

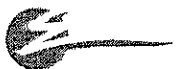
APPENDIX A – PM/HCL/HF EMISSIONS RESULTS

Indices

- A1 - Emissions Calculations / Field Data Sheets – Emission Unit No. 1**
- A2 - Emissions Calculations / Field Data Sheets – Emission Unit No. 2**



A1 - Emissions Calculations / Field Data Sheets – Emission Unit No. 1



INPUT DATA SHEET

Facility/Site: **UBWPAD**
Source: **EU 1**

Run No.: **U1-R1-M5/26A**
Date: **3/8/07**

As (SQFT) :

PITOT COEFFICIENT:

IMP-1 (INT) :

IMP-2 (INT) :

IMP-3 (INT) :

IMP-4 (INT) :

IMP-1 (FIN) :

IMP-2 (FIN) :

IMP-3 (FIN) :

IMP-4 (FIN) :

% CO₂ (OUT):

% O₂ (OUT) :

% CO (OUT) :

Pbar

Pstack

NUMBER OF POINTS

TEST LENGTH

FINAL METER

INITIAL METER

M2 BEGIN TIME

M2 END TIME

Nozzle ID (")

Traverse Points	VELOCITY HEAD	SQUARE ROOT	DELTA H	DRY GAS METER		STACK TEMP (F)
				IN	OUT	
A1	0.06	0.24	1.20	28	28	201
2	0.05	0.22	1.00	30	28	157
3	0.06	0.24	1.20	37	28	191
4	0.06	0.24	1.20	31	28	202
5	0.07	0.26	1.40	30	28	201
6	0.04	0.20	.80	34	29	163
B1	0.04	0.20	.80	33	31	128
2	0.05	0.22	1.00	35	34	170
3	0.05	0.22	1.00	36	33	183
4	0.05	0.22	1.00	35	33	164
5	0.05	0.22	1.00	36	33	167
6	0.05	0.22	1.00	36	34	158

AVERAGE:

0.05 0.23 1.05 33 31 174

INPUT DATA SHEET

Facility/Site: **UBWPAD**
Source: **EU 1**

Run No.: **U1-R3-M5/26A**
Date: **3/8/07**

As (SQFT) :
PITOT COEFFICIENT:
IMP-1 (INT) :
IMP-2 (INT) :
IMP-3 (INT) :
IMP-4 (INT) :
IMP-1 (FIN) :
IMP-2 (FIN) :
IMP-3 (FIN) :
IMP-4 (FIN) :
% CO2 (OUT):
% O2 (OUT):
% CO (OUT) :
Pbar
Pstack
NUMBER OF POINTS
TEST LENGTH
FINAL METER
INITIAL METER
BEGIN TIME
END TIME
Nozzle ID (")

Traverse Points	VELOCITY HEAD	SQUARE ROOT	DELTA H	DRY GAS METER		STACK TEMP (F)
				IN	OUT	
A1	0.08	0.28	4.24	31	30	157
2	0.07	0.26	3.71	31	29	161
3	0.08	0.28	4.24	32	28	161
4	0.09	0.30	4.77	34	29	183
5	0.08	0.28	4.24	33	28	173
6	0.07	0.26	3.71	33	28	181
B1	0.07	0.26	3.71	30	27	167
2	0.09	0.30	4.77	30	27	151
3	0.08	0.28	4.24	30	26	155
4	0.08	0.28	4.24	31	26	151
5	0.08	0.28	4.24	32	26	151
6	0.07	0.26	3.71	32	27	158

AVERAGE:

0.08 0.28 4.15 32 28 162.4

INPUT DATA SHEET

Facility/Site: **UBWPAD**
Source: **EU 1**

Run No.: **U1-R4-M5/26A**
Date: **3/8/07**

As (SQFT) :
PITOT COEFFICIENT:
IMP-1 (INT) :
IMP-2 (INT) :
IMP-3 (INT) :
IMP-4 (INT) :
IMP-1 (FIN) :
IMP-2 (FIN) :
IMP-3 (FIN) :
IMP-4 (FIN) :
% CO2 (OUT):
% O2 (OUT) :
% CO (OUT) :
Pbar
Pstack
NUMBER OF POINTS
TEST LENGTH
FINAL METER
INITIAL METER
BEGIN TIME
END TIME
Nozzle ID (")

AVERAGE:

Traverse Points	VELOCITY HEAD	SQUARE ROOT	DELTA H	DRY GAS METER		STACK TEMP (F)
				IN	OUT	
A1	0.09	0.30	4.77	26	23	169
2	0.10	0.32	5.30	29	24	183
3	0.11	0.33	5.83	31	25	156
4	0.09	0.30	4.77	30	24	155
5	0.08	0.28	4.24	30	24	157
6	0.07	0.26	3.71	31	24	152
B1	0.07	0.26	3.71	30	24	137
2	0.08	0.28	4.24	31	24	154
3	0.08	0.28	4.24	31	24	154
4	0.09	0.30	4.77	33	23	167
5	0.10	0.32	5.30	31	23	156
6	0.11	0.33	5.83	29	23	169
AVERAGE:						
	0.09	0.30	4.73	30	24	159.1

ISOKINETIC CALCULATION SHEET

Facility/Site: UBWPAD	Run No.: U1-R1-M5/26A
Source: EU 1	Date: 8-Mar-07

Ts (°F) =	173.8	% CO2 =	9.68	Vm (CF) =	33.710
Ts (°R) =	633.8	% O2 =	9.03	DELTA H (ABS) =	29.54
Tm (°F) =	32.0	% CO =	0	Ps (ABS) =	29.45
Tm (°R) =	492.0	% N2 =	81.29	SQRT DELTA P =	0.2284
VI (TOT) =	15.5	Cp =	0.84	Y =	0.9898
VI (adj) =	NA	TIME =	60	An =	0.000821

Vm std =	$\frac{17.64 (Vm)(Y)(DELTA H ABS)}{(Tm)}$	=	35.335 DSCF
Vw std =	.04707 (VI TOT)	=	0.730 CF
Bwo =	$Vw std / (Vw std) + (Vm std)$	=	0.020
Bwo =	by steam tables	=	NA
1 - Bwo =	1 - Bwo	=	0.980
Md (DRY)=	$0.44 (\% CO2) +$ $0.32 (\% O2) +$ $0.28 (\% CO) +$ $0.28 (\% N2)$	=	29.910 LB/LB MOLE
Ms (WET)=	$MD (1-Bwo) + 18 (Bwo)$	=	29.669 LB/LB MOLE
G =	$SQRT (Ts/Ps/Ms)$	=	0.852
Vs =	$85.49 (Cp) (G) (SQRT DELTA P)$	=	13.970 FPS 6606.355 cfm
Qs =	$3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts)$ $= (DSCFH/(1-\%H2O))/60$	=	318346 DSCFH 5415 WSCFM
% ISO =	$\frac{100 (Ts) (Vm std) (Pstd)}{60 (Tstd) (Vs) (Time) (An) (Ps) (1-Bwo)}$	=	106.5

ISOKINETIC CALCULATION SHEET

Facility/Site: UBWPAD	Run No.: U1-R3-M5/26A
Source: EU 1	Date: 8-Mar-07

Ts (°F) =	162.4	% CO2 =	9.56	Vm (CF) =	60.559
Ts (°R) =	622.4	% O2 =	8.34	DELTA H (ABS) =	29.69
Tm (°F) =	29.6	% CO =	0	Ps (ABS) =	29.37
Tm (°R) =	489.6	% N2 =	82.10	SQRT DELTA P =	0.2796
VI (TOT) =	29.0	Cp =	0.84	Y =	0.9898
VI (adj) =	NA	TIME =	60	An =	0.001310

Vm std =	$\frac{17.64 (Vm)(Y)(DELTA H ABS)}{(Tm)}$	=	64.112 DSCF
Vw std =	.04707 (VI TOT)	=	1.365 CF
Bwo =	$Vw std / (Vw std) + (Vm std)$	=	0.021
Bwo =	by steam tables	=	NA
1 - Bwo =	1 - Bwo	=	0.979
Md (DRY)=	$0.44 (\% CO2) +$ $0.32 (\% O2) +$ $0.28 (\% CO) +$ $0.28 (\% N2)$	=	29.864 LB/LB MOLE
Ms (WET)=	$MD (1-Bwo) + 18 (Bwo)$	=	29.616 LB/LB MOLE
G =	$SQRT (Ts/Ps/Ms)$	=	0.846
Vs =	$85.49 (Cp) (G) (SQRT DELTA P)$	=	16.985 FPS
Qs =	$3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts)$ $= (DSCFH/(1-\%H2O))/60$	=	392791 DSCFH 6686 WSCFM
% ISO =	$\frac{100 (Ts) (Vm std) (Pstd)}{60 (Tstd) (Vs) (Time) (An) (Ps) (1-Bwo)}$	=	98.2

ISOKINETIC CALCULATION SHEET

Facility/Site: UBWPAD	Run No.: U1-R4-M5/26A
Source: EU 1	Date: 8-Mar-07

Ts (°F) =	159.1	% CO2 =	10.18	Vm (CF) =	67.750
Ts (°R) =	619.1	% O2 =	8.72	DELTA H (ABS) =	29.76
Tm (°F) =	27.0	% CO =	0	Ps (ABS) =	29.39
Tm (°R) =	487.0	% N2 =	81.11	SQRT DELTA P =	0.2978
VI (TOT) =	38.5	Cp =	0.84	Y =	0.9898
VI (adj) =	NA	TIME =	60	An =	0.001310

Vm std =	$\frac{17.64 (Vm)(Y)(DELTA H ABS)}{(Tm)}$	=	72.287 DSCF
Vw std =	.04707 (VI TOT)	=	1.812 CF
Bwo =	Vw std / (Vw std) + (Vm std)	=	0.024
Bwo =	by steam tables	=	NA
1 - Bwo =	1 - Bwo	=	0.976
Md (DRY)=	0.44 (% CO2) + 0.32 (% O2) + 0.28 (% CO) + 0.28 (% N2)	=	29.977 LB/LB MOLE
Ms (WET)=	MD (1-Bwo) + 18 (Bwo)	=	29.684 LB/LB MOLE
G =	SQRT (Ts/Ps/Ms)	=	0.842
Vs =	85.49 (Cp) (G) (SQRT DELTA P)	=	18.013 FPS
Qs =	3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts)	=	417601 DSCFH
	= (DSCFH/(1-%H2O))/60		7134 WSCFM
% ISO =	$\frac{100 (Ts) (Vm std) (Pstd)}{60 (Tstd) (Vs) (Time) (An) (Ps) (1-Bwo)}$	=	104.1

PARTICULATE EMISSION CALCULATION SHEET

PLANT:	UBWPAD	RUN #:	U1-R1-M5/26A
LOCATION:	EU 1	DATE:	3/8/07

		BLANKS	
	<u>FILTER</u>	<u>BEAKER</u>	<u>FILTER</u> <u>ACETONE</u>
NUMBER :	9605	449	9589 00-133
FINAL :	0.3790	98.6545	0.3673 100.9400
TARE :	<u>0.3800</u>	<u>98.6523</u>	<u>0.3681</u> <u>100.9396</u>
NET :	0	0.0022	-0.0008 0.0004
VOLUME BLANK RINSE			100
VOLUME OF RINSE			125

Mn - Ar = Mn	O2 =	9.03
	CO2 =	9.68
Mn = 2.200	Vs =	13.97 ft/sec
Ar = 0.500	As =	7.88 ft ²
	Vm std =	35.34 DSCF
Mn = 1.700	Ffactor =	n/a

Qs =	3600(1-Bwo)(Vs)(As)(17.64)(Ps/Ts) =	318346 DSCFH
	3600 (Vs) (As)	= 396381 ACFH
	ACFH / 60	= 6606 ACFM
Cs =	(2.205 E-6) (Mn) / (Vm Std)	= 1.06E-07 lb/dscf
Cs' =	0.0154 (Mn) / (VmStd)	= 0.000741 grains/dscf
Cs'12 =	Cs' x 12 / %CO2	= 0.000918 grains/dscf @ 12% CO2
PMR =	Qs x Cs	= 0.03377 lb/hr
Sludge Process Rate		= 1.840 dry tons sludge / hr
PMR' =	(PM lb/hr) / (tons sludge / hour)	= 1.835E-02 lb/dry ton of sludge
TPY =	(lb/hr) / (2000 lb/ton) x (8760 hr/yr)	= 1.48E-01 tons/per year

PARTICULATE EMISSION CALCULATION SHEET

PLANT	UBWPAD	RUN # :	U1-R3-M5/26A
LOCATION	EU 1	DATE :	3/8/07

		BLANKS	
	<u>FILTER</u>	<u>BEAKER</u>	<u>FILTER</u> <u>ACETONE</u>
NUMBER :	9608	SF-4	9589 00-133
FINAL :	0.3691	105.201	0.3673 100.9400
TARE :	<u>0.3703</u>	<u>105.1995</u>	<u>0.3681</u> <u>100.9396</u>
NET :	0	0.0015	-0.0008 0.0004
VOLUME BLANK RINSE			100
VOLUME OF RINSE			150

Mn - Ar = Mn	O2 =	8.34
	CO2 =	9.56
Mn =	Vs =	16.99 ft/sec
Ar = <u>0.600</u>	As =	7.88 ft ²
	Vm std=	64.11 DSCF
Mn =	Ffactor =	0.0

Qs =	3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts) =	392791 DSCFH
	3600 (Vs) (As)	= 481941.2 ACFH
	ACFH / 60	= 8032 ACFM
Cs =	(2.205 E-6) (Mn) / (Vm Std)	= 3.1E-08 lb/dscf
Cs' =	0.0154 (Mn) / (VmSTD)	= 0.000216 grains/dscf
Cs'12 =	Cs' x 12 / %CO2	= 0.000271 grains/dscf @ 12% CO2
PMR =	Qs x Cs	= 0.0122 lb/hr
Sludge Process Rate		= 1.7100 dry tons sludge / hr
PMR' =	(PM lb/hr) / (tons sludge / hour)	= 7.110E-03 lb/dry ton of sludge
TPY =	(lb/hr) / (2000 lb/ton) x (8760 hr/yr)	= 5.33E-02 tons/per year

PARTICULATE EMISSION CALCULATION SHEET

PLANT	UBWPAD	RUN # :	U1-R4-M5/26A
LOCATION	EU 1	DATE :	3/8/07

		BLANKS	
	<u>FILTER</u>	<u>BEAKER</u>	<u>FILTER</u> <u>ACETONE</u>
NUMBER :	9609	739	9589 00-133
FINAL :	0.3677	97.069	0.3673 100.9400
TARE :	<u>0.3656</u>	<u>97.0654</u>	<u>0.3681</u> <u>100.9396</u>
NET :	0.0021	0.0036	-0.0008 0.0004
VOLUME BLANK RINSE			100
VOLUME OF RINSE			200

Mn - Ar = Mn	O2 =	8.72
	CO2 =	10.18
Mn = 5.700	Vs =	18.01 ft/sec
Ar = <u>0.800</u>	AS =	7.88 ft2
	Vm std=	72.29 DSCF
Mn = 4.900		

Qs = 3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts)	=	417601 DSCFH
3600 (Vs) (As)	=	511090.7 ACFH
ACFH / 60	=	8518 ACFM
Cs = (2.205 E-6) (Mn) / (Vm Std)	=	1.49E-07 lb/dscf
Cs' = 0.0154 (Mn) / (VmSTD)	=	0.001044 grains/dscf
Cs'12 = Cs' x 12 / %CO2	=	0.001231 grains/dscf @ 12% CO2
PMR = Qs x Cs	=	0.062417 lb/hr
Sludge Process Rate	=	1.77 dry tons sludge / hr
PMR' = (PM lb/hr) / (tons sludge / hour)	=	3.526E-02 lb/dry ton of sludge
TPY = (lb/hr) / (2000 lb/ton) x (8760 hr/yr)	=	2.73E-01 tons/per year

Emission Summary - Hydrogen Chloride via EPA Method 26A

Client: UBWPAD		Date: 3/8/07								
Facility: UBWPAD										
Source: EU 1										
Run I.D.	HCl	Sample Vol.	Flow	O ₂	concentration/emission rate					
	ug	dscf	dscfh	%	lb/dscf	ug/M3	ppm	ppm @7% O ₂	lb/hr	tons/year
U1-R1-M5/26A	520	35.335	318,346	9.03	3.24E-08	5.20E+02	0.34	0.402	1.0E-02	4.5E-02
U1-R3-M5/26A	690	64.112	392,791	8.34	2.37E-08	3.80E+02	0.25	0.278	9.3E-03	4.1E-02
U1-R4-M5/26A	900	72.287	417,601	8.72	2.75E-08	4.40E+02	0.29	0.332	1.1E-02	5.0E-02
Blank	<	200								

Calculations:

$$\text{lb/dscf} = (2.205\text{E-}9 \times \text{ug}) / \text{dscf}$$
$$\text{ug/M3} = \text{ug} / (\text{dscf} \times 0.02832)$$
$$\text{ppm} = (\text{lb/dscf}) \times 1\text{E}06 \times 386.1 / (\text{HCl MW})$$
$$\text{ppm @7\%O}_2 = \text{ppm} \times (20.9-7) / (20.9-\text{O}_2\%)$$
$$\text{lb/hr} = (\text{lb/dscf}) \times \text{dscfh}$$
$$\text{tons/year} = (\text{lb/hr}) / (2000 \text{ lb/ton}) \times (8760 \text{ hours/year})$$

Parameters:

HCl (Hydrogen Chloride) MW: 36.461

Emission Summary - Hydrogen Fluoride via EPA Method 26A

Client:	UBWPAD		Date:		3/8/07					
Facility:	UBWPAD									
Source:	EU 1									
Run I.D.	HF	Sample Vol.	Flow	O ₂	concentration/emission rate					
	ug	dscf	dscfh	%	lb/dscf	ug/M3	ppm	ppm @7% O ₂	lb/hr	tons/per
U1-R1-M5/26A	190	35.335	318,346	9.03	1.19E-08	1.90E+02	0.23	0.27	3.8E-03	1.7E-02
U1-R3-M5/26A	< 150	64.112	392,791	8.34	5.16E-09	8.26E+01	0.10	0.11	2.0E-03	8.9E-03
U1-R4-M5/26A	210	72.287	417,601	8.72	6.41E-09	1.03E+02	0.12	0.14	2.7E-03	1.2E-02
Blank	< 150									

Calculations:

lb/dscf = (2.205E-9 x ug) / dscf

ug/M3 = ug / (dscf x 0.02832)

ppm = (lb/dscf) x 1E06 x 386.1 / (HF MW)

ppm @7%O₂ = ppm x (20.9-7) / (20.9-O₂%)

lb/hr = lb/dscf x dscfh

tons/year = (lb/hr) / (2000 lb/ton) x (8760 hours/year)

Parameters:

HF (Hydrogen Fluoride) MW: 20.01

Note: "<" represents reportable detection limit (RDL)

TRAVERSE DATA SHEET

Facility/Site: UBIOPAP		Run No.: VIR1-M5/Hc/1/HF	
Source: unit 1		Date: 3-8-07	

Impinger Volumes (ml):		Sampling Parameters										
		Traverse	Delta P	Delta H	Dry Gas Meter		Stack	Meter	Probe	Filter	Impinger	Vacuum
		Point	(H ₂ O)	("H ₂ O)	In (F)	Out (F)	Temp (F)	Reading (CF)	Temp (F)	Temp (F)	Temp (F)	("Hg)
1 - Initial	100											
2 - Initial	100											
3 - Initial	0	A1	.06	1.2	23	28	201	350.00	239	227	33	3
4 - Initial	200	2	.05	1.0	30	28	157	353.05	238	226	33	3
5 - Initial		3	.06	1.2	37	28	191	356.1	239	250	33	3.0
6 - Initial		4	.06	1.2	31	28	202	352.6	238	251	34	3.0
7 - Initial		5	.07	1.4	30	28	201	361.6	237	244	33	3.0
		6	.07	.80	34	29	163	364.8	237	250	34	3.0
1 - Final	105	B1	.04	.80	33	31	128	367.2	242	252	25	3.0
2 - Final	102	2	.05	1.0	35	34	170	369.8	238	248	35	3.0
3 - Final	0	3	.05	1.0	36	34	133	372.6	235	245	35	3
4 - Final	208.5	4	.05	1.0	35	33	164	375.4	235	240	37	3
5 - Final		5	.05	1.0	36	33	167	375.1	239	242	35	3
6 - Final		6	.05	1.0	36	34	158	380.9	239	250	35	3
7 - Final												

Pstack ("H₂O):

Bar. Pres. ("Hg):

Run Time (min.): **60**

Final Meter (CF): **383.710**

Initial Meter (CF): **350.000**

Start Time: **0825**

End Time: **958**

Filter Information:		Leak Checks:				Sampling Train Information:			
ID:	9605	Train-pre:	0.002	@	10"	"Hg	Test Method:	13B	
Tare (g):	0.300	Train-mid:		@		"Hg	Meter Box No.:	EE3	
		Train-post:	0	@	10"	"Hg	Delta H:	1.82	
Trap Information:		Pitot-pre:	0	@	23	"H ₂ O	Y:	9898	
ID:		Pitot-post:		@		"H ₂ O	K-factor:	20.0	
		Field Team Members:				Nozzle ID: /Nozzle Diameter:			
		1) MM 2) 3)				Probe ID: 7-3			

Comments:

TRAVERSE DATA SHEET

Facility/Site:	UBWPAD					Run No.:	U1R2-M5/HC/HF				
Source:	Unit 1					Date:	3/8/07				

Impinger Volumes (ml):		Sampling Parameters										
		Traverse Point	Delta P (H ₂ O)	Delta H ("H ₂ O)	Dry Gas Meter		Stack Temp (F)	Meter Reading (CF)	Probe Temp (F)	Filter Temp (F)	Impinger Temp (F)	Vacuum ("Hg)
					In (F)	Out (F)						
1 - Initial	100	B41	0.00	3.18	32	31	156	384.076	248	243	38	0
2 - Initial	100	2	0.07	3.71	35	31	169	389	247	245	40	7
3 - Initial	0	3	0.08	4.24	37	32	187	394.0	245	251	45	7
4 - Initial	200	4	0.08	4.24	38	36	180	391.6	246	256	44	7
5 - Initial		5	0.08	4.24	38	33	183	405.2	244	250	44	7
6 - Initial		6	0.09	4.77	39	34	155	416.9	241	244	44	7
7 - Initial		4	0.04	2.12	34	34	104	420.2	248	249	40	4.0
1 - Final	104	2	0.07	3.71	35	33	157	425.5	240	243	44	4.0
2 - Final	110	3	0.09	4.77	36	33	178	431.8	241	248	45	6.0
3 - Final	2	4	0.09	4.77	37	33	182	436.9	240	244	49	8.0
4 - Final	211	5	0.07	3.71	38	33	164	442.2	248	250	50	7.0
5 - Final		6	0.09	4.77	39	33	170	447.8	245	248	52	8
6 - Final												
7 - Final												

Pstack ("H₂O):

Bar. Pres. ("H_g):

Run Time (min.): 600

Final Meter (CF): 447.813

Initial Meter (CF): 384.076

Start Time: 1140

End Time: 1302

Run voided due to particulate in port being picked up when winds blew train further on monorail.

Filter Information:		Leak Checks:				Sampling Train Information:			
ID:	9607	Train-pre:	0.002	@	10	"Hg	Test Method:	13B	
Tare (g):		Train-mid:	—	@	—	"Hg	Meter Box No.:	FE3	
		Train-post:	0.002	@	10	"Hg	Delta H:	1.82	
Trap Information:		Pitot-pre:	0	@	73	"H ₂ O	Y:	.9848	
ID:	N/A	Pitot-post:	0	@	73	"H ₂ O	K-factor:	53.0	
Field Team Members:						Nozzle ID: /Nozzle Diameter:			
1) MM 2) JP 3)						0.440.503			
						Probe ID:			
						7-1			

Comments:

TRAVERSE DATA SHEET

Facility/Site:	UBW PAD					Run No.:	U1-R3-M5 HCL					
Source:	unit 1					Date:	3-8-07					
Impinger Volumes (ml):		Sampling Parameters										
1 - Initial	100	Traverse	Delta P	Delta H	Dry Gas Meter		Stack	Meter	Probe	Filter	Impinger	Vacuum
2 - Initial	100	Point	(H ₂ O)	(H ₂ O)	In (F)	Out (F)	Temp (F)	Reading (CF)	Temp (F)	Temp (F)	Temp (F)	("Hg)
3 - Initial	0	A1	.08	4.24	31	30	157	-	251	215	41	10
4 - Initial	200	A2	.07	3.71	31	29	161	457.9	241	247	42	9
5 - Initial		A3	.08	4.24	32	28	161	451.2	244	251	46	10
6 - Initial		A4	.09	4.77	34	29	183	468.3	249	243	50	11
7 - Initial		A5	.08	4.24	33	28	173	474.1	244	254	51	11
		A6	.07	3.71	33	28	181	472.4	251	245	51	11
1 - Final	94	B1	.07	3.71	30	27	167	483.1	244	250	51	11
2 - Final	116	B2	.09	4.77	30	27	151	488.4	249	252	51	11
3 - Final	6	B3	.08	4.24	30	26	155	493.4	244	240	52	11
4 - Final	213	B4	.08	4.24	31	26	151	498.4	247	247	54	11
5 - Final		B5	.08	4.24	32	26	151	504.7	248	245	55	11
6 - Final		B6	.07	3.71	32	27	158	508.6	249	250	55	11
7 - Final												
Pstack ("H ₂ O):												
Bar. Pres. ("Hg):												
Run Time (min.):		60										
Final Meter (CF):		508.059										
Initial Meter (CF):		448.100										
Start Time:		1435										
End Time:		1540										
Filter Information:		Leak Checks:					Sampling Train Information:					
ID:	9603	Train-pre:	OK	@	12	"Hg	Test Method: M5					
Tare (g):		Train-mid:		@		"Hg	Meter Box No.: EE3					
		Train-post:		@		"Hg	Delta H: 1.32					
Trap Information:		Pitol-pre:	OK	@	5	"H ₂ O	Y: 0.9898					
ID:		Pitol-post:		@		"H ₂ O	K-factor: 53					
		Field Team Members:					Nozzle ID: /Nozzle Diameter: 10					
		1) MM 2) JP 3)					Probe ID: 6-7-3					
Comments:												

TRAVERSE DATA SHEET

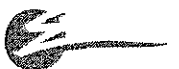
Facility/Site: <u>USW PAD</u>		Run No.: <u>01-R4-M5/HCL/HF</u>	
Source: <u>Unit 1</u>		Date: <u>2-3-07</u>	

Impinger Volumes (ml):		Sampling Parameters										
		Traverse Point	Delta P (H ₂ O)	Delta H ("H ₂ O)	Dry Gas Meter		Stack Temp (F)	Meter Reading (CF)	Probe Temp (F)	Filter Temp (F)	Impinger Temp (F)	Vacuum ("Hg)
1 - Initial	2 - Initial				In (F)	Out (F)						
<u>100</u>	<u>100</u>	<u>1</u>	<u>.07</u>	<u>4.77</u>	<u>26</u>	<u>23</u>	<u>169</u>	<u>—</u>	<u>250</u>	<u>230</u>	<u>30</u>	<u>8</u>
<u>0</u>	<u>200</u>	<u>2</u>	<u>.10</u>	<u>5.30</u>	<u>27</u>	<u>24</u>	<u>183</u>	<u>514.6</u>	<u>245</u>	<u>245</u>	<u>30</u>	<u>8</u>
		<u>3</u>	<u>.11</u>	<u>5.83</u>	<u>31</u>	<u>25</u>	<u>156</u>	<u>530.5</u>	<u>250</u>	<u>255</u>	<u>30</u>	<u>8</u>
		<u>4</u>	<u>.09</u>	<u>4.77</u>	<u>30</u>	<u>24</u>	<u>155</u>	<u>530.5</u>	<u>249</u>	<u>245</u>	<u>32</u>	<u>8</u>
		<u>5</u>	<u>.08</u>	<u>4.04</u>	<u>30</u>	<u>24</u>	<u>157</u>	<u>532.2</u>	<u>243</u>	<u>238</u>	<u>32</u>	<u>7.5</u>
		<u>6</u>	<u>.07</u>	<u>3.71</u>	<u>31</u>	<u>24</u>	<u>153</u>	<u>537.7</u>	<u>245</u>	<u>243</u>	<u>31</u>	<u>7.5</u>
		<u>A 1</u>	<u>.07</u>	<u>3.71</u>	<u>30</u>	<u>24</u>	<u>137</u>	<u>513.5</u>	<u>245</u>	<u>248</u>	<u>30</u>	<u>7.5</u>
1 - Final	<u>114</u>	<u>2</u>	<u>.09</u>	<u>4.24</u>	<u>31</u>	<u>24</u>	<u>154</u>	<u>543.5</u>	<u>239</u>	<u>240</u>	<u>31</u>	<u>7.5</u>
2 - Final	<u>112</u>	<u>3</u>	<u>.03</u>	<u>7.24</u>	<u>31</u>	<u>24</u>	<u>154</u>	<u>554.3</u>	<u>247</u>	<u>242</u>	<u>32</u>	<u>7.5</u>
3 - Final	<u>4</u>	<u>4</u>	<u>.09</u>	<u>4.71</u>	<u>33</u>	<u>23</u>	<u>167</u>	<u>554.9</u>	<u>250</u>	<u>245</u>	<u>30</u>	<u>8</u>
4 - Final	<u>208.5</u>	<u>5</u>	<u>.10</u>	<u>5.30</u>	<u>31</u>	<u>23</u>	<u>156</u>	<u>565.2</u>	<u>245</u>	<u>245</u>	<u>31</u>	<u>8</u>
5 - Final		<u>6</u>	<u>.11</u>	<u>5.83</u>	<u>29</u>	<u>23</u>	<u>169</u>	<u>571.1</u>	<u>246</u>	<u>249</u>	<u>32</u>	<u>8</u>
6 - Final												
7 - Final												

Pstack ("H ₂ O): <u>.21</u>
Bar. Pres. ("Hg):
Run Time (min.): <u>1.00</u>
Final Meter (CF): <u>576.743</u>
Initial Meter (CF): <u>508.993</u>
Start Time: <u>16:23</u>
End Time: <u>17:14</u>

Filter Information:		Leak Checks:				Sampling Train Information:	
ID: <u>9609</u>	Train-pre: <u>0.124</u>	@	<u>10</u>	"Hg	Test Method: <u>M5</u>		
Tare (g):	Train-mid: <u>—</u>	@	<u>—</u>	"Hg	Meter Box No.: <u>EE2</u>		
	Train-post: <u>—</u>	@	<u>—</u>	"Hg	Delta H: <u>1.57</u>		
Trap Information:		Pitot-pre: <u>C</u>	@	<u>23</u>	"H ₂ O	Y: <u>.8895</u>	
ID: <u>N/A</u>	Pitot-post: <u>—</u>	@	<u>—</u>	"H ₂ O	K-factor: <u>3.3</u>		
Field Team Members:					Nozzle ID: /Nozzle Diameter: <u>0.490</u>		
1) <u>SE</u> 2) <u>MM</u> 3) <u>—</u>					Probe ID: <u>7-1</u>		
Comments:							

A2 - Emissions Calculations / Field Data Sheets – Emission Unit No. 2



INPUT DATA SHEET

Facility/Site: **UBWPAD**
Source: **EU 2**

Run No.: **U2-R1-M5/26A**

Date: **3/15/2007**

As (SQFT) :

PITOT COEFFICIENT:

IMP-1 (INT) :

IMP-2 (INT) :

IMP-3 (INT) :

IMP-4 (INT) :

IMP-1 (FIN) :

IMP-2 (FIN) :

IMP-3 (FIN) :

IMP-4 (FIN) :

% CO₂ (OUT):

% O₂ (OUT) :

% CO (OUT) :

Pbar

Pstack

NUMBER OF POINTS

TEST LENGTH

FINAL METER

INITIAL METER

M2 BEGIN TIME

M2 END TIME

Nozzle ID (")

Traverse Points	VELOCITY HEAD	SQUARE ROOT	DELTA H	DRY GAS METER		STACK TEMP (F)
				IN	OUT	
A1	0.09	0.30	1.80	54	52	163
2	0.10	0.32	2.00	51	51	174
3	0.11	0.33	2.20	52	52	175
4	0.11	0.33	2.20	52	52	166
5	0.10	0.32	2.00	53	53	159
6	0.10	0.32	2.00	53	53	158
B1	0.09	0.30	1.80	54	54	154
2	0.10	0.32	2.00	55	55	170
3	0.12	0.35	2.40	55	55	159
4	0.10	0.32	2.00	56	56	161
5	0.09	0.30	1.80	56	56	152
6	0.09	0.30	1.80	56	56	159

AVERAGE:

0.10 0.32 2.00 54 54 163

INPUT DATA SHEET

Facility/Site:	UBWPAD
Source:	EU 2

Run No.: U2-R2-M5/26A

Date: 15-Mar-07

As (SQFT) : 7.88

PITOT COEFFICIENT: 0.84

IMP-1 (INT) : 100

IMP-2 (INT) : 100

IMP-3 (INT) : 0

IMP-4 (INT) :	200
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IMP-1 (FIN) : 94

IMP-2 (FIN) : 114

IMP-3 (FIN) : 10

IMP-4 (FIN) :	212.5
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% CO2 (OUT):	9.64
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% O2 (OUT):	8.73
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% CO (OUT): 0

Phar	29.38
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Pstack	-0.21
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NUMBER OF POINTS	12
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TEST LENGTH	60
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FINAL METER	694.032
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INITIAL METER	644 933
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BEGIN TIME	12:05
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END TIME	13:11
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Nozzle ID ("") 0 378

Traverse Points	VELOCITY HEAD	SQUARE ROOT	DELTA H	DRY GAS METER		STACK TEMP (F)
				IN	OUT	
A1	0.11	0.33	1.98	58	58	174
2	0.13	0.36	2.34	58	57	168
3	0.15	0.39	2.70	61	58	159
4	0.11	0.33	1.98	63	58	190
5	0.10	0.32	1.80	64	58	185
6	0.09	0.30	1.62	66	58	187
B1	0.12	0.35	2.16	60	59	168
2	0.14	0.37	2.52	65	59	192
3	0.13	0.36	2.34	67	60	183
4	0.12	0.35	2.16	67	60	176
5	0.12	0.35	2.16	67	60	173
6	0.10	0.32	1.80	67	60	158

AVERAGE:

0.12 0.34 2.13 64 59 176.1

INPUT DATA SHEET

Facility/Site: UBWPAD
Source: EU 2

Run No.: U2-R3-M5/26A
Date: 15-Mar-07

As (SQFT) : 7.88
PITOT COEFFICIENT: 0.84
IMP-1 (INT) : 100
IMP-2 (INT) : 100
IMP-3 (INT) : 0
IMP-4 (INT) : 200
IMP-1 (FIN) : 104
IMP-2 (FIN) : 106
IMP-3 (FIN) : 4
IMP-4 (FIN) : 212
% CO2 (OUT): 9.74
% O2 (OUT) : 8.62
% CO (OUT) : 0
Pbar 29.41
Pstack -0.21
NUMBER OF POINTS 12
TEST LENGTH 60
FINAL METER 743.804
INITIAL METER 694.478
BEGIN TIME 15:10
END TIME 16:16
Nozzle ID (") 0.378

Traverse Points	VELOCITY HEAD	SQUARE ROOT	DELTA H	DRY GAS METER		STACK TEMP (F)
				IN	OUT	
A1	0.12	0.35	2.16	52	52	188
2	0.12	0.35	2.16	52	52	183
3	0.13	0.36	2.34	54	52	190
4	0.12	0.35	2.16	57	52	175
5	0.11	0.33	1.98	59	53	161
6	0.11	0.33	1.98	60	53	155
B1	0.11	0.33	1.98	54	53	151
2	0.13	0.36	2.34	59	53	166
3	0.14	0.37	2.52	60	53	167
4	0.13	0.36	2.34	62	54	172
5	0.11	0.33	1.98	62	54	170
6	0.10	0.32	1.80	63	54	177

AVERAGE:

0.12 0.34 2.15 58 53 171.3

ISOKINETIC CALCULATION SHEET

Facility/Site: UBWPAD	Run No.: U2-R1-M5/26A
Source: EU 2	Date: 15-Mar-07

Ts (°F) =	162.5	% CO2 =	10.67	Vm (CF) =	47.544
Ts (°R) =	622.5	% O2 =	7.58	DELTA H (ABS) =	29.61
Tm (°F) =	53.8	% CO =	0	Ps (ABS) =	29.44
Tm (°R) =	513.8	% N2 =	81.74	SQRT DELTA P =	0.3159
VI (TOT) =	21.0	Cp =	0.84	Y =	0.9898
VI (adj) =	NA	TIME =	60	An =	0.000779

Vm std =	$\frac{17.64 (Vm)(Y)(DELTA H ABS)}{(Tm)}$	=	47.832 DSCF
Vw std =	.04707 (VI TOT)	=	0.988 CF
Bwo =	Vw std / (Vw std) + (Vm std)	=	0.020
Bwo =	by steam tables	=	NA
1 - Bwo =	1 - Bwo	=	0.980
Md (DRY)=	0.44 (% CO2) + 0.32 (% O2) + 0.28 (% CO) + 0.28 (% N2)	=	30.011 LB/LB MOLE
Ms (WET)=	MD (1-Bwo) + 18 (Bwo)	=	29.768 LB/LB MOLE
G =	SQRT (Ts/Ps/Ms)	=	0.843
Vs =	85.49 (Cp) (G) (SQRT DELTA P)	=	19.118 FPS 9040.908 cfm
Qs =	3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts)	=	443449 DSCFH
	= (DSCFH/(1-%H2O))/60		7544 WSCFM
% ISO =	$\frac{100 (Ts) (Vm std) (Pstd)}{60 (Tstd) (Vs) (Time) (An) (Ps) (1-Bwo)}$	=	109.0

ISOKINETIC CALCULATION SHEET

Facility/Site: UBWPAD	Run No.: U2-R2-M5/26A
Source: EU 2	Date: 15-Mar-07

Ts (°F) =	176.1	% CO2 =	9.64	Vm (CF) =	49.099
Ts (°R) =	636.1	% O2 =	8.73	DELTA H (ABS) =	29.54
Tm (°F) =	61.2	% CO =	0	Ps (ABS) =	29.36
Tm (°R) =	521.2	% N2 =	81.64	SQRT DELTA P =	0.3431
VI (TOT) =	30.5	Cp =	0.84	Y =	0.9898
VI (adj) =	NA	TIME =	60	An =	0.000779

Vm std =	$\frac{17.64 (Vm)(Y)(DELTA H ABS)}{(Tm)}$	=	48.585 DSCF
Vw std =	.04707 (VI TOT)	=	1.436 CF
Bwo =	Vw std / (Vw std) + (Vm std)	=	0.029
Bwo =	by steam tables	=	NA
1 - Bwo =	1 - Bwo	=	0.971
Md (DRY)=	0.44 (% CO2) + 0.32 (% O2) + 0.28 (% CO) + 0.28 (% N2)	=	29.891 LB/LB MOLE
Ms (WET)=	MD (1-Bwo) + 18 (Bwo)	=	29.549 LB/LB MOLE
G =	SQRT (Ts/Ps/Ms)	=	0.856
Vs =	85.49 (Cp) (G) (SQRT DELTA P)	=	21.097 FPS
Qs =	3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts)	=	473484 DSCFH
	= (DSCFH/(1-%H2O))/60		8125 WSCFM
% ISO =	$\frac{100 (Ts) (Vm std) (Pstd)}{60 (Tstd) (Vs) (Time) (An) (Ps) (1-Bwo)}$	=	103.7

ISOKINETIC CALCULATION SHEET

Facility/Site: UBWPAD	Run No.: U2-R3-M5/26A
Source: EU 2	Date: 15-Mar-07

Ts (°F) =	171.3	% CO2 =	9.74	Vm (CF) =	49.326
Ts (°R) =	631.3	% O2 =	8.62	DELTA H (ABS) =	29.57
Tm (°F) =	55.4	% CO =	0	Ps (ABS) =	29.39
Tm (°R) =	515.4	% N2 =	81.65	SQRT DELTA P =	0.3448
VI (TOT) =	26.0	Cp =	0.84	Y =	0.9898
VI (adj) =	NA	TIME =	60	An =	0.000779

Vm std =	$\frac{17.64 (Vm)(Y)(DELTA H ABS)}{(Tm)}$	=	49.410 DSCF
Vw std =	.04707 (VI TOT)	=	1.224 CF
Bwo =	$Vw std / (Vw std) + (Vm std)$	=	0.024
Bwo =	by steam tables	=	NA
1 - Bwo =	1 - Bwo	=	0.976
Md (DRY)=	$0.44 (\% CO2) +$ $0.32 (\% O2) +$ $0.28 (\% CO) +$ $0.28 (\% N2)$	=	29.903 LB/LB MOLE
Ms (WET)=	$MD (1-Bwo) + 18 (Bwo)$	=	29.615 LB/LB MOLE
G =	$SQRT (Ts/Ps/Ms)$	=	0.852
Vs =	$85.49 (Cp) (G) (SQRT DELTA P)$	=	21.087 FPS
Qs =	$3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts)$ $(DSCFH/(1-\%H2O))/60$	=	479584 DSCFH 8191 WSCFM
% ISO =	$\frac{100 (Ts) (Vm std) (Pstd)}{60 (Tstd) (Vs) (Time) (An) (Ps) (1-Bwo)}$	=	104.2

PARTICULATE EMISSION CALCULATION SHEET

PLANT:	UBWPAD	RUN #:	U2-R1-M5/26A
LOCATION:	EU 2	DATE:	15-Mar-07

			BLANKS	
	<u>FILTER</u>	<u>BEAKER</u>	<u>FILTER</u>	<u>ACETONE</u>
NUMBER :	9567	00-52	9589	00-133
FINAL :	0.3840	118.0539	0.3673	100.9400
TARE :	<u>0.3820</u>	<u>118.0527</u>	<u>0.3681</u>	<u>100.9396</u>
NET :	0.0020	0.0012	-0.0008	0.0004
VOLUME BLANK RINSE				100
VOLUME OF RINSE				125

Mn - Ar = Mn	O2 =	7.58
	CO2 =	10.67
Mn = 3.200	Vs =	19.12 ft/sec
Ar = 0.500	As =	7.88 ft ²
	Vm std =	47.83 DSCF
Mn = 2.700	Ffactor =	n/a

Qs =	3600(1-Bwo)(Vs)(As)(17.64)(Ps/Ts) =	443449 DSCFH
	3600 (Vs) (As)	= 542454 ACFH
	ACFH / 60	= 9041 ACFM
Cs =	(2.205 E-6) (Mn) / (Vm Std)	= 1.24E-07 lb/dscf
Cs' =	0.0154 (Mn) / (VmStd)	= 0.00087 grains/dscf
Cs'12 =	Cs' x 12 / %CO2	= 0.00098 grains/dscf @ 12% CO2
PMR =	Qs x Cs	= 0.05520 lb/hr
Sludge Process Rate		= 1.95 dry tons sludge / hr
PMR' =	(PM lb/hr) / (tons sludge / hour)	= 2.83E-02 lb/dry ton of sludge
TPY =	(lb/hr) / (2000 lb/ton) x (8760 hr/yr)	= 2.42E-01 tons/per year

PARTICULATE EMISSION CALCULATION SHEET

PLANT	UBWPAD	RUN # :	U2-R2-M5/26A
LOCATION	EU 2	DATE :	15-Mar-07

		BLANKS	
	<u>FILTER</u>	<u>BEAKER</u>	<u>FILTER</u> <u>ACETONE</u>
NUMBER :	9568	427	9589 00-133
FINAL :	0.3671	109.5796	0.3673 100.94
TARE :	<u>0.3672</u>	<u>109.5784</u>	<u>0.3681</u> <u>100.9396</u>
NET :	0	0.0012	-0.0008 0.0004
VOLUME BLANK RINSE			100
VOLUME OF RINSE			150

Mn - Ar = Mn	O2 =	8.73
	CO2 =	9.64
Mn = 1.200	Vs =	21.10 ft/sec
Ar = <u>0.600</u>	As =	7.88 ft2
	Vm std=	48.59 DSCF
Mn = 0.600	Ffactor =	0.0

Qs = 3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts) =	473484 DSCFH
3600 (Vs) (As)	= 598609.8 ACFH
ACFH / 60	= 9977 ACFM
Cs = (2.205 E-6) (Mn) / (Vm Std)	= 2.72E-08 lb/dscf
Cs' = 0.0154 (Mn) / (VmSTD)	= 0.00019 grains/dscf
Cs'12 = Cs' x 12 / %CO2	= 0.00024 grains/dscf @ 12% CO2
PMR = Qs x Cs	= 0.0129 lb/hr
Sludge Process Rate	= 1.95 dry tons sludge / hr
PMR' = (PM lb/hr) / (tons sludge / hour)	= 6.61E-03 lb/dry ton of sludge
TPY = (lb/hr) / (2000 lb/ton) x (8760 hr/yr)	= 5.65E-02 tons/per year

PARTICULATE EMISSION CALCULATION SHEET

PLANT	UBWPAD	RUN # :	U2-R3-M5/26A
LOCATION	EU 2	DATE :	15-Mar-07

			BLANKS	
	<u>FILTER</u>	<u>BEAKER</u>	<u>FILTER</u>	<u>ACETONE</u>
NUMBER :	9569	98-5	9589	00-133
FINAL :	0.3741	98.3376	0.3673	100.94
TARE :	<u>0.3740</u>	<u>98.3356</u>	<u>0.3681</u>	<u>100.9396</u>
NET :	0.0001	0.002	-0.0008	0.0004
VOLUME BLANK RINSE				100
VOLUME OF RINSE				200

Mn - Ar = Mn	O2 =	8.62
	CO2 =	9.74
Mn = 2.100	Vs =	21.09 ft/sec
Ar = <u>0.800</u>	AS =	7.88 ft2
	Vm std=	49.41 DSCF
Mn = 1.300		

Qs = 3600 (1-Bwo)(Vs)(As)(17.64)(Ps/Ts) =	479584 DSCFH
3600 (Vs) (As) =	598310.5 ACFH
ACFH / 60 =	9972 ACFM
Cs = (2.205 E-6) (Mn) / (Vm Std) =	5.8E-08 lb/dscf
Cs' = 0.0154 (Mn) / (VmSTD) =	0.00041 grains/dscf
Cs'12 = Cs' x 12 / %CO2 =	0.00050 grains/dscf @ 12% CO2
PMR = Qs x Cs =	0.0278 lb/hr
Sludge Process Rate =	1.94 dry tons sludge / hr
PMR' = (PM lb/hr) / (tons sludge / hour) =	1.43E-02 lb/dry ton of sludge
TPY = (lb/hr) / (2000 lb/ton) x (8760 hr/yr) =	1.22E-01 tons/per year

Emission Summary - Hydrogen Chloride via EPA Method 26A

Client: UBWPAD		Date: 3/15/2007								
Facility: UBWPAD										
Source: EU 2										
Run I.D.	HCl	Sample Vol.	Flow	O ₂	concentration/emission rate					
	ug	dscf	dscfh	%	lb/dscf	ug/M3	ppm	ppm @7% O ₂	lb/hr	tons/year
U2-R1-M5/26A	620	47.832	443.449	7.58	2.86E-08	4.58E+02	0.30	0.32	1.27E-02	5.56E-02
U2-R2-M5/26A	560	48.585	473.484	8.73	2.54E-08	4.07E+02	0.27	0.31	1.21E-02	5.28E-02
U2-R3-M5/26A	600	49.410	479.584	8.62	2.68E-08	4.29E+02	0.28	0.32	1.29E-02	5.63E-02
Blank	<	200								

Calculations:

$$\text{lb/dscf} = (2.205\text{E-}9 \times \text{ug}) / \text{dscf}$$
$$\text{ug/M3} = \text{ug} / (\text{dscf} \times 0.02832)$$
$$\text{ppm} = (\text{lb/dscf}) \times 1\text{E}06 \times 386.1 / (\text{HCl MW})$$
$$\text{ppm @7\%O}_2 = \text{ppm} \times (20.9-7) / (20.9-\text{O}_2\%)$$
$$\text{lb/hr} = \text{lb/dscf} \times \text{dscfh}$$
$$\text{tons/year} = (\text{lb/hr}) / (2000 \text{ lb/ton}) \times (8760 \text{ hours/year})$$

Parameters:

HCl (Hydrogen Chloride) MW: 36.461

Note: "<" represents reportable detection limit (RDL)

Emission Summary - Hydrogen Fluoride via EPA Method 26A

Client: UBWPAD		Date: 3/15/2007								
Facility: UBWPAD										
Source: EU 2										
Run I.D.	HF	Sample Vol.	Flow	O ₂	lb/dscf	ug/M3	concentration/emission rate			
	ug	dscf	dscfh	%			ppm	ppm @7% O ₂	lb/hr	ton/year
U2-R1-M5/26A	190	47.832	443,449	7.58	8.76E-09	1.40E+02	0.17	0.18	3.9E-03	1.7E-02
U2-R2-M5/26A	150	48.585	473,484	8.73	6.81E-09	1.09E+02	0.13	0.15	3.2E-03	1.4E-02
U2-R3-M5/26A	< 150	49.410	479,584	8.62	6.69E-09	1.07E+02	0.13	0.15	3.2E-03	1.4E-02
Blank	< 150									

Calculations:

lb/dscf = (2.205E-9 x ug) / dscf

ug/M3 = ug / (dscf x 0.02832)

ppm = (lb/dscf) x 1E06 x 386.1 / (HF MW)

ppm @7%O₂ = ppm x (20.9-7) / (20.9-O₂%)

lb/hr = lb/dscf x dscfh

tons/year = (lb/hr) / (2000 lb/ton) x (8760 hours/year)

Parameters:

HF (Hydrogen Fluoride) MW: 20.01

Note: "<" represents reportable detection limit (RDL)

TRAVERSE DATA SHEET

u2-

Facility/Site: UBWPAD		Run No.: U2-R1-M5/HCL/HF	
Source: Unit #2		Date: 3/15/07	

Impinger Volumes (ml):		Sampling Parameters										
		Traverse Point	Delta P (H ₂ O)	Delta H ("H ₂ O)	Dry Gas Meter		Stack Temp (F)	Meter Reading (CF)	Probe Temp (F)	Filter Temp (F)	Impinger Temp (F)	Vacuum ("Hg)
					In (F)	Out (F)						
1 - Initial	100	A1	.09	1.8	54	52	163	600.8	250	254	54	3
2 - Initial	100	2	.10	2.0	54	51	174	604.7	251	250	48	3
3 - Initial	0	3	.41	2.2	56	52	175	608.8	250	250	51	3
4 - Initial	200	4	.41	2.2	58	52	166	608.8	251	252	55	4
5 - Initial		5	.10	2.0	59	53	159	616.8	251	250	58	4
6 - Initial		6	.10	2.0	60	53	158	620.8	251	249	60	4
7 - Initial												
1 - Final	88	B1	.09	1.8	56	54	154	624.6	253	251	60	4
2 - Final	112	2	.10	2.0	60	55	170	628.4	252	247	60	4
3 - Final	7	3	.12	2.4	61	55	159	632.9	252	248	60	4
4 - Final	214.0	4	.10	2.0	63	56	161	637.0	251	249	62	4
5 - Final		5	.09	1.8	63	56	162	640.7	251	250	64	4
6 - Final		6	.09	1.8	63	56	158		250	250	64	4
7 - Final												

Pstack ("H₂O):

Bar. Pres. ("Hg):

Run Time (min.): **60**

Final Meter (CF): **644.509**

Initial Meter (CF): **596.965**

Start Time: **09:27**

End Time: **10:30**

Filter Information:		Leak Checks:				Sampling Train Information:					
ID:	9567	Train-pre:	0.00	@	10	"Hg	Test Method:	M5/HCL/HF			
Tare (g):		Train-mid:	-	@	-	"Hg	Meter Box No.:	EE-6			
		Train-post:	0.06	@	10	"Hg	Delta H:	1.82			
Trap Information:		Pitot-pre:	04	@	73	"H ₂ O	Y:	0.9898			
ID:	-	Pitot-post:		@		"H ₂ O	K-factor:	20			
Field Team Members:						Nozzle ID: /Nozzle Diameter: 0.378 / 0.429					
1) JB 2) SH 3) JF						Probe ID: P-7-1					

Comments: **Test Paused at 9:57 to change Ports**
Test Resumed at 1000

TRAVERSE DATA SHEET

Facility/Site: UBWPAN					Run No.: 02-R2-M5/HCl/HF (RTOZ)				
Source: Unit #2					Date: 3/15/07				

Impinger Volumes (ml):		Sampling Parameters										
		Traverse Point	Delta P (H ₂ O)	Delta H ("H ₂ O)	Dry Gas Meter		Stack Temp (F)	Meter Reading (CF)	Probe Temp (F)	Filter Temp (F)	Impinger Temp (F)	Vacuum ("Hg)
					In (F)	Out (F)						
1 - Initial	106	B1	.11	1.8	58	58	174	648.9	248	248	58	3
2 - Initial	100	2	.13	2.3	58	57	168	653.1	248	250	50	3
3 - Initial	0	3	.15	2.7	61	58	159	657.7	248	250	55	4
4 - Initial	200	4	.11	1.9	63	58	190	661.7	250	252	56	5
5 - Initial		5	.10	1.8	64	58	185	665.7	248	250	57	4
6 - Initial		6	.09	1.62	66	58	187	669.1	249	251	60	4
7 - Initial												
1 - Final	94	A1	.12	2.2	60	59	168	673.3	250	252	58	4
2 - Final	114	2	.14	2.5	65	59	192	677.7	248	250	50	4
3 - Final	10	3	.13	2.3	67	60	183	682.0	248	249	52	4
4 - Final	212.5	4	.12	2.2	67	60	176	686.3	249	247	53	4
5 - Final		5	.12	2.2	67	60	173	690.4	248	247	53	4
6 - Final		6	.10	1.8	67	60	158		248	248	53	4
7 - Final												

Pstack ("H ₂ O):	-0.21
Bar. Pres. ("H _g):	
Run Time (min.):	60
Final Meter (CF):	694.032
Initial Meter (CF):	644.933
Start Time:	1205
End Time:	1311

Filter Information:		Leak Checks:				Sampling Train Information:				
ID:	9568	Train-pre:	0.01	@	10	"Hg	Test Method:	M5/HCl/HF		
Tare (g):		Train-mid:	-	@	-	"Hg	Meter Box No.:	EE-3		
		Train-post:	0.00	@	10	"Hg	Delta H:	1.82		
Trap Information:		Pilot-pre:	04	@	73	"H ₂ O	Y:	0.9898		
ID:	-	Pilot-post:	04	@	73	"H ₂ O	K-factor:	2018		
		Field Team Members:				Nozzle ID: /Nozzle Diameter:		10.378		
		1) JB	2) SH	3) JB			Probe ID:	07-1		

Comments: **Test was paused at 1235 to change Ports**
Test was resumed at 12:41

TRAVERSE DATA SHEET

Facility/Site: UBWPAD					Run No.: U2-R3-M5/HCI/HF				
Source: Unit #2					Date: 3/15/06				

Impinger Volumes (ml):		Sampling Parameters										
		Traverse Point	Delta P (H ₂ O)	Delta H ("H ₂ O)	Dry Gas Meter		Stack Temp (F)	Meter Reading (CF)	Probe Temp (F)	Filter Temp (F)	Impinger Temp (F)	Vacuum ("Hg)
					In (F)	Out (F)						
1 - Initial	100	A1	.12	2.2	52	52	188	698.5	250	249	53	4
2 - Initial	100	2	.12	2.2	52	52	183	702.8	249	246	46	4
3 - Initial	0	3	.13	2.3	54	52	190	706.9	248	250	50	4
4 - Initial	200	4	.12	2.2	57	52	175	711.2	249	252	52	4
5 - Initial		5	.11	2.0	59	53	161	715.2	249	250	55	4
6 - Initial		6	.11	2.0	60	53	155	719.1	247	250	54	4
7 - Initial												
1 - Final	104	B1	.11	2.0	54	53	151	723.1	247	252	53	4
2 - Final	106	2	.13	2.3	59	53	166	727.3	247	255	51	4
3 - Final	4	3	.14	2.5	60	53	167	731.7	248	247	53	4
4 - Final	212.0	4	.13	2.3	62	54	172	736.0	247	252	54	5
5 - Final		5	.11	2.0	62	54	170	739.9	248	247	55	5
6 - Final		6	.10	1.8	63	54	177		249	249	54	5
7 - Final												

Pstack ("H₂O): **-21**

Bar. Pres. ("Hg):

Run Time (min.): **60**

Final Meter (CF): **743.804**

Initial Meter (CF): **694.478**

Start Time: **1510**

End Time: **1616**

Filter Information:		Leak Checks:				Sampling Train Information:				
ID:	9569	Train-pre:	0.00	@	10	"Hg	Test Method:	145/HCI/HF		
Tare (g):		Train-mid:	-	@	-	"Hg	Meter Box No.:	FE-3		
		Train-post:	0.00	@	10	"Hg	Delta H:	1.82		
Trap Information:		Pitol-pre:	04	@	23	"H ₂ O	Y:	0.9898		
ID:	-	Pitol-post:	04	@	23	"H ₂ O	K-factor:			
Field Team Members:						Nozzle ID: /Nozzle Diameter:		10.378		
1) JB 2) JH 3) JF						Probe ID:		P-7-1		

Comments: **Test was paused at 1540 to change ports
Test was resumed at 1546**