	Note: This is a reference cited in <i>AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.</i> 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.
AP42 Section:	11.1
Reference Number	: 52
Title:	Air Emission Test Report, Results Of A Source Emission Compliance Test Performed On A Asphalt Batch Plant Wet
Scrubber System,	Tri-City Paving, Inc., Little Falls, Minnesota, May 11, 1993,
	Twin City Testing Corporation, St. Paul, MN,

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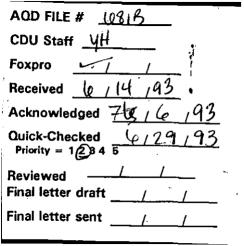
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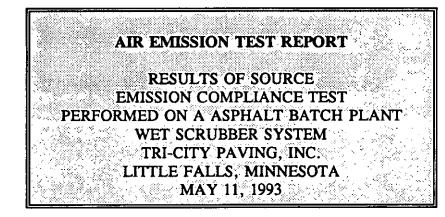
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AP-42 Section Reference Report Sect. Reference

Report Number: 4232-93-2590

Report Issued: June 7, 1993



Submitted to:

TRI-CITY PAVING, INC. P.O.Box 326 Little Falls, MN 56345

Submitted by:

TWIN CITY TESTING CORPORATION Air Quality Services Department 737 Pelham Blvd. St. Paul, Minnesota 55114

Prepared by:

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James Tryba, Manager Source and Ambient Testing Air Quality Services

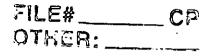
Approved by:

Aht Niemin

Ahto Niemioja Director Air Quality Services



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662 CROMWELL AVENUE ST. PAUL, MN 55114 PHONE 612/645-3601

June 7, 1993

Mr. Jack Surma Tri-City Paving, Inc. P.O.Box 326 Little Falls, MN 56345



Re: Source Emission Compliance Test Report

Dear Mr. Surma:

Enclosed are two copies of Twin City Testing Corporation's report #4232-93-2590 concerning the particulate and opacity emission compliance tests performed on the wet scrubber system at your asphalt batch plant facility located in Little Falls, Minnesota. Please note that the fuel analysis per Minnesota Exhibit D is not included with this report. Please forward the fuel anlysis to us when it becomes available so we can include it in the final report. Please forward a copy of this report to the Minnesota Pollution Control Agency at your earliest convenience.

Thank you for allowing TCT the opportunity of working with you on this project. If you have any questions regarding this report please call me at (612) 659-7574.

Sincerely,

Ant Niemin

Ahto Niemioja Director, Air Quality Service

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- Appendix E: Process Data
- Appendix F: Minnesota Exhibit C
- Appendix G: MPCA Test Plan



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#### INTRODUCTION

Twin City Testing Corporation (TCT) was contracted by Tri-City Paving, Inc. to perform a source emission compliance test on the wet scrubber system at their asphalt batch plant facility located near Little Falls, Minnesota. The exhaust gasses from the scrubber unit were tested for particulate and opacity emissions on May 11, 1993. This report presents the results of the test program along with all substantiating documentation.

Tri-City Paving, Inc. was represented throughout the test period by Mr. Jack Surma. The TCT sampling team consisted of Messrs. Jim Tryba, Dave Christian, and Jerry Wallerius. The test proceedings were witnessed by Ms. Annette Elliott, Air Emissions Compliance Specialist for the Minnesota Pollution Control Agency.

#### TEST RESULTS

The results of the particulate and opacity emission tests are summarized in Table 1. The data indicates an average particulate emission rate of 11.33 pounds per hour for test Runs 1-1 thru 1-3 and a rate of 7.58 pounds per hour for test runs 1-2 thru 1-4. A 60 minute visible emissions test was performed concurrent with each test run. The highest average opacity achieved during the four test runs was 11.7%.

There were no sampling problems encountered during the test.



June 7, 1993

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# Table 1Summary of Emission Test ResultsTri-City Paving, Inc., Little Falls, MinnesotaWet Scrubber UnitMay 11, 1993

#### Parameter

Time of Test; Start Finish	<u>Run #1</u> 10:10 11:20	<u>Run #2</u> 11:58 13:08	<u>Run #3</u> 13:43 14:52	<u>Run #4</u> 15:35 16:40	
Effluent Temperature, °F	136	145	149	146	
Effluent Moisture Content, % v/v	14.12	13.74	13.40	12.52	
Effluent Composition, % v/v dry; Carbon Dioxide Oxygen	3.47 16.40	4.00 15.80	4.27 15.53	3.20 17.00	• ,
Effluent Flow Rate; Actual Conditions, acfm Dry Standard Conditions, dscfm	27,890 20,985	27,169 20,234	•	-	
Isokinetic Variation, %	107.9	107.4	106.9	106.3	
Effluent Particulate Concentration; Actual conditions, gr/acf Standard conditions, gr/dscf Effluent Particulate Emission Rate; Particle Mass Rate, lb./hr.	0.1247 0.1269 22.83	0.0214 0.0221 3.83	0.0404 0.0422 7.32		

Standard Conditions: 68°F, 29.92 in. Hg. Particulate concentration and emission rates are based on analysis of the sampling train front and back catches.



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#### **PROCESS DATA**

Tri-City Paving, Inc. operates a Barber-Greene Model 848A asphalt batch plant utilizing a wet scrubber unit for controlling particulate emissions. Process data is included in Appendix E. The maximum hourly plant hot mix asphalt output rate was 210 tons per hour. The maximum fuel usage was 400 gallons per hour. A fourth test run was performed at the request of the facility operator as they were having problems with the plant during the first test run.

#### **TEST PROCEDURES**

The EPA Methods referenced below are described in Appendix A of the Code of Federal Regulations, Title 40, Part 60 (40 CFR 60).

The number of sampling points and their location with in the source stack/duct was determined per EPA Method 1 which is entitled "Sample and velocity traverses for stationary sources". In this method the number of sampling points is based on the length of straight, undisturbed flow both before and after the sampling port location. The following data is specific to the source tested:

Stack cross-sectional dimensions, inches:	59.25" x 59.50"
Minimum required number of sampling points	s:25
Number of sampling points used:	30
Sampling point distribution;	
Number of sampling ports:	5
Number of sampling points per port:	6
Particulate test sampling time;	
Time at each sampling point, minutes:	2.0
Test run total sampling time, minutes:	60.0

Effluent flow measurements were made per EPA Method 2 which is entitled "Determination of stack gas velocity and volumetric flow rate (Type S pitot tube)". Gas velocity pressure (head) and temperature data were obtained during each EPA Method 5 particulate test run by traversing each of the sampling points defined by EPA Method 1. This data along with gas density (EPA Method 3) and moisture content (EPA Method 4) data was used to calculate the gas velocity at each sampling point. The source volumetric flow rate was calculated by multiplying the average gas velocity by the stack/duct cross-sectional area at the point of measurement. Velocity pressure (head) measurements were made using a Type S pitot tube constructed to the design specifications detailed in EPA Method 2. Such pitot tubes have a base line coefficient of 0.84.



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The density of the effluent was determined per EPA Method 3 which is entitled "Gas analysis for the determination of dry molecular weight". A multi-point, integrated gas sample was collected simultaneously with each EPA Method 5 particulate test run. The gas sample was analyzed for carbon dioxide and oxygen concentrations with a standard Orsat analyzer using commercially prepared solutions. For calculations of gas density the balance of the gas was assumed to be nitrogen and carbon monoxide.

The effluent moisture content was determined per EPA Method 4 which is entitled "Determination of moisture content in stack gases". Data for making a gas moisture content determination was collected simultaneously with each EPA Method 5 particulate test run. The gas moisture content was calculated from the mass and/or volume of liquid collected in the Method 5 sampling train cold box impingers and the volume of gas sampled.

The effluent particulate concentration was determined per EPA Method 5 which is entitled "Determination of particulate emissions from stationary sources". For each test run, particulate matter was with drawn from the gas stream at each of the EPA Method 1 defined sampling points and collected on a glass fiber filter which was maintained at  $248\pm25$ °F. Water vapor, organic vapors and other matter in vapor form which passed through the filter was collected in an ice-cooled impinger trap who's exit temperature was maintained at less than 68°F. Sampling was performed using a Grasby-Nutech Model 2010 Method 5 stack sampling system which employed a five foot inconel lined probe and a 0.344 inch nominal diameter nozzle. Particulate emissions included analyses of both the front and back (condensible organics) catches as required by Minnesota Rule 7005.0500.

Source visible emissions were determined by plume opacity observations made by a certified opacity reader per EPA Method 9 which is entitled "Visual determination of the opacity of emissions from stationary sources".



# APPENDIX A

# CALCULATIONS



# \* SUMMARY OF TEST DATA •

SAMPLING TRAIN DATA		Run 1-1	Run 1-2	Run 1–3	Run 1–4
Sampling time, minutes Sampling nozzle diameter, inches Sampling nozzle area, sq.ft. Isokinetic variation, % Sample gas volume, acf Sample gas volume, dscf Avg.meter temperature, deg R Avg.oriface pressure drop, in.H2O Total particulate collected, mg	Dn An Vm Vmstd Tm dH Mn	60 0.344 0.000645 107.9 36.507 35.884 535 1.35 295.71	60 0.344 0.000645 107.4 35.767 34.515 545 1.26 49.59	60 0.344 0.000645 106.9 35.834 34.265 550 1.25 93.95	60 0.344 0.000645 106.3 37.408 35.627 552 1.37 148.02
Stack Area, sq.ft. Abs.stack gas pressure, in.Hg. Barometric pressure, in.Hg. Avg.stack temperature, deg R Avg. sq.rt. velocity head (Cp=.84) Avg.stack gas velocity, ft./sec.	A Ps Pbar Ts Vs	24.4818 29.59 29.59 596 0.31 18.987	24.4818 29.60 29.60 605 0.30 18.496	24.4818 29.60 29.60 609 0.30 18.543	24.4818 29.58 29.58 606 0.31 19.086
STACK GAS MOISTURE CONTENT					
Total water collected, ml Moisture in stack gas, %	Vic Bws	126 14.12	116 13.74	114 13.40	108 12.52
STACK GAS FLOW RATE					
Stack gas flow rate, dscf/hr. Stack gas flow rate, acfm Stack gas flow rate, dscfm	Qsd	1259115 27,890 20,985	1214065 27,169 20,234	1213921 27,238 20,232	1267557 28,036 21,126
PARTICULATE CONCENTRATION					
Particulate concentration, gr/acf Particulate concentration, gr/dscf	Cs	0.1247 0.1269	0.0214 0.0221	0.0404 0.0422	0.0609 0.0640
PARTICULATE EMISSION RATE					
Particle mass rate, lb./hr. Particle mass rate, lb./1000 lb.gas	Е	22.83 0.2168	3.83 0.0378	7.32 0.0725	11.59 0.1107
ORSAT DATA					
Percent CO2 by volume Percent O2 by volume Percent CO by volume Percent N2 by volume	CO2 O2 CO N2	3.47 16.40 0.00 80.13	4.00 15.80 0.00 80.20	4.27 15.53 0.00 80.20	3.20 17.00 0.00 79.80



Plant # & Location	=	TRI-CITY PA	/ING, Little Fa	lls, MN	
Date of Test	=	May 11, 1993			
Process Tested	=	Asphalt Plant	Net Scrubber		
Number of Sampling Points	=	30			
Pitot Tube Coefficient	=	0.84			
Stack Area, sq.ft.	=	24.4818			
Y Factor	=	1.0041			
		Run 1-1	Run 1–2	Run 1–3	Run 1-4
Dry Gas Meter Volume, cfd.	=	36.507	35.767	35.834	37.408
Barometric Pressure, in Hg.	=	29.59	29.60	29.60	29.58
Stack Pressure, in.Hg.	=	29.59	29.60	29.60	29.58
Total Water Collected, ml.	=	126.2	115.8	113.8	108.2
% Carbon Dioxide	=	3.47	4.00	4.27	3.20
% Oxygen	=	16.40	15.80	15.53	17.00
% Carbon Monoxide	=	0.00	0.00	0.00	0.00
% Nitrogen	=	80.13	80.20	80.20	79.80
Total Particulate, gr. (see Lab Data)	=	0.29571	0.04959	0.09395	0.14802
Total Sampling Time, min.	=	60	60	60	60
Nozzle Diameter, inches	=	0.344	0.344	0.344	0.344
Nozzle Area, sq.ft.	=	0.0006454	0.0006454	0.0006454	0.0006454
Laboratory Data:					
Front Catch :		Run 1-1	Run 1-2	Run 1-3	Run 1–4
Front Wash	=	0.07435	0.00646	0.02244	0.02498
Filter Catch	=	0.21105	0.03370	0.06011	0.11607
Front Half Total	=	0.28540	0.04016	0.08255	0.14105
Back Catch :					
** Impinger Catch	=	0.00830	0.00565	0.00825	0.00532
Impinger Wash		0.00201	0.00378	0.00315	0.00165
Back Half Total	=	0.01031	0.00943	0.01140	0.00697
TOTAL PARTICULATE COLLECTED	=	0.29571	0.04959	0:09395	0.14802

\*\* Chloroform/Ethyl Ether Extraction



Ts = Tm = Run 1~1	596 535 Stack	dH = SR dP = Velocity		npinger Water ilica Gel = Meter Temperature		120 ml 6.2 gr Sq.Root Velocity
Point #	Temp.	Pressure	Pressure	Inlet	Outlet	Pressure
A1	 127	0.22	2.83		65	0.46904
2	128	0.16	2.06	67	66	0.40000
3	129	0.12	1.54	67	66	0.34641
4	126	0.05	0.64	69	67	0.22361
5	131	0.05	0.64	69	67	0.22361
6	128	0.05	0.64	70	67	0.22361
B1	129	0.21	2.7	72	68	0.45826
2	131	0.16	2.06	73	69	0.40000
3	142	0.11	1.41	75	69	0.33166
4	133	0.06	0.77	75	70	0.24495
5	132	0.05	0.64	75	70	0.22361
6	133	0.05	0.64	76	71	0.22361
C1	134	0.22	2.83	77	72	0.46904
2	137	0.16	2.06	79	72	0.40000
3	13 <del>9</del>	0.11	1.41	80	73	0.33166
4	140	0.08	1.03	80	74	0.28284
5	138	0.05	0.64	80	74	0.22361
6	139	0.05	0.64	80	74	0.22361
DI	136	0.16	2.06	85	75	0.40000
2	140	0.14	1.8	82	76	0.37417
3	141	0.1	1.29	83	76	0.31623
4	141	0.07	0.9	83	76	0.26458
5	141	0.05	0.64	83	77	0.22361
6	140	0.06	0.77	83	77	0.24495
E1	136	0.15	1.93	82	78	0.38730
2	142	0.14	1.8	84	78	0.37417
3	143	0.11	1.41	85	79	0.33166
4	144	0.09	1.16	86	79	0.30000
5	143	0.06	0.77	86	79	0.24495
6	142	0.06	0.77	86	80	0.24495

Run 1-1

.

Ts = Tm = Run 1~2	605 545 Stack	dH = SR dP = Velocity	0.30 S Orifice	npinger Water : ilica Gel ≈ Meter Temperature		112 ml 3.8 gr Sq.Root Velocity
Point #	Temp.	Pressure	Pressure	Inlet	Outlet	Pressure
A1	 129	0.22	2.83		81	0.46904
2	131	0.16	2.06	82	80	0.40000
3	138	0.1	1.29	82	80	0.31623
4	141	0.07	0.9	82	80	0.26458
5	142	0.05	0.64	83	80	0.22361
6	140	0.04	0.51	83	81	0.20000
B1	140	0.21	2.7	84	81	0.45826
2	145	0.18	2.31	86	81	0.42426
3	147	0.07	0.9	86	81	0.26458
4	147	0.05	0.64	86	82	0.22361
5	147	0.05	0.64	87	82	0.22361
6	145	0.04	0.51	87	82	0.20000
C1	143	0.18	2.31	87	83	0.42426
2	148	0.16	2.06	88	83	0.40000
3	149	0.07	0.9	89	83	0.26458
4	150	0.05	0.64	88	83	0.22361
5	149	0.04	0.51	88	84	0.20000
6	148	0.04	0.51	89	84	0.20000
D1	147	0.18	2.31	89	85	0.42426
2	´ 150	0.12	1.54	90	85	0.34641
3	150	0.09	1.16	90	85	0.30000
4	150	0.07	0. <del>9</del>	90	85	0.26458
5	151	0.04	0.51	90	85	0.20000
6	150	0.04	0.51	90	85	0.20000
E1	144	0.16	2.06	90	86	0.40000
2	148	0.14	1.8	91	87	0.37417
3	148	0.12	1.54	92	87	0.34641
4	150	0.08	1.03	92	87	0.28284
5	150	0.07	0.90	92	87	0.26458
6	147	0.05	0.64	92	87	0.22361

Run 1-2



Ts = Tm = Run 1-3	609 550 Stack	dH = SR dP = Velocity		mpinger Water = Silica Gel = Meter	=	109 ml 4.8 gr Sq.Root Velocity
Point #	Temp.	Pressure	Pressure	Temperature Inlet	Outlet	Pressure
A1 -	131	0.23	3.01	87	87	0.47958
2	134	0.16	2.1	88	87	0.40000
3	138	0.07	0.92	88	87	0.26458
4	145	0.07	0.92	88	87	0.26458
5	145	0.05	0.65	89	87	0.22361
6	145	0.04	0.52	89	87	0.20000
B1	143	0.2	2.62	89	87	0.44721
2	150	0.14	1.83	90	87	0.37417
3	151	0.09	1,18	91	87	0.30000
4	152	0.05	0.65	91	87	0.22361
5	152	0.05	0.65	91	87	0.22361
6	152	0.04	0.52	91	88	0.20000
C1	145	0.18	2.36	91	88	0.42426
2	153	0.12	1.57	92	88	0.34641
3	154	0.09	1.18	93	88	0.30000
4	155	0.05	0.65	92	88	0.22361
5	156	0.04	0.52	92	88	0.20000
6	153	0.04	0.52	92	89	0.20000
D1	145	0.18	2.36	93	89	0.42426
2	154	0.12	1.57	94	89	0.34641
3	154	0.09	1.18	94	89	0.30000
4	154	0.05	0.65	94	89	0.22361
5	153	0.05	0.65	93	89	0.22361
6	154	0.04	0.52	93	90	0.20000
E1	145	0.19	2.49	93	90	0.43589
2	152	0.15	1.96	95	90	0.38730
3	154	0.1	1.31	95	90	0.31623
4	154	0.08	1.05	95	91	0.28284
5	154	0.05	0.65	95	91	0.22361
6	152	0.06	0.79	95	91	0.24495

Run 1-3

Ts = Tm =	606 552	dH = SR dP =		mpinger Water : ilica Gel = Meter	=	102 ml 6.2 gr Sq.Root
Run 1-4	Stack	Velocity	Orifice	Temperature		Velocity
Point #	Temp.	Pressure	Pressure	Inlet	Outlet	Pressure
A1	129	0.22	2.88	89	88	0.46904
2	140	0.18	2.36	88	88	0.42426
3	141	0.1	1.31	89	88	0.31623
4	143	0.05	0.65	89	88	0.22361
5	150	0.04	0.52	89	88	0.20000
6	150	0.04	0.52	89	88	0.20000
B1	148	0.18	2.36	90	88	0.42426
2	150	0.16	2.1	92	88	0.40000
3	149	0.11	1.44	92	89	0.33166
4	150	0.06	0.79	93	89	0.24495
5	149	0.04	0.52	92	89	0.20000
6	150	0.04	0.52	92	89	0.20000
C1	148	0.19	2.49	93	89	0.43589
2	149	0.16	2.1	94	90	0.40000
3	150	0.11	1.44	94	90	0.33166
4	150	0.06	0.79	95	90	0.24495
5	151	0.04	0.52	95	90	0.20000
6	152	0.04	0.52	94	90	0.20000
D1	150	0.19	2.49	95	90	0.43589
2	148	0.15	1.96	96	91	0.38730
3	147	0.11	1.44	96	91	0.33166
4	146	0.06	0.79	96	91	0.24495
5	144	0.05	0.65	95	91	0.22361
6	144	0.05	0.65	95	91	0.22361
E1	139	0.18	2.36	96	92	0.42426
2	141	0.16	2.1	97	92	0.40000
3	143	0.13	1.7	98	92	0.36056
4	143	0.1	1.31	98	93	0.31623
5	142	0.07	0.92	97	92	0.26458
6	142	0.06	0.79	98	93	0.24495
•	· · •					

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* DRY GAS VOLUME *
Vm(std) = Vm [T(std) / Tm] [(Pbar + (dH/13.6)) / P(std)]
<ul> <li>= 17.64 x [degR / in.Hg.] x Y x Vm [(Pbar + (dH/13.6))/Tm]</li> <li>Where:</li> <li>Vm(std) = Dry Gas Volume through meter at standard conditions</li> <li>Vm = Dry Gas Volume measured by meter</li> <li>Pbar = Barometric pressure at oriface meter</li> <li>Pstd = Standard absolute pressure</li> <li>Tm = Absolute temperature at meter degR.</li> <li>Tstd = Standard absolute temperature (528 degR).</li> <li>dH = Average pressure drop across oriface meter</li> <li>Y = Dry gas meter calibration factor.</li> <li>13.6 = Inches water per inches Hg.</li> </ul>
Run 1-1
Vm(std)=17.64 x 1.0041 x 36.507 [( 29.59 + ( 1.35 / 13.6 ))/ 535 ] = 35.884 dscf
Run 1–2
Vm(std)=17.64 x 1.0041 x 35.767 [( 29.60 + ( 1.26 / 13.6 ))/ 545 ] = 34.515 dscf
Run 1–3
Vm(std)=17.64 x 1.0041 x 35.834 [( 29.60 + ( 1.25 / 13.6 ))/ 550 ] = 34.265 dscf
Run 1-4
Vm(std)=17.64 x 1.0041 x 37.408 [( 29.58 +( 1.37 / 13.6 ))/ 552 ] = 35.627 dscf



# \* TOTAL CONTAMINANTS by WEIGHT: GRAIN LOADING \* C's = [0.0154 gr/mg] [Mn/Vm(std)]Where: = Concentration of particulate matter in stack gas C's corrected to standard conditions Mn = Total amount of particulate matter collected Vm(std) = Dry gas volume through meter at standard conditions Run 1-1 C's = 0.0154 x [ 0.29571 x 1000 ] / 35.884 =0.1269 gr/dscf \_\_\_\_\_\_ Run 1-2 C's = 0.0154 x [ 0.04959 x 1000 ] / 34.515 = 0.0221 gr/dscf\_\_\_\_\_\_ Run 1-3 $C's = 0.0154 \times [0.09395 \times 1000] / 34.265 =$ 0.0422 gr/dscf \_\_\_\_\_ Run 1-4 $C's = 0.0154 \times [0.14802 \times 1000] / 35.627 = 0.0640 \text{ gr/dscf}$ \_\_\_\_\_\_\_



Md = 0.44	ŧ (%	6 C	02	)+	0.3	2 (	% (	JZ)	+	0.2	:8 (7	6	.0.	+ 7	o ini	2)
% CO2 = % O2 = % N2 = % CO = 0.264 = 0.28 = 0.32 =	P€ = P( = P€ = R; = M = M	erce erce erce atic ole	ent ent ent o of cula cula	car oxy nitr car 02 ar v ar v	bor gel oge bor to vieg vieg	n di en b en t N m N2 ght ght	oxic y v oy v onc in a of l of (	de l olui volu oxic air N2 O2	me ume de t or ( div	i (di e (c by ' CO ide	ry ba dry b volu	asi bas me	is). sis). e (d	ry t		
Run 1–1																
Md = 0.4	4 (	3.	47)	) +	0.3	2 (	16.	.40	) +	- 0.	28 (	1	30.1	3)	=	29.211 lb/lb-mole ====================================
Run 1–2																
Md = 0.4	4 (	4.	00 )	) +	0.3	2 (	15.	.80	) +	- 0.	.28 (	1	30.2	20)	=	29.272 lb/lb-mole
Run 1–3																
Md = 0.4	4 (	4.	27 )	) + ,	0.3	2 (	15	.53	) +	- 0.	.28 (		30.2	20)	=	29.304 lb/lb-mole
Run 1-4																
Md = 0.4	4 (	3.	20 )	) +	0.3	12 (	17.	.00	) +	- 0.	.28 (		79.8	30)	=	29.192 lb/lb-mole
							•									

#### • WATER VAPOR CONDENSED •

Vwc(std) = (Vf - Vi) [Pw R T(std) / Mw P(std)] = 0.04707 (Vf - Vi)Vwsg(std) = (Wf - Wi) [R T(std) / Mw P(std)] = 0.04715 (Wf - Wi)Where: 0.04707 = Conversion factor 0.04715 = Conversion factor Vwc(std) = Volume of water vapor condensed (standard conditions) Vwsg(std) = Volume of water vapor collected in silica gel (standard conditions) Vf -- Vi = Final volume of impinger contents less initial volume Wf – Wi = Final weight of silica gel less initial weight Pw = Density of water R = Ideal gas constant Mw = Molecular weight of water vapor T(std) = Absolute temperature at standard conditions P(std) = Absolute pressure at standard conditions Run 1-1 Vwc(std) = 0.04707 x 120 ml =5.6 cu.ft. \_\_\_\_\_\_\_\_\_ Vwsg(std) = 0.04715 > 6.2 gr = 0.3 cu.ft. \_\_\_\_\_\_\_\_\_\_ Run 1-2 Vwc(std) = 0.04707 x 112 ml =5.3 cu.ft. \_\_\_\_\_\_ Vwsg(std) = 0.04715 3.8 gr = 0.2 cu.ft. ========================= Run 1-3 Vwc(std) = 0.04707 x 109 ml =5.1 cu.ft. \_\_\_\_\_\_ Vwsg(std) = 0.04715 > 4.8 gr = 0.2 cu.ft. \_\_\_\_\_\_ Run 1-4 Vwc(std) = 0.04707 x 102 ml = 4.8 cu.ft. \_\_\_\_\_\_\_ Vwsg(std) = 0.04715 > 6.2 gr = 0.3 cu.ft. ===============

twin city testing.

• MOISTURE CONTENT OF	STACK GASES *	
Bws = [Vwc(std) + Vwsg(st	d)] / [Vwc(std) + Vwsg(std) + Vm(	std)] x 100
Vwc(std) = Volume of water conditions	ater vapor measured by dry gas meter r vapor condensed corrected to sta er vapor collected in silica gel corre	
Run 1-1		
Bws = $(5.6 + 0.3) / ($	5.6 + 0.3 + 35.884) x 100 =	14.12 % =======
Run 1-2		
Bws = $(5.3 + 0.2) / ($	5.3 + 0.2 + 34.515) x 100 =	13.74 % ========
Run 1–3		
Bws = $(5.1 + 0.2) / ($	5.1 + 0.2 + 34.265) x 100 =	13.40 % == <b>=</b> =====
Run 1–4		,
Bws = $(4.8 + 0.3) / ($	4.8 + 0.3 + 35.627 ) x 100 =	12.52 % ========



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* MOLECULAR WEIGHT of STACK GASES *	
Ms = Md (1 - Bws) + 18 (Bws)	
Where: Ms = Molecular weight of stack gas Md = Molecular weight of stack gas Bws = Proportion of water vapor	
Run 1–1	
Ms = 29.28 (1 - 14.12%) + 18 (14.12%) = 27.69 lb/lb-mole	====
Run 1–2	
Ms = 29.28 (1 - 13.74 %) + 18 ( 13.74 %) = 27.73 lb/lb-mole	====
Run 1–3	
Ms = 29.28 (1 - 13.4 %) + 18 ( 13.4 %) = 27.77 lb/lb-mole ====================================	====
Run 1–4	
Ms = 29.28 (1 - 12.52 %) + 18 ( 12.52 %) = 27.87 lb/lb-mole	====

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### STACK GAS VELOCITY \*

Vs = Kp Cp [sq.rt.dP] x avg. [sq.rt.(Ts(avg.)/Ps Ms)] Where : Vs = Average velocity of gas stream in stack = 85.49 ft/sec [(g/g-mole) - (mm Hg) / (degK) (mm H2O)] 1/2 Ko Ср = Pitot tube coefficient dÞ = Velocity head of stack gas Pbar = Barometric pressure at measurement site = Stack static pressure Pg Ps = Absolute stack gas pressure Pstd = Standard absolute pressure = stack temperature ts Ts = Absolute stack temperature = Molecular weight of stack gas Ms Run 1-1  $596 / (29.59 \times 27.69) =$ 18.987 ft/sec. 0.310 x Sq.Rt.[ Vs = 85.49 x0.84 x \_\_\_\_\_\_ Run 1-2 605 /(  $29.6 \times 27.73 =$ 18.496 ft/sec. 0.84 x 0.300 x Sq.Rt.[ Vs = 85.49 x\_\_\_\_\_ Run 1-3 18.543 ft/sec. 609 /(  $29.6 \times 27.77 =$ Vs = 85.49 x0.84 x 0.300 x Sq.Rt.[ \_\_\_\_\_\_ Run 1-4 606 /(  $29.58 \times 27.87 =$ 19.086 ft/sec. Vs = 85.49 x0.310 x Sq.Rt.[ 0.84 x \_\_\_\_\_\_

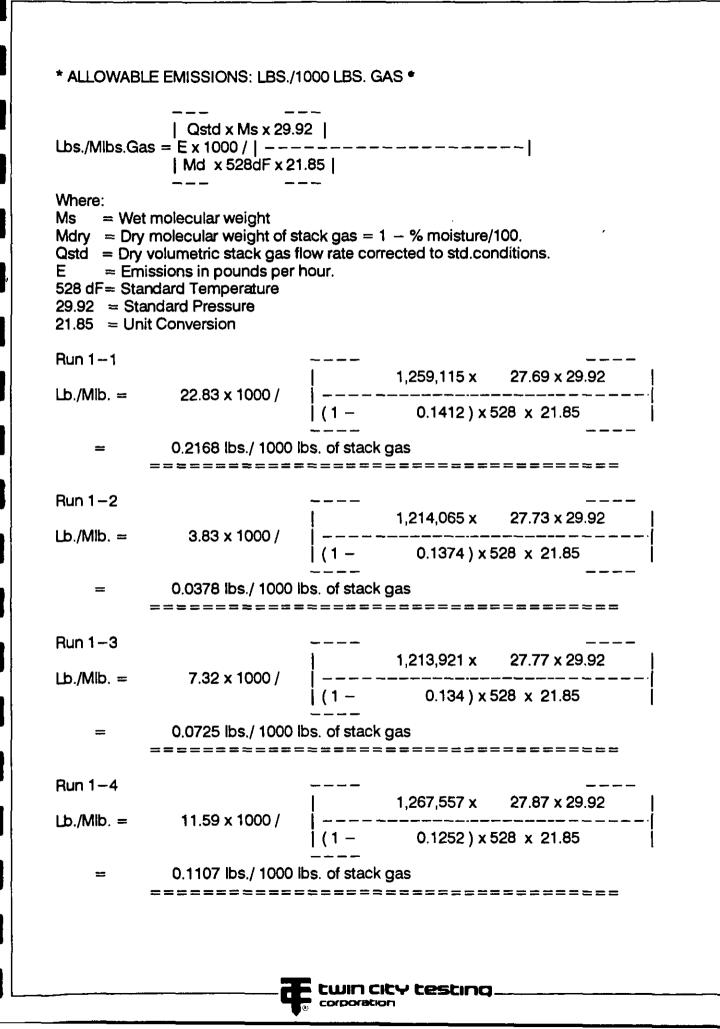


* STACK GAS FLOW RATE *
Qstd = 3600 (1 - Bws) Vs A (Tstd / Ts) (Ps / Pstd)
<ul> <li>Where :</li> <li>Qstd = Dry volumetric stack gas flow rate corrected to std.conditions.</li> <li>A = Cross sectional area of stack</li> <li>3600 = Conversion factor</li> <li>ts = Stack temperature</li> <li>Ts = Absolute stack temperature</li> <li>Tstd = Standard absolute temperature</li> <li>Pbar = Barometric pressure at measurement site</li> <li>Pg = Stack static pressure</li> <li>Ps = Absolute stack gas pressure</li> <li>Pstd = Standard absolute pressure</li> </ul>
Run 1-1
Q (std) = 3600(1 - 0.1412)(18.987)(24.4818)(528/596)(29.59/29.92)
Q (std) = 1,259,115 dscf/hr ====================================
Run 1-2
Q(std) = 3600(1 - 0.1374)(18.496)(24.4818)(528/605)(29.6/29.92)
Q (std) = 1,214,065 dscf/hr ====================================
Run 1-3
$Q(std) \approx 3600(1 - 0.134)(18.543)(24.4818)(528/609)(29.6/29.92)$
Q (std) = 1,213,921 dscf/hr ====================================
Run 1–4
$Q(std) \approx 3600(1 - 0.1252)(19.086)(24.4818)(528/606)(29.58/29.92)$
Q (std) = 1,267,557 dscf/hr
twincity testing

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• EMISSIONS RATE FROM STACK \* E = [Cs Qstd] / 7000 gr./lb. = lb. / hr. Where : Ε = Emissions rate Cs = Concentration of particulate matter corrected to std.conditions. Qstd = Dry volumetric stack gas flow rate corrected to std conditions. Run 1-1  $E = [0.1269 \times 1,259,115] / 7000 =$ 22.83 lb./hr. \_\_\_\_\_ Run 1-2  $E = [0.0221 \times 1,214,065] / 7000 =$ 3.83 lb./hr. \_\_\_\_\_\_\_ Run 1-3  $E = [0.0422 \times 1,213,921] / 7000 =$ 7.32 lb./hr. \_\_\_\_\_\_ Run 1-4 E = [ 0.064 x 1,267,557 ] / 7000 = 11.59 lb./hr. \_\_\_\_\_

corporation



* ISOKINE	TIC VARIAT	ION *				
l = 100 Ts	[0.002669 \	/ic + (Vm / Tr	n) (Pbar +	dH / 13.6)] / 60 e V	s Ps An	
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	conversion to bsolute ave = Conversion otal volume bsolute ave arometric play verage pres pecific grav conversion s otal samplir itack gas ve bsolute stat	rage stack ga of liquid colle rage dry gas ressure at san sure different ity of mercury econds to min ng time	s temperat ected in imp meter temp npling site ial across t nutes.	bingers and silica ge	9]	
Run 1-1						
l =100 x	[( 596 —	0.002669 x	126. )+(	36.507 / 535 )[ 		/13.6)] 
=	107.9 % =====	60 x	60 x	18.987 x	29.59 x	0.000645
Run 1–2	[(	0.002669 x	115. )+(	35.767 / 545 )[	29.6 +( 1.26	/13.6)]
l =100 x l =	605 107.4 % ======	60 x	60 x	18.496 x	29.6 x	0.000645
Run 1–3	[(	0.002669 x	113. )+(	35.834 / 550 )[	29.6 +( 1.25	/13.6)]
=100 x   =	609 106.9 %		60 x	18.543 x	29.6 X	0.000645
Run 1-4	[(		108. )+(	37.408 / 552 )[	29.58 + ( 1.37	/13.6)]
l =100 x l =	606 106.3 %		60 x	19.086 x	29.58 x	0.000645

# APPENDIX B

# FIELD DATA FORMS



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			EST FIEL		T	E	OUI PMEN	T IDENTI	FICATIO	)N			SETTINGS
CT Pro			32-93-2590		Contre	ol Unit	Numbers						1903
_					Gas M	eter Coe	efficier	)t:	1.0	041			<u>טל</u>
	<u>av 11, 1</u>					e Box Nu	_	1				MC	<u>lis</u>
	<u> </u>				Probe			Length:		5		Ps/Pm	1.00
Source:	Asphalt	Plant.	Wet Scrubt	<u>er</u>	Pitot			Coeffici	ent:	0.8	4	C	
				1 L W		e No:	11	Diameter		.344		ាន [	25
				<u> </u>		r No:		3				R	-
	Temp.,		<u>ا-5 &amp; FPA (</u> ديج ريا	Barometr	ic Press	ure, in	.Hg: 2	9.59		Static	Pressure	, in.WC:	<u>- "05"</u>
AIDTEN	( Tenp.,			1		тноо 5							
	TRAVERSE	SANDI F	SAMPLE	VELOCITY	ORIF	TICE	PUMP			TENPE	RATURE.	*F	GAS METER
CLOCK TIME	POINT	TIME	VOLUME	HEAD		<u>n.WC</u>	VAC.			UVEN	MPINGER]	AUXILIARY	JN   DUT
hours	NUMBER	minute		in.WC	REQ.		inHG			255 1	63		65 63
0.10	A.	6	237.900	-22	2.83	2.93	<u> </u>			252	58		67 46
	2	2	889.4	<u> </u>			3.0	169		250	54	~	6166
	3	Ч	891.0	<u>.12</u>	1.54	1.54	3.0			751	55	~	69 67
	Ч	6	891.4	05	64	.64	2,0			<u>151 1</u> 2521	56		64 61
	5	8	893.3	.05	-64	.01	ιο	151	251	251	5 <u>6</u>	~	10 61
	6	10	894.2	.05	-64	.64	2,2	198	<u></u>			×	XX
	ENSA	12	8950	$\times$	<u>×</u>	X	X	<u> </u>		X	×	×	XX
X	×	X	X		<u> </u>	×		<u>×</u>	X	X			72 61
	BI	0	895.0	. 21	2.70			129	257	251	56	<u> </u>	73 6
	2	12	896.7	.10	2.00	7.06	3.0	131	256	ZSL	53	<u> </u>	175 6
	3	4	898.3	<u>.</u>	1.41	1.41	30	142	256	251	<u>54</u>		13 2
	Ч	6	849.6	.06	1.11	<u> </u>	2-5	133	251	253	56		175 70
	5	8	900.6	_05	-64	.64	2,0	132	$\left \frac{u^{2}}{2}\right $	253	<u>_58_</u>		56 5
	6	10	401.5	,05	- 64	1,64	12.0	133	254	254	<u></u>		
	END B	112	901.3	X	X	1×	<u>×</u>	$\perp \times$	×		<u>X</u>		
x	X	×	X	×	X		<u>  ×</u>	<u> </u>		<u> </u>	<u>×</u>	<u> </u>	155 17
	101	0	902.3	.22	2.83		4.0	134	126	254	57		29 2
	2	2	904-1	- 16		12.00		13)	257	1253	<u>54</u>		18017
	3	4	305,6		1.41	1.4	3.0		125)	1254	54		80 74
	4	6	906.9	.08	1,03				25)	254	55		8017
	3	8	902.1	05	1.64			124		254		+	100 2
<b></b>	6	10	909.0	0.05	.64	11.64	2.5	139	25)	240		$\frac{1}{1}$	$ \times $
<u> </u>	ENDC	112	909.0		X	×	<u>×</u>	$\perp \times$	×		<u> </u>		
×			×	1			X	$\downarrow \times$	<u> </u>		<u>ŀ ÷</u>		
×		×	X	$\mathbf{X}$			X	$\perp \times$	<u> </u> X	X		$+ \times$	
⊢ Î×	×	<b>X</b>		×	X			$\bot$	X	X			
<u> </u>			4: MOISTU	-	ATION		E E	PA METHO	D 5 LEA			al Volume Gas pled, DCF:	36.50
				3	4	5				Vac,in.	Hal		V0.30
IMPIN		1	2		10.5		79.		006	15		ai pling ke, Min:	60
fina			118		204-3	<u> -`</u> >			000	6			Descriptio
Init		20	100	0	<u>6.2</u>	$\vdash \checkmark$	┍┥╠╨┙				<b></b>    <sup></sup> l	ter taten	ococcipere
Net'	l Hoistur	02		126-						<u> </u>	3	لتىنىم (	BAT.NL
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	nger Catc	II VESCE	1921011						• • • • • • •	VETC			
								BY ORSA	AL ANAL	1212	Baal	icate 4	Compou
Samp	le Identi	ficatio	n Re	plicate 1		Replica			blicate				🗕 Averag
			Bure	t Perce	nt Bu	ding	Percent Volume	Readin	r   Pe ng   Vo	rcent Lume	Buret Reading		Volume
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	ial Readi					<u>3.4</u> †	3.4	1 3.9	/   ]	5.4		$\overline{\boldsymbol{\nabla}}$	3.4
	on Dioxia		3.6		· · ·		16.4	19.8		o. 4		X	16.4
Oxyg			20.0		<u> </u>	$\frac{7.0}{0}$	$\overline{\mathcal{C}}$		0	<u>୍</u>	~	+	C
	Son Monox		C		gnature			<u>,                                     </u>			> _	 ,	
form	SST5, Re	vised 12	L/ CD/ YL	3 01	gnature Samplin sam Leade	ng er:	>	tam		2	1		
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	E EMISS		FICATION				EQUIPME			N:			NOMOGRAI	PH SETT	INGS
TCT Pro	-		232-93-259	20	Cont	rol Uni			1				oha 7	. 190.	<u>ــــــــــــــــــــــــــــــــــــ</u>
	av 11, 1			<u></u>		Meter C	-		1.0	041			Tm	70	
Company	<u>av 11. 1</u> <u>: Tri-C</u>	373		<u> </u>		le Box						··	мс	i Lu	
Source:	Acnhalt	· Plant	Wet_Scrub		Prot	e No:	5			-			Ps/Pm	1.00	0
	Dimension		<u>ast 311</u>		Pite	t No:	5		cient:	ð.	84		C		
Test Te	am: JT	/ DC /	.W		Nozz	le No:	11	Diamet	er:	.344			Ts	125	
Test Pr			1-5 & EPA	9		ter No:		83					R		-
	Temp.,		18 - E	Baromet		ssure, i			,	Stati	c Pr	essur	e, in.WC:	<u>-,</u> ;	<u>ک</u>
CLOCK	TRAVERSE		SAMPLE	VELOCITY		ETHOD 5				TEM	PERA	TURE.	•F		
TIME	POINT	TIME	VOLUME	HEAD	. На	in.WC	VAC.	STACK		FILTER	IMP	INGER	AUXILIARY		METE
hours	NUMBER	minute		in.WC		ACT.	inHG	GAS	LINER			<u>xit</u>	<u> </u>	IN	00
	D	0	909.9	-16		ZOL	40	136	128		_	.0_		<u>95</u> 82	75
	2	2	911.4	1.14		1.80	4.0	140	1258	255		<u>6</u>	<u> </u>	20	76
	3	4	912.9	<u>· 10</u>	1,19		30	141	254	2 <u>54</u> 254		<u>()</u> ()	+- <u>-</u>	173	26
	4	6	914.1	1.07	.90		2.5	<u>141</u> 141	256			<u>عبر</u> ک		33	120
	5	8	915.2	-05-	1.64	$\frac{1.64}{1.77}$	3.0	140	257	251		3		83	5
	6	10	916.1	<u> </u>		+ 5		$\times$		×	-	<u>×</u>			×
	ENDD X	1 <u>1</u> X		X	$\frac{x}{x}$	1		Â	†⊋́			$\overline{\mathbf{x}}$	×	×	×
	EI	$\hat{\circ}$	9/7.1	1.15	1.93	1.93	4.0	136	259	254	5	8		85	76
	2	7	918.6	+14	1.80		4.0	142	158	254		5	-	84	28
	3	<u> </u>	710 0	1.11	1.41	1.41	4.0	143	258	254		$\langle \rangle$		85	29
	4	6	921,3	.09	1.10	1.16	3.5	144	259	255	5			26	2
	5	8	922.4	.06	. ))	1.7	3.0	143	259	254		8		186	
	6	10	9135	.06	. ))	<u>יר.  </u>	3.0	142	259	254		9	<u> </u>	186	8
1.20	END E	12	924.40	) <u>×</u>		<u> </u>	<u> </u>	<u> </u>	1~	-		<u> </u>	<u>+</u>	×	X
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	EPA	METHOD	4: MOISTUR	E DETERMIN	ATION		EF	A METHO				Tota	al Volume Gas pled, DCF:	V.	SUT
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Final		$\leq$					9:3		006	/5	_	Sam Tim	al pling e, Min:	4 Ĉ	
lnitia Net			>				- 11:3	30.	000	4		Fil	ter Catch	-	
Total	Moisture	Collect	ed:										BROWN	്രം	7:1
lmping	er Catch	Descrip	otion:	CLOU		<u>ы</u> ,		DV ODC	T ALLAN						
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Sample	e Identif	reation									_			- Ave	rage
			Buret Readu	ig Volume	Read	net P ding V	ercent olume	Buret Readir		rcent Lume	Rea	ret ding	Percent Volume	10	cent ume
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	n Dioxide								_				+	·	-
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form S	ST5, Revi	sed 12/2	20/72	519 91	Samplin am Leade	<u>.</u>		-		2		_			
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			FICATION	D DATA S	1	Ê	OUIPMEN	T IDENTI	FICATIO	ж		NOHOGRAPH		
CT Pro		_	32-93-2590			Unit			1				190	<u> </u>
	av 11. 1				Gas Me	ter Coe	fficien	t:	<u>1.00</u>	<u>11-</u>		Tm	20	
	Tri-C		ina		Sample	BOX NU	mber:	۲.				MC	16	<u></u>
		•	Wet Scrubi	ver	Probe	No:		Length:		<u>S'</u>		Ps/Pm	<u>1. ÔC</u>	
Source I	Dimension	ນ <b>s:</b> ິງ	14 1/2 × 59	12:0	Pitot	No: <	2	Coeffici		0.8		C	-	
lest Te		/ DC /			Nozzle	No:	L	Diameter	:	<u>~3.4</u>	1	Ts R	30_	
lest Pr	ocedures:		-5 & FPA	)	Filter			<u> <u>84</u></u>				<u> </u>	02	
Ambient	Temp.,	·F: 5	26	Barometri		ure, in. 1800 5 1		2 <u>9.60</u> E DATA	2	Static	P1255012	,	01	••••••
							PUMP			TEMPE	RATURE	•F		
	TRAVERSE	SAMPLE TIME	SAMPLE VOLUME	VELOCITY HEAD	ORIF off, i		VAC.	STACK F	ROBE	ILTER	MPINGER	AUXILIARY	GAS ME	
TIME hours	POINT NUMBER	minute	cu.ft.	in.WC	REQ.	ACT.	inHG	GAS L		OVEN	EXIT			
1158	Al	6	724.700	.22	2.53	2 83	4.0			260	62		8/	<u>ן ק</u> טע
<u>, , , , , , , , , , , , , , , , , , , </u>	2	<u> </u>	926.6	-16	2.06	2.06	3.0			257	56 1		150	<u>90</u> 90
	3	_	8.1	-10	1,29	1.29	2.5			256	54		52 121	<u>80</u>
	Ч	6	919.4	.07	.70	.90	2.0			254	55		23	80
	5	P	930.5	.05	-64		2.0		216	253	56		es l	<u>30</u> 81
	6	10	931.4	.04	.51	.51	<u>j. 5</u>	<u></u>	256	253	56			<u>*/</u>
	ENDA	12	532.L	×	X	$\times$	<u>×</u>	X	<u>_X  </u>	×	<u>×</u>	×	×	X
X	×	X	X	×	×	×	_ <u>×  </u>	<u>×  </u>	<u>×  </u>	X	X		54	81
	Bi	0	932.2	. 21	7,70	2.70	4.0		253	253	58		34	81
	2	2	933.9	1.18	2.31	231	3,5	145		252	56	<u> </u>	1	81
	3	4	935 6	.07	.90	.90	25	142	258	253	<u>- 20</u>		56	82
	4	6	936-7	- 05	.64	164	2.0	147	259	253	$\frac{s}{ca}$		182	82
	5	8	1937.6	.05	.64	.64	2.0	142	257	254	<u>68</u> 59		87	82
	6	10	938.5	.04	1.31	.51	2.0	145		<u>254</u>	<u> </u>		X	
	ENDB	12	939.4	×	X		×	<u>×</u>	×	<u> </u>			$\frac{1}{x}$	Î
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	3_	4	941.5	07	,90	1.90	2,2	150	259	255	5)	+	138	85
	4	6	943.6	0.5	.69	1.64		144		254		<u>† – – – – – – – – – – – – – – – – – – –</u>	198	
	15	8	944,5	-04	1-51	1.51	1.5	148	261	254	160	-	189	8
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	t Temp.,			Barometri	C Press	ure, i	n.Hg: ,	29.60	]	Stati	: Pre	ssure	, in.₩C:	<u> </u>	72
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	5	R	951.4	.04	SI I	-51	2.0		258	254	58		1	90	81
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imping	er Catch	Descrip	tion:												
				EPA METHO	0 3: GAS	S COMP	DSITION	BY ORSAT	ANALY	\$15					
Sample	Identifi	cation	Repl	icate 1	Re	plicat	e 2	Repl	icate	3	R	eplic	ate 4	Com	bound
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Initia	at Reading		Reading	Volume	Reaction	-	or une						Vor Cone		
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	Monoxide								+					<u> </u>	<u> </u>
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			EST FIEL		1	EQUI	PMENT	IDENT1	FICATI	DN			H SETTINGS
CT Pro		_	32-93-2590		Control	Unit Num	ber:		1			sha 2.	
	av 11. 1		<u></u>	·	Gas Mete	r Coeffi	cient	;	1,00	4/			<u>90</u>
	· Iri-C				Sample B	iax Numbe	:1:	د	3			MC	16
			Wet Scrubt	vor	Probe No	»: <u>5</u>		ength:		-1-		Ps/Pm	1.00
Source	Dimension	IS: 50	14" N x 59	1/2"~	Pitot No	»: <u>S</u>		oeffici		0.3		C	-
_	am: ,]]				Rozzle	10: 11		iameter	:	.344		15 R	<u>/3</u> ]
-	the second s		-5 & EPA		Filter		8.		<u> </u>		Deessur	e, in.WC:	- 02
Ambient	Temp.,	· <b>f:</b>	78	Barometri	EPA METH			29.61 Data	2	STBUIC	Pressur	e, 11.001	
					OR1F1C	E PUI				TEMP	ERATURE.	• F	
CLOCK TIME	TRAVERSE	SAMPLE	SAMPLE VOLUME	VELOCITY HEAD	pH, in.	-		STACK F	ROBE	FILTER	IMPINGER	AUXILIARY	GAS METER
hours		minute	cu.ft.	in.¥C	RED. A	the second s			INER		EXIT		82 8
3:43	AI	0	760,800	.23	3013	014	<u> </u>			264	<u> </u>		8887
	2	2	92.7	.16		10 3	<u> </u>			261	<u>57</u>		138127
	3	Ч	964,2	(0)	1.92	1	्री	<u> </u>	257	259	56		128135
-	4	6	965.4	.07	,92	<u>922</u>	岩	t the second second	257	250	5)	<u></u>	187 87
	5_	8	966-4	.05		<u>65 1.</u> 52 1.	2+		257	251	58	$+-\overline{-}$	89 87
	6	10	967.3	.04		$\frac{2L}{2}$	+	· / ·	<u> </u>	XI	×	×	$\times \times$
	ENDA	12	968.2	<u> </u>			<del>×</del> †	×	$\hat{\mathbf{x}}$	Ŷ	×	1 7	XX
X	*		$\frac{X}{1000}$	× 20		62 4	6	142	254	253	60	<b>\</b>	8900
	<u>B</u>	$\frac{\circ}{2}$	9682		1111		0	150	258	253	56	-	9010)
	$\frac{2}{3}$	$\frac{1}{4}$	911.4	1.09	1.18	1.12 3	0	151	259	253	56		91 8
	4	6	972.5	.05	1-65	65 2	0	152	25)	253	5-7	~	118
	5	8	973.5	.05	1.65	.65 2	.0	152	254	254	58		17/ 87
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	ENDB	in	915.3	×		X	$\overline{\times}$	$\times$	<u>×</u>	× /	<u> </u>		
x	X	X	Ι ×	×			×	<u></u>	X		<u> </u>		<u>  x   x</u>   9/   98
	01	0	915.3	I.IR_	2,36	2363	5	145	238	254	58		192 80
	2	2	976,9	•12	1.57	<u>1.57]3</u>	<u>و</u>	122	1528	1254	159		193 50
	3	4	978.3	.09	1.14	1.18 2	<u>,</u> 0	154	257	254	109		192 80
	4	6	979.5	1.05					259		160		192 80
	<u></u>	8	780.5	.04	.52		.0	153	260		160		172 8
	6	10	1381.3	1.04		X	×	×	X	X	X	X	XX
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	$+\frac{x}{x}$		<u> </u>	X	<del>  2</del> 1	XL	X	X	X	X			
-X	$+\hat{\mathbf{x}}$	<u> </u>					×	X	X	X	X	<u> </u>	XX
<u> </u>						1	ED	A METHOD	5 LE/	AK CHEC	<    J9	Gas	: <i>35,8</i> 34
			4: MOISTUR	E DETERMIN	4		Tim			Vac, in		the second division of	: 33.035
IMPIN		1	2		14.4	<u> </u>		90.0	_	15	<b></b>   ]	nal moling me, Min:	60
Final			107		.09.6	XH	M:		00	5			Description
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h			-		HOD 3: GAS			BY OPSI	T ANAT	1515			
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Samp	le Identi	TICATIO		plicate 1				Buret		rcent	Buret		t Percent Volume
}			Readi	t Percer ng Volume	e Readir	-		Readin			Keadin		
	ial Readi												4,27
Carb	on Dioxic	le	4.2		4.4	4.	<u> </u>	4.2		1.2	<u> </u>	$\checkmark$	15.53
0xy9			19.8			2/15		19.8		<u>5.6</u>		$ \rightarrow $	- 12:22
	on Monoxi		C		0	(	Ŷ.	0		0	<u></u> _		
form	SST5, Rev	vised 12	/28/92	Si	Sampling	$\geq$	Je	7		S	- 6 /	~	
				16	am Leader:		<u> </u>						

CT Project Number:       4232-93-2590       Control Unit Number:       i       oh@ 2./903         rate:       May 11. 1993       Gas Meter Coefficient:       1.004/       Tm 90         company:       Tri-City Paving       Sample Box Number:       3       MC / C         company:       Tri-City Paving       Sample Box Number:       3       MC / C         cource:       Asphalt Plant Wet Scrubber       Probe No:       5       Length:       5'       Ps/Pm /.00         cource Dimensions:       Pitot No:       5       Coefficient:       0.8'4       C       -         rest Tebm:       JT / DC / JW       Nozzle No:       J       Diameter:       5'44       Ts       /35'         rest Procedures:       EPA 1-5 & EPA 9       Filter No:       #5'       R       -         wmbient Temp., "F:       JP       Barometric Pressure, in.Ng:       27'       CO       Static Pressure, in.WC:      0'L         EPA METHOD 5 TRAVERSE DATA         TEMPERATURE, "F         COCK         TRAVERSE       SAMPLE       VELOCITY       ORIFICE       PUMP       TEMPERATURE, "F         CINK       POINT       TIME       VOLUME       HEAD       oK, in.WC				EST FIEL	- <u></u>	<u></u>			NT IDENT		_			NOMOGRAF	_	_
atte: Ray 11, 1993       Loss Heter Coefficient: 1, 00-//       Im       90         atte: Ray 11, 1993       Sample Box Runder: 3       HL       //         atte: Ray 11, 1993       Sample Box Runder: 3       HL       //         atte: Ray 11, 1993       Sample Box Runder: 3       HL       //         atte: Ray 11, 1993       Datt Met. Scrahber       Price No: 5       Cefficient: 0, 2/4       C         augres Dimensions:       Pitot No: 5       Cefficient: 0, 2/4       C       C         augres Dimensions:       Phitot No: 5       Cefficient: 0, 2/4       C       C         augres Dimensions:       Phitot No: 5       Cefficient: 0, 2/4       C       C         augres Dimensions:       Phitot No: 5       Cefficient: 0, 2/4       C       C         augres Dimensions:       Sample Box       Factor StaveRet DATA       Tampession       NUC: -0 L         augres Dimensions:       Sample Box       Sample Box       Factor StaveRet DATA       Tampession       NUC: -0 L         augres Dimensions:       Sample Box       Sample Data       Sample Box       Factor StaveRet DATA       Tampession       NUC: -0 L         augres Dimensions:       Sample Box       Sample Box       Sample Box       Sample Box       Sample Box       Sa	TCT Pre				<u>.</u>	Contr				1				sha 2	140	3
Sampany:         Sample Box Number:         S         Probe         No.         /L           Supres Bound Inst:         Dimensions:         Probe         No.         S         Length:         S         Probe         No.         /L         Output:         S         Probe         No.         /L         Output:         S         Probe         No.         S         Probe         No.         /L         Output:         No.         /L         Output:         No.				<u></u>		Gas M	leter Co	efficie	ent:	1.00	41					
Gurce:         Source Disconsions:         Processon         Disconsion         Disconsion <thdisconsion< th="">         Disc</thdisconsion<>				<u></u>		Sampl	e Box M	(umber:	3					MC		
Durce Dimensions:         Pitot No:         Source Dimensions:         Optimized No:         C           ist Team:         1/         Dimensions:         Pitot No:         Pitot No: <t< td=""><td>Source:</td><td>Asnhalt</td><td>Plant</td><td>Wet Scrubt</td><td></td><td>Probe</td><td>No:</td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>; </td></t<>	Source:	Asnhalt	Plant	Wet Scrubt		Probe	No:				-					; 
Bit Inc.				<u></u>		Pitot	No:	5				<u>Ч_</u>				
Cell Procedures:       PA       PA<	Test Te	am: JT	/.DC_/	JW				<u></u>		er: ,	544				135	_
Initial:       Control pressure initial control processing interval initial control processing interval initial control processing initial control procesing initial control processing initial control					)											
Notice: NELL: NUC       NAC: STACK PROBE FITTER INVECTANCE ANXILLANY LEAS HELE         Notice works       Invite out: Invite       NELL: Nucle out: Invite       NEL: Nucle out: Invite       Stack Proble FITTER INVECTANCE ANXILLANY LEAS HELE         Dil       Open Status       Proble FITTER INVECTANCE ANXILLANY LEAS HELE       Nucle out: Invite       Status       Proble FITTER INVECTANCE ANXILLANY LEAS HELE         Dil       Open Status       Proble FITTER INVECTANCE ANXILLANY LEAS HELE       Nucle and Invite       Proble FITTER INVECTANCE ANXILLANY LEAS HELE         Z       2       Proble FITTER INVECTANCE ANXILLANY LEAS HELE       Nucle and Invite       Proble FITTER INVECTANCE ANXILLANY LEAS HELE         Z       2       Proble FITTER INVECTANCE ANXILLANY LEAS HELE       Nucle and Invite       Proble FITTER INVECTANCE ANXILLANY LEAS HELE         Z       Q       Proble FITTER INVECTANCE ANXILLANY LEAS HELE       Nucle and Invite       Proble FITTER INVECTANCE ANXILLANY LEAS HELE         Y       G       PROVE       Proble FITTER INVECTANCE ANXILLANY LEAS HELE       Proble FITTER INVECTANCE ANXILLANY LEAS HELE       Proble FITTER INVECTANCE ANXILLANY LEAS HELE         Y       G       PROVE       PROVE       PROVE       Prove FITTER INVECTANCE ANXILLANY LEAS HELE       Prove FITTER INVECTANCE ANXILLANY LEAS HELE         Y       G       PROVE       PROVE       PROVE <td>Ambient</td> <td>t Temp.,</td> <td>F: 7</td> <td>8</td> <td>Barometr</td> <td></td> <td></td> <td></td> <td></td> <td><u></u></td> <td>Stati</td> <td>C Pro</td> <td>essuri</td> <td>, m.wc.</td> <td></td> <td></td>	Ambient	t Temp.,	F: 7	8	Barometr					<u></u>	Stati	C Pro	essuri	, m.wc.		
Intel       NOILNE       NELO		TRAVERCE	CANDLE		VELOCITY	0811	ICE	PLIMP			TEM	PERA	TURE,	*F		
Dorn B       Dorn S       Sec. 1       1/8       2/3	TIME				HEAD	K	in.WC	VAC.		PROBE	FILTER	IMP	INCER	AUXILIARY		
D1       0       76       7.2 </td <td>hours</td> <td>NUMBER</td> <td>minute</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td>_</td>	hours	NUMBER	minute										_			_
L       2       7/3 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>2.36</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td>						2.36							-			
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Y       E       Y			<u> </u>				1.18	50		the second s		_	_			
3       7       77       72       52       52       10       754       259       654       61       93       97         1       12       789       0       X						· · · · · · · · · · · · · · · · · · ·			<u>/-<!--</u--></u>			1				
O       D       TO       T							100		133			_				
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3       4       992.2       .10       1.31       1.32       3.0       1.54       2.55       5.7       -       9.5       9.5         5       P       974.7       .05       6.5       2.0       1.52       2.57       5.7       9.5       9.5       9.5         6       10       975.6       .06       .20       1.52       2.57       2.57       2.57       2.57       5.7       -       9.5       9.5         4       0.974.7       .05       .6.5       2.0       1.52       2.58       2.57       5.7       -       9.5       9.5         4       10       975.6       .06       .27       1.52       2.58       2.57       5.7       -       9.5       9.5         7       12       976.6       .20       .57       2.58       2.57       5.7       2.57       5.7       5.7       7.57       9.5						17.96	1.91		152	260				-	95	
Y       G       973.5       .00       7.05       7.05       3.0       7.54       2.57       2.54       5.8       -       9.5       7.9         S       P       974.7       .05       6.5       2.0       7.54       2.58       2.53       6.0       -       9.5       9.7         G       10       995.60       .0.6       .0.79       1.52       2.58       2.54       6.0       -       9.5       9.7         Y       152       7.52       2.58       2.54       6.0       -       9.5       9.7         Y       152       7.52       2.58       2.54       6.0       -       9.5 <td< td=""><td></td><td></td><td></td><td>معصا المستعم فكشعه</td><td>يبغ المستكم المستحي المستحي</td><td>1,31</td><td>1.31</td><td>3.0</td><td>154</td><td>258</td><td>255</td><td></td><td></td><td>-</td><td>1.0</td><td>_</td></td<>				معصا المستعم فكشعه	يبغ المستكم المستحي المستحي	1,31	1.31	3.0	154	258	255			-	1.0	_
Signal P       979-0       300       270       1.97       2.5       1.52       2.52       2.54       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56       2.56			4	993.5		1.05	1.05	3.0	154	258	254					المنط المحيد
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IMPINGER     1     2     3     4     5     Time     Rate, dctm     Vac, In. Ag       Final     /3:39     0.000     /J     Initial     Ime, Min:     GO       Initial     ///Sigon     ///Sigon     0.000     S     Filter Catch Description       FPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS       Sample Identification       Buret     Percent     Buret     Percent       Reading     Percent     Buret     Percent     Buret       Initial Reading     Initial Reading     Initial Reading     Initial Reading       Carbon Dioxide     Initial Reading     Initial Reading     Initial Reading		┨────			<u>                                      </u>	1	1	1	1							
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IMPINGER     1     2     3     4     5     Time     Rate, dctm     Vac, In. Ag       Final     /3:39     0.000     /J     Initial     Ime, Min:     GO       Initial     ///Sigon     ///Sigon     0.000     S     Filter Catch Description       FPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS       Sample Identification       Buret     Percent     Buret     Percent       Reading     Percent     Buret     Percent     Buret       Initial Reading     Initial Reading     Initial Reading     Initial Reading       Carbon Dioxide     Initial Reading     Initial Reading     Initial Reading								<u> </u>	ļ						<u> </u>	
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Initial IIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	IMPING	ER		2	3	4	5			-	Vac,in	Hg	_			
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Impinger Catch Description:         EPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS         Sample Identification       Replicate 1       Replicate 2       Replicate 3       Replicate 4       Compound Replicate 4         Sample Identification       Replicate 1       Replicate 2       Replicate 3       Replicate 4       Compound Replicate 4         Buret Reading       Percent Reading       Volume       Reading       Percent Volume       Reading       Percent Volume       Percent Volume <td></td> <td></td> <td><u></u></td> <td></td> <td></td> <td></td> <td></td> <td><u>-  </u></td> <td></td> <td></td> <td></td> <td>—</td> <td> </td> <td></td> <td></td> <td></td>			<u></u>					<u>-  </u>				—				
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Sample Identification         Replicate 1         Replicate 2         Replicate 3         Replicate 4         Compound Average           Buret Reading         Percent Reading         Percent Reading         Percent Volume         Buret Reading         Percent Volume	1 mp 1 mg	Jei Latch	DESCEI						<u> </u>							
Buret Reading         Percent Volume					EPA METH				_							
Initial Reading Carbon Dioxide Carbon Monoxide Carbon Monoxide	Sample	e Identif	ication				<u> </u>		·				· · · · · · · · · · · · · · · · · · ·		l Áve	rage
Carbon Dioxide				Reading	g   Percent g   Volume	Read	ετ   Ρ ing   V	ercent olume	Readin	g   Võ	lume	Rea	ding	Volume	V8[	Ume
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Carbon Monoxide	Carbo	n Dioxide											_		<b> </b>	
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Form SST5, Revised 12/28/92 Signature of Sampling Team Leader:	-					1						L				
Team Leader:	Form S	ST5, Revi	sed 12/2	28/92	Sign of S	ature ampling		1			-		-			
					Tean	Leader	·	$\frac{1}{2}$	S		=7	J		<u> </u>		

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CT Pro-			32-93-2590		Contro		Number:	_				oha Z,		
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	<u>v 11, 19</u> Tri-C				Sample	BOX N	mber:		4				6	
			ung Wet Scrubt		Probe	No:	5	Length:		,			1.00	<u>.</u>
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est Ter		/ DC /			Nozzl	e No:	i [	Diamete	er: 43	44_		<u>1s /</u> R	35	
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	Temp., *	ليبي المتصف فاقسي	80	Barometri	c Press	ure, in	.Hg: (	<u>(9.58</u>		STOTIC	Pressure,		.0	<u> </u>
<u> </u>					EPA ME	THOD 5	TRAVERS	E DATA		<u></u>				
CLOCK	TRAVERSE	SAMPLE	SAMPLE	VELOCITY	ORIF		PUMP		290.99	TEMP	ERATURE, • IMPINGER	UXILIARY	GAS M	ETER
TIME	POINT	TIME	VOLUME	HEAD in.WC	<u>eH, i</u>	ACT.	VAC. inHG	GAS	LINER	OVEN	EXIT		11	001
hours	NUMBER	minute	cu.ft.	,22	2.88		4.0	129	255	1	66	`	87	فتهج
<u>۲۲: ۲</u>	AL	6	997.000 972.9	.22		2.36	4.0	140	255	257	60	-	88	5.5
	<u> </u>	2 4	1000-6	10	1.31	1.31	2.5	141	257	256	59			88
	<u> </u>	6	2.0	-05	.65	.65	20	143	258	256	60	-	P7	<del>5</del> 8
	5	8	2.9	.04	.52	-52	2.0	150	258	254	60		89	88
	6	10	3.8	.04	.52	- 52	2.0	150	259		60		89	<u>ক</u> িব
	ENSA	12	4-6	×	X	X	$\mathbf{X}$	X	X	X	<u>×</u>	<u>×</u>	×	X
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	BI	0	4.6	.18	2.36	7.36	40	148	25)	256	61		92	99
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<u>}</u>	X	1 ×	11.8	× 1.19	2.49	2.49	4.0	148	1257		60	-	93	
	<u>ci</u>		11.8	*16	2.10	2.47	1	149	261		158	~	94	
	$\frac{\zeta}{3}$	$\frac{1}{4}$	15.0	-10	_	1.44	3.0	150	25)		158		94	
	4	$\frac{1}{6}$	16.3	1.06	1.19			150	257		59	<u> </u>		
	$\frac{1}{5}$	8	117.4	.04	-52	52	2.0		260			<u> </u>	195	
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×	×	×	× _		X	X	┶┷					l Xolume	<u> </u>	<u>, x</u>
	FPA	METHOD	4: MOISTUR	E DETERMINA	TION					AK CHEC		as led, DCF:	37 (	408
IMPIN		1	2	3	4	5				Vac,in				
Final		99	103	0 2	12.4	$\mathbf{X}$			000	1/5	Samo	l ling , Min:	60	>
Initi		00	100		06.6	$\overline{X}$	16	:42 0,	000	5		ter Catch	Descri	ptio
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	Moisture			108.	۷	_,=				<u> </u>		Www.	-043	, , , , ,
Impin	nger Catch	h Descri	ption:	ن ،	417 <u>1' /</u>	1000	159							
			. —	EPA METI	HOD 3: (	SAS COM	POSITIO	BY ORS	AT ANA	LYSIS				
Samol	e ldenti	ficatio	n Re	plicate 1		Replica		Re	plicat	e 3		cate 4	- AVI	ipour erage rcent
			Bure Readi	·	t Bul	ret ding	Percent Volume	Bure Readi		ercent olume	Buret Reading	Percent Volume	Pe Vo	rceñt Lume
<b></b>			Readi		╧╧╋┯╼╼		Volume						in Constanting	2 <b>267</b> #85
	ial Readi						3.0	× 3,		3.2				20
	on Dioxid	e	-3.4	3.4		$\frac{0}{2}$	<u>, u</u> 17. L	20		16,8		$\mathbf{k}^{-}$		.00
Oxyge			20,4	<u>    ], 0</u>   0			6			0		$\sim$		0
	on Monoxi SST5, Rev		/28/92				<u></u>	$\overline{}$		$\geq$	· · ·			
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		_	FICATION	00	┥,	Contr		Number	_	1			oha Z,	1903	
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	av 11, 1					_		lumber:		4	· · ·		MC	16	
	<u>'' Tri-(</u>			L his			No:	5	Length		1		Ps/Pm	1.00	
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			UM	0			r No:	11	6				R	-	
	Temp.,		- <u>5 &amp; FPA</u> 20	Barome				n.Hg: Z			Static	: Pressure	, in.WC:	7.02	
					_			TRAVERS							
CLOCK	TRAVERSE	SAMPLE	SAMPLE	VELOCIT	Y	ORIF	ICE	PUMP			TEMP	ERATURE.	• F		
TIME	POINT	TIME	VOLUME	HEAD			n.WC	VAC.	STACK	PROBE	FILTER	IMPINGER EXIT	AUXILIARY	GAS P	OUT
hours		minute		in.WC			ACT.	inHG			_	61		95	90
	DI	0	19.0	+19		_	2.49		150		255	61		96	9
	2	2	<u>20.6</u>				1.96	4.0	148	259	254	59		-	71
	3	4	22,2	- 11	_	44	1.44	3.0	141	261	255	60		96.	91
	<u> </u>	6	23.5	1.04		12	.65	$\frac{z}{z}$	144	261	255	60		95	9
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	×	X	2/1	- 18	┥	.36			139	254	255	60	-	96	90
	Ę	0	26.4	-16		.10			jur	260		58	-	195	9
	2		29.7	•/6	-+;	$\frac{1}{2}$			147		225	S>	-	98	9
	3	4	31,0	1.70	+	<u>, 70</u> . 3j	1.31		143	2.59		55		98	2
	17		32.3	1.07		92	1.92		142		256	39	-	19)	2
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	<u> </u>		1	<u> </u>		_	1	- <u></u>	<u> </u>			Tot	ai Volume		_
	EPA	METHOD	4: MOISTU	RE DETERM	INATIO	N			A METHO			K of Sam	ai Volume Gas pled, DCF:	37	40
IMPIN	GER	1	2	3	4	ļ	5	Tir			Vac, in				
Final								<u> </u>	_	000	15		al pling ¢, Min:	60	
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Net				1					_						
	Moisture							_Ц			L		<u> </u>		
Impin	ger Catch	Descrip	ption:												
				EPA M	ETROO	3: G	AS COMP	OSITION	BY ORS!	AT ANAL	YSIS				
Sampl	e Identif	ication	R	plicate 1	T	R	eplicat	e 2	Rej	plicate	3		cate 4	Com Ave	rage
			Bur	et Perc	ent	Bur Read	et f	Percent /olume	Bure	t Pe	Cent	Buret Reading	Percent Volume	Vol	rage cent ume
<u> </u>	al 6		Read			Kea0		/otume	Reduti	<u> </u>	Succession:		Contrast Charge		
	al Readir													T	~
	n Dioxide						╾╼┽═							1-	
Oxyge	n Monoxia													1	
	ST5, Rev		28/02		ionat	ure		$-\epsilon$	<u> </u>		-		5		
FOLD 2	агэ, кеу	15CU 12/	20/72	ŝ	ignat f Sam eam L	ol ing eader	ł.		2	<u> </u>	2	2	<u> </u>		
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Date	:	<del></del>

\_\_\_\_\_ Project:\_\_\_\_\_

Technician: J.T.

Client: T21-CITY FAVING

Source/Process: WFT Scauce (R

5/11/93

POINT	FROM STOCK WALL	FROM PORT	FLOW O	4	Ċ	Ē
i	4.9	9,1		-16 50 119	-11 5	.100,124
2	14-P	19.0		-16 119 -15 0° 120 -10 5° 121	12 5° 123 100° 123	· 10 · 124
3	24.7	28.9		.10 5° 121	· 10 0° 12 3	.11 00 125
ų	34.6	38.8		.060 121	,06 0.	·11 0 07 50 15 07 07 15
5	44.4	48.6		.06 0121 .06 5121	.05 5 723	.0000
6	54.3	58.5		.06 50 122 .06 122	.04 30 123	.0200
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Comments:

-лек Д.тенстоны 5914" x 591/2" Дар шре WET BULC-

Klozele -11 - 3.44

twin city testing...

PORT LENGTH - 4 14

Form SST00001, General Data, Revised 10/21/92

1-05-4

OURCE NAME	mission Observ	RVATIC		Έ	STAR	T TIME	<u> </u>	STOP	TIME			
TRI-CITY PAUING		-11-	-	~	10.	_	•	11.1				
DDAESS	SE		Ť.			SEC				<u> </u>		
7.0 Bux 326	MIN	0	15	30	45	MIN	0	15	30	45		
	1	1	10	10	5	31	0	0	0	0		
	2	1/2	<u>r</u>		10	32		0	0			
ITY STATE FARES MINN 563	245	10	10		10		0	<u> </u>		0		
HONE SOURCE ID NUMBER	3	5	10	10	10	33	0	0	$\mathcal{O}$	0		
681-3	4	10	10	10	5-	34	0	0	0	_و		
ROCESS EQUIPMENT OPERATING M Schuger De au F 200 7 7.		5	5	- <u></u>	10	35	0	5	- تز	0		
ONTROL EQUIPMENT OPERATING M		10	10	10	10	36	0	Ð	o	0		
NET SCAUSER 1997	7	15	10	10	15	37	-د	0	0	0		
	8	سور	1			38	~	0				
TART TOPETSTOCKSTOP S. FALE EIGHT ABOVE GROUND LEVEL HEIGHT RELATIVE TOOL		1-	10	10	<u> </u>		0		0			
EIGHT ABOVE GROUND LEVEL HEIGHT RELATIVE TOOL		10	10	10	10	39	0	0	0	0		
START 20 STOP 20 START 25 STOP		15	10	10	10	40	0	-2	0	5-		
START 202' STOP במני על START לאמני STOP	11	10	10	15	سير ز	41	0	0	0	0		
ESCRIBE EMISSIONS			re-			42			<u> </u>			
START SCRUGER ( FAIre 13+ STOP	12	15	10	10	15		0	0_	0	0		
MISSION COLOR PLUME TYPE: CONTINU	13	15	15-	15	10	43	0	0	0	0		
STARTWAITE STOPWAITE FUGITIVE D INTERMIT	1	Vo	10	10	10	44	0	0	0	0		
VATER DROPLETS PRESENT: IF WATER DROPLET PL			T	10	h <del></del>	45	0	0		1		
NO O YESO ATTACHED D DETAC		10	10	10	5-		1	1	0	0		
OINT IN THE PLUME AT WHICH OPACITY WAS DETERM		10	10	10	10	46	0	0	0	0		
START END OF THUME STOP "	17	10	10	10	10	47	0	0	0	0		
DESCRIBE BACKGROUND	18	1-	10		10	48	0	0	a	e		
START 5 A Y STOP		-12-			<u> </u>	1	1	∽-				
BACKGROUND COLOR SKY CONDITIONS	19		5	10	10	49	0_	0	0	17		
START BLUE STOP START CLEAR STOP.	SAME 20	10	15	10	10	50	0	0	0	0		
WIND SPEED WIND DIRECTION	21	5	10	10	10	51	0	0	0	0		
START 5-10 STOP 5-10 START SOUTH STOP	22		<u> </u>	15	5	52						
AMBIENT TEMP. WET BULB TEMP. RH	i,percent	10	15	<u></u>	₽	·	10	0	p_	10		
START 75 STOP 59	37 23	5		<u> </u>	5	53	0	0	0	0		
-	24	3-	10	أسحا	سحا	54	0	0	0	0		
Source Layout Sketch Draw North Arrow	25		-	12		55	0	i i	6			
		-12-		1-	2	56		<u> e</u> _		10		
$\langle \rangle \rangle = \langle \rangle$	26		<u></u>	13	0		10	<u></u>	0	lo_		
Emission Point	27	0	0	0	5-	57	0	0	0	b		
	28	0	5-	0	0	58	0	0	0	0		
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	30		1	12-	1	60			10-			
Sun Wind Observers Position		10	0	0	Ø		0	0	10			
Frome and	AVE	RAGE ( HEST P	UPACÍ ERIOD	ir for //	.7%			F REA % WE				
Sidex 1400'	· · · · · · · · · · · · · · · · · · ·	IGE OF	OPAC	ITY REA	DINGS					-		
Sun Location Line		00	6 M	INIMUN	1	15	6 MA	XIMUN	1			
-K		SERVER				7.4						
CONTRE ST		DAVID CNRISTIAN										
COMMENTS	08	OBSERVER'S SIGNATORE - DATE Day - 5-11-93										
		ORGANIZATION										
I HAVE RECEIVED A COPY OF THESE OPACITY OBSER		م ( کیہ T RTIFIED		<u>, 77</u>		155		⊊ \TE				
SIGNATURE			<u>T_A</u>	·			-	<u>/·/</u> ~	47			
TITLE DATE	VEI	RIFIED L	3Y					TE				
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for H		pacity			10:15 a.m.						
Minir			> 1 ute Perio			rage Opa Test Perio	-	-> /	4.1%		
19111 I (I	num F	leading	] —	0 %	6						
Maxi	mum l	Readin	g	15 %	% 6 Minute						6 Minute
	0	15	30	45	Average		0	15	30	45	Average
1	5	10	10	5	<b>-</b>	31	0	0	0	0	<u>-</u> 1.3%
2	10	10	15	10		32	0	0	0	0	0.6%
З	5	10	10	10		33	0	0	0	0	0.4%
4	10	10	10	5		34	0	0	0	5	0.4%
5	5	5	5	10		35	0	5	5	0	0.6%
6	10	10	10	10	8.8%	36	0	0	0	0	0.6%
7	15	10	10	15	9.6%	37	5	0	0	0	0.8%
8	15	10	10	5	9.4%	38	0	0	0	0	0.8%
9 10	10 15	10 10	10 10	10	9.6%	39 40	0 0	0 5	0 0	0	0.8%
11	10	10	15	10 15	10.0% 11.0%	40	0	0	0	5 0	1.0% 0.6%
12	15	10	10	15	11.5%	42	ŏ	ŏ	Ő	ŏ	0.6%
13	15	15	15	10	11.7%	43	ŏ	ŏ	Ő	ŏ	0.4%
14	10	10	10	10	11.7%	44	ō	Õ	ĴŎ	ō	0.4%
15	10	10	10	5	11.5%	45	ō	Ō	0	ŏ	0.4%
16	10	10	10	10	11.3%	46	Ō	Ō	Ō	Ō	0.0%
17	10	10	10	10	10.8%	47	0	0	0	Ō	0.0%
18	5	10	15	10	10.4%	48	0	0	0	0	0.0%
19	5	5	10	10	9.4%	49	0	0	0	0	0.0%
20	10	5	10	10	9.2%	50	0	0	0	0	0.0%
21	5	10	10	10	9.2%	51	0	0	0	0	0.0%
22	10	5	5	5	8.5%	52	0	0	0	0	0.0%
23	5	5	5	5	7.7%	53	0	0	0	0	0.0%
24	5	10	5 5 5	5	7.1%	54	0	0	0	0	0.0%
25	5	5	5	5	6.7%	55	0	0	0	0	0.0%
26	5	5		0	5.8%	56	0	0	0	0	0.0%
27	0	0	0	5	4.6%	57	0	0	0	0	0.0%
28	0	5	0	0	3.8%	58	0	0	0	0	0.0%
29	0 0	0 0	0 0	5	3.1%	59	0	0	0	0	0.0%



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2-05-4

Visible Emission Observation Form	
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OURCE NAME		·		OBSER			E		TIME		STOP		
TRI-CITY PAU DORESS	ING			$\overline{SEC}$	// ;	~	·	12:	DC> NSEC		<u> </u>		
DORESS JOB 326				MIN	0	15	30	45	MIN	0	15	30	45
<u></u>				1	0	0		0	31	0	0	0	0
					21		0		32				
ITY LITILE FALLS	STATE	1N	ZIP 56345	2	0	0	<u> </u>	0		0	0	0	O
LITTLE FALLS	SOURCE		BER	3	<u> </u>	0	8	0	33	0	0	O	Ó
		: 10 NUME 3 /- 0		4	0	0	0	0	34	0	0	0	0
ROCESS EQUIPMENT	emt	OPERATI	ING MODE	5	0	0	0	0	35	c	0	0	Ö
CONTROL EQUIPMENT		OPERAT	ING MODE	6	0	0	0	0	36	0	0	0	0
WET SCAUBBET			60%	7		1			37			<u> </u>	-
DESCRIBE EMISSION POINT					0	0	0	<u> </u>		0	6	C	0
	STOP			8	0	0	0	0	38	0	0	e	Ô
EIGHT ABOVE GROUND LEVEL				9	0	C	0	0	39	C	6	c	0
START 2, STOP 20	t		STOP 14	10	0	0	0	0	40	Ø	0	0	C
DISTANCE FROM OBSERVER		10N FRON W. 32C S	A OBSERVER	11		1	0	o	41	0	0	0	c
DESCRIBE EMISSIONS	SIARI			12	Ø	<u> </u>	1	1	42		1		
START SCAUGHOR CHAMBER	STOP	11		ļ	0	0	0	12		0	0_	0	0
EMISSION COLOR		TYPE: CO		13	0	0	0	C	43	0	0	0	Ø
	1		ERMITTENT 🕱	14	0	<u>e</u>	0_	0	44	0_	0	0	0
WATER DROPLETS PRESENT:	IF WAT	ER DROPL	ET PLUME:	15	0	0	0	0	45	0	0	0	0
				16	e	0	0	0	46	0	Ø	6	0
POINT IN THE PLUME AT WHICH		Y WAS DI	ETERMINED	17	0		1		47	0	1	0	0
STARTEN'S OF PLUME					0	0	0	48	<u></u>	0	1		
DESCRIBE BACKGROUND START 5たゾ	STOP	<i></i>	,	18	0	10	0	la_		0	Ø	0	0
BACKGROUND COLOR		<u>5KY</u> NOITIONS		- 19	0	0	0	0	49	0	0	0	0
		CLEAR		20	0	0	0	0	50	0	0	0	0
WIND SPEED	WIND L	DIRECTION	V	21	0	0	0	0	51	0	0	0	0
START 5.10 STOP 5.10	START	South .	STOP 5011741	22	0		0	1	52	0	0	0	0
AMBIENT TEMP.		ULB TEMP.	. RH.percent	23		0		0	53	<u>_</u>			
START 76 STOP 78	5	7	37		0	0	0	0		<u>  0</u> _	10		0
- >	-			24	0	0	C	0	54	10	0	0	10
Source Leyout Sketch	Dra	w North A	Arrow	25	C	0	0	0	55	0	0	0	0
1a		(	ア)	26	0	0	0	0	56	0	0	0	0
FLUME ->		N - 0-'		27	0	0	0	0	57	0	0	0	0
	Emissio	n Point		28	0	0	0	0	58	0	0	0	6
		<b>L</b>	~ O	29					59				$\mathbf{T}$
	)	X WII	N 2		0	0	10	0		0	0	<u> </u>	10
Sun & Wind >	<b>Oh</b> a s a s a s	Brokie	-	30	0	0	0	0	60	0	0	0	10
Plume and = Siack		ers Positio	••	AVEF	RAGE ( IEST P	OPACI ERION	TY FOR		1 ~04		OF REA % WE		
JI400 14	<u>o•'</u>				GE OF	QPAC	ITY RE.	ADING	s a				
Sun Loca	tion Line	•			0	<u>/ M</u>	INIMU	м	01	O MA	XIMU	И	
	Y.				ERVER DA V		ME (PR ~ ^		57/4	N			
COMMENTS								DA	TE				
		OBSERVER'S SIGNATURE DATE											
				ORG	ANIZA	TION	1.7	~	T	T / AL	G		
I HAVE RECEIVED A COPY OF	THESE	DRACITY C	RSERVATIONS	CEP	7 µ TIFIED		<u>c//</u>	<u> </u>	755		ATE		
SIGNATURE	10525 (					<u> </u>	·				7- /-	93	
TITLE		, DATE		VER	IFIED	8Y				04	ATE		
										<u> </u>	-		

					··· –					<u>.</u>	. <u> </u>
			E	PA ME	THOD 9 OPACITY	( CALCUI	ATIO	NS			
		Proce	ss Tes D	ted: V	RICITY PAVING Vet Scrubber /11/93 2:00	, INC., Lit	tle Fa	lls, MN			
Resul											
		pacity - 6 Minu				age Opa est Perio		-> (	0.0%		
Minin	num F	leading	<b>;</b> –	0 %	6						
Maxir	num I	Reading	g —	0 %	6 6 Minute						6 Minute
	0	15 .	30	45	Average		0	15	30	45	Average
1	0	0	0	0		31	0	0	0	0	0.05
2	0	0	0	0		32	0	0	0	0	0.09
3	0	0	0	0		33	0	0	0	0	0.09
4	0	0	0	0		34	0	0	0	0	0.09
5	0	0	0	0		35	0	0	0	0	0.09
6	0	0	0	0	0.0%	36	0	0	0	0	0.09
7	0	0	0	0	0.0%	37	0	0	0	0	0.09
8 9	0 0	0 0	0 0	0	0.0% 0.0%	38 39	0 0	0 0	0 0	0 0	0.09 0.09
10	Ö	õ	0	0	0.0%	40	ŏ	Ö	Ö	Ö	0.0%
11	ŏ	ŏ	ŏ	ŏ	0.0%	40	ŏ	ŏ	õ	ŏ	0.0%
12	õ	ō	ō	Ō	0.0%	42	Ō	õ	ō	ō	0.09
13	0	0	0	0	0.0%	43	0	0	0	0	0.09
14	0	0	0	0	0.0%	44	0	0	0	0	0.09
15	0	0	0	0	0.0%	45	0	0	0	0	0.0%
16	0	0	0	0	0.0%	46	0	0	. 0	0	0.09
17	0	0	0	0	0.0%	47	0	0	0	0	0.05
18	0	0	0	0	0.0%	48	0	0	0	0	0.09
19	0	0	0	0	0.0%	49	0	0	0	0	0.09
20	0	0	0	0	0.0%	50	0	0	0	0	0.09
21	0	0	0	0	0.0%	51	0	0	0	0	0.09
22	0	0	0	0	0.0%	52 53	0 0	0	0 0	0	0.09
23 24	0 0	0 0	0 0	0 0	0.0% 0.0%	53 54	0	0 0	ő	0 0	0.09
24 25	õ	ŏ	0	Ö	0.0%	55	Ö	Ő	Ő	ő	0.0% 0.0%
25 26	õ	ŏ	ŏ	ŏ	0.0%	56	ŏ	ŏ	ŏ	ŏ	0.0%
27	õ	õ	ŏ	ŏ	0.0%	57	ŏ	õ	õ	ŏ	0.05
28	ō	õ	Õ	Ō	0.0%	58	õ	ō	õ	ŏ	0.05
29	Ō	Ō	Ō	Ō	0.0%	59	Ō	Ō	Ō	Õ	0.0%
23				0	0.0%		0	0	0	Ō	•·••

3-18-4

SOURCE NAME	16-	•		085ER 5-1,	. –		E	STAR	T TIME		STOP TIME			
TRICITY PAULA ADDRESS				SEC					SEC					
P.O.Bux 326				MIN	0	15		45	MIN 31	0 0	15	30		
		r		· · · · · · · · · · · · · · · · · · ·	0	0	5	5-	37		0	0	$\sigma$	
LITTLE FALLS	STATE MIN	N	ZIP 569415	2	0	0	0	0	33	0	0	0	0	
PHONE	SOURCE	10 NUM		4	6 0	5	0	0	34	0	0	0	0	
PROCESS EQUIPMENT AVIIALT	- فمن المر	OPERA	TING MODE	5	Ø	0	0	0	35	0	0	0	c	
CONTROL EQUIPMENT		OPERA	TING MODE	6	0	0	0	a	36	C	0	0	8	
NET SCAUBBLA DESCRIBE EMISSION POINT				7	0	0	0	0	37	Ð	0	0	Ö	
STARTTOP OF STACK	STOP 7	of of	STACK	8	0	5	5	5	38	0	0	0	C	
EIGHT ABOVE GROUND LEVEL	HEIGHT	RELATIV	E TOOBSERVER	9	0	0	0	0	39	Q	5	5	_ز	
START 20' STOP 20			STOP 17'	10	<u>}                                    </u>	17	5		40	5	5	<b>F</b>		
DISTANCE FROM OBSERVER		· · ·	MOBSERVER		5	12	- <u></u>	12				12	0	
START 200 STOP 200	START	J-320	STOP 5.4 mg	11	5	5	5	0_	41	0	0	0	0	
DESCRIBE EMISSIONS				12	0	5	5	5	42	0	0	0	0	
	STOP			13	5	5	5	0	43	0	0	0	0	
EMISSION COLOR			ONTINUOUS D	14	0	0	0	0	44	0	0	Ø	0	
START WHITE STOP			PLET PLUME:	<u> </u>		+	1	1	45		1		1	
WATER DROPLETS PRESENT: NO Ø YESCI	1			15	0	0	0	10_		0	0	þ	0	
POINT IN THE PLUME AT WHICH				16	0	0	0	2_	46	0	0	0	0	
START END OF PLAME	STOP .	5 A AA I	P	17_	0	0	0	0	47	0	0	0	0	
DESCRIBE BACKGROUND	<u> </u>			18	D	0	0	0	48	0	0	0	0	
START SKY	<u>ی stop</u>	AME		19			5	+ <u>-</u>	49	0	0	0	0	
BACKGROUND COLOR	SKY CO	NDITION	IS	20	0	0	1	10	50		-1	1		
STARTGLUE STOP BANE				+	0	0	0	10	+	0	0	0	0	
WIND SPEED		DIRECTIO		21	0	0	0	10	51	Ø	0	0	0	
START 10-15 STOP 10-15	WET RI	UR TEM	P. RH.percent	22	Ð	0	0	0	52	0	0	0	0	
START & STOP & /			27	23	0	0	0	0	53	0	0	Ø	C	
	<u>`````````````````````````````````````</u>			24	0	0	0	0	54	0	0	0	0	
Source Leyout Sketch	Dra	w North	Arrow	25	0	0	0	0	55	0	0	0		
					- ×-		-		56				_	
		(	$\mathcal{O}$	26	10	10	0	10		0	0	Ø	$ \mathcal{O} $	
	Emissio	n Point		27	0	0	0	0	57	10	0	0	10	
		_	0	28	0	0	0	0	58	10	Ø	0	10	
	1	Σw	INY	29	0	0	10	e	59	p_	0	0	0	
Sun & Wind				30	0		0	0	60	0	0	0		
Plume and =	Observe	rs Positi	on				TY FOR	101	NUN					
Stack	10*				IEST P		5. : 111 RE	5 %	<u></u>	w	% W	ENE (		
<u> </u>	tion Line				0%	• <b>•</b>	INIMU	м	<b>5</b>	6 MA	XIMU	м		
1 371							ME (PR c		9 N/					
COMMENTS		085	ÊRVEF	rs⁄sia	NATO				TE	<u> </u>				
			and		hur	tore		<u>ئے ا</u>	5-//-	93				
				ORG	ANIZA 7	TION W/A	1 61	74	TFS	TING	5			
I HAVE RECEIVED A COPY OF SIGNATURE	THESE	PACITY	OBSERVATIONS	CER	TIFIED					<u> </u>	ATE	.43		
TITLE		DATE		VER	IFIED						ATE	<u> </u>		
				1										
			F twin c	s <b>b-s_s</b> 1	POE	him								

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Resu	lto.	Proce	ss Tes D	ted: V ate: 5	RI-CITY PAVIN Vet Scrubber 5/11/93 :42 P.M.	G, 1100., EK					
Avera	ige Op		> ≎ ⊔te Per			erage Opa Test Perio		-> (	0.5%		
Minin	num R	leading	<b>]</b> —	0 %	6						
Maxir	num F	Reading	g –	5 %							
	0	15	30	45	6 Minute Average		0	15	30	45	6 Minute Average
1	0	0	<u>_</u> 5	<u>-</u> 5		31	0	0	0	0	0.0%
2 3	0	0	0	0		32	0	0	0	0	0.0%
	0	5	0	0		33	0	0	0	0	0.0%
4	0	0	0	0		34	0	0	0	0	0.0%
5 6	0	0	0	0	0.00/	35	0	0	0	0	0.0%
6 7	0 0	0 0	0 0	0 0	0.6% 0.2%	36 37	0 0	0 0	0 0	0 0	0.0% 0.0%
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9	ŏ	ŏ	ŏ	õ	0.6%	39	ŏ,	5	5	5	0.6%
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11	5	5	5	0	2.1%	41	0	0	0	0	1.3%
12	0	5	5	5	2.7%	42	0	0	0	0	1.3%
13	5	5	5	0	3.3%	43	0	0	0	0	1.3%
14	0	0	0	0	2.7%	44	0	0	0	0	1.3%
15	0	0	0	0	2.7%	45	0	0	0	0	0.6%
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22	Ō	Ō	Ō	Ō	0.2%	52	Ō	Ō	Ō	Ō	0.0%
23	0	0	0	0	0.2%	53	0	0	0	0	0.0%
24	0	0	0	0	0.2%	54	0	0	0	0	0.0%
25	0	0	0	0	0.0%	55	0	0	0	0	0.0%
26	0	0	0	0	0.0%	56	0	0	0	0	0.0%
27	0	0	0	0	0.0%	57	0	0	0	0	0.0%
28	0	0	0	0	0.0%	58 50	0	0	0	0	0.0%
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4054

Visible	Emission	Observation Form

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TITLE	£	VERIFIED BY DATE											

		<b>D</b> ar -				ING, INC., I	_ittle Fa	ilis, MN			
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	gnest	6 Minu	ite Per	100		for Test Pei	IOQ				
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3	0	0	0	0		33		0	5	5	2.9%
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12	0	0	0	0	0.0%			5	5	5	3.5%
13	0	0	0	0	0.0%			5	5	5	4.2%
14	0	0	0	0	0.0%			5	5	5	4.6%
15	0	0	0	0	0.0%			0	0	0	4.2%
16	0	0	0	0	0.0%			0	5	5	3.8%
17 18	0 5	0 5	0 0	0 0	0.0% 0.4%			5 5	5 5	5 5	3.5% 3.5%
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## APPENDIX C

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## LABORATORY REPORTS



## LABORATORY REPORT: EPA METHOD 5 PARTICULATE ANALYSIS

Project	Number:	4232-0	73	23	590
Client:	Tri C	: <del>\</del>			

7

TEST

RUN /

	FILTER CATCH				
	Sample Number: 317186			Numbe	ər:
		Date	Time	Ву	grams
Weight	<b>#</b> 4				
Weight	#3				
					0.56389
Weight	#1	5-14-93	12:15	11KC	0.56269
Filter	Ta	e Weight			0.35184
Net Sam	ple	e Weight			0. 21105

Weighings shall be to the nearest 0.1 mg. Weighings shall be to "constant weight" which means a difference of no more than 0.5 mg between two consecutive weighings, with no less than six hours of desiccation time between weighings.
INPINGER CATCH VOLUME
Measured Sample Volume, ml: 435

Estimated Volume Lost, ml:

WEIGHING PROCEDURE

	FRONT	WASH		
Sample Num		Measur Sample Volume	<b>&gt;</b>	Estimated Volume Lost, ml
31719	0	118		
	Date	Time	Ву	grams
Weight #4				
Weight #3	5-21-43	8:00	MKC	2.70445
Weight #2	5-20-93	3:00		2.70 452
Weight #1	5-19-93	12:40	1/	2.70229
Dish Tare	5-14-93	4:30	1/KC	2,62497
Weight of	collected	d matte:	r	0,07948
Water Bla	nk base	ed on 5	9 ml	0.00383
Acetone B	lank bas	ed on 5	q ml	0.00130
Net Sample	e Weight			0.07435

IMPINGER ACETONE RINSE

Date

138

Time

3:00

12:20

Measured Estimated Sample Volume Volume, ml Lost, ml

grame

2.61559

2.61542

2-61054

0.00505

0.00304

0.00201

By

HKC

MKC

HKL

IMPING	ER CATCH C	ORGANIC	EXTRA	CTION
Sample Num	nber: 3	1719	2	
	Date	Time	By	gramø
Weight #4	5-24-93	11:05	MKC	2.61 519
Weight #3	5-21-93	8:00	MKC	2,61898
Weight #2	5-20-93	3:00	MKC	2.62022
Weight #1	5-19-93	12:20	UKC	2.62427
Dish Tare	5-14-93	4:30	MAC	2.605:29
Weight of	collecte	d matte:	r	0.00861
Less Solv	ent Blank	B		
Ethyl Eth	er bas	ed on 1	5 ml	0.00024
Chlorofor	m bas	ed on 7	5 ml	100007
	bas	ed on	ml	
Net Sample				0.00830
5-3	26-93	4,35 8:15 7	MKC	- 2.6139 2.61390

IMPI	NGER CAT	CH MASS	RESID	UE
Sample Num	ber:			
	Date	Time	Ву	grame
Weight #5				
Weight #4				
Weight #3				
Weight #2				
Weight #1				
Dish Tare				
Weight of	collecte	d matte	r	
Water Blan	k bas	ed on	ml	
Net Sample	Weight			

Form: SST-LAB52C

Sample Number:

Weight #2 5-20-93

Weight #1 5-19-93

Net Sample Weight

Dish Tare 5-14-93 4:30

Weight of collected matter

Acetone Blank based on 138 ml

317191

Weight #3

corporation

## LABORATORY REPORT: BPA METHOD 5 PARTICULATE ANALYSIS

Project Number: 4232-93-2590	TEST	RUN
Client: Tri City		<u> </u>

	FILTER	CATCH		
Sample Nur 3171	nber: 87	Filter	Number 74	pr:
	Date	Time	Ву	grame
Weight #4	5-24-43	11:10	MKC	0.38404
Weight #3	5-21-93	8:00		0.38 396
Weight #2	5-20-93	2:50	HKC.	0.38293
Weight #1	5-19-93	12:15	UKC.	0.38382
Filter Tax	re Weight			0.35034
Net Sample	e Weight			1.03370

5-26-43 4- 10 MAC

	FRONT	WASH		
Sample Num 3)7/6		Measur Sample Volume 95	a –	Estimated Volume Lost, ml
	Date	Time	Ву	grams
Weight #4				
Weight #3				
				2.61415
Weight #1				
Dish Tare	5-14-93	4:35	MKC	2.60286
Weight of				0.01129
Water Blas	nk base	ed on 4	9 ml	0.00375
Acetone B.	lank base	ed on 4	'9 ml	0.00.105
Net Sample	e Weight			0.00646

#### WEIGHING PROCEDURE

Weighings shall be to the nearest O.1 mg. Weighings shall be to "constant weight" which means a difference of no more than 0.5 mg between two consecutive weighings, with no less than six hours of desiccation time between weighings.

	INPINGE	CATCH	VOLU	æ	
Measured	Sample	Volume	, ml:	427	
Estimate	d Volume	a Lost,	ml:		

IMPINGE	R CATCH C	RGANIC	EITRA	CTION
Sample Num	ber: 3	17 19	5	
	Date	Time	Ву	grame
Weight #4				
Weight #3				
Weight #2	5-20-93	3:05	Mike	2.62530
Weight #1	5-19-93	12:30	UKC	2.0 2546
Dish Tare	5-14-93	4:35	UKC	2,61934
Weight of	collected	d matte	r	0.00596
Less Solve	ent Blank	8		
Ethyl Ethe	er bas	ed on a	is ml	0.000 24
Chloroform	n bas	ed on	75 ml	0.00007
	bas	ad on	ml	
Net Sample	. Weight	الدي وي من ا		0.06565

IMPINGER A	CETONE	RINSE	
ample Number: 317194			Estimated Volume Lost, ml
Date	Time	Ву	grame
eight 13 5-21-93	8.00	MRC	2.65784
leight \$25-20-93	3:05	MKC	2.66045
leight #1 5-19-93	12.25	MKC-	2.67179
ish Tare 5-14-93	4:35	1KC	2.64733
eight of collected	d matte	r	0.00554
cetone Blank base	ed on g	o ml	0.00176
let Sample Weight			0.00378
orm: SST-LAB52C N+ #4 5.24-93 5-26-93 4135	il:jo 5 MKC	икс	2,65369 Etuin

IMP	INGER CATC	HASS	RESIDU	IE.
Sample Nu	mber:			
	Date	Time	Ву	grams
Weight #5				
Weight #4				
Weight #3				
Weight #2				
Weight 🗾				
Dish Tare	•			
Weight of	collected	i matte	r	
Water Bla	ink base	ad on	ml	
Net Sampl	le Weight			

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# LABORATORY REPORT: EPA METHOD 5 PARTICULATE ANALYSIS

			the second s
	Project Number: 4232-73-2590	TEST	RUN
	Client: Tri City		
1			

FILTER CATCE					
Sample Number: 1 3/7/88		Filter Number:			
) <u></u>		Date	Time	Ву	grame
Weight	14				
Weight	#3				
Weight	#2	5-20-93	2:55	HKC.	0.41067
Weight	#1	5-19-93	12:20	MKC.	0.41068
Filter Tare Weight					0.35056
والمتحاذ والمتحدث المراجعين والمحاج ويتحاذني المتحد ويتعارف والمتحد والمتحد والمتحد والمحاج وال				0.06011	

	FRONT WASH					
Sample Number: 3/7/96		Measured Sample Volume, ml 73		Estimated Volume Lost, ml		
	Date	Time	Ву	grams		
Weight #4						
Weight #3						
Weight #2	5-20-43	3:10	MKC	2.68200		
Weight #1	5-19-93	12:30	MKC	2.68176		
Dish Tare	5-14-93	4:40	LKC.	2.65596		
Weight of collected matter				0.02604		
Water Blank based on 36.5 ml			0.00280			
Acetone Blank based on 36.5 ml				0.00080		
Net Sample	e Weight			0.02244		

IMPINGER CATCH ORGANIC EXTRACTION						
Sample Number: 317198						
	Date	Time	Ву	grama		
Weight #4						
Weight #3	5-21-93	8:00	MKC	2.63541		
Weight #2	5-20-93	3:10	UKC	2,63591		
Weight #1	5-19-93	12:30		2.63659		
Dish Tare	5-14-93	4:40	MKC	2.62685		
Weight of	collecte	d matte	r	0.00856		
Less Solv	ent Blank	8	`			
Ethyl Eth	0.00074					
Chlorofor	0.00007					
Net Sampl	0.00525					

WEIGHING PROCEDURE

IMPINGER CATCH VOLUME

Measured Sample Volume, ml: Estimated Volume Lost, ml: 422

Weighings shall be to the nearest 0.1 mg. Weighings shall be to "constant weight" which means a difference of no more than 0.5 mg between two consecutive weighings, with no less than six hours of desiccation time between weighings.

INPINGER Sample Number: 317197	Measu	red	Estimated Volume Lost, ml	
Date	Time	Ву	grams	
Weight #3 5-21-97	8:00	MKC	2.64413	
Weight #2 5-20-93		<b>UKC</b>	2.64518	
Weight #1 5-19-93	12:30	MKC	2.64940	
Dish Tare 5-14-93	4:40	MKC	2.63637	
Weight of collecte	ad matte	r	0.00526	
Acetone Blank bas	0.00211			
Net Sample Weight	0,00315			
Form: \$\$1-LAB52C wt # 4 5-2 4-43 5-26-43 Uks	МКС . 4:40	j]: j0		

IMPINGER CATCE MASS RESIDUE					
Sample Num	wer:				
	Date	Time	Ву	grams	
Weight #5					
Weight #4					
Weight #3					
Weight #2					
Weight #1					
Dish Tare					
Weight of	collecte	d matte	r		
Water Bla	nk bas	ed on	ml		
Net Sample	e Weight				

win city testing\_\_\_\_

2.64163 corporation

## LABORATORY REPORT: EPA METHOD 5 PARTICULATE ANALYSIS

Project Number: 4232-93-2590 TEST RUN Client: Tri City

FILTER CATCH					
Sample Number: 317189		Filter Number:			
		Date	Time	Ву	grame
Weight	14				
Weight	13				
		5-20-93			0.46607
Weight	#1	5-19-93	P\$ 20	MKC	0.46584
Filter Tare Weight					0.35000
				0-11607	

	FRONT WASE					
Sample Number: 317199		Measured Sample Volume, ml		Estimated Volume Lost, ml		
	Date	Time	Ву	grams		
Weight #4						
Weight #3						
Weight #2	5-20-93	3:10	NIC	2.6 5715		
Weight #1	5-19-93	12:30		2.65 708		
Dish Tare	5-14-93	4:40	LIKC	2,62808		
Weight of collected matter				0.02907		
Water Blank based on $41.5$ ml				0.00318		
Acetone Bl	0.00091					
Net Sample	Weight			0.02498		

IMPINGER CATCH ORGANIC EXTRACTION							
Sample Num	Sample Number: 31720						
	Date	Time	Ву	grame			
Weight #4							
Weight #3							
Weight #2	1-20-93	3:15	<b>UKC</b>	2.63311			
Weight #1	5-19-93	12:35	MKC	2.63330			
Dish Tare	5-14-93	4:40	UKC	2.62748			
Weight of	collected	d matte	r	0.00563			
Less Solve	ent Blank	8					
Ethyl Ethe	Ethyl Ether based on 25 ml						
Chloroform							
based on ml							
Net Sample	Net Sample Weight 0.0053.2						

IMPINGER ACETONE RINSE					
Sample Number: 3172.00				Estimated Volume Lost, ml	
	Date	Time	By	grāms	
Weight #3					
Weight #2	5-20-93	3:15	MKC	2.64772	
Weight #1	5-19-93	12:35	MKC	2.64770	
Dish Tare					
Weight of	0.00414				
Acetone Bl	0.00249				
Net Sample	0.00165				

IMPINGER CATCH MASS RESIDUE					
Sample Num	ber:				
	Date	Time	Ву	gramø	
Weight #5		·			
Weight #4					
Weight #3					
Weight #2					
Weight #1					
Dish Tare					
Weight of	collected	d matte	r		
Water Blan	k bas	ed on	ml		
Net Sample	Weight				

Form: \$\$T-LAB52C

∓ twin city testing\_

WEIGHING PROCEDURE

Weighings shall be to the nearest 0.1 mg. Weighings shall be to "constant weight" which means a difference of no more than 0.5 mg between two consecutive weighings, with no less than six hours of desiccation time between weighings.

INPINGER CATCH VOLUME
Measured Sample Volume, ml: 731
Estimated Volume Lost, ml:

# LABORATORY REPORT: EPA METHOD 5 PARTICULATE TEST SOLVENT BLANKS

.

Project Number: 4232-93-2590 Client: Tr: City

DISTILLED, DEIONIZED WATER						
Sample Number: 317203		Measu Sample Volum 2014	Estimated Volume Lost, ml			
	Date	Time	Ву	grams		
Weight #4	5-26-93	41.40	UKC	2.68895		
Weight #3	5-24-43	11:15	Mike	2.68915		
Weight #2	5-21-93	8:00	MKC	2.68827		
Weight #1	5/10/43	7.25	spe	2.63707		
Dish Tare	5-14-93	4:45	MKC	2.64744		
Weight of	residual	matter				
Mass Conce	ntration	1		mg/ml		

ACETONE					
Sample Number: 317202		Measured Sample Volume, ml		Estimated Volume Lost, ml	
	Date	Time	Ву	grame	
Weight #4					
Weight #3					
Weight #2	5-20-93	3115	4KC	264755	
Weight #1	5-19-93	12:35	LIKC	2.64796	
Dish Tare	5-14-93	4:45	MKC	2.64315	
Weight of	residual	matter		0.00440	
Mass Conce	Mass Concentration: 2.2 5 mg/r				

TEST

CHL	CHLOROFORM						
Sample Number: 317205			Estimated Volume Lost, ml				
Date	Time	Ву	grame				
Weight #4							
Weight #3							
Weight #2 5-20-93			2.65412				
Weight #15-19-93			2.65421				
Dish Tare 5-14-93	4:45	NKC	2.65405				
Weight of residual	matter		0,00007				
Mass Concentration	: 9	-7	mg/ml				

ETHYL ETHER						
Sample Number: 317204		Measur Sample Volume 79	e, ml	Estimated Volume Lost, ml		
	Date	Time	Ву	grams		
Weight #4						
Weight #3						
Weight #2						
Weight #1	5-19-93	12:40	HKC.	2.6329.5		
Dish Tare	5-14-93	4:45	UKC	2.63271		
Weight of	residual	matter		0.00024		
Mass Conce	Mass Concentration: 3.2-4					

Sample Number:		Measured Sample Volume, ml		Estimated Volume Lost, ml	
	Date	Time	By	gramø	
Weight #4					
Weight #3					
Weight #2					
Weight #1					
Dish Tare					
Weight of	residual	matter			
Mass Conce	ntration	:		mg/ml	

Sample Number:		Measur Sample Volume	Estimated Volume Lost, ml	
<u></u>	Date	Time	Ву	grams
Weight #4	<u>-</u>			
Weight #3				
Weight #2				
Weight #1				
Dish Tare				
Weight of	residual	matter		
Mass Conce	ntration	1		mg/ml

Form: \$\$T-LAB53C

twin city testing\_

# LABORATORY REPORT: EPA METHOD 5 PARTICULATE TEST SOLVENT BLANKS

Project Number: 4232-Client:

DISTILLED, DEIONIZED WATER Measured Estimated Sample Volume Volume, ml Lost, ml Sample Number: Ricassay ∕ðy grams Time Date Weight #4 Weight #3 5-26-673 4:30 KIKC 2.63993 Weight #2 5-24-93 2.63495 1:05 MAC 2.63942 UKC 9:00 Weight #1 5-21-9% Dish Tare 5/20/43 11:15 Ac 262758 Weight of residual matter mg/ml Mass Concentration:

	AC	ETONE		
Sample Number:		Measured Sample Volume, ml		Estimated Volume Lost, ml
	Date	Time	Ву	grams
Weight #4				
Weight #3				<u> </u>
Weight #2				
Weight #1				
Dish Tare			<u> </u>	
Weight of	residual	matter		
Mass Conce	entration	1:		mg/ml

	CHLOROFORM						
Sample Number:		Measured Sample Volume, ml		Estimated Volume Lost, ml			
	Date	Time	Ву	grams			
Weight #4							
Weight #3							
Weight #2							
Weight #1							
Dish Tare							
Weight of	residual	matter					
Mass Conce	ntration	:		mg/ml			

ETHYL ETHER						
Sample Number:		Measured Sample Volume, ml		Estimated Volume Lost, ml		
	Date	Time	By	grams		
Weight #4						
Weight #3						
Weight #2						
Weight #1						
Dish Tare						
Weight of re	esidual	. matter				
Mass Concent	tration	1:		mg/ml		

I Q	water			
Sample Num	ber:	Measu: Sample Volume	A	Estimated Volume Lost, ml
317203		100	>	
	Date	Time	Ву	grams
Weight #4				
Weight #3				
Weight #2	5-24-93	11:05	I.K.	2,61943
Weight #1	5-21-43	9:00	<u>likc</u>	2.61901
Dish Tare	5-20-43	3:00	MRC	2,61177
Weight of	residual	matter		0.00766
Mass Conc	entration	: 7.	66 -5	mg/ml

Sample Number:		Measured Sample Volume, ml		Estimated Volume Lost, ml	
	Date	Time	By	grams	
Weight #4					
Weight #3					
Weight #2					
Weight #1					
Dish Tare					
Weight of	residual	matter			
Mass Conce	entration	1:		mg/m]	

Form: SST-LAB53C



TEST

## APPENDIX D

## **CALIBRATION DATA**



#### GAS METER AND ORIFICE CALIBRATION

Pretest calibration of TCT control unit #1 generated a gas meter coefficient of 1.0041. Post test calibration yielded a coefficient of 1.0130. Both sets of calibration data are included on the following pages. All calculations for tests performed using unit #1 were made using the lower (1.0041) calibration factor which produces worst case emission data.

### PITOT TUBE CALIBRATION DATA

Pitot tube #5 is a Type S pitot tube which meets the design specifications described in EPA Method 2 and the base line coefficient of 0.84 was assumed.



Date: Apr	c 6, 1993	Meter	# 1	Baromet	ric Pressu	re,Pb: 29	.67
Orifice manometer setting dH,in.H20	meter	Volume Dry gas meter Vd, ft3	Wet tes meter tw, df	st   Inlet	rature Dry gas me   Outlet F tdo, dF		Time e,min
0.5	5.000	5.017	69	72	67	69.5	13.75
1.0	5.000	4.994	69	74	69	71.5	9.70
2.0	10.000	10.005	69	78	71	74.5	14.00
4.0	10.000	9.966	67.5	80	71	75.5	9.95
6.0	10.000	9.960	67	81	71	76.0	8.10
8.0	10.000	9.9,50	66.5	83	71	77.0	7.08
	Y				dH@		
7	W Pb (td	+ 460)		0.0317	dH r (t	w + 460)	e <sub>1</sub> 2
Vd [Pb -	+ (dH/13.6	)] $(tw + 46)$	50)	Pb (to +	460)	Vw	- ]
·Yi :	1 = 0.996	3		dH@i 1 =	2.1452	<u></u>	
Yi 2	2 = 1.003	4		dH@i 2 =	2.1272		
Yi 3	3 = 1.004	9		dH@i 3 =	2.2072	·	
Yi 4	1 = 1.008	6		dH@i 4 =	2.2172		
Yi !	5 = 1.006	2		dH@i 5 =	2.2082		
Yi (	5 = 1.005	1		dh@i 6 =	2.2367		
	Y = 1.004	1		dH@ =	2.1903		
Vd = Gas tw = Temy tdi = Temy tdo = Temy td = Ave: th = Pres Yi = Rat: Yi = Ave: Pb = Barc e = Time dH@i = Ori;	volume pa perature o perature o rage tempe ssure diff io of accu rage of Yi ometric pr e of calib fice press	ssing throus ssing throus f the gas f the inlet f the outlo rature of the rature of the rature of we rature, in ration run ure differe ce pressure	ugh the d in the we t gas of et gas of the gas t cross or t test me ce = +/- Hg. , min. ential fo	lry gas me et test me the dry g f the dry in the dry ifice, in. eter to dr 0.02 or each ru	ter, ft3. ter, dF. gas meter, gas meter, gas meter H2O. Ty gas meter	dF. dF. , dF. er for ead	
Jam	~ 7/	n/m	A	pr 6, 1993	; 		

\_\_\_\_\_

— ORIFICE and DRY GAS METER POST TEST FORM ———

Client: TRI-CITY PAVING, INC., Little Falls, MN Date: May 12, 1993 Meter # 1 Barometric Pressure, Pb: 29.60 Max. Vacuum Achieved (in.Hg.): 6.0 Intermediate Orifice Setting: 1.35 dH@ Factor Used: 2.1903 Y Factor Used: 1.0041

Orifice manometer setting dH,in.H2O	meter	Volume Dry gas meter Vd, ft3	Wet test meter tw, dF	Inlet	ry gas me	ter Average td, dF	Time e,min.
1.35	10.000	10.174	76	87	79	83.0	17.00
1.35	10.000	10.026	76.5	89	82	85.5	16.85
1.35	10.000	9.809	77	91	84	87.5	17.00

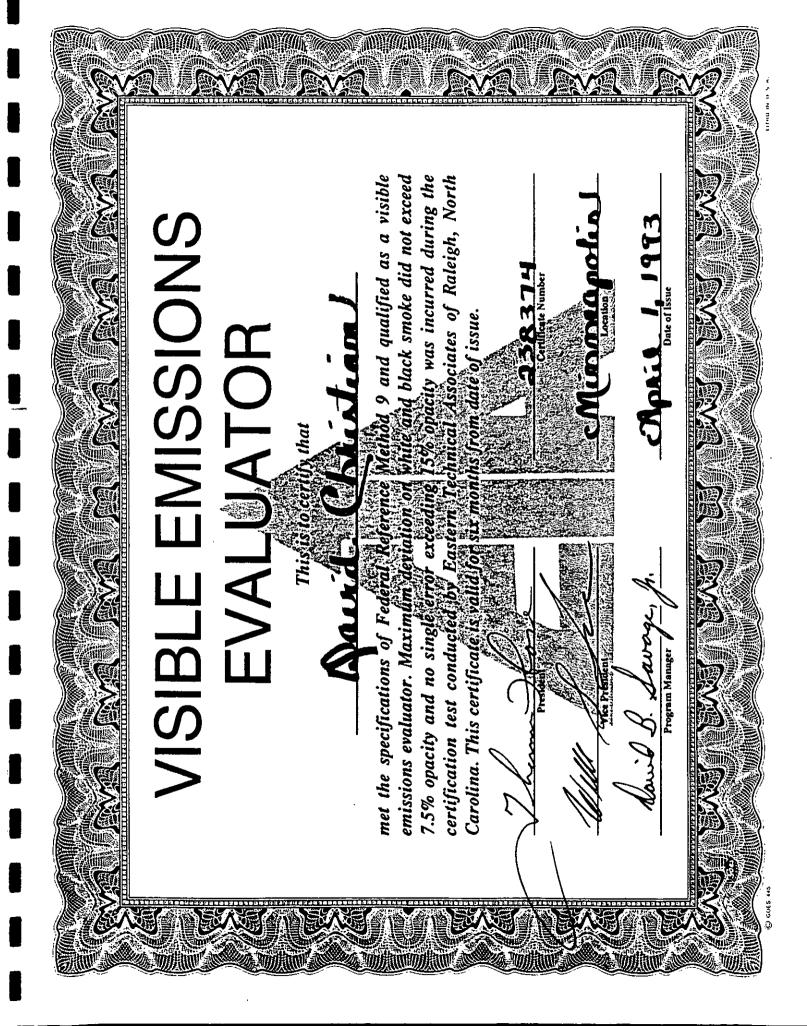
Y	dH@			
Vw Pb (td + 460)	0.0317  dH  [(tw + 460) e] 2			
Vd [Pb + (dH/13.6)] (tw + 460)	$\frac{1}{Pb (to + 460)} \left[ \frac{1}{Vw} \right]$			
Yi 1 = 0.9924	dH@i 1 = 2.2271			
Yi 2 = 1.0107	dH@i 2 = 2.1799			
Yi 3 = 1.0359	dH@i 3 = 2.2149			
Y = 1.0130	dH@ = 2.2073			
Difference = 0.89 % *	Difference = 0.78 % *			

\* Tolerance must be within +/- 5% of calibrated factors.

Definitions:

= Gas volume passing through the wet test meter, ft3. Vw = Gas volume passing through the dry gas meter, ft3. Vd = Temperature of the gas in the wet test meter, dF. = Temperature of the inlet gas of the dry gas meter, dF. tw tdi = Temperature of the outlet gas of the dry gas meter, dF. tdo = Average temperature of the gas in the dry gas meter, dF. = Pressure differential across orifice, in. H2O. td dH = Ratio of accuracy of wet test meter to dry gas meter for each run. Yi = Average of Yi. Y = Barometric pressure, in Hg. Pb = Time of calibration run, min. e dH@i = Orifice pressure differential for each run. dH@ = Average oriface pressure differential. May 12, 1993 James Tryba Date Calibrator twin city testing.

corporation



## APPENDIX E

## PROCESS DATA



Asphalt Plant Operating Co	onditions During Stack Testing タールーパ	Rev/YH/93
Test Date(s) Plant Mfr. & Model BARBER GREENE	SVS Type (circle one): Drum Mix Other (list):	Conventional
Pollution Control Equipment: Beghouse Venturi Scrubber (circle one)	wet scrubber If wet scrubbing: <u>122</u> % scrubber water recycled Normal pressure drop across control equipment:	yclone multiclone
Air flow through control equipment: <u>2000</u> acfm at <u>19</u> Date & procedures of last maintenance/cleaning of control equipme	C_F Was control equipment operating normally (	
<u></u>		

#### Fuel:

Itemize all fuels and materials added to the combustion process during the test period. List fuel type used during testing (if oil, specify grade)  $\underline{\#}$ . If other units of measure are used, specify and calculate appropriate heat input.

Test No.	Fuel Input (Gel/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	%Moisture Virgin	l (as received) recycle	in aggregate) combined
Run 1	130			1.42		
Run 2	170			1.60		
Run 3	200			1.03	(	7

Is the above fuel substantially the highest sulfur containing fuel normally burned?  $\frac{7e^{2}}{c^{2}}$ Production specific fuel usage: (circle one) measured or calculated: \_\_\_\_\_\_cubic foot/ ton hot mix 7 gal/ton hot mix

No. of Burners:

1

Burner(s) rating: \_\_\_\_\_ MMBTU/HR = 100% setting

**Operation:** 

time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate	Other (list)
10:0	6	205	0	11.89	220	13	205	
	6	305	6	11.89	220	13	205	
	in	205		11.29	7/8	12	205	
•	(ie)	210	$\bigcirc$	1:75	220	/3	205	
11:5%	6	2/0	$\langle \hat{\cdot} \rangle$	11.95	13	/ >	505	
	10	20	0	1195	Jon Die	13	200	
	6	210	0	11,75	220	Ĩ	305	
	6	210	$\overline{\mathcal{O}}$	11.95	220	12	1205	
13-13	10	210	ت ا	11 75	-here &	13	505	
	6	2.10	$\mathcal{O}$	1195	220	13	205	
	E.	6/0	Õ	11.95	Sala	15	305	
	6_	210	С О	11.95		13	205	

Plant Operator's Certification: I certify that the information submitted herein is accurate and correct and that no information requested was mithed from the Division Manager.

matte By: Much , Phone: ( J'L Ani Position:

Note: All information required must be completed and submitted as part of the performance test. Failure to submit the required information will result in an incomplete performance test report.

		Ro	Test Dat	e(s)						
t Mfr. &	Model	OHING-	Genne -	<u>049</u> 4		Type (aircí Other		Drum Mie	Conv	entic 
ution Cor	ntrol Equ	Jipment: Beg	house Venturi			>			çyclons n	nuitici
nodel: _	(circle	one)		If w	et ecrubbing	drop across or	ber wat	et tecycled	1	nchee
ow through	i control e	quipment: 2	A000 00	fm at <u>140</u>	tina presserv	pontrol equipm	ent open	ating normally	y during teati	ng? _
& procedu	res of last	: maintenanca/c	leaning of contr	al equipment _						
			•.				-			
			ded to the co							
ing (If oil,	specity pr		If other	· · · · · · · · · · · · · · · · · · ·						188t
	Test No	) Fuel   (Gel/i	niput BTU/C			Aoisture (ee roin i r	received ecycle	in eggregate		
	<u> </u>								4	
	Run	1 20				.23		·/	4	
	Run	2								
	Run	3		·			7			
	i nun									
iction sp	uel subs ecific fu	itantially the el usage: {ci	highest sulfu rcie one) mea	sured or cate	culated:		ibic foo al/ton h	ot/ ton hot	mix .	
	uel subs ecific fu	itantially the el usage: {ci		sured or cate	culated:		ibic foo al/ton h	ot/ ton hot	 mix	
f Burners f Burners ation: time	uel subs eclfic fu s:	itantially the el usage: (ci / Bo eggregate	rcie one) mea urner(s) rating recycle	sured or cato	MMBTUA Drum Mix	2 02 1R = 100 % 1 dust collects	ibic foc al/ton h etting	ot/ ton hot not mix ubber water		1
iction sp f Burner: ition:	uel subs ecific fu s:	itantially the el usage: (ci / B	rcie one) mea urner(s) rating recycle	sured or cato ;	MMBTUA Drum Mix	20 TR = 100% (	ibic foc al/ton f etting	ot/ ton hot lot mix		2 2
f Burners f Burners tion: time 15 min.	ual subs eclfic fu s: burner setting	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcie one) mea urner(s) rating recycle	sured or cato	MMBTUA Drum Mix tomp.	Z pressure dro	ibic foc al/ton f etting	ubber water flow rate	Other flet	
f Burners f Burners ation: time 15 min. intercels	ual subs ecific fu s: burner setting	itantially the el usage: {ci /B eggregate tons per hour	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11. 89 11. 89	Drum Mix tomp. 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11, 89 11, 89 11, 89	Culated: MMBTU/I Drum Mix tomp. F 220 220 220 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11. 89 11. 89	Drum Mix tomp. 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11, 89 11, 89 11, 89	Culated: MMBTU/I Drum Mix tomp. F 220 220 220 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11, 89 11, 89 11, 89	Culated: MMBTU/I Drum Mix tomp. F 220 220 220 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11, 89 11, 89 11, 89	Culated: MMBTU/I Drum Mix tomp. F 220 220 220 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11, 89 11, 89 11, 89	Culated: MMBTU/I Drum Mix tomp. F 220 220 220 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11, 89 11, 89 11, 89	Culated: MMBTU/I Drum Mix tomp. F 220 220 220 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11, 89 11, 89 11, 89	Culated: MMBTU/I Drum Mix tomp. F 220 220 220 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	
f Burners f Burners tion: 15 min. 16 min. 10 min. 7:30	uel subs eclfic fu s: burner setting %	el usage: (cin el usage: (cin / Bi eggregate tons per hour 2005	rcle one) mea urner(s) rating recycle tone per hour 	sured or calo asphalt tone per hour 11, 89 11, 89 11, 89	Culated: MMBTU/I Drum Mix tomp. F 220 220 220 220	CL Z TR = 100% d dust collects pressure dro inches wate	ibic foc al/ton f setting "	ubber water flow rate gpm	Other flet	

By: Mouth 1 Decebello Position: Saut

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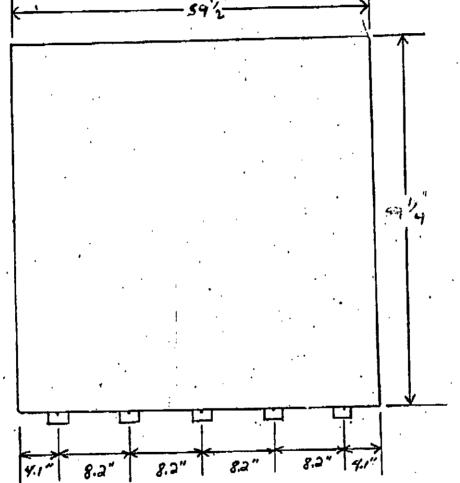
Note: All information required must be completed and submitted as part of the performance test. Failure to submit the required information will result in an incomplete performance test report.

Apr 27,93 12:06

Pg 2 0F2





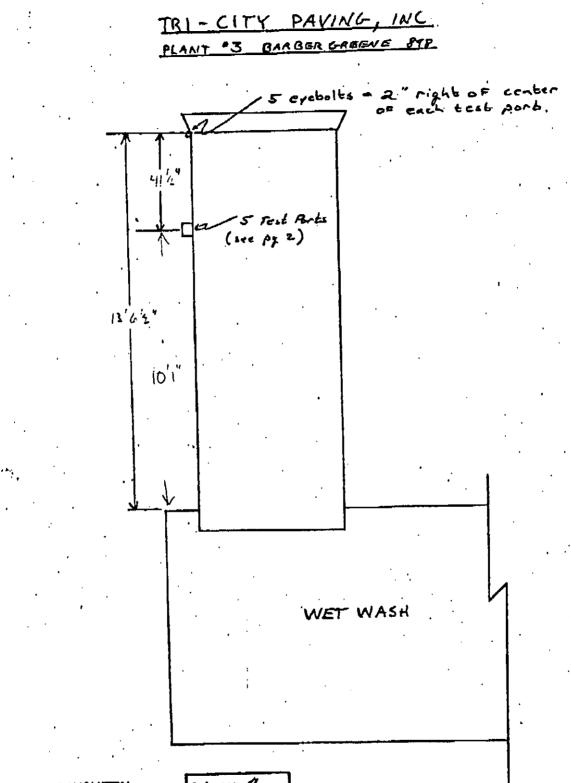


Test Ports - 4" Schedule 40 pipe threaded on exterior end.

> Not to scale 4/91 DJD

Apr 27,93 12:05

1



FAX TRANSMITTAL	e of pages 2
To: Jim Treflea	From ack
co Twin City Testine	Co. Tri-City Paving, Inc.
	Phone # (612) 632-5435
Fax#	Fax# (612) 632-5436

NOT TO SCALE

B-1

## APPENDIX F

## MINNESOTA EXHIBIT C



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REQUIRED DATA for COMBUSTION SOURCES

Plant  $\int_{\mathcal{I}}$ anel 41 Company Name C. Fuel Input

1. Itemize all fuels and materials that are added to the combustion process during the test period. Attach ultimate analysis of the fuel.

Coal:	DESCRIPTION State, City, Mine Specify Grade Ma Z	INPUT (LBS/HR) (GAL/H <del>R)</del> 7~ Z,00	& HOISTURE As Rec'd	As Rec'd (BTU/LB) (BTU/GAL)	HEAT INPUT (BTU/HR)
No1	- Ma. 2	2.00	<u></u>	<u> </u>	
N <del>o2</del>	- Ma. 2 - Ma. 2	2.00			
N <del>o. 3</del>	Mo 2	2.00	<u> </u>		
				TOTAL	
2	. Are the above fuel <u>All</u> . If r	ls substantial not, explain	ly the same a	s those normal:	Ly burned?
3	. Are the above fue:			proportions show	
4	. Describe any chang next twelve (12)	ges anticipate months. Aanle		ment of fuels	within the
D. E	quipment & Operating	Data		-	
	. Furnace No.				
2	. Furnace Mfg	\$/auc	JA.		
	. Type of Firing	Oil	/ / .		· · · · · · · · · · · · · · · · · · ·
	. Furnace opérating	ünder normal	operating con	nditions: No _ Yes _	$\times$

	5.	Specify normal soot blowing frequency:
		a) source operating time blowing soot: minutes/shift
		b) number of shifts per day
	6.	Specify soot blowing time during the test: start $\underline{W}\underline{A}$ end When was the last time before the test that you blew soot: (date & time)
	7.	Specify normal ash pulling frequency:
		a) source operating time pulling ashes: <u><i>WM</i></u> minutes/shift
		b) number of shifts per day
	8.	Specify ash pulling time during the test: start <u>NH</u> end When was the last time before the test that you pulled ashes: (date & time)
	9.	Date and procedures of last maintenance/cleaning of the boiler (please attach)
Ε.	Inst	trument Data
	1.	Include a copy of chart records during test for the combustion efficiency indices (CO, $0_2$ , CO <sub>2</sub> , combustibles, steam flow, air flow, etc.)
F.	Air	Pollution Control Equipment
	1.	Type/model control equipment BG Wet Mark.
	2.	Air pressure drop across the control equipment
	з.	Air flow through the control equipment
	4.	Was the control equipment operating normally? <u>Med</u> .
	5.	Date and procedures of last maintenance/cleaning of control equipment.
		5-10-93
Pla	nt O	perator's Certification
		fy that the information submitted herein is accurate and correct and that rmation requested was withheld from the Division Manager.
Ву	_//	Vork pueletle, Position plant questor

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## APPENDIX G

MPCA TEST PLAN



#### TEST PLAN for TRI CITY PAVING

I. GENERAL INFORMATION

Permittee: Tri-City Paving

Permittee's contact person and telephone number: Jack Surma

Permittee's mailing address: P.O. Box 326 Little Falls, MN 56345

DAQ File No.: 681B

MPCA permitting engineer: Bernadette Halverson

Applicable regulations for each source tested: Minn. Rules. 7005.2020, subp. A and B for TSP aand opacity

Reason for testing: This is a retest for compliance purposes.

Is this test for initial compliance demonstration: Yes, initial compliance will be while processing aggregate.

Drawings showing location of sampling ports included: must be sent to Yolanda Hernandez of the Compliance Determination Unit for approval prior to the test. They may be faxed to Yolanda at (612) 297-7709.

Location of the plant at the time of the test: Notify the Compliance Determination Unit prior to the test

Date when test plan was discussed and agreed upon with the permittee: to be determined

#### **II. NOTIFICATION REQUIREMENTS**

The permittee must contact the Agency at least two weeks before the scheduled test to obtain all necessary approvals.

It is very important to allow at least two weeks before the test to review the testing requirements in order to avoid last minute cancellations due to inadequate testing conditions.

Among the potential problems that may need to be solved before the test are:

1. Unsuitable location of sampling ports. The stack may need to be

extended and/or straightening vanes be installed.

2. Permittee must schedule the test at a time when the plant can be operated at 100% of rated capacity, and at maximum recycle rate if applicable.

3. Permitte must be ready to burn specified fuel.

4. Permittee may have to install pressure drop taps and gauges, as well as water flow rate measuring devices.

5. Permittee may have to install sampling taps on the fuel feeding line to the burner.

III. TEST PLAN

The following is the test plan developed for emission point no. 1 at Tri-City Paving plant in Little falls, MN.

A. Emission point(s) to be tested: Barber-Greene 848A asphalt concrete plant MFR Rated Drying Capacity 240 tons/hour @ 5% moisture Control equipment: Barber Greene CA 48 wet scrubber

B. Parameters to be tested at each emission point: TSP (front and back catch reported separately) and opacity

C. Fuel sampling and analysis. (Fuel oils and used oil)

This is part of the compliance demonstration requirements. Please note that the test report will not be accepted without complete submittal of fuel analysis results of samples taken at the time of the test.

1. Sampling. One tap sample per particulate test run must be taken. The sample must be taken as close as possible to the burner, (somewhere in feeding line) to be representative of the fuel burned at the time of the test. The sample may be taken in a pint-size clean container, and according to the procedures listed in Exhibit D. Mix the three samples taken into a composite.

2. Analysis. The composite must be analyzed according to Exhibit D.

D. Moisture content in the virgin and recycle aggregate.

1. Take two samples of each: the virgin and recycle aggregate per test run of particulates. Sample must be taken as close as possible to the feeding conveyor and during the corresponding run. Mix samples of virgin aggregate with the samples of recycle material in the same proportion as they enter the dryer, this will give one composite recycle/virgin sample per test run.

2. Perform one analysis of moisture content in each composite recycle/virgin aggregate sample as per ASTM or other recognized methodologies. A total of three analysis shall be performed, one per test run for particulates.

E. Moisture content in the virgin aggregate

1. Take two samples the virgin aggregate per test run of particulates. Sample must be taken as close as possible to the feeding conveyor and during the corresponding run. Mix the two samples of virgin aggregate, this will give one composite sample per test run.

2. Perform one analysis of moisture content in each composite sample as per ASTM or other recognized methodologies. A total of three analysis shall be performed, one per test run for particulates.

F. Operating Conditions during the Test

1. Operation must be at 100% of design capacity at the existing aggregate moisture content - no deliberate reduction of feed rate or fan speed during testing, except for nominal damper adjustment for proper combustion. - The test report must include copies of the manufacturer's specifications that define the design capacity of the plant as a function of the moisture content of the aggregate.

2. Must burn 100% of the highest emitting fuel to be listed in and allowed by the permit: used oil or fuel oil not to exceed 0.7% sulfur.

3. If the permit is to authorize recycling, then testing must be conducted while recycling and at the maximum ratio of recycle to virgin aggregate to be allowed by the permit: Maximum recycle percent to be determined during stack test.

4. The test must be conducted under normal operating conditions. If normal operation includes recycling of scrubber water, the test must be done under the same conditions.

G. Operating Data to Be Recorded during the Test

Operating data must be recorded during the test in its entirety i.e., particulates and visible emission observations. Operating data must be recorded every fifteen minutes. Please use the attached data sheet or equivalent.

Note: No test report will be accepted without a complete data sheet included.

1. During testing the following measurements must be made:

a) Pressure drop across the baghouse

c) Scrubber water flow rate. If the measurement is done indirectly from a pump pressure gauge, the test report must include calculations, nomograms or calibration data used to compute gallons per minute of water.

c) Virgin and recycle aggregate input (ton per hour) as well as asphalt input (ton per hour). Provide the manufacturer's rating of the asphalt plant at different moisture contents in the aggregate.

d) Moisture content of the aggregate, and if applicable, the recycling material.

2. Please provide the following data:

a) Average fuel consumption rate (calculated or measured)

b) Quality of the scrubber water: percent recycled

c) Cleaning cycles of the baghouse

d) Operating data sheet enclosed

H. Testing schedules and testing firm: Tentative date May 26, 1993

I. Permitting engineer to witness the test: To be determined.



# **Minnesota Pollution Control Agency**

April 22, 1993

Mr. Jack Surma Tri-City Paving P.O. Box 326 Little Falls, Minnesota 56345

Dear Mr. Surma:

RE: Performance Stack Testing Protocol, Test Plan, Exhibit C and D

This letter is written as the result of a your notice of April 7, 1993, by phone of your upcoming performance test on the Barber-Greene/848A portable asphalt concrete plant. The test is tentatively set for the first week of May.

Enclosed are copies of the test plan, protocol, Exhibit C, and Exhibit D, which must be included in the test report. It is the responsibility of the Permittee to submit one copy of the test report on or before the due date. Please discuss the enclosures with your consultant.

At this time, the Company must submit a schematic of port locations for the proposed testing site. Dimensions must be clearly marked and labeled. Distances above and below port locations should be included. Once the Company has submitted this information and reviewed the enclosed test plan, protocol, and exhibits, the Company should contact Tom Kosevich at (612)296-7513 to schedule the pretest meeting. Meetings should be scheduled at least two weeks before the actual test date.

If you have questions or corrections regarding the contents of this letter, please contact me at (612)296-8374.

Sincerely,

Idanda Verhande

Yolanda Hernandez ) Compliance Determination Unit Compliance and Enforcement Section Air Quality Division

YOH:mlp3888

Enclosures

cc: Annette Elliott, AQD Brainerd Regional Office Bernadette Halverson, AQD AQD File No. 681B

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