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.

# Background Report Reference

**AP-42 Section Number:** 11.6

**Background Chapter:** 4

**Reference Number:** 34

**Title:** Stack Sampling at General Portland, Inc., Trinity Division Fort Worth, TX

Texas Air Control Board

Texas Air Control Board

February 1979

AP-42 Section 11.6
Reference NOX USEO
Report Sect. 4
Reference 34

RECEIVED
MAR 12 1979
REGION 6
TEXAS AIR CONTROL BOARD

# STACK SAMPLING

at

GENERAL PORTLAND, INC.
Trinity Division

Fort Worth, Texas

on

July 11-14, 1978

Kilns One and Two
Kiln Three

Account No. TA-0386-D

February 13, 1979

PREPARED BY THE STAFF OF THE
TEXAS AIR CONTROL BOARD

QUALITY ASSURANCE

EVALUATION

The attached report has been evaluated in terms of adherence to standard procedures, practices defensible by sound engineering logic and compliance with established Quality Assurance policies.

As a result of this evaluation, this report is classified as a STACK SAMPLE and the following discrepancies are noted as a matter of record:

2/24/93

DISCOVERED IN SECTION 8.20

DOESN'T APPEAR TO BE USEABLE.

RM.

GENERAL PORTLAND, INC.
Plant

Fort Worth, Texas
Location

July 11-14, 1978
Date of Sampling

Billy [illegible]
Team Leader

James H Krupstein
Quality Assurance, Source Evaluation

27 FEB. 1979
Date of Signature

15 Feb 79
Date of Signature

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*Appendices available upon request.

## Introduction

Emissions from the Number one and two kiln and the Number three kiln electrostatic precipitator stacks at the General Portland Inc., Trinity Division, cement plant located at Fort Worth were sampled by the Texas Air Control Board staff during July 11-14, 1978 to determine compliance with Texas Air Control Board Rule 131.03.05.001 which concerns particulates.

Billy T. Chafin, P.E. was in charge of the sampling operation. He was assisted by David Thompson, James Sandel and Jesse Macias. This team is based in Texas Air Control Board Region 8 office in Fort Worth.

During sampling the kilns were being fired with coal. Kilns one and two are served by a single electrostatic precipitator and a single stack. Production rates of these two kilns are approximately equal.

## Conclusion

The number one and two kiln source was in violation of Rule 131.03.05.001; the number three kiln source was not in violation of this Rule. Average allowable particulate emission rate for the number one and two kiln source was 178 lb/hr based on two equal sources (see page A-15) while average particulate pollutant mass rate was 201 lb/hr. Average allowable particulate emission rate for the number three kiln source was 89.9 lb/hr while the average particulate pollutant mass rate was 25.7 lb/hr.

## Sulfur Dioxide

Average sulfur dioxide pollutant mass rate from the kiln numbers one and two source was 1840 lb/hr; from the kiln number three source it was 466 lb/hr. (See page A-16 for these calculations.) There are no Texas Air Control Board allowable sulfur dioxide emission rates established for cement kilns at this time.

PARTICULATE SUMMARY OF RESULTS *

NAME OF STACK/DUCT Number One and Two Kiln
(Electrostatic Precipitator)

*Values in parenthesis are based on two equal sources.

Account Number TA-0386-D Emission Point Number 1

| | Sample One | Sample Two | Sample Three | Sample Four | Average ** Value |
|---|---|---|---|---|---|
| Time Date | 1239-1521 7-13-78 | 0748-0936 7-14-78 | 1036-1200 7-14-78 | | |
| Stack Temperature Deg F | 432 | 414 | 411 | | 413 |
| Port Velocity Ft/Sec | 63.8 | 59.6 | 72.1 | | 65.9 |
| Percent Water | 27.8 | 27.9 | 29.6 | | 28.8 |
| Total Flow Rate ACFM | 364,000 | 340,000 | 411,000 | | 376,000 |
| Effective Stack Height in Feet | 363 | 338 | 392 | | 365 |
| Standard Effective Stack Height in Feet | 92.8 | 90.6 | 96.8 | | 93.7 |
| Allowable ** Emission Rate in lb/hr Rule 131.03.05.001 | 135 (175) | 129 (168) | 145 (189) | | 137 (178) |
| Pollutant Mass Rate in lb/hr | 206 | 228 | 174 | | 201 |
| Percent Isokinetic | 84.5 | 95.3 | 96.7 | | 96.0 |
| Percent of Allowable ** | 153 (118) | 177 (136) | 120 (92.1) | | 147 (113) |

**Sample number one has not been included in the average values due to low percent isokinetic. These results are shown for information only.

PARTICULATE SUMMARY OF RESULTS

NAME OF STACK/DUCT Number Three Kiln
(Electrostatic Precipitator)

Account Number TA-0386-D Emission Point Number 3

| | Sample One | Sample Two | Sample Three | Sample Four | Average Value |
|---|---|---|---|---|---|
| Time Date | | 1117-1356 7-11-78 | 0730-1015 7-12-78 | 1048-1324 7-12-78 | |
| Stack Temperature Deg F | | 423 | 405 | 413 | 414 |
| Port Velocity Ft/Sec | | 30.7 | 33.7 | 35.6 | 33.3 |
| Percent Water | | 31.4 | 30.8 | 34.6 | 32.6 |
| Total Flow Rate ACFM | | 175,000 | 192,000 | 203,000 | 190,000 |
| Effective Stack Height in Feet | | 211 | 221 | 231 | 221 |
| Standard Effective Stack Height in Feet | | 71.8 | 74.2 | 75.6 | 73.9 |
| Allowable Emission Rate in lb/hr Rule131.03.05.001 | | 85.5 | 90.6 | 93.7 | 89.9 |
| Pollutant Mass Rate in lb/hr | | 22.2 | 46.2 | 8.8 | 25.7 |
| Percent Isokinetic | | 107 | 96.5 | 100 | 101 |
| Percent of Allowable | | 26.0 | 51.0 | 9.4 | 28.6 |

SAMPLE ONE VOIDED DUE TO DIFFICULTIES IN THE FIELD.

Texas Air Control Board
3915-A Highway 377 (Benbrook Hwy.)
FORT WORTH, TEXAS 76116

PLANT OPERATIONAL STATUS FORM

Sampling Periods

Date 7-14-78 Account Number TA-0386-D

Plant Name TRINITY HEARTLAND CEMENT Location FT. WORTH

Stack Name #1 & 2 KILN ESP

Proportional or Isokinetic Sampling

| Sample Number | Duration of Sample (Show Start time and Stop time) | | Date of Sample |
|---|---|---|---|
| 1. | From 12:39 | To 15:12 | 7-13-78 |
| 2. | From 07:48 | To 09:36 | 7-14-78 |
| 3. | From 10:36 | To 12:00 | 7-14-78 |
| 4. | From | To | |

Special Conditions

Signature [illegible]
Title Engineer

The above portion is to be completed by the Air Control Board representative. The following portion is to be completed by the plant representative.

Plant Status During Sampling Periods Shown Above

Type of Process Continuous Cement Clinker Production

Abatement Controls ESP

Stack Height 74 ft Stack Exit Diameter 11.0 ft

Emission Point Number 1

| Sample Number | Percent of Maximum Capacity | Percent of Normal Operating Capacity | Special Conditions |
|---|---|---|---|
| 1. | 95% | 100% | #1 Kiln Slowed @ 14:20 to 15:00 |
| 2. | 95% | 100% | Normal |
| 3. | 95% | 100% | Normal |
| 4. | | | |

Additional Information

I certify that the above statements are true to the best of my knowledge and belief:

Signature John L. Wittmayer
Title Plant Engr.

Texas Air Control Board
3915-A Highway 377 (Benbrook Hwy.)
FORT WORTH, TEXAS 76116

PLANT OPERATIONAL STATUS FORM

Sampling Periods

Date 7-19-78 Account Number TA-0386-D

Plant Name TRINITY PORTLAND CEMENT Location FT. WORTH

Stack Name #3 KILN ESP

Proportional or Isokinetic Sampling

| Sample Number | Duration of Sample (Show Start time and Stop time) | | Date of Sample |
|---|---|---|---|
| 1. VOID | From | To | |
| 2. | From 11:17 | To 13:56 | 7-11-78 |
| 3. | From 07:30 | To 10:15 | 7-12-78 |
| 4. | From 10:48 | To 13:29 | 7-12-78 |

Special Conditions

Signature B. J. Clap

Title Engineer

The above portion is to be completed by the Air Control Board representative. The following portion is to be completed by the plant representative.

Plant Status During Sampling Periods Shown Above

Type of Process Continuous Cement Clinker Production

Abatement Controls ESP

Stack Height 74 ft Stack Exit Diameter 11.0 ft

Emission Point Number 2

| Sample Number | Percent of Maximum Capacity | Percent of Normal Operating Capacity | Special Conditions |
|---|---|---|---|
| 1. | | | |
| 2. | 95% | 100% | Normal |
| 3. | 95% | 100% | Normal |
| 4. | 95% | 100% | Normal |

Additional Information

I certify that the above statements are true to the best of my knowledge and belief:

Signature John S. Wittmayer

Title Plant Engr.

# APPENDIX A

INPUT DATA PRINT-DATE 02/09/79

GENERAL PORTLAND INC., TRINITY DIVISION, FT. WORTH 08-0031

NUMBER ONE TWO KILNS ESP

SAMPLE NO. ONE DATE 13 JUL 1978 TIME 12:39 TO 15:12

NOZ.AREA: 0.0001449 SQFT PITOT CALIB. FACTOR: 0.8460

TRAV. DURATION 144.0 MIN. VOL. DRY GAS METER: 30.41 CUFT

STACK: DIA,EXIT 11.00 FT, PORT 11.00 FT, HEIGHT 74.0 FT

ORSAT ANALYSIS: CO2 0.072, O2 0.137, CO 0.000, N2 0.791, DGMCF= 0.9970

TEMP IN DEG F: DRY GAS METER AVER. 96.20, STACK AVER. 432.30

MASS IN GRAMS: TOTAL IMP. GAIN 233.80 TOTAL PARTICULATE 0.2891

PARTICULATE IN IMP. 0.0036, SO2 2.9945, H2S 0.0000,

H2SO4 0.0000, FLUORIDE IONS 0.0000, SO3 0.0528, CL2 0.0000

PRESS: ATMOS 29.31 IN.HG, STACK -0.070 IN.H2O, AV.DELTA H 0.129 IN.H2O

PITOT TUBE DELTA P'S IN IN.H2O:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.300 | 0.380 | 0.680 | 0.80 | 0.830 | 1.100 | 1.200 | 1.400 |
| 1.500 | 1.500 | 1.300 | 0.550 | 0.330 | 0.330 | 0.450 | 0.450 |
| 0.550 | 0.620 | 0.680 | 0.740 | 0.760 | 0.660 | 0.600 | 0.500 |
| 0.350 | 0.350 | 0.350 | 0.350 | 0.380 | 0.420 | 0.420 | 0.480 |
| 0.450 | 0.380 | 0.380 | 0.300 | 0.600 | 0.680 | 0.720 | 0.810 |
| 0.920 | 0.950 | 1.100 | 1.200 | 1.200 | 1.200 | 1.200 | 0.830 |

RULE 107 PROCESS WEIGHT RATE 0.0 POUNDS PER HOUR

RULE 105.3 & 201.5 HEAT INPUT 0.0 MILLION BTU PER HOUR

RULES SELECTED 105.1

EXCESS AIR FLAG OFF PARTICAL SIZE FLAG SMALL

ACFM (UNCORRECTED FOR EXCESS AIR) WAS GREATER THAN (OR EQUAL TO) 100,000 CFM; SEE RULE 103.6

CALCULATION RESULTS

GENERAL PORTLAND INC., TRINITY DIVISION, FT. WORTH 68-0031

NUMBER ONE TWO KILNS ESP

SAMPLE NO ONE DATE 13 JUL 1978 TIME 12:39 TO 15:12

27.79 % H2O BW2 0.600 NOZ.VOL. 67.435 CUFT EACF 1.000

AV.VEL.PORT 63.767 FT PER SEC M.WT. 26.47 EF.STK.HT. 362.8 FT

ACFM 363599.6 SCFM 211527.3 (NO EXCESS AIR CORRECTION)

RULE 105.1
153.1 % OF ALLOWABLE %ISC. 84.5 STD.EF.STK.HT. 92.8 FT
EMISS.RATES.LBS/HR: ALLOWABLE 134.5, POLL.MASS 206.0
THIS STACK WAS IN VIOLAION OF RULE 105.1

INPUT DATA PRINT-DATE 02/09/79

GENERAL PORTLAND INC., TRINITY DIVISION, FT. WORTH 08-0031

NUMBER ONE TWO KILNS ESP

SAMPLE NO TWO DATE 14 JUL 1978 TIME 07:40 TO 09:36

NOZ.AREA: 0.0002032 SQFT PITOT CALIB. FACTOR: 0.8480

TRAV. DURATION 96.0 MIN. VOL. DRY GAS METER: 29.43 CUFT

STACK: DIA.EXIT 11.00 FT, PORT 11.00 FT, HEIGHT 74.0 FT

ORSAT ANALYSIS: CO2 0.004, O2 0.194, CO 0.000, N2 0.802, DGMCF= 0.9970

TEMP IN DEG F: DRY GAS METER AVER. 76.20, STACK AVER. 414.20

MASS IN GRAMS: TOTAL IMP. GAIN 236.80 TOTAL PARTICULATE 0.3374

PARTICULATE IN IMP. 0.1246, SO2 1.6101, H2S 0.0000,

H2SO4 0.0000, FLUORIDE IONS 0.0000, SO3 1.3720, CL2 0.0000

PRESS: ATMOS 29.37 IN.HG, STACK -0.070 IN.H2O, AV.DELTA H 0.304 IN.H2O

PITOT TUBE DELTA P'S IN IN.H2O:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.600 | 0.500 | 0.730 | 0.550 | 0.700 | 0.900 | 1.200 | 1.200 |
| 1.300 | 1.100 | 1.100 | 0.830 | 0.300 | 0.250 | 0.150 | 0.200 |
| 0.200 | 0.200 | 0.200 | 0.250 | 0.250 | 0.250 | 0.120 | 0.100 |
| 0.250 | 0.200 | 0.350 | 0.350 | 0.350 | 0.450 | 0.520 | 0.600 |
| 0.500 | 0.500 | 0.500 | 0.400 | 0.500 | 0.680 | 0.850 | 1.000 |
| 1.200 | 1.200 | 1.500 | 1.500 | 1.500 | 1.400 | 1.200 | 0.900 |

RULE 107 PROCESS WEIGHT RATE 0.0 POUNDS PER HOUR

RULE 105.3 & 201.5 HEAT INPUT 0.0 MILLION BTU PER HOUR

RULES SELECTED 105.1

EXCESS AIR FLAG OFF PARTICAL SIZE FLAG SMALL

ACFM (UNCORRECTED FOR EXCESS AIR) HAS GREATER THAN (OR EQUAL TO) 100,000 CFM; SEE RULE 103.6

CALCULATION RESULTS

GENERAL PORTLAND INC., TRINITY DIVISION, FT. WORTH 08-0031

NUMBER ONE TWO KILNS ESP

SAMPLE NO TWO DATE 14 JUL 1978 TIME 07:40 TO 09:36

27.92 % H2O BW2 0.000 NOZ.VOL. 66.511 CUFT EACF 1.000

AV.VEL.PORT 59.632 FT PER SEC M.WT. 25.82 EF.STK.HT. 337.8 FT

ACFM 340021.3 SCFM 202319.4 (NO EXCESS AIR CORRECTION)

RULE 105.1
176.8 % OF ALLOWABLE %ISO. 95.3 STD.EF.STK.HT. 90.6 FT
EMISS.RATES,LBS/HR: ALLOWABLE 129.1, POLL.MASS 228.1
THIS STACK WAS IN VIOLAION OF RULE 105.1

INPUT DATA PRINT-DATE 02/09/79

GENERAL PORTLAND INC., TRINITY DIVISION, FT. NORTH 08-0031

NUMBER ONE TWO KILNS ESP

SAMPLE NO THREE DATE 7-14-78 , TIME 1016 - 1200

NOZ.AREA: 0.0002032 SQFT PITOT CALIB. FACTOR: 0.8460

TRAV. DURATION 96.0 MIN. VOL. DRY GAS METER: 36.31 CUFT

STACK: DIA.EXIT 11.00 FT, PORT 11.00 FT, HEIGHT 74.0 FT

ORSAT ANALYSIS: CO2 0.006, C2 0.188, CO 0.000, N2 0.806, DGMCF= 0.9970

TEMP IN DEG F: DRY GAS METER AVER. 90.50, STACK AVER. 411.00

MASS IN GRAMS: TOTAL IMP. GAIN 307.50 TOTAL PARTICULATE 0.2616

PARTICULATE IN IMP. 0.0005, SO2 2.3183, H2S 0.0000,

H2SO4 0.0000, FLUORIDE IONS 0.0000, SO3 0.0790, CL2 0.0000

PRESS: ATMOS 29.35 IN.HG, STACK -0.070 IN.H2O, AV.DELTA H 0.407 IN.H2O

PITOT TUBE DELTA P"S IN IN.H2O:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.820 | 1.000 | 1.200 | 1.400 | 1.400 | 1.400 | 1.700 | 1.500 |
| 1.600 | 1.600 | 1.400 | 1.200 | 0.530 | 0.430 | 0.400 | 0.500 |
| 0.640 | 0.650 | 0.800 | 1.000 | 1.000 | 0.900 | 0.800 | 0.740 |
| 0.520 | 0.650 | 0.750 | 0.650 | 0.700 | 0.700 | 0.800 | 0.750 |
| 0.750 | 0.650 | 0.650 | 0.600 | 0.450 | 0.550 | 0.500 | 0.600 |
| 0.700 | 0.700 | 0.750 | 1.000 | 1.200 | 1.300 | 1.100 | 0.900 |

RULE 107 PROCESS WEIGHT RATE 0.0 POUNDS PER HOUR

RULE 105.3 & 201.5 HEAT INPUT 0.0 MILLION BTU PER HOUR

RULES SELECTED 105.1

EXCESS AIR FLAG OFF PARTICAL SIZE FLAG SMALL

ACFM (UNCORRECTED FOR EXCESS AIR) WAS GREATER THAN (OR EQUAL TO) 100,000 CFM; SEE RULE 103.6

CALCULATION RESULTS

GENERAL PORTLAND INC., TRINITY DIVISION, FT. WORTH 08-0031

NUMBER ONE TWO KILNS ESP

SAMPLE NO THREE DATE 7-14-78 , TIME 1016 - 1200

29.63 % H2O BW2 0.000 NOZ.VOL. 81.568 CUFT EACF 1.000

AV.VEL.PORT 72.081 FT PER SEC M.HT. 25.65 EF.STK.HT. 391.5 FT

ACFM 411004.7 SCFM 245287.2 (NO EXCESS AIR CORRECTION)

RULE 105.1
120.1 % OF ALLOWABLE %ISO. 96.7 STD.EF.STK.HT. 96.8 FT
EMISS.RATES.LBS/HR: ALLOWABLE 145.2, POLL.MASS 174.4
THIS STACK WAS IN VIOLAION OF RULE 105.1

AVERAGE RESULTS

GENERAL PORTLAND INC., TRINITY DIVISION, FT. WORTH 08-0031

NUMBER ONE TWO KILNS ESP

28.77 % H2O BW2 0.000 NOZ.VOL. 74.040 CUFT EACF 1.000

AV.VEL.PORT 65.856 FT PER SEC M.WT. 25.74 EF.STK.HT. 364.6 FT

ACFM 375513.0 SCFM 223803.3 (NO EXCESS AIR CORRECTION)

RULE 105.1
146.4 % OF ALLOWABLE %ISO. 96.0 STD.EF.STK.HT. 93.7 FT
EMISS.RATES,LBS/HR: ALLOWABLE 137.1, POLL.MASS 201.3
PERCENT OF ALLOWABLE FROM AVERAGE RESULTS: 146.8
THIS STACK WAS IN VIOLAION OF RULE 105.1

INPUT DATA PRINT-DATE 02/05/79

GENERAL PORTLAND INC., TRINITY DIVISION. FT. WORTH 08-0031

NUMBER THREE KILN ESP (B.T.CHAFIN)

SAMPLE NO TWO DATE 11 JUL 1978 TIME 12:40 TO 13:56

NOZ.AREA: 0.0002032 SQFT PITOT CALIB. FACTOR: 0.8480

TRAV. DURATION 144.0 MIN. VOL. DRY GAS METER: 24.52 CUFT

STACK: DIA.EXIT 11.00 FT, PORT 11.00 FT, HEIGHT 74.0 FT

ORSAT ANALYSIS: CO2 0.140, C2 0.071, CO 0.000, N2 0.789, DGMCF= 0.9970

TEMP IN DEG F: DRY GAS METER AVER. 85.20, STACK AVER. 423.00

MASS IN GRAMS: TOTAL IMP. GAIN 227.10 TOTAL PARTICULATE 0.0555

PARTICULATE IN IMP. 0.0031, SO2 1.1675, H2S 0.0000,

H2SO4 0.0000, FLUORIDE IONS 0.0000, SO3 0.1976, CL2 0.0000

PRESS: ATMOS 29.30 IN.HG, STACK -0.050 IN.H2O, AV.DELTA H 0.087 IN.H2O

PITOT TUBE DELTA P'S IN IN.H2O:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.120 | 0.150 | 0.200 | 0.260 | 0.260 | 0.320 | 0.380 | 0.420 |
| 0.440 | 0.440 | 0.380 | 0.200 | 0.080 | 0.080 | 0.080 | 0.080 |
| 0.080 | 0.100 | 0.100 | 0.100 | 0.080 | 0.080 | 0.060 | 0.060 |
| 0.060 | 0.060 | 0.060 | 0.060 | 0.080 | 0.080 | 0.100 | 0.120 |
| 0.160 | 0.160 | 0.180 | 0.180 | 0.080 | 0.100 | 0.150 | 0.160 |
| 0.220 | 0.240 | 0.280 | 0.280 | 0.280 | 0.280 | 0.280 | 0.160 |

RULE 107 PROCESS WEIGHT RATE 0.0 POUNDS PER HOUR

RULE 105.3 & 201.5 HEAT INPUT 0.0 MILLION BTU PER HOUR

RULES SELECTED 105.1

EXCESS AIR FLAG OFF PARTICAL SIZE FLAG SMALL

ACFM (UNCORRECTED FOR EXCESS AIR) WAS GREATER THAN (OR EQUAL TO) 100,000 CFM; SEE RULE 103.6

CALCULATION RESULTS

GENERAL PORTLAND INC., TRINITY DIVISION. FT. WORTH 08-0031

NUMBER THREE KILN ESP (B.T.CHAFIN)

SAMPLE NO TWO DATE 11 JUL 1978 TIME 12:40 TO 13:56

31.42 % H2O BW2 0.000 NOZ.VOL. 57.795 CUFT EACF 1.000

AV.VEL.PORT 30.684 FT PER SEC H.WT. 26.60 EF.STK.HT. 211.3 FT

ACFM 174960.4 SCFM 102826.8 (NO EXCESS AIR CORRECTION)

RULE 105.1
26.0 % OF ALLOWABLE %ISO. 107.3 STD.EF.STK.HT. 71.8 FT
EMISS.RATES.LBS/HR: ALLOWABLE 85.5, POLL.MASS 22.2

INPUT DATA PRINT-DATE 02/05/79

GENERAL PORTLAND INC., TRINITY DIVISION. FT. WORTH 08-0031

NUMBER THREE KILN ESP (B.T.CHAFIN)

SAMPLE NO THREE DATE 12 JUL 1978 TIME 07:30 TO 10:15

NOZ.AREA: 0.0002032 SQFT PITOT CALIB. FACTOR: 0.8480

TRAV. DURATION 144.0 MIN. VOL. DRY GAS METER: 24.48 CUFT

STACK: DIA.EXIT 11.00 FT. PORT 11.00 FT. HEIGHT 74.0 FT

ORSAT ANALYSIS: CO2 0.028, C2 0.180, CO 0.000, N2 0.792, DGMCF= 0.9970

TEMP IN DEG F: DRY GAS METER AVER. 75.20, STACK AVER. 405.10

MASS IN GRAMS: TOTAL IMP. GAIN 225.10 TOTAL PARTICULATE 0.1037

PARTICULATE IN IMP. 0.0683, SO2 0.2792, H2S 0.0000,

H2SO4 0.0000, FLUORIDE IONS 0.0000, SO3 0.9302, CL2 0.0000

PRESS: ATMOS 29.40 IN.HG, STACK -0.050 IN.H2O, AV.DELTA H 0.094 IN.H2O

PITOT TUBE DELTA P"S IN IN.H2O:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.140 | 0.140 | 0.140 | 0.140 | 0.220 | 0.380 | 0.420 | 0.460 |
| 0.540 | 0.380 | 0.220 | 0.100 | 0.360 | 0.420 | 0.280 | 0.480 |
| 0.420 | 0.200 | 0.240 | 0.180 | 0.100 | 0.200 | 0.140 | 0.240 |
| 0.110 | 0.140 | 0.220 | 0.220 | 0.240 | 0.180 | 0.240 | 0.200 |
| 0.280 | 0.350 | 0.180 | 0.070 | 0.120 | 0.150 | 0.150 | 0.100 |
| 0.100 | 0.060 | 0.050 | 0.050 | 0.050 | 0.060 | 0.060 | 0.060 |

RULE 107 PROCESS WEIGHT RATE 0.0 POUNDS PER HOUR

RULE 105.3 & 201.5 HEAT INPUT 0.0 MILLION BTU PER HOUR

RULES SELECTED 105.1

EXCESS AIR FLAG OFF PARTICAL SIZE FLAG SMALL

ACFM (UNCORRECTED FOR EXCESS AIR) WAS GREATER THAN (OR EQUAL TO) 100,000 CFM; SEE RULE 103.6

CALCULATION RESULTS

GENERAL PORTLAND INC., TRINITY DIVISION. FT. WORTH 08-0031

NUMBER THREE KILN ESP (B.T.CHAFIN)

SAMPLE NO THREE DATE 12 JUL 1978 TIME 07:30 TO 10:15

30.81 % H2O BW2 0.000 NOZ.VOL. 57.067 CUFT EACF 1.000

AV.VEL.PORT 33.691 FT PER SEC M.WT. 25.73 EF.STK.HT. 221.2 FT

ACFM 192108.4 SCFM 115634.4 (NO EXCESS AIR CORRECTION)

RULE 105.1

51.0 % OF ALLOWABLE %ISO. 96.5 STD.EF.STK.HT. 74.2 FT

EMISS.RATES,LBS/HR: ALLOWABLE 90.6, POLL.MASS 46.2

INPUT DATA PRINT-DATE 02/05/79

GENERAL PORTLAND INC., TRINITY DIVISION, FT. WORTH 08-0031

NUMBER THREE KILN ESP (B.T.CHAFIN)

SAMPLE NO FOUR DATE 12 JUL 1978 TIME 10:48 TO 13:24

NOZ.AREA: 0.0002032 SQFT PITOT CALIB. FACTOR: 0.8480

TRAV. DURATION 144.0 MIN. VOL. DRY GAS METER: 25.63 CUFT

STACK: DIA.EXIT 11.00 FT. PORT 11.00 FT. HEIGHT 74.0 FT

ORSAT ANALYSIS: CO2 0.040, O2 0.168, CO 0.000, N2 0.792, DGMCF= 0.9970

TEMP IN DEG F: DRY GAS METER AVER. 84.60, STACK AVER. 412.80

MASS IN GRAMS: TOTAL IMP. GAIN 274.40 TOTAL PARTICULATE 0.0205

PARTICULATE IN IMP. 0.0004, SO2 1.0853, H2S 0.0000,

H2SO4 0.0000, FLUORIDE IONS 0.0000, SO3 0.0774, CL2 0.0000

PRESS: ATMOS 29.40 IN.HG, STACK -0.050 IN.H2O, AV.DELTA H 0.108 IN.H2O

PITOT TUBE DELTA P"S IN IN.H2O:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.260 | 0.440 | 0.600 | 0.740 | 0.340 | 0.150 | 0.380 | 0.550 |
| 0.580 | 0.600 | 0.440 | 0.220 | 0.070 | 0.060 | 0.060 | 0.050 |
| 0.070 | 0.080 | 0.100 | 0.100 | 0.100 | 0.120 | 0.140 | 0.080 |
| 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.110 | 0.140 |
| 0.160 | 0.180 | 0.200 | 0.140 | 0.100 | 0.120 | 0.220 | 0.260 |
| 0.260 | 0.280 | 0.320 | 0.440 | 0.480 | 0.400 | 0.380 | 0.160 |

RULE 107 PROCESS WEIGHT RATE 0.0 POUNDS PER HOUR

RULE 105.3 & 201.5 HEAT INPUT 0.0 MILLION BTU PER HOUR

RULES SELECTED 105.1

EXCESS AIR FLAG OFF PARTICAL SIZE FLAG SMALL

ACFM (UNCORRECTED FOR EXCESS AIR) WAS GREATER THAN (OR EQUAL TO) 100,000 CFM; SEE RULE 103.6

CALCULATION RESULTS

GENERAL PORTLAND INC., TRINITY DIVISION. FT. WORTH 08-0031

NUMBER THREE KILN ESP (B.T.CHAFIN)

SAMPLE NO FOUR DATE 12 JUL 1978 TIME 10:48 TO 13:24

34.56 % H2O BW2 0.000 NOZ.VOL. 62.646 CUFT EACF 1.000

AV.VEL.PORT 35.558 FT PER SEC M.WT. 25.41 EF.STK.HT. 231.0 FT

ACFM 202753.6 SCFM 120965.4 (NO EXCESS AIR CORRECTION)

RULE 105.1
9.4 % OF ALLOWABLE %ISO. 100.3 STD.EF.STK.HT. 75.6 FT
EMISS.RATES,LBS/HR: ALLOWABLE 93.7. POLL.MASS 8.8

AVERAGE RESULTS

GENERAL PORTLAND INC., TRINITY DIVISION, FT. WORTH 08-0031

NUMBER THREE KILN ESP (B.T.CHAFIN)

32.26 % H2O BW2 0.000 NOZ.VOL. 59.170 CUFT EACF 1.000

AV.VEL.PORT 33.311 FT PER SEC M.WT. 25.91 EF.STK.HT. 221.2 FT

ACFM 189940.8 SCFM 113142.2 (NO EXCESS AIR CORRECTION)

RULE 105.1

28.8 % OF ALLOWABLE %ISO. 101.4 STD.EF.STK.HT. 73.9 FT

EMISS.RATES,LBS/HR: ALLOWABLE 89.9, POLL.MASS 25.7

PERCENT OF ALLOWABLE FROM AVERAGE RESULTS: 28.6

HAND CALCULAITON OF ALLOWABLE PARTICULATE
EMISSION RATE FOR KILNS ONE AND TWO,
BASED ON TWO EQUAL SOURCES

Allowable Emission Rate = $(0.06246)(ACFM)^{0.62}$

Sample One

Allowable Emission Rate = $(0.06246)(363,599.6)^{.62}$ = 175.1 lb/hr

Sample Two

Allowable Emission Rate = $(0.06246)(340,021.3)^{.62}$ = 167.9 lb/hr

Sample Three

Allowable Emission Rate = $(0.06246)(411,004.7)^{.62}$ = 188.9 lb/hr

*Average Particulate Allowable Emission Rate = 178.4 lb/hr

*This average is based on samples two and three, sample one was not used due to low (84.5%) isokinetic.

HAND CALCULATION OF SULFUR
DIOXIDE POLLUTANT MASS RATES

$$PMR_{SO_2} = \frac{ACFM}{Noz.\ Vol.} \times gm\ SO_2 \times \left(\frac{Lb}{gm} \times \frac{60\ min}{hr}\right)$$

.132277

Number One & Two Kiln Stack

Sample One

$$PMR_{SO_2} = \frac{363,596.6}{67.485} \times 2.9985 \times 0.132277 = 2136.9\ lb/hr$$

Sample Three

$$PMR_{SO_2} = \frac{441,004.7}{81.586} \times 2.3183 \times 0.132277 = 1545.2\ lb/hr$$

Average $SO_2$ PMR, 1841.1 lb/hr

Number Three Kiln Stack

Sample Two

$$PMR_{SO_2} = \frac{174,960.4}{57.795} \times 1.1675 \times 0.132277 = 467.5\ lb/hr$$

Sample Four

$$PMR_{SO_2} = \frac{202,753.6}{62.646} \times 1.0853 \times 0.132277 = 464.6\ lb/hr$$

Average $SO_2$ PMR, 466.1 lb/hr

Sample number two from the Number One and Two Kiln Stack and sample number three from the Number Three Kiln Stack were not included in these calculations due to an appearant impinger back up in both cases.