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. 1

Dear Jim:

As per the requirements of Air Quality Permit No. 2331R10, Specific Conditions and Limitations No. 7, the No. 1 Calciner was compliance tested for particulate emissions and sulfur dioxide on June 10, 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,

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)
15-09-025 (w/encl)

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SOURCE PERFORMANCE TEST

CALCINER NO. 1

TEXASGULF INC.

PHOSPHATE OPERATIONS

AURORA, NC

JUNE 10, 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-15-09-025

TEXASGULF INC. PHOSPHATE OPERATIONS

Summary

On June 10, 1992 sampling and analyses were conducted to determine the particulate emission rate at Texasgulf's Calciner No. 1 using Method 5 w/Backhalf Analysis.

The results of this series of runs showed the average particulate emission rate to be 41.00 pounds per hour. The average dry feed rate during the testing was 80 tons/hour. The average allowable particulate emission rate at this feedrate is 49.22 pounds of particulate/hour. A total of 4 stack samples were taken. Run 1 was voided due to the cold cyclone plugging. During Run 2 it appears that the probe came in contact with the stack wall. This caused a higher result.

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

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. 1

Method 5 W/Backhalf	06/10/92	06/10/92	06/10/92
	Run 2	Run 3	Run 4
Stack Volumetric Flow Rate, TSCFM	61,770	61,456	61,484
Sample Volume, DSCF	39.174	34.209	33.454
Lbs. of Particulate/Hr. Total	59.67*	36.10	27.21
Lbs. of Particulate/Hr. Front	53.94	24.72	23.91
Lbs. of Particulate/Hr. Back	5.73	11.38	3.30
Percent Isokinetic	104.74	105.41	100.56
Average Lbs of Particulate/Hr.(Total)			41.00
Allowable Lbs/Hr.			49.22
Dry Feed Rate TPH	79.9	79.9	79.9
Average Dry Feed Rate TPH			79.9

* Assumed probe hit stack wall

TEXASGULF INC. PHOSPHATE OPERATIONS

Calciner No. 1

Stack Data Summary Method 5 w/Backhalf

Date	Time	Run #	Velocity FPS	Volumetric Flow TSCF/Min	Average Stack Temp (oF)
06/10	11:13	2	43.190	61,770	167
06/10	13:21	3	42.885	61,456	166
06/10	15:10	4	43.067	61,484	168

TEXASGULF memo

Date: 06/24/92

To: Mill Superintendent

From: Environmental Affairs

Subject: EPA Method 5 w/Backhalf Isokinetic Sample
Calciner #1 Run 2

Sample Date	Time
06/10/92	11:13

Dry Feed Rate, TPH	Stack Volumetric Flow Rate TSTD Ft3/Min
80	61,770

Lbs. Particulate/Hr.		Lbs. Particulate/Ton of Product	
Total	59.67	Total	17.9259
Front Half	53.94	Front Half	16.2051
Back Half	5.73	Back Half	1.7209

M.R. Ashby

Supervisor, Environmental Laboratory File: ec-15-09-025

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

This stack sample was taken isokinetically. The %I = 104.74

TEXASGULF INC. PHOSPHATE OPERATIONS

Method 5 w/Backhalf		Rpt. Date	06/24/92
Run 2		Smple Date	06/10/92
Calciner #1		Smple Time	11:13
Barometric Pressure	29.98	Initial Dry Gas Mtr	377.400
Stack Static Pressure	-0.39	Final Dry Gas Mtr	419.186
Stack Diameter	72	Dry Gas Factor	0.9910
Nozzle Diameter	0.2220	Dry Mole Wt Stk Gas	29.74
Pitot Tube Corr	0.84	Stack Pressure	29.95
Sampling Time in Min.	96	Feed Rate, TPH	90
		Bulk Moisture (Lab Analysis)	11.23
		Feed Rate Dry TPH	79.89
Lbs Coal/Ton of Dry Feed	35.7	Coal Feed TPH	1.43
		Process Weight	81.32

		Stk oF	Delta P	Delta H	oF In	oF Out
Pt	1	135	0.49	0.61	90	83
Pt	2	160	0.61	0.76	96	84
Pt	3	170	0.64	0.80	100	85
Pt	4	170	0.58	0.73	104	87
Pt	5	169	0.53	0.66	106	89
Pt	6	169	0.50	0.63	108	90
Pt	7	169	0.31	0.39	108	92
Pt	8	169	0.26	0.33	109	93
Pt	9	169	0.29	0.36	110	94
Pt	10	169	0.33	0.41	112	95
Pt	11	168	0.42	0.53	113	96
Pt	12	167	0.47	0.59	113	97
Pt	13	160	0.25	0.31	98	94
Pt	14	170	0.41	0.51	103	94
Pt	15	171	0.46	0.58	105	94
Pt	16	170	0.50	0.63	107	94
Pt	17	169	0.55	0.69	109	95
Pt	18	168	0.49	0.61	110	95
Pt	19	168	0.29	0.36	110	96
Pt	20	167	0.34	0.43	111	96
Pt	21	170	0.46	0.58	113	96
Pt	22	171	0.51	0.64	113	97
Pt	23	170	0.61	0.76	113	97
Pt	24	169	0.59	0.74	110	98
Averages		167	0.45	0.57	107	93

Stack oR	627	Average Meter Temp oR	560

Gas Volume Collected	41.786
Corrected Gas Volume	41.410
Gas Volume STP	39.174

Calciner #1 06/10/92
Run 2

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	636.67
Final	434	172	103	649.90

Totals mls of water collected	409
Increase in grams of silica gel	13.23
Total Gas Volume	59.049
Bws	0.3366
One - Bws	0.6634
Wet Molecular Weight of Stack Gas	25.79
Stack Pressure	29.951
Stack Velocity FPS	43.190
Stack Volumetric Flow Rate TSTD Ft3/Min	61770
Particulate Calculations	
Inorganic	
Large Tare, grams	319.7743
Large Final, grams	319.7825
Mr =	0.00820
Sum Water + MeCl2, Mb (or 5% of mass)	0
Vic =	709
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	8.2
Organic	
Small Tare,grams	166.9623
Small Final,grams	166.9955
Mo, mg =	33.2
CPM mg/DSCF =	1.0568
CPM mg/TSCF =	0.7011
CPM mg	41.4000
5% of mass of CPM	2.07
Front Half	
Final Beaker Weight	134.9010
Tare Beaker Weight	134.6318
Final Filter Weight	0.6639
Tare Weight of Filter	0.5432
Net Sample Weight	0.38985
Mg Particulate/DSCF	9.9519
Mg Particulate/TSCF	6.6021

Total Particulates	Total	Front Half	Back Half
Lbs Particulate/Day	1432.16	1294.67	137.49
Lbs Particulate/Hr	59.67	53.94	5.73
Lbs Particulate/Ton of Product	17.9259	16.2051	1.7209

Isokinetic Sampling Rate	104.74
Allowable Part. Emission Rate, Lbs/Hr.	49.22

TEXASGULF memo

Date: 06/23/92

To: Mill Superintendent

From: Environmental Affairs

Subject: EPA Method 5 w/Backhalf Isokinetic Sample
Calciner #1 Run 3

Sample Date	Time
06/10/92	13:21

Dry Feed Rate, TPH	Stack Volumetric Flow Rate TSTD Ft3/Min
80	61,456

Lbs. Particulate/Hr.		Lbs. Particulate/Ton of Product	
Total	36.10	Total	10.8447
Front Half	24.72	Front Half	7.4261
Back Half	11.38	Back Half	3.4186

M. L. Ashby

Supervisor, Environmental Laboratory File: ec-15-09-025

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

This stack sample was taken isokinetically. The %I = 105.41

TEXASGULF INC. PHOSPHATE OPERATIONS

Method 5 w/Backhalf		Rpt. Date	06/23/92
Run 3		Smple Date	06/10/92
Calciner #1		Smple Time	13:21
Barometric Pressure	29.98	Initial Dry Gas Mtr	420.800
Stack Static Pressure	-0.39	Final Dry Gas Mtr	457.461
Stack Diameter	72	Dry Gas Factor	0.9910
Nozzle Diameter	0.2400	Dry Mole Wt Stk Gas	29.74
Pitot Tube Corr	0.84	Stack Pressure	29.95
Sampling Time in Min.	72	Feed Rate, TPH	90
		Bulk Moisture (Lab Analysis)	11.23
		Feed Rate Dry TPH	79.89
Lbs Coal/Ton of Dry Feed	35.7	Coal Feed TPH	1.43
		Process Weight	81.32

		Stk oF	Delta P	Delta H	oF In	oF Out
Pt	1	145	0.48	0.83	100	92
Pt	2	163	0.72	1.25	104	92
Pt	3	169	0.78	1.35	105	93
Pt	4	169	0.67	1.16	108	93
Pt	5	170	0.62	1.07	109	94
Pt	6	170	0.50	0.87	111	94
Pt	7	169	0.32	0.55	113	95
Pt	8	169	0.27	0.47	113	96
Pt	9	169	0.29	0.50	114	96
Pt	10	168	0.37	0.64	116	97
Pt	11	168	0.42	0.73	116	98
Pt	12	167	0.44	0.81	117	98
Pt	13	144	0.29	0.50	101	96
Pt	14	162	0.36	0.62	106	96
Pt	15	168	0.42	0.73	109	96
Pt	16	168	0.49	0.85	110	96
Pt	17	167	0.54	0.93	109	96
Pt	18	168	0.45	0.78	109	97
Pt	19	167	0.30	0.52	110	97
Pt	20	167	0.47	0.81	113	97
Pt	21	168	0.49	0.85	112	98
Pt	22	167	0.47	0.81	110	98
Pt	23	168	0.41	0.71	112	98
Pt	24	167	0.23	0.40	113	99
Averages		166	0.45	0.78	110	96

Stack oR	626	Average Meter Temp oR	563

Gas Volume Collected	36.661
Corrected Gas Volume	36.331
Gas Volume STP	34.209

Calciner #1 1 06/10/92

Run 3

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	647.77
Final	418	140	104	660.03

Totals mls of water collected	362
Increase in grams of silica gel	12.26
Total Gas Volume	51.826
Bws	0.3399
One - Bws	0.6601
Wet Molecular Weight of Stack Gas	25.75
Stack Pressure	29.951
Stack Velocity FPS	42.885
Stack Volumetric Flow Rate TSTD Ft3/Min	61456
Particulate Calculations	
Inorganic	
Large Tare, grams	306.9363
Large Final, grams	306.9405
Mr =	0.00420
Sum Water + MeCl2, Mb (or 5% of mass)	0
Vic =	662
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	4.2
Organic	
Small Tare,grams	164.7761
Small Final,grams	164.8444
Mo, mg =	68.35
CPM mg/DSCF =	2.1208
CPM mg/TSCF =	1.3999
CPM mg	72.5500
5% of mass of CPM	3.6275
Front Half	
Final Beaker Weight	137.8741
Tare Beaker Weight	137.8141
Final Filter Weight	0.6491
Tare Weight of Filter	0.5514
Net Sample Weight	0.1576
Mg Particulate/DSCF	4.6070
Mg Particulate/TSCF	3.0409

Total Particulates	Total	Front Half	Back Half
Lbs Particulate/Day	866.42	593.30	273.12
Lbs Particulate/Hr	36.10	24.72	11.38
Lbs Particulate/Ton of Product	10.8447	7.4261	3.4186

Isokinetic Sampling Rate	105.41
Allowable Part. Emission Rate, Lbs/Hr.	49.22

TEXASGULF memo

Date: 06/23/92

To: Mill Superintendent

From: Environmental Affairs

Subject: EPA Method 5 w/Backhalf Isokinetic Sample
Calciner #1 Run 4

Sample Date	Time
06/10/92	15:10

Dry Feed Rate, TPH	Stack Volumetric Flow Rate TSTD Ft3/Min
80	61,484

Lbs. Particulate/Hr.		Lbs. Particulate/Ton of Product	
Total	27.21	Total	8.1751
Front Half	23.91	Front Half	7.1831
Back Half	3.30	Back Half	0.9920

M.R. Asby

Supervisor, Environmental Laboratory File: ec-15-09-025

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

This stack sample was taken isokinetically. The %I = 100.56

TEXASGULF INC. PHOSPHATE OPERATIONS

Method 5 w/Backhalf		Rpt. Date	06/23/92
Run 4		Smple Date	06/10/92
Calciner #1		Smple Time	15:10

Barometric Pressure	29.9800	Initial Dry Gas Mtr	457.800
Stack Static Pressure	-0.39	Final Dry Gas Mtr	493.537
Stack Diameter	72	Dry Gas Factor	0.9910
Nozzle Diameter	0.2389	Dry Mole Wt Stk Gas	29.74
Pitot Tube Corr	0.84	Stack Pressure	29.95
Sampling Time in Min.	72	Feed Rate, TPH	90
		Bulk Moisture (Lab Analysis)	11.23
		Feed Rate Dry TPH	79.89
Lbs Coal/Ton of Dry Feed	35.7	Coal Feed TPH	1.43
		Process Weight	81.32

		Stk oF	Delta P	Delta H	oF In	oF Out
Pt	1	146	0.56	0.92	91	90
Pt	2	166	0.63	1.03	96	90
Pt	3	169	0.77	1.26	97	90
Pt	4	168	0.64	1.05	98	90
Pt	5	168	0.58	0.95	102	91
Pt	6	170	0.52	0.85	106	91
Pt	7	170	0.30	0.49	107	92
Pt	8	169	0.26	0.43	108	93
Pt	9	168	0.28	0.46	110	94
Pt	10	169	0.34	0.56	112	95
Pt	11	170	0.40	0.66	113	96
Pt	12	169	0.43	0.71	113	97
Pt	13	166	0.29	0.48	103	96
Pt	14	168	0.35	0.57	105	96
Pt	15	170	0.46	0.75	107	96
Pt	16	170	0.50	0.82	109	96
Pt	17	169	0.44	0.72	111	97
Pt	18	170	0.29	0.48	111	97
Pt	19	171	0.35	0.57	112	97
Pt	20	170	0.46	0.75	114	97
Pt	21	170	0.52	0.85	114	98
Pt	22	170	0.48	0.79	113	98
Pt	23	170	0.53	0.87	114	99
Pt	24	168	0.55	0.90	112	99
Averages		168	0.46	0.75	107	95

Stack oR	628	Average Meter Temp oR	561

Gas Volume Collected	35.737
Corrected Gas Volume	35.415
Gas Volume STP	33.454

Calciner #1 06/10/92

Run 4 4

Impinger Volumes/Weights

	No.1 (mls)	No. 2 (mls)	No.3 (mls)	No. 4 (g) (silica gel)
Initial	100	100	100	654.19
Final	381	133	103	667.70

Totals mls of water collected	317
Increase in grams of silica gel	13.51
Total Gas Volume	49.012
Bws	0.3174
One - Bws	0.6826
Wet Molecular Weight of Stack Gas	26.01
Stack Pressure	29.951
Stack Velocity FPS	43.067
Stack Volumetric Flow Rate TSTD Ft3/Min	61484
Particulate Calculations	
Inorganic	
Large Tare, grams	331.0947
Large Final, grams	331.1014
Mr =	0.00665
Sum Water + MeCl2, Mb (or 5% of mass)	0
Vic =	617
Vb =	0
Mc =	0
Mass of Inorganic,mg, Mrc (Mi) =	6.65
Organic	
Small Tare,grams	140.9260
Small Final,grams	140.9393
Mo, mg =	13.25
CPM mg/DSCF =	0.5948
CPM mg/TSCF =	0.4060
CPM mg	19.9000
5% of mass of CPM	0.995
Front Half	
Final Beaker Weight	173.5336
Tare Beaker Weight	173.4897
Final Filter Weight	0.6528
Tare Weight of Filter	0.5525
Net Sample Weight	0.1441
Mg Particulate/DSCF	4.3074
Mg Particulate/TSCF	2.9401

Total Particulates	Total	Front Half	Back Half
Lbs Particulate/Day	653.13	573.88	79.25
Lbs Particulate/Hr	27.21	23.91	3.30
Lbs Particulate/Ton of Product	8.1751	7.1831	0.9920

Isokinetic Sampling Rate	100.56
Allowable Part. Emission Rate, Lbs/Hr.	49.22

RAW DATA

TEXASGULF INC. PHOSPHATE OEPRATIONS

Box # 2

CONDENSABLE PARTICULATE MATTER WORKSHEET

Date 6-10-92 Plant CALCINER # 1

Run No. 02 Time 1110

	Filter	Front Half Beaker	Back Half Inorganic		Organic
			Beaker # 4	Beaker # 9	Beaker # 3
Tare	.5432	#41 134.63175	150.13405	169.64025	166.96225
1st Weight	.6636 ✓	134.9060	150 1389	169 6433	166.9942
2nd Weight	.6641 ✓	134.9019	150.1375	169.6404	166.9953
3rd Weight		134.8993	150.1398 ✓	169.6423 ✓	166.9933
4th Weight		134.9009 ✓	150.1401 ✓	169.6428 ✓	166.9955 ✓
5th Weight		134.9010 ✓			166.9954 ✓
6th Weight					
7th Weight					
Averaged Constant	0.66385	134.90095	150.13995	169.64255	166.99545
			.0059	.0023	.0332 = 0.0414g

Impingers Volumes/Gel Weights

	1st Impinger	2nd Impinger	3rd Impinger	Silica Gel Weights	
Post Volume (mls)	238 + 196	172	103	Post (grams)	649.90
Pre Volume (mls)	100	100	100	Pre (grams)	636.67

Revised 07/11/91
TGEA027.WR1

TEXASGULF INC. PHOSPHATE OPERATIONS

CONSOLE WORKSHEET

Box #2

Plant Calciner #1 Date 6-10-92 Time 1113 Run 2

Mtr Box 4 Meter H@ 1.7897 K Factor 1.25 Barometric 29.98

Assmd Moist 31% Nozzle Dia. .2220 Dry Gas X .9910 Console Oper JT

	PT	Smple Min.	Head Delta P	Orifice Delta H	Meter Ft3 377.400	Meter In oF	Meter Out oF	Stack oF	Hot Box oF	Imp. oF	Vacuum "Hg
SW 1113	1	4	.49	.61	379.2	90	83	135	225		4.9
	2	8	.61	.76	381.2	96	84	160	225		5.5
	3	12	.64	.80	383.2	100	85	170	225		6.0
	4	16	.58	.73	385.2	104	87	170	225		6.0
	5	20	.53	.66	387.1	106	89	169	225		6.0
	6	24	.50	.63	389.0	108	90	169	225		5.9
	7	28	.31	.39	390.4	108	92	169	230		4.2
	8	32	.26	.33	391.8	109	93	169	240		4.0
	9	36	.29	.36	393.2	110	94	169	225	68	4.0
	10	40	.33	.41	394.7	112	95	169	230	68	4.2
	11	44	.42	.53	396.4	113	96	168	240	68	5.0
1201	12	48	.47	.59	398.214	113	97	167	240	68	5.3
NN 1211	13	4	.25	.31	399.5	98	94	160	225		3.9
	14	8	.41	.51	401.2	103	94	170	225		5.1
	15	12	.46	.58	403.0	105	94	171	225		5.8
	16	16	.50	.63	404.8	107	94	170	230		6.1
	17	20	.55	.69	406.7	109	95	169	230		6.5
	18	24	.49	.61	408.6	110	95	168	225		6.1
	19	28	.29	.36	410.0	110	96	168	225		4.6
	20	32	.34	.43	411.5	111	96	167	225		5.0
	21	36	.46	.58	413.2	113	96	170	230		6.1
	22	40	.51	.64	415.1	113	97	171	225	68	6.8
	23	44	.61	.76	417.1	113	97	170	225	68	8.8
1259	24	48	.59	.74	419.186	110	98	169	230	68	8.8
	Total										
	Avg										

Probe and Sample Box Operator BL

Pre Leak Check At 10.5 "Hg = .014 C.F.M. Post Leak Check At 9.5 "Hg .009 C.F.M.

Pitot Leak Check Red ✓ Green ✓

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

1.25 = (846.72 x (.0034284) x (1.7897) x (.7056) x (.4761) x (29.740 / 36.101) x (1 / 1) x (560 / 629))

TGEA021.WR1

TEXASGULF INC. PHOSPHATE OEPRATIONS

Box #3

CONDENSABLE PARTICULATE MATTER WORKSHEET

Date 6-10-92 Plant CALCINER # 1

Run No. 3 Time 1321

	Filter	Front Half Beaker	Back Half Inorganic		Organic
			Beaker #49	Beaker #25	Beaker # 11
Tare	.5514	#15 137.8141	164.5559	142.38035	164.77605
1st Weight	.6492	137.8738	164.5584	142.3818	164.8442
2nd Weight	.6489	137.8743	164.5573	142.3831	164.8422
3rd Weight			164.5572	142.3833	164.8446
4th Weight					164.8442
5th Weight					
6th Weight					
7th Weight					
Averaged Constant	0.64905	137.87405	164.55725	142.3832	164.8444
			.00135	.00285	.06835 = .07255

Impingers Volumes/Gel Weights

	1st Impinger	2nd Impinger	3rd Impinger	Silica Gel Weights	
Post Volume (mls)	241 + 177	140	104	Post (grams)	660.03
Pre Volume (mls)	100	100	100	Pre (grams)	647.77

Revised 07/11/91
TGEA027.WR1

TEXASGULF INC. PHOSPHATE OPERATIONS

CONSOLE WORKSHEET

Box # 3

Plant Calciner #1 Date 6-10 92 Time 1321 Run 3

Mtr Box 4 Meter H@ 1.7897 K Factor 1.73 Barometric 29.98

Assmd Moist 3/8 Nozzle Dia @ 2400 Dry Gas X .9910 Console Oper ST

	PT	Smple Min.	Head Delta P	Orifice Delta H	Meter Ft3 420.800	Meter In oF	Meter Out oF	Stack oF	Hot Box oF	Imp. oF	Vacuum "Hg
1321	1	3	.48	.83	422.3	100	92	145	225		4.9
	2	6	.72	1.25	424.2	104	92	163	240		8.1
	3	9	.78	1.35	426.2	105	93	169	225		9.0
	4	12	.67	1.16	428.1	108	93	169	240		8.0
	5	15	.62	1.07	429.9	109	94	170	255		7.6
	6	18	.50	.87	431.5	111	94	170	225		5.8
	7	21	.32	.55	432.9	113	95	169	230		4.8
	8	24	.27	.47	434.1	113	96	169	250	68	4.0
	9	27	.29	.50	435.3	114	96	169	250	66	4.0
	10	30	.37	.64	436.7	116	97	168	230	66	4.8
	11	33	.42	.73	438.2	116	98	168	230	68	5.1
1357	12	36	.44	.81	439.779	117	98	167	250	68	5.8
1406	13	3	.29	.50	441.0	101	96	144	225		4.0
	14	6	.36	.62	442.1	106	96	162	225		4.8
	15	9	.42	.73	443.9	109	96	168	225		5.2
	16	12	.49	.85	445.5	110	96	168	240		6.1
	17	15	.54	.93	447.2	109	96	167	245		6.9
	18	18	.45	.78	448.7	109	97	168	255		6.0
	19	21	.30	.52	450.6	110	97	167	235		5.0
	20	24	.47	.81	451.6	113	97	167	235		6.4
	21	27	.49	.85	453.2	112	98	168	245		7.0
	22	30	.47	.81	454.8	110	98	167	245	67	6.4
	23	33	.41	.71	456.3	112	98	168	222	66	6.0
1442	24	36	.23	.40	457.461	113	99	167	235	68	4.2
	Total										
	Avg										

Probe and Sample Box Operator BL

Pre Leak Check At 9.5 "Hg = .005 C.F.M. Post Leak Check At 9.5 "Hg .006 C.F.M.

Pitot Leak Check Red ✓ Green ✓

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

1.73 = (846.72 x (.0033178) x (1.7897) x (.7036) x (.4761) x (29.740 / 26.101) x (565 / 679))

TGEA021.WR1

Box # 1

TEXASGULF INC. PHOSPHATE OEPRATIONS

CONDENSABLE PARTICULATE MATTER WORKSHEET

Date 6-10-92 Plant CALCINER # 1

Run No. 4 Time 1510

	Filter	Front Half Beaker	Back Half Inorganic Beaker 31	Back Half Inorganic Beaker 114	Organic Beaker 8
Tare	0.5525	#14 173.4897	168.8870	162.2127	140.9260
1st Weight	.6526	173.5333	168.8819	162.2174	140.9379
2nd Weight	.6529	173.5404	168.8835	162.2179	140.9390
3rd Weight		173.5334	168.8839	162.2174	140.9395
4th Weight		173.5337			
5th Weight					
6th Weight					
7th Weight					
Averaged Constant	0.65275	173.53355	168.8837	162.21765	140.93925
			.0017	.00495	.01325 = .0199

Impingers Volumes/Gel Weights

	1st Impinger	2nd Impinger	3rd Impinger	Silica Gel Weights	
Post Volume (mls)	240 + 141	133	103	Post (grams)	667.70
Pre Volume (mls)	100	100	100	Pre (grams)	654.19

Revised 07/11/91
TGEA027.WR1

TEXASGULF INC. PHOSPHATE OPERATIONS

CONSOLE WORKSHEET

RCY # 1

Plant Calciner #1 Date 6-10-92 Time 1510 Run 4

Mtr Box 4 Meter H@ 1.7897 K Factor 1.64 Barometric 29.90

Assmd Moist 31 Nozzle Dia. .23869 Dry Gas X .9910 Console Oper JT

	PT	Smple Min.	Head Delta P	Orifice Delta H	Meter Ft3 457.800	Meter In oF	Meter Out oF	Stack oF	Hot Box oF	Imp. oF	Vacuum "Hg	
1510	1	3	.58	.97	459.3	91	90	146	225		10.0	
	2	6	.63	1.03	461.1	96	90	166	225		12.9	?
	3	9	.77	1.26	463.0	97	90	169	240		17.5	5kg
	4	12	.64	1.05	464.8	98	90	168	250		14.8	of
	5	15	.58	.95	466.5	102	91	168	255		13.0	HX
	6	18	.52	.85	468.1	106	91	170	255		12.0	
	7	21	.30	.49	469.4	107	92	170	260		7.2	
	8	24	.26	.43	470.5	108	93	169	260		6.5	
	9	27	.28	.46	471.7	110	94	168	260	66	6.6	
	10	30	.34	.56	473.6	112	95	169	245	66	8.0	
	11	33	.40	.66	474.4	113	96	170	235	66	9.1	
1546	12	36	.43	.71	475.896	113	97	169	250	67	9.8	
1551	13	3	.29	.48	477.0	103	96	166	245		6.3	
	14	6	.35	.57	478.3	105	96	168	250		8.0	
	15	9	.46	.75	479.8	107	96	170	230		9.8	
	16	12	.50	.82	481.5	109	96	170	230		11.3	
	17	15	.44	.72	483.0	111	97	169	250		10.5	
	18	18	.29	.48	484.2	111	97	170	250		7.0	
	19	21	.35	.57	485.5	112	97	171	225		8.1	
	20	24	.46	.75	487.0	114	97	170	225		9.8	
	21	27	.52	.85	488.6	114	98	170	245		11.8	
	22	30	.48	.79	490.2	113	98	170	250	67	11.3	
	23	33	.53	.87	491.8	114	99	170	245	67	12.1	
1624	24	36	.55	.90	493.537	112	99	168	240	68	12.9	
	Total											
	Avg											

Probe and Sample Box Operator BL

Pre Leak Check At 10.0 "Hg = .013 C.F.M. Post Leak Check At 18.1 "Hg .018 C.F.M.

Pitot Leak Check Red ✓ Green ✓

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

1.64 = (846.72 x ( ) x ( ) x ( ) x ( ) x ( ) x (/) x (/) x (/)

.00311496 1.7897 .7096 .9761 29.940/26.101 565/079

TGEA021.WR1

Hazelguin Chemicals Co.

ISOKINETIC WORKSHEET

DATE: 6-10 92 STACK: Cal #1 TIME: _____

METER BOX: 4 OPERATOR JT

1. NOZZLE DIA. (A) _____" (B) _____" (C) _____"

2. ▲H @ 1.7897 ⑤ .2227 Avg. ⑥ .2226

3. C_p .84 Assy. # / ⑤ .2100 ①

4. BAROMETRIC PRESSURE (P_b) 29.98 "Hg

▲P STATIC -.39 "H_2

5. STACK PRESSURE (P_s) 29.95 "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 29.740 lb./lb. - MOLE

12. M_s 26.101 lb./lb. - MOLE

13. T_s 156 °F + 460 = 616 °R

14. T_m 100 °F + 460 = 560 °R

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

40

Preliminary	
▲P	T_s
1. .31	14
2. .51	147 15
3. .60	155 15
4. .55	154 15
5. .51	153 15
6. .40	149 15
7. .31	145 15
8. .24	149 15
9. .21	150 15
10. .28	150 15
11. .36	156
12. .40	155

Orsat Analyses

Date 6-8-92 Plant Cal #1 Technician ST

Pb / Stack Temp / Ambient Temp /

Dry Bulb Temp / Wet Bulb Temp /

Stack Static Press / Stack Press /

		CO2	O2	CO+N
Run 1	Burette Reading	7.3	21.6	
	Percent	7.3	14.3	78.4
Run 2	Burette Reading	7.3	21.6	
	Percent	7.3	14.3	78.4
Run 3	Burette Reading	7.3	21.6	
	Percent	7.3	14.3	78.4
		7.3	14.3	78.4

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))

7.3 → 3.212; 14.3 → 4.576; 78.4 → 21.952

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

V.P.= /

Bws = /

Md = 29.740

Ms = /

✓ Leak Check performed. No movement for 5 minutes.

#2

Cyclonic Flow Test

Plant Cal #1 Technician(s) TJH

Date 7-24-91 Time 0810

Point #	Delta P	Angle Alpha
SW		
1	.59	0
2	.71	2
3	.80	2
4	.78	4
5	.67	0
6	.49	5
7	.31	4
8	.30	4
9	.28	0
10	.26	12
11	.26	12
12	.27	12
Average		5.6

Average absolute Alpha must not be greater than 20 degrees.

7 of 2

Cyclonic Flow Test

Plant Cal #1 Technician(s) JT & JH

Date 7-24-91 Time 0810

Point #	Delta P	Angle Alpha
NW 1	.22	10
2	.36	0
3	.43	1
4	.48	5
5	.57	2
6	.50	0
7	.33	2
8	.43	6
9	.61	10
10	.69	12
11	.75	14
12	.70	15
Average		

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

Page 3
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

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

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

TGEA025.WR1 06/13/91

Date 6-5-92 Tech JT

Post-Calibration

Delta H Magnehelic

Leak Check @ .22 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	.22	.21	1
−	.30	.28	2

Leak Check @ 101 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	101	101	0
−	.96	.96	0

Leak Check @ 1.90 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	1.90	1.88	2
−	1.82	1.84	4

Delta P Magnehelic

Leak Check @ .40 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	.28	.29	1
−	.40	.40	0

Leak Check @ 1.01 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	1.01	1.01	0
−	1.01	1.01	0

Leak Check @ 1.78 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	1.82	1.81	1
−	1.78	1.80	2

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 # ____				

TGEA026.WR1 06/13/91

Post-Calibration

Date 6.17.92 Tech JT

Delta H Magnehelic

Leak Check @ .41 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	.41	.40	1
−	.39	.38	1

Leak Check @ 1.07 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	1.07	1.06	1
−	1.05	1.06	1

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	1
−	.42	.43	1

Leak Check @ 1.10 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	.98	.97	1
−	1.10	1.10	0

Leak Check @ 1.81 " H20 for 3 minutes.

	Gauge	Manometer	Delta
+	1.82	1.81	
−	1.81	1.79	2

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	A	33	34.5	1.5
(Must agree: +/- 5.4 oF)	B	70	70.5	0.5
	C	214	213.5	0.5
Dry Gas Meter Out	A	33	34.0	1.0
(Must agree: +/- 5.4 oF)	B	70	70.5	0.5
	C	235	239.5	4.5
Impinger Thermometer # 1	A	34	32.0	2.0
(Must agree: +/- 2 oF)	B	70	71.0	1.0
	C	196	188.0	2.0
Impinger Thermometer # 2	A	34	32.5	1.5
(Must agree: +/- 2 oF)	B	69	71.0	2.0
	C	216	218.0	2.0
Impinger Thermometer # 3	A	69	71.0	2.0
(Must agree: +/- 2 oF)	B	33	31.5	1.5
	C	184	185.5	1.5
HotBox Thermometer # 1	A	70	70.5	0.5
(Must agree: +/- 5.4 oF)	B	65	67.2	2.2
	C	269	266.0	3.0
HotBox Thermometer # 2	A	71	70.5	0.5
(Must agree: +/- 5.4 oF)	B	169	172.5	3.5
	C	266	267.5	1.5
HotBox Thermometer # 3	A	67	70.5	3.5
(Must agree: +/- 5.4 oF)	B	165	166.5	1.5
	C	270	272.5	2.5

TGEA025.WR1 06/13/91

MeCl

~~ACETONE~~ BLANK WORKSHEET

Lot # 910309

BEAKER WT. INIT.	(3B) 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: 8-31-91

SOURCE PERFORMANCE FOR: Calcium F2 + 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 1 CALCINER----JUNE 10, 1992

$$\frac{90 \text{ tons feed}}{\text{hour}} \rightarrow (90)\frac{(100\% - \%\ H_2O)}{100} = \frac{\text{Tons dry feed}}{\text{hour}}$$

$$\frac{(90 \text{ t feed})}{\text{hour}}\frac{(100 - 11.23)}{100} = (90)\ (0.8877) = \frac{79.9 \text{ t dry feed}}{\text{hour}}$$

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

$\frac{35.73\# \text{ coal}}{(1 \text{ ton dry feed})}$ *or at* $\frac{79.9 \text{ tons dry feed}}{\text{hour}}$ =

$$\frac{(35.73\# \text{ coal})}{\text{ton dry feed}}\frac{(79.9 \text{ tons dry feed})}{\text{hour}} = \frac{2{,}854.83\# \text{ coal}}{\text{hour}}$$

or $\frac{1.427 \text{ tons coal}}{\text{hour}}$

June 23, 1992