APPENDIX A

Nomenclature and Equations
for
Calculation of Source Emissions

METCO ENVIRONMENTAL

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)

METCO ENVIRONMENTAL

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.

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

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

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

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 – µg/dscm

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

20. Mercury – lbs/10^{12} Btu

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

21. DSCFM – calculated

DSCFM = (Unit Heat Input 10^6Btu/hr) x F_d x [20.9 ÷ (20.9 – O_2)] ÷ 60 min/hr

22. Mercury - lbs/hr

lbs/hr = µg ÷ Vm_{std} x (2.205 x 10^{-9} lbs/µg) x DSCFM* x 60 min/hr

23. Mercury lbs/hr input in coal = Hg ppm ÷ 1 x 10^6 x coal flow lbs/hr

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: 99-95WCR6
JOB NAME: TENNESSEE VALLEY AUTHORITY
LOCATION: STEVENSON, ALABAMA
UNIT TESTED: WIDOWS CREEK UNIT 6 PRECIPITATOR A INLET DUCT

SOURCE EMISSION CALCULATIONS

SYMBOL	DESCRIPTION	UNITS			
RUN #			1	2	3
DATE			10/20/99	10/20/99	10/21/99
BEGIN TIME			0915	1300	0800
END TIME			1145	1530	1030
P(b)	BAROMETRIC PRESSURE	"Hg Abs. (mm Hg)	29.56 (751)	29.48 (749)	29.50 (749)
P(m)	ORIFICE PRESSURE DROP	"H2O (mm H2O)	0.605 (15.4)	0.610 (15.5)	0.531 (13.5)
V(m)	VOLUME DRY GAS SAMPLED @ METER CONDITIONS	ft.^3 (m^3)	68.001 (1.926)	68.133 (1.929)	65.534 (1.856)
T(m)	AVERAGE GAS METER TEMPERATURE	DEG.F (DEG.C)	72 (22)	75 (24)	70 (21)
V(m[std])*	VOLUME DRY GAS SAMPLED @ STANDARD CONDITIONS*	DSCF (DSCM)	66.789 (1.891)	66.365 (1.879)	64.466 (1.825)
V(w)	TOTAL WATER COLLECTED, IMPINGERS & SILICA GEL	ml	118.6	110.5	112.3
V(w[gas])	VOLUME WATER VAPOR COLLECTED @ STANDARD CONDITIONS*	SCF (SCM)	5.598 (0.159)	5.216 (0.148)	5.301 (0.150)
%M	MOISTURE IN STACK GAS BY VOLUME	%	7.73	7.29	7.60

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

SOURCE EMISSION CALCULATIONS

TENNESSEE VALLEY AUTHORITY
STEVENSON, ALABAMA
WIDOWS CREEK UNIT 6 PRECIPITATOR A INLET DUCT

SYMBOL	DESCRIPTION	UNITS			
Md	MOL FRACTION OF DRY GAS		0.9227	0.9271	0.9240
CO2		%	14.0	13.4	14.0
O2		%	5.2	5.6	5.0
CO		%	0.0	0.0	0.0
N2		%	80.8	81.0	81.0
%EA	EXCESS AIR @ SAMPLING POINT	%	32.1	35.3	30.4
MWd	MOLECULAR WEIGHT OF DRY STACK GAS	LB/LB-MOLE (g/g-MOLE)	30.45 (30.45)	30.37 (30.37)	30.44 (30.44)
MW	MOLECULAR WEIGHT OF STACK GAS	LB/LB-MOLE (g/g-MOLE)	29.49 (29.49)	29.47 (29.47)	29.49 (29.49)
DELTA P	VELOCITY HEAD OF STACK GAS	"H2O (mm H20)	0.713 (18.1)	0.724 (18.4)	0.753 (19.1)
Ts	STACK TEMPERATURE	DEG. F (DEG. C)	320 (160)	323 (162)	318 (159)
Ps	STACK PRESSURE	"Hg Abs. (mm Hg)	28.79 (731)	28.72 (729)	28.70 (729)
Vs	STACK VELOCITY @ STACK CONDITIONS	FPM (m/SEC.)	3,329 (16.91)	3,369 (17.11)	3,433 (17.44)
As	STACK AREA	(SQ.INCHES) (SQ.METERS)	9,216 (5.95)	9,216 (5.95)	9,216 (5.95)
Qs	DRY STACK GAS VOLUME @ STANDARD CONDITIONS*	DSCFM (DSCM/HR)	128,519 (218,354)	129,867 (220,644)	132,646 (225,366)
Qa	ACTUAL STACK GAS VOLUME @ STACK CONDITIONS	ACFM (m^3/HR)	213,076 (362,016)	215,602 (366,308)	219,741 (373,340)

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

SOURCE EMISSION CALCULATIONS

TENNESSEE VALLEY AUTHORITY
STEVENSON, ALABAMA
WIDOWS CREEK UNIT 6 PRECIPITATOR A INLET DUCT

SYMBOL	DESCRIPTION	UNITS			
Tt	NET TIME OF TEST	MINUTES	150	150	150
Dn	SAMPLING NOZZLE DIAM.	IN. (m)	0.200 (0.005)	0.200 (0.005)	0.200 (0.005)
%I	PERCENT ISOKINETIC	%	102.0	100.3	95.4
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: 99-95WCR6
JOB NAME: TENNESSEE VALLEY AUTHORITY
LOCATION: STEVENSON, ALABAMA
UNIT TESTED: WIDOWS CREEK UNIT 6 PRECIPITATOR B INLET DUCT

SOURCE EMISSION CALCULATIONS

SYMBOL	DESCRIPTION	UNITS			
RUN #			1	2	3
DATE			10/20/99	10/20/99	10/21/99
BEGIN TIME			0810	1202	0717
END TIME			0840	1232	0747
P(b)	BAROMETRIC PRESSURE	"Hg Abs. (mm Hg)	29.50 (749)	29.52 (750)	29.50 (749)
P(m)	ORIFICE PRESSURE DROP	"H2O (mm H2O)	1.650 (41.9)	1.650 (41.9)	1.600 (40.6)
V(m)	VOLUME DRY GAS SAMPLED @ METER CONDITIONS	ft.^3 (m^3)	22.218 (0.629)	22.689 (0.642)	21.568 (0.611)
T(m)	AVERAGE GAS METER TEMPERATURE	DEG.F (DEG.C)	65 (18)	73 (23)	59 (15)
V(m[std])*	VOLUME DRY GAS SAMPLED @ STANDARD CONDITIONS*	DSCF (DSCM)	22.126 (0.627)	22.271 (0.631)	21.724 (0.615)
V(w)	TOTAL WATER COLLECTED, IMPINGERS & SILICA GEL	ml	31.7	29.8	32.0
V(w[gas])	VOLUME WATER VAPOR COLLECTED @ STANDARD CONDITIONS*	SCF (SCM)	1.496 (0.042)	1.407 (0.040)	1.510 (0.043)
%M	MOISTURE IN STACK GAS BY VOLUME	%	6.33	5.94	6.50
Tt	NET TIME OF TEST	MINUTES	30	30	30

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

SOURCE EMISSION CALCULATIONS

TENNESSEE VALLEY AUTHORITY
STEVENSON, ALABAMA
WIDOWS CREEK UNIT 6 PRECIPITATOR B INLET DUCT

SYMBOL	DESCRIPTION	UNITS			
Md	MOL FRACTION OF DRY GAS		0.9367	0.9406	0.9350
CO2		%	12.0	11.2	11.8
O2		%	6.6	7.2	7.0
CO		%	0.0	0.0	0.0
N2		%	81.4	81.6	81.2
%EA	EXCESS AIR @ SAMPLING POINT	%	44.1	49.9	48.2
MWd	MOLECULAR WEIGHT OF DRY STACK GAS	LB/LB-MOLE (g/g-MOLE)	30.18 (30.18)	30.08 (30.08)	30.17 (30.17)
MW	MOLECULAR WEIGHT OF STACK GAS	LB/LB-MOLE (g/g-MOLE)	29.41 (29.41)	29.36 (29.36)	29.38 (29.38)
DELTA P	VELOCITY HEAD OF STACK GAS	"H2O (mm H20)	0.693 (17.6)	0.656 (16.7)	0.696 (17.7)
Ts	STACK TEMPERATURE	DEG. F (DEG. C)	315 (157)	315 (157)	314 (157)
Ps	STACK PRESSURE	"Hg Abs. (mm Hg)	28.75 (730)	28.76 (731)	28.71 (729)
Vs	STACK VELOCITY @ STACK CONDITIONS	FPM (m/SEC.)	3,290 (16.71)	3,205 (16.28)	3,300 (16.76)
As	STACK AREA	(SQ.INCHES) (SQ.METERS)	9,216 (5.95)	9,216 (5.95)	9,216 (5.95)
Qs	DRY STACK GAS VOLUME @ STANDARD CONDITIONS*	DSCFM (DSCM/HR)	129,593 (220,179)	126,814 (215,457)	129,737 (220,423)
Qa	ACTUAL STACK GAS VOLUME @ STACK CONDITIONS	ACFM (m^3/HR)	210,546 (357,718)	205,104 (348,472)	211,171 (358,780)

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

METCO ENVIRONMENTAL

SOURCE EMISSION SURVEY

JOB NUMBER: 99-95WCR6
JOB NAME: TENNESSEE VALLEY AUTHORITY
LOCATION: STEVENSON, ALABAMA
UNIT TESTED: WIDOWS CREEK UNIT 6 PRECIPITATOR A OUTLET DUCT

SOURCE EMISSION CALCULATIONS

SYMBOL	DESCRIPTION	UNITS			
RUN #			1	2	3
DATE			10/20/99	10/20/99	10/21/99
BEGIN TIME			0915	1300	0800
END TIME			1151	1536	1035
P(b)	BAROMETRIC PRESSURE	"Hg Abs. (mm Hg)	29.59 (752)	29.51 (750)	29.47 (749)
P(m)	ORIFICE PRESSURE DROP	"H2O (mm H2O)	0.451 (11.5)	0.463 (11.8)	0.489 (12.4)
V(m)	VOLUME DRY GAS SAMPLED @ METER CONDITIONS	ft.^3 (m^3)	55.571 (1.574)	59.048 (1.672)	57.554 (1.630)
T(m)	AVERAGE GAS METER TEMPERATURE	DEG.F (DEG.C)	62 (17)	79 (26)	56 (13)
V(m[std])*	VOLUME DRY GAS SAMPLED @ STANDARD CONDITIONS*	DSCF (DSCM)	55.661 (1.576)	57.126 (1.618)	58.087 (1.645)
V(w)	TOTAL WATER COLLECTED, IMPINGERS & SILICA GEL	ml	88.1	84.6	89.6
V(w[gas])	VOLUME WATER VAPOR COLLECTED @ STANDARD CONDITIONS*	SCF (SCM)	4.158 (0.118)	3.993 (0.113)	4.229 (0.120)
%M	MOISTURE IN STACK GAS BY VOLUME	%	6.95	6.53	6.79

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

METCO ENVIRONMENTAL

SOURCE EMISSION CALCULATIONS

TENNESSEE VALLEY AUTHORITY
STEVENSON, ALABAMA
WIDOWS CREEK UNIT 6 PRECIPITATOR A OUTLET DUCT

SYMBOL	DESCRIPTION	UNITS			
Md	MOL FRACTION OF DRY GAS		0.9305	0.9347	0.9321
CO2		%	11.0	11.8	11.6
O2		%	8.2	7.2	7.6
CO		%	0.0	0.0	0.0
N2		%	80.8	81.0	80.8
%EA	EXCESS AIR @ SAMPLING POINT	%	62.1	50.5	55.0
MWd	MOLECULAR WEIGHT OF DRY STACK GAS	LB/LB-MOLE (g/g-MOLE)	30.09 (30.09)	30.18 (30.18)	30.16 (30.16)
MW	MOLECULAR WEIGHT OF STACK GAS	LB/LB-MOLE (g/g-MOLE)	29.25 (29.25)	29.38 (29.38)	29.33 (29.33)
DELTA P	VELOCITY HEAD OF STACK GAS	"H2O (mm H20)	0.337 (8.6)	0.322 (8.2)	0.341 (8.7)
Ts	STACK TEMPERATURE	DEG. F (DEG. C)	324 (162)	316 (158)	304 (151)
Ps	STACK PRESSURE	"Hg Abs. (mm Hg)	28.85 (733)	28.74 (730)	28.62 (727)
Vs	STACK VELOCITY @ STACK CONDITIONS	FPM (m/SEC.)	2,307 (11.72)	2,242 (11.39)	2,295 (11.66)
As	STACK AREA	(SQ.INCHES) (SQ.METERS)	14,745 (9.51)	14,745 (9.51)	14,745 (9.51)
Qs	DRY STACK GAS VOLUME @ STANDARD CONDITIONS*	DSCFM (DSCM/HR)	143,266 (243,409)	140,761 (239,153)	145,335 (246,924)
Qa	ACTUAL STACK GAS VOLUME @ STACK CONDITIONS	ACFM (m^3/HR)	236,176 (401,263)	229,613 (390,112)	234,973 (399,219)

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

SOURCE EMISSION CALCULATIONS

TENNESSEE VALLEY AUTHORITY
STEVENSON, ALABAMA
WIDOWS CREEK UNIT 6 PRECIPITATOR A OUTLET DUCT

SYMBOL	DESCRIPTION	UNITS			
Tt	NET TIME OF TEST	MINUTES	150	150	150
Dn	SAMPLING NOZZLE DIAM.	IN. (m)	0.226 (0.006)	0.226 (0.006)	0.226 (0.006)
%I	PERCENT ISOKINETIC	%	95.6	99.8	98.3
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: 99-95WCR6
JOB NAME: TENNESSEE VALLEY AUTHORITY
LOCATION: STEVENSON, ALABAMA
UNIT TESTED: WIDOWS CREEK UNIT 6 PRECIPITATOR B OUTLET DUCT

SOURCE EMISSION CALCULATIONS

SYMBOL	DESCRIPTION	UNITS			
RUN #			1	2	3
DATE			10/20/99	10/20/99	10/21/99
BEGIN TIME			1026	1322	0826
END TIME			1056	1352	0856
P(b)	BAROMETRIC PRESSURE	"Hg Abs. (mm Hg)	29.59 (752)	29.51 (750)	29.47 (749)
P(m)	ORIFICE PRESSURE DROP	"H2O (mm H2O)	1.600 (40.6)	1.700 (43.2)	1.600 (40.6)
V(m)	VOLUME DRY GAS SAMPLED @ METER CONDITIONS	ft.^3 (m^3)	21.062 (0.596)	21.284 (0.603)	20.886 (0.591)
T(m)	AVERAGE GAS METER TEMPERATURE	DEG.F (DEG.C)	61 (16)	68 (20)	46 (8)
V(m[std])*	VOLUME DRY GAS SAMPLED @ STANDARD CONDITIONS*	DSCF (DSCM)	21.197 (0.600)	21.085 (0.597)	21.556 (0.610)
V(w)	TOTAL WATER COLLECTED, IMPINGERS & SILICA GEL	ml	30.7	28.6	33.0
V(w[gas])	VOLUME WATER VAPOR COLLECTED @ STANDARD CONDITIONS*	SCF (SCM)	1.449 (0.041)	1.350 (0.038)	1.558 (0.044)
%M	MOISTURE IN STACK GAS BY VOLUME	%	6.40	6.02	6.74
Tt	NET TIME OF TEST	MINUTES	30	30	30

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

SOURCE EMISSION CALCULATIONS

TENNESSEE VALLEY AUTHORITY
STEVENSON, ALABAMA
WIDOWS CREEK UNIT 6 PRECIPITATOR B OUTLET DUCT

SYMBOL	DESCRIPTION	UNITS			
Md	MOL FRACTION OF DRY GAS		0.9360	0.9398	0.9326
CO2		%	11.6	11.2	11.0
O2		%	6.8	7.6	7.8
CO		%	0.0	0.0	0.0
N2		%	81.6	81.2	81.2
%EA	EXCESS AIR @ SAMPLING POINT	%	45.9	54.6	56.9
MWd	MOLECULAR WEIGHT OF DRY STACK GAS	LB/LB-MOLE (g/g-MOLE)	30.13 (30.13)	30.10 (30.10)	30.07 (30.07)
MW	MOLECULAR WEIGHT OF STACK GAS	LB/LB-MOLE (g/g-MOLE)	29.35 (29.35)	29.37 (29.37)	29.26 (29.26)
DELTA P	VELOCITY HEAD OF STACK GAS	"H2O (mm H20)	0.374 (9.5)	0.384 (9.8)	0.374 (9.5)
Ts	STACK TEMPERATURE	DEG. F (DEG. C)	311 (155)	292 (144)	301 (149)
Ps	STACK PRESSURE	"Hg Abs. (mm Hg)	28.83 (732)	28.73 (730)	28.60 (726)
Vs	STACK VELOCITY @ STACK CONDITIONS	FPM (m/SEC.)	2,403 (12.21)	2,411 (12.25)	2,400 (12.19)
As	STACK AREA	(SQ.INCHES) (SQ.METERS)	14,427 (9.31)	14,427 (9.31)	14,427 (9.31)
Qs	DRY STACK GAS VOLUME @ STANDARD CONDITIONS*	DSCFM (DSCM/HR)	149,245 (253,567)	153,614 (260,990)	149,269 (253,608)
Qa	ACTUAL STACK GAS VOLUME @ STACK CONDITIONS	ACFM (m^3/HR)	240,725 (408,992)	241,597 (410,473)	240,488 (408,589)

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

APPENDIX B

Field Data

METCO ENVIRONMENTAL

Job Number: 99-95 WCRC
Job Name: EPRI
Run Number: 1
Unit: 6 Precipitator A Duct (Inlet)
Date: 10/20/99
Operator: Bass/Conway/Heffey
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 62
Assumed Moisture % 9.11
Probe Length 10'
C Factor 1 to 0.263 to reference
Initial Leak @ 15.00 "Hg = 0.001 cfm
Final Leak @ 14.00 "Hg = 0.001 cfm

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H₂O (ΔP_s)	Orifice ΔH "H₂O Desired	Orifice ΔH "H₂O 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 °F	Remarks
A 5	0915	491.135	0.55	0.46	0.46	6.00	320	251	250	62	64	65	279	filter Q69
4	0920	492.95	0.70	0.59	0.59	7.50	330	252	253	49	64	65	281	thimble Q45
3	0925	495.23	0.75	0.64	0.64	7.50	334	255	252	49	64	65	280	
2	0930	497.39	0.85	0.72	0.72	8.00	338	257	251	47	65	65	279	
1	0935	499.75	0.70	0.59 ~~0.70~~	0.59	7.50	331	254	250	47	69	68	275	
B 5	0940	502.08	0.74	0.63	0.63	8.00	315	252	251	48	67	67	272	
4	0945	504.24	0.68	0.58	0.58	8.00	327	251	252	48	68	67	266	
3	0950	506.45	0.84	0.72	0.72	9.00	338	253	252	48	68	68	262	
2	0955	508.85	0.73	0.62	0.62	8.50	335	252	251	48	69	69	259	
1	1000	511.12	0.42	0.36	0.36	6.50	315	252	251	48	70	69	259	
C 5	1005	512.90	0.77	0.65	0.65	11.00	306	253	251	49	71	70	256	
4	1010	515.10	0.86	0.73	0.73	11.00	326	254	250	49	72	71	256	
3	1015	517.54	0.72	0.61	0.61	9.50	334	253	250	49	73	72	257	
2	1020	519.84	0.77	0.65	0.65	9.50	330	253	251	50	73	72	259	
1	1025	522.16	0.41	0.35	0.35	7.00	305	254	251	50	73	73	259	
D 5	1030	523.95	0.77	0.65	0.65	9.00	306	254	252	50	74	73	260	
4	1035	526.14	0.85	0.73	0.73	10.00	326	253	252	51	74	74	260	
3	1040	528.57	0.85	0.73	0.73	10.00	333	249	251	51	74	74	259	

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 68.001 ✓ ft³
Water Collected V_w 118.6 ✓ ml
Time of Test T_t 150 ✓ min.
Stack Pressure P_s -10.50 ✓ "H₂O

Pitot Tube No. M3 ✓
Baro. Press. P_b 29.56 ✓ "Hg
Probe Tip Dia. D_n ~~0.199~~ 0.20 ✓ in.
% CO_2 14.0 ✓ % CO 0.0 ✓
% O_2 5.2 ✓ % N_2 80.8 ✓
Area Stack A_s ~~9210~~ ~~10536~~ 9216 ✓ in²

Barometer No. 19-1 ✓
Total Volume of Leak Checks After Start: 0.000 ft³
V_m = Dry Gas Meter Calibration Factor 66.085 X 1.029 ✓

Probe Tip No. TFE2-7 ✓

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

Impinger Box No. Hg 1

Impinger 1	Final Weight	711.9
	Initial Weight	632.9
	Increase	79.0
Impinger 2	Final Weight	665.3
	Initial Weight	648.7
	Increase	16.6
Impinger 3	Final Weight	662.8
	Initial Weight	659.2
	Increase	3.6
Impinger 4	Final Weight	754.9
	Initial Weight	750.5
	Increase	4.4
Impinger 5	Final Weight	759.2
	Initial Weight	758.2
	Increase	1.0
Impinger 6	Final Weight	759.0
	Initial Weight	758.4
	Increase	0.6
Impinger 7	Final Weight	770.0
	Initial Weight	769.6
	Increase	0.4

Water Weight Gain

Imp 8 Final 939.5
Int. 926.5
13.0

V_w =
g SO_2 = -
V_w =

Impinger 1	79.0
Impinger 2	16.6
Impinger 3	3.6
Impinger 4	4.4
Impinger 5	1.0
Impinger 6	0.6
Impinger 7	0.4
Impinger 8	13.0
Total	118.6 = V_w

P_b =	29.56		%CO_2 =	14.0	
V_m =	68.001		%O_2 =	5.2	
V_w =	118.6		%CO =	0.0	
P_m =	0.605		%N_2 =	80.8	
Avg ΔP =	0.713		A_s =	9216	
			D_n =	~~0.199~~ 0.200	
Avg$\sqrt{\Delta P}$ =	0.839		T_t =	150	
C_p =	0.808				
P_s =	-10.5	"H_2O		28.79	"Hg
T_m =	72	°F		532	°R
T_s =	320	°F		780	°R

Moisture Content: %M = 7.73 M_d = 0.9227 MW_d = 30.448 MW = 29.49

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 68.001 \left[\frac{29.56 + \frac{0.605}{13.6}}{72 + 460}\right] = \frac{66.789\ ft^3}{0.445\ scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 118.6 = 5.598 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{5.598}{66.789 + 5.598}$ x 100 = 7.73 %

V_s = 5123.8 x 0.808 $\sqrt{\frac{780}{28.79 \times 29.49}}$ x 0.839 = 3329 fpm

ACFM: 213076

SCFM: 128519

%I = $\frac{1{,}039 \times 66.789 \times 780}{28.79 \times 0.9227 \times 3329 \times 150 \times (\frac{\cancel{0.199}}{0.200})^2}$ = ~~103.0~~ 102.0 %

%EA: 32.1

Run Number 1

Unit GAX Precip. Inlet

Date 10-20-99

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 °F	Remarks
D2	1045	531.06	0.77	0.65	0.65	10.00	324	250	251	51	73	74	259	
1	1050	533.42	0.50	0.42	0.42	8.00	309	250	252	51	72	72	260	
E5	1055	535.22	0.75	0.64	0.64	10.00	304	250	251	51	72	73	259	
4	1100	537.41	0.84	0.72	0.72	10.50	319	251	251	51	72	73	259	
3	1105	539.84	0.75	0.64	0.64	10.50	320	252	251	50	73	74	259	
2	1110	542.15	0.62	0.52	0.52	10.00	316	252	253	50	75	76	259	
1	1115	544.30	0.54	0.46	0.46	9.00	304	251	253	52	76	77	259	
F5	1120	546.19	0.67	0.57	0.57	10.00	306	253	250	52	77	78	261	
4	1125	548.26	0.95	0.80	0.80	12.00	306	251	254	52	77	78	260	
3	1130	550.79	0.95	0.80	0.80	12.00	314	252	253	52	77	78	262	
2	1135	553.37	0.68	0.58	0.58	11.00	309	251	253	52	77	79	263	
1	1140	555.41	0.40	0.34	0.34	9.00	306	251	253	53	76	79	264	
END	1145	557.220	–	–	–	–	–	–	–	–	–	–	–	

METCO ENVIRONMENTAL

Job Number 99-95WCR6
Job Name EPRI
Run Number 2
Unit 6A Precip. Inlet Duct
Date 10-20-99
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
Assumed Moisture % 9
Probe Length 10'
C Factor 1 to 0.263 to reference
Initial Leak @ 15.00 "Hg = 0.001 cfm
Final Leak @ 14.00 "Hg = 0.001 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 °F	Remarks
FS	1300	582.115	0.44	0.54	0.54	7.50	307	249	254 ~~66~~	46	71	71	265	Filter Q71
4	1305	584.21	0.95	0.80	0.80	8.50	307	252	254	54	71	71	269	Thimble Q46
3	1310	586.73	0.95	0.80	0.80	8.50	315	251	254	52	71	71	269	
2	1315	589.30	0.71	0.60	0.60	8.00	309	256	253	50	72	71	268	
1	1320	591.59	0.40	0.34	0.34	6.00	306	258	253	50	72	71	268	
ES	1325	593.84	0.77	0.64	0.64	8.00	309	267	252	52	72	72	266	
4	1330	595.62	0.80	0.68	0.68	8.50	326	259	251	51	74	72	264	
3	1335	598.00	0.87	0.74	0.74	9.00	330	258	252	51	75	73	265	
2	1340	600.47	0.62	0.52	0.52	8.00	320	258	252	51	76	73	263	
1	1345	602.59	0.62	0.52	0.52	8.00	308	255	254	51	76	73	263	
DS	1350	604.60	0.83	0.70	0.70	8.50	309	254	251	52	76	73	265	
4	1355	606.97	0.88	0.74	0.74	9.00	333	269	250	51	76	74	258	
3	1400	609.45	0.80	0.68	0.68	9.00	339	271	252	50	77	74	256	
2	1405	611.82	0.77	0.64	0.64	8.50	330	258	251	51	77	74	255	
1	1410	614.13	0.47	0.40	0.40	7.00	304	255	252	52	77	75	255	
CS	1415	615.93	0.77	0.64	0.64	8.50	310	252	251	53	77	75	255	
4	1420	618.17	0.90	0.76	0.76	10.00	328	250	253	52	77	75	253	
3	1425	620.67	0.83	0.70	0.70	10.00	343	257	253	52	77	75	254	

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 68.133 ✓ ft^3
Water Collected V_w 110.5 ✓ ml
Time of Test T_t 150 ✓ min.
Stack Pressure P_s -10.40 ✓ "H_2O

Pitot Tube No. M3 ✓
Baro. Press. P_b 29.48 ✓ "Hg
Probe Tip Dia. D_n ~~0.194~~ 0.203 in. ✓
% CO_2 13.4 ✓ % CO 0.0 ✓
% O_2 5.6 ✓ % N_2 81.0 ✓
Area Stack A_s ~~9216~~ ~~10836~~ 9216 ✓ in^2

Barometer No. 19-1 ✓
Probe Tip No. TFE2-7 ✓
Total Volume of Leak Checks After Start: — ft^3 ✓
V_m = Dry Gas Meter Calibration Factor 66.213 X 1.029

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

Impinger Box No. Hg 3

			Water Weight Gain		
Impinger 1	Final Weight	739.6	Imp 8	Impinger 1	81.5
	Initial Weight	658.1	Final 895.4	Impinger 2	11.2
	Increase	81.5	Int. 882.7	Impinger 3	1.7
Impinger 2	Final Weight	755.8	12.7	Impinger 4	3.9
	Initial Weight	744.6		Impinger 5	-0.3
	Increase	11.2		Impinger 6	-0.1
Impinger 3	Final Weight	754.4	V_w =	Impinger 7	-0.1
	Initial Weight	752.7	g SO_2 = -	Impinger 8	12.7
	Increase	1.7	V_w =	Total	110.5 = V_w
Impinger 4	Final Weight	752.0			
	Initial Weight	748.1			
	Increase	3.9			

Impinger 5	Final Weight	751.5	P_b =	29.48	%CO_2 =	14.134	
	Initial Weight	751.8	V_m =	68.133	%O_2 =	5.6	
	Increase	-0.3	V_w =	110.5	%CO =	0.0	
			P_m =	0.610	%N_2 =	81.0	
Impinger 6	Final Weight	751.6	Avg ΔP =	0.724	A_s =	9216	
	Initial Weight	751.7			D_n =	~~0.199~~ 0.200	
	Increase	-0.1	Avg$\sqrt{\Delta P}$ =	0.846	T_t =	150	
			C_p =	0.808			
Impinger 7	Final Weight	756.1	P_s =	-10.40 "H_2O		28.72 "Hg	
	Initial Weight	756.2	T_m =	75 °F		535 °R	
	Increase	-0.1	T_s =	323 °F		783 °R	

Moisture Content: %M = 7.29 M_d = 0.9271 MW_d = 30.365 MW = 29.47

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 68.133 \left[\frac{29.48 + \frac{0.610}{13.6}}{75 + 460}\right] = \frac{66.365}{0.442}\ \frac{sft^3}{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 110.5 = 5.216 sft^3

$$\% \text{ Moisture} = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{5.216}{66.365 + 5.216} \times 100 = 7.29\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{783}{28.72 \times 29.47}} \times 0.846 = 3369\ \text{fpm}$$

ACFM: 215602

SCFM: 129867

$$\%I = \frac{1{,}039 \times 66.365 \times 783}{28.72 \times 0.9271 \times 3369 \times 150 \times (0.199)^2} = \cancel{101.5}\ 100.3\ \%$$

%EA: 35.3

Run Number 2

Unit 6A Precip. Inlet Duct

Date 10/20/99

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 °F	Remarks
C2	1430	623.09	0.77	0.64	0.64	10.00	333	275	254	52	77	75	254	
1	1435	625.40	0.42	0.36	0.36	7.50	305	270	253	52	77	75	258	
B5	1440	627.16	0.75	0.64	0.64	10.00	304	258	253	55	76	75	257	
4	1445	629.33	0.73	0.62	0.62	10.00	332	251	254	53	76	76	260	
3	1450	631.59	0.83	0.70	0.70	10.50	342	271	253	54	77	76	263	
2	1455	633.97	0.77	0.64	0.64	10.50	340	275	252	55	77	76	263	
1	1500	636.29	0.48	0.41	0.41	9.00	327	278	253	55	78	76	267	
A5	1505	638.14	0.58	0.49	0.49	9.00	314	266	252	58	78	76	270	
4	1510	640.11	0.83	0.70	0.70	11.00	335	255	252	59	78	76	267	
3	1515	642.48	0.83	0.70	0.70	11.00	341	254	253	59	78	77	261	
2	1520	644.81	0.70	0.59	0.59	10.50	339	252	253	59	78	77	259	
1	1525	647.05	0.45	0.38	0.38	9.00	329	251	254	59	78	77	258	
END	1530	648.328	—	—	—	—	—	—	—	—	—	—	—	

METCO ENVIRONMENTAL

Job Number 99-95 WCRG
Job Name EPRI
Run Number 3
Unit 6A Precipitator Inlet Duct
Date 10/21/99
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 49
Assumed Moisture % 7.3
Probe Length 10'
C Factor 1 to 0.215 to reference
Initial Leak @ 15.00 "Hg = 0.001 cfm
Final Leak @ 14.00 "Hg = 0.001 cfm

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H₂O (ΔP_s)	Orifice ΔH "H₂O Desired	Orifice ΔH "H₂O 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 °F	Remarks
A5	0800	677.490	0.60	0.42	0.42	6.00	322	250	249	44	58	58	251	FILTER Q73
4	0805	679.30	0.82	0.56	0.56	8.00	326	251	250	42	58	58	250	THIMBLE Q47
3	0810	681.40	0.84	0.58	0.58	8.00	333	251	250	41	58	58	254	
2	0815	683.55	0.70	0.48	0.48	7.50	328	251	252	41	58	58	259	
1	0820	685.55	0.48	0.33	0.33	6.00	320	250	251	41	58	58	261	
B5	0825	687.17	0.75	0.52	0.52	8.00	312	250	253	41	59	58	262	
4	0830	689.21	0.69	0.48	0.48	8.00	322	252	253	41	60	59	261	
3	0835	691.18	0.84	0.58	0.58	9.00	331	251	252	41	62	60	260	
2	0840	693.34	0.75	0.52	0.52	8.50	331	255	251	42	63	61	263	
1	0845	695.39	0.62	0.43	0.43	8.50	324	254	252	42	65	63	263	
C5	0850	697.24	0.83	0.57	0.57	8.00	306	251	252	43	67	64	264	
4	0855	699.33	0.92	0.64	0.64	9.00	321	256	251	43	68	66	262	
3	0900	701.60	0.85	0.59	0.59	8.50	334	257	252	43	71	67	262	
2	0905	703.70	0.82	0.56	0.56	8.50	327	262	252	44	71	69	261	
1	0910	705.92	0.54	0.37	0.37	7.00	317	269	251	45	73	70	262	
D5	0915	707.60	0.83	0.57	0.57	8.00	306	252	253	46	74	72	263	
4	0920	709.70	0.90	0.62	0.62	9.00	320	256	253	46	74	73	264	
3	0925	711.94	0.73	0.53	0.53	8.50	329	267	254	46	75	74	260	1 to 0.225

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 65.534 ✓ ft³
Water Collected V_w 112.3 ✓ ml
Time of Test T_t 150 ✓ min.
Stack Pressure P_s -10.90 ✓ "H₂O

Pitot Tube No. M3 ✓
Baro. Press. P_b 29.50 ✓ "Hg
Probe Tip Dia. D_n ~~0.149~~ 0.200 ✓ in.
% CO_2 14.0 ✓ % CO 0.0 ✓
% O_2 5.0 ✓ % N_2 81.0 ✓
Area Stack A_s ~~9216~~ ~~10836~~ 9216 ✓ in²

Barometer No. 19-1 ✓
Probe Tip No. TFE2-7 ✓
Total Volume of Leak Checks After Start: – ft³
V_m = Dry Gas Meter Calibration Factor 63.687 X 1.029 ✓

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

Impinger Box No. HG 1

Impinger 1	Final Weight	717.1		Water Weight Gain	Impinger 1	82.5
	Initial Weight	634.6				
	Increase	82.5		953.5 ~~950.5~~	Impinger 2	7.3
Impinger 2	Final Weight	458.3	IMP. 8	939.2	Impinger 3	1.5
	Initial Weight	651.0				
	Increase	7.3		19.3	Impinger 4	2.1
Impinger 3	Final Weight	661.5	V_w =		Impinger 5	-0.4
	Initial Weight	660.0	g SO_2 =			
	Increase	1.5	V_w =		Impinger 6	0.0
Impinger 4	Final Weight	752.1			Impinger 7	0.0
	Initial Weight	750.0			impinger 8	19.3
	Increase	2.1			Total	112.3 = V_w
Impinger 5	Final Weight	758.0	P_b =	29.50	$\%CO_2$ =	14.0
	Initial Weight	758.4	V_m =	65.534	$\%O_2$ =	5.0
	Increase	-0.4	V_w =	112.3	%CO =	0.0
			P_m =	0.531	$\%N_2$ =	81.0
Impinger 6	Final Weight	765.4	Avg ΔP =	0.753	A_s =	9216
	Initial Weight	765.4			D_n =	~~0.199~~ 0.200
	Increase	0.0	Avg$\sqrt{\Delta P}$ =	0.865	T_t =	150
			C_p =	0.808		
Impinger 7	Final Weight	774.5	P_s =	-10.90 H_2O		28.70 "Hg
	Initial Weight	774.5	T_m =	70 °F		530 °R
	Increase	0.0	T_s =	318 °F		778 °R

Moisture Content: %M = 7.60 M_d = 0.9240 MW_d = 30.440 MW = 29.49

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 65.534 \left[\frac{29.50 + \frac{0.531}{13.6}}{70 + 460}\right] = \frac{64.466}{0.430}\ \frac{sft^3}{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 112.3 = 5.301 sft^3

$$\%\ Moisture = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{5.301}{64.466 + 5.301} \times 100 = 7.60\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{778}{28.70 \times 29.49}} \times 0.865 = 3433\ fpm$$

ACFM: 219,741

SCFM: 132,646

$$\%I = \frac{1{,}039 \times 64.466 \times 778}{28.70 \times 0.9240 \times 3433 \times 150 \times (0.199)^2} = \cancel{96.4}\ 95.4\ \%$$

%EA: 30.4

Run Number 3

Unit GA Precipitator Inlet Duct

Date 10-21-99

Hg FIELD DATA

Point	Clock Time	Dry Gas Meter, CF	ΔP_s "Pitot" "H_2O	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual	P_m 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 temp	Remarks
D2	0930	~~713~~714.04	0.82	0.59	0.59	9.00	321	250	252	47	76	75	259	
1	0935	716.23	0.62	0.45	0.45	8.00	306	251	254	47	77	76	259	
E5	0940	718.10	0.79	0.57	0.57	9.00	327	251	255	48	77	77	258	
4	0945	720.21	0.85	0.62	0.62	9.50	317	256	253	48	77	77	257	
3	0950	722.47	0.80	0.58	0.58	9.50	317	258	252	48	77	78	257	
2	0955	724.67	0.65	0.47	0.47	9.00	310	262	251	48	77	79	256	
1	1000	726.67	0.65	0.47	0.47	9.00	305	260	250	49	78	80	257	
F5	1005	728.55	0.65	0.47	0.47	9.00	306	252	253	50	79	81	257	
4	1010	730.51	0.95	0.69	0.69	10.00	305	258	254	50	79	80	257	
3	1015	732.99	1.00	0.73	0.73	10.50	313	263	253	48	77	80	258	
2	1020	735.53	0.78	0.56	0.56	10.00	310	264	252	50	77	80	257	
1	1025	737.90	0.53	0.37	0.37	7.50	303	264	252	51	78	80	257	
END	1030	741.177	–	–	–	–	–	–	–	–	–	–	–	

METCO ENVIRONMENTAL

Job Number 99-95WCR6 ✓
Job Name TVA - EPRI ✓
Run Number 1 ✓
Unit #6 INLET DUCT GB ✓
Date 10-20-99 ✓
Operator BURNSEN/HART ✓
Sample Box No. 19-3 Meter Box No. 27-2 ✓

VELOCITY Field Data

Read and record at the start of each test point.

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

Ambient Temp. °F 62 54
Assumed Moisture % 8.0
Probe Length 12'
C Factor – to reference
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 8.0 "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 (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	~~Oven~~ FLEX Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Remarks	
B4	0810	468.408	0.62	1.65	1.65	6.0	301	244	236	59	64	65	A5	0810
	0815	472.14	0.78	1.65	1.65	6.0	302	249	237	52	64	64	4	0811
	0820	475.76	0.76	1.65	1.65	6.0	308	251	239	50	65	63	3	0812
	0825	479.26	0.62	1.65	1.65	6.0	314	250	237	50	65	64	2	0813
	0830	482.66	0.42	1.65	1.65	6.0	313	247	236	50	66	64	1	0814
	0835	486.11	–	1.65	1.65	6.0	–	246	236	48	66	64	–	–
END	0840	490.000	0.68	–	–	–	314	–	–	–	–	–	B5	0816
			0.79				308						4	0817
			0.79				303						3	0818
			0.75				311						2	0819
			0.55				318						1	0820
			–				–						–	–
			0.70				317						C5	0822
			0.83				310						4	0823
			0.69				305						3	0824
			0.77				313						2	0825
			0.54				325						1	0826
			–				–						–	–

Pitot Tube Calibration Factor C_p 0.808 HIGH ✓
Volume Collected V_m 22.218 ✓ ft^3
Water Collected V_w 31.7 ✓ ml
Time of Test T_t 30 ✓ min.
Stack Pressure P_s -10.2 ✓ "H_2O

Pitot Tube No. M-5 ✓
Baro. Press. P_b 29.50 "Hg
Probe Tip Dia. D_n – in.
% CO_2 12.0 ✓ % CO 0.0 ✓
% O_2 6.6 ✓ % N_2 ~~80.4~~ ✓
Area Stack A_s 9216 ✓ in^2 81.4

Barometer No. 19-1 ✓
Probe Tip No. –
Total Volume of Leak Checks After Start: – ft^3
V_m = Dry Gas Meter Calibration Factor 1.029 ✓ X 21.592

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

Impinger Box No. 19-3

Impinger 1	Final Weight	755.5		Impinger 1	17.5
	Initial Weight	738.0			
	Increase	17.5		Impinger 2	6.7
Impinger 2	Final Weight	747.0 ~~740.3~~		Impinger 3	3.0
	Initial Weight	740.3			
	Increase	6.7		Impinger 4	4.5
Impinger 3	Final Weight	648.0	V_w =	Impinger 5	
	Initial Weight	645.0	g SO_2 = -		
	Increase	3.0	V_w =	Impinger 6	
Impinger 4	Final Weight	943.0		Impinger 7	
	Initial Weight	938.5			
	Increase	4.5		Total	31.7 = V_w

Water Weight Gain

Impinger 5	Final Weight		P_b =	29.50	$\%CO_2$ =	12.0
	Initial Weight		V_m =	22.218	$\%O_2$ =	6.6
	Increase		V_w =	31.7	%CO =	0.0
			P_m =	1.650	$\%N_2$ =	~~82.4~~ 81.4
Impinger 6	Final Weight		Avg ΔP =	0.693	A_s =	9216
	Initial Weight				D_n =	–
	Increase		Avg$\sqrt{\Delta P}$ =	0.830	T_t =	30
			C_p =	0.808		
Impinger 7	Final Weight		P_s =	-10.2 "H_2O	28.75	"Hg
	Initial Weight		T_m =	65 °F	525	°R
	Increase		T_s =	315 °F	775	°R

Moisture Content: %M = 6.33 M_d = 0.9367 MW_d = ~~29.04~~ 30.18 MW = ~~29.15~~ 29.41

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 22.218 \left[\frac{29.50 + \frac{1.650}{13.6}}{65 + 460}\right] = \frac{22.126\ sft^3}{0.738\ scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 31.7 = 1.496 sft^3

$$\%\ Moisture = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{1.496}{22.126 + 1.496} \times 100 = 6.33\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{775}{28.75 \times \cancel{29.15}\ 29.41}} \times 0.830 = \cancel{3304}\ 3290\ fpm$$

ACFM: ~~211,482~~ 210,546

SCFM: ~~130,144~~ 129,593

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

%EA: ~~44.9~~ 44.1

Run Number 1

Unit INLET DUCT 6B

Date 10-20-99

VELOCITY FIELD DATA

Point	Clock Time	Dry Gas Meter, CF	ΔP_s "Pitot" "H_2O	Orifice ΔH "H_2O Desired	Orifice ΔH "H_2O Actual	P_m 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	Remarks	
			0.70				321						D5	0828
			0.73				316						4	0829
			0.82				311						3	0830
			0.67				317						2	0831
			0.63				324						1	0832
			–				–						–	–
			0.61				323						E5	0834
			0.82				319						4	0835
			0.78				317						3	0836
			0.65				324						2	0837
			0.54				325						1	0838
			–				–						–	–
			0.71				321						F5	0840
			0.72				317						4	0841
			0.83				315						3	0842
			0.66				312						2	0843
			0.62				320						1	0844
													–	–

METCO ENVIRONMENTAL

Job Number 99-95 WCR 6 ✓
Job Name TVA - EPRI ✓
Run Number 2 ✓
Unit INLET DUCT 6B ✓
Date 10-20-99 ✓
Operator BORNSEN / SHART ✓
Sample Box No. 19-3 Meter Box No. 27-2 ✓

VELOCITY Field Data

Read and record at the start of each test point.

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

Ambient Temp. °F 58
Assumed Moisture % 9
Probe Length 12'
C Factor – to reference
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 15.0 "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 (P_m)	Pump Vacuum "Hg Guage	Stack Temp °F (T_s)	Probe Temp °F	FLEX Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Remarks	
B3	1202	558.765	0.51	1.65	1.65	8.0	299	248	230	63	74	73	A5	1202
	1207	562.50	0.76	1.65	1.65	9.0	302	246	231	59	75	76	4	1203
	1212	566.17	0.74	1.65	1.65	10.0	306	241	232	58	71	74	3	1204
	1217	569.81	0.62	1.65	1.65	10.0	316	243	234	58	71	73	2	1205
	1222	573.53	0.41	1.65	1.65	11.0	315	240	235	56	72	73	1	1206
	1227	577.20	–	1.65	1.65	12.0	–	240	235	56	72	73	–	–
END	1232	580.835	0.68	–	–	–	311	–	–	–	–	–	B5	1208
			0.75				308						4	1209
			0.72				303						3	1210
			0.72				309						2	1211
			0.53				319						1	1212
			–				–						–	–
			0.65				321						C5	1214
			0.67				313						C4	1215
			0.77				312						3	1216
			0.64				317						2	1217
			0.59				325						1	1218
			–				–						–	–

Pitot Tube Calibration Factor C_p 0.808 HIGH ✓
Volume Collected V_m 22.689 ✓ ft^3
Water Collected V_w 29.8 ✓ ml
Time of Test T_t 30 ✓ min.
Stack Pressure P_s -10.4 ✓ "H_2O

Pitot Tube No. M-5 ✓
Baro. Press. P_b 29.52 ✓ "Hg
Probe Tip Dia. D_n – in.
% CO_2 11.2 ✓ % CO 0.0 ✓
% O_2 7.2 ✓ % N_2 81.6 ✓
Area Stack A_s 9216 ✓ in^2

Barometer No. 19-1 ✓
Probe Tip No. –
Total Volume of Leak Checks After Start: – ✓ ft^3
V_m = Dry Gas Meter Calibration Factor 1.029 X 22.050

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

Impinger Box No. 19-3

Impinger 1	Final Weight	~~798.6~~ 801.6		Impinger 1	21.6
	Initial Weight	780.0			
	Increase	~~18.6~~ 21.6		Impinger 2	4.1
Impinger 2	Final Weight	752.6		Impinger 3	0.9
	Initial Weight	748.5			
	Increase	4.1		Impinger 4	3.2
			V_w =		
Impinger 3	Final Weight	649.3	g SO_2 = -	Impinger 5	
	Initial Weight	648.4	V_w =		
	Increase	0.9		Impinger 6	
Impinger 4	Final Weight	950.5		Impinger 7	
	Initial Weight	947.3			
	Increase	3.2		Total	~~26.8~~ 29.8 = V_w

Water Weight Gain

Impinger 5	Final Weight		P_b = 29.52	$\%CO_2$ = 11.2		
	Initial Weight		V_m = 22.689	$\%O_2$ = 7.2		
	Increase		V_w = 29.8	%CO = 0.0		
			P_m = 1.650	$\%N_2$ = 81.6		
Impinger 6	Final Weight		Avg ΔP = 0.656	A_s = 9216		
	Initial Weight			D_n = –		
	Increase		Avg$\sqrt{\Delta P}$ = 0.808	T_t = 30		
			C_p = 0.808			
Impinger 7	Final Weight		P_s = -10.4	"H_2O	28.76	"Hg
	Initial Weight		T_m = 73	°F	533	°R
	Increase		T_s = ~~73~~ 315	°F	775 ~~533~~	°R

Moisture Content: %M = 5.94 M_d = 0.9406 MW_d = 30.080 MW = 29.36

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 22.689 \left[\frac{29.52 + \frac{1.650}{13.6}}{73 + 460}\right] = \frac{22{,}271}{0.742}\ \text{sft}^3\ \text{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 29.8 = 1.407 sft^3

$$\%\ \text{Moisture} = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{1.407}{22{,}271 + 1.407} \times 100 = 5.94\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{775}{28.76 \times 29.36}} \times 0.808 = 3205\ \text{fpm}$$

ACFM: 205,104

SCFM: 126,814

%EA: 49.9

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

Run Number 2

Unit INLET DUCT 6B

Date 10-20-99

VELOCITY 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	Remarks	
			0.62				320						5	1220
			0.72				315						4	1221
			0.76				312						3	1222
			0.62				317						2	1223
			0.58				324						1	1224
			–				–						–	–
			0.69				320						5	1226
			0.75				315						4	1227
			0.77				314						3	1228
			0.60				318						2	1229
			0.57				325						1	1230
			–				–						–	–
			0.50				322						5	1232
			0.75				320						4	1233
			0.77				317						3	1234
			0.63				323						2	1235
			0.60				326						1	1236
			–				–						–	–

METCO ENVIRONMENTAL

Job Number 99-95 WCR6
Job Name TVA - EPRI
Run Number 3
Unit INLET DUCT 6B
Date 10-21-99
Operator BOENSEN / HART
Sample Box No. 19-3 Meter Box No. 27-2

VELOCITY Field Data

Read and record at the start of each test point.

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

Ambient Temp. °F 54
Assumed Moisture % 8.0
Probe Length 12'
C Factor – to reference
Initial Leak @ 16.0 "Hg = 0.000 cfm
Final Leak @ 8.0 "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~~ FGC Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Remarks	
B3	0717	656.042	0.62	1.60	1.60	5.0	298	240	242	54	59	60	A5	0717
	0722	659.74	0.19	1.60	1.60	5.6	302	247	246	52	60	60	4	0718
	0727	663.41	0.75	1.60	1.60	5.0	308	250	248	49	59	59	3	0719
	0732	667.02	0.61	1.60	1.60	5.0	315	249	251	49	59	59	2	0720
	0737	670.55	0.54	1.60	1.60	5.0	315	252	253	49	59	59	1	0721
	0742	673.78	–	1.60	1.60	5.0	–	253	256	49	59	59	–	–
END	0747	677.002	0.59	–	–	–	300	–	–	–	–	–	B5	0723
			0.77				304						4	0724
			0.76				309						3	0725
			0.62				317						2	0726
			0.54				316						1	0727
			–				–						–	–
			0.70				315						C5	0729
			0.80				307						4	0730
			0.78				308						3	0731
			0.76				310						2	0732
			0.56				320						1	0733
			–				–						–	–

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 21.568 ✓ ft^3
Water Collected V_w 32.0 ✓ ml
Time of Test T_t 30 ✓ min.
Stack Pressure P_s –10.8 ✓ "H_2O

Pitot Tube No. M-5 ✓
Baro. Press. P_b 29.50 ✓ "Hg
Probe Tip Dia. D_n – in.
% CO_2 11.8 ✓ % CO 0.0 ✓
% O_2 7.0 ✓ % N_2 81.2 ✓
Area Stack A_s 9216 ✓ in^2

Barometer No. 19-1 ✓
Probe Tip No. –
Total Volume of Leak Checks After Start: – ft^3
V_m = Dry Gas Meter Calibration Factor 1.029 ✓ X 20.960

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

Impinger Box No. 19-3

Impinger 1	Final Weight	772.5		Impinger 1	23.3
	Initial Weight	749.2			
	Increase	23.3		Impinger 2	2.5
Impinger 2	Final Weight	747.5		Impinger 3	0.5
	Initial Weight	745.0			
	Increase	2.5		Impinger 4	5.7
			V_w =		
Impinger 3	Final Weight	644.0	g SO_2 = -	Impinger 5	
	Initial Weight	643.5	V_w =		
	Increase	0.5		Impinger 6	
Impinger 4	Final Weight	887.7		Impinger 7	
	Initial Weight	882.0			
	Increase	5.7		Total	32.0 = V_w

Water Weight Gain

Impinger 5	Final Weight		P_b = 29.50	$\%CO_2$ = 11.8		
	Initial Weight		V_m = 21.568	$\%O_2$ = 7.0		
	Increase		V_w = 32.0	$\%CO$ = 0.0		
			P_m = 1,600	$\%N_2$ = 81.2		
Impinger 6	Final Weight		Avg ΔP = 0.696	A_s = 9216		
	Initial Weight			D_n = —		
	Increase		Avg$\sqrt{\Delta P}$ = 0.832	T_t = 30		
			C_p = 0.808			
Impinger 7	Final Weight		P_s = -10.8	$^{\circ}H_2O$	28.71	"Hg
	Initial Weight		T_m = 59	°F	519	°R
	Increase		T_s = 314	°F	774	°R

Moisture Content: %M = 6.50 M_d = 0.9350 MW_d = 30.168 MW = 29.38

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 21.568 \left[\frac{29.50 + \frac{1,600}{13.6}}{59 + 460}\right] = \frac{21,724}{0.724}\ \text{sft}^3\ \text{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 32.0 = 1.510 sft^3

$$\%\ \text{Moisture} = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{1.510}{21.724 + 1.510} \times 100 = 6.50\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{774}{28.71 \times 29.38}} \times 0.832 = 3300\ \text{fpm}$$

ACFM: 211,171

SCFM: 129,737

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

%EA: 48.2

Run Number 3

Unit INLET DUCT 6B

Date 10-21-99

VELOCITY 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	Remarks	
			0.70				319						D5	0734
			0.81				309						4	0735
			0.75				304						3	0736
			0.80				312						2	0737
			0.56				323						1	0738
			-				-						-	-
			0.72				320						E5	0739
			0.75				314						4	0740
			0.80				312						3	0741
			0.68				319						2	0742
			0.62				324						1	0743
			-				-						-	-
			0.57				323						F5	0744
			0.86				322						4	0745
			0.64				317						3	0746
			0.67				323						2	0747
			0.57				326						1	0748
			-				-						-	-

METCO ENVIRONMENTAL

Job Number 99-95WCR6 ✓
Job Name CPRI ✓
Run Number 1 ✓
Unit Unit 6 outlet to Precipitator Duct A ✓
Date 10-20-99 ✓
Operator Lee / Brown / Hesley ✓
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 50
Assumed Moisture % 9.0
Probe Length 12'
C Factor 2.0 ⇒ 1.50 to reference
Initial Leak @ 18.0 "Hg = 0.000 cfm
Final Leak @ 15.0 "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 (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
A5	0915	84.644	0.32	0.43	0.43	6.0	308	260	286	48	57	55	287	Filter G68
4	0920	86.46	0.35	0.47	0.47	6.0	315	281	288	54	57	55	283	Multi-Point
3	0925	88.36	0.34	0.45	0.45	6.0	324	276	291	55	58	55	288	Auto Orsat
2	0930	90.20	0.48	0.64	0.64	7.5	319	266	295	54	59	55	290	
1	0935	92.39	0.28	0.38	0.38	6.0	309	261	293	53	61	56	291	
End	0940	94.108	—	—	—	—	—	—	—	—	—	—	—	
B5	0941	94.210	0.32	0.43	0.43	6.5	326	260	294	56	62	56	290	
4	0946	95.96	0.32	0.43	0.43	7.0	348	260	296	58	63	56	289	
3	0951	97.75	0.32	0.43	0.43	7.0	345	271	295	53	63	57	289	
2	0956	99.56	0.34	0.45	0.45	7.5	322	264	285	51	63	58	285	
1	1001	101.42	0.20	0.27	0.27	6.0	306	263	284	55	63	59	283	
End	1006	102.873	—	—	—	—	—	—	—	—	—	—	—	
C5	1007	102.935	0.33	0.44	0.44	7.5	326	263	285	55	63	60	289	
4	1012	104.76	0.35	0.47	0.47	8.0	339	260	279	56	63	61	292	
3	1017	106.65	0.40	0.54	0.54	8.5	341	269	273	53	64	61	295	
2	1022	108.67	0.40	0.54	0.54	9.0	340	273	271	52	65	61	299	
1	1027	110.71	0.36	0.48	0.48	8.5	318	271	271	53	65	61	301	
End	1032	112.492	—	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 55.571 ✓ ft^3
Water Collected V_w 88.1 ✓ ml
Time of Test T_t 150 ✓ min.
Stack Pressure P_s −10.0 ✓ "H_2O

Pitot Tube No. M-6 ✓
Baro. Press. P_b 29.59 ✓ "Hg
Probe Tip Dia. D_n 0.226 ✓ in.
% CO_2 11.0 ✓ % CO 0 ✓
% O_2 8.2 ✓ % N_2 80.8 ✓
Area Stack A_s 14.745 ✓ in^2

Barometer No. 19-1 ✓
Probe Tip No. TFE 1-8 ✓
Total Volume of Leak Checks After Start: — ft^3
V_m = Dry Gas Meter Calibration Factor 1.000 ✓ X 55.571

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

R-20

Impinger Box No. Hg 4

Impinger 1	Final Weight	812.7	Imp 8	Impinger 1	63.2
	Initial Weight	749.5	Final 795.7	Impinger 2	10.5
	Increase	63.2	Int. 785.9	Impinger 3	1.5
		770.0	9.8	Impinger 4	2.7
Impinger 2	Final Weight	770		Impinger 5	-0.2
	Initial Weight	759.5		Impinger 6	0.1
	Increase	10.5		Impinger 7	0.5
Impinger 3	Final Weight	660.1		Imp 8	9.8
	Initial Weight	658.6		Total	88.1 = V_w
	Increase	1.5			
Impinger 4	Final Weight	761.3			
	Initial Weight	758.6			
	Increase	2.7			
Impinger 5	Final Weight	746.6			
	Initial Weight	746.8			
	Increase	-0.2			
Impinger 6	Final Weight	755.0			
	Initial Weight	754.9			
	Increase	0.1			
Impinger 7	Final Weight	756.4			
	Initial Weight	755.9			
	Increase	0.5			

Water Weight Gain

V_w =

g SO_2 = -

V_w =

P_b =	29.59		$\%CO_2$ =	11.0	
V_m =	55.571		$\%O_2$ =	8.2	
V_w =	88.1		%CO =	0	
P_m =	0.451		$\%N_2$ =	80.8	
Avg ΔP =	0.337		A_s =	14.745	
			D_n =	0.226	
Avg$\sqrt{\Delta P}$ =	0.578		T_t =	150	
C_p =	0.808				
P_s =	-10.0	"H_2O		28.85	"Hg
T_m =	62	°F		522	°R
T_s =	324	°F		784	°R

Moisture Content: %M = 6.95 M_d = 0.9305 MW_d = 30.088 MW = 29.25

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 55.571 \left[\frac{29.59 + \frac{0.451}{13.6}}{62 + 460}\right] = 55.661\ sft^3 = 0.371\ scfm$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 88.1 = 4.158 sft^3

$$\%\ Moisture = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{4.158}{55.661 + 4.158} \times 100 = 6.95\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{784}{28.85 \times 29.25}} \times 0.578 = 2307\ fpm$$

ACFM: 236,176

SCFM: 143,266

$$\%I = \frac{1{,}039 \times 55.661 \times 784}{150 \times 0.9305 \times 28.85 \times 2307 \times (0.226)^2} = 95.6\ \%$$

%EA: 62.1

Run Number 1

Unit Unit 6 outlet to Precipitator Duct A

Date 10-20-99

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	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
D5	1033	112.598	0.32	0.43	0.43	8.0	320	268	273	55	66	62	298	
4	1038	114.41	0.34	0.45	0.45	9.0	345	264	267	55	66	62	295	
3	1043	116.28	0.35	0.47	0.47	9.0	340	261	261	53	66	62	296	
2	1048	118.13	0.43	0.57	0.57	10.0	327	262	265	52	66	62	298	
1	1053	120.18	0.26	0.35	0.35	9.0	309	262	263	45	66	62	297	
End	1058	121.863	—	—	—	—	—	—	—	—	—	—	—	
E5	1100	121.967	0.31	0.42	0.42	8.0	301	258	262	44	65	62	296	
4	1105	123.69	0.34	0.45	0.45	9.0	332	260	267	43	66	61	296	
3	1110	125.76	0.33	0.44	0.44	9.0	329	261	264	46	67	61	298	
2	1115	127.41	0.29	0.39	0.39	9.0	312	260	263	48	67	61	297	
1	1120	129.21	0.21	0.28	0.28	8.0	302	258	261	48	68	62	298	
End	1125	130.625	—	—	—	—	—	—	—	—	—	—	—	
F5	1126	130.693	0.30	0.40	0.40	9.0	321	258	258	47	69	62	298	
4	1131	132.34	0.31	0.42	0.42	9.0	328	257	260	43	70	62	296	
3	1136	134.17	0.43	0.57	0.57	10.0	331	259	264	45	71	62	297	
2	1141	136.16	0.41	0.55	0.55	10.5	322	262	265	46	71	62	297	
1	1146	138.32	0.37	0.50	0.50	10.0	311	263	267	48	72	62	295	
End	1151	140.215	—	—	—	—	—	—	—	—	—	—	—	

METCO ENVIRONMENTAL

Job Number 99-95 WCR6 ✓
Job Name EPRI ✓
Run Number 2 ✓
Unit Unit 6 Precipitator Outlet Duct A ✓
Date 10-20-99 ✓
Operator Lee/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 64
Assumed Moisture % 9%
Probe Length 12"
C Factor 2.0 ⇒ 1.40 to reference
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 17.0 "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
E5	1300	141.877	0.28	0.41	0.41	6.5	301	259	261	51	71	66	296	Filter 270
4	1305	143.89	0.31	0.45	0.45	6.5	306	257	259	49	71	66	298	Multi-Point
3	1310	145.77	0.43	0.61	0.61	7.0	323	257	258	45	71	66	298	Port Orset
2	1315	147.85	0.43	0.61	0.61	7.0	318	260	258	44	71	66	300	
1	1320	150.06	0.39	0.56	0.56	7.0	302	259	261	42	71	66	299	
End	1325	152.063	—	—	—	—	—	—	—	—	—	—	—	
E5	1326	152.190	0.30	0.44	0.44	6.5	311	262	265	43	73	66	296	
4	1331	153.93	0.35	0.51	0.51	7.0	324	264	265	42	73	66	295	
3	1336	155.96	0.35	0.51	0.51	7.0	322	265	261	43	75	66	296	
2	1341	157.98	0.27	0.39	0.39	7.0	314	271	260	45	84	66	295	
1	1346	159.91	0.20	0.29	0.29	6.0	309	269	257	48	88	67		
End	1351	161.365	—	—	—	—	—	—	—	—	—	—	—	
D5	1352	161.469	0.33	0.47	0.47	7.5	308	266	265	47	90	68	297	
4	1357	163.41	0.35	0.51	0.51	8.0	321	269	265	46	92	68	295	
3	1402	165.43	0.36	0.52	0.52	8.0	336	274	269	46	89	69	298	
2	1407	167.40	0.39	0.56	0.56	8.5	314	276	270	47	87	70	298	
1	1412	169.51	0.29	0.42	0.42	8.0	303	275	274	50	87	72	297	
End	1417	171.190	—	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m 59.048 ft^3
Water Collected V_w 84.6 ml
Time of Test T_t 150 min.
Stack Pressure P_s -10.5 "H_2O

Pitot Tube No. M-6 ✓
Baro. Press. P_b ~~29.78~~ 29.51 "Hg
Probe Tip Dia. D_n 0.226 ✓ in.
% CO_2 11.8 % CO Ø
% O_2 7.2 % N_2 81.0
Area Stack A_s 14.745 ✓ in^2

Barometer No. 19-1 ✓
Probe Tip No. TFE 1-8 ✓
Total Volume of Leak Checks After Start: — ft^3
V_m = Dry Gas Meter Calibration Factor 1.000 ✓ X 59.048

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

Impinger Box No. Hg 2

			Water Weight Gain		
Impinger 1	Final Weight	807.1	Imp 8	Impinger 1	63.4
	Initial Weight	743.7	Final 850.7		
	Increase	63.4	Int. 839.9	Impinger 2	8.0
			10.8		
Impinger 2	Final Weight	759.5		Impinger 3	-0.5
	Initial Weight	751.5			
	Increase	8.0		Impinger 4	2.8
			V_w =		
Impinger 3	Final Weight	721.1	g SO_2 = -	Impinger 5	-0.4
	Initial Weight	721.6	V_w =		
	Increase	-0.5		Impinger 6	0.2
Impinger 4	Final Weight	758.0		Impinger 7	0.3
	Initial Weight	755.2		Imp. 8	10.8
	Increase	2.8		Total	84.6 = V_w
Impinger 5	Final Weight	672.1	P_b = 29.51	%CO_2 =	11.8
	Initial Weight	672.5	V_m = 59.048	%O_2 =	7.2
	Increase	-0.4	V_w = 84.6	%CO =	0
			P_m = 0.463	%N_2 =	81.0
Impinger 6	Final Weight	749.1	Avg ΔP = 0.322	A_s =	14.745
	Initial Weight	748.9		D_n =	0.226
	Increase	0.2	Avg$\sqrt{\Delta P}$ = 0.565	T_t =	150
			C_p = 0.808		
Impinger 7	Final Weight	682.4	P_s = -10.5 "H_2O		28.74 "Hg
	Initial Weight	682.1	T_m = 79 °F		539 °R
	Increase	0.3	T_s = 316 °F		776 °R

Moisture Content: %M = 6.53 M_d = 0.9347 MW_d = 30.176 MW = 29.38

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 59.048 \left[\frac{29.51 + \frac{0.463}{13.6}}{79 + 460}\right] = \frac{57.126\ sft^3}{0.381\ scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 84.6 = 3.993 sft^3

$$\% \text{ Moisture} = \frac{Vw_{gas}}{Vm_{std} + Vw_{gas}} \times 100 = \frac{3.993}{57.126 + 3.993} \times 100 = 6.53\ \%$$

$$V_s = 5123.8 \times 0.808 \sqrt{\frac{776}{28.74 \times 29.38}} \times 0.565 = 2242\ fpm$$

ACFM: 229,613

SCFM: 140,761

$$\%I = \frac{1{,}039 \times 57.126 \times 776}{150 \times 0.9347 \times 28.74 \times 2242 \times (0.226)^2} = 99.8\ \%$$

%EA: 50.5

Unit Unit 6 Precipitator Outlet Duct A

METCO ENVIRONMENTAL

Hg Field Data

Job Number: 99-95 WCR 6
Job Name: EPRI
Run Number: 3
Unit: Unit 6 Precipitator Outlet Duct A
Date: 10-21-99
Operator: Lee / Brown / Hedley
Sample Box No. Hg 4 Meter Box No. 29-1

Read and record at the start of each test point.

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

Ambient Temp. °F 38
Assumed Moisture % 9%
Probe Length 12'
C Factor 20 ⇒ 1.40 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" "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	Remarks
A5	0800	219.041	0.35	0.50	0.50	6.0	302	255	290	43	52	46	293	FILTER 272
4	0805	220.98	0.35	0.50	0.50	6.0	299	257	291	42	52	45	295	Multi-Point
3	0810	222.93	0.38	0.54	0.54	7.0	314	256	289	42	52	45	298	Bulb Orsat
2	0815	224.95	0.47	0.67	0.67	7.5	306	254	283	42	52	45	299	
1	0820	227.16	0.34	0.49	0.49	7.0	295	252	287	40	53	46	301	
End	0825	228.930	—	—	—	—	—	—	—	—	—	—	—	
B5	0826	229.028	0.34	0.49	0.49	7.0	296	252	290	44	55	46	296	
4	0831	230.97	0.33	0.47	0.47	7.0	326	260	286	43	55	46	299	
3	0836	232.91	0.34	0.49	0.49	7.5	321	266	284	41	56	46	299	
2	0841	234.76	0.32	0.46	0.46	7.5	308	268	286	41	57	47	299	
1	0846	236.65	0.19	0.27	0.27	6.5	293	264	290	43	58	48	300	
End	0851	238.042	—	—	—	—	—	—	—	—	—	—	—	
C5	0852	238.100	0.36	0.52	0.52	8.0	308	265	289	43	59	48	300	
4	0857	240.17	0.34	0.49	0.49	8.0	317	264	283	41	59	48	297	
3	0902	242.09	0.37	0.53	0.53	9.0	316	264	282	42	60	48	296	
2	0907	244.09	0.35	0.50	0.50	9.0	298	263	283	42	61	49	295	
1	0912	246.04	0.20	0.29	0.29	7.5	291	260	282	43	63	49	295	
End	0917	247.435	—	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.808
Volume Collected V_m 57.554 ft^3
Water Collected V_w ~~93.5~~ 89.4 ml
Time of Test T_t 150 min.
Stack Pressure P_s -11.6 "H_2O

Pitot Tube No. M-6
Baro. Press. P_b 29.47 "Hg
Probe Tip Dia. D_n 0.226 in.
% CO_2 11.6 % CO 0
% O_2 7.6 % N_2 80.8
Area Stack A_s 14.745 in^2

Barometer No. 19-1
Probe Tip No. TFE 1-8
Total Volume of Leak Checks After Start: ~~0~~ — ft^3
V_m = Dry Gas Meter Calibration Factor 1.000 X 57.554

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

Impinger Box No. 1G-4

Impinger 1	Final Weight	817.3		Impinger 1	67.2
	Initial Weight	750.1			
	Increase	67.2		Impinger 2	8.9
Impinger 2	Final Weight	765.9		Impinger 3	1.2
	Initial Weight	757.0			
	Increase	8.9		Impinger 4	2.5
Impinger 3	Final Weight	663.2		Impinger 5	-0.4
	Initial Weight	662.0			
	Increase	1.2		Impinger 6	0
Impinger 4	Final Weight	759.8		Impinger 7	~~3.7~~ -0.3
	Initial Weight	757.3			
	Increase	2.5		IMP. 8	10.5
				Total	~~93.6~~ 89.6 = V_w
Impinger 5	Final Weight	758.2			
	Initial Weight	758.6			
	Increase	-0.4			
Impinger 6	Final Weight	763.4			
	Initial Weight	763.4			
	Increase	0			
Impinger 7	Final Weight	763.7			
	Initial Weight	764.0			
	Increase	~~3.7~~ -0.3			

Water Weight Gain

888.1
IMP. 8 877.6
10.5

V_w =
g SO_2 = -
V_w =

P_b =	29.47		$\%CO_2$ =	11.6
V_m =	57.554		$\%O_2$ =	7.6
V_w =	~~93.6~~ 89.6		%CO =	0
P_m =	0.489		$\%N_2$ =	80.8
Avg ΔP =	0.341		A_s =	14.745
			D_n =	0.226
Avg$\sqrt{\Delta P}$ =	0.581		T_t =	150
C_p =	0.808			
P_s =	-11.6	"H_2O	28.62	"Hg
T_m =	~~56~~ 56	°F	516	°R
T_s =	304	°F	764	°R

Moisture Content: %M = ~~7.07~~ 6.79 M_d = ~~0.9293~~ 0.9321 MW_d = 30.160 MW = ~~29.30~~ 29.33

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 57.554 \left[\frac{29.47 + \frac{0.489}{13.6}}{56 + 460}\right] = 58.087\ sft^3 = 0.387\ scfm$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x ~~93.6~~ 89.6 = ~~4.418~~ 4.229 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{\cancel{4.418}\ 4.229}{58.087 + \cancel{4.418}\ 4.229}$ x 100 = ~~7.07~~ 6.79 %

V_s = 5123.8 x 0.808 $\sqrt{\frac{764}{28.62 \times \cancel{29.30}\ 29.33}}$ x 0.581 = ~~2296~~ 2295 fpm

ACFM: ~~235,093~~ 234,973

SCFM: ~~144,962~~ 145,335

%I = $\frac{1{,}039 \times 58.087 \times 764}{150 \times \cancel{0.9293}\ 0.9321 \times 28.62 \times \cancel{0.096}\ 2295 \times (0.226)^2}$ = ~~98.6~~ 98.3 %

%EA: 550

Run Number 3 Hg FIELD DATA

Unit Unit 6 Precipitator Outlet Duct A

Date 10-21-99

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	Remarks
D5	0918	247.526	0.35	0.50	0.50	9.0	313	261	283	44	64	50	294	
4	0923	249.52	0.35	0.50	0.50	9.5	328	263	283	46	64	51	295	
3	0928	251.45	0.39	0.56	0.56	10.0	314	268	284	46	64	52	295	
2	0933	253.51	0.39	0.56	0.56	10.0	306	266	286	48	65	52	297	
1	0938	255.58	0.30	0.43	0.43	9.5	292	267	286	49	65	53	296	
End	0943	257.243	—	—	—	—	—	—	—	—	—	—	—	
E5	0944	257.310	0.32	0.46	0.46	9.5	295	265	285	48	65	55	298	
4	0949	259.10	0.35	0.50	0.50	10.0	318	267	289	47	65	55	298	
3	0954	261.06	0.39	0.56	0.56	11.0	306	264	291	49	64	57	296	
2	0959	263.11	0.28	0.40	0.40	10.5	304	266	289	49	64	59	298	
1	1004	264.98	0.23	0.33	0.33	9.5	290	264	289	47	64	60	298	
End	1009	266.490	—	—	—	—	—	—	—	—	—	—	—	
F5	1010	266.556	0.29	0.42	0.42	9.5	293	265	289	47	63	62	297	
4	1015	268.34	0.30	0.43	0.43	10.0	299	265	291	46	64	62	296	
3	1020	270.18	0.42	0.60	0.60	10.0	298	263	291	47	63	63	296	
2	1025	272.19	0.42	0.60	0.60	12.0	295	263	289	48	67	63	295	
1	1030	274.35	0.42	0.60	0.60	12.0	290	261	288	49	68	63	295	
End	1035	276.595	—	—	—	—	—	—	—	—	—	—	—	

METCO ENVIRONMENTAL

Job Number: 49-95 WCRG ✓
Job Name: TVA - EPRI ✓
Run Number: 1 ✓
Unit: OUTLET DUCT CB ✓
Date: 10-20-99 ✓
Operator: BORENSEN / HART ✓
Sample Box No. 19-3 Meter Box No. 19-2 ✓

VELOCITY 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 % 8.0
Probe Length 10'
C Factor — to reference
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 15.0 "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	FCES Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet	Remarks	
~~B4~~	1026	169.737	0.32	~~1.70~~ 1.60	~~1.70~~ 1.60	9.0	310	243	233	53	60	59	A5	1026
	1031	173.34	0.39	1.60	1.60	11.0	322	245	232	49	62	58	4	1027
	1036	176.97	0.44	1.60	1.60	11.0	309	242	232	49	64	60	3	1028
	1041	180.62	0.40	1.60	1.60	11.0	317	240	234	49	64	60	2	1029
	1046	184.17	0.23	1.60	1.60	11.0	318	241	235	49	64	60	1	1030
	1051	187.80	—	1.60	1.60	11.0	—	242	234	49	62	61	-	-
END	1056	191.861	0.35	—	—	—	~~294~~ 311	—	—	—	—	—	B5	1032
			0.40				325						4	1033
			0.43				319						3	1034
			0.39				322						2	1035
			0.24				316						1	1036
			—				—						-	-
			0.33				306						C5	1037
			0.40				315						4	1038
			0.45				320						3	1039
			0.50				326						2	1041
			0.32				323						1	1042
			-				-						-	-

Pitot Tube Calibration Factor C_p 0.800 HIGH ✓
Volume Collected V_m ~~21.062~~ 21.062 OK ✓ ft^3 ~~31.217~~
Water Collected V_w 30.7 ✓ ml
Time of Test T_t 30 ✓ min.
Stack Pressure P_s -10.4 ✓ "H_2O

Pitot Tube No. ~~M-5~~ M-6 ✓
Baro. Press. P_b ~~29.56~~ 29.59 "Hg
Probe Tip Dia. D_n - in.
% CO_2 11.6 ✓ % CO 00 ✓
% O_2 6.8 ✓ % N_2 81.6 ✓
Area Stack A_s ~~14.364~~ 14.427 ✓ in^2

Barometer No. 19-1 ✓
Probe Tip No. -
Total Volume of Leak Checks After Start: - ft^3
V_m = Dry Gas Meter Calibration Factor ~~0.952~~ ~~0.951~~ 0.952 ✓ X 22.124
[Dry Gas Meter Reading - ft^3 - (T_t - min. X Leak Rate - cfm)]

Impinger Box No. 19-3

Impinger 1	Final Weight	780.0		Impinger 1	24.5
	Initial Weight	755.5			
	Increase	24.5		Impinger 2	1.5
Impinger 2	Final Weight	748.5		Impinger 3	0.4
	Initial Weight	747.0			
	Increase	1.5		Impinger 4	4.3
Impinger 3	Final Weight	648.4	V_w =	Impinger 5	
	Initial Weight	648.0	g SO_2 = -		
	Increase	0.4	V_w =	Impinger 6	
Impinger 4	Final Weight	947.3		Impinger 7	
	Initial Weight	943.0			
	Increase	4.3		Total	30.7 = V_w

Water Weight Gain

Impinger 5	Final Weight		P_b =	29.59	%CO_2 =	11.6
	Initial Weight		V_m =	~~21.217~~ ~~21.062~~ 21.062	%O_2 =	6.8
	Increase		V_w =	30.7	%CO =	0.0
			P_m =	1.600	%N_2 =	81.6
Impinger 6	Final Weight		Avg ΔP =	0.374	A_s =	~~14,364~~ 14,427
	Initial Weight				D_n =	–
	Increase		Avg$\sqrt{\Delta P}$ =	0.608	T_t =	30
			C_p =	0.808		
Impinger 7	Final Weight		P_s =	-10.4 "H_2O	28.83	"Hg
	Initial Weight		T_m =	61 °F	521	°R
	Increase		T_s =	311 °F	771	°R

Moisture Content: %M = ~~6.40~~ ~~6.35~~ 6.40 M_d = ~~0.9360~~ ~~0.9365~~ 0.9360 MW_d = 30.128 MW = ~~29.35~~ ~~29.36~~ 29.35

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times \frac{21.217}{21.062}\left[\frac{29.59 + \frac{1.6000}{13.6}}{61 + 460}\right] = \frac{21.353}{21.197}\ \text{sft}^3 \quad \frac{0.707}{0.712}\ \text{scfm}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 30.7 = 1.449 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{1.449}{21.353 + 1.449}$ x 100 = ~~6.35~~ 6.40 %

V_s = 5123.8 x 0.808 $\sqrt{\frac{771}{28.83 \times 29.35}}$ x 0.608 = ~~2402~~ 2403 fpm

ACFM: ~~239,674~~ 240,725

SCFM: ~~148,594~~ 149,245

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

%EA: 459

Run Number 1

Unit Outlet Duct 6B

Date 10-20-99

Velocity 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	Remarks
			0.36				299						D5 1044
			0.42				323						4 1045
			0.47				312						3 1046
			0.43				313						2 1047
			0.29				310						1 1048
			-				-						- -
			0.37				298						E5 1050
			0.39				317						4 1051
			0.41				321						3 1052
			0.33				315						2 1053
			0.20				300						1 1054
			-				-						- -
			0.35				288						F5 1056
			0.47				295						4 1057
			0.43				298						3 1058
			0.47				291						2 1059
			0.23				288						1 1100

METCO ENVIRONMENTAL

Job Number 99-95 WCR6 ✓
Job Name TVA - EPRI ✓
Run Number 2 ✓
Unit OUTLET DUCT 6B ✓
Date 10-20-99 ✓
Operator BORNSEN/HART ✓
Sample Box No. 19-3 Meter Box No. 19-2 ✓

VELOCITY Field Data

Read and record at the start of each test point.

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

Ambient Temp. °F 63
Assumed Moisture % 8.0
Probe Length 10'
C Factor — to reference
Initial Leak @ 16.0 "Hg = 0.000 cfm
Final Leak @ 17.0 "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	FCX Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet (T_m)	Remarks	
B3	1322	192.566	0.37	1.70	1.70	14.0	289	240	236	53	69	~~68~~ 68	A5	1322
	1327	196.24	0.38	1.70	1.70	14.0	293	239	236	49	~~65~~ 68	68	4	1323
	1332	199.96	0.50	1.70	1.70	14.0	293	240	235	49	68	69	3	1324
	1337	203.62	0.51	1.70	1.70	15.0	294	242	232	48	68	69	2	1325
	1342	207.30	0.42	1.70	1.70	15.0	287	240	234	49	68	69	1	1326
~~END~~	1347	~~B~~211.06	-	1.70	1.70	15.0	-	242	233	49	~~68~~	69	-	-
END	1352	214.923	0.38	-	-	-	293	-	-	-	-	-	B5	1328
			0.40				303						4	1329
			0.45				294						3	1330
			0.41				299						2	1331
			0.24				285						1	1332
			-				-						-	-
			0.35				290						C5	1334
			0.41				286						4	1335
			0.45				285						3	1336
			0.51				287						2	1337
			0.31				287						1	1338
			-				-						-	-

Pitot Tube Calibration Factor C_p 0.808 ✓
Volume Collected V_m ~~21.284~~ ✓ OK ~~ft³~~
Water Collected V_w 28.6 ✓ ml
Time of Test T_t 30 ✓ min.
Stack Pressure P_s -10.6 ✓ "H_2O

Pitot Tube No. ~~A-5~~ M-6 ✓
Baro. Press. P_b 29.51 ✓ "Hg
Probe Tip Dia. D_n — in.
% CO_2 11.2 ✓ % CO 0.0 ✓
% O_2 7.6 ✓ % N_2 81.2 ✓
Area Stack A_s ~~14.364~~ 14,427 ✓ in²

Barometer No. 19-1 ✓
Probe Tip No. —
Total Volume of Leak Checks After Start: — ft³
V_m = Dry Gas Meter Calibration Factor ~~0.152~~ ~~0.1551~~ 0.152 ✓ X 22.357
[Dry Gas Meter Reading — ft³ - (T_t — min. X Leak Rate — cfm)]

Impinger Box No. 19-3

Water Weight Gain

Impinger 1	Final Weight	763.5	Impinger 1	23.5
	Initial Weight	~~740.6~~ 740.0		
	Increase	23.5	Impinger 2	2.0
Impinger 2	Final Weight	754.6	Impinger 3	0.2
	Initial Weight	752.6		
	Increase	2.0	Impinger 4	2.9
Impinger 3	Final Weight	649.5	Impinger 5	
	Initial Weight	649.3		
	Increase	0.2	Impinger 6	
Impinger 4	Final Weight	953.4	Impinger 7	
	Initial Weight	950.5		
	Increase	2.9	Total	28.6 = V_w

V_w =

g SO_2 = -

V_w =

Impinger 5	Final Weight		P_b =	29.51
	Initial Weight		V_m =	~~21.284~~ ~~21.440~~ 21.384
	Increase		V_w =	28.6
			P_m =	1.700
Impinger 6	Final Weight		Avg ΔP =	0.384
	Initial Weight			
	Increase		Avg$\sqrt{\Delta P}$ =	0.617
			C_p =	0.808
Impinger 7	Final Weight		P_s =	-10.6 "H_2O
	Initial Weight		T_m =	68 °F
	Increase		T_s =	~~293~~ 292 °F

%CO_2 =	11.2	
%O_2 =	7.6	
%CO =	0.0	
%N_2 =	81.2	
A_s =	~~14,364~~ 14,427	
D_n =	–	
T_t =	30	
	28.73	"Hg
	528	°R
	~~753~~ 752	°R

Moisture Content: %M = ~~6.02~~ ~~5.98~~ 6.02 M_d = ~~0.9398~~ ~~0.9402~~ 0.9398 MW_d = 30.096 MW = 29.37

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times \text{~~21.440~~ ~~21.284~~ 21.284} \left[\frac{29.51 + \frac{1.700}{13.6}}{68 + 460}\right] = \text{~~21.239~~ 21.085 sft}^3 \text{ ~~21.085~~}$$

$$= \text{~~0.708~~ 0.703 scfm ~~0.703~~}$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 28.6 = 1.350 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{1.350}{21.085 + 1.350}$ x 100 = ~~6.02~~ ~~5.98~~ 6.02 %

V_s = 5123.8 x 0.808 $\sqrt{\frac{\text{~~753~~ 752}}{28.73 \times 29.37}}$ x 0.617 = ~~2413~~ 2411 fpm

ACFM: ~~240,702~~ 241,597

SCFM: ~~152,867~~ ~~152,952~~ 153,614 ~~152,267~~

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

%EA: 54.6

Run Number 2

Unit OUTLET DUCT 6B

Date 10-20-94

VELOCITY 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	Remarks	
			0.34				295						D5	1340
			0.40				295						4	1341
			0.45				290						3	1342
			0.40				289						2	1343
			0.27				283						1	1344
			–				–						–	-
			0.36				297						E5	1346
			0.38				295						4	1347
			0.42				292						3	1348
			0.32				290						2	1349
			0.21				291						1	1350
			–				–						–	-
			0.36				299						F5	1352
			0.37				302						4	1353
			0.42				303						3	1354
			0.43				296						2	1355
			0.26				290						1	1356
													–	–

METCO ENVIRONMENTAL

Job Number 99-95 WCR6 ✓
Job Name TVA- EPRI ✓
Run Number 3 ✓
Unit OUTLET DUCT GB ✓
Date 10-21-99 ✓
Operator BORNSEN/HART ✓
Sample Box No. 19-3 Meter Box No. 19-2 ✓

VELOCITY Field Data

Read and record at the start of each test point.

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

Ambient Temp. °F 44
Assumed Moisture % 9.0
Probe Length 10'
C Factor – to reference
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 10.0 "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	Remarks	
B3	0826	219.126	0.36	1.60	1.60	7.0	298	237	234	46	~~44~~ 44	42	15	0826
	0831	222.66	0.40	1.60	1.60	7.0	304	238	232	43	44	42	4	0827
	0836	226.23	0.43	1.60	1.60	7.0	312	239	231	43	48	43	3	0828
	0841	229.80	0.37	1.60	1.60	7.0	313	242	234	44	50	~~48~~ 43	2	0829
	0846	233.41	0.22	1.60	1.60	7.0	296 ~~303~~	243	232	44	51	44	1	0830
	0851	236.95	–	1.60	1.60	7.0	–	246	234	45	53	44	–	–
END	0856	241.065	0.35	–	–	–	302	–	–	–	–	–	15	0831
			0.39				319						4	0832
			0.42				310						3	0833
			0.36				311						2	0834
			0.23				300						1	0835
			–				–	–					–	–
			0.37				299						5	0836
			0.43				310						4	0837
			0.48				314						3	0838
			0.52				311						2	0839
			0.30				286						1	0840
			–				–						+	–

Pitot Tube Calibration Factor C_p 0.98 ✓
Volume Collected V_m ~~OK 20.896~~ ✓ ft³ ~~21.040~~
Water Collected V_w 33.0 ✓ ml
Time of Test T_t 30 ✓ min.
Stack Pressure P_s -1.6 ✓ "H_2O

Pitot Tube No. ~~M-5~~ M-6 ✓
Baro. Press. P_b 29.47 ✓ "Hg
Probe Tip Dia. D_n – in.
% CO_2 11.0 ✓ % CO 0.0 ✓
% O_2 7.8 ✓ % N_2 81.2 ✓
Area Stack A_s ~~14,364~~ 14,427 ✓ in²

Barometer No. 19-1 ✓ Probe Tip No. –
Total Volume of Leak Checks After Start: – ft³
V_m = Dry Gas Meter Calibration Factor ~~0.952~~ X 21.939
~~0.954~~ 0.952 ✓

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

Impinger Box No. 19-3

Water Weight Gain

Impinger 1	Final Weight	780.7		Impinger 1	25.2
	Initial Weight	755.5			
	Increase	25.2		Impinger 2	2.2
Impinger 2	Final Weight	749.7		Impinger 3	0.3
	Initial Weight	747.5			
	Increase	2.2		Impinger 4	5.3
			V_w =		
Impinger 3	Final Weight	644.3	g SO_2 =	Impinger 5	
	Initial Weight	644.0	V_w =		
	Increase	0.3		Impinger 6	
Impinger 4	Final Weight	893.0		Impinger 7	
	Initial Weight	887.7			
	Increase	5.3		Total	33.0 = V_w

Impinger 5	Final Weight		P_b =	29.47	%CO_2 =	11.0
	Initial Weight		V_m =	~~22.805~~ ~~21.040~~ 20.886	%O_2 =	~~6.078~~
	Increase		V_w =	33.0	%CO =	0.0
			P_m =	1.600	%N_2 =	81.2
Impinger 6	Final Weight		Avg ΔP =	0.374	A_s =	~~14,364~~ 14,427
	Initial Weight				D_n =	—
	Increase		Avg$\sqrt{\Delta P}$ =	0.608	T_t =	36
			C_p =	0.99		
Impinger 7	Final Weight		P_s =	-11.8 'H$_2$O		28.60 'Hg
	Initial Weight		T_m =	46 °F		506 °R
	Increase		T_s =	301 °F		761 °R

Moisture Content: %M = ~~6.69~~ ~~6.74~~ 6.74 M_d = ~~0.9331~~ ~~0.9326~~ 0.9326 MW_d = 30.072 MW = 29.26

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times \cancel{20.886}\ \cancel{21.040}\ 20.886 \left[\frac{29.47 + \frac{1.600}{13.6}}{46 + 460}\right] = \cancel{21.715}\ \cancel{21.556}\ 21.556\ sft^3$$

$$= \cancel{0.719}\ \cancel{0.724}\ 0.719\ scfm$$

Vw_{gas} = 0.0472 x Vw = 0.0472 x 33.0 = 1.558 sft^3

% Moisture = $\frac{Vw_{gas}}{Vm_{std} + Vw_{gas}}$ x 100 = $\frac{1.558}{21.556 + 1.558}$ x 100 = ~~6.69~~ ~~6.74~~ 6.74 %

V_s = 5123.8 x 0.308 $\sqrt{\frac{761}{28.60 \times 29.26}}$ x 0.608 = 2400 fpm

ACFM: ~~237,171~~ 240,488

SCFM: ~~148,697~~ ~~148,617~~ 149,269

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

%EA: 56.9

Run Number 3

Unit Outlet Duct 6B

Date 10-21-99

Velocity 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	Remarks	
			0.36				296						D5	0841
			0.40				307						4	0842
			0.46				312						3	0843
			0.45				316						2	0844
			0.26				287						1	0845
			–				–						–	–
			0.37				303						E5	0846
			0.40				297						4	0847
			0.44				300						3	0848
			0.35				296						2	0849
			0.22				284						1	0850
			–				–						–	–
			0.35				296						F5	0851
			0.40				297						4	0852
			0.44				295						3	0853
			0.48				296						2	0854
			0.23				285						1	0856
			–				–						EN	0856

PRELIMINARY VELOCITY TRAVERSE DATA
AND
SAMPLING LOCATION DATA

Job Number 99-95WCR4

Job Name EPRI

Sampling Location Unit 6 Precip Inlet 17

Date 10-19-99 Time 1655

Stack Height ~~47~~ ft.

Sampling Port Height Above Ground 97 ft.

	Port A	Port B	Port C	Port D	Average
Port & Inside Diameter (in.)	108"				108"
Port & Wall Thickness (in.)	12"				12"
Inside Stack Diameter (in.)	96"				96"

De = 96"

Sampling Ports are 8 ft. 6 in.

Sampling Ports are 17 ft. 7 in.

1.06 equivalent duct ~~stack~~ diameters) downstream from disturbance (inlet, constriction, bend, expansion)

2.20 equivalen duct ~~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 $\Delta P/T_s/\alpha$	Port B $\Delta P/T_s/\alpha$	Port C $\Delta P/T_s/\alpha$	Port D $\Delta P/T_s/\alpha$
1		9.625	9 5/8 ~~9.6 9 9/10~~	0.50/332/0	0.45/325/0	0.49/320/0	0.57/321/0
2		~~19.~~ 28.813	28 13/16	0.70/339/-2	0.65/340/0	0.75/333/0	0.77/324/-2
3		48.0	48	0.80/343/-5	0.75/341/-5	0.85/337/0	0.72/335/-2
4		~~67.2~~ 67.188	67 3/16	0.77/339/-2	0.70/334/0	0.84/328/-3	0.85/331/-2
5		~~86.4~~ 86.375	86. 3/8	0.55/332/0	0.69/329/0	0.75/316/-5	0.80/316/-2
6				/ /	/ /	/ /	/ /
7				/ /	/ /	/ /	/ /
8				/ /	/ /	/ /	/ /
9				/ /	/ /	/ /	/ /
10				/E/	/F/	/ /	/ /
11				0.63/311/-2	0.49/307/0	/ /	/ /
12				0.71/317/0	0.70/314/-2	/ /	/ /
13				0.79/325/0	0.90/319/-2	/ /	/ /
14				0.75/325/-5	0.91/315/0	/ /	/ /
15				0.77/315/-2	0.69/311/0	/ /	/ /
16				/ /	/ /	/ /	/ /
17				/ /	/ /	/ /	/ /
18				/ /	/ /	/ /	/ /
19				/ /	/ /	/ /	/ /
20				/ /	/ /	/ /	/ /
21				/ /	/ /	/ /	/ /
22				/ /	/ /	/ /	/ /
23				/ /	/ /	/ /	/ /
24				/ /	/ /	/ /	/ /

Pitot Tube No. M5

C_p = 0.808

P_b = 29.37 "Hg

P_s = -10.70 "H_2O 28.58 "Hg

A_s = ~~9216~~ ~~10,830~~ 9216 in.²

Average ΔP 0.710

Average $\Delta P^{1/2}$ 0.839

Average T_x ~~316~~ 326 °F

Average α 1.43 degrees

PRELIMINARY VELOCITY TRAVERSE DATA
AND
SAMPLING LOCATION DATA

Job Number 99-95WCR6

Job Name TVA - EPRI

Sampling Location INLET DUCT ~~6B~~ 6B

Date 10-20-99 Time 0810

Stack Height _____ ft.

Sampling Port Height Above Ground 97 ft.

	Port A	Port B	Port C	Port D	Average
Port & Inside Diameter (in.)					109"
Port & Wall Thickness (in.)					13"
Inside Stack Diameter (in.)					96"

Sampling Ports are 8 ft. 6 in. (1.06 stack diameters) downstream from disturbance (inlet, constriction, bend, expansion)

Sampling Ports are 17 ft. 7 in. (2.20 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 $\Delta P/T_s/\alpha$	Port B $\Delta P/T_s/\alpha$	Port C $\Delta P/T_s/\alpha$	Port D $\Delta P/T_s/\alpha$
1			9 5/8	1 1 0	1 1 0	1 1-3	1 1 0
2			28 13/16	1 1-2	1 1-5	1 1-3	1 1 0
3			48	1 1 0	1 1-5	1 1 0	1 1 0
4			67 3/16	1 1-5	1 1 0	1 1 0	1 1-5
5			86 3/8	1 1 0	1 1 0	1 1-5	1 1 0
6				1 1	1 1	1 1	1 1
7				1 1	1 1	1 1	1 1
8				PORT 1E	PORT 1F	1 1	1 1
9				1 1 0	1 1 0	1 1~~2~~	1 1
10				1 1 0	1 1 0	1 1~~2~~	1 1
11				1 1-3	1 1 0	1 1~~0~~	1 1
12				1 1-3	1 1 0	1 1	1 1
13				1 1 0	1 1 0	1 1	1 1
14				1 1	1 1	1 1	1 1
15				1 1	1 1	1 1	1 1
16				1 1	1 1	1 1	1 1
17				1 1	1 1	1 1	1 1
18				1 1	1 1	1 1	1 1
19				1 1	1 1	1 1	1 1
20				1 1	1 1	1 1	1 1
21				1 1	1 1	1 1	1 1
22				1 1	1 1	1 1	1 1
23				1 1	1 1	1 1	1 1
24				1 1	1 1	1 1	1 1

Pitot Tube No. M-5

C_p = 0.808

P_b = 29.50 "Hg

P_s = -10.2 "H_2O 28.75 "Hg

A_s = 9216 in.^{2}

Average ΔP –

Average $\Delta P^{1/2}$ –

Average T_x – °F

Average α 1.30 degrees

PRELIMINARY VELOCITY TRAVERSE DATA
AND
SAMPLING LOCATION DATA

Job Number 99-95 WCR 6
Job Name EPRI
Sampling Location Unit 6 Outlet to Precip. (A Duct)
Date 10-19-99 Time 1700

Stack Height —— ft.
Sampling Port Height Above Ground 32 ft.

	Port A	Port B	Port C	Port D	~~Average~~ Port E	Port F
Port & Inside Diameter (in.)	141½" ✓	141⅞" ✓	141⅞" ✓	141⅞" ✓	141⅞" ✓	141½"
Port & Wall Thickness (in.)	13"	12⅞"	12⅞"	12⅞"	12⅞"	13"
Inside Stack Diameter (in.)	128½"	128½"	128½"	128½"	128½"	128½"

D_e = 121¼

Sampling Ports are 12 ✓ ft. 7 ✓ in. (1.25 ✓ stack diameters) downstream from disturbance (inlet, constriction, bend, expansion)

Sampling Ports are 5 ✓ ft. 7 in. (0.55 ✓ stack diameters) upstream from disturbance (outlet, constriction, ~~bend, expansion~~) Bend

Point Number	Percent Diameter	Distance from Ref. Point (decimal in.)	Distance from Ref. Point (fractional in.)	Port A $\Delta P/T_s/\alpha$	Port B $\Delta P/T_s/\alpha$	Port C $\Delta P/T_s/\alpha$	Port D $\Delta P/T_s/\alpha$
1		12.875 ✓	12⅞ ✓	0.3112851-2	0.2713381-5	0.2012901-3	0.283061 ⊗
2		38.563 ✓	38 9/16 ✓	0.5112901-10	0.3713581-4	0.4013661 ⊗	0.463174-3
3		64.250 ✓	64 1/4 ✓	0.4213301 ⊗	0.3813931 ⊗	0.4314051 ⊗	0.471420 ⊗
4		89.938 ✓	89 15/16 ✓	0.4013365-8	0.3813895-4	0.4314061-2	0.411379 ⊗
5		115.625 ✓	115 5/8 ✓	0.3813071 ⊗	0.3513381 ⊗	0.3613481-5	0.4013461-4
6				/ /	/ /	/ /	/ /
7				/ /	/ /	/ /	/ /
8				/ /	/ /	/ /	/ /
9				/ /	/ /	/ /	/ /
10				Port E /	Port F / ⊗	/ /	/ /
11				0.2112851 ⊗	0.3812661-2	/ /	/ /
12				0.3013401 ⊗	0.4812951 ⊗	/ /	/ /
13				0.4213701-3	0.4713131 ⊗	/ /	/ /
14				0.4213701 ⊗	0.4013141-4	/ /	/ /
15				0.3713481-4	0.3512961 ⊗	/ /	/ /
16				/ /	/ /	/ /	/ /
17				/ /	/ /	/ /	/ /
18				/ /	/ /	/ /	/ /
19				/ /	/ /	/ /	/ /
20				/ /	/ /	/ /	/ /
21				/ /	/ /	/ /	/ /
22				/ /	/ /	/ /	/ /
23				/ /	/ /	/ /	/ /
24				/ /	/ /	/ /	/ /

Pitot Tube No. M-7 ✓
C_p = 0.811 ✓
P_b = 29.55 "Hg
P_s = -10.0 "H_2O 28.81 "Hg ✓
A_s = 14.745 ✓ in.²

Average ΔP 0.380 ✓
Average $\Delta P^{1/2}$ 0.614 ✓
Average T_s 340 ✓ °F
Average α 2.1 ✓ degrees

PRELIMINARY VELOCITY TRAVERSE DATA
AND
SAMPLING LOCATION DATA

Job Number 99-95WER6

Job Name TVA - EPRI

Sampling Location OUTLET DUCT 6B

Date 10-20-99 Time 1030

Stack Height — ft.

Sampling Port Height Above Ground 32 ft.

	Port A	Port B	Port C	Port D	Average
Port & Inside Diameter (in.)					139" ✓
Port & Wall Thickness (in.)					13" ✓
Inside Stack Diameter (in.)					126" ✓

Dc = 120

Sampling Ports are 12 ft. 7 in. (1.26 ✓ stack diameters) downstream from disturbance (inlet, constriction, bend, expansion)

Sampling Ports are 5 ft. 7 in. (0.56 ✓ 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 $\Delta P/T_s/\alpha$	Port B $\Delta P/T_s/\alpha$	Port C $\Delta P/T_s/\alpha$	Port D $\Delta P/T_s/\alpha$
1			12 5/8	/ / 0	/ / -2	/ / 0	/ / 0
2			37 13/16	/ / 0	/ / -2	/ / 0	/ / 0
3			63	/ / -5	/ / 0	/ / 0	/ / 0
4			88 3/16	/ / 0	/ / 0	/ / -5	/ / 0
5			113 3/8	/ / 0	/ / 0	/ / 0	/ / 0
6				/ /	/ /	/ /	/ /
7				/ /	/ /	/ /	/ /
8				/ /	/ /	/ /	/ /
9				PORT 1E	PORT 1F	/ /	/ /
10				/ / 0	/ / 0	/ /	/ /
11				/ / 0	/ / 0	/ /	/ /
12				/ / -5	/ / -2	/ /	/ /
13				/ / 0	/ / 0	/ /	/ /
14				/ / -5	/ / -5	/ /	/ /
15				/ /	/ /	/ /	/ /
16				/ /	/ /	/ /	/ /
17				/ /	/ /	/ /	/ /
18				/ /	/ /	/ /	/ /
19				/ /	/ /	/ /	/ /
20				/ /	/ /	/ /	/ /
21				/ /	/ /	/ /	/ /
22				/ /	/ /	/ /	/ /
23				/ /	/ /	/ /	/ /
24				/ /	/ /	/ /	/ /

Pitot Tube No. M-6 ✓

C_p = 0.803 ✓

P_b = 29.59 "Hg

P_s = -10.4 "H_2O 29.83 "Hg ✓

A_s = ~~14,364~~ 14,427 ✓ in.^{2}

Average ΔP —

Average $\Delta P^{1/2}$ —

Average T_x — °F

Average α 1.03 ✓ degrees

METCO ENVIRONMENTAL

ORSAT ANALYSIS DATA FORM

Job Number: 99.95 WCR6 Sample Location: Unit 6 Precipitator Inlet Duct A

Job Name: EPRI / TVA Analytical Method: 3B

Location: Stevenson, AL Sample Type: Single point or Multi point, Grab or Integrated

Date: 10/20/99 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 0915-1145	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	14.0	14.0	14.0	14.0
O_2 - % Vol.	5.2	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

$F_o = 1.121$

Run Number 2 Run Time 1300-1530	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	13.4	13.4	13.4	13.4
O_2 - % Vol.	5.6	5.6	5.6	5.6
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	81.0	81.0	81.0	81.0

$F_o = 1.075$

Run Number 3 Run Time 0800-1030	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	14.0	14.0	14.0	14.0
O_2 - % Vol.	5.0	5.0	5.0	5.0
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	81.0	81.0	81.0	81.0

$F_o = 1.136$

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METCO ENVIRONMENTAL

ORSAT ANALYSIS DATA FORM

Job Number: 99-95WCR6 Sample Location: Unit 6 Precipitator Outlet Duct A

Job Name: EPRI / TVA Analytical Method: 3B

Location: Stevenson, AL Sample Type: Single point or Multi point; Grab or Integrated

Date: 10/20/99 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 0915-1151	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	11.0	11.0	11.0	11.0
O_2 - % Vol.	8.2	8.2	8.2	8.2
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.8	80.8	80.8	80.8

$F_o = 1.155$

Run Number 2 Run Time 1300-1536	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	11.8	11.8	11.8	11.8
O_2 - % Vol.	7.2	7.2	7.2	7.2
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	81.0	81.0	81.0	81.0

$F_o = 1.161$

Run Number 3 Run Time 0800-1035	Analysis 1	Analysis 2	Analysis 3	Average - % Vol.
CO_2 - % Vol.	11.6	11.6	11.6	11.6
O_2 - % Vol.	7.6	7.6	7.6	7.6
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.8	80.8	80.8	80.8

$F_o = 1.147$

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APPENDIX C

Calibration Data

Equipment	Calibration Factor	Calibration Date
Pitot Tube #M-3	0.808	10/04/99
Pitot Tube #M-5	0.808	10/04/99
Pitot Tube #M-6	0.808	10/04/99
Pitot Tube #M-7	0.811	10/04/99
Probe Tip #TFE-1-8	0.226	10/04/99
Probe Tip #TFE-2-7	0.200	10/05/99
Dry Gas Meter #19-2	0.952	10/08/99
Stack Unit Orifice #19-2		10/22/99
Digital Temperature Indicator #19-2		10/08/99
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 #M-3	0.808	11/22/99
Pitot Tube #M-5	0.806	11/19/99
Pitot Tube #M-6	0.807	11/19/99
Pitot Tube #M-7	0.810	11/22/99
Probe Tip #TFE-1-8	0.235	11/19/99
Probe Tip #TFE-2-7	0.195	11/19/99
Dry Gas Meter #19-2	0.993	12/16/99
Stack Unit Orifice #19-2		12/23/99
Digital Temperature Indicator #19-2		12/13/99
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: 10-4-99 Time: 1130

Pitot No.: M3 T_s: 72 °F

Pitot Dimensions: 3/8" tps 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: Jam Brom 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: 1400

Pitot No.: m6

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 Bron 274

Checked By: Jason Conway #273

PITOT TUBE CALIBRATION

Date: 10-4-99

Time: 1430

Pitot No.: M7

T_s: 72 °F

Pitot Dimensions: 3/8" tip

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	0.50	0.707	0.816	0.50	0.707	0.816
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							0.811			0.811

Summary of Results:

Normal high side calibration factor 0.811

variation + 1.23%

variation - 0.37%

Normal low side calibration factor 0.811

variation + 1.23%

variation - 0.37%

Calibrator: Jason Brown 274

Checked By: Jason Conway # 273

METCO ENVIRONMENTAL

✓ BM 107

NOZZLE CALIBRATION

Nozzle Set No. TFE-1

Date 10-4-99 Calibrator: Jason Brown

	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

√ 1504 107

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.: 19-2

Date: 10-8-99

ΔH ("H_2O)	C_{DG}
0.5	0.957
1.0	0.948
1.5	0.953
2.0	0.951
3.0	0.950
4.0	0.953
Average	0.952

Variation: + 0.53 %

- 0.42 %

Calibrator: Jason Conway

Checked By: Bill Humphry

C_{DG} @ 2 liters/min. = —

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 10-8-99

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: 29.80 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1811	5.202 cf	73 °F	-1.00 "H_2O
Start	1758	0.000 cf	73 °F	-1.00 "H_2O
Avg.	13	5.202 cf	73 °F	-1.00 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	46.964 cf	73 °F	70 °F	0.50 "H_2O
Start	41.580 cf	70 °F	68 °F	0.50 "H_2O
Avg.	5.384 cf	70 °F	°F	0.50 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 5.202 \left[\frac{29.80 + \frac{-1.00}{13.6}}{73 + 460} \right] \times 1.000 \ (C_f) = 5.121 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 5.384 \left[\frac{29.80 + \frac{0.50}{13.6}}{70 + 460} \right] = 5.350 \text{ dcsf}$$

$$C_{DG} = \frac{5.121}{5.350} = \boxed{0.957}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 10-9-99

Calibrator: Jason Conway

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

Run No.: 3 @ 1.00

P_b: 29.35 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	0945	5.110 cf	71 °F	-1.40 "H_2O
Start	0936	0.000 cf	71 °F	-1.40 "H_2O
Avg.	9	5.110 cf	71 °F	-1.40 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	156.704 cf	79 °F	72 °F	1.00 "H_2O
Start	151.306 cf	77 °F	72 °F	1.00 "H_2O
Avg.	5.398 cf	75 °F		1.00 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 5.110 \left[\frac{29.35 + \frac{-1.40}{13.6}}{71 + 460}\right] \times 1.000 \ (C_t) = 4.968 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 5.398 \left[\frac{29.35 + \frac{1.00}{13.6}}{75 + 460}\right] = \cancel{5.191}\ 5.240 \text{ dcsf}$$

$$C_{DG} = \frac{4.968}{\cancel{5.191}\ 5.240} = \boxed{0.948\ \cancel{0.957}}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 10-9-99

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" H_2O

P_b: 29.35 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	0741	10.276 cf	71 °F	-19.0 "H_2O
Start	0726	0.000 cf	71 °F	-19.0 "H_2O
Avg.	15	10.276 cf	71 °F	-19.0 "H_2O

Dry Gas Meter

Meter Reading	Temp. In	Temp. Out	P_m
85.255 cf	81 °F	70 °F	1.50 "H_2O
74.503 cf	74 °F	69 °F	1.50 "H_2O
10.752 cf	74 °F		1.50 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.276 \left[\frac{29.35 + \frac{-19.0}{13.6}}{71 + 460}\right] \times 1.000 \quad (C_f) = \text{sc } \cancel{9.543}\ 9.977 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.752 \left[\frac{29.35 + \frac{1.50}{13.6}}{74 + 460}\right] = \text{sc } \cancel{10.544}\ 10.470 \text{ dcsf}$$

$$C_{DG} = \frac{\cancel{9.543}\ 9.977}{\cancel{10.544}\ 10.470} = \boxed{\text{sc } \cancel{0.906}\ 0.953}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 10-9-99

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 "H_2O

P_b: 29.35 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	0757	10.021 cf	71 °F	-22.0 "H_2O
Start	0744	0.000 cf	71 °F	-22.0 "H_2O
Avg.	13	10.021 cf	71 °F	-22.0 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	96546 cf	84 °F	71 °F	2.00 "H_2O
Start	86024 cf	78 °F	69 °F	2.00 "H_2O
Avg.	10.522 cf		76 °F	2.00 "H_2O

$$Wet\ Test\ Meter\ Vm_{std} = 17.65 \times 10.021 \left[\frac{29.35 + \frac{-22.0}{13.6}}{71 + 460}\right] \times 1.000\ (C_t) = \cancel{9.237}\ 9.722\ dcsf$$

$$Dry\ Gas\ Meter\ Vm_{std} = 17.65 \times 10.522 \left[\frac{29.35 + \frac{2.00}{13.6}}{76 + 460}\right] = 10.220\ dcsf$$

$$C_{DG} = \frac{\cancel{9.237}\ 9.722}{10.220} = \boxed{\cancel{0.904}\ 0.951}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 10-9-99

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" H_2O

P_b: 29.35 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	0811	10.471 cf	71 °F	-3.00 "H_2O
Start	0.800	0.000 cf	71 °F	-3.00 "H_2O
Avg.	"	10.471 cf	71 °F	-3.00 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	108.849 cf	88 °F	72 °F	3.00 "H_2O
Start	97.824 cf	84 °F	71 °F	3.00 "H_2O
Avg.	11.025 cf	~~78~~ 79 °F		3.00 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.471 \left[\frac{29.35 + \frac{-3.00}{13.6}}{71 + 460}\right] \times 1.000\ (C_f) = 10.138 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 11.025 \left[\frac{29.35 + \frac{3.00}{13.6}}{\cancel{78}\ 79 + 460}\right] = \cancel{10.695}\ 10.676 \text{ dcsf}$$

$$C_{DG} = \frac{10.138}{\cancel{10.695}\ 10.676} = \boxed{\cancel{0.948}\ 0.950}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 10-9-99

Calibrator: Jason Conway

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

Run No.: 1 @ 4.00" H_2O

P_b: 29.35 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	0822	10.575 cf	71 °F	-3.60 "H_2O
Start	0813	0.000 cf	71 °F	-3.60 "H_2O
Avg.		10.575 cf	71 °F	-3.60 "H_2O

Dry Gas Meter

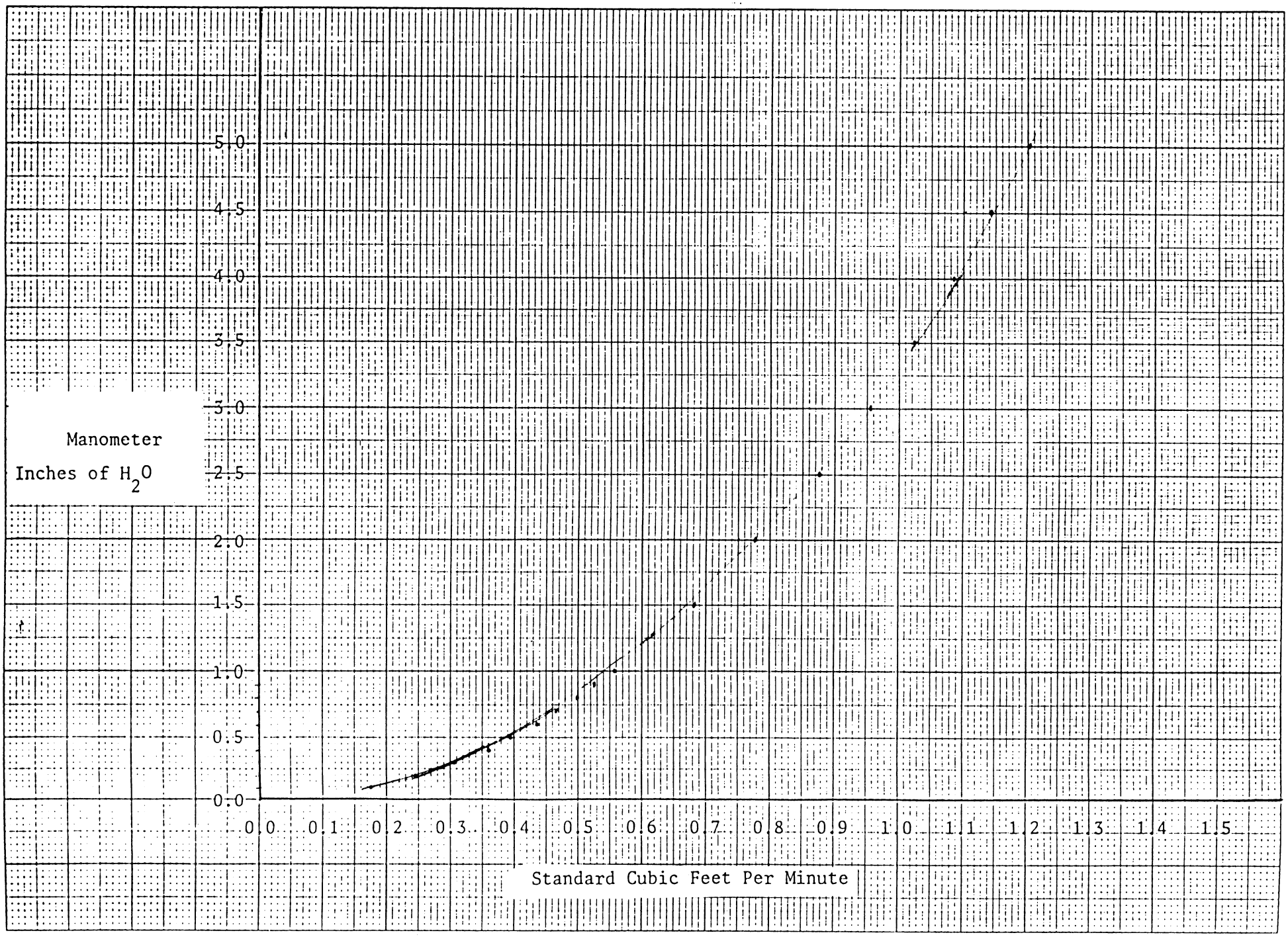
	Meter Reading	Temp. In	Temp. Out	P_m
End	120.628 cf	90 °F	74 °F	4.00 "H_2O
Start	109.540 cf	87 °F	72 °F	4.00 "H_2O
Avg.	11.088 cf	81 °F	°F	4.00 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.575 \left[\frac{29.35 + \frac{-3.60}{13.6}}{71 + 460}\right] \times 1.000 \quad (C_f) = 10.224 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 11.088 \left[\frac{29.35 + \frac{4.00}{13.6}}{81 + 460}\right] = 10.724 \text{ dcsf}$$

$$C_{DG} = \frac{10.224}{10.724} = \boxed{0.953}$$

0.959
Shane Lee 261
10-22-94



METCO ENVIRONMENTAL

DIGITAL TEMPERATURE INDICATOR NO. 19-2

CALIBRATION DATA

Date: 10-8-99

Media	Time	Mercury Temperature (°F)	DTI (°F)
Ambient Air	1736	73	73
Ice Bath	1739	32	32
Boiling Water	1745	212	213
Oven	1747	250	250
Oven	1748	300	300
Oven	1749	350	351
Oven	1750	375	376

Meter Adjusted? Yes _____ No ✓

Calibrator: Shane Lee 2d

Checked By: Bill Hyfry

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

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

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

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

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)					Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1529	10.355 cf	73 °F	-2.20 "H_2O	322.948 cf	77 °F	73 °F	1.50 "H_2O
Start	1515	0.000 cf	73 °F	-2.20 "H_2O	312.925 cf	73 °F	73 °F	1.50 "H_2O
Avg.	14	10.355 cf	73 °F	-2.20 "H_2O	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" 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	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

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

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

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

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)					Dry Gas Meter				
	Time	Meter Reading	Temp.		P_m	Meter Reading	Temp. In		Temp. Out	P_m
End	1618	11.961	cf 73	°F	-3.60 "H_2O	355.643	cf 83	°F	75 °F	3.00 "H_2O
Start	1607	0.000	cf 73	°F	-3.60 "H_2O	344.157	cf 78	°F	74 °F	3.00 "H_2O
Avg.	11	11.961	cf 73	°F	-3.60 "H_2O	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" H.O

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

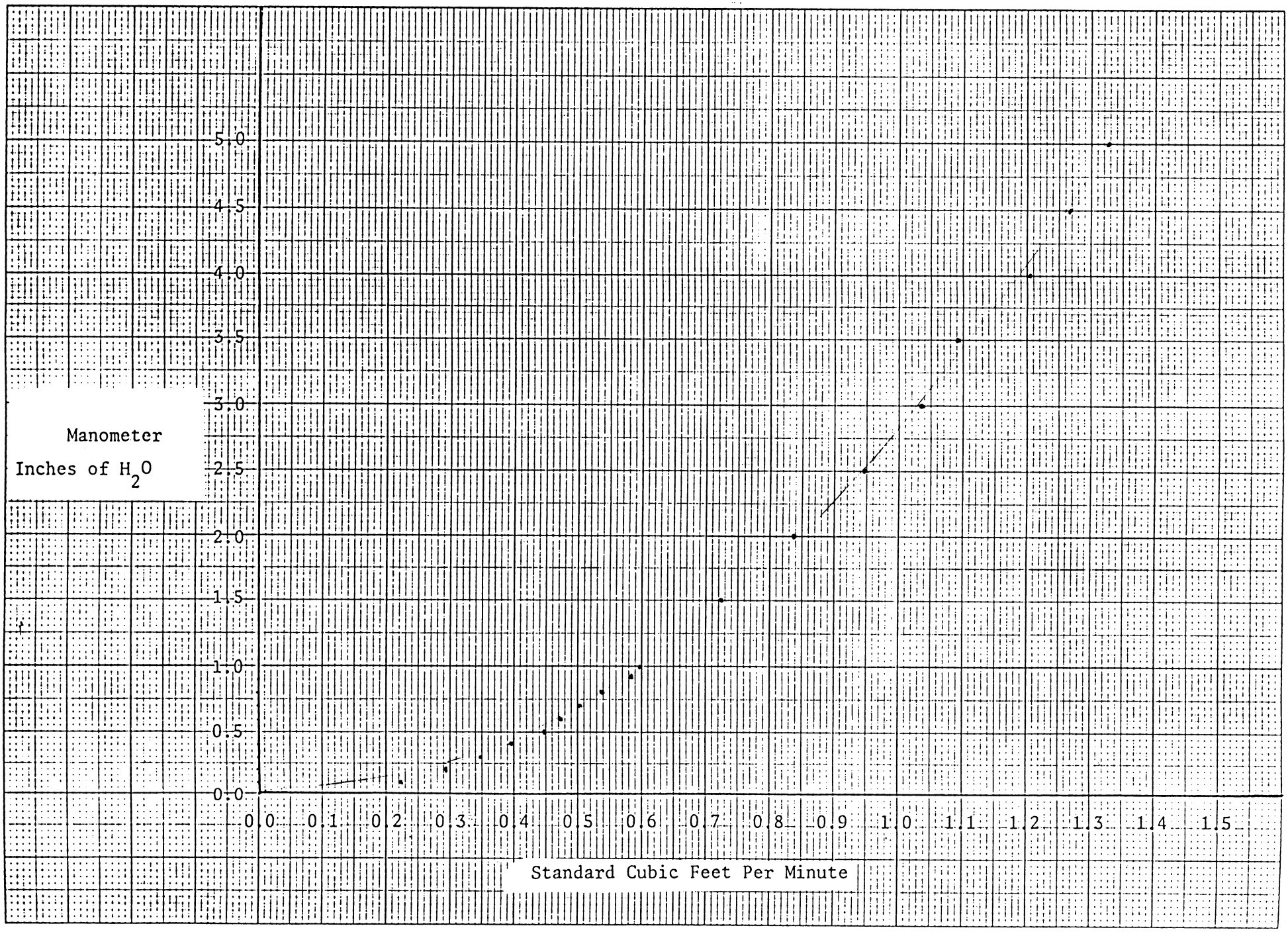
	Meter Reading	Temp. In	Temp. Out	P_m
End	369.641 cf	73 °F	72 °F	0.02 "H_2O
Start	367.018 cf	79 °F	75 °F	0.02 "H_2O
Avg.	2.623 cf	75 °F		0.02 "H_2O

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

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

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

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: 10-4-99

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 Lifley #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)

	Time	Meter Reading		Temp.		P_m	
End	1436	5.400	cf	75	°F	-1.60	"H_2O
Start	1426	0.000	cf	75	°F	-1.60	"H_2O
Avg.	10	5.400	cf	75	°F	-1.60	"H_2O

Dry Gas Meter

	Meter Reading		Temp. In		Temp. Out		P_m	
End	383.463	cf	75	°F	73	°F	1.00	"H_2O
Start	378.114	cf	76	°F	73	°F	1.00	"H_2O
Avg.	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

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

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

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

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	
End	1510	11.395	cf	75	°F	-2.40	"H_2O
Start	1456	0.000	cf	75	°F	-2.40	"H_2O
Avg.	14	11.395	cf	75	°F	-2.40	"H_2O

Dry Gas Meter

	Meter Reading		Temp. In		Temp. Out		P_m	
End	406.546	cf	70	°F	76	°F	2.00	"H_2O
Start	395.246	cf	75	°F	75	°F	2.00	"H_2O
Avg.	11.300	cf	74	°F			2.00	"H_2O

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

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

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

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29-1

Date: 10-4-99

Calibrator: Shane 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: 29.28 "Hg

Control Module Vacuum: 50 "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"

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.947 \left[\frac{29.28 + \frac{-3.90}{13.6}}{75 + 460}\right] \times 1.000\ (C_1) = 10.471 \text{ dcsf}$$

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

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

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

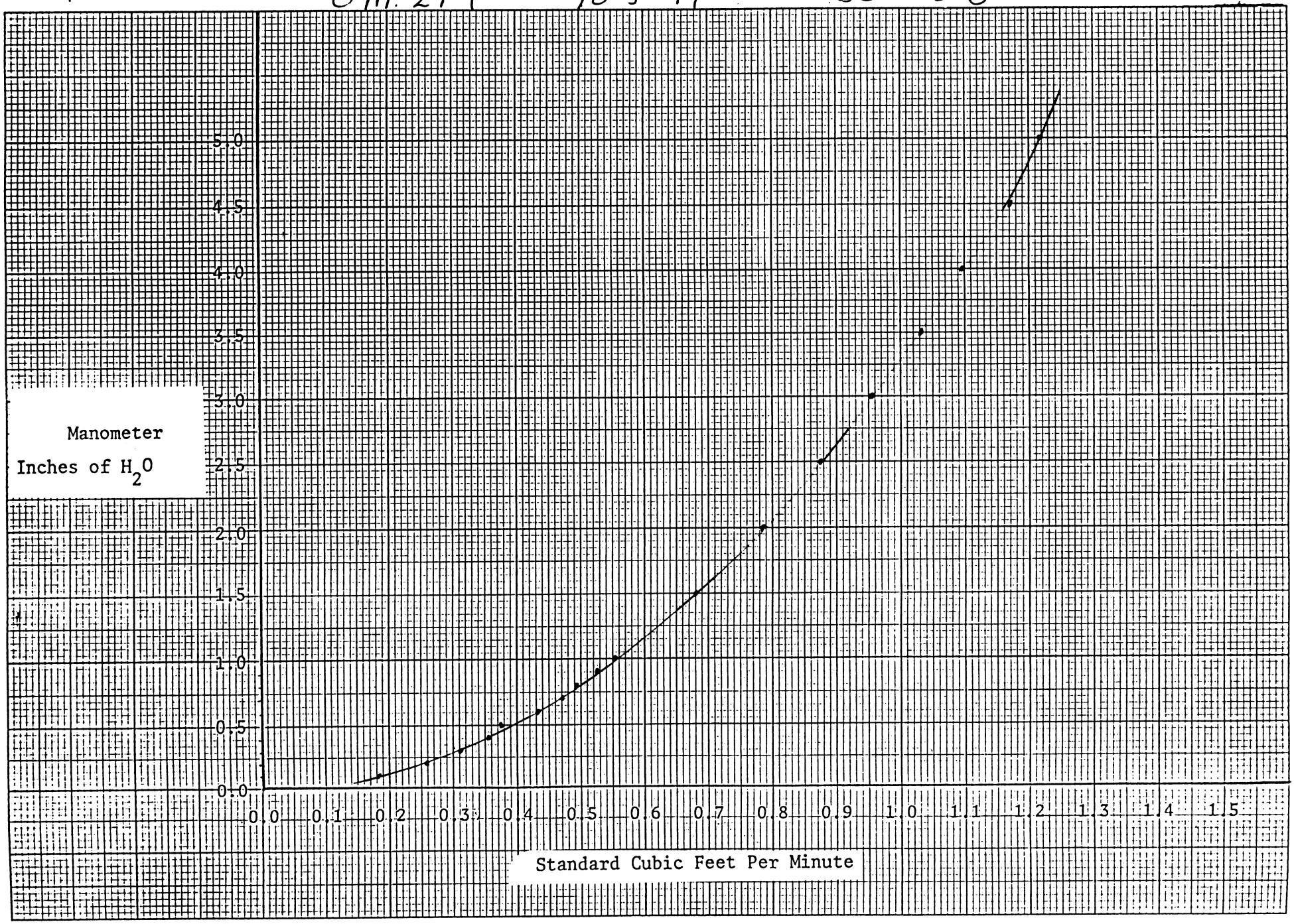
	Wet Test Meter (No. 3)					Dry Gas Meter				
	Time	Meter Reading	Temp.		P_m	Meter Reading	Temp. In		Temp. Out	P_m
End	1622	2.210 cf	75	°F	-0.20 "H_2O	432.153 cf	81	°F	76 °F	0.01 "H_2O
Start	1606	0.000 cf	75	°F	-0.20 "H_2O	430.968 cf	78	°F	76 °F	0.01 "H_2O
Avg.	16	2.210 cf	75	°F	-0.20 "H_2O	2.185 cf	78	°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 Hoffman #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: 11-22-99

Time: 1330

Pitot No.: M3

T_s: 68 °F

Pitot Dimensions: 3/8" tips

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	0.387	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: Scott Hart #248

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 - -1.2%

Calibrator: Scott Hart

Checked By: Mike Bass

PITOT TUBE CALIBRATION

Date: 11-19-99

Time: 1400

Pitot No.: m6

T_s: 68 °F

Pitot Dimensions: 3/8" tips

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	0.387	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	0.51	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							0.807			0.807

Summary of Results:

Normal high side calibration factor 0.807

variation + 0.12 %

variation - 1.36 %

Normal low side calibration factor 0.807

variation + 0.12 %

variation - 1.36 %

Calibrator: Scott Hart #268

Checked By: Mike Bass

PITOT TUBE CALIBRATION

Date: 11-22-99

Time: 1000

Pitot No.: M7

T_s: 70 °F

Pitot Dimensions: 3/8" tips

C_{pstd}: 0.990

Motor Setting	fps mark	Calibration Standard Start	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: Scott Hart #268

Checked By: Jason Conway #273

METCO ENVIRONMENTAL

NOZZLE CALIBRATION

Nozzle Set No. TFE-1

Date 11-19-99 Calibrator: Shane Dee 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 ✓					

MEICO 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

After Adjustment

Dry Gas Meter No.: 19-2

Date: 12/16/99

ΔH ("H_2O)	C_{DG}
0.5	1.006
1.0	1.000
1.5	0.992
2.0	0.991
3.0	0.984
4.0	0.985
Average	0.993

Variation: + 1.31%

- 0.91%

Calibrator: John Betz

Checked By: John Pellegrini

C_{DG} @ 2 liters/min. = 1.650

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 12/17/99

Calibrator: John Pellegrino

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

Run No.: 2 @ 0.50 "H2O

P_b: 29.48 "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	1003	7.282 cf	70 °F	-0.75 "H_2O		585.819 cf	80 °F	73 °F	0.50 "H_2O
Start	0945	0.000 cf	70 °F	-0.75 "H_2O		578.509 cf	80 °F	74 °F	0.50 "H_2O
Avg.	18	7.282 cf	70 °F	-0.75 "H_2O		7.310 cf		77 °F	0.50 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 7.282 \left[\frac{29.48 + \frac{-0.75}{13.6}}{70 + 460}\right] \times 1.000\,(C_f) = 7.136 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 7.310 \left[\frac{29.48 + \frac{0.50}{13.6}}{77 + 460}\right] = 7.092 \text{ dcsf}$$

$$C_{DG} = \frac{7.136}{7.092} = \boxed{1.006}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 12-16-99

Calibrator: John Betz

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

Run No.: 1 @ 1.0 "H_2O

P_b: 29.59 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1550	5.153 cf	73 °F	-1.20 "H_2O
Start	1541	0.000 cf	73 °F	-1.20 "H_2O
Avg.	9	5.153 cf	73 °F	-1.20 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	461.254 cf	80 °F	74 °F	1.00 "H_2O
Start	456.099 cf	76 °F	73 °F	1.00 "H_2O
Avg.	5.155 cf	76 °F		1.00 "H_2O

$$Wet\ Test\ Meter\ Vm_{std} = 17.65 \times 5.153 \left[\frac{29.59 + \frac{-1.20}{13.6}}{73 + 460}\right] \times 1.000 \quad (C_f) = 5.034\ dcsf$$

$$Dry\ Gas\ Meter\ Vm_{std} = 17.65 \times 5.155 \left[\frac{29.59 + \frac{1.00}{13.6}}{76 + 460}\right] = \quad dcsf\ 5.035$$

$$C_{DG} = \frac{5.034}{5.035} = \boxed{1.000}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Calibrator: John Betz

Date: 12-16-99

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

Run No.: 1 @ 1.5" H_2O

P_b: 29.59 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading		Temp.		P_m	
End	1615	10.458	cf	73	°F	-1.75	"H_2O
Start	1600	0.000	cf	73	°F	-1.75	"H_2O
Avg.	15	10.458	cf	73	°F	-1.75	"H_2O

Dry Gas Meter

	Meter Reading		Temp. In		Temp. Out		P_m	
End	472.450	cf	83	°F	75	°F	1.50	"H_2O
Start	461.917	cf	76	°F	75	°F	1.50	"H_2O
Avg.	10.533	cf	77			°F	1.50	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.458 \left[\frac{29.59 + \frac{-1.75}{13.6}}{73 + 460}\right] \times 1.000 \quad (C_f) = 10.203 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.533 \left[\frac{29.59 + \frac{1.50}{13.6}}{77 + 460}\right] = 10.282 \text{ dcsf}$$

$$C_{DG} = \frac{10.203}{10.282} = \boxed{0.992}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 12-16-99

Calibrator: John Betz

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

Run No.: 1 @ 2.0" H_2O

P_b: 29.59 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1635	10.364 cf	73 °F	-2.10 "H_2O
Start	1622	0.000 cf	73 °F	-2.10 "H_2O
Avg.	13	10.364 cf	73 °F	-2.10 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	484.674 cf	88 °F	75 °F	2.00 "H_2O
Start	474.188 cf	81 °F	74 °F	2.00 "H_2O
Avg.	10.486 cf	80 °F		2.00 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.364 \left[\frac{29.59 + \frac{-2.10}{13.6}}{73 + 460}\right] \times 1.000\ (C_f) = 10.102 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.486 \left[\frac{29.59 + \frac{2.00}{13.6}}{80 + 460}\right] = 10.192 \text{ dcsf}$$

$$C_{DG} = \frac{10.102}{10.192} = \boxed{0.991}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 12-16-99

Calibrator: John Betz

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

Run No.: 1 @ 30" H_2O

P_b: 29.59 "Hg

Control Module Vacuum: 5.0 "Hg

Wet Test Meter (No. 3)

	Time	Meter Reading	Temp.	P_m
End	1655	10.656 cf	73 °F	-2.95 "H_2O
Start	1644	0.000 cf	73 °F	-2.95 "H_2O
Avg.	11	10.656 cf	73 °F	-2.95 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	496.403 cf	90 °F	76 °F	3.00 "H_2O
Start	485.574 cf	81 °F	75 °F	3.00 "H_2O
Avg.	10.829 cf		81 °F	3.00 "H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.656 \left[\frac{29.59 + \frac{-2.95}{13.6}}{73 + 460}\right] \times 1.000\ (C_f) = 10.365 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 10.829 \left[\frac{29.59 + \frac{3.00}{13.6}}{81 + 460}\right] = 10.532 \text{ dcsf}$$

$$C_{DG} = \frac{10.365}{10.532} = \boxed{0.984}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 12/17/99

Calibrator: John Pellegrino

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

Run No.: 1 @ 4.00 "H2O

P_b: 29.48 "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	0930	14.535 cf	70 °F	-4.10	"H_2O	574.508 cf	92 °F	75 °F	4.00	"H_2O
Start	0917	0.000 cf	70 °F	-4.10	"H_2O	559.692 cf	88 °F	75 °F	4.00	"H_2O
Avg.	13	14.535 cf	70 °F	-4.10	"H_2O	14.816 cf	83 °F		4.00	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 14.530 \left[\frac{29.48 + \frac{-4.10}{13.6}}{70 + 460}\right] \times 1.000 \ (C_f) = 14.119 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 14.816 \left[\frac{29.48 + \frac{4.00}{13.6}}{83 + 460}\right] = 14.339 \text{ dcsf}$$

$$C_{DG} = \frac{14.119}{14.339} = \boxed{0.985}$$

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 19-2

Date: 12/17/99

Calibrator: John Pellegrini

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

Run No.: 1 @ 2.0 l/min.

P_b: 29.48 "Hg

Control Module Vacuum: 5.0 "Hg

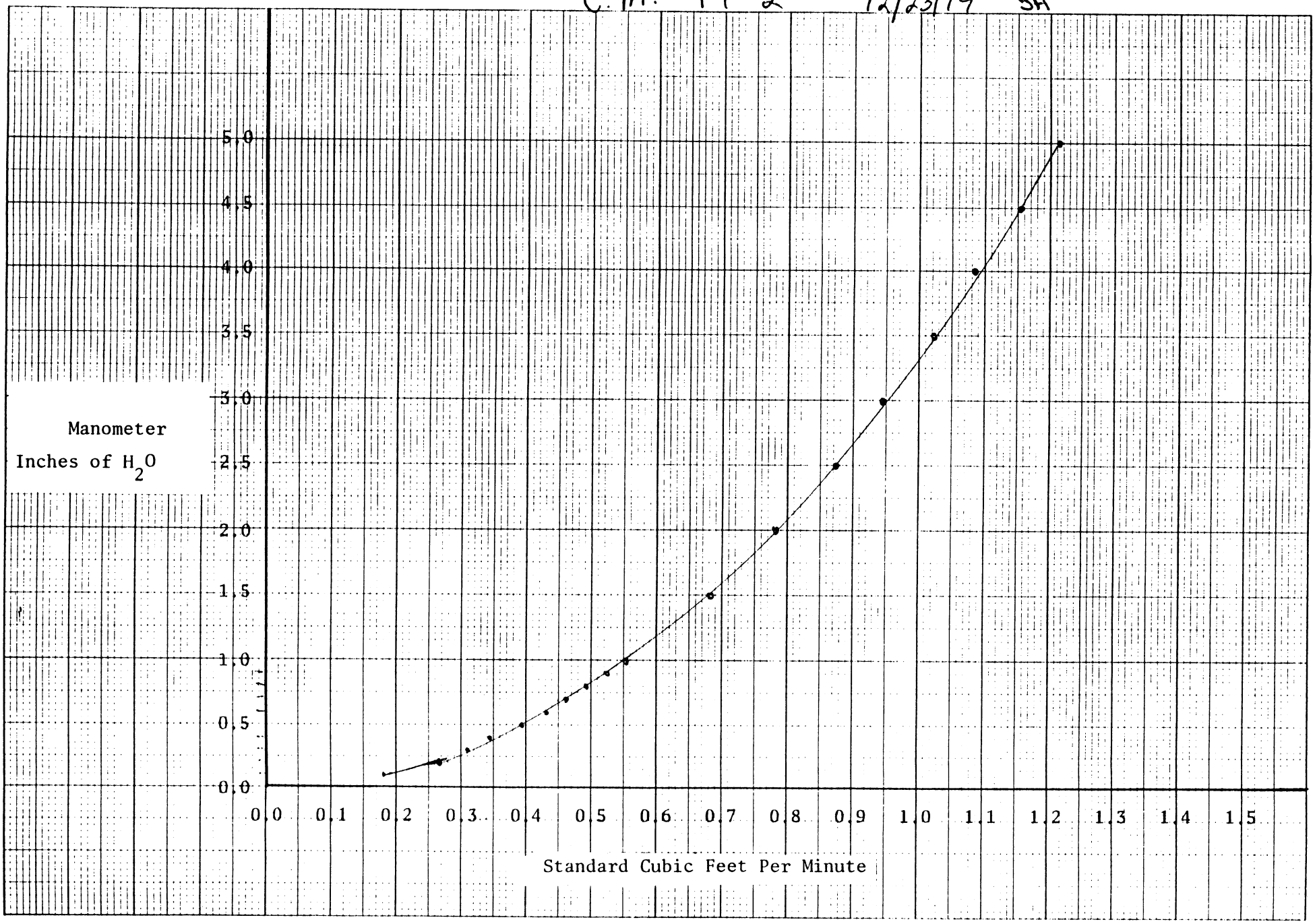
	Wet Test Meter (No. 1)					Dry Gas Meter				
	Time	Meter Reading	Temp.	P_m		Meter Reading	Temp. In	Temp. Out	P_m	
End	1145	2.144 cf	71 °F	-0.65	"H_2O	591.062 cf	71 °F	71 °F	0.02	"H_2O
Start	1117	0.000 cf	71 °F	-0.65	"H_2O	589.757 cf	71 °F	71 °F	0.02	"H_2O
Avg.	28	2.144 cf	71 °F	-0.65	"H_2O	1.305 cf	71 °F		0.02	"H_2O

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 2.144 \left[\frac{29.48 + \frac{-0.65}{13.6}}{71 + 460}\right] \times 1.006\ (C_f) = 2.110 \text{ dcsf}$$

$$\text{Dry Gas Meter } Vm_{std} = 17.65 \times 1.305 \left[\frac{29.48 + \frac{0.02}{13.6}}{71 + 460}\right] = 1.279 \text{ dcsf}$$

$$C_{DG} = \frac{2.110}{1.279} = \boxed{1.650}$$

C.M. 19-2 12/23/99 SH



METCO ENVIRONMENTAL

DIGITAL TEMPERATURE INDICATOR NO. 19-2

CALIBRATION DATA

Date: 12-13-99

Media	Time	Mercury Temperature (°F)	DTI (°F)
Ambient Air	1030	68	68
Ice Bath	1035	32	32
Boiling Water	1045	212	210
Oven	1050	252	249
Oven	1055	304	300
Oven	1100	355	352
Oven	1105	378	375

Meter Adjusted? Yes _____ No ✓

Calibrator: JASON BROWN #274

Checked By: John Pellegrino

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)

	Time	Meter Reading	Temp.	P_m
End	1310	5.015 cf	74 °F	-0.90 "H_2O
Start	1257	0.000 cf	74 °F	-0.90 "H_2O
Avg.	13	5.015 cf	74 °F	-0.900 "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	572.057 cf	77 °F	76 °F	0.50 "H_2O
Start	567.114 cf	76 °F	75 °F	0.50 "H_2O
Avg.	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	577.407 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	1326	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

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

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

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

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

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 @ 3.0" 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	1408	10.330	cf	74	°F	-2.90 "H_2O	608.602	cf	89	°F	79 °F	3.00 "H_2O
Start	1358	0.000	cf	74	°F	-2.90 "H_2O	598.364	cf	85	°F	78 °F	3.00 "H_2O
Avg.	10	10.330	cf	74	°F	-2.900 "H_2O	10.238	cf	83	°F	3.000	"H_2O

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

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

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

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 @ 4.0" H_2O

P_b: 29.32 "Hg

Control Module Vacuum: 3.00 "Hg

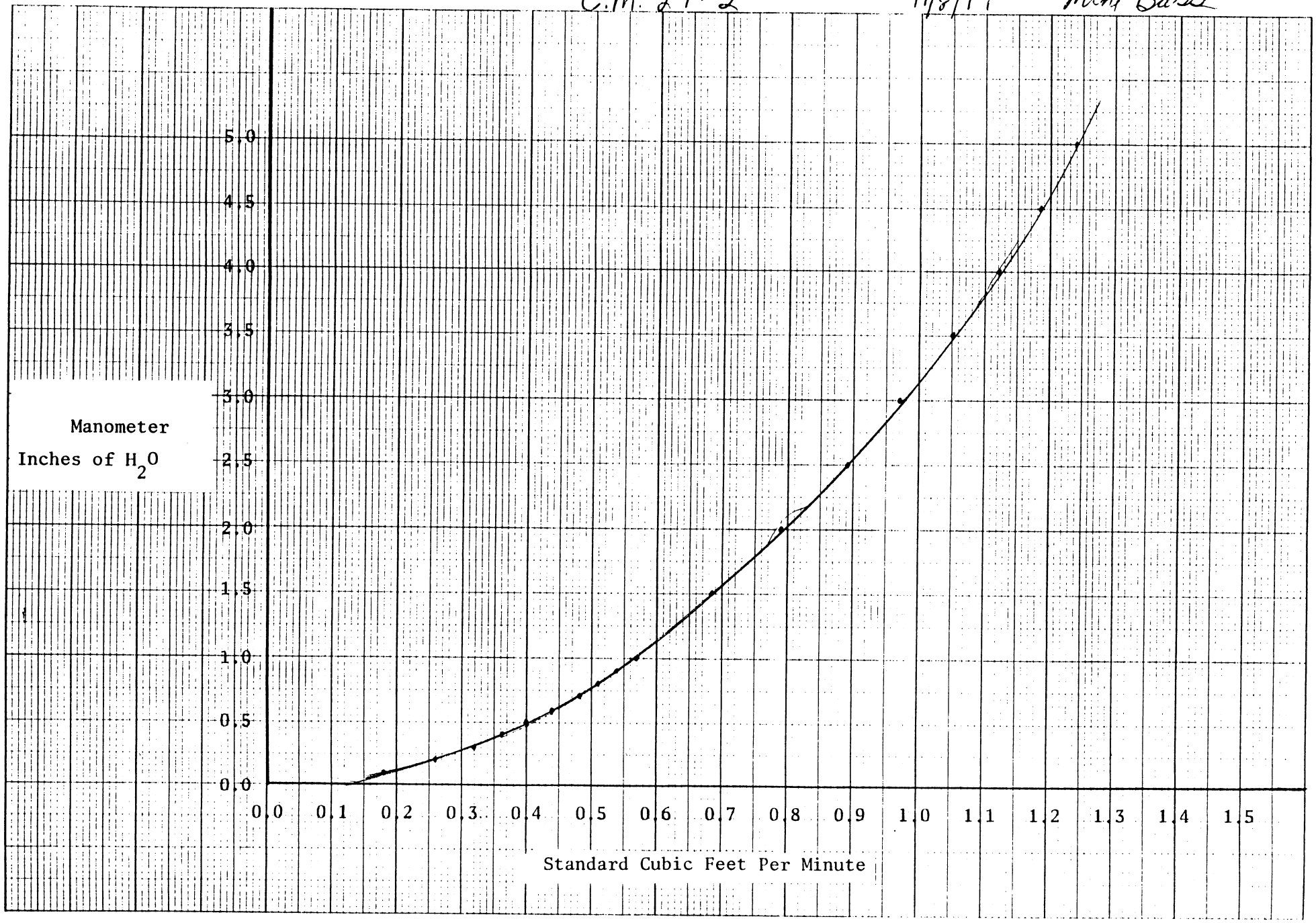
	Wet Test Meter (No. 3)				Dry Gas Meter			
	Time	Meter Reading	Temp.	P_m	Meter Reading	Temp. In	Temp. Out	P_m
End	1419	10.130 cf	74 °F	-3.70 "H_2O	619.031 cf	91 °F	80 °F	4.00 "H_2O
Start	1410	0.000 cf	74 °F	-3.70 "H_2O	608.926 cf	87 °F	79 °F	4.00 "H_2O
Avg.	9	10.130 cf ✓	74 °F ✓	-3.700 "H_2O ✓	10.105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

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.130 \left[\frac{29.32 + \frac{-3.700}{13.6}}{74 + 460}\right] \times 1000 \quad (C_f) = 9.726 \text{ dcsf} \checkmark$$

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

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

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

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 @ 1.00" H2O

P_b: 29.24 "Hg

Control Module Vacuum: 0.06 "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

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 @ 1.50 "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	1049	10,009 cf	69 °F	-16 "H_2O	755.874 cf	65 °F	71 °F	1.50 "H_2O
Start	1034	0.000 cf	69 °F	-16 "H_2O	745.977 cf	69 °F	71 °F	1.50 "H_2O
Avg.	15 ✓	10.009 ✓ cf	69 ✓ °F	-16 ✓ "H_2O	9.897 ✓ cf	69 ✓ °F	✓ 1.50 "H_2O	

$$\text{Wet Test Meter } Vm_{std} = 17.65 \times 10.009 \left[\frac{29.24 + \frac{-16}{13.6}}{69 + 460}\right] \times 1.000 \ (C_f) = 9.725 \checkmark \text{ dcsf}$$

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

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

METCO ENVIRONMENTAL

DRY GAS METER CALIBRATION

Meter Number: 29.1

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 @ 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)

	Time	Meter Reading	Temp.	P_m
End	1134	10.011 cf	69 °F	-3.0 "H_2O
Start	1124	0.000 cf	69 °F	-3.0 "H_2O
Avg.	10.05	10.0111 cf	69 ✓ °F	-3.0 ✓ "H_2O

Dry Gas Meter

	Meter Reading	Temp. In	Temp. Out	P_m
End	789.042 cf	69 °F	73 °F	3.0 "H_2O
Start	779.107 cf	66 °F	73 °F	3.0 "H_2O
Avg.	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

Calibrator: Jason Conway

Date: 11-21-99

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

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

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

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

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

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)

	Time	Meter Reading	Temp.	P_m
End	1637	2.229 cf	70 °F	-0.6 "H_2O
Start	1605	0.000 cf	70 °F	-0.6 "H_2O
Avg.	32 ✓	2.229 ✓ cf	70 ✓ °F	-0.6 ✓ "H_2O

Dry Gas Meter

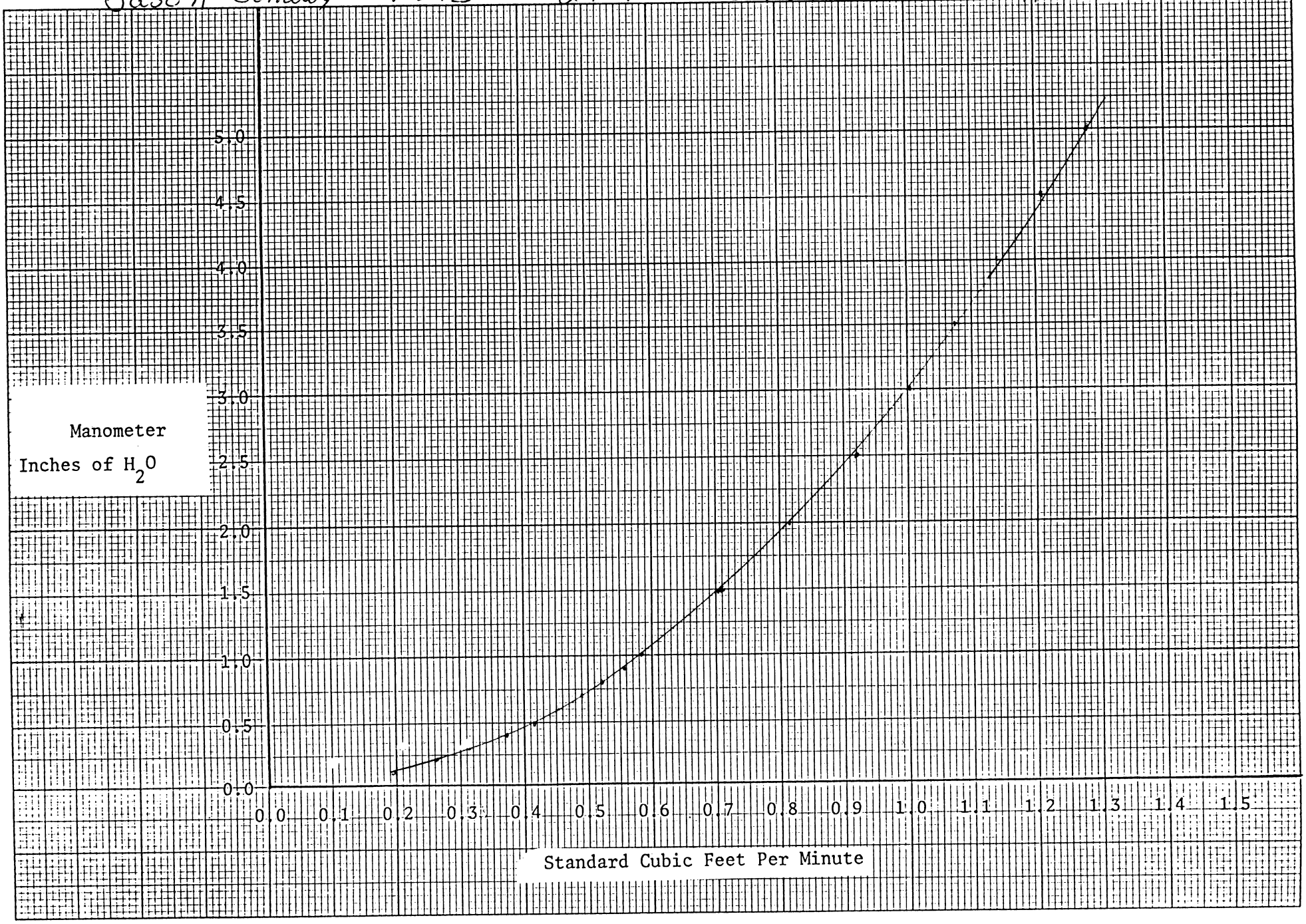
	Meter Reading	Temp. In	Temp. Out	P_m
End	873.468 cf	77 °F	72 °F	0.04 "H_2O
Start	871.246 cf	72 °F	72 °F	0.04 "H_2O
Avg.	2.222 ✓ cf	73 ✓ °F	✓ 0.04	"H_2O

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

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

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

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 Hall #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

99-95WCR6

TestAmerica
INCORPORATED

December 20, 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 Widows Creek Fossil Plant 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 30, 1999. All samples were intact when received. Please note the following:

- 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
QA Coordinator

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

TestAmerica
INCORPORATED

Sample ID: TVA
Widows Creek Fossil Plant
Stevenson, Alabama

Hg Analysis
Ontario Hydro Method

Summary Report

	Unit 6 Precipitator Inlet Duct A Run 1	Unit 6 Precipitator Inlet Duct A Run 2	Unit 6 Precipitator Inlet Duct A Run 3	Unit 6 Precipitator Outlet Duct A Run 1	Unit 6 Precipitator Outlet Duct A Run 2	Unit 6 Precipitator Outlet Duct A Run 3
Particle Bound Hg (ug)	5.58	4.79	4.66	0.152	0.021	0.012
Oxidized Hg (ug)	0.00	0.00	0.00	1.65	1.58	0.00
Elemental Hg (ug)	0.00	0.00	0.00	0.00	0.00	0.00
Total Hg (ug)	5.58	4.79	4.66	1.80	1.60	0.01

	Unit 6 Precipitator Inlet Duct A Blank Train	Unit 6 Precipitator Outlet Duct A 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)	---
Container # 12B (ug)	<0.01

Corrected Page - 1/18/00

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

TestAmerica
INCORPORATED

Sample ID: TVA
Widows Creek Fossil Plant
Stevenson, Alabama

Hg Analysis
Ontario Hydro Method

Duplicate Summary Report

	Unit 6 Precipitator Inlet Duct A Run 1	Unit 6 Precipitator Inlet Duct A Run 2	Unit 6 Precipitator Inlet Duct A Run 3	Unit 6 Precipitator Outlet Duct A Run 1	Unit 6 Precipitator Outlet Duct A Run 2	Unit 6 Precipitator Outlet Duct A Run 3
Particle Bound Hg (ug)	5.47	4.96	4.67	0.153	0.020	0.012
Oxidized Hg (ug)	0.00	0.00	0.00	1.72	1.60	0.00
Elemental Hg (ug)	0.00	0.00	0.00	0.00	0.00	0.00
Total Hg (ug)	5.47	4.96	4.67	1.87	1.62	0.01

	Unit 6 Precipitator Inlet Duct A Blank Train	Unit 6 Precipitator Outlet Duct A 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)	---
Container # 12B (ug)	<0.01

Corrected Page - 1/18/00

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Unit 6 Precipitator Inlet Duct A Run 1

Hg Analysis
Ontario Hydro Method

Collected On: 10/20/99
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	Q45	12/02/99	12/02/99	jpp	5.58	5.47	2	---	---	ug		
Container # 1B	Q69	12/02/99	12/02/99	jpp	<0.01	<0.01	0	---	---	ug		
Container # 2	2SV-3	11/30/99	11/30/99	jpp	<0.210	<0.210	0	<0.210	0	ug		
Container # 3	3SV-3	11/30/99	11/30/99	jpp	<1.48	<1.48	0	---	---	ug		
Container # 4	4SV-3	11/30/99	11/30/99	jpp	<0.78	<0.78	0	---	---	ug		
Container # 5	5SV-3	11/30/99	11/30/99	jpp	<1.0	<1.0	0	---	---	ug		

Particle Bound Hg (ug) **5.58**
(Containers 1A, 1B, and 2)

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

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

Total Hg (ug) **5.58**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **5.47**
(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) **5.47**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

Corrected Page - 1/18/00

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

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Unit 6 Precipitator Inlet Duct A Run 2

Hg Analysis
Ontario Hydro Method

Collected On: 10/20/99
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	Q46	12/02/99	12/02/99	jpp	4.79	4.96	3.6	---	---	ug		
Container # 1B	Q71	12/02/99	12/02/99	jpp	<0.01	<0.01	0	---	---	ug		
Container # 2	2SV-4	11/30/99	11/30/99	jpp	<0.192	<0.192	0	---	---	ug		
Container # 3	3SV-4	11/30/99	11/30/99	jpp	<1.44	<1.44	0	<1.44	0	ug		
Container # 4	4SV-4	11/30/99	11/30/99	jpp	<0.68	<0.68	0	---	---	ug		
Container # 5	5SV-4	11/30/99	11/30/99	jpp	<0.96	<0.96	0	---	---	ug		

Particle Bound Hg (ug) **4.79**
(Containers 1A, 1B, and 2)

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

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

Total Hg (ug) **4.79**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **4.96**
(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) **5.0**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

Corrected Page - 1/18/00

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

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Unit 6 Precipitator Inlet Duct A Run 3

Hg Analysis
Ontario Hydro Method

Collected On: 10/21/99
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	Q47	12/02/99	12/02/99	jpp	4.66	4.67	0	4.59	1.5	ug		
Container # 1B	Q73	12/02/99	12/02/99	jpp	<0.01	<0.01	0	---	---	ug		
Container # 2	2SV-5	11/30/99	11/30/99	jpp	<0.148	<0.148	0	---	---	ug		
Container # 3	3SV-5	11/30/99	11/30/99	jpp	<1.51	<1.51	0	---	---	ug		
Container # 4	4SV-5	11/30/99	11/30/99	jpp	<0.64	<0.64	0	---	---	ug		
Container # 5	5SV-5	11/30/99	11/30/99	jpp	<0.97	<0.97	0	---	---	ug		

Particle Bound Hg (ug) **4.66**
(Containers 1A, 1B, and 2)

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

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

Total Hg (ug) **4.66**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **4.67**
(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) **4.67**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

Corrected Page - 1/18/00

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

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Unit 6 Precipitator Outlet Duct A Run 1

Hg Analysis
Ontario Hydro Method

Collected On: 10/20/99
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	Q68	12/02/99	12/02/99	jpp	0.028	0.029	3.5	---	---	ug		
Container # 1B		Not Provided		jpp	---	---	---	---	---	ug		
Container # 2	2SV-6	11/30/99	11/30/99	jpp	0.124	0.124	0	---	---	ug		
Container # 3	3SV-6	11/30/99	11/30/99	jpp	1.65	1.72	4.4	---	---	ug		
Container # 4	4SV-6	11/30/99	11/30/99	jpp	<0.82	<0.82	0	---	---	ug		
Container # 5	5SV-6	11/30/99	11/30/99	jpp	<0.98	<0.98	0	---	---	ug		

Particle Bound Hg (ug) **0.152**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **1.65**
(Containers 3)

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

Total Hg (ug) **1.80**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **0.153**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **1.72**
(Containers 3)

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

Dup. Total Hg (ug) **1.87**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

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

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Unit 6 Precipitator Outlet Duct A Run 2

Hg Analysis
Ontario Hydro Method

Collected On: 10/20/99
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	Q70	12/02/99	12/02/99	jpp	0.021	0.020	2.0	---	---	ug		
Container # 1B		Not Provided		jpp	---	---	---	---	---	ug		
Container # 2	2SV-7	11/30/99	11/30/99	jpp	<0.082	<0.082	0	---	---	ug		
Container # 3	3SV-7	11/30/99	11/30/99	jpp	1.58	1.60	1.3	---	---	ug		
Container # 4	4SV-7	11/30/99	11/30/99	jpp	<0.74	<0.74	0	---	---	ug		
Container # 5	5SV-7	11/30/99	11/30/99	jpp	<0.94	<0.94	0	---	---	ug		

Particle Bound Hg (ug) **0.021**
(Containers 1A, 1B, and 2)

Oxidized Hg (ug) **1.58**
(Containers 3)

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

Total Hg (ug) **1.60**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **0.020**
(Containers 1A, 1B, and 2)

Dup. Oxidized Hg (ug) **1.60**
(Containers 3)

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

Dup. Total Hg (ug) **1.62**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

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

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Unit 6 Precipitator Outlet Duct A Run 3

Hg Analysis
Ontario Hydro Method

Collected On: 10/21/99
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	Q72	12/02/99	12/02/99	jpp	0.012	0.012	1.3	---	---	ug		
Container # 1B		Not Provided		jpp	---	---	---	---	---	ug		
Container # 2	2SV-8	11/30/99	11/30/99	jpp	<0.180	<0.180	0	---	---	ug		
Container # 3	3SV-8	11/30/99	11/30/99	jpp	<1.60	<1.60	0	---	---	ug		
Container # 4	4SV-8	11/30/99	11/30/99	jpp	<0.68	<0.68	0	---	---	ug		
Container # 5	5SV-8	11/30/99	11/30/99	jpp	<0.96	<0.96	0	---	---	ug		

Particle Bound Hg (ug) **0.012**
(Containers 1A, 1B, and 2)

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

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

Total Hg (ug) **0.01**
(Containers 1A, 1B, 2, 3, 4, and 5)

Dup. Part. Bound Hg (ug) **0.012**
(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) **0.01**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

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

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Unit 6 Precipitator Inlet Duct A Blank Train

Hg Analysis
Ontario Hydro Method

Collected On: 10/21/99
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	3SV-1	11/30/99	11/30/99	jpp	<0.93	<0.93	0	---	---	ug		
Container # 4	4SV-1	11/30/99	11/30/99	jpp	<0.60	<0.60	0	<0.60	0	ug		
Container # 5	5SV-1	11/30/99	11/30/99	jpp	<0.99	<0.99	0	<0.99	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) **0.0**
(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) **0.0**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

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

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Unit 6 Precipitator Outlet Duct A Blank Train

Hg Analysis
Ontario Hydro Method

Collected On: 10/21/99
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	3SV-2	11/30/99	11/30/99	jpp	<0.91	<0.91	0	---	---	ug		
Container # 4	4SV-2	11/30/99	11/30/99	jpp	<0.62	<0.62	0	---	---	ug		
Container # 5	5SV-2	11/30/99	11/30/99	jpp	<1.01	<1.01	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) **0.0**
(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) **0.0**
(Containers 1A, 1B, 2, 3, 4, and 5)

Notes:

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

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Reagent Blanks

Hg Analysis
Ontario Hydro Method

Collected On:
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	RBSV-7	---	11/30/99	jpp	<0.2	<0.2	0	---	---	ug/L		
Container # 8	RBSV-8	11/30/99	11/30/99	jpp	<2.0	<2.0	0	---	---	ug/L		
Container # 9	RBSV-9	11/30/99	11/30/99	jpp	<4.0	<4.0	0	---	---	ug/L		
Container # 10	RBSV-10	11/30/99	11/30/99	jpp	<2.0	<2.0	0	---	---	ug/L		
Container # 11	RBSV-11	---	11/30/99	jpp	<0.2	<0.2	0	---	---	ug/L		
Container # 12A	Q48	---	---	jpp	---	---	---	---	---	ug	*1	
Container # 12B	Q76	12/02/99	12/02/99	jpp	<0.01	<0.01	0	<0.01	0	ug		

Notes: *1 It was not neceassy to analyze a thimble blank as only the particulate matter was digested.

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

Mercury Sample Train Receipt Records

Mercury Sample Train Receipt Record

Client ID
EPRI - UNIT #6
WIDOWS CRK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
UNIT #6 PRECIP.
INLET DUCT

BLANK TRAIN

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☐ 2 ( )	___ + ___ + ___ = ___.		
☒ 3 (1)	464 + – + – = 464.	3SV-1	
☒ 4 (1)	152 + – + – = 152.	4SV-1	
☒ 5 (1)	496 + – + – = 496.	5SV-1	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

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

Notes: _____

Checked By: SGS
Date: 11-22-99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
EPRI - UNIT #6
WIDOWS CRK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
UNIT #6 PRECIP.
OUTLET DUCT

BLANK TRAIN

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☐ 2 ( )	___ + ___ + ___ = ___.		
☒ 3 (1)	453 + – + – = 453.	3SV-2	
☒ 4 (1)	155 + – + – = 155.	4SV-2	
☒ 5 (1)	505 + – + – = 505.	5SV-2	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

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

Notes:

Checked By: SGS
Date: 11-22-99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
EPRI - UNIT #6
WIDOWS CRK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
UNIT #6 PRECIP.
INLET DUCT
RUN #1

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☒ 2 (1)	104 + — + — = 104.	2 SV-3	
☒ 3 (2)	489 + 253 + — = 742.	3 SV-3 A+B	
☒ 4 (1)	193 + — + — = 193.	4 SV-3	
☒ 5 (1)	501 + — + — = 501.	5 SV-3	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			
☐ 1B ( )			
☒ 12A (1) THIMBLE	Q45		
☒ 12B (1) FILTER	Q69		

5th 2120

Notes:

Checked By: SGS

Date: 11-22-99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
EPRI - UNIT #6
WIDOWS CRK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
UNIT 6 PRECIP.
INLET DUCT

RUN #2

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☒ 2 (1)	96 + – + – = 96.	2 SV-4	
☒ 3 (2)	471 + 248 + – = 719.	3 SV-4 A+B	
☒ 4 (1)	170 + – + – = 170.	4 SV-4	
☒ 5 (1)	480 + – + – = 480.	5 SV-4	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			
☐ 1B ( )			
☒ 12A (1) THIMBLE	Q46		
☒ 12B (1) FILTER	Q71		

Std 1+2

Notes:

Checked By: SGS

Date: 11-22-99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
EPRI - UNIT #6
WIDOWS CRK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
UNIT 6 - PRECIP.
INLET DUCT
RUN #3

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☒ 2 (1)	74 + — + — = 74.	2 SV - 5	
☒ 3 (2)	421 + 334 + — = 755.	3 SV - 5 A+B	
☒ 4 (1)	157 + — + — = 157.	4 SV - 5	
☒ 5 (1)	484 + — + — = 484.	5 SV - 5	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			
☐ 1B ( )			
☒ 12A (1) THIMBLE	Q47		
☒ 12B (1) FILTER	Q73		

JAP 12/20

Notes:

Checked By: SGS
Date: 11-22-99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
EPRI - UNIT #6
WIDOWS CRK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
UNIT 6 PRECIP
OUTLET DUCT
RUN #1

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☒ 2 (1)	62 + – + – = 62.	2 SV-6	
☒ 3 (2)	475 + 203 + – = 678.	3 SV-6A+B	
☒ 4 (1)	204 + – + – = 204.	4 SV-6	
☒ 5 (1)	491 + – + – = 491.	5 SV-6	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			
☐ 1B ( )			
☐ 12A ( )			
☒ 12B (1) FILTER	Q68		

JPB 12/20

Notes:

Checked By: SGS
Date: 11-22-99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
EPRI - UNIT # 6
WIDOWS CRK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
UNIT 6 PRECIP.
OUTLET DUCT

RUN # 2

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☒ 2 (1)	41 + — + — = 41.	7 SV-7	
☒ 3 (2)	450 + 230 + — = 680.	3 SV-7A+B	
☒ 4 (1)	184 + — + — = 184.	4 SV-7	
☒ 5 (1)	470 + — + — = 470.	5 SV-7	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			
☐ 1B ( )			
☐ 12A ( )			
☒ 12B (1) FILTER	Q70		

Notes:

Checked By: SGS
Date: 11-22-99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
EPRI - UNIT # 6
WIDOWS CREK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
UNIT 6 - PRECIP.
OUTLET DUCT
RUN # 3

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☒ 2 (1)	90 + — + — = 90.	2SV-8	
☒ 3 (2)	479 + 322 + — = 801.	3SV-8A+B	
☒ 4 (1)	170 + — + — = 170.	4SV-8	
☒ 5 (1)	478 + — + — = 478.	5SV-8	
☐ 7 ( )	___ + ___ + ___ = ___.		
☐ 8 ( )	___ + ___ + ___ = ___.		
☐ 9 ( )	___ + ___ + ___ = ___.		
☐ 10 ( )	___ + ___ + ___ = ___.		
☐ 11 ( )	___ + ___ + ___ = ___.		

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			
☐ 1B ( )			
☐ 12A ( )			
☒ 12B (1) FILTER	Q72		

Notes:

Checked By: SGS
Date: 11-22-99

TestAmerica

Mercury Sample Train Receipt Record

Client ID
EPRI – UNIT #6
WIDOWS CRK FOSSIL PLANT
STEVENSON, AL

Location ID/Run #
REAGENT BLANKS
UNIT #6 PRECIP. INLET DUCT

Solutions:

Cont. ID/(#)	Volumes (mL)	TestAmerica ID(s)	Comments
☐ 2 ( )	___ + ___ + ___ = ___.		
☐ 3 ( )	___ + ___ + ___ = ___.		
☐ 4 ( )	___ + ___ + ___ = ___.		
☐ 5 ( )	___ + ___ + ___ = ___.		
☒ 7 (1)	50 + – + – = 50.	RBSV-7	
☒ 8 (1)	51 + – + – = 51.	RBSV-8	
☒ 9 (1)	50 + – + – = 50.	RBSV-9	
☒ 10 (1)	51 + – + – = 51.	RBSV-10	
☒ 11 (1)	93 + – + – = 93.	RBSV-11	

Filters:

Cont. ID/(#)	Filter ID(s)		
☐ 1A ( )			
☐ 1B ( )			
☒ 12A (3) THIMBLES	Q48, Q49, Q50		
☒ 12B (3) FILTERS	Q76, Q77, Q78		

Notes:

Checked By: SGS
Date: 11-22-99

TestAmerica

Sample Preparation Batch Sheets

METCO STEVENSON, AL FILTERS

NONAQUEOUS MERCURY BATCH SHEET

Analyst: DRP Date: 12/2/99 Water Bath: start mid end

Standard Reference: 65-41-17 temp: _____

ICV Reference: 65-41-18 date: _____

		Sample # / Client	Weight	MS	MSD
	12	BLANK			
	11	NIST 1633b	0.5713	87.52	
TRP	10	Q76 (Blank)			MB
SPK	9	Q45 (thimble)	0.5518	90.61	
~~SPK~~	8	Q69			
	7	Q46 (thimble)	0.5079	98.44	
	6	Q71			ICV
TRP	5	Q47 (thimble)	0.5265	94.97	
	4	Q73			
SPK	3	Q68			
ab cw	2	Q70			MS
	1	Q72			
					MSD
					RPD
					FLAG

HNO3 65-42-20
HCl 65-41-12
HF 65-27-17
Boric Acid 65-43-3
$SnCl_2$ - 65-43-4

SECONDARY DATA CHECK: analyst:
date:

Comments: 1633b - Coal Flyash

AQUEOUS MERCURY BATCH SHEET

analyst: SGS/DPP date: 11/30/95 WATER BATH: start mid end

temp:

standard reference #: 65-41-17

time:

icv reference #: 65-41-18

sample # / client	prep info
BLANK OR SPIKE IF NEEDED	5mL
~~MS~~	
~~MSD~~	
SSV-1 TRP 495mL	
SSV-2 SPK 505mL	
SSV-3 500mL	
SSV-4 480mL	
SSV-5 485mL	
SSV-6 490mL	
SSV-7 470mL	
SSV-8 480mL	
RBSV-10 51mL	

MB	ICV

MS	MSD

RPD	FLAG

SECONDARY DATA CHECK:

ANALYST:

DATE:

comments: HYDROXYLAMINE ~~SULFATE~~ HCl = 65-30-11
$SnCl_2$ - 65-41-16
$Mg(ClO_4)_2$ 65-32-13

AQUEOUS MERCURY BATCH SHEET

analyst: SGS/DRP date: 11/30/99 WATER BATH: start mid end

temp: _____

standard reference #: 65-41-17

time: _____

icv reference #: 65-41-18

sample # / client	prep info
BLANK	2.5mL
~~MS~~	
~~MSD~~	
4SV-1 TRP 150mL	
4SV-2 SPK 155mL	
4SV-3 195mL	
4SV-4 170mL ~~480mL~~	
4SV-5 160mL	
4SV-6 205mL	
4SV-7 185mL	
4SV-8 170mL	
ICBSV-9 50mL	

MB	ICV

MS	MSD

RPD	FLAG

SECONDARY DATA CHECK:

ANALYST:

DATE:

comments: HCl = 65-34-4 / $KMnO_4$ = 65-39-19 / HYDROXYLAMINE HCl = 65-41-3

$SnCl_2$ - 65-41-16

AQUEOUS MERCURY BATCH SHEET

analyst: SGS/ [illegible] date: 11/30/97 WATER BATH: start mid end

temp: _____

standard reference #: 65-41-17

time: _____

icv reference #: 65-41-18

sample # / client	prep info
BLANK	5mL
~~MS~~	
~~MSD~~	
2SV-3 TRP 105mL	
2SV-4 SPK 96mL	
2SV-5 74mL	
2SV-6 62mL	
2SV-7 41mL	
2SV-8 90mL	
3SV-1 465mL	
3SV-2 455mL	
3SV-3 A+B 740mL	
3SV-4 A+B TRP 720mL	
3SV-5 A+B SPK ~~[illegible]~~	755mL
3SV-6 A+B 680mL	
3SV-7 A+B 680mL	
3SV-8 A+B 900mL	
RBSV-8 51mL	

MB	ICV

MS	MSD

RPD	FLAG

SECONDARY DATA CHECK:

ANALYST:

DATE:

comments: H_2SO_4 = 65-38-9 / HNO_3 = 65-41-8 / 5% $KMnO_4$ = 65-39-19

$K_2S_2O_8$ = ~~[illegible]~~ 65-34-5

$SnCl_2$ - 65-41-16

11/30/99 Analytical Run

```
Protocol: SYSTEST
                        Rev: 3.001   Time: 16:23:18  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

AUTOSAMPLER:  Rack entry   Rack 113099A
Cup Id          Extended id          Weight Volume Macro check Help
 1 icb                               1.0000 1.0000
 2 5sv1                              1.0000 1.0000
 3 5sv 1 dup                         1.0000 1.0000
 4 5sv 1 trp                         1.0000 1.0000
 5 5sv 2                             1.0000 1.0000
 6 5sv 2 dup                         1.0000 1.0000
 7 5sv 2 sok                         1.0000 1.0000
 8 5sv 3                             1.0000 1.0000
 9 5sv 3 dup                         1.0000 1.0000
10 5sv 4                             1.0000 1.0000
11 5sv 4 dup                         1.0000 1.0000
12 5sv 5                             1.0000 1.0000
13 5sv 5 dup                         1.0000 1.0000
14 5sv 6                             1.0000 1.0000
15 5sv 6 dup                         1.0000 1.0000
                                                                                PgDn

Cup 1  ID: icb                                   Call entry, Ins to switch
                                                                   149 @  12
```

```
Protocol: SYSTEST
                        Rev: 3.001   Time: 16:23:24  30 Nov 1999
Folder: NOV99C          Seq: 173                    Print: On
User:                   Batch:              Id: Std6Repl   Cup: 1 19 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 5sv 7                             1.0000 1.0000
17 5sv 7 dup                         1.0000 1.0000
18 5sv 8                             1.0000 1.0000
19 5sv 8 dup                         1.0000 1.0000
20 rosv 10                           1.0000 1.0000
21 rosv 10 du                        1.0000 1.0000
22 ccb                               1.0000 1.0000
23 ccv                               1.0000 1.0000
24 4sv 1                             1.0000 1.0000
25 4sv 1 dup                         1.0000 1.0000
26 4sv 1 trp                         1.0000 1.0000
27 4sv 2                             1.0000 1.0000
28 4sv 2 dup                         1.0000 1.0000
29 4sv 2 spk                         1.0000 1.0000
30 4sv 3                             1.0000 1.0000
                                                                                PgDn

Cup 16 ID: 5sv 7                                   Cell entry, Ins to switch
                                                                   149 9  12
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 16:23:28  30 Nov 1999
Folder: NOV99C      Seq: 173                    Print: On
User:               Batch:            Id: StdGReol   Cup: 1 19 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
31 4sv 3 dup                         1.0000 1.0000
32 4sv 4                             1.0000 1.0000
33 4sv 4 dup                         1.0000 1.0000
34 4sv 5                             1.0000 1.0000
35 4sv 5 dup                         1.0000 1.0000
36 4sv 6                             1.0000 1.0000
37 4sv 6 dup                         1.0000 1.0000
38 4sv 7                             1.0000 1.0000
39 4sv 7 dup                         1.0000 1.0000
40 4sv 8                             1.0000 1.0000
41 4sv 8 dup                         1.0000 1.0000
42 rbsv 9                            1.0000 1.0000
43 rbsv 9 dup                        1.0000 1.0000
44 ccb                               1.0000 1.0000
                                                                           PgDn
```

```
Cup 31 ID: 4sv 3 dup                          Cell entry, Ins to switch
                                                                149 9  1Z
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 18:14:06  30 Nov 1999
Folder: NOV99C      Seq: 218                    Print: On
User:               Batch:            Id: ccb       Cup: 1 44 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 ccv                               1.00000 1.00000
 2 blk                               1.00000 1.00000
 3 blk dup                           1.00000 1.00000
 4 2sv 3                             1.00000 1.00000
 5 2sv 3 dup                         1.00000 1.00000
 6 2sv 3 trp                         1.00000 1.00000
 7 2sv 4                             1.00000 1.00000
 8 2sv 4 dup                         1.00000 1.00000
 9 2sv 4 spk                         1.00000 1.00000
10 2sv 5                             1.00000 1.00000
11 2sv 5 dup                         1.00000 1.00000
12 2sv 6                             1.00000 1.00000
13 2sv 6 dup                         1.00000 1.00000
14 2sv 7                             1.00000 1.00000
15 2sv 7 dup                         1.00000 1.00000
                                                                    PgDn

Cup 1  ID: ccv                          Cell entry, Ins to switch
                                                          129 9  12
```

```
Protocol: SYSTEST
                        Rev: 3.001   Time: 18:15:41  30 Nov 1999
Folder: NOV99C          Seq: 218                     Print: On
User:                   Batch:            Id: ccb        Cup: 1 44 Gas:    0.22 LPM
State: Idle                                              Xmit: Off Autosampler: On
```

```
AUTOSAMPLER:  Rack entry   Rack 113099a                                        PgUp
Cup Id          Extended id          Weight Volume Macro check Help
16 2sv 8                             1.00000 1.00000
17 2sv 8 dup                         1.00000 1.00000
18 3sv 1                             1.00000 1.00000
19 3sv 1 dup                         1.00000 1.00000
20 3sv 2                             1.00000 1.00000
21 3sv 2 dup                         1.00000 1.00000
22 3sv 3                             1.00000 1.00000
23 3sv 3 dup                         1.00000 1.00000
24 ccb                               1.00000 1.00000
25 ccv                               1.00000 1.00000
26 3sv 4                             1.00000 1.00000
27 3sv 4 dup                         1.00000 1.00000
28 3sv 4 trp                         1.00000 1.00000
29 3sv 5                             1.00000 1.00000
30 3sv 5 dup                         1.00000 1.00000
                                                                               PgDn
```

```
Cup 16 ID: 2sv 8                          Dell entry, Ins to switch
                                                          129 9  12
```

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 18:15:44  30 Nov 1999
Folder: NOV99C      Seq: 218                     Print: On
User:               Batch:            Id: ccb        Cup: 1 44 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
31 3sv 5 spk                         1.0000 1.0000
32 3sv 6                             1.0000 1.0000
33 3sv 6 dup                         1.0000 1.0000
34 3sv 7                             1.0000 1.0000
35 3sv 7 dup                         1.0000 1.0000
36 3sv 8                             1.0000 1.0000
37 3sv 8 dup                         1.0000 1.0000
38 rosv 8                            1.0000 1.0000
39 rosv 8 dup                        1.0000 1.0000
40 ccb                               1.0000 1.0000
41 ccv                               1.0000 1.0000
42                                   1.0000 1.0000
43                                   1.0000 1.0000
44                                   1.0000 1.0000
                                                                           PgDn
```

```
Cup 31 ID: 3sv 5 spk                          Call entry, Ins to switch
                                                          129 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                               1.0000 1.0000
 2 ccv                               1.0000 1.0000
 3 gb 1                              1.0000 1.0000
 4 gb 1 dup                          1.0000 1.0000
 5 gb 1 trp                          1.0000 1.0000
 6 gb 4                              1.0000 1.0000
 7 gb 4 dup                          1.0000 1.0000
 8 gb 4 spk                          1.0000 1.0000
 9 gb 7                              1.0000 1.0000
10 gb 7 dup                          1.0000 1.0000
11 gb 14a                            1.0000 1.0000
12 gb 14a dup                        1.0000 1.0000
13 rbsv 7                            1.0000 1.0000
14 rbsv 7 dup                        1.0000 1.0000
15 rbsv 11                           1.0000 1.0000
                                                                          PgDn

Cup 1  ID: ccb                                  Cell entry, Ins to switch
                                                              Col 9  12
```

```
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                      1.0000 1.0000
17 ccb                             1.0000 1.0000
18 ccv                             1.0000 1.0000
19                                 1.0000 1.0000
20                                 1.0000 1.0000
21                                 1.0000 1.0000
22                                 1.0000 1.0000
23                                 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: rosv 11 cu                          Call entry, Ins to switch
                                                              201 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 19157
Ave. Int. = 19157 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: 8.23 LPM

State: Idle Xmit: Off Autosampler: On

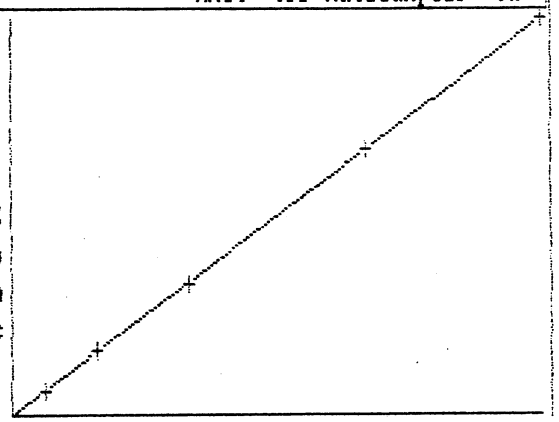
CALIBRATION: Line Calibration

Line: Hg

	Conc.	Calc.	Dev.	Accepted LiNear	
S1	.000	-.005	-.005	Quadratic	
S2	.200	.205	.005	WtdLinear	
S3	.500	.496	-.004		C
S4	1.00	1.00	.004	Accept	o
S5	2.00	2.01	.006		n
S6	3.00	2.99	-.005	StdAdd	c

A .0000000 r .999989

B 2.54956e-5 C 6.52902e-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

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

*** Check Standard: 2 Ck2 Seq: 173 16:24:59 30 Nov 1999 HG

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

*** Sample ID: icb Seq: 174 16:29:39 30 Nov 1999 HG

Hg -.005 ug/L .000 -.005 <0.2ug/L

*** Sample ID: Sev1 Seq: 175 16:31:56 30 Nov 1999 HG

Hg .000 ug/L .000 .000 <0.99ug

*** Sample ID: Sev 1 dup Seq: 176 16:34:13 30 Nov 1999 HG RPD NA

Hg -.001 ug/L .000 -.001 <0.99ug

*** Sample ID: Sev 1 trp Seq: 177 16:36:30 30 Nov 1999 HG

Hg -.002 ug/L .000 -.002 <0.99ug

*** Sample ID: Sev 2 Seq: 178 16:38:47 30 Nov 1999 HG

Hg -.001 ug/L .000 -.001 <1.0ug

*** Sample ID: Sev 2 dup Seq: 179 16:41:04 30 Nov 1999 HG RPD NA

Hg -.001 ug/L .000 -.001 <1.0ug

*** Sample ID: Sev 2 spk Seq: 180 16:43:21 30 Nov 1999 HG

Hg .970 ug/L .000 .970 +V=1.0 97%

*** Sample ID: Sev 3 Seq: 181 16:45:40 30 Nov 1999 HG

Hg -.001 ug/L .000 -.001 <1.0ug

*** Sample ID: Sev 3 dup Seq: 182 16:47:58 30 Nov 1999 HG RPD NA

Hg .010 ug/L .000 .010 <1.0ug

*** Sample ID: Sev 4 Seq: 183 16:50:16 30 Nov 1999 HG

Hg .014 ug/L .000 .014 <0.96ug

*** Sample ID: Sev 4 dup Seq: 184 16:52:34 30 Nov 1999 HG RPD NA

Hg .016 ug/L .000 .017 <0.96ug

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: 5sv 5					Seq: 185	16:54:51 30 Nov 1999 HG		
Hg	.007	ug/L	.000	.007			<0.97µg	
*** Sample ID: 5sv 5 dup					Seq: 186	16:57:07 30 Nov 1999 HG	RPD NA	
Hg	.005	ug/L	.000	.005			<0.97µg	
*** Sample ID: 5sv 6					Seq: 187	16:59:23 30 Nov 1999 HG		
Hg	.033	ug/L	.000	.033			< 0.98µg	
*** Sample ID: 5sv 6 dup					Seq: 188	17:01:40 30 Nov 1999 HG	RPD-NA	
Hg	.031	ug/L	.000	.031			<0.98µg	
*** Sample ID: 5sv 7					Seq: 189	17:03:57 30 Nov 1999 HG		
Hg	.040	ug/L	.000	.040			< 0.94µg	
*** Sample ID: 5sv 7 dup					Seq: 190	17:06:14 30 Nov 1999 HG	RPD NA	
Hg	.040	ug/L	.000	.040			<0.94µg	
*** Sample ID: 5sv 8					Seq: 191	17:08:31 30 Nov 1999 HG		
Hg	.047	ug/L	.000	.047			<0.96µg	
*** Sample ID: 5sv 8 dup					Seq: 192	17:10:48 30 Nov 1999 HG	RPD NA	
Hg	.047	ug/L	.000	.047			<0.96µg	
*** Sample ID: rbsv 10					Seq: 193	17:13:06 30 Nov 1999 HG		
Hg	-.001	ug/L	.000	-.001			<2.0µg/L	
*** Sample ID: rbsv 10 du					Seq: 194	17:15:24 30 Nov 1999 HG	RPD NA	
Hg	-.002	ug/L	.000	-.002			<2.0µg/L	
*** Sample ID: ccb					Seq: 195	17:17:42 30 Nov 1999 HG		
Hg	-.003	ug/L	.000	-.003			<0.2µg/L	
*** Sample ID: ccv					Seq: 196	17:20:00 30 Nov 1999 HG		
Hg	1.94	ug/L	.000	1.94	TV=2.0		97%	

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: 4sv 1					Seq: 197	17:22:28 30 Nov 1999 HG		
Hg	-.001	ug/L	.000	-.001			<0.60µg	
*** Sample ID: 4sv 1 dup					Seq: 198	17:24:46 30 Nov 1999 HG	RPD-NA	
Hg	.004	ug/L	.000	.004			<0.60µg	
*** Sample ID: 4sv 1 trp					Seq: 199	17:27:04 30 Nov 1999 HG	RPD-NA	
Hg	.002	ug/L	.000	.002			<0.60µg	
*** Sample ID: 4sv 2					Seq: 200	17:29:22 30 Nov 1999 HG		
Hg	.003	ug/L	.000	.003			<0.62µg	
*** Sample ID: 4sv 2 dup					Seq: 201	17:31:40 30 Nov 1999 HG	RPD-NA	
Hg	.002	ug/L	.000	.002			<0.62µg	
*** Sample ID: 4sv 2 spk					Seq: 202	17:33:58 30 Nov 1999 HG		
Hg	.941	ug/L	.000	.941		TV=1.0	94%	
*** Sample ID: 4sv 3					Seq: 203	17:36:27 30 Nov 1999 HG		
Hg	.002	ug/L	.000	.002			<0.78µg	
*** Sample ID: 4sv 3 dup					Seq: 204	17:38:46 30 Nov 1999 HG	RPD-NA	
Hg	.008	ug/L	.000	.008			<0.78µg	
*** Sample ID: 4sv 4					Seq: 205	17:41:05 30 Nov 1999 HG		
Hg	.007	ug/L	.000	.007		<0.68µg	~~<1.92µg~~ DDP 12/13 kg	
*** Sample ID: 4sv 4 dup					Seq: 206	17:43:24 30 Nov 1999 HG	RPD-NA	
Hg	.006	ug/L	.000	.006		<0.68µg	~~<1.92µg~~ DDP 12/13 kg	
*** Sample ID: 4sv 5					Seq: 207	17:45:44 30 Nov 1999 HG		
Hg	.009	ug/L	.000	.009			<0.64µg	
*** Sample ID: 4sv 5 dup					Seq: 208	17:48:04 30 Nov 1999 HG	RPD-NA	
Hg	.005	ug/L	.000	.005			<0.64µg	

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: 4sv 6					Seq: 209	17:50:24 30 Nov 1999 HG		
Hg	.010	ug/L	.000	.010			<0.82µg	
*** Sample ID: 4sv 6 dup					Seq: 210	17:52:44 30 Nov 1999 HG	RPD-NA	
Hg	.011	ug/L	.000	.011			<0.82µg	
*** Sample ID: 4sv 7					Seq: 211	17:55:04 30 Nov 1999 HG		
Hg	.009	ug/L	.000	.009			<0.74µg	
*** Sample ID: 4sv 7 dup					Seq: 212	17:57:24 30 Nov 1999 HG	RPD-NA	
Hg	.015	ug/L	.000	.015			<0.74µg	
*** Sample ID: 4sv 8					Seq: 213	17:59:44 30 Nov 1999 HG		
Hg	.013	ug/L	.000	.013			<0.68µg	
*** Sample ID: 4sv 8 dup					Seq: 214	18:02:04 30 Nov 1999 HG	RPD-NA	
Hg	.015	ug/L	.000	.015			<0.68µg	
*** Sample ID: rosv 9					Seq: 215	18:04:24 30 Nov 1999 HG		
Hg	.010	ug/L	.000	.010			<4.0µg/L	
*** Sample ID: rosv 9 dup					Seq: 216	18:06:44 30 Nov 1999 HG		
Hg	.003	ug/L	.000	.003			<4.0µg/L	
*** Sample ID: ccb					Seq: 217	18:09:05 30 Nov 1999 HG		
Hg	-.007	ug/L	.000	-.007			<0.2µg/L	

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

*** Check Standard: 2 Ck2 Seq: 218 18:17:13 30 Nov 1999 HG

Line	Flag	%Rcv.	Found	True	Units	SD/RSD
Hg		103.	.621	.604	ug/L	.000

*** Sample ID: ccv Seq: 219 18:19:33 30 Nov 1999 HG

Hg 1.93 ug/L .000 1.93 TV=2.0 97%

*** Sample ID: blk Seq: 220 18:22:01 30 Nov 1999 HG

Hg .002 ug/L .000 .002 <0.2µg/L

*** Sample ID: blk dup Seq: 221 18:24:17 30 Nov 1999 HG

Hg .008 ug/L .000 .008 <0.2µg/L

*** Sample ID: 2sv 3 Seq: 222 18:26:34 30 Nov 1999 HG

Hg .125 ug/L .000 .125 <0.21µg

*** Sample ID: 2sv 3 dup Seq: 223 18:29:50 30 Nov 1999 HG RPD-NA

Hg .124 ug/L .000 .124 <0.21µg

*** Sample ID: 2sv 3 trp Seq: 224 18:31:07 30 Nov 1999 HG RPD-NA

Hg .125 ug/L .000 .125 <0.21µg

*** Sample ID: 2sv 4 Seq: 225 18:33:24 30 Nov 1999 HG

Hg .048 ug/L .000 .048 <0.192µg

*** Sample ID: 2sv 4 dup Seq: 226 18:35:41 30 Nov 1999 HG RPD-NA

Hg .049 ug/L .000 .049 <0.192µg

*** Sample ID: 2sv 4 spk Seq: 227 18:37:58 30 Nov 1999 HG

Hg 1.06 ug/L .000 1.06 TV=1.0 106%

*** Sample ID: 2sv 5 Seq: 228 18:40:18 30 Nov 1999 HG

Hg .063 ug/L .000 .063 <0.148µg

*** Sample ID: 2sv 5 dup Seq: 229 18:42:36 30 Nov 1999 HG RPD-NA

Hg .072 ug/L .000 .072 <0.148µg

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: Isv 6					Seq: 230	18:44:53 30 Nov 1999 HG		
Hg	.007	ug/L	.000	.007			<0.124µg	
*** Sample ID: Isv 6 dup					Seq: 231	18:47:09 30 Nov 1999 HG RPD-NA		
Hg	.009	ug/L	.000	.009			<0.124µg	
*** Sample ID: Isv 7					Seq: 232	18:49:25 30 Nov 1999 HG		
Hg	.008	ug/L	.000	.008			<0.082µg	
*** Sample ID: Isv 7 dup					Seq: 233	18:51:42 30 Nov 1999 HG RPD-NA		
Hg	.008	ug/L	.000	.008			<0.082µg	
*** Sample ID: Isv 8					Seq: 234	18:53:59 30 Nov 1999 HG		
Hg	.009	ug/L	.000	.009			<0.180µg	
*** Sample ID: Isv 8 dup					Seq: 235	18:56:16 30 Nov 1999 HG RPD-NA		
Hg	.008	ug/L	.000	.008			<0.180µg	
*** Sample ID: Isv 1					Seq: 236	18:58:33 30 Nov 1999 HG		
Hg	.009	ug/L	.000	.009			<0.93µg	
*** Sample ID: Isv 1 dup					Seq: 237	19:00:51 30 Nov 1999 HG RPD-NA		
Hg	.007	ug/L	.000	.007			<0.93µg	
*** Sample ID: Isv 2					Seq: 238	19:03:09 30 Nov 1999 HG		
Hg	.019	ug/L	.000	.019			<0.91µg	
*** Sample ID: Isv 2 dup					Seq: 239	19:05:27 30 Nov 1999 HG RPD-NA		
Hg	.019	ug/L	.000	.019			<0.91µg	
*** Sample ID: Isv 3					Seq: 240	19:07:45 30 Nov 1999 HG		
Hg	.080	ug/L	.000	.080			<1.48µg	
*** Sample ID: Isv 3 dup					Seq: 241	19:10:03 30 Nov 1999 HG		
Hg	.080	ug/L	.000	.080			<1.48µg	

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccb					Seq: 242	19:12:22 30 Nov 1999 HG		
Hg	-.005	ug/L	.000	-.005			<0.2µg /L	
*** Sample ID: ccv					Seq: 243	19:14:40 30 Nov 1999 HG		
Hg	2.03	ug/L	.000	2.03		TV=1.0	102%	
*** Sample ID: Isv 4					Seq: 244	19:17:09 30 Nov 1999 HG		
Hg	.134	ug/L	.000	.134		<1.44µg	~~<0.288µg~~ 300ml/liter	
*** Sample ID: Isv 4 dup					Seq: 245	19:19:28 30 Nov 1999 HG	RPD-NA	
Hg	.140	ug/L	.000	.140		<1.44µg	~~<0.288µg~~ 300ml/liter	
*** Sample ID: Isv 4 trp					Seq: 246	19:21:47 30 Nov 1999 HG	RPD-NA	
Hg	.142	ug/L	.000	.142		<1.44µg	~~<0.288µg~~ 300ml/liter	
*** Sample ID: Isv 5					Seq: 247	19:24:05 30 Nov 1999 HG		
Hg	.030	ug/L	.000	.030		<1.51µg		
*** Sample ID: Isv 5 dup					Seq: 248	19:26:23 30 Nov 1999 HG	RPD-NA	
Hg	.029	ug/L	.000	.029		<1.51µg		
*** Sample ID: Isv 5 spk					Seq: 249	19:28:41 30 Nov 1999 HG		
Hg	1.09	ug/L	.000	1.09		TV=1.0	109%	
*** Sample ID: Isv 6					Seq: 250	19:31:05 30 Nov 1999 HG		
Hg	.242	ug/L	.000	.242		1.65µg		
*** Sample ID: Isv 6 dup					Seq: 251	19:33:24 30 Nov 1999 HG	RPD = 4.4%	
Hg	.253	ug/L	.000	.253		1.72µg		
*** Sample ID: Isv 7					Seq: 252	19:35:44 30 Nov 1999 HG	~~RPD = 4.2%~~ 121	
Hg	.232	ug/L	.000	.232		1.58µg		
*** Sample ID: Isv 7 dup					Seq: 253	19:38:04 30 Nov 1999 HG	RPD = 1.3%	
Hg	.235	ug/L	.000	.235		1.60µg		

19:40:25 30 Nov 1999 Protocol: SYSTEST

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: 3sv 8					Seq: 254	19:40:25 30 Nov 1999 HG		
Hg	.142	ug/L	.000	.142			<1.6 µg	
*** Sample ID: 3sv 8 duo					Seq: 255	19:42:45 30 Nov 1999 HG RPD-NA		
Hg	.145	ug/L	.000	.145			<1.6 µg	
*** Sample ID: rtsv 8					Seq: 256	19:45:06 30 Nov 1999 HG		
Hg	.007	ug/L	.000	.007			<2.0 µg/L	
*** Sample ID: rtsv 8 duo					Seq: 257	19:47:26 30 Nov 1999 HG RPD-NA		
Hg	.007	ug/L	.000	.007			<2.0 µg/L	

*** Sample ID: ccb Seq: 259 19:55:57 30 Nov 1999 HG

Hg -.006 ug/L .000 -.006 <0.2ug 1L

*** Sample ID: ccv Seq: 260 19:58:13 30 Nov 1999 HG

Hg 2.09 ug/L .000 2.09 TV=2.0 105%

*** Sample ID: gb 1 Seq: 261 20:00:41 30 Nov 1999 HG

Hg .071 ug/L .000 .071

*** Sample ID: gb 1 dup Seq: 262 20:02:57 30 Nov 1999 HG

Hg .083 ug/L .000 .083

*** Sample ID: gb 1 trp Seq: 263 20:05:14 30 Nov 1999 HG

Hg .083 ug/L .000 .083

Gibson Filters

*** Sample ID: gb 4 Seq: 264 20:07:31 30 Nov 1999 HG

Hg .114 ug/L .000 .114

*** Sample ID: gb 4 dup Seq: 265 20:09:48 30 Nov 1999 HG

Hg .114 ug/L .000 .114

*** Sample ID: gb 4 spk Seq: 266 20:12:05 30 Nov 1999 HG

Hg 1.16 ug/L .000 1.16

*** Sample ID: gb 7 Seq: 267 20:14:28 30 Nov 1999 HG

Hg .069 ug/L .000 .069

*** Sample ID: gb 7 dup Seq: 268 20:16:46 30 Nov 1999 HG

Hg .075 ug/L .000 .075

*** Sample ID: gb 14a Seq: 269 20:19:05 30 Nov 1999 HG

Hg .129 ug/L .000 .129

*** Sample ID: gb 14a dup Seq: 270 20:21:22 30 Nov 1999 HG

Hg .131 ug/L .000 .131

*** Sample ID: rbsv 7 Seq: 271 20:23:38 30 Nov 1999 HG

Hg -.006 ug/L .000 -.006 <0.2ug/L

*** Sample ID: rbsv 7 dup Seq: 272 20:25:55 30 Nov 1999 HG RPD-N/A

Hg -.002 ug/L .000 -.002 <0.2ug/L

*** Sample ID: rbsv 11 Seq: 273 20:28:12 30 Nov 1999 HG

Hg -.002 ug/L .000 -.002 <0.2ug/L

*** Sample ID: rbsv 11 du Seq: 274 20:30:29 30 Nov 1999 HG RPD-N/A

Hg -.003 ug/L .000 -.003 <0.2ug/L

*** Sample ID: ccb Seq: 275 20:32:46 30 Nov 1999 HG

Hg -.007 ug/L .000 -.007 <0.20ug/L

*** Sample ID: ccv Seq: 276 20:35:04 30 Nov 1999 HG

Hg 2.07 ug/L .000 2.07 TV=2.0 104%

12/2/99 Analytical Run

```
Protocol: SYSTEST
                        Rev: 3.001   Time: 20:06:05  02 Dec 1999
Folder: DEC99A          Seq: 257                     Print: On
User:                   Batch:            Id: Sto6Rep1   Cup: 1 29 Gas:    0.23 LPM
State: Idle                                              Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 120299e
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 1633b                             1.0000 1.0000
 5 1633b dup                         1.0000 1.0000
 6 Q76                               1.0000 1.0000
 7 Q76 dup                           1.0000 1.0000
 8 Q76 trp                           1.0000 1.0000
 9 Q45 1:5                           1.0000 1.0000
10 Q45 dup 1:5                       1.0000 1.0000
11 Q45 spk 1:5                       1.0000 1.0000
12 Q69                               1.0000 1.0000
13 Q69 dup                           1.0000 1.0000
14 Q46 1:5                           1.0000 1.0000
15 Q46 dup 1:5                       1.0000 1.0000
                                                                              PgDn

Cup 1  ID: icb                                   Cell entry, Ins to switch
                                                                  149 F  12
```

Protocol: SYSTEST

Rev: 3.001 Time: 20:06:08 02 Dec 1999

Folder: DEC99A Seq: 257 Print: On

User: -- Batch: Id: Std6Reol Cup: 1 29 Gas: 0.23 LPM

State: Idle Xmit: Off Autosampler: On

AUTOSAMPLER: Rack entry Rack 120299e PgUp

Cup	Id	Extended id	Weight	Volume	Macro	check	Help
16	Q71		1.00000	1.00000			
17	Q71 dup		1.00000	1.00000			
18	Q73		1.00000	1.00000			
19	Q73 dup		1.00000	1.00000			
20	Q70		1.00000	1.00000			
21	Q70 dup		1.00000	1.00000			
22	Q72		1.00000	1.00000			
23	Q72 dup		1.00000	1.00000			
24	ccb		1.00000	1.00000			
25	ccv		1.00000	1.00000			
26	Q47 1:5		1.00000	1.00000			
27	Q47 dup 1:5		1.00000	1.00000			
28	Q47 trp 1:5		1.00000	1.00000			
29	Q68		1.00000	1.00000			
30	Q68 dup		1.00000	1.00000			

PgDn

Cup 16 ID: Q71 Call entry. Ins to switch

149 9 12

```
Protocol: SYSTEST
                    Rev: 3.001   Time: 20:06:10  02 Dec 1999
Folder: DEC99A      Seq: 257                     Print: On
User:    --         Batch:            Id: Std6Rep1   Cup: 1 29 Gas:    0.23 LPM
State: Idle                                        Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 1200299a                                    PgUp
Cup Id        Extended id          Weight Volume Macro check Help
31 Q68 sck                         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: Q68 sck                          Call entry, Ins to switch
                                                              149 9  13
```

*** Standard: 1 Rep: 1 Seq: 251 19:32:35 02 Dec 1999 HG

Hg .000 ug/L -22
Ave. Int. = -22 S. D. = 0

*** Standard: 2 Rep: 1 Seq: 252 19:34:58 02 Dec 1999 HG

Hg .200 ug/L 7338
Ave. Int. = 7338 S. D. = 0

*** Standard: 3 Rep: 1 Seq: 253 19:37:20 02 Dec 1999 HG

Hg .500 ug/L 17767
Ave. Int. = 17767 S. D. = 0

*** Standard: 4 Rep: 1 Seq: 254 19:39:43 02 Dec 1999 HG

Hg 1.00 ug/L 35796
Ave. Int. = 35796 S. D. = 0

*** Standard: 5 Rep: 1 Seq: 255 19:42:10 02 Dec 1999 HG

Hg 2.00 ug/L 70709
Ave. Int. = 70709 S. D. = 0

Folder: DED99A Page 55
19:44:44 02 Dec 1999 Protocol: SYSTEST

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

*** Standard: 6 Rep: 1 Seq: 256 19:44:44 02 Dec 1999 HG

Hg 3.00 ug/L 105389
Ave. Int. = 105389 S. D. = 0

Protocol: SYSTEST

Rev: 3.001 Time: 19:45:36 02 Dec 1999

Folder: DEC99A Seq: 257 Print: On

User: -- Batch: _ Id: Std6Rep1 _ Cup: 1 29 Gas: 0.23 LPM

State: Idle Xmit: Off Autosampler: On

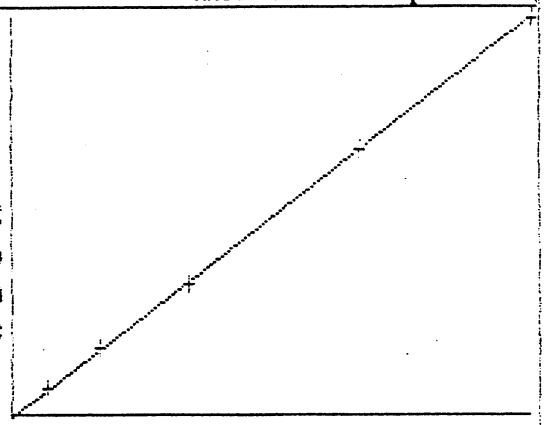
CALIBRATION: Line Calibration

Line: Hg

	Conc.	Calc.	Dev.	Accepted LiNear	
S1	.000	-.009	-.009	Quadratic	
S2	.200	.201	.001	UtdLinear	
S3	.500	.498	-.002		C
S4	1.00	1.01	.011	Accept	o
S5	2.00	2.01	.005		n
S6	3.00	2.99	-.007	StdAdd	c

A .0000000 r .999979

B 2.84727e-5 C -7.89631e-3



Relative Absorbance

	Mean	%RSD	
S1	-22	0	-22
S2	7338	0	7338
S3	17767	0	17767
S4	35796	0	35796
S5	70709	0	70709
S6	105389	0	105389

33?

New calibration coefficients stored 149 2 5

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

*** Check Standard: 2 Ck2 Seq: 257 20:11:05 02 Dec 1999 HG

Line	Flag	%Rcv.	Found	True	Units	SD/RSD
Hg		107.	.649	.604	ug/L	.000

*** Sample ID: icb Seq: 258 20:13:25 02 Dec 1999 HG

Hg -.014 ug/L .000 -.014 <0.2 µg/L

*** Sample ID: blk Seq: 259 20:15:42 02 Dec 1999 HG

Hg .038 ug/L .000 .038 <0.2 µg/L

*** Sample ID: blk dup Seq: 260 20:18:00 02 Dec 1999 HG

Hg .041 ug/L .000 .041 <0.2 µg/L

*** Sample ID: 1633b Seq: 261 20:20:18 02 Dec 1999 HG

Hg 1.82 ug/L .000 1.92 0.159 ~~µg~~ mg/kg

TV = 0.141 ±0.019

*** Sample ID: 1633b dup Seq: 262 20:22:38 02 Dec 1999 HG RPD = <1.0%

Hg 1.81 ug/L .000 1.81 0.159 mg/kg

*** Sample ID: Q76 Seq: 263 20:25:01 02 Dec 1999 HG

Hg .021 ug/L .000 .021 <0.01 µg

*** Sample ID: Q76 dup Seq: 264 20:27:19 02 Dec 1999 HG RPD = <6.0%

Hg .032 ug/L .000 .032 <0.01 µg

*** Sample ID: Q76 trp Seq: 265 20:29:37 02 Dec 1999 HG RPD = <1.0%

Hg .032 ug/L .000 .032 <0.01 µg

*** Sample ID: Q45 Seq: 266 20:31:55 02 Dec 1999 HG

Hg 4.09 ug/L .000 4.09 NO DATA

*** Sample ID: Q45 dup Seq: 267 20:34:26 02 Dec 1999 HG

Hg 4.05 ug/L .000 4.05 NO DATA

*** Sample ID: Q45 spk Seq: 268 20:36:58 02 Dec 1999 HG

Hg 4.97 ug/L .000 4.97 NO DATA

Line	Conc.	Units	SD/RSD	1	2	3	4	5	
*** Sample ID: Q69					Seq: 269	20:39:29 02 Dec 1999 HG			
Hg	.037	ug/L	.000	.037					<0.01µg
*** Sample ID: Q69 dup					Seq: 270	20:41:46 02 Dec 1999 HG			RPD = <1.0%
Hg	.054	ug/L	.000	.054					<0.01µg
*** Sample ID: Q46					Seq: 271	20:44:03 02 Dec 1999 HG			
Hg	3.53	ug/L	.000	3.53					NO DATA
*** Sample ID: Q46 dup					Seq: 272	20:46:33 02 Dec 1999 HG			
Hg	3.52	ug/L	.000	3.52					NO DATA
*** Sample ID: Q71					Seq: 273	20:48:59 02 Dec 1999 HG			
Hg	.047	ug/L	.000	.047					<0.01µg
*** Sample ID: Q71 dup					Seq: 274	20:51:17 02 Dec 1999 HG			RPD = <1.0%
Hg	.056	ug/L	.000	.056					<0.01µg
*** Sample ID: Q73					Seq: 275	20:53:35 02 Dec 1999 HG			
Hg	.089	ug/L	.000	.089					<0.01µg
*** Sample ID: Q73 dup					Seq: 276	20:55:53 02 Dec 1999 HG			RPD = <1.0%
Hg	.089	ug/L	.000	.089					<0.01µg
*** Sample ID: Q70					Seq: 277	20:58:11 02 Dec 1999 HG			
Hg	.412	ug/L	.000	.412					0.021µg
*** Sample ID: Q70 dup					Seq: 278	21:00:29 02 Dec 1999 HG			RPD = 2.0%
Hg	.404	ug/L	.000	.404					0.020µg
*** Sample ID: Q72					Seq: 279	21:02:47 02 Dec 1999 HG			
Hg	.235	ug/L	.000	.235					0.012µg
*** Sample ID: Q72 dup					Seq: 280	21:05:05 02 Dec 1999 HG			RPD = 1.3%
Hg	.232	ug/L	.000	.232					0.012µg

Folder: DEC99A
Protocol: SYSTEST

21:07:24 02 Dec 1999

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccb					Seq: 281	21:07:24 02 Dec 1999 HG		
Hg	-.008	ug/L	.000	-.008		<0.2µg/L		
*** Sample ID: ccv					Seq: 282	21:09:43 02 Dec 1999 HG		
Hg	2.02	ug/L	.000	2.02		TV=2.00 101%		
*** Sample ID: Q47					Seq: 283	21:12:11 02 Dec 1999 HG		
Hg	3.25	ug/L	.000	3.25		NODATA		
*** Sample ID: Q47 dup					Seq: 284	21:14:40 02 Dec 1999 HG		
Hg	3.23	ug/L	.000	3.23		NODATA		
*** Sample ID: Q47 trp					Seq: 285	21:17:09 02 Dec 1999 HG		
Hg	3.26	ug/L	.000	3.26		NODATA		
*** Sample ID: Q68					Seq: 286	21:19:40 02 Dec 1999 HG		
Hg	.568	ug/L	.000	.568		0.028 ~~0.03µg~~ JAO 12/20		
*** Sample ID: Q65 dup					Seq: 287	21:22:00 02 Dec 1999 HG	RPD = ~~3.0~~ 3.5% JAO 12	
Hg	.585	ug/L	.000	.585		0.029 ~~0.03µg~~ JAO 12/20		
*** Sample ID: Q68 spk					Seq: 288	21:24:20 02 Dec 1999 HG		
Hg	1.60	ug/L	.000	1.60		TV=1.0 103%		
*** Sample ID: Q45					Seq: 289	21:28:33 02 Dec 1999 HG		
Hg	1.04	ug/L	:5 .000	1.04		NODATA		
*** Sample ID: Q45 dup					Seq: 290	21:30:52 02 Dec 1999 HG		
Hg	.797	ug/L	:5 .000	.797		NODATA		
*** Sample ID: Q45					Seq: 291	21:35:34 02 Dec 1999 HG		
Hg	.835	ug/L	:5 .000	.835		5.58 ug ~~1.31µg X5 = 6.55µg~~ JAO 1/16		
*** Sample ID: Q45 dup					Seq: 292	21:37:54 02 Dec 1999 HG	RPD = 2.0%	
Hg	.818	ug/L	:5 .000	.818		~~1.29µg X5 = 6.43µg~~ JAO 1/16 5.47 ug		

Folder: DEC99A
Protocol: SYSTEST

21:40:12 02 Dec 1999

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: Q45 spk					Seq: 293	21:40:12 02 Dec 1999 HG		
			:5			TV=1.0	109%	
Hg	1.92	ug/L	.000	1.92				
*** Sample ID: Q46					Seq: 294	21:42:38 02 Dec 1999 HG		
			:5			4.79 ug ~~1.19 µg X5 = 5.95 µg~~		
Hg	.683	ug/L	.000	.683				
*** Sample ID: Q46 dup					Seq: 295	21:44:56 02 Dec 1999 HG	RPD = 3.6 %	
			:5			4.96 ug ~~1.24 µg X5 = 6.20 µg~~		
Hg	.708	ug/L	.000	.708				
*** Sample ID: Q47					Seq: 296	21:48:37 02 Dec 1999 HG		
			:5			4.60 ug ~~1.16 µg X5 = 5.78 µg~~		
Hg	.654	ug/L	.000	.654				
*** Sample ID: Q47 dup					Seq: 297	21:50:56 02 Dec 1999 HG	RPD = <1.0%	
			:5			4.61 ug ~~1.15 µg X5 = 5.79 µg~~		
Hg	.655	ug/L	.000	.655				
*** Sample ID: Q47 trp					Seq: 298	21:53:16 02 Dec 1999 HG	RPD = 1.5%	
			:5			4.59 ug ~~1.14 µg X5 = 5.69 µg~~		
Hg	.644	ug/L	.000	.644				
*** Sample ID: ccb					Seq: 299	21:55:36 02 Dec 1999 HG		
						<0.2 ug IC		
Hg	-.013	ug/L	.000	-.013				
*** Sample ID: ccv					Seq: 300	21:57:55 02 Dec 1999 HG		
						TV=2.00	103%	
Hg	2.05	ug/L	.000	2.05				

METCO Particulate Analysis Record

METCO Environmental

Particulate Analysis EPA Method 17

Thimbles and Backup Filters

Job Number 99-95 WCR6

Job Name EPRI

Location Stevenson, Al.

Unit Tested #6 Precip. Inlet Duct A

Desiccator Time In					
Desiccator Time Out	1325 10/28	950 10/29			

Run No. 1 Thimble No. Q45 Filter No. Q69

Thimble Final Weight (g)	17.7345	17.7328	✓		
Thimble Initial Weight (g)					
Particulate (g)					
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1062	0.1058	✓		

Filter and Particulate Average (g) 0.1060 ✓

Initial Filter Weight (g) 0.1078

Filter Particulate Average (mg) 0 ✓

Thimble Particulate Average (mg)

Total Particulate (mg)

Q45 PART. WEIGHT: 14.7585g PROVIDED BY METCO ON 1/18/00 JAS

Run No. 2 Thimble No. Q46 Filter No. Q71

Thimble Final Weight (g)	17.7238	17.7216	✓		
Thimble Initial Weight (g)					
Particulate (g)					
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1026	0.1025	✓		

Filter and Particulate Average (g) 0.1026 ✓

Initial Filter Weight (g) 0.1082

Filter Particulate Average (mg) 0 ✓

Thimble Particulate Average (mg)

Total Particulate (mg)

Q46 PART. WEIGHT: 14.2423g PROVIDED BY METCO ON 1/18/00 JAS

Run No. 3 Thimble No. Q47 Filter No. Q73

Thimble Final Weight (g)	18.6115	18.6110	✓		
Thimble Initial Weight (g)					
Particulate (g)					
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1042	0.1043	✓		

Filter and Particulate Average (g) 0.1043

Initial Filter Weight (g) 0.1075

Filter Particulate Average (mg) 0

Thimble Particulate Average (mg)

Total Particulate (mg)

Q47 PART WEIGHT: 15.0059g PROVIDED BY METCO ON 1/18/00 JAS

MH

Analyst

METCO Environmental

Particulate Analysis EPA Method 5

Stack Filters

Job Number 99-95 WCR6 Location Stevenson, Al.

Job Name EPRI Unit Tested #6 Precip. Outlet

Desiccator Time In	1550 10/26				
Desiccator Time Out	13 38 10/28	10⁰⁰ 10/29			

Run No. 1	Filter No. Q68				
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.2983	0.2981	✓		

* note - large flakes of metallic material

Filter & Particulate Average (g) 0.2982 see note

Initial Filter Weight (g) 0.1055

Total Particulate (mg) 192.7 ✓

Run No. 2	Filter No. Q70				
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1378	0.1378	✓		

one magnetic flake present

Filter & Particulate Average (g) 0.1378 ✓

Initial Filter Weight (g) 0.1084

Total Particulate (mg) 29.4 ✓

Run No. 3	Filter No. Q72				
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)	0.1472	0.1470	✓		

some small magnetic flakes present

Filter & Particulate Average (g) 0.1471 ✓

Initial Filter Weight (g) 0.1066

Total Particulate (mg) 40.5 ✓

Run No.	Filter No.				
Filter & Particulate + Tare Weight (g)					
Tare Weight (g)					
Filter & Particulate (g)					

Filter & Particulate Average (g)

Initial Filter Weight (g)

Total Particulate (mg)

MG

Analyst

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

ANALYTICAL REPORT

Client: METCO Environmental

Report to: Doug Saathoff
METCO Environmental
P. O. Box 598
Addison TX 75001

Project: 188425
Received: 24-NOV-99
Reported: 16-DEC-99

PURCHASE ORDER: 99-95-WCRG

Project Description: Widows Creek-Unit 6, Stevenson

	AS RECEIVED BASIS	DRY BASIS	UNITS	METHOD	DATE	ANALYST
Run 1 Coal Sample (WCFP/Unit 6)						
Lab Sample: 1384777						
sampled: 20-OCT-99						
Moisture, Total	8.89		%	D 3302	01-DEC-99	GLB
SHORT PROX - COAL						
Ash	10.4	11.4	%	D 3174	08-DEC-99	VJO
Sulfur	0.54	0.59	%	D 4239	08-DEC-99	VJO
Heating Value	11510	12630	BTU/lb	D 3286	02-DEC-99	VJO
Chloride, Total	0.04	0.04	%	E776/300.0	14-DEC-99	DRK
Run 2 Coal Sample (WCFP/Unit 6)						
Lab Sample: 1384778						
sampled: 20-OCT-99						
Moisture, Total	9.45		%	D 3302	01-DEC-99	GLB
SHORT PROX - COAL						
Ash	9.38	10.4	%	D 3174	08-DEC-99	VJO
Sulfur	0.46	0.51	%	D 4239	08-DEC-99	VJO
Heating Value	11540	12740	BTU/lb	D 3286	02-DEC-99	VJO
Chloride, Total	0.03	0.03	%	E776/300.0	14-DEC-99	DRK
Run 3 Coal Sample (WCFP/Unit 6)						
Lab Sample: 1384779						
sampled: 21-OCT-99						
Moisture, Total	9.23		%	D 3302	01-DEC-99	GLB
SHORT PROX - COAL						
Ash	9.30	10.2	%	D 3174	08-DEC-99	VJO
Sulfur	0.48	0.53	%	D 4239	08-DEC-99	VJO
Heating Value	11590	12770	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: 188425

	AS RECEIVED BASIS	DRY BASIS	UNITS	METHOD	DATE	ANALYST
Run 3 Coal Sample (WCFP/Unit 6)						
Lab Sample: 1384779 - continued						
Chloride, Total	0.03	0.03	%	E776/300.0	14-DEC-99	DRK

< Indicates less than the limit of quantitation.

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) 821-9667

Sample Container Information

Bottle Type (G P H)												
# of Containers												
Preserved? (Y/N)												

Report Results To:
PO # 79-95-WCRG Job ID WIDOWS CRK-UNIT 6, STEVENSON
Name DOUG SADTHOFF
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

158425

Analysis Requested

Page 1 of 1
PAS Quote#

Sampled by:	Air Vol. (L or m³)	Matrix Type	Date Sampled	Time Sampled	BTU CONTENT	FLY ASH	SULFUR	CHLORIDE	ASTM-D-3286	ASTM-D-3174	ASTM-D-5016	ASTM-?
SAMPLE DESCRIPTION												
1. RUN 1 COAL SAMP.			10/20/99		X	X	X	X				
2 RUN 2 COAL SAMP.			10/20/99		X	X	X	X				
3 RUN 3 COAL SAMP.			10/21/99		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):

		Date	Time
Samples relinquished to shipper or courier by:	[signature]	11-19-99	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	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:

Bags labelled WCFP/Unit 6. [illegible] 11-24-99

-1999 11:18 FROM TO 13312341010000000 P.06
TOTAL P.06

TestAmerica
INCORPORATED

Sample ID: **TVA**
Widows Creek Fossil Plant
Stevenson, Alabama
Coal Samples

Hg Analysis
ASTM D6414-99

Collected On: 10/20/99 for Run 1 and Run 2, 10/21/99 for Run 3 Composite
Collected By: METCO

	Digestion Date	Analysis Date	Analyst	Results	Duplicate Result	RPD	Units	Dry Weight (%)	Flags	Notes
Run 1 Composite	12/20/99	12/24/99	jpp	0.029	0.029	1.3	ug/g	95.3		
Run 2 Composite	12/20/99	12/24/99	jpp	0.024	0.024	<1.0	ug/g	95.4		
Run 3 Composite	12/20/99	12/24/99	jpp	0.021	0.021	1.9	ug/g	95.5		

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

Job# 99-[illegible] Unit Tested Unit 6

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
TVA
Widows Creek Fossil Plant
Stevenson, AL

Collected By/Company
~~METCO Envi~~ TVA

SAMPLE I.D.	DATE	TIME	AIR	SOLID	COMP	GRAB	# OF CONTAINERS	RECOVERED BY	HCl	PART.	SO2	SO3	PCDD/PCDF	SEMI-VOC	BTU	FLY ASH METALS	Sulfur	Cl2	Hg	REMARKS (Specific Compounds/Methods)
Run 1 Coal Sample	10/20/99				X		II	B.O.							X	X	X	X	X	Ship one Container to EERC
Run 2 Coal Sample	10/20/99				X		II	B.O.							X	X	X	X	X	↓
Run 3 Coal Sample	10/21/99				X		II	B.O.							X	X	X	X	X	↓
Fly Ash						X	I	B.O.												Ship to EERC Analyze Fly Ash for Major Elements
																				11/15/99 shipped as listed above Douglas R Southworth

SAMPLE ANALYSIS REQUIRED

Analyze according to the Ontario Hydro Method.

Received by:	Date:	Time:	Transported by:	Date:	Time:	Received at Lab by:	Date:	Time:
Jason Conway	10/29/99		Jason Brown	11/6/99	2300	John Kellerman	11/8/99	1300
Analyzed by:	Date:	Time:	Data Reviewed by:	Date:	Time:	Remarks:		

Ship to: METCO → T.A. + EERC

METCO ENVIRONMENTAL

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 # 79-95-WCRG Job ID WIDOWS CRK-UNIT 6, STEVENSON
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

Sampled by:

Page 1 of 1
PAS Quote#

Analysis Requested

SAMPLE DESCRIPTION	Air Vol. (L or min)	Matrix Type	Date Sampled	Time Sampled	BTU CONTENT	FLY ASH	SULFUR	CHLORIDE	ASTM-D-3286	ASTM-D-3174	ASTM-D-5016	ASTM-?	Comments/Hazards/Location Details
1. RUN 1 COAL SAMP.			10/20/99		X	X	X	X					ATTN: CHRIS WEATHINGTON
2 RUN 2 COAL SAMP.			10/20/99		X	X	X	X					TEST AMERICA, INC.
3 RUN 3 COAL SAMP.			10/21/99		X	X	X	X					3601 S. DIXIE DRIVE
4													DAYTON, OH 45439
5													PH: 1-800-572-9839
6 *SEE ATTACHED													* AFTER SAMPLE HAS BEEN
7 INSTRUCTIONS													PREPPED, PLEASE RETURN A
8 →													4 oz. JAR SAMPLE TO TEST
9													AMERICA AT THE ABOVE
10													ADDRESS! THANK YOU!

Special Instructions (including Data Deliverables and Turn Around Time):

	Date	Time
Samples relinquished to shipper or courier by:	11-19-99	1600
Samples received by:		

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:

NONAQUEOUS MERCURY BATCH SHEET

Analyst: DPP Date: 12/20/99 12/24/99 Water Bath: start mid end

Standard Reference: 65-41-7 temp:

ICV Reference: 65-41-18 date:

%DW		Sample # / Client	Weight	MS	MSD
83.1	3	1383831 [redacted]	1.0083 g		
82.6	4	1383832 ⊥	1.0242 g		
83.7	5	1383833 ⊥	1.0469 g		MB
95.1	6	1384792 [redacted]	1.0235 g		
94.1	7	1384793 ⊥	1.0080 g		
96.0	8	1384794 ⊥	1.0522 g		
93.7	9	1384812 TRP [redacted]	1.0296 g		ICV
93.7	10	1384813 SPK ⊥	1.0235 g		
94.5	11	1384814 ⊥	1.0070 g		
95.3	12	1384777 Widows Creek	1.0644 g		
95.4	13	1384778 ⊥	1.0445 g		MS
95.5	14	1384779 ⊥	1.0288 g		
98.2	15	1384806 [redacted]	1.0170 g		
98.9	16	1384807 ⊥	1.0099 g		
98.9	17	1384808 ⊥	1.0222 g		MSD
90.3	18	1384771 [redacted]	1.0139 g		
89.8	19	1384772 TRP ⊥	1.0105 g		
90.1	20	1384773 SPK ⊥	1.0365 g		
	2	NIST 1630 A	1.0390 g	=0.077 mg/kg	RPD
	1	Blank			

HNO3 65-48-14
HCl 65-46-1
KMnO4 - 65-33-1
~~SnCl2 - 65-50-6~~
SnCl2 - 66-31-19

FLAG

SECONDARY DATA CHECK: analyst:
date:

Comments: V_F = 50mL NIST 1630A = 0.106 ± ~~0.023~~ 0.032 mg/kg JAO 1/6

*** Standard: 1 Rep: 1 Seq: 292 15:35:21 24 Dec 1999 HG

Hg .000 ug/L 172
Ave. Int. = 172 S. D. = 0

Folder: DEC99C Page 258
15:37:43 24 Dec 1999 Protocol: SYSTEST

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

*** Standard: 2 Rep: 1 Seq: 293 15:37:43 24 Dec 1999 HG

Hg .200 ug/L 8051
Ave. Int. = 8051 S. D. = 0

*** Standard: 3 Rep: 1 Seq: 294 15:40:05 24 Dec 1999 HG

Hg .500 ug/L 20347
Ave. Int. = 20347 S. D. = 0

*** Standard: 4 Rep: 1 Seq: 295 15:42:27 24 Dec 1999 HG

Hg 1.00 ug/L 40126
Ave. Int. = 40126 S. D. = 0

*** Standard: 5 Rep: 1 Seq: 296 15:44:54 24 Dec 1999 HG

Hg 2.00 ug/L 81928
Ave. Int. = 81928 S. D. = 0

*** Standard: 6 Rep: 1 Seq: 297 15:47:23 24 Dec 1999 HG

Hg 3.00 ug/L 120049
Ave. Int. = 120049 S. D. = 0

Protocol: SYSTEST

Rev: 3.001 Time: 15:48:16 24 Dec 1999

Folder: DEC99C Seq: 298 Print: On

User: Batch: Id: Std6Rep1 Cup: 1 29 Gas: 0.23 LPM

State: Idle Xmit: Off Autosampler: On

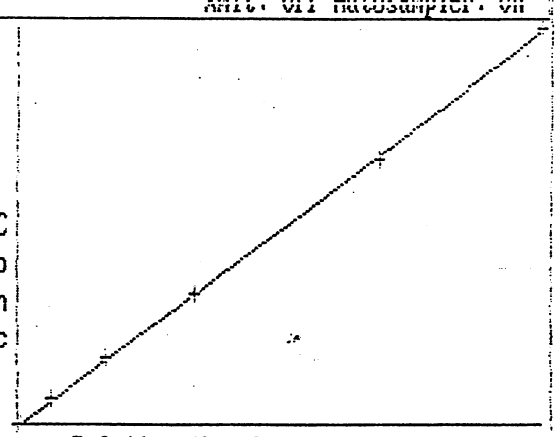
CALIBRATION: Line Calibration

Line: Hg

	Conc.	Calc.	Dev.	Accepted LiNear	
S1	.000	-.001	-.001	Quadratic	
S2	.200	.195	-.005	UtdLinear	
S3	.500	.501	.001		C
S4	1.00	.993	-.007	Accept	o
S5	2.00	2.03	.032		n
S6	3.00	2.98	-.019	StdAdd	c

A .0000000 r .999889

B 2.48732e-5 C -5.41651e-3



Relative Absorbance

	Mean	%RSD	
S1	172	0	172
S2	8051	0	8051
S3	20347	0	20347
S4	40126	0	40126
S5	81928	0	81928
S6	120049	0	120049

33?

New calibration coefficients stored 149 2 5

Protocol: SYSTEST

Rev: 1.001 Time: 17:51:34 24 Dec 1990

Folder: DEC990 Seq: 243 Print: On

User: Batch: Id: ccv Cup: 1 39 Gas: 0.22 LPM

State: Idle Xmit: Off Autosampler: On

AUTOSAMPLER: Rack entry Rack 122499a

cup	Id	Extended id	Weight	Volume	Macro	check	Halo
1	icc		1.0000	1.0000			
2	blk		1.0000	1.0000			
3	blk cup		1.0000	1.0000			
4	nist1630a		1.0000	1.0000			
5	nist cup		1.0000	1.0000			
6	831 ~~1.5~~ NODIL		1.0000	1.0000			
7	831 cup		1.0000	1.0000			
8	832		1.0000	1.0000			
9	832 cup		1.0000	1.0000			
10	833		1.0000	1.0000			
11	833 cup		1.0000	1.0000			
12	792		1.0000	1.0000			
13	792 cup		1.0000	1.0000			
14	793		1.0000	1.0000			
15	793 cup		1.0000	1.0000			

Cup: 1 ID: icc Call entry. Ins to enter

Ins = 12

```
Protocol: SYSTEST
                        Rev: 3.001    Time: 17:53:07   24 Dec 1999
Folder: DEC99C          Seq: 343                       Print: On
Lser:                   Batch:              Id: 100        Cuo: 1 39 Gas:    0.23 LPM
State: Idle                                                Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry   Rack 123499a  Range  1-44 Clear seq Undo exit   Fguo
cuo Id        Extended Id          Weight Volume Macro check Help
16 794                             1.0000 1.0000
17 794 cup                         1.0000 1.0000
18 812                             1.0000 1.0000
19 812 cuo                         1.0000 1.0000
20 812 tmo                         1.0000 1.0000
21 813                             1.0000 1.0000
22 813 cuo                         1.0000 1.0000
23 813 sck                         1.0000 1.0000
24 ccp                             1.0000 1.0000
25 ccv                             1.0000 1.0000
26 814                             1.0000 1.0000
27 814 cuc                         1.0000 1.0000
28 777                             1.0000 1.0000
29 777 cup                         1.0000 1.0000
30 778                             1.0000 1.0000
                                                                                Fq0n

                                                Column entry, Ins to switch
                                                                   Dil = 3
```

```
Protocol: SYSTEST
                        Rev: 3.001    Time: 17:53:39  24 Dec 1999
Folder: DEC99C          Seq: 343                      Print: On
User:                   Batch:              Id: icb        Cup: 1 39 Sec:    0.23 LPM
State: Idle                                                Xmit: Off Autosampler: On

AUTOSAMPLER:  Rack entry    Rack 122499a  Range  1-44 Clear seq Uroc exit    Pgup
cup Id          Extended id              Weight Volume Macro check Help
31 778 cup                               1.0000 1.0000
32 779                                   1.0000 1.0000
33 779 cup                               1.0000 1.0000
34 806                                   1.0000 1.0000
35 806 cup                               1.0000 1.0000
36 807                                   1.0000 1.0000
37 807 cup                               1.0000 1.0000
38 808                                   1.0000 1.0000
39 808 cup                               1.0000 1.0000
40 771                                   1.0000 1.0000
41 771 cup                               1.0000 1.0000
42 772                                   1.0000 1.0000
43 772 cup                               1.0000 1.0000
44 772 tro                               1.0000 1.0000

                                                                              PgDn

                                                   Column entry, Ins to enter
                                                                   341 F  X
```

Line	Conc.	Units	SD/REC	1	2	3	4	5	
*** Sample ID: 1cc					Seq: 343	17:55:12 24 Dec 1999 HG			
Hg	-.006	ug/L	.000	-.006					<0.2µg/L
*** Sample ID: blk					Seq: 344	17:58:22 24 Dec 1999 HG			
Hg	.010	ug/L	.000	.010					<0.2µg/L
*** Sample ID: blk dup					Seq: 345	18:00:44 24 Dec 1999 HG			
Hg	.009	ug/L	.000	.009					<0.2µg/L
*** Sample ID: [illegible]					Seq: 346	18:03:02 24 Dec 1999 HG			
Hg	1.60	ug/L	.000	1.60					TV = 0.106 ± ~~0.023~~ 0.032 mg/kg JAD 1/6 0.078 mg/kg
*** Sample ID: [illegible] dup					Seq: 347	18:05:25 24 Dec 1999 HG			RPD = <1.0%
Hg	1.60	ug/L	.000	1.60					0.078 mg/kg
*** Sample ID: [illegible]					Seq: [illegible]	[illegible]			
Hg	.178	ug/L	.000	.178					NO DATA
*** Sample ID: 831					Seq: 349	18:11:05 24 Dec 1999 HG			
Hg	1.01	ug/L	.000	1.01					0.060 µg/g
*** Sample ID: 831 dup					Seq: 350	18:13:25 24 Dec 1999 HG			RPD = <1.0%
Hg	1.02	ug/L	.000	1.02					0.061 µg/g
*** Sample ID: 832					Seq: 351	18:15:45 24 Dec 1999 HG			
Hg	.938	ug/L	.000	.938					0.055 µg/g
*** Sample ID: 832 dup					Seq: 352	18:18:04 24 Dec 1999 HG			RPD = 2.3%
Hg	.917	ug/L	.000	.917					0.054 µg/g
*** Sample ID: 833					Seq: 353	18:20:22 24 Dec 1999 HG			
Hg	1.21	ug/L	.000	1.21					0.069 µg/g
*** Sample ID: 833 dup					Seq: 354	18:22:44 24 Dec 1999 HG			RPD = <1.0%
Hg	1.20	ug/L	[illegible]	1.20					0.068 µg/g

Line	Conc.	Units	SD/RSD	1	2	3	4	5	
*** Sample ID: 792 [redacted]					Seq: 355	18:25:04 24 Dec 1999 HG			
Hg	1.02	ug/L	.000	1.02					0.052 µg/g
*** Sample ID: 792 dup					Seq: 356	18:27:24 24 Dec 1999 HG			RPD = <1.0%
Hg	1.02	ug/L	.000	1.02					0.052 µg/g
*** Sample ID: 793					Seq: 357	18:29:44 24 Dec 1999 HG			
Hg	.844	ug/L	.000	.844					0.044 µg/g
*** Sample ID: 793 dup					Seq: 358	18:32:03 24 Dec 1999 HG			RPD = 1.6%
Hg	.858	ug/L	.000	.858					0.045 µg/g
*** Sample ID: 794					Seq: 359	18:34:22 24 Dec 1999 HG			
Hg	.947	ug/L	.000	.947					0.047 µg/g
*** Sample ID: 794 dup					Seq: 360	18:36:41 24 Dec 1999 HG			RPD = <1.0%
Hg	.950	ug/L	.000	.950					0.047 µg/g ~~0.048 µg/g~~ MB 12/28/99
*** Sample ID: 812 [redacted]					Seq: 361	18:39:01 24 Dec 1999 HG			
Hg	1.21	ug/L	.000	1.21					0.063 µg/g
*** Sample ID: 812 dup					Seq: 362	18:41:19 24 Dec 1999 HG			RPD = <1.0%
Hg	1.20	ug/L	.000	1.20					0.062 µg/g
*** Sample ID: 812 trp					Seq: 363	18:43:38 24 Dec 1999 HG			RPD = 2.5%
Hg	1.18	ug/L	.000	1.18					0.061 µg/g
*** Sample ID: 813					Seq: 364	18:45:57 24 Dec 1999 HG			
Hg	1.26	ug/L	.000	1.26					0.066 µg/g
*** Sample ID: 813 dup					Seq: 365	18:48:21 24 Dec 1999 HG			RPD = 2.4%
Hg	1.29	ug/L	.000	1.29					0.067 µg/g
*** Sample ID: 813 spk					Seq: 366	18:50:41 24 Dec 1999 HG			
Hg	2.16	ug/L	.000	2.16					TV = ~~2.0~~ 1.0 MB 12/28/99 90%

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccb					Seq: 367	18:53:12 24 Dec 1999 HG		
Hg	-.029	ug/L	.000	-.029				<0.2µg/L
*** Sample ID: ccv					Seq: 368	18:55:31 24 Dec 1999 HG		
Hg	2.06	ug/L	.000	2.06				TV=2.0 103%
*** Sample ID: 814					Seq: 369	18:58:01 24 Dec 1999 HG		
Hg	1.28	ug/L	.000	1.28				0.067µg/g
*** Sample ID: 814 dup					Seq: 370	19:00:21 24 Dec 1999 HG		RPD=<1.0%
Hg	1.22	ug/L	.000	1.28				0.067µg/g
*** Sample ID: 777					Seq: 371	19:02:41 24 Dec 1999 HG		
Hg	.598	ug/L	.000	.598				0.029µg/g
*** Sample ID: 777 dup					Seq: 372	19:05:00 24 Dec 1999 HG		RPD=1.3%
Hg	.590	ug/L	.000	.590				0.029µg/g
*** Sample ID: 778					Seq: 373	19:07:19 24 Dec 1999 HG		
Hg	.484	ug/L	.000	.484				0.024µg/g
*** Sample ID: 778 dup					Seq: 374	19:09:39 24 Dec 1999 HG		RPD=<1.0%
Hg	.487	ug/L	.000	.487				0.024µg/g
*** Sample ID: 779					Seq: 375	19:11:58 24 Dec 1999 HG		
Hg	.404	ug/L	.000	.404				0.021µg/g
*** Sample ID: 779 dup					Seq: 376	19:14:17 24 Dec 1999 HG		RPD=1.9%
Hg	.412	ug/L	.000	.412				0.021µg/g
*** Sample ID: 806					Seq: 377	19:16:37 24 Dec 1999 HG		
Hg	1.62	ug/L	.000	1.62				0.081µg/g
*** Sample ID: 806 dup					Seq: 378	19:19:02 24 Dec 1999 HG		RPD=<1.0%
Hg	1.61	ug/L	.000	1.61				0.081µg/g

Windows check

19:21:26 24 Dec 1999 Folder: DEC99C Page Dec
Protocol: SYSTEST

Line	Conc.	Units	SD/RSD	1	2	3	4	5	
*** [illegible]									
Hg	2.39	ug/L	.000	2.39					0.120 µg/g
*** Sample ID: 807 dup					Seq: 380	19:22:52 24 Dec 1999 HG			RPD = 1.2%
Hg	2.42	ug/L	.000	2.42					0.121 µg/g
*** Sample ID: 808					Seq: 381	19:26:24 24 Dec 1999 HG			
Hg	2.37	ug/L	.000	2.37					0.117 µg/g
*** Sample ID: 808 dup					Seq: 382	19:28:51 24 Dec 1999 HG			RPD = <1.0%
Hg	2.36	ug/L	.000	2.36					0.117 µg/g
*** Sample ID: 771					Seq: 383	19:31:15 24 Dec 1999 HG			
Hg	1.19	ug/L	.000	1.19					0.065 µg/g
*** Sample ID: 771 dup					Seq: 384	19:33:43 24 Dec 1999 HG			RPD = 1.7%
Hg	1.21	ug/L	.000	1.21					0.066 µg/g ~~0.067~~ 0.066 µg/g
*** Sample ID: 772					Seq: 385	19:36:05 24 Dec 1999 HG			
Hg	1.23	ug/L	.000	1.23					0.068 µg/g
*** Sample ID: 772 dup					Seq: 386	19:38:32 24 Dec 1999 HG			RPD = <1.0%
Hg	1.24	ug/L	.000	1.24					0.068 µg/g
*** Sample ID: 772 trp					Seq: 387	19:40:54 24 Dec 1999 HG			RPD = 3.2%
Hg	1.27	ug/L	.000	1.27					0.070 µg/g
*** Sample ID: 773					Seq: 388	19:44:43 24 Dec 1999 HG			
Hg	1.31	ug/L	.000	1.31					0.070 µg/g
*** Sample ID: 773 dup					Seq: 389	19:47:01 24 Dec 1999 HG			RPD = <1.0%
Hg	1.30	ug/L	.000	1.30					0.069 µg/g
*** Sample ID: 773 spk					Seq: 390	19:49:22 24 Dec 1999 HG			
Hg	2.23	ug/L	.000	2.23					97%

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: ccc				Seq: 391	19:51:45 24 Dec 1999 HG			
Hg	-.025	ug/L	.000	-.025	<0.2 µg/L			
*** Sample ID: ccv				Seq: 392	19:54:03 24 Dec 1999 HG			
Hg	2.05	ug/L	.000	2.05	TV=2.0	103%		

Dry Weight(DW)/Total Volatile Solids (TVS) Notebook # 6

Sample Number/ Test (DW/TVS)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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.[illegible]69	10.9649	11.7093
Wt after Drying	5.9013	6.9834	5.00[illegible]	9.2599	10.3443	11.0886
Wt of Pan or Wt After Ignition	0.9782	0.982[illegible]	0.9836	0.9849	0.9842	0.9783
Difference	4.9231	[illegible].0014	4.0233	8.2750	9.3601	10.1103
Sample amount g	5.6[illegible]91	7.1840	4.8243	8.9120	9.9807	10.7310
Result	8[illegible] %	83.3 %	83.4 %	92.9 %	[illegible] %	94.2 %

Sample Number/ Test (DW/TVS)	138[illegible]	[illegible]07	13[illegible]	1384777	1384777	1384778
Client/Pan #	JAMMIS R1 7	—— R2 8	—— R3 9	WIDONS CRK 10 R1	—— DUP 11 R1	—→ 12 R2
Wt of Pan + Sample	10.1893	8.7766	9.85[illegible]1	7.6504	6.6912	11.7089
Wt after Drying	10.02[illegible]8	8.6516	9.7[illegible]07	6.7662	6.4253	11.2141
Wt of Pan or Wt After Ignition	0.9[illegible]82	0.9775	0.[illegible]737	0.9801	0.9801	0.9784
Difference	9.0476	7.6741	8.7870	5.7861	5.4452	10.2357
Sample amount g	9.2111	7.7571	8.8804	6.0703	5.7111	10.7305
Result	98.2%	98.9%	98.9%	95.3%	95.3 %	95.4 %

Sample Number/ Test (DW/TVS)	1384779	138[illegible]	1384813	1384[illegible]4
Client/Pan #	WIDONS CRK 13 R3	MONTANA 14 R1	—→ 15 R2	—→ 16 R3
Wt of Pan + Sample	7.2461	8.0743	7.709[illegible]	6.3980
Wt after Drying	6.9648	7.6309	7.2[illegible]5	6.0976
Wt of Pan or Wt After Ignition	0.9778	0.9802	0.9812	0.9779
Difference	5.9870	6.6507	6.3033	5.1197
Sample amount g	6.2683	7.09[illegible]1	6.7287	5.4201
Result	95.5%	[illegible]%	93.7%	94.5%

Batch Number ——
TVS -
DW - 3395

Note:
METCO COALS
CONTD -

Analyst: LP Date: 12/21/99

TestAmerica INCORPORATED

APPENDIX E

Unit Operational Data

WIDOWS CREEK FOSSIL PLANT - UNIT 6
EPA MERCURY ICR TEST
AVERAGE UNIT DATA

		Run 1	Run 2	Run 3
AIR EXIT HTR A	deg F	592.00	595.86	598.40
FLUGAS INLET HTR A	deg F	653.62	656.00	656.00
AIR EXIT HTR B	deg F	592.00	598.19	600.00
FLUGAS INLET AIR HTR B	deg F	664.00	666.22	670.53
AIR ENT/A	deg F	98.25	102.84	92.86
AIR ENT/B	deg F	100.20	104.60	96.31
A EXIT GAS	deg F	315.24	319.37	314.81
B EXIT GAS	deg F	313.21	315.81	314.60
PERCENT O2 A	%	2.93	2.95	3.26
PERCENT O2 B	%	4.91	4.56	5.18
FEEDWATER FLOW	KLBH	892.18	893.31	890.42
M S FLOW	KLBH	851.12	850.55	847.56
AIR FLOW	KLBH	897.24	893.97	910.90
OPACITY-A	%	10.54	9.86	11.64
OPACITY-B	%	21.01	23.15	22.21
MEGAWATTS	MW	119.49	119.71	119.99
COAL FLOW	LB/HR	99059	104298	104210

Coal flow is estimated. Only 2 of the four coal were in operation. Data from the two working scales was averaged and assumed for the other two coal scales. Mill amps and dP were very similar for all four mills, with the exception of mill D, which did not have a working coal scale. Mill amps on Mill D were slightly higher, therefore the estimated coal flow could be estimated low.

WIDOWS CREEK FOSSIL PLANT - UNIT 6
EPA ICR MERCURY SPECIATION TEST
DATA COLLECTED USING ON-LINE PLANT INSTRUMENTATION (fumes)

Test Run 1 - 10/20/99

Sample Time		9:00	9:15	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	Average	Max	Min
WC6-92 AIR EXIT HTR A	(DEGF)	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00
WC6-93 FLUGAS INLET HTR A	(DEGF)	648.00	648.00	648.00	649.07	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	653.62	656.00	648.00
WC6-97 AIR EXIT HTR B	(DEGF)	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00	592.00
WC6-98 FLUGAS INLET AIR HTR B	(DEGF)	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00	664.00
WC6-170 AIR ENT/A	(DEG)	97.02	97.25	97.26	97.47	97.65	97.69	97.79	97.88	98.50	98.87	99.53	99.92	100.44	98.25	100.44	97.02
WC6-171 AIR ENT/B	(DEG)	98.94	99.16	99.12	99.38	99.57	99.49	99.59	99.68	100.21	100.81	101.68	102.01	102.94	100.20	102.94	98.94
WC6-172 A EXIT GAS	(DEG)	314.88	314.55	313.95	314.15	314.60	314.80	314.70	314.76	315.18	315.97	316.66	316.99	316.99	315.24	316.99	313.95
WC6-173 B EXIT GAS	(DEG)	313.10	313.86	313.12	313.29	313.21	313.01	312.76	312.10	312.16	312.89	313.40	314.28	314.61	313.21	314.61	312.10
WC6-176 PERCENT O2 A	(%)	3.27	3.11	2.96	2.82	2.84	2.91	2.92	2.89	2.87	2.96	2.93	2.77	2.80	2.93	3.27	2.77
WC6-177 PERCENT O2 B	(%)	5.06	4.98	4.92	4.99	4.95	5.00	4.90	4.89	4.88	4.84	4.80	4.87	4.77	4.91	5.06	4.77
WC6-183 FEEDWATER FLOW	(KLBH)	895.56	891.30	895.64	892.14	892.88	892.69	890.31	893.19	891.91	891.05	890.94	889.06	891.63	892.18	895.64	889.06
WC6-184 M S FLOW	(KLBH)	851.43	851.19	851.27	851.09	851.69	850.51	851.22	851.46	850.57	850.78	851.01	851.16	851.15	851.12	851.69	850.51
WC6-185 AIR FLOW	(KLBH)	900.12	895.02	887.72	895.11	892.95	894.80	901.55	903.31	901.35	897.44	900.52	892.83	901.35	897.24	903.31	887.72
WC6-194 OPACITY	(%)	13.36	11.49	11.16	10.84	10.24	10.73	10.03	10.21	9.72	10.06	9.74	9.89	9.49	10.54	13.36	9.49
WC6-195 OPACITY	(%)	21.71	23.23	21.42	23.05	20.63	22.21	19.99	20.53	20.33	21.44	19.73	22.34	16.53	21.01	23.23	16.53
WC6-391 MEGAWATTS	(MW)	119.09	119.23	119.25	119.20	119.40	119.27	119.45	119.62	119.71	119.76	119.72	119.75	119.87	119.49	119.87	119.09

WIDOWS CREEK FOSSIL PLANT - UNIT 6
EPA ICR MERCURY SPECIATION TEST
DATA COLLECTED USING ON-LINE PLANT INSTRUMENTATION (fumes)

Test Run 2 - 10/20/99

Sample Time		13:00	13:15	13:30	13:45	14:00	14:15	14:30	14:45	15:00	15:15	15:30	15:45	16:00	Average	Max	Min
WC6-92 AIR EXIT HTR A	(DEGF)	592.00	592.00	592.00	592.00	598.93	594.67	595.73	592.00	597.87	598.93	600.00	600.00	600.00	595.86	600.00	592.00
WC6-93 FLUGAS INLET HTR A	(DEGF)	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00
WC6-97 AIR EXIT HTR B	(DEGF)	592.00	596.80	600.00	593.60	599.47	600.00	600.00	596.80	597.87	600.00	600.00	600.00	600.00	598.19	600.00	592.00
WC6-98 FLUGAS INLET AIR HTR B	(DEGF)	664.00	664.00	664.00	664.00	666.67	669.33	664.00	664.00	668.27	668.80	669.87	664.53	669.33	666.22	669.87	664.00
WC6-170 AIR ENT/A	(DEG)	100.55	100.11	100.55	102.89	102.76	103.24	103.38	103.58	103.68	103.41	104.25	103.72	104.77	102.84	104.77	100.11
WC6-171 AIR ENT/B	(DEG)	103.24	103.48	103.50	103.50	104.55	104.22	104.13	105.23	105.47	105.49	105.55	105.08	106.32	104.60	106.32	103.24
WC6-172 A EXIT GAS	(DEG)	317.47	318.17	318.59	318.62	319.42	319.06	319.12	319.16	320.01	320.03	320.71	320.60	320.88	319.37	320.88	317.47
WC6-173 B EXIT GAS	(DEG)	314.67	315.21	315.66	315.23	316.17	316.26	315.93	315.42	315.55	315.92	316.83	315.98	316.67	315.81	316.83	314.67
WC6-176 PERCENT O2 A	(%)	2.85	2.96	2.94	2.91	2.83	2.92	2.96	2.85	2.87	3.07	3.05	3.03	3.08	2.95	3.08	2.83
WC6-177 PERCENT O2 B	(%)	4.77	4.68	4.71	4.75	4.65	4.60	4.63	4.57	4.55	4.61	4.27	4.27	4.21	4.56	4.77	4.21
WC6-183 FEEDWATER FLOW	(KLBH)	893.71	890.58	894.99	894.93	891.74	893.42	895.50	894.98	891.42	893.22	893.89	894.69	889.89	893.31	895.50	889.89
WC6-184 M S FLOW	(KLBH)	849.45	849.58	851.12	850.52	850.78	850.74	850.13	851.29	850.67	849.57	851.63	851.40	850.27	850.55	851.63	849.45
WC6-185 AIR FLOW	(KLBH)	895.66	890.65	896.53	900.42	895.59	895.73	897.81	888.56	892.11	891.04	889.48	896.91	891.11	893.97	900.42	888.56
WC6-194 OPACITY	(%)	9.85	10.78	9.84	9.95	9.87	9.99	9.59	9.39	8.99	10.17	9.35	10.51	9.90	9.86	10.78	8.99
WC6-195 OPACITY	(%)	20.02	21.18	21.78	22.54	21.84	22.83	22.40	22.93	22.04	23.43	22.36	31.46	26.16	23.15	31.46	20.02
WC6-391 MEGAWATTS	(MW)	119.38	119.39	119.74	119.47	119.68	119.88	119.67	119.93	119.82	119.55	120.07	119.84	119.75	119.71	120.07	119.38

WIDOWS CREEK FOSSIL PLANT - UNIT 6
EPA ICR MERCURY SPECIATION TEST
DATA COLLECTED USING ON-LINE PLANT INSTRUMENTATION (fumes)

Test Run 3 - 10/21/99

Sample Time		8:00	8:15	8:30	8:45	9:00	9:15	9:30	9:45	10:00	10:15	10:30	10:45	Average	Max	Min
WC6-92 AIR EXIT HTR A	(DEGF)	592.00	592.00	596.80	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	598.40	600.00	592.00
WC6-93 FLUGAS INLET HTR A	(DEGF)	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00	656.00
WC6-97 AIR EXIT HTR B	(DEGF)	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
WC6-98 FLUGAS INLET AIR HTR B	(DEGF)	664.00	668.80	672.00	672.00	672.00	672.00	672.00	672.00	672.00	672.00	672.00	665.60	670.53	672.00	664.00
WC6-170 AIR ENT/A	(DEG)	90.98	91.18	91.35	91.67	92.12	92.50	92.78	93.26	93.66	94.30	95.09	95.42	92.86	95.42	90.98
WC6-171 AIR ENT/B	(DEG)	94.57	94.75	94.95	95.24	95.65	96.02	96.27	96.66	96.98	97.63	98.33	98.62	96.31	98.62	94.57
WC6-172 A EXIT GAS	(DEG)	313.66	313.40	313.27	313.76	315.34	315.21	314.69	314.54	315.56	316.00	316.16	316.13	314.81	316.16	313.27
WC6-173 B EXIT GAS	(DEG)	314.35	313.90	314.31	314.17	315.01	314.56	315.24	316.68	314.93	314.29	313.99	313.73	314.60	316.68	313.73
WC6-176 PERCENT O2 A	(%)	3.29	3.23	3.39	3.29	3.40	3.31	3.31	3.31	3.26	3.14	3.12	3.06	3.26	3.40	3.06
WC6-177 PERCENT O2 B	(%)	5.45	5.13	5.25	5.31	5.16	5.21	5.24	5.22	5.14	5.12	5.04	4.94	5.18	5.45	4.94
WC6-183 FEEDWATER FLOW	(KLBH)	895.82	890.58	887.91	886.09	888.29	888.48	891.45	891.61	890.55	890.99	892.43	890.87	890.42	895.82	886.09
WC6-184 M S FLOW	(KLBH)	847.20	848.04	847.58	847.93	847.71	847.37	846.93	847.26	847.60	848.21	847.38	847.54	847.56	848.21	846.93
WC6-185 AIR FLOW	(KLBH)	903.80	907.65	913.13	908.47	907.43	914.04	909.02	912.26	910.17	912.43	912.76	919.63	910.90	919.63	903.80
WC6-194 OPACITY	(%)	12.41	12.05	11.50	11.81	11.74	11.79	11.53	11.50	11.26	11.52	11.05	11.57	11.64	12.41	11.05
WC6-195 OPACITY	(%)	21.92	22.79	21.64	29.26	21.12	22.05	21.78	21.65	20.53	22.25	19.94	21.62	22.21	29.26	19.94
WC6-391 MEGAWATTS	(MW)	119.27	119.72	119.91	120.24	120.34	120.02	120.03	120.20	120.08	120.28	119.88	119.90	119.99	120.34	119.27

FUMES data 10/21/1999 08:00 to 10/21/1999 10:45

Average	598.399999	656	600	670.5333303	92.85992177	96.30654399	314.8118261	314.5968348	3.259558062
Minumum	592	656	600	664	90.97908783	94.56989288	313.2716064	313.7266846	3.059899807
Maximum	600	656	600	672	95.4160614	98.62085724	316.1593018	316.6804199	3.402677298

Sample Time	WC6-92 AIR EXIT HTR A (DEGF)	WC6-93 FLUGAS INLET HTR A (DEGF)	WC6-97 AIR EXIT HTR B (DEGF)	WC6-98 FLUGAS INLET AIR HTR B (DEGF)	WC6-170 AIR ENT/A (DEG)	WC6-171 AIR ENT/B (DEG)	WC6-172 A EXIT GAS (DEG)	WC6-173 B EXIT GAS (DEG)	WC6-176 PERCENT O2 A (%)
10/21/1999 08:00	592	656	600	664	90.97908783	94.56989288	313.6622314	314.3474731	3.285769224
10/21/1999 08:15	592	656	600	668.7999878	91.1829834	94.74501038	313.4024658	313.9024353	3.23111701
10/21/1999 08:30	596.7999878	656	600	672	91.35093689	94.95453644	313.2716064	314.3088379	3.386956692
10/21/1999 08:45	600	656	600	672	91.67398071	95.24137115	313.7644653	314.171936	3.287369728
10/21/1999 09:00	600	656	600	672	92.12319946	95.65396118	315.3432312	315.0099487	3.402677298
10/21/1999 09:15	600	656	600	672	92.4954071	96.01791382	315.212616	314.5645447	3.312180758
10/21/1999 09:30	600	656	600	672	92.7796402	96.27310944	314.6901855	315.239624	3.309151173
10/21/1999 09:45	600	656	600	672	93.2613678	96.65505219	314.5385742	316.6804199	3.313324451
10/21/1999 10:00	600	656	600	672	93.65932465	96.98164368	315.5605774	314.9309692	3.260215521
10/21/1999 10:15	600	656	600	672	94.30358124	97.63088989	316.0025635	314.2926941	3.144736767
10/21/1999 10:30	600	656	600	672	95.0934906	98.33428955	316.1593018	313.9864502	3.121298313
10/21/1999 10:45	600	656	600	665.5999756	95.4160614	98.62085724	316.1340942	313.7266846	3.059899807

5.183808128	890.4221497	847.5627187	910.8978119	11.64434179	22.21211974	119.9893163
4.939401627	886.0925293	846.934021	903.7958984	11.04808617	19.93762398	119.2737122
5.453911304	895.8204956	848.2095947	919.6315918	12.41339397	29.25570297	120.3379517

WC6-177 PERCENT O2 B (%)	WC6-183 FEEDWATER FLOW (KLBH)	WC6-184 MS FLOW (KLBH)	WC6-185 AIR FLOW (KLBH)	WC6-194 OPACITY (%)	WC6-195 OPACITY (%)	WC6-391 MEGAWATTS (MW)
5.453911304	895.8204956	847.1983032	903.7958984	12.41339397	21.91687012	119.2737122
5.126912117	890.5801392	848.0372314	907.6455688	12.05397511	22.78777504	119.7188339
5.253995419	887.9083862	847.583313	913.1329346	11.49614143	21.64283562	119.9093323
5.312421322	886.0925293	847.9281006	908.4673462	11.81165028	29.25570297	120.2390366
5.15938282	888.2875366	847.7096558	907.4273071	11.73765373	21.12078285	120.3379517
5.208662033	888.4771729	847.3707886	914.0408325	11.79457569	22.04779243	120.0201492
5.239589691	891.4477539	846.934021	909.0189209	11.53192139	21.78107452	120.0347977
5.216722488	891.6143799	847.2557983	912.2597046	11.50183392	21.65259171	120.1959991
5.140861034	890.5514526	847.6005249	910.1680298	11.25788593	20.53123665	120.0806122
5.116850376	890.9880981	848.2095947	912.4261475	11.51728439	22.25433731	120.2784271
5.036987305	892.4303589	847.3822021	912.7594604	11.04808617	19.93762398	119.8791046
4.939401627	890.8674927	847.5430908	919.6315918	11.56769943	21.61681366	119.9038391

4.558528423	893.3050725	850.5499737	893.9697782	9.859930625	23.15076667	119.7055112
4.206226349	889.8850098	849.4506836	888.5632935	8.990775108	20.01938057	119.3781204
4.76578331	895.5044556	851.62854	900.4229126	10.7764883	31.4585743	120.0723495

WC6-177 PERCENT O2 B (%)	WC6-183 FEEDWATER FLOW (KLBH)	WC6-184 MS FLOW (KLBH)	WC6-185 AIR FLOW (KLBH)	WC6-194 OPACITY (%)	WC6-195 OPACITY (%)	WC6-391 MEGAWATTS (MW)
4.76578331	893.7058716	849.4506836	895.6595459	9.848286629	20.01938057	119.3781204
4.678088188	890.5802002	849.5828857	890.6491699	10.7764883	21.17689514	119.3854446
4.712388515	894.9873657	851.1227417	896.5270996	9.835708618	21.77950478	119.7435455
4.746403694	894.9297485	850.5194092	900.4229126	9.951708794	22.54034233	119.4678879
4.64504528	891.7409058	850.7780762	895.5905762	9.872873306	21.83943176	119.6821976
4.602855206	893.4244385	850.737793	895.7284546	9.992596626	22.82680702	119.8809433
4.62938118	895.5044556	850.1287842	897.8143311	9.587638855	22.39989662	119.6693726
4.56786871	894.9815674	851.2894287	888.5632935	9.385972023	22.92926788	119.934967
4.549688816	891.4190063	850.6746216	892.1085205	8.990775108	22.03559685	119.8214035
4.612573624	893.2232666	849.5714111	891.0397949	10.17393398	23.42611122	119.547554
4.274141312	893.8898315	851.62854	889.482605	9.351008415	22.36492538	120.0723495
4.27042532	894.6942749	851.3986206	896.9121094	10.51139736	31.4585743	119.8369751
4.206226349	889.8850098	850.2666626	891.1087036	9.900710106	26.1632328	119.750885

FUMES data 10/20/1999 13:00 to 10/20/1999 16:00

Average	595.8563937	656	598.1948618	666.2153884	102.8380667	104.5954707	319.3730985	315.8083801	2.947468703
Minumum	592	656	592	664	100.1125641	103.2388611	317.4706726	314.6684265	2.829056978
Maximum	600	656	600	669.8666382	104.7741089	106.318779	320.8815308	316.8280334	3.077393055

Sample Time	WC6-92 AIR EXIT HTR A (DEGF)	WC6-93 FLUGAS INLET HTR A (DEGF)	WC6-97 AIR EXIT HTR B (DEGF)	WC6-98 FLUGAS INLET AIR HTR B (DEGF)	WC6-170 AIR ENT/A (DEG)	WC6-171 AIR ENT/B (DEG)	WC6-172 A EXIT GAS (DEG)	WC6-173 B EXIT GAS (DEG)	WC6-176 PERCENT O2 A (%)
10/20/1999 13:00	592	656	592	664	100.5508041	103.2388611	317.4706726	314.6684265	2.850551844
10/20/1999 13:15	592	656	596.7999878	664	100.1125641	103.4785843	318.1704407	315.2140808	2.955283165
10/20/1999 13:30	592	656	600	664	100.5518265	103.4974213	318.5882874	315.6629028	2.940705299
10/20/1999 13:45	592	656	593.5999756	664	102.8894272	103.5031433	318.6241455	315.2296143	2.908176661
10/20/1999 14:00	598.9332886	656	599.4666138	666.666687	102.76091	104.5450058	319.4173889	316.1650696	2.829056978
10/20/1999 14:15	594.666626	656	600	669.333313	103.2404938	104.2162933	319.0582275	316.2625427	2.917609692
10/20/1999 14:30	595.7333374	656	600	664	103.3777008	104.1303864	319.12146	315.9308472	2.956997871
10/20/1999 14:45	592	656	596.7999878	664	103.5794144	105.2300339	319.1629639	315.4229736	2.848779917
10/20/1999 15:00	597.8666382	656	597.8666382	668.2666626	103.6835556	105.4661942	320.0140686	315.546051	2.871189356
10/20/1999 15:15	598.9332275	656	600	668.7999878	103.4132462	105.4887238	320.0279541	315.9239807	3.071905136
10/20/1999 15:30	600	656	600	669.8666382	104.2457275	105.5475235	320.7095032	316.8280334	3.054754972
10/20/1999 15:45	600	656	600	664.5333862	103.7150879	105.0801697	320.6036377	315.9814148	3.034689188
10/20/1999 16:00	600	656	600	669.333374	104.7741089	106.318779	320.8815308	316.6730042	3.077393055

4.911090851	892.1762132	851.1174927	897.2361544	10.53654231	21.01050436	119.4854871
4.769213676	889.0574951	850.5137329	887.718689	9.490872383	16.52964592	119.0923691
5.056595802	895.6365967	851.6859131	903.3131714	13.35910702	23.22607231	119.8662796

WC6-177 PERCENT O2 B (%)	WC6-183 FEEDWATER FLOW (KLBH)	WC6-184 MS FLOW (KLBH)	WC6-185 AIR FLOW (KLBH)	WC6-194 OPACITY (%)	WC6-195 OPACITY (%)	WC6-391 MEGAWATTS (MW)
5.056595802	895.5561523	851.4331055	900.1242065	13.35910702	21.71439171	119.0923691
4.981019974	891.3041992	851.1918335	895.0217285	11.49207687	23.22607231	119.2260818
4.917048931	895.6365967	851.2663574	887.718689	11.1635561	21.42246819	119.2498932
4.988279819	892.1373291	851.0940552	895.1078491	10.83666325	23.04879951	119.203186
4.9532938	892.878479	851.6859131	892.9474487	10.24142456	20.6263752	119.4000931
4.995597839	892.6889038	850.5137329	894.7976685	10.73176575	22.21286583	119.2673035
4.904873371	890.3099976	851.220459	901.5491333	10.03162861	19.99454498	119.4477234
4.885149956	893.1945801	851.461853	903.3131714	10.2137785	20.52554512	119.6153336
4.875203133	891.913269	850.5654297	901.3480835	9.72018528	20.3255043	119.7069168
4.844274998	891.0456543	850.7780151	897.4350586	10.06415462	21.43629074	119.7637024
4.802428246	890.9421387	851.0078735	900.5206299	9.736447334	19.73026657	119.7243118
4.871201515	889.0574951	851.1572266	892.8325806	9.893389702	22.34378624	119.7481384
4.769213676	891.6259766	851.1515503	901.3537598	9.490872383	16.52964592	119.8662796

FUMES data 10/20/1999 09:00 to 10/20/1999 12:00

Average	592	653.6205116	592	664	98.2537654	100.1980203	315.2445467	313.2149447	2.927723958
Minumum	592	648	592	664	97.01730347	98.94402313	313.950531	312.095459	2.770745993
Maximum	592	656	592	664	100.4431686	102.9357758	316.988739	314.6123352	3.269533873

Sample Time	WC6-92 AIR EXIT HTR A (DEGF)	WC6-93 FLUGAS INLET HTR A (DEGF)	WC6-97 AIR EXIT HTR B (DEGF)	WC6-98 FLUGAS INLET AIR HTR B (DEGF)	WC6-170 AIR ENT/A (DEG)	WC6-171 AIR ENT/B (DEG)	WC6-172 A EXIT GAS (DEG)	WC6-173 B EXIT GAS (DEG)	WC6-176 PERCENT O2 A (%)
10/20/1999 09:00	592	648	592	664	97.01730347	98.94402313	314.8820801	313.1040649	3.269533873
10/20/1999 09:15	592	648	592	664	97.25328064	99.15860748	314.5527954	313.8551941	3.109578609
10/20/1999 09:30	592	648	592	664	97.26345825	99.11974335	313.950531	313.1171265	2.963686943
10/20/1999 09:45	592	649.0666504	592	664	97.47426605	99.3792572	314.1485901	313.2904663	2.816365719
10/20/1999 10:00	592	656	592	664	97.65492249	99.57356262	314.5978394	313.2149353	2.839461803
10/20/1999 10:15	592	656	592	664	97.69393158	99.48651886	314.8049622	313.0084839	2.914522648
10/20/1999 10:30	592	656	592	664	97.79489899	99.58733368	314.6964111	312.7640381	2.924983978
10/20/1999 10:45	592	656	592	664	97.87702942	99.67630768	314.7626038	312.095459	2.885938883
10/20/1999 11:00	592	656	592	664	98.50061798	100.207962	315.1763916	312.1574097	2.870331764
10/20/1999 11:15	592	656	592	664	98.87046814	100.8148651	315.9653015	312.8909607	2.963115215
10/20/1999 11:30	592	656	592	664	99.53060913	101.6762848	316.6647644	313.3993225	2.934874296
10/20/1999 11:45	592	656	592	664	99.92499542	102.0140228	316.9880981	314.2844849	2.770745993
10/20/1999 12:00	592	656	592	664	100.4431686	102.9357758	316.988739	314.6123352	2.797271729

10/20/99 WIDOWS CREEK FOSSIL PLANT - UNIT 6 ESP DATA

Mercury Test Run #1

READING TIME 0916

		6A1	6A2	6A3	6A4	6A5	6A1B	6A2B	6A3B	6A4B	6A5B
Lin Volts	rms	473	470	472	469	472	471	473	470	472	469
Pri Current	Ave	12.8	18.1	20.2	50	33	7.5	5.5	16.8	18.6	45
Pri Current	rms	27.2	37.3	41.3	90	71	22.8	12.8	42	46	76
Act Power	KW	5	6.2	7.1	19	9.6	3.5	1.8	7.4	7	10.9
App Power	KVA	12.4	17.7	16.3	45	34	10.6	6	18.3	25	38.6
Sec Volt	KV	42.8	44.3	37	37	33	44	35	20.03	37	34
Sec Volt Peak	KV	45.8	46.6	38.6	55	40.4	45.	37.2	29.33	44	36.8
Sec Volt Valley	KV	39.8	41.7	31	27	27	40	30	12.22	22	27.3
Sec Current	mA	107	145	175	349	288	27	49	64.0 115	160	391
Sec Current Peak	mA	605	760	984	1806	1674	388	380	690	1000	1240
Density	uA/m2	33	44	60	120	94	10	17	53	54	125

READING TIME 1035

		6A1	6A2	6A3	6A4	6A5	6A1B	6A2B	6A3B	6A4B	6A5B
Lin Volts	rms	474	469	472	469	472	471	473	471	472	469
Pri Current	Ave	13.0	19.3	18.1	54.3	34	7.7	5.6	18.9	24	40.6
Pri Current	rms	26.6	40	49	92.3	72.6	23.7	14.7	37	52	67.7
Act Power	KW	5	6.6	7.8	19.4	10	3	2.8	6.5	7	9.4
App Power	KVA	13.2	18	20.6	45.6	34.5	10.0	8	20	23.8	31
Sec Volt	KV	42.4	44	37.2	37.7	32.3	44	36	30	36	35
Sec Volt Peak	KV	45.9	46	37.6	54.7	40.3	46.1	38	33	33	39
Sec Volt Valley	KV	38.8	41.3	30.5	26	26.4	36.3	34	25	24	32
Sec Current	mA	123	158	174	387	295	27	53	106	201	308
Sec Current Peak	mA	674	853	1054	1915	1713	341	355	721	1122	1147
Density	uA/m2	39	53	72	149	98	8	18	74	72	110

READING TIME 1153

		6A1	6A2	6A3	6A4	6A5	6A1B	6A2B	6A3B	6A4B	6A5B
Lin Volts	rms	474	470	472	469	472	472	473	471	472	470
Pri Current	Ave	10.9	19.7	20	53	34	9	3.6	20	15	49
Pri Current	rms	25.2	40.1	44.6	96	74	24	8.5	41	30	75
Act Power	KW	5.0	6.6	8.7	19	10	3.6	1.4	6	3	11
App Power	KVA	13.4	18.4	21.0	43	35	12	6.1	19	20	36
Sec Volt	KV	42.5	44.1	31.7	37	32	44	36	21	27	35
Sec Volt Peak	KV	45.5	46.6	42.3	55	40	51	37	25	41	39
Sec Volt Valley	KV	39	41.3	33.1	27	26	40	34	19	25	31
Sec Current	mA	117	160	207	442	391	31	65	111	110	381
Sec Current Peak	mA	674	845	960	1907	1705	372	442	711	1023	1295
Density	uA/m2	37	53	69	152	96	10	21	75	55	110

10/21/97

WIDOWS CREEK FOSSIL PLANT - UNIT 6 ESP DATA

READING TIME 825

		6A1	6A2	6A3	6A4	6A5	6A1 B	6A2 B	6A3 B	6A4 B	6A5 B
Lin Volts	rms	480	476	478	476	479	478	480	476	480	476
Pri Current	Ave	10.5	16	25	50	32	7	3.6	9	17.7	46
Pri Current	rms	24	34	48	91	69	26	7.3	19	31	68
Act Power	KW	4	5	7	18	9.2	3.2	1.0	3	4	10
App Power	KVA	11	16	20	42	33	10.6	~~8.6~~ 4.4	9	18	32
Sec Volt	KV	43	44	34	39	32	~~44~~	~~35~~ 37	31	27	33
Sec Volt Peak	KV	45	46	40	55	40	~~47~~	~~34~~ 35	33	44	38
Sec Volt Valley	KV	39	42	31	~~39~~	26	38	~~34~~ 33	~~39~~	26	28
Sec Current	mA	95	132	200	383	278	25	~~33~~ 35	69	138	304
Sec Current Peak	mA	566	767	1000	1744	1650	357	215	521	891	1207
Density	uA/m2	30	44	70	131	92	8	10	45	61	109

Run 3

READING TIME 925

		6A1	6A2	6A3	6A4	6A5	6A1 B	6A2 B	6A3 B	6A4 B	6A5 B
Lin Volts	rms	480	477	478	476	479	478	480	477	478	476
Pri Current	Ave	11	17	24	48	33	6.5	5.9	11	18	48
Pri Current	rms	23	36	45	90	70	20	12	27	36	77
Act Power	KW	4	6	8	17	9	3	2	5	6.7	11
App Power	KVA	12	17	22	43	34	10	6	16	23	38
Sec Volt	KV	43	44	32	38	32	44	31	23	35	34
Sec Volt Peak	KV	45	46	41	55	40	49	33	31	42	38
Sec Volt Valley	KV	40	42	26	27	26	39	34	25	21	29
Sec Current	mA	95	132	209	419	279	25	55	99	160	406
Sec Current Peak	mA	575	767	1070	1637	1690	326	400	605	837	1202
Density	uA/m2	30	44	71	140	93	7	14	51	67	124

READING TIME 1022

		6A1	6A2	6A3	6A4	6A5	6A1 B	6A2 B	6A3 B	6A4 B	6A5 B
Lin Volts	rms	480	476	478	476	479	478	480	478	480	476
Pri Current	Ave	11.3	16	21	53	32	7.5	5.2	15	20	50
Pri Current	rms	24	34	40	78	70	22.1	14	26	44	80
Act Power	KW	4.4	5	7	16	9	3	2	4	6	11
App Power	KVA	11.9	16	19	40	34	10	6	14	22	36
Sec Volt	KV	43	44	37	39	33	40	31	30	28	37
Sec Volt Peak	KV	45	46	41	54	40	51	~~38~~ 33	33	34	37
Sec Volt Valley	KV	40	42	30	27	26	36	30	27	21	26
Sec Current	mA	91	129	200	411	278	31	52	111	141	425
Sec Current Peak	mA	570	750	960	1600	1659	380	~~[illegible]~~ 390	700	900	1500
Density	uA/m2	30	44	63	139	93	9	18	56	32	136

10/20/99

WIDOWS CREEK FOSSIL PLANT - UNIT 6 ESP DATA

READING TIME 1333

		6A1	6A2	6A3	6A4	6A5	B 6A1	B 6A2	B 6A3	B 6A4	B 6A5
Lin Volts	rms	474	470	472	469	472	471	473	471	472	469
Pri Current	Ave	13.7	21	18.4	57	35	8.5	6	11.7	12	59
Pri Current	rms	29	41.9	40.4	102	75	23	13	31	35	96
Act Power	KW	5.2	7	6.9	20	10	2.9	1.7	4	6	12
App Power	KVA	13	20	18	49	35	10	7	12	19	44
Sec Volt	KV	42.6	44	36	34	32	44	31	31	34	33
Sec Volt Peak	KV	46	46	40	53	40	51	37	33	41	36
Sec Volt Valley	KV	39	41	32	28	26	38	33	27	23	27
Sec Current	mA	111	169	202	434	300	27	56	95	208	412
Sec Current Peak	mA	620	884	984	1736	1760	364	372	760	761	1636
Density	uA/m2	35	55	59	135	99	9	22	68	54	148

READING TIME 1448

		6A1	6A2	6A3	6A4	6A5	B 6A1	B 6A2	B 6A3	B 6A4	B 6A5
Lin Volts	rms	475	471	473	470	473	472	474	472	473	470
Pri Current	Ave	12.5	20	17.4	60.4	35	9.2	5.2	15	23.4	49
Pri Current	rms	27.2	40	36	108.2	74	22.9	10	22	50	92
Act Power	KW	5	6.6	6.7	21	10	3.2	1.2	5.6	6.7	13
App Power	KVA	13.1	18	19	48	35	11	4.9	12	23	45
Sec Volt	KV	38	44	34	36	32	44	35	28.8	35	30
Sec Volt Peak	KV	45	46	38	54	40	51	36	34	43	37
Sec Volt Valley	KV	39	41	30	26	26	40	33	28	22	29
Sec Current	mA	103	166	198	436	300	26	62	164	200	426
Sec Current Peak	mA	612	876	930	1744	1744	36	428	760	1209	1426
Density	uA/m2	34	55	57	142	1[illegible]	8	20	73	60	153

READING TIME 1553

		6A1	6A2	6A3	6A4	6A5	B 6A1	B 6A2	B 6A3	B 6A4	B 6A5
Lin Volts	rms	476	469	474	469	475	473	475	472	474	469
Pri Current	Ave	11	20	21	54	34	6.7	4.1	10	23	190
Pri Current	rms	26	41	37	104	73	20	7.3	25	43	240
Act Power	KW	4.6	7	6	20	9	3.4	.91	4	7	53
App Power	KVA	12.8	19	19	47	35	10	4.5	13	26	112
Sec Volt	KV	42	44	36	36	32	40	35	22	33	32
Sec Volt Peak	KV	45	46	41	54	40	39	36	25	44	37
Sec Volt Valley	KV	39	41	32	22	26	32	33	28	24	25
Sec Current	mA	104	163	191	461	295	31	51	137	140	1462
Sec Current Peak	mA	636	853	907	2039	1744	364	426	807	922	3045
Density	uA/m2	33	54	55	161	97	8	16	54	33	350

94 91 94 99

run 1 coal calculations

	Mill A	Mill B	Mill C	Mill D
Integrator Reading	88767600	6564966		
Time	9:37:00	9:44:15		
Time for 5 Dumps	353	379		
Dump Coal Flow	25496	23747		
Integrator Reading	88795110	6591088		
Time	10:44:15	10:45:00		
Time for 5 Dumps	---	---		
Dump Coal Flow	---	---		
Integrator Coal Flow	24544.96788	25799.50617		
Integrator Reading	88815628	6613465		
Time	11:34:45	11:36:45		
Time for 5 Dumps	367	380		
Dump Coal Flow	24523	23684		
Integrator Coal Flow	24380	25944		

Dumps	25496	23747
	24523	23684
Integrater	24545	25800
	24380	25944
Average	24736	24794
Total	99059	

run 2 coal calculations

	Mill A	Mill B	Mill C	Mill D
Integrator Reading	888868196	6668389		
Time	13:42:00	13:44:00		
Time for 5 Dumps	350	359		
Dump Coal Flow	25714	25070		
Integrator Reading	888899712	6701444		
Time	14:56:00	14:57:10		
Time for 5 Dumps	---	---		
Dump Coal Flow	---	---		
Integrator Coal Flow	25554.20417	27107.5939		
Integrator Reading	888917712	6719492		
Time	15:37:25	15:39:15		
Time for 5 Dumps	340	402		
Dump Coal Flow	26471	26866		
Integrator Coal Flow	26079	25735		

Dumps	25714	25070
	26471	26866
Integrater	25554	27108
	26079	25735
Average	25955	26194
Total	104298	

run 3 coal calculations

	Mill A	Mill B	Mill C	Mill D
Integrator Reading	89341804	7180263		
Time	8:36:00	8:34:27		
Time for 5 Dumps	339	351		
Dump Coal Flow	26549	25641		
Integrator Reading	89366827	7206427		
Time	9:32:32	9:33:10		
Time for 5 Dumps	---	---		
Dump Coal Flow	---	---		
Integrator Coal Flow	26558.05561	26736.15369		
Integrator Reading	89392340	7231991		
Time	10:30:47	10:31:30		
Time for 5 Dumps	352	363		
Dump Coal Flow	25568	24793		
Integrator Coal Flow	26280	26295		

Dumps	26549	25641
	25568	24793
Integrater	26558	26736
	26280	26295
Average	26239	25866
Total	104210	

WIDOWS CREEK FOSSIL PLANT - UNIT 6 COAL FLOW DATA

DATE 10/20/99

1000
1500
2000
2500

	Mill A	Mill B	Mill C	Mill D
Integrator Reading	88767600	06564966		
Time	9:37:00	9:44:15		
Time for 5 Dumps	353 sec	379 sec		
Dump Coal Flow				
Integrator Reading	88795110	06591088		
Time	10:44:15	10:45		
Time for 5 Dumps	—	—		
Dump Coal Flow	—	—		
Integrator Coal Flow				
Integrator Reading	88815628	06613465		
Time	11:34:45	11:36:45		
Time for 5 Dumps	367	380		
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading	88868196	06668389		
Time	13:42	13:44		
Time for 5 Dumps	350	359		
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading	88899712	06701444		
Time	14:58	14:57:10		
Time for 5 Dumps	—	—		
Dump Coal Flow	—	—		
Integrator Coal Flow				
Integrator Reading	88917712	06719492		
Time	15:37:25	15:39:15		
Time for 5 Dumps	340	402/6 dump		
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading				
Time				
Time for 5 Dumps				
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading				
Time				
Time for 5 Dumps				
Dump Coal Flow				
Integrator Coal Flow				

Run 1

Run 2

Feeder out of service

500 lb/dump

WIDOWS CREEK FOSSIL PLANT - UNIT 6 COAL FLOW DATA

DATE 10/21/99

Run 3

	Mill A	Mill B	Mill C	Mill D
Integrator Reading	89341804	07180263		
Time	8:36	8:34:27		
Time for 5 Dumps	339	351		
Dump Coal Flow				
Integrator Reading	89366827	07206427		
Time	9132:32	9:33:10		
Time for 5 Dumps				
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading	89392340	~~89~~ 07231991		
Time	10:30:47	~~10:30:47~~ 10:31:30		
Time for 5 Dumps	352	363		
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading				
Time				
Time for 5 Dumps				
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading				
Time				
Time for 5 Dumps				
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading				
Time				
Time for 5 Dumps				
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading				
Time				
Time for 5 Dumps				
Dump Coal Flow				
Integrator Coal Flow				
Integrator Reading				
Time				
Time for 5 Dumps				
Dump Coal Flow				
Integrator Coal Flow				

APPENDIX F

Chain of Custody Records

Job# 99-95WCR6 Unit Tested Unit 6

CHAIN OF CUSTODY RECORD

Page # 1/1

Facility Name/Location
TVA
Widows Creek Fossil Plant
Stevenson, AL

Collected By/Company
METCO Environmental

Unit 6 Precipitator Inlet Duct A 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	10/20/99	1322	X				II	BH									X			Filter Thimble Ship to METCO for Weight
Container 2 0.1 N HNO_3 F.W.	10/20/99	1325	X				I	BH									X			Container 2A not recovered.
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/20/99	1338	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/20/99	1341	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/20/99	1356	X				I	BH									X			Used Hydroxylamine Sulfate / Sodium ~~Hydr~~ Chloride

SAMPLE ANALYSIS REQUIRED

Received by	Date:	Time:	Transported by:	Date:	Time:	Received at Lab by:	Date:	Time:
Jason Conway	10-21-99	1145	Jason Conway			Michael H. Ponder	10/30	6:00
Analyzed by:	**Date:**	**Time:**	**Data Reviewed by:**	**Date:**	**Time:**	**Remarks:**		
			RM	01/05/00	1300			

Ship to: ~~TestMa~~ TestAmerica

METCO ENVIRONMENTAL

Job# 99-95WCR6 Unit Tested Unit 6

CHAIN OF CUSTODY RECORD

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Facility Name/Location
TVA
Widows Creek fossil Plant
Stevenson, AL

Collected By/Company
METCO Environmental

Unit 6 Precipitator Inlet Ducta 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.
Container 1 Filter	10/20/99	1617	X				II	BH									X			Filter Q71 Thimble Q46 Ship to METCO for weight
Container 2 0.1 N HNO_3 F.W.	10/20/99	1619	X				I	BH									X			Container 2A not recovered.
Container 3 10 % HNO_3 Rinse Imp 1,2,3	10/20/99	1632	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/20/99	1636	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp. 5,6,7	10/20/99	1648	X				I	BH									X			Used Hydroxylamine sulfate / Sodium chloride.

Received by:	Date: 10-21-99	Time: 1145	Transported by: Jason Conway	Date:	Time:	Received at Lab by: Michael A. Lovelt	Date: 10/26	Time: 6:46
Analyzed by:	Date:	Time:	Data Reviewed by: JRN	Date: 01/05/00	Time: 1300	Remarks:		

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CHAIN OF CUSTODY RECORD

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Facility Name/Location
TVA
Widows Creek Fossil Plant
Stevenson, AL

Collected By/Company
METCO Environmental

Unit 6 Precipitator Inlet Duct A 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)
																				Analyze according to the Ontario Hydro Method.
Container 1 Filter	10/21/99	1102	X				II	BH												Ship to METCO for weight Filter Q73 Thimble Q47
Container 2 0.1 N HNO_3 F.W.	10/21/99	1104	X				I	BH												Container 2A not recovered.
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/21/99	1109	X				II	BH												
Container 4 0.1 N HNO_3 Rinse Imp 4	10/21/99	1111	X				I	BH												
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/21/99	1120	X				I	BH												Used Hydroxylamine Sulfate / Sodium Chloride

Received by:	Date: 10-21-99	Time: 1145	Transported by: Jason Conway	Date:	Time:	Received at Lab by: Medwal A Rosfeld	Date: 10/30	Time: 6:06
Analyzed by:	Date:	Time:	Data Reviewed by: JRm	Date: 01/05/00	Time: 1300	Remarks:		

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Job# 99-95WCRC Unit Tested Unit 6

CHAIN OF CUSTODY RECORD

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Facility Name/Location
TVA
Widows Creek Fossil Plant

Collected By/Company
METCO Environmental

Unit 6 Precipitator
~~On~~ Inlet Duct A

SAMPLE I.D. Blank Train	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 3 10% HNO_3 Rinse Imp 1,2,3	10/21/99	1005	X				I	BM									X			Analyze According to the Ontario Hydro method Run Time: 0730-0930 10/21/99 Containers 1, 2, 2A not recovered.
Container 4 0.1 N HNO_3 Rinse Imp 4	10/21/99	1007	X				I	BM									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/21/99	1015	X				I	BM									X			Used Hydroxylamine Sulfate / Sodium Chloride

Received by:	Date: 10-21-99	Time: 1145	Transported by: Jason Lamm	Date:	Time:	Received at Lab by: Michael H. Rosell	Date: 10/30	Time: 6:07
Analyzed by:	Date:	Time:	Data Reviewed by: JRm	Date: 01/05/00	Time: 1300	Remarks:		

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METCO ENVIRONMENTAL

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Facility Name/Location
TVA
Widows Creek Fossil Plant
Stevenson, AL

Collected By/Company
METCO Environmental

Unit 6 Precipitator Outlet Duct A

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	10/20/99	1425	X				I	BH									X			Filter: Q68 Ship to METCO for weight
Container 2 0.1 N HNO_3 F.W.	10/20/99	1429	X				I	BH									X			Container 2A not recovered.
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/20/99	1444	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/20/99	1450	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp. 5,6,7	10/20/99	1503	X				I	BH									X			Used Hydroxylamine Sulfate / Sodium Chloride

Analyze according to the Ontario Hydro method.

Received by:	Date: 10-21-99	Time: 1145	Transported by: Jason Conway	Date:	Time:	Received at Lab by: Michael H. Konselt	Date: 10/30	Time: 6:07
Analyzed by:	Date:	Time:	Data Reviewed by: JKM	Date: 01/05/00	Time: 1300	Remarks:		

Ship to: TestAmerica

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CHAIN OF CUSTODY RECORD

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Facility Name/Location
TVA
Widows Creek Fossil Plant
Stevenson, AL

Collected By/Company
METCO Environmental

Unit 6 Precipitator Outlet Duct A 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.
Container ~~2~~ 1 Filter	10/20/99	1656	X				I	BH									X			Filter Q70 Ship to METCO for weight
Container 2 0.1 N HNO_3 F.W.	10/20/99	1659	X				I	BH									X			Container 2A not recovered
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/20/99	1711	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/20/99	1716	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/20/99	1733	X				I	BH									X			Used Hydroxylamine Sulfate / Sodium Chloride

Received by:	Date: 10-21-99	Time: 1145	Transported by: Jason Cannon	Date:	Time:	Received at Lab by: Michael H. Rosebel	Date: 10/30	Time: 6:08
Analyzed by:	Date:	Time:	Data Reviewed by: RM	Date: 01/05/99	Time: 1300	Remarks:		

Ship to: TestAmerica

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Facility Name/Location
TVA
Widows Creek Fossil Plant
Stevenson, AL

Collected By/Company
METCO Environmental

Unit 6 Precipitator Outlet Duct A 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	10/21/99	1121	X				I	BH									X			Ship to METCO for weight. Filter Q72
Container 2 0.1 N HNO_3 F.W.	10/21/99	1124	X				I	BH									X			Container 2A not recovered.
Container 3 10% HNO_3 Rinse Imp 1,2,3	10/21/99	1133	X				II	BH									X			
Container 4 0.1 N HNO_3 Rinse Imp 4	10/21/99	1135	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/21/99	1145	X				I	BH									X			Used Hydroxylamine sulfate / Sodium Chloride.

Received by:	Date: 10-21-99	Time: 1145	Transported by: Jason Conway	Date:	Time:	Received at Lab by: Michael H. Ronelet	Date: 10/30	Time: 608
Analyzed by:	Date:	Time:	Data Reviewed by: JRM	Date: 01/05/00	Time: 1300	Remarks:		

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Facility Name/Location
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Widows Creek Fossil Plant
Stevenson, AL

Collected By/Company
METCO Environmental

Unit 6 Precipitator Outlet Duct A SAMPLE I.D. Blank Train	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 #3 10% HNO_3 Rinse Imp 1,2,3	10/21/99	0927	X				I	BH									X			Containers 1, 2, 2A not recovered.
Container 4 0.1 N HNO_3 Rinse Imp 4	10/21/99	0931	X				I	BH									X			
Container 5 0.1 N HNO_3 Rinse Imp 5,6,7	10/21/99	0943	X				I	BH									X			Used Hydroxylamine Sulfate / Sodium Chloride

Analyze according to to Ontario Hydro Method.

Run Time: 0730-0930 10/21/99

Received by:	Date: 10-21-99	Time: 1145	Transported by: Jason Cannon	Date:	Time:	Received at Lab by: Michael H. Rosell	Date: 10/30	Time: 6:08
Analyzed by:	Date:	Time:	Data Reviewed by: JRM	Date: 01/05/00	Time: 1300	Remarks:		

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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	10/21/99	0812	X				I	BH									X			Vol. = 50 ml
Container 8 1 M KCl Blank	10/21/99	0813	X				I	BH									X			Vol. = 52 ml
Container 9 5% HNO_3 - 10% H_2O_2 Blank	10/21/99	0815	X				I	BH									X			Vol. = 51 ml
Container 10 H_2SO_4 - $KMnO_4$ Blank	10/21/99	0816	X				I	BH									X			Vol. = 54 ml
Container 11 $NH_2OH \cdot H_2SO_4$ Blank	10/21/99	0818	X				I	BH									X			Vol. = 100 ml
Container 12 Filter Blank	10/21/99	0810	X				IV	BH									X			Filters: Q76, Q77, Q78 Thimbles: Q48, Q49, Q50

Received by:	Date: 10-21-99	Time: 11 45	Transported by: Jason Conway	Date:	Time:	Received at Lab by: Michael H. Rosales	Date: 10/30	Time: 6:05
Analyzed by:	Date:	Time:	Data Reviewed by: JRM	Date: 10/05/00	Time: 1300	Remarks:		

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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.