2	21.0
01:44:00	14.9	148.6	1.1	54.0	2.4	24.1	20.2	808.0	10.8	108.4	21.0
01:45:00	14.9	148.6	1.0	48.2	2.6	26.5	20.2	809.0	10.1	100.5	21.1

TESTING OF THE SUPER COOKER AT OAKOTA CITY, NE 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
01:46:00	15.0	150.0	1.1	54.0	2.3	23.4	20.2	807.0	10.1	100.5	21.1
01:47:00	15.9	158.6	1.0	48.2	2.2	22.4	20.3	810.0	11.0	110.4	21.2
01:48:00	15.9	158.6	0.9	45.1	2.3	23.4	20.3	811.0	11.6	116.3	21.2
01:49:00	14.9	149.0	0.7	36.5	2.0	20.0	20.3	810.0	10.4	104.2	21.3
01:50:00	14.0	140.0	0.6	31.0	2.2	21.7	20.3	810.0	10.1	101.1	21.3
01:51:00	13.6	135.9	0.6	31.3	1.8	17.9	20.3	812.0	10.8	108.0	21.4
01:52:00	14.4	143.5	0.6	30.3	2.0	19.6	20.3	811.0	11.1	110.8	21.4
01:53:00	14.5	144.8	0.6	29.6	2.2	22.0	20.3	810.0	9.7	97.4	21.4
01:54:00	14.4	144.1	0.6	28.2	1.9	18.6	20.2	809.0	9.4	93.6	21.5
01:55:00	14.4	144.1	0.5	26.1	2.2	22.4	20.2	809.0	8.9	89.4	21.5
01:56:00	14.4	144.1	0.5	24.4	2.0	19.6	20.3	810.0	8.6	85.7	21.6
01:57:00	14.2	142.1	0.5	22.7	1.8	17.9	20.3	811.0	8.4	83.9	21.6
01:58:00	14.0	140.0	0.4	20.6	2.0	19.6	20.3	811.0	8.9	89.1	21.6
01:59:00	13.6	135.5	0.4	18.2	1.6	16.2	20.3	811.0	9.1	90.5	21.6
02:00:00	13.0	129.7	0.3	16.5	1.9	18.9	20.3	810.0	8.9	89.1	21.5
02:01:00	12.5	124.9	0.3	15.1	1.5	15.5	20.3	812.0	10.1	101.1	21.5
Stop 02:02:00	12.5	124.9	0.3	15.1	1.7	16.5	20.3	810.0	11.1	110.8	21.5
02:03:00	12.6	126.2	0.0	2.1	1.5	15.1	20.4	814.0	11.2	111.8	21.6
02:04:00	3.0	29.6	-0.1	-4.1	1.0	10.0	20.4	816.0	1.6	15.8	21.6
02:05:00	2.4	24.4	-0.1	-6.9	1.3	12.7	0.2	8.3	52.5	524.9	21.6
02:06:00	2.3	23.0	-0.1	-6.9	0.8	7.6	0.1	5.8	1.4	13.8	21.6
02:07:00	2.2 2nd	22.4	-0.1 2nd	-6.9	1.0 2nd	10.3	0.1 2nd	2.8	1.1 2nd	10.7	21.7
02:08:00	2.0	20.3	-0.1	-6.9	45.8 5pm	457.8	0.1	3.1	1.4	14.1	21.7
02:09:00	2.1	20.6	-0.1	-6.9	1.2	12.4	0.1	4.5	1.5	15.1	21.8
02:10:00	2.0	20.3	-0.1	-6.9	1.1	11.4	0.1	2.1	30.6	306.1	21.8
02:11:00	1.8	17.9	17.1	853.0	0.6	6.2	16.0	639.4	30.3 5pm	302.7	21.9
02:12:00	1.7	16.5	17.6	878.0	0.9	8.9	18.1	723.0	2.2	22.0	21.9
02:13:00	1.6	16.2	17.6 4pm	881.0	0.7	7.2	18.1 5pm	722.0	0.5	4.8	21.9
02:14:00	2.1	20.6	0.1	6.9	0.7	6.9	0.4	16.5	1.0	9.6	22.0
02:15:00	6.6	65.7	-0.0	-0.7	0.7	7.2	0.1	5.2	1.0	10.3	22.0
02:16:00	12.4	123.5	-0.1	-3.1	0.6	5.8	0.1	2.4	1.0	10.0	22.0
02:17:00	18.7	186.8	-0.1	-4.1	0.6	5.8	0.1	3.1	1.5	14.8	22.0
02:18:00	23.5	235.3	-0.1	-5.5	0.7	6.9	0.0	1.4	0.9	8.9	22.1
02:19:00	26.2	261.8	-0.1	-6.2	0.4	3.8	0.1	3.8	1.2	12.0	22.1
02:20:00	29.6	295.5	-0.1	-6.9	0.8	7.6	0.0	1.0	0.9	9.3	22.1
02:21:00	33.3	333.3	-0.2	-7.6	0.4	4.5	0.1	3.1	0.7	6.9	22.1
02:22:00	36.4	364.2	-0.2	-8.3	0.5	5.2	0.0	1.0	0.6	5.8	22.1
02:23:00	38.4	384.2	-0.2	-8.9	0.7	6.5	0.0	0.7	0.9	9.3	22.1
02:24:00	40.1 4pm	401.3	-0.2	-9.3	0.4	4.5	0.1	2.4	1.0	10.0	22.1

APPENDIX B

SAMPLE CALCULATIONS

SAMPLE CALCULATIONS

(1) Acid Gas Emission Calculation - Pounds Per Hour

$$ER = \frac{(A) \times (B) \times (Qs) \times (C) \times (D)}{(VMSTD) \times (E)}$$

where:

ER	=	HCl, HF, HI, or HBr emission rate, lbs/hr
A	=	quantity of Cl^-, F^-, I^-, or Br^- collected, μg
B	=	1×10^{-6} g/μg
Qs	=	stack gas flowrate, dscfm
C	=	60 minutes/hour
D	=	1.0284 g HCl/g Cl
		1.0125 g HBr/g Br
		1.0531 g HF/g F
		1.0163 g HNO_3/g NO_3
VMSTD	=	sample volume of air at standard conditions, dscf
E	=	453.6 g/lb

(2) CEM Pollutant Gas Calculation - Pounds Per Hour

$$ER = \frac{(A) \times (Qs) \times (MW) \times (B)}{(C) \times (D)}$$

where:

ER	=	CO, THC, NO_x, and SO_2 emission rate, lbs/hr
A	=	concentration of CO, THC, NO_x, and SO_2 , ppm(v)
Qs	=	stack gas flowrate, dscfm
MW	=	molecular weight, lb/lb-mole
		28 - CO
		46 - NO_x (as NO_2)
		64 - SO_2
		44 - C_3H_8
		16 - THC (as methane)
B	=	60 minutes/hour
C	=	385.3 dscf/lb-mole @ 68°F (20°C)
D	=	1×10^6

(3) Metals Emission Calculation - Pounds Per Hour

$$ER = \frac{(MC) \times (C) \times (Qs) \times (D)}{(E) \times (VMSTD)}$$

where:

ER	=	metals emission rate, lbs/hr
MC	=	metal concentration, μg
C	=	1×10^{-6} g/μg
Qs	=	stack gas flowrate, dscfm
D	=	60 minutes/hour
E	=	453.6 g/lb
VMSTD	=	sample volume of air at standard conditions, dscf

(4) Particulate Concentration Corrections

(a) Correction to 12% CO_2:

$$\text{gr/dscf @ 12\% } CO_2 = \text{gr/dscf} \times \left(\frac{12}{\%\ CO_2}\right)$$

(b) Correction to 7% O_2:

$$\text{gr/dscf @ 7\% } O_2 = \text{gr/dscf} \times \left(\frac{20.9 - 7}{20.9 - \%\ O_{2dry}}\right)$$

(5) Ambient Sampling or Audit Gas Calculations

Conversion of compound concentration from ng/L to ppb(v):

$$ppb(v) = \frac{(A) \times (B)}{(MW)}$$

where:

A	=	24.04 L/g-mole @ 68°F (20°C)
B	=	concentration, ng/L or μg/m^3
MW	=	molecular weight of compound, g/g-mole

Note:

$$\mu g/m^3 = \frac{ppm(v) \times MW}{0.02404} \qquad ppb = \frac{24.04 \times \mu g/m^3}{MW}$$

$$ppm = \frac{0.02404 \times \mu g/m^3}{MW}$$

(6) DRE Calculations for POHCs - VOST

Compute for all POHCs.

$$\text{DRE, \%} = \frac{[(\sum\text{POHC in}) - (\text{POHC out})]}{(\sum\text{POHC in})} \times 100$$

where:

$\sum$POHC in = Sum of all waste streams fed

a) $$\text{POHC in j, g/min} = \frac{(\text{WFR}) \times (\text{A}) \times (\text{B})}{(\text{C})}$$

where:

j	=	a given waste stream
WFR	=	waste feed rate, lb/min
A	=	453.6 g/lb
B	=	POHC concentration, weight %
C	=	100

b) $$\text{POHC out, g/min} = \frac{(\text{D}) \times (\text{E}) \times (\text{Qs}) \times (\text{F})}{(\text{VMSTD})}$$

where:

D	=	POHC quantity detected, ng
E	=	28.32 L/dscf @ 68°F (20°C)
Qs	=	stack gas flowrate, dscfm
F	=	1×10^{-9} g/ng
VMSTD	=	sample volume of air at standard conditions, dsL

c) $$\text{VMSTD} = \frac{(\text{Vm}_{act}) \times (\text{PB}_{act}) \times (\text{T}_{std})}{(\text{P}_{std}) \times (\text{Tm}_{act})}$$

where:

VMSTD	=	sample volume of air at standard conditions, dsL
Vm_{act}	=	actual sample volume, aL
PB_{act}	=	atmospheric pressure at sampling location, mm Hg (in. Hg)
T_{std}	=	standard temperature = 293°K
P_{std}	=	standard pressure = 760 mm Hg (29.92 in. Hg)
Tm_{act}	=	actual meter temperature, °K (°C + 273)

(7) **DRE Calculations for POHCs - MM5**

Compute for all POHCs.

$$\text{DRE, \%} = \frac{[(\sum \text{POHC in}) - (\text{POHC out})]}{(\sum \text{POHC in})} \times 100$$

where:

$\sum$POHC in = Sum of all waste streams fed

a) $$\text{POHC in j, g/min} = \frac{(WFR) \times (A) \times (B)}{(C)}$$

where:

j	=	a given waste stream
WFR	=	waste feed rate, lb/min
A	=	453.6 g/lb
B	=	POHC concentration, weight %
C	=	100

b) $$\text{POHC out, g/min} = \frac{(D) \times (E) \times (Qs)}{(VMSTD)}$$

where:

D	=	POHC quantity detected, μg
Qs	=	stack gas flowrate, dscfm
E	=	1×10^{-6} g/μg
VMSTD	=	sample volume of air at standard conditions, dscf

(8) **Adjusted CO_2 Concentration Downstream of a Scrubber (40 CFR 60 - 60.54 (c)(6)(iii)**

$$(\%\ CO_2)_{adj} = (\%CO_2)_{di} \left[\frac{100 + (\%\ EA)_i}{100 + (\%\ EA)_o}\right]$$

where:

$(\%CO_2)_{adj}$	=	adjusted outlet CO_2 concentration, percent
$(\%CO_2)_{di}$	=	CO_2 measured before the scrubber, dry basis percent
$(\%\ EA)_i$	=	excess air before scrubber, percent
$(\%\ EA)_o$	=	excess air after scrubber, percent

(9) **Sulfuric Acid Mist and Sulfur Dioxide by EPA Reference Method 8**

(a) Sulfuric Acid Mist (H_2SO_4/SO_3)

$$C = \frac{(K_2) \times (N) \times (V_t - V_{tb}) \times V_{sol}}{VMSTD \times V_a}$$

(b) Sulfur Dioxide (SO_2)

$$C = \frac{(K_3) \times (N) \times (V_t - V_{tb}) \times V_{sol}}{VMSTD \times V_a}$$

where:

C	=	concentration, g/dscm or lb/dscf
K_2	=	0.04904 g/meq or 1.081×10^{-4} lb/meq
K_3	=	0.03203 g/meq or 7.061×10^{-5} lb/meq
N	=	normality of barium perchlorate titrant, meq/mL
V_t	=	volume of titrant used for sample, mL
V_{tb}	=	volume of titrant used for blank, mL
V_{sol}	=	total volume of sample solution, mL
V_a	=	Volume of sample aliquot titrated, mL
VMSTD	=	sample volume of air at standard conditions, dscm or dscf

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

APPENDIX C

PROCESS DATA

#3317

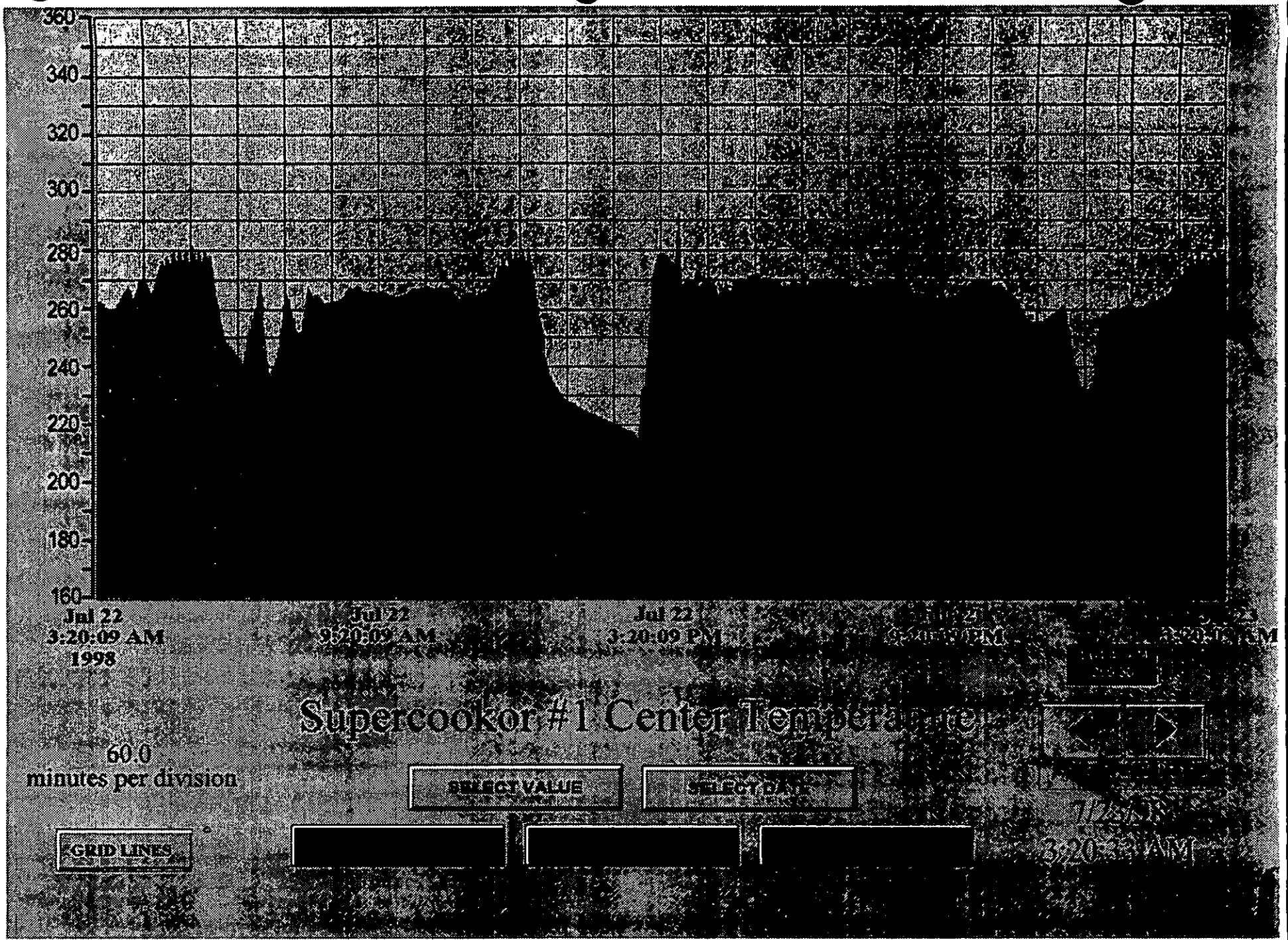
DAKOTA CITY SLAUGHTER
FOR THE WEEK ENDING
07/25/98

"A" SHIFT	MON	TUE	WED	THU	FRI	SAT	TOTAL
GROSS HOURS	8.00	8.00	4.00	4.00	8.00	4.00	36.00
PAID BREAKS	1	1	1	1	1	1	6
NET HOURS	7.75	7.75	3.75	3.75	7.75	3.75	34.50
ACTUAL SUNSHINE	0	2	3	4	1	3	13.00
PAID SUNSHINE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEAD KILLED	2,439	2,464	1,193	1,193	2,464	1,178	10,931
TARGET KILL	2,442	2,442	1,182	1,182	2,442	1,181	10,871
LIVE WT.	3,079,929	3,083,178	1,533,730	1,504,261	3,130,142	1,481,627	13,812,867
DRESS WT.	1,972,218	1,951,411	970,651	959,937	1,977,645	943,373	8,775,235
SLUNKS	0	37	8	0	32	4	81
"B" SHIFT							
GROSS HOURS	8.00	8.00	8.00	8.00	8.00	0.00	40.00
PAID BREAKS	1	1	1	1	1	0	5
NET HOURS	7.75	7.75	7.75	7.75	7.75	0.00	38.75
ACTUAL SUNSHINE	0	7	7	0	7	0	21.00
PAID SUNSHINE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEAD KILLED	2,388	2,464	2,464	2,431	2,464	0	12,211
TARGET KILL	2,442	2,442	2,442	2,442	2,442	0	12,210
LIVE WT.	2,990,496	3,044,162	3,006,815	3,036,331	3,027,606	0	15,105,410
DRESS WT.	1,889,613	1,928,424	1,891,562	1,902,291	1,909,229	0	9,521,119
SLUNKS	0	31	23	21	17	0	92
TOTAL							
GROSS HOURS	16.00	16.00	12.00	12.00	16.00	4.00	76.00
PAID BREAKS	2	2	2	2	2	1	11
NET HOURS	15.50	15.50	11.50	11.50	15.50	3.75	73.25
ACTUAL SUNSHINE	0.00	9.00	10.00	4.00	8.00	3.00	34.00
PAID SUNSHINE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEAD KILLED	4,827	4,928	3,657	3,624	4,928	1,178	23,142
TARGET KILL	4,884	4,884	3,624	3,624	4,884	1,181	23,081
LIVE WT.	6,070,425	6,127,340	4,540,545	4,540,592	6,157,748	1,481,627	28,918,277
DRESS WT.	3,861,831	3,879,835	2,862,213	2,862,228	3,886,874	943,373	18,296,354
SLUNKS	0	68	31	21	49	4	173

WEEKLY DATA

PLAN KILL		24,204
ACTUAL CHAIN SPEED:	A SHIFT	319
	B SHIFT	318
PD HRS MINUS PD SUNSHINE:	A SHIFT	36.00
	B SHIFT	40.00

Distribution:
Kelly
Dan Schroeder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320
300
280
260
240
220
200
180
160
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1998
Jul 22
9:20:09 AM
Jul 22
3:20:09 PM
Supercookor #1 Center Temperature
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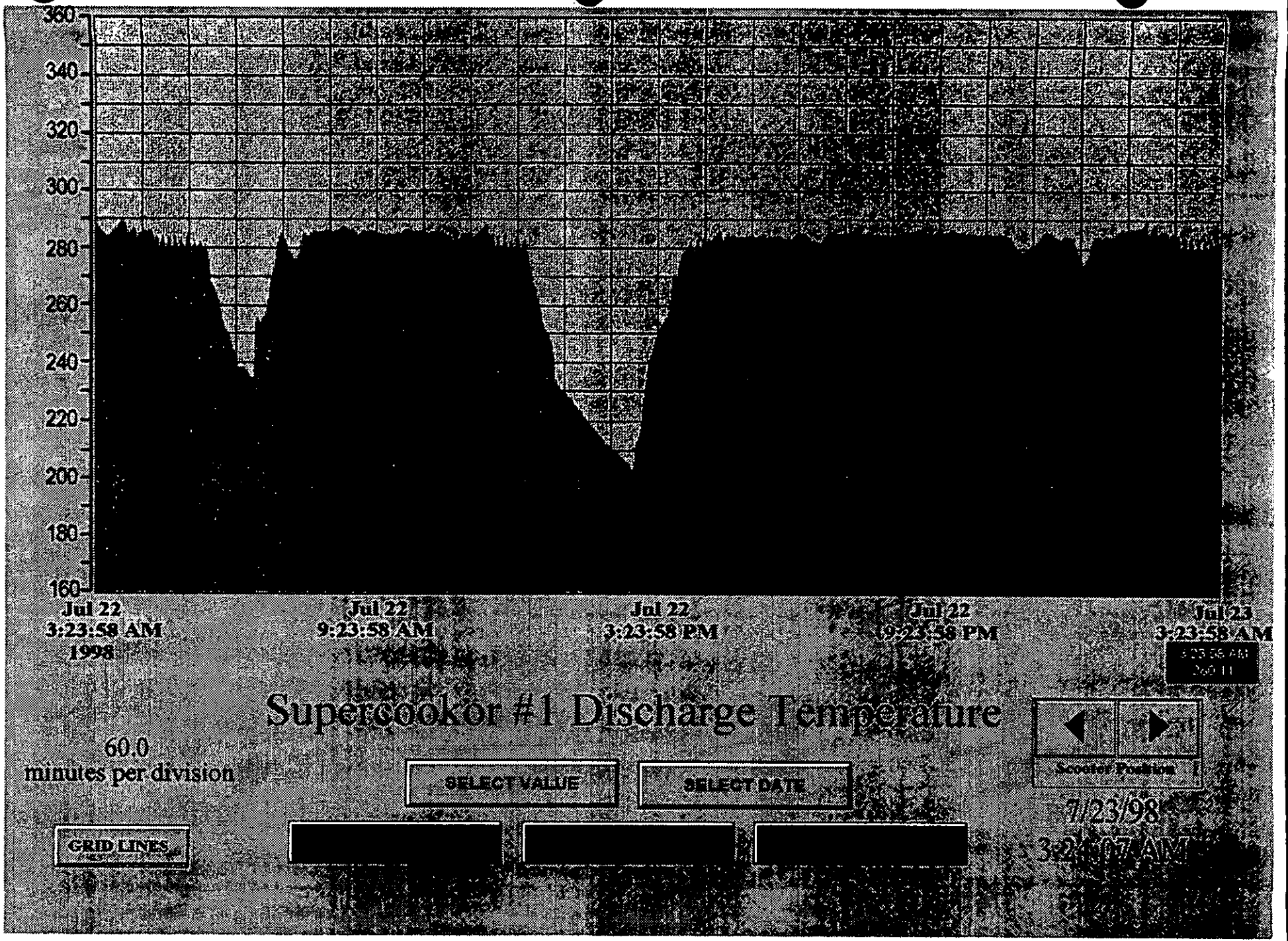
minutes per division
SELECT VALUE
SELECT DATE
GRID LINES
7/22/98
3:20:09 AM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1998
Jul 22
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Jul 22
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Jul 22
9:23:58 PM
Jul 23
3:23:58 AM
Supercookor #1 Discharge Temperature
60.0
minutes per division
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SELECT DATE
Scroller Position
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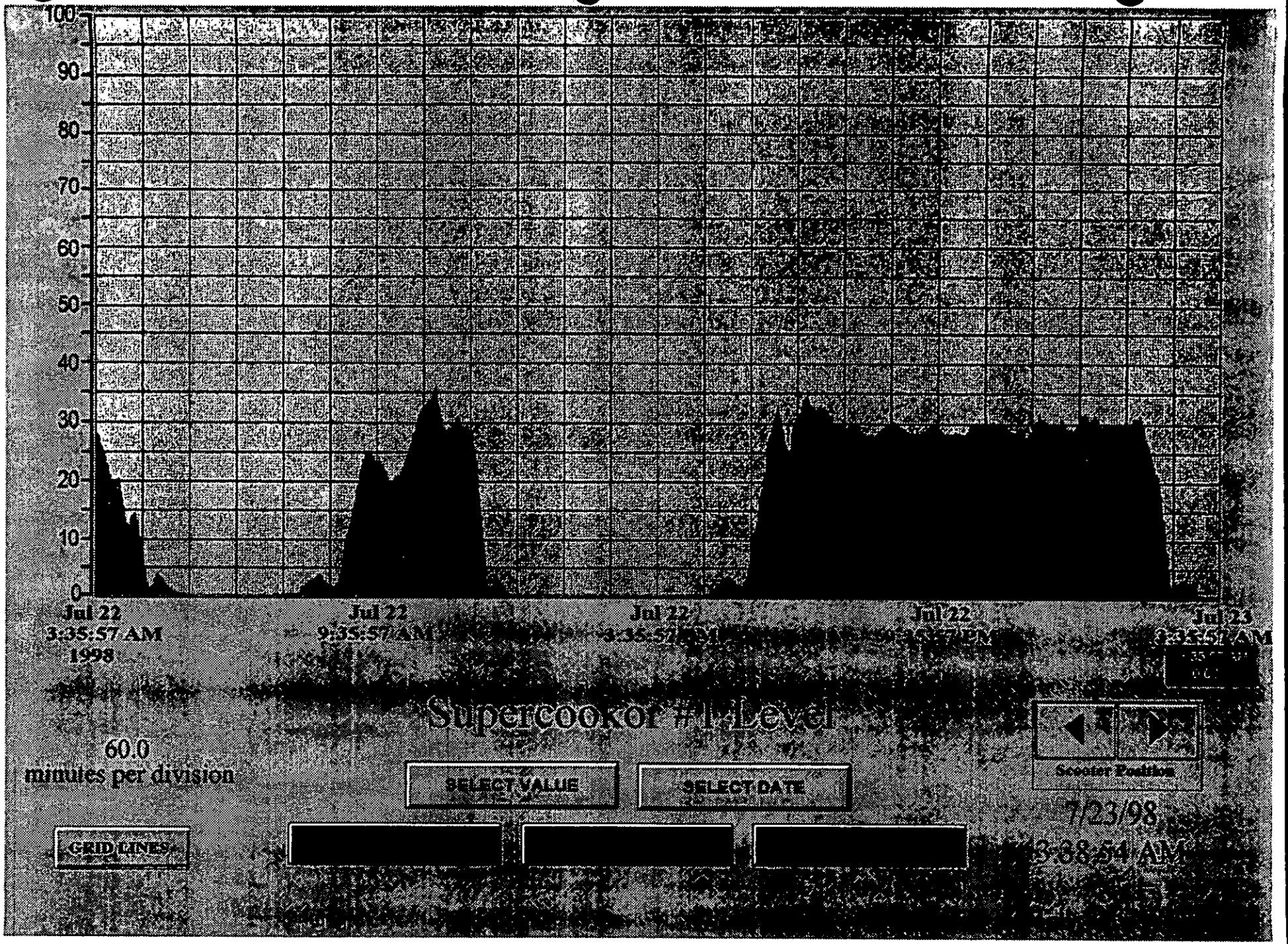
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80
70
60
50
40
30
20
10
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3:35:57 AM
1998
Jul 22
9:35:57 AM
Jul 22
3:35:57 PM
Jul 22
9:35:57 PM
Jul 23
3:35:57 AM
Supercooker #1 Level
60.0
minutes per division
SELECT VALUE
SELECT DATE
Scroller Position
GRID LINES
7/23/98
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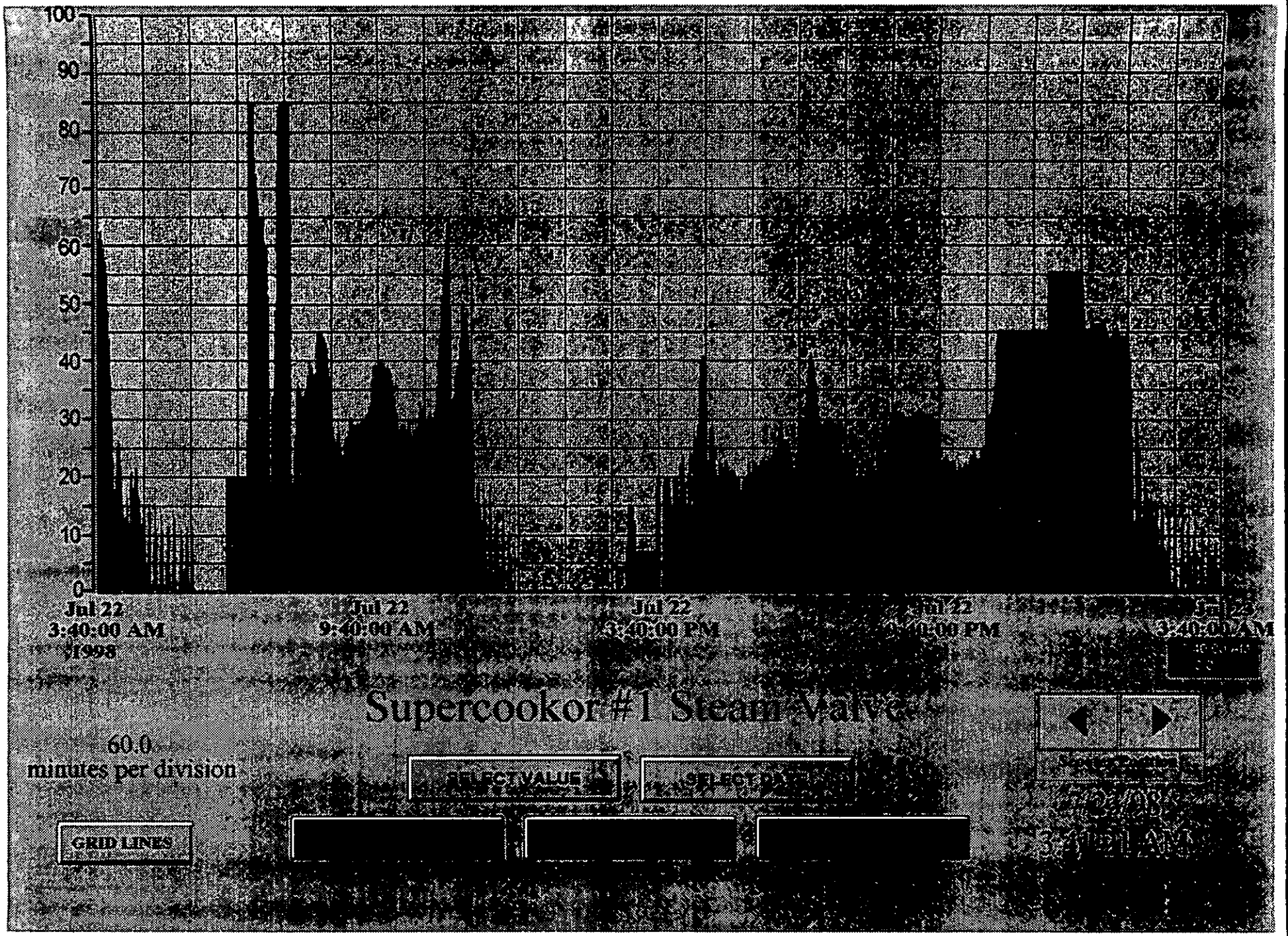
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30
20
10
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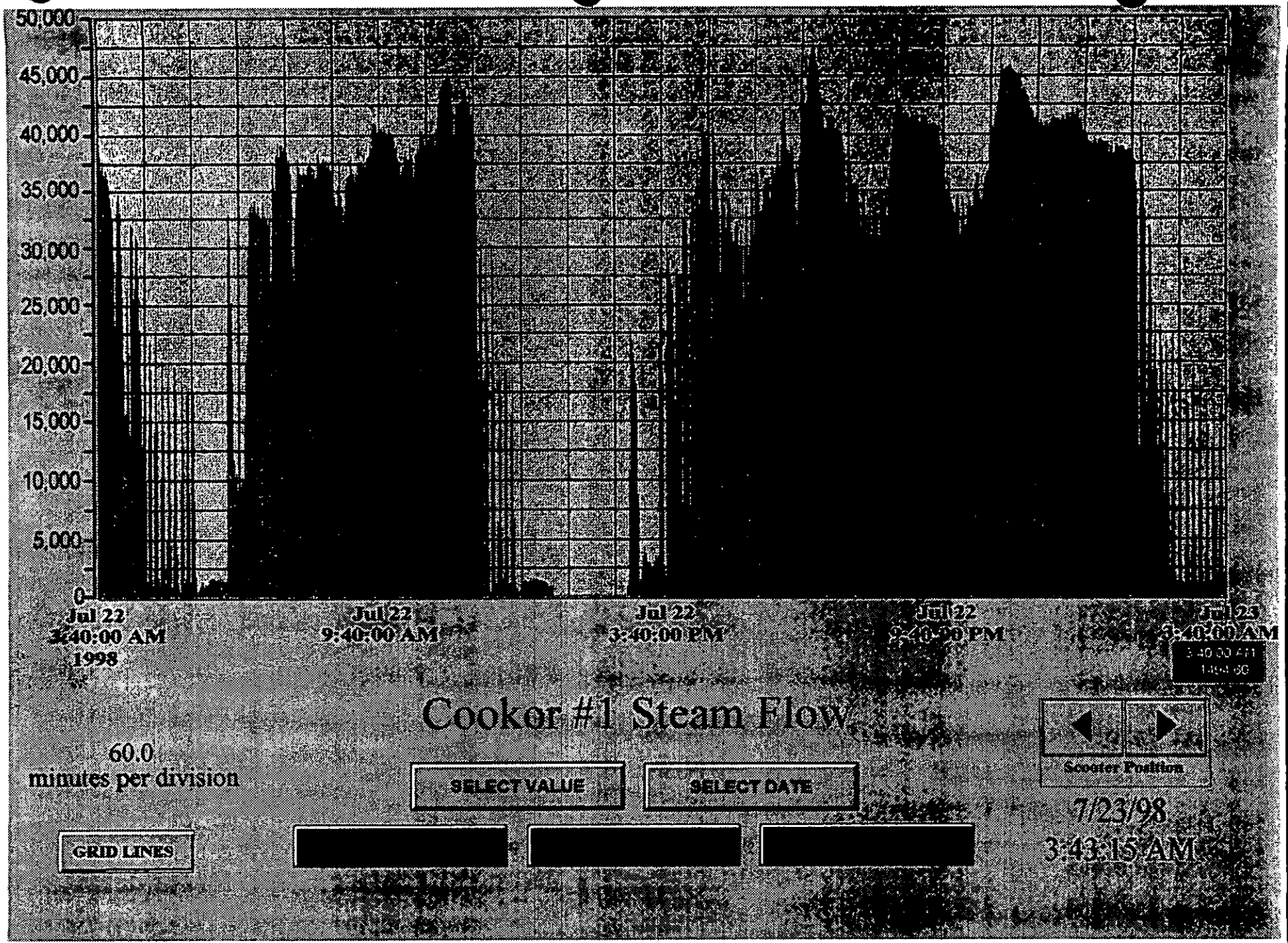
Jul 22
9:40:00 AM
Jul 22
3:40:00 PM
Jul 22
9:40:00 PM
Supercookor #1 Steam Valves
60.0
minutes per division
SELECT VALUE
SELECT PAT
GRID LINES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40,000
35,000
30,000
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10,000
5,000
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1998
Jul 22
9:40:00 AM
Jul 22
3:40:00 PM
Jul 22
9:40:00 PM
Jul 23
3:40:00 AM
Cookor #1 Steam Flow
60.0
minutes per division
SELECT VALUE
SELECT DATE
Scooter Position
7/23/98
3:43:15 AM
GRID LINES

APPENDIX D

LABORATORY DATA

Method 25
Analytical Results

prepared for

TRC ENVIRONMENTAL CORPORATION
1307 Butterfield Road, Suite 420
Downers Grove, IL 60515

by

Triangle Environmental Services, Inc.

Reviewed by:

Donna Nolen-Weathington
Laboratory Analyst

Approved by:

Larry W. Taylor
Laboratory Supervisor

Approved by:

John Y. Morimoto, Ph.D.
QA Officer

Report
98155

August 6, 1998

P.O. Box 13294 Research Triangle Park, NC 27709 (800) 367-4862

Triangle Environmental Services, Inc.

METHOD 25 TABLE OF RESULTS

Client: TRC Environmental Corporation ID#98155 Analyzed: 8/3-4/98

Project ID: 22214-12 (IBP Dakota City, Neb.)

	Sample Description	Concentrations (ppmC)						Mass Conc. (mgC/cu.m)
		CO	CH4	CO2	Noncondensibles	Condensibles	TGNMO	
1	Run 1	< 2	23	2746	< 5	54	54	27
2	Run 2	< 2	22	1844	6	54	60	30
3	Run 3	2	14	1199	< 4	44	44	22
4	Blank	< 2	< 2	3871	< 5	27	27	14

< # = Concentration Below Practical Quantitation Limit

* Please refer to the "Comments on the Analyses" page of the report for additional information.

Triangle Environmental Services, Inc.
METHOD 25 PROCEDURES

CALIBRATION

Initial calibrations and operational checks of the recovery and analytical systems are conducted at a frequency of no greater than one year between sets. The calibrations satisfy the requirements for Methods 25, 25-C, and 10-B.

Triplicate injections of a calibration gas mixture consisting of 200.0 ppm carbon monoxide, 50.0 ppm methane, 10000 ppm carbon dioxide, and 20.00 ppm propane are made immediately before and after each batch of samples. Daily response factors are calculated from the pre-batch integrated responses (average area count / concentration in ppmC) and must agree within 10% of the response factors of the initial calibrations. Further, the post-batch response factors must agree within 2% of the pre-batch response factors. Both criteria must be met before the analyses are considered valid.

CONDENSATE RECOVERY

To flush the trap of CO_2, hydrocarbon-free air is flushed through the trap maintained at -78 °C into the sample tank until less than 10 ppm CO_2 is detected in the flow stream (the concentration of CO_2 is monitored with an NDIR CO_2 detector and measured using a CO_2 analyzer). The sample tank is pressurized to about 1200 mm Hg for analysis and is replaced with an intermediate collection vessel (ICV).

To oxidize the organic material in the trap, hydrocarbon-free air is then passed through the trap heated to 250 °C and the recovery oxidation catalyst into the ICV until less than 10 ppm CO_2 is detected in the flow stream. The ICV is pressurized to about 1200 mm Hg for analysis.

ANALYSIS

All samples, which include the daily calibration gas mixture, sample tanks, and ICVs, are analyzed in triplicate using a computer-interfaced gas chromatograph equipped with an automated gas sampling system and a flame ionization detector (FID). CO, CH_4, and CO_2 are eluted from the Unibead 1S-Carbosieve G column and pass through the analytical oxidation and reduction catalyst to the FID. The column is then backflushed to elute the nonmethane organic (NMO) fraction, which passes through the analytical oxidation and reduction catalysts to the FID.

CALCULATIONS

Calculations are done in accord with USEPA Method 25 procedures. A sample calculation for one of the samples is provided in the report. CO and CO_2 blanks are used to compensate for a background concentration of (1) "CO" due to the interference of O_2 resulting from the coelution of O_2 and CO and (2) CO_2 due to CO_2 and organic compounds in the recovery carrier gas. A concentration of noncondensibles or condensibles of less than the PQL is considered to be zero in computing the TGNMO.

EQUIPMENT

Tanks and ICVs are twice evacuated and filled with ambient air filtered through charcoal and are then evacuated to below 10 mm Hg and monitored for at least an hour to check that the tanks do not leak more than 1 mm Hg/hour. They are then pressurized to greater than ambient pressure with helium, analyzed to ensure < 2 ppmC NMO, and stored for later use.

Traps are flushed at 300 °C for at least 30 minutes with compressed air. Each trap is then flushed at 300 °C for thirty minutes with hydrocarbon-free air. The effluent is then routed through an oxidation catalyst and a reduction catalyst for analysis by FID-GC to confirm less than 10 ppmC total C.

Sampling units are reconditioned by replacing filters and checking that all sections operate properly. The unit is heated (with a PTFE line used in place of a trap) and is flushed with zero air for at least thirty minutes before an aliquot of this flow is injected into the analyzer. If the total carbon concentration is below 10 ppm, the unit is made ready for use and stored for shipment.

Triangle Environmental Services, Inc.

METHOD 25 SAMPLE CALCULATION

Client: TRC Environmental Corporation ID#98155 Analyzed: 8/3-4/98

Project ID: 22214-12 (IBP Dakota City, Neb.)

Sample # 1 Run 1

D A T A

Note: All pressure values have been converted when necessary to mm Hg and all temperature values to Kelvin.

Pressure, Temperature, Volume Data:

	Pressure (mm Hg)	Temp. (K)
Presampling	6.4	296.48
Postsampling	662.9	299.82
Lab Receipt	653.0	298.15
Tank Final	1427.0	298.15
CV Final	1256.0	299.65

Tank N290T:
Tank Volume = 0.004500 cu.m

Trap GGC →
Collection Vessel 36:
CV Volume = 0.008388 cu.m

Response Factors (RF), Practical Quantitation Limits (PQL), and Area Counts:

	RF (area/ppmC)	PQL (ppmC)	Area 1	Area 2	Area 3
CO	246.7	2	181	299	28
CH4	259.6	2	2,655	2,767	2,646
CO2	256.4	2	323,419	323,102	322,171
Noncondensibles	253.5	5	412	401	472
Condensibles	256.4	3	4,703	4,679	4,671

CO Blank = 0 area counts CO2 Blank = 3 ppm

C A L C U L A T I O N S

Measured Concentrations, corrected for blank (ppmC):

Cm(CO) = [Area(CO) - CO Blank] / RF(CO)
= [181 - 0] / 246.7 = 0.7
= [299 - 0] / 246.7 = 1.2
= [28 - 0] / 246.7 = 0.1

Cm(CH4) = Area(CH4)/RF(CH4)
= 2655 / 259.6 = 10.2
= 2767 / 259.6 = 10.7
= 2646 / 259.6 = 10.2

Cm(CO2) = Area(CO2)/RF(CO2) - CO2 Blank
= 323419 / 256.4 - 3 = 1258.4
= 323102 / 256.4 - 3 = 1257.1
= 322171 / 256.4 - 3 = 1253.5

Cm(Noncondensibles) = Area(Noncondensibles)/RF(Noncondensibles)
= 412 / 253.5 = 1.6
= 401 / 253.5 = 1.6
= 472 / 253.5 = 1.9

Cm(Condensibles) = Area(Condensibles)/RF(Condensibles) - CO2 Blank
= 4703 / 256.4 - 3 = 15.3
= 4679 / 256.4 - 3 = 15.2
= 4671 / 256.4 - 3 = 15.2

Pressure-Temperature Ratio, Q(i) = P(i)/T(i) (mm Hg/K):

Tank Presampling: Q(2) = 6.4 / 296.48 = 0.022
Tank Postsampling: Q(1) = 662.9 / 299.82 = 2.211
Tank Lab Receipt: Q(5) = 653.0 / 298.15 = 2.190
Tank Final: Q(3) = 1427.0 / 298.15 = 4.786
CV Final: Q(4) = 1256.0 / 299.65 = 4.192

Volume Sampled (dscm) = 0.3857 x Tank Volume x [Q(1)-Q(2)]
= 0.3857 x 0.004500 x [2.211 - 0.022]
= 0.003800

Averages and % Relative Standard Deviations (%RSD) of Cm's are calculated.
(%RSD of C=%RSD of Cm)

Calculated Concentrations (ppmC):

C(CO) = Q(3)/[Q(1)-Q(2)] x Cm(CO)
= 4.786/(2.211 - 0.022) x 0.7 = 1.5 (<PQL of 2)

C(CH4) = Q(3)/[Q(1)-Q(2)] x Cm(CH4)
= 4.786/(2.211 - 0.022) x 10.4 = 22.6

C(CO2) = Q(3)/[Q(1)-Q(2)] x Cm(CO2)
= 4.786/(2.211 - 0.022) x 1256.4 = 2746.4

C(Noncondensibles) = Q(3)/[Q(1)-Q(2)] x Cm(Noncondensibles)
= 4.786/(2.211 - 0.022) x 1.7 = 3.7 (<PQL of 5)

C(Condensibles)
= Volume(CV)/Volume(Tank) x Q(4)/[Q(1)-Q(2)] x Cm(Condensibles)
= 0.008388/0.004500 x 4.192/(2.211 - 0.022) x 15.3 = 54.5

Total Gaseous Non-Methane Organics(TGNMO)=C(Noncondensibles)+C(Condensibles)
= 0.0 +54.5
= 54.5

Note: Values less than the PQLs have been set to zero.

Mass Concentration (mgC/cu.m)
= 0.4993 x TGNMO
= 0.4993 x 54.5 = 27.2

<PQL of ### = Concentration Below Practical Quantitation Limit

Triangle Environmental Services, Inc.
METHOD 25 SAMPLE QA/QC DATA

DAILY RECOVERY SYSTEM CHECKS

4.3.1.1* **Condensate Recovery System Leak Check**

Evacuate system to ≤10 mm Hg absolute pressure, isolate system, and monitor for ten minutes.
Requirement: Pressure Change ≤3 mm Hg

4.3.1.2* **Condensate Recovery System Background Test**

Analyze recovery system effluent for CO_2 concentrations.
Requirement: CO_2 ≤ 10 ppm

4.3.1.3* **Condensate Oxidation Catalyst Efficiency Check**

Analyze 1% methane standard through oxidation catalyst.
Requirement: CO_2 = CH_4 concentration ± 2%

DAILY ANALYZER CHECKS

5.3* **Daily Calibration**

Response Factor Checks
Requirement: Daily RF = Initial RF ± 10%
See the individual sample data sheet for the daily response factor

	Initial RF for Analyzer A 4/8/98	Initial RF for Analyzer B 4/21/98
CO	219.06	247.37
CH_4	227.99	250.07
CO_2	225.44	250.03
NMO	228.34	250.52

Triplicate injections of a mixture of CO, CH_4, CO_2, and C_3H_8 are made before and after each batch of samples.

* USEPA Method 25 Protocol Reference Number

INITIAL CONDENSATE RECOVERY SYSTEM TESTS

5.1.1* **Carrier and Auxiliary Gas Blank**

Requirement: $CO + CH_4 + CO_2 + NMO \leq 5$ ppm

5.1.3* **System Performance Check**

Volume Injected	Compound	Average % Recovery				% RSD			
50 uL	Hexane	101	102	98.8	104.6	0.058	0.101	1.68	0.229
50 uL	Decane	97	100	93.7	103.3	0.120	0.047	1.7	0.359
10 uL	Hexane	104	107	92	90.0	0.118	0.145	1.206	0.135
10 uL	Decane	98	97	99.6	93.3	0.119	0.232	1.36	0.254
Requirement:		100 ± 10%				≤5			

INITIAL NMO ANALYZER PERFORMANCE CHECKS

5.2.1* **Oxidation Catalyst Efficiency Check** Analyzer A,4/8/98; Analyzer B,4/21/98

FID response with reduction catalyst in bypass mode = 0, 0
Requirement: ≤1%

5.2.2* **Reduction Catalyst Efficiency Check** Analyzer A,4/8/98; Analyzer B,4/21/98

Response of CH_4 with oxidation and reduction catalysts in series mode compared to response with both catalysts in bypass mode.
100.0%, 100.0% Requirement: > 95%

5.2.3* **Analyzer Linearity Check+NMO Calibration** Analyzer A,4/8/98;Analyzer B,4/21/98

$100x(1-RF/RF_{average})$		Requirement:
max. dev. CO:	+1.70%, +1.28%	± 2.5%
max. dev. CH_4:	-2.00%, -1.77%	± 2.5%
max. dev. CO_2:	+1.71%, +2.10%	± 2.5%
max. dev. NMO:	-1.42%, -1.12%	± 2.5%
max. %RSD:	1.50%, 0.54%	≤ 2%
$\frac{RF\ (NMO)}{RF\ (CO_2)}$ =	0.98, 1.00	1.0 ± 0.1

* USEPA Method 25 Protocol Reference Number

5.2.4* **System Performance Check** Analyzer A,4/8/98; Analyzer B,4/21/98, 5/1/98

	Measured Value, Expected Value		Requirement
	Analyzer A	Analyzer B	
Propane in Mix	19.6, 20.0	20.22, 20.0	± 5%
Hexane	50.6, 51.6	51.6, 51.6	± 5%
Toluene	20.3, 20.0	19.34, 20.0	± 5%
Methanol	104.5, 109.1	109.55, 109.0	± 5%

EQUIPMENT CHECKS

4.1.1* **Clean Sampling Equipment Check**

Sample Unit	<10	ppmC total C	@ 100%
Trap	<10	ppmC total C	@ 100%
Tank	< 2	ppmC NMO	@ 100%

4.1.2* **Sample Tank Evacuation and Leak Check**

Tank evacuated to ≤10 mm Hg absolute pressure, monitored for ≥1 hour, and passed for use if no pressure change (< 1 mm Hg/hr) is noted.

5.4* **Sample Tank and ICV Volumes**

Tank weighed empty, filled with deionized distilled water (temperature recorded), and weighed to the nearest 2 g. Volume calculated based on density of water at that temperature and results recorded in permanent file.

* USEPA Method 25 Protocol Reference Number

Triangle Environmental Services, Inc.

METHOD 25 DATA REPORT

Client: TRC Environmental Corporation ID#98155 Analyzed: 8/3-4/98

Project ID: 22214-12 (IBP Dakota City, Neb.)

Sample # 1 Run 1

Pressure, Temperature, Volume Data:

	Pressure (mm Hg)	Temp. (K)	P/T
Presampling	6.4	296.48	0.022
Postsampling	662.9	299.82	2.211
Lab Receipt	653.0	298.15	2.190
Tank Final	1427.0	298.15	4.786
CV Final	1256.0	299.65	4.192

Tank N290T:
Tank Volume = 0.004500 cu.m
Volume Sampled = 0.003800 dscm

Lab Receipt P/T / Postsampling P/T = 0.991

Trap GGC →
Collection Vessel 36:
CV Volume = 0.008388 cu.m

Response Factors (RF), Practical Quantitation Limits (PQL), and Area Counts:

	RF (area/ppmC)	PQL (ppmC)	Area 1	Area 2	Area 3
CO	246.7	2	181	299	28
CH4	259.6	2	2,655	2,767	2,646
CO2	256.4	2	323,419	323,102	322,171
Noncondensibles	253.5	5	412	401	472
Condensibles	256.4	3	4,703	4,679	4,671

Recovery Oxidation Catalyst Efficiency Check: CO2/CH4 = 99.6%
CO Blank = 0 area counts CO2 Blank = 3 ppm

Concentrations:

*=corrected for Blank	ppmC Amount	±	SD	%RSD
CO*	< 2			
CH4	23	±	1	2.5
CO2*	2746	±	6	0.2
Noncondensibles	< 5			
Condensibles*	54	±	0	0.4

Note: A concentration of noncondensibles or condensibles of less than the PQL is considered to be zero in computing the TGNMO value.

TGNMO 54

Mass Concentration 27 mgC/cu.m

< # = Concentration Below Practical Quantitation Limit

Triangle Environmental Services, Inc.

METHOD 25 DATA REPORT

Client: TRC Environmental Corporation ID#98155 Analyzed: 8/3-4/98

Project ID: 22214-12 (IBP Dakota City, Neb.)

Sample # 2 Run 2

Pressure, Temperature, Volume Data:

	Pressure (mm Hg)	Temp. (K)	P/T
Presampling	2.5	297.04	0.008
Postsampling	683.3	297.04	2.300
Lab Receipt	672.0	298.15	2.254
Tank Final	1373.0	298.15	4.605
CV Final	1301.0	300.15	4.334

Tank N294T:
Tank Volume = 0.004531 cu.m
Volume Sampled = 0.004005 dscm

$\frac{\text{Lab Receipt P/T}}{\text{Postsampling P/T}} = 0.980$

Trap FFW →
Collection Vessel 39:
CV Volume = 0.008392 cu.m

Response Factors (RF), Practical Quantitation Limits (PQL), and Area Counts:

	RF (area/ppmC)	PQL (ppmC)	Area 1	Area 2	Area 3
CO	246.7	2	0	287	273
CH4	259.6	2	2,674	2,863	2,823
CO2	256.4	2	235,658	236,222	236,207
Noncondensibles	253.5	5	780	745	762
Condensibles	256.4	3	4,793	4,691	4,645

Recovery Oxidation Catalyst Efficiency Check: CO2/CH4 = 99.8%
CO Blank = 0 area counts CO2 Blank = 3 ppm

Concentrations:

*=corrected for Blank	ppmC Amount	±	SD	%RSD
CO*	< 2			
CH4	22	±	1	3.6
CO2*	1844	±	3	0.1
Noncondensibles	6	±	0	2.3
Condensibles*	54	±	1	1.9
TGNMO	60			

Mass Concentration 30 mgC/cu.m

< # = Concentration Below Practical Quantitation Limit

Triangle Environmental Services, Inc.

METHOD 25 DATA REPORT

Client: TRC Environmental Corporation ID#98155 Analyzed: 8/3-4/98

Project ID: 22214-12 (IBP Dakota City, Neb.)

Sample # 3 Run 3

Pressure, Temperature, Volume Data:

	Pressure (mm Hg)	Temp. (K)	P/T
Presampling	2.5	297.04	0.008
Postsampling	668.9	297.04	2.252
Lab Receipt	648.0	297.15	2.181
Tank Final	1193.0	297.15	4.015
CV Final	1320.0	298.15	4.427

Tank N295:
Tank Volume = 0.004503 cu.m
Volume Sampled = 0.003896 dscm

Lab Receipt P/T / Postsampling P/T = 0.968

Trap GGB →
Collection Vessel 34:
CV Volume = 0.008393 cu.m

Response Factors (RF), Practical Quantitation Limits (PQL), and Area Counts:

	RF (area/ppmC)	PQL (ppmC)	Area 1	Area 2	Area 3
CO	246.7	2	264	303	287
CH4	259.6	2	1,941	1,992	1,980
CO2	256.4	2	172,600	172,735	172,505
Noncondensibles	253.5	4	485	530	402
Condensibles	256.4	3	3,873	3,799	3,735

Recovery Oxidation Catalyst Efficiency Check: CO2/CH4 = 100.4%
CO Blank = 0 area counts CO2 Blank = 3 ppm

Concentrations:

*=corrected for Blank	ppmC Amount	±	SD	%RSD
CO*	2	±	0	6.9
CH4	14	±	0	1.4
CO2*	1199	±	1	0.1
Noncondensibles	< 4			
Condensibles*	44	±	1	2.3

Note: A concentration of noncondensibles or condensibles of less than the PQL is considered to be zero in computing the TGNMO value.

TGNMO 44

Mass Concentration 22 mgC/cu.m

< # = Concentration Below Practical Quantitation Limit

Triangle Environmental Services, Inc.

METHOD 25 DATA REPORT

Client: TRC Environmental Corporation ID#98155 Analyzed: 8/3-4/98

Project ID: 22214-12 (IBP Dakota City, Neb.)

Sample # 4 Blank

Pressure, Temperature, Volume Data:

	Pressure (mm Hg)	Temp. (K)	P/T
Presampling	4.7	297.04	0.016
Postsampling	671.7	298.15	2.253
Lab Receipt	669.5	297.15	2.253
Tank Final	1513.0	297.15	5.092
CV Final	1496.0	299.65	4.992

Tank N293:
Tank Volume = 0.004549 cu.m
Volume Sampled = 0.003925 dscm

$\frac{\text{Lab Receipt P/T}}{\text{Postsampling P/T}} = 1.000$

Trap EED →
Collection Vessel 23:
CV Volume = 0.008343 cu.m

Response Factors (RF), Practical Quantitation Limits (PQL), and Area Counts:

	RF (area/ppmC)	PQL (ppmC)	Area 1	Area 2	Area 3
CO	246.7	2	0	53	44
CH4	259.6	2	0	0	0
CO2	256.4	2	436,560	437,296	436,742
Noncondensibles	253.5	5	0	0	0
Condensibles	256.4	4	2,433	2,464	2,527

Recovery Oxidation Catalyst Efficiency Check: CO2/CH4 = 100.4%
CO Blank = 0 area counts CO2 Blank = 3 ppm

Concentrations:

*=corrected for Blank	ppmC Amount	±	SD	%RSD
CO*	< 2			
CH4	< 2			
CO2*	3871	±	3	0.1
Noncondensibles	< 5			
Condensibles*	27	±	1	2.8

Note: A concentration of noncondensibles or condensibles of less than the PQL is considered to be zero in computing the TGNMO value.

TGNMO 27

Mass Concentration 14 mgC/cu.m

< # = Concentration Below Practical Quantitation Limit

Chain of Custody

TR6 Environmental Consultants, Inc.

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
22214-12	IBP DAKOTA CITY, NE

SAMPLERS: (Signature) David A. Wells, Scott R. Miller

(Printed) DAVE WELLS, Scott Miller

FIELD SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PARAMETERS: TGNMO	REMARKS
Run 1	7/22	1030 1130	✓		CONDENSOR OUTLET SUPER COOKER		✓	
Run 2	7/22	1810 1910	✓		SUPER COOKER COND. OUT / PACKED BED		✓	
Run 3	7/22	2020 2120	✓		#1 OUTLET		✓	
BLANK	7/22		✓				✓	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
David A. Wells					
(Printed)		(Printed)	(Printed)		(Printed)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		John Y. Morimoto	7/24/98 7:45	
(Printed)		(Printed) John Y. Morimoto		

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field Files (pink).

PARTICULATE ANALYTICAL DATA FORM

COMPANY:	IBP	STACK NUMBER:	Cond Out / Packed Bed	
LOCATION:	Dakota City, NE	RUN NUMBER:	1	
DATE:	07/22/98	RELATIVE HUMIDITY:	50	%
		ACETONE DENSITY (Pa):	0.7853	g/ml

Liquid level marked and container sealed ?	Yes	
Acenton Blank residue concentration (Ca)		mg/g
Acetone Rinse volume (Vaw)		ml
Blank residue in acetone rinse (Wa) = Ca. Vaw. Pa =		mg

NOTE: In no case should a blank residue 0.01 mg/g or 0.001% of the weight of acetone used be subtracted from the sample weight.

Date of Weighing	28-Jul-98	Gross Weight	101,070.0	mg
Time of Weighing	08:00			
Date of Weighing	28-Jul-98	Gross Weight	101,070.4	mg
Time of Weighing	02:00			
		AVERAGE GROSS WT.	101,070.2	mg
		LESS BLANK RESIDUE (Wa)	0.0	mg
		TARE WEIGHT	101,046.5	mg
		WEIGHT OF PARTICULATE IN ACETONE RINSE	23.7	mg
Date of Weighing	28-Jul-98	Gross Filter Weight	603.3	mg
Time of Weighing	08:00			
Date of Weighing	28-Jul-98	Gross Filter Weight	603.4	mg
Time of Weighing	02:00			
		AVERAGE GROSS WT.	603.4	mg
		FILTER TARE WEIGHT	601.6	mg
		WEIGHT OF PARTICULATE ON FILTER	1.8	mg
		WEIGHT OF PARTICULATE IN ACETONE RINSE	23.7	mg
		TOTAL PARTICULATE	**25.5**	**mg**

REMARKS:

Initials of Analyst DW

PARTICULATE ANALYTICAL DATA FORM

COMPANY:	IBP	STACK NUMBER:	Cond Out / Packed Bed	
LOCATION:	Dakota City, NE	RUN NUMBER:	2	
DATE:	07/22/98	RELATIVE HUMIDITY:	50	%
		ACETONE DENSITY (Pa):	0.7853	g/ml

Liquid level marked and container sealed ?	Yes	
Acenton Blank residue concentration (Ca)		mg/g
Acetone Rinse volume (Vaw)		ml
Blank residue in acetone rinse (Wa) = Ca. Vaw. Pa =		mg

NOTE: In no case should a blank residue 0.01 mg/g or 0.001% of the weight of acetone used be subtracted from the sample weight.

Date of Weighing	28-Jul-98	Gross Weight	105,621.2	mg
Time of Weighing	08:00			
Date of Weighing	28-Jul-98	Gross Weight	105,621.3	mg
Time of Weighing	02:00			
		AVERAGE GROSS WT.	105,621.3	mg
		LESS BLANK RESIDUE (Wa)		mg
		TARE WEIGHT	105,610.6	mg
		WEIGHT OF PARTICULATE IN ACETONE RINSE	10.6	mg
Date of Weighing	28-Jul-98	Gross Filter Weight	602.2	mg
Time of Weighing	08:00			
Date of Weighing	28-Jul-98	Gross Filter Weight	602.2	mg
Time of Weighing	02:00			
		AVERAGE GROSS WT.	602.2	mg
		FILTER TARE WEIGHT	601.2	mg
		WEIGHT OF PARTICULATE ON FILTER	1.0	mg
		WEIGHT OF PARTICULATE IN ACETONE RINSE	10.6	mg
		TOTAL PARTICULATE	**11.6**	**mg**

REMARKS:

Initials of Analyst DW

PARTICULATE ANALYTICAL DATA FORM

COMPANY:	IBP	STACK NUMBER:	Cond Out / Packed Bed	
LOCATION:	Dakota City, NE	RUN NUMBER:	3	
DATE:	07/22/98	RELATIVE HUMIDITY:	50	%
		ACETONE DENSITY (Pa):	0.7853	g/ml

Liquid level marked and container sealed ?	Yes	
Acenton Blank residue concentration (Ca)		mg/g
Acetone Rinse volume (Vaw)		ml
Blank residue in acetone rinse (Wa) = Ca. Vaw. Pa =		mg

NOTE: In no case should a blank residue 0.01 mg/g or 0.001% of the weight of acetone used be subtracted from the sample weight.

Date of Weighing	28-Jul-98	Gross Weight	103,881.2	mg
Time of Weighing	08:00			
Date of Weighing	28-Jul-98	Gross Weight	103,881.4	mg
Time of Weighing	02:00			
		AVERAGE GROSS WT.	103,881.3	mg
		LESS BLANK RESIDUE (Wa)		mg
		TARE WEIGHT	103,874.6	mg
		WEIGHT OF PARTICULATE IN ACETONE RINSE	6.7	mg
Date of Weighing	28-Jul-98	Gross Filter Weight	605.6	mg
Time of Weighing	08:00			
Date of Weighing	28-Jul-98	Gross Filter Weight	605.6	mg
Time of Weighing	02:00			
		AVERAGE GROSS WT.	605.6	mg
		FILTER TARE WEIGHT	604.3	mg
		WEIGHT OF PARTICULATE ON FILTER	1.3	mg
		WEIGHT OF PARTICULATE IN ACETONE RINSE	6.7	mg
		TOTAL PARTICULATE	**8.0**	**mg**

REMARKS:

Initials of Analyst DW

Organic Extraction

Project: IBP
Date: 07/22/98
Location: Dakota City, NE
Source: Cond. out / Packed Bed out

Run Number	Beaker Number	Beaker Weight Final	Beaker Weight Initial	Total Organic Residue	Volume Sample	Volume Aliquot	Volume Solvent	Total (mg) Organics In Sample
Run 1	R1 ORG	98,630.5	98,629.4	1.1	300	300	100	1.1
Run 2	R2 ORG	101,024.8	101,024.0	0.8	300	300	100	0.8
Run 3	R3 ORG	102,489.2	102,488.4	0.8	325	300	100	0.8
Blank	BLK ORG	101,724.1	101,724.1	0.0	250	250	100	0.0

Dissolved Solids

Project: IBP
Date: 07/22/98
Location: Dakota City, NE
Source: Condensor Outlet / Packed Bed out

Run Number	Beaker Number (mg)	Beaker Weight Final (mg)	Beaker Weight Initial (mg)	Dissolved Solids Collected (mg)	Volume Sample (Vs) (ml)	Volume Aliquot (Va) (ml)	Total Solids x Vs / Va (mg)
Run 1	R1 TDS	97,921.6	97,918.6	3.0	300	300	**3.0**
Run 2	R2 TDS	99,807.7	99,807.0	0.7	300	300	**0.7**
Run 3	N-4	102,510.5	102,504.7	5.8	325	325	**5.8**
Blank	BLK TDS	101,685.8	101,685.8	0.0	300	300	**0.0**

Meter Box # 4 **RUNS 1-3**

Post Calibration Method				
	Run 1	**Run 2**	**Run 3**	
H@	1.8068	1.8068	1.8068	
SQRT Havg	1.33	1.364	1.321	
				AVERAGE
Post Yi	0.9939	1.0111	1.0166	1.0072
	5% Yi	**- RANGE +**		
	0.0491	0.9330	1.0312	

TVC Environmental Consultants, Inc

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
22214-12	IBP DAKOTA CITY, NE

SAMPLERS: (Signature) David A. Wells (Printed) DAVE WELLS

PARAMETERS

FIELD SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	GRAVIMETRIC	TOTAL ORGANICS	DISSOLVED SOLIDS	REMARKS
R1 PW	7/22		✓		SUPER COOKER COND OUT/#1 PACK BED OUT	1	✓			RMS TRAIN w/BACK ½
R2 PW	"		✓			1	✓			
R3 PW	"		✓			1	✓			
BLANK ACETONE	"		✓			1	✓			
R1 EMPS	"		✓			1		✓	✓	
R2 EMPS	"		✓			1		✓	✓	
R3 EMPS	"		✓			1		✓	✓	
BLANK WATER	"		✓			1		✓	✓	
R1 SG Filters	"		✓			1	✓			
R2 SG filter	"		✓			1	✓			
R3 SG filter	"		✓			1	✓			
R1-3 SG	"		✓			3	✓			

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
(Printed)		(Printed)	(Printed)		(Printed)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
(Printed)		(Printed)			

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field Files (pink).

APPENDIX E

EQUIPMENT CALIBRATION SHEETS

FORM 75-8

TRANSPORTABLE CONTINUOUS EMISSION MONITORING ANALYZER CALIBRATION

Date July 22,1998
Time 900
Project Num 22214-12
Plant Name IBP / DC
Analyzer Information :

Operator SM/DW
Unit No./Test Location SUPER COOKER
Ambient Temperatu 86 °F
Barometric Pressure 29.1 " Hg

				Span
Oxygen Analyzer Manufactur	Teledyne	Model 326-A	SN 132680	25
NO/NO_X Analyzer Manufactur	TECO	Model 10S	SN 10S40019-262	100
SO_2 Analyzer Manufactur	Bovar	Model 721-M	SN 93-721M-8007-8	100
CO_2 Analyzer Manufactur	Milton Roy	Model 3300	SN N7E3778T	20
CO Analyzer Manufactur	TECO	Model 48	SN 48-39875-261	100
THC Analyzer Manufactur	JUM	Model VE-7	SN N/A	N/A

Calibration Conducted After/Before Test Run Number BEFORE SC101203.RAW

Parameter	ZERO				MIDRANGE				HIGH RANGE			
	Cylinder Number	Cyl. ppm or %	Anal. pm or	% Diff.	Cylinder Number	Cyl. ppm or %	Anal. ppm or %	% Diff.	Cylinder Number	Cyl. ppm or %	Anal. ppm or %	% Diff.
O_2	CC92990	0	0	0	SG9163644	10.2	10.5	1.2	SG9163638	18	18	0
NO_X	CC92990	0	0	0	SG128628	46	45.4	-0.6	CC84962	84.3	84.5	0.2
SO_2	CC92990	0	0	0	CC79879	45.1	45.2	0.1	CC55747	88.7	88.8	0.1
CO_2	CC92990	0	0	0	SG9163644	9.9	9.6	-1.5	SG9163638	17.7	17.7	0
CO	CC92990	0	0.2	0.2	CC83926	30.3	29.8	-0.5	CC79908	86.9	86.9	0

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

REF: 40CFR60, App. A Method 6C, Section 6.3

PRELIMINARY CALIBRATION SUPER COOKER OUTLET 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
09:02:00	0.0	0.0	-0.0	-1.4	0.0	0.0	0.0	1.4	-0.2	-2.1	22.0
09:03:00	-0.0	-0.3	0.0	0.0	0.0	0.3	0.0	1.4	0.2	1.7	22.0
09:04:00	-0.0	-0.3	0.0	0.0	133.6	1336.0	0.1	2.1	0.1	1.4	22.0
09:05:00	-0.1	-0.7	0.0	0.0	84.4	844.0	0.0	1.7	0.4	4.1	22.0
09:06:00	-0.1	-0.7	0.0	0.0	84.5	845.0	0.0	1.0	0.7	6.9	22.0
09:07:00	-0.1	-1.0	0.0	0.0	45.4	453.7	0.0	1.4	0.8	8.3	22.0
09:08:00	-0.0	-0.3	0.0	0.0	45.4	453.7	0.1	2.4	0.5	5.2	22.0
09:09:00	0.0	0.3	17.4	871.0	-0.1	-0.7	18.1	725.0	0.4	4.1	21.9
09:10:00	0.0	0.0	17.7	885.0	-0.2	-2.1	18.1	722.0	-0.3	-3.4	21.9
09:11:00	0.0	0.0	17.7	887.0	-0.2	-2.1	18.0	718.0	-0.4	-4.5	22.0
09:12:00	0.0	0.3	9.6	479.4	-0.2	-2.4	10.5	419.3	-0.0	-0.3	22.0
09:13:00	0.0	0.0	9.6	479.8	-0.2	-1.7	10.5	418.6	-0.3	-3.1	22.0
09:14:00	0.0	0.3	2.4	120.0	0.4	4.5	12.4	494.2	-0.3	-3.4	22.0
09:15:00	8.6	86.3	0.1	3.8	0.4	3.8	0.1	2.4	0.8	7.6	22.0
09:16:00	8.9	89.1	0.1	2.8	0.3	3.4	0.0	1.0	0.3	3.4	22.0
09:17:00	8.9	89.1	0.0	2.1	0.2	2.1	0.1	2.4	0.6	6.2	22.0
09:18:00	89.2	892.0	0.0	1.7	0.2	2.4	0.0	1.0	0.4	4.1	21.9
09:19:00	88.8	888.0	0.0	1.4	0.3	3.4	0.0	1.0	0.8	8.3	21.9
09:20:00	58.8	588.4	0.0	0.7	-0.4	-4.1	0.1	2.4	0.5	4.8	21.9
09:21:00	45.2	451.6	0.0	0.0	-0.3	-3.1	0.1	2.1	0.7	6.5	21.9
09:22:00	2.0	19.6	0.0	0.0	-0.4	-3.8	0.1	2.1	27.6	275.5	22.0
09:23:00	0.3	2.8	-0.0	-0.7	-0.2	-2.4	0.0	0.3	88.5	885.0	21.9
09:24:00	0.2	1.7	-0.0	-1.0	-0.3	-3.1	0.0	0.7	86.3	863.0	21.9
09:25:00	0.1	1.4	-0.0	-1.4	-0.4	-4.5	0.0	1.4	86.9	869.0	21.9
09:26:00	0.1	0.7	-0.0	-1.4	-0.4	-4.5	0.1	2.1	46.9	469.1	21.9
09:27:00	0.1	0.7	-0.0	-2.1	-0.3	-3.1	0.0	1.7	29.4	294.4	21.9
09:28:00	0.0	0.0	-0.0	-2.1	-0.3	-3.1	0.0	1.7	29.8	298.2	21.9
09:29:00	-0.0	-0.3	-0.0	-2.1	-0.3	-2.8	0.0	1.7	6.2	62.3	21.9
09:30:00	-0.1	-1.0	-0.0	-2.1	-0.2	-2.1	0.0	0.3	0.0	0.3	21.9
09:31:00	0.6	5.8	-0.0	-2.1	-0.2	-1.7	2.1	82.9	0.1	0.7	21.9
09:32:00	0.4	3.8	-0.0	-1.4	-0.2	-2.4	0.1	2.4	5.8	57.8	21.9
09:33:00	0.3	3.1	-0.0	-1.4	-0.3	-3.4	0.1	3.4	1.5	15.5	21.9
09:34:00	0.2	2.4	-0.0	-1.4	-0.2	-2.1	0.1	2.4	1.1	11.0	21.9
09:35:00	0.2	1.7	-0.0	-1.4	45.0	450.2	0.0	1.7	1.3	13.1	21.9
09:36:00	0.1	1.4	17.4	870.0	0.2	2.1	18.0	719.0	1.7	17.2	21.9
09:37:00	0.2	2.4	17.6	878.0	-0.2	-1.7	18.1	722.0	0.6	5.8	21.9
09:38:00	0.5	5.2	17.6	881.0	-0.2	-1.7	18.0	721.0	0.9	9.3	21.9
09:39:00	28.7	287.2	0.2	9.6	-0.2	-2.4	0.3	10.7	0.8	7.9	21.9
09:40:00	40.5	405.5	0.1	4.8	-0.3	-2.8	0.1	4.1	1.6	16.2	21.9
09:41:00	42.2	422.3	0.1	3.4	-0.1	-0.7	0.1	2.4	1.3	13.1	21.9
09:42:00	43.1	430.9	0.1	2.8	0.0	0.0	0.1	2.1	1.3	12.7	21.9
09:43:00	43.4	434.4	0.0	2.1	-0.1	-0.7	0.0	1.4	1.4	14.4	21.9
09:44:00	21.5	214.9	0.1	3.4	-0.0	-0.3	0.2	6.5	1.4	14.1	21.9
09:45:00	3.1	31.3	0.0	2.1	-0.1	-0.7	0.1	2.1	31.0	310.2	21.9

PRELIMINARY CALIBRATION SUPER COOKER OUTLET 7-22-98

TIME	SO2 (PPM)	SO2 (MV)	CO2 (%)	CO2 (MV)	NOX (PPM)	NOX (MV)	O2 (%)	O2 (MV)	SPARE (PPM)	SPARE (MV)	TEMP (C)
09:46:00	2.1	21.3	0.0	2.1	-0.2	-1.7	0.1	3.4	31.5	314.7	21.9
09:47:00	1.7	16.9	0.0	1.4	-0.2	-1.7	0.1	2.4	29.7	296.8	21.9
09:48:00	1.4	14.1	0.0	1.4	0.0	0.0	0.0	1.7	1.2	11.7	21.9
09:49:00	1.3	13.4	0.0	1.4	-0.0	-0.3	0.1	2.8	1.3	13.4	21.9
09:50:00	36.8	368.0	0.0	1.0	-0.2	-2.1	0.1	2.8	1.7	16.5	21.9
09:51:00	42.9	428.5	0.0	1.4	-0.2	-1.7	0.1	2.8	1.9	18.9	21.9
09:52:00	6.5	64.7	0.0	1.4	-0.0	-0.3	0.0	1.4	1.4	14.1	21.9
09:53:00	2.1	20.6	0.0	1.4	-0.2	-1.7	0.1	3.1	1.5	15.5	21.9
09:54:00	38.3	382.5	0.0	1.4	-0.2	-2.1	0.1	2.8	1.7	16.9	21.9
09:55:00	43.0	430.2	0.0	1.4	-0.3	-2.8	0.1	3.1	1.9	18.6	21.9
09:56:00	6.0	60.2	0.0	1.0	-0.2	-1.7	0.0	1.7	1.5	14.8	21.9
09:57:00	1.9	18.6	0.0	1.0	-0.1	-1.4	0.0	1.4	1.3	12.7	21.9
09:58:00	37.5	375.5	0.0	1.0	-0.1	-1.4	0.1	2.4	1.6	15.8	21.9
09:59:00	43.1	430.6	0.0	1.0	-0.3	-3.1	0.1	2.8	1.8	18.2	21.9
10:00:00	6.3	62.6	0.0	1.4	-0.3	-3.1	0.1	3.1	1.6	16.2	21.9
10:01:00	1.8	17.5	0.0	1.4	-0.3	-3.4	0.1	3.4	1.5	14.8	21.9
10:02:00	1.2	12.0	0.0	1.4	-0.3	-3.1	0.1	2.1	1.2	11.7	21.9
10:03:00	0.9	8.9	0.0	1.4	-0.3	-2.8	0.0	1.7	1.1	11.0	21.9

RT

RT: Response Times Seconds

SO2	1	2	3	High
UP	86.0	82.0	80.0	86.0
DOWN	85.0	83.0	83.0	

For [illegible]nical Information Call
1-800-752-1597

PRODUCTS

Air Products and Chemicals, Inc. * 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIEICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCT AND CHEMICALS INC
12721 S WENTWORTH AVE
CHICAGO IL 60628

Order No: CSS-812908-01
Batch No: 861-42976
PO:
Release:

Cylinder No: SG9163644BAL
Bar Code No: DRG040
Cylinder Pressure*: 2000 psig
Certification Date: 11/10/97
Expiration Date: 11/10/00

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
CARBON DIOXIDE	9.90±.053 %	SG9168488BAL	GMIS	19.37 %	Horiba VIA-510	51135063	11/03/97	NON DISPERSIVE INFRARED
OXYGEN	10.2±.09 %	SG9113445BAL	GMIS	22.64 %	Shimadzu GC-8A	32029	11/03/97	GC-TCD
NITROGEN	Balance Gas							

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: James Laas
(16921)

Approved By: Richard Fry ICB
Richard Fry

Pub. No. 320-9702

For Technical Information Call
1-800-752-1597

PRODUCTS

Air Products and Chemicals, Inc. * 23320 S. Alameda Street, Long Beach, CA 90810

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G2)

Customer:
AIR PRODUCTS AND CHEMICALS
901 WEST 12TH STREET
LONG BEACH CA 90813-

Order No: SRP-765008-07
Batch No: 863-29604
PO:
Release:

Cylinder No: SG9128628BAL
Bar Code No: DMK314
Cylinder Pressure*: 2000 psig
Certification Date: 08/27/97
Expiration Date: 08/27/99

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
NITRIC OXIDE	46.0 ±0.23 PPM	SG9136106BAL	GMIS	57.69 PPM	TECO Model 42	53428296	08/08/97	CHEMILUMINESCENCE

NO2 (Reference Value Only): .500 PPM

NITROGEN Balance Gas

Contaminant

Nitrogen Dioxide .500 PPM

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: KOOK JEON

(16921)

Approved By: M KHOUBESSERIAN

Pub. No. 320-9703

For [illegible]nical Information Call
1-800-752-1597

PRODUCTS

Air Products and Chemicals, Inc. * 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCT AND CHEMICALS INC
12721 S WENTWORTH AVE
CHICAGO IL 60628

Order No: CSS-812907-01
Batch No: 861-42978
PO:
Release:

Cylinder No: SG9163638BAL
Bar Code No: DRG052
Cylinder Pressure*: 2000 psig
Certification Date: 11/08/97
Expiration Date: 11/08/00

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
CARBON DIOXIDE	17.7±.06 %	SG9168488BAL	GMIS	19.37 %	Horiba VIA-510	51135063	11/03/97	NON DISPERSIVE INFRARED
OXYGEN	18.0±.09 %	SG9113445BAL	GMIS	22.64 %	Shimadzu GC-8A	32029	11/03/97	GC-TCD
NITROGEN	Balance Gas							

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: James Laas/RJD
James Laas
(16921)

Approved By: Richard Fry ICB
Richard Fry

Pub. No. 320-9702

RS-13

SPECTRA GASES
277 Colt St. • Irvington, NJ 07111 USA Tel.: (201) 372-2060 • (800) 932-0624 • Fax: (201) 372-8551
Shipped From: 80 Industrial Drive • Alpha, N.J. 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Instrument Solutions
SGI ORDER # : 126377
ITEM# : 13
P.O.# : 97002

CYLINDER # : CC79908
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 350

CERTIFICATION DATE: 8/1/97
EXPIRATION DATE: 8/1/2000

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	7/25/97 8/1/97	86.94 ppm 86.87 ppm	86.9 ppm	+/- 1%

BALANCE Nitrogen

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	SRM-1678c	CLM009368	49.94 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba-VIA-510	570423011	NDIR	7/24/97

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: _____ **DATE:** 8/1/97
TED NEEME

RS-35

SPECTRA GASES
277 Coit St. • Irvington, NJ 07111 USA Tel.: (201) 372-2060 • (800) 932-0624 • Fax: (201) 372-8551
Shipped From: 80 Industrial Drive • Alpha, N.J. 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Stock
SGI ORDER # : 950457
ITEM# : 18
P.O.# : Verbal

CYLINDER # : CC55747
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 660

CERTIFICATION DATE: 7/25/97
EXPIRATION DATE: 7/25/99

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Sulfur Dioxide	7/18/97 7/25/97	88.70 ppm 88.72 ppm	88.7 ppm	+/- 1%

BALANCE Nitrogen

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Sulfur Dioxide	NTRM-R81694	CC53331	96.0 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Sulfur Dioxide	Horiba-VIA-510	851221093	NDIR	7/7/97

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: _____
TED NEEME

DATE: 7/25/97

RS-67

SPECTRA GASES
277 Colt St. • Irvington, NJ 07111 USA Tel.: (973) 372-2060 • (800) 932-0624 • Fax: (973) 372-8551
Shipped From: 80 Industrial Drive • Alpha, N.J. 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER:	Stock	**CYLINDER # :**	CC84962
SGI ORDER # :	950528	**CYLINDER PRES:**	2000
ITEM# :	5	**CGA OUTLET:**	660
P.O.# :	2.0006	**STOCK # :**	RS-67

CERTIFICATION DATE: 12/3/97
EXPIRATION DATE: 12/3/99

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Nitric Oxide	11/11/97 12/3/97	84.46 ppm 84.20 ppm	84.3 ppm	+/- 1%
NOx			84.3 ppm	Reference Value Only

BALANCE Nitrogen

REFERENCE STANDARDS

COMPONENT	BRM/NTRM#	CYLINDER#	CONCENTRATION
Nitric Oxide	SRM-1684b	CLM008435	98.8 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Nitric Oxide	Teco 10	10AR-34979-249	Chemi	11/3/97

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: Fred Pikula
FRED PIKULA

DATE: 12/3/97

RS-86

SPECTRA GASES
277 Colt St. • Irvington, NJ 07111 USA Tel.: (973) 372-2060 • (800) 932-0624 • Fax: (973) 372-8551
Shipped From: 80 Industrial Drive • Alpha, NJ. 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER:	Stock	**CYLINDER # :**	CC83928
SGI ORDER # :	950618	**CYLINDER PRES:**	2000 PSIG
ITEM# :	1	**CGA OUTLET:**	350
P.O.# :	VERBAL	**STOCK # :**	RS-86

CERTIFICATION DATE: 1/7/98
EXPIRATION DATE: 1/7/2001

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	12/31/97 1/7/98	30.28 ppm 30.22 ppm	30.3 ppm	+/- 1%

BALANCE Nitrogen

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	SRM-1679c	CAL011878	97.6 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	1/7/98

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: Fred Pikula
FRED PIKULA

DATE: 1/7/98

RS-34

SPECTRA GASES
277 Coit St. • Irvington, NJ 07111 USA Tel.: (201) 372-2060 • (800) 932-0624 • Fax: (201) 372-8551
Shipped From: 80 Industrial Drive • Alpha, N.J. 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE
PROCEDURE # : G1

CUSTOMER: Rental Solutions
SGI ORDER # : 127781
ITEM# : 3
P.O.# : 97012

CYLINDER # : CC79879
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 660

CERTIFICATION DATE: 9/15/97
EXPIRATION DATE: 9/15/99

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Sulfur Dioxide	9/6/97 9/15/97	45.04 ppm 45.10 ppm	45.1 ppm	+/- 1%

BALANCE Nitrogen

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Sulfur Dioxide	NTRM-R81694	CC53331	96.0 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Sulfur Dioxide	Horiba-VIA-510	851221093	NDIR	8/29/97

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: L Gameson
LYN GAMESON

DATE: 9/15/97

ROTOMETER CALIBRATION SHEET

Date: 4/28/97
Initials: DW
Part #: RIG #1

Rotometer Scale: 0-120 ccm
Rotometer Use: RM25 SAMPLE RIG
Calibrated Against: BIOS DC-1

Setting on Rotometer (cc/min)	Volume (mL)	Time (sec)	Actual Sampling Rate (cc/min)
40			38.66
60			61.12
80			80.39
100			98.52

TRC Environmental Corporation

SHEET NO. _____ OF _____

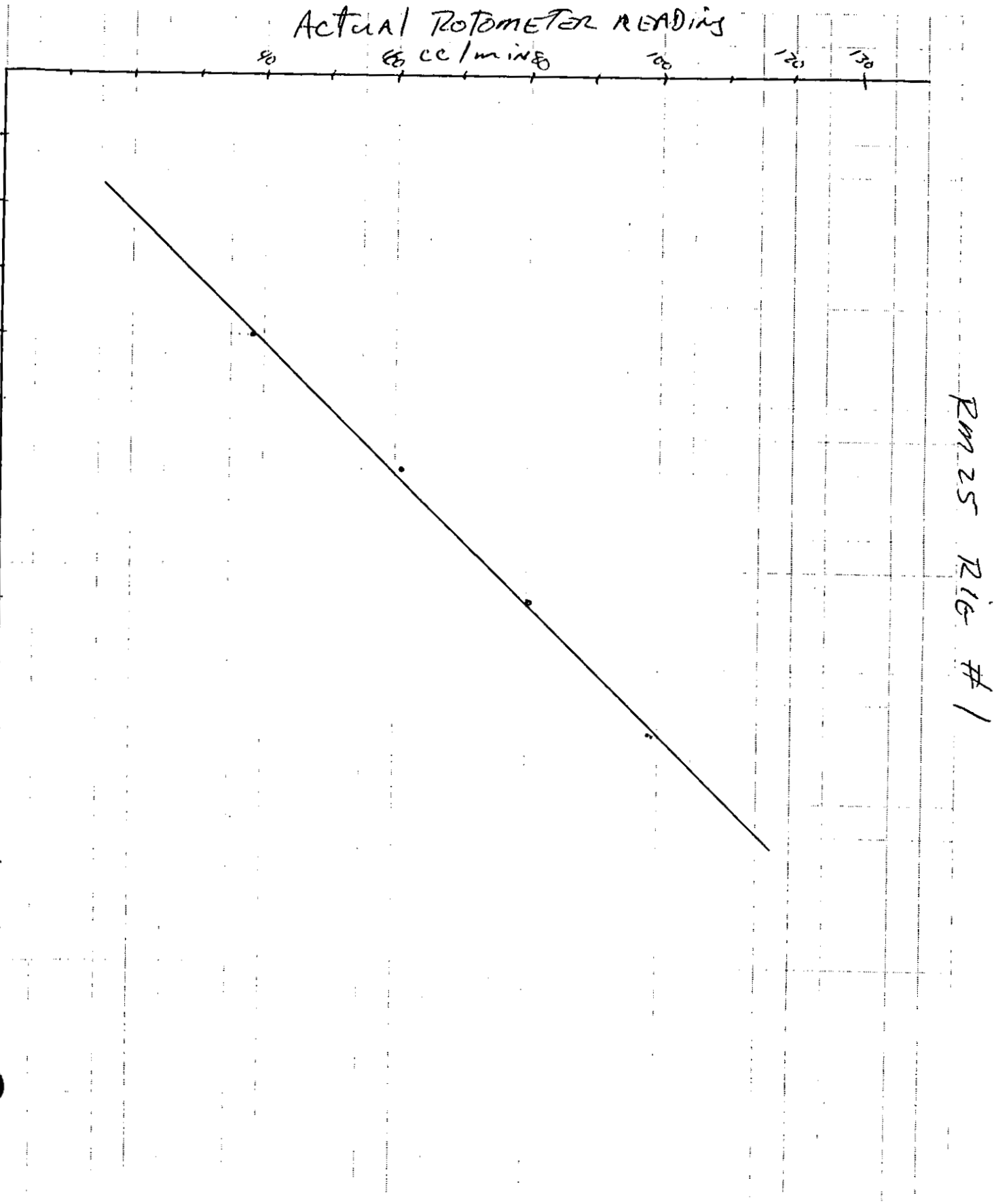
PROJECT NO. _____

DATE _____

BY _____

CHK'D _____

SUBJECT _____



RM25 Rig #1

TRC Environmental Corporation

SHEET NO. _____ OF _____

PROJECT NO. _____

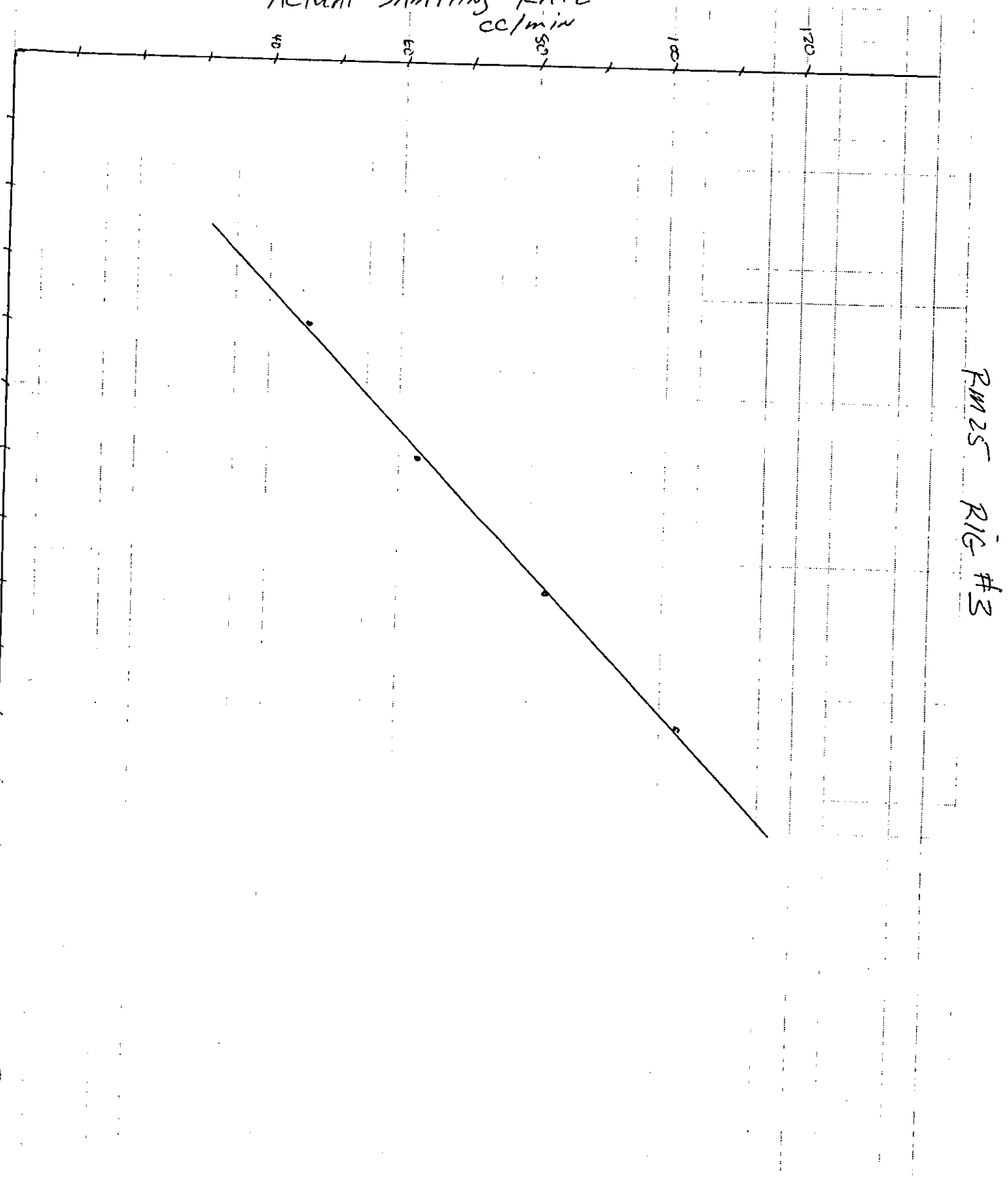
DATE _____

BY _____

CHK'D _____

SUBJECT _____

ACTUAL SAMPLING RATE
cc/min



RM25 RIG #3

ROTOMETER CALIBRATION SHEET

Date: 4/28/97
Initials: DW
Part #: RIG #3

Rotometer Scale: 0-120 ccm
Rotometer Use: RM25 SAMPLE RIG
Calibrated Against: BIOS DC-1

Setting on Rotometer (cc/min)	Volume (mL)	Time (sec)	Actual Sampling Rate (cc/min)
40			46.27
60			63.03
80			82.97
100			102.40

TRC Environmental Corporation

SHEET NO. _____ OF _____

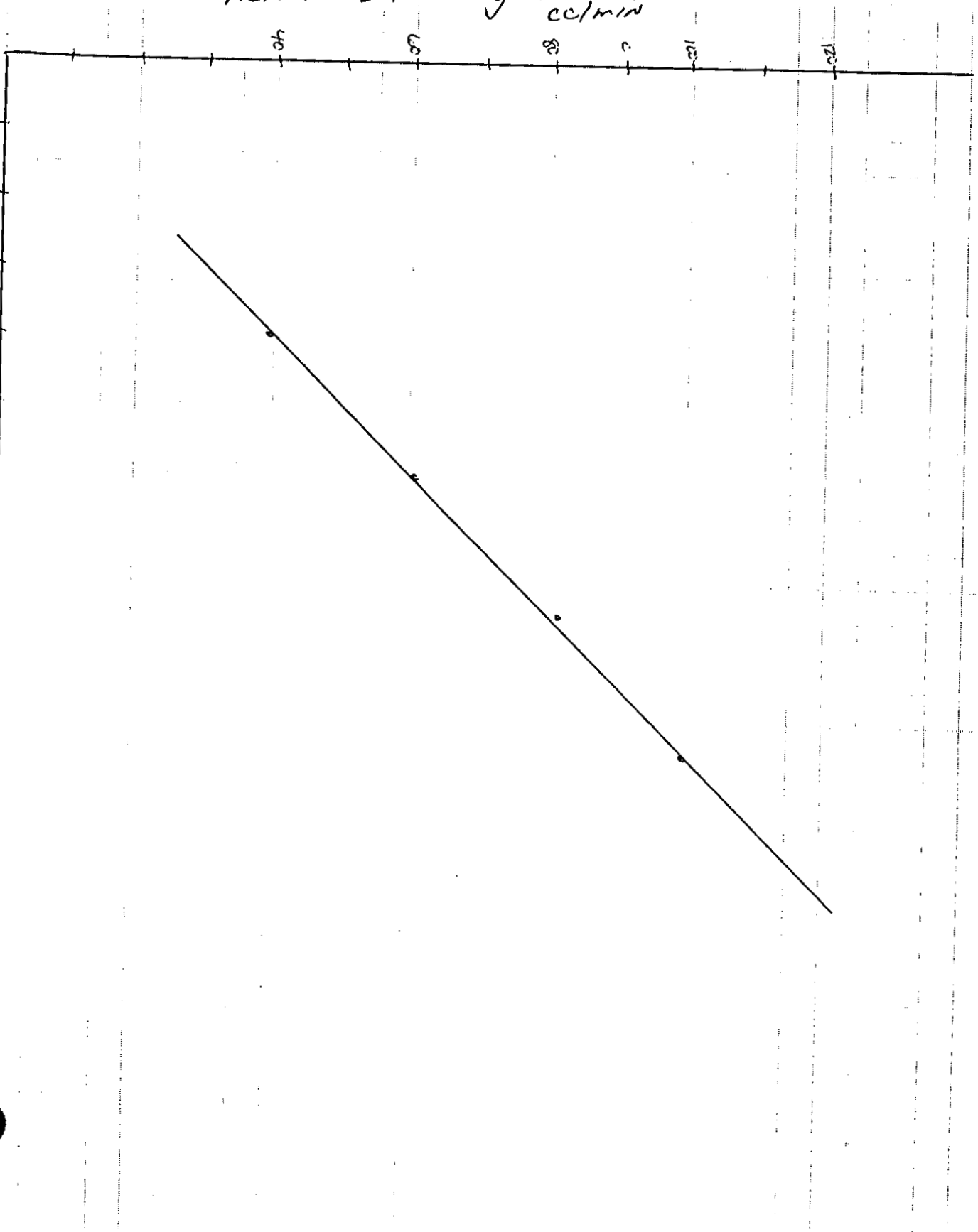
PROJECT NO. _____

DATE _____

BY _____

CHK'D _____

SUBJECT ACTUAL SAMPLING RATE cc/min



RM25 RIG #2

ROTOMETER CALIBRATION SHEET

Date: 4/28/97
Initials: DW
Part #: RIG #2

Rotometer Scale: 0-120 ccm
Rotometer Use: RM25 SAMPLE RIG
Calibrated Against: BIOS DC-1

Setting on Rotometer (cc/min)	Volume (mL)	Time (sec)	Actual Sampling Rate (cc/min)
40			39.95
60			61.10
80			82.31
100			100.3

PRETEST DRY GAS METER CALIBRATION DATA FORM (ENGLISH UNITS)

METER BOX NUMBER 4

DRY GAS METER NUMBER 6830271

DATE 02/03/98

REFERENCE TEST METER NUMBER 27865

DELTA-H		0.5	1	1.5	2	2.5	3	3.5	4
Vwr	645.408	650.622	659.152	665.909	672.909	679.075	692.381	698.531	704.385
Vdr	606.264	611.703	620.407	627.394	634.655	641.039	654.846	661.226	667.303
Tw		72	72	71	71	70	70	70	70
Tdi		77.5	81.5	83.5	85	87	89.5	91	93.5
Tdo		76	77.5	78	78.5	79.5	80.5	81.5	83.5
Td(AVE)		76.8	79.5	80.8	81.8	83.3	85.0	86.3	88.5
THETA		13.0	15.0	10.0	9.0	7.0	14.0	6.0	5.4
VAC.		1	1	1	1	1	1	1	1
Yi		0.9660	0.9914	0.9812	0.9787	0.9839	0.9837	0.9849	0.9871
DELTA-H@i		1.7552	1.7373	1.8346	1.8428	1.7842	1.8332	1.8346	1.8323
Vw		5.214	8.53	6.757	7	6.166	13.306	6.15	5.854
Vd		5.439	8.704	6.987	7.261	6.384	13.807	6.38	6.077
Vd/Min.		0.4184	0.5803	0.6987	0.8068	0.9120	0.9862	1.0633	1.1359

Y(AVE)	0.9821
DELTA-H@(AVE)	1.8068
Pbar	29.6

CALIBRATED BY DW

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.

Thermocouple Calibration Form

Meter Box #4

Thermocouple Number	Temperature Reading #1	Reference Temp #1	Temperature Reading #2	Reference Temp #2	Temperature Reading #3	Reference Temp #3
1 Stack	71	70	198	199	288	287
2 Probe	71	71	198	199	289	287
3 Filter	72	72	198	199	289	287
4 Impingers	71	72	198	199	288	287
5 Spare	71	72	198	199	288	287
6 DGM In	41	40	70	70	107	108
7 DGM Out	40	40	68	68	113	113

Calibrated By: SRM
Date: 4-29-96

Criteria: Impinger temperature must be with 2 °F of reference temperature
Criteria: DGM temperature must be with ±5.4 °F of reference temperature
Criteria: Stack temperature must be with 1.5% of reference temperature

PRETEST DRY GAS METER CALIBRATION DATA FORM (ENGLISH UNITS)				
METER BOX NUMBER		4		
DRY GAS METER NUMBER			6830271	
DATE			08/24/98	
REFERENCE TEST METER NUMBER				27865
DELTA-H	1.75	1.75	1.75	1.75
Vwr	848.641	853.641	858.641	863.641
Vdr	865.600	870.715	875.689	880.805
Tw		76.0	77.0	77.0
Tdi		68.0	73.0	76.0
Tdo		63.0	66.0	68.0
Td(AVE)		65.5	65.0	72.0
THETA		6.7	6.7	6.7
VAC.		8.0	8.0	8.0
Yi		0.9542	0.9785	0.9640
DELTA-H@i		1.8511	1.8597	1.8353
Vw		5	5	5
Vd		5.115	4.974	5.116
Vd/Min.		0.7634	0.7424	0.7636

Y(AVE)	0.9656
DELTA-H@(AVE)	1.8487
Pbar	29.42

CALIBRATED BY tl

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.

Nozzel Calibration Form

Nozzel Set No. 3-4 Date: 05/08/98 Tech: DW

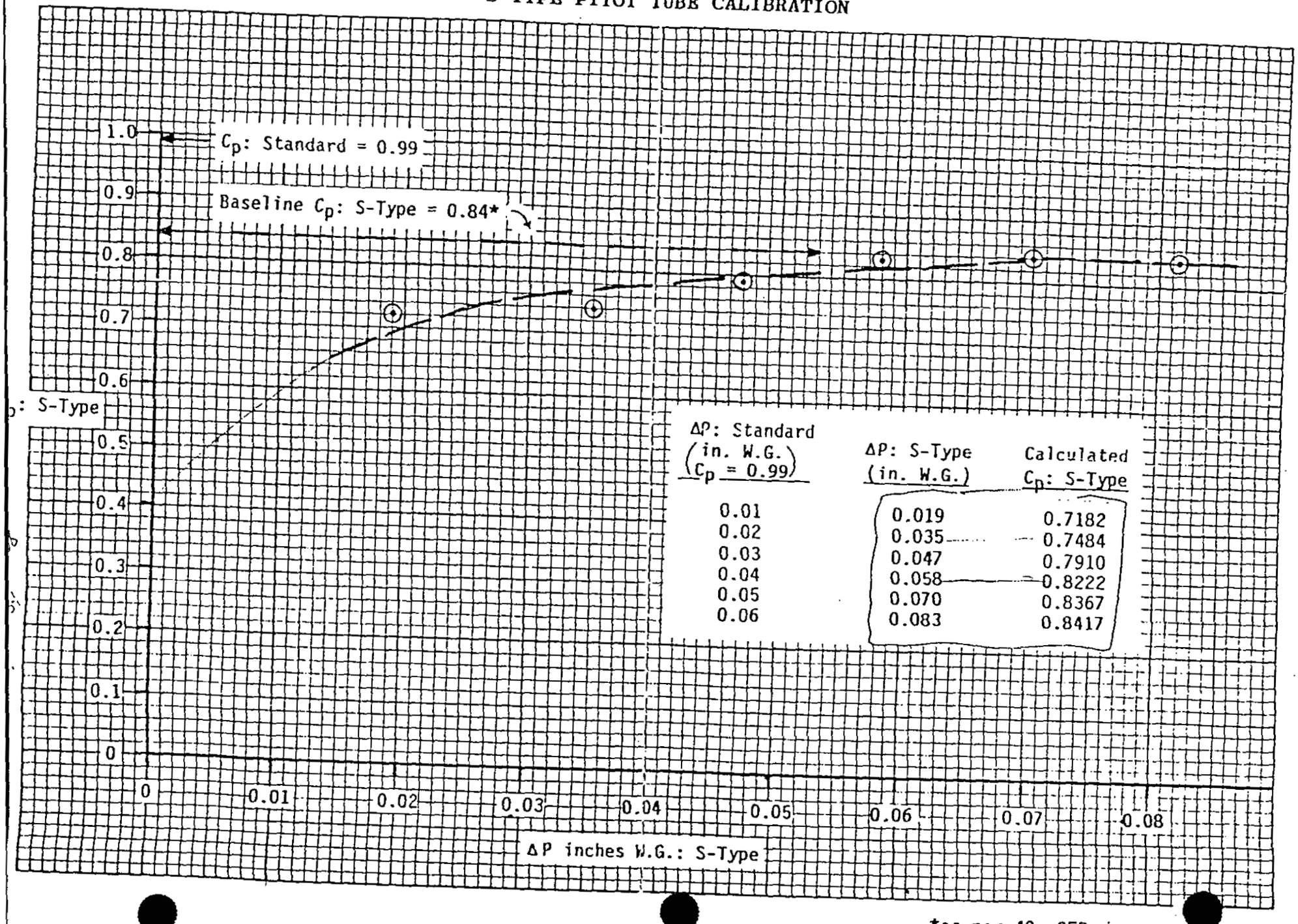
Nozzel No.	Diameter	a	b	c	average
1 - 4- 1	1 / 4	0.245	0.245	0.243	0.244

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
10/21/97	29.46	29.45	-.01
11/6/97	29.35	29.33	-.02
12/22/97	29.16	29.18	+.02
1/22/98	29.30	29.31	+.01
2/24/98	29.25	29.23	+.02
3/10/98	29.73	29.73	0.00

S-TYPE PITOT TUBE CALIBRATION



ΔP: Standard (in. W.G.) C_p = 0.99	ΔP: S-Type (in. W.G.)	Calculated C_p: S-Type
0.01	0.019	0.7182
0.02	0.035	0.7484
0.03	0.047	0.7910
0.04	0.058	0.8222
0.05	0.070	0.8367
0.06	0.083	0.8417

*as per 40: CFR

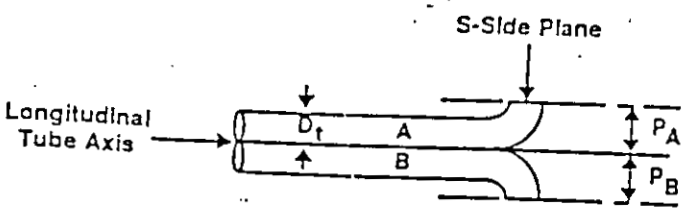
Type S Pitot Inspection Form

Pitot Tube No. 403

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)



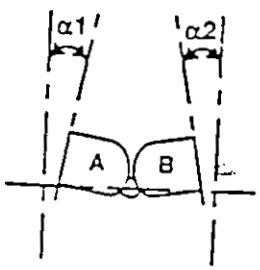
Note:

$1.05\ D_t < P < 1.50\ D_t$

$P_A = P_B$

P_A = 7/8 in.

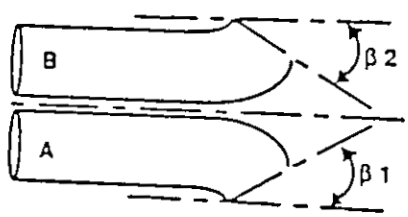
P_B = 7/8 in.



α 1 = 1 °

α 2 = 2 °

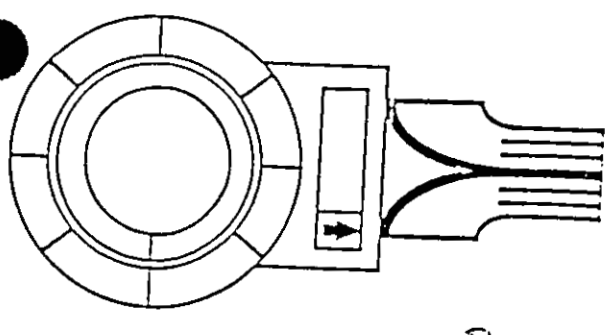
(< 10°)

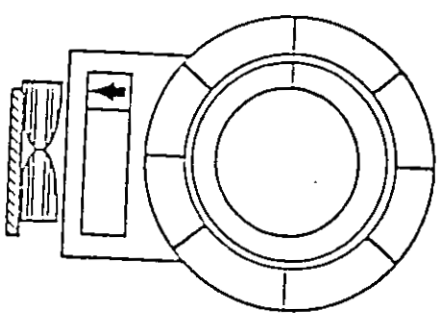


β 1 = 1 °

β 2 = 0 °

(< 5°)





Level Position to find γ = 0

Z = A' sin γ _____ In. (< 1/8 In.)

Level Position to find θ = 1

W = A' sin θ _____ In. (< 1/32 In.)

Comments: _____

Checked by: BW

Date: 4/12/98

Calibration Required? NO

D_t = External Tube Diameter

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

TDF