7 APPENDICES

A. Source Emissions Calculations
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APPENDIX A

Nomenclature and Equations for Calculation of Source Emissions

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.

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

8. Stack Pressure.

$$P_s = P_b + \frac{Stack\ Pressure\ "H_2O}{13.6} = "Hg\ Absolute$$

$$P_s = "Hg\ Abs. \times 25.4 = mm\ Hg$$

9. Stack velocity at stack conditions.

$$V_s = C_p\ 60 \left[\frac{2g \times \rho_{man} \times P_{std} \times MW_{air} \times (T_s + 460) \times \Delta P_s}{12 \times \rho_{air} \times P_s \times MW \times T_{std}} \right]^{1/2}$$

$$V_s = 5{,}123.8\ C_p \left[\frac{(T_s + 460)}{P_s \times MW} \right]^{1/2} \sqrt{\Delta P}\ average = fpm$$

$$V_s = fpm \times 0.00508 = m/\text{sec}$$

10. Dry stack gas volume at standard conditions.*

$$Q_s = \frac{1}{144}\ V_s \times A_s \times M_d \times \frac{T_{std}}{T_s + 460} \times \frac{P_s}{P_{std}}$$

$$Q_s = \frac{0.123\ V_s \times A_s \times M_d \times P_s}{T_s + 460} = DSCFM$$

$$Q_s = DSCFM \times 1.6990 = dscm/hr$$

11. Actual stack gas volume at stack conditions.

$$Q_a = \frac{V_s \times A_s}{144} = ACFM$$

$$Q_a = ACFM \times 1.6990 = m^3/hr$$

* 29.92 "Hg, 68°F (760 mm Hg, 20°C)

12. Percent isokinetic.

$$\%I = \frac{Vm_{std} \times (T_s + 460) \times P_{std} \times 100 \times 144\ in^2/ft^2}{M_d \times T_{std} \times P_s \times T_t \times V_s \left(\frac{\pi \times D_n^2}{4}\right)}$$

$$\%I = \frac{1039 \times Vm_{std} \times (T_s + 460)}{M_d \times P_s \times T_t \times V_s \times D_n^2}$$

13. Particulate - probe, cyclone, and filter.

$$C_{an} = \frac{m_f}{Vm_{std}} \times \frac{1\ gr}{64.8\ mg}$$

$$C_{an} = 0.0154 \times \frac{m_f}{Vm_{std}} = gr/dscf*$$

$$C_{an} = gr/dscf \times 2.290 = g/dscm*$$

14. Particulate total.

$$C_{ao} = 0.0154 \times \frac{m_t}{Vm_{std}} = gr/dscf*$$

$$C_{ao} = gr/dscf \times 2.290 = g/dscm*$$

* 29.92 "Hg, 68°F (760 mm Hg, 20°C)

15. Particulate - probe, cyclone, and filter at stack conditions.

$$C_{at} = C_{an} \times \frac{P_s}{P_{std}} \times \frac{(T_{std})}{(T_s + 460)} \times M_d$$

$$C_{at} = \frac{17.65 \times C_{an} \times P_s \times M_d}{T_s + 460} = gr/CF$$

$$C_{at} = gr/CF \times 2.290 = g/m^3$$

16. Particulate - total, at stack conditions.

$$C_{au} = \frac{17.65 \times C_{ao} \times P_s \times M_d}{T_s + 460} = gr/CF$$

$$C_{au} = gr/CF \times 2.290 = g/m^3$$

17. Particulate - probe, cyclone, and filter.

$$C_{aw} = C_{an} \times Q_s \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{1 \text{ lb}}{7000 \text{ gr}}$$

$$C_{aw} = 0.00857 \times C_{an} \times Q_s = lbs/hr$$

$$C_{aw} = lbs/hr \times 0.4536 = kg/hr$$

18. Particulate - total.

$$C_{ax} = 0.00857 \times C_{ao} \times Q_s = lbs/hr$$

$$C_{ax} = lbs/hr \times 0.4536 = kg/hr$$

19. Mercury – ug/dscm

ug/dscm = ug ÷ (Vm_{std} x 0.028317m^3/ft^3)

20. Mercury – lbs/10^{12} Btu

lbs/10^{12} Btu = ug ÷ Vm_{std} x (2.205 x 10^{-9} lbs/ug) x F_d x [20.9 ÷ (20.9 – O_2)] x (1.0 x 10^6)

F_d = Oxygen based F factor of 9,780 dscf*/million Btu

* 29.92 "Hg, 68 °F (760 mm Hg, 20 °C)

METCO ENVIRONMENTAL

SOURCE EMISSION SURVEY

JOB NUMBER: 99-95GIB3
JOB NAME: CINERGY CORPORATION
LOCATION: OWENSVILLE, INDIANA
UNIT TESTED: GIBSON UNIT NUMBER 3 PRECIPITATOR INLET DUCT

SOURCE EMISSION CALCULATIONS

SYMBOL	DESCRIPTION	UNITS			
RUN #			1	3	4
DATE			10/14/99	10/15/99	10/15/99
BEGIN TIME			0833	0900	1415
END TIME			1302	1247	1727
P(b)	BAROMETRIC PRESSURE	"Hg Abs. (mm Hg)	29.50 (749)	29.35 (745)	29.35 (745)
P(m)	ORIFICE PRESSURE DROP	"H2O (mm H2O)	0.869 (22.1)	0.420 (10.7)	0.478 (12.1)
V(m)	VOLUME DRY GAS SAMPLED @ METER CONDITIONS	ft.^3 (m^3)	82.723 (2.342)	61.037 (1.728)	62.565 (1.772)
T(m)	AVERAGE GAS METER TEMPERATURE	DEG.F (DEG.C)	72 (22.00)	74 (23.00)	85 (29.00)
V(m[std])*	VOLUME DRY GAS SAMPLED @ STANDARD CONDITIONS*	DSCF (DSCM)	81.137 (2.298)	59.274 (1.678)	59.540 (1.686)
V(w)	TOTAL WATER COLLECTED, IMPINGERS & SILICA GEL	ml	147.9	60.9	112.7
V(w[gas])	VOLUME WATER VAPOR COLLECTED @ STANDARD CONDITIONS*	SCF (SCM)	6.981 (0.198)	2.874 (0.081)	5.319 (0.151)
%M	MOISTURE IN STACK GAS BY VOLUME	%	7.92	4.63	8.20
Tt	NET TIME OF TEST	MINUTES	160	160	160

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

SOURCE EMISSION CALCULATIONS

CINERGY CORPORATION
OWENSVILLE, INDIANA
GIBSON UNIT NUMBER 3 PRECIPITATOR INLET DUCT

SYMBOL	DESCRIPTION	UNITS			
Md	MOL FRACTION OF DRY GAS		0.9208	0.9537	0.9180
CO2		%	13.6	14.0	14.0
O2		%	5.6	5.4	5.2
CO		%	0.0	0.0	0.0
N2		%	80.8	80.6	80.8
%EA	EXCESS AIR @ SAMPLING POINT	%	35.4	33.8	32.1
MWd	MOLECULAR WEIGHT OF DRY STACK GAS	LB/LB-MOLE (g/g-MOLE)	30.40 (30.40)	30.46 (30.46)	30.45 (30.45)
MW	MOLECULAR WEIGHT OF STACK GAS	LB/LB-MOLE (g/g-MOLE)	29.42 (29.42)	29.88 (29.88)	29.43 (29.43)
DELTA P	VELOCITY HEAD OF STACK GAS	"H2O (mm H20)	0.918 (23.3)	0.886 (22.5)	0.960 (24.4)
Ts	STACK TEMPERATURE	DEG. F (DEG. C)	317 (158)	323 (162)	326 (163)
Ps	STACK PRESSURE	"Hg Abs. (mm Hg)	28.53 (725)	28.34 (720)	28.37 (721)
Vs	STACK VELOCITY @ STACK CONDITIONS	FPM (m/SEC.)	3,788 (19.24)	3,726 (18.93)	3,912 (19.87)
As	STACK AREA	(SQ.INCHES) (SQ.METERS)	87,552 (56.49)	87,552 (56.49)	87,552 (56.49)
Qs	DRY STACK GAS VOLUME @ STANDARD CONDITIONS*	DSCFM (DSCM/HR)	1,379,200 (2,343,261)	1,385,045 (2,353,191)	1,395,885 (2,371,609)
Qa	ACTUAL STACK GAS VOLUME @ STACK CONDITIONS	ACFM (m^3/HR)	2,303,170 (3,913,086)	2,265,550 (3,849,169)	2,378,770 (4,041,530)

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

METCO ENVIRONMENTAL

SOURCE EMISSION CALCULATIONS

CINERGY CORPORATION
OWENSVILLE, INDIANA
GIBSON UNIT NUMBER 3 PRECIPITATOR INLET DUCT

SYMBOL	DESCRIPTION	UNITS			
Tt	NET TIME OF TEST	MINUTES	160	160	160
Dn	SAMPLING NOZZLE DIAM.	IN. (m)	0.200 (0.005)	0.175 (0.004)	0.174 (0.004)
%I	PERCENT ISOKINETIC	%	102.8	97.7	98.5
Mf	PARTICULATE - PROBE, CYCLONE AND FILTER	mg	----	----	----
Mt	PARTICULATE - TOTAL	mg	----	----	----
Can	PARTICULATE - PROBE, CYCLONE AND FILTER	gr/DSCF* (g/DSCM)	----	----	----
Cao	PARTICULATE - TOTAL	gr/DSCF* (g/DSCM)	----	----	----
Cat	PARTIC.-PROBE, CYCLONE AND FILTER @ STACK COND.	gr/CF (g/m3)	----	----	----
Cau	PARTICULATE - TOTAL @ STACK CONDITIONS	gr/CF (g/m3)	----	----	----
Caw	PARTICULATE - PROBE, CYCLONE AND FILTER	LBS/HR (Kg/HR)	----	----	----
Cax	PARTICULATE - TOTAL	LBS/HR (Kg/HR)	----	----	----

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

METCO ENVIRONMENTAL

SOURCE EMISSION SURVEY

JOB NUMBER: 99-95GIB3
JOB NAME: CINERGY CORPORATION
LOCATION: OWENSVILLE, INDIANA
UNIT TESTED: GIBSON UNIT NUMBER 3 STACK

SOURCE EMISSION CALCULATIONS

SYMBOL	DESCRIPTION	UNITS			
RUN #			1	3	4
DATE			10/14/99	10/15/99	10/15/99
BEGIN TIME			0906	0900	1415
END TIME			1303	1226	1736
P(b)	BAROMETRIC PRESSURE	"Hg Abs. (mm Hg)	29.45 (748)	29.30 (744)	29.30 (744)
P(m)	ORIFICE PRESSURE DROP	"H2O (mm H2O)	1.013 (25.7)	0.755 (19.2)	1.104 (28.0)
V(m)	VOLUME DRY GAS SAMPLED @ METER CONDITIONS	ft.^3 (m^3)	86.214 (2.441)	76.443 (2.165)	89.570 (2.536)
T(m)	AVERAGE GAS METER TEMPERATURE	DEG.F (DEG.C)	61 (16.00)	64 (18.00)	84 (29.00)
V(m[std])*	VOLUME DRY GAS SAMPLED @ STANDARD CONDITIONS*	DSCF (DSCM)	86.232 (2.442)	75.586 (2.140)	85.384 (2.418)
V(w)	TOTAL WATER COLLECTED, IMPINGERS & SILICA GEL	ml	129.0	96.6	141.7
V(w[gas])	VOLUME WATER VAPOR COLLECTED @ STANDARD CONDITIONS*	SCF (SCM)	6.089 (0.172)	4.560 (0.129)	6.688 (0.189)
%M	MOISTURE IN STACK GAS BY VOLUME	%	6.60	5.69	7.26
Tt	NET TIME OF TEST	MINUTES	160	160	160

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

METCO ENVIRONMENTAL

SOURCE EMISSION CALCULATIONS

CINERGY CORPORATION
OWENSVILLE, INDIANA
GIBSON UNIT NUMBER 3 STACK

SYMBOL	DESCRIPTION	UNITS			
Md	MOL FRACTION OF DRY GAS		0.9340	0.9431	0.9274
CO2		%	13.2	13.2	13.4
O2		%	5.9	6.0	5.8
CO		%	0.0	0.0	0.0
N2		%	80.9	80.8	80.8
%EA	EXCESS AIR @ SAMPLING POINT	%	38.0	38.9	37.2
MWd	MOLECULAR WEIGHT OF DRY STACK GAS	LB/LB-MOLE (g/g-MOLE)	30.35 (30.35)	30.35 (30.35)	30.38 (30.38)
MW	MOLECULAR WEIGHT OF STACK GAS	LB/LB-MOLE (g/g-MOLE)	29.53 (29.53)	29.65 (29.65)	29.48 (29.48)
DELTA P	VELOCITY HEAD OF STACK GAS	"H2O (mm H20)	0.621 (15.8)	0.817 (20.8)	1.195 (30.4)
Ts	STACK TEMPERATURE	DEG. F (DEG. C)	340 (171)	339 (171)	344 (173)
Ps	STACK PRESSURE	"Hg Abs. (mm Hg)	29.34 (745)	29.19 (741)	29.19 (741)
Vs	STACK VELOCITY @ STACK CONDITIONS	FPM (m/SEC.)	3,139 (15.95)	3,561 (18.09)	4,330 (22.00)
As	STACK AREA	(SQ.INCHES) (SQ.METERS)	115,172 (74.30)	115,172 (74.30)	115,172 (74.30)
Qs	DRY STACK GAS VOLUME @ STANDARD CONDITIONS*	DSCFM (DSCM/HR)	1,523,212 (2,587,937)	1,738,077 (2,952,993)	2,065,309 (3,508,960)
Qa	ACTUAL STACK GAS VOLUME @ STACK CONDITIONS	ACFM (m^3/HR)	2,510,265 (4,264,940)	2,848,403 (4,839,437)	3,462,778 (5,883,260)

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

SOURCE EMISSION CALCULATIONS

CINERGY CORPORATION
OWENSVILLE, INDIANA
GIBSON UNIT NUMBER 3 STACK

SYMBOL	DESCRIPTION	UNITS			
Tt	NET TIME OF TEST	MINUTES	160	160	160
Dn	SAMPLING NOZZLE DIAM.	IN. (m)	0.235 (0.006)	0.200 (0.005)	0.200 (0.005)
%I	PERCENT ISOKINETIC	%	94.3	100.0	95.1
Mf	PARTICULATE - PROBE, CYCLONE AND FILTER	mg	----	----	----
Mt	PARTICULATE - TOTAL	mg	----	----	----
Can	PARTICULATE - PROBE, CYCLONE AND FILTER	gr/DSCF* (g/DSCM)	----	----	----
Cao	PARTICULATE - TOTAL	gr/DSCF* (g/DSCM)	----	----	----
Cat	PARTIC.-PROBE, CYCLONE AND FILTER @ STACK COND.	gr/CF (g/m3)	----	----	----
Cau	PARTICULATE - TOTAL @ STACK CONDITIONS	gr/CF (g/m3)	----	----	----
Caw	PARTICULATE - PROBE, CYCLONE AND FILTER	LBS/HR (Kg/HR)	----	----	----
Cax	PARTICULATE - TOTAL	LBS/HR (Kg/HR)	----	----	----

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

APPENDIX B

Field Data

99-95GIB3

METCO ENVIRONMENTAL

Job Number 99-9561B3 ✓
Job Name EPRI ✓
Run Number 1 ✓
Unit Unit 3 Precipitator Inlet Duct ✓
Date 10-14-99 ✓
Operator Bass / Conway / Hefley ✓
Sample Box No. Hg-1 Meter Box No. 27.2 ✓

Hg Field Data

Read and record at the start of each test point.

Purge to: –
Purge time: –
Pitot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 60
Assumed Moisture % 6
Probe Length 10'
C Factor 1 to 2.99 to reference
Initial Leak @ 15.00 "Hg = 0.002 cfm
Final Leak @ 14.00 "Hg = 0.001 cfm

INIT	Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O (ΔP_s)	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Heated Line °F	Remarks
A	B4	0833	120.865	0.94	0.90	0.90	8.00	349	255	253	43	52	53	268	thimble Q33
	B3	0838	123.95	1.05	1.00	1.00	9.00	356	260	254	42	52	53	270	filter Q58
	B2	0843	126.48	0.92	0.88	0.88	8.50	357	275	250	42	52	52	268	
	B1	0848	129.07	1.05	1.00	1.00	9.50	349	269	255	42	53	52	269	
A	E4	0853	131.68	0.54	0.52	0.52	8.00	322	268	253	42	nb ~~56~~ 54	52	270	
	E3	0858	133.57	0.98	0.94	0.94	9.50	341	260	252	41	55	52	271	
	E2	0903	136.20	1.05	1.00	1.00	10.00	337	285	253	42	55	53	270	
	E1	0908	138.95	1.05	1.00	1.00	10.00	346	278	254	43	56	53	271	
A	H4	0913	141.57	0.68	0.64	0.64	7.50	312	277	255	45	57	54	272	
	3	0918	143.77	1.15	1.10	1.10	10.00	314	260	254	45	58	54	274	
	2	0923	146.62	1.15	1.10	1.10	10.00	316	262	255	46	59	55	274	
	1	0928	149.65	1.05	1.00	1.00	10.00	322	280	254	47	61	57	273	
A	K4	0933	152.05	1.35	1.30	1.30	12.00	289	279	255	48	63	58	277	
	3	0938	154.82	1.15	1.10	1.10	12.00	300	270	253	49	64	59	278	
	2	0943	157.68	0.94	0.90	0.90	11.50	301	256	254	49	65	59	279	
	1	0948	160.33	0.92	0.89	0.89	11.50	307	280	254	50	65	61	280	leak ✓ good @ 14.00" Hg
	END	0953	162.794	–	–	–	–	–	–	–	–	–	–	–	leak ✓ good @ 15.00" Hg
B	B4	1129	163.117	0.98	0.95	0.95	9.00	277	252	253	68	42	91	294	0.323

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 82.723 ✓ ft^3
Water Collected V_w 147.9 ✓ ml
Time of Test T_t 160 ✓ min.
Stack Pressure P_s -13.20 ✓ "H_2O

Pitot Tube No. M2 ✓
Baro. Press. P_b ~~29.75~~ 29.50 "Hg
Probe Tip Dia. D_n ~~0.199~~ 0.200 in.
% CO_2 13.6 ✓ % CO 0.0 ✓
% O_2 5.6 ✓ % N_2 80.8
Area Stack A_s 43,776 ✓ in^2
87,552 in^2 combined ✓

Barometer No. 19-1 ✓
Probe Tip No. TFE 2-7
Total Volume of Leak Checks After Start: 0.323 ft^3
V_m = Dry Gas Meter Calibration Factor ~~80.715~~ 80.392 X 1.029 ✓

[Dry Gas Meter Reading – ft^3 - (T_t – min. X Leak Rate – cfm)]

Impinger Box No. Hg 1

Impinger 1	Final Weight	718.5
	Initial Weight	634.1
	Increase	84.4
Impinger 2	Final Weight	677.0
	Initial Weight	648.6
	Increase	28.4
Impinger 3	Final Weight	660.3
	Initial Weight	657.1
	Increase	3.2
Impinger 4	Final Weight	759.4
	Initial Weight	749.4
	Increase	10.0
Impinger 5	Final Weight	756.5
	Initial Weight	754.3
	Increase	2.2
Impinger 6	Final Weight	762.9
	Initial Weight	760.6
	Increase	2.3
Impinger 7	Final Weight	770.6
	Initial Weight	770.0
	Increase	0.6

Water Weight Gain

Imp 8
Final 915.1
Int. 898.3
16.8

V_w =
g SO_2 = -
V_w =

Impinger 1	84.4
Impinger 2	28.4
Impinger 3	3.2
Impinger 4	10.0
Impinger 5	2.2
Impinger 6	2.3
Impinger 7	0.6
Imp 8	16.8
Total	147.9 = V_w

P_b =	~~29.75~~ 29.50		%CO_2 =	13.6
V_m =	82.723		%O_2 =	5.6
V_w =	147.9		%CO =	0.0
P_m =	0.869		%N_2 =	80.8
Avg ΔP =	0.918		A_s =	~~43,776~~ x 2
			D_n =	~~0.144~~ 0.200
Avg$\sqrt{\Delta P}$ =	0.951		T_t =	160
C_p =	0.808			
P_s =	-13.20	$^{\circ}H_2O$		~~28.70~~ 28.53 $^{\circ}$Hg
T_m =	72	°F		532 °R
T_s =	317	°F		777 °R

87552

Moisture Content: %M = ~~7.86~~ 7.92 M_d = ~~0.9214~~ 0.9208 MW_d = 30.400 MW = ~~28.01~~ 29.42 (13H)

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 82.723 \left[\frac{\text{29.50 } \cancel{29.75} + \frac{0.869}{13.6}}{72 + 460}\right] = \text{81.137 } \cancel{81.824}\ \text{sft}^3 \quad 0.511\ \text{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 147.9 = 6.981 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{6.981}{81.137\ \cancel{81.824} + 6.981}$ x 100 = ~~7.86~~ 7.92 %

V_s = 5123.8 x 0.808 $\sqrt{\frac{777}{\text{28.53 } \cancel{28.78} \times \text{29.42 } \cancel{28.01}}}$ x 0.951 = ~~3865~~ 3788 fpm

%I = $\frac{1{,}039 \times \text{81.137 } \cancel{81.824} \times 777}{\text{28.53 } \cancel{28.78} \times \text{0.9208 } \cancel{0.9214} \times \text{3788 } \cancel{3865} \times 160 \times (\text{0.200 } \cancel{0.144})^2}$ = ~~114.1~~ ~~103.0~~ 102.8 %

ACFM: 2,303,170

SCFM: 1,379,200

%EA: 35.4

Run Number 1

Unit 3 Precipitator Inlet Duct

Date 10 14-99

Hg FIELD DATA

	Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O (ΔP_s)	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Heated Line °F	Remarks
B	B 3	1134	165.97	1.00	0.97	0.97	9.00	284	257	253	57	88	91	289	thimble
	2	1139	168.75	0.75	0.72	0.72	8.00	296	263	252	54	84	89	282	Q34
	1	1144	171.16	0.85	0.82	0.82	8.50	290	267	253	53	81	88	276	
B	E 4	1149	173.53	0.68	0.66	0.66	8.50	300	265	254	52	80	86	275	
	3	1154	175.70	0.92	0.89	0.89	9.50	293	264	254	52	81	85	274	
	2	1159	178.32	1.05	1.00	1.00	10.50	302	261	255	54	84	85	275	
	1	1204	181.11	1.00	0.97	0.97	11.00	308	263	254	56	86	86	275	C Factor
	END	1209	183.666	—	—	—	—	—	—	—	—	—	—	—	1 to 0.28
B	H 4	1222	183.666	0.35	0.32	0.32	7.50	314	250	254	68	90	89	268	
	3	1227	185.29	0.58	0.52	0.52	8.50	319	266	251	66	89	89	270	
	2	1232	187.29	0.78	0.70	0.70	10.00	323	264	253	65	90	90	272	
	1	1237	189.62	0.95	0.85	0.85	11.50	311	259	255	59	91	91	271	
B	K 4	1242	192.31	0.85	0.77	0.77	12.00	324	260	254	60	91	91	271	
	3	1247	194.26	0.95	0.86	0.86	13.00	327	280	254	56	90	91	270	
	2	1252	196.85	0.80	0.72	0.72	13.00	329	284	255	56	90	91	267	
	1	1257	199.32	0.90	0.81	0.81	14.00	319	281	254	57	90	91	269	
	END	1302	201.580	—	—	—	—	—	—	—	—	—	—		

METCO ENVIRONMENTAL

ABORTED!

Hg Field Data

Job Number 99-95G1B3
Job Name EPRI
Run Number 2
Unit 3 Precipitator Inlet Duct
Date 10-14-99
Operator Bass / Conway / Hefley
Sample Box No. Hg 3 Meter Box No. 27-2 ✓

Read and record at the start of each test point.

Purge to: –
Purge time:
Pitot Leak Check Initial ✓ Final

Ambient Temp. °F 70
Assumed Moisture % 7.82
Probe Length 10'
C Factor 1 to 0.28 to reference
Initial Leak @ 15.00 "Hg = 0.001 cfm
Final Leak @ "Hg = cfm

	Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O (ΔP_s)	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Heated Line °F	Remarks
B	K4	1438	206.049	1.00	0.90	0.90	8.00	330	282	256	67	84	85	286	thimble @ 37
	3	1443	209.19	1.00	0.90	0.90	8.00	334	256	255	66	82	85	280	
	2	1448	211.92	0.85	0.76	0.76	8.00	334	252	252	62	80	84	281	ABORTED!
	1	1453	214.42	1.10	0.99	0.99	9.00	328	270	254	60	78	82	280	
B	H4	1458	217.20	0.40	0.36	0.36	7.00	320	280	252	59	77	81	279	
	3	1503	219.13	0.75	0.68	0.68	8.00	326	279	251	62	78	81	278	
	2	1508	221.38	0.85	0.76	0.76	9.00	326	249	250	59	78	80	277	
	1	1513	223.61	1.05	0.74	0.74	8.50	326	252	253	57	78	79	276	1 to 0.222
B	E4	1518	225.82	0.60	0.43	0.43	7.00	301	273	254	56	78	79	271	
	3	1523	227.88	0.95	0.68	0.68	7.50	301	271	255	55	78	78	270	
	2	1528	230.32	0.95	0.68	0.68	7.50	306	265	253	57	77	78	269	
	1	1533	232.59	1.00	0.72	0.72	8.00	310	266	255	58	78	78	270	
B	B4	1538	234.87	0.98	0.68	0.68	8.50	273	262	254	58	78	78	269	
	3	1543	237.05	0.84	0.60	0.60	8.00	289	261	257	58	76	76	268	
	2	1548	239.28	0.75	0.54	0.54	7.00	291	260	256	58	75	76	269	
	1	1553	241.50	0.75	0.54	0.54	7.00	296	261	255	57	74	75	268	
	END	1558	243.200	–	–	–	–	–	–	–	–	–	–	–	leak ✓ good @ 12.00 "Hg
A	K4														leak ✓ good @ 12.00 "Hg

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 38.228 ft^3
Water Collected V_w ml
Time of Test T_t 160 min.
Stack Pressure P_s –13.90 "H_2O

Pitot Tube No. M2 ✓
Baro. Press. P_b 29.40 "Hg
Probe Tip Dia. D_n 0.200 in.
% CO_2 13.6 % CO 0.0
% O_2 5.6 % N_2 80.8
Area Stack A_s 43.776 in^2

Barometer No. 19-1 ✓
Probe Tip No. TFE 1-7 ✓
Total Volume of Leak Checks After Start: 0 ft^3
V_m = Dry Gas Meter Calibration Factor 37.151 X 1.029

[Dry Gas Meter Reading – ft^3 - (T_t – min. X Leak Rate – cfm)]

Impinger Box No. Hg 3

Impinger 1	Final Weight	704.8		Impinger 1	49.6
	Initial Weight	655.2		Impinger 2	5.7
	Increase	49.6		Impinger 3	1.2
Impinger 2	Final Weight	749.0		Impinger 4	3.3
	Initial Weight	743.3		Impinger 5	0.5
	Increase	5.7		Impinger 6	0.1
Impinger 3	Final Weight	752.1		~~Impinger 8~~ Impinger 7	-0.3
	Initial Weight	750.9		Impinger 8	9.8
	Increase	1.2		Total	69.9 = V_w
Impinger 4	Final Weight	751.7			
	Initial Weight	748.4			
	Increase	3.3			
Impinger 5	Final Weight	748.0			
	Initial Weight	747.5			
	Increase	0.5			
Impinger 6	Final Weight	751.3 ~~750.8~~			
	Initial Weight	751.2			
	Increase	0.1			
Impinger 7	Final Weight	756.7			
	Initial Weight	757.0			
	Increase	-0.3			

Water Weight Gain

Imp8
Final 872.7
Int. 862.9
9.8

V_w =
g SO_2 = -
V_w =

P_b =	29.40	%CO_2 =	13.4
V_m =	~~69.90~~ 38.228	%O_2 =	5.6
V_w =	69.9	%CO =	0.0
P_m =	0.685	%N_2 =	80.8
Avg ΔP =	0.864	A_s =	43.776
		D_n =	0.200
Avg$\sqrt{\Delta P}$ =	0.924	T_t =	~~160~~ 80
C_p =	0.808		
P_s =	-13.10 "H_2O		28.44 "Hg
T_m =	79 °F		539 °R
T_s =	312 °F		772 °R

Moisture Content: %M = 8.21 M_d = 0.9179 MW_d = 30.400 MW = 29.38

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 38.228 \left[\frac{29.40 + \frac{0.685}{13.6}}{79 + 460}\right] = 36.866\ sft^3 = 0.961\ scfm$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 69.9 = 3.299 sft^3

$$\% \text{ Moisture} = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{3.299}{36.866 + 3.299} \times 100 = 8.21\ \%$$

ABORTED

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{772}{28.44 \times 29.38}} \times 0.924 = 3677 \text{ fpm}$$

ACFM:

SCFM:

$$\%I = \frac{1{,}039 \times 36.866 \times 772}{28.44 \times 0.9179 \times 3677 \times \cancel{160}\ 80 \times (0.200)^2} = 96.3\ \%$$

%EA:

METCO ENVIRONMENTAL

Job Number 99-95 G1B3 ✓
Job Name EPRI ✓
Run Number #3 ✓
Unit 3 Precipitator Inlet Duct ✓
Date 10-16-99 ✓
Operator Bass / Conway / Hefley ✓
Sample Box No. Hg 1 Meter Box No. 27-2 ✓

Hg Field Data

Read and record at the start of each test point.

Purge to: –
Purge time: ✓
Pitot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 57
Assumed Moisture % 8
Probe Length 10
C Factor see remarks to reference
Initial Leak @ 15.00 "Hg = 0.001 cfm
Final Leak @ 13.00 "Hg = 0.001 cfm

Inlet	Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O (ΔP_s)	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Heated Line °F	Remarks
A	B 4	0900	274.028	1.00	0.45	0.45	5.50 ~~7.00~~ MB	349	255	250	50	57	57	260	thimble Q39
	3	0905	276.09	1.00	0.45	0.45	5.50	359	253	253	49	57	57	259	filter Q64
	2	0910	277.97	0.85	0.39	0.39	5.50	358	252	252	48	58	57	260	
	1	0915	279.74	1.05	0.47	0.47	6.00	351	253	255	48	58	57	261	1 to ~~0.121~~ 0.141
A	E 4	0920	281.63	0.55	0.25	0.25	4.00	352	252	256	48	59	57	260	
	4	0921	282.018	–	–	–	–	–	–	–	–	–	–	–	power failure
	4	1000	285.172	0.55	0.25	0.25	4.50	353	250	250	58	65	64	250	Leak ✓ good @ 10"
	3	1004	286.74	0.85	0.39	0.39	5.00	342	251	253	57	66	64	257	3.154
	2	1009	288.26	3.95 ~~0.95~~	0.43	0.43	5.50	345	250	252	55	67	65	260	
	1	1014	290.14	1.05	0.47	0.47	5.50	344	253	253	55	68	66	259	
A	H 4	1019	292.18	0.55	0.25	0.25	4.50	310	252	256	54	69	67	276	
	3	1024	293.69	1.00	0.45	0.45	5.50	315	251	255	57	69	68	270	
	2	1029	295.59	1.10	0.50	0.50	6.00	307	253	257	56	70	69	267	
	1	1034	297.67	1.15	0.52	0.52	6.00	321	254	255	55	71	70	263	
A	K 4	1039	299.79	1.20	0.54	0.54	6.00	289	253	254	55	72	71	260	
	3	1044	301.95	1.10	0.50	0.50	6.00	302 MB ~~259~~	252	253	56	73	72	259	
	2	1049	303.62	0.90	0.41	0.41	5.50	308	254	254	56	73	72	258	
	1	1054	305.91	0.70	0.32	0.32	5.00	309	253	252	57	75	74	259	

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 61.037 ✓ ft^3
Water Collected V_w 60.9 ✓ ml
Time of Test T_t 160 ✓ min.
Stack Pressure P_s -13.8 ✓ "H_2O

Pitot Tube No. M2 ✓
Baro. Press. P_b 29.35 ✓ "Hg
Probe Tip Dia. D_n 0.275 ✓ in.
% CO_2 14.0 ✓ % CO 0.0 ✓
% O_2 5.4 ✓ % N_2 80.6
Area Stack A_s ~~43,776~~ 87,552 ✓ in^2

Barometer No. 19-1 ✓
Probe Tip No. ~~FE~~ TFE 2-6 ✓
Total Volume of Leak Checks After Start: 3.864 ft^3
V_m = Dry Gas Meter Calibration Factor ~~43.181~~ 59.317 X 1.029 ✓

[Dry Gas Meter Reading – ft^3 - (T_t – min. X Leak Rate – cfm)]

Impinger Box No. Hg1

Impinger 1	Final Weight	678.2		Impinger 1	40.7
	Initial Weight	637.5			
	Increase	~~38.5~~ 40.7		Impinger 2	6.6
Impinger 2	Final Weight	658.0		Impinger 3	0.7
	Initial Weight	651.4			
	Increase	6.6		Impinger 4	4.0
Impinger 3	Final Weight	660.1		Impinger 5	-0.4
	Initial Weight	659.4			
	Increase	0.7		Impinger 6	0.0
Impinger 4	Final Weight	758.9		Impinger 7	-0.5
	Initial Weight	754.9		Impinger 8	9.8
	Increase	4.0		Total	60.9 = V_w
Impinger 5	Final Weight	761.4			
	Initial Weight	761.8			
	Increase	-0.4			
Impinger 6	Final Weight	766.9			
	Initial Weight	766.9			
	Increase	0.0			
Impinger 7	Final Weight	770.0			
	Initial Weight	770.5			
	Increase	-0.5			

Water Weight Gain

imp 8
Final 924.4
Int. 914.6
Total 9.8

V_w =
g SO_2 = -
V_w =

P_b =	29.35		$\%CO_2$ =	14.0
V_m =	61.037		$\%O_2$ =	5.4
V_w =	60.9		%CO =	0.0
P_m =	0.420		$\%N_2$ =	80.6
Avg ΔP =	0.386		A_s =	~~45.776~~ 87,552
			D_n =	0.175
Avg$\sqrt{\Delta P}$ =	0.936		T_t =	160
C_p =	0.808			
P_s =	-13.80	H_2O	28.34	Hg
T_m =	74	°F	534	°R
T_s =	323	°F	783	°R

Moisture Content: %M = 4.63 M_d = 0.9537 MW_d = 30.456 MW = 29.88

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 61.037 \left[\frac{29.35 + \frac{0.420}{13.6}}{74 + 460}\right] = \frac{59.274}{0.370}\ \text{sft}^3\ \text{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 60.9 = 2.874 sft^3

$$\%\ \text{Moisture} = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{2.874}{59.274 + 2.874} \times 100 = 4.63\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{783}{28.34 \times 29.88}} \times 0.936 = 3726\ \text{fpm}$$

$$\%I = \frac{1{,}039 \times 59.274 \times 783}{28.34 \times 0.9537 \times 3726 \times 160 \times (0.175)^2} = 97.7\ \%$$

ACFM: 2,265,550

SCFM: 1,385,045

%EA: 33.8

Run Number Z 3 Hg FIELD DATA

Unit 3 Precipitator Inlet Duct

Date 10-15-99

	Point	Clock Time	Dry Gas Meter, CF	ΔP_s "Pitot" "H_2O	Orifice ΔH "H_2O Desired	P_m Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Guage	T_s Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	T_m Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet	Heated Line °F	Remarks
A	END	1059	307.674	–	–	–	–	–	–	–	–	–	–	–	leak ✓ good @ 10.00"
B	K4	1125	308.384	1.05	0.52	0.52	10.00	329	252	255	65	80	80	260	leak ✓ good @ 12.00"
	3	1130	310.35	1.00	0.50	0.50	10.00	334	251	254	63	81	80	259	
	2	1135	312.31	0.90	0.45	0.45	10.00	~~30~~ 336	250	255	62	81	80	260	
	1	1140	314.26	1.05	0.52	0.52	10.00	331	273	252	59	79	80	262	i to 0.156
B	H4	1145	316.24	0.50	0.25	0.25	6.00	324	275	250	58	77	78	258	
	3	1150	317.66	0.70	0.35	0.35	7.50	325	260	253	59	77	78	260	0.710
	2	1155	319.27	0.80	0.40	0.40	9.00	327	261	254	60	79	78	260	
	1	1200	321.07	1.10	0.55	0.55	12.00	326	259	254	61	80	79	259	
	END	1205	322.876	–	–	–	–	–	–	–	–	–	–	–	
	E4	1207	322.876	0.60	0.30	0.30	8.00	308	258	253	62	83	81	259	
	3	1212	324.53	0.85	0.42	0.42	9.00	302	257	252	61	84	83	261	
	2	1217	326.33	0.95	0.47	0.47	10.00	~~26~~ 312	265	251	63	84	83	262	
	1	1222	328.28	0.90	0.45	0.45	10.00	315	270	253	64	85	83	261	
	B4	1227	330.10	0.95	0.47	0.47	10.00	282	268	252	65	86	85	260	
	3	1232	331.93	0.85	0.42	0.42	10.00	293	255	251	65	87	85	259	
	2	1237	333.82	0.70	0.35	0.35	9.00	304	253	255	64	88	87	262	
	1	1242	335.62	0.80	0.40	0.40	10.00	309	258	252	63	89	88	263	
	END	1247	337.209	–	–	–	–	–	–	–	–	–	–	–	

METCO ENVIRONMENTAL

Job Number 99-95G1B3 ✓
Job Name EPRI ✓
Run Number 3 4 ✓
Unit 3 Precipitator Inlet Duct ✓
Date 10-15-99 ✓
Operator Bass / Conway / Hefley ✓
Sample Box No. Hg 3 Meter Box No. 27-2 ✓

Hg Field Data

Read and record at the start of each test point.

Purge to: –
Purge time:
Pitot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 70 80
Assumed Moisture % 8
Probe Length 10
C Factor see remarks to reference
Initial Leak @ 15.00 "Hg = 0.001 cfm
Final Leak @ 13.00 "Hg = 0.001 cfm

Inlet	Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Heated Line °F	Remarks
B	BK4	1415	338.640	1.10	0.55	0.55	10.00	323	253	250	68	88	88	261	Thimble Q40
	3	1420	340.61	1.15	0.57	0.57	10.00	339	252	251	67	87	88	265	Filter Q61
	2	1425	342.79	1.00	0.50	0.50	9.50	344	260	254	66	88	88	269	int. orsat
	1	1430	344.92	1.20	0.60	0.60	10.00	341	250	252	65	88	88	265	CDT
B	H 4	1435	346.77	0.50	0.25	0.25	7.00	335	260	253	65	88	88	266	1 to 0.155
	3	1440	348.03	0.80	0.40	0.40	10.00	332	259	253	65	88	88	264	
	2	1445	349.86	0.90	0.45	0.45	11.00	334	265	254	66	88	88	262	
	1	1450	351.68	1.20	0.60	0.60	12.00	336	253	251	66	88	88	259	
B	E 4	1455	353.73	0.65	0.33	0.33	9.50	324	257	253	63	87	87	259	
	3	1500	355.22	0.95	0.47	0.47	11.50	310	255	253	64	86	87	258	
	2	1505	357.19	1.05	0.52	0.52	13.00	315	255	252	62	86	87	256	
	1	1510	359.16	1.00	0.50	0.50	13.00	318	258	251	62	86	86	253	
B	B 4	1515	360.95	0.95	0.47	0.47	12.00	277	270	250	61	86	86	257	
	3	1520	362.77	0.85	0.42	0.42	12.50	286	255	252	61	86	86	259	
	2	1525	364.62	0.70	0.35	0.35	11.00	291	260	254	62	86	86	259	0.469
	1	1530	366.31	0.85	0.42	0.42	12.00	279	261	253	62	86	86	259	
	END	1535	367.933	–	–	–	–	–	–	–	–	–	–	–	leak ✓ good @ 14.00" Hg
A	K4	1605	368.402	1.20	0.60	0.60	10.00	297	284	252	67	83	83	260	leak ✓ good @ 16.00" Hg

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 62.565 ✓ ft^3
Water Collected V_w 112.7 ✓ ml
Time of Test T_t 160 ✓ min.
Stack Pressure P_s -13.35 ✓ "H_2O

Pitot Tube No. M2 ✓
Baro. Press. P_b 29.35 ✓ "Hg
Probe Tip Dia. D_n 0.174 ✓ in.
% CO_2 14.0 ✓ % CO 0.0 ✓
% O_2 5.2 ✓ % N_2 80.8 ✓
Area Stack A_s ~~43,770~~ in^2 87,552

Barometer No. 19-1 ✓
Probe Tip No. TFE1-6 ✓
Total Volume of Leak Checks After Start: 0.659 ft^3 ✓
V_m = Dry Gas Meter Calibration Factor 61.461 X 1.029
0.802

[Dry Gas Meter Reading – ft^3 - (T_t – min. X Leak Rate – cfm)]

Impinger Box No. HG3

Impinger 1	Final Weight	741.0	Water Weight Gain	Impinger 1	84.5
	Initial Weight	656.5	Imp8 Final 883.8	Impinger 2	9.4
	Increase	84.5	Int. 872.2	Impinger 3	1.9
Impinger 2	Final Weight	755.5	11.6	Impinger 4	6.0
	Initial Weight	746.1			
	Increase	9.4	V_w =	Impinger 5	0.3
Impinger 3	Final Weight	754.5	g SO_2 =	Impinger 6	0.3
	Initial Weight	752.6	V_w =		
	Increase	1.9		Impinger 7	-1.3
Impinger 4	Final Weight	756.7		Impinger 8	11.6
	Initial Weight	750.7		Total	112.7 = V_w
	Increase	6.0			
Impinger 5	Final Weight	749.6	P_b = 29.35	%CO_2 =	14.0
	Initial Weight	749.3	V_m = 62.565	%O_2 =	5.2
	Increase	0.3	V_w = 112.7	%CO =	0.0
			P_m = 0.478	%N_2 =	80.8
Impinger 6	Final Weight	754.8	Avg ΔP = 0.960	A_s =	~~13.776~~ 87.552
	Initial Weight	754.5		D_n =	0.174
	Increase	0.3	Avg$\sqrt{\Delta P}$ = 0.974	T_t =	160
			C_p = 0.808		
Impinger 7	Final Weight	756.7	P_s = -13.35 "H_2O		28.37 "Hg
	Initial Weight	758.0	T_m = 85 °F		545 °R
	Increase	-1.3	T_s = 326 °F		786 °R

Moisture Content: %M = 8.20 M_d = 0.9180 MW_d = 30.448 MW = 29.43

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 62.565 \left[\frac{29.35 + \frac{0.478}{13.6}}{85 + 460}\right] = \frac{59.540}{0.372}\ \frac{sft^3}{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 112.7 = 5.319 sft^3

$$\% \text{ Moisture} = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{5.319}{59.540 + 5.319} \times 100 = 8.20\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{786}{28.37 \times 29.43}} \times 0.974 = 3912\ fpm$$

$$\%I = \frac{1{,}039 \times 59.540 \times 786}{28.37 \times 0.9180 \times 3912 \times 160 \times (0.174)^2} = 98.5\ \%$$

ACFM: 2,378,770

SCFM: 1,395,885

%EA: 32.1

Run Number 3 4

Unit 3 Precipitator Inlet Duct

Date 10-15-99

Hg FIELD DATA

Inlet	Point	Clock Time	Dry Gas Meter, CF	ΔP_s "Pitot" "H_2O	Orifice ΔH "H_2O Desired	P_m Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Guage	T_s Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	T_m Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet	Heated Line °F	Remarks
A	K 3	1610	370.91	1.15	0.57	0.57	9.50	303	252	253	57	83	83	260	1 to 0.155
	2	1615	373.08	0.95	0.47	0.47	9.00	318	263	254	55	83	83	260	
	1	1620	375.07	0.90	0.45	0.45	9.00	320	280	254	55	83	84	261	
A	H 4	1625	376.88	0.60	0.30	0.30	7.00	321	271	254	54	84	83	260	
	3	1630	378.28	1.05	0.52	0.52	10.00	323	272	255	55	83	83	261	
	2	1635	380.33	1.20	0.60	0.60	11.00	312	265	253	54	83	83	261	
	1	1640	382.58	1.20	0.60	0.60	10.50	325	272	254	53	83	83	260	
A	END	1645	384.671	—	—	—	—	—	—	—	—	—	—	—	0.190
A	E 4	1647	384.861	0.52	0.26	0.26	6.50	338	270	253	56	83	83	261	
	3	1652	386.33	0.90	0.45	0.45	8.00	350	271	252	56	82	82	260	
	2	1657	388.20	1.00	0.50	0.50	9.00	353	269	252	56	82	82	260	
	1	1702	390.23	1.20	0.60	0.60	10.00	354	265	253	57	82	82	261	
A	B 4	1707	392.28	0.96	0.47	0.47	9.00	359	264	252	57	82	82	261	
	3	1712	394.15	1.00	0.50	0.50	9.00	361	261	251	57	82	82	260	
	2	1717	396.17	0.95	0.47	0.47	9.00	363	260	253	57	82	82	259	
	1	1722	398.13	1.10	0.55	0.55	10.00	360	261	253	57	82	82	261	
	END	1727	400.101	—	—	—	—	—	—	—	—	—	—	—	

METCO ENVIRONMENTAL

Job Number 99-95 GEB 3
Job Name ~~9~~ EPRI
Run Number 1
Unit Unit 3 Stack
Date 10-14-99
Operator Lee/Hart/Brown/Hefley
Sample Box No. Hg-2 Meter Box No. 29-1

Hg Field Data

Read and record at the start of each test point.

Purge to: –
Purge time: –
Pitot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 51
Assumed Moisture % 8.89
Probe Length 15'
C Factor 1.6 ⇒ 1.0 to reference
Initial Leak @ 15.0 "Hg = 0.009 cfm
Final Leak @ 18.0 "Hg = 0.003 cfm

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O (ΔP_s)	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet (T_m)	Heated Line	Remarks
A5	0906	727.934	0.70	1.10	1.10	10.0	328	254	290	56	52	48	284	Thimble Q32
5	0910	730.13	0.64	1.05	1.05	10.0	330	255	280	49	53	48	286	Filter Q57
4	0914	732.41	0.73	1.20	1.20	12.0	331	253	279	49	54	49	286	Multi-Point
4	0918	734.59	0.67	1.10	1.10	13.5	332	256	274	48	55	49	288	Pick Orsat
3	0922	736.74	0.68	1.10	1.10	15.0	340	258	273	49	55	49	287	
3	0926	738.91	0.65	1.05	1.05	15.0	339	257	273	48	56	50	287	
2	0930	741.06	0.70	1.15	1.15	14.5	334	260	268	47	56	49	287	
2	0934	743.46	0.68	1.10	1.10	14.5	334	259	268	47	56	50	286	
1	0938	745.91	0.60	0.98	0.98	14.0	329	257	265	46	56	50	284	
1	0942	748.22	0.58	0.95	0.95	13.0	327	258	265	47	56	50	287	
End	0946	750.464	–	–	–	–	–	–	–	–	–	–	–	leak/to 750.933; 18.0 0.002
D5	1010	751.751	0.58	0.95	0.95	9.0	346	271	297	52	59	52	285	leak/to 751.751; 20.0 0.003
5	1014	753.82	0.61	0.99	0.99	9.0	348	269	296	51	59	52	286	1.287
4	1018	756.07	0.67	1.10	1.10	9.5	351	272	294	49	59	52	286	
4	1022	758.40	0.64	1.05	1.05	10.0	350	272	291	47	59	53	287	
3	1026	760.82	0.70	1.15	1.15	10.5	353	273	294	47	59	53	286	
3	1030	763.29	0.72	1.15	1.15	10.5	352	273	294	48	59	54	286	
2	1034	765.81	0.66	1.10	1.10	10.0	346	271	296	47	59	53	286	

Pitot Tube Calibration Factor C_p 0.810
Volume Collected V_m 86.214 ft^3
Water Collected V_w 122.0 ml
Time of Test T_t 160 min.
Stack Pressure P_s -1.50 "H_2O

Pitot Tube No. M-8
Baro. Press. P_b ~~29.56~~ 29.45 "Hg
Probe Tip Dia. D_n 0.235 in.
% CO_2 13.2 % CO 0
% O_2 5.9 % N_2 80.9
Area Stack A_s 115.172 in^2

Barometer No. 19-1
Total Volume of Leak Checks After Start: 3.553 ft^3
V_m = Dry Gas Meter Calibration Factor 1.000 X 86.214

[Dry Gas Meter Reading – ft^3 - (T_t – min. X Leak Rate – cfm)]

Probe Tip No. TFE 2-8

Impinger Box No. Hg2

Impinger 1	Final Weight	823.4
	Initial Weight	747.3
	Increase	76.1
Impinger 2	Final Weight	771.9
	Initial Weight	752.2
	Increase	19.7
Impinger 3	Final Weight	726.8
	Initial Weight	723.1
	Increase	3.7
Impinger 4	Final Weight	764.1
	Initial Weight	755.3
	Increase	8.8
Impinger 5	Final Weight	669.3
	Initial Weight	668.7
	Increase	0.6
Impinger 6	Final Weight	759.6 ~~752.6~~
	Initial Weight	759.1
	Increase	~~6.5~~ 0.5
Impinger 7	Final Weight	684.3
	Initial Weight	683.2
	Increase	1.1

Water Weight Gain

Imp 8 Final 954.4
Int. 935.9
18.5

V_w =
g SO_2 = -
V_w =

Impinger 1	76.1
Impinger 2	19.7
Impinger 3	3.7
Impinger 4	8.8
Impinger 5	0.6
Impinger 6	~~6.5~~ 0.5
Impinger 7	1.1
Imp. 8	18.5
Total	~~122.0~~ 129.0 = V_w

P_b =	~~29.55~~ 29.45		%CO_2 =	13.2
V_m =	86.214		%O_2 =	5.9
V_w =	~~122.0~~ 129.0		%CO =	0.0
P_m =	1.013		%N_2 =	80.9
Avg ΔP =	0.621		A_s =	15,172
			D_n =	0.235
Avg$\sqrt{\Delta P}$ =	0.787		T_t =	160
C_p =	0.810			29.34 MB
P_s =	-1.50	$^{\circ}H_2O$		~~29.45~~ $^{\circ}Hg$
T_m =	61	°F		521 °R
T_s =	340	°F		800 °R

Moisture Content: %M = ~~6.24~~ 6.57 6.60 M_d = ~~0.9376~~ ~~0.9343~~ 0.9340 MW_d = 30.348 MW = ~~29.58~~ ~~29.54~~ 29.53 MB

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 86.214 \left[\frac{29.45 + \frac{1.013}{13.6}}{61 + 460}\right] =$$

86.232 MB ~~86.553~~ sft^3
~~0.541~~ 0.539 scfm

Vw_{gas} = 0.0472 x Vw = 0.0472 x ~~122.0~~ 129.0 = ~~5.76~~ ~~6.09~~ 6.089 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{\cancel{5.76}\ 6.089}{86.232\ \cancel{86.553} + \cancel{5.76}\ 6.089}$ x 100 = ~~6.24~~ ~~6.57~~ % 6.60 MB

V_s = 5123.8 x 0.810 $\sqrt{\frac{800}{\cancel{29.45}\ 29.34 \times \cancel{29.58}\ \cancel{29.54}\ 29.53}}$ x 0.787 = ~~3130~~ ~~3132~~ fpm 3139 MB

ACFM: ~~2,505,148~~ 2,510,265 MB

SCFM: ~~1,526,003~~ 1,523,212 MB

%I = $\frac{1,039 \times \cancel{86.553}\ 86.232}{160 \times \cancel{0.9376}\ \cancel{0.9343}\ 0.9340 \times \cancel{29.45}\ 29.34 \times \cancel{3130}\ \cancel{3132}\ 3139 \times (0.235)^2}$ = ~~94.2~~ ~~94.5~~ % 94.3 MB

%EA: 38.0

Run Number 1

Unit Unit 3 Stack

Date 10-14-99

H_s FIELD DATA

Point	Clock Time	Dry Gas Meter, CF	ΔP_s "Pitot" "H_2O	Orifice ΔH "H_2O Desired	P_m Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Guage	T_s Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	T_m Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet	Heated Line	Remarks
D 2	1038	768.29	0.67	1.10	1.10	10.5	347	272	291	47	60	54	286	
1	1042	770.78	0.50	0.82	0.82	9.0	339	266	293	47	61	54	287	
1	1046	772.99	0.53	0.86	0.86	8.5	340	269	291	48	62	54	286	
End	1050	775.079	—	—	—	—	—	—	—	—	—	—	—	leak/to 775.567; 12.2 0.003
C 5	11.26	775.841	0.50	0.82	0.82	8.0	354	276	294	53	59	58	284	leak/to 775.841; 15.0 0.002
5	1130	777.36	0.63	1.05	1.05	9.0	354	277	295	50	58	59	284	0.762
4	1134	779.50	0.70	1.15	1.15	9.0	350	274	296	47	59	59	285	
4	1138	781.71	0.65	1.05	1.05	9.0	349	275	295	46	61	60	287	
3	1142	783.89	0.68	1.10	1.10	9.0	342	273	296	45	63	61	286	
3	1146	786.07	0.59	0.96	0.96	9.0	339	271	298	45	65	61	287	
2	1150	788.27	0.64	1.05	1.05	9.5	332	272	293	46	66	62	284	
2	1154	790.51	0.60	0.98	0.98	9.5	332	271	291	45	68	63	285	
1	1158	792.71	0.61	1.00	1.00	10.0	326	269	288	46	68	64	288	
1	1202	794.86	0.51	0.82	0.82	9.0	324	270	290	46	70	65	294	
End	1206	796.978	—	—	—	—	—	—	—	—	—	—	—	leak/to 797.432; 12.0 0.003
B5	1223	798.482	0.61	1.00	1.00	9.0	354	264	276	49	74	70	289	leak/to 798.482; 12.0 0.003
5	1227	799.82	0.59	0.96	0.96	9.0	351	267	283	48	72	70	287	1.504
4	1231	801.64	0.69	1.10	1.10	9.0	347	267	268	47	72	71	288	
4	1235	803.94	0.61	1.00	1.00	9.0	342	264	267	48	71	72	288	
3	1239	806.02	0.63	1.05	1.05	9.0	341	260	268	48	72	72	286	
3	1243	808.35	0.55	0.90	0.90	8.5	342	263	271	48	74	73	287	
2	1247	810.29	0.60	0.98	0.98	9.0	336	261	260	49	76	73	287	
2	1251	812.47	0.55	0.90	0.90	8.5	335	260	266	49	75	74	288	
1	1255	814.40	0.53	0.86	0.86	8.0	329	260	270	50	75	75	287	
1	1259	816.24	0.46	0.74	0.74	8.0	330	262	274	50	77	75	288	
End	1303	817.701	—	—	—	—	—	—	—	—	—	—	—	

METCO ENVIRONMENTAL

Job Number 99-95 GDD 3
Job Name EPRI
Run Number 2
Unit Unit 3 Stack
Date 10-14-99
Operator Lee / Hart / Brown / Hefley
Sample Box No. Hg 4 Meter Box No. 29-1 ✓

Hg Field Data

Read and record at the start of each test point.

Purge to: —
Purge time: —
Pitot Leak Check Initial ✓ Final ____

ABORTED

Ambient Temp. °F 68
Assumed Moisture % 8.8
Probe Length 15'
C Factor 1.60 ⇒ 1.0 to reference
Initial Leak @ 16.0 "Hg = 0.000 cfm
Final Leak @ ____ "Hg = ____ cfm

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O (ΔP_s)	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Guage (P_m)	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet (T_m)	Heated Line	Remarks
B 5	1439	818.806	0.66	1.10	1.10	12.0	348	276	283	52	74	72	284	Thimble Q35
5	1443	820.84	0.64	1.05	1.05	12.0	347	275	283	50	75	73	286	Filter Q59
4	1447	822.83	0.66	1.10	1.10	12.0	342	276	285	49	78	74	286	Multi-Point
4	1451	825.26	0.65	1.10	1.10	12.0	343	280	287	49	81	75	288	Port Orst
3	1455	827.41	0.67	1.15	1.15	12.0	336	278	288	49	83	76	288	
3	1459	829.81	0.61	1.05	1.05	11.5	337	274	286	49	85	76	289	ABORTED!
2	1503	832.16	0.58	0.99	0.99	11.0	335	275	286	50	86	76	288	
2	1507	834.52	0.56	0.96	0.96	10.5	335	274	284	50	87	78	287	
1	1511	836.61	0.55	0.95	0.95	10.0	331	274	285	51	87	78	287	
1	1515	838.82	0.49	0.84	0.84	9.0	332	275	287	52	89	81	287	
End	1519	840.921	—	—	—	—	—	—	—	—	—	—	—	leak/to 841.539; 15.0 @ 0.000
C 5	1540	841.826	0.58	0.99	0.99	9.0	346	271	260	54	~~54~~ 73	84	270	leak/to 841.826; 16.0 @ 0.000
5	1657	844.92	0.77	1.30	1.30	11.0	348	269	259	54	73	84	271	pump off 1543
4	~~16~~ 1701	846.81	0.82	1.40	1.40	12.0	343	266	260	50	75	83	273	~~pump on 1556~~ pump on 1656
4	1705	849.42	0.85	1.45	1.45	12.5	342	268	257	46	75	83	276	Δ Heated Line
3	1709	852.08	0.80	1.35	1.35	12.5	342	268	252	44	76	82	277	leak/good; 15.0 @ 0.000 (0.870)
3	1713	854.74	0.73	1.25	1.25	13.0	340	270	254	45	78	82	277	
2	1717	857.11	0.73	1.25	1.25	14.5	336	273	255	45	78	82	278	

Pitot Tube Calibration Factor C_p 0.810 ✓
Volume Collected V_m ____ ft^3
Water Collected V_w ____ ml
Time of Test T_t 162 min.
Stack Pressure P_s -1.40 "H_2O

Pitot Tube No. M-8 ✓
Baro. Press. P_b ____ "Hg
Probe Tip Dia. D_n 0.235 in.
% CO_2 ____ % CO 0
% O_2 ____ % N_2 ____
Area Stack A_s 115.172 in^2

Barometer No. 19-1 ✓
Total Volume of Leak Checks After Start: ____ ft^3
V_m = Dry Gas Meter Calibration Factor 1.000 ✓ X ____

Probe Tip No. TFE 2-8

[Dry Gas Meter Reading — ft^3 - (T_t — min. X Leak Rate — cfm)]

Impinger Box No. Hg 4

Impinger 1	Final Weight		Imp. 8 Final	Impinger 1	
	Initial Weight	750.3	Int 862.5	Impinger 2	
	Increase				
Impinger 2	Final Weight			Impinger 3	
	Initial Weight	760.2			
	Increase			Impinger 4	
Impinger 3	Final Weight		V_w =	Impinger 5	
	Initial Weight	663.6	g SO_2 = -		
	Increase		V_w =	Impinger 6	
Impinger 4	Final Weight			Impinger 7	
	Initial Weight	759.0			
	Increase			Total	= V_w
Impinger 5	Final Weight		P_b =	$\%CO_2$ =	
	Initial Weight	757.9	V_m =	$\%O_2$ =	
	Increase		V_w =	%CO =	
			P_m =	$\%N_2$ =	
Impinger 6	Final Weight		Avg ΔP =	A_s =	
	Initial Weight	762.4		D_n =	
	Increase		Avg$\sqrt{\Delta P}$ =	T_t =	
			C_p =		
Impinger 7	Final Weight		P_s = ___ "H_2O	___ "Hg	
	Initial Weight	763.2	T_m = ___ °F	___ °R	
	Increase		T_s = ___ °F	___ °R	

Moisture Content: %M = ___ M_d = ___ MW_d = ___ MW = ___

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65\ x \left[\frac{\ + \frac{\ }{13.6}}{\ + 460}\right] = ___\ sft^3 \ ___\ scfm$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x ___ = ___ sft^3 ABORTED!

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

$$V_s = 5123.8 \times ___ \sqrt{\frac{\ }{\ \times\ }} \times ___ = ___\ fpm$$

ACFM: ___

SCFM: ___

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

%EA: ___

Run Number 2

Unit Unit 3 Stack

Date 10-14-99

Hg FIELD DATA

Point	Clock Time	Dry Gas Meter, CF	ΔP_s "Pitot" "H_2O	Orifice ΔH "H_2O Desired	P_m Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Guage	T_s Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	T_m Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet	Heated Line	Remarks
c 2	1721	859.27	0.70	1.20	1.20	16.0	334	273	259	45	79	81	278	
1	1725	861.65	0.66	1.10	1.10	15.0	332	275	260	45	80	81	278	ABORTED!
1	1729	864.473	0.64	1.10	1.10	14.0	329	275	261	45	80	81	277	
End	1733	866.644	—	—	—	—	—	—	—	—	—	—	—	

ABORTED

METCO ENVIRONMENTAL

Job Number: 99-95 GRB 3 ✓
Job Name: EPRD ✓
Run Number: 3 ✓
Unit: Unit 3 Stack ✓
Date: 10-15-99 ✓
Operator: Lee / Hart / Brown / Hefley ✓
Sample Box No. Hg-2 Meter Box No. 29-1 ✓

Hg Field Data

Read and record at the start of each test point.

Purge to: —
Purge time: —
Pitot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 50
Assumed Moisture % 8.8%
Probe Length 15'
C Factor 4.6 → 5.0 to reference
Initial Leak @ 16.0 "Hg = 0.000 cfm
Final Leak @ 15.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H₂O (ΔP_s)	Orifice ΔH "H₂O Desired	Orifice ΔH "H₂O Actual (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet (T_m)	Heated Line	Remarks
B5	0900	893.032	0.80	0.72	0.72	8.0	340	268	264	52	58	54	269	thimble Q 38
5	0904	894.93	0.83	0.77	0.77	8.0	340	276	272	48	58	54	276	filter Q63
4	0908	896.86	0.83	0.77	0.77	8.0	340	280	278	46	59	55	281	Multi-Point
4	0912	898.78	0.84	0.78	0.78	8.0	340	282	278	46	59	55	280	Int. Insert
3	0916	900.70	0.82	0.76	0.76	8.5	337	284	280	45	59	55	281	
3	0920	902.61	0.80	0.72	0.72	8.0	336	285	283	45	60	55	281	
2	0924	904.48	0.84	0.78	0.78	8.5	334	284	281	46	60	55	282	
2	0928	906.39	0.84	0.78	0.78	8.5	333	285	280	46	61	56	282	
1	0932	908.32	0.85	0.79	0.79	8.5	329	284	279	46	61	56	281	
1	0936	910.41	0.83	0.77	0.77	8.5	329	284	278	46	62	56	281	
End	0940	912.213	—	—	—	—	—	—	—	—	—	—	—	leak/to 912.339; 13.0 0.000
C5	0955	912.544	0.83	0.77	0.77	8.5	340	274	266	52	63	57	283	leak/to 912.544; 12.0 0.000
5	0959	914.43	0.83	0.77	0.77	8.5	341	280	262	49	62	57	282	
4	1003	916.37	0.83	0.77	0.77	8.5	338	282	263	49	62	57	280	
4	1007	918.29	0.82	0.76	0.76	8.5	340	285	263	49	63	58	282	
3	1011	920.44	0.78	0.73	0.73	8.5	343	284	268	49	63	58	284	
3	1015	922.11	0.79	0.73	0.73	8.5	341	284	269	49	64	58	284	
2	1019	924.00	0.85	0.79	0.79	8.5	339	283	271	50	64	58	285	

Pitot Tube Calibration Factor C_p 0.802 ✓
Volume Collected V_m 76.443 ✓ ft³
Water Collected V_w 96.6 ✓ ml
Time of Test T_t 160 ✓ min.
Stack Pressure P_s -1.50 ✓ "H₂O

Pitot Tube No. 45-12-1 ✓
Baro. Press. P_b ~~29.40~~ 29.30 "Hg ✓
Probe Tip Dia. D_n 0.200 ✓ in.
% CO_2 13.2 ✓ % CO 0 ✓
% O_2 6.0 % N_2 80.8 ✓
Area Stack A_s 115.172 in²

Barometer No. 19-1 ✓
Probe Tip No. TFE 2-7 ✓
Total Volume of Leak Checks After Start: 0.895 ✓ ft³
V_m = Dry Gas Meter Calibration Factor 1.000 ✓ X 76.443

[Dry Gas Meter Reading — ft³ - (T_t — min. X Leak Rate — cfm)]

Impinger Box No. Hg 2

Impinger 1	Final Weight	828.1	Imp 8.	Impinger 1	82.6
	Initial Weight	745.5	Final 964.3	Impinger 2	129
	Increase	82.6	Int. 953.9	Impinger 3	-3.2
Impinger 2	Final Weight	768.7	10.4	Impinger 4	3.9
	Initial Weight	750.8		Impinger 5	-4.9
	Increase	17.9		Impinger 6	-5.0
Impinger 3	Final Weight	723.5		Impinger 7	-5.1
	Initial Weight	726.7		Imp. 8	10.4
	Increase	-3.2		Total	96.6 = V_w
Impinger 4	Final Weight	760.1			
	Initial Weight	756.2			
	Increase	3.9			
Impinger 5	Final Weight	674.1			
	Initial Weight	679.0			
	Increase	-4.9			
Impinger 6	Final Weight	748.9			
	Initial Weight	753.9			
	Increase	-5.0			
Impinger 7	Final Weight	679.5			
	Initial Weight	684.6			
	Increase	-5.1			

Water Weight Gain

V_w =

g SO_2 = -

V_w =

P_b =	~~29.40~~ 29.30 MB		$\%CO_2$ =	13.2
V_m =	76.443		$\%O_2$ =	6.0
V_w =	96.6		%CO =	0
P_m =	0.755		$\%N_2$ =	80.8
Avg ΔP =	0.817		A_s =	115.122
			D_n =	0.200
Avg$\sqrt{\Delta P}$ =	0.902		T_t =	160
C_p =	0.802			
P_s =	-1.50	"H_2O	~~29.29~~ 29.19 MB	"Hg
T_m =	64	°F	524	°R
T_s =	339	°F	799	°R

Moisture Content: %M = ~~5.67~~ 5.69 M_d = ~~0.9433~~ 0.9431 MW_d = 30.352 MW = 29.65

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 76.443 \left[\frac{29.30 + \frac{0.755}{13.6}}{64 + 460}\right] = \text{~~75.843~~ 75.586 MB sft}^3 \text{ ~~0.474~~ 0.472 scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 96.6 = 4.560 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{4.560}{75.586 + 4.560}$ x 100 = ~~5.69~~ 5.67 %

V_s = 5123.8 x 0.802 $\sqrt{\frac{799}{\text{~~29.29~~ 29.19} \times 29.65}}$ x 0.902 = ~~3555~~ 3561 fpm

$$\%I = \frac{1{,}039 \times \text{~~75.843~~ 75.586} \times 799}{160 \times \text{~~0.9433~~ 0.9431} \times \text{~~29.29~~ 29.19} \times \text{~~3555~~ 3561} \times (0.200)^2} = \text{~~100.2~~ 100.0 MB \%}$$

ACFM: ~~2,864,537~~ 2,848,403 MB / 1,738,077 MB

SCFM: ~~174,462~~

%EA: 38.9

Run Number 3

Unit Unit 3 Stack

Date 10-15-99

Hg FIELD DATA

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H₂O (ΔP_s)	Orifice ΔH "H₂O Desired	Orifice ΔH "H₂O Actual (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Heated Line	Remarks
C 2	1023	925.97	0.81	0.75	0.75	8.0	339	285	274	50	65	59	285	
1	1027	927.90	0.77	0.72	0.72	9.0	343	287	269	53	65	60	284	
1	1031	929.83	0.84	0.78	0.78	9.0	345	286	265	54	65	60	284	
End	1035	931.680	—	—	—	—	—	—	—	—	—	—	—	leak/to 931.976; 12.0
D 5	1052	932.003	0.93	0.86	0.86	9.0	341	273	284	59	66	61	283	leak/to 932.003; 12.0
5	1056	934.07	0.95	0.88	0.88	9.0	343	277	288	56	66	61	285	
4	1100	936.13	0.96	0.89	0.89	9.0	340	278	287	55	67	61	285	
4	1104	938.21	0.94	0.87	0.87	9.0	341	278	283	53	67	62	283	
3	1108	940.26	0.96	0.89	0.89	9.0	~~336~~ 340	273	282	47	68	63	283	
3	1112	942.35	0.91	0.84	0.84	9.0	340	275	285	48	69	63	284	
2	1116	944.36	0.95	0.88	0.88	9.5	338	279	289	45	69	64	283	
2	1120	946.43	0.97	0.90	0.90	9.5	339	277	288	46	69	65	282	
1	1124	948.51	0.99	0.92	0.92	10.0	337	280	284	49	70	66	280	
1	1128	950.63	1.00	0.93	0.93	10.0	340	282	285	51	70	66	281	
End	1132	952.659	—	—	—	—	—	—	—	—	—	—	—	leak/to 952.980; 12.0
A 5	1146	952.900	0.68	0.63	0.63	8.0	343	266	275	50	71	71	282	leak/to 952.900; 12.0
5	1150	954.63	0.67	0.61	0.61	8.0	343	268	279	48	71	71	282	
4	1154	956.39	0.68	0.63	0.63	8.0	343	275	281	48	72	72	285	
4	1158	958.15	0.70	0.65	0.65	8.0	340	279	283	47	73	73	284	
3	1202	959.95	0.63	0.58	0.58	9.0	341	283	282	48	74	74	284	
3	1206	961.65	0.65	0.60	0.60	9.0	340	284	285	49	75	74	285	
2	1210	963.36	0.67	0.61	0.61	9.5	338	284	283	49	76	74	284	
2	1214	965.08	0.67	0.61	0.61	9.5	339	281	284	50	76	74	283	
1	1218	966.88	0.65	0.60	0.60	10.0	335	282	287	50	77	76	288	
1	1222	968.62	0.67	0.61	0.61	9.5	333	283	287	51	77	76	289	
End	1226	970.370	—	—	—	—	—	—	—	—	—	—	—	

METCO ENVIRONMENTAL

Job Number 99-95 GRB 3 ✓
Job Name EPRI ✓
Run Number 4 ✓
Unit Unit 3 Stack ✓
Date 10-13-99 ✓
Operator Lee/Hart/Brown/Hefley ✓
Sample Box No. Hg 4 Meter Box No. 29-1 ✓

Hg Field Data

Read and record at the start of each test point.

Purge to: —
Purge time: —
Pitot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 75
Assumed Moisture % 8.8%
Probe Length 15'
C Factor 4.6 ⇒ 5.0 to reference
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 16.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H_2O (ΔP_s)	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual	Pump Vacuum "Hg Guage (P_m)	Stack Temp °F (T_s)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Heated Line	Remarks
A5	1415	971.477	1.20	1.10	1.10	12.5	346	253	261	61	75	77	284	Thimble Q41
5	1419	973.78	1.30	1.20	1.20	12.5	348	257	268	58	76	77	284	Filter Q62
4	1423	976.19	1.30	1.20	1.20	12.5	348	260	269	54	76	77	286	Multi-Point
4	1427	978.63	1.30	1.20	1.20	12.5	346	262	269	51	77	78	286	Pitot Orsat
3	1431	981.06	1.20	1.10	1.10	12.5	342	265	274	48	78	79	285	
3	1435	983.40	1.20	1.10	1.10	12.5	343	267	275	48	80	80	285	
2	1439	985.73	1.20	1.10	1.10	14.5	341	268	279	49	82	82	283	
2	1443	987.93	1.10	1.00	1.00	14.5	339	267	277	49	83	82	283	
1	1447	990.16	1.10	1.00	1.00	13.0	333	268	275	50	84	84	281	
1	1451	992.38	1.10	1.00	1.00	13.0	335	268	276	52	85	84	282	
End	1455	994.651	—	—	—	—	—	—	—	—	—	—	—	leak/to 994.926; 15.0 0.000
D5	1509	995.234	1.40	1.30	1.30	12.0	348	265	275	60	83	84	283	leak/to 995.234; 15.0 0.000
5	1513	997.58	1.40	1.30	1.30	12.0	348	266	272	57	84	85	284	
4	1517	999.81	1.30	1.20	1.20	12.0	346	270	273	56	84	86	284	
4	1521	1002.17	1.40	1.30	1.30	12.0	347	273	274	53	84	86	284	
3	1525	1004.67	1.40	1.30	1.30	12.5	347	275	278	52	84	87	286	
3	1529	1007.21	1.40	1.30	1.30	12.5	346	275	280	52	84	87	287	
2	1533	1009.82	1.50	1.40	1.40	13.0	343	272	281	50	84	88	286	

Pitot Tube Calibration Factor C_p 0.802 ✓
Volume Collected V_m 89.570 ✓ ft^3
Water Collected V_w 141.7 ✓ ml
Time of Test T_t 160 ✓ min.
Stack Pressure P_s -1.50 ✓ "H_2O

Pitot Tube No. 45-12-1 ✓ Mrb
Baro. Press. P_b ~~29.40~~ 29.30 "Hg 0.200 ✓
Probe Tip Dia. D_n ~~0.199~~ in. ✓
% CO_2 13.4 ✓ % CO Ø
% O_2 5.9 ✓ % N_2 80.8 ✓
Area Stack A_s 115.172 ✓ in^2

Barometer No. 19-1 ✓
Total Volume of Leak Checks After Start: 1.393 ft^3
V_m = Dry Gas Meter Calibration Factor 1.000 ✓ × ~~89.9~~ 89.570

[Dry Gas Meter Reading — ft^3 - (T_t — min. X Leak Rate — cfm)]

Probe Tip No. TFE 1-7 ✓

Impinger Box No. Hg 4

Impinger 1	Final Weight	856.1
	Initial Weight	749.0
	Increase	107.1
Impinger 2	Final Weight	777.4
	Initial Weight	757.5
	Increase	19.9
Impinger 3	Final Weight	662.5
	Initial Weight	661.3
	Increase	1.2
Impinger 4	Final Weight	764.1
	Initial Weight	757.4
	Increase	6.7
Impinger 5	Final Weight	756.5
	Initial Weight	760.0
	Increase	-3.5
Impinger 6	Final Weight	756.5
	Initial Weight	759.8
	Increase	-3.3
Impinger 7	Final Weight	763.2
	Initial Weight	767.2
	Increase	-4.0

Water Weight Gain

Imp 8
Final 889.0
Int. 871.4
12.6

V_w =
g SO_2 = -
V_w =

Impinger 1	107.1
Impinger 2	19.9
Impinger 3	1.2
Impinger 4	6.7
Impinger 5	-3.5
Impinger 6	-3.3
Impinger 7	-4.0
Imp 8	12.6
Total	141.7 = V_w

P_b =	~~29.40~~ 29.30 MB	$\%CO_2$ =	13.4	
V_m =	89.570	$\%O_2$ =	5.8	
V_w =	141.7	%CO =	0	
P_m =	1.104	$\%N_2$ =	80.8	
Avg ΔP =	1.195	A_s =	115.172	
		D_n =	~~0.199~~ 0.200	
Avg$\sqrt{\Delta P}$ =	1.090	T_t =	160	
C_p =	0.802		29.19 MB	
P_s =	-1.50	H_2O	~~29.29~~	Hg
T_m =	84	°F	544	°R
T_s =	344	°F	804	°R

Moisture Content: %M = ~~7.24~~ 7.26 M_d = ~~0.9276~~ 0.9274 MW_d = 30.376 MW = 29.48

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 89.570 \left[\frac{29.30 + \frac{1.104}{13.6}}{84 + 460}\right] = \frac{85.384\ \text{MB}}{\cancel{85.675}\ \text{sft}^3}\ \frac{\cancel{0.535}}{0.534\ \text{MB}}\ \text{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 141.7 = 6.688 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{6.68}{85.384\ \cancel{85.675} + 6.68}$ x 100 = ~~7.24~~ 7.26 %

V_s = 5123.8 x 0.802 $\sqrt{\frac{804}{\cancel{29.29}\ 29.19 \times 29.48}}$ x 1.090 = ~~4322~~ 4330 fpm

ACFM: ~~3,456,862~~ 3,462,778 MB

SCFM: ~~2,069,002~~ 2,065,309 MB

%I = $\frac{1{,}039 \times \cancel{85.675}\ 85.384 \times 804}{160 \times \cancel{0.9276}\ 0.9274 \times \cancel{29.29}\ 29.19 \times \cancel{4322}\ 4330 \times (\cancel{0.199}\ 0.200)^2}$ = ~~96.2~~ ~~96.0~~ 95.1 %

%EA: 37.2

Run Number 4

Unit Unit 3 Stack

Date 10-15-99

Hg FIELD DATA

			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 Guage	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet	Heated Line	Remarks
D2	1537	1012.32	1.50	1.40	1.40	13.0	341	271	280	49	84	88	286	
1	1541	1014.92	1.50	1.40	1.40	13.0	338	270	283	50	84	88	285	
1	1545	1017.60	1.50	1.40	1.40	13.0	339	269	286	53	84	88	286	
End	1549	1020.327	—	—	—	—	—	—	—	—	—	—	—	leak/to 1020.527; 15.0 20.000
C 5	1602	1020.732	1.30	1.20	1.20	10.0	347	272	285	59	82	88	284	leak/to 1020.732; 16.0 20.000
5	1606	1023.08	1.20	1.10	1.10	11.5	349	270	285	57	82	88	285	
4	1610	1025.49	1.20	1.10	1.10	11.5	347	271	283	55	82	88	285	
4	1614	1027.93	1.20	1.10	1.10	12.0	347	273	283	54	83	88	286	
3	1618	1030.42	1.20	1.10	1.10	12.0	343	274	284	55	83	88	285	
3	1622	1032.87	1.20	1.10	1.10	12.0	345	274	285	56	84	88	285	
2	1626	1035.33	1.20	1.10	1.10	12.5	345	272	284	56	84	88	286	
2	1630	1037.78	1.10	1.00	1.00	12.0	344	276	280	57	84	89	287	
1	1634	1040.24	1.00	0.93	0.93	11.0	339	275	281	57	84	89	286	
1	1638	1042.54	1.00	0.93	0.93	11.0	338	276	282	57	84	89	286	
End	1642	1044.788	—	—	—	—	—	—	—	—	—	—	—	leak/to 1045.026; 13.0 20.000
B 5	1656	1045.193	1.00	0.93	0.93	10.0	349	271	283	61	82	88	286	leak/to 1045.193; 16.0 20.000
5	1700	1047.19	1.00	0.93	0.93	10.0	349	270	282	59	82	88	285	
4	1704	1049.31	1.10	1.00	1.00	10.0	347	274	279	56	83	87	285	
4	1708	1051.33	1.00	0.93	0.93	10.0	346	273	278	55	83	87	286	
3	1712	1053.54	1.05	0.97	0.97	11.0	347	273	280	55	83	87	286	
3	1716	1055.73	1.00	0.93	0.93	11.0	347	271	279	55	83	87	287	
2	1720	1057.62	0.97	0.90	0.90	9.5	345	271	283	56	83	87	286	
2	1724	1059.06	0.98	0.91	0.91	9.5	342	270	284	57	84	87	286	
1	1728	1060.26	0.91	0.84	0.84	9.0	343	269	286	59	84	87	287	
1	1732	1061.44	0.90	0.84	0.84	9.0	342	269	287	60	84	87	288	
End	1736	1062.440	—	—	—	—	—	—	—	—	—	—	—	

PRELIMINARY VELOCITY TRAVERSE DATA
AND
SAMPLING LOCATION DATA

Job Number 99-956iB3

Job Name EPRI

Sampling Location Gibson

Date 10-13-99 Time 1530

Stack Height — ft.

Sampling Port Height Above Ground 83 ft.

	Port A (all ports)	Port B	Port C	Port D	Average
Port & Inside Diameter (in.)	125				125
Port & Wall Thickness (in.)	29				29
Inside Stack Diameter (in.)	96				96

Sampling Ports are 24 ft. 11 in. — ~~3.11~~ 1.88 stack diameters) downstream from disturbance (inlet, constriction, bend, expansion)

Sampling Ports are 21 ft. 7 in. — ~~2.78~~ 1.63 stack diameters) upstream from disturbance (outlet, constriction, bend, expansion)

Eq dia = ~~156.~~ 159

Point Number	Percent Diameter	Distance from Ref. Point (decimal in.)	Distance from Ref. Point (fractional in.)	INLET A Port AB $\Delta P/T_s/\alpha$	Port ~~B~~AE $\Delta P/T_s/\alpha$	Port ~~C~~AH $\Delta P/T_s/\alpha$	Port ~~D~~AK $\Delta P/T_s/\alpha$
1			12"	0.781347 0	0.751347 2	0.681333 -2	0.632201 0
2			36"	0.631350 2	0.701346 0	0.751361 0	0.601314 0
3			60"	0.681350 0	0.601342 -8	0.701361 0	0.751304 0
4			84"	0.681346 0	0.351338 -5	0.431318 0	0.831302 0
~~5~~				/ /	/ /	/ /	/ /
6				/ /	/ /	/ /	/ /
7				/ /	/ /	/ /	/ /
8				/ /	/ /	/ /	/ /
9				INLET B	/ /	/ /	/ /
10				1BB1	1BE1	1BH1	1BK1
11				0.501284 -2	0.601291 0	0.681303 0	0.731304 1
12				0.451274 0	0.601287 0	0.501301 0	0.651304 3
13				0.501275 0	0.581280 0	0.431303 0	0.681304 0
14				0.531267 2	0.351285 0	0.231303 0	0.601305 -5
15				/ /	/ /	/ /	/ /
16				/ /	/ /	/ /	/ /
17				/ /	/ /	/ /	/ /
18				/ /	/ /	/ /	/ /
19				/ /	/ /	/ /	/ /
20				/ /	/ /	/ /	/ /
21				/ /	/ /	/ /	/ /
22				/ /	/ /	/ /	/ /
23				/ /	/ /	/ /	/ /
24				/ /	/ /	/ /	/ /

Pitot Tube No. M5

C_p = 0.808

P_b = 29.49 "Hg

P_s = -12.65 "H_2O 28.56 "Hg

A_s = 43.776 in.^{2}

Average ΔP 0.578

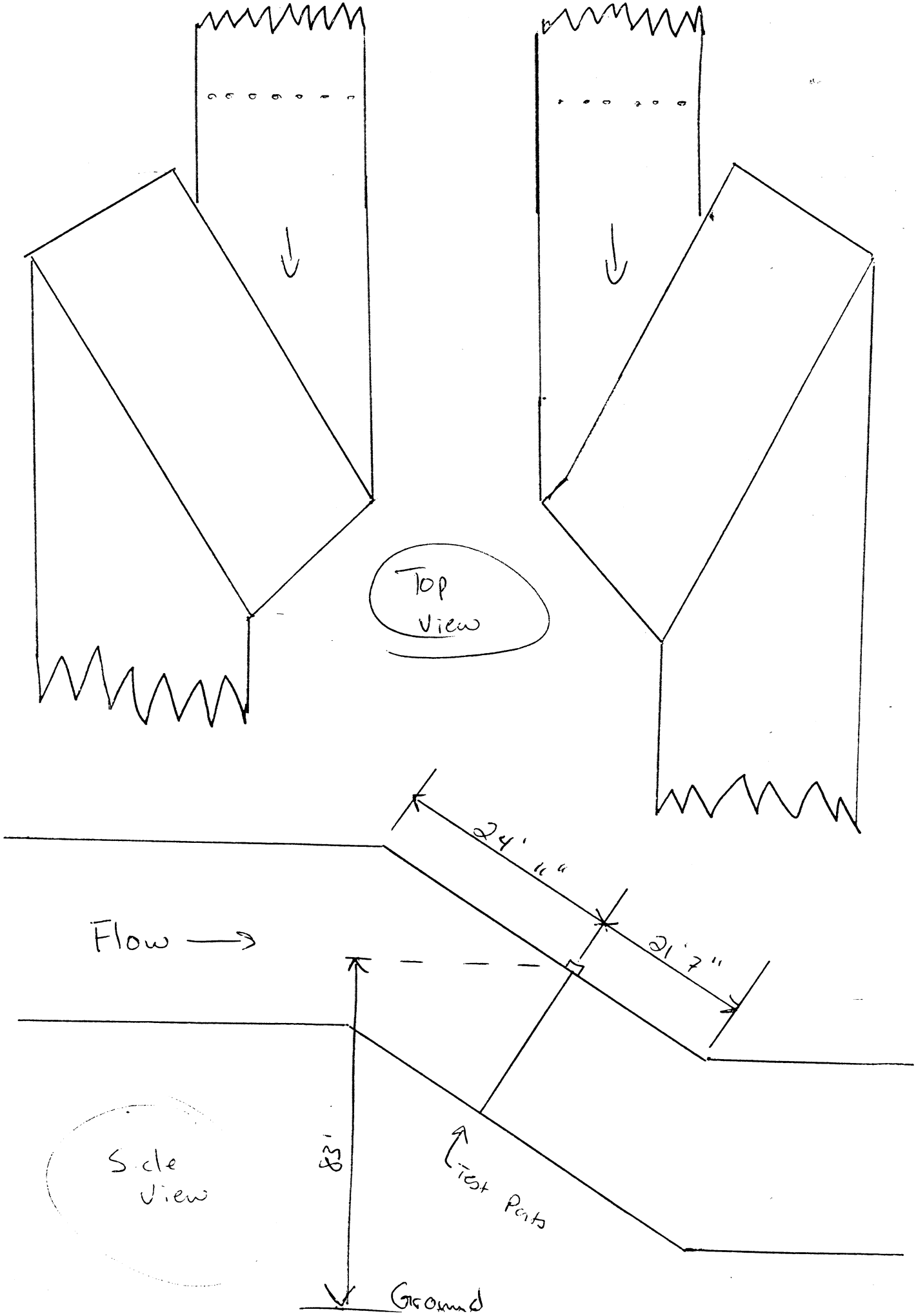
Average $\Delta P^{1/2}$ 0.768

Average T_x 311 °F

Average α 1.0 degrees

P_s (B) = -11.70"

P_s (A) = -13.60"


Top View
24' 11"
21' 7"
Flow
Side View
Test Pads
Ground

PRELIMINARY VELOCITY TRAVERSE DATA
AND
SAMPLING LOCATION DATA

Job Number 99-95GIB3
Job Name EPRI / Cinergy
Sampling Location Unit 3 Stack
Date 10-13-99 Time 1600

Stack Height ~~500~~ 504' 11 1/2" ft.
Sampling Port Height Above Ground ~~248~~ 252' 6 1/2" ft.

	Port A	Port B	Port C	Port D	Average
Port & Inside Diameter (in.)	~~430 15/16~~	~~424 15/16~~	~~430 15/16~~	~~426 15/16~~	~~428 7/16~~
Port & Wall Thickness (in.)	43"	47	43	49	45 1/2
Inside Stack Diameter (in.)	~~387 15/16~~	~~377 15/16~~	~~387 15/16~~	~~377 15/16~~	382 15/16

Sampling Ports are ~~172~~ 155 ft. ~~7~~ 8 in. ~~5.41~~ 4.88 stack diameters) downstream from disturbance (inlet, constriction, bend, expansion)

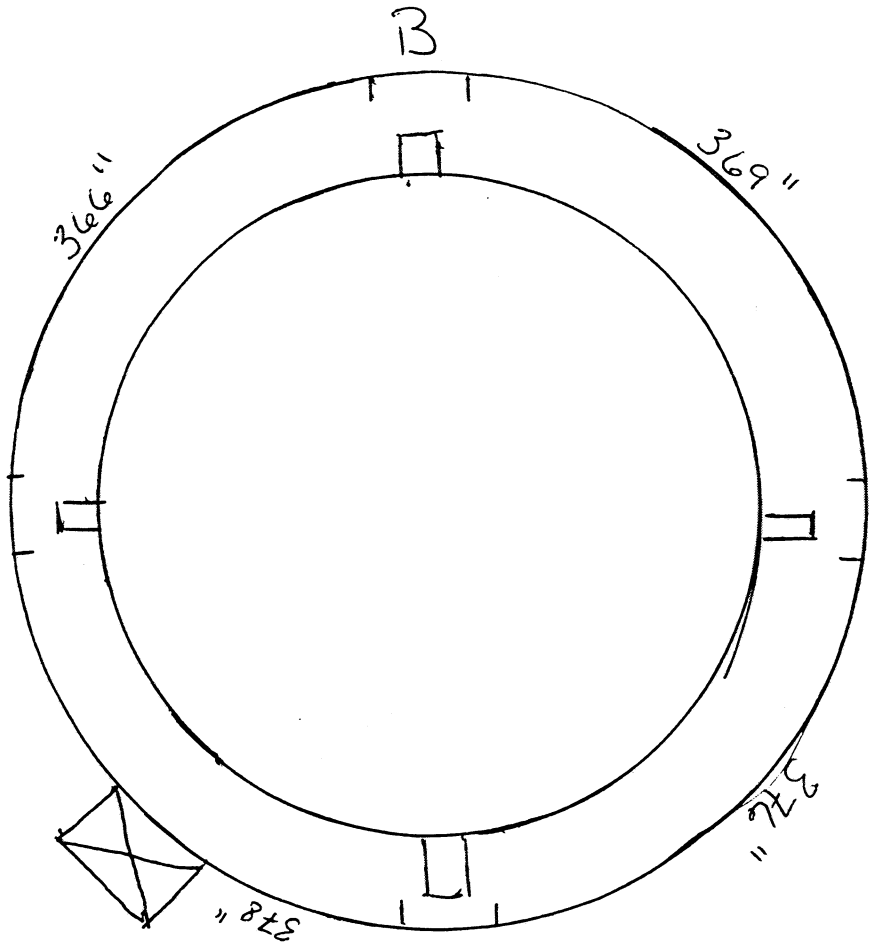
Sampling Ports are 252 ft. 5 in. 7.91 stack diameters) upstream from disturbance (outlet, constriction, bend, expansion)

Point Number	Percent Diameter	Distance from Ref. Point (decimal in.)	Distance from Ref. Point (fractional in.)	Port A ΔP/T$_s$/α	Port ~~B~~ D ΔP/T$_s$/α	Port C ΔP/T$_s$/α	Port ~~D~~ B ΔP/T$_s$/α
1	2.6	9.956	9 15/16 5	0.4513601 0	0.3113261 2	0.2913301 7	0.4013291 0
2	8.2	31.401	31 3/8 4	0.4613541 0	0.4713471 2	0.4413421 0	0.4313381 -3
3	14.6	55.909	55 15/16 3	0.4313501 2	0.4613711 0	0.4613401 -1	0.4213411 0
4	22.6	86.544	86 9/16 2	0.4213351 0	0.5013841 1	0.4413501 -1	0.4513501 0
5	34.2	130.965	130 15/16 1	0.3213201 1	0.4513621 0	0.4313521 0	0.4613601 -1
6				/ /	/ /	/ /	/ /
7				/ /	/ /	/ /	/ /
8				/ /	/ /	/ /	/ /
9				/ /	/ /	/ /	/ /
10				/ /	/ /	/ /	/ /
11				/ /	/ /	/ /	/ /
12				/ /	/ /	/ /	/ /
13				/ /	/ /	/ /	/ /
14				/ /	/ /	/ /	/ /
15				/ /	/ /	/ /	/ /
16				/ /	/ /	/ /	/ /
17				/ /	/ /	/ /	/ /
18				/ /	/ /	/ /	/ /
19				/ /	/ /	/ /	/ /
20				/ /	/ /	/ /	/ /
21				/ /	/ /	/ /	/ /
22				/ /	/ /	/ /	/ /
23				/ /	/ /	/ /	/ /
24				/ /	/ /	/ /	/ /

Pitot Tube No. 17-8
C_p = 0.810
P_b = 29.39 "Hg
P_s = -1.20 "H_2O 29.30 "Hg
A_s = 115,172 in.^{2}

Average ΔP 0.425
Average ΔP$^{1/2}$ 0.650 ~~0.647~~
Average T_x 347 °F
Average α 0.75 degrees

P.W. = 47"



366"
369"
376"
378"
1489" cir ✓

$d = \frac{1489''}{\pi}$

$OD = 473\,15/16$ ✓

$ID_{AC} = 473\frac{15}{16} - (43 + 43)$

$ID_{AC} = 387\frac{15}{16}$ ✓

$ID_{BD} = 473\frac{15}{16} - (47 + 49)$

$ID_{BD} = 377\frac{15}{16}$ ✓

$ID = 382\frac{15}{16}$ ✓

$31'\ 10\frac{15}{16}''$ ✓

METCO ENVIRONMENTAL

ORSAT ANALYSIS DATA FORM

Job Number: 99-95 GI33 Sample Location: Unit 3 Precipitator Inlet Duct

Job Name: EPRI / Cinergy Analytical Method: 33

Location: Owensville, Indiana Sample Type: Single point or Multi point; Grab or Integrated

Date: 10/14/99 Leak Check: Time: 4:00 (min. 4 minutes) Rate: 0.000

Operator: Hefley Ambient Air Check:

CO_2 - % Vol.	0.0
O_2 - % Vol.	20.9
N_2 - % Vol.	79.1

Run Number 1 Run Time 0833-1302	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	13.6	13.6	13.6	13.6
O_2 - % Vol.	5.6	5.5	5.6	5.6
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.8	80.9	80.8	80.8

Fo" 1.124

Run Number 3 Run Time	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	14.0	14.0	14.0	14.0
O_2 - % Vol.	5.4	5.4	5.4	5.4
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.6	80.6	80.6	80.6

Fo" 1.107

Run Number 4 Run Time	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	13.9	14.0	14.0	14.0
O_2 - % Vol.	5.3	5.2	5.2	5.2
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.8	80.8	80.8	80.8

Fo" 1.121

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METCO ENVIRONMENTAL

ORSAT ANALYSIS DATA FORM

Job Number: 99-95 GIB3 Sample Location: Unit 3 Stack

Job Name: EPRI / Cinergy Analytical Method: 3B

Location: Owensville, In Sample Type: Single point or Multi point; Grab or Integrated

Date: 10/14/99 Leak Check: Time: 4:00 (min. 4 minutes) Rate: 0.000

Operator: Hefley Ambient Air Check:

CO_2 - % Vol.	0.0
O_2 - % Vol.	20.9
N_2 - % Vol.	79.1

Run Number 1 Run Time 0906-1303	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	13.2	13.2	13.2	13.2
O_2 - % Vol.	5.8	5.9	5.9	5.9
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	~~80.8~~ 81.0	~~80.8~~ 80.9	80.9	80.9

Fo = 1.136

Run Number 3 Run Time	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	13.2	13.2	13.1	13.2
O_2 - % Vol.	6.0	6.0	6.0	6.0
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.8	80.8	80.8	80.8

Fo = 1.129

Run Number 4 Run Time	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	13.4	13.4	13.4	13.4
O_2 - % Vol.	5.8	5.8	5.8	5.8
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.8	80.8	80.8	80.8

Fo = 1.127

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APPENDIX C

Calibration Data

Equipment	Calibration Factor	Calibration Date
Pitot Tube #45-12-1	0.802	08/16/99
Pitot Tube #M-2	0.808	10/04/99
Pitot Tube #M-5	0.808	10/04/99
Pitot Tube #M-8	0.810	10/04/99
Probe Tip #TFE-1-6	0.174	10/04/99
Probe Tip #TFE-1-7	0.200	10/04/99
Probe Tip #TFE-2-6	0.175	10/05/99
Probe Tip #TFE-2-7	0.200	10/05/99
Probe Tip #TFE-2-8	0.235	10/05/99
Dry Gas Meter #27-2	1.029	08/13/99
Stack Unit Orifice #27-2		08/14/99
Digital Temperature Indicator #27-2		08/13/99
Dry Gas Meter #29-1	1.000	10/04/99
Stack Unit Orifice #29-1		10/05/99
Digital Temperature Indicator #29-1		10/04/99
Barometer #19-1		10/04/99

APPENDIX C

Post Test

Calibration Data

Equipment	Calibration Factor	Calibration Date
Pitot Tube #45-12-1	0.802	11/19/99
Pitot Tube #M-2	0.810	11/12/99
Pitot Tube #M-5	0.806	11/19/99
Pitot Tube #M-8	0.810	11/22/99
Probe Tip #TFE-1-6	0.174	11/19/99
Probe Tip #TFE-1-7	0.199	11/19/99
Probe Tip #TFE-2-6	0.172	11/19/99
Probe Tip #TFE-2-7	0.195	11/19/99
Probe Tip #TFE-2-8	0.234	11/19/99
Dry Gas Meter #27-2	1.015	11/07/99
Stack Unit Orifice #27-2		11/08/99
Digital Temperature Indicator #27-2		11/07/99
Dry Gas Meter #29-1	1.000	11/22/99
Stack Unit Orifice #29-1		11/22/99
Digital Temperature Indicator #29-1		11/22/99
Barometer #19-1		11/22/99

PITOT TUBE CALIBRATION

Date: 8/16/99

Time: 0830

Pitot No.: 45-12-1

T_s: 70 °F

Pitot Dimensions: 12' x 3/8"

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	Calibration Standard End	√Standard Average	High	√High	Cal. Factor	Low	√Low	Cal. Factor
7	20	0.10	0.10	0.316	0.15	0.387	0.808	0.15	0.387	0.808
14	30	0.22	0.22	0.469	0.34	0.583	0.796	0.34	0.583	0.796
20	40	0.34	0.34	0.583	0.52	0.721	0.801	0.51	0.714	0.808
28	50	0.54	0.54	0.735	0.84	0.917	0.794	0.84	0.917	0.794
35	60	0.80	0.80	0.894	1.20	1.095	0.808	1.20	1.095	0.808
41	70	1.00	1.00	1.00	1.55	1.245	0.795	1.55	1.245	0.795
50	80	1.30	1.30	1.140	1.95	1.396	0.808	1.90	1.378	0.819
62	90	1.60	1.60	1.265	2.40	1.549	0.808	2.40	1.549	0.808
28	50	0.54	0.54	0.735	0.84	0.917	0.794	0.83	0.911	0.799
28	50	0.54	0.54	0.735	0.84	0.917	0.794	0.84	0.917	0.794
Average							0.802			0.805

Summary of Results:

Normal high side calibration factor 0.802

variation + 0.75%

variation - 0.00%

Normal low side calibration factor 0.805

variation + 1.74%

variation - 1.37%

Calibrator: Jim Brown 274

Checked By: Shane Lee 261

PITOT TUBE CALIBRATION

Date: 10-4-99

Time: 1030

Pitot No.: M2

T_s: 72 °F

Pitot Dimensions: 3/8" tips

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	Calibration Standard End	√Standard Average	High	√High	Cal. Factor	Low	√Low	Cal. Factor
7	20	0.10	0.10	0.316	0.15	0.387	0.808	0.15	0.387	0.808
14	30	0.22	0.22	0.469	0.33	0.574	0.808	0.33	0.574	0.808
20	40	0.34	0.34	0.583	0.51	0.714	0.808	0.51	0.714	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
35	60	0.80	0.80	0.894	1.20	1.095	0.808	1.20	1.095	0.808
41	70	1.00	1.00	1.000	1.50	1.225	0.808	1.50	1.225	0.808
50	80	1.30	1.30	1.140	1.95	1.396	0.808	1.95	1.396	0.808
62	90	1.60	1.60	1.265	2.40	1.549	0.808	2.40	1.549	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
Average							0.808			0.808

Summary of Results:

Normal high side calibration factor 0.808

variation + 0.00%

variation - 0.00%

Normal low side calibration factor 0.808

variation + 0.00%

variation - 0.00%

Calibrator: Jason Brown 274

Checked By: Jason Conway #273

PITOT TUBE CALIBRATION

Date: 10-4-99

Time: 1330

Pitot No.: M5

T_s: 72 °F

Pitot Dimensions: 3/8" hps

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	Calibration Standard End	√Standard Average	High	√High	Cal. Factor	Low	√Low	Cal. Factor
7	20	0.10	0.10	0.316	0.15	0.387	0.808	0.15	0.387	0.808
14	30	0.22	0.22	0.469	0.33	0.574	0.808	0.33	0.574	0.808
20	40	0.34	0.34	0.583	0.51	0.714	0.808	0.51	0.714	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
35	60	0.80	0.80	0.894	1.20	1.095	0.808	1.20	1.095	0.808
41	70	1.00	1.00	1.000	1.50	1.225	0.808	1.50	1.225	0.808
50	80	1.30	1.30	1.140	1.95	1.396	0.808	1.95	1.396	0.808
62	90	1.60	1.60	1.265	2.40	1.549	0.808	2.40	1.549	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
Average							0.808			0.808

Summary of Results:

Normal high side calibration factor 0.808

variation + 0.00%

variation - 0.00%

Normal low side calibration factor 0.808

variation + 0.00%

variation - 0.00%

Calibrator: Jason Brown 274

Checked By: Jason Conway #273

PITOT TUBE CALIBRATION

Date: 10-4-99

Time: 1450

Pitot No.: M8

T_s: 72 °F

Pitot Dimensions: 3/8" tips

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	Calibration Standard End	√Standard Average	High	√High	Cal. Factor	Low	√Low	Cal. Factor
7	20	0.10	0.10	0.316	0.15	0.387	0.808	0.15	0.387	0.808
14	30	0.22	0.22	0.469	0.32	0.566	0.821	0.32	0.566	0.821
20	40	0.34	0.34	0.583	0.51	0.714	0.808	0.51	0.714	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
35	60	0.80	0.80	0.894	1.20	1.095	0.808	1.20	1.095	0.808
41	70	1.00	1.00	1.000	1.50	1.225	0.808	1.50	1.225	0.808
50	80	1.30	1.30	1.140	1.95	1.396	0.808	1.95	1.396	0.808
62	90	1.60	1.60	1.265	2.40	1.549	0.808	2.40	1.549	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
Average							0.810			0.810

Summary of Results:

Normal high side calibration factor 0.810

variation + 1.36%

variation - 0.25%

Normal low side calibration factor 0.810

variation + 1.36%

variation - 0.25%

Calibrator: Jason Brown 274

Checked By: Jason Conway #273

METCO ENVIRONMENTAL

✓ AM 107

NOZZLE CALIBRATION

Nozzle Set No. TFE-1

Date 10-4-99 Calibrator: JASON BROWN 374

	4	6	7	8	10	12
Reading 1	0.114	0.175	0.199	0.226	0.310	0.362
Reading 2	0.116	0.175	0.198	0.227	0.309	0.363
Reading 3	0.114	0.173	0.199	0.226	0.309	0.363
Reading 4	0.114	0.173	0.200	0.226	0.310	0.362
Reading 5	0.116	0.175	0.200	0.227	0.308	0.364
Reading 6	0.117	0.175	0.200	0.227	0.309	0.364
Reading 7	0.118	0.174	0.202	0.226	0.309	0.364
Reading 8	0.116	0.173	0.200	0.225	0.310	0.363
Reading 9	0.118	0.175	0.200	0.226	0.309	0.363
Reading 10	0.118	0.175	0.199	0.227	0.309	0.363
Average	0.116 ✓	0.174 ✓	0.200 ✓	0.226 ✓	0.309	0.363

	14	—	—	—	—	—
Reading 1	0.430					
Reading 2	0.432					
Reading 3	0.430					
Reading 4	0.430					
Reading 5	0.432					
Reading 6	0.431					
Reading 7	0.432					
Reading 8	0.432					
Reading 9	0.432					
Reading 10	0.431					
Average	0.431					

METCO ENVIRONMENTAL

NOZZLE CALIBRATION

Nozzle Set No. TFE-2

Date 10-5-99 Calibrator: JASON BROWN 274

	4	6	7	8	10	12
Reading 1	0.117	0.175	0.200	0.234	0.308	0.362
Reading 2	0.116	0.175	0.201	0.234	0.309	0.362
Reading 3	0.118	0.177	0.200	0.235	0.312	0.362
Reading 4	0.116	0.176	0.199	0.236	0.311	0.360
Reading 5	0.114	0.174	0.199	0.234	0.312	0.362
Reading 6	0.116	0.174	0.199	0.234	0.311	0.361
Reading 7	0.115	0.175	0.200	0.235	0.312	0.361
Reading 8	0.117	0.175	0.201	0.235	0.308	0.362
Reading 9	0.115	0.176	0.200	0.235	0.312	0.361
Reading 10	0.114	0.176	0.200	0.235	0.310	0.363
Average	0.116	0.175	0.200	0.235	0.311	0.362

	14	—	—	—	—	—
Reading 1	0.434					
Reading 2	0.430					
Reading 3	0.434					
Reading 4	0.432					
Reading 5	0.430					
Reading 6	0.430					
Reading 7	0.434					
Reading 8	0.434					
Reading 9	0.430					
Reading 10	0.433					
Average	0.432					

METCO ENVIRONMENTAL

Dry Gas Meter Calibration

Dry Gas Meter No.: 27-2

Date: 8-13-99

ΔH ("H_2O)	C_{DG}
0.5	1.036
1.0	1.023
1.5	1.025
2.0	1.033
3.0	1.034
4.0	1.024
Average	1.029

Variation: + 0.68% ✓

- 0.58% ✓

Calibrator: Shane Lee 261

Checked By: Mike Bass 243

C_{DG} @ 2 liters/min. = 1.033

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 8-13-99

Calibrator: Shane Lee

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

Run No.: 1 @ 0.5" H.O

P_b: 29.20 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1512	5.315 cf	73 °F	-1.20 "H_2O
Start	1500	0.000 cf	73 °F	-1.20 "H_2O
Avg.	12	5.315 cf	73 °F	-1.20 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	312.440 cf	73 °F	73 °F	0.50 "H_2O
Start	307.333 cf	72 °F	72 °F	0.50 "H_2O
Avg.	5.107 cf	73 °F		0.50 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 5.315 \left[\frac{29.20 + \frac{-1.20}{13.6}}{73 + 460}\right] \times 1.000\ (C_f) = 5.124 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 5.107 \left[\frac{29.20 + \frac{0.50}{13.6}}{73 + 460}\right] = 4.944 \text{ dcsf}$$

$$C_{DG} = \frac{5.124}{4.944} = \boxed{1.036}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 8-13-99

Calibrator: Shane Lee

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

Run No.: 1 @ 1.0 "H_2O

P_b: 29.20 "Hg

Control Module Vacuum: 5 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1419	5.168 cf	73 °F	-1.80 "H_2O
Start	1410	0.000 cf	73 °F	-1.80 "H_2O
Avg.	9	5.168 cf	73 °F	-1.80 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	307.007 cf	73 °F	72 °F	1.00 "H_2O
Start	301.998 cf	72 °F	71 °F	1.00 "H_2O
Avg.	5.009 cf	72 °F		1.00 "H_2O

$$Wet\ Test\ Meter\ Vm_{std} = 17.65 \times 5.168 \left[\frac{29.20 + \frac{-1.80}{13.6}}{73 + 460}\right] \times 1.000\ (C_f) = 4.975\ dcsf$$

$$Dry\ Gas\ Meter\ Vm_{std} = 17.65 \times 5.009 \left[\frac{29.20 + \frac{1.00}{13.6}}{72 + 460}\right] = 4.865\ dcsf$$

$$C_{DG} = \frac{4.975}{4.865} = \boxed{1.023}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 8-13-99

Calibrator: Shane Lee

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

Run No.: 1 @ 1.5 "H_2O

P_b: 29.20 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1529	10.355 cf	73 °F	-2.20 "H_2O
Start	1515	0.000 cf	73 °F	-2.20 "H_2O
Avg.	14	10.355 cf	73 °F	-2.20 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	322.948 cf	77 °F	73 °F	1.50 "H_2O
Start	312.925 cf	73 °F	73 °F	1.50 "H_2O
Avg.	10.023 cf	74 °F		1.50 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.355 \left[\frac{29.20 + \frac{-2.20}{13.6}}{73 + 460} \right] \times 1.000\ (C_f) = 9.957 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.023 \left[\frac{29.20 + \frac{1.50}{13.6}}{74 + 460} \right] = 9.710 \text{ dcsf}$$

$$C_{DG} = \frac{9.957}{9.710} = \boxed{1.025}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 8-13-99

Calibrator: Shane Lee

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

Run No.: 1 @ 2.0"/4.0

P_b: 29.20 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1605	10.514 cf	73 °F	-2.60 "H_2O
Start	1552	0.000 cf	73 °F	-2.60 "H_2O
Avg.	13	10.514 cf	73 °F	-2.60 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	343.568 cf	80 °F	76 °F	2.00 "H_2O
Start	333.427 cf	77 °F	73 °F	2.00 "H_2O
Avg.	10.141 cf	77 °F		2.00 "H_2O

$$Wet\ Test\ Meter\ Vm_{std} = 17.65 \times 10.514 \left[\frac{29.20 + \frac{-2.60}{13.6}}{73 + 460} \right] \times 1.000\ (C_f) = 10.100\ dcsf$$

$$Dry\ Gas\ Meter\ Vm_{std} = 17.65 \times 10.141 \left[\frac{29.20 + \frac{2.00}{13.6}}{77 + 460} \right] = 9.782\ dcsf$$

$$C_{DG} = \frac{10.100}{9.782} = \boxed{1.033}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 8-13-99

Calibrator: Shane Lee

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

Run No.: 1 @ 30" H_2O

P_b: 29.20 "Hg

Control Module Vacuum: 50 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1618	11.961 cf	73 °F	-3.60 "H_2O
Start	1607	0.000 cf	73 °F	-3.60 "H_2O
Avg.	11	11.961 cf	73 °F	-3.60 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	355.643 cf	83 °F	75 °F	3.00 "H_2O
Start	344.157 cf	78 °F	74 °F	3.00 "H_2O
Avg.	11.486 cf	78 °F		3.00 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 11.961 \left[\frac{29.20 + \frac{-3.60}{13.6}}{73 + 460}\right] \times 1.000\ (C_f) = 11.461 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 11.486 \left[\frac{29.20 + \frac{3.00}{13.6}}{78 + 460}\right] = 11.086 \text{ dcsf}$$

$$C_{DG} = \frac{11.461}{11.086} = \boxed{1.034}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 8-13-99

Calibrator: Shane Lee

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

Run No.: 1 @ 4.0" H2O

P_b: 29.20 "Hg

Control Module Vacuum: 5.0 "Hg

	Wet Test Meter (No. 3)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1630	10.708 cf	73 °F	-4.30 "H_2O	366.588 cf	84 °F	75 °F	4.00 "H_2O
Start	1620	0.000 cf	73 °F	-4.30 "H_2O	356.234 cf	81 °F	75 °F	4.00 "H_2O
Avg.	10	10.708 cf	73 °F	-4.30 "H_2O	10.354 cf	79 °F		4.00 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.708 \left[\frac{29.20 + \frac{-4.30}{13.6}}{73 + 460}\right] \times 1.000 \ (C_f) = 10.242 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.354 \left[\frac{29.20 + \frac{4.00}{13.6}}{79 + 460}\right] = 10.000 \text{ dcsf}$$

$$C_{DG} = \frac{10.242}{10.000} = \boxed{1.024}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 8-13-99

Calibrator: Shane Lee

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

Run No.: 1 @ 2.0 l/min.

P_b: 29.20 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1711	2.700 cf	73 °F	-0.20 "H_2O
Start	1636	0.000 cf	73 °F	-0.20 "H_2O
Avg.	35	2.700 cf	73 °F	-0.20 "H_2O

Dry Gas Meter

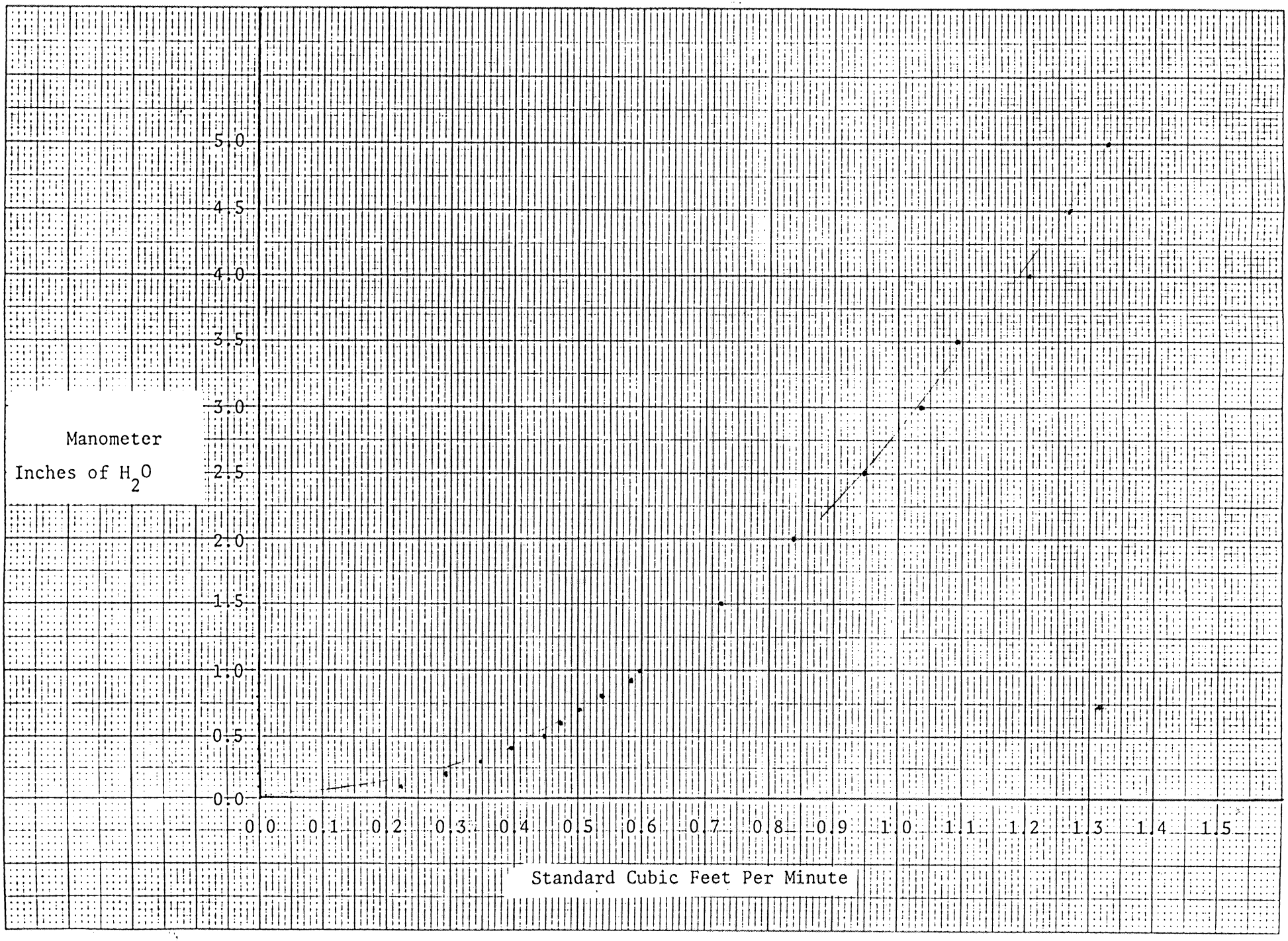
	Meter Reading	Temp. In	Temp. Out	P_m
End	369.641 cf	73 °F	72 °F	0.02 "H_2O
Start	367.018 cf	79 °F	75 °F	0.02 "H_2O
Avg.	2.623 cf	75 °F		0.02 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 2.700 \left[\frac{29.20 + \frac{-0.20}{13.6}}{73 + 460}\right] \times 1.000\ (C_f) = 2.609 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 2.623 \left[\frac{29.20 + \frac{0.02}{13.6}}{75 + 460}\right] = 2.527 \text{ dcsf}$$

$$C_{DG} = \frac{2.609}{2.527} = \boxed{1.033}$$

CM 27-2 1029


Manometer
Inches of H_2O
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
Standard Cubic Feet Per Minute

METCO ENVIRONMENTAL

DIGITAL TEMPERATURE INDICATOR NO. 27-2

CALIBRATION DATA

Date: 8-13-99

Media	Time	Mercury Temperature (°F)	DTI (°F)
Ambient Air	0944	72	72
Ice Bath	0947	32	33
Boiling Water	0958	212	211
Oven	1003	250	250
Oven	1007	300	300
Oven	1010	350	351
Oven	1014	375	375

Meter Adjusted? Yes _____ No ✓

Calibrator: Shane Lee 261

Checked By: Mike Bass 263

METCO ENVIRONMENTAL

Dry Gas Meter Calibration

Dry Gas Meter No.: 29-1

Date: 10-21-99

ΔH ("H_2O)	C_{DG}
0.5	1.000
1.0	1.001
1.5	0.999
2.0	0.995
3.0	0.998
4.0	1.009
Average	1.000

Variation: + 0.90%

- 0.50%

Calibrator: Shane Lee 261

Checked By: Bill Lyley #107

C_{DG} @ 2 liters/min. = 1.017

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 10-4-99

Calibrator: Shane Lee

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

Run No.: 1 @ 0.5" H_2O

P_b: 29.28 "Hg

Control Module Vacuum: 50 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading		Temp.		P_m	
End	1423	5.380	cf	75	°F	-1.10	"H_2O
Start	1409	0.000	cf	75	°F	-1.10	"H_2O
Avg.	14	5.380	cf	75	°F	-1.10	"H_2O

Dry Gas Meter

	Meter Reading		Temp. In		Temp. Out		P_m	
End	377.116	cf	75	°F	73	°F	0.50	"H_2O
Start	371.767	cf	74	°F	72	°F	0.50	"H_2O
Avg.	5.349	cf	74	°F			0.50	"H_2O

$$Wet\ Test\ Meter\ Vm_{std} = 17.65 \times 5.380 \left[\frac{29.28 + \frac{-1.10}{13.6}}{75 + 460}\right] \times 1.000\ (C_f) = \cancel{5.192}\ 5.183\ dcsf$$

$$Dry\ Gas\ Meter\ Vm_{std} = 17.65 \times 5.349 \left[\frac{29.28 + \frac{0.50}{13.6}}{74 + 460}\right] = 5.183\ dcsf$$

$$C_{DG} = \frac{\cancel{5.192}\ 5.183}{5.183} = \boxed{\cancel{1.002}\ 1.000}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 10-4-99

Calibrator: Shane Lee

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

Run No.: 1 @ 1.0" H_2O

P_b: 29.28 "Hg

Control Module Vacuum: 5.0 "Hg

	Wet Test Meter (No. 3)					Dry Gas Meter				
	Time	Meter Reading	Temp.	P_m		Meter Reading	Temp. In	Temp. Out	P_m	
End	1436	5.400 cf	75 °F	-1.60	"H_2O	383.463 cf	75 °F	73 °F	1.00	"H_2O
Start	1426	0.000 cf	75 °F	-1.60	"H_2O	378.114 cf	76 °F	73 °F	1.00	"H_2O
Avg.	10	5.400 cf	75 °F	-1.60	"H_2O	5.349 cf	74 °F		1.00	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 5.400 \left[\frac{29.28 + \frac{-1.60}{13.6}}{75 + 460}\right] \times 1.000\ (C_f) = 5.195 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 5.349 \left[\frac{29.28 + \frac{1.00}{13.6}}{74 + 460}\right] = 5.190 \text{ dcsf}$$

$$C_{DG} = \frac{5.195}{5.190} = \boxed{1.001}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 10-4-99

Calibrator: Shane Lee

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

Run No.: 1 @ 1.5" H.O

P_b: 29.28 "Hg

Control Module Vacuum: 50 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1454	10.668 cf	75 °F	-2.10 "H_2O
Start	1438	0.000 cf	75 °F	-1.90 "H_2O
Avg.	16	10.668 cf	75 °F	-2.00 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	384.790 cf	73 °F	74 °F	1.50 "H_2O
Start	384.223 cf	77 °F	73 °F	1.50 "H_2O
Avg.	10.567 cf	74 °F		1.50 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.668 \left[\frac{29.28 + \frac{-2.00}{13.6}}{75 + 460}\right] \times 1.000 \ (C_f) = 10.253 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.567 \left[\frac{29.28 + \frac{1.50}{13.6}}{74 + 460}\right] = 10.265 \text{ dcsf}$$

$$C_{DG} = \frac{10.253}{10.265} = \boxed{0.999}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 10-4-99

Calibrator: Shane Lee

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

Run No.: 1 @ 2.0" H_2O

P_b: 29.28 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)	Time	Meter Reading		Temp.		P_m		Dry Gas Meter	Meter Reading		Temp. In		Temp. Out		P_m	
End	1510	11.395	cf	75	°F	-2.40	"H_2O		406.546	cf	70	°F	76	°F	2.00	"H_2O
Start	1456	0.000	cf	75	°F	-2.40	"H_2O		395.246	cf	75	°F	75	°F	2.00	"H_2O
Avg.	14	11.395	cf	75	°F	-2.40	"H_2O		11.300	cf	74		°F		2.00	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 11.395 \left[\frac{29.28 + \frac{-2.40}{13.6}}{75 + 460}\right] \times 1.000\ (C_f) = 10.941 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 11.300 \left[\frac{29.28 + \frac{2.00}{13.6}}{74 + 460}\right] = 10.991 \text{ dcsf}$$

$$C_{DG} = \frac{10.941}{10.991} = \boxed{0.995}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 10-4-99

Calibrator: Shane [illegible]

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

Run No.: 1 @ 30 "H2O

P_b: 29.28 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading		Temp.		P_m	
End	1524	10.800	cf	75	°F	-3.00	"H_2O
Start	1513	0.000	cf	75	°F	-3.00	"H_2O
Avg.	11	10.800	cf	75	°F	-3.00	"H_2O

Dry Gas Meter

	Meter Reading		Temp. In		Temp. Out		P_m	
End	417.690	cf	67	°F	77	°F	3.00	"H_2O
Start	407.045	cf	75	°F	76	°F	3.00	"H_2O
Avg.	10.645	cf	74	°F			3.00	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.800 \left[\frac{29.28 + \frac{-3.00}{13.6}}{75 + 460}\right] \times 1.000\ (C_f) = 10.354 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.645 \left[\frac{29.28 + \frac{3.00}{13.6}}{74 + 460}\right] = \cancel{10.360}\ 10.380 \text{ dcsf}$$

$$C_{DG} = \frac{10.354}{\cancel{10.360}\ 10.380} = \boxed{\cancel{0.999}\ 0.998}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 10-4-99

Calibrator: Shane Lee

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

Run No.: 1 @ 4.0" H2O

P_b: 29.28 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)	Time	Meter Reading	Temp.	P_m	Dry Gas Meter	Meter Reading	Temp. In	Temp. Out	P_m
End	1547	10.947 cf	75 °F	-4.00 "H_2O"		430.335 cf	68 °F	77 °F	4.00 "H_2O"
Start	1537	0.000 cf	75 °F	-3.80 "H_2O"		419.698 cf	78 °F	77 °F	4.00 "H_2O"
Avg.	10	10.947 cf	75 °F	-3.90 "H_2O"		10.637 cf	75 °F		4.00 "H_2O"

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.947 \left[\frac{29.28 + \frac{-3.90}{13.6}}{75 + 460}\right] \times 1.000\ (C_f) = 10.471 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.637 \left[\frac{29.28 + \frac{4.00}{13.6}}{75 + 460}\right] = 10.378 \text{ dcsf}$$

$$C_{DG} = \frac{10.471}{10.378} = \boxed{1.009}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 10-4-99

Calibrator: Shane Lee

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

Run No.: 1 @ 2.0 L/min

P_b: 29.28 "Hg

Control Module Vacuum: 50 "Hg

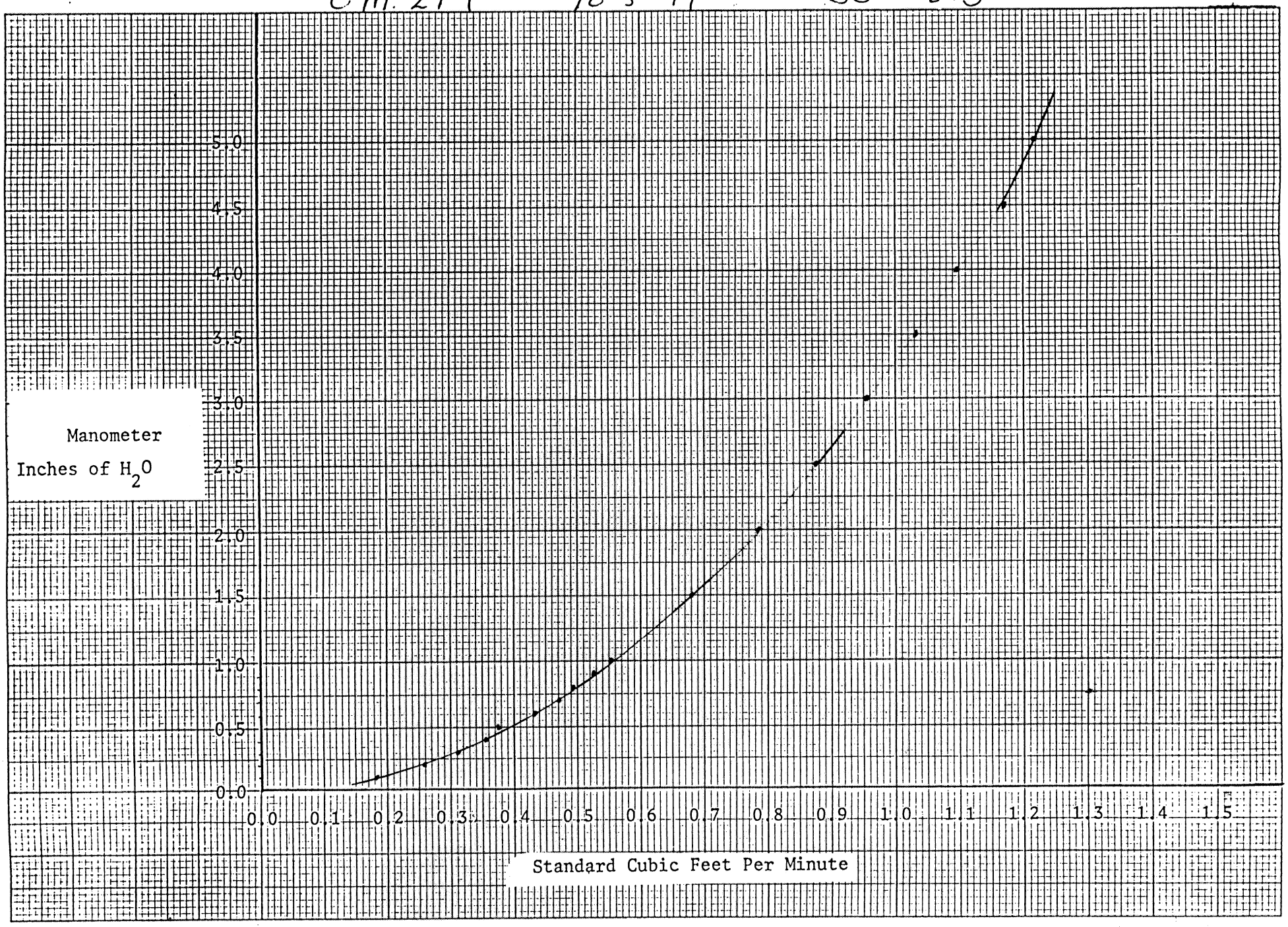
	Wet Test Meter (No. 3)					Dry Gas Meter				
	Time	Meter Reading	Temp.	P_m		Meter Reading	Temp. In	Temp. Out	P_m	
End	1622	2.210 cf	75	°F	-0.20 "H_2O	432.153 cf	81 °F	76 °F	0.01	"H_2O
Start	1606	0.000 cf	75	°F	-0.20 "H_2O	430.968 cf	78 °F	76 °F	0.01	"H_2O
Avg.	16	2.210 cf	75	°F	-0.20 "H_2O	2.185 cf	78	°F	0.01	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 2.210 \left[\frac{29.28 + \frac{-0.20}{13.6}}{75 + 460}\right] \times 1.000\ (C_f) = 2.134 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 2.185 \left[\frac{29.28 + \frac{0.01}{13.6}}{78 + 460}\right] = 2.099 \text{ dcsf}$$

$$C_{DG} = \frac{2.134}{2.099} = \boxed{1.017}$$

CM. 29-1 10-5-99 JC # 273



METCO ENVIRONMENTAL

DIGITAL TEMPERATURE INDICATOR NO. 29-1

CALIBRATION DATA

Date: 10-4-99

Media	Time	Mercury Temperature (°F)	DTI (°F)
Ambient Air	1330	70	70
Ice Bath	1337	32	32
Boiling Water	1345	212	212
Oven	1353	250	250
Oven	1355	300	301
Oven	1358	350	350
Oven	1359	375	376

Meter Adjusted? Yes _____ No ✓

Calibrator: Shane Lee #261

Checked By: Bill Hufty #101

METCO ENVIRONMENTAL

BAROMETER CALIBRATION

Barometer No. 19-1

Date: 10-4-99

Time: 1520

Barometric Pressure @ Addison Airport @ 719 ft.	=	30.210
	-	0.719
Absolute Pressure @ Addison Airport	=	29.491
	+	0.083
Absolute Pressure @ METCO @ 636 ft.	=	29.574
Barometer Reading	=	29.610
Variation	=	0.036

Barometer Adjusted? Yes ✓ No _____

Shane Lee 261

Signature of Calibrator

PITOT TUBE CALIBRATION

Date: 11-19-99

Time: 0930

Pitot No.: 45-12-1

T_s: 70 °F

Pitot Dimensions: 12' x 3/8"

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	Calibration Standard End	$\sqrt{\text{Standard Average}}$	High	$\sqrt{\text{High}}$	Cal. Factor	Low	$\sqrt{\text{Low}}$	Cal. Factor
7	20	0.10	0.10	0.316	0.15	0.387	0.808 ✓	0.15 ✓	0.316	0.808 ✓
14	30	0.22	0.22	0.469	0.33	0.574	0.808 ✓	0.33	0.574	0.808 ✓
20	40	0.34	0.34	0.583	0.52	0.721	0.801 ✓	0.52	0.721	0.801 ✓
28	50	0.54	0.54	0.735	0.82	0.906	0.803 ✓	0.81	0.900	0.808 ✓
35	60	0.80	0.80	0.894	1.25	1.118	0.792 ✓	1.20	1.095	0.808 ✓
41	70	1.00	1.00	1.000	1.55	1.245	0.795 ✓	1.50	1.225	0.808 ✓
50	80	1.30	1.30	1.140	1.95	1.396	0.808 ✓	1.95	1.396	0.808 ✓
62	90	1.60	1.60	1.265	2.45	1.565	0.800 ✓	2.40	1.549	0.808 ✓
28	50	0.54	0.54	0.735	0.82	0.906	0.803	0.81	0.900	0.808
28	50	0.54	0.54	0.735	0.82	0.906	0.803	0.81	0.900	0.808
Average							0.802			0.807

Summary of Results:

Normal high side calibration factor 0.802 ✓

variation + 0.75% ✓

variation - 1.25% ✓

Normal low side calibration factor 0.807 ✓

variation + 0.12% ✓

variation - 0.74% ✓

Calibrator: [signature] #281

Checked By: [signature] 236

PITOT TUBE CALIBRATION

Date: 11-12-99

Time: 1500

Pitot No.: M2

T_s: 75 °F

Pitot Dimensions: 3/8" tips

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	Calibration Standard End	√Standard Average	High	√High	Cal. Factor	Low	√Low	Cal. Factor
7	20	0.10	0.10	0.316	0.15	0.387	0.808	0.15	0.387	0.808
14	30	0.22	0.22	0.469	0.33	0.574	0.808	0.33	0.574	0.808
20	40	0.34	0.34	0.583	0.51	0.714	0.808	0.51	0.714	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
35	60	0.80	0.80	0.894	1.20	1.095	0.808	1.20	1.095	0.808
41	70	1.00	1.00	1.000	1.45	1.204	0.822	1.45	1.204	0.822
50	80	1.30	1.30	1.140	1.95	1.396	0.808	1.95	1.396	0.808
62	90	1.60	1.60	1.265	2.40	1.549	0.808	2.40	1.549	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
Average							0.810			0.810

Summary of Results:

Normal high side calibration factor 0.810

variation + 1.48%

variation - 0.25%

Normal low side calibration factor 0.810

variation + 1.48%

variation - 0.25%

Calibrator: Jason Brim #274

Checked By: Jason Conway #273

PITOT TUBE CALIBRATION

Date: 11-19-99

Time: 1500

Pitot No.: M5

T_s: 69 °F

Pitot Dimensions: 3/8" tips

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	Calibration Standard End	√Standard Average	High	√High	Cal. Factor	Low	√Low	Cal. Factor
7	20	0.10	0.10	0.316	0.15	0.387	0.808	0.15	0.387	0.808
14	30	0.22	0.22	0.469	0.34	0.583	0.796	0.34	0.583	0.796
20	40	0.34	0.34	0.583	0.51	0.714	0.808	0.52	0.721	0.801
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
35	60	0.80	0.80	0.894	1.20	1.095	0.808	1.20	1.095	0.808
41	70	1.00	1.00	1.000	1.50	1.225	0.808	1.50	1.225	0.808
50	80	1.30	1.30	1.140	1.95	1.396	0.808	1.95	1.396	0.808
62	90	1.60	1.60	1.265	2.45	1.565	0.800	2.45	1.565	0.800
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
Average							0.806			0.805

Summary of Results:

Normal high side calibration factor 0.806

variation + 0.25%

variation - -1.2%

Normal low side calibration factor 0.805

variation + 0.37%

variation - -1.1%

Calibrator: Scott Hart

Checked By: Mike Bass

PITOT TUBE CALIBRATION

Date: 11-22-99

Time: 0925

Pitot No.: m8

T_s: 70 °F

Pitot Dimensions: 3/8" tips

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	Calibration Standard End	√Standard Average	High	√High	Cal. Factor	Low	√Low	Cal. Factor
7	20	0.10	0.10	0.316	0.15	0.387	0.808	0.15	0.387	0.808
14	30	0.22	0.22	0.469	0.32	0.566	0.821	0.32	0.566	0.821
20	40	0.34	0.34	0.583	0.51	0.714	0.808	0.51	0.714	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
35	60	0.80	0.80	0.894	1.20	1.095	0.808	1.20	1.095	0.808
41	70	1.00	1.00	1.000	1.50	1.225	0.808	1.50	1.225	0.808
50	80	1.30	1.30	1.140	1.95	1.396	0.808	1.95	1.396	0.808
62	90	1.60	1.60	1.265	2.40	1.549	0.808	2.40	1.549	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
28	50	0.54	0.54	0.735	0.81	0.900	0.808	0.81	0.900	0.808
Average							0.810			0.810

Summary of Results:

Normal high side calibration factor 0.810

variation + 1.36%

variation - 0.25%

Normal low side calibration factor 0.810

variation + 1.36%

variation - 0.25%

Calibrator: Scott Hart #268

Checked By: Jason Cannizzy #273

METCO ENVIRONMENTAL

NOZZLE CALIBRATION

Nozzle Set No. TFE-1

Date 11-19-99 Calibrator: Shane Lee 261

	4	6	7	8	10	12
Reading 1	0.117	0.175	0.200	0.234	0.309	0.362
Reading 2	0.116	0.174	0.200	0.232	0.308	0.360
Reading 3	0.118	0.173	0.198	0.236	0.308	0.359
Reading 4	0.118	0.173	0.196	0.235	0.307	0.363
Reading 5	0.120	0.174	0.199	0.235	0.308	0.362
Reading 6	0.119	0.173	0.200	0.235	0.306	0.359
Reading 7	0.117	0.173	0.199	0.234	0.306	0.360
Reading 8	0.116	0.174	0.199	0.236	0.308	0.359
Reading 9	0.117	0.175	0.200	0.235	0.308	0.361
Reading 10	0.118	0.175	0.200	0.236	0.306	0.360
Average	0.118 ✓	0.174 ✓	0.199 ✓	0.235 ✓	0.307 ✓	0.361 ✓

	14	—	—	—	—	—
Reading 1	0.429					
Reading 2	0.429					
Reading 3	0.430					
Reading 4	0.429					
Reading 5	0.431					
Reading 6	0.428					
Reading 7	0.429					
Reading 8	0.429					
Reading 9	0.431					
Reading 10	0.430					
Average	0.430 ✓					

METCO ENVIRONMENTAL

NOZZLE CALIBRATION

Nozzle Set No. TFF-2

Date 11-19-99 Calibrator: Mike Bass

	4	6a	7	8	10	12
Reading 1	0.116	0.174	0.193	0.235	0.309	0.363
Reading 2	0.115	0.170	0.195	0.232	0.309	0.362
Reading 3	0.114	0.170	0.195	0.232	0.310	0.363
Reading 4	0.114	0.172	0.194	0.234	0.309	0.363
Reading 5	0.115	0.174	0.197	0.235	0.308	0.361
Reading 6	0.115	0.173	0.196	0.235	0.309	0.361
Reading 7	0.115	0.172	0.197	0.235	0.311	0.362
Reading 8	0.114	0.174	0.195	0.234	0.310	0.362
Reading 9	0.116	0.171	0.196	0.234	0.309	0.363
Reading 10	0.115	0.172	0.195	0.233	0.309	0.363
Average	0.115	0.172	0.195	0.234	0.309	0.362

	14	—	—	—	—	—
Reading 1	0.435					
Reading 2	0.433					
Reading 3	0.434					
Reading 4	0.435					
Reading 5	0.433					
Reading 6	0.434					
Reading 7	0.433					
Reading 8	0.432					
Reading 9	0.433					
Reading 10	0.432					
Average	0.433					

METCO ENVIRONMENTAL

Dry Gas Meter Calibration

Dry Gas Meter No.: 27-2

Date: 11-07-99

ΔH ("H_2O)	C_{DG}
0.5	~~1.012~~ 1.015
1.0	1.018
1.5	1.022
2.0	1.019
3.0	1.011
4.0	1.002
Average	1.015

Variation: + 0.69%

- 1.28%

Calibrator: M. Buss

Checked By: Pam Brown

C_{DG} @ 2 liters/min. = _____

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 11-07-99

Calibrator: M. Buss

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

Run No.: 1 @ 0.5 " H_2O

P_b: 29.32 "Hg

Control Module Vacuum: 2.00 "Hg

Wet Test Meter (No. 3)					Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1310	5.015 cf	74 °F	-0.90 "H_2O	572.057 cf	77 °F	76 °F	0.50 "H_2O
Start	1257	0.000 cf	74 °F	-0.90 "H_2O	567.114 cf	76 °F	75 °F	0.50 "H_2O
Avg.	13	5.015 cf	74 °F	-0.900 "H_2O	4.943 cf	76 °F		0.500 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 5.015 \left[\frac{29.32 + \frac{-0.900}{13.6}}{74 + 460}\right] \times 1.000 \ (C_f) = 4.849 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 4.943 \left[\frac{29.32 + \frac{0.500}{13.6}}{76 + 460}\right] = 4.778 \text{ dcsf}$$

$$C_{DG} = \frac{4.849}{4.778} = \boxed{1.015}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Calibrator: M. Bass

Date: 11-07-99

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

Run No.: 1 @ 1.0" H_2O

P_b: 29.32 "Hg

Control Module Vacuum: 2.00 "Hg

	Wet Test Meter (No. 3)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1323	5.122 cf	74 °F	-1.30 "H_2O	572.407 cf	78 °F	77 °F	1.00 "H_2O
Start	1314	0.000 cf	74 °F	-1.30 "H_2O	572.377 cf	77 °F	76 °F	1.00 "H_2O
Avg.	9	5.122 cf	74 °F	-1.300 "H_2O	5.030 cf	77 °F		1.000 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 5.122 \left[\frac{29.32 + \frac{-1.300}{13.6}}{74 + 460}\right] \times 1.000 \ (C_f) = 4.948 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 5.030 \left[\frac{29.32 + \frac{1.000}{13.6}}{77 + 460}\right] = 4.859 \text{ dcsf}$$

$$C_{DG} = \frac{4.948}{4.859} = \boxed{1.018}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 11-07-99

Calibrator: M. Bass

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

Run No.: 1 @ 1.5" H_2O

P_b: 29.32 "Hg

Control Module Vacuum: 2.00 "Hg

	Wet Test Meter (No. 3)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1341	10.295 cf	74 °F	-1.60 "H_2O	587.724 cf	82 °F	77 °F	1.50 "H_2O
Start	1324	0.000 cf	74 °F	-1.60 "H_2O	577.653 cf	78 °F	76 °F	1.50 "H_2O
Avg.	15	10.295 cf	74 °F	-1.600 "H_2O	10.071 cf	78 °F		1.500 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.295 \left[\frac{29.32 + \frac{-1.600}{13.6}}{74 + 460}\right] \times 1.000 \ (C_t) = 9.937 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.071 \left[\frac{29.32 + \frac{1.500}{13.6}}{78 + 460}\right] = 9.724 \text{ dcsf}$$

$$C_{DG} = \frac{9.937}{9.724} = \boxed{1.022}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Calibrator: M. Bass

Date: 11-07-99

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

Run No.: 1 @ 2.0" H_2O

P_b: 29.32 "Hg

Control Module Vacuum: 2.50 "Hg

	Wet Test Meter (No. 3)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1356	10.300 cf	74 °F	-2.50 "H_2O	598.026 cf	86 °F	78 °F	2.00 "H_2O
Start	1344	0.000 cf	74 °F	-2.50 "H_2O	587.902 cf	81 °F	77 °F	2.00 "H_2O
Avg.	12	10.300 cf	74 °F	-2.500 "H_2O	10.124 cf	81 °F		2.000 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.300 \left[\frac{29.32 + \frac{-2.500}{13.6}}{74 + 460}\right] \times 1.000\,(C_f) = 9.919 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.124 \left[\frac{29.32 + \frac{2.000}{13.6}}{81 + 460}\right] = 9.733 \text{ dcsf}$$

$$C_{DG} = \frac{9.919}{9.733} = \boxed{1.019}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 11-07-99

Calibrator: M. Bass

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

Run No.: 1 @ 3.0" H_2O

P_b: 29.32 "Hg

Control Module Vacuum: 3.00 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1408	10.330 cf	74 °F	-2.90 "H_2O
Start	1358	0.000 cf	74 °F	-2.90 "H_2O
Avg.	10	10.330 cf ✓	74 °F ✓	-2.900 "H_2O ✓

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	608.602 cf	89 °F	79 °F	3.00 "H_2O
Start	598.364 cf	85 °F	78 °F	3.00 "H_2O
Avg.	10.238 cf ✓	83 °F ✓		3.000 "H_2O ✓

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.330 \left[\frac{29.32 + \frac{-2.90}{13.6}}{74 + 460}\right] \times 1.000\ (C_f) = 9.938 \text{ dcsf} \checkmark$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.238 \left[\frac{29.32 + \frac{3.000}{13.6}}{83 + 460}\right] = 9.831 \text{ dcsf} \checkmark$$

$$C_{DG} = \frac{9.938}{9.831} = \boxed{1.011} \checkmark$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 27-2

Date: 11-07-99

Calibrator: M. Bass

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

Run No.: 1 @ 4.0" H_2O

P_b: 29.32 "Hg

Control Module Vacuum: 3.00 "Hg

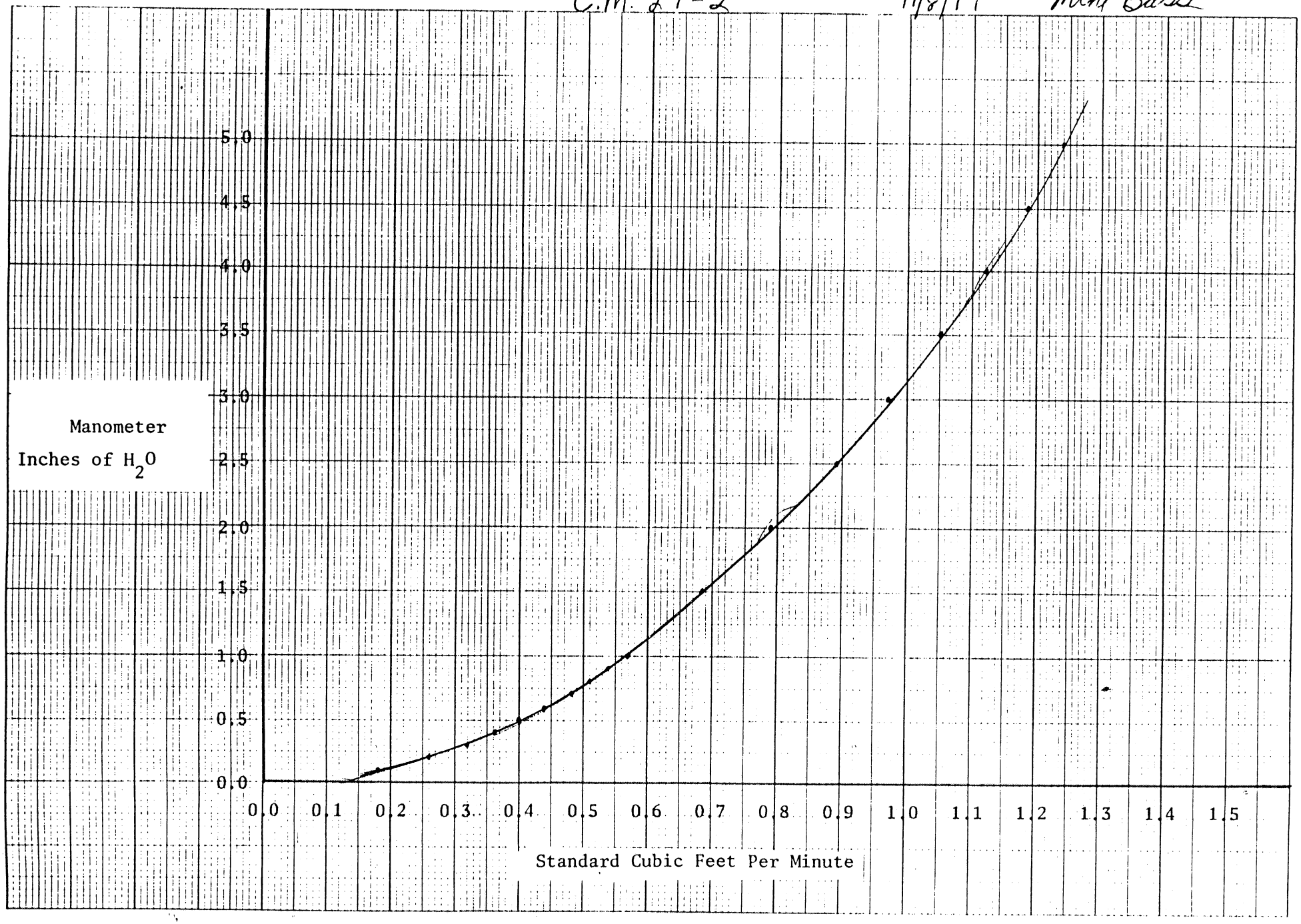
	Wet Test Meter (No. 3)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1419	10.130 cf	74 °F	-3.70 "H_2O	619.031 cf	91 °F	80 °F	4.00 "H_2O
Start	1410	0.000 cf	74 °F	-3.70 "H_2O	608.926 cf	87 °F	79 °F	4.00 "H_2O
Avg.	9	10.130 cf ✓	74 °F ✓	-3.700 "H_2O ✓	10.105 cf ✓	84 ✓ °F		4.000 "H_2O ✓

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.130 \left[\frac{29.32 + \frac{-3.700}{13.6}}{74 + 460}\right] \times 1.000 \quad (C_f) = 9.726 \text{ dcsf} \checkmark$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.105 \left[\frac{29.32 + \frac{4.000}{13.6}}{84 + 460}\right] = 9.709 \text{ dcsf} \checkmark$$

$$C_{DG} = \frac{9.726}{9.709} = \boxed{1.002} \checkmark$$

C.M. 27-2 11/8/99 Mike Bass



METCO ENVIRONMENTAL

DIGITAL TEMPERATURE INDICATOR NO. 27-2

CALIBRATION DATA

Date: 11-07-99

Media	Time	Mercury Temperature (°F)	DTI (°F)
Ambient Air	1248	77	75 ✓
Ice Bath	1250	36	36 ✓
Boiling Water	1300	210	211 ✓
Oven	1302	250	250 ✓
Oven	1304	300	301 ✓
Oven	1306	352	351 ✓
Oven	1308	376	378 ✓

Meter Adjusted? Yes _____ No ✓

Calibrator: Mike Bass

Checked By: Jason Brown

METCO ENVIRONMENTAL

Dry Gas Meter Calibration

Dry Gas Meter No.: 29-1

Date: 11-22-99

ΔH ("H_2O)	C_{DG}
0.5	1.005 ✓
1.0	0.999 ✓
1.5	1.003 ✓
2.0	1.000 ✓
3.0	0.994 ✓
4.0	0.999 ✓
Average	1.000 ✓

Variation: + 0.5% ✓

- 0.6% ✓

Calibrator: Jason Conning #273

Checked By: Scott Hart #268

C_{DG} @ 2 liters/min. = 1.013

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Calibrator: Jason Conway

Date: 11-22-99

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

Run No.: 1 @ 0.50" H_2O

P_b: 29.24 "Hg

Control Module Vacuum: 0.00 "Hg

	Wet Test Meter (No. 3)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	0935	5.003 cf	69 °F	-0.8 "H_2O	738522 cf	87 °F	71 °F	0.5 "H_2O
Start	0922	0.000 cf	69 °F	-0.8 "H_2O	733.505 cf	72 °F	71 °F	0.5 "H_2O
Avg.	13 ✓	5.003 ✓ cf	69 ✓ °F	-0.8 ✓ "H_2O	5.017 ✓ cf	75 ✓ °F	✓ 0.5 "H_2O	

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 5.003 \left[\frac{29.24 + \frac{-0.8}{13.6}}{69 + 460} \right] \times 1.000 \quad (C_f) = 4.871 \checkmark \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 5.017 \left[\frac{29.24 + \frac{0.5}{13.6}}{75 + 460} \right] = 4.846 \checkmark \text{ dcsf}$$

$$C_{DG} = \frac{4.871}{4.846} = \boxed{1.005 \checkmark}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 11-22-99

Calibrator: Jason Conway

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

Run No.: 1 @ 1.00" H2O

P_b: 29.24 "Hg

Control Module Vacuum: 0.00 "Hg

Wet Test Meter (No. 3)	Time	Meter Reading	Temp.	P_m
End	1031	5.004 cf	69 °F	-13 "H_2O
Start	1021	0.000 cf	69 °F	-13 "H_2O
Avg.	10 ✓	5.004 ✓ cf	69 ✓ °F	-13 ✓ "H_2O

Dry Gas Meter	Meter Reading	Temp. In	Temp. Out	P_m
End	244.777 cf	68 °F	71 °F	1.0 "H_2O
Start	239.786 cf	70 °F	71 °F	1.0 "H_2O
Avg.	4.991 ✓ cf	70 ✓ °F	✓ 1.0	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 5.004 \left[\frac{29.24 + \frac{-13}{13.6}}{69 + 460}\right] \times 1.000\ (C_f) = 4.866 \checkmark \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 4.991 \left[\frac{29.24 + \frac{1.0}{13.6}}{70 + 460}\right] = 4.872 \checkmark \text{ dcsf}$$

$$C_{DG} = \frac{4.866}{4.872} = \boxed{0.999 \checkmark}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 11-22-99

Calibrator: Jason Conway

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

Run No.: 1 @ 1.50 "H2O

P_b: 29.24 "Hg

Control Module Vacuum: 0.00 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1049	10,009 cf	69 °F	-1.6 "H_2O
Start	1034	0.000 cf	69 °F	-1.6 "H_2O
Avg.	15 ✓	10.009 ✓ cf	69 ✓ °F	-1.6 ✓ "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	755.874 cf	65 °F	71 °F	1.50 "H_2O
Start	745.977 cf	69 °F	71 °F	1.50 "H_2O
Avg.	9.897 ✓ cf	69 ✓ °F		✓ 1.50 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.009 \left[\frac{29.24 + \frac{-1.6}{13.6}}{69 + 460}\right] \times 1.000\ (C_t) = 9.725 \checkmark \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 9.897 \left[\frac{29.24 + \frac{1.50}{13.6}}{69 + 460}\right] = 9.692 \checkmark \text{ dcsf}$$

$$C_{DG} = \frac{9.725}{9.692} = \boxed{1.003 \checkmark}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29.1

Date: 11-22-99

Calibrator: Jason Conway

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

Run No.: 1 @ 2.00 "H2O

P_b: 29.24 "Hg

Control Module Vacuum: 8.00 "Hg

	Wet Test Meter (No. 3)					Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m		Meter Reading	Temp. In	Temp. Out	P_m
End	1103	10.088 cf	69 °F	-20	"H_2O	766.667 cf	69 °F	72 °F	2.0 "H_2O
Start	1051	0.000 cf	69 °F	-20	"H_2O	756.663 cf	68 °F	72 °F	2.0 "H_2O
Avg.	12 ✓	10.088 ✓ cf	69 ✓ °F	-20 ✓	"H_2O	10.004 ✓ cf	70 ✓ °F		✓ 2.0 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.088 \left[\frac{29.24 + \frac{-20}{13.6}}{69 + 460}\right] \times 1.000\,(C_f) = 9.792 \checkmark \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.004 \left[\frac{29.24 + \frac{2.0}{13.6}}{70 + 460}\right] = 9.790 \checkmark \text{ dcsf}$$

$$C_{DG} = \frac{9.792}{9.790} = \boxed{1.000 \checkmark}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 11-22-99

Calibrator: Jason Conway

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

Run No.: 1 @ 3.00 "H2O

P_b: 29.24 "Hg

Control Module Vacuum: 0.00 "Hg

Wet Test Meter (No. 3)					Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1134	10.011 cf	69 °F	-3.0 "H_2O	789.042 cf	69 °F	73 °F	3.0 "H_2O
Start	1124	0.000 cf	69 °F	-3.0 "H_2O	779.107 cf	68 °F	73 °F	3.0 "H_2O
Avg.	10.0 ✓	10.011 cf	69 ✓ °F	-3.0 ✓ "H_2O	9.935 ✓ cf	70 ✓ °F	✓ 3.0 "H_2O	

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.011 \left[\frac{29.24 + \frac{-3.0}{13.6}}{69 + 460}\right] \times 1{,}000\ (C_f) = 9.693 \checkmark \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 9.935 \left[\frac{29.24 + \frac{3.0}{13.6}}{70 + 460}\right] = 9.747 \checkmark \text{ dcsf}$$

$$C_{DG} = \frac{9.693}{9.747} = \boxed{0.994 \checkmark}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 11-21-99

Calibrator: Jason Conway

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

Run No.: 2 @ 4.00 "H2O

P_b: 29.24 "Hg

Control Module Vacuum: 0.00 "Hg

	Wet Test Meter (No. 3)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1311	10.002 cf	70 °F	-3.8 "H_2O	817.238 cf	68 °F	72 °F	4.0 "H_2O
Start	1302	0.000 cf	70 °F	-3.8 "H_2O	807.425 cf	70 °F	72 °F	4.0 "H_2O
Avg.	9 ✓	10.002 ✓ cf	70 ✓ °F	-3.8 ✓ "H_2O	9.813 ✓ cf	71 ✓ °F		✓ 4.0 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.002 \left[\frac{29.24 + \frac{-3.8}{13.6}}{70 + 460}\right] \times 1.000\,(C_f) = 9.646 \checkmark \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 9.813 \left[\frac{29.24 + \frac{4.0}{13.6}}{71 + 460}\right] = \cancel{9.651}\ 9.633 \checkmark \text{ dcsf}$$

$$C_{DG} = \frac{9.646}{9.651} = \boxed{0.999 \checkmark}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Calibrator: Jason Conway

Date: 11-22-99

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

Run No.: 1 @ 2L/min

P_b: 29.15 "Hg

Control Module Vacuum: 0.00 "Hg

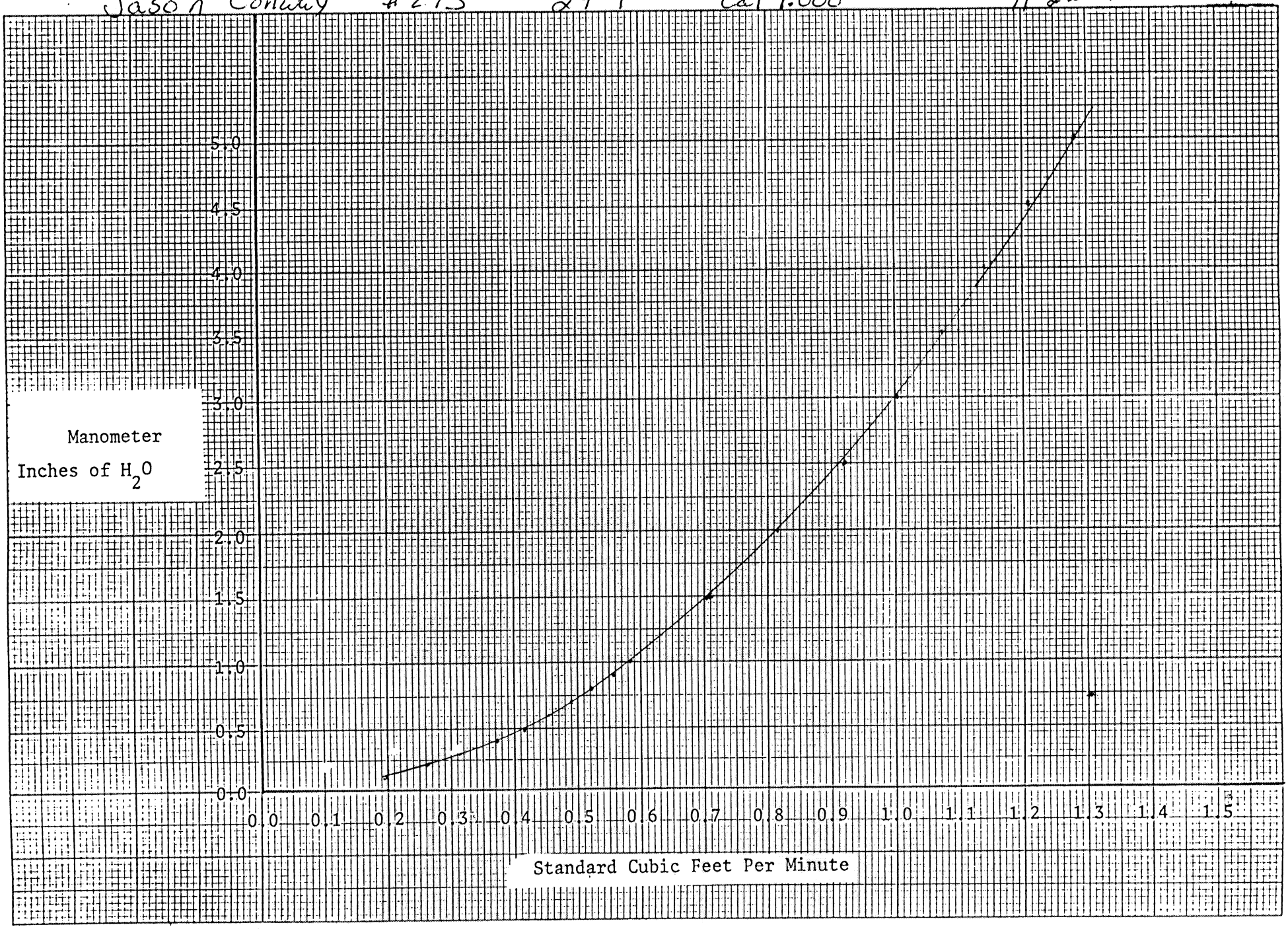
Wet Test Meter (No. 1)					Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1637	2.229 cf	70 °F	-0.6 "H_2O	873.468 cf	77 °F	72 °F	0.04 "H_2O
Start	1605	0.000 cf	70 °F	-0.6 "H_2O	871.246 cf	72 °F	72 °F	0.04 "H_2O
Avg.	32 ✓	2.229 ✓ cf	70 ✓ °F	-0.6 ✓ "H_2O	2.222 ✓ cf	73 ✓ °F	✓ 0.04	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 2.229 \left[\frac{29.15 + \frac{-0.6}{13.6}}{70 + 460}\right] \times 1.006\,(C_f) = 2.173 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 2.222 \left[\frac{29.15 + \frac{0.04}{13.6}}{73 + 460}\right] = 2.145 \text{ dcsf}$$

$$C_{DG} = \frac{2.173}{2.145} = \boxed{1.013}$$

Jason Conway #273 29-1 Cal 1.000 11-22-99



METCO ENVIRONMENTAL

DIGITAL TEMPERATURE INDICATOR NO. 29-1

CALIBRATION DATA

Date: 11-22-99

Media	Time	Mercury Temperature (°F)	DTI (°F)
Ambient Air	1025	70	70
Ice Bath	1112	35	36
Boiling Water	1050	212	212
Oven	1130	250	251
Oven	1141	300	300
Oven	1153	350	353
Oven	1200	375	375

Meter Adjusted? Yes _____ No ✓

Calibrator: Jason Conway #273

Checked By: Scott Hart #268

METCO ENVIRONMENTAL

BAROMETER CALIBRATION

Barometer No. 19-1

Date: 11-22-99

Time: 1115

Barometric Pressure @ Addison Airport @ 719 ft.	=	29.86
	-	0.719
Absolute Pressure @ Addison Airport	=	29.141
	+	0.083
Absolute Pressure @ METCO @ 636 ft.	=	29.224
Barometer Reading	=	29.18
Variation	=	0.044

Barometer Adjusted? Yes ✓ No _____

Scott Hart #268 ✓

Signature of Calibrator

APPENDIX D

Analytical Data

TestAmerica
INCORPORATED

December 13, 1999

Doug Saathoff
METCO Environmental
P.O. Box 598
Addison, Texas 75001

Dear Doug,

Please find included with this letter the analytical report and data package for the Gibson Generating Station samples submitted to TestAmerica for analysis. The samples were analyzed following the SOP based on the Ontario-Hydro Method.

Case Narrative

TestAmerica received the samples on October 16, 1999. All samples were intact when received. The following items were noted:

- Samples Identified as Container #2A were received separately from the other containers on November 4, 1999. There was no mention of a Container #2A on the original chain of custodies.
- Container #2A and Container #2 were unable be combined prior to analysis for most of the samples (Unit 3 Stack Run #3 and #4 were combined). TestAmerica attempted to analyze Container #2A separately but the samples were lost during the sample preparation step.
- Insufficient particulate matter was present on the thimble samples from the Unit 3 Stack. TestAmerica attempted to digest the entire filter per the method but the microwave membrane ruptured. TestAmerica added additional acid and redigested the samples. Although the digestion was done within hold time the analysis was completed two days past hold time. For these reasons the results for these fractions should be viewed as estimated.
- Two thimble filters were provided for Unit 3 Precipitator Inlet Duct Run 1. The samples were not composited prior to analysis. The samples were analyzed separately and mathematically combined.
- A filter sample (ID'd as Q58) that came with Unit 3 Precipitator Inlet Duct Run 1 was not included on the chain of Custody. The sample was analyzed and included with the report.
- According to the Chain of Custodies, Container #3 was not recovered for either of the Blank Trains. Container #3 was received on November 4, 1999 for both Blank Trains. The samples were analyzed and included with the report.
- A blank filter had the same ID as a sample filter (Q64). The sample containers were clearly marked and it was evident which was the blank filter and which was the sample filter.

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TestAmerica
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- All Duplicate and Triplicate sample results had a Relative Percent Difference of <10 %.
- All Matrix Spike sample results had a % Recovery between 75 % and 125 %.
- All other Quality Control Indicators were within acceptance limits.

If you have any questions or need additional information about this data package, please feel free to contact me at 937-294-6856.

Sincerely,

James A. Davis

James A. Davis
QA Coordinator

3601 SOUTH DIXIE DRIVE / DAYTON, OH 45439 / 937-294-6856 / FAX: 937-294-7816

TestAmerica
INCORPORATED

Sample ID: Cinergy
Gibson Generating Station
Owensville, Indiana

Hg Analysis
Ontario Hydro Method

Summary Report

	Unit 3 Stack Run 1	Unit 3 Stack Run 3	Unit 3 Stack Run 4	Unit 3 Precipitator Inlet Duct Run 1	Unit 3 Precipitator Inlet Duct Run 3	Unit 3 Precipitator Inlet Duct Run 4
Particle Bound Hg (ug)	0.000	0.000	0.000	10.87	40.10	6.81
Oxidized Hg (ug)	12.40	15.00	22.50	20.30	5.51	16.30
Elemental Hg (ug)	10.30	8.93	9.51	4.60	1.82	2.34
Total Hg (ug)	22.70	23.93	32.01	35.77	47.43	25.45

	Unit 3 Stack Blank Train	Unit 3 Precipitator Inlet Duct Blank Train
Particle Bound Hg (ug)	0.000	0.000
Oxidized Hg (ug)	0.00	0.00
Elemental Hg (ug)	0.00	0.00
Total Hg (ug)	0.00	0.00

	Reagent Blanks
Container # 7 (ug/L)	<0.2
Container # 8 (ug/L)	<2.0
Container # 9 (ug/L)	<4.0
Container # 10 (ug/L)	<2.0
Container # 11 (ug/L)	<0.2
Container # 12A (ug)	<0.01
Container # 12B (ug)	<0.01

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TestAmerica
INCORPORATED

Sample ID: Cinergy
Gibson Generating Station
Owensville, Indiana

Hg Analysis
Ontario Hydro Method

Duplicate Summary Report

	Unit 3 Stack Run 1	Unit 3 Stack Run 3	Unit 3 Stack Run 4	Unit 3 Precipitator Inlet Duct Run 1	Unit 3 Precipitator Inlet Duct Run 3	Unit 3 Precipitator Inlet Duct Run 4
Particle Bound Hg (ug)	0.000	0.000	0.000	10.88	40.50	6.81
Oxidized Hg (ug)	12.14	14.90	22.40	20.10	5.66	16.20
Elemental Hg (ug)	10.30	9.03	9.36	4.55	1.84	2.36
Total Hg (ug)	22.44	23.93	31.76	35.53	48.00	25.37

	Unit 3 Stack Blank Train	Unit 3 Precipitator Inlet Duct Blank Train
Particle Bound Hg (ug)	0.000	0.000
Oxidized Hg (ug)	0.00	0.00
Elemental Hg (ug)	0.00	0.00
Total Hg (ug)	0.00	0.00

	Reagent Blanks
Container # 7 (ug/L)	<0.2
Container # 8 (ug/L)	<2.0
Container # 9 (ug/L)	<4.0
Container # 10 (ug/L)	<2.0
Container # 11 (ug/L)	<0.2
Container # 12A (ug)	<0.01
Container # 12B (ug)	<0.01

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TestAmerica
INCORPORATED

Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Unit 3 Stack Run 1

Hg Analysis
Ontario Hydro Method

Collected On: 10/14/99
Collected By: METCO

Container # 1A - Main Filter
Container # 1B - Backup Filter
Container # 2 - 0.1 N HNO3 Rinse
Container # 3 - KCl Impingers (1,2,3)/10 %HNO3 Rinse
Container # 4 - HNO3/H2O2 Impinger (4)/0.1 N HNO3 Rinse
Container # 5 - H2SO4/KMnO4 Impinger (5,6,7)/0.1 N HNO3 Rinse

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 1A	GB-1	11/19/99	11/30/99	jpp	<0.01	<0.01	0	<0.01	0	ug	*2	(Q32)
Container # 1B	GB-8	11/19/99	11/20/99	jpp	<0.01	<0.01	0	—	—	ug		(Q57)
Container # 2	2GB-4	11/17/99	11/18/99	jpp	<0.094	<0.094	0	—	—	ug	*1	
Container # 3	3GB-5	11/17/99	11/18/99	jpp	12.4	12.14	2.4	—	—	ug		
Container # 4	4GB-6	11/19/99	11/19/99	jpp	<0.60	<0.60	0	—	—	ug		
Container # 5	5GB-6	11/19/99	11/19/99	jpp	10.3	10.3	0	—	—	ug		

Particle Bound Hg (ug) **0.000**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **12.40**
(Containers 3)

Elemental Hg (ug) **10.30**
(Containers 4 and 5)

Total Hg (ug) **22.70**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **0.000**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **12.14**
(Containers 3)

Dup. Elemental Hg (ug) **10.30**
(Containers 4 and 5)

Dup. Total Hg (ug) **22.44**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

*1 - Container #2A was received separately from the rest of the containers. Container #2A was not noted on the original chain of custodies. The analysis was completed prior to discovery of Container #2A. TestAmerica attempted to analyze Container #2A separately but the sample was lost during the sample preparation step.

*2 - Insuffucient particulate matter was on the filter. TestAmerica attempted to digest the entire filter as indicated by the method but the microwave vessel membrane ruptured. Additional acid was added and the sample was redigested. Although the sample was digested within hold time, the analysis was done two days past hold time. Because of the alteration in the method to account for the additional weight of the filter, the result should be considered an estimated.

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TestAmerica
INCORPORATED

Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Unit 3 Stack Run 3

Hg Analysis
Ontario Hydro Method

Collected On: 10/15/99
Collected By: METCO

Container # 1A - Main Filter
Container # 1B - Backup Filter
Container # 2 - 0.1 N HNO3 Rinse
Container # 3 - KCl Impingers (1,2,3)/10 %HNO3 Rinse
Container # 4 - HNO3/H2O2 Impinger (4)/0.1 N HNO3 Rinse
Container # 5 - H2SO4/KMnO4 Impinger (5,6,7)/0.1 N HNO3 Rinse

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 1A	GB-4	11/19/99	11/30/99	jpp	<0.01	<0.01	0	—	—	ug	*2	(Q38)
Container # 1B	GB-12	11/19/99	11/20/99	jpp	<0.01	<0.01	0	—	—	ug		(Q63)
Container # 2	2GB-5	11/17/99	11/18/99	jpp	<0.164	<0.164	0	—	—	ug	*1	
Container # 3	3GB-7	11/17/99	11/18/99	jpp	15.0	14.9	1.1	—	—	ug		
Container # 4	4GB-7	11/19/99	11/19/99	jpp	<0.68	<0.68	0	—	—	ug		
Container # 5	5GB-7	11/19/99	11/19/99	jpp	8.93	9.03	1.1	—	—	ug		

Particle Bound Hg (ug) **0.000**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **15.00**
(Containers 3)

Elemental Hg (ug) **8.93**
(Containers 4 and 5)

Total Hg (ug) **23.93**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **0.000**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **14.90**
(Containers 3)

Dup. Elemental Hg (ug) **9.03**
(Containers 4 and 5)

Dup. Total Hg (ug) **23.93**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:
*1 - Container #2A was redissolved and added to Container #2 prior to analysis.
*2 - Insuffucient particulate matter was on the filter. TestAmerica attempted to digest the entire filter as indicated by the method but the microwave vessel membrane ruptured. Additional acid was added and the sample was redigested. Although the sample was digested within hold time, the analysis was done two days past hold time. Because of the alteration in the method to account for the additional weight of the filter, the result should be considered an estimated.

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TestAmerica
INCORPORATED

Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Unit 3 Stack Run 4

Hg Analysis
Ontario Hydro Method

Collected On: 10/15/99
Collected By: METCO

Container # 1A - Main Filter
Container # 1B - Backup Filter
Container # 2 - 0.1 N HNO3 Rinse
Container # 3 - KCl Impingers (1,2,3)/10 %HNO3 Rinse
Container # 4 - HNO3/H2O2 Impinger (4)/0.1 N HNO3 Rinse
Container # 5 - H2SO4/KMnO4 Impinger (5,6,7)/0.1 N HNO3 Rinse

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 1A	GB-7	11/19/99	11/20/99	jpp	<0.01	<0.01	0	—	—	ug	*2	(Q41)
Container # 1B	GB-11	11/19/99	11/20/99	jpp	<0.01	<0.01	0	—	—	ug		(Q62)
Container # 2	2GB-6	11/17/99	11/18/99	jpp	<0.094	<0.94	0	—	—	ug	*1	
Container # 3	3GB-8	11/17/99	11/18/99	jpp	22.5	22.4	0.3	—	—	ug		
Container # 4	4GB-8	11/19/99	11/19/99	jpp	<0.72	<0.72	0	—	—	ug		
Container # 5	5GB-8	11/19/99	11/19/99	jpp	9.51	9.36	1.6	—	—	ug		

Particle Bound Hg (ug) **0.000**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **22.50**
(Containers 3)

Elemental Hg (ug) **9.51**
(Containers 4 and 5)

Total Hg (ug) **32.01**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **0.000**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **22.40**
(Containers 3)

Dup. Elemental Hg (ug) **9.36**
(Containers 4 and 5)

Dup. Total Hg (ug) **31.76**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:
*1 - Container #2A was redissolved and added to Container #2 prior to analysis.
*2 - Insuffucient particulate matter was on the filter. TestAmerica attempted to digest the entire filter as indicated by the method but the microwave vessel membrane ruptured. Additional acid was added and the sample was redigested. Although the sample was digested within hold time, the analysis was done two days past hold time. Because of the alteration in the method to account for the additional weight of the filter, the result should be considered an estimated.

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TestAmerica
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Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Unit 3 Precipitator Inlet Duct Run 1

Hg Analysis
Ontario Hydro Method

Collected On: 10/14/99
Collected By: METCO

Container # 1A - Main Filter
Container # 1B - Backup Filter
Container # 2 - 0.1 N HNO3 Rinse
Container # 3 - KCl Impingers (1,2,3)/10 %HNO3 Rinse
Container # 4 - HNO3/H2O2 Impinger (4)/0.1 N HNO3 Rinse
Container # 5 - H2SO4/KMnO4 Impinger (5,6,7)/0.1 N HNO3 Rinse

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 1A	GB-2	11/19/99	11/20/99	jpp	1.18	1.20	1.4	—	—	ug	*1	(Q33)
Container # 1A	GB-3	11/19/99	11/20/99	jpp	9.65	9.64	0.1	9.64	0.1	ug	*1	(Q34)
Container # 1B	GB-9	11/19/99	11/20/99	jpp	0.04	0.04	0.8	—	—	ug	*2	(Q58)
Container # 2	2GB-1	11/17/99	11/18/99	jpp	<0.180	<0.180	0	—	—	ug	*3	
Container # 3	3GB-2	11/17/99	11/18/99	jpp	20.3	20.1	1.1	—	—	ug		
Container # 4	4GB-2	11/19/99	11/19/99	jpp	<0.68	<0.68	0	—	—	ug		
Container # 5	5GB-2	11/19/99	11/19/99	jpp	4.60	4.55	1	—	—	ug		

Particle Bound Hg (ug) **10.87**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **20.30**
(Containers 3)

Elemental Hg (ug) **4.60**
(Containers 4 and 5)

Total Hg (ug) **35.77**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **10.88**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **20.10**
(Containers 3)

Dup. Elemental Hg (ug) **4.55**
(Containers 4 and 5)

Dup. Total Hg (ug) **35.53**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:
*1 - Ash was not composited into one sample prior to analysis. The results were matmatically combined.
*2 - Sample was not noted on Chain of Custody
*3 - Container #2A was received separately from the rest of the containers. Container #2A was not noted on the original chain of custodies. The analysis was completed prior to discovery of Container #2A. TestAmerica attempted to analyze Container #2A separately but the sample was lost during the sample preparation step.

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TestAmerica
INCORPORATED

Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Unit 3 Precipitator Inlet Duct Run 3

Hg Analysis
Ontario Hydro Method

Collected On: 10/15/99
Collected By: METCO

Container # 1A - Main Filter
Container # 1B - Backup Filter
Container # 2 - 0.1 N HNO3 Rinse
Container # 3 - KCl Impingers (1,2,3)/10 %HNO3 Rinse
Container # 4 - HNO3/H2O2 Impinger (4)/0.1 N HNO3 Rinse
Container # 5 - H2SO4/KMnO4 Impinger (5,6,7)/0.1 N HNO3 Rinse

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 1A	GB-5	11/19/99	11/20/99	jpp	40.1	40.5	0.9	—	—	ug		(Q39)
Container # 1B	GB-13	11/19/99	11/20/99	jpp	<0.01	<0.01	0	—	—	ug	*1	(Q64)
Container # 2	2GB-2	11/17/99	11/18/99	jpp	<0.104	<0.104	0	—	—	ug	*2	
Container # 3	3GB-3	11/17/99	11/18/99	jpp	5.51	5.66	2.8	—	—	ug		
Container # 4	4GB-3	11/19/99	11/19/99	jpp	<0.76	<0.76	0	—	—	ug		
Container # 5	5GB-3	11/19/99	11/19/99	jpp	1.82	1.84	1.4	—	—	ug		

Particle Bound Hg (ug) **40.10**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **5.51**
(Containers 3)

Elemental Hg (ug) **1.82**
(Containers 4 and 5)

Total Hg (ug) **47.43**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **40.50**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **5.66**
(Containers 3)

Dup. Elemental Hg (ug) **1.84**
(Containers 4 and 5)

Dup. Total Hg (ug) **48.00**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:
*1 - One of the Thimble Blanks is also identified as Q64
*2 - Container #2A was received separately from the rest of the containers. Container #2A was not noted on the original chain of custodies. The analysis was completed prior to discovery of Container #2A. TestAmerica attempted to analyze Container #2A separately but the sample was lost during the sample preparation step.

3601 SOUTH DIXIE DRIVE / DAYTON, OH 45439 / 937-294-6856 / FAX: 937-294-7816

TestAmerica
INCORPORATED

Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Unit 3 Precipitator Inlet Duct Run 4

Hg Analysis
Ontario Hydro Method

Collected On: 10/15/99
Collected By: METCO

Container # 1A - Main Filter
Container # 1B - Backup Filter
Container # 2 - 0.1 N HNO3 Rinse
Container # 3 - KCl Impingers (1,2,3)/10 %HNO3 Rinse
Container # 4 - HNO3/H2O2 Impinger (4)/0.1 N HNO3 Rinse
Container # 5 - H2SO4/KMnO4 Impinger (5,6,7)/0.1 N HNO3 Rinse

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 1A	GB-6	11/19/99	11/20/99	jpp	6.81	6.81	0	—	—	ug		(Q40)
Container # 1B	GB-10	11/19/99	11/20/99	jpp	<0.01	<0.01	0	—	—	ug		(Q61)
Container # 2	2GB-3	11/17/99	11/18/99	jpp	<0.162	<0.162	0	—	—	ug	*1	
Container # 3	3GB-4	11/17/99	11/18/99	jpp	16.3	16.2	0.4	16.1	1.3	ug		
Container # 4	4GB-4	11/19/99	11/19/99	jpp	<0.78	<0.78	0	—	—	ug		
Container # 5	5GB-4	11/19/99	11/19/99	jpp	2.34	2.36	0	—	—	ug		

Particle Bound Hg (ug) **6.81**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **16.30**
(Containers 3)

Elemental Hg (ug) **2.34**
(Containers 4 and 5)

Total Hg (ug) **25.45**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **6.81**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **16.20**
(Containers 3)

Dup. Elemental Hg (ug) **2.36**
(Containers 4 and 5)

Dup. Total Hg (ug) **25.37**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes: *1 - Container #2A was received separately from the rest of the containers. Container #2A was not noted on the original chain of custodies. The analysis was completed prior to discovery of Container #2A. TestAmerica attempted to analyze Container #2A separately but the sample was lost during the sample preparation step.

3601 SOUTH DIXIE DRIVE / DAYTON, OH 45439 / 937-294-6856 / FAX: 937-294-7816

TestAmerica
INCORPORATED

Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Unit 3 Stack Blank Train

Hg Analysis
Ontario Hydro Method

Collected On: 10/15/99
Collected By: METCO

Container # 1A - Main Filter
Container # 1B - Backup Filter
Container # 2 - 0.1 N HNO3 Rinse
Container # 3 - KCl Impingers (1,2,3)/10 %HNO3 Rinse
Container # 4 - HNO3/H2O2 Impinger (4)/0.1 N HNO3 Rinse
Container # 5 - H2SO4/KMnO4 Impinger (5,6,7)/0.1 N HNO3 Rinse

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 1A		Not Provided		jpp	—	—	—	—	—	ug		
Container # 1B		Not Provided		jpp	—	—	—	—	—	ug		
Container # 2		Not Provided		jpp	—	—	—	—	—	ug		
Container # 3	3GB-6	11/17/99	11/18/99	jpp	<0.88	<0.88	0	—	—	ug	*1	
Container # 4	4GB-5	11/19/99	11/19/99	jpp	<0.62	<0.62	0	<0.62	0	ug		
Container # 5	5GB-5	11/19/99	11/19/99	jpp	<0.96	<0.96	0	<0.96	0	ug		

Particle Bound Hg (ug) **0.00**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **0.00**
(Containers 3)

Elemental Hg (ug) **0.00**
(Containers 4 and 5)

Total Hg (ug) **0.00**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **0.00**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **0.00**
(Containers 3)

Dup. Elemental Hg (ug) **0.00**
(Containers 4 and 5)

Dup. Total Hg (ug) **0.00**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes: *1 - Chain of Custody indicates that Container #3 was not recovered, sample was received by TestAmerica on 11/04/99.

3601 SOUTH DIXIE DRIVE / DAYTON, OH 45439 / 937-294-6856 / FAX: 937-294-7816

TestAmerica
INCORPORATED

Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Unit 3 Precipitator Inlet Duct Blank Train

Hg Analysis
Ontario Hydro Method

Collected On: 10/15/99
Collected By: METCO

Container # 1A - Main Filter
Container # 1B - Backup Filter
Container # 2 - 0.1 N HNO3 Rinse
Container # 3 - KCl Impingers (1,2,3)/10 %HNO3 Rinse
Container # 4 - HNO3/H2O2 Impinger (4)/0.1 N HNO3 Rinse
Container # 5 - H2SO4/KMnO4 Impinger (5,6,7)/0.1 N HNO3 Rinse

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 1A		Not Provided		jpp	—	—	—	—	—	ug		
Container # 1B		Not Provided		jpp	—	—	—	—	—	ug		
Container # 2		Not Provided		jpp	—	—	—	—	—	ug		
Container # 3	3GB-1	11/17/99	11/18/99	jpp	<0.83	<0.830	0	—	—	ug	*1	
Container # 4	4GB-1	11/19/99	11/19/99	jpp	<0.52	<0.52	0	—	—	ug		
Container # 5	5GB-1	11/19/99	11/19/99	jpp	<0.90	<0.90	0	—	—	ug		

Particle Bound Hg (ug) **0.00**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **0.00**
(Containers 3)

Elemental Hg (ug) **0.00**
(Containers 4 and 5)

Total Hg (ug) **0.00**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **0.00**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **0.00**
(Containers 3)

Dup. Elemental Hg (ug) **0.00**
(Containers 4 and 5)

Dup. Total Hg (ug) **0.00**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes: *1 - Chain of Custody indicates that Container #3 was not recovered, sample was received by TestAmerica on 11/04/99.

TestAmerica
INCORPORATED

Sample ID: **Cinergy**
Gibson Generating Station
Owensville, Indiana
Reagent Blanks

Hg Analysis
Ontario Hydro Method

Collected On: 10/15/99
Collected By: METCO

Container # 7 - 0.1 N HNO_3 Blank
Container # 8 - 1 N KCl Blank
Container # 9 - 5 % HNO_3/10 % H_2O_2 Blank
Container # 10 - H_2SO_4-/$KMnO_4$ Blank
Container # 11 - 10 % Hydroxylamine Sulfate/Sodium Chloride Blank
Container # 12 Filter Blank

	ID	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Triplicate Result	RPD	Units	Flags	Notes
Container # 7	RBGB-1	—	11/18/99	jpp	<0.2	<0.2	0	—	—	ug/L		
Container # 8	RBGB-2	11/17/99	11/18/99	jpp	<2.0	<2.0	0	<2.0	0	ug/L		
Container # 9	RBGB-3	11/19/99	11/19/99	jpp	<4.0	<4.0	0	—	—	ug/L		
Container # 10	RBGB-4	11/19/99	11/19/99	jpp	<2.0	<2.0	0	—	—	ug/L		
Container # 11	RBGB-5	—	11/18/99	jpp	<0.2	<0.2	0	—	—	ug/L		
Container # 12A	GB-14	11/19/99	11/30/99	jpp	<0.01	<0.01	0	—	—	ug	*2	(Q42)
Container # 12B	GB-15	11/19/99	11/20/99	jpp	<0.01	<0.01	0	—	—	ug	*1	(Q65)

Notes:
*1 - Digested Blank that has ID of Q65, there is another Filter Blank that has ID of Q64 which is the same as one of the sample filters.
*2 - Insuffucient particulate matter was on the filter. TestAmerica attempted to digest the entire filter as indicated by the method but the microwave vessel membrane ruptured. Additional acid was added and the sample was redigested. Although the sample was digested within hold time, the analysis was done two days past hold time. Because of the alteration in the method to account for the

Mercury Sample Train Receipt Records

Mercury Sample Train Receipt Record

Client ID
CINERGY
GIBSON GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
STACK
RUN #1

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☑ 2 (1)	47 + — + — = 47.	2GB-4	
☑ 3 (2)	485 + 260 + — = 745.	3GB-5 (AB)	
☑ 4 (1)	150 + — + — = 150.	4GB-6	
☑ 5 (1)	505 + — + — = 505.	5GB-6	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☑ 1A (1)	THIMBLE Q32	GB-1	
☑ 1B (1)	FILTER Q57	GB-B	
☐ 12A ( )			
☐ 12B ( )			

Notes:

Checked By: DM
Date: 11/7/05

TestAmerica

Mercury Sample Train Receipt Record

Client ID
CINERGY
GIBSON GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
STACK
RUN ~~#4~~ 3
DPP 11/17/11

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☑ 2 (1)	72 + 10 + – = 82.	2GB-5	*2
☑ 3 (2)	475 + 315 + – = 790.	3GB7 (A+B)	
☑ 4 (1)	170 + – + – = 170.	4GB-7	
☑ 5 (1)	510 + – + – = 510.	5GB-7	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☑ 1A (1)	Q38 THIMBLE	6B-4	
☑ 1B (1)	Q63 FILTER	6B-12	
☐ 12A ( )			
☐ 12B ( )			

Notes:
*2 10mL FROM CONTAINER 2A.

Checked By: DPP
Date: 11/17/11

TestAmerica

Mercury Sample Train Receipt Record

Client ID
CINERGY
GIBSON GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
STACK
RUN #4

Solutions:

Cont. ID/(#)	Volumes (mL) 47	TestAmerica ID(s)	Comments
☑ 2 (1)	37 + 10 + – = ~~37~~	2GB-6	*2
☑ 3 (2)	475 + 285 + – = 760. 11/17/05	3GB 8 (A+B)	
☑ 4 (1)	180 + – + – = 180.	4GB-8	
☑ 5 (1)	490 + – + – = 490.	5GB-8	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☑ 1A ( )	THIMBLE Q41	6B-7	
☑ 1B ( )	Q62 FILTER	6B-11	
☐ 12A ( )			
☐ 12B ( )			

Notes:
* PLUS 10mL FROM CONTAINER 2A

Checked By: DM
Date: 11/17/05

TestAmerica

Mercury Sample Train Receipt Record

Client ID
CINERGY
GIBSON GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
PRECIPITATOR
INLET DUCT
RUN #1

Solutions:

Cont. ID/(#)	90 Volumes (mL)	TestAmerica ID(s)	Comments
☑ 2 (1)	~~88~~ + — + — = 90.	2GB-1	
☑ 3 (2)	490 + 280 + — = 770.	3GB2 (A+B)	
☑ 4 (1)	170 + — + — = 170.	4GB-2	
☑ 5 (1)	460 + — + — = 460.	5-GB-2	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☑ 1A (2)	THIMBLE Q33 DUCT A	6B-2	
~~☑ 1B ( )~~	THIMBLE Q34 DUCT B	6B-3	
☐ 12A ( )	Q58	6B-9	*1
☐ 12B ( )			

Notes:
*1 - FILTER NOT MENTIONED ON C.O.C.
LABELLED AS 3 OF 3.

Checked By: MM
Date: 11/17/95

TestAmerica

Mercury Sample Train Receipt Record

Client ID
CINERGY
GIBSON POWER GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
PRECIPITATOR
INLET DUCT
RUN #3

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☑ 2 (1)	52 + – + – = 52.	2GB-2	
☑ 3 (1)	460 + 330 + – = 790.	3GB-3 (A+B)	
☑ 4 (1)	190 + – + – = 190.	4GB-3	
☑ 5 (1)	510 + – + – = 510.	5GB-3	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☑ 1A (1)	THIMBLE Q39	6B-5	
☑ 1B (1)	FILTER Q64	6B-13	*
☐ 12A ( )			
☐ 12B ( )			

Notes:
* ALSO FILTER 15A = Q64

Checked By: [illegible]
Date: 11/17/99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
CINERGY
GIBSON GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
PRECIPITATOR WET DUCT
RUN #4

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☑ 2 (1)	81 + – + – = 81.	2GB-3	
☑ 3 (2)	405 + 300 + – = 705.	3GB-4(A+B)	
☑ 4 (1)	195 + – + – = 195.	4GB-4 11/17	
☑ 5 (2)	475 + 125 + – = 600.	~~5GB-5(A+B)~~ 5GB4 (A+B)	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☑ 1A (1)	THIMBLE Q40	6B-6	
☑ 1B (1)	FILTER Q61	6B-10	
☐ 12A ( )			
☐ 12B ( )			

Notes:

Checked By: TMP

Date: 11/17/05

TestAmerica

Mercury Sample Train Receipt Record

Client ID
CINELBY
GIBSON GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
STACK

BLANK TRAIN

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☐ 2 ( )	___ + ___ + ___ = ___.		* 1
☑ 3 (1)	440 + – + – = 440.	3GB-6	
☑ 4 (1)	155 + – + – = 155.	4GB-5	
☑ 5 (1)	480 + – + – = 480.	5GB-5	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			* 1
☐ 1B ( )			* 1
☐ 12A ( )			
☐ 12B ( )			

Notes:
* 1 NOT RECOVERED PER C.O.C. (COC STATES CONTAINER #3 AS NOT RECOVERED, RECEIVED AT TESTAMERICA 11/4/99)

Checked By: xm
Date: 11/17/99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
CINERGY
GIBSON GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
PRECIPITATOR INLET DUCT
BLANK TRAIN

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☐ 2 ( )	___ + ___ + ___ = ___.		*1
☑ 3 (1)	415 + – + – = 415.	3GB-1	
☑ 4 (1)	130 + – + – = 130.	4GB-1	
☑ 5 (1)	450 + – + – = 450.	5GB-1	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			*1
☐ 1B ( )			*1
☐ 12A ( )			
☐ 12B ( )			

Notes:
*1 CONTAINERS NOT RECOVERED PER C.O.C.
ACTUALLY RECEIVED CONTAINER #3 ALTHOUGH
COC DOES NOT MENTION

Checked By: DMP
Date: 11/17/98

TestAmerica

Mercury Sample Train Receipt Record

Client ID
CINERGY
GIBSON GENERATING STATION
OWENSVILLE, IN

Location ID/Run #
UNIT #3
REAGENT BLANKS

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☐ 2 ( )	___ + ___ + ___ = ___.		
☐ 3 ( )	___ + ___ + ___ = ___.		
☐ 4 ( )	___ + ___ + ___ = ___.		
☐ 5 ( )	___ + ___ + ___ = ___.		
☑ 7 (1)	50 + — + — = 50.	RBGB-1	
☑ 8 (1)	52 + — + — = 52.	RBGB-2	
☑ 9 (1)	51 + — + — = 51.	RBGB-3	
☑ 10 (1)	50 + — + — = 50.	RBGB-4	
☑ 11 (1)	107 + — + — = 107.	RBGB-5	

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			
☐ 1B ( )		14	
☑ 12A (3)	THIMBLES Q42, Q43, Q44	GB ~~13~~ A, B, C	
☑ 12B (3)	FILTERS Q64, Q65, Q66	GB ~~14~~ A, B, C 15	*

Notes:
* ALSO FILTER GB-13 = Q64

Checked By: [illegible]
Date: 11/17/99

TestAmerica

Sample Preparation Batch Sheets

FILTERS

NONAQUEOUS MERCURY BATCH SHEET

Analyst: MP Date: 11/19/99 Water Bath: start mid end

Standard Reference: 65-32-9 temp: _____

ICV Reference: 65-32-10 date: _____

	Sample # / Client		Weight	MS	MSD
12	BLANK				
11	NIST 1633B		0.5000	~~50.00~~ 100	
1	FTX8	47Q43			MB
2	FTX9	47Q46			
3	WB 1A	47Q53			
4	WB-2	47Q51			
5	WB-3	47Q52		97.83	ICV
6	WB-4	47Q56			
7	GB-5	Q 39	0.5111	~~48.44~~ 101.15	
8	GB-2	Q 33	0.5468	~~45.72~~ 91.44	
9	GB-3	Q 34	0.5976	83.67	MS
10	GB-6	Q 40	0.5543	90.20	
					MSD
					RPD
					FLAG

HF 65-27-17
HNO_3 65-39-12
HCl 65-37-11
$SnCl_2$ 65-39-13
Boric Acid 65-39-14
65-39-15

SECONDARY DATA CHECK: analyst:
date:

Comments: _____

Mercury in Flue Gas
Aqueous Preparation Batch Log

Analyst(s) JMP Preparation Date 11/17/99

Reagent Reference #'s

HCl	—	$SnCl_2$	65-39-3
$NH_2OH*HCl$	65-30-11	Calibration Standards	65-32-9
$KMnO_4$	65-37-4	ICV Standard	65-32-10
HNO_3	65-37-20	H_2SO_4	65-38-9
$K_2S_2O_8$	65-34-5		

Lab ID	Cont. #	Sample Description	Init Cont Vol (mL)	Init Prep Vol (mL)	Final Vol (mL)
RBWB2	8	HRSG STACK REAGENT BLANK	50	5.0	50
2WB1	2	STACK RUN#1	40	5.0	50
2WB2	2	STACK RUN#2	45	5.0	50
2WB3	2	STACK RUN#3	29	5.0	50
WB1	3	HRSG STACK BLANK TRAIN	405	5.0	50
3WB2	3 A+B	STACK RUN#1	835	5.0	50
3WB3	3 A+B	STACK RUN#2	840	5.0	50
3WB4	3 A+B	STACK RUN#3	880	5.0	50
rbgb2	8	UNIT #3 REAGENT BLK	52	5.0	50
* 2gb1	2	INLET RUN#1	90	5.0	50
26B2	2	INLET RUN#3	52	5.0	50
26B3	2	INLET RUN#4	81	5.0	50
* 26B4	2	STACK RUN#1	47	5.0	50
26B5	2	STACK RUN#3	82	5.0	50
26B6	2,2A	STACK RUN#4	47	5.0	50
36B1	3	INLET BLANK TRAIN	415	5.0	50
36B2	3 A+B	INLET RUN#1	770	5.0	50
36B3	3 A+B	INLET RUN#3	790	5.0	50
36B4	3 A+B	INLET RUN#4	705	5.0	50

Lab ID	Cont. #	Sample Description	Init Cont Vol (mL)	Init Prep Vol (mL)	Final Vol (mL)
3GB5	3 A+B	STACK RUN#1	745	5.0	50
3GB6	3	STACK BLANK TRAIN	440	5.0	50
3GB7	3 A+B	STACK RUN#3	790	5.0	50
3GB8	3 A+B	STACK RUN#4	760	5.0	50
				12/4/99	
rbgb1	7	Reagent Blank	50	JMP ~~5.0~~	~~50~~
rbgb5	11	Reagent Blank	107	~~5.0~~	~~50~~
				12/4/99	
rbwb1	7	Reagent Blank	50	JMP ~~5.0~~	~~50~~
rbwb5	11	Reagent Blank	50	~~5.0~~	~~50~~

NOTES *Gibson Run #2 aborted.

Mercury in Flue Gas
Aqueous Preparation Batch Log

Analyst(s) [illegible] Preparation Date 11/19/97

Reagent Reference #'s

HCl	65-37-11	$SnCl_2$	65-39-13
$NH_2OH*HCl$	65-30-11	Calibration Standards	65-32-9
$KMnO_4$	65-37-4	ICV Standard	65-32-10
HNO_3	—		

Lab ID	Cont. #	Sample Description	Init Cont Vol (mL)	Init Prep Vol (mL)	Final Vol (mL)	Lab ID	Cont. #	Sample Description	Init Cont Vol (mL)	Init Prep Vol (mL)	Final Vol (mL)
rbwb3	9	Reagent Blank	50	2.5	50	RBWB4	10	REAGENT BLANK	50	5.0	50
4wb1	4	Stack Blank Train	170	2.5 ~~5.0~~	50	5WB1	5	STACK BLANK TRAIN	465	5.0	50
4wb2	4	Stack Run #1	195	2.5	50	5WB2	5	STACK RUN #1	505	5.0	50
4wb3	4	Stack Run #2	160	2.5	50	5WB3	5	STACK RUN #2	490	5.0	50
4wb4	4	Stack Run #3	150	2.5	50	5WB4	5	STACK RUN #3	465	5.0	50
rbgb3	9	Reagent Blank	51	2.5	50	RBGB4	10	REAGENT BLANK	50	5.0	50
4GB1	4	Inlet Blank Train	130	2.5	50	5GB1	5	INLET BLANK TRAIN	450	5.0	50
4GB2	4	Inlet Run #1	170	2.5	50	5GB2	5	INLET RUN #1	460	5.0	50
4GB3	4	Inlet Run #3	190	2.5	50	5GB3	5	INLET RUN #3	510	5.0	50
4GB4	4	Inlet Run #4	195	2.5	50	5GB4	5	INLET RUN #4	600	5.0	50
4GB5	4	STACK BLANK TRAIN	155	2.5	50	5GB5	5	STACK BLANK TRAIN	480	5.0	50
4GB6	4	STACK RUN #1	150	2.5	50	5GB6	5	STACK RUN #1	505	5.0	50
4GB7	4	STACK RUN #3	170	2.5	50	5GB7	5	STACK RUN #3	510	5.0	50
4GB8	4	STACK RUN #4	180	2.5	50	5GB8	5	STACK RUN #4	490	5.0	50

NOTES

11/18/99 Analytical Run Data

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 15:21:02  18 Nov 1999
Folder: NOV99B      Seq: 496                    Print: On
User:               Batch:            Id: mb        Cup: 1 02 Gas:    0.23 LPM
State: Idle                                         Xmit: Off Autosampler: On
```

```
AUTOSAMPLER:  Rack entry   Rack 111599a
cup Id        Extended id          Weight Volume Macro check Help
 1 ico                             1.0000 1.0000
 2 mb                              1.0000 1.0000
 3 mb dup                          1.0000 1.0000
 4 rbwb2                           1.0000 1.0000
 5 rawo2 dup                       1.0000 1.0000
 6 2wb1                            1.0000 1.0000
 7 2wb1 dup                        1.0000 1.0000
 8 2wb2                            1.0000 1.0000
 9 2wb2 dup                        1.0000 1.0000
10 2wb3                            1.0000 1.0000
11 2wb3 dup                        1.0000 1.0000
12 23wb1                           1.0000 1.0000
13 3wb1 dup                        1.0000 1.0000
14 3wb2                            1.0000 1.0000
15 3wb2 dup                        1.0000 1.0000
                                                                          PgDn
```

```
Cup 1  ID: icb                                  Call entry, Ins to switch
```

```
Protocol: SYSTEST
                        Rev: 3.001    Time: 15:21:06  18 Nov 1999
Folder: NOV99           Seq: 496                     Print: On
User:                   Batch:              Id: mb        Cup: 1 @2 Gas:    0.23 LPM
State: Idle                                               Xmit: Off Autosampler: On
```

```
AUTOSAMPLER:  Rack entry   Rack 111899a                                        PgUp
Cup Id          Extended id          Weight Volume Macro check Help
16 3wb3                              1.0000 1.0000
17 3wo3 dup                          1.0000 1.0000
18 3wc4                              1.0000 1.0000
19 3wb4 dup                          1.0000 1.0000
20 rbgo2                             1.0000 1.0000
21 rbgo2 dup                         1.0000 1.0000
22 rbgb2 tro                         1.0000 1.0000
23 2gb1                              1.0000 1.0000
24 2gb1 dup                          1.0000 1.0000
25 2gb1 spk                          1.0000 1.0000
26 ccb                               1.0000 1.0000
27 ccv                               1.0000 1.0000
28 2gb2                              1.0000 1.0000
29 2gb2 dupo                         1.0000 1.0000
30 2gb3                              1.0000 1.0000
                                                                               PgDn
```

```
Cup 16 ID: 3wo3                                   Call entry, Ins to switch
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 15:21:05  18 Nov 1999
Folder: NOV99B      Seq: 496                    Print: On
User:               Batch:            Id: mo        Cup: 1 02 Gas:    0.23 LPM
State: Idle                                         Amit: Off Autosampler: On
```

```
AUTOSAMPLER:  Rack entry   Rack 111899a                                    PgUp
Cup Id          Extended id          Weight Volume Macro check Help
31 2gb3 dup                          1.0000 1.0000
32 2gb4                              1.0000 1.0000
33 2gb4 dup                          1.0000 1.0000
34 2gb5                              1.0000 1.0000
35 2gb5 dup                          1.0000 1.0000
36 2gb6                              1.0000 1.0000
37 2gb6 dup                          1.0000 1.0000
38 3gb1                              1.0000 1.0000
39 3gb1 dup                          1.0000 1.0000
40 3gb2                              1.0000 1.0000
41 3gb2 dup                          1.0000 1.0000
42 3gb3                              1.0000 1.0000
43 3gb3 dup                          1.0000 1.0000
44                                   1.0000 1.0000

                                                                           PgDn
```

```
Cup 31 ID: 2gb3 dup                          Call entry, Ins to switch
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 17:06:59  18 Nov 1999
Folder: NOV99B      Seq: 540                    Print: On
User:               Batch:            Id: 3gb3 dup   Cuc: 1 43 Gas:    0.33 LPM
State: Idle                                      Xmit: Off Autosampler: On
```

```
AUTOSAMPLER:  Rack entry   Rack 111899a
Cup Id          Extended id          Weight Volume Macro check Help
 1 icb                               1.0000 1.0000
 2 3gb4                              1.0000 1.0000
 3 3gb4 dup                          1.0000 1.0000
 4 3gb4 trp                          1.0000 1.0000
 5 3gb5                              1.0000 1.0000
 6 3gb5 dup                          1.0000 1.0000
 7 3gb5 spk                          1.0000 1.0000
 8 ccb                               1.0000 1.0000
 9 ccv                               1.0000 1.0000
10 3gb6                              1.0000 1.0000
11 3gb6 dup                          1.0000 1.0000
12 3gb7                              1.0000 1.0000
13 3gb7 dup                          1.0000 1.0000
14 3gb8                              1.0000 1.0000
15 3gb8 dup                          1.0000 1.0000
                                                                          Page
```

```
Cup 1  ID: icb                                   Call entry, Ins to switch
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 17:07:05  18 Nov 1999
Folder: NOV99B      Seq: 540                     Print: On
User:               Batch:            Id: 3gb3 dup   Cup: 1 43 Gas:    0.23 LPM
State: Idle                                        Xmit: Off Autosampler: On
```

AUTOSAMPLER: Rack entry Rack 111899a PgUp

Cup	Id	Extended id	Weight	Volume	Macro	Check	Help
16	ccb		1.0000	1.0000			
17	ccv		1.0000	1.0000			
18	rbgb1	DRP	1.0000	1.0000			
19	rbgb5	11/18/99	1.0000	1.0000			
20	rbwb1		1.0000	1.0000			
21	rbwb5		1.0000	1.0000			
22	ccb		1.0000	1.0000			
23	ccv		1.0000	1.0000			
24			1.0000	1.0000			
25			1.0000	1.0000			
26			1.0000	1.0000			
27			1.0000	1.0000			
28			1.0000	1.0000			
29			1.0000	1.0000			
30			1.0000	1.0000			

PgDn

Cup 16 ID: ccb Call entry, Ins to switch

*** Standard: 1 Rep: 1 Seq: 488 14:32:47 18 Nov 1999 HG

Hg .000 ug/L -213
Ave. Int. = -213 S. D. = 0

*** Standard: 2 Rep: 1 Seq: 489 14:35:09 18 Nov 1999 HG

Hg .200 ug/L 9270
Ave. Int. = 9270 S. D. = 0

*** Standard: 3 Rep: 1 Seq: 490 14:37:31 18 Nov 1999 HG

Hg .500 ug/L 21829
Ave. Int. = 21829 S. D. = 0

*** Standard: 4 Rep: 1 Seq: 491 14:39:53 18 Nov 1999 HG

Hg 1.00 ug/L 42988
Ave. Int. = 42988 S. D. = 0

Folder: NOV99B Page 154
14:42:16 18 Nov 1999 Protocol: SYSTEST

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Standard: 5 Rep: 1 Seq: 492 14:42:16 18 Nov 1999 HG

Hg 2.00 ug/L 85028
Ave. Int. = 85028 S. D. = 0

*** Standard: 6 Rep: 1 Seq: 493 14:47:04 18 Nov 1999 HG

Hg 3.00 ug/L 125934
Ave. Int. = 125934 S. D. = 0

Protocol: SYSTEST

Rev: 3.001 Time: 14:47:29 18 Nov 1999

Folder: NOV99B Seq: 494 Print: On

User: Batch: Id: Std6Rep1 Cup: 1 18 Gas: 0.23 LPM

State: Idle Xmit: Off Autosampler: On

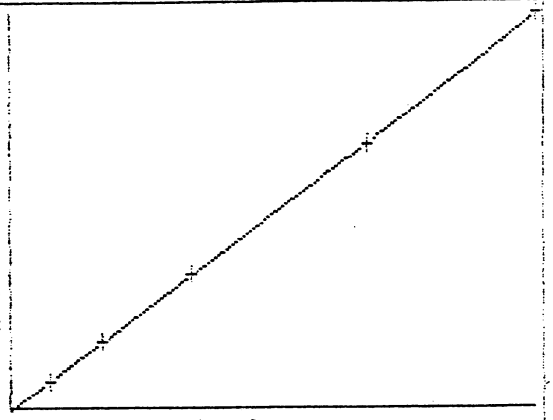
CALIBRATION: Line Calibration

Line: Hg

	Conc.	Calc.	Dev.	Accepted
S1	.000	-.020	-.020	LiNear
S2	.200	.206	.006	Quadratic
S3	.500	.505	.005	WtdLinear
S4	1.00	1.01	.010	Accept
S5	2.00	2.01	.012	
S6	3.00	2.99	-.013	StdAdd

A .0000000 r .999936

B 2.30400e-5 C -1.50825e-2



Relative Absorbance

	Mean	%RSD	
S1	-213	0	-213
S2	9270	0	9270
S3	21829	0	21829
S4	42988	0	42988
S5	85028	0	85028
S6	125934	0	125934

33?

New calibration coefficients stored

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Check Standard: 2 Ck2 Seq: 496 15:22:35 18 Nov 1999 HG

Line	Flag	%Rcv.	Found	True	Units	SD/RSD
Hg		103.	.624	.604	ug/L	.000

*** Sample ID: icb Seq: 497 15:24:55 18 Nov 1999 HG

Hg -.029 ug/L .000 -.029 <0.2µg/L

*** Sample ID: mb Seq: 498 15:27:12 18 Nov 1999 HG

Hg -.003 ug/L .000 -.003 <0.2µg/L

*** Sample ID: mb dup Seq: 499 15:29:29 18 Nov 1999 HG

Hg -.011 ug/L .000 -.011 <0.2µg/L

*** Sample ID: rbwb2 Seq: 500 15:32:15 18 Nov 1999 HG

Hg -.013 ug/L .000 -.013 <2.0µg/L

*** Sample ID: rbwb2 dup Seq: 501 15:34:03 18 Nov 1999 HG RPD-N/A

Hg -.016 ug/L .000 -.016 <2.0µg/L

*** Sample ID: 2wb1 Seq: 502 15:36:20 18 Nov 1999 HG

Hg -.006 ug/L .000 -.006 <0.08µg

*** Sample ID: 2wb1 dup Seq: 503 15:38:37 18 Nov 1999 HG RPD-N/A

Hg -.013 ug/L .000 -.013 <0.08µg

*** Sample ID: 2wb2 Seq: 504 15:40:55 18 Nov 1999 HG

Hg -.010 ug/L .000 -.010 <0.09µg

*** Sample ID: 2wb2 dup Seq: 505 15:43:12 18 Nov 1999 HG RPD-N/A

Hg -.013 ug/L .000 -.013 <0.09µg

*** Sample ID: 2wb3 Seq: 506 15:45:30 18 Nov 1999 HG

Hg -.012 ug/L .000 -.012 <0.06µg

*** Sample ID: 2wb3 dup Seq: 507 15:47:48 18 Nov 1999 HG RPD-N/A

Hg -.008 ug/L .000 -.008 <0.06µg

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: Iwb1					Seq: 508	15:50:05 18 Nov 1999 HG		
Hg	-.011	ug/L	.000	-.011			<0.81µg	
*** Sample ID: Iwb1 dup					Seq: 509	15:52:21 18 Nov 1999 HG	RPD-N/A	
Hg	-.013	ug/L	.000	-.013			<0.81µg	
*** Sample ID: Iwb2					Seq: 510	15:54:37 18 Nov 1999 HG		
Hg	.023	ug/L	.000	.023			<1.67µg	
*** Sample ID: Iwb2 dup					Seq: 511	15:56:54 18 Nov 1999 HG	RPD-N/A	
Hg	.028	ug/L	.000	.028			<1.67µg	
*** Sample ID: Iwb3					Seq: 512	15:59:11 18 Nov 1999 HG		
Hg	.008	ug/L	.000	.008			<1.68µg	
*** Sample ID: Iwb3 dup					Seq: 513	16:01:28 18 Nov 1999 HG	RPD-N/A	
Hg	.012	ug/L	.000	.012			<1.68µg	
*** Sample ID: Iwb4					Seq: 514	16:03:46 18 Nov 1999 HG		
Hg	.008	ug/L	.000	.008			<1.76µg	
*** Sample ID: Iwb4 dup					Seq: 515	16:06:04 18 Nov 1999 HG	RPD-N/A	
Hg	-.001	ug/L	.000	-.001			<1.76µg	
*** Sample ID: rogb2					Seq: 516	16:08:22 18 Nov 1999 HG		
Hg	-.010	ug/L	.000	-.010			<2.0µg/L	
*** Sample ID: rogb2 dup					Seq: 517	16:10:40 18 Nov 1999 HG	RPD-N/A	
Hg	-.013	ug/L	.000	-.013			<2.0µg/L	
*** Sample ID: rogo2 tro					Seq: 518	16:12:58 18 Nov 1999 HG	RPD-N/A	
Hg	-.017	ug/L	.000	-.017			<2.0µg/L	
*** Sample ID: Iqb1					Seq: 519	16:15:16 18 Nov 1999 HG		
Hg	-.008	ug/L	.000	-.008			<0.18µg	

Line	Conc.	Units	SD/RSD	1	2	3	4	5	
*** Sample ID: 2gb1 dup					Seq: 520	16:17:34 18 Nov 1999 HG			RPD-N/A
Hg	-.010	ug/L	.000	-.010			<0.18µg		
*** Sample ID: 2gb1 spk					Seq: 521	16:19:52 18 Nov 1999 HG			
Hg	1.03	ug/L	.000	1.03			103%		
*** Sample ID: ccb					Seq: 522	16:22:11 18 Nov 1999 HG			
Hg	-.025	ug/L	.000	-.025			<0.2µg/L		
*** Sample ID: ccv					Seq: 523	16:24:29 18 Nov 1999 HG			
Hg	2.01	ug/L	.000	2.01			101%		
*** Sample ID: 2gb2					Seq: 524	16:26:58 18 Nov 1999 HG			
Hg	-.020	ug/L	.000	-.020			<0.104µg		
*** Sample ID: 2gb2 dup					Seq: 525	16:29:16 18 Nov 1999 HG			RPD-N/A
Hg	-.014	ug/L	.000	-.014			<0.104µg		
*** Sample ID: 2gb3					Seq: 526	16:31:34 18 Nov 1999 HG			
Hg	-.013	ug/L	.000	-.013			<0.162µg		
*** Sample ID: 2gb3 dup					Seq: 527	16:33:53 18 Nov 1999 HG			RPD-N/A
Hg	-.014	ug/L	.000	-.014			<0.162µg		
*** Sample ID: 2gb4					Seq: 528	16:36:12 18 Nov 1999 HG			
Hg	-.007	ug/L	.000	-.007			<0.094µg		
*** Sample ID: 2gb4 dup					Seq: 529	16:38:31 18 Nov 1999 HG			RPD-N/A
Hg	-.004	ug/L	.000	-.004			<0.094µg		
*** Sample ID: 2gb5					Seq: 530	16:40:51 18 Nov 1999 HG			
Hg	.036	ug/L	.000	.036			<0.164µg		
*** Sample ID: 2gb5 dup					Seq: 531	16:43:11 18 Nov 1999 HG			RPD-N/A
Hg	.048	ug/L	.000	.048			<0.164µg		

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: 2gb6					Seq: 532	16:45:31 18 Nov 1999 HG		
Hg	.125	ug/L	.000	.125			<0.094µg	
*** Sample ID: 2gc6 dup					Seq: 533	16:47:51 18 Nov 1999 HG	RPD-N/A	
Hg	.117	ug/L	.000	.117			<0.094µg	
*** Sample ID: 3gb1					Seq: 534	16:50:11 18 Nov 1999 HG		
Hg	-.007	ug/L	.000	-.007			<0.83µg	
*** Sample ID: 3gb1 dup					Seq: 535	16:52:31 18 Nov 1999 HG	RPD-N/A	
Hg	-.006	ug/L	.000	-.006			<0.83µg	
*** Sample ID: 3gb2					Seq: 536	16:54:51 18 Nov 1999 HG		
Hg	2.64	ug/L	.000	2.64			20.3 20.33µg	
*** Sample ID: 3gb2 dup					Seq: 537	16:57:23 18 Nov 1999 HG	RPD-1.14%	
Hg	2.61	ug/L	.000	2.61			20.10µg	
*** Sample ID: 3gc3					Seq: 538	16:59:54 18 Nov 1999 HG		
Hg	.697	ug/L	.000	.697			5.51µg	
*** Sample ID: 3gc3 dup					Seq: 539	17:02:17 18 Nov 1999 HG	RPD=2.83%	
Hg	.717	ug/L	.000	.717			5.66µg	

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Check Standard: 2 Ck2 Seq: 540 17:08:36 18 Nov 1999 HG

Line	Flag	%Rcv.	Found	True	Units	SD/RSD
Hg		105.	.633	.604	ug/L	.000

*** Sample ID: icb Seq: 541 17:10:57 18 Nov 1999 HG

Hg -.022 ug/L .000 -.022 <0.2 µg/L

*** Sample ID: 3gb4 Seq: 542 17:13:14 18 Nov 1999 HG

Hg 2.31 ug/L .000 2.31 16.3 µg

*** Sample ID: 3gb4 dup Seq: 543 17:15:44 18 Nov 1999 HG RPD = 0.434%

Hg 2.30 ug/L .000 2.30 16.2 µg

*** Sample ID: 3gb4 trp Seq: 544 17:18:14 18 Nov 1999 HG RPD = 1.31%

Hg 2.29 ug/L .000 2.29 16.1 µg

*** Sample ID: 3gb5 Seq: 545 17:20:44 18 Nov 1999 HG

Hg 1.67 ug/L .000 1.67 12.4 µg

*** Sample ID: 3gb5 dup Seq: 546 17:23:23 18 Nov 1999 HG RPD = 2.42%

Hg 1.63 ug/L .000 1.63 12.14 µg

*** Sample ID: 3gb5 spk Seq: 547 17:26:11 18 Nov 1999 HG

Hg 2.53 ug/L .000 2.53 86%

*** Sample ID: ccb Seq: 548 17:28:59 18 Nov 1999 HG

Hg -.035 ug/L .000 -.035 <0.2 µg/L

*** Sample ID: ccv Seq: 549 17:31:17 18 Nov 1999 HG

Hg 1.98 ug/L .000 1.98 99%

*** Sample ID: 3gb6 Seq: 550 17:33:45 18 Nov 1999 HG

Hg .009 ug/L .000 .009 < 0.88 µg

*** Sample ID: 3gb6 dup Seq: 551 17:36:03 18 Nov 1999 HG RPD = N/A

Hg .021 ug/L .000 .021 <0.88 µg

Line	Conc.	Units	SD/RSD	1	2	3	4	5	
*** Sample ID: 3gb7					Seq: 552	17:38:20 18 Nov 1999 HG			
Hg	1.90	ug/L	.000	1.90					15.0µg
*** Sample ID: 3gb7 dup					Seq: 553	17:41:00 18 Nov 1999 HG			RPD=1.07%
Hg	1.88	ug/L	.000	1.88					14.9µg
*** Sample ID: 3gb8					Seq: 554	17:44:36 18 Nov 1999 HG			
Hg	2.96	ug/L	.000	2.96					22.5µg
*** Sample ID: 3gb8 dup					Seq: 555	17:47:07 18 Nov 1999 HG			RPD=0.333%
Hg	2.95	ug/L	.000	2.95					22.4µg
*** Sample ID: rbgb1					Seq: 556	17:49:36 18 Nov 1999 HG			
Hg	-.031	ug/L	.000	-.031					<0.2µg/L
*** Sample ID: rbgb1 dup					Seq: 557	17:51:53 18 Nov 1999 HG			RPD-N/A
Hg	-.015	ug/L	.000	-.015					<0.2µg/L
*** Sample ID: rogb5					Seq: 558	17:54:11 18 Nov 1999 HG			
Hg	-.014	ug/L	.000	-.014					<0.2µg/L
*** Sample ID: rogb5 dup					Seq: 559	17:56:29 18 Nov 1999 HG			RPD-N/A
Hg	-.019	ug/L	.000	-.019					<0.2µg/L
*** Sample ID: rbwb1					Seq: 560	17:58:47 18 Nov 1999 HG			
Hg	-.015	ug/L	.000	-.015					<0.2µg/L
*** Sample ID: rbwb1 dup					Seq: 561	18:01:05 18 Nov 1999 HG			RPD-N/A
Hg	-.017	ug/L	.000	-.017					<0.2µg/L
*** Sample ID: rbwb5					Seq: 562	18:03:22 18 Nov 1999 HG			
Hg	-.014	ug/L	.000	-.014					<0.2µg/L
*** Sample ID: rbwb5 dup					Seq: 563	18:05:41 18 Nov 1999 HG			RPD-N/A
Hg	-.016	ug/L	.000	-.016					<0.2µg/L

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccb					Seq: 564	18:07:59 18 Nov 1999 HG		
Hg	-.017	ug/L	.000	-.017			<0.2 µg/L	
*** Sample ID: ccv					Seq: 565	18:10:17 18 Nov 1999 HG		
Hg	2.05	ug/L	.000	2.05			103%	

11/19/99 Analytical Run Data

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 15:54:41  19 Nov 1999
Folder: NOV99B      Seq: 629                    Print: On
User:               Batch:            Id: ccv        Cup: 1 37 Gas:    0.23 LPM
State: Idle                                          Amit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 111999a  Range  1-44 Clear seq Undo eXit
cup Id        Extended id          Weight Volume Macro check Help
 1 icb                              1.0000 1.0000
 2 rowb3                            1.0000 1.0000
 3 rowb3 dup                        1.0000 1.0000
 4 rowb3 trp                        1.0000 1.0000
 5 4wb1                             1.0000 1.0000
 6 4wb1 dup                         1.0000 1.0000
 7 4wb1 spk                         1.0000 1.0000
 8 4wb2                             1.0000 1.0000
 9 4wb2 dup                         1.0000 1.0000
10 4wb3                             1.0000 1.0000
11 4wb3 dup                         1.0000 1.0000
12 4wb4                             1.0000 1.0000
13 4wb4 dup                         1.0000 1.0000
14 rbgb3                            1.0000 1.0000
15 rbgb3 dup                        1.0000 1.0000
                                                                          PgDn

                                          Column entry, Ins to switch
```

```
Protocol: SYSTEST
                        Rev: 3.001    Time: 15:54:42  19 Nov 1999
Folder: NOV99B          Seq: 629                      Print: On
User:                   Batch:              Id: ccv        Cuo: 1 37 Gas:    0.23 LPM
State: Idle                                                Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry    Rack 111999a  Range  1-44 Clear seQ Undo exit    PgUp
cup Id        Extended id          Weight Volume Macro check Help
16 4gb1                            1.0000 1.0000
17 4gb1 dup                        1.0000 1.0000
18 4gb2                            1.0000 1.0000
19 4gb2 dup                        1.0000 1.0000
20 4gb3                            1.0000 1.0000
21 4gb3 dup                        1.0000 1.0000
22 4gb4                            1.0000 1.0000
23 4gb4 dup                        1.0000 1.0000
24 ccb                             1.0000 1.0000
25 ccv                             1.0000 1.0000
26 4gb5                            1.0000 1.0000
27 4gb5 dup                        1.0000 1.0000
28 4gb5 trp                        1.0000 1.0000
29 4gb67                           1.0000 1.0000
30 4gb6 dup                        1.0000 1.0000
                                                                              PgDn

                                          Column entry, Ins to switch
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 15:54:43  19 Nov 1999
Folder: NOV99B      Seq: 629                    Print: On
User:               Batch:            Id: ccv       Cup: 1 37 Gas:    0.23 LPM
State: Idle                                         Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 111999a  Range  1-44 Clear seQ Undo eXit   PgUp
cup Id        Extended id          Weight Volume Macro checK Help
31 4gb6 sok                        1.0000 1.0000
32 4gb7                            1.0000 1.0000
33 4go7 dup                        1.0000 1.0000
34 4gb8                            1.0000 1.0000
35 4gb8 dup                        1.0000 1.0000
36 ccb                             1.0000 1.0000
37 ccv                             1.0000 1.0000
38                                 1.0000 1.0000
39                                 1.0000 1.0000
40                                 1.0000 1.0000
41                                 1.0000 1.0000
42                                 1.0000 1.0000
43                                 1.0000 1.0000
44                                 1.0000 1.0000
                                                                          PgDn

                                   Column entry, Ins to switch
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 16:18:39  19 Nov 1999
Folder: NOV99B      Seq: 630                    Print: On
User:               Batch:            Id: rbwb4      Cup: 1 02 Gas:    0.23 LPM
State: Idle                                          Xmit: Off Autosampler: Co
```

```
AUTOSAMPLER:  Rack entry   Rack 111999a
cup Id          Extended id          Weight Volume Macro check Help
 1 icp                               1.0000 1.0000
 2 rbwb4                             1.0000 1.0000
 3 rbwb4 dup                         1.0000 1.0000
 4 rbwb4 trp                         1.0000 1.0000
 5 Swb1                              1.0000 1.0000
 6 Swb1 dup                          1.0000 1.0000
 7 Swb1 spk                          1.0000 1.0000
 8 Swb2                              1.0000 1.0000
 9 Swb2 dup                          1.0000 1.0000
10 Swb3                              1.0000 1.0000
11 Swb3 dup                          1.0000 1.0000
12 Swb4                              1.0000 1.0000
13 Swb4 dup                          1.0000 1.0000
14 rbgp4                             1.0000 1.0000
15 rbgp4 dup                         1.0000 1.0000
                                                                    PgDn
```

```
Cup 1  ID: icp                                  Cell entry, Ins to switch
```

```
Protocol: SYSTEST                                                          =
                        Rev: 3.001   Time: 16:18:49  19 Nov 1999
Folder: NOV99B          Seq: 630                     Print: On
User:                   Batch:            Id: rowc4      Cup: 1 02 Gas:    0.23 LPM
State: Idle                                              Xmit: Off Autosampler: On
```

AUTOSAMPLER: Rack entry Rack 111999a PgUp

Cup	Id	Extended id	Weight	Volume	Macro check	Help
16	5gc1		1.0000	1.0000		
17	5gc1 dup		1.0000	1.0000		
18	5gc2		1.0000	1.0000		
19	5gc2 dup		1.0000	1.0000		
20	5gc3		1.0000	1.0000		
21	5gb3 dup		1.0000	1.0000		
22	5gc4		1.0000	1.0000		
23	5gb4 dup		1.0000	1.0000		
24	ccb		1.0000	1.0000		
25	ccv		1.0000	1.0000		
26	5gb5		1.0000	1.0000		
27	5gb5 dup		1.0000	1.0000		
28	5gb5 trp		1.0000	1.0000		
29	5gc6		1.0000	1.0000		
30	5gb6 dup		1.0000	1.0000		

PgDn

```
Cup 16 ID: 5gc1                                   Cell entry, Ins to switch
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 16:18:52  19 Nov 1999
Folder: NOV99B      Seq: 630                    Print: On
User:               Batch:            Id: rbwb4      Cuo: 1 02 Gas:    0.23 LPM
State: Idle                                        Xmit: Off Autosampler: Op
```

```
AUTOSAMPLER:  Rack entry   Rack 111999a                                    PgUp
cuo Id          Extended id          Weight Volume Macro check Help
31 5gb6 spk                          1.0000 1.0000
32 5gb7                              1.0000 1.0000
33 5gb7 dup                          1.0000 1.0000
34 5gb8                              1.0000 1.0000
35 5gb8 dup                          1.0000 1.0000
36 ccb                               1.0000 1.0000
37 ccv                               1.0000 1.0000
38                                   1.0000 1.0000
39                                   1.0000 1.0000
40                                   1.0000 1.0000
41                                   1.0000 1.0000
42                                   1.0000 1.0000
43                                   1.0000 1.0000
44                                   1.0000 1.0000

                                                                           PgDn
```

```
Cuo 31 ID: 5gb6 spk                          Call entry, Ins to switch
```

*** Standard: 1 Rep: 1 Seq: 585 13:48:00 19 Nov 1999 HG

Hg .000 ug/L -522
Ave. Int. = -522 S. D. = 0

*** Standard: 2 Rep: 1 Seq: 586 13:50:22 19 Nov 1999 HG

Hg .200 ug/L 8546
Ave. Int. = 8546 S. D. = 0

*** Standard: 3 Rep: 1 Seq: 587 13:52:45 19 Nov 1999 HG

Hg .500 ug/L 21538
Ave. Int. = 21538 S. D. = 0

*** Standard: 4 Rep: 1 Seq: 588 13:55:09 19 Nov 1999 HG

Hg 1.00 ug/L 44741
Ave. Int. = 44741 S. D. = 0

*** Standard: 5 Rep: 1 Seq: 589 13:57:35 19 Nov 1999 HG

Hg 2.00 ug/L 88336
Ave. Int. = 88336 S. D. = 0

*** Standard: 6 Rep: 1 Seq: 590 14:00:46 19 Nov 1999 HG

Hg 3.00 ug/L 131285
Ave. Int. = 131285 S. D. = 0

Protocol: SYSTEST

Rev: 3.001 Time: 14:01:18 19 Nov 1999

Folder: NOV99B Seq: 591 Print: On

User: Batch: Id: Std6Rep1 Cup: 1 07 Gas: 0.23 LPM

State: Idle Xmit: Off Autosampler: On

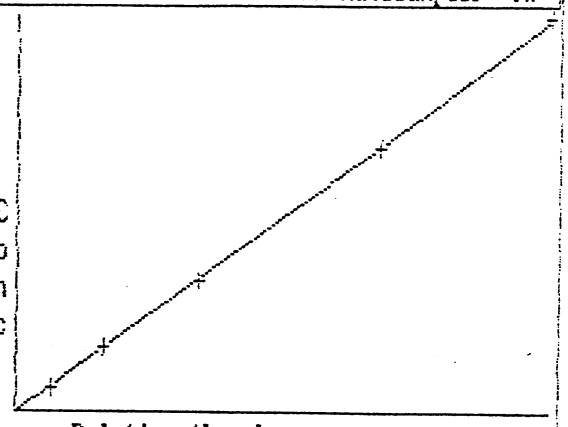
CALIBRATION: Line Calibration

Line: Hg

	Conc.	Calc.	Dev.	Accepted
S1	.000	-.009	-.009	LiNear
S2	.200	.198	-.002	Quadratic
S3	.500	.493	-.007	WtdLinear
S4	1.00	1.02	.020	Accept
S5	2.00	2.01	.011	
S6	3.00	2.99	-.013	StdAdd

A .0000000 r .999939

B 2.27272e-5 C 3.32871e-3



	Mean	%RSD	
S1	-522	0	-522
S2	8546	0	8546
S3	21538	0	21538
S4	44741	0	44741
S5	88336	0	88336
S6	131265	0	131265

33?

New calibration coefficients stored

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Check Standard: 2 Ck2 Seq: 591 14:10:52 19 Nov 1999 HB

Line	Flag	%Rcv.	Found	True	Units	SD/RSD
Hg		102.	.617	.604	ug/L	.000

*** Sample ID: icb Seq: 592 14:16:50 19 Nov 1999 HB

Hg -.002 ug/L .000 -.002 <0.20ug/L

*** Sample ID: rbwb3 Seq: 593 14:19:07 19 Nov 1999 HB

Hg .011 ug/L .000 .011 <4.0ug/L

*** Sample ID: rbwb3 dup Seq: 594 14:21:24 19 Nov 1999 HB RPD-N/A

Hg .006 ug/L .000 .006 <4.0ug/L

*** Sample ID: rbwb3 trp Seq: 595 14:23:41 19 Nov 1999 HB RPD-N/A

Hg .004 ug/L .000 .004 <4.0ug/L

*** Sample ID: 4wb1 Seq: 596 14:25:58 19 Nov 1999 HB

Hg .006 ug/L .000 .006 <0.68ug

*** Sample ID: 4wb1 dup Seq: 597 14:28:15 19 Nov 1999 HB RPD-N/A

Hg .004 ug/L .000 .004 <0.68ug

*** Sample ID: 4wb1 spk Seq: 598 14:30:38 19 Nov 1999 HB

Hg .964 ug/L .000 .964 96%

*** Sample ID: 4wb2 Seq: 599 14:33:00 19 Nov 1999 HB

Hg -.008 ug/L .000 -.008 <0.78ug

*** Sample ID: 4wb2 dup Seq: 600 14:35:18 19 Nov 1999 HB RPD-N/A

Hg .011 ug/L .000 .011 <0.78ug

*** Sample ID: 4wb3 Seq: 601 14:43:18 19 Nov 1999 HB

Hg .011 ug/L .000 .011 <0.64ug

*** Sample ID: 4wb3 dup Seq: 602 14:45:36 19 Nov 1999 HB RPD-N/A

Hg .006 ug/L .000 .006 <0.64ug

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: 4wb4					Seq: 602	14:47:54 19 Nov 1999 HG		
Hg	.005	ug/L	.000	.005				
*** Sample ID: 4wb4 dup					Seq: 604	14:50:10 19 Nov 1999 HG		
Hg	.007	ug/L	.000	.007				
*** Sample ID: rcqo3					Seq: 605	14:52:27 19 Nov 1999 HG		
Hg	.004	ug/L	.000	.004				
*** Sample ID: rcqo3 dup					Seq: 606	14:54:44 19 Nov 1999 HG		
Hg	.007	ug/L	.000	.007				
*** Sample ID: 4qb1					Seq: 607	14:57:01 19 Nov 1999 HG		
Hg	.003	ug/L	.000	.003				
*** Sample ID: 4qb1 dup					Seq: 608	14:59:18 19 Nov 1999 HG		
Hg	.005	ug/L	.000	.005				
*** Sample ID: 4qb2					Seq: 609	15:01:36 19 Nov 1999 HG		
Hg	.054	ug/L	.000	.054				
*** Sample ID: 4qb2 dup					Seq: 610	15:03:54 19 Nov 1999 HG		
Hg	.053	ug/L	.000	.053				
*** Sample ID: 4qb3					Seq: 611	15:06:12 19 Nov 1999 HG		
Hg	.040	ug/L	.000	.040				
*** Sample ID: 4qb3 dup					Seq: 612	15:08:30 19 Nov 1999 HG		
Hg	.039	ug/L	.000	.039				
*** Sample ID: 4qb4					Seq: 613	15:10:48 19 Nov 1999 HG		
Hg	.086	ug/L	.000	.086				
*** Sample ID: 4qb4 dup					Seq: 614	15:13:06 19 Nov 1999 HG		
Hg	.086	ug/L	.000	.086				

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccb					Seq: 615	15:15:25 19 Nov 1999 HG		
Hg	.001	ug/L	.000	.001			<0.2ug/L	
*** Sample ID: ccv					Seq: 616	15:17:43 19 Nov 1999 HG		
Hg	2.02	ug/L	.000	2.02			101%	
*** Sample ID: 4gb5					Seq: 617	15:20:06 19 Nov 1999 HG		
Hg	-.004	ug/L	.000	-.004			<0.62ug	
*** Sample ID: 4gb5 dup					Seq: 618	15:22:24 19 Nov 1999 HG	RPD-N/A	
Hg	.004	ug/L	.000	.004			<0.62ug	
*** Sample ID: 4gb5 trp					Seq: 619	15:24:42 19 Nov 1999 HG	RPD-N/A	
Hg	.004	ug/L	.000	.004			<0.62ug	
*** Sample ID: 4gb6					Seq: 620	15:27:00 19 Nov 1999 HG		
Hg	.039	ug/L	.000	.039			<0.60ug	
*** Sample ID: 4gb6 dup					Seq: 621	15:29:18 19 Nov 1999 HG	RPD-N/A	
Hg	.037	ug/L	.000	.037			<0.60ug	
*** Sample ID: 4gb6 spk					Seq: 622	15:31:37 19 Nov 1999 HG		
Hg	1.05	ug/L	.000	1.05			105%	
*** Sample ID: 4gb7					Seq: 623	15:33:57 19 Nov 1999 HG		
Hg	.174	ug/L	.000	.174			<0.68ug	
*** Sample ID: 4gb7 dup					Seq: 624	15:36:16 19 Nov 1999 HG	RPD-N/A	
Hg	.180	ug/L	.000	.180			<0.68ug	
*** Sample ID: 4gb8					Seq: 625	15:38:36 19 Nov 1999 HG		
Hg	.174	ug/L	.000	.174			<0.72ug	
*** Sample ID: 4gb8 dup					Seq: 626	15:40:56 19 Nov 1999 HG	RPD-N/A	
Hg	.174	ug/L	.000	.174			<0.72ug	

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccb					Seq: 627	15:43:16 19 Nov 1999 HG		
Hg	.004	ug/L	.000	.004			<0.2ug/L	
*** Sample ID: ccv					Seq: 628	15:45:36 19 Nov 1999 HG		
Hg	1.99	ug/L	.000	1.99			99%	

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Check Standard: 2 Ck2 Seq: 630 16:20:20 19 Nov 1999 HG

Line	Flag	%Rcv.	Found	True	Units	SD/RSD
Hg		98.8	.597	.604	ug/L	.000

*** Sample ID: icb Seq: 631 16:22:46 19 Nov 1999 HG

Hg -.003 ug/L .000 -.003 <0.20 µg/L

*** Sample ID: rbwb4 Seq: 632 16:25:03 19 Nov 1999 HG

Hg .005 ug/L .000 .005 <2.0 µg/L

*** Sample ID: rbwb4 dup Seq: 633 16:27:20 19 Nov 1999 HG RPD-N/A

Hg .010 ug/L .000 .010 <2.0 µg/L

*** Sample ID: rbwb4 trp Seq: 634 16:29:37 19 Nov 1999 HG RPD-N/A

Hg .005 ug/L .000 .005 <2.0 µg/L

*** Sample ID: 5wb1 Seq: 635 16:31:54 19 Nov 1999 HG

Hg .003 ug/L .000 .003 <0.93 µg

*** Sample ID: 5wb1 dup Seq: 636 16:34:11 19 Nov 1999 HG RPD-N/A

Hg .003 ug/L .000 .003 <0.93 µg

*** Sample ID: 5wb1 spk Seq: 637 16:36:28 19 Nov 1999 HG

Hg 1.02 ug/L .000 1.02 102%

*** Sample ID: 5wb2 Seq: 638 16:38:47 19 Nov 1999 HG

Hg 1.01 ug/L .000 1.01 5.1 µg

*** Sample ID: 5wb2 dup Seq: 639 16:41:05 19 Nov 1999 HG RPD=1.96%

Hg 1.03 ug/L .000 1.03 5.2 µg

*** Sample ID: 5wb3 Seq: 640 16:43:26 19 Nov 1999 HG

Hg .999 ug/L .000 .999 4.90 µg

*** Sample ID: 5wb3 dup Seq: 641 16:45:46 19 Nov 1999 HG RPD=1.09%

Hg 1.01 ug/L .000 1.01 4.95 µg

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: Swc4					Seq: 642	16:48:04 19 Nov 1999 HG		
						5.39µg		
Hg	1.16	ug/L	.000	1.16				
*** Sample ID: Swc4 dup					Seq: 643	16:50:25 19 Nov 1999 HG	RPD=0.858%	
						5.44µg		
Hg	1.17	ug/L	.000	1.17				
*** Sample ID: rogo4					Seq: 644	16:52:44 19 Nov 1999 HG		
						<2.0µg/L		
Hg	-.006	ug/L	.000	-.006				
*** Sample ID: rogo4 dup					Seq: 645	16:55:01 19 Nov 1999 HG	RPD NA	
						<2.0µg/L		
Hg	.003	ug/L	.000	.003				
*** Sample ID: Sgb1					Seq: 646	16:57:18 19 Nov 1999 HG		
						<0.90µg		
Hg	.004	ug/L	.000	.004				
*** Sample ID: Sgb1 dup					Seq: 647	16:59:35 19 Nov 1999 HG		
						<0.90µg		
Hg	.007	ug/L	.000	.007				
*** Sample ID: Sgo2					Seq: 648	17:01:53 19 Nov 1999 HG		
						4.6µg		
Hg	1.00	ug/L	.000	1.00				
*** Sample ID: Sgo2 dup					Seq: 649	17:04:12 19 Nov 1999 HG	RPD=1.0%	
						4.55µg		
Hg	.990	ug/L	.000	.990				
*** Sample ID: Sgo3					Seq: 650	17:06:30 19 Nov 1999 HG		
						1.82µg		
Hg	.357	ug/L	.000	.357				
*** Sample ID: Sgo3 dup					Seq: 651	17:08:48 19 Nov 1999 HG	RPD=1.39%	
						1.84µg		
Hg	.362	ug/L	.000	.362				
*** Sample ID: Sgo4					Seq: 652	17:11:07 19 Nov 1999 HG		
						2.34µg		
Hg	.390	ug/L	.000	.390				
*** Sample ID: Sgo4 dup					Seq: 653	17:13:25 19 Nov 1999 HG	RPD=1.02%	
						2.36µg		
Hg	.394	ug/L	.000	.394				

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccb					Seq: 654	17:15:43 19 Nov 1999 HG		
Hg	-.001	ug/L	.000	-.001				
*** Sample ID: ccv					Seq: 655	17:18:01 19 Nov 1999 HG		
Hg	1.95	ug/L	.000	1.95				
*** Sample ID: 5gb5					Seq: 656	17:20:30 19 Nov 1999 HG		
Hg	-.005	ug/L	.000	-.005				
*** Sample ID: 5gb5 dup					Seq: 657	17:22:48 19 Nov 1999 HG		
Hg	.004	ug/L	.000	.004				
*** Sample ID: 5gb5 trp					Seq: 658	17:25:06 19 Nov 1999 HG		
Hg	.004	ug/L	.000	.004				
*** Sample ID: 5gb6					Seq: 659	17:27:24 19 Nov 1999 HG		
Hg	2.04	ug/L	.000	2.04				
*** Sample ID: 5gb6 dup					Seq: 660	17:29:47 19 Nov 1999 HG		
Hg	2.04	ug/L	.000	2.04				
*** Sample ID: 5gb6 sdk					Seq: 661	17:32:17 19 Nov 1999 HG		
Hg	1.74	ug/L	.000	1.74				
*** Sample ID: 5gc7					Seq: 662	17:34:51 19 Nov 1999 HG		
Hg	1.75	ug/L	.000	1.75				
*** Sample ID: 5gb7 dup					Seq: 663	17:37:16 19 Nov 1999 HG		
Hg	1.77	ug/L	.000	1.77				
*** Sample ID: 5gb8					Seq: 664	17:39:44 19 Nov 1999 HG		
Hg	1.94	ug/L	.000	1.94				
*** Sample ID: 5gb8 dup					Seq: 665	17:42:06 19 Nov 1999 HG		
Hg	1.91	ug/L	.000	1.91				

55

CO.2 ug/L
98%
<0.96 ug
RPD-NA
<0.96 ug
RPD-NA
<0.96 ug
10.3 ug
RPD-NA
10.3 ug
WRONG SAMPLE
NO DATA SPIKE
8.93 ug
RPD=1.14%
9.03 ug
9.51 ug
RPD=1.56%
9.36 ug

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccb					Seq: 666	17:44:39 19 Nov 1999 HG		
Hg	-.009	ug/L	.000	-.009			<0.2 ug/L	
*** Sample ID: ccv					Seq: 667	17:47:00 19 Nov 1999 HG		
Hg	1.96	ug/L	.000	1.96			98%	

11/20/99 Analytical Run Data

```
Protocol: SYSTEST
                        Rev: 3.001    Time: 10:40:56  20 Nov 1999
Folder: NOV99B          Seq: 675                      Print: On
User:                   Batch:              Id: icb        Cuo: 1 01 Gas:    0.23 LPM
State: Idle                                                Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 112099a
cup Id          Extended id          Weight Volume Macro check Help
 1 icb                               1.0000 1.0000
 2 13wb1                             1.0000 1.0000
 3 13wb1 dup                         1.0000 1.0000
 4 13wb1 trp                         1.0000 1.0000
 5 13wb2                             1.0000 1.0000
 6 13wb2 dup                         1.0000 1.0000
 7 13wb2 spk                         1.0000 1.0000
 8 13wb3                             1.0000 1.0000
 9 13wb3 dup                         1.0000 1.0000
10 13wb4                             1.0000 1.0000
11 13wb4 dup                         1.0000 1.0000
12 rb1                               1.0000 1.0000
13 rb1 dup                           1.0000 1.0000
14 13gb1                             1.0000 1.0000
15 13gb1 dup                         1.0000 1.0000
                                                                                PgDn

Cup 1  ID: icb                                   Call entry, Ins to switch
```

```
Protocol: SYSTEST
                        Rev: 3.001   Time: 10:41:06  20 Nov 1999
Folder: NOV99B          Seq: 675                     Print: On
User:                   Batch:            Id: icb        Cup: 1 01 Gas:    0.23 LPM
State: Idle                                            Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 112099a                                        PgUp
cup Id          Extended id          Weight Volume Macro check Help
16 13gb2                             1.0000 1.0000
17 13gb2 dup                         1.0000 1.0000
18 13gb3                             1.0000 1.0000
19 13gb3 dup                         1.0000 1.0000
20 13gb4                             1.0000 1.0000
21 13gb4 dup                         1.0000 1.0000
22 ccb                               1.0000 1.0000
23 ccv                               1.0000 1.0000
24                                   1.0000 1.0000
25                                   1.0000 1.0000
26                                   1.0000 1.0000
27                                   1.0000 1.0000
28                                   1.0000 1.0000
29                                   1.0000 1.0000
30                                   1.0000 1.0000
                                                                              PgDn

Cup 16 ID: 13gb2                                   Cell entry, Ins to switch
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 11:48:28  20 Nov 1999
Folder: NOV99B      Seq: 698                     Print: On
User:               Batch:            Id: ccv        Cuv: 1 23 Gas:    0.23 LPM
State: Idle                                          Xmit: Off Autosampler: On
```

```
AUTOSAMPLER:  Rack entry   Rack 112099a
cup Id        Extended id          Weight Volume Macro check Help
 1 icb                             1.0000 1.0000
 2 blk                             1.0000 1.0000
 3 blk dup                         1.0000 1.0000
 4 la33b                           1.0000 1.0000
 5 la33b dup                       1.0000 1.0000
 6 ftx8                            1.0000 1.0000
 7 ftx8 dup                        1.0000 1.0000
 8 ftx8 trp                        1.0000 1.0000
 9 ftx9                            1.0000 1.0000
10 ftx9 dup                        1.0000 1.0000
11 ftx9 spk                        1.0000 1.0000
12 wo1a                            1.0000 1.0000
13 wo1a dup                        1.0000 1.0000
14 wo2                             1.0000 1.0000
15 wo2 dup                         1.0000 1.0000
                                                                          PgDn
```

```
Cup 3  ID: blk dup                          Call entry, Ins to switch
```

Protocol: SYSTEST

Folder: NOV995 | Rev: 3.001 | Seq: 698 | Batch: | Time: 11:49:28 20 Nov 1999 | Print: On | Io: ccv | Cup: 1 23 Gas: 0.23 LPM | Xmit: Off | Autosampler: On

State: Idle

AUTOSAMPLER: Rack entry Rack 112099a PgUp

Cup Id	Extended id	Weight	Volume	Macro check	Help
16 wb3		1.0000	1.0000		
17 wc3 dup		1.0000	1.0000		
18 wb4		1.0000	1.0000		
19 wb4 dup		1.0000	1.0000		
20 gb5 1:50		1.0000	1.0000		
21 gb5 dup 1:50		1.0000	1.0000		
22 gb2		1.0000	1.0000		
23 gb2 dup		1.0000	1.0000		
24 ccb		1.0000	1.0000		
25 ccv		1.0000	1.0000		
26 gb3 1/10		1.0000	1.0000		
27 gb3 dup 1/10		1.0000	1.0000		
28 gb3 trc 1/10		1.0000	1.0000		
29 gb6 1/5		1.0000	1.0000		
30 gb6 dup 1/5		1.0000	1.0000		

PgDn

Cup 16 ID: wc3 Cell entry, Ins to switch

Protocol: SYSTEST

Folder: NOV99B
User:
State: Idle

Rev: 3.001
Seq: 698
Batch:

Time: 11:49:35 20 Nov 1999
Print: On
Id: ccv
Cuo: 1 23 Gas: 0.23 LPM
Xmit: Off Autosampler: On

AUTOSAMPLER: Rack entry Rack 112099a

PgUp

Cup	Id	Extended id	Weight	Volume	Macro	check	Help
31	gb6	spk 15	1.0000	1.0000			
32	ccb		1.0000	1.0000			
33	ccv		1.0000	1.0000			
34			1.0000	1.0000			
35			1.0000	1.0000			
36			1.0000	1.0000			
37			1.0000	1.0000			
38			1.0000	1.0000			
39			1.0000	1.0000			
40			1.0000	1.0000			
41			1.0000	1.0000			
42			1.0000	1.0000			
43			1.0000	1.0000			
44			1.0000	1.0000			

PgDn

Cup 31 ID: gob spk

Call entry, Ins to switch

Time Conc. Units SD-RSD 1 2 3 4 5

```
Protocol: SYSTEST
                        Rev: 3.001    Time: 13:45:19  20 Nov 1999
Folder: NOV99B          Seq: 739                      Print: On
User:                   Batch:              Id: ccv        Cup: 1 33 Bas:    0.23 LPM
State: Idle                                                Xmit: Off Autosampler: On
```

```
AUTOSAMPLER:  Rack entry   Rack 112099a
Cup Id          Extended Id          Weight Volume Macro check Help
 1 ico                               1.0000 1.0000
 2 gb8                               1.0000 1.0000
 3 gb8 dup                           1.0000 1.0000
 4 gb8 trp                           1.0000 1.0000
 5 Igb9                              1.0000 1.0000
 6 gb9 dup                           1.0000 1.0000
 7 gb9 spk                           1.0000 1.0000
 8 gb10                              1.0000 1.0000
 9 gb10 dup                          1.0000 1.0000
10 gb11                              1.0000 1.0000
11 gb11 dup                          1.0000 1.0000
12 gb13                              1.0000 1.0000
13 gb13 dup                          1.0000 1.0000
14 gb15a                             1.0000 1.0000
15 gb15a dup                         1.0000 1.0000
                                                                                PgDn
Cup 1  ID: ico                                   Cell entry, Ins to switch
```

```
Protocol: SYSTEST
                        Rev: 3.001   Time: 13:45:27  20 Nov 1999
Folder: NOV99B          Seq: 739                     Print: On
User:                   Batch:            Id: ccv        Cup: 1 33 Gas:    0.23 LPM
State: Idle                                              Xmit: Off Autosampler: On

AUTOSAMPLER:  Pack entry   Rack 112099a                                        PgUp
cup Id        Extended id          Weight Volume Macro check Help
16 gb12                            1.0000 1.0000
17 gb12 dup                        1.0000 1.0000
18 blk                             1.0000 1.0000
19 blk dup                         1.0000 1.0000
20 1633b                           1.0000 1.0000
21 1633b dup                       1.0000 1.0000
22 ccb                             1.0000 1.0000
23 ccv                             1.0000 1.0000
24                                 1.0000 1.0000
25                                 1.0000 1.0000
26                                 1.0000 1.0000
27                                 1.0000 1.0000
28                                 1.0000 1.0000
29                                 1.0000 1.0000
30                                 1.0000 1.0000
                                                                              PgDn

Cup 16 ID: gb12                                   Call entry, Ins to switch
```

*** Standard: 1 Rep: 1 Seq: 668 10:05:36 20 Nov 1999 HG

Hg .000 ug/L -281
Ave. Int. = -281 S. D. = 0

*** Standard: 2 Rep: 1 Seq: 669 10:07:58 20 Nov 1999 HG

Hg .200 ug/L 9077
Ave. Int. = 9077 S. D. = 0

*** Standard: 3 Rep: 1 Seq: 670 10:10:20 20 Nov 1999 HG

Hg .500 ug/L 22309
Ave. Int. = 22309 S. D. = 0

*** Standard: 4 Rep: 1 Seq: 671 10:12:43 20 Nov 1999 HG

Hg 1.00 ug/L 46590
Ave. Int. = 46590 S. D. = 0

*** Standard: 5 Rep: 1 Seq: 672 10:15:10 20 Nov 1999 HG

Hg 2.00 ug/L 90105
Ave. Int. = 90105 S. D. = 0

*** Standard: 6 Rep: 1 Seq: 673 10:32:15 20 Nov 1999 HG

Hg 3.00 ug/L 130620
Ave. Int. = 130620 S. D. = 0

Protocol: SYSTEST

Rev: 3.001 Time: 10:32:37 20 Nov 1999

Folder: NOV99B Seq: 674 Print: On

User: Batch: Id: Std6Rep1 Cup: 1 37 Gas: 8.23 LPM

State: Idle Xmit: Off Autosampler: On

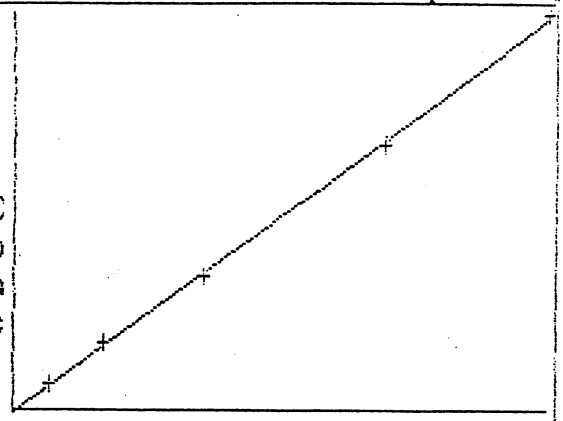
CALIBRATION: Line Calibration

Line: Hg

	Conc.	Calc.	Dev.	Accepted LiNear	
S1	.000	-.024	-.024	Quadratic	
S2	.200	.190	-.010	WtdLinear	
S3	.500	.491	-.009		C
S4	1.00	1.04	.045	Accept	o
S5	2.00	2.04	.037		n
S6	3.00	2.96	-.039	StdAdd	c

A .0000000 r .999583

B 2.27976e-5 C -1.72078e-2



Relative Absorbance

	Mean	%RSD	
S1	-281	0	-281
S2	9077	0	9077
S3	22389	0	22389
S4	46598	0	46598
S5	90105	0	90105
S6	130620	0	130620

33?

New calibration coefficients stored

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Check Standard: 2 Ck2 Seq: 674 10:37:48 20 Nov 1999 HG

Line	Flag	%Rcv.	Found	True	Units	SD/RSD
Hg		99.7	.602	.604	ug/L	.000

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: icb					Seq: 675	10:43:13 20 Nov 1999 HG		
Hg	-.020	ug/L	.000	-.020				
*** Sample ID: 13wb1					Seq: 676	10:45:30 20 Nov 1999 HG		
Hg	.085	ug/L	.000	.085				
*** Sample ID: 13wb1 dup					Seq: 677	10:47:47 20 Nov 1999 HG		
Hg	.084	ug/L	.000	.084				
*** Sample ID: 13wb1 tro					Seq: 678	10:50:04 20 Nov 1999 HG		
Hg	.085	ug/L	.000	.085				
*** Sample ID: 13wb2					Seq: 679	10:52:21 20 Nov 1999 HG		
Hg	.195	ug/L	.000	.195				
*** Sample ID: 13wb2 dup					Seq: 680	10:54:38 20 Nov 1999 HG		
Hg	.193	ug/L	.000	.193				
*** Sample ID: 13wb2 spk					Seq: 681	10:56:55 20 Nov 1999 HG		
Hg	1.21	ug/L	.000	1.21				
*** Sample ID: 13wb3					Seq: 682	10:59:15 20 Nov 1999 HG		
Hg	.075	ug/L	.000	.075				
*** Sample ID: 13wb3 dup					Seq: 683	11:01:32 20 Nov 1999 HG		
Hg	.084	ug/L	.000	.084				
*** Sample ID: 13wb4					Seq: 684	11:03:51 20 Nov 1999 HG		
Hg	.651	ug/L	.000	.651				
*** Sample ID: 13wb4 dup					Seq: 685	11:06:11 20 Nov 1999 HG		
Hg	.656	ug/L	.000	.656				
*** Sample ID: rb1					Seq: 686	11:08:30 20 Nov 1999 HG		
Hg	-.007	ug/L	.000	-.007				

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: rb1 dup				Seq: 687	11:10:46 20 Nov 1999 HG			
Hg	-.001	ug/L	.000	-.001				
*** Sample ID: 13gb1				Seq: 688	11:13:03 20 Nov 1999 HG			
Hg	.621	ug/L	.000	.621				
*** Sample ID: 13gb1 dup				Seq: 689	11:15:20 20 Nov 1999 HG			
Hg	.603	ug/L	.000	.603				
*** Sample ID: 13go2				Seq: 690	11:17:40 20 Nov 1999 HG			
Hg	.068	ug/L	.000	.068				
*** Sample ID: 13go2 dup				Seq: 691	11:19:57 20 Nov 1999 HG			
Hg	.065	ug/L	.000	.065				
*** Sample ID: 13go3				Seq: 692	11:22:15 20 Nov 1999 HG			
Hg	.641	ug/L	.000	.641				
*** Sample ID: 13go3 dup				Seq: 693	11:24:33 20 Nov 1999 HG			
Hg	.640	ug/L	.000	.640				
*** Sample ID: 13gb4				Seq: 694	11:26:52 20 Nov 1999 HG			
Hg	.150	ug/L	.000	.150				
*** Sample ID: 13gb4 dup				Seq: 695	11:29:10 20 Nov 1999 HG			
Hg	.153	ug/L	.000	.153				
*** Sample ID: ccb				Seq: 696	11:31:28 20 Nov 1999 HG			
Hg	-.018	ug/L	.000	-.018				
*** Sample ID: ccv				Seq: 697	11:33:46 20 Nov 1999 HG			
Hg	2.00	ug/L	.000	2.00				

*** Check Standard: 2 Ck2 Seq: 699 11:53:44 20 Nov 1999 HG

Line	Flag	%Rcv.	Found	True	Units	SD/RSD	
Hg		97.6	.589	.604	ug/L	.000	--

*** Sample ID: icb Seq: 700 11:56:03 20 Nov 1999 HG

Hg -.027 ug/L .000 -.027 <0.2µg/L

*** Sample ID: blk Seq: 701 11:58:20 20 Nov 1999 HG

Hg .087 ug/L .000 .087 <0.2µg/L

*** Sample ID: blk dup Seq: 702 12:00:37 20 Nov 1999 HG

Hg .081 ug/L .000 .081 <0.2µg/L

*** Sample ID: 1633b Seq: 703 12:02:54 20 Nov 1999 HG

Hg 1.55 ug/L .000 1.55 TV=0.141 0.155 µg/g DW 110%

*** Sample ID: 1633b dup Seq: 704 12:05:15 20 Nov 1999 HG RPD=1.29%

Hg 1.53 ug/L .000 1.53 TV=0.141 0.153 µg/g DW 109%

*** Sample ID: ftx8 Seq: 705 12:07:38 20 Nov 1999 HG

Hg .906 ug/L .000 .906 8/28/99

*** Sample ID: ftx8 dup Seq: 706 12:10:00 20 Nov 1999 HG

Hg .922 ug/L .000 .922

*** Sample ID: ftx8 trp Seq: 707 12:12:19 20 Nov 1999 HG

Hg .922 ug/L .000 .922

*** Sample ID: ftx9 Seq: 708 12:14:39 20 Nov 1999 HG

Hg 1.52 ug/L .000 1.52

*** Sample ID: ftx9 dup Seq: 709 12:17:03 20 Nov 1999 HG

Hg 1.52 ug/L .000 1.52

*** Sample ID: [illegible] Seq: [illegible] [illegible] Nov 1999 HG

Hg 2.50 ug/L .000 2.50 12/8/99

~~*** Sample ID: wo1a 47Q53 Seq: 711 12:21:53 20 Nov 1999 HG~~

~~Hg .022 ug/L .000 .022~~ <0.01µg

*** Sample ID: wo1a dup 47Q53DUP Seq: 712 12:24:09 20 Nov 1999 HG RPD-N/A

Hg .029 ug/L .000 .029 <0.01µg

*** Sample ID: wo2 47Q51 Seq: 713 12:26:25 20 Nov 1999 HG

Hg .064 ug/L .000 .064 <0.01µg

*** Sample ID: wo2 dup 47Q51DUP Seq: 714 12:29:42 20 Nov 1999 HG RPD-N/A

Hg .063 ug/L .000 .063 <0.01µg

*** Sample ID: wo3 47Q52 Seq: 715 12:30:59 20 Nov 1999 HG

Hg .080 ug/L .000 .080 <0.01µg

*** Sample ID: wo3 dup 47Q52DUP Seq: 716 12:33:16 20 Nov 1999 HG RPD-N/A

Hg .081 ug/L .000 .081 <0.01µg

*** Sample ID: wo4 47Q56 Seq: 717 12:35:34 20 Nov 1999 HG

Hg .306 ug/L .000 .306 0.02µg

*** Sample ID: wo4 dup 47Q56DUP Seq: 718 12:37:52 20 Nov 1999 HG RPD=0.33%

~~Hg .305 ug/L .000 .305~~ 0.02µg

*** Sample ID: go5 Q39 Seq: 719 12:40:10 20 Nov 1999 HG

Hg 32.8 ug/L .000 32.8 No data, >LR

*** Sample ID: go5 dup Q39DUP Seq: 720 12:43:08 20 Nov 1999 HG

Hg 32.9 ug/L .000 32.9 No data, >LR

*** Sample ID: go2 Q33 Seq: 721 12:46:09 20 Nov 1999 HG

Hg 1.40 ug/L .000 1.40 1.18µg

Line Conc. Units SD/RSD 1 2 3 4 5

*** Sample ID: qc1 dup Q33dup Seq: 722 12:48:29 20 Nov 1999 HG RPD=1.42%

Hg 1.42 ug/L .000 1.42 1.20µg

*** Sample ID: qb5 1:50 Seq: 723 12:52:07 20 Nov 1999 HG

Hg .804 ug/L .000 .804 40.11µg

*** Sample ID: qb5 dup 1:50 Seq: 724 12:54:26 20 Nov 1999 HG RPD=0.87%

Hg .811 ug/L .000 .811 40.46µg

*** Sample ID: ccb Seq: 725 13:02:38 20 Nov 1999 HG

Hg -.022 ug/L .000 -.022 <0.2µg/L

*** Sample ID: ccv Seq: 726 13:04:56 20 Nov 1999 HG

Hg 1.96 ug/L .000 1.96 98%

*** Sample ID: qb3 Seq: 727 13:07:25 20 Nov 1999 HG

Hg 8.32 ug/L .000 8.32 NO DATA, >LR

*** Sample ID: qb3 dup Seq: 728 13:10:05 20 Nov 1999 HG

Hg 8.23 ug/L .000 8.23 NO DATA, >LR

*** Sample ID: qb3 trp Seq: 729 13:12:39 20 Nov 1999 HG

Hg 8.34 ug/L .000 8.34 NO DATA, >LR

*** Sample ID: qb3 1:10 Seq: 730 13:17:17 20 Nov 1999 HG

Hg .877 ug/L .000 .877 9.65µg

*** Sample ID: qb3 dup 1:10 Seq: 731 13:19:35 20 Nov 1999 HG RPD=0.114%

Hg .876 ug/L .000 .876 9.64µg

*** Sample ID: qb3 trp 1:10 Seq: 732 13:21:54 20 Nov 1999 HG RPD=0.114%

Hg .876 ug/L .000 .876 9.64µg

*** Sample ID: qc6 Seq: 733 13:24:13 20 Nov 1999 HG

Hg 5.94 ug/L .000 5.94 NO DATA, >LR

Line Conc. Units SD/RSD 1 2 3 4 5

*** Sample ID: gb6 1:5 Seq: [illegible] [illegible] HG

Hg 1.20 ug/L .000 1.20 6.81 µg

*** Sample ID: gb6 dup 1:5 Seq: 735 13:31:41 20 Nov 1999 HG RPD - N/A

Hg 1.20 ug/L .000 1.20 6.81 µg

*** Sample ID: gb6 spk 1:5 Seq: 736 13:34:02 20 Nov 1999 HG

Hg 2.17 ug/L .000 2.17 97%

*** Sample ID: ccb Seq: 737 13:36:23 20 Nov 1999 HG

Hg -.031 ug/L .000 -.031 <0.2 µg/L

*** Sample ID: ccv Seq: 738 13:38:42 20 Nov 1999 HG

Hg 1.98 ug/L .000 1.98 99%

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Check Standard: 2 Ck2 Seq: 739 13:46:54 20 Nov 1999 HG

Line	Flag	%Rcv.	Found	True	Units	SD/RSD
Hg		95.1	.575	.604	ug/L	.000

*** Sample ID: icb Seq: 740 13:50:28 20 Nov 1999 HG
<0.2µg/L

Hg -.026 ug/L .000 -.026

*** Sample ID: gb8 Q57 Seq: 741 13:52:44 20 Nov 1999 HG
<0.01µg

Hg .044 ug/L .000 .044

*** Sample ID: gb8 dup Q57 dup Seq: 742 13:55:01 20 Nov 1999 HG RPD-N/A
<0.01µg

Hg .041 ug/L .000 .041

*** Sample ID: gb8 trp Q57trp Seq: 743 13:57:18 20 Nov 1999 HG RPD-N/A
<0.01µg

Hg .040 ug/L .000 .040

*** Sample ID: lgb9 Q58 Seq: 744 13:59:35 20 Nov 1999 HG
0.040µg

Hg .803 ug/L .000 .803

*** Sample ID: gb9 dup Q58 dup Seq: 745 14:01:52 20 Nov 1999 HG RPD=0.75%
0.040µg

Hg .797 ug/L .000 .797

*** Sample ID: gb9 spk Q58spk Seq: 746 14:04:10 20 Nov 1999 HG
105%

Hg 1.85 ug/L .000 1.85

*** Sample ID: gb10 Q61 Seq: 747 14:06:32 20 Nov 1999 HG
<0.01µg

Hg .101 ug/L .000 .101

*** Sample ID: gb10 dup Q61 dup Seq: 748 14:08:50 20 Nov 1999 HG RPD-N/A
<0.01µg

Hg .117 ug/L .000 .117

*** Sample ID: gb11 Q62 Seq: 749 14:11:09 20 Nov 1999 HG
<0.01µg

Hg .151 ug/L .000 .151

*** Sample ID: gb11 dup Q62 Seq: 750 14:13:28 20 Nov 1999 HG RPD-N/A
<0.01µg

Hg .149 ug/L .000 .149

14:15:45 20 Nov 1999 Folder: NOV99B Page 212
Protocol: SYSTEST

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: gb13 Q64					Seq: 751	14:15:45 20 Nov 1999 HG		
Hg	.030	ug/L	.000	.030		<0.01 µg		
*** Sample ID: gb13 dup Q64DUP					Seq: 752	14:18:01 20 Nov 1999 HG RPD-NA		
Hg	.036	ug/L	.000	.036		<0.01 µg		
*** Sample ID: gb15a Q65					Seq: 753	14:20:18 20 Nov 1999 HG		
Hg	.001	ug/L	.000	.001		<0.01 µg		
*** Sample ID: gb15a dup Q65DUP					Seq: 754	14:22:35 20 Nov 1999 HG RPD-NA		
Hg	-.002	ug/L	.000	-.002		<0.01 µg		
*** Sample ID: gb12 Q63					Seq: 755	14:24:52 20 Nov 1999 HG		
Hg	.042	ug/L	.000	.042		<0.01 µg		
*** Sample ID: gb12 dup Q63DUP					Seq: 756	14:27:09 20 Nov 1999 HG RPD-N/A		
Hg	.039	ug/L	.000	.039		<0.01 µg		
*** Sample ID: blk					Seq: 757	14:29:27 20 Nov 1999 HG		
Hg	-.001	ug/L	.000	-.001		<0.2 µg/L		
*** Sample ID: blk dup					Seq: 758	14:31:45 20 Nov 1999 HG		
Hg	-.000	ug/L	.000	-.000		<0.2 µg/L		
*** Sample ID: 1633b					Seq: 759	14:34:03 20 Nov 1999 HG 103%		
Hg	1.56	ug/L	.000	1.56		TV=0.141 0.145 µg/g DW		
*** Sample ID: 1633b dup					Seq: 760	14:36:24 20 Nov 1999 HG RPD=0.639%		
Hg	1.57	ug/L	.000	1.57		TV=0.141 0.146 µg/g DW 104%		
*** Sample ID: ccb					Seq: 761	14:38:48 20 Nov 1999 HG		
Hg	-.032	ug/L	.000	-.032		<0.2 µg/L		
*** Sample ID: ccv					Seq: 762	14:41:06 20 Nov 1999 HG		
Hg	1.89	ug/L	.000	1.89		95%		

11/30/99 Analytical Run Data

```
Protocol: SYSTEST
                    Rev: 3.001    Time: 19:50:56  30 Nov 1999
Folder: NOV99C      Seq: 258                     Print: On
User:               Batch:            Id: ccb        Cup: 1 39 Gas:    0.23 LPM
State: Idle                                          Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 113099a                                    PgUp
cup Id      Extended id          Weight Volume Macro check Help
16 rosv 11 cu                    1.00000 1.00000
17 ccb                           1.00000 1.00000
18 ccv                           1.00000 1.00000
19                               1.00000 1.00000
20                               1.00000 1.00000
21                               1.00000 1.00000
22                               1.00000 1.00000
23                               1.00000 1.00000
24                               1.00000 1.00000
25                               1.00000 1.00000
26                               1.00000 1.00000
27                               1.00000 1.00000
28                               1.00000 1.00000
29                               1.00000 1.00000
30                               1.00000 1.00000
                                                                           PgDn
Cup 16 ID: rosv 11 cu                          Call entry, Ins to switch
                                                              201 9  12
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 19:50:49  30 Nov 1999
Folder: NOV99C      Seq: 258                    Print: On
User:               Batch:            Id: ccb        Cup: 1 39 Gas:    0.23 LPM
State: Idle                                          Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 113099a
cup Id        Extended id          Weight Volume Macro check Help
 1 ccb                             1.00000 1.00000
 2 ccv                             1.00000 1.00000
 3 gb 1                            1.00000 1.00000
 4 gb 1 dup                        1.00000 1.00000
 5 gb 1 trp                        1.00000 1.00000
 6 gb 4                            1.00000 1.00000
 7 gb 4 dup                        1.00000 1.00000
 8 gb 4 spk                        1.00000 1.00000
 9 gb 7                            1.00000 1.00000
10 gb 7 dup                        1.00000 1.00000
11 gb 14a                          1.00000 1.00000
12 gb 14a dup                      1.00000 1.00000
13 rbsv 7                          1.00000 1.00000
14 rbsv 7 dup                      1.00000 1.00000
15 rbsv 11                         1.00000 1.00000
                                                                          PgDn

Cup 1  ID: ccb                          Cell entry, Ins to switch
                                                              Ins 9  12
```

*** Standard: 1 Rep: 1 Seq: 167 16:02:44 30 Nov 1999 HG

Hg .000 ug/L -470
Ave. Int. = -470 S. D. = 0

*** Standard: 2 Rep: 1 Seq: 168 16:05:06 30 Nov 1999 HG

Hg .200 ug/L 7779
Ave. Int. = 7779 S. D. = 0

*** Standard: 3 Rep: 1 Seq: 169 16:07:28 30 Nov 1999 HG

Hg .500 ug/L 19187
Ave. Int. = 19187 S. D. = 0

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Standard: 4 Rep: 1 Seq: 170 16:09:51 30 Nov 1999 HG

Hg 1.00 ug/L 39109
Ave. Int. = 39109 S. D. = 0

*** Standard: 5 Rep: 1 Seq: 171 16:12:15 30 Nov 1999 HG

Hg 2.00 ug/L 78438
Ave. Int. = 78438 S. D. = 0

*** Standard: 6 Rep: 1 Seq: 172 16:14:48 30 Nov 1999 HG

Hg 3.00 ug/L 117211
Ave. Int. = 117211 S. D. = 0

Protocol: SYSTEST

Rev: 3.001 Time: 16:15:31 30 Nov 1999

Folder: NOV99C Seq: 173 Print: On

User: Batch: Id: Std6Rep1 Cup: 1 19 Gas: 0.23 LPM

State: Idle Xmit: Off Autosampler: On

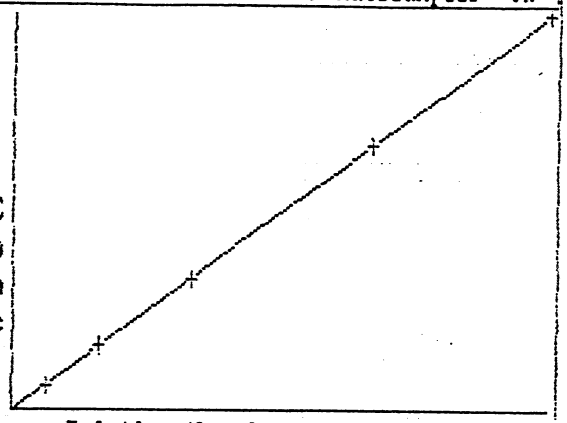
CALIBRATION: Line Calibration

Line: Hg

	Conc.	Calc.	Dev.	Accepted
S1	.000	-.005	-.005	LiNear
S2	.200	.205	.005	Quadratic
S3	.500	.496	-.004	WtdLinear
S4	1.00	1.00	.004	Accept
S5	2.00	2.01	.006	
S6	3.00	2.99	-.005	StdAdd

Conc

A	.0000000	r	.999989
B	2.54956e-5	C	6.52982e-3



Relative Absorbance

	Mean	%RSD	
S1	-470	0	-470
S2	7779	0	7779
S3	19187	0	19187
S4	39109	0	39109
S5	78438	0	78438
S6	117211	0	117211

33?

New calibration coefficients stored 149 2 5

*** Sample ID: ccb Seq: 259 19:55:57 30 Nov 1999 HG

Hg -.006 ug/L .000 -.006 <0.20 µg IC-

*** Sample ID: ccv Seq: 260 19:56:13 30 Nov 1999 HG

Hg 2.09 ug/L .000 2.09 105%

*** Sample ID: gb 1 Q32 Seq: 261 20:00:41 30 Nov 1999 HG

Hg .071 ug/L .000 .071 <0.01 µg

*** Sample ID: gb 1 dup Q32 dup Seq: 262 20:02:57 30 Nov 1999 HG RPD NA

Hg .083 ug/L .000 .083 <0.01 µg

*** Sample ID: gb 1 trp Q32 trp Seq: 263 20:05:14 30 Nov 1999 HG RPD NA

Hg .083 ug/L .000 .083 <0.01 µg

*** Sample ID: gb 4 Q38 Seq: 264 20:07:31 30 Nov 1999 HG

Hg .114 ug/L .000 .114 <0.01 µg

*** Sample ID: gb 4 dup Q38 Seq: 265 20:09:48 30 Nov 1999 HG RPD- NA

Hg .114 ug/L .000 .114 <0.01 µg

*** Sample ID: gb 4 spk Q38 spk Seq: 266 20:12:05 30 Nov 1999 HG

Hg 1.16 ug/L .000 1.16 116%

*** Sample ID: gb 7 Q41 Seq: 267 20:14:28 30 Nov 1999 HG

Hg .069 ug/L .000 .069 <0.01 µg

*** Sample ID: gb 7 dup Q41 Seq: 268 20:16:46 30 Nov 1999 HG RPD- NA

Hg .075 ug/L .000 .075 <0.01 µg

*** Sample ID: gb 14a Q42 Seq: 269 20:19:05 30 Nov 1999 HG

Hg .129 ug/L .000 .129 <0.01 µg

*** Sample ID: gb 14a dup Q42 dup Seq: 270 20:21:22 30 Nov 1999 HG RPD-N/A

Hg .131 ug/L .000 .131 <0.01 µg

*** Sample ID: rbsv 7 Seq: 271 20:23:38 30 Nov 1999 HG

Hg -.006 ug/L .000 -.006

*** Sample ID: rbsv 7 dup Seq: 272 20:25:55 30 Nov 1999 HG

Hg -.002 ug/L .000 -.002

888 12-blag

*** Sample ID: rbsv 11 Seq: 273 20:28:12 30 Nov 1999 HG

Hg -.002 ug/L .000 -.002

*** Sample ID: rbsv 11 du Seq: 274 20:30:29 30 Nov 1999 HG

Hg -.003 ug/L .000 -.003

*** Sample ID: ccb Seq: 275 20:32:46 30 Nov 1999 HG

Hg -.007 ug/L .000 -.007

*** Sample ID: ccv Seq: 276 20:35:04 30 Nov 1999 HG

Hg 2.07 ug/L .000 2.07

METCO Particulate Analysis Record

METCO Environmental

Particulate Analysis EPA Method 17

Thimbles and Backup Filters

Job Number 99-95G1B3 Location Owensville, Ind.

Job Name Cinergy Unit Tested #3 Precip. Inlet Dust

Desiccator Time In	1545 12/25				
Desiccator Time Out	1350 10/28	1020 10/29			

Run No. 1	Thimble No. Q33		Filter No. Q58		
Thimble Final Weight (g)	12.3008	12.3003	✓		
Thimble Initial Weight (g)	3.0580	3.0580			
Particulate (g)	9.2428	9.2423			
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1048	0.1048	✓		

Filter and Particulate Average (g) 0.1048 ✓
Initial Filter Weight (g) 0.1072
Filter Particulate Average (mg) 0 ✓
Thimble Particulate Average (mg) 9,242.6 ✓
Total Particulate (mg) [illegible]

Run No. 1	Thimble No. Q34		Filter No. —		
Thimble Final Weight (g)	16.3866	16.3862	✓		
Thimble Initial Weight (g)	3.2348	3.2348			
Particulate (g)	13.1518	13.1516			
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)					

Filter and Particulate Average (g) —
Initial Filter Weight (g) —
Filter Particulate Average (mg)
Thimble Particulate Average (mg) 13,151.6 ✓
Total Particulate (mg) 22,394.2 ✓

Run No. 3	Thimble No. Q39		Filter No. Q64 in pieces		
Thimble Final Weight (g)	13.4838	13.4834	✓		
Thimble Initial Weight (g)	3.2830	3.2830			
Particulate (g)	10.2008	10.2004			
Filter & Particulate + Tare Weight (g)					—
Tare Weight (g)					
Filter & Particulate (g)	0.1046	0.1048	✓		

Filter and Particulate Average (g) 0.1047 ✓
Initial Filter Weight (g) 0.1024
Filter Particulate Average (mg) 0 ✓
Thimble Particulate Average (mg) 10,200.6 ✓
Total Particulate (mg) 10,200.6 ✓

Analyst

METCO Environmental

Particulate Analysis EPA Method 17

Thimbles and Backup Filters

Job Number 99-95 G1B3 Location Owensville, Ind.

Job Name Cinergy Unit Tested #3 Precip. Inlet Duct

Desiccator Time In	1550 10/25				
Desiccator Time Out	1348 10/28	1025 10/29			

Run No. 4	Thimble No. Q40		Filter No. Q61		
Thimble Final Weight (g)	16.2053	16.2051	✓		
Thimble Initial Weight (g)	3.6254	3.6254			
Particulate (g)	12.5799	12.5797			
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1052	0.1054			

Filter and Particulate Average (g) 0.1053 ✓

Initial Filter Weight (g) 0.1074 ✓

Filter Particulate Average (mg) 0 ✓

Thimble Particulate Average (mg) 12,579.8 ✓

Total Particulate (mg) 12,579.8 ✓

Run No. _____	Thimble No. _____		Filter No. _____		
Thimble Final Weight (g)					
Thimble Initial Weight (g)					
Particulate (g)					
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)					

Filter and Particulate Average (g) _____

Initial Filter Weight (g) _____

Filter Particulate Average (mg) _____

Thimble Particulate Average (mg) _____

Total Particulate (mg) _____

Run No. _____	Thimble No. _____		Filter No. _____		
Thimble Final Weight (g)					
Thimble Initial Weight (g)					
Particulate (g)					
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)					

Filter and Particulate Average (g) _____

Initial Filter Weight (g) _____

Filter Particulate Average (mg) _____

Thimble Particulate Average (mg) _____

Total Particulate (mg) _____

MA

Analyst

METCO Environmental

Particulate Analysis EPA Method 17

Thimbles and Backup Filters

Job Number 99-95G1B3 Location Owensville, Ind.

Job Name Cinergy Unit Tested #3 Stack

Desiccator Time In	10/25				
Desiccator Time Out	1402 10/28	1035 10/29			

Run No. 1	Thimble No. Q32		Filter No. Q57		
Thimble Final Weight (g)	3.5635	3.5638	✓		
Thimble Initial Weight (g)	3.5185	3.5185			
Particulate (g)	0.0450	0.0453			
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1043	0.1046	✓		

Filter and Particulate Average (g) 0.1045 ✓

Initial Filter Weight (g) 0.1064

Filter Particulate Average (mg) 0 ✓

Thimble Particulate Average (mg) 45.2 ✓

Total Particulate (mg) 45.2 ✓

Run No. 3	Thimble No. Q38		Filter No. Q63		
Thimble Final Weight (g)	3.9100	3.9103	✓		
Thimble Initial Weight (g)	3.8752	3.8752			
Particulate (g)	0.0348	0.0351			
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1040	0.1040	✓		

Filter and Particulate Average (g) 0.1040 ✓

Initial Filter Weight (g) 0.1061

Filter Particulate Average (mg) 0 ✓

Thimble Particulate Average (mg) 35.0 ✓

Total Particulate (mg) 35.0 ✓

Run No. 4	Thimble No. Q41		Filter No. Q62		
Thimble Final Weight (g)	3.0180	3.0183	✓		
Thimble Initial Weight (g)	2.9797	2.9797			
Particulate (g)	0.0383	0.0386			
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1035	0.1032	✓		

Filter and Particulate Average (g) 0.1034 ✓

Initial Filter Weight (g) 0.1072

Filter Particulate Average (mg) 0 ✓

Thimble Particulate Average (mg) 38.5 ✓

Total Particulate (mg) 38.5 ✓

mk

Analyst

METCO Environmental

Particulate Analysis EPA Method 5

Front Wash

Job Number 99-95G1B3 Location Owensville, Ind.

Job Name EPRI - Cinergy Unit Tested Unit 3 Inlet

Desiccator Time In	1630 10/29				
Desiccator Time Out	925 11/1	845 11/2			

Run No. 1	Volume (ml) 128				
Final Weight (g)	141.5556	141.5555	✓		
Initial Weight (g)	141.5225	141.5225			
Particulate Weight (g)	0.0331	0.0330			

Particulate Average (mg) 33.1 ✓

7.9 mg/l Less Acetone Blank (mg) 1.0

Total Particulate (mg) 32.1 ✓

Run No. 3	Volume (ml) 133				
Final Weight (g)	170.0700	170.0698	✓		
Initial Weight (g)	170.0003	170.0003			
Particulate Weight (g)	0.0697	0.0695			

Particulate Average (mg) 69.6 ✓

Less Acetone Blank (mg) 1.1

Total Particulate (mg) 68.5 ✓

Run No. 4	Volume (ml) 120				
Final Weight (g)	124.0037	124.0040	✓		
Initial Weight (g)	123.8957	123.8957			
Particulate Weight (g)	0.1080	0.1083			

Particulate Average (mg) 108.2 ✓

Less Acetone Blank (mg) 0.9

Total Particulate (mg) 107.3 ✓

Acetone Blank	Volume (ml)				
Final Weight (g)					
Initial Weight (g)					
Difference (g)					

Average (mg) _____

* mg/l _____

* Note: If greater than 7.9 mg/l, use 7.9 mg/l.

Analyst

METCO Environmental

Particulate Analysis EPA Method 5

Front Wash

Job Number 99-95GIB3 Location Owensville, Ind.

Job Name EPRI/Cinergy Ambient Unit Tested Unit 3 Outlet

Desiccator Time In	1630 10/29	evaporation			
Desiccator Time Out	1005 11/1	900 11/2			

Run No. 1	Volume (ml) 145				
Final Weight (g)	120.1297	120.1295	✓		
Initial Weight (g)	120.0979	120.0979			
Particulate Weight (g)	0.0318	0.0316			

Particulate Average (mg) 31.7 ✓
Less Acetone Blank (mg) 1.1
Total Particulate (mg) 30.6 ✓

Run No. 3	Volume (ml) 86				
Final Weight (g)	164.5785	164.5787	✓		
Initial Weight (g)	164.5577	164.5577			
Particulate Weight (g)	0.0208	0.0210			

Particulate Average (mg) 20.9 ✓
Less Acetone Blank (mg) 0.7
Total Particulate (mg) 20.2 ✓

Run No. 4	Volume (ml) 60				
Final Weight (g)	174.2848	174.2851	✓		
Initial Weight (g)	174.2744	174.2744			
Particulate Weight (g)	0.0104	0.0107			

Particulate Average (mg) 10.6 ✓
Less Acetone Blank (mg) 0.5
Total Particulate (mg) 10.1 ✓

Acetone Blank	Volume (ml)				
Final Weight (g)					
Initial Weight (g)					
Difference (g)					

Average (mg) _____
* mg/l _____

* Note: If greater than 7.9 mg/l, use 7.9 mg/l.

MK
Analyst

METCO Environmental

Particulate Analysis Summary

Job Number 99-95 GIB3

Job Name Cibergy

Location Owensville, Ind.

Date Analysis Completed 11-2-99

Unit Tested Unit # 3 Inlet

Run No.	1	3	4		
Particulate on Thimble and Filter (mg)	22,394.2	10,200.6	12,579.8		
Particulate in Front Wash (mg)*	32.1	68.5	107.3		
MF (mg)	22,426.3	10,269.1	12,687.1		
Particulate in Impinger #1 (mg)**					
MT (mg)					

M. Ganter

Analyst

* Less Acetone Residue

** Less Ammonium Sulfate

PHILIP ANALYTICAL SERVICES

INDUSTRIAL HYGIENE ENVIRONMENTAL TESTING

• EPA/NVLAP 101262-0 • NY DOH 10903 • NJ DEP 77678
• AIHA ACCREDITATION NO. 100439 • PA DER 06-353

ANALYTICAL REPORT

Client: METCO Environmental

Report to: Doug Saathoff
METCO Environmental
P. O. Box 598
Addison TX 75001

Project: 188423
Received: 24-NOV-99
Reported: 16-DEC-99

PURCHASE ORDER: 99-95-GIB3

Project Description: Gibson Unit 3
BTU, Ash, Sulfur, Chloride

	AS RECEIVED BASIS	DRY BASIS	UNITS	METHOD	DATE	ANALYST
Run 1 Coal Sample						
Lab Sample: 1384774						
sampled: 14-OCT-99						
Moisture, Total	13.6		%	D 3302	01-DEC-99	GLB
SHORT PROX - COAL						
Ash	11.3	13.1	%	D 3174	08-DEC-99	VJO
Sulfur	1.48	1.71	%	D 4239	08-DEC-99	VJO
Heating Value	10820	12530	BTU/lb	D 3286	02-DEC-99	VJO
Chloride, Total	0.17	0.19	%	E776/300.0	14-DEC-99	DRK
Run 2 Coal Sample						
Lab Sample: 1384775						
sampled: 15-OCT-99						
Moisture, Total	12.6		%	D 3302	01-DEC-99	GLB
SHORT PROX - COAL						
Ash	11.3	12.9	%	D 3174	08-DEC-99	VJO
Sulfur	1.52	1.74	%	D 4239	08-DEC-99	VJO
Heating Value	10980	12570	BTU/lb	D 3286	02-DEC-99	VJO
Chloride, Total	0.20	0.22	%	E776/300.0	14-DEC-99	DRK
Run 3 Coal Sample						
Lab Sample: 1384776						
sampled: 15-OCT-99						
Moisture, Total	12.8		%	D 3302	01-DEC-99	GLB
SHORT PROX - COAL						
Ash	11.4	13.1	%	D 3174	08-DEC-99	VJO
Sulfur	1.49	1.71	%	D 4239	08-DEC-99	VJO
Heating Value	10960	12570	BTU/lb	D 3286	02-DEC-99	VJO

PHILIP
ANALYTICAL SERVICES

INDUSTRIAL HYGIENE ENVIRONMENTAL TESTING

• EPA/NVLAP 101262-0
• AIHA ACCREDITATION NO. 100439
• NY DOH 10903
• PA DER 06-353
• NJ DEP 77678

Client: METCO Environmental
Project: 188423

	AS RECEIVED BASIS	DRY BASIS	UNITS	METHOD	DATE	ANALYST
Run 3 Coal Sample						
Lab Sample: 1384776 - continued						
Chloride, Total	0.19	0.22	%	E776/300.0	14-DEC-99	DRK

< Indicates less than the limit of quantitation.

4418 POTTSVILLE PIKE, READING, PENNSYLVANIA 19605 610-921-8833 FAX 610-921-9667

Philip Analytical Services
Quality Assurance Protocol

PAS Sample#: All Projects Listed

Client Name: Metco

PAS Project #: 188425,188261,188422,188423

Job ID :

Units: %, BTU/lb

O1 SUMMARY FORM

Sample # & Parameter	Matrix Spike				Matrix Spike Duplicate				Laboratory Control Sample		
	Sample Conc.	Spike Conc.	Matrix Spike Conc.	Matrix Spike Recovery	Matrix Spike Dup Conc.	Matrix Spike Dup Recovery	Precision RPD	Method Blank	Spikes Conc.	Found Conc.	Recovery

Sample # & Parameter	Matrix Spike				Duplicate			Laboratory Control Sample			Method Blank	Detection Limits
	Sample Conc.	Spike Conc.	Matrix Spike Conc.	Matrix Spike Recovery	Sample Conc.	Sample Duplicate Conc.	Precision RPD	Spikes Conc.	Found Conc.	Recovery		
1383833-Ash					5.24	5.28	0.80	11.8	11.7	99	N/A	0.01
1384773-Sulfur					2.58	2.56	0.77	1.78	1.77	99	N/A	0.01
1384773-Heating Value					11271	11279	0.10	13350	13410	100	N/A	50
1383833-Chlorine					0.02	0.02	0	2.00	1.87	94	0.01	0.01

Matrix Spike	75 - 125
Laboratory Control Sample	80 - 120
Duplicate	0 - 20

PHILIP
ANALYTICAL SERVICES

Chain of Custody Record

4418 Pottsville Pike Reading, PA 19605
phone: (610) 921-8833 fax: (610) 921-9667

Sample Container Information

Bottle Type (G P H)											
# of Containers											
Preserved? (Y/N)											

Report Results To:

PO #99-95-GIG3 Job ID GIBSON UNIT 3
Name DOUG SAOTHOFF
Company METCO ENVIRONMENTAL
Mailing Address P.O. BOX 598
City ADDISON State TX Zip 75025
Telephone # 972/931/7127 Fax # 972/931/3398

Send Invoice To:

Name SAME Telephone #
Company Dept.
Mailing Address
City State Zip
Credit Card # Exp. Date

Analysis Requested: 188423

Page 1 of 1
PAS Quote#

Sampled by: SAMPLE DESCRIPTION	Air Vol. (L or mL)	Matrix Type	Date Sampled	Time Sampled	BTU CONTENT	FLY ASH	SULFUR	CHLORIDE	ASTM-D-3286	ASTM-D-3174	ASTM-D-5016
1. RUN1 COAL SAMP.			10/14/99		X	X	X	X			
2 RUN2 COAL SAMP.			10/15/99		X	X	X	X			
3 RUN3. COAL SAMP.			10/15/99		X	X	X	X			
4											
5											
6 * SEE ATTACHED											
7 INSTRUCTIONS											
8 →											
9											
10											

Comments/Hazards/Location Details

ATTN: CHRIS WEATHINGTON
TEST AMERICA, INC.
3601 S. DIXIE DRIVE
DAYTON, OH 45439
PH: 1-800-572-9839
* AFTER SAMPLE HAS BEEN PREPPED, PLEASE RETURN A 4 oz. JAR SAMPLE TO TEST AMERICA AT THE ABOVE ADDRESS! THANK YOU!

Special Instructions (including Data Deliverables and Turn Around Time):

Samples relinquished to shipper or courier by: [signature] Date 11-19-99 Time 1600
Samples received by: Date Time

Samples Relinquished by: Samples Relinquished to: Date Time
Samples Relinquished by: Samples Relinquished to Laboratory: [signature] Date 11/24/99 Time 1000

Method of Shipment/Delivery: UPS FED-EX PAS Courier Client drop off Other

Samples Rec'd. on Ice? (Y N n/a) Temp. Blank — Sample Temp. —
Samples rec'd intact? (Y N) Custody seals intact? (Y N n/a) ID on samples match COC? (Y N)
VOC Samples have zero headspace? (Y N n/a) Samples properly preserved? (Y N n/a)

Notes:

TestAmerica
INCORPORATED

Sample ID: Cinergy
Gibson Generating Station
Owensville, Indiana
Coal Samples

Hg Analysis
ASTM D6414-99

Collected On: 10/14/99 for Run 1, 10/15/99 for Run 2 and Run 3 Composites
Collected By: METCO

	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Units	Dry Weight (%)	Flags	Notes
Run 1 Composite	12/20/99	12/21/99	jpp	0.134	0.133	<1.0	ug/g	92.9		
Run 2 Composite	12/20/99	12/21/99	jpp	0.142	0.143	1.0	ug/g	93.8		
Run 3 Composite	12/20/99	12/21/99	jpp	0.141	0.139	<1.0	ug/g	94.2		

Notes:

3601 SOUTH DIXIE DRIVE / DAYTON, OH 45439 / 937-294-6856 / FAX: 937-294-7816

Sample Receipt Record

Chain of Custody Provided? Yes ☐ No ☒ Job #: _____

If no Chain of Custody is provided, the following section should be completed.

Client: METCO
Received by: James A Davis Date: 12/6/99 Time: 9 30 AM
Samples Shipped UPS (FEDEX) US Mail Other _____
Custody Seal(s) Intact ~~Yes ☐ No ☐~~
Containers Provided by TestAmerica Yes ☐ No ☒
Cooler Temperature _____ °C Ice (Ambient) Cool Packs

Deviations Noted

- None ☐
- Insufficient Volume ☐
- Samples Broken ☐
- Incorrect Containers/ Preservatives ☐
- Volatile Headspace ☐
- Holding Time Exceeeded upon receipt ☐
- Insufficient sample information ☐
- COC and sample labels disagree ☐

Comments

FROM PHILIP ANAL.
COAL FROM:
OWENSVILLE, EAST CHINA, COLSTRIP
WEST TERRE HAUTE, STEVENSON,
SHIPPINGPORT, STRATTON, BREMOND
PADUCAH, LAWRENCE, FAIRFIELD

Other _____ Initials _____ Date _____

Issues to Clarify with Client

Corrective Action

Client Contacted by: N/A Date: N/A

TestAmerica INCORPORATED

ITEX ENVIRONMENTAL

CHAIN OF CUSTODY RECORD

Job No: 99-195 GIB3
Job Name: EPRI
Location: Prinston Indiana
Unit: Gibson Unit 3

Collected By/Company

SAMPLE I.D.	DATE	TIME	AIR	SOLID	COMP	GRAB	# of CONTAINERS	RECOVERED BY	PART	HCL	CL2	METALS	PCDD/PCDF	SEMI-VOC	VOST	HEXCHROME				REMARKS (Specific Compounds/Methods)
Coal Samples Run 1	10/14/99						1													Took receipt of samples 10/26/99 Sent UPS - no COC or paperwork Instr. by Billy Hefley to send to EERC and Test America [signature]
Run 2	10/15/99						1													Analyze for Hg, Btu, Fly Ash
Run 3	10/15/99						1													Cl^-
																				ASTM D 6414-99A D-3286
																				D 5016 D 3174

Relinquished By/Sign:	Date/Time	Received By/Sign:	Relinquished By/Sign:	Date/Time	Received By/Sign:
[signature]	10/27/99 1600	→ Fed X to T/A			
Relinquished By/Sign:	Date/Time	Received By/Sign:	Relinquished By/Sign:	Date/Time	Received By/Sign:
Received for Laboratory By/Signature: James A. Davis 10/28/99 10:35 AM AMBIENT		Date/Time	Send Samples to: Phone:	Fax:	

05/99

D-100

PHILIP ANALYTICAL SERVICES

Chain of Custody Record

4418 Pottsville Pike Reading, PA 19605
phone: (610) 921-8833 fax: (610) 921-9667

Sample Container Information

Bottle Type (G P H)												
# of Containers												
Preserved? (Y/N)												

Report Results To:

PO #99-95-GIG3 Job ID GIBSON UNIT 3
Name DOUG SAOTHOFF
Company METCO ENVIRONMENTAL
Mailing Address P.O. BOX 598
City ADDISON State TX Zip 75025
Telephone # 972/931/7127 Fax # 972/931/3398

Send Invoice To:

Name SAME Telephone #
Company Dept.
Mailing Address
City State Zip
Credit Card # Exp. Date

Page 1 of 1
PAS Quote#

Sampled by:

Analysis Requested: BTU CONTENT; FLY ASH; SULFUR; CHLORIDE

	SAMPLE DESCRIPTION	Air Vol. (L or min)	Matrix Type	Date Sampled	Time Sampled	BTU CONTENT	FLY ASH	SULFUR	CHLORIDE
1.	RUN1 COAL SAMP.			10/14/99		X	X	X	X
2	RUN2 COAL SAMP.			10/15/99		X	X	X	X
3	RUN3. COAL SAMP.			10/15/99		X	X	X	X
4									
5									
6	*SEE ATTACHED								
7	INSTRUCTIONS								
8	→								
9									
10									

ASTM-D-3286
ASTM-D-3174
ASTM-D-5016
ASTM-?

Comments/Hazards/Location Details

ATTN: CHRIS WEATHINGTON
TEST AMERICA, INC.
3601 S. DIXIE DRIVE
DAYTON, OH 45439
PH: 1-800-572-9839
* AFTER SAMPLE HAS BEEN PREPPED. PLEASE RETURN A 4 oz. JAR SAMPLE TO TEST AMERICA AT THE ABOVE ADDRESS! THANK YOU!

Special Instructions (including Data Deliverables and Turn Around Time):

Samples relinquished to shipper or courier by: [signature] Date 11-17-99 Time 1600
Samples received by: Date Time

Samples Relinquished by: Samples Relinquished to: Date Time
Samples Relinquished by: Samples Relinquished to Laboratory: Date Time

Method of Shipment/Delivery: UPS FED-EX PAS Courier Client drop off Other _____

Samples Rec'd. on ice? (Y N n/a) Temp. Blank _____ Sample Temp. _____
Samples rec'd intact? (Y N) . Custody seals intact? (Y N n/a) ID on samples match COC? (Y N)
VOC Samples have zero headspace? (Y N n/a) Samples properly preserved? (Y N n/a)

Notes:

HSRALL# 122199Y

COALS

NONAQUEOUS MERCURY BATCH SHEET

Analyst: JPV Date: 12/20/99 Water Bath: start mid end

12/21/99

Standard Reference: 65-41-17 temp:

ICV Reference: 65-41-18 date:

% DW	Sample # / Client	Weight	MS	MSD
95.1	1384801 TRP [redacted]	1.0724 g		
76.7	1384802 SPL	1.0081 g		
76.8	1384803	1.0423 g		
84.2	1384908 [redacted]	1.0150 g		
88.7	1384909	1.0678 g		
88.7	1384910	1.0018 g		
95.0 ~~96.5~~	1384787 [redacted]	1.0110 g		
96.5	1384788	1.0059 g		
97.0	1384789	1.0816 g		
100	1384796 [redacted]	1.0090 g		
100	1384797 TRP	1.0203 g		
99.9	1384798 SPL	1.0674 g		
92.9	1384774 Gibson	1.0792 g		
93.8	1384775	1.0734 g		
94.2	1384776	1.0350 g		
86.5	1386554 [redacted]	1.0768 g		
83.5	1386555	1.0290 g		
83.4	1386556	1.0095 g		
	NIST 1630 A	1.0044 g		
	Blank			

MB

ICV

MS

MSD

RPD

FLAG

HNO_3 - 65-48-14

HCl - 65-46-1

$KMnO_4$ - 65-33-11

12/21 ~~$SnCl_2$ - 65-50-6~~

NH_2OH - 65-50-6

$SnCl_2$ - 65-50-16

SECONDARY DATA CHECK: analyst:

date:

Comments:

Protocol: SYSTEST

Rev: 3.001 Time: 15:27:06 21 Dec 1999

Folder: DEC99C Seq: 144 Print: On

User: Batch: In: SpecPack1 Cur: 1.04 Base: 0.22 Pr

State: Idle Pri: 100 Autoassembly: Y

AUTOSAMPLER: Rack entry Rack 1221PC:

Cup Id	Extended Id	Weight	Volume	Macro	Check	Help
1	100	1.0000	1.0000			
2	clk	1.0000	1.0000			
3	clk cup	1.0000	1.0000			
4	mixt 1630a	1.0000	1.0000			
5	1630a cup	1.0000	1.0000			
6	801 1:5	1.0000	1.0000			
7	801 cup 1:5	1.0000	1.0000			
8	801 trs 1:5	1.0000	1.0000			
9	802	1.0000	1.0000			
10	802 cup	1.0000	1.0000			
11	802 sck	1.0000	1.0000			
12	803	1.0000	1.0000			
13	803 cup	1.0000	1.0000			
14	906	1.0000	1.0000			
15	906 cup	1.0000	1.0000			

Cup 1 ID: 100 Dell entry, 1:5 to enter

```
Protocol: SYSTEST
                          Rev: 3.A01    Time: 15:27:10  21 Dec 1999
Filen: IEC990             Seq: 144                      Print: On
User:                     Batch:              Id: StoreRecl   Quot: 1 29 Seq:    0.22 PM
State: Idle                                                   Xmit: Off Autosampler: On

AUTOSAMPLER: Rack entry   Rack 1221997                                          Equip
Pos Id                    Extended id          Weight Volume Macro check Help
16 906                                         1.0000 1.0000
17 909 QUO                                     1.0000 1.0000
18 910                                         1.0000 1.0000
19 910 QUO                                     1.0000 1.0000
20 787 NODIL                                   1.0000 1.0000
21 787 QUO NODIL                               1.0000 1.0000
22 788 NODIL                                   1.0000 1.0000
23 788 QUO NODIL                               1.0000 1.0000
24 789 NODIL                                   1.0000 1.0000
25 789 QUO NODIL                               1.0000 1.0000
26 790                                         1.0000 1.0000
27 790 QUO                                     1.0000 1.0000
28 [illegible]                                 1.0000 1.0000
29 [illegible]                                 1.0000 1.0000
30 797                                         1.0000 1.0000
                                                                                Page

Que is ID: 944                                  Call entry, ins to exit:
                                                                   1:5 0  17
```

1:5

1:5

Protocol: SYSTEST

Rev: 2.001 Time: 15:27:12 21 Dec 1995

Falcon: DEC990 Seq: 144 Print: On

User: Batch: In: StopFast Col: 1 2? Gas: 4.20 lpm

State: Idle Auto: Off Autosampler: On

AUTOSAMPLER: Rack entry Rack: 1221994 Apus

Cup	Id		Expected Id	Weight	Volume	Warm	Check	Mix
31	797	cup		1.0000	1.0000			
32	797	tre		1.0000	1.0000			
33	798			1.0000	1.0000			
34	798	cup		1.0000	1.0000			
35	795	sck		1.0000	1.0000			
36	774			1.0000	1.0000			
37	774	cup		1.0000	1.0000			
38	775			1.0000	1.0000			
39	775	cup		1.0000	1.0000			
40	776			1.0000	1.0000			
41	776	cup		1.0000	1.0000			
42	594			1.0000	1.0000			
43	594	cup		1.0000	1.0000			
44				1.0000	1.0000			

1:5

NODIL

NODIL

1:5 (L=1.44 mg/L)

Page

Cup 31 Id 797 cup

Tail entry, line to switch

Line 12

```
Protocol: BATEST
                    Rev: 2.001    Time: 21:34:42  21 Dec 1999
Polymer: DEF95      Seq: 198                      Print: On
Clean:              Batch:            Inj: ccv        Cup: 1 %B Gas:    0.22 LPM
State: Idle                                             Amin: Off Autosampler: On

AUTOSAMPLER: Rack entry    Rack 1CD1PS:  Range  1-44 Clean aef Unoc a/it
Cup Id          Extended id          Weight Volume Macro check table
1  BBB      1:5
2  BBB cup                           1.0000 1.0000
3  BBB                               1.0000 1.0000
4  BBB cup                           1.0000 1.0000
5  BBB                               1.0000 1.0000
6  ccv                               1.0000 1.0000
7                                    1.0000 1.0000
8                                    1.0000 1.0000
9                                    1.0000 1.0000
10                                   1.0000 1.0000
11                                   1.0000 1.0000
12                                   1.0000 1.0000
13                                   1.0000 1.0000
14                                   1.0000 1.0000
15                                   1.0000 1.0000
                                                                          Esc

                                                 Select entry, ins to extend
                                                                    ins = 1
```

*** Standard: 1 Rep: 1 Seq: 138 13:03:55 21 Dec 1999 HG

Hg .000 ug/L 1096
Ave. Int. = 1096 S. D. = 0

*** Standard: 2 Rep: 1 Seq: 139 13:05:17 21 Dec 1999 HG

Hg .200 ug/L 5338
Ave. Int. = 5338 S. D. = 0

*** Standard: 3 Rep: 1 Seq: 140 13:06:40 21 Dec 1999 HG

Hg .500 ug/L 20394
Ave. Int. = 20394 S. D. = 0

*** Standard: 4 Rep: 1 Seq: 141 13:11:02 21 Dec 1999 HG

Hg 1.00 ug/L 46366
Ave. Int. = 46366 S. D. = 0

*** Standard: 5 Rep: 1 Seq: 142 13:13:26 21 Dec 1999 HG

Hg 2.00 ug/L 85028
Ave. Int. = 85028 S. D. = 0

*** Standard: 6 Rep: 1 Seq: 143 13:15:58 21 Dec 1999 HG

Hg 3.00 ug/L 133924
Ave. Int. = 133924 S. D. = 0

Protocol: SYSTEST

Rev: 3.001 Time: 18:21:11 21 Dec 1999

Folder: DEC99C Seq: 144 Print: On

User: Batch: Id: Std6Rep1 Cup: 1 29 Gas: 0.23 LPM

State: Idle Xmit: Off Autosampler: On

CALIBRATION: Line Calibration

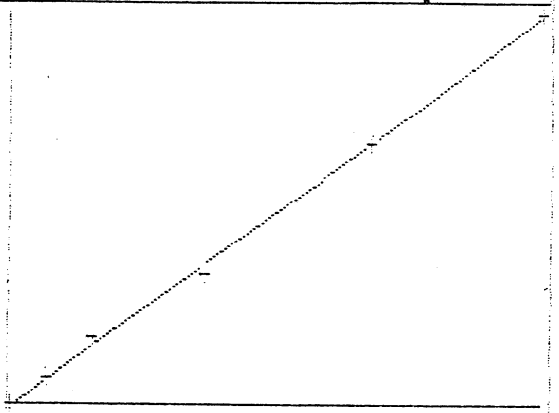
Line: Hg

	Conc.	Calc.	Dev.	Accepted LiNear / Quadratic / WtdLinear	
S1	.000	-.005	-.005		
S2	.200	.192	-.008		
S3	.500	.456	-.044		C
S4	1.00	1.08	.077	Accept	o
S5	2.00	2.00	.001		n
S6	3.00	2.98	-.021	StdAdd	c

A .0000000 r .999383

B 2.39012e-5 C -3.11681e-2

	Mean	%RSD	
S1	1096	0	1096
S2	9335	0	9335
S3	28394	0	28394
S4	46366	0	46366
S5	85828	0	85828
S6	125926	0	125926



Relative Absorbance

33?

New calibration coefficients stored 149 2 5

Line Conc. Units SD/RSD 1 2 3 4 5

*** Check Standard: 1 ppb Seq: 144 18:29:37 21 Dec 1999 HG

Line	Flag	%Rec.	Found	True	Units	SD/RSD
Hg		104.	.625	.604	ug/L	.000

*** Sample ID: 1cc Seq: 145 18:32:36 21 Dec 1999 HG

Hg -.010 ug/L .000 -.010 <0.0002 mg/L

*** Sample ID: blk Seq: 146 18:34:50 21 Dec 1999 HG

Hg .067 ug/L .000 .067 <0.0002 mg/L

*** Sample ID: blk dup Seq: 147 18:37:11 21 Dec 1999 HG

Hg .050 ug/L .000 .050 <0.0002 mg/L

*** Sample ID: mist 1cc Seq: 148 18:45:49 21 Dec 1999 HG

Hg 1.82 ug/L .000 1.82 0.091 mg/kg

TV = 0.106 ug/g ± 0.032

*** Sample ID: 1cc dup Seq: 149 18:48:11 21 Dec 1999 HG

Hg 1.80 ug/L .000 1.80 0.090 µg/g

*** [redacted] Seq: 150 18:50:51 21 Dec 1999 HG

Hg 4.64 ug/L .000 4.64 NO DATA

*** Sample ID: 801 1:5 Seq: 151 18:53:47 21 Dec 1999 HG

Hg .968 ug/L .000 .968 0.222 µg/g

*** Sample ID: 801 dup 1:5 Seq: 152 18:41:05 21 Dec 1999 HG RPD = 3.3%

Hg .908 ug/L .000 .908 0.208 µg/g

*** Sample ID: 801 trip 1:5 Seq: 153 18:43:20 21 Dec 1999 HG RPD = <1.0%

Hg .917 ug/L .000 .917 0.225 µg/g

*** Sample ID: [redacted] 1:5 Seq: 154 18:46:42 21 Dec 1999 HG

Hg .880 ug/L .000 .880 0.180 ug/kg

*** Sample ID: 802 dup 1:5 Seq: 155 18:48:11 21 Dec 1999 HG RPD = <1.0%

Hg .880 ug/L .000 .880 0.180 ug/g

Line	Conc.	Units	ED.FFD	1	2	3	4	5	
*** Sample ID: B0[redacted]			1:5	Seq: 156	19:50:19 21 Dec 1999				
1	1.88	ug/L	.00	1.88					TV=1.0 99.8%
*** Sample ID: B0[redacted]			1:5	Seq: 157	19:52:28 21 Dec 1999				
2	1.16	ug/L	.00	1.16					0.362 µg/g
*** Sample ID: B0[redacted]			1:5	Seq: 158	19:54:37 21 Dec 1999				RPD = <1.0%
2	1.17	ug/L	.00	1.17					0.365 µg/g
*** Sample ID: B0[redacted]			1:5	Seq: 159	19:57:[illegible] 21 Dec 1999				
3	.37	ug/L	.00	.37					0.110 µg/g
*** Sample ID: B0[redacted]			1:5	Seq: [illegible]	19:59:34 21 Dec 1999				RPD = 2.6%
3	.387	ug/L	.00	.387					0.113 µg/g
*** Sample ID: B0[redacted]			1:5	Seq: 161	20:01:52 21 Dec 1999				
4	.328	ug/L	.00	.328					0.102 µg/g
*** Sample ID: B0[redacted]			1:5	Seq: 162	20:04:11 21 Dec 1999				RPD = 3.8%
4	.401	ug/L	.00	.401					0.106 µg/g
*** Sample ID: B0[redacted]			1:5	Seq: 163	20:06:29 21 Dec 1999				
5	.247	ug/L	.00	.247					0.098 µg/g
*** Sample ID: B0[redacted]			1:5	Seq: 164	20:08:46 21 Dec 1999				RPD = 1.7%
5	.252	ug/L	.00	.252					0.099 µg/g
*** Sample ID: [redacted]			1:5	Seq: 165	20:11:04 21 Dec 1999				
6	.056	ug/L	.00	.056					NO DATA
*** Sample ID: [redacted]				Seq: 166	20:14:07 21 Dec 1999				
6	.015	ug/L	.00	.015					0.022 µg/g
*** Sample ID: [redacted]				Seq: 167	20:16:55 21 Dec 1999				RPD = <1.0%
[illegible]	[illegible]	ug/L	.00	.017					0.022 µg/g

Line	Conc.	Units	SD/RED	1	2	3	4	5
*** Sample ID: 786			1:5		Seq: 168	20:19:14 21 Dec 1999 HG		
Hg	.122	ug/L	.000	.122		NO DATA		
*** Sample ID: 788 [redacted]					Seq: 169	20:22:25 21 Dec 1999 HG		
Hg	.759	ug/L	.000	.759		0.039 µg/g		
*** Sample ID: 788 DUP					Seq: 170	20:24:47 21 Dec 1999 HG	RPD = <1.0%	
Hg	.759	ug/L	.000	.759		0.039 µg/g		
*** Sample ID: 789 [redacted]					Seq: 171	20:27:02 21 Dec 1999 HG		
Hg	.514	ug/L	.000	.514		0.024 µg/g		
*** Sample ID: 789 DUP					Seq: 172	20:29:21 21 Dec 1999 HG	RPD = 2.1%	
Hg	.525	ug/L	.000	.525		0.025 µg/g		
*** Sample ID: 790 [redacted]			1:5		Seq: 173	20:31:35 21 Dec 1999 HG		
Hg	.988	ug/L	.000	.988		0.096 µg/g		
*** Sample ID: 790 DUP			1:5		Seq: 174	20:33:55 21 Dec 1999 HG	RPD = <1.0%	
Hg	[illegible]	ug/L	.000	[illegible]		[illegible] µg/g		
*** Sample ID: ccc					Seq: 175	20:36:18 21 Dec 1999 HG		
Hg	-.027	ug/L	.000	-.027		<0.2 µg/L		
*** Sample ID: ccv					Seq: 176	20:38:37 21 Dec 1999 HG		
Hg	1.98	ug/L	.000	1.98		TV = 2.00 99%		
*** Sample ID: 797 BMP			1:5		[illegible]	[illegible]		
Hg	.222	ug/L	.000	.222		0.079 µg/g		
*** Sample ID: 797 DUP			1:5		Seq: 178	[illegible] 21 Dec 1999 HG	RPD = <1.0%	
Hg	.222	ug/L	.000	.222		0.079 µg/g		
*** Sample ID: 798			1:5		Seq: 179	20:45:35 21 Dec 1999 HG	RPD = 2.5%	
Hg	[illegible]	ug/L	.000	[illegible]		0.082 µg/g		

Line	Conc.	Units	SD/RSD	1	2	3	4	5
[redacted]			1:5					
Hg	-.002	ug/L	.000	-.002		NO DATA		
*** Sample ID: 795					Seq: 181	20:56:47 21 Dec 1999 HG		
Hg	2.20	ug/L	.000	2.20	0.105 µg/g	~~0.516 µg/g~~ ppm 1/6/00		
*** Sample ID: 795 dup					Seq: 182	20:58:33 21 Dec 1999 HG	RPD = <1.0%	
Hg	2.22	ug/L	.000	2.22	0.104 µg/g	~~0.520 µg/g~~ ppm 1/6/00		
*** Sample ID: 796 spk			1:5		Seq: 183	21:00:57 21 Dec 1999 HG		
Hg	1.44	ug/L	.000	1.44		TV=1.0	100%	
*** Sample ID: 774 GIBSON			1:5		Seq: 184	21:02:19 21 Dec 1999 HG		
Hg	.535	ug/L	.000	.535		0.134 µg/g		
*** Sample ID: 774 dup			1:5		Seq: 185	21:05:35 21 Dec 1999 HG	RPD = <1.0%	
Hg	.531	ug/L	.000	.531		0.133 µg/g		
*** Sample ID: 775 GIBSON			1:5		Seq: 186	21:06:46 21 Dec 1999 HG		
Hg	.570	ug/L	.000	.570		0.142 µg/g		
*** Sample ID: 775 dup			1:5		Seq: 187	21:11:21 21 Dec 1999 HG	RPD = 1.0%	
Hg	.576	ug/L	.000	.576		0.143 µg/g		
*** Sample ID: 776 GIBSON			1:5		Seq: 188	21:12:42 21 Dec 1999 HG		
Hg	.545	ug/L	.000	.545		0.141 µg/g		
*** Sample ID: 776 dup			1:5		Seq: 189	21:13:53 21 Dec 1999 HG	RPD = <1.0%	
Hg	.544	ug/L	.000	.544		0.139 µg/g		
*** Sample ID: [redacted]			1:5		Seq: 190	[illegible]		
Hg	1.07	ug/L	.000	1.07		0.287 µg/g		
*** Sample ID: 554 dup			1:5		Seq: 191	21:17:13 21 Dec 1999 HG	RPD = <1.0%	
Hg	1.07	ug/L	.000	1.07		0.287 µg/g		

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: 555 [redacted] 1:5					Seq: 192	21:22:57 21 Dec 1999 -6		
Hg	.995	ug/L	.000	.995				
						0.290 µg/g		
*** Sample ID: 555 dup					Seq: 193	21:24:51 21 Dec 1999 -6		RPD=<1.0%
Hg	1.00	ug/L	.000	1.00				
						0.291 µg/g		
*** Sample ID: 55[redacted] 1:5					Seq: 194	21:27:49 21 Dec 1999 -6		
Hg	.962	ug/L	.000	.962				
						0.287 µg/g		
*** Sample ID: 555 dup					Seq: 195	21:29:27 21 Dec 1999 -6		RPD=2.7%
Hg	[illegible]	ug/L	.000	[illegible]				
						~~0.280 µg/g~~		
*** Sample ID: 555					Seq: 196	21:31:49 21 Dec 1999 -6		
Hg	-.002	ug/L	.000	-.002				
						<0.0002 mg/L		
*** Sample ID: 557					Seq: 197	21:34:17 21 Dec 1999 -6		
Hg	1.99	ug/L	.000	1.99		TV=2.00	100%	

Dry Weight(DW)/Total Volatile Solids (TVS) Notebook # 6

Sample Number/ Test (DW/TVS)	[illegible]	[illegible]	[illegible]56	1384774	1384775	1384776
Client/Pan #	BB R1 1	BB R2 2	BB R3 3	GIBSON R1 4	GIBSON R2 5	GIBSON R3 6
Wt of Pan + Sample	6.6673	8.1660	5.8079	9.8969	10.9649	11.7093
Wt after Drying	5.9013	6.9834	5.0069	9.2599	10.3443	11.0886
Wt of Pan or Wt After Ignition	0.9782	0.9820	0.9836	0.9849	0.9842	0.9783
Difference	4.9231	6.0014	4.0233	8.2750	9.3601	10.1103
Sample amount g	5.6891	7.1840	4.8243	8.9120	9.9807	10.7310
Result	[illegible]	[illegible]	[illegible] %	92.9 %	93.8 %	94.2 %

Sample Number/ Test (DW/TVS)	1384806	1384807	1384808	1384777	1384777	1384778
Client/Pan #	JAMMIS R1 7	R2 8	R3 9	WIDOWS CRK 10 R1	[illegible] R2	12 R2
Wt of Pan + Sample	10.1893	8.7366	9.8541	[illegible]504	6.6912	11.7089
Wt after Drying	10.0258	8.6516	[illegible]607	6.7662	6.4253	11.2141
Wt of Pan or Wt After Ignition	0.9782	0.9[illegible]5	0.9737	0.9801	0.9801	0.9784
Difference	9.0476	7.6741	8.7870	5.7861	5.4452	10.2357
Sample amount g	9.[illegible]11	7.7591	8.8804	6.0703	5.7111	10.7305
Result	18.2 %	98.9 %	98.9 %	95.3 %	[illegible]	[illegible]

Sample Number/ Test (DW/TVS)	[illegible]	[illegible]	[illegible]	[illegible]14
Client/Pan #	WIDOWS CRK 13 R3	MONTANA 14 R1	15 R2	16 R3
Wt of Pan + Sample	7.2461	8.0743	7.[illegible]099	6.3980
Wt after Drying	6.9648	7.6309	7.2845	6.0976
Wt of Pan or Wt After Ignition	0.9778	0.9802	0.9812	0.9779
Difference	5.987[illegible]	6.6507	6.2033	5.1197
Sample amount g	6.[illegible]683	7.0941	6.7287	5.4201
Result	95.5 %	93.7 %	93.7 %	[illegible] %

Batch Number —
TVS -
DW - 3395

Note:
METCO COALS
CONTD -

Analyst: LP Date: 12/21/99

TestAmerica INCORPORATED

APPENDIX E

Unit Operational Data

99-95GIB3

Gibson Station - Unit 3

Mercury Flue Gas Sampling

Date: 10/14 & 15/99

Process Data

Time	Load (Mw)	Steam Flow (klb/h)	Mills in Service	Coal Flow (klb/h)	Coal Flow (tph)	Furnace Exit Gas Temp (F)
Run 1						
930	637	4438	5	555	277.5	788.9
945	640	4431	5	546.7	273.35	787.9
1000	636	4376	5	549.4	274.7	792
1015	636	4389.1	5	552.9	276.45	788.3
1030	639	4440	5	562	281	791
1045	640	4442.5	5	555.3	277.65	789.6
1100	640	4490.7	5	567	283.5	793.2
1115	640	4435.4	5	564.4	282.2	791.1
1130	644	4467.1	5	592.4	296.2	789.4
1145	638	4469.5	5	220.3	110.15	790.1
1200	644	4342.2	5	574	287	789.3
1215	642	4458.5	5	559.4	279.7	788.4
1245	638	4384.7	5	550.2	275.1	788.6
Run 3 Avg.	640	4428.1	5		267.38	789.8
900	643	4449.9	5	530.1	265.05	797.9
915	637	4461	5	538.8	269.4	797.2
930	645	4453.2	5	565.7	282.85	791.7
945	640	4376.9	5	553.6	276.8	791.8
1000	642	4378.8	5	550	275	793.1
1015	642	4390.6	5	544.1	272.05	792.8
1030	640	4403	5	546.2	273.1	791.7
1045	643	4394.4	5	547.9	273.95	792.9
1100	636	4387.6	5	531.5	265.75	794.1
1115	642	4400.7	5	544.9	272.45	792.6
1130	639	4394	5	545.5	272.75	791.5
1145	642	4397	5	549.2	274.6	792.7
1200	640	4341.6	5	545.6	272.8	791.7
1215	642	4399.8	5	556.1	278.05	792.2
1230	641	4353.5	5	550.1	275.05	793.2
Run 4 Avg	641	4398.8	5		273.38	793.1
1415	638	4430.2	5	537.1	268.55	788.2
1430	636	4408.3	5	548.9	274.45	789.7
1445	641	4419.1	5	538.2	269.1	789.8
1500	639	4438.5	5	544.6	272.3	788.7
1515	640	4396.4	5	550.2	275.1	789.2
1530	641	4335.5	5	546.3	273.15	791.2
1545	639	4335.5	5	546.3	273.15	790.7
1600	637	4389.1	5	547.2	273.6	794.5
1615	639	4401.1	5	545.6	272.8	796.4
1630	641	4408.2	5	552	276	793.6
1645	641	4413.8	5	535.6	267.8	793.3
1700	637	4384.8	5	538	269	792.8
1715	639	4380.3	5	544.4	272.2	792.8
1730	642	4377	5	542.8	271.4	792.7
Avg	639	4394.1	5		272.0	791.7

Gibson Station - Unit 3

Mercury Flue Gas Sampling

Date: 10/14&15/99

CEM Data

Time	CO2 (wet)	SO2 (lb/mmBtu)	NOx (lb/mmBtu)	Opacity (%)	Flow (scf/h)
Run 1					
930	12.1	2.7	0.5	13.7	96896840
945	12.3	2.71	0.5	13	95626480
1000	12.5	2.7	0.49	18.7	97675952
1015	12.4	2.73	0.51	18.4	100090616
1030	12.1	2.72	0.51	14.8	101019404
1045	12.4	2.69	0.47	13.8	98160496
1100	12.3	2.72	0.48	14.1	100735268
1115	12.2	2.74	0.5	14.1	100233840
1130	12.4	2.75	0.49	16.2	98824032
1145	12.4	2.75	0.49	16.5	97360672
1200	12.4	2.73	0.49	13.6	98787540
1215	12.5	2.75	0.5	13.7	95193840
1245	12.5	2.75	0.49	13.1	95336088
Run 3	12.3	2.73	0.49	14.9	98,149,313
900	12.4	2.68	0.45	14.2	92358796
915	11.6	2.68	0.45	15.1	96907040
930	12	2.67	0.46	15.9	98899328
945	12.2	2.73	0.45	14.7	96497816
1000	12.3	2.7	0.46	12.7	99588552
1015	12.3	2.71	0.46	12.2	95278864
1030	12.3	2.7	0.46	15.2	95040396
1045	12.3	2.69	0.46	12.3	99404112
1100	12.3	2.69	0.46	12.4	98273460
1115	12.4	2.7	0.47	13.6	96333720
1130	12.4	2.72	0.47	12.6	98888528
1145	12.3	2.72	0.46	15	95357476
1200	12.4	2.71	0.46	13.8	97944296
1215	12.4	2.71	0.46	12	98118576
1230	12.4	2.72	0.46	12.2	97961744
Run 4	12.3	2.70	0.46	13.6	97,123,514
1415	12.2	2.71	0.45	16.5	100387796
1430	12.2	2.71	0.46	14.7	98515872
1445	12.3	2.71	0.46	15.4	100287420
1515	12.3	2.7	0.46	13.9	96333284
1530	12.4	2.71	0.45	15	99355608
1545	12.4	2.71	0.45	13.3	97018648
1600	12.3	2.7	0.44	13.3	94064204
1615	12.4	2.71	0.44	13.2	97939736
1630	12.4	2.7	0.45	12.8	97039464
1645	12.4	2.71	0.45	13.3	97041084
1700	12.4	2.7	0.45	12.5	94710484
1715	11.8	2.7	0.45	13.7	100394732
1730	12.3	2.69	0.47	12.6	96477324
	12.3	2.70	0.45	13.9	97,658,89=

Gibson Station - Unit 3

Mercury Flue Gas Sampling

Date: 10/14 & 15/99

Precipitator Data

Time	Power Input (kVA)	Fields Out of Service	Duct Opacity (%)	Gas Inlet Temp. A (F)	Gas Inlet Temp. B (F)	Gas Outlet Temp (F)
Run 1						
930	see sheets	see sheets	12	311	333	309
945	see sheets	see sheets	12	310	333	308.6
1000	see sheets	see sheets	15.3	311	334	309.4
1015	see sheets	see sheets	15	312	334	309.4
1030	see sheets	see sheets	12.4	314	335	312
1045	see sheets	see sheets	12.5	316	336	314.3
1100	see sheets	see sheets	12.9	316	336	313.8
1115	see sheets	see sheets	12	316	335	314.4
1130	see sheets	see sheets	14.4	316	335	314.6
1145	see sheets	see sheets	14.3	314	336	313.5
1200	see sheets	see sheets	11.1	314	336	313.2
1215	see sheets	see sheets	11.2	310	333	310.3
1245	see sheets	see sheets	11.1	310	334	310.5
Run 3			12.8	313	335	312
900	see sheets	see sheets	12.2	307	331	306.1
915	see sheets	see sheets	12.5	311	332	309.6
930	see sheets	see sheets	14.5	312	330	310.2
945	see sheets	see sheets	12.1	311	330	309.6
1000	see sheets	see sheets	10.4	310	331	310.1
1015	see sheets	see sheets	9.9	310	331	307.3
1030	see sheets	see sheets	12.8	310	331	308.2
1045	see sheets	see sheets	10.2	310	331	309
1100	see sheets	see sheets	10.1	310	335	309.9
1115	see sheets	see sheets	11.2	312	335	310.5
1130	see sheets	see sheets	10.6	313	336	312.7
1145	see sheets	see sheets	12.5	315	338	313.1
1200	see sheets	see sheets	10.7	316	338	314
1215	see sheets	see sheets	9.9	317	337	314.9
1230	see sheets	see sheets	9.9	318	338	316.4
Run 4.			11.3	312	334	311
1415	see sheets	see sheets	12.9	326	343	323.8
1430	see sheets	see sheets	11.3	325	342	324.3
1445	see sheets	see sheets	12	324	342	324.1
1500	see sheets	see sheets	10.9	323	340	323.6
1515	see sheets	see sheets	11.3	318	339	322.6
1530	see sheets	see sheets	11.8	317	340	319.7
1530	see sheets	see sheets	11.8	318	340	319.7
1545	see sheets	see sheets	10.4	318	340	319.3
1600	see sheets	see sheets	10.4	318	340	320.1
1615	see sheets	see sheets	10.6	319	341	319.9
1630	see sheets	see sheets	10.3	319	341	320.2
1645	see sheets	see sheets	11.6	319	342	320.3
1700	see sheets	see sheets	10.6	320	342	320.7
1715	see sheets	see sheets	11.7	321	343	321.2
1730	see sheets	see sheets	11.3	321	343	321.7
			11.3	320	341	321

Date: 10/14 & 15/1999 Gibson Precipitator Data

Unit: 3

Run #	1 0930																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	17	97	93	116	101	106	105	87	110	86	166	128	153	165	158	54
	Pri Volts	168	340	338	321	362	326	364	331	348	348	400	345	388	355	400	395
	Prec mAmps	91	784	567	714	609	861	728	532	920	518	1160	945	1150	1150	1280	280
	Sparks	GND	yes	yes	yes	yes	yes	yes	yes	yes	yes						yes
	N/S GND										GND						GND
B	Pri Amps	106	21	129	165	140	70	95	43	100	36	166	144	167	150	168	146
	Pri Volts	333	93	340	379	379	305	336	283	380	242	367	441	360	444	367	355
	Prec mAmps	637	112	889	1090	819	370	770	315	595	147	1070	1060	1060	1000	1120	100
	Sparks	yes	GND		yes		yes	yes	yes		GND				yes		
	N/S GND								GND				GND		GND		

Run #	1 1000																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	29	66	75	60	75	147	122	85	125	113	165	129	155	165	158	53
	Pri Volts	187	283	316	273	333	343	396	328	364	398	403	345	391	355	396	278
	Prec mAmps	105	322	490	287	455	826	903	595	924	686	1140	945	1160	1125	1270	287
	Sparks	GND	yes	yes	yes	yes	yes	yes	yes	yes	yes						yes
	N/S GND										GND						GND
B	Pri Amps	61	20	144	166	120	70	111	63	72	37	166	130	164	160	168	148
	Pri Volts	261	88	369	396	360	305	360	350	324	261	364	410	362	480	367	355
	Prec mAmps	329	98	980	1090	720	370	728	378	329	175	1070	1000	1070	1100	1140	1000
	Sparks	yes	GND	yes		yes	yes	yes	yes		GND				yes		
	N/S GND								GND				GND		GND		

Run #	1 1015																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	29	66	75	60	75	147	122	85	125	113	165	129	155	165	158	53
	Pri Volts	187	283	316	273	333	343	396	328	364	398	403	345	391	355	396	278
	Prec mAmps	105	322	490	287	455	826	903	595	924	686	1140	945	1160	1125	1270	287
	Sparks	GND	yes	yes	yes	yes	yes	yes	yes	yes	yes						yes
	N/S GND										GND						GND
B	Pri Amps	54	23	127	156	144	70	112	58	55	32	165	137	167	139	166	147
	Pri Volts	261	96	364	379	400	305	360	273	300	254	362	436	360	400	369	355
	Prec mAmps	343	133	812	1090	1020	360	833	168	252	168	1070	1040	1070	924	1140	1000
	Sparks	yes	GND	yes	yes	yes			yes		GND				yes		
	N/S GND								GND				GND		GND		

Run #	1 1030																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	24	127	95	168	89	129	57	104	115	137	165	128	130	165	158	55
	Pri Volts	206	355	338	372	360	333	288	360	357	453	403	345	376	350	396	266
	Prec mAmps	126	790	574	1060	462	805	343	812	693	896	1160	952	1140	1125	1280	210
	Sparks	GND	yes	yes		yes	yes	yes	yes	yes	yes						yes
	N/S GND										GND						GND
B	Pri Amps	85	23	121	166	154	72	111	77	96	35	167	117	167	143	167	146
	Pri Volts	278	98	348	386	386	305	360	307	384	259	362	400	302	446	369	357
	Prec mAmps	364	112	917	1100	896	400	833	301	413	119	1070	938	1070	903	1140	1000
	Sparks		GND	yes		yes	yes	yes	yes	yes	GND		yes		yes		
	N/S GND								GND				GND		GND		

Run #	1 1100																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	14	31	72	164	81	115	126	78	167	119	167	129	155	163	158	43
	Pri Volts	156	235	319	376	345	314	403	316	429	386	400	345	391	372	398	271
	Prec mAmps	63	182	392	1060	434	672	840	434	1290	588	1160	945	1150	1090	1290	245
	Sparks	GND	yes	yes		yes	yes	yes	yes		yes						yes
	N/S GND										GND						GND
B	Pri Amps	70	32	118	165	95	69	103	38	70	33	167	151	167	113	167	162
	Pri Volts	278	115	338	374	331	331	352	271	326	247	360	441	355	391	364	367
	Prec mAmps	448	182	861	1080	581	434	847	189	371	98	1070	1120	1050	593	1120	1090
	Sparks	yes	GND	yes		yes				yes	GND		yes		yes		
	N/S GND																

Run #	1 1130																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	18	130	83	67	52	64	96	43	87	56	159	105	153	164	158	43
	Pri Volts	182	362	316	254	309	271	362	271	331	297	398	316	388	372	391	271
	Prec mAmps	98	994	476	119	252	343	651	231	630	322	1120	777	1000	1100	1280	245
	Sparks	GND	yes	yes	yes	yes	yes	yes	yes	yes	yes		yes				yes
	N/S GND										GND						GND
B	Pri Amps	63	18	130	167	102	70	109	55	108	23	164	152	166	153	168	160
	Pri Volts	271	86	340	381	338	331	360	319	393	218	357	465	360	480	364	364
	Prec mAmps	273	98	966	1090	651	364	833	259	588	98	1070	1130	1080	1090	1120	1080
	Sparks	yes	GND	yes		yes					GND						
	N/S GND								GND				GND		GND		

Run #	1 1200																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	27	118	100	167	140	147	126	111	152	103	167	117	155	166	158	50
	Pri Volts	199	340	340	364	390	364	386	350	362	364	400	333	388	374	393	266
	Prec mAmps	119	714	602	1070	720	1100	930	693	945	511	1160	917	1160	1100	1290	234
	Sparks	GND	yes			yes		yes	yes	yes	yes		yes				yes
	N/S GND										GND						GND
B	Pri Amps	65	20	160	166	107	72	114	53	94	38	168	144	166	111	168	161
	Pri Volts	280	88	379	384	345	331	336	312	372	271	360	448	355	376	364	367
	Prec mAmps	408	119	1120	1080	693	336	791	252	497	161	1050	1070	1070	700	1120	1090
	Sparks	yes	GND	yes		yes			yes		GND		yes		yes		
	N/S GND								GND				GND		GND		

Run #	1 1245																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	29	82	80	140	80	110	88	66	101	72	165	128	147	163	158	52
	Pri Volts	240	309	319	357	352	320	331	302	326	326	391	345	388	372	391	276
	Prec mAmps	175	560	304	787	448	679	434	413	609	385	1120	924	1070	1120	1290	245
	Sparks	GND	yes	yes	yes	yes		yes	yes	yes	yes						yes
	N/S GND										GND						GND
B	Pri Amps	66	27	144	164	166	71	115	43	108	37	167	151	167	131	167	161
	Pri Volts	273	108	364	388	412	331	360	290	393	261	357	465	355	432	364	364
	Prec mAmps	322	154	1090	1100	910	364	882	231	553	189	1030	1120	1080	938	1120	1090
	Sparks	yes	GND	yes					yes		GND				yes		
	N/S GND								GND				GND		GND		

Run #	3 0900																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	48	80	105	83	117	149	124	119	106	76	168	136	158	164	158	50
	Pri Volts	261	295	343	288	379	364	388	355	338	304	398	348	391	369	391	271
	Prec mAmps	224	525	637	434	588	1090	830	700	826	392	1170	987	1180	1110	1290	231
	Sparks	GND	yes		yes	yes		yes	yes	yes	yes						
	N/S GND										GND						GND
B	Pri Amps	60	30	147	167	168	74	108	48	126	25	163	140	167	160	167	153
	Pri Volts	305	117	362	374	420	336	355	304	429	223	352	446	357	465	364	357
	Prec mAmps	310	161	910	1090	1000	392	826	280	714	105	1070	1090	1070	1110	1120	1040
	Sparks	yes	GND	yes		yes		yes	yes		GND		yes				
	N/S GND								GND				GND		GND		

Run #	3 0930																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	26	86	102	64	86	100	105	90	113	90	167	131	158	162	158	50
	Pri Volts	204	300	343	264	328	307	316	333	340	336	398	345	388	367	396	280
	Prec mAmps	140	567	616	322	448	707	462	616	651	518	1160	980	1170	1110	1290	266
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes						yes
	N/S GND										GND						GND
B	Pri Amps	85	25	163	165	141	73	111	58	102	26	165	147	165	118	167	153
	Pri Volts	320	100	393	376	393	333	357	319	396	220	355	458	355	388	367	360
	Prec mAmps	350	140	952	1090	973	385	812	357	581	126	1070	1040	1070	749	1140	1040
	Sparks	yes	GND	yes		yes			yes	yes	GND				yes		
	N/S GND								GND				GND		GND		

Run #	3 1000																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	34	101	90	61	100	144	72	100	106	96	164	129	158	166	158	40
	Pri Volts	225	331	333	235	348	376	307	362	331	357	391	345	391	369	393	266
	Prec mAmps	182	581	567	273	434	1090	413	693	765	571	1170	931	1180	1110	1280	345
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes	yes	yes				yes
	N/S GND										GND						GND
B	Pri Amps	75	20	158	167	166	75	111	59	112	33	162	145	166	123	167	155
	Pri Volts	315	96	376	376	422	338	360	321	410	235	357	453	357	396	367	357
	Prec mAmps	275	112	1000	1100	917	385	826	343	658	140	1060	954	1070	826	1140	1040
	Sparks	yes	GND	yes	yes	yes			yes	yes	GND		yes		yes		
	N/S GND								GND				GND		GND		

Run #	3 1030																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	29	83	106	82	73	143	86	127	114	118	167	134	159	161	156	55
	Pri Volts	223	300	340	271	428	348	324	357	345	374	398	348	391	360	391	268
	Prec mAmps	161	574	637	371	511	903	504	1010	630	679	1160	994	1180	1090	1280	259
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes		yes				
	N/S GND										GND						GND
B	Pri Amps	70	28	130	166	160	72	111	66	124	29	167	147	167	137	168	153
	Pri Volts	340	110	333	376	424	336	357	333	408	235	355	460	357	434	367	360
	Prec mAmps	380	161	826	1090	1000	385	833	378	707	126	1060	1090	1070	917	1120	1020
	Sparks	yes	GND	yes		yes			yes	yes	GND				yes		
	N/S-GND								GND				GND		GND		

Run #	3 1100																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	43	103	107	101	82	135	99	112	94	82	168	132	158	145	158	50
	Pri Volts	249	338	345	309	331	321	340	364	328	321	398	348	391	364	396	266
	Prec mAmps	259	805	665	735	448	700	595	777	553	350	1170	987	1160	1130	1290	294
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes				yes		yes
	N/S GND										GND						GND
B	Pri Amps	52	20	137	127	86	60	107	68	126	28	162	128	168	128	167	153
	Pri Volts	298	91	350	348	309	319	350	297	432	232	350	412	357	374	367	357
	Prec mAmps	36	133	931	1090	637	308	679	231	721	98	1050	1070	1080	658	1140	1030
	Sparks	yes	GND	yes		yes			yes	yes	GND				yes		
	N/S GND								GND				GND		GND		

Run #	3 1130																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	31	42	79	60	70	104	114	73	105	62	131	122	158	164	158	53
	Pri Volts	218	464	326	256	290	302	369	261	333	290	362	348	391	364	396	288
	Prec mAmps	196	245	462	427	315	945	385	175	805	406	1090	980	1170	1100	1290	217
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes			yes			yes
	N/S GND										GND						GND
B	Pri Amps	68	23	91	166	168	71	98	58	127	26	164	146	167	137	167	154
	Pri Volts	310	100	321	386	405	333	328	319	427	230	350	458	357	441	364	357
	Prec mAmps	39	98	749	1100	1010	364	861	266	721	112	1070	910	1070	791	1140	1050
	Sparks	yes	GND	yes		yes			yes		GND				yes		
	N/S GND								GND				GND		GND		

Run #	3 1200																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	30	103	91	94	84	107	87	77	86	77	162	35	159	163	158	45
	Pri Volts	204	297	333	307	333	328	357	304	309	319	398	216	391	369	369	271
	Prec mAmps	126	616	623	504	497	665	777	525	679	350	1160	280	1170	1080	1300	259
	Sparks	GND	yes	yes	yes	yes	yes	yes	yes	yes	yes		yes				yes
	N/S GND										GND						GND
B	Pri Amps	72	21	131	158	152	70	111	54	86	34	165	134	165	127	168	154
	Pri Volts	332	93	360	386	400	331	357	307	360	256	357	424	355	391	364	357
	Prec mAmps	40	112	847	1090	987	357	637	329	462	175	1060	1090	1070	966	1120	1030
	Sparks	yes	GND	yes	yes	yes		yes			GND				yes		
	N/S GND								GND				GND		GND		

Run #	3 1230																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	30	62	100	103	116	147	96	72	141	121	148	123	150	133	158	46
	Pri Volts	213	297	336	307	381	348	345	304	369	360	369	340	388	343	396	273
	Prec mAmps	112	350	574	910	693	1070	707	553	742	623	1170	511	931	903	1300	254
	Sparks	GND			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes			
	N/S GND										GND						GND
B	Pri Amps	82	26	106	155	134	64	110	57	134	24	164	146	165	125	167	154
	Pri Volts	330	105	324	392	381	321	357	307	434	223	350	458	352	400	364	357
	Prec mAmps	37	112	854	1090	854	322	847	392	707	140	1060	1090	1070	373	1140	1040
	Sparks	yes	GND	yes		yes			yes		yes	yes	yes		yes		
	N/S GND								GND				GND		GND		

Run #	4 1415																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	23	97	73	77	96	116	104	97	117	95	148	131	158	132	157	43
	Pri Volts	189	331	324	285	362	336	320	336	369	352	381	345	388	345	396	266
	Prec mAmps	77	532	462	308	441	847	518	644	987	539	1090	973	1080	980	1300	245
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes		yes	yes	yes		
	N/S GND										GND						GND
B	Pri Amps	82	24	124	164	160	74	108	72	72	37	167	115	166	87	167	151
	Pri Volts	330	108	345	381	362	331	355	340	338	259	367	393	355	338	362	357
	Prec mAmps	45	140	210	1090	749	357	735	259	392	119	1050	840	1080	539	1140	1020
	Sparks	yes	GND	yes				yes	yes		GND		yes				
	N/S GND								GND				GND		GND		

Run #	4 1445																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	14	63	81	42	101	119	94	101	101	65	154	70	159	163	158	51
	Pri Volts	160	249	328	223	379	317	321	331	333	290	381	264	388	372	393	280
	Prec mAmps	70	300	462	259	497	808	400	518	728	315	1080	483	1180	1070	1280	292
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes		yes		yes		yes
	N/S GND										GND						GND
B	Pri Amps	75	22	133	167	134	68	108	61	52	37	162	145	167	167	167	152
	Pri Volts	335	96	353	364	376	326	360	333	300	271	362	458	355	504	362	357
	Prec mAmps	400	126	807	1100	893	322	819	266	252	196	1050	1090	1080	1120	1130	1030
	Sparks	yes	GND	yes		yes			yes		GND		yes		yes		
	N/S GND								GND				GND		GND		

Run #	4 1515																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	20	118	90	105	85	138	107	75	114	165	167	128	157	162	158	41
	Pri Volts	177	348	388	278	328	328	364	304	324	342	396	343	388	376	393	264
	Prec mAmps	98	840	532	329	441	728	740	448	707	543	1160	945	1170	1090	1290	238
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes						
	N/S GND										GND						GND
B	Pri Amps	77	21	151	166	144	72	110	66	58	32	160	147	168	147	167	153
	Pri Volts	355	98	369	381	388	331	357	333	309	254	362	458	352	450	362	360
	Prec mAmps	455	105	1030	1110	890	364	833	324	273	168	1060	1090	1080	1120	1140	1040
	Sparks	yes	GND	yes		yes			yes		GND				yes		
	N/S GND								GND				GND		GND		

Run #	4 1545																
Set		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	14	57	86	61	84	118	89	101	84	50	160	127	149	114	157	45
	Pri Volts	158	256	331	252	352	331	333	285	307	261	388	340	360	333	396	271
	Prec mAmps	70	371	518	392	427	854	686	413	763	287	1010	917	1190	791	1290	231
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes		yes
	N/S GND										GND						GND
B	Pri Amps	61	24	145	142	147	70	110	64	49	42	166	144	168	132	168	154
	Pri Volts	336	100	369	352	400	331	360	321	285	264	364	439	357	463	364	357
	Prec mAmps	448	154	812	1050	1020	350	854	266	203	175	1050	945	1070	1050	1140	1050
	Sparks		GND	yes				yes	yes		GND		yes		yes		
	N/S GND								GND				GND		GND		

Run #	4 1615																
Set	0	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	26	72	90	78	81	95	97	43	120	53	167	131	133	163	158	43
	Pri Volts	201	302	339	273	331	321	347	252	352	264	396	345	365	386	393	266
	Prec mAmps	49	462	581	455	546	651	504	133	708	293	1050	973	931	1050	1280	231
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes	yes		yes	yes		yes
	N/S GND										GND						GND
B	Pri Amps	77	18	120	143	155	71	110	71	60	35	167	138	167	116	166	155
	Pri Volts	357	86	338	357	400	328	359	340	314	252	367	350	355	405	362	360
	Prec mAmps	457	126	882	1100	653	371	812	259	252	189	1050	1090	1080	812	1140	1050
	Sparks	yes	GND	yes	yes	yes			yes		GND				yes		
	N/S GND								GND				GND		GND		

Run #	4 1645																
Set	0	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	12	34	99	75	73	139	120	71	94	83	165	114	119	129	157	43
	Pri Volts	156	220	331	268	314	360	355	300	321	319	324	333	336	348	396	268
	Prec mAmps	70	252	581	371	490	959	532	406	658	378	826	239	812	1050	1280	217
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes	yes		yes	yes		
	N/S GND										GND						GND
B	Pri Amps	55	22	95	168	153	70	161	23	67	41	165	144	166	143	167	151
	Pri Volts	304	98	362	379	400	328	350	218	321	254	364	441	357	410	362	357
	Prec mAmps	385	140	798	1090	1020	364	588	98	273	147	1060	1070	1080	882	1140	1050
	Sparks	yes	GND	yes	yes	yes		yes	yes		GND		yes		yes		
	N/S GND								GND				GND		GND		

Run #	4 1715																
Set	0	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
A	Pri Amps	16	55	91	46	74	104	96	102	139	58	93	123	116	154	158	45
	Pri Volts	170	271	333	228	309	319	343	355	374	288	292	343	331	381	393	271
	Prec mAmps	98	252	567	301	413	756	490	763	602	301	735	784	1080	904	1300	217
	Sparks	GND	yes		yes	yes	yes	yes	yes	yes	yes	yes		yes	yes		
	N/S GND										GND						GND
B	Pri Amps	69	22	134	166	133	72	109	7	81	43	165	147	167	80	165	152
	Pri Volts	348	98	357	379	408	331	345	122	355	280	364	458	357	309	364	357
	Prec mAmps	252	133	609	1050	910	364	812	14	434	161	1060	1080	1080	574	1140	1030
	Sparks	yes	GND	yes		yes			yes		GND				yes		
	N/S GND								GND				GND		GND		

APPENDIX F

Chain of Custody Records

Job# 99-95 GIB B Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

Unit 3 Precipitator Inlet Duct SAMPLE I.D. Run 1	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Container 1 Filter	10/14/99	1505	X				III	BH		X							X			Thimble Q33 = Duct A Thimble Q34 = Duct B
Container 2 0.1 N HNO_3 F.W.	10/14/99	1507	X				I	BH									X			
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/14/99	1524	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/14/99	1528	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/14/99	1549	X				I	BH									X			Used Hydroxylamine Sulfate / Sodium Chloride

Analyze according to the Ontario Hydro method.

Received by:	Date:	Time:	Transported by:	Date:	Time:	Received at Lab by:	Date:	Time:
			Shane Lee	10/15/99	2215		10/16/99	14:00
Analyzed by:	Date:	Time:	Data Reviewed by:	Date:	Time:	Remarks:		
			JRM					

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95 GEB3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

Unit 3 Precipitator Inlet Duct SAMPLE I.D. Run 2	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
																				Analyze according to the Ontario Hydro method. ABORTED! NOT Recovered
Container 1 Filter	10/14/99		X				III	BH		X							X			Thimble: Thimble: Filter:
Container 2 0.1 N HNO_3 F.W.	10/14/99		X				I	BH									X			
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/14/99		X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/14/99		X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/14/99		X				I	BH									X			Used Hydroxylamine Sulfate / Sodium Chloride

Received by:	Date:	Time:	Transported by: Shane Lee	Date: 10/15/99	Time: 2215	Received at Lab by:	Date: 10/16/99	Time: 14:00
Analyzed by:	Date:	Time:	Data Reviewed by: RM	Date:	Time:	Remarks: (NO SAMPLES)		

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95 GIB3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

Unit 3 Precipitator Inlet Duct SAMPLE I.D. Run 3	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Container 1 Filter	10/15/99	1503	X				II ~~III~~	BH		X							X			Thimble: Q39 ~~Thimble:~~ Tore Filter during recovery. Stuck to Filt. Filter Q64
Container 2 0.1 N HNO_3 F.W.	10/15/99	1513	X				I	BH									X			
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/15/99	1525	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/15/99	1530	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/15/99	1541	X				I	BH									X			Used Hydroxylamine Sulfate/Sodium Chloride

Received by:	Date:	Time:	Transported by: Shane Lee	Date: 10/15/99	Time: 2215	Received at Lab by:	Date: 10/16/99	Time: 14:00
Analyzed by:	Date:	Time:	Data Reviewed by: JEM	Date:	Time:	Remarks:		

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95GIB3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

Unit 3 Precipitator Inlet Duct SAMPLE I.D. Run 4	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Container 1 Filter	10/5/99	1827	X				II	BH		X							X			Thimble: Q40 Filter: Q61
Container 2 0.1 N HNO_3 F.W.	10/5/99	1832	X				I	BH									X			
Container 3 10% HNO_3 Rinse Imp 1, 2, 3	10/5/99	1845	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/5/99	1849	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5, 6, 7	10/5/99	1901	X				II	BH									X			Used Hydroxylamine Sulfate / Sodium chloride

SAMPLE ANALYSIS REQUIRED

Analyze according to the Ontario Hydro method.

Received by:	Date:	Time:	Transported by:	Date:	Time:	Received at Lab by:	Date:	Time:
			Shane Lee	10/5/99	2215	[illegible]	10/10/99	14:00
Analyzed by:	**Date:**	**Time:**	**Data Reviewed by:**	**Date:**	**Time:**	**Remarks:**		
			JCM					

Ship to: Test America

METCO ENVIRONMENTAL

Job# 99-95 GIB3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location: Cinergy Gibson Generating Station, Owensville, Indiana

Collected By/Company: METCO Environmental

SAMPLE I.D. (Unit 3 Stack, Run 1)	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Container 1 Filter	10/14/99	1600	X				II										X			Filter # Q57 Thimble # Q32
Container 2 0.1 N HNO_3 F.W.	10/14/99	1602	X				I										X			
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/14/99	1649	X				II										X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/14/99	1651	X				I										X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/14/99	1939	X				I										X			Used Hydroxylamine Sulfate / Sodium Chloride

Received by:	Date:	Time:	Transported by:	Date:	Time:	Received at Lab by:	Date:	Time:
			Steve Lee	10/15/99	2215	[illegible]	10/16/99	14:00
Analyzed by:	**Date:**	**Time:**	**Data Reviewed by:**	**Date:**	**Time:**	**Remarks:**		
			[illegible]					

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95 G1B3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

Unit 3 Stack SAMPLE I.D. Run 2	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Container 1 Filter			X				I										X			Filter #: Thimble #:
Container 2 0.1 N HNO_3 F.W.			X				I										X			
Container 3 10% HNO_3 Rinse Imp 1,2,3			X				II										X			
Container 4 0.1 N HNO_3 Rinse Imp 4			X				I										X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7			X				I										X			Used Hydroxylamine Sulfate / Sodium Chloride

Analyze according to the Ontario Hydro method.
ABORTED!
NOT Recovered.

Received by:	Date:	Time:	Transported by: Shane Lee	Date: 10/15/99	Time: 2215	Received at Lab by: James A. Davis	Date: 10/16/99	Time: 14:00
Analyzed by:	Date:	Time:	Data Reviewed by: JRM	Date:	Time:	Remarks: (NO SAMPLE)		

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95 G1B3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 2

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

Unit 3 Stack

SAMPLE I.D. Run 3	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Container 1 Filter	10/15/99	1425	X				II										X			Filter #: Q63 Thimble #: Q38
✓ Container 2 0.1 N HNO_3 F.W.	10/15/99	1427	X				I										X			
✓ Container 3 10% HNO_3 Rinse Imp 1,2,3	10/15/99	1438	X				II										X			
✓ Container 4 0.1 N HNO_3 Rinse Imp 4	10/15/99	1440	X				I										X			
✓ Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/15/99	1452	X				I										X			Used Hydroxylamine Sulfate/ Sodium Chloride

Analyze according to the Ontario method.

Received by:	Date:	Time:	Transported by: Shane Lee	Date: 10/15/99	Time: 2215	Received at Lab by:	Date: 10/16/99	Time: 14:00
Analyzed by:	Date:	Time:	Data Reviewed by: RM	Date:	Time:	Remarks:		

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95GIB3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location: Cinergy Gibson Generating Station, Owensville, Indiana

Collected By/Company: METCO Environmental

SAMPLE I.D. Unit 3 Stack Run 4	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Container 1 Filter	10/15/99	1912	X				II	BH		X							X			Thimble: Q 41 Filter: Q42
Container 2 0.1 N HNO_3 F.W.	10/15/99	1914	X				I	BH									X			
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/15/99	1922	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/15/99	1925	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/15/99	1934	X				I	BH									X			Used Hydroxylamine Sulfate / Sodium Chloride.

SAMPLE ANALYSIS REQUIRED

Received by:	Date:	Time:	Transported by: Shane Lee	Date: 10/15/99	Time: 2215	Received at Lab by:	Date: 10/16/99	Time: 14:00
Analyzed by:	Date:	Time:	Data Reviewed by:	Date:	Time:	Remarks:		

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95GIB3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

SAMPLE I.D.	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Unit 3 Precipitator Inlet Duct Blank Train																				Analyze according to the Ontario Hydro Method. Run Time 1000 – 1200 10/15/99
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/15/99	1244	X				I	BH									X			Containers 1, 2, 3 were not recovered.
Container 4 0.1 N HNO_3 Rinse Imp 4	10/15/99	1248	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/15/99	1257	X				I	BH									X			Used Hydroxylamine Sulfate / Sodium Chloride

Received by:	Date:	Time:	Transported by: Shane Lee	Date: 10/15/99	Time: 2215	Received at Lab by:	Date: 10/16/99	Time: 14:00
Analyzed by:	Date:	Time:	Data Reviewed by: JRM	Date:	Time:	Remarks:		

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95 GIB3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location: Cinergy Gibson Generating Station, Owensville, Indiana

Collected By/Company: METCO Environmental

SAMPLE I.D.	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Unit 3 Stack Blank Train																				Analyze according to the Ontario Hydro method. Run Time 1000-1200 10/15/99
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/15/99	1216	X				I	BH									X			Containers 1, 2, 3 were not recovered.
Container 4 0.1 N HNO_3 Rinse Imp 4	10/15/99	1219	X				I	BH									X			
Containers 0.1 N HNO_3 Rinse Imps 5,6,7	10/15/99	1230	X				I	BH									X			Used Hydroxylamine Sulfate / Sodium Chloride.

Received by:	Date:	Time:	Transported by:	Date:	Time:	Received at Lab by:	Date:	Time:
			Shane Lee	10/15/99	2215	[illegible]	10/16/99	14:00
Analyzed by:	**Date:**	**Time:**	**Data Reviewed by:**	**Date:**	**Time:**	**Remarks:**		
			KM					

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# 99-95 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

SAMPLE I.D.	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Reagent Blanks																				Analyze according to the Ontario Hydro Method.
Container 7 0.1 N HNO_3 Blank	10/15/99	1624	X				I	BH									X			Vol. = 50 ml
Container 8 1M KCl Blank	10/15/99	1625	X				I	BH									X			Vol. = 52 ml
Container 9 Blank 5% HNO_3 - 10% H_2O_2	10/15/99	1626	X				I	BH									X			Vol. = 52 ml
Container 10 $KMnO_4$ - H_2SO_4 Blank	10/15/99	1627	X				I	BH									X			Vol. = 50 ml
Container 11 Hydroxylamine Sulfate/ Sodium Chlaide Blank	10/15/99	1629	X				I	BH									X			Vol. = 102 ml
Container 12 Filter Blank	10/15/99		X				IV	BH									X			Thimbles: Q42, Q43, Q44 Filters: Q64, Q65, Q66

Received by:	Date:	Time:	Transported by:	Date:	Time:	Received at Lab by:	Date:	Time:
			Shane Qee	10/15/99	2215	[illegible]	10/16/99	14:00

Analyzed by:	Date:	Time:	Data Reviewed by:	Date:	Time:	Remarks:
			JRM			

Ship to: TestAmerica

METCO ENVIRONMENTAL

Job# ~~99-95~~ GI33 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
Cinergy
Gibson Generating Station
Owensville, Indiana

Collected By/Company
METCO Environmental

Unit 3 Precipitator Inlet Duct SAMPLE I.D.	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Run 1 - Container 2A Ace Rinse	10/14/99	1508	X				I	BH		X							X			Analyze according to the Ontario Hydro method. Ship to TestAmerica for Hg Analysis.
Run ~~2~~ 3 - Container 2A Ace Rinse	10/15/99	1511	X				I	BH		X							X			Run 2 was Aborted. Sample was not recovered.
Run 3 - Container 2A Ace Rinse	10/15/99	1830	X				I	BH		X							X			
Acetone Blank			X				I	BH		X										Vol. =

Received by:	Date:	Time:	Transported by: Shane Lee	Date: 10/15/99	Time: 2215	Received at Lab by:	Date: 10/18/99	Time: 0800
Analyzed by:	Date:	Time:	Data Reviewed by: JRM	Date:	Time:	Remarks: part. by Metco	11-2-99 M. Gantner	

Ship to: METCO

TESTAMERICA: James G. Davis 11/4/99

METCO ENVIRONMENTAL

Job# 9955 GIB3 Unit Tested Unit 3

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location: Cinergy Gibson Generating Station, Owensville, Indiana

Collected By/Company: METCO Environmental

SAMPLE I.D.	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	POHC's	METALS	Hg			REMARKS (Specific Compounds/Methods)
Unit 3 Stack																				Analyze according to the Ontario Hydro Method. Ship to TestAmerica for Hg Analysis.
Run 1 - Container 2A Acc. Rinse	10/14/99	1758	X				I	BH SL		X							X			
Run ~~2~~3 - Container 2A Acc. Rinse	10/15/99	1422	X				I	BH SL		X							X			Run 2 was aborted. Sample was not recovered
Run ~~3~~4 - Container 2A Acc. Rinse	10/15/99	1411	X				I	BH SL		X							X			
Acc. Blank			X				I	BH		X										Vol. =

Received by:	Date:	Time:	Transported by:	Date:	Time:	Received at Lab by:	Date:	Time:
			Steve Roe	10/15/99	SC 2215 20+		10/18/99	0800
Analyzed by:	**Date:**	**Time:**	**Data Reviewed by:**	**Date:**	**Time:**	**Remarks:**		
						part. by metco	11/2/99 M. Santer	

Ship to: METCO Environmental

TESTAMERICA: James A. Davis 11/4/99

METCO ENVIRONMENTAL

APPENDIX G

Resumes

METCO ENVIRONMENTAL

BILLY J. MULLINS, JR.; President

Education	Post Graduate Study Environmental Engineering at Southern Methodist University; Dallas, Texas 1970. M.S. 1969, New York University; New York, New York, in Civil Engineering (Air Resources). B.S. 1968, Texas Tech University; Lubbock, Texas, in Civil Engr. (Water Resources). Studies in Engineering at U.S. Naval Academy; Annapolis, Maryland, 1963-1964.
Professional Training Courses	Attended Short Course on Air Pollution Engineering at the University of Texas at Austin, February 1970. Attended four-week management course presented by the American Management Association, 1976.
Certification	Registered Professional Engineer Certified Visible Emissions Evaluator Licensed Private Pilot (Multi-Engine-Land, Instrument) Diplomat in the American Academy of Environmental Engineers Inductee into the Stack Sampling Hall of Fame Certified as Qualified Environmental Professional (QEP)
Professional Memberships	**Air & Waste Management Association** - Past Chairman, Past Vice Chairman, and Past Board of Directors of North Texas Chapter and Southwest Section; Past Chairman, Consultants Committee; Past Chairman, Source Measurement Committee **Source Evaluation Society** - Past President, Past Board of Directors **American Management Association**

MULLINS

Publications

Co-authored "Sulfur Compound Emissions of the Petroleum Production Industry," December 1974.

Co-authored "Field Procedure for Stabilizing Hydrogen Sulfide Samples to be Analyzed Using Modified Methylene Blue Technique," presented at the Conference on Ambient Air Quality Measurements, Austin, Texas, March 1975.

Co-authored "Atmospheric Emissions Survey of the Sour Gas Industry," October 1975.

Co-authored "Technique for Insuring the Validity of Samples for High Concentrations of Sulfur Dioxide Using the EPA Method 5 Sampling Train," presented at the Third National Conference on Energy and the Environment, College Corner, Ohio, September 1975.

Teaching Experience

Conducted training seminars on sampling methods periodically since 1974 to present.

Conducted a one-day seminar on Part 75 Testing over ten times in 1993 and 1994.

Served as a lecturer in the Environmental Protection Agency's training course number 450, "Source Sampling for Particulate Pollutants," for two years from January 1974 to October 1975 and in March, 1992.

Conducted a two-day training course entitled "Technical Assistance in Source Sampling" at Iowa State University, Ames, Iowa, for the Environmental Protection Agency, October 1974.

Conducted EPA's training course number 450, "Source Sampling for Particulate Pollutants," for the EPA at Research Triangle Park, North Carolina, September 1975.

MULLINS

Teaching Experience (Cont'd)

Conducted a two-day short course entitled "Performing and Observing Source Sampling" at Dallas, Texas; July 1976, May 1977, October 1977, November 1987 and November 1988; at Lake Charles, Louisiana, May 1977; at Casper, Wyoming, May 1977; and at Point Comfort, Texas, November 1992.

Served as a lecturer in the Environmental Protection Agency's two-day seminar entitled "Asphalt Industry Environmental Solutions," presented in Dallas, Texas, on March 21 and 22, 1979.

Conducted a two-day short course entitled "Performing and Observing Source Sampling" in Phoenix, Arizona in August, 1990 for the State of Arizona, Department of Environmental Quality; in Lincoln, Nebraska, in March 1980 for the State of Nebraska, Air Quality Control Division.

Technical Experience

Directed and performed stack sampling on over 2000 sources of which over 500 were sampled simultaneously using more than one sampling train at several points in the flue gas stream; 1972-present.

Directed and performed over 200 short-term ambient air studies using mobile sampling vans and various ambient air sampling equipment; 1972-present.

Designed, directed and operated over 20 permanent ambient air networks of various size and duration for a variety of parameters; 1972-present.

Designed surface and underground drainage systems for residential subdivisions, public works projects, and shopping centers; 1969-1972.

Designed several residential subdivisions including lot layout, street design, drainage design, and utility design; 1969-1972.

MULLINS

Research Projects

Supervised and conducted a study made by the Hawaiian Sugar Planters' Association to characterize the emissions for several bagasse-fired boilers. April-May 1976.

Supervised and conducted a study made by the Rio Grande Valley Sugar Growers, Inc. to determine the area affected by the burning of sugarcane fields prior to harvesting. November 1974-April 1975.

Supervised and conducted a study by a lightweight aggregate manufacturer to develop a material balance around the process through sampling and analysis of several parameters. November 1973.

Conducted a study in New York City to attempt to develop a correlation in the ambient air between carbon dioxide and sulfur dioxide to provide a tool for predicting air pollution episodes. January-May 1969.

Related Projects

Served as Chairman of the Engineering Foundation Conference on Stack Sampling and Source Evaluation in Santa Barbara, California, 1985.

Served as Session Chairman at the Engineering Foundation Conference on Stack Sampling and Source Evaluation in Hershey, Pennsylvania, 1984; in San Diego, California, 1993; and in Palm Coast, Florida, 1994.

BILLY L. HEFLEY; Project Supervisor II

Education	B.S. 1991, East Central University; Ada, Oklahoma, in Environmental Science with a concentration in Environmental Management.
Professional Training Course	Attended 40-hour Occupational and Environmental Training Program on Hazardous Materials (CFR 1910.120) Dallas, Texas, April 1993. Also attended an 8-hour refresher course January 1994, February 1995, and January 1996. Attended 8-hour Safe Hazardous Materials Transportation Training Program (HM-126F and HM-181) Dallas, Texas, October 1994. Attended Bill Mullins' Performing and Observing Source Sampling Short Course; Dallas, Texas, January 1995.
Certification	Certified Visible Emissions Evaluator
Technical Experience	Participated in the sampling of over 150 sources, including several of which were sampled simultaneously using more than one sampling train. Thoroughly trained in all EPA testing procedures, 1992-present. Participated in an auditing program for a permanent eight-station sulfur dioxide ambient air network in East Texas. 1992-1993. Participated in a semi-monthly ambient air monitoring survey for organic compounds at a petrochemical facility located in South Texas. 1992-1993.

HEFLEY

Thoroughly trained in all EPA testing procedures, 1991 - Present

Experienced in the analysis of commercial calibration gas cylinders for CO_2, O_2, NO_x, and SO_2.

Experienced with calibration techniques for all field testing equipment.

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

Thermo Environmental Model 10AR Oxides of Nitrogen Analyzer

Thermo Environmental Model 48 Carbon Monoxide Analyzer

Teledyne Model 326 Oxygen Analyzer

Western Research Model 721A Sulfur Dioxide Analyzer

Anarad Model AR880 Oxides of Nitrogen Analyzer

Anarad Model AR23 Oxygen Analyzer

Anarad Model AR30C2 Sulfur Dioxide Analyzer

Anarad Model AR50-C Carbon Dioxide Analyzer

SHANE LEE; Environmental Technician II

Education	B. S. - Environmental Science-Biology, December 20, 1997; Sul Ross State University; Alpine, 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, 1998-present.

MICHAEL BASS; Environmental Technician III

Education	B. S. Geography, August 1998; Texas A&M University, College Station, Texas
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, 1998-present.

SCOTT HART; Environmental Technician II

Education	Associate Degree-Environmental Science, March 1999; Texas State Technical College, Breckenridge, 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 procedures, 1999-present.

JASON CONWAY; Environmental Technician II

Education	B.S. Biology, July 1999; Southeastern Oklahoma State University; Durant, Oklahoma.
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, 1999-present.

JASON BROWN; Environmental Technician II

Education	B. S. in Zoology, 1995; University of Oklahoma, Norman, Oklahoma.
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, 1999-present.