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

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

AP42 Section: 11.1

Reference Number: 230

Title: Source Sampling For Particulate Emissions, I. A. Construction Corp.,Vista, CA,

San Diego Air Pollution Control District, San Diego, CA,

July 24, 1987.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference ~~231~~ 230
Same facility as Ref 237, 238

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
9150 CHESAPEAKE DRIVE
SAN DIEGO, CA. 92123

TEST NO. : 87205

P.O. NO. : 4818

SOURCE TEST: Industrial Asphalt, Inc.
1309 Sycamore Avenue
Vista, California, 92083

UNIT TESTED: Exhaust Baghouse

PERFORMED BY: P. Jarman
G. Carrier
C. Ridenour
B. Baten (Engineer)

REPORT PREPARED BY G. CARRIER

APPROVED BY: C.W. Ridenour
C.W. RIDENOUR
Senior Air Pollution Chemist

Aug. 10, 1987
DATE

SUMMARY OF RESULTS.....1

TEST DESCRIPTION.....2

FINAL CALCULATIONS.....3

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SITE DESCRIPTION, FIGURE 2.....6

SAMPLING TRAIN, FIGURE 3.....7

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LABORATORY DATA.....10

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SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

TEST DATE: JULY 24, 1987

TEST NO. : 87205

P.O. NO. : 4818

SUMMARY: EMISSIONS TO ATMOSPHERE

NAME OF FIRM: INDUSTRIAL ASPHALT INC.

LOCATION OF PLANT: 1309 SYCAMORE AVENUE, VISTA, CA. 92083

TYPE OF OPERATION: HOT MIX ASPHALT PLANT

UNIT TESTED: EXHAUST BAG HOUSE

	MEASURED EMISSIONS	ALLOWABLE EMISSIONS
RULE 52 PARTICULATE MATTER, DRY	_____ Grains per SCF	_____ Grains per SCF
RULE 53A SULFUR COMPDS AS SO-2, DRY	_____ % by VOL.	_____ % by VOL.
RULE 53B COMBUSTION CONTAMINANTS	_____ Grains per SCF @12% CO2	_____ Grains per SCF @12% CO2
RULE 53C INCINERATORS	_____ Grains per SCF @12% CO2	_____ Grains per SCF @12% CO2
RULE 54 DUST & FUMES	8.29 Lbs/Hr	40 Lbs/Hr

GAS FLOW RATE, DSCFM 31439

GAS TEMPERATURE, F 197 (AVE)

PROCESS WEIGHT 267 tons/hr

EMISSION RATES

PARTICULATES: 8.29 Lbs/Hr

OXIDES OF NITROGEN: _____ Lbs/Hr

TEST DESCRIPTION

INTRODUCTION

This report presents the results of particulate loading and gas volume tests performed at Industrial Asphalt Inc, Vista CA. on July 24, 1987. The tests were performed on the bag house exhaust serving the hot mix asphalt drier. Production averaged 267 tons per hour.

SYSTEM DESCRIPTION

This asphalt plant combines crushed rock and sand with hot asphalt oil in batch loads of varying sizes. The rock and sand are dried in a rotary drier which is heated by natural gas. The exhaust from this drier is pulled through a baghouse, the emissions to the atomosphere from this baghouse are the subject of this report.

PROCEDURES

The procedures and equipment utilized in performing these tests are based on EPA New Source Performance Standards Method 5. The sampling train was modified as shown in figure 3. The calculations were designed to include the impinger catch so that the test results can be compared to Rule 54 of SDAPCD.

VELOCITY TRAVERSE

Prior information regarding the stack velocity profile eliminated the need for a separate exploratory traverse. Temperature and pitot tube data collected during actual sampling was used to calculate stack volume.

PARTICULATE SAMPLING

This sample consisted of 30 traverse points, 6 from each sample port as shown in Figure 1. The sample was collected 4.5 feet below the top of the stack. Field data associated with sample collection has been transferred to computer printout and is shown on pages 8 & 9. Calculations were done by computer and are shown on pages 3 and 4.

GAS ANALYSIS

Oxygen and Carbon dioxide content of the stack gas was measured with an ORSAT analyzer.

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

TEST NO. 87205
INDUSTRIAL ASPHALT, VISTA
RUN 1

TEST DATE JULY 24, 1987

A.	V_m	METER VOLUME, UNCORRECTED*FACTOR	=	55.02	cu ft
B.	P_m	METER PRESSURE, P_{bar} + H/13.6	=	29.56	in Hg
C.	T_m	METER TEMPERATURE, 460+(T_1+T_2)/2	=	558.	DEG. R
D.	T_i	IMPINGER TEMPERATURE	=	50.	DEG. F
E.	T_s	AVERAGE STACK TEMPERATURE, 460+DEG. F	=	657.	DEG. R
F.	P_s	STACK PRESSURE, P_{bar} + P_g/13.6	=	29.42	in Hg
G.	VP_i	MAX. H_2O VP PERMITTED AT T_j (SEE APPENDIX)	=	.37	in Hg
H.	V_{lc}	VOLUME OF CONDENSED H_2O (SEE LAB SHEET)	=	252.	ml
I.	V_{calc}	H_2O VAPOR , METER COND , H*C/B*0.00267	=	12.70	cu ft
J.	V_{wv}	MOISTURE METERED AT METER COND., A*C/B	=	.69	cu ft
K.	V_{dry}	SAMPLE VOLUME AT METER COND., DRY, A-J	=	54.34	cu ft
L.	$\%M_c$	PER CENT MOISTURE CALC. 100*(I+J)/(A+I)	=	19.76	%
M.	VP_s	MAX. H_2O VP PERMITTED AT T_s (SEE APPENDIX)	=	22.05	in Hg
N.	$\%M_s$	PER CENT MOISTURE PERMITTED, M/F*100	=	75.0	%
	B_{ws}	ENTER LOWER OF L OR N	=	19.8	%
O.	M.C.	MOISTURE CORRECTION FACTOR, (100-L OR N)/100=		.802	
P.	$V_{m(std)}$	SAMPLE VOL., STD COND.(DRY),K*528/29.92*B/C	=	50.781	cu ft
S.	m_n	WEIGHT OF PARTICULATE MATTER COLLECTED	=	.101	g
T.	c_s	GRAIN LOADING (DRY), 15.43*S/P	=	.031	grains/scf

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

TEST NO. 87205
INDUSTRIAL ASPHALT, VISTA
RUN 1

TEST DATE JULY 24, 1987

GAS ANALYSIS				
COMPONENT	VOL. %/100	*MOISTURE CORR	*MOL. WT.	=WT./MOLE WET BASIS
WATER, B ws	.1976	1.00000	18.0	3.557
OXYGEN	.1520	.80238	32.0	3.903
CARBON MONOXIDE	.0000	.80238	28.0	.000
CARBON DIOXIDE	.0310	.80238	44.0	1.094
NITROGEN & INERTS	.8170	.80238	28.2	18.486

AA. M_s AVERAGE MOLECULAR WEIGHT ! 27.041 !

DD. C_p PITOT TUBE CORRECTION FACTOR = .822

EE. V_s STACK VELOCITY AT STACK COND (SEE SAMPLE DATA)= 71.07 ft/sec

FF. $V_{s(std)}$ STACK VEL. AT STD COND.(DRY),EE*528/29.92*F/E*D = 45.05 ft/sec

GG. DURATION OF SAMPLING = 90. min

HH. AVERAGE SAMPLING RATE (DRY),F/GG = .564 scfm

II. SELECTED NOZZLE DIAMETER = .195 in

JJ. SAMPLING VELOCITY AT STD COND.,HH/II**2*144/60*4/3. = 45.34 ft/sec

KK. I ISOKINETIC VARIATION, JJ/FF*100 = 101. %

LL. A_s AREA OF STACK = 11.63 sq ft

MM. Q_{sd} FLOW RATE AT STD. COND.(DRY), FF*LL*60 = 31439. scfm

NN. Q_s FLOW RATE AT STACK COND , EE*LL*60 = 49595. acfm

UU. PARTICULATE EMISSION RATE, Q *0024*T*MM = 8.29 lb/hr

SAN DIEGO AIR POLLUTION CONTROL DISTRICT

TRAVERSE POINTS

INDUSTRIAL ASPHALT
HOT MIX BAGHOUSE EXHAUST DUCT

DUCT MEASURES 27" x 62"

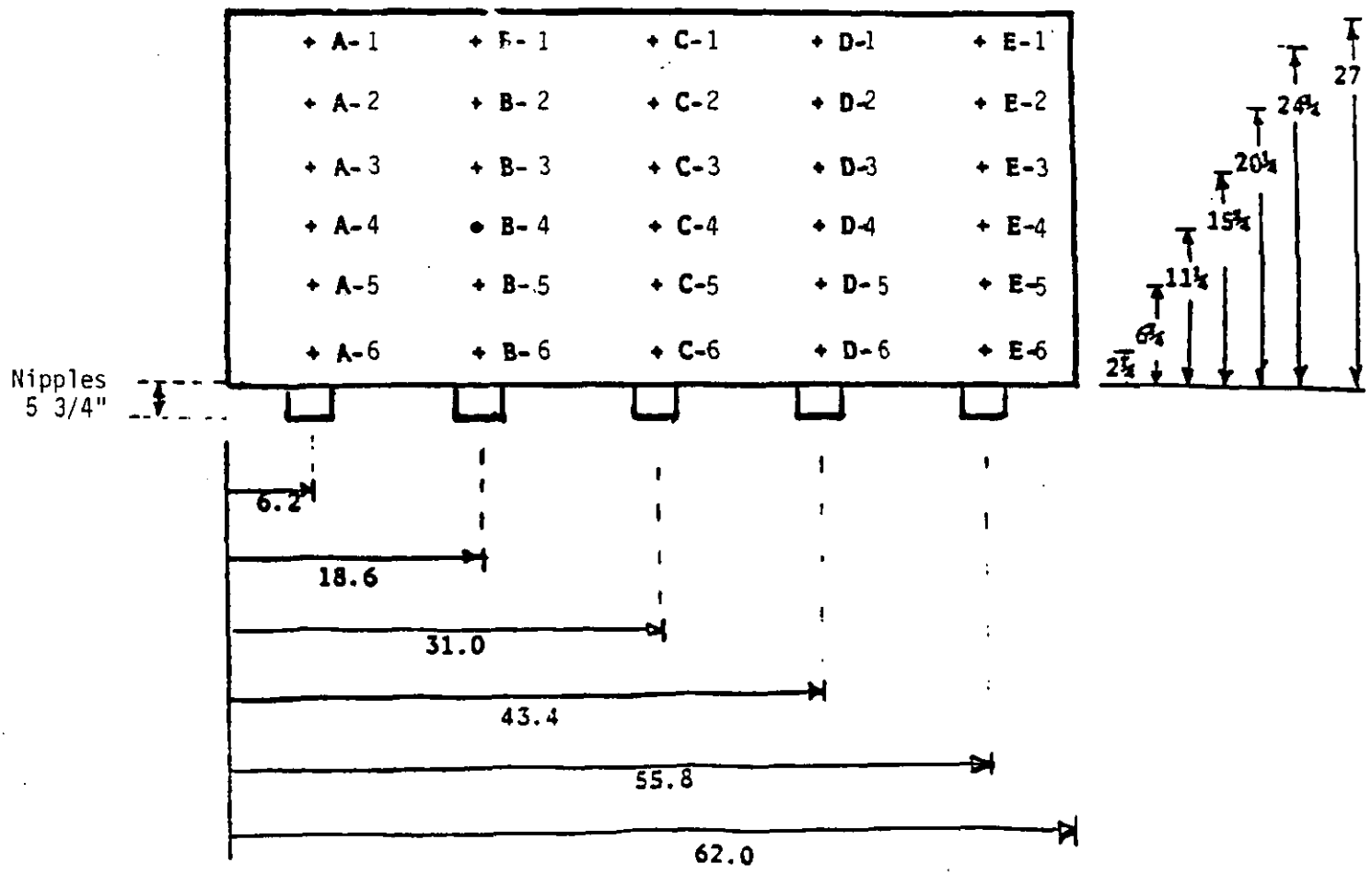


FIGURE 1

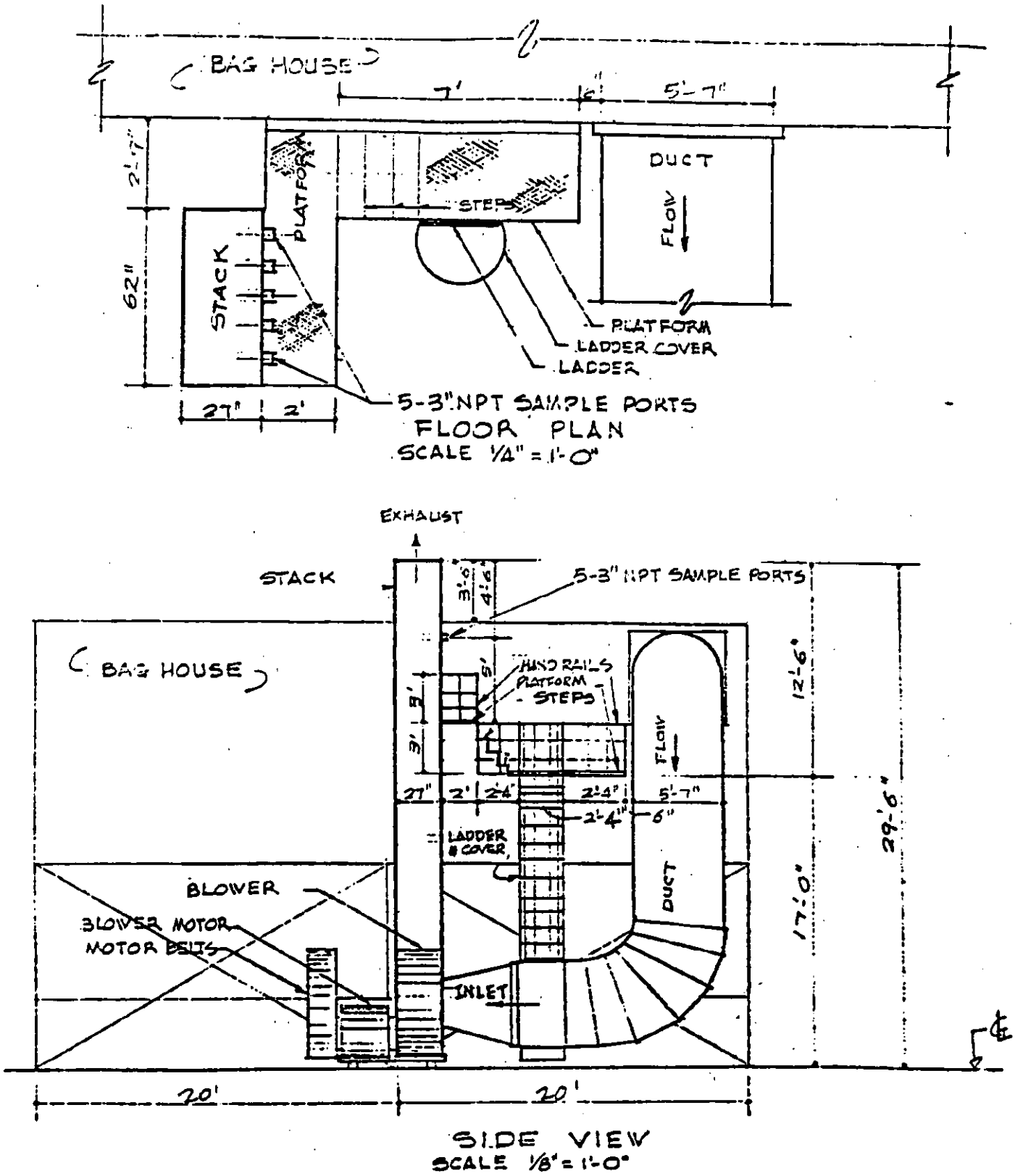
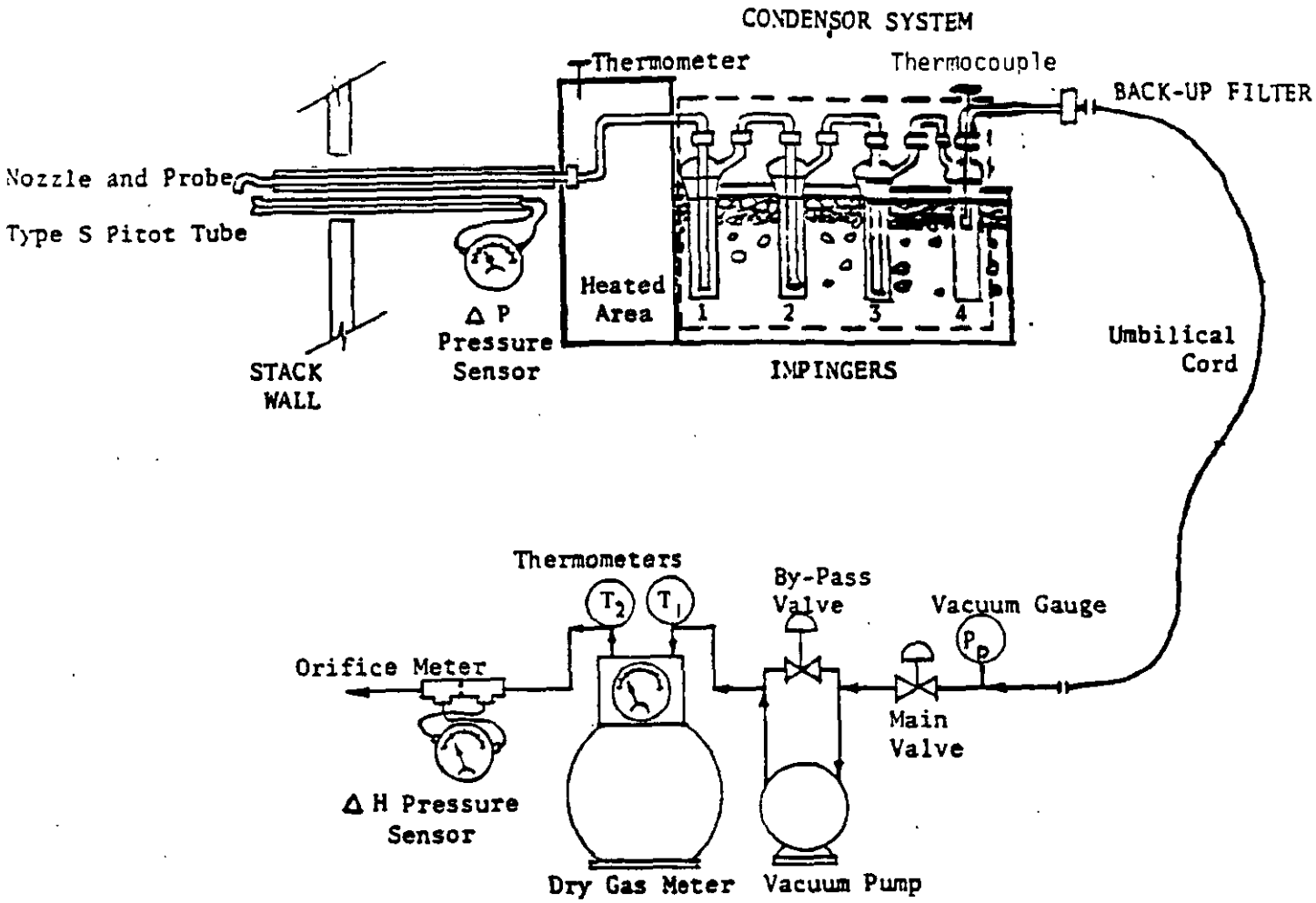

BAG HOUSE
7'
6"
5'-7"
2'-7"
62"
STACK
PLATFORM
STEPS
DUCT
FLOW
PLATFORM
LADDER COVER
LADDER
5-3" NPT SAMPLE PORTS
27"
2'
FLOOR PLAN
SCALE 1/4" = 1'-0"
EXHAUST
STACK
3'-0"
4'-6"
5-3" NPT SAMPLE PORTS
BAG HOUSE
HAND RAILS
PLATFORM
STEPS
9'
3'
3'
FLOW
12'-6"
27"
2'
2'-4"
2'-4"
5'-7"
2'-4"
6"
LADDER & COVER
BLOWER
BLOWER MOTOR
MOTOR BELTS
DUCT
17'-0"
29'-6"
INLET
20'
20'
SIDE VIEW
SCALE 1/8" = 1'-0"

FIGURE 2

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT



LEGEND

Greenburg-Smith Type Impingers

No. 1 Mod- 100 ML Deionized Water

No. 2 Std- 100 ML Deionized Water

No. 3 Mod- Dry

No. 4 Mod- Dry

Mod - Modified Type
Std - Standard Type

FIELD DATA ABBREVIATIONS

PT = Point Number
T_s = Stack Temperature, °F
P = Pitot Tube Pressure Differential, in.H_2
VEL= Stack Velocity, fps
H = Orifice Meter Pressure Drop, in. H_2O
T_1 = Meter Inlet Temperature, °F
T_2 = Meter Outlet Temperature, °F
P_p = Pump Vacuum, in. Hg
T_i = Impinger Temperature, °F
P_{bar} = Barometric Pressure, in. Hg

FIGURE 3: PARTICULATE MATTER SAMPLING TRAIN

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

TEST NO. 87205 TEST DATE JULY 24, 1987
INDUSTRIAL ASPHALT, VISTA
RUN 1

PT	T_s	P	VEL	H	T_1	T_2	P_m	T_i	CO_2
A1	191	1.200	69.6	1.60	78.0	96.0	2.00	57.00	3.10
A2	203.	1.200	70.3	1.60	78.0	110.0	2.00	54.00	3.10
A3	205	1.200	70.4	1.60	78.0	112.0	2.00	50.00	3.10
A4	206.	1.200	70.4	1.60	80.0	112.0	2.00	50.00	3.10
A5	206.	1.200	70.4	1.60	80.0	114.0	2.00	50.00	3.10
A6	204	1.200	70.3	1.60	80.0	116.0	2.00	50.00	3.10
B1	192.	1.300	72.5	1.75	82.0	106.0	2.00	49.00	3.10
B2	168	1.200	68.4	1.60	84.0	100.0	2.00	44.00	3.10
B3	182	1.300	72.0	1.70	84.0	110.0	2.00	48.00	3.10
B4	189	1.200	69.5	1.60	84.0	112.0	2.00	48.00	3.10
B5	192.	1.000	63.6	1.30	84.0	114.0	2.00	48.00	3.10
B6	195.	.800	57.0	1.00	84.0	114.0	1.00	48.00	3.10
C1	204.	1.300	73.2	1.70	84.0	100.0	2.00	47.00	3.10
C2	206.	1.300	73.3	1.70	84.0	110.0	2.00	48.00	3.10
C3	194.	1.200	69.8	1.60	84.0	110.0	2.00	46.00	3.10
C4	184	.900	60.0	1.15	85.0	103.0	2.00	46.00	3.10
C5	179.	1.000	63.0	1.30	86.0	104.0	2.00	46.00	3.10
C6	185.	.700	52.9	.90	86.0	110.0	1.00	46.00	3.10
D1	189.	1.600	80.3	2.10	86.0	102.0	3.00	46.00	3.10
D2	192.	1.600	80.5	2.10	86.0	112.0	3.00	50.00	3.10
D3	198.	1.300	72.9	1.70	86.0	114.0	2.00	51.00	3.10
D4	203.	1.200	70.3	1.60	86.0	116.0	2.00	52.00	3.10
D5	206	1.100	67.4	1.45	86.0	118.0	2.00	53.00	3.10
D6	207.	.900	61.0	1.20	86.0	118.0	2.00	53.00	3.10
E1	207.	1.900	88.7	2.50	88.0	108.0	3.00	56.00	3.10
E2	206.	1.900	88.6	2.50	88.0	118.0	3.00	55.00	3.10
E3	207.	1.700	83.9	2.20	88.0	120.0	3.00	55.00	3.10
E4	207.	1.500	78.8	2.00	88.0	120.0	3.00	55.00	3.10
E5	203	1.400	75.9	1.85	88.0	122.0	3.00	55.00	3.10

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

TEST NO. 87205 TEST DATE JULY 24, 1987
INDUSTRIAL ASPHALT, VISTA
RUN 1

SAMPLE COLLECTION DATA

PT	T_s	P	VEL	H	T_1	T_2	P_m	T_i	CO_2
E6	203.	1.100	67.3	1.45	88.0	124.0	3.00	56.00	3.10
AVG	197.	1.238	71.1	1.65	84.3	111.5	2.20	50.40	3.10

$$VEL = 85.48 * C_p * SQ.RT((P_s * T_s)/(P_s * M_s))$$

AVERAGE DELTA P = 1.2533

DRY GAS METER VOLUME UNCORRECTED = 53.164 P_{bar} = 29.44in Hg

METER CORRECTION FACTOR = 1.0350 P_s (STACK PRESSURE) = -.3 in water

NOTES - 1. AVG P IS THE SQUARE OF THE MEAN (SQ.RT)
2. (VEL) = VEL*COS(ANG)
3. AVG CO_2 IS THE VELOCITY WEIGHTED AVERAGE

TEST NO. 87205

COUNTY OF SAN DIEGO - AIR POLLUTION CONTROL DISTRICT

PARTICULATE MATTER
LABORATORY DATA

PARTICULATES

A. ACETONE WASH NOZZLE, PROBE IMPINGERS. Final 1.0399 g Net Wt. .0341 g

Pan # 284 Tare 1.0058 g

B. WATER WASH NOZZLE, PROBE, IMPINGERS, IMPINGER CATCH Final 1.0756 g Net Wt. .0667 g

Pan # 281 Tare 1.0089 g

C. BACK-UP FILTER Final 1.1151 g Net Wt. .0008 g

Pan # 283 Tare 1.0025 g

Filter # C-6 Tare .1118 g

D. BLANKS

1000 ml Water .00008 g/100ml .0002 g Water Correction

500 ml Acetone .00008 g/100ml .0002 g Acetone Correction

Water Pan# W-2 .0004 g Net Weight

Acetone Pan# W-3

Total Weight of Particulate Matter (A + B + C - D) .1012 g

Condensed Moisture Final 452 ml

Impinger tare 200 ml

Net Gain 252 ml

Wash Volumes

Acetone 217 ml

Filtered D.I. Water 88 ml

Imp. Tare 200 ml

Total Water 288 ml

Mechanical Engineering Test Report

P/O no. 4818
Renewal Test
300 ton per hour max.

Industrial Asphalt
1309 Sycamore Ave.
Vista, Ca 92083

Test Date: 7/24/87 Engineer: R.L. Batten

Rules:

50 – visible emissions not to exceed no. 1 on Ringlemann chart at baghouse stack exhaust

54 – particulate matter not to exceed 40 lbs/hr from the baghouse stack exhaust

Purpose: The asphalt plant was tested for the purpose of permit renewal by the APCD source test team. District test methods were employed to verify compliance with the Rules.

Test Conditions: Attachment 1 shows the time and events for the test period. The rotary dryer was fired with natural gas. The material produced contained the following composition:

oil	440 LBS
1/2 INCH AGGR.	7560
3/8 INCH "	1968
Dust	2080
Sand	6050 LBS

1/2 inch regular mix

The production rate was averaged 267 tons per hour ~~for the 1.25 hours of operating time expended~~ during the source test period. No visible emissions were apparent from the stack exhaust for the duration of the test.

The baghouse differential pressure levels were nominal.

"Blue-smoke" emissions were not excessive and did not exceed the Rule 50 limits around the plant pulmell or truck tunnel.

Attachment 1

Time and Events

Time	B/H ΔP ~ IN, W.C.g.	Mix Temp °F	Event
7:14 AM			START test
7:20	4.6	290	
7:23			no apparent drum leaks
7:35			drum stop
7:37			drum starts 2
7:43			drum stops
7:59	4.8	290	drum starts 6
8:46			drum stops
9:11			drum starts 31
9:21			drum stops
9:24			drum starts 3
9:39			no apparent drum leaks
10:04	4.5	285	
10:10 AM			test complete

apcd

County of San Diego

R. J. Sommerville
Air Pollution Control Officer

Industrial Asphalt Inc.
1309 Sycamore Avenue
Vista CA. 92083

note Address change - 5000 CARROLL CYN RD SAN DIEGO, CA 92121

Dear Sir:

The enclosed test report is the result of testing at your facility.

If you have any questions, please call me at (619) 565-5911.

C.W. RIDENOUR
Senior Air Pollution Chemist

CWR:gjc

Enclosure

AIR POLLUTION CONTROL DISTRICT
9150 Chesapeake Drive. San Diego, California 92123-1095
(619) 565-5901

QA Copy

SOURCE TEST
COMPUTER INPUT DATA FORM

TEST NO.	RUN NO.	CARD NO.	TEST SITE
1 2 3 4 5	6 7	8 9	10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36

Industrial Asphalt
VISTA
Test #87205 7-24-87 QC copy

DATA		CARD NO.	
29.44		01	Barometric Pressure, in.Hg
-.3		02	Stack Pressue, in. H_2O
276.400		03	Start meter Volume, ft^3
329.564		04	Final Meter volume, ft^3
.3681		05	Max. vapor permitted at T_I, in. Hg 50 est .3626
22.05		06	Max. water vapor permitted at T_S, in. Hg 200 est 22.47
252.0		07	Volume of condensed water, ml.
1.035		08	Meter calibration factor
3.1		09	% CO_2 (min. value = 0.04)
0.0		10	% CO
15.2		11	% O_2
81.7		12	% N_2
.822		13	Pitot tube correction Factor
11.63		14	Area of stack, ft^2
.195		15	Nozzle diameter, in.
90.0		16	Duration of sampling, min.
.1012		17	Wt of particulate matter collected, gm. .1 est
0.0		18	PPM NO_2, DRY
0.0		19	PPM SO_2, DRY
0.0		20	Auxillary Fuel Flow Rate, CFM
-1			
1 2 3 4 5	6 7	8 9	

NOTE:

Start coding at Column 1. The decimal point must also be coded, otherwise, it is assumed that the decimal point is after column 7. Up to 7 digits can be coded. Minus sign should also be coded for negative numbers.

WRD:ST:8-11-83

```
872051  0INDUSTRIAL ASPHALT VISTA      7-24-87
29.44
-.3
276.400
329.564
.3681
22.05
252.0
1.035
3.1
0.0
15.2
81.7
.822
11.63
.195
90.0
.1012
0.0
0.0
0.0
A1   191.  1.2   1.6   78.   96.   2.    57.   3.1
A2   203.  1.2   1.6   78.   110.  2.    54.   3.1
A3   205.  1.2   1.6   78.   112.  2.    50.   3.1
A4   206.  1.2   1.6   80.   112.  2.    50.   3.1
A5   206.  1.2   1.6   80.   114.  2.    50.   3.1
A6   204.  1.2   1.6   80.   116.  2.    50.   3.1
B1   192.  1.3   1.75  82.   106.  2.    49.   3.1
B2   168.  1.2   1.6   84.   100.  2.    44.   3.1
B3   182.  1.3   1.7   84.   110.  2.    48.   3.1
B4   189.  1.2   1.6   84.   112.  2.    48.   3.1
B5   192.  1.    1.3   84.   114.  2.    48.   3.1
B6   195.  .8    1.    84.   114.  1.    48.   3.1
C1   204.  1.3   1.7   84.   100.  2.    47.   3.1
C2   206.  1.3   1.7   84.   110.  2.    48.   3.1
C3   194.  1.2   1.6   84.   110.  2.    46.   3.1
C4   184.  .9    1.15  85.   103.  2.    46.   3.1
C5   179.  1.    1.3   86.   104.  2.    46.   3.1
C6   185.  .7    .9    86.   110.  2.    46.   3.1
D1   189.  1.6   2.1   86.   102.  3.    46.   3.1
D2   192.  1.6   2.1   86.   112.  3.    50.   3.1
D3   198.  1.3   1.7   86.   114.  2.    51.   3.1
D4   203.  1.2   1.6   86.   116.  2.    52.   3.1
D5   206.  1.1   1.45  86.   118.  2.    53.   3.1
D6   207.  .9    1.2   86.   118.  2.    53.   3.1
E1   207.  1.9   2.5   88.   108.  3.    56.   3.1
E2   206.  1.9   2.5   88.   118.  3.    55.   3.1
E3   207.  1.7   2.2   88.   120.  3.    55.   3.1
E4   207.  1.5   2.    88.   120.  3.    55.   3.1
E5   203.  1.4   1.85  88.   122.  3.    55.   3.1
E6   203.  1.1   1.45  88.   124.  3.    56.   3.1
END
30
```

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

TEST NO. 87205 TEST DATE 7-24-87
INDUSTRIAL ASPHALT VISTA
RUN 1

A.	V_m	METER VOLUME, UNCORRECTED*FACTOR	=	55.02	cu ft
B.	P_m	METER PRESSURE, P_{bar} + H/13.6	=	29.56	in Hg
C.	T_m	METER TEMPERATURE, 460+(T_1 +T_2)/2	=	558.	DEG. R
D.	T_i	IMPINGER TEMPERATURE	=	50.	DEG. F
E.	T_s	AVERAGE STACK TEMPERATURE, 460+DEG. F	=	657.	DEG. R
F.	P_s	STACK PRESSURE, P_{bar} + P_g /13.6	=	29.42	in Hg
G.	VP_i	MAX. H_2O VP PERMITTED AT T_i (SEE APPENDIX)	=	.37	in Hg
H.	V_{lc}	VOLUME OF CONDENSED H_2O (SEE LAB SHEET)	=	252.	ml
I.	$V_{calc\ 2}$	H_2O VAPOR , METER COND., H*C/B*0.00267	=	12.70	cu ft
J.	V_{wv}	MOISTURE METERED AT METER COND., A*G/B	=	.69	cu ft
K.	V_{dry}	SAMPLE VOLUME AT METER COND., DRY, A-J	=	54.34	cu ft
L.	$\%M_c$	PER CENT MOISTURE CALC. 100*(I+J)/(A+I)	=	19.76	%
M.	VP_s	MAX. H_2O VP PERMITTED AT T_s (SEE APPENDIX)	=	22.05	in Hg
N.	$\%M_s$	PER CENT MOISTURE PERMITTED, M/F*100	=	75.0	%
	B_{ws}	ENTER LOWER OF L OR N	=	19.8	%
O.	M.C.	MOISTURE CORRECTION FACTOR, (100-L OR N)/100=		.802	
P.	$V_{m(std)}$	SAMPLE VOL.,STD COND.(DRY),K*528/29.92*B/C	=	50.781	cu ft
S.	m_n	WEIGHT OF PARTICULATE MATTER COLLECTED	=	.101	g
T.	c_s	GRAIN LOADING (DRY), 15.43*S/P	=	.031	grains/scf

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INDUSTRIAL ASPHALT VISTA
RUN 1

GAS ANALYSIS				
COMPONENT	VOL. %/100	*MOISTURE CORR	*MOL. WT.	=WT. /MOLE WET BASIS
WATER, B_{ws}	.1976	1.00000	18.0	3.557
OXYGEN	.1520	.80238	32.0	3.903
CARBON MONOXIDE	.0000	.80238	28.0	.000
CARBON DIOXIDE	.0310	.80238	44.0	1.094
NITROGEN & INERTS	.8170	.80238	28.2	18.486

AA. M_s AVERAGE MOLECULAR WEIGHT ! 27.041 !

DD. C_p PITOT TUBE CORRECTION FACTOR = .822

EE. V_s STACK VELOCITY AT STACK COND. (SEE SAMPLE DATA)= 71.07 ft/sec

FF. $V_{s(std)}$ STACK VEL. AT STD COND.(DRY),EE*528/29.92*F/E*D = 45.05 ft/sec

GG. DURATION OF SAMPLING = 90. min

HH. AVERAGE SAMPLING RATE (DRY),P/GG = .564 scfm

II. SELECTED NOZZLE DIAMETER = .195 in

JJ. SAMPLING VELOCITY AT STD COND.,HH/II**2*144/60*4/3. = 45.34 ft/sec

KK. I ISOKINETIC VARIATION, JJ/FF*100 = 101. %

LL. A_s AREA OF STACK = 11.63 sq ft

MM. Q_{sd} FLOW RATE AT STD. COND.(DRY), FF*LL*60 = 31439. scfm

NN. Q_s FLOW RATE AT STACK COND., EE*LL*60 = 49595. acfm

UU. PARTICULATE EMISSION RATE, 0.00847*T*MM = 8.29 lb/hr

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RUN 1

SUMMARY FINAL CALCULATIONS

T.	c_s GRAIN LOADING(DRY)	=	.031	grains/scf
UU.	PARTICULATE EMISSION RATE	=	8.29	lb/hr
OO.	$\%CO_2$ (GAS ANALYSIS)	=	3.10	%
PP.	C_{12} GRAIN LOADING(DRY) AT 12% CO_2 , T*12/OO.	=	.119	grains/scf

ZZ. EXCESS AIR = $\dfrac{(\%\ \text{OXYGEN} - \%\ \text{CO}) * 100}{0.264*(\%\ \text{N2}) - (\%\ \text{OX}) + 0.5*(5\ \text{CO})}$ = 239. %