METCO ENVIRONMENTAL
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SOURCE EMISSIONS SURVEY
OF
BFI SUNSET FARMS LANDFILL
ENCLOSED FLARE OUTLET STACK
AND INLET DUCT
AUSTIN, TEXAS
FOR
WEAVER BOOS & GORDON

NOVEMBER 2002

FILE NUMBER 02-300A

" I certify that I have personally checked and am familiar with the information submitted herein, and based on my inquiries of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. "

James R. Monfries
Senior Quality Assurance Manager

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INTRODUCTION

METCO Environmental, P.O. Box 598, Addison, Texas, conducted a source emissions survey of BFI Sunset Farms Landfill, located near Austin, Texas, for Weaver Boos & Gordon, on November 6 and 7, 2002. The purpose of these tests was to determine the concentrations of non-methane organic compounds being emitted to the atmosphere via the Enclosed Flare Outlet Stack. The concentrations of non-methane organic compounds were also determined at the Enclosed Flare Inlet Duct in order to calculate the removal efficiency.

The sampling was performed by the following METCO personnel: Mike Bass – Project Supervisor, Mike Hoskovec, and Joe Hannon.

The sampling followed the procedures set forth in the Code of Federal Regulations, Title 40, Chapter I, Part 60, Appendix A, Methods 3B, 3C, 4, 18, 19, 25A, and 25C; and in the "Sampling Procedures Manual, Texas Air Control Board, Revised July 1985."

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SUMMARY OF RESULTS

Enclosed Flare

Run Number	Inlet Duct: Non-Methane Organic Compounds Emissions as Hexane (dry ppm)	Inlet Duct: Non-Methane Organic Compounds Emissions as Hexane (lbs/hr)	Outlet Stack: Non-Methane Organic Compounds Emissions as Hexane (dry ppm*)	Outlet Stack: Non-Methane Organic Compounds Emissions as Hexane (lbs/hr)	Removal Efficiency (%**)
1	977.5	10.28	< 0.2	< 0.01	> 99.90
2	840.8	8.84	< 0.1	< 0.01	> 99.89
3	895.0	9.41	0.8	0.05	99.47
Average	904.4	9.51	< 0.4	< 0.02	> 99.75
Allowable Emission Rate	----	----	≤ 20	----	≥ 98

* Corrected to 3 percent oxygen.

** Based on the pounds per hour emissions.

SUMMARY OF RESULTS

Enclosed Flare Outlet Stack

Run Number	1	2	3
Date	11/07/02	11/07/02	11/07/02
Time	0857-0957	1008-1108	1138-1238
Stack Flow Rate - DSCFM*	10,295	6,404	6,305
% Water Vapor - % Volume	8.08	9.44	7.91
% CO_2 - % Vol.	5.8	7.0	6.0
% O_2 - % Vol.	13.0	8.2	8.0
% Excess Air @ Sampling Point	152.6	57.5	54.1
Unit Heat Input - million Btu/hr	25.322	25.322	25.322

* 29.92 "Hg, 68°F (760 mm Hg, 20°C) calculated according to EPA Method 19.

SUMMARY OF RESULTS

Enclosed Flare Outlet Stack

Run Number	1	2	3
Total Hydrocarbons Emissions as Propane - wet ppm	0.4	0.4	1.1
Total Hydrocarbons Emissions as Propane - dry ppm	0.4	0.4	1.2
Total Hydrocarbons Emissions as Hexane - dry ppm	0.2	0.2	0.6
Methane Concentrations as Hexane - dry ppm	1.2	0.8	< 1
Non-Methane Organic Compounds Emissions as Hexane - dry ppm	< 0.1	< 0.1	0.6
Non-Methane Organic Compounds Emissions as Hexane - dry ppm*	< 0.2	< 0.1	0.8
Non-Methane Organic Compounds Emissions as Hexane - lbs/hr	< 0.01	< 0.01	0.05

* Corrected to 3 percent oxygen.

SUMMARY OF RESULTS

Enclosed Flare Inlet Duct

Run Number	1	2	3
Date	11/07/02	11/07/02	11/07/02
Time	0857-0957	1008-1108	1138-1238
Flow Rate - DSCFM*	783	783	783
Non-Methane Organic Compounds Emissions as Methane - dry ppm	5,865	5,045	5,370
Non-Methane Organic Compounds Emissions as Hexane - dry ppm	977.5	840.8	895.0
Non-Methane Organic Compounds Emissions as Hexane - lbs/hr	10.28	8.84	9.41

* 29.92 "Hg, 68°F (760 mm Hg, 20°C) calculated according to EPA Method 19.

DISCUSSION OF RESULTS

Enclosed Flare Outlet Stack

The three tests for non-methane organic compounds appeared to be valid representations of the actual emissions during the tests. All leak checks performed on the sampling train, the integrated bag sampling system, and the reference method monitor sampling system showed no leaks before or after each test. The zero and calibration drift tests of the reference method monitor were stable with no variations greater than 3.0 percent. The calibration error check and the sampling system bias check performed on the reference method monitor prior to testing were valid. The indicative parameters calculated from the field data were in close agreement. The moisture percentages for the three tests were within 11.4 percent of the mean value.

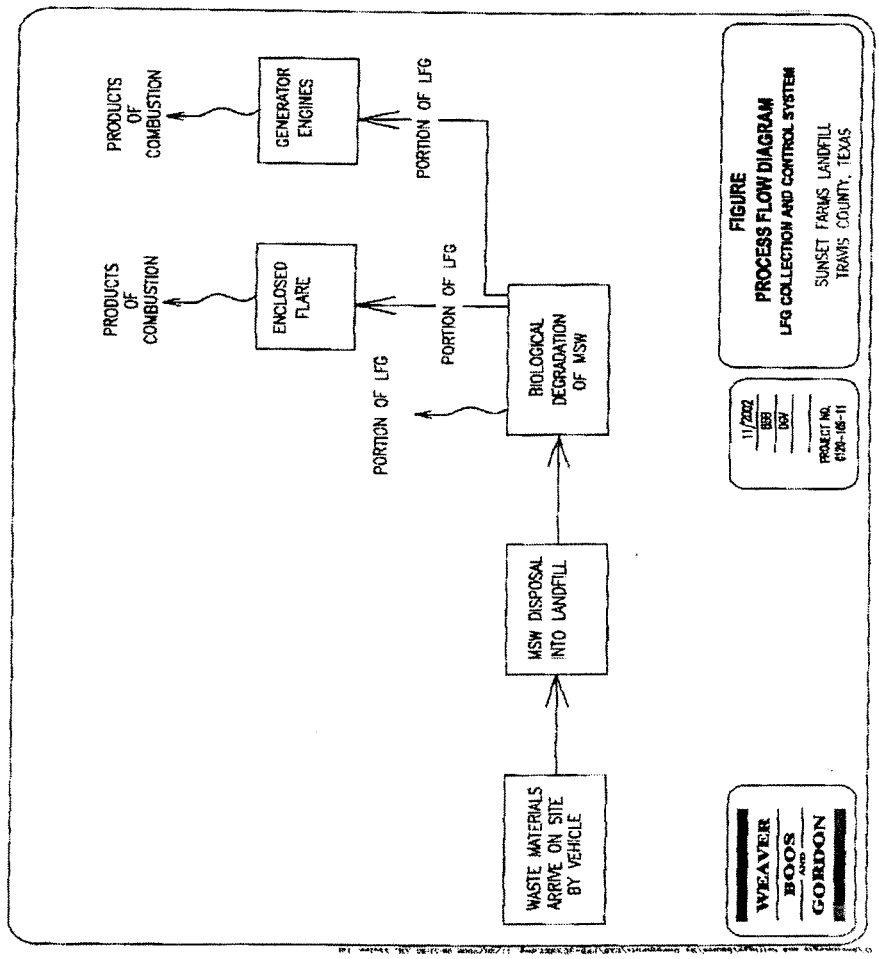
The calculated emissions (pounds per hour) of non-methane organic compounds for two of the three tests were below the minimum detectable limit of the method.

Enclosed Flare Inlet Duct

The three tests for non-methane organic compounds appeared to be valid representations of the actual emissions during the tests. All leak checks performed on the canister sampling system showed no leaks before or after each test.

The calculated emissions (pounds per hour) of non-methane organic compounds for the three tests showed a range of -7.0 percent to +8.1 percent variation from the mean value.

PROCESS SCHEMATIC



DESCRIPTION OF SAMPLING LOCATIONS

The sampling location on the Enclosed Flare Outlet Stack is approximately 35 feet above the ground. The sampling ports are located 32 feet (3.19 stack diameters) downstream from an inlet to the stack and 5 feet (0.50 stack diameters) upstream from the outlet of the stack.

The sampling location on the Enclosed Flare Inlet Duct is approximately 3 feet above the ground. The sampling ports are located 17 feet 4 inches (20.29 duct diameters) downstream from an expansion in the duct and 19 feet 3 inches (22.54 duct diameters) upstream from an expansion in the stack.

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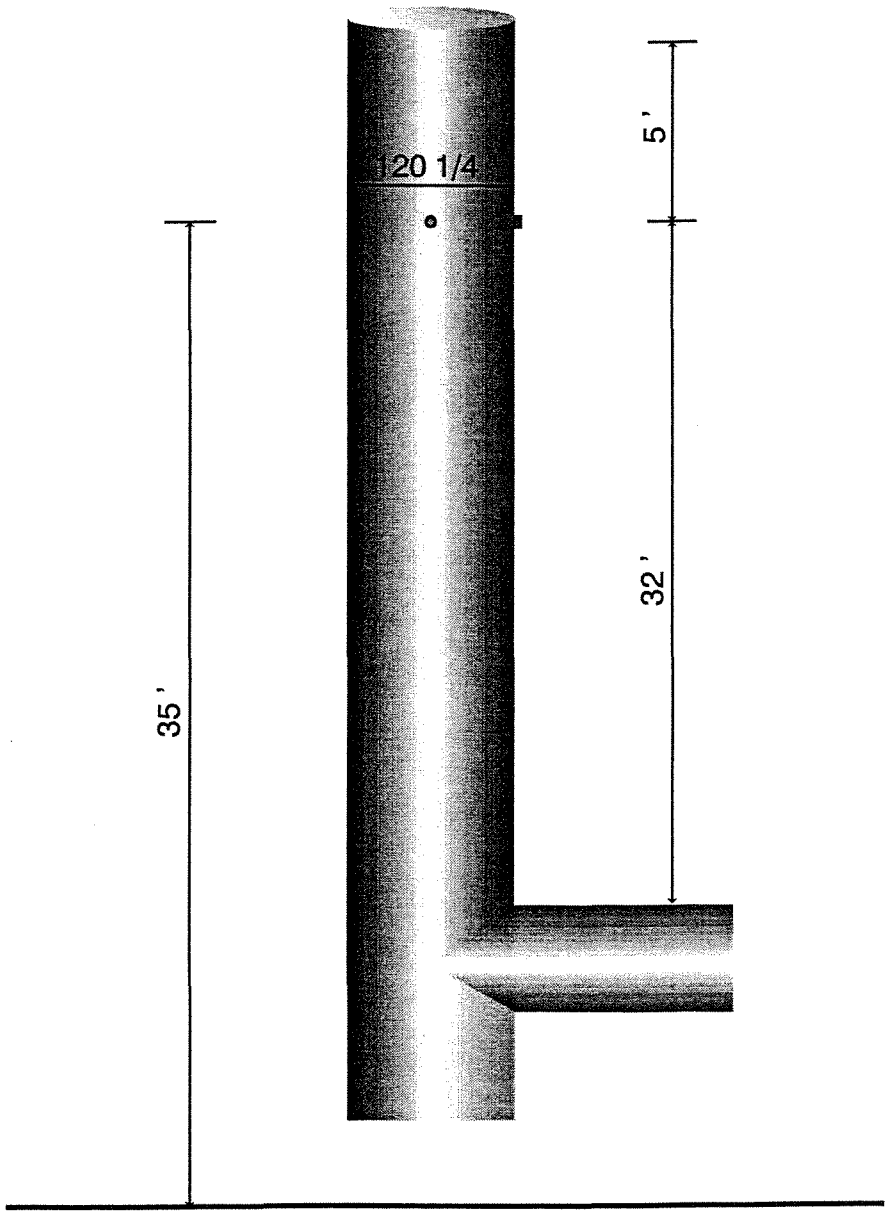
SAMPLING LOCATION

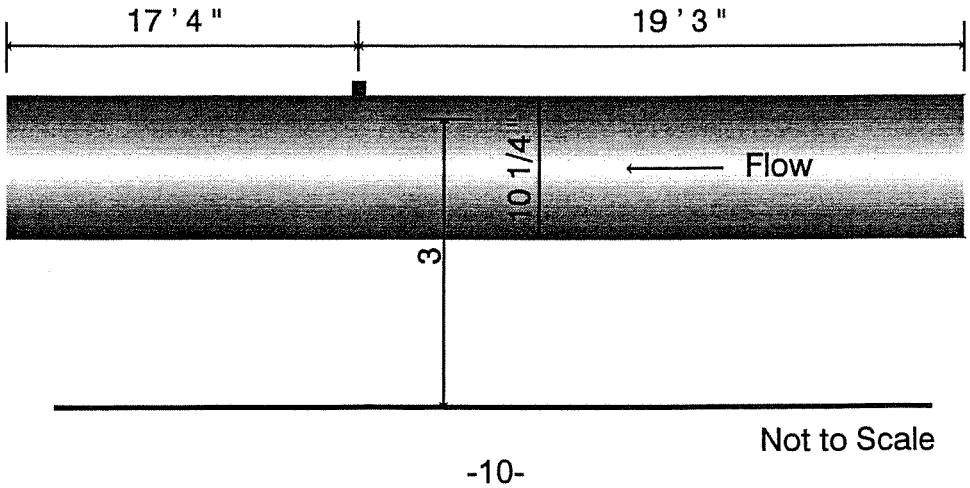
Enclosed Flare Outlet Stack



Not to Scale

SAMPLING LOCATION

Enclosed Flare Inlet Duct



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SAMPLING AND ANALYTICAL PROCEDURES

The sampling followed the procedures set forth in the Code of Federal Regulations, Title 40, Chapter I, Part 60, Appendix A, Methods 3B, 3C, 4, 18, 19, 25A, and 25C; and in the "Sampling Procedures Manual, Texas Air Control Board, Revised July 1985."

The flow rate on the stack was calculated according to EPA Method 19.

The sampling train was leak-checked at 15 inches of mercury vacuum before each test, and again after each test at the highest vacuum reading recorded during the test. This was done to predetermine the possibility of a diluted sample.

The reference method monitor sampling system was leak-checked at the end of the sampling probe, before sampling, and again at the conclusion of sampling.

An integrated orsat sample was collected and analyzed according to EPA Method 3B during each test on the stack.

Moisture

The moisture samples were taken according to EPA Method 4. For each run, samples of sixty-minute duration were taken from the midpoint of the stack. Data was recorded at five-minute intervals.

The " front-half " of the sampling train contained the following components:

Stainless Steel Probe
Heated Teflon Flex Line @ 248°F ± 25°F
Heated Glass Fiber Filter and Glass Support @ 248°F ± 25°F

The " back-half " of the sampling train contained the following components:

Impinger Number	Contents	Amount	Parameter Collected
1	Deionized Water	100 ml	Moisture
2	Deionized Water	100 ml	Moisture
3	Empty	----	Moisture
4	Silica Gel	200 g	Moisture

Non-Methane Organic Compounds

The non-methane organic compounds sampling on the stack was performed according to EPA Methods 18 and 25A. A J.U.M. Model VE-7 Total Hydrocarbon Analyzer (Serial Number 101841092) was used to monitor the concentrations of total organic compounds during each run. The reference method analyzer was operated at a range of 0 to 52 parts per million. A multi-point calibration was performed on the reference method analyzer prior to testing. An analyzer calibration error check and a sampling system bias check were also conducted prior to testing. After each run, the zero and calibration drift of the reference method monitor was checked. The calibration gases were as follows:

Zero Nitrogen

14.9 ppm C_3H_8 in N_2 (ALM 20039)

27.6 ppm C_3H_8 in N_2 (BLM 4119)

46.1 ppm C_3H_8 in N_2 (BAL 1901)

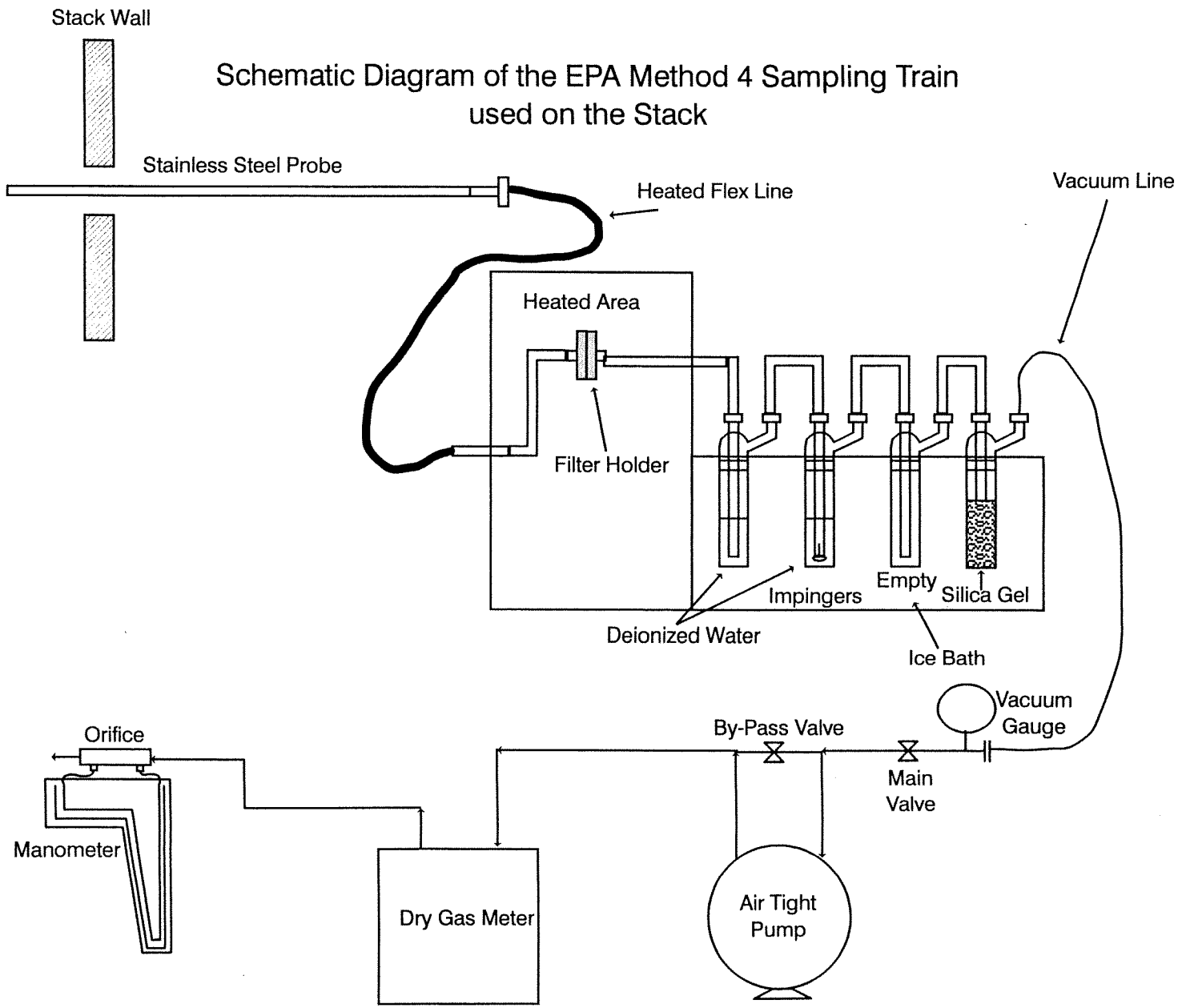
The reference method sampling system consisted of a heated probe and a heated Teflon sample line. The calibration gases for the bias and drift checks were introduced upstream of the heated Teflon sample line.

Calibration gas certifications are included in Appendix C.

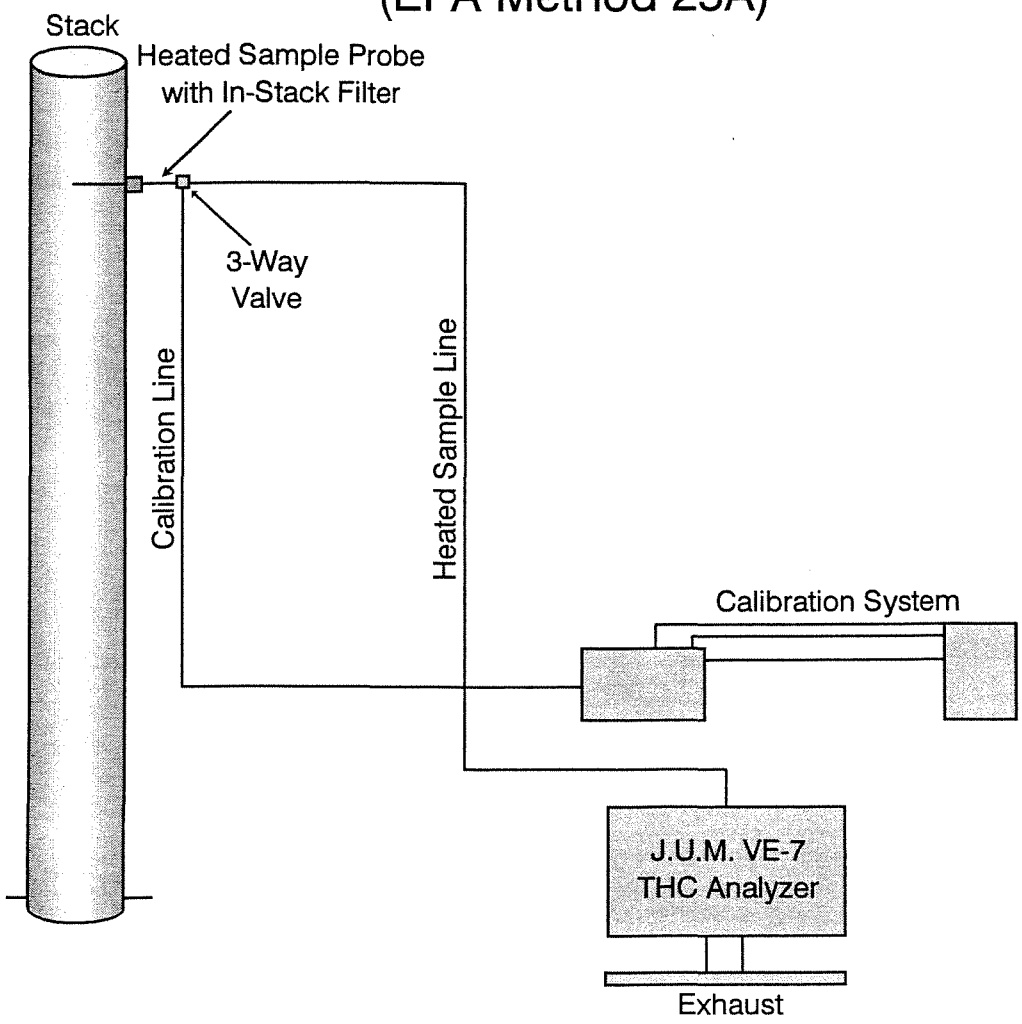
An integrated gas sample was also collected during each test according to EPA Method 18. The reference method sampling system consisted of a stainless steel probe, a chilled condenser, and an aluminized Tedlar bag. The integrated samples were analyzed for methane by GC/FID. The concentrations of methane were subtracted from the total organics concentrations to obtain the non-methane organic compounds concentrations.

The gaseous compounds sampling on the inlet duct was performed according to EPA Methods 3C and 25C modified. For each run, samples of sixty-minute duration were taken from the midpoint of the duct. The reference method sampling system consisted of a stainless steel probe, a rotameter, and a stainless steel canister. The samples were analyzed by TCD for carbon dioxide, methane, nitrogen, and oxygen. The samples were analyzed for total gaseous non-methane organics by FID/TCA.

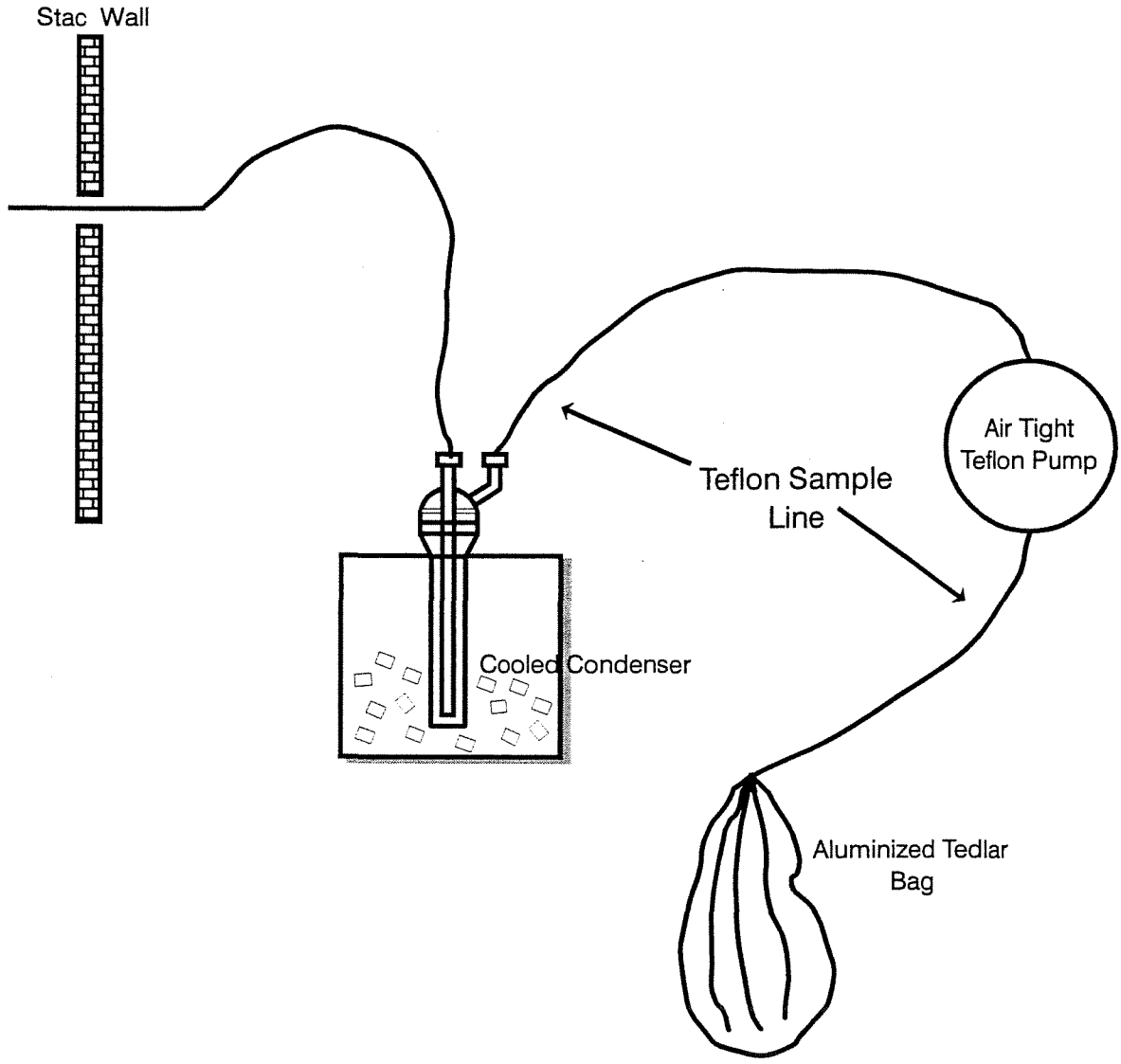
Schematic Diagram of the EPA Method 4 Sampling Train used on the Stack



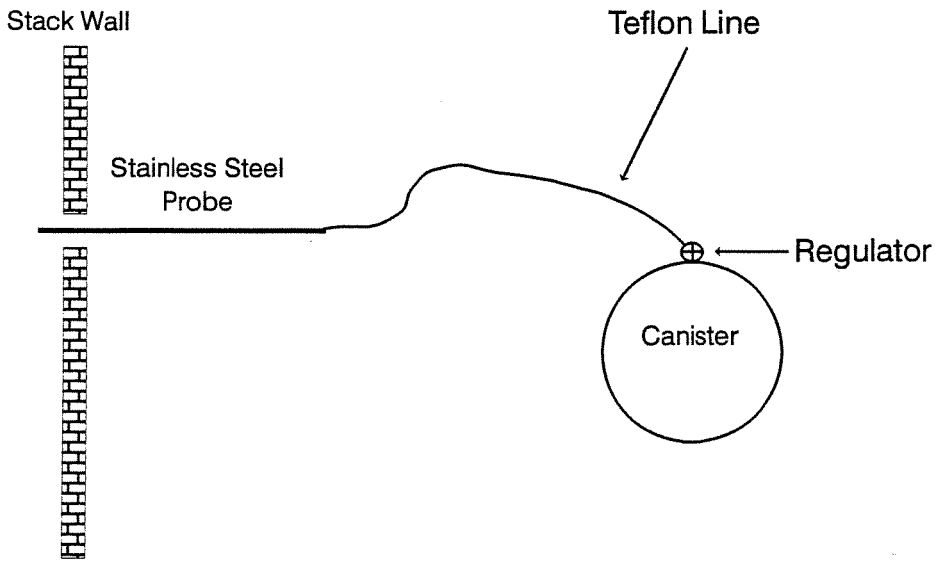
Reference Method Monitor Sampling System used on the Stack (EPA Method 25A)



EPA Method 18 (Integrated Bag) Sampling Train
used for the determination of Methane on the Stack



EPA Method 25C Sampling Train for
Volatile Organic Compounds



DESCRIPTION OF TESTS

Personnel from METCO Environmental arrived at the plant at 11:30 a.m. on Wednesday, November 6, 2002. After meeting with plant personnel and attending a brief safety orientation, the equipment was moved onto the Enclosed Flare Outlet Stack and Inlet Duct. The equipment was secured for the night and all work was completed at 5:15 p.m.

On Thursday, November 7, work began at 7:00 a.m. The reference method monitor was calibrated and the equipment was prepared for testing. The first set of tests for non-methane organic compounds began at 8:57 a.m. Testing continued until completion of the third set of tests at 12:38 p.m.

The reference method monitor was calibrated and secured for transport. The equipment was moved off of the stack and loaded into the sampling van. The samples were recovered and transported to METCO Environmental's laboratory in Dallas, Texas, for analysis and evaluation.

Operations at BFI Sunset Farms Landfill, Enclosed Flare Outlet Stack and Inlet Duct, located in Austin, Texas, for Weaver Boos & Gordon, were completed at 2:00 p.m. on Thursday, November 7, 2002.

APPENDICES

A. Location of Sampling Points

B. Source Emissions Calculations

C. Calibration Data

D. Field Testing Data

E. Analytical Data

F. Reference Method Monitor Data

G. Plant Operational Data and F_d Factor Calculations

H. Chain of Custody

I. Resumes of Test Personnel

APPENDIX A

Location of Sampling Points
Enclosed Flare Outlet Stack

The sampling ports are located 32 feet (3.19 stack diameters) downstream from an inlet to the stack and 5 feet (0.50 stack diameters) upstream from the outlet of the stack. The locations of the sampling points were calculated as follows:

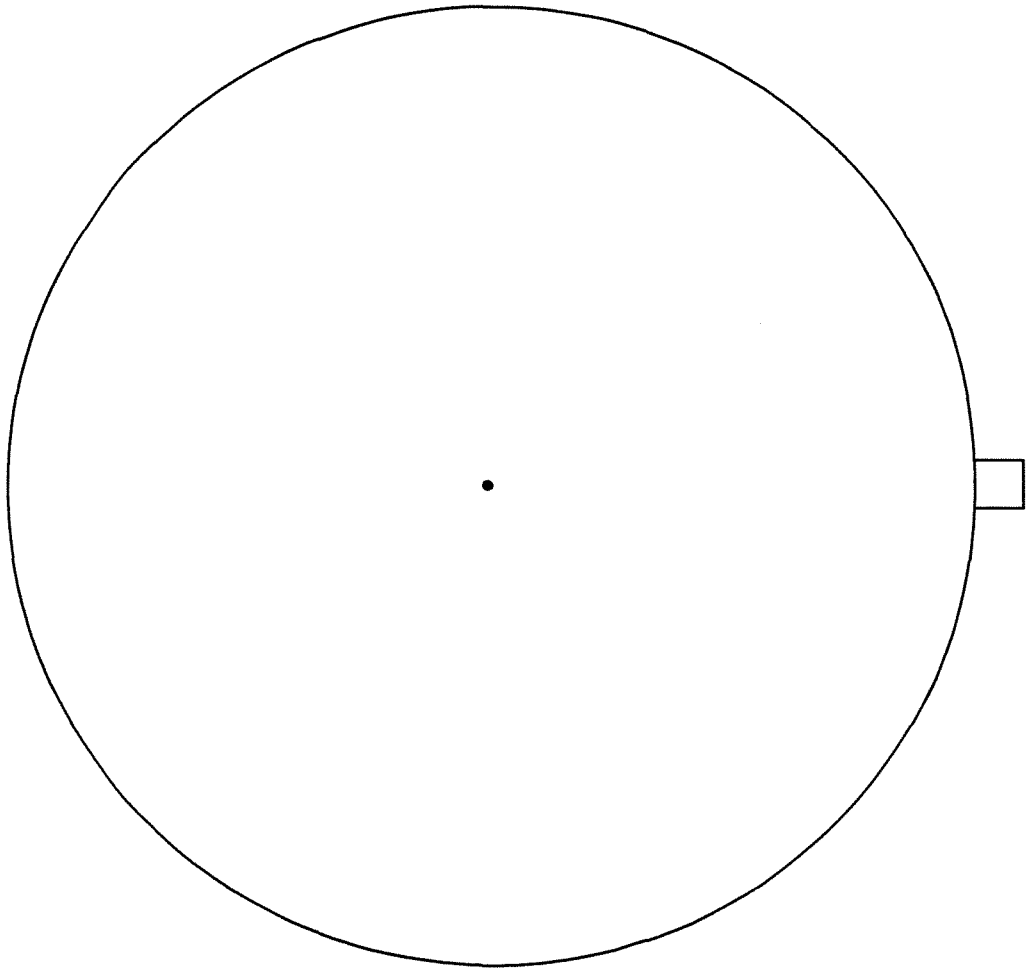
Port and Wall Thickness = 5 inches
Inside Stack Diameter = 120 1/4 inches

Point Number	Percent of Diameter From Wall	Distance From Wall
1	50.0	60 1/8 "

APPENDIX A

Location of Sampling Points

Enclosed Flare Outlet Stack



APPENDIX B

Nomenclature and Equations
for
Calculation of Source Emissions

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NOMENCLATURE FOR PARTICULATE CALCULATIONS

Symbol	English Units	Metric Units	Description
A_s	$in.^2$	m^2	Stack Area
C_{an}	gr/dscf*	g/dscm*	Particulate - probe, cyclone, and filter
C_{ao}	gr/dscf*	g/dscm*	Particulate - total
C_{at}	gr/CF @ stack conditions	g/m^3	Particulate - probe, cyclone, and filter
C_{au}	gr/CF @ stack conditions	g/m^3	Particulate - total
C_{aw}	lbs/hr	kg/hr	Particulate - probe, cyclone, and filter
C_{ax}	lbs/hr	kg/hr	Particulate - total
C_p			Pitot Tube Calibration Factor
D_n	in.	m	Sampling Nozzle Diameter
%EA			Percent Excess Air at sampling point
g	32.174 ft/sec^2		Acceleration of Gravity
%I			Percent Isokinetic
%M			Percent Moisture in the stack gas by volume
M_d			Mole fraction of dry gas

* 29.92 " Hg, 68° F (760 mm Hg, 20° C)

Symbol	English Units	Metric Units	Description
m_f	mg	mg	Particulate - probe, cyclone, and filter
M_{water}	18 lb/lb-mole		Molecular Weight of water
m_t	mg	mg	Particulate - total
MW	lb/lb-mole	g/g-mole	Molecular Weight of stack gas
MW_{air}	28.96 lb/ lb-mole		Molecular Weight of air
MW_d	lb/lb-mole	g/g-mole	Molecular Weight of dry stack gas
P_b	"Hg Absolute	mm Hg	Barometric Pressure
P_m	"H_2O	mm H_2O	Orifice Pressure drop
P_s	"Hg Absolute	mm Hg	Stack Pressure
ΔP	"H_2O	mm H_2O	Velocity Head of stack gas
P_{std}	29.92 "Hg	760 mm Hg	Standard Barometric Pressure
Q_a	ACFM	m^3/hr	Stack Gas Volume at actual stack conditions
Q_s	DSCFM*	dscm/hr*	Stack Gas Volume at 29.92 "Hg, 528°R, dry
R	21.83 "Hg-ft^3/lb-mole°R		Universal Gas Constant
T_m	°F	°C	Average Gas Meter Temperature

* 29.92 " Hg, 68° F (760 mm Hg, 20° C)

Symbol	English Units	Metric Units	Description
T_t	min	min	Net time of test
T_s	°F	°C	Stack Temperature
T_{std}	528°R	293°K	Standard Temperature
V_m	ft^3	m^3	Volume of dry gas sampled @ meter conditions
Vm_{std}	dscf*	dscm*	Volume of dry gas sampled @ standard conditions
V_s	fpm	m/sec	Stack velocity @ stack conditions
V_w	ml	ml	Total water collected in impingers and silica gel
Vw_{gas}	scf*	scm*	Volume of water vapor collected @ standard conditions
ρ_{air}	0.0752 lbs/ft^3		Density of Air
ρ_{water}	1 g/ml		Density of Water
ρ_{man}	62.32 lbs/ft^3		Density of Manometer Oil

Standard Conditions: 29.92 "Hg, 68°F (760 mm Hg, 20°C)

* 29.92 " Hg, 68° F (760 mm Hg, 20° C)

EXAMPLE CALCULATIONS

1. Volume of dry gas sampled at standard conditions. *

$$Vm_{std} = Vm \left(\frac{T_{std}}{T_m + 460} \right) \left[\frac{P_b + \frac{P_m}{13.6}}{P_{std}} \right]$$

$$Vm_{std} = 17.65\, Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460} \right] = dscf$$

$$Vm_{std} = dscf \times 0.028317 = dscm$$

2. Volume of water vapor collected at standard conditions. *

$$Vw_{gas} = \frac{(V_w - gms\ SO_2 - gms\ H_2S)\, \rho_{water}\, R\, T_{std}}{P_{std}\, M_{water}\, 453.6}$$

$$Vw_{gas} = 0.0472\, (V_w - gms\ SO_2 - gms\ H_2S) = scf$$

$$Vw_{gas} = scf \times 0.028317 = scm$$

3. Percent moisture in stack gas.

$$\%M = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \%$$

* 29.92 " Hg, 68° F (760 mm Hg, 20° C)

4. Mole fraction of dry gas.

$$M_d = \frac{100 - \%M}{100}$$

5. Average molecular weight of dry stack gas.

$$MW_d = \left[\%CO_2 \times \frac{44}{100}\right] + \left[\%O_2 \times \frac{32}{100}\right] + \left[\%N_2 \times \frac{28}{100}\right] + \left[\%CO \times \frac{28}{100}\right] = lb/lb\text{-}mole$$

$$= g/g\text{-}mole$$

6. Molecular weight of stack gas.

$$MW = MW_d \times M_d + 18\,(1 - M_d) = \frac{lb}{lb\text{-}mole} = g/g\text{-}mole$$

7 Percent excess air at sampling point.

$$\%EA = \frac{100\,[\%O_2 - (0.5\,\%CO)]}{0.265\,(\%N_2) - [\%O_2 - (0.5\,\%CO)]}$$

EXAMPLE CALCULATIONS

$$E_{corr.} = E_{meas.} \times \frac{20.9\% O_2 - \% O_{2\,corr.}}{20.9\% O_2 - \% O_{2\,meas.}}$$

$E_{corr.}$ = Emission Rate corrected for Oxygen
$E_{meas.}$ = Emission Rate measured
$\% O_2$ = The Oxygen content to be corrected to (ie. 3.0% O_2)
$\% O_{2\,meas.}$ = The Oxygen content measured

propane concentrations as hexane = propane concentrations/2
methane concentrations as hexane = methane concentrations/6

EXAMPLE CALCULATIONS

$$\text{lbs/hr} = \frac{\text{ppm} \times \text{MW} \times 60 \times \text{DSCFM*}}{385.1 \times 10^6}$$

where : MW = molecular weight

ppm = ppm of compound

DSCFM* = Stack Flow Rate

Compound	Molecular Weight
Hexane	86.18

* 29.92 "Hg, 68°F (760 mm Hg, 20°C)

EXAMPLE CALCULATIONS

Flow Rate

$$\text{DSCFM*} = \frac{\text{million Btu/hr} \times F_d \text{ Factor (dscf*/million Btu)} \times 20.9\% O_2}{(20.9\% O_2 - \%\ O_2 \text{ measured})(60 \text{ min/hr})}$$

million Btu/hr = Unit Heat Input

F_d Factor = 9,221 dscf*/million Btu as calculated in Appendix G

* 29.92 "Hg, 68°F (760 mm Hg, 20°C)

SOURCE EMISSION SURVEY

JOB NUMBER: 02-300
JOB NAME: WEAVER, BOOS & GORDON
LOCATION: AUSTIN, TEXAS
UNIT TESTED: ENCLOSED FLARE OUTLET STACK

SOURCE EMISSION CALCULATIONS

			RUN NUMBER		
SYMBOL	DESCRIPTION	UNITS	1	2	3
DATE			11/07/02	11/07/02	11/07/02
BEGIN TIME			0857	1008	1138
END TIME			0957	1108	1238
P(b)	BAROMETRIC PRESSURE	"Hg Abs.	29.90	29.90	29.86
		(mm Hg)	(759.00)	(759.00)	(758.00)
P(m)	ORIFICE PRESSURE DROP	"H2O	0.900	0.900	0.900
		(mm H2O)	(22.900)	(22.900)	(22.900)
	DGM CALIBRATION FACTOR		1.011	1.011	1.011
V(m)	VOLUME DRY GAS SAMPLED	ft.^3	33.222	33.636	33.792
	@ METER CONDITIONS	(m^3)	(0.941)	(0.952)	(0.957)
	LEAK CHECK VOLUME	ft.^3	0.000	0.000	0.000
T(m)	AVERAGE GAS METER	DEG.F	66	70	74
	TEMPERATURE	(DEG.C)	(19)	(21)	(23)
V(m[std])*	VOLUME DRY GAS SAMPLED	DSCF	33.405	33.566	33.425
	@ STANDARD CONDITIONS*	(DSCM)	(0.946)	(0.950)	(0.946)
V(w)	TOTAL WATER COLLECTED,	ml	62.2	74.1	60.8
	IMPINGERS & SILICA GEL				
V(w[gas])	VOLUME WATER VAPOR	SCF	2.936	3.498	2.870
	COLLECTED @ STANDARD	(SCM)	(0.083)	(0.099)	(0.081)
	CONDITIONS*				
%M	MOISTURE IN STACK GAS	%	8.08	9.44	7.91
	BY VOLUME				
Md	MOL FRACTION OF DRY GAS		0.9192	0.9056	0.9209
Tt	NET TIME OF TEST	MINUTES	60	60	60

* 68 Deg.F, 29.92 "Hg (20 Deg.C, 760 mm Hg)

SOURCE EMISSION CALCULATIONS

JOB NUMBER: 02-300
JOB NAME: WEAVER, BOOS & GORDON
LOCATION: AUSTIN, TEXAS
UNIT TESTED: ENCLOSED FLARE OUTLET STACK

			RUN NUMBER		
SYMBOL	DESCRIPTION	UNITS	1	2	3
CO2		%	5.8	7.0	6.0
O2		%	13.0	8.2	8.0
CO		%	0.0	0.0	0.0
N2		%	81.2	84.8	86.0
%EA	EXCESS AIR @ SAMPLING POINT	%	152.6	57.5	54.1
MWd	MOLECULAR WEIGHT OF DRY STACK GAS	LB/LB-MOLE (g/g-MOLE)	29.45 (29.45)	29.45 (29.45)	29.28 (29.28)
MW	MOLECULAR WEIGHT OF STACK GAS	LB/LB-MOLE (g/g-MOLE)	28.52 (28.52)	28.37 (28.37)	28.39 (28.39)

APPENDIX C

Calibration Data

Equipment	Calibration Factor	Calibration Date
Dry Gas Meter #49-3	1.011	09/24/02
Stack Unit Orifice #49-3		09/24/02
Digital Temperature Indicator #49-3		09/24/02
Barometer #49-1		09/25/02

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Dry Gas Meter Calibration

Dry Gas Meter No.: 49-3

Date: 9-24-02

ΔH ("H_2O)	C_{DG}
0.5	1.027
1.0	1.015
1.5	1.014
2.0	1.009
3.0	1.003
4.0	0.999
Average	1.011 ✓

Variation: + 1.58% ✓

\- 1.19% ✓

Calibrator: Mike B Bass

Checked By: Mike Bass

DRY GAS METER CALIBRATION

Meter Number: 49-3 Calibrator: [signature]

Date: 9-24-02

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } Vm_{std}}{\text{Dry Gas Meter } Vm_{std}}$$

Run No.: 1 @ 0.50 P_b: 29.96 "Hg

Control Module Vacuum: 5.0 "Hg

	Wet Test Meter (No. 2)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1124	5.201 cf	76 °F	-1.20 "H_2O	957.498 cf	75 °F	73 °F	0.50 "H_2O
Start	1112	0.000 cf	76 °F	-1.20 "H_2O	952.467 cf	70 °F	70 °F	0.50 "H_2O
Avg.	12 ✓	5.201 ✓ cf	76 ✓ °F	-1.20 ✓ "H_2O	5.031 ✓ cf	72 ✓ °F		0.50 ✓ "H_2O

$$Vm_{std} = 17.65 \times 5.201 \left[\frac{29.96 + \frac{-1.20}{13.6}}{76 + 460} \right] \times 1.005\ (C_f) = 5.142 \text{ dcsf}$$ ✓

$$Vm_{std} = 17.65 \times 5.031 \left[\frac{29.96 + \frac{0.50}{13.6}}{72 + 460} \right] = 5.007 \text{ dcsf}$$ ✓

$C_{DG} = \frac{5.030}{5.007} = 1.027$ ✓

DRY GAS METER CALIBRATION

Meter Number: 49.3 Calibrator: Mike B Hall

Date: 9-24-02

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } Vm_{std}}{\text{Dry Gas Meter } Vm_{std}}$$

Run No.: 1 @ 1.00 P_b: 29.96 "Hg

Control Module Vacuum: 5.0 "Hg

	Wet Test Meter (No. 2)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1140	5.172 cf	76 °F	-2.70 "H_2O	963.283 cf	80 °F	73 °F	1.00 "H_2O
Start	1128	0.000 cf	76 °F	-2.70 "H_2O	958.208 cf	76 °F	73 °F	1.00 "H_2O
Avg.	12	5.172 cf	76 °F	-2.70 "H_2O	5.075 cf	76 °F		1.00 "H_2O

$$Vm_{std} = 17.65 \times 5.172 \left[\frac{29.96 + \frac{-2.70}{13.6}}{76 + 460} \right] \times 1.005 \; (C_f) = 5.094 \text{ dcsf}$$

$$Vm_{std} = 17.65 \times 5.075 \left[\frac{29.96 + \frac{1.00}{13.6}}{76 + 460} \right] = 5.019 \text{ dcsf}$$

$$C_{DG} = \frac{5.094}{5.019} = \boxed{1.015}$$

DRY GAS METER CALIBRATION

Meter Number: 49-3 Calibrator: [signature]

Date: 9-24-02

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } Vm_{std}}{\text{Dry Gas Meter } Vm_{std}}$$

Run No.: 1 @ 1.50 P_b: 29.96 "Hg

Control Module Vacuum: 5.0 "Hg

	Wet Test Meter (No. 2)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1156	10.261 cf	76 °F	-3.30 "H_2O	973.802 cf	80 °F	74 °F	1.50 "H_2O
Start	1143	0.000 cf	76 °F	-3.30 "H_2O	963.752 cf	77 °F	73 °F	1.50 "H_2O
Avg.	13	10.261 cf	76 °F	-3.30 "H_2O	10.050 cf	76 °F		1.50 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.261 \left[\frac{29.96 + \frac{-3.30}{13.6}}{76 + 460}\right] \times 1.005\ (C_i) = 10.091 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.050 \left[\frac{29.96 + \frac{1.50}{13.6}}{76 + 460}\right] = 9.951 \text{ dcsf}$$

$$C_{DG} = \frac{10.091}{9.951} = \boxed{1.014}$$

DRY GAS METER CALIBRATION

Meter Number: 49-3 Calibrator: [signature]

Date: 9-24-02

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } Vm_{std}}{\text{Dry Gas Meter } Vm_{std}}$$

Run No.: 2 @ 2.00

P_b: 29.96 "Hg

Control Module Vacuum: 5.0 "Hg

	Wet Test Meter (No. 2)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1308	10.117 cf	77 °F	-3.40 "H_2O	9~~9~~9.923 cf	80 °F	73 °F	2.00 "H_2O
Start	1256	0.000 cf	77 °F	-3.40 "H_2O	985.000 cf	76 °F	73 °F	2.00 "H_2O
Avg.	12 ✓	10.117 ✓ cf	77 °F	-3.40 "H_2O	9.923 ✓ cf	76 ✓	°F	2.00 ✓ "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.117 \left[\frac{29.96 + \frac{-3.40}{13.6}}{77 + 460} \right] \times 1.005(C_f) = 9.929 \text{ dcsf} \quad ✓$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 9.923 \left[\frac{29.96 + \frac{2.00}{13.6}}{76 + 460} \right] = 9.838 \text{ dcsf} \quad ✓$$

$$C_{DG} = \frac{9.929}{9.838} = \boxed{1.009} \quad ✓$$

DRY GAS METER CALIBRATION

Meter Number: 49-3 Calibrator: [signature]

Date: 9-24-02

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } Vm_{std}}{\text{Dry Gas Meter } Vm_{std}}$$

Run No.: 1 @ 300 P_b: 29.96 "Hg

Control Module Vacuum: 5.0 "Hg

	Wet Test Meter (No. 2)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1324	10.284 cf	77 °F	-3.60 "H_2O	1006.151 cf	79 °F	75 °F	3.00 "H_2O
Start	1313	0.000 cf	77 °F	-3.60 "H_2O	996.030 cf	77 °F	74 °F	3.00 "H_2O
Avg.	11 ✓	10.284 cf	77 °F	-3.60 "H_2O	10.121 cf	76 ✓ °F		3.00 "H_2O

$$Vm_{std} = 17.65 \times 10.284 \left[\frac{29.96 + \frac{-3.60}{13.6}}{77 + 460} \right] \times 1.005\,(C_f) = 10.088 \text{ dcsf} \checkmark$$

$$Vm_{std} = 17.65 \times 10.121 \left[\frac{29.96 + \frac{3.00}{13.6}}{76 + 460} \right] = 10.058 \text{ dcsf} \checkmark$$

$$C_{DG} = \frac{10.088}{10.058} = \boxed{1.003} \checkmark$$

DRY GAS METER CALIBRATION

Meter Number: 49-3
Date: 9-24-02

Calibrator: Mike B Hakeem

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } Vm_{std}}{\text{Dry Gas Meter } Vm_{std}}$$

Run No.: 1 @ 4.00

P_b: 29.96 "Hg

Control Module Vacuum: 5.0 "Hg

	Wet Test Meter (No. 2)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1337	10.210 cf	77 °F	-4.30 "H_2O	1016.758 cf	82 °F	75 °F	4.00 "H_2O
Start	1329	0.000 cf	77 °F	-4.30 "H_2O	1006.890 cf	77 °F	74 °F	4.00 "H_2O
Avg.	8 ✓	10.210 ✓ cf	77 ✓ °F	-4.30 ✓ "H_2O	10.068 cf	77 ✓	°F	4.00 ✓ "H_2O

$$Vm_{std} = 17.65 \times 10.210 \left[\frac{29.96 + \frac{-4.30}{13.6}}{77 + 460}\right] \times 1.005 \; (C_f) = 9.998 \text{ dcsf} \; ✓$$

$$Vm_{std} = 17.65 \times 10.068 \left[\frac{29.96 + \frac{4.00}{13.6}}{77 + 460}\right] = 10.011 \; ✓ \text{ dcsf}$$

$$C_{DG} = \frac{9.998}{10.011} = \boxed{0.999} \; ✓$$

DRY GAS METER CALIBRATION

Meter Number: 49-3

Calibrator: [signature]

Date: 9-24-02

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } Vm_{std}}{\text{Dry Gas Meter } Vm_{std}}$$

Run No.: 1 @ 2.00

P_b: 29.96 "Hg

Control Module Vacuum: 5.0 "Hg

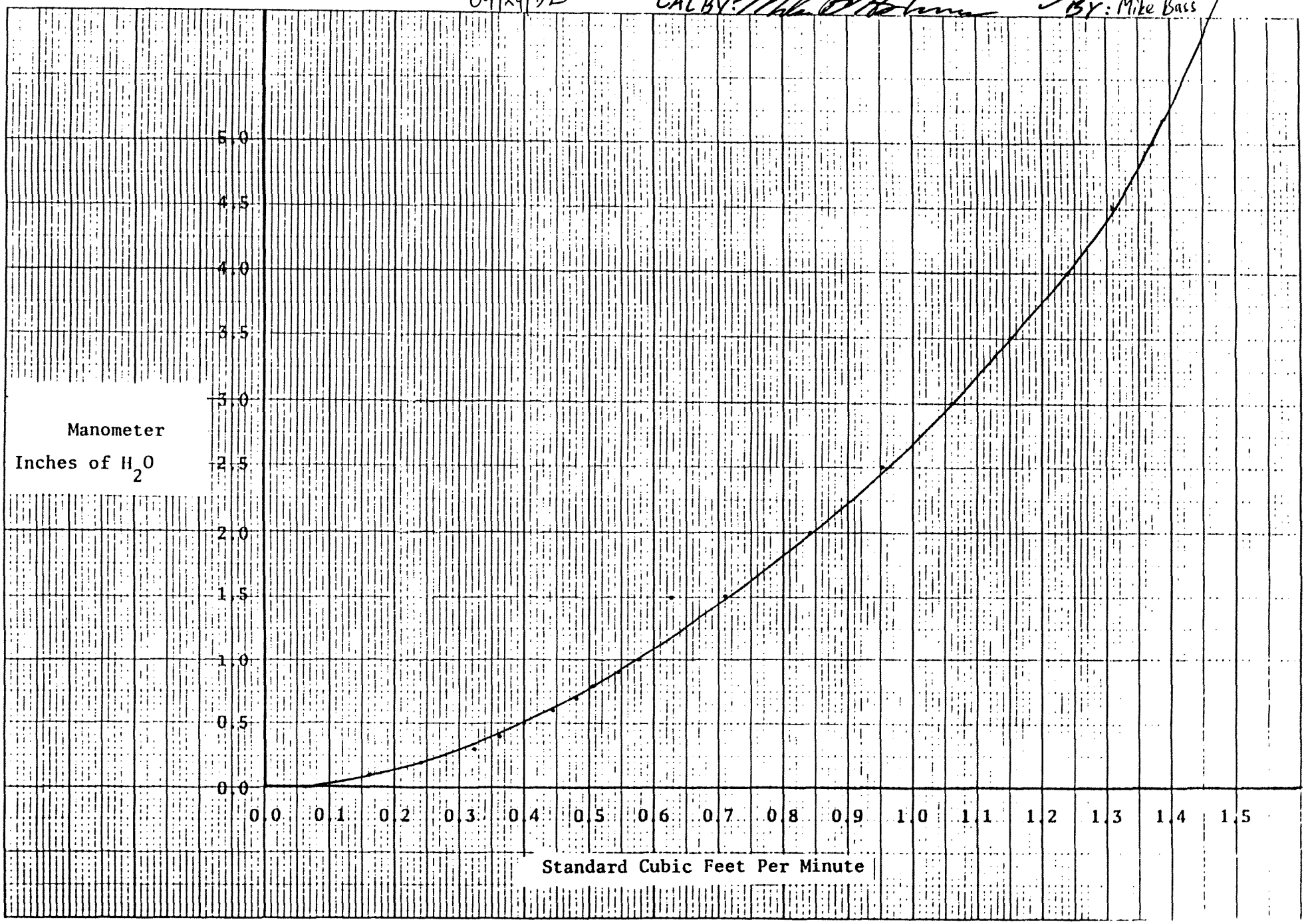
	Wet Test Meter (No. 2)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1248	10.351 cf	77 °F	-3.40 "H_2O	984.311 cf	79 °F	74 °F	2.00 "H_2O
Start	1237	0.000 cf	77 °F	-3.40 "H_2O	974.337 cf	77 °F	76 °F	2.00 "H_2O
Avg.	11	10.351 cf	77 °F	-3.40 "H_2O	9.974 cf	77 °F		2.00 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.351 \left[\frac{29.96 + \frac{-3.40}{13.6}}{77 + 460} \right] \times 1.005 (C_i) = 10.158 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 9.974 \left[\frac{29.96 + \frac{2.00}{13.6}}{77 + 460} \right] = 9.870 \text{ dcsf}$$

$$C_{DG} = \frac{10.158}{9.870} = \boxed{1.029}$$

09/24/12 CAL BY: Mike Bass



DIGITAL TEMPERATURE INDICATOR NO. 49-3

CALIBRATION DATA

Date: 9-24-02

Media	Time	Mercury Thermometer (°F)	DTI (°F)
Ice Bath	0748	33	33 ✓
Ambient Air	0746	76	76 ✓
Boiling Water	0755	211	212 ✓
Oven	0759	252	252 ✓
Oven	0804	300	302 ✓
Oven	0808	352	353 ✓
Oven	0813	372	373 ✓

Meter Adjusted? Yes _____ No ✓

Signature of Calibrator

Led by: Mike Dass

METCO ENVIRONMENTAL

BAROMETER CALIBRATION

Barometer No. 49-1

Date: 9-25-02
Time: 1320

Barometric Pressure @ Hobby Airport @ 45 ft.	=	29.980
	-	0.045
Absolute Pressure @ Hobby Airport	=	29.935
	+	0.024
Absolute Pressure @ METCO @ 21 ft.	=	29.959 : 29.96
Barometer Reading	=	29.95
Variation	=	0.03%
Barometer Adjusted?	Yes ____	No ✓
Barometer Reading (after adjustment)	=	____

Signature of Calibrator

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 7638
Project No.: 05-95286-016

Customer

METCO ENVIRONMENTAL
SCOT JACKSON
P O BOX 598
ADDISON TX 75001

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM020039 **Certification Date:** 8/13/02 **Exp. Date:** 8/12/2005
Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
PROPANE	14.90	PPM	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1668	8/01/05	ALM010723	99.50 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/6000/08963016A	08/13/02	FLAME IONIZATION

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis **Second Triad Analysis** **Calibration Curve**

PROPANE

Date:08/13/02	Response Unit:MV	
Z1 = 0.00000	R1 = 3684396.	T1 = 548555.0
R2 = 3692241.	Z2 = 0.00000	T2 = 548694.0
Z3 = 0.00000	T3 = 549828.0	R3 = 3685875.
Avg. Concentration:	14.90	PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = .999994	
Constants:	A = 0.0658416
B = 2.69E-5	C = 0
D = 0	E = 0

APPROVED BY:

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

9810 BAY AREA BLVD,PASADENA,TX 77507 Phone: 281-474-5800 Fax: 281-474-5857

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
9810 BAY AREA BLVD
PASADENA,TX 77507

P.O. No.: 7124
Project No.: 04-97452-008

Customer

METCO ENVIRONMENTAL
SCOT JACKSON
P O BOX 598
ADDISON TX 75001

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: BLM004119 **Certification Date:** 6/27/01 **Exp. Date:** 6/26/2004
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
PROPANE	27.55	PPM	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1667	8/01/01	ALM009247	49.70 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HP 5890A/5890A/2423A01568	06/05/01	TCD/FID

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

PROPANE

Date:06/27/01	Response Unit:AREA	
Z1 = 920.0000	R1 = 767018.0	T1 = 428334.0
R2 = 772549.0	Z2 = 4583.000	T2 = 429537.0
Z3 = 5490.000	T3 = 429580.0	R3 = 774207.0
Avg. Concentration:	27.55	PPM

Second Triad Analysis

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999953	1667
Constants:	A = -0.274384
B = 0.0000639	C = 0
D = 0	E = 0

APPROVED BY: _____
LING WEN

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

9810 BAY AREA BLVD,PASADENA,TX 77507 Phone: 281-474-5800 Fax: 281-474-5857

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
9810 BAY AREA BLVD
PASADENA,TX 77507

P.O. No.: 7020
Project No.: 04-95551-006

Customer

METCO ENVIRONMENTAL
SCOT JACKSON
P O BOX 598
ADDISON TX 75001

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: BAL1901 **Certification Date:** 5/01/01 **Exp. Date:** 5/01/2004
Cylinder Pressure*:** 1950 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
PROPANE	46.1	PPM	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1667	8/01/01	ALM009247	49.70 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
MTI-A/M200/171109	04/05/01	GAS CHROMATOGRAPHY

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

PROPANE

Date:05/01/01	Response Unit:AREA	
Z1 = 97.00000	R1 = 4944.000	T1 = 2331.000
R2 = 4965.000	Z2 = 74.00000	T2 = 2326.000
Z3 = 53.00000	T3 = 2354.000	R3 = 4950.000
Avg. Concentration:	46.14	PPM

Second Triad Analysis

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999998208
Constants: A = -0.08654192
B = 0.020034265 C =
D = E =

APPROVED BY: DAVID KELLY

APPENDIX D

Field Testing Data

METCO ENVIRONMENTAL

Job Number 02-300 ✓ Moisture Field Data
Job Name Weaver, Boos & Gordan ✓
Run Number 1 ✓ Read and record at the start of each test point.
Unit Enclosed Flare Outlet stack ✓
Date 11-7-02 ✓ Purge to: —
Operator Hannon / Hosko / BAS Purge time: —
Sample box No. 51-1 Meter Box No. 49-3 ✓ Pilot Leak Check Initial — Final — ✓

Ambient Temp. °F 56
Assumed Moisture % —
Probe Length 5 feet
C Factor — to reference.
Initial Leak @ 15.0 "Hg = 0.000 cfm ✓
Final Leak @ 6.5 "Hg = 0.000 cfm ✓

			ΔP_s		P_m		T_s					T_m	
Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Gauge	Stack Temp °F	~~Probe~~ Temp Aux °F Heated	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
Mid point	0857	457.728	—	0.90	0.90	6.5	—	255	234	42	65	63	int onset
	0902	460.42	—	0.90	0.90	6.5	—	256	236	41	65	63	
	0907	463.13	—	0.90	0.90	6.5	—	256	230	40	65	63	
	0912	465.89	—	0.90	0.90	6.5	—	256	230	41	66	63	
	0917	468.57	—	0.90	0.90	6.5	—	256	235	42	67	64	
	0922	471.34	—	0.90	0.90	6.5	—	256	22.4	43	67	64	
	0927	474.34	—	0.90	0.90	6.5	—	256	230	43	67	64	
	0932	476.89	—	0.90	0.90	6.5	—	255	22.9	43	67	65	
	0937	479.45	—	0.90	0.90	6.5	—	255	228	45	68	65	
	0942	482.42	—	0.90	0.90	6.5	—	255	235	45	68	65	
	0947	485.02	—	0.90	0.90	6.5	—	256	230	46	68	66	
	0952	487.86	—	0.90	0.90	6.5	—	256	232	49	69	66	
End	0957	490.559	—	—	—	—	—	—	—	—	—	—	

D-2

Pitot Tube Calibration Factor C_p —
Volume Collected V_m ~~33.223~~ ft^3 33.222 ✓
Water Collected V_w 62.2 ✓ ml
Time of Test T_t 60 ✓ min.
Stack Pressure P_s — "H_2O

Pitot Tube No. —
Baro. Press. P_b 29.90 ✓ "Hg
Probe Tip Dia. D_n — in.
% CO_2 5.8 ✓ % CO 0 ✓
% O_2 13.0 ✓ % N_2 81.2 ✓
Area Stack A_s 11357 in^2

Barometer No. 49-1 ✓ Probe Tip No. —
Total Volume of Leak Checks After Start: 0 ft^3
V_m = Dry Gas Meter Calibration Factor 32.86 ✓ X 1.011 ✓

{Dry Gas Meter Reading — ft^3 – (T_t — min. X Leak Rate — cfm)}

Impinger Box No. S1-1

			Water Weight Gain		
Impinger 1	Final Weight	699.9		Impinger 1	32.7
	Initial Weight	667.2			
	Increase	32.7		Impinger 2	17.2
Impinger 2	Final Weight	653.2		Impinger 3	2.8
	Initial Weight	636.0			
	Increase	17.2		Impinger 4	9.5
			V_w =		
Impinger 3	Final Weight	651.8	g SO_2 =	Impinger 5	
	Initial Weight	649.0	V_w =		
	Increase	2.8		Impinger 6	
Impinger 4	Final Weight	927.0		Impinger 7	
	Initial Weight	917.5			
	Increase	9.5		Total	62.2 ✓ = V_w

Impinger 5	Final Weight		P_b =	29.90 ✓	$\%CO_2$ =	5.8 ✓	
	Initial Weight		V_m =	~~32.223~~ 33.222	$\%O_2$ =	13.6 ✓	
	Increase		V_w =	62.2 ✓	%CO =	0 ✓	
			P_m =	0.900 ✓	$\%N_2$ =	81.2 ✓	
Impinger 6	Final Weight		Avg ΔP =	—	A_s =	11357 ✓	
	Initial Weight				D_n =	—	
	Increase		Avg$\sqrt{\Delta P}$ =	—	T_t =	60 ✓	
			C_p =	—			
Impinger 7	Final Weight		P_s =	— $"H_2O$		—	"Hg
	Initial Weight		T_m =	66 ✓ °F		526 ✓	°R
	Increase		T_s =	— °F		—	°R

Moisture Content: %M = ~~4.33~~ 8.31 8.08 ✓ M_d = ~~0.9569~~ 0.9169 0.9192 ✓ MW_d = 29.448 ✓ MW = ~~31.50~~ 28.52 ✓

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times ~~32.223~~ 33.222 \left[\frac{29.90 + \frac{0.900}{13.6}}{66 + 460}\right] = \begin{matrix} 33.405 \checkmark \\ ~~32.401~~ \text{ sft}^3 \\ 0.540 \text{ scfm} \\ 0.559 \checkmark \end{matrix}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 62.2 ✓ = 2.936 ✓ sft^3 8.08 ✓

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{2.936}{33.405 + 2.936}$ x 100 = ~~4.33~~ 8.31 % M.b

V_s = 5123.8 x $\sqrt{\quad\quad}$ x ____ = ____ fpm ACFM: ____

SCFM: ____

%I = $\frac{1{,}039 \times \quad \times}{\times \quad \times \quad \times \quad \times (\quad)^2}$ = ____ % %EA: 152.6 ✓

METCO ENVIRONMENTAL

Job Number 02-300 ✓ | Moisture Field Data | Ambient Temp. °F 68

Job Name Weaver, Boos & Gordan ✓ | Assumed Moisture % —

Run Number 2 ✓ | Read and record at the start of each test point. | Probe Length 5 feet

Unit Enclosed flare outlet stack ✓ | C Factor — to reference.

Date 11-7-02 ✓ | Purge to: — | Initial Leak @ 15 "Hg = 0.000 cfm ✓

Operator Hannon / Hosko / Boos ✓ | Purge time: — | Final Leak @ 6.5 "Hg = 0.000 cfm ✓

Sample box No. 51-2 Meter Box No. 49-3 | Pilot Leak Check Initial — Final — ✓

			ΔP_s		P_m		T_s				T_m		
Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
Mid Point	1008	491.099	—	0.90	0.90	6.5	—	256	228	59	70	67	Int. orsat
	1013	493.79	—	0.90	0.90	6.5	—	257	233	59	70	67	
	1018	496.61	—	0.90	0.90	6.5	—	258	229	56	70	67	
	1023	499.34	—	0.90	0.90	6.5	—	258	225	55	70	68	
	1028	502.16	—	0.90	0.90	6.5	—	258	225	56	71	68	
	1033	504.99	—	0.90	0.90	6.5	—	258	233	57	71	68	
	1038	507.82	—	0.90	0.90	6.5	—	258	235	57	71	68	
	1043	510.52	—	0.90	0.90	6.5	—	259	233	57	71	69	
	1048	513.32	—	0.90	0.90	6.5	—	260	225	58	72	69	
	~~1053~~	516.13	—	0.90	0.90	6.5	—	260	227	58	72	70	
	1058	518.81	—	0.90	0.90	6.5	—	260	237	58	72	70	
	1103	522.02	—	0.90	0.90	6.5	—	258	230	58	72	70	
End	1108	524.369	—	—	—	—	—	—	—	—	—	—	

D-4

Pitot Tube Calibration Factor C_p —

Volume Collected V_m 33.631 ✓ ft^3

Water Collected V_w 74.1 ✓ ml

Time of Test T_t 60 ✓ min.

Stack Pressure P_s 29.90 ✓ "H_2O

Pitot Tube No. —

Baro. Press. P_b — "Hg

Probe Tip Dia. D_n — in.

% CO_2 7.0 ✓ % CO 0 ✓

% O_2 8.2 ✓ % N_2 84.8 ✓

Area Stack A_s 11357 ✓ in^2

Barometer No. 49-1 ✓ Probe Tip No. —

Total Volume of Leak Checks After Start: — ft^3 ✓

V_m = Dry Gas Meter Calibration Factor 33.27 ✓ X 1.011 ✓

{Dry Gas Meter Reading — ft^3 – (T_t — min. X Leak Rate — cfm)}

Impinger Box No. 51-2

			Water Weight Gain		
Impinger 1	Final Weight	714.4		Impinger 1	44.0
	Initial Weight	670.4			
	Increase	44.0		Impinger 2	21.2
Impinger 2	Final Weight	761.2		Impinger 3	1.6
	Initial Weight	740.0			
	Increase	21.2		Impinger 4	7.3
		654.2	V_w =		
Impinger 3	Final Weight	~~652.8~~	g SO_2 = -	Impinger 5	
	Initial Weight	652.6	V_w =		
	Increase	1.6		Impinger 6	
Impinger 4	Final Weight	964.8		Impinger 7	
	Initial Weight	957.5			
	Increase	7.3		Total	74.1 ✓ = V_w

Impinger 5	Final Weight		P_b =	29.90 ✓	$\%CO_2$ =	7.0 ✓	
	Initial Weight		V_m =	33.636 ✓	$\%O_2$ =	8.2 ✓	
	Increase		V_w =	74.1 ✓	%CO =	0.0 ✓	
			P_m =	0.900 ✓	$\%N_2$ =	84.8 ✓	
Impinger 6	Final Weight		Avg ΔP =	—	A_s =	11357 ✓	
	Initial Weight				D_n =	—	
	Increase		Avg $\sqrt{\Delta P}$ =	—	T_t =	60 ✓	
			C_p =	—			
Impinger 7	Final Weight		P_s =	— "H_2O		— "Hg	
	Initial Weight		T_m =	~~67~~ 70 ✓ °F		~~527~~ 530 °R	
	Increase		T_s =	— °F		— °R	

Moisture Content: %M = ~~9.39~~ 9.44 ✓ M_d = ~~0.9061~~ 0.9056 ✓ MW_d = 29.448 ✓ MW = 28.37 ✓

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 33.636 \left[\frac{29.90 + \frac{0.900}{13.6}}{67 + 460}\right] = \frac{33.566 \text{ ✓}}{\sim\sim 33.759 \sim\sim} \text{ sft}^3 = \frac{0563}{0.5591} \text{ scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 74.1 ✓ = ~~3.500~~ 3.498 ✓ sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{3.498}{33.566 + 3.498}$ x 100 = ~~9.39~~ 9.44 ✓ %

V_s = 5123.8 x $\sqrt{\quad\quad}$ x ____ = ____ fpm ACFM: ____

SCFM: ____

%I = $\frac{1{,}039 \times \quad\quad \times}{\quad\quad}$ = ____ % %EA: 57.5 ✓

METCO ENVIRONMENTAL

Job Number 02-300 ✓ | Moisture Field Data | Ambient Temp. °F 73

Job Name Weaver, Bass & Gordon ✓ | Assumed Moisture % —

Run Number 3 ✓ | Read and record at the start of each test point. | Probe Length 5 feet

Unit Enclosed Flare Outlet Stack ✓ | C Factor — to reference.

Date 11-7-02 ✓ | Purge to: — | Initial Leak @ 15 "Hg = 0.000 cfm ✓

Operator Hannan / Hosko / BASS ✓ | Purge time: — | Final Leak @ 6.5 "Hg = 0.000 cfm ✓

Sample box No. 31-3 Meter Box No. 49-3 ✓ | Pilot Leak Check Initial — Final — ✓

			ΔP_s		P_m		T_s					T_m	
Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Gauge	Stack Temp °F	~~Probe~~ Temp Heat °F (Rx	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
MidPoint	1138	524.738	—	0.90	0.90	7.0	—	263	235	59	74	73	int. orsat
	1143	527.92	—	0.90	0.90	7.0	—	264	228	52	74	73	
	1148	530.51	—	0.90	0.90	7.0	—	264	230	49	74	73	
	1153	533.25	—	0.90	0.90	6.5	—	264	232	47	74	73	
	1158	536.12	—	0.90	0.90	6.5	—	263	228	47	74	73	
	1203	539.09	—	0.90	0.90	6.5	—	264	235	48	74	73	
	1208	541.11	—	0.90	0.90	6.5	—	264	230	47	75	72	
	1213	544.72	—	0.90	0.90	6.5	—	264	231	47	75	73	
	1218	547.19	—	0.90	0.90	6.5	—	264	229	48	75	73	
	1223	549.89	—	0.90	0.90	6.5	—	265	230	48	75	73	
	1228	552.63	—	0.90	0.90	6.5	—	264	230	48	76	73	
	1233	555.42	—	0.90	0.90	6.5	—	265	233	49	76	73	
End	1238	558.162	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p —

Volume Collected V_m ~~33.788~~ ft^3 33.792 ✓

Water Collected V_w 60.8 ✓ ml

Time of Test T_t 60 ✓ min.

Stack Pressure P_s — "H_2O

Pitot Tube No. —

Baro. Press. P_b 29.86 ✓ "Hg

Probe Tip Dia. D_n — in.

% CO_2 6.0 ✓ % CO 0 ✓

% O_2 8.0 ✓ % N_2 86.0 ✓

Area Stack A_s 11357 in^2

Barometer No. 49-1 ✓ Probe Tip No. —

Total Volume of Leak Checks After Start: — ft^3

V_m = Dry Gas Meter Calibration Factor 33.421 ✓ X 1.011 ✓

{Dry Gas Meter Reading — ft^3 – (T_t — min. X Leak Rate — cfm)}

Impinger Box No. 51-3

			Water Weight Gain		
Impinger 1	Final Weight	792.8		Impinger 1	42.8
	Initial Weight	750.0			
	Increase	42.8		Impinger 2	8.7
Impinger 2	Final Weight	792.7		Impinger 3	2.3
	Initial Weight	784.0			
	Increase	8.7		Impinger 4	7.0
			V_w =		
Impinger 3	Final Weight	644.9	g SO_2 =	Impinger 5	
	Initial Weight	642.6	V_w =		
	Increase	2.3		Impinger 6	
Impinger 4	Final Weight	897.4		Impinger 7	
	Initial Weight	890.4			
	Increase	7.0		Total	60.8 ✓ = V_w

Impinger 5	Final Weight		P_b =	29.86 ✓	$\%CO_2$ =	6.0 ✓	
	Initial Weight		V_m =	~~33.788~~ 33.792 ✓	$\%O_2$ =	8.0 ✓	
	Increase		V_w =	60.8 ✓	%CO =	0.0 ✓	
			P_m =	0.900 ✓	$\%N_2$ =	86.0 ✓	
Impinger 6	Final Weight		Avg ΔP =	—	A_n =	11357 ✓	
	Initial Weight				D_n =	—	
	Increase		Avg$\sqrt{\Delta P}$ =	—	T_t =	60 ✓	
			C_p =	—			
Impinger 7	Final Weight		P_s =	—	$^{\circ}H_2O$	—	$^{\circ}Hg$
	Initial Weight		T_m =	74 ✓	°F	534 ✓	°R
	Increase		T_s =	—	°F	—	°R

Moisture Content: %M = 7.91 ✓ M_d = 0.9209 ✓ MW_d = 29.280 ✓ MW = ~~28.40~~ 28.39 ✓

$$Vm_{std} = 17.65\ Vm\left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times \text{~~33.788~~ } 33.792 \left[\frac{29.86 + \frac{0.900}{13.6}}{74 + 460}\right] = \text{~~33.413~~ } 33.425 \text{ sft}^3 = 0.557 \text{ scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 60.8 ✓ = 2.870 ✓ sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{2.870}{\text{~~33.413~~ } 33.425 + 2.870}$ x 100 = 7.91 ✓ %

V_s = 5123.8 x $\sqrt{\quad}$ x ____ = — fpm

ACFM: —

SCFM: —

%I = $\frac{1{,}039 \times \quad \times}{\quad x \quad x \quad x \quad x(\ )^2}$ = — %

%EA: 54.1 ✓

APPENDIX E

Analytical Data

AtmAA Inc.
23917 Craftsman Rd.
Calabasas, CA 91302

LABORATORY ANALYSIS REPORT

Permanent Gases and Total Gaseous Non- Methane Organics (TGNMO)
Analysis in SUMMA Canister Samples

Report Date: November 26, 2002
Client: Metco
Project Name: Weaver, Boos, & Gordon
Project No.: 02-299

Date Received: November 11, 2002
Date Analyzed: November 14, 2002

ANALYSIS DESCRIPTION

Permanent gases were measured by thermal conductivity detection/gas chromatography (TCD/GC). Total gaseous non-methane organics (TGNMO) was measured by flame ionization detection/total combustion analysis (FID/TCA), EPA Method 25.

AtmAA Lab No.:	03152-5	03152-6	03152-7
Sample I.D.:	canister 283	canister 339	canister 386
	run 1	run 2	run 3
Initial Pressure:	524	559	528
Final Pressure:	795	811	803

Components	*(Concentration in %,v)*						Average
	Normalized		*Normalized*		*Normalized*		
Nitrogen	3.6	3.53	3.7	3.58	3.02	3.1	3.47
Oxygen	0.8	0.75	0.8	0.79	0.69	0.7	0.77
Methane	54.1	53.0	54.0	52.9	53.2	54.6	54.23
Carbon dioxide	41.5	40.6	41.5	40.7	40.6	41.6	41.53
	(Concentration in ppmv)						
TGNMO		5865		5045		5370	

The accuracy of permanent gas analysis by TCD/GC is +/- 2%, actual results are reported. TGNMO is total gaseous non-methane organics reported as ppmv methane.

Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Project Name: Weaver, Boos, & Gordon
Date Received: November 11, 2002
Date Analyzed: November 14, 2002

Components	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in %,v)			
Nitrogen	canister 297	23.1	20.8	22.0	5.2
	canister 365	26.9	27.5	27.2	1.1
	canister 326	21.4	21.0	21.2	0.94
	canister 283	3.59	3.47	3.53	1.7
	canister 339	3.59	3.57	3.58	0.28
	canister 386	3.00	3.04	3.02	0.66
Oxygen	canister 297	2.73	2.31	2.52	8.3
	canister 365	4.41	4.27	4.34	1.6
	canister 326	1.82	2.33	2.08	12
	canister 283	0.76	0.74	0.75	1.3
	canister 339	0.75	0.83	0.79	5.1
	canister 386	0.66	0.71	0.69	3.6
Methane	canister 297	37.9	37.8	37.9	0.1
	canister 283	52.9	53	53.0	0.1
Carbon dioxide	canister 297	27.9	29.5	28.7	2.8
	canister 283	40.8	40.4	40.6	0.49
		(Concentration in ppmv)			
TGNMO	canister 297	3320	3300	3310	0.30
	canister 365	3500	3450	3475	0.72
	canister 326	3290	3330	3310	0.60
	canister 283	6010	5720	5865	2.5
	canister 339	5040	5050	5045	0.10
	canister 386	5450	5290	5370	1.5

A set of 6 SUMMA canister samples, laboratory number 03152–(2-7), was analyzed for permanent gases and TGNMO. Agreement between repeat analyses is a measure of precision and is shown in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 22 repeat measurements from the sample set of 6 SUMMA canister sample is 2.3%.

Core Lab
PETROLEUM SERVICES

8210 Mosley Rd.
Houston. TX 77075
713 943-9776 Telephone
713 943-3846 Facsimile

CORE LABORATORIES

NOV 2 2 2002

METCO

JOHN PELLEGRINE
METCO ENVIRONMENTAL CO.

3226 COMMANDER DR
CARROLTON TX 75006

Date Reported: 11/14/02
Date Received: 11/13/02

Analytical Report

Test	Result	Units	Method	Date	Analyst
Sample Number: 124867-001	**Sample ID:**	02-299 Enclosed Flare Outlet Stack Run			**Sample Rcvd:**
Sample Date: 11/5/02 3:55:00 PM	**Description:**	Weaver,Boos & Gordon-San Antonio,Tx			11/13/02
Hydrocarbons in Air					
Methane	6	ppm v/v	Method 18 Mod.	11/14/02	CC
Sample Number: 124867-002	**Sample ID:**	02-299 Enclosed Flare Outlet Stack Run			**Sample Rcvd:**
Sample Date: 11/5/02 4:45:00 PM	**Description:**	Weaver,Boos & Gordon-San Antonio,Tx			11/13/02
Hydrocarbons in Air					
Methane	4	ppm v/v	Method 18 Mod.	11/14/02	CC
Sample Number: 124867-003	**Sample ID:**	02-299 Enclosed Flare Outlet Stack Run			**Sample Rcvd:**
Sample Date: 11/5/02 6:55:00 PM	**Description:**	Weaver,Boos & Gordon-San Antonio,Tx			11/13/02
Hydrocarbons in Air					
Methane	3	ppm v/v	Method 18 Mod.	11/14/02	CC
Sample Number: 124867-004	**Sample ID:**	02-300 Enclosed Flare Outlet Stack Run			**Sample Rcvd:**
Sample Date: 11/7/02 9:58:00 AM	**Description:**	Weaver,Boos & Gordon-Austin,Tx			11/13/02
Hydrocarbons in Air					
Methane	7	ppm v/v	Method 18 Mod.	11/14/02	CC
Sample Number: 124867-005	**Sample ID:**	02-300 Enclosed Flare Outlet Stack Run			**Sample Rcvd:**
Sample Date: 11/7/02 11:08:00 AM	**Description:**	Weaver,Boos & Gordon-Austin,Tx			11/13/02
Hydrocarbons in Air					
Methane	5	ppm v/v	Method 18 Mod.	11/14/02	CC
Sample Number: 124867-006	**Sample ID:**	02-300 Enclosed Flare Outlet Stack Run			**Sample Rcvd:**
Sample Date: 11/7/02 12:38:00 PM	**Description:**	Weaver,Boos & Gordon-Austin,Tx			11/13/02

Core Lab
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CORE LABORATORIES

JOHN PELLEGRINE
METCO ENVIRONMENTAL CO.

3226 COMMANDER DR
CARROLTON TX 75006

Date Reported: 11/14/02
Date Received: 11/13/02

Analytical Report

Test	Result	Units	Method	Date	Analyst
Sample Number:	**124867-006**	**Sample ID:**	**02-300 Enclosed Flare Outlet Stack Run**		**Sample Rcvd:**
Sample Date:	**11/7/02 12:38:00 PM**	**Description:**	**Weaver,Boos & Gordon-Austin,Tx**		**11/13/02**
Hydrocarbons in Air					
Methane	< 1	ppm v/v	Method 18 Mod.	11/14/02	CC

Approved By:

Jean Waits
Supervising Chemist

APPENDIX F

Reference Method Monitor Data

filename	11/7/2002	8:37:48				
testby1	METCO Environmental, Inc.					
testby2	Houston Operations					
testby3	METCO 51					
testby4	02-300					
testfor1	Weaver, Boos, & Gordon					
testfor2	Sunset Farms Landfill					
testfor3	Enclosed Flare Outlet Stack					
testfor4	THC					
name			THC			
sn			101841092T			
offset				0		
fullscale				52		
train				1		
gastype			thc 25a			
dcg1	11/7/2002	8:42:45		-0.5	SG986191ALC/cg1	THC 0
dcg1	11/7/2002	8:43:00		-0.5	SG986191ALC/cg1	THC 0
dcg1	11/7/2002	8:43:15		-0.4	SG986191ALC/cg1	THC 0
dcg1	11/7/2002	8:43:30		-0.5	SG986191ALC/cg1	THC
dcg1	11/7/2002	8:43:45		-0.1	SG986191ALC/cg1	THC 0
dcg1	11/7/2002	8:44:00		0.0	SG986191ALC/cg1	THC 0
dcg1	11/7/2002	8:44:15		0.0	SG986191ALC/cg1	THC 0
dcg1	11/7/2002	8:44:30		0.0	SG986191ALC/cg1	THC 0
dcg1	11/7/2002	8:44:45		0.0	SG986191ALC/cg1	THC 0
thcezero1	11/7/2002	8:44:45		0.0	SG986191ALC/cg1	THC 0
dcg4	11/7/2002	8:45:00		0.0	ALM020039/cg4	THC 14.9
dcg4	11/7/2002	8:45:15		0.0	ALM020039/cg4	THC 14.9
dcg4	11/7/2002	8:45:30		5.9	ALM020039/cg4	THC 14.9
dcg4	11/7/2002	8:45:45		13.2	ALM020039/cg4	THC 14.9
dcg4	11/7/2002	8:46:00		14.7	ALM020039/cg4	THC 14.9
dcg4	11/7/2002	8:46:15		14.7	ALM020039/cg4	THC 14.9
dcg4	11/7/2002	8:46:30		14.7	ALM020039/cg4	THC 14.9
dcg4	11/7/2002	8:46:45		14.7	ALM020039/cg4	THC 14.9
thclow1	11/7/2002	8:46:45		14.7	ALM020039/cg4	THC 14.9
dcg3	11/7/2002	8:47:00		14.7	BLM004119/cg3	THC 27.55
dcg3	11/7/2002	8:47:15		14.0	BLM004119/cg3	THC 27.55
dcg3	11/7/2002	8:47:30		26.4	BLM004119/cg3	THC 27.55
dcg3	11/7/2002	8:47:45		26.7	BLM004119/cg3	THC 27.55
dcg3	11/7/2002	8:48:00		26.8	BLM004119/cg3	THC 27.55
dcg3	11/7/2002	8:48:15		26.8	BLM004119/cg3	THC 27.55
dcg3	11/7/2002	8:48:30		26.7	BLM004119/cg3	THC 27.55
thcmid1	11/7/2002	8:48:30		26.7	BLM004119/cg3	THC 27.55
dcg2	11/7/2002	8:48:45		26.7	BAL1901/cg2	THC 46.1
dcg2	11/7/2002	8:49:00		24.7	BAL1901/cg2	THC 46.1
dcg2	11/7/2002	8:49:15		42.7	BAL1901/cg2	THC 46.1
dcg2	11/7/2002	8:49:30		47.3	BAL1901/cg2	THC 46.1
dcg2	11/7/2002	8:49:45		47.4	BAL1901/cg2	THC 46.1
dcg2	11/7/2002	8:50:00		47.5	BAL1901/cg2	THC 46.1
dcg2	11/7/2002	8:50:15		47.5	BAL1901/cg2	THC 46.1
dcg2	11/7/2002	8:50:30		47.5	BAL1901/cg2	THC 46.1
dcg2	11/7/2002	8:50:45		47.5	BAL1901/cg2	THC 46.1
thchigh1	11/7/2002	8:50:45		47.5	BAL1901/cg2	THC 46.1

SUM VE-7

dcg1	11/7/2002	8:51:00	47.6	SG986191ALC/cg1	THC	0
dcg1	11/7/2002	8:51:15	43.6	SG986191ALC/cg1	THC	0
dcg1	11/7/2002	8:51:30	9.2	SG986191ALC/cg1	THC	0
dcg1	11/7/2002	8:51:45	0.1	SG986191ALC/cg1	THC	0
dcg1	11/7/2002	8:52:00	0.0	SG986191ALC/cg1	THC	0
dcg1	11/7/2002	8:52:15	0.0	SG986191ALC/cg1	THC	0
dcg1	11/7/2002	8:52:30	0.0	SG986191ALC/cg1	THC	0
dcg1	11/7/2002	8:52:45	0.0	SG986191ALC/cg1	THC	0
thcezero1	11/7/2002	8:52:45	0.0	SG986191ALC/cg1	THC	0
run1	11/7/2002	8:57:00	-0.1			
run1	11/7/2002	8:57:15	-0.1			
run1	11/7/2002	8:57:30	-0.1			
run1	11/7/2002	8:57:45	-0.1			
run1	11/7/2002	8:58:00	-0.1			
run1	11/7/2002	8:58:15	-0.1			
run1	11/7/2002	8:58:30	-0.1			
run1	11/7/2002	8:58:45	-0.1			
run1	11/7/2002	8:59:00	-0.1			
run1	11/7/2002	8:59:15	-0.1			
run1	11/7/2002	8:59:30	-0.1			
run1	11/7/2002	8:59:45	-0.1			
run1	11/7/2002	9:00:00	-0.1			
run1	11/7/2002	9:00:15	-0.1			
run1	11/7/2002	9:00:30	-0.1			
run1	11/7/2002	9:00:45	-0.2			
run1	11/7/2002	9:01:00	-0.2			
run1	11/7/2002	9:01:15	-0.2			
run1	11/7/2002	9:01:30	-0.2			
run1	11/7/2002	9:01:45	-0.2			
run1	11/7/2002	9:02:00	-0.2			
run1	11/7/2002	9:02:15	-0.2			
run1	11/7/2002	9:02:30	-0.2			
run1	11/7/2002	9:02:45	-0.2			
run1	11/7/2002	9:03:00	-0.2			
run1	11/7/2002	9:03:15	-0.2			
run1	11/7/2002	9:03:30	-0.2			
run1	11/7/2002	9:03:45	-0.2			
run1	11/7/2002	9:04:00	-0.2			
run1	11/7/2002	9:04:15	-0.2			
run1	11/7/2002	9:04:30	-0.2			
run1	11/7/2002	9:04:45	-0.2			
run1	11/7/2002	9:05:00	-0.3			
run1	11/7/2002	9:05:15	-0.3			
run1	11/7/2002	9:05:30	-0.3			
run1	11/7/2002	9:05:45	-0.3			
run1	11/7/2002	9:06:00	-0.3			
run1	11/7/2002	9:06:15	-0.3			
run1	11/7/2002	9:06:30	-0.3			
run1	11/7/2002	9:06:45	-0.3			
run1	11/7/2002	9:07:00	-0.3			
run1	11/7/2002	9:07:15	-0.3			
run1	11/7/2002	9:07:30	-0.3			

run1	11/7/2002	9:07:45	-0.3
run1	11/7/2002	9:08:00	-0.3
run1	11/7/2002	9:08:15	-0.3
run1	11/7/2002	9:08:30	-0.3
run1	11/7/2002	9:08:45	-0.3
run1	11/7/2002	9:09:00	-0.3
run1	11/7/2002	9:09:15	-0.3
run1	11/7/2002	9:09:30	-0.3
run1	11/7/2002	9:09:45	-0.3
run1	11/7/2002	9:10:00	-0.3
run1	11/7/2002	9:10:15	-0.1
run1	11/7/2002	9:10:30	0.0
run1	11/7/2002	9:10:45	0.0
run1	11/7/2002	9:11:00	-0.1
run1	11/7/2002	9:11:15	0.0
run1	11/7/2002	9:11:30	0.0
run1	11/7/2002	9:11:45	0.0
run1	11/7/2002	9:12:00	0.0
run1	11/7/2002	9:12:15	0.0
run1	11/7/2002	9:12:30	0.0
run1	11/7/2002	9:12:45	-0.1
run1	11/7/2002	9:13:00	-0.1
run1	11/7/2002	9:13:15	-0.1
run1	11/7/2002	9:13:30	-0.1
run1	11/7/2002	9:13:45	-0.1
run1	11/7/2002	9:14:00	-0.1
run1	11/7/2002	9:14:15	-0.1
run1	11/7/2002	9:14:30	0.0
run1	11/7/2002	9:14:45	0.0
run1	11/7/2002	9:15:00	0.0
run1	11/7/2002	9:15:15	0.0
run1	11/7/2002	9:15:30	0.0
run1	11/7/2002	9:15:45	-0.1
run1	11/7/2002	9:16:00	-0.1
run1	11/7/2002	9:16:15	-0.1
run1	11/7/2002	9:16:30	-0.1
run1	11/7/2002	9:16:45	-0.1
run1	11/7/2002	9:17:00	-0.1
run1	11/7/2002	9:17:15	-0.1
run1	11/7/2002	9:17:30	-0.1
run1	11/7/2002	9:17:45	2.7
run1	11/7/2002	9:18:00	4.0
run1	11/7/2002	9:18:15	2.9
run1	11/7/2002	9:18:30	3.5
run1	11/7/2002	9:18:45	3.8
run1	11/7/2002	9:19:00	2.7
run1	11/7/2002	9:19:15	2.2
run1	11/7/2002	9:19:30	1.9
run1	11/7/2002	9:19:45	1.6
run1	11/7/2002	9:20:00	1.4
run1	11/7/2002	9:20:15	1.2
run1	11/7/2002	9:20:30	1.1

run1	11/7/2002	9:20:45	0.9
run1	11/7/2002	9:21:00	0.8
run1	11/7/2002	9:21:15	0.7
run1	11/7/2002	9:21:30	0.5
run1	11/7/2002	9:21:45	0.8
run1	11/7/2002	9:22:00	1.0
run1	11/7/2002	9:22:15	1.0
run1	11/7/2002	9:22:30	0.9
run1	11/7/2002	9:22:45	0.8
run1	11/7/2002	9:23:00	0.7
run1	11/7/2002	9:23:15	0.6
run1	11/7/2002	9:23:30	0.4
run1	11/7/2002	9:23:45	0.8
run1	11/7/2002	9:24:00	1.0
run1	11/7/2002	9:24:15	0.8
run1	11/7/2002	9:24:30	0.6
run1	11/7/2002	9:24:45	0.5
run1	11/7/2002	9:25:00	0.4
run1	11/7/2002	9:25:15	0.4
run1	11/7/2002	9:25:30	0.3
run1	11/7/2002	9:25:45	0.3
run1	11/7/2002	9:26:00	0.3
run1	11/7/2002	9:26:15	0.3
run1	11/7/2002	9:26:30	0.3
run1	11/7/2002	9:26:45	0.3
run1	11/7/2002	9:27:00	2.9
run1	11/7/2002	9:27:15	2.1
run1	11/7/2002	9:27:30	1.5
run1	11/7/2002	9:27:45	1.4
run1	11/7/2002	9:28:00	1.3
run1	11/7/2002	9:28:15	1.1
run1	11/7/2002	9:28:30	0.8
run1	11/7/2002	9:28:45	0.7
run1	11/7/2002	9:29:00	0.9
run1	11/7/2002	9:29:15	1.2
run1	11/7/2002	9:29:30	1.3
run1	11/7/2002	9:29:45	1.2
run1	11/7/2002	9:30:00	1.1
run1	11/7/2002	9:30:15	1.1
run1	11/7/2002	9:30:30	0.8
run1	11/7/2002	9:30:45	0.8
run1	11/7/2002	9:31:00	0.8
run1	11/7/2002	9:31:15	0.8
run1	11/7/2002	9:31:30	0.8
run1	11/7/2002	9:31:45	0.8
run1	11/7/2002	9:32:00	0.7
run1	11/7/2002	9:32:15	0.7
run1	11/7/2002	9:32:30	0.6
run1	11/7/2002	9:32:45	0.5
run1	11/7/2002	9:33:00	0.7
run1	11/7/2002	9:33:15	0.6
run1	11/7/2002	9:33:30	0.6

run1	11/7/2002	9:33:45	0.6
run1	11/7/2002	9:34:00	0.5
run1	11/7/2002	9:34:15	0.5
run1	11/7/2002	9:34:30	0.5
run1	11/7/2002	9:34:45	0.5
run1	11/7/2002	9:35:00	0.4
run1	11/7/2002	9:35:15	0.4
run1	11/7/2002	9:35:30	0.2
run1	11/7/2002	9:35:45	0.1
run1	11/7/2002	9:36:00	0.3
run1	11/7/2002	9:36:15	0.7
run1	11/7/2002	9:36:30	0.8
run1	11/7/2002	9:36:45	0.6
run1	11/7/2002	9:37:00	1.6
run1	11/7/2002	9:37:15	1.6
run1	11/7/2002	9:37:30	1.2
run1	11/7/2002	9:37:45	0.9
run1	11/7/2002	9:38:00	0.7
run1	11/7/2002	9:38:15	0.7
run1	11/7/2002	9:38:30	0.5
run1	11/7/2002	9:38:45	0.6
run1	11/7/2002	9:39:00	0.5
run1	11/7/2002	9:39:15	0.5
run1	11/7/2002	9:39:30	0.6
run1	11/7/2002	9:39:45	0.6
run1	11/7/2002	9:40:00	0.6
run1	11/7/2002	9:40:15	0.6
run1	11/7/2002	9:40:30	0.6
run1	11/7/2002	9:40:45	0.5
run1	11/7/2002	9:41:00	0.4
run1	11/7/2002	9:41:15	0.4
run1	11/7/2002	9:41:30	0.4
run1	11/7/2002	9:41:45	0.4
run1	11/7/2002	9:42:00	0.4
run1	11/7/2002	9:42:15	0.4
run1	11/7/2002	9:42:30	0.9
run1	11/7/2002	9:42:45	0.8
run1	11/7/2002	9:43:00	0.7
run1	11/7/2002	9:43:15	0.6
run1	11/7/2002	9:43:30	0.5
run1	11/7/2002	9:43:45	0.5
run1	11/7/2002	9:44:00	0.5
run1	11/7/2002	9:44:15	0.4
run1	11/7/2002	9:44:30	0.2
run1	11/7/2002	9:44:45	0.2
run1	11/7/2002	9:45:00	0.2
run1	11/7/2002	9:45:15	0.2
run1	11/7/2002	9:45:30	0.2
run1	11/7/2002	9:45:45	0.2
run1	11/7/2002	9:46:00	0.2
run1	11/7/2002	9:46:15	0.2
run1	11/7/2002	9:46:30	0.1

run1	11/7/2002	9:46:45	0.1			
run1	11/7/2002	9:47:00	0.1			
run1	11/7/2002	9:47:15	0.1			
run1	11/7/2002	9:47:30	0.1			
run1	11/7/2002	9:47:45	0.6			
run1	11/7/2002	9:48:00	1.2			
run1	11/7/2002	9:48:15	0.9			
run1	11/7/2002	9:48:30	0.7			
run1	11/7/2002	9:48:45	0.6			
run1	11/7/2002	9:49:00	0.5			
run1	11/7/2002	9:49:15	0.5			
run1	11/7/2002	9:49:30	0.4			
run1	11/7/2002	9:49:45	0.7			
run1	11/7/2002	9:50:00	0.8			
run1	11/7/2002	9:50:15	0.7			
run1	11/7/2002	9:50:30	0.5			
run1	11/7/2002	9:50:45	0.4			
run1	11/7/2002	9:51:00	0.4			
run1	11/7/2002	9:51:15	0.3			
run1	11/7/2002	9:51:30	0.2			
run1	11/7/2002	9:51:45	0.2			
run1	11/7/2002	9:52:00	0.2			
run1	11/7/2002	9:52:15	0.2			
run1	11/7/2002	9:52:30	0.2			
run1	11/7/2002	9:52:45	0.1			
run1	11/7/2002	9:53:00	0.1			
run1	11/7/2002	9:53:15	0.1			
run1	11/7/2002	9:53:30	0.1			
run1	11/7/2002	9:53:45	-0.1			
run1	11/7/2002	9:54:00	0.1			
run1	11/7/2002	9:54:15	0.3			
run1	11/7/2002	9:54:30	0.4			
run1	11/7/2002	9:54:45	0.3			
run1	11/7/2002	9:55:00	0.2			
run1	11/7/2002	9:55:15	0.2			
run1	11/7/2002	9:55:30	0.4			
run1	11/7/2002	9:55:45	0.4			
run1	11/7/2002	9:56:00	0.3			
run1	11/7/2002	9:56:15	0.2			
run1	11/7/2002	9:56:30	0.2			
run1	11/7/2002	9:56:45	0.1			
averun1	11/7/2002	8:57:00	0.4		60	
scg1	11/7/2002	9:57:00	0.1	SG986191ALC/cg1	THC	0
scg3	11/7/2002	9:57:15	0.3	BLM004119/cg3	THC	27.55
scg3	11/7/2002	9:57:30	7.7	BLM004119/cg3	THC	27.55
scg3	11/7/2002	9:57:45	24.6	BLM004119/cg3	THC	27.55
scg3	11/7/2002	9:58:00	26.1	BLM004119/cg3	THC	27.55
scg3	11/7/2002	9:58:15	26.7	BLM004119/cg3	THC	27.55
scg3	11/7/2002	9:58:30	26.8	BLM004119/cg3	THC	27.55
scg3	11/7/2002	9:58:45	27.3	BLM004119/cg3	THC	27.55
scg3	11/7/2002	9:59:00	27.3	BLM004119/cg3	THC	27.55
scg3	11/7/2002	9:59:15	27.3	BLM004119/cg3	THC	27.55

thcspan1	11/7/2002	9:59:15	27.3	BLM004119/cg3	THC	27.55
scg1	11/7/2002	9:59:30	26.6	SG986191ALC/cg1	THC	0
scg1	11/7/2002	9:59:45	26.0	SG986191ALC/cg1	THC	0
scg1	11/7/2002	10:00:00	14.5	SG986191ALC/cg1	THC	0
scg1	11/7/2002	10:00:15	0.3	SG986191ALC/cg1	THC	0
scg1	11/7/2002	10:00:30	0.0	SG986191ALC/cg1	THC	0
scg1	11/7/2002	10:00:45	0.0	SG986191ALC/cg1	THC	0
scg1	11/7/2002	10:01:00	0.0	SG986191ALC/cg1	THC	0
scg1	11/7/2002	10:01:15	0.0	SG986191ALC/cg1	THC	0
thczero1	11/7/2002	10:01:15	0.0	SG986191ALC/cg1	THC	0
run2	11/7/2002	10:08:00	-0.2			
run2	11/7/2002	10:08:15	-0.2			
run2	11/7/2002	10:08:30	-0.2			
run2	11/7/2002	10:08:45	-0.3			
run2	11/7/2002	10:09:00	-0.3			
run2	11/7/2002	10:09:15	-0.3			
run2	11/7/2002	10:09:30	-0.3			
run2	11/7/2002	10:09:45	-0.3			
run2	11/7/2002	10:10:00	-0.3			
run2	11/7/2002	10:10:15	-0.3			
run2	11/7/2002	10:10:30	-0.3			
run2	11/7/2002	10:10:45	-0.3			
run2	11/7/2002	10:11:00	-0.3			
run2	11/7/2002	10:11:15	-0.3			
run2	11/7/2002	10:11:30	-0.3			
run2	11/7/2002	10:11:45	-0.3			
run2	11/7/2002	10:12:00	-0.4			
run2	11/7/2002	10:12:15	-0.4			
run2	11/7/2002	10:12:30	-0.4			
run2	11/7/2002	10:12:45	-0.4			
run2	11/7/2002	10:13:00	-0.4			
run2	11/7/2002	10:13:15	-0.4			
run2	11/7/2002	10:13:30	-0.4			
run2	11/7/2002	10:13:45	-0.4			
run2	11/7/2002	10:14:00	-0.4			
run2	11/7/2002	10:14:15	-0.4			
run2	11/7/2002	10:14:30	-0.3			
run2	11/7/2002	10:14:45	0.1			
run2	11/7/2002	10:15:00	0.3			
run2	11/7/2002	10:15:15	0.3			
run2	11/7/2002	10:15:30	0.8			
run2	11/7/2002	10:15:45	0.5			
run2	11/7/2002	10:16:00	0.3			
run2	11/7/2002	10:16:15	0.2			
run2	11/7/2002	10:16:30	0.1			
run2	11/7/2002	10:16:45	0.0			
run2	11/7/2002	10:17:00	-0.1			
run2	11/7/2002	10:17:15	-0.1			
run2	11/7/2002	10:17:30	-0.2			
run2	11/7/2002	10:17:45	-0.2			
run2	11/7/2002	10:18:00	-0.3			
run2	11/7/2002	10:18:15	-0.4			

run2	11/7/2002	10:18:30	-0.4
run2	11/7/2002	10:18:45	-0.4
run2	11/7/2002	10:19:00	-0.4
run2	11/7/2002	10:19:15	-0.4
run2	11/7/2002	10:19:30	-0.5
run2	11/7/2002	10:19:45	-0.5
run2	11/7/2002	10:20:00	-0.6
run2	11/7/2002	10:20:15	-0.6
run2	11/7/2002	10:20:30	-0.7
run2	11/7/2002	10:20:45	-0.7
run2	11/7/2002	10:21:00	-0.7
run2	11/7/2002	10:21:15	-0.6
run2	11/7/2002	10:21:30	-0.6
run2	11/7/2002	10:21:45	-0.2
run2	11/7/2002	10:22:00	0.0
run2	11/7/2002	10:22:15	-0.1
run2	11/7/2002	10:22:30	-0.2
run2	11/7/2002	10:22:45	-0.1
run2	11/7/2002	10:23:00	-0.3
run2	11/7/2002	10:23:15	-0.1
run2	11/7/2002	10:23:30	0.0
run2	11/7/2002	10:23:45	-0.1
run2	11/7/2002	10:24:00	-0.2
run2	11/7/2002	10:24:15	-0.3
run2	11/7/2002	10:24:30	-0.3
run2	11/7/2002	10:24:45	-0.3
run2	11/7/2002	10:25:00	-0.4
run2	11/7/2002	10:25:15	-0.4
run2	11/7/2002	10:25:30	-0.4
run2	11/7/2002	10:25:45	-0.4
run2	11/7/2002	10:26:00	-0.4
run2	11/7/2002	10:26:15	-0.4
run2	11/7/2002	10:26:30	-0.4
run2	11/7/2002	10:26:45	-0.4
run2	11/7/2002	10:27:00	-0.4
run2	11/7/2002	10:27:15	-0.4
run2	11/7/2002	10:27:30	-0.4
run2	11/7/2002	10:27:45	-0.4
run2	11/7/2002	10:28:00	-0.3
run2	11/7/2002	10:28:15	0.2
run2	11/7/2002	10:28:30	0.0
run2	11/7/2002	10:28:45	0.0
run2	11/7/2002	10:29:00	0.0
run2	11/7/2002	10:29:15	0.0
run2	11/7/2002	10:29:30	-0.1
run2	11/7/2002	10:29:45	-0.1
run2	11/7/2002	10:30:00	-0.1
run2	11/7/2002	10:30:15	-0.2
run2	11/7/2002	10:30:30	-0.2
run2	11/7/2002	10:30:45	0.1
run2	11/7/2002	10:31:00	0.3
run2	11/7/2002	10:31:15	0.3

run2	11/7/2002	10:31:30	0.3
run2	11/7/2002	10:31:45	0.4
run2	11/7/2002	10:32:00	0.5
run2	11/7/2002	10:32:15	0.4
run2	11/7/2002	10:32:30	0.3
run2	11/7/2002	10:32:45	0.2
run2	11/7/2002	10:33:00	0.1
run2	11/7/2002	10:33:15	0.2
run2	11/7/2002	10:33:30	0.3
run2	11/7/2002	10:33:45	0.3
run2	11/7/2002	10:34:00	0.9
run2	11/7/2002	10:34:15	0.8
run2	11/7/2002	10:34:30	0.5
run2	11/7/2002	10:34:45	0.3
run2	11/7/2002	10:35:00	0.3
run2	11/7/2002	10:35:15	0.3
run2	11/7/2002	10:35:30	0.7
run2	11/7/2002	10:35:45	0.7
run2	11/7/2002	10:36:00	0.6
run2	11/7/2002	10:36:15	0.6
run2	11/7/2002	10:36:30	0.6
run2	11/7/2002	10:36:45	1.2
run2	11/7/2002	10:37:00	1.0
run2	11/7/2002	10:37:15	0.9
run2	11/7/2002	10:37:30	0.8
run2	11/7/2002	10:37:45	0.6
run2	11/7/2002	10:38:00	0.5
run2	11/7/2002	10:38:15	0.5
run2	11/7/2002	10:38:30	0.5
run2	11/7/2002	10:38:45	0.6
run2	11/7/2002	10:39:00	0.7
run2	11/7/2002	10:39:15	0.8
run2	11/7/2002	10:39:30	0.7
run2	11/7/2002	10:39:45	0.7
run2	11/7/2002	10:40:00	0.7
run2	11/7/2002	10:40:15	0.7
run2	11/7/2002	10:40:30	0.7
run2	11/7/2002	10:40:45	0.8
run2	11/7/2002	10:41:00	1.0
run2	11/7/2002	10:41:15	0.9
run2	11/7/2002	10:41:30	0.8
run2	11/7/2002	10:41:45	0.8
run2	11/7/2002	10:42:00	1.0
run2	11/7/2002	10:42:15	1.5
run2	11/7/2002	10:42:30	0.9
run2	11/7/2002	10:42:45	0.5
run2	11/7/2002	10:43:00	0.5
run2	11/7/2002	10:43:15	0.5
run2	11/7/2002	10:43:30	0.6
run2	11/7/2002	10:43:45	0.7
run2	11/7/2002	10:44:00	0.7
run2	11/7/2002	10:44:15	0.6

run2	11/7/2002	10:44:30	0.5
run2	11/7/2002	10:44:45	0.7
run2	11/7/2002	10:45:00	1.4
run2	11/7/2002	10:45:15	1.0
run2	11/7/2002	10:45:30	0.9
run2	11/7/2002	10:45:45	0.8
run2	11/7/2002	10:46:00	0.8
run2	11/7/2002	10:46:15	0.7
run2	11/7/2002	10:46:30	1.3
run2	11/7/2002	10:46:45	1.2
run2	11/7/2002	10:47:00	0.9
run2	11/7/2002	10:47:15	0.8
run2	11/7/2002	10:47:30	0.8
run2	11/7/2002	10:47:45	0.7
run2	11/7/2002	10:48:00	0.6
run2	11/7/2002	10:48:15	0.7
run2	11/7/2002	10:48:30	0.7
run2	11/7/2002	10:48:45	0.7
run2	11/7/2002	10:49:00	0.8
run2	11/7/2002	10:49:15	0.9
run2	11/7/2002	10:49:30	0.8
run2	11/7/2002	10:49:45	0.9
run2	11/7/2002	10:50:00	0.8
run2	11/7/2002	10:50:15	0.7
run2	11/7/2002	10:50:30	0.6
run2	11/7/2002	10:50:45	0.5
run2	11/7/2002	10:51:00	0.4
run2	11/7/2002	10:51:15	0.4
run2	11/7/2002	10:51:30	0.5
run2	11/7/2002	10:51:45	0.4
run2	11/7/2002	10:52:00	0.5
run2	11/7/2002	10:52:15	0.5
run2	11/7/2002	10:52:30	0.5
run2	11/7/2002	10:52:45	0.4
run2	11/7/2002	10:53:00	0.4
run2	11/7/2002	10:53:15	0.5
run2	11/7/2002	10:53:30	0.5
run2	11/7/2002	10:53:45	0.6
run2	11/7/2002	10:54:00	0.6
run2	11/7/2002	10:54:15	0.5
run2	11/7/2002	10:54:30	0.4
run2	11/7/2002	10:54:45	0.3
run2	11/7/2002	10:55:00	0.3
run2	11/7/2002	10:55:15	0.2
run2	11/7/2002	10:55:30	0.3
run2	11/7/2002	10:55:45	0.3
run2	11/7/2002	10:56:00	0.4
run2	11/7/2002	10:56:15	0.3
run2	11/7/2002	10:56:30	0.3
run2	11/7/2002	10:56:45	0.3
run2	11/7/2002	10:57:00	0.2
run2	11/7/2002	10:57:15	0.2

run2	11/7/2002	10:57:30	0.2			
run2	11/7/2002	10:57:45	0.2			
run2	11/7/2002	10:58:00	0.2			
run2	11/7/2002	10:58:15	0.1			
run2	11/7/2002	10:58:30	0.1			
run2	11/7/2002	10:58:45	0.1			
run2	11/7/2002	10:59:00	0.1			
run2	11/7/2002	10:59:15	0.1			
run2	11/7/2002	10:59:30	0.0			
run2	11/7/2002	10:59:45	0.0			
run2	11/7/2002	11:00:00	0.0			
run2	11/7/2002	11:00:15	0.1			
run2	11/7/2002	11:00:30	0.1			
run2	11/7/2002	11:00:45	0.0			
run2	11/7/2002	11:01:00	0.0			
run2	11/7/2002	11:01:15	0.0			
run2	11/7/2002	11:01:30	0.0			
run2	11/7/2002	11:01:45	0.0			
run2	11/7/2002	11:02:00	0.0			
run2	11/7/2002	11:02:15	0.1			
run2	11/7/2002	11:02:30	0.2			
run2	11/7/2002	11:02:45	0.4			
run2	11/7/2002	11:03:00	0.6			
run2	11/7/2002	11:03:15	0.6			
run2	11/7/2002	11:03:30	0.6			
run2	11/7/2002	11:03:45	0.5			
run2	11/7/2002	11:04:00	0.5			
run2	11/7/2002	11:04:15	0.5			
run2	11/7/2002	11:04:30	0.7			
run2	11/7/2002	11:04:45	0.9			
run2	11/7/2002	11:05:00	1.0			
run2	11/7/2002	11:05:15	1.0			
run2	11/7/2002	11:05:30	1.0			
run2	11/7/2002	11:05:45	1.0			
run2	11/7/2002	11:06:00	0.9			
run2	11/7/2002	11:06:15	1.0			
run2	11/7/2002	11:06:30	2.0			
run2	11/7/2002	11:06:45	2.9			
run2	11/7/2002	11:07:00	4.1			
run2	11/7/2002	11:07:15	6.7			
run2	11/7/2002	11:07:30	15.9			
run2	11/7/2002	11:07:45	11.7			
run2	11/7/2002	11:08:00	11.3			
averun2	11/7/2002	10:08:00	0.4		60	
scg3	11/7/2002	11:08:30	10.8	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:08:45	9.2	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:09:00	24.0	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:09:15	27.4	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:09:30	26.7	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:09:45	25.6	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:10:00	28.1	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:10:15	28.6	BLM004119/cg3	THC	27.55

scg1	11/7/2002	11:10:30	29.1	SG986191ALC/cg1	THC	0
scg1	11/7/2002	11:10:45	28.3	SG986191ALC/cg1	THC	0
scg1	11/7/2002	11:11:00	17.4	SG986191ALC/cg1	THC	0
scg1	11/7/2002	11:11:15	3.9	SG986191ALC/cg1	THC	0
scg1	11/7/2002	11:11:30	0.4	SG986191ALC/cg1	THC	0
scg1	11/7/2002	11:11:45	0.0	SG986191ALC/cg1	THC	0
scg1	11/7/2002	11:12:00	0.0	SG986191ALC/cg1	THC	0
scg1	11/7/2002	11:12:15	0.0	SG986191ALC/cg1	THC	0
thczero1	11/7/2002	11:12:15	0.0	SG986191ALC/cg1	THC	0
scg3	11/7/2002	11:12:30	-0.1	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:12:45	-0.3	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:13:00	3.2	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:13:15	23.4	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:13:30	26.7	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:13:45	27.0	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:14:00	26.9	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:14:15	26.8	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:14:30	26.8	BLM004119/cg3	THC	27.55
scg3	11/7/2002	11:14:45	26.8	BLM004119/cg3	THC	27.55
thcspan1	11/7/2002	11:14:45	26.8	BLM004119/cg3	THC	27.55
run3	11/7/2002	11:37:30	4.6			
run3	11/7/2002	11:37:45	3.8			
run3	11/7/2002	11:38:00	3.0			
run3	11/7/2002	11:38:15	2.4			
run3	11/7/2002	11:38:30	1.9			
run3	11/7/2002	11:38:45	1.8			
run3	11/7/2002	11:39:00	1.9			
run3	11/7/2002	11:39:15	2.0			
run3	11/7/2002	11:39:30	1.9			
run3	11/7/2002	11:39:45	2.0			
run3	11/7/2002	11:40:00	2.0			
run3	11/7/2002	11:40:15	2.3			
run3	11/7/2002	11:40:30	2.8			
run3	11/7/2002	11:40:45	3.2			
run3	11/7/2002	11:41:00	2.6			
run3	11/7/2002	11:41:15	1.9			
run3	11/7/2002	11:41:30	1.4			
run3	11/7/2002	11:41:45	1.3			
run3	11/7/2002	11:42:00	1.4			
run3	11/7/2002	11:42:15	1.3			
run3	11/7/2002	11:42:30	1.3			
run3	11/7/2002	11:42:45	1.4			
run3	11/7/2002	11:43:00	1.4			
run3	11/7/2002	11:43:15	1.4			
run3	11/7/2002	11:43:30	1.4			
run3	11/7/2002	11:43:45	1.3			
run3	11/7/2002	11:44:00	1.1			
run3	11/7/2002	11:44:15	1.0			
run3	11/7/2002	11:44:30	0.9			
run3	11/7/2002	11:44:45	0.9			
run3	11/7/2002	11:45:00	0.9			
run3	11/7/2002	11:45:15	0.9			

run3	11/7/2002	11:45:30	0.9
run3	11/7/2002	11:45:45	0.9
run3	11/7/2002	11:46:00	0.9
run3	11/7/2002	11:46:15	0.9
run3	11/7/2002	11:46:30	1.0
run3	11/7/2002	11:46:45	1.0
run3	11/7/2002	11:47:00	1.0
run3	11/7/2002	11:47:15	1.0
run3	11/7/2002	11:47:30	1.0
run3	11/7/2002	11:47:45	0.9
run3	11/7/2002	11:48:00	0.9
run3	11/7/2002	11:48:15	1.0
run3	11/7/2002	11:48:30	1.0
run3	11/7/2002	11:48:45	1.1
run3	11/7/2002	11:49:00	0.9
run3	11/7/2002	11:49:15	0.8
run3	11/7/2002	11:49:30	0.8
run3	11/7/2002	11:49:45	0.8
run3	11/7/2002	11:50:00	0.9
run3	11/7/2002	11:50:15	1.0
run3	11/7/2002	11:50:30	1.0
run3	11/7/2002	11:50:45	1.0
run3	11/7/2002	11:51:00	0.9
run3	11/7/2002	11:51:15	0.9
run3	11/7/2002	11:51:30	0.8
run3	11/7/2002	11:51:45	0.9
run3	11/7/2002	11:52:00	0.9
run3	11/7/2002	11:52:15	0.9
run3	11/7/2002	11:52:30	0.9
run3	11/7/2002	11:52:45	0.8
run3	11/7/2002	11:53:00	0.8
run3	11/7/2002	11:53:15	0.7
run3	11/7/2002	11:53:30	0.7
run3	11/7/2002	11:53:45	0.8
run3	11/7/2002	11:54:00	0.8
run3	11/7/2002	11:54:15	0.8
run3	11/7/2002	11:54:30	0.8
run3	11/7/2002	11:54:45	0.8
run3	11/7/2002	11:55:00	0.7
run3	11/7/2002	11:55:15	0.7
run3	11/7/2002	11:55:30	0.7
run3	11/7/2002	11:55:45	0.7
run3	11/7/2002	11:56:00	0.6
run3	11/7/2002	11:56:15	0.7
run3	11/7/2002	11:56:30	0.7
run3	11/7/2002	11:56:45	0.7
run3	11/7/2002	11:57:00	0.7
run3	11/7/2002	11:57:15	0.7
run3	11/7/2002	11:57:30	0.7
run3	11/7/2002	11:57:45	0.7
run3	11/7/2002	11:58:00	0.7
run3	11/7/2002	11:58:15	0.7

run3	11/7/2002	11:58:30	0.7
run3	11/7/2002	11:58:45	0.7
run3	11/7/2002	11:59:00	0.7
run3	11/7/2002	11:59:15	0.7
run3	11/7/2002	11:59:30	0.7
run3	11/7/2002	11:59:45	0.7
run3	11/7/2002	12:00:00	0.7
run3	11/7/2002	12:00:15	0.7
run3	11/7/2002	12:00:30	0.8
run3	11/7/2002	12:00:45	0.8
run3	11/7/2002	12:01:00	0.8
run3	11/7/2002	12:01:15	0.8
run3	11/7/2002	12:01:30	0.8
run3	11/7/2002	12:01:45	0.8
run3	11/7/2002	12:02:00	0.8
run3	11/7/2002	12:02:15	0.8
run3	11/7/2002	12:02:30	0.8
run3	11/7/2002	12:02:45	0.8
run3	11/7/2002	12:03:00	0.8
run3	11/7/2002	12:03:15	0.8
run3	11/7/2002	12:03:30	0.8
run3	11/7/2002	12:03:45	0.8
run3	11/7/2002	12:04:00	0.8
run3	11/7/2002	12:04:15	0.8
run3	11/7/2002	12:04:30	0.8
run3	11/7/2002	12:04:45	0.8
run3	11/7/2002	12:05:00	0.8
run3	11/7/2002	12:05:15	1.0
run3	11/7/2002	12:05:30	1.0
run3	11/7/2002	12:05:45	1.0
run3	11/7/2002	12:06:00	0.9
run3	11/7/2002	12:06:15	0.9
run3	11/7/2002	12:06:30	1.0
run3	11/7/2002	12:06:45	0.9
run3	11/7/2002	12:07:00	0.9
run3	11/7/2002	12:07:15	0.9
run3	11/7/2002	12:07:30	0.9
run3	11/7/2002	12:07:45	0.8
run3	11/7/2002	12:08:00	0.7
run3	11/7/2002	12:08:15	0.7
run3	11/7/2002	12:08:30	0.6
run3	11/7/2002	12:08:45	0.6
run3	11/7/2002	12:09:00	0.6
run3	11/7/2002	12:09:15	0.6
run3	11/7/2002	12:09:30	0.6
run3	11/7/2002	12:09:45	0.6
run3	11/7/2002	12:10:00	1.4
run3	11/7/2002	12:10:15	6.3
run3	11/7/2002	12:10:30	5.8
run3	11/7/2002	12:10:45	6.9
run3	11/7/2002	12:11:00	4.9
run3	11/7/2002	12:11:15	3.9

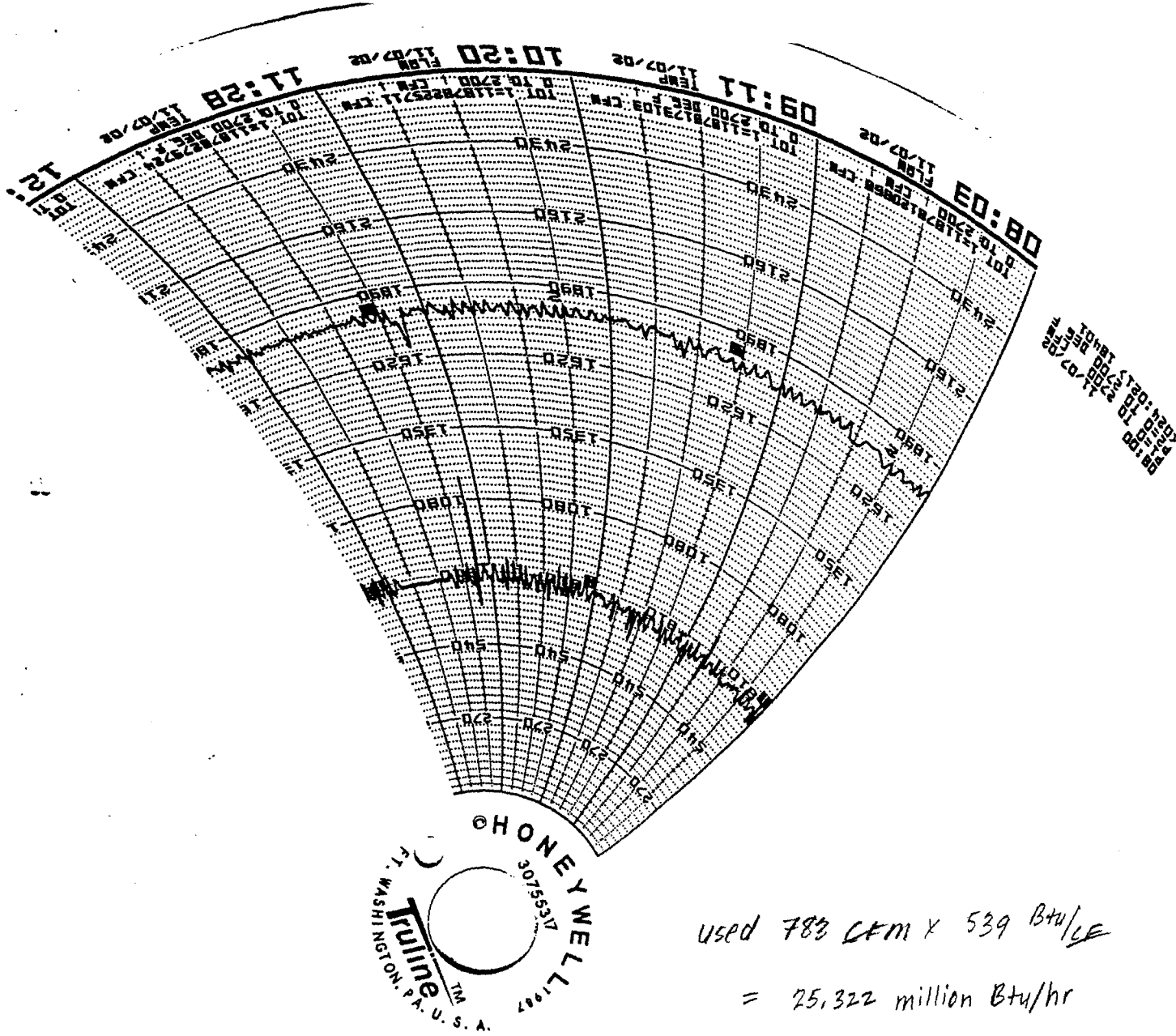
run3	11/7/2002	12:11:30	3.3
run3	11/7/2002	12:11:45	2.8
run3	11/7/2002	12:12:00	2.3
run3	11/7/2002	12:12:15	1.9
run3	11/7/2002	12:12:30	2.4
run3	11/7/2002	12:12:45	6.1
run3	11/7/2002	12:13:00	3.8
run3	11/7/2002	12:13:15	3.0
run3	11/7/2002	12:13:30	2.4
run3	11/7/2002	12:13:45	2.2
run3	11/7/2002	12:14:00	2.1
run3	11/7/2002	12:14:15	1.9
run3	11/7/2002	12:14:30	1.6
run3	11/7/2002	12:14:45	1.4
run3	11/7/2002	12:15:00	1.2
run3	11/7/2002	12:15:15	1.1
run3	11/7/2002	12:15:30	1.0
run3	11/7/2002	12:15:45	1.0
run3	11/7/2002	12:16:00	0.9
run3	11/7/2002	12:16:15	0.9
run3	11/7/2002	12:16:30	0.8
run3	11/7/2002	12:16:45	0.8
run3	11/7/2002	12:17:00	0.7
run3	11/7/2002	12:17:15	0.7
run3	11/7/2002	12:17:30	0.6
run3	11/7/2002	12:17:45	0.6
run3	11/7/2002	12:18:00	0.6
run3	11/7/2002	12:18:15	0.6
run3	11/7/2002	12:18:30	0.6
run3	11/7/2002	12:18:45	0.4
run3	11/7/2002	12:19:00	0.4
run3	11/7/2002	12:19:15	0.3
run3	11/7/2002	12:19:30	0.3
run3	11/7/2002	12:19:45	0.3
run3	11/7/2002	12:20:00	0.3
run3	11/7/2002	12:20:15	0.2
run3	11/7/2002	12:20:30	0.2
run3	11/7/2002	12:20:45	0.2
run3	11/7/2002	12:21:00	0.2
run3	11/7/2002	12:21:15	0.2
run3	11/7/2002	12:21:30	0.2
run3	11/7/2002	12:21:45	0.2
run3	11/7/2002	12:22:00	0.1
run3	11/7/2002	12:22:15	-0.1
run3	11/7/2002	12:22:30	0.3
run3	11/7/2002	12:22:45	0.4
run3	11/7/2002	12:23:00	0.4
run3	11/7/2002	12:23:15	0.4
run3	11/7/2002	12:23:30	0.4
run3	11/7/2002	12:23:45	0.3
run3	11/7/2002	12:24:00	0.1
run3	11/7/2002	12:24:15	0.2

run3	11/7/2002	12:24:30	0.6
run3	11/7/2002	12:24:45	0.3
run3	11/7/2002	12:25:00	0.3
run3	11/7/2002	12:25:15	0.3
run3	11/7/2002	12:25:30	0.2
run3	11/7/2002	12:25:45	0.2
run3	11/7/2002	12:26:00	0.1
run3	11/7/2002	12:26:15	0.1
run3	11/7/2002	12:26:30	0.0
run3	11/7/2002	12:26:45	-0.2
run3	11/7/2002	12:27:00	-0.2
run3	11/7/2002	12:27:15	-0.1
run3	11/7/2002	12:27:30	2.1
run3	11/7/2002	12:27:45	3.5
run3	11/7/2002	12:28:00	3.3
run3	11/7/2002	12:28:15	2.8
run3	11/7/2002	12:28:30	2.3
run3	11/7/2002	12:28:45	1.9
run3	11/7/2002	12:29:00	3.1
run3	11/7/2002	12:29:15	3.7
run3	11/7/2002	12:29:30	2.4
run3	11/7/2002	12:29:45	1.8
run3	11/7/2002	12:30:00	1.3
run3	11/7/2002	12:30:15	1.2
run3	11/7/2002	12:30:30	1.1
run3	11/7/2002	12:30:45	1.0
run3	11/7/2002	12:31:00	0.9
run3	11/7/2002	12:31:15	0.8
run3	11/7/2002	12:31:30	0.7
run3	11/7/2002	12:31:45	2.0
run3	11/7/2002	12:32:00	1.9
run3	11/7/2002	12:32:15	1.7
run3	11/7/2002	12:32:30	0.8
run3	11/7/2002	12:32:45	1.1
run3	11/7/2002	12:33:00	2.3
run3	11/7/2002	12:33:15	6.3
run3	11/7/2002	12:33:30	0.7
run3	11/7/2002	12:33:45	0.2
run3	11/7/2002	12:34:00	0.2
run3	11/7/2002	12:34:15	0.4
run3	11/7/2002	12:34:30	0.4
run3	11/7/2002	12:34:45	0.4
run3	11/7/2002	12:35:00	0.3
run3	11/7/2002	12:35:15	1.1
run3	11/7/2002	12:35:30	1.3
run3	11/7/2002	12:35:45	1.4
run3	11/7/2002	12:36:00	1.2
run3	11/7/2002	12:36:15	0.8
run3	11/7/2002	12:36:30	0.4
run3	11/7/2002	12:36:45	0.2
run3	11/7/2002	12:37:00	0.1
run3	11/7/2002	12:37:15	0.0

run3	11/7/2002	12:37:30	0.0			
run3	11/7/2002	12:37:45	0.0			
averun3	11/7/2002	11:38:00	1.1		60	
scg3	11/7/2002	12:38:00	0.0	BLM004119/cg3	THC	27.55
scg3	11/7/2002	12:38:15	0.2	BLM004119/cg3	THC	27.55
scg3	11/7/2002	12:38:30	16.7	BLM004119/cg3	THC	27.55
scg3	11/7/2002	12:38:45	26.7	BLM004119/cg3	THC	27.55
scg3	11/7/2002	12:39:00	26.8	BLM004119/cg3	THC	27.55
scg3	11/7/2002	12:39:15	26.8	BLM004119/cg3	THC	27.55
scg3	11/7/2002	12:39:30	26.9	BLM004119/cg3	THC	27.55
scg3	11/7/2002	12:39:45	25.9	BLM004119/cg3	THC	27.55
thcspan1	11/7/2002	12:39:30	26.9	BLM004119/cg3	THC	27.55
scg1	11/7/2002	12:40:00	25.1	SG986191ALC/cg1	THC	0
scg1	11/7/2002	12:40:15	23.3	SG986191ALC/cg1	THC	0
scg1	11/7/2002	12:40:30	5.7	SG986191ALC/cg1	THC	0
scg1	11/7/2002	12:40:45	0.3	SG986191ALC/cg1	THC	0
scg1	11/7/2002	12:41:00	0.3	SG986191ALC/cg1	THC	0
scg1	11/7/2002	12:41:15	0.0	SG986191ALC/cg1	THC	0
scg1	11/7/2002	12:41:30	0.2	SG986191ALC/cg1	THC	0
scg1	11/7/2002	12:41:45	0.1	SG986191ALC/cg1	THC	0
scg1	11/7/2002	12:42:00	-0.1	SG986191ALC/cg1	THC	0
thczero1	11/7/2002	12:42:00	-0.1	SG986191ALC/cg1	THC	0
End						

APPENDIX G

Plant Operational Data and
F_d factor Calculations



used 783 CFM x 539 Btu/CF

= 25,322 million Btu/hr

11/7/02

08:30 — 12:30

AM. P.M.

Gas Recovery Systems.

Sunset Farms

SIERRA INSTRUMENTS, INC.
HARRIS COURT, BUILDING L
MONTEREY, CA 93940 USA
800-866-0200 831-373-0200
FAX 831-373-4402

CALIBRATION CERTIFICATE

Print Date and Time

Wednesday, October 31, 2001 12:30 PM

Order Information	Customer Name	GAS RECOVERY SYSTEM INC.
	Sales Order Number	133850
	Purchase Order Number	Warranty
Instrument	Model	6405-MAA-E1S-S2-P3-V4-MR-CC
	Serial Number	26028
	Tag Number	N/A
	Factory Full Scale	2700.0000
	User Full Scale	2700.0000
	Units	SCFM
	Line Size	11.25 Inch I.D. Pipe
	Output	4 - 20 mA
	Display Setting (Optional)	N/A
	Totalizer Setting (Optional)	N/A
	Alarm Settings (Optional)	N/A
	Other	N/A
	Calibration Date	October 31, 2001
	Calibration Due Date	October 31, 2002
Cal-Lab Data	Calibration Method	Gas Loop Asset Numbers 0114,0115 and 0116
	M&TE Asset Numbers	0051, 0052
	Ambient Temperature	73.4° F
	Ambient Pressure	29.80 In Hg
Application Data	Calibrated for (gas)	32% CH4, 48% CO2, 7% N2, 13% O2
	Operating Gas Temperature	125.0° F
	Operating Pressure	18.00 Inch W.C.
	Reference Temperature	70 Deg F.
	Reference Pressure	1 ATM
	Accuracy Specification	+/- 2% Reading (10-100%FS) & .5% FS below 10% FS

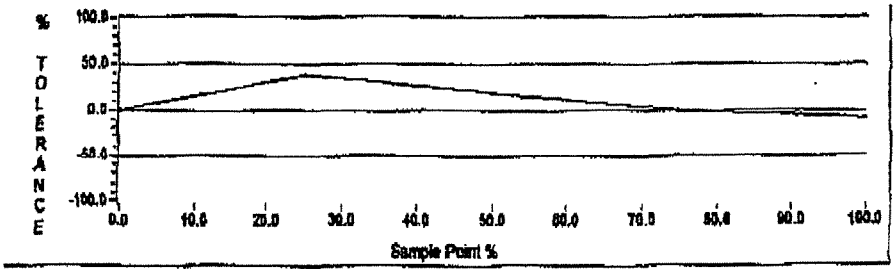
Range 1 Mass Flow Sensor Data

Alpha Temperature	0.003844
Ro Temperature	999.4
Alpha Velocity	0.003843
Ro Velocity	20.02

Performance Data

Sample Point	Output	Indicated Flow	Actual Flow	% Tolerance	Bridge Voltage
0.00	4.007	1.2157	0.0000	0.0	3.527
25.02	8.003	668.5136	675.4647	37.4	6.943
50.01	12.034	1356.0951	1350.2293	16.8	7.911
74.87	15.993	2022.8617	2029.2924	-8.9	8.559
99.94	19.962	2693.5141	2698.4047	-9.1	9.653

Performance Graph



The calibration standards used in this procedure are traceable to NIST or applicable international Standards.
This instrument has been calibrated in accordance with the provisions of ANSI/NCSL Z540-1 and ISO/IEC guide 25.

Note: the % Tolerance is the error, as a percent of the maximum error allowed for the flowmeter to meet the accuracy specification shown above. A % Tolerance of less than 100% indicates the meter is within specification.

Sierra Instruments holds an ISO 9001 Certificate of Registration No. 99112.1

Calibration Technician: _____ Date: 10/31/01

Q.C.Technician: Jose Luis Hernandez Date: 10/31/01

SI form #: 6440-B

SW :FloBot Cal_sht, Rev. 1.03

Fd Factor Calculations

	Specific Gravity	Btu/ft3	%Vol.	Specific Gravity Ratio	(% wt.)	O2%	C%	H%	S%
Hydrogen	0.0696	324.9		0.0000	0.00			100.0	
Oxygen	1.1100		0.77	0.0085	0.87	100.0			
Nitrogen	0.9672		3.47	0.0336	3.45				
Carbon Monoxide	0.9671	321.3		0.0000	0.00	57.1	42.9		
Carbon Dioxide	1.5194		41.53	0.6310	64.82	72.7	27.3		
Hydrogen Sulfide	1.1765	638.6		0.0000	0.00			5.9	94.1
Methane (C1)	0.5539	1012.0	54.23	0.3004	30.86		75.0	25.0	
Ethane (C2)	1.0382	1772.9		0.0000	0.00		80.0	20.0	
Ethylene (C2=)	0.9686	1602.9		0.0000	0.00		85.7	14.3	
Propane (C3)	1.5224	2523.0		0.0000	0.00		81.8	18.2	
Propylene (C3=)	1.4528	2339.0		0.0000	0.00		85.7	14.3	
Butanes (IC4+NC4+Other)	2.0067	3265.0		0.0000	0.00		82.8	17.2	
Butenes (IC4=+TC4=2+CC4=2)	1.9371	3080.1		0.0000	0.00		85.7	14.3	
Butadiene (C4=13)	1.8675	2887.7		0.0000	0.00		88.9	11.1	
Pentanes (IC5+NC5)	2.4910	4014.0		0.0000	0.00		83.3	16.7	
Pentenes (C5=+)	2.4214	3824.0		0.0000	0.00		85.6	14.4	
Hexanes+ (C6+)	2.9753	4758.0		0.0000	0.00		83.7	16.3	
Cyclohexane	2.9056	4397.0		0.0000	0.00		85.6	14.3	
Acetylene	0.8990	1476.2		0.0000	0.00		92.3	7.7	
Benzene	2.6968	3750.6		0.0000	0.00		92.3	7.7	
Toluene	3.1820	4485.2		0.0000	0.00	91.3		8.7	
H2O	0.0622			0.0000	0.00	85.7		14.3	
COS	2.0715	594.0		0.0000	0.00	26.7	20.0		53.3
Sum =			100.00	0.9735	100.00				
Specific Gravity =	0.9735					C% =	40.84		
Btu/ft3* =	539					H% =	7.72		
Btu/lb* =	7,482					O% =	47.99		
						N% =	3.45		
						S% =	0.00		
						Sum =	100.00		

$$\text{Fd factor} = \frac{1{,}000{,}000[3.64(\%H)+1.53(\%C)+0.57(\%S)+0.14(\%N)-0.46(\%O)}{\text{^Btu/lb}}$$

Fd factor = 9,221 dscf*/million Btu

*29.92 "Hg, 68 Deg.F (760 mm Hg, 20 Deg.C)

APPENDIX H

Chain of Custody

METCO ENVIRONMENTAL

CHAIN OF CUSTODY

Job # 02-300 Date 11/7/02

Client Weaver, Boos, & Gordon Method 18

Location Austin, TX Project Supervisor M. Bass

Source Name Enclosed Flare Outlet Stack Program Manager L. Adams

	Number of Containers	Absorb. Solution	Initial Solution	Initial Volume	Part.	SO_2	SO_3	Other Analyses
Filter Cont.								
Front Wash								
Back Wash								
Impinger 1								
Impinger 2								
Impinger 3								
Impinger 4								
Impinger 5								
Blank 1								
Blank 2								
NO_x Bag Other	111							Methane

Special Instructions:

Run # 1 Recov. By Mike Bass Date 11/7/02 Time 0958 Location M49

Run # 2 Recov. By Mike Bass Date 11/7/02 Time 1108 Location M49

Run # 3 Recov. By Mike Bass Date 11/7/02 Time 1238 Location M49

Run # _____ Recov. By _____ Date _____ Time _____ Location _____

Samples Rcvd. By [redacted] for transport. Date 11-7-02 Time 1400 Location M49

Samples Rcvd. By Con Paens for transport. Date 11-13-02 Time 0800 Location M34

Sample Rcvd. At lab by A. Middleton Date 11-13-02 Time 9:15

Sample Analyzed by _____ Date _____ Time _____

Sample Analyzed by _____ Date _____ Time _____

Data checked by _____ Date 11/20/02 Time _____

METCO ENVIRONMENTAL

CHAIN OF CUSTODY RECORD

Job No: 02-300
Job Name: Weaver, Boos & Gordon
Location: Austin TX
Unit: Enclosed Flare Inlet Duct

Collected By/Company: BASS / METCO

SAMPLE I.D.	DATE	TIME	AIR	SOLID	COMP	GRAB	# of CONTAINERS	SAMPLE ANALYSIS REQUIRED: RECOVERED BY	PART	HCL	CL2	METALS	PCDD/PCDF	SEMI--VOC	VOST	HEXCHROME				REMARKS (Specific Compounds/Methods)
Canister #283 - Run 1	11/7/02	0957	/				1	MB												03152-5
Canister #339 - Run 2	11/7/02	1107	/				1	MB												-6
Canister #386 - Run 3	11/7/02	1237	/				1	MB												-7

Analyze according to reference EPA Methods 3C, 18, 25C.

Relinquished By/Sign:	Date/Time	Received By/Sign:	Relinquished By/Sign:	Date/Time	Received By/Sign:
MB	11/8/02 1200				
Relinquished By/Sign:	Date/Time	Received By/Sign:	Relinquished By/Sign:	Date/Time	Received By/Sign:
Received for Laboratory By/Signature:	Date/Time	Send Samples to: ATMAA, Inc.			
	11/11/02 1100	Phone: 818-723-3277	Fax: 818-223-8250		

H-3

APPENDIX I

Resumes of Test Personnel

ROBERT M. PATTERSON; President

Education	B.S. 1983, Central Michigan University; Mt. Pleasant, Michigan, in Geology and Earth Science-Meteorology.
Professional Training Courses	Two-day short course, "Performing and Observing Source Sampling," Dallas, Texas. Attended one-day short course on basic supervision. Attended four-week management course presented by the American Management Association, 1991-1992.
Certification	Certified Visible Emissions Evaluator Certified Cabot Full-Face Respirator Fit Tester
Professional Memberships	Source Evaluation Society American Management Association
Technical Experience	Participated in the sampling of over 1,000 sources, including several of which were sampled simultaneously using more than one sampling train. Thoroughly trained in all EPA testing procedures. 1986—present. Over nineteen years experience with EPA and Texas Air Control Board methods of sampling - both stationary sources and ambient air. CFR, Title 40, Chapter I, Part 60, EPA Methods 1 through 25, and 101 through 110. Performance Specifications 1 through 5. CFR, Title 40, Chapter I, Part 50, Appendix A through F. "Sampling Procedures Manual, Texas Air Control Board, January 1983." Parts 1-1 through 14-6, Appendix B through Appendix M.

(continued)

PATTERSON, Rob (cont'd)

Experienced with sampling Method 0010, Modified Method 5 Sampling Train; Method 0030, Volatile Organic Sampling Train; and various EPA and "Site Specific" multiple metal and acid gas sampling trains.

Over nineteen years experience with EPA and Texas Air Control Board methods of analysis of both stationary and ambient air samples. Particulate matter, SO_3, SO_2, H_2SO_4, NO_x, CO, CO_2, O_2, H_2S, F , TRS, HCl, Cl_2, NH_3, VOC, C_1-C_7, and other organics. Both laboratory and on-site analyses were performed.

Experienced in the sampling and analysis of commercial calibration gas cylinders for sulfur dioxide, oxides of nitrogen, carbon dioxide, oxygen, carbon monoxide, and C_1-C_7 hydrocarbons.

Thoroughly trained in the operation and routine maintenance of the following:

- MSA LIRA Model 202S Infrared Analyzer
- Analytical Instrument Development, Inc. Model 340A Calibration System
- Shimadzu GC-Mini 2 Gas Chromatograph
- Thermo Environmental Model 10AR Oxides of Nitrogen Analyzer
- Thermo Oxygen Analyzer
- Teledyne Model 326 Oxygen Analyzer
- Thermo Environmental Model 48 Carbon Monoxide Analyzer
- Thermo Environmental Model 40 Sulfur Dioxide Analyzer
- Ratfisch Model RS 100 Total Hydrocarbon Analyzer
- Western Research Model 721AT Sulfur Dioxide Analyzer
- Horiba Model PIR 2000 Carbon Dioxide Analyzer
- Ratfisch Model RS 55 Total Hydrocarbon Analyzer
- J.U.M. Model VE-7 Total Hydrocarbon Analyzer

JAMES R. MONFRIES; Senior Quality Assurance Manager

Education	B.S. 1975, University of Texas at Arlington; Arlington, Texas, in Biology with a minor in Chemistry. Graduate work at the University of Texas at Dallas in the Environmental Science Department.
Professional Training Courses	Two-day short course, "Performing and Observing Source Sampling," Dallas, Texas, July 1976.
Certification	Certified Visible Emissions Evaluator
Professional Memberships	Air and Waste Management Association Source Evaluation Society - Past President
Technical Experience	Participated in the sampling of over 700 sources, serving in the supervisory capacity on over 500 sources. Many of the sources were sampled simultaneously using more than one sampling train at several points in the flue gas stream, 1976—present. Has also supervised several ambient air monitoring studies, including a permanent five-station high volume air sampling network in South Texas, a permanent four-station high volume air sampling network in Pennsylvania, and a permanent seven-station sulfur dioxide sampling network in East Texas. Twenty years experience with EPA and Texas Natural Resource Conservation Commission methods of analysis of both source and ambient air samples for particulates, SO_2, $SO_{3,}$, H_2SO_4, H_2S, HCl, Cl_2, NO_x, Hydrocarbons, and TRS.

(continued)

MONFRIES, James (cont'd)

Experienced in the analysis of commercial calibration gas cylinders for sulfur dioxide and oxides of nitrogen.

Experienced with VOST and Modified Method 5 Sampling Procedures.

Thoroughly trained in the operation and routine maintenance of the following:

- Lear Siegler, Inc. SM800 Stack Gas Monitor
- Du Pont Model 460/1 Photometric Analyzer System
- Lear Siegler, Inc. SM1000 Ambient SO_2 Monitor
- Calibrated Instruments Ultragas SO_2 Monitor
- Meloy 285E SO_2 Analyzer
- Meloy SA-700 Fluorescent SO_2 Analyzer
- MSA LIRA Model 202S Infrared Analyzer
- Analytical Instrument Development, Inc. Model 340A Calibration System
- Shimadzu GC-Mini 2 Gas Chromatograph
- Thermo Environmental Model 10S NO_x Analyzer
- Thermo Oxygen Analyzer
- Teledyne Model 326 Oxygen Analyzer
- Thermo Environmental Model 48 Carbon Monoxide Analyzer
- Thermo Environmental Model 40 Sulfur Dioxide Analyzer
- Ratfisch Model RS 103 Total Hydrocarbon Analyzer
- Western Research Model 721AT Sulfur Dioxide Analyzer
- Horiba Model PIR 2000 Carbon Dioxide Analyzer
- Ratfisch Model RS 55 Total Hydrocarbon Analyzer
- J.U.M. Model VE-7 Total Hydrocarbon Analyzer

MICHAEL BASS; Project Supervisor II

Education	B. S. Geography, August 1998; Texas A&M University, College Station, Texas.
Technical Experience	Participated in the sampling of over 200 sources, including several of which were sampled simultaneously using more than one sampling train.
	Thoroughly trained in all EPA testing procedures, 1998—present.

MIKE HOSKOVEC; Environmental Scientist III

Education	B. S. Biology, May 2000; Truman State University, Kirksville, Missouri.
Technical Experience	Participated in the sampling of over 100 sources, including several of which were sampled simultaneously using more than one sampling train. Thoroughly trained in all EPA testing procedures, 2001—present.

JOE HANNON; Environmental Scientist II

Education	B.A. Psychology, May 2001; UT—San Antonio, San Antonio, Texas.
Technical Experience	Participated in the sampling of over 50 sources, including several of which were sampled simultaneously using more than one sampling train.
	Thoroughly trained in all EPA testing procedures, 2001—present.