AP42 Section: 11.1

Reference Number: 233

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

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

July 23, 1991.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference 233-234

Industrial Asphalt-Mission Va y on 7/23/91 P.O.#30431 TEST ; same as Ref #'s 235, 236, 232, 233
SAN DIEGO AIR POLLUTION CONTROL DISTRICT, 9150 CHESAPEAKE DRIVE., SAN DIEGO, CA. 921

SOURCE TEST OF PARTICULATE EMISSIONS TO THE ATMOSPHERE

TEST SITE: Industrial Asphalt Mission Valley
8150 Friars Road
San Diego, CA 92108

TEST #: 91204.1 P.O.# 30431 TEST DATE: 7/23/91

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

UNIT TESTED: Baghouse

EQUIPMENT: Asphalt Plant

TESTED BY: David Shina, Gary Smith, & Linda Twaddle	DATE:
SITE PERSONNEL:	DATE: 7/23/91
APCD ENGINEER: John McCafferty	DATE:
LAB ANALYSIS BY: David Shina	DATE: 7/23/91
REPORT BY: David Shina	DATE: 7/29/91
REVIEWED BY: Gary Smith	DATE: 9/10/91
APPROVED BY: for CWR	DATE: 9/24/91

C.W. RIDENOUR, 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	0.99 lbs/hr	PASSED
RULE 260.92	0.04 gr/dscf	0.004 gr/dscf	PASSED

SUMMARY:

ITEM	Vm	Bws	Cs	E	I	Qstd	ts	PROD RATE
UNITS	ft^3	%	gr/dscf	lbs/hr	%	dscfm	°F	tons/hr
VALUE	54.511	21.29	0.004	0.99	104	3.07E+04	187	239.00

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 only (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 24 traverse points, 12** from each of 2 sample ports (fig.2), collected from 66 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. (**the stack is oblong on the E-W traverse, so points 1&2 and 11 & 12 were combined)

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-Mission V. .y on 7/23/91 P.O.#30431 TEST #91204.1

Trav. Pt	Vm (ft^3)	ΔP	ΔH	t 1(unc)	t 2(unc)	Stack Temp	Imp Temp	velocity
	918.619	(in H2O)	(in H20)	(°F)	(°F)	(°F)	(°F)	(ft/sec)
1		1.200	1.100	78.00	98.00	185	54	71.60
2		2.900	2.800	78.00	115.00	178	50	110.70
3		3.350	3.100	78.00	110.00	180	50	119.17
4		4.000	3.700	78.00	92.00	160	51	128.17
5		1.800	1.700	78.00	115.00	175	49	87.01
6		3.000	2.700	77.00	110.00	182	49	112.95
7		2.900	2.700	78.00	98.00	166	48	111.40
8		3.350	3.100	78.00	113.00	194	50	120.47
9		3.350	3.100	78.00	118.00	197	50	120.74
10		2.800	2.600	79.00	116.00	192	49	109.97
11		3.000	2.800	79.00	118.00	186	48	113.30
12		1.400	1.300	79.00	116.00	183	49	77.22
1		3.200	3.000	82.00	80.00	150	50	113.71
2		2.700	2.500	80.00	109.00	177	48	106.73
3		3.200	3.000	80.00	113.00	184	47	116.83
4		3.200	3.000	79.00	114.00	193	48	117.65
5		4.100	3.800	80.00	117.00	202	49	134.08
6		3.700	3.400	80.00	119.00	207	50	127.85
7		2.650	2.450	81.00	119.00	210	49	108.46
8		1.900	1.800	81.00	119.00	208	51	91.69
9		2.700	2.500	81.00	119.00	200	49	108.64
10		1.300	1.200	83.00	100.00	188	54	74.70
11		2.200	2.000	82.00	114.00	198	49	97.02
12	973.13	2.400	2.200	83.00	118.00	193	48	101.89

	Vm (ft^3)	ΔP (in H2O)	ΔH (in H2O)	t 1 (°F)	t 2 (°F)	ts (°F)	ti (°F)	vs (ft/sec)
Average:	54.511	2.700	2.565	79.58	111.17	187	50	107.58

MISCELLANEOUS:

Ø = 70.5 min
tn = 24 points
ø = 2.9 min

NOZZLE & PROBE:

Dn = 0.175 in
An = 0.0241 in^2
Cp = 0.850

METER BOX PARAMETERS:

ΔH@ = 2.7254
Y = 0.9782
Box ID = D337

PRESSURES:

Pbar = 29.95 in Hg
Pg = -2.60 in H2O
Vpw @ ts 17.82 in Hg
Silica (yes/no) no
Vpw @ ti = 0.3626 in Hg

VOLUME:

start leak rate = 0.000 cfm
Pass/Fail PASS
final leak rate = 0.000 cfm
Pass/Fail PASS
Vm 54.511 ft^3

TEMPERATURES:

t1 corr = 0.40 °F
t2 corr = 0.10 °F
tm = 96 °F
ts = 187 °F
ti = 50 °F

STACK PARAMETERS:

circular (yes/no) yes**
Width = 3.000,3.167 f t
Length = N/A f t
As = 7.46 ft^2

LAB DATA:

mn(front) = 0.00844 g
mn(back) = 0.00382 g
mn(total) = 0.0123 g
Vlc 275.81 ml

STACK GAS MEASUREMENTS:

CO2 = 3.53 %
O2 = 15.03 %
CO = 0.00 %
N2 = 81.44 %

TEMPERATURES:

01)	ts = (Σ ts(n))/total n's		187 °F
02)	Ts = ts+460		647 °R
03)	tm= (Σ {(t 1(n)+t 2t(n))/2}/total n's		96 °F
04)	Tm= (t1+t2)/2 + 460		556 °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)]}		29.95 in Hg
08)	Pg= read from pressure sensing device		-2.60 in H2O
09)	Ps= Pbar + (Pg/13.6)		29.76 in Hg
10)	ΔH		2.56 in H20
11)	Pm= Pbar+(ΔH/13.6)		30.14 in Hg
12)	Pstd		29.92 in Hg

VOLUME:

13)	Vm= Vm(end)-Vm(begin)		54.511 ft^3
14)	Y		0.9782
15)	Vm'= Vm*Y		53.323 ft^3
16)	Vpw @ ti = from appendix		0.3626 in Hg
17)	corr Vwm = {[(Vm'*Vpw@imp/Ps)*Pm*Tstd]/(Tm*Pstd)}		0.6219 ft^3
18)	Vm std = {[Vm'*(Tstd/Tm)*(Pm/Pstd)]-corr Vwm}		50.420 ft^3
19)	Vlc= (Σ Volume of impingers)		275.81 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}		13.6402 ft^3

CALCULATIONS:

MOISTURE-

24)	Bws(1) =(Vw std)/(Vw std+Vm std)100	21.29 %	
25)	Vpw @ ts = from appendix	17.82 in Hg	
26)	Bws(2) =[(Vpw @ ts)/Ps]*100	59.88 %	
27)	Bws = lower value of equation 24 or 26		21.29 %

MOLECULAR WEIGHT-

28)	%O2		15.03 %
29)	%CO2		3.53 %
30)	%N2+inerts+%CO		81.44 %
31)	Md=[0.440(%CO2)]+[0.320*(%O2)]+[0.280(%N2+inerts+%CO)]		29.17 g/g*mole
32)	Ms=Md*(1-Bws)+18.0*(Bws)		26.79 g/g*mole

FLOW-

33)	ΔP		2.700 in H2O
34)	Cp		0.850
35)	vs= 85.49*Cp*{[(Ts*ΔP)/(Ps*Ms)]^.5}		107.581 ft/s
36)	As=3.14*[(Ds)^2/4]		7.46 ft^2
37)	Qs = (vs)*As*60		4.82E+04 acfm
38)	Qstd =17.64*Qs*(1-Bws)*Ps/Ts		3.07E+04 dscfm

EMISSIONS-

FRONT HALF

39)	mn (front)		0.00844 g
40)	Cs (front) =15.43*mn(front)/Vm std	0.002 gr/dscf=	0.00 grains/dscf
41)	E (front) = (0.00857)*(Qsd)*Cs (front)		0.63 lbs/hr

BACK HALF

42)	mn (back)		0.00382 g
43)	Cs (back) =15.43*mn(back)/Vm std	0.0012 gr/dscf=	0.00 grains/dscf
44)	E (back) = (0.00857)*(Qsd)*Cs (back)		0.31 lbs/hr

TOTAL

45)	mn (total) = mn(front)+mn(back)		0.01226 g
46)	Cs (total) =15.43*mn(total)/Vm std	0.0038 gr/dscf=	0.00 grains/dscf
47)	E (total) = (0.00857)*(Qsd)*Cs (total)		0.99 lbs/hr

ISOKINETICS:

48)	An=3.14*[(Dn)^2/4]		0.0241 in^2
49)	I=.09450(Ts*Vm std)/Ps*vsAnØ(1-Bws)	103.94 %=	104 %

APPENDIX

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

LABORATORY ANALYSIS OF PARTICULATE TEST

TEST SITE: Industrial Asphalt-Mission Valley
8150 Friars Road
San Diego, CA 82108

TEST # 91204 P.O.# 30431 TEST DATE: 7/23/91

LAB ANALYSIS BY: David Shina DATE: 7/29/91

LAB REPORT BY: David Shina DATE: 7/31/91

REVIEWED BY: Gary Smith DATE: 9/10/91

(1) IMPINGER VOLUMES

	FINAL WEIGHT		INITIAL WEIGHT		NET WEIGHT
#1	812.39 g	-	555.81 g	=	256.58 g
#2	559.58 g	-	541.31 g	=	18.27 g
#3	454.39 g	-	453.60 g	=	0.79 g
#4	457.30 g	-	457.13 g	=	0.17 g
SILICA GEL CONTAINER:					
#5	____ g	-	____ g	=	g

Tot. Vol.= 275.81 g

(2) BLANKS

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

ACETONE:

VOLUMES:

BKR ID = 91013
Initial= 200.00 ml
tot. Rinses= 30.00 ml
Tot. Vol= 230.00 ml

WEIGHTS:

final= 29.1564 g
initial= 29.1546 g
net= 0.0018 g

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

STD = 7.82609E-06 g/ml
0.000783 %
= 7.83 ppm
The Blank PASSED

WATER:

VOLUMES:

BKR ID = 91002
Initial= 200.00 ml
tot. Rinses= 40.00 ml
Tot. Vol= 240.00 ml

WEIGHTS:

final= 28.7455 g
initial= 28.7451 g
net= 0.0004 g

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

STD = 1.66667E-06 g/ml
0.000167 %
1.67 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	BACK HALF
ACETONE	**ACETONE**
WEIGHT (uncorrected):	WEIGHT (uncorrected):
BKR ID= 91015	BKR ID= 91000
final= 30.4872 g	final= 30.5736 g
initial= 30.4795 g Wgt. Ac= 0.0077 g	initial= 30.5708 g Wgt. Ac.= 0.0028 g
VOLUME:	VOLUME:
Initial= 250.00 ml	Initial= 500.00 ml
tot. rinses= 30.00 ml	tot. Rinses= 30.00 ml
Sep funnel= ml Tot. Vol= 280.00 ml	Sep. funnel= ml Tot. Vol= 530.00 ml
WEIGHT FROM SOLVENT:	WEIGHT FROM SOLVENT:
Total Vol * Acetone STD = 0.002191 g	Total Vol * Acetone STD = 0.004148 g
WEIGHT (corrected):	WEIGHT (corrected):
Wgt(corr)= Wgt(unc)-Wgt from solvent= 0.005509 g	Wgt(corr)= Wgt(unc)-Wgt from solvent= 0.000000 g
WATER:	**WATER:**
WEIGHT (uncorrected):	WEIGHT (uncorrected):
BKR ID= 91004	BKR ID= 91096
final= 28.9309 g	final= 50.0112 g
initial= 28.9276 g Wgt. Water= 0.0034 g	initial= 50.0060 g Wgt. Water= 0.0052 g
VOLUMES:	VOLUMES:
Initial= 250.00 ml	Initial= 590.00 ml
tot. Rinses= 30.00 ml	tot. Rinses= 40.00 ml
Tot. Vol = 280.00 ml	Imp. charge= 198.67 ml Tot. Vol= 828.67 ml
WEIGHT FROM SOLVENT:	WEIGHT FROM SOLVENT:
Total Vol * Water STD = 0.000467 g	Total Vol * Water STD = 0.001381 g
WEIGHT (corrected):	WEIGHT (corrected):
Wgt(corr)= Wgt(unc)-Wgt from solvent= 0.002933 g	Wgt(corr)= Wgt(unc)-Wgt from solvent= 0.003819 g
ORGANIC:	**ORGANIC:**
WEIGHT (uncorrected):	WEIGHT (uncorrected):
BKR ID=	BKR ID=
final= g	final= g
initial= g Wgt. Org= 0.0000 g	initial= g Wgt. Org= 0.0000 g
VOLUMES:	VOLUMES:
tot. Rinses= ml Tot. Vol= 0.00 ml	tot. Rinses= ml Tot. Vol= 0.00 ml
WEIGHT FROM SOLVENT:	WEIGHT FROM SOLVENT:
Total Vol * Organic STD = N/A g	Total Vol * Organic STD = N/A g
WEIGHT (corrected):	WEIGHT (corrected):
Wgt(corr)= Wgt(unc)-Wgt from solvent= N/A g	Wgt(corr)= Wgt(unc)-Wgt from solvent= N/A g
FILTERS:	**FILTERS:**
WEIGHT:	WEIGHT:
ID No.=	ID No.= 89074
final= g	final= 1.6050 g
Initial= g Wgt. Filter= 0.0000 g	Initial= 1.6052 g Wgt. Filter= 0.0000 g

PARTICULATE COLLECTED (front half):

ΣWgt corrected + Wgt filter= mn (front)= 0.00844 g

PARTICULATE COLLECTED (back half):

ΣWgt corrected + Wgt filter= mn (back)= 0.00382 g

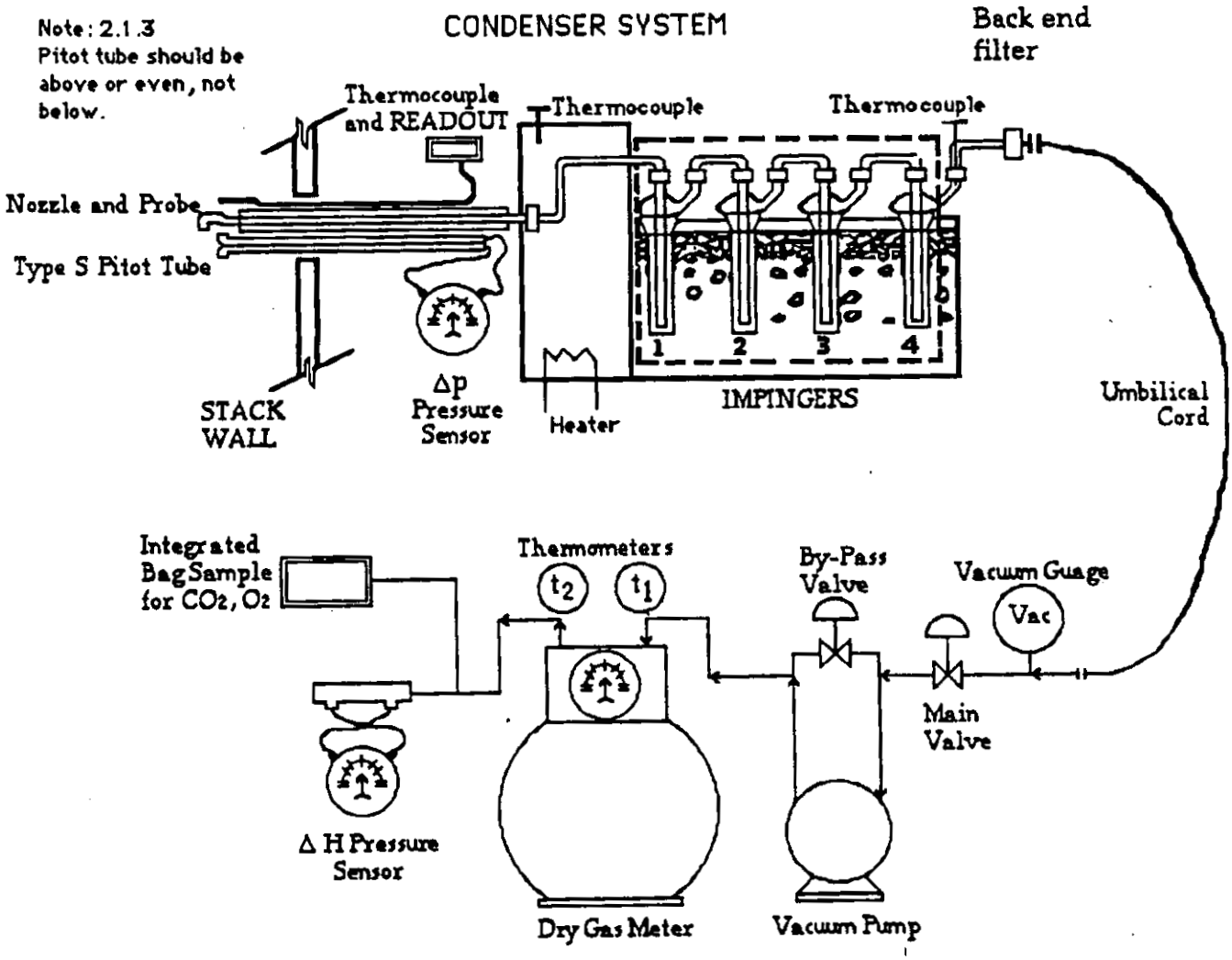
TOTAL PARTICULATE COLLECTED:

mn(front) + mn(back) = 0.01226 g

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

FIGURE 1

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 " "

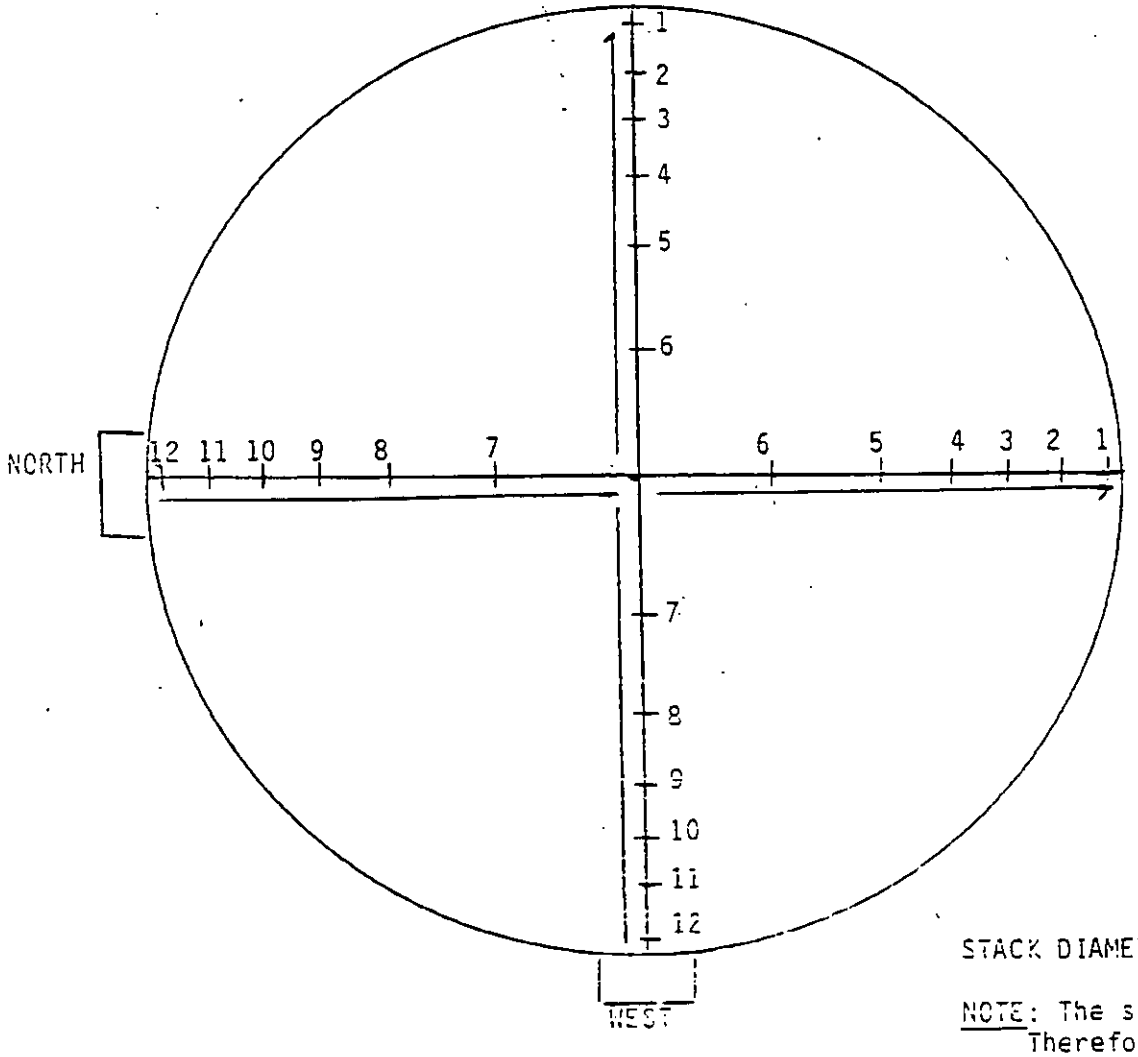
FIELD DATA ABBREVIATIONS

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

INDUSTRIAL ASPHALT, MISSION VALLEY

TRAVERSE POINTS



STACK DIAMETER = 38"

NOTE: The stack is oblong by 2
Therefore, on E-W traverse
points 1 & 2 and 11 & 12
were combined.

POINT #	DISTANCE INTO STACK
1	0.8 in.
2	2.5
3	4.5
4	6.7
5	9.5
6	13.5
7	24.5
8	28.5
9	31.3
10	33.5
11	35.5
12	37.2

FIGURE 1

Figure 3

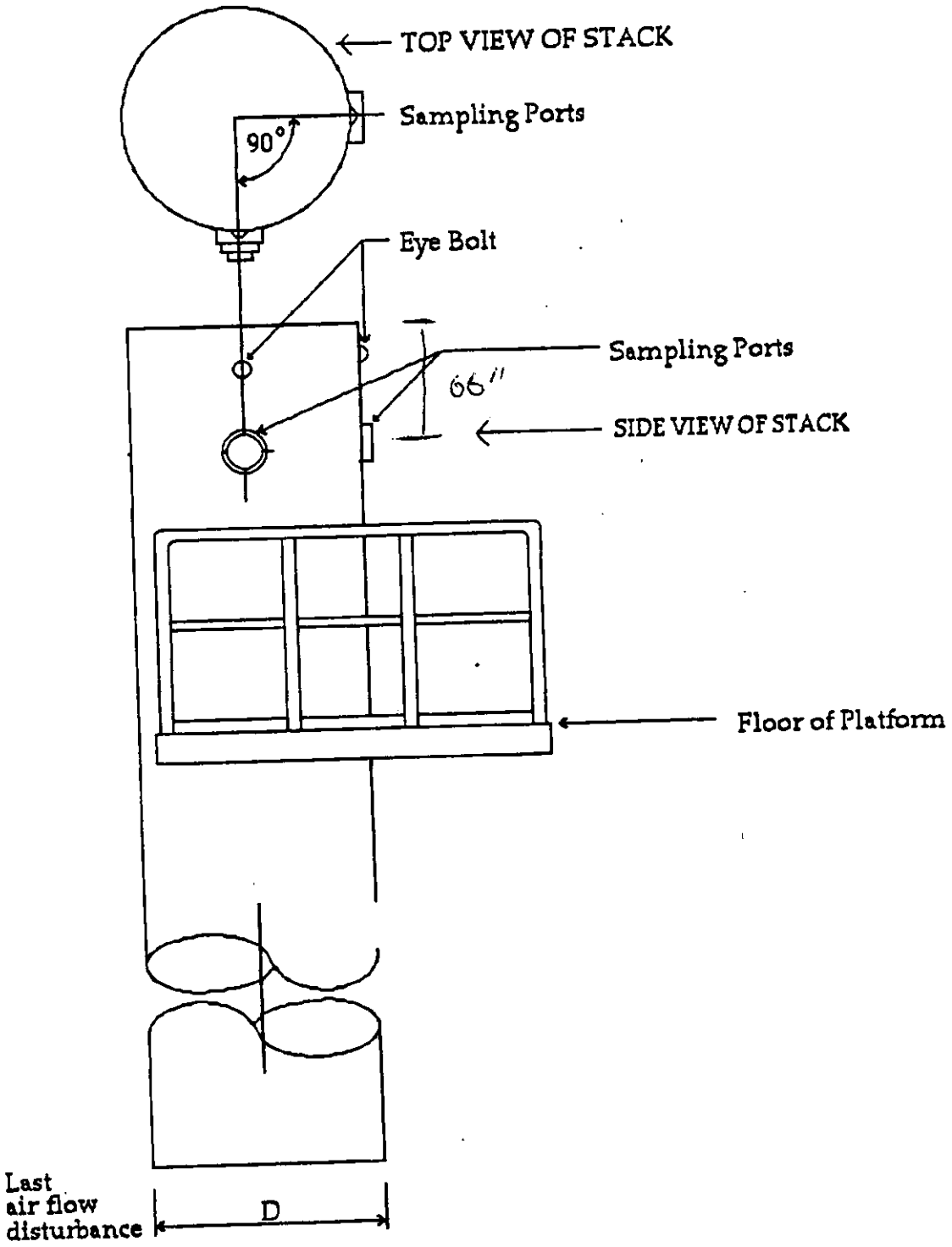


Figure 3

NOMENCLATURE

symbol	units	explanation	equation
	A		
An	in^2	nozzle area	π/4((Dn)^2)
As	ft^2	stack area	π/4((De)^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	equatio
	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
θ(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	ti 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

MECHANICAL ENGINEERING

SOURCE TEST REPORT

PERMIT RENEWAL TEST

TEST DATE: JULY 23, 1991 ENGINEER: JOHN McCAFFERTY

TESTER: APCD (DAVID SHINA & CREW)

TEST: PARTICULATES

SOURCE: INDUSTRIAL ASPHALT, INC., 8150 FRIARS RD, SAN DIEGO, CA

PERMIT TO OPERATE: 080431, HOT-MIX ASPHALT BATCH PLANT

EQUIPMENT DESCRIPTION: ASPHALT BATCH PLANT, HOT-MIX (350 TONS/HR CAP):

P/O CONDITIONS: P/O ATTACHED

OBSERVATIONS:

- SITE PERSONNEL — STAN SORENSEN, DISTRICT MGR.
  JEFF ORDONES, FOREMAN
  JIM CHAPMAN, OPERATOR

- VISIBLE EMISSIONS (COND. 3) — LARGE CONDENSED-MOISTURE PLUME EXISTED DURING TEST; PARTICULATE OPACITY NOT DETERMINED

- FUEL USAGE — NATURAL GAS FUEL USAGE WAS MEASURED FOR EIGHT MINUTES AT THE SITE GAS METER. THE UNCORRECTED METER READINGS INDICATE A FLOW RATE OF 1560 CFH WHICH WOULD BE APPROX. 94 MM BTU/HR.

• ASPHALT PRODUCTION RATE (COND. 5) – THE ACTUAL ASPHALT PRODUCTION RATE CAN ONLY BE MEASURED AS THE TRUCK FILL RATE, USING THE INVOICE TICKETS. THE AGGREGATE THROUGHPUT RATE THROUGH THE DRYER DRUM DURING THE PARTICULATE TEST IS NOT MEASURED BUT IS ASSUMED TO BE APPROXIMATED BY THE TRUCK RATE. THE DIFFERENCES WOULD BE THE ASPHALT OIL WEIGHT AND THE SURGE-TANK EFFECT OF THE TOWER AGGREGATE HOPPER. THE STORAGE SILO WAS NOT USED DURING THE TEST.

MAX DESIGN RATE (P/O) ——— 350 TONS/HR.

PEAK 10-MIN RATE (9:19-9:29) ——— 384

PEAK 15-MIN RATE (9:34-9:49) ——— 318

PEAK 30-MIN RATE (9:19-9:49) ——— 287

★ TEST PERIOD RATE (70.5 MIN, 8:07-10:12) ——— 239

PEAK ONE-HOUR RATE (9:15-10:15) ——— 223

OVERALL, INCL. DOWNTIME (8:00-10:15) ——— 184

★ THE WAITING TRUCKS WERE FILLED FAST BUT MANY SMALL TRUCKS RESULTED IN A REDUCED TRUCK HAUL-OUT RATE IF THE PARTICULATE TEST RESULTS PROVE TO BE MARGINAL AT THE LOW TEST PRODUCTION RATE IT WOULD INDICATE POTENTIAL EMISSION EXCEEDANCES AT HIGHER RATES.

- MAX. AGGREGATE TEMPERATURE — THE MAXIMUM TEMPERATURE OF THE AGGREGATE AT THE DRYER DRUM FREQUENTLY EXCEEDED THE 340 °F ALLOWED IN THE P/O. AN APPLICATION (891170) FOR PAVEMENT RECYCLING HAS BEEN APPROVED AND AN S/A ISSUED. THE COLD PAVEMENT PIECES ARE MIXED WITH THE HOT AGGREGATE. THE MIXTURE TEMPERATURE SHOULD NOT EXCEED 340°F. THIS CONDITION SHOULD BE REVISED. NO ADDITIONAL EMISSIONS RESULT FROM THE ACTUAL CURRENT USAGE. (COND. 7)

- OIL TANK COVERS — VISIBLE SMOKE FROM THE TANK FILL AREA EXCEEDED 20% OPACITY DURING ONE BULK DROP OF 425 °F OIL. THE SITE MANAGEMENT BELIEVES THAT THE UNUSUALLY HOT OIL DROPPING INTO AN ALMOST EMPTY TANK CAUSED AIR EXPANSION THAT OVERWHELMED THE TANK VENT SYSTEM. THIS SYSTEM SHOULD BE REINSPECTED FOR CONTINUING COMPLIANCE. (COND. 8)

- AGGREGATE THROUGHPUT - IT WAS NOT SEEN HOW THE LISTED MAXIMUM AGGREGATE THROUGHPUTS COULD BE MEASURED. NO RECORDS ARE REQUIRED. ENGINEERING SHOULD RE-EXAMINE THIS CON (COND. 10)

- BLUE SMOKE TUNNEL (COND. 12) — THE VENTILATION SYSTEM FOR THIS TRUCK LOADING TUNNEL WAS INOPERATIVE BECAUSE A CLEAN-OUT ACCESS DOOR ON THE DRYER-BLOWER INLET WAS NOT REINSTALLED AFTER CLEANING. THE DOOR WAS REPLACED DURING THE TEST. NO RULE 50 VIOLATIONS WERE OBSERVED. THE INSPECTOR SHOULD CHECK THIS DOOR WHEN ON SIT

- ROAD CLEANING (COND. 13) — ALL WET-SWEEPING AND ROAD CLEANING AND WATERING IS HANDLED BY CAL-MAT (THE PARENT COMPANY) NOT BY INDUSTRIAL ASPHALT DIVISION, AND NO RECORDS ARE KEPT BY THAT DIVISION. ENGINEERING SHOULD RE-EXAMINE THIS CONDITION.