Canyon Rock on 10/8/92 — P.O.#254 TEST 92282

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

SOURCE TEST OF PARTICULATE EMISSIONS TO THE ATMOSPHERE

TEST SITE: V.R. Dennis-Canyon Rock
7500 Mission Gorge Road
San Diego, CA 92120

TEST #: 92282 P.O.#: 254 TEST DATE: 10/8/92

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

UNIT TESTED: Hot Mix Asphalt Batch Plant

EQUIPMENT: Barber-Reeen Model 896 Hot plant vented to a Barber-Green wet collector model CN-70

TESTED BY: SDAPCD: David N. Shina & Bob Yelenosky	DATE: 10/8/92
SITE PERSONNEL:	DATE: 10/8/92
APCD ENGINEER: Chuck Williams	DATE: 10/8/92
LAB ANALYSIS BY: David N. Shina	DATE: 10/21/92
REPORT BY: David N. Shina	DATE: 10/22/92
REVIEWED BY: Guy Allphin II	DATE: 11/10/92
APPROVED BY: Robert Yelenosky	DATE: 11/10/92

ROBERT YELENOSKY, SENIOR AIR POLLUTION CHEMIST

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

SDAPCD RULES

TEST	LIMIT	MEASURED	EXCEEDANCE/NON-EXCEEDANCE
RULE 54 DUST & FUMES	40 lbs/hr	9.12 lbs/hr	NON-EXCEEDANCE

TEST RESULTS SUMMARY:

ITEM	I	Cs	E (y component)
UNITS	%	gr/dscf	lbs/hr
VALUE	108	0.1308	9.124

ENGINEERING SUMMARY

Qstd (y component)	Fuel	Asphalt Production
dscfm	type	tons/hr
8139	Nat. gas	198.9

TEST PARAMETERS:

SYSTEM DESCRIPTION:

This asphalt plant combines crushed rock 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 vented through a cyclone and then to a wet scrubber, which exhausts tangentially into the exit stack. The emissions from this stack are the subject of this report.

PROCEDURES:

The procedures utilized in these tests are based on EPA's 40 CFR, July 1, 1991, Part 60, Appendix A, Methods 1-5 inclusive. The sampling train was modified as follows: (1) Teflon tubing was run from the end of the probe to the first impinger in the cold box (the hot box was eliminate (2) A back-end filter was used instead of a front-end filter (for both modifications see fig. 1).

CALCULATIONS

All equations are from the EPA's 40 CFR, July 1, 1991, Part 60, Appendix A, Methods 1-5 inclusive. All preliminary assumptions and calculations are based on data obtained from previous tests. Because this site exhibits extensive cyclonic flow, calculations for velocity (vs), flow rate (Qs), flow rate at standard condtions (Qstd), and the emission rate (E) must be adjusted using the cosine of the angle (see the CALCULATION section, sub-headings, VELOCITY and EMISSIONS-page 4).

PARTICULATE SAMPLING:

The test consisted of sampling at 48 traverse points, 12 from each of 4 sample ports (fig.2), collected from 82 inches below the stack (fig.3). Because this site has a tangential inlet, the stack exhibits a significant amount of cyclonic flow; therefore, EPA NSPS Methods 2 & 5 are not directly applicable and some modifications must be made to achieve isokinetic sampling. An inclinometer was strapped to the probe, the pitotobe tube was rotated until a maximum ΔP was obtained, and the angle was recorded. This procedure was repeated for all the points. The flow was counterclockwise, and the average angle was 82° from the vertical (46 of the 48 points registered a maximum ΔP of 82°, while 2 of the points had a maximum ΔP at 80°). Except for the rotation of the probe into the direction of maximum flow, 82° from the vertical, the sampling was perfromed as usual. 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 (40 CFR, July 1, 1991, Part 60, Appendix A, Methods 1-5).

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-Nap	Temp. read out-Omega
Macrobalance-Sargent Welch	Beakers-Pyrex	Cold/Hot box-Napp	Aneroid Barometer-Taylor
Microbalance-Sartorious	Impingers-Ace	Pitobe tube-Napp	Press. devices-Dwyer magnehelic

Canyon Rock on 10/8/92 — P.O.#254 TEST 92282

FIELD DATA:

Trav. Pt	Vm (ft^3)	ΔP (in H2O)	ΔH (In H20)	Stack Temp (°F)	Box Temp (°F)	Imp Temp (°F)	t 1 (In) (°F)	t 2 (out) (°F)	velocity (ft/sec)	vel-adjusted vs*cos 82°
START	87.509									
West 1		0.06	0.86	159		63	89.00	099.00	15.93	2.23
2		0.07	1.00	161		67	88.00	104.00	17.24	2.41
3		0.09	1.30	162		67	89.00	108.00	19.56	2.74
4		0.11	1.60	159		68	89.00	110.00	21.57	3.02
5		0.14	2.00	162		66	89.00	113.00	24.40	3.41
6		0.15	2.10	166		66	90.00	112.00	25.31	3.54
7		0.16	2.30	168		66	91.00	110.00	26.21	3.67
8		0.18	2.60	169		65	91.00	110.00	27.82	3.89
9		0.20	2.80	170		65	91.00	109.00	29.35	4.11
10		0.18	2.60	170		68	91.00	110.00	27.84	3.89
11		0.20	2.80	170		67	91.00	110.00	29.35	4.11
12		0.21	3.00	170		65	92.00	110.00	30.07	4.21
South 1		0.06	0.80	160		61	96.00	112.00	15.95	2.23
2		0.14	2.00	147		61	96.00	116.00	24.10	3.37
3		0.14	2.00	155		60	96.00	120.00	24.26	3.39
4		0.20	2.80	162		59	97.00	121.50	29.16	4.08
5		0.20	2.80	164		59	97.00	120.50	29.21	4.09
6		0.20	2.80	167		60	98.00	119.00	29.28	4.10
7		0.22	3.10	167		61	98.00	119.00	30.71	4.30
8		0.22	3.10	168		61	98.00	118.00	30.73	4.30
9		0.24	3.40	168		67	98.50	117.00	32.10	4.49
10		0.24	3.40	168		65	99.00	118.00	32.10	4.49
11		0.25	3.60	167		64	99.00	118.00	32.73	4.58
12		0.25	3.60	162		64	99.50	119.00	32.60	4.56
East 1		0.14	2.00	162		65	103.00	114.00	24.40	3.41
2		0.20	2.80	155		61	102.00	121.00	29.23	4.09
3		0.18	2.60	167		61	103.00	124.50	27.77	3.89
4		0.18	2.60	167		61	103.00	125.00	27.77	3.89
5		0.10	1.40	167		63	103.00	125.00	20.70	2.90
6		0.25	3.60	169		63	103.00	126.50	32.78	4.59
7		0.24	3.40	168		61	103.00	124.00	32.10	4.49
8		0.26	3.70	169		63	104.00	123.00	33.43	4.68
9		0.28	4.00	169		64	104.00	122.00	34.70	4.85
10		0.26	3.70	165		66	103.00	122.00	33.33	4.66
11		0.22	3.10	169		64	102.00	121.50	30.75	4.30
12		0.21	3.00	169		64	103.00	121.00	30.05	4.20
North 1		0.10	1.40	161		62	106.00	114.00	20.60	2.88
2		0.12	1.70	161		62	106.00	122.00	22.57	3.16
3		0.14	2.00	161		62	105.00	128.00	24.38	3.41
4		0.16	2.30	162		62	105.00	129.00	26.08	3.65
5		0.20	2.80	163		63	105.00	130.00	29.18	4.08
6		0.16	2.30	167		63	105.00	125.00	26.19	3.66
7		0.19	2.70	167		60	105.00	124.00	28.54	3.99
8		0.14	2.00	168		61	105.00	122.00	24.51	3.43
9		0.14	2.00	167		61	104.50	122.50	24.49	3.43
10		0.18	2.60	165		61	104.65	123.00	27.73	3.88
11		0.16	2.30	165		62	104.50	123.00	26.14	3.66
12	147.002	0.20	2.80	163		62	104.50	124.50	29.18	4.08

	Vm ft^3	ΔP (in H2O)	ΔH (in H20)	ts (°F)	tbox (°F)	ti (°F)	t 1 (in) (°F)	t 2 (out) (°F)	vs (ft/sec)	vs(y-comp) (ft/sec)
Average:	59.493	0.173	2.524	165	N/A	63	98.94	118.32	27.170	3.801

Since all 48 angles were 82° +/- 2°, it was decided to use 82° as the average angle, and treat all points equally.

DATA SUMMARY:

LABORATORY DATA:	SAMPLING PARAMETERS:	SAMPLING DATA:
IMPINGER CATCH:	***METER BOX:***	***VOLUME & TIME:***
Silica gel ? = YES	Box ID = C138	Ø (total time) = 72.0 min
Vlc = 549.59 ml	ΔH@ = 1.8883	Final leak rate = 0.005 cfm
	Y = 0.9924	Pass/Fail = PASS
		Vm = 59.493 ft^3
GAS ANALYSIS:	***STACK DIMENSIONS:***	***PRESSURES:***
CO2 = 5.70 %	Circular ? = YES	Pbar = 29.38 in Hg
O2 = 10.90 %	Ds = 9.00 ft	Pg = 0.00 in H2O
CO = 0.00 %	Length = N/A ft	Vpw @ ts = 10.86 in Hg
N2 = 83.40 %	As = 63.59 ft^2	Vpw @ ti = N/A in Hg
PARTICULATE ANALYSIS:	***NOZZLE & PROBE***	***TEMPERATURES:***
mn(front) = 0.165208 g	Dn = 0.373 in	t1 = 98.94 °F ti = 63 °F
mn(back) = 0.294020 g	An = 0.1092 in^2	t2 = 118.32 °F tbox = N/A °F
mn(total) = 0.45923 g	Cp = 0.8400	tm = 108.63 °F ts = 165 °F

CALCULATIONS:

TEMPERATURES:

01)	ts = {Σ ts(n)}/total n's		165 °F
02)	Ts = ts+460		625 °R
03)	tm= {Σ [(t 1(n)+t 2t(n))/2]/total n's=(t1+t2)/2		109 °F
04)	Tm= (t1+t2)/2 + 460		569 °R
05)	ti= {Σ ti(n)}/total n's		63 °F
06)	Tstd		528 °R

PRESSURES:

07)	Pbar= {(P @ S.L.)+[(ft. above S.L.*(-0.1 in Hg/100ft)]}		29.38 in Hg
08)	Pg= read from pressure sensing device		0.00 in H2O
09)	Ps= Pbar + (Pg/13.6)		29.38 in Hg
10)	ΔH		2.52 in H20
11)	Pm= Pbar+(ΔH/13.6)		29.57 in Hg
12)	Pstd		29.92 in Hg
13)	ΔP		0.1727 in H2O

VOLUME:

14)	Vm= Vm(end)-Vm(begin)		59.493 ft^3
15)	Y		0.9924
16)	Vm'= Vm*Y		59.041 ft^3
17)	Vm std = [Vm'*(Tstd/Tm)*(Pm/Pstd)]		54.173 ft^3
18)	Vlc= {Σ Volume of impingers}		549.59 ml
19)	∂		####### lb/ml
20)	R		21.85 in Hg-ft^3/°R-lb-mo
21)	MwH2O		18.00 g/g-mo
22)	Vw std = {[(Vlc*∂*R*Tstd)/(Pstd*MwH2O)]		25.8692 ft^3

MOISTURE:

23)	Bws(1) =(Vw std)/(Vw std+Vm std)100	32.32 %	
24)	Vpw @ ts = from appendix	10.86 in Hg	
25)	Bws(2) =[(Vpw @ ts)/Ps]*100	36.96 %	
26)	Bws = lower value of equation 24 or 26		32.32 %

MOLECULAR WEIGHT:

27)	%O2		10.90 %
28)	%CO2		5.70 %
29)	%N2+inerts+%CO		83.40 %
30)	Md=[0.440(%CO2)]+[0.320*(%O2)]+[0.280(%N2+inerts+%CO)]		29.35 g/g*mole
31)	Ms=Md*(1-Bws)+18.0*(Bws)		25.68 g/g*mole

CALCULATIONS (cont. on next page):

CALCULATIONS (concluded):

VELOCITY:

32)	Cp	0.840
33)	Ds=	9.000 ft
34)	vs= 85.49*Cp*{[(Ts*ΔP)/(Ps*Ms)]^.5}	27.170 ft/sec
34 a)	vs (y-component)= 85.49*Cp*{[(Ts*ΔP)/(Ps*Ms)]^.5} * (cos 82°)	3.801 ft/sec
35)	As=3.14*[(Ds)^2/4]	63.585 ft^2
36)	Qs = (vs)*As*60	103656 acfm
36 a)	Qs(y component) = (vs (y component))*As*60	14501 acfm
37)	Qstd =17.64*Qs*(1-Bws)*Ps/Ts	58182 dscfm
37)	Qstd (y-component)=17.64*[Qs (y-component)]*(1-Bws)*Ps/Ts	8139 dscfm

EMISSIONS:

FRONT HALF

38)	mn (front)	0.16521 g
39)	Cs (front) =15.43*mn(front)/Vm std	0.04706 grains/dscf
40)	7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857 lbs-min/grains-hr
41)	E (front) = (0.00857)*(Qstd)*Cs (front)	23.46 lbs/hr
41 a)	E(front,y component) = [0.00857]*[Qstd(y component)]*Cs (front)	3.28 lbs/hr

BACK HALF

42)	mn (back)	0.29402 g
43)	Cs (back) =15.43*mn(back)/Vm std	0.08375 grains/dscf
44)	7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857 lbs-min/grains-hr
45)	E (back) = (0.00857)*(Qstd)*Cs (back)	41.76 lbs/hr
45 a)	E(back,y component) = (0.00857)*(Qstd(y component))*Cs (front)	5.84 lbs/hr

TOTAL

46)	mn (total) = mn(front)+mn(back)	0.45923 g
47)	Cs (total) =15.43*mn(total)/Vm std	0.13080 grains/dscf
48)	7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857 lbs-min/grains-hr
49)	E (total) = (0.00857)*(Qstd)*Cs (total)	65.22 lbs/hr
49 a)	E(total,y component) = [0.00857]*[Qstd(y component)]*Cs (front)	9.12 lbs/hr

ISOKINETICS:

50)	Dn=	0.373 in
51)	An=3.14*[(Dn)^2/4]	0.1092 in^2
52)	Ø	72 min
53)	I=.09450[Ts*Vm std)/Ø*Ps*vs(An/144)t 108.44 % =	108 %

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

PARTICULATE TEST LABORATORY ANALYSIS DATA SHEET

TEST SITE: V.R. Dennis-Canyon Rock
7500 Mission Gorge
San Diego, CA 92120

TEST #: 92282 P.O.#: 254 TEST DATE: 10/8/92

LAB ANALYSIS BY: David N. Shina DATE:

LAB REPORT BY: David N. Shina DATE:

REVIEWED BY: DATE:

(1) IMPINGER VOLUMES

	FINAL WGT.		INIT WGT.		NET WGT.
#1	781.31 g	-	552.87 g	=	228.44 g
#2	858.25 g	-	565.19 g	=	293.06 g
#3	481.97 g	-	468.83 g	=	13.14 g
#4	780.19 g	-	765.24 g	=	14.95 g
#5	g	-	g	=	N/A g
#6	g	-	g	=	N/A g

Total impinger charge= 200.00 ml

Partiulates from impinger charge
(Total impinger charge * H(water blank) = 0.00015 g

Total weight collected= 549.59 g

Total volume collected,Vlc= 549.59 ml

(2) BLANKS

A AREA	B SOLVENT	C ID	D END WGT g	E INIT WGT g	F NET WGT. (E-F) g	G RINSES ml	H g/ml (G/D)	I % (H*100)	J ppm (H*10^6)	K PASS FAIL	L LIMITS
BLANK	ACETONE	92010	28.6343	28.6311	0.00320	550.00	0.0000058	0.0005818	5.8	P	0.0010%=10ppm
BLANK	WATER	92009	28.7503	28.7501	0.00020	260.00	0.0000008	0.0000769	0.8	P	0.0004%=4ppm
BLANK	ORGANIC	N/A									

(3) WEIGHTS & RINSES

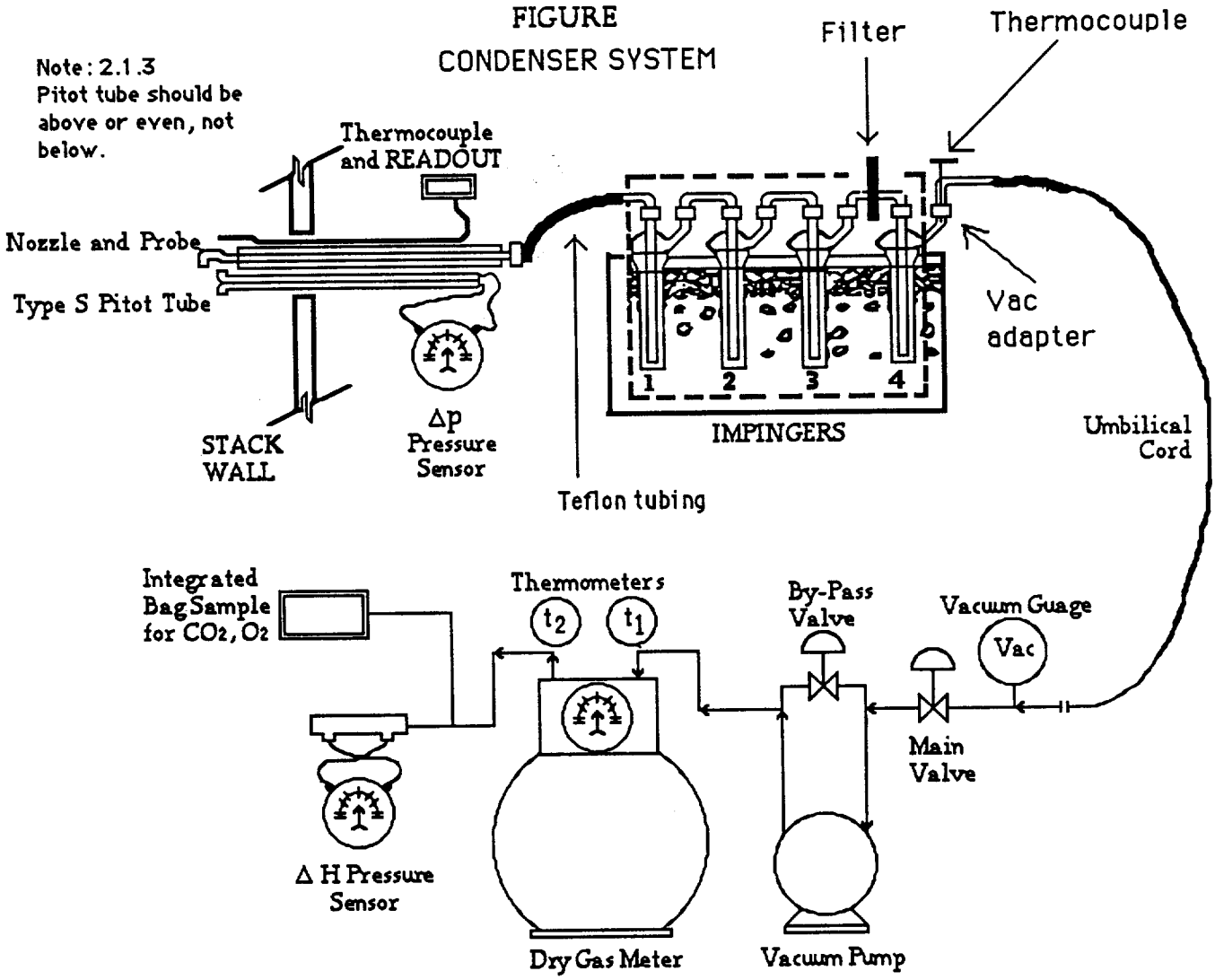
a AREA	b SOLVENT	c ID	d END WGT g	e INIT. WGT g	f NET WGT. (e-f) g	g RINSES ml	h SOLV. WGT (g*H) g	i WGT (corr) (f-h) g	j Subtotal {mn (AREA)} (Σi) g	k Total { mn (tot) } (Σj) g
F	ACETONE	91081	50.1884	50.1720	0.0164	575.00	0.003345	0.01305		
R	WATER	92060	28.8677	28.7152	0.1525	450.00	0.000346	0.15215		
O	ORGANIC	N/A								
N	FILTER	N/A								
T								mn(front) =	0.165208 g	
B	ACETONE	92058	28.6811	28.6687	0.0124	380.00	0.002211	0.01019		
A	WATER **	91066	50.0867	49.8032	0.2835	410.00	0.000469	0.28303		
C	ORGANIC	N/A								
K	FILTER	91004	1.5987	1.5979	0.0008	--------	----------	0.00080		
								mn(back) =	0.294020 g	
TOTAL								mn(total) =		0.45923 g

** The Back Water-SOLV.WGT is corrected for the initial impinger charge
{ [g(back water) * H(blank water)] + [Partiulates from impinger charge] }.

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- Silica gel

Mod - Modified Type Greenburg-Smith
Std - Standard Type " "

FIELD DATA ABBREVIATIONS

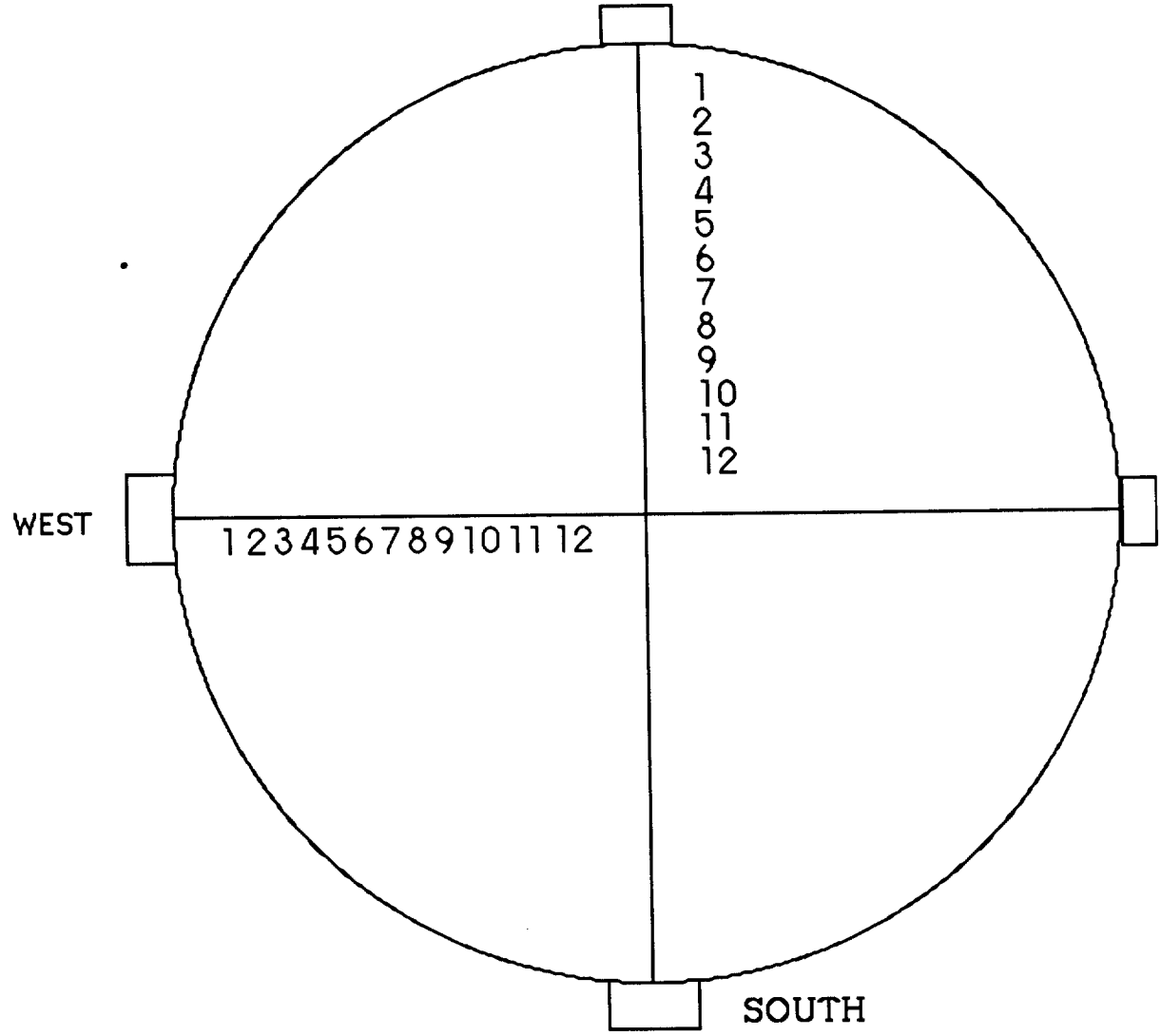
PT = Point Number
T_s = Stack Temperature
Δp = Pitot Tube Pressure Differential; in H_2O
V_s = Stack Velocity, fps
ΔH = Orifice Meter Pressure Drop, in H_2O
t_1 = Meter Inlet Temperature, °F
t_2 = Meter Outlet Temperature, °F
Pm = Pump Vacuum, in Hg
ti = Impinger Temperature
P_{bar} = Barometric Pressure

FIGURE : PARTICULATE MATTER SAMPLING TRAIN

SAN DIEGO CO_NTY AIR POLLUTION CONTROL DISTR_

FIGURE

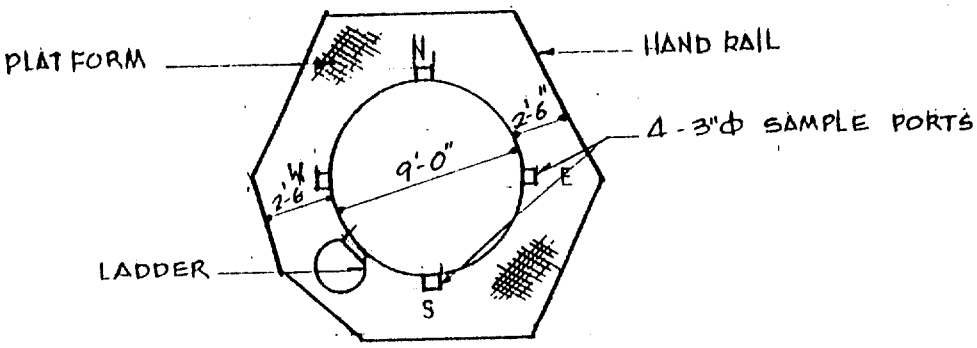
TRAVERSE POINTS



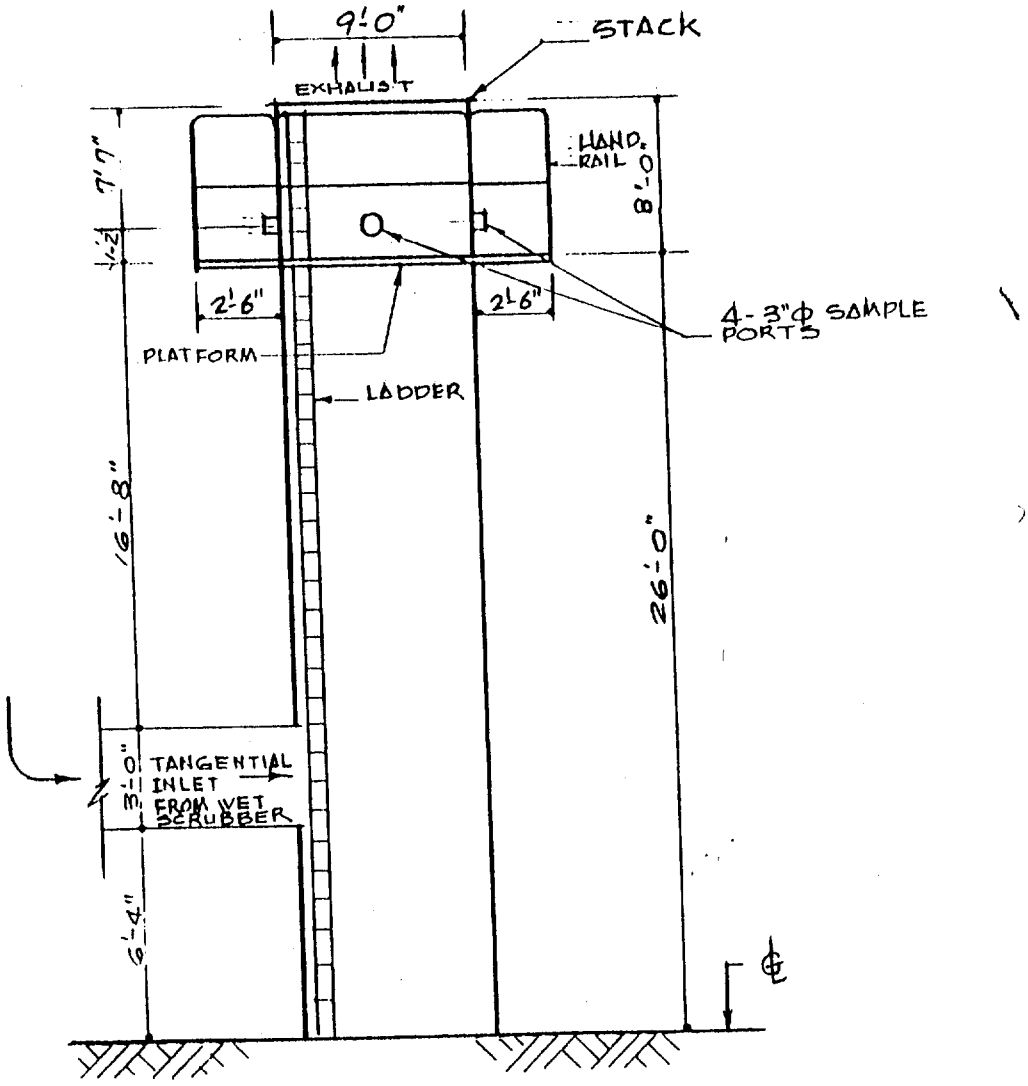
Point No.	Distance into the stack
1	1.2 inches
2	3.5
3	5.9
4	8.5
5	11.3
6	14.3
7	17.4
8	20.0
9	21.0
10	24.8
11	29.2
12	34.9

Stack Diameter= 9ft = 108"

SITE DESCRIPTION
SAN DIEGO AIR POLLUTION CONTROL DISTRICT
V.R. DENNIS CANYON ROCK ASPHALT PLANT



TOP VIEW
NO SCALE



SIDE VIEW
NO SCALE

FIG 3

NOMENCLATURE

symbol	units	explanation	equation
	A		
An	in^2	nozzle area	π/4((Dn)^2)
As	ft^2	stack area	π/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		
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)
Cs12(front, back,total)		same as Cs(front,back,total) except-corrected for grain loading at 12% CO2	(12/%CO2)*(15.43*mn(fr, back,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-.5%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

NOMENCLATURE (cont.)

NOMENCLATURE (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
	U		
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 (60/7000)	see Lange's Handbook of Chemistry
0.04707	ft^3/ml	(∂*R*Tstd)/(Pstd*MW H2O)	see Lange's Handbook of Chemistry
15.43	gr/g	conversion from g to gr	see Lange's Handbook of Chemistry
17.64	°R/in H2O	Tstd/Pstd (528/29.92)	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

TEST NO. 92-282

APCD Source Test No. 92-282 Test Date 10-8-92

ASPHALT BATCH PLANT - CANYON ROCK PLANT
7500 MISSION GORGE ROAD, SAN DIEGO, CALIFORNIA
P/O #0254

I. COMPOSITION FOR TYPICAL 3-TON BATCH

BIN		POUNDS
1	Sand & Dust	3385
2	3/8" Rock	1980
3	1/2" Rock	280
	AR 4000 Oil	354
		5999

II. OPERATING PARAMETERS, NOTES, ASPHALT PRODUCTION DURING SOURCE TEST METHOD 5

PLANT TIME	MATERIAL AGGREGATE	TEMP°F DRYER EXHAUST	OIL TEMP F°	NAT'L GAS METER RDG. FT	TONS	REMARKS
6:30 AM				229123	0	
6:47				229123		
6:55						Computer will not turn on. Gas to dryer. Wait for repairs.
8:13	323°F	305°F		229123	Rate ≈200/hr	Rotary dryer on
8:36	323	310				

PLANT TIME	MATERIAL AGGREGATE	TEMP°F DRYER EXHAUST	OIL TEMP F°	NAT'L GAS METER RDG. FT	TONS	REMARKS
8:52						Dryer & conveyor stopped.
8:56				229123	118	Shut down. Elevator blew fuse. Shovel out elevator.
9:58					118	Start dryer.
10:15						Feed off 10 sec. to zero scale.
10:18	320°F	379°F	300	229123		
10:24	325	338				
10:27						Noticed dust puffing at burner end of dryer.
10:28					220	Start sampling.
10:39						Relative. humidity 85,66=37%
11:10	333	318	300		354	Total 238 in 1 hr. & 20 min.
11:32						158°F at gauge on dryer outlet.
11:38	325	294	300		454	
11:50				229123		

PLANT TIME	MATERIAL AGGREGATE	TEMP°F DRYER EXHAUST	OIL TEMP F°	NAT'L GAS METER RDG. FT	TONS	REMARKS
12:09 PM	305°F	300°F			563	Finish sampling.
12:30						Load out photo.
12:31						Load out photo.
1:00						Wind 4-6 MPH.
1:21						Relative humidity 91,73=42%

Production Total Time: Stop 12:09 Start 8:13 3 Hrs 56 Min
Production Down Time: Stop 8:52 Start 9:58 1 Hr 6 Min
Production Down Time: Stop 10:15 Start 10:15:10 10 Sec down
Production Net time: 3 Hrs 56 Min - 1 Hr 6 Min 10 Sec = 2:49:50
Production Weight: Production Total = 563 Tons

Average Production Rate = $\frac{\text{Production Tons}}{\text{Net Prod. Time}} = \frac{563 \text{ Tons}}{2.8305 \text{ Min}} = \frac{198.9 \text{ Tons}}{\text{Hr}}$

LOAD OUT FROM HOT ASPHALT STORAGE BINS

TIME	TICKET	MATERIAL		TUNNAGE	TOTAL
10:35	20563	1/2"	4000 AC	25.26	198.89
10:42	20564	1/2"	4000 AC	25.21	224.10
10:46	20565	1/2"	4000 AC	24.74	248.84
10:57	20567	1/2"	4000 AC	25.64	274.48
11:05	20568	1/2"	4000 AC	24.35	298.83
11:13	20570	1/2"	4000 AC	24.60	323.43
11:26	20571	1/2"	4000 AC	24.67	348.10
11:37	20573	1/2"	4000 AC	25.06	373.16
11:46	20574	1/2"	4000 AC	24.73	397.89
11:59	20575	1/2"	4000 AC	+25.25	423.14
			Total	249.51	224.25 Tons

III. NATURAL GAS FLOW USAGE TIME

Final Reading: 229123 FT^3 @ 11:50
Initial Reading: 229123 FT^3 @ 6:30
Δ Volume = 0 FT^3
Δ Time = 3:56 = 3.933 Hrs - 1.103 Hrs Down time = 2.83 Hrs

Average Flow Rate = $\frac{\Delta \text{ Vol - } FT^3}{\Delta \text{ Time - Hrs}} = \frac{0}{2.83 \text{ Hrs}}$ = 0, Meter Defective

NOTE: Gas Meter MFR: Rockwell Electro Corrector P&T
RDG x 1000 cu. ft. Model — S/N1163-110-18233A with Electro-Corrector Indicator — to correct to standard conditions. (SDG&E No. 42440)

COMMENTS

1. Test was conducted by San Diego County Air Pollution Control District Source Test Team Consisting of Bob Yelenosky and David Shina, and Chuck Williams of Engineering Division.

2. The scrubber exhaust stack was evaluated for APCD Rule 54 (particulate emissions not to exceed 40 pounds per hour) and Rule 50 (visible emissions not to exceed Ringelmann No. 1 (20% opacity) for more than three minutes in any 60 consecutive minutes.

3. The sampling time was ~~2-1/2~~ 1.5 minutes per point and ~~6~~ 12 points per traverse for 4 ports around he exhaust stack for a total of ~~24~~ 48 points.

4. The air flow out of the stack was cyclonic with the direction at 80° to 90° from vertical. The exhaust flow was fluctuating but velocities were positive across all traverses. (There was no back flow back into the stack.)

5. The truck loading station at the mixer was not used. Truck loading occurred at the scales under the three storage hoppers. The visible emissions there were ≈ 15% -20% opacity.

6. At the scrubber exhaust stack, there was constant 5-10% opacity dust trail after steam dissipation. The steam plume was not detached so a reading of opacity at the stack was not possible.

7. Dust was emitted from the dryer shoe seals but most of this emission was drawn back into the dryer through the gap near the burner. Occasionally, dust would escape from the rotary dryer housing because all four doors were open.

8. The scrubber water flow was controlled by a hand valve that was set prior to plant start-up for the day. There was no water flowmeter or water pressure gauge for the water supply pipe.

9. Photos of the asphalt plant were taken during the test.

10. Emission Points and Inspection Notes

    A. Dust leaks at scale house level at RAMS above the pug mill.

    B. Dust leaks at the long horizontal access doors above the pug mill.

    C. Dust leaks at top of bucket elevator (two places).
    Dust leaks at underside of screens near elevator.

    D. Dust leaks at access door at mid point on bucket elevator. Also on opposite side.

    E. Dust leaks at fan housing 4-5 places.

    F. Dust is emitted from rotary dryer housing. (All four doors are left open.)

    G. The large air duct serving the covered hot asphalt conveyor is collapsed.

    H. One section of the cover for the hot asphalt conveyor is missing.

    I. Note: The aggregate entrance to the dryer could be more enclosed to increase capture efficiency elsewhere.

    J. Is detergent used on conveyor belts?

    K. Access roads could have more water.

    L. Are spray nozzles worn, clogged, or missing?

M. Burner combustion air damper could be adjusted to draw more air from emission sources.

N. 10-15 % visible "blue smoke" emission was continual at the traveling hopper (batch mixer to conveyor) area.

O. Mechanical bimetal temperature gauges on rotary drier exhaust are apparently non-functional.

P. The applicant should confirm that the blowers and motors for the suspended oil particle control system are clean and in good operating condition drawing the prescribed volume of air. (See permit equipment condition.)

Q. In "P" above, the control system feeds into the rotary dryer combustion air blower that has a damper that allow indraft of clean air. If this damper is closed somewhat, then more contaminated air could be drawn from the oil particle control system (See "P" above)

IV. HOT ASPHALT DELIVERY (TANKER TO STORAGE TANKS)

Continental Western Transportation (C.W.T.): Dwayne, driver, delivered 24-1/2 tons of AR 4000 asphalt from Fletcher Refinery in Carson at 12:45 on this test day. During delivery a visible emission evaluation was done. See attachment. The emission was 20-35% opacity. There is apparently no control for this "blue smoke."

CONCLUSIONS

Various points of fugitive emissions were noted in A - Q in part III above. It is suggested that Enforcement staff do follow-up for Rule 21 compliance.

C. Chuck Williams

CHUCK WILLIAMS
ENGINEERING DIVISION

CW:lbm

Oldham
10/#92-10/21/92

P.O. #254
Test 92-044

CANYON ROCK

① IMPINGERS:

Date:	#	CONTENTS	WGT	DATE	WGT	NET
10/7/92	1	100 mL H_2O	552.87	10/8/92	781.31	228.44
↓	2	—11—	565.19	↓	858.25	293.06
	3	MT	468.83		481.97	13.14
	4	Silica gel	765.24		780.19	14.95
		200 mL				549.59gr

② GAS ANALYSIS:

CO_2: Ametek AR400 ; Cal # 25.6, cal gas: 5.2%
#1 = 5.7%, #2 = 5.7%, #3 = 5.7%, AVG = 5.7%

O_2 : Teledyne Ryan ; Cal # = 20.8, cal gas = 7.9%
#1 = 10.9%, #2 = 10.9%, #3 = 10.9%, AVG = 10.9%

10/8/92 ↓

③ CP:
We used SV2 cal on 6/92 as Ø.84

④ WGTS & RINSES:

	ID	RINSE	TARE	10/19 #1	10/20 #2	#3	#4	AVG
BLANKS								
Acetone	92010	500+50	28.6311	28.6342	.6343	.6343	—	28.6343
Water	92009	200+60	28.7501	28.7503	.7503	.7503	—	28.7503
FRONT								
Acetone	91081	500+75	50.1720	50.1884	.1884	.1885	—	50.1884
Water	92060	400+50	28.7152	28.8676	.8677	.8677	—	28.8677
BACK								
Acetone	92058	350+50	28.6687	28.6812	.6811	.6811	—	28.6811
water	91066	310+100	49.1882	50.0863	.0867	.0866	.0867	50.0867
Filter	91004	—	1.5979	1.5987	1.5987	1.5987	—	1.5987

⑤ BLANKS:
Acetone: BRAND → J.T. Baker (HPLC Reagent) LOT# ~~X~~ FOB256SX
WATER: BRAND → Culligan ~~taken~~ on 10/7/92

METHOD 5 EQUIPMENT CHECKLIST

SITE: Centon Rock TEST#: 92282 P.O.#: 2524 DATE: 10/8/92

SAMPLING EQUIPMENT (MAIN)

Meter Box
- L/S Box
- Electrical cords (50' & 100')
- Electric strip
- Umbilical cord
- Thermocouple Display

Cold/Hot Box
- Impingers (4 of them)
- Imp.-imp. connections
- Impinger clips
- Impinger-probe conncetions
- 100 ml H2O in 1st & 2nd imp.
- Silica gel in 4th impinger
- Filter between 3rd & 4th imp.
- Vacuum adapter on 4th imp.
- Heating coil in hot box
- Probe
- Pitot tube capped
- Nozzle
- Nozzle capped
- Pitot leak test equipment
- Vacuum leak test equipment
- Tedlar bag

LAB/FIELD RECOVERY
- Sample collection bottles
- Acetone
- Water
- Squeeze bottles
- Probe brush
- Nozzle brush
- Foil
- Parafilm
- Petri dishes
- Labels
- Tape
- Pens
- Kimwipes
- Sterile gloves
- Spatula

SAMPLING EQUIPMENT (RESERVE)

Meter Box
- L/S Box
- Thermocouple Display

Cold/Hot Box
- Impingers (4 of them)
- Imp.-imp. connections
- Impinger clips
- Impinger-probe conncetions
- 100 ml H2O in 1st & 2nd imp.
- Silica gel in 4th impinger
- Filter between 3rd & 4th imp.
- Vacuum adapter on 4th imp.
- Heating coil in hot box
- Probe
- Pitot tube capped
- Pitot leak test equipment
- Vacuum leak test equipment

STACK EQUIPMENT

Support Strut
- Unirail (2)
- Port/nipple adapters
- 2 C-clamps
- 2 unirails with rollers
- Chains
- 2 nylon straps
- Rope (25' and 50')
- Pail
- Gloves (leather-2 Pairs)
- Gloves (heat resistant)
- Rags and diapers

TOOLS
- Assorted monkey wrenches
- Assorted open-end wrenches
- Assorted screwdrivers
- 3' pipe wrench
- Port (wire) brush
- Tape measure
- Duct tape
- Leverage bar
- Knife

MISC. SAMPLING EQUIPMENT
- Magnehelics (0-10 in H2O)
- Tape measure
- White out
- Teflon ape
- L/S box fuses
- Tygon tubing
- Nozzle box with nuts
- Silicone grease
- Barometer
- Inclinometer (cyclonic flow)
- Large pipe wrench
- C/H box rollers (SDG&E sites)

CALCULATION EQUIPMENT
- Datasheets
- Stopwatch
- Nomograph
- Calculator
- Calibration notebook
- Old tests

MISC. RESERVE EQUIPMENT
- Silicone grease
- Filter
- Tape measure
- Gloves
- Leak testing equipment
- Imp.-imp. connections
- Imp.-probe. connections
- Impinger clips
- Foil
- Tedlar bag
- Nomograph
- Calculator
- Parafilm
- Electric strip and cord (50')

SAFETY
- First aid box
- Safety Cones
- Safety shoes & hard hat
- Safety Belts & Ear plugs
- Fire Extinguisher

EQUIPMENT DATA SHEET

	MAIN				RESERVE			
EQUIPMENT	ID NUMBER	SIZE/TYPE	CAL DATE	CLEANED	ID NUMBER	SIZE/TYPE	CAL DATE	CLEANED
Meter box:	C38	L/S	6/92	—				
Gas meter:	662774	Rockwell	4/91	—				
T in:	—	Ranco	6/92	—				
T out:	—	Ranco	6/92	—				
ΔP pressure device:	~~#11~~	Dwyer 0-1"	~~5/92~~	—				
ΔH pressure device:	60203 M24	Dwyer	6/92	—				
Temperatrue display:	—	Omega	6/92	—				
Impinger thermocouple:	—	KJ	6/92	—				
Hot box thermocouple:	—	—	—	—				
Probe:	5W2	SS/Mpl	6/92	—				
Probe Thermocouple:	—	K	6/92	—				
Nozzle:	J	316/SS	6/92	—				
Tedlar Bags:	—	SKC	—	DW				

IMPINGER COLLECTION, GAS ANALYSIS DATA SHEET MAN

SITE: C. Rock P.O.#: 254 TEST #: 92282 DATE: 10/8/92

IMPINGER COLLECTION MEASUREMENTS:

PRE-TEST

A DATE	B IMP No.	C CONTENTS of IMPINGER	D CHARGE AMT (g)	E WGT of IMPINGER +CHARGE (g)
			100ml	552.87
			100ml	565.19
			—	468.83
			silica	765.24

TTL WGT OF CHARGE (ΣD): 200 g

POST-TEST

F DATE	G WGT of IMPINGER +CHARGE (g)	H H2O collectd (G-E) (g)	I COMMENTS
10/8	781.31	228.44	
	858.25	293.06	
	481.97	13.14	
	780.19	14.95	

TTL WGT GAIN FROM IMP (ΣH): 549.59 g

BLANKS:

TYPE	LOT NUMBER	BRAND	PREVIOUS	%PPT	IF YES, TEST SITE
WATER	———		YES (NO)		
ACETONE	F032566	J.T. Baker (HPLC Reagent)	(YES) NO	5.18	OAT MESA
			YES NO		

GAS ANALYSIS:

GAS= CO2	INSTRUMENT: Anarad		Cal. Gas%= 5.990 %	Cal. No.= 23.6
DATE: 10/8	RUN #1= 5.7 %	RUN #2= 5.7 %	RUN #3= 5.7 %	AVG= 5.790 %

GAS= O2	INSTRUMENT: Teledyne Ryan		Cal. Gas%= 20.89 %	Cal. No.= 2004
DATE: 10/8	RUN #1= 10.9 %	RUN #2= 10.9 %	RUN #3= 10.9 %	AVG= 10.90 %

FILTERS:

DATE	LOCATION	LABEL	PRE-TEST WEIGHT
	FRONT	N/A	——— g
10/7	BACK	91004	g

Cp CALCULATION:

ΔP (above)		Cp(above)	
ΔP (test)		**Cp(test)**	
ΔP (below)		Cp(below)	

Pitot Tube S/N: SW2
Cal. Date: 6/92
Cp (test)= .84

Cp(test)= {{[ΔP (test) −ΔP (above)] / [ΔP (below) −ΔP (above)]} * [Cp (below) −Cp (above)]} + Cp (above)

SW26 TEC
SSLL-12C

METER ORIFICE CHECK

SITE: C. Rock TEST#: P.O#: 254 DATE: 10/8

L/S Box= 0390 ΔH@= 1.8883 Y= .9924 Cal. Date= 6/92

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

PRE-TEST 5 MINUTE Y CHECK

	TIME	VOLUME	t1 (in)	t2 (out)	tm=(t1+t2)/2
INITIAL	0	80.317	88	98	93
	min	ft^3	°F	°F	°F
FINAL	5	84.150	88	103	95.5
	min	ft^3	°F	°F	°F

Pbar= 29.98
Y= .9924
.97*Y= .9626
Yc= 1.0018
1.03*Y= 1.0223
0.97*Y < Yc < 1.03*Y
PASS FAIL

t(final)-t(initial)	Vm(final)- Vm(initial)	tm-avg = (tm(initial) + tm(final)) /2	Tm = tm-avg + 460°R
5 min	3.833 ft^3	94.25 °F	554.25 °R

Yc=(5 min/ 3.833 ft^3)*{[(.0319* 554.25 °R)/ 29.98 in Hg]^0.5}= 1.018
time Vm Tm Pbar Yc

SIGNATURE: [signature] DATE: 10/4/92 TIME: 6:45

POST-TEST 5 MINUTE Y CHECK

	TIME	VOLUME	t1 (in)	t2 (out)	tm=(t1+t2)/2
INITIAL	0	149.007	105	125	115
	min	ft^3	°F	°F	°F
FINAL	5	152.985	104.5	126.5	115.5
	min	ft^3	°F	°F	°F

Pbar= 29.05
Y= .9924
.97*Y= .9626
Yc= .9989
1.03*Y= 1.0223
0.97*Y < Yc < 1.03*Y
PASS FAIL

t(final)-t(initial)	Vm(final)- Vm(initial)	tm-avg = (tm(initial) + tm(final)) /2	Tm = tm-avg + 460°R
5 min	3.978 ft^3	115.25 °F	575.25 °R

Yc=(5 min/ 3.978 ft^3)*{[(.0319* 575.25 °R)/ 29.05 in Hg]^0.5}= .9989
time Vm Tm Pbar Yc

SIGNATURE: [signature] DATE: 10/8/92 TIME: 11:47

PRELIMINARY TRAVERSE/NOMOGRAPH CALCULATIONS SHEET

SITE: C. Rock TEST#: 25A P.O#: 9228 DATE: 10/8

PRELIMINARY TRAVERSE

TRAV PT NO	PRESS DIFF ACROSS PIT TUBES, in H2O ΔP	STACK TEMP, °F °F th l	TRAV PT NO	PRESS DIFF ACROSS PIT TUBES, in H2O ΔP	STACK TEMP, °F °F th l
1	.02	163	10		
2	.04	163	11		
3	.08	163	12		
4	.16	164			
5	.10	166			
6	.14	168			
7	.18	164			
8	.18	170			
9	.16	169			
10	.15	170			
11	.11	169			
12	/				
1	.12				
2					
3					
4					
5					
6					
7					
8					
9					

NOMOGRAPH CALCULATIONS

	Prelim	Site			
Pm	30.0	30		Pbar+ΔH/13.6	in Hg
Ps	29.8	29.8		Pbar+Pg/13.6	in Hg
tm	100	100		from meter	°F
ΔH@	1.8824	1.8824	calib const	from L/S box	none
Bws	21	22		moisture	%
C	.80	.78	from nomograph	corr factor	none
ts avg	125	165	from traverse	temp stack	°F
ΔPavg (trav)	.10	.12	(ΔPhi+ΔPlo)/2	take the avg	in H2O
Dn(ideal)	.39	.383	from nomograph	ideal nozzle	in
Dn(actual)	.396	.373	from nomograph	nozzle used	in
ΔPavg (Dn actual)	.090	.130	from nomo. (based on Dn(actual))		in H2O
K	2.055	1.423	ΔH/ΔP=1.85/ΔPavg (Dn actual)		none
ΔH avg (Dn actual)	2.055	1.76	K* ΔPavg (trav)		in H2O
rate	.8051	.7858	ΔHavg (Dn actual)	interpolate	ft^3/min
Y	.9924	.9924	calib. const.		none
Vm	40.31	40.31	40 ft^3/Y 53		ft^3
total time	50.00	50	Vm/rate 72 min		min
ttl. # trav. pts.	24	48			none
time/point	2.5	1.5	total time/ttl. # trav. pts		time
Cp			pitot const		none
Md				MW gas-dry	g/g-mo
Ms				MW gas-wet	g/g-mo

ΔH	rate	Interpolation
a	x	{(b-a)/(c-a)}={(y-x)/(z-x)}
b	y(unk)	y=[{(b-a)/(c-a)}*(z-x)] + x
c	z	y= rate of draw

PRELIMINARY:

SITE:

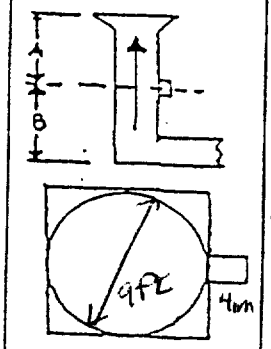
Pm = Pbar + ΔH/13.6

Ps = Pbar + Pg/13.6

PARTICULATE SAMPLING FIELD DATA SHEET

SITE: Clean | TEST#: | P.O: 254 | DATE: 10/8/92

STACK
Ds: 9 ft
Angle: 82-85
Port D: 3 in
Offset: 4 in



LEAK TESTS (PRE)
PITOT
Hold for: 15 sec
(+) ΔP(end): 3.8 in H2O
ΔP(st): 3.8 in H2O
Difference: 0 in H2O
PASS/FAIL: Pass Fail
(-) ΔP(end): 2.2 in H2O
ΔP(st): 2.2 in H2O
Difference: 0 in H2O
PASS/FAIL: Pass Fail
VACUUM
Hold for 60 sec @ 15 in Hg
Vm(end): 87.305 ft^3
Vm(st): 87.304 ft^3
Difference: .005 ft^3
PASS/FAIL: Pass Fail

SAMPLING TRAIN
Meter box Id#: 130
Y: .9924
ΔH@: 1.8824
C/H Box Id#: 1
F. Filter Id#:
B. Filter Id#: 91002
H. Box heater: OFF
Probe heater: OFF
Probe Id#: SN2
Length: 3 ft
Type: SS
Liner: SS
Cp: .841
Nozzle Id#: 5
Size = Dn: .373 in^2
Type: SS

TEST ID
Oper.: DWS
Date: 10/8/92
Unit /Run#: 1

MEASUREMENTS
PRESSURE
Pbar(st): 29.70 in Hg
Pbar(end): 29.05 in Hg
Pbar(avg): 29.38 in Hg
Pg: 0 in H2O
MOISTURE
assumed Bws: 22 %
Calc. Bws: — %
Bws used: 22 %
TEST CONSTANTS
K: 14.23
time/pt: 1.5 min

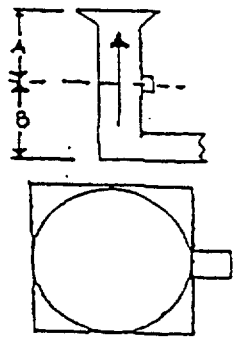
LEAK TESTS (POST)
PITOT
Hold for: 15 sec
(+) ΔP(end): 4.7 in H2O
ΔP(st): 4.7 in H2O
Difference: 0 in H2O
PASS/FAIL: Pass Fail
(-) ΔP(end): 2.95 in H2O
ΔP(st): 2.95 in H2O
Difference: 0 in H2O
PASS/FAIL: Pass Fail
VACUUM
Hold for 60 sec @ 14 in Hg
Vm(end): 148.320 ft^3
Vm(st): 148.315 ft^3
Difference: .005 ft^3
PASS/FAIL: Pass Fail

TRAV PT	TIME Sample min	TIME Clock hr:min	GAS METER ft3 Vm	VEL in H2O ΔP	PRESS. DIFF. ACROSS THE ORIFICE, in H2O ΔH, ideal	ΔH, actual	STACK TEMP, °F t-stack	BOX TEMP, °F t-box	IMPINGER TEMP, °F t-imp	DRY GAS METER TEMP, °F t in	t out	PUMP VAC. in Hg
start	0.0	1030	87.509									
W1	1.5		88.241	.06	.85	.80	154	—	63	89	94	6
2	3.0		89.240	.07	.99	1.0	161	—	67	88	104	6
3	4.5		90.085	.09	1.28	1.3	162	—	69	89	108	6.5
4	6.0		—	.11	1.56	1.6	159	—	68	89	110	7
5	7.5		92.211	.14	1.99	2.0	162	—	66	89	113	13
6	9.0		93.441	.15	2.13	2.1	165	—	66	90	112	15
7	10.5		94.657	.16	2.27	2.3	168	—	66	91	110	15
8	12.0		95.9	.18	2.56	2.6	169	—	65	91	110	16
9	13.5		97.091	.20	2.84	2.8	170	—	65	91	109	16
10	15.0		98.343	.18	2.56	2.6	170	—	68	91	110	16
11	16.5		99.6	.20	2.8	2.8	170	—	67	91	110	17
12	18		101.615	.21	2.9	2.6	170	—	65	92	110	17
S1	1.5		102.901	.06	.85	.8	160	—	61	96	112	10
S2	3.0		103.9	.14	1.99	2.0	147	—	61	90	116	11
S3	4.5		105.20	.14	1.99	2.0	155	—	60	96	120	12
S4	6.0		106.465	.20	2.8	2.8	162	—	59	97	121.5	16
S5	7.5		107.005	.20	2.8	2.8	164	—	59	97	120.5	17
S6	9.0		108.922	.20	2.8	2.8	167	—	60	98	119	17
S7	10.5		110.260	.22	3.13	3.1	167	—	61	98	119	17
S8	12.0		111.501	.22	3.13	3.1	168	—	61	98	118	17
S9	13.5		112.807	.24	3.41	3.4	168	—	62	98.5	117	17
S10	15.0		↓	.24	3.41	3.4	168	—	65	99	118	17
11	16.5	1122	115.497	.25	3.55	3.6	167	—	64	99	118	17
12	18	1122	117.962	.25	3.55	3.6	162	—	64	99.5	119	17

PARTICULATE SAMPLING FIELD DATA SHEET

SITE: Con. Rock | TEST#: | P.O: 25T | DATE: 10/6

STACK
Ds: ft
Angle:
Port D: in
Offset: in



LEAK TESTS (PRE)

PITOT
Hold for: sec
(+) ΔP(end): in H2O
ΔP(st): in H2O
Difference: in H2O
PASS/FAIL: Pass Fail
(-) ΔP(end): in H2O
ΔP(st): in H2O
Difference: in H2O
PASS/FAIL: Pass Fail

VACUUM
Hold for sec @ In Hg
Vm(end): ft^3
Vm(st): ft^3
Difference: ft^3
PASS/FAIL: Pass Fail

SAMPLING TRAIN
Meter box Id#:
Y:
ΔH@:
C/H Box Id#:
F. Filter Id#:
B. Filter Id#:
H. Box heater:
Probe heater:
Probe id#:
Length: ft
Type:
Liner:
Cp:
Nozzle Id#:
Size = Dn: in^2
Type:

TEST ID
Oper.:
Date:
Unit /Run#:

MEASUREMENTS
PRESSURE
Pbar(st): in Hg
Pbar(end): 29.05 in Hg
Pbar(avg): in Hg
Pg: in H2O
MOISTURE
assumed Bws: %
Calc. Bws: %
Bws used: %
TEST CONSTANTS
K: 14.27
time/pt: 1.5 min

LEAK TESTS (POST)

PITOT
Hold for: sec
(+) ΔP(end): in H2O
ΔP(st): in H2O
Difference: in H2O
PASS/FAIL: Pass Fail
(-) ΔP(end): in H2O
ΔP(st): in H2O
Difference: in H2O
PASS/FAIL: Pass Fail

VACUUM
Hold for sec @ 19 In Hg
Vm(end): 146.320 ft^3
Vm(st): 146.315 ft^3
Difference: ft^3
PASS/FAIL: Pass Fail

TRAV PT	TIME Sample min	TIME Clock hr:min	GAS METER ft3 Vm	VEL. in H2O ΔP	PRESS. DIFF. ACROSS THE ORIFICE, in H2O ΔH, ideal	ΔH, actual	STACK TEMP,°F t-stack	BOX TEMP,°F t-box	IMPINGER TEMP,°F t-imp	DRY GAS METER TEMP, °F t in	t out	PUMP VAC. in Hg
start	0.0											
1	1.5		118	.14	1.99	2.0	162	—	65	103	114	12
2	3.0			.20	2.8	2.8	165	—	61	102	121	14
3	4.5		121	.18	2.56	2.6	167	—	61	103	124.5	15
4	6.0		122.487	.18	2.56	2.6	167	—	61	103	125	17
5	7.5		123.561	.10	1.4	1.4	167	—	63	103	125	14
6	9.0		124.871	.25	3.55	3.6	169	—	63	103	126.5	17
7	10.5		126.071	.24	3.42	3.4	168	—	61	103	124	17
8	12.0		127.481	.26	3.69	3.7	169	—	63	104	123	17
9	8.5		128.652	.28	3.98	4.0	169	—	64	104	122	18
10	15		129.902	.26	3.67	3.7	169	—	66	103	122	17
11	16.5		131.283	.22	3.13	3.1	169	—	64	102	125	16
12	18		133.350	.21	2.98	3.0	169	—	64	103	121	16
1	1.5		134.525	.10	1.4	1.4	161	—	64	106	114	14
2	3.0		135.741	.12	1.7	1.7	161	—	63	106	122	12
3	4.5		136.813	.14	1.99	2.0	161	—	62	105	128	12
4	6.0		138.003	.16	2.27	2.3	162	—	62	105	129	13
5	7.5		139.231	.20	2.8	2.8	163	—	62	105	130	15
6	9.0		140.533	.16	2.27	2.3	167	—	63	105	125	17
7	10.5		141.821	.19	2.7	2.7	167	—	63	105	124	17
8	12.0		143.042	.14	1.99	2.0	168	—	60	105	122	18
9	13.5		144.287	.14	1.99	2.0	167	—	61	104.5	123.5	17
10	15		145.392	.18	2.56	2.6	165	—	61	104.5	123	17
11	16.5		146.811	.16	2.27	2.3	165	—	61	104.5	123	17
12	18		~~147.008~~ 147.002	.20	2.8	2.8	163	—	62	104.5	124.5	18

WEIGHT/RINSE SHEET

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

BLANKS

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	BLANK-Ac	5/10	2x incin
	1°	92010		
	2°			TOTAL RINSE VOL= 550 ml

	WGT1		DATE	
	WGT2			FINAL WGT 28,6343
	WGT3			INIT WGT 28,6331
	WGT4			NET WGT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	BLANK-Wa	200	
10/12	1°	92009	60	
	2°			TOTAL RINSE VOL= 260 ml

	WGT1	28.7502	10/19	am
	WGT2	28,7503	10/20	FINAL WGT 28,7503
	WGT3	28,7503	10/21	INIT WGT 28,7501
	WGT4			NET WGT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	BLANK-Org		
	1°			
	2°			TOTAL RINSE VOL= ml

	WGT1			
	WGT2			FINAL WGT
	WGT3			INIT WGT
	WGT4			NET WGT

FRONT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	FRONT-Ac	500	
10/12	1°	91081	75	
	2°			TOTAL RINSE VOL= 575 ml

	WGT1	50,1884	10/19	4m
	WGT2	.1884	10/20	FINAL WGT 50,1884
	WGT3	.1885	10/21	INIT WGT 50,1720
	WGT4			NET WGT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	FRONT-Wa	400	
10/12	1°	92060	50	
	2°			TOTAL RINSE VOL= 450 ml

	WGT1	28,8676	10/19	4m
	WGT2	.8677	10/20	FINAL WGT 28,8677
	WGT3	.8677	10/21	INIT WGT 28,7152
	WGT4			NET WGT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	FRONT-Org		
	1°			
	2°			TOTAL RINSE VOL= ml

	WGT1			
	WGT2			FINAL WGT
	WGT3			INIT WGT
	WGT4			NET WGT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	N/A	FRONT-Filter	N/A	

	WGT1			
	WGT2			FINAL WGT
	WGT3			INIT WGT
	WGT4			NET WGT

BACK

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	BACK-Ac	330	
10/12	1°	92058	50	
	2°			TOTAL RINSE VOL= 380 ml

	WGT1	28,6812	10/19	4m
	WGT2	.6811	10/20	FINAL WGT 28,6811
	WGT3	.6811	10/21	INIT WGT 28,6687
	WGT4			NET WGT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	BACK-Wa	310	
10/12	1°	91066	100	
	2°			TOTAL RINSE VOL= 410 ml

	WGT1	50,0863	10/19	4m
	WGT2	.0867	10/20	FINAL WGT 50,0867
	WGT3	.0866	10/21	INIT WGT 49,8032
	WGT4	.0867	10/21 pm	NET WGT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	INIT	BACK-Org		
	1°			
	2°			TOTAL RINSE VOL= ml

	WGT1			
	WGT2			FINAL WGT
	WGT3			INIT WGT
	WGT4			NET WGT

DATE	RINSE	LABEL (ID)	RINSE VOL	COMMENTS
	N/A	BACK-Filter	N/A	
		91004		

	WGT1	1,5987	10/19	4m
	WGT2	1,5987	10/20	FINAL WGT 1,5987
	WGT3	1,5987	10/21	INIT WGT 1,5974
	WGT4			NET WGT

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

SOURCE TEST OF PARTICULATE EMISSIONS TO THE ATMOSPHERE

TEST SITE: V.R. Dennis-Canyon Rock

TEST #: P.O.#: TEST DATE:

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

UNIT TESTED: Hot Mix Asphalt Batch Plant

EQUIPMENT: Barber-Reeen Model 896 Hot plant vented to a Barber-Green wet collector model (

TESTED BY:

SITE PERSONNEL: DATE:

APCD ENGINEER: DATE:

LAB ANALYSIS BY: DATE:

REPORT BY: DATE:

REVIEWED BY: DATE:

APPROVED BY: DATE:

ROBERT YELENOSKY, SENIOR AIR POLLUTION CHEMIST

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

SDAPCD RULES

TEST	LIMIT	MEASURED	EXCEEDANCE/NON-EXCEEDANCE
RULE 54 DUST & FUMES	40 lbs/hr	9.12 lbs/hr	NON-EXCEEDANCE

TEST RESULTS SUMMARY:

ITEM	I	Cs	E (y component)
UNITS	%	gr/dscf	lbs/hr
VALUE	108	0.1308	9.124

ENGINEERING SUMMARY

Qstd (y componen	RATE	Asphalt Production
dscfm		tons/hr
8139		

TEST PARAMETERS:

SYSTEM DESCRIPTION:

This asphalt plant combines crushed rock 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 vented through a cyclone and then to a wet scrubber, which exhausts tangentially into the exit stack. The emissions from this stack are the subject of this report.

PROCEDURES:

The procedures utilized in these tests are based on EPA's 40 CFR, July 1, 1991, Part 60, Appendix A, Methods 1-5 inclusive. The sampling train was modified as follows: (1) Teflon tubing was run from the end of the probe to the first impinger in the cold box (the hot box was eliminate (2) A back-end filter was used instead of a front-end filter (for both modifications see fig. 1).

CALCULATIONS

All equations are from the EPA's 40 CFR, July 1, 1991, Part 60, Appendix A, Methods 1-5 inclusive. All preliminary assumptions and calculations are based on data obtained from previous tests. Because this site exhibits extensive cyclonic flow, calculations for velocity (vs), flow rate (Qs), flow rate at standard condtions (Qstd), and the emission rate (E) must be adjusted using the cosine of the angle (see the CALCULATION section, sub-headings, VELOCITY and EMISSIONS-page 4).

PARTICULATE SAMPLING:

The test consisted of sampling at 48 traverse points, 12 from each of 4 sample ports (fig.2), collected from 82 inches below the stack (fig.3). Because this site has a tangential inlet, the stack exhibits a significant amount of cyclonic flow; therefore, EPA NSPS Methods 2 & 5 are not directly applicable and some modifications must be made to achieve isokinetic sampling. An inclinometer was strapped to the probe, the pitotobe tube was rotated until a maximum ΔP was obtained, and the angle was recorded. This procedure was repeated for all the points. The flow was counterclockwise, and the average angle was 82° from the vertical (46 of the 48 points registered a maximum ΔP of 82°, while 2 of the points had a maximum ΔP at 80°). Except for the rotation of the probe into the direction of maximum flow, 82° from the vertical, the sampling was perfromed as usual. 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 (40 CFR, July 1, 1991, Part 60, Appendix A, Methods 1-5).

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-Nap	Temp. read out-Omega
Macrobalance-Sargent Welch	Beakers-Pyrex	Cold/Hot box-Napp	Aneroid Barometer-Taylor
Microbalance-Sartorious	Impingers-Ace	Pitobe tube-Napp	Press. devices-Dwyer magnehelic

FIELD DATA:

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Trav. Pt	Vm (ft^3)	ΔP (in H2O)	ΔH (in H20)	Stack Temp (°F)	Box Temp (°F)	Imp Temp (°F)	t 1 (in) (°F)	t 2 (out) (°F)	velocity (ft/sec)	vel-adjusted vs*cos 82°
START	87.509									
1		0.06	0.86	159		63	89.00	099.00	15.93	2.23
2		0.07	1.00	161		67	88.00	104.00	17.24	2.41
3		0.09	1.30	162		67	89.00	108.00	19.56	2.74
4		0.11	1.60	159		68	89.00	110.00	21.57	3.02
5		0.14	2.00	162		66	89.00	116.00	24.40	3.41
6		0.15	2.10	165		66	90.00	112.00	25.31	3.54
7		0.16	2.30	168		66	91.00	110.00	26.21	3.67
8		0.18	2.60	169		65	91.00	110.00	27.82	3.89
9		0.20	2.80	170		65	91.00	109.00	29.35	4.11
10		0.18	2.60	170		68	91.00	110.00	27.84	3.89
11		0.20	2.80	170		67	91.00	110.00	29.35	4.11
12		0.21	3.00	170		65	92.00	110.00	30.07	4.21
13		0.06	0.80	160		61	96.00	112.00	15.95	2.23
14		0.14	2.00	147		61	96.00	116.00	24.10	3.37
15		0.14	2.00	155		60	96.00	120.00	24.26	3.39
16		0.20	2.80	162		59	97.00	121.50	29.16	4.08
17		0.20	2.80	164		59	97.00	120.50	29.21	4.09
18		0.20	2.80	167		60	98.00	119.00	29.29	4.10
19		0.22	3.10	167		61	98.00	119.00	30.71	4.30
20		0.22	3.10	168		61	98.00	118.00	30.73	4.30
21		0.24	3.40	168		67	98.50	117.00	32.10	4.49
22		0.24	3.40	168		65	99.00	118.00	32.19	4.49
23		0.25	3.60	167		64	99.00	118.00	32.73	4.58
24		0.25	3.60	162		64	99.50	119.00	32.60	4.56
1		0.14	2.00	162		65	103.00	114.00	24.40	3.41
2		0.20	2.80	165		61	102.00	121.00	29.23	4.09
3		0.18	2.60	167		61	103.00	124.50	27.77	3.89
4		0.18	2.60	167		61	103.00	125.00	27.77	3.89
5		0.10	1.40	167		63	103.00	125.00	20.70	2.90
6		0.25	3.60	169		63	103.00	126.50	32.76	4.59
7		0.24	3.40	168		61	103.00	124.00	32.10	4.49
8		0.26	3.70	169		63	104.00	123.00	33.43	4.68
9		0.28	4.00	169		64	104.00	122.00	34.70	4.85
10		0.26	3.70	169		66	103.00	122.00	33.43	4.68
11		0.22	3.10	169		64	102.00	121.50	30.75	4.30
12		0.21	3.00	169		64	103.00	121.00	30.05	4.20
13		0.10	1.40	161		64	106.00	114.00	20.60	2.88
14		0.12	1.70	161		62	106.00	122.00	22.57	3.16
15		0.14	2.00	161		62	105.00	128.00	24.38	3.41
16		0.16	2.30	162		62	105.00	129.00	26.08	3.65
17		0.20	2.80	163		62	105.00	130.00	29.18	4.08
18		0.16	2.30	167		63	105.00	125.00	26.19	3.66
19		0.19	2.70	167		63	105.00	124.00	28.54	3.99
20		0.14	2.00	168		60	105.00	122.00	24.51	3.43
21		0.14	2.00	167		61	104.50	122.50	24.49	3.43
22		0.18	2.60	165		61	104.50	123.00	27.73	3.88
23		0.16	2.30	165		61	104.50	123.00	26.14	3.66
24	147.002	0.20	2.80	163		62	104.50	124.50	29.18	4.08

	Vm ft^3	ΔP (in H2O)	ΔH (in H20)	ts (°F)	tbox (°F)	ti (°F)	t 1 (in) (°F)	t 2 (out) (°F)	vs (ft/sec)	vs(y-comp) (ft/sec)
Average:	59.493	0.173	2.524	165	N/A	63	98.94	118.39	27.172	3.801

Since all 48 angles were 82° +/- 2°, it was decided to use 82° as the average angle, and treat all points equally.

diff due to temp