Appendix A

MERCURY TEST #1

DATE/TIME	GROSS LOAD	AUX USE	P1 AUX	NET GEN	STM TEMP	STM PRESS	1ST STG PRESS	MAIN STM FLOW	FW TEMP	ATTEMP FLOW MS	CIRC H2O IN TEMP	CIRC H2O OUT TEMP	COND. PRESS	BARO METER
	1LOAD	JT1EN15 .	JT0EN15A.		AL1SM50A	PT1SM50A	PT1SM50D	AM1IG02S	TE1CF51A	AM1CF50M	TE1RC49C	TE1RC49B	PT1IT21A	PT0MI26
01-Sep-99 10:35:00	40.02	1.52	1.35	37.15	899.21	825.26	629.12	341.98	382.80	344.74	69.63	80.61	1.42	29.46
01-Sep-99 11:05:00	39.93	1.52	1.18	37.24	901.06	826.63	625.74	340.09	382.56	342.27	69.77	80.86	1.45	29.46
01-Sep-99 11:35:00	39.89	1.52	1.23	37.15	900.08	825.26	624.94	340.31	382.73	343.62	70.13	81.10	1.47	29.46
01-Sep-99 12:05:00	40.02	1.51	1.27	37.23	901.62	828.03	629.79	342.24	382.81	345.11	70.49	81.35	1.49	29.44
01-Sep-99 12:35:00	40.44	1.51	1.20	37.74	899.26	822.72	638.22	345.25	383.91	353.46	70.84	81.56	1.51	29.43

MERCURY TEST #1

AH 1 GAS IN TEMP	AH1 GAS OUT TEMP	AH1 AIR IN TEMP	AH1 AIR OUT TEMP	TEMP FD FAN SUCTION	AMBIENT TEMP	STACK FLOW	STACK TEMP	OPACITY	CARBON DIOXIDE	A FEEDER RPM	B FEEDER RPM	C FEEDER RPM	TOTAL COAL USEAGE LBS.	CO2 PRECENT
AL1FH81D.	AL1FH81C.	AL1FH81A.	AL1FH81B.	AL1FH81A	TE0MI26	AL1AME03.	AL1AME12.	AL1AME23.	AL1AME01.	FT1FH01A.	FT1FH01B.	FT1FH01C.		AL1AME27.
597.46	388.53	102.00	496.57	102.00	64.52	8.00	350.20	2.74	56.86	7.01	6.96	6.97		12.23
598.79	389.86	103.83	498.09	103.83	67.14	8.00	350.20	3.03	56.60	7.12	7.01	7.05		12.28
600.13	390.77	105.30	499.53	105.30	69.05	8.00	350.20	2.60	57.09	6.93	6.92	6.91		12.10
601.89	392.23	106.57	500.60	106.57	70.81	8.00	350.20	2.29	58.09	6.98	6.93	6.92		12.28
604.43	388.93	107.06	498.47	107.06	71.82	9.00	350.20	15.02	61.67	6.63	6.58	6.59	75429.8	11.75

MERCURY TEST #2

DATE/TIME	GROSS LOAD	AUX USE	P1 AUX	NET GEN	STM TEMP	STM PRESS	1ST STG PRESS	MAIN STM FLOW	FW TEMP	ATTEMP FLOW MS	CIRC H2O IN TEMP	CIRC H2O OUT TEMP	COND. PRESS	BARO METER
	1LOAD	JT1EN15 .	JT0EN15A.		AL1SM50A	PT1SM50A	PT1SM50D	AM1IG02S	TE1CF51A	AM1CF50M	TE1RC49C	TE1RC49B	PT1IT21A	PT0MI26
01-Sep-99 14:50:00	40.27	1.51	1.21	37.55	899.07	825.82	634.39	344.62	383.96	347.53	72.63	83.59	1.61	29.39
01-Sep-99 15:20:00	40.22	1.51	1.19	37.52	901.62	827.11	634.55	343.88	383.72	346.86	73.01	84.04	1.63	29.37
01-Sep-99 15:50:00	40.07	1.51	1.17	37.39	900.04	826.26	634.65	344.54	383.74	347.31	73.39	84.49	1.65	29.35
01-Sep-99 16:20:00	40.14	1.51	1.44	37.19	904.07	825.78	635.20	343.60	383.68	346.65	73.77	84.95	1.67	29.34
01-Sep-99 16:50:00	40.25	1.51	1.54	37.21	900.84	828.00	637.76	345.10	384.59	348.90	74.14	85.10	1.69	29.33

MERCURY TEST #2

AH 1 GAS IN TEMP	AH1 GAS OUT TEMP	AH1 AIR IN TEMP	AH1 AIR OUT TEMP	TEMP FD FAN SUCTION	AMBIENT TEMP	STACK FLOW	STACK TEMP	OPACITY	CARBON DIOXIDE	A FEEDER RPM	B FEEDER RPM	C FEEDER RPM	TOTAL COAL USEAGE LBS.	CO2 PRECENT
AL1FH81D.	AL1FH81C.	AL1FH81A.	AL1FH81B.	AL1FH81A	TE0MI26	AL1AME03.	AL1AME12.	AL1AME23.	AL1AME01.	FT1FH01A.	FT1FH01B.	FT1FH01C.		AL1AME27.
600.75	391.50	111.04	500.84	111.04	75.85	8.00	350.20	2.03	57.34	7.03	6.91	6.92		12.14
601.07	391.91	111.61	501.09	111.61	76.60	8.00	350.20	2.14	57.31	7.08	7.02	6.99		12.20
601.50	392.34	113.06	501.72	113.06	77.51	8.00	350.20	2.28	57.27	7.11	7.06	7.17		12.13
602.88	394.25	112.76	502.37	112.76	78.68	8.00	350.20	2.41	57.23	7.13	7.13	7.11		12.05
604.17	394.75	112.74	503.47	112.74	79.30	8.00	350.20	2.45	57.20	7.02	6.99	7.07	75670.8	12.18

MERCURY TEST #3

DATE/TIME	GROSS LOAD	AUX USE	P1 AUX	NET GEN	STM TEMP	STM PRESS	1ST STG PRESS	MAIN STM FLOW	FW TEMP	ATTEMP FLOW MS	CIRC H2O IN TEMP	CIRC H2O OUT TEMP	COND. PRESS	BARO METER
	1LOAD	JT1EN15 .	JT0EN15A.		AL1SM50A	PT1SM50A	PT1SM50D	AM1IG02S	TE1CF51A	AM1CF50M	TE1RC49C	TE1RC49B	PT1IT21A	PT0MI26
02-Sep-99 08:15:00	40.03	1.33	1.49	37.21	900.26	822.97	629.64	341.87	382.87	346.44	71.02	82.24	1.41	29.38
02-Sep-99 08:45:00	39.98	1.37	1.50	37.11	899.52	826.99	628.23	341.42	382.72	344.66	70.76	82.07	1.43	29.38
02-Sep-99 09:15:00	40.03	1.42	1.50	37.11	900.73	827.39	625.54	341.31	382.67	344.17	70.58	81.91	1.45	29.38
02-Sep-99 09:45:00	40.03	1.46	1.29	37.27	900.17	827.79	627.03	341.10	382.50	344.96	70.42	81.74	1.46	29.38
02-Sep-99 10:15:00	39.91	1.51	1.22	37.18	899.88	827.06	624.78	339.65	382.24	343.70	70.27	81.57	1.48	29.38

MERCURY TEST #3

AH 1 GAS IN TEMP	AH1 GAS OUT TEMP	AH1 AIR IN TEMP	AH1 AIR OUT TEMP	TEMP FD FAN SUCTION	AMBIENT TEMP	STACK FLOW	STACK TEMP	OPACITY	CARBON DIOXIDE	A FEEDER RPM	B FEEDER RPM	C FEEDER RPM	TOTAL COAL USEAGE LBS.	CO2 PRECENT
AL1FH81D.	AL1FH81C.	AL1FH81A.	AL1FH81B.	AL1FH81A	TE0MI26	AL1AME03.	AL1AME12.	AL1AME23.	AL1AME01.	FT1FH01A.	FT1FH01B.	FT1FH01C.		AL1AME27.
589.42	378.08	99.50	487.24	99.50	55.18	8.00	350.20	2.48	56.19	7.26	7.01	7.18		12.30
591.49	380.68	100.42	489.63	100.42	57.80	8.00	350.20	2.56	55.99	6.99	6.89	6.93		12.23
593.17	382.16	101.35	491.96	101.35	60.70	8.00	350.20	2.47	55.79	6.96	6.84	6.87		12.30
595.07	383.91	102.63	494.46	102.63	63.84	8.00	350.20	2.41	55.59	7.03	6.87	6.93		12.23
596.92	385.80	104.84	495.82	104.84	67.38	8.00	350.20	2.20	55.40	7.09	6.87	6.98	75306.2	12.27

TEST 3

Form 400221 (R8-96) • Previously Form 18898

CLIFFSIDE STEAM STATION
PRECIPITATOR DAILY READINGS

DATE 9/2/99

MORNING READINGS

Unit	Unit Status On/Off	Time of Reading	Control Cabinet	Opacity %	O_2 %	AC Amps	VAC Volts	PPTR MA	Spark Rate	Gross MW	ID Amps A	ID Amps B	PHTR Gas Inlet Temp.	
1	ON	8:15	A	2.4	2.5	31	261	450	22	40	152		590	
1			B			85	310	687	0					
1			C			95	312	786	0					
1			D			100	303	826	0					
2			A											
2			B											
2			C											
2			D											
3			A											
3			B											
3			C											
4			A											
4			B											
4			C											Shift Supv.

Additional Comments:

Test 3

Form 400221 (R8-96) • Previously Form 18898

9/2/99

CLIFFSIDE STEAM STATION
PRECIPITATOR DAILY READINGS

DATE

MORNING READINGS

Unit	Unit Status On/Off	Time of Reading	Control Cabinet	Opacity %	O_2 %	AC Amps	VAC Volts	PPTR MA	Spark Rate	Gross MW	ID Amps A	ID Amps B	PHTR Gas Inlet Temp.	
1	On	8:45	A	2.6	2.3	47	297	332	17	40	147	X	591	
1			B			75	296	691	1					
1			C			95	311	786	0					
1			D			100	303	822	0					
2			A											
2			B											
2			C											
2			D											
3			A											
3			B											
3			C											
4			A											
4			B											
4			C											Shift Supv.

Additional Comments:

Test -

Form 400221 (R8-96) • Previously Form 18898

CLIFFSIDE STEAM STATION
PRECIPITATOR DAILY READINGS

DATE 9/2/99

MORNING READINGS

Unit	Unit Status On/Off	Time of Reading	Control Cabinet	Opacity %	O_2 %	AC Amps	VAC Volts	PPTR MA	Spark Rate	Gross MW	ID Amps A	ID Amps B	PHTR Gas Inlet Temp.
1	ON	9:15	A	2.4	2.6	60	272	363	16	40	150	X	594
1			B			85	303	695	0				
1			C			96	312	790	0				
1			D			100	303	830	0				
2			A										
2			B										
2			C										
2			D										
3			A										
3			B										
3			C										
4			A										
4			B										
4			C										

Shift Supv.

Additional Comments:

1651 3

Form 400221 (R8-96) • Previously Form 18898

9/2/99

CLIFFSIDE STEAM STATION
PRECIPITATOR DAILY READINGS

DATE

MORNING READINGS

Unit	Unit Status On/Off	Time of Reading	Control Cabinet	Opacity %	O_2 %	AC Amps	VAC Volts	PPTR MA	Spark Rate	Gross MW	ID Amps A	ID Amps B	PHTR Gas Inlet Temp.	
1	~~NON~~	9:45	A	2.4	2.5	26	168	450	14	40	150	X	595	
1			B			85	302	681	0					
1			C			95	311	782	0					
1			D			100	302	822	0					
2			A											
2			B											
2			C											
2			D											
3			A											
3			B											
3			C											
4			A											
4			B											
4			C											Shift Supv.

32

Additional Comments:

Test 3

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9/2/99

CLIFFSIDE STEAM STATION
PRECIPITATOR DAILY READINGS

DATE

MORNING READINGS

Unit	Unit Status On/Off	Time of Reading	Control Cabinet	Opacity %	O_2 %	AC Amps	VAC Volts	PPTR MA	Spark Rate	Gross MW	ID Amps A	ID Amps B	PHTR Gas Inlet Temp.
1	on	10:15	A	2.2	2.5	38	267	395	16	40	149	X	597
1			B			85	302	687	0				
1			C			95	309	786	0				
1			D			100	303	830	0				
2			A										
2			B										
2			C										
2			D										
3			A										
3			B										
3			C										
4			A										
4			B										
4			C										

Shift Supv.

Additional Comments:

Appendix B

SUMMARY OF RESULTS CALCULATIONS

$$Vm\ (std) = 17.647 \times Vm \times \left[\frac{P_{bar} + \frac{DH}{13.6}}{(460 + Tm)} \right] \times Y$$

$$Vw\ (std) = 0.0471 \times Vlc$$

Vlc = water + silica net

$$Bws = \left[\frac{Vw\ (std)}{Vw\ (std) + Vm\ (std)} \right]$$

$$Md = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + [0.28 \times (100 - \%CO_2 - \%O_2)]$$

$$MS = Md \times (1 - Bws) + (18 \times Bws)$$

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

Cp = pitot tube correction factor
Ps = absolute flue gas pressure
Ms = molecular weight of gas (lb/lb mole)
Md = dry molecular weight of gas (lb/lb mole)
Bws = water vapor in gas stream proportion by volume

$$Acfm = Vs \times Area\ (of\ stack\ or\ duct) \times 60$$

$$Dscfm = Acfm \times 17.647 \times \left[\frac{Ps}{(460 + Ts)} \right] \times (1 - Bws)$$

$$Scfm = Acfm \times 17.647 \times \left[\frac{Ps}{(460 + Ts)} \right]$$

$$Scfh = Scfm \times 60 \frac{min}{hr}$$

CALCULATION FORMULAS

1. $$V_{m(std)} = V_m Y \left(\frac{T_{std}}{T_m}\right)\left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{P_{std}}\right) = K_1 V_m Y \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}$$

2. $$V_{w(std)} = V_{lc}\left(\frac{\rho_w}{M_w}\right)\left(\frac{RT_{std}}{P_{std}}\right) = K_2 V_{lc}$$

3. $$B_{ws} = \frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}}$$

4a. $$C_a = \frac{m_a}{V_a \rho_a}$$

4b. $$W_a = C_a V_{aw} \rho_a$$

5. $$C_S = (15.43 \text{ grains/gram})\,(m_n / V_{m(std)})$$

6. $$C_{acf} = 15.43 K_i \left(\frac{m_n P_s}{V_{w(std)} + V_{m(std)}\, T_s}\right)$$

7. $$\%EA = \left(\frac{\%O_2 - (0.5\,\%CO}{0.264\,\%N_2 - (\%O_2 - 0.5\,\%CO)}\right) \times 100$$

8. $$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$

9. $$M_s = M_d(1 - B_{ws}) + 18.0 B_{ws}$$

10. $$v_s = K_p C_p \sqrt{\frac{\Delta P\, T_s}{P_s M_s}}$$

11. $$Q_{acfm} = v_s A(60_{sec/min})$$

12. $$Q_{sd} = (3600_{sec/hr})(1 - B_{ws})\, v_s \left(\frac{T_{std} P_s}{T_s P_{std}}\right) A$$

13. $$E \text{ (emission rate, lbs/hr)} = Q_{std}(C_s / 7000 \text{ grains/lb})$$

14. $$IKV = \frac{T_s V_{m(std)} P_{std}}{T_{std} v_s \theta A_n P_s 60(1 - B_{ws})} = K_4 \frac{T_s V_{m(std)}}{P_s v_s A_n \theta (1 - B_{ws})}$$

NOMENCLATURE

A = Cross-sectional area of stack or duct, ft^2
A_n = Cross-sectional area of nozzle, ft^2
B_{ws} = Water vapor in gas stream, proportion by volume
C_a = Acetone blank residue concentration, g/g
C_{acf} = Concentration of particulate matter in gas stream at actual conditions, gr/acf
C_p = Pitot tube coefficient, dimensionless
C_s = Concentration of particulate matter in gas stream, dry basis, corrected to standard conditions, gr/dscf
IKV = Isokinetic sampling variance, must be $.90 \leq IKV \leq 1.10$
M_d = Dry molecular weight of gas, lb/lb-mole
m_n = Total amount of particulate matter collected, grams
M_s = Molecular weight of gas, wet basis, lb/lb-mole
M_w = Molecular weight of water, 18.0 lb/lb-mole
m_a = Mass of residue of acetone after evaporation, grams
P_{bar} = Barometric pressure at testing site, in. Hg
P_g = Static pressure of gas, in. Hg (in. H_2O/13.6)
P_s = Absolute pressure of gas, in. Hg = $P_{bar} + P_g$
P_{std} = Standard absolute pressure, 29.92 in. Hg
Q_{acfm} = Actual volumetric gas flow rate, acfm
Q_{sd} = Dry volumetric gas flow rate corrected to standard conditions, dscf/hr
R = Ideal gas constant, 21.85 in. Hg-ft^3/°R-lb-mole
T_m = Absolute dry gas meter temperature, °R
T_s = Absolute gas temperature, °R
T_{std} = Standard absolute temperature, 528°R
V_a = Volume of acetone blank, ml
V_{aw} = Volume of acetone used in wash, ml
V_{lc} = Total volume of liquid collected in impingers and silica gel, ml
V_m = Volume of gas sample as measured by dry gas meter, dcf
$V_{m(std)}$ = Volume of gas sample measured by dry gas meter, corrected to standard conditions, dscf
v_s = Gas velocity, ft/sec
$V_{w(std)}$ = Volume of water vapor in gas sample, corrected to standard conditions, scf
W_a = Weight of residue in acetone wash, grams
Y = Dry gas meter calibration factor
ΔH = Average pressure differential across the orifice meter, in. H_2O
Δp = Velocity head of gas, in. H_2O
ρ_a = Density of acetone, 0.7855 g/ml (average)
ρ_w = Density of water, 0.002201 lb/ml
θ = Total sampling time, minutes
K_1 = 17.64 °R/in. Hg
K_2 = 0.04707 ft^3/ml
K_4 = 0.09450/100 = 0.000945
K_p = Pitot tube constant, $85.49 \frac{ft}{sec}\left[\frac{(lb/lb-mole)(in.Hg)}{(°R)(in.H_2O)}\right]^{1/2}$
%EA = Percent excess air
$\%CO_2$ = Percent carbon dioxide by volume, dry basis
$\%O_2$ = Percent oxygen by volume, dry basis
%CO = Percent carbon monoxide by volume, dry basis
$\%N_2$ = Percent nitrogen by volume, dry basis
0.264 = Ratio of O_2 to N_2 in air, v/v
0.28 = Molecular weight of N_2 or CO, divided by 100
0.32 = Molecular weight of O_2 divided by 100
0.44 = Molecular weight of CO_2 divided by 100
13.6 = Specific gravity of mercury (Hg)

MERCURY CALCULATIONS

Determination of Speciated Mercury

Concentration

$$\frac{\text{ug of Mercury detected} \times \frac{10^{-6}\text{g}}{\text{ug}}}{453.6\,\text{g/lb}} = \text{lbs Mercury/sample}$$

$$\frac{\text{lbs Mercury/sample}}{\text{Vm(std)}} = \text{lbs Mercury/dscf}$$

Emission Rates

$$\text{lbs Mercury/hr} = \text{lbs/dscf} \times \text{dscf/min} \times 60\ \text{min/hr}$$

$$\text{lbs Mercury}/10^{12}\,\text{Btu} = \text{lbs/dscf} \times F_d\,\text{Factor}\left(\text{dscf}/10^{6}\,\text{Btu}\right) \times \frac{20.9\%}{20.9\% - O_2\%} \times 10^{6}$$

Mercury Fractions

Elemental Mercury Catch – mercury collected in the acidified hydrogen peroxide (HNO_3-H_2O_2) and potassium permanganate (H_2SO_4-$KMnO_4$) impinger solutions.

Oxidized Mercury Catch – mercury collected in the aqueous potassium chloride (KCl) impinger solution.

Particle-bound Mercury Catch – mercury associated with the particulate matter collected in the front half of the sampling train.

Determination of Mercury Available from Coal

$$\text{lbs Mercury/hr} = \frac{\text{ug Mercury}}{\text{g Coal}}(\text{dry}) \times \frac{10^{-6}\text{g}}{\text{ug}} \times \frac{\text{lbs Coal (wet)}}{\text{hr}} \times (1 - B_{ws})\,\text{moisture corr.}$$

$$\text{lbs Mercury}/10^{12}\,\text{Btu} = \frac{\text{lbs Mercury}}{\text{hr}} \div \frac{10^{12}\,\text{Btu}}{\text{hr}}$$

EMISSION RATE CALCULATIONS

A pollutant emission rate (E), expressed as pounds of pollutant per million Btu heat input from the fuel combusted can be calculated by several methods as follows:

1. $C = C_s/7000$ where, C = pollutant concentration, lb/dscf
   c_s = pollutant concentration, grains/dscf

2. If fuel flow is monitored and the fuel combusted during the test is sampled and analyzed for gross calorific value, then:

$$E = \frac{Q_{sd} C}{\text{fuel flow rate (lb / hr) GCV}} \times 10^6$$

where, E = lbs per million Btu
GCV = gross calorific value, Btu / lb
Q_{sd} = dry volumetric gas flow at standard conditions, dscf / hr

3. If an integrated gas sample is taken during the test and analyzed for $\%CO_2$ or $\%O_2$, dry basis by volume, with an Orsat gas analyzer, then

$$E = C F_c \frac{100}{(\%CO_2)} \text{ or, } E = C F \frac{20.9}{(20.9 - \%O_2)} \text{ where,}$$

$\%CO_2$ and $\%O_2$ are expressed as percent; and, for example, for subbituminous and bituminous coals:

F_c = a factor representing a ratio of the volume of carbon dioxide generated to the calorific value of the fuel combusted, 1800 scf CO_2/million Btu.

F = a factor representing a ratio of the volume of dry flue gases generated to the calorific value of the fuel combusted, 9780 dscf/million Btu.

4. If fuel sample increments are taken and composited during the test and an ultimate analysis is performed and the GCV is determined, then

$$F_c = \frac{321 \times 10^3 (\%C)}{GCV} \text{ where, } \%C = \text{carbon content by weight expressed as percent}$$

$$F = \frac{[3.64 (\%H) + 1.53 (\%C) + 0.57 (\%S) + 0.14 (\%N) - 0.46 (\%O_2)]}{GVC} \times 10^6$$

where, H, C, S, N, and O are content by weight of hydrogen, carbon, sulfur, nitrogen, and oxygen (expressed as percent) respectively.

5. If fuels other than subbituminous and bituminous coals are fired, other F-factors than those above will apply; and, if combinations of different fuels are fired, the F-factors must be prorated according to the fraction of the total heat input derived from each type of fuel.

Appendix C

MOSTARDI-PLATT ASSOCIATES, INC.
TEST SUPPORT DATA

TEST RUN NO. #1 O.H. Hg

COMPANY: Duke Energy
PLANT: Cliffside Steam Station
TEST LOCATION: #1 Unit - Precip. Inlet
CLIENT: Duke Energy
OPERATOR: Jeff Daniels
DATE: 9-1-99
CONTROL BOX: E35 POT. NO.: E35
METER NO.: E35
METER CALIBRATION FACTOR: 1.001
PITOT ID NO.: 514A
PITOT TUBE COEFFICIENT: 0.828
PORT LENGTH: 18 in.
PORT SIZE: 4 in.
PORT TYPE: Nipple w/Cap

IMPINGER H_2O
FINAL: 4818.7 ml/gm
INITIAL: 4736.4 ml/gm
GAIN: 82.3 ml/gm
TOTAL H_2O COLLECTED: 94.2
DESCRIPTION OF IMPINGER H_2O: See Lab Notes
SILICA GEL EXHAUSTED?: ↓
IMPINGERS RECOVERED BY: JW
SILICA GEL WEIGHED BY: JW

SILICA GEL:
FINAL WT: 801.4 gm
INITIAL WT: 789.5 gm
WT. GAIN: 11.9 gm

THIMBLE NO: 028 TARE WT: 3.1786
FILTER NO: None TARE WT: None
BAROMETRIC PRESSURE in. Hg: 29.5
FLUE PRESSURE in. H_2O: -0.4" Hg
FLUE PRESSURE in. Hg ABS: 29.1
PROBE LENGTH: 3.75 ft.
PROBE LINER MATERIAL: glass
NOZZLE IDENTIFICATION NO: glass Set 2
CALIBRATED NOZZLE DIAMETER: 0.236
LEAK CHECK: * PRE: 0.002 POST: 0.002 @ 16/11 in. Hg
DUCT SHAPE: Rectangle EQ DIAMETER:
DUCT AREA: 84 sq. ft. L 6' W 14'
DISTURBANCE UPSTREAM: 28' DOWNSTREAM: 4'
TEST LENGTH: 120 min
MINUTES PER POINT: 10 (1 reading/5 min)
TOTAL NUMBER OF TRAVERSE POINTS: 12 (2 readings/point)
GAS ANALYSIS (ORSAT/FYRITE):
CO_2: 14 14 14.0 13.8
O_2: 4.4 4.2 4.2 4.4
Total 18.4 18.2 18.2 18.2
PITOT LEAK CHECK: PRE 5.2 POST 3.8
ΔH@ 1.878
SAMPLES REMOVED FROM SITE BY: JRP/JW

COMMENTS & NOTES LIMITED CLEARANCE PORT TO GRATING
Glass thimble holder = 14" long
Port = 18" Long

Point 1 = 34" Point 2 = 39.5 Point 3 = 45"

* from probe extension 0.002 @ 11" Hg

For computer data entry: Supervisor, please complete.
Do you want to enter a fuel analysis? Y ☐ N ☐
What value do you want to use? F = 9,780 F_c = 1,800 Other = _____
Circle to indicate "Yes" or add other value if not given.

Form 1053 [Rev. 6/97]

FIELD TEST DATA SHEET FOR ISOKINETIC SAMPLING

MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT Duke Energy Corp

TEST RUN NO. #1 = CLIFFside

TEST LOCATION [illegible] INLET - UNIT #1

DATE 1 Sept 99 PAGE 1 OF 2

1ST	Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	1.327 Orifice (H) in. H_2O	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	0.634 Meter Rate cfm	Pump Vacuum in. Hg	×5 Notes		Probe Temp. °F	HEATED LINE ~~Filter Holder~~ Temp. °F	Fully Iced Impinger Outlet Temp. °F
1	1-1	0.19	0.436	1035	779.82	0.25	632	69	72	0.276	3	1.382		246	225	64
	2	0.19	0.436	1040	781.50	0.25	649	70	72	0.276	3	1.382	81.202	259	235	63
	2-1	0.19	0.436	1045	782.69	0.25	651	74	71	0.276	3	1.382	82.584	263	237	62
	2	0.19	0.436	1050	784.285	0.25	649	74	72	0.276	3	1.382	83.966	262	226	61
	3-1	0.19	0.436	1055	785.645	0.25	647	72	73	0.276	3	1.382	85.348	263	234	62
	2	0.21	0.459	1100	787.01	0.28	651	73	74	0.291	3	1.453	86.73	262	235	60
			(2.6377)	1105	788.585	(1.53)	(3879)	(866)					88.183			
					(8.765)											
2	1-1	0.38	0.616	1107:30	788.64	0.50	648	74	74	0.391	4	1.954		261	240	59
	2	0.37	0.608	1112:30	790.68	0.49	655	75	74	0.386	4	1.928	90.594	264	240	60
	2-1	0.39	0.625	11:17:30	792.40	0.52	654	76	74	0.396	4	1.980	92.522	262	229	59
	2	0.40	0.632	11:22:30	794.32	0.53	657	77	75	0.401	4	2.005	94.502	262	235	59
	3-1	0.42	0.648	11:27:30	796.39	0.56	653	77	75	0.411	4	2.054	96.507	265	240	59
	2	0.42	0.648	11:32:30	798.38	0.56	650	78	76	0.411	4	2.054	98.561	262	238	59
			(3.7778)	11:37:30	800.75	(3.16)	(3917)	(905)					100.615			
					(12.11)											
3	1-1	0.43	0.656	1141	800.87	0.57	648	76	76	0.416	4	2.079		264	238	59
	2	0.42	0.648	1146	802.97	0.56	656	77	76	0.411	4	2.054	802.949	265	238	58
	2-1	0.45	0.671	1151	804.92	0.60	656	78	76	0.425	4	2.127	805.003	266	239	59
	2	0.45	0.671	1156	807.25	0.60	653	78	76	0.425	5	2.127	807.130	264	238	58
	3-1	0.48	0.693	1201	809.20	0.64	655	78	76	0.439	5	2.196	809.26	266	240	59
	2	0.49	0.70	1206	811.32	0.65	656	79	76	0.444	5	2.219	811.456	266	240	59
			(4.0383)	1211	813.46	(3.62)	(3924)	(922)					813.675			
					(12.59)											
			10.4538		33.465	8.31	11720	2693								

Form 1026 [Rev. 5/27]

FIELD TEST DATA SHEET
FOR ISOKINETIC SAMPLING

MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT Duke Energy Corporation
TEST RUN NO. 1
TEST LOCATION

DATE 9/1/99 PAGE 2 OF 2

Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	1,327 Orifice (H) in. H_2O	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	0.634 Meter Rate cfm	Pump Vacuum in. Hg	x5 Notes	Probe Temp. °F	~~HEATED LINE~~ ~~Filter~~ ~~Holder~~ Temp. °F	Fully Loaded Impinger Outlet Temp. °F
Test 4 1-1	0.60	0.693	12:13:30	813.53	0.80	652	80	76	0.439	5	2.196	263	240	61
2	0.61	0.781	12:18:30	815.66	0.81	653	80	77	0.495	7	2.476 815.73	265	241	61
2-1	0.63	0.794	12:23:30	818.14	0.84	651	80	76	0.503	8	2.516 818.206	263	240	61
2	0.64	0.80	12:28:30	820.65	0.85	655	81	77	0.507	8	2.536 820.722	265	240	60
3-1	0.55	0.742	12:33:30	822.95	0.73	647	81	78	0.470	7	2.351 823.258	267	239	63
2	0.52	0.721	12:38:30	824.98	0.69	647	81	76	0.457	7	2.286 825.610	266	239	65
		4.61208	12:43:30	827.80	4.72	3905	943				827.896			
				14.27										
		10.4538		33.465	8.31	11,720	2693							
		15.066			13.03	15,625	3636							
		0.6277		47.735	0.543	651.04	75.75							

MOSTARDI-PLATT ASSOCIATES, INC.
TEST SUPPORT DATA

TEST RUN NO. #2

COMPANY: Duke Energy Corporation
PLANT: Cliffside Steam Station
TEST LOCATION: Unit #1 - Precip. Inlet
CLIENT: Duke Energy Corporation
OPERATOR: Jeff Daniels
DATE: 9-1-99
CONTROL BOX: E35 POT. NO.: E35
METER NO.: E35
METER CALIBRATION FACTOR: 1.001
PITOT ID NO.: 514A
PITOT TUBE COEFFICIENT: .828
PORT LENGTH: 18 in.
PORT SIZE: 4 in.
PORT TYPE: Nipple w/cap

IMPINGER H_2O SILICA GEL:
FINAL: 4663.1 ml/gm FINAL WT: 716.7 gm
INITIAL: 4586.9 ml/gm INITIAL WT: 702.6 gm
GAIN: ml/gm WT. GAIN: gm
TOTAL H_2O COLLECTED: 90.3
DESCRIPTION OF IMPINGER H_2O: See lab notes
SILICA GEL EXHAUSTED?: N
IMPINGERS RECOVERED BY: JW
SILICA GEL WEIGHED BY: JW

COMMENTS & NOTES

THIMBLE NO: 026 TARE WT: 3.2667
FILTER NO: NONE TARE WT: NONE
BAROMETRIC PRESSURE in. Hg: 29.50
FLUE PRESSURE in. H_2O: -0.4" Hg
FLUE PRESSURE in. Hg ABS: 29.10
PROBE LENGTH: 3.75 ft.
PROBE LINER MATERIAL: GLASS
NOZZLE IDENTIFICATION NO: GLASS SET 3
CALIBRATED NOZZLE DIAMETER: 0.235
LEAK CHECK: PRE: 0.008 POST: 0.002 @ 14/8 in. Hg
DUCT SHAPE: RECTANGULAR DIAMETER:
DUCT AREA: 84.0 sq. ft. L 6' W 14'
DISTURBANCE UPSTREAM: 28' DOWNSTREAM: 4'
TEST LENGTH: 120 min
MINUTES PER POINT: 10 (5 min readings)
TOTAL NUMBER OF TRAVERSE POINTS: 12
GAS ANALYSIS (ORSAT/FYRITE):
CO_2: 13.8 13.8 13.6
O_2: 4.2 4.2 4.4
18.0 18.0 18.0
PITOT LEAK CHECK: PRE 4.2" H_2O POST 6" H_2O
ΔH@ 1.878
SAMPLES REMOVED FROM SITE BY: JRP, JW

For computer data entry: Supervisor, please complete.
Do you want to enter a fuel analysis? Y ☐ N ☐
What value do you want to use? F = 9,780 F_c = 1,800 Other = _____
Circle to indicate "Yes" or add other value if not given.

FIELD TEST DATA SHEET
FOR ISOKINETIC SAMPLING (600) MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT Duke Energy Corp.
TEST RUN NO. #2 - Cliffside Steam Station
TEST LOCATION Precip. Inlet - Unit #1 DATE 1 Sept 99 PAGE 1 OF 2

	Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	1.338 Orifice (H) in. H_2O	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	0.645 Meter Rate cfm	Pump Vacuum in. Hg	x5 Notes		Probe Temp. °F	~~Heated Line Filter Holder~~ Temp. °F	Fully Iced Impinger Outlet Temp. °F
1ST	1-1	0.19	0.436	1450	828.81	0.25	642	83	82	0.281	3	1.406		262	242	67
	2	0.18	0.424	55	830.12	0.24	645	85	84	0.274	3	1.368	830.216	260	239	66
	2-1	0.21	0.458	1500	831.48	0.28	642	84	84	0.296	3	1.478	831.58	262	242	62
	2	0.19	0.436	05	833.17	0.25	644	84	84	0.281	3	1.406	833.06	265	239	63
	3-1	0.18	0.424	10	834.50	0.24	644	84	84	0.274	3	1.368	834.466	264	240	66
	2	0.20	0.447	15	835.98	0.27	647	85	84	0.288	3	1.442	835.834	263	241	67
			2.626	20	837.48	1.53	3864	1007					837.276			
					8.67					LEAK CHECK		0.006 @ 11" Hg				
2	1-1	0.37	0.608	15:30:30	837.66	0.50	644	86	85	0.392	3	1.962		262	242	68
	2	0.40	0.632	15:35:30	839.58	0.54	652	86	84	0.408	3	2.039	839.62	264	242	68
	2-1	0.40	0.632	15:40:30	841.75	0.54	654	86	86	0.408	3	2.040	841.66	265	243	66
	2	0.39	0.624	15:45:30	843.77	0.52	652	87	87	0.403	3	2.014	843.70	264	242	64
	3-1	0.38	0.616	15:50:30	845.58	0.51	652	88	86	0.398	3	1.988	845.714	264	242	65
	2	0.40	0.632	15:55:30	847.81	0.54	653	88	84	0.408	4	2.040	847.702	264	244	66
			3.746	16:00:30	849.88	3.15	3907	1033					849.742			
					12.22					LEAK CHECK		0.006 @ 10" Hg				
3	1-1	0.43	0.656	1607	850.03	0.58	651	88	86	0.423	4	2.115		262	241	67
	2	0.42	0.648	1612	852.26	0.56	651	89	87	0.418	4	2.090	852.145	265	241	66
	2-1	0.45	0.671	1617	854.33	0.60	654	89	88	0.433	4	2.163	854.235	265	242	67
	2	0.45	0.671	1622	856.34	0.60	655	89	88	0.433	5	2.163	856.398	265	241	68
	3-1	0.44	0.663	1627	858.37	0.59	653	89	88	0.428	5	2.139	858.561	266	244	66
	2	0.45	0.671	1632	860.59	0.60	652	90	88	0.433		2.163	860.700	266	242	
			3.996	1637	862.78	3.53	3916	1059					862.863			
					12.75					LEAK CHECK		0.002 @ 7" Hg				
			10.3522		33.64	8.21	11687	3099								

FIELD TEST DATA SHEET
FOR ISOKINETIC SAMPLING

MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT Duke Energy Corporation
TEST RUN NO. 2 Cliffside Steam Station
TEST LOCATION INLET O.H. Hg DATE 9-1-99 PAGE 2 OF 2

Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	1.338 Orifice (H) in. H_2O	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	0.645 Meter Rate cfm	Pump Vacuum in. Hg	Notes	Probe Temp. °F	~~Filter Holder~~ TRANSFER LINE Temp. °F	Impinger Outlet Temp. °F
1-1	0.52	0.721	1643	862.91	0.70	646	92	88	0.465	5	2.326	264	242	64
2	0.53	0.728	1648	865.11	0.70	649	91	88	0.470	5	2.348 865.236	264	244	65
2-1	0.51	0.714	1653	867.47	0.68	647	91	88	0.460	5	2.303 867.548	264	245	66
2	0.51	0.714	1658	869.88	0.68	648	91	88	0.46	5	2.303 869.851	262	241	67
3-1	0.55	0.742	1703	871.82	0.74	646	91	88	0.478	6	2.392 872.154	262	242	68
2	0.53	0.728	1708	874.61	0.71	646	92	88	0.476	6	2.348 874.546	267	243	
		4.347	1713	876.60	4.21	3882	1076				876.894			
				13.69										
		10.3522		33.64	8.21	11687	3099							
		14.692			12.42	15569	4175							
	44	0.6125		47.33	0.5175	648.71	86.98							
						1108.71	546.98							

EST 4

Form 1026 [Rev. 5/27]

MOSTARDI-PLATT ASSOCIATES, INC.
TEST SUPPORT DATA

TEST RUN NO. 3 O.H. Hg

COMPANY: Duke Energy Corporation
PLANT: Cliffside Generating Station
TEST LOCATION: Inlet
CLIENT: Duke Energy Corp.
OPERATOR: Jeff Daniels
DATE: 9-1-99
CONTROL BOX: E35 POT. NO.: E35
METER NO.: E35
METER CALIBRATION FACTOR: 1.001
PITOT ID NO.: 514A
PITOT TUBE COEFFICIENT: 0.828
PORT LENGTH: 4 in.
PORT SIZE: 18 in.
PORT TYPE: Nipple with Cap

IMPINGER H_2O / SILICA GEL:
FINAL: 4917.1 ml/gm — FINAL WT: 804.5 gm
INITIAL: 4833.4 ml/gm — INITIAL WT: 772.9 gm
GAIN: ml/gm — WT. GAIN: gm
TOTAL H_2O COLLECTED: 95.3
DESCRIPTION OF IMPINGER H_2O: See lab notes
SILICA GEL EXHAUSTED?: N
IMPINGERS RECOVERED BY: JW
SILICA GEL WEIGHED BY: JW

THIMBLE NO: 023 TARE WT: 3.8785
FILTER NO: None TARE WT: None
BAROMETRIC PRESSURE in. Hg: 29.25
FLUE PRESSURE in. H_2O: -4.0
FLUE PRESSURE in. Hg ABS: 28.96
PROBE LENGTH: 3.75 ft.
PROBE LINER MATERIAL: Glass
NOZZLE IDENTIFICATION NO: Glass set #2
CALIBRATED NOZZLE DIAMETER: 0.236
LEAK CHECK: PRE: 0.004 POST: 0.002 @ 15/8 in. Hg
DUCT SHAPE: Rectangle DIAMETER: 10.3417
DUCT AREA: 84 sq. ft. L 6' W 14'
DISTURBANCE UPSTREAM: 28' DOWNSTREAM: 4'
TEST LENGTH: 120 min
MINUTES PER POINT: 10 (5 minute readings)
TOTAL NUMBER OF TRAVERSE POINTS: 12
GAS ANALYSIS (ORSAT/FYRITE):
CO_2: 13.5
O_2: 4.4

PITOT LEAK CHECK: PRE 3.9" H_2O POST
ΔH@ 1.878
SAMPLES REMOVED FROM SITE BY: JRP, JW

COMMENTS & NOTES

For computer data entry: Supervisor, please complete.
Do you want to enter a fuel analysis? Y ☐ N ☐
What value do you want to use? F = 9,780 F_C = 1,800 Other = _____
Circle to indicate "Yes" or add other value if not given.

FIELD TEST DATA SHEET
FOR ISOKINETIC SAMPLING

MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT Duke Energy Corporation
TEST RUN NO. 3 Ontario Hydro Mercury
TEST LOCATION Precipitator Inlet

DATE 9-2-99 PAGE 1 OF 2

Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	1.33 Orifice (H) in. H_2O	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	0.637 Meter Rate cfm	Pump Vacuum in. Hg	X5 Notes		Probe Temp. °F	Filter Holder Temp. °F	Impinger Outlet Temp. °F
START 1- 1-1	0.17	0.412	815	876.92	0.23	641	63	63	0.263	3	1.313		240	238	63
2	0.18	0.424	820	878.24	0.24	641	64	63	0.270	3	1.351	878.23	263	240	63
2-1	0.19	0.436	825	879.56	0.25	640	65	64	0.278	3	1.388	879.58	265	240	60
2	0.19	0.436	830	880.99	0.25	641	65	64	0.278	3	1.388	880.968	257	239	57
3-1	0.19	0.436	835	882.04	0.25	645	67	67	0.278	4	1.388	882.356	258	241	55
3-2	0.19	0.436	840	883.21	0.27	647	67	67	0.278	4	1.388	883.428	256	240	53
			845	884.88								884.816	256	240	53
		2.5801		7.96	1.49	3855	779								
										▶	LEAK CHECK 0.005 @ 8" H_g				
2 1-1	0.39	0.624	851	885.06	0.52	650	70	67	0.398	5	1.989		252	240	52
2	0.40	0.632	856	886.83	0.53	650	70	67	0.403	5	2.014	886.949	247	241	52
2-1	0.41	0.64	901	888.89	0.55	650	70	67	0.408	5	2.039	888.963	257	239	52
2	0.43	0.656	906	890.98	0.57	648	71	68	0.418	5	2.089	891.602	259	240	53
3-1	0.43	0.656	911	893.15	0.57	649	72	68	0.418	5	2.089	893.091	261	241	55
2	0.43	0.656	916	895.22	0.57	650	73	69	0.418	5	2.089	895.18	268	241	55
		3.8645	921	897.21	3.31	3897	832					897.269			
				12.15						▶	LEAK CHECK 0.004 @ 8" Hg				
3 1-1	0.42	0.648	0926	897.42	0.56	641	73	70	0.412	5	2.064		259	238	57
2	0.43	0.656	0931	899.56	0.57	645	73	70	0.418	5	2.089	899.444	261	240	57
2-1	0.43	0.656	0936	901.67	0.57	646	74	71	0.418	5	2.089	901.533	261	240	56
2	0.43	0.657	0941	903.75	0.57	643	74	72	0.418	5	2.089	903.622	261	240	55
3-1	0.46	0.678	0946	905.718	0.61	647	74	72	0.432	5	2.160	905.711	263	241	57
2	0.48	0.693	0951	907.880	0.64	650	76	73	0.441	5	2.207	907.871	262	241	54
		3.9864	0956	910.14	3.52	3872	872					910.078			
				12.72											
		10.431		32.83	8.32	11624	2483								

Form 1026 [Rev. 5/27]

FI TE DAT HEE
FOR ISOKINETIC SAMPLING

MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT DUKE ENERGY CORP
TEST RUN NO. 3 CLIFFSIDE
TEST LOCATION PRECIP INLET (JCD)
DATE 9-2-99 PAGE 2 OF 2

Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	1.33 Orifice (H) in. H_2O	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	0.637 Meter Rate cfm	Pump Vacuum in. Hg	X5 Notes	Probe Temp. °F	Filter Holder Temp. °F	Impinger Outlet Temp. °F
TEST ND 4- 1-1	0.53	0.728	1001	910.30	0.71	643	76	73	0.464	6	2.319	257	240	52
2	0.53	0.728	1006	912.55	0.71	642	77	75	0.464	6	2.319 912.619	259	239	53
2-1	0.54	0.735	1011	914.75	0.73	642	78	75	0.468	6	2.340 914.938	258	240	53
2	0.55	0.742	1016	917.31	0.73	646	78	75	0.472	7	2.362 917.278	259	241	54
3-1	0.56	0.745	1021	919.91	0.74	648	79	76	0.474	7	2.372 919.64	259	242	54
2	0.54	0.735	1026	921.64	0.72	647	80	76	0.468	7	2.340 922.012	257	241	56
		9.457	1031	923.99	4.34	3868	918				924.352			
				13.69										
		10.431		32.83	8.32	11624	2483							
		14.847			12.66	15492	3401							
		8.619		46.52	0.528	645.5	70.85							

MOSTARDI-PLATT ASSOCIATES, INC.
TEST SUPPORT DATA

TEST RUN NO. 1

COMPANY: Duke Energy
PLANT: Cliffside 1
TEST LOCATION: Stack
CLIENT: EPRI.
OPERATOR: JAP
DATE: 9/1/99
CONTROL BOX: E-18 POT. NO.: E-18
METER NO.: E-18
METER CALIBRATION FACTOR: 0.992
PITOT ID NO.: 427A
PITOT TUBE COEFFICIENT: 0.830
PORT LENGTH: 6 in.
PORT SIZE: 4 in.
PORT TYPE: 00 FLANGE

IMPINGER H_2O
FINAL: 149 ml/gm
INITIAL: 0 ml/gm
GAIN: 149.0 ml/gm
TOTAL H_2O COLLECTED: 169.2

SILICA GEL:
FINAL WT: 771.0 gm
INITIAL WT: 750.8 gm
WT. GAIN: 20.2 gm

DESCRIPTION OF IMPINGER H_2O:
SILICA GEL EXHAUSTED?:
IMPINGERS RECOVERED BY:
SILICA GEL WEIGHED BY:

COMMENTS & NOTES

THIMBLE NO: 032 TARE WT: 3.3942
FILTER NO: TARE WT:
BAROMETRIC PRESSURE in. Hg: 29.45
FLUE PRESSURE in. H_2O: -0.50
FLUE PRESSURE in. Hg ABS: 29.41
PROBE LENGTH: 10.5 ft.
PROBE LINER MATERIAL: GLASS
NOZZLE IDENTIFICATION NO: #10 (SET A)
CALIBRATED NOZZLE DIAMETER: 0.308
LEAK CHECK: PRE: 0.00 POST: 0.00 @ 12/12" in. Hg
DUCT SHAPE: ROUND DIAMETER: 10'6"
DUCT AREA: 86.59 sq. ft. L — W —
DISTURBANCE UPSTREAM: 23.5' DOWNSTREAM: 38'
TEST LENGTH: 120 min
MINUTES PER POINT: 5
TOTAL NUMBER OF TRAVERSE POINTS: 24
GAS ANALYSIS (ORSAT/FYRITE):

CO_2:	12.1 //	12.2	12.2	12.2
O_2:	6.0 //	6.4	6.4	6.4

Prelim

PITOT LEAK CHECK: PRE ✓ POST ✓
ΔH@
SAMPLES REMOVED FROM SITE BY: JAP

For computer data entry: Supervisor, please complete.
Do you want to enter a fuel analysis? Y ☐ N ☐
What value do you want to use? F = 9,780 F_c = 1,800 Other =
Circle to indicate "Yes" or add other value if not given.

FIELD TEST DATA SHEET
FOR ISOKINETIC SAMPLING

MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT Duke Energy
TEST RUN NO. 1
TEST LOCATION Stack

DATE 9/1/99 PAGE 1 OF 1

Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	Orifice (H) in. H_2O (C 277)	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	Meter Rate cfm (1.27)	Pump Vacuum in. Hg	Notes	Probe Temp. °F	Filter Holder Temp. °F	Impinger Outlet Temp. °F
1-1	0.33	0575	1035	2988	1.74	381	76	76	0.73	8.0		220	247	58
2	0 35	0.592	1040	33.40	1.85	383	77	77	0.75		33 5	230	249	58
3	0.35	0.592	1045	37.10	1.85	383	77	77	0.75		37.26	233	249	59
4	0.28	0.529	1050	40.70	1.48	384	79	78	067		41.01	232	246	59
5	0 27	0.469	1055	44.30	1.16	383	79	78	0.60		44 36	232	241	54
6	0 27	0.520	1100	47.42	1 42	384	80	78	0.66	8.0	47.36	229	243	60
7	0 35	0.592	1105	50.70	1.54	385	81	79	0.75		50.66	229	245	60
8	0.38	0.616	1110	54.40	2.00	385	83	80	0.76	8.5	54.41	229	247	60
9	0.53	0.728	1115	58.20	2.79	354	55	51	0.92	10.0	58.31	228	243	64
10	0 65	0.806	1120	62.70	3.43	384	89	85	1.07	15.5	62.41	229	245	66
11	0.75	0.866	1125	68.20	3.75	385	89	86	1.10	16	68 81	229	246	64
12	0 62	0 787	1130	73.90	3.27	344	90	87	1.00	17	74.41	228	246	69
(0.79)		(7.672)	1135	78.8	(26.78)	(4565)	(1947)				79.41			
2-1	0.35	0.592	1144	79.5	1 85	384	91	87	075	7.5		225	246	65
2	0.33	0.575	1149	82.91	1.74	384	91	87	0.73		83 16	227	246	61
3	0.30	0.548	1154	86.30	1.58	384	93	88	070		86.81	231	245	60
4	0.30	0.548	1159	90.10	1.58	384	93	88	0.70		90.31	233	246	60
5	0.35	0 592	1204	93.40	1.85	385	96	90	0.75		93.81	234	246	61
6	0 35	0.592	1209	97.37	1 85	386	96	90	0.75		97.56	234	247	63
7	0.35	0 592	1214	101.10	1.85	387	98	91	0.75	8.5	101.31	229	243	63
8	0.45	0.671	1219	105.10	2.37	390	98	91	0.85		105.06	230	243	64
9	0.60	0.776	1224	109.30	3.16	395	99	95	0.98		109.31	228	248	64
10	0.55	0 742	1229	114.10	2.90	385	99	95	094	12.0	114.21	228	249	67
11	0 39	0.608	1234	118.76	1 95	384	99	95	0.77		118.91	228	248	67
12	0 32	0.566	1239	122.90	1 68	382	99	95	0.72		122.76	225	245	67
		7.402	1244	126.67	24.36	4630	3744				126.42			
		15.074		-0.70	51.14	9195	4191							
		0.6281		96.09	2.13	383.1	87.3							

843.1 547.3

MOSTARDI-PLATT ASSOCIATES, INC.

TEST SUPPORT DATA

TEST RUN NO. 2

COMPANY: Duke Energy
PLANT: Cliffside 1
TEST LOCATION: STACK
CLIENT: ERMI
OPERATOR: JRP
DATE: 9/1/99
CONTROL BOX: E-18 POT. NO.: E-18
METER NO.: E-18
METER CALIBRATION FACTOR: 0.992
PITOT ID NO.: 427A
PITOT TUBE COEFFICIENT: 0.840
PORT LENGTH: 6 in.
PORT SIZE: 4 in.
PORT TYPE: FLANGE

IMPINGER H_2O
FINAL: 102 ml/gm
INITIAL: 0 ml/gm
GAIN: 102 ml/gm

SILICA GEL:
FINAL WT: 733.5 gm
INITIAL WT: 718.2 gm
WT. GAIN: 15.3 gm

TOTAL H_2O COLLECTED: 117.3
DESCRIPTION OF IMPINGER H_2O:
SILICA GEL EXHAUSTED?:
IMPINGERS RECOVERED BY:
SILICA GEL WEIGHED BY:

COMMENTS & NOTES

THIMBLE NO: 017 TARE WT: 3.2408
FILTER NO: TARE WT:
BAROMETRIC PRESSURE in. Hg: 29.45
FLUE PRESSURE in. H_2O: -0.50
FLUE PRESSURE in. Hg ABS: 29.41
PROBE LENGTH: 10.5 ft.
PROBE LINER MATERIAL: GLASS
NOZZLE IDENTIFICATION NO: #8 (Set A)
CALIBRATED NOZZLE DIAMETER: 0.245
LEAK CHECK: PRE: 0.00 POST: 0.00 @ 15/15 in. Hg
DUCT SHAPE: ROUND DIAMETER: 10' 6"
DUCT AREA: 86.59 sq. ft. L — W —
DISTURBANCE UPSTREAM: 23.5' DOWNSTREAM: 38'
TEST LENGTH: 120 min
MINUTES PER POINT: 5
TOTAL NUMBER OF TRAVERSE POINTS: 24
GAS ANALYSIS (ORSAT/FYRITE):
CO_2: 12.0 12.0 12.0
O_2: 6.3 6.3 6.3

PITOT LEAK CHECK: PRE POST
ΔH@
SAMPLES REMOVED FROM SITE BY:

For computer data entry: Supervisor, please complete.
Do you want to enter a fuel analysis? Y ☐ N ☐
What value do you want to use? F = 9,780 F_c = 1,800 Other =
Circle to indicate "Yes" or add other value if not given.

FIELD TEST DATA SHEET
FOR ISOKINETIC SAMPLING

MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT Duke Energy
TEST RUN NO. 2
TEST LOCATION STACK

DATE 9/1/99 PAGE 1 OF 1

Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	2.21 Orifice (H) in. H_2O	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	.849 Meter Rate cfm	Pump Vacuum in. Hg	Notes	Probe Temp. °F	Filter Holder Temp. °F	Impinger Outlet Temp. °F
1-1	0.35	0592	1450	27.39	077	385	97	97	050	6		225	247	71
2	035	0592	1455	29.80	0.77	386	97	97	050		29.89	235	247	70
3	035	0592	1500	32.35	0.77	386	97	97	0.50		32.39	245	245	66
4	0.35	0592	1505	34.80	077	385	97	97	050		34.89	246	247	67
5	035	0592	1510	37.30	0.77	385	97	97	0.50		37.39	245	245	67
6	030	0548	1515	39.80	0.66	386	97	97	0.47	5.5	39.89	244	245	64
7	036	0600	1520	42.15	0.80	386	98	98	051		42.24	245	246	61
8	0.50	0.707	1525	44.55	1.11	385	98	98	0.60		44.79	242	247	64
9	0.55	0742	1530	47.50	1 22	386	99	98	063		47.79	242	244	62
10	075	0.866	1535	5070	1.66	386	99	98	0.74		50.94	242	246	63
11	080	0.894	1540	54.50	177	387	100	98	0.76	11.0	54 64	242	246	64
12	080	0.894	1545	58.15	1.77	384	100	98	0 76		58.44	240	246	67
		(8.211)	1550	62.15	(12.84)	(4627)	(2346)				62.24			
2-1	0.35	0 592	1555	02.34	0.77	384	100	98	0.50	6.5		239	245	70
2	0.35	0 592	1600	64 90	0.77	383	100	98	0 50		64 84	243	248	67
3	0.36	0 600	1605	67.50	0.80	383	100	98	0.51		67.34	240	247	66
4	0.36	0.600	1610	70.00	0.80	384	100	98	0.51		64.89	248	247	66
5	036	0.600	1615	72.50	0 80	384	100	98	051	6.0	72.44	241	248	66
6	038	0.616	1620	75.10	0.84	385	100	98	0.52		74.99	250	247	66
7	0.32	0566	1625	77.50	0 71	387	100	98	0.48		77.59	246	247	66
8	0.32	0.566	1630	80.00	0.71	389	100	98	0.48		79.89	245	238	68
9	0 32	0566	1635	82.40	0.71	390	100	98	0 48		82.39	245	247	68
10	0.40	0 633	1640	84.80	0.88	391	100	98	0.54		84.79	244	247	69
11	0.30	0.548	1645	87.40	0.66	388	101	98	0.47		87.49	243	247	71
12	030	0548	1650	89.80	0.66	354	101	98	0.47		89.84	241	245	71
		7.027	1655	92.20	9.11	4635	2378				92.19			
		15238		-0.19	21.95	9262	4724							
		0.6349			0.915	385.9	98.4							
				64.62		8459	5584							

Form 1026 [Rev. 5/27]

MOSTARDI-PLATT ASSOCIATES, INC.
TEST SUPPORT DATA

TEST RUN NO. 3

COMPANY: DUKE ENERGY
PLANT: CLIFFSIDE 1
TEST LOCATION: STACK
CLIENT: EPRI
OPERATOR: JN
DATE: 9/2/99
CONTROL BOX: E-18 POT. NO.: E-18
METER NO.: E-18
METER CALIBRATION FACTOR: 0.992
PITOT ID NO.: 427A
PITOT TUBE COEFFICIENT: 0.830
PORT LENGTH: 6 in.
PORT SIZE: 4 in.
PORT TYPE: FLANGE

IMPINGER H_2O
FINAL: 93.1 ml/gm
INITIAL: 0 ml/gm
GAIN: 93.1 ml/gm
TOTAL H_2O COLLECTED:
DESCRIPTION OF IMPINGER H_2O:
SILICA GEL EXHAUSTED?:
IMPINGERS RECOVERED BY:
SILICA GEL WEIGHED BY:

SILICA GEL:
FINAL WT: 756.4 gm
INITIAL WT: 745.7 gm
WT. GAIN: 10.7 gm

COMMENTS & NOTES

THIMBLE NO: 027 TARE WT: 3.1779
FILTER NO: TARE WT:
BAROMETRIC PRESSURE in. Hg: 29.25
FLUE PRESSURE in. H_2O: -0.50
FLUE PRESSURE in. Hg ABS: 29.21
PROBE LENGTH: 10.5 ft.
PROBE LINER MATERIAL: GLASS
NOZZLE IDENTIFICATION NO: #8 (set A)
CALIBRATED NOZZLE DIAMETER: 0.245
LEAK CHECK: PRE: 0.00 POST: 0.00 @ 16/18 in. Hg
DUCT SHAPE: ROUND DIAMETER: 10'6"
DUCT AREA: 86.59 sq. ft. L — W —
DISTURBANCE UPSTREAM: 23.5' DOWNSTREAM: 38'
TEST LENGTH: 120 min
MINUTES PER POINT: 5
TOTAL NUMBER OF TRAVERSE POINTS: 24
GAS ANALYSIS (ORSAT/FYRITE):
CO_2: 12.2 12.2 12.2
O_2: 6.1 6.1 6.1

PITOT LEAK CHECK: PRE ✓ POST ✓
ΔH@
SAMPLES REMOVED FROM SITE BY: JM

For computer data entry: Supervisor, please complete.
Do you want to enter a fuel analysis? Y ☐ N ☐
What value do you want to use? F = 9,780 F_c = 1,800 Other = _____
Circle to indicate "Yes" or add other value if not given.

FIELD TEST DATA SHEET
FOR ISOKINETIC SAMPLING

MOSTARDI-PLATT ASSOCIATES, INC.

PROJECT NKA Energy
TEST RUN NO. 3
TEST LOCATION STACK

DATE 9/2/99 PAGE 1 OF 1

Port-Point No.	Velocity Head (P) in. H_2O	$\sqrt{P}$	Clock Time 24 hr.	Meter Volume (Vm) ft^3	209 Orifice (H) in. H_2O	Stack Temp (t_s) °F	Meter Temp. (t_m) Inlet °F	Meter Temp. (t_m) Outlet °F	0.802 Meter Rate cfm	Pump Vacuum in. Hg	Notes	Probe Temp. °F	Filter Holder Temp. °F	Impinger Outlet Temp. °F
1-1	0.34	0583	0815	92.57	0.71	374	64	64	0.47	3.0		225	246	62
2	0.30	0.548	0821	94.86	0.62	375	65	65	0.44		94.87	241	242	55
3	0.34	0.584	0829	97.00	0.71	375	66	66	0.47		97.07	248	248	57
4	0.32	0.566	0837	99.30	0.67	375	67	67	0.45		99.42	246	246	54
5	0.32	0.566	0845	101.55	0.67	375	68	68	0.45		101.67	245	243	53
6	0.30	0.548	0853	103.90	0.62	376	70	69	0.42		103.92	242	246	52
7	0.37	0.608	0901	106.05	0.77	376	71	69	0.49		106.12	242	241	50
8	0.50	0.707	0908	108.50	1.04	375	71	69	0.67		108.57	241	243	48
9	0.60	0.787	0916	111.30	1.24	377	70	68	0.63	5.0	111.42	241	248	47
10	0.71	0.843	0924	114.42	1.48	375	74	69	0.68		114.57	240	247	56
11	0.75	0.866	0932	117.80	1.57	376	75	70	0.69	6.0	117.97	240	245	51
12	0.82	0906	0940	121.30	1.71	376	76	71	0.73		121.42	239	240	51
		8.111	0944	125.07	11.54	4503	1447				125.07			
2-1	0.34	0.512	0949	125.20	0.73	376	77	71	0.47	3.0		238	247	57
2	0.34	0.541	0954	127.64	0.73	376	78	72	0.47		127.55	239	244	55
3	0.35	0.592	0959	129.95	0.73	376	78	72	0.47		129.90	242	249	55
4	0.38	0.616	1004	132.10	0.79	376	79	73	0.49		132.25	243	250	56
5	0.34	0.592	1009	134.75	0.73	378	80	74	0.47		134.70	245	250	58
6	0.35	0.592	1014	137.10	0.73	379	80	74	0.47		137.05	245	249	56
7	0.21	0.458	1019	139.43	0.44	380	81	74	0.27		139.40	244	249	60
8	0.21	0.458	1024	141.30	0.44	381	82	74	0.27		141.25	243	249	60
9	0.25	0.500	1029	143.20	0.52	381	82	74	0.30		143.10	242	249	60
10	0.30	0.548	1034	145.20	0.63	381	83	74	0.44		145.11	242	248	59
11	0.25	0.500	1039	147.40	0.52	381	84	75	0.30		147.31	241	248	59
12	0.24	0.490	1044	149.40	0.50	381	84	75	0.00		149.31	241	249	58
		3.540	1049	151.45	7.51	4546	1850				151.51			
		14.651				9049	3497							
		0.6105		-0.15	0.508	377.0	72.9							

58.750 547.0 5329

METHOD 3 - FIELD DATA SHEET
INTEGRATED SAMPLES - GAS ANALYSIS

Project: DUKE ENERGY CORP. = CLIFFSIDE STEAM STA. Date: 1 Sept 99
Sampling Location: UNIT #1 - PRECIP. INLET
Source Condition: NORMAL
Fuel Type: COAL
Module No: _____ Rate Meter Units: lpm Orsat No. _____

Monitor Model No: _____
Serial No: E-35
Bag Type: TEDLAR

Test (Run) No. #1

SAMPLING

	Port-Point No.	Clock Time 24hr	Flow Rate
1	1-2	1040	1 lpm
1	2-1	↓	↓
1	2-2	1055	↓
2	1-2	11:12	1 lpm
2	2-1	↓	
2	2-2	11:27	1 lpm
3	2-1	11:51	1 lpm
	2-2	12:01	1 lpm
4	2-1	12:23	1 lpm
	2	12:33	1 lpm

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
18.4	14	4.4	
18.2	14	4.2	
18.2	14	4.2	
18.2	13.8	4.4	
Avg.			

Pre-Run Leak Check:
Train: ✓ @ 10" Hg
Bag: ✓ @ 10" Hg
Pipettes: ✓ @ 4 min
Burette: ✓ @ 4 min

Post-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

VALIDATION	
Fuel Factor (F_o)	Percent Difference
Orsat / Fuel	

Test (Run) No. #2

SAMPLING

	Port-Point No.	Clock Time 24hr	Flow Rate
1	2-1	1500	1 lpm
	2	↓	↓
	3-1	1515	↓
2	2-1	1540	1 lpm
	2	1550	
3	1-2	1612	
	2-1	↓	
	2-2	1627	
4	2-1	1653	
	2-2	↓	↓
	3-1	1703	

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
18	13.8	4.2	
18	13.8	4.2	
18	13.6	4.4	
Avg.	13.73	4.27	

Pre-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

Post-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

VALIDATION	
Fuel Factor (F_o)	Percent Difference
Orsat / Fuel	

Comments:

Operator: JCD

$$F12_o(\text{Orsat}) = \frac{20.9 - (\%O_2 - 0.5\,\%CO)}{\%CO_2 + \%CO}$$

$$F_o(\text{Fuel}) = \frac{0.209\,F_d}{F_c} = \frac{0.651\,(1.53\,\%C - 3.64\,\%H + 0.57\,\%S + 0.14\,\%S + 0.14\,\%N - 0.46\,\%O)}{\%C}$$

$$\%\ \text{Difference} = \frac{F_o(\text{Orsat}) - F_o(\text{Fuel})}{F_o(\text{Fuel})} \cdot 100$$

METHOD 3 - FIELD DATA SHEET
INTEGRATED SAMPLES - GAS ANALYSIS

Project: Duke Energy - Cliffside Date: 9-2-99
Sampling Location: Inlet
Source Condition: Full Load Monitor Model No:
Fuel Type: Coal Serial No:
Module No: 1 Rate Meter Units: lpm Orsat No. 3008-008 Bag Type:

Test (Run) No. 3

SAMPLING

Port-Point No.	Clock Time 24hr	Flow Rate
1-2	825	1 lpm
3	840	↓
2-1	853	↓
2	908	1 lpm
3-1	931	↓
2	946	↓
4-1	1005	1 lpm
2	1015	"

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
18	13.4	4.6	
18	13.6	4.4	
18.2	13.8	4.2	
Avg.	13.6	4.4	

Pre-Run Leak Check:
Train: ok @ 10" Hg
Bag: ok @ 10" Hg
Pipettes: ✓ @ 4 min
Burette: ✓ @ 4 min

Post-Run Leak Check:
Train: ✓ @ 10" Hg
Bag: ✓ @ 10" Hg
Pipettes: ✓ @ 4 min
Burette: ✓ @ 4 min

VALIDATION

Fuel Factor (F_o)		Percent Difference
Orsat	Fuel	

Test (Run) No.

SAMPLING

Port-Point No.	Clock Time 24hr	Flow Rate

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
Avg.			

Pre-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

Post-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

VALIDATION

Fuel Factor (F_o)		Percent Difference
Orsat	Fuel	

Comments:

Operator: Jeff Daniels

$$F12_o(\text{Orsat}) = \frac{20.9 - (\%O_2 - 0.5\,\%CO)}{\%CO_2 + \%CO}$$

$$F_o(\text{Fuel}) = \frac{0.209\,F_d}{F_c} = \frac{0.651\,(1.53\,\%C - 3.64\,\%H + 0.57\,\%S + 0.14\,\%S + 0.14\,\%N - 0.46\,\%O)}{\%C}$$

$$\%\ \text{Difference} = \frac{F_o(\text{Orsat}) - F_o(\text{Fuel})}{F_o(\text{Fuel})} \cdot 100$$

METHOD 3 - FIELD DATA SHEET
INTEGRATED SAMPLES - GAS ANALYSIS

Project: Duke Energy Cliffside 1 Date: 9/1/99
Sampling Location: Stack
Source Condition: Monitor Model No:
Fuel Type: Coal Serial No:
Module No: Rate Meter Units: Orsat No. Bag Type:

Test (Run) No. 1

SAMPLING

Port-Point No.	Clock Time 24hr	Flow Rate (SCFH)
1-1	1038	3
2	1043	2
3	1048	2
4	1053	1.5
5	1058	1.5
6	1103	1.5
7	1108	1.5
8	1113	1.5
9	1118	1.5
10	—	—
11	—	—
12		

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
18.6	12.2	6.4	—
18.6	12.2	6.4	—
18.6	12.2	6.4	—
Avg.	12.2	6.4	—

Pre-Run Leak Check:
Train: ✓
Bag: ✓
Pipettes: ✓
Burette: ✓

Post-Run Leak Check:
Train: ✓
Bag: ✓
Pipettes: ✓
Burette: ✓

VALIDATION

Fuel Factor (F_o)		Percent Difference
Orsat	Fuel	

Test (Run) No. 1

SAMPLING

Port-Point No.	Clock Time 24hr	Flow Rate
2-1	—	
2	1151	1.5
3	1156	1.5
4	1200	1.5
5	1205	1.5
6	1211	1.5
7	1216	1.5
8	1220	1.5
9	1224	1.5
10	1229	1.5
11	—	—
12	—	—

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
Avg.			

Pre-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

Post-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

VALIDATION

Fuel Factor (F_o)		Percent Difference
Orsat	Fuel	

Comments: Operator: JHP

$$F12_o(\text{Orsat}) = \frac{20.9 - (\%O_2 - 0.5\,\%CO)}{\%CO_2 + \%CO}$$

$$F_o(\text{Fuel}) = \frac{0.209\,F_d}{F_c} = \frac{0.651\,(1.53\,\%C - 3.64\,\%H + 0.57\,\%S + 0.14\,\%S + 0.14\,\%N - 0.46\,\%O)}{\%C}$$

$$\%\ \text{Difference} = \frac{F_o(\text{Orsat}) - F_o(\text{Fuel})}{F_o(\text{Fuel})} \cdot 100$$

METHOD 3 - FIELD DATA SHEET
INTEGRATED SAMPLES - GAS ANALYSIS

Project: Duke Energy Cliffside 1 Date: 9/1/99
Sampling Location: STACK
Source Condition:
Fuel Type: COAL
Module No: _____ Rate Meter Units: _____ Orsat No. _____
Monitor Model No: _____
Serial No: _____
Bag Type: _____

Test (Run) No. 2

SAMPLING

Port-Point No.	Clock Time 24hr	Flow Rate
1-1	— Purge	
2	1457	1.5
3	1503	1.5
4	1508	1.5
5	1512	1.5
6	1516	1.5
7	1522	1.5
8	1526	1.5
9	1531	1.5
10	1537	1.5
11	—	—
12	—	—

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
18.3	12.0	6.3	
18.3	12.0	6.3	
18.3	12.0	6.3	
Avg.	12.0	6.3	

Pre-Run Leak Check:
Train: ✓
Bag: ✓
Pipettes: ✓
Burette: ✓

Post-Run Leak Check:
Train: ✓
Bag: ✓
Pipettes: ✓
Burette: ✓

VALIDATION

Fuel Factor (F_o)		Percent Difference
Orsat	Fuel	

Test (Run) No. 2

SAMPLING

Port-Point No.	Clock Time 24hr	Flow Rate
2-1	Purge	
2	1602	1.5
3	1607	1.5
4	1611	1.5
5	1616	1.5
6	1621	1.5
7	1626	1.5
8	1633	1.5
9	1637	1.5
10	1642	1.5
11	—	—
12	—	—

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
Avg.			

Pre-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

Post-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

VALIDATION

Fuel Factor (F_o)		Percent Difference
Orsat	Fuel	

Comments:

Operator: JM

$$F12_o(\text{Orsat}) = \frac{20.9 - (\%O_2 - 0.5\,\%CO)}{\%CO_2 + \%CO}$$

$$F_o(\text{Fuel}) = \frac{0.209\,F_d}{F_c} = \frac{0.651\,(1.53\,\%C - 3.64\,\%H - 0.57\,\%S + 0.14\,\%S + 0.14\,\%N - 0.46\,\%O)}{\%C}$$

$$\%\ \text{Difference} = \frac{F_o(\text{Orsat}) - F_o(\text{Fuel})}{F_o(\text{Fuel})} \cdot 100$$

METHOD 3 - FIELD DATA SHEET
INTEGRATED SAMPLES - GAS ANALYSIS

Project: Duke Energy Cliffside 1 Date: 9/2/99
Sampling Location: Stack
Source Condition:
Fuel Type: Coal
Module No: _____ Rate Meter Units: _____ Orsat No. _____
Monitor Model No: _____
Serial No: _____
Bag Type: _____

Test (Run) No. 3

SAMPLING

Port-Point No.	Clock Time 24hr	Flow Rate
1-1	0816	1.5
2	0822	1.5
3	0827	1.5
4	0832	1.5
5	0837	1.5
6	0842	1.5
7	0847	1.5
8	0851	1.5
9	0857	1.5
10	0901	1.5
11	—	—
12	—	—

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
18.3	12.2	6.1	
18.3	12.2	6.1	
18.3	12.4	6.1	
Avg.	12.4	6.1	

Pre-Run Leak Check:
Train: ✓
Bag: ✓
Pipettes: ✓
Burette: ✓

Post-Run Leak Check:
Train: ✓
Bag: ✓
Pipettes: ✓
Burette: ✓

VALIDATION

Fuel Factor (F_o)		Percent Difference
Orsat	Fuel	

Test (Run) No. 3

SAMPLING

Port-Point No.	Clock Time 24hr	Flow Rate
2-1	—	—
2	—	—
3	0930	1.5
4	0935	1.5
5	0940	1.5
6	0945	1.5
7	0950	1.5
8	0955	1.5
9	1000	1.5
10	1005	1.5
11	—	—
12	—	—

ANALYSIS

% By Volume (dry basis)			
Total	CO_2	O_2	CO
Avg.			

Pre-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

Post-Run Leak Check:
Train:
Bag:
Pipettes:
Burette:

VALIDATION

Fuel Factor (F_o)		Percent Difference
Orsat	Fuel	

Comments:

Operator: JH

$$F12_o(\text{Orsat}) = \frac{20.9 - (\%O_2 - 0.5\,\%CO)}{\%CO_2 + \%CO}$$

$$F_o(\text{Fuel}) = \frac{0.209\,F_d}{F_c} = \frac{0.651\,(1.53\,\%C - 3.64\,\%H - 0.57\,\%S + 0.14\,\%S + 0.14\,\%N - 0.46\,\%O)}{\%C}$$

$$\%\ \text{Difference} = \frac{F_o(\text{Orsat}) - F_o(\text{Fuel})}{F_o(\text{Fuel})} \cdot 100$$

PITOT TRAVERSE DATA

Project: Duke Energy Corporation - Cliffside

Location: Inlet

Date: Sept 1, 1999 Test No: Null Point Preliminary Cyclonic Flow ∅ from ∅ CHECK Time: 738 - 759

Point No.	ΔP	√ΔP	t_s	α	Point No.	ΔP	√ΔP	t_s	α
EAST 1-1	0.23		635	-2.5					
2	0.23		639	0					
3	0.25		636	∅					
2-1	0.43		654	-5°					
2	0.46		649	0					
3	0.46		636	0					
3-1	0.45		649	-7°					
2	0.44		648	-2.5°					
3	0.45		637	0					
WEST 4-1	0.53		637	0					
2	0.50		627	0					
3	0.48		620	-2°					
		7.60428	7667						
		0.63369	638.92	1098.92					

P_{bar} 29.50 "Hg Static -5.44 "H_2O P_g -0.4 "Hg P_s 29.1 "Hg Pitot ID → C_p 84 Temp. ID

0.44 × 14.0 %CO_2 = 6.16 √ΔP .6337 t_s 639 °F T 1099 °R Flue Area 84.0 ft²

13.2 0.32 × 4.2 %O_2 = +1.344 Duct Dimensions 6' x 14'

0.28 × 81.8 %N_2 = +22.904 B_{ws} .10 1 - B_{ws} .90 Disturbance: Upstream 3.3 dia 28

(30.408 Md × .9 1-B_{ws}) + (18 × .1 B_{ws}) = 29.1692 (Ms) Downstream 0.48 d.a

V_{KS} = 81.712

v_s = 85.49 × ____ Cp × $\sqrt{\frac{(\quad)\text{Ts °R}}{29.1692\text{Ms} \times 29.1\text{ Ps}}}$ × ____ √ΔP = ____ ft/sec (Vs)

Q_{acfm} = 57.8 Vs × ____ Flue Area × 60 = 260970 acfm Port Length 18 Inches

Q_{dscfm} = 17.647 × ACFM × $\frac{Ps}{Ts\ °R}$ = ____ SCFM

Q_{dscfm} = 17.647 × ACFM × $\frac{Ps}{Ts\ °R}$ × (1-Bws) = ____ DSCFM

Pre-test leak check 5.8 "H_2O Data Taken By: JCD / NS

Post-test leak check ____ "H_2O Field Engineer / Test Technician

PITOT TRAVERSE DATA

Project: Duke Energy Cliffside 1

Location: Outlet (Stack)

Date: 9/1/99 Test No: Prelim. + Time: 7[illegible]

Point No.	ΔP	√ΔP	t_s	Null Point	Point No.	ΔP	√ΔP	t_s	Null Point
2-1	0.35	0.592	363	3.0	1-1	0.30	0548	365	0
2	0.35	0.592	365	4.5	2	0.34	0.583	368	0
3	0.34	0583	364	5.0	3	0.32	0.566	371	0
4	0.37	0.608	364	5.2	4	0.32	0.566	372	6.5
5	0.30	0.548	364	4.0	5	0.28	0.529	373	10.3
6	0.36	0.600	365	7.0	6	0.32	0.566	372	11.2
7	0.35	0.592	367	7.0	7	0.36	0.6[illegible]	371	13.0
8	0.32	0566	368	11.0	8	0.45	0.671	371	13.3
9	0.44	0.663	369	10.0	9	0.62	0.787	372	13.0
10	0.37	0.608	369	8.0	10	0.75	0.866	371	13.0
11	0.41	0.640	369	9.0	11	0.80	0.894	370	16.0
12	0.43	0.656	366	10.2	12	0.80	0.894	369	15.0
									19.83
									8.3 AVG
							[illegible]	368	
							[illegible]	368.3	
								528.3	

P_{bar} 29.43 "Hg Static -0.5 "H_2O P_g ____ "Hg P_s 29.41 "Hg Pitot ID 427A C_p 0.83 Temp. ID ____

0.44 × 12.1 $\%CO_2$ = ____ √ΔP ____ t_s ____ °F T ____ °R Flue Area ____ ft^2

0.32 × 6.2 $\%O_2$ = + ____ Duct Dimensions 10 5

0.28 × 81.9 $\%N_2$ = + ____ B_{ws} .10 1 - B_{ws} 0.90

(30.196 Md × .90 1-B_{ws}) + (18 × 0.10 B_{ws}) = 29.00 (Ms) Disturbance: Upstream ____ Downstream ____

$v_s = 85.49 \times$ ____ $Cp \times \sqrt{\frac{(\quad)Ts\ °R}{Ms \times Ps}} \times$ ____ $\sqrt{\Delta P}$ = ____ ft/sec (Vs)

Q_{acfm} = ____ Vs × ____ Flue Area × 60 = ____ acfm Port Length 6 Inches

$Q_{dscfm} = 17.647 \times ACFM \times \frac{Ps}{Ts\ °R}$ = ____ SCFM

$Q_{dscfm} = 17.647 \times ACFM \times \frac{Ps}{Ts\ °R} \times (1\text{-Bws})$ = ____ DSCFM

Pre-test leak check ____ "H_2O Data Taken By: JMS /

Post-test leak check ____ "H_2O Field Engineer / Test Technician

CALIBRATION PROCEDURES

PITOT TUBES

The pitot tubes used during this test program are fabricated according to the specification described and illustrated in the *Code of Federal Regulations*, Title 40, Part 60, Appendix A, Methods 1 through 5 as published in the *Federal Register*, Volume 42, No. 160; hereafter referred to by the appropriate method number. The pitot tubes comply with the alignment specifications in Method 2, Section 4; and the pitot tube assemblies are in compliance with specifications in the same section.

Pitot tube assemblies are calibrated in accordance with Method 2, Section 4, against a standard hemispherical pitot utilizing a wind tunnel meeting the specification in Method 2, Section 4.1.2.

NOZZLES

The nozzles are measured according to Method 5, Section 5.1.

TEMPERATURE SENSING DEVICES

The potentiometer and thermocouples are calibrated against a mercury thermometer in a calibration well. Alternatively, readings are checked utilizing a NBS traceable millivolt source.

DRY GAS METERS

The test meters are calibrated according to Method 5, Section 5.3 and "Procedures for Calibrating and Using Dry Gas Volume Meters as Calibration Standards" by P.R. Westlin and R.T. Shigehara, March 10, 1978.

ANALYTICAL BALANCE

The accuracy of the analytical balance is checked with Class S, Stainless Steel Type 303 weights manufactured by F. Hopken and Son, Jersey City, New Jersey.

Pitot Tube Calibration Data

Calibration Pitot Tube: Type: HEMI STD Size (OD): 1/4" Pitot ID #: 16018

Type "S" Pitot Tube ID Number: 514 (1/4") Cp(std) = 0.99

Calibration Date: 12/4/1997 Performed By: M. McIntyre

P_{std}, (in.) H_2O		A-Side Calibration		
Set Value	Read Value	P_s, (in.) H_2O	$C_{p(S)}$ [a]	DEV. [b]
0.25	0.27	0.39	0.829	0.001
0.55	0.55	0.79	0.822	0.005
0.85	0.85	1.20	0.831	0.003
1.00	1.05	1.50	0.828	0.001
2.00	2.00	2.85	0.829	0.002
3.00	3.00	4.30	0.827	0.001
		Average	0.828	0.002

P_{std}, (in.) H_2O		B-Side Calibration		
Set Value	Read Value	P_s, (in.) H_2O	$C_{p(S)}$ [a]	DEV. [b]
0.25	0.26	0.37	0.830	0.000
0.55	0.55	0.78	0.830	0.000
0.85	0.85	1.20	0.831	0.001
1.00	1.05	1.50	0.828	0.002
2.00	2.00	2.85	0.829	0.001
3.00	3.00	4.25	0.832	0.002
		Average	0.830	0.001

$\overline{C_p}(A) - \overline{C_p}(B) =$ 0.002 ***(must be ≤ 0.01)***

[a] $C_{p(S)} = C_{p(std)}\sqrt{\frac{\Delta P_{std}}{\Delta P_s}}$

[b] $DEV = C_{p(S)} - \overline{C_p}$, (must be ≤ 0.01)

Pitot Tube Calibration Data

Calibration Pitot Tube: Type: HEMI STD Size (OD): 1/4" Pitot ID #: 16018

Type "S" Pitot Tube ID Number: 427 (1/4") Cp(std) = 0.99

Calibration Date: 12/4/1997 Performed By: M. McIntyre

P_{std}, (in.) H_2O		A-Side Calibration		
Set Value	Read Value	P_s, (in.) H_2O	$C_{p(S)}$ [a]	DEV. [b]
0.25	0.27	0.39	0.829	0.001
0.55	0.55	0.78	0.830	0.000
0.85	0.85	1.20	0.831	0.001
1.00	1.05	1.50	0.828	0.002
2.00	2.00	2.85	0.829	0.001
3.00	3.00	4.25	0.832	0.002
		Average	0.830	0.001

P_{std}, (in.) H_2O		B-Side Calibration		
Set Value	Read Value	P_s, (in.) H_2O	$C_{p(S)}$ [a]	DEV. [b]
0.25	0.26	0.37	0.830	0.001
0.55	0.55	0.78	0.830	0.001
0.85	0.85	1.20	0.831	0.001
1.00	1.05	1.50	0.828	0.003
2.00	2.00	2.80	0.837	0.005
3.00	3.00	4.25	0.832	0.000
		Average	0.831	0.002

$\overline{C_p}(A) - \overline{C_p}(B) =$ 0.001 ***(must be ≤ 0.01)***

[a] $C_{p(S)} = C_{p(std)}\sqrt{\frac{\Delta P_{std}}{\Delta P_s}}$

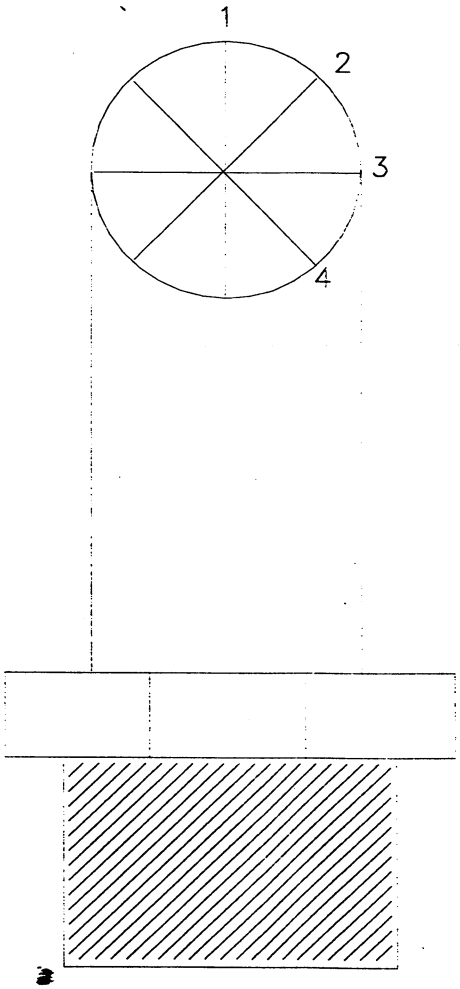
[b] $DEV = C_{p(S)} - \overline{C_p}$, (must be ≤ 0.01)

Nozzle Calibration

Date: 9/1/99

Nozzle ID No.: Set 2

Analyst: JCD



Pre Test		Post Test
0.235	1	√
0.236	2	√
0.236	3	√
0.235	4	√

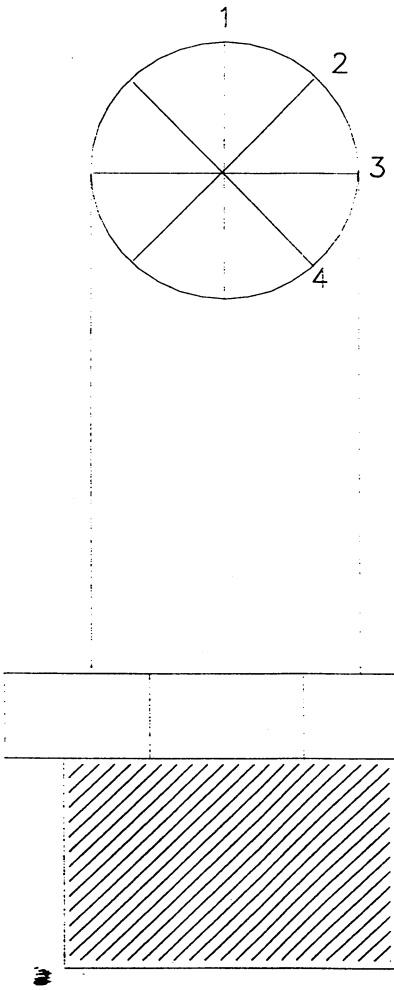
Average
0.236

Nozzle Calibration

Date: 9/1/99

Nozzle ID No.: Set 3

Analyst: JCD



Pre Test		Post Test
0.235	1	√
0.235	2	√
0.234	3	√
0.235	4	√

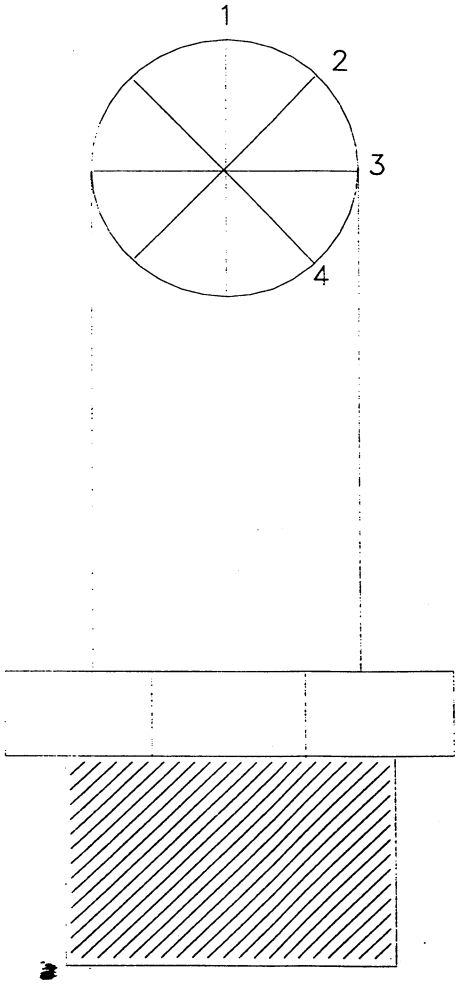
Average
0.235

Nozzle Calibration

Date: 9/1/99

Nozzle ID No.: #10 Set A

Analyst: JCD



Pre Test		Post Test
0.308	1	√
0.308	2	√
0.308	3	√
0.308	4	√

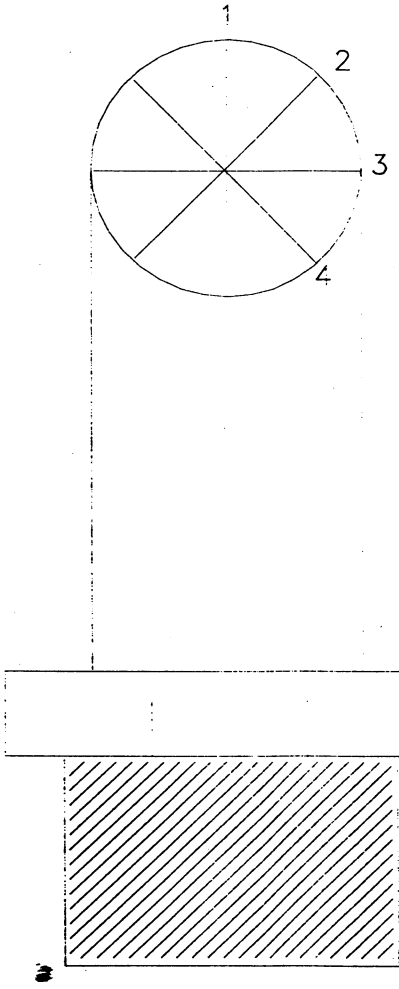
Average
0.308

Nozzle Calibration

Date: 9/1/99

Nozzle ID No.: #8 Set A

Analyst: JCD



Pre Test		Post Test
0.244	1	√
0.245	2	√
0.245	3	√
0.245	4	√

Average
0.245

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM (FOR K-TYPE THERMOCOUPLES)

EPA Control Module Number: E35 Name: Sarah Kaufman

Ambient Temperature: 88 °F Date: 07-27-99

Model 1061; S/N: A20821 Reference Source (T/C Calibrator): Transmation, Inc.

Date of Calibration Verification: 10/18/94

Primary Standards Directly Traceable to
National Institute of Standards and Technology (NIST)

Reference[a] Source Temperature, (°F)	Test Thermometer Temperature, (°F)	Temperature Difference,[b] %
50	51	0.196
100	100	0.000
150	150	0.000
200	200	0.000
250	250	0.000
300	300	0.000
350	350	0.000
400	400	0.000
450	451	0.110
500	500	0.000
550	551	0.099
600	601	0.094
650	650	0.000
700	700	0.000
800	800	0.000
900	901	0.074
1000	1000	0.000
1100	1101	0.064
1200	1201	0.060

[a]Every (50°F) for each reference point.

$$\frac{\text{(Ref. Temp., °F + 460) - (Test Therm. Temp., °F + 460)}}{\text{Ref. Temp., °F + 460}} * 100 <= 1.5\ \%$$

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM (FOR K-TYPE THERMOCOUPLES)

EPA Control Module Number: 677191 Name: Sarah Kaufman

Ambient Temperature: 72 °F Date: 08-09-99

Model 1061; S/N: A20821 Reference Source (T/C Calibrator): Transmation, Inc.

Date of Calibration Verification: 10/18/94

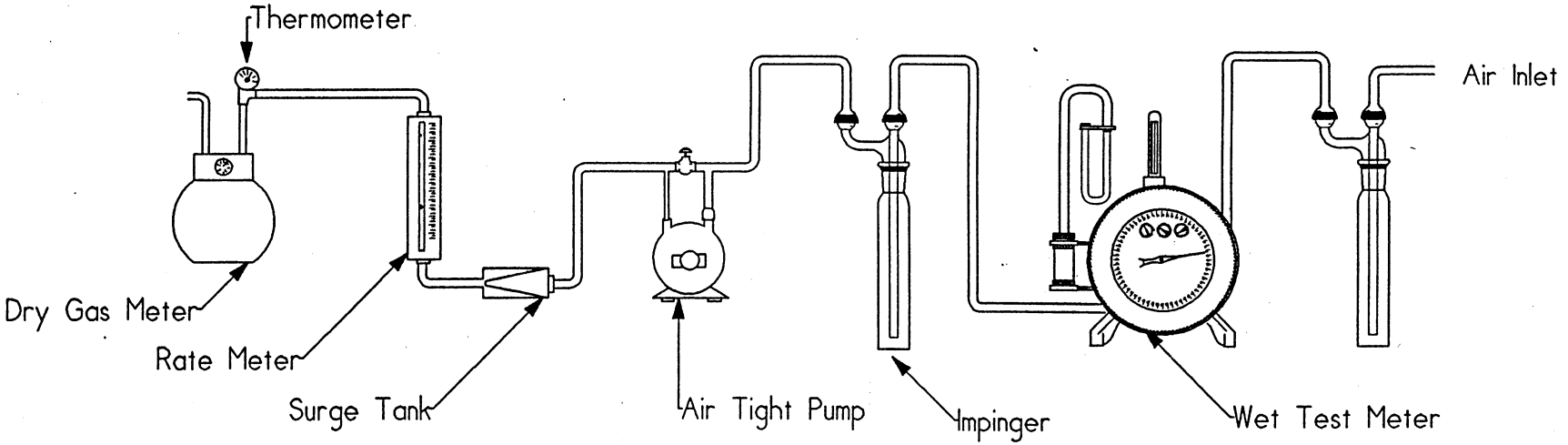
Primary Standards Directly Traceable to
National Institute of Standards and Technology (NIST)

Reference[a] Source Temperature, (°F)	Test Thermometer Temperature, (°F)	Temperature Difference,[b] %
50	51	0.196
100	101	0.179
150	151	0.164
200	200	0.000
250	250	0.000
300	300	0.000
350	350	0.000
400	400	0.000
450	450	0.000
500	500	0.000
550	549	0.099
600	599	0.094
650	649	0.090
700	699	0.086
800	799	0.079
900	898	0.147
1000	998	0.137
1100	1098	0.128
1200	1198	0.120

[a]Every (50°F) for each reference point.

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

Gas Meter Calibration Train



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DWG-AF

[Rev. 7/97]

METER BOX CALIBRATION

Dry Gas Meter No.	E35	Date:	07-27-99
Standard Meter No.	3623853	Calibrated By:	Sarah Kaufman
Standard Meter (Yr)	0.9943	Barometric Pressure :	29.29

Formula Protection Password: MPA

Run Number		Orifice Setting in H20 Chg (H)	Standard Meter Gas Volume Vr	Dry Meter Gas Volume Vd	Standard Meter Temp. F tr	Dry Gas Meter Inlet Temp. F tdi	Dry Gas Meter Outlet Temp. F tdo	Dry Gas Meter Avg. Temp. F td	Time Min.	Time Sec.	Y	Chg (H@)
Final			34.299	69.181	88	91	92					
Inital			28.936	63.809	88	91	90					
Difference	1	0.20	5.363	5.372	88	91	91	91	20	14	1.003	1.678
Final			39.699	74.629	89	92	92					
Inital			34.440	69.339	89	91	92					
Difference	2	0.50	5.259	5.290	89	91.5	92	91.75	13	1	0.998	1.810
Final			22.614	57.504	88	91	91					
Inital			16.544	51.396	88	90	89					
Difference	3	0.70	6.070	6.108	88	90.5	90	90.25	12	56	0.996	1.876
Final			45.019	79.949	89	93	92					
Inital			39.954	74.882	89	92	92					
Difference	4	0.90	5.065	5.067	89	92.5	92	92.25	9	34	1.003	1.895
Final			50.304	85.236	89	93	91					
Inital			45.206	80.155	89	92	92					
Difference	5	1.20	5.098	5.081	89	92.5	91.5	92	8	31	1.006	1.978
Final			28.595	63.471	88	92	91					
Inital			22.922	57.793	88	90	91					
Difference	6	2.00	5.673	5.678	88	91	91	91	7	27	1.000	2.033
									Average		1.001	1.878

VOLUME METERING SYSTEM FIELD AUDIT

Date: 07-27-99 Name: Sarah Kaufman

EPA Control Module No.: E35 Ambient Temperature: 90 °F

Calibration (Y): 1.001 Barometric Pressure: 29.29 "Hg

Delta H: 1.878

#VALUE!

Run No.	Time (Minutes)	Gas Meter Reading/Gas Meter Temperature (Cubic Feet)	Inlet (°F)	Outlet (°F)	Yc (Calculated)
1	0	8.861	94	93	1.020
	10	16.474	95	92	
	Vm=	7.613	Avg.= 93.50	553.50	
2	0	16.474	94	92	1.018
	10	24.099	95	93	
	Vm=	7.625	Avg.= 93.50	553.50	
3	0	24.099	94	92	1.018
	10	31.724	95	92	
	Vm=	7.625	Avg.= 93.25	553.25	

$$Yc = \frac{10}{Vm}\sqrt{\frac{Pbar}{0.0319Tm}}$$

Limit: 0.97Y < Yc < 1.03Y

Limit: 0.971 < Yc < 1.031

$$\text{Calc. Delta H @} = \frac{0.0319\,(\text{Delta H})(Tm)(100)}{Pbar(Y^2)(Vm^2)}$$

(From Calibration Data) = 1.945

METER BOX CALIBRATION

Dry Gas Meter No.	E18	Date:	08-09-99
Standard Meter No.	677191	Calibrated By:	Sarah Kaufman
Standard Meter (Yr)	0.9991	Barometric Pressure :	29.33

Formula Protection Password: MPA

Run Number		Orifice Setting in H20 Chg (H)	Standard Meter Gas Volume Vr	Dry Meter Gas Volume Vd	Standard Meter Temp. F tr	Dry Gas Meter Inlet Temp. F tdi	Dry Gas Meter Outlet Temp. F tdo	Dry Gas Meter Avg. Temp. F td	Time Min.	Time Sec.	Y	Chg (H@)
Final			66.251	72.771	72	77	77					
Inital			61.204	67.646	71	76	76					
Difference	1	0.20	5.047	5.125	71.5	76.5	76.5	76.5	20	10	0.994	1.816
Final			71.415	78.032	73	78	78					
Inital			66.393	72.916	72	77	77					
Difference	2	0.50	5.022	5.116	72.5	77.5	77.5	77.5	12	47	0.990	1.846
Final			54.506	60.846	71	75	75					
Inital			49.489	55.782	70	74	74					
Difference	3	0.70	5.017	5.064	70.5	74.5	74.5	74.5	10	57	0.996	1.896
Final			76.832	83.549	73	79	79					
Inital			71.580	78.196	73	78	78					
Difference	4	0.90	5.252	5.353	73	78.5	78.5	78.5	10	4	0.989	1.884
Final			82.079	88.892	73	79	79					
Inital			76.977	83.691	73	79	79					
Difference	5	1.20	5.102	5.201	73	79	79	79	8	37	0.989	1.949
Final			61.046	67.469	71	76	76					
Inital			54.714	61.061	71	75	75					
Difference	6	2.00	6.332	6.408	71	75.5	75.5	75.5	8	21	0.992	1.978
										Average	0.992	1.895

VOLUME METERING SYSTEM FIELD AUDIT

Date: 08-09-99 Name: Sarah Kaufman

EPA Control Module No.: E18 Ambient Temperature: 79 °F

Calibration (Y): 0.992 Barometric Pressure: 29.33 "Hg

Delta H: 1.895

Run No.	Time (Minutes)	Gas Meter Reading/Gas Meter Temperature (Cubic Feet)	Inlet (°F)	Outlet (°F)	Yc (Calculated)
1	0	89.056	80	80	1.004
	10	96.689	80	80	
	Vm=	7.633	Avg.= 80.00	540.00	
2	0	96.689	80	80	1.012
	10	104.262	81	81	
	Vm=	7.573	Avg.= 80.50	540.50	
3	0	11.052	76	76	0.996
	10	18.725	77	77	
	Vm=	7.673	Avg.= 76.50	536.50	

$$Yc = \frac{10}{Vm}\sqrt{\frac{Pbar}{0.0319Tm}}$$

Limit: $0.97Y < Yc < 1.03Y$

Limit: $0.962 < Yc < 1.022$

$$\text{Calc. Delta H @} = \frac{0.0319\,(\text{Delta H})(Tm)(100)}{Pbar(Y^2)(Vm^2)}$$

(From Calibration Data) = 1.941

ONTARIO HYDRO METHOD TEST SUPPORT DATA

PROJECT NO.:	93504	**TEST RUN NO.:**	1	**TEST DATE:**	9/2/99

CUSTOMER:	Duke Energy Corporation	**BAROMETRIC PRESSURE (Pb)**	29.5	**in. Hg.**	
PLANT:	Cliffside Steam Station	**STATIC PRESSURE**	-0.4	**in. H2O**	
TEST LOC.:	Unit 1 Precipitator Inlet	**FLUE PRESSURE (Ps)**	29.47	**in. Hg. abs.**	
CLIENT:	Electric Power Research Institute	**PROBE LENGTH:**	3.75	**ft.**	
OPERATOR:	J. Daniels	**PROBE LINER MATERIAL:**	Glass		
CONTROL BOX:	E-35	**NOZZLE IDENTIFICATION NO.:**	Glass Set 2		
METER NO.:	E-35	**CALIBRATED NOZZLE DIAMETER:**	0.236	**in.**	
METER CALIBRATION FACTOR:	1.001	**LEAK CHECK** **PRE:**	0.002	**POST:**	0.002 @ 11 in. Hg.
PITOT ID NO.:	514A	**DUCT SHAPE:**	Circular DIA.		Feet
			Rectangular	6 Feet	14 Feet
PITOT TUBE COEFFICIENT:	0.828	**DUCT AREA:**		84 **sq. ft.**	
PORT LENGTH:	18 in.	**TEST LENGTH:**	120	**min.**	
PORT SIZE:	4 in.	**MINUTES PER POINT:**	10		
PORT TYPE:	Nipple W/Cap	**TOTAL NUMBER OF TRAVERSE POINTS:**		12	

ONTARIO HYDRO METHOD TRAVERSE DATA

Company: Duke Energy Corporation **Date:** 9/2/99 **Test Ru** 1

Location: Unit 1 Precipitator Inlet

Point	Δp	Sq. Root Δp	Time	Volume cubic feet	ΔH	Stack Temp °F	Meter Inlet °F	Meter Outlet °F	Vacuum in. Hg	
1-1	0.19	0.436	10:35	779.82	0.25	632	69	72	3	1.680
1-1	0.19	0.436	10:40	781.50	0.25	649	70	72	3	1.190
1-2	0.19	0.436	10:45	782.69	0.25	651	74	71	3	1.595
1-2	0.19	0.436	10:50	784.29	0.25	649	74	72	3	1.360
1-3	0.19	0.436	10:55	785.65	0.25	647	72	73	3	1.365
1-3	0.21	0.458	11:00	787.01	0.28	651	73	74	3	1.575
			11:05	788.59						0.000
2-1	0.38	0.616	11:07	788.64	0.50	648	74	74	4	2.040
2-1	0.37	0.608	11:12	790.68	0.49	655	75	74	4	1.720
2-2	0.39	0.624	11:17	792.40	0.52	654	76	74	4	1.920
2-2	0.40	0.632	11:22	794.32	0.53	657	77	75	4	2.070
2-3	0.42	0.648	11:27	796.39	0.56	653	77	75	4	1.990
2-3	0.42	0.648	11:32	798.38	0.56	650	78	76	4	2.370
			11:37	800.75						0.000
3-1	0.43	0.656	11:41	800.87	0.57	648	76	76	4	2.100
3-1	0.42	0.648	11:46	802.97	0.56	656	77	76	4	1.950
3-2	0.45	0.671	11:51	804.92	0.60	656	78	76	4	2.330
3-2	0.45	0.671	11:56	807.25	0.60	653	78	76	5	1.950
3-3	0.48	0.693	12:01	809.20	0.64	655	78	76	5	2.120
3-3	0.49	0.700	12:06	811.32	0.65	656	79	76	5	2.140
			12:11	813.46						0.000
4-1	0.60	0.775	12:13	813.53	0.80	652	80	76	5	2.130
4-1	0.61	0.781	12:18	815.66	0.81	653	80	77	7	2.480
4-2	0.63	0.794	12:23	818.14	0.84	651	80	76	8	2.510
4-2	0.64	0.800	12:28	820.65	0.85	655	81	77	8	2.300
4-3	0.55	0.742	12:33	822.95	0.73	647	81	78	7	2.030
4-3	0.52	0.721	12:38	824.98	0.69	647	81	76	7	2.820
			12:43	827.80						0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
		0.628		47.735	0.54	651	77	75		#####
							75.75			

MOISTURE, DILUENT AND MERCURY DATA

Company Duke Energy Corporation **Date:** 9/2/99 **Test Run:** 1

Location: Unit 1 Precipitator Inlet

SILICA GEL FINAL WT.:	801.40	**grams**
SILICA GEL INITIAL WT.:	789.50	**grams**
DIFFERENCE:	11.90	
FINAL IMPINGER WATER:	4818.70	**mls.**
INITIAL IMPINGER WATER:	4736.40	**mls.**
DIFFERENCE:	82.30	
TOTAL WATER GAIN:	94.20	

ITEM	MERCURY (UG)		= NET WT. (G)
FILTER:	0.207		0.000000207
PROBE WASH:	0.000		0.000000000
		Particle-bound Total:	0.000000207
KCl:	4.538		0.000004538
		Oxidized Total:	0.000004538
HNO_3/H_2O_2:	0.338		0.000000338
$KMNO_4$:	3.703		0.000003703
		Elemental Total:	0.000004041

Orsat Analysis	1	2	3	Average
Carbon Dioxide:	14.00	14.00	14.00	14.00
Oxygen:	4.40	4.20	4.20	4.27

ONTARIO HYDRO METHOD DATA ENTRY FORM

Field Data/Calculated Data

Company:	Duke Energy Corporation
Date:	9/2/99
Test Run:	1
Stack or Duct No.:	Unit 1 Precipitator Inlet
Start Time:	10:35
Stop Time:	12:43

Pb:	29.50	Inches Hg
Static	-0.40	Inches H2O
Ps:	29.47	Inches Hg Abs.
Vlc:	94	ml + grams
Mn:	0.0000	gm
Test Time:	120	minutes
% O2:	4.27	%
% CO2:	14.00	%
% N2:	81.73	%
Delta H:	0.54	Inches H20
Cp:	0.828	Dimensionless - pitot
Tm:	75.75	°F
Sqrt P:	0.628	Inches H20
Ts:	651.04	°F
Vm:	47.735	Cubic Feet
Dn:	0.236	Inches - nozzle
As:	84.00	Sq. Feet
Yd:	1.001	Mcf
CF:	N/A	Process tons/hr
Heat Input:	N/A	MM BTU/hr
Fd:	N/A	dscf/10^6 Btu
Fc:	N/A	scf/10^6 Btu

Vmstd:	46.493	cubic feet (dry)
Vwstd:	4.437	cubic feet (wet)
Bwo:	0.087	
Md:	30.411	lb/lb-mole (dry)
Ms:	29.329	lb/lb-mole (wet)
Excess Air (%)	24.647	
Vs:	50.379	fps
ACFM:	253909.	
DSCFM:	108498.	
WSCFM:	118852	
%I:	98.8	isokinetic variance
GR/ACF:	---	
GR/DSCF:	---	
lbs/hr	---	
lbs/ton prod.:	N/A	
lbs/MM BTU:	N/A	Heat Input
lbs/MM BTU:	N/A	O2 Basis
lbs/MM BTU:	N/A	CO2 Basis

ONTARIO HYDRO METHOD TEST SUPPORT DATA

PROJECT NO.:	93504	**TEST RUN NO.:**	2	**TEST DATE:**	9/1/99

CUSTOMER:	Duke Energy Corporation	**BAROMETRIC PRESSURE (Pb)**	29.5	**in. Hg.**	
PLANT:	Cliffside Steam Station	**STATIC PRESSURE**	-0.4	**in. H2O**	
TEST LOC.:	Unit 1 Precipitator Inlet	**FLUE PRESSURE (Ps)**	29.47	**in. Hg. abs.**	
CLIENT:	Electric Power Research Institute	**PROBE LENGTH:**	3.75	**ft.**	
OPERATOR:	J. Daniels	**PROBE LINER MATERIAL:**	Glass		
CONTROL BOX:	E-35	**NOZZLE IDENTIFICATION NO.:**	Glass Set 3		
METER NO.:	E-35	**CALIBRATED NOZZLE DIAMETER:**	0.235	**in.**	
METER CALIBRATION FACTOR:	1.001	**LEAK CHECK** **PRE:**	0.008	**POST:**	0.002 @ 8 in. Hg.
PITOT ID NO.:	514A	**DUCT SHAPE:**	Circular DIA.		Feet
			Rectangular	6 Feet	14 Feet
PITOT TUBE COEFFICIENT:	0.828	**DUCT AREA:**		84 **sq. ft.**	
PORT LENGTH:	18 in.	**TEST LENGTH:**	120	**min.**	
PORT SIZE:	4 in.	**MINUTES PER POINT:**	10		
PORT TYPE:	Nipple W/Cap	**TOTAL NUMBER OF TRAVERSE POINTS:**		12	

ONTARIO HYDRO METHOD TRAVERSE DATA

Company: Duke Energy Corporation **Date:** 9/1/99 **Test Ru** 2

Location: Unit 1 Precipitator Inlet

Point	Δp	Sq. Root Δp	Time	Volume cubic feet	ΔH	Stack Temp °F	Meter Inlet °F	Meter Outlet °F	Vacuum in. Hg	
1-1	0.19	0.436	14:50	828.81	0.25	642	83	82	3	1.310
1-1	0.18	0.424	14:55	830.12	0.24	645	85	84	3	1.360
1-2	0.21	0.458	15:00	831.48	0.28	642	84	84	3	1.690
1-2	0.19	0.436	15:05	833.17	0.25	644	84	84	3	1.330
1-3	0.18	0.424	15:10	834.50	0.24	644	84	84	3	1.480
1-3	0.20	0.447	15:15	835.98	0.27	647	85	84	3	1.500
			15:20	837.48						0.000
2-1	0.37	0.608	15:30	837.66	0.50	644	86	85	3	1.920
2-1	0.40	0.632	15:35	839.58	0.54	652	86	84	3	2.170
2-2	0.40	0.632	15:40	841.75	0.54	654	86	86	3	2.020
2-2	0.39	0.624	15:45	843.77	0.52	652	87	87	3	1.810
2-3	0.38	0.616	15:50	845.58	0.51	652	88	86	3	2.230
2-3	0.40	0.632	15:55	847.81	0.54	653	88	84	4	2.070
			16:00	849.88						0.000
3-1	0.43	0.656	16:07	850.03	0.58	651	88	86	4	2.230
3-1	0.42	0.648	16:12	852.26	0.56	651	89	87	4	2.070
3-2	0.45	0.671	16:17	854.33	0.60	654	89	88	4	2.010
3-2	0.45	0.671	16:22	856.34	0.60	655	89	88	5	2.030
3-3	0.44	0.663	16:27	858.37	0.59	653	89	88	5	2.220
3-3	0.45	0.671	16:32	860.59	0.60	652	90	88	5	2.190
			16:37	862.78						0.000
4-1	0.52	0.721	16:43	862.91	0.70	646	92	88	5	2.200
4-1	0.53	0.728	16:48	865.11	0.70	649	91	88	5	2.360
4-2	0.51	0.714	16:53	867.47	0.68	647	91	88	5	2.410
4-2	0.51	0.714	16:58	869.88	0.68	648	91	88	5	1.940
4-3	0.55	0.742	17:03	871.82	0.74	646	91	88	6	2.790
4-3	0.53	0.728	17:08	874.61	0.71	646	92	88	6	1.990
			17:13	876.60						0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
		0.612		47.330	0.52	649	88	86		#####
							86.98			

MOISTURE, DILUENT AND MERCURY DATA

Company Duke Energy Corporation **Date:** 9/1/99 **Test Run:** 2

Location: Unit 1 Precipitator Inlet

SILICA GEL FINAL WT.:	716.70	**grams**
SILICA GEL INITIAL WT.:	702.60	**grams**
DIFFERENCE:	14.10	
FINAL IMPINGER WATER:	4663.10	**mls.**
INITIAL IMPINGER WATER:	4586.90	**mls.**
DIFFERENCE:	76.20	
TOTAL WATER GAIN:	90.30	

ITEM	MERCURY (UG)		= NET WT. (G)
FILTER:	0.105		0.000000105
PROBE WASH:	0.000		0.000000000
		Particle-bound Total:	0.000000105
KCl:	4.198		0.000004198
		Oxidized Total:	0.000004198
HNO_3/H_2O_2:	0.246		0.000000246
$KMNO_4$:	3.703		0.000003703
		Elemental Total:	0.000003949

Orsat Analysis	1	2	3	Average
Carbon Dioxide:	13.80	13.80	13.60	13.73
Oxygen:	4.20	4.20	4.40	4.27

ONTARIO HYDRO METHOD DATA ENTRY FORM

Field Data/Calculated Data

Company:	Duke Energy Corporation
Date:	9/1/99
Test Run:	2
Stack or Duct No.:	Unit 1 Precipitator Inlet
Start Time:	14:50
Stop Time:	17:13

Pb:	29.50	Inches Hg
Static	-0.40	Inches H2O
Ps:	29.47	Inches Hg Abs.
Vlc:	90	ml + grams
Mn:	0.0000	gm
Test Time:	120	minutes
% O2:	4.27	%
% CO2:	13.73	%
% N2:	82.00	%
Delta H:	0.52	Inches H20
Cp:	0.828	Dimensionless - pitot
Tm:	86.98	°F
Sqrt P:	0.612	Inches H20
Ts:	648.71	°F
Vm:	47.330	Cubic Feet
Dn:	0.235	Inches - nozzle
As:	84.00	Sq. Feet
Yd:	1.001	Mcf
CF:	N/A	Process tons/hr
Heat Input:	N/A	MM BTU/hr
Fd:	N/A	dscf/10^6 Btu
Fc:	N/A	scf/10^6 Btu

Vmstd:	45.149	cubic feet (dry)
Vwstd:	4.253	cubic feet (wet)
Bwo:	0.086	
Md:	30.368	lb/lb-mole (dry)
Ms:	29.303	lb/lb-mole (wet)
Excess Air (%)	24.547	
Vs:	49.122	fps
ACFM:	247577.	
DSCFM:	106134.	
WSCFM:	116132	
%I:	98.9	isokinetic variance
GR/ACF:	---	
GR/DSCF:	---	
lbs/hr	---	
lbs/ton prod.:	N/A	
lbs/MM BTU:	N/A	Heat Input
lbs/MM BTU:	N/A	O2 Basis
lbs/MM BTU:	N/A	CO2 Basis

ONTARIO HYDRO METHOD TEST SUPPORT DATA

PROJECT NO.:	93504	**TEST RUN NO.:**	3	**TEST DATE:**	9/1/99

CUSTOMER:	Duke Energy Corporation	**BAROMETRIC PRESSURE (Pb)**	29.25	**in. Hg.**	
PLANT:	Cliffside Steam Station	**STATIC PRESSURE**	-4	**in. H2O**	
TEST LOC.:	Unit 1 Precipitator Inlet	**FLUE PRESSURE (Ps)**	28.96	**in. Hg. abs.**	
CLIENT:	Electric Power Research Institute	**PROBE LENGTH:**	3.75	**ft.**	
OPERATOR:	J. Daniels	**PROBE LINER MATERIAL:**	Glass		
CONTROL BOX:	E-35	**NOZZLE IDENTIFICATION NO.:**	Glass Set #2		
METER NO.:	E-35	**CALIBRATED NOZZLE DIAMETER:**	0.236	**in.**	
METER CALIBRATION FACTOR:	1.001	**LEAK CHECK** **PRE:**	0.004	**POST:**	0.002 @ 8 in. Hg.
PITOT ID NO.:	514A	**DUCT SHAPE:**	Circular DIA.		Feet
			Rectangular	6 Feet	14 Feet
PITOT TUBE COEFFICIENT:	0.828	**DUCT AREA:**		84 **sq. ft.**	
PORT LENGTH:	18 in.	**TEST LENGTH:**	120	**min.**	
PORT SIZE:	4 in.	**MINUTES PER POINT:**	10		
PORT TYPE:	Nipple W/Cap	**TOTAL NUMBER OF TRAVERSE POINTS:**	12		

ONTARIO HYDRO METHOD TRAVERSE DATA

Company: Duke Energy Corporation **Date:** 9/1/99 **Test Ru** 3

Location: Unit 1 Precipitator Inlet

Point	Δp	Sq. Root Δp	Time	Volume cubic feet	ΔH	Stack Temp °F	Meter Inlet °F	Meter Outlet °F	Vacuum in. Hg	
1-1	0.17	0.412	8:15	876.92	0.23	641	63	63	3	1.320
1-1	0.18	0.424	8:20	878.24	0.24	641	64	63	3	1.320
1-2	0.19	0.436	8:25	879.56	0.25	640	65	64	3	1.430
1-2	0.19	0.436	8:30	880.99	0.25	641	65	64	3	1.050
1-3	0.19	0.436	8:35	882.04	0.25	645	67	67	4	1.170
1-3	0.19	0.436	8:40	883.21	0.27	647	67	67	4	1.670
			8:45	884.88						0.000
2-1	0.39	0.624	8:51	885.06	0.52	650	70	67	5	1.770
2-1	0.40	0.632	8:56	886.83	0.53	650	70	67	5	2.060
2-2	0.41	0.640	9:01	888.89	0.55	650	70	67	5	2.090
2-2	0.43	0.656	9:06	890.98	0.57	648	71	68	5	2.170
2-3	0.43	0.656	9:11	893.15	0.57	649	72	68	5	2.070
2-3	0.43	0.656	9:16	895.22	0.57	650	73	69	5	1.990
			9:21	897.21						0.000
3-1	0.42	0.648	9:26	897.42	0.56	641	73	70	5	2.140
3-1	0.43	0.656	9:31	899.56	0.57	645	73	70	5	2.110
3-2	0.43	0.656	9:36	901.67	0.57	646	74	71	5	2.080
3-2	0.43	0.656	9:41	903.75	0.57	643	74	72	5	1.968
3-3	0.46	0.678	9:46	905.72	0.61	647	74	72	5	2.162
3-3	0.48	0.693	9:51	907.88	0.64	650	76	73	5	2.260
			9:56	910.14						0.000
4-1	0.53	0.728	10:01	910.30	0.71	643	76	73	6	2.250
4-1	0.53	0.728	10:06	912.55	0.71	642	77	75	6	2.200
4-2	0.54	0.735	10:11	914.75	0.73	642	78	75	6	2.560
4-2	0.55	0.742	10:16	917.31	0.73	646	78	75	7	2.600
4-3	0.56	0.748	10:21	919.91	0.74	648	79	76	7	1.730
4-3	0.54	0.735	10:26	921.64	0.72	647	80	76	7	2.350
			10:31	923.99						0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
		0.619		46.520	0.53	646	72	70		#####
							70.85			

MOISTURE, DILUENT AND MERCURY DATA

Company Duke Energy Corporation **Date:** 9/1/99 **Test Run:** 3

Location: Unit 1 Precipitator Inlet

SILICA GEL FINAL WT.:	804.50	**grams**
SILICA GEL INITIAL WT.:	792.90	**grams**
DIFFERENCE:	11.60	
FINAL IMPINGER WATER:	4917.10	**mls.**
INITIAL IMPINGER WATER:	4833.40	**mls.**
DIFFERENCE:	83.70	
TOTAL WATER GAIN:	95.30	

ITEM		MERCURY (UG)		= NET WT. (G)
FILTER:	14	0.085		0.000000085
PROBE WASH:		0.000		0.000000000
			Particle-bound Total:	0.000000085
KCl:		4.918		0.000004918
			Oxidized Total:	0.000004918
HNO_3/H_2O_2:		0.305		0.000000305
$KMNO_4$:		8.303		0.000008303
			Elemental Total:	0.000008608

Orsat Analysis	1	2	3	Average
Carbon Dioxide:	13.60			13.60
Oxygen:	4.40			4.40

ONTARIO HYDRO METHOD DATA ENTRY FORM

Field Data/Calculated Data

Company:	Duke Energy Corporation
Date:	9/1/99
Test Run:	3
Stack or Duct No.:	Unit 1 Precipitator Inlet
Start Time:	8:15
Stop Time:	10:31

Pb:	29.25	Inches Hg
Static	-4.00	Inches H2O
Ps:	28.96	Inches Hg Abs.
Vlc:	95	ml + grams
Mn:	0.0000	gm
Test Time:	120	minutes
% O2:	4.40	%
% CO2:	13.60	%
% N2:	82.00	%
Delta H:	0.53	Inches H20
Cp:	0.828	Dimensionless - pitot
Tm:	70.85	°F
Sqrt P:	0.619	Inches H20
Ts:	645.50	°F
Vm:	46.520	Cubic Feet
Dn:	0.236	Inches - nozzle
As:	84.00	Sq. Feet
Yd:	1.001	Mcf
CF:	N/A	Process tons/hr
Heat Input:	N/A	MM BTU/hr
Fd:	N/A	dscf/10^6 Btu
Fc:	N/A	scf/10^6 Btu

Vmstd:	45.339	cubic feet (dry)
Vwstd:	4.489	cubic feet (wet)
Bwo:	0.090	
Md:	30.352	lb/lb-mole (dry)
Ms:	29.239	lb/lb-mole (wet)
Excess Air (%)	25.510	
Vs:	50.037	fps
ACFM:	252186.	
DSCFM:	106065.	
WSCFM:	116566	
%I:	98.6	isokinetic variance
GR/ACF:	---	
GR/DSCF:	---	
lbs/hr	---	
lbs/ton prod.:	N/A	
lbs/MM BTU:	N/A	Heat Input
lbs/MM BTU:	N/A	O2 Basis
lbs/MM BTU:	N/A	CO2 Basis

ONTARIO HYDRO METHOD TEST SUPPORT DATA

PROJECT NO.:	93504	**TEST RUN NO.:**	1	**TEST DATE:**	9/1/99

CUSTOMER:	Duke Energy Corporation	**BAROMETRIC PRESSURE (Pb)**	29.45 **in. Hg.**
PLANT:	Cliffside Steam Station	**STATIC PRESSURE**	-0.5 **in. H2O**
TEST LOC.:	Stack	**FLUE PRESSURE (Ps)**	29.41 **in. Hg. abs.**
CLIENT:	Electric Power Research Institute	**PROBE LENGTH:**	10.5 **ft.**
OPERATOR:	J. Platt	**PROBE LINER MATERIAL:**	Glass
CONTROL BOX:	E-18	**NOZZLE IDENTIFICATION NO.:**	#10 (Set A)
METER NO.:	E-18	**CALIBRATED NOZZLE DIAMETER:**	0.308 **in.**
METER CALIBRATION FACTOR:	0.992	**LEAK CHECK PRE:**	0.000 **POST:** 0.000 @ 17 in. Hg.
PITOT ID NO.:	427A	**DUCT SHAPE:**	Circular DIA. 10.5 Feet Rectangular Feet Feet
PITOT TUBE COEFFICIENT:	0.830	**DUCT AREA:**	86.590074 **sq. ft.**
PORT LENGTH:	6 in.	**TEST LENGTH:**	120 **min.**
PORT SIZE:	4 in.	**MINUTES PER POINT:**	5
PORT TYPE:	Flange	**TOTAL NUMBER OF TRAVERSE POINTS:**	24

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ONTARIO HYDRO METHOD TRAVERSE DATA

Company: Duke Energy Corporation **Date:** 9/1/99 **Test Ru** 1

Location: Stack

Point	Δp	Sq. Root Δp	Time	Volume cubic feet	ΔH	Stack Temp °F	Meter Inlet °F	Meter Outlet °F	Vacuum in. Hg	
1-1	0.33	0.574	10:35	29.88	1.74	381	76	76	8	3.520
1-2	0.35	0.592	10:40	33.40	1.85	383	77	77	8	3.700
1-3	0.35	0.592	10:45	37.10	1.85	383	77	77	8	3.600
1-4	0.28	0.529	10:50	40.70	1.48	384	79	78	8	3.600
1-5	0.22	0.469	10:55	44.30	1.16	383	79	78	8	3.100
1-6	0.27	0.520	11:00	47.40	1.42	384	80	78	8	3.300
1-7	0.35	0.592	11:05	50.70	1.84	385	81	79	8	3.700
1-8	0.38	0.616	11:10	54.40	2.00	385	83	80	8.5	3.800
1-9	0.53	0.728	11:15	58.20	2.79	384	85	81	10	4.500
1-10	0.65	0.806	11:20	62.70	3.43	384	89	85	15.5	5.500
1-11	0.75	0.866	11:25	68.20	3.95	385	89	86	16	5.700
1-12	0.62	0.787	11:30	73.90	3.27	344	90	87	17	4.900
			11:35	78.80						0.000
2-1	0.35	0.592	11:44	79.50	1.85	384	91	87	7.5	3.410
2-2	0.33	0.574	11:49	82.91	1.74	384	91	87	7.5	3.390
2-3	0.30	0.548	11:54	86.30	1.58	384	93	88	7.5	3.800
2-4	0.30	0.548	11:59	90.10	1.58	384	93	88	7.5	3.300
2-5	0.35	0.592	12:04	93.40	1.85	385	96	90	7.5	3.970
2-6	0.35	0.592	12:09	97.37	1.85	386	96	90	7.5	3.730
2-7	0.35	0.592	12:14	101.10	1.85	387	98	91	8.5	4.000
2-8	0.45	0.671	12:19	105.10	2.37	390	98	91	8.5	4.200
2-9	0.60	0.775	12:24	109.30	3.16	395	99	95	8.5	4.800
2-10	0.55	0.742	12:29	114.10	2.90	385	99	95	12	4.660
2-11	0.37	0.608	12:34	118.76	1.95	384	99	95	12	4.140
2-12	0.32	0.566	12:39	122.90	1.68	382	99	95	12	3.770
			12:44	126.67						0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
		0.628		96.090	2.13	383	89	86		#####
							87.31			

MOISTURE, DILUENT AND MERCURY DATA

Company Duke Energy Corporation **Date:** 9/1/99 **Test Run:** 1

Location: Stack

SILICA GEL FINAL WT.:	771.00	**grams**
SILICA GEL INITIAL WT.:	750.80	**grams**
DIFFERENCE:	20.20	
FINAL IMPINGER WATER:	149.00	**mls.**
INITIAL IMPINGER WATER:	0.00	**mls.**
DIFFERENCE:	149.00	
TOTAL WATER GAIN:	169.20	

ITEM	MERCURY (UG)		= NET WT. (G)
FILTER:	0.849		0.000000849
PROBE WASH:	0.000		0.000000000
		Particle-bound Total:	0.000000849
KCl:	5.828		0.000005828
		Oxidized Total:	0.000005828
HNO_3/H_2O_2:	0.682		0.000000682
$KMNO_4$:	7.563		0.000007563
		Elemental Total:	0.000008245

Orsat Analysis	1	2	3	Average
Carbon Dioxide:	12.20	12.20	12.20	12.20
Oxygen:	6.40	6.40	6.40	6.40

ONTARIO HYDRO METHOD DATA ENTRY FORM

Field Data/Calculated Data

Company:	Duke Energy Corporation
Date:	9/1/99
Test Run:	1
Stack or Duct No.:	Stack
Start Time:	10:35
Stop Time:	12:44

Pb:	29.45	Inches Hg
Static	-0.50	Inches H2O
Ps:	29.41	Inches Hg Abs.
Vlc:	169	ml + grams
Mn:	0.0000	gm
Test Time:	120	minutes
% O2:	6.40	%
% CO2:	12.20	%
% N2:	81.40	%
Delta H:	2.13	Inches H20
Cp:	0.830	Dimensionless - pitot
Tm:	87.31	°F
Sqrt P:	0.628	Inches H20
Ts:	383.13	°F
Vm:	96.090	Cubic Feet
Dn:	0.308	Inches - nozzle
As:	86.59	Sq. Feet
Yd:	0.992	Mcf
CF:	N/A	Process tons/hr
Heat Input:	N/A	MM BTU/hr
Fd:	N/A	dscf/10^6 Btu
Fc:	N/A	scf/10^6 Btu

Vmstd:	90.994	cubic feet (dry)
Vwstd:	7.969	cubic feet (wet)
Bwo:	0.081	
Md:	30.208	lb/lb-mole (dry)
Ms:	29.225	lb/lb-mole (wet)
Excess Air (%)	42.413	
Vs:	44.122	fps
ACFM:	229229.	
DSCFM:	129757.	
WSCFM:	141121	
%I:	97.9	isokinetic variance
GR/ACF:	---	
GR/DSCF:	---	
lbs/hr	---	
lbs/ton prod.:	N/A	
lbs/MM BTU:	N/A	Heat Input
lbs/MM BTU:	N/A	O2 Basis
lbs/MM BTU:	N/A	CO2 Basis

ONTARIO HYDRO METHOD TEST SUPPORT DATA

PROJECT NO.:	93504	**TEST RUN NO.:**	2	**TEST DATE:**	9/1/99

CUSTOMER:	Duke Energy Corporation	**BAROMETRIC PRESSURE (Pb)**	29.45	**in. Hg.**	
PLANT:	Cliffside Steam Station	**STATIC PRESSURE**	-0.5	**in. H2O**	
TEST LOC.:	Stack	**FLUE PRESSURE (Ps)**	29.41	**in. Hg. abs.**	
CLIENT:	Electric Power Research Institute	**PROBE LENGTH:**	10.5	**ft.**	
OPERATOR:	J. Platt	**PROBE LINER MATERIAL:**	Glass		
CONTROL BOX:	E-18	**NOZZLE IDENTIFICATION NO.:**	#8 (Set A)		
METER NO.:	E-18	**CALIBRATED NOZZLE DIAMETER:**	0.245	**in.**	
METER CALIBRATION FACTOR:	0.992	**LEAK CHECK** **PRE:**	0.000	**POST:**	0.000 @ 15 in. Hg.
PITOT ID NO.:	427A	**DUCT SHAPE:**	Circular DIA.	10.5 Feet	
			Rectangular	Feet	Feet
PITOT TUBE COEFFICIENT:	0.830	**DUCT AREA:**	86.590074	**sq. ft.**	
PORT LENGTH:	6 in.	**TEST LENGTH:**	120	**min.**	
PORT SIZE:	4 in.	**MINUTES PER POINT:**	5		
PORT TYPE:	Flange	**TOTAL NUMBER OF TRAVERSE POINTS:**	24		

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ONTARIO HYDRO METHOD TRAVERSE DATA

Company: Duke Energy Corporation **Date:** 9/1/99 **Test Ru** 2

Location: Stack

Point	Δp	Sq. Root Δp	Time	Volume cubic feet	ΔH	Stack Temp °F	Meter Inlet °F	Meter Outlet °F	Vacuum in. Hg	
1-1	0.35	0.592	14:50	27.39	0.77	385	97	97	6	2.410
1-2	0.35	0.592	14:55	29.80	0.77	386	97	97	6	2.550
1-3	0.35	0.592	15:00	32.35	0.77	386	97	97	6	2.450
1-4	0.35	0.592	15:05	34.80	0.77	385	97	97	6	2.500
1-5	0.35	0.592	15:10	37.30	0.77	385	97	97	6	2.500
1-6	0.30	0.548	15:15	39.80	0.66	386	97	97	5.5	2.350
1-7	0.36	0.600	15:20	42.15	0.80	386	98	98	5.5	2.400
1-8	0.50	0.707	15:25	44.55	1.11	385	98	98	5.5	2.950
1-9	0.55	0.742	15:30	47.50	1.22	386	99	98	5.5	3.200
1-10	0.75	0.866	15:35	50.70	1.66	386	99	98	5.5	3.800
1-11	0.80	0.894	15:40	54.50	1.77	387	100	98	11	3.650
1-12	0.80	0.894	15:45	58.15	1.77	384	100	98	11	4.000
			15:50	62.15						0.000
2-1	0.35	0.592	15:55	62.34	0.77	384	100	98	6.5	2.560
2-2	0.35	0.592	16:00	64.90	0.77	383	100	98	6.5	2.600
2-3	0.36	0.600	16:05	67.50	0.80	383	100	98	6.5	2.500
2-4	0.36	0.600	16:10	70.00	0.80	384	100	98	6.5	2.500
2-5	0.36	0.600	16:15	72.50	0.80	384	100	98	6	2.600
2-6	0.38	0.616	16:20	75.10	0.84	388	100	98	6	2.400
2-7	0.32	0.566	16:25	77.50	0.71	387	100	98	6	2.500
2-8	0.32	0.566	16:30	80.00	0.71	389	100	98	6	2.400
2-9	0.32	0.566	16:35	82.40	0.71	390	100	98	6	2.400
2-10	0.40	0.632	16:40	84.80	0.88	391	100	98	6	2.600
2-11	0.30	0.548	16:45	87.40	0.66	388	101	98	6	2.400
2-12	0.30	0.548	16:50	89.80	0.66	384	101	98	6	2.400
			16:55	92.20						0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
		0.635		64.620	0.91	386	99	98		#####
							98.42			

MOISTURE, DILUENT AND MERCURY DATA

Company Duke Energy Corporation **Date:** 9/1/99 **Test Run:** 2

Location: Stack

SILICA GEL FINAL WT.:	733.50	**grams**
SILICA GEL INITIAL WT.:	718.20	**grams**
DIFFERENCE:	15.30	
FINAL IMPINGER WATER:	102.00	**mls.**
INITIAL IMPINGER WATER:	0.00	**mls.**
DIFFERENCE:	102.00	
TOTAL WATER GAIN:	117.30	

ITEM	MERCURY (UG)		= NET WT. (G)
FILTER:	0.139		0.000000139
PROBE WASH:	0.000		0.000000000
		Particle-bound Total:	0.000000139
KCl:	3.128		0.000003128
		Oxidized Total:	0.000003128
HNO_3/H_2O_2:	0.612		0.000000612
$KMNO_4$:	2.083		0.000002083
		Elemental Total:	0.000002695

Orsat Analysis	1	2	3	Average
Carbon Dioxide:	12.00	12.00	12.00	12.00
Oxygen:	6.30	6.30	6.30	6.30

ONTARIO HYDRO METHOD DATA ENTRY FORM

Field Data/Calculated Data

Company:	Duke Energy Corporation
Date:	9/1/99
Test Run:	2
Stack or Duct No.:	Stack
Start Time:	14:50
Stop Time:	16:55

Pb:	29.45	Inches Hg
Static	-0.50	Inches H2O
Ps:	29.41	Inches Hg Abs.
Vlc:	117	ml + grams
Mn:	0.0000	gm
Test Time:	120	minutes
% O2:	6.30	%
% CO2:	12.00	%
% N2:	81.70	%
Delta H:	0.91	Inches H20
Cp:	0.830	Dimensionless - pitot
Tm:	98.42	°F
Sqrt P:	0.635	Inches H20
Ts:	385.92	°F
Vm:	64.620	Cubic Feet
Dn:	0.245	Inches - nozzle
As:	86.59	Sq. Feet
Yd:	0.992	Mcf
CF:	N/A	Process tons/hr
Heat Input:	N/A	MM BTU/hr
Fd:	N/A	dscf/10^6 Btu
Fc:	N/A	scf/10^6 Btu

Vmstd:	59.795	cubic feet (dry)
Vwstd:	5.525	cubic feet (wet)
Bwo:	0.085	
Md:	30.172	lb/lb-mole (dry)
Ms:	29.142	lb/lb-mole (wet)
Excess Air (%)	41.261	
Vs:	44.743	fps
ACFM:	232458.	
DSCFM:	130572.	
WSCFM:	142636	
%I:	101.0	isokinetic variance
GR/ACF:	---	
GR/DSCF:	---	
lbs/hr	---	
lbs/ton prod.:	N/A	
lbs/MM BTU:	N/A	Heat Input
lbs/MM BTU:	N/A	O2 Basis
lbs/MM BTU:	N/A	CO2 Basis

ONTARIO HYDRO METHOD TEST SUPPORT DATA

PROJECT NO.:	93504	**TEST RUN NO.:**	3	**TEST DATE:**	9/2/99

CUSTOMER:	Duke Energy Corporation	**BAROMETRIC PRESSURE (Pb)**	29.25	**in. Hg.**	
PLANT:	Cliffside Steam Station	**STATIC PRESSURE**	-0.5	**in. H2O**	
TEST LOC.:	Stack	**FLUE PRESSURE (Ps)**	29.21	**in. Hg. abs.**	
CLIENT:	Electric Power Research Institute	**PROBE LENGTH:**	10.5	**ft.**	
OPERATOR:	J. Platt	**PROBE LINER MATERIAL:**	Glass		
CONTROL BOX:	E-18	**NOZZLE IDENTIFICATION NO.:**	#8 (Set A)		
METER NO.:	E-18	**CALIBRATED NOZZLE DIAMETER:**	0.245	**in.**	
METER CALIBRATION FACTOR:	0.992	**LEAK CHECK** **PRE:**	0.000	**POST:**	0.000 @ 18 in. Hg.
PITOT ID NO.:	427A	**DUCT SHAPE:**	Circular / Rectangular	DIA.	10.5 Feet / Feet Feet
PITOT TUBE COEFFICIENT:	0.830	**DUCT AREA:**	86.590074	**sq. ft.**	
PORT LENGTH:	6 in.	**TEST LENGTH:**	120	**min.**	
PORT SIZE:	4 in.	**MINUTES PER POINT:**	5		
PORT TYPE:	Flange	**TOTAL NUMBER OF TRAVERSE POINTS:**	24		

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ONTARIO HYDRO METHOD TRAVERSE DATA

Company: Duke Energy Corporation **Date:** 9/2/99 **Test Ru** 3

Location: Stack

Point	Δp	Sq. Root Δp	Time	Volume cubic feet	ΔH	Stack Temp °F	Meter Inlet °F	Meter Outlet °F	Vacuum in. Hg	
1-1	0.34	0.583	8:15	92.52	0.71	374	64	64	3	2.340
1-2	0.30	0.548	8:20	94.86	0.63	375	65	65	3	2.140
1-3	0.34	0.583	8:25	97.00	0.71	375	66	66	3	2.300
1-4	0.32	0.566	8:30	99.30	0.67	375	67	66	3	2.250
1-5	0.32	0.566	8:35	101.55	0.67	375	68	66	3	2.350
1-6	0.30	0.548	8:40	103.90	0.63	376	70	66	3	2.150
1-7	0.37	0.608	8:45	106.05	0.77	376	71	67	3	2.450
1-8	0.50	0.707	8:50	108.50	1.04	375	72	68	3	2.800
1-9	0.62	0.787	8:55	111.30	1.29	375	73	68	5	3.120
1-10	0.71	0.843	9:00	114.42	1.48	375	74	69	5	3.380
1-11	0.75	0.866	9:05	117.80	1.57	376	75	70	6	3.500
1-12	0.82	0.906	9:10	121.30	1.71	376	76	71	6	3.720
			9:15	125.02						0.000
2-1	0.35	0.592	9:19	125.20	0.73	376	77	71	3	2.450
2-2	0.35	0.592	9:24	127.65	0.73	376	78	72	3	2.300
2-3	0.35	0.592	9:29	129.95	0.73	376	78	72	3	2.250
2-4	0.38	0.616	9:34	132.20	0.79	376	79	73	3	2.550
2-5	0.35	0.592	9:39	134.75	0.73	378	80	74	3	2.350
2-6	0.35	0.592	9:44	137.10	0.73	379	80	74	3	2.330
2-7	0.21	0.458	9:49	139.43	0.44	380	81	74	3	1.870
2-8	0.21	0.458	9:54	141.30	0.44	381	82	74	3	1.900
2-9	0.25	0.500	9:59	143.20	0.52	381	82	74	3	2.000
2-10	0.30	0.548	10:04	145.20	0.63	381	83	74	3	2.200
2-11	0.25	0.500	10:09	147.40	0.52	381	84	75	3	2.000
2-12	0.25	0.500	10:14	149.40	0.52	381	84	75	3	2.050
			10:19	151.45						0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
										0.000
		0.610		58.750	0.81	377	75	70		######
							72.85			

MOISTURE, DILUENT AND MERCURY DATA

Company Duke Energy Corporation **Date:** 9/2/99 **Test Run:** 3

Location: Stack

SILICA GEL FINAL WT.:	756.40	**grams**
SILICA GEL INITIAL WT.:	745.70	**grams**
DIFFERENCE:	10.70	
FINAL IMPINGER WATER:	93.10	**mls.**
INITIAL IMPINGER WATER:	0.00	**mls.**
DIFFERENCE:	93.10	
TOTAL WATER GAIN:	103.80	

ITEM	MERCURY (UG)		= NET WT. (G)
FILTER:	0.124		0.000000124
PROBE WASH:	0.000		0.000000000
		Particle-bound Total:	0.000000124
KCl:	5.278		0.000005278
		Oxidized Total:	0.000005278
HNO_3/H_2O_2:	0.508		0.000000508
$KMNO_4$:	2.863		0.000002863
		Elemental Total:	0.000003371

Orsat Analysis	1	2	3	Average
Carbon Dioxide:	12.20	12.20	12.20	12.20
Oxygen:	6.10	6.10	6.10	6.10

ONTARIO HYDRO METHOD DATA ENTRY FORM

Field Data/Calculated Data

Company:	Duke Energy Corporation
Date:	9/2/99
Test Run:	3
Stack or Duct No.:	Stack
Start Time:	8:15
Stop Time:	10:19

Pb:	29.25	Inches Hg
Static	-0.50	Inches H2O
Ps:	29.21	Inches Hg Abs.
Vlc:	104	ml + grams
Mn:	0.0000	gm
Test Time:	120	minutes
% O2:	6.10	%
% CO2:	12.20	%
% N2:	81.70	%
Delta H:	0.81	Inches H20
Cp:	0.830	Dimensionless - pitot
Tm:	72.85	°F
Sqrt P:	0.610	Inches H20
Ts:	377.04	°F
Vm:	58.750	Cubic Feet
Dn:	0.245	Inches - nozzle
As:	86.59	Sq. Feet
Yd:	0.992	Mcf
CF:	N/A	Process tons/hr
Heat Input:	N/A	MM BTU/hr
Fd:	N/A	dscf/10^6 Btu
Fc:	N/A	scf/10^6 Btu

Vmstd:	56.570	cubic feet (dry)
Vwstd:	4.889	cubic feet (wet)
Bwo:	0.080	
Md:	30.196	lb/lb-mole (dry)
Ms:	29.226	lb/lb-mole (wet)
Excess Air (%)	39.434	
Vs:	42.883	fps
ACFM:	222792.	
DSCFM:	126300.	
WSCFM:	137216	
%I:	98.8	isokinetic variance
GR/ACF:	---	
GR/DSCF:	---	
lbs/hr	---	
lbs/ton prod.:	N/A	
lbs/MM BTU:	N/A	Heat Input
lbs/MM BTU:	N/A	O2 Basis
lbs/MM BTU:	N/A	CO2 Basis

Appendix E

Project Summary-Samples Received Report

Project	*Client*	*Unit*
93504	DUKE ENERGY CORP.	CLIFFSIDE STEAMSTATION,NC

Project	*Sample*	*Sample Point*	*Date Received*	*Analyte Detail*
93504	001	INL HNO3 RNS T1	9/2/1999	Mercury
93504	002	INL HNO3 RNS T2	9/2/1999	Mercury
93504	003	INL HNO3 RNS T3	9/2/1999	Mercury
93504	004	INL KCL IMP T1	9/2/1999	Mercury
93504	005	INL KCL IMP T2	9/2/1999	Mercury
93504	006	INL KCL IMP T3	9/2/1999	Mercury
93504	007	IN HNO3/H2O2 T1	9/2/1999	Mercury
93504	008	IN HNO3/H2O2 T2	9/2/1999	Mercury
93504	009	IN HNO3/H2O2 T3	9/2/1999	Mercury
93504	010	INL KMNO4 IM T1	9/2/1999	Mercury
93504	011	INL KMNO4 IM T2	9/2/1999	Mercury
93504	012	INL KMNO4 IM T3	9/2/1999	Mercury
93504	013	OUT HNO3 RNS T1	9/2/1999	Mercury
93504	014	OUT HNO3 RNS T2	9/2/1999	Mercury
93504	015	OUT HNO3 RNS T3	9/2/1999	Mercury
93504	016	OUT KCL IMP T1	9/2/1999	Mercury
93504	017	OUT KCL IMP T2	9/2/1999	Mercury
93504	018	OUT KCL IMP T3	9/2/1999	Mercury
93504	019	OUT HNO3/H2O2-1	9/2/1999	Mercury
93504	020	OUT HNO3/H2O2-2	9/2/1999	Mercury
93504	021	OUT HNO3/H2O2-3	9/2/1999	Mercury
93504	022	OUT KMNO4 IM T1	9/2/1999	Mercury
93504	023	OUT KMNO4 IM T2	9/2/1999	Mercury
93504	024	OUT KMNO4 IM T3	9/2/1999	Mercury
93504	025	FLD BL INL KCL	9/2/1999	Mercury
93504	026	F/B INHNO3/H2O2	9/2/1999	Mercury

Project	*Sample*	*Sample Point*	*Date Received*	*Analyte Detail*
93504	027	FLD BL IN KMNO4	9/2/1999	Mercury
93504	028	FLD BL OUT KCL	9/2/1999	Mercury
93504	029	F/B HNO3/H2O2	9/2/1999	Mercury
93504	030	F/B OUTL KMNO4	9/2/1999	Mercury
93504	031	BLANK:QRTZ FLT	9/2/1999	Mercury
93504	032	BLANK:QRTZ FLT	9/2/1999	Mercury
93504	033	BLANK:QRTZ FLT	9/2/1999	Mercury
93504	034	REAG BLNK HNO3	9/2/1999	Mercury
93504	035	REAG BLNK KCL	9/2/1999	Mercury
93504	036	R/BL HNO3/H2O2	9/2/1999	Mercury
93504	037	REAG BL KMNO4	9/2/1999	Mercury
93504	038	REAG BL KMNO4	9/2/1999	Mercury
93504	039	R/BL HYDROXYLAM	9/2/1999	Mercury
93504	040	COAL SAMPLE T1	9/2/1999	Mercury
93504	040	COAL SAMPLE T1	9/2/1999	Ultimate/Proximate on Coal
93504	040	COAL SAMPLE T1	9/2/1999	Chloride
93504	041	COAL SAMPLE T2	9/2/1999	Chloride
93504	041	COAL SAMPLE T2	9/2/1999	Mercury
93504	041	COAL SAMPLE T2	9/2/1999	Ultimate/Proximate on Coal
93504	042	COAL SAMPLE T3	9/2/1999	Chloride
93504	042	COAL SAMPLE T3	9/2/1999	Mercury
93504	042	COAL SAMPLE T3	9/2/1999	Ultimate/Proximate on Coal
93504	043	FLY ASH SMPL T1	9/2/1999	Hold
93504	044	FLY ASH SMPL T2	9/2/1999	Hold
93504	045	FLY ASH SMPL T3	9/2/1999	Hold

Appendix F

LABORATORY REPORT

TEI Analytical, Inc.
7177 N. Austin
Niles, IL 60714-4617
847-647-1345

PREPARED FOR:

Frank Jarke
Mostardi-Platt Associates, Inc.
945 Oaklawn Avenue
Elmhurst, IL 60126

Report #: 36089
Report Date: 1/27/00
Sample Received:
9/20/99 16:35

TEI	93504	Type	Total ug	mg/kg	Date	%RSD	Lin.Reg	Blank	CPI	MS	MSD
36089	001	HNO3	<0.004		1/4/00	9.04	1	NA	97	128	127
36090	002	HNO3	<0.004		1/4/00	2.37	1	NA	97	128	127
36091	003	HNO3	<0.004		1/4/00	0.689	1	NA	97	128	127
36092	004	KCl	4.69		12/23/99	0.416	1	0.219	96.8	101	103
36093	005	KCl	4.35		12/23/99	0.054	1	0.219	96.8	101	103
36094	006	KCl	5.07		12/23/99	0.342	1	0.219	96.8	101	103
36095	007	H2O2	0.338		1/3/00	1.05	0.99995	0.103	98.6	93.8	88.6
36096	008	H2O2	0.246		1/3/00	1.15	0.99995	0.103	98.6	93.8	88.6
36097	009	H2O2	0.305		1/3/00	1.28	0.99995	0.103	98.6	93.8	88.6
36098	010	KMnO4	3.83		12/12/99	0.341	0.99999	0.07	92.3	108	108
36099	011	KMnO4	5.39		12/12/99	0.348	0.99999	0.07	92.3	108	108
36100	012	KMnO4	8.43		12/13/99	1.27	1	<0.03	93.5	118	110
36101	013	HNO3	<0.004		1/4/00	5.12	1	<0.03	97	112	112
36102	014	HNO3	<0.004		1/4/00	1.64	1	<0.03	97	112	112
36103	015	HNO3	<0.004		1/4/00	0.373	1	<0.03	97	112	112
36104	016	KCl	5.98		12/28/99	0.822	1	0.282	97	98.5	98.5
36105	017	KCl	3.28		12/28/99	0.375	1	0.282	97	98.5	98.5
36106	018	KCl	5.43		12/28/99	0.476	1	0.282	97	98.5	98.5
36107	019	H2O2	0.682		1/3/00	0.022	0.99999	0.103	98.1	93.8	88.6
36108	020	H2O2	0.612		1/4/00	0.912	0.99999	0.103	98.1	93.8	88.6
36109	021	H2O2	0.508		1/4/00	0.142	1	0.103	97	112	112
36110	022	KMnO4	7.69		12/13/99	1.19	1	<0.03	93.5	118	110
36111	023	KMnO4	2.21		12/13/99	0.739	1	<0.03	93.5	118	110
36112	024	KMnO4	2.99		12/13/99	2.99	1	<0.03	93.5	118	110

Gayle E. O'Neill, Ph.D.

LABORATORY REPORT

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Frank Jarke
Mostardi-Platt Associates, Inc.
945 Oaklawn Avenue
Elmhurst, IL 60126

Report #: 36089
Report Date: 1/27/00
Sample Received:
9/20/99 16:35

TEI	93504	Type	Total ug	mg/kg	Date	%RSD	Lin.Reg	Blank	CPI	MS	MSD
36113	025	KCl	0.185		1/4/00	0.992	1	<0.03	97	112	112
36114	026	H2O2	<0.004		10/25/99	13.9	0.99883	<0.03	102	106	106
36115	027	KMnO4	3.42		12/12/99	0.754	0.99999	0.07	92.3	108	108
36116	028	KCl	0.185		1/4/00	1.71	1	<0.03	97	112	112
36117	029	H2O2	<0.004		10/25/99	10.6	0.99883	<0.03	102	106	106
36118	030	KMnO4	1.65		12/12/99	0.584	0.99999	0.07	92.3	108	108
36119	031	Filt		0.021	10/1/99	1.72	0.99928	0.129	107	91	89
36120	032	Filt		0.015	10/1/99	1.59	0.99925	0.129	107	91	89
36121	033	Filt	No sample								
36122	034	HNO3	<0.003		1/10/00	1.84	0.99998	0.135	97.2	103	113
36123	035	KCl	0.152		1/4/00	2.21	1	<0.03	97	112	112
36124	036	H2O2	<0.01		1/10/00	0.448	0.99998	0.135	97.2	103	103
36125	037	KMnO4	0.137		12/12/99	0.134	0.99999	0.07	92.3	108	108
36126	038	KMnO4	0.116		12/12/99	0.187	0.99999	0.07	92.3	108	108
36127	039	NH2OH	<0.003		12/15/99	5.99	0.99999	NA	102	111	111
36152	001	Filt		0.065	9/29/99	9.84	0.99884	0.545	98.2	109	84.1
36153	002	Filt		0.032	1/9/00	0.34	0.99998	0.138	101	122	108
36154	003	Filt		0.022	1/9/00	0.19	0.99998	0.138	101	122	108
36155	013	Filt		0.25	9/29/99	3.33	0.99884	0.545	98.2	109	84.1
36156	014	Filt		0.043	9/29/99	4.76	0.99884	0.545	98.2	109	84.1
36157	015	Filt		0.039	9/29/99	2.61	0.99884	0.545	98.2	109	84.1

Gayle E. O'Neill, Ph.D.

LABORATORY REPORT

TEI Analytical, Inc.
7177 N. Austin
Niles, IL 60714-4617
847-647-1345

PREPARED FOR:

Frank Jarke
Mostardi-Platt Associates, Inc.
945 Oaklawn Avenue
Elmhurst, IL 60126

Report #: 36089
Report Date: 1/27/00
Sample Received:
9/20/99 16:35

Mercury (Ontario Hydro Method)

The QAPP called for the analysis of all samples in duplicate with every tenth sample run in triplicate. To simplify the instrument setup, we chose to run all samples, blanks, standards, matrix spikes and matrix spike duplicates in triplicate. The reported %RSD is for the triplicate measurements.

All sample results are reported as total micrograms in the sample received by the laboratory, with the exception of the filter samples. The filter sample results are expressed as mg/kg.

The instrument was calibrated at least daily with a blank and four standards. The Lin.Reg. column in this report represents the linear regression coefficient obtained during the calibration.

The laboratory method blank is reported in ug/l in the Blank column of this report. For samples requiring only addition of Hydroxylamine Hydrochloride, NA is entered in this column. No laboratory method blanks were applicable for these samples.

The CPI column presents the % Recovery of an independent standard (obtained from CPI). The calibration curve was prepared in our laboratory from Mercuric Chloride in accordance with EPA Method 7470.

The MS and MSD columns present the % Recovery of the Matrix Spikes and Matrix Spike Duplicates.

Gayle E. O'Neill, Ph.D.

LABORATORY REPORT

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Elmhurst, IL 60126

Report #: 36089
Report Date: 1/27/00
Sample Received:
9/20/99 16:35

In reviewing the initial data for these samples, inconsistently high results were obtained, particularly for the KCl solutions. After considerable investigation, it was determined that the disposable plastic tubes used for the sample digestion were the source of the contamination.

It was also determined that adjustments in the instrument parameters and calibration levels were required to reach the lower limits required for this program. Where possible, samples were reanalysed following these adjustments. However, some samples had insufficient quantity for reanalysis. This was particularly true in the case of the filters.

Gayle E. O'Neill, Ph.D.

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 630-953-9300 FAX: 630-953-9306

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SGS Member of the SGS Group (Société Générale de Surveillance)

ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD.
SOUTH HOLLAND, IL 60473
TEL: (708) 331-2900
FAX: (708) 333-3060

September 28, 1999

MOSTARDI-PLATT ASSOCIATES, INC
945 Oaklawn Avenue
Elmhurst, IL 60126
Attn: Frank Jarke

Sample identification by
Mostardi-Platt Assoc., Inc.

Kind of sample reported to us Coal

Sample taken at ------

Sample taken by Mostardi-Platt Assoc., Inc.

Date sampled September 1, 1999

Date received September 9, 1999

MPA Sample No: 93504-040
Test 1

P.O. No. 22173

Analysis Report No. 71-102154 Page 1 of 2

PROXIMATE ANALYSIS	As Received	Dry Basis
% Moisture	7.34	xxxxx
% Ash	8.49	9.16
% Volatile	33.03	35.65
% Fixed Carbon	51.14	55.19
	100.00	100.00
Btu/lb	12790	13803
% Sulfur	0.79	0.85
MAF Btu		15195

ULTIMATE ANALYSIS	As Received	Dry Basis
% Moisture	7.34	xxxxx
% Carbon	71.20	76.84
% Hydrogen	4.56	4.92
% Nitrogen	1.54	1.66
% Sulfur	0.79	0.85
% Ash	8.49	9.16
% Oxygen(diff)	6.08	6.57
	100.00	100.00
% CHLORIDE	0.13	0.14

METHODS
Moisture: ASTM D 3302; Ash: ASTM D 3174; Volatile: ASTM D 3175; Fixed Carbon: Calculated Value; ASTM D 3172
Btu/lb: ASTM 3286; Sulfur: ASTM D 4239 (Method C); Carbon, Hydrogen & Nitrogen: ASTM D 5373; Chloride: ASTM D 4208

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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Joseph B. Hourie
South Holland Laboratory

MEMBER ACIL

COMMERCIAL TESTING & ENGINEERING CO.

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September 28, 1999

MOSTARDI-PLATT ASSOCIATES, INC
945 Oaklawn Avenue
Elmhurst, IL 60126
Attn: Frank Jarke

Sample identification by
Mostardi-Platt Assoc., Inc.

Kind of sample reported to us Coal

Sample taken at ------

Sample taken by Mostardi-Platt Assoc., Inc.

Date sampled September 1, 1999

Date received September 9, 1999

MPA Sample No: 93504-040

P.O. No. 22173

Analysis Report No. 71-102154

	Dry Basis, ug/g	
Mercury, Hg	0.07	
	Expected	**Observed**
SARM 1157	0.05	0.05
NIST 1630A	0.11	0.11

METHOD
Mercury: ASTM D 3684

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

106 Joseph B. Strauss

South Holland Laboratory

MEMBER ACIL

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FAX: (708) 333-3060

September 28, 1999

MOSTARDI-PLATT ASSOCIATES, INC
945 Oaklawn Avenue
Elmhurst, IL 60126
Attn: Frank Jarke

Sample identification by
Mostardi-Platt Assoc., Inc.

Kind of sample reported to us Coal

Sample taken at ------

Sample taken by Mostardi-Platt Assoc., Inc.

Date sampled September 1, 1999

Date received September 9, 1999

MPA Sample No: 93504-041
Test 2

P.O. No. 22173

Analysis Report No. 71-102155

PROXIMATE ANALYSIS	As Received	Dry Basis
% Moisture	7.83	xxxxx
% Ash	7.66	8.31
% Volatile	33.27	36.10
% Fixed Carbon	51.24	55.59
	100.00	100.00
Btu/lb	12149	13181
% Sulfur	0.71	0.77
MAF Btu		14376

ULTIMATE ANALYSIS	As Received	Dry Basis
% Moisture	7.83	xxxxx
% Carbon	69.51	75.41
% Hydrogen	4.37	4.74
% Nitrogen	1.58	1.71
% Sulfur	0.71	0.77
% Ash	7.66	8.31
% Oxygen(diff)	8.34	9.06
	100.00	100.00
% CHLORIDE	0.13	0.14

METHODS
Moisture: ASTM D 3302; Ash: ASTM D 3174; Volatile: ASTM D 3175; Fixed Carbon: Calculated Value; ASTM D 3172
Btu/lb: ASTM 3286; Sulfur: ASTM D 4239 (Method C); Carbon, Hydrogen & Nitrogen: ASTM D 5373; Chloride: ASTM D 4208

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

107 Joseph B. Brusek
South Holland Laboratory

MEMBER ACIL

LIST OF PARTICIPANTS

Name	Organization	Project Role
Paul Chu	EPRI	Program Manager
Heidi Knach	Duke Energy Corporation	Plant Coordinator
James R. Platt	Mostardi Platt	Vice President
Jeffery C. Daniels	Mostardi Platt	Project Supervisor
John Wendell	Mostardi Platt	Laboratory Chemist
Norm Smith	Mostardi Platt	Test Technician
Corey Shelby	Mostardi Platt	Test Technician
Gayle E. O'Neill, Ph.D.	TEI Analytical, Inc.	Speciated Hg Sample Analysis
Joseph Houser	CTE	Coal Sample Analysis