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

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP42 Section: 11.1

Reference Number: 66

Title: Air Emission Test Report, Results Of Emission Compliance Test Performed On A Asphalt Plant Baghouse System, Northern Asphalt Construction, Inc., Minneapolis, Minnesota, August 17, 1993,

Twin City Testing Corporation, St. Paul, MN,

September 16, 1993.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference 66

Report Number: 4232-93-2677

Report Issued: September 16, 1993

AIR EMISSION TEST REPORT

RESULTS OF EMISSION COMPLIANCE TEST
PERFORMED ON A ASPHALT PLANT
BAGHOUSE SYSTEM
NORTHERN ASPHALT CONSTRUCTION, INC.
MINNEAPOLIS, MINNESOTA
AUGUST 17, 1993

Submitted to:

NORTHERN ASPHALT CONSTRUCTION, INC.
11064 Raddison Road, NE
Minneapolis, MN 55449

Submitted by:

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

Prepared by:

James Tryba, Manager
Source and Ambient Testing
Air Quality Services

Approved by:

Ahto Niemioja
Director
Air Quality Services

twin city testing corporation

twin city testing
corporation

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

September 16, 1993

Mr. Jeffrey Dusenka
Northern Asphalt Construction, Inc.
11064 Raddison Road, NE
Minneapolis, MN 55449

Re: Source Emission Compliance Test Report

Dear Mr. Dusenka:

Enclosed are two copies of Twin City Testing Corporation's report #4232-93-2677 concerning the particulate and opacity emission compliance test performed on the baghouse system at your asphalt plant located in Minneapolis, Minnesota. Please review and 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) 659-7566.

Sincerely,

Ahto Niemioja
Director, Air Quality Services

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INTRODUCTION

Twin City Testing Corporation (TCT) was contracted by Northern Asphalt Construction, Inc. to perform a source emission compliance test on the baghouse system at their asphalt plant located in Minneapolis, Minnesota. The exhaust gases from the baghouse were tested for particulate and opacity emissions on August 17, 1993. This report presents the results of the test program along with all substantiating documentation.

Northern Asphalt Construction, Inc. was represented throughout the test period by Mr. Jeffrey Dusenka. The TCT sampling team consisted of Messrs. Jim Tryba, Dave Christian, and Brad Lavold. The opacity testing was performed by Mr. Dave Christian, who is a certified visible emissions evaluator.

TEST RESULTS

The results of the particulate emission test are summarized in Table 1. The data indicates an average grain loading of 0.0130 grains per dry standard cubic foot of exhaust gas. A 60 minute visible emissions test was performed concurrent with each test run. The highest average opacity achieved during each of the three test runs was 0.0%.

There were no sampling problems encountered during the test.

Table 1
Summary of Emission Test Results
Northern Asphalt Construction, Inc., Minneapolis, Minnesota
Asphalt Plant Baghouse
August 17, 1993

SAMPLING TRAIN DATA		Run 1-1	Run 1-2	Run 1-3	Average
Sampling time, minutes		70	70	70	
Sampling nozzle diameter, inches	Dn	0.188	0.188	0.188	
Sampling nozzle area, sq.ft.	An	0.000193	0.000193	0.000193	
Isokinetic variation, %	I	100.9	101.8	99.0	100.6
Sample gas volume, acf	Vm	49.810	53.237	53.154	52.067
Sample gas volume, dscf	Vmstd	50.268	52.828	51.476	51.524
Avg.meter temperature, deg R	Tm	531	541	555	542
Avg.oriface pressure drop, in.H2O	dH	2.08	2.27	2.21	2.19
Total particulate collected, mg	Mn	51.19	38.43	40.41	43.34
VELOCITY TRAVERSE DATA					
Stack Area, sq.ft.	A	6.0156	6.0156	6.0156	
Abs.stack gas pressure, in.Hg.	Ps	29.88	29.92	29.96	
Barometric pressure, in.Hg.	Pbar	30.00	30.04	30.08	
Avg.stack temperature, deg R	Ts	698	686	681	688
Avg. sq.rt. velocity head (Cp=.84)		1.51645	1.58243	1.56539	1.55476
Avg.stack gas velocity, ft./sec.	Vs	97.302	100.592	99.079	98.991
STACK GAS MOISTURE CONTENT					
Total water collected, ml	Vic	215.0	241.2	224.1	226.8
Moisture in stack gas, %	Bws	16.73	17.62	16.94	17.10
STACK GAS FLOW RATE					
Stack gas flow rate, dscf/hr.	Qsd	1,325,529	1,381,263	1,383,637	1,363,476
Stack gas flow rate, acfm		35,120	36,307	35,761	35,729
Stack gas flow rate, dscfm		22,092	23,021	23,061	22,725
PARTICULATE EMISSION RATE					
Particle grain loading, gr/dscf	Cs	0.0157	0.0112	0.0121	0.0130
Particle mass rate, lb./hr.	E	2.97	2.21	2.39	2.52
ORSAT DATA					
Percent CO2 by volume	CO2	3.13	3.23	3.10	3.15
Percent O2 by volume	O2	16.30	16.23	16.37	16.30
Percent CO by volume	CO	0.00	0.00	0.00	0.00
Percent N2 by volume	N2	80.57	80.54	80.53	80.55

PROCESS DATA

Northern Asphalt Construction, Inc. operates a Barber-Greene asphalt plant utilizing a Barber-Greene Model CF-11 baghouse for controlling particulate emissions. The process data is included in Appendix E. The maximum hourly plant hot mix asphalt output rate was 127 tons per hour. The maximum fuel usage was 247 gallons per hour. The average aggregate moisture content as sampled from the aggregate stockpile was 1.72%.

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:	31.5" x 27.5"
Distance from flow disturbances to test ports;	
Upstream from disturbance, inches:	31.0"
Downstream from disturbance, inches:	89.5"
Minimum required number of sampling points:	25
Number of sampling points used:	28
Sampling point distribution;	
Number of sampling ports:	4
Number of sampling points per port:	7
Particulate test sampling time;	
Time at each sampling point, minutes:	2.5
Test run total sampling time, minutes:	70.0

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)". A check for cyclonic gas flow indicated that the exhaust gas flow was parallel to the stack walls. 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.

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±25°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 three foot inconel lined probe and a 0.188 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

* DRY GAS VOLUME *

Vm(std) = Vm [T(std) / Tm] [(Pbar + (dH/13.6)) / P(std)]

= 17.64 x [degR / in.Hg.] x Y x Vm [(Pbar + (dH/13.6))/Tm]

Where:

Vm(std) = Dry Gas Volume through meter at standard conditions
Vm = Dry Gas Volume measured by meter
Pbar = Barometric pressure at oriface meter
Pstd = Standard absolute pressure
Tm = Absolute temperature at meter degR.
Tstd = Standard absolute temperature (528 degR).
dH = Average pressure drop across oriface meter
Y = Dry gas meter calibration factor.
13.6 = Inches water per inches Hg.

Run 1-1

Vm(std)= 17.64 x 1.0075 x 49.810 [(30.00 +(2.08 / 13.6)) / 531] = 50.268 dscf

Run 1-2

Vm(std)= 17.64 x 1.0075 x 53.237 [(30.04 +(2.27 / 13.6)) / 541] = 52.828 dscf

Run 1-3

Vm(std)= 17.64 x 1.0075 x 53.154 [(30.08 +(2.21 / 13.6)) / 555] = 51.476 dscf

• TOTAL CONTAMINANTS by WEIGHT: GRAIN LOADING •

C's = [0.0154 gr/mg] [Mn/Vm(std)]

Where:

C's = Concentration of particulate matter in stack gas 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 [0.05119 x 1000] / 50.268 = 0.0157 gr/dscf

Run 1–2

C's = 0.0154 x [0.03843 x 1000] / 52.828 = 0.0112 gr/dscf

Run 1–3

C's = 0.0154 x [0.04041 x 1000] / 51.476 = 0.0121 gr/dscf

• DRY MOLECULAR WEIGHT •

$$Md = 0.44\ (\%\ CO2) + 0.32\ (\%\ O2) + 0.28\ (\%\ CO + \%\ N2)$$

Where:

Md = Dry molecular weight
% CO2 = Percent carbon dioxide by volume (dry basis).
% O2 = Percent oxygen by volume (dry basis).
% N2 = Percent nitrogen by volume (dry basis).
% CO = Percent carbon monoxide by volume (dry basis).
0.264 = Ratio of O2 to N2 in air
0.28 = Molecular wieght of N2 or CO
0.32 = Molecular wieght of O2 divided by 100.
0.44 = Molecular weight of CO2 divided by 100.

Run 1–1

$$Md = 0.44\ (\ 3.13\ ) + 0.32\ (\ 16.30\ ) + 0.28\ (\ 80.57\ ) = \underline{29.153}\ \underline{lb/lb-mole}$$

Run 1–2

$$Md = 0.44\ (\ 3.23\ ) + 0.32\ (\ 16.23\ ) + 0.28\ (\ 80.54\ ) = \underline{29.166}\ \underline{lb/lb-mole}$$

Run 1–3

$$Md = 0.44\ (\ 3.10\ ) + 0.32\ (\ 16.37\ ) + 0.28\ (\ 80.53\ ) = \underline{29.151}\ \underline{lb/lb-mole}$$

* 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 207 ml = 9.7 cu.ft.

Vwsg(std) = 0.04715 x 8.0 gr = 0.4 cu.ft.

Run 1–2

Vwc(std) = 0.04707 x 228 ml = 10. cu.ft.

Vwsg(std) = 0.04715 x 13.2 gr = 0.6 cu.ft.

Run 1–3

Vwc(std) = 0.04707 x 211 ml = 9.9 cu.ft.

Vwsg(std) = 0.04715 x 13.1 gr = 0.6 cu.ft.

* MOISTURE CONTENT OF STACK GASES *

Bws = [Vwc(std) + Vwsg(std)] / [Vwc(std) + Vwsg(std) + Vm(std)] x 100

Where:

Bws = Proportion of water vapor

Vm = Dry gas volume measured by dry gas meter

Vwc(std) = Volume of water vapor condensed corrected to standard conditions

Vwsg(std) = Volume of water vapor collected in silica gel corrected to standard conditions

Run 1-1

Bws = (9.7 + 0.4) / (9.7 + 0.4 + 50.268) x 100 = 16.73 %

Run 1-2

Bws = (10.7 + 0.6) / (10.7 + 0.6 + 52.828) x 100 = 17.62 %

Run 1-3

Bws = (9.9 + 0.6) / (9.9 + 0.6 + 51.476) x 100 = 16.94 %

• 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 – 0.1673) + 18 (0.1673) = 29.26 lb/lb–mole

Run 1–2

Ms = 29.28 (1 – 0.1762) + 18 (0.1762) = 29.26 lb/lb–mole

Run 1–3

Ms = 29.28 (1 – 0.1694) + 18 (0.1694) = 29.26 lb/lb–mole

* 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

Kp = 85.49 ft/sec [(g/g-mole) - (mm Hg) / (degK) (mm H2O)] 1/2
Cp = Pitot tube coefficient
dP = Velocity head of stack gas
Pbar = Barometric pressure at measurement site
Pg = Stack static pressure
Ps = Absolute stack gas pressure
Pstd = Standard absolute pressure
ts = stack temperature
Ts = Absolute stack temperature
Ms = Molecular weight of stack gas

Run 1-1

Vs = 85.49 x 0.84 x 1.51645 x Sq.Rt. [698 / (29.88 x 29.26)] = 97.302 ft/sec.

Run 1-2

Vs = 85.49 x 0.84 x 1.58243 x Sq.Rt. [686 / (29.92 x 29.26)] = 100.592 ft/sec.

Run 1-3

Vs = 85.49 x 0.84 x 1.56539 x Sq.Rt. [681 / (29.96 x 29.26)] = 99.079 ft/sec.

* STACK GAS FLOW RATE *

Qstd = 3600 (1 − Bws) Vs A (Tstd / Ts) (Ps / Pstd)

Where :

Qstd = Dry volumetric stack gas flow rate corrected to std.conditions.
A = Cross sectional area of stack
3600 = Conversion factor
ts = Stack temperature
Ts = Absolute stack temperature
Tstd = Standard absolute temperature
Pbar = Barometric pressure at measurement site
Pg = Stack static pressure
Ps = Absolute stack gas pressure
Pstd = Standard absolute pressure

Run 1−1

Q (std) = 3600 (1− 0.1673) (97.302) (6.015) (528 / 698) (29.88 / 29.92)

Q (std) = 1,325,529 dscf/hr

Run 1−2

Q(std) = 3600 (1− 0.1762) (100.59) (6.015) (528 / 686) (29.92 / 29.92)

Q (std) = 1,381,263 dscf/hr

Run 1−3

Q(std) = 3600 (1− 0.1694) (99.079) (6.015) (528 / 681) (29.96 / 29.92)

Q (std) = 1,383,637 dscf/hr

* EMISSIONS RATE FROM STACK *

E = [Cs Qstd] / 7000 gr./lb. = lb. / hr.

Where :

E = 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 = [0.0157 x 1,325,529] / 7000 = 2.97 lb./hr.

Run 1-2

E = [0.0112 x 1,381,263] / 7000 = 2.21 lb./hr.

Run 1-3

E = [0.0121 x 1,383,637] / 7000 = 2.39 lb./hr.

• ISOKINETIC VARIATION •

$$I = 100\ Ts\ [0.002669\ Vic + (Vm / Tm)\ (Pbar + dH / 13.6)] / 60\ e\ Vs\ Ps\ An$$

Where :

I = Percent isokinetic sampling.
100 = Conversion to percent.
Ts = Absolute average stack gas temperature
0.002669 = Conversion factor
Vic = Total volume of liquid collected in impingers and silica gel
Tm = Absolute average dry gas meter temperature
Pbar = Barometric pressure at sampling site
dH = Average pressure differential across the oriface meter
13.6 = Specific gravity of mercury.
60 = Conversion seconds to minutes.
e = Total sampling time
Vs = Stack gas velocity
Ps = Absolute stack gas pressure
An = Cross sectional area of nozzle

Run 1–1

$$I = 100 \times 698 \times \frac{[(0.002669 \times 215.0) + (49.810 / 531)(30.00 + (2.08 / 13.6))]}{60 \times 70 \times 97.302 \times 29.88 \times 0.0001928} = \underline{100.9}\ \%$$

Run 1–2

$$I = 100 \times 686 \times \frac{[(0.002669 \times 241.2) + (53.237 / 541)(30.04 + (2.27 / 13.6))]}{60 \times 70 \times 100.592 \times 29.92 \times 0.0001928} = \underline{101.8}\ \%$$

how get?

Run 1–3

$$I = 100 \times 681 \times \frac{[(0.002669 \times 224.1) + (53.154 / 555)(30.08 + (2.21 / 13.6))]}{60 \times 70 \times 99.079 \times 29.96 \times 0.0001928} = \underline{99.0}\ \%$$

APPENDIX B

FIELD DATA FORMS

Field Data :

Plant # & Location	=	NORTHERN ASPHALT COMPANY, Blaine, MN
Date of Test	=	August 18, 1993
Process Tested	=	Asphalt Plant Baghouse
Number of Sampling Points	=	28
Pitot Tube Coefficient	=	0.84
Stack Area, sq.ft.	=	6.0156
Y Factor	=	1.0075

		Run 1-1	Run 1-2	Run 1-3
Dry Gas Meter Volume, cfd.	=	49.810	53.237	53.154
Barometric Pressure, in.Hg.	=	30.00	30.04	30.08
Stack Pressure, in.Hg.	=	29.88	29.92	29.96
Total Water Collected, ml.	=	215.0	241.2	224.1
% Carbon Dioxide	=	3.13	3.23	3.10
% Oxygen	=	16.30	16.23	16.37
% Carbon Monoxide	=	0.00	0.00	0.00
% Nitrogen	=	80.57	80.54	80.53
Total Particulate, gr.(see Lab Data)	=	0.05119	0.03843	0.04041
Total Sampling Time, min.	=	70	70	70
Nozzle Diameter, inches	=	0.188	0.188	0.188
Nozzle Area, sq.ft.	=	0.0001928	0.0001928	0.0001928

Laboratory Data:

Front Catch :		Run 1-1	Run 1-2	Run 1-3
Front Wash	=	0.01726	0.01503	0.01753
Filter Catch	=	0.01307	0.01328	0.01540
Front Half Total	=	0.03033	0.02831	0.03293
Back Catch :				
** Impinger Catch	=	0.01397	0.00798	0.00511
Impinger Wash	=	0.00689	0.00214	0.00237
Back Half Total	=	0.02086	0.01012	0.00748
TOTAL PARTICULATE	=	0.05119	0.03843	0.04041

** Chloroform/Ethyl Ether Extraction

Run 1–1

Ts =	698	dH =	2.08	Impinger Water =	207 ml
Tm =	531	SR dP =	1.51645	Silica Gel =	8.0 gr

Run 1–1 Point #	Stack Temp.	Velocity Pressure	Orifice Pressure	Meter Temperature Inlet	Meter Temperature Outlet	Sq.Root Velocity Pressure
A1	220	2.3	2.0	64	65	1.51658
2	230	3.1	2.8	63	64	1.76068
3	242	3.2	2.9	64	64	1.78885
4	246	2.2	2.0	65	64	1.48324
5	247	2.6	2.3	67	64	1.61245
6	248	2.7	2.4	68	65	1.64317
7	248	2.6	2.3	69	65	1.61245
B1	208	2.0	1.8	70	66	1.41421
2	245	2.9	2.6	71	66	1.70294
3	250	3.0	2.7	72	67	1.73205
4	251	2.1	1.9	73	67	1.44914
5	250	2.4	2.2	73	67	1.54919
6	249	2.7	2.4	74	68	1.64317
7	245	2.2	2.0	75	68	1.48324
C1	235	2.2	2.0	73	69	1.48324
2	239	2.6	2.3	75	70	1.61245
3	242	2.6	2.3	76	70	1.61245
4	242	2.2	2.0	77	70	1.48324
5	240	2.2	2.0	78	71	1.48324
6	238	2.2	2.0	78	71	1.48324
7	236	2.1	1.9	79	72	1.44914
D1	219	1.5	1.3	79	73	1.22474
2	229	2.2	2.0	79	73	1.48324
3	231	2.3	2.0	80	73	1.51658
4	236	2.2	2.0	81	74	1.48324
5	237	1.5	1.3	81	74	1.22474
6	237	1.6	1.4	82	75	1.26491
7	237	1.6	1.4	82	75	1.26491

Run 1–2

Ts =	686	dH =	2.27	Impinger Water =	228 ml
Tm =	541	SR dP =	1.58243	Silica Gel =	13.2 gr

Run 1–2 Point #	Stack Temp.	Velocity Pressure	Orifice Pressure	Meter Temperature Inlet	Meter Temperature Outlet	Sq.Root Velocity Pressure
A1	200	2.7	2.4	73	72	1.64317
2	210	3.5	3.2	73	72	1.87083
3	208	3.6	3.3	74	72	1.89737
4	215	2.7	2.4	75	72	1.64317
5	218	2.9	2.6	77	73	1.70294
6	219	3.1	2.8	78	73	1.76068
7	223	3.0	2.7	79	74	1.73205
B1	226	2.5	2.3	80	75	1.58114
2	222	3.3	2.9	81	75	1.81659
3	225	3.1	2.8	82	75	1.76068
4	231	2.6	2.3	83	76	1.61245
5	232	2.7	2.4	84	76	1.64317
6	230	2.8	2.4	85	77	1.67332
7	231	2.5	2.3	86	78	1.58114
C1	216	2.2	2.0	86	79	1.48324
2	225	2.8	2.4	87	79	1.67332
3	230	2.8	2.4	87	79	1.67332
4	233	2.5	2.3	88	80	1.58114
5	234	2.2	2.0	89	81	1.48324
6	233	2.2	2.0	89	81	1.48324
7	234	2.2	2.0	90	82	1.48324
D1	233	2.1	1.9	90	83	1.44914
2	231	2.4	2.2	91	83	1.54919
3	231	2.2	2.0	91	84	1.48324
4	235	2.0	1.8	91	84	1.41421
5	235	1.5	1.3	92	85	1.22474
6	235	1.4	1.1	92	85	1.18322
7	232	1.5	1.3	92	86	1.22474

Run 1–3

Ts =	681	dH =	2.21	Impinger Water =	211 ml
Tm =	555	SR dP =	1.56539	Silica Gel =	13.1 gr

Run 1–3 Point #	Stack Temp.	Velocity Pressure	Orifice Pressure	Meter Temperature Inlet	Meter Temperature Outlet	Sq.Root Velocity Pressure
A1	205	2.3	2.0	89	87	1.51658
2	208	3.3	2.9	89	87	1.81659
3	217	3.1	2.8	89	87	1.76068
4	220	2.4	2.2	90	88	1.54919
5	222	2.4	2.2	92	88	1.54919
6	223	2.6	2.3	93	88	1.61245
7	223	2.8	2.4	94	88	1.67332
B1	225	2.7	2.4	94	89	1.64317
2	220	3.1	2.8	96	90	1.76068
3	223	3.0	2.7	97	90	1.73205
4	225	2.3	2.0	98	90	1.51658
5	225	2.6	2.3	98	91	1.61245
6	223	2.7	2.4	99	91	1.64317
7	223	2.5	2.3	99	92	1.58114
C1	226	2.8	2.4	97	92	1.67332
2	221	2.9	2.6	100	93	1.70294
3	222	2.9	2.6	100	93	1.70294
4	226	2.2	2.0	101	93	1.48324
5	227	2.2	2.0	101	94	1.48324
6	225	2.4	2.2	101	94	1.54919
7	225	2.4	2.2	101	94	1.54919
D1	210	2.0	1.8	102	96	1.41421
2	215	2.5	2.3	101	95	1.58114
3	222	2.3	2.0	103	96	1.51658
4	224	2.0	1.8	102	96	1.41421
5	224	1.5	1.3	102	96	1.22474
6	223	1.6	1.4	102	97	1.26491
7	223	1.7	1.5	102	97	1.30384
				2732	2572	

5304.00

≈ 94.71

SOURCE EMISSION TEST FIELD DATA SHEET TEST: 1 RUN: 1 PAGE: 1 of 2

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH SETTINGS
TCT Project Number: 4232-93-2677	Control Unit Number: 1	∆H@ 2.0416
Date: 8/17/93	Gas Meter Coefficient: 1.0075	Tm 70
Company: NORTHERN ASPHALT	Sample Box Number: 1	MC 16%
Source: BAGHOUSE	Probe No: 3 Length: 3'	Ps/Pm .996
Source Dimensions: 31½" x 27½"	Pitot No: 3 Coefficient: 0.84	C 2.0
Test Team: JT/BL/DC	Nozzle No: 6 Diameter: .188	Ts 220
Test Procedures: EPA 1-5 + 9	Filter No: 102	R –
Ambient Temp., °F: 65°	Barometric Pressure, in.Hg: 30.00	Static Pressure, in.WC: -1.6

EPA METHOD 5 TRAVERSE DATA

CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME minute	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ∆H, in.WC REQ.	ORIFICE ∆H, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, °F STACK GAS	PROBE LINER	FILTER OVEN	IMPINGER EXIT	AUXILIARY	GAS METER IN	GAS METER OUT
6:31	A1	0	780.000	2.3	2.0	2.0	3.5	220	256	253	50	-	64	65
	2	2.5	781.8	3.1	2.8	2.8	5.0	250	255	251	45	-	63	64
	3	5	783.8	3.2	2.9	2.9	5.5	242	256	251	46	-	64	64
	4	7.5	785.8	3.2	2.0	2.0	4.0	246	257	251	49	-	65	64
	5	10	787.7	2.6	2.3	2.3	4.5	247	257	251	52	-	67	64
	6	12.5	789.7	2.7	2.4	2.4	5.0	248	258	252	53	-	68	65
	7	15	791.4	2.6	2.3	2.3	5.0	248	258	253	56	-	69	65
	END A	17.5	793.1	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	B1	0	793.1	2.0	1.8	1.8	4.0	248	254	255	56	-	70	66
	2	2.5	794.8	2.9	2.6	2.6	5.0	245	258	253	55	-	71	66
	3	5	796.6	3.0	2.7	2.7	5.0	250	257	253	55	-	72	67
	4	7.5	798.6	2.1	1.9	1.9	4.0	251	258	252	56	-	73	67
	5	10	800.4	2.4	2.2	2.2	4.5	250	259	252	56	-	73	67
	6	12.5	802.3	2.7	2.4	2.4	5.0	249	258	252	57	-	74	68
	7	15	804.1	2.2	2.0	2.0	4.0	245	259	253	56	-	75	68
	END B	17.5	806.0	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	C1	0	806.0	2.2	2.0	2.0	3.5	235	257	256	59	-	73	69
	2	2.5	807.8	2.6	2.3	2.3	5.0	239	257	255	57	-	75	70
	3	5	809.7	2.6	2.3	2.3	5.0	242	258	253	56	-	76	70
	4	7.5	811.6	2.2	2.0	2.0	4.0	242	258	254	56	-	77	70
	5	10	813.3	2.2	2.0	2.0	4.0	240	258	254	57	-	78	71
	6	12.5	815.1	2.2	2.0	2.0	4.0	238	258	254	58	-	78	71
	7	15	816.9	2.1	1.9	1.9		236	259	253	59	-	79	72
	END C	17.5	818.6	X	X	X	X	X	X	X	X	X	X	X

EPA METHOD 4: MOISTURE DETERMINATION

IMPINGER	1	2	3	4	5
Final	313	89	5	692.9	
Initial	100	100	0	684.9	
Net	213	-11	5	8.0	

Total Moisture Collected: 215.0

Impinger Catch Description: CLEAR

EPA METHOD 5 LEAK CHECK

Time	Rate, dcfm	Vac, in.Hg
6:45	0.000	15
7:52	0.000	6.5

Total Volume of Gas Sampled, DCF: 49.810

Total Sampling Time, Min: 70

Filter Catch Description: VERY LIGHT TAN

EPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS

Sample Identification	Replicate 1 Buret Reading	Replicate 1 Percent Volume	Replicate 2 Buret Reading	Replicate 2 Percent Volume	Replicate 3 Buret Reading	Replicate 3 Percent Volume	Replicate 4 Buret Reading	Replicate 4 Percent Volume	Compound Average Percent Volume
Initial Reading									
Carbon Dioxide	3.0	3.0	3.2	3.2	3.2	3.2			3.13
Oxygen	19.4	16.4	19.4	16.2	19.5	16.3			16.30
Carbon Monoxide	0	0	0	0	0	0			0

Form SST5, Revised 12/28/92

Signature of Sampling Team Leader: [signature]

AGGREGATE MOISTURE - 1.8%

twin city testing corporation

SOURCE EMISSION TEST FIELD DATA SHEET TEST: 1 RUN: 1 PAGE: 2 of 2

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH SETTINGS
TCT Project Number: 4232-93-2677	Control Unit Number: 1	∆H@ 2.0416
Date: 8/17/93	Gas Meter Coefficient: 1.0075	Tm 70
Company: NORTHERN ASPHALT	Sample Box Number: 1	MC 16%
Source: BAGHOUSE	Probe No: 3' Length: 3'	Ps/Pm .996
Source Dimensions: 31½" x 27½"	Pitot No: 3 Coefficient: 0.84	C 2.0
Test Team: JT / BL / DC	Nozzle No: 6 Diameter: .188	Ts 220
Test Procedures: EPA 5 + 9	Filter No: 102	R -
Ambient Temp., °F: 65°	Barometric Pressure, in.Hg: 30.00	Static Pressure, in.WC: -1.6

EPA METHOD 5 TRAVERSE DATA

CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME minute	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ∆H, in.WC REQ.	ORIFICE ∆H, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, °F STACK GAS	PROBE LINER	FILTER OVEN	IMPINGER EXIT	AUXILIARY	GAS METER IN	GAS METER OUT
	D1	0	818.6	1.5	1.3	1.3	3.0	219	259	255	60	-	79	73
	2	2.5	820.0	2.2	2.0	2.0	4.0	229	258	254	60	-	79	73
	3	5	821.8	2.3	2.0	2.0	4.0	231	259	253	59	-	80	73
	4	7.5	823.6	2.2	2.0	2.0	4.0	236	258	254	60	-	81	74
	5	10	825.3	1.5	1.3	1.3	3.0	237	259	255	61	-	81	74
	6	12.5	826.8	1.6	1.4	1.4	3.0	237	259	255	62	-	82	75
	7	15	828.2	1.6	1.4	1.4	3.0	237	259	255	61	-	82	75
7:50	END D	17.5	829.810	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	E1	0												
	2	2.5												
	3	5												
	4	7.5												
	5	10												
	6	12.5												
	7	15												
	END E	17.5		X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

EPA METHOD 4: MOISTURE DETERMINATION

IMPINGER	1	2	3	4	5
Final	313	89	5	692.9	X
Initial	100	100	0	684.9	
Net	213	-11	5	8.0	

Total Moisture Collected: 215.0

Impinger Catch Description: CLEAR

EPA METHOD 5 LEAK CHECK

Time	Rate, dcfm	Vac, in.Hg
6:45	0.000	15
7:52	0.000	6.5

Total Volume of Gas Sampled, DCF: 49.810

Total Sampling Time, Min: 70

Filter Catch Description: VERY LIGHT TAN

EPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS

Sample Identification	Replicate 1 Buret Reading	Replicate 1 Percent Volume	Replicate 2 Buret Reading	Replicate 2 Percent Volume	Replicate 3 Buret Reading	Replicate 3 Percent Volume	Replicate 4 Buret Reading	Replicate 4 Percent Volume	Compound Average Percent Volume
Initial Reading									
Carbon Dioxide	3.0	3.0	3.2	3.2	3.2	3.2			3.13
Oxygen	19.4	16.4	19.4	16.2	19.5	16.3			16.30
Carbon Monoxide	0	0	0	0	0	0	0	0	0

Form SS15, Revised 12/28/92

Signature of Sampling Team Leader: [signature]

AVERAGE MOISTURE - 1.8%

twin city testing corporation

SOURCE EMISSION TEST FIELD DATA SHEET TEST: 1 RUN: 2 PAGE: 1 of 2

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH SETTINGS
TCT Project Number: 4232-93-2677	Control Unit Number: 1	∆H@ 2.0416
Date: 8/17/93	Gas Meter Coefficient: 1.0075	Tm 70
Company: NORTHERN ASPHALT	Sample Box Number: 2	MC 16%
Source: BAGHOUSE	Probe No: 3 Length: 3'	Ps/Pm .946
Source Dimensions: 31½" x 27½"	Pitot No: 3 Coefficient: 0.84	C 2.0
Test Team: JT/BL/DC	Nozzle No: 6 Diameter: .188	Ts 220
Test Procedures: EPA 1-5 + 9	Filter No: 103	R -
Ambient Temp., °F: 70°	Barometric Pressure, in.Hg: 30.01	Static Pressure, in.WC: -1.7

EPA METHOD 5 TRAVERSE DATA

CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME minute	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ∆H, in.WC REQ.	ORIFICE ∆H, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, °F STACK GAS	PROBE LINER	FILTER OVEN	IMPINGER EXIT	AUXILIARY	GAS METER IN	GAS METER OUT
9:15	A1	0	25.0	2.7	2.4	2.4	4.0	200	256	251	58	-	73	72
	2	2.5	32.7	3.5	3.2	3.2	4.5	210	254	250	57	-	73	72
	3	5	35.0	3.6	3.3	3.3	5.0	208	256	251	53	-	74	72
	4	7.5	37.3	2.7	2.4	2.4	4.0	215	256	251	55	-	75	72
	5	10	39.3	2.9	2.6	2.6	4.5	218	257	253	57	-	77	73
	6	12.5	41.3	3.1	2.8	2.8	5.0	219	258	253	58	-	78	73
	7	15	43.4	3.0	2.7	2.7	5.0	223	259	253	58	-	77	74
	END A	17.5	45.5	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	B1	0	45.5	2.5	2.3	2.3	4.0	226	260	254	57	-	80	75
	2	2.5	47.5	3.3	2.9	2.9	5.0	226	259	254	60	-	81	75
	3	5	49.5	3.1	2.8	2.8	5.0	225	259	254	60	-	82	75
	4	7.5	51.7	2.6	2.3	2.3	4.0	231	259	254	60	-	83	76
	5	10	53.7	2.7	2.4	2.4	4.0	232	260	255	60	-	84	76
	6	12.5	55.7	2.8	2.4	2.4	4.0	230	260	255	61	-	85	77
	7	15	57.7	2.5	2.3	2.3	4.0	231	259	255	59	-	86	78
	END B	17.5	59.7	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	C1	0	59.7	2.2	2.0	2.0	3.5	216	260	256	61	-	86	79
	2	2.5	61.4	2.8	2.4	2.4	4.0	225	259	256	58	-	87	79
	3	5	63.3	2.8	2.4	2.4	4.0	230	260	256	57	-	87	79
	4	7.5	65.3	2.5	2.3	2.3	4.0	233	260	255	57	-	88	80
	5	10	67.3	2.2	2.0	2.0	4.0	234	260	255	57	-	89	81
	6	12.5	69.1	2.2	2.0	2.0	4.0	233	260	255	57	-	89	81
	7	15	70.9	2.2	2.0	2.0	4.0	234	261	254	57	-	90	82
	END C	17.5	72.7	X	X	X	X	X	X	X	X	X	X	X

EPA METHOD 4: MOISTURE DETERMINATION

IMPINGER	1	2	3	4	5
Final	297	130	1	704.4	X
Initial	100	100	0	691.2	X
Net	197	30	1	13.2	X

Total Moisture Collected: 241.2

Impinger Catch Description: CLEAR

EPA METHOD 5 LEAK CHECK

Time	Rate, dcfm	Vac, in.Hg
8:11	0.000	15
10:24	0.000	4

Total Volume of Gas Sampled, DCF: 53.237

Total Sampling Time, Min: 70

Filter Catch Description: VERY LIGHT TAN

EPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS

Sample Identification	Replicate 1 Buret Reading	Replicate 1 Percent Volume	Replicate 2 Buret Reading	Replicate 2 Percent Volume	Replicate 3 Buret Reading	Replicate 3 Percent Volume	Replicate 4 Buret Reading	Replicate 4 Percent Volume	Compound Average Percent Volume
Initial Reading									
Carbon Dioxide	3.2	3.2	3.3	3.3	3.2	3.2	X	X	3.23
Oxygen	19.5	16.3	19.4	16.1	19.5	16.3	X	X	16.23
Carbon Monoxide	0	0	0	0	0	0	X	X	0

Form SST5, Revised 12/28/92

Signature of Sampling Team Leader:

AGGREGATE MOISTURE - 1.54%

twin city testing corporation

SOURCE EMISSION TEST FIELD DATA SHEET TEST: 1 RUN: 2 PAGE: 2 of 2

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH SETTINGS
TCT Project Number: 4232.43-2677	Control Unit Number: 1	∆H@ 2.0416
Date: 8/17/93	Gas Meter Coefficient: 1.0075	Tm 70
Company: NORTHERN ASPHALT	Sample Box Number: 2	MC 16%
Source: BAGHOUSE	Probe No: 3 Length: 3'	Ps/Pm .996
Source Dimensions: 31½" x 27½"	Pitot No: 3 Coefficient: 0.841	C 2.0
Test Team: JT / BL / DC	Nozzle No: 6 Diameter: .188	Ts 220
Test Procedures: EPA 1-5 & 9	Filter No: 103	R -
Ambient Temp., °F: 70°	Barometric Pressure, in.Hg: 30.04	Static Pressure, in.WC: -1.7

EPA METHOD 5 TRAVERSE DATA

CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME minute	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ∆H, in.WC REQ.	ORIFICE ∆H, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, °F STACK GAS	PROBE LINER	FILTER OVEN	IMPINGER EXIT	AUXILIARY	GAS METER IN	GAS METER OUT
	A1	0	72.7	2.1	1.9	1.9	4.0	233	260	255	59	-	90	83
	2	2.5	74.4	2.4	2.2	2.2	4.0	231	260	255	58	-	91	83
	3	5	76.1	2.2	2.0	2.0	4.0	231	260	255	58	-	91	84
	4	7.5	78.1	2.0	1.8	1.8	3.5	235	260	255	58	-	91	84
	5	10	79.8	1.5	1.3	1.3	3.0	235	260	255	58	-	92	85
	6	12.5	81.2	1.4	1.1	1.1	3.0	235	261	255	59	-	92	85
	7	15	82.6	1.5	1.3	1.3	3.0	232	261	256	59	-	92	86
10:28	END	11.5	84.03									-		

EPA METHOD 4: MOISTURE DETERMINATION

IMPINGER	1	2	3	4	5
Final	297	130	1	704.4	X
Initial	100	100	0	691.2	X
Net	197	30	1	13.2	X

Total Moisture Collected: 241.2

Impinger Catch Description: CLEAR

EPA METHOD 5 LEAK CHECK

Time	Rate, dcfm	Vac, in.Hg
8:11	0.000	15
10:29	0.000	6

Total Volume of Gas Sampled, DCF: 53.237

Total Sampling Time, Min: 70

Filter Catch Description: VERY LIGHT TAN

EPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS

Sample Identification	Replicate 1 Buret Reading	Replicate 1 Percent Volume	Replicate 2 Buret Reading	Replicate 2 Percent Volume	Replicate 3 Buret Reading	Replicate 3 Percent Volume	Replicate 4 Buret Reading	Replicate 4 Percent Volume	Compound Average Percent Volume
Initial Reading									
Carbon Dioxide	3.2	3.2	3.3	3.3	3.2	3.2			3.23
Oxygen	19.5	16.3	19.4	16.1	19.5	16.3			16.23
Carbon Monoxide	0	0	0	0	0	0			0

Form SST5, Revised 12/28/92

Signature of Sampling Team Leader: [signature]

AGGREGATE MOISTURE - 1.54%

twin city testing corporation

SOURCE EMISSION TEST FIELD DATA SHEET TEST: 1 RUN: 3 PAGE: 1 of 2

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH SETTINGS
TCT Project Number: 4232-93 - 2677	Control Unit Number: 1	oh@ 2.00/16
Date: 8/17/93	Gas Meter Coefficient: 1.0075	Tm 80°
Company: NORTHERN ASPHALT	Sample Box Number: 3	MC 16%
Source: BAGHOUSE	Probe No: 3 Length: 3'	Ps/Pm .996
Source Dimensions: 31 1/2" x 27 1/2"	Pitot No: 3 Coefficient: 0.84	C 2.0
Test Team: JT / BL / DC	Nozzle No: 6 Diameter: .188	Ts 220
Test Procedures: EPA 1-5 + 9	Filter No: 104	R —
Ambient Temp., °F: 74°	Barometric Pressure, in.Hg: 30.08	Static Pressure, in.WC: -1.7

EPA METHOD 5 TRAVERSE DATA

CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME minute	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ΔH, in.WC REQ.	ORIFICE ΔH, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, °F STACK GAS	PROBE LINER	FILTER OVEN	IMPINGER EXIT	AUXILIARY	GAS METER IN	GAS METER OUT
11:03	A1	0	884.500	2.3	2.0	2.0	3.5	205	259	255	64	-	89	83
	2	2.5	86.3	3.3	2.9	2.9	5.0	208	259	255	58	-	89	83
	3	5	88.3	3.1	2.8	2.8	5.0	217	259	254	54	-	89	83
	4	7.5	90.5	2.4	2.2	2.2	4.0	220	260	256	54	-	90	88
	5	10	92.4	2.4	2.2	2.2	4.0	222	260	255	56	-	92	88
	6	12.5	94.4	2.6	2.3	2.3	4.0	223	260	256	57	-	93	88
	7	15	96.3	2.8	2.4	2.4	4.0	223	261	256	58	-	94	88
	END A	17.5	98.3	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	B1	0	98.3	2.7	2.4	2.4	4.0	225	261	256	60	-	94	89
	2	2.5	900.3	3.1	2.8	2.8	5.0	220	260	255	58	-	96	90
	3	5	2.4	3.0	2.7	2.7	5.0	223	261	255	58	-	97	90
	4	7.5	4.6	2.3	2.0	2.0	4.0	225	260	256	59	-	98	90
	5	10	6.4	2.6	2.3	2.3	4.0	223	260	256	59	-	98	91
	6	12.5	8.4	2.7	2.4	2.4	4.0	223	259	256	59	-	99	91
	7	15	10.3	2.5	2.3	2.3	4.0	223	259	256	58	-	99	92
	END B	17.5	12.3	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	C1	0	12.3	2.8	2.4	2.4	4.0	226	258	257	60	-	98	92
	2	2.5	14.3	2.9	2.6	2.6	4.5	221	260	256	60	-	100	93
	3	5	16.3	2.9	2.6	2.6	4.5	222	261	256	60	-	100	93
	4	7.5	18.4	2.2	2.0	2.0	4.0	226	260	256	60	-	101	93
	5	10	20.2	2.2	2.0	2.0	4.0	227	260	255	60	-	101	94
	6	12.5	22.1	2.4	2.2	2.2	4.0	225	260	256	60	-	101	94
	7	15	24.0	2.4	2.2	2.2	4.0	225	260	255	60	-	101	94
	END C	17.5	25.8	X	X	X	X	X	X	X	X	X	X	X

EPA METHOD 4: MOISTURE DETERMINATION

IMPINGER	1	2	3	4	5
Final	274	136	1	705.0	X
Initial	100	100	0	691.9	
Net	174	36	1	13.1	

Total Moisture Collected: 224.1

Impinger Catch Description: Clean

EPA METHOD 5 LEAK CHECK

Time	Rate, dcfm	Vac, in.Hg
10:47	0.000	15
12:18	0.000	6

Total Volume of Gas Sampled, DCF: 55.154

Total Sampling Time, Min: 70

Filter Catch Description: Very Light Tan

EPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS

Sample Identification	Replicate 1 Buret Reading	Replicate 1 Percent Volume	Replicate 2 Buret Reading	Replicate 2 Percent Volume	Replicate 3 Buret Reading	Replicate 3 Percent Volume	Replicate 4 Buret Reading	Replicate 4 Percent Volume	Compound Average Percent Volume
Initial Reading									
Carbon Dioxide	5.6	3.2	3.1	3.1	3.0	3.0			3.10
Oxygen	19.4	16.2	19.5	16.4	19.5	16.5			16.37
Carbon Monoxide	0	0	0		0	0			0

Form SST5, Revised 12/28/92

Signature of Sampling Team Leader:

Average Moisture - 1.94%

twin city testing corporation

SOURCE EMISSION TEST FIELD DATA SHEET TEST: 1 RUN: 3 PAGE: 2 of 2

TEST IDENTIFICATION		EQUIPMENT IDENTIFICATION		NOMOGRAPH SETTINGS
TCT Project Number:	4232.93-2677	Control Unit Number:	1	∆H@ 2.0016
Date:	8/12/93	Gas Meter Coefficient:	1.0075	Tm 80°
Company:	NORTHERN ASPHALT	Sample Box Number:	3	MC 16%
Source:	BAGHOUSE	Probe No: 3	Length: 3'	Ps/Pm .996
Source Dimensions:	31½" x 27½"	Pitot No: 3	Coefficient: 0.84	C 2.0
Test Team:	JT/BL/WC	Nozzle No: 6	Diameter: .188	Ts 220
Test Procedures:	EPA 1-5 4-9	Filter No:	104	R -
Ambient Temp., °F: 74°		Barometric Pressure, in.Hg: 30.08		Static Pressure, in.WC: -1.7

EPA METHOD 5 TRAVERSE DATA

CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME minute	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ∆H, in.WC REQ.	ORIFICE ∆H, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, °F STACK GAS	PROBE LINER	FILTER OVEN	IMPINGER EXIT	AUXILIARY	GAS METER IN	GAS METER OUT
	A1	0	25.8	2.0	1.8	1.8	3.5	210	260	255	60	-	102	96
	2	2.5	27.5	2.5	2.3	2.3	4.0	215	258	256	61	-	101	95
	3	5	29.4	2.3	2.0	2.0	4.0	222	260	255	60	-	103	96
	4	7.5	31.2	2.0	1.8	1.8	3.5	224	259	255	60	-	102	96
	5	10	33.0	1.5	1.3	1.3	3.0	224	259	255	61	-	102	96
	6	12.5	34.5	1.6	1.4	1.4	3.0	223	260	256	62	-	102	97
	7	15	36.0	1.7	1.5	1.5	3.0	223	260	256	62	-	102	97
12:16	END A	17.5	937.654											

EPA METHOD 4: MOISTURE DETERMINATION

IMPINGER	1	2	3	4	5
Final	274	136	1	705.6	X
Initial	100	100	0	691.9	X
Net	174	36	1	13.1	X

Total Moisture Collected: 224.1

Impinger Catch Description: OCCAN

EPA METHOD 5 LEAK CHECK

Time	Rate, dcfm	Vac, in.Hg
12:14	0.000	15
12:18	0.000	6

Total Volume of Gas Sampled, DCF: 53.154

Total Sampling Time, Min: 76

Filter Catch Description: VERY LIGHT TAN

EPA METHOD 3: GAS COMPOSITION BY ORSAT ANALYSIS

Sample Identification	Replicate 1 Buret Reading	Replicate 1 Percent Volume	Replicate 2 Buret Reading	Replicate 2 Percent Volume	Replicate 3 Buret Reading	Replicate 3 Percent Volume	Replicate 4 Buret Reading	Replicate 4 Percent Volume	Compound Average Percent Volume
Initial Reading									
Carbon Dioxide	3.2	3.2	3.1	3.1	3.0	3.0	X	X	3.16
Oxygen	19.4	16.2	19.5	16.4	19.5	16.5	X	X	16.37
Carbon Monoxide	0	0	0	0	0	0	X	X	0

Form SST5, Revised 12/28/92

Signature of Sampling Team Leader: [signature]

AVERAGE MOISTURE - 1.74%

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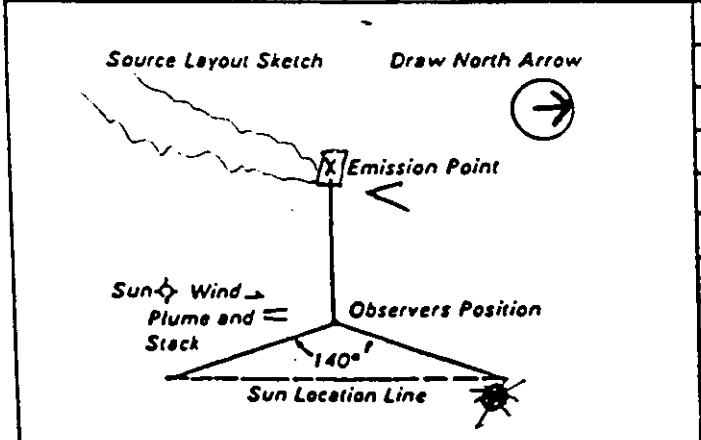
Visible Emission Observation Form

SOURCE NAME: NORTHERN ASPHALT	OBSERVATION DATE: 8-17-93	START TIME: 6:32	STOP TIME: 7:32
ADDRESS: 11064 Brenner Rd. N.E.			
CITY: Blaine	STATE: MN	ZIP: 55434	
PHONE: 784-1805	SOURCE ID NUMBER: 1059-93-6-1		
PROCESS EQUIPMENT: ASPHALT PLANT	OPERATING MODE: 130 TPH		
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: 100 %		
DESCRIBE EMISSION POINT: START EXHAUST STACK STOP EXHAUST STACK			
HEIGHT ABOVE GROUND LEVEL: START 40' STOP 40'	HEIGHT RELATIVE TO OBSERVER: START 34' STOP 34'		
DISTANCE FROM OBSERVER: START 120' STOP	DIRECTION FROM OBSERVER: START 280° West STOP		
DESCRIBE EMISSIONS: START WHITE STOP WHITE			
EMISSION COLOR: START ~~WHITE~~ STOP WHITE	PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐		
WATER DROPLETS PRESENT: NO ☐ YES ☒	IF WATER DROPLET PLUME: ATTACHED ☒ DETACHED ☐		
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START END OF VAPOR TRAIL STOP SAME			
DESCRIBE BACKGROUND: START BLUE SKY STOP BLUE SKY			
BACKGROUND COLOR: START BLUE STOP	SKY CONDITIONS: START CLEAR STOP		
WIND SPEED: START 0-5 STOP	WIND DIRECTION: START NE STOP		
AMBIENT TEMP.: START 62 STOP 69	WET BULB TEMP.: 50°	RH,percent: 82	

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



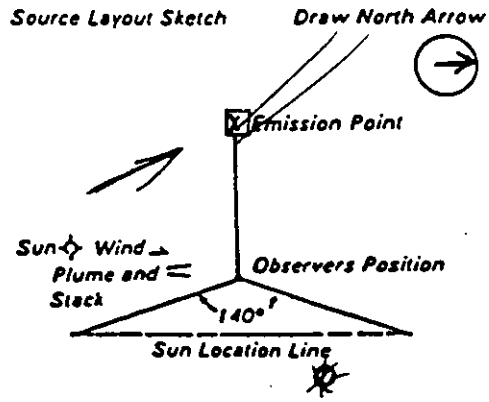
AVERAGE OPACITY FOR HIGHEST PERIOD: 0	NUMBER OF READINGS ABOVE 20 % WERE 0
RANGE OF OPACITY READINGS: 0% MINIMUM	0% MAXIMUM
OBSERVER'S NAME (PRINT): DAVID L. CHRISTIAN	
COMMENTS	OBSERVER'S SIGNATURE: [signature] — DATE: 8-17-93
	ORGANIZATION: TWIN CITY TESTING
I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS SIGNATURE	CERTIFIED BY: ETA — DATE: 4-1-93
TITLE — DATE	VERIFIED BY — DATE

twin city testing corporation

Visible Emission Observation Form

SOURCE NAME	NORTHERN ASPHALT
ADDRESS	11064 Aspen St. NE
CITY	BLAINE
STATE	MN
ZIP	55434
PHONE	784-1805
SOURCE ID NUMBER	1059-93-G-1
PROCESS EQUIPMENT	ASPHALT PLANT
OPERATING MODE	125 TPH
CONTROL EQUIPMENT	BAG HOUSE
OPERATING MODE	100%
DESCRIBE EMISSION POINT	START EXHAUST STACK STOP SAME
HEIGHT ABOVE GROUND LEVEL	START 40' STOP 40'
HEIGHT RELATIVE TO OBSERVER	START 34' STOP 34'
DISTANCE FROM OBSERVER	START 120' STOP 120'
DIRECTION FROM OBSERVER	START WEST 220° STOP SAME
DESCRIBE EMISSIONS	START CLEAR STOP SAME
EMISSION COLOR	START CLEAR STOP CLEAR
PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 3' ABOVE STACK STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START BLUE STOP BLUE
SKY CONDITIONS	START CLEAR STOP CLEAR
WIND SPEED	START 5-10 STOP 5-10
WIND DIRECTION	START S.E STOP S.E.
AMBIENT TEMP.	START 74 STOP 79
WET BULB TEMP.	68
RH.percent	73

Source Layout Sketch



OBSERVATION DATE	START TIME	STOP TIME
8-17-93	9:20	10:20

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

AVERAGE OPACITY FOR HIGHEST PERIOD 0%	NUMBER OF READINGS ABOVE 20 % WERE 0
RANGE OF OPACITY READINGS 0% MINIMUM	0% MAXIMUM
OBSERVER'S NAME (PRINT)	DAVID L. CHRISTIAN
OBSERVER'S SIGNATURE	DATE 8-17-93
ORGANIZATION	TWIN CITY TESTING
CERTIFIED BY	ETA — DATE 4-1-93
VERIFIED BY	DATE

COMMENTS

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SIGNATURE
TITLE DATE

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Visible Emission Observation Form

SOURCE NAME: NORTHERN ASPHALT	OBSERVATION DATE: 8-17-93	START TIME: 11:07	STOP TIME: 12:04
ADDRESS: 11064 Aldrich Rd. N.E.			
CITY: Big Lake	STATE: MN	ZIP: 55434	
PHONE: 781-1817	SOURCE ID NUMBER: 1059-93-0-1		
PROCESS EQUIPMENT: ASPHALT PLANT	OPERATING MODE: 125 TPH		
CONTROL EQUIPMENT: BAG HOUSE	OPERATING MODE: 100%		
DESCRIBE EMISSION POINT: START EXHAUST STACK STOP SAME			
HEIGHT ABOVE GROUND LEVEL: START 40' STOP 40'	HEIGHT RELATIVE TO OBSERVER: START 34' STOP 34'		
DISTANCE FROM OBSERVER: START 120' STOP 120'	DIRECTION FROM OBSERVER: START West STOP SAME		
DESCRIBE EMISSIONS: START CLEAR STOP CLEAR			
EMISSION COLOR: START CLEAR STOP CLEAR	PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐		
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐		
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 3' ABOVE STACK STOP SAME			
DESCRIBE BACKGROUND: START SKY STOP SKY			
BACKGROUND COLOR: START BLUE STOP BLUE	SKY CONDITIONS: START CLEAR STOP CLEAR		
WIND SPEED: START 5-10 STOP 5-10	WIND DIRECTION: START S.E. STOP S.E		
AMBIENT TEMP.: START 79 STOP 83	WET BULB TEMP.: 74	RH.percent: 78	

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

AVERAGE OPACITY FOR HIGHEST PERIOD: 0

NUMBER OF READINGS ABOVE 20 % WERE 0

RANGE OF OPACITY READINGS: 0% MINIMUM 0% MAXIMUM

OBSERVER'S NAME (PRINT): DAVID L. CHRISTIAN

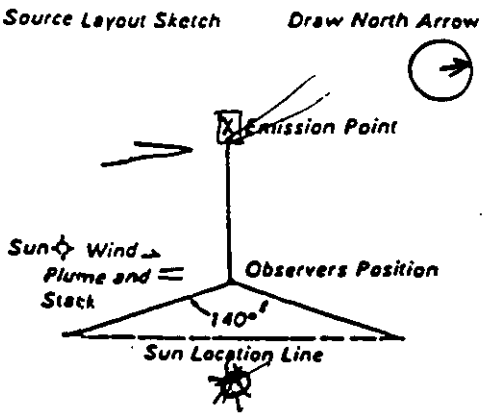
OBSERVER'S SIGNATURE: [signature] DATE: 8-17-93

ORGANIZATION: TWIN CITY TESTING

CERTIFIED BY: E.T.A. DATE: 4-1-93

VERIFIED BY: DATE:

Source Layout Sketch — Draw North Arrow



COMMENTS

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SIGNATURE

TITLE DATE

twin city testing corporation

APPENDIX C

LABORATORY REPORTS

LABORATORY REPORT: EPA METHOD 5 PARTICULATE ANALYSIS

Project Number: 4232-93-2677	TEST	RUN
Client: Northern Asphalt	1	1

FILTER CATCH				
Sample Number: 324583		Filter Number: 102		
	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:30	MKC	0.36351
Weight #1	8-25-93	8:50	MKC	0.36383
Filter Tare Weight				0.35074
Net Sample Weight				0.01307

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.

IMPINGER CATCH VOLUME	
Measured Sample Volume, ml:	510
Estimated Volume Lost, ml:	

FRONT WASH				
Sample Number: 324586		Measured Sample Volume, ml 113		Estimated Volume Lost, ml
	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:40	MKC	2.63653
Weight #1	8-25-93	9:00	MKC	2.63662
Dish Tare	8-18-93	3:35	MKC	2.61900
Weight of collected matter				0.01753
Water Blank based on 56.5 ml				ND
Acetone Blank based on 56.5 ml				0.00027
Net Sample Weight				0.01726

IMPINGER CATCH ORGANIC EXTRACTION				
Sample Number: 324588				
	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:45	MKC	2.64773
Weight #1	8-25-93	9:05	MKC	2.64720
Dish Tare	8-18-93	3:35	MKC	2.63280
Weight of collected matter				0.01456
Less Solvent Blanks				
Ethyl Ether based on 75 ml				0.00056
Chloroform based on 75 ml				0.00023
based on ml				
Net Sample Weight				0.01397

IMPINGER ACETONE RINSE				
Sample Number: 324587		Measured Sample Volume, ml 110		Estimated Volume Lost, ml
	Date	Time	By	grams
Weight #3				
Weight #2	8-25-93	4:45	MKC	2.63432
Weight #1	8-25-93	9:05	MKC	2.63436
Dish Tare	8-18-93	3:35	MKC	2.62690
Weight of collected matter				0.00742
Acetone Blank based on 110 ml				0.00053
Net Sample Weight				0.00689

IMPINGER CATCH MASS RESIDUE				
Sample Number:				
	Date	Time	By	grams
Weight #5				
Weight #4				
Weight #3				
Weight #2				
Weight #1				
Dish Tare				
Weight of collected matter				
Water Blank based on ml				
Net Sample Weight				

Form: SST-LAB52C

LABORATORY REPORT: EPA METHOD 5 PARTICULATE ANALYSIS

Project Number: 4232-93-2677	TEST	RUN
Client: Northern Asphalt	1	2

FILTER CATCH				
Sample Number: 324584		Filter Number: 103		
	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:30	MKC	0.36342
Weight #1	8-25-93	8:50	MKC	0.36351
Filter Tare Weight				0.35014
Net Sample Weight				0.01328

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.

IMPINGER CATCH VOLUME	
Measured Sample Volume, ml:	504
Estimated Volume Lost, ml:	

FRONT WASH				
Sample Number: 324589		Measured Sample Volume, ml 93		Estimated Volume Lost, ml
	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:30	MKC	2.61552
Weight #1	8-25-93	8:55	MKC	2.61545
Dish Tare	8-18-93	3:40	MKC	2.60027
Weight of collected matter				0.01525
Water Blank based on 46.5 ml				ND
Acetone Blank based on 46.5 ml				0.00022
Net Sample Weight				0.01503

IMPINGER CATCH ORGANIC EXTRACTION				
Sample Number: 324591				
	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:45	MKC	2.65482
Weight #1	8-25-93	9:10	MKC	2.64690
Dish Tare	8-18-93	3:40	MKC	2.63825
Weight of collected matter				0.00825
Less Solvent Blanks				
Ethyl Ether based on 75 ml				0.00036
Chloroform based on 75 ml				0.00043
based on ml				
Net Sample Weight				0.00748

IMPINGER ACETONE RINSE				
Sample Number: 324590		Measured Sample Volume, ml 91		Estimated Volume Lost, ml
	Date	Time	By	grams
Weight #3				
Weight #2	8-25-93	4:50	MKC	2.63560
Weight #1	8-25-93	9:10	MKC	2.63569
Dish Tare	8-18-93	3:40	MKC	2.63302
Weight of collected matter				0.00258
Acetone Blank based on 91 ml				0.00044
Net Sample Weight				0.00214

IMPINGER CATCH MASS RESIDUE				
Sample Number:				
	Date	Time	By	grams
Weight #5				
Weight #4				
Weight #3				
Weight #2				
Weight #1				
Dish Tare				
Weight of collected matter				
Water Blank based on ml				
Net Sample Weight				

Form: SST-LAB52C

LABORATORY REPORT: EPA METHOD 5 PARTICULATE ANALYSIS

Project Number: 4232- 93-2-672	TEST	RUN
Client: Northern Asphalt	1	3

FILTER CATCH

Sample Number: 324585	Filter Number: 104			
	Date	Time	By	grams
Weight #4				
Weight #3	8-25-93	4:30	MKC	0.36515
Weight #2	8-25-93	8:50	MKC	0.36510
Weight #1	~~8-25-93~~	~~8:50~~	~~MKC~~	~~0.36505~~
Filter Tare Weight				0.34975
Net Sample Weight				0.01540

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.

IMPINGER CATCH VOLUME

Measured Sample Volume, ml:	515
Estimated Volume Lost, ml:	

FRONT WASH

Sample Number: 324592	Measured Sample Volume, ml 98		Estimated Volume Lost, ml	
	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:35	MKC	2.64496
Weight #1	8-25-93	8:55	MKC	2.64472
Dish Tare	8-18-93	3:45	MKC	2.62719
Weight of collected matter				0.01777
Water Blank based on 49 ml				ND
Acetone Blank based on 49 ml				0.00024
Net Sample Weight				0.01753

IMPINGER CATCH ORGANIC EXTRACTION

Sample Number: 324594				
	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:50	MKC	2.61657
Weight #1	8-25-93	9:10	MKC	2.61650
Dish Tare	8-18-93	3:45	MKC	2.61087
Weight of collected matter				0.00570
Less Solvent Blanks				
Ethyl Ether based on 75 ml				0.00036
Chloroform based on 75 ml				0.00023
based on ml				
Net Sample Weight				0.00511

IMPINGER ACETONE RINSE

Sample Number: 324593	Measured Sample Volume, ml 91		Estimated Volume Lost, ml	
	Date	Time	By	grams
Weight #3				
Weight #2	8-25-93	4:35	MKC	2.65087
Weight #1	8-25-93	8:55	MKC	2.65075
Dish Tare	8-18-93	3:45	MKC	2.64806
Weight of collected matter				0.00281
Acetone Blank based on 91 ml				0.00044
Net Sample Weight				0.00237

IMPINGER CATCH MASS RESIDUE

Sample Number:				
	Date	Time	By	grams
Weight #5				
Weight #4				
Weight #3				
Weight #2				
Weight #1				
Dish Tare				
Weight of collected matter				
Water Blank based on ml				
Net Sample Weight				

Form: SST-LAB52C

LABORATORY REPORT: EPA METHOD 5 PARTICULATE TEST SOLVENT BLANKS

Project Number: 4232-93-2677	TEST
Client: Northern Asphalt	1

DISTILLED, DEIONIZED WATER

Sample Number: 324595	Measured Sample Volume, ml: 200	Estimated Volume Lost, ml

	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-27-93	7:50	MRC	3.98816
Weight #1	8-26-93	4:25	MRC	3.98858
Dish Tare	8-18-93	3:25	MKC	3.99109
Weight of residual matter				ND
Mass Concentration:				NP mg/ml

ACETONE

Sample Number: 324596	Measured Sample Volume, ml: 186	Estimated Volume Lost, ml

	Date	Time	By	grams
Weight #4				
Weight #3	8-27-93	2:00	MRC	3.80033
Weight #2	8-27-93	7:50	MRC	3.79947
Weight #1	8-26-93	4:25	MRC	3.80012
Dish Tare	8-18-93	3:25	MKC	3.79928
Weight of residual matter				0.00095
Mass Concentration:				4.85 -6 mg/ml

CHLOROFORM

Sample Number: 324597	Measured Sample Volume, ml: 75	Estimated Volume Lost, ml

	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:40	MRC	2.63071
Weight #1	8-25-93	9:00	MRC	2.63058
Dish Tare	8-18-93	3:30	MKC	2.63048
Weight of residual matter				0.00023
Mass Concentration:				3.07 -6 mg/ml

ETHYL ETHER

Sample Number: 324598	Measured Sample Volume, ml: 75	Estimated Volume Lost, ml

	Date	Time	By	grams
Weight #4				
Weight #3				
Weight #2	8-25-93	4:40	MRC	2.61164
Weight #1	8-25-93	9:00	MRC	2.61163
Dish Tare	8-18-93	3:30	MKC	2.61128
Weight of residual matter				0.00036
Mass Concentration:				4.8 -6 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 Concentration:				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 Concentration:				mg/ml

Form: SST-LAB53C

Job Name: EIH-N-ASPH.1
Description: 4232-93-2677 TOTAL PARTIC.
Invoice: 4410_03-2216
Printed: 18-AUG-1993 15:07

Date Created: 18-AUG-1993
Login by: MICROSCOPY
Project Alert: None
Job Due Date: 1-SEP-1993

Rpt & Bill to: Northern Asphalt
Customer Inv/PO: 4232-93-2677

Sample number	Customer Sample Description	S C	Date Smpld	Date / Rec'd	P r	Sample Matrix	ANALYSES	STORAGE
324583	1-1 FILTER 102	V		/18-AUG	3	FILTER	PARTICULAT	EIH
324584	1-2 FILTER 103	V		/18-AUG	3	FILTER	PARTICULAT	EIH
324585	1-3 FILTER 104	V		/18-AUG	3	FILTER	PARTICULAT	EIH
324586	1-1 PROBE WASH	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324587	1-1 ACETONE RINSE	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324588	1-1 IMPINGER CATCH	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324589	1-2 PROBE WASH	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324590	1-2 ACETONE RINSE	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324591	1-2 IMPINGER CATCH	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324592	1-3 PROBE WASH	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324593	1-3 ACETONE RINSE	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324594	1-3 IMPINGER CATCH	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324595	WATER BLANK	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324596	ACETONE BLANK	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324597	CHLOROFORM BLANK	V		/18-AUG	3	LIQUID	PARTICULAT	EIH
324598	ETHER BLANK	V		/18-AUG	3	LIQUID	PARTICULAT	EIH

Paula Crowley has 16 tests assigned to 16 samples.

Status Codes: V = available W = awaiting prep P = in progress C = completed A = authorized
H = hold S = suspended X = cancelled U = unavailable

Job remarks:

RESULTS TO JIM TRYBA

Sample remarks:

Legend
Technical Services

739 VANDALIA ST.
ST. PAUL, MN 55114
(612) 642-1150
FAX (612) 642-1239

September 3, 1993

Mr. Jeff Dusenka
Northern Asphalt
11064 Radison Road
Minneapolis, MN 55434

SUBJECT: Bag House
LEGEND No. 93-1459

1.0 INTRODUCTION

LEGEND TECHNICAL SERVICES, INC. (LEGEND) received three oil samples from a representative of Northern Asphalt on August 19, 1993. Our laboratory was requested to analyze the samples for the presence of polychlorinated biphenyls, total organic halogens, flashpoint, lead, BTU, percent sulfur, and percent ash.

2.0 DISCUSSION

The sample analysis indicated the presence of some of the analytes requested.

3.0 SAMPLE IDENTIFICATION

Laboratory No.	Client ID
SN93-14413	Bag House 1-1
SN93-14414	Bag House 1-2
SN93-14415	Bag House 1-3

4.0 METHODOLOGY

Lead

The samples were prepared and analyzed using EPA SW-846, Method 7420.

Flashpoint

The samples were analyzed by the Pensky Martens Method SW-846, method 1010.

Percent Ash

The samples were prepared and analyzed with methods based on ASTM D482-87.

BTU/Sulfur

The samples were prepared and analyzed with methods based on ASTM D-2382-88.

Polychlorinated Biphenyls

The samples were prepared and analyzed with methods based on SW-846 8080.

Total Halogens

The samples were combusted in an oxygen bomb and the rinsate was analyzed using a chloride ion electrode.

5.0 CASE NARRATIVE

The associated method blanks were free of target analytes at detectable levels, and the associated batch quality assurance/quality control criteria were met with satisfaction.

6.0 REMARKS

The samples will be retained by our laboratory for 30 days from the date of this report and then discarded unless other instructions are received by the client.

Submitted by,

LEGEND TECHNICAL SERVICES, INC.

Chris Bremer (CB)
Chris Bremer
Laboratory Manager

Jeff Zeake
Jeffery Zeake
Chemist

CB/JZ/ss

Attachment

LEGEND TECHNICAL SERVICES, INC.

TABLE #1
LEGEND No. 93-1459
NORTHERN ASPHALT
ANALYTICAL RESULTS

Parameter	Bag House 1-1	Bag House 1-2	Bag House 1-3	MDL*	Date Analyzed
BTU/lb	19,000	19,000	19,000	—	8/27/93 Btu/lb
Percent Sulfur	0.62	0.54	0.47	—	8/27/93
Percent Ash	0.43	0.42	0.42	—	8/24/93
Total Organic Halogens, mg/kg	280	260	420	50	8/31/93
Flashpoint	135° F	140° F	125° F	—	8/31/93
Lead, mg/kg	80 ppm	92	85	2.5	8/29/93

* MDL - Method detection limit.

mg/kg is equal to parts per million.

< = Less than number shown.

LEGEND TECHNICAL SERVICES, INC.
TABLE #2
LEGEND No. 93-1459
NORTHERN ASPHALT
POLYCHLORINATED BIPHENYLS

Aroclor	Bag House 1-1 (mg/kg)	Bag House 1-2 (mg/kg)	Bag House 1-3 (mg/kg)	Method Blank (mg/kg)	MDL (mg/kg)
1016	<5.0	<5.0	<5.0	<5.0	5.0
1221	<5.0	<5.0	<5.0	<5.0	5.0
1232	<5.0	<5.0	<5.0	<5.0	5.0
1242	<1.0	<1.0	<1.0	<1.0	1.0
1248	<1.0	<1.0	<1.0	<1.0	1.0
1254	<1.0	<1.0	<1.0	<1.0	1.0
1260	<1.0	<1.0	<1.0	<1.0	1.0

Recovery Data	Percent Recovery
Spike #1	102%

Date Extracted: 9/01/93
Date Analyzed: 9/01/93

MDL = Method detection limit

mg/kg is equal to parts per million

LEGEND TECHNICAL SERVICES, INC.
739 Vandalia Street
St. Paul, MN 55114
(612)642-1150

CHAIN OF CUSTODY RECORD

Client Name:

Report To:

Samples:

Project No.:

Verbal Results To:

Copy of Report To:

Samples Returned To:

Laboratory Project No.: 93-1459

Item #	Field ID #	Sample Description	Collection Date	Collection Time	Sample Matrix Air	Sample Matrix Liq.	Sample Matrix Sol.	Lab ID#	Sulfur content	Ash content	Lead content	PCB	Halogens, organic	Gross Heating value	Flashpoint
1		Baghouse 1-1				oil		14413	X	X	X	X	X	X	X
2		Baghouse 1-2				oil		14414	X	X	X	X	X	X	X
3		Baghouse 1-3				oil		14415	X	X	X	X	X	X	X
4															
5															
6															
7															
8															
9															
10															
11															

Transfer No.	Item Number	Relinquished By	Accepted By	Date	Time	Comments
1			[illegible]	8/19		See MPCA guideline.
2						
3						
4						

APPENDIX D

CALIBRATION DATA

GAS METER AND ORIFICE CALIBRATION

Pretest calibration of TCT control unit #1 generated a gas meter coefficient of 1.0075. Post test calibration yielded a coefficient of 1.0083. Both sets of calibration data are included on the following pages. All calculations for tests performed using unit #1 were made using the lower (1.0075) calibration factor which produces worst case emission data.

PITOT TUBE CALIBRATION DATA

Pitot tube #3 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 used.

ORIFICE and DRY GAS METER CALIBRATION FORM

Date: Jun 30, 1993 Meter # 1 Barometric Pressure,Pb: 29.98

Orifice manometer setting dH,in.H2O	Gas Volume Wet test meter Vw, ft3	Dry gas meter Vd, ft3	Temperature Wet test meter tw, dF	Dry gas meter Inlet tdi, dF	Outlet tdo, dF	Average td, dF	Time e,min.
0.5	5.000	5.035	69	75	73	74.0	13.35
1.0	5.000	5.030	69	78	74	76.0	9.40
2.0	10.000	9.944	69	76	71	73.5	13.55
4.0	10.000	9.925	69	79	72	75.5	9.60
6.0	10.000	9.899	69	80	73	76.5	7.95
8.0	10.000	9.874	69	82	74	78.0	6.90

Y	dH@
$\frac{Vw\ Pb\ (td + 460)}{Vd\ [Pb + (dH/13.6)]\ (tw + 460)}$	$\frac{0.0317\ dH}{Pb\ (to + 460)} \left[\frac{(tw + 460)\ e}{Vw} \right]^2$
Yi 1 = 1.0012	dH@i 1 = 1.9788
Yi 2 = 1.0047	dH@i 2 = 1.9585
Yi 3 = 1.0092	dH@i 3 = 2.0462
Yi 4 = 1.0100	dH@i 4 = 2.0504
Yi 5 = 1.0097	dH@i 5 = 2.1052
Yi 6 = 1.0102	dh@i 6 = 2.1105
Y = 1.0075	dH@ = 2.0416

Definitions:

Vw = Gas volume passing through the wet test meter, ft3.
Vd = Gas volume passing through the dry gas meter, ft3.
tw = Temperature of the gas in the wet test meter, dF.
tdi = Temperature of the inlet gas of the dry gas meter, dF.
tdo = Temperature of the outlet gas of the dry gas meter, dF.
td = Average temperature of the gas in the dry gas meter, dF.
dH = Pressure differential across orifice, in. H2O.
Yi = Ratio of accuracy of wet test meter to dry gas meter for each run.
Y = Average of Yi. Tolerance = +/- 0.02
Pb = Barometric pressure, in Hg.
e = Time of calibration run, min.
dH@i = Orifice pressure differential for each run.
dH@ = Average oriface pressure differential. Tolerance = +/- 0.20

Calibrator - James Tryba

Jun 30, 1993
Date

twin city testing corporation

ORIFICE and DRY GAS METER POST TEST FORM

Client: NORTHERN ASPHALT COMPANY, Blaine, MN
Date: Aug 18, 1993 Meter # 1 Barometric Pressure,Pb: 29.90
Max. Vacuum Achieved (in.Hg.): 6.0 Intermediate Orifice Setting: 2.19
dH@ Factor Used: 2.0416 Y Factor Used: 1.0075

Orifice manometer setting dH,in.H2O	Gas Volume Wet test meter Vw, ft3	Gas Volume Dry gas meter Vd, ft3	Temperature Wet test meter tw, dF	Temperature Dry gas meter Inlet tdi, dF	Temperature Dry gas meter Outlet tdo, dF	Temperature Dry gas meter Average td, dF	Time e,min.
2.19	10.000	9.998	76	87	79	83.0	12.95
2.19	10.000	10.015	76.5	88	81	84.5	13.00
2.19	10.000	10.023	76.5	89	82	85.5	12.95

Y	dH@
$\frac{Vw\ Pb\ (td + 460)}{Vd\ [Pb + (dH/13.6)]\ (tw + 460)}$	$\frac{0.0317\ dH}{Pb\ (to + 460)} \left[\frac{(tw + 460)\ e}{Vw}\right]^2$
Yi 1 = 1.0078	dH@i 1 = 2.0755
Yi 2 = 1.0080	dH@i 2 = 2.0877
Yi 3 = 1.0090	dH@i 3 = 2.0678
Y = 1.0083	dH@ = 2.0770
Difference = 0.08 % *	Difference = 1.73 % *

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

Definitions:

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

Calibrator - James Tryba

Aug 18, 1993
Date

twin city testing corporation

VISIBLE EMISSIONS EVALUATOR

This is to certify that

David Christian

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

Thomas Rose
President

238374
Certificate Number

Vice President

Minneapolis
Location

David B. Savage, Jr.
Program Manager

April 1, 1993
Date of Issue

© COLS 445

APPENDIX E

MINNESOTA EXHIBIT C

PROCESS DATA

Asphalt Plant Operating Conditions During Stack Testing

Rev/YH/93

Test Date(s) AUG. 17 - 1993

Plant Mfr. & Model Barber Greene

Type (circle one): Drum Mix Conventional
Other (list): Continuous drum mix

Pollution Control Equipment: (Baghouse) Venturi Scrubber wet scrubber cyclone multiclone
(circle one)
If wet scrubbing: ____ % scrubber water recycled
List model: Barber Greene CF-11
Normal pressure drop across control equipment: ____ inches water
Air flow through control equipment: 37000 acfm at 250° F
Was control equipment operating normally during testing? ____
Date & procedures of last maintenance/cleaning of control equipment
replaced bags throughout season as nec

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) waste oil If other units of measure are used, specify and calculate appropriate heat input.

Test No.___	Fuel Input (Gal/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	% Moisture (as received in aggregate) Virgin	recycle	combined
Run 1	247 G	138,500	34,209,500	5%	—	—
Run 2	247 G	138,500	34,209,500	5%	—	—
Run 3	—	—	—	—	—	—

Is the above fuel substantially the highest sulfur containing fuel normally burned? yes
Production specific fuel usage: (circle one) measured or calculated: ____ cubic foot/ ton hot mix
1.4 (gal/ton) hot mix

No. of Burners: 1 Burner(s) rating: 86 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 gpm	Other (list)
6:30	2½	131		140	310	2		
6:45	2½	139		147	310	2		
7:00	2½	132		138	300	2		
7:15	2½	130		136	300	2		
7:30	2½	122		127	300	2½		
7:45	2½	130		136	300	2		
9:20	2½	124		134	315	2		
9:35	2½	133		140	300	2		
9:50	2½	129		139	300	2		
10:05	2½	128		137	300	2½		
10:20	2½	127		135	290	2		
10:35	2½	129		138	300	2		

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

By: Jeff Insenbe, Phone: ( ) 7841805

Position: General Manager

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.

Asphalt Plant Operating Conditions During Stack Testing

Rev/YH/93

Test Date(s) AUG. 17 - 1993

Plant Mfr. & Model Barber Greene

Type (circle one): Drum Mix Conventional
Other (list): Continuous drum mix

Pollution Control Equipment: (Baghouse) Venturi Scrubber wet scrubber cyclone multicione
(circle one)
If wet scrubbing: ____ % scrubber water recycled

List model: Barber Greene CF-11

Normal pressure drop across control equipment: _____ inches water

Air flow through control equipment: 37000 acfm at 350° F

Was control equipment operating normally during testing? _____

Date & procedures of last maintenance/cleaning of control equipment
replaced bags throughout season as nec.

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) waste oil. If other units of measure are used, specify and calculate appropriate heat input.

Test No. ___	Fuel Input (Gal/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	%Moisture (as received in aggregate) Virgin	recycle	combined
Run 1	—	—	—	—	—	—
Run 2	—	—	—	—	—	—
Run 3	235G	138,500	32,547,500	5%	—	—

Is the above fuel substantially the highest sulfur containing fuel normally burned? yes

Production specific fuel usage: (circle one) measured or calculated: _____ cubic foot/ ton hot mix
1.9 (gal/ton) hot mix

No. of Burners: 1 Burner(s) rating: 86 MMBTU/HR = 100% setting

Operation:

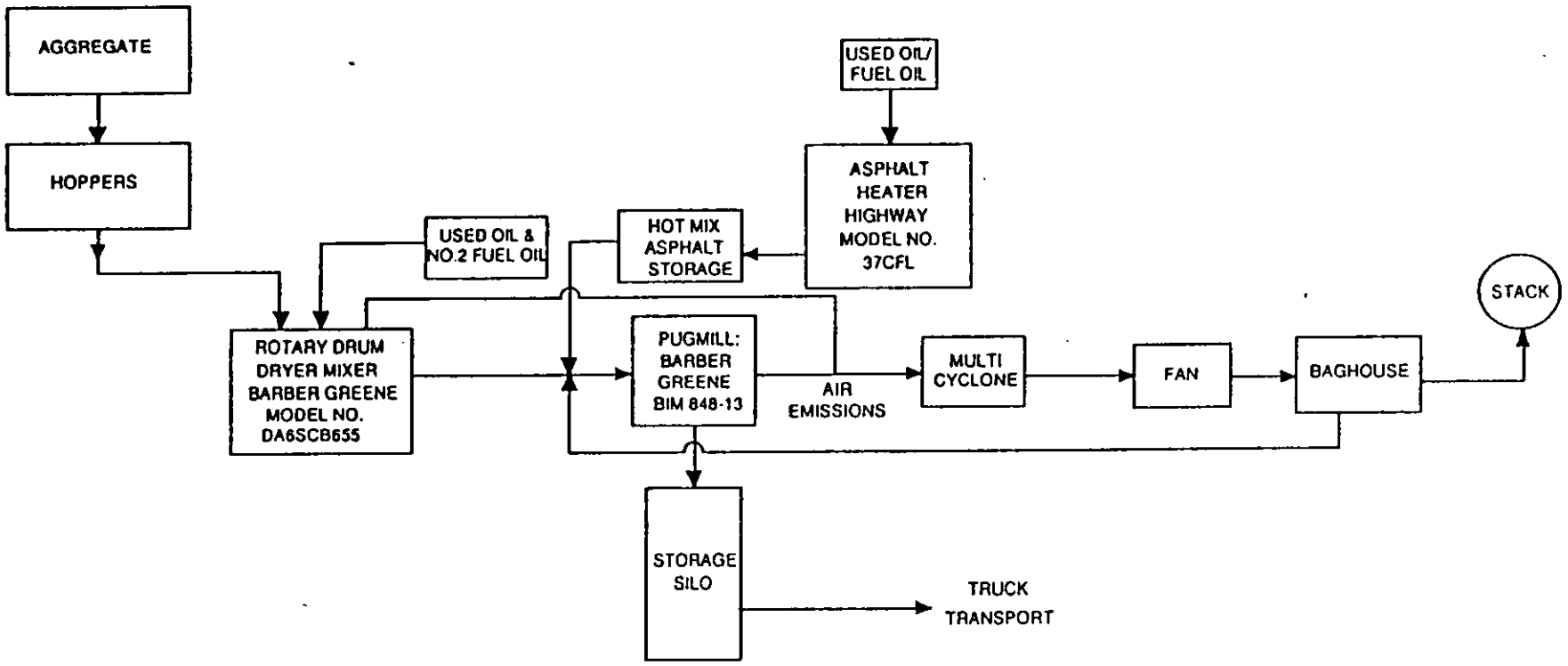
time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate gpm	Other (list)
11:00	2½	122		129	310	2¼		
11:15	2¼	124		130	310	2		
11:30	2	125		132	300	2		
11:45	2	123		130	310	2¼		
12:00	2	122		130	310	2		
12:15	2	124		130	300	2¼		

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

By: Jeff Dromka, Phone: ( ) 7841805

Position: General Manager

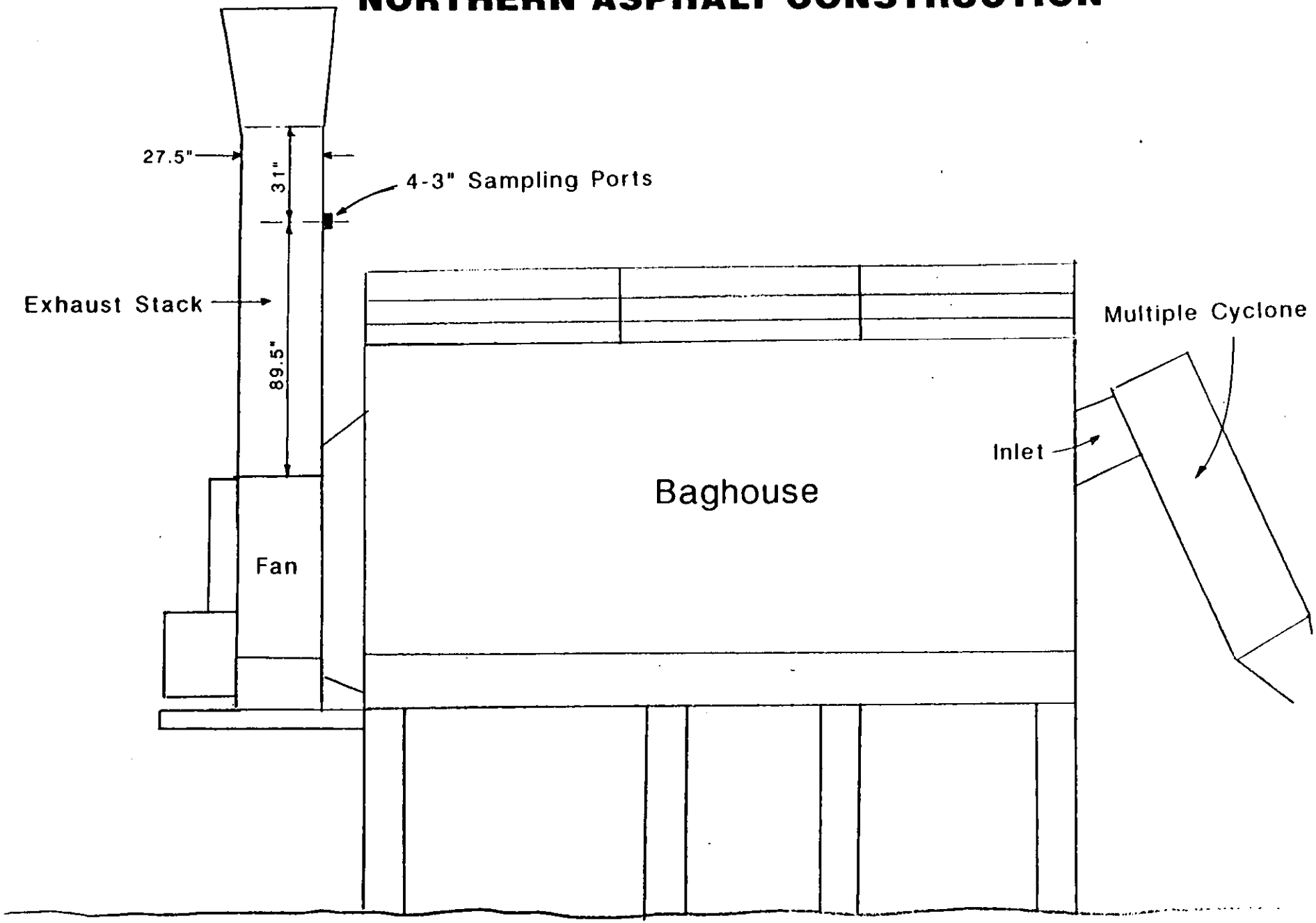
Note: All information required must be completed and submitted as part of the performance test. Failure to submit the required information will result in an incomplete performance test report.



PROJECT:	DATE:	FEBRUARY 8, 1993
PROCESS FLOW DIAGRAM **HOT ASPHALT PRODUCTION** **NORTHERN ASPHALT CONSTRUCTION** **BLAINE, MINNESOTA**	PROJECT NO:	4232 93-2247
	DRAWN BY:	S. GOEPFERT
	REVIEWED BY:	S. ADAMS
	SCALE:	NONE
	MACDRAW PRO DWG:	

twin city testing corporation

NORTHERN ASPHALT CONSTRUCTION



twin city testing corporation

APPENDIX F

MPCA TEST PLAN

TWIN CITY TESTING
AIR QUALITY SERVICES
TEST PLAN

CLIENT INFORMATION

Company- Northern Asphalt Construction, Inc.
Address- 11064 Raddison Road NE, Minneapolis, MN 55434
Contact- Jeff Dusenka
Phone: (612) 784-1805
FAX: (612) 784-1831

PRETEST MEETING

Location - MPCA building, St. Paul, MN
Date - August 4, 1993
Time - 2:00 p.m.

TEST PARAMETERS

Location- Client's facility at address above.

Source(s)- Asphalt Plant Baghouse.

Procedures/Methods-
- -EPA Methods 1 thru 5 including back half analysis for particulate matter.
- -EPA Method 9 for opacity.
- -Aggregate moisture content.

Test Date - August ~~12~~ 17, 1993

Time of Test - Approximately 6:00 a.m.

Comments:
- AUGUST 17 TEST DATE
- 1500 TON 135TPH
- 4 PORTS
- 3 HOURS OF OPACITY READINGS
- YOUNGER WILL WITNESS
- USED OIL
- VIRGIN AGGREGATES ONLY, NO RECYCLE

Minnesota Pollution Control Agency
Division of Air Quality
Stack Testing Protocol
April 29, 1993

The following is a summary of the testing requirements for the portable asphalt plant owned by Northern Asphalt Construction, Inc. :

I. Test Methods

A. EPA Method 1 for the location of sampling ports and points. Location of the sampling ports must be approved before the test.

Check for cyclonic flow must be done whenever there is a cyclonic type of device directly upstream of the sampling location. Correction of cyclonic flow by straightening vanes must also be verified by checking the cyclonic flow before the test.

If the location does not meet the minimum requirements in Method 1, the testing firm must conduct the flow pattern evaluation and testing according to the alternative procedures in part 2.5 of EPA Method 1 (Three-dimensional directional probe).

B. EPA Method 2 for velocity and volumetric flow rate. Three determinations: one measurement concurrently with each test run for pollutant.

C. EPA Method 3 for gas analysis. Three determinations: one measurement on an integrated sample taken concurrently with each test run for pollutant.

D. EPA Method 4 for the determination of moisture in the flue gases. Three determinations: one measurement concurrently with each test for pollutant.

E. EPA Method 5 as amended in Exhibit C and Minn. Rules 7005.0500 for the determination of particulate matter emissions including condensibles. The sampling time for each run must be at least 60 minutes, and the sampling rate must be at least 0.9 dscm/hr (0.53 dscf/min). Three one-hour determinations are required. The results should be reported as dry catch only and dry catch plus wet catch.

F. EPA Method 9 for the determination of visible emissions as amended in Minn. Rules part 7005.1860. Three hours of opacity readings are required for initial compliance of NSPS sources.

AQD File No.: 1095

Note: The protocol, testplan, and any information required in Exhibit C shall be submitted as part of the performance test report.

TEST PLAN
FOR
ASPHALT PLANTS
April 29, 1993

I. GENERAL INFORMATION

Permittee: Northern Asphalt Construction, Inc.

Permittee's contact person and telephone number: Jeffrey Dusenka 784-1805

Permittee's mailing address: 11064 Raddison Road Northeast, Blaine, Mn. 55449

DAQ File No.: 1059

MPCA permitting engineer: Jerry Liefert

Applicable regulations for each source tested (be specific): Federal NSPS 40 CFR Part 60, Subp. I and Mn. Rules 7005.2020 A & B for PM and opacity.

Reason for testing: initial compliance with permit

Is this test for initial compliance demonstration: Yes

Drawings showing location of sampling ports included: To be submitted

Location of the plant at the time of the test: Unknown

Date when test plan was discussed and agreed upon with the permittee, or Pre-test meeting needed: Pre-test meeting to be scheduled by Permittee.

II. NOTIFICATION REQUIREMENTS:

The permitTee must contact the Agency at least two weeks before the scheduled test to have a pre-test meeting and 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. If the plant is tested at less than 100% of capacity, the Permittee will be required to limit production to the tested rate.

3. Permittee must be ready to burn specified fuel.

4. Permittee may have to install pressure drop taps and gauges.

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

III. TEST PLAN

The following is the test plan developed for the Barber Greene drum mix plant.

A. Emission point(s) to be tested: Exhaust stack for fabric filter

B. Parameters to be tested at each emission point: PM and opacity for Emission Point 1.

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 in Exhibit D. Mix the three samples taken into a composite.

2. Analysis. The composite must be analyzed as specified in Exhibit D.

D. 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.

E. 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. If circumstances cause operation of the plant to be less than 100% during the test, the Permittee will be required to limit production to the tested rate.

2. Must burn 100% of the highest emitting fuel to be listed in and allowed by the permit: Used oil (waste oil, crank oil).

3. If normal operation of the plant will be with recycling of collected PM from the baghouse into the dryer, the test must be conducted under the same conditions.

F. 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.

b) Virgin 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.

c) Moisture content of the aggregate.

2. Please provide the following data:

a) Average fuel consumption rate (calculated or measured) and type

b) Cleaning cycles of the baghouse

c) Operating data sheet enclosed

G. Testing schedules and testing firm: Test shall be conducted by the date specified in the final letter for the August 4, 1992 performance test.

H. Permitting engineer to witness the test: No