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

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

Texasgulf Inc.
elf aquitaine group
P.O. Box 48 Aurora, North Carolina 27806

Phosphate Operations
(919) 322-4111

July 8, 1992

Mr. Jim Mulligan
Regional Supervisor
Division of Environmental Management
N. C. Department of EHNR
P. O. Box 2188
Washington, North Carolina 27889

Re: **Texasgulf Inc.**
Permit No. 2331R10
Calciner No. 5

Dear Jim:

As per the requirements of Air Quality Permit No. 2331R10, Specific Conditions and Limitations No. 7, the No. 5 Calciner was compliance tested for particulate emissions and sulfur dioxide on June 16, 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,

J. C. Furnes

for W. A. Schimming

WAS:BAP/re

Enclosure

pc: Mike Aldridge - DEM, Raleigh (w/encl)
H. M. Breza (w/encl)
J. N. Richardson (w/encl)
J. C. Carrere (w/encl)
00-12-000 (w/o encl)
15-09-021 (w/encl)

A:\doc\bap\cal#5comp.ltr

SOURCE PERFORMANCE TEST

CALCINER NO. 5

TEXASGULF INC.

PHOSPHATE OPERATIONS

AURORA, NC

JUNE 16, 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-15-09-021

TEXASGULF INC. PHOSPHATE OPERATIONS

Summary

On June 16, 1992 sampling and analyses were conducted to determine the particulate emission rate at Texasgulf's Calciner No. 5 using Method 5 w/Backhalf Analysis.

The results of this series of runs showed the average particulate emission rate to be 23.12 pounds per hour. The average dry feed rate during the testing was 82 tons/hour. The average allowable particulate emission rate at this feedrate is 49.53 pounds of particulate/hour. A total of 3 stack samples were taken.

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

Mr. Don Wynne, of the North Carolina Division of Environmental Management was present during the testing as an official observer.

TEXASGULF INC. PHOSPHATE OPERATIONS

Calciner Calculations

1) LBS. of Particulate/Day

Total =	((A + B) x C x 60 / 1000 / 453.59 x 24)
Front Half =	(A x C x 60 / 1000 / 453.59 x 24)
Back Half =	(B x C x 60 / 1000 / 453.59 x 24)

2) Mr = D - E

3) Vic = (F + G + H + I)

4) Mass of Inorganic Fraction = (((J x (K / ((K - L) - U) x 1000))

5) Mo = (M - N) x 1000

6) CPM mg/DSCF = (O + P) / Q

7) CPM mg/TSCF = (R x S)

8) CPM mg = (O + (J x 1000))

9) 5 % of Mass of CPM = (T x 0.05)

10) Feed Rate, Dry TPH = (V x ((100 - W)/100))

11) Coal Feed TPH = (X x Y) / 2000

12) Process Weight = (Z + AA)
****

13) Allowable Emission Rate = (AB ^0.11)*50)–40
****

Where:

A = Mg Particulate TSCF
B = CPM Mg/TSCF
C = Stack Volumetric Flow Rate TSCFM
D = Total Weight of Inorganic Fraction (incl. weighing vessel)
E = Tare Weight of Inorganic Fraction weighing vessel
F = Total mls of H2O collected
G = Initial volume of Impinger 1
H = Initial volume of Impinger 2
I = Initial volume of Impinger 3
J = Mr
K = Vic
L = Vb
M = Final Weight of Organic Fraction (incl. weighing vessel)
N = Tare Weight of Organic Fraction weighing vessel
O = Mo
P = Mi
Q = Gas Volume STP
R = CPM mg/DSCF
S = 1 - BWS
T = CPM mg
U = Blank
V = Feed Rate TPH
W = Bulk Moisture (from Lab Analysis, 24 hr composite)
X = Lbs of Coal / Ton of Dry Feed
Z = Coal Feed Rate TPH
AA = Dry Feed Rate
AB = Process Weight

TEXASGULF INC. PHOSPHATE OPERATIONS

Test Summary - Calciner No. 5

Method 5 W/Backhalf	06/16/92	06/16/92	06/16/92
	Run 1	Run 2	Run 3
Stack Volumetric Flow Rate, TSCFM	62,097	62,716	63,275
Sample Volume, DSCF	34.491	34.405	34.807
Lbs. of Particulate/Hr. Total	24.15	23.97	21.23
Lbs. of Particulate/Hr. Front	18.01	16.77	16.65
Lbs. of Particulate/Hr. Back	6.15	7.19	4.58
Percent Isokinetic	102.43	103.24	103.37
Average Lbs of Particulate/Hr.(Total)			23.12
Allowable Lbs/Hr.			49.53
Dry Feed Rate TPH	82	82	82
Average Dry Feed Rate TPH			82

TEXASGULF INC. PHOSPHATE OPERATIONS

Calciner No. 5

Stack Data Summary Method 5 w/Backhalf

Date	Time	Run #	Velocity FPS	Volumetric Flow TSCF/Min	Average Stack Temp (oF)
06/16	09:54	2	42.665	62,097	161
06/16	11:55	3	43.018	62,716	160
06/16	13:48	4	43.462	63,275	161

TEXASGULF memo

Date: 06/23/92

To: Mill Superintendent

From: Environmental Affairs

Subject: EPA Method 5 w/Backhalf Isokinetic Sample
Calciner #5 Run 1

Sample Date	Time
06/16/92	09:54

Dry Feed Rate, TPH	Stack Volumetric Flow Rate TSTD Ft3/Min
82	62,097

Lbs. Particulate/Hr.		Lbs. Particulate/Ton of Product	
Total	24.15	Total	7.0366
Front Half	18.01	Front Half	5.2461
Back Half	6.15	Back Half	1.7905

Supervisor, Environmental Laboratory File: ec-15-09-021

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

This stack sample was taken isokinetically. The %I = 102.43

TEXASGULF INC. PHOSPHATE OPERATIONS

Method 5 w/Backhalf		Rpt. Date	06/23/92
Run 1		Smple Date	06/16/92
Calciner #5		Smple Time	09:54

Barometric Pressure	30.23	Initial Dry Gas Mtr	671.700
Stack Static Pressure	-0.61	Final Dry Gas Mtr	708.059
Stack Diameter	72	Dry Gas Factor	0.9910
Nozzle Diameter	0.2393	Dry Mole Wt Stk Gas	29.832
Pitot Tube Corr	0.84	Stack Pressure	30.19
Sampling Time in Min.	72	Feed Rate, TPH	94
		Bulk Moisture (Lab Analysis)	12.36
		Feed Rate Dry TPH	82.38
Lbs Coal/Ton of Dry Feed	35.7	Coal Feed TPH	1.47
		Process Weight	83.85

		Stk oF	Delta P	Delta H	oF In	oF Out
Pt	1	145	0.50	0.86	95	88
Pt	2	162	0.67	1.15	101	88
Pt	3	162	0.75	1.28	103	87
Pt	4	163	0.79	1.35	105	88
Pt	5	161	0.69	1.18	107	89
Pt	6	162	0.64	1.09	109	90
Pt	7	163	0.39	0.67	110	90
Pt	8	162	0.30	0.51	109	91
Pt	9	163	0.25	0.43	109	91
Pt	10	162	0.20	0.34	109	93
Pt	11	162	0.21	0.36	110	92
Pt	12	161	0.21	0.36	110	93
Pt	13	148	0.31	0.53	100	92
Pt	14	162	0.51	0.87	96	90
Pt	15	163	0.43	0.74	99	89
Pt	16	162	0.47	0.80	104	89
Pt	17	163	0.60	1.03	106	89
Pt	18	163	0.63	1.08	107	89
Pt	19	162	0.38	0.65	108	90
Pt	20	162	0.40	0.68	110	91
Pt	21	163	0.45	0.77	111	91
Pt	22	162	0.47	0.80	112	92
Pt	23	162	0.44	0.75	112	92
Pt	24	161	0.43	0.74	113	93
Averages		161	0.46	0.79	106	90

Stack oR	621	Average Meter Temp oR	558

Gas Volume Collected	36.359
Corrected Gas Volume	36.032
Gas Volume STP	34.491

Calciner #5
Run 1

06/16/92

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	675.36
Final	399	131	103	684.30

Totals mls of water collected	333
Increase in grams of silica gel	8.94
Total Gas Volume	50.587
Bws	0.3182
One - Bws	0.6818
Wet Molecular Weight of Stack Gas	26.07
Stack Pressure	30.185
Stack Velocity FPS	42.665
Stack Volumetric Flow Rate TSTD Ft3/Min	62097

Particulate Calculations

Inorganic	
Large Tare, grams	316.4605
Large Final, grams	316.4894
Mr =	0.02895
Sum Water + MeCl2, Mb (or 5% of mass)	0
Vic =	633
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	28.95
Organic	
Small Tare,grams	168.6891
Small Final,grams	168.6980
Mo, mg =	8.9
CPM mg/DSCF =	1.0974
CPM mg/TSCF =	0.7482
CPM mg	37.8500
5% of mass of CPM	1.8925
Front Half	
Final Beaker Weight	142.3803
Tare Beaker Weight	142.3380
Final Filter Weight	0.6100
Tare Weight of Filter	0.5414
Net Sample Weight	0.1109
Mg Particulate/DSCF	3.2153
Mg Particulate/TSCF	2.1923

Total Particulates	Total	Front Half	Back Half
Lbs Particulate/Day	579.69	432.18	147.50
Lbs Particulate/Hr	24.15	18.01	6.15
Lbs Particulate/Ton of Product	7.0366	5.2461	1.7905

Isokinetic Sampling Rate	102.43
Allowable Part. Emission Rate, Lbs/Hr.	49.53

TEXASGULF memo

Date: 06/23/92

To: Mill Superintendent

From: Environmental Affairs

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

Sample Date	Time
06/16/92	11:55

Dry Feed Rate, TPH	Stack Volumetric Flow Rate TSTD Ft3/Min
82	62,716

Lbs. Particulate/Hr.		Lbs. Particulate/Ton of Product	
Total	23.97	Total	6.9820
Front Half	16.77	Front Half	4.8860
Back Half	7.19	Back Half	2.0960

Supervisor, Environmental Laboratory File: ec-15-09-021

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

This stack sample was taken isokinetically. The %I = 103.24

...ROUGH INC. PHOSPHATE OPERATIONS

Method 5 w/Backhalf
Run 2
Calciner #5

Rpt. Date	06/23/92
Smple Date	06/16/92
Smple Time	11:55

Barometric Pressure	30.23	Initial Dry Gas Mtr	712.400
Stack Static Pressure	-0.61	Final Dry Gas Mtr	748.801
Stack Diameter	72	Dry Gas Factor	0.9910
Nozzle Diameter	0.2386	Dry Mole Wt Stk Gas	29.832
Pitot Tube Corr	0.84	Stack Pressure	30.19
Sampling Time in Min.	72	Feed Rate, TPH	94
		Bulk Moisture (Lab Analysis)	12.36
		Feed Rate Dry TPH	82.38
Lbs Coal/Ton of Dry Feed	35.7	Coal Feed TPH	1.47
		Process Weight	83.85

		Stk oF	Delta P	Delta H	oF In	oF Out
Pt	1	142	0.46	0.78	96	89
Pt	2	161	0.72	1.22	100	89
Pt	3	162	0.82	1.39	99	89
Pt	4	161	0.83	1.40	99	90
Pt	5	162	0.72	1.22	101	90
Pt	6	162	0.66	1.12	105	90
Pt	7	161	0.47	0.79	106	90
Pt	8	160	0.35	0.59	108	92
Pt	9	160	0.28	0.47	109	92
Pt	10	161	0.25	0.42	110	92
Pt	11	162	0.21	0.35	110	93
Pt	12	161	0.21	0.35	110	94
Pt	13	144	0.24	0.41	102	93
Pt	14	160	0.32	0.54	108	93
Pt	15	162	0.41	0.69	110	93
Pt	16	161	0.50	0.85	113	94
Pt	17	162	0.64	1.08	113	94
Pt	18	162	0.63	1.06	113	94
Pt	19	163	0.37	0.63	113	95
Pt	20	162	0.40	0.68	113	95
Pt	21	162	0.44	0.74	114	95
Pt	22	162	0.48	0.81	115	96
Pt	23	161	0.45	0.76	114	96
Pt	24	160	0.45	0.76	115	96
Averages		160	0.47	0.80	108	93

Stack oR	620	Average Meter Temp oR	560
Gas Volume Collected		36.401	
Corrected Gas Volume		36.073	
Gas Volume STP		34.405	

Calciner #5
Run 2

06/16/92

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	636.50
Final	407	136	104	646.21

Totals mls of water collected	347
Increase in grams of silica gel	9.71
Total Gas Volume	51.197
Bws	0.3280
One - Bws	0.6720
Wet Molecular Weight of Stack Gas	25.95
Stack Pressure	30.185
Stack Velocity FPS	43.018
Stack Volumetric Flow Rate TSTD Ft3/Min	62716
Particulate Calculations	
Inorganic	
Large Tare, grams	275.9568
Large Final, grams	275.9832
Mr =	0.02645
Sum Water + MeCl2, Mb (or 5% of mass)	0
Vic =	647
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	26.45
Organic	
Small Tare,grams	138.1226
Small Final,grams	138.1405
Mo, mg =	17.95
CPM mg/DSCF =	1.2905
CPM mg/TSCF =	0.8672
CPM mg	44.4000
5% of mass of CPM	2.22
Front Half	
Final Beaker Weight	152.2628
Tare Beaker Weight	152.2215
Final Filter Weight	0.6029
Tare Weight of Filter	0.5407
Net Sample Weight	0.1035
Mg Particulate/DSCF	3.0082
Mg Particulate/TSCF	2.0216

Total Particulates	Total	Front Half	Back Half
Lbs Particulate/Day	575.19	402.51	172.67
Lbs Particulate/Hr	23.97	16.77	7.19
Lbs Particulate/Ton of Product	6.9820	4.8860	2.0960

Isokinetic Sampling Rate	103.24
Allowable Part. Emission Rate, Lbs/Hr.	49.53

TEXASGULF memo

Date: 06/23/92

To: Mill Superintendent

From: Environmental Affairs

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

Sample Date	Time
06/16/92	13:48

Dry Feed Rate, TPH	Stack Volumetric Flow Rate TSTD Ft3/Min
82	63,275

Lbs. Particulate/Hr.		Lbs. Particulate/Ton of Product	
Total	21.23	Total	6.1847
Front Half	16.65	Front Half	4.8512
Back Half	4.58	Back Half	1.3335

Supervisor, Environmental Laboratory File: ec-15-09-021

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

This stack sample was taken isokinetically. The %I = 103.37

Method 5 w/Backhalf
Run 3
Calciner #5

Rpt. Date	06/23/92
Smple Date	06/16/92
Smple Time	13:48

Barometric Pressure	30.23	Initial Dry Gas Mtr	757.401
Stack Static Pressure	-0.61	Final Dry Gas Mtr	794.406
Stack Diameter	72	Dry Gas Factor	0.9910
Nozzle Diameter	0.2393	Dry Mole Wt Stk Gas	29.832
Pitot Tube Corr	0.84	Stack Pressure	30.19
Sampling Time in Min.	72	Feed Rate, TPH	94
		Bulk Moisture (Lab Analysis)	12.36
		Feed Rate Dry TPH	82.38
Lbs Coal/Ton of Dry Feed	35.7	Coal Feed TPH	1.47
		Process Weight	83.85

		Stk oF	Delta P	Delta H	oF In	oF Out
Pt	1	142	0.45	0.77	96	92
Pt	2	163	0.72	1.24	104	92
Pt	3	164	0.83	1.43	105	92
Pt	4	163	0.85	1.46	105	92
Pt	5	163	0.75	1.29	105	92
Pt	6	162	0.70	1.20	106	93
Pt	7	161	0.45	0.77	109	93
Pt	8	162	0.36	0.62	111	95
Pt	9	162	0.30	0.52	113	95
Pt	10	162	0.23	0.40	113	96
Pt	11	162	0.21	0.36	112	95
Pt	12	161	0.21	0.36	113	96
Pt	13	145	0.27	0.46	107	96
Pt	14	161	0.31	0.53	109	96
Pt	15	163	0.52	0.89	114	96
Pt	16	162	0.55	0.95	115	96
Pt	17	164	0.64	1.10	116	96
Pt	18	163	0.67	1.15	116	97
Pt	19	162	0.41	0.71	116	97
Pt	20	163	0.38	0.65	116	98
Pt	21	162	0.45	0.77	116	98
Pt	22	163	0.43	0.74	116	97
Pt	23	162	0.42	0.72	117	98
Pt	24	160	0.42	0.72	117	98
Averages		161	0.48	0.83	111	95

Stack oR	621	Average Meter Temp oR	563
Gas Volume Collected		37.005	
Corrected Gas Volume		36.672	
Gas Volume STP		34.807	

Calciner #5
Run 3

06/16/92

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	647.35
Final	369	159	124	661.08

Totals mls of water collected	352
Increase in grams of silica gel	13.73
Total Gas Volume	52.023
Bws	0.3309
One - Bws	0.6691
Wet Molecular Weight of Stack Gas	25.92
Stack Pressure	30.185
Stack Velocity FPS	43.462
Stack Volumetric Flow Rate TSTD Ft3/Min	63275

Particulate Calculations

Inorganic	
Large Tare, grams	312.1713
Large Final, grams	312.1860
Mr =	0.01470
Sum Water + MeCl2, Mb (or 5% of mass)	0
Vic =	652
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	14.7
Organic	
Small Tare,grams	134.2654
Small Final,grams	134.2792
Mo, mg =	13.75
CPM mg/DSCF =	0.8174
CPM mg/TSCF =	0.5469
CPM mg	28.4500
5% of mass of CPM	1.4225
Front Half	
Final Beaker Weight	175.2766
Tare Beaker Weight	175.2437
Final Filter Weight	0.6251
Tare Weight of Filter	0.5545
Net Sample Weight	0.1035
Mg Particulate/DSCF	2.9736
Mg Particulate/TSCF	1.9895

Total Particulates	Total	Front Half	Back Half
Lbs Particulate/Day	509.50	399.65	109.85
Lbs Particulate/Hr	21.23	16.65	4.58
Lbs Particulate/Ton of Product	6.1847	4.8512	1.3335

Isokinetic Sampling Rate	103.37
Allowable Part. Emission Rate, Lbs/Hr.	49.53

RAW DATA

TEXASGULF INC. PHOSPHATE OEPRATIONS

BLY #1

CONDENSABLE PARTICULATE MATTER WORKSHEET

Date 6-16-92 Plant CA/ #5

Run No. 1 Time 0454

	Filter	Front Half Beaker #33	Back Half Inorganic Beaker # Y	Back Half Inorganic Beaker # V	Organic Beaker # X
Tare	.5414	142.3380	162.73495	153.7255	168.68905
1st Weight	0.6100	142.3802	162.7503	153.7399	168.6978
2nd Weight	0.6100	142.3804	162.7502	153.7391	168.6981
3rd Weight				153.7392	
4th Weight					
5th Weight					
6th Weight					
7th Weight					
Averaged Constant	0.6100	142.3803	162.75025	153.73915	168.69795

Impingers Volumes/Gel Weights

	1st Impinger	2nd Impinger	3rd Impinger	Silica Gel Weights	
Post Volume (mls)	232 + 167	131	103	Post (grams)	684.30
Pre Volume (mls)	100	100	100	Pre (grams)	675.36

Revised 07/11/91
TGEA027.WR1

TEXASGULF INC. PHOSPHATE OPERATIONS

CONSOLE WORKSHEET

Box #1

Plant Calciner #5 Date 6-16-92 Time 0954 Run 1

Mtr Box 4 Meter H@ 1.7897 K Factor 1.71 Barometric 30.23

Assmd Moist 3% Nozzle Dia. ③ .2393 Dry Gas X .9910 Console Oper JT

	PT	Smple Min.	Head Delta P	Orifice Delta H	Meter Ft3 671.700	Meter In oF	Meter Out oF	Stack oF	Hot Box oF	Imp. oF	Vacuum "Hg
0954	1	3	.50	.86	673.3	95	88	M5 ~~245~~	225		6.0
	2	6	.67	1.15	675.1	101	88	162	230		8.6
	3	9	.75	1.28	677.0	103	87	162	225		9.8
	4	12	.79	1.35	679.0	105	88	163	230		11.3
	5	15	.69	1.18	680.9	107	89	161	230		9.0
	6	18	.64	1.09	682.6	109	90	162	230		8.8
	7	21	.39	.67	684.1	110	90	163	240		5.8
	8	24	.30	.51	685.4	109	91	162	240	66	4.9
	9	27	.25	.43	686.6	109	91	163	230	68	4.0
	10	30	.20	.34	687.6	109	93	162	230	68	3.4
	11	33	.21	.36	688.7	110	92	162	235	68	3.4
1030	12	36	.21	.36	689.752	110	93	161	245	68	3.4
	13	3	.31	.53	691.0	100	92	148	225		5.0
	14	6	.51	.87	693.5	96	90	162	225		6.0
	15	9	.43	.74	694.0	99	89	163	225		6.0
	16	12	.47	.80	695.6	104	89	162	230		6.2
	17	15	.60	1.03	697.3	106	89	163	230		8.1
	18	18	.63	1.08	699.1	107	89	163	240		8.8
	19	21	.38	.65	700.5	108	90	162	245		5.9
	20	24	.40	.68	702.0	110	91	162	235	66	5.9
	21	27	.45	.77	703.5	111	91	163	240	66	6.2
	22	30	.47	.80	705.0	112	92	162	240	68	6.9
	23	33	.44	.75	706.5	112	92	162	245	68	6.7
1142	24	36	.43	.74	708.059	113	93	161	245	68	6.5
	Total										
	Avg										

Pre 1016
Hot Box 1039
Imp 1044

Probe and Sample Box Operator RL

Pre Leak Check At 10.0 "Hg = .011 C.F.M. Post Leak Check At 11.8 "Hg .014 C.F.M.

Pitot Leak Check Red ✓ Green ✓

$K = (846.72 \times D_n^4 \times H@ \times Cp^2 \times (1 - Bws)^2 \times (M_d / M_s) \times (P_s / P_m) \times (T_m oR / T_s oR))$

1.71 = (846.72 x ( ) x ( ) x ( ) x ( ) x ( ) x (/) x (/) x (/)

.0032792 1.7897 .7056 .4761 29.832/26.164 560/677

TGEA021.WR1

TEXASGULF INC. PHOSPHATE OEPRATIONS

Box #2

CONDENSABLE PARTICULATE MATTER WORKSHEET

Date 6-16-92 Plant Cal #5

Run No. 2 Time 1155

	Filter	Front Half Beaker #34	Back Half Inorganic Beaker # Z	Back Half Inorganic Beaker # G	Organic Beaker # W
Tare	15407 ~~[illegible]~~7	152.22145	137.64335	138.3134	138.12255
1st Weight	0.6029	152.2627	137.6567	138.3271	138.1406
2nd Weight	0.6028	152.2629	137.6566	138.3265	138.1404
3rd Weight				138.3266	
4th Weight					
5th Weight					
6th Weight					
7th Weight					
Averaged Constant	0.60285	152.2628	137.65665	138.32655	138.1405

Impingers Volumes/Gel Weights

	1st Impinger	2nd Impinger	3rd Impinger	Silica Gel Weights	
Post Volume (mls)	233 + 174	136	104	Post (grams)	646.21
Pre Volume (mls)	100	100	100	Pre (grams)	636.50

Revised 07/11/91
TGEA027.WR1

TEXASGULF INC. PHOSPHATE OPERATIONS

Box #2

CONSOLE WORKSHEET

Plant Cal 45 Date 6-16-92 Time 1155 Run 2

Mtr Box 4 Meter H@ 1.7897 K Factor 1.69 Barometric 30.23

Assmd Moist 3% Nozzle Dia. .3386 Dry Gas X .9910 Console Oper JT

	PT	Smple Min.	Head Delta P	Orifice Delta H	Meter Ft3 712.400	Meter In oF	Meter Out oF	Stack oF	Hot Box oF	Imp. oF	Vacuum "Hg
1155	1	3	.46	.78	713.9	96	89	142	225		7.0
	2	6	.72	1.22	715.7	100	89	161	225		12.0
	3	9	.82	1.39	717.7	99	89	162	230		14.0
	4	12	.83	1.40	719.8	99	90	161	225		14.8
	5	15	.72	1.22	721.7	101	90	162	230		12.9
	6	18	.66	1.12	723.5	105	90	162	235		12.0
	7	21	.47	.79	725.1	106	90	161	240		7.8
	8	24	.35	.59	726.5	108	92	160	240		6.4
	9	27	.28	.47	727.7	109	92	160	240	66	5.5
	10	30	.25	.42	728.8	110	92	161	240	66	5.1
	11	33	.21	.35	729.9	110	93	162	235	68	4.8
1231	12	36	.21	.35	730.973	110	94	161	235	68	4.8
1235	13	3	.24	.41	732.0	102	93	144	225		5.0
	14	6	.32	.54	733.3	108	93	160	225		5.8
	15	9	.41	.69	734.7	110	93	162	225		7.1
	16	12	.50	.85	736.3	113	94	161	225		8.9
	17	15	.64	1.08	738.0	113	94	162	225		11.0
	18	18	.63	1.06	739.8	113	94	162	230		12.9
	19	21	.37	.63	741.2	113	95	163	225		7.2
	20	24	.40	.68	742.7	113	95	162	225		7.8
	21	27	.44	.74	744.2	114	95	162	230	68	8.1
	22	30	.48	.81	745.7	115	96	162	225	66	9.0
	23	33	.45	.76	747.2	114	96	161	225	66	8.8
1311	24	36	.45	.76	748.801	115	96	160	230	66	8.8
	Total										
	Avg										

Probe and Sample Box Operator HL

Pre Leak Check At 10.0 "Hg = .010 C.F.M. Post Leak Check At 15.0 "Hg .018 C.F.M.

Pitot Leak Check Red ✓ Green ✓

$K = (846.72 \times D_n^4 \times H@ \times Cp^2 \times (1 - Bws)^2 \times (M_d / M_s) \times (P_s / P_m) \times (T_m oR / T_s oR))$

1.69 = (846.72 x ( ) x ( ) x ( ) x ( ) x ( ) x (/) x (/) x (/)

TGEA021.WR1 .003741 1.1047 .1046 .4761 29.892/76164 560/672

Box # 3

TEXASGULF INC. PHOSPHATE OEPRATIONS

CONDENSABLE PARTICULATE MATTER WORKSHEET

Date 6-16-92

Plant CAI #5

Run No. 3

Time 1348

	Filter	Front Half Beaker #17	Back Half Inorganic Beaker #5	Back Half Inorganic Beaker #18	Organic Beaker #C
Tare	.5545	175.24365	141.1963	170.9750	134.2654
1st Weight	0.6251	175.2756	141.2050	170.9828	134.2789
2nd Weight	0.6251	175.2765 ✓	141.2040 ✓	170.9820 ✓	134.2794
3rd Weight		175.2766 ✓	141.2036 ✓	170.9824 ✓	
4th Weight					
5th Weight					
6th Weight					
7th Weight					
Averaged Constant	0.6251	175.27655	141.2038	170.9822	134.27915

Impingers Volumes/Gel Weights

	1st Impinger	2nd Impinger	3rd Impinger	Silica Gel Weights	
Post Volume (mls)	240+129	159	124	Post (grams)	661.08
Pre Volume (mls)	100	100	100	Pre (grams)	647.35

Revised 07/11/91
TGEA027.WR1

TEXASGULF INC. PHOSPHATE OPERATIONS

Box 3

CONSOLE WORKSHEET

Plant Calcining 45 Date 6-16-92 Time 1348 Run 3

Mtr Box 4 Meter H@ 1.7897 K Factor 1.72 Barometric 30.23

Assmd Moist 3% Nozzle Dia. .2393 Dry Gas X .9910 Console Oper JT

	PT	Smple Min.	Head Delta P	Orifice Delta H	Meter Ft3 757.400	Meter In oF	Meter Out oF	Stack oF	Hot Box oF	Imp. oF	Vacuum "Hg
1348	1	3	.45	.77	758.9	96	92	142	228		5.9
	2	6	.72	1.24	760.8	104	92	163	225		10.8
	3	9	.83	1.43	762.8	105	92	164	230		13.5
	4	12	.85	1.46	764.8	105	92	163	240		15.6
	5	15	.75	1.29	766.8	105	92	163	245		13.9
	6	18	.70	1.20	768.7	106	93	162	235		12.9
	7	21	.45	.77	770.3	109	93	161	235		8.0
	8	24	.36	.62	771.7	111	95	162	245		6.2
	9	27	.30	.52	773.0	113	95	162	240	64	5.2
	10	30	.23	.40	774.1	113	96	162	230	66	4.5
	11	33	.21	.36	775.1	112	95	162	230	68	4.0
1424	12	36	.21	.36	776.176	113	96	161	245	68	4.0
1428	13	3	.27	.46	777.3	107	96	145	245		4.8
	14	6	.31	.53	778.5	109	96	161	245		5.0
	15	9	.52	.89	780.1	114	96	163	225		7.8
	16	12	.55	.95	781.8	115	96	162	225		8.2
	17	15	.64	1.10	783.6	116	96	164	225		9.5
	18	18	.67	1.15	785.5	116	97	163	230		10.0
	19	21	.41	.71	787.0	116	97	162	235		7.0
	20	24	.38	.65	788.4	116	98	163	245		6.2
	21	27	.45	.77	789.9	116	98	162	245	65	7.1
	22	30	.43	.74	791.4	116	97	163	225	66	7.0
	23	33	.42	.72	792.9	117	98	162	225	66	7.0
1504	24	36	.42	.72	794.406	117	98	160	230	67	7.0
	Total										
	Avg										

Probe and Sample Box Operator BL

Pre Leak Check At 29 "Hg = .007 C.F.M. Post Leak Check At 16 "Hg .006 C.F.M.

Pitot Leak Check Red ✓ Green ✓

$K = (846.72 \times D_n^4 \times H@ \times Cp^2 \times (1 - Bws)^2 \times (M_d / M_s) \times (P_s / P_m) \times (T_m oR / T_s oR))$

.172 = (846.72 x ( ) x ( ) x ( ) x ( ) x ( ) x (/) x (/) x (/)

TGEA021.WR1 .0037797 1.1897 .7056 .4761 29.837 / 26.164 560 / 672

ISOKINETIC WORKSHEET

DATE: 6-16 92 STACK: Calciner #5 TIME: /

METER BOX: 4 OPERATOR JT

1. NOZZLE DIA. (A) ③ .2392 ⑥ .2394 " (B) .2390 .2375 " (C) .2396 .2389 "

2. ▲H @ 1.7897 Y=.9910 Avg. ③ .239 ⑥ .238

3. C_p .84 Assy. # /

4. BAROMETRIC PRESSURE (P_b) 30.23 "Hg

▲P STATIC -.61 "

5. STACK PRESSURE (P_s) 30.19 "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} .31 X 100 = 31 % H_2O

11. M_d 29.832 lb./lb. - MOLE

12. M_s 26.164 lb./lb. - MOLE

13. T_s 162 °F + 460 = 622 °R

14. T_m 100 °F + 460 = 56 °R

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

Preliminary

	▲P	T_s
1.	.41	
2.	.71	159
3.	.80	161
4.	.79	161
5.	.77	160
6.	.65	161
7.	.47	162
8.	.32	163
9.	.28	163
10.	.23	162
11.	.19	161
12.	.19	160

(1) $V.P. = S.V.P. - \left[(3.67 \times 10^{-4}) \cdot (P_s) \cdot (T_d - T_w) \cdot \left[1 + \left(\frac{T_w - 32}{1571}\right)\right]\right]$

$_____ = _____ - \left[(\quad) \cdot (\quad) \cdot (\quad) \cdot \left[1 + (\frac{\quad}{1571}\right.\right.$

(2) $B_{ws} = \frac{V.P.}{P_s} = _____$

(3) $M_d = \left((0.44) \cdot (\%\ CO_2)\right) + \left((0.32) \cdot (\%\ O_2)\right) + \left((0.28) \cdot (\%\ CO + \%\ N_2)\right)$

$\underline{29.832} = \left((0.44) \cdot (\quad)\right) + \left((0.32) \cdot (\quad)\right) + \left((0.28) \cdot (\quad + \quad)\right)$

(4) $M_s = \left[(M_d) \cdot (1 - B_{ws})\right] + \left[(18) \times (B_{ws})\right]$

$\underline{28.164} = \left[(\quad) \cdot (.69)\right] + \left[(18) \cdot (.31)\right]$

(5) $\Delta H = K \cdot \Delta P$

$K = (846.72) \cdot (D_n^4) \cdot (\Delta H@) \cdot (C_p^2) \cdot (1-B_{ws})^2 \cdot \left(\frac{M_d}{M_s}\right) \cdot \left(\frac{P_s}{P_m}\right) \cdot \left(\frac{T_m\ {}^oR}{T_s\ {}^oR}\right)$

$_____ = (846.72) \cdot (\quad) \cdot (\quad) \cdot (\quad) \cdot (\quad) \cdot (\quad) \cdot (____)(____\ {}^oR\ {}^oR)$

(6) $\% I = \frac{(T_s\ {}^oR) \cdot (\text{GAS VOL. S.T.P.}) \cdot (P_{std}) \cdot (100)}{(T_{std}\ {}^oR) \cdot (V_s\ \text{ft./sec.}) \cdot (P_s) \cdot (\text{Sampling Time Min.})\ (60)\ (A_n)\ (1-B_{ws})}$

$_____\ \% = \frac{(\quad {}^oR) \cdot (\quad \text{stp}) \cdot (29.92) \cdot (100)}{(528^oR) \cdot (\quad \text{ft/sec.}) \cdot (\quad \text{"Hg}) \cdot (\quad \text{Min.}) \cdot (60\ \frac{\text{Sec.}}{\text{Min.}}) \cdot (\quad \text{ft}^2)}$

Orsat Analyses

Date 6-15-92 Plant Calciner #5 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	8.2	21.2	
	Percent	8.2	13.0	78.8
Run 2	Burette Reading	8.2	21.2	7
	Percent	8.2	13.0	78.8
Run 3	Burette Reading	8.2	21.2	
	Percent	8.2	13.0	78.8

Ps = (Static Press/13.6) + Pb

V.P.= S.V.P. - ((3.67*10^-4) * (Ps) * (Td - Tw) * ((1 + (Tw-32)/1571))

Bws = V.P./Ps

Md = ((0.44 * %CO2) + (0.32 * %O2) + (0.28 * %CO+N))
3.608 4.16 22.064

Ms = ((Md * (1-Bws)) + ((18 * Bws))

V.P.= _____

Bws = _____

Md = 29.832

Ms = _____

Cyclonic Flow Test

Plant CAL #5 Technician(s) JH + PF

Date 2-28-91 Time 1000

SW Port

Point #	Delta P	Angle Alpha
1	.74	4°
2	1.10	6°
3	1.30	8°
4	1.20	5°
5	.96	5°
6	.88	3°
7	.36	4°
8	.36	3°
9	.26	2°
10	.20	0°
11	.18	4°
12	.16	7°
Average		1 of 2

Pitot Leak ✓
R+G OK

Average absolute Alpha must not be greater than 20 degrees.

Cyclonic Flow Test

Plant CAL*S Technician(s) JH + PF

Date 2-28-91 Time 1227

NW

Point #	Delta P	Angle Alpha
1	.18 ~~.26~~	-4 ~~4°~~
2	.34	0
3	.42	0
4	.40	5°
5	.52	0
6	.52	0
7	.40	0
8	.30	0
9	.30	0
10	.32	2
11	.28	3
12	.24	4
Average		2.9°

(STATIC .36)

2 of 2

Average absolute Alpha must not be greater than 20 degrees.

CALIBRATIONS

TEXASGULF INC. PHOSPHATE OPERATIONS

Console Calibration *PRE*

06/05/92		Console	4
Technician Jack Taylor		Number of Runs	8
Barometric Pressure	29.85	Test Meter Factor	0.9986
Test Meter No.	699357		
Delta H Setting	0.25	Meter Pressure	29.87
Test Meter Initial	686.800		
Test Meter Final	691.806	Test Dry Gas Volume	5.006
Console Meter Inital	241.100		
Console Meter Final	246.382	Console Dry Gas Volume	5.2821
Test Meter oF In	73		
Test Meter oF Out	72	Test Average oR	532.5
Console Meter oF In	94		
Console Meter oF Out	80	Console Average oR	547
Total Time In Mins.	18.90	Corr Test Meter Vol	5.00
Delta Ha=	1.9673	y Factor=	0.9716
Delta H Setting	0.50	Meter Pressure	29.89
Test Meter Initial	692.101		
Test Meter Final	697.114	Test Dry Gas Volume	5.013
Console Meter Inital	246.901		
Console Meter Final	252.219	Console Dry Gas Volume	5.318
Test Meter oF In	74		
Test Meter oF Out	72	Test Average oR	533
Console Meter oF In	104		
Console Meter oF Out	87	Console Average oR	555.5
Total Time In Mins.	13.00	Corr Test Meter Vol	5.01
Delta Ha=	1.8313	y Factor=	0.9799
Delta H Setting	0.75	Meter Pressure	29.91
Test Meter Initial	697.500		
Test Meter Final	702.509	Test Dry Gas Volume	5.009
Console Meter Inital	252.801		
Console Meter Final	258.116	Console Dry Gas Volume	5.315
Test Meter oF In	74		
Test Meter oF Out	72	Test Average oR	533
Console Meter oF In	107		
Console Meter oF Out	89	Console Average oR	558
Total Time In Mins.	10.52	Corr Test Meter Vol	5.00
Delta Ha=	1.7937	y Factor=	0.9834

Page 2
Console Calibration
06/05/92

Delta H Setting	1.00	Meter Pressure	29.92
Test Meter Initial	702.800		
Test Meter Final	707.809	Test Dry Gas Volume	5.009
Console Meter Inital	258.700		
Console Meter Final	263.945	Console Dry Gas Volume	5.245
Test Meter oF In	73		
Test Meter oF Out	72	Test Average oR	532.5
Console Meter oF In	99		
Console Meter oF Out	86	Console Average oR	552.5
Total Time In Mins.	8.97	Corr Test Meter Vol	5.00
Delta Ha=	1.7528	y Factor=	0.9871
Delta H Setting	1.25	Meter Pressure	29.94
Test Meter Initial	708.100		
Test Meter Final	718.112	Test Dry Gas Volume	10.012
Console Meter Inital	264.500		
Console Meter Final	274.980	Console Dry Gas Volume	10.48
Test Meter oF In	73		
Test Meter oF Out	72	Test Average oR	532.5
Console Meter oF In	107		
Console Meter oF Out	88	Console Average oR	557.5
Total Time In Mins.	16.05	Corr Test Meter Vol	10.00
Delta Ha=	1.7400	y Factor=	0.9957
Delta H Setting	1.50	Meter Pressure	29.96
Test Meter Initial	718.500		
Test Meter Final	728.811	Test Dry Gas Volume	10.311
Console Meter Inital	275.500		
Console Meter Final	286.287	Console Dry Gas Volume	10.787
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.	15.20	Corr Test Meter Vol	10.30
Delta Ha=	1.7593	y Factor=	0.9992

Console Calibration
05-Jun-92

Delta H Setting	1.75	Meter Pressure	29.98
Test Meter Initial	729.100		
Test Meter Final	739.114	Test Dry Gas Volume	10.014
Console Meter Inital	286.900		
Console Meter Final	297.382	Console Dry Gas Volume	10.482
Test Meter oF In	72		
Test Meter oF Out	71	Test Average oR	531.5
Console Meter oF In	111		
Console Meter oF Out	92	Console Average oR	561.5
Total Time In Mins.	13.62	Corr Test Meter Vol	10.00
Delta Ha=	1.7345	y Factor=	1.0035
Delta H Setting	2.00	Meter Pressure	30.00
Test Meter Initial	739.600		
Test Meter Final	749.616	Test Dry Gas Volume	10.016
Console Meter Inital	298.300		
Console Meter Final	308.760	Console Dry Gas Volume	10.46
Test Meter oF In	72		
Test Meter oF Out	72	Test Average oR	532
Console Meter oF In	114		
Console Meter oF Out	93	Console Average oR	563.5
Total Time In Mins.	12.77	Corr Test Meter Vol	10.00
Delta Ha=	1.7389	y Factor=	1.0079
Average Delta Ha=	1.7897	Average y Factor=	0.9910

TEXASGULF INC. PHOSPHATE OPERATIONS

Console Calibration *POST*

06/17/92		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	759.302		
Test Meter Final	764.392	Test Dry Gas Volume	5.09
Console Meter Inital	805.401		
Console Meter Final	810.777	Console Dry Gas Volume	5.376
Test Meter oF In	73		
Test Meter oF Out	72	Test Average oR	532.5
Console Meter oF In	100		
Console Meter oF Out	83	Console Average oR	551.5
Total Time In Mins.	17.70	Corr Test Meter Vol	5.08
Delta Ha=	1.6275	y Factor=	0.9786

Delta H Setting	0.50	Meter Pressure	30.40
Test Meter Initial	764.700		
Test Meter Final	769.711	Test Dry Gas Volume	5.011
Console Meter Inital	811.401		
Console Meter Final	816.719	Console Dry Gas Volume	5.318
Test Meter oF In	72		
Test Meter oF Out	72	Test Average oR	532
Console Meter oF In	104		
Console Meter oF Out	87	Console Average oR	555.5
Total Time In Mins.	12.72	Corr Test Meter Vol	5.00
Delta Ha=	1.7187	y Factor=	0.9813

Delta H Setting	0.75	Meter Pressure	30.42
Test Meter Initial	770.000		
Test Meter Final	775.007	Test Dry Gas Volume	5.007
Console Meter Inital	817.401		
Console Meter Final	822.688	Console Dry Gas Volume	5.287
Test Meter oF In	74		
Test Meter oF Out	72	Test Average oR	533
Console Meter oF In	104		
Console Meter oF Out	90	Console Average oR	557
Total Time In Mins.	10.40	Corr Test Meter Vol	5.00
Delta Ha=	1.7280	y Factor=	0.9865

Page 2
Console Calibration
06/17/92

Delta H Setting	1.00	Meter Pressure	30.43
Test Meter Initial	775.700		
Test Meter Final	780.711	Test Dry Gas Volume	5.011
Console Meter Inital	823.500		
Console Meter Final	828.769	Console Dry Gas Volume	5.269
Test Meter oF In	74		
Test Meter oF Out	72	Test Average oR	533
Console Meter oF In	109		
Console Meter oF Out	90	Console Average oR	559.5
Total Time In Mins.	8.98	Corr Test Meter Vol	5.00
Delta Ha=	1.7074	y Factor=	0.9945

Delta H Setting	1.25	Meter Pressure	30.45
Test Meter Initial	781.200		
Test Meter Final	791.208	Test Dry Gas Volume	10.008
Console Meter Inital	829.500		
Console Meter Final	840.014	Console Dry Gas Volume	10.514
Test Meter oF In	71		
Test Meter oF Out	71	Test Average oR	531
Console Meter oF In	112		
Console Meter oF Out	92	Console Average oR	562
Total Time In Mins.	16.12	Corr Test Meter Vol	9.99
Delta Ha=	1.7036	y Factor=	1.0030

Delta H Setting	1.50	Meter Pressure	30.47
Test Meter Initial	791.600		
Test Meter Final	801.606	Test Dry Gas Volume	10.006
Console Meter Inital	840.600		
Console Meter Final	851.064	Console Dry Gas Volume	10.464
Test Meter oF In	71		
Test Meter oF Out	71	Test Average oR	531
Console Meter oF In	109		
Console Meter oF Out	90	Console Average oR	559.5
Total Time In Mins.	14.75	Corr Test Meter Vol	9.99
Delta Ha=	1.7200	y Factor=	1.0025

Page 3
Console Calibration
17-Jun-92

Delta H Setting	1.75	Meter Pressure	30.49
Test Meter Initial	802.200		
Test Meter Final	812.224	Test Dry Gas Volume	10.024
Console Meter Inital	852.201		
Console Meter Final	862.657	Console Dry Gas Volume	10.456
Test Meter oF In	72		
Test Meter oF Out	71	Test Average oR	531.5
Console Meter oF In	112		
Console Meter oF Out	91	Console Average oR	561.5
Total Time In Mins.	13.68	Corr Test Meter Vol	10.01
Delta Ha=	1.7170	y Factor=	1.0071
Delta H Setting	2.00	Meter Pressure	30.51
Test Meter Initial	812.800		
Test Meter Final	822.813	Test Dry Gas Volume	10.013
Console Meter Inital	863.501		
Console Meter Final	873.914	Console Dry Gas Volume	10.413
Test Meter oF In	72		
Test Meter oF Out	71	Test Average oR	531.5
Console Meter oF In	112		
Console Meter oF Out	92	Console Average oR	562
Total Time In Mins.	12.77	Corr Test Meter Vol	10.00
Delta Ha=	1.7121	y Factor=	1.0104
Average Delta Ha=	1.7043	Average y Factor=	0.9955

TEXASGULF INC. PHOSPHATE OPERATIONS

Temperature Calibrations

Console 4 Date 6-5-92

Technician JT

Instrument		Indicator oF	Actual oF	Difference oF
Dry Gas Meter In (Must agree: +/- 5.4 oF)	A	32	32.0	0
	B	70	71.0	1.0
	C	168	169.5	1.5
Dry Gas Meter Out (Must agree: +/- 5.4 oF)	A	32	32.5	0.5
	B	69	71.0	2.0
	C	163	166.0	3.0
Impinger Thermometer # 1 (Must agree: +/- 2 oF)	A	34	32.5	1.5
	B	72	70.0	2.0
	C	145	145.8	0.8
Impinger Thermometer # 2 (Must agree: +/- 2 oF)	A	33	32.5	0.5
	B	71	70.0	1.0
	C	148	146.5	1.5
Impinger Thermometer # 3 (Must agree: +/- 2 oF)	A	34	32.5	1.5
	B	72	70.0	2.0
	C	141	139.8	1.2
HotBox Thermometer # 1 (Must agree: +/- 5.4 oF)	A	183	179.0	4.0
	B	265	266.5	1.5
	C	70	72.0	2.0
HotBox Thermometer # 2 (Must agree: +/- 5.4 oF)	A	71	72.0	1.0
	B	275	276.0	1.0
	C	175	171.5	3.5
HotBox Thermometer # 3 (Must agree: +/- 5.4 oF)	A	68	72.0	4.0
	B	255	259.0	4.0
	C	185	180.0	5.0

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TEXASGULF INC. PHOSPHATE OPERATIONS

Temperature Calibrations

Date 7-9-92

Technician JT

Instrument		Indicator oF	Actual oF	Difference %
Stack Thermocouple Assy # 3	A	70	70.2	0.3
(Must agree: +/- 1.5 %)	A	70	70.2	0.3
	A	69	70.0	1.4
	B	137	137.2	0.2
	B	135	136.4	1.0
	B	133	134.2	1.5
	C	216	218.0	0.9
	C	215	216.8	0.8
	C	214	214.2	0.6
Stack Thermocouple Assy # 6	A	69	70.0	1.4
(Must agree: +/- 1.5 %)	A	69	69.8	1.1
	A	69	69.7	1.0
	B	123	123.6	0.5
	B	121	122.1	0.9
	B	119	120.5	1.2
	C	258	259.9	0.7
	C	255	257.4	0.9
	C	252	254.8	1.1
Stack Thermocouple Assy #	A			
(Must agree: +/- 1.5 %)	A			
	A			
	B			
	B			
	B			
	C			
	C			
	C			
Probe Heater Assy # 3		212° (0)	.75 CFM	
Probe Heater Assy # 6		212° (0)	.75 CFM	
Probe Heater Assy #				

TGEA026.WR1 06/13/91

TEXASGULF INC. PHOSPHATE OPERATIONS

Temperature Calibrations

Date 6-18-92

Technician ST

Instrument		Indicator oF	Actual oF	Difference %
Stack Thermocouple Assy # 3	A	70	70.5	0.7
(Must agree: +/- 1.5 %)	A	70	71.0	1.4
	A	70	71.0	1.4
	B	139	139.3	0.2
	B	137	137.2	0.1
	B	133	133.5	0.4
	C	214	213.5	0.2
	C	220	219.5	0.2
	C	221	220	0.5
Stack Thermocouple Assy # 6	A	70	71.0	1.4
(Must agree: +/- 1.5 %)	A	70	71.0	1.4
	A	70	71.0	1.4
	B	140	142.0	1.4
	B	138	139.6	1.1
	B	136	137.0	0.7
	C	220	223	1.3
	C	220	223.5	1.5
	C	220	222.5	1.1
Stack Thermocouple Assy # _____	A			
(Must agree: +/- 1.5 %)	A			
	A			
	B			
	B			
	B			
	C			
	C			
	C			
Probe Heater Assy # 3		212°F @ .75 CFM		
Probe Heater Assy # 6		214°F @ .75 CFM		
Probe Heater Assy # _____				

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[redacted]-Calibration

Date 6-17-92 Tech JT

Delta H Magnehelic

Leak Check @ .41 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	.41	.40	.01
−	.39	.38	.01

Leak Check @ 1.07 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	1.07	1.06	.01
−	1.05	1.06	.01

Leak Check @ 1.79 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	1.79	1.79	0
−	1.90	1.90	0

Delta P Magnehelic

Leak Check @ .42 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	.27	.26	.01
−	.42	.43	.01

Leak Check @ 1.10 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	.98	.97	.01
−	1.10	1.10	0

Leak Check @ 1.81 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	1.82	1.81	.01
−	1.81	1.79	.02

TEXASGULF INC. PHOSPHATE OPERATIONS

Temperature Calibrations

Console 4 Date 6-17-92

Technician SJ

Instrument		Indicator oF	Actual oF	Difference oF
Dry Gas Meter In (Must agree: +/- 5.4 oF)	A	33	34.5	1.5
	B	70	70.5	0.5
	C	214	213.5	0.5
Dry Gas Meter Out (Must agree: +/- 5.4 oF)	A	33	34.0	1.0
	B	70	70.5	0.5
	C	235	239.5	4.5
Impinger Thermometer # 1 (Must agree: +/- 2 oF)	A	34	32.0	2.0
	B	70	71.0	1.0
	C	186	188.0	2.0
Impinger Thermometer # 2 (Must agree: +/- 2 oF)	A	34	32.5	1.5
	B	69	71.0	2.0
	C	216	218.0	2.0
Impinger Thermometer # 3 (Must agree: +/- 2 oF)	A	69	71.0	2.0
	B	33	31.5	1.5
	C	184	185.5	1.5
HotBox Thermometer # 1 (Must agree: +/- 5.4 oF)	A	70	70.5	0.5
	B	165	167.2	2.2
	C	269	266.0	3.0
HotBox Thermometer # 2 (Must agree: +/- 5.4 oF)	A	71	70.5	0.5
	B	169	172.5	3.5
	C	266	267.5	1.5
HotBox Thermometer # 3 (Must agree: +/- 5.4 oF)	A	67	70.5	3.5
	B	165	166.5	1.5
	C	270	272.5	2.5

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MeCl

~~ACETONE~~ BLANK WORKSHEET

Lot # 910309

BEAKER WT. INIT.	(38) 139.6226	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: Calcinor #2 + 4
#1 + #5

ACETONE BLANK WORKSHEET

LOT # 2443 KJBM

BEAKER WT. INIT.	147.7354	FILTER WT. INIT.	
BEAKER WT. FINAL	147.7353	FILTER WT. FINAL	
WT. OF RESIDUE	-.00005	NET FILTER WT.	

200 MLS

CONSTANT WTS.	
BEAKER	FILTER
147.7352 ✓	
147.7381	
147.7355 ✓	

TECHNICIAN:

DATE:

SOURCE PERFORMANCE FOR: COAL, #1 & #5 Calciner

PRODUCTION DATA

NUMBER 5 CALCINER----JUNE 16, 1992

$$\frac{94 \text{ tons feed}}{\text{hour}} \rightarrow \quad (94)\ \frac{(100\% - \%\ H_2O)}{100} = \frac{\text{Tons dry feed}}{\text{hour}}$$

$$\frac{(94 \text{ t feed})(100 - 12.36)}{\text{hour} \quad 100} = (94)\ (0.8764) = \frac{82.4 \text{ t dry feed}}{\text{hour}}$$

Loss on Ignition is calculated each month from assays. In June it was 7.19%.

(So) Coal usage is based on consumption per ton calcine and is $\frac{38.3\# \text{ coal}}{\text{ton calcine}}$ *for a YTD figure.*

Calculate coal usage based on Dry Feed:

Take coal usage $\frac{(38.3\# \text{ coal})}{\text{ton calcine}} \quad \frac{(1 \text{ ton calcine})}{(1.0719 \text{ tons dry feed})} =$

$\frac{35.73\# \text{ coal}}{(1 \text{ ton dry feed})}$ *or at* $\frac{82.4 \text{ tons dry feed}}{\text{hour}} =$

$$\frac{(35.73\# \text{ coal})}{\text{ton dry feed}} \ \frac{(82.4 \text{ tons dry feed})}{\text{hour}} = \frac{2{,}944.15\# \text{ coal}}{\text{hour}}$$

or $\frac{1.472 \text{ tons coal}}{\text{hour}}$

June 23, 1992