AP42 Section: 11.1

Reference Number: 306

Title: Source Sampling For Particulate Emissions, Tri-State Asphalt, Wheeling, WV,

West Virginia Air Pollution Control Commission, Wheeling, WV,

April 24, 1986.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference ~~305~~ 306

WEST VIRGINIA
AIR POLLUTION CONTROL COMMISSION
NORTHERN PANHANDLE REGIONAL OFFICE
1911 Warwood Avenue
WHEELING, WEST VIRGINIA 26003
Telephone: 304-277-2662

MEMORANDUM FOR RECORD

TO: NPRO File DATE: May 20, 1986

FROM: Judith L. Tredway
Air Pollution Specialist II

Bruce E. Morgan
Acting Regional Engineer

SUBJECT: TRI-STATE ASPHALT CORP. - WEIRTON PLANT
Stack Test

FILE: Tri-State Asphalt Corp.
Weirton Plant
Stack Tests

Pursuant to an order issued by Director Carl G. Beard, II in February, 1986 (see letter dated 2/26/86), particulate emissions testing was performed on Tri-State Asphalt Corporation's hot drum mix asphalt Plant at Weirton, WV on Thursday, April 24, 1986. The fabric filter Baghouse tested this date was installed in July, 1985 as a new replacement for a unit that had failed earlier in the month to meet mass emission and opacity limitations.

Actual testing/sampling was conducted by Ramcon Environmental Corporation (Memphis, Tenn.) personnel Ken Allmendinger and Shawn Greenwood. A copy of the pre-test protocol, which includes a comprehensive description of source facilities and operations, is appended hereto as Attachment A.

As required under rules promulgated by the US/EPA in December, 1985 (Vol. 50, No. 249 of the FR), Mr. Jeff Scharding of Chester Engineers (Pbg., Pa.) was retained by Tri-State to conduct visible emissions observations concurrent with mass emissions testing.

All three (3) test runs were monitored by US/EPA-Wheeling Field Office representatives Richard Eaton and David Lorentz along with NPRO compliance personnel Bruce Morgan and Judy Tredway. Messrs. Eaton and Morgan monitored the testing procedures and recorded pertinent

sampling and operating data (Attachments B and C) while Mr. Lorentz and Ms. Tredway conducted concurrent stack opacity observations (Attachment D). Photographs of the stack/effluent were obtained during each test run.

Results based on preliminary field analysis of samples from test Run No. 1 indicated an in-stack particulate concentration of 0.022 gr/dscf (see calculations, Attachment C).

On Friday, May 16, 1986 Mr. Frank Kline (Supt. of Plants, Tri-State Asphalt Corp.) hand-delivered a copy of the final stack test report to the NPRO. That report, appended hereto as Attachment E, indicates compliance with NSPS/WVAPCC mass particulate emission standards as follows:

Applicable standard:	0.04 gr/dscf
Test Run No. 1:	0.0201 gr/dscf (5.5 lbs/hr)
Test Run No. 2:	0.0121 gr/dscf (3.4 lbs/hr)
Test Run No. 3:	0.0089 gr/dscf (2.3 lbs/hr)
Average:	0.0137 gr/dscf (3.7 lbs/hr)

Re visible emissions - all detectable emissions occurred as after-stack plume formations originating from 8 or 10 stack diameters to several yards above the stack exit and were generally white to bluish-white in color. Although the greater majority of emissions were <10% opacity in either case, marginal violations were observed/recorded during test Runs No. 1 and No. 2. With the exception of an occasional reading of 5% opacity, emissions were generally non-detectable or Ø% opacity during Run No. 3.

Comments

According to observers, all testing procedures conformed to specified EPA method requirements.

Visible emission/opacity excursions may have been attributable to prevailing weather conditions during Run No. 1 and to "abnormal" start-up conditions during Run No. 2.

During Run No. 1, ambient temperatures were very cool (50° to 55°F) and after-stack condensation of water vapor was noted for a period of ≤15 minutes. Such conditions may also have caused/contributed to condensation of exhaust gases.

The Plant was shut down for a period of two (2) hours between Runs No. 1 and No. 2. During the "initial" start-up for Run No. 2, "cold mix" adhering to the buckets on the hot mix elevator caused additional adherence/build of "hot mix" which eventually caused complete plugging of the system. The Plant had to be shut down for ≈25 minutes while the elevator system was manually cleaned out. During the re-start, excessive visible emissions were noted for a period of 2 to 3 minutes, which may have been attributable to re-heating of mix retained in the drum.

The writer has no knowledge at this time as to how EPA may rule re status of compliance with applicable VE standards during testing.

Judith L. Tredway
Air Pollution Specialist II

Bruce E. Morgan
Acting Regional Engineer

JLT/gag

Attachments

cc: C. G. Beard, II

ATTACHMENT A

Pretest Protocol

Attachment A

RAMCON ENVIRONMENTAL CORPORATION

RAMCON BUILDING 223 SCOTT STREET MEMPHIS, TENNESSEE 38112 TELEPHONE 901 / 458-7000 800 / 458-4567

PRETEST INFORMATION

TRI STATE ASPHALT COMPANY
R.D. 1, Box 427A
Rayland, Ohio 43943

G. Sumner Buck, III
President

PRE-TEST INFORMATION

During the season of 1986, personnel from RAMCON Environmental Corporation (REC) will be conducting a source emissions test for West Virginia and EPA N.S.P.S. compliance. We will be testing Tri State Asphalt Company's Barber-Greene drum mix asphalt plant located in Weirton, West Virginia on Route 22. Personnel conducting the test will be Sam Turner, Field Supervisor and Allen Turner. Kim Rea will be responsible for the laboratory record books. Custody of the samples will be limited to Mr. Turner and Ms. Rea.

The purpose of the test is to determine if the rate of emissions the plants' baghouse and the total contaminants by weight (grain loading) is below the limits set by the State of West Virginia and by the U.S. Environmental Protection Agency.

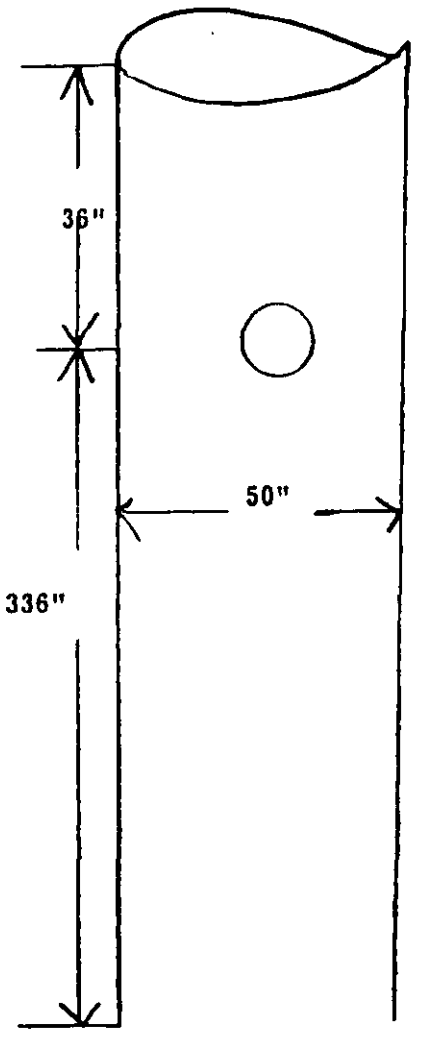
Testing will consist of three runs of US EPA Method 5 as specified in FR 37936, July 25, 1977, as amended. Allowable emissions are not to exceed .04 gr/dscf as specified in 30 FR 9314, March 8, 1974, as amended at 40 FR 46259, October 6, 1975. The minumim volume of gas that will be sampled per test run is .53 cubic feet per minute.

Testing will consist of:

1. Method 5 for particulate matter concentractions and moisture traverse.
2. Method 1 for sample and velocity traverse.
3. Method 2 for velocity and volumetric flow rate.
4. Method 3 for gas analysis.
5. Method 9 for visible emissions (if required).

Sampling Site: The emissions test will be conducted after a baghouse on a round stack with a diameter of 50". The sample ports will be installed 36" down (0.7 diameters upstream) from the top of the stack and 336" up (6.7 diameters downstream) from the last flow disturbance. Thirty two points will be sampled, sixteen through each traverse for two minutes each for a total testing time of sixty four minutes each test run.

Points on a Diameter	Probe Mark
1	1.0"
2	3.9"
3	4.3"
4	6.3"
5	8.5"
6	11.0"
7	14.2"
8	18.8"
9	31.3"
10	35.9"
11	39.0"
12	41.6"
13	43.8"
14	45.8"
15	47.6"
16	49.0"



THE SOURCE

IV. THE SOURCE

Tri State Asphalt Company employs a Barber-Greene drum mix asphalt plant which is used to manufacture asphalt concrete for road pavement. The process consists of blending prescribed portions of cold feed materials (sand, gravel, screenings, chips, etc.) uniformly and adding sufficient hot asphalt oil to bind the mixture together. After the hot asphalt mix is manufactured at the plant, it is transported to the location where it is to be applied. The hot asphalt mix is spread evenly over the surface with a paver and then compacted with a heavy roller to produce the final product.

The following is a general description of the plant's manufacturing process: The cold feed materials (aggregate) are dumped into four separate bins which in turn feed a common continuous conveyor. The aggregate is dispensed from the bins in accordance with the desired formulation onto the cold feed system conveyor to an inclined weigh conveyor then to a rotating drum for continuous mixing and drying at approximately 300°F. When recycled asphalt mix is used, it is added approximately halfway down the drum through a separate weigh conveyor. The required amount of hot asphalt oil is then injected onto and mixed into the dried aggregate. The now newly formed hot asphalt mix is pulled to the top of a storage silo by conveyor. The hot asphalt mix is then discharged from the storage silo through a slide gate into waiting dump trucks, which transport the material to a final destination for spreading. The rated capacity of the plant will vary with each aggregate mix and moisture content with a 5% surface moisture removal.

The drum mixer uses a burner fired with diesel fuel to heat air to dry the aggregate, and the motion of the rotating drum to blend the aggregate and hot asphalt oil thoroughly. The air is drawn into the system via an exhaust fan. After passing through the burner and the mixing drum, the air passes through a baghouse. The baghouse is manufactured by Eastern Controls. The exhaust gasses are drawn through the baghouse and discharged to the atmosphere through the stack. The design pressure drop across the tube sheet is 1 - 4 inches of water. The particulate matter, which is removed by the baghouse is reinjected into the drum mixer.

1. Aggregate bins: Virgin aggregate is fed individually into each of four bins by type. It is metered onto a conveyor belt running under the bins to a shaker screen. The proporation of each aggregate type is determined by the job mix formula and pre-set to be metered out to meet these specifications.

2. Preliminary oversize screen: The aggregate is fed through a shaker screen where oversize rocks and foreign material is screened out of the mix.

3. Weigh conveyor belt: The aggregate is conveyed to the rotary drum dryer on a conveyor belt which weighs the material. The production rate is determined by this weight reading.

4. Rotary drum dryer/mixer: The aggregate is fed into the rotary drum dryer where it is tumbled by flighting into a veil in front of a flame which drives off the moisture. Further mixing is also accomplished in this drum. Hot liquid asphalt is injected approximately one-third of the way down the inclined drum where it is mixed with the aggregate.

5. Burner: The fuel fired burner is used to provide the flame which drys the aggregate.

6. Knock off baffleing: A baffeling plate is inserted in the "dirty" side plenum as a knock out for heavy particles in the air stream. These particles fall to the bottom of the baghouse.

7. Baghouse: The hot gases are pulled through the bags into the clean air plenum. The solid particulate matter is trapped on the dust coat buildup on the bags. A bag cleaning cycle consisting of jet burst of air from the inside (or clean air side) of the bags sends a large bubble of air down the inside of the bags shaking loose buildup on the bag surface. This particulate matter is collected at the bottom of the baghouse and reinjected into the drum mixer where it is used as part of the finished project.

8. Liquid asphalt storage: The liquid asphalt is stored in this heated tank until it is needed in the mixer. The amount of asphalt content and its temperature are pre-set for each different type job.

9. Conveyor to surge/storage bin: The finished product of aggregate mixed with liquid asphalt is conveyed to a surge bin.

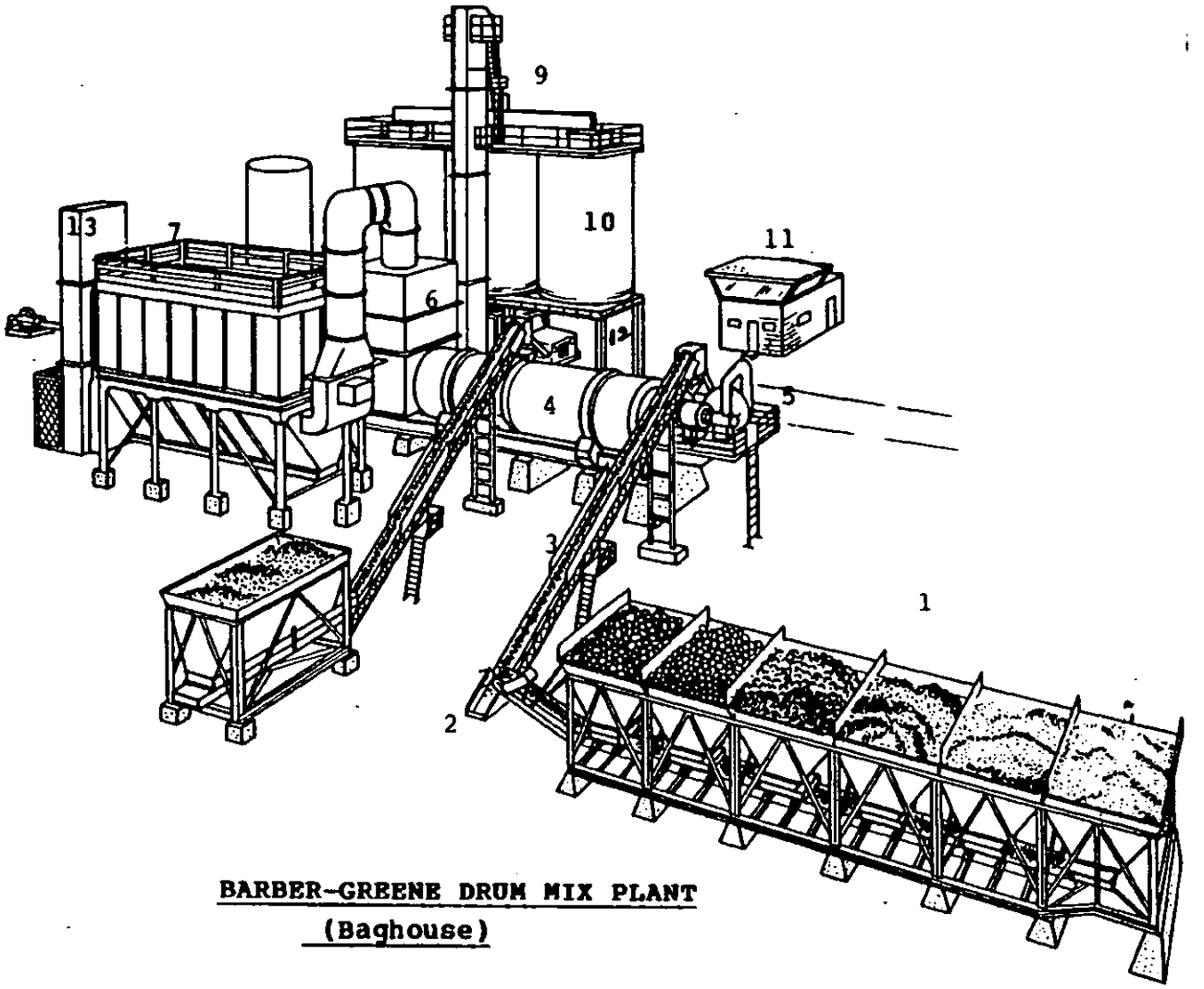
10. Surge/Storage bin: The asphaltic cement is dumped into this surge bin and metered out to dump trucks which pull underneath a slide gate at the bottom of the bin.

11. Control/operators house: The entire plant operation is controlled from this operator's house.

12. Truck loading scale: As the trucks receive the asphalt from the storage/surge bin they are weighed on the loading scale which tells the plant operator the amount of asphalt that is being trucked on each individual load.

13. Fuel Storage

14. Stack



BARBER-GREENE DRUM MIX PLANT

(Baghouse)

EQUIPMENT USED

V. EQUIPMENT USED

Equipment used on conducting the particulate emissions test was:

A. The Lear Siegler PM-100 stack sampler with appropriate auxillary equipment and glassware. The train was set up according to the schematic on the nex page.

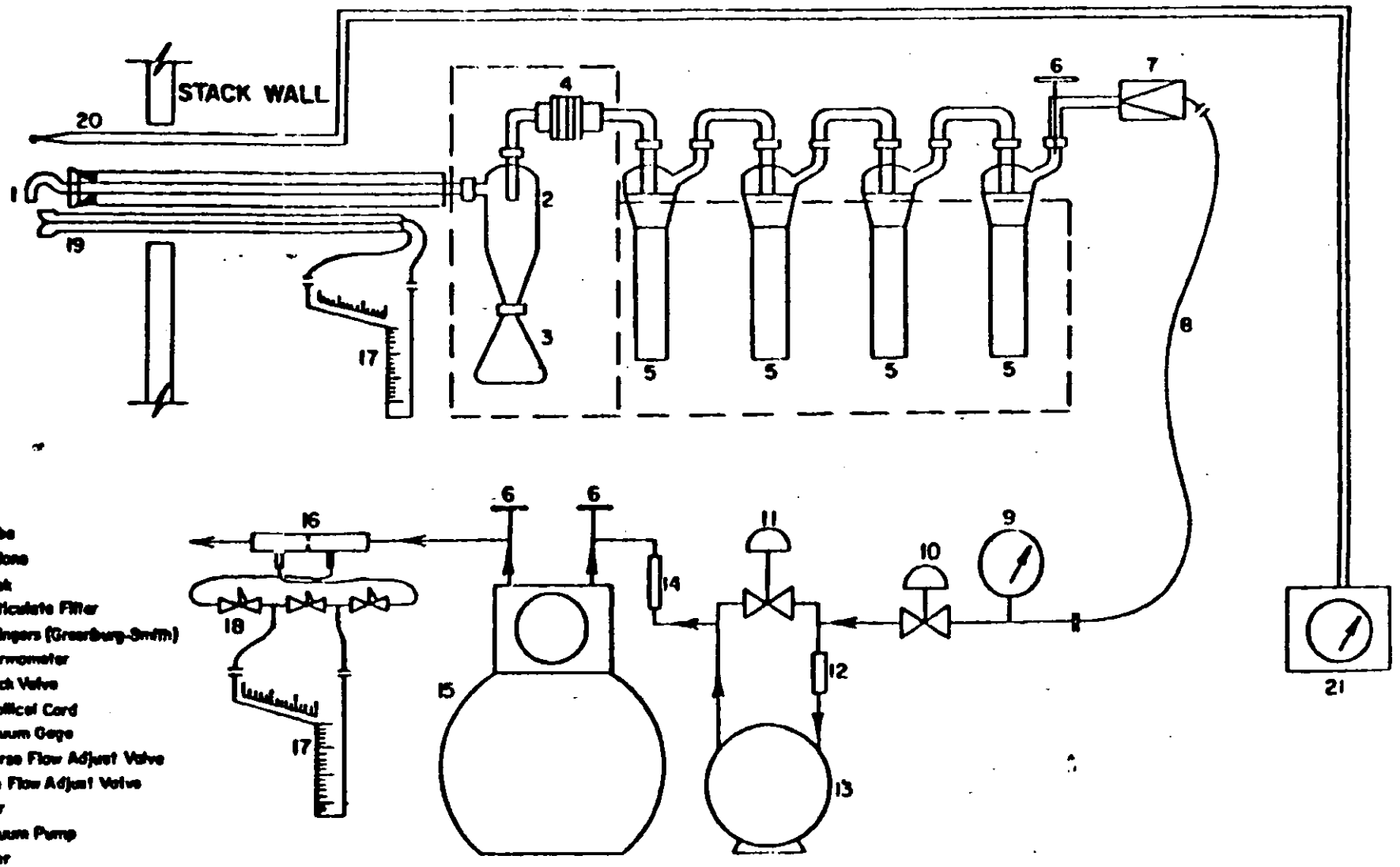
B. An Airguide Instruments Model 211-B (uncorrected) aneroid barometer was used to check the barometric pressure.

C. Weston dial thermometers are used to check meter temperatures. An Analogic Model 2572 Digital Thermocouple is used for stack temperatures.

D. A Hays 621 Analyzer was used to measure the oxygen, carbon dioxide and carbon monoxide content of the stack gases. For non-combustion sources, A Bacharach Instrument Company Fyrite is used for the gas analysis.

E. Filters are mady by Schleicher and Schuell and are type 1-HV with a porosity of .03 microns.

F. The acetone is reagent grade or ACS grade with a residue of $\leq$ .001.



1) Probe
2) Cyclone
3) Flask
4) Particulate Filter
5) Impingers (Greenburg-Smith)
6) Thermometer
7) Check Valve
8) Umbilical Cord
9) Vacuum Gage
10) Course Flow Adjust Valve
11) Fine Flow Adjust Valve
12) Oiler
13) Vacuum Pump
14) Filter
15) Dry Gas Meter
16) Orifice Tube
17) Incline Manometer
18) Solenoid Valves
19) Pitot
20) Thermocouple
21) Pyrometer

SAMPLING TRAIN
USED FOR ISOKINETIC SAMPLING

LABORATORY PROCEDURES

LABORATORY PROCEDURES FOR PARTICULATE SAMPLING

I. Field Preparation

A. FILTERS: Fiberglass 4" sampling filters are prepared as follows:

Filters are removed from their box and numbered on the back side with a felt pen. The numbering system is continuous from job to job. The filters are placed in a dessicator to dry for at least 24 hours. Clean plastic petri dishes, also numbered, top and bottom, are placed in the dessicator with the filters. After dessication, the filters are removed one at a time and weighed on the Sartorius analytical balance, then placed in the correspondingly numbered petri dish. Weights are then recorded in the lab record book. Three filters are used for each complete particulate source emissions test and there should be several extra filters included as spares.

B. SILICA GEL: Silica Gel used for the test is prepared as follows:

Approximately 200 g of silica gel is placed in a wide mouth "Mason" type jar and dried in an oven (175°C for two hours). The open jars are removed and placed in a dessicator until cool (2 hours) and then tightly sealed. The jars are then numbered and weighed on the triple beam balance to the closest tenth of a gram, and this weight is recorded for each sealed jar. The number of silica gel jars used is the same as the number of filters. Silica gel should be indicating type, 6-16 mesh.

II. Post-Testing Lab Analysis

A. FILTERS: The filters are returned to the lab in their sealed glass filter holder which was used in field sampling. In the lab these holders are opened. The filter is placed in its petri dish with the lid off and returned to the dessicator for at least 24 hours. The top half of the filter holder is washed into the corresponding probe wash bottle and the bottom half of the filter holder is washed into the corresponding impinger catch bottle. (See II, C and D). After dessication, the filters are reweighed. The final weight is recorded in the lab record book. The filter pick up weight is calculated and recorded also. This procedure is repeated for all filters used in the field.

Alternately, the test team may opt to oven dry the filters at 220°F for two to three hours, weigh the sample, and use this weight as a final weight.

B. SILICA GEL: The sealed silica gel jars should be reweighed on the triple-beam balance and their weights recorded as shown on previous page.

C. PROBE RINSINGS: In all tests, a probe wash-out analysis will be necessary. These samples are returned in sealed Mason jars and consist of A.R. Acetone with an unknown solid content. Clean 250 ml beakers are used to make this analysis. These should be immaculately washed and rinsed with deionized water, then oven dried at 105°C for about one hour. The beakers should be moved to the dessicator to cool for ninety (90) minutes, then labeled with a pencil and weighed on the Sartorius analytical balance. Any variance from this procedure should be duplicated exactly when reweighing, as this procedure has been found to be quite sensitive. After preparing the necessary number of beakers (one for each probe wash and one blank) the Mason jars should be opened, poured into the beaker, and any material remaining on the jar walls rinsed with an acetone wash bottle into the beaker. The amount of liquid in the beaker should be noted on the analysis form. The acetone rinsings are evaporated on a warming plate. The liquid is kept swirled with an air sweep to prevent "bumping". When the acetone is evaporated the beakers are weighed as in Section II A.

D. IMPINGER CATCH: In some testing cases, the liquid collected in the impingers must be analyzed for solids content. This involves a similar procedure to the probe wash solids determination, except that the liquid is deionized water.

E. ACETONE: Conduct a blank analysis of acetone in the 1 gallon glass container. This acetone will be used in the field for rinsing the probe, nozzle, and top half of the filter holder. Performing such a blank analysis prior to testing will insure that the quality of the acetone to be used will not exceed the .001% residual purity standard.

SPECIAL NOTE

When sampling sources high in moisture content, (such as asphalt plants) the filter paper sometimes sticks to the filter holder. When removing the filter it may tear. In order to maintain control of any small pieces of filter paper which may be easily lost, they are washed with acetone into the probe washing. This makes the filter weight light (sometimes negative) and the probe wash correspondingly heavier. The net weight is the same and no particulate is lost. This laboratory procedure is taught by EPA in the Quality Assurance for Source Emissions Workshop at Research Triangle Park and is approved by EPA.

WEIGHING PROCEDURE - SARTORIUS ANALYTICAL BALANCE

The Sartorius balance is accurate to 0.1 mg and has a maximum capacity of 200 grams. The balance precision (standard deviation) is 0.05 mg. Before weighing an item, the balance should first be zeroed. This step should be taken before every series of weighings. To do this, the balance should have all weight adjustments at "zero" position. The beam arrest lever (on the lower left hand side toward the rear of the balance) is then slowly pressed downward to full release position. The lighted vernier scale on the front of the cabinet should align the "zero" with the mark on the cabinet. If it is not so aligned, the adjustment knob on the right hand side (near the rear of the cabinet) should be turned carefully until the marks align. Now return the beam arrest to horizontal arrest position. The balance is now "zeroed".

To weigh an item, it is first placed on the pan. And the sliding doors are closed to avoid air current disturbance. The weight adjustment knob on the right hand side must be at "zero". The beam arrest is then slowly turned upward. The lighted scale at the front of the cabinet will now indicate the weight of the item in grams. If the scale goes past the divided area, the item then exceeds 100 g weight (about 3-1/2 ounces) and it is necessary to arrest the balance (beam arrest lever) and move the lever for 100 g weight away from you. It is located on the left hand side of the cabinet near the front, and is the knob closest to the side of the cabinet. The balance will not weigh items greater than 200 grams in mass, and trying to do this might harm the balance. Remember -- this is a delicate precision instrument.

After the beam is arrested, in either weight range, the procedure is the same. When the weight of the item in grams is found, "dial in" that amount with the two knobs on the left hand side (near the 100 g lever) color coded yellow and green. As you dial the weight, the digits will appear on the front of the cabinet. When the proper amount is dialed, carefully move the arrest lever down with a slow, steady turn of the wrist. The lighted dial will appear, and the right hand side knob (front of cabinet) is turned to align the mark with the lower of the two lighted scale divisions which the mark appears between. When these marks are aligned, the two lighted digits along with the two indicated on the right hand window on the cabinet front are the fractional weight in grams (the decimal would appear before the lighted digits) and the whole number of grams weight is the amount "dialed in" on the left.

In general, be sure that the beam is in "arrest" position before placing weight on or taking weight off of the pan. Don't "dial in" weight unless the beam is arrested. The balance is sensitive to even a hand on the table near the balance, so be careful and painstaking in every movement while weighing.

TYPICAL FORMS USED

DATA SUMMARY

Plant

1. Manufacturer of plant _____.
2. Designed maximum operating capacity ____TPH @ ____% moisture.
3. Actual operation rate _____TPH @ _____% moisture.
4. Startup date _____.
5. Type of fuel used in dryer _____.
6. Quanity of fuel consumption _____.

Aggregate

7. Name/type of mix _____.
8. Percent asphalt in mix _____%.
9. Temperature of asphalt _____.
10. Sieve/Screening analysis: % Passing;

1"	_____	3/8"	_____	#	_____
3/4"	_____	#	_____	#	_____
1/2"	_____	#	_____	#200	_____

Scrubber Control System

11. Manufacturer _____.
12. Type; Venturi _____; Wet Washer _____;
    Spray Booth_____; Other _____.
13. Water line pressure _____psi.
14. Pressure drop across system _____psi.
15. Gallons per minute through system _____.
16. Water source _____(i.e., lagoon, pond, etc.)
17. Number of spray nozzles _____.

COMPANY NAME _____

COMPANY REPRESENTATIVE _____

DATE _____

PLANT DATA

COMPANY NAME ____

COMPANY REP. ____________________ DATE ______________________ PHONE # ____________

DATA SOURCE ____

PLANT LOCATION ____

PLANT MFG. ____________________ PLANT MODEL # _______________ PLANT TYPE ___________

MIX SPECIFICATION # ____________________ OIL SPECIFICATION # ____________________

Time 24 Hour	__ Fuel Oil __ Nat. Gas __ Propane __ Coal __ ________	Burner Setting ________	Aggregate TPH	Recycle TPH	Liquid Asphalt TPH	Mix Temp. °F	__ Venturi __ Baghouse Pressure Drop Inches Water

SAMPLE ANALYTICAL DATA FORM

Plant Location _____

Sample Location _____

		Run #	Run #	Run #
Relative humidity in lab	%			
Density of acetone (p_a) .78	mg/ml			
Acetone rinse container number	#			
Acetone rinse volume (V_{aw})	ml			
		Gross	Tare	Net
Acetone blank (M_a)	g			

Acetone blank residue concentration (C_a)

(C_a) = (M_a) / (V_{aw}) (p_a) = (mg/g)

Weight of residue in acetone wash

$W_a = C_a V_{aw} p_a$ = ( ) ( ) ( ) = ( )

Date/Time of wt _____ Gross wt	g			
Date/Time of wt _____ Gross wt	g			
Average Gross wt	g			
Tare wt	g			
Less acetone blank wt (W_a)	g			
Wt of particulate in acetone rinse (m_a)	g			

Filter Numbers	#			
Date/Time of wt _____ Gross wt	g			
Date/Time of wt _____ Gross wt	g			
Average Gross wt	g			
Tare wt	g			

Weight of particulate on filters(s) (m_f)	g			
Weight of particulate in acetone rinse	g			
Total weight of particulate (m_n)	g			

Remarks _____

_____

Signature of analyst _____ Signature of reviewer _____

SAMPLE RECOVERY AND INTEGRITY DATA FORM

Plant _____ Sample Date _____

Sample location _____

Sample recovery person _____ Recovery Date _____

MOISTURE

	Run	Run	Run
Impingers			
Final volume (wt) ml (g)			
Initial volume (wt) ml (g)			
Net volume (wt) ml (g)			
Silica Gel			
Final wt (g)			
Initial wt (g)			
Net wt (g)			
Color of silica gel			
Description of impinger water			
Total moisture (g)			

RECOVERED SAMPLE

Filter numbers			
Filter containers sealed			
Description of particulate on filters			
Acetone rinse container number/Level			
Acetone blank container number/Level			
Samples stored and locked			

Remarks _____

_____

_____

Date of laboratory custody _____

Laboratory personnel taking custody _____

RAMCON ENVIRONMENTAL CORPORATION

Plant _____

Location _____
Operator _____
Date _____
Run No. _____
Sample Box No. _____
Meter Box No. _____
Meter H @ _____
C Factor _____
Pitot Tube Coefficient Cp _____

Ambient Temperature _____
Barometric Pressure _____
Assumed Moisture, % _____
Probe Length, m(ft) _____
Nozzle Identification No. _____
Avg. Calibrated Nozzle Dia., (in.) _____
Probe Heater Setting _____
Leak Rate, m^3/min. (cfm) _____
Probe Liner Material _____
Static Pressure, mm Hg (in. Hg) _____
Filter No. _____

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL		
INITIAL		
DIFFERENCE		

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F		FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
							Inlet	Outlet		

Form #REC-05

Stack Diameter _____ _____

Equivalent Diameter = $\frac{2\ LW}{L + W}$

	POINTS ON A DIAMETER	PLUS STANDOFF	PROBE MARK	STATIC PRESSURE	VELOCITY ΔP	STACK TEMP.	
1.							1.
2.							2.
3.							3.
4.							4.
5.							5.
6.							6.
7.							7.
8.							8.
9.							9.
10.							10.
11.							11.
12.							12.
13.							13.
14.							14.
15.							15.
16.							16.
17.							17.
18.							18.
19.							19.
20.							20.
21.							21.
22.							22.
23.							23.
24.							24.

$$\Delta M = 846.72 \left(D_N\right)^4 \left(C_p\right)^2 \left(1 - B_{wo}\right)^2 \Delta M_D \frac{M_d}{M_s} \frac{T_a}{T_s} \frac{P_s}{P_a} \Delta P$$

Form #REC-06

RAMCON emissions test log sheet, cont. DATE__________ LOCATION__________ TEST NO.__________

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							in	out		

$V_{m(std)} = 11.64(\quad)\left(\frac{P_{bar} + \frac{13.6}{}}{T_M}\right) =$ _____

$X_{w(sed)} = .0474\ (\ V_{ic}\ ) =$ _____

$B_{ws)} = \frac{W_w}{V_w + V_M} =$ _____

$M_d = .44(CO_2) + .32(O_2) + .28(N_2 + CO) =$ _____

$M_s = M_d(1 - B_{ws}) + 18(B_{ws}) =$ _____

$V_s = 85.48(C_p)(\Sigma\sqrt{\Delta P}_{Avg})\left(\frac{T_s}{M_s P_s}\right)^{1/2} =$ _____

$I = 1.667\left[\frac{(.00267)(V_{ic})}{\emptyset\ V_s} + \frac{\frac{V_M}{T_M}\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{P_s\ A_N}\right] T_s =$ _____

$Q_s = 3600\,(1 - B_{ws}) \cdot V_s \cdot A_s \cdot (17.64)(P_s / T_s) =$ _____

$C_s = .0154\,\frac{M_N}{V_{M(std)}} =$ _____ $\quad E = \frac{C_s \cdot Q_s}{7000} =$ _____

$Y_c = \frac{10}{V_M}\left[\frac{0.0319}{P_{bar}}\right]^{1/2} =$ _____ $\quad E' = \frac{C_s F}{7000}\left[\frac{20.9}{20.9 - O_2}\right] =$ _____

$ACFM = 60 \cdot V_s \cdot A_s =$ _____

RUN NO. _____

$\Sigma\sqrt{\Delta P}_{Avg} =$ ___ $\quad T_s\ (°R) =$ ___ $\quad P_{bar} =$ ___ $\quad V_{ic} =$ gal ___ IMP ___ cyc ___

$\Delta H =$ ___ $\quad T_M\ (°R) =$ ___ $\quad V_M =$ ___

ATTACHMENT B

Source/Operating Data

Tri-State Asphalt Corp., Weirton Plant
Re Stack Test 4/24/86 - Source/Operating Data - Attachment B

Source Data - General

Plant

Manufacturer/Model Barber-Greene/DM-665
Original start-up date July, 1984
Process rate:
- Design max capacity 300 TPH @ 4% moisture
- Normal max operation 240 TPH @ 5% moisture

Dryer fuel:
- Type No. 2 Fuel Oil
- Norm. consumption rate 336 gal/hr

Baghouse

Manufacturer Eastern Control Systems
Type Pulse air
Installation date July, 1985
No. Bags 540
Bag fabric 100% Nomex
Total cloth area 7,290 sq. ft.
Design gas volume 54,000 ACFM
Air-to-cloth ratio 7.4:1
Pressure drop 4.5 in., WC
Cleaning:
- Pulse pressure 90-100 psi
- Pulse duration 0.12 sec.
- Pulse cycle 60 sec.

Tri-State Asphalt Corp., Weirton
Re Stack Test 4/24/86 - Source/Operating Data - Attachment B

Operating Data - 4/24/86

Parameter	Run No. 1	Run No. 2	Run No. 3
(Time of test)	(10:03 AM - 11:18 AM)	(1:25 PM - 3:03 PM)	(4:28 PM - 5:36 PM)
(Time "parameters" observed)	(10:25 AM)	(2:15 PM)	(5:02 PM)
Process rate, TPH	220	199	220
Mix temp., °F	300	305	295
Burner setting, %	55	34	39
Percent asphalt	6.0	6.0	6.0
Percent sand	49	*49	51
Percent lg. aggregate	51	*51	49
Baghouse:			
ΔP, in. water	4.5	4.5	4.1
inlet temp., °F	285	290	280
pulse pressure, psig	100	90	90
pulse cycle (timed), sec.	55	55	35
Power consump., amps:			
hot elevator	40	40	40
exhaust fan	135	137	135
burner blower	52	50	50
drum mixer motor No. 1	17(spkg)	17	17
" " " No. 2	17	17	17
" " " No. 3	17	17	17
" " " No. 4	17	17	17

*Changed to 51% sand and 49% agg. at 2:30 PM

Hot Mix Data

Name/type mix: Wrg. I
Percent asphalt: 6.0
Avg. mix temp.: 310°F
Sieve/screen analysis:

1"		3/8"	95%	#16	30%
3/4"		#4	62%	#100	4%
1/2"	100%	#8	44%	#200	2.5%

Tri-State Asphalt Corp., Weirton Plant
Re Stack Test 4/24/86 - Source/Operating Data - Attachment B

Operating Data (Cont'd)

Test Run No. 1

Time Obsvd.	Burner Setting %	Aggregate Feed Rate TPH	Asphalt %	Mix Temp. °F	Baghouse Δ P in. H_2O
9:40 AM	34	177	6.0	305	3.3
9:55	37	200	"	310	4.0
10:10	45	215	"	310	4.1
10:25	55	220	"	300	4.6
10:40	56	220	"	305	4.5
10:55	45	220	"	315	4.1
11:10	43	220	"	314	3.6

Test Run No. 2

Time Obsvd.	Burner Setting %	Aggregate Feed Rate TPH	Asphalt %	Mix Temp. °F	Baghouse Δ P in. H_2O
1:45 PM	40	175	6.0	285	3.5
2:00	40	200	"	295	3.8
2:15	34	200	"	305	4.4
2:30	34	225	"	310	4.5
2:45		220	"		4.5
3:00	41	225	"	313	4.5
3:15	40	225	"	310	4.4

Test Run No. 3

Time Obsvd.	Burner Setting %	Aggregate Feed Rate	Asphalt %	Mix Temp. °F	Baghouse Δ P in. H_2O
4:30 PM	21	150	6.0	317	3.2
4:45	35	200	"	304	4.0
5:00	39	225	"	295	4.1
5:15	39	225	"	305	4.1
5:30	39	225	"	310	4.6

ATTACHMENT C

Sampling Data

Tri-State Asphalt Corp., Weirton Plant
Stack Test 4/24/86 - Sampling Data - Attachment C

Preliminary Test Results - Run No. 1

Acetone Rinse

Beaker gross wt.	136.8755 g
Beaker tare wt.	136.8320 g
Particulate wt.	0.0435 g

Filter No. SG-1310

Filter gross wt.	0.6997
Filter tare wt.	0.6880
Particulate wt.	0.0117

Total Particulate wt. 0.552 g

Particulate stack concentration

$$Cs = \left(0.0154 \frac{gr}{mg}\right)\left(\frac{Mn}{Vm(std)}\right)$$

Where:

Cs = particulate concentration, gr/dscf
Mn = total particulate wt. collected, mg
Vm(std.) = dry gas volume @ standard conditions, cu.ft.

$$Cs = \left(0.0154 \frac{gr}{mg}\right)\left(\frac{55.2}{39.16}\right) = .0217 \text{ gr/dscf}$$

TRI-STATE ASPHALT CORP., WEIRTON PLANT
STACK TEST 4/24/86 – ATTACHMENT C

SAMPLING DATA

U.S. EPA - Wheeling Office

PAGE 1 of

Client TRI - STATE ASPHALT

Location WEIRTON, WV

Operator R. ALLMENDINGER

Date 4-24-86

Run No. 1

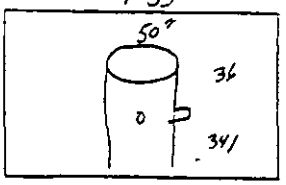
Sample Box No. 1

Meter Box No. 6468R

Meter H @ 1.78

Y Factor 1.001

Pitot Tube Coefficient Cp .84



Schematic of Stack Cross Section

Ambient Temperature	70										
Barometric Pressure	25.7										
Assumed Moisture, %	30										
Probe Length, m(ft)	5'										
Nozzle Identification No.	1004-885										
Avg. Calibrated Nozzle Dia., (in.)	.231/.231/.230										
Probe Heater Setting	325										
Leak Rate, m^3/min. ($c\bar{f}m$)											
Probe Liner Material	316 STAINLESS										
Static Pressure, mm Hg (in. Hg)											
Filter No.											

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	GAS SAMPLE TEMP. AT DRY GAS METER °F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A) 1	10:03 / 10:05	4	150	1.0	1.4	444.713 / 448.59	65	60	270	45
2	10:07	4	155	1.1	1.5	479.22	75	60	265	45
3	10:09	4	160	1.1	1.5	458.44	80	60	260	45
4	10:11	4	165	1.1	1.5	499.81	80	60	255	45
5	10:13	4	170	1.1	1.5	501.25	85	60	250	45
6	10:15	4	170	1.1	1.5	502.31	85	65	250	45
7	10:17	4	170	1.1	1.5	503.59	90	65	245	45
8	10:19	5	165	1.2	1.6	504.93	90	65	240	45
9	10:21	5	170	1.2	1.6	506.21	90	65	250	45
10	10:23	4	165	1.0	1.4	507.58	90	65	255	45
11	10:25	4	165	.96	1.3	508.86	90	70	260	45
12	10:27	4	165	.94	1.3	510.15	95	70	250	45
13	10:29	4	170	.94	1.3	511.45	95	70	255	45

U.S. EPA - Wheeling Office

PAGE: 2 of ____

Plant TRI-STATE ASPHALT

Location WEIRTON WV
Operator R. ALLMENDINGER
Date 4-24-86
Run No. 1
Sample Box No. 1
Meter Box No. 64E882
Meter H @ 1.98
Y Factor 1.00
Pitot Tube Coefficient Cp .84

Schematic of Stack Cross Section

Ambient Temperature
Barometric Pressure
Assumed Moisture, %
Probe Length, m(ft)
Nozzle Identification No.
Avg. Calibrated Nozzle Dia., (in.)
Probe Heater Setting
Leak Rate, m^3/min. (cfm)
Probe Liner Material
Static Pressure, mm Hg(in.Hg)
Filter No.

TRAV. PT NO.	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_g) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	GAS SAMPLE TEMP. AT DRY GAS METER °F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
14	10:31	4	170	.64	1.3	512.71	95	70	260	45
15	10:33	4	165	.92	1.2	513.96	95	70	250	45
16	10:35:10	4	165	.90	1.2	515.18	95	70	255	45
B) 1	10:42.8 10:74	4	160	.80	1.1	516.36	85	75	250	45
2	10:46	4	170	.85	1.3	517.60	90	75	245	45
3	10:48	4	165	.95	1.3	518.81	85	75	240	45
4	10:50	4	165	.85	1.2	520.03	95	75	250	45
5	10:52	4	165	.90	1.2	521.23	100	75	255	45
6	10:54	4	160	.90	1.2	522.44	100	75	260	45
7	10:56	5	165	1.0	1.4	523.75	100	75	265	45
8	10:58	5	165	.95	1.3	525.00	100	75	260	45
9	11:00	5	170	.95	1.3	526.27	100	75	260	45
10	11:01	5	170	.93	1.3	526.92	100	75	255	45

U.S. EPA - Wheeling Office

Plant TRI STATE ASPHALT

Location WEIRTON, W. VA.

Operator

Date 4/24/88

Run No.

Sample Box No. 1

Meter Box No.

Meter H @

Pitot Factor

Pitot Tube Coefficient Cp

Ambient Temperature

Barometric Pressure

Assumed Moisture, %

Probe Length, m(ft)

Nozzle Identification No.

Avg. Calibrated Nozzle Dia., (in.)

Probe Heater Setting

Leak Rate, m^3/min. (cfm)

Probe Liner Material

Static Pressure, mm Hg(in.Hg)

Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (P_s) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	°F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
11	~~11:03~~ 11:08	5	160	.93	1.3	~~531.3~~	90	80	260	45
12	11:10	4	165	.90	1.2	530.20	100	80	265	45
13	11:12	4	165	.90	1.2	531.21	100	80	255	45
14	11:14	4	170	.92	1.2	532.49	100	80	250	45
15	11:16	5	165	.95	1.3	533.74	100	80	245	45
16	11:18	5	200	.92	1.22	534.97	100	80	240	45

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Plant TRI-STATE ASPHALT

Pp = 1.42

Location WEIRTON, W VA.
Operator MILMENDINGER
Date 4-24-85
Run No. 3
Sample Box No. ____
Meter Box No. 4&5
Meter H@ 1.5
Factor 1.001
Pitot Tube Coefficient Cp .84

Ambient Temperature 73
Barometric Pressure 29.71
Assumed Moisture, % 30 (INITIAL) 200 30
Probe Length, m(ft) 5 (DIFFERENCE)
Nozzle Identification No. 1 .0053 .585
Avg. Calibrated Nozzle Dia., (in.) .231
Probe Heater Setting 3.5
Leak Rate, m³/min. (cfm) .018
Probe Liner Material 316 STAINLESS STEEL
Static Pressure, mm Hg(in.Hg) ____
Filter No. ____

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Ps) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft³	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A) 1	~~1:25.45~~ 1:27	3	150	.80	1.1	~~538.11~~ 536.28	85	80	225	45
2	1:29	3	165	.88	1.2	537.50	90	80	230	45
* 3	1:31:45	4	165	.90	1.3	538.19	95	80	235	45
4	~~1:58~~ 2:02	5	175	1.1	1.6	540.25	85	80	260	45
5	2:04	5	195	1.1	1.6	541.58	95	80	265	45
6	2:06	6	205	1.1	1.6	542.94	100	80	260	45
7	2:08	6	200	1.1	1.6	544.31	100	80	250	45
8	2:10	6	200	1.1	1.6	545.67	100	80	245	45
9	2:12	6	105	1.2	1.7	547.18	105	80	240	45
10	2:14	5	100	.96	1.4	548.53	105	80	250	45
11	2:16	4	100	.95	1.3	549.84	105	85	255	45
12	2:18	4	100	.90	1.3	551.14	105	85	250	45
13	2:20	4	105	.88	1.2	~~552.39~~	105	85	260	45

* delay due to equipment failure

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Plant TRI-STATE ASPHALT
Location WELLTON, W. VA.
Operator ALMEND
Date 4-24-84
Run No. 2
Sample Box No. 1
Meter Box No. 64,685
Meter H @ 1.98
Y Factor 1.051
Pitot Tube Coefficient Cp .87

Ambient Temperature
Barometric Pressure
Assumed Moisture, %
Probe Length, m(ft)
Nozzle Identification No. .000284.5
Avg. Calibrated Nozzle Dia., (in.) .230
Probe Heater Setting 3.5
Leak Rate, m³/min. (cfm)
Probe Liner Material 316 STAINLESS STEEL
Static Pressure, mm Hg(in. Hg)
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Ps) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft³	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	GAS SAMPLE TEMP. AT DRY GAS METER °F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
14	2:22	4	100	.83	1.2	553.16	105	85	250	45
15	2:24	4	100	.80	1.1	554.85	105	85	245	45
16	2:26	4	105	.75	1.1	556.053	105	85	240	45
B) 1	2:31 / 2:33	5	105	1.0	1.4	557.40	85	85	245	45
2	2:35	5	105	1.1	1.6	558.80	105	85	250	45
3	2:37	5	105	1.2	1.7	560.24	105	85	260	45
4	2:39	5	110	1.2	1.7	561.68	110	85	265	45
5	2:41	5	110	1.2	1.7	563.15	110	85	255	45
6	2:43	5	110	1.2	1.7	564.56	110	85	250	45
7	2:45	5	110	1.2	1.7	565.88	110	85	245	45
8	2:47	5	110	1.1	1.6	567.42	110	85	240	45
9	2:49	4	110	.80	1.1	568.79	110	85	245	45
10	2:51	4	110	.78	1.1	569.96	110	85	250	45

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Plant TRI STATE

Location WEIRTON, W.VA.

Operator

Date 4-24-96

Run No. 3

Sample Box No.

Meter Box No. DGS82

Meter H @ 1.78

Factor 1.001

Pitot Tube Coefficient Cp .84

Ambient Temperature

Barometric Pressure

Assumed Moisture, %

Probe Length, m(ft)

Nozzle Identification No.

Avg. Calibrated Nozzle Dia., (in.)

Probe Heater Setting 3.5

Leak Rate, m^3/min. (cfm)

Probe Liner Material

Static Pressure, mm Hg(in. Hg)

Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD [P_s) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	GAS SAMPLE TEMP. AT DRY GAS METER °F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
11	2:53	4	110	.75	1.1	571.18				
12	2:55	4	110	.73	1.0	572.33	110	85	255	45
13	2:57	4	110	.70	.96	573.48	110	85	260	45
14	2:59	4	110	.68	.97	574.62	110	85	255	45
15	3:01	4	115	.65	.92	575.73	110	85	250	45
16	3:03	3	115	.60	.85	576.75	110	85	240	45

U.S. EPA - Wheeling Office

Client RI STATE ASPHALT

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Location WEIRTON, W.VA.
Operator R. ALLMINDINGER
Date 4-24-88
Run No. 3
Sample Box No. 1
Meter Box No. 641885
Meter H @ 1.98
K Factor 1.021
Pitot Tube Coefficient Cp .84

Ambient Temperature
Barometric Pressure
Assumed Moisture, %
Probe Length, m(ft)
Nozzle Identification No.
Avg. Calibrated Nozzle Dia., (in.) 3.5
Probe Heater Setting
Leak Rate, m^3/min. ($c\bar{f}m$)
Probe Liner Material 316 STAINLESS STEEL
Static Pressure, mm Hg (in. Hg)
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A) 1	4:30	2	160	.80	1.1	571.92	90	85	250	45
2	4:32	2	170	.85	1.2	576.49	95	85	250	45
3	4:34	2	180	.87	1.2	579.73	95	85	250	45
4	4:36	2	180	.90	1.3	580.98	100	85	255	45
5	4:38	2	175	.90	1.3	582.27	100	85	255	45
6	4:40	2	180	.87	1.2	583.56	100	85	250	45
7	4.42	2	200	.87	1.2	584.83	105	85	250	45
8	4:44	3	200	.95	1.3	586.07	105	85	250	45
9	4:46	3	200	1.2	1.7	587.40	105	85	245	45
10	4.48	3	175	1.2	1.7	588.86	105	85	250	45
11	4:50	3	175	1.2	1.7	590.31	105	85	250	45
12	4:52	2	195	.87	1.2	591.77	105	85	255	45
13	4:54	2	190	.85	1.2	593.05	105	85	250	45
						594.32	105	85	250	45

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Plant: TRI STATE ASPHALT
Location: WEIRTON, W.VA.
Operator: K. ALLMENDINGER
Date: 4-24-86
Run No.: 3
Sample Box No.: 1
Meter Box No.: 6408R
Meter H@: 1.78
Y Factor: 1.001
Pitot Tube Coefficient Cp: .84

Ambient Temperature
Barometric Pressure
Assumed Moisture, %
Probe Length, m(ft)
Nozzle Identification No.
Avg. Calibrated Nozzle Dia., (in.)
Probe Heater Setting: 3.5
Leak Rate, m³/min. (cfm)
Probe Liner Material: 316 STAINLESS STEEL
Static Pressure, mm Hg (in. Hg)
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Ps) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft³	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	°F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
14	4:56	2	200	.80	1.1	585.67	105	85	250	45
15	4:58	2	190	.75	1.1	596.74	105	85	255	45
16	5:00	2	190	.70	.99	597.87	105	85	255	45
8 1	5:04	2	190	.87	1.2	599.13	95	85	250	45
2	5:08	3	175	1.0	1.4	602.46	105	85	250	45
3	~~5:10~~	3	175	1.1	1.6	601.88	105	85	250	45
4	5:12	3	175	1.2	1.7	603.35	110	85	245	45
5	5:14	3	175	1.2	1.7	604.82	110	85	245	45
6	5:16	3	170	1.2	1.7	606.31	110	85	250	45
7	5:18	3	170	1.2	1.7	607.82	110	85	250	45
8	5:20	3	270	1.2	1.7	609.31	110	85	250	45
9	5:22	3	280	1.0	1.4	610.65	110	85	255	45
10	5:24	3	260	.90	1.3	611.97	110	85	255	45

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lant: TRI STATE

ocation: WESTON, WV
perator: R. HILGENBINGER
ate: 8-24-91
un No.: 3
ample Box No.: _____
eter Box No.: 04282
eter H @: 1.98
Factor: 1.00
itot Tube Coefficient Cp: .84

Ambient Temperature: _____
Barometric Pressure: _____
Assumed Moisture, %: _____
Probe Length, m(ft): _____
Nozzle Identification No.: _____
Avg. Calibrated Nozzle Dia., (in.): _____
Probe Heater Setting: 3.5
Leak Rate, m^3/min. (cfm): _____
Probe Liner Material: 316 STAINLESS STEEL
Static Pressure, mm Hg(in.Hg): _____
Filter No.: _____

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (P_g) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F		FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
							Inlet	Outlet		
11	~~5:26~~	3	265	.87	1.2	~~613.~~	110	85	255	45
12	5:28	3	270	.85	1.2	614.54	110	85	250	45
13	5:30	3	200	.85	1.2	615.70	110	85	250	45
14	5:32	3	175	.85	1.2	617.10	110	85	250	45
15	5:34	3	175	.85	1.2	618.37	110	85	250	45
16	5:36	3	175	.75	1.1	619.61	110	85	250	45

ATTACHMENT D

VE Observation Records

Attachment D

VISIBLE EMISSIONS OBSERVATION RECORD

COMPANY TRI-STATE ASPHALT PLANT WEIRTON

CITY WEIRTON COUNTY BROOKE REGION I

DATE 4/24/86 TYPE INSPECT. STACK TEST (Test Run #1 - Pg 1 of 2)

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
9	55	20	/	/	/	
	59	/	/	/	/	
10	00	10	15	5	10	
	01	5	5	5	0	
	02	5	5	5	5	
	03	5	5	-	-	
	04	-	-	-	-	
	05		10	15	15	
	06	15	15	15	15	
	07	10	15	15	15	
	08	15	15	10	5	
	09	0	5	10	5	
	10	5	5	10	5	
	11	10	5	-	-	
	12	5	5	10	15	
	13	15	5	5	10	
	14	5	5	5	5	
	15	5	0	0	0	
	16	5	0	0	5	
	17	10	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	5	5	
	22	5	5	5	10	
	23	5	5	5	10	
	24	5	10	5	10	
	25	0	15	5	10	
	26	20	15	20	20	
	27	25	25	25	25	

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
10	28	25	20	10	25	
	29	25	25	20	15	
	30	10	5	10	10	
	31	10	15	10	20	
	32	20	15	15	10	
	33	10	15	15	20	
	34	10	10	20	5	
	35	25	30	25	30	
	36	25	20	10	25	
	37	30	30	20	30	
	38	20	25	30	20	
	39	15	10	10	10	
	40	15	10	15	10	
	41	10	10	5	15	
	42	20	10	10	20	
	43	25				
	44					
	45	DENSE STEAM				Photo #1
	46	PLUME				#2
	47	0-5% TRAIL OFF				#3
	48					#4
	49					
	50					
	51					
	52					
	53	0	0	0	0	
	54	0	0	5	5	
	55	5	0	10	15	
	56	20	5	5	5	
	57	5	5	15	10	

SOURCE ID BAGHOUSE

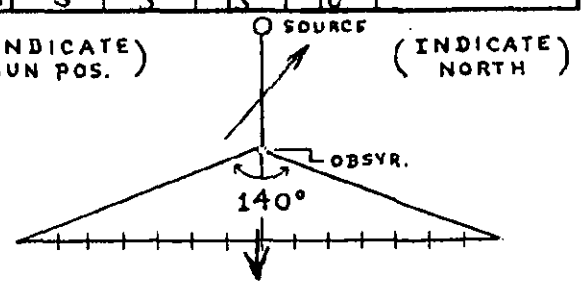
SOURCE POS. RE OBSERVER:

HEIGHT ABV./BLW. ≈ EVEN

DISTANCE FROM 100 - 125 yds

DIRECTION FROM WNW

OBSVR. LOC: S/D SLAG HAUL RD. WEST OF SLAG PIT



WEATHER CONDITIONS:

GEN. Bright sunshine ; WIND DIR. @ 5-8 MPH; 50-60 °F; ____ %RH

PLUME DESCRIPTION:

COLOR Wht to Bluish wht ; ATCHD. ___ DTCHD. ✓ ; STEAM (Y) / N ; DIST. VIS. Var - 25-50 yds

PT. OF OBSVN. DENSEST PLUME BACKGRD. Sky / hillside

INSPECTOR JUDITH L. TREDWAY APS II / Judith L Tredway

VISIBLE EMISSIONS OBSERVATION RECORD

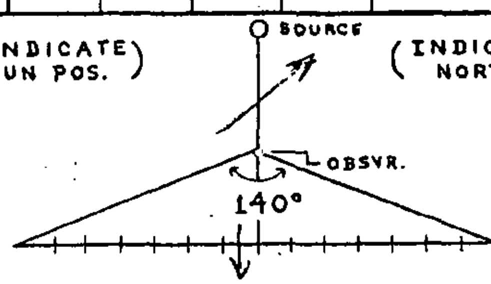
COMPANY: TRI-STATE ASPHALT PLANT: WEIRTON

CITY: WEIRTON COUNTY: BROOKE REGION: I

DATE: 4/24/86 TYPE INSPECT.: STACK TEST (Run #1 - Pg 2 of 2)

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES	TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
10	58	Ø	5	5	Ø								
	59	Ø	5	Ø	5								
11	00	5	Ø	5	Ø								
	01	* Shut down to silos			-	*Fan Stop							
	02					Drum Stop							
	03				*	Start up							
	04	25	10	5	10								
	05	5	5	10	* 10	Steam							
	06	15	10	10	10	Intermittent							
	07	5	5	15	5								
	08	5	10	5	15	Note: White cloud							
	09	10	15	5	5	form causing							
	10	Ø	10	5	Ø	backlight							
	11	5	Ø	5	Ø	interference							
	12	Ø	5	Ø	Ø	Does not appear							
	13	Ø	5	10	10	to be appreciable							
	14	5	10	5	5	Attribute to							
	15	5	5	Ø	10	steam dissip							
	16	10	Ø										
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												

SOURCE ID: BAGHOUSE STACK (INDICATE SUN POS.) (INDICATE NORTH)



SOURCE POS. RE OBSERVER: See Pg 1

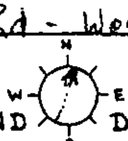
HEIGHT ABV./BLW.: ≈ Even

DISTANCE FROM: 100-125 yds

DIRECTION FROM: WNW

OBSVR. LOC.: Std Slag Haul Rd - West of Slag Pit

WEATHER CONDITIONS:



GEN.: Bright sunshine; WIND DIR. @ 5-8 MPH; 55-60 °F; ___ %RH

PLUME DESCRIPTION:

COLOR: Wht - Bl.wht; ATCHD. ___ DTCHD. ✓; STEAM- Y / N; DIST. VIS. ___

PT. OF OBSVN.: Densest plume BACKGRD.: Sky / hillside

INSPECTOR: Judith [signature]

VISIBLE EMISSIONS OBSERVATION RECORD

COMPANY TRI STATE ASPHALT PLANT WEIRTON

CITY WEIRTON COUNTY BROOKE REGION I

DATE 4/24/86 TYPE INSPECT. STACK TEST (RUN #2 Pg 1 of 2)

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
1	25	0	0	0	0	
1	26	0	0	0	0	
	27	0	0	0	5	
	28	0	5	0	5	
	29	5	5	5	0	
1	30	5	5	5	*	Stop drum
	31					Man shut d
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					Resume
	53	*	0	0	0	Steam
	54	*				* Down

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
2	00	-	-	60	65	Resume
	01	65	60	50	40	31.0
	02	40	25	15	5	
	03	20	10	10	5	
	04	10	5	5	5	
	05	5	0	0	0	
	06	0	0	5	0	
	07	0	0	0	0	
	08	0	5	0	5	
	09	0	5	0	0	
	10	5	5	5	5	
	11	0	0	5	0	
	12					Photos
	13					#5
	14					#6
	15					#7
	16	10	10	5	5	
	17	10	15	5	0	
	18	5	5	5	5	
	19	0	0	5	5	
	20	5	5	5	5	
	21	5	0	0	5	
	22	5	10	5	10	
	23	10	5	10	5	
	24	5	5	0	5	
	25	5	5	5	0	
	26	0	5	5	0	
	27	0	0	5	0	
	28	0	5	5	5	
	29	0	5	5	0	

SOURCE ID BAGHOUSE STACK (INDICATE SUN POS.)

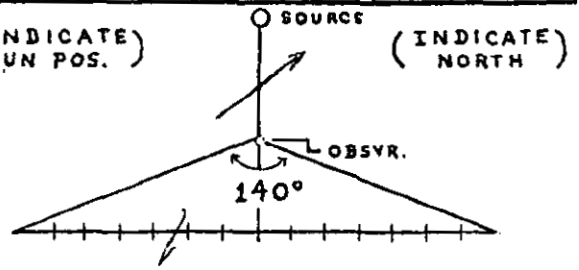
SOURCE POS. RE OBSERVER:

HEIGHT (ABV.) / BLW. ≈ 5 - 10 ft

DISTANCE FROM 100 - 125 yds

DIRECTION FROM WNW

OBSVR. LOC: STD. SLAG HAUL ROAD WEST SIDE OF SLAG PIT



WEATHER CONDITIONS:

GEN. Bright sunshine-Cl ; WIND W E S DIR. @ 3 - 5 MPH ; 65 - 70 °F; ____ %RH

PLUME DESCRIPTION:

COLOR Bl-wht ; ATCHD. ____ DTCHD. ✓ ; STEAM- Y / (N) ; DIST. VIS. ____

PT. OF OBSVN. Densest plume BACKGRD. Sky / hillside

INSPECTOR JUDITH L. TREDWAY APS II / Judith L Tredway

VISIBLE EMISSIONS OBSERVATION RECORD

COMPANY Tri State Asphalt PLANT Weirton

CITY Weirton COUNTY Brooke REGION I

DATE 4/24/86 TYPE INSPECT. Stack Test (Run #2 Pg 2 of 2)

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES	TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
2	30	0	5	0	0								
	31	0	0	0	0								
	32	5	0	0	5								
	33	0	0	0	0								
	34	0	0	0	0								
	35	0	0	0	0								
	36	0	5	0	0								
	37	5	0	0	0								
	38	0	0	0	0								
	39	0	0	0	0								
	40	0	0	5	0								
	41	0	0	5	0								
	42	0	0	0	0								
	43	0	0	0	0								
	44	0	0	0	0								
	45	0	0	0	0								
	46	0	0	0	5								
	47	0	0	0	0								
	48	0	0	0	0								
	49												
	50												
	51												
	52												
	53												
	54												
	55												
	56												
	57												
	58												
	59												

SOURCE ID Baghouse Stack (INDICATE SUN POS.)

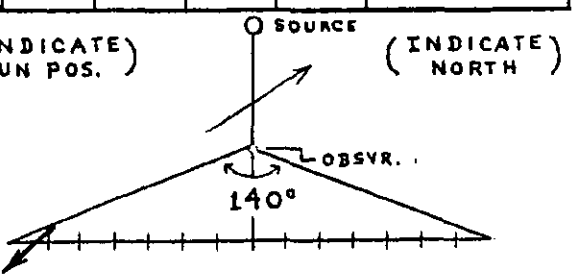
SOURCE POS. RE OBSERVER:

HEIGHT (ABV) / BLW. ≈ 5 - 10 ft

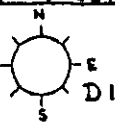
DISTANCE FROM 100 - 125 yds

DIRECTION FROM WNW

OBSVR. LOC: Std. Slag Haul Road - West of Slag Pit



WEATHER CONDITIONS:

GEN. Bright Sunshine Clear ; WIND  DIR. @ C - 5 MPH ; 65 - 70± °F ; ____ %RH

PLUME DESCRIPTION:

COLOR Bl-wht ; ATCHD. ____ DTCHD. ✓ ; STEAM- Y / (N) ; DIST. VIS. ____

PT. OF OBSVN. Densest plume BACKGRD. Sky / hillside

INSPECTOR Judith L. Tredway APS II / Judith L Tredway

VISIBLE E. .SSIONS OBSERVATION ..CORD

COMPANY TRI STATE ASPHALT PLANT WEIRTON

CITY WEIRTON COUNTY BROOKE REGION I

DATE 4/24/86 TYPE INSPECT. STACK TEST (RUN #3 Pg 1 of 2)

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
4	30	Ø	Ø	Ø	Ø	
	31	Ø	Ø	Ø	Ø	
	32	Ø	Ø	Ø	Ø	
	33	Ø	Ø	Ø	Ø	
	34	Ø	Ø	Ø	Ø	
	35	Ø	Ø	Ø	Ø	
	36	Ø	Ø	Ø	Ø	
	37	Ø	Ø	Ø	Ø	
	38	Ø	Ø	Ø	Ø	
	39	Ø	5	Ø	Ø	
	40	Ø	Ø	Ø	Ø	
	41	Ø	Ø	Ø	Ø	
	42	Ø	Ø	Ø	Ø	
	43	Ø	Ø	5	Ø	
	44	Ø	Ø	Ø	5	
	45	Ø	Ø	Ø	Ø	
	46	Ø	Ø	5	Ø	
	49	Ø	Ø	Ø	5	
	#8	Ø	Ø	Ø	Ø	
	#9	Ø	Ø	5	Ø	
	50	Ø	Ø	Ø	5	
	51	Ø	Ø	Ø	Ø	
	52	Ø	Ø	Ø	Ø	
	53	Ø	Ø	Ø	Ø	
	54	Ø	Ø	Ø	Ø	
	55	Ø	Ø	Ø	Ø	
	56	Ø	Ø	Ø	Ø	
	57	Ø	5	Ø	Ø	
	58	5	Ø	Ø	Ø	
	59	Ø	Ø	Ø	Ø	

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
5	00					Photos
	01					#8 St (obs probe)
	02					#9 St
	03					
	04					
	05					
	06					
	07					
	08					#10 St
	09					#11 St
	10	Ø	Ø	Ø	Ø	#12 St
	11	Ø	Ø	Ø	Ø	#13 End loading
	12	Ø	Ø	Ø	Ø	
	13	Ø	Ø	Ø	Ø	
	14	Ø	5	Ø	Ø	
	15	Ø	Ø	Ø	Ø	
	16	Ø	Ø	Ø	5	
	17	Ø	Ø	Ø	Ø	
	18	Ø	Ø	Ø	Ø	
	19	Ø	Ø	Ø	5	
	20	Ø	Ø	Ø	Ø	
	21	5	Ø	Ø	Ø	
	22	Ø	Ø	Ø	Ø	
	23	Ø	Ø	Ø	Ø	
	24	Ø	Ø	Ø	Ø	
	25	Ø	Ø	Ø	Ø	
	26	Ø	Ø	Ø	Ø	
	27	5	Ø	Ø	Ø	
	28	Ø	Ø	Ø	Ø	
	29	Ø	Ø	Ø	Ø	

SOURCE ID BAGHOUSE STACK (INDICATE SUN POS.) (INDICATE NORTH)

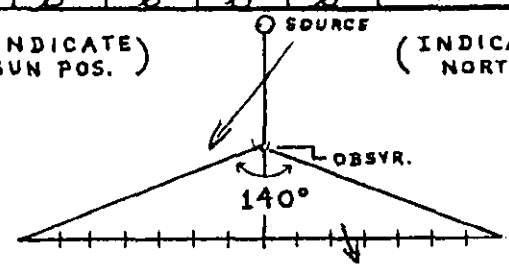
SOURCE POS. RE OBSERVER:

HEIGHT (ABV) / BLW. 20-25 ft

DISTANCE FROM 60-80 yds

DIRECTION FROM ESE

OBSVR. LOC: Bet RR tracks & Freedom Way



WEATHER CONDITIONS:

GEN. Bright sunshine - clear ; WIND  DIR. @ E - S MPH ; 65-70 °F ; ____ %RH

PLUME DESCRIPTION:

COLOR Wht-tan-wht ; ATCHD. DTCHD. ✓ ; STEAM- Y / (N) ; DIST. VIS. 30-50ft

PT. OF OBSVN. Densest plumed BACKGRD. Hillside / sky

INSPECTOR JUDITH L. TREDWAY APS II / Judith L Tredway

VISIBLE EMISSIONS OBSERVATION RECORD

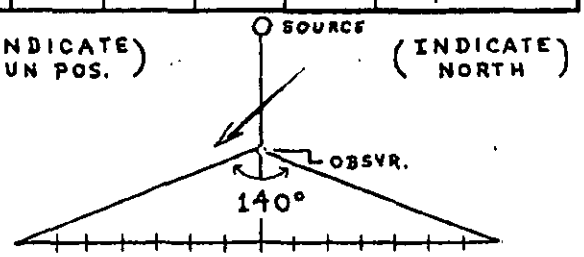
COMPANY TRI-STATE ASPHALT PLANT WEIRTON

CITY WEIRTON COUNTY BROOKE REGION I

DATE 4/24/86 TYPE INSPECT. STACK TEST (RUN #3 Pg 2 of 2)

TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES	TIME HR	TIME MN	% OPACITY 0	15	30	45	NOTES
5	30	0	0	0	0								
	31	0	0	0	0								
	32	0	0	0	0								
	33	0	0	0	0								
	34	0	5	0	0								
	35	0	0	0	0								
	36	0	0										

SOURCE ID BAGHOUSE STACK (INDICATE SUN POS.)



SOURCE POS. RE OBSERVER:

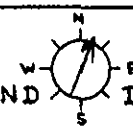
HEIGHT ABV./BLW. See Pg 1

DISTANCE FROM

DIRECTION FROM

OBSVR. LOC.

WEATHER CONDITIONS:



GEN. Bright sunshine - clear ; WIND DIR. @ C-5 MPH ; 65-70 °F; ____ %RH

PLUME DESCRIPTION:

COLOR Lt tan-white ; ATCHD. ____ DTCHD. ✓ ; STEAM-Y / N ; DIST. VIS. 30-50 ft

PT. OF OBSVN. Densest plume BACKGRD. Hillside / sky

INSPECTOR JUDITH L. TREDWAY APS II / Judith L Tredway

ATTACHMENT E

Stack Test Report