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

SOURCE TEST OF PARTICULATE EMISSIONS TO THE ATMOSPHERE

TEST SITE: Industrial Asphalt-Vista
1309 Sycamore Ave.
Vista, CA 92083

TEST #: 91260 P.O.# 4818 TEST DATE: 9/17/91

Type of plant (Asphalt /Perlite / Combustion) : asphalt

UNIT TESTED: Baghouse

EQUIPMENT: Asphalt batch plant

TESTED BY: David Shina, Gary Smith, Linda Twaddle	DATE: 9/17/91
SITE PERSONNEL: Brad	DATE: 9/17/91
APCD ENGINEER: none available †	DATE:
LAB ANALYSIS BY: David Shina	DATE: 10/2/91
REPORT BY: David Shina	DATE: 10/2/91
REVIEWED BY: Linda Twaddle	DATE: 10-10-91
APPROVED BY: Robert Gatewood for CWR	DATE: 10/14/91

C.W. LIDENOUR, SENIOR AIR POLLUTION CHEMIST

This report has been reviewed and found to be representative of the testing that was performed.

TEST	PERMIT LIMIT	MEASURED	PERFORMANCE
RULE 54 DUST & FUMES	40 lbs/hr	3.51 lbs/hr	PASSED

† There was no engineer available, so the engineering data was provided by the site.

SUMMARY:

ITEM	Vm	Bws	Cs	E	I	Qstd	ts	PROD RATE
UNITS	ft^3	%	gr/dscf	lbs/hr	%	dscfm	°F	tons/hr
VALUE	59.488	19.54	0.016	3.513	103	2.62E+04	188	206.47

SYSTEM DESCRIPTION:

This asphalt plant combines crushed rock and and sand with asphalt oil in batch loads of varying sizes. The rock and sand are heated in a rotary drum to dry them. The exhaust from this dryer is routed through a baghouse and finally to a stack. It is the emissions from this stack that are the subject of this report.

PROCEDURES:

The procedures and equipment utilized in these tests are based on EPA New Source Performance Standards Method 5. The sampling train was modified to utilize a back-end filter and fifth impinger filled with silica gel (fig. 1), as outlined by the SDAPCD QA manual.

CALCULATIONS

All preliminary assumptions and calculations are based on data obtained from previous tests. All equations are from EPA CFR 40, July 1, 1990, Parts 53-60, Appendix A, Methods 1-5 inclusive.

PARTICULATE SAMPLING:

The test consisted of sampling at 30 traverse points, 6 from each of 5 sample ports (fig.2), collected from 53 inches below the stack (fig.3). All field data was transferred to the computer printout. All calculations were done by the computer and the emissions were compared to rule 54 of the SDAPCD.

ANALYSES:

Gas: An integrated bag sample was collected during the test and analyzed at the APCD lab.

Particulate: All procedures follow EPA guidelines, except where noted in the SDAPCD QA manual.

EQUIPMENT:

All testing and analysis equipment was calibrated according to EPA guidelines.

Analysis:	*Collection:*	*Sampling:*	*Temp./Press.:*
CO2-Anarad AR400	Filter-Gelman	L/S Box-Napp	Thermocouples-Omega
O2-Teledyne Ryan 320 P4	Holder-Gelman	Umbilical cord-Napp	Read out-Omega
Macrobalance-Sargent Welch	Beakers-Pyrex	Cold/Hot box-Napp	Barometric-calc. by APCD
Microbalance-Sartorious	Impingers-Ace	Pitobe tube-Napp	L/S box-Dwyer magnehelic

Industrial Asphalt-Vista on 7/91 P.O.#4818 TEST #91260

Trav. Pt	Vm (ft^3)	ΔP	ΔH	t 1(unc)	t 2(unc)	Stack Temp	Imp Temp	velocity
	302.56	(in H2O)	(in H20)	(°F)	(°F)	(°F)	(°F)	(ft/sec)
a1		0.810	2.800	76.00	100.00	187.00	58	58.28
2		0.620	2.100	76.00	110.00	192.00	58	51.19
3		0.720	2.500	76.00	112.00	197.00	54	55.37
4		0.740	2.500	75.00	113.00	198.00	50	56.18
5		0.760	2.600	76.00	114.00	196.00	48	56.85
6		0.650	2.200	75.00	114.00	186.00	48	52.17
c1		0.780	2.700	77.00	96.00	189.00	49	57.28
2		0.850	2.900	75.00	109.00	177.00	48	59.24
3		0.890	3.000	76.00	97.00	158.00	45	59.71
4		0.720	2.500	74.00	103.00	161.00	44	53.84
5		0.650	2.200	74.00	107.00	197.00	44	52.61
6		0.500	1.700	74.00	107.00	167.00	44	45.08
e1		1.020	3.500	74.00	101.00	186.00	46	65.35
2		1.010	3.500	74.00	108.00	189.00	46	65.18
3		0.980	3.400	74.00	110.00	192.00	48	64.36
4		1.050	3.600	74.00	111.00	191.00	48	66.56
5		0.920	3.200	79.00	96.00	166.00	53	61.10
6		0.650	2.200	80.00	116.00	165.00	51	51.32
b1		0.950	3.300	80.00	105.00	184.00	54	62.97
2		0.920	3.100	80.00	111.00	190.00	51	62.26
3		0.880	3.000	81.00	115.00	192.00	50	60.98
4		0.810	2.800	82.00	117.00	195.00	49	58.64
5		0.730	2.500	82.00	118.00	199.00	49	55.84
6		0.580	2.000	83.00	119.00	189.00	50	49.40
d1		0.930	3.200	86.00	111.00	194.00	52	62.79
2		0.910	3.100	88.00	120.00	199.00	50	62.35
3		0.950	3.300	86.00	123.00	202.00	51	63.85
4		0.930	3.200	89.00	124.00	204.00	50	63.27
5		0.780	2.700	88.00	125.00	203.00	51	57.90
6	362.048	0.620	2.100	89.00	126.00	189.00	51	51.07

	Vm (ft*^3)	ΔP (in H2O)	ΔH (in H2O)	t 1 (°F)	t 2 (°F)	ts (°F)	ti (°F)	vs (ft/sec)
Average:	59.488	0.804	2.780	79.03	111.27	188	50	58.10

MISCELLANEOUS:

Ø = 75.0 min
tn = 30 points
ø = 2.5 min

NOZZLE & PROBE:

Dn = 0.240 in
An = 0.0452 in^2
Cp = 0.840

METER BOX PARAMETERS:

ΔH@ = 2.7254
Y = 0.9782
Box ID = d337

PRESSURES:

Pbar = 29.45 in Hg
Pg = 0.55 in H2O
Vpw @ ts 18.21 in Hg
Silica (yes/no) yes
Vpw @ ti = 0.3626 in Hg

VOLUME:

start leak rate = 0.000 cfm
Pass/Fail PASS
final leak rate = 0.010 cfm
Pass/Fail PASS
Vm 59.488 ft^3

TEMPERATURES:

t1 corr = 0.40 °F
t2 corr = 0.10 °F
tm = 95 °F
ts = 188 °F
ti = 50 °F

STACK PARAMETERS:

circular (yes/no) no
Width = 2.25 f t
Length = 5.17 f t
As = 11.63 ft^2

LAB DATA:

mn(front) = 0.01847 g
mn(back) = 0.03712 g
mn(total) = 0.05559 g
Vlc 282.05 ml

STACK GAS MEASUREMENTS:

CO2 = 3.13 %
O2 = 16.40 %
CO = 0.00 %
N2 = 80.47 %

TEMPERATURES:

01)	ts = (Σ ts(n))/total n's		188 °F
02)	Ts = ts+460		648 °R
03)	tm= (Σ {(t 1(n)+t 2t(n))/2}/total n's		95 °F
04)	Tm= (t1+t2)/2 + 460		555 °R
05)	ti= (Σ ti(n))/total n's		50 °F
06)	Tstd		528 °R

PRESSURES:

07)	Pbar= {(P @ S.L.)+[ft. above S.L.*(-0.1 in Hg/100ft)]}		29.45 in Hg
08)	Pg= read from pressure sensing device		0.55 in H2O
09)	Ps= Pbar + (Pg/13.6)		29.49 in Hg ✓
10)	ΔH		2.78 in H20
11)	Pm= Pbar+(ΔH/13.6)		29.65 in Hg
12)	Pstd		29.92 in Hg

VOLUME:

13)	Vm= Vm(end)-Vm(begin)		59.488 ft^3
14)	Y		0.9782
15)	Vm'= Vm*Y		58.191 ft^3
16)	Vpw @ ti = from appendix		0.0000 in Hg
17)	corr Vwm = {[(Vm'*Vpw@imp/Ps)*Pm*Tstd]/(Tm*Pstd)}		0.0000 ft^3
18)	Vm std = {[Vm'*(Tstd/Tm)*(Pm/Pstd)]-corr Vwm}		54.829 ft^3
19)	Vlc= (Σ Volume of impingers)		282.05 ml
20)	∂		0.002201 lb/ml
21)	R		21.85 Hg-ft^3/°R-lb-mo
22)	MwH2O		18.00 g/g-mo
23)	Vw std = {[(Vlc*∂*R*Tstd)/(Pstd*MwH2O)}+corr Vwm}		13.3128 ft^3

CALCULATIONS:

MOISTURE-

24)	Bws(1) =(Vw std)/(Vw std+Vm std)100	19.54 %	
25)	Vpw @ ts = from appendix	18.21 in Hg	
26)	Bws(2) =[(Vpw @ ts)/Ps]*100	61.75 %	
27)	Bws = lower value of equation 24 or 26		19.54 %

MOLECULAR WEIGHT-

28)	%O2		16.40 %
29)	%CO2		3.13 %
30)	%N2+inerts+%CO		80.47 % ✓
31)	Md=[0.440(%CO2)]+[0.320*(%O2)]+[0.280(%N2+inerts+%CO)]		29.16 g/g*mole
32)	Ms=Md*(1-Bws)+18.0*(Bws)		26.98 g/g*mole

FLOW-

33)	ΔP		0.804 in H2O
34)	Cp		0.840
35)	vs= 85.49*Cp*{[(Ts*ΔP)/(Ps*Ms)]^.5}		58.100 ft/s
36)	As=3.14*[(Ds)^2/4]		11.63 ft^2
37)	Qs = (vs)*As*60		4.06E+04 acfm
38)	Qstd =17.64*Qs*(1-Bws)*Ps/Ts		2.62E+04 dscfm

EMISSIONS-

FRONT HALF

39)	mn (front)		0.01847 g
40)	Cs (front) =15.43*mn(front)/Vm std	0.0048 gr/dscf=	0.005 grains/dscf ✓
41)	E (front) = (0.00857)*(Qsd)*Cs (front)		1.08 lbs/hr

BACK HALF

42)	mn (back)		0.03712 g
43)	Cs (back) =15.43*mn(back)/Vm std	0.0104 gr/dscf=	0.010 grains/dscf
44)	E (back) = (0.00857)*(Qsd)*Cs (back)		2.35 lbs/hr

TOTAL

45)	mn (total) = mn(front)+mn(back)		0.05559 g
46)	Cs (total) =15.43*mn(total)/Vm std	0.0156 gr/dscf=	0.016 grains/dscf
47)	E (total) = (0.00857)*(Qsd)*Cs (total)		3.51 lbs/hr ✓

ISOKINETICS:

48)	An=3.14*[(Dn)^2/4]		0.0452 in^2
49)	I=.09450(Ts*Vm std)/Ps*vsAnØ(1-Bws)	103.33 %=	103 %

APPENDIX

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

LABORATORY ANALYSIS OF PARTICULATE TEST

TEST SITE: Industrial Asphalt-Vista
1309-Sycamore Ave.
Vista, CA 92083

TEST # 91260.0 P.O.# 4818 TEST DATE: 9/17/91

LAB ANALYSIS BY: David N. Shina DATE: 10/2/91

LAB REPORT BY: David N. Shina DATE: 10/3/91

REVIEWED BY: Linda Twaddle DATE: 10-10-91

(1) IMPINGER VOLUMES

	FINAL WEIGHT		INITIAL WEIGHT		NET WEIGHT
#1	845.71 g	-	550.91 g	=	294.80 g
#2	513.06 g	-	540.52 g	=	-27.46 g
#3	453.06 g	-	449.34 g	=	3.72 g
#4	466.42 g	-	465.13 g	=	1.29 g
SILICA GEL CONTAINER:					
#5	883.85 g	-	874.15 g	=	9.70 g

Tot. Vol.= 282.05 g

(2) BLANKS

STD = Net Wgt(solv) / Tot. Vol(solv. used)

ACETONE:

VOLUMES:

BKR ID = 91035
Initial= 500.00 ml
tot. Rinses= 45.00 ml
Tot. Vol= 545.00 ml

WEIGHTS:

final= 29.1141 g
initial= 29.1121 g
net= 0.0020 g

LIMIT: 0.001% = 10 ppm = 0.000010g/ml

STD = 3.66972E-06 g/ml
0.000367 %
= 3.67 ppm
The Blank PASSED

WATER:

VOLUMES:

BKR ID = 91023
Initial= 200.00 ml
tot. Rinses= 45.00 ml
Tot. Vol= 245.00 ml

WEIGHTS:

final= 28.6440 g
initial= 28.6437 g
net= 0.0003 g

LIMIT: 4ppm = 4mg/L = 0.000004g/ml

STD = 1.22449E-06 g/ml
0.000122 %
1.22 ppm
The Blank PASSED

ORGANIC:

VOLUMES:

BKR ID =
Initial= ml
tot. Rinses= ml
Tot. Vol= 0.00 ml

WEIGHTS:

final= g
initial= g
net= 0.0000 g

LIMIT: 0.001% = 10 ppm = 0.000010g/ml

STD = N/A g/ml
N/A %
N/A ppm
The Blank N/A

(3) WEIGHT

FRONT HALF

WEIGHT (uncorrected): **ACETONE**

BKR ID= 91052
final= 28.8475 g
initial= 28.8335 g Wgt. Ac= 0.0140 g

VOLUME:

Initial= 120.00 ml
tot. rinses= 30.00 ml
Sep funnel= ml Tot. Vol= 150.00 ml

WEIGHT FROM SOLVENT:

Total Vol * Acetone STD = 0.000550 g

WEIGHT (corrected):

Wgt(corr)= Wgt(unc)-Wgt from solvent= 0.013450 g

WEIGHT (uncorrected): **WATER:**

BKR ID= 91040
final= 29.8416 g
initial= 29.8361 g Wgt. Water= 0.0055 g

VOLUMES:

initial= 350.00 ml
tot. Rinses= 45.00 ml
Tot. Vol = 395.00 ml

WEIGHT FROM SOLVENT:

Total Vol * Water STD = 0.000484 g

WEIGHT (corrected):

Wgt(corr)= Wgt(unc)-Wgt. from solvent= 0.005016 g

WEIGHT (uncorrected): **ORGANIC:**

BKR ID=
final= g
initial= g Wgt. Org= 0.0000 g

VOLUMES:

tot. Rinses= ml Tot. Vol= 0.00 ml

WEIGHT FROM SOLVENT:

Total Vol * Organic STD = N/A g

WEIGHT (corrected):

Wgt(corr)= Wgt(unc)-Wgt from solvent= N/A g

WEIGHT: **FILTERS:**

ID No.=
final= g
initial= g Wgt. Filter= 0.0000 g

BACK HALF

WEIGHT (uncorrected): **ACETONE**

BKR ID= 91089
final= 50.2469 g
initial= 50.2177 g Wgt. Ac.= 0.0292 g

VOLUME:

Initial= 350.00 ml
tot. Rinses= 45.00 ml
Sep. funnel= ml Tot. Vol= 395.00 ml

WEIGHT FROM SOLVENT:

Total Vol * Acetone STD = 0.001450 g

WEIGHT (corrected):

Wgt(corr)= Wgt(unc)-Wgt from solvent= 0.027750 g

WEIGHT (uncorrected): **WATER:**

BKR ID= 91031
final= 30.6266 g
initial= 30.6163 g Wgt. Water= 0.0103 g

VOLUMES:

initial= 500.00 ml
tot. Rinses= 60.00 ml
Imp. charge= 198.22 ml Tot. Vol= 758.22 ml

WEIGHT FROM SOLVENT:

Total Vol * Water STD = 0.000928 g

WEIGHT (corrected):

Wgt(corr)= Wgt(unc)-Wgt from solvent= 0.009372 g

WEIGHT (uncorrected): **ORGANIC:**

BKR ID=
final= g
initial= g Wgt. Org= 0.0000 g

VOLUMES:

tot. Rinses= ml Tot. Vol= 0.00 ml

WEIGHT FROM SOLVENT:

Total Vol * Organic STD = N/A g

WEIGHT (corrected):

Wgt(corr)= Wgt(unc)-Wgt from solvent= N/A g

WEIGHT: **FILTERS:**

ID No.= 89075
final= 1.5850 g
initial= 1.5855 g Wgt. Filter= 0.0000 g

PARTICULATE COLLECTED (front half):

ΣWgt corrected + Wgt filter= mn (front)= 0.01847 g

PARTICULATE COLLECTED (back half):

ΣWgt corrected + Wgt filter= mn (back)= 0.03712 g

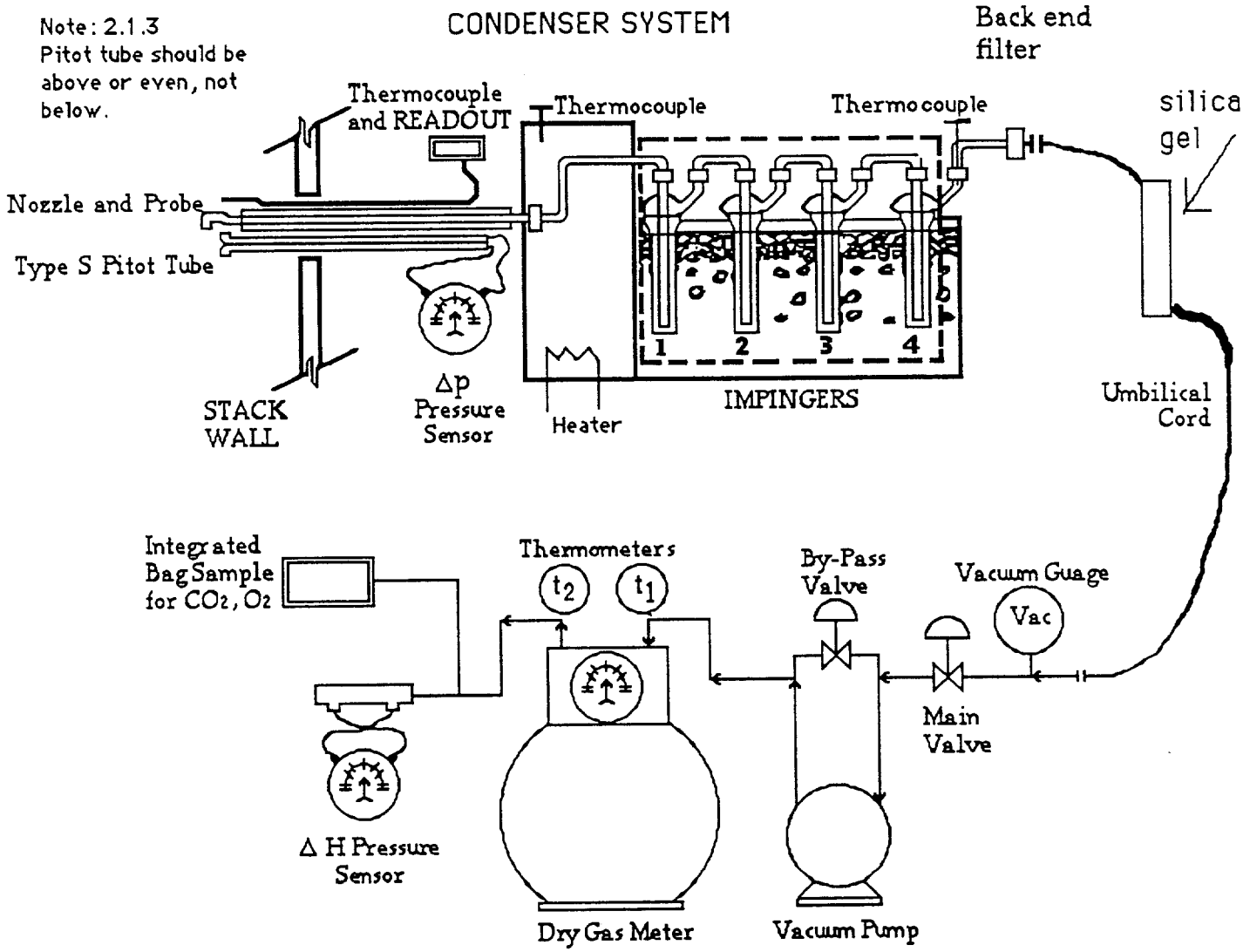
TOTAL PARTICULATE COLLECTED:

mn(front) + mn(back) = 0.05559 g

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

FIGURE

CONDENSER SYSTEM



LEGEND

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 Greenburg-Smith
Std - Standard Type " "

FIELD DATA ABBREVIATIONS

PT = Point Number
T_s = Stack Temperature
Δp = Pitot Tube Pressure Differential; in H_2O
V_s = Stack Velocity, fps
ΔH = Orifice Meter Pressure Drop, in H_2O
t_1 = Meter Inlet Temperature, °F
t_2 = Meter Outlet Temperature, °F
Pm = Pump Vacuum, in Hg
ti = Impinger Temperature
P_{bar} = Barometric Pressure

FIGURE 1 : PARTICULATE MATTER SAMPLING TRAIN

SAN DIEGO AIR POLLUTION CONTROL DISTRICT

TRAVERSE POINTS

INDUSTRIAL ASPHALT
HOT MIX BAGHOUSE EXHAUST DUCT

DUCT MEASURES 27" x 62"

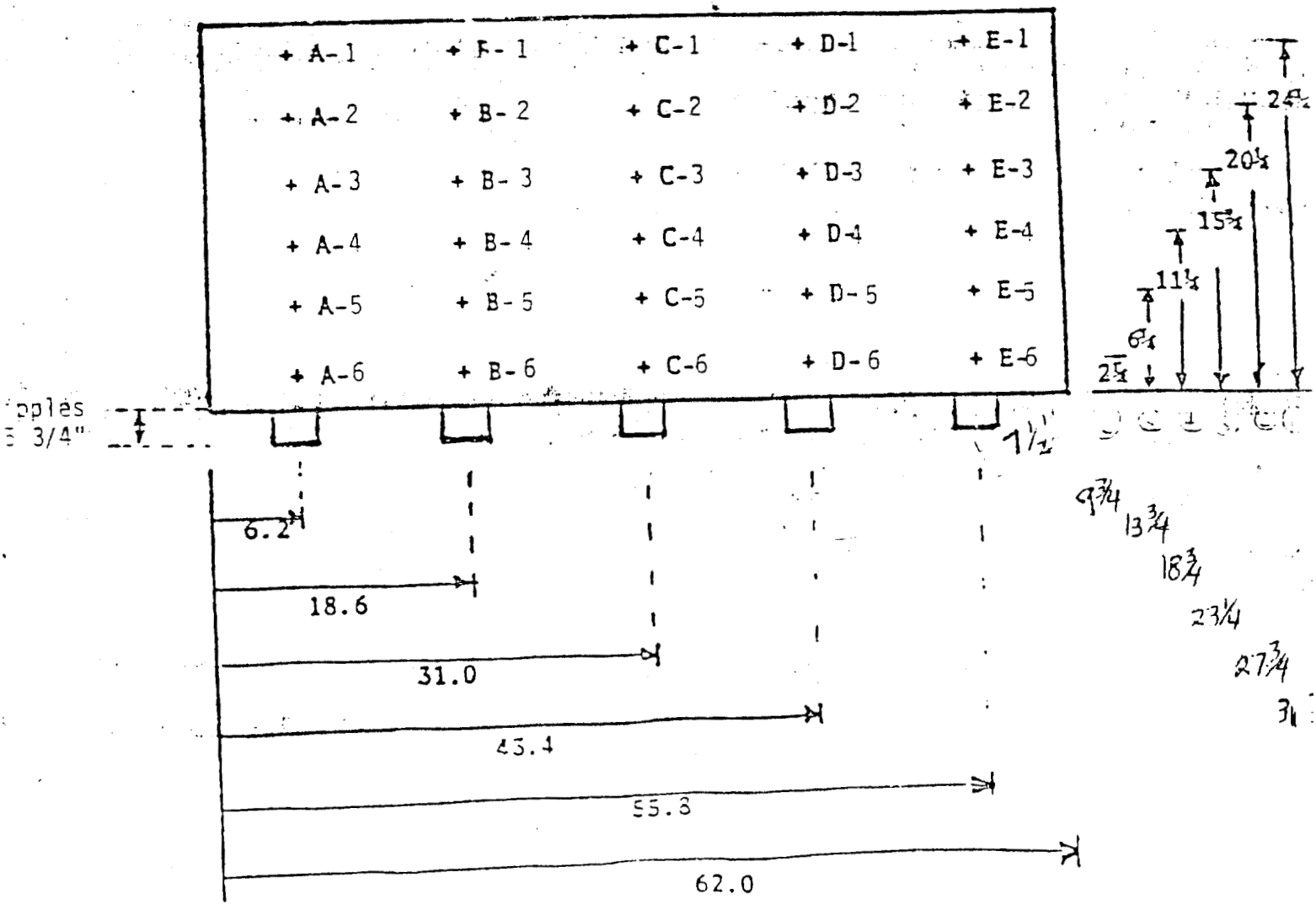
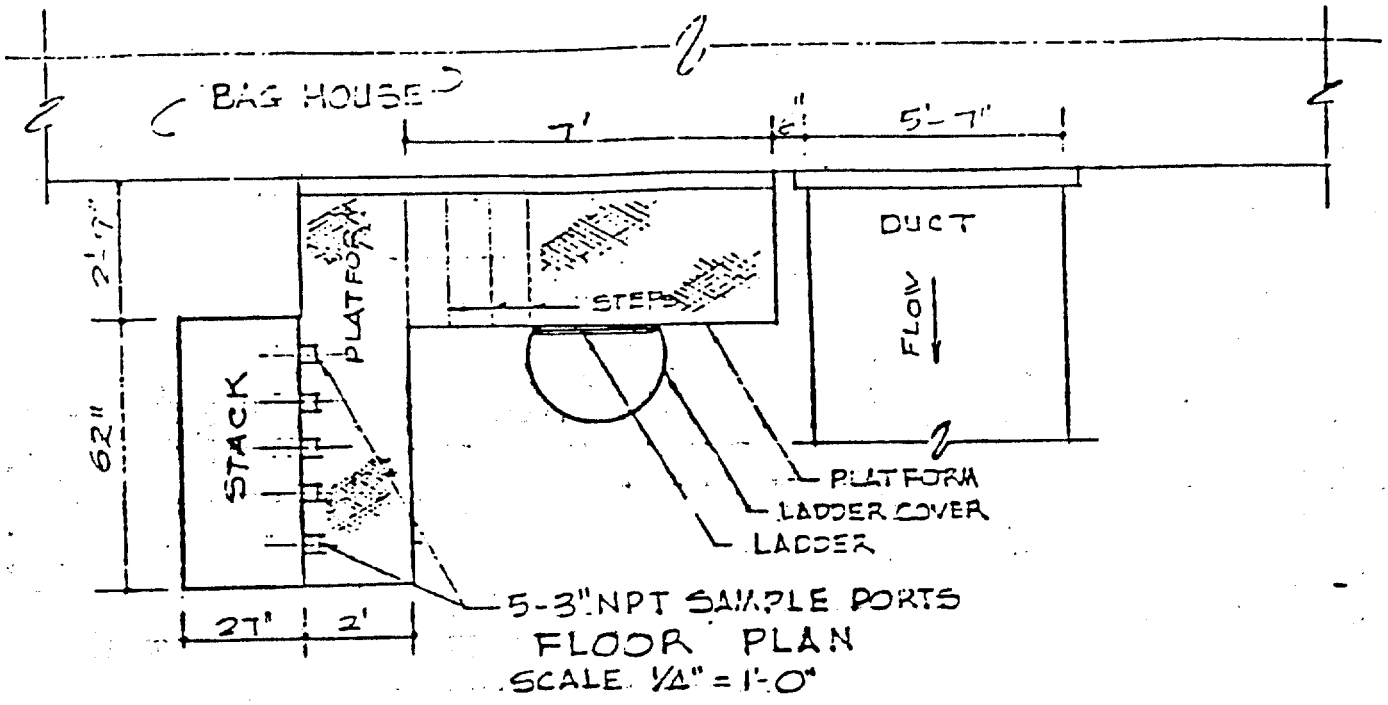
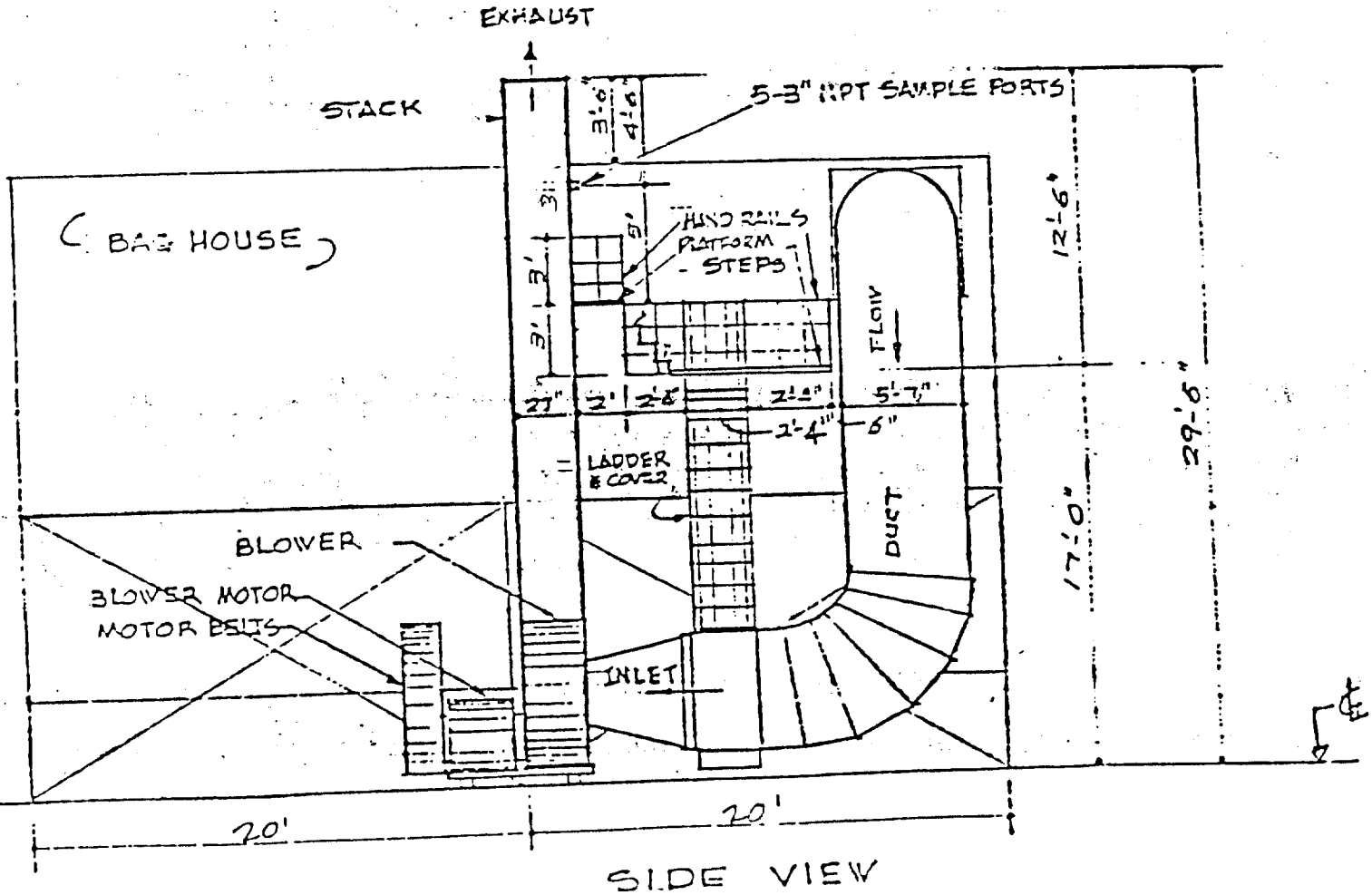


FIGURE 2



FLOOR PLAN
SCALE 1/4" = 1'-0"



SIDE VIEW
SCALE 1/8" = 1'-0"

FIGURE 3

NOMENCLATURE

symbol	units	explanation	equation
	A		
An	in^2	nozzle area	$\pi/4(Dn)^2$
As	ft^2	stack area	$\pi/4(Ds)^2$ or LxW
	B		
Bws(1)	%	fractional stack gas moisture-equ 1	((Vw std)/(Vw std+Vm std))100
Bws(2)	%	fractional stack gas moisture-equ 2	((Vpw @ ts)/Ps)100
Bws	%	water vapor in the gas stream	lower of Bws(1) and Bws(2)
	C		
C12	gr/dscf	corr for grain loading at 12% CO2	(12*Cs)/(%CO2)
CO	%	carbon monoxide	read from measuring device(0 for Asphalt plants)
CO2	%	carbon dioxide	read from measuring device
Corr Vwm	ft^3	correction for Vw w/o silica gel	((Vm*(Vpw@ti)/Ps)*Pm*Tstd)/ (Tm*Pstd)
Cp	none	pitot tube correction factor	see EPA method 3
Cs(front)	gr/dscf	concentration of particulate in stack gas, corrected to STP-for front	(15.43*mn(front))/(Vm std)
Cs(back)	gr/dscf	concentration of particulate in stack gas, corrected to STP-for back	(15.43*mn(back))/(Vm std)
Cs(total)	gr/dscf	concentration of particulate in stack gas, corrected to STP-for total	(15.43*mn(total))/(Vm std)
	D		
∂ (density)	lb/ml	density of water at STP	0.002201 (see CRC)
Ds	in or ft	stack diameter	measure at site
Dn	in	nozzle diameter	avg of at least three measurements
	E		
E.A.	%	Excess air (for combustion)	((%O2-%CO)*100)/ (.264*%N2-%O2-.5*%CO)
E(front)	lbs/hr	part. emissions rate-front	(0.00857)(Qsd*Cs(front))
E(back)	lbs/hr	part. emissions rate-back	(0.00857)(Qsd*Cs(back))
E(total)	lbs/hr	part. emissions rate-total	(0.00857)(Qsd*Cs(total))
	H		
ΔH	in H2O	average differential pressure across the orifice meter	avg of the readings from the pressure measuring device
ΔH@	none	orifice pressure differential at STP	see EPA Method 5 Appendix
	I		
I	%	isokinetics	[0.09450*Ts*Vm std]/ [Ps*vs*Ø*(An/144)*(1-(Bws/100))]
	M		
Md	g/g-mole	dry stack gas molecular wgt	0.44(%CO2)+0.320(%O2)+0.280 (%N2+inerts+CO)
mn(back)	g	particulate in impingers	measurement from lab analysis
mn(front)	g	particulate in nozzle & probe	measurement from lab analysis
mn(total)	g	total particulate collected	measurement from lab analysis
Ms	g/g-mole	wet stack gas molecular wgt	Md(1-Bws)+18.0(Bws)
MW CO2	g/mole	mo. wgt of carbon dioxide	44 (see periodic table)
MW N2	g/mole	mo. wgt of nitrogen	28 (see periodic table)
MW O2	g/mole	mo. wgt of oxygen	32 (see periodic table)
MW H2O	g/mole	mo. wgt of water	18 (see periodic table)
	N		
N2	%	percent nitrogen	100-(%CO2+%O2+%CO+inerts)
	O		
O2	%	percent oxygen	read from measuring device

NOMENCLATRE (cont.)

NOMENCLATRE (concl.)

symbol	units	explanation	equation
	P		
ΔP	in H2O	pitot diff. press.-velocity head of stack gas	read from measuring device
Pbar	in Hg	barometric pressure at sampling pt.	read from press measuring device
π(pi)	none	the ratio of the circumference of a circle to its diameter	3.14165 (see CRC)
Pm	in Hg	absoulte meter pressure	Pbar+(ΔH/13.6)
Ps	in Hg	absolute stack pressure	Pbar+(Pstatic/13.6)
Pg	in H2O	static pressure of stack	read from pressure sensing device
Pstd	in Hg	press at std conditions (29.92)	see CFR
	Q		
Qs	acfm	flow rate	vs*Ao*60
Qstd	dscfm	dry volumetric stack gas flow rate, corrected to STP	17.64*Qs(1-Bws)*(Ps/Ts)
	R		
R	in Hg-ft^3/°R-lb-mo	ideal gas constant	21.85 (see CRC)
	S		
S.L.	none	Sea Level	read from a relief map
	T		
t1	°F	dry gas meter inlet temp, uncorrected	read from temp sensing device
t2	°F	dry gas meter outlet temp,uncorrected	read from temp sensing device
t1 corr	°F	dry gas meter outlet temp,corrected	t1 + temperature correction
t2 corr	°F	dry gas meter outlet temp,corrected	t2 + temperature correction
ø(theta)	min	sampling time/point	Ø/tn
Ø(Theta)	min	total sampling time	none
ti	°F	impinger outlet temp	read from temp sensing device
tm	°F	dry gas meter temp in F	(t1+t2)/2
Tm	°R	dry gas meter temp in R	tm+460
tn	none	ttl number or traverse pts	summation of the traverse points
ts	°F	stack temp in F	read from temp sensing device
Ts	°R	stack temp in R	ts+460
Tstd	°R	temp at std conditions (528)	see CFR
	V		
Vlc	ml	water collected from impingers and the silica gel (if applicable)	from lab analysis
Vm	ft^3	sample gas volume, uncorrected	read from dry gas meter
Vm'	ft^3	sample gas volume, corrected	Vm*Y
Vm std	ft^3	volume of gas sample by the dry gas meter,corrected to STP	((Vm'*Tstd)Pm)/((Pstd*Tm)-corr Vm)
Vpw@ts	in Hg	vapor pressure of water at ts	see CRC water vapor press. tables
Vpw@ti	in Hg	vapor pressure of water at ti	see CRC water vapor press. tables
vs	ft/sec	stack gas velocity	85.49*Cp((Ts*ΔP)/(Ps*Ms))^0.5
Vw std	ft^3	Vol. of water vapor in gas sample, corrected to STP	(Vlc*∂*R*Tstd)/(Pstd*MW H2O)+corr Vwm
	Y		
Y	none	dry gas meter calibration factor	see CFR 40, parts 53-60

Conversion Factors

(multiply by the number)			
0.002669	in Hg-ft^3/°R-ml	conversion to get in Hg-ft^3/R	see CRC
0.00857	lb/gr-min/hr	conv from gr/min to lb/hr	see Lange's Handbook of Chemistry
0.04707	ft^3/ml	conversion from ml to ft^3	see Lange's Handbook of Chemistry
15.43	gr/g	conversion from g to gr	see Lange's Handbook of Chemistry
85.49	(ft/sec)-(lb-in Hg/lb-mo-°R-in H20))^.5	conversion factor to get velocity in ft/sec	see CRC
(divide by the number)			
144	in^2/ft^2	conversion from in^2 to ft^2	see CRC
13.6	in H20/in Hg	conversion from in H20 to in Hg	see CRC
(add to the number)			
460	°R/°F	conversion from F to R	see CRC

ENGINEERING REPORT

BY: David N. Shina
DATE: 9/17/91

Due to some scheduling problems, no engineers were available for this test. The engineering data was given to the chemist, David Shina, verbally by the site foreman, Brad. No other infromation was obtained.

TESTING TIMES

7:20-7:35	1st traverse
7:40-7:43	2nd traverse
8:08-8:19	2nd traverse
8:22-8:32	3rd traverse
8:53-8:59	3rd traverse
9:01-9:17	4th traverse
9:19-9:34	5th traverse

For the times from 6 am to 9:45 am (3.75 hrs), the plant gave a total production of 774.27 tons

PRODUCTION RATE = 774.27tons / 3.75hr = 206.47 tons/hr

David N. Shina
Assist. Chemist

RAW DATA SHEETS

SITE: | TEST#: | P.O#. | DATE:

PIT (ΔP end) in. H20 − (ΔP start) in. H2O = (ΔP calc = 0 to Pass); (15 sec. min.) in H2O

PRE(+):	4.5	4.5	0	in 15 sec	P	F
PRE(-):	3.4	3.4	0	in 15 sec	P	F
POST(+):	2.5	2.5	0	in 15 sec	P	F
POST(-):	4.6	4.6	0	in 15 sec	P	F

VAC (Vend) − (Vstart) = (Vcalc =< 0.02 cfm) @ (vac) in 1 min

	ft^3	ft^3	ft^3	in. Hg.			
PRE:	302,265	302,265	0	@ 15	in 1 min	P	F
POST:	362,091	362,081	.010	@ 6	in 1 min	P	F

OPER: DM

T1 corr: +.4 °F T2 corr: +.1 °F

Pbar 24.50 in Hg Ds: ft

Ps: +.55 in H2O T amb: Dryer °F

Probe ID: L/S box: 0337

Probe len: 3 ft ΔH@: 2.57 2.7254

Cp: .840 Y: .99782

Dn: .240 in C. box:

K= 3.43 time/pt= 2.5 min

TRA PT NO	SAMPLING TIME min	GAS METER ft3, Vm Vm	PRESS DIFF ACROSS PIT TUBES, in H2O ΔP	PRESS DIFF. ACROSS THE ORIFICE, in H2O ΔH DESIRED	ΔH ACTUAL	STACK TEMP, °F °F th I	BOX TEMP, °F °F th II	IMPINGER TEMP, °F °F th III	DRY GAS METER TEMP, °F INLET (T1)	OUTLET (T2)	PUMP VAC in. Hg	CLOCK TIME Hr:min
		302,500										7:20 St
A1	2.5	304,632	.81	2.81	2.8	187	64		78	100	4.4	7:20
2	5.0	306,43	.62	2.13	2.1	192	140	58	76	110	1.2	
3	7.5	308,200	.72	2.47	2.5	197	161	54	76	112	2.1	
4	10	310,080	.74	2.5	2.5	195	191	50	75	113	2.2	
5	12.5	311.982	.75	2.6	2.6	196	2190	48	75	114	2.5	
6	15	313,791	.65	2.23	2.2	180	235	48	76	114	2	7:35 stop
C1	2.5	315,759	.75	2.67	2.7	184	204	49	77	96	2.2	7:40 st
			.85	2.91	2.9							
C2	5.0	317,762	.85	2.91	2.9	177	212	48	75	109		7:45 stop
			.95	3.26	3.3	152	113	49	75	64		8:05 start
C3	7.5	319,820	.89	3.05	3.0	158	134	45	76	97	2.1	
C4	10	321,751	.77	2.64	2.5	161	172	44	74	103	2.2	
C5	12.5	323,538	.65	2.2	2.2	144	201	44	74	107	2.0	
C6	15.0	325,125	0.5	.71	1.7	167	203	44	74	107	1.2	8:14 stop
E1	2.5	327,252	.102	3.44	3.5	186	217	46	74	101	4.9	8:22 start
2	5.0	329,	1.08	3.40	3.5	189	242	46	74	108	4.8	
3	7.5	331,672	.98	3.36	3.4	192	261	48	74	110	4.5	
4	10.0	333,451	1.05	3.6	3.6	191	269	48	74	111	4.9	8:32 stop
			1.2									8:53 st
5	12.5	335,892	.92	3.15	3.2	166	155	53	79	96	4.5	
6	15	337,690	.65	2.2	2.2	165	140	51	80	116	2.0	8:59 stop

SITE: | TEST#: | P.O#. | DATE:

PIT (ΔP end) in. H2O - (ΔP start) in. H2O = (ΔP calc = 0 to Pass); (15 sec min.) in H2O

PRE(+) : _____ - _____ = _____ in _____sec P F

PRE(-) : _____ - _____ = _____ in _____sec P F

POST(+): _____ - _____ = _____ in _____sec P F

POST(-): _____ - _____ = _____ in _____sec P F

VAC (Vend) ft^3 - (Vstart) ft^3 = (Vcalc =< 0.02 cfm) ft^3 @ (vac) in. Hg in 1 min

PRE : _____ - _____ = _____ @ ____ in ___min P F

POST : _____ - _____ = _____ @ ____ in ___min P F

OPER: _____

T1 corr: _____ °F T2 corr: _____ °F

Pbar _____ in Hg Ds: _____ ft

Ps: _____ in H2O T amb: _____ °F

Probe ID: _____ L/S box: _____

Probe len: _____ ft ΔH@: _____

Cp: _____ Y: _____

Dn: _____ in C. box: _____

K= 3.43 time/pt= 2.5 min

TRA PT NO	SAMPLING TIME min	GAS METER ft3, Vm Vm	PRESS DIFF ACROSS PIT TUBES,in H2O ΔP	PRESS DIFF. ACROSS THE ORIFICE, in H2O ΔH DESIRED	ΔH ACTUAL	STACK TEMP,°F °F th I	BOX TEMP,°F °F th II	IMPINGER TEMP,°F °F th III	DRY GAS METER TEMP, °F INLET (T1)	OUTLET (T2)	PUMP VAC in. Hg	CLOCK TIME Hr:min	
B1	2.5	339.752	.95	3.26	3.3	184	204	54	80	105	4	9:01	St
2	5.0	341.859	.92	3.15	3.1	190	192	51	80	111	4.1		
3	7.5	343.955	.88	3.01	3.0	192	208	50	81	115	4.1		
4	10.0	345.991	.81	2.78	2.8	195	229	44	82	117	4.1		
5	12.5	347.926	.73	2.5	2.5	194	249	49	82	118	3.9		
6	15	349.067	.58	1.9	2.0	189	236	50	83	119	2	9:17	Loop
01	2.5	351.710	.93	3.18	3.2	194	197	52	86	111	4	9:19	St
2	5.0	353.828	.90	3.12	3.1	194	182	50	88	120	4.2		
3	7.5	356.000	.95	3.20	3.3	202	173	51	86	123	4.5		
4	10.0	358.128	.93	3.18	3.2	204	167	50	89	124	4.5		
5	12.5	360.581	.78	2.67	2.7	203	161	51	88	125	4.0		
			.82	2.81	2.8								
6	15.0	362.048	.62	2.12	2.1	189	185	51	89	120	3.1	9:34	Stop
			.52	1.75	1.8								

apcd
County of San Diego

R. J. Sommerville
Air Pollution Control Officer

October 17, 1991

Industrial Asphalt Inc.
Attention: Chief Engineer
P. O. Box 1925
Vista, CA 92085-1925

SUBJECT: **RENEWAL TEST REPORT**

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

If you have any questions, please call me at (619) 694-3359.

Robert Jelenosky for CWR
C. W. Ridenour
Senior Air Pollution Chemist

CWR:jo

Enclosures

AIR POLLUTION CONTROL DISTRICT
9150 Chesapeake Drive, San Diego, California 92123-1095
(619) 694-3307 FAX (619) 694-2730

PRELIMINARY TESTS

SITE: | TEST#: | Pm=29.5? | P.O#: | DATE:

TRA PT NO	PRESS DIFF ACROSS PIT TUBES,in H2O ΔP	STACK TEMP,°F °F th l
A1	.7	167
A2	.8	167
A3	.9	174
A4	.95	176
A5	.87	177
A6	.87	184
B1	.55	167
B2	.65	174
B3	.78	191
B4	.85	182
B5	.9	182
B6	.92	187
C1	.115	
C2	.62	181
C3	.78	183
C4	.8	185
C5	.9	181
C6	.95	186
D1	.5	
D2	.65	177
D3	.72	181
D4	.85	186
D5	.85	181
D6	.85	177
E1	.5	
E2	.65	
E3	.72	174
E4	.79	181
E5	.83	184
E6	.81	174

TRA PT NO	PRESS DIFF ACROSS PIT TUBES,in H2O ΔP	STACK TEMP,°F °F th l

	Prelim	Site	
Pm	29.8	29.8	from meter
Ps	29.6	29.6	from stack
Tm	100		from meter
ΔH@	2.7254		calib const
Bws	21%		moisture
C	1.17		corr factor
Ts	185		prelim trav
ΔPavg .5-1	.75		prelim trav
Dn(ideal)	.222		ideal nozzle
Dn(actual)	.240		nozzle used
ΔPavg (Dn actual)	.54		
K	1.85/.54	3.43	ΔH/ΔP
ΔH avg (Dn actual)			K* ΔPavg

Vm'= 50 ft^3 Vm'/Rate=Tot time ttl time/total pts=time/pt

ΔPavg= (ΔP high + ΔP low)/2

PRELIMINARY:

ΔHavg = .75 x 3.43 = 2.573

$\left(\frac{.6743 - .8346}{1-2}(.573)\right) + .6743 = .7683$

$\frac{50}{.7683} = \frac{65.078}{30} = 2.17$ 2.5 mins/pt

~~SITE:~~

Claimed 774.27 tons

from 6am — 9:45

SIGNATURE:_____ DATE:_____ TIME:_____

Yc METER CHECK

MAIN

SITE: I00 Asph - West | TEST#: 9120 | P.O#: 4818 | Date: 9/17

P bar= _____ in Hg | L/S Box= 0337 | ΔH@= 2.7254 | T1 corr= +.40 °F

Y= .9782 | 0.97*Y= .9489 | 1.03*Y= 1.0075 | T2 corr= +.10 °F

Yc=(5 min/Vm) * {[(0.0319*Tm)/Pb]^0.5} run L/S box at ΔH@ for 5 minutes

PRE-TEST 5 MINUTE Y CHECK

9:43 - 9:48

	Volume	t1 (unc)	t1 (corr)	t2 (unc)	t2 (corr)	tavg (t1(c)+t2(c))/2
initial(i)	364,492 ft^3	93 °F	93.4 °F	128 °F	128.1 °F	110.75 °F
final(f)	368,892 ft^3	93.5 °F	93.9 °F	130.5 °F	130.6 °F	112.25 °F

Vm(f) - Vm(i): Vm= 3.97 ft^3

(tavg-i+tavg-f)/2: tm= 111.5 °F | tm+460 °R/°F: Tm= 571.5 °R

9140

Yc=(5 min/ 3.97 ft^3)*{[(.0319* 571.5 °R)/ 29.5 in Hg]^0.5}= .9900

Vm | Tm | Pbar

can

0.97*Y < Yc < 1.03*Y = .9782 < .9900 < 1.0075 (PASS) FAIL

SIGNATURE:_____ DATE:_____ TIME:_____

774,27

POST-TEST 5 MINUTE Y CHECK

	Volume	t1 (unc)	t1 (corr)	t2 (unc)	t2 (corr)	tavg (t1(c)+t2(c))/2
initial(i)	ft^3	°F	°F	°F	°F	°F
final(f)	ft^3	°F	°F	°F	°F	°F

Vm(f) - Vm(i): Vm= ft^3

(tavg-i+tavg-f)/2: tm= °F | tm+460 °R/°F: Tm= °R

Yc=(5 min/ ft^3)*{[(.0319* °R)/ in Hg]^0.5}=

Vm | Tm | Pbar

0.97*Y < Yc < 1.03*Y = .9782 < _____ < 1.0075 PASS FAIL

MAIN

LAB DATA SHEET

SITE: IND Asp-Vista | TEST#: 9126 | P.O.#: 4818 | DATE:

COLD BOX#: Blue 4 | HOT BOX#: Blue 4

PRE TEST MEASUREMENTS POST- TEST

	A	B	C	D	E		F	G
DATE	IMP No.	TRAP(w/o H2O) grams	TRAP (w/ H2O) grams	water (C-B) grams	INSERT+ H2O grams	DATE	IMPINGER+H2O grams	H2O COLLECTED (F-E) grams
9/16	1	325,28 g	424,54 g	99,26 g	550,91 g	9/17	845,71 g	294,80 g
	2	312,85 g	411,81 g	98,96 g	540,52 g		513,06 g	-27,46 g
	3	320,26 g	320,26 g	— g	449,34 g		453,06 g	3,72 g
	4	326,92 g	326,92 g	— g	465,13 g		466,42 g	1,29 g
	5	874,15 g	g	g	874,15 g		883,85 g	9,70 g
		g	g	g	g		g	g

274,15 148,22

TTL WGT GAIN FROM IMP (ΣG)	282,05 g

PreTest : SIGNATURE:_____ DATE:_____ TIME:_____

PostTest: SIGNATURE:_____ DATE:_____ TIME:_____

GAS ANALYSIS

DATE	TRIAL	INSTRUMENT	RANGE	GAS	PERCENT
9/17	1	Anarad	30,0%	CO2	3,1 %
	2	↓	↓	CO2	3,2 %
↓	3	↓	↓	CO2	3,1 %
	AVG			CO2	%
9/17	1	Teledyne	1+	O2	16,4 %
	2	↓	↓	O2	16,4 %
	3	↓	↓	O2	%
	AVG			O2	%

FILTER DATA

VARIABLE	WEIGHTS
(1) ID #	89075
(2) PRETEST	g
(3) POST-TEST	g
REC. AMT (3-2)	g

1,5853
CAL ## = 20,4
CO2
5,290

PreTest : SIGNATURE:_____ DATE:_____ TIME:_____

PostTest: SIGNATURE:_____ DATE:_____ TIME:_____

USE 3 ft t Probe

EQUIPMENT DATA SHEET

SITE: | TEST#: | P.O.# | DATE:

EQUIPMENT CHECK:

MAIN:	TYPE	ID#	SIZE	UNITS	CLEANED	CHECKED	CAL. DATE
Nozzle Dia.	Napp						
Pitot Tube	Napp		3	ft			
Tedlar Bag							
L/S Box	Napp	0337					
Stack Temp Sensor	Omega	I					
Box Temp Sensor	Omeg	II					
Imp. Temp Sensor	Omeg	III					
ΔP Sensor	Dwyer						
ΔH Sensor	Dwyer						
Cold Box	NAPP						
Hot Box	Napp						
Thermoc. Display							

RESERVE							
Nozzle Dia.	Napp						
Pitot Tube	Napp		3	ft			
Tedlar Bag							
L/S Box	Napp	0337					
Stack Temp Sensor	Omega	I					
Box Temp Sensor	Omega	II					
Imp. Temp Sensor	Omega	III					
ΔP Sensor	Dwyer						
ΔH Sensor	Dwyer						
Cold Box	Nap						
Hot Box	Napp						
Thermoc. Display							

SIGNATURE:_____ DATE:_____ TIME:_____

METHOD 5 EQUIPMENT CHECKLIST

IMPINGERS:

Spare filter _____
Filter No. _____
DI water _____
"C" Tube _____
"S" Tube _____
"V" Tube _____
100 ml Grad Cyl _____
Acetone _____
Spare clips (Imp) _____
Kimwipes _____
Stopcock Grease _____
Spare Imp _____

TOOLS:

Chain 8' _____
Rope 40' _____
Rope 2' _____
Bailing Wire _____
Tool Box _____
Wrenches 8" _____
Pipe Wrench _____
Tape Measure _____

SAFETY

First Aid Box _____
Hard Hat _____
Ear Protection _____
Gloves (Leather) _____
Gloves (Heat Resistant) _____
Filter Mask _____
Safety Belt _____
Safety Cones _____

MISC

Tadlar Bag _____
Fuses _____
Camera & Film _____
Ice Chest/Scoop _____
Masking Tape _____
Pens & Markers _____
Duct Tape _____
Calculator _____
Scissors _____
Rags & Diapers _____
Stop Watch _____
Monorail w/rollers _____
"S" Hook _____
Nozzle Nut _____
Probe Brush _____
TC Extension _____
Nomograph _____
Extension Cords _____

FIGURE 5-3B

BAROMETRIC PRESSURE REQUEST

SITE: TOD Asp_Vista | TEST#: 9126D | P.O.#: 4818 | DATE: 9/16

TO: Tom / DON | OF: Meteorology | DATE: 9/16/91

FROM: David S | OF: MTS | DATE: 9/16/91

ADDRESS: 1309 Sycamore Ave, VISTA 92083

TEST DATE: 9/17, Tue | TEST TIME: 5am – 1pm

I need an hourly breakdown

GRADE LEVEL: 450 Feet above MSL

\+ 0 Feet above Grade

ALTITUDE: 450 Feet above MSL

CALCULATIONS:

5A – 29.43" Hg
6A – 29.44"
7A – 29.45"
8A – 29.45"
9A – 29.44"
10A – 29.44"
11A – 29.43"
12 – 29.43"
1P – 29.42"

tested 7:30 – 9:30

$\frac{29.45 + 29.45 + 29.44}{3} = 29.45$

SIGNATURE: [signature] | DATE: 9/18/91 | TIME: 0840 PST

D.V. Shine
9/17/91

P.O.# 4818

IND. ASP. - VISTA
TEST #91260
006

PRE-TEST IMPINGERS

DATE	IMP	WGT IMP	IMP + H_2O	H_2O	IMP, H_2O + INSERT
9/16	1	325.28	424.54	99.26	550.91
	2	312.85	411.81	98.96	520.50
	3	320.26	320.26	—	449.34
	4	326.92	326.92	—	465.13
	5				874.15

POST-TEST IMPING

DATE	WGT IMP	VET	COMMENTS
9/17	845.71	294.80	
	513.06	-27.46	
	453.06	3.72	
	466.42	1.29	
	883.85	9.70	Silica gel
	total =	282.05	

WEIGHT SHEET

LOC	BKR NO	INIT WGT	9/25 WGT 1	9/26 WGT 2	9/29 WGT 3	10/2 WGT 4	FINAL	
Ac	91052	~~28.8335~~ 28.8361	28.8472	.8475	.8474	.8475	28.8475	
Fr wat	91040	FT wgt	24.8416	.8417	.8416	.8416	24.8416	
Bk Ac	91089	50.2177	50.2468	.2468	.2468	.2468	50.2464	
Bk wat	91031	30.6163	30.6266	.6267	.6266	.6268	30.6266	
Filter	89075	1.5855	1.5850	1.5850	1.5850	1.5850	1.5850	
BL Ac	91035	29.1124	29.1137	.1140	.1140	.1141	29.1141	FROM PRE. Hg
BL wat	91023	28.6437	28.6440	.6441	.6440	.6440	28.6440	

GAS

CO_2: ~~Tetele~~ Anarad Cal gas = 5.2% CO_2 cal # = 20.4

$t_1 = 3.1$, $t_2 = 3.2$ $t_3 = 3.1$

AVG = 3.13

O_2: Teledyne Ryan

$t_1 = 16.4$ $t_2 = 16.4$ $t_3 = 16.4$ AVG = 16.4

9/17/91

P.O. #

IND. Asph - VISTA 008
TEST #

WATER

Date	RINSE (cnt)	VOL (mL)	Label	COMMENTS — FRONT
9/17	INIT	350	Fr wat	
9/19	10	45	91040	slight amount of light brown ppt
	ttl =	395		

Date	RINSE (cnt)	VOL (mL)	Label	COMMENTS — BACK
9/17 9/19	INIT	500	Back wat	
	10	60	91031	more brown ppt than front half
	ttl -	560		

Date	RINSE (cnt)	VOL (mL)	Label	COMMENTS — BLANK
9/17	INIT	200	Blank wat	
9/20	10	45	9/023	clear
	ttl -	245		

U.N. Skin

9/17/91

P.O. # 4818

IUD. ASP- VISTA

TEST # 912600.1

007

ACETONE

DATE	RINSE	VOL (mL)	LABEL	comments FRONT
9/17	INIT	120	Front Ac	clear. some dirt particles
	1°	30	91052	—11—
	tot=	150		

DATE	RINSE	VOL (mL)	LABEL	comments BACK
9/17	INIT	350	Back Ac	clear
	1°	45	91089	
	tot=	395		

DATE	RINSE	VOL (mL)	LABEL	comments BLANK
9/5	INIT	500	A C BL	I used the same Acetone as R.T. Hazard; so this data is from R.T. Hazard's File
9/8	1°	45	91035	
		545		

Acetone: EM-Science - Omnisolve
Lot# 9132. Bottle labelled w/
IUD Aspn-Vista