APPENDIX K

OEPA STACK TEST REVIEW SUMMARY FORM

APPLICATION NUMBER 08-57-19-05-84 P003/P004
FACILITY NAME Metal Shredders, Inc
SOURCE DESCRIPTION (OR SCC CODE)
Ferrous/Non-ferrous metal handling
CONTROL EQUIPMENT Cyclone

DATE(S) OF TEST 9-19-91
FINAL TEST REPORT RECEIVED ON 9-30-91
POLLUTANT(S) TESTED PM
TEST METHOD Method 5
TEST FIRM Total Source Analysis Inc
EMISSION RATES*:
ACTUAL (lb(s)/hr) 1.64 lb/hr ALLOWABLE** 5.86 lb/hr
OPERATING RATES*:
DURING TEST** 153,333 lb MAXIMUM** 160 000 lb
EMISSION FACTOR***
COMMENTS:

I HEREBY VERIFY THAT THE INFORMATION CONTAINED WITHIN THE STACK TEST REPORT HAS BEEN REVIEWED AND IT HAS BEEN DETERMINED THAT THE TEST PROCEDURES, ANALYSES AND CALCULATIONS ARE:

[X] AN ACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

[ ] AN UNACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

10-15-91
DATE OF REVIEW

Jon Hilty
REVIEWED BY

* BASED ON 3 RUN AVERAGE
** SPECIFY APPLICABLE UNITS
***SPECIFY IN UNITS OF MASS/INPUT

APPENDIX K

OEPA STACK TEST REVIEW SUMMARY FORM

APPLICATION NUMBER 08-07190584 P002

FACILITY NAME Metal Shredders Inc

SOURCE DESCRIPTION (OR SCC CODE)

"Z" - Box Separator

CONTROL EQUIPMENT Cyclone

DATE(S) OF TEST 9-19-91

FINAL TEST REPORT RECEIVED ON 9-30-91

POLLUTANT(S) TESTED PM

TEST METHOD Method 5

TEST FIRM Total Source Analysis Inc

EMISSION RATES*:

ACTUAL (lb(s)/hr) 0.73 lb/hr ALLOWABLE** 2.83 lb/hr

OPERATING RATES*:

DURING TEST** 153,333 lb MAXIMUM** 160,000 lb

EMISSION FACTOR***

COMMENTS:

I HEREBY VERIFY THAT THE INFORMATION CONTAINED WITHIN THE STACK TEST REPORT HAS BEEN REVIEWED AND IT HAS BEEN DETERMINED THAT THE TEST PROCEDURES, ANALYSES AND CALCULATIONS ARE:

[X] AN ACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

[ ] AN UNACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

10-15-91

DATE OF REVIEW

Jon Hutty

REVIEWED BY

* BASED ON 3 RUN AVERAGE

** SPECIFY APPLICABLE UNITS

***SPECIFY IN UNITS OF MASS/INPUT

APPENDIX K

OEPA STACK TEST REVIEW SUMMARY FORM

APPLICATION NUMBER 08-571902-84 P001

FACILITY NAME Metal Shredders, Inc.

SOURCE DESCRIPTION (OR SCC CODE)

Automobile Shredder

CONTROL EQUIPMENT Scrubber

DATE(S) OF TEST 9-19-91

FINAL TEST REPORT RECEIVED ON 9-30-91

POLLUTANT(S) TESTED PM

TEST METHOD Method 5

TEST FIRM Total Source Analysis, Inc.

EMISSION RATES*:

ACTUAL (lb(s)/hr) 2.04 lb/hr ALLOWABLE** 9.26 lb/hr

OPERATING RATES*:

DURING TEST** 153,333 lb MAXIMUM** 160,000 lb

EMISSION FACTOR***

COMMENTS:

I HEREBY VERIFY THAT THE INFORMATION CONTAINED WITHIN THE STACK TEST REPORT HAS BEEN REVIEWED AND IT HAS BEEN DETERMINED THAT THE TEST PROCEDURES, ANALYSES AND CALCULATIONS ARE:

[X] AN ACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

[ ] AN UNACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

10-15-91

DATE OF REVIEW

Jon Huitz

REVIEWED BY

* BASED ON 3 RUN AVERAGE

** SPECIFY APPLICABLE UNITS

***SPECIFY IN UNITS OF MASS/INPUT

INVESTIGATIVE TEST REPORT FOR METAL SHREDDERS, INC. WEST CARROLLTON, OHIO

September 19, 1991

91-172-OH

TOTAL SOURCE ANALYSIS, INC.
ENVIRONMENTAL TESTING CONSULTANTS
Services Worldwide

I, Tim Renner, hereby certify that the emissions tests conducted at Metal Shredders, Inc. are in accordance with procedures established by the USEPA. This report accurately and faithfully presents the data obtained from the tests and the results determined from analysis of ~~this~~ these data.

Timothy A Renner

Tim Renner
Crew Chief

I, Bruce Woods, Jr., hereby attest that all work on this project was completed under my supervision and this report accurately presents the emissions from the unit.

Bruce Woods

Bruce Woods Jr.
Chief Test Engineer

139 W. Herrick • P.O. Box 257 • Wellington, OH 44090 • (216) 647-4444 • FAX (216) 647-5288
41444 Hwy. 19 N. • P.O. Box 2807 • Umatilla, FL 32784 • (904) 669-3113 • FAX (904) 669-1965
599 James Rollo Ct. • P.O. Box 272 • Grain Valley, MO 64029 • (816) 224-6905 • FAX (816) 443-2515

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INTRODUCTION

This report presents the final results of the emissions tests performed for Metal Shredders, Inc.

The emissions testing was performed by Total Source Analysis, Inc., whose main office is located at 139 W. Herrick, Wellington, Ohio.

The tests were performed on September 19, 1991. The testing was performed in accordance with EPA reference methods as published in the July 1, 1990 Federal Register, - "Standards of Performance for New Stationary Sources" and subsequent revisions.

The testing equipment and sampling procedures are described in Section III of this report. The raw field data and equations used in determining final results are presented in the Appendix.

SUMMARY OF TEST RESULTS

The following table presents the final results of the emissions tests performed at Metal Shredders, Inc.

PARTICULATE

* RUN #	LOCATION	LB/DSCF	LBS/HR	GRS/DSCF
1	Mill Sys Scrub Out	8.27E-07	2.25	5.79E-03
** 2	Mill Sys Scrub Out	3.31E-07	.89	2.32E-03
3	Mill Sys Scrub Out	6.76E-07	1.83	4.73E-03
AVG.		7.52E-07	2.04	5.26E-03
1	Z Box Sys Cyclone Out	1.31E-06	1.06	9.21E-03
2	Z Box Sys Cyclone Out	6.05E-07	.48	4.23E-03
3	Z Box Sys Cyclone Out	8.22E-07	.65	5.75E-03
AVG.		9.00E-07	.73	6.40E-03
1	#4 Sys Cyclone Out	1.20E-06	1.67	8.41E-03
2	#4 Sys Cyclone Out	4.32E-07	.59	3.02E-03
3	#4 Sys Cyclone Out	1.93E-06	2.65	1.35E-02
AVG.		1.20E-06	1.64	8.31E-03

VISIBLE EMISSIONS

RUN #	LOCATION	% OPACITY
1	Mill Sys Scrubber Out	1.979%
2	Mill Sys Scrubber Out	1.313%
3	Mill Sys Scrubber Out	0.688%
1	Z Box Sys Cyclone Out	0%
2	Z Box Sys Cyclone Out	0%
3	Z Box Sys Cyclone Out	0%
1	#4 Sys Cyclone Outlet	0%
2	#4 Sys Cyclone Outlet	0%
3	#4 Sys Cyclone Outlet	0%

The count of the cars charged was obtained from the operator to obtain the number of cars processed.

Run #1 - 59 cars (147,500)
Run #2 - 61 cars (152,500)
Run #3 - 64 cars (160,000)

* Due to the danger of explosion at the test sites, one average sample point was sampled from each stack for sixty minutes per sample.

** This run not calculated in average.

The complete results can be found on the computer printouts following.

Total Source Analysis, Inc.
Particulate Test Analysis

METAL SHREDDERS
WEST CARROLLTON, OHIO
PEDCON
91-172

		1	2	3
Run Number		(01)	(02)	(03)
Data set				
Date		9-19-91	9-19-91	9-19-91
Location		MILL SYSTM SCRUB OUT	MILL SYSTM SCRUB OUT	MILL SYSTM SCRUB OUT
Start time				
Barometric Pressure	In. Hg	29.95	29.95	29.95
Static Pressure	In. H2O	-0.85	-0.85	-0.85
Volume of Condensate	Mls	33	36	25
Volume Sampled	DCF	81.665	108.023	83.102
Meter Correction Factor		1.01	1.01	1.01
Square Root of Delta P		0.911	0.911	0.911
Orifice Pressure	In. H2O	1.03	1.03	1.03
Meter Temperature	Deg. F	69	83	81
Flue Temperature	Deg. F	65	69	69
Percent CO2	%	0.00	0.00	0.00
Percent O2	%	20.90	20.90	20.90
Diameter of Nozzle	In	0.309	0.309	0.309
Area of Flue	Sq Ft	15.90	15.90	15.90
Sample Time	Min	60	60	60
Weight Gain	Grams	0.0310	0.0160	0.0252
Absolute Flue Pressure	In. Hg	29.89	29.89	29.89
Corrected Sample Volume	DSCF	82.58	106.42	82.17
Moisture in Flue Gas	%	1.8	1.6	1.4
Molecular Weight	Lb/LbMole	28.64	28.67	28.68
Velocity of Flue Gas	FpS	48.19	48.35	48.33
Volume of Flue Gas	ACFM	45,972	46,122	46,108
Volume of Flue Gas	DSCFM	45,313	45,245	45,304
Dust Concentration	Lb/DSCF	8.27E-07	3.31E-07	6.76E-07
Dust Concentration	Lbs/Hour	2.25	.89	1.83
Dust Concentration	Grs/ACF	5.76E-03	2.30E-03	4.67E-03
Dust Concentration	Grs/DSCF	5.79E-03	2.32E-03	4.73E-03
Isokinetic Rate	%	92.6	119.5	92.2

Averages:

Stack Temperature		67.7			
Vol Flue Gas	ACFM	46,067	Percent O2		20.9
	DSCFM				45,287
Part Emis	Lb/DSCF	6.11E-07		Lb/Hour	1.66
	Grs/ACF	4.25E-03		Grs/DSCF	4.28E-03
	Lbs/MBtu	0			

Total Source Analysis, Inc.
Particulate Test Analysis

METAL SHREDDERS
WEST CARROLLTON, OHIO
PEDCON
91-172

		1	2	3
Run Number				
Data set		(04)	(05)	(06)
Date		9-19-91	9-19-91	9-19-91
Location		Z BOX SYST YCLON OUT	Z BOX SYST CYCLON OUT	Z BOX SYST CYCLON OUT
Start time				
Barometric Pressure	In. Hg	29.95	29.95	29.95
Static Pressure	In. H2O	-0.34	-0.34	-0.34
Volume of Condensate	Mls	14	14	16
Volume Sampled	DCF	53.845	53.539	54.524
Meter Correction Factor		1.01	1.01	1.01
Square Root of Delta P		0.854	0.854	0.854
Orifice Pressure	In. H2O	3.58	3.64	3.64
Meter Temperature	Deg. F	55	64	64
Flue Temperature	Deg. F	72	77	77
Percent CO2	%	0.00	0.00	0.00
Percent O2	%	20.90	20.90	20.90
Diameter of Nozzle	In	0.255	0.255	0.255
Area of Flue	Sq Ft	5.03	5.03	5.03
Sample Time	Min	60	60	60
Weight Gain	Grams	0.0336	0.0151	0.0209
Absolute Flue Pressure	In. Hg	29.93	29.93	29.93
Corrected Sample Volume	DSCF	56.28	55.01	56.02
Moisture in Flue Gas	%	1.2	1.2	1.3
Molecular Weight	Lb/LbMole	28.71	28.71	28.69
Velocity of Flue Gas	FpS	45.39	45.60	45.61
Volume of Flue Gas	ACFM	13,697	13,762	13,766
Volume of Flue Gas	DSCFM	13,434	13,368	13,352
Dust Concentration	Lb/DSCF	1.31E-06	6.05E-07	8.22E-07
Dust Concentration	Lbs/Hour	1.06	.48	.65
Dust Concentration	Grs/ACF	9.11E-03	4.15E-03	5.65E-03
Dust Concentration	Grs/DSCF	9.21E-03	4.23E-03	5.75E-03
Isokinetic Rate	%	98.9	97.1	99.0

Averages:

Stack Temperature	:	75.3	Percent O2	:	20.9
Vol Flue Gas ACFM	:	13,742	DSCFM	:	13,385
Part Emis Lb/DSCF	:	9.14E-07	Lb/Hour	:	.73
Grs/ACF	:	6.31E-03	Grs/DSCF	:	6.4E-03
Lbs/MBtu	:	0			

Total Source Analysis, Inc.
Particulate Test Analysis

METAL SHREDDERS
WEST CARROLLTON, OHIO
PEDCON
91-172

Run Number		1	2	3
Data set		(07)	(08)	(09)
Date		9-19-91	9-19-91	9-19-91
Location		4 SYSTEM CYCLONE	4 SYSTEM CYCLONE	4 SYSTEM CYCLONE
Start time				
Barometric Pressure	In. Hg	29.95	29.95	29.95
Static Pressure	In. H2O	-0.95	-0.95	-0.95
Volume of Condensate	Mls	17	15	25
Volume Sampled	DCF	67.444	71.573	70.039
Meter Correction Factor		0.97	0.97	0.97
Square Root of Delta P		1.158	1.158	1.158
Orifice Pressure	In. H2O	4.85	4.85	4.85
Meter Temperature	Deg. F	64	79	85
Flue Temperature	Deg. F	70	81	79
Percent CO2	%	0.00	0.00	0.00
Percent O2	%	20.90	20.90	20.90
Diameter of Nozzle	In	0.248	0.248	0.248
Area of Flue	Sq Ft	6.40	6.40	6.40
Sample Time	Min	60	60	60
Weight Gain	Grams	0.0364	0.0135	0.0584
Absolute Flue Pressure	In. Hg	29.88	29.88	29.88
Corrected Sample Volume	DSCF	66.75	68.86	66.64
Moisture in Flue Gas	%	1.2	1.0	1.7
Molecular Weight	Lb/LbMole	28.71	28.73	28.65
Velocity of Flue Gas	FpS	61.48	62.09	62.06
Volume of Flue Gas	ACFM	23,606	23,843	23,831
Volume of Flue Gas	DSCFM	23,198	22,993	22,899
Dust Concentration	Lb/DSCF	1.20E-06	4.32E-07	1.93E-06
Dust Concentration	Lbs/Hour	1.67	.59	2.65
Dust Concentration	Grs/ACF	8.34E-03	2.93E-03	1.31E-02
Dust Concentration	Grs/DSCF	8.41E-03	3.02E-03	1.35E-02
Isokinetic Rate	%	91.3	95.1	92.4

Averages:

Stack Temperature	:	76.7	Percent O2	:	20.9
Vol Flue Gas ACFM	:	23,760	DSCFM	:	23,030
Part Emis Lb/DSCF	:	1.18E-06	Lb/Hour	:	1.64
Grs/ACF	:	8.15E-03	Grs/DSCF	:	8.32E-03
Lbs/MBtu	:	0			

TESTING EQUIPMENT - EPA METHOD 5 SAMPLING TRAIN

A Aerotherm Corporation Stack Sampler was used at the sampling location(s) (Figure A-1). The particulate sampling train consisted basically of a glass or stainless steel probe; a variable-heat-controlled filter oven with a calibrated Type K (Chromel/Alumel) thermocouple located at the impinger outlet; a 1/2-hp shaft sealed carbon vane vacuum pump assembly with a vacuum gauge; a control unit with an elapse time indicator, a temperature selector switch, a temperature indicator (potentiometer), temperature controllers, gauges, a calibrated dry gas meter, and an umbilical and various interconnecting hoses, fitting and valves. An appropriately sized glass or stainless-steel nozzle, a calibrated Type K temperature sensor, a static pressure tube, a calibrated S type pitot tube and a variable-heat-controlled stainless-steel liner with a calibrated Type K (Chromel/Alumel) thermocouple are integral parts of the probe assembly.

The vacuum pump was used to control gas sampling rates. The control unit was used to control probe and oven temperatures. The control unit was also used to monitor elapsed sampling times, temperatures, velocities, static pressure, gas sampling rates and sampled gas volume.

Analyzer (Orsat)

Flue gas concentrations were determined with a Gas Analyzer (Orsat) which measures the percentage of carbon dioxide, percentage of oxygen and percentage of carbon monoxide to the nearest tenth of a percent.

Programmable Calculator

A Hewlett Packard, Model 32S, programmable calculator was used to determine the isokinetic sampling rate at each sampling point.

Prior to the field testing, the following procedures were performed: All instruments were checked and calibrated. Gelman Spectro Grade, glass-fiber-mat filters with 99.95 percent retention of 0.3-micron particles were individually numbered, placed in similarly numbered glass petri dishes, desiccated for 24 hours and weighed on a Sartorious analytical balance to the nearest 0.1-milligram, and weighed a minimum of every six hours until two consecutive weights within +0.5 milligram were obtained, or heated for two to three hours at 220 degrees F, cooled in a desiccator and weighed. Several 250 milliliter crucibles were desiccated for a minimum of 24 hours and weighed in the same manner as the filters and petri dishes. Also, several 200-gram quantities of Type 6-16 mesh indicating silica gel were weighed on an Ohaus beam balance and placed into separate airtight polypropylene storage bottles.

The number of sampling points and positions of the points in the flue at the sampling location(s), and the sampling time at each point were determined prior to the particulate testing. The sampling procedures were performed in accordance with the Environmental Protection Agency's Reference Method 5, "Determination of Particulate Emissions from Stationary Sources" in the July 1, 1990 Code of the Federal Register, "Standards of Performance for New Stationary Sources" and subsequent revisions.

Before each test run a particulate sampling train was prepared inpart at the sampling location(s) in the following manner: An appropriately sized sampling nozzle was installed onto the inlet of the sampling probe and capped. The probe was then dimensioned and marked with glass-cloth tape at increments that corresponded with the predetermined sampling positions in the flue. A standard impinger assembly was prepared by adding 250 milliliters of distilled water to each of the first two impingers. The third impinger was left dry and the fourth was filled with approximately 400 grams of type 6-16 mesh indicating silica gel. The entire impinger assembly was then placed in an ice bath. A disc filter was removed from its petri dish and placed inside of a filter holder. The filter holder was then placed inside of a filter oven and assembled to the sampling probe outlet and the impinger unit inlet. Next, an umbilical and sampling hoses were connected to the sampling probe, filter oven, impinger unit, a vacuum pump and the control unit, accordingly. The probe and oven were then heated to and held at 248 degrees F plus of minus 25 degrees.

As soon as the probe and oven temperatures had stabilized the entire sampling train assembly was leak-checked at a minimum of 15 inches of mercury vacuum for one minute and the leakage rate recorded. A leakage rate of less than .02 cfm and no vacuum loss was considered acceptable.

After the particulate sampling train had been assembled, the probe and oven heated, and the entire system leak-checked, as previously described, the particulate sampling was performed.

Three test runs were performed at the sampling location(s). The sampling data for each test run was recorded on a field test form during each of the sampling periods.

After the completion of a test run, the following procedures were performed: A final leak-check was performed at maximum vacuum or greater incurred during the test for one minute and the leakage rate recorded. The flue gas moisture collected in the first three impingers was measured and recorded. The moisture laden silica gel in the fourth impinger was transferred to an appropriately marked, airtight polypropylene bottle and retained for later weighing. The weight gain of the silica gel moisture collection was added to the measured moisture condensed for that test run. The sample nozzle, probe and filter holder were capped and taken to a clean area for sample recovery. At the recovery area, the disc filter was carefully removed from the filter

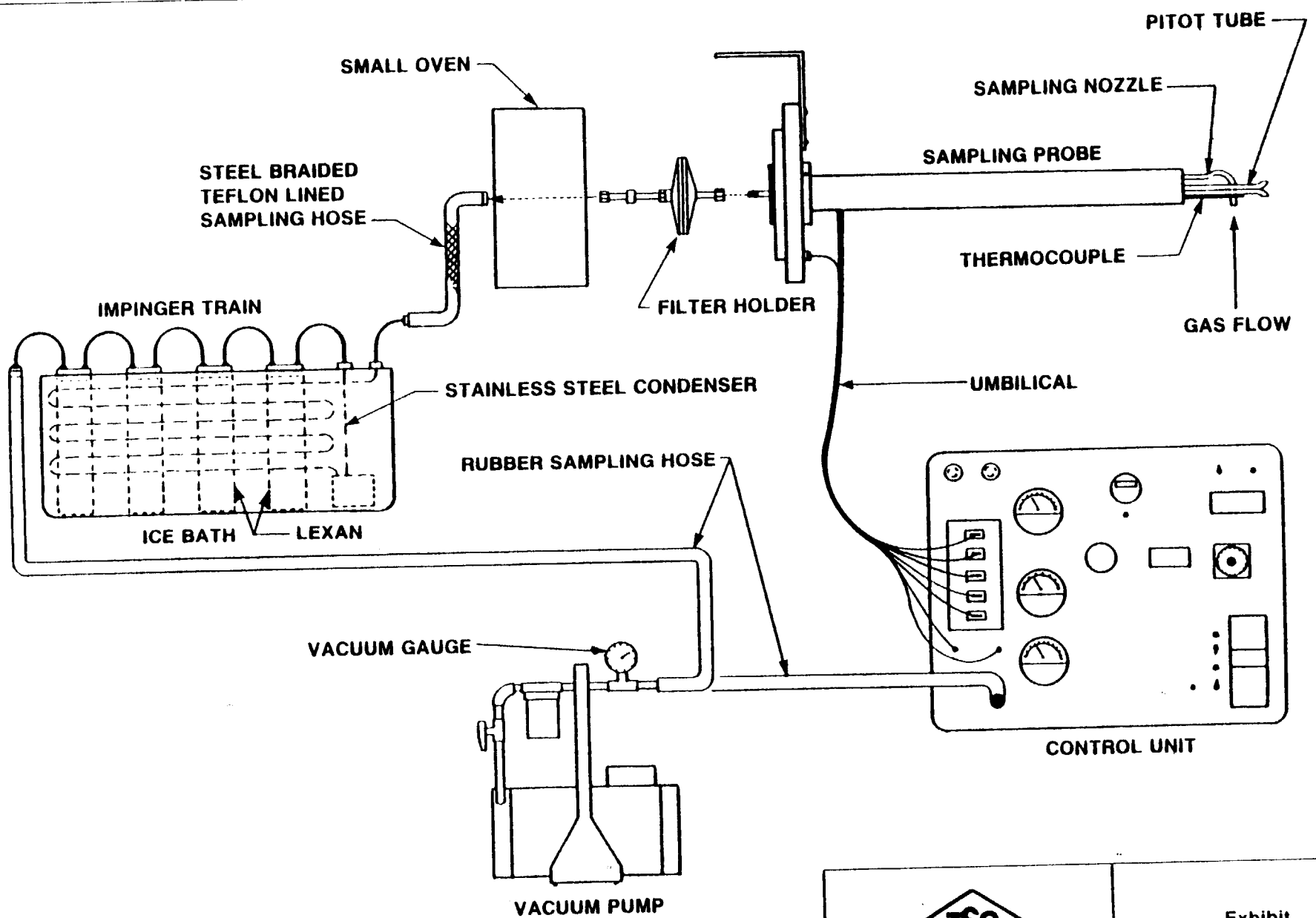
holder and transferred to its petri dish for later weighing. The sampling nozzle, probe and filter holder were washed with nanograde acetone, glass components were washed three times, stainless steel components were washed six times and visually inspected for cleanliness. The acetone washing and acetone blank were collected and labeled polypropylene sample bottles and retained for later evaporation, desiccation and weighing.

Flue gas concentrations (percentage of CO_2, percentage of O_2, and percentage of CO) were determined by taking several Orsat samples of the gas collected, simultaneously with the particulate sampling, throughout the test run, by an integrated gas sampling train. The integrated gas sample was collected from the discharge of the particulate control unit. The sampling train was set at a predetermined constant flow rate to obtain an adequate sample or by taking direct readings from the sampling points. The concentrations for each test run were recorded on a field test form.

ANALYTICAL PROCEDURES - EPA REFERENCE METHOD 5 (PARTICULATE)

After the field testing was completed, the following procedures were performed: Each silica gel moisture collection was weighed in its storage bottle on an Ohaus beam balance with sensitivity of 0.1-gram. Each disc filter and petri dish was oven dried at 220 degrees Fahrenheit for two to three hours and cooled in a dessicator for two hours before weighing. Each acetone washing and acetone blank was transferred from its sample bottle to a preweighed crucible for evaporation. When the acetone in a crucible had completely evaporated, the crucible was transferred to a desiccator for further drying at room temperature. Each acetone blank collected was used to determine the amount of residual weight each crucible retained due to acetone impurities. Each disc filter and petri dish, acetone washing and acetone blank was weighed on a Sartorious analytical balance with a sensitivity of 0.1-milligram.

All test instruments were recalibrated to determine the deviation percentage.



Total Source Analysis, Inc.
Environmental Testing Consultants

Exhibit

AEROTHERM
SAMPLING TRAIN

METHOD 9 - VISUAL DETERMINATION OF OPACITY OF EMISSIONS FROM STATIONARY SOURCES

Many stationary sources discharge visible emissions into the atmosphere; these emissions are usually plume shaped. This method involves the determination of plume opacity by our qualified observers. The method includes procedures for training and certification of observers, and procedures used in the field for determination of plume opacity. The appearance of the plume as viewed by an observer depended upon a number of variables, some of which could be controlled and some of which could not be controlled in the field. Variables which could be controlled to an extent to which they no longer exerted a significant influence upon plume appearance included: angle of the observer with respect to the plume; angle of the observer with respect to the sun; point of observation of attached and detached steam plume; and angle of the observer with respect to the plume emitted from a rectangular stack with a large length to width ratio. The method includes specific criteria applicable to these variables.

Other variables which could not be controlled in the field were luminescence and color contrast between the plume and the background against which the plume was viewed. These variables exerted an influence upon the appearance of the plume as viewed by the observer, and could affect the ability of the observer to accurately assign opacity values to the observed plumes.

The plume is most visible and presents the greatest apparent opacity when viewed against a contrasting background. It follows from this that the opacity of a plume, viewed under conditions where a contrasting background is present, could be assigned with the greatest degree of accuracy. However, the potential for a positive error is also the greatest when a plume is viewed under such contrasting conditions. Under conditions presenting a less contrasting background, the apparent opacity of plume is less and approaches zero as the color and luminescence contrast decrease toward zero. As a result, significant negative bias and negative errors could be made when a plume is viewed under less contrasting conditions. A negative bias decreases rather than increases the possibility that a plant operator will be cited for a violation of opacity standards due to observer error.

PROCEDURES

The observer used the following procedures for visually determining the opacity of emissions:

Position-

The qualified observer stood at a distance sufficient to provide a clear view of the emissions with the sun oriented in the 140 degree sector to his back.

Consistent with maintaining the above requirement, the observer made his observations from a position such that his line of vision was approximately perpendicular to the plume direction, and when observing opacity of emissions from rectangular outlets (e.g. roof monitors, open baghouses, noncircular stacks), approximately perpendicular to the longer axis of the outlet. The observer's line of sight did not include more than one plume at a time when multiple stacks were involved, and in any case the observer make his observations with his line of sight perpendicular to the longer axis of such a set of multiple stacks (e.g. stub stacks on baghouses).

Field Records-

The observer recorded the name of the plant, emission location, type of facility, observer's name and affiliation, and the date on a field data sheet. The time, estimated distance to the emission location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), and plume background were recorded on a field data sheet at the time opacity readings were initiated and completed.

Observations-

Opacity observations were made at the point of greatest opacity in that portion of the plume where condensed water vapor was not present. The observer did not look continuously at the plume, but instead observed the plume momentarily at 15-second intervals.

Attached Steam Plumes

When condensed water vapor was present within the plume as it emerged from the emission outlet, opacity observations were made beyond the point in the plume at which condensed water vapor was no longer visible. The observer recorded the approximate distance from the emissions outlet to the point in the plume at which the observations were made.

Detached Steam Plumes

When water vapor in the plume condensed and became visible at a distinct distance from the emission outlet, the opacity of emissions was evaluated at the emission outlet prior to the condensation of water vapor and the formation of the steam plume.

Recording Observations

Opacity observations were recorded to the nearest 5 percent at 15-second intervals on an observational record sheet. A minimum of 24 observations were recorded. Each momentary observations recorded was deemed to represent the average opacity of emissions for a 15-second period.

Data Reduction

Opacity was determined as an average of 24 consecutive observations recorded at 15-second intervals. The observations recorded on the record sheet were divided into sets of 24 consecutive observations. Sets needed may not be consecutive in time and in no case were two sets overlapped.

Each set of 24 observations was calculated to an average by summing the opacity of the 24 observations and dividing this sum by 24.

Information: This information was taken from the "Code of Federal Regulations", Parts of 53 to 80, Revised edition, July 1, 1990.

SAMPLING LOCATION DIMENSIONS
METAL SHREDDERS, INC.
MILL SYSTEM
SCRUBBER OUTLET
STACK

Effective Inside Dimension (s): 54" ID x 41'0" H

Effective Inside Area: 15.90 ft^2

Equivalent Diameter: 54"

Upstream Distance (A): 36"

Number of Diameters Upstream: 0.7

Downstream Distance (B): 456"

Number of Diameters Downstream: 8.4

Total Number of Test Ports: 2

Total Number of Sampling Points: 24

Sampling Point Dimensions:

(1)	1.134"	(7)	34.776"
(2)	3.618"	(8)	40.500"
(3)	6.372"	(9)	44.442"
(4)	9.558"	(10)	47.628"
(5)	13.500"	(11)	50.382"
(6)	19.224"	(12)	52.866"

SAMPLING LOCATION DIMENSIONS

METAL SHREDDERS, INC.

Z BOX SYSTEM

CYCLONE OUTLET

STACK

Effective Inside Dimension (s): 34 1/2" W x 21" D x 7'0" H

Effective Inside Area: 5.03 ft^2

Equivalent Diameter: 26.1"

Upstream Distance (A): 14"

Number of Diameters Upstream: 0.5

Downstream Distance (B): 70"

Number of Diameters Downstream: 2.7

Total Number of Test Ports: 5

Total Number of Sampling Points: 25

Sampling Point Dimensions:

(1) 2.10"
(2) 6.30"
(3) 10.50"
(4) 14.70"
(5) 18.90"

SAMPLING LOCATION DIMENSIONS

METAL SHREDDERS, INC.

NO. 4 SYSTEM

CYCLONE OUTLET

STACK

Effective Inside Dimension (s): 33 1/2" W x 27 1/2" D x 6'4" H

Effective Inside Area: 6.40 ft^2

Equivalent Diameter: 30.2"

Upstream Distance (A): 15 1/2"

Number of Diameters Upstream: 0.5

Downstream Distance (B): 60 1/2"

Number of Diameters Downstream: 2.0

Total Number of Test Ports: 5

Total Number of Sampling Points: 25

Sampling Point Dimensions:

(1) 2.75"
(2) 8.25"
(3) 13.75"
(4) 19.25"
(5) 24.75"

NOMENCLATURE

acf	= actual cubic feet
acfm	= actual cubic feet per minute
A	= effective area of flue in square feet
acm	= actual cubic meters
acmm	= actual cubic meters per minute
A_n	= inside area of sampling nozzle in square feet
B_{ws}	= water vapor in gas stream, proportion by volume
%C	= percent carbon by weight, dry basis
%CO	= percent carbon monoxide by volume, dry basis
$\%CO_2$	= percent carbon dioxide by volume, dry basis
C_p	= pitot tube coeffecient
D_I	= dust loading per heat input in pounds (grams) per million Btu (calories) per Fr constant
D_I'	= dust loading per heat input in pounds (grams) per million Btu (calories) per Fr calculated
dscf	= dry standard cubic feet
dscfh	= dry standard cubic feet per hour
dscm	= dry standard cubic meters
dscmh	= dry standard cubic meters per hour
fps	= feet per second
F_r	= ratio factor of dry flue gas volume to heat value of combusted fuel in dry standard cubic feet (meters) per million Btu (calories)
gms	= grams
gm-mole	= gram-mole
grs	= grains
ΔH	= orfice pressure drop in inches water, average
%H	= percent hydrogen by weight, dry basis
H_c	= heat of combustion in Btu per pound, dry basis
hr	= hour
%I	= percent isokinetic
in. Hg	= inches mercury
lbs	= pounds
lb-mole	= pound-mole
%M	= percent moisture by volume
mmBtu	= million Btu
mmcal	= million calories
mm Hg	= millimeters mercury
mps	= meters per second
M_s	= molecular weight in pounds (gram) per pound (gram) mole (wet basis)
%N	= percent nitrogen by weight, dry basis
$\%N_2$	= percent nitrogen by difference, dry basis
%O	= percent oxygen by difference, dry basis
$\%O_2$	= percent oxygen by volume, dry basis
P_b	= barometric pressure in inches mercury
P_{std}	= standard absolute pressure (29.92 in Hg)
P_s	= absolute pressure in flue in inches (millimeters) mercury
P_f	= static pressure in flue in inches water, average
$\sqrt{\Delta P}$	= square root of velocity head in inches water, average
%S	= percent sulfur by weight, dry basis
scf	= standard cubic feet
scm	= standard cubic meters
T_{std}	= absolute temperature of air in degrees Rankine at standard conditions (528 degrees)
T_S	= absolute temperature of flue gas in degrees Rankin, average
T_m	= absolute temperature at meter in degrees Rankine, average
V_S	= velocity of flue gas in feet (meters) per second
V_l	= volume of condensate through the impingers in milliliters
V_{lc}	= volume of liquid collected in condenser in milliliters plus weight of liquid absorbed in silica gel in grams indicated as milliliters
V_m	= volume of metered gas measured at meter conditions in cubic feet (meters)
V_{ms}	= volume of metered gas corrected to dry standard conditions in cubic feet (meters)
V_o	= volume of flue gas at actual conditions in cubic feet (meters) per minute
Q_{sd}	= volume of flue gas corrected to dry standard conditions in cubic feet (meters) per hour
V_t	= total volume of flue gas sampled at actual conditions in cubic feet (meters)
V_w	= volume of water vapor in metered gas corrected to standard conditions in cubic feet (meters)
V_{wc}	= volume of water condensed in impingers corrected to standard conditions
V_{wsg}	= volume of water collected in silica gel corrected to standard conditions
W_a	= total weight of dust collected per unit volume in grains (grams) per actual cubic feet (meters)
W_d	= total weight of dust collected per unit volume in pounds (grams) per dry standard cubic feet (meters)
W_g	= total weight of dust collected in grams
W_h	= total weight of dust collected per unit volume in pounds (grams) per hour, dry basis
W_p	= total weight of dust collected in pounds
W_s	= total weight of dust collected per unit volume in grains (grams) per dry standard cubic feet (meters)
W_{sg}	= impinger silica gel weight gain in grams
Y	= metered gas volume correction factor
Θ	= total elapsed sampling time in minutes

EPA DUST LOADING Formulas

(1) ABSOLUTE FLUE PRESSURE (in. Hg)

$$P_s = (\pm P_f \div 13.6) + P_b$$

(2) WATER VAPOR VOLUME IN METERED GAS CORRECTED TO STANDARD CONDITIONS (scf)

$$V_{wc} = .04707 \times V_l \qquad V_{wsg} = .04715 \times W_{sg}$$
$$V_w = V_{wc} + V_{wsg}$$

(3) METERED GAS VOLUME CORRECTED TO STANDARD CONDITIONS (scf)

$$V_{ms} = 17.64 \times Y \times V_m \frac{P_b + (\Delta H/13.6)}{T_m}$$

(4) PERCENT MOISTURE IN FLUE GAS

$$B_{ws} = \frac{V_w}{(V_{ms} + V_w)} \qquad \%M = B_{ws} \times 100$$

(5) AVERAGE RESULTS OF FLUE GAS ANALYSIS

$$\%N_2 \text{ dry} = 100 - (\%CO_2 + \%O_2 + \%CO)$$

(6) APPROXIMATE MOLECULAR WEIGHT OF FLUE GAS (WET BASIS) (lb/lb-mole)

$$M_s = (18 \times B_{ws}) + \Big((.440\ (\%CO_2) + .320\ (\%O_2) + .280\ (\%N_2 + \%CO)\Big) \times (1. - B_{ws})$$

(7) GAS VELOCITY IN FLUE (fps)

$$V_s = 85.49 \times C_p \times (\sqrt{\Delta P}\ )\ \text{avg.} \sqrt{\frac{T_s}{P_s \times M_s}}$$

(8) FLUE GAS VOLUME AT ACTUAL CONDITIONS (acfm)

$$V_a = V_s \times A \times 60$$

(9) FLUE GAS VOLUME CORRECTED TO DRY STANDARD CONDITIONS (dscfh)

$$Q_{sd} = \frac{T_{std}}{29.92} \times \frac{P_s}{T_s} \times V_a \times (1 - B_{ws}) \times 60$$

(10) TOTAL FLUE GAS VOLUME SAMPLED AT ACTUAL CONDITIONS (acf)

$$V_t = \left[V_m \times Y \times \frac{T_s}{T_m} \times \left(\frac{P_b + (\Delta H/13.6)}{P_s} \right) \right] + \left(0.00267 \times V_{lc} \times \frac{T_s}{P_s} \right)$$

(11) DUST CONCENTRATION FOR INDIRECT HEATING UNIT ACTUAL CONDITIONS AND STANDARD CONDITIONS

W_g = gms

$W_p = 0.002205 \times W_g$ (lb)

$W_d = \frac{W_p}{V_{ms}}$ (lb/dscf)

$W_h = W_d \times Q_{sd}$ (lb/hr dry)

$W_a = \frac{7000 \times W_p}{V_t}$ (gr/acf)

$W_s = 7000 \times W_d$ (gr/dscf)

$D_l = \frac{9780 \times 20.9 \times W_d}{(20.9 - \%O_2)}$ (lb/mmBtu with constant 9780Fr)

$F_r = \frac{10^6 \times [(3.64 \times \%H) + (1.53 \times \%C) + (0.57 \times \%S) + (0.14 \times \%N) - (0.46 \times \%O)]}{H_c}$ (dscf/mmBtu)

$D_l' = \frac{20.9 \times W_d \times F_r}{(20.9 - \%O_2)}$ (lb/mmBtu with calculated F_r)

(12) PERCENT OF ISOKINETIC SAMPLING

$$\%i = \frac{1.667 \times T_s \times \left\{0.00267 \times V_{lc} + \left[\frac{V_m \times Y}{T_m} \times \left(P_b + \Delta H/13.6\right)\right]\right\}}{\Theta \times V_s \times P_s \times A_n}$$

Particulate Field Data Sheet

Client: M.S.I. (PEDCON)

Date: 9-19-91 Page 1 Of 2

Project No.: 91-172

Operator: S. Teague

Sampling Location: mill system scrubber OUTLET

Run No.:

Filter No.: [redacted]

Acetone No.:

Condensate: [redacted]

Orsat Analysis

CO_2	$+O_2$	O_2	CO
0		20.9	

Barometric Pressure: 29.95

Static Pressure: -.85

Probe Number: 5-1

Nozzle Diameter: .309

Nozzle Number: 1-10

Pitot Coefficient: .79

Pitot Number: 5-1

Meter Corr. Factor: 1.01

Meter-Orifice: 6 (3.46)

Sample Pt. Time: 60 min

Assumed % Moisture: 5%

Leak Test: Before Run 1 .005 @ 16" After Run 1 .003 @ 15"

Sample Point	ΔP	$\sqrt{\Delta P}$	ΔH	Temperature °F: Stack	Probe	Imp. Out	Oven	Meter In	Meter Out	Vac. Pr (in. HG)	Dry Gas Meter Reading in Cu. Ft.
Run 1 (LEAK CHECK Before .005 @ 16					After .003 @ 15	68		(Filter No. 184)			
S 4	.83	.911	1.03	62	258		257	85		1.5	554.763
CONDENSATE 15ml				68	264		255	83		2.0	636.428
				65				69			81.665
Run 2 (LEAK CHECK Before .008 @ 15"					After .005 @ 15"			(Filter No 307)			
S 4	.83	.911	1.03	69	266		260	79		2.0	697.999
CONDENSATE 10 ml				68	264		254	87		2.5	746.022
				69				83			108.023
Run 3 (LEAK CHECK Before .006 @ 17"					After .004 @ 15"			(Filter No 189)			
S 4	.83	.911	1.03	67	261		253	81		2.0	746.870
CONDENSATE 15ml				71	257		251	80		2.5	829.972
				69				81			83.102

Pitot Tube Leak Check: Before OK After OK

Integrated Bag Leak Check: Before N/A After N/A

Particulate Field Data Sheet

Client: MSI (Pedcon)				Date: 9-19-91	Page 1 Of 2
Project No.: 91-172-0A	Operator: G. Edgel			Orsat Analysis	
Sampling Location: #2 Box System Cyclone Outlet		Run No.: 1		CO_2	$+O_2$ / O_2 / CO
Filter No.: 91-089	Acetone No.:	Condensate: ~~mL~~		0	20.9
Barometric Pressure: 29.95	Static Pressure: -.34	Probe Number: A3-1			
Nozzle Diameter: .255	Nozzle Number:	Pitot Coefficient: .79	Pitot Number: A3-1		
Meter Corr. Factor: 1.01	Meter-Orifice: #68	4.36			
Sample Pt. Time: 1 HR	Assumed % Moisture: 2%	Leak Test: Before Run #2 .007 @ 25"	After .005 @ 28"		

Sample Point	ΔP	$\sqrt{\Delta P}$	ΔH	Temperature °F: Stack	Probe	Imp. Out	Oven	Meter In	Meter Out	Vac. Pr (in. HG)	Dry Gas Meter Reading in Cu. Ft.
Start - 9:20											
B-2	.73	.854	3.58	72	255	<68	254	54	53	4	400.586
Run #2	4 mL	Condensate									
B-2	.73	.854	3.58	72	254	<68	253	60 / 55	63	4	454.421 / 53.845
Stop - 10:20											
Run #2	Start - 12:00										
B-2	.73	.854	3.64	77	255	<68	252	62	64	3	455.167
		Initial Leak - .002 @ 28"					2 mL Condensate				
		Final Leak - .002 @ 28"					Filter 91-108				
B-2	.73	.854	3.64	76 / 77	253	<68	254	65 / 64	66	3	508.706 / 53.539
Stop - 1:00											
Run #3											
Start - 2:15											
B-2	.73	.854	3.64	76	250	<68	252	64	63	3	511.092
	Initial Leak - .002 @ 28"						Condensate - 2 mL				
	Final Leak - .001 @ 28"						Filter Number - 91-205				
B-2	.73	.854	3.64	77 / 77	250	<68	251	65 / 64	64	3	565.616 / 54.524
Stop - 3:15											

Pitot Tube Leak Check: Before O.K. After O.K.

Integrated Bag Leak Check: Before N/A After N/A

Particulate Field Data Sheet

Client: MSI (Pedcon)										Date: 9-19-91	Page: 1 Of 2		
Project No.: 91-172			Operator: JOHN SUTTON							Orsat Analysis			
Sampling Location: 4 SYSTEM CYCLONE					Run No.: [redacted]					CO_2	$+O_2$	O_2	CO
Filter No.: [redacted]			Acetone No.:		Condensate: ↓					0		20.7	
Barometric Pressure: 29.95			Static Pressure: -.95		Probe Number: 4-2								
Nozzle Diameter: .248		Nozzle Number: 1-41		Pitot Coefficient: .79		Pitot Number: 4-2							
Meter Corr. Factor: .97			Meter-Orifice: 66 (3.26)										
Sample Pt. Time: 60 min			Assumed % Moisture: 2%			Leak Test: Before [redacted]			After				

Sample Point	ΔP	$\sqrt{\Delta P}$	ΔH	Temperature °F: Stack	Probe	Imp. Out	Oven	Meter In	Meter Out	Vac. Pr (in. HG)	Dry Gas Meter Reading in Cu. Ft.
RUN 1 (LEAK CHECK Before .008 @ 15" After .016 @ 16")						68	(Filter 183)				
C 3	1.34	1.158	4.85	67	253		257	57		2	609.041
CONDENSATE 5mL				72	254		266	71		2	676.485
				70				64			67.444
(LEAK CHECK Before .014 @ 11" After .013 @ 14")							(Filter 115)				
RUN 2	1.34	1.158	4.85	82	258		260	72		2	677.249
C 3				80	257		259	85		2	748.822
CONDENSATE 5mL				81				79			71.573
RUN 3 (LEAK CHECK Before .015 @ 15" After .017 @ 15")							(Filter 206)				
C 3	1.34	1.158	4.85	78	256		259	85		2	750.109
CONDENSATE 5mL				80	251		250	85		2	820.145
				79				85			70.039

Pitot Tube Leak Check: Before OK After OK

Integrated Bag Leak Check: Before N/A After N/A

PAH FIELD DATA SHEET

Client MSI (PeDCon)			Date 9-17-91
Project No. 91-172-01H	Operator Scott Teague		Orsat Analysis
Sampling Location M.S. Scrubber Outlet		Run No. 1	CO2 +O2 O2 CO
Filter No. /	Acetone No. /	Condensate /	
Barometric Press. /	Static Pressure - .85		
Probe No. /	Nozzle Dia. /	Nozzle No. /	
Pitot Coeff. .79	Pitot No.	Meter Corr. Factor 1.01	Meter Orifice .57
Sample Point Time /	Assumed % Moisture /		
Leak Test Before: /	After: /		

Sample Point	ΔP	√ΔP	ΔH	Temperature °F Stack	Probe	Imp. Out	Meter In	Meter Out	Vac Pr (in. HG)	Dry Gas Meter Reading in Cu. Ft.
9 1	1.00	1.000		94						
2	1.01	1.005		95						
3	.95	.975		95						
4	.90	.949		94						
5	.75	.866		94						
6	.60	.775		94						
7	.40	.632		95						
8	.30	.549		96						
9	.75	.866		96						
10	.70	.837		96						
11	.65	.806		97						
12	.75	.866		96						
				[redacted]						
E 1	1.10	1.049		96						
2	1.15	1.072		97						
3	1.10	1.049		96						
4	1.20	1.095		97						
5	1.05	1.025		97						
6	1.00	1.000		96						
7	.70	.837		96						
8	.75	.866		96						
9	.85	.922		95						
10	.65	.806		96						
11	.80	.894		97						
12	.70	.837		97						

Pitot Tube Leak Check: Before: OK After: OK
Integrated Bag Leak Check: Before: N.A. After: NA

Particulate Field Data Sheet

Client: MSI - (Pedcon)				Date: 9-17-91	Page 1 Of 2
Project No.: 91-172-OH	Operator: G. Edgel			Orsat Analysis	
Sampling Location: "Z" Box System Cyclone Outlet		Run No.: 1		CO_2 / $+O_2$ / O_2 / CO	
Filter No.	Acetone No.	Condensate			
Barometric Pressure	Static Pressure: -.34	Probe Number: A3-1			
Nozzle Diameter	Nozzle Number	Pitot Coefficient: .79	Pitot Number: A3-1		
Meter Corr. Factor	Meter-Orifice				
Sample Pt. Time	Assumed % Moisture	Leak Test	Before	After	

Sample Point	ΔP	$\sqrt{\Delta P}$	ΔH	Temperature °F: Stack	Probe	Imp. Out	Oven	Meter In	Meter Out	Vac. Pr (in. HG)	Dry Gas Meter Reading in Cu. Ft.
				TRAVERSE							
A. 1	.95	.975		100							
2	1.00	1.000		100							
3	1.05	1.025		100							
4	1.05	1.025		100							
5	.95	.975		100							
B. 1	.90	.949		100							
2	.75	.866		100							
3	.65	.806		101							
4	.75	.866		101							
5	.80	.894		100							
C. 1	.85	.922		100							
2	.65	.806		101							
3	.65	.806		101							
4	.60	.775		100							
5	.65	.806		100							
D 1	.75	.866		101							
2	.55	.742		101							
3	.55	.742		101							
4	.65	.806		100							
5	.60	.775		100							
E. 1	.55	.742		100							
2	.65	.806		101							
3	.60	.775		100							
4	.55	.742		101							
5	.50	.707		101							
	/	/		/							
	.73	.848		100							

Pitot Tube Leak Check: Before O.K. After O.K.

Integrated Bag Leak Check: Before N/A After N/A

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PAH FIELD DATA SHEET

Client MSI (PEOCON)			Date 9-17-91
Project No. 91-172-OH	Operator J. SUTTON		Orsat Analysis
Sampling Location # 4 SYSTEM-CYCLONE		Run No. 1	CO2 +O2 O2 CO
Filter No. —	Acetone No.	Condensate —	— — — —
Barometric Press. —	Static Pressure -.95		— — — —
Probe No. 4-2	Nozzle Dia. —	Nozzle No. —	— — — —
Pitot Coeff. .79	Pitot No. 4-2	Meter Corr. Factor .97	Meter Orifice 3.2C
Sample Point Time —	Assumed % Moisture —		
Leak Test Before: —	After: —		

				Temperature °F						
Sample Point	ΔP	$\sqrt{\Delta P}$	ΔH	Stack	Probe	Imp. Out	Meter In	Meter Out	Vac Pr (in. HG)	Dry Gas Meter Reading in Cu. Ft.
					TRAVERSE					
A 1	1.50	1.225		95						
2	1.45	1.204		94						
3	1.40	1.183		94						
4	1.35	1.162		93						
5	1.10	1.049		93						
B 1	1.70	1.304		94						
2	1.65	1.285		94						
3	1.60	1.265		93						
4	1.30	1.140		92						
5	1.20	1.095		92						
C 1	1.60	1.265		93						
2	1.65	1.285		93						
3	1.50	1.225		92						
4	1.15	1.072		92						
5	1.10	1.049		92						
D 1	1.45	1.204		93						
2	1.35	1.162		92						
3	1.30	1.140		92						
4	1.20	1.095		92						
5	1.10	1.049		91						
E 1	1.30	1.140		92						
2	1.25	1.118		93						
3	1.25	1.118		93						
4	1.10	1.049		92						
5	1.00	1.000		91						

Pitot Tube Leak Check: Before: OK After: OK
Integrated Bag Leak Check: Before: N/A After: N/A

Visible Emissions Evaluation Data Sheet

Run 1

Client Pedcon
Project No. 91-172-OH
Plant Name MSI
Location Mill System Scrubber outlet
Type of Facility Metal Shredder

Observer Tim Runnr
Date 9-19-91
Observation began 9:20 AM
ended 10:20 AM

Source Identification (Stack, Duct, etc.) Stack (Circular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source 75 Ft
Height of Source (above ground) 60 Ft

Weather Conditions
Wind Direction NW
Wind Speed 0-5
Temperature 60° F
Position of Sun East
Sky Condition clear
(clear, overcast, %clouds, color of clouds, etc.) 10% Cloud

Plume Description
Color Grayish White
Background Sky
Type (wet or dry) Wet Dist. None

Comments

Observers Signature
Tim Runnr

Date of Last EPA Method 9 Examination
5-91

Examination Passed in EPA Region
Columbus, OH

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

60 min Avg 1.979%

*If wet, distance (ft.) from plume outlet to point in plume where observations made

TSA
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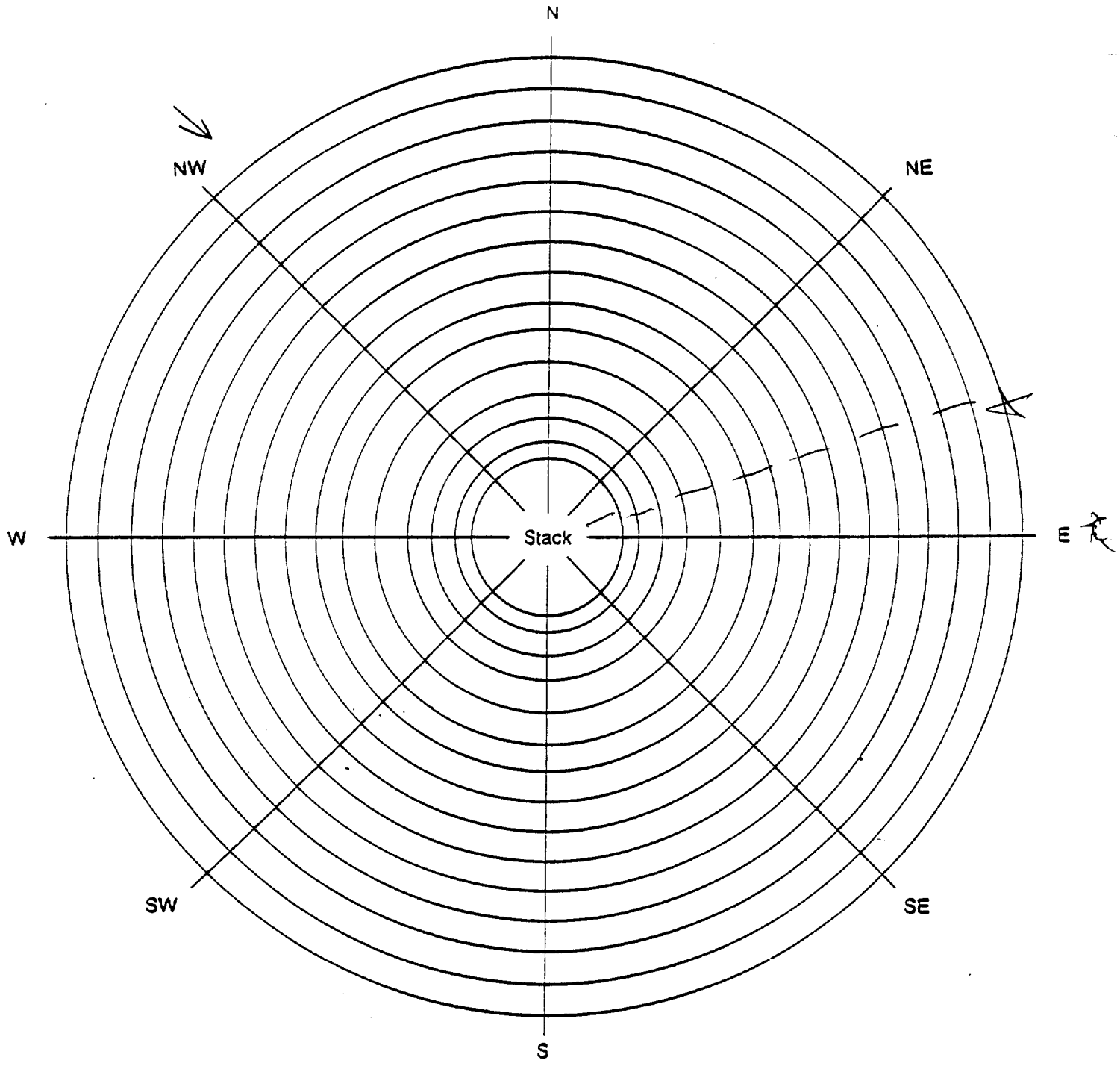
Environmental Testing Consultants



LOCATE THE FOLLOWING ON THE DIAGRAM

1. The stack configuration with the stack under observation in the center
2. Observer's position using X to indicate position.
3. Arrow pointing direction wind is blowing.
4. Dotted line between observer and plume indicating observers line of sight when making readings.
5. Circle with S in center to indicate sun location.
6. Any large structures or significant topographical features.

NOTE: Stack configuration is not proportional to distances in feet from stack in the diagram.

TSA
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Enviromental Testing Consultants

Visible Emissions Evaluation Data Sheet

Run 2

Client Redcon
Project No. 91-172-OH
Plant Name MSI
Location Mill System Scrubber Outlet
Type of Facility Metal Shredder

Observer Tim Renner
Date 9-19-91
Observation began 12:00 pm
ended 1:00 pm

Source Identification (Stack, Duct, etc.) Stack (circular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source 75 ft
Height of Source (above ground) 60 ft

Weather Conditions
Wind Direction NW
Wind Speed 0-5
Temperature 60° F
Position of Sun East
Sky Condition Cloudy
(clear, overcast, %clouds, color of clouds, etc.) 75% Cloud

Plume Description
Color Grayish White
Background Sky
Type (wet or dry) Wet Dist. Nom

Comments

Observers Signature
Tim Renner

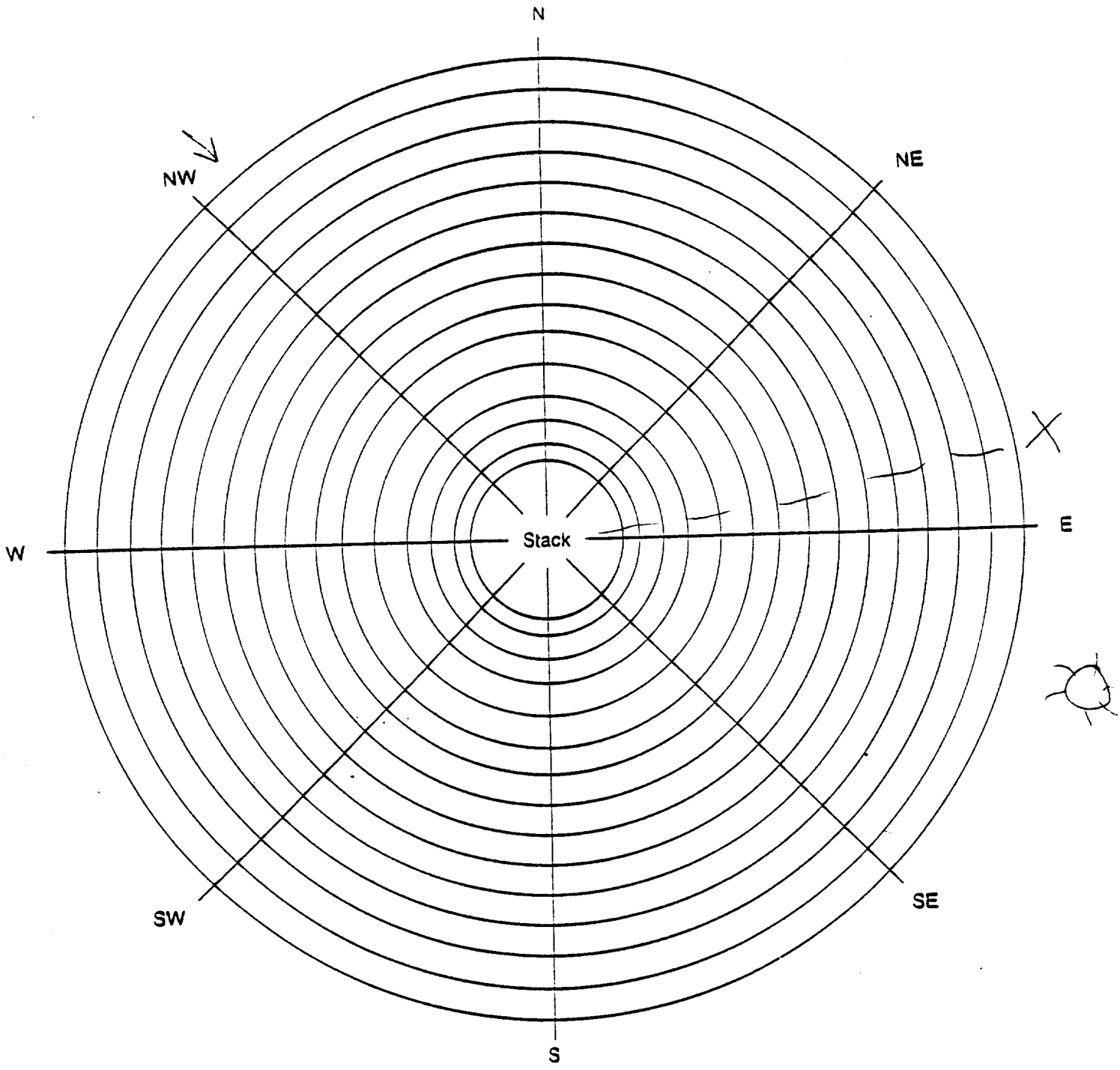
Date of Last EPA Method 9 Examination
5-91

Examination Passed in EPA Region
Columbus OH

Min.	Seconds 0	15	30	45	Min.	Seconds 0	15	30	45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	5	31	0	0	0	0
2	0	0	0	5	32	0	0	0	0
3	0	0	0	0	33	0	5	0	5
4	0	0	0	0	34	5	5	5	10
5	0	0	0	5	35	5	10	5	0
6	5	0	0	0	36	0	0	5	0
7	0	0	0	0	37	0	0	0	5
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	5	5	5	5	40	0	0	0	0
11	5	5	5	5	41	0	0	0	0
12	5	5	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	10	47	0	0	0	5
18	5	5	0	0	48	5	5	5	5
19	0	0	5	5	49	20	5	0	0
20	0	0	0	0	50	0	0	5	5
21	15	5	5	5	51	5	0	0	0
22	5	5	5	5	52	0	0	0	0
23	5	5	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	15	5	58	0	0	0	0
29	0	0	0	0	59	5	0	0	0

60 min Avg 1.313%

*If wet, distance (ft.) from plume outlet to point in plume where observations made



LOCATE THE FOLLOWING ON THE DIAGRAM

1. The stack configuration with the stack under observation in the center
2. Observer's position using X to indicate position.
3. Arrow pointing direction wind is blowing.
4. Dotted line between observer and plume indicating observers line of sight when making readings.
5. Circle with S in center to indicate sun location.
6. Any large structures or significant topographical features.

NOTE: Stack configuration is not proportional to distances in feet from stack in the diagram.

Total Source Analysis, Inc.
Enviromental Testing Consultants

Run 3

Visible Emissions Evaluation Data Sheet

Client: Pedcon
Project No.: 91-172-OH
Plant Name: MST
Location: Mill System Scrubber outlet
Type of Facility: Metal Shredder

Observer: Tim Renner
Date: 9-19-91
Observation began: 2:15pm
ended: 3:15pm

Source Identification (Stack, Duct, etc.): Stack (Circular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source: 75 ft
Height of Source (above ground): 60 ft

Weather Conditions
Wind Direction: NW
Wind Speed: 0-5
Temperature: 65°F
Position of Sun: South East
Sky Condition: Cloudy
(clear, overcast, %clouds, color of clouds, etc.): 75% Cloud

Plume Description
Color: Grayish White
Background: Sky
Type (wet or dry): Wet Dist.*: None

Comments: Emissions From Scrubber pit ranged From 0-10% during the 3rd Run, lasting for short periods At A time.

Observers Signature: Tim Renner

Date of Last EPA Method 9 Examination: 5-91

Examination Passed in EPA Region: Columbus, OH

Min.	Seconds 0	15	30	45	Min.	Seconds 0	15	30	45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	5	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	5
4	5	5	5	5	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	5	0
8	0	0	0	0	38	0	0	0	10
9	0	0	0	0	39	0	0	0	0
10	0	0	0	5	40	0	5	5	0
11	5	5	0	0	41	0	0	0	5
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	10
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	20	5	0	48	0	0	0	0
19	0	0	0	5	49	0	0	0	0
20	0	0	0	0	50	0	0	5	5
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	5	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	5	5	5
28	0	0	0	0	58	5	5	5	5
29	0	0	0	0	59	0	0	0	0

60 min Avg. 0.688%

*If wet, distance (ft.) from plume outlet to point in plume where observations made

TSA
Total Source Analysis, Inc.
Environmental Testing Consultants

Visible Emissions Evaluation Data Sheet

Run 1

Client Pedcon
Project No. 91-172-OH
Plant Name MST
Location 2 Box System Cyclone outlet
Type of Facility Metal Shredder

Observer Tim Renner
Date 9-19-91
Observation began 9:20 AM
ended 10:20 AM

Source Identification (Stack, Duct, etc.) STACK (Rectangular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source 75 Ft
Height of Source (above ground) 20 Ft

Weather Conditions
Wind Direction NW
Wind Speed 0-5
Temperature 60° F
Position of Sun EAST
Sky Condition CLEAR
(clear, overcast, %clouds, color of clouds, etc.) 10% cloud

Plume Description
Color None
Background SKY
Type (wet or dry) Dry Dist. None

Comments

Observers Signature
Tim Renner

Date of Last EPA Method 9 Examination
5-91

Examination Passed in EPA Region
Columbus OH

Min.	Seconds 0	15	30	45	Min.	Seconds 0	15	30	45
0	0	0	0	0	30	0	0	0	0
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	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

AVG 0%

*If wet, distance (ft.) from plume outlet to point in plume where observations made

TSA
Total Source Analysis, Inc.
Environmental Testing Consultants

Run 2

Visible Emissions Evaluation Data Sheet

Client Pedcon
Project No. 91-172-OH
Plant Name MSI
Location 2 Box System Cyclone Outlet
Type of Facility Metal Shredder

Observer Tim Renner
Date 9-19-91
Observation began 12:00 p.m.
ended 1:00 p.m.

Source Identification (Stack, Duct, etc.) Stack (Rectangular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source 75 ft
Height of Source (above ground) 20 ft

Weather Conditions
Wind Direction NW
Wind Speed 0-5
Temperature 60° F
Position of Sun East
Sky Condition Cloudy
(clear, overcast, %clouds, color of clouds, etc.) 75% cloud

Plume Description
Color None
Background Sky
Type (wet or dry) Dry Dist. None

Comments

Min.	Seconds 0	15	30	45	Min.	Seconds 0	15	30	45
0	0	0	0	0	30	0	0	0	0
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	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

Avg 0%

Observers Signature
Tim Renner

Date of Last EPA Method 9 Examination
5-91

Examination Passed in EPA Region
Columbus, OH

*If wet, distance (ft.) from plume outlet to point in plume where observations made

Run 3

Visible Emissions Evaluation Data Sheet

Client Pedcon
Project No. 91-172-OH
Plant Name MST
Location 2 Box System Cyclone Outlet
Type of Facility Metal Shredder

Observer Tim Runner
Date 9-19-91
Observation began 2:15 pm
ended 3:15 pm

Source Identification (Stack, Duct, etc.) Stack (Rectangular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source 75 ft
Height of Source (above ground) 20 ft

Weather Conditions
Wind Direction NW
Wind Speed 0-5
Temperature 65° F
Position of Sun South East
Sky Condition Cloudy
(clear, overcast, %clouds, color of clouds, etc.) 75% cloud

Plume Description
Color None
Background Sky
Type (wet or dry) Dry Dist. None

Comments

Observers Signature
Tim Runner

Date of Last EPA Method 9 Examination
5-91

Examination Passed in EPA Region
Columbus, OH

Min.	Seconds 0	15	30	45	Min.	Seconds 0	15	30	45
0	0	0	0	0	30	0	0	0	0
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	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

Avg 0%

*If wet, distance (ft.) from plume outlet to point in plume where observations made

TSA
Total Source Analysis, Inc.
Environmental Testing Consultants

Run 1

Visible Emissions Evaluation Data Sheet

Client Pedcon
Project No. 91-172-OH
Plant Name MSI
Location #4 System cyclone outlet
Type of Facility Metal Shredder

Observer Tim Renner
Date 9-19-91
Observation began 9:20 am
ended 10:20 AM

Source Identification (Stack, Duct, etc.) Stack (Rectangular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source 75 ft
Height of Source (above ground) 50 ft

Weather Conditions
Wind Direction NW
Wind Speed 0-5
Temperature 60° F
Position of Sun East
Sky Condition Clear
(clear, overcast, %clouds, color of clouds, etc.) 10% cloud

Plume Description
Color None
Background Sky
Type (wet or dry) Dry Dist. None

Comments

Observers Signature
Tim Renner

Date of Last EPA Method 9 Examination
5-91

Examination Passed in EPA Region
Columbus, OH

Min.	Seconds 0	15	30	45	Min.	Seconds 0	15	30	45
0	0	0	0	0	30	0	0	0	0
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	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

Avg. 0%

*If wet, distance (ft.) from plume outlet to point in plume where observations made

TSA
Total Source Analysis, Inc.
Environmental Testing Consultants

Visible Emissions Evaluation Data Sheet

Run 2

Client Pedcon
Project No. 91-172-OH
Plant Name MSI
Location #4 System Cyclone Outlet
Type of Facility Metal Shredder

Observer Tim Renner
Date 9-19-91
Observation began 12:00 pm
ended 1:00 pm

Source Identification (Stack, Duct, etc.) Stack (Rectangular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source 75 ft
Height of Source (above ground) 50 ft

Weather Conditions
Wind Direction NW
Wind Speed 0-5
Temperature 60° F
Position of Sun East
Sky Condition Cloudy
(clear, overcast, %clouds, color of clouds, etc.) 75% cloud

Plume Description
Color None
Background Sky
Type (wet or dry) dry Dist. None

Comments

Observers Signature
Tim Renner

Date of Last EPA Method 9 Examination
5-91

Examination Passed in EPA Region
Columbus, OH

Min.	Seconds 0	15	30	45	Min.	Seconds 0	15	30	45
0	0	0	0	0	30	0	0	0	0
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	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

Avg 0%

*If wet, distance (ft.) from plume outlet to point in plume where observations made

Total Source Analysis, Inc.
Environmental Testing Consultants

Visible Emissions Evaluation Data Sheet

Run 3

Client Redcon
Project No. 91-172-OH
Plant Name MSI
Location #4 System Cyclone outlet
Type of Facility Metal Shredder

Observer Tim Renner
Date 9-19-91
Observation began 2:15pm
ended 3:15pm

Source Identification (Stack, Duct, etc.) Stack (Rectangular)

Observer Location
(Diagram on back of sheet)
Distance from Observer to source 75 ft
Height of Source (above ground) 50 ft

Weather Conditions
Wind Direction NW
Wind Speed 0-5
Temperature 65°F
Position of Sun South East
Sky Condition Cloudy
(clear, overcast, %clouds, color of clouds, etc.) 75% Cloud

Plume Description
Color None
Background Sky
Type (wet or dry) dry Dist. None

Comments

Observers Signature
Tim Renner

Date of Last EPA Method 9 Examination
5-91

Examination Passed in EPA Region
Columbus, OH

Min.	Seconds 0	15	30	45	Min.	Seconds 0	15	30	45
0	0	0	0	0	30	0	0	0	0
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	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

Avg 0%

*If wet, distance (ft.) from plume outlet to point in plume where observations made

TSA
Total Source Analysis, Inc.
Environmental Testing Consultants

Dry Gas Meter Calibration Sheet

Client Metal Moulders, Inc. Run By C. Scott

Project No. 91-177-CH Date 9-10-91

Module 065-1 Barometric Press 29.29

Orifice SMALL (3.46)

ΔH in. H_2O	Vw initial	Vw final	Vw ft.³	Vd initial	Vd final	Vd ft.³	tw °F	tdi °F	tdo °F	Pw in H_2O	Time Θ min.
.5	825.465	829.462	3.997	410.296	414.249	3.953	80	77	77	—	10 min
1.0	829.750	835.368	5.618	414.516	420.028	5.512	80	77	77	—	10 min
2.0	835.599	843.400	7.801	420.268	427.856	7.588	80	78	77	—	10 min
4.0	843.738	854.683	10.945	428.178	438.764	10.586	80	78	78	—	10 min
6.0	854.932	867.055	12.123	438.991	450.643	11.652	80	78	78	—	10 min

ΔH	ΔH / 13.6	Mc (Y) Vw Pb (td + 460) / Vd (Pb + ΔH/13.6) (tw + 460)	ΔHa (For Small Orifice Only) 0.0317 ΔH / Pb (td + 460)	(tw + 460) Θ² / Vw
.5	.0368	1.00		1.8393
1.0	.0737	1.01		1.8620
2.0	.147	1.02		1.9279
4.0	.294	1.02		1.9587
~~5.0~~	~~.368~~	1.02		1.9957
Average		1.01		1.9257

ΔH = Orifice Setting

Vw = Volume of Gas of Wet Test Meter

Vd = Volume of Gas of Dry Gas Meter

Pw = Pressure of Wet Test Meter

tw = Temperature of Fluid in Wet Test Meter

tdi = Inlet Temperature of Dry Gas Meter

tdo = Outlet Temperature of Dry Gas Meter

td = Average Temperature of Dry Gas Meter

Θ = Time required to pull specified cubic feet

Mc = Dry Gas Meter Correction Factor

ΔHa = Orifice setting that would pull .75 cfm of air at standard conditions

Dry Gas Meter Calibration Sheet

Client Metal Shredders, Inc. Run By C. Scott

Project No. 91-172-C14 Date 7-8-91

Module Meter 68-1 Barometric Press 29.40

Orifice SMALL

Sto P = 4.36

ΔH in. H_2O	Vw initial	Vw final	Vw ft.³	Vd initial	Vd final	Vd ft.³	tw °F	tdi °F	tdo °F	Pw in H_2O	Time Θ min.
.5	499.299	503.551	3.252	281.536	284.743	3.207	72	72	70	—	10 min
1.0	503.717	illegible	4.844	284.913	289.602	4.780	72	71	70	—	10 min
2.0	508.00	514.83	6.830	290.124	296.848	6.724	72	71	70	—	10 min
4.0	515.122	524.890	9.768	297.136	306.713	9.577	72	71	70	—	10 min
6.0	525.312	537.22	11.810	307.135	318.696	11.561	72	74	71	—	10 min

ΔH	ΔH / 13.6	Mc (Y) Vw Pb (td + 460) / Vd (Pb + ΔH/13.6) (tw + 460)	ΔHa (For Small Orfice Only) 0.0317 ΔH / Pb (td + 460)	(tw + 460) Θ² / Vw
.5	.0368	1.01	2.7120	
1.0	.0737	1.01	2.4492	
2.0	.147	1.01	2.4639	
4.0	.294	1.01	2.4093	
6.0	.441	1.01	2.4630	
Average		1.01	2.4995	

ΔH = Orfice Setting

Vw = Volume of Gas of Wet Test Meter

Vd = Volume of Gas of Dry Gas Meter

Pw = Pressure of Wet Test Meter

tw = Temperature of Fluid in Wet Test Meter

tdi = Inlet Temperature of Dry Gas Meter

tdo = Outlet Temperature of Dry Gas Meter

td = Average Temperature of Dry Gas Meter

Θ = Time required to pull specified cubic feet

Mc = Dry Gas Meter Correction Factor

ΔHa = Orfice setting that would pull .75 cfm of air at standard conditions

Dry Gas Meter Calibration Sheet

Client Metal Alliance, Inc. Run By Scott Teague

Project No. 91-172-OH Date 9/16/91

Module 6C Barometric Press 29.25

Orifice SM 3.26

ΔH in. H_2O	Vw initial	Vw final	Vw ft.³	Vd initial	Vd final	Vd ft.³	tw °F	tdi °F	tdo °F	Pw in H_2O	Time θ min.
.5	982.155	985.989	3.834	432.347	436.114	3.767	81	97			10
1.0	986.412	991.472	5.060	436.592	441.640	5.048	81	98			10
2.0	991.702	999.239	7.537	441.969	449.377	7.508	91	99			10
4.0	999.711	010.379	10.669	449.937	460.470	10.633	81	101			10
6.0	010.653	023.711	13.058	460.733	473.732	12.999	91	105			10

ΔH	ΔH / 13.6	Mc (Y) Vw Pb (td + 460) / Vd (Pb + ΔH/13.6) (tw + 460)	ΔHa (For Small Orifice Only) 0.0317 ΔH / Pb (td + 460)	(tw + 460) θ² / Vw
.5	.0368	0.96		
1.0	.0737	0.97		
2.0	.147	0.97		
4.0	.294	0.97		
6.0	.441	0.97		
Average		0.97		

ΔH = Orfice Setting
Vw = Volume of Gas of Wet Test Meter
Vd = Volume of Gas of Dry Gas Meter
Pw = Pressure of Wet Test Meter
tw = Temperature of Fluid in Wet Test Meter
tdi = Inlet Temperature of Dry Gas Meter
tdo = Outlet Temperature of Dry Gas Meter
td = Average Temperature of Dry Gas Meter
θ = Time required to pull specified cubic feet
Mc = Dry Gas Meter Correction Factor
ΔHa = Orfice setting that would pull .75 cfm of air at standard conditions

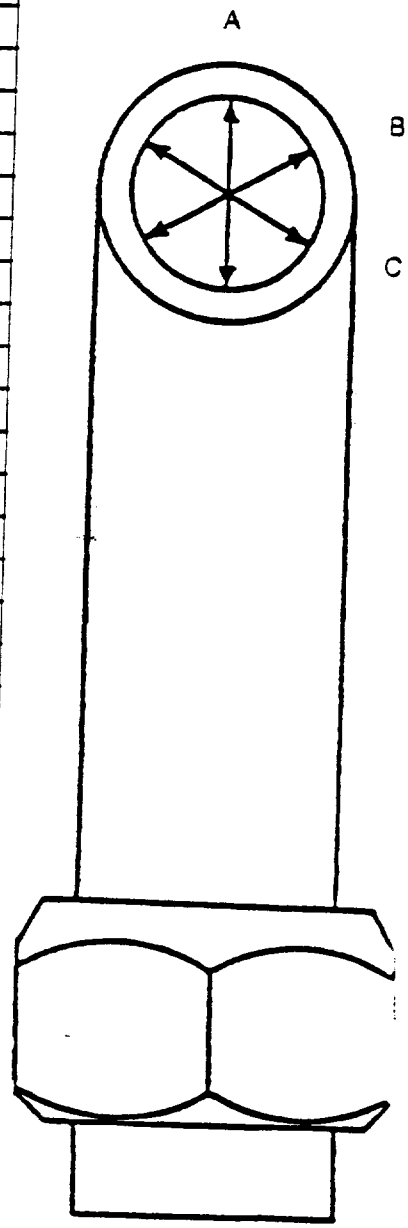
Nozzle Calibration

Sized By JOHN C SUTTON

AEROTHERM

Date	Nozzle	Dimension A	Dimension B	Dimension C	Difference	Avg. Diameter
7-9-91	1-1	.118	.118	.119	.001	.118
	1-2	.120	.121	.122	.002	.121
	1-3	.121	.122	.121	.001	.121
	1-4	.123	.122	.121	.002	.122
	1-5	.122	.123	.123	.001	.123
	1-6	.126	.125	.126	.001	.126
	1-7	.242	.242	.242	.000	.242
	1-8	.250	.250	.249	.001	.250
	1-9	.254	.252	.252	.002	.253
	1-10	.308	.309	.309	.001	.309
	1-11	.306	.306	.305	001	.306
	1-12	.309	.310	.310	.001	.310
	1-13	.310	.311	.310	.001	.310
	1-14	.311	.311	.309	.002	.310
	1-15	311	.310	.312	002	311
	1-16	.310	.312	.310	.002	.311
	1-17	.310	.311	.312	.002	.311
	1-18	.311	.310	.311	.001	.311
	1-19	.312	312	312	000	312
	1-20	.314	.314	.315	001	.314
	1-21	.378	.380	.380	002	.380
	1-22	498	.497	.496	002	.497
	1-23	.559	.560	.560	.001	.560
	1-24	621	.623	622	002	.622
	1-25	626	.626	.626	.000	.626
	1-26	.629	.628	629	001	.629
	1-27	.659	.658	.658	.001	.658
	1-28	.725	.724	.725	.001	.725
	1-29	.750	.751	.750	001	.750
	1-30	384	385	.384	.001	.384
	1-31	.122	121	.122	001	.122
	1-32	.125	126	.126	001	.126
	1-33	249	248	250	.002	.249
	1-34	255	254	255	001	.255
	1-35	311	.312	.313	002	.312

All Dimensions are in inches.



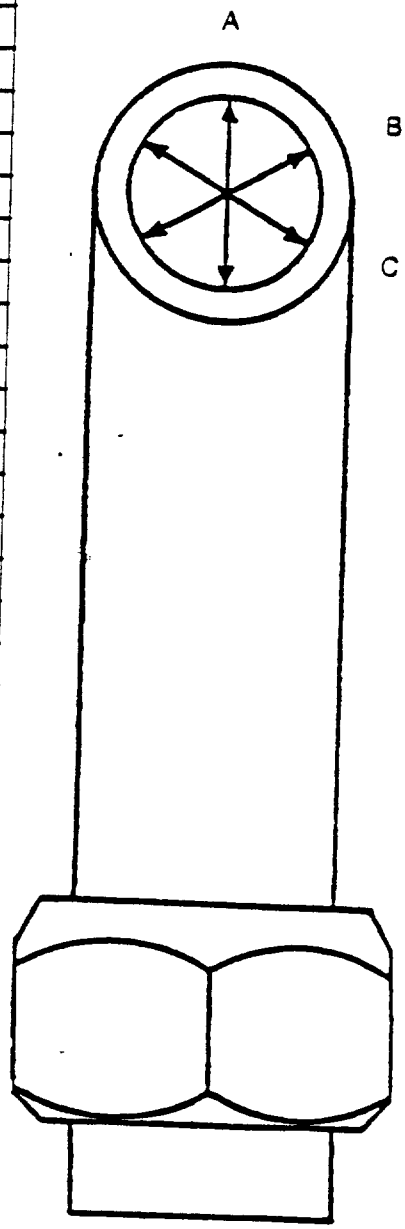
Nozzle Calibration

Sized By John Sutton

AEROTHERM

Date	Nozzle	Dimension A	Dimension B	Dimension C	Difference	Avg. Diameter
7-9-91	1-36	.560	.559	.560	.001	.560
	1-37	.200	.199	.200	.001	.200
	1-38	.185	.184	.185	.001	.185
	1-39	.305	.305	.305	.000	.305
	1-40	.310	.311	.309	.002	.310
	1-41	.250	.248	.248	.002	.249
	1-42	.375	.374	.375	.001	.375
	1-43	.623	.622	.623	.001	.623
	1-44	.752	.752	.752	.000	.752

All Dimensions are in inches.



Thermocouple Calibrations

(Oven, ~~Probe~~) Stack

Client Metal Shredders Inc Barometric Press 29.43

Project No. 41-172-OH

Aerotherm

Thermocouple Identification	Trendicator	Thermometer	Thermometer Number	Date
(Probes)		GCA/PS	30755	2-9-91
A3-1	248	247		
A3-2	300	301		
A5-1	247	247		
A5-2	249	249		
A5-3	310	310		
A5-4	308	307		
A7-1	248	249		
A7-2	310	310		
A10-1	247	247		
A10-2	245	245		
A10-3	249	249		
A10-4	310	310		
A15-1	290	290		
A15-2	320	320		
A15-3	311	311		
A15-4	315	315		
A20-1	312	312		
A20-2	310	310		
(OVENS)				
A-1	300	300		
A-2	300	300		
A-3	248	248		
A-4	248	248		
A-5	250	250		
A-6	280	280		
A-7	300	300		
A-8	310	310		

Thermocouple Calibrations

(Oven, Probe)

Client Metal Shredders Inc Barometric Press 29.43

Project No. 91-172-CH

Aetherm Probe heater

Thermocouple Identification	Trendicator	Thermometer	Thermometer Number	Date
		GCA/PS	30755	7-9-91
A 3-1	230	230		
A 3-2	236	235		
A 5-1	240	239		
A 5-2	240	240		
A 5-3	230	228		
A 5-4	232	230		
A 7-1	244	243		
A 7-2	239	240		
A 10-1	238	238		
A 10-2	248	247		
A 10-3	250	250		
A 10-4	251	250		
A 15-1	247	248		
A 15-2	246	246		
A 15-3	240	240		
A 15-4	242	242		
A 20-1	238	238		
A 20-2	236	236		

Pitot Calibration Form

Client Metal Shredders, Inc. Run By Bruce Woods

Project No. 91-172-OH Date 7-8-91

Test Location _____ Pitot No. A3-1

	● "A" Side Calibration			
Run No.	Δ P std cm H_2O (in. H_2O)	Δ P (s) cm H_2O (in. H_2O)	$C_p(s)$	Deviation $C_p(s) - \bar{C}_p(A)$
1	1.0	1.58	.79	—
2	1.0	1.58	.79	—
3	1.0	1.58	.79	—
	Average	$\bar{C}_p$ (Side A)	.79	—

	●● "B" Side Calibration			
Run No.	Δ P std cm H_2O (in. H_2O)	Δ P (s) cm H_2O (in. H_2O)	$C_p(s)$	Deviation $C_p(s) - \bar{C}_p(B)$
1	1.0	1.58	.79	—
2	1.0	1.58	.79	—
3	1.0	1.58	.79	—
	Average	$\bar{C}_p$ (Side B)	.79	—

Calculations:

$$C_p\,(s) = 0.99 \sqrt{\frac{\Delta P\ (\text{standard})}{\Delta P\ (s)}}$$

Deviation = $C_{p(s)} = \bar{C}_p$ (A or B)

$$\text{Average Deviation} = \sigma(\text{A or B}) = \frac{\sum_{1}^{3} |C_p(s) - \bar{C}_p(\text{A or B})|}{3}$$

$|\bar{C}_p(\text{Side A}) - \bar{C}_p(\text{Side B})| =$ ———

Nozzle size used for Calibrations (inches) .620

Intercomponent Spacings During Calibrations:

Pitot - Nozzle: 1/2 ≥

Pitot - Thermocouple: 1/2 ≥

Pitot - Probe Sheath: 5 1/2

Pitot Calibration Form

Client Metal Shredders Inc. Run By Bruce Woods

Project No. 91-172-04 Date 7-8-91

Test Location _____ Pitot No. A5-1

	● "A" Side Calibration			
Run No.	Δ P std cm H_2O (in. H_2O)	Δ P (s) cm H_2O (in. H_2O)	$C_p(s)$	Deviation $C_p(s) - \bar{C}_p(A)$
1	1.0	1.58	.79	—
2	1.0	1.58	.79	—
3	1.0	1.58	.79	—
Average		$\bar{C}_p$ (Side A)	.79	—

	●● "B" Side Calibration			
Run No.	Δ P std cm H_2O (in. H_2O)	Δ P (s) cm H_2O (in. H_2O)	$C_p(s)$	Deviation $C_p(s) - \bar{C}_p(B)$
1	1.0	1.58	.79	—
2	1.0	1.58	.79	—
3	1.0	1.58	.79	—
Average		$\bar{C}_p$ (Side B)	.79	—

Calculations:

$$C_p(s) = 0.99 \sqrt{\frac{\Delta P \text{ (standard)}}{\Delta P \text{ (s)}}}$$

Deviation = $C_{p(s)} = \bar{C}_p$ (A or B)

$$\text{Average Deviation} = \sigma(\text{A or B}) = \frac{\sum_{1}^{3} |C_p(s) - \bar{C}_p(\text{A or B})|}{3}$$

$|\bar{C}_p(\text{Side A}) - \bar{C}_p(\text{Side B})| =$ ———

Nozzle size used for Calibrations (inches) .620

Intercomponent Spacings During Calibrations:

Pitot - Nozzle: 1/2 ≥

Pitot - Thermocouple: 1/2 ≥

Pitot - Probe Sheath: 5 1/2

PARTICULATE FILTER PERFORMANCE DATA

Gelman A/E Type
Glass Fiber Filters

For gravimetric analysis of air pollutants and pre filter for use upstream of membrane filters. Standard filter for dissolved and suspended solids testing in sanitary water analysis procedures. Binderfree and organic-free. DOP efficiency is 99.98% (0.3 micrometer).

Analytical Data Sheet

Client [illegible] Project No. [illegible] Date [illegible]

Run No. 1
Filter No. 91- 184
Acetone No.
Amount liquid lost during transport
Acetone blank volume, ml
Acetone wash volume, ml
Acetone blank concentration, mg/mg (equation 5-4)**
Acetone wash blank, mg (equation 5-5)**

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.1200	1.1653	.0147
2	106.2771	106.2603	.0168
3			
	Less acetone blank		
	Weight of particulate matter		.0315

	Volume of Liquid Water Collected	
	Impinger Volume, ml.	Silica Gel Weight, g
Final	515	415
Initial	500	400
Liquid collected	15	18
Total Volume Collected	33	g* ml

Run No. 2
Filter No. 91- 116
Acetone No.
Amount liquid lost during transport
Acetone blank volume, ml
Acetone wash volume, ml
Acetone blank concentration, mg/mg (equation 5-4)**
Acetone wash blank, mg (equation 5-5)**

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.0714	1.0714	.0000
2	105.3182	105.3022	.0160
3			
	Less acetone blank		
	Weight of particulate matter		.0160

	Volume of Liquid Water Collected	
	Impinger Volume, ml.	Silica Gel Weight, g
Final	510	426
Initial	500	400
Liquid collected	10	26
Total Volume Collected	36	g* ml

Run No. 3
Filter No. 91- 189
Acetone No.
Amount liquid lost during transport
Acetone blank volume, ml
Acetone wash volume, ml
Acetone blank concentration, mg/mg (equation 5-4)**
Acetone wash blank, mg (equation 5-5)**

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.1085	1.1042	.0043
2	104.2433	104.2224	.0209
3			
	Less acetone blank		
	Weight of particulate matter		.0252

	Volume of Liquid Water Collected	
	Impinger Volume, ml.	Silica Gel Weight, g
Final	515	410
Initial	500	400
Liquid collected	15	10
Total Volume Collected	25	g* ml

Run No.
Filter No.
Acetone No.
Amount liquid lost during transport
Acetone blank volume, ml
Acetone wash volume, ml
Acetone blank concentration, mg/mg (equation 5-4)**
Acetone wash blank, mg (equation 5-5)**

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1			
2			
3			
	Less acetone blank		
	Weight of particulate matter		

	Volume of Liquid Water Collected	
	Impinger Volume, ml.	Silica Gel Weight, g
Final		
Initial		
Liquid collected		
Total Volume Collected		g* ml

*Convert weight of water to volume by dividing total weight increase by density of water (1g/ml): $\frac{\text{Increase, g}}{\text{1g/ml}}$ = Volume Water, ml

**See Federal Register, Method 5, 6.6, & 6.7.

Analytical Data Sheet

Client MSI PEDCON [illegible]   Project No. [illegible] ZBCY   Date [illegible]

Run No. 1
Filter No. 91-030
Acetone No.
Amount liquid lost during transport
Acetone blank volume, ml
Acetone wash volume, ml
Acetone blank concentration, mg/mg (equation 5-4)**
Acetone wash blank, mg (equation 5-5)**

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.1089	1.0923	.0166
2	107.3643	107.3473	.0170
3			
		Less acetone blank	
		Weight of particulate matter	.0336

	Volume of Liquid Water Collected		
	Impinger Volume, ml.	Silica Gel Weight, g	
Final	504	410	
Initial	500	400	
Liquid collected	4	10	
Total Volume Collected	14	g*	ml

Run No. 2
Filter No. 91-108
Acetone No.
Amount liquid lost during transport
Acetone blank volume, ml
Acetone wash volume, ml
Acetone blank concentration, mg/mg (equation 5-4)**
Acetone wash blank, mg (equation 5-5)**

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.0690	1.0668	.0022
2	108.2[illegible]	108.2332	.0227
3			
		Less acetone blank	
		Weight of particulate matter	.0251

	Volume of Liquid Water Collected		
	Impinger Volume, ml.	Silica Gel Weight, g	
Final	502	412	
Initial	500	400	
Liquid collected	2	12	
Total Volume Collected	14	g*	ml

Run No. 3
Filter No. 91-205
Acetone No.
Amount liquid lost during transport
Acetone blank volume, ml
Acetone wash volume, ml
Acetone blank concentration, mg/mg (equation 5-4)**
Acetone wash blank, mg (equation 5-5)**

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.1090	1.1054	.0036
2	106.0867	106.0694	.0173
3			
		Less acetone blank	
		Weight of particulate matter	.0209

	Volume of Liquid Water Collected		
	Impinger Volume, ml.	Silica Gel Weight, g	
Final	502	414	
Initial	500	400	
Liquid collected	2	14	
Total Volume Collected	16	g*	ml

Run No.
Filter No.
Acetone No.
Amount liquid lost during transport
Acetone blank volume, ml
Acetone wash volume, ml
Acetone blank concentration, mg/mg (equation 5-4)**
Acetone wash blank, mg (equation 5-5)**

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1			
2			
3			
		Less acetone blank	
		Weight of particulate matter	

	Volume of Liquid Water Collected		
	Impinger Volume, ml.	Silica Gel Weight, g	
Final			
Initial			
Liquid collected			
Total Volume Collected		g*	ml

*Convert weight of water to volume by dividing total weight increase by density of water (1g/ml): $\frac{\text{Increase, g}}{\text{1g/ml}}$ = Volume Water, ml

**See Federal Register, Method 5, 6.6, & 6.7.

Analytical Data Sheet

Client MSI PECCON Project No. [illegible] Date [illegible]

4 SYSTEMS CYCLONE

Run No. _____
Filter No. 91-206
Acetone No. _____
Amount liquid lost during transport _____
Acetone blank volume, ml _____
Acetone wash volume, ml _____
Acetone blank concentration, mg/mg (equation 5-4)** _____
Acetone wash blank, mg (equation 5-5)** _____

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.1159	1.1053	.0106
2	99.6049	99.5791	.0258
3			
	Less acetone blank		
	Weight of particulate matter		.0364

	Volume of Liquid Water Collected	
	Impinger Volume, ml.	Silica Gel Weight, g
Final	505	412
Initial	500	400
Liquid collected	5	12
Total Volume Collected	17	g* ml

Run No. 2
Filter No. 91-183
Acetone No. _____
Amount liquid lost during transport _____
Acetone blank volume, ml _____
Acetone wash volume, ml _____
Acetone blank concentration, mg/mg (equation 5-4)** _____
Acetone wash blank, mg (equation 5-5)** _____

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.1096	1.1069	.0027
2	102.0017	101.9909	.0108
3			
	Less acetone blank		
	Weight of particulate matter		.0135

	Volume of Liquid Water Collected	
	Impinger Volume, ml.	Silica Gel Weight, g
Final	505	410
Initial	500	400
Liquid collected	5	10
Total Volume Collected	15	g* ml

Run No. 3
Filter No. 91-115
Acetone No. _____
Amount liquid lost during transport _____
Acetone blank volume, ml _____
Acetone wash volume, ml _____
Acetone blank concentration, mg/mg (equation 5-4)** _____
Acetone wash blank, mg (equation 5-5)** _____

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1	1.1177	1.0692	.0485
2	100.3902	100.3803	.0099
3			
	Less acetone blank		
	Weight of particulate matter		.0584

	Volume of Liquid Water Collected	
	Impinger Volume, ml.	Silica Gel Weight, g
Final	505	420
Initial	500	400
Liquid collected	5	20
Total Volume Collected	25	g* ml

Run No. _____
Filter No. _____
Acetone No. _____
Amount liquid lost during transport _____
Acetone blank volume, ml _____
Acetone wash volume, ml _____
Acetone blank concentration, mg/mg (equation 5-4)** _____
Acetone wash blank, mg (equation 5-5)** _____

Container Number	Weight of Particulate Collected g		
	Final Weight	Tare Weight	Weight Gain
1			
2			
3			
	Less acetone blank		
	Weight of particulate matter		

	Volume of Liquid Water Collected	
	Impinger Volume, ml.	Silica Gel Weight, g
Final		
Initial		
Liquid collected		
Total Volume Collected		g* ml

*Convert weight of water to volume by dividing total weight increase by density of water (1g/ml): $\frac{\text{Increase, g}}{\text{1g/ml}}$ = Volume Water, ml

**See Federal Register, Method 5, 6.6, & 6.7.

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PARTICULATE EMISSION TEST DATA

FACILITY :metal shredder scrubber
PROCESS/RUN NUMBER :
SOURCE/RUN :1
TEST DATE :9-19-91

****

VOLUME METERED AT STD. CONDITIONS = 82.58867330003892 DSCF

VOLUME WATER COLLECTED AT STP. = 1.55331 SCF
PERCENT MOISTURE BY VOLUME = 1.846058220972885 %

MOLECULAR WEIGHT OF STACK GAS = 28.63596113117538 LB/LB-MOL
PERCENT EXCESS AIR =-118750.0000000061 %

AVERAGE STACK GAS VELOCITY = 48.18809527731162 FT/SEC
ABSOLUTE STACK PRESSURE = 29.8875 IN. HG

STACK FLOW RATE AT ACTUAL COND. = 45976.99416313123 ACFM
STACK FLOW RATE AT STD. COND. = 45318.67322201521 DSCFM

STACK EMISSIONS = 5.780453673903187E-003 GR/DSCF
= 8.260268300007654E-007 LB/DSCF

STACK EMISSION RATE = 2.246066398885308 LB/HR

ISOKINETIC VARIATION = 92.74692859317949 %

****

TIME OF TEST = 60 MIN
VOLUME METERED = 81.67 CU.FT
DRY GAS METER CALB. FACT. = 1.01
TEST BAR. PRESSURE = 29.95 IN HG
AVERAGE DELTA H = 1.03
AVG. METER TEMP. = 69 DEG. F
VOL. H2O (IMPINGERS) = 15 ML
WEIGHT GAIN OF SILICA GEL = 18 GM
%CO2 = 0 %
%CO = 0 %
%O2 = 20.9 %
%N2 = 79.09999999999999 %
STATIC P OF STACK =-.85 IN. H2O
STACK TEMP. = 65 DEG. F
PITOT COEFFICIENT = .79
AVG. ROOT DELTA P = .911
STACK DIAMETER = 54 IN.
MASS PARTICULATE = 31 MG
NOZZLE DIAMETER = .309 IN
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PARTICULATE EMISSION TEST DATA

FACILITY :metal shredder scrubber
PROCESS/RUN NUMBER :
SOURCE/RUN :2
TEST DATE :9-19-91

****

VOLUME METERED AT STD. CONDITIONS = 106.4187000404615 DSCF

VOLUME WATER COLLECTED AT STP. = 1.69452 SCF
PERCENT MOISTURE BY VOLUME = 1.567356886942988 %

MOLECULAR WEIGHT OF STACK GAS = 28.66616120773086 LB/LB-MOL
PERCENT EXCESS AIR =-118750.0000000061 %

AVERAGE STACK GAS VELOCITY = 48.34583409504724 FT/SEC
ABSOLUTE STACK PRESSURE = 29.8875 IN. HG

STACK FLOW RATE AT ACTUAL COND. = 46127.49516676282 ACFM
STACK FLOW RATE AT STD. COND. = 45251.3475661306 DSCFM

STACK EMISSIONS = 2.315382539970101E-003 GR/DSCF
= 3.308681649617275E-007 LB/DSCF

STACK EMISSION RATE = .8983338198750578 LB/HR

ISOKINETIC VARIATION = 119.6857316774179 %

****

TIME OF TEST = 60 MIN
VOLUME METERED = 108.02 CU.FT
DRY GAS METER CALB. FACT. = 1.01
TEST BAR. PRESSURE = 29.95 IN HG
AVERAGE DELTA H = 1.03
AVG. METER TEMP. = 83 DEG. F
VOL. H2O (IMPINGERS) = 10 ML
WEIGHT GAIN OF SILICA GEL = 26 GM
%CO2 = 0 %
%CO = 0 %
%O2 = 20.9 %
%N2 = 79.09999999999999 %
STATIC P OF STACK =-.85 IN. H2O
STACK TEMP. = 69 DEG. F
PITOT COEFFICIENT = .79
AVG. ROOT DELTA P = .911
STACK DIAMETER = 54 IN.
MASS PARTICULATE = 16 MG
NOZZLE DIAMETER = .309 IN
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PARTICULATE EMISSION TEST DATA

FACILITY :metal shredder scrubber
PROCESS/RUN NUMBER :
SOURCE/RUN :3
TEST DATE :9-19-91

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VOLUME METERED AT STD. CONDITIONS = 82.17077154425355 DSCF

VOLUME WATER COLLECTED AT STP. = 1.17675 SCF
PERCENT MOISTURE BY VOLUME = 1.411859618855255 %

MOLECULAR WEIGHT OF STACK GAS = 28.68301089170084 LB/LB-MOL
PERCENT EXCESS AIR =-118750.0000000061 %

AVERAGE STACK GAS VELOCITY = 48.33163175591898 FT/SEC
ABSOLUTE STACK PRESSURE = 29.8875 IN. HG

STACK FLOW RATE AT ACTUAL COND. = 46113.94449912498 ACFM
STACK FLOW RATE AT STD. COND. = 45309.51831546558 DSCFM

STACK EMISSIONS = 4.722847220571578E-003 GR/DSCF
= 6.748948678196786E-007 LB/DSCF

STACK EMISSION RATE = 1.834749682469367 LB/HR

ISOKINETIC VARIATION = 92.29617560882366 %

****

TIME OF TEST = 60 MIN
VOLUME METERED = 83.09999999999999 CU.FT
DRY GAS METER CALB. FACT. = 1.01
TEST BAR. PRESSURE = 29.95 IN HG
AVERAGE DELTA H = 1.03
AVG. METER TEMP. = 81 DEG. F
VOL. H2O (IMPINGERS) = 15 ML
WEIGHT GAIN OF SILICA GEL = 10 GM
%CO2 = 0 %
%CO = 0 %
%O2 = 20.9 %
%N2 = 79.09999999999999 %
STATIC P OF STACK =-.85 IN. H2O
STACK TEMP. = 69 DEG. F
PITOT COEFFICIENT = .79
AVG. ROOT DELTA P = .911
STACK DIAMETER = 54 IN.
MASS PARTICULATE = 25.2 MG
NOZZLE DIAMETER = .309 IN
****

PARTICULATE EMISSION TEST REVIEW SHEET

1. **Facility Name:** Metal Shredder Scrubber
2. **Run Number:** 1
3. **Test Date:** 1-19-91
4. **Time of Test:** 50 (min)
5. **Volume Metered:** 81.67 (ft^3)
6. **Dry Gas Meter Calb. Factor:** 1.01
7. **Test Barometric Pressure:** 29.95 (in. Hg)
8. **Avg. Delta H:** 1.03 (in. H_2O)
9. **Avg. Meter Temp:** 69 (Deg. F)
10. **Volume H_2O (Impingers):** 15 (ML)
11. **Weight Gain of Silica Gel:** 18 (GM)
12. **% CO_2:** 0
13. **% CO:** —
14. **% O_2:** 20.9
15. **% N_2:** 79.1
16. **Static Pressure of Stack:** -.95 (in. H_2O)
17. **Stack Temp:** 65 (Deg. F)
18. **Pitot Coefficient:** .79
19. **Avg. Root Delta P:** .911
20. **Stack Diameter:** 54 (in.)
21. **Mass Particulate:** .0310 (mg)
22. **Nozzle Diameter:** .309 (in.)

Coal Data

1. % Hydrogen: _____
2. % Carbon: _____
3. % Sulfur: _____
4. % Nitrogen: _____
5. % Oxygen: _____
6. F Factor: _____
7. Gross Calorific Value: _____

PARTICULATE EMISSION TEST REVIEW SHEET

1. **Facility Name:** Metal Shredder Scrubber
2. **Run Number:** -2
3. **Test Date:** 9-19-91
4. **Time of Test:** 60 (min)
5. **Volume Metered:** 108.02 (ft^3)
6. **Dry Gas Meter Calb. Factor:** 1.01
7. **Test Barometric Pressure:** 29.95 (in. Hg)
8. **Avg. Delta H:** 1.03 (in. H_2O)
9. **Avg. Meter Temp:** 93 (Deg. F)
10. **Volume H_2O (Impingers):** 10 (ML)
11. **Weight Gain of Silica Gel:** 26 (GM)
12. **% CO_2:** 0
13. **% CO:** —
14. **% O_2:** 20.9
15. **% N_2:** 79.1
16. **Static Pressure of Stack:** -.85 (in. H_2O)
17. **Stack Temp:** 69 (Deg. F)
18. **Pitot Coefficient:** .79
19. **Avg. Root Delta P:** .911
20. **Stack Diameter:** 54 (in.)
21. **Mass Particulate:** .0160 (mg)
22. **Nozzle Diameter:** .309 (in.)

Coal Data

1. **% Hydrogen:** _____
2. **% Carbon:** _____
3. **% Sulfur:** _____
4. **% Nitrogen:** _____
5. **% Oxygen:** _____
6. **F Factor:** _____
7. **Gross Calorific Value:** _____

PARTICULATE EMISSION TEST REVIEW SHEET

1. Facility Name: Metal Shredder Scrubber
2. Run Number: 2
3. Test Date: 1-19-91
4. Time of Test: 60 (min)
5. Volume Metered: 83.10 (ft^3)
6. Dry Gas Meter Calb. Factor: 1.01
7. Test Barometric Pressure: 29.95 (in. Hg)
8. Avg. Delta H: 1.03 (in. H_2O)
9. Avg. Meter Temp: 81 (Deg. F)
10. Volume H_2O (Impingers): 15 (ML)
11. Weight Gain of Silica Gel: 10 (GM)
12. % CO_2: 0
13. % CO: —
14. % O_2: 20.9
15. % N_2: 79.1
16. Static Pressure of Stack: -.3 (in. H_2O)
17. Stack Temp: 89 (Deg. F)
18. Pitot Coefficient: .79
19. Avg. Root Delta P: .911
20. Stack Diameter: 54 (in.)
21. Mass Particulate: .0252 (mg)
22. Nozzle Diameter: .309 (in.)

Coal Data

1. % Hydrogen: _____
2. % Carbon: _____
3. % Sulfur: _____
4. % Nitrogen: _____
5. % Oxygen: _____
6. F Factor: _____
7. Gross Calorific Value: _____