AP42 Section: 11.1

Reference Number: 79

Title: Results Of A Source Emission Compliance Test On An Asphalt Plant Operated By River Bend Asphalt Company, Kasota, Minnesota,

MMT Environmental Services, Inc., St. Paul, MN,

October 21, 1994.

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MMT Environmental Services, Inc.
4610 North Churchill Street
St. Paul, MN 55126-5892
Phone (612) 483-9595 Fax (612) 483-2699

RESULTS OF A SOURCE EMISSION COMPLIANCE TEST ON AN ASPHALT PLANT OPERATED BY RIVER BEND ASPHALT COMPANY KASOTA, MINNESOTA September 16, 1994

Submitted to:

River Bend Asphalt Company
1905 Third Avenue
Mankato, Minnesota 56002
Attn: Mr. Larry V. Nurre

Prepared by:

Ted Gibbons
Sampling Team Leader

Approved by:

Alan L. Trowbridge
Director of Technical Services

MMT Report Number: 10083
MMT Project Number: 9616
Report Issued: October 21, 1994

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REPORT CERTIFICATIONS

1. **Certification of sampling procedures by the sampling team leader:**
I certify under penalty of law that the sampling procedures were performed in accordance with the approved test plan and that the data presented in this test report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained in the report.

Name: Ted M. Gibbons Signature: Ted M. Gibbons

Title: Technical Services Technician Date: 10-21-94

2. **Certification of analytical procedures by the responsible sample analyst:**
I certify under penalty of law that the analytical procedures were performed in accordance with the requirements of the test methods and that the data presented in this test report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained in the report.

Name: Ted M. Gibbons Signature: Ted M. Gibbons

Title: Technical Services Technician Date: 10-21-94

3. **Certification of test report by testing department senior staff:**
I certify under penalty of law that this report and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed the sampling and analyses relating to the performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained in the report.

Name: Alan L. Trowbridge Signature: Alan L Trowbridge

Title: Director of Technical Services Date: 10-21-94

4. **Certification of test report by the emission facility Owner or Operator:**
I certify under penalty of law that the information submitted in this report accurately reflects the operating conditions at the emission facility during this performance test and describes the date and nature of all operational and maintenance activities that were performed on the process and control equipment during the month prior to the performance test. Based on my inquiry of the person or persons who performed the operational and maintenance activities, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained in the cover letter or attachments submitted with this report.

Name: LARRY V. NURRE Signature: Larry V Nurre

Title: PRESIDENT Date: 10-24-94

RESULTS OF A SOURCE EMISSION COMPLIANCE TEST ON AN ASPHALT PLANT OPERATED BY RIVER BEND ASPHALT COMPANY, KASOTA, MINNESOTA

September 16, 1994

MMT Report Number: 10083
MMT Project Number: 9616
Report Issued: October 21, 1994

1 INTRODUCTION

MMT Environmental Services, Inc. (MMT) was contracted by River Bend Asphalt Company to perform a source emission compliance test on a single source at their hot-mix asphalt plant operating near Kasota, Minnesota. The source is a Barber Green model BE101 asphalt plant. Emissions generated by the plant's aggregate drum dryer are controlled by a StanSteel Corporation model AB-768-15 fabric filter baghouse. The baghouse exhaust was tested for particulate and visible emissions on September 16, 1994. The test was performed as a condition of Minnesota Pollution Control Agency air emission permit number 602-93-G-1 which identifies the source as Emission Point #1. This report presents the results of the test program along with all substantiating documentation.

The MMT sampling team consisted of Messrs. Ted Gibbons, Bill Anderson and Alan Trowbridge. Messrs. David Wachal and Mark Redlin represented River Bend Asphalt Company throughout the test period. Representatives of the Minnesota Pollution Control Agency were invited to witness the test proceedings but declined to do so.

2 TEST RESULTS

The results of the particulate emission test are presented in Table 2.1. The data indicates an average effluent particulate concentration of 0.012 grains per dry standard cubic foot and an average source particulate emission rate of 3.13 pounds per hour. The average process weight rate during the test period was 255 tons per hour.

The asphalt plant source emissions are regulated by Minnesota Rule 7011.0905. In order to be in compliance with this rule, the effluent particulate concentration must be less than 0.30 grains per dry standard cubic foot **and** the particulate emissions must also satisfy at least **one** of the following:

1) Particulate concentration less than 0.062 grains per dry standard cubic foot;
   Based on Minnesota Rule 7011.0735 and a volumetric flow rate of 30,196 dscfm.
2) Particulate mass emission rate less than 42.0 pounds per hour;
   Based on Minnesota Rule 7011.0730 and a process weight rate of 255 tons per hour.

The scrubber particulate emissions, as tested, were in compliance with this emission standard.

The visible emission test was performed concurrent with the particulate test run #2. The maximum observed plume opacity was zero (0) percent; i.e. no visible emissions were observed during the test period. Minnesota Rule 7011.0905 states that the asphalt concrete plant shall not discharge into the atmosphere any gases which exhibit greater than 20 percent opacity, except that a maximum of 40 percent opacity shall be permissible for not more than four minutes within any 30-minute period and a maximum of 60 percent opacity shall be permissible for not more than four minutes in any 60-minute period. The scrubber visible emissions, as tested, were in compliance with this standard.

No problems were encountered during sample acquisition or analysis. Based on a review of the entire test proceedings, it is MMT's opinion that the results presented herein are accurate and can be used for compliance status determination.

Table 2.1 Particulate Emission Test Results
River Bend Asphalt Company, Kasota, Minnesota
Asphalt Plant Baghouse Exhaust Test, September 16, 1994

Parameter	Run #1	Run #2	Run #3	Average
Time of Test;				
Start Time, hr	0930	1116	1315	---
Finish Time, hr	1049	1236	1435	---
Effluent Temperature, °F	243	242	241	242
Effluent Moisture Content, % v/v	28.7	28.5	29.3	28.8
Effluent Composition Parameters;				
Carbon Dioxide, % v/v dry	4.9	4.9	5.0	4.9
Oxygen Content, % v/v dry	14.9	14.2	14.4	14.5
Effluent Volumetric Flow Rate;				
Actual Conditions, acfm	58,024	59,322	60,240	59,195
Standard Conditions, scfm	41,773	42,617	42,942	42,444
Dry Standard Conditions, dscfm	29,771	30,473	30,343	30,196
Effluent Particulate Concentration;				
Front Catch Only, gr/dscf	0.0103	0.0066	0.0056	0.0075
Back Catch Only, gr/dscf	0.0062	0.0048	0.0022	0.0044
Total Catch, gr/dscf	0.0165	0.0114	0.0079	**0.0119**
Source Particulate Emission Rate;				
Classical Method, lb/hr	4.20	2.98	2.05	3.08
Ratio of Areas Method, lb/hr	4.37	3.04	2.12	3.17
Average of Two Methods, lb/hr	4.29	3.01	2.09	**3.13**
Test Quality Control Parameters;				
Total Sampling Time, min.	75.0	75.0	75.0	75.0
Total Volume Sampled, dscf	39.266	39.307	39.824	39.466
Total Particulate Mass Collected, g	0.0419	0.0291	0.0203	0.0304
Average Isokinetic Variation, %	104.1	101.8	103.6	103.2

Standard Conditions: 68°F, 29.92 in. Hg

3 PROCESS DATA

Production data is presented in Appendix E and summarized in Table 3.1.

During the test period the burner on the plant's aggregate drum dryer was fired with used oil. One composite fuel sample was submitted for analyses. The results of the analysis are presented in Table 3.2.

Table 3.1 Summary of Process Data
River Bend Asphalt Company, Kasota, Minnesota
Asphalt Plant Baghouse Exhaust Test, September 16, 1994

Parameter	Run #1	Run #2	Run #3	Average
Time of Test, hr				
Start	0930	1116	1315	---
Finish	1049	1236	1435	---
Process Weight Rate;				
Aggregate Material, ton/hr	179	179	179	179
Recycle Material, ton/hr	64	64	64	64
Asphalt Material, ton/hr	12	12	12	12
Total Material, ton/hr	255	255	255	255
Material Moisture Content;				
Aggregate Material, % Moisture	5.2	5.0	5.5	5.2
Recycle Material, % Moisture	6.5	6.5	6.9	6.6
Combined Material, % Moisture	5.5	5.4	5.9	5.6
Dryer Gas Temperature, °F	251	250	249	250
Baghouse Pressure Drop, in WC	4.5	4.5	4.5	4.5

Table 3.2 Results of Fuel Analysis (as received basis)
River Bend Asphalt Company, Kasota, Minnesota
Asphalt Plant Baghouse Exhaust Test, September 16, 1994

Gross heating value, Btu/lb	18,501	Organic halogen content, % wt	0.06
Flash point, °F	170	pH	4.72
Ash content, % wt	0.77	Lead (Pb) content, % wt	0.008
Sulfur (S) content, % wt	0.47	PCB content, µg/g	<5

4 TEST PROCEDURES

In order to determine the pollutant emission rate from stationary sources, the Environmental Protection Agency (EPA) has established a series of reference methods which specify the manner in which tests must be performed. These reference methods are found in the Code of Federal Regulations (40 CFR 60) under Title 40 "Protection of the Environment"; Chapter 1 "Environmental Protection Agency"; Subchapter C "Air Programs"; Part 60 "Standards of Performance for New Stationary Sources"; Appendix A "Reference Methods". Unless otherwise noted, the tests presented in this report were performed according to the EPA Reference Methods as revised on July 1, 1993. A brief description of the test procedures used follows.

4.1 SAMPLING POINTS

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. Site specific data is presented in Figure 4.1.

4.2 EFFLUENT VOLUMETRIC FLOW RATE

The effluent volumetric flow rate was determined 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), 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.

4.3 EFFLUENT COMPOSITION AND MOLECULAR WEIGHT

The density of the effluent was determined per EPA Method 3 which is entitled "Gas analysis for the determination of dry molecular weight". One gas sample was collected during each EPA Method 5 particulate test run. The gas samples were 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.

4.4 EFFLUENT MOISTURE CONTENT

The effluent moisture content was determined per EPA Method 4 which is entitled "Determination of moisture content in stack gases". Data for making the gas moisture content determinations 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.

Figure 4.1 Site Description Form
River Bend Asphalt Company, Kasota, Minnesota
Asphalt Plant Baghouse Exhaust Test, September 16, 1994

SAMPLING LOCATION DATA

Stack Cross-Sectional Dimension;
- Depth, inches 48.0
- Width, inches 60.0
- Equivalent diameter, inches 53.3

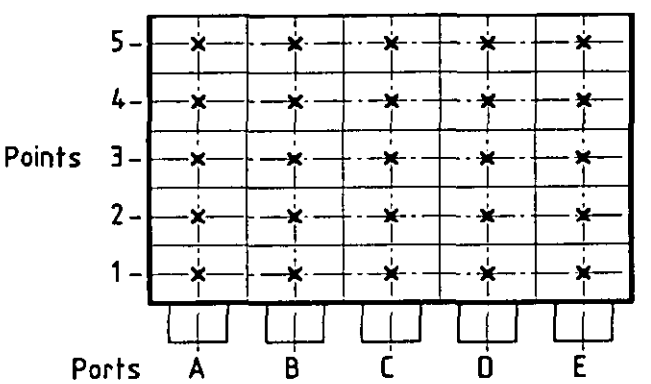
Length of straight, undisturbed flow;
- Before ports, inches 300
- After ports, inches 36
- Before ports, stack diameters 5.6
- After ports, stack diameters 0.7

Number of sampling points;
- Required by EPA Method 1 25
- Actually used 25
  - Number of ports 5
  - Number of points per port 5

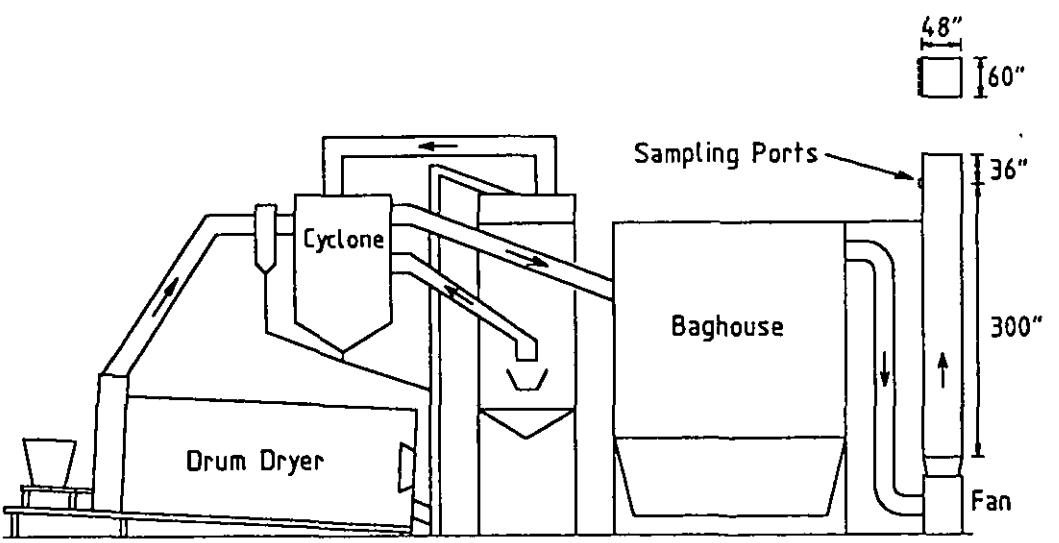
Particulate test sampling time;
- Minutes per point: 3.0
- Minutes per test run: 75.0

SAMPLING POINT LOCATION WITHIN STACK CROSS-SECTION

Point Number	Percent of Traverse	Inches from Wall
1	10.0	4.8
2	30.0	14.4
3	50.0	24.0
4	70.0	33.6
5	90.0	43.2



SAMPLING SITE SCHEMATIC



4.5 EFFLUENT PARTICULATE CONCENTRATION

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 isokinetically withdrawn 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 constant temperature (248±25°F). Water vapor, organic vapors and inorganic vapors which passed through the filter were collected in an impinger trap which was ice-cooled to maintain an exit temperature of not more than 68°F.

The EPA Method 5 sampling train (Figure 4.2) includes a heated sampling probe with attached nozzle, thermocouple and S-type pitot tube. The probe attaches to the front sample case (hot box) which houses a glass cyclone (optional) and an all-glass in-line filter holder in a temperature controlled environment. The front sample case is connected to the back sample case (cold box) which houses a series of glass impingers and a desiccant column in an ice bath. The back sample case is connected to the control unit which contains the sample vacuum pump, gas meter, pressure and temperature indicators and all operating controls.

A representative particulate sample was acquired by sampling for equal periods of time at the center of a number of equal area regions within the stack/duct. At each sampling point the gas velocity head and temperature were measured and the sampling rate rapidly adjusted to isokinetic conditions with the aid of a nomograph or programmable computing device. Sample gas drawn into the nozzle flowed through the probe to the glass fiber filter where the solid particulate matter was collected. The gases then passed through the ice-cooled condenser (impingers and desiccant column) which quantitatively removed all moisture and condensable particulate matter from the gas stream. The gas then passed through the vacuum pump, the dry test gas meter and the calibrated orifice.

Leak checks to detect any dilution air being pulled into the sampling line were performed at the beginning and end of each test run and also when and if any sample line connections were broken.

After completion of each test run, the sampling train was removed to the clean-up area for sample recovery. The filter was removed from the filter holder and placed in Container #1. Particulate matter collected in the nozzle, probe and all connecting glassware in front of the filter was quantitatively transferred to Container #2 by means of a distilled water wash followed by an acetone wash. A stiff brush was used in the probe cleaning step to help dislodge deposits.

The liquid collected in impingers #1, #2 and #3 was measured and transferred to Container #3. These impingers and all connecting pieces between the filter paper and the desiccant column were then rinsed with distilled water and these rinsings were added to Container #3. These same pieces were then rinsed with acetone and these rinsings were placed in Container #4.

The desiccant column was then weighed and its contents transferred to a waste desiccant container. Samples of the rinse solutions (water and acetone) were retained as analytical blanks.

Sample particulate analysis was performed at MMT's laboratory. The filter was dried in a 105°C oven for three hours and then desiccated to a constant weight. The contents of Container #2 were quantitatively transferred to a tared beaker, evaporated at ambient temperature and pressure to near dryness and then desiccated to a constant weight.

Figure 4.2 Particulate Sampling Train Description
River Bend Asphalt Company, Kasota, Minnesota
Asphalt Plant Baghouse Exhaust Test
September 16, 1994

PARTICULATE SAMPLING TRAIN IDENTIFICATION

Sampling Train Manufacturer: ..... MMT Environmental Services, Inc.
Sampling Train Model: ..... Universal Stack Sampler, unit #4

Hot Box Set-up and Operating Temperature;
- Cyclone used: ..... No
- Filter Media: ..... Glass Fiber Filter, Whatman GF/C, 11.0 cm diameter
- Filtration Temperature: ..... 248 ± 25 degrees Fahrenheit

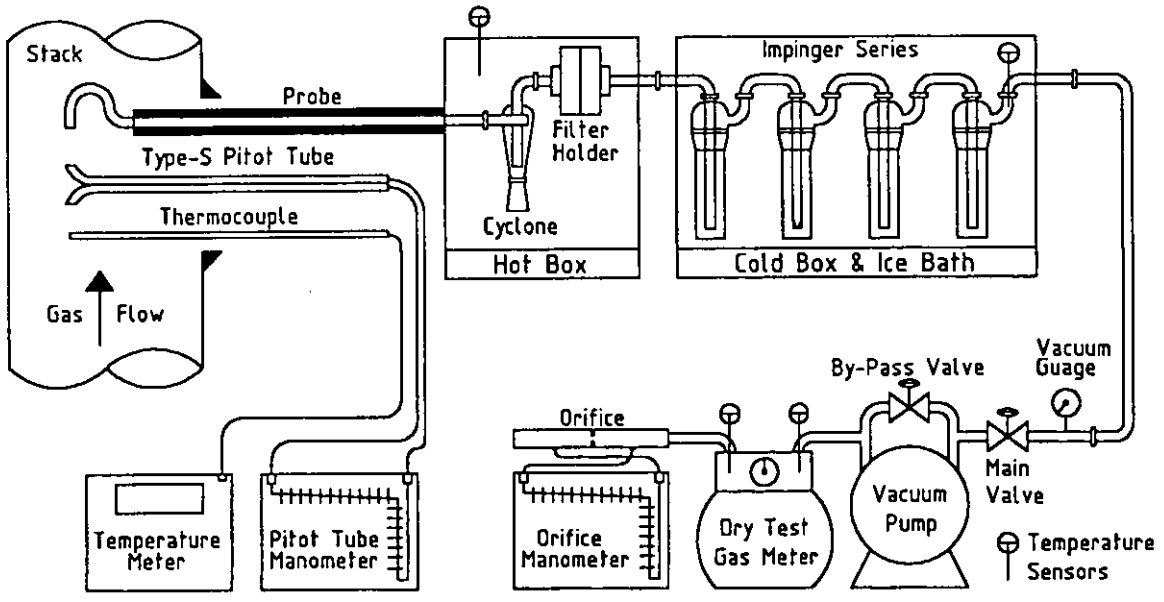
Cold Box Set-up; Impinger Type and Initial Contents
- Impinger #1: ..... Modified Greenburg-Smith design, 100 ml deionized, distilled water
- Impinger #2: ..... Standard Greenburg-Smith design, 100 ml deionized, distilled water
- Impinger #3: ..... Modified Greenburg-Smith design, empty
- Impinger #4: ..... Modified Greenburg-Smith design, ≈ 250 grams silica gel, indicating type

Nozzles Used: ..... MMT #L2, 0.249" diameter, stainless steel

Sampling Probe Used: .... MMT #75, stainless steel liner

Pitot Tube Used: ..... MMT #68, S-type, 0.848 coefficient

PARTICULATE SAMPLING TRAIN SCHEMATIC



The contents of Container #3 were analyzed for condensable organic compounds using the chloroform/ethyl ether extraction procedure described in Minnesota Rule 7011.0725. The collected extract was transferred to a tared beaker, evaporated at ambient temperature and pressure to near dryness and then desiccated to a constant weight. The contents of Container #4 were quantitatively transferred to a tared beaker, evaporated at ambient temperature and pressure to near dryness and then desiccated to a constant weight.

The mass of particulate matter collected and the volume of gas sampled were used to calculate the effluent particulate concentration. The source particulate mass emission rate was calculated by multiplying the effluent particulate concentration by the source volumetric flow rate. Separate calculations were performed for total catch, front catch only (Containers 1 & 2) and back catch only (Containers 3 & 4).

4.6 SOURCE PLUME OPACITY

The source visible emissions were determined by the visual observations of a certified visible emissions evaluator per EPA Method 9 which is entitled "Visual determination of the opacity of emissions from stationary sources".

In this procedure, the observer positions himself at a distance sufficient to provide a clear view of the emissions with the sun oriented in the 140 degree sector to his back. Consistent with this requirement, the observer's line of site was, as much as possible, perpendicular to the plume's direction.

Opacity observations were made at the point of greatest opacity in that portion of the plume where condensed water vapor was not present. Observations were made at 15-second intervals and recorded to the nearest 5 percent opacity.

5 QUALITY ASSURANCE

The project manager is responsible for implementation of the quality assurance program as applied to any specific project.

5.1 SAMPLING QUALITY ASSURANCE

Source sampling quality assurance procedures are implemented to ensure work is performed:

- by competent, trained individuals experienced on the specific methodologies being used
- using properly calibrated equipment
- using approved procedures for sample handling and documentation

All measuring devices (pitot tubes, dry gas meters, thermocouples, portable gas analyzers, etc.) are uniquely identified and calibrated with documented procedures and acceptance criteria before and after each field effort. Records of all calibration data are maintained in the files. Prior to the test program, MMT provides the following:

- filter numbers and tare weights of all filters available for the test
- results of an acetone residue analysis on the acetone to be used during the test
- calibrations of all pitot tubes, dry gas meters, orifice meters, thermocouples and probes

Specific details of MMT's QA program for stationary air pollution sources may be found in "Quality Assurance Handbook for Air Pollution Measurement Systems", Volume III (EPA-600/4-7-027b).

5.2 ANALYTICAL QUALITY CONTROL

MMT maintains a vigorous quality control program for all sample analyses. This program is based on the general guidelines given in "Handbook for Analytical Quality Control in Water and Waste water Laboratories" (EPA-600/4-79-019); March 1979 . This program suggests guidelines in the areas of:

- Laboratory services
- Glassware
- Solvents
- Analytical performance
- Instrument selection
- Reagents
- Gases
- Laboratory safety

Standards and curves are determined for each analysis using the appropriate standard. Least square linear regression calculations are used in determining "best fit" to the data. Correlation coefficients are also calculated.

5.3 CALIBRATION GASES

MMT uses either EPA Protocol 1 or Acublend Certified Master gases (Scott Specialty Gases) when performing all calibrations in order to ensure tolerances on gas concentrations have been verified and are negligible. Certifications of all calibration gas bottles used during testing are presented in each report.

APPENDIX A: CALCULATIONS

DEFINITION OF UNIT ABBREVIATIONS

ACFM	ACTUAL CUBIC FEET PER MINUTE
DEG F	DEGREES FAHRENHEIT
DCF	DRY CUBIC FEET
DSCF	DRY STANDARD CUBIC FEET
DSCFM	DRY STANDARD CUBIC FEET PER MINUTE
FPS	FEET PER SECOND
G	GRAMS
GR/ACF	GRAINS PER ACTUAL CUBIC FOOT
GR/DSCF	GRAINS PER DRY STANDARD CUBIC FOOT
GR/SCF	GRAINS PER STANDARD CUBIC FOOT
IN	INCHES
IN HG	INCHES OF MERCURY
IN WC	INCHES OF WATER
LB/HR	POUNDS PER HOUR
LB/LB-MOLE	POUND PER POUND-MOLE
MIN	MINUTES
ML	MILLILITERS
SCF	STANDARD CUBIC FEET
SCFM	STANDARD CUBIC FEET PER MINUTE
SF	SQUARE FEET
% V/V DRY	PERCENT BY VOLUME, DRY BASIS

DEFINITION OF STANDARD CONDITIONS

STANDARD TEMPERATURE	68 DEGREES FAHRENHEIT
STANDARD PRESSURE	29.92 INCHES OF MERCURY

DEFINITION OF VARIABLES

An .... CROSS-SECTIONAL AREA OF NOZZLE, SF
As .... CROSS-SECTIONAL AREA OF STACK, SF
Bwp ... EFFLUENT MOISTURE CONTENT, PERCENT BY VOLUME
Bws ... EFFLUENT MOISTURE CONTENT, PROPORTION BY VOLUME
Ca* ... EFFLUENT PARTICULATE CONCENTRATION AT ACTUAL CONDITIONS, GR/ACF; *=f,b,t; Caf: FRONT CATCH ONLY; Cab: BACK CATCH ONLY; Cat: TOTAL CATCH
CD .... EFFLUENT CARBON DIOXIDE CONCENTRATION, % V/V DRY
CM .... EFFLUENT CARBON MONOXIDE CONCENTRATION, % V/V DRY
Cp .... PITOT TUBE COEFFICIENT, DIMENSIONLESS
Cs* ... EFFLUENT PARTICULATE CONCENTRATION AT DRY STANDARD CONDITIONS, GR/DSCF; *=f,b,t; Csf: FRONT CATCH ONLY; Csb: BACK CATCH ONLY; Cst: TOTAL CATCH
Cw* ... EFFLUENT PARTICULATE CONCENTRATION AT STANDARD CONDITIONS, GR/SCF; *=f,b,t; Cwf: FRONT CATCH ONLY; Cwb: BACK CATCH ONLY; Cwt: TOTAL CATCH
Dn .... NOZZLE DIAMETER, IN
I ..... ISOKINETIC VARIATION, %
Md .... EFFLUENT MOLECULAR WEIGHT, LB/LB-MOLE, DRY BASIS
Ms .... EFFLUENT MOLECULAR WEIGHT, LB/LB-MOLE, WET BASIS
NI .... EFFLUENT NITROGEN CONCENTRATION, % V/V DRY
OX .... EFFLUENT OXYGEN CONCENTRATION, % V/V DRY
Pb .... BAROMETRIC PRESSURE, IN HG
Pg .... STACK STATIC PRESSURE, IN WC
Po .... AVERAGE PRESSURE DROP ACROSS THE METERING ORIFICE, IN WC
Ps .... STACK ABSOLUTE PRESSURE, IN HG
Pv .... AVERAGE SQUARE-ROOT VELOCITY PRESSURE, IN WC
Qa .... EFFLUENT FLOW RATE AT ACTUAL CONDITIONS, ACFM
Qs .... EFFLUENT FLOW RATE AT STANDARD CONDITIONS, SCFM
Qsd ... EFFLUENT FLOW RATE AT STANDARD CONDITIONS, DRY BASIS, DSCFM
Rc* ... SOURCE PARTICULATE EMISSION RATE, CLASSICAL METHOD, LB/HR; *=f,b,t; Rcf: FRONT CATCH ONLY; Rcb: BACK CATCH ONLY; Rct: TOTAL CATCH
Rr* ... SOURCE PARTICULATE EMISSION RATE, RATIO OF AREAS METHOD, LB/HR; *=f,b,t; Rrf: FRONT CATCH ONLY; Rrb: BACK CATCH ONLY; Rrt: TOTAL CATCH
Sl .... STACK DIAMETER OR LENGTH, IN
Sw .... STACK WIDTH, IN
Ti .... TOTAL SAMPLING TIME, MIN
Tm .... AVERAGE DRY GAS METER TEMPERATURE, DEG F
Ts .... AVERAGE EFFLUENT TEMPERATURE, DEG F
Vl .... VOLUME OF LIQUID COLLECTED, ML
Vm .... VOLUME OF GAS SAMPLED AT METER CONDITIONS, DCF
Vms ... VOLUME OF GAS SAMPLED AT STANDARD CONDITIONS, DSCF
Vs .... AVERAGE EFFLUENT VELOCITY, FPS
Vw .... VOLUME OF WATER VAPOR COLLECTED AT STANDARD CONDITIONS, SCF
Wb .... MASS OF PARTICULATE MATTER COLLECTED IN THE BACK (WET) CATCH, G
Wf .... MASS OF PARTICULATE MATTER COLLECTED IN THE FRONT (DRY) CATCH, G
Wt .... TOTAL MASS OF PARTICULATE MATTER COLLECTED, G
Y ..... DRY GAS METER COEFFICIENT, DIMENSIONLESS

EQUATIONS USED TO CALCULATE PARTICULATE EMISSIONS

```
An = 0.005454154 * Dn * Dn

As = 0.005454154 * Sl * Sl      (FOR ROUND STACKS)

As = Sl * Sw / 144.0      (FOR RECTANGULAR STACKS)

Ps = Pb + Pg/13.6

NI = 100.0 - CD - OX - CM

Wt = Wf + Wb

Vms = (528/29.92) * Vm * Y * (Pb + Po/13.6) / (Tm + 460.0)

Vw = 0.04707 * Vl

Bws = Vw / (Vw + Vms)

Bwp = 100.0 * Bws

Md = 0.440 * CD  +  0.320 * OX  + 0.280 * (NI + CM)

Ms = Md * (1.0 - Bws)  +  18.0 * Bws

Vs = 85.49 * Cp * Pv * SQRT( (Ts+460.0)/(Ms*Ps) )

Qa = 60.0 * Vs * As

Qs = Qa * (528/29.92) * Ps / (Ts + 460.0)

Qsd = Qs * (1.0 - Bws)

I = 0.09450 * (Ts+460.0) * Vms / (Ps * Vs * An * Ti * (1.0-Bws) )

Csf = 15.42 * Wf / Vws
Csb = 15.42 * Wb / Vws
Cst = 15.42 * Wt / Vws

Cwf = Csf / (1.0 - Bws)
Cwb = Csb / (1.0 - Bws)
Cwt = Cst / (1.0 - Bws)

Caf = Cwf * (29.92/528.0) * (Ts+460.0) / Ps
Cab = Cwb * (29.92/528.0) * (Ts+460.0) / Ps
Cat = Cwt * (29.92/528.0) * (Ts+460.0) / Ps

Rcf = 0.008578 * Csf * Qsd
Rcb = 0.008578 * Csb * Qsd
Rct = 0.008578 * Cst * Qsd

Rrf = 0.008578 * Csf * (Vms/Ti) * (As/An)
Rrb = 0.008578 * Csb * (Vms/Ti) * (As/An)
Rrt = 0.008578 * Cst * (Vms/Ti) * (As/An)
```

TRAVERSE POINT DATA SUMMARY AND VELOCITY PROFILE

PROJECT NUMBER: 9616 COMPANY: RIVER BEND ASPHALT CO.
TEST NUMBER: 1 SOURCE: BAGHOUSE EXHAUST
RUN NUMBER: 1 TIME: 9/16/94 0930-1049

SAMPLING LOCATION PORT	POINT	TRAVERSE POINT DATA: VELOCITY PRESSURE IN WC	ORIFICE PRESSURE IN WC	TEMPERATURE, DEG.F: STACK GAS	METER INLET	METER OUTLET	VELOCITY PROFILE: SQRT VELOCITY PRESSURE	GAS VELOCITY FT/SEC
A	1	0.5100	0.970	239	60	60	0.714	50.01
A	2	0.5200	0.990	244	62	60	0.721	50.68
A	3	0.5400	1.000	243	63	60	0.735	51.60
A	4	0.6100	1.200	245	65	60	0.781	54.93
A	5	0.6000	1.100	242	66	60	0.775	54.36
B	1	0.4900	0.930	240	66	60	0.700	49.05
B	2	0.4500	0.850	244	67	61	0.671	47.14
B	3	0.4100	0.780	247	68	61	0.640	45.09
B	4	0.5100	0.970	249	69	61	0.714	50.36
B	5	0.5600	1.100	248	69	62	0.748	52.74
C	1	0.4200	0.800	245	68	62	0.648	45.58
C	2	0.3900	0.740	246	68	62	0.624	43.95
C	3	0.4100	0.780	246	68	62	0.640	45.06
C	4	0.4800	0.910	246	69	63	0.693	48.76
C	5	0.5700	1.100	245	70	63	0.755	53.09
D	1	0.3500	0.660	241	68	64	0.592	41.49
D	2	0.3400	0.640	241	68	63	0.583	40.89
D	3	0.4100	0.780	243	68	63	0.640	44.97
D	4	0.5800	1.100	243	70	64	0.762	53.48
D	5	0.6200	1.200	243	70	64	0.787	55.29
E	1	0.2800	0.530	240	70	64	0.529	37.08
E	2	0.3300	0.630	238	69	64	0.574	40.20
E	3	0.4200	0.800	240	70	64	0.648	45.41
E	4	0.5400	1.000	242	71	64	0.735	51.57
E	5	0.6400	1.200	242	72	65	0.800	56.14
AVERAGE		0.4792	0.910	243	68	62	0.688	48.35

PARTICULATE EMISSION TEST CALCULATIONS

PROJECT NUMBER: 9616 COMPANY: RIVER BEND ASPHALT CO.
TEST NUMBER: 1 SOURCE: BAGHOUSE EXHAUST
RUN NUMBER: 1 TIME: 9/16/94 0930-1049

TEST DATA

GAS METER COEFFICIENT	1.0013	Y	VOLUME OF LIQUID COLLECTED, ML	336.3	Vl
PITOT TUBE COEFFICIENT	0.848	Cp			
NOZZLE DIMENSIONS;			GAS COMPOSITION, % V/V DRY;		
DIAMETER, IN	0.249	Dn	CARBON DIOXIDE	4.93	CD
AREA, SF	0.000338	An	OXYGEN	14.87	OX
			CARBON MONOXIDE	0.00	CM
			NITROGEN (BY DIFFERENCE)	80.20	NI
STACK DIMENSIONS;					
DIAMETER/LENGTH, IN	48.00	Sl	AVE. TRAVERSE POINT DATA;		
WIDTH, IN	60.00	Sw	STACK TEMP., DEG F	243	Ts
AREA, SF	20.000	As	METER TEMP., DEG F	65	Tm
			ORIFICE PRESSURE, IN WC	0.910	Po
BAROMETRIC PRESSURE, IN HG	28.71	Pb	SQRT VELOCITY P., IN WC	0.688	Pv
STACK PRESSURES;			MASS OF PARTICULATE MATTER		
STATIC, IN WC	-0.26	Pg	COLLECTED, G;		
ABSOLUTE, IN HG	28.69	Ps	FRONT CATCH (62.5%)	0.0262	Wf
			BACK CATCH (37.5%)	0.0157	Wb
SAMPLING TIME, MIN	75.00	Ti	TOTAL CATCH	0.0419	Wt
VOLUME OF GAS SAMPLED AT METER, DCF	40.541	Vm			

CALCULATED RESULTS

VOLUME OF GAS SAMPLED AT METER, DSCF	39.266	Vms	GAS MOLECULAR WEIGHT;		
			DRY BASIS, LB/LB-MOLE	29.38	Md
			WET BASIS, LB/LB-MOLE	26.11	Ms
EQUIVALENT VOLUME OF WATER VAPOR COLLECTED, SCF	15.830	Vw	AVERAGE GAS VELOCITY, FPS	48.35	Vs
GAS MOISTURE CONTENT;			GAS VOLUMETRIC FLOW RATE;		
VOLUME FRACTION	0.2873	Bws	ACTUAL, ACFM	58024	Qa
PERCENT BY VOLUME	28.73	Bwp	STANDARD, SCFM	41773	Qs
			DRY STANDARD, DSCFM	29771	Qsd
			ISOKINETIC VARIATION, %	104.07	I

PARTICULATE EMISSION PARAMETER	FRONT CATCH	BACK CATCH	TOTAL CATCH
PARTICULATE CONCENTRATION			
ACTUAL, GR/ACF	0.0053 Caf	0.0032 Cab	0.0084 Cat
STANDARD, GR/SCF	0.0073 Cwf	0.0044 Cwb	0.0117 Cwt
DRY STANDARD, GR/DSCF	0.0103 Csf	0.0062 Csb	0.0165 Cst
PARTICULATE EMISSION RATE, LB/HR			
CLASSICAL METHOD	2.63 Rcf	1.57 Rcb	4.20 Rct
RATIO OF AREAS METHOD	2.73 Rrf	1.64 Rrb	4.37 Rrt

STANDARD CONDITIONS: 68 DEG F, 29.92 IN HG * NON-APPLICABLE DATA

TRAVERSE POINT DATA SUMMARY AND VELOCITY PROFILE

PROJECT NUMBER: 9616 COMPANY: RIVER BEND ASPHALT CO.
TEST NUMBER: 1 SOURCE: BAGHOUSE EXHAUST
RUN NUMBER: 2 TIME: 9/16/94 1116-1236

		TRAVERSE POINT DATA					VELOCITY PROFILE	
SAMPLING LOCATION PORT	POINT	VELOCITY PRESSURE IN WC	ORIFICE PRESSURE IN WC	TEMPERATURE, DEG.F STACK GAS	METER INLET	METER OUTLET	SQRT VELOCITY PRESSURE	GAS VELOCITY FT/SEC
A	1	0.5700	1.100	242	66	66	0.755	53.10
A	2	0.6100	1.200	244	67	66	0.781	55.00
A	3	0.6000	1.100	244	69	66	0.775	54.55
A	4	0.6400	1.200	244	71	66	0.800	56.34
A	5	0.5900	1.100	243	73	66	0.768	54.06
B	1	0.5200	0.980	241	72	67	0.721	50.68
B	2	0.5400	1.000	242	73	67	0.735	51.68
B	3	0.4700	0.890	244	74	67	0.686	48.28
B	4	0.5100	0.960	245	74	67	0.714	50.33
B	5	0.5700	1.100	246	75	68	0.755	53.25
C	1	0.4200	0.790	243	74	69	0.648	45.61
C	2	0.3300	0.620	244	75	69	0.574	40.46
C	3	0.4000	0.750	243	75	69	0.632	44.51
C	4	0.4900	0.920	244	75	69	0.700	49.30
C	5	0.5700	1.100	243	75	69	0.755	53.13
D	1	0.3500	0.660	241	74	70	0.592	41.58
D	2	0.3600	0.680	238	74	70	0.600	42.08
D	3	0.3800	0.720	240	75	70	0.616	43.29
D	4	0.5900	1.100	239	75	70	0.768	53.90
D	5	0.6400	1.200	244	76	70	0.800	56.34
E	1	0.2900	0.550	239	74	70	0.539	37.79
E	2	0.4000	0.750	235	75	70	0.632	44.26
E	3	0.4500	0.850	237	75	70	0.671	47.01
E	4	0.5700	1.100	236	76	70	0.755	52.87
E	5	0.6500	1.200	239	76	70	0.806	56.58
AVERAGE		0.5004	0.945	242	74	68	0.703	49.44

PARTICULATE EMISSION TEST CALCULATIONS

PROJECT NUMBER: 9616 COMPANY: RIVER BEND ASPHALT CO.
TEST NUMBER: 1 SOURCE: BAGHOUSE EXHAUST
RUN NUMBER: 2 TIME: 9/16/94 1116-1236

TEST DATA

GAS METER COEFFICIENT	1.0013	Y	VOLUME OF LIQUID COLLECTED, ML	332.8	Vl
PITOT TUBE COEFFICIENT	0.848	Cp			
NOZZLE DIMENSIONS;			GAS COMPOSITION, % V/V DRY;		
DIAMETER, IN	0.249	Dn	CARBON DIOXIDE	4.90	CD
AREA, SF	0.000338	An	OXYGEN	14.23	OX
			CARBON MONOXIDE	0.00	CM
			NITROGEN (BY DIFFERENCE)	80.87	NI
STACK DIMENSIONS;			AVE. TRAVERSE POINT DATA;		
DIAMETER/LENGTH, IN	48.00	Sl	STACK TEMP., DEG F	242	Ts
WIDTH, IN	60.00	Sw	METER TEMP., DEG F	71	Tm
AREA, SF	20.000	As	ORIFICE PRESSURE, IN WC	0.945	Po
BAROMETRIC PRESSURE, IN HG	28.58	Pb	SQRT VELOCITY P., IN WC	0.703	Pv
STACK PRESSURES;			MASS OF PARTICULATE MATTER COLLECTED, G;		
STATIC, IN WC	-0.25	Pg	FRONT CATCH (57.7%)	0.0168	Wf
ABSOLUTE, IN HG	28.56	Ps	BACK CATCH (42.3%)	0.0123	Wb
SAMPLING TIME, MIN	75.00	Ti	TOTAL CATCH	0.0291	Wt
VOLUME OF GAS SAMPLED AT METER, DCF	41.228	Vm			

CALCULATED RESULTS

VOLUME OF GAS SAMPLED AT METER, DSCF	39.307	Vms	GAS MOLECULAR WEIGHT;		
			DRY BASIS, LB/LB-MOLE	29.35	Md
			WET BASIS, LB/LB-MOLE	26.12	Ms
EQUIVALENT VOLUME OF WATER VAPOR COLLECTED, SCF	15.665	Vw	AVERAGE GAS VELOCITY, FPS	49.44	Vs
GAS MOISTURE CONTENT;			GAS VOLUMETRIC FLOW RATE;		
VOLUME FRACTION	0.2850	Bws	ACTUAL, ACFM	59322	Qa
PERCENT BY VOLUME	28.50	Bwp	STANDARD, SCFM	42617	Qs
			DRY STANDARD, DSCFM	30473	Qsd
			ISOKINETIC VARIATION, %	101.78	I

PARTICULATE EMISSION PARAMETER	FRONT CATCH	BACK CATCH	TOTAL CATCH
PARTICULATE CONCENTRATION			
ACTUAL, GR/ACF	0.0034 Caf	0.0025 Cab	0.0059 Cat
STANDARD, GR/SCF	0.0047 Cwf	0.0035 Cwb	0.0082 Cwt
DRY STANDARD, GR/DSCF	0.0066 Csf	0.0048 Csb	0.0114 Cst
PARTICULATE EMISSION RATE, LB/HR			
CLASSICAL METHOD	1.72 Rcf	1.26 Rcb	2.98 Rct
RATIO OF AREAS METHOD	1.75 Rrf	1.28 Rrb	3.04 Rrt

STANDARD CONDITIONS: 68 DEG F, 29.92 IN HG * NON-APPLICABLE DATA

TRAVERSE POINT DATA SUMMARY AND VELOCITY PROFILE

PROJECT NUMBER: 9616 COMPANY: RIVER BEND ASPHALT CO.
TEST NUMBER: 1 SOURCE: BAGHOUSE EXHAUST
RUN NUMBER: 3 TIME: 9/16/94 1315-1435

		TRAVERSE POINT DATA					VELOCITY PROFILE	
SAMPLING LOCATION PORT	POINT	VELOCITY PRESSURE IN WC	ORIFICE PRESSURE IN WC	TEMPERATURE, DEG.F STACK GAS	METER INLET	METER OUTLET	SQRT VELOCITY PRESSURE	GAS VELOCITY FT/SEC
A	1	0.5900	1.100	239	70	70	0.768	54.23
A	2	0.6400	1.200	241	72	70	0.800	56.56
A	3	0.6500	1.300	242	74	70	0.806	57.05
A	4	0.6100	1.200	242	76	70	0.781	55.26
A	5	0.6300	1.200	244	77	70	0.794	56.24
B	1	0.5500	1.100	241	77	71	0.742	52.44
B	2	0.4900	0.940	243	78	71	0.700	49.56
B	3	0.4600	0.880	244	78	71	0.678	48.06
B	4	0.4900	0.940	245	79	72	0.700	49.63
B	5	0.5400	1.000	245	79	72	0.735	52.11
C	1	0.5300	1.000	241	79	73	0.728	51.47
C	2	0.4100	0.790	241	79	73	0.640	45.27
C	3	0.3900	0.750	243	79	73	0.624	44.22
C	4	0.4800	0.920	243	80	73	0.693	49.06
C	5	0.5800	1.100	244	80	73	0.762	53.96
D	1	0.4400	0.840	240	78	72	0.663	46.87
D	2	0.3600	0.690	239	79	73	0.600	42.36
D	3	0.4300	0.820	237	79	72	0.656	46.23
D	4	0.5500	1.100	238	79	72	0.742	52.32
D	5	0.6600	1.300	239	79	72	0.812	57.36
E	1	0.2800	0.540	232	77	72	0.529	37.17
E	2	0.3300	0.630	235	78	72	0.574	40.44
E	3	0.4100	0.790	237	78	72	0.640	45.14
E	4	0.6100	1.200	239	78	72	0.781	55.14
E	5	0.6500	1.300	240	79	73	0.806	56.96
AVERAGE		0.5104	0.985	241	78	72	0.710	50.20

PARTICULATE EMISSION TEST CALCULATIONS

PROJECT NUMBER: 9616 COMPANY: RIVER BEND ASPHALT CO.
TEST NUMBER: 1 SOURCE: BAGHOUSE EXHAUST
RUN NUMBER: 3 TIME: 9/16/94 1315-1435

TEST DATA

GAS METER COEFFICIENT	1.0013 Y	VOLUME OF LIQUID COLLECTED, ML	351.3 Vl
PITOT TUBE COEFFICIENT	0.848 Cp		
NOZZLE DIMENSIONS;		GAS COMPOSITION, % V/V DRY;	
DIAMETER, IN	0.249 Dn	CARBON DIOXIDE	5.03 CD
AREA, SF	0.000338 An	OXYGEN	14.40 OX
		CARBON MONOXIDE	0.00 CM
		NITROGEN (BY DIFFERENCE)	80.57 NI
STACK DIMENSIONS;			
DIAMETER/LENGTH, IN	48.00 Sl	AVE. TRAVERSE POINT DATA;	
WIDTH, IN	60.00 Sw	STACK TEMP., DEG F	241 Ts
AREA, SF	20.000 As	METER TEMP., DEG F	75 Tm
		ORIFICE PRESSURE, IN WC	0.985 Po
BAROMETRIC PRESSURE, IN HG	28.32 Pb	SQRT VELOCITY P., IN WC	0.710 Pv
STACK PRESSURES;		MASS OF PARTICULATE MATTER	
STATIC, IN WC	-0.29 Pg	COLLECTED, G;	
ABSOLUTE, IN HG	28.30 Ps	FRONT CATCH (71.4%)	0.0145 Wf
		BACK CATCH (28.6%)	0.0058 Wb
SAMPLING TIME, MIN	75.00 Ti	TOTAL CATCH	0.0203 Wt
VOLUME OF GAS SAMPLED AT METER, DCF	42.444 Vm		

CALCULATED RESULTS

VOLUME OF GAS SAMPLED AT METER, DSCF	39.824 Vms	GAS MOLECULAR WEIGHT;	
		DRY BASIS, LB/LB-MOLE	29.38 Md
		WET BASIS, LB/LB-MOLE	26.04 Ms
EQUIVALENT VOLUME OF WATER VAPOR COLLECTED, SCF	16.536 Vw	AVERAGE GAS VELOCITY, FPS	50.20 Vs
GAS MOISTURE CONTENT;		GAS VOLUMETRIC FLOW RATE;	
VOLUME FRACTION	0.2934 Bws	ACTUAL, ACFM	60240 Qa
PERCENT BY VOLUME	29.34 Bwp	STANDARD, SCFM	42942 Qs
		DRY STANDARD, DSCFM	30343 Qsd
		ISOKINETIC VARIATION, %	103.56 I

PARTICULATE EMISSION PARAMETER	FRONT CATCH	BACK CATCH	TOTAL CATCH
PARTICULATE CONCENTRATION			
ACTUAL, GR/ACF	0.0028 Caf	0.0011 Cab	0.0040 Cat
STANDARD, GR/SCF	0.0040 Cwf	0.0016 Cwb	0.0056 Cwt
DRY STANDARD, GR/DSCF	0.0056 Csf	0.0022 Csb	0.0079 Cst
PARTICULATE EMISSION RATE, LB/HR			
CLASSICAL METHOD	1.46 Rcf	0.58 Rcb	2.05 Rct
RATIO OF AREAS METHOD	1.51 Rrf	0.60 Rrb	2.12 Rrt

STANDARD CONDITIONS: 68 DEG F, 29.92 IN HG * NON-APPLICABLE DATA

TABLE SUMMARY OF PARTICULATE EMISSION TEST RESULTS

PROJECT NUMBER: 9616 COMPANY: RIVER BEND ASPHALT CO.
TEST NUMBER: 1 SOURCE: BAGHOUSE EXHAUST

TEST PARAMETER	RUN 1	RUN 2	RUN 3
TEST DATE	9/16/94	9/16/94	9/16/94
TIME OF TEST, HR;			
START	0930	1116	1315
FINISH	1049	1236	1435
EFFLUENT TEMPERATURE, DEGREES F	243	242	241
BAROMETRIC PRESSURE, IN HG	28.71	28.58	28.32
EFFLUENT MOISTURE CONTENT, % V/V	28.7	28.5	29.3
EFFLUENT COMPOSITION, % V/V DRY;			
CARBON DIOXIDE	4.9	4.9	5.0
OXYGEN	14.9	14.2	14.4
CARBON MONOXIDE	0.0	0.0	0.0
EFFLUENT VOLUMETRIC FLOW RATE;			
ACTUAL CONDITIONS, ACFM	58024	59322	60240
STANDARD CONDITIONS, SCFM	41773	42617	42942
DRY STANDARD CONDITIONS, DSCFM	29771	30473	30343
ISOKINETIC VARIATION, %	104.1	101.8	103.6
EFFLUENT PARTICULATE CONCENTRATION;			
EFFLUENT FRONT HALF PARTICULATE CONCENTRATION;			
ACTUAL CONDITIONS, GR/ACF	0.0053	0.0034	0.0028
STANDARD CONDITIONS, GR/SCF	0.0073	0.0047	0.0040
DRY STANDARD CONDITIONS, GR/DSCF	0.0103	0.0066	0.0056
EFFLUENT BACK HALF PARTICULATE CONCENTRATION;			
ACTUAL CONDITIONS, GR/ACF	0.0032	0.0025	0.0011
STANDARD CONDITIONS, GR/SCF	0.0044	0.0035	0.0016
DRY STANDARD CONDITIONS, GR/DSCF	0.0062	0.0048	0.0022
EFFLUENT TOTAL PARTICULATE CONCENTRATION;			
ACTUAL CONDITIONS, GR/ACF	0.0084	0.0059	0.0040
STANDARD CONDITIONS, GR/SCF	0.0117	0.0082	0.0056
DRY STANDARD CONDITIONS, GR/DSCF	0.0165	0.0114	0.0079
SOURCE PARTICULATE EMISSION RATE;			
CLASSICAL METHOD, LB/HR	4.20	2.98	2.05
RATIO OF AREAS METHOD, LB/HR	4.37	3.04	2.12

PARTICULATE CONCENTRATION AND EMISSION RATES BASED ON ANALYSIS OF THE SAMPLING TRAIN FRONT AND BACK CATCHES.

STANDARD CONDITIONS: 68 DEGREES FAHRENHEIT, 29.92 INCHES OF MERCURY.

VOLUMETRIC FLOW RATE CALCULATION

PROJECT NUMBER: 9616 COMPANY: RIVERBEND
TEST DATE: 9-16-94 SOURCE: BAGHOUSE OUTLET

Preliminary Flow Rate Determination

DUCT DIMENSIONS:		
LENGTH, INCHES	60.00	LN
WIDTH, INCHES	48.00	WD
CROSS-SECTIONAL AREA, SQ FT	20.000	AR
EFFLUENT TEMPERATURE, DEG F	240	TS
MOISTURE CONTENT DETERMINATION:		
EFFLUENT WET BULB TEMPERATURE, DEG F	155	TW
EFFLUENT DEW POINT TEMPERATURE, DEG F	151	TD
EFFLUENT RELATIVE HUMIDITY, %	15.3	RH
EFFLUENT MOISTURE CONTENT, % V/V	27.0	MC
DUCT PRESSURES;		
BAROMETRIC PRESSURE, IN HG	28.65	PB
STATIC PRESSURE, IN WC	-0.35	PS
ABSOLUTE PRESSURE, IN WC	28.62	PA
EFFLUENT COMPOSITION;		
CARBON DIOXIDE CONTENT, % V/V DRY	5.0	CD
OXYGEN CONTENT, % V/V DRY	14.5	OX
EFFLUENT MOLECULAR WEIGHT;		
DRY BASIS, LB/LB-MOLE	29.38	MD
WET BASIS, LB/LB-MOLE	26.31	MS
PITOT TUBE COEFFICIENT	0.848	CP

EFFLUENT VELOCITY PRESSURES, IN WC;

POINT	PORT A	PORT B	PORT C	PORT D	PORT E
1	0.530	0.650	0.490	0.400	0.290
2	0.540	0.610	0.450	0.390	0.370
3	0.520	0.550	0.470	0.400	0.410
4	0.550	0.480	0.490	0.450	0.490
5	0.520	0.490	0.470	0.590	0.600

AVE. SQUARE-ROOT VELOCITY PRESSURE, IN WC	0.70	PV
EFFLUENT AVERAGE VELOCITY, FT/SEC	48.645	VS
EFFLUENT VOLUMETRIC FLOW RATE:		
ACTUAL, ACFM	58374	FA
STANDARD, SCFM	42131	FW
DRY STANDARD, DSCFM	30749	FD

EQUATIONS USED TO CALCULATE THE VOLUMETRIC FLOW RATE

AR = LN * WD / 144.0

PA = PB + PS/13.6

MD = 0.44*CD + 0.32*OX + 0.28*(100-CD-OX)

MS = MD*(1-MC/100) + 0.18*MC

VS = 85.48 * CP * PV * SQRT((460+TS)/(MS*PA))

FA = 60 * VS * AR

FW = 17.65 * FA * PA / (TS+460)

FD = FW * (1-MC/100)

STANDARD CONDITIONS: 68 DEG F, 29.92 IN HG

TABLE ANALYSIS OF VISIBLE EMISSION TEST DATA

PROJECT NUMBER: 9616
DATE TESTED: 9-16-94
TIME OF TEST: 1125

COMPANY: RIVERBEND ASPHALT CO.
SOURCE: BAGHOUSE OUTLET
OBSERVER: MR. ALAN TROWBRIDGE
RE-CERTIFICATION DATE: 10-5-94

Concurrent With Test-Run # 1-2

PLUME OPACITY OBSERVATIONS

MIN-UTE	** 00	SECONDS 15	30	45	MIN-UTE	** 00	SECONDS 15	30	45	MIN-UTE	** 00	SECONDS 15	30	45
0	0	0	0	0	20	0	0	0	0	40	0	0	0	0
1	0	0	0	0	21	0	0	0	0	41	0	0	0	0
2	0	0	0	0	22	0	0	0	0	42	0	0	0	0
3	0	0	0	0	23	0	0	0	0	43	0	0	0	0
4	0	0	0	0	24	0	0	0	0	44	0	0	0	0
5	0	0	0	0	25	0	0	0	0	45	0	0	0	0
6	0	0	0	0	26	0	0	0	0	46	0	0	0	0
7	0	0	0	0	27	0	0	0	0	47	0	0	0	0
8	0	0	0	0	28	0	0	0	0	48	0	0	0	0
9	0	0	0	0	29	0	0	0	0	49	0	0	0	0
10	0	0	0	0	30	0	0	0	0	50	0	0	0	0
11	0	0	0	0	31	0	0	0	0	51	0	0	0	0
12	0	0	0	0	32	0	0	0	0	52	0	0	0	0
13	0	0	0	0	33	0	0	0	0	53	0	0	0	0
14	0	0	0	0	34	0	0	0	0	54	0	0	0	0
15	0	0	0	0	35	0	0	0	0	55	0	0	0	0
16	0	0	0	0	36	0	0	0	0	56	0	0	0	0
17	0	0	0	0	37	0	0	0	0	57	0	0	0	0
18	0	0	0	0	38	0	0	0	0	58	0	0	0	0
19	0	0	0	0	39	0	0	0	0	59	0	0	0	0

SUMMARY OF TEST DATA

PLUME OPACITY %	PERCENT OF TIME AT OPACITY	PERCENT OF TIME OPACITY EXCEEDED
0	100.00	0.00
5	0.00	0.00
10	0.00	0.00
15	0.00	0.00
20	0.00	0.00
25	0.00	0.00
30	0.00	0.00
35	0.00	0.00
40	0.00	0.00
45	0.00	0.00
50	0.00	0.00
55	0.00	0.00
60	0.00	0.00
65	0.00	0.00
70	0.00	0.00
75	0.00	0.00
80	0.00	0.00
85	0.00	0.00
90	0.00	0.00
95	0.00	0.00
100	0.00	0.00

OPACITY RANGE,%	TIME OPACITY IN RANGE % OF TIME	MIN/HR
0 - 20	100.00	60.00
25 - 40	0.00	0.00
45 - 60	0.00	0.00
> 60	0.00	0.00

MAXIMUM OBSERVED OPACITY, %: 0
MINIMUM OBSERVED OPACITY, %: 0
ARITHMETIC MEAN OPACITY, %: 0.0

SIX-MINUTE AVERAGE OPACITY, %

MAXIMUM:	0.0	(54:00-59:45)
2nd LARGEST:	0.0	(48:00-53:45)
3rd LARGEST:	0.0	(42:00-47:45)
4th LARGEST:	0.0	(36:00-41:45)
5th LARGEST:	0.0	(30:00-35:45)

APPENDIX B: FIELD DATA FORMS

SOURCE EMISSION TEST
SITE DESCRIPTION DATA SHEET

TRAVERSE POINT LOCATION		
Traverse Point Number	Port Length: 3.5" Inches From Wall	Inches From Port
1	4.8	8.3
2	14.4	17.9
3	24.0	27.5
4	33.6	37.1
5	43.2	46.7
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

PRELIMINARY TRAVERSE DATA	
Effluent Temperature, °F:	
Ave. Velocity Pressure, IN WC:	

MMT Job Number: 9616 Date: Sept. 1994

Company: River Bend Asphalt Company

Address: P.O. Box 217 Kasota, MN 56050

Source: Baghouse Exhaust

Source Cross-sectional Dimensions

Round Duct; diameter: Not Applicable

Rectangular Duct;

Length: Depth = 48 inches

Width: 60 inches

Equivalent diameter: 53.33" = 4.44 ft

De = 2LW/(L+W)

Distance to Nearest Flow Disturbance;

Before Ports: 25' = 5.63 diameters

36" After Ports: 3' = 0.68 diameters

Number of Sampling Points;

Required by EPA Method 1: 25

Actually Used: 25

Number of ports: 5 ✓

Points per port: 5 ✓

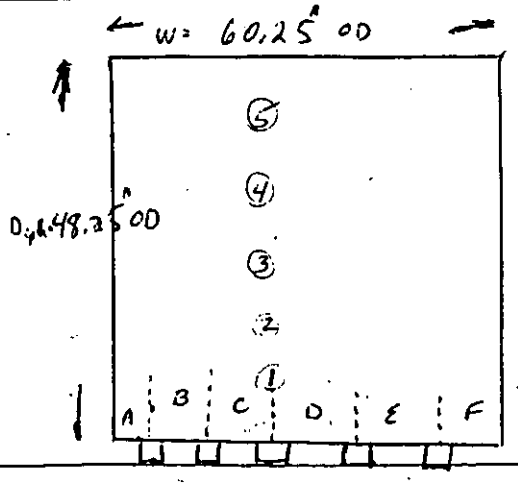
Sampling Time;

Minutes per Point:

Minutes per Test Run:

SITE SKETCH AND COMMENTS

A = 10
B = 10
C = 10
D = 10
E = 10
F = 10



Port depth = 3.5 inches
Ports ID: 3" female N.P.T.

EPA METHOD 2: VOLUMETRIC FLOW RATE DETERMINATION

Field Data Sheet

MMT Job Number: 96116
Date: Friday 9.16.94
Company: River Bend Asphalt Co.
Source: Baghouse Exhaust
Dimensions, inches: 60 x 48
Test Team Members: AT-BA-TG
Test No.: 0 Run No.: Prelim.

Ambient Temperature, °F: 62
Barometric Pressure, in. Hg.: 28.65
Static Pressure, in. WC: -0.35
Dry Bulb Temp., °F: 240
Wet Bulb Temp., °F: 155
Relative Humidity, %:
Moisture Content, %: 26.92 = 27 %

VELOCITY TRAVERSE: Time: 0840 Pitot Tube No: 68 Coefficient: A=.848

Traverse Point Number	Inches From Wall	Inches From Port	PORT A ΔP in. H2O	PORT A Temp. °F	PORT B ΔP in. H2O	PORT B Temp. °F	PORT C ΔP in. H2O	PORT C Temp. °F	PORT D ΔP in. H2O	PORT D Temp °F
			~~East~~ Port	Port	Port	Port	~~West~~ Port			
1	4.8	8.3	.53	.65	.49	.40	.38		.29	
2	14.4	17.9	.54	.61	.45	.39	.38		.37	
3	24.0	27.5	.52	.55	.47	.40	.40		.41	
4	33.6	37.1	.55	.48	.49	.45	.50		.49	
5	43.2	46.7	.52	.49	.47	.59	.48		.60	

Average Velocity Pressure, in. W.C = .50 = .488 .49
Minimum V.P. in. W.C. = .29
Maximum V.P. in. W.C. = .65
5 % O2
14.5 % O2
Ideal Nozzle Diameter, @ inches = .281
Actual Nozzle Diameter inches @ = .249 "@
Nozzle Identification = L2

		L2	S2					
Nozzle dia.	=	.249	.30	.249				
est. vol. per point	=	1.37	1.99	1.09				
est. vol. per test	=	34.25	49.5	41				
test minutes	=	62.5	62.5	75				
x Delta H	=	.92	1.95					
max ° H	=	1.23	2.6					

.25 x 2.5 = 62.5

FORM: ~~S-FD-2b~~

SOURCE EMISSION TEST
FIELD DATA SHEET

TEST: 1	RUN: 1
Page 1 of 2	

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH PARAMETERS
MMT Job Number: 9616	Control Unit No.: 4	ΔH@ 1.856
Date: Friday 9.16.94	Gas Meter Coefficient: 0.996	TM 72
Company: River Bend Asphalt Company	Sample Box No.: 4	MC 27
Source: Baghouse Exhaust	Probe No.: 75 Length: 75 inches	PS/PM = 1.0
Source Dimensions: 48 x 60 inches	Pitot No.: 68 Coefficient: A = .848	C .946
Test Team: AT-BA-TG	Nozzle No.: 22 Diameter: .249" ø	TS 240
Test Procedure: EPA 1-5	Filter No.: 8890	R
Ambient Temp., °F: 61	Barometric Pressure, in.Hg: 28.71 sh. 28.70	Static Pressure, in.WC: -.26 -.26

theoretical vol. cf	CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME min.	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ΔH, in.WC REQ.	ORIFICE ΔH, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, DEG F: STACK GAS	GAS METER IN	GAS METER OUT	OVEN	PROBE	LAST IMP.
--	0930	1 test	0	468.591	.51	.97	.97	6.5	239	60	60	231	245	65
470.3	933	2 test	3	470.3	.52	.99	.99	8	244	62	60	235	247	60
472	936	3	6	472	.54	1.02	1.0	8	243	63	60	239	244	60
473.7	939	4	9	473.8	.61	1.16	1.2	8.5	245	65	60	241	247	60
475.5	942	5	12	475.6	.60	1.14	1.1	8	242	66	60	240	239	60
477.3	945	End	15	477.4										
--	0946	1	15	---	.49	.93	.93	7.5	240	66	60	241	249	60
1	0949	2	18	479.1	.45	.85	.85	7.5	244	67	61	245	252	60
480.6	0952	3	21	480.9	.41	.78	.78	6.5	247	68	61	852	256	60
482.1	0955	4	24	482.2	.51	.97	.97	8	249	69	61	252	255	60
483.8	0958	5	27	483.9	.56	1.06	1.1	7.5	248	69	62	250	257	60
485.5	1001	End	30	485.7										
---	1002	1	30	---	.42	.80	.80	6	245	68	62	247	255	60
487	1005	2	33	487.3	.39	.74	.74	5.5	246	68	62	248	254	60
488.5	1008	3	36	488.7	.41	.78	.78	5.5	246	68	62	251	257	60
490.0	1011	4	39	490.2	.48	.91	.91	7.5	246	69	63	250	256	60
491.6	1014	5	42	491.9	.57	1.08	1.1	7.5	245	70	63	245	252	60
493.4	1017	End	45	493.6										
				x Gas Meter Cal.		= 1.0013		4.15.94 DF						

FINAL Product = 25% RAP (Recycled Asphalt Product)

MOISTURE DETERMINATION					
IMPINGER	1	2	3	4	5
Final					X
Initial	100	100	0	760.4	X
Difference					X
Total Moisture Collected: 336.3					

SYSTEM LEAK CHECKS		
Time	Rate (cfm)	Vac. (in.Hg)
0919	.005	28

Impinger Catch Description:

DETERMINATION OF GAS COMPOSITION BY ORSAT ANALYSIS								
Sample Id:	Replicate 1		Replicate 2		Replicate 3		Average	
1-1	Buret Reading	Percent Volume	Buret Reading	Percent Volume	Buret Reading	Percent Volume	Compound	Percent Volume
Initial Reading		X		X		X	X	X
Carbon Dioxide							CO_2	4.93
Oxygen							O_2	14.87
Carbon Monoxide							CO	

Total Sampling Time, min.: 75

FORM: S-FD-5

Volume of Gas Sampled, DCF:

SOURCE EMISSION TEST
FIELD DATA SHEET

TEST: 1 | RUN: 1
Page 2 of 2

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH PARAMETER
MMT Job Number: 9616	Control Unit No.: 4	ΔH@ 1.856
Date: 9.16.94	Gas Meter Coefficient: 0.996	TM 72
Company: River Bend Asphalt Company	Sample Box No.: 4	MC 27
Source: Baghouse Exhaust	Probe No.: 75 Length: 75 inches	PS/PM ≈ 1.0
Source Dimensions: 48 x 60"	Pitot No.: 68 Coefficient: A = .848	C .996
Test Team: AT - BA - TG	Nozzle No.: C2 Diameter: .249	TS 240
Test Procedure: EPA 1-5	Filter No.:	R
Ambient Temp., °F:	Barometric Pressure, in.Hg: 28.71 (28.72)	Static Pressure, in.WC: -.26

	CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME min.	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ΔH, in.WC REQ.	ORIFICE ΔH, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, DEG F: STACK GAS	GAS METER IN	GAS METER OUT	OVEN	PROBE	LAST IMP.
-------	1018	1	45	------	.35	.66	.66	6	241	68	64	247	252	61
494.8	102[illegible]	2	48	495.0	.34	.64	.64	5	241	68	63	249	253	60
496.2	1034	3	51	496.4	.41	.78	.78	5	243	68	63	252	251	60
497.7	1027	4	54	498.0	.58	1.09	1.1	8	243	70	63	251	242	60
499.5	1030	5	57	499.5	.62	1.18	1.2	9	243	70	64	256	244	60
501.3	1033	End	60	501.4										
-------	1034	1	60	------	.28	.53	.53	4	240	70	64	251	247	60
502.6	1037	2	63	502.7	.33	.63	.63	6	238	69	64	250	251	60
5039	1040	3	66	504.0	.42	.80	.80	6.5	240	70	64	247	254	60
505.4	1043	4	69	505.6	.54	1.02	1.0	7	242	71	64	250	248	60
507.2	1046	5	72	507.3	.64	1.21	1.2	9	242	72	65	251	247	60
509.0	1049	End	75	509.32										

MOISTURE DETERMINATION					
IMPINGER	1	2	3	4	5
Final					X
Initial	100	100	0	780.4	X
Difference					X
Total Moisture Collected:					

SYSTEM LEAK CHECKS		
Time	Rate (cfm)	Vac. (in.Hg)
1051	.002	20

Impinger Catch Description:

DETERMINATION OF GAS COMPOSITION BY ORSAT ANALYSIS								
Sample Id: 1-1	Replicate 1		Replicate 2		Replicate 3		Average	
	Buret Reading	Percent Volume	Buret Reading	Percent Volume	Buret Reading	Percent Volume	Compound	Percent Volume
Initial Reading		X		X		X	X	X
Carbon Dioxide							CO_2	
Oxygen							O_2	
Carbon Monoxide							CO	

Total Sampling Time, min.: 75

FORM: S-FD-5

Volume of Gas Sampled, DCF: 40.541

SOURCE EMISSION TEST
FIELD DATA SHEET

TEST: 1	RUN: 2
Page 1 of 2	

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH PARAMETERS
MMT Job Number: 9616	Control Unit No.: 4	ΔH@ 1.856
Date: Friday 9.16.94	Gas Meter Coefficient: 0.996	TM 70
Company: River Bend Asphalt Company	Sample Box No.: 4	MC 27
Source: Baghouse Exhaust	Probe No.: 75 Length: 75 inches	PS/PM = 1.0
Source Dimensions: 48 x 60"	Pitot No.: 68 Coefficient: A = .848	C .996
Test Team: AT-BA-TG	Nozzle No.: L2 Diameter: .249	TS 242
Test Procedure: EPA 1-5	Filter No.: 8891	R
Ambient Temp., °F: 65	Barometric Pressure, in.Hg: ~~28.70~~	Static Pressure, in.WC: -.25

T = 28.58

theoretical vol. cf	CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME min.	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ΔH, in.WC REQ.	ORIFICE ΔH, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, DEG F: STACK GAS	GAS METER IN	GAS METER OUT	OVEN	PROBE	LAST IMP.
--	~~1110~~ 1116	1	0	509.639	.57	1.08	1.1	7	242	66	66	231	227	70
511.4	1119	2	3	511.3	.61	1.15	1.2	10	244	67	66	239	242	64
513.2	1122	3	6	513.3	.60	1.13	1.1	9	244	69	66	240	248	62
515.1	1125	4	9	515.2	.64	1.21	1.2	11	244	71	66	245	252	61
516.9	1128	5	12	517.0	.59	1.11	1.1	9	243	73	66	251	253	61
518.7	1131	End	15	518.9										
--	1132	1	15	---	.52	.98	.98	8	241	72	67	250	247	61
520.4	1135	2	18	520.6	.54	1.02	1.0	9	242	73	67	249	239	61
522.2	1138	3	21	522.4	.47	.89	.89	7	244	74	67	254	251	61
524.0	1141	4	24	524.0	.51	.96	.96	8.5	245	74	67	248	252	61
525.4	1144	5	27	525.6	.57	1.08	1.1	9	246	75	68	251	247	61
527.2	1147	End	30	527.4										
---	1148	1	30	---	.42	.79	.79	6.5	243	74	69	244	241	61
528.7	1151	2	33	528.9	.33	.62	.62	6	241	75	69	240	246	61
530.1	1154	3	36	530.4	.40	.75	.75	7	243	75	69	241	246	61
531.6	1157	4	39	531.9	.49	.92	.92	7.5	244	75	69	242	250	61
532	1200	5	42	533.4	.57	1.08	1.1	9	243	75	69	248	252	61
535	1203	End	45	535.3										

MOISTURE DETERMINATION					
IMPINGER	1	2	3	4	5
Final					X
Initial	100	100	0	7329	
Difference					
Total Moisture Collected: 332.8					

SYSTEM LEAK CHECKS		
Time	Rate (cfm)	Vac. (in.Hg)
1108	.006	24

Impinger Catch Description:

DETERMINATION OF GAS COMPOSITION BY ORSAT ANALYSIS								
Sample Id: 1-2	Replicate 1		Replicate 2		Replicate 3		Average	
	Buret Reading	Percent Volume	Buret Reading	Percent Volume	Buret Reading	Percent Volume	Compound	Percent Volume
Initial Reading		X		X		X	X	X
Carbon Dioxide							CO_2	4.90
Oxygen							O_2	14.23
Carbon Monoxide							CO	

Total Sampling Time, min.:

FORM: S-FD-5

Volume of Gas Sampled, DCF:

SOURCE EMISSION TEST
FIELD DATA SHEET

TEST: 1 | RUN: 2
Page 2 of 2

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH PARAMETER
MMT Job Number: 9616	Control Unit No.: 4	ΔH@ 1.856
Date: 9.16.94 Friday	Gas Meter Coefficient: 0.996	TM 72
Company: River Bend Asphalt Company	Sample Box No.: 4	MC 27
Source: Baghouse Exhaust	Probe No.: 75 Length: 75 inches	PS/PM = 1.0
Source Dimensions: 48 x 60 "	Pitot No.: 68 Coefficient: A = .848	C .996
Test Team: AT - BA - TG	Nozzle No.: L2 Diameter: .249	TS 240
Test Procedure: EPA 1-5	Filter No.: 8891	R
Ambient Temp., °F: 69	Barometric Pressure, in.Hg: 28.58 (28.48 28.68)	Static Pressure, in.WC: -.25

	CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME min.	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ΔH, in.WC REQ.	ORIFICE ΔH, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, DEG F: STACK GAS	GAS METER IN	GAS METER OUT	OVEN	PROBE	LAST IMP.
------	1205	1	0	-----	.35	.66	.66	6	241	74	70	251	244	60
536.4	1208	2	3	536.6	.36	.68	.68	7	238	74	70	250	245	61
537.8	1211	3	6	538.0	.38	.72	.72	7	240	75	70	254	244	60
539.2	1214	4	9	539.4	.59	1.11	1.1	10	239	75	70	251	246	61
541	1217	5	12	541.2	.64	1.21	1.2	10	244	76	70	252	247	60
542.9	1220	End	15	543.1	~~~	~~~	~~~	~~~	~~~	~~~	~~~	~~~	~~~	~~~
------	1221	1	0	------	.29	.55	.55	6	239	74	70	247	249	62
544.2	1224	2 West	3	544.4	.40	.75	.75	7	235	75	70	244	253	61
545.6	1227	3	6	545.8	.45	.85	.85	8	237	75	70	238	249	61
547.2	1230	4	9	547.4	.57	1.08	1.1	9	236	76	70	236	245	61
549	1233	5	12	549.1	.65	1.23	1.2	10	239	76	70	231	236	61
550.9	1236	End	15	550.867	~~~	~~~	~~~	~~~	~~~	~~~	~~~	~~~	~~~	~~~

MOISTURE DETERMINATION

IMPINGER	1	2	3	4	5
Final					X
Initial	100	100	0	732.9	
Difference					
Total Moisture Collected:					

SYSTEM LEAK CHECKS

Time	Rate (cfm)	Vac. (in.Hg)
1240	.002	20

Impinger Catch Description:

DETERMINATION OF GAS COMPOSITION BY ORSAT ANALYSIS

Sample Id: 1-2	Replicate 1 Buret Reading	Replicate 1 Percent Volume	Replicate 2 Buret Reading	Replicate 2 Percent Volume	Replicate 3 Buret Reading	Replicate 3 Percent Volume	Average Compound	Average Percent Volume
Initial Reading		X		X		X	X	X
Carbon Dioxide							CO_2	
Oxygen							O_2	
Carbon Monoxide							CO	

Total Sampling Time, min.: 75
Volume of Gas Sampled, DCF: 91.228 (111.228)

FORM: S-FD-5

SOURCE EMISSION TEST
FIELD DATA SHEET

TEST: 1	RUN: 3
Page 1 of 2	

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH PARAMETERS
MMT Job Number: 9616	Control Unit No.: 4	ΔH@ 1.856
Date: Fri 9.16.94	Gas Meter Coefficient: 0.996	TM 74
Company: River Bend Asphalt Company	Sample Box No.: 4	MC 27
Source: Baghouse Exhaust	Probe No.: 75 Length: 75 inches	PS/PM = 1.0
Source Dimensions: 48 x 60"	Pitot No.: 68 Coefficient: A=.848	C .996
Test Team: AT-BA-TG	Nozzle No.: L2 Diameter: .249	TS 240
Test Procedure: EPA 1-5	Filter No.: 8892	R
Ambient Temp., °F: 70	Barometric Pressure, in.Hg: ~~28.48~~ Grd 28.32 $\bar{x}$ = 28.40	Static Pressure, in.WC: -.29

theoretical vol. lcf	CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME min.	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ΔH, in.WC REQ.	ORIFICE ΔH, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, DEG F STACK GAS	GAS METER IN	GAS METER OUT	OVEN	PROBE	LAST IMP.
--	1315	1	0	551.346	.59	1.13	1.1	8	239	70	70	238	254	71
553.2	1318	2	3	553.1	.64	1.23	1.2	10	241	72	70	248	256	65
555.11	1321	3	6	555.1	.65	1.25	1.3	10	242	74	70	251	249	62
557	1324	4	9	557.1	.61	1.17	1.2	10	242	76	70	252	248	62
558.9	1327	5	12	559.0	.63	1.21	1.2	10	244	77	70	250	256	62
560.8	1330	End	15	561.0										
--	1331	1	0	---	.55	1.05	1.1	9	241	77	71	252	249	62
562.5	1334	2	3	562.7	.49	.94	.94	7	243	78	71	251	247	62
564.2	1337	3	6	564.4	.46	.88	.88	7.5	244	78	71	250	248	62
565.9	1340	4	9	566.0	.49	.94	.94	7.5	245	79	72	251	249	62
567.5	1343	5	12	567.8	.54	1.04	1.0	8	245	79	72	252	250	62
569.2	1346	End	15	569.4										
---	1348	1	0	---	.53	1.02	1.0	7.5	241	79	73	255	248	62
570.9	1351	2	3	571.1	.41	.79	.78	7	241	79	73	254	251	62
572.5	1354	3	6	572.8	.39	.75	.75	7	243	79	73	250	254	62
574	1357	4	9	574.3	.48	.92	.92	8.5	243	80	73	250	253	62
575.6	1400	5	12	576.0	.58	1.11	1.1	8.5	244	80	73	251	253	62
577.3	1403	End	15	577.8										

MOISTURE DETERMINATION					
IMPINGER	1	2	3	4	5
Final					
Initial	100	100	0	744.2	
Difference					
Total Moisture Collected: 351.3					

SYSTEM LEAK CHECKS		
Time	Rate (cfm)	Vac. (in.Hg)
1258	.003	21

Impinger Catch Description:

DETERMINATION OF GAS COMPOSITION BY ORSAT ANALYSIS								
Sample Id: 1-3	Replicate 1		Replicate 2		Replicate 3		Average	
	Buret Reading	Percent Volume	Buret Reading	Percent Volume	Buret Reading	Percent Volume	Compound	Percent Volume
Initial Reading								
Carbon Dioxide							CO_2	5.03
Oxygen							O_2	14.40
Carbon Monoxide							CO	

Total Sampling Time, min.:
Volume of Gas Sampled, DCF:

FORM: S-FD-5

SOURCE EMISSION TEST
FIELD DATA SHEET

TEST: 1 | RUN: 2
Page 2 of 2

TEST IDENTIFICATION	EQUIPMENT IDENTIFICATION	NOMOGRAPH PARAMETER
MMT Job Number: 9616	Control Unit No.: 4	ΔH@ 1.856
Date: Friday 9.16.94	Gas Meter Coefficient: 0.996	TM 74
Company: River Bend Asphalt Company	Sample Box No.: 4	MC 27
Source: Baghouse Exhaust	Probe No.: 75 Length: 75 inches	PS/PM = 1.0
Source Dimensions: 48 * 60"	Pitot No.: 68 Coefficient: A = .848	C .996
Test Team: AT - BA - TG	Nozzle No.: L2 Diameter: .249	TS 240
Test Procedure: EPA 1-5	Filter No.: 8892	R
Ambient Temp., °F: 72	Barometric Pressure, in.Hg: 28.40	Static Pressure, in.WC: -.29

	CLOCK TIME hours	TRAVERSE POINT NUMBER	SAMPLE TIME min.	SAMPLE VOLUME cu.ft.	VELOCITY HEAD in.WC	ORIFICE ΔH, in.WC REQ.	ORIFICE ΔH, in.WC ACT.	PUMP VAC. inHG	TEMPERATURE, DEG F STACK GAS	GAS METER IN	GAS METER OUT	OVEN	PROBE	LAST IMP
------	1404	1	0	------	.44	.84	.84	7	240	78	72	247	251	63
579.0	1407	2	3	579.3	.36	.69	.69	6	239	79	73	248	252	62
580.5	1410	3	6	580.8	.43	.82	.82	7.5	237	79	72	249	252	62
582.0	1413	4	9	584.3	.55	1.05	1.1	9	238	79	72	248	252	62
583.8	1416	5	12	584.0	.66	1.27	1.3	10	239	79	72	251	249	62
585.7	1419	End	15	585.9										
------	1420	1	0	------	.28	.54	.54	5	232	77	72	251	258	62
587	1423	2	3	587.2	.33	.63	.63	5.5	235	78	72	250	257	62
588.4	1426	3	6	588.5	.41	.79	.79	7	237	78	72	251	255	62
589.9	1429	4	9	590.0	.61	1.17	1.2	9	239	78	72	250	255	62
591.8	1432	5	12	591.9	.65	1.25	1.3	9.5	240	79	73	251	256	63
593.7	1435	End	15	593.790										
				551.346	starting 42									

MOISTURE DETERMINATION

IMPINGER	1	2	3	4	5
Final					
Initial	100	100	0	749.2	
Difference					

Total Moisture Collected:

SYSTEM LEAK CHECKS

Time	Rate (cfm)	Vac. (in.Hg
1439	.005	24

Impinger Catch Description:

DETERMINATION OF GAS COMPOSITION BY ORSAT ANALYSIS

Sample Id: 1-3	Replicate 1 Buret Reading	Replicate 1 Percent Volume	Replicate 2 Buret Reading	Replicate 2 Percent Volume	Replicate 3 Buret Reading	Replicate 3 Percent Volume	Average Compound	Average Percent Volume
Initial Reading								
Carbon Dioxide							CO_2	
Oxygen							O_2	
Carbon Monoxide							CO	

Total Sampling Time, min.: 75
Volume of Gas Sampled, DCF: 42.444

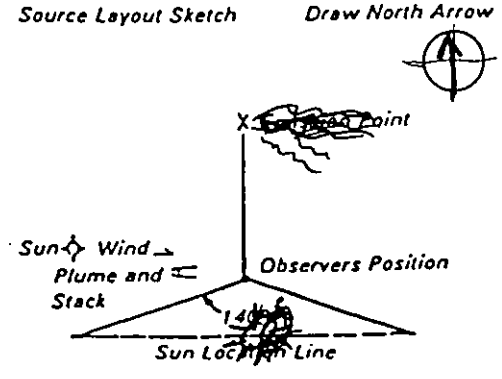
FORM: S-FD-5

Concurrent with Particulate test 1-2

Visible Emission Observation Form

SOURCE NAME	River Bend Asphalt Co.
ADDRESS	
CITY	Kasota
STATE	MN
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	Asphalt Plant
OPERATING MODE	
CONTROL EQUIPMENT	Baghouse
OPERATING MODE	
DESCRIBE EMISSION POINT	rectangular
START	Steel stack
STOP	same
HEIGHT ABOVE GROUND LEVEL START / STOP	
HEIGHT RELATIVE TO OBSERVER START / STOP	
DISTANCE FROM OBSERVER START / STOP	≈170' / ≈170'
DIRECTION FROM OBSERVER START / STOP	N-NNW / N-NNW
DESCRIBE EMISSIONS START / STOP	Mostly clear except for occassional plume
EMISSION COLOR START / STOP	clear / clear
PLUME TYPE: CONTINUOUS / FUGITIVE / INTERMITTENT	X / ☐ / ☐
WATER DROPLETS PRESENT: NO / YES	☐ / ☐ (sometimes)
IF WATER DROPLET PLUME: ATTACHED / DETACHED	☐ / X
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START / STOP	2-10' from exit / 2-10' from exit
DESCRIBE BACKGROUND START / STOP	SKY / SKY
BACKGROUND COLOR START / STOP	Blue + white / blue
SKY CONDITIONS START / STOP	Mostly clear / clear
WIND SPEED START / STOP	≈5-20 / ≈5-20
WIND DIRECTION START / STOP	W-WNW / WNW
AMBIENT TEMP. START / STOP	
WET BULB TEMP.	
RH.percent	

Source Layout Sketch



Mostly blue sky with a few distinct white clouds

estimate steam plume present ∠20% of time

OBSERVATION DATE	START TIME	STOP TIME
9/16/94	1125	1225

SEC / MIN	0	15	30	45	SEC / MIN	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 % WERE	0
RANGE OF OPACITY READINGS MINIMUM	0
MAXIMUM	0
OBSERVER'S NAME (PRINT)	Alan L. Trowbridge
OBSERVER'S SIGNATURE	Alan L. Trowbridge
DATE	9/16/94
ORGANIZATION	MPT Environmental Services
CERTIFIED BY	ETA
DATE	4/6/94
VERIFIED BY	
DATE	

COMMENTS: Steam plume sometimes — intermittent, detached.

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE / TITLE / DATE

APPENDIX C: LABORATORY REPORTS

SUMMARY OF PARTICULATE EMISSION TEST LABORATORY DATA

PROJECT NUMBER: 9616 COMPANY: RIVER BEND ASPHALT CO.
TEST NUMBER: 1 SOURCE: BAGHOUSE EXHAUST

	MASS OF PARTICULATE MATTER COLLECTED, GRAMS							
	FRONT CATCH				BACK CATCH			TOTAL PARTICULATE MASS COLLECTED
RUN NUMBER	FRONT WASH	CYCLONE CATCH	FILTER CATCH	FRONT TOTAL	IMPINGER CATCH **	IMPINGER WASH	BACK TOTAL	
1	0.0039	0.0000	0.0223	0.0262	0.0055	0.0102	0.0157	0.0419
2	0.0008	0.0000	0.0160	0.0168	0.0039	0.0084	0.0123	0.0291
3	0.0032	0.0000	0.0113	0.0145	0.0003	0.0055	0.0058	0.0203

* NOT APPLICABLE

** CHLOROFORM/ETHYL ETHER EXTRACTION

LABORATORY REPORT: EPA Method 5

Project Number: # 9616 Company: RIVERBEND ASPHALT Co.

Frontwashes

Test-Run	1-1	1-2	1-3	Date
Dish #	1193	1196	1199	- - - - -
1	2.3025	2.3401	2.3213	9-20-94
2	2.3023	2.3400	2.3214	9-20-94
3	2.3024	2.3402	2.3213	9-21-94
Tare	2.2984	2.3392	2.3181	4-26-94
Blank	0.0000	0.0000	0.0000	- - - - -
Net	0.0039	0.0008	0.0032	- - - - -

Solvent Blanks

Solvents	Acetone	Chloroform	Ether	Date
Dish #	1190	1191	1192	- - - - -
1	2.3045	2.2797	2.3106	9-20-94
2	2.3046	2.2797	2.3107	9-20-94
3	2.3045	2.2798	2.3107	9-21-94
Tare	2.3045	2.2797	2.3105	4-26-94
Net	0.0000	0.0000	0.0001	- - - - -

Backwashes

Test-Run	1-1	1-2	1-3	Date
Dish #	1194	1197	1200	- - - - -
1	2.2933	2.3121	2.3207	9-20-94
2	2.2933	2.3121	2.3204	9-20-94
3	2.2934	2.3121	2.3205	9-21-94
Tare	2.2831	2.3037	2.3169	4-26-94
Blank	0.0000	0.0000	0.0000	- - - - -
Net	0.0103	0.0084	0.0055	- - - - -

Glass Filters

Test-Run	1-1	1-2	1-3	Date
Filter #	8890	8891	8892	- - - - -
1	0.5264	0.5183	0.5170	9-20-94
2	0.5266	0.5185	0.5173	9-20-94
3	0.5264	0.5186	0.5174	9-21-94
Tare	0.5041	0.5023	0.5057	6-2-94
Net	0.0223	0.0160	0.0113	- - - - -

Extractions

Test-Run	1-1	1-2	1-3	Date
Dish #	1195	1198	1201	- - - - -
1	2.3116	2.3024	2.3203	9-20-94
2	2.3114	2.3025	2.3200	9-20-94
3	2.3115	2.3025	2.3200	9-21-94
Tare	2.3058	2.2984	2.3196	4-26-94
Blank	0.0001	0.0001	0.0001	- - - - -
Net	0.0055	0.0039	0.0003	- - - - -

COMMENTS

Lowest Final Weight
- Tare
- Blank(if applicable)

= Sample Net Gain (grams)

Signature Bill Anderson Date 9-21-94

Laboratory Report: Moisture Content of Aggregate Samples

Project Number 9616 Company Riverbend Asphalt

Test 1-1 Virgin Aggregate				
Trial #	1	2	3	Date
Dish #	1202	1203	1204	
Tare	2.3129	2.3295	2.3378	4.26.94
Tare + Wet	45.8094	45.7034	45.6701	9.19.94
Wet	43.4965	43.3739	43.3323	
Dry	41.3617	41.3015	40.7496	
Dry + Tare	43.6746	43.6310	43.0874	9.20.94
% Moisture	4.91	4.78	5.96	

Test 1-2 Virgin Aggregate				
Trial #	1	2	3	Date
Dish #	1205	1206	1207	
Tare	2.3248	2.3257	2.3084	4.26.94
Tare + Wet	45.5683	45.6629	45.8946	9.19.94
Wet	43.2435	43.3372	43.5860	
Dry	40.9475	41.1635	41.4963	
Dry + Tare	43.2723	43.4892	43.8047	9.20.94
% Moisture	5.31	5.02	4.79	

Test 1-3 Virgin Aggregate				
Trial #	1	2	3	Date
Dish #	1208	1209	1210	
Tare	2.3077	2.3074	2.2987	4.26.94
Tare + Wet	45.8328	45.4282	45.7842	9.19.94
Wet	43.5251	43.1208	43.4855	
Dry	41.1051	40.8455	41.0382	
Dry + Tare	43.4128	43.1529	43.3369	9.20.94
% Moisture	5.56	5.28	5.63	

Summary Virgin Aggregate				
	Mean	on-1 Deviation simple std	% Error	
Test 1-1	5.22	.65	12.4	
1-2	5.04	.26	5.2	
1-3	5.49	.19	3.4	

Comments

$\frac{\text{Dry}}{\text{Wet}} * 100 =$ % Solids

100- % Solids = % Moisture

Signature Ted Gibbons Date 9.20.94

Laboratory Report: Moisture Content of Aggregate Samples

Project Number 9616 Company Riverbend Asphalt

Test 1-1 RAP recycled Asphalt Product				
Trial #	1	2	3	Date
Dish #	1211	1212	1213	
Tare	2.3370	2.3027	2.3040	4.26.94
Tare + Wet	45.7457	45.3330	45.7318	9.19.94
Wet	43.4087	43.0303	43.4228	
Dry	40.6851	40.1613	40.6072	
Dry + Tare	43.0221	42.4640	42.9162	9.20.94
% Moisture	6.27	6.67	6.48	

Test 1-2 RAP Recycled Asphalt Product				
Trial #	1	2	3	Date
Dish #	1214	1215	1216	
Tare	2.3015	2.3046	2.3426	4.26.94
Tare + Wet	45.3261	45.6192	45.5482	9.19.94
Wet	43.0246	43.3146	43.2056	
Dry	40.4286	40.0332	40.6011	
Dry + Tare	42.7301	42.3378	42.9437	9.20.94
% Moisture	6.03	7.58	6.03	

Test 1-3 RAP Recycled Asphalt Product				
Trial #	1	2	3	Date
Dish #	1217	1218	1219	
Tare	2.3047	2.2859	2.3134	4.26.94
Tare + Wet	45.4352	45.5234	45.9189	9.19.94
Wet	43.1305	43.2375	43.6055	
Dry	40.1950	40.3600	40.5104	
Dry + Tare	42.4997	42.6459	42.8238	9.20.94
% Moisture	6.81	6.66	7.10	

Virgin + RAP % Moisture Summary				
Test-Run #	1-1	1-2	1-3	
Virgin				
RAP				
Process % Virgin				
Process % RAP				
Process % Moisture				

RAP Summary Recycled Asphalt Product				
	Mean	Simple Standard Deviation	% Error	
Test 1-1	6.47	.20	3.1	
1-2	6.55	.89	13.7	
1-3	6.86	.22	3.3	

Comments

Dry / Wet * 100 = % Solids

100- % Solids = % Moisture

Signature Ted Gibbons Date 9.20.94

EPA METHOD 4 MOISTURE ANALYSIS

mmt environmental services, inc.

Sampling Train* Cold Box Setup		
Impinger	Type**	Initial Contents
1	M	100 ml H_2O
2	S	100 ml H_2O
3	M	empty
4	M	silica gel
5	---	not used
6	---	not used
7	---	not used

MMT Project Number: 9616
Company: River Bend Asphalt Co.
Source: Baghouse Exhaust
Sample Acquisition:
Dates: Friday 9.16.94
Technicians: BA - TG - AT
Sample Recovery:
Date: 9.19.94
Technician: BA

* EPA Method 5 sampling train ** S: Standard (with orifice) M: Modified (straight tube)

Test-Run 1-1 | Box No: 1 | Filter No: 8890

Impinger Number	Mass (g) or Volume (ml)		
	Initial	Final	Net Gain
1	100	354	254
2	100	169	69
3	0	0	0
4	780.4	793.7	13.3
5	---	---	0
6	---	---	0
7	---	---	0
Total mass of liquid collected, g			336.3

Description of liquid collected: Slight cloud

Test-Run 1-2 | Box No: 2 | Filter No: 8891

Impinger Number	Mass (g) or Volume (ml)		
	Initial	Final	Net Gain
1	100	333	233
2	100	184	84
3	0	0	0
4	732.9	748.7	15.8
5	---	---	0
6	---	---	0
7	---	---	0
Total mass of liquid collected, g			332.8

Description of liquid collected: Slight cloud

Test-Run 1-3 | Box No: 7 | Filter No: 8892

Impinger Number	Mass (g) or Volume (ml)		
	Initial	Final	Net Gain
1	100	294	194
2	100	221	121
3	0	18	18
4	744.2	762.5	18.3
5	---	---	0
6	---	---	0
7	---	---	0
Total mass of liquid collected, g			351.3

Description of liquid collected: Slight cloud

Test-Run | Box No: | Filter No:

Impinger Number	Mass (g) or Volume (ml)		
	Initial	Final	Net Gain
1	100		
2	100		
3	0		
4			
5	---	---	0
6	---	---	0
7	---	---	0
Total mass of liquid collected, g			

Description of liquid collected:

MMT form: S-LB-4b 5/9/84

mmt environmental services, inc.

EPA METHOD 3 LABORATORY REPORT
ORSAT ANALYSIS

Project Number: 9616

Company: River Bend Asphalt

Sample Identification		Gas Parameter Measured	Replicate #1 Buret ml Reading	Replicate #1 Percent Volume	Replicate #2 Buret ml Reading	Replicate #2 Percent Volume	Replicate #3 Buret ml Reading	Replicate #3 Percent Volume	Average Percent Volume	Fuel Factor Fo
Bag Id:	Submitted by: BA	Initial Reading	0.0		0.0		0.0			1.223
1-1	Submittal Date: 9.16.94 Time: 1020	Carbon Dioxide	4.9	4.9	5.0	5.0	4.9	4.9	4.93	
	Analyzed by: TG	Oxygen	19.80	14.9	19.8	14.8	19.8	14.9	14.87	
	Analysis Date: 9.16.94 Time: 1238	Carbon Monoxide	NA	—	—	—	—	—	—	
Bag Id:	Submitted by: BA	Initial Reading	0.0		0.0		0.0			1.361
1-2	Submittal Date: 9.16.94 Time: 1140	Carbon Dioxide	4.8	4.8	4.9	4.9	5.0	5.0	4.90	
	Analyzed by: TG	Oxygen	18.9	14.1	19.2	14.3	19.3	14.3	14.23	
	Analysis Date: 9.16.94 Time: 1255	Carbon Monoxide	—	—	—	—	—	—	—	
Bag Id:	Submitted by: BA	Initial Reading	0.0		0.0		0.0			1.292
1-3	Submittal Date: 9.16.94 Time: 1330	Carbon Dioxide	5.0	5.0	5.1	5.1	5.0	5.0	5.03	
	Analyzed by: TG	Oxygen	19.4	14.4	19.5	14.4	19.4	14.4	14.40	
	Analysis Date: 9.16.94 Time: 1350	Carbon Monoxide	—	—	—	—	—	—	—	
Bag Id:	Submitted by:	Initial Reading								
	Submittal Date: Time:	Carbon Dioxide								
	Analyzed by:	Oxygen								
	Analysis Date: Time:	Carbon Monoxide								

Percent Volume Calculations:
$\%CO_2 = 100 * (CO_2 - IR) / (100 - IR)$
$\%O_2 = 100 * (O_2 - CO_2) / (100 - IR)$
$\%CO = 100 * (CO - O_2) / (100 - IR)$
where IR, CO_2, O_2 & CO are buret ml values

$Fo = (20.9 - \%O_2 + 0.5 * \%CO) / (\%CO_2 + \%CO)$
Fuel factor Fo is a quality control check which is only valid for pure combustion sources. The EPA Method 3B list of acceptable Fo ranges for various fuels is presented to the right.

Anthracite coal:	1.016 - 1.130	Distillate oil:	1.260 - 1.413
Bituminous coal:	1.083 - 1.230	Residual oil:	1.210 - 1.370
Lignite coal:	1.016 - 1.130	Natural gas:	1.600 - 1.836
Wood:	1.000 - 1.120	Propane gas:	1.434 - 1.586
Wood bark:	1.003 - 1.130	Butane gas:	1.405 - 1.553

MMT form: S-LB-3a 5/9/94

Record buret readings to the nearest 0.1 ml.

Record percent volume values to the nearest 0.01 percent.

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9306

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., P.O. BOX 127
SOUTH HOLLAND, IL 60473
TEL: (708) 331-2900
FAX: (708) 333-3060

September 30, 1994

MMT ENVIRONMENTAL SERVS, INC.
4610 N. Churchill Street
St. Paul, MN 55126
Attn: Alan Trowbridge

Sample identification by
MMT Environmental Servs, Inc.

Kind of sample reported to us	Used Oil	
		Used Oil
Sample taken at	Riverbend Asphalt Company	Project No. 9616
Sample taken by	Riverbend Personnel	
Date sampled	September 16, 1994	
Date received	September 22, 1994	P.O. No. 8620

Analysis Report No. 71-82674

	As Received
HEATING VALUE, Btu/lb	18,501
TOTAL ACID No. mg.KOH/g	1.63
ASH, % Wt.	0.77
SULFUR, % Wt.	0.47
ORGANIC HALOGENS, % Wt.	0.06
FLASH POINT	
P-Martens Closed Cup, °F	170
pH	4.72
LEAD, % Wt.	0.008

METHODS
Heating Value: ASTM D 240; Ash: ASTM D 874; Sulfur: ASTM D 1552
Organic Halogens: SW 846 Module Method 9253; pH: ASTM D 1067; Lead: ASTM D 3683

RECEIVED OCT 0 3 1994

RECEIVED OCT 0 3 1994

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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Date received	September 22, 1994
	P.O. No. 8620

Analysis Report No. 71-82674

POLYCHORINATED BIPHENYLS (PCB's)

PARAMETER	RESULTS	METHOD
PCB, ug/g	<5	SW8080

<5 Denotes probable PCB's detected at or below that level.

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

APPENDIX D: CALIBRATION DATA

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Alan Thrasbridge

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 Lore
President

243029
Certificate Number

Vice President

Minneapolis
Location

David B. Savage, Jr.
Program Manager

April 6, 1994
Date of Issue

Page: SSQA-1-70

CALIBRATION
DRY TEST METER/ORIFICE METER

Date: Monday 9.19.94 Barometric Pressure, in. Hg. (Pb): 28.78

EQUIPMENT IDENTIFICATION			
Control Unit 4	Dry Test Meter	Wet Test Meter	Calibration Type
Mfg: Andersen	Mfg: rockwell	Mfg: GCA Corporation	General: x
Model: Universal	Model: S-175	Model: Precision	Post-test: x
SN: 591-544	SN: 83	SN: 11 AH 12	

EQUIPMENT CALIBRATION

Orifice Pressure Drop in. WC H	Pump Vac. in.Hg	Wet Test Meter Volume, CF Initial V_{wi}	Wet Test Meter Volume, CF Final V_{wf}	Temp. °F T_w	Dry Test Meter Volume, CF Initial V_{di}	Dry Test Meter Volume, CF Final V_{df}	Temperature, °F Inlet Initial T_{ii}	Temperature, °F Inlet Final T_{if}	Temperature, °F Outlet Initial T_{oi}	Temperature, °F Outlet Final T_{of}	Elapsed Time, min. Q
0.90	11	ZERO	7.220	77	596.102	603.290	76	75	83	76	13
0.90	11	7.220	15.014	77	603.290	611.053	82	76	86	77	14
0.90	11	15.014	27.788	77	611.053	623.745	84	76	88	77	23

COMPUTER PRINTOUT

Pr.# 9616 Post-Test Calibration

Maximum observed vacuum, in. Hg = 11

Average orifice Pressure = 0.94 in. WC

H	Vw	Tw	Vd	Td	Q	C	Hø
0.9	7.220	77	7.188	77.5	13.0	1.0031	1.7242
0.9	7.794	77	7.763	80.3	14.0	1.0078	1.7073
0.9	12.774	77	12.742	81.3	23.0	1.0081	1.7122

AVERAGE CORRECTION FACTOR: C = 1.0063
AVERAGE ORIFICE CONSTANT: Hø = 1.7146

EQUATIONS:
Vw = Vwf - Vwi
Vd = Vdf - Vdi
Td = (Tii + Tif + Toi + Tof) / 4
C = Vw * Pb * (Td+460) / (Vd * (Pb+H/13.6) * (Tw+460))
Hø = 0.0317 * H * ((Tw+460)*Q/Vw)^2 / (Pb * (Td+460))

Pre Post Test Average C = 1.0013

Calibration Performed by:

50 (Print) Ted Gibbons Ted Gibbons

CALIBRATION
DRY TEST METER/ORIFICE METER

Page: SSQA-1- 69

Date: TUE 9.6.94 Barometric Pressure, in. Hg. (Pb): 28.80

EQUIPMENT IDENTIFICATION			
Control Unit 4	Dry Test Meter	Wet Test Meter	Calibration Type
Mfg: Andersen	Mfg: rockwell	Mfg: GCA Corporation	General: x
Model: Universal	Model: S-175	Model: Precision	Post-test: x
SN: 591-544	SN: 83	SN: II AH 12	

EQUIPMENT CALIBRATION

Orifice Pressure Drop in. WC H	Pump Vac. in.Hg	Wet Test Meter Volume, CF Initial V_{wi}	Wet Test Meter Volume, CF Final V_{wf}	Wet Test Meter Temp. °F T_w	Dry Test Meter Volume, CF Initial V_{di}	Dry Test Meter Volume, CF Final V_{df}	Dry Test Meter Temperature, °F Inlet Initial T_{ii}	Dry Test Meter Temperature, °F Inlet Final T_{if}	Dry Test Meter Temperature, °F Outlet Initial T_{oi}	Dry Test Meter Temperature, °F Outlet Final T_{of}	Elapsed Time, min. Q
1.5	16	Zero	5.520	74	449.284	454.784	71	72	71	72	8
1.5	16	5.520	11.036	74	454.784	460.292	72	74	72	72	8
1.5	16	11.036	17.256	74	460.292	466.488	73	76	72	72	9

COMPUTER PRINTOUT

Pr. #9614 Riverbend Pre-Test Calibration

$\bar{X}$ Orifice Pressure = 1.51 in. W.C, Maximum Observed Vaccuum = 16 in. Hg

H	Vw	Tw	Vd	Td	Q	C	Hθ
1.5	5.520	74	5.500	71.5	8.0	0.9951	1.8605
1.5	5.516	74	5.508	72.5	8.0	0.9948	1.8597
1.5	6.220	74	6.196	73.3	9.0	0.9986	1.8485

AVERAGE CORRECTION FACTOR: C = 0.9962
AVERAGE ORIFICE CONSTANT: Hθ = 1.8563

EQUATIONS:

Vw = Vwf - Vwi
Vd = Vdf - Vdi
Td = (Tii + Tif + Toi + Tof) / 4
C = Vw * Pb * (Td+460) / (Vd * (Pb+H/13.6) * (Tw+460))
Hθ = 0.0317 * H * ((Tw+460)*θ/Vw)^2 / (Pb * (Td+460))

Calibration Performed by:

(Print) Ted Gibbons - Ted Gibbons

CALIBRATION

NOZZLE DIAMETER

Nozzle Number	Nominal Diameter, in.	Measured Diameter, in. D1	D2	D3	Nozzle* Diameter, in.
L-1		.174	.175	.175	.175
L-2		.249	.248	.249	.249
L-3		.355	.355	.355	.355
L-4		.489	.488	.489	.489
L-5		.125	.125	.125	.125
L-6		.300	.300	.300	.300
L-7		.175	.175	.176	.175
L-8		.489	.490	.491	.490
L-10		.245	.246	.245	.245
L-11		.250	.250	.250	.250
L-12		.247	.248	.248	.248
L-13		.240	.240	.239	.240
L-14		.199	.199	.199	.199

* Nozzle diameter = (D1 + D2 + D3)/3

Calibration Performed by:

(Print) Bill Anderson

(Signature) Bill Anderson

Date: 3-18-94

CALIBRATION

S-TYPE PITOT TUBE

Date: 3.29.94 Tuesday

Ambient Temperature, °F: 67

Barometric Pressure, in. Hg.: 28.85

Probe ID: 75 inches

S-Type Pitot Tube ID No.: 68" Wide Body

Standard Pitot Tube ID No.: 1.5 ft

Standard Pitot Tube Coefficient: 0.990

PITOT TUBE EXAMINATION

Alignment Check	Pitot Tube Dimensions	Pitot Assembly Intercomponent Spacings
✓ $\alpha_1 < 10°$	External tubing diameter (D_t): 3/8	Pitot to _____ nozzle (X): NA
✓ $\alpha_2 < 10°$	Base to Side A opening plane (P_A): .56	Pitot to probe sheath (Y): NA
✓ $\beta_1 < 5°$	Base to Side B opening plane (P_B): .55	Pitot to thermocouple, along probe (W): NA
✓ $\beta_2 < 5°$		Pitot to thermocouple, perpendicular to probe (Z): NA
✓ Z<1/8 in.		
✓ R<1/32 in.		

DESIRED CALIBRATION POINT		SIDE A CALIBRATION		SIDE B CALIBRATION	
Velocity ft/sec	P_{std} in. WC	P_{std} in. WC	P_s in. WC	P_{std} in. WC	P_s in. WC
20	0.09	.14	.19	.14	.195
40	0.37	.33	.45	.37	.52
60	0.82	.89	1.20	.83	1.15
80	1.45	1.48	2.04	1.5	2.1
100	2.30	X	X	X	X

COMPUTER PRINTOUT

SIDE A CALIBRATION				SIDE B CALIBRATION			
Pstd	Ps	Cp	Cp-Cp(A)	Pstd	Ps	Cp	Cp-Cp(B)
0.140	0.190	0.850	0.001	0.140	0.195	0.839	0.001
0.330	0.450	0.848	-0.001	0.370	0.520	0.835	-0.003
0.890	1.200	0.853	0.004	0.830	1.150	0.841	0.003
1.480	2.040	0.843	-0.005	1.500	2.100	0.837	-0.001
Cp(A) = 0.848				Cp(B) = 0.838			

Side A σn = .004

Side B σn = .002

Calibration Performed by:

(Print) Bill + Ted

(Signature) Bill + Ted

APPENDIX E: PROCESS DATA

ASPHALT PLANT OPERATING CONDITIONS DURING PERFORMANCE TEST

mnt environmental services, inc.

Project No: 9616 Date:

Company: Riverbend Asphalt Company

Location: Kasota Mn

The Minnesota Pollution Control Agency requires that the following information be included in the performance test report. The agency may reject any report without this completed form duly certified by a company representative.

Asphalt Plant Description

Mfg: Barber Green

Model: BE 101

Type: ☐ Drum Mix ☒ Conventional ☐ Other (specify):

Class: ☒ Stationary ☐ Portable

Pollution Control Equipment

Mfg: Stan Steel

Model: AB 768-15

Type: ☒ Baghouse ☐ Cyclone ☐ Multiclone ☐ Venturi Scrubber ☐ Wet Scrubber ☐ Other:

Fuel Description

Itemize all fuels and materials added to the combustion process during the test period (if oil specify type):

Waste oil

Is the above listed fuel the "dirtiest" that the plant is allowed to burn? ☒ Yes ☐ No

Is the above fuel substantially the highest sulfur containing fuel normally burned? ☒ Yes ☐ No

Production specific fuel usage determination method:

☒ Measured _____ cu.ft./ton hot mix

☐ Calculated 2.3 gal/ton hot mix

Number of burners in system dryer: 1

Burner rating: 120 ~~000~~ 130 BTU 10^6Btu = 100% control setting

Control Equipment Operating Parameters

Was control equipment operating normal during the test period? ☒ Yes ☐ No

Normal system pressure drop, in WC: 2 - 8

Normal system air flow rate, acfm: 80000

For Baghouse systems:	Design	At Test
Cleaning cycles	C.F.M./Sq. Ft. 3.10-4.50	
Air-to-Cloth Ratio	5.3:1	5.3 - 1
For Wet Scrubbing systems:		
% scrubbing water recycled		
Number of spray bars		
Water delivery pressure, psi		
Water flow rate, gpm		

Heat Input Data (specify units)

Test Run Number	Fuel Usage Rate gal /Hr	Fuel Heat Content Btu/___	Total Heat Input Rate 10^6Btu/Hr
1	586.5		
2	586.5		
3	586.5		

Control Equipment Cleaning/Maintenance

Date and procedure of last maintenance or cleaning of the pollution control equipment:

9-15-94 Visual inspection and tig

Aggregate and Recycle Material Usage

Test Number	Virgin Aggregate ton/hr	Recycle Material ton/hr	Liquid Asphalt ton/hr	Process Weight Rate ton/hr*	Recycle Percentage %**
1					
2					
3					

Aggregate & Recycle Moisture Content

Virgin Aggregate % moisture	Recycle Material % moisture	Combined Material % moisture

* Process Weight Rate = Total of all materials introduced into the process equipment = Aggregate + Recycle + Asphalt

** % Recycle = 100 x Recycle / (Aggregate + Recycle) Asphalt excluded as per Minn. Dept. of Transportation mix basis calculation

Describe location of the thermocouples reading the dryer gas exit temperature:

in duct work 10' before the exhaust fan

Affidavit: I certify that the information recorded above is accurate and correctly describes the plant equipment and operating conditions during the indicated performance test period.

By (print): David Wachal Position: Plant Manager

Signature: David Wachal Phone: 507 931 4241

MMT form: S-PD-16 Rev.3/20/94

mmt environmental services, inc.

ASPHALT PLANT OPERATING DATA LOG

(Record Data at 15 Minute Intervals)

Project No: 9616 Date: 9.16.94

Company: River Bend Asphalt Company

Location:

Time of Day Hr : Min	Burner Setting %	Material Processing Rate, Tons Per Hour: Aggregate Material	Recycle Material	Total Solid Materials	Liquid Asphalt	Total All Materials	Dryer Exhaust Gas Temp. °F	Dust Collector Pressure Drop inches water	Wet Scrubber Water: Flow Rate gpm	Pressure psi		
9:30 Am	87%	177	64	241	12	253	250°	4.6"				
9:45	87	179	64	243	12	255	251	4.6				
10:01	87	179	64	243	12	255	249	4.5				
10:15	87	179	64	243	12	255	253	4.4				
10:30	87	179	64	243	12	255	250	4.4				
10:45	87	179	64	243	12	255	250	4.4				
11:00	87	179	64	243	12	255	249	4.5				
11:15	87	179	64	243	12	255	251	4.4				
11:30	87	179	64	243	12	255	253	4.4				
11:45	87	179	64	243	12	255	252	4.4				
12:00	87	179	64	243	12	255	249	4.4				
12:15	87	179	64	243	12	255	252	4.6				
12:30	87	179	64	243	12	255	246	4.5				
12:45	87	179	64	243	12	255	249	4.4				
1:00	87	179	64	243	12	255	248	4.7				
1:15	87	179	64	243	12	255	246	4.6				
1:30	87	179	64	243	12	255	245	4.5				
1:45	87	179	64	243	12	255	250	4.4				

#1

#2

#3

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Affidavit: I certify that the information recorded above is accurate and correctly describes plant operating conditions during the indicated period. I also certify that the above data was recorded by myself or by personnel under my direct supervision.

By (print): David Clarkson Position: Plant Operator

Signature: David Clarkson Phone: 509-731-1511

MMT form: S-PD-1a Rev.5/2094

mmt environmental services, inc.

ASPHALT PLANT OPERATING DATA LOG

(Record Data at 15 Minute Intervals)

Project No: 9616 Date: 9-16-94

Company: River Bend Asphalt Company

Location: _____

Time of Day Hr : Min	Burner Setting %	Material Processing Rate, Tons Per Hour: Aggregate Material	Recycle Material	Total Solid Materials	Liquid Asphalt	Total All Materials	Dryer Exhaust Gas Temp. °F	Dust Collector Pressure Drop inches water	Wet Scrubber Water: Flow Rate gpm	Wet Scrubber Water: Pressure psi		
#3												
2:00	87	179	64	243	12	255	350	4.4	NA	NA		
2:15	87	179	64	243	12	255	248	4.5				
2:30	87	179	64	243	12	255	257	4.41				
2:45												

Affidavit: I certify that the information recorded above is accurate and correctly describes plant operating conditions during the indicated period. I also certify that the above data was recorded by myself or by personnel under my direct supervision.

By (print): Dennis Lachelt Position: Plant Supervisor

Signature: Dennis Lachelt Phone: 507-931-1091

MMT form: S-PD-1a Rev.5/20/94

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Minnesota Pollution Control Agency
Division of Air Quality

Fabric Filter (Baghouse) Application
(DS-7)

For Agency Use Only
DAQ No. _____

1. Name of Division or Plant: RIVERBEND Asphalt Company
2. Address: Hwy 22 S.
3. City: KASOTA State MN. Zip 56050
4. Manfacturer: STANDARD Corp.
5. Model: AB 768-15 Type: pulse jet
6. Emission Equipment Served: ____ Primary X Secondary ____
7. Gas Stream Cooling: ____ Yes X No: Liquid Spray ____
   Excess Air ____ Other ____
8. Bag Cleaning Method: ____ Shaker, ____ Reverse Air, X Pulse Air
9. Cleaning Cycle: Average Filtration Time: 10 Minutes
   Average Bag Cleaning Time: .1 Minutes
10. Cleaning Pulse Pressure: 90 - 110 psig
11. No. of Bags: 768 Total Cloth Area: 15,084 sq. ft.
12. No. of Bags Cleaned at One Time: 16
13. Filter (Gas/Cloth) Ratio: 5.3:1 Normal Operation: 5.3 acfm/sq. ft.
    Cleaning Cycle 210-158 acfm/sq. ft.
14. Reverse Air Fan: NA H.P.: ____ acfm
15. Media Material (cloth): Nomex Coating: ____
16. Media Weight: 14 oz/sq. ft. Media Thickness: .075 inches
17. Filter Drag 25-35 permeability inches of H_2O/ACFM/ft^2
18. Media Maximum Operating Temperature: 450 °F
19. Rated or Design Gas Capacity: 80,000 acfm Inlet Gas Temp.: 300 °F
20. Baseline (Rated-Maximum-Nominal) Pressure Differential
    Drop 4/11 inches of H_2O
21. Exhaust Gas Dew Point: 212 °F
22. Exhaust Emissions: 7.04 gr/dscf
23. Guaranteed (or Design) Collection Efficiency: 99.9 %
24. Estimated Bag Life: 5 years
25. By-Pass ___ Yes X No Purpose: ____ Length of time ___ Min.
26. Unit exhausts to outside air through stack/vent number STACK.

mlp 3:75

APPENDIX F: TEST PLAN

SEP 13 1994

Minnesota Pollution Control Agency

September 12, 1994

Mr. Larry Nurre
President
River Bend Asphalt Co.
P.O. Box 217
Kasota, Minnesota 56050

RE: August 4, 1994, Test Plan Submittal for the September 7, 1994, Performance Test on the Hot Mix Asphalt Plant

Dear Mr. Nurre:

This letter and its enclosures conclude the pretest requirements for the River Bend Asphalt Co. (Company) facility located near Kasota, Minnesota, as discussed during our telephone conversation of August 30, 1994.

The Air Quality Division (AQD) staff of the Minnesota Pollution Control Agency (MPCA) has reviewed the submittal, and find the test plan to be acceptable for the proposed test.

Copies of the Asphalt Plant Operating Conditions During Stack Testing, Certifications Required For Performance Test Reports, and Microfiche Submittal forms are enclosed. These forms will help you to comply with the submittal requirements of Minn. Rules pt. 7017.2035 and 7017.2040. **A copy of the test plan, including this letter, must be included as part of the performance test report.**

Remember, it is not the Testing Consultant's responsibility to submit the Company report or microfiche, or to certify that the microfiche submitted is an exact copy of the original test report by the deadlines specified in the applicable compliance document (i.e., Permit, Stipulation Agreement, Administrative Penalty Order, etc.). The responsibility for these submittals lies solely with the Company.

If you have any questions or comments on the content of this letter, please contact me at (612)297-8301.

Sincerely,

Craig D. Averman
Performance Test Coordinator
Compliance Determination Unit
Compliance and Enforcement Section
Air Quality Division

CDA:sme

Enclosures

cc: Marshall Cole, MPCA Rochester Regional Office
Mary Jean Fenske, AQD
AQD File No. 602

mmt environmental services, inc.

SOURCE EMISSION COMPLIANCE TEST PLAN
ASPHALT PLANT TEST PLAN #9616

Date Test Plan Written/Revised	MPCA Pre-Test Meeting Date	Scheduled Test Date(s)
August 2, 1994	to be determined	September 7, 1994

PART I. GENERAL INFORMATION

1: Emission Facility: ..... River Bend Asphalt Company
P.O. Box 217
Kasota, MN 56050

2: Facility Contact Person: ..... Larry Nurre
Phone: (507) 625-4848 Fax: (507) 625-4907

3: MPCA file/permit number: ..... Permit #602-93-G-1

4: Reason For Test: ..... Plant particulate emission control equipment has been changed from a wet scrubber to a fabric filter baghouse. Minor modification permit requirement.

5: Source to be Tested:..... Emission Point #1
Asphalt Plant Baghouse Exhaust
See Figure 1 for sampling location data

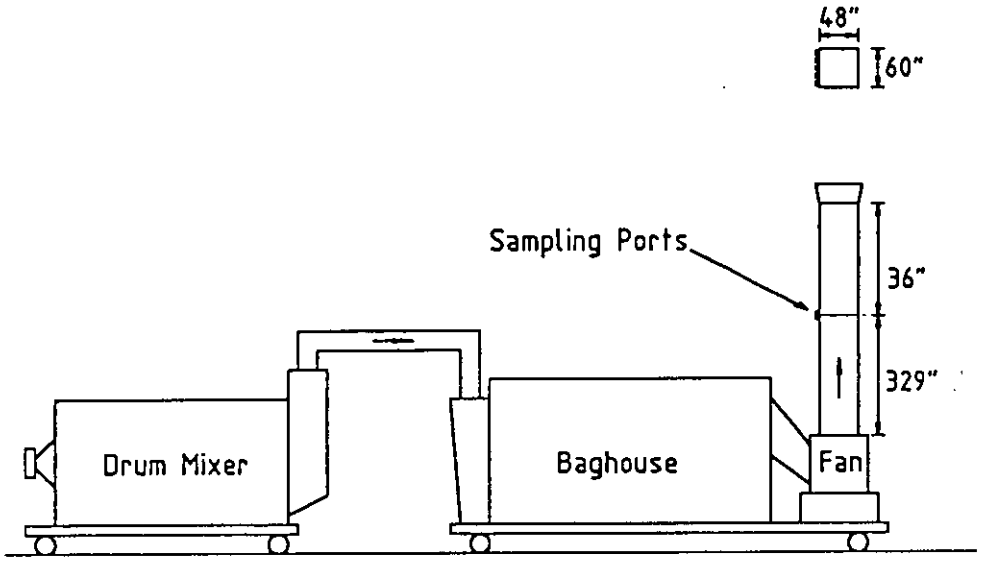
6: Physical Location of Source: ..... Stationary, Located at:
1 mile South of Kasota, MN
on TH 22, LeSueur County, MN

7: Testing Company: ..... MMT Environmental Services, Inc.
4610 N. Churchill Street, St. Paul, MN 55126-5892
Phone: (612) 483-9595 Fax: (612) 483-2699
Contact: Alan Trowbridge

8: Test Plan Discussions: ..... Pre-test meeting

9: Out-of-State Compliance Test: ..... Not Applicable

Figure 1: Process and sampling site schematic



EPA Method 1 Sampling Location Data:

48" stack depth at sampling port location
60" stack width at sampling port location
329" (6.1 diameters) of straight, undisturbed flow before sampling ports
36" (0.68 diameters) of straight, undisturbed flow after sampling ports
25 points required for particulate test
  5 sampling ports
  5 sampling points per port

PART II. TESTING REQUIREMENTS

1. Pollutants to be tested, applicable emission limits, and governing regulations:

Emission Point	Pollutant	Emission Limit	Applicable Rule or Regulation (Emission point #1 defined as an existing source)
1	Particulate Matter	Variable: Exhaust gas particulate concentration must be less than 0.30 gr/dscf and at least one of the following two conditions must be met: 1) Particulate emission rate (lb/hr) must not exceed the amount permitted in MN Rule 7011.0730 for the allocated process weight. 2) Particulate concentration (gr/dscf) must not exceed the amount permitted in MN Rule 7011.0735 for the appropriate source gas volume.	MPCA permit #602-93-G-1 MN Rule 7011.0905, subpart A which references MN Rules 7011.0700 through 7011.0735 MN Rule 7011.0730: Allowable particulate emission rate is process weight rate dependent; P = Process Weight Rate, ton/hr E = Allowable Emission Rate, lb/hr $E = 3.59 \cdot P^{0.62}$ for $P \leq 30$ $E = 17.31 \cdot P^{0.16}$ for $P > 30$ MN Rule 7011.0735: Allowable particulate concentration is source gas volumetric flow rate dependent; Q = Source gas flow rate, dscfm C = Allowable concentration, gr/dscf $C = 0.100$ for $Q \leq 7000$ $C = 1.7669 * Q^{-0.3244}$ for $7000 < Q < 1{,}000{,}000$ $C = 0.020$ for $Q \geq 1{,}000{,}000$
1	Opacity	Exhaust gases must not exhibit greater than 20% opacity, except that a maximum of 40% opacity shall be permissible for not more than four minutes in any 30-minute period and a maximum of 60% opacity shall be permissible for not more than four minutes in any 60-minute period.	MPCA permit #602-93-G-1 MN Rule 7011.0905, subpart B

The emission test must be conducted with the asphalt plant's burner operating on the lowest quality (highest emitting) fuel listed in or allowed by the facility's permit. The fuel to be used during the test on Emission Point #1 is **Used Oil**.

2. Fuel sampling and analysis (Applicable to solid and liquid fuels only):

Required as part of the compliance demonstration. *The MPCA will not accept test reports without an analysis* of fuel samples collected during the test period. Sampling and analytical procedures are describe in MPCA Exhibit D which is also known as Part 11 of the MPCA Air Emission Permit.

1) Sampling - One tap sample is collected during each particulate test run. In order to be representative of the fuel burned during the test period, the fuel sampling location must be as close as possible to the burner. The minimum sample size is one pint.

2) Analysis - The individual fuel samples are to be combined together into a single composite sample which is to be analyzed for the following (e through i apply to Used Oil only):
   a) Sulfur content, % weight
   c) Moisture content (solid fuels), % by wt
   b) Ash content, % by weight
   d) Gross heating value, Btu/gal or Btu/lb
   e) Flash point, °F
   f) Lead content, % by weight
   g) Polychlorinated biphenyls (PCBs), ppm by wt
   h) Organic halogens, % by weight
   i) Acidity, pH

3. Moisture Content of the Aggregate

Required as part of the compliance demonstration. The MPCA will not accept test reports without moisture content analyses of aggregate samples collected during the test period.

1) Sampling - Collect two or more samples of raw material during each particulate test run. In order to be representative of the material processed during the test period, the samples must be collected as close to the drum mixer/dryer as possible. If recycled material is included in the aggregate then , if possible, collect the samples after the virgin and recycled materials have been mixed. Otherwise collect separate samples of the virgin and recycled materials.

For each particulate test run, mix the individual samples into a single composite. If separate virgin and recycled material samples were collected, then combine the individual samples to obtain one virgin-composite and one recycled-composite for each particulate test run.

2) Analysis - Each composite sample is to be analyzed for moisture content per ASTM or other recognized methodologies. If separate virgin and recycled samples were collected, then a mass-weighted average aggregate moisture content must be calculated based on the virgin/recycled proportions processed during the test period.

Note: The facility owner/operator must provide (for inclusion in the test report) a copy of the manufacturer's specifications which define the design capacity of the plant as a function of the aggregate moisture content.

PART III. OPERATING CONDITIONS

1. General operating parameters for each emission point to be tested:

Note that the asphalt plant, pollution control equipment and all related equipment must be operated by the facilities regular operators using their normal operating procedures.

Emission Point #1	
	Process Equipment Description: Equipment ..... Direct Fired Rotary Drum Asphalt Plant Manufacturer/Model ..... Barber Greene Rated Capacity ..... 250 ton/hr @ 6 % moisture
	Process Rates and Operating Conditions during Test: Process weight rate: Aggregate, virgin ..... 162 ton/hr Aggregate, recycle ..... 54 ton/hr Asphalt ..... 9 ton/hr Total process weight rate ..... 225 ton/hr Fuel Type ..... Used Oil
	Control Equipment Description: Equipment ..... Fabric Filter Baghouse Manufacturer/Model ..... StanSteel Corporation model AB-768-15
	Control Equipment Operating Parameters: Normal Pressure Drop ..... 4 in. WC Air-to-Cloth Ratio 5.3:1

2. Explanation of why the proposed test conditions are considered to be the worst case in accordance with Minnesota Rules part 7017.2025, subpart 2:

Emission Point	Rationale For Worst Case
1	Worst case is generally considered to be 1) operation at maximum production level 2) burning of worst quality fuel 3) maximum ratio of recycled to virgin aggregate

3. Definition of the normal range of process or operating rates for each emission unit:

Emission Point	Normal Range of Process or Operating Rates
1	Normal production rates vary between 200 and 225 tons per hour. Aggregate moisture content varies between 3 and 6 percent.

4. For each piece of process and control equipment listed in section III.1. above, the following are the descriptions of how air pollution control and process equipment will be monitored:

Emission Point	Process Equipment Description	Description Of Process Monitoring During Test Period
1	Asphalt plant	Process data will be recorded by plant personnel. Aggregate feed rate monitored by belt scales. Asphalt feed rate determined by Digi-Flow meter. Fuel usage determined by tank level measurement. Dryer gas temperature monitored by thermocouple and indicating meter.

Emission Point	Control Equipment Description	Description Of Control Equipment Monitoring During Test Period
1	Fabric Filter Baghouse	Process data will be recorded by plant personnel. Pressure drop measured by magnehelic gauge.

PART IV. TEST METHODS

1. Specific Test Plan

   A) Three (3) replicate particulate emission test runs per EPA Methods 1, 2, 3, 4 and 5.
   B) One (1) hour of plume opacity observations per EPA Method 9. The opacity observations shall be performed concurrent with one (1) of the particulate emission tests.

2. General Test Methodology

   The following is a general listing of test requirements:

   A: EPA Method 1 for the location of sampling ports and sampling points.

   A check for cyclonic flow must be done whenever there is a cyclonic type of device directly upstream of the sampling location. The check must be performed even if flow straightening vanes have been installed.

   If the sampling location does not meet the minimum requirements of EPA Method 1, then the testing firm must conduct flow pattern evaluation and testing according to the alternative procedures in part 2.5 of EPA Method 1. Flow pattern documentation is required.

   Previously documented flow pattern tests are acceptable providing that no changes have occurred that would affect the flow pattern.

   B: EPA Method 2 for velocity and volumetric flow rate determination. Three (3) test runs are required; one concurrent with each pollutant emission test run.

   C: EPA Method 3 for gas analysis (CO_2 & O_2). Three (3) determinations are required; one integrated sample concurrent with each pollutant emission test run.

   D: EPA Method 4 for determination of moisture in the flue gases. Three (3) test runs are required; one concurrent with each pollutant emission test run.

   E: EPA Method 5 as amended by Minnesota Rules 7017.2060 and 7011.0725 for the determination of particulate matter emissions. Particulate analysis will include back catch condensable organic matter. Three (3) test runs are required and each run must represent a minimum sampling time of 60 minutes and a minimum sample volume of 32 dry standard cubic feet.

   F: EPA Method 9 as amended in Minnesota Rule 7017.2060 for the determination of visible emissions. Normally one (1) sixty-minute test is required. However, if this is an initial compliance test subject to NSPS regulations, then three (3) sixty-minute tests are required.

   If particulate emission testing is being performed, then the opacity test(s) must be performed concurrent with one or more of the EPA Method 5 test runs. Note: weather conditions may make it impossible to obtain valid opacity observations concurrent with the particulate test. If such circumstances exist, the visible emission test will be rescheduled for a later time/date and will be performed at similar load conditions.

3. Reference to any compliance document, federal regulation, or Minnesota rule or statute requiring use of specific methods or procedures, shall be stated in this section. **NONE**

4. Proposed alternative/equivalent test methods: **NONE**

5. Non-reference test method: For each proposed non-reference test method, include a statement of the detection limit and the degree of accuracy of that method at the expected emission rate and under the conditions of the performance test. **NOT APPLICABLE**

NOTE: Sampling times and rates must be increased if necessary to ensure that the detection limit for each pollutant is below the applicable emission limit, using the equation in Minn. Rules pt. 7017.2045, Subpart 6.

PART V. CEMS RELATIVE ACCURACY TEST

Testing of continuous emission monitoring systems is **not** included in this test program.

PART VI. OTHER

For each process unit to be tested the following are specified:

1. Pollutant(s) emissions must be reported in same terms as the emission limit(s).

2. Special averaging times for emission limits: NOT APPLICABLE

3. Plant personnel must complete the following two forms and give them to the testing firm representative for inclusion in the test report. A copy of each form is included at the end of this test plan.
   A) Asphalt Plant Operating Conditions During Stack Testing
   B) Asphalt Plant Operating Data Log

4. One complete test report (one hard copy) shall be submitted to the MPCA within 45 days after the date on which the on-site testing was completed. The test report **must** be submitted to the agency regardless of the test results. Note that submittal of the report to the MPCA is the responsibility of the owner/operator and not of the testing firm.

5. A microfiche copy of the report shall be submitted to the MPCA within 105 days after the date on which the on-site testing was completed. The microfiche copy **must** be submitted to the agency regardless of the test results. Note that submittal of the microfiche copy to the MPCA is the responsibility of the owner/operator and not of the testing firm.

6. All submittals shall be addressed to:

   Supervisor, Compliance Determination Unit
   Compliance and Enforcement Section
   Air Quality Division
   Minnesota Pollution Control Agency
   520 Lafayette Road
   St. Paul, Minnesota 55155-4194

PART VII. MPCA WARNING TO OWNER/OPERATOR

Given the seriousness of exceeding an emission limit, the Company is hereby provided notice that enforcement action will be taken for a first performance test failure . This enforcement action will not be initiated until the results of the retest have been reviewed by MPCA staff and will require the Company to pay a civil penalty.

Please be advised that upon receiving written notice of a second performance test failure, the Company will be required to either shut down the tested process unit(s) or to submit a compliance plan, subject to MPCA approval, which indicates specific measures-to-be-taken which are expected to make all the unit(s) operate in compliance with the applicable emission limitations . The plan must also include specific measures the facility will take to minimize emissions until compliance is demonstrated. However, if the unit(s) continue to operate, they will be considered to be operating in violation of the applicable limits from the date of the performance test until a retest has been conducted that demonstrates compliance .

Please note that results of a performance test are not final until MPCA staff provides a written compliance determination.