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

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

AP42 Section: 11.1

Reference Number: 214

Title: Source Testing At Granite Construction, Pitchaco, CA,

BWE Associates, Inc., Medford, OR,

June 10, 1991.

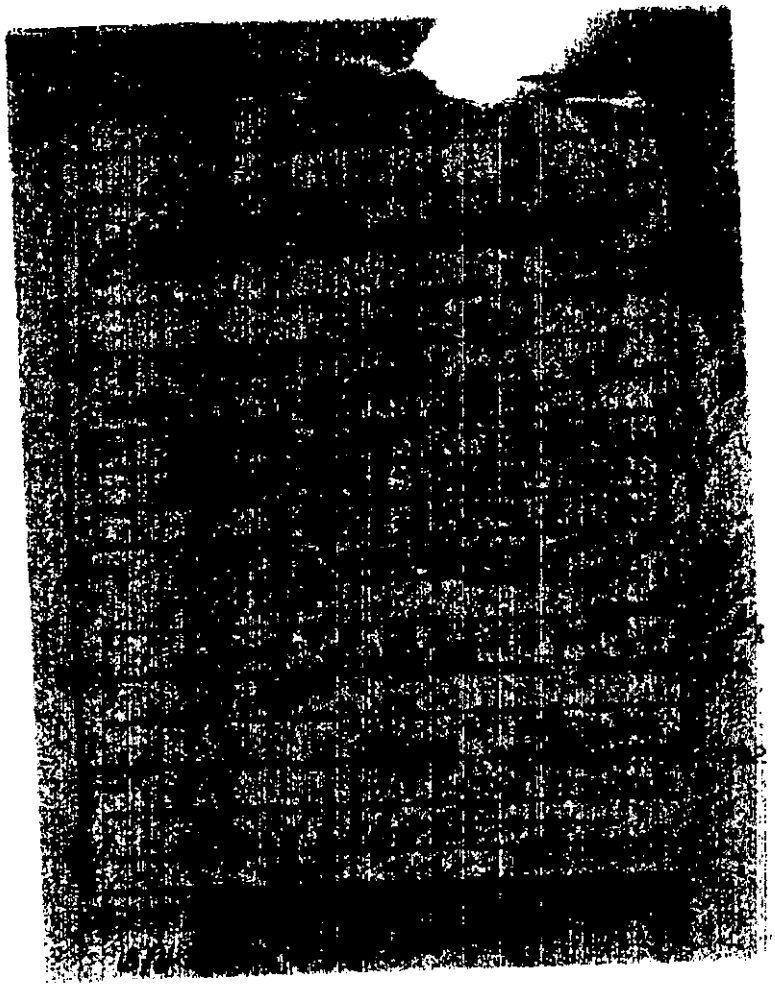
BWR ASSOCIATES, INC.

ENVIRONMENTAL CONSULTANTS

GRANITE CONSTRUCTION
Pitchaco, California

ASPHALT PAVING PLANT

June 10, 1991



N C.

920 MASON WAY ● MEDFORD, OREGON 97501-1343 ● (503) 779-2646

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1. CERTIFICATION SHEET

****

GRANITE CONSTRUCTION
Pitchaco, California

91-305P

I hereby certify that the sampling and analytical procedures and data presented in this report are authentic and accurate.

by: Mark W Bailey
Reviewed by

I hereby certify that the testing details and conclusions reported herein are, to the best of my knowledge, accurate and valid.

by: R. L. Martinez Jr.
BWR Associates, Inc.

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EMISSION TEST REPORT

GRANITE CONSTRUCTION
Pitchaco, California

ASPHALT PAVING PLANT

2. INTRODUCTION:

2.1. Test Purpose: The purpose of the test was to determine the status of compliance with air contaminant discharge limits as imposed by the operating permit for the source.

2.2. Test Location: The test location was in the discharge stack of the bag house serving the rotary mixer.

2.3. Test Dates: All field testing was performed on the tenth day of June, 1991 by BWR test personnel: Mark W. Bailey, Project Manager
H. Dan Nelson, Field Tech.
James A. Turcke, Field Tech.

2.4. Pollutants Tested: Test samples were obtained for the determination of the concentrations of particulate matter, sulfur dioxide ,carbon monoxide, oxides of nitrogen, and volatile organic compounds present in the exhaust gas stream. Measurements of oxygen and carbon dioxide were also taken.

2.5. Observers Names:

2.5.1. Agency Observers: Notified, but not present
2.5.2. Industry Observers: -Ray Johnson
Project Mngr., Granite Const.

-Ron Yoakum
Plant Mngr.,Granite Const.

2.6. Methods Utilized:

Particulate Matter- EPA 1-5
PM_{10}-Cascade Impactor
SO_x-EPA 6
CO-EPA 10
NO_x-EPA 7E
VOC-EPA 25A

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410 TPH

3. SUMMARY OF RESULTS:

3.1. Test Results:

Exhaust Parameters:	
Temperature - °F	274
Moisture - %	22
Velocity - fps	75
Flow Rate - dscfm	49000
Oxygen Conc. - % vol.	14.95
Carbon Dioxide Conc. - % vol.	3.52
Particulate Emissions:	
- gr/dscf	0.02
- lbs/hr	8.5
- % PM_{10}	100
Average Equivalent Opacity - %	5
Sulfur Dioxide - lbs/hr	2.2
Carbon Monoxide - ppm	54
- lbs/hr	11.6
Oxides of Nitrogen - ppm	55
- lbs/hr	19.4
Volatile Organic Compounds - ppm	53
- lbs/hr	6.5

rate

LIMIT 44,100 DSCFM CONDITION 5889 SECTION A-11 PARAGRAPH(1)

BACT = ≤ 0.01 gr/dscf

LIMIT ≤ 0.0191 gr/dscf LCND 5889 SECTION A-11 PARAGRAPH(2)

7½ hrs of operation @ 410 TPH to be [illegible]

3.2. Discussion: The proportion of particulate matter smaller than 10 microns in diameter (aerodynamic diameter) was determined by performing a full particle size distribution analysis at the highest velocity point within the traverse. Refer to appendix C for the distribution curves.

410TPH OPERATING

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3.3. Allowable Emissions:

As stipulated in the Authority to Construct, the allowable emissions from this source are:

-0.01 gr/dscf & 3.55 lbs/hr of particulate matter.
-Ringlemann 0.5 (10% opacity)

As stipulated in the USEPA Code of Federal Regulations 40, part 60.92 of subpart I, the allowable emissions from this source are:

-0.04 gr/dscf of particulate matter.
-20% opacity

As stipulated in the Authority to Construct, the allowable emissions from the facility on days in which Granite Construction is operating alone are:

CO: 200 pounds per day
NOx: 145 pounds per day
POC: 80 pounds per day
SO_2: 100 pounds per day
PM_{10}: 70 pounds per day
TSP: 90 pounds per day

3.4. Description of Collected Samples:

3.4.1. Filter Appearance: TAN
3.4.2. Impinger Catch Appearance: SLIGHTLY CLOUDY

3.5. Visible Emission Summary: Visible emissions were read at 5% equivalent opacity by Mark W. Bailey of BWR Assoc., Inc.. (See Appendix A for field data and documentation.)

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3.6. Quality Assurance Procedures: See Appendix E. All procedures presented outline the present quality assurance program being utilized by BWR Associates on all testing projects. There are no deviations from those procedures outlined in the EPA Quality Assurance Handbook Volume III which has been used as a guide for all forms and protocols.

3.6.1. Errors in Stack Sampling: Table 1 is taken from a paper entitled "Significance of Errors in Stack Sampling Measurements" by R.T. Shigahara, W.F. Todd, and W.S. Smith. It summarizes the maximum error expressed in percent which may be introduced into the test procedures by equipment or instrument limitations. In practice, BWR Associates has been able to consistently reproduce results from steady state operations within less than 5% variation between sequential tests and at less than 3% variation between simultaneous tests.

3.6.2. Reproducibility of Data: There is no published information or statistical analyses of EPA Method 5 tests which establish a range of expected results in a series of samples. As discussed in a March 1989 telecon between R.T. Shigahara (E.P.A.) and Eugene A. Wellman (BWR Associates, Inc.), the EPA conducted tests a number of years ago on incinerators, for which blank values of approximately 5 mg were found with average filter catches of about 40 mg. This is approximately a 12.5% deviation.

The generally accepted confidence range among sampling professionals is +/- 10%. Consultation with other experienced testers indicates that data should be reproducible within this range of +/- 10%, having filter catches of 50 mg or more.

In 1987 BWR Associates examined a year's data on Method 5 tests and by regression analysis concluded that the expected deviation of samples was 0.007 gr/dscf. This was an in-house study and has not yet been released. However, it seems to verify other unpublished studies claiming an error range of +/- 10% for Method 5 test results with sample catches between 40 & 100 mg.

TABLE 1: ERRORS IN STACK SAMPLING

Measurement	%Max Error
Stack Temperature Ts	1.40
Meter Temperature Tm	1.00
Stack Gage Pressure Ps	0.42
Meter Gage Pressure Pm	0.42
Atmospheric Pressure Patm	0.21
Dry Molecular Weight Md	0.42
Moisture Content Bws (Absolute)	1.10
Pressure Head Delta P	10.00
Orifice Pressure Differential Delta H	5.00
Pitot Tube Coefficient Cp	2.40
Orifice Meter Coefficient Km	1.50
Diameter of Probe Nozzle Dn	0.80

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GAS INSTRUMENT DRIFT AND BIAS

		RUN 1	RUN 2	RUN 3
CARBON MONOXIDE (CO)				
Instrument Range	4000			
Response Time	25			
System Calibration Response	240			
Calibration Error - %		0.00	-0.05	0.03
Zero Drift - %		0.08	0.15	0.05
Upscale Drift - %		-0.20	-0.10	0.23
System Calibration Bias - %	-0.08			
OXIDES OF NITROGEN (NOx)				
Instrument Range	500			
System Calibration Response	92			
Calibration Error - %		-0.02	0.02	-0.04
Zero Drift - %		0.20	1.06	1.92
Upscale Drift - %		0.98	1.18	1.12
System Calibration Bias - %	-0.14			
TOTAL HYDROCARBONS (THC)				
Instrument Range	400			
System Calibration Response	101			
Calibration Error - %		0.18	-0.02	0.07
Zero Drift - %		1.35	2.05	-0.70
Upscale Drift - %		-0.10	0.25	-1.00
System Calibration Bias - %	0.00			
OXYGEN (O2)				
Instrument Range	19.99			
System Calibration Response	9			
Calibration Error - %		0.00	-0.05	0.05
Zero Drift - %		-1.15	-0.45	-0.20
Upscale Drift - %		-0.20	-0.70	1.30
System Calibration Bias - %	-0.05			
CARBON DIOXIDE (CO2)				
Instrument Range	20			
System Calibration Response	15			
Calibration Error - %		-0.10	0.05	-0.10
Zero Drift - %		0.10	0.10	0.15
Upscale Drift - %		0.20	0.65	0.45
System Calibration Bias - %	-0.50			

CLIENT: GRANITE CONST.
JOB #: 91-305P
SOURCE: DRUM MIX
DATE: JUNE 10, 1991

BWR ASSOCIATES
PLANT: Granite Const.
SOURCE: Drum Mix A.C. Plant
LOCATION: Pitchaco, CA

GAS INSTRUMENT DATA SHEET
DATE: 6/4/91
JOB #: 91-305P
RUNS 1 TO 3

OPERATOR: HDN

CARBON MONOXIDE (CO)

SPAN: 4000 CAL. GAS CONC. 243.1 SYSTEM CALIBRATION: 240
RESPONSE TIME (90%) 218.8 :Z→U: 25 Sec (10%) 24.3 :U→Z: 25 Sec
ALLOWABLE LIMITS:
CALIBRATION ERROR (±2%) -80 TO 80 AND 163.1 TO 323.1
ZERO DRIFT (±3%) -120 TO 120
UPSCALE DRIFT (±3%) 123.1 TO 363.1
SYSTEM CAL. BIAS (±5%) 43.1 TO 445.1

OXIDES OF NITROGEN (NOx)

SPAN: 500 CAL. GAS CONC. 92.6 SYSTEM CALIBRATION: 92
ALLOWABLE LIMITS:
CALIBRATION ERROR (±2%) -10 TO 10 AND 82.6 TO 102.6
ZERO DRIFT (±3%) -15 TO 15
UPSCALE DRIFT (±3%) 77.6 TO 107.6
SYSTEM CAL. BIAS (±5%) 67.6 TO 117.6

SULFUR DIOXIDE (SO2)

SPAN: N/A CAL. GAS CONC. — SYSTEM CALIBRATION: —
ALLOWABLE LIMITS:
CALIBRATION ERROR (±2%) — TO — AND — TO —
ZERO DRIFT (±3%) — TO —
UPSCALE DRIFT (±3%) — TO —
SYSTEM CAL. BIAS (±5%) — TO —

TOTAL HYDROCARBONS (THC)

SPAN: 400 CAL. GAS CONC. 101.7 SYSTEM CALIBRATION: 101
ALLOWABLE LIMITS:
CALIBRATION ERROR (±2%) -8 TO 8 AND 93.7 TO 109.7
ZERO DRIFT (±3%) -12 TO 12
UPSCALE DRIFT (±3%) 89.7 TO 113.7
SYSTEM CAL. BIAS (±5%) 81.7 TO 121.7

OXYGEN (O2)

SPAN: 19.99 CAL. GAS CONC. 9.01 SYSTEM CALIBRATION: 9.0
ALLOWABLE LIMITS:
CALIBRATION ERROR (±2%) -.4 TO .4 AND 8.61 TO 9.41
ZERO DRIFT (±3%) -.6 TO .6
UPSCALE DRIFT (±3%) 8.41 TO 9.61
SYSTEM CAL. BIAS (±5%) 8.01 TO 10.01

CARBON DIOXIDE (CO2)

SPAN: 20 CAL. GAS CONC. 15.08 SYSTEM CALIBRATION: 15.0
ALLOWABLE LIMITS:
CALIBRATION ERROR (±2%) -.4 TO .4 AND 14.68 TO 15.48
ZERO DRIFT (±3%) -.6 TO .6
UPSCALE DRIFT (±3%) 14.48 TO 15.68
SYSTEM CAL. BIAS (±5%) 14.08 TO 16.08

8. APPENDIX C: PARTICLE SIZE DISTRIBUTIONS

8.1. Particle Size Distributions

8.1.1. Calculations
8.1.2. Distribution Curves

8.2. Field Data

8.3. Laboratory Analysis

8.4. Calibration Curves

8.4.1. Cutter Nozzle
8.4.2. Impactor Stages

DATA ANALYSIS SHEET FOR CASCADE IMPACTOR

SAMPLE I.D.: RUN 1

FLOW RATE ACFM	IMPACTOR STAGE	STACK TEMP F	Dp50 @ 70 F	VISCOSITY CORRECTION FACTOR	ACTUAL Dp50	
1.608	CUT. NOZ.	278.8	6.58	1.125	7.40	
1.608	PREIMPACT	278.8	6.16	1.125	6.93	
1.608	1	278.8	3.90	1.125	4.39	
1.608	2	278.8	2.43	1.125	2.74	2.5 0.24
1.608	3	278.8	1.55	1.125	1.74	0.76
1.608	4	278.8	0.94	1.125	1.06	1.0 0.06
1.608	5	278.8	0.60	1.125	0.68	0.32
1.608	6	278.8	0.37	1.125	0.42	
1.608	7	278.8	0.21	1.125	0.24	

TOTAL CATCH WEIGHT: 0.0773

IMPACTOR STAGE	TARE WEIGHT	FINAL WEIGHT	NET WEIGHT	CUMULATIVE % LESS THAN	
CUT. NOZ.	99.0163	99.0284	0.0121	84.3	
PREIMPACT	97.8005	97.8075	0.007	75.3	
1	1.9165	1.9270	0.0105	61.7	
2	1.9032	1.9100	0.0068	52.9	50.1% ≤ 2.5 um (Linear interp.)
3	1.9091	1.9180	0.0089	41.4	
4	1.9155	1.9200	0.0045	35.6	33.9% ≤ 1 um (Linear interp.)
5	1.9156	1.9240	0.0084	24.7	
6	1.9087	1.9170	0.0083	14.0	
7	1.9176	1.9280	0.0104	0.5	
BACKUP	2.6219	2.6223	0.0004		

CLIENT: GRANITE CONST.
JOB #: 91-305P
SOURCE: DRUM MIX
DATE: JUNE 10, 1991

DATA ANALYSIS SHEET FOR CASCADE IMPACTOR

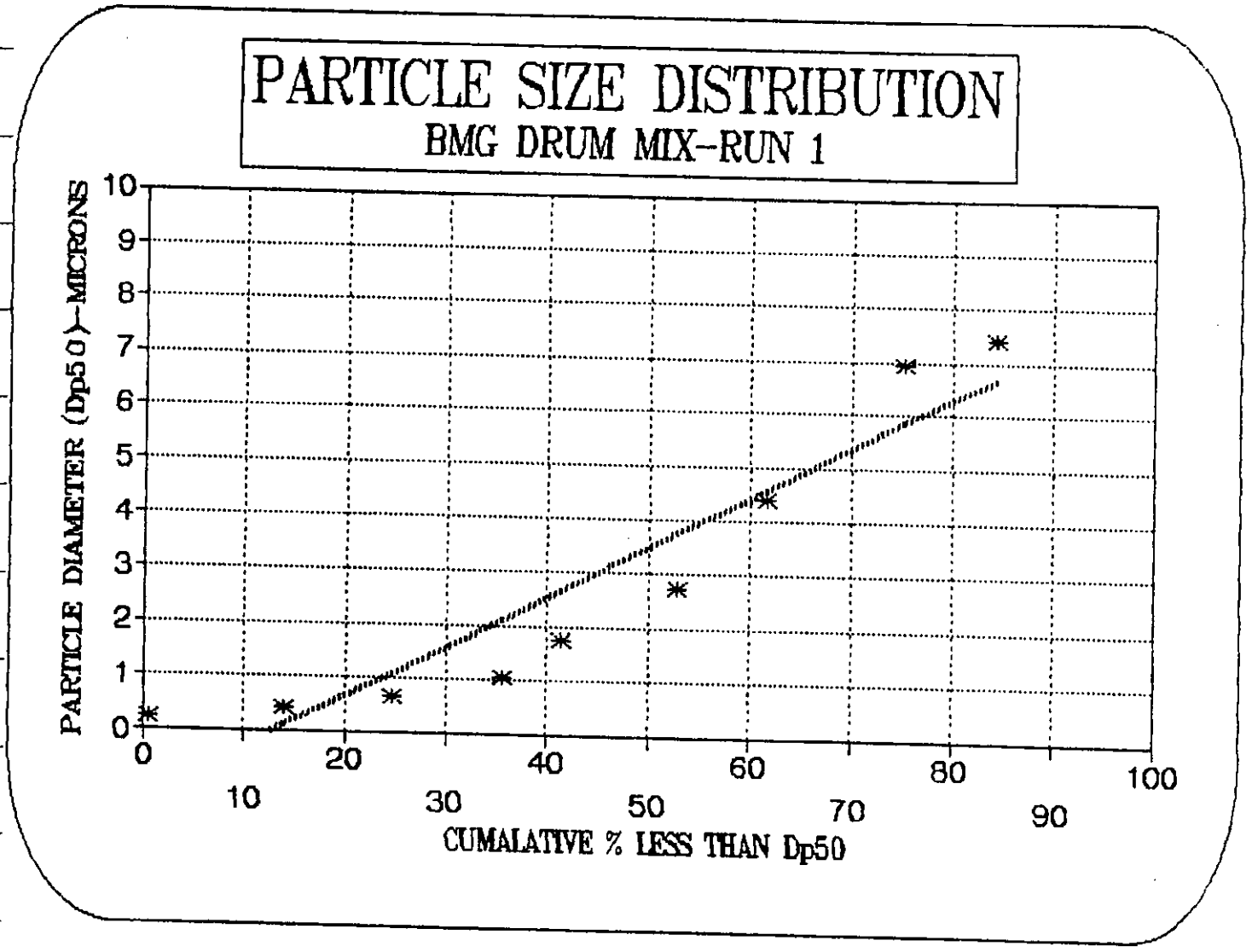
SAMPLE I.D.: RUN 2

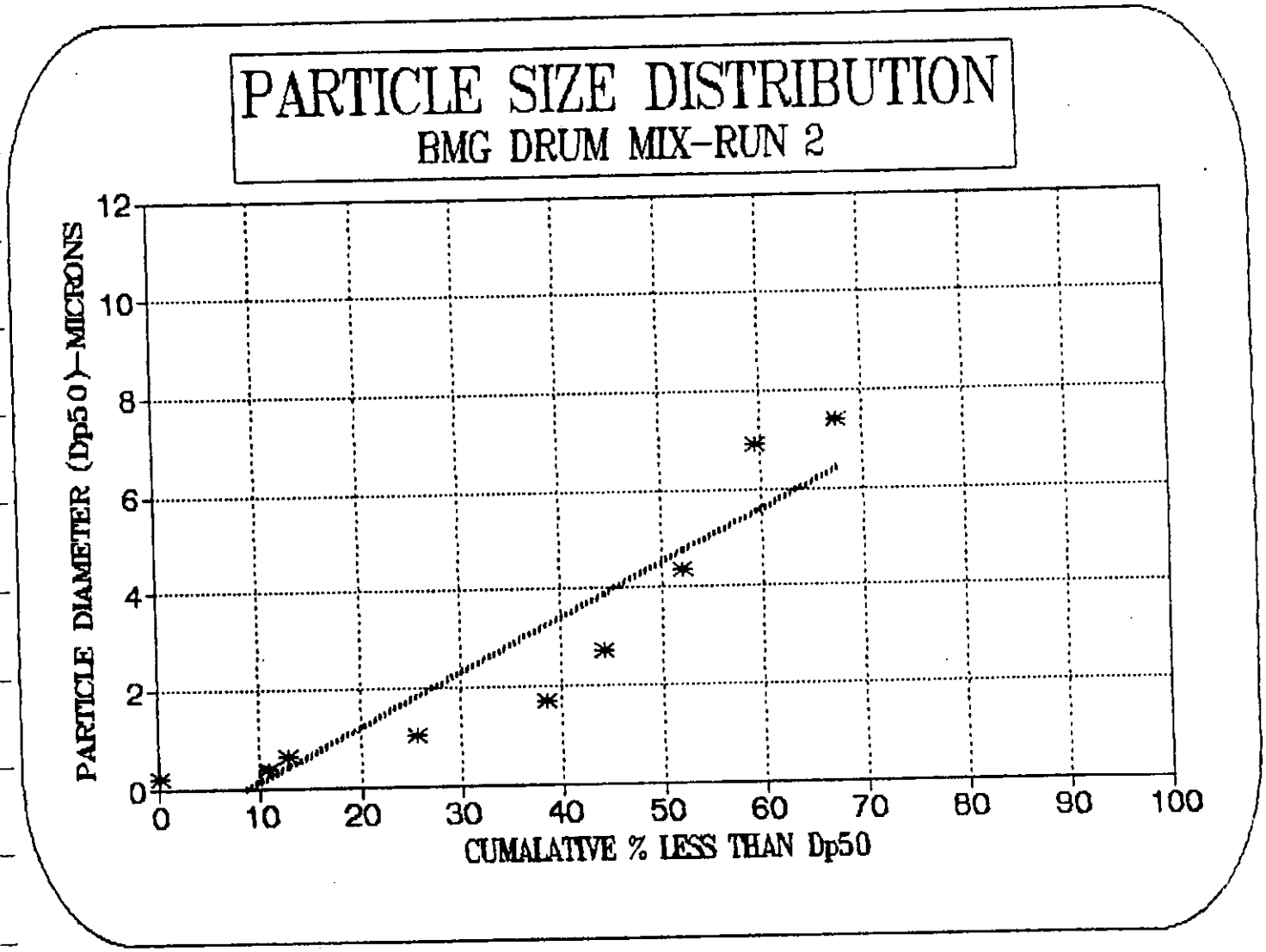
FLOW RATE ACFM	IMPACTOR STAGE	STACK TEMP F	Dp50 @ 70 F	VISCOSITY CORRECTION FACTOR	ACTUAL Dp50	
1.617	CUT. NOZ.	276	6.56	1.12	7.35	
1.617	PREIMPACT	276	6.14	1.12	6.88	
1.617	1	276	3.89	1.12	4.36	
1.617	2	276	2.43	1.12	2.72	2.5 0.22
1.617	3	276	1.54	1.12	1.73	0.77
1.617	4	276	0.94	1.12	1.05	1.0 0.05
1.617	5	276	0.60	1.12	0.67	0.33
1.617	6	276	0.37	1.12	0.42	
1.617	7	276	0.21	1.12	0.24	

TOTAL CATCH WEIGHT: 0.081

IMPACTOR STAGE	TARE WEIGHT	FINAL WEIGHT	NET WEIGHT	CUMULATIVE % LESS THAN
CUT. NOZ.	108.9724	108.9986	0.0262	67.7
PREIMPACT	95.5257	95.5323	0.0066	59.5
1	1.9041	1.91	0.0059	52.2
2	1.9116	1.9181	0.0065	44.2 — 42.9% ≤ 2.5 μm (linear interp)
3	1.919	1.9236	0.0046	38.5
4	1.9196	1.93	0.0104	25.7 — 24.0% ≤ 1.0 μm (linear interp.)
5	1.9125	1.9229	0.0104	12.8
6	1.896	1.8976	0.0016	10.9
7	1.9	1.9086	0.0086	0.2
BACKUP	2.6132	2.6134	0.0002	

CLIENT: GRANITE CONSTRUCTION
JOB #: 91-305P
SOURCE: DRUM MIX
DATE: JUNE 10, 1991


PARTICLE SIZE DISTRIBUTION
BMG DRUM MIX-RUN 1
PARTICLE DIAMETER (Dp50)-MICRONS
0
1
2
3
4
5
6
7
8
9
10
0
10
20
30
40
50
60
70
80
90
100
CUMALATIVE % LESS THAN Dp50


PARTICLE SIZE DISTRIBUTION
BMG DRUM MIX-RUN 2
PARTICLE DIAMETER (Dp50)-MICRONS
0
2
4
6
8
10
12
0
10
20
30
40
50
60
70
80
90
100
CUMALATIVE % LESS THAN Dp50

FIELD DATA SHEET

DATE: 6-11-91

JOB #: 91-3057
PLANT: Granite Const
LOCATION: Salinas, CA
SOURCE: Drum Mix HCP
DUCT DIMENSION(S): 48x48
RUN #: 2 PM10
START: 1500
FINISH: 1520
dH FACTOR: 3.32

C.U. #: 3
dH@: 1.72
Y: 1.00

THERMOMETER #: E

D.B. 276 W.B. 157

PROBE #: 3
Cp: .84

NOZZLE #: NA
DIAMETER: 2.03

BAROMETRIC PRESSURE: 29.60
STATIC PRESSURE: -.03
EXHAUST PRESSURE: 29.58
ESTIMATED MOISTURE: 2 2%

LEAK CHECK
SYSTEM INITIAL: cfm @ "Hg
FINAL: cfm @ "Hg
PITOT INITIAL:
FINAL:

CONTROL UNIT OPERATOR: HDN

POINT NO.	TIME MIN.	METER VOL. (dcf)	dP "H2O	dH "H2O	TEMPERATURE (F) METER IN	METER OUT	STACK	BOX	IMP	VAC "Hg	O2 (%)	CO2 (%)	dH
Start		43.20	****	***	**	**	***	**	***	***	***	***	***
1	5	48.0	1.25	3.32	88	86	276		18	"			2.7
2	10	52.6	1.25	3.32	90	86	276			"			2.7
3	15	57.3	1.25	3.32	100	90	276			"			2.7
4	20	61.952	1.25	3.32	100	90	276			"			2.7
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													

AVERAGE OF PARAMETERS AVG. 1.25 94.5 88.0 276 ~~2.70~~ 2.70

Vm, dcf: 18.752

IMPINGER CONDENSATE:
IMPINGER #1: N/A ml
IMPINGER #2: N/A ml
IMPINGER #3: N/A ml
TOTAL VOL.: N/A ml
NET VOL. (TOTAL - 200): N/A ml
SILICA GEL:
GROSS: N/A g.
TARE: N/A g.
NET: N/A g.
TOTAL CONDENSATE (Vlc): N/A ml

SAMPLE IDENTIFICATION AND DESCRIPTION
FILTER ID#: N/A FILTER APPEARANCE: N/A
IMPINGER CATCH APPEARANCE: N/A
BACK HALF CONTENTS/H2O WASH ID #: N/A
BACK HALF ACETONE WASH ID #: N/A
~~FRONT HALF ACETONE WASH ID #:~~ G.C. PM10 SEP #2
~~CUPPER BOTTLE ACETONE WASH ID #:~~ G.C PM10 #2

WATER #: ~~306~~ VOL. 200 ml CHARGE
100 ml BACK
ACETONE #: 306 VOL. 100 ml FRONT
N/A ml BACK

SAMPLES RECOVERED BY: MWB LAB DATE: BY:

$$\text{Sample Flow (acfm)} = \frac{\frac{18.752}{20} \times \frac{(276+460)}{(29.58)} \times \frac{29.80}{(91.2+460)}}{(1-Mc)} = 1.617$$

FIELD DATA SHEET

DATE: 6/11/91

JOB #: 91-305P
PLANT: Granite Cement
LOCATION: Richmond, CA
SOURCE: Drum mix Plant
DUCT DIMENSION(S): 53" x 53"
RUN #: PM10 Run #1
START: 1310
FINISH: 1330
GR FACTOR:

C.M. #: 3
dHa: 1.72
Y: 1.00

THERMOMETER #: E

B.B. 275 W.B. 157

PROBE #: 3
Cp: .84

NOZZLE #: AA
DIAMETER: .2703

BAROMETRIC PRESSURE: 29.6
STATIC PRESSURE: -0.3
EXHAUST PRESSURE: 29.58
ESTIMATED MOISTURE: 24%

LEAK CHECK
SYSTEM INITIAL: cfm @ "Hg
FINAL: cfm @ "Hg
PITOT INITIAL:
FINAL:

CONTROL UNIT
OPERATOR: HDW

POINT NO.	TIME MIN.	METER VOL. (dcf)	dP "H2O	dH "H2O	TEMPERATURE (F) METER IN	METER OUT	STACK	BOX	IMP	VAC "Hg	O2 (%)	CO2 (%)	dH
Start		24.300											
1	5	29.7	1.50	2.90	88	86	275			"			2.90
2	10	33.7	1.50	2.70	94	86	280			"			2.70
3	15	38.3	1.50	2.80	100	90	280			"			2.60
4	20	42.933	1.50	2.60	104	94	280			"			2.60
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
AVERAGE OF PARAMETERS			AVG. 1.50		96.5	89.0	278.8						2.70

Vm, dcf: 18.633

IMPINGER CONDENSATE:
IMPINGER #1: N/A ml
IMPINGER #2: N/A ml
IMPINGER #3: N/A ml
TOTAL VOL.: N/A ml
NET VOL. (TOTAL - 200): N/A ml
SILICA GEL:
GROSS: N/A g.
TARE: N/A g.
NET: g.
TOTAL CONDENSATE (Vlc): ml

SAMPLE IDENTIFICATION AND DESCRIPTION
FILTER ID#: N/A FILTER APPEARANCE: N/A
IMPINGER CATCH APPEARANCE: N/A
BACK HALF CONTENTS/H2O WASH ID #:
BACK HALF ACETONE WASH ID #:
FRONT HALF ACETONE WASH ID #: GC# PRESSER
CUTTER NOZZLE ACETONE WASH ID #: GC# PM10

WATER #: VOL. 200 ml CHARGE
100 ml BACK
ACETONE #: 206 VOL. 100 ml FRONT
ml BACK

SAMPLES RECOVERED BY: WWB

LAB DATE: BY:

$$\text{Sample Flow Rate (acfm)} = \frac{\frac{18.633}{20} \times \frac{(278.8+460)}{(29.58)} \times \frac{(29.60)}{(92.75+460)}}{(1-0.22)} = 1.608$$

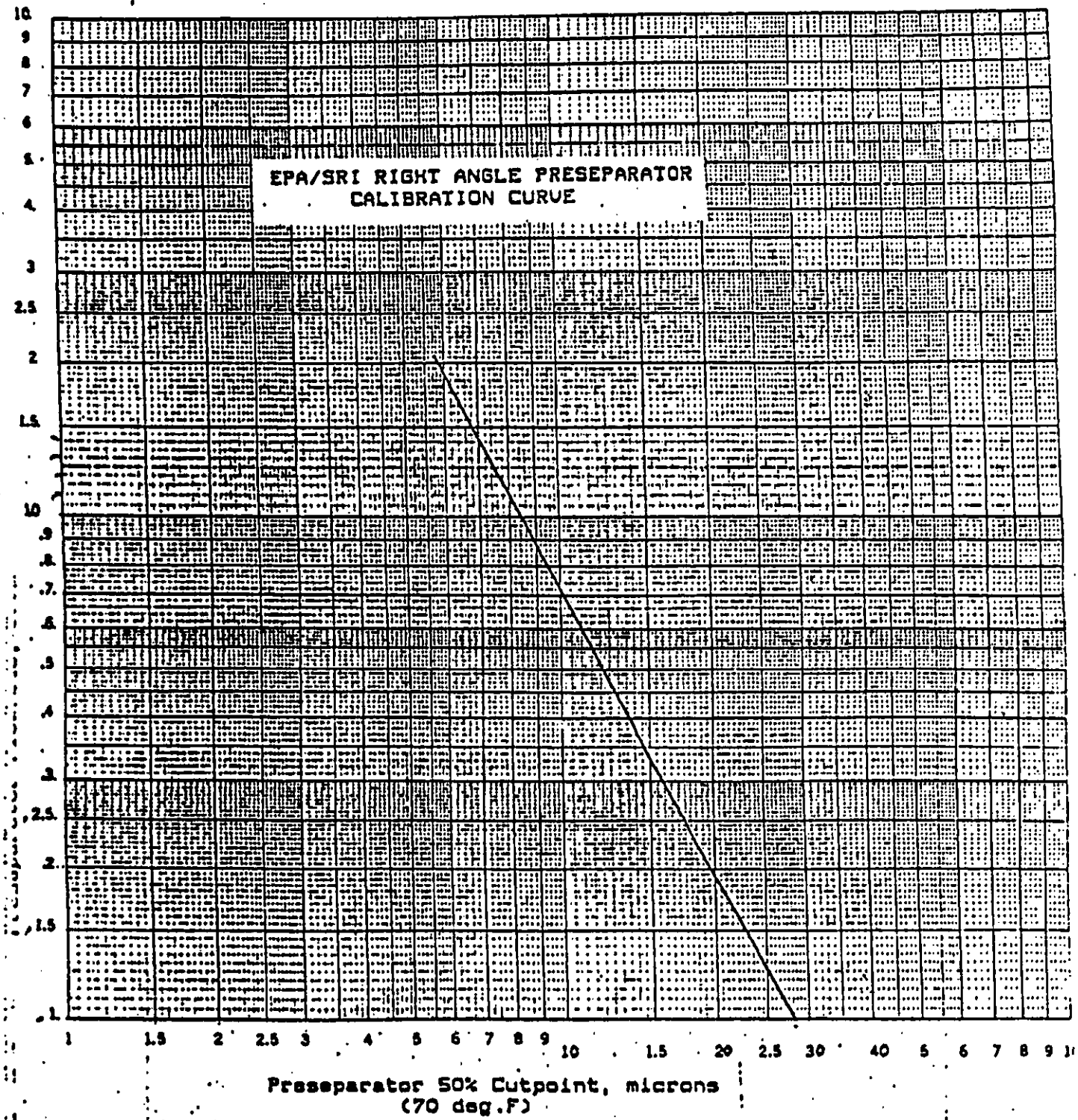
LABORATORY ANALYSIS DATA FORM

PLANT: GRANITE CONSTRUCTION
LOCATION: PITCHACO, CA
PROJ. #: 91-305P
REF. WT. =100.0001

SAMPLE DATE: 06/10/91
REC'D IN LAB: 06/14/91
FINAL WTS.: 06/19/91

SOURCE: ASPHALT PLANT

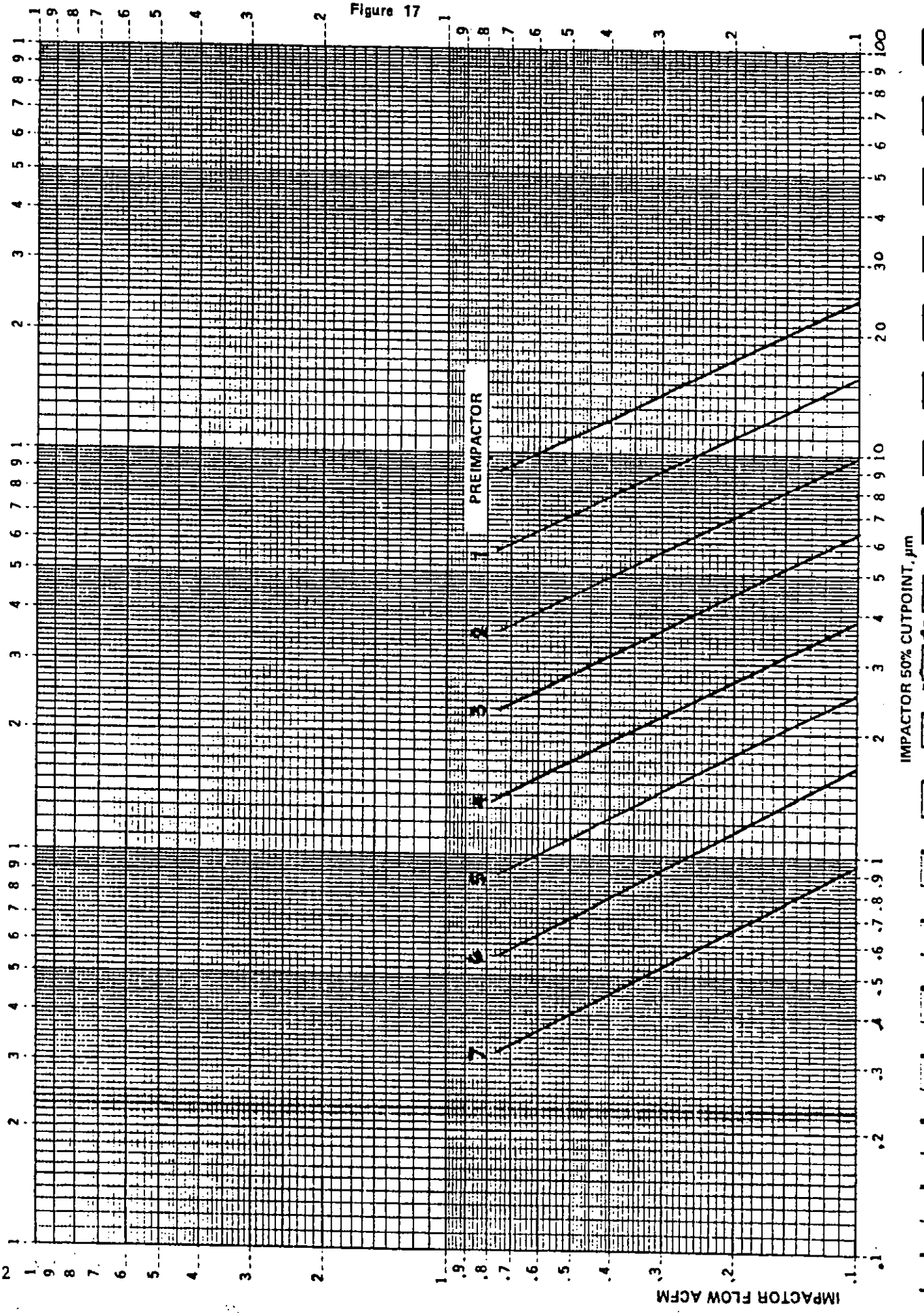
	RUN 1	RUN 2
NOZZLE:		
BEAKER #:	31	15
BEAKER GROSS g:	99.0285	108.9987
BEAKER TARE g:	99.0163	108.9724
NET g:	0.0122	0.0263
FILTER #:	11	31
GROSS g:	1.9270	1.9100
TARE g:	1.9165	1.9041
NET g:	0.0105	0.0059
FILTER #:	12	32
GROSS g:	1.9100	1.9181
TARE g:	1.9032	1.9116
NET g:	0.0068	0.0065
FILTER #:	13	33
GROSS g:	1.9180	1.9236
TARE g:	1.9091	1.9190
NET g:	0.0089	0.0046
FILTER #:	14	34
GROSS g:	1.9200	1.9300
TARE g:	1.9155	1.9196
NET g:	0.0045	0.0104
FILTER #:	15	35
GROSS g:	1.9240	1.9229
TARE g:	1.9156	1.9125
NET g:	0.0084	0.0104
FILTER #:	16	36
GROSS g:	1.9170	1.8976
TARE g:	1.9087	1.8960
NET g:	0.0083	0.0016
FILTER #:	17	37
GROSS g:	1.9280	1.9086
TARE g:	1.9176	1.9000
NET g:	0.0104	0.0086
BACK-UP FILTER#	617	619
GROSS g:	2.6223	2.6134
TARE g:	2.6219	2.6132
NET g:	0.0004	0.0002
CATCH g:	0.0704	0.0745
WASH:		
BEAKER #:	64	51
GROSS g:	97.8076	95.5324
TARE g:	97.8005	95.5257
NET g:	0.0071	0.0067
ACETONE BLK g:	0.0003	0.0003
TOTAL WT. g:	0.0772	0.0809

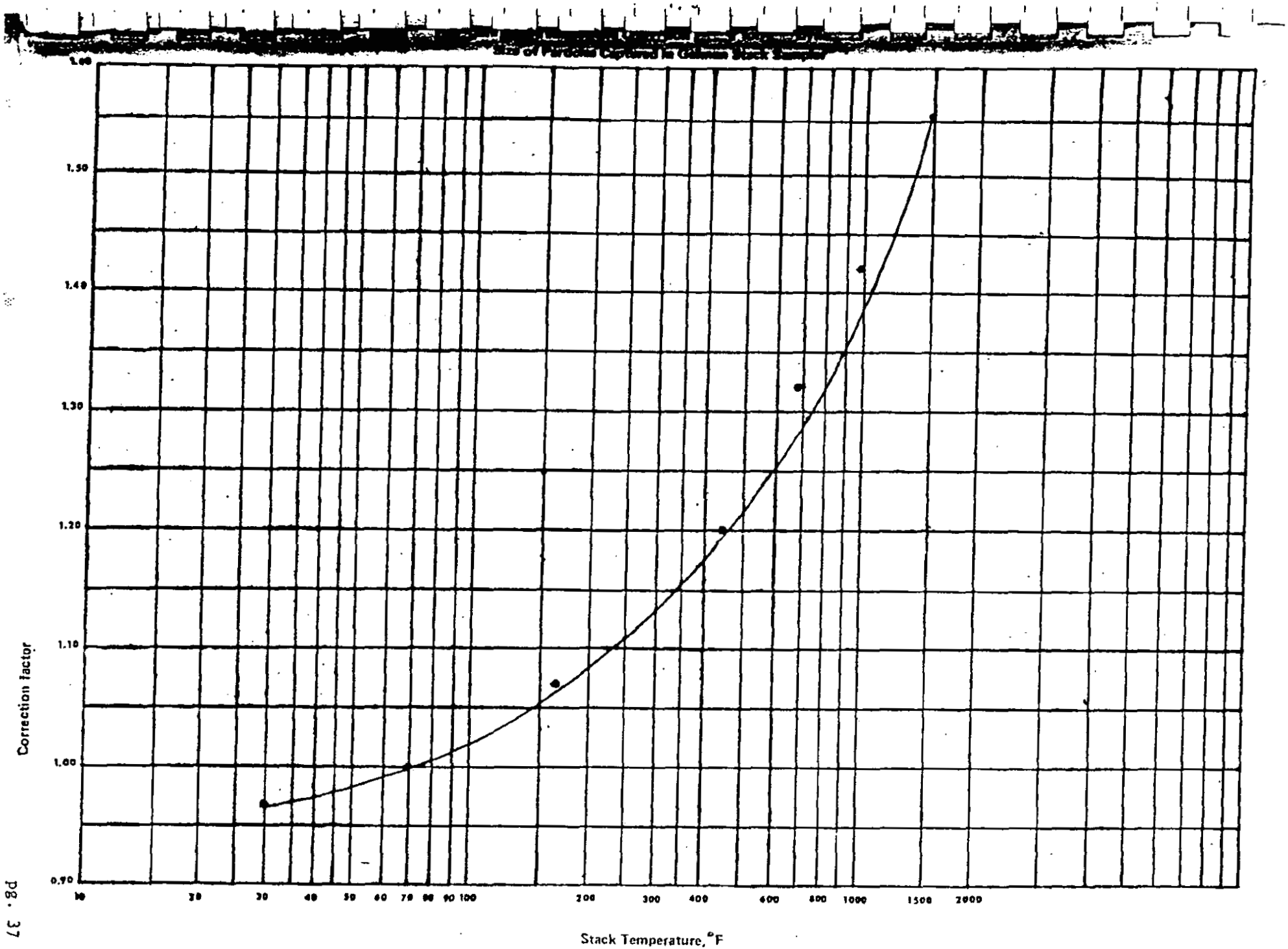


$$Q_{presep} = 10^{\left[-1.922 \log x + 1.77933\right]}$$

$$x = 10^{\left(\frac{\log y - 1.77933}{-1.922}\right)}$$

Figure 17


PREIMPACTOR
1
2
3
4
5
6
7
IMPACTOR 50% CUTPOINT, µm
IMPACTOR FLOW ACFM


Size of Particles Captured in Gelman Stack Sampler
1.60
1.50
1.40
1.30
1.20
1.10
1.00
0.90
Correction factor
10
20
30
40
50
60
70
80
90
100
200
300
400
600
800
1000
1500
2000
Stack Temperature, °F

9. APPENDIX D: PRODUCTION, CALIBRATION AND QUALITY ASSURANCE

9.1. Production Certification

9.2. Calibration Data

- 9.2.1. Nozzle
- 9.2.2. Thermometer/Thermocouple(s)
- 9.2.3. Pitot Tube(s)
- 9.2.4. Volume Meter
- 9.2.5. Gas Instrument Linearity Graphs

9.3. Quality Assurance

- 9.3.1. Sample Train Schematic
- 9.3.2. Continuous Gas Analysis Schematic

920 MASON WAY ● MEDFORD, OREGON 97501-1343 ● (503) 779-2646

PRODUCTION CERTIFICATION AND INFORMATIONAL SHEET

PROJECT NUMBER: 91 - 305P

I hereby certify that the following exhibits, related to plant operation during the testing procedures, are accurate and valid to the best of my knowledge.

Unless specifically requested in advance, and approved by BWR, three (3) copies of the report will be sent to the client within twenty one (21) days after completion of testing.

Site Representative: Mark W. Bailey
Signature

Name (please print): Mark W. Bailey *

Title: Test Manager

REPORTS TO BE SENT TO:

Name of Company: _____

Attn: _____

Mailing Address: _____

UPS Street address: _____

City, State, Zip: _____

* Production rate based on computer setting for aggregate feed (390 T/hr) and 4.9% by weight of Asphalt added. Feed rate does vary continuously by 5 T/hr.

EPA SAMPLE NOZZLE

IDENTIFICATION AND CALIBRATION

IDENTIFICATION

NOZZLE ID#:	G
JOB #:	91-305P
DATE:	6/10/91
CALIBRATED BY:	HDN

CALIBRATION

DIAMETER #	INSIDE DIAMETER (")
I	0.243
II	0.243
III	0.243
AVERAGE	0.2430

DIFFERENCE BETWEEN LARGEST AND SMALLEST MEASUREMENTS

ALLOWABLE 0.004 INCHES

ACTUAL 0.000 INCHES

THERMOMETER AND THERMOCOUPLE

IDENTIFICATION AND CALIBRATION

IDENTIFICATION

THERMOMETER ID #:	E
THERMOCOUPLE ID #:	6
JOB #:	91-305P
DATE:	6/19/91
CALIBRATED BY:	BDW

CALIBRATION

AVG. EXHAUST TEMPERATURE-F.: 271.8

RANGE OF CALIBRATION-10% ABS.,F. 199 TO 345

READING	REFERENCE THERMOMETER F	TEST THERMOMETER F
I	210	211
II	264	267
III	325	329
AVERAGE-F.	266.3	269.0

PERCENT DIFFERENCE OF ABSOLUTE READINGS:

ALLOWABLE	1.5 %
ACTUAL	0.4 %

THERMOMETER AND THERMOCOUPLE

IDENTIFICATION AND CALIBRATION

IDENTIFICATION

THERMOMETER ID #:	E
THERMOCOUPLE ID #:	11
JOB #:	91-305P
DATE:	6/19/91
CALIBRATED BY:	BDW

CALIBRATION

AVG. EXHAUST TEMPERATURE-F.: 277.1

RANGE OF CALIBRATION-10% ABS.,F. 203 TO 351

READING	REFERENCE THERMOMETER F	TEST THERMOMETER F
I	221	221
II	270	274
III	331	336
AVERAGE-F.	274.0	277.0

PERCENT DIFFERENCE OF ABSOLUTE READINGS:

ALLOWABLE	1.5 %
ACTUAL	0.4 %

MULTI-VELOCITY "S" TYPE PITOT TUBE CALIBRATION WORKSHEET

PITOT/PROBE ASSEMBLY #	6	DATE	5/22/91
EFFECTIVE LENGTH- in.	57	CALIBRATOR	BDW
FACE-OPENING ALIGNMENTS	OK	MANOMETER LEAK CHECK	OK

VELOCITY DETERMINATION DATA

FAN SETTING	I	II	III	IV
EXHAUST GAS TEMPERATURE- F.	60	60	60	60
BAROMETRIC PRESSURE- "Hg	28.96	28.96	28.96	28.96
STATIC PRESSURE- "H2O	1.55	1.25	0.72	-0.09
ABSOLUTE EXHAUST GAS PRESSURE- "Hg	29.07	29.05	29.01	28.95
MOLECULAR WEIGHT OF EXHAUST GAS	28.73	28.73	28.73	28.73
CALIBRATION VELOCITY- fpm	981	2004	3307	4835

CALIBRATION DATA

FAN SETTING	SIDE "A" dP(std)	SIDE "A" dP(s)	SIDE "A" Cp	SIDE "B" dP(std)	SIDE "B" dP(s)	SIDE "B" Cp
	0.060	0.085	0.8318	0.060	0.087	0.8222
I	0.060	0.086	0.8263	0.060	0.087	0.8222
	0.060	0.085	0.8318	0.060	0.087	0.8222
AVG.	0.0600	0.0853	0.8301	AVG. 0.0600	0.0870	0.8222
	0.250	0.349	0.8379	0.250	0.355	0.8308
II	0.250	0.349	0.8379	0.250	0.355	0.8308
	0.250	0.350	0.8367	0.250	0.357	0.8285
AVG.	0.2500	0.3493	0.8375	AVG. 0.2500	0.3557	0.8300
	0.680	0.920	0.8511	0.680	0.930	0.8465
III	0.680	0.923	0.8497	0.680	0.935	0.8443
	0.680	0.924	0.8493	0.680	0.935	0.8443
AVG.	0.6800	0.9223	0.8501	AVG. 0.6800	0.9333	0.8450
	1.450	1.890	0.8671	1.450	1.910	0.8626
IV	1.450	1.890	0.8671	1.450	1.915	0.8615
	1.450	1.900	0.8649	1.450	1.910	0.8626
AVG.	1.4500	1.8933	0.8664	AVG. 1.4500	1.9117	0.8622

MAXIMUM DIFFERENCE BETWEEN Cp AVERAGES OF SIDES "A" & "B" AT ANY GIVEN FAN SETTING:

ALLOWABLE= 0.01
DIFFERENCE= 0.0080

MAXIMUM AVERAGE DEVIATION FROM THE MEAN FOR SIDES "A" & "B" AT ANY GIVEN FAN SETTING:

ALLOWABLE= 0.01
SIDE "A" DEVIATION= 0.0022
SIDE "B" DEVIATION= 0.0010

4. SOURCE OPERATION:

4.1. Description of source and operating parameters during testing:

Type of Source: ROTARY DRUM MIXER
Manufacturer: BMG CORPORATION
Installation Date: May 1, 1991
Serial Number: 712/45R30P
Rated Production Capacity: 450 TONS PER HOUR OF MIX

Primary Fuel: #2 Diesel (low sulfur)
Firing Rate: 1.8 gal/ton

Air Pollution Control System:
Bag House
Bag Area: 13928 sq.ft. Pressure Drop: 3.5"H_2O
Air:Cloth Ratio: 6.39:1

Operating Parameters:

	Run 1	Run 2	Run 3
Production Rate			
- Mix T/hr:	410	410	410
- Feed T/hr:	390	390	390

Mix Temperature ^{0}F: Set Point at 290
% Asphalt: 4.9
Grade: AR4000
Supplier: Conoco
% Fines (-200): 4

5. PROCEDURES:

5.1. Sampling And Analysis Procedures

5.1.1. Sampling Port Location: See Sample and Traverse Point Determination Sheet, appendix A.
5.1.2. Sampling Point Description: See Sample and Traverse Point Determination Sheet, appendix A.
5.1.3. Sampling Apparatus: See QA-QC Data section, Sampling Train Schematic Diagram, and Continuous Gas Flow Schematic, appendix D.
5.1.4. Instruments Utilized:

Beckman 7003D O2 Analyzer
Beckman 951 NOx Analyzer
Beckman 400 Flame Ionization Detector (VOC's)
Beckman 870 NDIR CO Analyzer
Beckman 870 NDIR CO2 Analyzer

920 MASON WAY ● MEDFORD, OREGON 97501-1343 ● (503) 779-2646

6. APPENDIX A: PARTICULATE AND SULFUR DIOXIDE EMISSIONS

6.1. Sampling Calculations

6.1.1. Nomenclature
6.1.2. Sample Calculations
6.1.3. Particulate Emission Calculations
6.1.4. Sulfur Dioxide Analysis/Calculations

6.2. Particulate Field Data

6.2.1. Run No. 1
6.2.2. Run No. 2
6.2.3. Run No. 3
6.2.4. Opacity Data

6.3 Particulate Laboratory Analysis

6.4. Sample and Traverse Point Determination

NOMENCLATURE FOR EPA METHOD 5

ABBREVIATION	DESCRIPTION
A	Cross sectional area of exhaust - $ft.^2$.
Bws (calc)	Water vapor in the gas stream, proportion by volume. As calculated from condensate catch.
Bws (min)	Water vapor in the gas stream, proportion by volume. Minimum value as determined by either BWS (calc) or BWS (sat).
Bws (sat)	Water vapor in the gas stream, proportion by volume. Calculated by use of carrier equation and assuming saturated conditions.
CO	Concentration of carbon monoxide in the gas stream - ppm.
% CO_2	Percent of carbon dioxide by volume - dry.
Cp	Pitot tube coefficient, dimensionless. Determined by calibration.
Cs	Concentration of particulate matter in exhaust gas, dry basis, corrected to standard conditions - gr/dscf and g/dscm.
Cs'	Concentration of particulate matter in exhaust gas, dry basis, corrected to standard conditions and for excess air - gr/dscf and g/dscm.
C_t	Emission rate of particulate matter in the gas stream - lbs/hr and kg/hr.
dH	Average pressure differential across the orifice meter - inches of H_2O.
Dn	Average nozzle diameter - inches.
dP	Average square root of velocity head - inches H_2O.
dt	Total sampling time - minutes.
e''	Vapor pressure of water at saturated temperature - inches Hg.
%I	Percent of isokinetic sampling.
Md	Dry molecular weight - g/g-mole.

NOMENCLATURE FOR EPA METHOD 5
Continued

ABBREVIATION	DESCRIPTION
Mn	Total amount of particulate matter collected - mg.
Ms	Molecular weight of exhaust gas, wet basis - g/g-mole.
Na	Average cosine of null angle.
$\%N_2$	Percent of nitrogen by volume, dry basis.
$\%O_2$	Percent oxygen by volume, dry basis.
Pb	Barometric pressure at measurement site - inches Hg.
Ps	Absolute exhaust gas pressure - inches Hg.
Qs	Actual exhaust gas flow rate - acf/min and acm/min.
Qs (std)	Dry volumetric exhaust gas flow rate corrected to standard conditions - dscf/min and dscm/min.
Tmi	Average dry gas meter inlet temperature - ^{o}F.
Tmo	Average dry gas meter outlet temperature - ^{o}F.
Ts	Average exhaust gas temperature - ^{o}F.
Vlc	Total volume of liquid collected in impingers and silica gel-ml.
Vm	Volume of gas sample as measured by dry gas meter - dcf.
Vm (std)	Volume of gas sample measured by the dry gas meter, corrected to standard conditions.
Vp	Average sample point velocity - fps and fpm.
Vs	Average exhaust gas velocity - fps and fpm.
Vw (std)	Volume of water vapor in the gas sample, corrected to standard conditions - scf.
Y	Dry gas meter calibration factor.

SAMPLE CALCULATIONS FOR EPA METHODS 1-5

$$Vm(std)=17.64\ (Vm)\ (Y)\left[\frac{(Pb)+(dH/13.6)}{(((Tm)+(Tmo))/2)+460}\right]$$

$$Vm(std)=17.64\ (\underline{51.187})(\underline{1.01})\left[\frac{(29.51)+(2.135/13.6)}{((\underline{83.2})+(\underline{77.0}))/2)+460}\right]$$

Vm(std)= 50.093 dscf

Vw(std)= 0.04707 (V1c)
Vw(std)= 0.04707 (323.5) = 15.23 scf

$$Bws(calc)=\frac{(Vw(std))}{(Vm(std))+(Vw(std))}=\frac{(15.23)}{(15.23)+(50.093)}$$

Bws(calc)= 0.233 Vol.

Md = 0.440 (% CO2) + 0.320(% O2) + 0.280(% N2 + CO/10000)

Md = 0.440 (3.67) • 0.320 (14.23) + 0.280 (82.1 • 52 /10000)

Md = 29.16 g/g-mole

Ms = (Md) (1-(Bws(~~min~~ calc)) + 18.0 (Bws(calc))

Ms = (29.16) (1-(0.233)) + 18.0 (0.233) = 26.56 g/g-mole

$$Vs = 85.49\ (Cp)\ (dP)\sqrt{\frac{(Ts)+460}{(Ps)\ (Ms)}}$$

$$Vs = 85.49\ (0.856)\ (1.0815)\sqrt{\frac{(267.7)+460}{(29.48)\ (\cancel{28.56})\ 26.56}}$$

Vs = ~~72.32~~ 76.3 fps

$Qs = 60\ (Vs)\ (A) = 60\ (\cancel{72.3}\ 76.3)\ (19.691)$

$Qs = 90,140$ cfm

$Qs(std) = (1-(Bws(calc))\ (Qs) \left(\frac{528}{(Ts) + 460}\right)\left(\frac{(Ps)}{29.92}\right)$

$Qs(std) = (1-(0.233)\ (90,140)\ \left(\frac{528}{(267.7)+460}\right)\left(\frac{(29.48)}{29.92}\right)$

$Qs(std) = 49,430$ dscfm

$Cs = 0.01543\ (Mn)\ /\ (Vm(std)$

$Cs = 0.01543\ (62.5)\ /\ (50.09)$

$Cs = 0.019$ gr/dscf

$Ct = 0.00857\ (Cs)\ (Qs(std)) = 0.00857\ (0.019)\ (49,430)$

$Ct = 8.16$ lbs/hr

$$\%I = \frac{17.3262\ ((Ts) + 460)\ (Vm(std)}{(Ps)(Vs)(Dn)^2\ (dt)(1-(Bws(calc))}$$

$$\%I = \frac{17.3262\ ((267.7) + 460)\ (50.09)}{(29.48)(76.3)(0.243)^2\ (62.5)(1-(0.233)}$$

$\%I = 99$

CLIENT: GRANITE CONSTRUCTION
JOB # : 91-205P
SOURCE: DRUM MIX
RUN # : 1
DATE : JUNE 10 1991

CALCULATION SHEET FOR EPA METHODS 1-5

SYMBOL	DEFINITIONS - UNITS	RUN 1	RUN 2	RUN 3	AVERAGE
Vm	Sample Volume-dcf	51.187	52.075	51.011	
Y	Gas Meter Factor	1.01	1.01	1.01	
Pb	Barometric Pressure-"Hg	29.51	29.51	29.60	
dH	Average Orifice Differential-"H2O	2.135	2.204	1.990	
Tmi	Average Inlet Meter Temp.-F	83.2	96.4	103.4	
Tmo	Average Outlet Meter Temp-F	77.0	88.6	96.5	
Vm(std)	Standard Sample Volume-dscf	50.09	49.83	48.28	
	-dscm	1.42	1.41	1.37	
Vlc	Net Volume Condensate-ml	324	301	286	
Vw(std)	Standard Net Volume Condensate-scf	15.23	14.15	13.45	
Bws	Fraction Of H2O Vapor-vol.	0.233	0.221	0.218	0.224
%CO2	Percent CO2 By Vol. (dry)	3.67	3.47	3.42	3.52
%O2	Percent O2 By Vol. (dry)	14.23	15.01	15.61	14.95
CO	Concentration Of CO-ppm	52	53	58	54
%N2	Percent Nitrogen By Vol. (dry)	82.09	81.51	80.96	
Md	Dry Molecular Weight-g/g. mole	29.16	29.16	29.17	
Ms	Wet Molecular Weight (wet)-g/g. mole	26.56	26.69	26.74	
Cp	Pitot Tube Coefficient	0.856	0.839	0.855	
dP	Average SQRT Of Velocity Head-"H2O	1.082	1.082	1.058	
Ts	Average Exhaust Temp-F	267.7	277.1	275.8	273.5
Ps	Absolute Exhaust Pressure-"Hg	29.5	29.48	29.57	
Vs	Average Exhaust Gas Velocity-fps	76	75	75	75
	-fpm	4578	4507	4475	4520
A	Cross Sectional Area of Exhaust-sq. ft.	19.691	19.691	19.691	
Qs	Exhaust Gas Flow Rate-acf/min	90151	88750	88110	89004
	-acm/min	2553	2513	2495	2521
Qs(std)	Standard Gas Flow Rate-dscf/min	49426	48786	48871	49028
	-dscm/min	1400	1382	1384	1388
Mn	Weight Of Collected Particulate-mg	62.6	67.3	64.9	
Cs	Particulate Concentration-gr/dscf	0.019	0.021	0.021	0.020
	-g/dscm	0.044	0.048	0.047	0.046
Ct	Particulate Emission Rate-lbs/hr	8.1	8.7	8.7	8.5
	-kg/hr	3.7	4.0	3.9	3.9
Dn	Average Nozzle Diam.-inches	0.2430	0.2430	0.2430	
dt	Total Sampling Time-min.	~~62.50~~	~~62.50~~	~~62.50~~	
%I	Percent Of Isokinetic Sampling	99	100	97	~~99~~

CLIENT: GRANITE CONST.
JOB #: 91-305P
SOURCE: DRUM MIX
DATE: JUNE 10, 1991

DH

BWR ASSOCIATES
SO2 CALCULATION SHEET

PROJECT #: 91-305P
DATE: 06/10/91
SOURCE: GRANITE CONSTRUCTION
LOCATION: PITCHACO, CA

	RUN	RUN	RUN	AVERAGE
N:	0.0097	0.0097	0.0097	
Vt, ml:	0.65	0.83	0.85	
Vtb, ml:	0.01	0.01	0.01	
Vsoln, ml:	808	683	669	
Va, ml:	10	10	10	
Vm, dscf:	50.09	49.83	48.28	
CONC. SO2, lb/dscf:	7.1E-07	7.7E-07	8.0E-07	7.56E-07
Qs, stack gas flow rate, dscfm	49426	48786	48871	
Mass Emission Rate, lb/hr	2.10	2.24	2.34	2.22

FIELD DATA SHEET

DATE: 6-10-91

JOB #: 91-305P
PLANT: Ormite Corp.
LOCATION: Pitchaco, Cal
SOURCE: Soaphouse exhaust
DUCT DIMENSION(S): 53½ x 53½
RUN #: 1
START: 736
FINISH: 847
AR FACTOR: 1.78

C.S. #: 2
dHa: 1.72
Y: 1.00

PROBE #: 6
Cp: .84

NOZZLE #: G
DIAMETER: .245

THERMOMETER #: E
D.B. 28B W.B. 15B

BAROMETRIC PRESSURE: 29.51
STATIC PRESSURE: -0.40
EXHAUST PRESSURE: 29.48
ESTIMATED MOISTURE: 21%

LEAK CHECK
SYSTEM INITIAL: 0 cfm @ 15 "Hg
FINAL: 0 cfm @ 10 "Hg
PITOT INITIAL: ✓
FINAL: ✓

CONTROL UNIT OPERATOR: HDP

POINT NO.	TIME MIN.	METER VOL. (dcf) 869.202	dP "H2O	dH "H2O	TEMPERATURE (F) METER IN	METER OUT	STACK	BOX	IMP	VAC "Hg	O2 (%)	CO2 (%)	
Start		~~257.647~~	****	***	**	**	***	**	***	***	***	***	***
1	2.5	870.0	1.02	1.78	68	68	269	290	48	1			
2	5	872.9	1.10	1.96	69	67	271	275	50	1			
3	7.5	875.1	1.09	1.94	70	68	271	250	51	1			
4	10	—	1.65	2.94	73	68	270	230	52	3			
5	12.5	879.7	1.63	2.90	77	70	267	250	—	3			
6	15	881.7	1.10	1.96	77	72	264	290	58	1			
7	17.5	883.6	1.10	1.96	78	72	256	255	57	1			
8	20	886.1	1.20	2.14	80	74	261	250	56	1			
9	22.5	889.9	1.25	2.23	82	74	268	245	56	3			
10	25	889.9	1.29	2.30	83	76	271	260	—	3			
11	27.5	891.7	.94	1.67	84	77	259	255	58	1			
12	30	893.4	.87	1.55	84	78	263	230	58	1			
13	32.5	895.3	.87	1.55	84	78	267	255	58	1			
14	35	897.0	.79	1.43	85	79	272	250	57	1			
15	37.5	899.0	1.15	2.09	86	80	270	245	—	3			
16	40	901.3	1.33	2.41	86	80	268	260	58	3			
17	42.5	903.4	1.31	2.38	88	80	266	235	59	3			
18	45	905.1	.80	1.45	89	82	272	250	61	1			
19	47.5	~~[illegible]~~	1.20	2.18	89	82	270	265	59	3			
20	50	909.5	2.25	4.08	92	82	274	255	59	5			
21	52.5	912.0	1.08	1.96	91	83	262	260	59	2			
22	55	913.9	1.05	1.90	91	84	263	255	59	2			
23	57.5	915.9	1.03	1.87	91	84	275	255	60	2			
24	60	917.9	1.10	1.99	91	84	272	255	60	2			
25	62.5	920.189	1.50	2.72	91	84	271	250	60	4			
AVERAGE OR PARAMETER AVG. /SQF			1.0815	2.135	83.2	77.0	267.7	255			14.23	3.67	51.7

Vm, dcf: 51.187

IMPINGER CONDENSATE:
IMPINGER #1: 228 ml
IMPINGER #2: 277 ml
IMPINGER #3: 3 ml
TOTAL VOL.: 508 ml
NET VOL. (TOTAL - 200): 308 ml
SILICA GEL:
GROSS: 279.7 g.
TARE: 264.2 g.
NET: 15.5 g.
TOTAL CONDENSATE (Vlc): 323.5 ml

SAMPLE IDENTIFICATION AND DESCRIPTION
FILTER ID: 61 FILTER APPEARANCE: TAN
IMPINGER CATCH APPEARANCE: Slightly cloudy
BACK HALF CONTENTS/H2O WASH ID #: GC 101 A/B
BACK HALF ACETONE WASH ID #: GC102
FRONT HALF ACETONE WASH ID #: GC103
CUTTER NOZZLE ACETONE WASH ID #: N/A

WATER #: 122 VOL. 200 ml CHARGE H_2O_2
300 ml BACK
ACETONE #: 306 VOL. 225 ml FRONT
175 ml BACK

SAMPLES RECOVERED BY: MWB LAB DATE: BY:

Noz .243
.243
.243

FIELD DATA SHEET

DATE: 6-11-91

JOB #: 91-305P
PLANT: Granite Const
LOCATION: Pittsburg, CA
SOURCE: Drum Mix Plant
DUCT DIMENSION(S): 53"x53"
RUN #: 2
START: 0902
FINISH: 1011
DH FACTOR: 1.859

C.P. #: 2
dHa: 1.72
Y: 1.00

THERMOMETER #: E

B.P. 286 W.P. 156

PROBE #: 11
Cp: .84

NOZZLE #: 6
DIAMETER: 0.2430

BAROMETRIC PRESSURE: 29.51
STATIC PRESSURE: -0.40
EXHAUST PRESSURE: 29.48
ESTIMATED MOISTURE: 2.1%

LEAK CHECK
SYSTEM INITIAL: 0 cfm @ 10 "Hg
FINAL: 0 cfm @ 5 "Hg
PITOT INITIAL: OK
FINAL: OK

CONTROL UNIT
OPERATOR: HDAN

POINT NO.	TIME MIN.	METER VOL. (dcf)	dP "H2O	dH "H2O	TEMPERATURE (F) METER IN	METER OUT	STACK	BOX	IMP	VAC "Hg	O2 (%)	CO2 (%)	
Start		920.40	****	***	**	**	***	**	***	***	***	***	***
1	2.5		1.05	1.93	84	83	271	205	76	1			
2	5	924.5	1.05	1.93	86	83	278	220	70	1			
3	7.5	926.4	1.05	1.93	88	83	278	230	71	1			
4	10	928.4	1.00	1.84	90	84	279	235	69	1			
5	12.5	931.0	1.62	2.99	92	84	274	245	69	5			
6	15	933.2	1.80	3.31	93	85	279	245	68	5			
7	17.5	935.3	1.25	2.30	94	86	273	255	68	3			
8	20	937.3	.91	1.68	94	86	276	255	66	1			
9	22.5	939.0	.78	1.45	94	86	278	255	66	1			
10	25	941.0	1.42	2.64	92	87	281	260	67	3			
11	27.5	942.9	.93	1.72	93	88	278	270	66	1			
12	30	944.8	.98	1.81	95	88	278	265	63	2			
13	32.5	946.6	.85	1.57	96	89	280	270	60	1			
14	35	948.3	.73	1.35	97	90	283	245	58	1			
15	37.5	950.4	1.10	2.05	98	91	271	255	60	2			
16	40	952.5	1.38	2.57	98	91	274	260	63	3			
17	42.5	954.4	1.00	1.86	100	92	275	250	63	2			
18	45	956.5	1.12	2.09	100	92	278	250	60	2			
19	47.5	958.8	1.35	2.49	100	92	281	250	60	3			
20	50	961.4	1.68	3.10	102	93	280	250	62	5			
21	52.5	963.6	1.72	3.18	104	94	276	250	63	5			
22	55	965.6	1.00	1.86	104	94	276	255	63	2			
23	57.5	967.7	1.08	2.01	104	94	278	250	65	2			
24	60	969.0	1.12	2.09	104	95	276	245	66	3			
25	62.5	972.475	1.80	3.35	106	86	277	225	68	5			
AVERAGE OR PARAMETER AVG.			1.082	2.704	96.4	88.6	277.1	247			15.01	3.47	53.2

Vm, dcf: 52.075

IMPINGER CONDENSATE:
IMPINGER #1: 282 ml
IMPINGER #2: 200 ml
IMPINGER #3: 1 ml
TOTAL VOL.: 483 ml
NET VOL. (TOTAL - 200): 283 ml

SILICA GEL:
GROSS: 236.0 g.
TARE: 218.4 g.
NET: 17.6 g.

TOTAL CONDENSATE (Vlc): 300.6 ml

SAMPLE IDENTIFICATION AND DESCRIPTION
FILTER ID#: 612 FILTER APPEARANCE: Tan
IMPINGER CATCH APPEARANCE: Slightly Cloudy
BACK HALF CONTENTS/H2O WASH ID #: BC 104 A/B
BACK HALF ACETONE WASH ID #: BC 105
FRONT HALF ACETONE WASH ID #: BC 106
COPPER NOZZLE ACETONE WASH ID #: /

WATER #: 122 VOL. 200 ml CHARGE H_2O_2
200 ml BACK
ACETONE #: 326 VOL. 200 ml FRONT
200 ml BACK

SAMPLES RECOVERED BY: MWB LAB DATE: _____ BY: _____

FIELD DATA SHEET

DATE: 6-11-91

JOB #: 91-305P
PLANT: Granite Coast
LOCATION: Bitelaco, CA
SOURCE: Drum Mix ACP
DUCT DIMENSION(S): 53" x 53"
RUN #: 3
START: 1030
FINISH: 1139
AH FACTOR: 1.75

C.P. #: 2
dHa: 1.72
Y: 1.00

THERMOMETER #: E
D.B. 286 W.B. 106

PROBE #: 6
Cp: .84

NOZZLE #: 6
DIAMETER: 0.243

BAROMETRIC PRESSURE: 29.60
STATIC PRESSURE: -.40
EXHAUST PRESSURE: 29.57
ESTIMATED MOISTURE: 2.4%

LEAK CHECK
SYSTEM INITIAL: 0 cfm @ 10 "Hg
FINAL: 0 cfm @ 7 "Hg
PITOT INITIAL: ✓
FINAL: ✓

CONTROL UNIT OPERATOR: HDJ

POINT NO.	TIME MIN.	METER VOL. (dcf)	dP "H2O	dH "H2O	TEMPERATURE (F) METER IN	METER OUT	STACK	BOX	IMP	VAC "Hg	O2 (%)	CO2 (%)	
Start		972.702	****	***	**	**	***	**	***	***	***	***	***
1	2.5	974.6	.88	1.54	94	92	272	235	61				
2	5	976.5	.93	1.63	95	92	273	265	60				
3	7.5	978.4	1.02	1.79	96	92	273	260	60				
4	10	980.7	1.32	2.31	97	92	274	265		3			
5	12.5	983.1	1.72	3.01	100	93	275	270	65	4			
6	15	985.1	.99	1.73	101	94	277	280	64				
7	17.5	987.1	1.02	1.79	101	94	278	270	62				
8	20	989.0	1.05	1.84	102	95	275	290	62				
9	22.5	991.2	1.11	1.94	103	96	280	250	62				
10	25	993.4	1.61	2.32	104	96	290	235	63	3			
11	27.5	995.4	1.00	1.75	104	97	272	275	64				
12	30	997.3	1.03	1.80	104	97	276	280	62				
13	32.5	999.1	.80	1.40	105	97	278	240	62				
14	35	1001.1	1.10	1.93	105	98	278	215	62				
15	37.5	1003.5	1.08	1.89	106	98	279	270	65				
16	40	1005.2	1.30	2.30	105	99	277	210	67	2			
17	42.5	1007.0	.91	1.61	106	99	278	235	63				
18	45	1008.9	.87	1.54	106	99	282	245	65				
19	47.5	1011.0	1.12	1.98	106	99	283	250	64	3			
20	50	1013.6	1.81	3.20	108	99	280	255		4			
21	52.5	1015.5	1.03	1.82	107	99	274	255	62				
22	55	1017.4	.98	1.73	107	99	276	255	62				
23	57.5	1019.3	.97	1.71	107	99	271	250	61				
24	60	1021.4	1.15	2.03	107	99	268	265	62				
25	62.5	1023.713	1.50	2.65	108	99	265	270		3			
AVERAGE OR PARAMETER AVG.			1.0576	1.990	103.4	96.5	275.8	255			15.61	3.42	58.4

Vm, dcf: 51.011

IMPINGER CONDENSATE:
IMPINGER #1: 208 ml
IMPINGER #2: 260 ml
IMPINGER #3: 1 ml
TOTAL VOL.: 469 ml
NET VOL. (TOTAL - 200): 269 ml
SILICA GEL:
GROSS: 236.2 g.
TARE: 219.4 g.
NET: 16.8 g.
TOTAL CONDENSATE (Vlc): 245.8 ml

SAMPLE IDENTIFICATION AND DESCRIPTION
FILTER ID#: 613 FILTER APPEARANCE: L.T. TAN
IMPINGER CATCH APPEARANCE: ~~L.T. TAN~~ Tur. b.
BACK HALF CONTENTS/H2O WASH ID #: GC 107 A + B
BACK HALF ACETONE WASH ID #: GC 108
FRONT HALF ACETONE WASH ID #: GC 109
CUTTER NOZZLE ACETONE WASH ID #: N/A

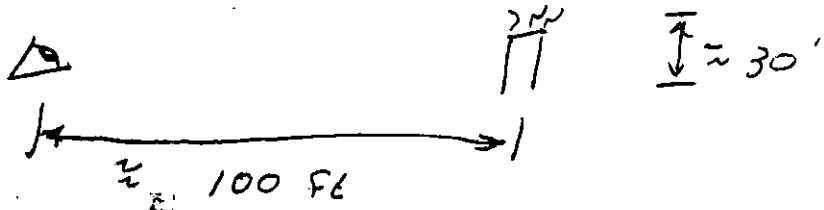
WATER #: 122 VOL. 200 ml CHARGE
400 ml BACK
ACETONE #: 306 VOL. 200 ml FRONT
200 ml BACK

SAMPLES RECOVERED BY: HDJ LAB DATE: BY:

Granite Construction

OPACITY READINGS
ON BAGHOUSE EXHAUST
6/11/91

Time	%			
10:38	5	5	5	5
10:39	5	5	5	5
10:40	5	5	5	5
10:41	5	5	5	5
10:42	5	5	5	5
10:43	5	5	5	5
10:44	5	5	5	5
10:45	5	5	5	5
10:46	5	5	5	5
10:47	5	5	5	5



T ≈ 78°F Clear skies

WIND ≈ 10 mph from SW

Mark and Bailey

EPA METHOD 5 LABORATORY ANALYSIS SHEET

PROJECT #91-305P
PLANT: GRANITE CONSTRUCTION
LOCATION: PITCHAGO, CA

SAMPLE DATE: 06/10/91
LAB DATE: 06/14/91
FINAL WEIGHTS: 06/19/91

REF. WT: 100.0001
TEMP: 65F
HUMIDITY: 40%

ANALYST: LCC

	RUN 1	RUN 2	RUN 3
FILTER NUMBER:	611	612	613
FILTER GROSS, g	2.7049	2.7235	2.6745
FILTER TARE, g	2.6726	2.6790	2.6382
FILTER NET, g	0.0323	0.0445	0.0363
FRONT WASH CONTAINER NO:	GC 103	GC 106	GC 109
BEAKER NUMBER:	112	22	86
BEAKER GROSS, g	99.0105	96.6596	105.8622
BEAKER TARE, g	98.9800	96.6366	105.8334
BLANK NET, g	0.0003	0.0002	0.0002
FRONT WASH NET, g	0.0302	0.0228	0.0286
TOTAL FRONT HALF NET, g	0.0625	0.0673	0.0649
, mg	62.5500	67.2750	64.8750

$G = 15.43 \cdot \frac{WP}{VD}$

$15.43 \frac{(.0625)}{57.187} = 0.0188 gr/SDCF$ ✓ ok

BLANK CALCULATION SHEET

PROJECT #:91-305P
COMPANY: GRANITE CONSTEUCTION
LOCATION: PITCHACO, CA

	RUN 1	RUN 2	RUN 3
ACETONE FRONT WASH			
ACETONE BOTTLE #:	306	306	306
FIELD VOLUME, ml:	225	200	200
BLANK VALUE/100ml, g:	0.0001	0.0001	0.0001
LAB VOLUME, ml:	25	25	25
ACETONE BLANK NET, g:	0.0003	0.0002	0.0002
ALLOWABLE ACETONE BLANK VALUE			
FRONT WASH			
VOLUME USED IN FRONT WASH, ml:	225	200	200
DENSITY OF ACETONE USED, g/ml:	0.7845	0.7845	0.7845
ALLOWABLE BLANK VALUE, g:	0.0018	0.0016	0.0016

SAMPLE AND TRAVERSE POINT DETERMINATION SHEET
FOR SQUARE STACKS

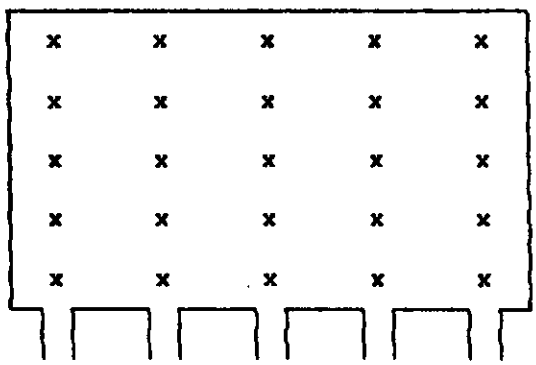
MINIMUM NUMBER OF TRAVERSE POINTS FOR PARTICULATE TRAVERSES
EPA METHOD 1

Sample Port Location
Duct diameters upstream from flow disturbance (distance A)

```
    0.5                 1.0                 1.5                 2.0
-------------------------------------------------------------------------
     '         '         '         '         '         '         '
  25 <*********************************
P 22 ^                                *
O 20 ^                                ************
I 18 ^                                            *
N 16 ^      5x5 Matrix = 25 points                ************
T 14 ^                                                        *
S 12 ^                                                        *************
  10 ^
-----^-------------------------------------------------------------------
          '         '         '         '         '         '         '
     2         3         4         5         6         7         8
```

Sample Port Location
Duct diameters downstream from flow disturbance (distance B)

T R A V E R S E P O I N T L O C A T I O N
********** ********* **********



	Point #	Dist. from wall
STACK DIMENSIONS: 53.25 X 53.25	1	5.3
STACK AREA: 19.691 SQ. FEET	2	16.1
DISTANCE "A": 26 INCHES = 0.5 EQ. DIAMETERS	3	26.8
DISTANCE "B": 108 INCHES = 2 EQ. DIAMETERS	4	37.6
PTS REQUIRED: 25	5	48.3
PROJECT #: 91-305P		
CLIENT: GRANITE CONSTRUCTION		

Formulas for Gaseous Sampling Calculations

Gas Velocity:

Velocity afm = (5129.4)(Cp)(S)[sqrt (1/(Ps)(Ms)]

Where:

5129.4 = Pitot Velocity Factor 85.48 x 60 sec/min
Cp = Pitot Tube Coefficient
S = Velocity Factor (avg sqrt delta-P)(sqrt Ts R)
Ps = Absolute Stack Pressure inches of Hg.
(Barometric Pressure + Static Pressure)
Ms = Stack Gas Molecular Weight

Gas Volumetric Flow Rate:

Flow dscfm = .123(md)(Vs)(As)[(Ps)/Ts]

Where:

0.123 = Tstd/Pstd = 528 R/29.92" Hg/144 $inches^2/feet^2$
md = % Stack Moisture/100
Vs = Stack Velocity fpm
As = Stack Area $inchs^2$
Ps = Absolute Stack Pressure inches of Hg.
Ts = Stack Temperature degrees R = (°F + 460)

Gaseous Emissions Rate:

$$\text{Emissions lbs/hr} = \frac{(\text{ppm})(\text{Flow dscfm})(\text{MW gas})(60\ \text{min/hr})}{385.1 \times 10^6}$$

Where:

MW = 28 for CO
= 64 for SO_2
= 46 for NO_2
= 16 for CH_4
ppm = Average Concentration Of Measured Gas, Corrected For Z/S
385.1×10^6 = Molar Volume Constant + Conversions

GASEOUS SAMPLING CALCULATIONS

	RUN 1	RUN 2	RUN 3	AVERAGE
CARBON MONOXIDE (CO)				
Average-ppm	53	58	60	
Upscale Gas Concentration	243.1	243.1	243.1	
Start Zero	1	3	0	
Start Upscale	243	245	242	
End Zero	4	9	2	
End Upscale	235	241	251	
Emission Concentration-ppm	52	53	58	54
Exhaust Gas Flow Rate-dscfm	49426	48786	48871	
Mass Emissions-lbs/hr	11.1	11.3	12.4	11.6
OXIDES OF NITROGEN (NOx)				
Average-ppm	57	60	57	
Upscale Gas Concentration	92.6	92.6	92.6	
Start Zero	0	0	0	
Start Upscale	93	93	93	
End Zero	1	5	10	
End Upscale	98	98	98	
Emission Concentration-ppm	55	57	54	55
Exhaust Gas Flow Rate-dscfm	49426	48786	48871	
Mass Emissions-lbs/hr	19.6	19.9	18.7	19.4
TOTAL HYDROCARBONS (THC)				
Average-ppm	53	56	51	
Upscale Gas Concentration	101.7	101.7	101.7	
Start Zero	0	0	0	
Start Upscale	101	102	101	
End Zero	5	8	-3	
End Upscale	101	103	97	
Emission Concentration-ppm	52	54	53	53
Exhaust Gas Flow Rate-dscfm	49426	48786	48871	
Mass Emissions-lbs/hr	6.4	6.6	6.4	6.5
OXYGEN (O2) - % by volume				
Average-%	14.02	14.69	15.61	
Upscale Gas Concentration	9.01	9.01	9.01	
Start Zero	0.43	0.38	0.30	
Start Upscale	9.01	9.02	9.00	
End Zero	0.20	0.29	0.26	
End Upscale	8.97	8.88	9.26	
Emission Concentration-%	14.23	15.01	15.61	14.95
CARBON DIOXIDE (CO2) - % by volume				
Average-%	3.73	3.53	3.48	
Upscale Gas Concentration	15.08	15.08	15.08	
Start Zero	0.05	0.05	0.05	
Start Upscale	15.10	15.07	15.10	
End Zero	0.07	0.07	0.08	
End Upscale	15.14	15.20	15.19	
Emission Concentration-%	3.67	3.47	3.42	3.52

CLIENT: GRANITE CONST.
JOB #: 91-305P
SOURCE: DRUM MIX
DATE: JUNE 10, 1991

0727

BWR ASSOCIATES, INC. GAS DATA SHEET

PLANT: Ceramics Cons T DATE: 6-4-91 OPERATOR: HDW

SOURCE: Burner exhaust RUN: 1 CALIBRATION GAS CYLINDER ID#'S:

LOCATION: Stitchco, CA JOB #: 91-7055 ZERO: CC 73742 UPSCALE: CC-48235

COMPONENTS:		CO (ppm)	NOx (ppm)	SOx (ppm)	THC (ppm)	O2 (%)	CO2 (%)
CAL. GAS CONC.		243	92.6		101.7	9.01	15.05
START ZERO:		1.0	0		0	0.43	.05
START UPSCALE:		243	92.7		101.0	9.01	15.10
START	TIME	CO (ppm)	NOx (ppm)	SOx (ppm)	THC (ppm)	O2 (%)	CO2 (%)
1	0736	43	~~46~~ 52		45	14.86	3.75
2	0738	42	~~48~~ 51		48	14.74	3.41
3	0740	44	~~110~~ 55		47	14.63	3.41
4	0742	43	~~110~~ 55		48	14.63	3.41
5	0744	39	~~110~~ 55		47	14.56	3.44
6	0746	38	~~106~~ 56		47	14.47	3.47
7	0748	40	~~106~~ 56		48	14.22	3.66
8	0750	73	~~110~~ 55		58	13.62	4.03
9	0752	56	56		53	13.80	3.83
10	0754	47	57		52	14.11	3.66
11	0756	55	57		53	13.72	4.00
12	0758	88	54		60	13.50	4.11
13	0800	88	55		62	13.60	3.95
14	0802	53	57		54	13.88	3.79
15	0804	57	58		54	13.94	3.76
16	0806	58	58		54	13.86	3.80
17	0808	53	58		54	13.86	3.80
18	0810	52	58		53	13.87	3.79
19	0812	52	58		52	13.86	3.80
20	0814	50	59		53	13.80	3.84
21	0816	58	57		55	13.86	3.78
22	0818	43	61		54	13.81	3.81
23	0820	67	58		57	13.81	3.79
24	0822	56	58		57	13.88	3.76
25	0824	50	59		56	13.95	3.71
26	0826	40	60		55	13.99	3.71
27	0828	69	56		58	13.81	3.82
28	0830	46	60		55	13.90	3.74
29	0832	48	61		54	13.92	3.72
30	0834	47	60		55	13.99	3.68
31	0836	48	61		55	14.00	3.70
32	0838						
33	0840						
34	0842						
35	0844						
36	0846						
37	0848						
38	0850						
39	0852						
40	0854						
41	0856						
42	0858						
43							
44							
45							
AVERAGE		52.8 ✓	57.1 ✓		53.3 ✓	14.019 ✓	3.775 ✓
END ZERO:		4.0	1.0		5.4	[illegible]	0.07
END UPSCALE:		235	97.6		100.6	8.97	15.14
CORR. Z/S:		51.7 ✓	55.4 ✓		52.4 ✓	14.23 ✓	3.67 ✓

BWR ASSOCIATES, INC. GAS DATA SHEET

PLANT: Amerite Const. DATE: 6-11-91 OPERATOR: HDN

SOURCE: Drum Mix ACP RUN: 2 CALIBRATION GAS CYLINDER ID#'S:

LOCATION: Pittsburg, CA JOB #: 91-3051 ZERO: CC 73242 UPSCALE: CC 48235

COMPONENTS:		CO (ppm)	NOx (ppm)	SOx (ppm)	THC (ppm)	O2 (%)	CO2 (%)
CAL. GAS CONC.		243.1	92.6		101.7	9.01	15.08
START ZERO:		3	0		0	0.38	0.05
START UPSCALE:		245	92.5		101.8	9.02	15.07
START	TIME	CO (ppm)	NOx (ppm)	SOx (ppm)	THC (ppm)	O2 (%)	CO2 (%)
1	0902	46	58		46	14.91	3.53
2	0904	46	58		51	14.85	3.57
3	0906	45	57		52	14.98	3.49
4	0908	45	58		52	14.57	3.52
5	0910	45	58		53	14.56	3.54
6	0912	48	58		57	14.58	3.54
7	0914	50	58		56	14.59	3.54
8	0916	48	58		54	14.62	3.52
9	0918	47	58		54	14.64	3.53
10	0920	48	59		55	14.63	3.56
11	0922	51	58		56	14.65	3.51
12	0924	51	58		55	14.77	3.45
13	0926	67	58		60	14.52	3.61
14	0928	52	59		57	14.75	3.47
15	0930	56	58		59	14.78	3.43
16	0932	52	59		59	14.76	3.45
17	0934	54	59		59	14.75	3.44
18	0936	52	60		58	14.64	3.53
19	0938	65	60		59	14.43	3.67
20	0940	65	61		59	14.45	3.66
21	0942	59	60		59	14.68	3.50
22	0944	65	60		59	14.73	3.48
23	0946	70	61		57	14.73	3.49
24	0948	69	62		56	14.71	3.54
25	0950	72	62		57	14.69	3.58
26	0952	65	62		56	14.73	3.56
27	0954	70	62		57	14.73	3.57
28	0956	68	62		57	14.74	3.56
29	0958	65	64		57	14.68	3.61
30	1000	84	63		58	14.73	3.56
31	1002	85	63		58	14.76	3.56
32	1004						
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45					56.3		
AVERAGE		57.9	59.7		[redacted]	14.69	3.52
END ZERO:		9.0	55.3		8.2	0.29	0.07
END UPSCALE:		241	98.4		102.8	8.83	15.20
CORR. Z/S:		53.2	56.9		[redacted] 54.1	15.01	3.47

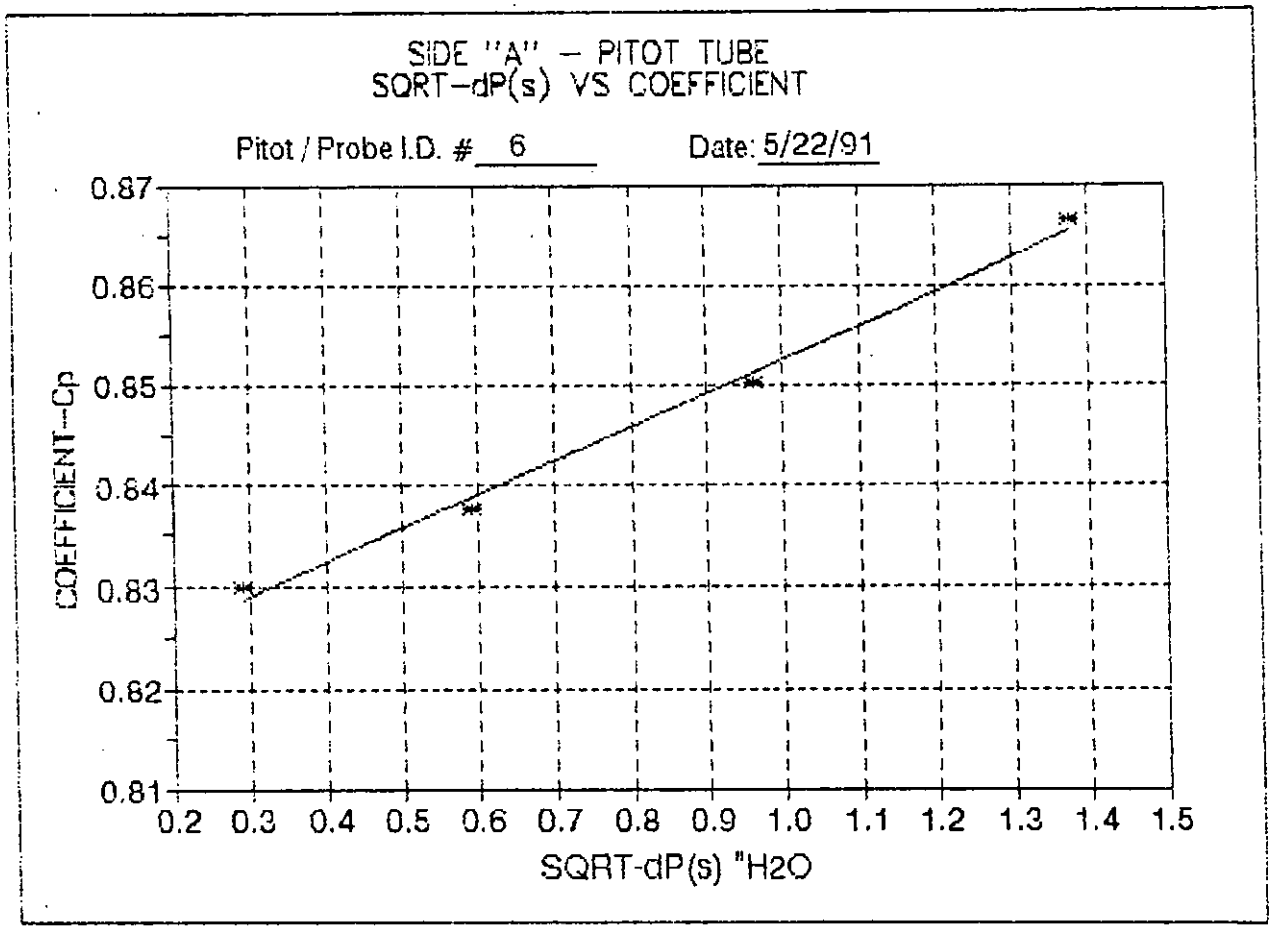
BWR ASSOCIATES, INC. GAS DATA SHEET

PLANT: Granite Const. DATE: 6-11-91 OPERATOR: HDM

SOURCE: Drum Mix HCP RUN: 3 CALIBRATION GAS CYLINDER ID#'S:

LOCATION: Pittsburg, CA JOB #: 91-305P ZERO: CC673742 UPSCALE: CC48235

COMPONENTS:		CO (ppm)	NOx (ppm)	SOx (ppm)	THC (ppm)	O2 (%)	CO2 (%)
CAL. GAS CONC.		243.1	92.6		101.7	9.01	15.08
START ZERO:		0	~~92.8~~ 0		~~101.4~~ 0	0.30	0.05
START UPSCALE:		242.0	92.8		101.4	9.00	15.10
START	TIME	CO (ppm)	NOx (ppm)	SOx (ppm)	THC (ppm)	O2 (%)	CO2 (%)
1	1030	~~60~~ 50	56		50	15.46	3.54
2	1032	~~57~~ 57	56		50	15.45	3.55
3	1034	~~50~~ 50	58		50	15.36	3.61
4	1036	~~52~~ 58	56		50	15.54	3.47
5	1038	53	56		50	15.60	3.46
6	1040	54	56		51	15.66	3.42
7	1042	52	56		51	15.61	3.46
8	1044	52	57		52	15.64	3.47
9	1046	63	57		51	15.68	3.46
10	1048	59	59		51	15.52	3.58
11	1050	56	58		52	15.55	3.55
12	1052	46	59		52	15.58	3.58
13	1054	47	60		52	15.49	3.54
14	1056	62	59		52	15.51	3.49
15	1058	80	58		52	15.69	3.39
16	1100	72	58		51	15.68	3.40
17	1102	60	59		51	15.68	3.41
18	1104	75	57		53	15.81	3.31
19	1106	94	52		53	15.74	3.30
20	1108	76	52		48	15.86	3.34
21	1110	60	57 ~~57~~		48	15.84	3.26
22	1112	62	55		49	15.90	3.24
23	1114	57	55		49	15.94	3.22
24	1116	59	56		50	15.93	3.23
25	1118	52	58		50	15.83	3.39
26	1120	52	58		50	15.69	3.46
27	1122	50	61		50	15.50	3.61
28	1124	51	61		51	15.45	3.65
29	1126	53	61		53	15.42	3.69
30	1128	67	60		54	15.14	3.90
31	1130	80	60		56	15.14	3.90
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
AVERAGE		~~58~~ 60.0	57.4		51.0	15.61	3.48
END ZERO:		2.0	9.6		-2.8	0.26	0.08
END UPSCALE:		251	98.4		~~5~~ 97.4	9.26	15.19
CORR. Z/S:		58.4	53.6		52.9	~~9.26~~ 15.61	3.42


SIDE "A" – PITOT TUBE
SQRT–dP(s) VS COEFFICIENT
Pitot / Probe I.D. # 6
Date: 5/22/91
COEFFICIENT–Cp
0.87
0.86
0.85
0.84
0.83
0.82
0.81
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
SQRT-dP(s) "H2O

MULTI-VELOCITY "S" TYPE PITOT TUBE CALIBRATION WORKSHEET

PITOT/PROBE ASSEMBLY #	11	DATE	4/23/91
EFFECTIVE LENGTH- in.	64	CALIBRATOR	BDW
FACE-OPENING ALIGNMENTS	OK	MANOMETER LEAK CHECK	OK

VELOCITY DETERMINATION DATA

FAN SETTING	I	II	III	IV
EXHAUST GAS TEMPERATURE- F.	56	56	56	56
BAROMETRIC PRESSURE- "Hg	28.74	28.74	28.74	28.74
STATIC PRESSURE- "H2O	1.55	1.25	0.72	-0.09
ABSOLUTE EXHAUST GAS PRESSURE- "Hg	28.85	28.83	28.79	28.73
MOLECULAR WEIGHT OF EXHAUST GAS	28.73	28.73	28.73	28.73
CALIBRATION VELOCITY- fpm	973	2004	3295	4851

CALIBRATION DATA

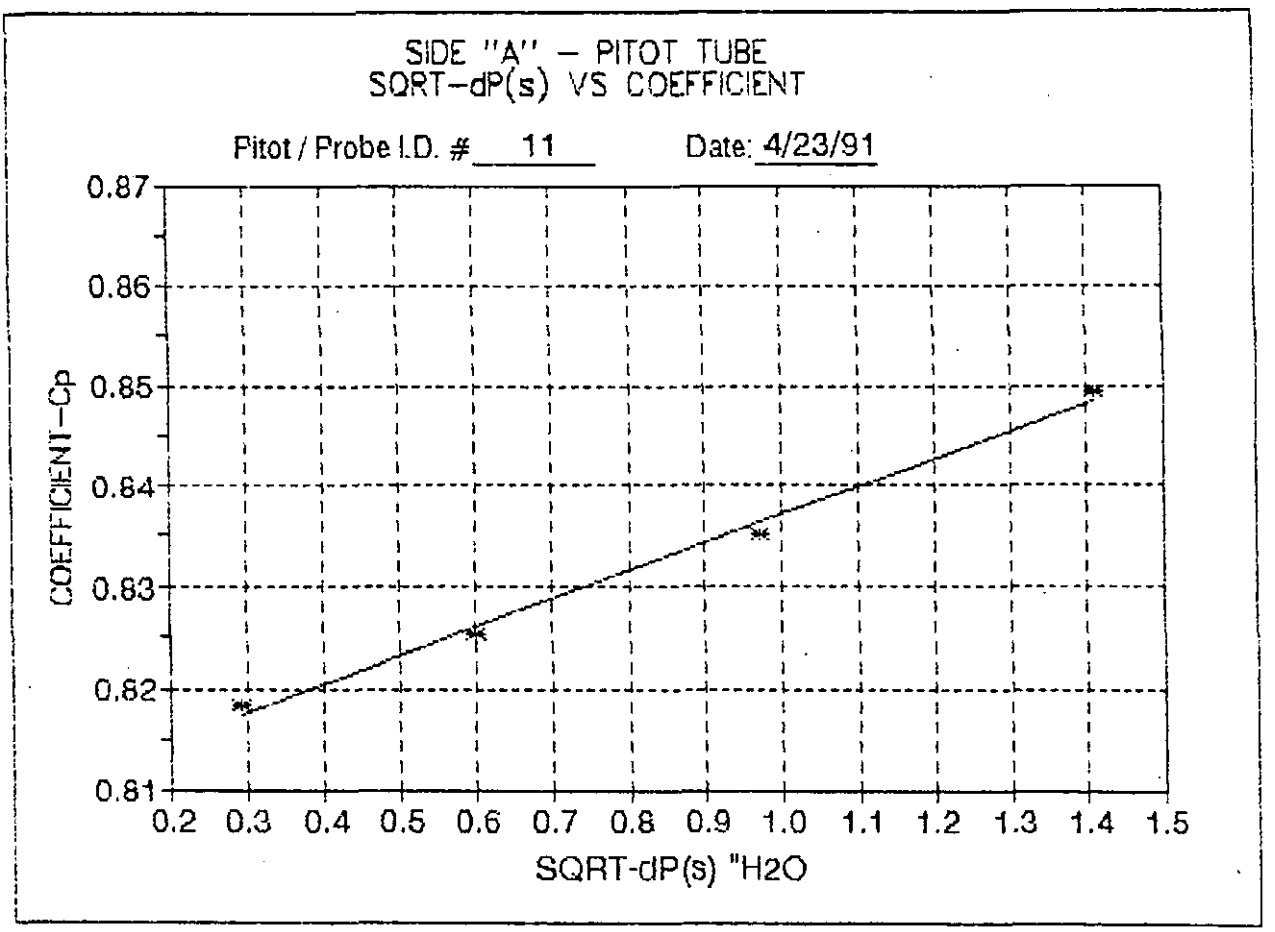
FAN SETTING	SIDE "A" dP(std)	SIDE "A" dP(s)	SIDE "A" Cp	SIDE "B" dP(std)	SIDE "B" dP(s)	SIDE "B" Cp
	0.059	0.087	0.8153	0.059	0.085	0.8248
I	0.059	0.086	0.8200	0.059	0.085	0.8248
	0.059	0.086	0.8200	0.059	0.086	0.8200
AVG.	0.0590	0.0863	0.8184	AVG. 0.0590	0.0853	0.8232
	0.250	0.360	0.8250	0.250	0.355	0.8308
II	0.250	0.359	0.8261	0.250	0.355	0.8308
	0.250	0.360	0.8250	0.250	0.355	0.8308
AVG.	0.2500	0.3597	0.8254	AVG. 0.2500	0.3550	0.8308
	0.675	0.950	0.8345	0.675	0.930	0.8434
III	0.675	0.950	0.8345	0.675	0.930	0.8434
	0.675	0.945	0.8367	0.675	0.935	0.8412
AVG.	0.6750	0.9483	0.8352	AVG. 0.6750	0.9317	0.8427
	1.460	1.980	0.8501	1.460	1.950	0.8566
IV	1.460	1.980	0.8501	1.460	1.950	0.8566
	1.460	1.930	0.8480	1.460	1.940	0.8588
AVG.	1.4600	1.9833	0.8494	AVG. 1.4600	1.9467	0.8574

MAXIMUM DIFFERENCE BETWEEN Cp AVERAGES OF SIDES "A" & "B" AT ANY GIVEN FAN SETTING:

ALLOWABLE= 0.01
DIFFERENCE= 0.0080

MAXIMUM AVERAGE DEVIATION FROM THE MEAN FOR SIDES "A" & "B" AT ANY GIVEN FAN SETTING:

ALLOWABLE= 0.01
SIDE "A" DEVIATION= 0.0021
SIDE "B" DEVIATION= 0.0021


SIDE "A" – PITOT TUBE
SQRT–dP(s) VS COEFFICIENT
Pitot / Probe I.D. # 11
Date: 4/23/91
COEFFICIENT–Cp
0.87
0.86
0.85
0.84
0.83
0.82
0.81
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5
SQRT-dP(s) "H2O

FULL RANGE CONTROL UNIT CALIBRATION WORKSHEET

CONTROL UNIT #:	2	DATE:	3/12/91
SERIAL #:	7271	CALIBRATOR:	BDW
THERMOMETERS CALIBRATED:	OK	LEAK CHECK:	OK
BAROMETRIC PR. "Hg:	28.78		

DELTA H "H20	1	2	3	4
BEGINING METER TEMP. F				
-DRY GAS METER :INLET	79.0	83.0	87.0	91.0
:OUTLET	73.0	77.0	79.0	81.0
-REFERENCE METER	71.0	71.0	72.0	72.0
BEGINING VOLUME METER READING				
-DRY GAS METER	778.500	785.100	791.400	798.300
-REFERENCE METER	766.065	772.559	778.766	785.550
ENDING METER TEMP. F				
-DRY GAS METER :INLET	83.0	88.0	92.0	94.0
:OUTLET	76.0	79.0	81.0	83.0
-REFERENCE METER	71.0	72.0	72.0	72.0
ENDING VOLUME METER READING				
-DRY GAS METER	784.359	790.890	797.535	804.102
-REFERENCE METER	771.834	778.265	784.801	791.295

CALIBRATION CALCULATIONS

DELTA H "H20	1	2	3	4
DRY GAS METER c.f.	5.859	5.790	6.135	5.802
REFERENCE METER c.f.	5.769	5.706	6.035	5.745
AVERAGE DRY GAS METER TEMP. F				
-INLET	81.00	85.50	89.50	92.50
-OUTLET	74.50	78.00	80.00	82.00
-AVERAGE	77.75	81.75	84.75	87.25
AVERAGE REFERENCE METER TEMP. F	71.00	71.50	72.00	72.00
TIME min.	10	7	6	5
DRY GAS METER FACTOR "Y"	0.99	1.00	1.00	1.01
ORIFICE DELTA Ha "H20	1.74	1.73	1.70	1.73
AVERAGE DRY GAS METER FACTOR "Y"				1.00
AVERAGE ORIFICE DELTA Ha "H20				1.72

LARGEST DEVIATION FROM AVERAGE GAS METER FACTOR "Y"
-DIFFERENCE 0.008

LARGEST DEVIATION FROM AVERAGE ORIFICE DELTA Ha "H20
-DIFFERENCE 0.02

POST-TEST SERIES CONTROL UNIT CALIBRATION WORKSHEET

CONTROL UNIT #:	2	DATE:	6/18/91
SERIAL #:	7271	JOB #:	91-305P
dHa "H2O:	1.72	CALIBRATOR:	BDW
BAROMETRIC PR. "Hg:	28.78	MAX. VACUUM "Hg:	5
PRE-TEST FACTOR "Y":	1.00	AVERAGE dH "H2O:	2.110

CALIBRATION RUN #	1	2	3
BEGINING METER TEMP. F			
-DRY GAS METER :INLET	79.0	82.0	85.0
:OUTLET	74.0	76.0	78.0
-REFERENCE METER	72.0	73.0	73.0
BEGINING VOLUME METER READING			
-DRY GAS METER	111.300	116.700	122.100
-REFERENCE METER	497.481	502.898	508.289
ENDING METER TEMP. F			
-DRY GAS METER :INLET	85.0	88.0	91.0
:OUTLET	76.0	78.0	80.0
-REFERENCE METER	73.0	73.0	73.0
ENDING VOLUME METER READING			
-DRY GAS METER	116.700	122.100	127.500
-REFERENCE METER	502.898	508.289	513.620

CALIBRATION CALCULATIONS

CALIBRATION RUN #	1	2	3
DRY GAS METER c.f.	5.400	5.400	5.400
REFERENCE METER c.f.	5.417	5.391	5.331
AVERAGE DRY GAS METER TEMP. F			
-INLET	82.00	85.00	88.00
-OUTLET	75.00	77.00	79.00
-AVERAGE	78.50	81.00	83.50
AVERAGE REFERENCE METER TEMP. F	72.50	73.00	73.00
DRY GAS METER FACTOR "Y"	1.01	1.01	1.00
AVERAGE POST-TEST DRY GAS METER FACTOR "Y"			1.01

LARGEST DEVIATION FROM AVERAGE GAS METER FACTOR "Y"
- DIFFERENCE 0.005

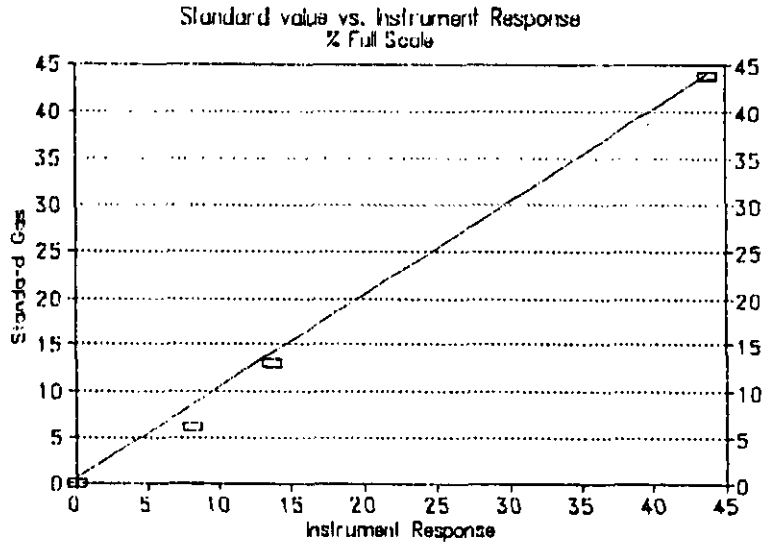
DEVIATION FROM PRE-TEST DRY GAS METER FACTOR "Y"
- % DIFFERENCE 1

CARBON MONOXIDE INSTRUMENT LINEARITY

BECKMAN MODEL 870, CONFIGURATION 110
Instrument ID: SN 1000149 Date: 6/17/91
Instrument Full Scale: 4000 PPM Technician: DCJ

		GAS	CO	Instrument Response	
	Bottle #	Value	%FS	Reading	%FS
1	CC410	1753.00	43.83	1752.00	43.80
2	CC73742	0.00	0.00	1.00	0.03
3	CC28435	243.10	6.08	321.00	8.03
4	CC73742	0.00	0.00	0.00	0.00
5	CC12396	518.00	12.95	546.00	13.65

Pearson Product Moment Correlation Coefficient = r = 0.9990

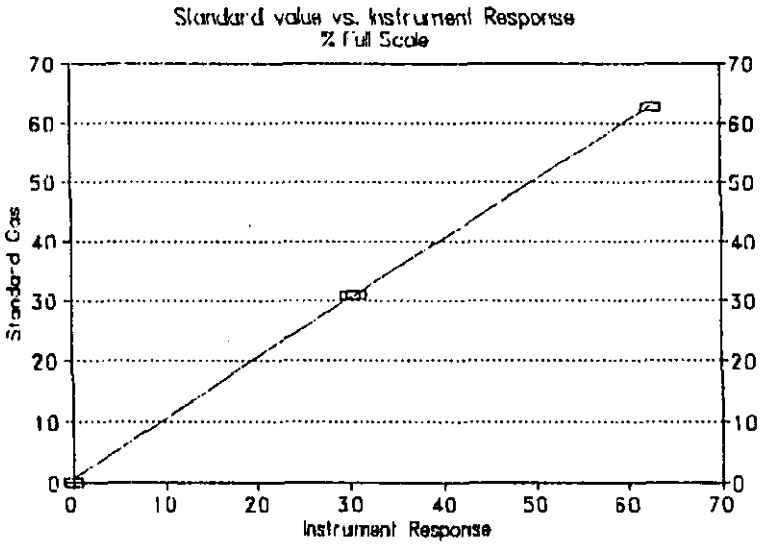


OXIDES OF NITROGEN INSTRUMENT LINEARITY

BECKMAN MODEL 951A
Instrument ID: SN 101297 Date: 6/17/91
Instrument Full Scale: 300 PPM Technician: DCJ

		GAS	NOx	Instrument Response	
	Bottle #	Value	%FS	Reading	%FS
1	CC410	188.40	62.80	188.00	62.67
2	CC73742	0.00	0.00	0.30	0.10
3	CC28435	92.60	30.87	90.50	30.17
4	CC73742	0.00	0.00	0.00	0.00
5	CC12396	93.20	31.07	92.40	30.80

Pearson Product Moment Correlation Coefficient = r = 0.9999

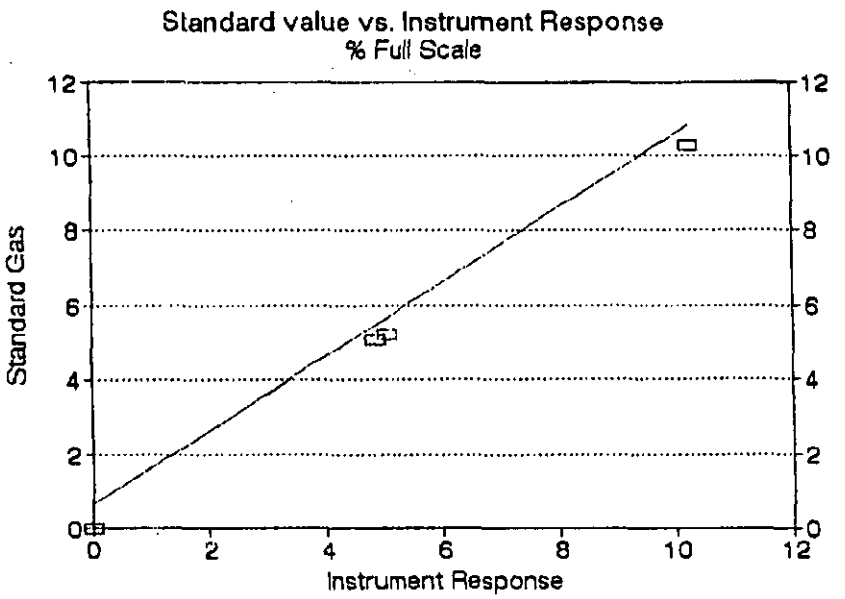


TOTAL HYDROCARBON INSTRUMENT LINEARITY

BECKMAN MOD 400A
Instrument ID: SN 1000368 Date: 6/17/91
Instrument Full Scale: 2000 PPM Technician: DCJ

		GAS:	CH4	Instrument Response	
	Bottle #	Value	%FS	Reading	%FS
1	CC410	205.70	10.29	205.00	10.25
2	CC73742	0.00	0.00	0.00	0.00
3	CC28435	101.70	5.09	97.00	4.85
4	CC73742	0.00	0.00	0.00	0.00
5	CC12396	104.60	5.23	101.00	5.05

Pearson Product Moment Correlation Coefficient = r = 0.9997

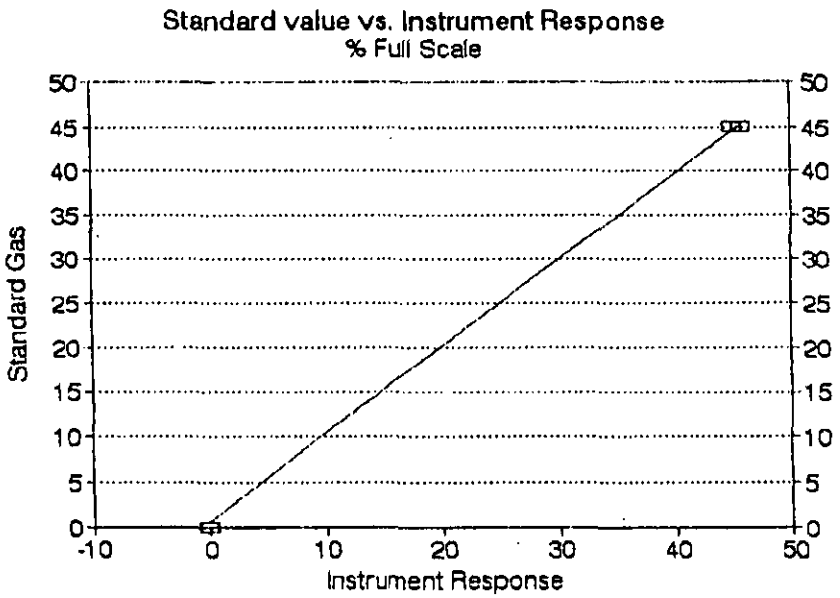


OXYGEN INSTRUMENT LINEARITY

BECKMAN MOD 7000D
Instrument ID: SN 1000240 Date: 6/17/91
Instrument Full Scale: 20 % Technician: DCJ

		GAS:	O2	Instrument Response	
	Bottle #	Value	%FS	Reading	%FS
1	CC410	0.00	0.00	0.02	0.10
2	CC73742	9.01	45.07	9.14	45.72
3	CC28435	0.00	0.00	-0.01	-0.05
4	CC73742	9.01	45.07	9.00	45.02
5	CC12396	0.00	0.00	0.00	0.00

Pearson Product Moment Correlation Coefficient = r = 0.9999

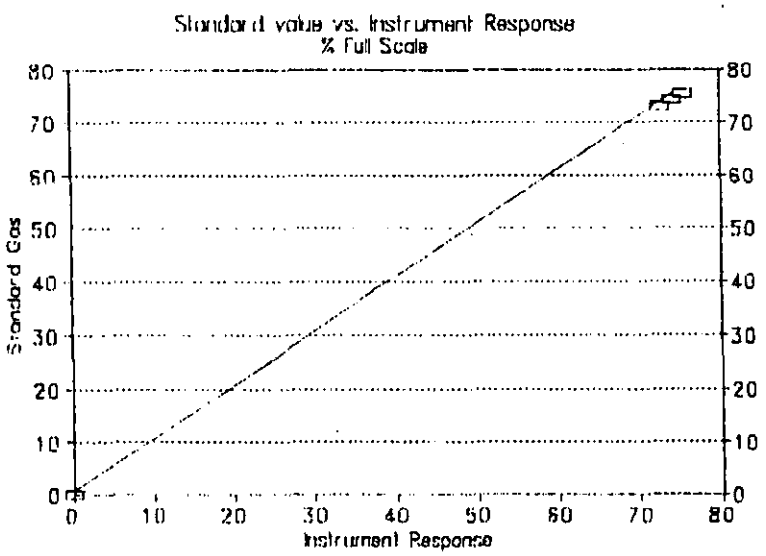


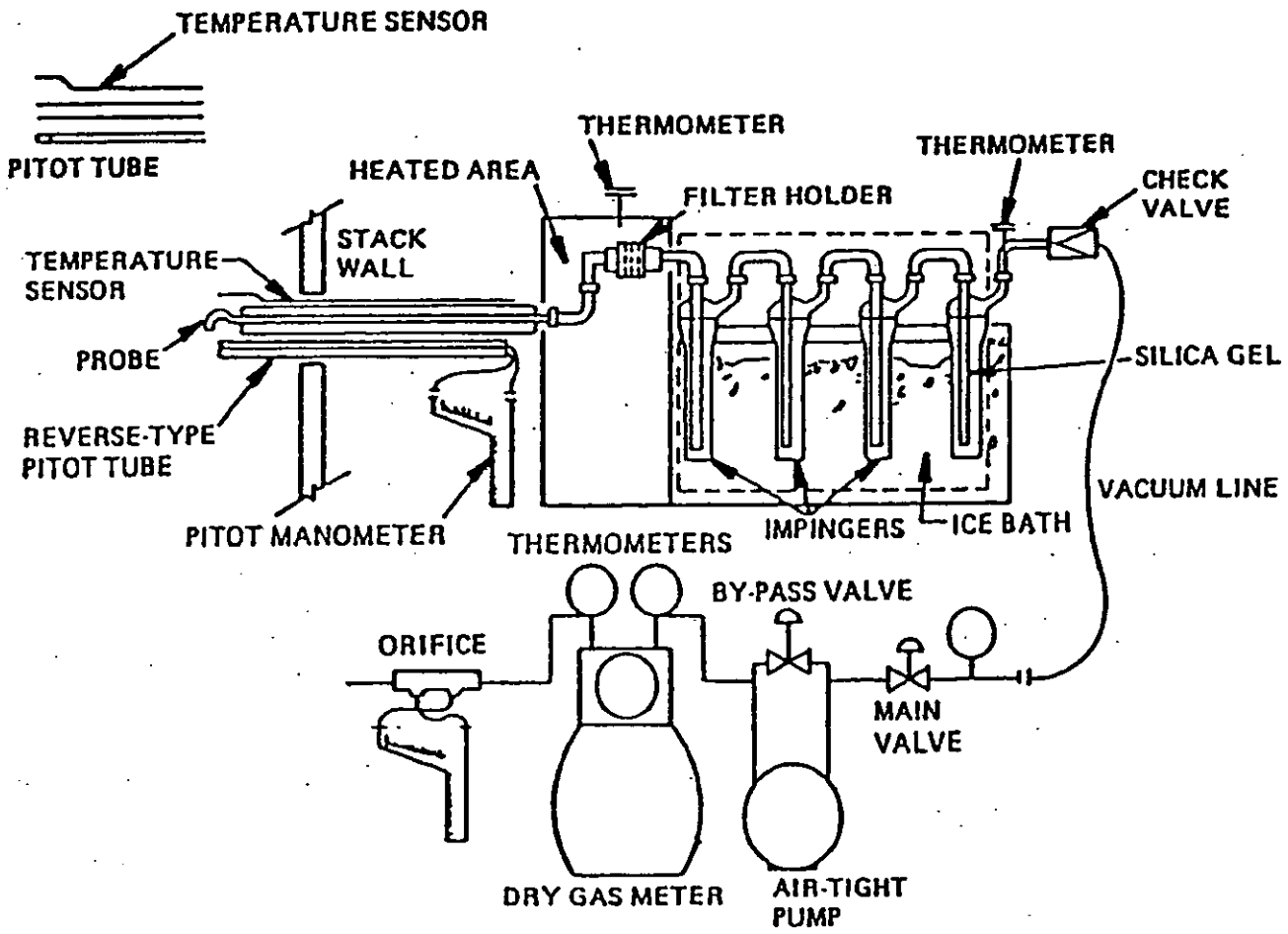
CARBON DIOXIDE INSTRUMENT LINEARITY

BECKMAN MODEL	870	CONFIGURATION		126	
Instrument ID:	SN 1000138			Date:	6/17/91
Instrument	Full Scale:		20 %	Technician:	DCI

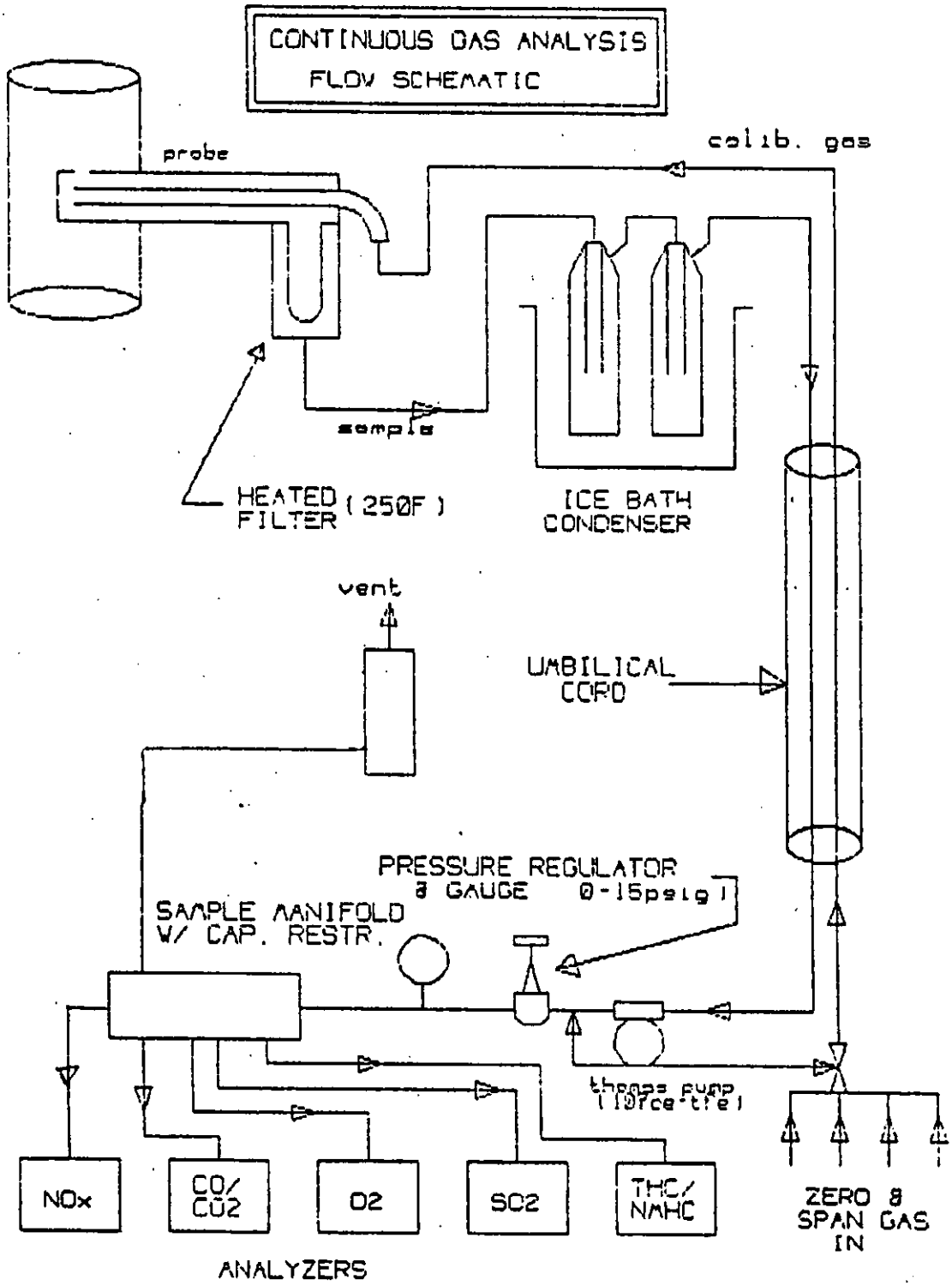
		GAS	CO2	Instrument Response	
	Bottle #	Value	%FS	Reading	%FS
1	CC410	14.86	74.30	14.86	74.30
2	CC73742	0.00	0.00	0.00	0.00
3	CC28435	15.08	75.40	15.13	75.65
4	CC73742	0.00	0.00	0.00	0.00
5	CC12396	14.63	73.15	14.56	72.80

Pearson Product Moment Correlation Coefficient = r = 1.0000





EPA METHOD 5 PARTICULATE SAMPLE APPARATUS


CONTINUOUS GAS ANALYSIS
FLOW SCHEMATIC
probe
calib. gas
sample
HEATED FILTER (250F)
ICE BATH CONDENSER
vent
UMBILICAL CORD
PRESSURE REGULATOR & GAUGE 0-15psig
SAMPLE MANIFOLD W/ CAP. RESTR.
thomas pump (force-fit)
NOx
CO/ CO2
O2
SO2
THC/ NMHC
ZERO & SPAN GAS IN
ANALYZERS

10. APPENDIX E: DISCHARGE PERMIT AND RELATED CORRESPONDENCE

10.1. Discharge Permit

10.2. Source Test Plan

10.3. Proposal

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

ALAMEDA COUNTY
Edward R. Campbell
Shirley J. Campbell
Loni Hancock
Frank H. Ogawa

CONTRA COSTA COUNTY
Paul L. Cooper
(Vice Chairperson)
unne Wright McPeak
Tom Powers

MARIN COUNTY
Al Aramburu

NAPA COUNTY
Bob White

SAN FRANCISCO COUNTY
Harry G. Britt
Jim Gonzalez

SAN MATEO COUNTY
Gus J. Nicolopulos
Anna Eshoo
(Secretary)

SANTA CLARA COUNTY
Martha Clevenger
Rod Diridon
Roberta H. Hughan
Susanne Wilson

SOLANO COUNTY
Osby Davis
(Chairperson)

SONOMA COUNTY
Jim Harberson
Patricia Hilligoss

May 14, 1991

Granite Construction Company
P.O. Box 900
Watsonville, CA 95077

Attention: Mr. Ray Johnson
Mr. Lon Dugger

Application Number: *5841*
Equipment Location:

13151 Pacheco Pass Hwy
Hollister, CA 95023

Gentlemen:

This is your Authority to Construct the following:

S-10 Aggregate Storage and Transport for the storage of crushed aggregate in piles, for the loading of aggregate into bins via front-end loader, and for traffic on the unpaved site.

S-12 Vibrating Screen System, BMG Model #VS501; five (5) 20-ton bins on rollers, each equipped with a vibrating screen for the screening of aggregate. The screen system will be enclosed and vented to baghouse, A-12 (see below).

S-13 Aggregate Conveyors, BMG Model #SCP3045, for the conveyance of cold feed aggregate.

S-14 Liquid Asphaltic Cement Storage, BMG Model #1FT30P, 30,000 gallon storage tank, with associated 2 MMBtu per hr diesel oil-fired burner for the storage and heating of asphaltic cement.

S-16 Drum Mixer, BMG Model 45R30P, 450 TPH, with burner blower rated at 150 MMBtu per hour, diesel oil-fired. The drum mixer will be abated to A-11 baghouse (see below).

S-17 Hot End Process, with drag slat conveyor BMG Model #DS45083P, and hot mix elevator and surge silo BMG Model #SS165PO. The entire hot end process shall be abated to baghouse A-11.

S-19 Diesel Generator, Caterpillar Model #3512TA, 1000 kW capacity, which shall be fired on #2 diesel fuel.

A-11 Baghouse, BMG Model #BH14198P, 78,120 cfm capacity, to abate S-16, drum mixer, and S-17, hot end process. The baghouse is rated at 0.01 grains per dscfm.

939 ELLIS STREET • SAN FRANCISCO, CALIFORNIA 94109 • (415) 771-6000 • FAX (415) 928-8560

RECYCLED PAPER

A-12 Baghouse, BMG model #JV-49-8 continuous duty pulse-jet JET-VENT, 3200 CFM @ 10"SP. This Baghouse shall abate the vibrating screen, S-12.

Operation of this equipment will be subject to the following specific conditions:

S-10:

1. The aggregate piles shall be sprayed with chemical suppressant each time the pile is disturbed, and as often as necessary to insure that the emissions from the piles do not exceed Ringleman 0.5, or result in fallout on adjacent property in such quantities as to cause a public nuisance. The piles shall be covered when not in active use.

2. The entire site where vehicular traffic or transport occurs shall be sprayed with chemical suppressant as often as necessary to insure that emissions from traffic and transport shall not exceed Ringleman 0.5, or result in fallout on adjacent property in such quantities as to cause a public nuisance.

S-12

1. The vibrating screen shall be enclosed and vented to Baghouse A-12. The baghouse shall be operated at all times that the screen is being used. The baghouse shall provide no less than 99% abatement of particulate emissions from the screen, and emissions from this source shall not exceed 0.0012 $^{lbs}/_{ton}$, or 0.3 $^{lbs}/_{hr}$, or a grain-loading of 0.01 $^{gr}/_{dscf}$.

S-14

1. The sulfur content of the diesel #2 fuel oil shall not exceed 0.15%, by weight.

2. Oil mist particulate emissions from the liquid asphalt storage tank shall be controlled at all times by steel wool packed demister containers or equivalent oil mist eliminators. ok

S-16

1. The drum mixer shall be abated to Baghouse A-11. The baghouse shall be operated at all times that the drum mixer is being used, and be in proper working order, as designed by the manufacturer.

2. The sulfur content of the diesel #2 fuel oil shall not exceed 0.15%, by weight.

3. A dedicated fuel oil meter and recording chart which indicates instantaneous fuel usage shall be installed and maintained. Recorded fuel meter data shall be retained for a period of at least two years from date of entry and made available to the District on demand.

4. As an alternative to the fuel meter/recorder specified in Condition #3 above, Granite Construction may maintain a District-approved daily log of fuel oil usage. Recorded data

shall be retained for a period of at least two years from date of entry and made available to the District on demand.

5. Emissions from the Baghouse, A-11, shall not exceed 0.01 $^{gr}/_{dscf}$.

6. A District-approved detector shall be installed and maintained in the baghouse, which detects broken bags. The detector warning indicator shall be audible and/or visible to plant personnel at all times. The drum mixer shall not be operated while baghouse A-11 is malfunctioning.

7. A continuous data logger/recorder or similar data gathering device shall be installed and maintained. The data logger/recorder shall record at a minimum the hours of drum mixer operation and hourly production rate.

S-17

1. The entire hot end process shall be enclosed and abated by the Baghouse, A-11. The baghouse shall be subject to conditions stated above.

S-19

1. The sulfur content of the diesel #2 fuel oil shall not exceed 0.15%, by weight.

2. Source S-19, Diesel Generator, shall not operate at a rate in excess of 600 kW electrical output, except for momentary spikes during equipment startup or for brief source test periods, as per condition 6 for the entire facility (see below). This limit may be adjusted by the District if the source test of this facility, (in conjunction with the source test of the Calaveras Rock facility, AC #6492) shows that the overall emissions do not meet the standards of District Regulation 2-2-301. In order to demonstrate compliance with this restriction, Granite Construction shall install, maintain, and operate an electrical output meter/continuous recorder to monitor S-19. If the emissions are significantly lower than District standards, this limit may also be adjusted accordingly.

3. As an alternative to the requirement for metering of the electrical output of the diesel generator, S-19, (stated in condition 2), Granite Construction may substitute a dedicated meter and recorder which indicates instantaneous fuel consumption -- if it can be established that there is a direct correlation between fuel consumption, electrical output, and NOx emissions rate (grams per kWhr) at S-19, Diesel Generator.

A-11

1. This baghouse shall not be operated in excess of 44,100 dscfm unless it can be shown by the source test of Condition 6 for the entire facility (see below) that total particulate emissions from A-11 do not exceed 3.55 lb/hr.

2. The particulate emissions from this baghouse shall not exceed 0.01 gr/dscf

A-12 1. The particulate emissions from this baghouse shall not exceed 0.01 gr/dscf.

The following conditions apply to the entire stationary source:

1. Visible particulate emissions from this source shall not exceed Ringlemann 0.5 or result in fallout on adjacent property in such quantities as to cause a public nuisance per Regulation 1-301.

2. On days when Granite Construction is operating alone, emissions of the following shall not be exceeded:

NOx	145.0 lbs/day
CO	200.0 lbs/day
POC	80.0 lbs/day
SO2	100.0 lbs/day
PM10	70.0 lbs/day
TSP	90.0 lbs/day

3. On days when both Granite Construction and Calaveras Rock (AC #6492) are operating in the same 24-hour calendar day, the emissions of the following shall not be exceeded:

NOx	145.0 lbs/day
CO	200.0 lbs/day
POC	100.0 lbs/day
SO2	145.0 lbs/day
PM10	80.0 lbs/day
TSP	100.0 lbs/day

4. When Granite Construction is operating alone, this plant shall not be operated in excess of 5 hours per day, 7 days per week, and 600 hours of operation per year, total. The plant shall not produce in excess of 150,000 tons of product in any consecutive 365-day period. The total daily tonnage limit is 2,250 tons per day.

5. When Granite Construction and Calaveras Rock (AC #6492) both operate during the same 24-hour calendar day, this plant shall not operate in excess of 4 hours (1,800 tons) per day, 7 days per week, for more than a total of 600 hours of operation per year. This plant shall not produce in excess of 150,000 tons in any consecutive 365-day period [AND] Calaveras Rock shall not operate their plant in excess of 7 hours (1,750 tons) per day, 7 days per week, for more than a total of 600 hours of operation per year. The quarrying/crushing/screening plant operated by Calaveras Rock will not produce in excess of 150,000 tons of product in any consecutive 365 day period.

6. Because this is a temporary plant, and because the emissions from this plant approach the BACT triggers for several pollutants, the District shall be notified in advance of the start-up date, and a District-approved source test shall be performed at a 450 TPH plant throughput for the above pollutants within 15 days from the date of start-up. A lower throughput for the source test may be used if Granite agrees to be conditioned to that throughput. The results shall be submitted to the District within 21 days of startup.

7. If the source test specified in Condition 6 above (in conjunction with the source test of the Calaveras facility, AC #6492) shows that the emission limits of Conditions 2 and 3 above are exceeded, the District shall further restrict as necessary the hours and production rates specified in Conditions 4 and 5 above. If the source test emissions are lower than expected, the District may increase accordingly the hours and production rates allowed.

8. In order to demonstrate compliance with the above permit conditions, the following records shall be maintained in a District approved log. These records shall be kept on site and made available for District inspection for a period of 24 months from the date on which a record is made.

   a. Total daily throughput of product.
   b. Total daily hours of operation.
   c. The daily throughput of product and hours of operation shall be totaled for all sources at this facility on a monthly basis.
   d. All records pertaining to S-14, as specified in Condition 1 for that source.
   e. All records pertaining to S-16, as specified in Conditions 2, 3,4, and 7 for that source.
   f. All records pertaining to S-19, as specified in Conditions 1, 2, and 3 for that source.

Notification

Please notify the District by letter at least three days before the initial operation of the equipment is to take place so that we may observe the equipment in operation and verify conformance with the Authority to Construct. Operation includes any start-up of the source for testing or other purposes. Operation of equipment without prior written notification to the District or beyond the start-up period without a Permit to Operate may result in enforcement action.

Start-Up Period

After receipt of the start-up letter required above, this Authority to Construct authorizes operation during the start-up period from the date of initial operation noted in your start-up letter until the Permit to Operate is

issued, up to a maximum of 60 days. All conditions (specific or implied) of the Authority to Construct are in effect during the start-up period.

Fees

District Regulation 3 requires a fee for each new Permit to Operate. You will be invoiced upon receipt of your start-up letter. No permits will be issued until all outstanding fees are paid.

Implied Conditions

In the absence of specific permit conditions to the contrary, the throughputs, fuel and material consumptions, capacities, and hours of operation described in your permit application will be considered maximum allowable limits. A new permit will be required before any increase in these parameters, or change in raw material handled, may be made.

Expiration

In accordance with Regulation 2-1-407, this Authority to Construct expires two years from the date of issuance unless substantial use of the authority has begun.

Correspondence

Please include your application number with any correspondence with the District regarding this matter. If you have any questions on this matter, please call **Barbara A. Lee, Air Quality Engineer I, at (415) 771-6000, extension 292.**
4709

Very truly yours,

Milton Feldstein
Air Pollution Control Officer

by John A. Swanson
Permit Services Division

JAS:KJL:BAL:bl

May 29, 1991

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

Attention: Mr. Tim Underwood

Regarding: Emission Testing on Asphalt Paving Plant #5446, Located in Pittsburg, California

Dear Mr. Underwood:

This correspondence is to notify the Department of the pending source test for the above-referenced facility, scheduled for June 11, 1991. Unless changed by the Department, this notice also serves as the approved source test plan.

1. Sources to be Tested: Asphalt Paving Plant Including the Drum Mixer and Generators

2. Sources Descriptions: Drum mixer emission controlled by baghouse
Diesel fired generator

3. Pollutant(s) to be Monitored: Drum Mixer - Total Particulates
Generators - NOx, CO, VOC & SOx*

4. Methods Approved: EPA Method 1-5 (with back half analysis), Method 6, 7E, 10, 25A & 9

5. Number of Sampling Replicates: Three per Exhaust

6. Source Testing Personnel: Two BWR Associates, Inc. representatives

7. Granite Construction Contact: Ron Yoakum
Telephone: (408) 848-1690

8. Applicable Process/Production Information to be collected by: Granite Construction for BWR Associates, Inc.

10. Opacity Readings to be taken by: BWR representative.
Certified Plume Evaluator: Yes (X) No ( )

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* Only if fuel exceeds 1/2% sulfur.

ii. Exhaust flow rate from the generators will be determined by using the designated factors outlined in part 60.45 of the CFR.

In no case will sampling replicate(s) be accepted if separated by a time duration of twenty-four (24) or more hours, unless prior authorization is granted by the Agency.

The source to be tested will operate at a nominal rate during testing. Rates not in agreement with those stipulated in the Air Contaminant Discharge Permit can result in test rejection for application to determine compliance. Imposed process limitations could also result in test report rejection.

If you have any questions, or need additional information, please let me know.

Sincerely,

R. L. Gantenbein, Jr., P.E.
General Manager

RLG/dmr

cc: Ron Yoakum, Granite Construction
P91-095

BWI ASSOCIATES, INC.

ENVIRONMENTAL CONSULTANTS

May 29, 1991

Granite Construction
P.O. Box 478
Santa Cruz, California 95061

Attention: Mr. Ron Yoakum

Regarding: Emission Testing Proposal for Asphalt Paving Plant Located in Pitchaco, Calif.

Dear Mr. Yoakum:

Attached, please find two copies of our proposal and quotation in response to your request regarding emission testing at Pitchaco, California. Testing is scheduled for June 11, 1991.

It is understood that the purpose of the testing is to determine the status of compliance in regards to applicable regulations. BWR Associates, Inc. proposes to use standard EPA source test Methods 1 through 5, to determine particulate emissions which would include determination of flow rate, molecular weight and moisture. Method 7E will be used for determination of Nitrogen Oxides (NO_x), and Method 10 for Carbon Monoxide (CO). Hydrocarbons will be determined by EPA approved Method 25A (Flame Ionization Detection). Method 6 for sulfur dioxide and EPA Methods 1 & 2 to determine flow rate and moisture.

The quotation (based on an 8-hour work day) includes the services of a professional sampling team consisting of two testers, and the appropriate laboratory and data processing support. Additional field work (i.e., system tuning, field weights/calculations) will be charged at consulting rates. A sampling vehicle will be located on site, as close to the test duct as possible, to serve as a base for testing. BWR will provide all testing equipment and sufficient manpower to determine the parameters outlined in the proposal. Collected samples will be secured and transported to the BWR lab for final analysis. BWR insures the precision and accuracy of the measurements and analytical determinations by maintaining a comprehensive quality assurance program as prescribed in EPA publications.

Granite Construction is to provide the following:

1. All information necessary to complete any required Source Test Plan.

2. Any required entry or safety permits.

3. Clear access to the test site and sampling vehicle location.

4. Clear access to the test duct and suitable platforms at the test ports.

5. Three inch or four inch standard pipe nipple test ports with provisions for supporting test equipment for particulate sampling (four inch ports are preferred). One inch standard pipe test ports for gaseous sampling.

6. Two 110 volt/30A electrical circuits with outlets within 100 feet of the test duct. (3-prong "U" ground)

7. Any process information to be included in the report.

In addition, BWR Associates recommends a minimum of eight hours of continuous operating time on the scheduled test day(s) for gathering representative data.

The quotation, excluding stand-by time, if any, is $6.606 (Six Thousand Six Dollars) and includes sampling, analysis, report compilation, travel time, and expenses. **This estimate is valid for a period of sixty (60) days.** There will be no charges for BWR sampling equipment failures, or collection of non-isokinetic samples. However, if significant delays are caused by upset sampling conditions, or client unpreparedness, an additional stand-by charge will be added. Cancellation within four working days or after the test team is on site will be charged at the rate of 20% of the quotation plus actual travel and per diem expenses. Appropriate adjustments to the quotation may be made to cover any additions or deletions to the measurements required, before or during the testing. Upon completion of field testing, the invoice is mailed. **Terms are net ten days.** Our policy is to mail the report once the invoice is paid in full.

Three copies of the final confidential report, including all field and analytical data, calculations and results, will be mailed three weeks after completion of the testing.

In the case where litigation occurs to enforce this agreement, the prevailing party shall be entitled to collect attorney fees.

To indicate acceptance of our proposal and terms, please sign one copy and return it to our office, along with a copy of your purchase order, if one is required.

Upon acceptance of this proposal and confirmation of a test date which meets with your schedule, a Source Test Plan will be filed as required by the agency.

If you have any questions, do not hesitate to call me.

Sincerely,

Mark W. Bailey for

R. L. Gantenbein, Jr. P. E.
General Manager

Granite Construction Co.

By: _____

Date: _____

Enclosures

RLG/dmr
P91-095