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

TEST NO.: 85260

P.O. NO.: 0254

TEST DATE: September 17, 1985

SOURCE TEST: Canyon Rock Company
7500 Mission Gorge Road
San Diego, CA 92120

UNIT TESTED: Plant #2

PERFORMED BY: P. Jarman
B. Yelenosky
R. Batten (Engineer)
C. Bejar (Enforcement)
G. Carrier

REPORT PREPARED BY: G. Carrier

APPROVED BY: C W Ridenour — 10/16/85

C.W. RIDENOUR
SENIOR AIR POLLUTION CONTROL CHEMIST

DATE

INDEX

SAN DIE COUNTY AIR POLLUTION CONTROL DISTRICT

TEST DATE: September 19, 1985

TEST NO: 85260

P.O. NO. 0254

SUMMARY: EMISSIONS TO ATMOSPHERE

NAME OF FIRM: CANYON ROCK COMPANY

LOCATION OF PLANT: 7500 Mission Gorge Road, San Diego, CA

TYPE OF OPERATION: Hot Mix Asphalt Plant, operating at 217 tons/hour

UNIT TESTED: Wet Scrubber

		MEASURED EMISSIONS		ALLOWABLE EMISSIONS	
Rule 52	Particulate Matter, Dry	_____	Grains per SCF	_____	Grains per SCF
Rule 53A	Sulfur Compounds as SO_2, Dry	_____	% by Vol.	_____	% by Vol.
Rule 53B	Combustion Contaminants	_____	Grains per SCF @12% CO_2	_____	Grains per SCF @12% CO_2
Rule 53C	Incinerators	_____	Grains per SCF @12% CO_2	_____	Grains per SCF @12% CO_2
Rule 54	Dust and Fumes	18.0	Lbs/Hr	40.0	Lbs/Hr
	NO_2 (Final Readings)	_____	ppm by Vol. @ 3% O_2	_____	ppm by Vol. @ 3% O_2
		_____	ppm by Vol. @ 3% O_2	_____	ppm by Vol. @ 3% O_2

Gas Flow Rate, DSCFM 9982

Gas Temperature, °F 156 (Avg)

Process Weight 217 tons/hr

EMISSION RATES

Particulates: 18.0 Lbs/Hr

Oxides of Nitrogen: _____ Lbs/Hr

TEST DESCRIPTION

Introduction

This report presents the results of velocity profile and particulate loading tests performed at V.R. Dennis - Canyon Rock on September 17, 1985. The tests were performed on the exhaust from the wet scrubber serving the hot mix asphalt plant, while asphalt production averaged 217 tons/hour.

System Description

The asphalt plant combines crushed rock and sand with hot asphalt oil in batches of 6,000 pounds. Each batch can be carried by conveyor to a silo or loaded directly into trucks. The rock and sand is dried in a rotary drier, which is heated with natural gas. The exhaust from this drier is vented through a cyclone to a wet scrubber, which exhausts tangentially into a 9-foot diameter stack. The water flow rate through the wet scrubber could not be determined because of an inoperative flow meter.

Procedures

Previous testing has shown that there is significant cyclonic flow in this stack, due to the tangential inlet. EPA NSPS Methods 2 and 5 are not applicable to this stack, and require significant modification to enable testing, allowing both isokinetic sampling and the determination of the stack volumetric flow rate. The volumetric flow rate of the stack was determined by using the following procedure for the 48 traverse points, 12 from each sampling port as shown in Figure 1.

The pitot tube on the sampling probe was placed at a traverse point with the pitot tube faces in a vertical plane. The probe was then rotated until the ΔP was 0.00" H_2O. The angle of rotation (α) was measured with a clinometer and recorded. This was done for the twelve points at each sample port just prior to sampling. These measurements were taken with the sampling nozzle removed to prevent flow interference.

After the direction of flow was determined at each of the points at a particular port, the sampling nozzle was installed, and the probe placed at the first sample point. The probe was rotated α degrees from the vertical so that the nozzle was aligned with the gas flow. The ΔP was measured and a sample extracted isokinetically. In order to obtain a representative sample, the sampling time was made proportional to the cosine of α. This procedure was repeated at each of the twelve points at that sample port, adjusting the angle of rotation of the probe and the sample time for each new "α". A sample was not taken at points where α was greater than 89°.

Calculations

The velocity at 21 points was calculated. These calculations are presented on Pages 9 and 10. The vertical component of the velocity vector was calculated by multiplying the velocity by the cosine of α. The average of these 21 components was found to be 4.0 feet per second. The particulate concentration calcula-

tions were done using normal methods. The emission rate in pounds per hour was calculated using the grain loading and the stack flow based on the vertical component of the stack vector.

Gas Analysis

Oxygen and carbon dioxide content of the stack gas was measured with an ORSAT analyzer according to EPA New Source Performance Standards Method 3. The results of this analysis are on Page 5.

Visible Emissions

A visible emissions evaluation made by R. Batten, Air Pollution Engineer , is found on Page 13 and shows the stack exhaust emissions to be in compliance with Rule 50.

Comments

The conditions inside the stack during testing made it extremely difficult to record stable readings. The plume exiting the stack was not only cyclonic, but very turbulent and would collapse back into the upper area of the stack. This effect could be observed extending approximately three feet down into the stack and swirling was observed around the sampling nozzle. Wind conditions at the stack opening also contributed to the turbulence. The plume would be caught by a gust of wind and sent cascading down the outside walls of the stack.

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

TEST NO. 85260 TEST DATE SEPTEMBER 17, 1985
CANYON ROCK
RUN 1

A.	V_m	METER VOLUME, UNCORRECTED*FACTOR	=	34.3	cu ft
B.	P_m	METER PRESSURE, P + H/13.6	=	29.89	in Hg
		bar			
C.	T_m	METER TEMPERATURE, 460+(T +T)/2	=	557.	DEG. R
		1 2			
D.	T_i	IMPINGER TEMPERATURE	=	70.	DEG. F
E.	T_s	AVERAGE STACK TEMPERATURE, 460+DEG. F	=	616.	DEG. R
F.	P_s	STACK PRESSURE, P + P /13.6	=	29.80	in Hg
		bar g			
G.	VP_i	MAX. H_2O VP PERMITTED AT T_i (SEE APPENDIX)	=	.80	in Hg
H.	V_{lc}	VOLUME OF CONDENSED H_2O (SEE LAB SHEET)	=	156.	ml
I.	$V_{calc\ 2}$	H_2O VAPOR , METER COND., H*C/B*0.00267	=	7.76	cu ft
J.	V_{wv}	MOISTURE METERED AT METER COND., A*G/B	=	.93	cu ft
K.	V_{dry}	SAMPLE VOLUME AT METER COND., DRY, A-J	=	33.36	cu ft
L.	$\%M_c$	PER CENT MOISTURE CALC. 100*(I+J)/(A+I)	=	20.66	%
M.	VP_s	MAX. H_2O VP PERMITTED AT T_s (SEE APPENDIX)	=	8.77	in Hg
		2 s			
N.	$\%M_s$	PER CENT MOISTURE PERMITTED, M/F*100	=	29.4	%
	B ws	ENTER LOWER OF L OR N	=	20.7	%
O.	M.C.	MOISTURE CORRECTION FACTOR, (100-L OR N)/100	=	.793	
P.	$V_{m(std)}$	SAMPLE VOL., STD COND. (DRY), K*528/29.92*B/C	=	31.579	cu ft
S.	m_n	WEIGHT OF PARTICULATE MATTER COLLECTED	=	.430	g
T.	c_s	GRAIN LOADING (DRY), 15.43*S/P	=	.210	grains/scf

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

TEST NO. 85260 TEST DATE SEPTEMBER 17, 1985
CANYON ROCK
RUN 1

COMPONENT	VOL. %/100	*MOISTURE CORR*	MOL. WT.	=WET BASIS WT./MOLE
WATER, B ws	.2066	1.00000	18.0	3.719
OXYGEN	.1660	.79336	32.0	4.214
CARBON MONOXIDE	.0000	.79336	28.0	.000
CARBON DIOXODE	.0240	.79336	44.0	.838
NITROGEN & INERTS	.8100	.79336	28.2	18.122

GAS ANALYSIS

AA. M_s AVERAGE MOLECULAR WEIGHT = 26.894

$\theta = 72.67°$

DD. C_p PITOT TUBE CORRECTION FACTOR = .829

EE. V_s STACK VELOCITY AT CYCLONIC STACK COND. (SEE DATA = 4.01 ft/sec → 16.0

FF. $V_{s(std)}$ STACK VEL. AT STD COND. (DRY), EE*528/29.92*F/E*0 = 2.71 ft/sec 10.83

GG. DURATION OF SAMPLING = 113. min

HH. AVERAGE SAMPLING RATE (DRY), P/GG = .279 scfm

II. SELECTED NOZZLE DIAMETER = .382 in

JJ. SAMPLING VELOCITY AT STD COND., HH/II**2*144/60*4/3. = 5.85 ft/sec

KK. I ISOKINETIC VARIATION, JJ/FF*100 = 54. % 55/10.83

LL. A_s AREA OF STACK 61.28 sq ft

MM. Q_{sd} FLOW RATE AT STD. COND. (DRY), FF*LL*60 9982. scfm

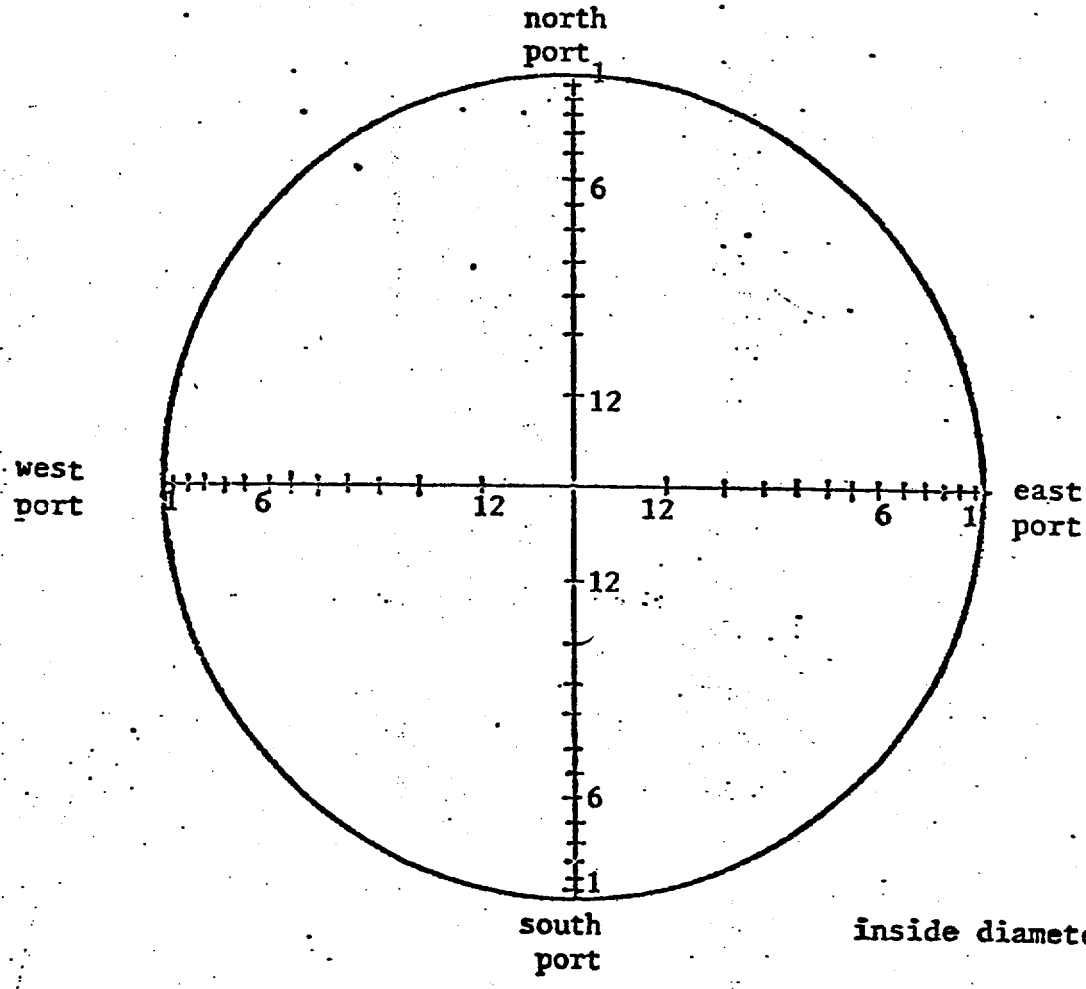
NN. Q_s FLOW RATE AT CYCLONIC STACK COND., EE*LL*60 = 14729. acfm

UU. PARTICULATE EMISSION RATE, 0.00847*T*MM = 17.97 lb/hr

Canyon Rock

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

TRAVERSE POINTS

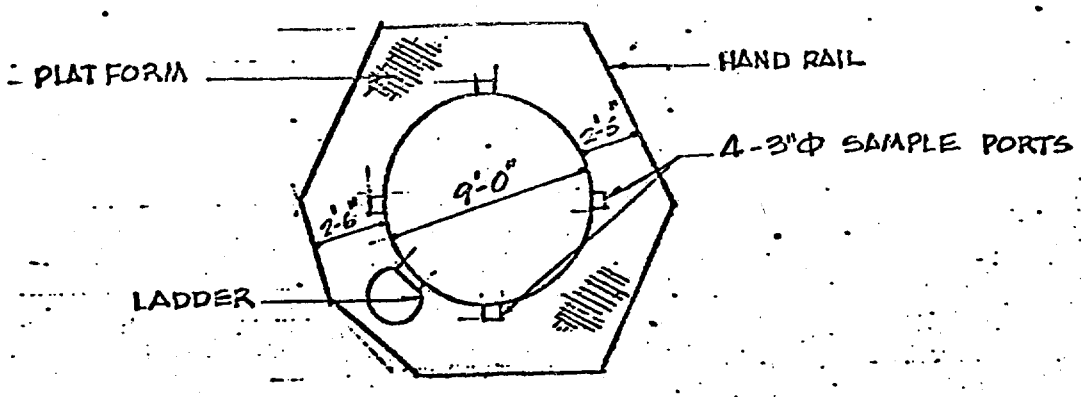


inside diameter = 106"

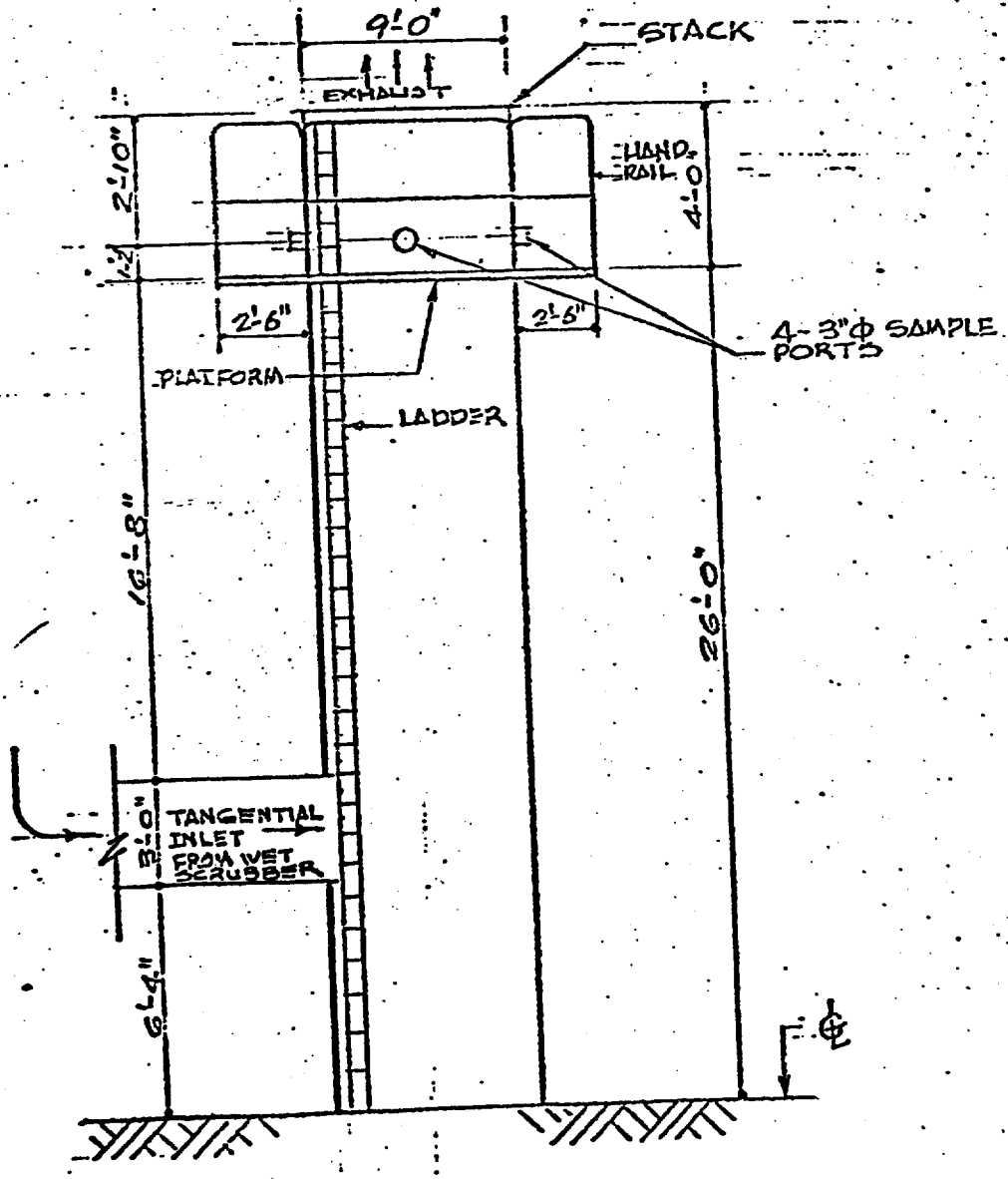
Point	Distance
1	1.1"
2	3.4"
3	5.8"
4	8.4"
5	11.1"
6	14.0"
7	17.1"
8	20.5"
9	24.4"
10	28.8"
11	34.3"
12	42.2"

FIGURE 1

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

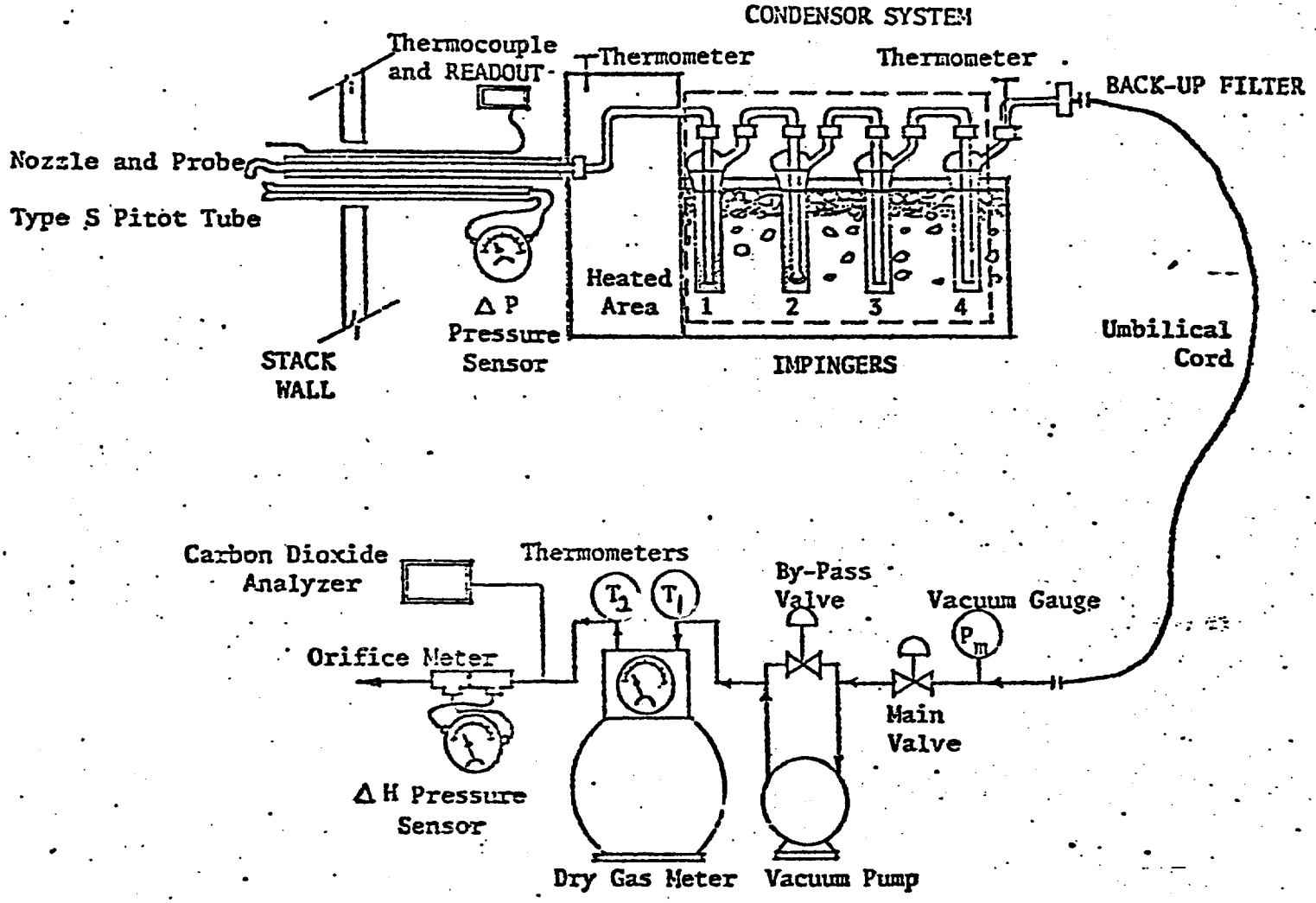


TOP VIEW
NO SCALE



SIDE VIEW
NO SCALE

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT



LEGEND

Greenburg-Smith Type Impingers

No. 1 Mod- 100 ML Deionized Water

No. 2 Std- 100 ML Deionized Water

No. 3 Mod- Dry

No. 4 Mod- Dry

Mod - Modified Type
Std - Standard Type

FIELD DATA ABBREVIATIONS

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

FIGURE 3: PARTICULATE MATTER SAMPLING TRAIN

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

TEST NO. 85260 TEST DATE SEPTEMBER 17, 1985
CANYON ROCK
RUN 1

PT	T_s	P	VEL	H	T_1	T_2	P_m	T_i	ANG	(VEL)
W8.	152.	.060	15.2	1.00	93.5	83.5	3.00	64.50	70.	5.2
W7	155.	.090	18.6	1.52	105.0	83.5	1.50	64.50	75.	4.8
W6	155.	.115	21.0	1.95	92.0	84.0	1.75	64.00	75.	5.4
W5	156.	.140	23.2	2.40	109.5	84.0	2.00	64.50	75.	6.0
W4	163.	.155	24.6	2.70	110.5	84.0	2.25	62.50	75.	6.4
W3	161.	.150	24.2	2.35	112.5	84.5	2.25	63.50	75.	6.3
W2	159.	.150	24.1	2.50	112.0	80.0	.00	66.00	65.	10.2
W1	159.	.030	10.8	.50	114.0	83.0	.00	72.00	70.	3.7
N11	147.	.020	8.7	.34	103.0	86.0	.00	83.00	40.	6.7
N10	147.	.055	14.5	.92	109.5	84.5	.00	82.00	70.	4.9
N9	149.	.080	17.5	1.35	110.0	86.0	.00	79.00	80.	3.0
N8	152.	.080	17.5	1.35	110.0	86.0	.00	82.00	89.	.3
N7	152.	.080	17.5	1.35	110.0	86.0	.00	82.00	89.	.3
E12	144.	.020	8.7	.34	108.0	87.0	1.00	73.00	45.	6.2
E11	144.	.030	10.7	.50	111.0	86.0	.00	68.00	60.	5.3
E10	160.	.050	13.9	.85	115.0	86.0	2.00	66.00	85.	1.2
E9	160.	.060	15.3	1.03	115.0	86.0	2.00	68.00	85.	1.3
S11	159.	.010	6.2	.17	113.0	86.0	.00	68.00	45.	4.4
S10	163.	.030	10.8	.50	111.0	86.0	.00	69.00	80.	1.9
S9	167.	.050	14.0	.85	111.0	86.0	2.00	67.00	89.	.2
S7	167.	.090	18.8	1.53	111.0	86.0	3.00	67.00	89.	.3
AVG	156.	.066	16.0	1.24	108.9	85.0	1.08	70.26	72.67	4.01

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

AVERAGE DELTA P = .0736

DRY GAS METER VOLUME UNCORRECTED = 34.220 P_{bar} = 29.80 in Hg

METER CORRECTION FACTOR = 1.0020 P_g (STACK PRESSURE) = .0 in water

NOTES - 1. AVG P IS THE SQUARE OF THE MEAN (SQ.RT)
2. (VEL) = VEL*COS(ANG)
3. AVG CO IS THE VELOCITY WEIGHTED AVERAGE
$_2$

TEST NO. 85260 PAGE 10

COUNTY OF SAN DIEGO - AIR POLLUTION CONTROL DISTRICT

PARTICULATE MATTER
LABORATORY DATA

PARTICULATES

A. ACETONE WASH NOZZLE, PROBE, IMPINGERS. Final 1.5510 g Net Wt. .1489 g

Pan # C-2 Tare 1.4021 g

B. WATER WASH NOZZLE, PROBE, IMP., IMP. CATCH. Final 1.6608 g Net Wt. .2698 g

Pan # C-1 Tare 1.3910 g

C. BACK-UP FILTER Final .1216 g Net Wt. .0136 g

Pan # _____ Tare ——— g

Filter Tare .1080 g

D. Blanks

610 ml Water .0003 g/100ml .00183 g Water Correction

292 ml acetone .0002 g/100ml .00058 g Acetone Correction

Water Pan # N/A Net Wt. .0024 g

Acetone Pan # 151

Total Weight of Particulate Matter (A + B + C - D) .4299 g

CONDENSED MOISTURE Final 356 ml

Tare 200 ml

Net Gain 156 ml

See lab note book # 1 pg 68, 69, 70
G CARRIER

MECHANICAL ENGINEERING TEST REPORT

Canyon Rock/V.R. Dennis Asphalt Plant
7500 Mission Gorge Road
San Diego, California

PERMIT TO OPERATE NO. 254: Renewal Compliance Test conducted by the APCD

TEST DATE: September 17, 1985

TEST PERIOD: 9:57 am to 2:50 pm

ASPHALT HOT MIX: Each batch was 3 tons.

	3/8 INCH				1/2 INCH				
	3/8" Aggragate								
	3/8 Agg.	Sand	Dust	Oil	1/2 Agg.	3/8 Agg.	Rock	Dust	Oil
LBS.	1956	1956	1656	432	804	2004	1410	1410	372
%	32.6	32.6	27.6	7.2	13.4	33.4	23.5	23.5	6.2

Only small amount % 1/2 inch mix was produced.

ROTARY DRUM BURNER FUEL: Natural Gas

BATCH COUNT: 1 batch per 0.83 minutes.

$$\frac{\text{batch}}{0.83 \text{ min.}} \times \frac{3 \text{ ton}}{\text{batch}} \times \frac{60 \text{ min}}{\text{hr.}} = 217 \text{ tons/hr}$$

Plant was operating at full 200 tons/hr capacity for duration of test.

AGGRAGATE TEMPERATURE: 290 to 310°F at exit of rotary drum.

A/C OIL TEMPERATURE: 350-360°F into mixing section

COMMENTS

- The stack exhaust was visibly checked periodically between 8:30 and 10:30 AM and appeared to be predominately water vapor. It was not apparent that the detached plume contained particulate matter.

- "Blue smoke" emissions from the drop zone under the storage silos were quite significant. Each drop to either the truck bed or trailer bed produced opacity levels ranging between 40 and 60% for a rough average of 23 seconds each drop. Since each drop was a continuous delivery of 12 or 13 tons, the resulting elongated pile exposed more surface area to the atmosphere. The asphalt in the truck bed was measured to be 290 ^{o}F. The magnitude of the emissions were 3 times that observed elsewhere where the load temperature was 300 ^{o}F. It is apparent that some other parameter was the cause for the larger emissions, perhaps the quality of A/C oil being used.

- The inverted conveyor belt on the underside of the hot mix transport (conveyor assembly) to the storage silo exhibited "blue smoke" emissions as the result of hot mix "clinging" to the belt. Positioning of the observer with relation to the sun is very critical for observing "blue smoke" emissions, especially for line emissions such as these belt emissions. A special determination should be conducted to evaluate the significance of these emissions with regard to Rule 50. A water based surfactant is being

employed to lubricate the belts. It should be determined whether or not the surfactant is contributing to the emissions. The apparent color of the emissions is the typical blue tint. A brown tint would be expected if the surfactant material was prominant in the emissions.

- "Blue" smoke emissions that would violate Rule 50 were not observed at the silo load-in area as was observed before the facility management installed the fan and ducting to transfer the suspended liquid medium to the roatry drum burner.

- The source test team encountered extreme difficulty in obtaining valid measurements in the wet collector exhaust stack, due primarily to exhaust gas turbulence.

CONCLUSIONS

The plant was operating at full capacity.

"Blue smoke" emissions at the silo load out area exceeded 40% opacity.

Detached particulate matter in the stack exhaust plume was not apparent.

ROBERT L. BATTEN
Associate Air Pollution Control Engineer

RLB:jo

092085

SOURCE TEST
COMPUTER INPUT DATA FORM

TEST NO. 85260 | RUN NO. | CARD NO.

TEST SITE: CANYON ROCK — NPP 254

SOURCE TEST: P JARMAN, B Yelenosky, G CARRIER
R BATTEN (ENG) C BEJAR (ENG)

71 = .7648
70 = .7392
.0256 · .55 ≡ .01408

DATA	CARD NO.		
29.80	0	1	Barometric Pressure, in.Hg
0.0	0	2	Stack Pressue, in. H_2O
954580	0	3	Start meter Volume, ft^3
988800	0	4	Final Meter volume, ft^3
.75333	0	5	Max. vapor permitted at T_I, in. Hg 70°.55° .7533
8.3511	0	6	Max. water vapor permitted at T_S, in. Hg ~~150°~~ 154°
1.56	0	7	Volume of condensed water, ml.
1.002	0	8	Meter calibration factor
2.4	0	9	% CO_2 (min. value = 0.04)
0.0	1	0	% CO
16.6	1	1	% O_2
81.0	1	2	% N_2
.8299	1	3	Pitot tube correction Factor SN #5
61.28	1	4	Area of stack, ft^2
.3821	1	5	Nozzle diameter, in.
11.30	1	6	Duration of sampling, min. ~~130:58~~ ~~112:18~~ 108:34
.4302	1	7	Wt of particulate matter collected, gm. .1gm
0.0	1	8	PPM NO_2, DRY
0.0	1	9	PPM SO_2, DRY
0.0	2	0	Auxillary Fuel Flow Rate, CFM

NOTE:

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

WRD:ST:8-11-83

1 2 3 4 5 6 7 8 9

ambient temp - 71°F. Canyon Rock Asphalt

FILTER NO #53 NOZZLE DIA 0.382 in.
SAMPLE BOX NO 02
P. BARO ____ in.Hg. P.STACK ____ in.H2O

SAN DIEGO APCD
SAMPLE COLLECTION DATA

DATE 9/17/85 81
TEST NO 85260
OPERATOR

Starting Volume 954.580

R Jarman, B Yeterosky, G Carrier

CHECKS	POINT NO.	STACK TEMP. °F	PITOT P in.H2O	GAS METER H	GAS METER T_1	GAS METER T_2	GAS METER VAC	T_j °F	GAS VOL. FT.^{3} (954.580)	CARD	α or %CO_2
INITIAL	W 12		-.02	1.8			0.0		954.580	-	
Pitot ___											
Thermo. ___	W 11		-.02	1.8			0.0		954.580	-	
Train ___	W 10		-.03	1.8			0.0		954.580	-	
INTERMEDIATE											
Pitot ___	W 9		-.05	1.8			0.0		954.580	-	
Train ___											
Start 957	W 8	160	.06	1.0	83	77	3.0	63	954.580	-	70
FINAL ___											
Pitot ___	W 7	167	.09	1.5	96	78	0.0	66	956.900	-	75
Train ___											
	W 6	165	.11	1.8.5	98	79	0.0	65	957.650	-	75
	W 5	163	.14	2.4	102	80	0.0	68	958.535	-	75
	W 4	165	.16	2.7	102	80	0.0	65	959.580	-	75
DAPCD ST #53	W 3	163	.15	2.2	106	81	0.0	66	960.600	-	75
	W 2	159	.15	2.5	112	82	0.0	64	962.205	-	65
Sample Stopped 10:22	W 1	159	.03	5.0	114	83	0.0	72	962.600	-	70

Canyon Rock Asphalt

P2

SAN DIEGO APCD
SAMPLE COLLECTION DATA

FILTER NO ______
SAMPLE BOX NO ______
P. BARO ______ in.Hg.

NOZZLE DIA ______ in.
P.STACK ______ in.H2O

DATE 9/17/85
TEST NO 85260
OPERATOR ______

HECKS

INITIAL
Pitot ____
Th..mo. ____
Train ____
INTERMEDIATE
Pitot ____
Train ____
FINAL ____
Pitot ____
Train ____

DAPCD ST #53

POINT NO.	STACK TEMP. °F	PITOT P in.H_2O	GAS METER H	GAS METER T_1	GAS METER T_2	GAS METER VAC	T_j °F	GAS VOL. FT.^{3}		CARD	α or $\%CO_2$
N 12		.02	.			.		.		-	
N 11	148	.02	.34	100	86	0.0	81	963.200		-	40
N 10	147	.06	1.0	108	83	0.0	81	963.945		-	70
N 9	147	.08	1.35	108	85	0.0	80	964.643		-	80
N 8	147	.08	1.35	108	85	0.0	80	.		-	89
N 7	147	.08	1.35	108	85	0.0	80	964.670		-	89
N 6		-.10	.			.		.		-	
N 5		-.12	.			.		.		-	
N 4		-.13	.			.		.		-	
N 3		-.14	.			.		.		-	
N 2		-.09	.			.		.		-	
N 1		-.06	.			.		.		-	

Canyon Rock Asphalt

FILTER NO _____ NOZZLE DIA _____ in.
SAMPLE BOX NO _____
P. BARO _____ in.Hg. P.STACK _____ in.H2O

SAN DIEGO APCD
SAMPLE COLLECTION DATA

DATE 9/17/85 P3
TEST NO 85260
OPERATOR _____

CHECKS	POINT NO.	STACK TEMP. °F	PITOT P in.H_2O	GAS METER H	GAS METER T_1	GAS METER T_2	GAS METER VAC	T_j °F	GAS VOL. FT.^{3}	CARD	α or %CO_2
INITIAL	N 1 2									-	
Pitot ___											
Thermo. ___	N 1 1	145	02	34	106	86	0 0	85	965.010	-	40
Train ___	N 1 0	147	05T	85T	111	86	0 0	83	965.795	-	70
INTERMEDIATE											
Pitot ___	N 9	150	08	135	112	87	0 0	78	966.325	-	80
Train	N 8	157	08	135	112	87	0 0	84		-	89
FINAL ___											
Pitot ___	N 7	157	08	135T	112	87	0 0	84	966.425T	-	89
Train ___	N									-	
										-	
										-	
										-	
DAPCD ST #53										-	
										-	
										-	
										-	

Canyon Rock Asphalt

FILTER NO #53 NOZZLE DIA .382 in.
SAMPLE BOX NO 02
P. BARO ____ in.Hg. P.STACK ____ in.H2O

SAN DIEGO APCD
SAMPLE COLLECTION DATA

DATE 9-17-85
TEST NO 85260
OPERATOR ____

P 4

CHECKS	POINT NO.	STACK TEMP. °F	PITOT P in.H_2O	GAS METER H	GAS METER T_1	GAS METER T_2	GAS METER VAC	T_j °F	GAS VOL. FT.^{3}		CARD	α or %CO_2
INITIAL	E 12#	144	0.2	1.35	108	87	1.0	73	968.705		-	45
Pitot ___	E 12#	144	0.3	1.50	111	86	0.0	68	972.300		-	60
Thermo. ___												
Train ___	E 10#	160	0.5	.85	115	86	2.0	66	972.955		-	85
INTERMEDIATE												
Pitot ___	E #9#	160	0.6	1.03	115	86	2.0	68	973.770		-	85
Train	E 8#		-0.10								-	
FINAL ___												
Pitot ___	E 7#		-0.11								-	
Train ___	E 6#		-0.11								-	
	E 5#		-0.10								-	
	E 4#		-0.09								-	
DAPCD ST #53	E 3#		-0.06								-	
	E 2#		-0.03								-	
	E 1#		-0.05								-	

Canyon Rock

FILTER NO #53 NOZZLE DIA .382 in.

SAMPLE BOX NO 02

P. BARO _____ in.Hg. P.STACK _____ in.H2O

SAN DIEGO APCD
SAMPLE COLLECTION DATA

DATE 8-17-85 P5

TEST NO 85260

OPERATOR _____

CHECKS	POINT NO.	STACK TEMP. °F	PITOT P in.H_2O	GAS METER H	GAS METER T_1	GAS METER T_2	GAS METER VAC	T_j °F	GAS VOL. FT.^{3}		CARD	α or %CO_2
INITIAL	S 1 2 7		- 0 2									20
Pitot ___)												
Thermo. ___	S 1 1 2	159	0 1	1 7	1 1 3	86	0 0	68	976.135		-	45
Train ___	S 1 0 3	163	0 3	1 5 0	1 1 1	86	0 0	69	976.900		-	80
INTERMEDIATE												
Pitot ___	S 9 4	167	0 5	1 8 5	1 1 1	86	2 0	67	977.340		-	89
Train	S 8 5	#	0 8	1 3 5							-	
FINAL ___												
Pitot ___	S 7 6	167	0 9	1 5 3	1 1 1	86	3 0	67	977.645		-	89
Train ___)	S 6 4										-	
	S 5 #											
	S 5 3										-	
	S											
	S 4 9										-	
DAPCD ST #53	S 3 6										-	
	S 2 #										-	
	S 1 2										-	

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

TEST# 85260 / N00254 DATE# 9/17/85 SITE# CANYON ROCK

UNIT#

ABSOLUTE PRESSURE IN METER: 30.07

ABSOLUTE PRESSURE IN STACK: 29.86

ABSOLUTE TEMP. IN METER: 99°F ~~[illegible]~~

PRESSURE DROP ACROSS METER: 2.7

% MOISTURE OF STACK GAS: 3%

CORRECTION FACTOR: .935

STACK TEMPERTURE: 172°F

AVE. DIFFERENTIAL PRESSURE: .1

IDEAL NOZZLE DIAMETER: .382

NOZZLE USED: .382

TEST DIFFERENTIAL PRESSURE: .1 ΔP / 1.7 ΔH

STACK conditions required the Nominal Number to be changed to 20

ΔH 1.7 rate = .577 SCFM

Required sample Vol = 60 SCF

$$\text{Time} = \frac{60 \text{ SCF}}{.577 \text{ SCFM}} = 103 \text{ min}$$

Test points = 48

Minutes per test point = ≥ 2.0 min

Ave sampling ∠ = 78°

$$\text{Nominal Number} = \frac{\text{min/PT}}{\cos 78^\circ} = 9.6 \text{ or } 10 \text{ min a point}$$

Canyon Rock Asphalt 9/17/85

4 30 Left APCD

5 00 arrived @ test site. It is dark and there are no lights @ the stack. There are a few about 100 yds away but give very little light our way. must have proper lighting if we are to climb the stack in the dark.

5 30 There is not enough clearance between the platform and the port hole (only 14", there should be 20½" for clearance of the impinger box) Bottom railing to the platform 18" (Need at least 21" for the impinger box) sent P. J. to bring longer probe (7') and longer railing.

6 30 P. J. returned. He had to clean the probe @ the lab before coming back.

7 00 Problems w leakcheck

7 30 Finally found the leaks

7 45 Leak checks completed

8 00 Problems with measuring cyclonic flow because the stack is not only cyclonic but very turbulent.

9 57 Began sampling

2 45 Production stopped. Test ended.

3 05 Leak checks Ok

$m_d = .44(5.92) + .32(10.5) + .28(83.58)$

$2.6 + 3.36 + 23.4024$

ISOKINETIC ΔH CANYON ROCK

$D_{m(ACT)} = .382$

$\Delta He = 2.7$

$C_p = .823$

$(1-B_{ws}) = .7$

$M_D = 29.3624$

$T_m = 559$

$P_s = 29.86$

$M_s = 26.18$

$T_s = 632$

$P_m = 30.07$

$$\left[846.872\left(.382^4\right)(2.7)\left(.823^2\right)\cdot\frac{29.3624\,(559)(29.86)}{26.18\,(632)(30.07)}\right]$$

$$\left[846.872\left(\frac{.0213}{.4792}\right)(2.7)(.6773)\right]^{(1^2)}\cdot{}^{(.49)}\frac{490110.0}{497531.0}$$

$$\left[\frac{16.164}{32.987}\cdot .9851\right]$$

$$\left[15.923\right] = K$$

$$\left[\underset{K}{15.923}\right]\cdot\underset{\Delta Pest}{(.1)} = 1.6$$

$\Delta H = 1.6$

NOZZLE Est for Canyon Rock
long method

$$D_{m(est)} = \sqrt{\frac{.0358\,(Q_m)(P_m)}{T_m\, C_p\, (1-B_{ws})}} \cdot \sqrt{\frac{T_s\, M_s}{P_s\, (\Delta P_{est})}}$$

$Q_m = .577 =$ ■
$P_m = 30.07$
$T_m = 559$
$C_p = .823$
$(1-B_{ws}) = .7$
$T_s = 632$
$M_s = 26.18$
$P_s = 29.86$
$\Delta P_{est} = .1$

$$= \sqrt{\frac{.0358(.577)(30.07)}{559\,(.823)(.7)}} \cdot \sqrt{\frac{632 \cdot 26.18}{29.86 \cdot (.1)}}$$

$$= \sqrt{\frac{.62114}{322.039}} \cdot \sqrt{\frac{16545.76}{2.986}}$$

$$= \sqrt{.001929} \cdot \sqrt{5541.112}$$

$$= \sqrt{.001929 \cdot 74.4386}$$

$$= \sqrt{.143592}$$

$D_{m\,est} = .379$ IDEAL

USE .382

Canyon Rock

1. Probes
2. Inclinometer & Level
3. Nomograph
4. Center scale Magnehelic — Stack tube manometer
5. No site file —
6. Special Forms
7. STACK TRAVERSE POINTS
8. CALCULATORS

	ΔP
1984	-.1
1983	-.1
1981	-.1

MECHANICAL ENGINEERING TEST REPORT

Canyon Rock/V.R. Dennis Asphalt Plant
7500 Mission Gorge Road
San Diego, California

PERMIT TO OPERATE NO. 254: Renewal Compliance Test conducted by the APCD

TEST DATE: September 17, 1985

TEST PERIOD: 9:57 am to 2:50 pm

ASPHALT HOT MIX: Each batch was 3 tons.

	3/8 INCH				1/2 INCH				
	3/8" Aggragate								
	3/8 Agg.	Sand	Dust	Oil	1/2 Agg.	3/8 Agg.	Rock	Dust	Oil
LBS.	1956	1956	1656	432	804	2004	1410	1410	372
%	32.6	32.6	27.6	7.2	13.4	33.4	23.5	23.5	6.2

Only small amount % 1/2 inch mix was produced.

ROTARY DRUM BURNER FUEL: Natural Gas

BATCH COUNT: 1 batch per 0.83 minutes.

$$\frac{\text{batch}}{0.83 \text{ min.}} \times \frac{3 \text{ ton}}{\text{batch}} \times \frac{60 \text{ min}}{\text{hr.}} = 217 \text{ tons/hr}$$

Plant was operating at full 200 tons/hr capacity for duration of test.

AGGRAGATE TEMPERATURE: 290 to 310°F at exit of rotary drum.

A/C OIL TEMPERATURE: 350-360°F into mixing section

COMMENTS

- The stack exhaust was visibly checked periodically between 8:30 and 10:30 AM and appeared to be predominately water vapor. It was not apparent that the detached plume contained particulate matter.

- "Blue smoke" emissions from the drop zone under the storage silos were quite significant. Each drop to either the truck bed or trailer bed produced opacity levels ranging between 40 and 60% for a rough average of 23 seconds each drop. Since each drop was a continuous delivery of 12 or 13 tons, the resulting elongated pile exposed more surface area to the atmosphere. The asphalt in the truck bed was measured to be 290 ^{o}F. The magnitude of the emissions were 3 times that observed elsewhere where the load temperature was 300 ^{o}F. It is apparent that some other parameter was the cause for the larger emissions, perhaps the quality of A/C oil being used.

- The inverted conveyor belt on the underside of the hot mix transport (conveyor assembly) to the storage silo exhibited "blue smoke" emissions as the result of hot mix "clinging" to the belt. Positioning of the observer with relation to the sun is very critical for observing "blue smoke" emissions, especially for line emissions such as these belt emissions. A special determination should be conducted to evaluate the significance of these emissions with regard to Rule 50. A water based surfactant is being

employed to lubricate the belts. It should be determined whether or not the surfactant is contributing to the emissions. The apparent color of the emissions is the typcial blue tint. A brown tint would be expected if the surfactant material was prominant in the emissions.

- o "Blue" smoke emissions that would violate Rule 50 were not observed at the silo load-in area as was observed before the facility management installed the fan and ducting to transfer the suspended liquid medium to the roatry drum burner.

- o The source test team encountered extreme difficulty in obtaining valid measurements in the wet collector exhaust stack, due primarily to exhaust gas turbulence.

CONCLUSIONS

The plant was operating at full capacity.

"Blue smoke" emissions at the silo load out area exceeded 40% opacity.

Detached particulate matter in the stack exhaust plume was not apparent.

ROBERT L. BATTEN
Associate Air Pollution Control Engineer

RLB:jo

092085

TEST NO.: 85260

TEST DATE: 9/17/85

TEST SITE: CANYON ROCK 7300 MISSION GORGE RD

LOCATION: Mission Gorge & Princess View

SOURCE TEST PERSONNEL: P. JARMAN G. Carrier B. Yelenosky (B. Batten Eng.)

FACILITY CONTACT: Ken ATWELL 583-7606

APCD ENGINEER: B. Batten

APCD INSPECTOR: CARLOS

SAMPLE BOX NO.: #1

METER BOX NO.: D-337

FILTER NO.: 53

NOZZLE DIAMETER: .382 (#146)

STACK SIZE: 106" D

AMBIENT TEMP., °F: 71°F

ASSUMED MOISTURE, %: 30%

NO. OF SAMPLE POINTS: 48

MINUTES/POINT: Cont ✗ .20

START TIME: 0957

STOP TIME: 1445

TOTAL TEST TIME: 4HRS 48 minutes

INITIAL VOLUME, FT^3: 954.580

FINAL VOLUME, FT^3: 988.800

LEAK CHECKS:

	INITIAL	FINAL
1. VAC. LINE (RED):	ok	ok
2. PRESSURE LINE (GREEN):	ok	ok
3. SAMPLE LINE:	0.015 @ 15"	0.007 @ 7"

(MUST BE $\leq$ ~~0.002~~ 0.02 FT^3/MIN.)

Sample Recovery

CANYON ROCK

Explorer & Turbulent stack

9/17/85 1630 - WASHED outside of Probe

① Acetone 200 ml + 100 ml - 62 = 238 ml probe & nozzle WASH

② DI H_2O 200 ml - 48 = 202 ml Probe & Nozzle WASH

9/18/85 IMPINGER Recovery - WASHED outside of all imp.

#1 IMPINGER	248 ml	350 ml
#2 IMPINGER	108 ml	-200 ml charge
#3 Empty	—	150 ml GAIN
#4 Empty	—	

H_2O WASH 200 ml + 150 ml

Acetone WASH 150 ml + 100 ml

Impinger catch light tan with ~~sed~~ residue settling on bottom of impinger

Impinger catch & Wash beaker put into oven at 105°C

Acetone Beaker left at room temperature

Filter #53 Removed from holder and put in Plastic petri dish. Put in desicator for drying

9/18/85 1420

H_2O Beaker Evaporated to dryness. Have to do Quantitative transfer of contents. Measured out 100 ml of DI H_2O (Filtered) Used 60 ml H_2O in Transfer

SAMPLE Recovery

9/9/85
G Cartier

Orgueil Rock 85260 NØØ254

PAN	TARE	9/24/85	9/24/85 1315	9/24/85 1600	9/25/85 1145		FINAL
C-1 IMPINGER (H_2O)	1.3910	1.6616	1.6622	1.6608	1.6608		1.6608
C-2 IMPINGER (Acetone)	1.4021	1.5501	1.5510	1.5510			1.5510
H_2O BEAKER	26.3275						WATER Correction Pg 66 .0003gm/100ml
Acetone BEAKER	27.0355						Acetone wash correction Pg 63 .0002 gm/100ml
#53 FILTER (4.0 K3 Pg 8)	9/19/85 1145 .1080 +.1245	9/19/85 1145 .1245	9/24 .1216	9/24 1345 .1212	9/24 1600 .1216		.1216

↑ Changed silica gel in desicator

TRANSFERRED ACETONE BEAK contents to PAN # C-2 MEASURED 100 ml of Acetone for WASH. Used 42 ml in Transfer

Put 2 50 ml beakers in oven for Drying before weighing

TARE weights

H_2O Beaker

9/20/85 1000 26.3274 gm

9/20/85 1400 26.3275

9/20/85 26.3275

9/20/85 Acetone Beaker 1000 27.0355

9/20/85 1400 27.03566

9/20/85 1600 27.0355

9/24/85 Weighed Pan#

		1345	1600	9/25/85 1145
C-1	1.6616	1.6622	1.6608	1.6608
C-2	1.5501	1.5510	1.5510	
Filter #53	.1216	.1212	.1216	

Sample Recovery
Canyon Rock 85260 #47254
Computations

WATER Recovery & Impinger Catch

C-1 ~~TARE~~

FINAL	1.6608
TARE	1.3910
TOTAL	.2698g

H_2O	.2698 ok
Acetone	.1489 ok
Filter	.0136 ok
	.4323 ok
Correction	.0021 ok
	.4302 ok

Acetone WASH

C-2

FINAL	1.5510
TARE	1.4021
TOTAL	.1489

Correction

H_2O 510ml x .0003 = .00153gm ok

Acetone 292ml x .0002 = .00584gm

TOTAL .0021 ok

FILTER #53

FINAL	.1216
TARE	.1080
	.0136

WATER BEAKER
9/26/85
26.3275

Acetone BEAKER
9/26/85 9/27
27.0352

DATA NOT VALID
Wt determination in Range of Weighing tolerance

H_2O used in WASH & CHARGE

Charge	200
WASH	200
WASH	150
Trans	60
	510ml
	610 ml

10/1/85 RR

Acetone used in WASH

WASH	150
WASH	100
WASH	42
	292ml

9/24/85

CANYON ROCK TOTAL SAMPLING TIME COMPUTATION

West PORT	Run #1	RUN #2
W 8	3:25	3:25
W 7	2:35	2:35
W 6	2:35	2:35
W 5	2:35	2:35
W 4	2:35	2:35
W 3	2:35	2:35
W 2	4:14	:30
W 1	3:25	0:00
TOTAL	20:239.	13:230.

NORTH PORT	RUN #1	RUN #2
N-11	~~8:40~~ 7:40	7:40
N-10	3:25	3:25
N-9	1:44	1:44
N-8	:10	:10
N-7	:10	:10
TOTAL	11:129.	11:129.

CANYON ROCK TOTAL SAMPLING TIME COMPUTATION

EAST PORT	
E12	14:08
E11	10:00
E10	1:44
E9	1:44
TOTAL	26:96

SOUTH PORT	
S-11	14:08
S-10	3:28
S-9	:20
S-7	:20
	17:76

WEST PORT #1	20:239
#2	13:230
NORTH PORT #1	11:129
#2	11:129
EAST Port	26:96
SOUTH PORT	17:76
	98:899

899 seconds = 14:59 ok

98 minutes ok
14:59 ok
112:59 = 113 minutes
ok PCQ

SITE. Canyon Rock

TEST # 85260

Port * West

CYCLONIC FLOW

FIELD DATA WORK SHEET

Canyon Rock Asphalt

counterclockwise

DATE 9-17-85

POINT NUMBER	NULL ANGLE	SAMPLE ANGLE	COSINE SAMPLE ANGLE	NOMINAL # 10	SAMPLE TIME	Repeat sampling of port to get more coff. of sample
12	180	180	—	—	—	
11	155	155	—		—	
10	110	110	—		—	
9	91	91	—		—	
8	70	70	0.342		3'25"	3'25"
7	75	75	0.259		2'35"	2'35"
6	75	75	0.259		2'35"	2'35"
5	75	75	0.259		2'35"	2'35"
4	75	75	0.259		2'35"	2'35"
3	75	75	0.259		2'35"	2'35"
2	65	65	0.423		4'14"	4'14"
1	70	70	0.342		3'25"	3'25"

SITE. Canyon Rock

TEST # 85260

Port # North

CYCLONIC FLOW
FIELD DATA WORK SHEET

DATE 9-17-85

POINT NUMBER	NULL ANGLE	SAMPLE ANGLE	COSINE SAMPLE ANGLE	NOMINAL # 10	SAMPLE TIME	
12	30 ~~45~~	30 ~~45~~	0.866 ~~0.707~~		8' 40" ~~7' 04"~~	Turbulent @ sample neg ΔP
11	40	40	0.766		7' 40"	
10	70	70	0.342		3' 25"	
9	80	80	0.174		1' 44"	
8	89	89	0.0175		10"	
7	89	89	0.0175		10"	
6	100	100			—	
5	95	95			—	
4	105	105			—	
3	100	100			—	
2	110	110			—	
1	110	110			—	

SITE. Canyon Rock

TEST # 85260

PORT # East

CYCLONIC FLOW
FIELD DATA WORK SHEET

DATE 9-17-85

POINT NUMBER	NULL ANGLE	SAMPLE ANGLE	COSINE SAMPLE ANGLE	NOMINAL # 20	SAMPLE TIME	
12	45	45	0.707		14'.08"	
11	60	60	0.500		10'.0"	
10	85	85	0.087		1' 44"	
9	85	85	0.087		1'44"	
8	105	105			—	
7	105	105			—	
6	110	110			—	
5	110 ~~100~~	110 ~~100~~			—	
4	115	115			—	
3	115	115			—	
2	120	120			—	
1	120	120				

SITE. _____

TEST # ~~South~~ 85260

Port South

CYCLONIC FLOW

FIELD DATA WORK SHEET

DATE 9/17/85

POINT NUMBER	NULL ANGLE	SAMPLE ANGLE	COSINE SAMPLE ANGLE	NOMINAL # 20	SAMPLE TIME	
12	20	20	0.940		18 1/4 8"	Did not sample
11	45	45	0.707		14' 08"	
10	80	80	0.174		3' 24"	
9	89	89	0.0175		20"	
8	110	110			—	
7	89	89			20"	
6	100	100			—	
5	100	100			—	
4	100	100			—	
3	100	100			—	
2	110	110			—	
1	110	110			—	

270-8406

~~Paradise — lesue~~

~~BAY cities on desk~~

1/33 points

Canyon Rock
New entry points
10/2/88 (2)

W-8								
160	.060	1.00	83	77	3.0	63	70	
152			93.5	83.5		64.5		
144	.060	1.00	104	90	3.0	66	70	
W-7								
167	,090	1.5	96	78	0.0	66	75	
155		1.525	105	83.5	1.5	64.5		
143	1090	1.55	114	89	3.0	63	75	
W-6								
165	.110	1.85	98	79	0.0	65	75	
154.5	.115	1.95	92	84	1.75	64		
144	.120	2.05	116	89	3.5	63	75	
W5								
163	.140	2.4	102	80	0.0	68	75	
155.5			109.5	84	2.0	64.5		
148	.140	2.4	117	88	4.0	61	75	
W4								
165	.160	2.7	102	80	0.0	65	75	
162.5	.155		110.5	84	2.25	62.5		
160	.150	2.7	119	88	4.5	60	75	
W3								
163	.150	2.2	106	81	0.0	66	75	
161		2.35	112.5	84.5	2.75	63.5		
159	.150	2.5	119.	88	4.5	61	75	
W2								
159	.150	2.50	112	80	0.0	66	65	88%
	~~.135~~	~~2.275~~	~~115.5~~	~~84~~	~~2.25~~	~~63.5~~		
~~159~~	~~.120~~	~~2.05~~	~~119~~	~~88~~	~~4.5~~	~~61~~	~~65~~	12%

W1

159	.1030	.50	114.0	83	0.0	72	70

N11

148	.1020	.34	100	86	0.0	81	40
146.5			103			83	
145	.1020	.34	106	86	0.0	85	40

N10

147	.1060	1.0	108	83	0.0	81	70
	1055	.925	109.5	84.5		82	
147	1050	.85	111	86	0.0	83	70

N9

147	.080	1.35	108	85	0.0	80	80
148.5			110	86		79	
150	.080	1.35	112	87	0.0	78	80

N8

147	.080	1.35	108	85	0.0	80	89
152			110	86		82	
157	.080	1.35	112	87	0.0	84	89

N7

147	.080	1.35	108	85	0.0	80	89
152			110	86		82	
157	.080	1.35	112	87	0.0	84	89

SPECIAL EQUIPMENT:

CANYON ROCK ASPHALT.

1. NO A FRAMES
2. 9' RAIL
3. 7' PROBE
4. CLINEOMETER & POINTER
5. 0- .5" DWYER GAUGE
6. CONTACT KEN ATWELL @ 583-7611
7. SITE POTENTIALLY DANGEROUS,
   A) STACK RUSTED/SUPPORTS RUSTED OUT.
   B) CATWALK NARROW AND WITHOUT RETAINERS, POSSIBLE EQUIPMENT FALLING.
   C) EXHAUST GAS 5' FROM CATWALK SO ALL WORK MUST BE CROUCHING OR SITTING ON SIDE OF CATWALK.
   D) CHECK FOR LEAKS IN DUCTING FROM KILN DRYER TO SCRUBBER.
8. NOZZLE .312" (USED LAST)
9. NEW 48" STACK EXTENTION INSTALLED NO Need for New parts

CANYON ROCK DENNIS AKA U.R.

AIR POLLUTION CONTROL DEPARTMENT - COUNTY OF SAN DIEGO

ORSAT FIELD DATA

Test No. 85260

Date 9/17/85

Site Canyon Rock Asphalt

Leak Check

	%		1st Reading	2nd Reading	3rd Reading	4th Reading	5th Reading	Stable Reading
AMB AIR #	0	CO_2	0	0	0	0		0
	20.7	O_2	19.4	20.4	20.7	20.7		20.7
		CO						
AMPLE # E	2.4	CO_2	2.4	2.4				2.4
	16.5	O_2	18.3	18.9	18.9			18.9
		CO						
AMPLE # E	2.4	CO_2	2.4	2.4				2.4
	16.6	O_2	18.6	19.0	19.0			19.0
		CO						
AMPLE #		CO_2						
		O_2						
		CO						
AMPLE #		CO_2						
		O_2						
		CO						

SAMPLE # _____ AVERAGE ANALYSIS SAMPLE # _____

2.4	CO_2
16.6	O_2
	CO

	CO_2
	O_2
	CO

SDAPCD ST # W.R.D. 04-23-1982

Canyon Rock Asphalt

FILTER NO _____ NOZZLE DIA ____ in.
SAMPLE BOX NO _____
P. BARO ____ in.Hg. P.STACK ____ in.H2O

SAN DIEGO APCD
SAMPLE COLLECTION DATA

DATE 9/17/85 P6
TEST NO 85 260
OPERATOR _____

CHECKS	POINT NO.	STACK TEMP. °F	PITOT P in.H_2O	GAS METER H	GAS METER T_1	GAS METER T_2	GAS METER VAC	T_j °F	GAS VOL. FT.^{3}		CARD	α or $\%CO_2$
INITIAL	W 8	144	0.6	1.0	104	90	3.0	66	979.000		-	7.0
Pitot ___												
Thermo. ___	W 7	143	0.9	1.5	114	89	3.0	63	981.035		-	7.5
Train ___	W 6	144	1.2	2.0	116	89	3.5	63	982.725		-	7.5
INTERMEDIATE												
Pitot ___	W 5	148	1.4	2.4	117	88	4.0	61	984.560		-	7.5
Train												
	W 4	160	1.5	2.5	119	88	4.5	60	986.[illegible]		-	7.5
FINAL ___												
Pitot ___	W 3	159	1.5	2.5	119	88	4.5	61	988.375		-	7.5
Train												
1. Inadvertently stopped 45 2	W 2	159	1.2	2.0	119	88	4.5	61	988.800	30" only	-	6.5
	W 1										-	
											-	
											-	
DAPCD ST #53											-	
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											-	