APPENDIX A

ORIGINAL DATA SHEETS

A-1. Example of Sampling Data Sheets

A-2. Mercury Results

- a. Flue Gas
- b. Liquid Samples
- c. Solid Samples

A-3. Field Spikes and Blanks Data

A-1

Example of Sampling Data Sheets

DATE 05/22/98
RUN # MRY-D5-ESPin-OH2
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 12:15 | OPERATORS FOX / TOMAN
SAMPLE PORT ESP INLET | TRAVERSE POINT SOUTHM, MIDDLE, NORTH

Pb (BAROMETRIC PRESSURE) 27.94 in. Hg

Ps (STACK PRESSURE) = Pb +/- (-5.06 in. H2O / 13.6)= 27.57 in. Hg

Ts (STACK TEMP) = 368 F +460F = 828 R

^P (PITOT)= 0.585 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.125 in APPROX % H2O = 12

^H@ = 1.72 in H2O Cm = 1

Vs(STACK VELOCITY) = 3351 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.2855 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.1377 ACFM

^H (ORIFICE)= 0.06 in H2O

SECOND/REV = 43.6

TIME = 120 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 21.009 CF

GAS METER VOL = 21.009 CF

AVERAGE ^ H = 0.11

METER TEMP = 94

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.11	96	92

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	607.9	662.0	54.1
BUBBLER	KCl	755.7	759.3	3.6
IMPINGER	KCl	708.2	708.1	-0.1
BUBBLER	H2O2	633.6	635.3	1.7
BUBBLER	KMnO4	649.8	650.3	0.5
BUBBLER	KMnO4	639.9	639.6	-0.3
IMPINGER	KMnO4	630.0	629.8	-0.2
BUBBLER	SILICA GEL	874.1	880.7	6.6
				0.0
				0.0
		TOTAL H2O		65.9
FILTER		0.20519	2.33209	2.12690
		TOTAL DUST		2.12690

VwSTD = 3.109 SCF

VmC = 21.009 ACF

VmSTD = 18.770 SCF

VtSTD = 21.879 SCF

%H2O = 14.2 %H2O

QnSTD = 0.168 SCFM

% ISO = 108.3 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 1.5002 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

4-sheets

Date 5-22-96 Time

DUST LOADING DATA SHEET

DATE MRY-D5-ESPin-OH2

RUN #

FUND #

COST CENTER #

Time at Start 12:15:00 **Operators** Don John Kelly

Sample Pt. South Port ESPIN **Traverse Pt.**

P_s (Barometric Pressure) = 27.94 in. Hg

P_s (Stack Ptessure) = $P_s \pm$ (-5.06 in. H_2O/13.6) = 27.57 in. Hg

T_s (Stack Temperature) = 360 °F + 460 = 820 °R

ΔP(Pitot) = .75 in H_2O X Type S C_p = .84 ____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_n = 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3775 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .322 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_n T_s (P_s + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .185 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_s + \Delta H/13.6)}{0.03175\ T_m}$ = .1 in H_2O

Second/Rev = 32.4 $\%CO_2$ ____ $\%O_2$ ____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft^3)	Pitot ~~ΔH~~ ~~(in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack 364	T2 Probe	orifice T3 ~~Muff~~ ~~Hot Box~~ ΔH 1.25	T4 sec/rev ~~Impinger~~	T5 Meter In 91	T6 Meter Out 86
0	12:14:45	989.928								
N	12:15:00	990.006	x .75	7.0	360	201	.4	32.4	85	83
10	12:25:00	992.909		5.5	364	197	.1		88	84
	12:25:00	992.909	x .65	5.5	370	202	.1	34.9	88	84
20	12:35:00	994.805		6.1	371	200	.1		90	86
	12:35:00	994.805	x .55	6.1	376	194	.1	37.8	92	86
30	12:45:00	996.338		6.2	378	200	.05		93	89
	12:45:00	996.338	x .60	6.5	365	204	.05	35.9	93	89
40	12:55:00	997.903		8.9	348	204	.1		96	90
	12:55:20	997.965								

Comments leak check OK at 9" Hg 10 minute Traverse

Date 5-22-98 Time ____

DUST LOADING DATA SHEET

MRY-D5-ESPin-OH2

DATE ____

RUN # ____

FUND # ____

COST CENTER # ____

Time at Start 13:10:00 **Operators** ____

Sample Pt. middle Port ESP IN **Traverse Pt.** ____

Don
John
Kelly

P_b (Barometric Pressure) = 27.94 **in. Hg**

P_s (Stack Ptessure) = $P_b \pm$ (-5.06 **in. H_2O/13.6) =** 27.57 **in. Hg**

T_s (Stack Temperature) = 360 **°F + 460 =** 820 **°R**

ΔP(Pitot) = .55 **in H_2O** X **Type S C_p = .84** ____ **Standard**

D_n (Nozzle Size) = .125 **in** **Approx % H_2O** 12

ΔH@ = 1.72 **C_n =** 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3233 **ft/min**

Q_a (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .276 **ACFM**

Q_m(Meter Flow Rate) = $\frac{Q_a T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .16 **ACFM**

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H @ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .07 **in H_2O**

Second/Rev = 37.4 **%CO_2** ____ **%O_2** ____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Pitot ΔH (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	orifice T3 Multi Hot Box ΔH	T4 sec./Rev	T5 Meter In	T6 Meter Out
0 13:09:45	998.051			368					
13:10:00	998.104	x .55	9.5	360	204	.10	37.4	91	89
10 13:20:00	999.902		10.3	363	194	.10		93	90
13:20:00	999.902	x .50	10.6	370	204	.10	39.4	93	89
20 13:30:00	1.501		10.5	372	203	.10		95	91
13:30:00	1.501	x .50	10.6	380	204	.10	39.5	95	92
30 13:40:00	3.016		12.0	380	200	.10		98	94
13:40:00	3.016	x .60	12.0	365	200	.10	35.6	98	94
40 13:50:00	4.565*	uPto 70	14.9	354	197	.10	34.2	101	96
13:50:18	4.588								

Comments leak Check OK at 8.5" Hg
10 minute Traverse

Date_____ Time_____

DUST LOADING DATA SHEET

DATE MRY-D5-ESPin-OH2
RUN # _____
FUND # _____
COST CENTER # _____

Time at Start 14:07:00 Operators _____

Sample Pt. North Port ESP IN Traverse Pt. _____

Don
John
Kelly

P_b (Barometric Pressure) = 27.94 in. Hg

P_s (Stack Ptessure) = P_b ± (-5.06 in. H_2O/13.6) = 27.57 in. Hg

T_s (Stack Temperature) = 362 °F + 460 = 822 °R

ΔP(Pitot) = .65 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_m = 1.0

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 3519 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .30 ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .177 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = .08 in H_2O

Second/Rev = 33.9 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft³)	Pitot ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack 369	T2 Probe	orifice T3 ~~Muff/ Hot Box~~ ΔH	T4 Sec/Rev ~~Impinger~~	T5 Meter In 101	T6 Meter Out 99
art	0 14:06:45	4.749								
ce IN	14:07:00	4.884*	x .65	15.0	362	194	.15	33.9	101	97
1 END	10 14:17:00	6.801		16.0	365	200	.10		101	99
2	14:17:00	6.801	x .60	16.0	368	204	.10	35.3	102	99
2 END	20 14:27:00	8.485		17.0	368	194	.10		101	99
3	14:27:00	8.485	x .45	17.0	375	200	.10	41	101	99
3 END	30 14:37:00	10.032		16.1	374	204	.10		102	99
4	14:37:00	10.032	x .55	16.2	375	195	.10	37.1	101	99
1 END	40 14:47:00	11.535*		17.9	362	197	.10		102	99
obe ut	14:47:13	11.563								

Comments leak check OK at 16.5" Hg
10 minute Troverse
all leak checks OK

Date_____ Time_____

DUST LOADING DATA SHEET

DATE MRY-D5-ESPin-OH2

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start _____ **Operators** _____

Sample Pt._____ **Traverse Pt.**_____

P_b (Barometric Pressure) = _____ **in. Hg**

P_s (Stack Ptessure) =$P_b \pm$ (_____ **in. H_2O/13.6) =** [ ] **in. Hg**

T_s (Stack Temperature) = _____ **°F + 460 =** [ ] **°R**

ΔP(Pitot) = _____ **in H_2O** _____**Type S C_p = .84** _____ **Standard**

D_n (Nozzle Size) = _____ **in** **Approx % H_2O** _____

$\Delta H@$ = _____ **C_m =** _____

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s\ \Delta P}{P_s}}$ = _____**ft/min**

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ **ACFM**

Q_m(Meter Flow Rate) = $\frac{Q_n\ T_m\ P_s}{C_m\ T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = _____**ACFM**

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = _____ **in H_2O**

Second/Rev = _____ **$\%CO_2$** _____ **$\%O_2$** _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	T4 Impinger	T5 Meter In	T6 Meter Out

Comments_____

Sample Pt. _____

Date _____ Time _____

Date MRY-D5-ESPin-OH2

Run _____

Fund # _____

Cost Center # _____

Train Type : **ONTARIO-HYDRO METHOD**

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	607.94	662.0	
BUBBLER	KCl	755.70	759.3	
IMPINGER	KCl	708.18	708.1	
BUBBLER	H_2O_2/HNO_3	633.59	635.3	
BUBBLER	$KMnO_4/H_2SO_4$	649.75	650.3	
BUBBLER	$KMnO_4/H_2SO_4$	639.87	639.6	
IMPINGER	$KMnO_4/H_2SO_4$	630.03	629.8	
BUBBLER	SILICA GEL	874.1	880.7	
			Total H_2O (g)	
FILTER		0.20519	2.33209	
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL - Outlet DCL}) * 100}{\text{Inlet DCL}}$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * $P_s/T_s * 17.71$ _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

A-2

Mercury Results

Flue Gas

Liquid Samples

Solid Samples

		MERCURY ANALYSIS		
DATE:	5/19/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
519-1	MRY-D2-ST-OH1	KCl	500	0.69
519-2	MRY-D2-ST-OH1	H2O2	200	< 0.1
519-3	MRY-D2-ST-OH1	KMnO4	500	6.61
519-4	MRY-D2-ST-OH1	Probe rinse	250	< 0.1
519-5	MRY-D2-ST-OH2	KCl	500	1.43
519-6	MRY-D2-ST-OH2	H2O2	200	0.05
519-7	MRY-D2-ST-OH2	KMnO4	500	12.9
519-8	MRY-D2-ST-OH2	Probe rinse	250	< 0.1
519-9	MRY-D2-ESPin-OH1	KCl	500	0.31
519-10	MRY-D2-ESPin-OH1	H2O2	200	2.28
519-11	MRY-D2-ESPin-OH1	KMnO4	500	5.17
519-12	MRY-D2-ESPin-OH1	Probe rinse	250	< 0.1
519-13	MRY-D2-ESPin-OH2	KCl	500	0.45
519-14	MRY-D2-ESPin-OH2	H2O2	200	0.04
519-15	MRY-D2-ESPin-OH2	KMnO4	500	6.13
519-16	MRY-D2-ESPin-OH2	Probe rinse	250	< 0.1
519-17	MRY-D2-FGDin-OH1	KCl	500	0.92
519-18	MRY-D2-FGDin-OH1	H2O2	200	< 0.1
519-19	MRY-D2-FGDin-OH1	KMnO4	500	14.2
519-20	MRY-D2-FGDin-OH1	Probe rinse	500	< 0.1
519-21	MRY-D2-FGDin-OH2	KCl	500	4.1
519-22	MRY-D2-FGDin-OH2	H2O2	200	2.51
519-23	MRY-D2-FGDin-OH2	KMnO4	500	16.1
519-24	MRY-D2-FGDin-OH2	Probe rinse	500	< 0.1
519-25	MRY-D2-FGDout-OH1	KCl	500	0.25
519-26	MRY-D2-FGDout-OH1	H2O2	200	< 0.1
519-27	MRY-D2-FGDout-OH1	KMnO4	500	10.9
519-28	MRY-D2-FGDout-OH1	Probe rinse	250	< 0.1
519-29	MRY-D2-FGDout-OH2	KCl	500	0.44
519-30	MRY-D2-FGDout-OH2	H2O2	200	< 0.1
519-31	MRY-D2-FGDout-OH2	KMnO4	500	10.8
519-32	MRY-D2-FGDout-OH2	Probe rinse	250	< 0.1

		MERCURY ANALYSIS					
DATE:	5/21/98						
LOCATION:	MILTON R. YOUNG POWER STATION						
LAB #	SAMPLE ID	SAMPLE TYPE		VOLUME, ml		CONCENTRATION, ug/L	
521-1	MRY-D4-OH-FB	KCl		500		< 0.1	✓
521-2	MRY-D4-OH-FB	H2O2		200		< 0.1	✓
521-3	MRY-D4-OH-FB	KMnO4		500		0.057	✓
521-4	MRY-D4-OH-FBspk (20 ppb)	KCl		500		20.02	✓
521-5	MRY-D4-OH-FBspk (20 ppb)	H2O2		200		15.3	✓
521-6	MRY-D4-OH-FBspk (20 ppb)	KMnO4		500		19	✓
521-7	MRY-D4-ESPin-OH1	KCl		500		0.32	
521-8	MRY-D4-ESPin-OH1	H2O2		200		< 0.1	✓
521-9	MRY-D4-ESPin-OH1	KMnO4		500		6.38	✓
521-10	MRY-D4-ESPin-OH1	Probe rinse		250		0.12	✓
521-11	MRY-D4-ESPin-OH2	KCl		500		0.44	✓
521-12	MRY-D4-ESPin-OH2	H2O2		200		< 0.1	✓
521-13	MRY-D4-ESPin-OH2	KMnO4		500		8.53	✓
521-14	MRY-D4-ESPin-OH2	Probe rinse		250		< 0.1	✓
521-15	MRY-D4-AHin-OH1	KCl		500		<0.1	
521-16	MRY-D4-AHin-OH1	H2O2		200		2.04	✓
521-17	MRY-D4-AHin-OH1	KMnO4		500		10.9	✓
521-18	MRY-D4-AHin-OH1	KMnO4		100		1.29	✓

		MERCURY ANALYSIS		
DATE:	5/22/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
522-1	MRY-D5-ST-OH1	KCl	500	1.05
522-2	MRY-D5-ST-OH1	H2O2	200	0.021
522-3	MRY-D5-ST-OH1	KMnO4	500	10.5
522-4	MRY-D5-ST-OH1	Probe rinse	250	<0.1
522-5	MRY-D5-ESPin-OH1	KCl	510	<0.1
522-6	MRY-D5-ESPin-OH1	H2O2	200	0.31
522-7	MRY-D5-ESPin-OH1	KMnO4	500	6.52
522-8	MRY-D5-ESPin-OH1	Probe rinse	250	<0.1
522-9	MRY-D5-FGDin-OH1	KCl	500	1.19
522-10	MRY-D5-FGDin-OH1	H2O2	200	0.162
522-11	MRY-D5-FGDin-OH1	KMnO4	500	6.58
522-12	MRY-D5-FGDin-OH1	Probe rinse	500	<0.1
522-13	MRY-D5-FGDout-OH1	KCl	500	0.01
522-14	MRY-D5-FGDout-OH1	H2O2	200	<0.1
522-15	MRY-D5-FGDout-OH1	KMnO4	500	7.04
522-16	MRY-D5-FGDout-OH1	Probe rinse	500	<0.1
522-17	MRY-D5-AHin-OH1	KCl	500	1.96
522-18	MRY-D5-AHin-OH1	KCl	200	2.38
522-19	MRY-D5-AHin-OH1	H2O2	200	1.23
522-20	MRY-D5-AHin-OH1	KMnO4	500	0.43
522-21	MRY-D5-OH-FB	KCl	500	<0.1
522-22	MRY-D5-OH-FB	H2O2	200	<0.1
522-23	MRY-D5-OH-FB	KMnO4	500	<0.1
522-24	MRY-D5-OH-FBspk (20 ppb)	KCl	500	4.5
522-25	MRY-D5-OH-FBspk (20 ppb)	H2O2	200	16.1
522-26	MRY-D5-OH-FBspk (20 ppb)	KMnO4	500	15.9

MERCURY ANALYSIS

DATE: 5/23/98
LOCATION: MILTON R. YOUNG POWER STATION

LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
523-11	MRY-D5-ST-OH2	KCl	500	1.67 ✓
523-1	MRY-D5-ST-OH2	H2O2	200	<[illegible] ✓
523-22	MRY-D5-ST-OH2	KMnO4	500	12.5 ✓
523-12	MRY-D5-ESPin-OH2	KCl	500	0.44 ✓
523-2	MRY-D5-ESPin-OH2	H2O2	250	0.07 ✓
523-23	MRY-D5-ESPin-OH2	KMnO4	500	7.7 ✓
523-34	MRY-D5-ESPin-OH2	Probe rinse	500	0.47 ✓
523-13	MRY-D5-FGDin-OH2	KCl	500	1.5 ✓
523-10	MRY-D5-FGDin-OH2	H2O2	200	<0.1 ✓
523-24	MRY-D5-FGDin-OH2	KMnO4	500	11.7 ✓
523-35	MRY-D5-FGDin-OH2	Probe rinse	500	<0.1 ✓
523-14	MRY-D5-FGDout-OH2	KCl	500	0.017
523-3	MRY-D5-FGDout-OH2	H2O2	200	0.89 ✓
523-25	MRY-D5-FGDout-OH2	KMnO4	500	7.14 ✓
523-26	MRY-D5-FGDout-OH2	KMnO4	250	0.025 ✓
523-36	MRY-D5-FGDout-OH2	Probe rinse	250	<0.1 ✓
523-15	MRY-D5-AHin-OH2	KCl	500	0.074 ✓
523-4	MRY-D5-AHin-OH2	H2O2	200	<0.1 ✓
523-27	MRY-D5-AHin-OH2	KMnO4	500	10.8 ✓
523-21	MRY-D5-FBspk (10 ppb)	KCl	500	10.5 ✓
523-9	MRY-D5-FBspk (10 ppb)	H2O2	200	8.61 ✓
523-32	MRY-D5-FBspk (10 ppb)	KMnO4	500	8.47 ✓

MERCURY ANALYSIS

DATE: 5/23/98

LOCATION: MILTON R. YOUNG POWER STATION

LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
523-16	MRY-D5-ST-OH3	KCl	500	1.18
523-17	MRY-D5-ST-OH3	KCl	100	0.58
523-5	MRY-D5-ST-OH3	H2O2	200	0.14
523-28	MRY-D5-ST-OH3	KMnO4	500	11.4
523-33	MRY-D5-ST-OH3	Probe rinse	250	0.1
523-18	MRY-D5-ESPin-OH3	KCl	500	0.4
523-6	MRY-D5-ESPin-OH3	H2O2	200	0.21
523-29	MRY-D5-ESPin-OH3	KMnO4	500	7.92
523-37	MRY-D5-ESPin-OH3	Probe rinse	500	0.031
523-19	MRY-D5-FGDin-OH3	KCl	500	0.94
523-7	MRY-D5-FGDin-OH3	H2O2	200	<0.1
523-30	MRY-D5-FGDin-OH3	KMnO4	500	6.89
523-38	MRY-D5-FGDin-OH3	Probe rinse	500	<0.1
523-20	MRY-D5-FGDout-OH3	KCl	500	<0.1
523-8	MRY-D5-FGDout-OH3	H2O2	200	<0.1
523-31	MRY-D5-FGDout-OH3	KMnO4	500	7.36
523-39	MRY-D5-FGDout-OH3	Probe rinse	250	<0.1

MERCURY ANALYSIS				
DATE:	5/18/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
518-1	MRY-D1-ST-OH1	KCl	500	1.73
518-2	MRY-D1-ST-OH1	H2O2	250	< 0.1
518-3	MRY-D1-ST-OH1	KMnO4	500	22.3
518-4	MRY-D1-ST-OH1	Probe rinse	200	< 0.1
518-5	MRY-D1-ESPin-OH1	KCl	500	6.13
518-6	MRY-D1-ESPin-OH1	H2O2	250	< 0.1
518-7	MRY-D1-ESPin-OH1	KMnO4	500	4.82
518-8	MRY-D1-ESPin-OH1	Probe rinse	200	< 0.1
518-9	MRY-D1-FGDout-OH1	KCl	500	0.12
518-10	MRY-D1-FGDout-OH1	KCl	250	< 0.1
518-11	MRY-D1-FGDout-OH1	H2O2	250	< 0.1
518-12	MRY-D1-FGDout-OH1	KMnO4	500	20.1
518-13	MRY-D1-FGDout-OH1	Probe rinse	200	< 0.1

		MERCURY ANALYSIS		
DATE:	5/19/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
519-1	MRY-D2-ST-OH1	KCl	500	0.69
519-2	MRY-D2-ST-OH1	H2O2	200	< 0.1
519-3	MRY-D2-ST-OH1	KMnO4	500	6.61
519-4	MRY-D2-ST-OH1	Probe rinse	250	< 0.1
519-5	MRY-D2-ST-OH2	KCl	500	1.43
519-6	MRY-D2-ST-OH2	H2O2	200	0.05
519-7	MRY-D2-ST-OH2	KMnO4	500	12.9
519-8	MRY-D2-ST-OH2	Probe rinse	250	< 0.1
519-9	MRY-D2-ESPin-OH1	KCl	500	0.31
519-10	MRY-D2-ESPin-OH1	H2O2	200	2.28
519-11	MRY-D2-ESPin-OH1	KMnO4	500	5.17
519-12	MRY-D2-ESPin-OH1	Probe rinse	250	< 0.1
519-13	MRY-D2-ESPin-OH2	KCl	500	0.45
519-14	MRY-D2-ESPin-OH2	H2O2	200	0.04
519-15	MRY-D2-ESPin-OH2	KMnO4	500	6.13
519-16	MRY-D2-ESPin-OH2	Probe rinse	250	< 0.1
519-17	MRY-D2-FGDin-OH1	KCl	500	0.92
519-18	MRY-D2-FGDin-OH1	H2O2	200	< 0.1
519-19	MRY-D2-FGDin-OH1	KMnO4	500	14.2
519-20	MRY-D2-FGDin-OH1	Probe rinse	500	< 0.1
519-21	MRY-D2-FGDin-OH2	KCl	500	4.1
519-22	MRY-D2-FGDin-OH2	H2O2	200	2.51
519-23	MRY-D2-FGDin-OH2	KMnO4	500	16.1
519-24	MRY-D2-FGDin-OH2	Probe rinse	500	< 0.1
519-25	MRY-D2-FGDout-OH1	KCl	500	0.25
519-26	MRY-D2-FGDout-OH1	H2O2	200	< 0.1
519-27	MRY-D2-FGDout-OH1	KMnO4	500	10.9
519-28	MRY-D2-FGDout-OH1	Probe rinse	250	< 0.1
519-29	MRY-D2-FGDout-OH2	KCl	500	0.44
519-30	MRY-D2-FGDout-OH2	H2O2	200	< 0.1
519-31	MRY-D2-FGDout-OH2	KMnO4	500	10.8
519-32	MRY-D2-FGDout-OH2	Probe rinse	250	< 0.1

MERCURY ANALYSIS				
DATE:	5/21/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
521-1	MRY-D4-OH-FB	KCl	500	< 0.1
521-2	MRY-D4-OH-FB	H2O2	200	< 0.1
521-3	MRY-D4-OH-FB	KMnO4	500	0.057
521-4	MRY-D4-OH-FBspk (20 ppb)	KCl	500	20.02
521-5	MRY-D4-OH-FBspk (20 ppb)	H2O2	200	15.3
521-6	MRY-D4-OH-FBspk (20 ppb)	KMnO4	500	19
521-7	MRY-D4-ESPin-OH1	KCl	500	0.32
521-8	MRY-D4-ESPin-OH1	H2O2	200	< 0.1
521-9	MRY-D4-ESPin-OH1	KMnO4	500	6.38
521-10	MRY-D4-ESPin-OH1	Probe rinse	250	0.12
521-11	MRY-D4-ESPin-OH2	KCl	500	0.44
521-12	MRY-D4-ESPin-OH2	H2O2	200	< 0.1
521-13	MRY-D4-ESPin-OH2	KMnO4	500	8.53
521-14	MRY-D4-ESPin-OH2	Probe rinse	250	< 0.1
521-15	MRY-D4-AHin-OH1	KCl	500	< 0.1
521-16	MRY-D4-AHin-OH1	H2O2	200	2.04
521-17	MRY-D4-AHin-OH1	KMnO4	500	10.9
521-18	MRY-D4-AHin-OH1	KMnO4	100	1.29

	MERCURY ANALYSIS			
DATE:	5/22/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
522-1	MRY-D5-ST-OH1	KCl	500	1.05
522-2	MRY-D5-ST-OH1	H2O2	200	0.021
522-3	MRY-D5-ST-OH1	KMnO4	500	10.5
522-4	MRY-D5-ST-OH1	Probe rinse	250	<0.1
522-5	MRY-D5-ESPin-OH1	KCl	510	<0.1
522-6	MRY-D5-ESPin-OH1	H2O2	200	0.31
522-7	MRY-D5-ESPin-OH1	KMnO4	500	6.52
522-8	MRY-D5-ESPin-OH1	Probe rinse	250	<0.1
522-9	MRY-D5-FGDin-OH1	KCl	500	1.19
522-10	MRY-D5-FGDin-OH1	H2O2	200	0.162
522-11	MRY-D5-FGDin-OH1	KMnO4	500	6.58
522-12	MRY-D5-FGDin-OH1	Probe rinse	500	<0.1
522-13	MRY-D5-FGDout-OH1	KCl	500	0.01
522-14	MRY-D5-FGDout-OH1	H2O2	200	<0.1
522-15	MRY-D5-FGDout-OH1	KMnO4	500	7.04
522-16	MRY-D5-FGDout-OH1	Probe rinse	500	<0.1
522-17	MRY-D5-AHin-OH1	KCl	500	1.96
522-18	MRY-D5-AHin-OH1	KCl	200	2.38
522-19	MRY-D5-AHin-OH1	H2O2	200	1.23
522-20	MRY-D5-AHin-OH1	KMnO4	500	0.43
522-21	MRY-D5-OH-FB	KCl	500	<0.1
522-22	MRY-D5-OH-FB	H2O2	200	<0.1
522-23	MRY-D5-OH-FB	KMnO4	500	<0.1
522-24	MRY-D5-OH-FBspk (20 ppb)	KCl	500	4.5
522-25	MRY-D5-OH-FBspk (20 ppb)	H2O2	200	16.1
522-26	MRY-D5-OH-FBspk (20 ppb)	KMnO4	500	15.9

MERCURY ANALYSIS				
DATE:	5/23/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
523-11	MRY-D5-ST-OH2	KCl	500	1.67
523-1	MRY-D5-ST-OH2	H2O2	200	<0.1
523-22	MRY-D5-ST-OH2	KMnO4	500	12.5
523-12	MRY-D5-ESPin-OH2	KCl	500	0.44
523-2	MRY-D5-ESPin-OH2	H2O2	250	0.07
523-23	MRY-D5-ESPin-OH2	KMnO4	500	7.7
523-34	MRY-D5-ESPin-OH2	Probe rinse	500	0.47
523-13	MRY-D5-FGDin-OH2	KCl	500	1.5
523-10	MRY-D5-FGDin-OH2	H2O2	200	<0.1
523-24	MRY-D5-FGDin-OH2	KMnO4	500	11.7
523-35	MRY-D5-FGDin-OH2	Probe rinse	500	<0.1
523-14	MRY-D5-FGDout-OH2	KCl	500	0.017
523-3	MRY-D5-FGDout-OH2	H2O2	200	0.89
523-25	MRY-D5-FGDout-OH2	KMnO4	500	7.14
523-26	MRY-D5-FGDout-OH2	KMnO4	250	0.025
523-36	MRY-D5-FGDout-OH2	Probe rinse	250	<0.1
523-15	MRY-D5-AHin-OH2	KCl	500	0.074
523-4	MRY-D5-AHin-OH2	H2O2	200	<0.1
523-27	MRY-D5-AHin-OH2	KMnO4	500	10.8
523-21	MRY-D5-FBspk (10 ppb)	KCl	500	10.5
523-9	MRY-D5-FBspk (10 ppb)	H2O2	200	8.61
523-32	MRY-D5-FBspk (10 ppb)	KMnO4	500	8.47

MERCURY ANALYSIS				
DATE:	5/23/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
523-16	MRY-D5-ST-OH3	KCl	500	1.18
523-17	MRY-D5-ST-OH3	KCl	100	0.58
523-5	MRY-D5-ST-OH3	H2O2	200	0.14
523-28	MRY-D5-ST-OH3	KMnO4	500	11.4
523-33	MRY-D5-ST-OH3	Probe rinse	250	<0.1
523-18	MRY-D5-ESPin-OH3	KCl	500	0.4
523-6	MRY-D5-ESPin-OH3	H2O2	200	0.21
523-29	MRY-D5-ESPin-OH3	KMnO4	500	7.92
523-37	MRY-D5-ESPin-OH3	Probe rinse	500	0.031
523-19	MRY-D5-FGDin-OH3	KCl	500	0.94
523-7	MRY-D5-FGDin-OH3	H2O2	200	<0.1
523-30	MRY-D5-FGDin-OH3	KMnO4	500	6.89
523-38	MRY-D5-FGDin-OH3	Probe rinse	500	<0.1
523-20	MRY-D5-FGDout-OH3	KCl	500	<0.1
523-8	MRY-D5-FGDout-OH3	H2O2	200	<0.1
523-31	MRY-D5-FGDout-OH3	KMnO4	500	7.36
523-39	MRY-D5-FGDout-OH3	Probe rinse	250	<0.1

		MERCURY ANALYSIS			
DATE:	5/18/98				
LOCATION:	MILTON R. YOUNG POWER STATION				
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L	
518-1	MRY-D1-ST-OH1	KCl	500	1.73	✓
518-2	MRY-D1-ST-OH1	H2O2	250	< 0.1	✓
518-3	MRY-D1-ST-OH1	KMnO4	500	22.3	✓
518-4	MRY-D1-ST-OH1	Probe rinse	200	< 0.1	✓
518-5	MRY-D1-ESPin-OH1	KCl	500	6.13	✓
518-6	MRY-D1-ESPin-OH1	H2O2	250	< 0.1	✓
518-7	MRY-D1-ESPin-OH1	KMnO4	500	4.82	✓
518-8	MRY-D1-ESPin-OH1	Probe rinse	200	< 0.1	✓
518-9	MRY-D1-FGDout-OH1	KCl	500	0.12	✓
518-10	MRY-D1-FGDout-OH1	KCl	250	< 0.1	✓
518-11	MRY-D1-FGDout-OH1	H2O2	250	< 0.1	✓
518-12	MRY-D1-FGDout-OH1	KMnO4	500	20.1	✓
518-13	MRY-D1-FGDout-OH1	Probe rinse	200	< 0.1	✓

Final Results

June 29, 1998

Set Number: 49674
Fund#: 4558
PI: Stan Miller
Contact Person: G. Schelkoph

Request Date: Friday, June 05, 1998
Due Date: Friday, June 19, 1998
Set Description: MRY Hg trip-Liquid & Slurry

Sample 49674-01

49674-01 5-19-98 MRY-D2-L21-1 flyash slurry feed B (solid, 101.76g wet, 38.6%M, reported ug/g
Mercury 0.131 µg/g

49674-02 5-19-98 MRY-D2-L21-2 flyash slurry feed B (solid, 89.77g wet, 40.0%M, reported ug/g d
Mercury 0.135 µg/g

49674-03 5-19-98 MRY-D2-L24-1 FGD slurry B (solid, 50.65g wet, 33.2%M, reported ug/g dry)
Mercury 0.134 µg/g

49674-04 5-19-98 MRY-D2-L24-2 FGD slurry B (solid, 41.6g wet, 38.7%M, reported ug/g dry)
Mercury 0.124 µg/g

49674-06 5-22-98 MRY-D4-L18-1lime slurry feed B 8:48A(solid, 67.92g wet, 48.2%M, reported u
Mercury < 0.069 µg/g

49674-07 5-22-98 MRY-D4-L18-2 lime slurry feed B 4:51P(solid, 65.39g wet, 44.6%M, reported u
Mercury < 0.07 µg/g

49674-08 5-22-98 MRY-D4-L24-1FGD slurry A (solid, 47.2g wet, 46.8%M, reported ug/g dry)
Mercury 0.0868 µg/g

49674-09 5-22-98 MRY-D4-L24-2 FGD slurry A (solid, 26.22g wet, 58.6%M, reported ug/g dry)
Mercury 0.154 µg/g

49674-10 5-19-98 MRY-D2-L21-1 flyash slurry feed B(liquid)
Mercury < 0.1 µg/L

49674-11 5-19-98 MRY-D2-L21-2 flyash slurry feed B(liquid)
Mercury 0.1 µg/L

49674-12 5-19-98 MRY-D2-L24-1FGD slurry B(liquid, 246mL)
Mercury 0.1 µg/L

49674-13 5-19-98 MRY-D2-L24-2 FGD slurry B(liquid, 158mL)
Mercury 0.16 µg/L

49674-15 5-22-98 MRY-D4-L18-1lime slurry feed B 8:48A(liquid)
Mercury < 0.1 µg/L

49674-16 5-22-98 MRY-D4-L18-2 lime slurry feed B 4:52P(liquid)
Mercury 0.1 µg/L

49674-17 5-22-98 MRY-D4-L24-1 FGD slurry A(liquid, 242mL)
Mercury 3.89 µg/L

49674-18 5-22-98 MRY-D4-L24-2 FGD slurry A(liquid, 274mL)
Mercury 4.50 µg/L

49674-19 5-19-98 MRY-D2-L22-1ash pond make-up water
Mercury 0.14 µg/L

49674-20 5-19-98 MRY-D2-L23-1ash sluice water B

Distribution GG Date 6-29-98

Sample	49674-20	
	Mercury	< 0.1 µg/L
49674-21	5-19-98 MRY-D2-L22-2 ash pond make-up water	
	Mercury	0.1 µg/L
49674-22	5-19-98 MRY-D2-L23-2 ash sluice water B	
	Mercury	< 0.1 µg/L
49674-23	5-22-98 MRY-D4-L22-1 ash pond make-up water	
	Mercury	< 0.1 µg/L
49674-24	5-22-98 MRY-D4-L23-1 ash sluice water A-B	
	Mercury	< 0.1 µg/L
49674-25	5-22-98 MRY-D4-L22-2 ash pond make-up water	
	Mercury	0.14 µg/L
49674-26	5-22-98 MRY-D4-L23-2 ash sluice water A-B	
	Mercury	< 0.1 µg/L

Distribution 45 Date 6-29-98

Final Results

June 29, 1998

Set Number: 49676
Fund#: 4558
PI: Stan Miller
Contact Person: G. Schelkoph

Request Date: Thursday, June 11, 1998
Due Date: Thursday, June 25, 1998
Set Description: MRY Hg trip-SOLID

Sample 49676-01

49676-01	5-19-98MRY-D2-L3-1 Crusher Outlet Coal	
Mercury		0.096 µg/g
49676-03	5-19-98MRY-D2-L3-2 Crusher Outlet Coal	
Mercury		0.086 µg/g
49676-05	5-22-98MRY-D4-L3-1 Crusher Outlet Coal	
Mercury		0.074 µg/g
49676-07	5-22-98MRY-D4-L3-2 Crusher Outlet Coal	
Mercury		0.057 µg/g

Distribution 33 Date 6-29-98

Final Results

June 29, 1998

Set Number: 49675
Fund#: 4558
PI: Stan Miller
Contact Person: G. Schelkoph

Request Date: Monday, June 08, 1998
Due Date: Monday, June 22, 1998
Set Description: MRY Hg trip-SOLID

Sample	49675-20	
49675-20	5/19/98MRY-D2-L13-2 ESP SILO ash B	
Mercury		0.196 µg/g
49675-21	5/19/98MRY-D2-L14-2 ESP Feeder 3B1(A)	
Mercury		0.087 µg/g
49675-22	5/19/98MRY-D2-L14-2 ESP Feeder 3B2(B)	
Mercury		0.144 µg/g
49675-23	5/19/98MRY-D2-L14-2 ESP Feeder 3B3(C)	
Mercury		0.081 µg/g
49675-24	5/19/98MRY-D2-L14-2 ESP Feeder 3B4(D)	
Mercury		0.075 µg/g

Distribution JG Date 6-29-98

A-3

Field Spikes and Blanks Data

SPIKE RECOVERIES FOR MERCURY ANALYSIS					
DATE:	5/18/98				
Calibration Standards:		0, 1, 5, 10, 20 ppb	R=0.9996		QC= 4.15 (4)
Spike Recovery					
KCl Spike	(5 ppb)	Sample 518-1	Spike =	7.07	((7.07-1.73)/5) * 100 = 106.8 %
			Sample =	1.73	
KCl Spike	(10 ppb)	Sample 518-1	Spike =	11.75	((11.75-1.73)/10) * 100 = 100.02%
			Sample =	1.73	
KMnO4 Spike	(5 ppb)	Sample 518-7	Spike =	10.4	((10.40-4.82)/5) * 100 = 111.6%
			Sample =	4.82	
H2O2 Spike	(10 ppb)	Sample 518-2	Spike =	8.16	8.16/10 * 100 = 81.6%
			Sample =	-0.09	
DATE:	5/19/98				
Calibration Standards:		0, 1, 5, 10, 20 ppb	R=0.9997		QC= 4.09 (4)
Spike Recovery					
KCl Spike	(20 ppb)	Sample 519-1	Spike =	20.16	((20.16-0.69)/20) * 100 = 97.35%
			Sample =	0.69	
KMnO4 Spike	(5 ppb)	Sample 519-11	Spike =	9.76	((9.76-5.17)/5) * 100 = 91.8%
			Sample =	5.17	
H2O2 Spike	(10 ppb)	Sample 519-2	Spike =	8.296	8.296/10 * 100 = 82.96%
			Sample =	-0.16	

SPIKE RECOVERIES FOR MERCURY ANALYSIS					
DATE:	5/21/98				
Calibration Standards:		0, 1, 5, 10, 20 ppb	R=0.9997		QC = 4.0 (4)
Spike Recovery					
KCl Spike	(5 ppb)	Sample 521-7	Spike =	5.87	((5.87-0.32)/5) * 100 = 111 %
			Sample =	0.32	
KCl Spike	(10 ppb)	Sample 521-7	Spike =	11	((11.0-0.32)/10) * 100 = 106.8%
			Sample =	0.32	
Field Blank	(20 ppb)	Sample 521-4	Spike =	20.02	20.02/20 * 100 = 100.1%
KCl Spike			Sample =	0	
KMnO4 Spike	(5 ppb)	Sample 521-9	Spike =	10.8	((10.80-6.38)/5) * 100 = 88.4%
			Sample =	6.38	
Field Blank	(20 ppb)	Sample 521-6	Spike =	19	19/20 * 100 = 95%
KMnO4 Spike			Sample =	0	
H2O2 Spike	(5 ppb)	Sample 521-8	Spike =	4.25	4.25/5 * 100 = 85.0%
			Sample =	-0.102	
Field Blank	(5 ppb)	Sample 521-2	Spike =	4.22	4.22/5 * 100 = 84.32%
H2O2 Spike			Sample =	0	
Field Blank	(20 ppb)	Sample 521-5	Spike =	15.3	15.3/20 * 100 = 76.5%
H2O2 Spike			Sample =	0	
Field Blank Spike	(20 ppb)	Sample 521-5	Spike =	30.53	((30.53 - 15.3)/20) * 100 = 76.2%
H2O2 Spike			Sample =	15.3	

SPIKE RECOVERIES FOR MERCURY ANALYSIS					
DATE:	5/22/98				
Calibration Standards:		0, 1, 5, 10, 20 ppb	R=0.9997		QC= 4.00 (4)
Spike Recovery					
KCl Spike	(5 ppb)	Sample 522-1	Spike =	6.33	((6.33-1.05)/5) * 100 = 105.6%
			Sample =	1.05	
KCl Spike	(10 ppb)	Sample 522-1	Spike =	11.26	((11.26-1.05)/10) * 100 = 102.1%
			Sample =	1.05	
Field Blank	(20 ppb)	Sample 522-24	Spike =	4.5	4.5/20 * 100 = 22.5%
KCl Spike			Sample =	0	Repeated spiking on 5/23/98
KMnO4 Spike	(5 ppb)	Sample 522-7	Spike =	11.6	((11.6-6.52)/5) * 100 = 101.6%
			Sample =	6.52	
Field Blank	(20 ppb)	Sample 522-26	Spike =	15.9	15.9/20 * 100 = 79.5%
KMnO4 Spike			Sample =	0	Repeated spiking on 5/23/98
H2O2 Spike	(10 ppb)	Sample 522-2	Spike =	8.75	((8.75-0.021)/10) * 100 = 82.96%
			Sample =	0.021	
Field Blank	(20 ppb)	Sample 522-25	Spike =	16.1	16.1/20 * 100 = 80.5%
H2O2 Spike			Sample =	0	Repeated spiking on 5/23/98
Field Blank Spike	(10 ppb)	Sample 522-25	Spike =	24.3	((24.3 - 16.1)/10) * 100 = 82%
H2O2 Spike			Sample =	16.1	
Field Blank Spike	(20 ppb)	Sample 522-25	Spike =	31.32	((31.32 - 16.1)/20) * 100 = 76.1%
H2O2 Spike			Sample =	16.1	

SPIKE RECOVERIES FOR MERCURY ANALYSIS					
DATE:	5/23/98				
Calibration Standards:		0, 1, 5, 10, 20 ppb	R=0.9996		QC= 4.07 (4)
Spike Recovery					
KCl Spike	(5 ppb)	Sample 523-11	Spike =	7.22	((7.22-1.67)/5) * 100 = 111%
			Sample =	1.67	
KCl Spike	(10 ppb)	Sample 523-11	Spike =	12.11	((12.11-1.67)/10) * 100 = 104.4%
			Sample =	1.67	
Field Blank	(10 ppb)	Sample 523-21	Spike =	10.54	10.54/10 * 100 = 105.4%
KCl Spike			Sample =	0	
KMnO4 Spike	(5 ppb)	Sample 523-22	Spike =	16.4	((16.4-12.5)/5) * 100 = 78%
			Sample =	12.5	
Field Blank	(10 ppb)	Sample 523-32	Spike =	8.47	8.47/10 * 100 = 84.7%
KMnO4 Spike			Sample =	0	
H2O2 Spike	(10 ppb)	Sample 523-1	Spike =	8.54	8.54/10 * 100 = 85.4%
			Sample =	0	
Field Blank	(10 ppb)	Sample 523-9	Spike =	8.61	8.61/10 * 100 = 86.1%
H2O2 Spike			Sample =	0	
Field Blank Spike	(10 ppb)	Sample 523-9	Spike =	17.31	((17.31 - 8.61)/10) * 100 = 86.97%
H2O2 Spike			Sample =	8.61	
Field Blank Spike	(20 ppb)	Sample 523-9	Spike =	25.76	((25.76 - 8.61)/20) * 100 = 85.74%
H2O2 Spike			Sample =	8.61	

APPENDIX B

EXAMPLES OF CALCULATIONS USED IN THE REPORT

EXAMPLES OF CALCULATIONS USED IN THE REPORT

1. Concentration of Mercury in Flue Gas ($\mu g/Nm^3$)

Measured concentration in H_2SO_4–$KMnO_4$ solution (Hg^0) – 6.61 µg/L
Volume of sample – 500 mL
Gas volume samples – 18.284 scf
Convert 18.284 scf to Nm^3 = 0.518 Nm^3*
Calculated Hg^0 concentration at the stack: (6.61)(500/1000)/(0.518) = <u>6.38 $\mu g/Nm^3$</u>

* Nm^3 for purposes of this report is defined as 20 °C and 1 atmosphere pressure. This is the same as standard conditions for the English system, 68 °F and 1 atmosphere.

<u>Note:</u> The mercury concentration on the sample filters is calculated in the same manner, except the units are µg of Hg/g of dust. Therefore, the total weight of dust on the filter must be known rather than the volume of sample.

2. Correction to Dry Conditions and 3% Oxygen

Measured O_2 concentration at the stack – 6.2%
Assumed to be air (O_2) leaking in – 21%
Measured water – 17.0%
Calculation of the correction factor for O_2 at stack
Let x = volume of gas leaking into system
assume volume of gas measured = 1
Then: (0.03)(1 - x) + 0.21 x = (0.062)(1)
x = 0.1778
$O_{2\ \text{correction Factor}}$ = 1 - 0.1778 = 0.8222
Calculation of factor for dry conditions
1 - (0.17) = 0.83
Corrected Hg^0 concentration in the flue gas:
(6.38 $\mu g/Nm^3$)/(0.8222)(0.83) = <u>9.35 $\mu g/Nm^3$</u>

3. Calculation of Emission Factors

Hg^0 concentration at the stack – 6.38 μg/Nm^3 (uncorrected value)
Stack gas flow gate (from plant) – 1,593,517 scfm
Coal heating value (as received) – 6460 Btu/lb
Coal feed rate (from plant) – 700.4 klb/hr or 11,673 lb/min
Convert: 1,593,517 scf to Nm^3 = 45,123 Nm^3
Conversion factor for μg to lb multiply by 2.2026×10^{-9}
Calculate Hg^0 emission factor at the stack =
$(6.38)(2.2026 \times 10^{-9})(45{,}123)/(11{,}673)(6460) = 8.42 \times 10^{-12}$ lb/Btu or $\underline{8.42\ lb/10^{12}\ Btu}$

4. Calculation of Mercury Flow Rates (lb/min)

Coal

Measured mercury concentration in coal = 96 ppb or 0.096 μg/g
Coal feed rate = 11,673 lb/min
Coal moisture content = 37.3%
Dry coal feed rate (to put on the same basis as flue gas mercury flow rate)
$= (11{,}673)(1-0.373) = 7319$ lb/min
Convert: 0.096 μg Hg/g coal to lb Hg/lb coal = 9.60×10^{-8} lb Hg/lb coal
Mercury flow from coal is $(9.60 \times 10^{-8})(7319) = \underline{7.03 \times 10^{-4}\ lb\ Hg/min}$

ESP Hopper Ash

Measured mercury concentration in the ash = 101 ppb or 0.101 μg/g
Measured ESP inlet dust loading = 1.7471 grains/scf (dry basis)
Measured ESP outlet dust loading = 0.0017 grains/scf
Ash removed by ESP: 1.3423 - 0.0017 = 1.7454 grains/scf
Flue gas moisture content = 17.3% (0.173)
Flue gas flow rate = 1,567,656 scfm
Dry flue gas flow rate: $(1{,}567{,}656)(1-0.173) = 1{,}296{,}451$ scfm
Convert: 0.101 μg Hg/g ash to lb Hg/lb ash = 10.10×10^{-8} lb Hg/lb ash
Convert: grains/scf to lb/scf = $(1.7471)/7000 = 2.493 \times 10^{-4}$ lb/scf
Calculate ESP ash removal rate $(2.493 \times 10^{-4})(1{,}296{,}451) = 323.3$ lb/min
Mercury flow from the ash is $(10.10 \times 10^{-8})(323.3) = \underline{0.33 \times 10^{-4}\ lb\ Hg/min}$

Flue Gas

Measured mercury concentration at the ESP inlet = 9.97 μg/Nm^3

Dry stack gas flow rate =1,069,650 scfm

Convert: 9.97 μg/Nm^3 mercury to lb/scf = 6.22×10^{-10} lb/scf

Calculate mass flow rate of Hg: $(6.22 \times 10^{-10})(1{,}069{,}650) = \underline{6.64 \times 10^{-4} \text{ lb Hg/min}}$

Scrubber Slurry

Measured mercury concentration in the reacted FGD slurry solids = 0.134 μg/g

Estimated slurry flow rate = 260 gal/min

Volume of slurry collect = 246 mL

Amount of solids in slurry collected = 50.65 g

Convert: 0.134 μg Hg/g solid to lb Hg/g solid = 2.95×10^{-10} lb/g solid

Calculate mass flow rate of Hg

$(2.95 \times 10^{-10}$ lb/g)(50.65g/246 mL)(3785.4 mL/gal)(260gal/min) = $\underline{0.598 \times 10^{-4} \text{ lb/min}}$

5. Calculation of FGD Bypass

Condition A:

Flue gas flow rate = 1,567,656 scfm

Convert scfm to kg/min using Ideal Gas Law, which at 68°F and 1 atmosphere

= 387 ft^3 / 28.84 lb (assuming molecular weight of flue gas is the same as air)

= (1,567,656)(29) / (2.2)(387) = 53,397 kg/min

Thermodynamic data for flue gas are shown in Table B-1.

TABLE B-1

Condition A Thermodynamic Data for Flue Gas

Location	Water Vapor, %	Flue Gas Temp., °F	Enthalpy of Water Vapor, kJ/kg	Enthalpy of Air, kJ/kg
Stack	17.3	226	2682	382
FGD Inlet	14.3	368	2777	462
FGD Outlet	18.9	140	2604	333

Calculation of Stack Enthalpy

Enthalpy at the stack: (0.173)(53,397)(2682) + (0.827)(53,397)(382) = 41,644,320 kJ/kg

An iteration process was done comparing different fractions of flue gas bypass to determine which give fraction of the bypass gives the same total enthalpy as calculated at the stack.

60% FGD bypass:

(0.6)(0.143)(53,397)(2777) + (0.6)(0.857)(53,397)(462) = 25,077,734 kJ/kg

(0.4)(0.189)(53,397)(2604) + (0.4)(0.811)(53,397)(333) = 16,280,083 kJ/kg

Total = 41,687,817 kJ/kg

Enthalpy comparison to the stack value = (41,687,817)/(41,644,320)(100%) = 100.01%

Therefore, for Condition A, 60% of the flue gas bypassed the FGD system.

Condition B:

Flue gas flow rate = 1,524,750 scfm

Convert scfm to kg/min using Ideal Gas Law, which at 68°F and 1 atmosphere

= 387 ft^3 / 28.84 lbs (assuming molecular weight of flue gas is the same as air)

= (1,524,750)(29) / (2.2)(387) = 51,935 kg/min

Thermodynamic data for flue gas are shown in Table B-2.

Calculation of Stack Enthalpy

Enthalpy at the stack: (0.169)(51,935)(2706) + (0.831)(51,935)(398) = 40,927,480 kJ/kg

An iteration process was done comparing different fractions of flue gas bypass to determine which give fraction of the bypass gives the same total enthalpy as calculated at the stack.

TABLE B-2

Condition B Thermodynamic Data for Flue Gas

Location	Water Vapor, %	Flue Gas Temp., °F	Enthalpy Water Vapor, kJ/kg	Enthalpy of Air, kJ/kg
Stack	16.9	255	2706	398
FGD Inlet	14.3	375	2780	466
FGD Outlet	19.1	139	2603	332

90% FGD bypass:

(0.9)(0.140)(51,935)(2780) + (0.1)(0.860)(51,935)(466) = 36,923,915 kJ/kg

(0.1)(0.191)(51,935)(2603) + (0.9)(0.809)(51,935)(332) = 3,976,980 kJ/kg

Total = 40,900,895 kJ/kg

Enthalpy comparison to the stack value = (40,900,895)/(40,927,480)(100%) = 99.94%

Therefore, for Condition B, 90% of the flue gas bypassed the FGD system.

Minnkota Power
COOPERATIVE, INC.

A Touchstone Energy® Partner

1822 Mill Road • P.O. Box 13200 • Grand Forks, ND 58208-3200 • Phone (701) 795-4000

34, 35

May 5, 1999

Mr. William H. Maxwell
Combustion Group
Emissions Standards Division
Office of Air Quality Planning and Standards
United States Environmental Protection Agency
Research Triangle Park, NC 27711

Dear Mr. Maxwell:

This letter is in response to your letter of Apir 20, 1999 requestin g additional information concerning the accptance by the EPA of an emissions test report forwarded by the DOE in fullfillment of Minnkota Power's obligations to perform mercury testing under the approved ICR for mercury. The responses to your questions are given below.

Response for Question 1

The only test location sampled during this test program that meets the EPA Methods 1-4 criteria for suitable sampling locations was the stack. The other sampling locations, (ESP inlet, FGD inlet, FGD outlet) do not meet the standard criteria for distances from upstream and downstream flow disturbances. It was not possible to do the sampling at locations that would meet the established criteria because no such points exist or, in the case of the FGD inlet, the cost to provide new ports and a sampling platform would be excessive, as well it would have posed a safety concern. In addition, because the mercury is primarily in the gaseous phase, it is not impacted by uncertainties in gas flow and isokinetic sampling variations. Based on the results obtained, there was very little mercury measured as particulate-bound mercury. It should also be noted that the flows coming out of the boiler are split into four streams and only one set of the streams was sampled.In addition to the sampling and collection points shown on Figure 2-1 of the report, some additional schematics or pictures of sampling locations are enclosed.

Response to Question 2

A test matrix is shown in Table 1 below, with the times in which the samples were taken. The original plan was to perform all the tests simultaneously. However, because the test crew was sampling at up to four locations simultaneously for this test, it proved to be almost impossible to start each sample at the same time. Also, it should be noted that each test was set up to run for two hours of sample time, however the actual time to accomplish this varied greatly from location to location due to the varying physical conditions at the different locations. The decision was made to try to start the sample

times for each set of runs as close as possible but allow for staggered sample start times. A review of the data indicates that this approach was justified. In addition, for this test, we also have mercury CEM data from the stack location. This data suggests that no significant variations in mercury concentrations occurred. This data is shown in Figure 4-5 of the report.

TABLE 1
Mercury Sampling Schedule at the Milton R. Young Station

		Start Times			
FGD Condition	Date	ESP Inlet	ESP Outlet/ FGD Inlet	FGD Outlet	Stack
A	5-19-98	No Sample*	10:11	09:40	09:43
A	5-19-98	No Sample*	15:43	15:10	14:45
A	5-20-98	09:15			
A	5-20-98	13:43	Changing Scrubber Conditions from A to B		
	5-21-98	Changing Testing to a Different Scrubber Module			
B	5-22-98	09:50	08:31	09:05	08:21
B	5-22-98	12:15	15:19	13:11	12:27

		Start Times			
B	5-22-98	16:15	18:17	17:06	16:22

*ESP Inlet Samples were not taken 5-19-98 due to problems with probe and sample box. These samples were taken the next day.

During the first day of testing, the sample team at the ESP inlet had a problem with their sampling probe and sampling box and it was not possible to redo the sampling that day. Therefore, it was decided that the ESP inlet test would be repeated, but because of cost considerations the other three locations with valid data were not be repeated. The pooled data from the ESP inlet (five data points) indicates that this was a valid compromise. It should be noted that for purposes of the ICR for Unit 2, the ESP inlet would not be sampled as it is the first of two air pollution control devices at this plant. However, for purposes of utilizing the test report for Unit 1, this would be the inlet of the air pollution control device.

During day four on site, the FGD scrubber module that was being tested became inoperable due to a mechanical failure. Therefore, it was decided to switch sampling activities to the other scrubber module as they are similar. No other options were available. No significant impact on data was seen. This will be discussed in more detail in Question 3.

Response to Question 3

The original test was to sample at one scrubber module which was to be operated at two conditions. Condition A with fly ash as the SO_2 sorbent followed by testing at Condition B with lime as the SO_2 sorbent. The plant operates the wet FGD system in a manner which ensures they will be in compliance for SO_2 emissions (1.2 lb/10^6 Btu). Therefore, either of these two conditions or a combination of them can considered to be within the scope of normal operation.

As stated earlier, a problem was encountered during testing where the scrubber module had to be taken out of service for repairs. Therefore in the middle of a test, we were required to move to another module. Because the change over required an extra day, only two Ontario Hydro (OH) speciation samples were completed at each of three sampling locations for Condition A. However, three OH samples were taken for Condition B. It should be noted, that based on the results obtained (shown in Table 4-4 of the report), there was no statistical significant difference between the two conditions. The testing that was completed at Condition B meets all the requirements for sampling for the ICR. Triplicate sampling was done at 4 different points. Sampling that is required for the ICRfor Unit 2, would be the three OH samples at the FGD Inlet and the three OH samples at the stack. For the ICR for Unit 1, the sampling would ideally require 3 OH samples at the ESP inlet and three at the ESP outlet. As is described in the report, there was substantial bypass of the FGD and therefore the stack and FGD outlet numbers are not the same. As shown in Figure 2-1 (points 3 and 4) the sampling was done at locations that

give results that would provide data to determine the mercury mass balance around the FGD system.

It should also be noted that during this testing program, EPA Method 26A samples were taken at the FGD inlet to determine chloride concentrations in the flue gas. Also, several OH samples were taken at the preheater outlet to determine the effects of temperature on mercury speciation.

A second concern was the variation in the coal samples taken during the testing. These samples were collected from the feed hoppers. The sampling was done over the four day period. Although it appears the four coal samples taken are different in mercury concentration, these concentrations were within the variability experienced with this coal. To date, 9 coal analyses from the Milton R. Young Station have been completed as part of the ICR. The following table gives these results and the standard deviation. As can be seen from the table, the four samples taken as part of the sampling done by the EERC are statistically within that variability.

TABLE 2
Coal Samples at the Milton R. Young Station

	Without EERC Samples	With EERC Samples
Coal Sample No	Mercury Concentration ppb	Mercury Concentration ppb
1	0.105	0.105
2	0.091	0.091
3	0.148	0.148
4	0.119	0.119
5	0.125	0.125
6	0.106	0.106
7	0.106	0.106
8	0.153	0.153
9	0.088	0.088
10		**0.098**
11		**0.086**
12		**0.074**
13		**0.057**
Average	0.116	0.104
Std. Dev.	0.023	0.027

Note: The four bold samples were from the EERC Test

Response to Question 4

All raw data from the testing is attached to this response.

If you have additional questions concerning the report, please contact me at 701-795-4221.

Yours very truly,

John T. Graves, P.E.
Environmental Manager

c: Kevin Thomas

FGD system.

TABLE 1
Mercury Sampling Schedule at the Milton R. Young Station

		Start Times			
FGD Condition	Date	ESP Inlet	ESP Outlet/ FGD Inlet	FGD Outlet	Stack
A	5-19-98	No Sample*	10:11	09:40	09:43
A	5-19-98	No Sample*	15:43	15:10	14:45
A	5-20-98	09:15			
			Changing Scrubber Conditions from A to B		
A	5-20-98	13:43			
	5-21-98	Changing Testing to a Different Scrubber Module			
B	5-22-98	09:50	08:31	09:05	08:21
B	5-22-98	12:15	15:19	13:11	12:27

		Start Times			
B	5-22-98	16:15	18:17	17:06	16:22

*ESP Inlet Samples were not taken 5-19-98 due to problems with probe and sample box. These samples were taken the next day.

It should also be noted that during this testing program, EPA Method 26A samples were taken at the FGD inlet to determine chloride concentrations in the flue gas. Also, several OH samples were taken at the preheater outlet to determine the effects of temperature on mercury speciation.

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1	0.105	0.105
2	0.091	0.091
3	0.148	0.148
4	0.119	0.119
5	0.125	0.125
6	0.106	0.106
7	0.106	0.106
8	0.153	0.153
9	0.088	0.088
11		**0.098**
11		**0.086**
11		**0.074**
13		**0.057**
Average	0.116	0.104

Coal Sample No	Without EERC Samples Mercury Concentration ppb	With EERC Samples Mercury Concentration ppb
Std. Dev.	0.023	0.027

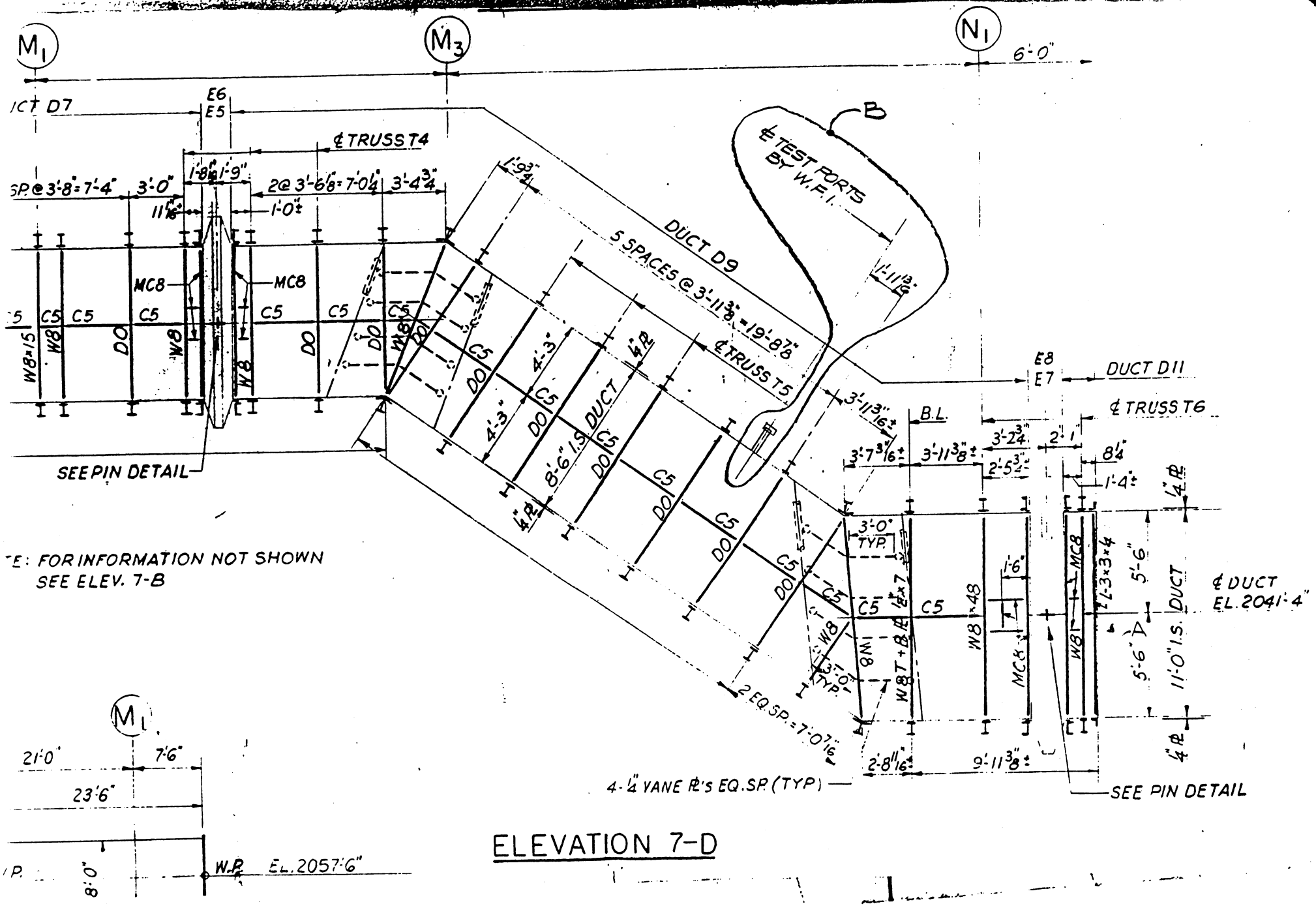
Note: The four bold samples were from the EERC Test

Response to Question 4

All raw data from the testing is attached to this response.

CKUBBER
MPHOUSE
2A
ABS
UNIT 2
STACK
UNIT 1
STACK
2A
PRECIP
2B
ESP
BLR
BLR
UNIT 2
UNIT 1
RELAY
ROOM
WAREHOUSE
UNIT 2
MAIN
XFMR
UNIT 1
MAIN
XFMR
MAINT.
SHOP
FGD outlet
Day 2
FGD outlet
Day 5
FGD inlet day 2
FGD
inlet day 5
inlet sample
location day 2-4-5

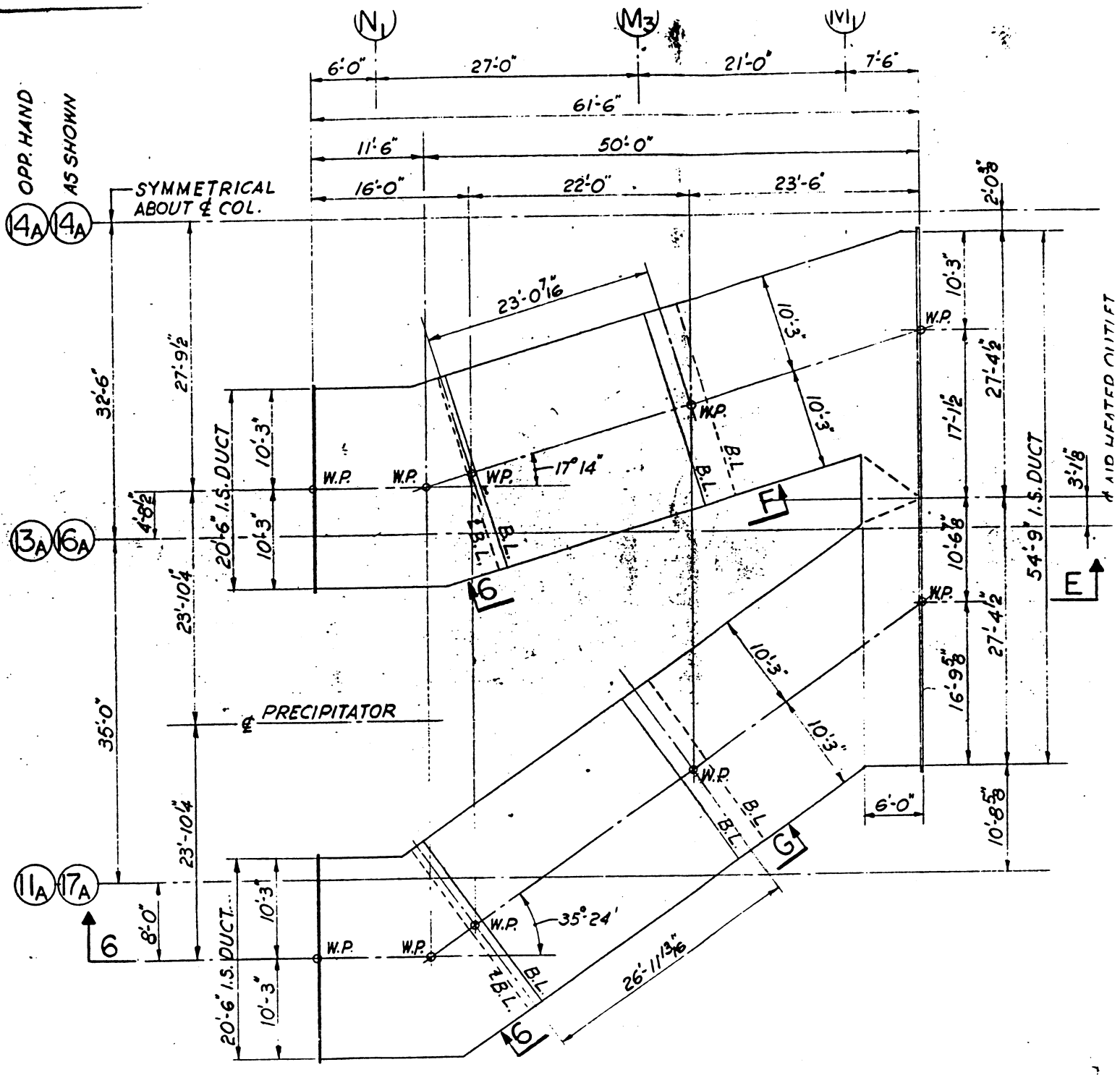
ESP Inlet side view



ELEVATION 7-D

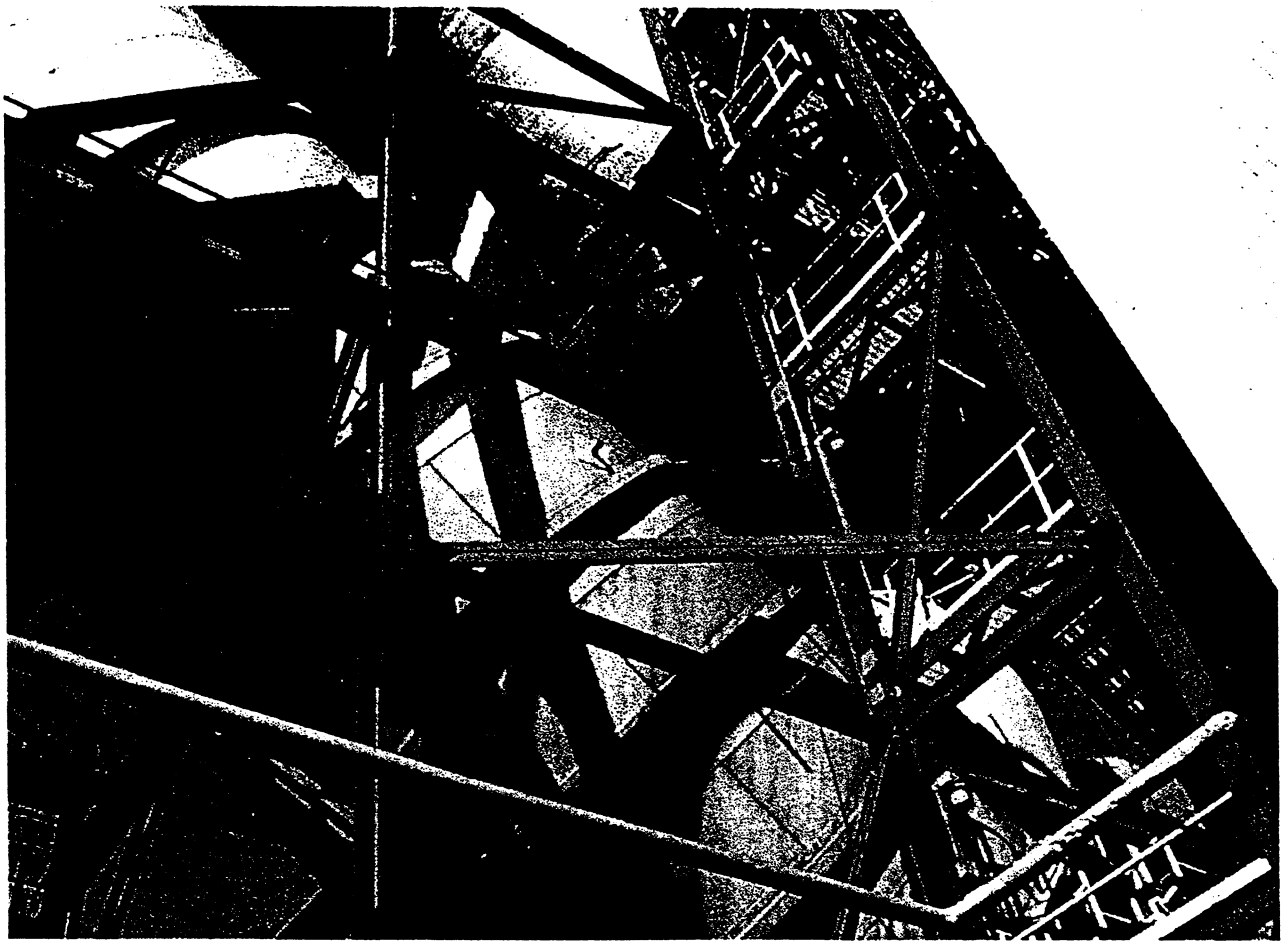
8090

ESP Inlet Top View

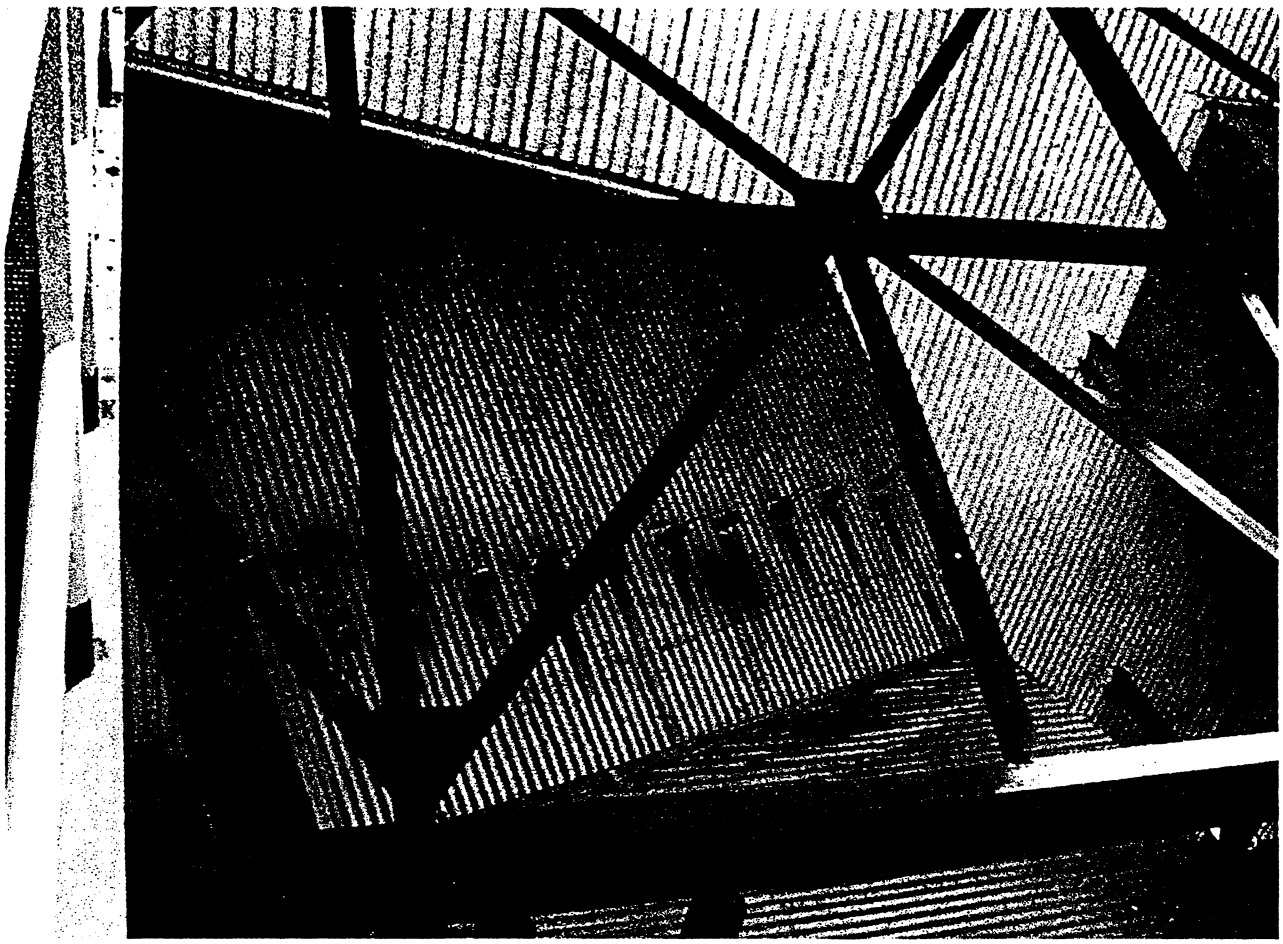


GEOMETRICAL PROPERTIES OF INLET DUCTS

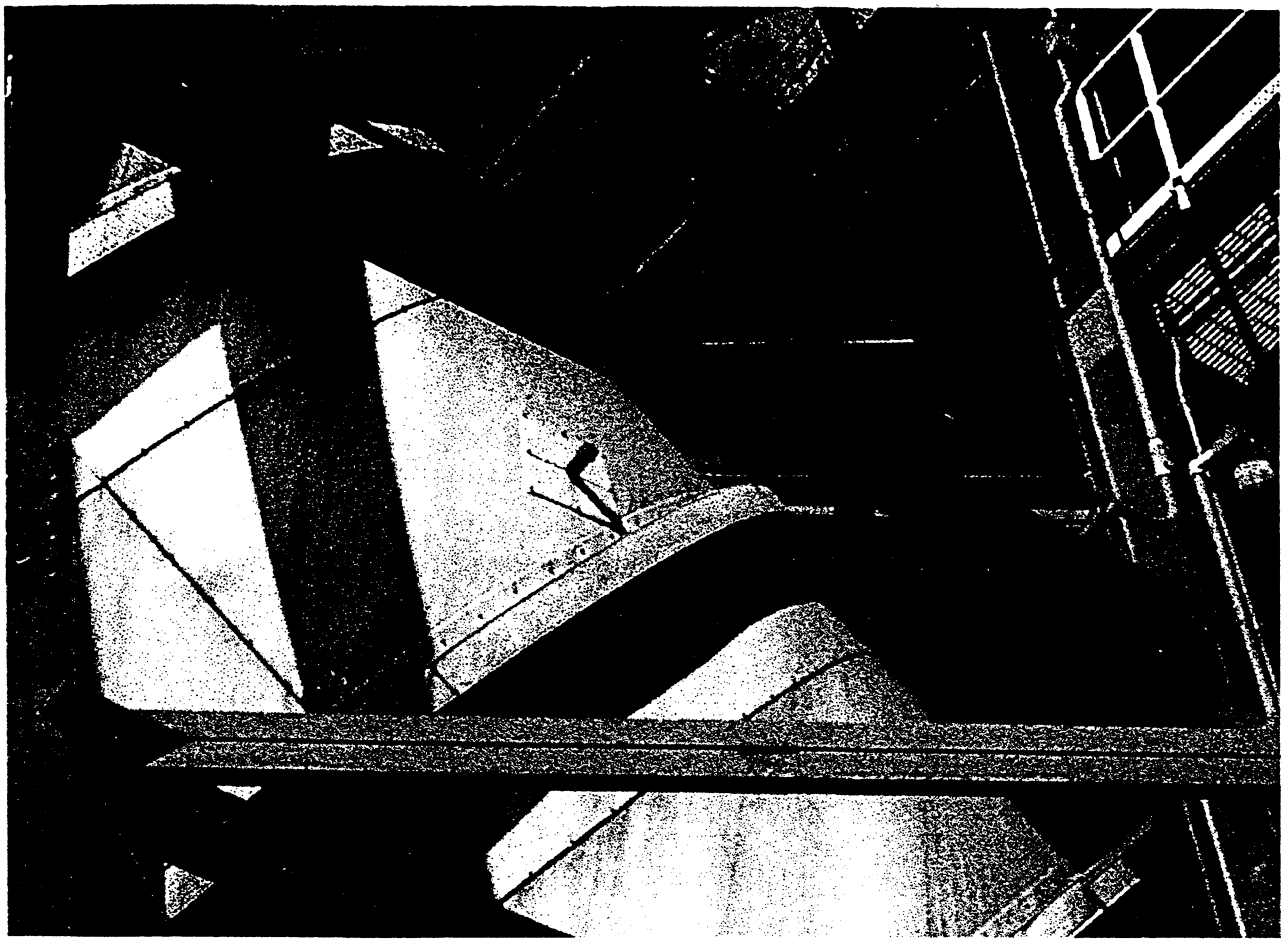
~~SCALE 3/32" 1'-0"~~



Milton R. Young FGD Inlet Ports



Milton R. Young ESP Inlet



Milton R. Young FGD Inlet Ports

DATE 05/21/98
RUN # MRY-D4-ESPin-OH2
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 13:43 OPERATORS TOMAN / FOX
SAMPLE PORT ESP INLET TRAVERSE POINT SOUTH, MIDDLE, NORTH

Pb (BAROMETRIC PRESSURE) 28.02 in. Hg

Ps (STACK PRESSURE) = Pb +/- (-5.06 in. H2O / 13.6)= 27.65 in. Hg

Ts (STACK TEMP) = 368 F +460F = 828 R

^P (PITOT)= 0.63 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.125 in APPROX % H2O = 12

^H@ = 1.72 in H2O Cm = 1

Vs(STACK VELOCITY) = 3472 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.2959 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.1427 ACFM

^H (ORIFICE)= 0.07 in H2O

SECOND/REV = 42.0

TIME = 120 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 22.452 CF

GAS METER VOL = 22.452 CF

AVERAGE ^ H = 0.13

METER TEMP = 94

^H	T5	T6
in H20	METER IN	METER OUT
0.13	95	92

TRACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL.WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	722.3	781.0	58.7
BUBBLER	KCl	717.9	722.3	4.4
IMPINGER	KCl	753.0	753.0	0.1
BUBBLER	H2O2	694.4	695.7	1.3
BUBBLER	KMnO4	708.0	708.1	0.0
BUBBLER	KMnO4	702.4	701.6	-0.7
IMPINGER	KMnO4	728.1	727.5	-0.6
BUBBLER	SILICA GEL	960.0	965.5	5.5
				0.0
				0.0
		TOTAL H2O		68.6
FILTER		0.21050	2.32887	2.11837
		TOTAL DUST		2.11837

VwSTD = 3.235 SCF

VmC = 22.452 ACF

VmSTD = 20.136 SCF

VtSTD = 23.371 SCF

%H2O = 13.8 %H2O

QnSTD = 0.175 SCFM

% ISO = 111.3 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 1.3987 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

Date 5 of 15 Time _____

MRY-D4-ESPin-OH2

DATE _____

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start 13:43:45 Operators _____

Sample Pt. South Port ESP In Traverse Pt. _____

John
Don
Reilly

P_s (Barometric Pressure) = 28.02 in. Hg

P_s (Stack Ptessure) = $P_s \pm$ (-5.06 in. H_2O/13.6) = 27.65 in. Hg

T_s (Stack Temperature) = 367 °F + 460 = 827 °R

ΔP(Pitot) = .8 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_n = 1

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3910 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .333 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .191 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = .01 in H_2O

Second/Rev = 31.4 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	~~Pitot ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 ~~Muff~~ ~~Hot Box~~ Orifice ΔH	T4 Sec/Rev ~~Impinger~~	T5 Meter In	T6 Meter Out
13:45:30	945.081								
0 13:43:45	946.090	.8	5.0	367	204	.20	31.4	89	86
10	948.008								
13:53:45	948.008	.6	5.0	377	204	.1	36.3	92.5	89
20 12:54	949.587		5.5	379	202	.1		94	91
14:03:45	949.587	.7	5.5	382	201	.15	33.5	95	91
30 14:04	952.107		13.0	382	202	.20		98	92
14:13:45	952.107	.7	13.0	354	196	.20	32.8	98	93
40 14:23:45	954.304		12.2	344	194	.15		98	94
14:24:15	954.416								

8.214

Comments Leak Check OK Doesn't seem to be any adjustment on fine control at all

10 minute Traverse

all leak ✓ ok

Date 5-21-98 Time _____

DUST LOADING DATA SHEET

DATE MRY-D4-ESPin-OH2
RUN # _____
FUND # _____
COST CENTER # _____

Time at Start 14:44:45 Operators _____

Sample Pt. Middle Port ESP IN Traverse Pt. _____

John
Don
Kelly

P_b (Barometric Pressure) = 28.02 in. Hg

P_s (Stack Ptessure) = P_b ± (-5.06 in. H_2O/13.6) = 27.65 in. Hg

T_s (Stack Temperature) = 370 °F + 460 = 830 °R

ΔP(Pitot) = .6 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_m = 1

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 3392 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .289 ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n\, T_m\, P_s}{C_m\, T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\% H_2O}{100}\right)$ = .167 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = .08 in H_2O

Second/Rev = 36 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft^3)	Pitot ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box orifice ΔH	T4 Sec./Rev ~~Impinger~~	T5 Meter In	T6 Meter Out
-t	0 14:44:30	954.531								
:IN	14:44:45	954.505	.6	13.5	370	195	.15	36	92	92
END	14:54:45 10	956.901								
	14:54:45	956.901	.5	13.0	380	197	.10	39.5	94	93
END	20 15:04:45	958.509		11.5	382	200	.10		94	92
	15:04:45	958.509	.5	11.7	381	199	.10	39.6	94	93
END	30 15:14:45	960.065		12.0	381	196	.10		94	93
	15:14:45	960.065	.65	12.0	350	198	.10	34	95	94
ND	40 15:24:45	961.702		15.8	347	202	.10		96	94
t	15:25:10	961.799								

Comments 7.197 leak check OK at 13" Hg, Traverse at 10 minutes
all leak checks OK

Date 5-21-98 Time _____

DUST LOADING DATA SHEET

MRY-D4-ESPin-OH2

DATE _____
RUN # _____
FUND # _____
COST CENTER # _____

Time at Start 15:46:00 Operators _____

Sample Pt. North Port ESP IN Traverse Pt. _____

Kelly
Don
John

P_b (Barometric Pressure) = 28.02 in. Hg

P_s (Stack Ptessure) = P_b ± (-5.06 in. H_2O/13.6) = 27.65 in. Hg

T_s (Stack Temperature) = 355 °F + 460 = 815 °R

ΔP(Pitot) = _____ in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_m = 1

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 3499 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .298 ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .175 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = .08 in H_2O

Second/Rev = 34.3 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft^3)	Pitot ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 .12 ~~Muff/ Hot Box~~ orifice ΔH	T4 Sec/Rev. Impinger	T5 Meter In	T6 Meter Out
+	15:45:45	961.962								
IN	15:46:00	962.106	x .65	16.5	355	201	.15	34.3	92	92
ND	15:56:00	964.402		16.0	361	194	.15		94	92
	15:56:00	964.402	x .65	16.0	361	194	.15	34.3	94	92
ND	16:06:00	966.034		14.5	362	204	.10		95	93
	16:06:00	966.034	x .60	14.5	362	204	.10	35.7	95	93
ND	16:16:00	967.588		15.0	373	200	.10		95	94
	16:16:00	967.588	x .65	15.0	373	202	.10	34.4	97	95
ND	16:26:00	969.147		17.1	368	198	.10		97	95
	16:26:30	969.186								

Comments 7.041 leak check O.K. at 16" Hg 10 min Traverse

Sample Pt. _____ Date_____ Time_____

Train Type : **ONTARIO-HYDRO METHOD**

Date ~~MRY-D4-ESPin-OH2~~
Run _____
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	722.28	781.02	58.74
BUBBLER	KCl	717.93	722.28	4.34
IMPINGER	KCl	752.98	753.04	.06
BUBBLER	H_2O_2/HNO_3	694.42	695.70	1.28
BUBBLER	$KMnO_4/H_2SO_4$	708.01	708.06	-.04
BUBBLER	$KMnO_4/H_2SO_4$	702.37	701.64	-.73
IMPINGER	$KMnO_4/H_2SO_4$	728.13	727.50	-.63
BUBBLER	SILICA GEL	960.0	965.5	5.50
			Total H_2O (g)	68.52
FILTER		0.21050	2.32887	2.11837
			Total Dust (g)	

$V_wstd = 0.0474 * (H_2O\ g)$ — 3.231 SCF

$V_mCorrected = V_m * C_m$ — 22.450 ACF

$V_mstd = \frac{17.71\ V_mC\ (P_b + \Delta H/13.6)}{T_m}$ — 19.991 SCF

$V_tstd = V_wstd + V_mstd$ — 23.222 SCF

$\%H_2O = (V_wstd / V_tstd) * 100$ — 13.9 $\%H_2O$

$Q_nstd = 17.71\ Q_n\ P_s / T_s$ — _____ SCFM

% Isokinetic = $V_tstd / (Q_nstd * Time)$ — _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / V_tstd — 1.4078 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area (ft}^2\text{)}$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/19/98
RUN # MRY-D2-FGDin-OH1
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 10:11 OPERATORS RANDY S. / BUTCH R.
SAMPLE PORT TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 28.05 in. Hg

Ps (STACK PRESSURE) = Pb +/- (in. H2O / 13.6)= 28.53 in. Hg

Ts (STACK TEMP) = 369 F +460F = 829 R

^P (PITOT)= 0.79 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.18 in APPROX % H2O = 18

^H@ = 1.76 in H2O Cm = 0.96

Vs(STACK VELOCITY) = 3830 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.6768 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.3263 ACFM

^H (ORIFICE)= 0.36 in H2O

SECOND/REV = 18.4

TIME = 110 min

INITIAL GAS METER = 400.025 CF

FINAL GAS METER = 436.75 CF

GAS METER VOL = 36.725 CF

AVERAGE ^ H = 0.30

METER TEMP = 82

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.3	84	79

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	695.3	789.4	94.2
BUBBLER	KCl	731.0	742.0	11.0
IMPINGER	KCl	734.7	735.3	0.6
BUBBLER	H2O2	705.1	707.9	2.8
BUBBLER	KMnO4	710.7	710.5	-0.1
BUBBLER	KMnO4	678.1	677.7	-0.4
IMPINGER	KMnO4	729.0	729.9	1.0
BUBBLER	SILICA GEL	952.1	962.0	9.9
				0.0
				0.0
		TOTAL H2O		118.8
FILTER		0.20820	0.21235	0.00415
		TOTAL DUST		0.00415

VwSTD = 5.599 SCF

VmC = 35.256 ACF

VmSTD = 32.369 SCF

VtSTD = 37.968 SCF

%H2O = 14.7 %H2O

QnSTD = 0.412 SCFM

% ISO = 83.7 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0017 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

Date [illegible]-14-98 Time _____

DUST LOADING DATA SHEET

DATE _____ MRY-D2-FGDin-OH1

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start 10:11 Operators RS / BK

Sample Pt. FGD in - bottom Traverse Pt. _____

use valve no

use pitot sensor yes

isokinetic no

probe temp yes 200°

P_b (Barometric Pressure) = 28.05 in. Hg

P_s (Stack Ptessure) = P_b ± ([illegible] in. H_2O/13.6) = 28.79 in. Hg

T_s (Stack Temperature) = 367.9 °F + 460 = 828 °R

ΔP(Pitot) = .579 in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .18 in Approx % H_2O _____

ΔH@ = 1.76 C_m = 0.96

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 3031 ft/min

75.88
84.61
86.42

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .5356 ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\% H_2O}{100}\right)$ = .3185 ACFM

Ave T_M = 82.3(

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = .3 in H_2O

Second/Rev = 14.8 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

.5

Time (min)	Gas meter (ft³)	ΔP (in H_2O) pitot	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	ΔH .3	T5 Meter In 84	T6 Meter Out 79	PT
0	400.025	~	2	367	130		.5	73	67	12
10	404.035		1	366.8	135.7			75.8	70.4	11
20	406.855		1	367.0	108.7			79.5	73.4	10
30	409.670		1	367.8	96			81.9	75.8	9 STATC
40	412.475	.8	1	368.5	91.7		.2	83.7	78.3	8 3.8
50	415.285	.7	1	369.7	89.3		.2	84.4	79.5	7 ΔP
60	418.050	.8	1	369.0	89.3		.15	85.6	81.9	6 .5
70	421.030	.8	1	369.8	169.		.3	89.3	82.6	Σ 2.8 STA
80	424.705	.6	1	368.5	196		.3	90.5	83.1	4

Comments Re calced sec/rev @ 50 min - came up with 15.7 sec/rev using 3.8 static, .7 ΔP Re adjusting on pt 7
& will try to keep probe around 200 °F

DUST LOADING DATA SHEET

Date _____ Time _____

DATE _____ MRY-D2-FGDin-OH1

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start _____ Operators RS / BR

Sample Pt. _____ Traverse Pt. _____

P_b (Barometric Pressure) = 28.05 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (2.8 in. H_2O/13.6) = 28.26 in. Hg

T_s (Stack Temperature) = 370 °R + 460 = 830 °R

ΔP(Pitot) = .6 in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .18 in Approx % H_2O _____

$\Delta H@$ = 1.76 C_n = 0.96

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3356 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .5930 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_n T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .3614 ACFM

ΔH(Orrifice) = $\frac{Q_n^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .37 in H_2O

Second/Rev = 10.6 $\%CO_2$ _____ $\%O_2$ _____

V_s = 36.725

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	~~T4~~ Δ H Impinger	T5 Meter In	T6 Meter Out	
90	428.~~6~~	.760/.7	1	323	165		.65	92.9	84.4	
100	433.30	.7	1	368.6	299		.3	88.0	84.4	4,2 STATI
110	436.750	1.3	1	369.0	169		.3	84.4	84.4	
120										
		Leak Test								

Comments _____

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____ Date _____ Time _____

Run MRY-D2-FGDin-OH1

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	695.26	789.43	94.2
BUBBLER	KCl	731.02	741.98	11.0
IMPINGER	KCl	734.66	735.25	0.6
BUBBLER	H_2O_2/HNO_3	705.09	707.85	2.8
BUBBLER	$KMnO_4/H_2SO_4$	710.67	710.53	-0.1
BUBBLER	$KMnO_4/H_2SO_4$	678.13	677.69	-0.4
IMPINGER	$KMnO_4/H_2SO_4$	728.95	729.90	1.0
BUBBLER	SILICA GEL	952.1	962.0	9.9
			Total H_2O (g)	119.0
FILTER		.20820	.21235	0.00415
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ — 5.611 SCF

$V_m Corrected = V_m * C_m$ — 35.256 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 32.323 SCF

$V_t std = V_w std + V_m std$ — 37.934 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 14.8 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.33 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 104.5 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 0.0017 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area (ft}^2\text{)}$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/21/98
RUN # MRY-D4-ESPin-OH1
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 09:15 OPERATORS TOMAN / FOX
SAMPLE PORT ESP inlet TRAVERSE POINT north, middle

Pb (BAROMETRIC PRESSURE) 28.05 in. Hg

Ps (STACK PRESSURE) = Pb +/- (-5.06 in. H2O / 13.6)= 27.68 in. Hg

Ts (STACK TEMP) = 365 F +460F = 825 R

^P (PITOT)= 0.648 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.15 in APPROX % H2O = 12

^H@ = 1.72 in H2O Cm = 1

Vs(STACK VELOCITY) = 3513 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.4311 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.2087 ACFM

^H (ORIFICE)= 0.14 in H2O

SECOND/REV = 28.7

TIME = 80 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 17.458 CF

GAS METER VOL = 17.458 CF

AVERAGE ^ H = 0.15

METER TEMP = 87

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.15	89	85

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	711.8	754.8	43.0
BUBBLER	KCl	623.0	627.3	4.4
IMPINGER	KCl	747.3	748.0	0.8
BUBBLER	H2O2	701.6	703.0	1.5
BUBBLER	KMnO4	611.3	611.2	-0.1
BUBBLER	KMnO4	612.4	611.8	-0.6
IMPINGER	KMnO4	708.2	707.7	-0.5
BUBBLER	SILICA GEL	869.8	874.3	4.5
				0.0
				0.0
		TOTAL H2O		52.9
FILTER		0.21055	2.95711	2.74656
		TOTAL DUST		2.74656

VwSTD = 2.497 SCF

VmC = 17.458 ACF

VmSTD = 15.861 SCF

VtSTD = 18.358 SCF

%H2O = 13.6 %H2O

QnSTD = 0.256 SCFM

% ISO = 89.6 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 2.3089 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

Date 5-21 Time

DATE MRY-D4-ESPin-OH1

RUN #

FUND #

COST CENTER #

Time at Start 9:15 Operators John Kelly Don

Sample Pt. North ESP Port Traverse Pt.

P_s (Barometric Pressure) = 28.05 in. Hg

P_g (Stack Ptessure) = $P_s \pm$ (-5.06 in. H_2O/13.6) = 27.68 in. Hg

T_s (Stack Temperature) = 360 °F + 460 = 820 °R 825

ΔP(Pitot) = .65 in H_2O X Type S C_p = .84 ____ Standard

D_n (Nozzle Size) = .15 in Approx % H_2O 12

ΔH@ = 1.72 C_n = 1

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3640 ft/min 3518

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .447 ACFM .4318

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_s + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = .252 ACFM .2438

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_s + \Delta H/13.6)}{0.03175\ T_m}$ = .18 in H_2O .16

80 min

Second/Rev = 23.8 $\%CO_2$ ____ $\%O_2$ ____ 24.6

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Pitot ΔH (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	ΔH Manif/ Hot Box	T4 Sec/Rec	T5 Meter In	T6 Meter Out
9:15	926.617	.65	4.5	350	203	.2	24.6	79	76
9:15:30	926.723								
10	929.402	.65	5.5	356	205	.15		83	77
9:25:30	929.402	.65	6.0	358	208	.15	24.7	84	78
20	931.613	.60	10.0	361	199	.2		88	81
9:35:30	931.613	.60	10.0	369	195	.15	25.9	88	82
30	933.948	.60	11.0	370	194	.15		89	84
9:45:30	933.948	Pitot down to 0 (Purge)	12.0	369	204	.15	25.9	89	83
40	936.002		12.5	363	197	.15		91	86
9:55:46	936.071								

9.279 total

will use some ΔP because of flying

Comments leak check ok @ 5" Hg 10 min Traverse found that Pitot was plugged at end of test. Cleaned out all leak checks were ok

DUST LOADING DATA SHEET

Date 5-21 Time

DATE MRY-D4-ESPin-OH1

RUN #

FUND #

COST CENTER #

Time at Start 10:20 Operators John Kelly Don

Sample Pt. middle port Traverse Pt.

P_b (Barometric Pressure) = 28.05 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (-5.06 in. H_2O/13.6) = 27.68 in. Hg

T_s (Stack Temperature) = 360 °F + 460 = 820 °R

ΔP(Pitot) = .15 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .15 in Approx % H_2O 12

ΔH@ = 1.72 C_m = 1

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3508 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .43 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = .248 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .17 in H_2O

Second/Rev = 24.2 $\%CO_2$ _____ $\%O_2$ _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

orifice #4

Time (min)	Gas meter (ft^3)	Pitot ΔH (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 ~~Manif~~ Hot Box	T4 Sec./Rej ~~Impinger~~	T5 Meter In	T6 Meter Out
10:19:30	936.991	.65	9.0	360	201	.20	~~24.7~~	85	85
0 10:20	936.446								
10	938.307	.60	10.5	367	200	.10		89	86
10:30	938.307	.60	10.5	378	203	.10	25.3	89	86
20	940.503	.65	17.5	379	198	.15		92	89
10:40	940.503	Plugged (.65)	17.5	380	201	.15	24.2	93	89
30	942.527	.85	12.0	379	202	.15	22.2	95	91
10:50	942.527	Guess? .70?	13.0	349	197	.15	22.8	97	91
40 11:00	944.625	Plugged	23.0	346	194	.15		99	94
11:00:21	944.701								

8.179

Comments Leak Check OK @ 12.5" Hg 10 min Traverse
Ran out of Pump Adjustment only all leak check OK

Sample Pt. _____ Date _____ Time _____

Train Type : **ONTARIO-HYDRO METHOD**

Date MRY-D4-ESPin-OH1
Run _____
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	711.80	754.81	43.01
BUBBLER	KCl	622.97	627.32	4.35
IMPINGER	KCl	747.28	748.03	.75
BUBBLER	H_2O_2/HNO_3	701.56	703.04	1.48
BUBBLER	$KMnO_4/H_2SO_4$	611.28	611.22	-.06
BUBBLER	$KMnO_4/H_2SO_4$	612.38	611.79	-.59
IMPINGER	$KMnO_4/H_2SO_4$	708.22	707.73	-.49
BUBBLER	SILICA GEL	869.8	874.3	4.50
			Total H_2O (g)	52.95
FILTER		0.21055	2.957112	2.746562
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ — 2.497 SCF

$V_m Corrected = V_m * C_m$ — 17.458 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — ~~15.626~~ 15832 SCF

$V_t std = V_w std + V_m std$ — 18.329 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 13.8 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — .258 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 88.8 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 2.3125 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — ~ %

ACFM = V_s * Pipe Area (ft^2) — _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * $P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/19/98
RUN # MRY-D2-FGDin-OH2
FUND # 4428/5041
CST CTR #

DUST LOADINGDATA SHEET

START TIME 15:43 OPERATORS RANDY S. / BUTCH R.
SAMPLE PORT TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 28.08 in. Hg

Ps (STACK PRESSURE) = Pb +/- (4.2 in. H2O / 13.6)= 28.39 in. Hg

Ts (STACK TEMP) = 368 F +460F = 828 R

^P (PITOT)= 0.806 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA = 0.18 in APPROX % H2O = 15

^H@ = 1.76 in H2O Cm = 0.96

Vs(STACK VELOCITY) = 3876 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.6849 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.3406 ACFM

^H (ORIFICE)= 0.39 in H2O

SECOND/REV = 17.6

TIME = 120 min

INITIAL GAS METER = 436.925 CF

FINAL GAS METER = 486.096 CF

GAS METER VOL = 49.171 CF

AVERAGE ^ H = 0.41

METER TEMP = 102

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.2	89	87
0.25	97	91
0.35	103	94
0.45	108	97
0.45	110	100
0.5	112	103
0.5	112	104
0.5	113	105
0.5	113	105

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	643.7	735.9	92.2
BUBBLER	KCl	641.6	683.7	42.2
IMPINGER	KCl	702.7	704.3	1.6
BUBBLER	H2O2	629.3	635.4	6.1
BUBBLER	KMnO4	604.1	604.7	0.6
BUBBLER	KMnO4	610.3	610.1	-0.2
IMPINGER	KMnO4	709.2	709.1	-0.2
BUBBLER	SILICA GEL	984.1	993.9	9.8
				0.0
				0.0
		TOTAL H2O		152.1
FILTER		0.21015	0.21420	0.00405
		TOTAL DUST		0.00405

VwSTD = 7.172 SCF

VmC = 47.204 ACF

VmSTD = 41.786 SCF

VtSTD = 48.957 SCF

%H2O = 14.6 %H2O

QnSTD = 0.416 SCFM

% ISO = 98.1 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0013 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

DATE _____
RUN # _____
FUND # _____
COST CENTER # _____

Time at Start 15:43 Operators _____

Sample Pt FGD-in-bottom Traverse Pt. _____ Date 5-19-98 Time _____
MRY-D2-FGDin-OH2

P_b (Barometric Pressure) = 28.09 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (4.2 in. H_2O/13.6) = 28.39 in-Hg

T_s (Stack Temperature) = 368 °F + 460 = 828 °R

ΔP(Pitot) = .5 in H_2O ✓ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .18 in Approx % H_2O _____

ΔH@ = 1.76 C_n = .96

START
4.2
ΔP .5
ΔH START .5

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3053 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2/576$ = .5394 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .3267 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .3 in H_2O

ΔP .9 gauge x 1.2 Dig-it

Second/Rev = 18.4 $\%CO_2$ _____ $\%O_2$ _____

97.66
108.30

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft³) 436.923 (0)	~~ΔP ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	~~T3 Manif Hot Box~~ ΔP Digital	~~ΔH Impinger~~ 0.41	T5 Meter In 103	T6 Meter Out	sec/rev
0	430.925	.6	1	369	201		.2	89.3	87.4	1018.4
~~15~~	441.435	.7	1	371.4	202		.25	97.2	91.0	915.4
~~30~~	446.790	.75	2	372.5	202		.35	102.7	94.1	813.5
~~45~~	452.925	.95	3	373.1	203		.45	107.5	97.2	714.2
60	459.555	.8	3	373.3	203		.45	110.0	100.2	613.3
75	466.145	.9	3	374.5	202		.5	111.8	102.7	513.3
90	472.790	.7	3	373.6	203		.5	111.8	103.9	413.2
105	479.440	.9	3	374.1	203	1.2	.5	113.0	105.1	312.6
120	486.092 (486.094)	1.0	3	375.5	203	1.37	.5	113.0	105.1	

26.2
37.4

Comments Added Box @ 50 minutes & 90 min

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____
Run _____
Fund # _____ Date _____ Time _____
Cost Center # MRY-D2-FGDin-OH2

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	643.74	735.91	92.17
BUBBLER	KCl	641.657	683.73	42.2
IMPINGER	KCl	702.71	704.32	1.6
BUBBLER	H_2O_2/HNO_3	629.25	635.36	6.1
BUBBLER	$KMnO_4/H_2SO_4$	604.12	604.74	0.6
BUBBLER	$KMnO_4/H_2SO_4$	610.29	610.07	-0.2
IMPINGER	$KMnO_4/H_2SO_4$	709.20	709.05	-0.1
BUBBLER	SILICA GEL	984.1	993.9	9.8
			Total H_2O (g)	152.2
FILTER		.21015	.21420	0.00405
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ — 7.176 SCF

$V_m Corrected = V_m * C_m$ — 47.205 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 41.741 SCF

$V_t std = V_w std + V_m std$ — 48.917 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 14.7 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.328 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 124.5 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 0.0013 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area (ft}^2)$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/19/98
RUN # MRY-D2-FGDout-OH1
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

ONTARIO-HYDRO

START TIME 09:40
SAMPLE PORT
OPERATORS GLENN / RANDY L.
TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 28.05 in. Hg

Ps (STACK PRESSURE) = Pb +/- (4 in. H2O / 13.6)= 28.34 in. Hg

Ts (STACK TEMP) : 140 F +460F = 600 R

^P (PITOT)= 1.059 in. H2O 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.125 in APPROX % H2O = 18

^H@ = 1.45 in H2O Cm = 1

Vs(STACK VELOCITY) = 3785 ft/min Tm (METER TEMP) = 80

Qn (NOZZLE FLOWRATE) = 0.3225 ACFM ^H ASSUMED = 0.5

Qm (METER FLOWRATE) = 0.2402 ACFM

^H (ORIFICE)= 0.14 in H2O

SECOND/REV = 25.0

TIME = 120 min

INITIAL GAS METER = 204.092 CF

FINAL GAS METER= 233.793 CF

GAS METER VOL = 29.701 CF

AVERAGE ^ H = 0.14

METER TEMP = 56

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.14	60	51

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	697.1	817.3	120.2
BUBBLER	KCl	734.3	737.9	3.6
IMPINGER	KCl	723.5	723.6	0.1
BUBBLER	H2O2	735.0	736.0	1.0
BUBBLER	KMnO4	714.9	714.3	-0.5
BUBBLER	KMnO4	645.9	645.2	-0.6
IMPINGER	KMnO4	729.2	729.1	-0.1
BUBBLER	SILICA GEL	855.4	864.7	9.3
				0.0
				0.0
	TOTAL H2O			133.0
FILTER		0.21178	0.21178	0.00000
	TOTAL DUST			0.00000

VwSTD = 6.270 SCF

VmC = 29.701 ACF

VmSTD = 28.632 SCF

VtSTD = 34.902 SCF

%H2O = 18.0 %H2O

QnSTD = 0.270 SCFM

% ISO = 107.8 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0000 grains/SCF

INLET DCL = _____ grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

Date _____ Time _____

DATE _____ MRY-D2-FGDout-OH1

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start 0940 Operators RR/GF

Sample Pt. FGD out Traverse Pt. _____

P_s (Barometric Pressure) = ~~29.97~~ 28.05 in. Hg

P_s (Stack Ptessure) = $P_s \pm$ (+ 6 in. H_2O/13.6) = 28.34 in. Hg

T_s (Stack Temperature) = 140 °R + 460 = 600 °R

ΔP(Pitot) = 1.0 1.054 in H_2O 1.00 Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 18

$\Delta H@$ = 1.45 C_n = 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = ~~3678~~ 3678 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = 0.3134 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_n T_s (P_s + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = 0.2334 ACFM TH 80

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_s + \Delta H/13.6)}{0.03175\ T_m}$ = 0.13 in H_2O

Second/Rev = 25.7 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

ΔT = ~~5628~~ 57.84

Time (min)	Gas meter (ft^3)	$\Delta H_{@} = 0.14$ ΔH (in H_2O)	Pump Vacuum (in Hg)	T1 ΔP Stack	T2 Probe	T3 Muff/Hot Box	T4 Impinger	T5 Meter In	T6 Meter Out	
Start	204.092	.10	.6	.77	338	200	136	48	48	55.17
10	206.175	.10	9.7	.77	338	198	135	52	48	
20	208.440	.11	7.2	.83	337	197	134	55	50	
30	210.813	.18	6.3	1.0	339	204	135	59	52	
40	213.085	.12	6.5	.92	337	200	136	59	53	
50	215.405	.13	6.3	1.1	334	196	136	61	54	
60	217.745	.13	6.3	1.1	338	199	136	62	55	
70	220.257	.16	6.5	1.2	337	198	135	62	56	
80	222.820	.16	6.4	1.2	336	203	135	63	56	

Comments Leak Checked okay

Inches Left Distance from flange Starting from Back to Front

DUST LOADING DATA SHEET

Date _____ Time _____

DATE MRY-D2-FGDout-OH1

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start _____ Operators _____

Sample Pt. _____ Traverse Pt. _____

P_b (Barometric Pressure) = _____ in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (_____ in. H_2O/13.6) = _____ in. Hg

T_s (Stack Temperature) = _____ °F + 460 = _____ °R

ΔP(Pitot) = _____ in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = _____ in Approx % H_2O _____

$\Delta H@$ = _____ C_m = _____

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s\ \Delta P}{P_s}}$ = _____ ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n\ T_m\ P_s}{C_m\ T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = _____ ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = _____ in H_2O

Second/Rev = _____ $\%CO_2$ _____ $\%O_2$ _____

$V_s = 29.70$

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Δp Stack	T2 Probe	T3 Muff/ Heater	T4 Impinger	T5 Meter In	T6 Meter Out	
90	225.522	.18	6.8	1.4	338	199	135	62	57	60.5
100	228.244	.17	6.5	1.3	337	197	135	63	57	
110	231.012	.17	6.2	1.3	338	200	136	64	57	
120	233.798	.18	6.2	1.0	337	197	136	66	58	

Comments _____

Sample Pt. _____ Date _____ Time _____

MRY-D2-FGDout-OH1

Train Type : **ONTARIO-HYDRO METHOD**

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	697.12	817.3	120.2
BUBBLER	KCl	734.28	737.88	3.6
IMPINGER	KCl	723.45	723.59	0.1
BUBBLER	H_2O_2/HNO_3	734.99	736.01	1.0
BUBBLER	$KMnO_4/H_2SO_4$	714.87	714.32	-0.6
BUBBLER	$KMnO_4/H_2SO_4$	645.86	645.24	-0.6
IMPINGER	$KMnO_4/H_2SO_4$	729.23	729.14	-0.1
BUBBLER	SILICA GEL	855.4	864.7	9.3
			Total H_2O (g)	132.9
FILTER		0.21178		0.00001
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ — 6.266 SCF

$V_m Corrected = V_m * C_m$ — 29.701 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 28.503 SCF

$V_t std = V_w std + V_m std$ — 34.769 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 18.0 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.262 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 110.5 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 0.0000 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

ACFM = V_s * Pipe Area (ft^2) — _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * $P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/19/98
RUN # MRY-D2-FGDout-OH2
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 15:10 OPERATORS GLENN / RANDY L.
SAMPLE PORT FGD OUTLET TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 28.08 in. Hg

Ps (STACK PRESSURE) = Pb +/- (4 in. H2O / 13.6)= 28.37 in. Hg

Ts (STACK TEMP)= 140 F +460F = 600 R

^P (PITOT)= 1.02 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.125 in APPROX % H2O = 18

^H@ = 1.45 in H2O Cm = 1

Vs(STACK VELOCITY) = 3712 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.3164 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.2010 ACFM

^H (ORIFICE)= 0.11 in H2O

SECOND/REV = 29.9

TIME = 120 min

INITIAL GAS METER = 233.965 CF

FINAL GAS METER= 263.603 CF

GAS METER VOL = 29.638 CF

AVERAGE ^ H = 0.14

METER TEMP = 80

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.14	83	77

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	738.9	860.6	121.7
BUBBLER	KCl	752.9	758.2	5.3
IMPINGER	KCl	714.3	714.3	0.0
BUBBLER	H2O2	610.8	611.2	0.4
BUBBLER	KMnO4	719.8	720.0	0.2
BUBBLER	KMnO4	704.1	703.6	-0.5
IMPINGER	KMnO4	716.2	715.8	-0.4
BUBBLER	SILICA GEL	962.7	970.9	8.2
				0.0
				0.0
		TOTAL H2O		134.9
FILTER		0.21187	0.21254	0.00067
		TOTAL DUST		0.00067

VwSTD = 6.362 SCF

VmC = 29.638 ACF

VmSTD = 27.304 SCF

VtSTD = 33.666 SCF

%H2O = 18.9 %H2O

QnSTD = 0.265 SCFM

% ISO = 105.9 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0003 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

DATE Date Time
RUN # MRY-D2-FGDout-OH2
FUND #
COST CENTER #

Time at Start 15:10 Operators RB/GF

Sample Pt. FGD outlet Traverse Pt.

P_b (Barometric Pressure) = 28.08 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (+4 in. H_2O/13.6) = 28.37 in. Hg

T_s (Stack Temperature) = 140 °F + 460 = 600 °R

ΔP(Pitot) = .75 in H_2O 1.020 Type S C_p = .84 Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 18

ΔH@ = 1.45 C_m = 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3183 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = 0.2713 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = 0.2020 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = 0.10 in H_2O

Second/Rev = 29.7 $\%CO_2$ _____ $\%O_2$ _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

79.5

Time (min)	Gas meter (ft^3) 29,63$	ΔH (in H_2O) 0.14	Pump Vacuum (in Hg)	T1 ΔP Stack	T2 Probe	T3 Muff/ [illegible]	T4 Impinger	T5 Meter In	T6 Meter Out	
Start	233,965	.10	2.0	.73	342	238	136	64	65	72.33
10	236.085	.09	2.2	.73	342	240	136	70	66	86.57
20	238.213	.10	2.3	.79	342	234	135	74	68	
30	240.486	.12	2.5	.90	342	230	135	78	70	
40	242.896	.12	2.6	.93	342	240	136	81	74	
50	245.180	.13	2.7	1.0	343	226	136	83	75	
60	247.705	.14	2.8	1.1	342	237	136	86	78	
70	250.242	.14	3.0	1.1	343	228	135	88	80	
80	252.999	.16	3.1	1.2	343	225	136	90	82	

Comments Leak checked okay inches Hg from the flange
Started Back to [illegible] front

DUST LOADING DATA SHEET

DATE Date Time
RUN # MRY-D2-FGDout-OH2
FUND #
COST CENTER #

Time at Start _____ Operators _____

Sample Pt. _____ Traverse Pt. _____

P_b (Barometric Pressure) = _____ in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (_____ in. H_2O/13.6) = _____ in. Hg

T_s (Stack Temperature) = _____ °F + 460 = _____ °R

ΔP(Pitot) = _____ in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = _____ in Approx % H_2O _____

ΔH@ = _____ C_m = _____

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s\ \Delta P}{P_s}}$ = _____ ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n\ T_m\ P_s}{C_m\ T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = _____ ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = _____ in H_2O

Second/Rev = _____ $\%CO_2$ _____ $\%O_2$ _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Δp Stack	T2 Probe	T3 Hot Box Muff	T4 Impinger	T5 Meter In	T6 Meter Out
90	255.550	.16	3.2	1.2	342	223	136	91	83
100	258.200	.16	3.3	1.2	343	221	136	92	84
110	260.905	.17	3.4	1.3	343	222	137	93	85
120	263.603	.17	3.5	1.3	342	234	137	94	86
								93	77

Comments _____

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____ Time _____

Date MRY-D2-FGDout-OH2

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	738.94	860.6	121.7
BUBBLER	KCl	752.94	758.2	5.3
IMPINGER	KCl	714.30	714.3	0
BUBBLER	H_2O_2/HNO_3	610.76	611.2	0.4
BUBBLER	$KMnO_4/H_2SO_4$	719.79	720.0	0.2
BUBBLER	$KMnO_4/H_2SO_4$	704.09	703.6	-0.5
IMPINGER	$KMnO_4/H_2SO_4$	716.15	715.8	-0.4
BUBBLER	SILICA GEL	962.7	970.9	8.2
			Total H_2O (g)	134.9
FILTER		21187	21254	0.00067
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ — 6.361 SCF

$V_m Corrected = V_m * C_m$ — 29.638 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 27.330 SCF

$V_t std = V_w std + V_m std$ — 33.690 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 18.9 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.227 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 123.6 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL - Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

ACFM = V_s * Pipe Area (ft^2) — _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * $P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/19/98
RUN # MRY-D2-ST-OH1
FUND # 4428/5041
CST CTR #

DAY 2

DUST LOADING DATA SHEET

START TIME 09:43 OPERATORS HEIDT/DUNHAM
SAMPLE PORT STACK TRAVERSE POINT 92"-47"-17"

Pb (BAROMETRIC PRESSURE) 28.05 in. Hg

Ps (STACK PRESSURE) = Pb +/- (-1 in. H2O / 13.6)= 27.98 in. Hg

Ts (STACK TEMP) = 230 F +460F = 690 R

^P (PITOT)= 0.68 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.19 in APPROX % H2O = 17

^H@ = 1.5 in H2O Cm = 1

Vs(STACK VELOCITY) = 3274 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.6445 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.3557 ACFM

^H (ORIFICE)= 0.36 in H2O

SECOND/REV= 16.9

TIME = 40 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 16.308 CF

GAS METER VOL = 16.308 CF

AVERAGE ^ H= 1.095

METER TEMP= 82

^H	T5	T6
in H20	METER IN	METER OUT
1.095	83.1	80.1

.RACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	608.8	659.4	50.6
BUBBLER	KCl	734.0	745.2	11.2
IMPINGER	KCl	720.5	721.7	1.2
BUBBLER	H2O2	706.5	707.4	0.9
BUBBLER	KMnO4	709.3	709.2	-0.1
BUBBLER	KMnO4	613.4	612.9	-0.5
IMPINGER	KMnO4	615.5	615.5	-0.0
BUBBLER	SILICA GEL	865.6	871.9	6.3
				0.0
				0.0
		TOTAL H2O		69.6
FILTER		0.21126	0.21048	0.00001
		TOTAL DUST		0.00001

VwSTD = 3.284 SCF

VmC = 16.308 ACF

VmSTD = 15.001 SCF

VtSTD = 18.284 SCF

%H2O = 18.0 %H2O

QnSTD = 0.463 SCFM

% ISO = 98.8 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0000 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

14 of 70

DATE: Date Time START TIME: 0943

RUN NUMBER: MRY-D2-ST-OH1

SAMPLING SUMMARY

TOTAL SAMPLING TIME 45.6 MINUTES

MAXIMUM SYSTEM VACUUM 6.2 in Hg

AVERAGE STACK TEMPERATURE 190.52 °F

AVERAGE VELOCITY HEAD ΔP 0.680 in H_2O

AVERAGE STACK VELOCITY 54.69 FT/SEC

AVERAGE ORRIFICE PERSSURE ΔH 1.095 in H_2O

TOTAL VOLUME SAMPLED 16.308 FT^3

AVERAGE DGM INLET 83.07 °F

AVERAGE DGM OUTLET 80.08 °F

AVERAGE DGM TEMPERATURE 81.58 °F

FILTER TEMPERATURE NA (518.74) °F

LAST IMPINGER TEMPERATURE NA (529.17) °F

METER PRESSURE Pm 28.153 in Hg

STACK PRESSURE Ps 17.64 in Hg

AREA OF NOZZLE 0.0284 IN^2

AVG SQRT ΔP 0.654

MOLECULAR WEIGHT 27.13

MOISTURE CONTENT 0.170

VmSTD = 14.972 SCF

% ISOKINETIC 128.02

DIST LOADING DATA SHEET

DATE Date Time
RUN # MRY-D2-ST-OH1
FUND #
COST CENTER #

Time at Start 0943 Operators

Sample Pt. Stack Traverse Pt. 92"-47"-17" 5 min each 4 ports

P_b (Barometric Pressure) = ~~29.91~~ 28.05 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (-1 in. H_2O/13.6) = ~~28.05~~ 27.98 in. Hg

T_s (Stack Temperature) = ~~190.5~~ 230 °R + 460 = ~~651~~ 690 °R

ΔP(Pitot) = 0.68 in H_2O Type S C_p = .84 Standard

D_n (Nozzle Size) = ~~.315~~ .19 in Approx % H_2O ~~10~~ 17

$\Delta H@$ = 1.5 C_n = 1.0

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = ~~3274 3178~~ 3274 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = ~~0.2361~~ 0.6445 ~~0.2293~~ ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = ~~0.1587~~ 0.4132 ~~0.1634~~ ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = ~~0.06~~ 0.42 ~~0.07~~ in H_2O

Second/Rev = ~~37.8~~ 14.5 ~~36.7~~ $\%CO_2$ $\%O_2$

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	T4 Impinger	T5 Meter In	T6 Meter Out

Comments

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date Date Time

Run MRY-D2-ST-OH1

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	608.81	659.43	50.6
BUBBLER	KCl	733.96	745.20	11.2
IMPINGER	KCl	720.52	721.71	1.2
BUBBLER	H_2O_2/HNO_3	706.52	707.40	0.9
BUBBLER	$KMnO_4/H_2SO_4$	709.28	709.17	-0.1
BUBBLER	$KMnO_4/H_2SO_4$	613.39	612.94	-0.5
IMPINGER	$KMnO_4/H_2SO_4$	615.49	615.46	0
BUBBLER	SILICA GEL	865.6	871.9	6.3
			Total H_2O (g)	69.6
FILTER 0.21126		0.21048		0.00001
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$

$V_m Corrected = V_m * C_m$

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$

$V_t std = V_w std + V_m std$

$\%H_2O = (\ V_w std / V_t std) * 100$

$Q_n std = 17.71\ Q_n\ P_s / T_s$

% Isokinetic = $V_t std / (Q_n std * Time)$

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$

$\%\ Efficiency = \frac{(Inlet\ DCL - Outlet\ DCL) * 100}{Inlet\ DCL}$

$ACFM = V_s * Pipe\ Area\ (ft^2)$

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$

lbs/hour = grains / scf * 0.000143 * SCFM * 60

~~3.282~~ 3,284 SCF

16,308 ACF

~~15.001~~ ~~16.3~~ 15,001 SCF

~~18.283~~ 18,284 SCF

~~17.9~~ 18.0 $\%H_2O$

~~0.17~~ 0.463 SCFM

~~269.6~~ 98.8 %

0.0000 grains/scf

_____ %

_____ ACFM

_____ SCFM

_____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-ESPin-OH3
FUND # 4428/5041
CST CTR #

DUST LOADINGDATA SHEET

START TIME 16:15 OPERATORS FOX/TOMAN
SAMPLE PORT ESP INLET TRAVERSE POINT SOUTH, MIDDLE, NORTH

Pb (BAROMETRIC PRESSURE) 27.96 in. Hg

Ps (STACK PRESSURE) = Pb +/- (-5.06 in. H2O / 13.6)= 27.59 in. Hg

Ts (STACK TEMP) = 371 F +460F = 831 R

^P (PITOT)= 0.563 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.125 in APPROX % H2O = 12

^H@ = 1.72 in H2O Cm = 1

Vs(STACK VELOCITY) = 3292 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.2805 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.1348 ACFM

^H (ORIFICE)= 0.06 in H2O

SECOND/REV = 44.5

TIME = 120 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 20.464 CF

GAS METER VOL = 20.464 CF

AVERAGE ^ H = 0.10

METER TEMP = 95

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.1	96	93

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	709.0	759.7	50.7
BUBBLER	KCl	592.5	595.6	3.1
IMPINGER	KCl	609.3	609.1	-0.2
BUBBLER	H2O2	647.3	648.7	1.4
BUBBLER	KMnO4	700.7	701.1	0.4
BUBBLER	KMnO4	705.0	704.7	-0.3
IMPINGER	KMnO4	618.7	617.9	-0.8
BUBBLER	SILICA GEL	876.1	882.1	6.0
				0.0
				0.0
		TOTAL H2O		60.3
FILTER		0.21188	2.43048	2.21860
		TOTAL DUST		2.21860

VwSTD = 2.843 SCF

VmC = 20.464 ACF

VmSTD = 18.279 SCF

VtSTD = 21.122 SCF

%H2O = 13.5 %H2O

QnSTD = 0.165 SCFM

% ISO = 106.7 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 1.6209 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

Date 5-22-98 Time _____

DUST LOADING DATA SHEET

MRY-D5 ESPin-OH3

DATE _____

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start 16:15:00 Operators _____

Sample Pt. North Port ESPIN Traverse Pt. _____

Don
John
Kelly

P_b (Barometric Pressure) = 27.96 in. Hg

P_s (Stack Ptessure) = P_b ± (-5.06 in. H_2O/13.6) = 27.59 in. Hg

T_s (Stack Temperature) = 365 °F + 460 = 825 °R

ΔP(Pitot) = .60 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_m = 1.00

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 3386 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .289 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\% H_2O}{100}\right)$ = .166 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = .08 in H_2O

Second/Rev = 36.2 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft³)	Pitot ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	Orifice T3 ~~Muff/ Hot Box~~ ΔH	T4 sec/Rev ~~Impinger~~	T5 Meter In	T6 Meter Out
rt	0 16:14:45	11.800	.60	5.0	365	197	.15	36.2	87	85
IN	16:15:00	11.9048								
END	10 16:25:00	14.947		5.0	364	194	.10		89	86
	16:25:00	14.947	.55	5.0	370	197	.10	37.8	90	86
END	20 16:35:00	16.563	.55	6.5	369	204	.10		93	88
	16:35:00	16.563	.45	6.7	376	198	.10	41.7	93	88
END	30 16:45:00	18.135	.50	6.0	376	196	.05		93	90
	16:45:00	18.135	.57	6.0	374	198	.05	36.9	94	91
END	40 16:55:00	19.649	.55	8.1	365	193	.10		96	92
	16:55:15	19.683								

Comments leak check OK at 8.0" Hg
10 minute traverse

DUST LOADING DATA SHEET

Date 5-22-98 Time

DATE MRY-D5-ESPin-OH 53

RUN #

FUND #

COST CENTER #

Time at Start 17:07:00 Operators

Sample Pt. middle port Traverse Pt.

Kelly
John
Don

P_s (Barometric Pressure) = 27.96 in. Hg

P_g (Stack Ptessure) = $P_s \pm$ (-5.06 in. H_2O/13.6) = 27.59 in. Hg

T_s (Stack Temperature) = 358 °R + 460 = 818 °R

ΔP(Pitot) = .60 in H_2O X Type S C_p = .84 Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_n = 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3372 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .287 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .168 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H @ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .08 in H_2O

Second/Rev = 35.7 $\%CO_2$ $\%O_2$

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Pitot ~~ΔH~~ (~~in H_2O~~)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 ~~Muff~~ ~~Hot Box~~ orifice ΔH	T4 ~~Impinger~~ sec/RcV	T5 Meter In	T6 Meter Out
0 17:06:45	19.754	.60	8.0	358	196	.10	35.7	93	92
17:07:00	19.803								
10 17:17:00	21.565		11.0	364	199	.10		95	92
17:17:00	21.565	.50	10.9	373	197	.10	39.3	96	92
20 17:27:00	23.412		11.2	372	204	.10		94	94
17:27:00	23.412	.50	11.5	390	195	.15	39.3	98	94
30 17:37:00	24.988		11.5	382	202	.10		99	95
17:37:00	24.988	.60	11.5	377	199	.10	35.7	100	96
40 17:47:00	26.526		12.5	366	204	.10		101	97
17:47:15	26.584								

Comments 10 minute traverse
leak check OK at 8" Hg

Date 5-22-98 Time

DUST LOADING DATA SHEET

DATE MRY-D5-ESPin-OH[redacted]3

RUN #

FUND #

COST CENTER #

Time at Start 18:00:00 Operators Kelly Don John

Sample Pt. South Port Traverse Pt.

P_b (Barometric Pressure) = 27.96 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (-5.06 in. H_2O/13.6) = 27.59 in. Hg

T_s (Stack Temperature) = 360 °F + 460 = 820 °R

ΔP(Pitot) = .75 in H_2O X Type S C_p = .84 ____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_n = 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3774 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .322 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .189 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .10 in H_2O

Second/Rev = 31.7 %CO_2 ____ %O_2 ____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	~~Pitot ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	~~T3 Muff Hot Box~~ orifice ΔH	T4 ~~Impinger~~ sec/Rev	T5 Meter In	T6 Meter Out
17:59:45	26.701								
18:00:00	26.726	.75	10.8	360	194	.10	31.7	97	96
18:10:00	28.333		12.5		194	.10		98	96
18:10:00	28.333	.65	12.5	375	194	.10	34.3	98	96
18:20:00	29.845		13.0	375	205	.10		99	96
18:20:00	29.845	.50	13.0	380	204	.10	39.2	99	97
18:30:00	31.283		13.9	380	197	.10		100	97
18:30:00	31.283	.60	13.9	370	200	.10	35.5	100	97
18:40:00	32.722		15.0	356	197	.10		100	98
18:40:22	32.778								

Comments leak check OK at 12.5" Hg
10 minute Traverse
last leak check OK at 15" Hg

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date Date_____ Time_____

Run ~~MRY-D5-ESPin-OH3~~

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	709.0	759.7	
BUBBLER	KCl	592.5	595.6	
IMPINGER	KCl	609.3	609.1	
BUBBLER	H_2O_2/HNO_3	647.3	648.7	
BUBBLER	$KMnO_4/H_2SO_4$	700.7	701.1	
BUBBLER	$KMnO_4/H_2SO_4$	705.0	704.7	
IMPINGER	$KMnO_4/H_2SO_4$	618.7	617.9	
BUBBLER	SILICA GEL	876.1	882.1	
			Total H_2O (g)	
FILTER		0.21089		
	Rf	.21188	2.43048	
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

$\%\ Efficiency = \frac{(Inlet\ DCL - Outlet\ DCL) * 100}{Inlet\ DCL}$ _____ %

$ACFM = V_s * Pipe\ Area\ (ft^2)$ _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-FGDin-OH1
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 08:31 OPERATORS BUTCH R. / RANDY S.
SAMPLE PORT FGD INLET TRAVERSE POINT

Pb (BAROMETRICPRESSURE) 27.94 in. Hg

Ps (STACK PRESSURE) = Pb +/- (2.6 in. H2O / 13.6)= 28.13 in. Hg

Ts (STACK TEMP) = 377 F +460F = 837 R

^P (PITOT)= 0.953 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.18 in APPROX % H2O = 13

^H@ = 1.76 in H2O Cm = 0.96

Vs(STACK VELOCITY) = 4256 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.7522 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.3772 ACFM

^H (ORIFICE)= 0.48 in H2O

SECOND/REV = 15.9

TIME = 80 min

INITIAL GAS METER = 573.016 CF

FINAL GAS METER = 609.304 CF

GAS METER VOL = 36.288 CF

AVERAGE ^ H = 0.49

METER TEMP = 82

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.2	69	69
0.396	76	70
0.406	80	72
0.57	86	76
0.57	89	78
0.57	90	81
0.57	92	83
0.57	94	84
0.56	95	86

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	648.6	741.5	92.9
BUBBLER	KCl	609.9	620.1	10.3
IMPINGER	KCl	692.6	693.7	1.2
BUBBLER	H2O2	726.1	728.3	2.1
BUBBLER	KMnO4	719.1	719.4	0.3
BUBBLER	KMnO4	703.7	703.2	-0.5
IMPINGER	KMnO4	589.7	589.6	-0.2
BUBBLER	SILICA GEL	960.6	967.3	6.7
				0.0
				0.0
		TOTAL H2O		112.8
FILTER		0.21162	0.21169	0.00007
		TOTAL DUST		0.00007

VwSTD = 5.319 SCF

VmC = 34.836 ACF

VmSTD = 31.864 SCF

VtSTD = 37.183 SCF

%H2O = 14.3 %H2O

QnSTD = 0.448 SCFM

% ISO = 103.8 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0000 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

Date 5-19-98 Time

DATE MRY-D5-FGDin-OH1

RUN #

FUND #

COST CENTER #

Time at Start 831 Operators Butch & Randy S.

2 nd

Sample Pt. FGD in - 5th from bottom port 28 Traverse Pt.

P_s (Barometric Pressure) = 27.94 in. Hg

P_s (Stack Ptessure) = $P_s \pm$ (2.6 in. H_2O/13.6) = 28.13 in. Hg

T_s (Stack Temperature) = 377 °F + 460 = 837 °R

ΔP(Pitot) = .8 in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .18 in Approx % H_2O 13

$\Delta H@$ = 1.76 C_n = .96

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3900 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .16892 ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_n T_s (P_s + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .3969 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_s + \Delta H/13.6)}{0.03175\ T_m}$ = .46 in H_2O

Pressure data

PT	STATIC	Pitot
8	~~2.6~~ 2.6	~~1.9~~ .8
4	~~2.05~~	~~1.25~~ .3
1	~~1.8~~	
	2.6	.8

START guesses

ΔH → .5

T_s → 320

8 – most of probe out of stack

1 – most of probe in the stack

Second/Rev = 15.1 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3) 573.016	ΔP ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	~~T4~~ ΔH ~~Impinger~~	T5 Meter In	T6 Meter Out	PT	Sa
0	573.016	.8	.5	377	219	220	.2	68.6	69.2		
10	576.80	.8	2	~~377~~	220	216	.396	75.881	69.8		
20	580.875	1.0	2	~~377~~	220	217	.406	80.1	72.2		
30	585.553	1.0	2.6	~~377~~	219	217	.57	85.6	75.8		
40	~~590.310~~ 590.310	1.0	2.5	~~377~~ 379	220	217	.57	88.6	78.3		
50	595.060	1.0	2.5	~~377~~	220	218	.57	90.4	80.7		
60	599.810	1.0	2.5	~~377~~	220	218	.57	92.3	82.5		
70	604.553	1.0	2.5	~~377~~	219	217	.57	93.5	84.4		
80	609.304	1.0	2.6	372	219	~~220~~	.56	94.7	86.2		

219

Comments * I decided to use the average of the three pitot readings (1.0) ps

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____ Time _____

Date MRY-D5-FGDin-OH1

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	648.63	741.49	
BUBBLER	KCl	609.86	620.13	
IMPINGER	KCl	692.57	693.74	
BUBBLER	H_2O_2/HNO_3	726.14	728.29	
BUBBLER	$KMnO_4/H_2SO_4$	719.09	719.41	
BUBBLER	$KMnO_4/H_2SO_4$	703.69	703.17	
IMPINGER	$KMnO_4/H_2SO_4$	589.71	589.56	
BUBBLER	SILICA GEL	960.6	967.3	
			Total H_2O (g)	
FILTER	RB	0.21162		
	replaced Filter	.21162	.21169	
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

$\%\ Efficiency = \frac{(Inlet\ DCL - Outlet\ DCL)}{Inlet\ DCL} * 100$ _____ %

$ACFM = V_s * Pipe\ Area\ (ft^2)$ _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-FGDin-OH2
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 15:19 OPERATORS SAUER / RISKE
SAMPLE PORT FGD INLET TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 27.96 in. Hg

Ps (STACK PRESSURE) = Pb +/- (2.9 in. H2O / 13.6)= 28.17 in. Hg

Ts (STACK TEMP) = 368 F +460F = 828 R

^P (PITOT)= 0.731 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA)= 0.195 in APPROX % H2O = 13

^H@ = 1.76 in H2O Cm = 0.96

Vs(STACK VELOCITY) = 3705 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.7684 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.3898 ACFM

^H (ORIFICE)= 0.51 in H2O

SECOND/REV = 15.4

TIME = 80 min

INITIAL GAS METER = 663.016 CF

FINAL GAS METER = 699.456 CF

GAS METER VOL= 36.44 CF

AVERAGE ^ H = 0.49

METER TEMP = 98

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.43	89	89
0.45	94	88
0.47	99	90
0.48	103	93
0.47	104	95
0.47	106	97
0.47	106	98
0.47	107	99
0.7	109	100

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	723.0	829.9	106.9
BUBBLER	KCl	599.6	682.5	82.9
IMPINGER	KCl	567.1	550.9	-16.2
BUBBLER	H2O2	731.5	652.3	-79.2
BUBBLER	KMnO4	627.9	628.9	1.0
BUBBLER	KMnO4	713.3	713.5	0.2
IMPINGER	KMnO4	713.3	712.9	-0.4
BUBBLER	SILICA GEL	854.0	861.2	7.2
				0.0
				0.0
		TOTAL H2O		102.4
FILTER		0.20941	0.21225	0.00284
		TOTAL DUST		0.00284

VwSTD = 4.828 SCF

VmC = 34.982 ACF

VmSTD = 31.077 SCF

VtSTD = 35.906 SCF

%H2O = 13.4 %H2O

QnSTD = 0.463 SCFM

% ISO = 96.9 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0012 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

Date 5-22-98 Time

DATE MRY-D5-FGDin-OH2

RUN #

FUND #

COST CENTER #

Time at Start 1519 PM Operators CANDYS. Gil Bob

Sample Pt. FGD inlet - side 2nd Traverse Pt.

P_b (Barometric Pressure) = 27.96 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (2.9 in. H_2O/13.6) = 28.17 in. Hg

T_s (Stack Temperature) = 368 °F + 460 = 828 °R

ΔP(Pitot) = .6 in H_2O Type S C_p = .84 Standard

D_n (Nozzle Size) = .195 in Approx % H_2O 13

$\Delta H@$ = 1.76 C_n = .96

PT	STATIC	ΔP
8	3.0	.9
4	2.9	.75
1	2.9	.6

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3357 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .16961 ACFM

ΔH START .5

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .14209 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .50 in H_2O

8 - most of probe out of STACK

1 - most of probe in the stack

Second/Rev = 14.3 %CO_2 ____ %O_2 ____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft³) 663.013	ΔP	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	ΔH	T5 Meter In	T6 Meter Out	
0	663.016	.6	3.0	368	219	214	.43	88.6	89.3	1 14.3
10	667.448	.6	2.5		219	217	.45	93.5	98.0	2
20	671.900	.7	2.5	373	220	217	.47	99.0	89.8	3 13.1
30	676.333	.7	2.5		220	220	.48	102.6	92.9	4 13.0
40	680.775	.75	2.5	376	219	218	.47	103.9	95.3	5 12.6
50	685.190	.75	2.7		218	218	.47	106.3	96.5	6
60	689.613	.8	2.7	374	219	217	.47	106.3	98.4	7 12.1
70	694.246	.8	2.5		219	213	.47	106.9	99.0	8
80	699.456	.9	2.7	373	219	218	.70	108.7	99.6	

Comments Did not pass leak test - had some back up between bottles - liquid went from the middle of the train towards the [illegible] pinch clamp on black off hose leaking - 2nd train

1st check OK 2-3 KCl H2O1 KMnO4

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____ Time _____

MRY-D5-FGDin-OH2

Date _____

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	723.00	829.9	
BUBBLER	KCl	599.64	682.5	
IMPINGER	KCl	567.09	550.9	
BUBBLER	H_2O_2/HNO_3	731.51	652.3	
BUBBLER	$KMnO_4/H_2SO_4$	627.87	628.9	
BUBBLER	$KMnO_4/H_2SO_4$	713.30	713.5	
IMPINGER	$KMnO_4/H_2SO_4$	713.29	712.9	
BUBBLER	SILICA GEL	854.0	861.2	
			Total H_2O (g)	
FILTER		.21053	.21225	
	RI	.20941		
	replaced Filter			
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * $P_s/T_s * 17.71$ _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-ESPin-OH1
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 07:50 (09:50) D.L.F. OPERATORS TOMAN / FOX
SAMPLE PORT ESP INLET TRAVERSE POINT SOUTH, MIDDLE, NORTH

Pb (BAROMETRIC PRESSURE) 28.12 in. Hg

Ps (STACK PRESSURE) = Pb +/- (-5.06 in. H2O / 13.6)= 27.75 in. Hg

Ts (STACK TEMP) = 365 F +460F = 825 R

^P (PITOT)= 0.562 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA)= 0.125 in APPROX % H2O = 12

^H@ = 1.72 in H2O Cm = 1

Vs(STACK VELOCITY) = 3267 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.2785 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.1348 ACFM

^H (ORIFICE)= 0.06 in H2O

SECOND/REV = 44.5

TIME = 120 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 19.126 CF

GAS METER VOL= 19.126 CF

AVERAGE ^ H = 0.06

METER TEMP = 82

^H	T5	T6
in H20	METER IN	METER OUT
0.06	83	80

TRACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	725.7	777.7	52.0
BUBBLER	KCl	600.2	602.6	2.3
IMPINGER	KCl	674.9	675.0	0.1
BUBBLER	H2O2	696.8	698.8	1.9
BUBBLER	KMnO4	598.8	599.0	0.3
BUBBLER	KMnO4	719.0	719.0	-0.1
IMPINGER	KMnO4	607.3	607.3	-0.0
BUBBLER	SILICA GEL	870.9	876.3	5.4
				0.0
				0.0
		TOTAL H2O		61.9
FILTER		0.20422	0.20847	0.00425
		TOTAL DUST		0.00425

VwSTD = 2.920 SCF

VmC = 19.126 ACF

VmSTD = 17.593 SCF

VtSTD = 20.513 SCF

%H2O = 14.2 %H2O

QnSTD = 0.166 SCFM

% ISO = 103.1 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0032 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

MRY-D5-ESPin-OH1

DATE _____
RUN # _____
FUND # _____
COST CENTER # _____

Time at Start 7:50:00 Operators _____

Sample Pt. North Port ESP IN Traverse Pt. _____

Don
John
Kelly

P_b (Barometric Pressure) = 28.12 in. Hg

P_s (Stack Ptessure) = P_b ± (-5.06 in. H_2O/13.6) = 27.75 in. Hg

T_s (Stack Temperature) = 360 °F + 460 = 820 °R

ΔP(Pitot) = .55 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_m = 1

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 3223 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .275 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\% H_2O}{100}\right)$ = .154 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = .07 in H_2O

Second/Rev = 38.9 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min) 7:49:45	Gas meter (ft³)	Pitot ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	orifice ~~T3 Muff/ Hot Box~~ ΔH .08	T4 Sec./Rev ~~Impinger~~	T5 Meter In 79	T6 Meter Out 76
0 7:50:00	969.761 970.101	x .55	5.0	360	202	.15	38.9	72	69
10 8:00:00	972.499		4.0	362	198	.05		74	71
8:00:00	972.499	x .55	5.0	366	200	.10	38.8	76	72
20 8:10:00	974.381		5.5	366	204	.10		79	75
8:10:00	974.381	x .45	6.0	374	194	.10	42.8	80	76
30 8:20:00	976.093		6.5	373	201	.10		82	78
8:20:00	976.093	x .55	6.5	370	194	.08	38.5	82	78
40 8:30:00	977.675		6.8	355	200	.05		83	78
8:30:25	977.715								

Comments [illegible] 10 minute Traverse
all leak checks ok

DUST LOADING DATA SHEET

MRY-D5-ESPin-OH1

DATE _____
RUN # _____
FUND # _____
COST CENTER # _____

Time at Start 18:50:00 Operators _____

Sample Pt. middle Port ESPIN Traverse Pt. _____

Don
John
Kelly

P_s (Barometric Pressure) = 28.12 in. Hg

P_s (Stack Ptessure) = $P_s \pm$ (-5.06 in. H_2O/13.6) = 27.75 in. Hg

T_s (Stack Temperature) = 355 °F + 460 = 815 °R

ΔP(Pitot) = .55 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

$\Delta H@$ = 1.72 C_n = 1

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3213 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .274 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_s + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .157 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_s + \Delta H/13.6)}{0.03175\ T_m}$ = .07 in H_2O

Second/Rev = 38.2 $\%CO_2$ _____ $\%O_2$ _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Pitot ~~ΔH~~ (~~in H_2O~~)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 ~~Muff~~ ~~Hot Box~~ orifice ΔH	T4 Sec/Rej ~~Impinger~~	T5 Meter In	T6 Meter Out
8:49:45	977.791								
0									
8:50:00	977.807	x .55	8.7	355	194	.05	38.2	80	78
10									
9:00:05	979.576								
9:00:06	979.576	x .50	8.5	365	204	.05	40.3	82	79
20									
9:15:05	991.102		9.0	368	196	.05		83	80
9:15:06	991.102	x .50	9.0	377	198	.05	40.4	84	80
30									
9:30:00	982.528		9.2	378	200	.05		85	82
9:30:06	982.527	x .55	9.2	360	198	.05	38.0	85	83
40									
9:39:55	983.965		12.[illegible]	350	20[illegible]	.07		87	83
9:39:[illegible]	984.004								

Comments 10 minute reverse leak check ok at 7" Hg
add. Orifice check ok

DUST LOADING DATA SHEET

Date 5-22-98 Time _____

DATE MRY-D5-ESPin-OH1

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start 9:50:00 Operators _____

Sample Pt. South Port ESP IN Traverse Pt. _____

Don John Kelly

P_b (Barometric Pressure) = 28.12 in. Hg

P_s (Stack Ptessure) = P_b ± (-5.06 in. H_2O/13.6) = 27.75 in. Hg

T_s (Stack Temperature) = 365 °F + 460 = 825 °R

ΔP(Pitot) = .7 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_m = 1

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 3647 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .311 ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\% H_2O}{100}\right)$ = .177 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = .09 in H_2O

Second/Rev = 33.9 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft³)	Pitot ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	Orifice ~~T3 Muff/ Hot Box~~ ΔH	T4 Sec/Rev ~~Impinger~~	T5 Meter In	T6 Meter Out
09:49:45	984.145								
9:50:00	984.304	x .70	12.1	365	203	.05	33.9	82	81
10 10:00:00	986.795		12.0	365	200	.05		84	82
10:00:00	986.795	x .65	12.0	370	203	.05	35.2	85	82
20 10:10:00	987.210	.75	12.0	372	200	.05		87	84
10:10:00	987.210	x .50	12.0	377	194	.05	40.1	87	84
30 10:20:00	988.462	.50	12.2	374	194	.05		89	85
10:20:00	988.462	x .60	12.2	350	202	.05	35.9	89	86
40 10:30:00	989.695		14.5	345	204	.05		90	87
10:30:00	989.724								

Comments 10 minute Traverse, leak check ok at 12.5" Hg
all [illegible] check ok

Sample Pt. _____ Date _____ Time _____

Train Type : **ONTARIO-HYDRO METHOD**

Date MRY-D5-ESPin-OH1

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	725.68	777.68	
BUBBLER	KCl	600.21	602.55	
IMPINGER	KCl	674.87	674.99	
BUBBLER	H_2O_2/HNO_3	696.84	698.77	
BUBBLER	$KMnO_4/H_2SO_4$	598.78	599.03	
BUBBLER	$KMnO_4/H_2SO_4$	~~778~~ 719.04	718.98	
IMPINGER	$KMnO_4/H_2SO_4$	607.33	607.28	
BUBBLER	SILICA GEL	870.9	876.3	
			Total H_2O (g)	
FILTER		0.20422	.20897	
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

$\%\ Efficiency = \frac{(Inlet\ DCL - Outlet\ DCL) * 100}{Inlet\ DCL}$ _____ %

$ACFM = V_s * Pipe\ Area\ (ft^2)$ _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-ESPin-OH2
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 12:15 OPERATORS FOX / TOMAN
SAMPLE PORT ESP INLET TRAVERSE POINT SOUTHM, MIDDLE, NORTH

Pb (BAROMETRIC PRESSURE) 27.94 in. Hg

Ps (STACK PRESSURE) = Pb +/- (-5.06 in. H2O / 13.6)= 27.57 in. Hg

Ts (STACK TEMP) = 368 F +460F = 828 R

^P (PITOT)= 0.585 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.125 in APPROX % H2O = 12

^H@ = 1.72 in H2O Cm = 1

Vs(STACK VELOCITY) = 3351 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 02855 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.1377 ACFM

^H (ORIFICE)= 0.06 in H2O

SECOND/REV = 43.6

TIME = 120 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 21.009 CF

GAS METER VOL = 21.009 CF

AVERAGE ^ H = 0.11

METER TEMP = 94

^H	T5	T6
in H20	METER IN	METER OUT
0.11	96	92

TRACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	607.9	662.0	54.1
BUBBLER	KCl	755.7	759.3	3.6
IMPINGER	KCl	708.2	708.1	-0.1
BUBBLER	H2O2	633.6	635.3	1.7
BUBBLER	KMnO4	649.8	650.3	0.5
BUBBLER	KMnO4	639.9	639.6	-0.3
IMPINGER	KMnO4	630.0	629.8	-0.2
BUBBLER	SILICA GEL	874.1	880.7	6.6
				0.0
				0.0
		TOTAL H2O		65.9
FILTER		0.20519	2.33209	2.12690
		TOTAL DUST		2.12690

VwSTD = 3.109 SCF

VmC = 21.009 ACF

VmSTD = 18.770 SCF

VtSTD = 21.879 SCF

%H2O = 14.2 %H2O

QnSTD = 0.168 SCFM

% ISO = 108.3 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 1.5002 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

ST LOADING DATA SHEET 4-3

Date 5-22-98 Time

DATE MRY-D5-ESPin-OH2

RUN #

FUND #

COST CENTER #

Time at Start 12:15:00 Operators

Sample Pt. South Duct ESPIN Traverse Pt.

P_s (Barometric Pressure) = 27.94 in. Hg

P_g (Stack Ptessure) = $P_s \pm$ (-5.06 in. H_2O/13.6) = 27.57 in. Hg

T_s (Stack Temperature) = 360 °F + 460 = 820 °R

Don
John
Kelly

ΔP(Pitot) = .75 in H_2O X Type S C_p = .84 ____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

ΔH@ = 1.72 C_n = 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3775 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .322 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_s + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .185 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H @ (P_s + \Delta H/13.6)}{0.03175\ T_m}$ = .1 in H_2O

Second/Rev = 32.4 $\%CO_2$ ____ $\%O_2$ ____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Pitot ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	orifice T3 ~~Muff/ Hot Box~~ ΔH 1.25	T4 sec/rev ~~Impinger~~	T5 Meter In 91	T6 Meter Out 84
0 12:14:45	989.928								
:N 12:15:00	990.006	x .75	7.0	360	201	.4	32.4	85	83
10 12:25:00	992.909		5.5	364	197	.1		88	84
12:25:00	992.909	x .65	5.5	370	202	.1	34.9	88	84
20 12:35:00	994.805		6.1	371	200	.1		90	86
12:35:00	994.805	x .55	6.1	376	194	.1	37.8	92	86
30 12:45:00	996.338		6.2	378	200	.05		93	89
12:45:00	996.338	x .60	6.5	365	204	.05	35.9	93	89
40 12:55:00	997.903		8.9	348	204	.1		96	90
12:55:20	997.965								

Comments Leak check OK at 7" Hg 10 minute Traverse

DUST LOADING DATA SHEET

Date 2-22-18 Time ____

DATE MRY-D5-ESPin-OH2

RUN # ____

FUND # ____

COST CENTER # ____

Time at Start 13:10:00 Operators ____

Sample Pt. middle Port ESP IN Traverse Pt. ____

Don
John
Kelly

P_s (Barometric Pressure) = 27.94 in. Hg

P_t (Stack Ptessure) = $P_s \pm$ (-5.06 in. H_2O/13.6) = 27.57 in. Hg

T_s (Stack Temperature) = 360 °F + 460 = 820 °R

ΔP(Pitot) = .55 in H_2O X Type S C_p = .84 ____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

$\Delta H@$ = 1.72 C_n = 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3233 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .276 ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_s + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = .16 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_s + \Delta H/13.6)}{0.03175\ T_m}$ = .07 in H_2O

Second/Rev = 37.4 %CO_2 ____ %O_2 ____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft^3)	Pitot ΔH (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 orifice Manif Hot Box ΔH	T4 sec. Rev	T5 Meter In	T6 Meter Out
+	0 13:09:45	998.051			368					
JN	13:10:00	998.104	x .55	9.5	360	204	.10	37.4	91	89
ND	10 13:20:00	999.902		10.3	363	194	.10		93	90
	13:20:00	999.902	x .50	10.6	370	204	.10	39.4	93	89
ND	20 13:30:00	1.501		10.5	372	203	.10		95	91
	13:30:00	1.501	x .50	10.6	380	204	.10	39.5	95	92
ND	33 13:40:00	3.016		12.0	380	200	.10		98	94
	13:40:00	3.016	x .60	12.0	365	200	.10	35.6	98	94
ND	40 13:50:00	4.565*	up to 70	14.9	354	197	.10	34.2	101	96
	13:50:18	4.588								

Comments leak Check OK at 9.5" Hg
10 minute Traverse

DUST LOADING DATA SHEET

Date _____ Time _____

DATE MRY-D5-ESPin-OH2

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start 14:07:00 Operators _____

Sample Pt. North Port ESPIN Traverse Pt. _____

Don
John
Kelly

P_b (Barometric Pressure) = 27.94 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (-5.06 in. H_2O/13.6) = 27.57 in. Hg

T_s (Stack Temperature) = 362 °F + 460 = 822 °R

ΔP(Pitot) = .65 in H_2O X Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 12

$\Delta H@$ = 1.72 C_n = 1.0

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3519 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .30 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = .177 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .08 in H_2O

Second/Rev = 33.9 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Pitot ~~ΔH (in H_2O)~~	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	orifice T3 ~~Muff Hot Box~~ ΔH	T4 ~~SEC/Rev Impinger~~	T5 Meter In	T6 Meter Out
0 14:06:45	4.749								
14:07:00	4.884	x .65	15.0	362	194	.15	33.9	101	97
10 14:17:00	6.801		16.0	365	200	.10		101	99
14:17:00	6.801	x .60	16.0	368	204	.10	35.3	102	99
20 14:27:00	8.485		17.0	368	194	.10		101	99
14:27:00	8.485	x .45	17.0	375	200	.10	41	101	99
30 14:37:00	10.032		16.1	374	204	.10		102	99
14:37:00	10.032	x .55	16.2	375	195	.10	37.1	101	99
40 14:47:00	11.535		17.9	362	197	.10		102	99
14:47:13	11.563								

Comments leak check OK at 16.5" Hg
10 minute Traverse
all post checks OK

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____ Time _____

Date MRY-D5-ESPin-OH2

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	607.94	662.0	
BUBBLER	KCl	755.70	759.3	
IMPINGER	KCl	708.18	708.1	
BUBBLER	H_2O_2/HNO_3	633.59	635.3	
BUBBLER	$KMnO_4/H_2SO_4$	649.75	650.3	
BUBBLER	$KMnO_4/H_2SO_4$	639.87	639.6	
IMPINGER	$KMnO_4/H_2SO_4$	630.03	629.8	
BUBBLER	SILICA GEL	874.1	880.7	
			Total H_2O (g)	
FILTER		0.20519	2.33209	
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

$$\% \text{ Efficiency} = \frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$$ _____ %

$ACFM = V_s * \text{Pipe Area } (ft^2)$ _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

DATE 05/19/98
RUN # MRY-D2-ST-OH2
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 14:45 OPERATORS Heidt/ Dunham
SAMPLE PORT stack TRAVERSE POINT 92"-47"-17"

Pb (BAROMETRIC PRESSURE) 28.08 in. Hg

Ps (STACK PRESSURE) = Pb +/- (-1 in. H2O / 13.6)= 28.01 in. Hg

Ts (STACK TEMP) = 272 F +460F = 732 R

^P (PITOT)= 1.137 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.19 in APPROX % H2O = 17

^H@ = 1.5 in H2O Cm = 1

Vs(STACK VELOCITY) = 4358 ft/min Tm (METER TEMP) = 85

Qn (NOZZLE FLOWRATE) = 08580 ACFM ^H ASSUMED = 0.5

Qm (METER FLOW RATE) = 05281 ACFM

^H (ORIFICE)= 0.68 in H2O

SECOND/REV = 11.4

TIME = 60 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 31.696 CF

GAS METER VOL = 31.696 CF

AVERAGE ^ H = 1.55

METER TEMP = 83

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
1.554	85.2	81.7

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	744.5	854.0	109.5
BUBBLER	KCl	614.6	626.9	12.3
IMPINGER	KCl	731.4	732.3	0.9
BUBBLER	H2O2	703.7	705.1	1.4
BUBBLER	KMnO4	701.6	702.1	0.5
BUBBLER	KMnO4	703.0	703.1	0.2
IMPINGER	KMnO4	638.3	638.3	0.0
BUBBLER	SILICA GEL	848.3	858.3	10.0
				0.0
				0.0
		TOTAL H2O		134.7
FILTER		0.21064	0.21010	0.00001
		TOTAL DUST		0.00001

VwSTD = 6.353 SCF

VmC = 31.696 ACF

VmSTD = 29.122 SCF

VtSTD = 35.475 SCF

%H2O = 17.9 %H2O

QnSTD = 0.581 SCFM

% ISO = 101.7 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0000 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

Date_____ Time_____
MRY-D2-ST-OH2

DATE: 5/19/98 START TIME: 1445

RUN NUMBER: _____

SAMPLING SUMMARY

TOTAL SAMPLING TIME 60.0 MINUTES

MAXIMUM SYSTEM VACUUM 4.6 in Hg

AVERAGE STACK TEMPERATURE 272.40 °F

AVERAGE VELOCITY HEAD ΔP 1.137 in H_2O

AVERAGE STACK VELOCITY 73.43 FT/SEC

AVERAGE ORRIFICE PERSSURE ΔH 1.554 in H_2O

TOTAL VOLUME SAMPLED 31.696 FT^3

AVERAGE DGM INLET 85.22 °F

AVERAGE DGM OUTLET 81.71 °F

AVERAGE DGM TEMPERATURE ~~83.46~~ 83.46 °F

FILTER TEMPERATURE NA (527.42) °F

LAST IMPINGER TEMPERATURE NA (527.58) F

METER PRESSURE Pm 28.067 in Hg

STACK PRESSURE Ps 27.95 in Hg

AREA OF NOZZLE 0.0284 IN^2

AVG SQRT ΔP 1.065

MOLECULAR WEIGHT 28.41

MOISTURE CONTENT 0.170

VmSTD = 28.809 SCF

% ISOKINETIC 99.04

DUST LOADING DATA SHEET

DATE _____
RUN # _____
FUND # _____
COST CENTER # _____

Time at Start 1445 Operators _____

Sample Pt. Stack Traverse Pt. 92"-47"-17" Date _____ Time _____
MRY-D2-ST-OH2

P_b (Barometric Pressure) = 28.08 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (-1 in. H_2O/13.6) = 28.01 in. Hg

T_s (Stack Temperature) = 272 °F + 460 = 732 °R

ΔP(Pitot) = 1.137 in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = 0.19 in Approx % H_2O 17

$\Delta H@$ = 1.5 C_m = 1.0

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 4358 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = 0.8580 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = 0.5184 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = 0.67 in H_2O

Second/Rev = 11.6 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	T4 Impinger	T5 Meter In	T6 Meter Out

Comments _____

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____
Run _____ Date _____ Time _____
Fund # MRY-D2-ST-OH2
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	744.53	854.0	109.~~9~~5
BUBBLER	KCl	614.56	626.91	12.4
IMPINGER	KCl	731.40	732.30	0.9
BUBBLER	H_2O_2/HNO_3	703.73	705.09	1.4
BUBBLER	$KMnO_4/H_2SO_4$	701.60	702.09	0.5
BUBBLER	$KMnO_4/H_2SO_4$	702.95	703.12	0.1
IMPINGER	$KMnO_4/H_2SO_4$	638.28	638.28	0
BUBBLER	SILICA GEL	848.3	858.3	10.0
			Total H_2O (g)	134.8
FILTER		0.21064	0.21010	0.00001
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ — 6.356 SCF

$V_m Corrected = V_m * C_m$ — 31.696 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 29.122 SCF

$V_t std = V_w std + V_m std$ — 35.477 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 17.9 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.581 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 101.7 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 0.0000 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL - Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area (ft}^2)$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/22/98
RUN # NRY-D5-FGDin-OH3
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 18:07 OPERATORS SAUER / RISKE
SAMPLE PORT FGD INLET TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 27.96 in. Hg

Ps (STACK PRESSURE) = Pb +/- (2.9 in. H2O / 13.6)= 28.17 in. Hg

Ts (STACK TEMP) = 371 F +460F = 831 R

^P (PITOT)= 0.741 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.195 in APPROX % H2O = 13

^H@ = 1.76 in H2O Cm = 0.96

Vs(STACK VELOCITY) = 3737 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.7750 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.3918 ACFM

^H (ORIFICE)= 0.52 in H2O

SECOND/REV = 15.3

TIME = 40 min

INITIAL GAS METER = 702.933 CF

FINAL GAS METER = 722.366 CF

GAS METER VOL = 19.433 CF

AVERAGE ^ H = 0.56

METER TEMP = 93

^H	T5	T6
in H20	METER IN	METER OUT
0.45	87	88
0.58	89	86
0.6	93	87
0.55	96	87
0.56	98	89
0.57	100	90
0.57	101	91
0.56	102	92
0.6	102	93

TRACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	649.3	691.8	42.5
BUBBLER	KCl	740.9	749.7	8.8
IMPINGER	KCl	608.7	609.9	1.2
BUBBLER	H2O2	651.4	652.4	1.0
BUBBLER	KMnO4	723.8	724.2	0.4
BUBBLER	KMnO4	595.3	594.9	-0.4
IMPINGER	KMnO4	743.8	743.8	0.0
BUBBLER	SILICA GEL	868.6	871.8	3.2
				0.0
				0.0
		TOTAL H2O		56.7
FILTER		0.21164	0.21366	0.00202
		TOTAL DUST		0.00202

VwSTD = 2.672 SCF

VmC = 18.656 ACF

VmSTD = 16.734 SCF

VtSTD = 19.406 SCF

%H2O = 13.8 %H2O

QnSTD = 0.465 SCFM

% ISO = 104.3 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0016 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

Date 1-22-98 Time ____

DATE MRY-D5-FGDin-OH3

RUN # ____

FUND # ____

COST CENTER # ____

Time at Start 1807 Operators Randy S ; Buster

Sample Pt. 2nd FGD inlet - side Traverse Pt. Second filter with Muff

P_b (Barometric Pressure) = 27.96 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (2.9 in. H_2O/13.6) = 28.17 in. Hg

T_s (Stack Temperature) = 371 °F + 460 = 831 °R

ΔP(Pitot) = ____ in H_2O ____ Type S C_p = .84 ____ Standard

D_n (Nozzle Size) = .195 in Approx % H_2O 13

$\Delta H@$ = 1.76 C_n = .96

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3363 ft/min

PT	STATIC	P,tot
4	3.0	.8
4	2.9	.8
1	2.9	.6

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = .16974 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_n T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = .14187 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = .50 in H_2O

ΔH = .5 START

4 – most of probe is out of stack
1 – most of probe in stack

Second/Rev = 143 %CO_2 ____ %O_2 ____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft³) 702.933	~~ΔH (in H_2O)~~ ΔP	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	~~Et~~ ΔH ~~Impinger~~	T5 Meter In	T6 Meter Out	PT	Rev/6
89 0	702.933	.6	2.2	371	219	212	.45	86.8	88.0	1	14.
91 5	705.213	.6	2.7	X	219	216	.58	89.2	86.2		
91 10	707.788	.7	3.0	376	219	218	.60	92.9	86.8	2	
91 15	710.260	.8	2.5	X	220	220	.55	95.9	87.4	3	13.2
91 20	712.673	.8	2.5	376	220	218	.56	97.7	88.6	4	12.7
191 25	715.090	.8	2.5	X	219	218	.57	99.6	89.8	5	
191 30	717.528	.8	2.5	374	219	218	.57	100.8	91.1	6	
191 35	719.937	.8	2.5	X	219	209	.56	101.5	91.7	7	
191 40	722.366	.8	2.5	375	220	218	.6	102.0	92.9	8	

Comments Look checked okay

Sample Pt. _____ Date _____ Time _____

Train Type : **ONTARIO-HYDRO METHOD**

Date MRY-D5-FGDin-OH 3
Run _____
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	649.3	691.8	42.5
BUBBLER	KCl	740.9	749.7	8.8
IMPINGER	KCl	608.7	609.9	1.2
BUBBLER	H_2O_2/HNO_3	651.4	652.3	1.0
BUBBLER	$KMnO_4/H_2SO_4$	723.8	724.2	0.4
BUBBLER	$KMnO_4/H_2SO_4$	595.3	594.9	-0.4
IMPINGER	$KMnO_4/H_2SO_4$	743.8	743.8	0.0
BUBBLER	SILICA GEL	868.6	871.8	3.2
			Total H_2O (g)	56.7
FILTER		0.21164	.21366	0.00202
			Total Dust (g)	0.00202

$V_w std = 0.0474 * (H_2O\ g)$ — 2.672 SCF

$V_m Corrected = V_m * C_m$ — 18.6656 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 16.734 SCF

$V_t std = V_w std + V_m std$ — 19.406 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 13.8 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.465 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 104.3 %

DUST LOADING CALCULATIONS (Concentration Basis)

$DCL = 15.432\ (dust\ g) / V_t std$ — 0.0016 grains/scf

$\%\ Efficiency = \frac{(Inlet\ DCL - Outlet\ DCL) * 100}{Inlet\ DCL}$ — _____ %

$ACFM = V_s * Pipe\ Area\ (ft^2)$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

$lbs/hour = grains / scf * 0.000143 * SCFM * 60$ — _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-FGDout-OH1
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 09:05 OPERATORS GLENN / RANDY L.
SAMPLE PORT FGD OUTLET TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 28.12 in. Hg

Ps (STACK PRESSURE) = Pb +/- (4 in. H2O / 13.6)= 28.41 in. Hg

Ts (STACK TEMP) = 140 F +460F = 600 R

^P (PITOT)= 0.645 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA)= 0.125 in APPROX % H2O = 18

^H@ = 1.45 in H2O Cm = 1

Vs(STACK VELOCITY) = 2950 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.2514 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.1597 ACFM

^H (ORIFICE)= 0.07 in H2O

SECOND/REV = 37.6

TIME = 120 min

INITIAL GAS METER = 263.687 CF

FINAL GAS METER = 286.724 CF

GAS METER VOL = 23.037 CF

AVERAGE ^ H = 0.09

METER TEMP = 65

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
0.09	67	63

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	715.3	811.9	96.6
BUBBLER	KCl	606.8	609.9	3.1
IMPINGER	KCl	720.2	720.3	0.1
BUBBLER	H2O2	704.5	705.1	0.6
BUBBLER	KMnO4	725.7	725.7	-0.0
BUBBLER	KMnO4	705.1	704.4	-0.6
IMPINGER	KMnO4	703.6	703.7	0.1
BUBBLER	SILICA GEL	863.6	868.3	4.7
		TOTAL H2O		104.4
FILTER		0.20702	0.20847	0.00145
		TOTAL DUST		0.00145

VwSTD = 4.923 SCF

VmC = 23.037 ACF

VmSTD = 21.858 SCF

VtSTD = 26.781 SCF

%H2O = 18.4 %H2O

QnSTD = 0.211 SCFM

% ISO = 105.8 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0008 grains/SCF

INLET DCL = _____ grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET

Date 5/28/98 Time 0905

DATE MRY-D5-FGDout-OH1

RUN #

FUND #

COST CENTER #

Time at Start 09:05 Operators Glen - RANDY

Sample Pt. 5-FGD Out-1 Traverse Pt.

P_b (Barometric Pressure) = 28.12 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (+ 4 in. H_2O/13.6) = 28.41 in. Hg

T_s (Stack Temperature) = 140 °F + 460 = 600 °R

ΔP(Pitot) = 77.645 in H_2O Type S C_p = .84 Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 18

ΔH@ = 1.45 C_n = 1.00

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = 3223 ft/min

Q_a (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = 0.2747 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_a T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = 0.2046 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = 0.10 in H_2O

Second/Rev = 29.3 %CO_2 %O_2

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O) .09	Pump Vacuum (in Hg)	T1 ΔP Stack	T2 Probe	T3 Muff/ Heat Box	T4 Impinger	T5 Meter In	T6 Meter Out
0	263.687	.06	.5	.47	229	348	137	56	56
10	265.361	.06	.6	.47	234	348	137	59	56
20	267.090	.07	.8	.52	241	345	137	61	57
30	268.836	.07	1.0	.55	244	346	136	63	59
40	270.672	.08	1.1	.59	235	348	136	66	61
50	272.548	.08	1.3	.63	231	348	136	67	63
60	274.444	.09	1.6	.67	229	347	136	68	64
70	276.378	.09	1.7	.70	227	348	136	69	65
80	278.347	.09	1.8	.72	233	359	136	70	65

Comments Leak checked okay Inches are From the Flange

Date _____ Time _____

MRY-D5-FGDout-OH1

DUST LOADING DATA SHEET

DATE _____

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start _____ Operators _____

Sample Pt. _____ Traverse Pt. _____

P_b (Barometric Pressure) = _____ in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (_____ in. H_2O/13.6) = [ ] in. Hg

T_s (Stack Temperature) = _____ °F + 460 = [ ] °R

ΔP(Pitot) = _____ in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = _____ in Approx % H_2O _____

$\Delta H@$ = _____ C_m = _____

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = _____ ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n\, T_m\, P_s}{C_m\, T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = _____ ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = _____ in H_2O

Second/Rev = _____ $\%CO_2$ _____ $\%O_2$ _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 ΔP ~~Stack~~	T2 Probe	T3 Muff/ ~~Hot Box~~	T4 Impinger	T5 Meter In	T6 Meter Out
7	90	280.410	.10	1.9	.74	229	344	137	71	66
23	100	282.475	.10	2.0	.77	224	341	137	72	67
18	110	284.597	.11	2.0	.81	223	344	137	71	67
14	120	286.724	.11	2.1	.82	223	349	136	72	68
									67	13

Comments _____

Date _____ Time _____

MRY-D[illegible]FGDout-OH1

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	715.34	811.9	96.6
BUBBLER	KCl	606.84	609.9	3.1
IMPINGER	KCl	720.22	720.3	0.1
BUBBLER	H_2O_2/HNO_3	704.50	705.1	0.6
BUBBLER	$KMnO_4/H_2SO_4$	725.73	725.7	-0.0
BUBBLER	$KMnO_4/H_2SO_4$	705.05	704.4	-0.6
IMPINGER	$KMnO_4/H_2SO_4$	703.60	703.7	0.1
BUBBLER	SILICA GEL	863.6	~~869.0~~ 868.3	4.7
			Total H_2O (g)	104.4
FILTER		0.20702	0.20847	0.00145
			Total Dust (g)	0.00145

$V_w std = 0.0474 * (H_2O\ g)$ — 4.923 SCF

$V_m Corrected = V_m * C_m$ — 23.037 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 21.858 SCF

$V_t std = V_w std + V_m std$ — 26.781 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 18.4 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.211 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 105.8 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 0.0008 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area } (ft^2)$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-FGDout-OH2
FUND# 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 13:11 OPERATORS GLENN / RANDY L.
SAMPLE PORT FGD OUTLET TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 28.12 in. Hg

Ps (STACK PRESSURE) = Pb +/- (4 in. H2O / 13.6)= 28.41 in. Hg

Ts (STACK TEMP) = 137 F +460F = 597 R

^P (PITOT)= 0.649 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.125 in APPROX % H2O = 18

^H@ = 1.45 in H2O Cm = 1

Vs(STACK VELOCITY) = 2952 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 0.2516 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 0.1606 ACFM

^H (ORIFICE)= 0.07 in H2O

SECOND/REV = 37.4

TIME = 120 min

INITIAL GAS METER = 288.443 CF

FINAL GAS METER = 309.723 CF

GAS METER VOL = 21.28 CF

AVERAGE ^ H = 0.09

METER TEMP = 70

^H	T5	T6
in H20	METER IN	METER OUT
0.09	72	68

TRACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	715.3	810.5	95.2
BUBBLER	KCl	712.2	715.6	3.4
IMPINGER	KCl	703.8	704.3	0.5
BUBBLER	H2O2	692.1	693.2	1.1
BUBBLER	KMnO4	746.6	746.8	0.2
BUBBLER	KMnO4	658.4	657.9	-0.5
IMPINGER	KMnO4	615.6	615.3	-0.3
BUBBLER	SILICA GEL	965.3	971.2	5.9
				0.0
				0.0
		TOTAL H2O		105.4
FILTER		0.21194	0.21394	0.00200
		TOTAL DUST		0.00200

VwSTD = 4.972 SCF

VmC = 21.280 ACF

VmSTD = 20.000 SCF

VtSTD = 24.972 SCF

%H2O = 19.9 %H2O

QnSTD = 0.212 SCFM

% ISO = 98.1 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0012 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

DUST LOADING DATA SHEET 2-3

Date _____ Time _____

MRY-D5-FGDout-OH2

DATE _____

RUN # 5/22/98

FUND # _____

COST CENTER # _____

Time at Start 13:11 Operators Galen - Randy

Sample Pt. FGDout-2 Traverse Pt. _____

P_s (Barometric Pressure) = 28.12 in. Hg

P_g (Stack Ptessure) = $P_s \pm$ (+ 4 in. H_2O/13.6) = 28.41 in. Hg

T_s (Stack Temperature) = 137 °F + 460 = 597 °R

ΔP(Pitot) = .50 in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .125 in Approx % H_2O 18

$\Delta H@$ = 1.45 C_n = 1.00

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 2591 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = 0.2208 ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_s + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = 0.1653 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_s + \Delta H/13.6)}{0.03175\, T_m}$ = 0.07 in H_2O

Second/Rev = 36.3 $\%CO_2$ _____ $\%O_2$ _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O) .09	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hotbox	T4 Impinger	T5 Meter In 72	T6 Meter Out 68
Start	286.802	.07	1.8	.47	219	350	138	64	64
10	288.443	.07	2.0	.47	223	355	138	67	64
20	290.149	.07	2.1	.53	226	347	137	69	65
30	291.900	.07	2.1	.55	229	352	137	71	67
40	293.739	.08	2.2	.59	227	348	137	72	68
50	295.580	.08	2.3	.64	224	342	137	73	69
60	297.496	.09	2.4	.68	224	353	137	73	69
70	299.437	.09	2.4	.70	220	341	137	74	70
80	301.417	.09	2.5	.72	221	354	137	74	70

Inches: 91, 76, 66, 58, 50, 44, 38, 32

Comments Leak checked okay Inches are from flange in

DUST LOADING DATA SHEET

Date_____ Time_____

DATE MRY-D5-FGDout-OH2

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start _____ Operators _____

Sample Pt._____ Traverse Pt._____

P_b (Barometric Pressure) = _____ in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (_____ in. H_2O/13.6) = _____ in. Hg

T_s (Stack Temperature) = _____ °F + 460 = _____ °R

ΔP(Pitot) = _____ in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = _____ in Approx % H_2O _____

ΔH@ = _____ C_m = _____

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = _____ ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = _____ ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H @ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = _____ in H_2O

Second/Rev = _____ $\%CO_2$_____ $\%O_2$_____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 ΔP Stack	T2 Probe	T3 Muff/ Heat[illegible]x	T4 Impinger	T5 Meter In	T6 Meter Out
27	90	303.429	.10	2.5	.76	218	342	137	74	70
23	100	305.478	.10	2.5	.77	219	342	135	73	69
8	110	307.604	.11	2.6	.81	218	348	135	74	70
7	120	309.723	.11	2.7	.82	219	346	134	74	69

Comments_____

Date _____ Time _____

Sample Pt. MRY-D5-FGDout-OH2

Train Type : **ONTARIO-HYDRO METHOD**

Date _____ Time _____

~~MRY-D5-AHin-OH2~~

Date _____

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	715.30	810.5	95.2
BUBBLER	KCl	712.19	715.6	3.4
IMPINGER	KCl	703.81	704.3	0.5
BUBBLER	H_2O_2/HNO_3	692.09	693.2	1.1
BUBBLER	$KMnO_4/H_2SO_4$	746.63	746.8	0.2
BUBBLER	$KMnO_4/H_2SO_4$	658.40	657.9	-0.5
IMPINGER	$KMnO_4/H_2SO_4$	615.63	615.3	-0.3
BUBBLER	SILICA GEL	965.3	971.2	5.9
			Total H_2O (g)	105.4
FILTER		~~0.21293~~		
		0.21194	.21394	0.00200
			Total Dust (g)	0.00200

$V_w std = 0.0474 * (H_2O\ g)$ — 4.972 SCF

$V_m Corrected = V_m * C_m$ — 21.280 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 20.000 SCF

$V_t std = V_w std + V_m std$ — 24.972 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 19.9 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.212 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 98.1 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 0.0012 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area (ft}^2)$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-FGDout-OH3
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 17:06 OPERATORS GLENN / RANDY L.
SAMPLE PORT FGD OUTLET TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 27.96 in. Hg

Ps (STACK PRESSURE) = Pb +/- (4 in. H2O / 13.6)= 28.25 in. Hg

Ts (STACK TEMP) = 137 F +460F = 597 R

^P (PITOT)= 0.637 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.1125 in APPROX % H2O = 18

^H@ = 1.45 in H2O Cm = 1

Vs(STACK VELOCITY) = 2933 ft/min Tm (METER TEMP) =

Qn (NOZZLE FLOWRATE) = 02024 ACFM ^H ASSUMED =

Qm (METER FLOW RATE) = 01292 ACFM

^H (ORIFICE)= 0.05 in H2O

SECOND/REV = 46.4

TIME = 120 min

INITIAL GAS METER = 311.457 CF

FINAL GAS METER = 332.354 CF

GAS METER VOL = 20.897 CF

AVERAGE ^ H = 0.08

METER TEMP = 72

^H	T5	T6
in H20	METER IN	METER OUT
0.08	74	70

TRACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	719.5	808.1	88.6
BUBBLER	KCl	719.2	722.4	3.2
IMPINGER	KCl	707.4	707.7	0.3
BUBBLER	H2O2	721.9	722.1	0.2
BUBBLER	KMnO4	708.0	708.3	0.3
BUBBLER	KMnO4	709.0	708.4	-0.6
IMPINGER	KMnO4	631.9	632.0	0.1
BUBBLER	SILICA GEL	982.1	987.6	5.5
				0.0
				0.0
		TOTAL H2O		97.6
FILTER		0.20976	0.21424	0.00448
		TOTAL DUST		0.00448

VwSTD = 4.602 SCF

VmC = 20.897 ACF

VmSTD = 19.454 SCF

VtSTD = 24.056 SCF

%H2O = 19.1 %H2O

QnSTD = 0.170 SCFM

% ISO = 118.2 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0029 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

Date 3/22/98 Time _____

DUST LOADING DATA SHEET

DATE MRY-D5-FGDout-OH3
RUN # _____
FUND # _____
COST CENTER # _____

Time at Start 1706 Operators Glen-Randy

Sample Pt. FGD out Traverse Pt. _____

P_b (Barometric Pressure) = 27.96 in. Hg

P_s (Stack Ptessure) = P_b ± (+4 in. H_2O/13.6) = 28.25 in. Hg

T_s (Stack Temperature) = 137 °R + 460 = 597 °R

ΔP(Pitot) = .5 .637 in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = .1125 in Approx % H_2O 18

ΔH@ = 1.45 C_m = 1.00

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = 2598 ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = 0.2214 ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\% H_2O}{100}\right)$ = 0.1657 ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = 0.07 in H_2O

Second/Rev = 36.2 %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft³) 309.795	Δ H (in H_2O) .08	Pump Vacuum (in Hg)	T1 ΔP ~~Stack~~	T2 Probe	T3 Muff/ ~~Hot Box~~	T4 Impinger	T5 Meter In 74	T6 Meter Out 70
Start	~~[illegible]~~	.07	1.8	.48	229	343	138	67	67
10	311.457	.07	1.9	.48	234	341	137	69	66
20	313.138	.07	2.0	.51	242	349	137	70	67
30	314.878	.07	2.1	.54	243	352	136	72	68
40	316.674	.07	2.1	.57	244	345	~~123~~ 135	73	69
50	318.458	.08	2.1	.60	244	342	~~130~~ 135	74	71
60	320.316	.08	2.2	.64	239	354	137	75	71
70	322.341	.09	2.2	.69	241	341	136	75	71
80	324.212	.09	2.3	.71	243	352	136	76	71

Comments Leak checked okay. inches are from the flange, taken from the ~~Con~~ Back to ~~Fen~~ ding at the Side

DUST LOADING DATA SHEET

DATE ~~Dy 5 - Allm 3~~
RUN # _____ ~~Date~~ _____ ~~Time~~ _____
FUND # _____
COST CENTER # ~~MRY-D5-FGDout-OH3~~

Time at Start _____ Operators _____

Sample Pt. _____ Traverse Pt. _____

P_b (Barometric Pressure) = 27.96 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (_____ in. H_2O/13.6) = [ ] in. Hg

T_s (Stack Temperature) = _____ °F + 460 = [ ] °R

ΔP(Pitot) = _____ in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = _____ in Approx % H_2O _____

$\Delta H@$ = _____ C_m = _____

V_s (Stack Velocity) = $951.6\, C_p \sqrt{\frac{T_s\, \Delta P}{P_s}}$ = _____ ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n\, T_m\, P_s}{C_m\, T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\% H_2O}{100}\right)$ = _____ ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\, T_m}$ = _____ in H_2O

Second/Rev = _____ %CO_2 _____ %O_2 _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

	Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 ΔP ~~Stack~~	T2 Probe	T3 Muff/ ~~HotBox~~	T4 Impinger	T5 Meter In	T6 Meter Out
27	90	326.203	.10	2.3	.75	243	343	136	76	71
23	100	328.240	.10	2.4	.77	242	344	136	76	72
18	110	330.285	.11	2.4	.81	245	354	136	76	71
14	120	332.354	.10	2.5	.80	251	339	135	77	72

Comments _____

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date _____ Time _____

Date MRY-D5-FGDout-OH3

Run _____

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	719.5	708.1	88.6
BUBBLER	KCl	719.2	722.4	3.2
IMPINGER	KCl	707.4	707.7	0.3
BUBBLER	H_2O_2/HNO_3	721.9	722.1	0.2
BUBBLER	$KMnO_4/H_2SO_4$	708.0	708.3	0.3
BUBBLER	$KMnO_4/H_2SO_4$	709.0	708.4	-0.6
IMPINGER	$KMnO_4/H_2SO_4$	631.9	632.0	0.1
BUBBLER	SILICA GEL	982.1	987.6	5.5
			Total H_2O (g)	97.6
FILTER		0.2~~13~~43		
RB		.2~~1~~64	.2~~1~~66	
RB		.20976	.21424	0.00448
having problems with Filter holder!			Total Dust (g)	0.00448

$V_wstd = 0.0474 * (H_2O\ g)$ — 4.602 SCF

$V_mCorrected = V_m * C_m$ — 20.897 ACF

$V_mstd = \frac{17.71\ V_mC\ (P_b + \Delta H/13.6)}{T_m}$ — 19.454 SCF

$V_tstd = V_wstd + V_mstd$ — 24.056 SCF

$\%H_2O = (V_wstd / V_tstd) * 100$ — 19.1 $\%H_2O$

$Q_nstd = 17.71\ Q_n\ P_s / T_s$ — 0.170 SCFM

% Isokinetic = $V_tstd / (Q_nstd * Time)$ — 118.2 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / V_tstd — 0.0029 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area (ft}^2)$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-ST-OH1
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 08:21 OPERATORS HEIDT/ DUNHAM
SAMPLE PORT STACK TRAVERSE POINT 17"-47"-92"

Pb (BAROMETRIC PRESSURE) 27.94 in. Hg

Ps (STACK PRESSURE) = Pb +/- (____ in. H2O / 13.6)= 27.76 in. Hg

Ts (STACK TEMP) = 297 F +460F = 757 R

^P (PITOT)= 1.238 in. H20 0.84 TYPE S Cp = .84 ____ STANDARD

Dn (NOZZLE DIA) = 0.19 in APPROX % H2O = 17

^H@ = 1.5 in H2O Cm = 1

Vs(STACK VELOCITY) = 4644 ft/min Tm (METER TEMP) = 85

Qn (NOZZLE FLOWRATE) = 0.9145 ACFM ^H ASSUMED = 0.5

Qm (METER FLOW RATE) = 0.5422 ACFM

^H (ORIFICE)= 0.71 in H2O

SECOND/REV = 11.1

TIME = 60 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 33.659 CF

GAS METER VOL = 33.659 CF

AVERAGE ^ H = 1.63

METER TEMP = 86

^H	T5	T6
in H20	METER IN	METER OUT
1.632	86	85

TRACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	651.8	756.1	104.3
BUBBLER	KCl	611.9	628.5	16.5
IMPINGER	KCl	758.0	760.0	1.9
BUBBLER	H2O2	592.2	593.5	1.3
BUBBLER	KMnO4	751.8	751.9	0.2
BUBBLER	KMnO4	707.2	706.4	-0.8
IMPINGER	KMnO4	735.9	735.6	-0.3
BUBBLER	SILICA GEL	970.4	978.2	7.8
				0.0
				0.0
		TOTAL H2O		130.9
FILTER		0.20572	0.22469	0.01897
		TOTAL DUST		0.01897

VwSTD = 6.171 SCF

VmC = 33.659 ACF

VmSTD = 30.663 SCF

VtSTD = 36.834 SCF

%H2O = 16.8 %H2O

QnSTD = 0.594 SCFM

% ISO = 103.4 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0079 grains/SCF

INLET DCL = ____ grains/SCF

%EFF = ERR %

Date _____ Time _____

MRY-DEST-OH1
5

DATE: 5/22/98 START TIME: 0821

RUN NUMBER: _____

SAMPLING SUMMARY

TOTAL SAMPLING TIME 60.0 MINUTES

MAXIMUM SYSTEM VACUUM 5.3 in Hg

AVERAGE STACK TEMPERATURE 296.76 °F

AVERAGE VELOCITY HEAD ΔP 1.238 in H_2O

AVERAGE STACK VELOCITY 78.12 FT/SEC

AVERAGE ORRIFICE PERSSURE ΔH 1.632 in H_2O

TOTAL VOLUME SAMPLED 33.659 FT^3

AVERAGE DGM INLET 86.14 °F

AVERAGE DGM OUTLET 85.47 °F

AVERAGE DGM TEMPERATURE 86.80 °F

FILTER TEMPERATURE NA °F

LAST IMPINGER TEMPERATURE NA °F

METER PRESSURE Pm 27.900 in Hg

STACK PRESSURE Ps 27.76 in Hg

AREA OF NOZZLE 0.0291 IN^2

AVG SQRT ΔP 1.111

MOLECULAR WEIGHT 28.41

MOISTURE CONTENT 0.170

VmSTD = 30.279 SCF

% ISOKINETIC 99.15

DUST LOADING DATA SHEET

DATE MRY-DEST-OH1
RUN #
FUND #
COST CENTER #

Time at Start 0821 Operators

Sample Pt. Stack Traverse Pt. 17" - 47" - 92" 5 min/point : 4 ports

P_b (Barometric Pressure) = 27.94 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (_____ in. H_2O/13.6) = _____ in. Hg

T_s (Stack Temperature) = _____ °F + 460 = _____ °R

ΔP(Pitot) = _____ in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = _____ in Approx % H_2O _____

$\Delta H@$ = _____ C_n = _____

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = _____ ft/min

Q_a (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ ACFM

Q_m(Meter Flow Rate) = $\frac{Q_a T_m P_s}{C_m T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = _____ ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = _____ in H_2O

Second/Rev = _____ $\%CO_2$ _____ $\%O_2$ _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	T4 Impinger	T5 Meter In	T6 Meter Out

Comments

Date _____ Time _____

MRY-D4-ST-OH1

Sample Pt. _____

Date 5

Run _____

Train Type : **ONTARIO-HYDRO METHOD**

Fund # _____

Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	651.84	756.13	104.3
BUBBLER	KCl	611.92	628.47	16.55
IMPINGER	KCl	758.03	759.97	1.9
BUBBLER	H_2O_2/HNO_3	592.20	593.54	1.3
BUBBLER	$KMnO_4/H_2SO_4$	751.75	751.90	0.2
BUBBLER	$KMnO_4/H_2SO_4$	707.21	706.38	-0.8
IMPINGER	$KMnO_4/H_2SO_4$	735.94	735.59	-0.3
BUBBLER	SILICA GEL	970.4	978.2	7.8
			Total H_2O (g)	130.9
FILTER		0.20572	.22469	0.01897
			Total Dust (g)	0.01897

$V_wstd = 0.0474 * (H_2O\ g)$ — 6.171 SCF

$V_mCorrected = V_m * C_m$ — 33.659 ACF

$V_mstd = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 30.663 SCF

$V_tstd = V_wstd + V_mstd$ — 36.834 SCF

$\%H_2O = (V_wstd / V_tstd) * 100$ — 16.8 $\%H_2O$

$Q_nstd = 17.71\ Q_n\ P_s / T_s$ — 0.594 SCFM

% Isokinetic = $V_tstd / (Q_nstd * Time)$ — 103.4 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / V_tstd — 0.0079 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL - Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area (ft}^2\text{)}$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-ST-OH2
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 12:27 OPERATORS HEIDT / DUNHAM
SAMPLE PORT TRAVERSE POINT 17"-47"-92"

Pb (BAROMETRIC PRESSURE) 27.94 in. Hg

Ps (STACK PRESSURE) = Pb +/- (in. H2O / 13.6)= 27.74 in. Hg

Ts (STACK TEMP) = 299.79 F +460F = 759.79 R

^P (PITOT)= 1.269 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.19 in APPROX % H2O = 17

^H@ = 1.5 in H2O Cm = 1

Vs(STACK VELOCITY) = 4713 ft/min Tm (METER TEMP) = 85

Qn (NOZZLE FLOWRATE) = 0.9279 ACFM ^H ASSUMED = 0.5

Qm (METER FLOW RATE) = 0.5478 ACFM

^H (ORIFICE)= 0.73 in H2O

SECOND/REV = 11.0

TIME = 60 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 33.436 CF

GAS METER VOL = 33.436 CF

AVERAGE ^ H = 1.63

METER TEMP = 92

^H	T5	T6
in H20	METER IN	METER OUT
1.63	93.04	90.62

TRACE ELEMENTS

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	677.1	781.2	104.1
BUBBLER	KCl	625.3	641.3	16.0
IMPINGER	KCl	735.7	737.4	1.7
BUBBLER	H2O2	602.2	602.7	0.5
BUBBLER	KMnO4	599.4	600.5	1.1
BUBBLER	KMnO4	706.7	706.8	0.1
IMPINGER	KMnO4	718.8	718.7	-0.1
BUBBLER	SILICA GEL	928.9	939.2	10.3
				0.0
				0.0
		TOTAL H2O		133.7
FILTER		0.21525	0.22007	0.00482
		TOTAL DUST		0.00482

VwSTD = 6.304 SCF

VmC = 33.436 ACF

VmSTD = 30.110 SCF

VtSTD = 36.414 SCF

%H2O = 17.3 %H2O

QnSTD = 0.600 SCFM

% ISO = 101.2 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0020 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

Date_____ Time_____

MRY-D5-ST-OH2

DATE: 5/21/98 START TIME: 1227

RUN NUMBER: _____

SAMPLING SUMMARY

TOTAL SAMPLING TIME 60.0 MINUTES

MAXIMUM SYSTEM VACUUM 5.9 in Hg

AVERAGE STACK TEMPERATURE 299.79 °F

AVERAGE VELOCITY HEAD ΔP 1.269 in H_2O

AVERAGE STACK VELOCITY 79.28 FT/SEC

AVERAGE ORRIFICE PERSSURE ΔH 1.630 in H_2O

TOTAL VOLUME SAMPLED 33.436 FT^3

AVERAGE DGM INLET 93.04 °F

AVERAGE DGM OUTLET 90.62 °F

AVERAGE DGM TEMPERATURE 91.83 °F

FILTER TEMPERATURE NA °F

LAST IMPINGER TEMPERATURE NA °F

METER PRESSURE Pm 27.901 in Hg

STACK PRESSURE Ps 27.74 in Hg

AREA OF NOZZLE 0.0284 IN^2

AVG SQRT ΔP 1.125

MOLECULAR WEIGHT 28.41

MOISTURE CONTENT 0.170

VmSTD = 29.851 SCF

% ISOKINETIC 99.34

DUST LOADING DATA SHEET

Date _____ Time _____

MRY-D5-ST-OH

DATE _____

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start 1227 Operators _____

Sample Pt. Stack Traverse Pt. 17" - 47" - 92"

P_b (Barometric Pressure) = 27.94 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (_____ in. H_2O/13.6) = _____ in. Hg

T_s (Stack Temperature) = _____ °R + 460 = _____ °R

ΔP(Pitot) = _____ in H_2O _____ Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = ø.19 in Approx % H_2O _____

$\Delta H@$ = _____ C_m = _____

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s \Delta P}{P_s}}$ = _____ ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ ACFM

Q_m (Meter Flow Rate) = $\frac{Q_n T_m P_s}{C_m T_s (P_b + \Delta H/13.6)} \left(1 - \frac{\%H_2O}{100}\right)$ = _____ ACFM

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = _____ in H_2O

Second/Rev = _____ $\%CO_2$ _____ $\%O_2$ _____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	T4 Impinger	T5 Meter In	T6 Meter Out

Comments _____

Sample Pt. _____ Date _____ Time _____

Train Type : **ONTARIO-HYDRO METHOD**

Date MRY-D5-ST-OH2
Run _____
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	677.13	781.20	104.1
BUBBLER	KCl	625.26	641.30	16.0
IMPINGER	KCl	735.67	737.41	1.7
BUBBLER	H_2O_2/HNO_3	602.18	602.7	0.5
BUBBLER	$KMnO_4/H_2SO_4$	599.43	600.5	1.1
BUBBLER	$KMnO_4/H_2SO_4$	706.72	706.78	0.1
IMPINGER	$KMnO_4/H_2SO_4$	718.82	718.72	-0.1
BUBBLER	SILICA GEL	928.90	939.2	10.3
			Total H_2O (g)	133.7
FILTER		~~0.20519~~		
		0.21525	.22007	0.00482
			Total Dust (g)	0.00482

$V_w std = 0.0474 * (H_2O\ g)$ — 6.304 SCF

$V_m Corrected = V_m * C_m$ — 33.436 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 30.110 SCF

$V_t std = V_w std + V_m std$ — 36.414 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 17.3 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.600 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 101.2 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 0.0020 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

$ACFM = V_s * \text{Pipe Area (ft}^2)$ — _____ ACFM

$SCFM = ACFM * P_s/29.92 * 530/T_s = ACFM * P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

DATE 05/22/98
RUN # MRY-D5-ST-OH3
FUND # 4428/5041
CST CTR #

DUST LOADING DATA SHEET

START TIME 16:22 OPERATORS HEIDDT / DUNHAM
SANPLE PORT STACK TRAVERSE POINT

Pb (BAROMETRIC PRESSURE) 27.96 in. Hg

Ps (STACK PRESSURE) = Pb +/- (in. H2O / 13.6)= 27.73 in. Hg

Ts (STACK TEMP) = 299.72 F +460F = 759.72 R

^P (PITOT)= 1.237 in. H20 0.84 TYPE S Cp = .84 STANDARD

Dn (NOZZLE DIA) = 0.19 in APPROX % H2O = 17

^H@ = 1.5 in H2O Cm = 1

Vs(STACK VELOCITY) = 4653 ft/min Tm (METER TEMP) = 85

Qn (NOZZLE FLOWRATE) = 0.9162 ACFM ^H ASSUMED = 0.5

Qm (METER FLOW RATE) = 0.5403 ACFM

^H (ORIFICE)= 0.71 in H2O

SECOND/REV = 11.1

TIME = 60 min

INITIAL GAS METER = 0 CF

FINAL GAS METER = 33.148 CF

GAS METER VOL = 33.148 CF

AVERAGE ^ H = 1.71

METER TEMP = 95

TRACE ELEMENTS

^H	T5	T6
in H20	METER IN	METER OUT
1.71	95.91	93.65

ONTARIO-HYDRO

STOPPER	SOLUTION	INITIAL WT (g)	FINAL WT(g)	NET
BUBBLER	KCl	666.6	723.3	56.7
BUBBLER	KCl	648.7	707.6	58.9
IMPINGER	KCl	756.6	758.1	1.5
BUBBLER	H2O2	641.9	643.3	1.4
BUBBLER	KMnO4	633.1	633.5	0.4
BUBBLER	KMnO4	637.7	637.4	-0.3
IMPINGER	KMnO4	718.9	718.8	-0.1
BUBBLER	SILICA GEL	864.0	869.9	5.9
				0.0
				0.0
		TOTAL H2O		124.4
FILTER		0.21128	0.22079	0.00951
		TOTAL DUST		0.00951

VwSTD = 5.865 SCF

VmC = 33.148 ACF

VmSTD = 29.719 SCF

VtSTD = 35.585 SCF

%H2O = 16.5 %H2O

QnSTD = 0.592 SCFM

% ISO = 100.1 %

DUST LOADING CALCULATIONS (CONCENTRATION BASIS)

DCL = 0.0041 grains/SCF

INLET DCL = grains/SCF

%EFF = ERR %

Date_____ Time_____

MRY-D5-ST-OH3

DATE: 5/22/98 START TIME: 16:22

RUN NUMBER: _____

SAMPLING SUMMARY

TOTAL SAMPLING TIME 60.0 MINUTES

MAXIMUM SYSTEM VACUUM 4.3 in Hg

AVERAGE STACK TEMPERATURE 299.72 °F

AVERAGE VELOCITY HEAD ΔP 1.237 in H_2O

AVERAGE STACK VELOCITY 78.27 FT/SEC

AVERAGE ORRIFICE PERSSURE ΔH 1.710 in H_2O

TOTAL VOLUME SAMPLED 33.148 FT^3

AVERAGE DGM INLET 95.91 °F

AVERAGE DGM OUTLET 93.65 °F

AVERAGE DGM TEMPERATURE 94.78 °F

FILTER TEMPERATURE NA °F

LAST IMPINGER TEMPERATURE NA °F

METER PRESSURE Pm 27.896 in Hg

STACK PRESSURE Ps 27.73 in Hg

AREA OF NOZZLE 0.0284 IN^2

AVG SQRT ΔP 1.110

MOLECULAR WEIGHT 28.41

MOISTURE CONTENT 0.170

VmSTD = 29.423 SCF

% ISOKINETIC 99.21

DUST LOADING DATA SHEET

DATE MRY-D5-ST-OH3

RUN # _____

FUND # _____

COST CENTER # _____

Time at Start 1622 Operators _____

Sample Pt._____ Traverse Pt._____

P_b (Barometric Pressure) = 27.96 in. Hg

P_s (Stack Ptessure) = $P_b \pm$ (_____ in. H_2O/13.6) = _____ in. Hg

T_s (Stack Temperature) = _____ °F + 460 = _____ °R

ΔP(Pitot) = _____ in H_2O _____Type S C_p = .84 _____ Standard

D_n (Nozzle Size) = _____ in Approx % H_2O _____

$\Delta H@$ = _____ C_n = _____

V_s (Stack Velocity) = $951.6\ C_p \sqrt{\frac{T_s\ \Delta P}{P_s}}$ = _____ ft/min

Q_n (Nozzle Flow Rate) = $V_s \pi D_n^2 / 576$ = _____ ACFM

Q_m(Meter Flow Rate) = $\frac{Q_n\ T_m\ P_s}{C_m\ T_s (P_b + \Delta H/13.6)}\left(1 - \frac{\%H_2O}{100}\right)$ = _____ ACFM

)

ΔH(Orrifice) = $\frac{Q_m^2 \Delta H@ (P_b + \Delta H/13.6)}{0.03175\ T_m}$ = _____ in H_2O

Second/Rev = _____ $\%CO_2$_____ $\%O_2$_____

Note: Standard Temperature and Pressure are 70° F and 29.92 in Hg

Time (min)	Gas meter (ft^3)	Δ H (in H_2O)	Pump Vacuum (in Hg)	T1 Stack	T2 Probe	T3 Muff/ Hot Box	T4 Impinger	T5 Meter In	T6 Meter Out

Comments_____

Sample Pt. _____ Date _____ Time _____

Train Type : **ONTARIO-HYDRO METHOD**

Date MRY-D5-ST-OH3
Run _____
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	666.6	723.3	56.7
BUBBLER	KCl	648.7	707.6	58.9
IMPINGER	KCl	756.6	758.1	1.5
BUBBLER	H_2O_2/HNO_3	641.9	643.3	1.4
BUBBLER	$KMnO_4/H_2SO_4$	633.1	633.5	0.4
BUBBLER	$KMnO_4/H_2SO_4$	637.7	637.4	-0.3
IMPINGER	$KMnO_4/H_2SO_4$	718.9	718.8	-0.1
BUBBLER	SILICA GEL	864.0	869.9	5.9
			Total H_2O (g)	124.4
FILTER		~~0.21069~~		
KB		.21128	.22079	0.00951
			Total Dust (g)	0.00951

$V_w std = 0.0474 * (H_2O\ g)$ — 5.865 SCF

$V_m Corrected = V_m * C_m$ — 33.148 ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ — 29.719 SCF

$V_t std = V_w std + V_m std$ — 35.585 SCF

$\%H_2O = (V_w std / V_t std) * 100$ — 16.5 $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ — 0.592 SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ — 100.1 %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ — 0.0041 grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL}) * 100}{\text{Inlet DCL}}$ — _____ %

ACFM = V_s * Pipe Area (ft^2) — _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * $P_s/T_s * 17.71$ — _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 — _____ lbs/hour

Final Results

June 29, 1998

Set Number: 49674
Fund#: 4558
PI: Stan Miller
Contact Person: G. Schelkoph

Request Date: Friday, June 05, 1998
Due Date: Friday, June 19, 1998
Set Description: MRY Hg trip-Liquid & Slurry

Sample 49674-01

49674-01 5-19-98 MRY-D2-L21-1 flyash slurry feed B (solid, 101.76g wet, 38.6%M, reported ug/g
Mercury 0.131 µg/g

49674-02 5-19-98 MRY-D2-L21-2 flyash slurry feed B (solid, 89.77g wet, 40.0%M, reported ug/g d
Mercury 0.135 µg/g

49674-03 5-19-98 MRY-D2-L24-1 FGD slurry B (solid, 50.65g wet, 33.2%M, reported ug/g dry)
Mercury 0.134 µg/g

49674-04 5-19-98 MRY-D2-L24-2 FGD slurry B (solid, 41.6g wet, 38.7%M, reported ug/g dry)
Mercury 0.124 µg/g

49674-06 5-22-98 MRY-D4-L18-1lime slurry feed B 8:48A(solid, 67.92g wet, 48.2%M, reported u
Mercury < 0.009 µg/g

49674-07 5-22-98 MRY-D4-L18-2 lime slurry feed B 4:51P(solid, 65.39g wet, 44.6%M, reported u
Mercury < 0.01 µg/g

49674-08 5-22-98 MRY-D4-L24-1FGD slurry A (solid, 47.2g wet, 46.8%M, reported ug/g dry)
Mercury 0.0868 µg/g

49674-09 5-22-98 MRY-D4-L24-2 FGD slurry A (solid, 26.22g wet, 58.6%M, reported ug/g dry)
Mercury 0.154 µg/g

49674-10 5-19-98 MRY-D2-L21-1 flyash slurry feed B(liquid)
Mercury < 0.1 µg/L

49674-11 5-19-98 MRY-D2-L21-2 flyash slurry feed B(liquid)
Mercury 0.1 µg/L

49674-12 **5-19-98 MRY-D2-L24-1FGD slurry B(liquid, 246mL)**
Mercury 0.1 µg/L

49674-13 **5-19-98 MRY-D2-L24-2 FGD slurry B(liquid, 158mL)**
Mercury 0.16 µg/L

49674-15 5-22-98 MRY-D4-L18-1lime slurry feed B 8:48A(liquid)
Mercury < 0.1 µg/L

49674-16 5-22-98 MRY-D4-L18-2 lime slurry feed B 4:52P(liquid)
Mercury 0.1 µg/L

49674-17 **5-22-98 MRY-D4-L24-1 FGD slurry A(liquid, 242mL)**
Mercury 3.89 µg/L

49674-18 **5-22-98 MRY-D4-L24-2 FGD slurry A(liquid, 274mL)**
Mercury 4.50 µg/L

49674-19 **5-19-98 MRY-D2-L22-1ash pond make-up water**
Mercury 0.14 µg/L

49674-20 **5-19-98 MRY-D2-L23-1ash sluice water B**

Distribution 4y Date 6-29-98

Sample	49674-20	
	Mercury	< 0.1 µg/L
49674-21	5-19-98 MRY-D2-L22-2 ash pond make-up water	
	Mercury	0.1 µg/L
49674-22	5-19-98 MRY-D2-L23-2 ash sluice water B	
	Mercury	< 0.1 µg/L
49674-23	5-22-98 MRY-D4-L22-1 ash pond make-up water	
	Mercury	< 0.1 µg/L
49674-24	5-22-98 MRY-D4-L23-1 ash sluice water A-B	
	Mercury	< 0.1 µg/L
49674-25	5-22-98 MRY-D4-L22-2 ash pond make-up water	
	Mercury	0.14 µg/L
49674-26	5-22-98 MRY-D4-L23-2 ash sluice water A-B	
	Mercury	< 0.1 µg/L

Distribution 85 Date 6-29-98

Final Results

June 29, 1998

Set Number: 49675
Fund#: 4558
PI: Stan Miller
Contact Person: G. Schelkoph

Request Date: Monday, June 08, 1998
Due Date: Monday, June 22, 1998
Set Description: MRY Hg trip-SOLID

Sample 49675-20

49675-20	5/19/98MRY-D2-L13-2 ESP SILO ash B	
Mercury		0.196 µg/g
49675-21	5/19/98MRY-D2-L14-2 ESP Feeder 3B1(A)	
Mercury		0.087 µg/g
49675-22	5/19/98MRY-D2-L14-2 ESP Feeder 3B2(B)	
Mercury		0.144 µg/g
49675-23	5/19/98MRY-D2-L14-2 ESP Feeder 3B3(C)	
Mercury		0.081 µg/g
49675-24	5/19/98MRY-D2-L14-2 ESP Feeder 3B4(D)	
Mercury		0.075 µg/g

Distribution JL Date 6-29-98

Final Results

June 29, 1998

Set Number: 49676
Fund#: 4558
PI: Stan Miller
Contact Person: G. Schelkoph

Request Date: Thursday, June 11, 1998
Due Date: Thursday, June 25, 1998
Set Description: MRY Hg trip-SOLID

Sample 49676-01

49676-01	5-19-98MRY-D2-L3-1 Crusher Outlet Coal	
Mercury		0.096 µg/g
49676-03	5-19-98MRY-D2-L3-2 Crusher Outlet Coal	
Mercury		0.086 µg/g
49676-05	5-22-98MRY-D4-L3-1 Crusher Outlet Coal	
Mercury		0.074 µg/g
49676-07	5-22-98MRY-D4-L3-2 Crusher Outlet Coal	
Mercury		0.057 µg/g

Distribution 35 Date 6-29-98

Final Results

June 1, 1998

Set Number: 49670
Fund#: 4428
PI: Dennis Laudal
Contact Person: Richard Schulz

Request Date: Thursday, May 28, 1998
Due Date: Thursday, June 11, 1998
Set Description: M.R.YOUNG FIELD TRIP ASH

Sample 49670-01

49670-01	**MRY-D2-FGDout-OH1 FILTER ASH (TOTAL ug)**	
Mercury		< 0.005 µg
49670-02	**MRY-D2-FGDin-OH1 FILTER ASH (TOTAL ug)**	
Mercury		< 0.005 µg
49670-03	**MRY-D2-ESPin-OH1 FILTER ASH**	
Mercury		0.084 µg/g
49670-04	**MRY-D2-STin-OH1 FILTER ASH (TOTAL ug)**	
Mercury		< 0.005 µg
49670-05	**MRY-D5-FGDout-OH1 FILTER ASH (TOTAL ug)**	
Mercury		< 0.005 µg
49670-06	**MRY-D5-AHin-OH1 FILTER ASH**	
Mercury		0.014 µg/g
49670-07	**MRY-D5-ST-OH1 FILTER ASH (TOTAL ug)**	
Mercury		< 0.005 µg
49670-08	**MRY-D5-ESPin-OH1 FILTER ASH**	
Mercury		0.084 µg/g
49670-09	**MRY-D5-FGDin-OH1 FILTER ASH (TOTAL ug)**	
Mercury		< 0.005 µg

Distribution JS Date 6-1-98

		SPIKE RECOVERIES FOR MERCURY ANALYSIS						
DATE:	5/18/98							
Calibration Standards:		0, 1, 5, 10, 20 ppb		R=0.9996		QC= 4.15 (4)		
Spike Recovery								
KCl Spike	(5 ppb)	Sample 518-1		Spike =	7.07		((7.07-1.73)/5) * 100 = 106.8 %	
				Sample =	1.73			
KCl Spike	(10 ppb)	Sample 518-1		Spike =	11.75		((11.75-1.73)/10) * 100 = 100.02%	
				Sample =	1.73			
KMnO4 Spike	(5 ppb)	Sample 518-7		Spike =	10.4		((10.40-4.82)/5) * 100 = 111.6%	
				Sample =	4.82			
H2O2 Spike	(10 ppb)	Sample 518-2		Spike =	8.16		8.16/10 * 100 = 81.6%	
				Sample =	-0.09			
DATE:	5/19/98							
Calibration Standards:		0, 1, 5, 10, 20 ppb		R=0.9997		QC= 4.09 (4)		
Spike Recovery								
KCl Spike	(20 ppb)	Sample 519-1		Spike =	20.16		((20.16-0.69)/20) * 100 = 97.35%	
				Sample =	0.69			
KMnO4 Spike	(5 ppb)	Sample 519-11		Spike =	9.76		((9.76-5.17)/5) * 100 = 91.8%	
				Sample =	5.17			
H2O2 Spike	(10 ppb)	Sample 519-2		Spike =	8.296		8.296/10 * 100 = 82.96%	
				Sample =	-0.16			

		SPIKE RECOVERIES FOR MERCURY ANALYSIS				
DATE:	5/21/98					
Calibration Standards:		0, 1, 5, 10, 20 ppb	R=0.9997		QC = 4.0 (4)	
Spike Recovery						
KCl Spike	(5 ppb)	Sample 521-7	Spike =	5.87	((5.87-0.32)/5) * 100 = 111 %	
			Sample =	0.32		
KCl Spike	(10 ppb)	Sample 521-7	Spike =	11	((11.0-0.32)/10) * 100 = 106.8%	
			Sample =	0.32		
Field Blank	(20 ppb)	Sample 521-4	Spike =	20.02	20.02/20 * 100 = 100.1%	
KCl Spike			Sample =	0		
KMnO4 Spike	(5 ppb)	Sample 521-9	Spike =	10.8	((10.80-6.38)/5) * 100 = 88.4%	
			Sample =	6.38		
Field Blank	(20 ppb)	Sample 521-6	Spike =	19	19/20 * 100 = 95%	D4-FBSpK 5/21/9
KMnO4 Spike			Sample =	0		
H2O2 Spike	(5 ppb)	Sample 521-8	Spike =	4.25	4.25/5 * 100 = 85.0%	
			Sample =	-0.102		
Field Blank	(5 ppb)	Sample 521-2	Spike =	4.22	4.22/5 * 100 = 84.32%	
H2O2 Spike			Sample =	0		
Field Blank	(20 ppb)	Sample 521-5	Spike =	15.3	15.3/20 * 100 = 76.5%	
H2O2 Spike			Sample =	0		
Field Blank Spike	(20 ppb)	Sample 521-5	Spike =	30.53	((30.53 - 15.3)/20) * 100 = 76.2%	
H2O2 Spike			Sample =	15.3		

		SPIKE RECOVERIES FOR MERCURY ANALYSIS				
DATE:	5/22/98					
Calibration Standards:		0, 1, 5, 10, 20 ppb	R=0.9997		QC= 4.00 (4)	
Spike Recovery						
KCl Spike	(5 ppb)	Sample 522-1	Spike =	6.33	((6.33-1.05)/5) * 100 = 105.6%	
			Sample =	1.05		
KCl Spike	(10 ppb)	Sample 522-1	Spike =	11.26	((11.26-1.05)/10) * 100 = 102.1%	
			Sample =	1.05		
Field Blank	(20 ppb)	Sample 522-24	Spike =	4.5	4.5/20 * 100 = 22.5%	
KCl Spike			Sample =	0	Repeated spiking on 5/23/98	
KMnO4 Spike	(5 ppb)	Sample 522-7	Spike =	11.6	((11.6-6.52)/5) * 100 = 101.6%	
			Sample =	6.52		
Field Blank	(20 ppb)	Sample 522-26	Spike =	15.9	15.9/20 * 100 = 79.5%	D5-FBSp 5/22/98
KMnO4 Spike			Sample =	0	Repeated spiking on 5/23/98	
H2O2 Spike	(10 ppb)	Sample 522-2	Spike =	8.75	((8.75-0.021)/10) * 100 = 82.96%	
			Sample =	0.021		
Field Blank	(20 ppb)	Sample 522-25	Spike =	16.1	16.1/20 * 100 = 80.5%	
H2O2 Spike			Sample =	0	Repeated spiking on 5/23/98	
Field Blank Spike	(10 ppb)	Sample 522-25	Spike =	24.3	((24.3 - 16.1)/10) * 100 = 82%	
H2O2 Spike			Sample =	16.1		
Field Blank Spike	(20 ppb)	Sample 522-25	Spike =	31.32	((31.32 - 16.1)/20) * 100 = 76.1%	
H2O2 Spike			Sample =	16.1		

		SPIKE RECOVERIES FOR MERCURY ANALYSIS			
DATE:	5/23/98				
Calibration Standards:		0, 1, 5, 10, 20 ppb	R=0.9996	QC= 4.07 (4)	
Spike Recovery					
KCl Spike	(5 ppb)	Sample 523-11	Spike =	7.22	((7.22-1.67)/5) * 100 = 111%
			Sample =	1.67	
KCl Spike	(10 ppb)	Sample 523-11	Spike =	12.11	((12.11-1.67)/10) * 100 = 104.4%
			Sample =	1.67	
Field Blank	(10 ppb)	Sample 523-21	Spike =	10.54	10.54/10 * 100 = 105.4%
KCl Spike			Sample =	0	
KMnO4 Spike	(5 ppb)	Sample 523-22	Spike =	16.4	((16.4-12.5)/5) * 100 = 78%
			Sample =	12.5	
Field Blank	(10 ppb)	Sample 523-32	Spike =	8.47	8.47/10 * 100 = 84.7%
KMnO4 Spike			Sample =	0	
H2O2 Spike	(10 ppb)	Sample 523-1	Spike =	8.54	8.54/10 * 100 = 85.4%
			Sample =	0	
Field Blank	(10 ppb)	Sample 523-9	Spike =	8.61	8.61/10 * 100 = 86.1%
H2O2 Spike			Sample =	0	
Field Blank Spike	(10 ppb)	Sample 523-9	Spike =	17.31	((17.31 - 8.61)/10) * 100 = 86.97%
H2O2 Spike			Sample =	8.61	
Field Blank Spike	(20 ppb)	Sample 523-9	Spike =	25.76	((25.76 - 8.61)/20) * 100 = 85.74%
H2O2 Spike			Sample =	8.61	

D5-F
5/23/9

		MERCURY ANALYSIS		
DATE:	5/18/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
518-1	MRY-D1-ST-OH1	KCl	500	1.73
518-2	MRY-D1-ST-OH1	H2O2	250	< 0.1
518-3	MRY-D1-ST-OH1	KMnO4	500	22.3
518-4	MRY-D1-ST-OH1	Probe rinse	200	< 0.1
518-5	MRY-D1-ESPin-OH1	KCl	500	6.13
518-6	MRY-D1-ESPin-OH1	H2O2	250	< 0.1
518-7	MRY-D1-ESPin-OH1	KMnO4	500	4.82
518-8	MRY-D1-ESPin-OH1	Probe rinse	200	< 0.1
518-9	MRY-D1-FGDout-OH1	KCl	500	0.12
518-10	MRY-D1-FGDout-OH1	KCl	250	< 0.1
518-11	MRY-D1-FGDout-OH1	H2O2	250	< 0.1
518-12	MRY-D1-FGDout-OH1	KMnO4	500	20.1
518-13	MRY-D1-FGDout-OH1	Probe rinse	200	< 0.1

MERCURY ANALYSIS

DATE: 5/19/98

LOCATION: MILTON R. YOUNG POWER STATION

LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
519-1	MRY-D2-ST-OH1	KCl	500	0.69
519-2	MRY-D2-ST-OH1	H2O2	200	< 0.1
519-3	MRY-D2-ST-OH1	KMnO4	500	6.61
519-4	MRY-D2-ST-OH1	Probe rinse	250	< 0.1
519-5	MRY-D2-ST-OH2	KCl	500	1.43
519-6	MRY-D2-ST-OH2	H2O2	200	0.05
519-7	MRY-D2-ST-OH2	KMnO4	500	12.9
519-8	MRY-D2-ST-OH2	Probe rinse	250	< 0.1
519-9	MRY-D2-ESPin-OH1	KCl	500	0.31
519-10	MRY-D2-ESPin-OH1	H2O2	200	2.28
519-11	MRY-D2-ESPin-OH1	KMnO4	500	5.17
519-12	MRY-D2-ESPin-OH1	Probe rinse	250	< 0.1
519-13	MRY-D2-ESPin-OH2	KCl	500	0.45
519-14	MRY-D2-ESPin-OH2	H2O2	200	0.04
519-15	MRY-D2-ESPin-OH2	KMnO4	500	6.13
519-16	MRY-D2-ESPin-OH2	Probe rinse	250	< 0.1
519-17	MRY-D2-FGDin-OH1	KCl	500	0.92
519-18	MRY-D2-FGDin-OH1	H2O2	200	< 0.1
519-19	MRY-D2-FGDin-OH1	KMnO4	500	14.2
519-20	MRY-D2-FGDin-OH1	Probe rinse	500	< 0.1
519-21	MRY-D2-FGDin-OH2	KCl	500	4.1
519-22	MRY-D2-FGDin-OH2	H2O2	200	2.51
519-23	MRY-D2-FGDin-OH2	KMnO4	500	16.1
519-24	MRY-D2-FGDin-OH2	Probe rinse	500	< 0.1
519-25	MRY-D2-FGDout-OH1	KCl	500	0.25
519-26	MRY-D2-FGDout-OH1	H2O2	200	< 0.1
519-27	MRY-D2-FGDout-OH1	KMnO4	500	10.9
519-28	MRY-D2-FGDout-OH1	Probe rinse	250	< 0.1
519-29	MRY-D2-FGDout-OH2	KCl	500	0.44
519-30	MRY-D2-FGDout-OH2	H2O2	200	< 0.1
519-31	MRY-D2-FGDout-OH2	KMnO4	500	10.8
519-32	MRY-D2-FGDout-OH2	Probe rinse	250	< 0.1

		MERCURY ANALYSIS		
DATE:	5/21/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
521-1	MRY-D4-OH-FB	KCl	500	< 0.1
521-2	MRY-D4-OH-FB	H2O2	200	< 0.1
521-3	MRY-D4-OH-FB	KMnO4	500	0.057
521-4	MRY-D4-OH-FBspk (20 ppb)	KCl	500	20.02
521-5	MRY-D4-OH-FBspk (20 ppb)	H2O2	200	15.3
521-6	MRY-D4-OH-FBspk (20 ppb)	KMnO4	500	19
521-7	MRY-D4-ESPin-OH1	KCl	500	0.32
521-8	MRY-D4-ESPin-OH1	H2O2	200	< 0.1
521-9	MRY-D4-ESPin-OH1	KMnO4	500	6.38
521-10	MRY-D4-ESPin-OH1	Probe rinse	250	0.12
521-11	MRY-D4-ESPin-OH2	KCl	500	0.44
521-12	MRY-D4-ESPin-OH2	H2O2	200	< 0.1
521-13	MRY-D4-ESPin-OH2	KMnO4	500	8.53
521-14	MRY-D4-ESPin-OH2	Probe rinse	250	< 0.1
521-15	MRY-D4-AHin-OH1	KCl	500	< 0.1
521-16	MRY-D4-AHin-OH1	H2O2	200	2.04
521-17	MRY-D4-AHin-OH1	KMnO4	500	10.9
521-18	MRY-D4-AHin-OH1	KMnO4	100	1.29

		MERCURY ANALYSIS		
DATE:	5/22/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
522-1	MRY-D5-ST-OH1	KCl	500	1.05
522-2	MRY-D5-ST-OH1	H2O2	200	0.021
522-3	MRY-D5-ST-OH1	KMnO4	500	10.5
522-4	MRY-D5-ST-OH1	Probe rinse	250	<0.1
522-5	MRY-D5-ESPin-OH1	KCl	510	<0.1
522-6	MRY-D5-ESPin-OH1	H2O2	200	0.31
522-7	MRY-D5-ESPin-OH1	KMnO4	500	6.52
522-8	MRY-D5-ESPin-OH1	Probe rinse	250	<0.1
522-9	MRY-D5-FGDin-OH1	KCl	500	1.19
522-10	MRY-D5-FGDin-OH1	H2O2	200	0.162
522-11	MRY-D5-FGDin-OH1	KMnO4	500	6.58
522-12	MRY-D5-FGDin-OH1	Probe rinse	500	<0.1
522-13	MRY-D5-FGDout-OH1	KCl	500	0.01
522-14	MRY-D5-FGDout-OH1	H2O2	200	<0.1
522-15	MRY-D5-FGDout-OH1	KMnO4	500	7.04
522-16	MRY-D5-FGDout-OH1	Probe rinse	500	<0.1
522-17	MRY-D5-AHin-OH1	KCl	500	1.96
522-18	MRY-D5-AHin-OH1	KCl	200	2.38
522-19	MRY-D5-AHin-OH1	H2O2	200	1.23
522-20	MRY-D5-AHin-OH1	KMnO4	500	0.43
522-21	MRY-D5-OH-FB	KCl	500	<0.1
522-22	MRY-D5-OH-FB	H2O2	200	<0.1
522-23	MRY-D5-OH-FB	KMnO4	500	<0.1
522-24	MRY-D5-OH-FBspk (20 ppb)	KCl	500	4.5
522-25	MRY-D5-OH-FBspk (20 ppb)	H2O2	200	16.1
522-26	MRY-D5-OH-FBspk (20 ppb)	KMnO4	500	15.9

		MERCURY ANALYSIS		
DATE:	5/23/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
523-11	MRY-D5-ST-OH2	KCl	500	1.67
523-1	MRY-D5-ST-OH2	H2O2	200	<0.1
523-22	MRY-D5-ST-OH2	KMnO4	500	12.5
523-12	MRY-D5-ESPin-OH2	KCl	500	0.44
523-2	MRY-D5-ESPin-OH2	H2O2	250	0.07
523-23	MRY-D5-ESPin-OH2	KMnO4	500	7.7
523-34	MRY-D5-ESPin-OH2	Probe rinse	500	0.47
523-13	MRY-D5-FGDin-OH2	KCl	500	1.5
523-10	MRY-D5-FGDin-OH2	H2O2	200	<0.1
523-24	MRY-D5-FGDin-OH2	KMnO4	500	11.7
523-35	MRY-D5-FGDin-OH2	Probe rinse	500	<0.1
523-14	MRY-D5-FGDout-OH2	KCl	500	0.017
523-3	MRY-D5-FGDout-OH2	H2O2	200	0.89
523-25	MRY-D5-FGDout-OH2	KMnO4	500	7.14
523-26	MRY-D5-FGDout-OH2	KMnO4	250	0.025
523-36	MRY-D5-FGDout-OH2	Probe rinse	250	<0.1
523-15	MRY-D5-AHin-OH2	KCl	500	0.074
523-4	MRY-D5-AHin-OH2	H2O2	200	<0.1
523-27	MRY-D5-AHin-OH2	KMnO4	500	10.8
523-21	MRY-D5-FBspk (10 ppb)	KCl	500	10.5
523-9	MRY-D5-FBspk (10 ppb)	H2O2	200	8.61
523-32	MRY-D5-FBspk (10 ppb)	KMnO4	500	8.47

		MERCURY ANALYSIS		
DATE:	5/23/98			
LOCATION:	MILTON R. YOUNG POWER STATION			
LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
523-16	MRY-D5-ST-OH3	KCl	500	1.18
523-17	MRY-D5-ST-OH3	KCl	100	0.58
523-5	MRY-D5-ST-OH3	H2O2	200	0.14
523-28	MRY-D5-ST-OH3	KMnO4	500	11.4
523-33	MRY-D5-ST-OH3	Probe rinse	250	<0.1
523-18	MRY-D5-ESPin-OH3	KCl	500	0.4
523-6	MRY-D5-ESPin-OH3	H2O2	200	0.21
523-29	MRY-D5-ESPin-OH3	KMnO4	500	7.92
523-37	MRY-D5-ESPin-OH3	Probe rinse	500	0.031
523-19	MRY-D5-FGDin-OH3	KCl	500	0.94
523-7	MRY-D5-FGDin-OH3	H2O2	200	<0.1
523-30	MRY-D5-FGDin-OH3	KMnO4	500	6.89
523-38	MRY-D5-FGDin-OH3	Probe rinse	500	<0.1
523-20	MRY-D5-FGDout-OH3	KCl	500	<0.1
523-8	MRY-D5-FGDout-OH3	H2O2	200	<0.1
523-31	MRY-D5-FGDout-OH3	KMnO4	500	7.36
523-39	MRY-D5-FGDout-OH3	Probe rinse	250	<0.1