1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted an Industrial Boiler Maximum Achievable Control Technology (IB MACT) test program for Verso Corporation at the Quinnesec Mill on Waste Fuel (Hog) Boiler Outlet Duct on May 5, 2020. This report summarizes the results of the test program and test methods used.

Test location, test date, and test parameters are summarized below.

TEST INFORMATION		
Test Location	**Test Date**	**Test Parameters**
Waste Fuel (Hog) Boiler Outlet Duct	May 5, 2020	Filterable Particulate Matter (FPM), Hydrogen Chloride (HCl), Mercury (Hg), and Carbon Monoxide (CO)

The purpose of the test program was to evaluate the FPM, HCl, and Hg emissions against the IB MACT standards under the stoker/sloped grate wet biomass fuel category. Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report.

TEST RESULTS				
Test Location	**Test Date**	**Test Parameter**	**Emission Limit**	**Emission Rate**
Waste Fuel (Hog) Boiler Outlet Duct	5/5/2020	FPM	0.037 lb/mmBtu	0.0058 lb/mmBtu (Fd-Factor)
		HCl	0.022 lb/mmBtu	0.0051 lb/mmBtu (Fd-Factor)
		Hg	0.0000057 lb/mmBtu	0.00000097 lb/mmBtu (Fd-Factor)
		CO	1500 ppmvd @ 3% O_2	313.8 ppmvd @ 3% O_2

Calculated Fd-Factors supplied by Verso Corporation was used to calculate the emissions on a lb/mmBtu basis. Plant operating data as provided by Verso Corporation is included in Appendix A.

The Stationary Source Audit Sample Program audit sample was obtained from ERA and analyzed by MP in the Elmhurst laboratory. The result of the audit sample was compared to the assigned value by ERA and found to be acceptable. The audit sample result and evaluation are appended to this report.

The identifications of the individuals associated with the test program are summarized below.

TEST PERSONNEL INFORMATION		
Location	**Address**	**Contact**
Test Facility	Verso Corporation U.S. Highway 2 Quinnesec, Michigan 49876	Ms. Paula LaFleur Environmental Engineer (906) 779-3494 (phone) paula.lafleur@versopaper.com
Testing Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Christopher E. Jensen Project Manager (630) 993-2100 (phone) @mp-mail.com

The test crew consisted of Messrs. B. Garcia, C. Trezak, J. Nestor, and Chris Jensen of Mostardi Platt. Ms Sydney Bruestle of the EGLE Marquette District Office observed a portion of the test program.

2.0 TEST METHODOLOGY

Emissions testing were conducted following the methods specified in 40 CFR, Part 60, Appendix A. Schematics of the test section diagram and sampling trains used are found in Appendix B and C, respectively. Calculation nomenclature and sample calculations are found in Appendix D. Sample analysis data are found in Appendix E. Copies of reference method data and field data sheets for each test run are included in Appendix F and G, respectively.

The following methodologies were used during the test program:

Method 1 Traverse Point Determination

Test measurement points were selected in accordance with Method 1. The characteristics of the measurement location are summarized below.

TEST POINT INFORMATION						
Location	**Stack Diameter (Feet)**	**Stack Area (Square Feet)**	**Upstream Diameters**	**Downstream Diameters**	**Test Parameter**	**Number of Sampling Points**
Waste Fuel (Hog) Boiler Outlet Duct	10.18	81.393	>0.5	>2.0	FPM, HCl	24
					CO	12 (Run 1-Stratification,Runs 2 and 3)

Gaseous Stratification Test

A 12 point stratification test was performed during Run 1. The results were not less than 10% difference so 12 test points were run for both Runs 2 and 3.

Method 2 Volumetric Flowrate Determination

Gas velocity was measured following Method 2, for purposes of calculating stack gas volumetric flow rate. An S-type pitot tube, differential pressure gauge, thermocouple and temperature readout were used to determine gas velocity at each sample point. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 3A Oxygen (O_2)/Carbon Dioxide (CO_2) Determination

Stack gas molecular weight was determined in accordance with Method 3A, 40 CFR, Part 60, Appendix A. A Servomex analyzer was used to determine stack gas oxygen and carbon dioxide content and, by difference, nitrogen content. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H and gas cylinder certifications are presented in Appendix I.

Method 5 Filterable Particulate Matter (FPM) Determination

Stack gas FPM concentrations and emission rates were determined in accordance with USEPA Method 5, 40CFR60, Appendix A with filter and probe temperatures between 248 and 273 degrees Fahrenheit. An Environmental Supply Company, Inc. sampling train was used to sample stack gas at an isokinetic rate, as specified in the Method utilizing Pallflex TX40HI45 filters. Particulate matter in the sample probe was recovered using an acetone rinse. The probe wash and filter catch were analyzed by Mostardi Platt in accordance with the Method in the Elmhurst, Illinois laboratory. Sample analysis data are found in Appendix E. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 10 Carbon Monoxide (CO) Determination

Stack gas carbon monoxide concentrations and emission rates were determined in accordance with Method 10. A Thermo Scientific carbon monoxide analyzer was used to determine carbon monoxide concentrations, in the manner specified in the Method.

Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250°F. Excess moisture in the stack gas was removed using a refrigerated condenser. The entire system was calibrated in accordance with the Method, using certified calibration gases introduced at the probe, before and after each test run.

A list of calibration gases used and the results of all calibration and other required quality assurance checks can be found in Appendix G. Copies of calibration gas certifications can be found in Appendix H.

Method 26A Hydrogen Chloride (HCl) Determination

Stack gas hydrogen chloride concentrations and emission rates were determined in accordance with Method 26A, 40CFR60, Appendix A in conjunction with the USEPA Method 5 sampling. An Environmental Supply Company sampling train was used to sample stack gas, in the manner specified in the Method utilizing Pallflex TX40HI45 filters. Analyses of the samples collected were conducted by Mostardi Platt in the Elmhurst laboratory. Sample analysis data are found in Appendix F. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix I.

Mercury Determination by Method 30B (Sorbent Trap Method)

Paired trains were utilized sampling three test points per test run.

Per Method 30B sampling, each sample was collected on the paired in-situ sorbent traps. A tube of silica was used to capture remaining moisture prior to the sample reaching the gas metering system.

The sample train used for this test program was designed by APEX, Inc. and meets all requirements for Method 30B sampling. Samples were analyzed onsite utilizing an Ohio Lumex, Inc. analyzer for total gaseous mercury. Mercury quality assurance and control data are found in Appendix J. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

3.0 TEST RESULTS SUMMARIES

Client: Verso Corporation
Facility: Quinnesec Mill
Test Location: Waste Fuel (HOG) Boiler Outlet Duct
Test Method: 5/26A

Source Condition	**Normal**	**Normal**	**Normal**	
Date	**5/5/20**	**5/5/20**	**5/5/20**	
Start Time	**8:50**	**11:10**	**13:35**	
End Time	**10:52**	**13:12**	**15:37**	
	Run 1	**Run 2**	**Run 3**	**Average**
Stack Conditions				
Average Gas Temperature, °F	392.2	395.8	398.6	395.5
Flue Gas Moisture, percent by volume	20.8%	21.5%	23.0%	21.8%
Average Flue Pressure, in. Hg	28.81	28.81	28.81	28.81
Gas Sample Volume, dscf	85.998	87.362	87.066	86.809
Average Gas Velocity, ft/sec	61.142	61.596	62.000	61.579
Gas Volumetric Flow Rate, acfm	256,797	258,702	260,399	258,633
Gas Volumetric Flow Rate, dscfm	121,249	120,687	118,662	120,199
Gas Volumetric Flow Rate, scfm	153,184	153,682	154,180	153,682
Average %CO_2 by volume, dry basis	14.3	14.2	14.1	14.2
Average %O_2 by volume, dry basis	6.1	6.1	6.2	6.1
Isokinetic Variance	97.5	99.5	100.9	99.3
Calculated Fuel Factor Fd, dscf/mmBtu	9,615.0	9,615.0	9,614.0	9,614.7
Filterable Particulate Matter (Method 5)				
grams collected	0.01673	0.01629	0.01743	0.01682
grains/acf	0.0014	0.0013	0.0014	0.0014
grains/dscf	0.0030	0.0029	0.0031	0.0030
lb/hr	3.120	2.976	3.142	3.079
lb/mmBtu (Calculated Fd Factor)	0.0058	0.0056	0.0060	0.0058

Client: Verso Corporation
Facility: Quinnesec Mill
Test Location: Waste Fuel (HOG) Boiler Outlet Duct
Test Method: 5/26A

Source Condition	Normal	Normal	Normal	
Date	5/5/20	5/5/20	5/5/20	
Start Time	8:50	11:10	13:35	
End Time	10:52	13:12	15:37	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	392.2	395.8	398.6	395.5
Flue Gas Moisture, percent by volume	20.8%	21.5%	23.0%	21.8%
Average Flue Pressure, in. Hg	28.81	28.81	28.81	28.81
Gas Sample Volume, dscf	85.998	87.362	87.066	86.809
Average Gas Velocity, ft/sec	61.142	61.596	62.000	61.579
Gas Volumetric Flow Rate, acfm	256,797	258,702	260,399	258,633
Gas Volumetric Flow Rate, dscfm	121,249	120,687	118,662	120,199
Gas Volumetric Flow Rate, scfm	153,184	153,682	154,180	153,682
Average %CO_2 by volume, dry basis	14.3	14.2	14.1	14.2
Average %O_2 by volume, dry basis	6.1	6.1	6.2	6.1
Isokinetic Variance	97.5	99.5	100.9	99.3
Calculated Fuel Factor Fd, dscf/mmBtu	9,615.0	9,615.0	9,614.0	9,614.7
Hydrogen Chloride (HCl) Emissions				
ug of sample collected	12465.00	18121.00	14074.00	14886.67
ppm	3.37	4.83	3.76	3.99
mg/dscm	5.12	7.33	5.71	6.05
lb/hr	2.32	3.31	2.54	2.72
lb/mmBtu (Calculated Fd Factor)	0.0043	0.0062	0.0049	0.0051

Verso Corporation Quinnesec Mill Waste Fuel (HOG) Boiler Outlet Duct Gaseous Summary Normal Load												
Test No.	Date	Start Time	End Time	CO ppmvd	CO_2 % (dry)	O_2 % (dry)	Moisture, %	Flowrate, DSCFM	CO lb/hr	Fd Factor, dscf/MMBtu	O2 based CO lb/MMBtu	CO ppmvd @ 3% O_2
1	05/05/20	08:50	09:55	300.2	14.5	6.0	20.8	121,249	158.68	9,615.0	0.294	360.6
2	05/05/20	11:10	12:16	270.4	14.0	6.3	21.5	120,687	142.27	9,616.0	0.270	331.5
3	05/05/20	13:35	14:40	203.4	14.1	6.3	23.0	118,656	105.22	9,614.0	0.203	249.4
Average				258.0	14.2	6.2	21.8	120,197	135.39	9,615.0	0.256	313.8

Method 30B (Sorbent Trap) Mercury Test Results Summary
Verso Paper Corporation
Quinnesec, MI
Waste Fuel (HOG) Boiler Duct

Test No.	Date	Start Time	End Time	V_m (standard L)	ng detected	ppb	ug/dscm	ug/wscm	lb/mmbtu (Fd Factor)	lb/mmbtu (Heat Input)
1A	5/5/2020	8:50	9:50	52.362	54.5	0.125	1.041	0.824	0.00000088	0.00000087
1B				52.192	52.6	0.121	1.008	0.798	0.00000085	0.00000084
Average				52.277	53.6	0.123	1.024	**0.811**	0.00000086	**0.00000086**
2A	5/5/2020	11:10	12:10	51.522	59.4	0.138	1.153	0.905	0.00000099	0.00000100
2B				51.509	71.7	0.167	1.392	1.093	0.00000120	0.00000121
Average				51.516	65.6	0.153	1.272	**0.999**	0.00000109	**0.00000111**
3A	5/5/2020	13:35	14:35	51.179	52.1	0.122	1.018	0.784	0.00000087	0.00000080
3B				51.196	60.0	0.140	1.172	0.902	0.00000101	0.00000092
Average				51.187	56.1	0.131	1.095	**0.843**	0.00000094	**0.00000086**

Emmisions Limit 0.0000057 lb/mmBtu (Heat Input)	ng detected	ppb	ug/dscm	ug/wscm	lb/Tbtu (Fd Factor)	lb/Tbtu (Heat Input)
Average of Runs 1-3	**58.4**	**0.136**	**1.131**	**0.884**	**0.00000097**	**0.00000094**

4.0 CERTIFICATION

MOSTARDI PLATT is pleased to have been of service to Verso Corporation. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

CERTIFICATION

As project manager, I hereby certify that this test report represents a true and accurate summary of emissions test results and the methodologies employed to obtain those results, and the test program was performed in accordance with the methods specified in this test report.

MOSTARDI PLATT

Program Manager

Christopher E. Jensen

Quality Assurance

Scott W. Banach

APPENDICES

Appendix A - Plant Operating Data and Fuel Analysis

Wast Fuel Boiler Process Data

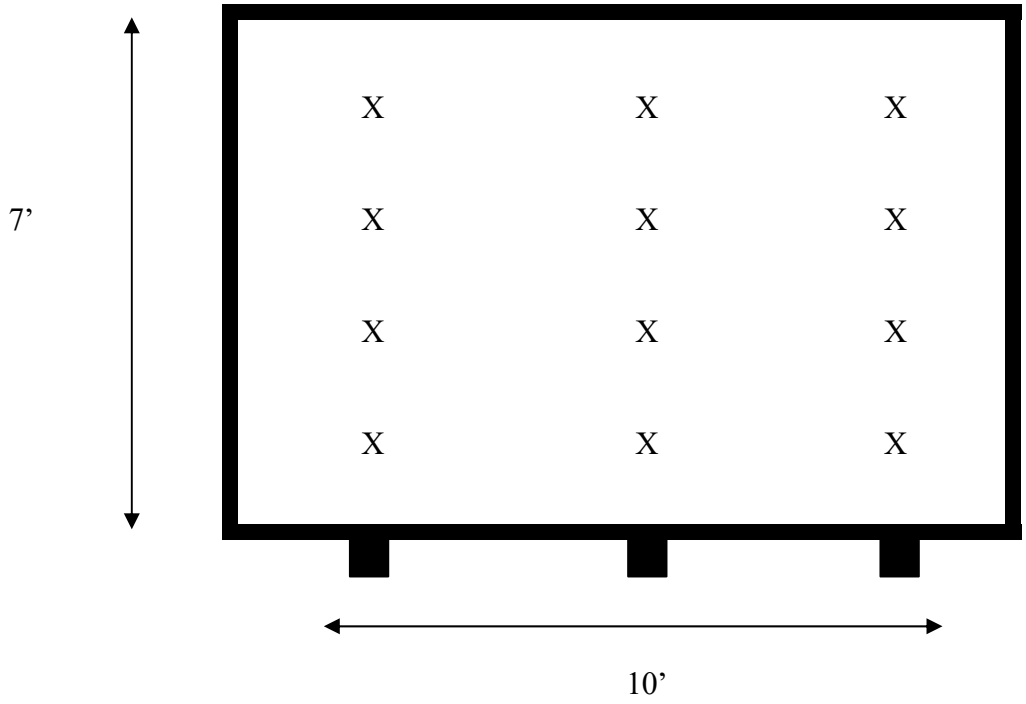
	Date/time	Hog (tons/hr) short belt scale	Coal (lb/hr)	Average steaming rate (Kpph)	Nat gas flow (kscfh)	Heat Input (MMBTU/HR	adjusted belt scale tons/hr*	adjusted heat input (mmBTU/hr)	O2 Trim (% O2)	F-Factor
Hg & CO #1	5/5/2020 8:50 5/5/2020 9:55	52.6	3732	381	0.00	485	59.5	543	4	9615
Hg & CO #2	5/5/2020 11:10 5/5/2020 12:16	50.1	3732	375	0.00	464	56.6	519	4	9616
Hg & CO #3	5/5/2020 13:35 5/5/2020 14:40	55.4	3732	381	0.00	508	62.6	569	4	9614
FPM & HCl #1	5/5/2020 8:50 5/5/2020 10:52	51.6	3732	382	0.00	477	58.4	533	NA	9615
FPM & HCl #2	5/5/2020 11:10 5/5/2020 13:12	51.7	3732	376	0.00	477	58.5	534	NA	9615
FPM & HCl #3	5/5/2020 13:35 5/5/2020 15:37	56.1	3732	379	0.00	514	63.4	576	NA	9614

Tons hog fuel in month per bark to bin weightometer	34740
Tons hog fuel in month per Accounting	39302
*Ratio	1.13

Maximum test run steam flow:	382
Maximum 30 day steam flow limit:	420
Minimum O2 trim setpoint:	4

Appendix B - Test Section Diagram

EQUAL AREA TRAVERSE FOR RECTANGULAR DUCTS



Job: Verso Corporation
Quinnesec Mill
Quinnesec, Michigan

Date: May 5, 2020

Area: 70 Square Feet

Test Location: Waste Fuel (Hog) Boiler Outlet Duct

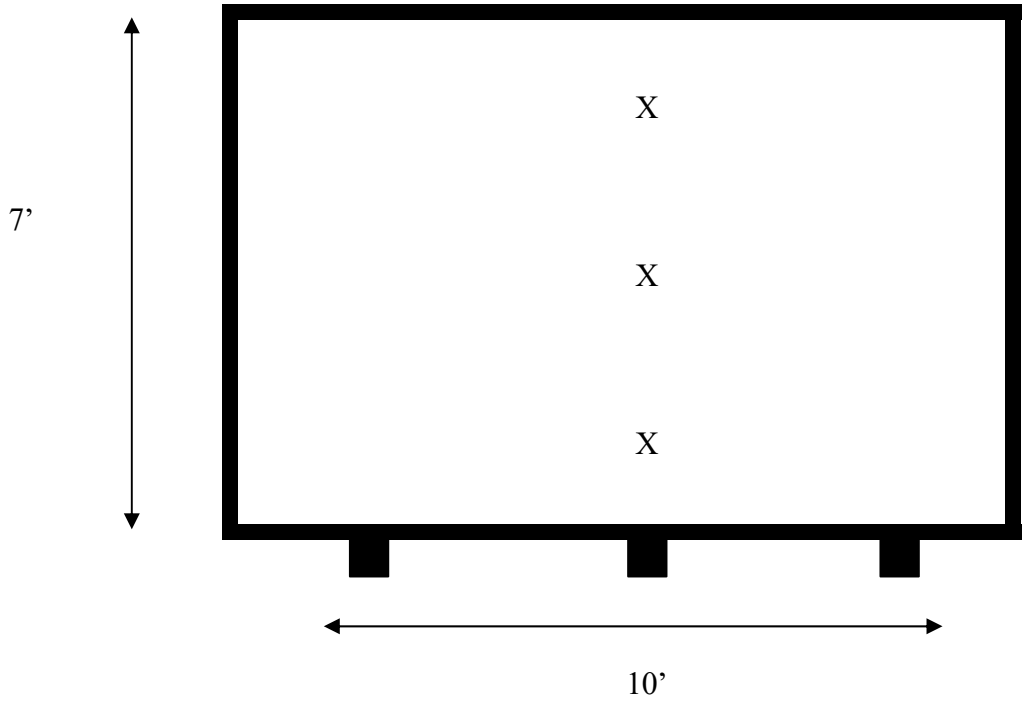
No. Test Ports: 3

Length: 7 Feet

Tests Points per Port: 4

Width: 10 Feet

EQUAL AREA TRAVERSE FOR RECTANGULAR DUCTS



Job: Verso Corporation
Quinnesec Mill
Quinnesec, Michigan

Date: May 5, 2020

Area: 70 Square Feet

Test Location: Waste Fuel (Hog) Boiler Outlet Duct

No. Test Ports: 1

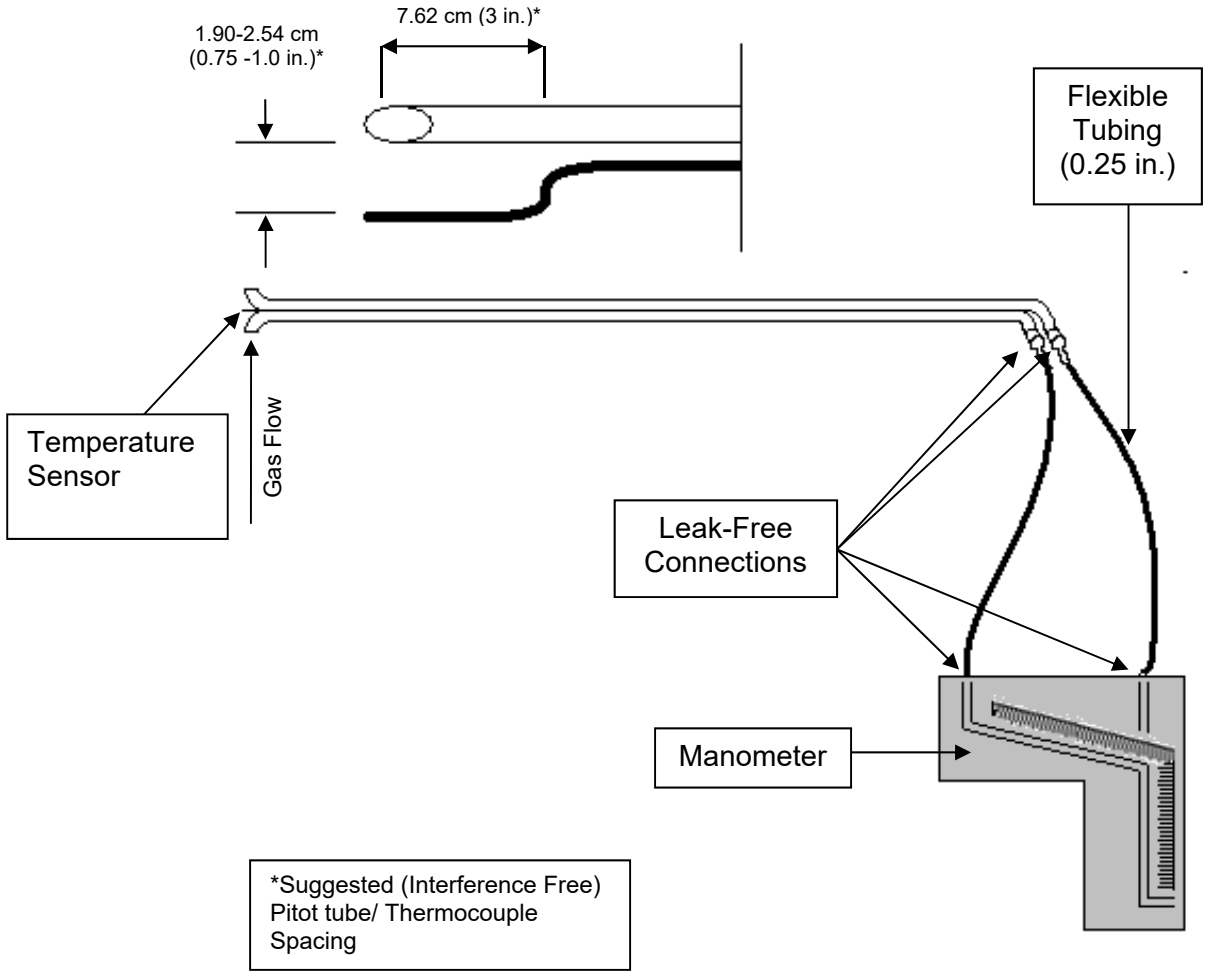
Length: 7 Feet

Tests Points per Port: 3

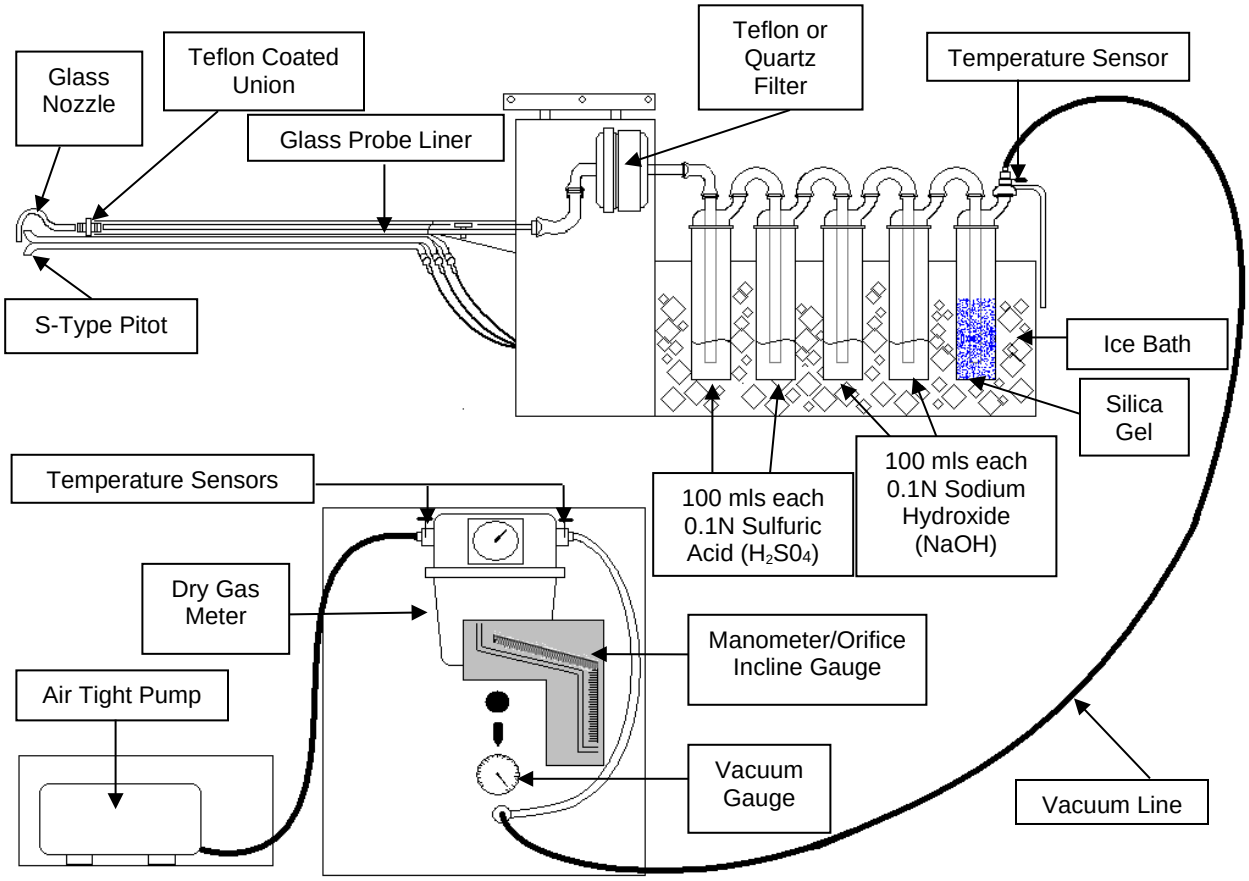
Width: 10 Feet

Appendix C - Sample Train Diagrams

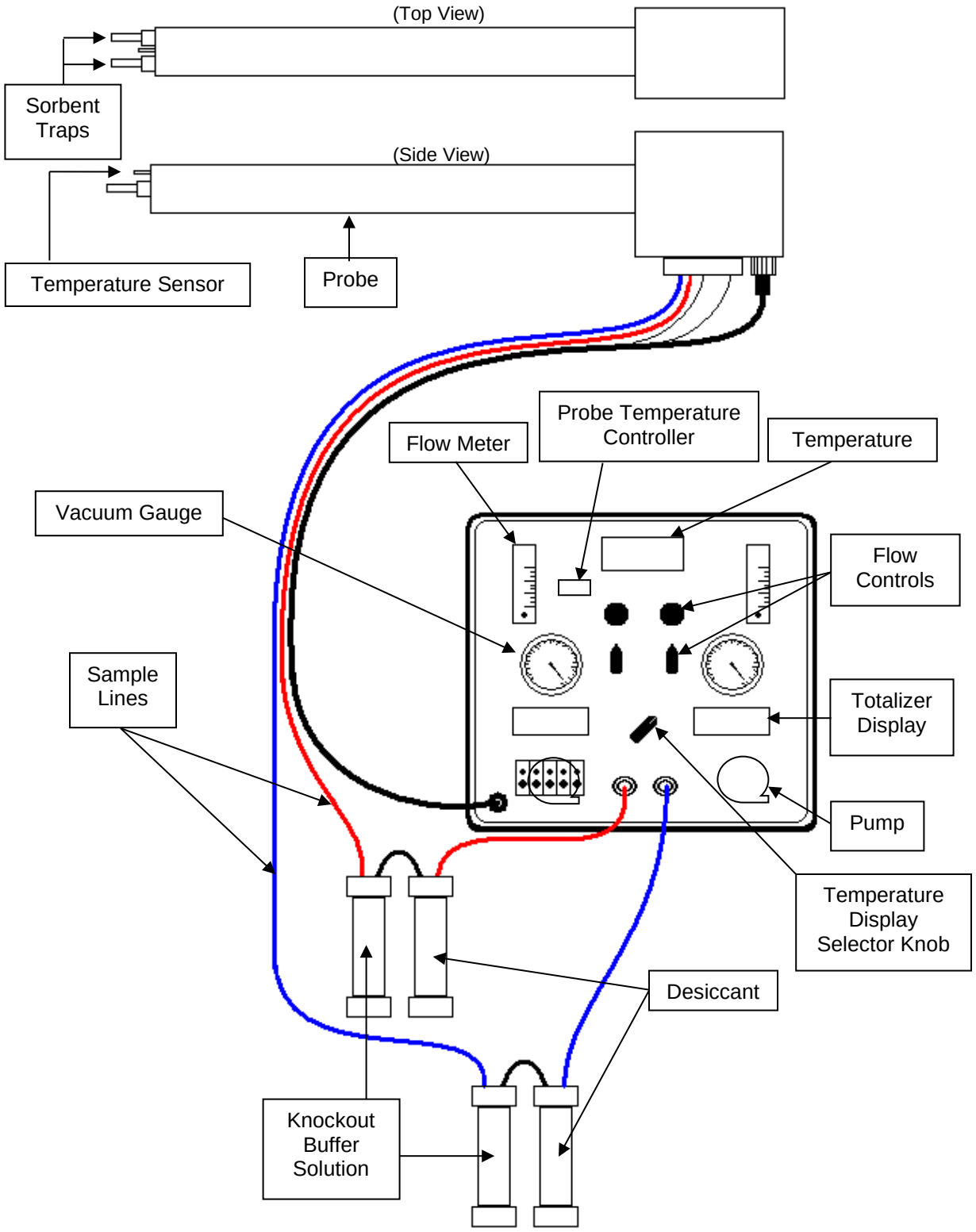
USEPA Method 2 – Type S Pitot Tube Manometer Assembly



USEPA Method 5/26A –Particulate Matter/ HCl Sample Train Diagram



USEPA Method 30B- Mercury Sorbent Trap Sampling Train



USEPA Method 3A - Integrated Oxygen/Carbon Dioxide Sample Train Diagram Utilizing ECOM To Measure from Sample Exhaust