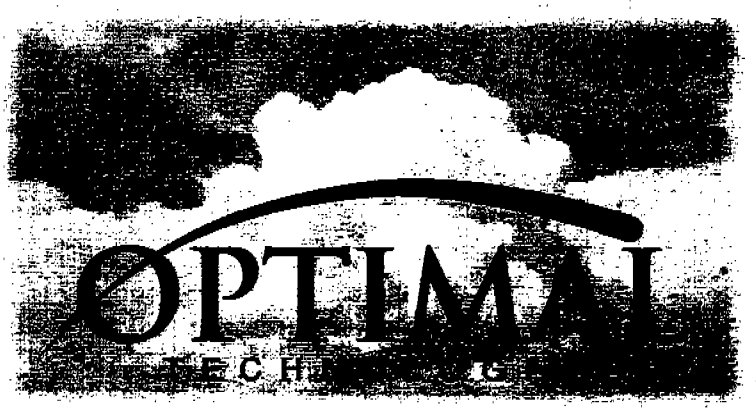
Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

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.

AP-42 Section 12.7
Reference
Report Sect. 4
Reference 170



Air Quality Services

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FINAL REPORT

EMISSIONS EVALUATION
OF
BATTERIES 1B AND 2 PUSHING EMISSIONS CONTROL SYSTEM
BATTERY 1B COMBUSTION STACK
BATTERY 2 COMBUSTION STACK

KOPPERS INDUSTRIES
MONESSEN COKE PLANT
MONESSEN, PENNSYLVANIA

OPTIMAL PROJECT NO. 937

DECEMBER 6, 1996

PREPARED BY

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MANAGER-SOURCE TESTING

OPTIMAL TECHNOLOGIES
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Appendix A	Field Data Sheets
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1.0 EXECUTIVE SUMMARY

Optimal Technologies, Inc. (Optimal) was contracted by Koppers Industries, Inc. to perform emission testing at the coke plant located in Monessen, Pennsylvania. Testing was conducted at the following sources:

- Batteries 1B and 2 Pushing Emission Control System;
- Battery 1B Combustion Stack; and
- Battery 2 Combustion Stack.

The following emissions were sample at each source:

- Particulate Matter;
- Nitrogen Oxides (NO_x);
- Volatile Organic Compounds (VOC);
- Carbon Monoxide (CO); and
- Visible Emissions.

Testing and analyses were conducted using the principles of U.S. Environmental Protection Agency (EPA) Methods specified in 40 CFR, Part 60, Appendix A and Pennsylvania Department of Environmental Protection (PADEP) source testing methodology. The source testing was performed to demonstrate compliance with the permit limitation of 0.04 grains per dry standard cubic feet (0.04 gr/dscf) of Particulate Matter for each of the subject sources. Testing results for NO_x, VOC, CO, and visible emissions are provided for informational purposes. Table 1 summarizes the emission results.

TABLE 1

SUMMARY OF EMISSION RESULTS

Emission Parameter	Measured Emission		
	Battery 1B and 2 Pushing Emission Control System	Battery 1B Combustion Stack	Battery 2 Combustion Stack
Particulate Matter	0.0035 gr/dscf	0.0037 gr/dscf	0.0084 gr/dscf
NO_x	8.24 lb/hr	122.93 lb/hr	61.93 lb/hr
VOC	1.06 lb/hr	1.32 lb/hr	2.28 lb/hr
CO	21.10 lb/hr	46.98 lb/hr	9.11 lb/hr
Visible Emissions	0.0 %	0.3 %	0.1 %

2.0 SCOPE AND OBJECTIVES

The scope of this project was to determine the following emissions from Batteries 1B and 2 Pushing Emission Control System and Batteries 1B and 2 Combustion Stacks using approved reference sampling methods:

- Total Particulate
- Nitrogen Oxides
- Volatile Organic Compounds
- Carbon Monoxide
- Visible Emissions

The average of three sampling runs constituted the test for each parameter. The particulate emission test results will be used to demonstrate compliance with the 0.04 gr/dscf particulate emission limit. Testing results for the other pollutants are provided for informational purposes.

The field sampling program was performed from November 18 through 22, 1996. One test run was conducted each day on November 18, 19, and 20, 1996 for Batteries 1B and 2 Pushing Emission Control System. Three test runs were conducted each day on November 21 and 22, 1996 for Batteries 2 and 1B Combustion Stacks, respectively.

The Optimal test personnel consisted of Messrs. William Stanziana, Paul Jadlowiec, Jim Phillippi , Joseph Stanger, David Sonnet, and Ms. Denise Smith. Mr. Greg Shamitko served as plant liaison for this test program. The PADEP was represented on November 18, 1996 by Mr. Daniel Haney, Air Quality Specialist, and on November 22, 1996 by Mr. Donald F. Rinald, Air Pollution Control Engineer.

3.0 PROCESS DESCRIPTION

3.1 BATTERIES 1B AND 2 PUSHING EMISSION CONTROL SYSTEM

Batteries 1B and 2 pushing emissions are collected through the use of a Minister-Stein system and baghouse which includes a hood above the car (hot car) into which the hot coke is pushed. The traveling hood has the ability to move with the hot car and evacuate the emissions to a baghouse thereby removing particulate matter from the gas stream prior to discharge to the atmosphere. Typically, twenty-seven (27) ovens are pushed during an eight-hour turn at the Monessen Coke Plant.

3.2 BATTERIES 1B AND 2 COMBUSTION STACKS

Desulfurized coke oven gas is used as the underfiring fuel for Batteries 1B and 2. The products of combustion from the underfiring for each battery are exhausted through single exhaust stacks.

4.0 PROCEDURES

4.1 FIELD WORK

4.1.1 Field Data Sheets

All field data sampling sheets are contained in Appendix A.

4.1.2 Testing Station and Traverse Locations

4.1.2.1 Batteries 1B and 2 Pushing Emission Control System

The sampling station for Batteries 1B and 2 Pushing Emission Control System is located on an existing platform approximately 50 feet above elevation. The inside diameter of the metal exhaust stack is 71.25 inches. The two sampling ports are located approximately 12 feet, or 1.5 diameters, upstream from the stack exit and 36 feet, or six diameters, downstream from the inlet plenum. Twenty-four sampling points were selected, 12 at each test port, using EPA Method 1--Sample and Velocity Traverses for Stationary Sources.

4.1.2.2 Battery 1B Combustion Stack

The sampling station for Battery 1B Combustion Stack is located on an existing platform approximately 50 feet above elevation. The inside diameter of the exhaust stack is 13 feet. The four sampling ports are located more than 100 feet, or eight diameters, upstream from the stack exit and approximately 50 feet, or four diameters, downstream from the inlet plenum. Twenty-four sampling points were selected, six at each test port, using EPA Method 1.

4.1.2.3 Battery 2 Combustion Stack

The sampling station for Battery 2 Combustion Stack is located on an existing platform approximately 50 feet above elevation. The inside diameter of the exhaust stack is 10 feet. The four sampling ports are located more than 100 feet, or 10 diameters, upstream from the stack exit and approximately 50 feet, or five diameters, downstream from the inlet plenum. Twenty-four sampling points were selected, six at each test port, using EPA Method 1.

4.1.3 Gas Flow and Gas Temperature Measurements

The gas flow rate and temperature profiles for the gas stream were measured by conducting simultaneous velocity and temperature traverses concurrently with the Particulate Matter emission sampling. Gas velocity head was measured with a calibrated "S"-type Pitot tube that was connected to an inclined manometer. A Chrome-Alumel thermocouple attached to a digital indicator was used to measure the gas temperature at each of the traverse points. The gas flow and gas temperature measurements followed the principles of EPA Method 2--Temperature and Velocity Traverses for Stationary Sources.

The gas flow data collected for the Particulate Matter emission tests were used to calculate the emission rates of NO_x, VOCs, and CO that were measured during each Particulate Matter sample run.

4.1.4 Carbon Dioxide and Oxygen Determination

A Fyrite analyzer was used to determine the molecular weight of the flue gas for the measurement of gas flow during sampling. Three grab samples were collected during each sample run using the principles of EPA Method 3--Gas Analysis for the Determination of Dry Molecular Weight. The following parameters were measured: percent carbon dioxide (CO_2) by volume and percent oxygen (O_2) by volume. The percent nitrogen (N_2) by volume was determined by difference.

4.1.5 Moisture Content Sampling

Moisture sampling was conducted using the principles presented in EPA Method 4--Moisture Content in Stack Gases concurrently with Particulate Matter emission sampling. Parameters evaluated in order to determine the gas stream moisture content were: sample gas volume, sample gas temperature, sample gas pressure, impingers moisture gain, and silica gel moisture gain.

4.1.6 Determination of Particulate Matter Emissions

EPA Method 5-- Determination of Particulate Matter Emissions from Stationary Sources was used in this test program. The sampling and analytical procedures described in the PADEP "Source Testing Manual," 1995, Revision No. 2 was incorporated in the test program. Particulate Matter was withdrawn isokinetically from the gas streams of each source and collected in a stainless steel-lined probe and nozzle and on a heated glass fiber filter. A series of glass impingers were used to

collect moisture and the "back-half" catch was analyzed by procedures described the PADEP "Source Testing Manual." A calibrated dry gas meter measured the gas sample volume that exceeded 61 dry standard cubic feet (dscf) for Batteries 1B and 2 Combustion Stacks and 36 dscf for Batteries 1B and 2 Pushing Emission Control System. The average of three 120-minute sampling runs constituted the test for Battery 1B and 2 Combustion Stacks and three 48-minute sampling runs constituted the test for Battery 1B and 2 Pushing Emission Control System.

When testing Battery 1B and 2 Pushing Control System, each of the 24 sampling points were sampled for two minutes. Sampling started when the fan damper opened and coke started to be pushed. Twenty-four pushes, one push per point, constituted each sampling run.

4.1.7 Determination of Carbon Monoxide Emissions

The principles of EPA Method 10--Determination of Carbon Monoxide Emissions from Stationary Sources were used for this test program. A gas sample was continuously extracted from each source at one sampling point in the gas stream and a portion of the sample was conveyed to a CO analyzer. The analyzer measured the CO concentration using the principles of nondispersive infrared (NDIR) analyses. Three 60-minute samples were collected for Battery 1B and 2 Combustion Stacks and three 48-minute samples were collected for Battery 1B and 2 Pushing Emission Control System.

4.1.8 Determination of Volatile Organic Compound Emissions

The principles of EPA Method 25A--Determination of Volatile Organic Compound Emissions from Stationary Sources Using A Flame Ionization Analyzer (FIA) were used for this test program to determine VOCs. A gas sample was continuously extracted from each source at one sampling point in the gas stream and a portion of the sample was conveyed to a VOC Analyzer. The VOC analyzer was calibrated with propane and the emissions were reported as propane. Three 60-minute samples were collected for Battery 1B and 2 Combustion Stacks and three 48-minute samples were collected for Battery 1B and 2 Pushing Emission Control System.

4.1.9 Determination of Nitrogen Oxides Emission

The principles of EPA Method 7E--Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure) were used for this test program. A gas sample was continuously extracted from each source at one sampling point in the gast stream and a portion of the sample was conveyed to a NO_x analyzer. The

analyzer measured the NO_x concentration using the principles of chemiluminescence. Three 60-minute samples were collected for Battery 1B and 2 Combustion Stacks and three 48-minute samples were collected for Battery 1B and 2 Pushing Emission Control System.

4.1.10 Determination of Visible Emissions

Visible emissions were determined using a certified visible emission observer. The principles of EPA Method 9–Visual Determination of the Opacity From Stationary Sources was used. Observations were made simultaneously with Particulate Matter sampling at each source.

4.1.11 Sample Recovery

Recovery of samples was conducted on-site in the Optimal Air Van.

4.2 ANALYSIS

Analysis for the "front half" total particulate was conducted by Optimal in their Pittsburgh, Pennsylvania laboratory. The analysis for the "back half" particulate was conducted by Air Quality Services, Inc. Copies of all laboratory reports are contained in Appendix B.

4.3 CALCULATIONS

Emission calculations were completed using a computer spreadsheet format. The results of each pertinent parameter are detailed on the spreadsheet for each sampling run and are contained in Appendix C.

4.4 FIELD EQUIPMENT CALIBRATIONS

The following field equipment calibration data are contained in Appendix D:

- Nozzle Diameter
- Thermocouple
- Dry Gas Meter and Orifice
- Pitot Tube
- Field Barometer
- Calibration Gas Certificates
- Analyzer Drift
- Analyzer Response Time

- Analyzer System Bias
- NO_x Analyzer Interference
- NO_x Analyzer NO to NO_2 conversion

4.5 OPERATION DATA

Copies of the Pushing Schedules for Batteries 1B and 2 for all sampling periods are contained in Appendix E.

5.0 SUMMARY OF RESULTS

5.1 BATTERIES 1B AND 2 PUSHING EMISSION CONTROL SYSTEM

5.1.1 PARTICULATE MATTER EMISSIONS

Table 2 summarizes the results of the Particulate Matter emission sampling. The measured emissions ranged from 0.0015 to 0.0048 gr/dscf. The average Particulate Matter emission concentration was 0.0035 gr/dscf.

5.1.2 NITROGEN OXIDES EMISSIONS

Table 3 summarizes the results of the NO_x emission sampling. The measured NO_x emissions ranged from 7.27 lb/hr to 10.10 lb/hr. The average NO_x emission was 8.24 lb/hr.

5.1.3 VOLATILE ORGANIC COMPOUND EMISSIONS

Table 3 summarizes the results of the VOC emission sampling. The measured VOC emissions ranged from 0.78 lb/hr to 1.28 lb/hr. The average VOC emission was 1.06 lb/hr.

5.1.4 CARBON MONOXIDE EMISSIONS

Table 3 summarizes the results of the CO emission sampling. The measured CO emissions ranged from 17.74 lb/hr to 23.74 lb/hr. The average CO emission was 21.10 lb/hr.

5.1.5 VISIBLE EMISSIONS

Table 4 summarizes the results of the visible emissions observations. At no time did the opacity exceed 0 percent.

5.2 BATTERY 1B COMBUSTION STACK

5.2.1 PARTICULATE MATTER EMISSIONS

Table 5 summarizes the results of the Particulate Matter emission sampling. The measured emissions ranged from 0.0022 to 0.0060 gr/dscf. The average Particulate Matter emission concentration was 0.0037 gr/dscf.

5.2.2 NITROGEN OXIDES EMISSIONS

Table 6 summarizes the results of the NO_x emission sampling. The measured NO_x emissions ranged from 118.96 lb/hr to 130.61 lb/hr. The average NO_x emission was 122.93 lb/hr.

5.2.3 VOLATILE ORGANIC COMPOUND EMISSIONS

Table 6 summarizes the results of the VOC emission sampling. The measured VOC emissions ranged from 0.31 lb/hr to 2.49 lb/hr. The average VOC emission was 1.32 lb/hr.

5.2.4 CARBON MONOXIDE EMISSIONS

Table 6 summarizes the results of the CO emission sampling. The measured CO emissions ranged from 11.97 lb/hr to 103.65 lb/hr. The average CO emission was 46.98 lb/hr.

5.2.5 VISIBLE EMISSIONS

Table 7 summarizes the results of the visible emissions observations. The average opacity was 0.3 percent. At no time did the opacity exceed 15 percent.

5.3 BATTERY 2 COMBUSTION STACK

5.3.1 PARTICULATE MATTER EMISSIONS

Table 8 summarizes the results of the Particulate Matter emission sampling. The measured emissions ranged from 0.0033 to 0.0165 gr/dscf. The average Particulate Matter emission concentration was 0.0084 gr/dscf.

5.3.2 NITROGEN OXIDES EMISSIONS

Table 9 summarizes the results of the NO_x emission sampling. The measured NO_x emissions ranged from 53.86 lb/hr to 69.69 lb/hr. The average NO_x emission was 61.93 lb/hr.

5.3.3 VOLATILE ORGANIC COMPOUND EMISSIONS

Table 9 summarizes the results of the VOC emission sampling. The measured VOC emissions ranged from 1.97 lb/hr to 2.53 lb/hr. The average VOC emission was 2.28 lb/hr.

5.3.4 CARBON MONOXIDE EMISSIONS

Table 9 summarizes the results of the CO emission sampling. The measured CO emissions ranged from 1.17 lb/hr to 22.75 lb/hr. The average CO emission was 9.11 lb/hr.

5.3.5 VISIBLE EMISSIONS

Table 7 summarizes the results of the visible emissions observations. The average opacity was 0.1 percent. At no time did the opacity exceed 15 percent.

TABLES

TABLE 2

SUMMARY OF RESULTS
BATTERIES 1B AND 2 PUSHING EMISSIONS CONTROL SYSTEM
PARTICULATE EMISSIONS

Parameter	Run 1	Run 2	Run 3	Average
Gas Flow (acfm)	124629	121357	122769	122918
Gas Flow (dscfm)	116094	112527	117286	115302
Gas Temp (°F)	88.8	83.5	74.2	82.2
Gas Moisture (%)	2.0	2.2	1.5	1.9
Oxygen (%)	21.0	21.0	21.0	21.0
Carbon Dioxide (%)	0.0	0.0	0.0	0.0
Isokinetic Ratio (%)	104.4	104.0	103.8	104.1
Particulate Emissions:				
(gr/dscf)	0.0048	0.0041	0.0015	0.0035
(lb/hr)	4.8	4.0	1.5	3.4

TABLE 3

SUMMARY OF RESULTS
BATTERIES 1B AND 2 PUSHING EMISSIONS CONTROL SYSTEM
NO_X, VOC, AND CO EMISSIONS

Parameter	Run 1	Run 2	Run 3	Average
NO_x Emissions:				
(ppm)	8.85	12.55	8.67	10.02
(lb/hr)	7.35	10.1	7.27	8.24
VOC Emissions:				
(ppm)	1.42	1.01	1.59	1.34
(lb/hr)	1.13	0.78	1.28	1.06
CO Emissions:				
(ppm)	35.11	48.48	42.76	42.12
(lb/hr)	17.74	23.74	21.83	21.1

TABLE 4

SUMMARY OF RESULTS
BATTERIES 1B AND 2 PUSHING EMISSIONS CONTROL SYSTEM
VISIBLE EMISSIONS

	Run 1	Run 2	Run 3	Average
Average Opacity	0	0	0	0
Lowest Opacity	0	0	0	0
Highest Opacity	0	0	0	0
No. of Min. ≥ 20%	0	0	0	0
No. of Min. ≥ 60%	0	0	0	0

TABLE 5

SUMMARY OF RESULTS
BATTERIES 1B AND 2 PUSHING EMISSIONS CONTROL SYSTEM
PARTICULATE EMISSIONS

Parameter	Run 1	Run 2	Run 3	Average
Gas Flow (acfm)	112451	111017	94771	106080
Gas Flow (dscfm)	45658	44549	37880	42696
Gas Temp (°F)	607.1	602.2	606.4	605.2
Gas Moisture (%)	16.5	17.9	17.9	17.4
Oxygen (%)	11.7	12.3	12.0	12.0
Carbon Dioxide (%)	5.3	5.7	6.0	5.7
Isokinetic Ratio (%)	106.3	106.9	106.5	106.6
Particulate Emissions:				
(gr/dscf)	0.0060	0.0022	0.0028	0.0037
(lb/hr)	2.3	0.8	0.9	1.3

TABLE 6

SUMMARY OF RESULTS
BATTERY 1B COMBUSTION STACK
NO_X, VOC, AND CO EMISSIONS

Parameter	Run 1	Run 2	Run 3	Average
NO_x Emissions:				
(ppm)	364.40	410.04	440.19	404.88
(lb/hr)	118.96	130.61	119.23	122.93
VOC Emissions:				
(ppm)	0.98	8.17	4.53	4.56
(lb/hr)	0.31	2.49	1.17	1.32
CO Emissions:				
(ppm)	127.4	534.59	72.58	244.86
(lb/hr)	25.32	103.65	11.97	46.98

TABLE 7

SUMMARY OF RESULTS
BATTERY 1B COMBUSTION STACK
VISIBLE EMISSIONS

	Run 1	Run 2	Run 3	Average
Average Opacity	0.3	0.3	0.2	0.3
Lowest Opacity	0	0	0	0
Highest Opacity	15	15	15	15
No. of Min. $\geq$ 20%	0	0	0	0
No. of Min. $\geq$ 60%	0	0	0	0

TABLE 8

SUMMARY OF RESULTS
BATTERY NO. 2 COMBUSTION STACK
PARTICULATE EMISSIONS

Parameter	Run 1	Run 2	Run 3	Average
Gas Flow (acfm)	53721	48632	50941	51098
Gas Flow (dscfm)	24011	21141	22186	22446
Gas Temp (°F)	542.5	554.6	562.0	553.0
Gas Moisture (%)	13.4	14.7	13.8	14.0
Oxygen (%)	12.7	12.3	11.0	12.0
Carbon Dioxide (%)	4.5	4.0	5.0	4.5
Isokinetic Ratio (%)	90.9	91.4	103.9	95.4
Particulate Emissions:				
(gr/dscf)	0.0054	0.0033	0.0165	0.0084
(lb/hr)	1.1	0.6	3.1	1.6

TABLE 9

SUMMARY OF RESULTS
BATTERY 2 COMBUSTION STACK
NO_X, VOC, AND CO EMISSIONS

Parameter	Run 1	Run 2	Run 3	Average
NO_x Emissions:				
(ppm)	362.54	356.27	439.30	386.04
(lb/hr)	62.24	53.86	69.69	61.93
VOC Emissions:				
(ppm)	15.38	16.20	12.97	14.85
(lb/hr)	2.53	2.34	1.97	2.28
CO Emissions:				
(ppm)	217.66	12.69	35.3	88.55
(lb/hr)	22.75	1.17	3.41	9.11

TABLE 10

SUMMARY OF RESULTS
BATTERY 2 COMBUSTION STACK
VISIBLE EMISSIONS

	Run 1	Run 2	Run 3	Average
Average Opacity	0.2	0	0.1	0.1
Lowest Opacity	0	0	0	0
Highest Opacity	15	5	10	10
No. of Min. ≥ 20%	0	0	0	0
No. of Min. ≥ 60%	0	0	0	0

APPENDIX A

Plant KOPPERS / MONNESSEN

Date NOVEMBER 17, 1996

Sampling location PUSH BAGHOUSE STACK

Inside of far wall to outside of nipple 77.25

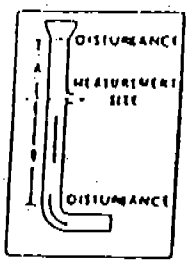
Inside of near wall to outside of nipple (nipple length):
6.0"

Stack inside diameter, inches 71.25

Distance downstream from flow disturbance (Distance B):
~36' feet / inches / diameter = 6 dd

Distance upstream from flow disturbance (Distance A):
~12' feet / inches / diameter = 2 dd

Calculated by JEP & PJ



SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	NIPPLE LENGTH	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	.021	71.25	1.5	6"	7.5
2	.067		4.8		10.8
3	.118		8.4		14.4
4	.177		12.6		18.6
5	.250		17.8		23.8
6	.356		25.4		31.4
7	.644		45.9		51.9
8	.750		53.4		59.4
9	.823		58.6		64.6
10	.882		62.8		68.8
11	.933		66.4		72.4
12	.979		69.8		75.8

Plant Koppers / Monessen

Date 11-17-96

Sampling location ~~Battery 18~~ Battery 1B Combustion Stack ~~Pushing Emission Control System~~

Inside of far wall to outside of nipple 13'14"

Inside of near wall to outside of nipple (nipple length): 14"

Stack inside diameter, inches 13'

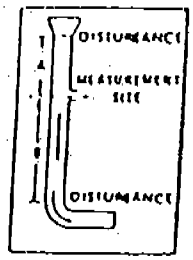
Distance downstream from flow disturbance (Distance B):

~50 ~~inches~~ feet / diameter = ~4 dd

Distance upstream from flow disturbance (Distance A):

>100 ~~inches~~ feet / diameter = >2 dd

Calculated by JZP



SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	NIPPLE LENGTH	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	.1021	156	3.3	14"	17.3
2	.1067		10.5		24.5
3	.1118		18.4		32.4
4	.1177		27.6		41.6
5	.1250		39.0		53.0
6	.1356		55.5		69.5

Plant KEPPERS / INCINERATOR

Date NOVEMBER 17, 1996

Sampling location NO. 2 COMBUSTION STACK

Inside of far wall to outside of nipple 10' 10"

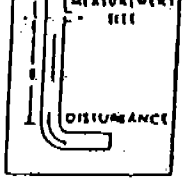
Inside of near wall to outside of nipple (nipple length):
10"

Stack inside diameter, inches 10' (120")

Distance downstream from flow disturbance (Distance B):
~ 50 ~~inches~~ feet / diameter = ~ 5 dd

Distance upstream from flow disturbance (Distance A):
210 ~~inches~~ feet / diameter = 22 dd

Calculated by JEP



SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	NIPPLE LENGTH	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	.021	120"	2.5	10"	12.5
2	.067		8.0		18.0
3	.118		14.2		24.2
4	.177		21.3		31.3
5	.250		30.0		40.0
6	.356		42.7		52.7

EPA METHOD 5
FIELD DATA SHEET

Run No:	1	Control Box Number:	80902	Nozzle Diameter:	0.182
Date:	11-18-96	Pitot Number:	6-1	Meter H@:	1.917
Client:	Koppers	Filter Number:	3/2	Correction Factor:	0.972
Plant:	Monessen	Umbilical Length:	25'	Pitot Correction Factor:	0.84
Location:	Push Baghouse	Barometric Pressure:	29.61	Probe Number:	6-1
Project No:	937	Static Pressure:	-0.62	Thermocouple No:	6-1
Test Crew:	PJ	Assumed Moisture:	1	Probe Length:	~7'
Ambient Temperature:	~45	Calculated Multiplier:		Stack Diameter:	71.25

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	0823	53.471										
R1	2	0825	54.9	1.3	1.7	5	51	49	73	241	262	42	
		0857											
R2	4	0859	56.3	1.4	1.8	5	50	49	79	239	233	41	
		0909											
3	6	0911	57.6	1.3	1.7	5	50	49	92	248	267	43	
		0920											
4	8	0922	59.0	1.5	1.9	6	51	49	90	244	235	41	
		0934											
5	10	0936	60.5	1.5	1.9	6	52	50	84	237	264	42	
		0948											
6	12	0950	62.1	1.5	2.0	6	52	50	90	238	246	42	
		0958											
1	14	1000	63.6	1.8	2.2	6	53	50	91	223	265	42	
	Total/Avg.		38.257	1.297	2.15				88.8				

54.6

Sample Train Leak Check

	in. Hg	CFM
Time		
Initial	15	0.005
Final	8	0.004

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg.
CO2	0.0	0.0	0.0	0.0
O2	21.0	21.0	21.0	21.0
CO	—	—	—	—
N2	79.0	79.0	79.0	79.0

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	110	100	10
2	198	100	-2
3	1	0	1
4	232.1	224.7	-7.4
5			
		Total Gain	16.4

EPA METHOD 5
FIELD DATA SHEET

Run No: 1 Date: 11-18-96 Client: Koppers Location: Coke Plant Baghouse Page 2 of 2

Traverse Point No.	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp	Comments
8	16	1044	65.4	2.0	2.5	6	54	52	90	258	261	42	
		1053											
9	18	1053	67.2	2.2	2.8	7	54	53	79	230	246	42	
		1114											
10	20	1118	69.1	2.2	2.8	7	55	53	77	231	238	43	
		1126											
11	22	1128	70.9	2.1	2.7	7	55	53	85	233	265	44	
		1137											
12	24	1139	72.7	2.4	3.2	7	55	53	96	233	238	44	
		1148											
1	26	1150	74.2	1.4	1.8	5	56	54	90	250	264	45	
		1200											
2	28	1202	75.7	1.4	1.8	5	56	54	99	237	238	45	
		1210											
3	30	1212	77.1	1.3	1.7	5	57	55	96	240	266	45	
		1300											
4	32	1302	78.7	1.6	2.0	6	58	56	77	247	267	45	
		1310											
5	34	1312	80.3	1.6	2.0	6	58	56	83	231	232	45	
		1322											
6	36	1324	81.9	1.7	2.1	6	58	57	89	240	265	46	
		1333											
7	38	1335	83.5	1.7	2.1	6	59	56	91	234	237	47	
		1344											
8	40	1346	85.2	1.9	2.4	6	59	57	102	227	262	46	
		1354											
9	42	1356	86.8	1.7	2.1	6	60	58	95	223	240	47	
		1404											
10	44	1406	88.3	1.6	2.0	5	60	58	104	238	261	48	
		1415											
11	46	1417	90.0	1.8	2.2	6	61	58	92	250	257	48	
		1425											
12	48	1437	91.728	1.7	2.1	6	60	58	96	230	262	48	

EPA METHOD 5
FIELD DATA SHEET

Run No: 2
Date: 11-19-96
Client: Koppers
Plant: Monessen
Location: Coke Push Baghouse
Project No: 937
Test Crew: PJ
Ambient Temperature: ~42

Control Box Number: 80902
Pitot Number: G-1
Filter Number: 314
Umbilical Length: ~25'
Barometric Pressure: 29.24
Static Pressure: -0.60
Assumed Moisture: 1
Calculated Multiplier: —

Nozzle Diameter: 0.182
Meter H@: 1.917
Correction Factor: 0.972
Pitot Correction Factor: G-1
Probe Number: G-1
Thermocouple No: G-1
Probe Length: ~8'
Stack Diameter: 71.25

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	0752	94.131										
R 1	2	0754	98.4	1.2	1.5	5	43	40	65	137	262	36	
		0812											
2	4	0814	96.7	1.2	1.5	5	42	41	69	243	263	36	
		0827											
3	6	0829	97.9	1.2	1.5	5	43	41	79	238	257	36	
		0844											
4	8	0851	99.4	1.3	1.7	5	42	41	72	235	265	35	
		0907											
5	10	0909	100.8	1.3	1.7	5	42	40	72	230	264	35	
		0924											
6	12	0926	102.3	1.5	1.9	6	41	40	75	236	251	35	
		0943											
7	14	0945	103.9	1.7	2.1	7	41	40	81	232	241	35	
		0946											
8	16	0948	105.5	1.9	2.4	7	41	40	86	224	265	35	
	Total/Avg.		39.723	1.26	2.02				83.5				

45.0

Sample Train Leak Check

Time	in. Hg	CFM
Initial	15	0.000
Final	7	0.000

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg.
CO2	0.0	0.0	0.0	0.0
O2	21.0	21.0	21.0	21.0
CO				
N2				

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	106	100	6
2	101	100	1
3	2	0	2
4	223	214.7	8.6
5			
		Total Gain	17.6

EPA METHOD 5
FIELD DATA SHEET

Run No: 2 Date: 11-[illegible]90 Client: Koppers Location: Coke Push Baghuse Page 2 of 2

Traverse Point No.	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp	Comments
	8	0956											
9	18	0958	107.2	1.9	2.4	7	41	40	88	227	234	35	
	9	1005											
10	20	1007	108.9	1.9	2.4	7	42	40	89	223	263	35	
	10	1107											
11	22	1109	110.7	2.3	2.9	9	43	42	69	226	260	35	
	11	1132											
12	24	1134	112.6	2.4	3.0	9	46	44	84	224	236	37	
	12	1142											
1	26	1144	114.1	1.4	1.8	6	47	45	84	237	248	37	
	1	1151											
2	28	1153	115.4	1.2	1.5	5	49	46	85	236	263	38	
		1201											
3	30	1203	116.9	1.4	1.8	6	48	47	89	235	237	37	
		1210											
4	32	[illegible]	[illegible]	1.5	1.9	6	49	47	94	238	[illegible]	37	
		1219											
5	34	1221	[illegible]	1.6	2.0	6	50	47	[illegible]	229	[illegible]	38	
		[illegible]											
6	36	1300	[illegible]	[illegible]	2.1	6	49	[illegible]	69	[illegible]	241	[illegible]	
		1317											
7	38	[illegible]	[illegible]	[illegible]	2.0	6	50	[illegible]	[illegible]	240	256	37	
		[illegible]											
8	40	[illegible]	[illegible]	[illegible]	[illegible]		49	[illegible]	97	231	248	37	
		[illegible]											
9	42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	50	48	[illegible]	[illegible]	[illegible]	[illegible]	
		1350											
10	44	1352	[illegible]	1.7	2.1	6	50	48	94	[illegible]	264	39	
		[illegible]											
11	46	[illegible]	[illegible]	[illegible]	2.0	6	51	48	100	229	[illegible]	[illegible]	
		[illegible]											
12	48	[illegible]	130.854	[illegible]	[illegible]	6	51	49	93	231	[illegible]	[illegible]	
	Total/Avg.												

EPA METHOD 5
FIELD DATA SHEET

Run No: 3
Date: 11-20-96
Client: Koppers
Plant: Monnesson
Location: Coke Push baghouse
Project No:
Test Crew: PJ
Ambient Temperature: ~

Control Box Number: 80902
Pitot Number: 6-1
Filter Number: 313
Umbilical Length: ~25'
Barometric Pressure: 29.40
Static Pressure: -0.58
Assumed Moisture: 1
Calculated Multiplier:

Nozzle Diameter: 0.1820
Meter H@: 1.917
Correction Factor: 0.972
Pitot Correction Factor: 0.84
Probe Number: 6-1
Thermocouple No: 6-1
Probe Length: ~7'
Stack Diameter: 71.25

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	0734	131.000										
1	2	0736	132.4	1.3	1.7	5	33	32	60	224	246	27	
		0747											
2	4	0749	133.8	1.3	1.7	5	34	32	67	226	256	27	
		0800											
3	6	0802	135.1	1.3	1.7	5	34	32	69	223	238	28	
		0810											
4	8	0812	136.6	1.4	1.8	5	34	32	73	228	263	28	
		0821											
5	10	0829	138.1	1.5	1.9	5	33	32	71	232	249	28	
		[illegible]											
6	12	0845	139.6	1.6	2.0	5	[illegible]	[illegible]	72	229	238		
		[illegible]											
7	14	0856	141.3	2.1	2.7	6	35	33	72	230	263	[illegible]	
		0905											
8	16	[illegible]	143.2	2.2	2.8	7	[illegible]	34	83	[illegible]	[illegible]		
	Total/Avg.		37.476	1.292	2.129				74.2				

38.0

Sample Train Leak Check

Time	in. Hg	CFM
Initial		
Final	7	0.[illegible]

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg.
CO2	0.0	0.0	0.0	0.0
O2	21.0	21.0	21.0	21.0
CO				
N2				

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	109	100	9
2	95	100	-4
3	1	0	1
4	230.3	224.2	6.1
5			
		Total Gain	12.1

EPA METHOD 5
FIELD DATA SHEET

Run No: 3 Date: 11-20-96 Client: Koppers Location: Coke Rich Bag House Page 2 of 2

Traverse Point No.	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp	Comments
		0915											
9	18	0917	145.0	2.2	2.8	7	37	35	77	228	264	30	
		0925											
10	20	0927	146.9	2.2	2.8	7	38	36	76	226	233	31	
		1030											
11	22	1032	148.8	2.4	3.0	7	43	41	62	230	249	31	
		1040											
12	24	1042	150.7	2.3	2.9	7	43	42	75	232	257	33	
		1050											
1	26	1052	151.9	1.0	1.2	3	44	42	63	231	239	34	
		1101											
2	28	1103	153.2	1.3	1.7	5	43	42	80	231	263	34	
		1111											
3	30	1113	154.7	1.6	1.9	5	43	42	77	228	238	33	
		1123											
4	32	1125	156.2	1.4	1.8	5	45	43	85	224	265	33	
		1135											
5	34	1137	157.6	1.6	2.0	5	43	42	81	232	232	34	
		1147											
6	36	1147	159.2	1.7	2.1	6	42	41	85	226	259	34	
		1306											
7	38	1308	160.7	1.7	2.1	6	34	38	56	232	254	33	
		1316											
8	40	1318	162.3	1.7	2.1	6	38	38	74	224	242	33	
		1321											
9	42	1329	163.8	1.7	2.1	6	39	38	74	227	265	34	
		1337											
10	44	1339	165.4	1.7	2.1	6	40	38	79	226	230	34	
		1349											
11	46	1351	166.9	1.7	2.1	6	41	39	75	232	264	33	
		1359											
12	48	1401	168.476	1.7	2.1	6	41	40	86	223	231	35	
	Total/Avg.												

EPA METHOD 5
FIELD DATA SHEET

Run No: 1
Date: NOVEMBER 22, 1996
Client: KOPPERS
Plant: MONESSEN PA
Location: NO. 1 COMBUSTION STACK
Project No:
Test Crew: JBS
Ambient Temperature: ~35

Control Box Number: 80672
Pitot Number: 6-1
Filter Number: 318
Umbilical Length: 50'
Barometric Pressure: 29.54
Static Pressure: -1.67
Assumed Moisture: 14%
Calculated Multiplier:

Nozzle Diameter: 0.6200
Meter H@: 1.789
Correction Factor: 0.985
Pitot Correction Factor: 0.84
Probe Number: 6-1
Thermocouple No: 6-1
Probe Length: ~7'
Stack Diameter: 156"

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	850	965.023										
A 1	5	855	968.6	.03	1.9	2	46	44	606	226	213	45	
2	10	900	972.2	.03	1.9	2	46	47	615	237	237	52	
3	15	905	975.9	.03	1.9	2	47	49	614	243	239	60	
4	20	910	979.4	.025	1.6	2	49	49	605	248	270	67	
5	25	915	983.0	.025	1.6	2	49	49	605	246	270	70	
6	30	920	987.5	.05	3.2	2	50	49	600	247	270	60	
		925											
B 1	35	930	992.0	.03	1.9	2	50	49	590	250	270	68	
2	40	935	996.6	.02	1.25	2	51	46	612	226	276	62	
3	45	940	999.0	.02	1.25	2	50	46	620	231	272	55	
4	50	945	001.5	.02	1.25	2	50	46	645	231	272	56	
5	55	950	004.7	.02	1.25	2	50	46	609	238	269	56	
6	60	955	008.0	.02	1.25	2	51	47	600	239	260	51	
	Total/Avg.		40.898	0.171	1.868		49.9		607.1				

Sample Train Leak Check

Time	in. Hg	CFM
Initial	5	0
Final	5	0

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg.
CO2	5	6	5	5.3
O2	12	11	12	11.7
CO				
N2				

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	355	100	255
2	200	100	100
3	12	0	12
4	347.8	228.0	19.8
5			
		Total Gain	386.8

EPA METHOD 5
FIELD DATA SHEET

Run No: #1 Date: 11-22-96 Client: Koppers Location: No. 1 Comb. Stack

Traverse Point No	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp	Probe Temp.	Oven Temp.	Impinger Temp	Comments
1	65	1027	012.0	.03	1.9	[illegible]	52	49	617	[illegible]	276	[illegible]	
2	70	[illegible]	[illegible]	.04	2.5	[illegible]	[illegible]	57	611	[illegible]	[illegible]	[illegible]	
3	75	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
4	80	[illegible]	[illegible]	[illegible]	[illegible]	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
5	85	[illegible]	[illegible]	.03	1.9	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
6	90	[illegible]	31.0	.025	[illegible]	[illegible]	51	52	[illegible]	[illegible]	[illegible]	[illegible]	
		1034											
1	95	1039	35.2	.035	2.2	4	55	49	589	225	275	57	
2	100	1044	39.5	.04	2.5	5	52	58	612	229	293	51	
3	105	1049	43.6	.035	2.2	5	53	49	613	246	284	54	
4	110	1054	47.7	.035	2.2	5	52	52	602	265	276	63	
5	115	1059	51.8	.035	2.2	5	52	49	603	272	278	60	
6	120	1104	1055.921	.035	2.2	5	54	49	581	257	279	57	
Total/Avg.													

EPA METHOD 5
FIELD DATA SHEET

Date:	11-22-96	Control Box Number:	80872	Nozzle Diameter:	0.6200
Client:	Koppers	Pitot Number:	6-1	Meter H@:	1.789
Plant:	Monessen PA	Filter Number:	~~319~~ 344	Correction Factor:	0.985
Location:	#1 Comb. Stack	Umbilical Length:	50	Pitot Correction Factor:	0.84
Project No:		Barometric Pressure:	29.54	Probe Number:	6-1
Test Crew:	JRS	Static Pressure:	-1.63	Thermocouple No:	6-1
Ambient Temperature:	~35	Assumed Moisture:	14%	Probe Length:	~7'
		Calculated Multiplier:		Stack Diameter:	156"

Reversed port dir. Counterclockwise

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	1140	056.268										
1		1145	59.8	.03	1.9	3	53	54	612	235	184	65	
2		1150	64.3	.04	2.4	5	47	48	602	221	217	47	
3		1155	68.6	.05	2.1	5	54	47	602	242	255	55	
4		1200	72.4	.03	1.8	4	54	49	605	246	272	55	
5		1205	76.0	.03	1.8	4	51	47	597	248	274	68	
6		1210	79.4	.025	[illegible]	3	52	47	580	243	276	65	
		1213	[illegible]										
1		1218	82.2	.03	1.8	[illegible]	52	49	597	220	275	68	
2		1223	86.7	.03	1.8	[illegible]	52	49	628	221	276	52	
3		1228	90.3	.035	2.1	[illegible]	52	48	623	241	285	55	
4		1233	94.0	.035	2.1	[illegible]	53	49	599	249	276	52	
5		1238	97.7	.03	1.8	[illegible]	54	52	599	252	275	51	
6		1243	101.5	.03	1.8	[illegible]	54	49	580	248	278	51	
	Total/Avg.		89.514	0.169	1.858				602.2				

51.8

Sample Train Leak Check

Time	in. Hg	CFM
Initial	5	0
Final	5	0

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg
CO2	5	6	[illegible]	[illegible]
O2	12	12	[illegible]	[illegible]
CO				
N2				

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	387	100	287
2	213	100	113
3		0	0
4	226.4	208.2	18.2
5			
		Total Gain	418.2

EPA METHOD 5
FIELD DATA SHEET

Run No: #2 Date: 11-22 1247 Client: Koppers Location: Mcuessen

Traverse Point No.	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp	Comments
1		1252	104.9	.03	1.7	5	54	49	590	220	273	54	
2	1257	[illegible]	109.1	.04	2.4	5	52	49	618	220	263	47	
3		102	112.9	.03	1.7	4	53	51	621	236	283	47	
4		107	116.7	.03	1.7	4	54	52	622	243	278	50	
5		122	120.2	.025	1.5	3	54	57	595	245	270	50	
6		127	123.4	.02	1.2	3	54	51	581	233	282	66	
		921		~~.035~~	~~2.1~~	~~4~~	~~54~~	~~51~~	~~610~~	~~237~~	~~263~~	~~47~~	
1		0126	127.2	.035	2.1	4	54	51	610	237	268	47	
2		0131	131.4	.04	2.4	5	54	51	599	223	278	49	
3		0136	136.0	.04	2.4	5	55	51	604	242	282	50	
4		0141	139.1	.03	1.7	3	58	54	606	255	287	61	
5		0146	142.9	.03	1.7	3	55	51	593	263	274	55	
6		0151	145.782	.02	1.2	3	55	51	590	255	277	55	
Total/Avg.													

EPA METHOD 5
FIELD DATA SHEET

Run No:	#3	Control Box Number:	80872	Nozzle Diameter:	0.6200
Date:	11-22-96	Pitot Number:	6-1	Meter H@:	1.789
Client:	Koppers	Filter Number:	~~320~~ 345	Correction Factor:	0.985
Plant:	Monessen PA	Umbilical Length:	50	Pitot Correction Factor:	0.84
Location:	#1 Comb Stack	Barometric Pressure:	29.54	Probe Number:	6-1
Project No:		Static Pressure:	-1.65	Thermocouple No:	6-1
Test Crew:	JRS	Assumed Moisture:	14%	Probe Length.	~7'
Ambient Temperature:	~35	Calculated Multiplier:		Stack Diameter:	156"

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	1247											
~~1~~		~~1252~~		~~.03~~	~~1.7~~	~~3~~	~~54~~	~~49~~	~~590~~	~~220~~	~~273~~	~~54~~	
~~2~~		~~0107~~											
~~3~~		~~0112~~											
~~4~~		~~0117~~											
~~5~~		~~0122~~											
~~6~~		~~0127~~											
		0223	145.918										
1		0228	148.8	.02	1.2	2	51	55	605	220	252	68	
2		0233	151.8	.015	0.9	1	50	52	600	220	257	54	
3		0238	154.9	.02	1.2	2	51	49	608	226	283	58	
4		0243	157.9	.02	1.2	2	51	51	604	236	280	51	
5		0248	160.9	.02	1.2	2	52	49	595	243	275	51	
6		0253	163.9	.02	1.2	2	53	49	590	247	276	50	
	Total/Avg.		76.077	0.144	1.289			52.2	606.4				

Sample Train Leak Check

Time	in. Hg	CFM
Initial	5	0
Final	3	0

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg.
CO2	6.0	6.0	6.0	6.0
O2	12.0	12.0	12.0	12.0
CO				
N2				

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	205	100	205
2	130	100	130
3	3	0	3
4	245.7	230.3	15.4
5			
		Total Gain	353.4

EPA METHOD 5
FIELD DATA SHEET

Run No: #3 Date: 11-22 Client: Koppers Location: Monessen

Page 2 of 2

Traverse Point No.	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp	Comments
1	1	0300	166.5	.015	0.9	1	51	54	610	220	273	52	
2	2	0305	169.3	.015	0.9	1	54	49	630	220	247	49	
3	3	0310	172.3	.02	1.2	2	52	50	606	221	275	51	
4	4	0315	175.1	.015	0.9	1	54	49	602	232	281	46	
5	5	0320	177.5	.01	0.6	1	54	49	602	233	271	47	
6	6	0325	179.8	.01	0.6	1	53	51	601	230	278	51	
		0331											
	1	0336	183.4	.03	1.8	3	52	51	620	220	262	50	
	2	0341	187.3	.035	2.1	4	53	50	626	223	257	49	
	3	0346	191.1	.03	1.8	4	55	50	623	241	279	53	
	4	0351	194.5	.02	1.2	2	54	50	606	250	279	52	
	5	0356	197.6	.02	1.2	2	54	50	601	248	276	52	
	6	0401	200.6	.02	1.2	2	54	50	599	242	272	60	
		0403											
	1	0408	204.4	.03	1.8	4	56	51	613	220	233	51	
	2	0413	208.2	.03	1.8	4	55	51	603	229	255	54	
	3	0418	211.9	.03	1.8	4	55	54	609	244	278	55	
	4	0423	215.6	.03	1.8	4	58	51	614	254	283	57	
	5	0428	219.1	.03	1.8	4	58	52	603	259	282	62	
	6	0433	221.995	.01	0.6	1	57	55	585	254	279	61	
	Total/Avg.												

EPA METHOD 5
FIELD DATA SHEET

Run No:	1	Control Box Number:	80872	Nozzle Diameter:	0.62
Date:	11-21-98	Pitot Number:	6-1	Meter H@:	1.789
Client:	Koppers	Filter Number:	315	Correction Factor:	0.985
Plant:	Monessen	Umbilical Length:	~50'	Pitot Correction Factor:	0.84
Location:	No 2 Battery Stack	Barometric Pressure:	29.42	Probe Number:	6-1
Project No:		Static Pressure:	-1.4	Thermocouple No:	6-1
Test Crew:	[illegible]	Assumed Moisture:	18	Probe Length.	~71
Ambient Temperature:	~30	Calculated Multiplier:		Stack Diameter:	10.0'

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	0755	747.787										
E 1	5	0800	753.9	.06	3.8	7	40	41	478	225	244	36	
2	10	0805	756.4	.02	1.2	2	53	43	480	243	270	36	
3	15	0810	760.0	.02	1.2	2	54	41	552	252	269	36	
4	20	0815	762.7	.02	1.2	2	55	41	[illegible]	250	[illegible]	36	
5	25	0820	765.4	.02	1.2	2	56	43	560	249	268	37	
6	30	0825	768.4	.025	1.5	2	56	41	581	230	261	36	
		0829											
N 6	35	0834	771.6	.03	1.8	2	44	50	561	230	266	38	
5	40	0839	774.5	.02	1.2	2	43	51	567	228	262	37	
4	45	0844	777.1	.02	1.2	2	41	51	548	231	261	37	
3	50	0849	780.1	.02	1.2	2	45	49	499	243	247	37	
2	55	0854	783.2	.02	1.2	2	45	49	480	243	249	37	
1	60	0859	786.2	.02	1.2	2	45	49	481	242	240	39	
			797.8										
			5.6										
	Total/Avg.		69.131	0.143	1.271			47.5	542.5				

Sample Train Leak Check

Time	in. Hg	CFM
Initial	15	0.000
Final	10	0.000

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg.
CO2	4½	4	5	4.5
O2	16	12	12	12.7
CO				
N2				

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	313	100	213
2	105	100	15
3			
4	242.3	230.0	12.3
5			
		Total Gain	230.3

EPA METHOD 5

FIELD DATA SHEET

Run No. [illegible] Date [illegible] Client: Royster Location: Unit 2 Battery Stack Page 2 of 3

Traverse Point No.	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp	Comments
B/		65	0908	787.5	.02	1.2	1	49	46	574	225	240	
1		70	0913	791.8	.02	1.2	1	49	46	569	229	251	
		75	0918	795.9	.01	.6	1	49	43	501	231	249	
2		80	0923	796.0	.01	.6	1	49	44	562	231	249	
		85	0928	799.2	.015	.9	1	49	43	569	2[illegible]	2[illegible]	
3		90	0933	800.7	.015	.9	1	53	46	540	229	250	
			943										
5		95	948	803.5	.02	1.2	1	53	47	554	230	245	37
4		100	953	806.9	.02	1.2	1	51	43	590	232	251	39
		105	958	810.7	.02	1.2	1	52	44	564	230	260	37
5		110	1003	811.4	.02	1.2	1	53	46	551	229	260	38
		115	1008	814.2	.02	1.2	1	53	46	530	229	260	39
6		120	1013	816.918	.02	1.2	1	53	47	526	240	269	43

EPA METHOD 5
FIELD DATA SHEET

Run No: #2
Date: 11-21-96
Client: Koppers
Plant: [illegible] MONESSA
Location: [illegible] STACK
Project No:
Test Crew: [illegible]
Ambient Temperature: 35

Control Box Number: 80872
Pitot Number: 6-1
Filter Number: 316
Umbilical Length: ~50'
Barometric Pressure: 29.40
Static Pressure: -1.3
Assumed Moisture: 10
Calculated Multiplier:

Nozzle Diameter: 0.6200
Meter H@: [illegible]
Correction Factor: [illegible]
Pitot Correction Factor: [illegible]
Probe Number: 6-1
Thermocouple No: 6-1
Probe Length: ~7'
Stack Diameter: 3 feet

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	1107	820.[illegible]										
	1	1112	823.5	.025	1.5	2	60	55	553	225	[illegible]	38	
	2	1117	826.[illegible]	.025	1.5	2	61	53	565	226	[illegible]	[illegible]	
	3	1122	829.[illegible]	.02	1.2	2	61	53	564	230	258	44	
	4	1127	832.2	.02	1.2	2	60	54	540	231	258	43	
	5	1132	835.2	.02	1.2	2	61	56	530	226	[illegible]	44	
	6	1137	838.1	.02	1.2	2	60	52	520	233	240	43	
		1140											
	6	1145	841.0	.02	1.2	2	60	51	560	231	244	44	
	5	1150	843.9	.02	1.2	2	63	58	589	221	261	38	
	4	1155	847.1	.02	1.2	2	61	59	575	240	252	39	
	3	1200	849.7	.02	1.2	2	60	59	557	242	255	39	
	2	1205	852.15	.02	1.2	2	61	58	550	240	253	40	
	1	1210	855.4	.02	1.2	2	61	58	547	247	262	41	
	Total/Avg.		62.633	0.1285	1.0125				554.6				

58.1

Sample Train Leak Check

Time	In. Hg	CFM
Initial	[illegible]	[illegible]
Final	3	0.00

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg.
CO2	4	4	4	4
O2	12	13	12	12.3
CO				
N2				

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	310	100	210
2	104	100	4
3	0	0	0
4	231.1	218.7	12.4
5			
		Total Gain	226.4

EPA METHOD 5
FIELD DATA SHEET

Run No: #2 Date: 11-21-96 Client: Koppers Location: #2 Battery Stack

1213

Traverse Point No.	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp	Comments
6	[illegible]	1218	858.2	.02	1.2	2	61	57	546	[illegible]	234	[illegible]	
[illegible]	[illegible]	1223	860.8	.015	[illegible]	2	60	56	[illegible]	[illegible]	241	[illegible]	
	[illegible]	1228	863.2	.015	.4	2	[illegible]	[illegible]	[illegible]	[illegible]	270	[illegible]	
		1233	865.7	.01	[illegible]	2	60	[illegible]	[illegible]	[illegible]	272	[illegible]	
		1238	868.3	.015	[illegible]	2	[illegible]	[illegible]	[illegible]	246	271		
		1243	870.8	.015	.1	2	[illegible]	[illegible]	[illegible]	240	267	[illegible]	
		1245											
6		1250	873.0	.01	.6	2	61	54	519	[illegible]	[illegible]	[illegible]	
5		1255	875.1	.01	.6	2	61	55	546	[illegible]	[illegible]	[illegible]	
4		1300	877.1	.01	.6	2	[illegible]	54	[illegible]	[illegible]	[illegible]	[illegible]	
3		1305	879.3	.01	.6	2	61	54	570	231	247	39	
2		1310	881.3	.01	.6	2	61	55	551	235	250	[illegible]	
1		1315	883.323	.01	.6	2	62	56	556	238	260	40	
Total/Avg.													

EPA METHOD 5
FIELD DATA SHEET

Run No: 3
Date: 11-21-16
Client: KUIPERS
Plant: MICHIGAN
Location: NO2 BAT. STACK
Project No:
Test Crew: HT & JS
Ambient Temperature:

Control Box Number: 80?-2
Pitot Number: G-1
Filter Number: 317
Umbilical Length: 50'
Barometric Pressure: 29.36
Static Pressure: -1.37
Assumed Moisture:
Calculated Multiplier:

Nozzle Diameter: 0.6200
Meter H@: 1.789
Correction Factor: 0.985
Pitot Correction Factor: 0.84
Probe Number: G-1
Thermocouple No: G-1
Probe Length: ~7'
Stack Diameter:

Traverse Point Number	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp.	Comments
	0	1417	390.152										
E 6	5	1422	393.2	.02	1.2	2	50	52	550	241	250	37	
5	10	1427	996.3	.02	1.2	2	50		550	221	250		
4	15	1432	899.3	.02	1.2	2	58	52	550	259	261	39	
3	20	1437	902.6	.02	1.2	2	58	54	531	260	267	39	
2	25	1442	905.6	.02	1.3	2	58	54	530	259	266	39	
1	30	1447	908.9	.02	1.3	2	57	54	530	261	266	37	
		1450											
N 6	35	1455	912.1	.02	1.3	2	58	54	540	244	273	37	
5	40	1500	915.2	.02	1.3	2	59	55	576	241	278	46	
4	45	1505	918.7	.02	1.3	2	61	54	594	233	287	48	
3	50	1510	921.4	.02	1.3	2	62	54	593	236	249	49	
2	55	1515	925.1	.02	1.3	2	61	56	561	229	236	51	
1	60	1520	927.7	.01	1.64	1	59	54	520	242	258	51	
	Total/Avg.		77.318	0.134	1.173		55.5		562.0				

Sample Train Leak Check

Time	in. Hg	CFM
Initial	25	0.000
Final	5	.18

Pitot Leak Check

Pressure	OK
Static	OK

Gas Analysis

Run	1	2	3	Avg.
CO2	5	4.5	5.5	5.0
O2	11	11	11	11.0
CO				
N2				

Moisture Gain

Impinger	Final Vol.	Inital Vol.	Difference
1	330	100	230
2	103	100	3
3	0	0	
4	210.7	222.2	18.5
5			
		Total Gain	251.5

EPA METHOD 5
FIELD DATA SHEET

Run No: 3 Date: 11-20-96 Client: Koppers Location: No 2 Bat. Stack

Traverse Point No.	Elapsed Time	Clock Time	Gas Meter Reading	Velocity Head	Orifice Pressure	Pump Vacuum	Meter Temp. In	Meter Temp. Out	Stack Temp.	Probe Temp.	Oven Temp.	Impinger Temp	Comments
		1522											
W 6		1527	931.0		1.3	2	57						
5		1532	934.2	.02	1.3	2	57						
4		1537			1.3	2	57						
3		1542	.7		1.3	2							
2		1547	.1	.01	.64	1							
1		1552	945.5	.01	.64	1							
		1557											
S 6		1602	149.90	.02	1.3	1	57	53					
5		1607	951.9	.02	1.3	1	57	52					
4		1610	955.5	.02	1.3	1	57	52					
3		1615	958.8	.02	1.3	1	58	52	570	242	261	53	
2		1620	962.2	.02	1.3	1	58	54	561	240	270	53	
1		1625	1.4 .470	.01	.64	1	58	54	555	230	261	53	
1													
8													
6													
7													
9													
10													
11													
12													
Total/Avg.													

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 18, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 1			
11/18/96 08:23:51	3	2	1
11/18/96 08:24:11	3	5	1
11/18/96 08:24:31	3	53	3
11/18/96 08:24:51	3	67	9
11/18/96 08:25:11	3	42	9
11/18/96 08:25:31	3	20	5
Push 2			
11/18/96 08:58:37	2	33	3
11/18/96 08:58:57	5	93	18
11/18/96 08:59:17	3	82	20
11/18/96 08:59:37	2	45	16
11/18/96 08:59:57	2	32	14
11/18/96 09:00:17	2	30	14
Push 3			
11/18/96 09:08:57	2	31	3
11/18/96 09:09:17	2	56	9
11/18/96 09:09:37	2	42	9
11/18/96 09:09:57	2	25	9
11/18/96 09:10:17	2	13	5
11/18/96 09:10:37	2	5	1
Push 4			
11/18/96 09:21:57	1	45	3
11/18/96 09:22:17	1	62	9
11/18/96 09:22:37	1	45	9
11/18/96 09:22:57	2	33	9
11/18/96 09:23:17	2	29	7
11/18/96 09:23:37	2	28	7
Push 5			
11/18/96 09:35:17	1	4	1
11/18/96 09:35:37	1	35	3
11/18/96 09:35:57	1	54	9
11/18/96 09:36:17	1	41	12
11/18/96 09:36:37	1	27	9
11/18/96 09:36:57	2	14	5
Push 6			
11/18/96 09:49:57	2	36	5
11/18/96 09:50:17	2	46	9
11/18/96 09:50:37	2	33	9
11/18/96 09:50:57	2	25	9
11/18/96 09:51:17	2	24	7
11/18/96 09:51:37	2	24	7
Push 7			
11/18/96 09:59:17	2	3	1
11/18/96 09:59:37	2	17	1
11/18/96 09:59:57	2	45	7
11/18/96 10:00:17	2	43	9
11/18/96 10:00:37	2	28	9
11/18/96 10:00:57	2	14	3
Push 8			
11/18/96 10:43:09	1	56	9
11/18/96 10:43:29	1	47	9
11/18/96 10:43:49	1	32	9
11/18/96 10:44:09	1	27	7
11/18/96 10:44:29	1	28	7
11/18/96 10:44:49	2	28	7
Push 9			
11/18/96 10:54:29	1	40	5
11/18/96 10:54:49	1	51	9
11/18/96 10:55:09	1	36	9
11/18/96 10:55:29	1	27	7
11/18/96 10:55:49	1	24	7
11/18/96 10:56:09	1	21	7
Push 10			
11/18/96 11:15:34	1	43	5
11/18/96 11:15:54	1	66	12
11/18/96 11:16:14	1	49	12
11/18/96 11:16:34	1	35	9
11/18/96 11:16:54	1	28	7
11/18/96 11:17:14	1	28	9

Push Emissions Data Only

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 18, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 11			
11/18/96 11:27:29	2	43	3
11/18/96 11:27:49	1	58	12
11/18/96 11:28:09	1	40	12
11/18/96 11:28:29	1	29	9
11/18/96 11:28:49	1	25	7
11/18/96 11:29:09	1	21	7
Push 12			
11/18/96 11:39:04	1	36	3
11/18/96 11:39:24	2	59	12
11/18/96 11:39:44	1	43	12
11/18/96 11:40:04	1	30	9
11/18/96 11:40:24	1	25	7
11/18/96 11:40:44	1	25	7
Push 13			
11/18/96 11:49:32	1	44	7
11/18/96 11:49:52	1	46	9
11/18/96 11:50:12	1	34	9
11/18/96 11:50:32	1	28	9
11/18/96 11:50:52	1	27	9
11/18/96 11:51:12	1	21	7
Push 14			
11/18/96 12:01:45	3	56	9
11/18/96 12:02:05	3	47	14
11/18/96 12:02:25	3	29	12
11/18/96 12:02:45	2	21	9
11/18/96 12:03:05	2	19	9
11/18/96 12:03:25	2	20	9
Push 15			
11/18/96 12:11:22	2	23	3
11/18/96 12:11:42	2	51	9
11/18/96 12:12:02	1	44	12
11/18/96 12:12:22	1	31	9
11/18/96 12:12:42	1	27	9
11/18/96 12:13:02	1	26	9
Push 16			
11/18/96 13:01:20	1	38	5
11/18/96 13:01:40	1	60	12
11/18/96 13:02:00	1	47	12
11/18/96 13:02:20	1	32	9
11/18/96 13:02:40	2	26	7
11/18/96 13:03:00	2	27	7
Push 17			
11/18/96 13:11:27	2	35	3
11/18/96 13:11:47	1	57	9
11/18/96 13:12:07	1	40	12
11/18/96 13:12:27	1	26	9
11/18/96 13:12:47	1	22	9
11/18/96 13:13:07	1	18	7
Push 18			
11/18/96 13:23:31	2	67	9
11/18/96 13:23:51	1	67	14
11/18/96 13:24:11	1	41	12
11/18/96 13:24:31	1	30	9
11/18/96 13:24:51	1	27	9
11/18/96 13:25:11	1	26	7
Push 19			
11/18/96 13:34:37	1	29	3
11/18/96 13:34:57	1	52	9
11/18/96 13:35:17	1	42	12
11/18/96 13:35:37	1	29	9
11/18/96 13:35:57	1	24	9
11/18/96 13:36:17	1	24	9
Push 20			
11/18/96 13:44:57	1	20	1
11/18/96 13:45:17	1	55	9
11/18/96 13:45:37	3	65	14
11/18/96 13:45:57	3	55	14
11/18/96 13:46:17	2	42	12
11/18/96 13:46:37	2	33	9

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 18, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 21			
11/18/96 13:55:43	1	40	7
11/18/96 13:56:03	1	47	12
11/18/96 13:56:23	1	34	9
11/18/96 13:56:43	1	27	9
11/18/96 13:57:03	1	25	9
11/18/96 13:57:23	1	25	9
Push 22			
11/18/96 14:06:29	1	40	8
11/18/96 14:06:49	1	49	13
11/18/96 14:07:09	1	35	10
11/18/96 14:07:29	1	29	9
11/18/96 11:07:49	1	24	9
11/18/96 14:08:09	1	22	9
Push 23			
11/18/96 14:15:48	2	51	9
11/18/96 14:16:08	1	54	14
11/18/96 14:16:28	1	37	12
11/18/96 14:16:48	1	27	9
11/18/96 14:17:08	1	24	7
11/18/96 14:17:28	1	24	9
Push 24			
11/18/96 14:36:12	1	20	1
11/18/96 14:36:32	1	53	9
11/18/96 14:36:52	1	48	12
11/18/96 14:37:12	1	29	9
11/18/96 14:37:32	1	14	3
11/18/96 14:37:52	1	6	1
Average ppm	**1.5**	**35.2**	**8.5**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
1.5	0.0	90.5	85.9	1.42

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
35.2	0.0	80.8	80.6	35.11

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
8.5	0.0	24.5	25.5	8.85

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibration gas.
Cma = Actual concentration of calibration gas

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 19, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 1			
11/19/96 07:53:42	1	11	1
11/19/96 07:54:02	1	51	5
11/19/96 07:54:22	1	67	12
11/19/96 07:54:42	1	51	12
11/19/96 07:55:02	1	32	7
11/19/96 07:55:22	1	14	3
Push 2			
11/19/96 08:13:06	4	85	12
11/19/96 08:13:26	2	100	29
11/19/96 08:13:46	0	65	23
11/19/96 08:14:06	0	41	18
11/19/96 08:14:26	0	36	14
11/19/96 08:14:46	0	35	14
Push 3			
11/19/96 08:28:50	2	20	1
11/19/96 08:29:10	1	58	7
11/19/96 08:29:30	1	60	12
11/19/96 08:29:50	1	42	9
11/19/96 08:30:10	1	21	5
11/19/96 08:30:30	1	7	3
Push 4			
11/19/96 08:50:20	1	38	3
11/19/96 08:50:40	2	76	14
11/19/96 08:51:00	1	63	14
11/19/96 08:51:20	1	41	12
11/19/96 08:51:40	1	36	9
11/19/96 08:52:00	1	36	9
Push 5			
11/19/96 9:07:40	1	38	3
11/19/96 9:08:00	2	77	14
11/19/96 9:08:20	1	61	15
11/19/96 9:08:40	1	42	12
11/19/96 9:09:00	1	35	10
11/19/96 9:09:20	1	34	9
Push 6			
11/19/96 09:25:05	2	37	3
11/19/96 09:25:25	5	100	20
11/19/96 09:25:45	2	103	29
11/19/96 09:26:05	1	59	23
11/19/96 09:26:25	0	36	16
11/19/96 09:26:45	0	29	14
Push 7			
11/19/96 09:37:08	1	21	1
11/19/96 09:37:28	1	51	7
11/19/96 09:37:48	1	53	12
11/19/96 09:38:08	1	41	12
11/19/96 09:38:28	1	34	9
11/19/96 09:38:48	1	27	9
Push 8			
11/19/96 09:47:09	1	32	3
11/19/96 09:47:29	1	64	14
11/19/96 09:47:49	0	57	16
11/19/96 09:48:09	0	38	12
11/19/96 09:48:29	0	30	9
11/19/96 09:48:49	0	28	9
Push 9			
11/19/96 09:57:17	0	6	1
11/19/96 09:57:37	4	65	7
11/19/96 09:57:57	2	108	36
11/19/96 09:58:17	0	73	29
11/19/96 09:58:37	0	37	20
11/19/96 09:58:57	0	19	9
Push 10			
11/19/96 10:06:47	4	85	14
11/19/96 10:07:07	2	100	29
11/19/96 10:07:27	0	63	23
11/19/96 10:07:47	0	36	16
11/19/96 10:08:07	0	27	14
11/19/96 10:08:27	0	26	12

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 19, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 11			
11/19/96 11:08:43	0	44	3
11/19/96 11:09:03	3	101	16
11/19/96 11:09:23	0	82	16
11/19/96 11:09:43	0	47	12
11/19/96 11:10:03	0	25	7
11/19/96 11:10:23	0	11	3
Push 12			
11/19/96 11:33:04	2	60	9
11/19/96 11:33:24	2	89	16
11/19/96 11:33:44	1	69	16
11/19/96 11:34:04	1	44	14
11/19/96 11:34:24	0	33	12
11/19/96 11:34:44	0	30	9
Push 13			
11/19/96 11:43:04	1	63	7
11/19/96 11:43:24	1	83	16
11/19/96 11:43:44	1	55	16
11/19/96 11:44:04	0	35	12
11/19/96 11:44:24	0	27	12
11/19/96 11:44:44	0	19	7
Push 14			
11/19/96 11:51:55	2	49	5
11/19/96 11:52:15	1	75	16
11/19/96 11:52:35	0	55	16
11/19/96 11:52:55	0	36	14
11/19/96 11:53:15	0	29	12
11/19/96 11:53:35	0	27	12
Push 15			
11/19/96 12:02:20	1	24	1
11/19/96 12:02:40	1	58	9
11/19/96 12:03:00	0	55	14
11/19/96 12:03:20	0	38	12
11/19/96 12:03:40	0	32	12
11/19/96 12:04:00	0	28	9
Push 16			
11/19/96 12:11:49	3	48	5
11/19/96 12:12:09	2	78	16
11/19/96 12:12:29	1	55	16
11/19/96 12:12:49	1	35	14
11/19/96 12:13:09	0	27	12
11/19/96 12:13:29	0	26	9
Push 17			
11/19/96 12:20:29	4	51	7
11/19/96 12:20:49	4	110	25
11/19/96 12:21:09	1	89	29
11/19/96 12:21:29	0	45	20
11/19/96 12:21:49	0	27	16
11/19/96 12:22:09	0	17	9
Push 18			
11/19/96 13:08:50	1	53	5
11/19/96 13:09:10	1	75	14
11/19/96 13:09:30	0	53	14
11/19/96 13:09:50	0	36	12
11/19/96 13:10:10	0	32	9
11/19/96 13:10:30	0	32	9
Push 19			
11/19/96 13:20:27	5	80	9
11/19/96 13:20:47	4	106	27
11/19/96 13:21:07	1	72	25
11/19/96 13:21:27	1	38	18
11/19/96 13:21:47	0	30	16
11/19/96 13:22:07	0	28	14
Push 20			
11/19/96 13:30:38	1	62	7
11/19/96 13:30:58	3	100	20
11/19/96 13:31:18	0	79	20
11/19/96 13:31:38	0	44	16
11/19/96 13:31:58	0	32	12
11/19/96 13:32:18	0	29	12

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 19, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 21			
11/19/96 13:41:09	3	69	12
11/19/96 13:41:29	0	64	16
11/19/96 13:41:49	0	41	14
11/19/96 13:42:09	0	30	12
11/19/96 13:42:29	0	28	9
11/19/96 13:42:49	0	25	9
Push 22			
11/19/96 13:51:28	1	61	7
11/19/96 13:51:48	3	86	16
11/19/96 13:52:08	2	89	18
11/19/96 13:52:28	2	78	20
11/19/96 13:52:48	0	48	16
11/19/96 13:53:08	0	32	12
Push 23			
11/19/96 14:01:37	1	64	9
11/19/96 14:01:57	1	75	16
11/19/96 14:02:17	0	48	16
11/19/96 14:02:37	0	35	12
11/19/96 14:02:57	0	33	12
11/19/96 14:03:17	0	32	9
Push 24			
11/19/96 14:12:00	0	8	1
11/19/96 14:12:20	0	37	5
11/19/96 14:12:40	0	60	12
11/19/96 14:13:00	1	54	14
11/19/96 14:13:20	0	28	7
11/19/96 14:13:40	0	9	3
Average ppm	**1.0**	**48.6**	**12.4**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
1.0	0.0	24.1	24.4	1.01

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
48.6	0.0	80.8	80.6	48.48

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
12.4	0.0	25.2	25.5	12.55

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer.
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibration gas.
Cma = Actual concentration of calibration gas

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 20, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 1			
11/20/96 07:36:56	2	44	5
11/20/96 07:37:16	2	59	5
11/20/96 07:37:36	2	48	10
11/20/96 07:37:56	2	38	8
11/20/96 07:38:16	2	35	8
11/20/96 07:38:36	2	35	8
Push 2			
11/20/96 07:47:46	2	4	0
11/20/96 07:48:06	1	24	0
11/20/96 07:48:26	1	48	6
11/20/96 07:48:46	1	45	9
11/20/96 07:49:06	1	32	9
11/20/96 07:49:26	1	19	5
Push 3			
11/20/96 08:01:03	2	42	4
11/20/96 08:01:23	2	63	9
11/20/96 08:01:43	2	51	10
11/20/96 08:02:03	1	38	9
11/20/96 08:02:23	1	33	8
11/20/96 08:02:43	1	33	8
Push 4			
11/20/96 08:11:47	2	30	1
11/20/96 08:12:07	2	58	7
11/20/96 08:12:27	1	51	9
11/20/96 08:12:47	1	35	9
11/20/96 08:13:07	1	20	4
11/20/96 08:13:27	1	9	1
Push 5			
11/20/96 08:29:00	2	38	4
11/20/96 08:29:20	2	57	10
11/20/96 08:29:40	2	48	10
11/20/96 08:30:00	2	37	9
11/20/96 08:30:20	2	34	8
11/20/96 08:30:40	2	34	8
Push 6			
11/20/96 08:44:58	2	28	1
11/20/96 08:45:18	2	67	8
11/20/96 08:45:38	2	62	10
11/20/96 08:45:58	2	40	9
11/20/96 08:46:18	2	20	4
11/20/96 08:46:38	2	7	1
Push 7			
11/20/96 08:55:41	2	33	4
11/20/96 08:56:01	3	68	15
11/20/96 08:56:21	2	56	13
11/20/96 08:56:41	2	38	11
11/20/96 08:57:01	2	33	9
11/20/96 08:57:21	2	31	9
Push 8			
11/20/96 09:05:55	2	34	1
11/20/96 09:06:15	2	65	9
11/20/96 09:06:35	2	52	10
11/20/96 09:06:55	2	32	8
11/20/96 09:07:15	2	14	3
11/20/96 09:07:35	2	5	1
Push 9			
11/20/96 09:16:55	4	89	19
11/20/96 09:17:15	2	73	18
11/20/96 09:17:35	2	44	15
11/20/96 09:17:55	2	35	11
11/20/96 09:18:15	1	34	11
11/20/96 09:18:35	1	33	11
Push 10			
11/20/96 09:26:14	1	17	0
11/20/96 09:26:34	1	52	6
11/20/96 09:26:54	1	56	9
11/20/96 09:27:14	1	39	9
11/20/96 09:27:34	2	21	4
11/20/96 09:27:54	2	8	1

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 20, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 11			
11/20/96 10:31:45	2	68	6
11/20/96 10:32:05	2	79	10
11/20/96 10:32:25	3	71	11
11/20/96 10:32:45	2	57	10
11/20/96 10:33:05	2	47	9
11/20/96 10:33:25	2	44	8
Push 12			
11/20/96 10:41:10	1	39	3
11/20/96 10:41:30	1	58	9
11/20/96 10:41:50	1	44	10
11/20/96 10:42:10	1	26	6
11/20/96 10:42:30	1	11	1
11/20/96 10:42:50	1	5	0
Push 13			
11/20/96 10:51:33	1	36	4
11/20/96 10:51:53	1	61	10
11/20/96 10:52:13	1	51	10
11/20/96 10:52:33	1	40	9
11/20/96 10:52:53	1	36	8
11/20/96 10:53:13	1	34	9
Push 14			
11/20/96 11:01:50	1	18	0
11/20/96 11:02:10	2	54	7
11/20/96 11:02:30	1	58	12
11/20/96 11:02:50	1	38	10
11/20/96 11:03:10	2	17	4
11/20/96 11:03:30	1	5	1
Push 15			
11/20/96 11:13:53	4	81	11
11/20/96 11:14:13	1	78	13
11/20/96 11:14:33	1	52	13
11/20/96 11:14:53	1	38	10
11/20/96 11:15:13	1	33	9
11/20/96 11:15:33	1	33	9
Push 16			
11/19/96 11:23:55	2	49	5
11/19/96 11:24:15	1	75	16
11/19/96 11:24:35	1	55	16
11/19/96 11:24:55	1	36	14
11/19/96 11:25:15	1	29	12
11/19/96 11:25:35	1	27	12
Push 17			
11/20/96 11:36:40	1	60	8
11/20/96 11:37:00	1	60	11
11/20/96 11:37:20	1	44	11
11/20/96 11:37:40	1	35	9
11/20/96 11:38:00	1	32	8
11/20/96 11:38:20	1	32	8
Push 18			
11/20/96 11:46:58	2	40	4
11/20/96 11:47:18	2	68	11
11/20/96 11:47:38	2	56	12
11/20/96 11:47:58	2	35	8
11/20/96 11:48:18	2	15	3
11/20/96 11:48:38	2	5	1
Push 19			
11/20/96 13:06:59	1	56	7
11/20/96 13:07:19	1	65	10
11/20/96 13:07:39	1	52	10
11/20/96 13:07:59	1	42	8
11/20/96 13:08:19	1	38	8
11/20/96 13:08:39	1	38	7
Push 20			
11/20/96 13:17:30	2	43	4
11/20/96 13:17:50	2	75	13
11/20/96 13:18:10	1	56	15
11/20/96 13:18:30	1	36	12
11/20/96 13:18:50	1	22	7
11/20/96 13:19:10	2	10	4

Koppers
Monessen, PA Facility
Push Baghouse Emissions Test
VOCs, CO, and NOx
November 20, 1996

DATE/TIME	VOC ppm	CO ppm	NOx ppm
Push 21			
11/20/96 13:28:13	1	61	8
11/20/96 13:28:33	1	63	11
11/20/96 13:28:53	1	46	10
11/20/96 13:29:13	1	37	9
11/20/96 13:29:33	1	36	9
11/20/96 13:29:53	1	36	9
Push 22			
11/20/96 13:38:10	2	21	1
11/20/96 13:38:30	2	61	8
11/20/96 13:38:50	2	65	12
11/20/96 13:39:10	2	45	11
11/20/96 13:39:30	2	27	7
11/20/96 13:39:50	2	11	4
Push 23			
11/20/96 13:50:12	5	50	5
11/20/96 13:50:32	4	92	17
11/20/96 13:50:52	1	66	16
11/20/96 13:51:12	1	39	12
11/20/96 13:51:32	1	29	9
11/20/96 13:51:52	1	26	9
Push 24			
11/20/96 14:00:19	1	28	1
11/20/96 14:00:39	5	133	32
11/20/96 14:00:59	2	134	46
11/20/96 14:01:19	1	64	29
11/20/96 14:01:39	1	27	16
11/20/96 14:01:59	1	10	6
Average ppm	**1.6**	**42.6**	**8.7**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
1.6	0.0	24.5	24.4	1.59

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
42.6	0.0	80.3	80.6	42.76

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
8.7	0.0	25.6	25.5	8.67

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer.
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibration gas.
Cma = Actual concentration of calibration gas.

Koppers
Monessen, PA Facility
Combustion Stack No. 1
VOCs, CO, and NOx
November 22, 1996
Run No. 1

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/22/96 09:00:04	1	249	497
11/22/96 09:01:04	4	47	223
11/22/96 09:02:04	3	75	322
11/22/96 09:03:04	2	169	335
11/22/96 09:04:04	2	285	348
11/22/96 09:05:04	1	293	368
11/22/96 09:06:04	1	413	380
11/22/96 09:07:04	1	65	373
11/22/96 09:08:04	1	5	353
11/22/96 09:09:04	1	5	357
11/22/96 09:10:04	1	69	381
11/22/96 09:11:04	1	59	390
11/22/96 09:12:04	1	21	402
11/22/96 09:13:04	1	21	420
11/22/96 09:14:04	0	33	431
11/22/96 09:15:04	1	3	425
11/22/96 09:16:04	0	119	447
11/22/96 09:17:04	1	349	457
11/22/96 09:18:04	1	533	461
11/22/96 09:19:04	1	489	467
11/22/96 09:20:04	0	523	472
11/22/96 09:21:04	4	49	228
11/22/96 09:22:04	3	31	291
11/22/96 09:23:04	2	19	309
11/22/96 09:24:04	2	13	323
11/22/96 09:25:04	1	9	350
11/22/96 09:26:04	1	7	363
11/22/96 09:27:04	1	5	366
11/22/96 09:28:04	1	5	373
11/22/96 09:29:04	1	3	401
11/22/96 09:30:04	1	25	422
11/22/96 09:31:04	1	147	441
11/22/96 09:32:04	1	187	450
11/22/96 09:33:04	1	343	449
11/22/96 09:34:04	1	209	453
11/22/96 09:35:04	0	81	433
11/22/96 09:36:04	0	35	433
11/22/96 09:37:04	0	13	443
11/22/96 09:38:04	0	5	453
11/22/96 09:39:04	0	7	456
11/22/96 09:40:04	0	1	459
11/22/96 09:41:04	4	37	204
11/22/96 09:42:04	3	81	308
11/22/96 09:43:04	2	159	342
11/22/96 09:44:04	2	237	362
11/22/96 09:45:04	1	339	380
11/22/96 09:46:04	1	37	384
11/22/96 09:47:04	1	5	390
11/22/96 09:48:04	1	5	394
11/22/96 09:49:04	1	3	401
11/22/96 09:50:04	1	3	403

Koppers
Monessen, PA Facility
Combustion Stack No. 1
VOCs, CO, and NOx
November 22, 1996
Run No. 1

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/22/96 09:51:04	1	3	411
11/22/96 09:52:04	1	17	425
11/22/96 09:53:04	1	345	436
11/22/96 09:54:04	0	597	439
11/22/96 09:55:04	1	611	444
11/22/96 09:56:04	0	49	430
11/22/96 09:57:04	0	11	433
11/22/96 09:58:04	0	3	441
11/22/96 09:59:04	0	17	449
Average ppm	**1.1**	**126.4**	**394.6**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
1.1	0.1	25.0	24.4	0.98

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
126.4	-1.0	278.0	279.0	127.40

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
361.8	0.0	486.5	490.0	364.40

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer.
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibration
Cma = Actual concentration of calibration gas.

Koppers
Monessen, PA Facility
Combustion Stack No. 1
VOCs, CO, and NOx
November 22, 1996
Run No. 2

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/22/96 12:15:15	4	809	446
11/22/96 12:16:15	4	117	462
11/22/96 12:17:15	6	31	464
11/22/96 12:18:15	5	9	463
11/22/96 12:19:15	5	7	470
11/22/96 12:20:15	5	15	462
11/22/96 12:21:15	37	37	220
11/22/96 12:22:15	32	27	304
11/22/96 12:23:15	20	87	341
11/22/96 12:24:15	14	275	354
11/22/96 12:25:15	11	409	363
11/22/96 12:26:15	9	449	389
11/22/96 12:27:15	8	524	409
11/22/96 12:28:15	6	537	407
11/22/96 12:29:15	5	605	408
11/22/96 12:30:15	5	744	413
11/22/96 12:31:15	4	823	423
11/22/96 12:32:15	4	900	433
11/22/96 12:33:15	4	890	425
11/22/96 12:34:15	4	904	426
11/22/96 12:35:15	3	1025	450
11/22/96 12:36:15	3	851	447
11/22/96 12:37:15	3	1103	450
11/22/96 12:38:15	3	1236	463
11/22/96 12:39:15	3	1189	464
11/22/96 12:40:15	4	1014	467
11/22/96 12:41:15	37	57	236
11/22/96 12:42:15	29	129	328
11/22/96 12:43:15	22	199	347
11/22/96 12:44:15	14	299	366
11/22/96 12:45:15	11	439	382
11/22/96 12:46:15	9	367	382
11/22/96 12:47:15	7	407	403
11/22/96 12:48:15	6	387	407
11/22/96 12:49:15	5	449	407
11/22/96 12:50:15	4	543	431
11/22/96 12:51:15	4	541	422
11/22/96 12:52:15	4	515	439
11/22/96 12:53:15	3	601	448
11/22/96 12:54:15	3	728	442
11/22/96 12:55:15	3	715	451
11/22/96 12:56:15	3	707	446
11/22/96 12:57:15	3	817	461
11/22/96 12:58:15	3	809	453
11/22/96 12:59:15	2	817	461
11/22/96 13:00:15	3	723	460
11/22/96 13:01:15	36	71	240
11/22/96 13:02:15	29	197	328
11/22/96 13:03:15	22	285	341
11/22/96 13:04:15	14	363	372
11/22/96 13:05:15	10	409	390

Koppers
Monessen, PA Facility
Combustion Stack No. 1
VOCs, CO, and NOx
November 22, 1996
Run No. 2

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/22/96 13:06:15	8	431	406
11/22/96 13:07:15	7	493	424
11/22/96 13:08:15	5	543	412
11/22/96 13:09:15	4	543	434
11/22/96 13:10:15	4	653	424
11/22/96 13:11:15	3	667	430
11/22/96 13:12:15	3	729	445
11/22/96 13:13:15	3	708	448
11/22/96 13:14:15	3	826	458
Average ppm	**8.9**	**529.8**	**409.2**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
8.9	0.9	24.8	24.4	8.17

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
529.8	0.0	276.5	279.0	534.59

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
409.2	0.0	489.0	490.0	410.04

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer.
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibration g
Cma = Actual concentration of calibration gas.

Koppers
Monessen, PA Facility
Combustion Stack No. 1
VOCs, CO, and NOx
November 22, 1996
Run No. 3

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/22/96 15:00:27	5	12	212
11/22/96 15:01:27	5	27	204
11/22/96 15:02:27	5	41	247
11/22/96 15:03:27	5	45	264
11/22/96 15:04:27	5	49	394
11/22/96 15:05:27	5	58	403
11/22/96 15:06:27	6	68	413
11/22/96 15:07:27	7	62	428
11/22/96 15:08:27	8	72	429
11/22/96 15:09:27	5	75	439
11/22/96 15:10:27	4	83	444
11/22/96 15:11:27	5	89	449
11/22/96 15:12:27	8	90	458
11/22/96 15:13:27	14	90	354
11/22/96 15:14:27	15	103	462
11/22/96 15:15:27	9	109	464
11/22/96 15:16:27	8	118	464
11/22/96 15:17:27	5	115	473
11/22/96 15:18:27	8	109	482
11/22/96 15:19:27	9	135	473
11/22/96 15:20:27	6	120	484
11/22/96 15:21:27	4	128	485
11/22/96 15:22:27	4	128	488
11/22/96 15:23:27	3	128	493
11/22/96 15:24:27	7	117	500
11/22/96 15:25:27	9	124	499
11/22/96 15:26:27	5	117	504
11/22/96 15:27:27	3	127	503
11/22/96 15:28:27	6	110	513
11/22/96 15:29:27	4	16	175
11/22/96 15:30:27	4	7	307
11/22/96 15:31:27	4	13	352
11/22/96 15:32:27	3	23	375
11/22/96 15:33:27	4	28	394
11/22/96 15:34:27	3	33	407
11/22/96 15:35:27	4	36	420
11/22/96 15:36:27	3	47	425
11/22/96 15:37:27	3	40	444
11/22/96 15:38:27	4	43	446
11/22/96 15:39:27	4	48	454
11/22/96 15:40:27	4	48	462
11/22/96 15:41:27	3	55	462
11/22/96 15:42:27	4	56	470
11/22/96 15:43:27	4	55	478
11/22/96 15:44:27	3	63	480
11/22/96 15:45:27	3	63	483
11/22/96 15:46:27	3	61	491
11/22/96 15:47:27	5	68	490
11/22/96 15:48:27	4	72	491
11/22/96 15:49:27	4	74	495
11/22/96 15:50:27	3	71	503

Koppers
Monessen, PA Facility
Combustion Stack No. 1
VOCs, CO, and NOx
November 22, 1996
Run No. 3

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/22/96 15:51:27	4	73	505
11/22/96 15:52:27	3	75	506
11/22/96 15:53:27	2	74	508
11/22/96 15:54:27	4	76	510
11/22/96 15:55:27	3	81	509
11/22/96 15:56:27	3	81	512
11/22/96 15:57:27	2	103	507
11/22/96 15:58:27	6	68	529
11/22/96 15:59:27	4	11	183
Average ppm	**4.9**	**71.8**	**436.6**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
4.9	0.5	24.2	24.4	4.53

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
71.8	0.0	276.0	279.0	72.58

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
436.6	0.0	486.0	490.0	440.19

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer.
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibration g
Cma = Actual concentration of calibration gas.

Koppers
Monessen, PA Facility
Combustion Stack No. 2
VOCs, CO, and NOx
November 21, 1996
Run No. 1

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/21/96 08:20:4	5	617	335
11/21/96 08:21:4	4	609	337
11/21/96 08:22:4	4	465	366
11/21/96 08:23:4	4	331	389
11/21/96 08:24:4	4	183	390
11/21/96 08:25:4	66	239	109
11/21/96 08:26:4	54	325	259
11/21/96 08:27:4	34	335	307
11/21/96 08:28:4	24	299	334
11/21/96 08:29:4	18	265	357
11/21/96 08:30:4	14	239	373
11/21/96 08:31:4	11	229	386
11/21/96 08:32:4	10	213	398
11/21/96 08:33:4	9	179	409
11/21/96 08:34:4	8	153	421
11/21/96 08:35:4	8	171	427
11/21/96 08:36:4	8	227	438
11/21/96 08:37:4	7	111	445
11/21/96 08:38:4	7	171	446
11/21/96 08:39:4	7	89	443
11/21/96 08:40:4	6	7	381
11/21/96 08:41:4	6	5	362
11/21/96 08:42:4	6	5	384
11/21/96 08:43:4	6	5	406
11/21/96 08:44:4	6	5	407
11/21/96 08:45:4	80	77	123
11/21/96 08:46:4	46	49	260
11/21/96 08:47:4	31	29	314
11/21/96 08:48:4	21	19	344
11/21/96 08:49:4	16	13	364
11/21/96 08:50:4	12	9	382
11/21/96 08:51:4	10	7	396
11/21/96 08:52:4	8	67	406
11/21/96 08:53:4	8	357	410
11/21/96 08:54:4	7	383	413
11/21/96 08:55:4	6	171	421
11/21/96 08:56:4	6	693	351
11/21/96 08:57:4	6	969	299
11/21/96 08:58:4	5	812	351
11/21/96 08:59:4	4	469	360
11/21/96 09:00:4	4	415	380
11/21/96 09:01:4	4	243	396
11/21/96 09:02:4	4	177	400
11/21/96 09:03:4	4	133	415
11/21/96 09:04:4	4	149	449
11/21/96 09:05:4	67	299	118
11/21/96 09:06:4	55	303	259
11/21/96 09:07:4	36	205	304
11/21/96 09:08:4	25	177	332
11/21/96 09:09:4	18	199	354
11/21/96 09:10:4	14	177	373

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Monessen, PA Facility
Combustion Stack No. 2
VOCs, CO, and NOx
November 21, 1996
Run No. 1

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/21/96 09:11:4	11	181	388
11/21/96 09:12:4	10	261	397
11/21/96 09:13:4	9	129	411
11/21/96 09:14:4	8	119	417
11/21/96 09:15:4	7	121	424
11/21/96 09:16:4	7	19	371
11/21/96 09:17:4	6	5	336
11/21/96 09:18:4	6	5	339
11/21/96 09:19:4	6	5	345
Average ppm	**15.0**	**215.5**	**361.8**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
15.0	0.5	23.5	24.4	15.38

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
215.5	0.0	79.8	80.6	217.66

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
361.8	0.0	489.0	490.0	362.54

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer.
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibratio
Cma = Actual concentration of calibration gas.

Koppers
Monessen, PA Facility
Combustion Stack No. 2
VOCs, CO, and NOx
November 21, 1996
Run No. 2

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/21/96 11:01:5	4	3	385
11/21/96 11:02:5	4	3	393
11/21/96 11:03:5	4	3	399
11/21/96 11:04:5	4	1	400
11/21/96 11:05:5	105	73	126
11/21/96 11:06:5	59	43	235
11/21/96 11:07:5	38	27	300
11/21/96 11:08:5	27	17	341
11/21/96 11:09:5	20	13	362
11/21/96 11:10:5	16	9	384
11/21/96 11:11:5	13	9	396
11/21/96 11:12:5	11	7	408
11/21/96 11:13:5	10	7	420
11/21/96 11:14:5	9	5	432
11/21/96 11:15:5	9	5	438
11/21/96 11:16:5	8	5	442
11/21/96 11:17:5	8	5	453
11/21/96 11:18:5	8	5	384
11/21/96 11:19:5	7	5	381
11/21/96 11:20:5	7	5	409
11/21/96 11:21:5	7	5	388
11/21/96 11:22:5	6	5	390
11/21/96 11:23:5	6	5	423
11/21/96 11:24:5	6	5	467
11/21/96 11:25:5	90	113	169
11/21/96 11:26:5	50	43	279
11/21/96 11:27:5	33	25	319
11/21/96 11:28:5	22	15	296
11/21/96 11:29:5	16	11	290
11/21/96 11:30:5	12	7	289
11/21/96 11:31:5	10	5	296
11/21/96 11:32:5	8	5	301
11/21/96 11:33:5	7	3	321
11/21/96 11:34:5	6	3	365
11/21/96 11:35:5	6	3	390
11/21/96 11:36:5	5	3	403
11/21/96 11:37:5	5	3	412
11/21/96 11:38:5	5	3	417
11/21/96 11:39:5	5	3	422
11/21/96 11:40:5	5	3	415
11/21/96 11:41:5	5	3	349
11/21/96 11:42:5	4	3	368
11/21/96 11:43:5	4	1	374
11/21/96 11:44:5	4	1	378
11/21/96 11:45:5	87	77	126
11/21/96 11:46:5	51	43	232
11/21/96 11:47:5	33	25	287
11/21/96 11:48:5	22	17	316
11/21/96 11:49:5	16	13	332
11/21/96 11:50:5	13	9	354
11/21/96 11:51:5	10	7	323

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Combustion Stack No. 2
VOCs, CO, and NOx
November 21, 1996
Run No. 2

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/21/96 11:52:5	9	7	313
11/21/96 11:53:5	8	5	329
11/21/96 11:54:5	6	5	338
11/21/96 11:55:5	6	5	352
11/21/96 11:56:5	5	5	353
11/21/96 11:57:5	5	5	376
11/21/96 11:58:5	5	5	410
11/21/96 11:59:5	5	5	438
11/21/96 12:00:5	5	5	446
Average ppm	**16.3**	**12.8**	**355.6**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
16.3	0.1	24.5	24.4	16.20

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
12.8	0.2	80.2	80.6	12.69

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
355.6	0.2	489.0	490.0	356.27

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer.
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibratio
Cma = Actual concentration of calibration gas.

Koppers
Monessen, PA Facility
Combustion Stack No. 2
VOCs, CO, and NOx
November 21, 1996
Run No. 3

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/21/96 14:25:1	3	13	479
11/21/96 14:26:1	79	243	232
11/21/96 14:27:1	46	43	326
11/21/96 14:28:1	30	27	365
11/21/96 14:29:1	20	19	391
11/21/96 14:30:1	14	13	407
11/21/96 14:31:1	11	11	424
11/21/96 14:32:1	8	11	443
11/21/96 14:33:1	7	9	454
11/21/96 14:34:1	7	7	467
11/21/96 14:35:1	6	7	479
11/21/96 14:36:1	5	7	486
11/21/96 14:37:1	5	7	494
11/21/96 14:38:1	5	7	499
11/21/96 14:39:1	5	7	509
11/21/96 14:40:1	5	7	515
11/21/96 14:41:1	5	7	520
11/21/96 14:42:1	5	7	526
11/21/96 14:43:1	5	7	529
11/21/96 14:44:1	6	7	537
11/21/96 14:45:1	5	9	523
11/21/96 14:46:1	64	133	271
11/21/96 14:47:1	39	37	300
11/21/96 14:48:1	26	23	308
11/21/96 14:49:1	17	15	326
11/21/96 14:50:1	13	11	337
11/21/96 14:51:1	9	9	360
11/21/96 14:52:1	7	7	370
11/21/96 14:53:1	6	5	397
11/21/96 14:54:1	5	5	455
11/21/96 14:55:1	4	5	470
11/21/96 14:56:1	4	5	485
11/21/96 14:57:1	4	3	496
11/21/96 14:58:1	3	3	500
11/21/96 14:59:1	3	3	509
11/21/96 15:00:1	3	3	516
11/21/96 15:01:1	3	5	522
11/21/96 15:02:1	3	3	527
11/21/96 15:03:1	3	3	526
11/21/96 15:04:1	3	3	539
11/21/96 15:05:1	3	7	519
11/21/96 15:06:1	78	227	250
11/21/96 15:07:1	46	45	353
11/21/96 15:08:1	30	81	386
11/21/96 15:09:1	21	19	413
11/21/96 15:10:1	16	13	377
11/21/96 15:11:1	12	15	342
11/21/96 15:12:1	10	377	347
11/21/96 15:13:1	8	207	358
11/21/96 15:14:1	7	29	372
11/21/96 15:15:1	7	51	405

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Combustion Stack No. 2
VOCs, CO, and NOx
November 21, 1996
Run No. 3

DATE/TIME	VOC ppm	CO ppm	NOx ppm
11/21/96 15:16:1	6	101	439
11/21/96 15:17:1	6	9	409
11/21/96 15:18:1	6	8	431
11/21/96 15:19:1	5	39	497
11/21/96 15:20:1	5	41	514
11/21/96 15:21:1	5	57	521
11/21/96 15:22:1	5	43	527
11/21/96 15:23:1	5	15	536
11/21/96 15:24:1	5	7	543
Average ppm	**13.1**	**35.9**	**439.3**

VOC CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
13.1	-0.4	25.0	24.4	12.97

CO CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
35.9	0.2	81.7	80.6	35.31

NOx CALIBRATION DRIFT CORRECTION CALCULATION

Cavg	Co	Cm	Cma	Cgas
439.3	0.2	490.0	490.0	439.28

Cgas = Effluent gas concentration, corrected for drift, ppm.
Cavg = Average gas concentration from analyzer.
Co = Average of initial and final system calibration bias check for zero.
Cm = Average of initial and final system calibration bias check for calibratio
Cma = Actual concentration of calibration gas.

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: PUSH BAGHOUSE EXHAUST STACK

LOCATION: MONESSON PLANT

CITY: MONESSON | STATE: PA | ZIP:

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~75' END "	HEIGHT RELATIVE TO OBSERVER: START 75' END "
DISTANCE FROM OBSERVER: START ~50 YDS END "	DIRECTION FROM OBSERVER: START SW END "
VERTICAL ANGLE TO OBS. PT.: START ~45° END "	DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START INTERMITTENT END

EMISSION COLOR: START END | IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☐

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~20' END "

DESCRIBE PLUME BACKGROUND: START SKY/STACK END "

BACKGROUND COLOR: START GRAY/WHITE END "

SKY CONDITIONS: START OVERCAST END "

WIND SPEED: START 0-5 END

WIND DIRECTION: START SW END "

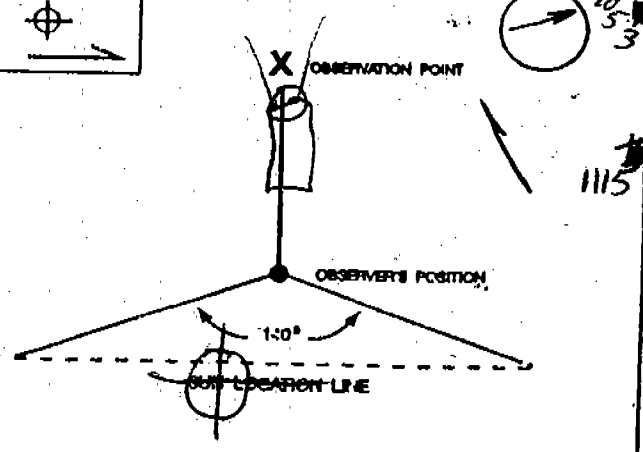
AMBIENT TEMP: START ~50 END

WET BULB TEMP: | RH PERCENT:

STACK WITH PLUME / SUN / WIND

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



START TIME	0824	STOP TIME								
	0	15	30	45		0	15	30	45	
1	0	0	0	0	31	0	0	0	0	1126
2	0	0	0	0	32	0	0	0	0	
3					33					
4	0	0	0	0	34	0	0	0	0	1132
5	0	0	0	0	35	0	0	0	0	
6					36					
7	0	0	0	0	37	0	0	0	0	1147
8	0	0	0	0	38	0	0	0	0	
9					39					
10	0	0	0	0	40	0	0	0	0	120
11	0	0	0	0	41	0	0	0	0	
12					42					
13	0	0	0	0	43	0	0	0	0	
14	0	0	0	0	44	0	0	0	0	
15					45					
16	0	0	0	0	46	0	0	0	0	1255
17	0	0	0	0	47	0	0	0	0	
18					48					
19	0	0	0	0	49	0	0	0	0	1310
20	0	0	0	0	50	0	0	0	0	
21					51					
22	0	0	0	0	52	0	0	0	0	1322
23	0	0	0	0	53	0	0	0	0	
24					54					
25	0	0	0	0	55	0	0	0	0	133
26	0	0	0	0	56	0	0	0	0	
27					57					
28	0	0	0	0	58	0	0	0	0	1344
29	0	0	0	0	59	0	0	0	0	
30					60					

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-18-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

ADDITIONAL INFORMATION

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: PUSH BAGHOUSE EXHAUST STACK 1354

LOCATION: MONESSON PLANT

CITY: MONESSON | STATE: PA | ZIP: 1404

PROCESS EQUIPMENT: | OPERATING MODE:

CONTROL EQUIPMENT: | OPERATING MODE: 1414

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~75' END "
HEIGHT RELATIVE TO OBSERVER: START ~75' END " 1436

DISTANCE FROM OBSERVER: START ~50 YDS END "
DIRECTION FROM OBSERVER: START SW END "

VERTICAL ANGLE TO OBS. PT.: START ~45° END "
DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START INTERMITTENT END

EMISSION COLOR: START END
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ NA ☒

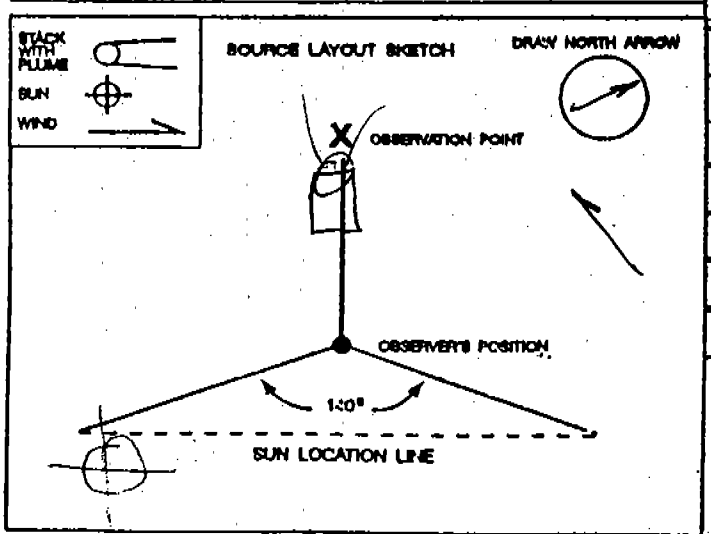
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~20' END "

DESCRIBE PLUME BACKGROUND: START SKY-STACK END "

BACKGROUND COLOR: START GRAY/WHITE END "
SKY CONDITIONS: START OVERCAST FOGGY END "

WIND SPEED: START 0-5 END "
WIND DIRECTION: START SW END "

AMBEINT TEMP: START ~50 END "
WET BULB TEMP:
RH PERCENT:



ADDITIONAL INFORMATION:

START TIME 1354

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3				
4	0	0	0	0
5	0	0	0	0
6				
7	0	0	0	0
8	0	0	0	0
9				
10	0	0	0	0
11	0	0	0	0
12				
13				
14				
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16				
17				
18				
19				
20				
21				
22				
23				
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25				
26				
27				
28				
29				
30				

STOP TIME

	0	15	30	45
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
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47				
48				
49				
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51				
52				
53				
54				
55				
56				
57				
58				
59				
60				

OBSERVERS NAME: JAMES E. PHILLIPPI

OBSERVERS SIGNATURE: James E. Phillippi | DATE: 11-18-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER:

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: PUSH BAGHOUSE EXHAUST STACK

LOCATION: MCKEESPORT PLANT

CITY: MCKEESPORT | STATE: PA | ZIP:

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL	HEIGHT RELATIVE TO OBSERVER
START ~75' END "	START ~75' END "

DISTANCE FROM OBSERVER	DIRECTION FROM OBSERVER
START ~50 FEET END "	START SW END "

VERTICAL ANGLE TO OBS. PT.	DIRECTION TO OBS. PT.
START ~45° END "	START SW END "

DESCRIBE EMISSIONS: START INTERMITTENT END "

EMISSION COLOR	IF WATER DROPLET PLUME
START END	ATTACHED ☐ DETACHED ☐ NA ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~10-20' END "

DESCRIBE PLUME BACKGROUND: START SKY/STACK END "

BACKGROUND COLOR	SKY CONDITIONS
START GRAY/WHITE END "	START OVERCAST/CLEARING END PARTLY CLOUDY

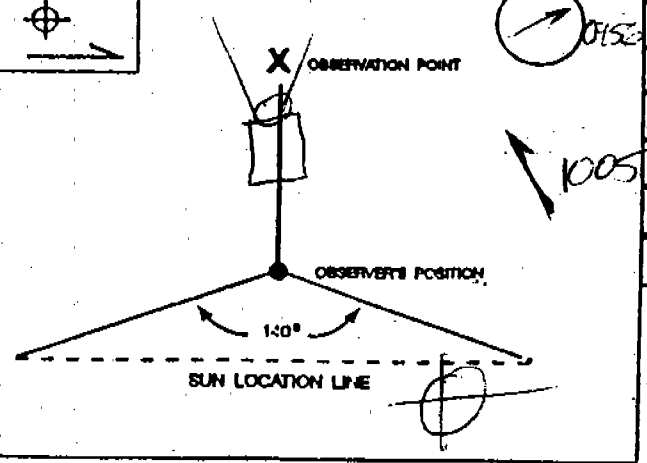
WIND SPEED	WIND DIRECTION
START 0-5 END "	START W-SW END W

AMBIENT TEMP	WET BULB TEMP	RH PERCENT
START ~45° END "		

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



ADDITIONAL INFORMATION

	START TIME				STOP TIME				
	0	15	30	45		0	15	30	45
1	0	0	0	0	1108 31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3					33				
4	0	0	0	0	1132 34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6					36				
7	0	0	0	0	1157 37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9					39				
10	0	0	0	0	1221 40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12					42				
13	0	0	0	0	1245 43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15					45				
16	0	0	0	0	1311 46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18					48				
19	0	0	0	0	1334 49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21					51				
22	0	0	0	0	1357 52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24					54				
25	0	0	0	0	1419 55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27					57				
28	0	0	0	0	1329 58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30					60				

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-19-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: PLANT BAGHOUSE EXHAUST STACK 1340

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 1352

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE: 1400

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL — START ~75' END " | HEIGHT RELATIVE TO OBSERVER 1411 — START ~75' END "

DISTANCE FROM OBSERVER — START ~50 YDS END " | DIRECTION FROM OBSERVER — START SW END "

VERTICAL ANGLE TO OBS. PT. — START ~45° END " | DIRECTION TO OBS. PT. — START SW END "

DESCRIBE EMISSIONS — START INTERMITTENT END "

EMISSION COLOR — START END | IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ NA ☑

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET — START ~10-20' END "

DESCRIBE PLUME BACKGROUND — START SKY/STACK END "

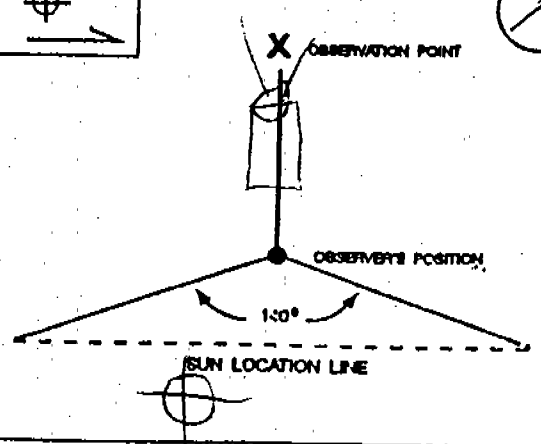
BACKGROUND COLOR — START GRAY/WHITE END " | SKY CONDITIONS — START PARTLY CLOUDY END "

WIND SPEED — START 0-5 END " | WIND DIRECTION — START W END

AMBIENT TEMP — START ~45° END " | WET BULB TEMP | RH PERCENT

STACK WITH PLUME ○ — SUN ⊕ — WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



	START TIME 0	15	30	45		STOP TIME 0	15	30	45
1	○	○	○	○	31				
2	○	○	○	○	32				
3					33				
4	○	○	○	○	34				
5	○	○	○	○	35				
6					36				
7	○	○	○	○	37				
8	○	○	○	○	38				
9					39				
10	○	○	○	○	40				
11	○	○	○	○	41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-19-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PSU STATE UNIVERSITY | DATE: 10-1-96

ADDITIONAL INFORMATION

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: PUSH BAGHOUSE EXHAUST STACK

LOCATION: MONESSON PLANT

CITY: MONESSON | STATE: PA | ZIP:

PROCESS EQUIPMENT: | OPERATING MODE:

CONTROL EQUIPMENT: | OPERATING MODE:

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~75' END "

HEIGHT RELATIVE TO OBSERVER: START ~75' END "

DISTANCE FROM OBSERVER: START ~50' END "

DIRECTION FROM OBSERVER: START SW END "

VERTICAL ANGLE TO OBS. PT.: START ~45° END "

DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START INTERMITTENT END "

EMISSION COLOR: START END

IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ NA ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~10-20' END "

DESCRIBE PLUME BACKGROUND: START STACK/SKY END "

BACKGROUND COLOR: START GRAY WHITE BLUE END "

SKY CONDITIONS: START PARTLY CLOUDY END MOSTLY CLOUDY

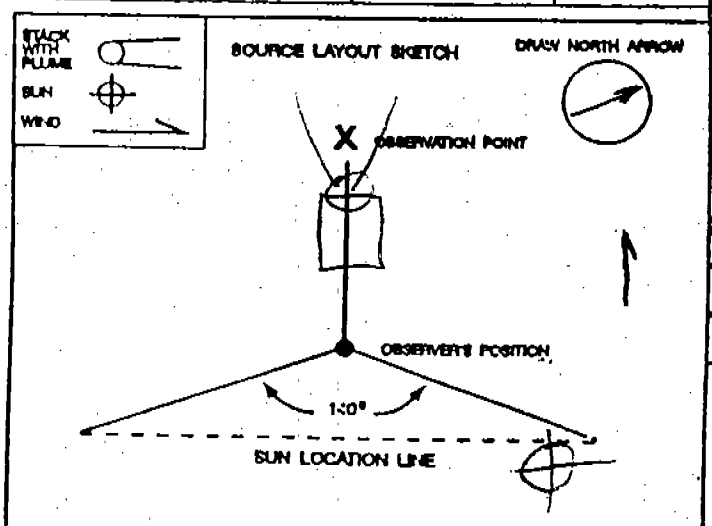
WIND SPEED: START 0-5 END "

WIND DIRECTION: START NW END NNW

AMBEINT TEMP: START ~35 END ~40

WET BULB TEMP:

RH PERCENT:



START TIME	0	15	30	45	STOP TIME	0	15	30	45
0735 1	0	0	0	0	1030 31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3					33				
0747 4	0	0	0	0	1040 34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6					36				
0800 7	0	0	0	0	1050 37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9					39				
0811 10	0	0	0	0	1101 40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12					42				
0825 13	0	0	0	0	1113 43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15					45				
0874 16	0	0	0	0	1123 46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18					48				
0854 19	0	0	0	0	1135 49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21					51				
0905 22	0	0	0	0	1146 52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24					54				
0915 25	0	0	0	0	1306 55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27					57				
0925 28	0	0	0	0	1316 58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30					60				

OBSERVERS NAME: JAMES E. PHILLIPPI

OBSERVERS SIGNATURE: James E. Phillippi | DATE: 11-20-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

ADDITIONAL INFORMATION:

CONTINUED ON VEO FORM NUMBER:

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KERRES

LOCATION: MAIN BAGHOUSE EXHAUST STACK

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: [redacted]

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~75' END "

HEIGHT RELATIVE TO OBSERVER: START ~75' END "

DISTANCE FROM OBSERVER: START ~50' END "

DIRECTION FROM OBSERVER: START SW END "

VERTICAL ANGLE TO OBS. PT.: START ~75' END "

DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START INTERMITTENT END "

EMISSION COLOR: START END

IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~10-20' END "

DESCRIBE PLUME BACKGROUND: START STACK/SKY END "

BACKGROUND COLOR: START GRAY/WHITE/BLUE END "

SKY CONDITIONS: START MOSTLY CLOUDY END "

WIND SPEED: START 0-5 END "

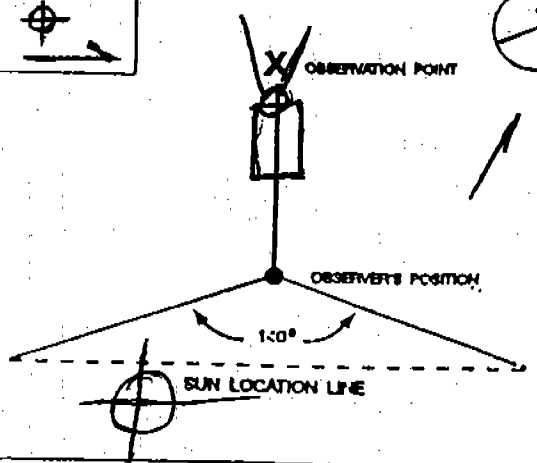
WIND DIRECTION: START NNW END "

AMBIENT TEMP: START ~40° END "

WET BULB TEMP | RH PERCENT

STACK WITH PLUME | SUN | WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



ADDITIONAL INFORMATION

START TIME	0	15	30	45	STOP TIME	0	15	30	45
1337 1	0	0	0	0	31				
2	0	0	0	0	32				
3					33				
1337 4	0	0	0	0	34				
5	0	0	0	0	35				
6					36				
1399 7	0	0	0	0	37				
8	0	0	0	0	38				
9					39				
1354 10	0	0	0	0	40				
11	0	0	0	0	41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-20-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

PAGE 1 OF 4

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 1 COMBUSTION STACK — RUN NO. 1

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~300' END "	HEIGHT RELATIVE TO OBSERVER: START ~300' END "
DISTANCE FROM OBSERVER: START 300 YDS END "	DIRECTION FROM OBSERVER: START SW END "
VERTICAL ANGLE TO OBS. PT.: START ~25° END "	DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR: START BLACK END "

IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ NA ☒

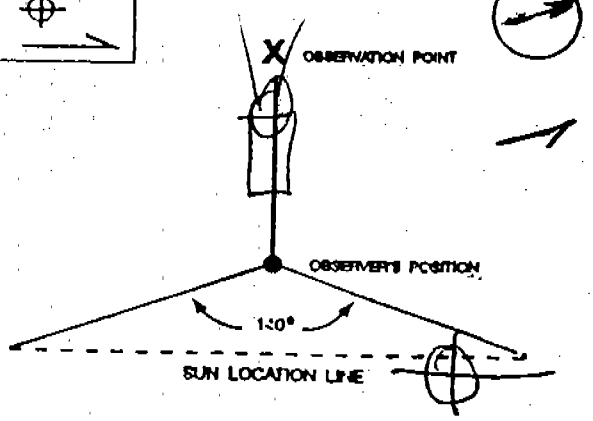
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY END

BACKGROUND COLOR: START GRAY END "	SKY CONDITIONS: START OVERCAST END "
WIND SPEED: START 0-5 END "	WIND DIRECTION: START N END "
AMBIENT TEMP: START ~30° END "	WET BULB TEMP / RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH



ADDITIONAL INFORMATION

ETA Revised 05-01-92

START TIME 0850 — STOP TIME 0901

	0	15	30	45		0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50	0	0	0	0
21					51	0	0	0	0
22					52	0	0	0	0
23					53	0	0	0	0
24					54	0	0	0	0
25					55	0	0	0	0
26					56	0	0	0	0
27					57	0	0	0	0
28					58	0	0	0	0
29					59	0	0	0	0
30					60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-22-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

VISIBLE EMISSION OBSERVATION FORM

1000

COMPANY NAME: KOPPERS

LOCATION: NO. 1 COMBUSTION STACK — RUN NO. 7

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

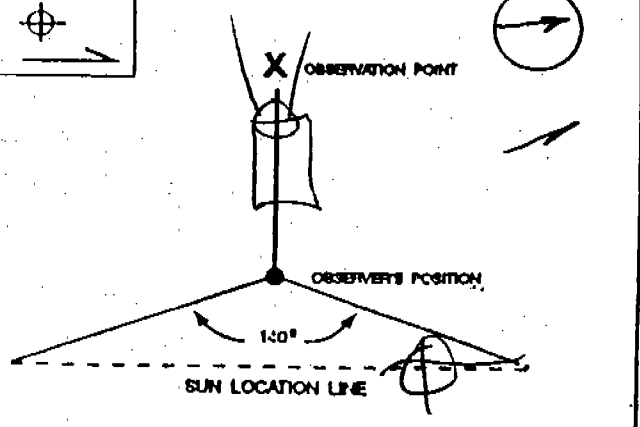
HEIGHT ABOVE GROUND LEVEL — START ~300' END "
HEIGHT RELATIVE TO OBSERVER — START ~300 END "
DISTANCE FROM OBSERVER — START ~300 YDS END "
DIRECTION FROM OBSERVER — START SW END "
VERTICAL ANGLE TO OBS. PT. — START ~25° END "
DIRECTION TO OBS. PT. — START SW END "

DESCRIBE EMISSIONS — START CONTINUOUS END "
EMISSION COLOR — START BLACK END
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET — START ~50' END "

DESCRIBE PLUME BACKGROUND — START SKY END "
BACKGROUND COLOR — START GRAY END "
SKY CONDITIONS — START OVERCAST FLURRIES END "
WIND SPEED — START 0-5 END "
WIND DIRECTION — START N END "
AMBIENT TEMP — START ~30° END "
WET BULB TEMP | RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH



ADDITIONAL INFORMATION

	START TIME 0901				STOP TIME				
	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	X	X		50	0	0	0	0
21	PORT				51	0	0	0	0
22		CHANGE			52	0	0	0	0
23					53	0	0	0	0
24	X				54	0	0	0	0
25	0	0	0	0	55	0			
26	0	0	0	0	56	PORT			
27	0	0	0	0	57				
28	0	0	0	0	58	CHANGE			
29	0	0	0	0	59				
30	0	0	0	0	60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI
OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-22-96
ORGANIZATION: OPTIMAL TECHNOLOGIES
CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 1 COMBUSTION STACK — RUN NO. 1

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

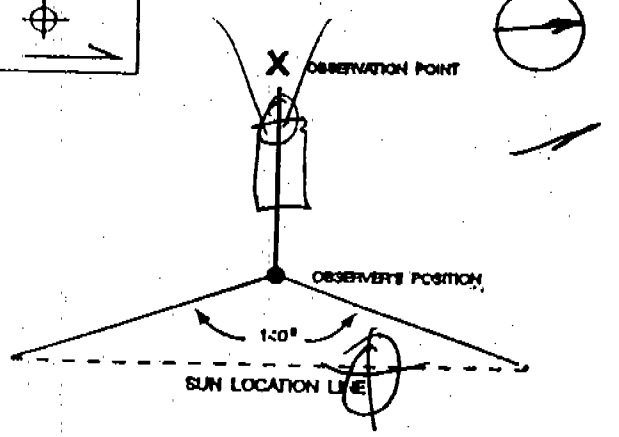
HEIGHT ABOVE GROUND LEVEL — START ~300 END "
HEIGHT RELATIVE TO OBSERVER — START ~300 END "
DISTANCE FROM OBSERVER — START ~300 FT END "
DIRECTION FROM OBSERVER — START SW END "
VERTICAL ANGLE TO OBS. PT. — START ~25 END "
DIRECTION TO OBS. PT. — START SW END "

DESCRIBE EMISSIONS — START CONTINUOUS END "
EMISSION COLOR — START BLACK END "
IF WATER DROPLET PLUME — ATTACHED ☐ DETACHED ☐ N/A ☒
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET — START ~50 END "

DESCRIBE PLUME BACKGROUND — START SKY END "
BACKGROUND COLOR — START GRAY END "
SKY CONDITIONS — START OVERCAST END FLURRIES
WIND SPEED — START 0-5 END
WIND DIRECTION — START N END
AMBEINT TEMP — START ~30 END
WET BULB TEMP | RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



ADDITIONAL INFORMATION

START TIME 1001 — STOP TIME 1101

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	POR T			
2	0	0	0	0	32				
3	0	0	0	0	33	CHANGE			
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	5
28	0	0	0	0	58	5	5	10	10
29	0	0	0	0	59	15	15	15	15
30	0				60	15	10	5	0

OBSERVERS NAME: JAMES E. PHILLIPPI
OBSERVER'S SIGNATURE: James E. Phillippi — DATE: 11-22-96
ORGANIZATION: OPTIMAL TECHNOLOGIES
CERTIFIED BY: PENN STATE UNIVERSITY — DATE: 10-7-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

PAGE 4 OF 4

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK — RUN NO. 1

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL — START ~300' END "

HEIGHT RELATIVE TO OBSERVER — START ~300' END "

DISTANCE FROM OBSERVER — START ~300-405 END "

DIRECTION FROM OBSERVER — START SW END "

VERTICAL ANGLE TO OBS. PT. — START ~25° END "

DIRECTION TO OBS. PT. — START SW END "

DESCRIBE EMISSIONS — START CONTINUOUS END "

EMISSION COLOR — START BLK END "

IF WATER DROPLET PLUME — ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET — START ~50' END "

DESCRIBE PLUME BACKGROUND — START END

BACKGROUND COLOR — START END

SKY CONDITIONS — START END

WIND SPEED — START END

WIND DIRECTION — START END

AMBEINT TEMP — START END

WET BULB TEMP | RH PERCENT

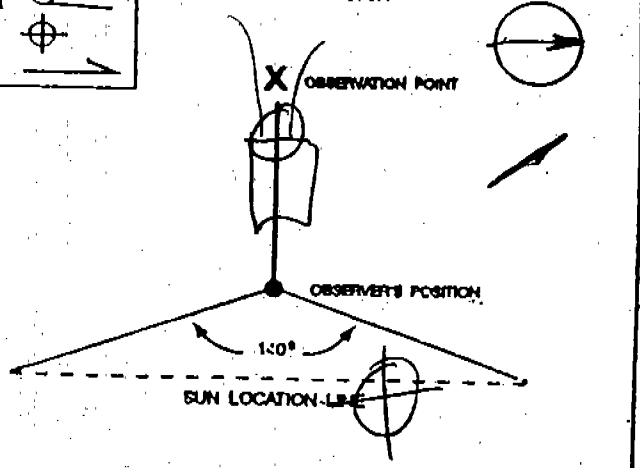
STACK WITH PLUME ○

SUN ⊕

WIND →

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



START TIME 1101 — STOP TIME 1104

	0	15	30	45		0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	⊖				34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

OBSERVERS NAME: JAMES E. PHILLIPPI

OBSERVERS SIGNATURE: James E. Phillippi | DATE: 11-22-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

ADDITIONAL INFORMATION

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 1 COMBUSTION STACK — RUN NO. 2

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~300' END "

HEIGHT RELATIVE TO OBSERVER: START ~300' END "

DISTANCE FROM OBSERVER: START ~300 YDS END "

DIRECTION FROM OBSERVER: START SW END "

VERTICAL ANGLE TO OBS. PT.: START ~25° END "

DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR: START BLACK END

IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY END "

BACKGROUND COLOR: START GRAY END "

SKY CONDITIONS: START OVERCAST END "

WIND SPEED: START 0-5 END "

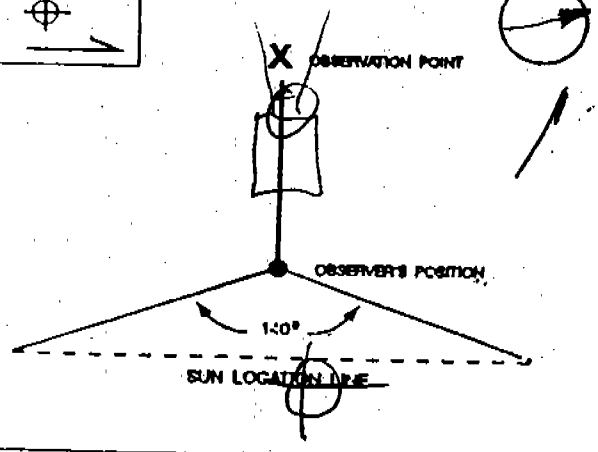
WIND DIRECTION: START NNW END "

AMBIENT TEMP: START ~30° END "

WET BULB TEMP | RH PERCENT

STACK WITH PLUME | SUN | WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



ADDITIONAL INFORMATION

START TIME 1140 — STOP TIME 1201

	0	15	30	45		0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40	0	0	0	0
11					41	0	0	0	0
12					42	0	0	0	0
13					43	0	0	0	0
14					44	0	0	0	0
15					45	0	0	0	0
16					46	0	0	0	0
17					47	0	0	0	0
18					48	0	0	0	0
19					49	0	0	0	0
20					50	0	0	0	0
21					51	0	0	0	0
22					52	0	0	0	0
23					53	0	0	0	0
24					54	0	0	0	0
25					55	0	0	0	0
26					56	0	0	0	0
27					57	0	0	0	0
28					58	0	0	0	0
29					59	0	0	0	0
30					60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-22-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: No. 1 Combustion Stack RUN NO. 2

LOCATION: MONESSEN PLANT

CITY: MONESSEN STATE: PA ZIP: 15062

PROCESS EQUIPMENT: OPERATING MODE:

CONTROL EQUIPMENT: OPERATING MODE:

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~300' END " HEIGHT RELATIVE TO OBSERVER: START ~300' END "

DISTANCE FROM OBSERVER: START ~300 YDS END " DIRECTION FROM OBSERVER: START SW END "

VERTICAL ANGLE TO OBS. PT.: START ~25° END " DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR: START BLACK END " IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY END "

BACKGROUND COLOR: START GRAY END " SKY CONDITIONS: START OVERCAST/FLURRIES END "

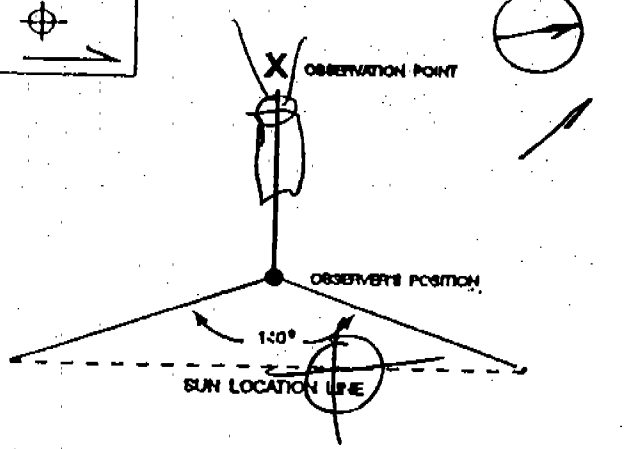
WIND SPEED: START 0-5 END " WIND DIRECTION: START NNW END "

AMBEINT TEMP: START ~30° END " WET BULB TEMP: RH PERCENT:

STACK WITH PLUME / SUN / WIND

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



ADDITIONAL INFORMATION:

	START TIME 1201					STOP TIME 1301			
	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0				40	0	0	0	0
11	PORT CHANGE				41	0	0	0	0
12					42	0	0	0	0
13	0	0	0	0	43	0			
14	0	0	0	0	44	X	X	X	X
15	0	0	0	0	45	PORT CHANGE			
16	0	0	0	0	46				
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi DATE: 11-22-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER:

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 1 COMBUSTION STACK — RUN NO. 2

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

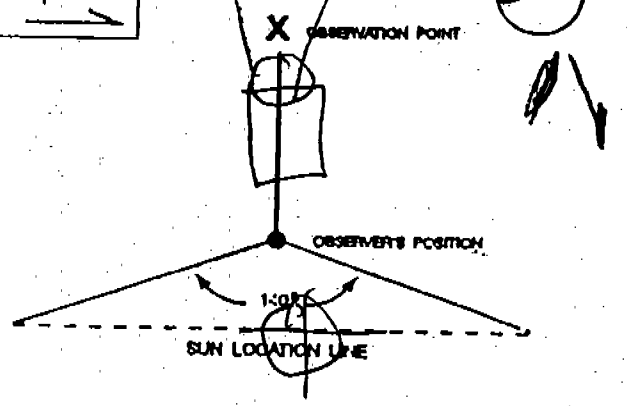
HEIGHT ABOVE GROUND LEVEL: START ~300' END "
HEIGHT RELATIVE TO OBSERVER: START ~300' END "
DISTANCE FROM OBSERVER: START ~300 X .05 END "
DIRECTION FROM OBSERVER: START SW END "
VERTICAL ANGLE TO OBS. PT.: START ~25° END "
DIRECTION TO OBS. PT.: START SW END

DESCRIBE EMISSIONS: START CONTINUOUS END "
EMISSION COLOR: START BLACK END "
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY END "
BACKGROUND COLOR: START GRAY END "
SKY CONDITIONS: START OVERCAST FLURRIES END "
WIND SPEED: START 0-5 END "
WIND DIRECTION: START NE END "
AMBIENT TEMP: START ~30° END "
WET BULB TEMP | RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



START TIME 1301					STOP TIME				
	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0				47	0	0	0	0
18	PORT				48	0	0	0	0
19					49	0	0	0	0
20	CHANGE				50	0	0	0	0
21	0	0	0	0	51	0			
22	0	0	0	0	52				
23	0	0	0	0	53				
24	0	0	0	0	54				
25	0	0	0	0	55				
26	0	0	0	0	56				
27	0	0	0	5	57				
28	5	5	5	10	58				
29	10	15	15	15	59				
30	15	15	10	5	60				

OBSERVER'S NAME: JAMES E. PHILLIPPI
OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-22-96
ORGANIZATION: OPTIMAL TECHNOLOGIES
CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

ADDITIONAL INFORMATION

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

PAGE 1 OF

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO 2 COMBUSTION STACK RUN NO. 3

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~300' END "	HEIGHT RELATIVE TO OBSERVER: START ~300' END "
DISTANCE FROM OBSERVER: START ~300 YDS END "	DIRECTION FROM OBSERVER: START SW END "
VERTICAL ANGLE TO OBS. PT.: START ~25° END "	DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR: START BLACK END " | IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ NA ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~450' END "

DESCRIBE PLUME BACKGROUND: START SKY END "

BACKGROUND COLOR: START GRAY END " | SKY CONDITIONS: START OVERCAST END "

WIND SPEED: START 0-5 END " | WIND DIRECTION: START NE END "

AMBIENT TEMP: START ~35° END " | WET BULB TEMP | RH PERCENT

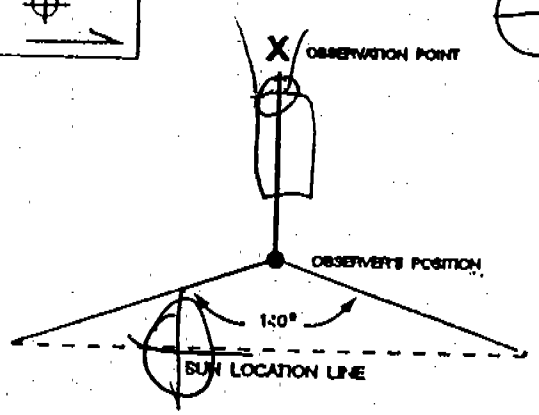
STACK WITH PLUME

SUN

WIND

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



ADDITIONAL INFORMATION

START TIME 1420 | STOP TIME 1501

	0	15	30	45		0	15	30	45
1					31	0	0	0	0
2					32	0	0	0	0
3					33	0	0	0	0
4					34	0	0	0	0
5					35	0	0	0	0
6					36	0	0	0	0
7					37	0	0	0	0
8					38	0	0	0	0
9					39	0	0	0	0
10					40	0	0	0	0
11					41	0	0	0	0
12					42	0	0	0	0
13					43	0	0	0	0
14					44	0	0	0	0
15					45	0	0	0	0
16					46	0	0	0	0
17					47	0	0	0	0
18					48	0	0	0	0
19					49	0	0	0	0
20					50	0	0	0	0
21					51	0	0	0	0
22					52	0	0	0	0
23	0	0	0	0	53	0	X	X	X
24	0	0	0	0	54	POR	TION	CHAN	GE
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	5	5
28	0	0	0	0	58	5	5	5	5
29	0	0	0	0	59	5	5	5	10
30	0	0	0	0	60	15	5	5	0

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-22-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

PAGE 2 OF

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 1 COMBUSTION STACK — RUN NO. 3

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT	OPERATING MODE
CONTROL EQUIPMENT	OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL	HEIGHT RELATIVE TO OBSERVER
START ~300' END "	START ~300' END "
DISTANCE FROM OBSERVER	DIRECTION FROM OBSERVER
START ~300YDS END "	START SW END "
VERTICAL ANGLE TO OBS. PT.	DIRECTION TO OBS. PT.
START ~25° END "	START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR	IF WATER DROPLET PLUME:
START BLACK END "	ATTACHED ☐ DETACHED ☐ N/A ☒

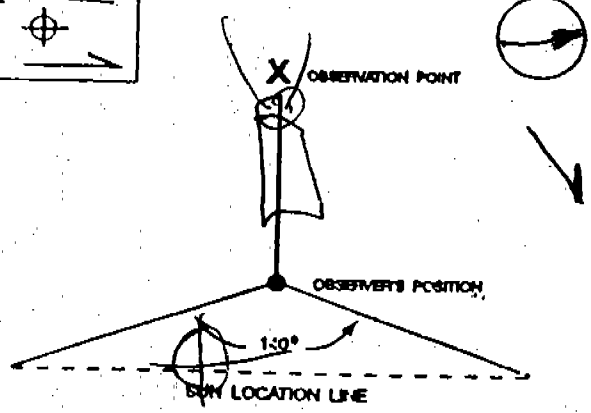
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY " END "

BACKGROUND COLOR	SKY CONDITIONS
START GRAY END "	START OVERCAST END OVERCAST
WIND SPEED	WIND DIRECTION
START 0-5 END "	START NE END "
AMBIENT TEMP	WET BULB TEMP / RH PERCENT
START ~35 END ~30	

STACK WITH PLUME / SUN / WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



ADDITIONAL INFORMATION:

START TIME 1501 — STOP TIME 1601

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0				55	0	0	0	0
26	POST				56	0	0	0	0
27					57	0	0	0	0
28					58	0	0	0	0
29	CHANGE				59	0	0	0	0
30					60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi — DATE: 11-22-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY — DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER:

ETA Revised 05-01-92

PAGE 3 OF

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 1 COMBUSTION STACK — RUN NO. 3

LOCATION: MONESSEN PLANT — RUN NO. 3

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL — START ~300 END "

HEIGHT RELATIVE TO OBSERVER — START ~300 END "

DISTANCE FROM OBSERVER — START ~300 YDS END "

DIRECTION FROM OBSERVER — START SW END "

VERTICAL ANGLE TO OBS. PT. — START ~25° END "

DIRECTION TO OBS. PT. — START SW END

DESCRIBE EMISSIONS — START CONTINUOUS END "

EMISSION COLOR — START BLACK END "

IF WATER DROPLET PLUME — ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET — START ~50' END "

DESCRIBE PLUME BACKGROUND — START SKY END "

BACKGROUND COLOR — START GRAY END "

SKY CONDITIONS — START OVERCAST FLUFFY END "

WIND SPEED — START 0-5 END "

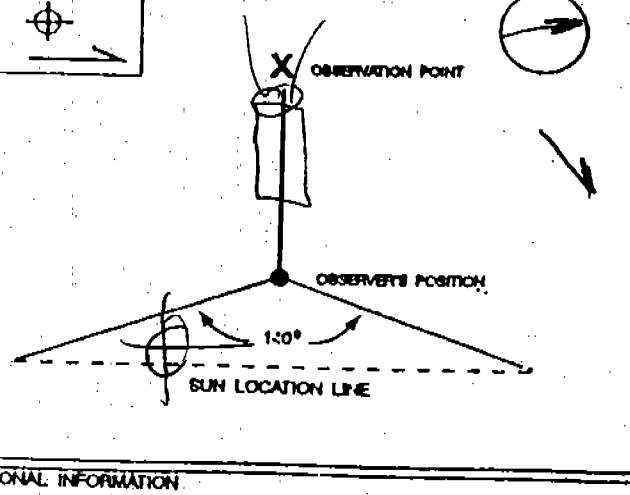
WIND DIRECTION — START NE END "

AMBIENT TEMP — START ~30 END "

WET BULB TEMP | RH PERCENT

STACK WITH PLUME | SUN | WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



START TIME 1601 — STOP TIME 1633

	0	15	30	45		0	15	30	45
1	0	PORT			31	0	0	0	0
2		CHANGE			32	0	0	0	0
3	0	0	0	0	33	0			
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
10	0	0	0	0	40				
11	0	0	0	0	41				
12	0	0	0	0	42				
13	0	0	0	0	43				
14	0	0	0	0	44				
15	0	0	0	0	45				
16	0	0	0	0	46				
17	0	0	0	0	47				
18	0	0	0	0	48				
19	0	0	0	0	49				
20	0	0	0	0	50				
21	0	0	0	0	51				
22	0	0	0	0	52				
23	0	0	0	0	53				
24	0	0	0	0	54				
25	0	0	0	0	55				
26	0	0	0	0	56				
27	0	0	0	0	57				
28	0	0	0	0	58				
29	0	0	0	0	59				
30	0	0	0	0	60				

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-22-96

ORGANIZATION: CANONAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

ADDITIONAL INFORMATION

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK — RUN NO. 1

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL — START ~300 END "

HEIGHT RELATIVE TO OBSERVER — START ~300 END "

DISTANCE FROM OBSERVER — START ~200 FT END "

DIRECTION FROM OBSERVER — START SW END "

VERTICAL ANGLE TO OBS. PT. — START ~30° END "

DIRECTION TO OBS. PT. — START SW END "

DESCRIBE EMISSIONS — START CONTINUOUS END

EMISSION COLOR — START END

IF WATER DROPLET PLUME — ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET — START ~150' END

DESCRIBE PLUME BACKGROUND — START SKY END "

BACKGROUND COLOR — START WHITE/GRAY BLUE END "

SKY CONDITIONS — START CLOUDY PARTLY END "

WIND SPEED — START 0-5 END "

WIND DIRECTION — START SSW END "

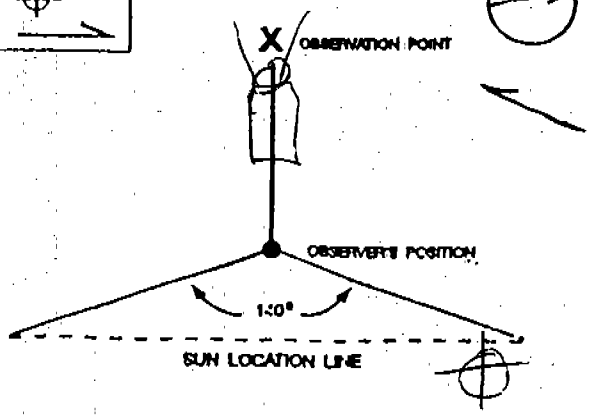
AMBIENT TEMP — START ~30 END ~35

WET BULB TEMP | RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



ADDITIONAL INFORMATION

START TIME 0755 — STOP TIME 0801

	0	15	30	45		0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55	0	0	0	0
26					56	0	0	0	0
27					57	0	0	0	0
28					58	0	0	0	0
29					59	0	0	0	0
30					60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK

LOCATION: [illegible] PLANT RUN NO. 1

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

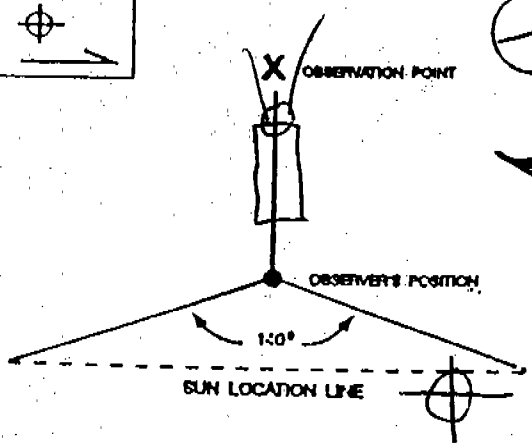
HEIGHT ABOVE GROUND LEVEL: START ~300' END "
HEIGHT RELATIVE TO OBSERVER: START ~300' END "
DISTANCE FROM OBSERVER: START ~200 YDS END "
DIRECTION FROM OBSERVER: START SW END "
VERTICAL ANGLE TO OBS. PT.: START ~30° END "
DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "
EMISSION COLOR: START BLACK END "
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ NA ☒
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY END "
BACKGROUND COLOR: START BLUE END "
SKY CONDITIONS: START CLOUDY END "
WIND SPEED: START 0-5 END "
WIND DIRECTION: START SSW END "
AMBIENT TEMP: START ~35 END "
WET BULB TEMP | RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



ADDITIONAL INFORMATION

START TIME 0801 — STOP TIME 0901

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	5	5	47	0	0	0	0
18	5	5	5	5	48	0	0	0	0
19	10	10	15	15	49	0	0	0	0
20	5	5	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	5	5	5	0
25	0				55				
26	PORT				56	PORT			
27		CHANGE			57				
28					58	CHANGE			
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI
OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96
ORGANIZATION: OPTIMAL TECHNOLOGIES
CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK Run No: 1

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL — START ~300' END "

HEIGHT RELATIVE TO OBSERVER — START ~300' END "

DISTANCE FROM OBSERVER — START ~200'/05 END "

DIRECTION FROM OBSERVER — START SW END "

VERTICAL ANGLE TO OBS. PT. — START ~30° END "

DIRECTION TO OBS. PT. — START SW END "

DESCRIBE EMISSIONS — START CONTINUOUS END "

EMISSION COLOR — START BLACK END

IF WATER DROPLET PLUME — ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET — START ~50' END "

DESCRIBE PLUME BACKGROUND — START SKY END "

BACKGROUND COLOR — START WHITE/GRAY ALIKE END "

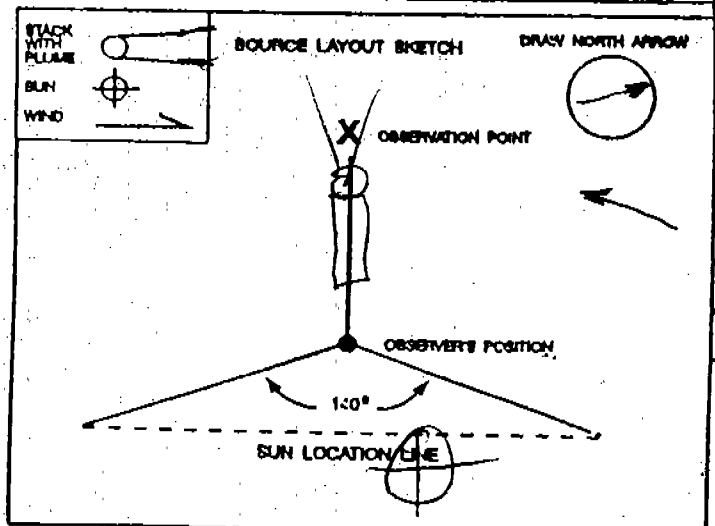
SKY CONDITIONS — START PARTLY CLOUDY END MOSTLY CLEAR

WIND SPEED — START 0-5 END "

WIND DIRECTION — START SSW END "

AMBEINT TEMP — START ~35 END ~40

WET BULB TEMP | RH PERCENT



ADDITIONAL INFORMATION

	START TIME 0901					STOP TIME 1001			
	0	15	30	45		0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32		PORT		
3	0	0	0	0	33				
4	0	0	0	0	34		CHANGE		
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
10	0	0	0	0	40				
11	0	0	0	0	41				
12	0	0	0	0	42		↓		
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	□
27	0	0	0	0	57	0	0	0	0
28	PORT				58	0	0	0	0
29					59	0	0	0	0
30	CHANGE				60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK — RUN NO. 1

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~300' END "	HEIGHT RELATIVE TO OBSERVER: START ~300' END "
DISTANCE FROM OBSERVER: START ~200 YDS END "	DIRECTION FROM OBSERVER: START SW END "
VERTICAL ANGLE TO OBS. PT.: START ~30° END "	DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR: START END | IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

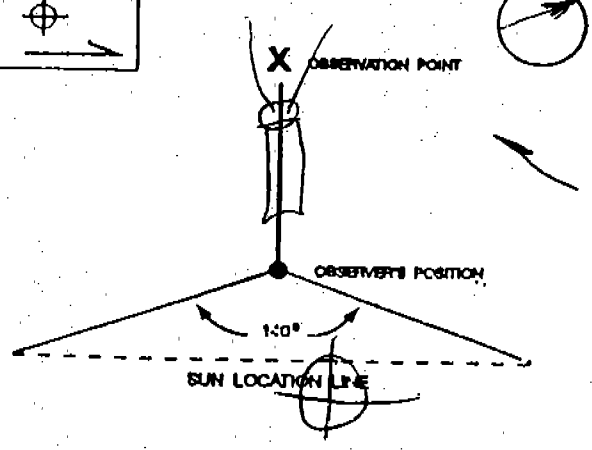
DESCRIBE PLUME BACKGROUND: START SKY END "

BACKGROUND COLOR: START GRAY/WHITE END BLUE	SKY CONDITIONS: START MOSTLY CLEAR END
WIND SPEED: START 0-5 END "	WIND DIRECTION: START S-SW END "
AMBIENT TEMP: START ~40 END "	WET BULB TEMP / RH PERCENT

SOURCE LAYOUT SKETCH

STACK WITH PLUME
SUN
WIND

DRAW NORTH ARROW



ADDITIONAL INFORMATION

	START TIME 1001				STOP TIME				
	0	15	30	45		0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
10	0	0	0	0	40				
11	0	0	0	0	41				
12	0	0	0	0	42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK RUN NO. 2

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

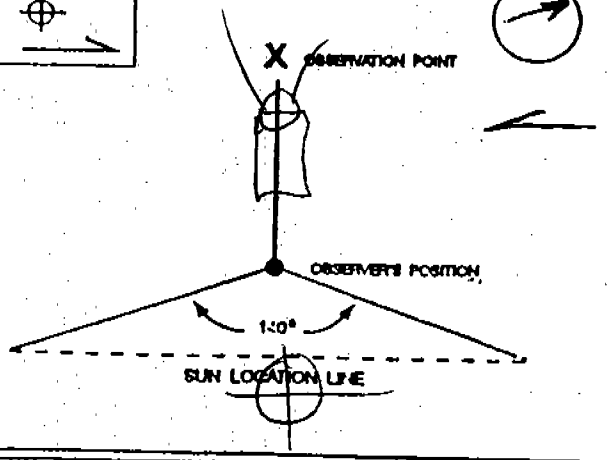
HEIGHT ABOVE GROUND LEVEL: START ~300' END
HEIGHT RELATIVE TO OBSERVER: START ~300' END
DISTANCE FROM OBSERVER: START ~200 FT END
DIRECTION FROM OBSERVER: START SW END
VERTICAL ANGLE TO OBS. PT.: START ~30° END
DIRECTION TO OBS. PT.: START SW END

DESCRIBE EMISSIONS: START CONTINUOUS END
EMISSION COLOR: START BLACK END
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END

DESCRIBE PLUME BACKGROUND: START SKY END
BACKGROUND COLOR: START BLUE/WHITE/GRAY END
SKY CONDITIONS: START CLOUDY/PARTLY END MOSTLY CLOUDY
WIND SPEED: START 0-5 END
WIND DIRECTION: START S END
AMBIENT TEMP: START ~40 END
WET BULB TEMP | RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



ADDITIONAL INFORMATION

START TIME 1107 — STOP TIME 1201

	0	15	30	45		0	15	30	45
1					31	0	0	0	0
2					32	0	0	0	0
3					33	0	0	0	0
4					34	0	0	0	0
5					35	0	0	0	0
6					36	0	0	0	0
7	0	0	0	0	37	POP-T			
8	0	0	0	0	38	CHANGE			
9	0	0	0	0	39				
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI
OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96
ORGANIZATION: OPTIMAL TECHNOLOGIES
CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK RUN NO. 2

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK - EXIT

HEIGHT ABOVE GROUND LEVEL: START ~300' END "	HEIGHT RELATIVE TO OBSERVER: START ~300' END "
DISTANCE FROM OBSERVER: START ~200YDS END "	DIRECTION FROM OBSERVER: START SW END "
VERTICAL ANGLE TO OBS. PT.: START ~30° END "	DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR: START BLACK END " | IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ NA ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY END "

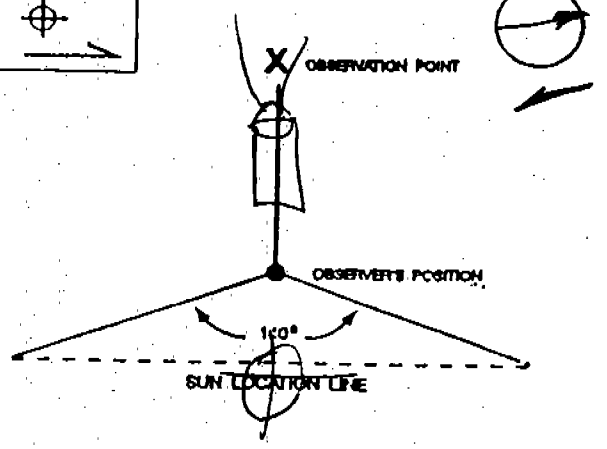
BACKGROUND COLOR: START WHITE/GRAY BLUE END " | SKY CONDITIONS: START CLOUDY MOSTLY END OVERCAST

WIND SPEED: START 0-5 END " | WIND DIRECTION: START S END "

AMBIENT TEMP: START ~40° END " | WET BULB TEMP | RH PERCENT

STACK WITH PLUME / SUN / WIND

SOURCE LAYOUT SKETCH



START TIME 1201 | STOP TIME 1301

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	—	—	—	40	0	0	0	0
11	PORT CHANGE				41	0	0	0	0
12					42	0	0	0	0
13	0	0	0	0	43	0	—	—	—
14	0	0	0	0	44	PORT CHANGE			
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILIPPI

OBSERVER'S SIGNATURE: James E. Philippi | DATE: 11-21-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

ADDITIONAL INFORMATION

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK RUN NO. 2

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT: | OPERATING MODE:

CONTROL EQUIPMENT: | OPERATING MODE:

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~300' END "
HEIGHT RELATIVE TO OBSERVER: START ~300' END "

DISTANCE FROM OBSERVER: START ~200 YDS END "
DIRECTION FROM OBSERVER: START SW END "

VERTICAL ANGLE TO OBS. PT.: START ~30° END "
DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR: START BLACK END "
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ NA ☒

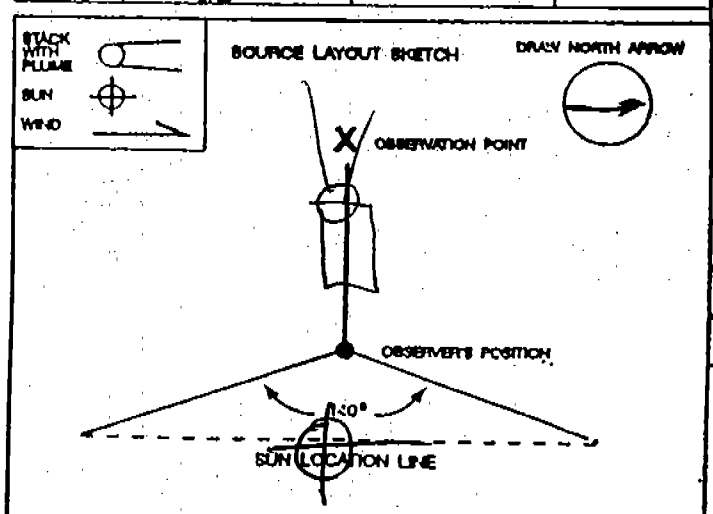
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY END "

BACKGROUND COLOR: START WHITE/GREY BLUE END "
SKY CONDITIONS: START OVERCAST END "

WIND SPEED: START 0-5 END "
WIND DIRECTION: START S END "

AMBEINT TEMP: START ~40° END "
WET BULB TEMP:
RH PERCENT:



ADDITIONAL INFORMATION:

START TIME 1301

	0	15	30	45		0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
10	0	0	5	5	40				
11	0	0	0	0	41				
12	0	0	0	0	42				
13	0	0	0	0	43				
14	0	0	0	0	44				
15	0				45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

STOP TIME

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER:

ETA Revised 05-01-92

PAGE 1 OF

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK RUN NO. 3

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

	START	END
HEIGHT ABOVE GROUND LEVEL	~300'	"
HEIGHT RELATIVE TO OBSERVER	~300'	"
DISTANCE FROM OBSERVER	~300 YDS	"
DIRECTION FROM OBSERVER	SW	"
VERTICAL ANGLE TO OBS. PT.	~30°	"
DIRECTION TO OBS. PT.	SW	"

DESCRIBE EMISSIONS

START: CONTINUOUS END: "

EMISSION COLOR: START BLACK END " | OF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END "

DESCRIBE PLUME BACKGROUND: START SKY END "

	START	END
BACKGROUND COLOR	WHITE/GRAY BLUE	"
SKY CONDITIONS	OVERCAST	"
WIND SPEED	0-5	"
WIND DIRECTION	SE	"
AMBIENT TEMP	~35°	"
WET BULB TEMP		
RH PERCENT		

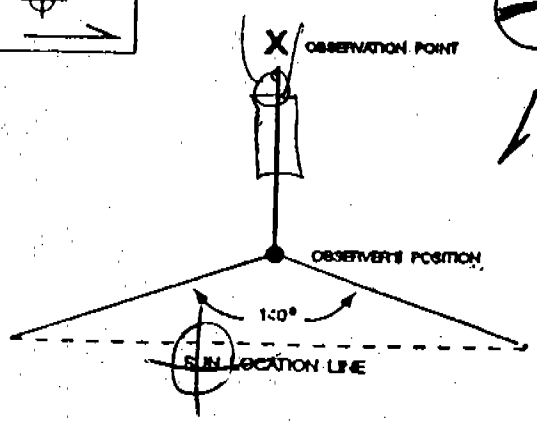
STACK WITH PLUME

SUN

WIND

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



ADDITIONAL INFORMATION

START TIME 1417 | STOP TIME 1501

	0	15	30	45		0	15	30	45
1					31	0	0	0	0
2					32	0	0	0	0
3					33	0	0	0	0
4					34	0	0	0	0
5					35	0	0	0	0
6					36	0	0	0	0
7					37	0	0	0	0
8					38	0	0	0	0
9					39	0	0	0	0
10					40	0	0	0	0
11					41	0	0	0	0
12					42	0	0	0	0
13					43	0	0	0	0
14					44	0	0	0	0
15					45	0	0	0	0
16					46	0	0	0	0
17	0	0	0	0	47	0			
18	0	0	0	0	48	PORT CHANGE			
19	0	0	0	0	49				
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96

ORGANIZATION: CRITICAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK RUN NO. 3

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

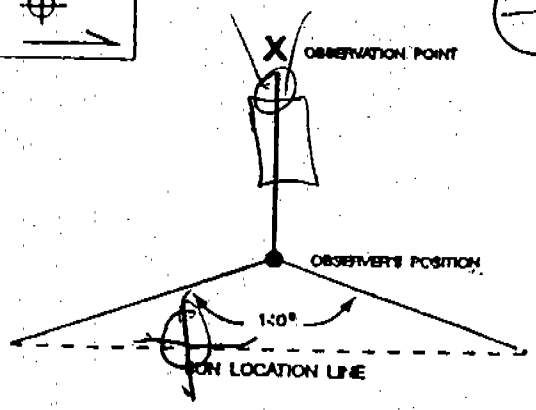
HEIGHT ABOVE GROUND LEVEL: START ~300' END
HEIGHT RELATIVE TO OBSERVER: START ~300' END
DISTANCE FROM OBSERVER: START ~200 YDS END
DIRECTION FROM OBSERVER: START SW END
VERTICAL ANGLE TO OBS. PT.: START ~30° END
DIRECTION TO OBS. PT.: START SW END

DESCRIBE EMISSIONS: START CONTINUOUS END
EMISSION COLOR: START BLACK END
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☒
DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END

DESCRIBE PLUME BACKGROUND: START SKY END
BACKGROUND COLOR: START WHITE/GRAY END
SKY CONDITIONS: START OVERCAST END
WIND SPEED: START 0-5 END
WIND DIRECTION: START SE END
AMBIENT TEMP: START ~35° END
WET BULB TEMP | RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH



ADDITIONAL INFORMATION

START TIME 1501 | STOP TIME 1601

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0				50	0	0	0	0
21	PORT	CHANGE			51	0	0	0	0
22	0	0	0	0	52	0			
23	0	0	0	0	53	PORT CHANGE			
24	0	0	0	0	54				
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

OBSERVER'S NAME: JAMES E. PHILLIPPI
OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96
ORGANIZATION: OPTIMAL TECHNOLOGIES
CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-7-96

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

VISIBLE EMISSION OBSERVATION FORM

COMPANY NAME: KOPPERS

LOCATION: NO. 2 COMBUSTION STACK (RMW NO. 3)

LOCATION: MONESSEN PLANT

CITY: MONESSEN | STATE: PA | ZIP: 15062

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT: STACK EXIT

HEIGHT ABOVE GROUND LEVEL: START ~300' END "
HEIGHT RELATIVE TO OBSERVER: START ~300' END "

DISTANCE FROM OBSERVER: START ~200-405 END "
DIRECTION FROM OBSERVER: START SW END "

VERTICAL ANGLE TO OBS. PT.: START ~30° END "
DIRECTION TO OBS. PT.: START SW END "

DESCRIBE EMISSIONS: START CONTINUOUS END "

EMISSION COLOR: START BLACK END "
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ N/A ☑

DISTANCE OF OBSERVATION POINT FROM EMISSION OUTLET: START ~50' END

DESCRIBE PLUME BACKGROUND: START SKY END "

BACKGROUND COLOR: START WHITE/GRAY/BLUE END "
SKY CONDITIONS: START OVERCAST END "

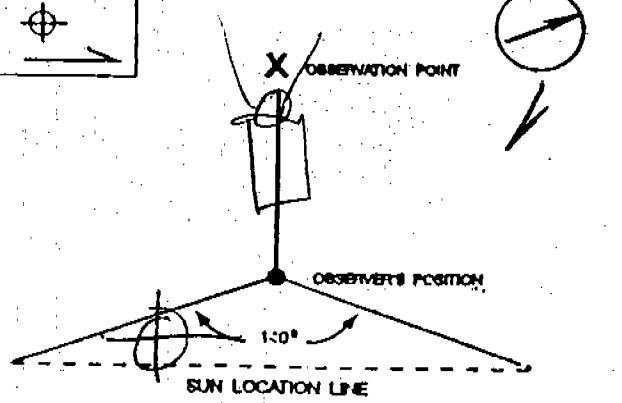
WIND SPEED: START 0-5 END "
WIND DIRECTION: START SE END "

AMBIENT TEMP: START ~35° END "
WET BULB TEMP | RH PERCENT

STACK WITH PLUME
SUN
WIND

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



	START TIME 1601				STOP TIME				
	0	15	30	45		0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
10	0	0	0	0	40				
11	0	0	0	0	41				
12	0	0	0	0	42				
13	5	5	5	10	43				
14	10	5	5	0	44				
15	0	0	0	0	45				
16	0	0	0	0	46				
17	0	0	0	0	47				
18	0	0	0	0	48				
19	0	0	0	0	49				
20	0	0	0	0	50				
21	0	0	0	0	51				
22	0	0	0	0	52				
23	0	0	0	0	53				
24	0	0	0	0	54				
25	0				55				
26					56				
27					57				
28					58				
29					59				
30					60				

OBSERVER'S NAME: JAMES E. PHILLIPPI

OBSERVER'S SIGNATURE: James E. Phillippi | DATE: 11-21-96

ORGANIZATION: OPTIMAL TECHNOLOGIES

CERTIFIED BY: PENN STATE UNIVERSITY | DATE: 10-1-96

ADDITIONAL INFORMATION

CONTINUED ON VEO FORM NUMBER

ETA Revised 05-01-92

APPENDIX B

EPA METHOD 5
BLANK ANALYTICAL DATA FORM

Client: Koppers
Project No: 937
Location: Coke Push Baghouse
No. 1 Comb. Stack
No. 2 Comb. Stack

Sample date: 11/18-22/96
Analysis date: 11/25-26/96
Technician: PJ

ACETONE BLANK	UNIT	
Acetone rinse container No.		286
Density of acetone (pa)	g/ml	0.7857
Acetone blank volume (Va)	ml	140
Average gross wt.	mg	67121.80
Average tare wt.	mg	67121.70
Weight of blank (Ma)	mg	0.10
Acetone blank wt. (Ca=Ma/(Va x Pa))	mg/g	0.0009

Note:
In no case should a blank resdue greater than 0.01 mg/g or 0.001% of the blank weight be subtracted from the sample weight.

EPA METHOD 5
ANALYTICAL PARTICULATE DATA

Client: Koppers
Project No: 937
Location: Coke Push Baghouse

Sample date: 11/18-20/96
Analysis date: 11/25-27/96
Technician: PJ

	UNIT	RUN 1	RUN 2	RUN 3
ACETONE RINSE				
Acetone rinse container No.		268	269	270
Density of acetone (pa)	g/ml	0.7857	0.7857	0.7857
Acetone rinse volume (Vaw)	ml	100	100	100
Acetone blank (Ca)	mg/g	0.0009	0.0009	0.0009
Wa =(Ca) (Vaw) (pa)	mg	0.07	0.07	0.07
Average gross wt.	mg	93600.00	104019.60	106843.30
Average tare wt.	mg	93588.85	104011.20	106840.00
Acetone blank wt. (Wa)	mg	0.07	0.07	0.07
Wt. of particulate in acetone rinse (Ma)	mg	11.08	8.33	3.23
FILTER				
Filter No.		312	314	313
Average gross wt.	mg	412.65	412.10	413.10
Average tare wt.	mg	412.25	410.85	412.70
Wt. of particulate on filter (Mf)	mg	0.40	1.25	0.40
FINAL WEIGHT				
Wt. of particulate in acetone rinse (Ma)	mg	11.08	8.33	3.23
Wt. of particulate on filter (Mf)	mg	0.40	1.25	0.40
TOTAL WT OF PARTICULATE (Mn)	**mg**	**11.48**	**9.58**	**3.63**

EPA METHOD 5
ANALYTICAL PARTICULATE DATA

Client: Koppers
Project No: 937
Location: No. 1 Combustion Stack

Sample date: 11/22/96
Analysis date: 11/25-27/96
Technician: PJ

	UNIT	RUN 1	RUN 2	RUN 3
ACETONE RINSE				
Acetone rinse container No.		271	272	273
Density of acetone (pa)	g/ml	0.7857	0.7857	0.7857
Acetone rinse volume (Vaw)	ml	130	105	130
Acetone blank (Ca)	mg/g	0.0009	0.0009	0.0009
Wa =(Ca) (Vaw) (pa)	mg	0.09	0.07	0.09
Average gross wt.	mg	94072.80	95309.50	101265.70
Average tare wt.	mg	94044.85	95299.05	101255.90
Acetone blank wt. (Wa)	mg	0.09	0.07	0.09
Wt. of particulate in acetone rinse (Ma)	mg	27.86	10.38	9.71
FILTER				
Filter No.		318	344	345
Average gross wt.	mg	418.10	412.75	416.60
Average tare wt.	mg	411.05	411.00	413.40
Wt. of particulate on filter (Mf)	mg	7.05	1.75	3.20
FINAL WEIGHT				
Wt. of particulate in acetone rinse (Ma)	mg	27.86	10.38	9.71
Wt. of particulate on filter (Mf)	mg	7.05	1.75	3.20
TOTAL WT OF PARTICULATE (Mn)	**mg**	**34.91**	**12.13**	**12.91**

EPA METHOD 5
ANALYTICAL PARTICULATE DATA

Client: Koppers
Project No: 937
Location: No. 2 Combustion Stack

Sample date: 11/21/96
Analysis date: 11/25-27/96
Technician: PJ

	UNIT	RUN 1	RUN 2	RUN 3
ACETONE RINSE				
Acetone rinse container No.		283	284	285
Density of acetone (pa)	g/ml	0.7857	0.7857	0.7857
Acetone rinse volume (Vaw)	ml	100	140	140
Acetone blank (Ca)	mg/g	0.0009	0.0009	0.0009
Wa =(Ca) (Vaw) (pa)	mg	0.07	0.10	0.10
Average gross wt.	mg	66668.40	66093.90	66609.20
Average tare wt.	mg	66651.85	66083.45	66534.55
Acetone blank wt. (Wa)	mg	0.07	0.10	0.10
Wt. of particulate in acetone rinse (Ma)	mg	16.48	10.35	74.55
FILTER				
Filter No.		318	344	345
Average gross wt.	mg	418.10	412.75	416.60
Average tare wt.	mg	411.05	411.00	413.40
Wt. of particulate on filter (Mf)	mg	7.05	1.75	3.20
FINAL WEIGHT				
Wt. of particulate in acetone rinse (Ma)	mg	16.48	10.35	74.55
Wt. of particulate on filter (Mf)	mg	7.05	1.75	3.20
TOTAL WT OF PARTICULATE (Mn)	**mg**	**23.53**	**12.10**	**77.75**

AIR QUALITY SERVICES, INC.

4527 Clairton Boulevard
Pittsburgh, PA 15236
(412) 881-5630

TABLE I
ANALYSIS OF IMPINGER WATER FOR INSOLUBLE PARTICULATE
OPTIMAL TECHNOLOGIES, INC.
U-PARC
575 WILLIAM PITT WAY
PITTSBURGH, PA 15238
SAMPLES RECEIVED: NOVEMBER 26, 1996

PROJECT PURCHASE ORDER #18476

OPTIMAL TECHNOLOGIES ID	AQS LABORATORY NUMBER	PARTICULATE WEIGHT MILLIGRAMS
COKE PUSH BAGHOUSE RUN #1	73282	0.45
COKE PUSH BAGHOUSE RUN #2	73283	0.27
COKE PUSH BAGHOUSE RUN #3	73284	0.07
#1 COMB STACK RUN #1	73285	0.74
#1 COMB STACK RUN #2	73286	0.62
#1 COMB STACK RUN #3	73287	0.94
#2 COMB STACK RUN #1	73288	0.95
#2 COMB STACK RUN #2	73289	1.10
#2 COMB STACK RUN #3	73290	1.40
BLANK	73291	0.001

THE FILTERS WERE WEIGHED ON A MICRO BALANCE CALIBRATED WITH WEIGHTS TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.

AIR QUALITY SERVICES, INC.

JOB 5430
REPORTED: DECEMBER 03, 1996

APPENDIX C

KOPPERS
COKE PUSH BAGHOUSE
NOVEMBER 18, 19 AND 20, 1996
PROJECT NO. 937

PARTICULATE EMISSIONS

SYMBOL		DESCRIPTION		RUN NO. 1	RUN NO. 2	RUN NO. 3	AVERAGE
Theta	=	Duration of test, min.	=	48	48	48	48
Vm	=	Dry sample volume (meter conditions), cu. ft.	=	38.257	36.723	37.476	37.485
SQRT(dP)	=	Average of square roots of pitot pressure , in. water	=	1.297	1.261	1.292	1.283
dH	=	Orifice pressure drop, in. water	=	2.15	2.02	2.13	2.10
Ts	=	Average stack temperature, deg. F	=	88.8	83.5	74.2	82.2
Tm	=	Average dry gas meter temperature, deg. F	=	54.6	45.0	38.0	45.9
CO2	=	CO2 in stack gas, %	=	0.0	0.0	0.0	0.0
O2	=	O2 in stack gas, %	=	21.0	21.0	21.0	21.0
CO+N2	=	CO and N2 in stack gas, %	=	79.0	79.0	79.0	79.0
Pbar	=	Barometric pressure, in. Hg.	=	29.61	29.24	29.40	29.42
Pa	=	Static pressure, in. water	=	-0.62	-0.60	-0.58	-0.60
Ps	=	Stack pressure (absolute), in. Hg.	=	29.56	29.20	29.36	29.37
Cp	=	Pitot correction factor, dimensionless	=	0.84	0.84	0.84	0.84
Y	=	Dry gas meter correction factor	=	0.972	0.972	0.972	0.972
Dn	=	Diameter of nozzle, in.	=	0.1820	0.1820	0.1820	0.1820
Ds	=	Diameter of stack, in.	=	71.25	71.25	71.25	71.25
Vlc	=	Volume of liquid collected in impingers and silica gel, ml	=	16.4	17.6	12.1	15.4
Fh	=	Front half catch, mg	=	11.48	9.58	3.63	8.23
Bh	=	Back half catch, mg	=	0.45	0.27	0.07	0.26
Mn	=	Total particulate catch, mg	=	11.93	9.85	3.70	8.49
		CALCULATED VALUES					
An	=	Area of the nozzle, sq. ft.	=	1.807E-04	1.807E-04	1.807E-04	1.807E-04
A	=	Area of the stack, sq. ft.	=	27.688	27.688	27.688	27.688
Md	=	Dry molecular weight of stack gas, dry basis, lb/lb-mole	=	28.84	28.84	28.84	28.84
Vw(std)	=	Volume of liquid collected, cu. ft.	=	0.772	0.828	0.570	0.723
Ms	=	Molecular weight of stack gas, wet basis, lb/lb-mole	=	28.62	28.60	28.68	28.63
Vm(std)	=	Dry sample volume (standard conditions), dscf	=	37.945	36.643	38.137	37.575
Vs	=	Stack velocity, ft/sec	=	75.02	73.05	73.90	73.99
Bws	=	Moisture content of the gas stream, %	=	2.0	2.2	1.5	1.9
Qs	=	Stack gas flow, acfm	=	124629	121357	122769	122918
Qsd	=	Stack gas flow, dscfm	=	116094	112527	117286	115302
I	=	Isokinetic ratio, %	=	104.4	104.0	103.8	104.1
		PARTICULATE EMISSION SUMMARY					
Cs	=	Particulate concentration, gr/dscf	=	0.0048	0.0041	0.0015	0.0035
E	=	Particulate emission rate, lb/hr	=	4.8	4.0	1.5	3.4

KOPPERS
NO. 1 COKE OVEN BATTERY COMBUSTION STACK
NOVEMBER 22, 1996
PROJECT NO. 937

PARTICULATE EMISSIONS

SYMBOL		DESCRIPTION		RUN NO. 1	RUN NO. 2	RUN NO. 3	AVERAGE
Theta	=	Duration of test, min.	=	120	120	120	120
Vm	=	Dry sample volume (meter conditions), cu. ft.	=	90.898	89.514	76.077	85.496
SQRT(dP)	=	Average of square roots of pitot pressure , in. water	=	0.171	0.169	0.144	0.161
dH	=	Orifice pressure drop, in. water	=	1.868	1.858	1.289	1.672
Ts	=	Average stack temperature, deg. F	=	607.7	602.2	606.4	605.4
Tm	=	Average dry gas meter temperature, deg. F	=	49.9	51.8	52.2	51.3
CO2	=	CO2 in stack gas, %	=	5.3	5.7	6.0	5.7
O2	=	O2 in stack gas, %	=	11.7	12.3	12.0	12.0
CO+N2	=	CO and N2 in stack gas, %	=	83.0	82.0	82.0	82.3
Pbar	=	Barometric pressure, in. Hg.	=	29.54	29.54	29.54	29.54
Pa	=	Static pressure, in. water	=	-1.67	-1.63	-1.65	-1.65
Ps	=	Stack pressure (absolute), in. Hg.	=	29.42	29.42	29.42	29.42
Cp	=	Pitot correction factor, dimensionless	=	0.84	0.84	0.84	0.84
Y	=	Dry gas meter correction factor	=	0.985	0.985	0.985	0.985
Dn	=	Diameter of nozzle, in.	=	0.6200	0.6200	0.6200	0.6200
Ds	=	Diameter of stack, in.	=	156.0	156.0	156.0	156.0
Vlc	=	Volume of liquid collected in impingers and silica gel, ml	=	386.8	418.2	353.4	386.1
Fh	=	Front half catch, mg	=	34.91	12.13	12.91	19.98
Bh	=	Back half catch, mg	=	0.74	0.62	0.94	0.77
Mn	=	Total particulate catch, mg	=	35.65	12.75	13.85	20.75
		CALCULATED VALUES					
An	=	Area of the nozzle, sq. ft.	=	2.097E-03	2.097E-03	2.097E-03	2.097E-03
A	=	Area of the stack, sq. ft.	=	132.732	132.732	132.732	132.732
Md	=	Dry molecular weight of stack gas, dry basis, lb/lb-mole	=	29.32	29.40	29.44	29.39
Vw(std)	=	Volume of liquid collected, cu. ft.	=	18.207	19.685	16.635	18.176
Ms	=	Molecular weight of stack gas, wet basis, lb/lb-mole	=	27.45	27.36	27.39	27.40
Vm(std)	=	Dry sample volume (standard conditions), dscf	=	91.924	90.186	76.481	86.197
Vs	=	Stack velocity, ft/sec	=	14.12	13.94	11.90	13.32
Bws	=	Moisture content of the gas stream, %	=	16.5	17.9	17.9	17.4
Qs	=	Stack gas flow, acfm	=	112451	111017	94771	106080
Qsd	=	Stack gas flow, dscfm	=	45658	44549	37880	42696
I	=	Isokinetic ratio, %	=	106.3	106.9	106.5	106.6
		PARTICULATE EMISSION SUMMARY					
Cs	=	Particulate concentration, gr/dscf	=	0.0060	0.0022	0.0028	0.0037
E	=	Particulate emission rate, lb/hr	=	2.3	0.8	0.9	1.4

KOPPERS
NO. 2 COKE OVEN BATTERY COMBUSTION STACK
NOVEMBER 21, 1996
PROJECT NO. 937

PARTICULATE EMISSIONS

SYMBOL		DESCRIPTION		RUN NO. 1	RUN NO. 2	RUN NO. 3	AVERAGE
Theta	=	Duration of test, min.	=	120	120	120	120
Vm	=	Dry sample volume (meter conditions), cu. ft.	=	69.131	62.633	74.318	68.694
SQRT(dP)	=	Average of square roots of pitot pressure , in. water	=	0.143	0.128	0.134	0.135
dH	=	Orifice pressure drop, in. water	=	1.271	1.010	1.173	1.151
Ts	=	Average stack temperature, deg. F	=	542.5	554.6	562.0	553.0
Tm	=	Average dry gas meter temperature, deg. F	=	47.5	58.1	55.5	53.7
CO2	=	CO2 in stack gas, %	=	4.5	4.0	5.0	4.5
O2	=	O2 in stack gas, %	=	12.7	12.3	11.0	12.0
CO+N2	=	CO and N2 in stack gas, %	=	82.8	83.7	84.0	83.5
Pbar	=	Barometric pressure, in. Hg.	=	29.42	29.40	29.36	29.39
Pa	=	Static pressure, in. water	=	-1.40	-1.30	-1.37	-1.36
Ps	=	Stack pressure (absolute), in. Hg.	=	29.32	29.30	29.26	29.29
Cp	=	Pitot correction factor, dimensionless	=	0.84	0.84	0.84	0.84
Y	=	Dry gas meter correction factor	=	0.985	0.985	0.985	0.985
Dn	=	Diameter of nozzle, in.	=	0.6200	0.6200	0.6200	0.6200
Ds	=	Diameter of stack, in.	=	120.0	120.0	120.0	120.0
Vlc	=	Volume of liquid collected in impingers and silica gel, ml	=	230.3	226.4	251.5	236.1
Fh	=	Front half catch, mg	=	23.53	12.10	77.75	37.79
Bh	=	Back half catch, mg	=	0.95	1.10	1.40	1.15
Mn	=	Total particulate catch, mg	=	24.48	13.20	79.15	38.94
		CALCULATED VALUES					
An	=	Area of the nozzle, sq. ft.	=	2.097E-03	2.097E-03	2.097E-03	2.097E-03
A	=	Area of the stack, sq. ft.	=	78.540	78.540	78.540	78.540
Md	=	Dry molecular weight of stack gas, dry basis, lb/lb-mole	=	29.23	29.13	29.24	29.20
Vw(std)	=	Volume of liquid collected, cu. ft.	=	10.840	10.657	11.838	11.112
Ms	=	Molecular weight of stack gas, wet basis, lb/lb-mole	=	27.73	27.49	27.69	27.64
Vm(std)	=	Dry sample volume (standard conditions), dscf	=	69.855	61.911	73.762	68.509
Vs	=	Stack velocity, ft/sec	=	11.40	10.32	10.81	10.84
Bws	=	Moisture content of the gas stream, %	=	13.4	14.7	13.8	14.0
Qs	=	Stack gas flow, acfm	=	53721	48632	50941	51098
Qsd	=	Stack gas flow, dscfm	=	24011	21141	22186	22446
I	=	Isokinetic ratio, %	=	90.9	91.4	103.9	95.4
		PARTICULATE EMISSION SUMMARY					
Cs	=	Particulate concentration, gr/dscf	=	0.0054	0.0033	0.0165	0.0084
E	=	Particulate emission rate, lb/hr	=	1.1	0.6	3.1	1.6

KOPPERS
COKE PUSH BAGHOUSE
NOVEMBER 18, 19, 20, 1996
NOx, VOC AND CO EMISSIONS

				Run No. 1	Run No. 2	Run No. 3	Avg.
Qsd	=	Stack gas flow, dscfm	=	116094	112527	117286	115302
		NOx EMISSIONS					
Cppm	=	NOx concentration, ppm	=	8.85	12.55	8.67	10.02
E	=	NOx Emissions, lb/hr	=	7.35	10.10	7.27	8.24
		VOC EMISSIONS					
Cppm	=	VOC concentration, ppm	=	1.42	1.01	1.59	1.34
E	=	VOC Emissions, lb/hr as propane	=	1.13	0.78	1.28	1.06
		CO EMISSIONS					
Cppm	=	CO concentration, ppm	=	35.11	48.48	42.76	42.12
E	=	CO Emissions, lb/hr	=	17.74	23.74	21.83	21.10

KOPPERS
NO. 1 COMBUSTION STACK
NOVEMBER 22, 1996
NOx, VOC AND CO EMISSIONS

				Run No. 1	Run No. 2	Run No. 3	Avg.
Qsd	=	Stack gas flow, dscfm	=	45658	44549	37880	42696
		NOx EMISSIONS					
Cppm	=	NOx concentration, ppm	=	364.40	410.04	440.19	404.88
E	=	NOx Emissions, lb/hr	=	118.96	130.61	119.23	122.93
		VOC EMISSIONS					
Cppm	=	VOC concentration, ppm	=	0.98	8.17	4.53	4.56
E	=	VOC Emissions, lb/hr as propane	=	0.31	2.49	1.17	1.32
		CO EMISSIONS					
Cppm	=	CO concentration, ppm	=	127.40	534.59	72.58	244.86
E	=	CO Emissions, lb/hr	=	25.32	103.65	11.97	46.98

KOPPERS
NO. 2 COMBUSTION STACK
NOVEMBER 21, 1996
NOx, VOC AND CO EMISSIONS

				Run No. 1	Run No. 2	Run No. 3	Avg.
Qsd	=	Stack gas flow, dscfm	=	24011	21141	22186	22446
		NOx EMISSIONS					
Cppm	=	NOx concentration, ppm	=	362.54	356.27	439.30	386.04
E	=	NOx Emissions, lb/hr	=	62.24	53.86	69.69	61.93
		VOC EMISSIONS					
Cppm	=	VOC concentration, ppm	=	15.38	16.20	12.97	14.85
E	=	VOC Emissions, lb/hr as propane	=	2.53	2.34	1.97	2.28
		CO EMISSIONS					
Cppm	=	CO concentration, ppm	=	217.66	12.69	35.31	88.55
E	=	CO Emissions, lb/hr	=	22.75	1.17	3.41	9.11

APPENDIX D

NOZZLE CALIBRATION DATA FORM

Date 11-17-96 Calibrated by Paul Jadlowiec

Nozzle identification number	Nozzle Diameter[a] D_1, mm (in.)	D_2, mm (in.)	D_3, mm (in.)	ΔD,[b] mm (in.)	D_{avg}[c]
Push Baghouse	0.182	0.182	0.182	0.000	0.182
Comb Stacks	0.620	0.620	0.620	0.000	0.620

where:

[a] $D_{1,2,3}$ = three different nozzles diameters, mm (in.); each diameter must be within (0.025 mm) 0.001 in.

[b] ΔD = maximum difference between any two diameters, mm (in.), $\Delta D \leq$ (0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.

STACK GAS THERMOCOUPLE CALIBRATION

Client: Koppers

Location: Monessen Coke Plant Push Baghouse Comb Stacks

Date: 12-5-90

Technician: Paul Jadlowiec

TEMPERATURE SOURCE	TEMPERATURE	REFERENCE	% DIFFERENCE
water Bath	65	64	1.6
water Bath	135	136	0.7
water Bath	214	213	0.9
Oil Bath	470	460	2.2

DRY GAS METER AND ORIFICE CALIBRATION

09/12/96 **OPERATOR: JEP** **CONSOLE: 80902**

WET TEST METER GAS VOLUMES AND TEMPERATURES

Orifice Manometer Setting (in. H2O)	Initial Reading ft (cf) Vw	Temp. (deg F) Tw	Final Reading ft (cf) Vw	Temp. (deg F) Tw	Net Volume (ft) Vw	Avg. Temp. (F) Tw
1.00	0.000	66.5	5.000	66.5	5.000	66.5
1.50	0.000	66.5	5.000	66.5	5.000	66.5
2.00	0.000	66.5	5.000	66.5	5.000	66.5
3.00	0.000	66.5	4.997	66.5	4.997	66.5

DRY TEST METER VOLUMES AND TEMPERATURES

Orifice Manometer Setting (in. H2O)	Initial Reading (cf) Vd	Final Reading (cf) Vd	Temperature Inlet (deg f) Ti	Outlet (deg f) Td	Net Volume (ft) Vd	Avg. Temp. (deg f) Td
1.00	960.949	966.121	74.0	72.0	5.172	73.0
1.50	967.170	972.359	76.0	72.0	5.189	74.0
2.00	973.397	978.601	77.0	73.0	5.204	75.0
3.00	979.627	984.821	74.0	72.0	5.194	73.0

Orifice Manometer Setting (in. H2O)	Total Test Time (min.)	Barometer Reading Inches ("Hg)
1.00	9.150	29.10
1.50	7.483	29.10
2.00	6.567	29.10
3.00	5.317	29.10

	Gamma	delta H
	0.976	1.897
	0.974	1.900
	0.971	1.947
	0.967	1.924
Average	**0.972**	**1.917**

DRY GAS METER AND ORIFICE CALIBRATION

10/17/96 **OPERATOR: JEP** **CONSOLE: 80872**

WET TEST METER GAS VOLUMES AND TEMPERATURES

Orifice Manometer Setting (in. H2O)	Initial Reading ft (cf) Vw	Temp (deg F) Tw	Final Reading ft (cf) Vw	Temp. (deg F) Tw	Net Volume (ft) Vw	Avg. Temp. (F) Tw
1.00	0.000	70.5	5.002	70.5	5.002	70.5
1.50	0.000	70.5	4.999	70.5	4.999	70.5
2.00	0.000	70.5	5.000	70.5	5.000	70.5
3.00	0.000	70.5	5.000	70.0	5.000	70.3

DRY TEST METER VOLUMES AND TEMPERATURES

Orifice Manometer Setting (in. H2O)	Initial Reading (cf) Vd	Final Reading (cf) Vd	Temperature Inlet (deg f) Ti	Outlet (deg f) Td	Net Volume (ft) Vd	Avg. Temp. (deg f) Td
1.00	956.447	961.628	85.0	81.0	5.181	83.0
1.50	962.663	967.823	85.0	81.0	5.160	83.0
2.00	968.865	974.044	85.0	81.0	5.179	83.0
3.00	975.066	980.246	86.0	81.0	5.180	83.5

Orifice Manometer Setting (in. H2O)	Total Test Time (min.)	Barometer Reading Inches ("Hg)
1.00	8.867	29.30
1.50	7.317	29.30
2.00	6.333	29.30
3.00	5.167	29.30

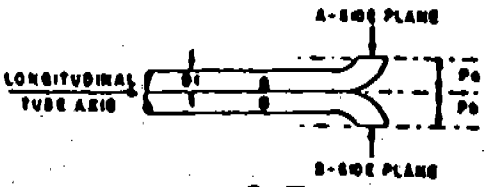
	Gamma	delta H
	0.986	1.762
	0.988	1.802
	0.983	1.799
	0.982	1.793
Average	**0.985**	**1.789**

TYPE S PITOT TUBE CONSTRUCTION SPECIFICATIONS

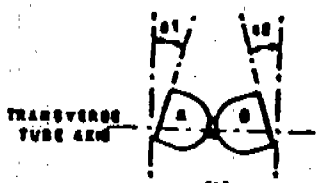
TYPE S PITOT TUBE NO. 5-3 DATE 11-18-96 TECHNICIAN PJ

CONSTRUCTION STANDARDS :

1. Dt - between 0.48 and 0.95 centimeters
2. Pa = Pb $1.05\ Dt \leq P \leq 1.50\ Dt$
3. $\alpha 1, \alpha 2 < 10°$
4. $\beta 1, \beta 2 < 5°$
5. $Z \leq 0.32$ cm
6. $W \leq 0.08$ cm

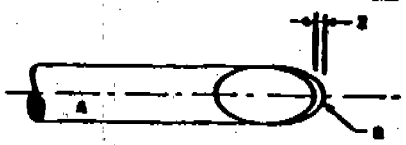


Dt = 0.95
Pa = 1.17
Pb = 1.18

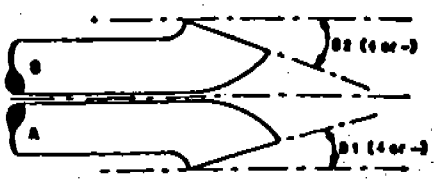


(b)

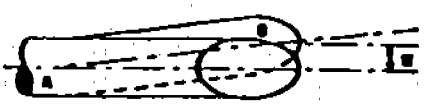
α1 = 0
α2 = 0



(a)



β1 = 0
β2 = 0



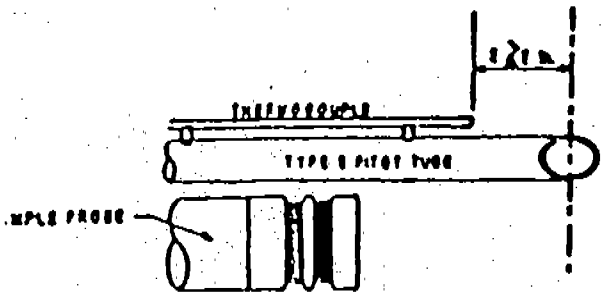
Z = 0
W = 0

TYPE S PITOT TUBE ALIGNMENT SPECIFICATIONS

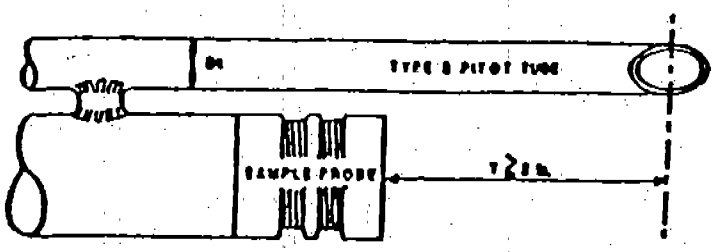
Client: Koppers
Location: Manassas Coke Plant
Date: 11-18-96
Technician: P. Juddlowiec

PITOT ALIGNMENT STANDARDS:

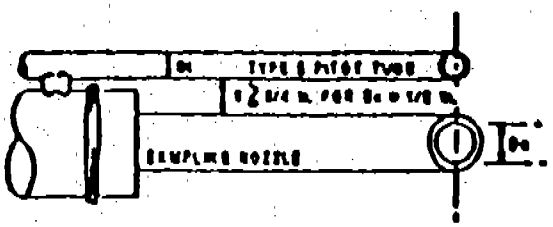
1. X ≥ 3/4 in.
2. Ip must be higher than Np
3. Z ≥ 1.90 cm
4. Y ≥ 3 in.



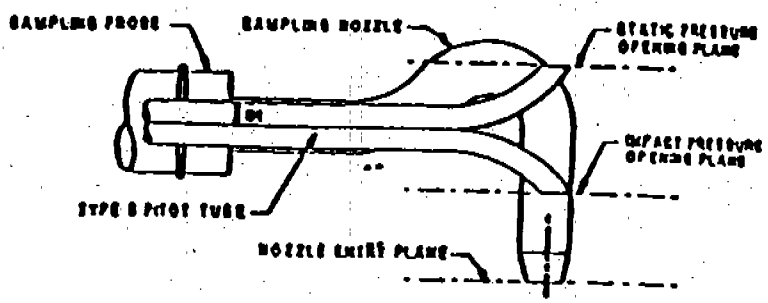
Z = 2.0"



Y = 3.1"



X = 0.80"



Is Ip higher than Np = Yes

Barometer Calibration
Field Barometer Number 2
February 1, 1996

Date	Time	NWS	Field Barometer	Corrected	Difference
01/18/96	07:00 AM	30.08	29.24	30.08	0.00
01/18/96	12:00 PM	30.02	29.15	29.99	0.03
01/19/96	07:00 AM	29.43	28.75	29.59	-0.16
01/19/96	12:00 PM	29.74	28.84	29.68	0.06
01/22/96	07:00 AM	30.42	29.47	30.31	0.11
01/22/96	12:00 PM	30.40	29.45	30.29	0.11
01/24/96	07:00 AM	29.51	28.64	29.48	0.03
01/24/96	12:00 PM	30.27	29.45	30.29	-0.02
01/25/96	07:00 AM	30.40	29.46	30.30	0.10
01/25/96	12:00 PM	30.14	29.24	30.08	0.06
01/29/96	07:00 AM	30.12	29.25	30.09	0.03
01/29/96	12:00 PM	30.15	29.25	30.09	0.06
				Average	0.034

Note: Correction for Altitude = 0.855
Note: Correction for Gravity = -0.015
NWS = National Weather Service

PENNSTATE

1855

Continuing Education

Visible Emissions Evaluation Program

this certifies that

JIM PHILLIPPI

has met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by The Pennsylvania State University.

Certified, from and to

1 Oct '96 - 1 Apr '97 Robert T Hellmich

Recertified, from and to

Vice President and Dean for
Continuing and Distance Education

Robert Tenning Hellmich

Project Director of Visible Emissions
Training Program
Environmental Resources Research Institute

Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310 (215) 766-8861 FAX (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Optimal Technologies Inc
575 William Pitt Way
Pittsburgh, PA 15238

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order S32536
Scott Project # 01-74924-002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; 1 Procedure #G1, Section Number 3.0.4; September, 1993.

Cylinder Number	ALM003574	**Certification Date**	01-03-96	**Expiration Date**	01-03-98
Cylinder Pressure	2000 psig*	**Previous Certification Dates**	None		

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Nitric Oxide	24.9 ppm	±1% NIST Traceable
Total Oxides of Nitrogen	25.5 ppm	Reference Value Only
Balance Gas: Nitrogen		

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of all known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM2629	11-26-96	CLM003365	19.86 ppm NO in N_2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
NO: Horiba/CLA220/570885810	12-29-95	Chemiluminescent

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

Components: Nitric Oxide

First Triad Analysis

Date: 12-26-95 Response Units: Volts

Z1=0.0005	R1=0.9061	T1=0.2374
R2=0.9044	Z2=0.0003	T2=0.2399
Z3=0.0001	T3=0.2409	R3=0.9053

Avg. Conc. of Cust. Cyl. 24.8 ppm

Second Triad Analysis

Date: 01-03-96 Response Units: Volts

Z1=0.0001	R1=0.7972	T1=1.0016
R2=0.7848	Z2=0.0001	T2=0.9963
Z3=-0.0002	T3=0.9978	R3=0.7898

Avg. Conc. of Cust. Cyl. 25.1 ppm

Calibration Curve

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

r=0.99988	NTRM2629
Constants:	A=9.6816E-02
B=3.0230E+01	C=0.0000E+00
D=0.0000E+00	E=0.0000E+00

Special Notes:

Analyst: Wesley Bleiler

Scott Specialty Gases

6141 Easton Road, PO Box 310 Plumsteadville PA 18949-0310 PHONE: (215) 766-8861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: Interference-Free™ EPA Protocol Gas

Customer
OPTIMAL TECHNOLOGIES INC
575 WILLIAM PITT WAY
PITTSBURGH, PA 15238

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
Plumsteadville, PA 18949

Purchase Order *532512*
Scott Project # *7190504A*

ANALYTICAL INFORMATION

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

Cylinder Number *ALM040014*

Previous Certification Dates

Certification Date *9/25/95*

Cylinder Pressure+ *1910 psig*

Expiration Date *9/25/97*

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Accuracy*
Nitric Oxide	98.2 ppm	± 1% Directly NIST Traceable
Total Oxides in Nitrogen	98.2 ppm	Reference Value Only
Nitrogen	Balance Gas	

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

REFERENCE STANDARD

Type/Sample No.	Expiration Date	Cylinder Number	Concentration
NTRM1684	*6/7/97*	*ALM049084*	*94.4 ppm NO in N2*

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Method
Nicolet FTIR/8220/AAB9300174	*9/7/95 :NO*	*Scott Enhanced FTIR*

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

Components: *NO*

First Triad Analysis

Date: 9/18/95 Response Units: ppm

Z1= 0.21	R1= 94.40	T1= 98.26
R2= 94.46	Z2= 0.10	T2= 97.89
Z3= 0.31	T3= 98.21	R3= 94.45

Avg. Concentration: 98.12 ppm

Second Triad Analysis

Date: 9/25/95 Response Units: ppm

Z1= 0.07	R1= 94.40	T1= 98.26
R2= 94.46	Z2= 0.19	T2= 98.42
Z3= 0.08	T3= 98.31	R3= 94.37

Avg. Concentration: 98.33 ppm

Calibration Curve

Concentration = A+Bx+Cx2+Dx3+Ex4

R= 0.99999	AAL2222
Constants:	A= 1.96E-01
B= 6.24E-01	C= 5.66E-04
D= 2.45E-07	E= 2.25E-10

Special Notes:

Analyst: Garrett R. Knoll

PROTOCOL

Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310 (215) 766-8861 FAX (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Optimal Technologies Inc
575 William Pitt Way
Pittsburgh, PA 15238

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order S32536
Scott Project # 01-74924-001

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; 1 Procedure #G1, Section Number 3.0.4; September, 1993.

Cylinder Number ALM016063
Cylinder Pressure 2000 psig+
Certification Date 01-04-96
Previous Certification Dates None
Expiration Date 01-04-98

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Nitric Oxide	262 ppm	±1% NIST Traceable
Total Oxides of Nitrogen	264 ppm	Reference Value Only
Balance Gas: Nitrogen		

+Do not use when cylinder is less than 150 psig.
*Analytical uncertainty is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM1685	07-10-97	ALM050886	248 ppm NO in N_2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
NO: Horiba/CLA220/570885081(	12-29-95	Chemiluminescent

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

Components: Nitric Oxide

First Triad Analysis

Date: 12-28 95 Response Units: Volts
Z1=-0.0004 R1=0.2462 T1=0.2625
R2=0.2469 Z2=0.0000 T2=0.2610
Z3=0.0000 T3=0.2611 R3=0.2473
Avg. Conc of Cust. Cyl. 262 ppm

Second Triad Analysis

Date: 01-04-96 Response Units: Volts
Z1=0.0000 R1=0.8094 T1=0.8546
R2=0.8188 Z2=0.0005 T2=0.8638
Z3=0.0003 T3=0.8660 R3=0.8092
Avg. Conc. of Cust. Cyl. 262 ppm

Calibration Curve

Concentration=$A+Bx+Cx^2+Dx^3+Ex^4$
r=0.99995 NTRM1685
Constants: A=1.4532E+00
B=3.0499E+02 C=0.0000E+00
D=0.0000E+00 E=0.0000E+00

Special Notes:

Analyst Wesley Bleiler

Air Products and Chemicals, Inc.
P.O. BOX 351
R.D. #1
TAMAQUA, PA 18252

[redacted] Arrived 3/18/96 for All. Ludlum

Certificate of Analysis - EPA Protocol Gas Standard

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

Customer:
APCI- CP
CLYDE RORABAUGH
FREEPORT RD, ROUTE 28
CREIGHTON PA 15030-

PO: Rel:

Notes:
NO2- <1ppm;For information only
Not a certified analysis

Order No: 148-013358-01
Batch No: 255-83657

Cylinder No: SG9150757BAL
Cylinder Pressure*: 2000 psig
Certification Date: 03/07/96
Expiration Date: 03/07/98

*** Certified Concentration ***		********* Reference Standards *********			********** Analytical Instrumentation **********			
Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
NITRIC OXIDE	490±1.45 PPM	SG9152250BAL	GMIS	484.2400 PPM	Thermal Enviro	10S-4502	02/25/96	CHEMILUMINESCENCE

Balance Gas: NITROGEN

* Standard should not be used below 150 psig

Analyst: Lisa Tarricone /mk
Lisa Tarricone

Approved By: K Roubik /mk
Ken Roubik

Scott Specialty Gases, Inc.

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310 (215) 766-8861 FAX (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer	Assay Laboratory	
Control Analytics	Scott Specialty Gases, Inc.	Purchase Order 713
C/O Optimal Technologies	6141 Easton Road	Scott Project # 01-75952-00[illegible]
575 William Pitt Way	P.O. Box 310	
Pittsburgh, PA 15238	Plumsteadville, PA 18949-0310	

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standard 1 Procedure #G1, Section Number 3.0.4, September, 1993.

Cylinder Number	AAL14824	Certification Date	02-06-96	Expiration Date	
Cylinder Pressure	2000 psig+	Previous Certification Dates	None		

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Carbon monoxide	25.3 ppm	±1% NIST Traceable
Balance Gas: Nitrogen		

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
[illegible]2635	07-31-97	CLM003676	23.9 ppm CO in N

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO: Horiba/CFA310A/474091	01-15-96	NDIR

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

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Carbon monoxide	Date: 01-30-96 Response Units: Volts Z1=0.0014 R1=0.2226 T1=0.2359 R2=0.2235 Z2=0.0013 T2=0.2361 Z3=0.0011 T3=0.2358 R3=0.2230 Avg. Conc. of Cust. Cyl. 25.3 ppm	Date: 02-06-96 Response Units: Volts Z1=0.0008 R1=0.2209 T1=0.2360 R2=0.2207 Z2=0.0010 T2=0.2337 Z3=0.0011 T3=0.2337 R3=0.2204 Avg. Conc. of Cust. Cyl. 25.4 ppm	Concentration=A+Bx+Cx+Dx+Ex r=0.99999 NTRM1678 Constants: A=4.6586E-02 B=7.1443E+01 C=0.0000E+00 D=0.0000E+00 E=0.0000E+00

Special Notes:

Analyst Terrance P. Boswell

Scott Specialty Gases

6141 Easton Road, PO Box 310 Plumsteadville PA 18949-0310 PHONE: (215) 766-8861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: Interference-Free™ EPA Protocol Gas

Customer
CONTROL ANALYTICS
C/O OPTIMAL TECHNOLOGIES
575 WILLIAM PITT WAY
PITTSBURGH, PA 15238

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
Plumsteadville, PA 18949

Purchase Order *713*
Scott Project # *7595203A*

ANALYTICAL INFORMATION

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

Cylinder Number *AAL21186*
Cylinder Pressure+ *1855 PSIG*

Previous Certification Dates

Certification Date *2/5/96*
Expiration Date *2/5/99*

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Accuracy*
Carbon Monoxide	80.6 ppm	± 1% Directly NIST Traceable
Nitrogen	Balance Gas	

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

REFERENCE STANDARD

Type/Sample No.	Expiration Date	Cylinder Number	Concentration
NTRM1679	*8/11/96*	*ALM041543*	*97.1 ppm CO in N2*

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Method
Nicolet FTIR/8220/AAB9300174	*1/18/96*	*Scott Enhanced FTIR*

ANALYZER READINGS

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

Components *CO*

First Triad Analysis

Date: 1/29/96	Resp. Units: ppm	
Z1= 0.00	R1= 97.10	T1= 80.4
R2= 97.13	Z2= 0.00	T2= 80.4
Z3= 0.00	T3= 80.5	R3= 97.16
Avg. Concentration: 80.5 ppm		

Second Triad Analysis

Date: 2/5/96	Resp. Units: ppm	
Z1= 0.05	R1= 97.10	T1= 80.8
R2= 97.46	Z2= 0.19	T2= 80.9
Z3= 0.22	T3= 80.7	R3= 97.53
Avg. Concentration: 80.8 ppm		

Calibration Curve

Concentration = A+Bx+Cx2+Dx3+Ex4	
R= 0.99999	ALM021486
Constants:	A= 4.53E-01
B= 2.66E-01	C= 2.84E-04
D= 3.91E-06	E= 2.70E-09

Special Notes:

Analyst: Garren R. Knoll

PROTOCOL

Scott Specialty Gases, Inc.

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

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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

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

Purchase Order : 13985-71500
Scott Project # : 585106

ANALYTICAL INFORMATION

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

Cylinder Number : ALM031186
Cylinder Pressure + : 1900 psig
Certificate Date : 9/1/95
Previous Certificate Date : None
Expiration Date : 9/1/98

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Carbon Monoxide	279.2 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

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

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM 1681	4/21/96	ALM-024826	966.0 ppm Carbon Monoxide in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO : Beckman/864/102528	8/10/95	Non-Dispersive Infrared

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

Components: Carbon Monoxide

First Triad Analysis

Date: 8/25/95	Response Units: PPM	
Z1=0.00	R1=100.00	T1=33.00
R2=100.00	Z2=0.00	T2=33.00
Z3=0.00	T3=33.00	R3=100.00

Avg. Conc. of Cust. Cyl. 280.1 ppm

Second Triad Analysis

Date: 9/1/95	Response Units: PPM	
Z1=0.00	R1=100.00	T1=32.80
R2=100.00	Z2=0.00	T2=32.80
Z3=0.00	T3=32.80	R3=100.00

Avg. Conc. of Cust. Cyl: 278.3 ppm

Calibration Curve

Concentration = $A+Bx+Cx^2+Dx^3+Ex^4$	
r=1.00000	NTRM 1681
Constants:	A=-0.162760000
B=7.918200000	C=0.017444000
D=0.000000000	E=0.000000000

Special Notes

Cylinder

Analyst

MISP/P-1

Air Products and Chemicals, Inc.
P.O. BOX 351
R.D. #1
TAMAQUA, PA 18252

Certificate of Analysis - EPA Protocol Gas Standard

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

Customer:
AIR PRODUCTS & CHEMICALS
JIM ORRIS
FREEPORT RD, ROUTE 28
CREIGHTON PA 15030

Notes:

PO: Rel:

Order No: 255-056159-01
Batch No: 255-58322

Cylinder No: SG9114474BAL
Cylinder Pressure*: 2000 psig
Certification Date: 11/13/94
Expiration Date: 11/06/94

*** Certified Concentration ***		********* Reference Standards *********			********** Analytical Instrumentation **********			
Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
CARBON MONOXIDE	594 ±1.47 PPM	SG9113535BAL	GMIS	507.2000 PPM	Hewlett Packar	2518A052	10/14/94	GC-FID

Balance Gas: Nitrogen

* Standard should not be used below 150 psig

Analyst: Michael Wagner /jp
Michael Wagner

Approved By: K. Roubik /jp
Ken Roubik

09-14-1995 12:07

Scott Specialty Gases, Inc.

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

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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

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

Purchase Order : 15612-71500
Scott Project # : 501873

ANALYTICAL INFORMATION

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

Cylinder Number : ALM051293
Cylinder Pressure + : 1900 psig
Certificate Date : 9/20/96
Previous Certificate Date : None
Expiration Date : 9/20/99

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Carbon Monoxide	1515 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

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

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM2637	4/3/98	ALM059632	2513 ppm Carbon Monoxide in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO: Horiba/OPE-135/565607092	9/20/96	Non-dispersive Infrared

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

Components: Carbon Monoxide

First Triad Analysis

Date: 9/13/96 Response Units: mv

Z1=0.00	R1=145.00	T1=112.70
R2=145.00	Z2=0.00	T2=112.70
Z3=0.00	T3=112.70	R3=145.00

Avg. Conc. of Cust. Cyl. 1515 ppm

Second Triad Analysis

Date: 9/20/96 Response Units: mv

Z1=0.00	R1=145.00	T1=112.70
R2=145.00	Z2=0.00	T2=112.70
Z3=0.00	T3=112.70	R3=145.00

Avg. Conc. of Cust. Cyl: 1515 ppm

Calibration Curve

Concentration=A+Bx+Cx²+Dx³+Ex⁴

r=1.00000	NTRM2637
Constants:	A=-0.166834000
B=8.575558000	C=-0.016680580
D=0.000531353	E=0.000000000

Special Notes

Mail

Analyst

MISP/P-1

Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310 (215) 766-8861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Optimal Technologies Inc
575 William Pitt Way
Pittsburgh, PA 15238

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 532512
Scott Project # 01-71905-001

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; 1 Procedure #G1, Section Number 3.0.4; September, 1993.

Cylinder Number ALM032640
Cylinder Pressure 2000 psig+
Certification Date 10-05-95
Previous Certification Dates None
Expiration Date 10-05-97

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	24.4 ppm	±1% NIST Traceable
Balance Gas: Nitrogen		

Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
RM1667B	11-15-97	CLM005278	47.3 ppm C_3H_8 in N_2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
(3) Horiba/VA3300/7945	10-21-95	FID

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

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Propane	Date: 10-05-95 Response Units: Area Z1=000000 R1=510118 T1=264368 R2=510113 Z2=000000 T2=264055 Z3=000000 T3=263560 R3=512152 Avg. Conc. of Cust. Cyl: 24.4 ppm		Concentration=A+Bx+Cx²+Dx³+Ex⁴ r=1.00000 NITRM1668 Constants: A=-9.9257E-03 B=1.0172E-04 C=0.0000E+00 D=0.0000E+00 E=0.0000E+00

Special Notes:

Analyst James T. Kraus

Scott Specialty Gases, Inc.

Shipped From: 1290 COMBERMERE STREET
TROY MI 48083
Phone: 810-589-2950 Fax: 810-589-2134

CERTIFICATE OF ANALYSIS

C A E INSTRUMENT RENTAL

246 WOODWORK LANE

PALATINE IL 60067

PROJECT #: 05-94608-003
PO#: 14897-71500
ITEM #: 05023451 2AL
DATE: 3/28/96

CYLINDER #: ALM030236
FILL PRESSURE: 2050PSIA
BLEND TYPE : ACUBLEND MASTER GAS

ANALYTICAL ACCURACY: +/-1%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
PROPANE	85.	PPM	85.89	PPM
NITROGEN	BALANCE		BALANCE	

ACUBLEND MASTER GAS

ANALYST: [signature] AAL 13201

Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310 (215) 766-8861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Optimal Technologies Inc
575 William Pitt Way
Pittsburgh, PA 15238

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 532512
Scott Project # 01-171905-002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards, 1 Procedure #G1, Section Number 3.0.4, September, 1993.

Cylinder Number ALM045840 **Certification Date** 10-02-95 **Expiration Date** 10-02-97
Cylinder Pressure 2000 psig+ **Previous Certification Dates** None

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	249 ppm	±1% NIST Traceable
Balance Gas: Nitrogen		

*Do not use when cylinder is less than 150 psig.
Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM2646	10-14-95	AAL18424	973 ppm C_3H_8 in N_2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
C_3H_8 Varian/VA3300/7945	10-02-95	FID

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

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Propane	Date: 10-02-95 Response Units: Area Z1=000000 R1=819263 T1=209100 R2=817615 Z2=000000 T2=208852 Z3=000000 T3=210115 R3=819464 Avg. Conc. of Cust. CyL 249 ppm		Concentration=A+Bx+Cx²+Dx³+Ex⁴ r=0.99999 Constants: A=0.0000E+00 B=0.0000E+00 C=0.0000E+00 D=0.0000E+00 E=0.0000E+00

Special Notes:

Analyst James T. Kraus

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD NOx

Client: Koppers
Location: Monessen PA Bag house
Run #'s: 24 probes x 3 days
Parameter: NOx
Operators: WK Tenziano

Proj #: 437
Date: 11/19/96
Inst. Supplier: CTI
Inst. Manufacturer: Shimadzu
Sys. Bias-Inst: 489 S.Train: 489
Response Time (sec.) 52 sec

DAY
RUN # 1 Start Time: 8:23 Stop Time: 14:37 Inst. Range: 0->1000 File:

11/19/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
Zero	000	-0.3	—	0.0	-0.3		
490	489	486	-0.04%				
262	259	258	-0.04%				
98.2	98	97	-0.01%	97	96		-0.01%
25.5	24	24	-0.02%	25	25		-0.01%

DAY
~~RUN #~~ 2 Start Time: 7:53 Stop Time: 14:13 Inst. Range: 0->1000 File: DAT12

11/19/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
Z.A	000	-0.3	—	000	-0.3		—
98.2	100	98	0%				
262	270	265	+0.3%				
25.5	27.1	25.0	-0.05%	28.2	25.4		+0.04%

DAY
~~RUN #~~ 3 Start Time: 7:36 Stop Time: 14:01 Inst. Range: 0->500 File:

11/20/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	000	0.4	—	000	-0.2		—
262	260	260	-0.2%				
98.2	98.0	98.0	-0.02%				
25.1	25.1	25.1	0%	26.1	26.1		+0.2%

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD

VOCs

Client: Koppers
Location: Monessen PA Bayhouse
Run #'s: 24 pushes x 3 days
Parameter: VOCs as Propane
Operators: WK Tenziano

Proj #: 937
Date: 11/18/96
Inst. Supplier: OTI
Inst. Manufacturer: JUM
Sys. Bias-Inst: 562 S.Train: 562
Response Time (sec.) 36 sec

DAY
~~RUN #~~ 1 Start Time: 8:13 Stop Time: 14:37 Inst. Range: 0->1000 File: DAT 11

11/18/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.00	0.00	—	0.00	-0.10		—
562	5.62	5.65	+0.3%				
~~562~~ 249	2.54	2.56	+0.7%				
85.7	0.92	0.93	+0.7%	0.88	0.88		-0.5%

DAY
~~RUN #~~ 2 Start Time: 7:53 Stop Time: 14:13 Inst. Range: 0->1000 File: DAT 12

11/19/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.00	0.00	—	-0.01	-0.01		—
85.9	0.86	0.87	+0.1%	0.86	0.87		0%
249	2.47	2.45	-0.1%				
562	5.53	5.56	-0.6%				
24.4	0.240	0.240	-0.04%	0.242	0.242		+0.02%

DAY
~~RUN #~~ 3 Start Time: 7:36 Stop Time: 14:01 Inst. Range: 0->1000 File: DAT 13

11/20/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.00	0.00	—	0.00	0.00		—
85.9	8.56	8.56	-0.3%				
24.4	2.42	2.42	-0.2%	~~24.7~~	2.48		-0.6%
~~249~~				24.7			

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD

CO

Client: Koppers
Location: McKeesport PA Boghouse
Run #'s: 24 Pushes x 5 days
Parameter: C.O
Operators: WMS Tanziano

Proj # 937
Date: 11/18/96
Inst. Supplier: CTI
Inst. Manufacturer: TECO 48C
Sys. Bias-Inst: 80.6 S.Train: 80.6
Response Time (sec.) 46 sec.

DAY RUN # 1 Start Time: 8:43 Stop Time: 14:37 Inst. Range: 0-1000 File: DAT 11

11/18/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	-0.02	-0.1	—	0.3	0.3		—
80.6	80.6	80.6	0%	81.0	81.0		+0.04%
25.3	24.9	24.9	-0.04%				
9.9	9.7	9.7	-0.02%				

DAY RUN # 2 Start Time: 7:53 Stop Time: 14:13 Inst. Range: 0-1000 File: DAT12

11/19/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.04	0.01	—	-0.04	-0.01		—
80.6	80.6	80.6	0%	81.0	81.0		+0.04%
25.3	25.1	25.1	-0.02%				
9.9	9.8	9.8	-0.01%				
279.2				286	287	+0.8%	~~+0.8%~~

DAY RUN # 3 Start Time: 7:16 Stop Time: 14:01 Inst. Range: 0-1000 File:

11/20/96

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.05	0.08	—	0.00	0.00		—
80.6	80.6	80.8	+0.02%	80.0	80.0		0.6%
25.3	24.9	24.9	-0.04%				
279.2	278	279	0%				

NOx

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD

Client: Koppers
Location: Monessen PA Comb Stack
Run #'s: 1, 2, 3
Parameter: NOx
Operators: W K Tanziano

Proj #: 937
Date: 11/21/96
Inst. Supplier: CTI
Inst. Manufacturer: Shim[illegible]
Sys. Bias-Inst: [illegible] S.Train: 489
Response Time (sec.) 52 sec

RUN # 1 Start Time: 9:00 Stop Time: 9:59 Inst. Range: 0 -> 500 File: DAT 19

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	[illegible]	[illegible]	—	000	0.0		—
490	[illegible]	489	-0.2%	484	484		-1.0%
262	[illegible]	256	-1.2%				
982	[illegible]	96	-0.4%				

RUN # 2 Start Time: 12:15 Stop Time: 12:14 Inst. Range: 0 -> 500 File: DAT 21

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	[illegible]	[illegible]		[illegible]	[illegible]		—
490	[illegible]	[illegible]		489	489		+1.0%

RUN # 3 Start Time: 15:00 Stop Time: 15:59 Inst. Range: 0 -> 500 File: DAT 22

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	[illegible]	0.0		000	0.0		—
490	[illegible]	489		484	484		-1.0%

VOCs

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD

Client: Koppers
Location: Monessen PA Coumb Stack
Run #'s: 1, 2, 3
Parameter: VOCs as Propane
Operators: WK Tenzinger

Proj #: 937
Date: 11/21/96
Inst. Supplier: OTI
Inst. Manufacturer: JUMO
Sys. Bias-Inst: [illegible] S.Train: 5.1
Response Time (sec.) 300 sec

RUN # 1 Start Time: 9:00 Stop Time: 9:59 Inst. Range: 0-2100 File: DAT 19

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.00	0.00	—	0.2	0.2		—
85.9	86.9	86.9					
24.4	25.11	25.4		24.6	24.6		-0.8%

RUN # 2 Start Time: 12:15 Stop Time: 13:14 Inst. Range: 0-2100 File: DAT 21

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.2	0.2		1.6	1.6		—
211.4	211.6	211.6		25.0	25.0		+0.4%

RUN # 3 Start Time: 15:00 Stop Time: 15:59 Inst. Range: 0-2100 File: DAT 22

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.0	0.0		1.0	1.0		—
211.4	25.0	25.0		23.4	23.4		-1.6%

CO

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD

Client: Kuppers
Location: Monessen PA Comb Stack
Run #'s: 1, 2, 3
Parameter: CO
Operators: L & Tenziano

Proj #: 437
Date: 11/21/96
Inst. Supplier: CTI
Inst. Manufacturer: TECO 48C
Sys. Bias-Inst: [illegible] S.Train: [illegible]
Response Time (sec.) 60 sec

RUN # 1 Start Time: 9:00 Stop Time: 9:59 Inst. Range: 0 -> 2000 File: DAT 19

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.9	[illegible]	—	-1.2	-1.2		—
279.2	279	[illegible]	0%	[illegible]	[illegible]		-0.1%
594	[illegible]	[illegible]	-0.45%				
25.5	24.6	23.9	-0.07%				

RUN # 2 Start Time: 12:15 Stop Time: 13:14 Inst. Range: 0 -> 2000 File: DAT 21

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	-0.8	-0.8		0.8	0.8		—
279.2	277	277		276	276		[illegible]
1515				1530	1530		

RUN # 3 Start Time: 15:00 Stop Time: 15:59 Inst. Range: 0 -> 2000 File: DAT 22

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.8	0.8		-0.8	-0.8		—
279.2	276	276		[illegible]	[illegible]		[illegible]

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD

NCx

Client: Koppers
Location: Monessen PA Comb Stack 2
Run #'s: 1, 2, 3
Parameter: NOx
Operators: WK Tenziano

Proj #: 437
Date: 11/21/96
Inst. Supplier: OTI
Inst. Manufacturer: Shimadzu
Sys. Bias-Inst: 490 S.Train: 499
Response Time (sec.) 57 sec

RUN # 1 Start Time: 8:20 Stop Time: 9:19 Inst. Range: 0->500 File: DAT 16

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	000	0.02	—	000	-0.1		—
490	499	489	-0.2%	499	489		0%
262	257	257	-1.0%				
98.2	96	96	-0.4%				

RUN # 2 Start Time: 11:41 Stop Time: 12:00 Inst. Range: 0->500 File: DAT 17

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	000	0.1		000	0.3		—
490	499	489		499	489		0%

RUN # 3 Start Time: 14:25 Stop Time: 15:25 Inst. Range: 0->500 File: DAT 18

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	000	0.0		002	0.4		—
490	499	489		491	491		+0.4%

VOCs

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD

Client: Koppers
Location: Monessen PA Comb Stack 2
Run #'s: 1, 2, 3
Parameter: VOCs as Propane
Operators: WAS Tanziana

Proj #: 937
Date: 11/21/96
Inst. Supplier: OTI
Inst. Manufacturer: JUM
Sys. Bias-Inst: 85 S.Train: 85
Response Time (sec.) 30 sec

RUN # 1 Start Time: 8:20 Stop Time: 9:19 Inst. Range: 0 -> 100 File: DAT7

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.00	0.01	—	0.00	0.00		—
24.4	2.43	24.2	-0.2%		22.8		-1.4%
85.9	86.6	86.6	+0.7%				

RUN # 2 Start Time: 11:01 Stop Time: 12:00 Inst. Range: 0 -> 100 File: DAT1

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	00.0	00.0		00.2	00.2		—
24.4	23.8	23.8		25.2	25.2		+1.4%
85.9							

RUN # 3 Start Time: 14:25 Stop Time: 15:24 Inst. Range: 0 -> 100 File: DAT18

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	-00.2	-00.2	—	-0.6	-0.6		—
24.4	25.2	25.2		24.8	24.8		-0.4%
85.9							

CO

OPTIMAL TECHNOLOGIES, INC.

SOURCE TESTING INSTRUMENT CALIBRATION RECORD

Client: Koppers
Location: Monessen PA Comb Stack 2
Run #'s: 1, 2, 3
Parameter: CO
Operators: WK Henziana

Proj #: 937
Date: 11/21/96
Inst. Supplier: OTI
Inst. Manufacturer: TECO 48C
Sys. Bias-Inst: 80.6 S.Train: 80.5
Response Time (sec.) 40 sec

RUN # 1 Start Time: 8:20 Stop Time: 9:19 Inst. Range: 0 -> 2000 File: DAT 16

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.3	0.0	—	0.3	0.0		—
80.6	80.3	80.6	0%	78.8	79.0		-0.08%
25.3	25.0	25.0	-0.02%				
279.2	277	278	-0.06%				

RUN # 2 Start Time: 11:01 Stop Time: 12:00 Inst. Range: 0 -> 2000 File: DAT 17

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.6	0.0		0.8	0.4		—
80.6	80.6	80.6		79.8	79.8		-0.4%

RUN # 3 Start Time: 14:25 Stop Time: 12.00 Inst. Range: 0 -> 2000 File: DAT 18

Cal. Gas Conc.	Pre-Test			Post-Test			% Drift
	Inst.	Logger	%Error	Inst.	Logger		
ZA	0.4	0.2		0.4	0.2		—
80.6	81.2	81.2		82.2	82.2		+0.5%
279.2	289	287	+0.5%				

Technician - Paul Jadlowiec

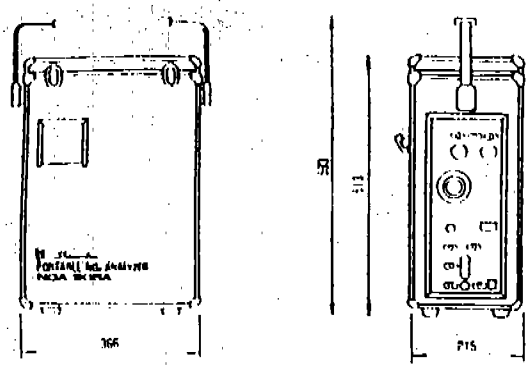
Date - November 15, 1996

NO To NO_2 Conversion Efficiency Test

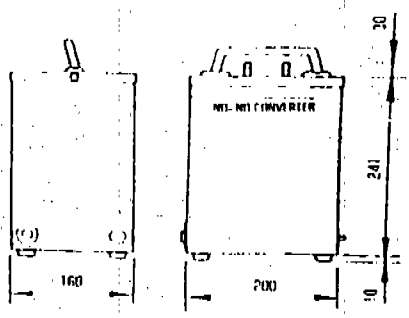
The 284 calibration gas was added to a clean 50 liter tedlar bag with zero air in an approximate 1 to 1 ratio. The bag was then attached to the analyzer and analysis data was collected for 30 minutes.

Time	PPM	Time	PPM
4:15	141	4:30	141
16	141	31	141
17	141	32	141
18	142	33	141
19	142	34	141
20	142	35	141
21	142	36	141
22	142	37	141
23	142	38	141
24	142	39	141
25	142	40	141
26	142	41	141
27	142	42	141
28	141	43	141
29	141	44	141

Dimensions



NOA-305A analyzer dimensions Unit: mm



NO_2-NO converter dimensions Unit: mm

Specifications

Principle: Atmospheric pressure chemiluminescence method

Measuring range: 0-50/100/250/500/1000/2000-10/250-10/5000-10 ppm of NO_x or 0-50/100/250/500/1000/2500-10 ppm of NO

Repeatability: Less than ±1% of full scale

Zero drift: Less than ±10 ppm/±5°C

Span drift: Less than ±2% of full scale/±5°C

Linearity: Better than ±2% of full scale

Response: Less than 1 minute for dead time plus 90% of final reading

Sampling rate: 2 ℓ/min

Recorder output: 0-1V D.C. (Not insulated)

Ambient conditions: 5-35°C

Power requirements: AC 100V, 110V, 115V, 120V, 127V, 220V, 230V, or 240V (±10%) as ordered 50 Hz or 60 Hz
About 280 VA in power consumption

Dimensions and weight:
NOA-305A main body: 366W×513D×215Hmm, 13.0 kg
NO_2-NO converter: 200W×241D×160Hmm, 4.0 kg

Sample Gas Conditions:
Dust: 0.1 g/Nm³ or less
SO_2: 1000 ppm or less
NH_3: 5 ppm or less
CO_2: 15 vol% or less
SO_3: 10 ppm or less
H_2O: 18 wt% or less
CO: 500 ppm or less
NO: 300 ppm or less
C_2H_4, HCl, Cl_2: Not contained

Note: Be sure to specify the line voltage and frequency in your area.

Standard Accessories

Description	Q'ty	Remarks
Electrical power cable	1	
Electrical signal cable	1	
Converter cable	1	Connects the main body to the converter
Fluoro-rubber tube	1	Connects the ozone deactivator
Fluoro-rubber tube	2	Connects the main body to the converter
Soft vinyl tube	1	Exhausts the drain

Necessary Items & Supplies (Spare parts kit)

(P/N 638-69049)

Description	P/N	Q'ty	Remarks
Dehumidifier (silica gel)	017-40424	1	500g
Ozone deactivator catalyst	638-65232	1	300g
Filter element	630-02514	1	1 box
Air filter	630-02148	1	
Mist absorber element	630-00705-02	1	200mℓ
Fluoro-rubber tube, 7mm ID, 10mm OD	631-41200-04	1	1m
Fluoro-rubber tube, 9mm ID, 12mm OD	631-41200-06	1	1m
Soft vinyl tube, 7mm ID, 10mm OD	630-00315-07	1	2m

These items are available as a set. Please place an order for this set, together with the main body.
When placing an order for consumption items, please let us know their part numbers.

SHIMADZU

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The contents of this catalog are subject to change without notice.

APPENDIX E

BY PRODUCT COKE I
CHARGING & PUSH

DATE 11 - 18 19 92

TURN 1

	OVEN NO.	TIME SCHED.	TIME PUSHED	TIME CHARGED	POUNDS COAL CHARGED	AMPERES START	AMPERES PUSH		OVEN NO.
		SPILLAGE						31	
B	5	EMPTY		7:41				32	
C	5	EMPTY		58		N		33	
A 1	7	7:38	7:38	8:35		O		34	
C 2	7	55	55	47				35	
B 3	9	8:13	8:25	9:10		A		36	
C 4	9	36	55	23		M		37	
A 5	11	47	9:05	36		P		38	
C 6	11	9:04	20	51				39	
B 7	13	22	33	10:03				40	
C 8	13	39	48	43		M		41	
B 9	15	56	10:00	54		E		42	
C 10	15	10:13	40	11:16		T		43	
B 11	17	31	51	29		E		44	
C 12	17	48	11:13	41		R		45	
A 13	19	11:05	26	52				46	
C 14	19	22	38	12:25				47	
B 15	21	46	49	15				48	
C 16	21	57	12:02	1:03				49	
B 17	23	12:14	12	15				50	
C 18	23	44	1:00	26				51	
C 19	25	1:02	12	38				52	
C 20	25	19	23	49				53	
B 21	27	36	35	2:00				54	
C 22	27	53	46	11				55	
B 23	29	2:11	57	23				56	
B 24	2	28	2:08	45				57	
C 25	2	45	20	58				58	
B 26	4	3:02	42					59	
C 27	4	20	55					60	
28								61	
29								62	

BY PRODUCT COKE DE

CHARGING & PUSHIN

DATE 11 19 19 96

TURN 1

27

	OVEN NO.	TIME SCHED.	TIME PUSHED	TIME CHARGED	POUNDS COAL CHARGED	AMPERES START	AMPERES PUSH		OVEN NO.
		SPILLAGE						31	
B	4	EMPTY		7:58				32	
C	4	EMPTY		8:15				33	
B1	6	7:38	7:52	35		170	90	34	
C2	6	55	8:12	55		140	90	35	
B3	8	8:13	28	9:12		130	90	36	
C4	8	30	50	26		120	80	37	
B5	10	47	9:07	38		140	90	38	
C6	10	9 04	23	48		130	90	39	
B7	12	22	35	59		130	100	40	
C8	12	39	45	10:08		130	90	41	
B9	14	56	56	11:00		150	85	42	
C10	14	10:13	10:06	10		140	100	43	
B11	16	31	11:06	35		130	80	44	
C12	16	48	30	45		130	80	45	
B13	18	11:05	40	53		130	80	46	
C14	18	22	50	12:03		130	90	47	
B15	20	40	12:00	13		130	85	48	
C16	20	57	10	1:02		140	90	49	
B17	22	12:14	20	12		140	90	50	
C18	22	44	1:07	22		130	100	51	
B19	24	1:02	17	32		140	90	52	
C20	24	19	28	42		140	100	53	
B21	26	36	39	52		140	85	54	
C22	26	52	50	2:05		160	110	55	
B23	28	2:11	2:02	15		120	80	56	
B24	1	28	12	40		200	90	57	
C25	1	45	25	50		130	80	58	
B26	3	3:02	37			130	80	59	
C27	3	20	47			135	90	60	
28								61	
29								62	

ARD

BY PRODUCT COI

CHARGING & PI

DATE 11-20-19 96

TURN -1-

	OVEN NO.	TIME SCHED.	TIME PUSHED	TIME CHARGED	POUNDS COAL CHARGED	AMPERES START	AMPERES PUSH	
		SPILLAGE						31
B	26	EMPTY		7:40				32
C	26	EMPTY		51				33
B_1	28	7:38	7:37	8:00		120	80	34
B_2	1	55	48	15		200	90	35
C_3	1	8:13	8:00	35		120	80	36
B_4	3	30	1=	45		110	80	37
C_5	3	47	28	57		130	90	38
B_6	5	9:04	42	9:08		130	80	39
C_7	5	22	54	18		140	100	40
B_8	7	39	9:05	30		130	90	41
C_9	7	56	15	10:34		120	85	42
B_{10}	9	10:13	27	45		120	85	43
C_{11}	9	31	10:31	55		110	80	44
B_{12}	11	45	42	11:05		120	80	45
C_{13}	11	11:05	52	17		125	90	46
B_{14}	13	22	11:02	29		120	90	47
C_{15}	13	40	14	41		125	90	48
B_{16}	15	57	26	53		130	90	49
C_{17}	15	12:19	38	1:05		130	90	50
B_{18}	17	44	50	19		130	90	51
C_{19}	17	1:02	1:02	30		120	100	52
B_{20}	19	19	16	41		120	80	53
C_{21}	19	36	27	52		120	90	54
B_{22}	21	53	38	2:05		120	80	55
C_{23}	21	2:11	49	17		120	90	56
B_{24}	23	28	2:02	28		140	90	57
C_{25}	23	45	14	55		120	90	58
B_{26}	25	3:02	6:30	7:00				59
C_{27}	25	20	52					60
28								61
29								62
30								63

BY PRODUC

CHARGIN

DATE 11-21-96

TURN 3-1-

	OVEN NO.	TIME SCHED.	TIME PUSHED	TIME CHARGED	POUNDS COAL CHARGED	AMPERES START	AMPERES PUSI
		SPILLAGE					
B	23	EMPTY		7:56			
C	23	EMPTY		8.14			
B_1	25	7:38	9:07	9:44		[illegible]	90
C_2	25	55	7:49	8:51		150	45
B_3	27	8:13	8:09	8:37		145	95
C_4	27	50	26	9:28		120	80
B_5	29	47	45	43		130	80
B_6	2	9:04	9:24	54		[illegible]	85
C_7	2	22	39	10:06		150	80
B_8	4	39	50	11:00		140	85
C_9	4	56	10:02	11:15		135	85
B_{10}	6	10:13	11:05	25		140	90
C_{11}	6	31	11:10	35		140	90
B_{12}	8	48	11:20	50		135	85
C_{13}	8	11:05	30	12:00		120	[illegible]
B_{14}	10	22	45	12:10		130	[illegible]
C_{15}	10	40	55	25		[illegible]	[illegible]
B_{16}	12	[illegible]	12:05	40		135	85
C_{17}	12	[illegible]	20	45		105	90
B_{18}	14	[illegible]	35	55		130	80
C_{19}	14	1:02	1:40	2:05			
B_{20}	16	19	50	45			
C_{21}	16	34	2:00	3:05			
B_{22}	18	53	2:55				
C_{23}	18	2:11	3:00				
B_{24}	20	28					
C_{25}	20	45					
B_{26}	22	3:02					
C_{27}	22	20					
28							
29							

DATE 11-21 19 96

BY PRODUCT

CHARGING

TURN -2-

	OVEN NO.	TIME SCHED.	TIME PUSHED	TIME CHARGED	POUNDS COAL CHARGED	AMPERES START	AMPERES PUSH
		SPILLAGE					
B	18	EMPTY		3:39			
C	18	EMPTY		56			
R1	20	3:36	3:26	4:12			
C2	20	53	53	29			
R3	22	4:09	4:09	46			
C4	22	26	26	5:03			
R5	24	43	43	13			
C6	24	5:00	5:00	24			
B7	26	16	10	33			
C8	26	33	21	6:04			
R9	28	50	30	26			
R10	1	6:06	6:06	43			
C11	1	23	23	59			
R12	3	40	40	7:15			
C13	3	57	56	27			
B14	5	7:13	7:12	35			
C15	5	30	24	45			
R16	7	46	32	56			
C17	7	9:03	42	8:06			
R18	9	20	53	9:09			
C19	9	50	8:03	25			
R20	11	9:06	9:06	34			
C21	11	22	22	43			
B22	13	39	31	56			
C23	13	56	40	10:06			
R24	15	10:13	53	40			
C25	15	30	10:03	48			
R26	17	47	37	11:03		130	85
C27	17	11:04	45			130	95
B28	19	21	11:00			125	85
29							
30							

[redacted]

DATE 11-21 19 96

TURN -1-

BY PRODUCT COKE

CHARGING & PUSH

	OVEN NO.	TIME SCHED.	TIME PUSHED	TIME CHARGED	POUNDS COAL CHARGED	AMPERES START	AMPERES PUSH		OVEN NO.
		SPILLAGE						31	
B	18	EMPTY		7:40				32	
C	18	EMPTY		8:00				33	
B1	20	7:36	7:38	18		145	90	34	
C2	20	53	58	38		160	100	35	
B3	22	8:09	8:16	56		160	95	36	
C4	22	22	36	9:15		160	100	37	
B5	24	43	54	26		130	90	38	
C6	24	9:00	9:13	39		150	100	39	
B7	26	16	:24	48		145	90	40	
C8	26	33	37	58		170	105	41	
B9	28	50	46	10:10		150	100	42	
B10	1	10:06	56	45		210	95	43	
C11	1	[illegible]	10:08	11:05		135	90	44	
B12	3	40	54	16				[illegible]	
C13	3	57	11:03	26				[illegible]	
B14	5	11:13	14	36				[illegible]	
C15	5	30	24	46				[illegible]	
B16	7	46	34	56				[illegible]	
C17	7	12:03	44	12:07				50	
B18	9	20	54	1:18				51	
C19	9	50	12:05	29				52	
B20	11	1:06	1:11	40				53	
C21	11	22	27	50				54	
B22	13	39	38	2:02				55	
C23	13	56	48	12				56	
B24	15	2:13	2:00	22				57	
C25	15	30	10	32				58	
B26	17	47	20	42				59	
C27	17	8:04	30					60	
B28	19	21	40					61	
29								62	
30								63	

BY PRODUCT COI

CHARGING & PU

DATE 11-22 19 96

TURN 2

28

	OVEN NO.	TIME SCHED.	TIME PUSHED	TIME CHARGED	POUNDS COAL CHARGED	AMPERES START	AMPERES PUSH	
		SPILLAGE						31
C	17	EMPTY		3:37				32
B	19	EMPTY		52				33
C 1	19	3:36	3:43	4:06				34
B 2	21	53	53	15				35
C 3	21	4:09	4:03	27				36
B 4	23	26	12	51				37
C 5	23	43	24	5:01				38
B 6	25	5:00	48	11				39
C 7	25	16	58	21				40
B 8	27	33	5:08	31				41
C 9	27	50	18	4:24				42
B 10	29	6:06	28	46				43
B 11	2	23	6:33	7:43				44
C 12	2	40	43	55				[redacted]
B 13	4	57	7:30	8:06				[redacted]
C 14	4	7:13	52	19				[redacted]
B 15	6	30	8:03	27				[redacted]
C 16	6	46	15	33				[redacted]
B 17	8	8:03	24	41				50
C 18	8	20	30	49				51
B 19	10	50	39	9:33				52
C 20	10	9:06	16	46				53
B 21	12	22	9:50	58				54
C 22	12	39	43	10:06				55
B 23	14	26	55	15				56
C 24	14	10:13	10:03	33				57
B 25	16	30	43	47				58
C 26	16	47	32	55				59
B 27	18	11:04	44					60
C 28	18	21	—					61
29				[redacted]	[redacted]			62
30								ARD