Appendix A

Analytical Methodology

State of California
Air Resources Board
Monitoring & Laboratory Division

S.O.P. No. NLB021

Standard Operating Procedure for the Determination of Benomyl and Its Breakdown Product, Carbendazim, in Ambient Air

1. SCOPE

1.1 This document describes an HPLC procedure for the determination of benomyl and its breakdown product, carbendazim, from ambient air samples. The procedure was developed from EPA Test Method 402, dated January 1983.

1.2 This procedure will not separate carbendazim from benomyl. If both of these compounds are suspected to be present, the benomyl results should be considered to include the contribution of its breakdown product, carbendazim.

2. SUMMARY OF METHOD

The exposed XAD-2 sorbent tubes are frozen until desorbed with 2 mL of acetonitrile. The injection volume is 50 uL. The reverse phase chromatographic method employs an isocratic mobile phase and a silica/C_{18} bonded stationary phase with ultraviolet spectrometric detection.

3. INTERFERENCES/LIMITATIONS

3.1 Method interferences may be caused by contaminants in solvents, reagents, glassware or other processing apparatus that lead to discrete artifacts or elevated baselines. A method blank must accompany all quantitation runs to detect any possible method interferences.

3.2 Matrix interferences may be caused by contaminants that are coextracted from the sample. The extent of matrix interferences will vary from source to source.

4. APPARATUS

4.1 An all Waters HPLC system consisting of a 510 solvent delivery unit. 710 WISP (automated sampler), 490 Programmable Multiwavelength Detector and an 840 data and chromatography control station employing a Digital 350 computer.

4.2 Column: Waters uBondapakC_{18} 3.9 mm x 30 cm.

4.3 Supelco 4 mL glass desorption vials with Teflon septum screw caps. Sun Brokers 1 mL autosampler "SunVial" with polyethylene cap septum.

4.4 Sample shaker/desorber with timer and sample rack.

4.5 Gelman AcroPrep syringeless 0.45 um PTFE membrane sample filter units.

4.6 Filtration and degassing system for solvents such as Waters Part #85124.

4.7 Volumetric Class A glassware normally found in an analytical laboratory.

5. REAGENTS

5.1 HPLC Mobile Phase -- Dissolve 4.1 g of sodium acetate in 450 mL of HPLC-grade water. Add 50 mL glacial acetic acid. Mix thoroughly. Add 500 mL of HPLC-grade acetonitrile and mix thoroughly.

5.2 Benomyl; Methyl-1-[butylcarbamoyl]-2-benzimidazole carbamate obtained from Chem Service, Inc.

6. CALIBRATION

6.1 Establish HPLC operating parameters equivalent to those indicated in Table 1.

6.2 Stock Standard: Dissolve approximately 0.0400 g benomyl in 100 mL ACN.

Intermediate Standard (IS): Dilute stock standard to obtain an IS of 100 ug/mL.

6.3 Working or Calibration Standards: Dilute the IS to obtain calibration standards of 1, 4, 8 and 12 ug/mL.

6.4 Equilibrate the column for 30 minutes at initial start-up for the day. Analyze a blank to check for method interferences.

6.5 Calibrate the instrument using the three calibration standards and quantitate on average peak area using three injections per standard.

6.6 Check the calibration of the instrument by analyzing a 5 ug/mL control sample. The concentration given must fall within the UWL and LWL of the control sample value (±2 S.D.). Plot all results on the method control chart.

7. ANALYSIS OF SAMPLES

7.1 The field samples are collected on a XAD-2 sorbent air sample tube (SKC #226-30-06) which are refrigerated after exposure and before desorption.

7.2 Remove the glass wool plug from the primary end of the XAD-2 tube with a forceps and place it into a 4 mL desorbing vial. Pour the XAD-2 resin into the vial and add 2.0 mL of acetonitrile.

Retain the secondary section of the XAD-2 tube for later analyses in case the primary section gives a positive result.

7.3 Agitate the capped vials for 45 minutes. Filter the extract through a 0.45 um PTFE filter and pour the filtrate into a 1 mL autosampler vial.

7.4 Analyze a control and blank every 10 samples to check the instrument calibration.

7.5 Results are recorded in micrograms per sample and are calculated as:

ug = ug/mL (found) x 2 mL

8. <u>METHOD SENSITIVITY, PRECISION AND ACCURACY</u>

Benomyl Concentration (ug/mL):	1,	4,	8,	12
Coefficient of Variation:	2.3%	4.7%	1.7%	2.4%

Correlation Coefficient: 0.999

Slope: 0.999

Intercept: 0.00121

MLD: 1 x 3 SD = -0.00141 + 3 (0.021)

= 0.1 ug/mL

n =3

9. QUALITY CONTROL INFORMATION

9.1 Six XAD-2 vials were spiked at three different concentration levels for a total of eighteen spiked samples. The vials were extracted and analyzed three to six days later.

Spike Amount (ug)	Recovered (ug)	% Recovered	% RSD
2.3	2.0	87	1.8
3.4	3.6	106	5.5
7.8	7.3	94	1.8

9.2 Instrument Variability

Six replicate injections of one sample, repeated at each of the three concentration levels used in the spike studies, were used to test for method precision.

Amount (ug)	Standard Deviation	% RS
2.3	0.04	1.6
3.4	0.03	0.8
7.8	0.14	1.8

10. COLLECTION CONVERSION EFFICIENCY

Six additional XAD-2 vials were spiked, as above, and exposed to ambient conditions at 2.5 LPM for 24 hours. The vials were extracted and analyzed with quality control samples above.

Spike Amount (ug)	Recovered (ug)	% Recovered	% RSD
2.3	1.6	71	7.4
3.4	3.0	88	8.6
7.8	6.8	87	13.0

Table 1

HPLC Chromatographic Conditions

Column:	Waters uBondapak C_{18} 3.9 mm x 30 cm.
Pre-Column:	Waters Guard-PAK uBondapak C_{18}
Flow Rate:	1.0 mL/min
Injection Volume:	50 uL
Temperature:	$30^{o}C \pm 1^{o}$
Detector:	280 nm wavelength U.V. sample rate at 2 points/second and 1.00 AUFS. Retention time is approximately four minutes under these conditions.
Mobile Phase:	50% acetonitrile/50% - 10% v/v glacial acetic acid, 0.10 M sodium acetate.

Appendix B

Sampling Data and Results

BENOMYL PESTICIDE SAMPLING STUDY
SAMPLING TUBE DATA

Sta. 1A: Pond School (collocated with 1B)

SAMPLE NUMBER	MONTH	BEGIN			END			SAMPLE TIME, min.	FLOW, lpm	VOLUME, liters	SAMPLE, ug	SAMPLE CONCENTRATION	
		day	hour	min.	day	hour	min.					ng/liter	ppt
1A- 1	Feb.	8	13	51	9	10	57	1266	2.5	3165	< 0.2	< 0.06	< 5
1A- 2		9	10	58	10	11	8	1450	2.5	3625	< 0.2	< 0.06	< 5
1A- 3		10	11	10	11	8	45	1295	2.5	3238	< 0.2	< 0.06	< 5
1A- 4		16	13	20	17	9	45	1225	2.5	3063	< 0.2	< 0.07	< 5
1A- 5		17	9	45	18	10	11	1466	2.5	3665	< 0.2	< 0.05	< 5
1A- 6		18	10	11	19	10	50	1479	2.5	3698	< 0.2	< 0.05	< 4
1A- 7		22	13	45	23	14	30	1485	2.5	3713	< 0.2	< 0.05	< 4
1A- 8		23	14	30	24	10	20	1190	2.5	2975	< 0.2	< 0.07	< 6
1A- 9		24	10	20	25	10	15	1435	2.5	3588	< 0.2	< 0.06	< 5
1A-10		25	10	15	26	8	55	1360	2.5	3400	< 0.2	< 0.06	< 5
1A-11	Mar.	1	9	25	2	9	15	1430	2.5	3575	< 0.2	< 0.06	< 5
1A-12		2	9	15	3	9	20	1445	2.5	3613	< 0.2	< 0.06	< 5
1A-13		3	9	20	4	8	50	1410	2.5	3525	< 0.2	< 0.06	< 5

BENOMYL PESTICIDE SAMPLING STUDY
SAMPLING TUBE DATA

Sta. 1B: Pond School (collocated with 1A)

SAMPLE NUMBER	MONTH	BEGIN			END			SAMPLE TIME, min.	FLOW, lpm	VOLUME, liters	SAMPLE, ug	SAMPLE CONCENTRATION	
		day	hour	min.	day	hour	min.					ng/liter	ppt
1B- 1	Feb.	8	13	51	9	10	58	1267	2.5	3168	< 0.2	< 0.06	< 5
1B- 2		9	10	59	10	11	10	1451	2.5	3628	< 0.2	< 0.06	< 5
1B- 3		10	11	11	11	8	45	1294	2.5	3235	< 0.2	< 0.06	< 5
1B- 4		16	13	22	17	9	46	1224	2.5	3060	< 0.2	< 0.07	< 5
1B- 5		17	9	46	18	10	12	1466	2.5	3665	< 0.2	< 0.05	< 5
1B- 6		18	10	12	19	10	50	1478	2.5	3695	< 0.2	< 0.05	< 4
1B- 7		22	13	45	23	14	30	1485	2.5	3713	< 0.2	< 0.05	< 4
1B- 8		23	14	30	24	10	20	1190	2.5	2975	< 0.2	< 0.07	< 6
1B- 9		24	10	20	25	10	15	1435	2.5	3588	< 0.2	< 0.06	< 5
1B-10		25	10	15	26	8	55	1360	2.5	3400	< 0.2	< 0.06	< 5
1B-11	Mar.	1	9	25	2	9	10	1425	2.5	3563	< 0.2	< 0.06	< 5
1B-12		2	9	15	3	9	20	1445	2.5	3613	< 0.2	< 0.06	< 5
1B-13		3	9	20	4	8	50	1410	2.5	3525	< 0.2	< 0.06	< 5

BENOMYL PESTICIDE SAMPLING STUDY
SAMPLING TUBE DATA

Sta. 2: Browning School, McFarland

SAMPLE NUMBER	MONTH	BEGIN			END			SAMPLE TIME, min.	FLOW, lpm	VOLUME, liters	SAMPLE, ug	SAMPLE CONCENTRATION	
		day	hour	min.	day	hour	min.					ng/liter	ppt
2- 1	Feb.	8	14	21	9	11	53	1292	2.5	3230	< 0.2	< 0.06	< 5
2- 2		9	11	54	10	11	46	1432	2.5	3580	< 0.2	< 0.06	< 5
2- 3		10	11	47	11	9	9	1282	2.5	3205	< 0.2	< 0.06	< 5
2- 4		16	13	56	17	10	20	1224	2.5	3060	< 0.2	< 0.07	< 5
2- 5		17	10	20	18	10	55	1475	2.5	3688	0.2	0.05	4
2- 6		18	10	55	19	9	40	1365	2.5	3413	< 0.2	< 0.06	< 5
2- 7		22	14	15	23	15	0	1485	2.5	3713	0.2	0.05	4
2- 8		23	15	0	24	9	45	1125	2.5	2813	< 0.2	< 0.07	< 6
2- 9		24	9	45	25	10	40	1495	2.5	3738	< 0.2	< 0.05	< 4
2-10		25	10	40	26	9	20	1360	2.5	3400	< 0.2	< 0.06	< 5
2-11	Mar.	1	10	5	2	10	0	1435	2.5	3588	< 0.2	< 0.06	< 5
2-12		2	10	0	3	10	15	1455	2.5	3638	< 0.2	< 0.05	< 5
2-13		3	10	15	4	9	20	1385	2.5	3463	< 0.2	< 0.06	< 5

BENOMYL PESTICIDE SAMPLING STUDY
SAMPLING TUBE DATA

Sta. 3: McFarland Learning Center

SAMPLE NUMBER	MONTH	BEGIN			END			SAMPLE TIME, min.	FLOW, lpm	VOLUME, liters	SAMPLE, ug	SAMPLE CONCENTRATION	
		day	hour	min.	day	hour	min.					ng/liter	ppt
3- 1	Feb.	8	14	35	9	12	31	1316	2.5	3290	< 0.2	< 0.06	< 5
3- 2		9	12	32	10	12	8	1416	2.5	3540	< 0.2	< 0.06	< 5
3- 3		10	12	9	11	9	20	1271	2.5	3178	< 0.2	< 0.06	< 5
3- 4		16	14	10	17	10	44	1234	2.5	3085	< 0.2	< 0.06	< 5
3- 5		17	10	44	18	11	15	1471	2.5	3678	< 0.2	< 0.05	< 5
3- 6		18	11	15	19	9	50	1355	2.5	3388	< 0.2	< 0.06	< 5
3- 7		22	14	22	23	15	10	1488	2.5	3720	< 0.2	< 0.05	< 4
3- 8		23	15	10	24	9	55	1125	2.5	2813	< 0.2	< 0.07	< 6
3- 9		24	9	55	25	10	55	1500	2.5	3750	< 0.2	< 0.05	< 4
3-10		25	10	55	26	9	40	1365	2.5	3413	< 0.2	< 0.06	< 5
3-11		1	10	20	2	10	25	1445	2.5	3613	< 0.2	< 0.06	< 5
3-12		2	10	25	3	10	40	1455	2.5	3638	< 0.2	< 0.05	< 5
3-13		3	10	40	4	9	45	1385	2.5	3463	< 0.2	< 0.06	< 5

BENOMYL PESTICIDE SAMPLING STUDY
SAMPLING TUBE DATA

Sta. 4: Wasco High School

SAMPLE NUMBER	MONTH	BEGIN			END			SAMPLE TIME, min.	FLOW, lpm	VOLUME, liters	SAMPLE, ug	SAMPLE CONCENTRATION	
		day	hour	min.	day	hour	min.					ng/liter	ppt
4- 1	Feb.	School Holiday											
4- 2		9	10	19	10	10	12	1433	2.5	3583	< 0.2	< 0.06	< 5
4- 3		10	10	12	11	8	22	1330	2.5	3325	< 0.2	< 0.06	< 5
4- 4		16	15	0	17	9	0	1080	2.5	2700	< 0.2	< 0.07	< 6
4- 5		17	9	0	18	9	40	1480	2.5	3700	< 0.2	< 0.05	< 4
4- 6		18	9	40	19	10	25	1485	2.5	3713	< 0.2	< 0.05	< 4
4- 7		22	14	50	23	14	0	1390	2.5	3475	< 0.2	< 0.06	< 5
4- 8		23	14	0	24	11	0	1260	2.5	3150	< 0.2	< 0.06	< 5
4- 9		24	11	0	25	9	30	1350	2.5	3375	< 0.2	< 0.06	< 5
4-10		25	9	30	26	8	46	1396	2.5	3490	< 0.2	< 0.06	< 5
4-11	Mar.	1	9	0	2	8	50	1430	2.5	3575	< 0.2	< 0.06	< 5
4-12		2	8	50	3	9	15	1465	2.5	3663	0.2	0.05	5
4-13		3	9	15	4	8	30	1395	2.5	3488	< 0.2	< 0.06	< 5

BENOMYL PESTICIDE SAMPLING STUDY
SAMPLING TUBE DATA

Sta. 5: Bakersfield (background station)

SAMPLE NUMBER	MONTH	BEGIN			END			SAMPLE TIME, min.	FLOW, lpm	VOLUME, liters	SAMPLE, ug	SAMPLE CONCENTRATION	
		day	hour	min.	day	hour	min.					ng/liter	ppt
5- 1	Feb.	8	15	47	9	8	44	1017	2.5	2543	< 0.2	< 0.08	< 7
5- 2		9	8	47	10	8	57	1450	2.5	3625	< 0.2	< 0.06	< 5
5- 3		10	8	58	11	10	17	1519	2.5	3798	< 0.2	< 0.05	< 4
5- 4		16	16	15	17	11	40	1165	2.5	2913	< 0.2	< 0.07	< 6
5- 5		17	11	40	18	12	10	1470	2.5	3675	< 0.2	< 0.05	< 5
5- 6		18	12	10	19	8	50	1240	2.5	3100	< 0.2	< 0.06	< 5
5- 7		22	15	45	23	16	25	1480	2.5	3700	0.6	0.16	13
5- 8		23	16	25	24	9	0	995	2.5	2488	< 0.2	< 0.08	< 7
5- 9		24	9	0	25	11	45	1605	2.5	4013	< 0.2	< 0.05	< 4
5-10		25	11	45	26	7	45	1200	2.5	3000	< 0.2	< 0.07	< 6
5-11	Mar.	1	8	10	2	8	0	1430	2.5	3575	< 0.2	< 0.06	< 5
5-12		2	8	0	3	8	15	1455	2.5	3638	< 0.2	< 0.05	< 5
5-13		3	8	15	4	7	40	1405	2.5	3513	< 0.2	< 0.06	< 5

BENOMYL PESTICIDE SAMPLING STUDY
SAMPLING TUBE DATA

Sta. 6: Field Study (sampling during and after field application)

SAMPLE NUMBER	MONTH	BEGIN			END			SAMPLE TIME, min.	FLOW, lpm	VOLUME, liters	SAMPLE, ug	SAMPLE CONCENTRATION	
		day	hour	min.	day	hour	min.					ng/liter	ppt
6- 1	Feb.	23	6	10	23	8	10	120	1.9	228	< 0.2	< 0.88	< 73
6- 2		23	9	45	23	10	45	60	1.9	114	< 0.2	< 1.75	< 145
6- 3		23	10	45	23	11	45	60	1.9	114	< 0.2	< 1.75	< 145
6- 4		23	13	0	24	13	0	1440	1.9	2736	< 0.2	< 0.07	< 6

DFT C88-012

BENOMYL PESTICIDE SAMPLING STUDY
SAMPLING TUBE DATA

Sta. 6E: Field Study (collocated with sampling station 6)

SAMPLE NUMBER	MONTH	BEGIN			END			SAMPLE TIME, min.	FLOW, lpm	VOLUME, liters	SAMPLE, ug	SAMPLE CONCENTRATION	
		day	hour	min.	day	hour	min.					ng/liter	ppt
6E- 1	Feb.	23	6	10	23	8	10	120	1.9	228	< 0.2	< 0.88	< 73
6E- 2		23	9	45	23	10	45	60	1.9	114	< 0.2	< 1.75	< 145
6E- 3		23	10	45	23	11	45	60	1.9	114	< 0.2	< 1.75	< 145
6E- 4		23	13	0	24	14	0	1500	1.9	2850	< 0.2	< 0.07	< 6

DFT C88-012

Appendix C

Laboratory Data and Results

Sacramento Laboratory Sample Analysis Request/Report Form
Monitoring & Laboratory Division - Laboratory Services Section

Division/Section Submitting Request:	Date Submitted:	Control Number:
SSD/TOXIC PROGRAM SUPPORT	16 FEB 88	16995-17097
Name of Requestor:	**Phone Number:**	**Expected Sample Receipt Date:**
ROBERT BARHAM	322-7072	11 FEB 88
Analytical Service Requested:		**Expected Sample Turn-Around Time:**
BENOMYL ANALYSIS		2 MONTHS

Description of Sample (how and where taken, purpose of sampling):

ONE HUNDRED AND THREE XAD-2 TUBES EXPOSED TO APPROXIMATELY 4 M^3 OF AMBIENT AIR AT VARIOUS POINTS IN KERN COUNTY DURING THE SPRAYING OF BENOMYL PESTICIDE ON FIELD CROPS. THE SAMPLING WAS DONE AT THE 4 FEB 88 REQUEST OF DFA AS PART OF THE REQUIREMENTS FOR AB 1807. SAMPLES WERE IDENTIFIED BY LOG # 1-157 (NOT INCLUSIVE).

Specific Compounds/Elements/Ions to Analyze for of Identify: (see listing on reverse side)

BENOMYL (METHYL 1-(BUTYLCARBAMOYL)-2-BENZIMIDAZOLE-CARBAMATE)
AND ITS BREAKDOWN PRODUCT METHYL 2-BENZIMIDAZOLE CARBAMATE

RESULTS

Analyst's Signature:	Phone Number:	Date Completed:	Instrument/Method:
D. J. Hartmann	324-6863	14 APR 88	HPLC/NLS 021

Qualitative Information/Quantitative Data:

SEE ATTACHMENT

Description of Methods Used:

REVERSE PHASE LIQUID CHROMATOGRAPHY EMPLOYING AN ISOCRATIC MOBILE PHASE AND A REVERSE-PHASE COLUMN WITH ULTRAVIOLET DETECTION @ 280 nM. THE METHOD IS SIMILAR TO EPA'S TEST METHOD #402.

Supervisor's Approval:	Phone Number:	Date:
R. C. Kuhlman	322-6042	20 APR 88

cc: David Todd
Lynn Baker
Mike Pearce

Benomyl Analysis Results
Kern County Study
February-March, 1988
Method NLS021

I. Field Sample Analysis Result

Log #	Sample #	Sample Date	Sample I.D.	Analysis Result (ug)
35	2-5	2/18/88	Browning School	0.2
58	2-7	2/23/88	Browning School	0.2
63	5-7	2/23/88	Bakersfield	0.6
136	4-12	3/3/88	Wasco	0.2

The remaining 91 field samples fell below the method's detection limit of 0.2 ug.

II. Field Spike Analysis Results

Log #	Sample #	Date Exposed	Site I.D.	Analysis Result (ug)
129	1A-12	3/3/88	Pond 12 ug Spike	10.2
134	3-12	3/3/88	LRN CTR 12 ug Spike	10.6
132	2-12	3/3/88	Browning 5 ug Spike	4.4
~~132~~ 137	5-12	3/3/88	Bakersfield 5 ug Spike	5.3

XAD-2 tubes were spiked with the amount indicated and then exposed for 24 hours at 2.5 LPM at the sites indicated.

II. Trip Spike Analysis Results

Log #	Sample #	Spike Amt.ug	Anal.Res. ug
142	7S-1	12	12.2
144	7S-3	12	11.2
143	7S-2	5	4.6
145	7S-4	5	4.4

These spikes were not exposed but made a trip "loop" similar to the field spikes.

IV. Quality Control Information

Six XAD-2 vials were spiked at three different concentration levels giving a total of eighteen spiked samples. The vials were extracted and analyzed three to six days later.

Spike Amount (ug)	Recovered (ug)	% Recovered	% RSD
2.3	2.0	87	1.8
3.4	3.6	106	5.5
7.8	7.3	94	1.8

V. Instrument Variability

Six replicate injections of one sample repeated at each of the three concentration levels used in the QC spike studies were used to test for method precision.

Amount (ug)	Standard Deviation	% RS
2.3	0.04	1.6
3.4	0.03	0.8
7.8	0.14	1.8

VI. Collection Conversion Efficiency

Six additional XAD-2 vials were spiked as above and exposed to ambient conditions at 2.5 LPM for 24 hours. The vials were extracted and analyzed with the quality control samples above.

Spike Amount (ug)	Recovered (ug)	% Recovered	% RSD
2.3	1.6	71	7.4
3.4	3.0	88	8.6
7.8	6.8	87	13.0

Appendix D

Quality Control/Quality Assurance

QUALITY CONTROL

Procedures to document the accuracy of reported sampling and analytical results have been established by the ARB for most sampling procedures in the Air Monitoring Quality Assurance, Volume VI, Standard Operating Procedures for Stationary Source Emission Monitoring and Testing and in the draft Quality Assurance Plan for Pesticide Sampling. These quality control (QC) procedures include the use of audit samples, field and laboratory blank samples, and multi-point calibration of analyzers. Quality control procedures are necessary to minimize random and systematic errors in sampling that could lead to incorrect results, or incorrect conclusions. Specific QC considerations for this pesticide sampling are given below.

A. Field QC

Several QC measures were taken during the course of the sampling program. Prior to each sampling, the tube was covered to protect the resin from sunlight, the inlet protected from rain, and the sampling train was checked for leaks at the start and end of each sample run. Immediately after being collected tube samples were capped, labeled, logged, placed in a speciman tube with a screw cap, and then stored with ice in a covered ice chest until delivered to the laboratory.

Collocated samplers were placed at the Pond School site between two and four meters apart. But all samples were below detection limits so precision cannot be calculated. On a daily basis, blank XAD-2 resin tubes were created and stored with the samples until submitted to the lab for analysis.

The Quality Assurance (QA) Section of MLD performed a "flow check" of all rotometers on December 24, 1987. The "flow check" measured true flow through the rotometers with a standard limiting orifice combined with a calibrated magnehelic pressure gauge. The flow checks indicated that the true flow was close to that indicated by the flow meters of the sampling train. A copy of the report is at the end of this Appendix. No corrections have been made to the data based upon the results of that report and no other corrections have been made to the data based upon QC reports. One possible concern was siting. The sampler intake probes did not extend the required one meter minimum from the supporting structure at any of the sites. However, obstruction to flow should not be a problem because of the relatively small size of the supporting structure (approximately one to two inches effective diameter).

B. Chain of Custody

All sample labels contain the job number, the date the sample was taken, the sample or run number, the sample location, the type of sample, the chain of custody log number for the sample, and the labeler's initials.

Each sample custodian is responsible for insuring sample integrity until the sample is transferred to another person. The following people were required to maintain log books: ARB field personnel and all laboratory receivers. Also, each laboratory is required to maintain its own internal chain-of-custody record for all samples received for this project. If any samples were damaged or the integrity was questionable, a note was to be made and initialed by the person delivering the sample on the chain of custody sheet.

C. Laboratory QC

From the time the samples are collected, they are logged and chain of cutody is maintained by the field personnel until the samples reach the laboratory. At that point laboratory personnel maintain a separate log sheet so that the time between collection and analysis can be determined. Precision and accuracy of the measured concentrations can be affected by the amount of time elapsed between collection and analysis, sample tube handling, the condition of the tubes and instrument accuracy. Instrument accuracy is determined by the laboratory personnel using known standard, audit samples, field and laboratory blanks, and multipoint calibrations.

As required by the draft Quality Assurance Plan for Pesticide Sampling, the laboratory determined instrument variability, sample recovery, and conversion/collection efficiency. The laboratory also provide field spikes, some of which were placed in a sampler and used to collect a sample. Other field spikes were taken into the field and returned to the laboratory with the collected samples. The results of the laboratory's work is shown in Appendix A, Sample Methodology, and Appendix C, Laboratory Data and results.

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Testing Section

LOG NUMBER: SL-500
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

FROM: Rudy Abangan, AP Specialist

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name QASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 1	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 in 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression Slope	1.0150		
(x = True: Y = Intercept	-0.0433		
"As is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Co. .ents:
Calibration Equation: Display = 1.02 Air Flow -0.04
Air Flow = 0.99 Display +0.04

Calibrated By D. Boggs/J. Bearden

Checked By K. Kalthoff

MLD-25 (1/88)

• VOL-O-FLO CALIBRATION

Log No.: SL-500

Date: 12-23-87

Make: Dwyer

Model: 0-5 lpm

S/N: 1

Prop. No.: N/A

Transfer Standard: Matheson 5-1

Prop. No.: 06852

Date of Last Calibration: 12-17-87

Airflow = (Display + 0.4704) ÷ 9.4093

Ambient Pressure (P_A) 768.2

Ambient Temperature (T_A) 24.4

SSD

VOL-O-FLO		TRANSFER STANDARD		
ΔP	ΔP_{std}	Set Point	Display	Air Flow
4.5	N/A	N/A	41.6	4.47
3.5			32.7	3.53
2.5			22.6	2.45
1.5			13.9	1.52
1.0			9.4	1.05
4.5			35.4	3.81
2.5			20.7	2.25
1.0			8.8	0.99

$$\Delta P_{std} = \Delta P \; [1 + 0.00263\,(25°C - T_A)] \left(\frac{298°}{273 + T_A}\right) \left(\frac{P_A}{760mm}\right)$$

Results: Display = 1.0151 OK Airflow = 0.0432

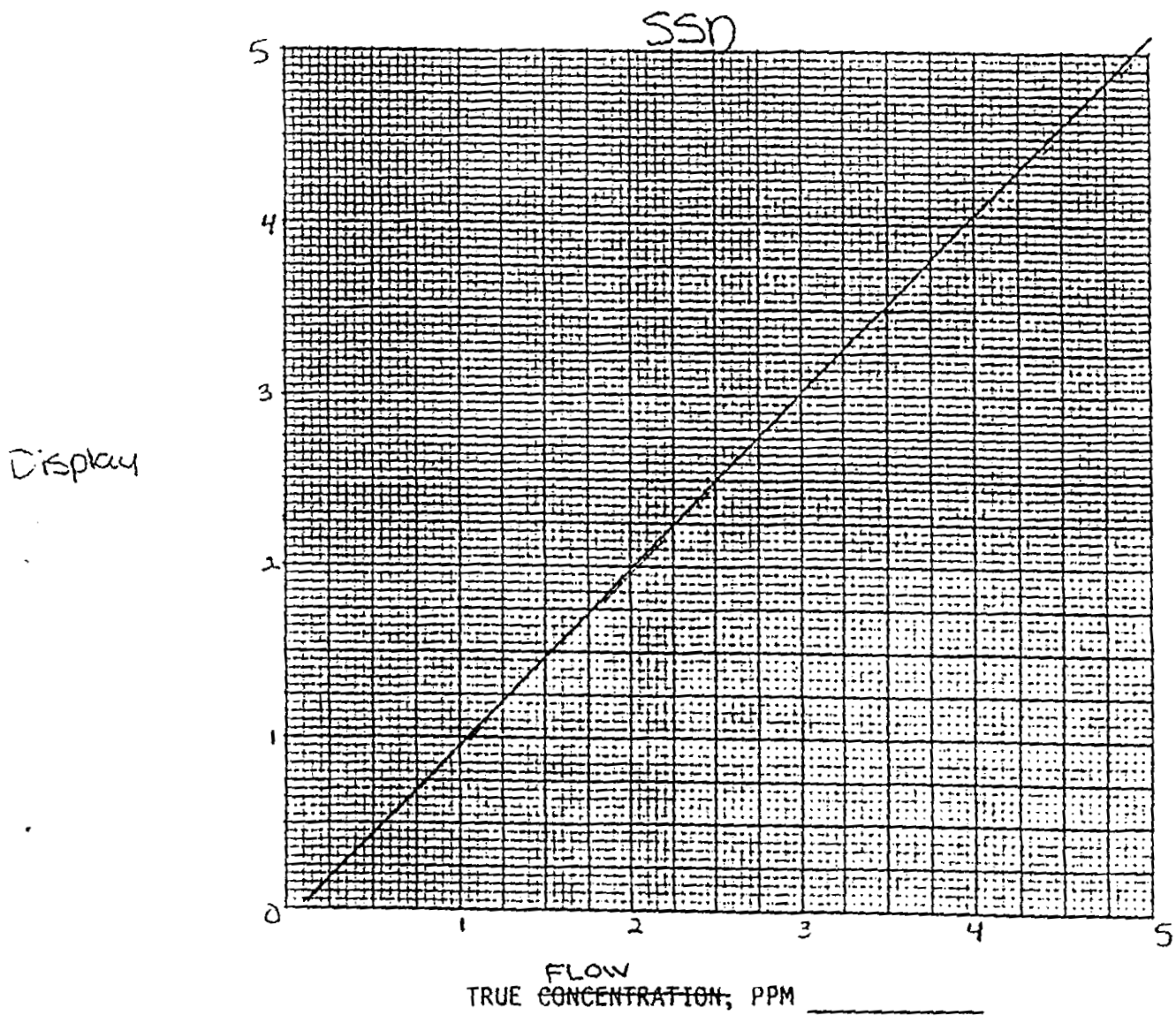
Comments Corr. Coef = 0.99997

AirFlow = 0.9852 + 0.0426

Calibrated by D. Boggs / D. Reeder Checked By R. Nunes

LOG NUMBER: SL-500
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

Station Name: QASL Site No.: 34-299
Instrument Make and Model: Dwyer Flowmeter D-5
Instrument Property No.: N/A ; Serial No.: 1



COMMENTS: _____

TSD-24 (12/82)

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Testing Section

LOG NUMBER: SL-500 A
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

FROM: Rudy Abangan, AP Specialist

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name QASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 2	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 In 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression Slope	1.0292		
(x = True; Y = Intercept	0.0414		
"As Is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Comments:
Calibration Equation: Display = 1.03 Air Flow +0.04
Air Flow = 0.97 Display -0.04

Calibrated By J. Bearden/D. Boggs

Checked By K. Kalthoff

MLD-25 (1/88)

VOL-O-FLO CALIBRATION

Log No.: S1-300A

Date: 12-24-87

Make: Dwyer

Model: 0→5 lpm

S/N: 2

Prop. No.: N/A

Transfer Standard: Metron 5m1

Prop. No.: 06852

Date of Last Calibration: 12-17-87

Airflow = (Display + 0.4704) ÷ 9.4093

Ambient Pressure (P_A) 768.0

Ambient Temperature (T_A) 24°C

SSD

VOL-O-FLO		TRANSFER STANDARD		
Δ P	Δ P_{std}	Set Point	Display	Air Flow
4.5	N/A	N/A	40.3	4.33
3.5			31.2	3.37
2.5			21.9	2.38
1.5			12.8	1.41
1.0			8.4	0.94
4.5			36.7	3.95
2.5			22.4	2.43
1.0			9.0	1.00

$$\Delta P_{std} = \Delta P \; [1 + 0.00263\,(25°C - T_A)] \left(\frac{298°}{273 + T_A}\right) \left(\frac{P_A}{760mm}\right)$$

Results: Display = 1.0292 α Airflow + 0.04139

Comments Corr Coef = 0.9999

Airflow = 0.9716 − 0.0402

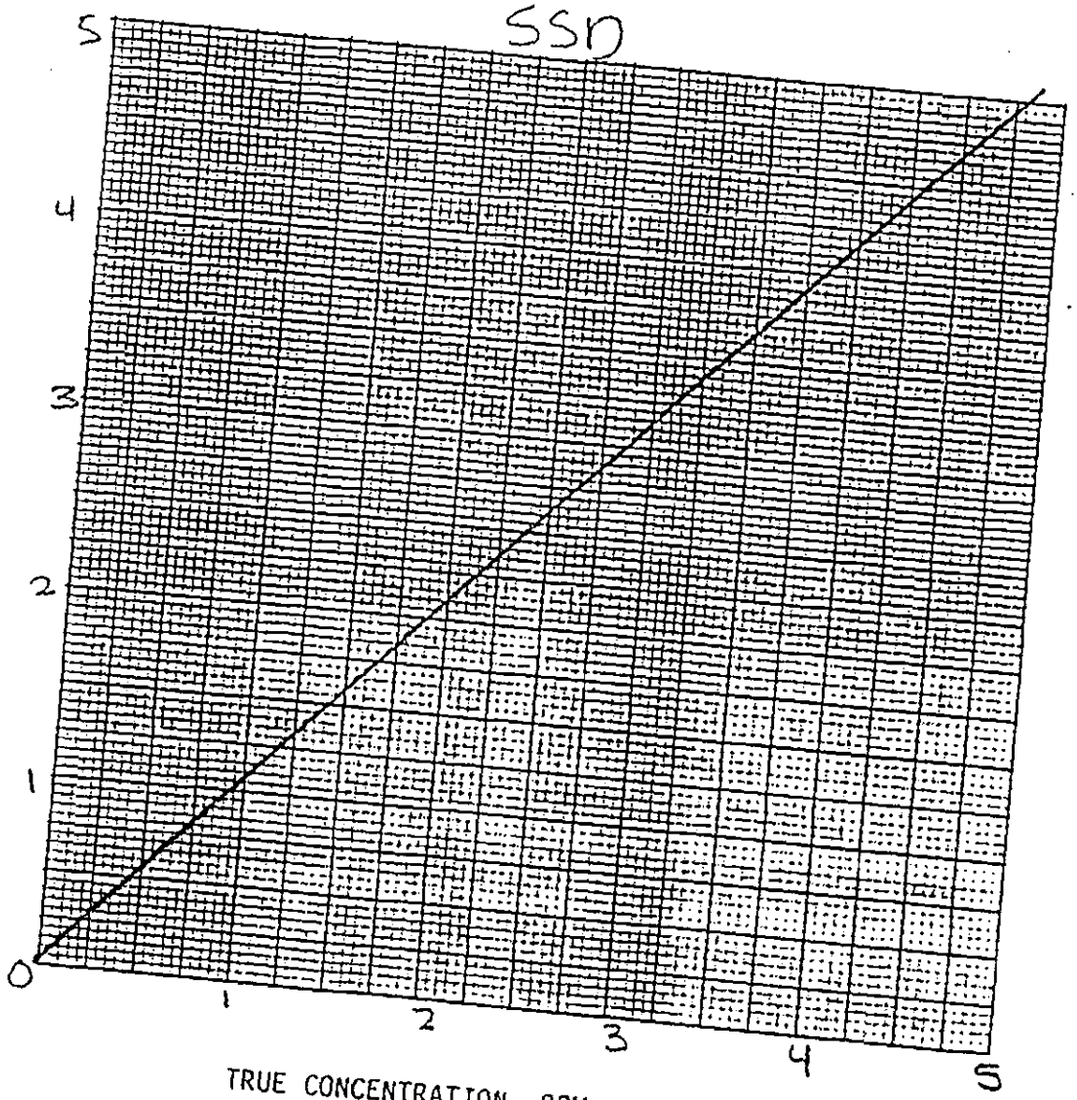
Calibrated by J. Bearden/D. Boyd Checked By R. NUNES

LOG NUMBER: SL-500A
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

Station Name: QASL

Instrument Make and Model: Dwyer Flowmeter Q-51 Site No.: 34-299

Instrument Property No.: N/A ; Serial No.: 2



Display

TRUE CONCENTRATION, PPM _____

COMMENTS: _____

TSD-24 (12/82)

Graph Prepared by _____

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Stationary Source Div.

LOG NUMBER: SL-500 B
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

FROM: Rudy Abangan, AP Specialist
(12)

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name QASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 3	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' ; Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 in 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression ; Slope	1.0317		
(x = True; Y = ; Intercept	0.0042		
"As Is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Comments:
Calibration Equation: Display = 1.03 Air Flow +0.00
Air Flow = 0.97 Display -0.00

Calibrated By J. Bearden

Checked By K. Kalthoff

MLD-25 (1/88)

VOL-O-FLO CALIBRATION

Log No.: SL-500B
Date: 12-24-87
Make: Dwyer
Model: 0→5 lpm
S/N: S
Prop. No.: N/A

Transfer Standard: MATHESON 5 in 1
Prop. No.: 06852
Date of Last Calibration: 12-17-87
Airflow = (Display + 0.4704) ÷ 9.4093
Ambient Pressure (P_A) 768.0
Ambient Temperature (T_A) 24

ROTO-METER ~~VOL-O-FLO~~		SSD TRANSFER STANDARD		
Δ P	Δ P_{std}	Set Point	Display	Air Flow
4.5	N/A	N/A	40.5	4.35
3.5			31.4	3.39
2.5			22.5	2.44
1.5			13.0	1.43
1.0			8.7	0.97
4.5			34.6	3.73
2.5			21.1	2.29
1.0			8.6	0.96

$$\Delta P_{std} = \Delta P \; [1 + 0.00263\,(25°C - T_A)] \left(\frac{298°}{273 + T_A}\right) \left(\frac{P_A}{760mm}\right)$$

Results: Display = 1.0317 ok Airflow + 0.0042

Comments Corr Coef = 0.9999

AIRFLOW = 0.9693 (DISPLAY) − 0.0041

Calibrated by J. Beaudien Checked By R. NUNES

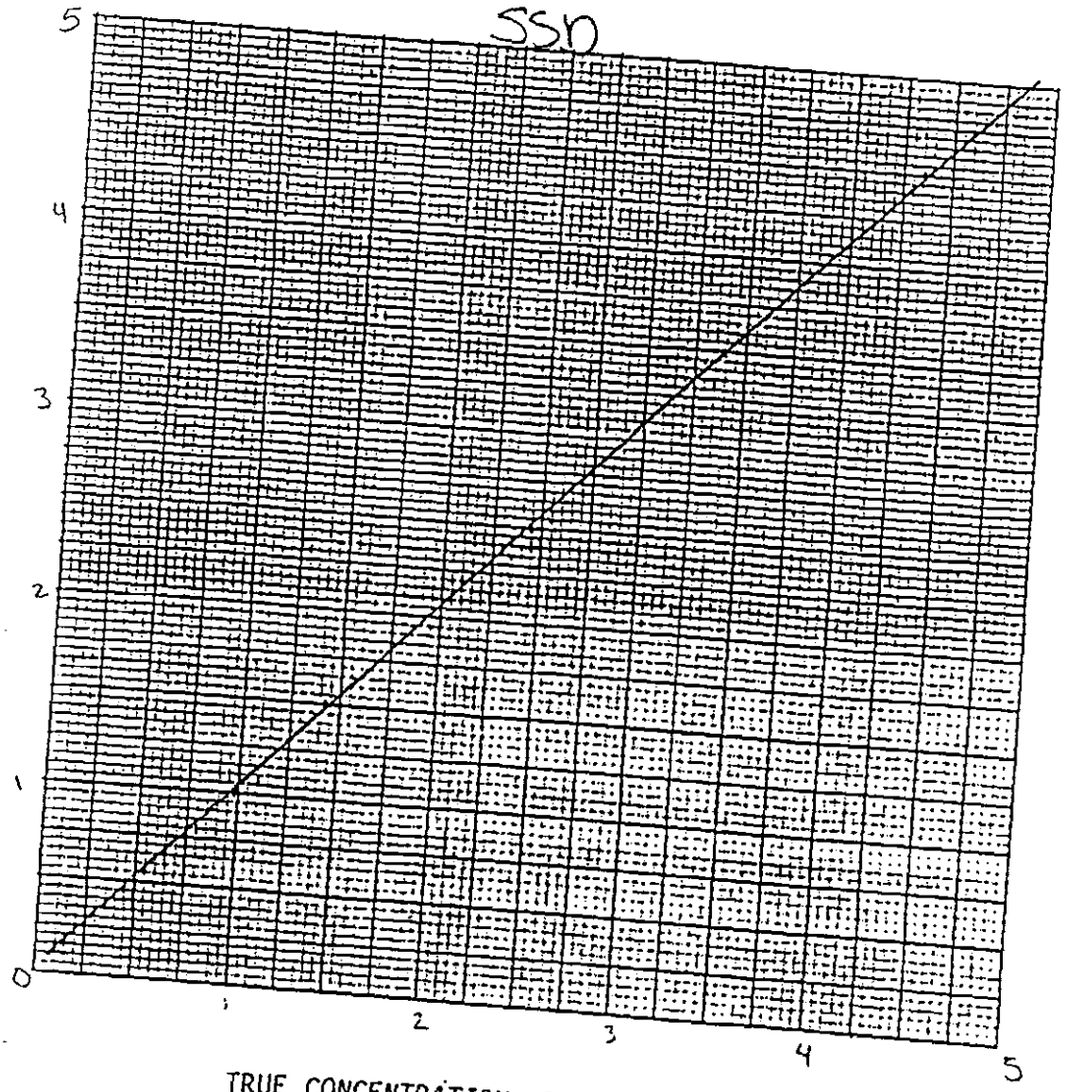
LOG NUMBER: SL-500B
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

Station Name: QASL

Instrument Make and Model: Dwyer Flowmeter Q-SL

Site No.: 34-299

Instrument Property No.: N/A ; Serial No.: 3



DISPLAY

TRUE CONCENTRATION, PPM _____

COMMENTS: _____

TSD-24 (12/82)

Graph Prepared By: [illegible]

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Testing Section

LOG NUMBER: SL-500 C
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

FROM: Rudy Abangan, AP Specialist

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name QASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 4	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 in 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression Slope	0.9604		
(X = True; Y = Intercept	+0.0330		
"As Is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Comments:
Calibration Equation: Display = 1.04 Air Flow -0.03
Air Flow = 0.96 Display +0.03

Calibrated By J. Bearden

Checked By K. Kalthoff

MLD-25 (1/88)

FLOW METER CALIBRATION

Date: 12-24-87
Log No.: SL-500C
Make: Dwyer Flowmeter
Model: 0-5LPM
Serial No.: N/A
Property No.: 4
Ambient Temperature: 768.0
Ambient Pressure: 24.0°C

Transfer Standard: Matheson 5 inch
Property No.: 068852
Pos. No.: 4
Date Certified: 12-17-87
Certification Expires:
Airflow = Display x 0.1063 ± 0.05 slpm
Supply Air Pressure: -15"

SSD

FLOW METER		TRANSFER STANDARD		
Set Point	Display	Set Point	Display	Airflow
N/A	4.5	N/A	40.6	4.36
	3.5		31.4	3.39
	2.5		22.4	2.43
	1.5		13.4	1.47
	1.0		9.0	1.00
	4.5		34.9	3.76
	2.5		20.7	2.25
	1.0		8.5	0.95

Results: Airflow = Display x 0.9604 ⊕ 0.0330 slpm

Comments: Corr Coef = 0.9999

DISPLAY = 1.0413 - 0.0344

Calibrated by J. Berrueden Checked by R. Nunes

APP 63 (12/82)

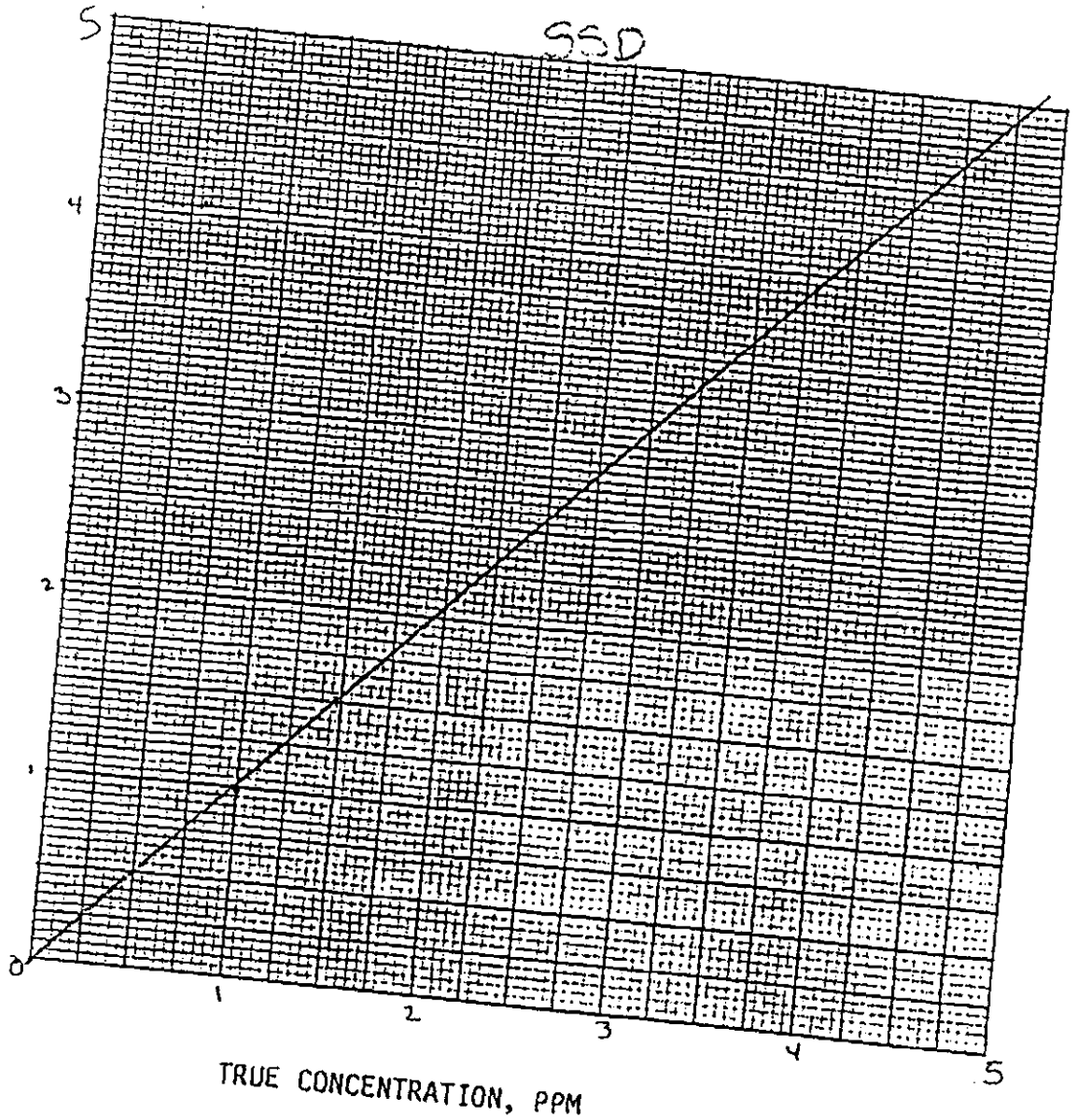
LOG NUMBER: SL-500 C
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

Station Name: QASL

Instrument Make and Model: Dwyer Flowmeter O-SL

Site No.: 34-244

Instrument Property No.: N/A ; Serial No.: 4



COMMENTS:

TSD-24 (12/82)

Graph Prepared By

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Testing Section

LOG NUMBER: SL-500 D
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

FROM: Rudy Abangan, AP Specialist

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name OASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 5	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 in 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression Slope	1.0000		
(x = True; Y = Intercept	-0.0500		
"As Is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Comments:
Calibration Equation: Display = 1.00 Air Flow +0.05
Air Flow = 1.00 Display -0.05

Calibrated By J. Bearden

Checked By K. Kalthoff

MLD-25 (1/88)

FLOW METER CALIBRATION

Date: 12-24-87
Log No.: SL-5000
Make: Dwyer Flowmeter
Model: 0-5LPM
Serial No.: N/A
Property No.: 5
Ambient Temperature: 768.0
Ambient Pressure: 24.0°C

Transfer Standard: Matheson Sig 1
Property No.: 06852
Pos. No.: 4
Date Certified: 12-17-87
Certification Expires:
Airflow = Display x 0.1063 ± 0.05 slpm
Supply Air Pressure: -15"

SSD

FLOW METER		TRANSFER STANDARD		
Set Point	Display	Set Point	Display	Airflow
N/A	4.5	N/A	41.7	4.48
	3.5		31.6	3.41
	2.5		22.5	2.44
	1.5		13.4	1.47
	1.0		8.5	0.95
	4.5		47.9	5.14
	2.5		28.3	3.06
	1.0		11.5	1.27

Results: Airflow = Display x 1.0000 ± 0.0500 slpm

Comments: 0.9998

Display = 1.0000 + 0.0500

Calibrated by J. Bearden Checked by R. Nunes

LOG NUMBER: SL-500D
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

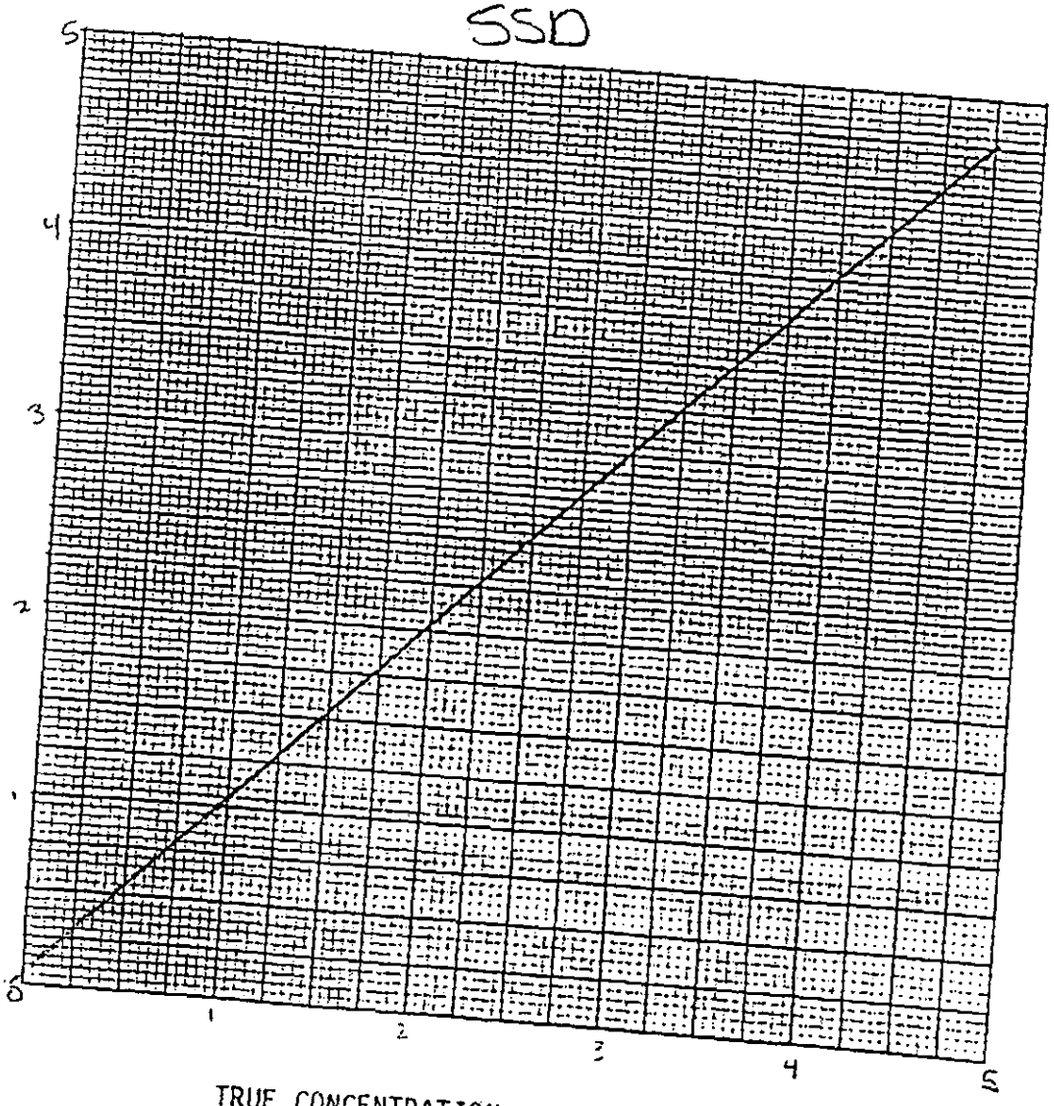
Station Name: QASL

Instrument Make and Model: Dwyer Flowmeter QASL

Site No.: 34299

Instrument Property No.: N/A ; Serial No.: 5

SSD



TRUE CONCENTRATION, PPM _____

COMMENTS: _____

TSD-24 (12/82)

Graph Prepared By: _____

Display

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Testing Section

LOG NUMBER: SL-500 E
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

FROM: Rudy Abangan, AP Specialist

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name QASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 6	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 in 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression Slope	1.0037		
(x = True; Y = Intercept	-0.1095		
"As Is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Comments:
Calibration Equation: Display = 0.99 Air Flow +0.1
Air Flow = 1.00 Display -0.1

Calibrated By J. Bearden

Checked By K. Kalthoff

MLD-25 (1/88)

FLOW METER CALIBRATION

Date: 12-24-87
Log No.: SL-5002
Make: Dwyer Flowmeter
Model: 0-5 LPM
Serial No.: N/A
Property No.: 6
Ambient Temperature: 24.0°C
Ambient Pressure: 768.0

Transfer Standard: Matheson 5in1
Property No.: 065852
Pos. No.: 4
Date Certified: 12-17-87
Certification Expires:
Airflow = Display x 0.1063 ± 0.05 slpm
Supply Air Pressure: -15"

SSD

FLOW METER		TRANSFER STANDARD		
Set Point	Display	Set Point	Display	Airflow
N/A	4.5	N/A	41.8	4.39
	3.5		32.6	3.42
	2.5		23.2	2.42
	1.5		13.4	1.37
	1.0		8.9	.90
	4.5		42.9	4.51
	2.5		30.5	3.19
	1.0		14.2	1.46

Results: Airflow = Display x 1.0037 OK ± 0.1095 slpm

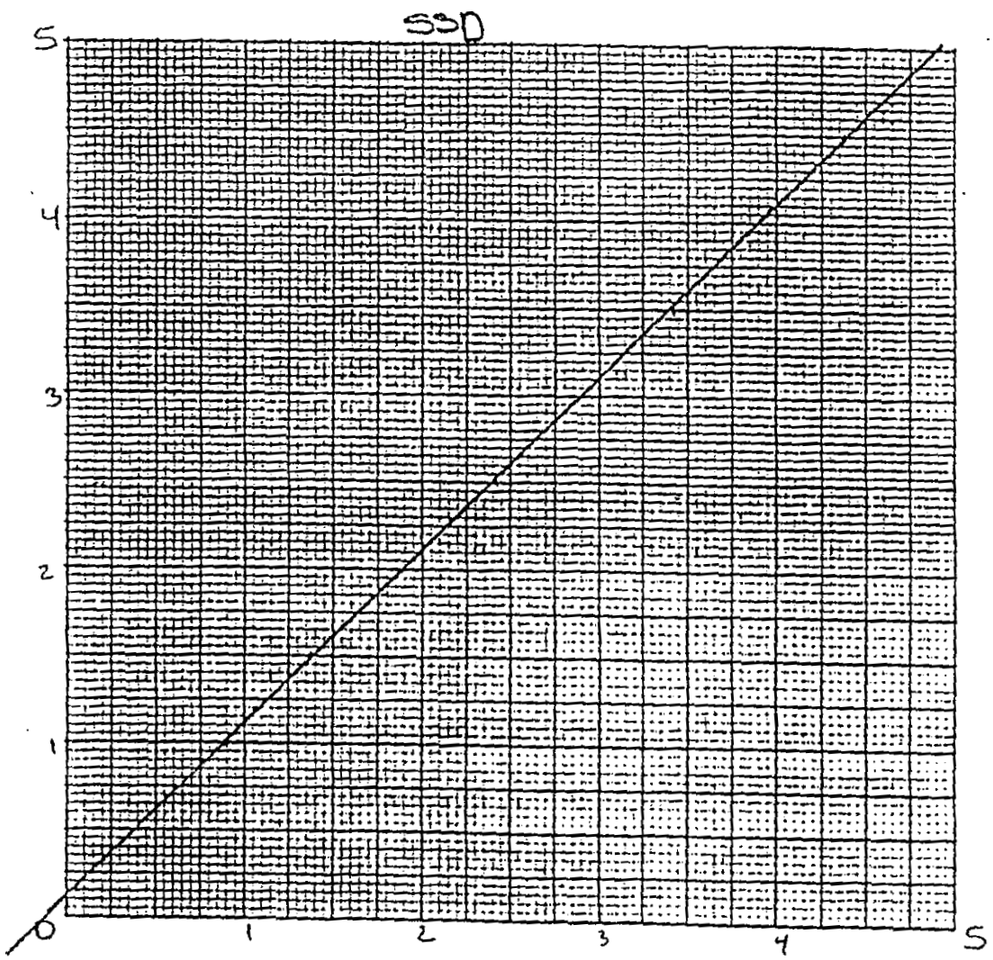
Comments: Corr. Coef. = 0.9994

Display = 0.9964 + 0.1091

Calibrated by J. Beaudin Checked by R. Nunes

LOG NUMBER: SL-[illegible]
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

Station Name: DASL Site No.: 24-299
Instrument Make and Model: Dwyer Flowmeter [illegible]
Instrument Property No.: N/A ; Serial No.: 6



TRUE CONCENTRATION, PPM _____

COMMENTS: _____

TSD-24 (12/82)

Graph Prepared By [illegible]

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Testing Section

LOG NUMBER: SL-500 F
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

FROM: Rudy Abangan, AP Specialist

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name QASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 7	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 in 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression Slope	0.9754		
(x = True; Y = Intercept	-0.0820		
"As Is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Cc nts:
Calibration Equation: Display = 1.03 Air Flow +0.08
Air Flow = 0.98 Display -0.08

Calibrated By J. Bearden

Checked By K. Kalthoff

MLD-25 (1/88)

FLOW METER CALIBRATION

Date: 12-24-87
Log No.: SL-500F
Make: Dwyer Flowmeter
Model: 0-5 LPM
Serial No.: N/A
Property No.: 7
Ambient Temperature: 24.0°C
Ambient Pressure: 768.0

Transfer Standard: Matheson Sinl
Property No.: 016852
Pos. No.: 4
Date Certified: 12-17-87
Certification Expires:
Airflow = Display x 0.1062 ± 0.05 slpm
Supply Air Pressure: -15"

SSD

FLOW METER		TRANSFER STANDARD		
Set Point	Display	Set Point	Display	Airflow
N/A	4.5	N/A	41.1	4.32
	3.5		31.7	3.32
	2.5		22.6	2.35
	1.5		13.4	1.37
	1.0		9.0	0.91
	4.5		35.4	3.71
	2.5		20.4	2.12
	1.0		8.7	0.87

Results: Airflow = Display x 0.9754 OK ± 0.0820 slpm

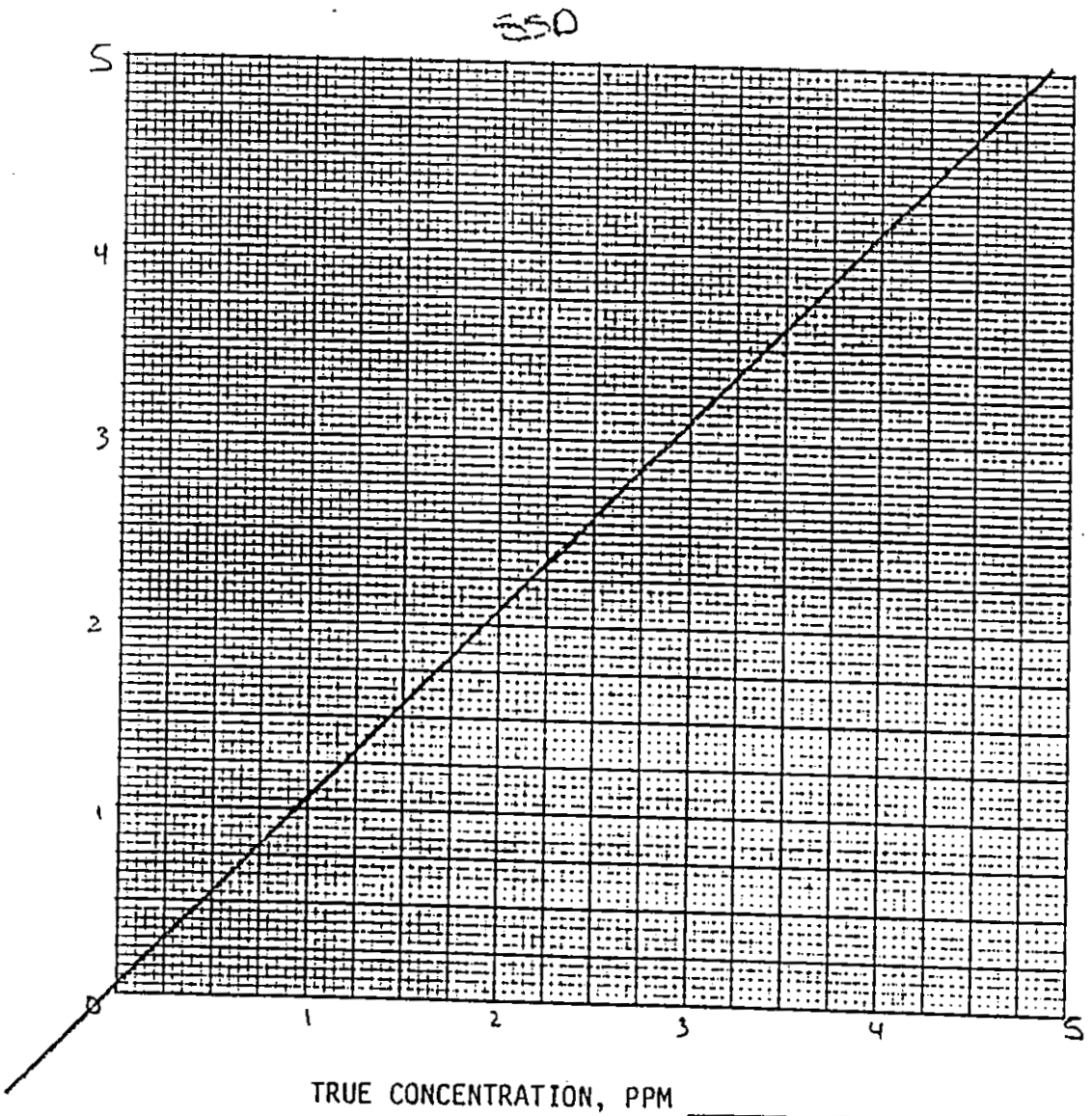
Comments: Corr Coef = 0.9999

Display = 1.0253 + 0.0840

Calibrated by J. Beardin Checked by R. Jones

LOG NUMBER: SL-520 F
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

Station Name: QASL Site No.: 24-299
Instrument Make and Model: Dwyer Flowmeter O-5L
Instrument Property No.: N/A ; Serial No.: 7



TRUE CONCENTRATION, PPM _____

COMMENTS: _____

TSD-24 (12/82)

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Testing Section

FROM: Rudy Abangan, AP Specialist

LOG NUMBER: SL-500 G
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name QASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 8	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 in 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression	Slope	0.9705	
(x = True: Y =	Intercept	-0.0293	
"As Is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Comments:
Calibration Equation: Display = 1.03 Air Flow +0.0302
Air Flow = 0.97 Display -0.03

Calibrated By J. Bearden

Checked By K. Kalthoff

MLD-25 (1/88)

FLOW METER CALIBRATION

Date: 12-24-87
Log No.: SL-500G
Make: Dwyer Floometer
Model: 0-5 LPM
Serial No.: N/A
Property No.: 8
Ambient Temperature: 24.0°C
Ambient Pressure: 768.0

Transfer Standard: McTheson Sinl
Property No.: 016857
Pos. No.: 4
Date Certified: 12-17-87
Certification Expires:
Airflow = Display x 0.1067 ± 0.05 slpm
Supply Air Pressure: -15"

SED

FLOW METER		TRANSFER STANDARD		
Set Point	Display	Set Point	Display	Airflow
N/A	4.5	N/A	41.4	4.35
	3.5		31.9	3.34
	2.5		23.1	2.41
	1.5		14.0	1.44
	1.0		9.2	0.93
	4.5		48.7	5.13
	2.5		29.3	3.06
	1.0		12.2	1.25

Results: Airflow = Display x 0.9705 OK ± 0.0293 slpm

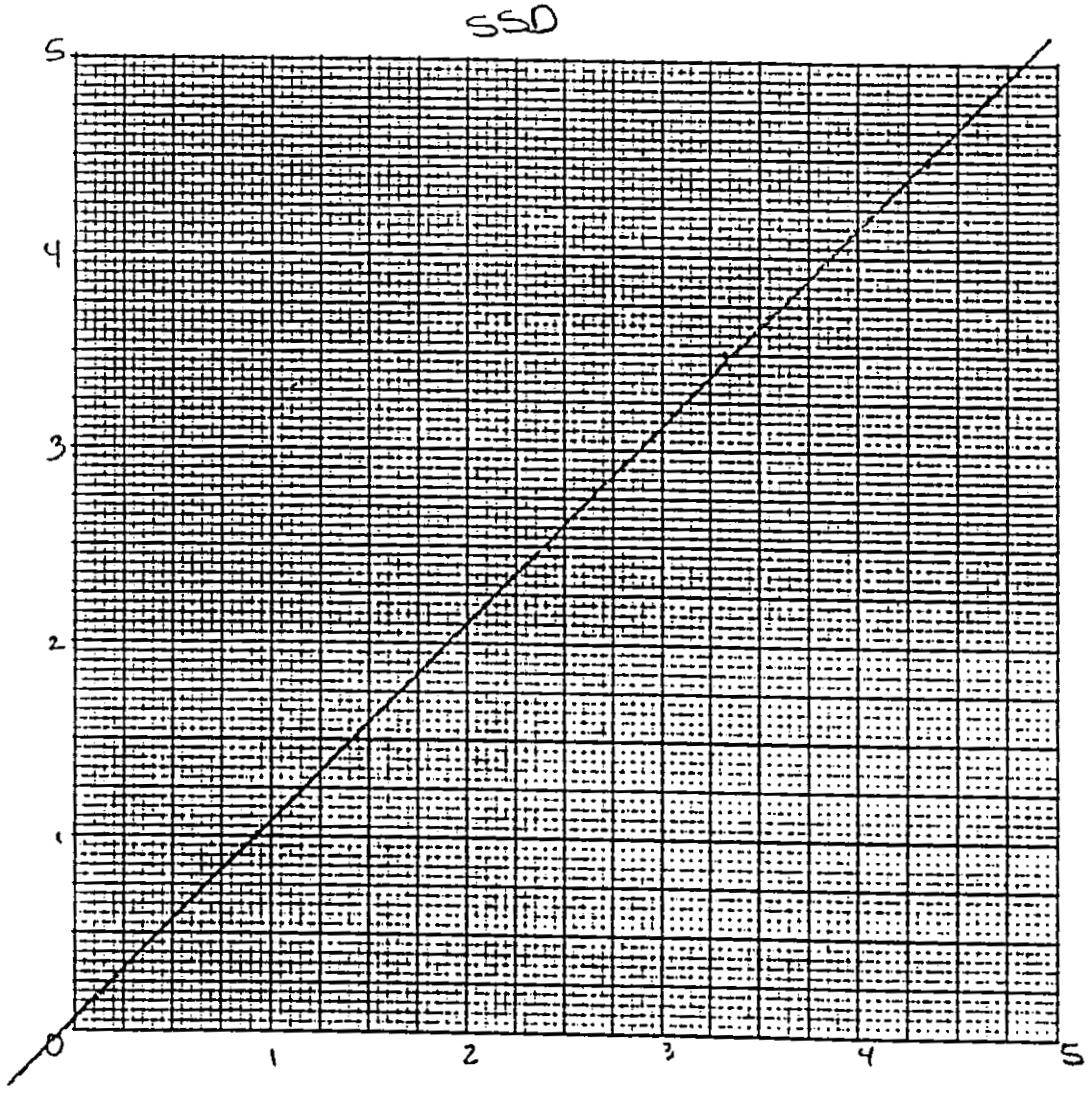
Comments: Corr Fact = 0.9999.

DISPLAY = 1.0304 ± 0.0302

Calibrated by Jennifer Bearden Checked by R. Nunes

LOG NUMBER: SL-500G
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

Station Name: QASL Site No.: 34-299
Instrument Make and Model: Dwyer Flowmeter O-5L
Instrument Property No.: N/A ; Serial No.: 8



TRUE CONCENTRATION, PPM _____

COMMENTS: _____

TSD-24 (12/82)

Graph Prepared By J. Pennington

CALIFORNIA AIR RESOURCES BOARD

CALIBRATION REPORT

TO: Dwight Warner
Testing Section

FROM: Rudy Abangan, AP Specialist

LOG NUMBER: SL-500 H
CALIBRATION DATE: 12-24-87
REPORT DATE: 12-29-87

IDENTIFICATION

Instrument Dwyer Flowmeter	Site Name QASL
Model Number	Site Number 34-299
Property Number	Site 1309 T Street
Serial Number 9	Location Sacramento, CA 95814
Previous Calibration Log Number	Instrument Property of SSD
Elevation 25' Site Temperature 24 °C	Barometric Pressure 768.0 " Hg

CALIBRATION STANDARDS

Standard	I.D. Number	Certification Date	Certified Value Or Factor
Matheson 5 in 1	6852		

CALIBRATION RESULTS

Component			
Instrument Range, ppm			
Initial Zero Setting			
Initial Span Setting			
Air Flow Rate, SLPM			
Air Flow Setting			
Reagent Flow Rate, SCCM			
Reagent Flow Setting			
Converter Efficiency			
Best Fit Linear Regression Slope	1.0048		
(x = True; Y = Intercept	-0.1604		
"As Is" Deviation from True			
"Final" Deviation from True			
Change from Previous Calibration, % (date)			
Final Zero Setting			
Final Span Setting			

Comments:
Calibration Equation: Display = 0.99 Air Flow +0.16
Air Flow = 1.00 Display − 0.1604

Calibrated By J. Bearden
LD-25 (1/88)

Checked By K. Kalthoff

FLOW METER CALIBRATION

Date: 12-24-87
Log No.: SL-500H
Make: Dwyer Flowmeter
Model: 0-5LPM
Serial No.: N/A
Property No.: 9
Ambient Temperature: 24°C
Ambient Pressure: 788.0

Transfer Standard: Matheson Sinl
Property No.: 06857
Pos. No.: 4
Date Certified: 12-17-87
Certification Expires:
Airflow = Display x 0.1003 ± 0.05 slpm
Supply Air Pressure: -15"

SSD

FLOW METER		TRANSFER STANDARD		
Set Point	Display	Set Point	Display	Airflow
N/A	4.5	N/A	41.3	4.34
	3.5		32.6	3.42
	2.5		22.1	2.30
	1.5		13.0	1.33
	1.0		8.7	0.87
	4.5		35.3	3.70
	2.5		20.9	2.17
	1.0		8.4	0.84

OK

Results: Airflow = Display x 1.0048 ± 0.1604 slpm

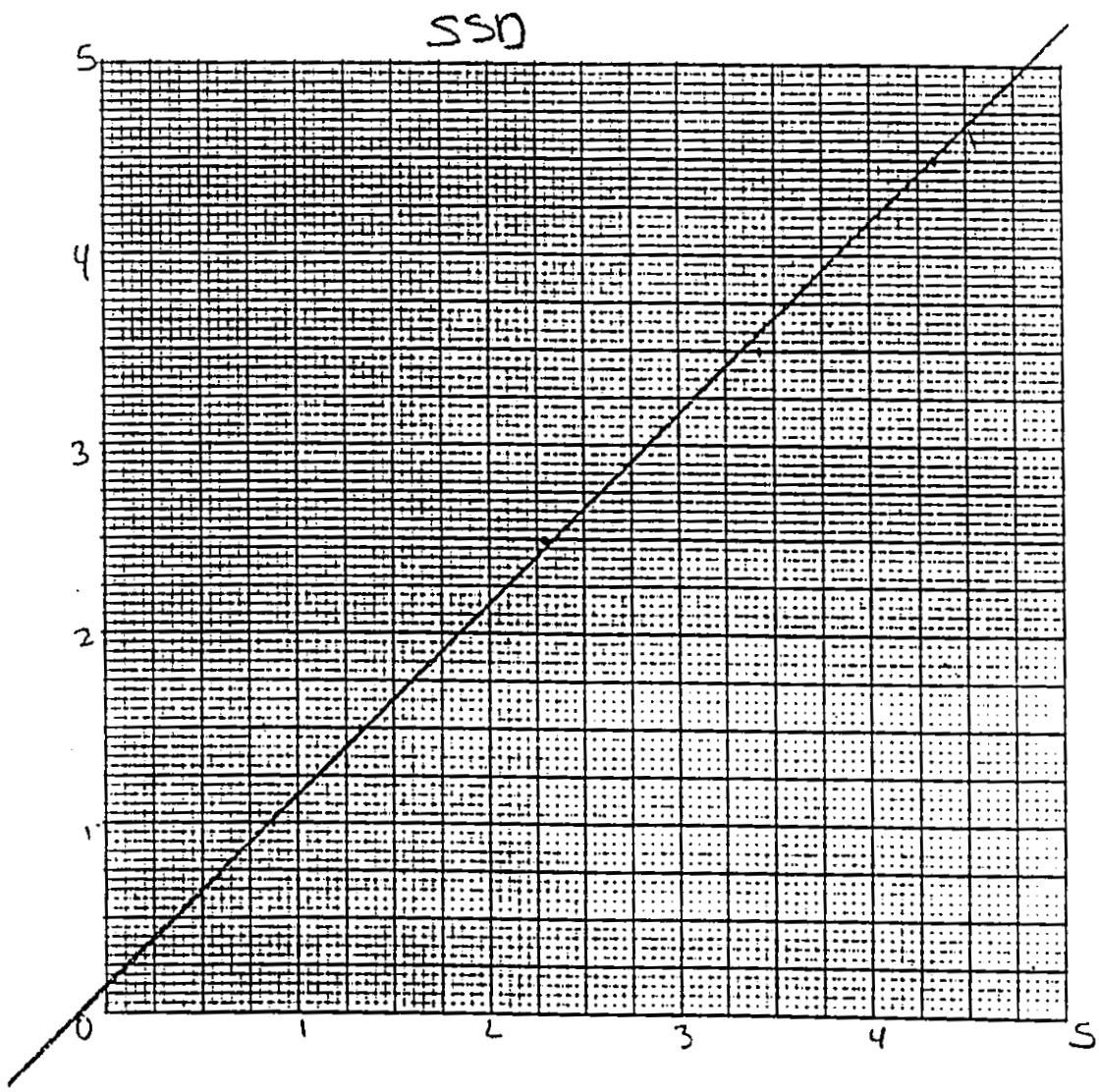
Comments: Corr Coef = 0.9995

Display = 0.9953 + 0.1596

Calibrated by J. Beaudin Checked by R. Nunes

LOG NUMBER: SL-500 H
CALIBRATION DATE: 12-24-87
AS IS /✓/
FINAL /___/

Station Name: QASL Site No.: 34-299
Instrument Make and Model: Dwyer Flowmeter DASL
Instrument Property No.: N/A ; Serial No.: 9



TRUE CONCENTRATION, PPM _____

COMMENTS: _____

TSD-24 (12/82)

Graph Prepared By S. Beardon