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Texasgulf Inc.

an elf aquitaine company

P.O. Box 48
Aurora, North Carolina 27806

W.A. Schimming
Manager
Environmental Affairs
(919) 322-8239

September 21, 1992

Mr. Jim Mulligan
Regional Supervisor
Division of Environmental Management
N. C. Department of EHNR
P. O. Box 1507
Washington, North Carolina 27889

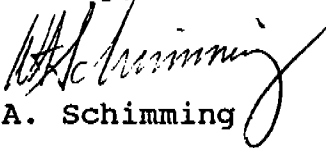
Re: Texasgulf Inc.
Permit No. 2331R10
Calciner No. 3

Dear Jim:

As per the requirements of Air Quality Permit No. 2331R10, Special Conditions and Limitations No. 7, the Calciner Plant No. 3 has been compliance tested for particulate emissions on August 27, 1992. A copy of the compliance test results are attached for your review.

If I may provide you any additional information on this subject, please let me know.

Sincerely,


W. A. Schimming

WAS:BAP/re

Enclosure

pc: Mike Aldridge - DEM, Raleigh (w/encl)
H. M. Breza (w/encl)
J. M. Waters (w/encl)
J. C. Carrere (w/encl)
B. A. Peacock (w/o encl)
00-12-000 (w/o encl)
15-09-020 (w/encl)

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SOURCE PERFORMANCE TEST

CALCINER NO. 3

TEXASGULF INC.

PHOSPHATE OPERATIONS

AURORA, NC

AUGUST 27, 1992

PREPARED BY:

**JOHN C. CARRERE, JR.
ENV. DATA COORDINATOR**

REVIEWED BY:

**JIMMY A. HARDY
SR. ENV. TECHNICIAN**

REVIEWED BY:

**MIKE L. ASBY
ENV. LAB SUPERVISOR**

REVIEWED BY:

**BRAD A. PEACOCK
SR. ENV. ENGINEER**

File: EC-15-09-020

TEXASGULF INC. PHOSPHATE OPERATIONS

Summary

On August 27, 1992 sampling and analyses were conducted to determine the particulate emission rate at Texasgulf's Calciner No. 3 using Method 5 w/Backhalf Analysis. The result of this series of runs showed the average particulate emission rate to be 35.12 pound per hour. The average dry feed rate during the testing was 87.5 tons/hour. The average allowable particulate emission rate at this feedrate is 50.12 pounds of particulate/hour. A total of 3 stack samples were taken.

Performing the stack sampling were Senior Environmental Technicians Jack Taylor and Phillip Forest. Senior Environmental Technician Brad Lee performed the work down.

Mr. Vic Copelan of the North Carolina Division of Environmental Management was present during as an official observer.

TEXASGULF INC. PHOSPHATE OPERATIONS

Test Summary - Calciner No. 3

Method 5 W/Backhalf	08/27/92	08/27/92	08/27/92
	Run 1	Run 2	Run 3
Stack Volumetric Flow Rate, TSCFM	68,504	68,724	67,226
Sample Volume, DSCF	36.448	35.163	36.012
Lbs. of Particulate/Hr. Total	42.46	34.25	28.66
Lbs. of Particulate/Hr. Front	15.66	16.57	17.85
Lbs. of Particulate/Hr. Back	26.80	17.68	10.80
Percent Isokinetic	100.59	97.92	97.30
Average Lbs of Particulate/Hr.(Total)			35.12
Allowable Lbs/Hr.			50.12
Dry Feed Rate TPH	87.5	87.5	87.5
Average Dry Feed Rate TPH			87.5

TEXASGULF INC. PHOSPHATE OPERATIONS

Calcliner No. 3

Stack Data Summary Method 5 w/Backhalf

Date	Time	Run #	Velocity	Volumetric Flow	Average Stac
			FPS	TSCF/Min	Temp (oF)
08/27	10:12	1	47.194	68,504	162
08/27	12:17	2	47.380	68,724	162
08/27	14:12	3	46.410	67,226	163

Texasgulf_{Inc.} memo

an elf aquitaine company

Date: 09/01/92
To: Mill Superintendent
From: Environmental Affairs
Subject: EPA Method 5 w/Backhalf Isokinetic Sample
Calciner #3 Run 1

Sample Date

Time

08/27/92

10:12

Dry Feed Rate, TPH

Stack Volumetric Flow Rate
TSTD Ft³/Min

88

68,504

Lbs. Particulate/Hr.

Lbs. Particulate/Ton of Product

Total 42.46
Front Half 15.66
Back Half 26.80

Total 11.6454
Front Half 4.2948
Back Half 7.3507

Supervisor, Environmental Laboratory

File: ec-15-09-020

The Allowable Emission Rate for Particulate Matter at this Process Rate is
50.12 Lbs.Particulate/Hour.

This stack sample was taken isokinetically. The %I = 100.59

TEXASGULF INC. PHOSPHATE OPERATIONS

Method 5 w/Backhalf
Run 1
Calciner #3

Report Date 09/01/92
Sample Date 08/27/92
Sample Time 10:12

Barometric Pressure	30.19	Initial Dry Gas Mtr	321.000
Stack Static Pressure	-0.76	Final Dry Gas Mtr	360.044
Stack Diameter	72	Dry Gas Factor	0.9905
Nozzle Diameter	0.2416	Dry Mole Wt Stk Gas	29.508
Pitot Tube Corr	0.84	Stack Pressure	30.13
Sampling Time in Min.	72	Feed Rate, TPH	97
		Bulk Moisture (Lab Analysis)	9.78
		Feed Rate Dry TPH	87.51
Lbs Coal/Ton of Dry Feed	34.9	Coal Feed TPH	1.53
		Process Weight	89.04

	Stk oF	Delta P	Delta H	oF In	oF Out
Pt 1	146	0.59	0.98	103	95
Pt 2	162	0.99	1.64	104	95
Pt 3	164	1.09	1.81	104	96
Pt 4	163	0.92	1.53	106	96
Pt 5	163	0.90	1.49	110	96
Pt 6	163	0.71	1.18	112	97
Pt 7	164	0.40	0.66	112	98
Pt 8	163	0.28	0.46	113	98
Pt 9	163	0.22	0.37	114	100
Pt 10	163	0.29	0.48	115	99
Pt 11	162	0.35	0.58	115	100
Pt 12	161	0.39	0.65	116	100
Pt 13	150	0.18	0.30	102	98
Pt 14	160	0.32	0.53	108	98
Pt 15	162	0.44	0.73	111	98
Pt 16	163	0.52	0.86	114	99
Pt 17	163	0.70	1.16	115	98
Pt 18	164	0.62	1.03	114	99
Pt 19	164	0.35	0.58	115	100
Pt 20	163	0.41	0.68	117	100
Pt 21	163	0.55	0.91	119	101
Pt 22	163	0.79	1.31	119	102
Pt 23	163	0.71	1.18	119	102
Pt 24	161	0.80	1.33	120	103
Averages	162	0.56	0.94	112	99

Stack oR	622	Average Meter Temp oR	566
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Gas Volume Collected	39.044	
Corrected Gas Volume	38.673	38.601 *
Gas Volume STP	36.448	

* Gas volume corrected due to 0.021 cfm leak rate.

08/27/92

Run 1

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	664.58
Final	375	169	156	677.11

Totals mls of water collected	400
Increase in grams of silica gel	12.53
Total Gas Volume	55.867
Bws	0.3476
One - Bws	0.6524
Wet Molecular Weight of Stack Gas	25.51

Stack Pressure	30.134
Stack Velocity FPS	47.194
Stack Volumetric Flow Rate TSTD Ft3/Min	68504

Particulate Calculations

Inorganic	
Large Tare, grams	337.7812
Large Final, grams	337.7809
Mr =	-0.00030
Sum Water + MeCl2, Mb (or 5% of mass)	0
Vic =	700
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	-0.3
Organic	
Small Tare,grams	147.7345
Small Final,grams	147.9001
Mo, mg =	165.55
CPM mg/DSCF =	4.5338
CPM mg/TSCF =	2.9579
CPM mg	165.2500
5% of mass of CPM	8.2625
Front Half	
Final Beaker Weight	168.7105
Tare Beaker Weight	168.6891
Final Filter Weight	0.6303
Tare Weight of Filter	0.5551
Net Sample Weight	0.09655
Mg Particulate/DSCF	2.6490
Mg Particulate/TSCF	1.7282

Total Particulates	Total	Front Half	Back Half
Lbs Particulate/Day	1019.13	375.85	643.28
Lbs Particulate/Hr	42.46	15.66	26.80
Lbs Particulate/Ton of Product	11.6454	4.2948	7.3507
Isokinetic Sampling Rate	100.59		
Allowable Part. Emission Rate, Lbs/Hr.	50.12		

Texasgulf^{Inc.} memo

an elf aquitaine company

Date: 09/01/92

To: Mill Superintendent

From: Environmental Affairs

Subject: EPA Method 5 w/Backhalf Isokinetic Sample
Calciner #3 Run 2

Sample Date

Time

08/27/92

12:17

Dry Feed Rate, TPH

Stack Volumetric Flow Rate
TSTD Ft³/Min

88

68,724

Lbs. Particulate/Hr.

Lbs. Particulate/Ton of Product

Total	34.25
Front Half	16.57
Back Half	17.68

Total	9.3937
Front Half	4.5443
Back Half	4.8493

Supervisor, Environmental Laboratory

File: ec-15-09-020

The Allowable Emission Rate for Particulate Matter at this Process Rate is
50.12 Lbs.Particulate/Hour.

This stack sample was taken isokinetically. The %I =

97.92

TEXASGULF INC. PHOSPHATE OPERATIONS

Method 5 w/Backhalf
Run 2
Calciner #3

Report Date 09/01/92
Sample Date 08/27/92
Sample Time 12:17

Barometric Pressure	30.19	Initial Dry Gas Mtr	363.100
Stack Static Pressure	-0.76	Final Dry Gas Mtr	401.878
Stack Diameter	72	Dry Gas Factor	0.9905
Nozzle Diameter	0.2375	Dry Mole Wt Stk Gas	29.508
Pitot Tube Corr	0.84	Stack Pressure	30.13
Sampling Time in Min.	72	Feed Rate, TPH	97
		Bulk Moisture (Lab Analysis)	9.78
		Feed Rate Dry TPH	87.51
Lbs Coal/Ton of Dry Feed	34.9	Coal Feed TPH	1.53
		Process Weight	89.04

	Pt	Stk oF	Delta P	Delta H	oF In	oF Out
	1	148	0.60	0.94	100	95
	2	161	1.00	1.56	106	95
	3	163	1.11	1.73	105	96
	4	164	0.99	1.54	107	97
	5	164	0.90	1.40	111	97
	6	163	0.75	1.17	114	98
	7	164	0.38	0.59	116	99
	8	163	0.26	0.41	116	100
	9	163	0.23	0.36	116	101
	10	163	0.29	0.45	117	102
	11	162	0.32	0.50	118	102
	12	161	0.34	0.53	119	103
	13	149	0.21	0.33	105	101
	14	162	0.33	0.51	110	101
	15	165	0.49	0.76	114	101
	16	163	0.51	0.80	117	102
	17	164	0.62	0.97	119	102
	18	164	0.68	1.06	120	103
	19	165	0.32	0.50	120	104
	20	163	0.40	0.62	122	104
	21	163	0.61	0.95	124	105
	22	164	0.72	1.12	124	105
	23	163	0.82	1.28	124	106
	24	163	0.88	1.37	124	106

Averages	162	0.57	0.89	115	101
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Stack oR	622	Average Meter Temp oR	568
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Gas Volume Collected	37.778
Corrected Gas Volume	37.419
Gas Volume STP	35.163

Page 2
 Calciner #3
 Run 2

08/27/92

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	628.94
Final	413	144	106	638.96

Totals mls of water collected	363
Increase in grams of silica gel	10.02
Total Gas Volume	52.722
Bws	0.3330
One - Bws	0.6670
Wet Molecular Weight of Stack Gas	25.68

Stack Pressure	30.134
Stack Velocity FPS	47.380
Stack Volumetric Flow Rate TSTD Ft ³ /Min	68724

Particulate Calculations

Inorganic

Large Tare, grams	302.9523
Large Final, grams	302.9565
Mr =	0.00420
Sum Water + MeCl ₂ , Mb (or 5% of mass)	0
Vic =	663
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	4.2

Organic

Small Tare,grams	164.7772
Small Final,grams	164.8756
Mo, mg =	98.35
CPM mg/DSCF =	2.9164
CPM mg/TSCF =	1.9451
CPM mg	102.5500
5% of mass of CPM	5.1275
Front Half	
Final Beaker Weight	166.9836
Tare Beaker Weight	166.9603
Final Filter Weight	0.6135
Tare Weight of Filter	0.5407
Net Sample Weight	0.0961
Mg Particulate/DSCF	2.7330
Mg Particulate/TSCF	1.8228

	Total	Front Half	Back Half
Total Particulates			
Lbs Particulate/Day	822.07	397.69	424.38
Lbs Particulate/Hr	34.25	16.57	17.68
Lbs Particulate/Ton of Product	9.3937	4.5443	4.8493

Isokinetic Sampling Rate	97.92
Allowable Part. Emission Rate, Lbs/Hr.	50.12

Texasgulf^{Inc.} memo

an elf aquitaine company

Date: 09/01/92
To: Mill Superintendent
From: Environmental Affairs
Subject: EPA Method 5 w/Backhalf Isokinetic Sample
Calciner #3 Run 3

Sample Date

Time

08/27/92

14:12

Dry Feed Rate, TPH

Stack Volumetric Flow Rate
TSTD Ft³/Min

88

67,226

Lbs. Particulate/Hr.

Lbs. Particulate/Ton of Product

Total 28.66
Front Half 17.85
Back Half 10.80

Total 7.8586
Front Half 4.8963
Back Half 2.9624

Supervisor, Environmental Laboratory

File: ec-15-09-020

The Allowable Emission Rate for Particulate Matter at this Process Rate is
50.12 Lbs.Particulate/Hour.

This stack sample was taken isokinetically. The %I =

97.30

TEXASGULF INC. PHOSPHATE OPERATIONS

Method 5 w/Backhalf
Run 3
Calciner #3

Report Date 09/01/92
Sample Date 08/27/92
Sample Time 14:12

Barometric Pressure	30.19	Initial Dry Gas Mtr	402.700
Stack Static Pressure	-0.76	Final Dry Gas Mtr	441.609
Stack Diameter	72	Dry Gas Factor	0.9905
Nozzle Diameter	0.2426	Dry Mole Wt Stk Gas	29.508
Pitot Tube Corr	0.84	Stack Pressure	30.13
Sampling Time in Min.	72	Feed Rate, TPH	97
		Bulk Moisture (Lab Analysis)	9.78
		Feed Rate Dry TPH	87.51
Lbs Coal/Ton of Dry Feed	34.9	Coal Feed TPH	1.53
		Process Weight	89.04

	Pt	Stk oF	Delta P	Delta H	oF In	oF Out
	Pt 1	152	0.53	0.90	103	100
	Pt 2	162	1.01	1.72	111	100
	Pt 3	164	1.10	1.87	114	99
	Pt 4	164	0.95	1.62	116	101
	Pt 5	165	0.91	1.55	117	102
	Pt 6	164	0.70	1.19	120	102
	Pt 7	163	0.32	0.54	120	103
	Pt 8	164	0.24	0.41	120	103
	Pt 9	163	0.23	0.39	119	104
	Pt 10	163	0.29	0.49	121	105
	Pt 11	164	0.38	0.65	123	105
	Pt 12	162	0.33	0.56	123	105
	Pt 13	160	0.19	0.32	111	105
	Pt 14	163	0.31	0.53	116	105
	Pt 15	164	0.41	0.70	118	104
	Pt 16	165	0.53	0.90	120	105
	Pt 17	164	0.60	1.02	122	105
	Pt 18	164	0.58	0.99	124	105
	Pt 19	163	0.33	0.56	123	106
	Pt 20	163	0.39	0.66	123	105
	Pt 21	164	0.59	1.00	124	106
	Pt 22	163	0.79	1.34	123	106
	Pt 23	163	0.72	1.22	123	107
	Pt 24	161	0.81	1.38	122	106
Averages		163	0.55	0.94	119	104
Stack oR		623		Average Meter Temp oR		571

Gas Volume Collected	38.909
Corrected Gas Volume	38.539
Gas Volume STP	36.012

Page 2
 Calciner #3
 Run 3

08/27/92

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	651.19
Final	408	151	104	659.05

Totals mls of water collected	363
Increase in grams of silica gel	7.86
Total Gas Volume	53.469
Bws	0.3265
One - Bws	0.6735
Wet Molecular Weight of Stack Gas	25.75

Stack Pressure	30.134
Stack Velocity FPS	46.410
Stack Volumetric Flow Rate TSTD Ft ³ /Min	67226

Particulate Calculations

Inorganic

Large Tare, grams	273.5385
Large Final, grams	273.5408
Mr =	0.00230
Sum Water + MeCl ₂ , Mb (or 5% of mass)	0
Vic =	663
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	2.3

Organic

Small Tare,grams	162.7333
Small Final,grams	162.7960
Mo, mg =	62.65
CPM mg/DSCF =	1.8036
CPM mg/TSCF =	1.2147
CPM mg	64.9500
5% of mass of CPM	3.2475
Front Half	
Final Beaker Weight	138.3415
Tare Beaker Weight	138.3147
Final Filter Weight	0.6294
Tare Weight of Filter	0.5488
Net Sample Weight	0.10735
Mg Particulate/DSCF	2.9810
Mg Particulate/TSCF	2.0077

	Total	Front Half	Back Half
Total Particulates			
Lbs Particulate/Day	687.74	428.49	259.25
Lbs Particulate/Hr	28.66	17.85	10.80
Lbs Particulate/Ton of Product	7.8586	4.8963	2.9624
Isokinetic Sampling Rate	97.30		
Allowable Part. Emission Rate, Lbs/Hr.	50.12		

RAW DATA

TEXASGULF PHOSPHATE OPERATIONS

CONDENSABLE PARTICULATE MATTER STACK SAMPLING WORKSHEET

DATE 8-27-92

PLANT Cal #3

RUN NO. 1

TIME 337.7812

	FILTER	BEAKER X	ORGANIC BACK HALF BEAKER 6	BACK HALF BEAKER BW	AN Beaker SW 14 14
TARE	15551	168.6891	147.7345	164.2911	173.4901
1ST WEIGHT	16301	168.7106 ✓	147.8984	164.2402 ✓	173.4907 ✓
2ND WEIGHT	16305 ✓	168.7084	147.8999 ✓	164.2880	173.4877
3RD WEIGHT		168.7103 ✓	147.9010	164.2904 ✓	173.4897
4TH WEIGHT			147.9002 ✓		173.4905 ✓
5TH WEIGHT					
6TH WEIGHT					
7TH WEIGHT					
Average 8TH WEIGHT	16303	168.71045	147.90005	164.2903	173.4906

INORGANIC
337.7809

IMPINGER VOLUMES/GEL WEIGHTS

	1ST IMPINGER	2ND IMPINGER	3RD IMPINGER	SILICA GEL WEIGHTS
POST VOLUME	226 + 149 (375)	169	156	677.11
PRE VOLUME	100	100	100	664.58

REVISED 8/26/92

TGEA044.WR1

Box #1

Plant #3 Calciner Date 8-27-92 Time 1012 Run 1
Mtr Box 4 Meter H@ 1.7024 K Factor 1.66 Barometric 30.19
Assmd Moist 32% Nozzle Dia. .2416 Dry Gas X .9905 Console Oper ST

۱۳۸۵

1048

NW

1132

~~17.2~~ 17.2 ~~0.21~~ 0.21 V/R

175 *Hg 531 C.F.M.

✓ Green ✓

[illegible]

$\begin{array}{r} 10034071 \\ 17026 \\ 17056 \\ 14624 \\ \hline 29.508 \\ 25.875 \end{array}$
 $\begin{array}{r} 565 \\ 623 \end{array}$

TEXASGULF PHOSPHATE OPERATIONS

CONDENSABLE PARTICULATE MATTER STACK SAMPLING WORKSHEET

DATE 8-27-92

PLANT CAL #3

RUN NO. 2

TIME 302.9523 AN Beaker

	FILTER	BEAKER <u>3</u>	ORGANIC BACK HALF BEAKER <u>11</u>	BACK HALF BEAKER <u>EAST</u>	SILICA BEAKER <u>15</u>
TARE	<u>.5407</u>	<u>166.9603</u>	<u>164.7772</u>	<u>165.1402</u>	<u>137.8121</u>
1ST WEIGHT	<u>.6133</u>	<u>166.9836</u> ✓	<u>164.8754</u> ✓	<u>165.1423</u> ✓	<u>137.8131</u>
2ND WEIGHT	<u>.6137</u>	<u>166.9815</u>	<u>164.8774</u>	<u>165.1412</u>	<u>137.8120</u>
3RD WEIGHT		<u>166.9836</u> ✓	<u>164.8783</u>	<u>165.1423</u> ✓	<u>137.8140</u> ✓
4TH WEIGHT			<u>164.8757</u> ✓		<u>137.8144</u> ✓
5TH WEIGHT					
6TH WEIGHT					
7TH WEIGHT					
Average 2ND WEIGHT	<u>.6135</u>	<u>166.9836</u>	<u>164.87555</u>	<u>165.1423</u>	<u>137.8142</u>

Inorganic
302.9565

IMPINGER VOLUMES/GEL WEIGHTS

	1ST IMPINGER	2ND IMPINGER	3RD IMPINGER	SILICA GEL WEIGHTS
POST VOLUME	<u>238 + 175</u> <u>(413)</u>	<u>144</u>	<u>106</u>	<u>638.96</u>
PRE VOLUME	<u>100</u>	<u>100</u>	<u>100</u>	<u>678.94</u>

CONSOLE WORKSHEET

Box #2

Assmd Moist 3290 Nozzle Dia. 2375 Dry Gas X .9905 Console Oper 57

TGEA021.WR1 ,0031817 1.7026 ,7056,4624 $\frac{29.508}{29.875}$ $\frac{568}{673}$

TEXASGULF PHOSPHATE OPERATIONS

CONDENSABLE PARTICULATE MATTER STACK SAMPLING WORKSHEET

DATE 8-27-92

PLANT CAL #3

RUN NO. 3

TIME 273.5385

	FILTER	BEAKER <u>G</u>	BACK HALF BEAKER <u>W 7/14</u>	BACK HALF BEAKER <u>41</u>	ORGANIC <u>Y</u>
TARE	<u>.5488</u>	<u>138.3147</u>	<u>138.9061</u>	<u>134.6324</u>	<u>162.7933</u>
1ST WEIGHT	<u>.6287</u> ✓	<u>138.3817</u> ✓	<u>138.9083</u> ✓	<u>134.6329</u> ✓	<u>162.7961</u> ✓
2ND WEIGHT	<u>.6290</u> ✓	<u>138.3403</u>	<u>138.9058</u>	<u>134.6324</u> ✓	<u>162.7958</u> ✓
3RD WEIGHT		<u>138.3413</u> ✓	<u>138.9080</u> ✓		
4TH WEIGHT					
5TH WEIGHT					
6TH WEIGHT					
7TH WEIGHT					
Average 8TH WEIGHT	<u>.62935</u>	<u>138.3415</u>	<u>138.90815</u>	<u>134.63265</u>	<u>162.79595</u>

Inorganic

273.5408

IMPINGER VOLUMES/GEL WEIGHTS

	1ST IMPINGER	2ND IMPINGER	3RD IMPINGER	SILICA GEL WEIGHTS
POST VOLUME	<u>408</u> <u>834 + 174</u>	<u>151</u>	<u>104</u>	<u>659.05</u>
PRE VOLUME	<u>100</u>	<u>100</u>	<u>100</u>	<u>651.19</u>

REVISED 8/26/92

TGEA044.WR1

Box #3

Plant #3 Calaveras Date 8-27-92 Time 1412 Run 3

Mtr Box 4 Meter H@ 1.7026 K Factor 1.70 Barometric _____

Assmd Moist 296 Nozzle Dia. 2.926 Dry Gas X .9905 Console Oper ST

[illegible]

Probe and Sample Box Operator PF

Pre Leak Check At 16.0 "Hg = .010 C.F.M. Post Leak Check At 19.5 "Hg .014 C.F.M.

Pitot Leak Check Red ✓ Green ✓

$$K = (846.72 \times D_A^4 \times H_0^3 \times C_p^3 \times (1 - Bws)^2 \times (M_4/M_5) \times (P_3/P_m) \times (T_{mOR}/T_{5OR}))$$

[illegible]

TGEA021.WR1

.0034639

1,7076

1056

4674

29.508

25. 823

570

673

ISOKINETIC WORKSHEET

DATE: 8-27-92 STACK: #3 Calciner TIME: 1000

METER BOX: 4 OPERATOR JT

1. NOZZLE DIA. (A) ③ .2409 " (B) .2412 " (C) .2420 "

2. $\Delta H @$ 1.7076 $\gamma = .9905$ Avg. ⑥ .2375

3. C_p .84 Assy. #

4. BAROMETRIC PRESSURE (P_b) 30.19 "Hg ΔP STATIC - .76 "H.

5. STACK PRESSURE (P_s) 30.13 "Hg = $P_b \pm \frac{\text{INCHES } H_2O}{13.6}$

6. T_d °F

7. T_w °F

8. S. V.P. "Hg

9. V.P. "Hg

10. B_{ws} .32 X 100 = 32 % H_2O
ESTIMATE

11. M_d 29.508 lb./lb. - MOLE

12. M_s 25.825 lb./lb. - MOLE

13. T_s 163 °F + 460 = 623 °R

14. T_m 105 °F + 460 = 565 °R

15. P_m "Hg $\left(\frac{\text{AVG. } \Delta H}{13.6} + P_b \right)$

Preliminary

ΔP	T_s
1. .51	147
2. .91	158
3. 1.12	163
4. 1.04	163
5. .93	163
6. .75	163
7. .36	162
8. .26	163
9. .22	163
10. .26	164
11. .37	163
12. .34	161

ACETONE BLANK WORKSHEET

LOT # 1443 KJBM

BEAKER WT. INIT.	147.7354	FILTER WT. INIT.	
BEAKER WT. FINAL	147.73535	FILTER WT. FINAL	
WT. OF RESIDUE	- .00005	NET FILTER WT.	

100 mL

CONSTANT WTS.		
BEAKER		FILTER
147.7352 ✓		
147.7381		
147.7355 ✓		

TECHNICIAN:

DATE:

SOURCE PERFORMANCE FOR: COAL, #1 & #5 C.A. CINDER

McC

~~ACETONE~~ BLANK WORKSHEET

Lot # 910309

BEAKER WT. INIT.	(12) 139.6326	FILTER WT. INIT.	
BEAKER WT. FINAL	139.6216	FILTER WT. FINAL	
WT. OF RESIDUE	- 0010	NET FILTER WT.	

200mLs

CONSTANT WTS.		
BEAKER		FILTER
139.6218		
139.6216		

TECHNICIAN: JT

DATE: 8-21-91

SOURCE PERFORMANCE FOR: CALCIUM F2 + 4

Orsat Analyses

Date 7-8-92 Plant Celiner #3 Technician JT
 Pb Stack Temp Ambient Temp
 Dry Bulb Temp Wet Bulb Temp
 Stack Static Press Stack Press

		CO2	O2	CO+N
Run 1	Burette Reading	5.2	21.0	
	Percent	5.2	15.8	79.0
Run 2	Burette Reading	5.3	21.0	
	Percent	5.3	15.7	79.0
Run 3	Burette Reading	5.3	21.1	
	Percent	5.3	15.8	78.9

$$P_s = (\text{Static Press}/13.6) + P_b$$

$$V.P. = S.V.P. - ((3.67 \times 10^{-4}) * (P_s) * (T_d - T_w) * ((1 + (T_w - 32)/1571)))$$

$$B_{ws} = V.P./P_s$$

$$M_d = ((0.44 * \overset{55}{x_{CO2}}) + (0.32 * \overset{15.8}{x_{O2}}) + (0.28 * \overset{79.0}{x_{CO+N}}))$$

2.332 5.096 22.12

$$M_s = ((M_d * (1 - B_{ws})) + ((18 * B_{ws})))$$

$$V.P. = \underline{\hspace{2cm}}$$

$$B_{ws} = \underline{\hspace{2cm}}$$

$$M_d = \underline{29.508}$$

$$M_s = \underline{\hspace{2cm}}$$

Leak ☒ no movement for 30 minutes

Pre-Calibration

Date 9-16-92 Tech JT

Delta H Magnehelic

Leak Check @ .33 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	<u>.32</u>	<u>.33</u>	<u>1</u>
-	<u>.42</u>	<u>.42</u>	<u>0</u>

Leak Check @ .93 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	<u>.92</u>	<u>.93</u>	<u>1</u>
-	<u>1.05</u>	<u>1.05</u>	<u>0</u>

Leak Check @ 1.82 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	<u>1.82</u>	<u>1.82</u>	<u>0</u>
-	<u>1.80</u>	<u>1.79</u>	<u>1</u>

Delta P Magnehelic

Leak Check @ .42 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	1.38 <u>.38</u>	1.40 <u>.40</u>	<u>.42</u>
-	<u>.41</u>	<u>.42</u>	<u>1</u>

Leak Check @ 1.02 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	<u>1.02</u>	<u>1.03</u>	<u>1</u>
-	<u>1.03</u>	<u>1.02</u>	<u>1</u>

Leak Check @ 1.81 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	<u>1.77</u>	<u>1.75</u>	<u>2</u>
-	<u>1.82</u>	<u>1.81</u>	<u>1</u>

Cyclonic Flow Test

Plant CALCINER #3

Technician(s) JT + PF

Date 6/26/91

Time 1037

SW Fort

Point #	Delta P	Angle Alpha
1	.71	0
2	1.10	5
3	1.14	2
4	1.07	0
5	.80	1
6	.61	3
7	.27	7
8	.70	4
9	.19	8
10	.22	13
11	.26	17
12	.25	18
Average		7

Average absolute Alpha must not be greater than 20 degrees.

Cyclonic Flow Test

Plant Calaveras #3 Technician(s) JT & PF
 Date 6-26-91 Time 1037

NW Port

Point #	Delta P	Angle Alpha
1	.38	9
2	.43	7
3	.55	3
4	.61	1
5	.68	2
6	.64	3
7	.33	2
8	.34	5
9	.46	10
10	.52	12
11	.60	13
12	.58	16
Average		

Average absolute Alpha must not be greater than 20 degrees.

PRODUCTION DATA

NUMBER 3 CALCINER----AUGUST 27, 1992

$$\frac{97 \text{ tons feed}}{\text{hour}} \rightarrow (97) \frac{(100\% - \% H_2O)}{100} = \frac{\text{Tons dry feed}}{\text{hour}}$$

$$\frac{(97 \text{ t feed})(100 - 9.78)}{\text{hour} \quad 100} = (97) (0.9022) = \frac{87.5 \text{ t dry feed}}{\text{hour}}$$

Loss on Ignition is calculated each month from assays. In July it was 7.41%.

(So) Coal usage is based on consumption per ton calcine and is 37.5# coal for a YTD figure.
ton calcine

Calculate coal usage based on Dry Feed:

$$\text{Take coal usage } \frac{(37.5\# \text{ coal})}{\text{ton calcine}} \quad \frac{(1 \text{ ton calcine})}{(1.0741 \text{ tons dry feed})} =$$

$$\frac{34.91\# \text{ coal}}{(1 \text{ ton dry feed})} \quad \text{or at} \quad \frac{87.5 \text{ tons dry feed}}{\text{hour}} =$$

$$\frac{(34.91\# \text{ coal})}{\text{ton dry feed}} \quad \frac{(87.5 \text{ tons dry feed})}{\text{hour}} = \frac{3,054.6\# \text{ coal}}{\text{hour}}$$

$$\text{or } \frac{1.53 \text{ tons coal}}{\text{hour}}$$

August 31, 1992 ojc

CALIBRATIONS

TEXASGULF INC. PHOSPHATE OPERATIONS

Console Calibration

08/10/92		Console	4
Technician	Jack Taylor	Number of Runs	8
Barometric Pressure	30.09	Test Meter Factor	0.9986
Test Meter No.	699357		
Delta H Setting	0.25	Meter Pressure	30.11
<i>Rechecked 8/11/92</i>			
Test Meter Initial	996.100		
Test Meter Final	1001.102	Test Dry Gas Volume	5.002
Console Meter Initial	108.800		
Console Meter Final	114.091	Console Dry Gas Volume	5.291
Test Meter oF In	73		
Test Meter oF Out	72	Test Average oR	532.5
Console Meter oF In	96		
Console Meter oF Out	84	Console Average oR	550
Total Time In Mins.	17.58	Corr Test Meter Vol	4.99
Delta Ha=	1.6820	y Factor=	0.9745
Delta H Setting	0.50	Meter Pressure	30.13
Test Meter Initial	910.700		
Test Meter Final	915.705	Test Dry Gas Volume	5.005
Console Meter Initial	18.100		
Console Meter Final	23.388	Console Dry Gas Volume	5.288
Test Meter oF In	71		
Test Meter oF Out	70	Test Average oR	530.5
Console Meter oF In	103		
Console Meter oF Out	85	Console Average oR	554
Total Time In Mins.	12.62	Corr Test Meter Vol	5.00
Delta Ha=	1.7061	y Factor=	0.9858
Delta H Setting	0.75	Meter Pressure	30.15
Test Meter Initial	916.000		
Test Meter Final	921.005	Test Dry Gas Volume	5.005
Console Meter Initial	23.900		
Console Meter Final	29.211	Console Dry Gas Volume	5.311
Test Meter oF In	71		
Test Meter oF Out	70	Test Average oR	530.5
Console Meter oF In	105		
Console Meter oF Out	87	Console Average oR	556
Total Time In Mins.	10.30	Corr Test Meter Vol	5.00
Delta Ha=	1.6985	y Factor=	0.9845

Page 2

Console Calibration

08/10/92

Delta H Setting	1.00	Meter Pressure	30.16
<i>Rechecked 8/11/92</i>			
Test Meter Initial	1.400		
Test Meter Final	6.404	Test Dry Gas Volume	5.004
Console Meter Initial	114.700		
Console Meter Final	119.923	Console Dry Gas Volume	5.223
Test Meter oF In	73		
Test Meter oF Out	73	Test Average oR	533
Console Meter oF In	107		
Console Meter oF Out	87	Console Average oR	557
Total Time In Mins.	8.82	Corr Test Meter Vol	5.00
Delta Ha=	1.6740	y Factor=	0.9974
Delta H Setting	1.25	Meter Pressure	30.18
Test Meter Initial	926.700		
Test Meter Final	936.712	Test Dry Gas Volume	10.012
Console Meter Initial	35.600		
Console Meter Final	46.149	Console Dry Gas Volume	10.549
Test Meter oF In	72		
Test Meter oF Out	70	Test Average oR	531
Console Meter oF In	105		
Console Meter oF Out	89	Console Average oR	557
Total Time In Mins.	16.00	Corr Test Meter Vol	10.00
Delta Ha=	1.7072	y Factor=	0.9911
Delta H Setting	1.50	Meter Pressure	30.20
Test Meter Initial	937.000		
Test Meter Final	947.309	Test Dry Gas Volume	10.309
Console Meter Initial	46.700		
Console Meter Final	57.546	Console Dry Gas Volume	10.846
Test Meter oF In	72		
Test Meter oF Out	70	Test Average oR	531
Console Meter oF In	102		
Console Meter oF Out	89	Console Average oR	555.5
Total Time In Mins.	15.08	Corr Test Meter Vol	10.29
Delta Ha=	1.7212	y Factor=	0.9893

Page 3

Console Calibration

10-Aug-92

Delta H Setting	1.75	Meter Pressure	30.22
Test Meter Initial	948.000		
Test Meter Final	958.011	Test Dry Gas Volume	10.011
Console Meter Initial	58.500		
Console Meter Final	69.003	Console Dry Gas Volume	10.503
Test Meter oF In	71		
Test Meter oF Out	70	Test Average oR	530.5
Console Meter oF In	108		
Console Meter oF Out	90	Console Average oR	559
Total Time In Mins.	13.57	Corr Test Meter Vol	10.00
Delta Ha=	1.7102	y Factor=	0.9987
Delta H Setting	2.00	Meter Pressure	30.24
Test Meter Initial	958.400		
Test Meter Final	968.399	Test Dry Gas Volume	9.999
Console Meter Initial	69.700		
Console Meter Final	80.152	Console Dry Gas Volume	10.452
Test Meter oF In	72		
Test Meter oF Out	70	Test Average oR	531
Console Meter oF In	110		
Console Meter oF Out	90	Console Average oR	560
Total Time In Mins.	12.72	Corr Test Meter Vol	9.99
Delta Ha=	1.7217	y Factor=	1.0026
Average Delta Ha=	1.7026	Average y Factor=	0.9905

TEXASGULF INC. PHOSPHATE OPERATIONS

Temperature Calibrations

Console 4

Date 8-10-92

Technician JT

Instrument		Indicator oF	Actual oF	Difference oF
Dry Gas Meter In (Must agree: +/- 5.4 oF)	A	32	33.6	1.6
	B	69	70.8	1.8
	C	229	225.5	3.5
Dry Gas Meter Out (Must agree: +/- 5.4 oF)	A	33	33.4	0.4
	B	69	70.8	1.8
	C	228	224.0	4.0
Impinger Thermometer # <u>1</u> (Must agree: +/- 2 oF)	A	36	34.1	1.9
	B	74	72.4	1.6
	C	150	151.2	1.2
Impinger Thermometer # <u>2</u> (Must agree: +/- 2 oF)	A	34	34.1	0.1
	B	72	72.2	0.2
	C	149	150.8	1.8
Impinger Thermometer # <u>3</u> (Must agree: +/- 2 oF)	A	36	34.1	1.9
	B	73	72.1	0.9
	C	156	150.2	0.2
HotBox Thermometer # <u>1</u> (Must agree: +/- 5.4 oF)	A	74	75.4	1.4
	B	162	164.7	2.7
	C	270	267.5	2.5
HotBox Thermometer # <u>2</u> (Must agree: +/- 5.4 oF)	A	72	75.6	3.6
	B	144	147.6	3.6
	C	266	264.5	1.5
HotBox Thermometer # <u>3</u> (Must agree: +/- 5.4 oF)	A	75	75.6	0.6
	B	140	149.2	5.2
	C	265	264.0	0

TEXASGULF INC. PHOSPHATE OPERATIONS

Temperature Calibrations

Date 8.11.92

Technician ST

Instrument		Indicator oF	Actual oF	Difference %
Stack Thermocouple Assy # <u>3</u> (Must agree: +/- 1.5 %)	A	72	73.0 72.0	1.4
	A	72	73.1	1.5
	A	72	73.0	1.4
	B	146	145.4	0.4
	B	143	143.2	0.1
	B	146	139.5	0.4
	C	238	239.5	0.6
	C	231	233.0	0.9
	C	224	222.0	0.9
Stack Thermocouple Assy # <u>6</u> (Must agree: +/- 1.5 %)	A	72	73.1	1.5
	A	72	73.0	1.4
	A	72	72.8	1.0
	B	145	144.8	0.1
	B	143	142.3	0.5
	B	141	140.0	0.7
	C	240	239.5	0.2
	C	235	232.5	1.1
	C	230	229.5	0.2
Stack Thermocouple Assy # _____ (Must agree: +/- 1.5 %)	A			
	A			
	A			
	B			
	B			
	B			
	C			
	C			
	C			
Probe Heater Assy # <u>3</u>		212 °F @	75 CFM	
Probe Heater Assy # <u>6</u>		212 °F @	75 CFM	
Probe Heater Assy # _____				

Pre-Calibration

Date 8-10-92Tech JT

Delta H Magnehelic

Leak Check @ .42 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	.42	.42	0
-	.36	.36	0

Leak Check @ .93 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	.93	.94	1
-	1.00	1.00	0

Leak Check @ 1.80 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	1.80	1.82	2
-	1.81	1.83	2

Delta P Magnehelic

Leak Check @ .32 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	.41	.41	0
-	.32	.32	0

Leak Check @ .92 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	.99	.98	1
-	.92	.92	0

Leak Check @ 1.83 " H2O for 3 minutes.

	Gauge	Manometer	Delta
+	1.74	1.76	2
-	1.83	1.81	2

TEXASGULF INC. PHOSPHATE OPERATIONS

Console Calibration

09/15/92		Console	4
Technician	Jack Taylor	Number of Runs	8
Barometric Pressure	30.36	Test Meter Factor	0.9986
Test Meter No.	699357		
Delta H Setting	0.25	Meter Pressure	30.38
Test Meter Initial	24.300		
Test Meter Final	29.300	Test Dry Gas Volume	5
Console Meter Initial	640.800		
Console Meter Final	646.161	Console Dry Gas Volume	5.361
Test Meter oF In	73		
Test Meter oF Out	72	Test Average oR	532.5
Console Meter oF In	103		
Console Meter oF Out	95	Console Average oR	559
Total Time In Mins.	17.62	Corr Test Meter Vol	4.99
Delta Ha=	1.6490	y Factor=	0.9771
Delta H Setting	0.50	Meter Pressure	30.40
Test Meter Initial	29.600		
Test Meter Final	34.600	Test Dry Gas Volume	5
Console Meter Initial	646.600		
Console Meter Final	651.929	Console Dry Gas Volume	5.329
Test Meter oF In	73		
Test Meter oF Out	72	Test Average oR	532.5
Console Meter oF In	107		
Console Meter oF Out	91	Console Average oR	559
Total Time In Mins.	12.68	Corr Test Meter Vol	4.99
Delta Ha=	1.7079	y Factor=	0.9824
Delta H Setting	0.75	Meter Pressure	30.42
Test Meter Initial	35.000		
Test Meter Final	40.003	Test Dry Gas Volume	5.003
Console Meter Initial	652.500		
Console Meter Final	657.797	Console Dry Gas Volume	5.297
Test Meter oF In	72		
Test Meter oF Out	71	Test Average oR	531.5
Console Meter oF In	109		
Console Meter oF Out	90	Console Average oR	559.5
Total Time In Mins.	10.28	Corr Test Meter Vol	5.00
Delta Ha=	1.6740	y Factor=	0.9911

09/15/92

Delta H Setting	1.00	Meter Pressure	30.43
Test Meter Initial	40.400		
Test Meter Final	45.402	Test Dry Gas Volume	5.002
Console Meter Initial	658.500		
Console Meter Final	663.775	Console Dry Gas Volume	5.275
Test Meter oF In	73		
Test Meter oF Out	72	Test Average oR	532.5
Console Meter oF In	109		
Console Meter oF Out	90	Console Average oR	559.5
Total Time In Mins.	8.87	Corr Test Meter Vol	4.99
Delta Ha=	1.6687	y Factor=	0.9925
Delta H Setting	1.25	Meter Pressure	30.45
Test Meter Initial	45.700		
Test Meter Final	55.769	Test Dry Gas Volume	10.069
Console Meter Initial	664.300		
Console Meter Final	674.810	Console Dry Gas Volume	10.51
Test Meter oF In	72		
Test Meter oF Out	71	Test Average oR	531.5
Console Meter oF In	111		
Console Meter oF Out	91	Console Average oR	561
Total Time In Mins.	15.97	Corr Test Meter Vol	10.05
Delta Ha=	1.6579	y Factor=	1.0068
Delta H Setting	1.50	Meter Pressure	30.47
Test Meter Initial	56.200		
Test Meter Final	66.201	Test Dry Gas Volume	10.001
Console Meter Initial	675.600		
Console Meter Final	686.119	Console Dry Gas Volume	10.519
Test Meter oF In	72		
Test Meter oF Out	71	Test Average oR	531.5
Console Meter oF In	113		
Console Meter oF Out	91	Console Average oR	562
Total Time In Mins.	14.70	Corr Test Meter Vol	9.99
Delta Ha=	1.7056	y Factor=	1.0003

Page 3
Console Calibration
15-Sep-92

Delta H Setting	1.75	Meter Pressure	30.49
Test Meter Initial	66.800		
Test Meter Final	76.804	Test Dry Gas Volume	10.004
Console Meter Initial	687.000		
Console Meter Final	697.492	Console Dry Gas Volume	10.492
Test Meter oF In	71		
Test Meter oF Out	70	Test Average oR	530.5
Console Meter oF In	114		
Console Meter oF Out	91	Console Average oR	562.5
Total Time In Mins.	13.59	Corr Test Meter Vol	9.99
Delta Ha=	1.6918	y Factor=	1.0053
Delta H Setting	2.00	Meter Pressure	30.51
Test Meter Initial	77.300		
Test Meter Final	87.309	Test Dry Gas Volume	10.009
Console Meter Initial	698.300		
Console Meter Final	708.765	Console Dry Gas Volume	10.465
Test Meter oF In	72		
Test Meter oF Out	71	Test Average oR	531.5
Console Meter oF In	114		
Console Meter oF Out	91	Console Average oR	562.5
Total Time In Mins.	12.67	Corr Test Meter Vol	9.99
Delta Ha=	1.6852	y Factor=	1.0059
Average Delta Ha=	1.6800	Average y Factor=	0.9952

TEXASGULF INC. PHOSPHATE OPERATIONS

Temperature Calibrations

Console 4

Date 9-16-92

Technician 51

Instrument		Indicator oF	Actual oF	Difference oF
Dry Gas Meter In (Must agree: +/- 5.4 oF)	A	33	32.2	0.8
	B	73	74.8	1.8
	C	175	173.4	1.6
Dry Gas Meter Out (Must agree: +/- 5.4 oF)	A	32	32.3	0.3
	B	72	74.6	2.6
	C	177	179.8	1.2
Impinger Thermometer # <u>1</u> (Must agree: +/- 2 oF)	A	34	32.5	1.5
	B	78	76.9	1.1
	C	161	160.1	0.9
Impinger Thermometer # <u>2</u> (Must agree: +/- 2 oF)	A	33	33.1	0.1
	B	75	76.0	1.0
	C	160	161.0	1.0
Impinger Thermometer # <u>3</u> (Must agree: +/- 2 oF)	A	34	32.8	1.2
	B	75	76.6	1.6
	C	151	152.8	1.8
HotBox Thermometer # <u>1</u> (Must agree: +/- 5.4 oF)	A	74	78.0	4.0
	B	208 208	210.5	2.5
	C	285	290.0	5.0
HotBox Thermometer # <u>2</u> (Must agree: +/- 5.4 oF)	A	75	78.4	3.6
	B	202	206.0	4.0
	C	279	282.0	3.0
HotBox Thermometer # <u>3</u> (Must agree: +/- 5.4 oF)	A	75	79.2	4.2
	B	201	204.5	3.5
	C	283	281.5	1.5

TEXASGULF INC. PHOSPHATE OPERATIONS

Temperature Calibrations

Date 9-16-92

Technician JF

Instrument		Indicator oF	Actual oF	Difference %
Stack Thermocouple Assy # <u>3</u> (Must agree: +/- 1.5 %)	A	73	73.8	1.0
	A	73	74.1	1.5
	A	74	74.4	0.5
	B	131	132.9	1.4
	B	130	131.4	1.1
	B	128	129.0	0.8
	C	215	215.5	0.2
	C	213	213.5	0.2
	C	211	211.0	0
Stack Thermocouple Assy # <u>6</u> (Must agree: +/- 1.5 %)	A	73	74.0	1.4
	A	75	75.2	0.3
	A	74	75.0	1.3
	B	154	156.2	1.4
	B	153	153.8	0.5
	B	151	151.7	0.5
	C	218	219.5	0.7
	C	217	217.5	0.2
	C	212	211.5	0.2
Stack Thermocouple Assy # _____ (Must agree: +/- 1.5 %)	A			
	A			
	A			
	B			
	B			
	B			
	C			
	C			
	C			
Probe Heater Assy # <u>3</u>		210°F @ 1.75 CFM		
Probe Heater Assy # <u>6</u>		215°F @ 1.75 CFM		
Probe Heater Assy # _____				