Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

New additional [illegible]ence

EMB Report 8[illegible]
May 1980

Air

EPA

Nonfossil Fueled Boilers

(24)

Emission Test Report
St. Joe Paper Company
Port St. Joe, Florida

Source Analysis Section, AMTB (MD-14)
Research Tri[illegible] Park, N. C. 27711

AP42 Section 1.6
4/93
Reference 27

Particulate $\frac{1.5\ lb}{10^6\ Btu}$ Back, ~~[illegible]~~ after cyclone

[illegible] after cyclone ~~[illegible]~~

[illegible] = $\frac{1.5\ lb}{10^6\ Btu}$ × $\frac{[illegible]\ Btu}{lb}$ × $\frac{[illegible]}{[illegible]}$

= 18.3 lb/ton

~ 15 lb/ton

[redacted]

[illegible] $\frac{[illegible]}{[illegible]}$ on a dry basis.

NONFOSSIL FUELED BOILERS

Emission Test Report
St. Joe Paper Company
Port St. Joe, Florida

Project No.: 80-WFB-5

Prepared for

Environmental Protection Agency
Office of Air Quality Planning and Standards
Emission Measurement Branch
Research Triangle Park
North Carolina 27711

by

James A. Peters and M. Timothy Thalman

Contract 68-02-2818, Work Assignment No. 25

May 1980

MONSANTO RESEARCH CORPORATION
DAYTON LABORATORY
1515 Nicholas Road
Dayton, Ohio 45407

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SECTION 1

Bark Fired

INTRODUCTION

The St. Joe Paper Company in Port St. Joe, Florida, was emission tested by Monsanto Research Corporation (MRC) for the U.S. Environmental Protection Agency (EPA) under Contract Number 68-02-2818, Work Assignment Number 25. The objective of the sampling program was to obtain emissions data from well-controlled sources for the development of new source performance standards for the nonfossil fuel-fired boiler industry.

Gaseous, particulate and benzo-alpha-pyrene (BaP) emissions were determined simultaneously at the inlet and outlet of the venturi scrubber unit serving the bark-fired number four boiler. The field test work was monitored by Dan Bivins, Field Testing Section, Emission Measurement Branch, EPA. The sampling conducted by MRC was directed by M. Timothy Thalman as team leader. The field testing conducted by TRW, Inc. for BaP emissions was led by James R. McReynolds. The collection methods employed were EPA Methods 1, 2, 3, 4, 5, 6, 7 and 9, with particulate sizing by Andersen cascade impactor and BaP collection via a modified EPA Method 5 train with a Battelle trap loaded with XAD-2 resin. The BaP samples collected were analyzed using a fluorescence spectrophotometric procedure.

The sampling at the Port St. Joe site was performed by MRC during January 16-17 and 21-24, 1980; and by TRW during January 18-21, 1980. Two levels of venturi scrubber pressure conditions were tested, three test runs at each level.

Quality assurance/quality control in the sampling area covered such activities as instrument calibration, using standard or approved sampling methods, chain-of-custody procedures, and protocols for the recording and calculation of data. QA/QC in the analysis area involved using only validated analysis methods, periodic operator QC checking and training, sample QC by the use of splits, reference standards, and spikes, and interlaboratory audits.

SECTION 2

SUMMARY OF RESULTS

In this emission test, Boiler #4 venturi scrubber inlet and outlet locations were sampled simultaneously for particulates and BaP; also, two distinctly different scrubber pressure conditions were maintained by plant operators. Test run numbers 1 through 3 were taken at a scrubber pressure drop of 8 in. H_2O; while test run numbers 4 through 6 were at a scrubber pressure drop of 13.5 in. H_2O. For BaP samples, run numbers BaP-1 through BaP-3 were taken at a scrubber pressure drop of 8 in H_2O pressure drop.

Pollutants which were measured for this emission test were particulate matter, BaP, particle size, CO_2, CO, SO_2, NO_x, and plume opacity. Table 1 presents the sampling and analysis schedule in condensed form.

Equipment setup for the emission test began on January 16. The first particulate emission test was performed on January 17. It was interrupted for over two hours due to plant problems with the venturi pressure drop, but otherwise proceeded normally. Average steam output of Boiler #4 during testing was 101,000 lb/hr.

On January 18 the first BaP emission test was performed. Average steam output was 100,000 lb/hr, and no difficulties were encountered. The bark feed rate was lowest during this test.

The second and third BaP tests were run on January 19, completing the three BaP emission runs at a scrubber pressure drop of 8 in. H_2O. Average steam outputs were 106,000 lb/hr and 100,000 lb/hr, respectively.

The fourth and fifth BaP tests were run on January 20, at a scrubber pressure drop of 13.5 in. H_2O. Average steam outputs were 103,000 lb/hr and 108,000 lb/hr, respectively. Near the end of the fourth BaP run a decrease in steam production was noted due to a switch from burning sawdust to bark. The boiler operator increased the bark feed rate to compensate and steam production increased to previous levels.

On January 21 the sixth BaP run was completed, and the third run at 13.5 in. H_2O scrubber pressure was finished. Average steam output was 104,000 lb/hr.

TABLE 1. ST. JOE PAPER COMPANY SAMPLING AND ANALYSIS SCHEDULE

Sampling site	Total number of samples	Sample type	Sampling method	Minimum sampling time	Initial analysis	
					Type	Method
Scrubber inlet	6	Particulate matter	EPA 5	60 min		
Scrubber inlet	6	Particle-size distribution	Andersen			
Scrubber inlet	6	Integrated gas analysis	EPA 3		CO_2, O_2, CO	EPA 3
Scrubber inlet	6	BaP	Modified EPA 5	60 min		Fluorescence spectrophotometry
Scrubber outlet	6	Particulate matter	EPA 5	60 min		
Scrubber outlet	6	Particle-size distribution	Andersen			
Scrubber outlet	6	Integrated gas analysis	EPA 3		CO_2, O_2, CO	EPA 3
Scrubber outlet	6	BaP	Modified EPA 5	60 min		Fluorescence spectrophotometry
Scrubber inlet and outlet	3	SO_2	EPA 6, option 2	Same as Method 5		
Scrubber outlet	3 runs, 4 samples each	NO_x	EPA 7	15 min intervals		
Scrubber outlet	6	Opacity	EPA 9			
Boiler feed conveyor	6 samples, 2 fuel analyses each	ASTM			Ultimate analysis and heating value	ASTM

Also, on January 21 the second particulate emission test was performed. The scrubber pressure drop was lowered to 8 in. H_2O. Average steam output was 99,000 lb/hr.

The third and fourth particulate emission tests were run on January 22. Test run #3 was conducted at a scrubber pressure drop of 8 in. H_2O, and test run #4 was at 13.5 in. H_2O. During the final 10 minutes of run #4 the venturi pressure drop slipped to 12.5 in. H_2O. Average steam outputs were 101,000 lb/hr and 102,000 lb/hr, respectively.

On January 23 the fifth and sixth particulate emission tests were completed, the last two runs at 13.5 in. H_2O scrubber pressure. Average steam outputs were 104,000 lb/hr and 108,000 lb/hr, respectively.

For the BaP tests, the inlet and outlet locations were sampled simultaneously at forty-eight points for three minutes a point. The particulate emission tests were conducted similarly, except that two minutes per sampling point were used for a total of 96 minutes per run.

Tables 2 and 3 summarize the data for particulate emissions and stack gas parameters. The first test run at the scrubber inlet was well outside of isokinetic variation and is not included in the averages for inlet runs. The sample line apparently had plugged because very little sample volume was pulled during the first half of the run. Also, the measured stack moisture was lower for run 1-I. Run 2-I had a malfunctioning stack temperature thermocouple which was discovered and corrections made. All other runs were made without any problems. The venturi scrubber unit demonstrated an average particulate removal efficiency of 92.4% at 8 in. H_2O pressure drop, and 94.4% at 13.5 in. H_2O.

Integrated gas analysis results are given in Table 4. No CO was detected in any test run at either inlet or outlet location.

Results of emission testing for BaP are given in Table 5 (scrubber inlet) and Table 6 (scrubber outlet). The emissions reported were near the minimum detectable limit of the method of analysis, which is 0.0001 μg/mL of extract. The analysis method originally chosen for the emission test was intended to be thin layer chromatography separation and measurement by scanning in-situ with a scanning attachment for a fluorescence spectrophotometer, but this method lacked the required sensitivity. The method used instead, narrow slit width fluorescence spectrophotometry, is a relative intensity technique relying on a curve plotted from standards. All of the BaP samples analyzed were at or near the origin of the standards curves, which led the emission rates reported to be very low, less than 0.00001 lb/hr BaP. Average emissions at the scrubber outlet are shown to be higher than those at the scrubber inlet, which indicates that analysis results are near minimum limits.

TABLE 2. ST. JOE PAPER COMPANY PARTICULATE EMISSION DATA AND STACK GAS PARAMETERS, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980 (ENGLISH UNITS)

Run number	Date	Time, min	Flow, dscfm	Stack temperature, °F	H_2O, %	Isokinetic, %	Emissions: Actual gr/dscf	Emissions: Actual lb/hr	Emissions: Actual lb/mm Btu	Emissions: Corrected, 12% CO_2 gr/dscf
Scrubber inlet (8 in. H_2O scrubber pressure)										
1	1/17/80	96	49,294	380	13.05	50.1	0.4799	202.75	1.464	0.6399
2	1/21/80	96	41,191	372	18.11	97.4	0.3161	111.6	0.827	0.4079
3	1/22/80	96	40,693	375	20.97	101.5	0.6046	210.9	1.533	0.8848
Average[a]			40,942	374	19.54		0.4604	161.3	1.180	0.6464
Scrubber outlet (8 in. H_2O scrubber pressure)										
1	1/17/80	96	60,156	143	21.26	99.6	0.0250	12.9	0.093	0.0370
2	1/21/80	96	56,717	140	19.65	95.2	0.0255	12.4	0.092	0.0397
3	1/22/80	96	56,788	142	20.25	97.1	0.0232	11.3	0.082	0.0428
Average			57,887	142	20.39		0.0246	12.2	0.089	0.0398

(continued)

Average of Run No. 1, 2 and 3 1.180 lb/10^6 Btu
Average of Run No. 4, 5 and 6 1.817
Average 1.498 ~ 1.5 lb/10^6 Btu

TABLE 2 (continued)

Run number	Date	Time, min	Flow, dscfm	Stack temperature, °F	H_2O, %	Isokinetic, %	Emissions: Actual gr/dscf	Emissions: Actual lb/hr	Emissions: Actual lb/mm Btu	Emissions: Corrected, 12% CO_2 gr/dscf
Scrubber inlet (13.5 in. H_2O scrubber pressure)										
4	1/22/80	96	43,651	373	19.33	101.4	1.0452	391.0	2.810	1.3783
5	1/23/80	96	32,420	377	20.11	104.9	0.4232	117.6	0.824	0.5706
6	1/23/80	96	46,866	379	20.09	104.0	0.6702	269.3	1.818	0.8936
Average			40,979	376	19.84		0.7129	259.3	1.817	0.9475
Scrubber outlet (13.5 in. H_2O scrubber pressure)										
4	1/22/80	96	60,254	143	21.34	100.1	0.0401	20.7	0.149	0.0587
5	1/23/80	96	57,172	144	22.59	97.3	0.0247	12.1	0.085	0.0502
6	1/23/80	96	54,237	146	23.43	99.3	0.0230	10.7	0.072	0.0452
Average			57,221	144	22.45		0.0293	14.5	0.102	0.0514

[a]Average is based on runs 2 and 3 only.

TABLE 3. ST. JOE PAPER COMPANY PARTICULATE EMISSION DATA AND STACK GAS PARAMETERS, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980 (METRIC UNITS)

Run number	Date	Time, min	Flow, dncmpm	Stack temperature, °C	H_2O, %	Isokinetic, %	Emissions: Actual gr/dncm	Emissions: Actual kg/hr	Emissions: Actual kg/GJ	Emissions: Corrected, 12% CO_2 gr/dncm
Scrubber inlet (8 in. H_2O scrubber pressure)										
1	1/17/80	96	1,396	194	13.05	50.1	1.0985	92.0	0.630	1.4647
2	1/21/80	96	1,167	189	18.11	97.4	0.7235	50.6	0.355	0.9335
3	1/22/80	96	1,152	191	20.97	101.5	1.3839	95.6	0.659	2.0252
Average[a]			1,160	190	19.54		1.0537	73.1	0.507	1.4794
Scrubber outlet (8 in. H_2O scrubber pressure)										
1	1/17/80	96	1,704	61	21.26	99.6	0.0572	5.8	0.040	0.0847
2	1/21/80	96	1,606	60	19.65	95.2	0.0585	5.6	0.039	0.09.2
3	1/22/80	96	1,608	61	20.25	97.1	0.0532	5.1	0.035	0.0982
Average			1,639	61	20.39		0.0563	5.5	0.038	0.0914

(continued)

TABLE 3 (continued)

Run number	Date	Time, min	Flow, dncmpm	Stack temperature, °C	H_2O, %	Isokinetic, %	Emissions: Actual gr/dncm	Emissions: Actual kg/hr	Emissions: Actual kg/GJ	Emissions: Corrected, 12% CO_2 gr/dncm
Scrubber inlet (13.5 in. H_2O scrubber pressure)										
4	1/22/80	96	1,236	190	19.33	101.4	2.3923	177.3	1.208	3.1547
5	1/23/80	96	918	192	20.11	104.9	0.9686	53.3	0.354	1.3060
6	1/23/80	96	1,327	193	20.09	104.0	1.5346	122.1	0.781	2.0461
Average			1,160	192	19.84		1.6318	117.6	0.781	2.1689
Scrubber outlet (13.5 in. H_2O scrubber pressure)										
4	1/22/80	96	1,706	62	21.34	100.1	0.0918	9.4	0.064	0.1343
5	1/23/80	96	1,619	62	22.59	97.3	0.0566	5.5	0.037	0.1151
6	1/23/80	96	1,536	63	23.43	99.3	0.0526	4.8	0.031	0.1035
Average			1,620	62	22.45		0.0670	6.6	0.044	0.1176

[a]Average is based on runs 2 and 3 only.

TABLE 4. SUMMARY OF INTEGRATED GAS ANALYSIS RESULTS, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980

Run number	Date	CO_2, %	CO, %	O_2, %	N_2, %	Molecular weight, lb/lb·mole
Scrubber inlet (8 in. H_2O pressure drop)						
1	1/17	9.0	0.0	14.0	77.1	30.0
2	1/21	9.3	0.0	13.9	76.8	30.0
3	1/22	8.2	0.0	14.5	77.4	29.9
Average		8.8	0.0	14.1	77.1	30.0
Scrubber outlet (8 in. H_2O pressure drop)						
1	1/17	8.1	0.0	12.8	79.1	29.8
2	1/21	7.7	0.0	14.2	78.1	29.8
3	1/22	6.5	0.0	15.0	78.6	29.7
Average		7.4	0.0	14.0	78.6	29.8
Scrubber inlet (13.5 in. H_2O pressure drop)						
4	1/22	9.1	0.0	15.4	75.5	30.1
5	1/23	8.9	0.0	14.5	76.5	30.0
6	1/23	9.0	0.0	15.8	75.1	30.1
Average		9.0	0.0	15.2	75.7	30.1
Scrubber outlet (13.5 in. H_2O pressure drop)						
4	1/22	8.2	0.0	14.6	76.8	29.9
5	1/23	5.9	0.0	14.6	79.4	29.5
6	1/23	6.1	0.0	15.1	78.8	29.6
Average		6.7	0.0	14.9	78.3	29.7

Andersen particle sizing results are presented in Table 7. Four of the inlet tests were outside of isokinetic variation, but sampling times were only five minutes at the inlet location due to heavy particulate loadings.

Test runs for NO_x emissions were performed only at the scrubber outlet and only at the normal scrubber pressure drop of 8 in. H_2O. Samples for NO_x emissions were collected in the afternate port during particulate emission testing and results are presented in Table 8.

Samples for SO_2 emissions were taken concurrently with particulate emission runs by using the back half of the Method 5 train. Scrubber inlet and outlet locations were sampled only when the scrubber Δp was 8 in. H_2O. Due to the very low sulfur content of

TABLE 5. SUMMARY OF BaP INLET TEST RESULTS, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980

Test #	SJI - 1	SJI - 2	SJI - 3	SJI - 4	SJI - 5	SJI - 6	Average Inlet
Date	1/18/80	1/19/80	1/19/80	1/20/80	1/20/80	1/21/80	
Time	0930-1227	1000-1311	1515-1912	1045-1342	1545-1842	0900-1157	
Meter volume, dscf	107.984	74.078	83.329	94.210	77.533	84.936	86.95
Meter volume, dscm	3.053	2.096	2.358	2.666	2.194	2.404	2.400
Stack flow, acfm	160,334	139,108	150,839	167,491	139,745	154,840	152,060
Stack flow, dscfm	86,680	73,190	84,073	92,399	76,136	84,962	82,907
Stack flow, dscmm	2,453.0	2,071.3	2,379.3	2,614.9	2,154.7	2,404.4	2,346.3
Stack temperature, °F	377.3	384.2	364.5	359.1	356.8	358.0	366.6
Percent moisture	17.1	18.2	15.3	17.9	19.1	18.4	17.7
Percent isokinetic	92.5	101.2	102.3	101.3	101.2	99.5	99.7
BaP, lb/dscf	3.0×10^{-12}	0.00	0.4×10^{-12}	0.6×10^{-12}	0.4×10^{-12}	0.7×10^{-12}	0.85×10^{-12}
BaP, lb/hr	1.6×10^{-5}	0.00	0.2×10^{-5}	0.3×10^{-5}	0.2×10^{-5}	0.4×10^{-5}	0.45×10^{-5}
BaP, lb/mm Btu	1.1×10^{-7}	0.00	1.46×10^{-8}	2.13×10^{-8}	1.35×10^{-8}	2.82×10^{-8}	3.24×10^{-8}
BaP, mg/dscm	4.90×10^{-5}	0.00	0.66×10^{-5}	1.12×10^{-5}	0.68×10^{-5}	1.14×10^{-5}	1.42×10^{-5}
BaP, kg/hr	7.2×10^{-6}	0.00	0.9×10^{-6}	1.5×10^{-6}	0.8×10^{-6}	1.6×10^{-6}	2.0×10^{-6}
BaP, lb/(8,760 hr) yr	0.14	0.00	0.02	0.03	0.02	0.04	0.04

TABLE 6. SUMMARY OF BaP OUTLET TEST RESULTS, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980

Test #	SJO - 1	SJO - 2	SJO - 3	SJO - 4	SJO - 5	SJO - 6	Average outlet
Date	1/18/80	1/19/80	1/19/80	1/20/80	1/20/80	1/21/80	
Time	0931-1230	1004-1312	1516-1907	1045-1344	1545-1842	0900-1157	
Meter volume, dscf	75.984	69.271	86.413	77.909	78.573	72.415	76.763
Meter volume, dscm	2.151	1.960	2.445	2.205	2.224	2.049	2.172
Stack flow, acfm	94,171	80,576	100,067	95,384	95,363	86,284	91,974
Stack flow, dscfm	66,364	56,886	70,250	67,349	67,093	60,655	64,766
Stack flow, dscmm	1,878.1	1,609.9	1,988.1	1,906.0	1,898.7	1,716.5	1,832.9
Stack temperature, °F	139.8	140.8	140.6	141.4	139.7	139.1	140.2
Percent moisture	20.3	20.2	20.7	20.1	20.6	20.7	20.4
Percent isokinetic	93.0	99.5	99.9	94.3	95.0	97.1	96.5
BaP, lb/dscf	1.1×10^{-12}	0.8×10^{-12}	3.4×10^{-12}	0.00	5.7×10^{-12}	0.2×10^{-12}	1.9×10^{-12}
BaP, lb/hr	0.4×10^{-5}	0.3×10^{-5}	1.4×10^{-5}	0.00	2.3×10^{-5}	0.07×10^{-5}	0.7×10^{-5}
BaP, lb/mm Btu	2.92×10^{-8}	2.06×10^{-8}	1.02×10^{-7}	0.00	1.56×10^{-7}	0.49×10^{-8}	5.21×10^{-8}
BaP, mg/dscm	1.78×10^{-5}	1.39×10^{-5}	5.62×10^{-5}	0.00	9.2×10^{-5}	0.37×10^{-5}	3.07×10^{-5}
BaP, kg/hr	2.0×10^{-6}	1.2×10^{-6}	6.5×10^{-6}	0.00	10.4×10^{-6}	0.3×10^{-6}	3.4×10^{-6}
BaP, lb/(8,760 hr) yr	0.04	0.03	0.12	0.00	0.20	0.006	0.07

TABLE 7. SUMMARY OF ANDERSEN PARTICLE SIZING RESULTS, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA, JANUARY 16-23, 1980

Scrubber Inlet

Run 1 - 1/16

Flow rate, acfm: 0.297
Isokinetic %: 129.1

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	1.8	98.2	>19.0
1	13.6	84.6	14.0-19.0
2	7.1	77.5	11.0-14.0
3	10.0	67.5	9.0-11.0
4	11.8	55.7	6.0-9.0
5	13.6	42.1	3.8-6.0
6	24.3	17.8	1.9-3.8
7	6.5	11.3	1.2-1.9
8	11.2	0.1	0.82-1.2
Final filter	0.1	0	<0.82

Run 2 - 1/16

Flow rate, acfm: 0.280
Isokinetic %: 121.6

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	5.7	94.4	>21.0
1	7.4	87.0	16-21
2	6.4	80.5	14-16
3	9.5	71.1	8.8-14
4	12.4	58.7	5.9-8.8
5	16.3	42.4	3.8-5.9
6	18.7	23.7	1.9-3.8
7	12.4	11.3	1.3-1.9
8	2.8	8.5	0.82-1.3
Final filter	8.5	0	<0.82

Run 3 - 1/16

Flow rate, acfm: 0.285
Isokinetic %: 107.1

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	6.7	93.3	>21.0
1	5.9	87.4	16-21
2	8.0	79.4	12-16
3	7.4	72.0	9-12
4	12.6	59.4	8-9
5	13.9	45.5	3.8-8
6	16.5	29.0	2.1-4.5
7	13.0	16.0	1.8-2.1
8	5.2	10.8	0.81-1.8
Final filter	10.8	0	<0.81

Run 4 - 1/22

Flow rate, acfm: 0.292
Isokinetic %: 106.0

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	3.2	96.8	>19.2
1	21.6	75.2	14.9-19.2
2	1.6	73.6	8.3-14.9
3	1.6	72.0	5.7-8.3
4	4.0	68.0	3.7-5.7
5	0.8	67.2	2.0-3.7
6	0.8	66.4	1.5-2.0
7	17.6	48.8	1.1-1.5
8	26.4	22.4	0.7-1.1
Final filter	22.4	0	<0.7

(continued)

TABLE 7 (continued)

Scrubber Inlet

Run 5 - 1/23

Flow rate, acfm: 0.269
Isokinetic %: 119.5

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	0.9	99.1	>22
1	1.7	97.4	14-22
2	1.7	95.7	8.9-14
3	24.1	71.6	6.0-8.9
4	11.2	60.4	3.8-6.0
5	21.6	38.8	1.9-3.8
6	15.5	23.3	1.3-1.9
7	2.6	20.7	0.8-1.3
8	5.2	15.5	0.5-0.8
Final filter	15.5	0	<0.5

Run 6 - 1/23

Flow rate, acfm: 0.257
Isokinetic %: 114.0

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	1.4	98.6	>22
1	13.7	84.9	14-22
2	27.4	57.5	9-14
3	12.3	45.2	6.1-9
4	1.4	43.8	3.9-6.1
5	4.1	39.7	2.0-3.9
6	4.1	35.6	1.4-2.0
7	13.7	21.9	0.83-1.4
8	8.2	13.7	0.65-0.83
Final filter	13.7	0	<0.65

Scrubber Outlet

Run 1 - 1/16

Flow rate, acfm: 0.149
Isokinetic %: 95.7

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	0.7	99.4	>24
1	0.4	99.0	19-24
2	0.7	98.3	16-19
3	2.1	96.2	12-16
4	3.8	92.4	7.5-12
5	7.3	85.1	4.8-7.5
6	6.6	78.5	2.5-4.8
7	47.2	31.3	1.4-2.5
8	18.8	12.5	0.85-1.4
Final filter	12.5	0	<0.85

Run 2 - 1/16

Flow rate, acfm: 0.152
Isokinetic %: 96.7

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	1.1	98.8	>25.6
1	1.1	97.7	18.8-25.6
2	0	97.7	
3	0	97.7	
4	0	97.7	
5	12.7	85.0	4.8-18.8
6	14.9	70.1	2.4-4.8
7	11.5	58.6	1.6-2.4
8	24.1	34.5	0.9-1.6
Final filter	34.5	0	<0.9

(continued)

TABLE 7 (continued)

Scrubber Outlet

Run 3 - 1/16

Flow rate, acfm: 0.150
Isokinetic %: 97.6

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	3.2	96.6	>24
1	0.7	95.9	19-24
2	0.4	95.8	16-19
3	1.8	94.0	11-16
4	3.4	90.6	7.2-11
5	7.0	83.6	4.7-7.2
6	6.3	77.3	2.3-4.7
7	48.6	28.7	1.4-2.3
8	17.1	11.6	0.95-1.4
Final filter	11.6	0	<0.95

Run 4 - 1/16

Flow rate, acfm: 0.152
Isokinetic %: 97.7

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	6.4	93.7	>22
1	0.7	93.0	19-22
2	0.7	92.3	14-19
3	2.4	89.9	11-14
4	3.4	86.5	7.2-11
5	6.8	79.7	4.8-7.2
6	6.1	73.6	2.3-4.8
7	44.9	28.7	1.4-2.3
8	17.9	10.8	0.9-1.4
Final filter	10.8	0	<0.9

Run 5 - 1/23

Flow rate, acfm: 0.132
Isokinetic %: 94.4

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	3.0	97.1	>28
1	14.7	82.4	22-28
2	11.2	71.2	17-22
3	9.5	61.7	12-17
4	16.4	45.3	8-12
5	10.8	34.5	5.1-8
6	8.2	26.3	2.9-5.1
7	9.9	16.4	1.9-2.9
8	8.6	7.8	1.0-1.9
Final filter	7.8	0	<1.0

Run 6 - 1/23

Flow rate, acfm: 0.160
Isokinetic %: 102.8

Stage	Percent in size range	Cumulative % less than size range	Size range microns
Preimpact. Washes			
Stage 0	3.7	96.3	>24
1	1.8	94.5	18-24
2	0.9	93.6	16-18
3	12.8	80.8	11-16
4	0	80.8	7-11
5	11.9	68.9	4-7
6	13.8	55.1	2.2-4.0
7	9.2	45.9	1.4-2.2
8	20.2	25.7	0.92-1.4
Final filter	25.7	0	<0.92

TABLE 8. SUMMARY OF NO_x EMISSIONS (SCRUBBER OUTLET), ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980

Run number	Date	PPM	lb/dscf x 10^{-6}	lb/hr[a]	lb/mm Btu	g/ncm x 10^{-3}	kg/hr[a]	kg/GJ
1-1	1/17/80	91.3	10.80	37.8	0.2730	0.173	17.1	0.1171
1-2		14.2	1.68	5.9	0.0426	0.027	2.7	0.0185
1-3		77.5	9.17	32.1	0.2319	0.147	14.5	0.0993
1-4		51.5	6.09	21.3	0.1538	0.098	9.7	0.0664
Average		58.7	6.94	24.3	0.1753	0.111	11.0	0.0753
2-1	1/21/80	68.4	8.09	26.7	0.1977	0.130	12.1	0.0849
2-2		40.9	4.84	16.0	0.1185	0.078	7.2	0.0505
2-3		68.1	8.06	26.6	0.1970	0.129	12.1	0.0849
2-4		72.3	8.55	28.2	0.2089	0.137	12.8	0.0898
Average		62.4	7.39	24.4	0.1805	0.118	11.1	0.0775
3-1	1/22/80	72.7	8.60	28.6	0.2079	0.138	13.0	0.0896
3-2		12.4	1.47	4.9	0.0356	0.024	2.2	0.0152
3-3		86.6	10.25	34.0	0.2472	0.164	15.4	0.1061
3-4		9.8	1.17	3.9	0.0284	0.019	1.8	0.0124
Average		45.4	5.37	17.9	0.1298	0.086	8.1	0.0558

[a]Based on corresponding Method 5 run for flow velocity.

the waste wood feed, emissions of SO_2 were below minimum detectable limits (0.74 x 10^{-7} lb/scf for Method 8) at the scrubber outlet, and also on run #3 at the scrubber inlet. The waste wood feed during runs 1 and 2 had a slightly higher sulfur content and resulted in detectable SO_2 emissions at the inlet location, as shown in Table 9. A summary of the bark fuel analysis results is given in Table 10. Opacity readings by EPA Method 9 could not be made due to the steam content of the plume.

Average boiler operating conditions during testing is presented in Table 11. Fuel feedrates reported represent the weightometer readings of the fuel as it filled the bins leading to the boiler. A lag time of 10-40 minutes was estimated between bin fill rate and boiler feed rate. Complete boiler operating data are given in Appendix E.

Boiler #4 and its venturi scrubber pollution control equipment operated normally during the emission test. The samples taken can be expected to characterize boiler emissions during normal operation.

TABLE 9. SUMMARY OF SO_2 RESULTS, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980

Run number	Date	PPM	lb/scf x 10^{-7}	lb/hr[a]	lb/mm Btu
Scrubber inlet					
1	1/17/80	4.85	6.02	178.1	1.286
2	1/21/80	1.06	1.32	36.0	0.267
3	1/22/80	Below detection limit[b]			
Scrubber outlet					
1	1/17/80	Below detection limit[b]			
2	1/21/80	Below detection limit[b]			
3	1/22/80	Below detection limit[b]			

[a]Based on corresponding Method 5 run for flow velocity.

[b]Minimum detectable limit is 0.74 x 10^{-7} lb/scf for SO_2.

TABLE 10. SUMMARY OF BARK FUEL ANALYSES, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980

Analysis	Run #1		Run #2		Run #3	
	As rcvd	Dry basis	As rcvd	Dry basis	As rcvd	Dry basis
Proximate analysis, %						
Moisture	48.51	--	48.04	--	48.54	--
Volatile matter	--	--	--	--	--	--
Fixed carbon	--	--	--	--	--	--
Ash	0.47	0.92	0.64	1.23	2.30	4.47
Sulfur	0.02	0.04	0.02	0.03	0.01	0.02
Btu/lb	4,778	9,279	4,931	9,490	4,651	9,038
Ultimate analysis, %						
Carbon	25.98	50.45	26.19	50.40	25.61	49.76
Hydrogen	8.27	5.59	8.25	5.60	8.08	5.22
Nitrogen	0.08	0.15	0.05	0.10	0.07	0.14
Sulfur	0.02	0.04	0.02	0.03	0.01	0.02
Ash	0.47	0.92	0.64	1.23	2.30	4.47
Oxygen	65.18	42.85	64.85	42.64	63.93	40.39

Analysis	Run #4		Run #5		Run #6	
	As rcvd	Dry basis	As rcvd	Dry basis	As rcvd	Dry basis
Proximate analysis, %						
Moisture	47.57	--	51.95	--	49.90	--
Volatile matter	--	--	--	--	--	--
Fixed carbon	--	--	--	--	--	--
Ash	0.61	1.17	1.04	2.17	1.21	2.42
Sulfur	0.01	0.02	0.00	0.01	0.01	0.01
Btu/lb	4,802	9,159	4,429	9,218	4,558	9,907
Ultimate analysis, %						
Carbon	26.01	49.60	20.69	43.06	23.85	47.61
Hydrogen	8.12	5.40	7.99	4.62	8.15	5.21
Nitrogen	0.06	0.11	0.04	0.08	0.07	0.13
Sulfur	0.01	0.02	0.00	0.01	0.01	0.01
Ash	0.61	1.17	1.04	2.17	1.21	2.42
Oxygen	65.19	43.70	70.24	50.06	66.71	44.62

TABLE 11. SUMMARY OF AVERAGE BOILER OPERATING CONDITIONS DURING TESTING, POWER BOILER NUMBER 4, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA, JANUARY 17-23, 1980

Test number	Date	Time interval	Bark feed rate, lb/hr[a]	Steam production, lb/hr	Steam temperature, °F	Steam pressure, psig	Steam heat output, mm Btu/hr	Steam heat output, GJ/hr	Scrubber pressure drop, in. H_2O
1	1/17	940-1526	50,293	101,000	740	630	138.45	146.08	8
BAP-1	1/18	930-1227	28,015	100,000	737.5	630	136.935	144.48	8
BAP-2	1/19	1000-1311	37,896	106,000	740	630	145.30	153.31	8
BAP-3	1/19	1515-1912	52,098	100,000	740	630	137.08	144.63	8
BAP-4	1/20	1045-1342	49,485	103,000	739.2	630	141.14	148.92	13.5
BAP-5	1/20	1545-1842	57,184	108,000	737.5	630	147.89	156.04	13.5
BAP-6	1/21	900-1200	41,814	104,000	728.8	630	141.89	149.71	13.5
2	1/21	1800-1959	34,311	99,000	727.8	630	135.02	142.46	8
3	1/22	952-1148	32,682	101,000	724.6	630	137.56	145.14	8
4	1/22	1825-2018	38,183	102,000	725.7	603.2	139.13	146.79	13.5
5	1/23	1200-1358	56,714	104,000	740.4	620	142.65	150.51	13.5
6	1/23	1705-1853	56,542	108,000	740	615	148.14	156.30	13.5

[a]Average hourly feed rates were based on weightometer integration readings taken at start and end of each test. Values reported represent the fill rate of the feed bin above boiler which has a residence time of approximately 10-40 minutes.

SECTION 3

PROCESS DESCRIPTION

At their mill in Port St. Joe, Florida, the St. Joe Paper Company operates seven boilers which produce steam for process and electrical power. One of these, power boiler #4, is a 1952 vintage Babcock & Wilcox forced-draft traveling-grate spreader-stoker bark/oil-fired boiler, design rated to produce 110,000 lb steam/hr from bark (175,000 lb steam/hr from oil). No. 6 fuel oil is supplied as auxiliary feed to bark in order to meet high steam demand, compensate for wet bark, or boiler start-up. No fuel oil was burned during this emission test. Cyclone fly ash is reinjected into the boiler after sand is screened out, but comprises a negligible portion of fuel feed according to plant personnel.

The boiler exhaust gases travel through Buell Rotoclones and are then pushed by an ID fan through an Air Pollution Industries, Inc. (installed 1978) variable throat venturi wet scrubber system, which normally operates at 8-10 inches W.G. pressure drop. A sketch of the wet scrubber unit is provided in Figure 1. Exhaust gases are discharged through a stack which terminates 139 ft above ground level.

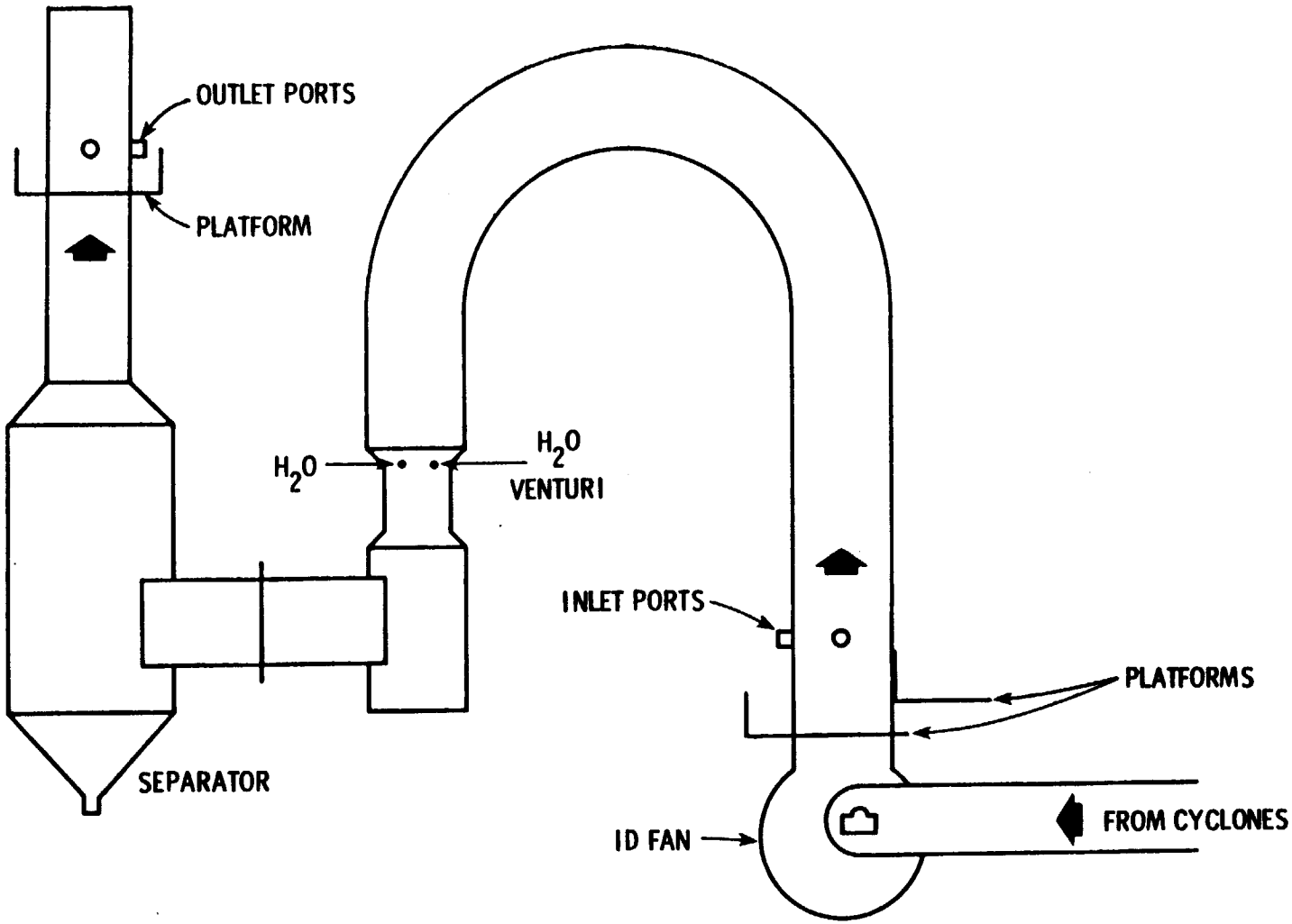


Figure 1. Diagram of venturi scrubber control equipment, Boiler #4, St. Joe Paper Company.

SECTION 4

LOCATION OF SAMPLING POINTS

As a result of the pretest survey, the sampling program included the inlet to the venturi scrubber and the outlet at the stack platform. Simultaneous sampling for particulates, particle size, and BaP was performed at the two locations.

Sampling ports at the scrubber inlet were installed by the plant prior to the test. Two 4-inch ports 90° apart were installed in the 72 inch diameter circular duct six feet above the floor of the platform. Figure 2 illustrates the inlet sampling location. The nearest disturbance was an expansion one stack diameter below the ports (upstream).

A diagram of the scrubber outlet sampling location is given in Figure 3. The 84 inch diameter stack has two 4 inch ports 90° apart which are 4 ft above the platform floor and a 3 ft 7 in. railing provides protection. The nearest upstream disturbance is 18 ft (2.5 stack diameters) below the ports and the top of the stack is 11 ft (1.6 stack diameters) above ports.

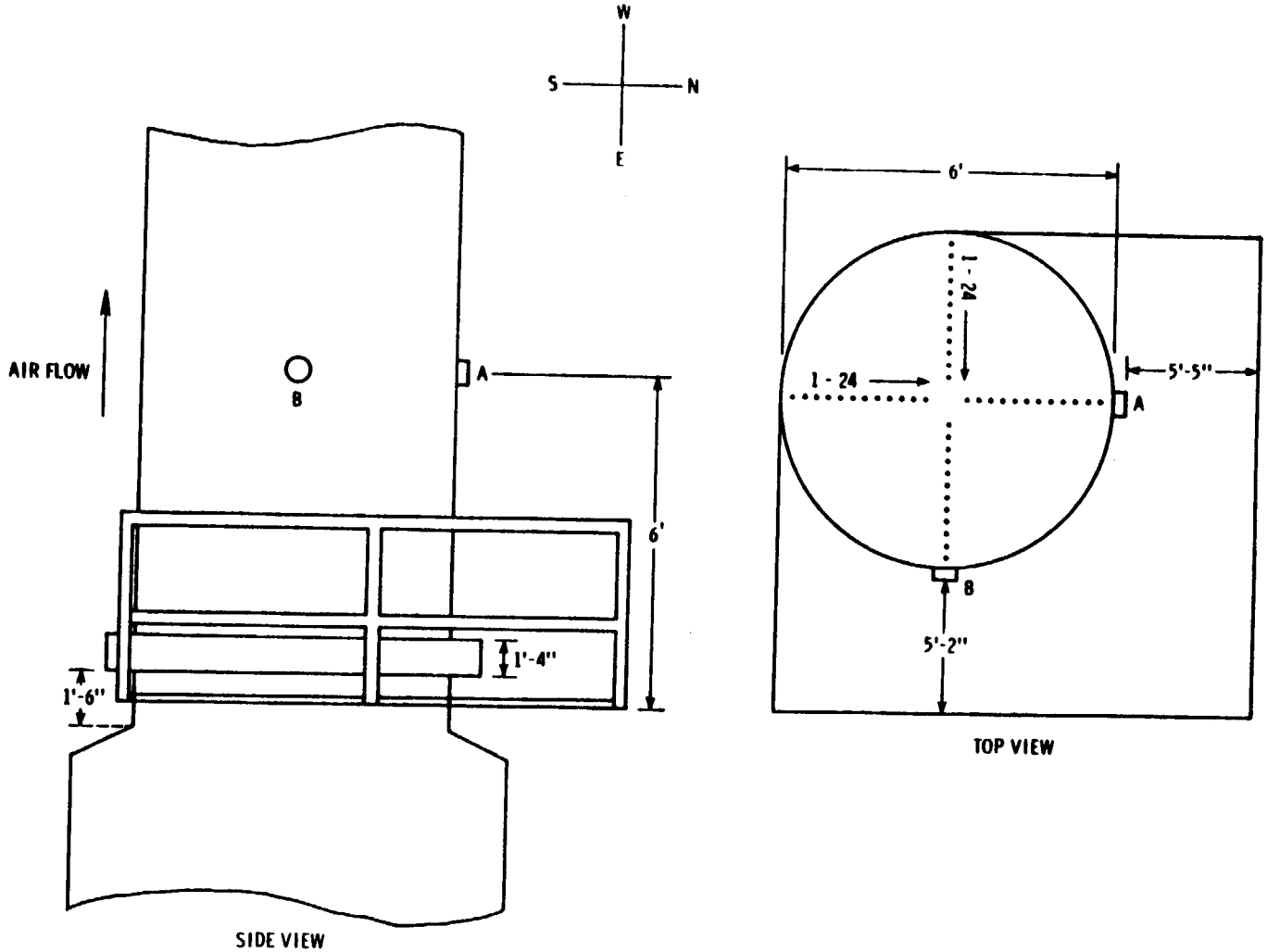


Figure 2. Venturi scrubber inlet sampling location, St. Joe Paper Company.

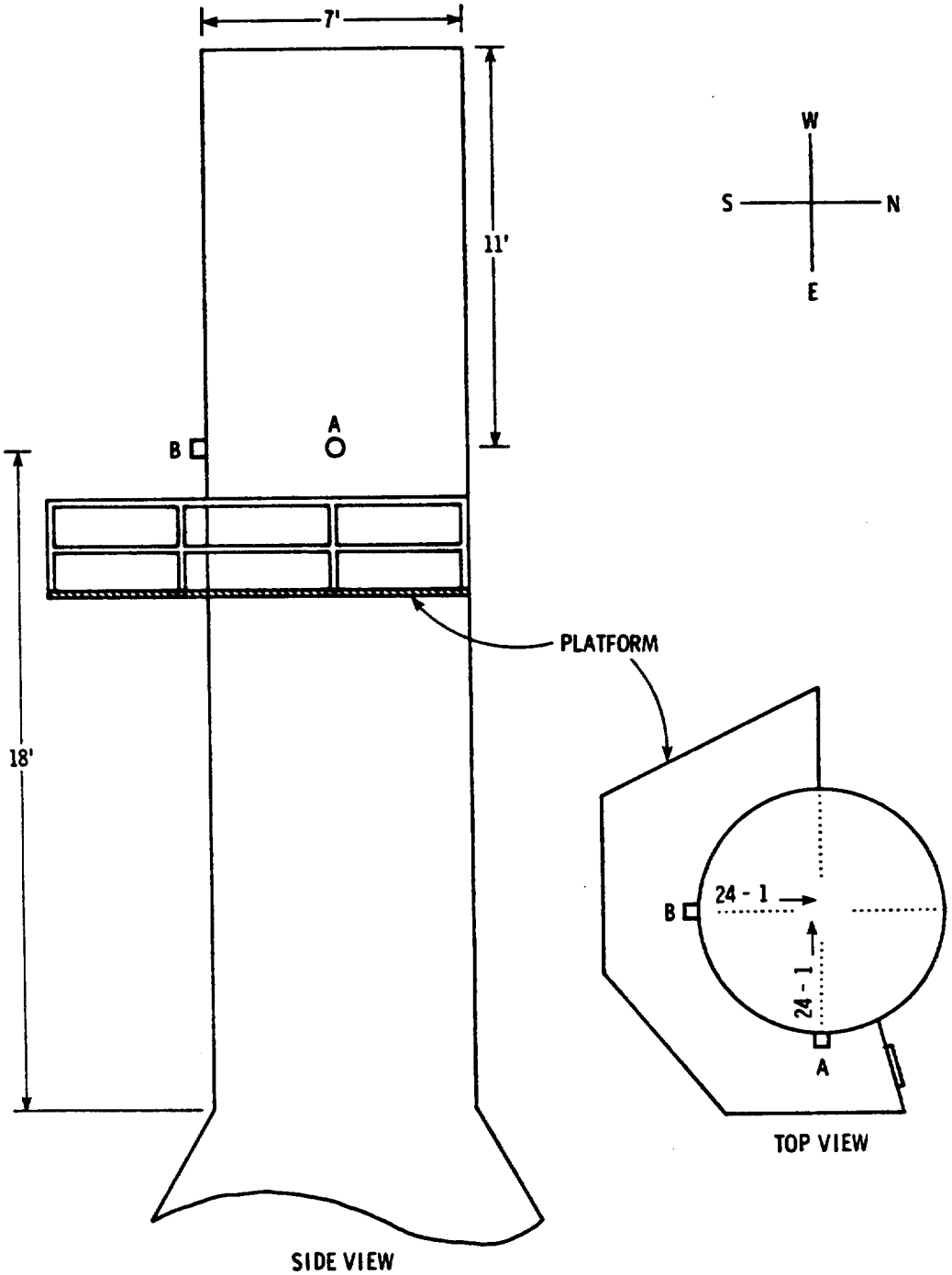


Figure 3. Venturi scrubber outlet sampling location, St. Joe Paper Company.

SECTION 5

SAMPLING AND ANALYTICAL PROCEDURES

The St. Joe Paper Company's boiler #4 was sampled for particulate matter, particle size, benzo-alpha-pyrene, SO_2, NO_x, integrated gas analysis, and fuel analysis. The following describes the methods used.

SAMPLING PROCEDURES

Particulate

Sampling for particulates was performed using the method outlined in the Federal Register, Method 5, "Determination of Particulate Emissions from Stationary Sources," with the modification that the sample box temperature was maintained at 325°F instead of 250°F.

Particle Size

Sampling for particle size was performed using an Andersen cascade impactor with seven stages and a back-up filter.

The sampling train used consisted of the following equipment listed in order of the flow: a 10 mm diameter probe tip; a curved (90°) probe tip to Andersen head connector; standard Andersen heads; a 4 foot stainless steel probe; a Smith-Greenburg impinger with water, then one charged with color indicating silica gel; and an EPA-5 console equipped with a dry gas meter, digital electronic thermometer and an inclined manometer. Also, an S-type pitot tube was connected to the probe so the stack gas pressure could be continually monitored.

A total of 12 particle sizing runs were made. Each run was conducted under isokinetic conditions for about 5 minutes at the scrubber inlet and 25 minutes at the scrubber outlet.

At the completion of each run, the moisture collected was measured and the Andersen heads were opened and oven-dried for three hours. After drying, each stage was weighed, then the filter was removed and the stage assemblies were cleaned, desiccated and reweighed to provide partial tare weights. The tare weights of the filters were taken during the assembly of the heads (after desiccation for 24 hours).

All weight measurements were made with a Mettler analytical balance. The balance was calibrated daily and rezeroed before each weight determination. Calculations were performed using the methods and tables provided in the Andersen manual.

Benzo-alpha-pyrene

The sampling procedures used at the venturi scrubber inlet and outlet locations consisted of an EPA Method 5 train, modified in the following manner (using EPA's draft BaP Method). A Battelle trap loaded with XAD-2 resin was inserted between the heated filter, which was cut from a General Metal Works No. 25 Hi-Volume Filter (see Appendix D for typical Elemental Analysis), and the first impinger. A thermostatically-controlled water bath kept the temperature of the Battelle trap at 127°F. The Battelle trap was shielded from visible and ultraviolet light by wrapping with aluminum foil. The Battelle trap was capped after sampling and remained capped, until the analysis was performed. Methylene chloride was used for the recovery of the sample from the 316 stainless steel probe, glass filter holder with a 316 stainless steel filter support and the connecting glassware up to the Battelle trap. Figure 4 is a schematic of the BaP train while Figure 5 shows the Battelle trap used in the BaP train. All the field data sheets and analytical forms are included in Appendix D.

For the BaP tests, the inlet and outlet locations were sampled simultaneously at forty-eight points for three minutes a point. Tests 1, 2, and 3 were conducted with eight inches of water pressure drop across the scrubber while tests 4, 5, and 6 had fourteen inches of water pressure drop. No major problems were encountered during the testing.

Sulfur Dioxide

Sampling for SO_2 was performed using the alternate method outlined in the Section 2.1 the Federal Register, Method 6, "Determination of Sulfur Dioxide Emissions from Stationary Sources," Option 2, where SO_2 is determined simultaneously with particulate matter by replacing the Method 5 water impinger system (back half) with a Method 8 isopropanol-filter-peroxide system.

Nitrogen Oxides

Sampling for NO_x was performed using the method outlined in the Federal Register, Method 7, "Determination of Nitrogen Oxide Emissions from Stationary Sources."

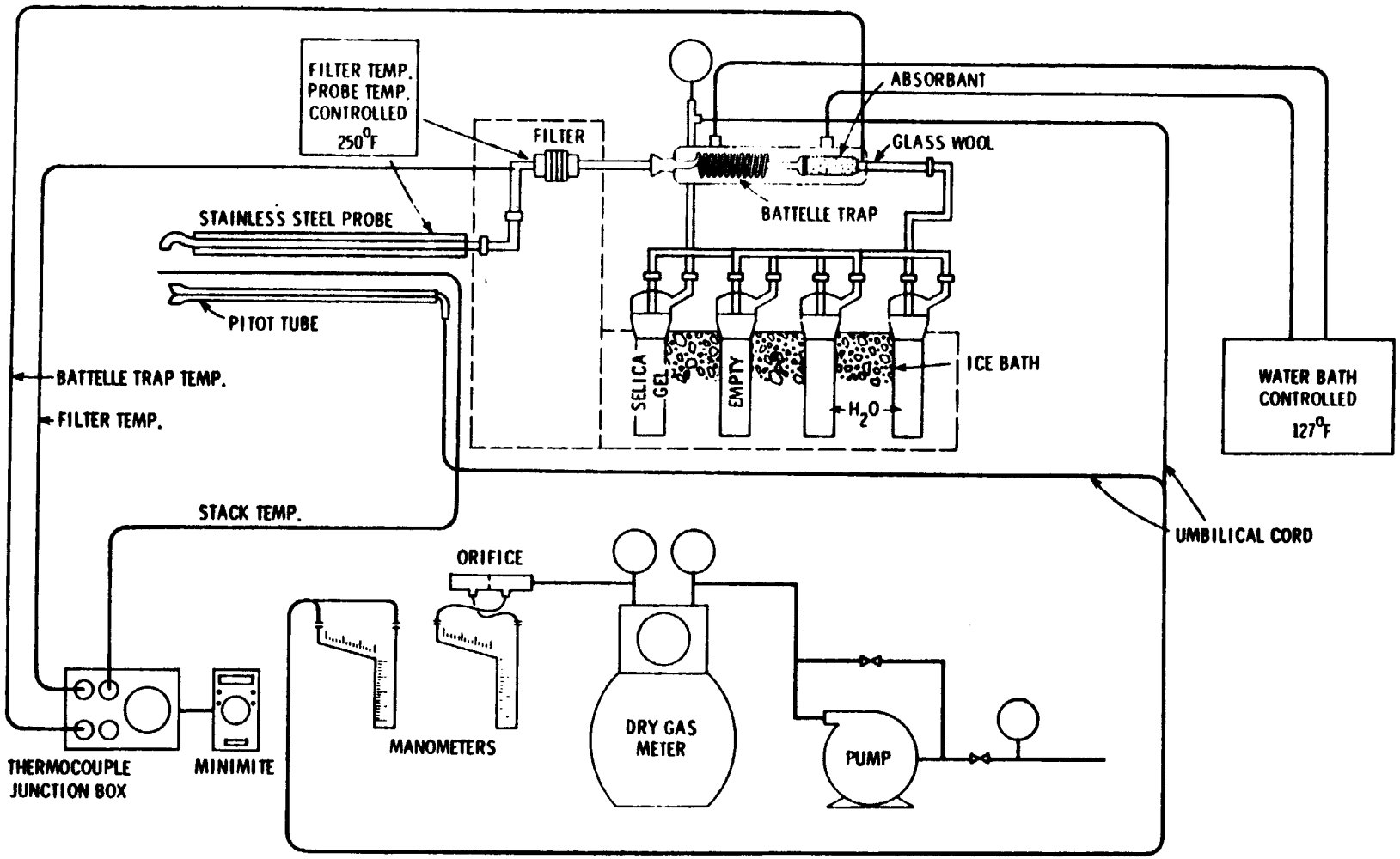


Figure 4. BaP sample train.

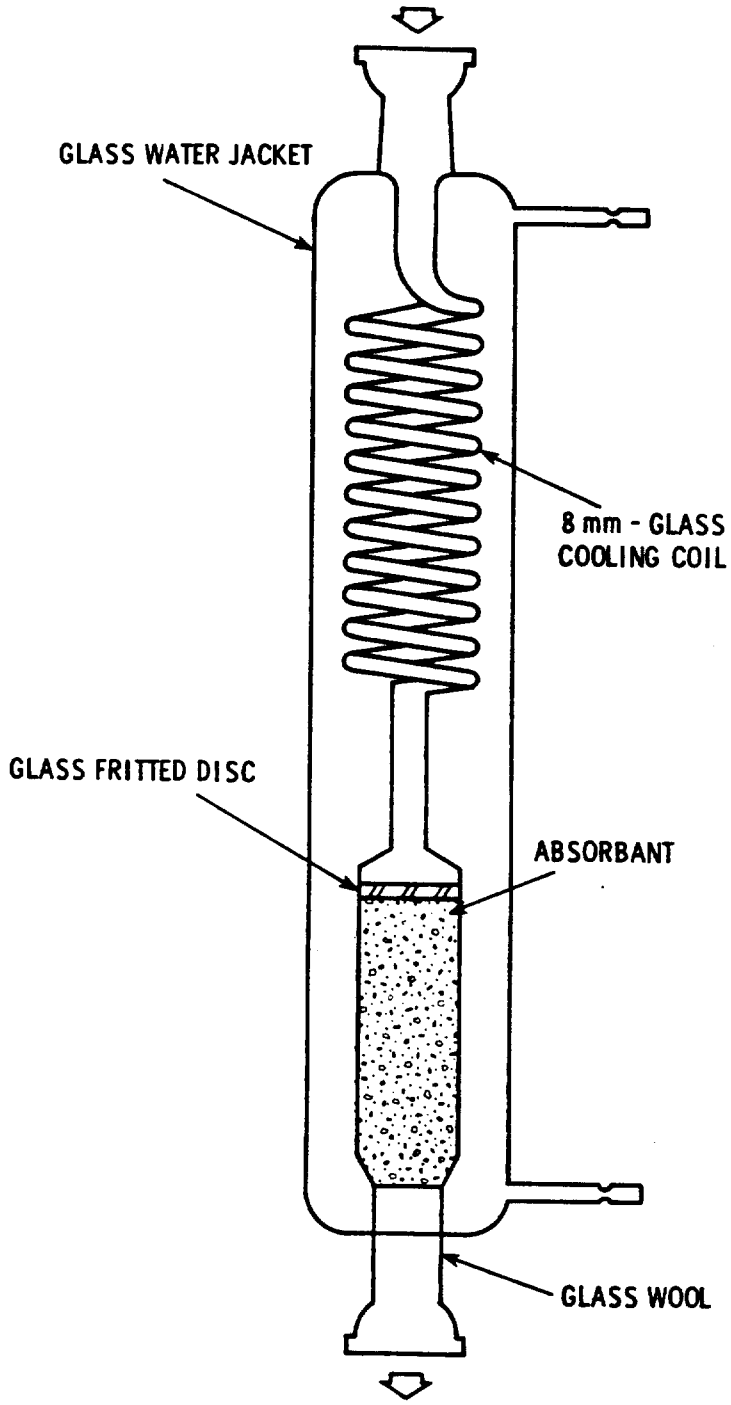


Figure 5. Battelle resin trap for BaP sample train.

Opacity

Visible emissions were to be read during particulate sampling by a certified smoke reader who met the specifications of Federal Register, Method 9. However, the high water content of the plume prevented accurate measurements from being taken, and these readings were dropped from the sampling program.

Integrated Gas Analysis

Exhaust gas analysis was performed using the method outlined in the Federal Register, Method 3, "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight."

Fuel

Six grab samples of feed bark were taken from the conveyor, one during each Method 5 run.

ANALYTICAL PROCEDURES

Particulate, SO_2, NO_x, Gas Analysis

All analytical procedures were performed using the methods described in EPA Methods 3, 5, 6, and 7, previously mentioned in the Sampling Procedures section.

BaP Analysis

The volume of the rinse sample was recorded and the sample was stored at 4°C in an amber glass bottle until the analysis was performed. If the rinse sample was deeply colored or contained a large amount of suspended material, it was diluted ten to one with cyclohexane before it was analyzed. No samples needed dilution in this emission test.

The filter was extracted with 100 mL of cyclohexane while the XAD-2 resin from the Battelle trap was extracted with 250 mL of cyclohexane. The extraction procedure placed the filter or XAD-2 into a single thickness pre-extracted cellulose extraction thimble. The thimble was then placed in a soxhlet extraction apparatus and extracted for eight hours at five to six cycles per hour. All this was done either behind a yellow light-safe screen or under a yellow safe light. At the end of the extraction, the extract volume was recorded, and the extract stored in an amber bottle at 4°C until the analysis was performed. The thimble was checked with a black light to confirm complete extraction.

The samples are analyzed for BaP using the fluorescence spectrophotometric procedure. This method is preferred over the thin layer chromatographic (TLC) method for low level BaP analysis, as the TLC method has only 0.01 the sensitivity of direct liquid measurement. The benzo-a-pyrene method using the fluorescence spectrophotometry was tailored to these samples. The method originally chosen was intended to be a thin layer chromatography separation and measurement by scanning *in-situ* with a scanning attachment for the fluorescence spectrophotometer. This method lacked the sensitivity required for the analyses.

The procedure for BaP analysis was by means of fluorescence spectrophotometry. The equipment used for this analysis was the Aminco Model SPF-125 Spectrophotofluorometer with 7 mm lightpath cell. This instrument accurately measures concentrations of BaP as low as 0.001 ppm. The wavelength settings were 378 nm excitation and 403 nm emission with respective slitwidth openings of 1 mm and 0.5 mm. This instrument becomes extremely substance specific at very narrow slit widths, as was used in this analysis.

The spectrophotometer is equipped with a high intensity xenon lamp which provides the excitation energy. For BaP analysis, the best results are obtained by setting the excitation wavelength and emission wavelength to produce the maximum peak height. With a narrow slit width, the specificity of the instrument is greatly increased. The excitation wavelength is 378 nm. The minimum entrance slit width used was 1 mm. The excitation energy is re-emitted as fluorescence of a longer wavelength. For BaP, this wavelength is 403 nm. The exit slit width can be narrower than the entrance slit width, as in this case, 0.5 mm. The fluorescence is expressed as a relative intensity. The relative intensity values are converted to BaP concentrations by analyzing a set of known standards. These standards are prepared by serial dilution of a 1,000 μg/mL BaP stock solution. This is prepared by dissolving 10 mg of three times recrystallized BaP in 10 mL spectral grade cyclohexane. This is stable for several months if stored away from light at 0°C.

To determine the concentration of BaP in unknown samples, it is necessary to plot a curve of the relative intensities from the standards. The μg/mL in the sample is then determined by the sample's relative intensity compared to the graph of the standards.

The results can be affected by temperature, humidity, and light. Precautions are taken during sampling, preparation, and analysis to keep the exposure to light at a minimum. The optimum relative humidity is between 35 percent and 50 percent. The instrument is equipped with a constant temperature cell compartment to avoid instability and the possible loss of sensitivity which could be caused by a change in sample temperature. All glassware with which the sample comes in contact is cleaned by using soapy water wash, 50% nitric acid rinse, and a distilled, deionized water rinse, respectively. When using fluorescence spectrophotometry, only high quality quartz cuvettes are used. No corks, rubber stoppers or lubricating agents are used and care is taken so that impurities do not contaminate the sample.

Fuel

Analysis of the bark feed was performed using ASTM D 3178 for carbon and hydrogen, ASTM D 3176 for oxygen, ASTM D 3179 for nitrogen, ASTM D 3177 for sulfur, and ASTM D 3174 for ash. Fuel value was determined using ASTM D 2015.

Quality Assurance/Quality Control

Results of quality control tests are furnished with the analytical data sheets provided in Appendix C.

APPENDICES

A. Complete Emission Results

B. Field Data Sheets

C. Analytical Data Sheets

D. BaP Field and Analytical Results

E. Boiler Operation Report

F. Project Participants

APPENDIX A

COMPLETE EMISSION RESULTS

EMISSION MEASUREMENT BRANCH

TECHNICAL DIRECTIVE NO. 1

Project Number 80-WFB-5 Date 1/10/80

Contractor Monsanto Research Corp.

Contract Number 68-02-2818 Work Assignment Number 25

Technical Manager Dan Bivins

Verbal Directions Given To Tim Thulman on 1/05/80

Directive: Gather particulate and SO_2 emissions with the same sampling train using or replacing the water in the method 5 impinger system with 3% peroxide solution.

Dan Bivins
Technical Manager, EMB

F. E. McCarthy
Section Chief, EMB

27 MAY 1980

ST JOE PAPER CO
PARTICULATE SAMPLING

ABBR	DESCRIPTION (68 DEG F)	UNITS	1I	2I	3I	4I	5I	6I
TT	DURATION OF RUN	MINUTES	96.0	96.0	96.0	96.0	96.0	96.0
PB	BAROMETRIC PRESSURE	IN HG	30.10	30.03	29.92	30.03	29.73	29.73
DELH	AVG ORIFICE PRESS DROP	IN H2O	0.320	0.252	0.281	0.299	0.201	0.417
VM	VOL DRY GAS(METER CON)	DCF	16.473	26.791	27.575	28.836	21.763	31.555
TM	AVG GAS METER TEMP	DEG F	98.0	97.2	94.9	83.4	68.4	75.0
VMSTD	VOL DRY GAS (STD COND)	DSCF	15.70	25.50	26.26	28.14	21.62	30.98
VW	TOTAL H2O COLLECTED	ML	50.0	119.7	147.9	143.2	115.6	165.4
VWG	VOL H2O VAPOR(STD CON)	SCF	2.355	5.638	6.966	6.745	5.445	7.790
PCNTM	PERCNT MOISTURE BY VOL		13.05	18.11	20.97	19.33	20.11	20.09
MD	MOLE FRACTION DRY GAS		0.870	0.819	0.790	0.807	0.799	0.799
CO2	PERCENT CO2		9.0	9.3	8.2	9.1	8.9	9.0
O2	PERCENT O2		14.0	13.9	14.5	15.4	14.5	15.8
N2	PERCENT N2		77.1	76.8	77.4	75.5	76.5	75.1
MWD	MOL WT OF DRY GAS		30.0	30.0	29.9	30.1	30.0	30.1
MW	MOL WT OF STACK GAS		28.5	27.9	27.4	27.7	27.6	27.6
DELP	AVG STACK VELOCITY HEAD	IN H2O	0.698	0.543	0.567	0.601	0.366	0.734
CP	PITOT COEFFICIENT		0.770	0.770	0.770	0.770	0.770	0.770
TS	STACK TEMPERATURE	DEG F	380.	372.	375.	373.	377.	379.
PM	STACK PRESSURE(STATIC)	IN H2O	0.90	0.70	0.70	14.50	14.50	14.00
PS	STACK PRESSURE (ABS)	IN HG	30.17	30.08	29.97	31.10	30.80	30.76
VS	AVG STACK GAS VELOCITY	FPM	3209.	2827.	2915.	2947.	2241.	3249.
DS	STACK DIAMETER	INCHES	71.37	71.37	71.37	71.37	71.37	71.37
AS	STACK AREA	SQ IN	4001.1	4001.1	4001.1	4001.1	4001.1	4001.1
QS	STACK FLOW RT(DRY STD)	DSCFM	49294.	41191.	40693.	43651.	32420.	46866.
QA	STACK FLOW RT(ACTUAL)	ACFM	89151.	78530.	80980.	81861.	62250.	90267.
DN	PROBE TIP DIAMETER	INCHES	0.184	0.184	0.184	0.184	0.184	0.184
PCTI	PERCENT ISOKINETIC		50.1	97.4	101.5	101.4	104.9	104.0
MF	PARTICULATE (FRONT)	MG	489.20	523.40	1031.00	1910.10	594.20	1348.90
MT	PARTICULATE (TOTAL)	MG	489.20	523.40	1031.00	1910.10	594.20	1348.90
CAN	PARTICULATE (FRONT)	GR/DSCF	0.4799	0.3161	0.6046	1.0452	0.4232	0.6704
CAO	PARTICULATE (TOTAL)	GR/DSCF	0.4799	0.3161	0.6046	1.0452	0.4232	0.6704
CAT	PARTICULATE (FRONT)	GR/ACF	0.2644	0.1652	0.3027	0.5553	0.2196	0.3468
CAU	PARTICULATE (TOTAL)	GR/ACF	0.2644	0.1652	0.3027	0.5553	0.2196	0.3468
CAW	PARTICULATE (FRONT)	LB/HR	202.750	111.578	210.854	390.980	117.573	269.279
CAX	PARTICULATE (TOTAL)	LB/HR	202.750	111.578	210.854	390.980	117.573	269.279

27 MAY 1980

ST JOE PAPER CO
PARTICULATE SAMPLING

ABBR	DESCRIPTION (20 DEG C)	UNITS	1I	2I	3I	4I	5I	6I
TT	DURATION OF RUN	MINUTES	96.0	96.0	96.0	96.0	96.0	96.0
PB	BAROMETRIC PRESSURE	CM HG	76.45	76.28	76.00	76.28	75.51	75.51
DELH	AVG ORIFICE PRESS DROP	CM H2O	0.613	0.640	0.714	0.758	0.510	1.060
VM	VOL DRY GAS(METER CON)	DCM	0.467	0.759	0.781	0.817	0.616	0.894
TM	AVG GAS METER TEMP	DEG C	36.6	36.2	35.0	28.6	20.2	23.9
VMSTD	VOL DRY GAS (STD COND)	DNCM	0.44	0.72	0.74	0.80	0.61	0.88
VW	TOTAL H2O COLLECTED	ML	50.0	119.7	147.9	143.2	115.6	165.4
VWG	VOL H2O VAPOR(STD CON)	NCM	0.067	0.160	0.197	0.191	0.154	0.221
PCNTM	PERCNT MOISTURE BY VOL		13.05	18.11	20.97	19.33	20.11	20.09
MD	MOLE FRACTION DRY GAS		0.870	0.819	0.790	0.807	0.799	0.799
CO2	PERCENT CO2		9.0	9.3	8.2	9.1	8.9	9.0
O2	PERCENT O2		14.0	13.9	14.5	15.4	14.5	15.8
N2	PERCENT N2		77.1	76.8	77.4	75.5	76.5	75.1
MWD	MOL WT OF DRY GAS		30.0	30.0	29.9	30.1	30.0	30.1
MW	MOL WT OF STACK GAS		28.5	27.9	27.4	27.7	27.6	27.6
DELP	AVG STACK VELOCITY HEAD	CM H2O	1.772	1.380	1.440	1.526	0.929	1.863
CP	PITOT COEFFICIENT		0.770	0.770	0.770	0.770	0.770	0.770
TS	STACK TEMPERATURE	DEG C	194.	189.	191.	190.	192.	193.
PM	STACK PRESSURE(STATIC)	CM H2O	2.29	1.78	1.78	36.83	36.83	35.56
PS	STACK PRESSURE (ABS)	CM HG	76.62	76.41	76.13	78.98	78.22	78.13
VS	AVG STACK GAS VELOCITY	MPM	978.	862.	888.	898.	683.	990.
DS	STACK DIAMETER	CM	181.29	181.29	181.29	181.29	181.29	181.29
AS	STACK AREA	SQ CM	25815.2	25815.2	25815.2	25815.2	25815.2	25815.2
QS	STACK FLOW RT(DRY STD)	DNCMPM	1396.	1167.	1152.	1236.	918.	1327.
QA	STACK FLOW RT(ACTUAL)	ACMPM	2525.	2224.	2293.	2318.	1763.	2556.
DN	PROBE TIP DIAMETER	CM	0.467	0.467	0.467	0.467	0.467	0.467
PCTI	PERCENT ISOKINETIC		50.1	97.4	101.5	101.4	104.9	104.0
MF	PARTICULATE (FRONT)	MG	489.20	523.40	1031.00	1910.10	594.20	1348.90
MT	PARTICULATE (TOTAL)	MG	489.20	523.40	1031.00	1910.10	594.20	1348.90
CAN	PARTICULATE (FRONT)	G/DNCM	1.0985	0.7235	1.3839	2.3923	0.9686	1.5346
CAO	PARTICULATE (TOTAL)	G/DNCM	1.0985	0.7235	1.3839	2.3923	0.9686	1.5346
CAT	PARTICULATE (FRONT)	G/ACM	0.6052	0.3781	0.6929	1.2710	0.5026	0.7938
CAU	PARTICULATE (TOTAL)	G/ACM	0.6052	0.3781	0.6929	1.2710	0.5026	0.7938
CAW	PARTICULATE (FRONT)	KG/HR	91.967	50.612	95.643	177.349	53.331	122.145
CAX	PARTICULATE (TOTAL)	KG/HR	91.967	50.612	95.643	177.349	53.331	122.145

3 MARCH 1980

ST JOE PAPER CO
PARTICULATE SAMPLING

ABBR	DESCRIPTION (68 DEG F)	UNITS	10	20	30	40	50	60
TT	DURATION OF RUN	MINUTES	96.0	96.0	96.0	96.0	96.0	96.0
PB	BAROMETRIC PRESSURE	IN HG	30.00	30.00	29.84	29.84	29.73	29.75
DELH	AVG ORIFICE PRESS DROP	IN H2O	0.970	0.819	0.859	0.993	0.868	0.794
VM	VOL DRY GAS(METER CON)	DCF	49.507	44.822	46.932	49.630	45.447	43.852
TM	AVG GAS METER TEMP	DEG F	78.0	80.3	91.1	72.6	66.8	65.2
VMSTD	VOL DRY GAS (STD COND)	DSCF	48.84	44.02	44.95	49.20	45.36	43.93
VW	TOTAL H2O COLLECTED	ML	280.0	228.5	242.3	283.3	281.1	285.3
VWG	VOL H2O VAPOR(STD CON)	SCF	13.188	10.762	11.412	13.343	13.240	13.438
PCNTM	PERCNT MOISTURE BY VOL		21.26	19.65	20.25	21.34	22.59	23.43
MD	MOLE FRACTION DRY GAS		0.787	0.804	0.798	0.787	0.774	0.766
CO2	PERCENT CO2		8.1	7.7	6.5	8.2	5.9	6.1
O2	PERCENT O2		12.8	14.2	15.0	14.9	14.6	15.1
N2	PERCENT N2		79.1	78.1	78.6	76.8	79.4	78.8
MWD	MOL WT OF DRY GAS		29.8	29.8	29.7	29.9	29.5	29.6
MW	MOL WT OF STACK GAS		27.3	27.5	27.3	27.4	26.9	26.9
DELP	AVG STACK VELOCITY HEAD	IN H2O	0.448	0.384	0.390	0.450	0.416	0.384
CP	PITOT COEFFICIENT		0.770	0.770	0.770	0.770	0.770	0.770
TS	STACK TEMPERATURE	DEG F	143.	140.	142.	143.	144.	146.
PM	STACK PRESSURE(STATIC)	IN H2O	-0.30	-0.30	-0.30	-0.02	-0.02	-0.02
PS	STACK PRESSURE (ABS)	IN HG	29.98	29.98	29.82	29.84	29.73	29.75
VS	AVG STACK GAS VELOCITY	FPM	2240.	2059.	2097.	2259.	2187.	2105.
DS	STACK DIAMETER	INCHES	84.25	84.25	84.25	84.25	84.25	84.25
AS	STACK AREA	SQ IN	5574.8	5574.8	5574.8	5574.8	5574.8	5574.8
QS	STACK FLOW RT(DRY STD)	DSCFM	60156.	56717.	56788.	60254.	57172.	54237.
QA	STACK FLOW RT(ACTUAL)	ACFM	86695.	79712.	81176.	87447.	84671.	81485.
DN	PROBE TIP DIAMETER	INCHES	0.246	0.246	0.246	0.246	0.246	0.246
PCTI	PERCENT ISOKINETIC		99.6	95.2	97.1	100.1	97.3	99.3
MF	PARTICULATE (FRONT)	MG	79.30	73.00	67.80	128.10	72.80	65.50
MT	PARTICULATE (TOTAL)	MG	79.30	73.00	67.80	128.10	72.80	65.50
CAN	PARTICULATE (FRONT)	GR/DSCF	0.0250	0.0255	0.0232	0.0401	0.0247	0.0230
CAO	PARTICULATE (TOTAL)	GR/DSCF	0.0250	0.0255	0.0232	0.0401	0.0247	0.0230
CAT	PARTICULATE (FRONT)	GR/ACF	0.0173	0.0181	0.0162	0.0275	0.0166	0.0152
CAU	PARTICULATE (TOTAL)	GR/ACF	0.0173	0.0181	0.0162	0.0275	0.0166	0.0152
CAW	PARTICULATE (FRONT)	LB/HR	12.892	12.414	11.306	20.707	12.109	10.674
CAX	PARTICULATE (TOTAL)	LB/HR	12.892	12.414	11.306	20.707	12.109	10.674

3 MARCH 1980

ST JOE PAPER CO
PARTICULATE SAMPLING

ABBR	DESCRIPTION (20 DEG C)	UNITS	10	20	30	40	50	60
TT	DURATION OF RUN	MINUTES	96.0	96.0	96.0	96.0	96.0	96.0
PB	BAROMETRIC PRESSURE	CM HG	76.20	76.20	75.79	75.79	75.51	75.57
DELH	AVG ORIFICE PRESS DROP	CM H2O	2.465	2.080	2.182	2.522	2.205	2.017
VM	VOL DRY GAS(METER CON)	DCM	1.402	1.269	1.329	1.406	1.287	1.242
TM	AVG GAS METER TEMP	DEG C	25.6	26.8	32.8	22.6	19.4	18.5
VMSTD	VOL DRY GAS (STD COND)	DNCM	1.38	1.25	1.27	1.39	1.28	1.24
VW	TOTAL H2O COLLECTED	ML	280.0	228.5	242.3	283.3	281.1	285.3
VWG	VOL H2O VAPOR(STD CON)	NCM	0.373	0.305	0.323	0.378	0.375	0.381
PCNTM	PERCNT MOISTURE BY VOL		21.26	19.65	20.25	21.34	22.59	23.43
MD	MOLE FRACTION DRY GAS		0.787	0.804	0.798	0.787	0.774	0.766
CO2	PERCENT CO2		8.1	7.7	6.5	8.2	5.9	6.1
O2	PERCENT O2		12.8	14.2	15.0	14.9	14.6	15.1
N2	PERCENT N2		79.1	78.1	78.6	76.8	79.4	78.8
MWD	MOL WT OF DRY GAS		29.8	29.8	29.7	29.9	29.5	29.6
MW	MOL WT OF STACK GAS		27.3	27.5	27.3	27.4	26.9	26.9
DELP	AVG STACK VELOCITY HEAD	CM H2O	1.138	0.976	0.990	1.144	1.056	0.974
CP	PITOT COEFFICIENT		0.770	0.770	0.770	0.770	0.770	0.770
TS	STACK TEMPERATURE	DEG C	61.	60.	61.	62.	62.	63.
PM	STACK PRESSURE(STATIC)	CM H2O	-0.76	-0.76	-0.76	-0.05	-0.05	-0.05
PS	STACK PRESSURE (ABS)	CM HG	76.14	76.14	75.74	75.79	75.51	75.56
VS	AVG STACK GAS VELOCITY	MPM	683.	628.	639.	689.	667.	642.
DS	STACK DIAMETER	CM	213.99	213.99	213.99	213.99	213.99	213.99
AS	STACK AREA	SQ CM	35968.6	35968.6	35968.6	35968.6	35968.6	35968.6
QS	STACK FLOW RT(DRY STD)	DNCMPM	1704.	1606.	1608.	1706.	1619.	1536.
QA	STACK FLOW RT(ACTUAL)	ACMPM	2455.	2257.	2299.	2477.	2398.	2308.
DN	PROBE TIP DIAMETER	CM	0.625	0.625	0.625	0.625	0.625	0.625
PCTI	PERCENT ISOKINETIC		99.6	95.2	97.1	100.1	97.3	99.3
MF	PARTICULATE (FRONT)	MG	79.30	73.00	67.80	128.10	72.80	65.50
MT	PARTICULATE (TOTAL)	MG	79.30	73.00	67.80	128.10	72.80	65.50
CAN	PARTICULATE (FRONT)	G/DNCM	0.0572	0.0585	0.0532	0.0918	0.0566	0.0526
CAO	PARTICULATE (TOTAL)	G/DNCM	0.0572	0.0585	0.0532	0.0918	0.0566	0.0526
CAT	PARTICULATE (FRONT)	G/ACM	0.0396	0.0414	0.0371	0.0630	0.0381	0.0349
CAU	PARTICULATE (TOTAL)	G/ACM	0.0396	0.0414	0.0371	0.0630	0.0381	0.0349
CAW	PARTICULATE (FRONT)	KG/HR	5.848	5.631	5.128	9.393	5.493	4.842
CAX	PARTICULATE (TOTAL)	KG/HR	5.848	5.631	5.128	9.393	5.493	4.842

A - METHOD 5 - COMPUTER INPUT DATA

mpany St Joe Paper Co.

o No. 13-022-760.93. 1011 1067

Workup by W. McDonald

Data checked by W. McDonald

TT	PB	VM	VW					DN	MF	MT	DS	PM	Cp
Dur. of Run Min.	Bar. Press. in Hg	Vol. Dry Gas dcf	Total H_2O Collected ml	% CO_2	% O_2	% N_2	% CO	Probe Tip Diameter inches	Part. (front) mg	Part. (total) mg	Stack Dia. inches	Static Stack Press. in H_2O	Pitot Tube Coeff.
1I(96)	30.10	16.473	50	9.0	14.0	77.1 ~~86.1~~	0	0.184			71.375	+0.90	0.77
2I(96)	30.03	26.791	119.7	9.3	13.9	76.8 ~~86.1~~	0	0.184			71.375	+0.70	0.77
3I(96)	29.92	27.575	147.9	8.2	14.5	77.4 ~~85.5~~	0	0.184			71.375	+0.70	0.77
4I(96)	30.03	28.836	143.2	9.1	15.4	75.5 ~~84.6~~	0	0.184			71.375	+14.5	0.77
5I(96)	29.73	21.763	115.6	8.9	14.55	76.5 ~~85.45~~	0	0.184			71.375	+14.5	0.77
6I(96)	29.73	31.555	165.4	9.0	15.8	75.15 ~~84.2~~	0	0.184			71.375	+14.0	0.77
1-O(96)	30.0	49.507	280.0	8.1	12.8	79.1 ~~87.3~~	0	0.246			84.25	-0.30	0.77
2-O(96)	30.0	44.822	228.5	7.7	14.2	78.15 ~~85.9~~	0	0.246			84.25	-0.3	0.77
3-O(96)	29.84	46.932	242.3	6.5	15.0	78.6 ~~85.1~~	0	0.246			84.25	-0.3	0.77
4-O(96)	29.84	49.630	283.3	8.2	14.9	76.85 ~~85.1~~	0	0.246			84.25	-0.02	0.77
5-O(96)	29.73	45.447	241.1	5.9	14.6	79.45 ~~85.9~~	0	0.246			84.25	-0.02	0.77
6-O(96)	29.75	43.852	285.3	6.1	15.1	78.85 ~~84.9~~	0	0.246			84.25	0.02	0.77

NOX CALCULATION (68 DEG F)

ST. JOE PAPER COMPANY
2 JUNE 198:

VSC - SAMPLE VOLUME AT STANDARD CONDITIONS (DRY BASIS),ML
MASS - MASS OF NO2 IN GAS SAMPLE,UG
PPM - PPM,NOX AS NO2
LB/DSCF - CONCENTRATION OF NOX AS NO2 (DRY BASIS),LB/DSCF

VSC	MASS	PPM	LB/DSCF
0.144651E+04	0.252365E+03	0.912936E+02	0.108019E-04
0.141220E+04	0.383746E+02	0.142390E+02	0.168477E-05
0.143636E+04	0.212428E+03	0.774960E+02	0.916937E-05
0.141497E+04	0.139029E+03	0.514858E+02	0.609183E-05
0.175357E+04	0.228838E+03	0.683962E+02	0.809268E-05
0.136980E+04	0.106916E+03	0.408996E+02	0.483926E-05
0.186066E+04	0.241841E+03	0.681074E+02	0.805851E-05
0.180661E+04	0.249127E+03	0.722582E+02	0.854964E-05
0.173825E+04	0.241167E+03	0.727003E+02	0.860194E-05
0.181492E+04	0.430970E+02	0.124429E+02	0.147225E-05
0.159065E+04	0.262889E+03	0.866025E+02	0.102469E-04
0.169742E+04	0.318983E+02	0.984712E+01	0.116512E-05

KG/HR	G/NCM	LB/HR
0.171270E+02	0.173011E+00	0.377579E+02
0.267129E+01	0.269844E-01	0.588908E+01
0.145385E+02	0.146863E+00	0.320514E+02
0.965890E+01	0.975709E-01	0.212939E+02
0.121138E+02	0.129618E+00	0.267059E+02
0.724379E+01	0.775089E-01	0.159696E+02
0.120626E+02	0.129071E+00	0.265931E+02
0.127978E+02	0.136937E+00	0.282138E+02
0.129550E+02	0.137775E+00	0.285603E+02
0.221728E+01	0.235805E-01	0.488819E+01
0.154323E+02	0.164121E+00	0.340218E+02
0.175473E+01	0.186613E-01	0.386845E+01

NO_x COMPUTER PROGRAM INPUT DATA FOR EPA - METHOD 7 CALCULATIONS

Company St. Joe Paper Co. Date 2/19/80

Job Number 101.1067 Analyst N.F. May

Card #1 - Input Coordinates N= 5 M= 1 K= 12

Card #2 - Standards

Card #3

x(μg/ml)=	0	100	200	300	400	
y(abs.)=	0.0040	0.1261	0.2609	0.4066	0.6065	

Card #	4	5	6	7	8	9	10	11	12	
Run # Neck # / Flask #	Absorbance	Initial Barometric Pressure	Final Barometric Pressure	Initial Temperature	Final Temperature	Initial Flask Vacuum	Final Flask Vacuum	Total Dilution Factor(1)	Flask Volume-absorbing solution	Stack Velocity
	@ 410 nm	mmHg/inHg	mmHg/inHg	°C/°F	°C/°F	mmHg/inHg	mmHg/inHg		ml	DSCFM
1-1 16/16	0.1714	30.00	30.01	72	74	22.20	0.7	2	2039	58,258
1-2 2/2	0.0128	"	"	"	"	21.8	1.0	2	2055	"
1-3 15/15	0.1418	"	"	"	"	22.5	1.8	2	2100	"
1-4 55/55	0.0874	"	"	"	"	21.9	1.1	2	2059	"
2-1 2/85	0.1540	30.02	30.01	68	68	27.4	1.5	2	2025	55,000
2-2 55/55	0.0636	"	"	"	"	21.0	1.1	2	2059	"
2-3 15/15	0.1636	"	"	"	"	27.5	1.0	2	2100	"
2-4 16/16	0.1690	"	"	"	"	27.3	0.8	2	2039	"
3-1 11/11	0.1631	30.01	29.83	68	74	26.4	0.3	2	2031	55,337
3-2 10/10	0.0163	"	"	"	"	27.2	0.1	2	2041	"
3-3 46/54	0.1792	"	"	"	"	23.9	0.2	2	2051	"
3-4 50/50	0.0080	"	"	"	"	26.8	1.3	2	2030	"

N = # (x, y) Pairs
M = 0 indicates input is in metric
= 1 indicates input is in inches

K = # of samples

(1) where 1 = 100 mls (no dilution)
2 = 200 mls (2:1 dilution)

METHOD 6

SO_2 CALCULATION

Plant St Joe Paper Date 2-6-80

Location Field Blank 3% H_2O_2 Run# all Runs

Barometric Pressure Absolute (in Hg)	BP =	
Average Meter Temperature (°R) Absolute (°F + 460)	T_m =	
Volume Through Dry Gas Meter (CF)	V_m =	
Volume of $Ba(ClO_4)_2$ to Titrate Sample (ml)	V_t =	0
Volume of $Ba(ClO_4)_2$ to Titrate Blank (ml)	V_b =	0
Normality of $Ba(ClO_4)_2$ Solution (g-eq/l)	N =	0.0110
Total Volume of Solution (ml)	V_s =	250 ml
Volume of Aliquot (ml)	V_a =	50 ml

Volume of Gas at Standard Conditions (SCF) = V_g

$$V_g = 17.71 \frac{(V_m)(BP)}{(T_m)} = 17.71 \frac{(\quad)(\quad)}{(\quad)} = \_\_\_\_\_$$

Concentration of SO_2 (lbs/SCF) dry basis = C

$$C = 7.05 \times 10^{-5} \frac{(V_t - V_b)(N)(V_s)}{(V_g)(V_a)} = 7.05 \times 10^{-5} \frac{(\quad)(\quad)(\quad)}{(\quad)(\quad)}$$

C = _____ lbs/SCF

Velocity of Stack Gas (Actual)(FPS)	V =	
% Moisture in Stack Gas	M =	
Area of Stack (ft^2)	A =	
Absolute Stack Temperature (°R)	T_s =	
Absolute Stack Pressure (in Hg)	P_s =	

SO_2 Flow Rate (lbs/hr) = S

$$S = \frac{6.377 \times 10^{+4}(1-(M \times 10^{-2}))(V)(A)(P_s)(C)}{(T_s)}$$

$$S = \frac{6.377 \times 10^{4} (\quad)(\quad)(\quad)(\quad)(\quad)}{(\quad)}$$

S = _____ (lbs/hr)

F.P N.B.P 1731212

METHOD 6

SO_2 CALCULATION

Plant St Joe Paper Date 2-6-80

Location Field Blank dist H_2O Run# _____

Barometric Pressure Absolute (in Hg)	BP =	_____
Average Meter Temperature (°R) Absolute (°F + 460)	T_m =	_____
Volume Through Dry Gas Meter (CF)	V_m =	_____
Volume of $Ba(ClO_4)_2$ to Titrate Sample (ml)	V_t =	0
Volume of $Ba(ClO_4)_2$ to Titrate Blank (ml)	V_b =	0
Normality of $Ba(ClO_4)_2$ Solution (g-eq/l)	N =	0.0110
Total Volume of Solution (ml)	V_s =	500 ml
Volume of Aliquot (ml)	V_a =	50 ml

Volume of Gas at Standard Conditions (SCF) = V_g

$$V_g = 17.71 \frac{(V_m)(BP)}{(T_m)} = 17.71 \frac{(\quad)(\quad)}{(\quad)} = \_\_\_\_\_$$

Concentration of SO_2 (lbs/SCF) dry basis = C

$$C = 7.05 \times 10^{-5} \frac{(V_t - V_b)(N)(V_s)}{(V_g)(V_a)} = 7.05 \times 10^{-5} \frac{(\quad)(\quad)(\quad)}{(\quad)(\quad)}$$

C = _____ lbs/SCF

Velocity of Stack Gas (Actual)(FPS)	V =	_____
% Moisture in Stack Gas	M =	_____
Area of Stack (ft^2)	A =	_____
Absolute Stack Temperature (°R)	T_s =	_____
Absolute Stack Pressure (in Hg)	P_s =	_____

SO_2 Flow Rate (lbs/hr) = S

$$S = \frac{6.377 \times 10^{+4}(1-(M \times 10^{-2}))(V)(A)(P_s)(C)}{(T_s)}$$

$$S = \frac{6.377 \times 10^{4} (\quad)(\quad)(\quad)(\quad)(\quad)}{(\quad)}$$

S = _____ (lbs/hr)

F.P. NBP 173 312

METHOD 6

SO_2 CALCULATION

Plant St Joe Paper Date 2-6-80

Location Inlet Run# 1

Barometric Pressure Absolute (in Hg)	BP =	30.1
Average Meter Temperature (°R) Absolute (°F + 460)	T_m =	523
Volume Through Dry Gas Meter (CF)	V_m =	16.473
Volume of $Ba(ClO_4)_2$ to Titrate Sample (ml)	V_t =	1.3
Volume of $Ba(ClO_4)_2$ to Titrate Blank (ml)	V_b =	0
Normality of $Ba(ClO_4)_2$ Solution (g-eq/l)	N =	0.0110
Total Volume of Solution (ml)	V_s =	1000 ml
Volume of Aliquot (ml)	V_a =	100 ml
Volume of Gas at Standard Conditions (SCF) = V_g		

$$V_g = 17.\cancel{71}\,64 \frac{(V_m)(BP)}{(T_m)} = 17.\cancel{71}\,64 \frac{(16.473)(30.1)}{(523)} = 16.724$$

Concentration of SO_2 (lbs/SCF) dry basis = C

$$C = 7.05 \times 10^{-5} \frac{(V_t - V_b)(N)(V_s)}{(V_g)(V_a)} = 7.05 \times 10^{-5} \frac{(1.3)(0.0110)(1000)}{(16.724)(100)}$$

C = 6.02×10^{-7} lbs/SCF

Velocity of Stack Gas (Actual)(FPS)	V =	53.48
% Moisture in Stack Gas	M =	13.05
Area of Stack (ft^2)	A =	27.785
Absolute Stack Temperature (°R)	T_s =	840
Absolute Stack Pressure (in Hg)	P_s =	30.17

SO_2 Flow Rate (lbs/hr) = S

$$S = \frac{6.377 \times 10^{+4}(1-(M \times 10^{-2}))(V)(A)(P_s)(C)}{(T_s)}$$

$$S = \frac{6.377 \times 10^{4}(86.95)(53.48)(27.785)(30.17)(6.02 \times 10^{-7})}{(840)}$$

S = 178.1 (lbs/hr)

7 P ABP 173212

METHOD 6

SO_2 CALCULATION

Plant St Joe Paper Date 2-6-80

Location Inlet Imp 2 and 3 Run# 2

Barometric Pressure Absolute (in Hg)	BP =	30.03
Average Meter Temperature (°R) Absolute (°F + 460)	T_m =	535
Volume Through Dry Gas Meter (CF)	V_m =	26.791
Volume of $Ba(ClO_4)_2$ to Titrate Sample (ml)	V_t =	0.9
Volume of $Ba(ClO_4)_2$ to Titrate Blank (ml)	V_b =	0
Normality of $Ba(ClO_4)_2$ Solution (g-eq/l)	N =	0.0110
Total Volume of Solution (ml)	V_s =	500 ml
Volume of Aliquot (ml)	V_a =	100 ml

Volume of Gas at Standard Conditions (SCF) = V_g

$$V_g = 17.\cancel{71}\,64 \frac{(V_m)(BP)}{(T_m)} = 17.\cancel{71}\,64 \frac{(26.791)(30.03)}{(535)} = 26.527$$

Concentration of SO_2 (lbs/SCF) dry basis = C

$$C = 7.05 \times 10^{-5} \frac{(V_t - V_b)(N)(V_s)}{(V_g)(V_a)} = 7.05 \times 10^{-5} \frac{(0.9)(0.0110)(500)}{(26.527)(100)}$$

C = 1.316×10^{-7} lbs/SCF

Velocity of Stack Gas (Actual)(FPS)	V =	42.58
% Moisture in Stack Gas	M =	18.11
Area of Stack (ft^2)	A =	27.785
Absolute Stack Temperature (°R)	T_s =	679
Absolute Stack Pressure (in Hg)	P_s =	30.08

SO_2 Flow Rate (lbs/hr) = S

$$S = \frac{6.377 \times 10^{+4}(1-(M \times 10^{-2}))(V)(A)(P_s)(C)}{(T_s)}$$

$$S = \frac{6.377 \times 10^{4}\,(81.89)(42.58)(27.785)(30.08)(1.316 \times 10^{-7})}{(679)}$$

S = 36.0 (lbs/hr)

7 P UBP 173212

A-12

METHOD 6

SO_2 CALCULATION

Plant St Joe Paper Date 2-6-80

Location Inlet #4 Boiler Run# 3

Barometric Pressure Absolute (in Hg)	BP =	29.92
Average Meter Temperature (°R) Absolute (°F + 460)	T_m =	554.9
Volume Through Dry Gas Meter (CF)	V_m =	27.575
Volume of $Ba(ClO_4)_2$ to Titrate Sample (ml)	V_t =	0
Volume of $Ba(ClO_4)_2$ to Titrate Blank (ml)	V_b =	0
Normality of $Ba(ClO_4)_2$ Solution (g-eq/l)	N =	0.0110
Total Volume of Solution (ml)	V_s =	250 ml
Volume of Aliquot (ml)	V_a =	100 ml

Volume of Gas at Standard Conditions (SCF) = V_g

$$V_g = 17.\cancel{71}\,64 \frac{(V_m)(BP)}{(T_m)} = 17.\cancel{71}\,64 \frac{(27.575)(29.92)}{(554.9)} = 26.23$$

Concentration of SO_2 (lbs/SCF) dry basis = C

$$C = 7.05 \times 10^{-5} \frac{(V_t - V_b)(N)(V_s)}{(V_g)(V_a)} = 7.05 \times 10^{-5} \frac{(0-0)(\quad)(\quad)}{(\quad)(\quad)}$$

C = 0 lbs/SCF

Velocity of Stack Gas (Actual)(FPS)	V =	
% Moisture in Stack Gas	M =	
Area of Stack (ft^2)	A =	
Absolute Stack Temperature (°R)	T_s =	
Absolute Stack Pressure (in Hg)	P_s =	

SO_2 Flow Rate (lbs/hr) = S

$$S = \frac{6.377 \times 10^{+4}(1-(M \times 10^{-2}))(V)(A)(P_s)(C)}{(T_s)}$$

$$S = \frac{6.377 \times 10^{4}(\quad)(\quad)(\quad)(\quad)(\quad)}{(\quad)}$$

S = 0 (lbs/hr)

F-P NBP 1731212

METHOD 6

SO_2 CALCULATION

Plant St Joe Paper Date 2-6-80

Location Boiler 1/2 outlet Run# 1

Barometric Pressure Absolute (in Hg)	BP =	30.00
Average Meter Temperature (°R) Absolute (°F + 460)	T_m =	538
Volume Through Dry Gas Meter (CF)	V_m =	49.507
Volume of $Ba(ClO_4)_2$ to Titrate Sample (ml)	V_t =	0
Volume of $Ba(ClO_4)_2$ to Titrate Blank (ml)	V_b =	0
Normality of $Ba(ClO_4)_2$ Solution (g-eq/l)	N =	0.0110
Total Volume of Solution (ml)	V_s =	500 ml
Volume of Aliquot (ml)	V_a =	100 ml
Volume of Gas at Standard Conditions (SCF) = V_g		

$$V_g = 17.\cancel{71}\,64 \frac{(V_m)(BP)}{(T_m)} = 17.\cancel{71}\,64 \frac{(49.507)(30.00)}{(538)} = 48.70$$

Concentration of SO_2 (lbs/SCF) dry basis = C

$$C = 7.05 \times 10^{-5} \frac{(V_t-V_b)(N)(V_s)}{(V_g)(V_a)} = 7.05 \times 10^{-5} \frac{(0-0)(\quad)(\quad)}{(\quad)(\quad)}$$

C = 0 lbs/SCF

Velocity of Stack Gas (Actual)(FPS)	V =	
% Moisture in Stack Gas	M =	
Area of Stack (ft^2)	A =	
Absolute Stack Temperature (°R)	T_s =	
Absolute Stack Pressure (in Hg)	P_s =	

SO_2 Flow Rate (lbs/hr) = S

$$S = \frac{6.377 \times 10^{+4}(1-(M \times 10^{-2}))(V)(A)(P_s)(C)}{(T_s)}$$

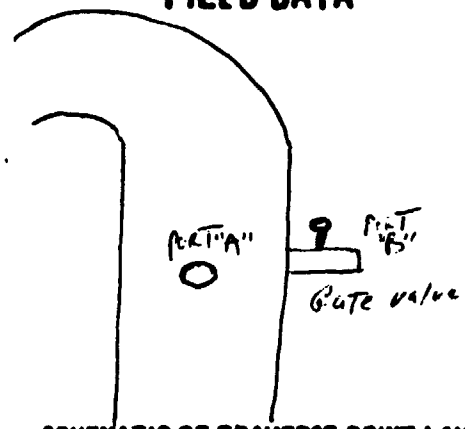
$$S = \frac{6.377 \times 10^{4}(\quad)(\quad)(\quad)(\quad)(\quad)}{(\quad)(\quad)}$$

S = 0 (lbs/hr)

7-p UEP 133212

FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 16, 1980
SAMPLING LOCATION Boiler #4 Inlet
SAMPLE TYPE Anderson
RUN NUMBER Sample Run
OPERATOR C. Clark
AMBIENT TEMPERATURE 20° F
BAROMETRIC PRESSURE 30.1
STATIC PRESSURE, (P_s) +9
FILTER NUMBER (s) Anderson Filters
Impactor # 599



SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER —
METER BOX NUMBER #4
METER $\Delta H_@$ 1.83
C FACTOR
PROBE HEATER SETTING Night
HEATER BOX SETTING —
REFERENCE Δp

READ AND RECORD ALL DATA EVERY 2 MINUTES LEAK RATE .0012 CFM @ 10 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACU in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0		~~422.533~~ 422.589									
8	0		422.594	.79	.075	.075		83	83	1.0		
	2		423.662		.075			84	83	1.0		
	4		424.045					84	83	1.0		
	6		424.336					84	83	1.0		
	8		424.667					84	83	1.0		
	10		425.002					83	83	1.0		
Single Pt.			1.453									

B-142

METHOD 6

SO_2 CALCULATION

Plant St Croix Paper Date 2-6-80

Location #4 Stack Outlet Run# 3

Barometric Pressure Absolute (in Hg)	BP =	29.84
Average Meter Temperature (°R) Absolute (°F + 460)	T_m =	551.1
Volume Through Dry Gas Meter (CF)	V_m =	46.932
Volume of $Ba(ClO_4)_2$ to Titrate Sample (ml)	V_t =	0
Volume of $Ba(ClO_4)_2$ to Titrate Blank (ml)	V_b =	0
Normality of $Ba(ClO_4)_2$ Solution (g-eq/l)	N =	0.0110
Total Volume of Solution (ml)	V_s =	500 ml
Volume of Aliquot (ml)	V_a =	100 ml
Volume of Gas at Standard Conditions (SCF) = V_g		

$$V_g = 17.\cancel{71}\,64 \frac{(V_m)(BP)}{(T_m)} = 17.\cancel{71}\,64 \frac{(46.932)(29.84)}{(551.1)} = 44.83$$

Concentration of SO_2 (lbs/SCF) dry basis = C

$$C = 7.05 \times 10^{-5} \frac{(V_t - V_b)(N)(V_s)}{(V_g)(V_a)} = 7.05 \times 10^{-5} \frac{(0-0)(\quad)(\quad)}{(\quad)(\quad)}$$

C = 0 lbs/SCF

Velocity of Stack Gas (Actual)(FPS)	V =	
% Moisture in Stack Gas	M =	
Area of Stack (ft^2)	A =	
Absolute Stack Temperature (°R)	T_s =	
Absolute Stack Pressure (in Hg)	P_s =	

SO_2 Flow Rate (lbs/hr) = S

$$S = \frac{6.377 \times 10^{+4}(1-(M \times 10^{-2}))(V)(A)(P_s)(C)}{(T_s)}$$

$$S = \frac{6.377 \times 10^{4}(\quad)(\quad)(\quad)(\quad)(\quad)}{(\quad)}$$

S = 0 (lbs/hr)

F.P. NBP 173 1212

A-16

Int. Fac Paper CO.
Jan. 16, 1980
McDonald + Clark
Boiler Tabulet
Run # 1-I Impactor # 575

TABULAR PRESENTATION OF IMPACTOR DATA

AIR TEMPERATURE = 00°F

FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	Probe 1 2 NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.2972	0	33.7853	33.7856	.0003 0.3	1.78	98.2	> 19.0	19.0
	1	27.5642	27.5619	.0023 2.3	13.6	84.6	14.0 – 19.0	14.0
	2	28.9224	28.9212	.0012 1.2	7.1	77.5	11.0 – 14.0	11.0
	3	28.7447	28.7464	.0017 1.7	10.0	67.5	9.0 – 11.0	9.0
	4	21.9797	21.9817	0.002 2.0	11.8	55.7	6.0 – 9.0	6.0
	5	17.6401	17.6424	.0023 2.3	13.6	42.1	3.8 – 6.0	3.8
	6	17.8836	17.8877	.0041 4.1	24.3	17.8	1.9 – 3.8	1.9
	7	17.8653	17.8664	.0011 1.1	6.5	11.3	1.2 – 1.9	1.2
	8	28.7332	28.7351	.0019 1.9	11.2	0.1	0.82 – 1.2	.82
	Back up Filter	21.4851	21.4841	-.001 0	0	0	0	0

Total 16.9

St. Joe Paper Co.
Jan. , 1980
McDonald + Clark
Boiler #4 Inlet
Run # 2-I Impactor #562

TABULAR PRESENTATION OF IMPACTOR DATA

AIR TEMPERATURE = 00°F

FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	Probe 11.5 NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.2798	0	33.6106	33.6122	.0016 1.6	5.7	94.3	> 21.0	21.0
	1	27.8055	27.8076	.0021 2.1	7.4	86.9	16.0 - 21.0	16.0
	2	28.3332	28.3350	.0018 1.8	6.4	80.5	14.0 - 16.0	14.0
	3	29.4433	29.4460	.0027 2.7	9.5	71.0	8.8 - 14.0	8.8
	4	22.0048	22.0083	.0035 3.5	12.4	58.6	5.9 - 8.8	5.9
	5	17.7902	17.7948	.0046 4.6	16.3	42.3	3.8 - 5.9	3.8
	6	17.8383	17.8436	.0053 5.3	18.7	23.6	1.9 - 3.8	1.9
	7	17.9820	17.9855	.0035 3.5	12.4	11.2	1.3 - 1.9	1.3
	8	28.6226	28.6234	.0008 0.8	2.8	8.4	0.82 - 1.3	0.82
	Backup Filter	20.4955	20.4979	.0024 2.4	8.5	0	0	
				28.3				

St. Joe Paper Co.
Lang. 1988
McDonald + Clark
Boiler #4 Outlet
Run # 3-I Impactor #561

TABULAR PRESENTATION OF IMPACTOR DATA

AIR TEMPERATURE = 00°F

Probe 8.6 mg

FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.251	0	33.7153	33.7184	.0031 3.1	6.7	93.3	>21.0	> 21.0
	1	27.6033	27.6060	.0027 2.7	5.9	87.4	16.0 – 21.0	16.0
	2	28.8744	28.8781	.0037 3.7	8.0	79.4	12.0 – 16.0	12.0
	3	29.2756	29.2790	.0034 3.4	7.4	72.0	9.0 – 12.0	9.0
	4	21.6103	21.6161	.0058 5.8	12.6	59.4	8.0 – 9.0	8.0
	5	17.9977	18.0041	.0064 6.4	13.9	45.5	4.5 – 8.0	4.5
	6	17.8724	17.8800	.0076 7.6	16.5	29.0	2.1 – 4.5	2.1
	7	17.9512	17.9572	.006 6.0	13.0	16.0	1.8 – 2.1	1.8
	8	28.8299	28.8323	.0024 2.4	5.2	10.8	0.81 – 1.8	.81
	Backup Filter	20.3796	20.3846	.005 5.0	10.8	0	0	0

46.1

St. Joe Paper Co.
Jan. , 1980
McDonald + Clark
Boiler #4 Inlet
Run #4-I Impactor #561

TABULAR PRESENTATION OF IMPACTOR DATA
AIR TEMPERATURE = 00°F

Probe 13.0

FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.2917	0	33.7184	33.7188	0.4	3.2	96.8	> 19.2	19.2
	1	27.6100	27.6127	2.7	21.6	75.2	14.9 - 19.2	14.9
	2	28.8826	28.88.28	0.2	1.6	73.6	8.3 - 14.9	8.3
	3	29.2816	29.2818	0.2	1.6	72.0	5.7 - 8.3	5.7
	4	21.6163	21.6168	0.5	4.0	68.0	3.7 - 5.7	3.7
	5	18.0067	18.0068	0.1	0.8	67.2	2.0 - 3.7	2.0
	6	17.8808	17.8809	0.1	0.8	66.4	1.5 - 2.0	1.5
	7	17.9600	17.9622	2.2	17.6	48.8	1.1 - 1.5	1.1
	8	28.8323	28.8356	3.3	26.4	22.4	0.7 1.1	0.7
	BACKUP FILTER	20.3800	20.3828	2.8	22.4	0	0	0
				12.5				

A-20

St. Joe Paper Co.
Sept. 1980
C. Clark
Boiler #4 Inlet
Run # 5-I Impactor #599

TABULAR PRESENTATION OF IMPACTOR DATA

AIR TEMPERATURE = 00°F

Probe 16.5

FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.2641	0	33.0085	33.0086	0.1	0.86	99.14	> 22	22.0
	1	27.6334	27.6336	0.2	1.72	97.42	14.0 - 22.0	14.0
	2	28.4682	28.4684	0.2	1.72	95.70	8.9 - 14.0	8.9
	3	29.0333	29.0361	2.8	24.14	71.56	6.0 - 8.9	6.0
	4	21.8944	21.8957	1.3	11.21	60.35	3.8 - 6.0	3.8
	5	18.0284	18.0309	2.5	21.55	38.80	1.9 - 3.8	1.9
	6	17.7718	17.7736	1.8	15.52	23.28	1.3 - 1.9	1.3
	7	17.8464	17.8467	0.3	2.59	20.69	0.8 - 1.3	0.8
	8	28.3600	28.3606	0.6	5.17	15.52	0.5 - 0.8	0.5
	Backup filter	21.1235	21.1253	1.8	15.52	0	0	0
				11.6				

St. Joe Paper Co.
Jan. 24, 1980
C. Clark
Boiler #4 Inlet
Run # 6-I Impactor #575

TABULAR PRESENTATION OF IMPACTOR DATA

AIR TEMPERATURE = 00°F

Probe 15.7

FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.2569	0	33.6074	33.6075	0.0001	1.37	98.63	> 22.0	22.0
	1	27.3640	27.3650	0.0010	13.70	84.93	14.0 - 22.0	14.0
	2	28.7666	28.7686	0.0020	27.40	57.53	9.0 - 14.0	9.0
	3	28.5700	28.5709	0.0009	12.33	45.20	6.1 - 9.0	6.1
	4	22.0422	22.0423	0.00010	1.37	43.83	3.9 - 6.1	3.9
	5	17.7300	17.7303	0.0003	4.10	39.73	2.0 - 3.9	2.0
	6	18.0910	18.0913	0.0003	4.10	35.63	1.4 - 2.0	1.4
	7	18.0290	18.0300	0.0010	13.70	21.93	0.83 - 1.4	.83
	8	28.7359	28.7365	0.0006	8.22	13.71	0.65 - 0.83	.65
	Backup Filter	21.6600	21.6610	0.0010	13.70	0	- 0.65	0

7.3

A-22

ANDERSON PARTICLE SIZING DATA

Job: St Joe Paper Date: 1-16-80 Location: Boiler #4 outlet Run No. 1-0 A Head No. #599

Flow Rate: (ACFM) 0.1486 Stack Temperature 140 °F Analyst: W. McDonald

STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
Preimpact.							
Washes			13.7				
Stage 0	33.0102	33.01040	0.0002	0.69	99.31	> 24.0	24.0
1	27.5237	27.5238	0.0001	0.35	98.96	19.0 – 24	19.0
2	28.5820	28.5822	0.0002	0.69	98.27	16.0 – 19.0	16.0
3	29.0850	29.0856	0.0006	2.08	96.19	12.0 – 16.0	12.0
4	21.8946	21.8957	0.0011	3.80	92.39	7.5 – 12.0	7.5
5	18.0237	18.0258	0.0021	7.29	85.1	4.8 – 7.5	4.8
6	17.7736	17.7755	0.0019	6.59	78.51	2.5 – 4.8	2.5
7	17.8512	17.8648	0.0136	47.22	31.29	1.4 – 2.5	1.4
8	28.3577	28.3631	0.0054	18.75	12.54	0.85 – 1.4	.85
Final Filter	21.1025	21.1061	0.0036	12.50	0	0	0

28.8

Job: St Joe Paper Date: 1-16-80 Location: Boiler #4 outlet Run No. 2-0 A Head No. #585

Flow Rate: (ACFM) 0.1523 Stack Temperature 140 °F Analyst: W. McDonald

STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
Preimpact.							
Washes			16.5				
Stage 0	33.7855	33.7856	0.0001	1.14	98.86	> 25.6	25.6
1	27.5639	27.5640	0.0001	1.14	97.72	18.8 – 25.6	18.8
2	28.9226	28.9226	0	0	97.72	0	0
3	28.7439	28.7439	0	0	97.72	0	0
4	21.9799	21.9799	0	0	97.72	0	0
5	17.6405	17.6416	0.0011	12.65	85.07	4.8 – 18.8	4.8
6	17.8839	17.8852	0.0013	14.94	70.13	2.4 – 4.8	2.4
7	17.8654	17.8664	0.0010	11.49	58.64	1.6 – 2.4	1.6
8	28.7340	28.7361	0.0021	24.14	34.50	0.9 – 1.6	0.9
Final Filter	21.4854	21.4884	0.0030	34.5	0	0	0

8.7

A-23

2/5/80

ANDERSON PARTICAL SIZING DATA

Job: St. Joe Paper Co. Date: 1-1-80 Location: Boiler #4 outlet Run No. 3-0A Head No. 561

Flow Rate: (ACFM) 0.1501 Stack Temperature _____ °F Analyst: _____

STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
Preimpact.							
Washes			0				
Stage 0	33.7158	33.7167	0.0009	3.15	96.85	24.0 >	24.0
1	27.6035	27.6037	0.0002	0.70	96.15	19.0 - 24.0	19.0
2	28.8745	28.8746	0.0001	0.35	95.8	16.0 - 19.0	16.0
3	29.2757	29.2762	0.0005	1.75	94.05	11.0 - 16.0	11.0
4	21.6100	21.6110	0.0010	3.49	90.56	7.2 - 11.0	7.2
5	17.9978	17.9998	0.0020	6.99	83.57	4.7 - 7.2	4.7
6	17.8726	17.8744	0.0018	6.29	77.28	2.3 - 4.7	2.3
7	17.9513	17.9652	0.0139	48.6	28.68	1.4 - 2.3	1.4
8	28.8301	28.8350	0.0049	17.1	11.58	0.95 - 1.4	.95
Final Filter	20.3793	20.3826	0.0033	11.58	0	0	0
			28.6				

Job: _____ Date: _____ Location: _____ Run No. _____ Head No. _____

Flow Rate: (ACFM) _____ Stack Temperature _____ °F Analyst: _____

STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
Preimpact.							
Washes							
Stage 0							
1							
2							
3							
4							
5							
6							
7							
8							
Final Filter							

A-24

2/5/80

St Joe Paper Co.
Jan 27, 1990
McDonald & Clark
Boiler #4 outlet
Run # 1-0 Impactor # 599

TABULAR PRESENTATION OF IMPACTOR DATA
AIR TEMPERATURE = 00°F

FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.1518	0	33.0100	33.0119	0.0019 (1.9) [0.4]	6.42	93.58	22.0 >	22.0
	1	27.5235	27.5237	0.0002 (0.2)	0.70	92.88	19.0 – 22.0	19.0
	2	28.5816	28.5819	0.0002 (0.2)	0.70	92.18	14.0 – 19.0	14.0
	3	29.0849	29.0856	0.0007 (0.7)	2.36	89.82	11.0 – 14.0	11.0
	4	21.8948	21.8958	0.0010 (1.0)	3.38	86.44	7.2 – 11.0	7.2
	5	18.0240	18.0260	0.0020 (2.0)	6.76	79.68	4.8 – 7.2	4.8
	6	17.7740	17.7758	0.0018 (1.8)	6.08	73.60	2.3 – 4.8	2.3
	7	17.8514	17.8647	0.0133 (13.3)	44.9	28.70	1.4 – 2.3	1.4
	~~Backup Filter~~ 8	28.3574	28.3627	0.0053 (5.3)	17.9	10.8	0.9 – 1.4	0.9
	Back up	21.1023	21.1055	0.0032 (3.2)	10.8	0	0	0

29.6

St. Joe Paper Co.
Jan. 23, 1980
McDonald + Clark
Boiler #4 outlet
Run #2-0 Impactor #575

TABULAR PRESENTATION OF IMPACTOR DATA
AIR TEMPERATURE = 00°F

FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.1318	0	33.7847	33.7840	0.7	3.02	96.98	> 28.0	28
	1	27.5669	27.5635	3.4	14.66	82.32	22.0 - 28.0	22.0
	2	28.9276	28.9250	2.6	11.2	71.12	17.0 - 22.0	17.0
	3	28.7483	28.7461	2.2	9.48	61.64	12.0 - 17.0	12.0
	4	21.9838	21.9800	3.8	16.4	45.24	8.0 - 12.0	8.0
	5	17.6441	17.6416	2.5	10.8	34.44	5.1 - 8.0	5.1
	6	17.8860	17.8841	1.9	8.2	26.24	2.9 - 5.1	2.9
	7	17.8706	17.8683	2.3	9.9	16.34	1.9 - 2.9	1.9
	8	28.7399	28.7379	2.0	8.6	7.74	1.0 - 1.9	1.0
	Backup Filter	21.4865	21.4847	1.8	7.8	0	0	

23.2

A-26

ST. Joe Paper Co.
JAN. 23, 1980
McDonald & Clark
Boiler #4 Outlet
Run # 2-0 Impactor #562

TABULAR PRESENTATION OF IMPACTOR DATA
AIR TEMPERATURE = 00°F

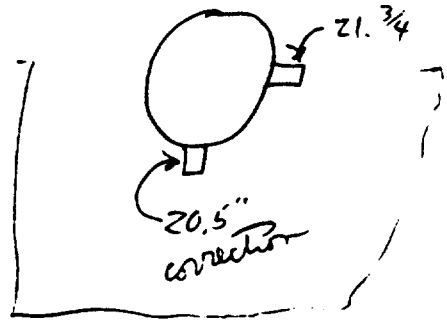
FLOW RATE (ACFM)	STAGE	TARE (g)*	FINAL (g)	NET (mg)	% IN SIZE RANGE	CUMULATIVE % LESS THAN SIZE RANGE	SIZE RANGE (MICRONS)	EFFECTIVE CUT DIAMETER
0.1596	0	33.6106	33.6102	-0.0004	3.7	96.3	>24.0	24.0
	1	27.8066	27.8068	0.0002	1.8	94.5	18.0 - 24.0	18.0
	2	28.3332	28.3333	0.0001	0.9	93.6	16.0 - 18.0	16.0
	3	29.4465	29.4451	-0.0014	12.8	80.8	11.0 - 16.0	11.0
	4	22.0050	22.0050	0.0000	0	80.8	00 - 000	0
	5	17.7950	17.7963	0.0013	11.9	68.9	4.0 - 16.0	4.0
	6	17.8429	17.8444	0.0015	13.8	55.1	2.2 - 4.0	2.2
	7	17.9874	17.9884	0.0010	9.2	45.9	1.4 - 2.2	1.4
	8	28.6218	28.6240	0.0022	20.2	25.7	0.92 1.4	0.92
	Backup Filter	20.4945	20.4973	0.0028	25.7	0	.0	0

APPENDIX B

FIELD DATA SHEETS

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT St Joe Paper Co
DATE 1-21-80
SAMPLING LOCATION Inlet #4 Boiler
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A)
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B)
STACK I.D., (DISTANCE A - DISTANCE B) 71.375
NEAREST UPSTREAM DISTURBANCE 5.3
NEAREST DOWNSTREAM DISTURBANCE 3.6
CALCULATOR W. McDonald



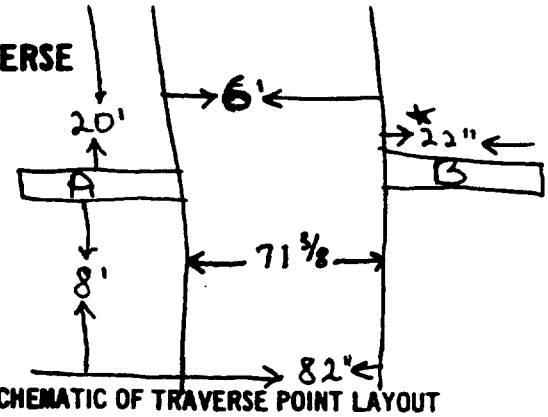
SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)	
1	.011	71 3/8"	0.79 ~~0.8~~	21 3/4	22.54 ⇒	22 3/8
2	.032	71.38	2.28	21.75	24	24
3	.055	"	3.93	"	25.68	25 5/8
4	.079	"	5.64	"	27.39	27 3/8
5	.105	"	7.49		29.24	29 1/4
6	.132		9.42		31.17	31 1/8
7	.161		11.49		33.24	33 1/4
8	.194		13.85		35.60	35 5/8
9	.23		16.42		38.17	38 1/8
10	.272		19.42		41.17	41 1/8
11	.323		23.06		44.81	44 3/4
12	.398		28.41		50.16	50 1/8
13	.602		42.97		64.72	64 3/4
14	.677		48.32		70.07	70
15	.728		51.96		73.71	73 3/4
16	.77		54.96		76.71	76 3/4
17	.806		57.53		79.28	79 1/4
18	.839		59.89		81.64	81 5/8
19	.868		61.96		83.71	83 3/4
20	.895		63.89		85.64	85 5/8
21	.921		65.74		87.49	87 1/2
22	.945		67.45		89.20	89 1/4
23	.968		69.10		90.85	90 7/8
24	.989		70.59		92.34	92 3/4

EPA (Dur) 232

PRELIMINARY VELOCITY TRAVERSE

PLANT St. Joe Paper Co.
DATE 1/15/80
LOCATION Scrubber Inlet
STACK I.D. 60"
BAROMETRIC PRESSURE, in. Hg 30.04
STACK GAUGE PRESSURE, in. H_2O +.90
OPERATORS Malone + Desai



SCHEMATIC OF TRAVERSE POINT LAYOUT

$21\frac{3}{4}$
$10\frac{5}{8}$
$-\ 34\frac{5}{8}$
$71\frac{5}{8}$

A

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
1	.57	380
2	.74	
3	.98	
4	.96	
5	.95	
6	.90	
7	.87	
8	.79	
9	.71	
10	.64	
11	.59	
12	.54	
13	.54	
14	.57	
15	.68	
16	.74	
17	.76	
18	.79	
19	.84	
20	.95	
21	.90	
22	.93	
23	.95	
24	.95	380
AVERAGE	.79	380

B

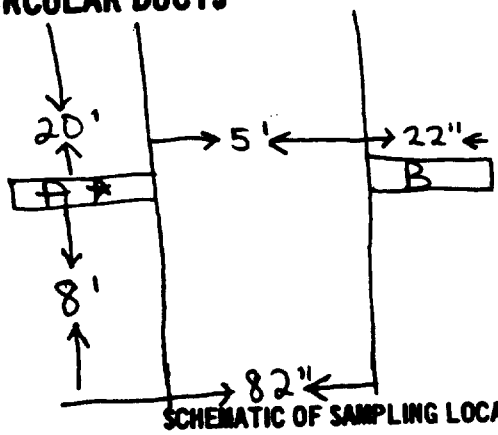
TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
AVERAGE		

EPA (Dur) 233
4/72

*Includes Gate value + Packing Gland

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT St. Joe Paper Co.
DATE 1-15-80
SAMPLING LOCATION Scrubber Inlet
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) 82"
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) 22"
STACK I.D., (DISTANCE A - DISTANCE B) 60"
NEAREST UPSTREAM DISTURBANCE 20'
NEAREST DOWNSTREAM DISTURBANCE 8'
CALCULATOR McLowe + Desal



SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	.011	60"	.66	22"	22 5/8
2	.032		1.92		23 7/8
3	.055		3.30		25 1/4
4	.079		4.74		26 3/4
5	.105		6.30		28 1/4
6	.132		7.92		29 7/8
7	.161		9.66		31 5/8
8	.194		11.64		33 5/8
9	.230		13.80		35 3/4
10	.272		16.32		38 3/8
11	.323		19.38		41 3/8
12	.398		23.88		45 7/8
13	.602		36.12		58 1/8
14	.677		40.62		62 5/8
15	.728		43.68		65 5/8
16	.770		46.20		68 1/4
17	.806		48.36		70 3/8
18	.839		50.34		72 3/8
19	.868		52.08		74
20	.895		53.70		75 3/4
21	.921		55.26		77 1/4
22	.945		56.70		78 3/4
23	.968		58.08		80
24	.989	60"	59.34	22"	81 3/8

EPA (Dur) 232 * Includes Gate valve + Packing Gland
4/72

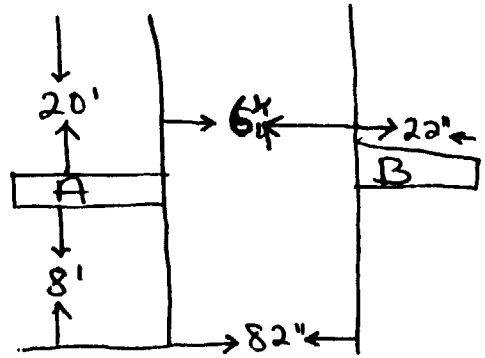
NOMOGRAPH DATA (HP-65)

PLANT St. Joe Paper Co. USED ON RUN NO.: 1
DATE 1/16/80 CALCULATOR: Malone
SAMPLING LOCATION Scrubber Inlet

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Run card			—
2	Initialize program		A	0.00
3	Enter average T_m (meter temp. °F + 460) If meter temp. unknown, use ambient + 20°F	546 °R	R/S	546 T_m
4	Enter P_m (Barometric pressure at meter)	30.10 In. Hg	R/S	18.14 T_m/P_m
5	Enter P_s (static pressure in stack) [P_m ± .073 x stack gauge pressure in In. H_2O]	30.17 + ~~.90~~ In. Hg	R/S	30.17 P_s
6	Enter average T_s (stack temperature + 460)	840 °R	R/S	.036 P_s/T_s
7	Enter B_{ms} (mole fraction of H_2O vapor in gas stream)	.22 Fraction of H_2O	R/S	.78 Fraction Dry
8	Enter MD (molecular weight of dry gas)	30.23 lbs/lb mole	R/S	22.54 MW molecular wt of stack gas lbs/lb mole
9	Enter C_p (type "S" pitot tube coefficient)	.77	R/S	766.76
10	Enter average Δ_p Highest Δ_p (_____)	.79 In. H_2O	R/S	D_n theo. (nozzle dia. in inches) .277
11	Initialize "B"	—	B	—
12	Enter actual D_n	.184 In.	R/S	.0011
13	Enter $\Delta H_@$ (Calibrated pressure differential across orifice)	1.83 In. H_2O	R/S	K factor .96
14_1	Enter actual Δ_{p_1}	.79	E	.36 ΔH_1 In. H_2O
14_2	Enter actual Δ_{p_2}	.95	E	.44 ΔH In. H_2O
14_3	Enter actual Δ_{p_3}	.54	E	.25 ΔH .95 In. H_2O

FIELD DATA

PLANT St. Joe Paper Company
DATE 1-17-80
SAMPLING LOCATION Scrubber Inlet
SAMPLE TYPE EPA#5+6 Option 2
RUN NUMBER 1-I
OPERATOR Malone + B. Desai
AMBIENT TEMPERATURE 63°F
BAROMETRIC PRESSURE 30.10
STATIC PRESSURE, (P_s) +.90
FILTER NUMBER (s) 206671-15 (1 of 1)



SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 8' S.S.
NOZZLE I.D. .184
ASSUMED MOISTURE, % 22
SAMPLE BOX NUMBER 4
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
FACTOR 0.46
PROBE HEATER SETTING 325
HEATER BOX SETTING 325
REFERENCE Δp

READ AND RECORD ALL DATA EVERY 2 MINUTES

Purged 15 min. After the Run
LEAK RATE .001 CFM @ 16 "Hg
Post " " .000 " @ 12 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe
	0	0	430.588										
0	0	0940	430.588	.75	.34	.34	380	89	90	1.0	265	79	298
1	2	0942	430.900	.99	.45	.45	380	90	90	1.0	266	80	299
2	4	0944	431.101	1.10	.51	.51	370	90	90	1.0	269	80	300
3	6	0946	431.235	1.15	.53	.53	365	91	91	1.0	270	81	301
4	8	0948	431.348	1.15	.53	.53	380	91	91	1.0	271	81	302
5	10	0950	431.500	1.15	.53	.53	380	92	92	1.0	272	81	303
6	12	0952	431.651	1.15	.53	.53	380	92	92	1.0	270	80	302
7	14	0954	431.780	.94	.43	.43	380	92	92	1.0	267	82	303
8	16	0956	431.845	.85	.39	.39	381	92	92	1.0	266	82	303
9	18	0958	431.962	.85	.39	.39	382	92	91	1.0	266	82	304
10	20	1000	432.000	.77	.35	.35	382	94	93	1.0	265	83	304
11	22	1002	432.175	.74	.34	.34	381	93	92	1.0	265	83	303
12	24	1004	432.230	.63	.29	.29	385	93	92	1.0	264	84	305
13	26	1006	432.350	.63	.29	.29	380	93	92	1.0	264	84	304
14	28	1008	432.372	.63	.29	.29	390	93	92	1.0	265	84	304
15	30	1010	432.492	.63	.29	.29	388	93	92	1.0	266	84	304

PLANT St. Joe Paper Company DATE 1/17/80 RUN NO. 1-I

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	P_e %
	30	1010	432.392										
16	32	1012	432.398	.66	.30	.30	382	93	93	1.0	265	84	32
17	34	1014	432.500	.94	.43	.43	384	93	93	1.0	263	84	32
18	36	1016	432.568	.94	.43	.43	383	94	93	1.0	262	84	33
19	38	1018	432.586	.94	.43	.43	385	93	93	1.0	261	83	32
20	40	1020	432.596	.94	.43	.43	386	93	92	1.0	262	83	32
21	42	1022	432.747	1.10	.51	.51	381	93	93	1.0	259	82	34
22	44	1024	432.915	1.10	.51	.51	380	93	92	2.0	259	82	34
23	46	1026	433.820	1.20	.55	.55	378	93	92	2.0	262	80	340
24	48	1028	434.240 →	Changed from Port A to Port B ←									
24	48	1210	434.240	.40	.18	.18	380	92	92	1.0	300	99	30
25	50	1212	434.982	.65	.30	.30	380	92	92	1.0	303	97	30
26	52	1214	435.290	.48	.22	.22	380	94	92	1.0	304	97	31
27	54	1216	435.560	.48	.22	.22	380	95	92	1.0	304	97	34
27	55	1217	435.787	Shut down, the process went down									
				and had to do a leak check. (See page three (3)									
27	55	1445	436.600	.40	.18	.18	380	106	104	1.0	275	99	30
28	56	1446	436.800	.46	.21	.21	380	106	104	1.0	275	96	30
29	58	1448	436.912	.44	.20	.20	380	106	104	1.0	275	96	30
30	60	1450	437.500	.40	.18	.18	380	107	104	1.0	277	97	30
31	62	1452	437.640	.40	.18	.18	380	107	104	1.0	279	97	31
32	64	1454	437.800	.40	.18	.18	379	107	104	1.0	283	97	32
33	66	1456	438.145	.40	.18	.18	380	108	104	1.0	285	94	32
34	68	1458	438.800	.49	.23	.23	379	110	105	1.0	286	92	31
35	70	1500	439.370	.65	.30	.30	378	111	105	1.0	290	92	32
36	72	1502	440.235	.60	.28	.28	378	112	105	1.0	291	91	32
37	74	1504	441.100	.62	.29	.29	380	111	105	1.0	291	88	32

PLANT St. Joe Paper Co. DATE 1-17-80 RUN NO. 1-I

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe
	74	1504	441.100										
38	76	1506	441.541	.62	.29	.29	380	111	105	1.0	291	88	330
39	78	1508	441.950	.55	.25	.25	380	111	105	1.0	291	88	340
40	80	1510	442.480	.55	.25	.25	380	108	105	1.0	291	94	356
41	82	1512	443.100	.50	.23	.23	380	107	105	1.0	290	93	362
42	84	1514	443.250	.50	.23	.23	380	104	104	1.0	290	93	370
43	86	1516	443.500	.50	.23	.23	379	104	104	1.0	288	93	372
44	88	1518	444.000	.50	.23	.23	381	104	104	1.0	287	89	372
45	90	1520	444.579	.46	.21	.21	382	104	103	1.0	285	90	367
46	92	1522	446.100	.46	.21	.21	380	103	103	1.0	285	90	361
47	94	1524	446.654	.34	.16	.16	380	103	103	1.0	286	91	359
48	96	1526	447.061	End	of	Run	1-I						
			leak	check	000								
			16.473										
			~~15.66~~	Avg 1.82	.38		380	98					

*Total Cu. Ft shows a -.813 cu. Ft For Leak Check After breaking AN impinger outlet.

ISOKINETIC CALCULATION

Plant St. Joe Paper Company

Run# 1-I, Date 1/17/80

Location Scrubber Inlet, Initials TM

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 50 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 15.66 cu.ft.

Barometric Pressure - absolute = BP = 30.10 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 558 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(15.66)\,(30.10)}{(558)\,(50)}} = 13.68\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

$N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (\quad + \quad + \quad)$

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

$MD = 0.44\,(CO_2) + 0.32\,(O_2) + 0.28\,(N_2 + CO)$

$MD = 0.44\,(\quad) + 0.32\,(\quad) + 0.28\,(\quad + \quad)$

MD = 30.23

ISOKINETIC CALCULATION (Cont.d)

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18\,(M \times 10^{-2})$

$MS = (30.23)[1 - (.1368)] + 18\,(.1368) = 28.56$

.8632 2.4624

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 840 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .82 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 30.17 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(840)}{(30.17)(28.56)}}\right]\left[.82\right]$$

$$= 53.289 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .38 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .184 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4}\,(d^2) = 54.54 \times 10^{-4}\,(.184)^2 = .0001846$ sq. ft.

.0010035

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267\,(V_L) + \frac{(V_m)}{(T_m)}\left(PB + \frac{(\Delta H)}{13.6}\right)\right]}{(T)(V_s)(P_s)(A)}$$

1370.881

$$I = \frac{(1.667)(840)\left[0.00267\,(50) + \frac{(15.66)}{(558)}\left(30.10 + \frac{(.38)}{13.6}\right)\right]}{(96)(53.289)(30.17)(.0001846)}$$

1400.28 .1335 .0280 30.13

I = ~~45.73~~ 48.11 %

CLEAN-UP DATA

Plant St. Joe

Comments:

Date 1/15/80

Sampling Location Scrubber Inlet

Sample Type EPA Method 5-6 Option 2

Run Number # 1-I

Sample Box Number # 4

Clean-up Man MALONE

IMPINGERS

	#1	#2	#3	#4	#5
Final Vol.	IPA 115 ml	H_2O_2 121 ml	H_2O_2 103 ml	dry 0 ml	ml
Initial Vol.	100 ml	100 ml	100 ml	0 ml	ml
Net Vol.	15 ml	21 ml	3 ml	0 ml	ml

Total Net Volume in Impingers 39 ml

SILICA GEL

Final Weight	211 g	g	g
Initial Weight	200 g	g	g
Net Weight	11 g	g	g

Total Net Weight in Silica Gel 11 g

Total Moisture 50 g

Filter Number(s) 20667I-15

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-17-80
SAMPLING TIME (24-hr CLOCK) 0940 - 1526
SAMPLING LOCATION Inlet Run # 1
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) BAG
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 60
OPERATOR W. McDonald

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	8.9		9.0		9.0		9.0	44/100	3.6
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	13.8		14.0		14.0		13.9 ~~13.9~~	32/100	4.48
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	13.8	0	14.0	0	14.0	0	0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		77.3 ~~86.2~~		77.0 ~~86.0~~		77.0 ~~86.0~~	77.1 ~~86.1~~	28/100	21.6 ~~24.1~~
								TOTAL	29.7 ~~32.2~~

EPA (Dur) 230
4/72

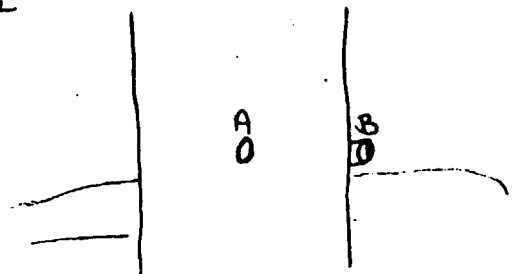
NOMOGRAPH DATA (HP-65)

PLANT St Joe Paper Co USED ON RUN NO.: 02-I
DATE 1-21-80 CALCULATOR: W. McDonald
SAMPLING LOCATION Toilet #4

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Run card			—
2	Initialize program		A	0.00
3	Enter average T_m (meter temp. °F + 460) If meter temp. unknown, use ambient + 20°F	546 °R	R/S	546 T_m
4	Enter P_m (Barometric pressure at meter)	29.73 30.03 In. Hg	R/S	18.18 T_m/P_m
5	Enter P_s (static pressure in stack) [P_m ± .073 x stack gauge pressure in In. H_2O] +.7	29.80 30.10 In. Hg	R/S	30.10 P_s
6	Enter average T_s (stack temperature + 460) 380	840 °R	R/S	0.036 P_s/T_s
7	Enter B_{ms} (mole fraction of H_2O vapor in gas stream)	.18 Fraction of H_2O	R/S	0.82 Fraction ~~0.28~~ Dry
8	Enter MD (molecular weight of dry gas)	31.23 lbs/lb mole	R/S	~~27.54~~ MW 28.0 molecular wt of stack gas lbs/lb mole
9	Enter C_p (type "S" pitot tube coefficient)	.77 —	R/S	782.19 768.54
10	Enter average Δ_p Highest Δ_p (_____)	.79 In. H_2O	R/S	D_n theo. 2766 (nozzle dia. in inches) 271
11	Initialize "B"	—	B	—
12	Enter actual D_n	0.184 In.	R/S	.00115
13	Enter $\Delta H_@$ (Calibrated pressure differential across orifice)	1.83 In. H_2O	R/S	~~0.460~~ .499 K factor
14_1	Enter actual Δ_{p_1}		E	ΔH_1 In. H_2O
14_2	Enter actual Δ_{p_2}		E	ΔH In. H_2O
14_3	Enter actual Δ_{p_3}		E	ΔH In. H_2O

FIELD DATA

PLANT St Joe Paper Co.
DATE 1-21-80
SAMPLING LOCATION Inlet #4 Boiler
SAMPLE TYPE EPA 5
RUN NUMBER Row # 2 Inlet
OPERATOR C. Clark
AMBIENT TEMPERATURE 75
BAROMETRIC PRESSURE 30.03
STATIC PRESSURE, (P_s) +.7
FILTER NUMBER (s) 2C6672-15



SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 5.5. 8 ft
NOZZLE I.D. 0.184
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER 4
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
K FACTOR .460
PROBE HEATER SETTING Hi 315
HEATER BOX SETTING Hi - 315
REFERENCE Δp

READ AND RECORD ALL DATA EVERY 2 MINUTES LEAK RATE .001 CFM @ 16 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe Temp
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				
PORT "B"	0	1700	453.247										317
1	2	1802	453.955	.08	.36	.36	180	81	83	1.0	297	80	315
2	4	1804	454.355	.28	.12	.12	201	81	83	1.0	297	86	312
3	6	1806	454.888	.31	.14	.14	208	81	83	1.0	295	79	312
4	8	1808	455.385	.28	.12	.12	208	81	83	1.0	296	79	307
5	10	1810	455.635	.31	.14	.14	208	82	82	1.0	296	79	305
6	12	1812	455.936	.28	.12	.12	210	81	82	1.0	295	79	305
7	14	1814	456.412	.31	.14	.14	210	81	82	1.0	296	79	301
8	16	1816	456.835	.32	.14	.14	211	82	82	1.0	297	79	303
9	18	1818	457.250	.37	.17	.17	208	82	82	1.0	299	79	304
10	20	1820	457.713	.45	.20	.20	213	87	82	1.0	303	82	311
11	22	1822	458.205	.45	.20	.20	216	88	83	1.0	303	84	321
12	24	1824	458.710	.48	.22	.22	218	91	83	1.0	305	87	331
13	26	1826	459.242	.43	.19	.19	222	93	84	1.0	307	87	342
14	28	1830	459.743	.39	.17	.17	220	95	84	1.0	309	89	355
15	30	1832	460.179	.34	.15	.15	220	96	85	1.0	310	91	371
16	32	1834	460.610	.33	.15	.15	222	98	86	1.0	312	93	

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PLANT ST. Joe Paper Co. DATE Jan. 21, 1980 RUN NO. 2-I

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe Temp
		1834	460.610										
17	34	1836	461.590	.33	.15	.15	222	100	89	1.0	316	95	403
18	36	1838	462.942	.31	.14	.14	224	102	90	1.0	319	95	428
19	38	1840	462.355	.29	.13	.13	224	108	90	1.0	320	96	423
20	40	1842	462.655	.29	.13	.13	224	108	90	1.0	322	96	424
21	42	1844	462.825	.31	.14	.14	225	103	91	1.0	322	96	428
22	44	1846	463.210	.31	.14	.14	225	103	92	1.0	324	96	418
23	46	1848	463.615	.32	.15	.15	223	104	93	1.0	325	96	414
24	48	1850	464.039	.33	.15	.15	223	104	93	1.0	325	96	414
0	50			Change		Ports							
1	0	19	464.039		START		BACK	UP		PORT	"A"		
1	2	1915	464.395	.85	.39	.39	205	105	100	1.0	335	84	405
2	4	1915	464.992	.85	.39	.39	210	107	100	1.0	334	84	404
3	6	1917	465.597	.83	.38	.38	210	107	100	1.0	333	84	402
4	8	1919	466.315	.79	.36	.36	211	107	101	1.0	333	85	399
5	10	1921	466.955	.73	.33	.33	212	107	101	1.0	333	85	398
6	12	1923	467.699	.79	.36	.36	372	107	101	1.0	332	85	359
7	14	1925	468.265	.72	.33	.33	372	106	101	1.5	331	84	337
8	16	1927	468.901	.69	.31	.31	212	106	101	1.5	330	84	355
9	18	1929	469.532	.57	.26	.26	215	106	101	1.5	327	85	360
10	20	1931	470.115	.54	.24	.24	217	106	102	1.5	327	86	329
11	22	1933	470.685	.48	.22	.22	217	106	102	1.5	327	89	283
12	24	1935	471.225	.48	.22	.22	215	106	102	1.5	327	89	28
13	26	1937	471.727	.65	.29	.29	219	107	102	1.5	328	90	310
14	28	1939	472.475	.73	.33	.33	220	108	103	1.5	328	90	325
15	30	1941	473.010	.84	.38	.38	220	109	102	1.5	328	91	342
16	32	1943	473.630	.89	.40	.40	221	109	103	1.7	329	90	372
17	34	1945	474.335	.91	.41	.41	219	109	103		327	88	390

B-14

PLANT St. Joe Paper Co. DATE Jan. 21, 1980 RUN NO. 2-I

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe Temp.
	34	1945	474.335										
~~19~~ 18	36	1947	475.085	.86	.39	.39	220	109	103	1.7	328	88	376
~~20~~ 19	38	1949	475.749	.93	.42	.42	222	109	104	1.7	328	89	375
~~21~~ 20	40	1951	476.475	.93	.42	.42	224	109	104	1.7	328	90	376
~~22~~ 21	42	1953	477.215	.89	.40	.40	225	109	104	1.7	329	91	376
~~23~~ 22	44	1955	477.915	.72	.33	.33	223	110	104	1.7	330	92	377
~~24~~ 23	46	1957	478.675	.69	.31	.31	219	111	104	1.6	330	93	377
24	48	1959	479.493	.68	.31	.31	130	112	104	1.6	330	95	377
			480.038	.68	.31	.31	130*	112	104	1.6	330	95	377
					End		Run						

Purge 15 min

meter Reading at start of Purge 480.038

" " " End " " 488.148

* Broken thermocouple for this run, correct reading is ~ 372°

B-15

ISOKINETIC CALCULATION

Plant ST. SOE Paper. CO.

Run# 2-I, Date 1-21-80

Location Scrubber inlet, Initials J.V.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 119.7 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 26.8 cu.ft.

Barometric Pressure - absolute = BP = 30.03 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 559 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(26.8)\,(30.03)}{(559)\,(119.7)}} = 18.2\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (+ +)

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

MD = 0.44 (CO_2) + 0.32 (O_2) + 0.28 (N_2 + CO)

MD = 0.44 ( ) + 0.32 ( ) + 0.28 (+)

MD = _____

#2-I St. Joe Paper J.Y.

ISOKINETIC CALCULATION (Cont.d)

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

MS = (MD)[1 - (M x 10^{-2})] + 18 (M x 10^{-2})

MS = (30)[1 - (18.2x10^{-2})] + 18 (18.2x10^{-2}) = 27.8

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 820 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .73 (in.H_2O)$^{1/2}$

Absolute pressure of stack (BP ± $\frac{p}{13.6}$) = P_s = 30.1 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)\,(\ CP\ )\left[\sqrt{\frac{(\ T_s\ )}{(\ P_s\ )\,(\ MS\ )}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)\,(\ .77\ )\left[\sqrt{\frac{(\ 820\ )}{(\ 30.1\ )\,(\ 27.8\ )}}\right]\left[.73\right]$$

= 47.56 FPS

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .26 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .184 in.

Area of nozzle = A

A = 54.54 x 10^{-4} (d^2) = 54.54 x 10^{-4} (.184)^2 = 1.85X10^{-4} sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)\,(\ T_s\ )\left[0.00267\,(V_L\ ) + \frac{(\ V_m\ )}{(\ T_m\ )}\left(PB + \frac{(\ \Delta H\ )}{13.6}\right)\right]}{(\ T\ )\,(\ V_s\ )\,(\ P_s\ )\,(\ A\ )}$$

$$I = \frac{(1.667)\,(\ 820\ )\left[0.00267\,(119.7) + \frac{(\ 26.8\ )}{(\ 559\ )}\left(30.03 + \frac{(\ .26\ )}{13.6}\right)\right]}{(\ 96\ )\,(\ 47.56\ )\,(\ 30.1\ )\,(\ 1.85\times10^{-4}\ )}$$

1366.94 0.32 0.048 30.05 0.000185

I = 94.6 %

94.75

CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:
Date 1/18/80
Sampling Location Scrubber Inlet
Sample Type EPA #5 + 6, Option 2
Run Number 2-I
Sample Box Number #4
Clean-up Man D. McDonald

IMPINGERS

	#1 IPA	#2 H_2O_2	#3 H_2O_2	#4 MT	#5
Final Vol.	141 ml	148 ml	112 ml	0 ml	ml
Initial Vol.	100 ml	100 ml	100 ml	0 ml	ml
Net Vol.	41 ml	48 ml	12 ml	ml	ml

Total Net Volume in Impingers 101 ml

SILICA GEL

Final Weight	218.7 g	g	g
Initial Weight	200 g	g	g
Net Weight	18.7 g	g	g

Total Net Weight in Silica Gel 18.7 g

Total Moisture 119.7 g

Filter Number(s) 206672-15

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-21-80
SAMPLING TIME (24-hr CLOCK) 1800 - 1959 Run #2
SAMPLING LOCATION Inlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 68
OPERATOR W. McDonald

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	9.3	9.3	9.3	9.3	9.0	9.3	9.3	44/100	4.092
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	14.1		13.7		13.8		13.9	32/100	4.448
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		85.9		86.3		86.2	76.8 ~~86.1~~	28/100	21.504 ~~24.108~~
								TOTAL	30.04 ~~32.65~~

EPA (Det) 230
4/72

SHH

FIELD DATA

PLANT St Joe Paper Co.
DATE 1-22-80
SAMPLING LOCATION Inlet #4 Boiler
SAMPLE TYPE EPA Mon Meth. 5
RUN NUMBER 3-1
OPERATOR E. Johnson
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.92
STATIC PRESSURE, (P_s) +0.7
FILTER NUMBER (s) 206671-77

PROBE LENGTH AND TYPE 5.5 8 Ft
NOZZLE I.D. 0.184
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER 4
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
C FACTOR K- .460
PROBE HEATER SETTING Hi
HEATER BOX SETTING Hi
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2 MINUTES LEAK RATE 0.00/CFM @ 62 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	[redacted] TEMPERATURE, °F Probe	[redacted] Imp
	0	0952	488.664										
1	2	0954	488.801	.05	.02	.02	369	96	96	0	319	386	
2	4	0956	489.331	.28	.14	.14	368	96	96	0	320	385	86
3	6	0958	489.793	.31	.15	.15	370	96	96	0	317	385	
4	8	1000	490.287	.33	.16	.16	371	97	96	0	312		
5	10	1002	490.666	.31	.15	.15	372	97	96	0	312	383	
6	12	1004	491.141	.32	.16	.16	373	97	96	0	310		
7	14	1006	491.600	.34	.17	.17	373	98	96	0	311	385	85
8	16	1008	492.030	.32	.16	.16	372	99	95	0	307		
9	18	1010	492.400	.32	.16	.16	373	98	95	0	306	385	
10	20	1012	492.82	.34	.17	.17	373	98	95	0	305		
11	22	1014	493.316	.41	.20	.20	372	97	95	0	303		83
12	24	1016	493.852	.49	.22	.22	372	97	95	0	301	383	
13	26	1018	494.414	.51	.25	.25	373	97	95	0	302		
14	28	1020	494.942	.47	.23	.23	374	97	95	0	299	383	
15	30	1022	495.450	.40	.20	.20	373	97	95	0	299		
16	32	1024	495.942	.38	.19	.19	372	98	96	0	301	383	
								97	96				

EHH

PLANT St Joe Paper DATE 1-22-80 RUN NO. #3 Inlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	[redacted] TEMPERATURE, °F Probe	Imp
17	34	1026	496.42	.34	.17	.17	378	96	94	0	304	301	84
18	36	1028	496.831	.34	.17	.17	379	96	94	0	301		
19	38	1030	497.310	.36	.18	.18	377	96	94	0	299	304	
20	40	1032	497.752	.32	.16	.16	376	97	94	0	299		
21	42	1034	498.211	.32	.16	.16	377	97	94	0	297		86
22	44	1036	498.671	.35	.17	.17	376	97	94	0	299		
23	46	1038	499.151	.36	.18	.18	375	97	94	0	301		
24	48	1040	499.605	.33	.16	.16	375	96	94	0	300	308	84
		1100											
1	50	1102	500.099	.38	.19	.19	361	91	92	0	310	309	
2	52	1104	500.771	.82	.41	.41	368	90	92	0	309	306	84
3	54	1106	501.523	.93	.46	.46	372	91	92	0	308		82
4	56	1108	502.291	.97	.48	.48	375	92	92	0	307		82
5	58	1110	503.042	.93	.46	.46	377	93	92	0	306	301	
6	60	1112	503.793	.90	.45	.45	378	94	92	0	305		83
7	62	1114	504.526	.84	.42	.42	379	95	92	0	304		
8	64	1116	505.203	.72	.36	.36	379	95	92	0	304	308	84
9	66	1118	505.845	.66	.33	.33	379	96	92	0	304		
10	68	1120	506.461	.60	.30	.30	380	96	92	0	304		85
11	70	1122	507.042	.53	.26	.26	381	96	92	0	303	303	
12	72	1124	507.601	.51	.25	.25	382	96	92	0	303		
13	74	1126	508.228	.62	.31	.31	382	96	92	0	303		84
14	76	1128	508.899	.73	.36	.36	382	96	92	0	302	309	
15	78	1130	509.600	.81	.40	.40	381	96	92	0	301		85
16	80	1132	510.338	.88	.44	.44	379	97	92	0	300		
17	82	1134	511.098	.91	.45	.45	376	97	92	0	300	305	85
18	84	1136	511.853	.98	.49	.49	374	97	92	0	300		
								96	92				

94

EHH

PLANT St Joe Paper Co. DATE 1-22-80 RUN NO. 3 Inlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	~~[illegible]~~ TEMPERATURE, °F Probe	
					DESIRED	ACTUAL		INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F				
19	86	1138	512.635	.96	.48	.48	375	98	92	0	301		87
20	88	1140	513.384	.93	.46	.46	373	98	93	0	301	307	
21	90	1142	514.146	.93	.46	.46	376	98	93	0	302		86
22	92	1144	514.870	.86	.43	.43	379	98	93	0	302		
23	94	1146	515.571	.78	.39	.39	377	98	93	1.0	302	304	87
24	96	1148	516.239	.74	.37	.37	375	98	93	1.0	303		

temp

3-22

ISOKINETIC CALCULATION

Plant ST. JOE PAPER

Run# 3-I, Date 1-22-80

Location Scrubber Inlet, Initials J.Y.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 147.9 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 27.58 cu.ft.

Barometric Pressure - absolute = BP = 29.92 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 555 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(27.58)\,(29.92)}{(555)\,(147.9)}} = 21.03\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (+ +)

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

MD = 0.44 (CO_2) + 0.32 (O_2) + 0.28 (N_2 + CO)

MD = 0.44 ( ) + 0.32 ( ) + 0.28 (+)

MD = _____

3-I

ISOKINETIC CALCULATION (Cont.d)

J.Y.

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18\,(M \times 10^{-2})$

$MS = (30)[1 - (21.0 \times 10^{-2})] + 18\,(21.0 \times 10^{-2}) = 27.48$

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 835 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .73 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 29.97 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(835)}{(29.97)(27.48)}}\right]\left[.73\right]$$

$$= 48.38 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .28 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .184 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4}\,(d^2) = 54.54 \times 10^{-4}\,(.184)^2 = 1.85 \times 10^{-4}$ sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267\,(V_L) + \frac{(V_m)}{(T_m)}\left(PB + \frac{(\Delta H)}{13.6}\right)\right]}{(T)(V_s)(P_s)(A)}$$

$$I = \frac{(1.667)(835)\left[0.00267\,(147.9) + \frac{(27.58)}{(555)}\left(29.92 + \frac{(.28)}{13.6}\right)\right]}{(96)(48.38)(29.97)(1.85 \times 10^{-4})}$$

I = 101.8 %

CLEAN-UP DATA

Plant St Joe Paper

Comments:

Date 1-21-86

Sampling Location Inlet

Sample Type EPA Mod Meth 5

Run Number 3

Sample Box Number 4

Clean-up Man W. McDonald

IMPINGERS

	#1 80% IPA	#2 3% H2O2	#3 3% H2O2	#4 MT	#5
Final Vol.	168 ml	148 ml	116 ml	2 ml	ml
Initial Vol.	100 ml	100 ml	100 ml	0 ml	ml
Net Vol.	68 ml	48 ml	16 ml	2 ml	ml

Total Net Volume in Impingers 134 ml

SILICA GEL

Final Weight	~~243.3~~ g	g	g
Initial Weight	229.4 g	g	g
Net Weight	13.9 g	g	g

Total Net Weight in Silica Gel 13.9 g

Total Moisture 147.9 g

Filter Number(s) 206671-17

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-22-80
SAMPLING TIME (24-hr CLOCK) 0952 – 1148
SAMPLING LOCATION Inlet Run #3
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 68
OPERATOR W. McDonald

COMMENTS:

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	8.2		8.0		8.0		8.05	44/100	3.54
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	14.5		14.6		14.6		14.55	32/100	4.66
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		85.5		85.4		85.4	77.4 ~~85.45~~	28/100	21.672 ~~23.926~~
								TOTAL	29.87 ~~32.73~~

EPA (Dur) 230
4/72

B-26

FIELD DATA

PLANT St Joe Paper Co.
DATE 1-22-80
SAMPLING LOCATION INLET
SAMPLE TYPE Mod EPA 5
RUN NUMBER 4
OPERATOR E Johnsen
AMBIENT TEMPERATURE 73
BAROMETRIC PRESSURE 30.03
STATIC PRESSURE, (P_s) [redacted]
FILTER NUMBER (s) 6672-18

PROBE LENGTH AND TYPE 10' particulate
NOZZLE I.D. .184
ASSUMED MOISTURE, % 18
SAMPLE BOX NUMBER [redacted]4
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
C FACTOR .77
PROBE HEATER SETTING High
HEATER BOX SETTING High
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

525.175 READ AND RECORD ALL DATA EVERY 2 MINUTES LEAK RATE 0.01 CFM @ 15.5" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe °F
	0	1825	[redacted]										
1	2	1827	525.832	.30	.15	.15	373	84	85	0	301	80	309
2	4	1829	526.342	.32	.16	.16	375	84	85	0	306	80	307
3	6	1831	526.831	.35	.17	.17	374	84	85	0	304	81	311
4	8	1833	527.220	.34	.17	.17	372	85	85	0	3[illegible]	79	318
5	10	1835	527.831	.36	.18	.18	377	86	84	0	303	77	321
6	12	1837	528.300	.30	.15	.15	360	86	84	0	300	77	316
7	14	1839	528.823	.38	.19	.19	357	86	84	0	309	77	318
8	16	1841	529.—	.42	.21	.21	346	84	84	0	318	77	306
9	18	1843	529.882	.42	.21	.21	332	85	84	0	312	77	301
10	20	1845	530.460	.46	.23	.23	373	86	84	0	316	77	300
11	22	1847	531.045	.52	.26	.26	375	86	84	0	314	77	300
12	24	1849	531.665	.56	.28	.28	372	86	84	0	315	76	298
13	26	1851	532.251	.48	.24	.24	376	86	84	0	316	76	303
14	28	1853	532.823	.50	.25	.25	373	85	84	0	314	75	302
15	30	1855	533.361	.47	.23	.23	376	85	84	0	317	75	303
16	32	1857	533.866	.35	.17	.17	373	85	84	0	315	76	300

SBA1

PLANT St Joe Paper Co DATE 1-22-80 RUN NO. 4

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Pro °F
17	34	1859	534.382	.38	.19	.19	376	85	84	0	310	76	30
18	36	1901	534.848	.35	.17	.17	373	85	83	0	307	78	31
19	38	1903	535.333	.34	.17	.17	377	85	83	0	314	78	30
20	40	1905	535.790	.32	.16	.16	379	86	83	0	313	78	30
21	42	1907	536.241	.32	.16	.16	375	86	84	0	310	78	30
22	44	1909	536.756	.37	.18	.18	376	85	83	0	316	78	30
23	46	1911	537.235	.34	.17	.17	379	86	83	0	317	78	30
24	48	1913	537.721	.35	.17	.17	378	86	83	0	314	78	30
		1930											
1	50	1932	538.287	.52	.26	.26	374	83	82	0	310	82	31
2	52	1934	539.003	.83	.41	.41	379	83	82	0	314	82	32
3	54	1936	539.760	.96	.48	.48	375	83	82	0	318	80	31
4	56	1938	540.543	.99	.49	.49	373	84	82	0	316	80	31
5	58	1940	541.331	.98	.49	.49	378	84	82	0	320	79	31
6	60	1942	542.182	.93	.46	.46	375	83	82	0	312	77	31
7	62	1944	542.800	.84	.42	.42	373	83	82	0	312	77	31
8	64	1946	543.471	.73	.36	.36	378	83	82	0	314	77	31
9	66	1948	542.127	.69	.34	.34	379	83	82	0	317	78	31
10	68	1950	544.748	.60	.30	.30	373	83	82	0	316	78	31
11	70	1952	545.330	.51	.25	.25	375	83	82	0	312	78	31
12	72	1954	545.921	.54	.27	.27	378	83	82	0	315	78	30
13	74	1956	546.623	.78	.39	.39	375	83	81	0	316	77	30
14	76	1958	547.358	.87	.43	.43	377	83	81	0	318	77	30
15	78	2000	548.121	.94	.47	.47	376	83	81	0	314	77	30
16	80	2002	548.845	.96	.48	.48	378	83	81	0	317	78	30
17	82	2004	549.631	.97	.48	.48	373	83	81	0	316	77	30
18	84	2006	550.410	.96	.48	.48	377	83	81	0	316	77	30

PLANT St Joe Paper Co DATE 22-80 RUN NO. 4

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe ap
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				
19	86 38	2008	551.184	.98	.49	.49	372	83	81	0	320	77	303
20	88	2010	551.910	.83	.41	.41	374	83	81	0	316	77	305
21	90	2012	552.610	.87	.43	.43	376	83	81	[illegible]	317	77	304
22	92	2014	553.310	.79	.39	.39	379	83	81	0	317	77	303
23	94 46	2016	553.985	.72	.36	.36	378	83	81	0	315	77	301
24	96	2018	554.668	.74	.37	.37	379	83	81	0	314	77	303

ISOKINETIC CALCULATION

Plant St. Joe Paper

Run# 4-I, Date 1-22-80

Location Scrubber inlet, Initials J.Y.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 143.2 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 29.49 cu.ft.

Barometric Pressure - absolute = BP = 30.03 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 544 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(29.49)\,(30.03)}{(544)\,(143.2)}} = 19.1\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (+ +)

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

MD = 0.44 (CO_2) + 0.32 (O_2) + 0.28 (N_2 + CO)

MD = 0.44 ( ) + 0.32 ( ) + 0.28 (+)

MD = 30.0

#4I

ISOKINETIC CALCULATION (Cont.d)

J.Y.

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18\,(M \times 10^{-2})$

$MS = (30)[1 - (19.1 \times 10^{-2})] + 18\,(19.1 \times 10^{-2}) = 27.71$

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 835 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .76 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 30.1 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(835)}{(30.1)(27.71)}}\right]\left[.76\right]$$

$$= 50.1 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .30 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .184 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4}\,(d^2) = 54.54 \times 10^{-4}\,(.184)^2 = 1.85 \times 10^{-4}$ sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267\,(V_L) + \frac{(V_m)}{(T_m)}\left(PB + \left(\frac{\Delta H}{13.6}\right)\right)\right]}{(T)(V_s)(P_s)(A)}$$

$$I = \frac{(1.667)(835)\left[0.00267\,(143.2) + \frac{(29.49)}{(544)}\left(30.03 + \left(\frac{.30}{13.6}\right)\right)\right]}{(96)(50.1)(30.1)(1.85 \times 10^{-4})}$$

I = 104.5 %

CLEAN-UP DATA

Plant St. Joe Paper Co # 101.1067 Comments:
Date 1/22/80
Sampling Location INLET
Sample Type EPA METHOD 5 + ~~Method 6 Option 2~~
Run Number #4
Sample Box Number 5
Clean-up Man W. McDonald

IMPINGERS

	#1	#2	#3	#4	#5
Final Vol.	178 ml	140 ml	114 ml	2 ml	ml
Initial Vol.	100 ml	100 ml	100 ml	0 ml	200g ml
Net Vol.	78 ml	40 ml	14 ml	2 ml	ml

Total Net Volume in Impingers 134 ml

SILICA GEL

Final Weight	209.2 g	g	g
Initial Weight	200 g	g	g
Net Weight	9.2 g	g	g

Total Net Weight in Silica Gel 9.2 g

Total Moisture 143.2 g

Filter Number(s) 206672-18

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-22-80
SAMPLING TIME (24-hr CLOCK) 1825 - 2018 Run # 4
SAMPLING LOCATION Inlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) BAG
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 73
OPERATOR W. McDonald

COMMENTS:

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	9.2		9.1		9.1		9.1	44/100	4.004
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	15.2		15.5		15.5		15.4	32/100	4.928
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		84.8		84.5		84.5	75.5 ~~84.6~~	28/100	21.14 ~~23.68~~
								TOTAL	30.07 ~~32.62~~

EPA (Det) 230
4/72

NOMOGRAPH DATA (HP-65)

PLANT St Joe Paper USED ON RUN NO.: 5
DATE 1-23-80 CALCULATOR: E. Johnson.
SAMPLING LOCATION Inlet

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Run card			—
2	Initialize program		A	0.00
3	Enter average T_m (meter temp. °F + 460) If meter temp. unknown, use ambient + 20°F	544 °R	R/S	544 T_m
4	Enter P_m (Barometric pressure at meter)	29.73 In. Hg	R/S	18.258 T_m/P_m
5	Enter P_s (static pressure in stack) [P_m ± .073 x stack gauge pressure in In. H_2O]	30.79 In. Hg	R/S	30.79 P_s
6	Enter average T_s (stack temperature + 460)	835 °R	R/S	0.03687 P_s/T_s
7	Enter B_{ms} (mole fraction of H_2O vapor in gas stream)	0.18 Fraction of H_2O	R/S	.82 Fraction Dry
8	Enter MD (molecular weight of dry gas)	30.23 lbs/lb mole	R/S	28.0286 MW molecular wt of stack gas lbs/lb mole
9	Enter C_p (type "S" pitot tube coefficient)	.77	R/S	760.113
10	Enter average Δ_p Highest Δ_p (_____)	.70 In. H_2O	R/S	D_n theo. .2248 (nozzle dia. in inches)
11	Initialize "B"	—	B	—
12	Enter actual D_n	.187 In.	R/S	.00122
13	Enter $\Delta H_@$ (Calibrated pressure differential across orifice)	1.83 In. H_2O	R/S	.55184 K factor
14_1	Enter actual Δ_{p_1}	.70	E	ΔH_1 .386 In. H_2O
14_2	Enter actual Δ_{p_2}	.59	E	ΔH .720 In. H_2O
14_3	Enter actual Δ_{p_3}	.19	E	ΔH .104 In. H_2O

FIELD DATA

PLANT ST J[redacted] Paper Co.
DATE 1-[redacted]-80 1-23-80
SAMPLING LOCATION inlet
SAMPLE TYPE Particulate
RUN NUMBER 5
OPERATOR E. Johnson
AMBIENT TEMPERATURE 71
BAROMETRIC PRESSURE 29.73
STATIC PRESSURE, (P_s) -14.5
FILTER NUMBER (s) 206672-27

PROBE LENGTH AND TYPE 10' P[redacted]
NOZZLE I.D. .18
ASSUMED MOISTURE, % 18
SAMPLE BOX NUMBER 4
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
C FACTOR .77
PROBE HEATER SETTING High
HEATER BOX SETTING High
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2 MINUTES LEAK RATE 0.005 CFM @ ~~10~~ 15.0 Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe °F
	0	1200	555.734										
1	2	1202	556.132	.09	.05	.05	350	75	75	0	298	72	335
2	4	1204	556.285	.13	.07	.07	374	75	74	0	297	72	332
3	6	1206	556.476	.12	.06	.06	378	74	75	0	301	72	328
4	8	1208	556.582	.06	.03	.03	380	74	75	0	305	73	325
5	10	1210	—	.13	.07	.07	379	74	75	0	302	72	319
6	12	1212	557.037	.14	.08	.08	380	73	74	0	303	70	319
7	14	1214	557.350	.12	.07	.07	381	73	74	0	307	68	318
8	16	1216	557.622	.10	.06	.06	381	72	73	0	301	68	316
9	18	1218	558.154	.09	.05	.05	381	71	73	0	300	67	313
10	20	1220	558.400	.19	.10	.10	377	68	69	0	296	68	305
11	22	1222	558.750	.19	.10	.10	378	67	69	0	298	63	301
12	24	1224	559.113	.20	.11	.11	378	66	68	0	302	63	300
13	26	1226	559.772	.18	.10	.10	379	66	68	0	300	62	302
14	28	1228	—	.08	.04	.04	380	65	67	0	299	64	322
15	30	1230	560.010	.08	.04	.04	379	65	66	0	298	66	330
16	32	1232	560.237	.10	.05	.05	379	65	66	0	302	66	328

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PLANT St Joe Paper Co. DATE 1-23-80 RUN NO. 5 inlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe °F
17	34	1241	560.489	.11	.06	.06	378	65	66	0	310	64	34
18	36	1243	560.749	.14	.08	.08	379	66	66	0	308	63	35
19	38	1245	561.039	.16	.09	.09	379	66	67	0	305	64	37
20	40	1247	561.338	.24	.08	.08	378	66	67	0	302	64	39
21	42	1249	561.842	.34	.19	.19	379	66	67	0	301	64	41
22	44	1251	—	.40	.22	.22	379	66	67	0	303	64	43
23	46	1253	562.847	.38	.21	.21	378	66	68	0	302	65	45
24	48	1255	563.289	.38	.21	.21	375	68	68	0	304	66	43
1	50	1312	—	.36	.20	.20	361	68	68	0	303	68	32
2	52	1314	564.276	.68	.38	.38	374	67	68	0	305	67	38
3	54	1316	564.963	.74	.41	.41	378	67	68	0	304	67	32
4	56	1318	565.665	.78	.43	.43	379	67	68	0	306	68	32
5	58	1320	566.356	.73	.40	.40	378	68	68	0	301	68	32
6	60	1322	567.038	.68	.38	.38	378	69	68	0	300	68	32
7	62	1324	567.661	.62	.34	.34	379	69	68	0	300	68	33
8	64	1326	568.268	.53	.29	.29	379	69	68	0	298	68	33
9	66	1328	568.842	.51	.28	.28	379	69	68	0	299	67	32
10	68	1330	569.472	.43	.24	.24	378	68	68	0	299	66	31
11	70	1332	569.917	.43	.24	.24	378	68	69	0	302	66	31
12	72	1334	570.451	.46	.25	.25	379	68	69	0	301	66	32
13	74	1336	571.098	.56	.31	.31	380	68	68	0	300	65	32
14	76	1338	571.656	.58	.32	.32	380	67	68	0	300	64	34
15	78	1340	572.306	.68	.38	.38	380	67	68	0	302	63	36
16	80	1342	573.024	.79	.44	.44	379	67	68	0	302	63	38
17	82	1344	573.661	.61	.34	.34	378	67	68	0	303	61	40
18	84	1346	—	.57	.31	.31	378	66	67	0	301	61	42

SHY

PLANT St Joe Paper Co DATE 1-23-80 RUN NO. 5 inlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe °F
					DESIRED	ACTUAL		INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F				
19	86	1348	574.853	.55	.30	.30	376	66	67	0	302	61	445
20	88	1350	575.420	.49	.27	.27	374	65	67	0	298	61	463
21	90	1352	575.963	.47	.26	.26	373	65	66	0	297	60	480
22	92	1354	576.472	.42	.23	.23	372	65	66	0	298	61	497
23	94	1356	—	.36	.20	.20	369	65	66	0	298	61	509
24	96	1358	577.497	.38	.21	.21	369	66	66	0	300	62	517

ISOKINETIC CALCULATION

Plant St. Joe Paper

Run# 5-I, Date 1-23-80

Location Scrubber inlet, Initials J.Y.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 115.6 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 21.76 cu.ft.

Barometric Pressure - absolute = BP = 29.73 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 528 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(21.76)\,(29.73)}{(528)\,(115.6)}} = 20.16\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (+ +)

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

MD = 0.44 (CO_2) + 0.32 (O_2) + 0.28 (N_2 + CO)

MD = 0.44 ( ) + 0.32 ( ) + 0.28 (+)

MD = _____

ISOKINETIC CALCULATION (Cont.d)

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18\,(M \times 10^{-2})$

$MS = (30)[1 - (20.16 \times 10^{-2})] + 18\,(20.16 \times 10^{-2}) = 27.58$

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 838 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .565 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 30.8 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(838)}{(30.8)(27.58)}}\right]\left[.565\right]$$

$$= 36.94 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .20 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .184 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4}\,(d^2) = 54.54 \times 10^{-4}\,(.184)^2 = 1.85 \times 10^{-4}$ sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267\,(V_L) + \frac{(V_m)}{(T_m)}\left(PB + \frac{(\Delta H)}{13.6}\right)\right]}{(T)(V_s)(P_s)(A)}$$

$$I = \frac{(1.667)(838)\left[0.00267\,(115.6) + \frac{(21.76)}{(528)}\left(29.73 + \frac{(.20)}{13.6}\right)\right]}{(96)(36.94)(30.8)(1.85 \times 10^{-4})}$$

I = 106.1 %

CLEAN-UP DATA

Plant St Joe Paper

Date 1-23-80

Sampling Location Inlet

Sample Type EPA METHOD 5

Run Number # 5 Inlet

Sample Box Number 4

Clean-up Man W. McDonald

Comments:

IMPINGERS

	#1	#2	#3	#4	#5
Final Vol.	205 ml	103 ml	0 ml	ml	ml
Initial Vol.	100 ml	100 ml	0 ml	ml	ml
Net Vol.	105 ml	3 ml	0 ml	ml	ml

Total Net Volume in Impingers 108 ml

SILICA GEL

Final Weight	237.0 g	g	g
Initial Weight	229.4 g	g	g
Net Weight	7.6 g	g	g

Total Net Weight in Silica Gel 7.6 g

Total Moisture 115.6 g

Filter Number(s) 206672-27

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-23-80
SAMPLING TIME (24-hr CLOCK) 1200 – 1358
SAMPLING LOCATION Inlet Run # 5
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 71
OPERATOR W. McDonald

COMMENTS:

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	8.9		9.0		8.9		8.93	44/100	3.92
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	14.5		14.6		14.6		14.55	32/100	4.66
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		85.5		85.4		85.4	76.5 ~~85.44~~	28/100	21.42 ~~23.92~~
								TOTAL	30.00 ~~32.50~~

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EPA (Dur) 230
4/72

Inlet

FIELD DATA

PLANT St Joe Paper Co.
DATE 1-23-80
SAMPLING LOCATION inlet
SAMPLE TYPE Particulate
RUN NUMBER 6 inlet
OPERATOR E Johnson
AMBIENT TEMPERATURE 70
BAROMETRIC PRESSURE 29.73
STATIC PRESSURE, (P_s) +14
FILTER NUMBER (s) 206672-16

PROBE LENGTH AND TYPE 10' particulate
NOZZLE I.D. .187
ASSUMED MOISTURE, % 18
SAMPLE BOX NUMBER 4
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
C FACTOR .77
PROBE HEATER SETTING High
HEATER BOX SETTING High
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2 MINUTES LEAK RATE 0.005 CFM @ 15" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe °F
	0	1705	579.776										
1	2	1707	580.401	.75	.41	.41	374	76	74	0	309	70	297
2	4	1709	581.321	1.1	.61	.61	376	73	74	0	311	63	298
3	6	1711	582.214	1.2	.66	.66	378	71	73	0	301	62	297
4	8	1713	583.102	1.2	.66	.66	378	71	73	0	301	62	299
5	10	1715	583.962	1.1	.61	.61	379	72	73	0	303	63	301
6	12	1717	584.836	1.2	.66	.66	378	72	73	0	304	63	301
7	14	1719	585.689	1.1	.61	.61	378	72	73	0	304	61	300
8	16	1721	586.500	1.0	.55	.55	378	72	73	0	303	62	302
9	18	1723	587.261	.89	.49	.49	380	72	73	0	303	63	301
10	20	1725	588.025	.89	.49	.49	380	72	73	0	304	63	303
11	22	1729	~	.73	.40	.40	379	72	73	0	303	64	302
12	24	1731	589.449	.87	.48	.48	379	72	73	0	303	64	300
13	26	1733	590.201	1.0	.55	.55	379	72	73	0	302	64	302
14	28	1735	591.153	1.3	.72	.72	380	72	73	0	305	63	301
15	30	1737	592.036	1.2	.66	.66	380	73	72	0	303	63	301
16	32	1739	592.883	1.2	.66	.66	380	73	72	0	304	64	301

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SAJ

PLANT St Joe Paper Co DATE 1-23-80 RUN NO. 6 inlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET (T_m in), °F	DRY GAS METER TEMPERATURE OUTLET (T_m out), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
17	34	1741	593.785	1.2	.66	.66	380	75	73	0	304	66	302
18	36	1743	594.600	.98	.54	.54	379	76	73	0	303	67	305
19	38	1745	595.361	.96	.53	.53	379	76	73	0	303	67	305
20	40	1747	596.144	.96	.53	.53	379	76	73	0	302	67	306
21	42	1749	597.071	1.1	.61	.61	379	77	73	0	301	68	306
22	44	1751	597.726	.89	.49	.49	378	78	74	0	301	69	305
23	46	1753	598.446	.86	.47	.47	378	78	74	0	300	70	306
24	48	1755	599.154	.86	.47	.47	379	79	75	0	300	70	312
		1805											
1	50	1807	599.336	.06	.03	.03	372	77	76	0	315	71	327
2	52	1809	599.652	.22	.12	.12	376	76	76	0	316	68	318
3	54	1811	600.015	.27	.15	.15	379	76	77	0	318	66	318
4	56	1813	600.400	.33	.18	.18	379	76	77	0	318	66	316
5	58	1815	600.600	.20	.11	.11	378	76	77	0	319	67	317
6	60	1817	600.851	.24	.13	.13	378	77	77	0	319	68	318
7	62	1819	601.230	.30	.17	.17	378	77	77	0	318	68	321
8	64	1821	601.711	.39	.22	.22	378	77	77	0	317	68	335
9	66	1823	602.103	.34	.19	.19	379	77	78	0	316	66	347
10	68	1825	602.535	.29	.16	.16	379	78	77	0	316	66	352
11	70	1827	603.018	.41	.23	.23	379	78	76	0	315	66	355
12	72	1829	603.590	.56	.31	.31	379	78	76	0	316	66	353
13	74	1831	604.243	.72	.40	.40	379	78	76	0	311	64	350
14	76	1833	604.913	.70	.39	.39	379	78	76	0	312	63	355
15	78	1835	605.562	.70	.39	.39	380	78	76	0	312	63	352
16	80	1837	606.218	.68	.38	.38	380	78	76	0	311	62	366
17	82	1839	606.849	.68	.38	.38	380	76	75	0	310	62	361
18	84	1841	607.479	.62	.34	.34	379	76	75	0	313	63	358

PLANT St Joe Paper Co DATE 1-23-80 RUN NO. 6 inlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				
			608.128										
19	86	1843	[illegible]	.68	.38	.38	380	76	75	0	311	63	355
20	88	1845	608.751	.68	.38	.38	380	76	75	0	314	63	351
21	90	1847	609.360	.60	.33	.33	380	76	75	0	312	64	347
22	92	1849	610.029	.70	.39	.39	379	76	75	0	315	64	331
23	94	1851	610.670	.69	.38	.38	379	76	75	0	313	64	332
24	96	1853	611.331	.69	.38	.38	379	76	75	0	312	64	332
			0.00	at 1.0" Hg									

ISOKINETIC CALCULATION

Plant St. Joe Paper

Run# 6-I, Date 1-23-80

Location Scrubber Inlet, Initials J.Y

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 165.4 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 31.55 cu.ft.

Barometric Pressure - absolute = BP = 29.73 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 535 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(31.55)\,(29.73)}{(535)\,(165.4)}} = 20.2\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (+ +)

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

MD = 0.44 (CO_2) + 0.32 (O_2) + 0.28 (N_2 + CO)

MD = 0.44 ( ) + 0.32 ( ) + 0.28 (+)

MD = _____

ISOKINETIC CALCULATION (Cont.d)

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18\,(M \times 10^{-2})$

$MS = (30)[1 - (20.2 \times 10^{-2})] + 18\,(20.2 \times 10^{-2}) = 27.6$

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 838 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .84 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 30.76 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(838)}{(30.76)(27.6)}}\right]\left[.84\right]$$

$$= 54.9 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .76 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .184 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4}\,(d^2) = 54.54 \times 10^{-4}\,(.184)^2 = 1.85 \times 10^{-4}$ sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267\,(V_L) + \frac{(V_m)}{(T_m)}\left(PB + \frac{(\Delta H)}{13.6}\right)\right]}{(T)(V_s)(P_s)(A)}$$

$$I = \frac{(1.667)(838)\left[0.00267\,(165.4) + \frac{(31.55)}{(535)}\left(29.73 + \frac{(.76)}{13.6}\right)\right]}{(96)(54.9)(30.76)(1.85 \times 10^{-4})}$$

$$I = 102.4\ \%$$

CLEAN-UP DATA

Plant St Joe Paper

Date 1-23-80

Sampling Location Inlet

Sample Type EPA-5

Run Number 6- I

Sample Box Number

Clean-up Man W. McDonald

Comments:

IMPINGERS

	#1	#2	#3	#4	#5
Final Vol.	246 ml	111 ml	1 ml	ml	ml
Initial Vol.	100 ml	100 ml	0 ml	ml	ml
Net Vol.	146 ml	11 ml	1 ml	ml	ml

Total Net Volume in Impingers 158 ml

SILICA GEL

Final Weight	236.8 g	g	g
Initial Weight	229.4 g	g	g
Net Weight	7.4 g	g	g

Total Net Weight in Silica Gel 7.4 g

Total Moisture 165.4 g

Filter Number(s) 206672-16

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-23-80
SAMPLING TIME (24-hr CLOCK) 1705 - 1853
SAMPLING LOCATION Inlet Run #6
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) BAG
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 70
OPERATOR W. McDonald

COMMENTS:

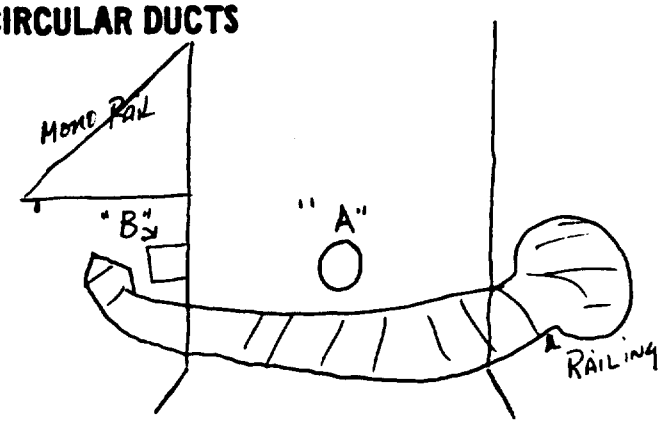
RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	9.0		9.1		9.0		9.05	44/100	3.98
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	15.8		15.8		15.8		15.8	32/100	5.056
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		84.2		84.2		84.2	~~84.2~~ 75.15	28/100	~~23.576~~ 21.042
								TOTAL	~~32.612~~ 30.08

B-48

EPA (Dur) 230
4/72

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT St Joe Paper Co.
DATE 1-17-80
SAMPLING LOCATION Scrubber Outlet
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) 86 1/4"
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) 2"
STACK I.D., (DISTANCE A - DISTANCE B) 84 1/4"
NEAREST UPSTREAM DISTURBANCE 2 "DIAM
NEAREST DOWNSTREAM DISTURBANCE 1 1/2 DIAM
CALCULATOR JY & JF



SCHEMATIC OF SAMPLING LOCATION

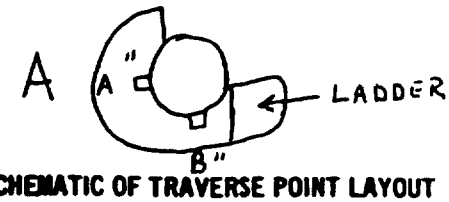
TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	0.011	84.25	0.93	2"	3"
2	0.032	↓	2.7	↓	4 3/4
3	0.055	↓	4.6	↓	6 5/8
4	0.079	↓	6.66	↓	8 5/8
5	0.105	↓	8.85	↓	10 7/8
6	0.132	↓	11.12	↓	13 1/8
7	0.161	↓	13.56	↓	15 1/2
8	0.194	↓	16.34	↓	18 3/8
9	0.230	↓	19.38	↓	21 3/8
10	0.272	↓	22.92	↓	24 7/8
11	0.323	↓	27.21	↓	29 1/4
12	0.398	↓	33.53	↓	35 1/2
13	0.602	↓	50.72	↓	52 3/4
14	0.677	↓	57.04	↓	59
15	0.728	↓	61.33	↓	63 3/8
16	0.770	↓	64.87	↓	66 7/8
17	0.806	↓	67.91	↓	69 7/8
18	0.839	↓	70.69	↓	72 3/4
19	0.868	↓	73.13	↓	75 1/8
20	0.895	↓	75.40	↓	77 1/8
21	0.921	↓	77.59	↓	79 5/8
22	0.945	↓	79.62	↓	81 5/8
23	0.968	↓	81.55	↓	83 1/2
24	0.989	↓	83.32	↓	85 1/4

EPA (Dur) 232
4/72

PRELIMINARY VELOCITY TRAVERSE

PLANT St Joe Paper Co
DATE 1-15-80
LOCATION Scrubber Outlet
STACK I.D. 84"4
BAROMETRIC PRESSURE, in. Hg 30.02
STACK GAUGE PRESSURE, in. H_2O -.30
OPERATORS JY, JRF

Gulf of Mexico



SCHEMATIC OF TRAVERSE POINT LAYOUT

B

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
1	0.44	141
2	0.49	141
3	0.51	141
4	0.47	141
5	0.44	141
6	0.43	141
7	0.40	141
8	0.41	141
9	0.40	142
10	0.39	142
11	0.41	142
12	0.41	143
13	0.35	143
14	0.28	142
15	0.23	142
16	0.23	142
17	0.23	141
18	0.25	141
19	0.31	141
20	0.34	142
21	0.38	141
22	0.42	141
23	0.45	142
24	0.48	143
AVERAGE	0.38	

A

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
1	0.48	143
2	0.57	143
3	0.64	142
4	0.62	142
5	0.61	143
6	0.62	143
7	0.57	142
8	0.56	142
9	0.52	142
10	0.49	142
11	0.48	142
12	0.45	143
13	0.28	143
14	0.24	143
15	0.17	143
16	0.13	143
17	0.13	143
18	0.11	143
19	0.16	143
20	0.17	143
21	0.25	143
22	0.33	144
23	0.38	143
24	0.52	143
AVERAGE	0.40	143

EPA (Dur) 233
4/72

NOMOGRAPH DATA (HP-65)

PLANT St Joe Paper Co. USED ON RUN NO.: 1-0

DATE 1-15-80 CALCULATOR: J.Y.

SAMPLING LOCATION Scrubber Outlet

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Run card			—
2	Initialize program		A	0.00
3	Enter average T_m (meter temp. °F + 460) If meter temp. unknown, use ambient + 20°F	545 °R	R/S	545 T_m
4	Enter P_m (Barometric pressure at meter)	30.0 29.84 In. Hg	R/S	18.26 T_m/P_m
5	Enter P_s (static pressure in stack) [P_m ± .073 x stack gauge pressure in In. H_2O]	29.82 In. Hg	R/S	29.82 P_s
6	Enter average T_s (stack temperature + 460)	600 °R	R/S	0.0497 P_s/T_s
7	Enter B_{ms} (mole fraction of H_2O vapor in gas stream)	0.21 Fraction of H_2O	R/S	0.79 Fraction Dry
8	Enter MD (molecular weight of dry gas)	30 lbs/lb mole	R/S	27.48 MW molecular wt of stack gas lbs/lb mole
9	Enter C_p (type "S" pitot tube coefficient)	0.77	R/S	552.92
10	Enter average Δ_p Highest Δ_p (_____)	0.39 In. H_2O	R/S	D_n theo. 0.302 (nozzle dia. in inches)
11	Initialize "B"	0.302	B	—
12	Enter actual D_n	0.246 In.	R/S	0.00366
13	Enter $\Delta H_@$ (Calibrated pressure differential across orifice)	1.877 In. H_2O	R/S	2.14 K factor
14_1	Enter actual Δ_{p_1}	0.13	E	ΔH_1 .278 In. H_2O
14_2	Enter actual Δ_{p_2}	0.39	E	ΔH .840 In. H_2O
14_3	Enter actual Δ_{p_3}	0.64	E	ΔH 1.37 In. H_2O

FIELD DATA

PLANT St. Joe Paper
DATE 1-17-80
SAMPLING LOCATION Scrubber outlet (#4 boiler)
SAMPLE TYPE Combined EPA 5+6
RUN NUMBER 1
OPERATOR J.Y., J.R.F.
AMBIENT TEMPERATURE 65°F
BAROMETRIC PRESSURE 30.0
STATIC PRESSURE, (P_s) -.30
FILTER NUMBER (s) 206672-14

PROBE LENGTH AND TYPE 10 ft. SS
NOZZLE I.D. .246
ASSUMED MOISTURE, % 21
SAMPLE BOX NUMBER 5
METER BOX NUMBER 8
METER $\Delta H_@$ 1.877
K FACTOR 2.14
PROBE HEATER SETTING Hi (310°F)
HEATER BOX SETTING Hi (310°F)
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

Before Leak Rate .01 CFM @ 16" Hg

READ AND RECORD ALL DATA EVERY 2 MINUTES. LEAK RATE .008 CFM @ 15" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
	0	9:40	792.589										
1	0	9:40	792.589	.65	1.4	1.4	142	72	73	3	307	71	174
2	2	9:42	793.825	.66	1.3	1.3	142	74	73	3.4	302	70	177
3	4	9:44	795.050	.55	1.2	1.2	142	76	73	3.2	297	71	179
4	6	9:46	796.225	.44	.94	.94	142	78	73	3.0	294	73	182
5	8	9:48	797.275	.38	.81	.81	141	80	73	2.8	293	74	183
6	10	9:50	798.260	.32	.68	.68	141	81	73	2.7	293	74	186
7	12	9:52	799.135	.28	.60	.60	142	80	73	2.8	293	71	186
8	14	9:54	799.990	.27	.58	.58	142	79	73	2.8	294	70	186
9	16	9:56	800.805	.25	.54	.54	141	79	73	2.8	296	70	187
10	18	9:58	801.620	.27	.58	.58	141	78	73	2.8	298	70	185
11	20	10:00	802.410	.27	.58	.58	142	78	73	2.8	299	69	184
12	22	10:02	803.230	.32	.68	.68	143	78	73	3.0	299	69	183
13	24	10:04	804.100	.38	.81	.81	142	78	73	3.1	299	69	183
14	26	10:06	805.100	.53	1.1	1.1	142	78	73	3.4	301	68	184
15	28	10:08	806.215	.60	1.3	1.3	142	78	73	3.6	300	68	184
16	30	10:10	807.405	.62	1.3	1.3	142	78	73	3.8	291	68	184

PLANT St. Joe Paper DATE 1-17-88 RUN NO. 1

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
	30	10:10	807.405										
17	32	10:12	808.590	.63	1.4	1.4	142	78	73	3.9	302	68	184
18	34	10:14	809.815	.64	1.4	1.4	142	79	73	4.0	303	68	183
19	36	10:16	811.040	.58	1.3	1.3	142	78	73	4.1	302	68	181
20	38	10:18	812.220	.63	1.4	1.4	142	78	73	4.2	303	68	180
21	40	10:20	813.450	.70	1.5	1.5	142	77	73	4.4	302	68	179
22	42	10:22	814.715	.20	.43	.43	143	76	73	2.8	297	69	178
23	44	10:24	815.570	.25	.54	.54	142	76	73	3.0	300	69	177
24	46	10:26	816.325	.30	.64	.64	142	75	73	3.2	302	69	178
	48	10:28	817.174	-		-	-	-	-				
		shutdown to change port											
1	48	12:10	817.174	.57	1.2	1.2	144	75	75	4.5	298	70	159
2	50	12:12	818.300	.55	1.2	1.2	144	75	75	4.5	301	68	159
3	52	12:14	819.440	.49	1.1	1.1	145	76	75	4.1	302	68	161
4	54	12:16	820.530	.43	.92	.92	145	77	75	4.0	298	69	164
5	56	12:18	821.590	.39	.83	.83	144	79	75	3.8	301	68	165
6	58	12:20	822.515	.34	.73	.73	143	82	75				
7	60	14:45	823.408	.32	.68	.68	141	82	83	3.5	303	71	175
8	62	14:47	824.330	.29	.62	.62	141	79	83	3.4	300	69	174
9	64	14:49	825.185	.29	.62	.62	142	81	83	3.4	299	72	174
10	66	14:51	826.015	.31	.66	.64	141	83	82	3.5	301	71	174
11	68	14:53		.30	.64	.64	141	83	82	3.5	302	70	175
12	70	14:55	827.745	.32	.68	.68	141	84	82	3.9	301	70	175
13	72	14:57	828.650	.37	.79	.79	141	85	81	4.0	[illegible]	70	176
14	74	14:59	829.540	.49	1.1	1.1	142	85	81	4.6	303	69	176
15	76	15:01	830.640	.48	1.0	1.0	142	85	81	4.5	302	70	174
16	78	15:03	831.715	.47	1.0	1.0	142	85	81	4.5	303	70	174

PLANT ST. Joe Paper DATE 1-17-81 RUN NO. 1

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
	74	15:03	831.715										
17	80	15:05	832.780	.50	1.1	1.1	142	85	81	4.8	302	69	171
18	82	15:07	833.870	.60	1.1	1.1	151	85	81	4.8	303	69	174
19	84	15:09	834.965	.61	1.1	1.1	151	84	81	4.8	301	69	172
20	86	15:11	836.070	.56	1.2	1.2	143	83	81	5.0	302	70	170
21	88	15:13	837.215	.54	1.2	1.2	143	83	80	5.0	304	71	169
22	90	15:15	838.380	.59	1.3	1.3	143	83	80	5.2	305	71	168
23	92	15:17	839.570	.69	1.5	1.5	143	83	80	5.5	303	70	169
24	94	15:19	840.835	.54	1.2	1.2	144	83	80	5.2	301	70	169
	96	15:21	842.096										

avg $\sqrt{\Delta p}$ = .66

Purged for 2 cu. ft. @ ΔH = .70 for 4.8 min

B-54

30-20

ISOKINETIC CALCULATION

Plant ST. JOE PAPER

Run# 1-0, Date 1-17-80

Location #4 Boiler scrubber outlet, Initials J.Y.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 280 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 49.51 cu.ft.

Barometric Pressure - absolute = BP = 30.0 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 540 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(49.51)\,(30.0)}{(540)\,(280)}} = 21.4\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

$N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (\quad + \quad + \quad)$

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

$MD = 0.44\,(CO_2) + 0.32\,(O_2) + 0.28\,(N_2 + CO)$

$MD = 0.44\,(\quad) + 0.32\,(\quad) + 0.28\,(\quad + \quad)$

MD = _____

1-0 J.S.

ISOKINETIC CALCULATION (Cont.d)

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18\,(M \times 10^{-2})$

$MS = (30)[1 - (21.4 \times 10^{-2})] + 18\,(21.4 \times 10^{-2}) =$ 27.4

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 602 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .66 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 29.98 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(602)}{(29.98)(27.4)}}\right]\left[.66\right]$$

$$= 37.2 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .97 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .246 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4}\,(d^2) = 54.54 \times 10^{-4}\,(.246)^2 =$ 3.3×10^{-4} sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267\,(V_L) + \frac{(V_m)}{(T_m)}\left(PB + \frac{(\Delta H)}{13.6}\right)\right]}{(T)(V_s)(P_s)(A)}$$

$$I = \frac{(1.667)(602)\left[0.00267\,(280) + \frac{(49.51)}{(540)}\left(30.0 + \frac{(.97)}{13.6}\right)\right]}{(96)(37.2)(29.98)(3.3 \times 10^{-4})}$$

I = 99.5 %

CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:
Date 1/17/79 Thurs.
Sampling Location Outlet
Sample Type Method 5 & 6 (EPA)
Run Number 1-0
Sample Box Number MRC 5
Clean-up Man T. Thelmen

IMPINGERS

	#1 (IPA)	#2 (H_2O_2)	#3 (H_2O_2)	#4	Silica Gel #5
Final Vol.	244 ml	180 ml	100 ml	~~160~~ ml	ml
Initial Vol.	100 ml	100 ml	100 ml	0 ml	ml
Net Vol.	144 ml	80 ml	0 ml	ml	ml

Total Net Volume in Impingers 224 ml

SILICA GEL

Final Weight	280 g	g	g
Initial Weight	224 g	g	g
Net Weight	56 g	g	g

Total Net Weight in Silica Gel 56 g

Total Moisture 280 g

Filter Number(s) 206672-14

Sil. gel number wrong See Typer

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-17-80
SAMPLING TIME (24-hr CLOCK) 0945 - 1521
SAMPLING LOCATION Outlet Run #1
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 62°
OPERATOR W. McDonald

COMMENTS:

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	8.2		8.0		8.2		8.1	44/100	3.56
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	12.5		13.0		13.0		12.83	32/100	4.11
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0	~~87.5~~	0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		87.5		87.0		87.0	79.1 ~~87.35~~	28/100	22.14 ~~24.43~~
								TOTAL	29.81 ~~32.10~~

EPA (Dur) 230

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EPA METHOD 5
FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan 21, 1980
SAMPLING LOCATION Boiler #4 outlet
SAMPLE TYPE EPA 5 & 6
RUN NUMBER 2-0
OPERATOR JY, MM
AMBIENT TEMPERATURE 70°F
BAROMETRIC PRESSURE 30.0
STATIC PRESSURE, (P_s) −0.3
FILTER NUMBER (s) 206671-16
PITOT TUBE No. & Cp.

Note: These three field data sheets are recopied from pp. B-62 to B-65 because they cannot be xeroxed

PROBE LENGTH AND TYPE 8' SS
NOZZLE I.D. 0.246
ASSUMED MOISTURE, % 21
SAMPLE BOX NUMBER 4
METER BOX NUMBER 6
METER ΔH@ 1.877
K FACTOR 2.19
PRE-TEST LEAK CHECK RATE 0.008 CFM @ 15 "Hg
POST TEST LEAK CHECK RATE 0.007 CFM @ 15 "Hg
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME, min	CLOCK TIME (24 hr. CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	PROBE TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F				
	000	1800	844.329										
01	00	1800	844.329	.56	1.2	1.2	142	70	71	3.0	309	82	304
02	02	1802	845.600	.49	1.1	1.1	141	72	71	3.3	309	82	295
03	04	1804	846.700	.41	.88	.88	142	75	71	3.3	308	83	187
04	06	1806	847.700	.34	.73	.73	142	76	71	3.6	308	85	186
05	08	1808	848.600	.27	.58	.58	140	78	72	3.8	308	85	178
06	10	1810	849.315	.23	.49	.49	141	78	72	3.5	308	83	192
07	12	1812	850.155	.20	.43	.43	141	87	73	3.3	300	83	194
08	14	1814	850.850	.20	.43	.43	141	83	74	3.0	300	83	196
09	16	1816	851.550	.18	.39	.39	141	86	75	2.2	300	79	198
10	18	1818	852.215	.18	.39	.39	139	90	75	2.2	300	80	183
11	20	1820	852.875	.19	.41	.41	139	89	76	2.3	300	79	191
12	22	1822	853.545	.27	.58	.58	139	87	77	2.8	302	80	190
13	24	1824	854.320	.40	.86	.86	140	86	77	3.3	302	81	190
14	26	1826	855.255	.44	.94	.94	139	85	78	3.6	302	80	190
15	28	1828	856.260	.45	.96	.96	140	85	78	3.8	302	79	190

PLANT St. Joe DATE 1-21-80 RUN NO. 2-0

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME, min	CLOCK TIME (24 hr. CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	PROBE TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F				
16	30	1830	857.275	.48	1.0	1.0	140	84	79	3.8	302	79	188
17	32	1832	858.310	.53	1.1	1.1	140	86	79	3.8	302	82	
18	34	1834	859.385	.53	1.1	1.1	139	87	79	3.8	302	78	
19	36	1836	860.465	.57	1.2	1.2	140	87	80	3.8	302	78	
20	38	1838	860.590	.58	1.2	1.2	140	87	80	3.8	302	75	
21	40	1840	862.725	.58	1.2	1.2	139	87	81	4.0	302	75	
22	42	1842	863.860	.5853	1.1	1.1	140	89	81	4.0	302	73	
23	44	1844	864.950	.58	1.2	1.2	139	90	82	4.0	302	73	
24	46	1846	866.055	.55	1.2	1.2	140	90	82	4.0	302	73	
	48	1848	867.180										
		STOPPED TO CHANGE PORTS											
1	48	1915	867.181	.47	1.0	1.0	138	79	80	3.0	316	68	
2	50	1917	868.215	.44	.54	.54	138	78	79	3.0	312	68	
3	52	1919	869.235	.40	.86	.86	138	77	79	3.0	316	68	
4	54	1921	870.220	.34	.73	.73	138	78	78	3.5	312	68	
5	56	1923	871.130	.30	.64	.64	140	78	79	3.5	317	68	
6	58	1925	871.995	.25	.54	.54	141	79	78	3.5	301	69	
7	60	1927	872.745	.22	.47	.47	139	79	77	3.5	312	67	
8	62	1929	873.495	.22	.47	.47	140	80	76	3.5	309	67	
9	64	1931	874.295	.21	.45	.45	142	81	77	3.5	312	67	
10	66	1933	874.915	.23	.49	.49	138	83	78	3.5	312	67	
11	68	1935	875.690	.27	.58	.58	139	84	78	4.0	302	66	
12	70	1937	876.435	.34	.73	.73	140	80	78	4.5	302	66	
13	72	1939	877.325	.41	.88	.88	139	86	78	4.5	300	65	

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1/80

PLANT St. Joe Paper DATE 1-21-80 RUN NO. 2-0

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME, min	CLOCK TIME (24 hr. CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	PROBE TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F				
14	74	1941	877.815	.40	.86	.86	140	87	76	4.5	301	63	
15	76	1943	879.250	.38	.81	.81	139	87	75	4.5	302	64	
16	78	1945	880.190	.39	.83	.83	140	87	79	4.6	301	64	
17	80	1947	881.145	.40	.86	.86	138	88	79	4.8	301	65	
18	82	1949	882.105	.38	.81	.81	140	89	79	3.8	302	68	
19	84	1951	883.070	.43	.92	.92	140	87	79	3.8	303	68	
20	86	1953	884.045	.45	.96	.96	140	84	79	3.8	302	68	
21	88	1955	885.070	.45	.96	.96	139	82	79	3.8	303	68	
22	90	1957	8	.48	1.0	1.0	139	81	78	3.8	303	68	
23	92	1959	887.110	.46	.98	.98	139	80	78	3.8	303	68	
24	94	2001	888.155	.40	.96	.96	139	80	79	3.8	303	68	
		2003	889.151										

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222.

FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 21, 1980
SAMPLING LOCATION Boiler #4 Tube
SAMPLE TYPE EPA #5 + 6
RUN NUMBER #2-0
OPERATOR J.Y, MM
AMBIENT TEMPERATURE 70°F
BAROMETRIC PRESSURE 30.0
STATIC PRESSURE, (P_s) -.3
FILTER NUMBER (s) 206671-16

PROBE LENGTH AND TYPE 8' S.S
NOZZLE I.D. .266
ASSUMED MOISTURE, % 21
SAMPLE BOX NUMBER [illegible]
METER BOX NUMBER 6
METER ΔH@ [illegible].37 [illegible].22
K FACTOR 2.15
PROBE HEATER SETTING Hi 326
HEATER BOX SETTING Hi 330
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY _____ MINUTES. (4) LEAK RATE .007 CFM @ 15 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe
1	00	1800	844.329										
01	[illegible]	1800	844.329	.5[illegible]	1.2	[illegible].2	142	[illegible]	71	3[illegible]	309/310	82	304
02	0[illegible]	1802	845.600	.4[illegible]	1.1	1.1	[illegible]	[illegible]	[illegible]	3.3	[illegible]09/310	88	245
03	0[illegible]	1804	846.700	.41	[illegible]	.88	[illegible]	[illegible]	[illegible]	3.3	3[illegible]/310	83	
04	06	1806	847.700	.34	.73	.73	[illegible]	[illegible]	79	3[illegible]	30[illegible]/310	83	
05	08	1808	848.600	.27	.58	.58	[illegible]	[illegible]	7[illegible]	3.[illegible]	30[illegible]/310	8[illegible]	
06	10	1810	[illegible]	.23	.42	.4[illegible]	14[illegible]	78	[illegible]	3[illegible]	3[illegible]/310	8[illegible]	194
07	12	1812	[illegible]0.155	.2[illegible]	.43	.43	141	8[illegible]	[illegible]	3.[illegible]	[illegible]/310	8[illegible]	196
08	14	1814	[illegible]50.850	[illegible]	.43	.43	141	83	74	3.0	[illegible]/310	8[illegible]	198
09	1[illegible]	1816	8[illegible].550	.18	.39	.39	141	8[illegible]	75	2.2	[illegible]/310	[illegible]	183
10	[illegible]	1818	852.945	.18	.39	.39	[illegible]	[illegible]	[illegible]	[illegible]	3[illegible]/310	8[illegible]	191
11	[illegible]	1820	852.875	.19	.41	.41	13[illegible]	[illegible]	7[illegible]	3[illegible]	[illegible]/310	7[illegible]	190
12	22	1822	853.545	.27	.58	.58	13[illegible]	8[illegible]	77	2[illegible]	3.0[illegible]	8[illegible]	190
13	24	1824	854.320	.40	.86	.86	14[illegible]	86	[illegible]7	3.3	302	[illegible]	190
14	26	1826	855.255	.44	.94	.94	1[illegible]	[illegible]	[illegible]	3.[illegible]	30[illegible]	80	190
15	28	1828	856.260	.45	.96	.96	14[illegible]	[illegible]	[illegible]	[illegible]	[illegible]2	79	188
16	30	1830	857.275	.48	1.0	1.0	140	[illegible]	[illegible]	3[illegible]	302	79	

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PLANT St Joe Paper DATE 1-21-80 RUN NO.

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	30	1830	857.275									
17	32	1832	858.310	[illegible]	[illegible]	[illegible]	14[illegible]	[illegible]6	7[illegible]	3.8	302	[illegible]
18	34	1834	859.385	.5	1.1	[illegible]	[illegible]	[illegible]7	[illegible]	3.8	302	[illegible]
19	36	1836	860.465	[illegible]7	1.2	1.2	[illegible]	[illegible]	[illegible]	3.8	302	[illegible]
20	38	1838	861.59[illegible]	[illegible]7	1.2	1.2	146	[illegible]	[illegible]	[illegible]	302	[illegible]
21	40	1840	862.72[illegible]	[illegible]	1.2	1.2	135	[illegible]	81	[illegible]	302	[illegible]
22	42	1842	863.8[illegible]	.53	1.1	1.1	140	89	8[illegible]	4.0	302	[illegible]
23	44	1844	864.9[illegible]	.58	1.2	1.2	139	90	82	4.0	[illegible]	[illegible]
24	46	1846	866.055	.55	[illegible]	[illegible]	140	90	82	4.0	302	[illegible]
	48	1848	867.18[illegible]									
		STOPPED										
[illegible]	48	[illegible]	867[illegible]	.47	[illegible]	[illegible]	[illegible]	[illegible]	8[illegible]	[illegible]	316	68
[illegible]	5[illegible]	[illegible]	[illegible]	.44	[illegible]	.44	[illegible]	78	79	[illegible]	312	68
[illegible]	5[illegible]	[illegible]	[illegible]	.40	[illegible]6	[illegible]	13[illegible]	77	79	[illegible]	316	68
[illegible]	[illegible]	[illegible]	[illegible]	.34	.73	[illegible]	138	[illegible]	[illegible]	[illegible]	312	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	.30	[illegible]	[illegible]	140	[illegible]	79	[illegible]	317	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	.25	.54	[illegible]	141	79	78	3.[illegible]	301	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.47	.47	139	79	77	[illegible]	312	[illegible]
[illegible]	6[illegible]	[illegible]	[illegible]	[illegible]	.47	.47	14[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	6[illegible]	[illegible]	[illegible]	[illegible]1	[illegible]	[illegible]	142	81	77	[illegible]	312	67
[illegible]	6[illegible]	[illegible]	[illegible]	.23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	312	67
[illegible]	68	[illegible]	[illegible]	.27	[illegible]	.58	13[illegible]	[illegible]4	78	[illegible]	302	[illegible]
[illegible]	70	19:37	876.435	.34	.73	[illegible]3	140	[illegible]0	78	4.[illegible]	302	66
[illegible]	72	19:39	877.325	.41	.89	[illegible]	134	[illegible]	78	4.5	[illegible]	65
14	74	19:41	878.815	.40	[illegible]	[illegible]	140	[illegible]	76	4.[illegible]	301	63
15	76	19:43	879.250	.38	[illegible]1	[illegible]1	139	[illegible]	75	[illegible]	302	64
16	78	19:45	880.190	.39	[illegible]3	[illegible]3	140	[illegible]7	79	4.6	301	64
17	80	19:47	881.145	.40	[illegible]	[illegible]	[illegible]3	[illegible]	[illegible]	4.8	301	65

84 79

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PLANT St. Joe Paper DATE [illegible] RUN NO. [illegible]

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	80	19:47	88[illegible].145									
18	82	19:49	882.105	[illegible]	.81	.81	14[illegible]	[illegible]	[illegible]	3.8	302	68
19	84	19:51	883.07[illegible]	[illegible]3	.92	.92	140	[illegible]	[illegible]	3.8	303	68
20	86	19:53	884.06[illegible]	[illegible]	.96	.96	14[illegible]	[illegible]	[illegible]	[illegible]	302	68
21	88	19:55	885.07[illegible]	[illegible]	.96	.9[illegible]	1[illegible]	[illegible]	[illegible]	3.8	303	68
22	90	19:57	[illegible]	[illegible]	1.0	1.0	[illegible]	[illegible]	78	3.8	303	68
23	92	19:59	887.1[illegible]	[illegible]6	.98	.98	1[illegible]	80	[illegible]	3.8	303	68
24	94	20:01	888.1[illegible]	.40	.86	.86	134	80	[illegible]	3.8	303	68
	96	20:03	889.15[illegible]									

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ISOKINETIC CALCULATION

Plant St. Joe Paper

Run# 2-0, Date 1-21-80

Location Scrubber Outlet, Initials J.Y.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 228.5 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 44.82 cu.ft.

Barometric Pressure - absolute = BP = 30.0 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 541 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63 \, (V_m)(BP)}{(T_m)(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63 \, (44.82)(30.0)}{(541)(228.5)}} = 19.7 \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (+ +)

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

MD = 0.44 (CO_2) + 0.32 (O_2) + 0.28 (N_2 + CO)

MD = 0.44 ( ) + 0.32 ( ) + 0.28 (+)

MD = _____

#2-0 **ISOKINETIC CALCULATION (Cont.d)** J.Y.

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18\,(M \times 10^{-2})$

$MS = (30)[1 - (19.7 \times 10^{-2})] + 18\,(19.7 \times 10^{-2}) = 27.6$

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 600 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .61 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 29.98 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(600)}{(29.98)(27.6)}}\right]\left[.61\right]$$

$$= 34.2 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .82 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .246 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4}\,(d^2) = 54.54 \times 10^{-4}\,(.246)^2 = 3.3 \times 10^{-4}$ sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267\,(V_L) + \frac{(V_m)}{(T_m)}\left(PB + \frac{(\Delta H)}{13.6}\right)\right]}{(T)(V_s)(P_s)(A)}$$

$$I = \frac{(1.667)(600)\left[0.00267\,(228.5) + \frac{(44.82)}{(541)}\left(30.0 + \frac{(.82)}{13.6}\right)\right]}{(96)(34.2)(29.98)(3.3 \times 10^{-4})}$$

$$I = 95.5\ \%$$

CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:
Date 1/18/80
Sampling Location Outlet
Sample Type EPA Methods 5 & 6
Run Number 2-0
Sample Box Number 5
Clean-up Man

IMPINGERS

	#1 IPA	#2 H_2O_2	#3 H_2O_2	#4	#5 Silica Gel
Final Vol.	240 ml	155 ml	124 ml	1 ml	ml
Initial Vol.	100 ml	100 ml	100 ml	0 ml	~~200~~ ml
Net Vol.	140 ml	55 ml	24 ml	1 ml	ml

Total Net Volume in Impingers 220.0 ml

SILICA GEL

Final Weight	2369 228.4 g	g	g
Initial Weight	[redacted] g	g	g
Net Weight	8.5 g	g	g

Total Net Weight in Silica Gel [redacted] 8.5 ~~228.4~~ g

Total Moisture 228.5 g

Filter Number(s) 206671-16

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-21-80
SAMPLING TIME (24-hr CLOCK) 1800 - 2003 Run # 2
SAMPLING LOCATION Outlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) BAG
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 65
OPERATOR W. McDonald

COMMENTS:

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	7.6		7.8		7.6		7.7	44/100	3.388
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	13.9		14.2		14.2		14.15	32/100	4.528
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		86.1		85.8		85.8	78.15	28/100	21.882
								TOTAL	29.80

EPA (Dur) 230
4/72

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FIELD DATA

PLANT St. Joe Paper
DATE 1-22-80
SAMPLING LOCATION Scrubber Outlet
SAMPLE TYPE EPA 5 & 6 combined
RUN NUMBER 3-0
OPERATOR J.Y probe - MM.
AMBIENT TEMPERATURE 65°F
BAROMETRIC PRESSURE 29.84
STATIC PRESSURE, (P_s) 29.82
FILTER NUMBER (s) 206672-17

PROBE LENGTH AND TYPE 10ft eff - SS.
NOZZLE I.D. .246
ASSUMED MOISTURE, % 20
SAMPLE BOX NUMBER 5
METER BOX NUMBER 8
METER ΔH@ 1.877
K FACTOR 2.19
PROBE HEATER SETTING Hi
HEATER BOX SETTING Hi
~~REFERENCE Δp~~

SCHEMATIC OF TRAVERSE POINT LAYOUT

Before Leak Rate .007 CFM @ 15" Hg

READ AND RECORD ALL DATA EVERY 2 MINUTES after LEAK RATE .006 CFM @ 15" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Prob
	0	9:35	896.562										208
1	0	9:35	896.562	.58	1.3	1.3	142	92	91	4.8	310	97	208
2	2	9:37	897.770	.51	1.1	1.1	141	96	91	4.8	309	95	208
3	4	9:39	898.890	.45	.99	.98	141	99	91	4.6	311	93	207
4	6	9:41	900.065	.37	.81	.81	136	100	92	4.0	309	94	207
5	8	9:43	900.935	.30	.66	.66	140	100	92	4.0	310	93	207
6	10	9:45	901.830	.24	.53	.53	140	100	93	4.2	311	93	205
7	12	9:47	902.635	.21	.46	.46	140	101	92	4.0	312	86	203
8	14	9:49	903.375	.21	.46	.46	141	101	92	4.0	307	88	203
9	16	9:51		.22	.48	.48	141	101	93	4.0	309	87	203
10	18	9:53	904.860	.20	.44	.44	140	96	92	4.0	308	90	202
11	20	9:55	905.590	.20	.44	.44	140	96	92	4.0	309	90	201
12	22	9:57	906.315	.24	.53	.53	140	96	92	3.3	308	89	200
13	24	9:59	907.095	.38	.88	.88	140	94	92	4.1	309	86	199
14	26	10:01		.40	.88	.88	141	95	91	4.5	309	85	198
15	28	10:03	909.050	.44	.96	.96	142	95	91	4.8	308	85	198
16	30	10:05	910.095	.49	1.1	1.1	140	95	91	5.1	306	84	

97 92 95

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PLANT St. Joe Paper DATE 1-22-80 RUN NO. 3-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				
	30	10:05	910.095										
17	32	10:07	911.240	.49	1.1	1.1	140	95	91	5.2	307	85	192
18	34	10:09	912.325	.53	1.2	1.2	140	94	91	5.8	306	87	198
19	36	10:11	913.470	.54	1.2	1.2	142	93	91	6.0	306	85	198
20	38	10:13	914.625	.55	1.2	1.2	142	92	91	6.1	306	82	195
21	40	10:15	915.780	.47	1.0	1.0	141	88	90	4.8	305	82	195
22	42	10:17	916.865	.45	.99	.99	141	89	90	4.6	302	83	195
23	44	10:19	917.940	.50	1.1	1.1	141	89	88	4.9	305	83	19[illegible]
24	46	10:21	919.075	.42	.92	.92	142	87	87	4.4	304	82	19[illegible]
	48	10:23	920.112										
		STOPPED TO	change		parts								
1	48	11:00	920.112	.51	1.1	1.1	142	84	85	4.6	328	86	20[illegible]
2	50	11:02	921.230	.49	1.1	1.1	142	84	85	4.7	326	83	20[illegible]
3	52	11:04	922.335	.47	1.0	1.0	143	85	85	4.5	323	85	196
4	54	11:06	923.420	.42	.92	.92	144	88	84	4.4	322	89	197
5	56	11:08	924.415	.37	.81	.81	141	89	85	4.1	321	90	196
6	58	11:10	925.380	.30	.66	.66	143	92	85	3.8	317	93	196
7	60	11:12	926.235	.24	.53	.53	143	94	85	3.3	315	93	19[illegible]
8	62	11:14	927.040	.23	.50	.50	143	93	87	3.3	312	94	187
9	64	11:16	927.805	.22	.48	.48	142	93	87	3.2	311	94	19[illegible]
10	66	11:18	928.550	.24	.53	.53	144	93	87	3.5	309	90	190
11	68	11:20	929.325	.30	.66	.66	141	93	87	3.8	307	8[illegible]	188
12	70	11:22	930.175	.35	.77	.77	145	94	87	4.2	306	90	189
13	72	11:24	931.100	.43	.94	.94	145	93	88	4.8	302	87	18[illegible]
14	74	11:26	932.130	.40	.88	.88	146	92	88	4.7	302	84	18[illegible]
15	76	11:28	933.110	.40	.88	.88	144	94	87	4.8	301	88	190
16	78	11:30	934.110	.40	.88	.88	145	95	88	4.8	301	84	188
17	80	11:32	935.110	.39	.85	.85	145	94	88	4.8	297	83	18[illegible]

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PLANT St. Joe Paper DATE 1-22-80 RUN NO. 3-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe
					DESIRED	ACTUAL		INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F				
	80	11:32	935.110										
18	82	11:34	936.075	.43	.94	.94	145	92	88	4.2	300	81	183
19	84	11:36	937.115	.48	1.1	1.1	145	92	88	5.5	301	84	187
20	86	11:38	938.215	.48	1.1	1.1	144	91	88	5.5	302	86	188
21	88	11:40	939.315	.48	1.1	1.1	144	92	88	5.6	301	86	187
22	90	11:42	940.425	.47	1.0	1.0	145	92	88	5.4	302	88	188
23	92	11:44	941.500	.47	1.0	1.0	144	91	88	5.4	303	90	188
24	94	11:46	942.560	.35	.77	.77	145	91	88	5.8	304	90	187
	96	11:48	943.494					90					

15 min Purge at $\Delta H = 0.7$

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ISOKINETIC CALCULATION

Plant St. Joe Paper

Run# 3-0, Date 1-22-80

Location Scrubber outlet, Initials J.Y.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 242.3 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 46.93 cu.ft.

Barometric Pressure - absolute = BP = 29.84 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 552 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(46.93)\,(29.84)}{(552)\,(242.3)}} = 20.36\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

$N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (\quad + \quad + \quad)$

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

$MD = 0.44\,(CO_2) + 0.32\,(O_2) + 0.28\,(N_2 + CO)$

$MD = 0.44\,(\quad) + 0.32\,(\quad) + 0.28\,(\quad + \quad)$

MD = _____

#3-0

J.P.

ISOKINETIC CALCULATION (Cont.d)

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

MS = (MD)[1 - (M x 10^{-2})] + 18 (M x 10^{-2})

MS = (30)[1 - (20.36 x 10^{-2})] + 18 (20.36 x 10^{-2}) = 27.56

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 602 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .62 (in.H_2O)$^{1/2}$

Absolute pressure of stack (BP ± $\frac{p}{13.6}$) = P_s = 29.82 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)\,(\ CP\ )\left[\sqrt{\frac{(\ T_s\ )}{(\ P_s\ )\ (\ MS\ )}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)\,(\ .77\ )\left[\sqrt{\frac{(\ 602\ )}{(29.82\ )\ (27.56\ )}}\right]\left[.62\right]$$

= 34.9 FPS

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .86 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .246 in.

Area of nozzle = A

A = 54.54 x 10^{-4} (d^2) = 54.54 x 10^{-4} $(.246)^2$ = 3.3×10^{-4} sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)\,(\ T_s\ )\left[0.00267\ (V_L\ ) + \frac{(\ V_m\ )}{(\ T_m\ )}\left(PB + \frac{(\ \Delta H\ )}{13.6}\right)\right]}{(\ T\ )\ (\ V_s\ )\ (\ P_s\ )\ (\ A\ )}$$

$$I = \frac{(1.667)\,(602)\left[0.00267\ (242.3) + \frac{(46.93)}{(552)}\left(29.84 + \frac{(.86)}{13.6}\right)\right]}{(\ 96\ )(\ 34.9\ )(\ 29.82\ (\ 3.3 \times 10^{-4}\ )}$$

I = 97.1 %

CLEAN-UP DATA

Plant St Joe Paper Co.

Date 1-21-80

Sampling Location outlet

Sample Type EPA Mod Method 5

Run Number 3-0 (outlet

Sample Box Number 5

Clean-up Man W. H. McDonald

Comments:

IMPINGERS

	#1 EPA	#2 H2O2	#3 H2O2	#4	#5
Final Vol.	242 ml	144 ml	120 ml	1 ml	ml
Initial Vol.	100 ml	100 ml	100 ml	0 ml	ml
Net Vol.	142 ml	44 ml	20 ml	1 ml	ml

Total Net Volume in Impingers 207 ml

SILICA GEL

Final Weight	264.7 g	g	g
Initial Weight	229.4 g	g	g
Net Weight	35.3 g	g	g

Total Net Weight in Silica Gel 35.3 g

Total Moisture 242.3 g

Filter Number(s) 206672-17

MRC 7/73

Plant: St. Joe Date: _____

Run # 1-5 Location Sampled: Boiler #4 inlet

LINE	INSTRUCTIONS	DATA		KEYS	DISPLAY
1	Load program card APst-05A				
2	a. Store variables	V_m			
		P_{bar}			
		ΔH			
	(°F)	T_m			2
		V_{l_c}			
		M_n			2
	b. Compute $V_{m_{std}}$	(V_m)		STO 1	
		(P_{bar})		STO 2	
		(ΔH)		STO 3	
		(T_m)		STO 4	
				B	$V_{m_{std}}$
	c. Compute $V_{m_{std}}$	(V_{l_c})		STO 5	
				R/S	$V_{m_{std}}$
	d. Compute B_{wo}	$(V_{m_{std}})$		STO 7	
		$(V_{m_{std}})$		R/S	B_{wo}
	e. Compute mass loading, c'_p	(M_n)		STO 6	
	grams/DSCF	$(V_{m_{std}})$		STO 7	
				C	c'_p
	f. Compute mass loading, c_p	(M_n)		STO 6	
	lbs/DSCF	$(V_{m_{std}})$		STO 7	
				D	c_p
	g. Compute mass loading, c''_p	(M_n)		STO 6	
	gm/DSCM	$(V_{m_{std}})$		STO 7	
				E	c''_p
3	Load program card APst-05B				
4	a. Store (If Line No. 2 has been	(V_m)	.788	STO 1	
	omitted, storage registers 1-5	(P_{bar})	30.01	STO 2	
	must be loaded first)	(ΔH)	.1075	STO 3	
		(T_m)	83	STO 4	
		(V_{l_c})	7.7	STO 5	
	b. Compute percent of isokinetic				
	sampling (°F)	T_s	~~389~~		
		θ	5		129.06
	=	V_s	60.01	A	1
		P_s	~~26.6~~ 30.08		~~138.2~~
		A_n	7.601×10^{-5}	R/S	%
	(Note: Card APst-05B does not				
	overwrite any storage register used				
	by card APst-05A)				

$E_P = (60)(C_{BP})(Q) = (60)(\quad)(\quad)$

Emission rate front half (lbs/Hr) = E_P = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$V_s = 85.48\,(.77)\sqrt{\frac{829}{30.08\,(\cancel{26.15})}}\sqrt{.79} = \cancel{60.01}\ 60.01$

FIELD DATA

PLANT St. Joe Paper
DATE 1-22-80
SAMPLING LOCATION Scrubber Outlet
SAMPLE TYPE EPA-5
RUN NUMBER 4-0
OPERATOR J.Y.
AMBIENT TEMPERATURE 70°F
BAROMETRIC PRESSURE 29.84
STATIC PRESSURE, (P_s) 29.82
FILTER NUMBER (s) 672-19

PROBE LENGTH AND TYPE 10ft. eff. SS.
NOZZLE I.D. .246
ASSUMED MOISTURE, % 20
SAMPLE BOX NUMBER 5
METER BOX NUMBER 8
METER ΔH@ 1.877
K FACTOR 2.19
PROBE HEATER SETTING #1
HEATER BOX SETTING #1
~~REFERENCE Δp~~

SCHEMATIC OF TRAVERSE POINT LAYOUT

Before Leak Rate .006 CFM @ 15" Hg

READ AND RECORD ALL DATA EVERY 2 MINUTES, after LEAK RATE .004 CFM @ 15" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	probe
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				
	0	18:20	952.588										
1	0	18:20	952.588	.48	1.1	1.1	145	75	73	4.2	304	71	172
2	2	18:22	953.725	.48	1.1	1.1	145	76	74	4.2	301	79	172
3	4	18:24	954.835	.46	1.0	1.0	144	76	74	3.9	302	78	172
4	6	18:26	955.900	.42	.92	.92	142	76	74	4.0	303	77	171
5	8	18:28	956.905	.37	.81	.81	144	76	74	3.3	298	73	169
6	10	18:30	957.870	.32	.70	.70	143	76	74	3.1	296	73	174
7	12	18:32	958.765	.31	.68	.68	144	75	74	3.1	294	72	173
8	14	18:34	959.625	.28	.61	.61	144	75	73	3.0	298	71	174
9	16	18:36	960.460	.28	.61	.61	143	75	73	3.0	301	70	175
10	18	18:38	961.280	.30	.66	.66	144	75	73	3.1	303	71	174
11	20	18:40	962.135	.32	.70	.70	143	75	73	3.2	304	70	173
12	22	18:42	963.020	.37	.81	.81	143	75	73	3.5	303	70	174
13	24	18:44	963.960	.39	.85	.85	144	75	73	3.8	302	71	174
14	26	18:46	964.930	.42	.92	.92	144	75	72	4.0	301	70	176
15	28	18:48	965.940	.37	.81	.81	143	75	73	3.8	302	71	[illegible]
16	30	18:50	966.900	.41	.90	.90	143	75	72	4.0	302	71	174

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PLANT Sn Sac Paper DATE 1-22-88 RUN NO. 4-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	probe
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				
	30	18:50	966.900										
17	32	18:52	967.900	.41	.90	.90	143	75	72	3.9	301	70	174
18	34	18:54	968.990	.40	.88	.88	144	74	72	4.0	302	71	175
19	36	18:56	969.875	.42	.92	.92	143	74	71	4.2	301	70	175
20	38	18:58	970.895	.48	1.1	1.1	143	74	71	5.0	301	70	174
21	40	19:00	972.100	.44	.96	.96	143	74	71	4.8	300	72	174
22	42	19:02	973.050	.40	.88	.88	143	73	71	4.5	300	74	175
23	44	19:04	974.035	.53	1.2	1.2	143	73	71	5.5	301	75	176
24	46	19:06	975.185	.27	.59	.59	142	73	71	3.2	301	76	184
	48	19:08	976.114										
		Shutdown to change ports											
1	48	19:30	976.114	.46	1.0	1.0	142	70	70	4.0	302	70	161
2	50	19:32	977.170	.40	.88	.88	143	70	70	3.9	303	68	161
3	52	19:34	978.160	.40	.88	.88	143	71	70	3.9	301	68	162
4	54	19:36	979.140	.38	.83	.83	143	72	70	3.8	301	68	162
5	56	19:38	980.090	.32	.70	.70	143	72	70	3.8	300	67	163
6	58	19:40	981.000	.37	.81	.81	143	72	70	4.0	300	67	162
7	60	19:42	981.935	.40	.88	.88	143	73	70	4.0	301	66	162
8	62	19:44	982.915	.37	.81	.81	143	73	70	3.9	300	66	162
9	64	19:46	983.860	.38	.83	.83	143	73	70	4.0	300	67	163
10	66	19:48	984.820	.38	.83	.83	143	74	70	4.0	301	67	162
11	68	19:50	985.770	.40	.88	.88	143	74	70	4.2	302	67	163
12	70	19:52	986.750	.43	.94	.94	143	74	70	4.6	301	67	164
13	72	19:54	987.765	.50	1.1	1.1	144	74	70	5.0	301	67	163
14	74	19:56	988.883	.60	1.3	1.3	144	74	70	5.4	302	67	162
15	76	19:58	990.035	.65	1.4	1.4	144	74	70	5.9	303	68	161
16	78	19:60	991.235	.60	1.3	1.3	144	74	70	6.0	302	67	161

PLANT St Joe Paper DATE 1-22-80 RUN NO. 4-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
					DESIRED	ACTUAL		INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F				
	78	19:60	991.235										
17	80	19:62	992.458	.65	1.4	1.4	143	74	70	6.0	300	68	66
18	82	19:64	993.645	.70	1.5	1.5	144	74	70	6.2	301	68	61
19	84	19:66	994.885	.75	1.7	1.7	143	74	70	7.2	299	68	61
20	86	19:68	997.460	.73	1.6	1.6	144	74	70	8.3	298	67	60
21	88	19:70		.62	1.4	1.4	144	74	70	8.4	300	67	61
22	90	19:72	998.715	.60	1.3	1.3	144	73	70	7.5	300	67	62
23	92	19:74	999.915	.60	1.3	1.3	144	74	70	7.2	301	67	63
24	94	19:76	001.085	.60	1.3	1.3	144	74	70	7.3	302	67	63
	96	19:78	002.218										

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ISOKINETIC CALCULATION

Plant St. Joe Paper

Run# 4-0, Date 1-22-80

Location Scrubber Outlet, Initials J.Y.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 283.3 ml

Net volume of gas through dry gas meter at meter conditions = V_m = ~~283.3~~ 49.6 cu.ft.

Barometric Pressure - absolute = BP = 29.84 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 532 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(\cancel{283.3}\ 49.6)\,(29.84)}{(532)\,(283.3)}} = 21.4\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

$N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (\quad + \quad + \quad)$

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

$MD = 0.44\,(CO_2) + 0.32\,(O_2) + 0.28\,(N_2 + CO)$

$MD = 0.44\,(\quad) + 0.32\,(\quad) + 0.28\,(\quad + \quad)$

MD = _____

ISOKINETIC CALCULATION (Cont.d)

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18 (M \times 10^{-2})$

$MS = (30)[1 - (21.4 \times 10^{-2})] + 18 (21.4 \times 10^{-2}) =$ 27.4

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 603 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .66 $(in.H_2O)^{1/2}$

Absolute pressure of stack $(BP \pm \frac{p}{13.6})$ = P_s = 29.82 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(603)}{(29.82)(27.4)}}\right]\left[.66\right]$$

$$= 37.3 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .99 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .246 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4} (d^2) = 54.54 \times 10^{-4} (.246)^2 =$ 3.3×10^{-4} sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267 (V_L) + \frac{(V_m)}{(T_m)}\left(PB + \frac{(\Delta H)}{13.6}\right)\right]}{(T)(V_s)(P_s)(A)}$$

$$I = \frac{(1.667)(603)\left[0.00267 (283.3) + \frac{(49.6)}{(532)}\left(29.84 + \frac{(.99)}{13.6}\right)\right]}{(96)(37.3)(29.82)(3.3 \times 10^{-4})}$$

I = 101.1 %

CLEAN-UP DATA

Plant St. Joe Paper
Date 1-22-80
Sampling Location Outlet
Sample Type EPA METHOD 5
Run Number 4-0
Sample Box Number
Clean-up Man W. McDonald

Comments:

IMPINGERS

	#1	#2	#3	#4	#5
Final Vol.	H2O 346 ml	H2O 122 ml	1 ml	ml	ml
Initial Vol.	100 ml	100 ml	0 ml	ml	ml
Net Vol.	246 ml	22 ml	1 ml	ml	ml

Total Net Volume in Impingers 269 ml

SILICA GEL

Final Weight	243.7 g	g	g
Initial Weight	229.4 g	g	g
Net Weight	14.3 g	g	g

Total Net Weight in Silica Gel 14.3 g

Total Moisture 283.3 g

Filter Number(s) 306672-19

MRC 7/73

3-81

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-22-80
SAMPLING TIME (24-hr CLOCK) 1820 - 1928 Run # 4
SAMPLING LOCATION outlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 70°
OPERATOR W. Mc Donald

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	8.3		8.2		8.3		8.25	44/100	3.630
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	14.8		15.0		14.8		14.90	32/100	4.768
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		85.2		85.0		85.2	76.85 ~~85.10~~	28/100	21.52 ~~23.828~~
								TOTAL	29.92 ~~32.236~~

EPA (Dur) 230
4/72

FIELD DATA

PLANT St. Joe Paper
DATE 1-23-80
SAMPLING LOCATION Scrubber outlet
SAMPLE TYPE EPA-5
RUN NUMBER 5-0
OPERATOR J.Y.
AMBIENT TEMPERATURE 60°
BAROMETRIC PRESSURE 27.73
STATIC PRESSURE, (P_s) 29.71
FILTER NUMBER (s) 206672-20

PROBE LENGTH AND TYPE 10 ft. eff. S.S.
NOZZLE I.D. .246
ASSUMED MOISTURE, % 21
SAMPLE BOX NUMBER 5
METER BOX NUMBER 6
METER $\Delta H_@$ 1.877
C FACTOR 2.08
PROBE HEATER SETTING Hi
HEATER BOX SETTING Hi
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

Before Leak Rate .005 CFM @ 15" Hg

READ AND RECORD ALL DATA EVERY 2 MINUTES. After LEAK RATE ____ CFM @ ____ "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	12:00	005.398									
1	0	12:00	005.398	.56	1.2	1.2	145	64	64	2.7	306	66
2	2	12:02	006.695	.51	1.1	1.1	145	64	64	2.7	306	66
3	4	12:04	007.796	.45	.94	.94	144	65	64	2.7	305	67
4	6	12:06	008.815	.38	.79	.79	144	65	64	2.5	305	65
5	8	12:08	009.760	.32	.67	.67	144	65	64	2.2	305	64
6	10	12:10	010.625	.31	.64	.64	144	65	64	2.2	304	65
7	12	12:12	011.470	.25	.52	.52	144	65	63	2.1	304	65
8	14	12:14	012.270	.27	.56	.56	144	66	64	2.1	304	65
9	16	12:16	013.025	.27	.56	.56	144	66	64	2.1	303	66
10	18	12:18		.25	.52	.52	144	66	64	2.2	303	66
11	20	12:20	014.597	.29	.60	.60	145	66	65	2.1	303	66
12	22	12:22	015.375	.31	.64	.64	144	66	64	2.4	304	66
13	24	12:24	016.215	.32	.67	.67	143	66	64	2.7	303	66
14	26	12:26	017.075	.43	.89	.89	144	67	64	3.0	302	65
15	28	12:28	018.030	.56	1.2	1.2	145	67	64	3.3	302	65
16	30	12:30	019.130	.68	1.4	1.4	145	67	64	3.8	301	65

PLANT St. Joe Paper DATE 1-23-80 RUN NO. 5-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	30	12:30	019.130									
17	32	12:32	020.295	.66	1.4	1.4	145	67	64	3.8	300	65
18	34	12:34	021.540	.64	1.3	1.3	144	68	64	3.5	300	65
19	36	12:36	022.695	.62	1.3	1.3	144	68	65	3.8	301	66
20	38	12:38	023.870	.62	1.3	1.3	143	68	65	3.8	300	65
21	40	12:40	025.030	.63	1.3	1.3	144	68	65	3.9	301	65
22	42	12:42	026.210	.65	1.4	1.4	144	68	66	4.2	302	66
23	44	12:44	027.415	.55	1.2	1.2	143	68	66	4.0	301	66
24	46	12:46	028.565	.48	1.0	1.0	144	69	66	3.6	300	66
	48	12:48	029.617									
		shutdown to change ports										
1	48	13:10	029.617	.46	.94	.94	143	66	64	3.5	307	65
2	50	1312	030.655	.44	.92	.92	143	66	64	3.5	306	65
3	52	1314	031.780	.43	.89	.89	144	66	64	3.4	307	65
4	54	1316	032.760	.42	.87	.87	144	67	64	3.4	306	64
5	56	1318	033.750	.37	.77	.77	143	67	64	3.3	305	63
6	58	1320	034.650	.32	.67	.67	144	68	65	3.2	304	64
7	60	1322	035.505	.26	.54	.54	142	69	65	2.8	303	65
8	62	1324	036.285	.23	.48	.48	143	69	66	2.8	302	65
9	64	1326	037.025	.24	.50	.50	142	70	66	2.9	302	65
10	66	1328	037.770	.26	.54	.54	143	70	66	3.0	301	66
11	68	1330	038.535	.29	.60	.60	144	71	66	3.1	301	66
12	70	1332	039.345	.34	.71	.71	143	72	66	3.4	302	66
13	72	1334	040.230	.39	.81	.81	143	72	66	3.7	302	66
14	74	1336	041.165	.43	.89	.89	143	72	66	3.8	301	67
15	76	13:38	042.150	.41	.85	.85	143	72	67	3.9	301	67
16	78	13:40	043.115	.40	.83	.83	143	72	67	3.8	300	67
17	80	13:42	044.075	.40	.83	.83	144	72	67	3.9	300	67

B-84

PLANT St. Joe Paper DATE 1-23-80 RUN NO. 5-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	80	13:42	044.075									
18	82	13:44	045.025	.40	.83	.83	143	73	67	3.8	301	67
19	84	13:46	045.080	.41	.85	.85	144	73	67	3.9	300	68
20	86	13:48	046.950	.41	.85	.85	144	73	67	3.9	300	68
21	88	13:50	047.915	.42	.87	.87	144	73	67	3.9	299	68
22	90	13:52	048.890	.42	.87	.87	144	73	68	3.9	300	68
23	92	13:54	049.875	.43	.89	.89	144	73	68	4.0	301	68
24	94	13:56	050.845	.37	.77	.77	143	73	68	3.8	301	68
	96	13:58										

after leak check .005 cfm @ 15" Hg

1	2	3
356 ml	113 ml	0 ml.

2-05

ISOKINETIC CALCULATION

Plant St. Joe Paper

Run# 5-0, Date 1-23-80

Location Scrubber Outlet, Initials J.V.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 281.1 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 45.45 cu.ft.

Barometric Pressure - absolute = BP = 29.73 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 527 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63\,(V_m)\,(BP)}{(T_m)\,(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63\,(45.45)\,(29.73)}{(527)\,(281.1)}} = 22.7\ \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (+ +)

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

MD = 0.44 (CO_2) + 0.32 (O_2) + 0.28 (N_2 + CO)

MD = 0.44 ( ) + 0.32 ( ) + 0.28 (+)

MD = _____

5-0

ISOKINETIC CALCULATION (Cont.d)

J.Y.

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

MS = (MD)[1 - (M x 10^{-2})] + 18 (M x 10^{-2})

MS = (30)[1 - (227 x 10^{-2})] + 18 (227 x 10^{-2}) = 27.3

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 604 °R .677

Average of the square root of Δp = $\sqrt{\Delta p}$ = .64 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 29.71 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)\,(\ CP\ )\left[\sqrt{\frac{(\ T_s\ )}{(\ P_s\ )\ (\ MS\ )}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)\,(\ .77\ )\left[\sqrt{\frac{(\ 604\ )}{(\ 29.71\ )\ (\ 27.3\ )}}\right]\left[\ .64\ \right]$$

= 36.35 FPS

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .87 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .246 in.

Area of nozzle = A

A = 54.54 x 10^{-4} (d^2) = 54.54 x 10^{-4} $(.246)^2$ = 3.3×10^{-4} sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)\,(\ T_s\ )\left[0.00267\,(V_L\ ) + \frac{(\ V_m\ )}{(\ T_m\ )}\left(PB + \frac{(\ \Delta H\ )}{13.6}\right)\right]}{(\ T\ )\ (\ V_s\ )\ (\ P_s\ )\ (\ A\ )}$$

$$I = \frac{(1.667)\,(\ 604\ )\left[0.00267\,(281.1) + \frac{(45.45)}{(527)}\left(29.73 + \frac{(\ .87\ )}{13.6}\right)\right]}{(\ 96\ )(\ 36.35\ )(\ 29.71\ (\ 3.3 \times 10^{-4}\ )}$$

I = 97.7 %

CLEAN-UP DATA

Plant St Joe Paper Co.

Date 1-22-80

Sampling Location Outlet

Sample Type EPA METHOD 5

Run Number 5-C

Sample Box Number 5 METER Box 8

Clean-up Man W. McDONALD

Comments:

IMPINGERS

	#1	#2	#3	#4	#5
Final Vol.	356 ml	113 ml	ml	ml	ml
Initial Vol.	100 ml	100 ml	0 ml	ml	ml
Net Vol.	256 ml	13 ml	ml	ml	ml

Total Net Volume in Impingers 269.0 ml

SILICA GEL

Final Weight	241.5 g	g	g
Initial Weight	229.4 g	g	g
Net Weight	12.1 g	g	g

Total Net Weight in Silica Gel 12.1 g

Total Moisture 281.1 g

Filter Number(s) 206672-20

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-23-80
SAMPLING TIME (24-hr CLOCK) 1200 - 1356
SAMPLING LOCATION Outlet Run #5
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) BAG
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 71
OPERATOR W. McDonald

COMMENTS:

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	5.9		6.0		6.0		5.95	44/100	2.613
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	14.6		14.6		14.6		14.6	32/100	4.672
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		85.4		85.4		85.4	~~85.4~~ 79.45	28/100	~~23.912~~ 22.246
								TOTAL	~~31.197~~ 29.53

EPA (Dur) 230
4/72

3-89

outlet

FIELD DATA

PLANT St. Joe Paper
DATE 1-23-80
SAMPLING LOCATION Scrubber outlet
SAMPLE TYPE EPA-5
RUN NUMBER 6-8
OPERATOR J.V.
AMBIENT TEMPERATURE 50°F
BAROMETRIC PRESSURE 29.85
STATIC PRESSURE, (P_s) 29.73
FILTER NUMBER (s) 206671-18

PROBE LENGTH AND TYPE 10 ft eff. 55
NOZZLE I.D. .246
ASSUMED MOISTURE, % 21
SAMPLE BOX NUMBER 5
METER BOX NUMBER 8
METER $\Delta H_@$ 1.877
K FACTOR 2.08
PROBE HEATER SETTING Hi
HEATER BOX SETTING Hi
~~REFERENCE~~ Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

Before Leak Rate .01 CFM @ 15" Hg

READ AND RECORD ALL DATA EVERY 2 MINUTES After LEAK RATE .004 CFM @ 15" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	probe
					DESIRED	ACTUAL		INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F				
	0	17:05	051.906										
1	0	17:05	051.906	.39	.81	.81	144	64	64	2.8	302	60	148
2	2	17:07	052.875	.41	.85	.85	144	65	63	2.8	301	58	147
3	4	17:09	053.835	.37	.77	.77	144	65	63	2.7	302	58	147
4	6	17:11	054.775	.34	.71	.71	145	66	63	2.5	303	58	148
5	8	17:13	055.645	.32	.67	.67	144	66	63	2.5	303	58	148
6	10	17:15	056.520	.27	.56	.56	144	68	63	2.3	302	58	145
7	12	17:17	057.300	.24	.50	.50	144	68	63	2.2	302	58	145
8	14	17:19	058.035	.25	.52	.52	145	68	63	2.3	301	58	144
9	16	17:21	058.790	.24	.50	.50	145	69	63	2.3	301	58	145
10	18	17:23	059.530	.25	.52	.52	146	69	63	2.3	300	59	143
11	20	17:25	060.280	.28	.58	.58	145	70	63	2.5	300	59	144
12	22	17:27	061.070	.32	.67	.67	145	71	64	2.6	300	55	144
13	24	17:29	061.910	.38	.79	.79	145	70	64	2.9	301	58	141
14	26	17:31	062.830	.39	.81	.81	146	69	63	3.0	302	58	140
15	28	17:33	063.765	.37	.77	.77	145	69	64	2.9	303	58	139
16	30	17:35	064.675	.37	.77	.77	145	69	64	2.9	303	58	139

3-40

PLANT St. Joe Paper DATE 1-23-80 RUN NO. 6-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	probe
	30	17:35	064.675										
17	32	17:37	065.585	.38	.79	.79	147	72	64	3.0	300	59	140
18	34	17:39	066.505	.39	.81	.81	146	72	64	3.1	301	59	140
19	36	17:41	067.445	.41	.85	.85	145	72	64	3.1	302	59	139
20	38	17:43	068.395	.41	.85	.85	145	73	64	3.2	302	58	139
21	40	17:45	069.345	.42	.87	.87	145	73	64	3.3	302	58	139
22	42	17:47	070.310	.45	.94	.94	144	73	64	3.4	301	58	141
23	44	17:49	071.310	.45	.94	.94	143	73	65	3.4	300	59	141
24	46	17:51	072.315	.39	.81	.81	144	73	64	3.2	299	58	139
	48	17:53	073.239										
		stopped to change ports											
1	48	18:05	073.239	.48	1.0	1.0	147	66	65	4.0	308	58	155
2	50	18:07	074.320	.46	.96	.96	148	63	63	3.7	307	56	155
3	52	18:09	075.330	.39	.81	.81	148	66	62	3.4	306	56	156
4	54	18:11	076.265	.34	.71	.71	147	66	63	3.2	306	56	157
5	56	18:13	077.140	.29	.60	.60	148	67	63	3.0	305	57	157
6	58	18:15	077.940	.26	.54	.54	148	68	62	3.0	304	54	157
7	60	18:17	078.710	.25	.52	.52	147	68	60	3.0	304	57	155
8	62	18:19	079.455	.23	.48	.48	148	65	62	2.9	303	57	156
9	64	18:21	080.170	.24	.50	.50	148	68	61	2.9	303	57	153
10	66	18:23	080.910	.19	.39	.39	148	67	61	2.8	302	56	153
11	68	18:25	081.570	.22	.46	.46	149	67	61	3.0	302	56	154
12	70	18:27	082.275	.25	.52	.52	149	67	61	3.1	301	56	153
13	72	18:29	083.055	.32	.67	.67	149	65	61	3.5	301	54	154
14	74	18:31		.38	.79	.79	148	65	61	3.8	301	55	154
15	76	18:33	084.790	.50	1.0	1.0	148	65	61	4.5	300	55	154
16	78	18:35	085.825	.48	1.0	1.0	148	66	61	4.5	300	55	154
17	80	18:37	086.850	.58	1.2	1.2	147	66	60	4.8	301	55	152

B-91

PLANT St. Joe Paper DATE 1-23-80 RUN NO. 6 8

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				
	80	1837	086.850										
18	82	1839	087.950	.58	1.2	1.2	146	65	60	4.9	300	55	154
19	84	1841	089.060	.62	1.3	1.3	147	65	60	6.0	299	54	153
20	86	1843	090.235	.60	1.2	1.2	147	67	60	5.8	300	55	152
21	88	1845	091.360	.56	1.2	1.2	148	69	60	5.8	301	56	152
22	90	1847	092.460	.60	1.2	1.2	148	70	60	6.0	301	56	151
23	92	1849	093.645	.60	1.2	1.2	147	70	60	6.0	300	56	151
24	94	1851	094.730	.50	1.0	1.0	148	70	60	5.2	300	56	151
	96	1853	095.758										

3-92

ISOKINETIC CALCULATION

Plant St. Joe Paper

Run# 6-0, Date 1-23-80

Location Scrubber Outlet, Initials J.Y.

MOISTURE

Net volume of liquid collected in impingers and silica gel = V_L = 285.3 ml

Net volume of gas through dry gas meter at meter conditions = V_m = 43.85 cu.ft.

Barometric Pressure - absolute = BP = 29.75 in.Hg

Average absolute meter temperature (°F + 460) = T_m = 527 °R

Percent moisture = M

$$M = \frac{100}{1 + \frac{373.63 \, (V_m)(BP)}{(T_m)(V_L)}}$$

$$= \frac{100}{1 + \frac{373.63 \, (43.85)(29.75)}{(527)(285.3)}} = 23.57 \%$$

MOLECULAR WEIGHT

Percent O_2 by volume dry basis = O_2 = _____ %

" CO " " " " = CO = _____ %

" CO_2 " " " " = CO_2 = _____ %

N_2 = 100 - (O_2 + CO_2 + CO) = 100 - (+ +)

Percent N_2 by volume dry basis = N_2 = _____ %

Dry molecular weight = MD

MD = 0.44 (CO_2) + 0.32 (O_2) + 0.28 (N_2 + CO)

MD = 0.44 ( ) + 0.32 ( ) + 0.28 (+)

MD = _____

6-D

ISOKINETIC CALCULATION (Cont.d)

S.Y.

MOLECULAR WEIGHT (Cont.d)

Stack gas molecular weight = MS

$MS = (MD)[1 - (M \times 10^{-2})] + 18\,(M \times 10^{-2})$

$MS = (30)[1 - (23.57 \times 10^{-2})] + 18\,(23.57 \times 10^{-2}) =$ 27.2

VELOCITY

Pitot tube coefficient, type S = CP = .77

Average Absolute Stack Temp. (°F + 460) = T_s = 606 °R

Average of the square root of Δp = $\sqrt{\Delta p}$ = .61 $(in.H_2O)^{1/2}$

Absolute pressure of stack $\left(BP \pm \frac{p}{13.6}\right)$ = P_s = 29.73 in.Hg

Stack gas velocity = V_s

$$V_s = (85.48)(CP)\left[\sqrt{\frac{(T_s)}{(P_s)(MS)}}\right]\left[\sqrt{\Delta p}\right]$$

$$V_s = (85.48)(.77)\left[\sqrt{\frac{(606)}{(29.73)(27.2)}}\right]\left[.61\right]$$

$$= 34.76 \text{ FPS}$$

ISOKINETIC PERCENT

Average pressure drop across orifice = ΔH = .79 in.H_2O

Total sampling time = T = 96 min.

Diameter of nozzle = d = .246 in.

Area of nozzle = A

$A = 54.54 \times 10^{-4}\,(d^2) = 54.54 \times 10^{-4}\,(.246)^2 = 3.3 \times 10^{-4}$ sq. ft.

I = percent Isokinetic

$$I = \frac{(1.667)(T_s)\left[0.00267\,(V_L) + \frac{(V_m)}{(T_m)}\left(PB + \frac{(\Delta H)}{13.6}\right)\right]}{(T)(V_s)(P_s)(A)}$$

$$I = \frac{(1.667)(606)\left[0.00267\,(285.3) + \frac{(43.85)}{(527)}\left(29.75 + \frac{(.79)}{13.6}\right)\right]}{(96)(34.76)(29.73)(3.3 \times 10^{-4})}$$

I = 100.0 %

CLEAN-UP DATA

Plant St Joe Paper

Comments:

Date 1-23-80

Sampling Location Outlet

Sample Type EPA 5

Run Number 6-0

Sample Box Number

Clean-up Man W. McDonald

IMPINGERS

	#1	#2	#3	#4	#5
Final Vol.	360 ml	114 ml	1 ml	ml	ml
Initial Vol.	100 ml	100 ml	0 ml	ml	ml
Net Vol.	260 ml	14 ml	1 ml	ml	ml

Total Net Volume in Impingers 275 ml

SILICA GEL

Final Weight	239.7 g	g	g
Initial Weight	229.4 g	g	g
Net Weight	10.3 g	g	g

Total Net Weight in Silica Gel 10.3 g

Total Moisture 285.3 g

Filter Number(s) 2066 71-18

MRC 7/73

DRY MOLECULAR WEIGHT DETERMINATION

PLANT St Joe Paper Co.
DATE 1-23-80
SAMPLING TIME (24-hr CLOCK) 1705 - 1853 Run #6
SAMPLING LOCATION Outlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) BAG
ANALYTICAL METHOD Fyrite
AMBIENT TEMPERATURE 70
OPERATOR W. McDonald

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	6.0		5.9		6.1		6.05	44/100	2.66
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	14.9		15.2		15.2		15.10	32/100	4.83
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	0		0		0		0	28/100	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		85.1		84.8		84.8	~~78.85~~ ~~81.7~~	28/100	~~22.08~~ ~~23.71~~
								TOTAL	~~29.57~~ ~~31.26~~

EPA (Dur) 230
1/72

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SOURCE SAMPLING PROCEDURE - EPA METHOD 7 - NOx

Date 1-17-8

Company St Joe Paper Co.

Project Waste Fired Boilers (wood)

Sample Point Outlet of Scrubber

Analyst Jose Jiminez → see W. McDonald

Sample Day	Sample Time	Sample No.	Flask No.	Initial Bar. Press. in Hg	Initial Flask Vacuum in Hg	Initial Temp. °F	Clean Up Analysis Day	Clean Up Analysis Time	Final Bar. Press. in Hg	Final Flask Vacuum in Hg	Final Temp. °F	ABS @ 420	TOTAL Dil. ml	FLASK Vol.-Abs ml	NOx Conc. lb/scf	NOx Conc. ppm
1-0																
1/17	1105	1	16/16	30.00	22.20	72°F	1/21	0905	30.01	0.7	74°					
1/17	1115	2	2/2	30:00	21.80	72°F	1/21	0856	30:01	1.0	74°					
1/17	1451	3	15/15	30:00	22.50	72°F	1/21	0900	30:01	1.8	74°					
1/17	1508	4	55/55	30.00	21.90	72°F	1/21	0858	30:01	1.1	74°					
2-0																
1/21	1925	5	15/15	30:02	27.4	68°F	1/22	1540	30:01	1.5	68°					
1/21	1931	6	55/55	30:02	21.0	68°F	1/22	1534	30:01	1.1	68°					
1/21	1941	7	16/16	30:02	27.5	68°F	1/22	1531	30:01	1.0	68°					
1/21	1902	8	2/55	30:02	27.3	68°F	1/22	1526	30:01	0.8	68°					
3-0																
1/22	1150	9	50/50	30:01	26.4	68°F	1/23	1239	29:83	0.3	74°					
1/22	1032	10	11/11	30:01	27.2	68°F	1/23	1153	29:83	0.1	74°					
1/22	1134	11	10/10	30:01	23.9	68°F	1/23	1206	29:83	0.2	74°					
1/22	1141	12	46/54	30:01	26.8	68°F	1/23	1230	29:83	1.3	74°					

Plant: St. Joe Date: _____

Run # #1-0A Location Sampled: Boiler #4 outlet

LINE	INSTRUCTIONS	DATA		KEYS		DISPLAY	
1	Load program card APol-05A						
2	a. Store variables	V_m		↑			
		P_{bar}		↑			
		ΔH		↑			
	(°F)	T_m		A		2	
		$V\rho_c$		↑			
		M_n		H/S		2	
	b. Compute $V_{m_{std}}$	(V_m)		STO	1		
		(P_{bar})		STO	2		
		(ΔH)		STO	3		
		(T_m)		STO	4		
				B		$V_{m_{std}}$	
	c. Compute $V_{m_{std}}$	$(V\rho_c)$		STO	5		
				R/S		$V_{m_{std}}$	
	d. Compute B_{wo}	$(V_{m_{std}})$		STO	7		
		$(V_{m_{std}})$		R/S		B_{wo}	
	e. Compute mass loading, c'_s,	(M_n)		STO	6		
	grains/DSCF	$(V_{m_{std}})$		STO	7		
				C		c'_s	
	f. Compute mass loading, c_s,	(M_n)		STO	6		
	lbs/DSCF	$(V_{m_{std}})$		STO	7		
				D		c_s	
	g. Compute mass loading, c''_s,	(M_n)		STO	6		
	gm/DSCM	$(V_{m_{std}})$		STO	7		
				E		c''_s	
3	Load program card APol-05B						
4	a. Store (If Line No. 2 has been	(V_m)	3.043	STO	1		
	omitted, storage registers 1-5	(P_{bar})	30.01	STO	2		
	must be loaded first)	(ΔH)	.045	STO	3		
		(T_m)	73	STO	4		
		$(V\rho_c)$	5.40	STO	5		
	b. Compute percent of isokinetic						
	sampling (°F)	T_s	142	↑			
		θ	25	↑			
		V_s	~~16.58~~ 34.14	A		1	
		P_s	29.99	↑			
		A_n	7.60 $\times 10^{-5}$	R/S		%	95.74
	(Note: Card APol-05B does not						
	overwrite any storage register used						
	by card APol-05A)						

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$E_p = (60)(C_{BP})(Q) = \cancel{(60)}(\quad)(\quad)$

Emission rate front half (lbs/Hr) = Ep = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

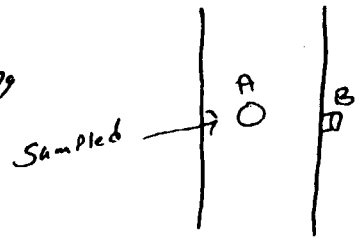
Emission rate total (lbs/Hr) = E_T = _____

$V_s = 85.48(.77)\sqrt{\frac{\cancel{142.60}}{(29.99)(29.1)}}\sqrt{.39}$ - ~~16.58~~ 34.14

3-98

FIELD DATA

PLANT St. Joe Paper Co.
DATE 1-16-80
SAMPLING LOCATION Boiler #4 outlet
SAMPLE TYPE Anderson Particle Sizing
RUN NUMBER #1-OA
OPERATOR C. Clark
AMBIENT TEMPERATURE 60°
BAROMETRIC PRESSURE 30.01
STATIC PRESSURE, (P_s) -0.3
FILTER NUMBER (s) ANDERSEN #599



PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 20%
SAMPLE BOX NUMBER —
METER BOX NUMBER #8
METER $\Delta H_@$ 1.877
K$_\beta$ FACTOR 0.116
PROBE HEATER SETTING Hi
HEATER BOX SETTING —
REFERENCE Δp .39

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 12 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	[illegible] TEMPERATURE, °F Condenser
	0	1300	780.189									
Single	1	1301	780.306	.39	.045	.045	142	73		1.0		65
PT.	2	1302	780.425	.39		.045		73		1.5		
	3	1303	780.542	.39		.045		72		1.5		
	4	1304	780.657	.39		.045		73		1.5		
	5	1305	780.773	.39		.045		73		1.5		
	6	1306	780.892	.39		.045		74		1.5		
	7	1307	781.006	.39		.045		73		1.5		
	8	1308	781.125	.39		.045		73		1.5		
	9	1309	781.243	.39		.045		73		1.5		
	10	1310	781.360	.39		.045		72		1.5		
	11	1311	781.477	.39		.045		74		1.5		
	12	1312	781.593	.39		.045		73		1.5		
	13	1313	781.711	.39		.045		73		1.5		
	14	1314	781.828	.39		.045		73		1.5		
	15	1315	781.945	.39		.045		73		1.5		
	16	1316	782.061	.39		.045		73		1.5		

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PLANT St. Joe Paper Co. DATE 1-16-80 RUN NO. #1-0A

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F		~~IMPINGER~~ TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				Condenser
	16	1317	782.179										
	17	1318	782.296	.39	.045	.045	142	73		1.5			65
	18	1319	782.410	.39	.045	.045	142	72		1.5			
	19	1320	782.529	.39	.045	.045	142	73		1.5			
	20	1321	782.647	.39	.045	.045	142	72		1.5			
	21	1322	782.766	.39	.045	.045	142	73		1.5			
	22	1323	782.881	.39	.045	.045	142	72		1.5			
	23	1324	782.997	.39	.045	.045	142	73		1.5			
	24	1325	783.115	.39	.045	.045	142	73		1.5			
	25	1326	783.232	.39	.045	.045	142	73		1.5			
			3.043	.34	0.45		142	73					

CLEAN-UP DATA

Plant ST. Joe Paper CO. Comments:

Date 1-16-90

Sampling Location Boiler #4 outlet

Sample Type Anderson

Run Number #1-O-A

Sample Box Number Impactor #

Clean-up Man W. McDonald

~~IMPINGERS~~ Condenser

	#1	#2	#3	#4	#5
Final Vol.	1119.0 ml	ml	ml	ml	ml
Initial Vol.	1116.6 ml	ml	ml	ml	ml
Net Vol.	2.40 ml	ml	ml	ml	ml

Total Net Volume in ~~Impingers~~ Condenser 2.40 ml

SILICA GEL

Final Weight	736.2 g	g	g
Initial Weight	733.2 g	g	g
Net Weight	3.0 g	g	g

Total Net Weight in Silica Gel 3.0 g

Total Moisture 5.40 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

Plant: St. Joe Date:

Run # [redacted] #1-0 Location Sampled: #4 Boiler outlet

LINE	INSTRUCTIONS	DATA		KEYS	DISPLAY	
1	Load program card APar-05A					
2	a. Store variables	V_m		↑		
		P_{bar}		↑		
		ΔH		↑		
	(°F)	T_m		A	2	
		$V\theta_c$		↑		
		M_n		R/S	2	
	b. Compute $V_{m_{std}}$	(V_m)		STO 1		
		(P_{bar})		STO 2		
		(ΔH)		STO 3		
		(T_m)		STO 4		
				B	$V_{m_{std}}$	
	c. Compute $V_{m_{std}}$	$(V\theta_c)$		STO 5		
				R/S	$V_{m_{std}}$	
	d. Compute B_{wo}	$(V_{m_{std}})$		STO 7		
		$(V_{m_{std}})$		R/S	B_{wo}	
	e. Compute mass loading, c'_s	(M_n)		STO 6		
	grams/DSCF	$(V_{m_{std}})$		STO 7		
				C	c'_s	
	f. Compute mass loading, c_s,	(M_n)		STO 6		
	lb/DSCF	$(V_{m_{std}})$		STO 7		
				D	c_s	
	g. Compute mass loading, c''_s	(M_n)		STO 6		
	gr/DSCM	$(V_{m_{std}})$		STO 7		
				E	c''_s	
3	Load program card APar-05B					
4	a. Store (If Line No. 2 has been	(V_m)	1.25	STO 1		
	omitted, storage registers 1-5	(P_{bar})	30.00	STO 2		
	must be loaded first)	(ΔH)	.045	STO 3		
		(T_m)	73	STO 4		
		$(V\theta_c)$	5.65	STO 5		
	b. Compute percent of isokinetic					
	sampling (°F)	T_s	142	↑		
		θ	15	↑		
		V_s	34.14	A	1	
		P_s	29.98	↑		
		A_n	2.60×10^{-5}	R/S	5	97.66
	(Note: Card APar-05B does not					
	overwrite any storage register used					
	by card APar-05A)					

$E_P = (60)(C_{BP})(Q) = (60)(\quad)(\quad)$

Emission rate front half (lbs/Hr) = E_P = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$85.48 (.77) \sqrt{\frac{60}{(29.98)(29.1)}} \sqrt{39} = 34.14$

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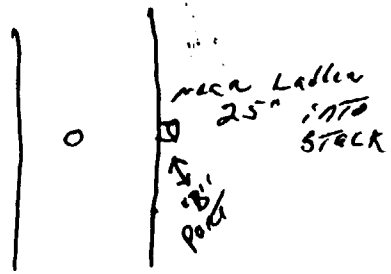
FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 22, 1980
SAMPLING LOCATION Boiler #4 outlet
SAMPLE TYPE Robinson Particle Sizing
RUN NUMBER #1-0
OPERATOR C. Clark
AMBIENT TEMPERATURE 50
BAROMETRIC PRESSURE 30.00
STATIC PRESSURE, (P_s) -.3
FILTER NUMBER (s) Eaton #599



PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 20%
SAMPLE BOX NUMBER
METER BOX NUMBER #8
METER $\Delta H_@$ 1.877
K# FACTOR 0.116
PROBE HEATER SETTING High
HEATER BOX SETTING
REFERENCE Δp .39

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 11" Hg

Length of Run = 15 min.

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
Single pt.	0	1337	950.742									
	1	1338	950.845	.39	.045	.045	142					
	2	1339	950.959									
	3	1340	951.073									
	4	1341	951.194									
	5	1342	951.301									
	6	1343	951.429									
	7	1344	951.544									
	8	1345	951.666									
	9	1346	951.783									
	10	1347	951.916									
	11	1348	952.026									
	12	1349	952.147									
	13	1350	952.263									
	14	1351	952.379									
	15	1352	952.493									
		~~Volume~~	1.751		End	of	Run					

Volume 1.751

Z-143

CLEAN-UP DATA

Plant St. Joe Power Co. Comments:

Date Jan. 22, 1980

Sampling Location Boiler #4 outlet

Sample Type Andersen Particle Sizing

Run Number #1-0

Sample Box Number Impactor #599

Clean-up Man C. Clark

Condenser ~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1120.05 ml	ml	ml	ml	ml
Initial Vol.	1117.7 ml	ml	ml	ml	ml
Net Vol.	2.35 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 2.35 ml

SILICA GEL

Final Weight	739.0 g	g	g	g
Initial Weight	735.7 g	g	g	g
Net Weight	3.3 g	g	g	g

Total Net Weight in Silica Gel 3.3 g

Total Moisture 5.65 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

Plant: St. Joe Date: _____

Run # #2-0 Location Sampled: Boiler #4 outlet

LINE	INSTRUCTIONS	DATA		KEYS		DISPLAY
1	Load program card APol-05A					
2	a. Store variables	V_m		↑		
		P_{bar}		↑		
		ΔH		↑		
	(°F)	T_m		A		2
		V_{ℓ_c}		↑		
		M_n		R/S		2
	b. Compute $V_{m_{std}}$	(V_m)		STO	1	
		(P_{bar})		STO	2	
		(ΔH)		STO	3	
		(T_m)		STO	4	
				B		$V_{m_{std}}$
	c. Compute $V_{w_{std}}$	(V_{ℓ_c})		STO	5	
				R/S		$V_{m_{std}}$
	d. Compute B_{wo}	$(V_{m_{std}})$		STO	7	
		$(V_{w_{std}})$		R/S		B_{wo}
	e. Compute mass loading, c'_s,	(M_n)		STO	6	
	grains/DSCF	$(V_{m_{std}})$		STO	7	
				C		c'_s
	f. Compute mass loading, c_s,	(M_n)		STO	6	
	lbs/DSCF	$(V_{m_{std}})$		STO	7	
				D		c_s
	g. Compute mass loading, c''_s,	(M_n)		STO	6	
	gm/DSCM	$(V_{m_{std}})$		STO	7	
				E		c''_s
3	Load program card APol-05B					
4	a. Store (If Line No. 2 has been	(V_m)	2.754	STO	1	
	omitted, storage registers 1-5	(P_{bar})	29.73	STO	2	
	must be loaded first)	(ΔH)	.043	STO	3	
		(T_m)	78 7.5	STO	4	
		(V_{ℓ_c})	8.6	STO	5	
	b. Compute percent of isokinetic					
	sampling (°F)	T_s	142	↑		
		θ	25	↑		
		V_s	34.30	A		1
		P_s	29.71	↑		
		A_n	7.607×10⁻³	R/S		91.44
	(Note: Card APol-05B does not					
	overwrite any storage register used					
	by card APol-05A)					

$E_P = (60)(C_{BP})(Q) = \cancel{(60)}(\quad)(\quad)$

Emission rate front half (lbs/Hr) = Ep = _____

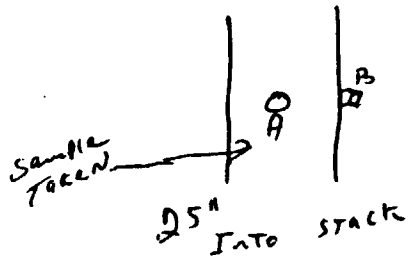
$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$85.48(.77)\sqrt{\frac{602}{(29.1)(29.71)}}\sqrt{.39} = 34.30$

FIELD DATA

PLANT St. Joe Paper Co.
DATE June 23, 1980
SAMPLING LOCATION Boiler #4 OUTLET
SAMPLE TYPE Anderson Particle Sizing
RUN NUMBER #2-0
OPERATOR C. Clark
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE ~~29.00~~ 29.73
STATIC PRESSURE, (P_s) -.3
FILTER NUMBER (s) Infactor # 575



SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 20%
SAMPLE BOX NUMBER —
METER BOX NUMBER #8
METER $\Delta H_@$ 1.877
K FACTOR 0.116
PROBE HEATER SETTING High
HEATER BOX SETTING —
REFERENCE Δp .39

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE ____ CFM @ ____ "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
Single Pt.	0	1012	002.644									
	1	1013	.002.747	.39	.043	.043	142			1.5		
	2	1014	.002.856	.39	.043	.043				1.5		
	3	1015	002.966	.39	.043	.043				1.5		
	4	1016	003.083	.39	.043	.043				1.5		
	5	1017	003.189			.043				1.5		
	6	1018	003.299			.043				1.5		
	7	1019	003.415			.043				1.5		
	8	1020	003.535			.043				1.5		
	9	1021	003.632			.043				1.5		
	10	1022	003.739			.043				1.5		
	11	1023	003.847			.043				1.5		
	12	1024	003.962			.043				1.5		
	13	1025	004.970			.043				1.5		
	14	1026	004.177			.043				1.5		
	15	1027	004.288			.043				1.5		
	16	1028	004.412			.043				1.5		

PLANT St. Joe Paper Co. DATE Jan. 23, 1980 RUN NO. F2-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
Single A:	16	1028	004.412									
	17	1029	004.512	.39	~~.043~~ ~~.045~~	~~.043~~ ~~.045~~	142			1.5		
	18	1030	004.624			.043				1.5		
	19	1031	004.733			.043				1.5		
	20	1032	004.843			.043				1.5		
	21	1033	004.955			.043				1.5		
	22	1034	005.067			.043				1.5		
	23	1035	005.173			.043				1.5		
	24	1036	005.284			.043				1.5		
	25	1037	005.398			.043				1.5		
			2.954									

CLEAN-UP DATA

Plant St. Joe Paper Co.

Date Jan. 23, 1980

Sampling Location ~~Scrubber~~ Boiler #4 Outlet

Sample Type Anderson Particle Sizing

Run Number #2-0 Impactor # 575

Sample Box Number —

Clean-up Man C. Clark

Comments:

Condenser ~~Impingers~~

	#1	#2	#3	#4	#5
Final Vol.	1127.9 ml	ml	ml	ml	ml
Initial Vol.	1120.5 ml	ml	ml	ml	ml
Net Vol.	6.4 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 6.4 ml

SILICA GEL

Final Weight	741.2 g	g	g
Initial Weight	739.0 g	g	g
Net Weight	2.2 g	g	g

Total Net Weight in Silica Gel 2.2 g

Total Moisture 8.6 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

Plant: St. Joe Date: _____

Run # #2-OA Location Sampled: Boiler #4 outlet

LINE	INSTRUCTIONS	DATA		KEYS		DISPLAY	
1	Load program card APol-05A						
2	a. Store variables	V_m		↑			
		P_{bar}		↑			
		ΔH		↑			
	(°F)	T_m		A		2	
		V_{ℓ_c}		↑			
		M_n		R/S		2	
	b. Compute $V_{m_{std}}$	(V_m)		STO	1		
		(P_{bar})		STO	2		
		(ΔH)		STO	3		
		(T_m)		STO	4		
				B		$V_{m_{std}}$	
	c. Compute $V_{m_{std}}$	(V_{ℓ_c})		STO	5		
				R/S		$V_{m_{std}}$	
	d. Compute B_{wo}	$(V_{m_{std}})$		STO	7		
		$(V_{m_{std}})$		R/S		B_{wo}	
	e. Compute mass loading, c'_s,	(M_n)		STO	6		
	grains/DSCF	$(V_{m_{std}})$		STO	7		
				C		c'_s	
	f. Compute mass loading, c_s,	(M_n)		STO	6		
	lbs/DSCF	$(V_{m_{std}})$		STO	7		
				D		c_s	
	g. Compute mass loading, c''_s,	(M_n)		STO	6		
	gm/DSCM	$(V_{m_{std}})$		STO	7		
				E		c''_s	
3	Load program card APol-05B						
4	a. Store (If Line No. 2 has been	(V_m)	3.096	STO	1		
	omitted, storage registers 1-5	(P_{bar})	30.01	STO	2		
	must be loaded first)	(ΔH)	.045	STO	3		
		(T_m)	73	STO	4		
		(V_{ℓ_c})	5.0	STO	5		
	b. Compute percent of isokinetic						
	sampling (°F)	T_s	142	↑			
		θ	25	↑			
		V_s	34.14	A		1	
		P_s	29.49	↑			
		A_n	7.607×10⁻⁵	R/S		%	96.73
	(Note: Card APol-05B does not						
	overwrite any storage register used						
	by card APol-05A)						

$E_p = (60)(C_{BP})(Q) = \cancel{(60)}(\quad)(\quad)$

Emission rate front half (lbs/Hr) = Ep = _____

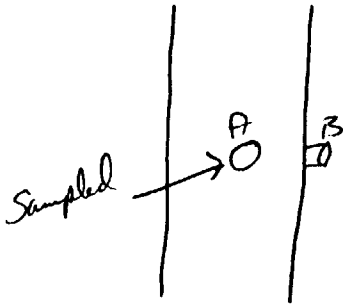
$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$V_s = 85.48(.77)\sqrt{\frac{602}{\cancel{30.0}(29.49)(29.1)}}\sqrt{.34} = 34.4$

FIELD DATA

PLANT St. Joe Paper Co.
DATE 1-16-80
SAMPLING LOCATION Boiler #4 outlet
SAMPLE TYPE Anderson
RUN NUMBER #2-0 A
OPERATOR C. Clark
AMBIENT TEMPERATURE 62°
BAROMETRIC PRESSURE 30.01
STATIC PRESSURE, (P_s) -0.3
FILTER NUMBER (s) Inductor #



PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 20%
SAMPLE BOX NUMBER —
METER BOX NUMBER #8
METER $\Delta H_@$ 1.877
K@ FACTOR .116
PROBE HEATER SETTING Hi
HEATER BOX SETTING —
REFERENCE Δp .39

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 15" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	[illegible] TEMPERATURE, °F
	0	1341	783.525									Condenser
Single	1	1342	783.644	.39	.045	.045	142	73		1.0		65
Pt.	2	1343	783.764	.39	.045	.045		73		1.0		
	3	1344	783.881	.39	.045	.045		73		1.0		
	4	1345	784.001	.39	.045	.045		73		1.2		
	5	1346	784.121	.39	.045	.045		73		1.2		
	6	1347	784.240	.39	.045	.045		73		1.2		
	7	1348	784.358	.39	.045	.045		72		1.2		
	8	1349	784.477	.39	.045	.045		73		1.2		
	9	1350	784.596	.39	.045	.045		73		1.5		
	10	1351	784.715	.39	.045	.045		73		1.5		
	11	1352	784.835	.39	.045	.045		73		1.5		
	12	1353	784.953	.39	.045	.045		73		1.5		
	13	1354	785.072	.39	.045	.045		74		1.5		
	14	1355	785.192	.39	.045	.045		74		1.5		
	15	1356	785.311	.39	.045	.045		74		1.5		
	16	1357	785.428	.39	.045	.045		74		1.5		

PLANT St. Joe Paper Co DATE 1-16-80 RUN NO. #2-0A

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	HOMOGEN TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			Condensen
	16	1358	785.549									
	17	1359	785.667	.39	.045	.045	142	74		1.5		65
	18	1400	785.788	.39	.045	.045	143	74		1.5		
	19	1401	785.904	.39	.045	.045	142	73		1.5		
	20	1402	786.026	.39	.045	.045	142	73		1.5		
	21	1403	786.142	.39	.045	.045		73		1.5		
	22	1404	786.262	.39	.045	.045		73		1.5		
	23	1405	786.381	.39	.045	.045		73		1.5		
	24	1406	786.500	.39	.045	.045		73		1.5		
	25	1407	786.621	.39	.045	.045		73		1.5		
			3.096									

CLEAN-UP DATA

Plant ST. Joe Paper Co. Comments:

Date 1-16-80

Sampling Location Boiler #4 Outlet

Sample Type Andersen

Run Number # 2-OA

Sample Box Number Impactor # 599

Clean-up Man W. McDonald

Condenser
~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1121.2 ml	ml	ml	ml	ml
Initial Vol.	1119.0 ml	ml	ml	ml	ml
Net Vol.	2.2 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 2.2 ml

SILICA GEL

Final Weight	734.9 g	g	g
Initial Weight	732.1 g	g	g
Net Weight	2.8 g	g	g

Total Net Weight in Silica Gel 2.8 g

Total Moisture 5.0 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

Plant: St Joe Date: _____

Run # #3-OA Location Sampled: Boiler #4 outlet

LINE	INSTRUCTIONS	DATA		KEYS	DISPLAY
1	Load program card APar-05A				
2	a. Store variables	V_m		↑	
		P_{bar}		↑	
		ΔH		↑	
	(°F)	T_m		A	2
		V_{l_c}		↑	
		M_n		R/S	2
	b. Compute $V_{m_{std}}$	(V_m)		STO 1	
		(P_{bar})		STO 2	
		(ΔH)		STO 3	
		(T_m)		STO 4	
				B	$V_{m_{std}}$
	c. Compute $V_{m_{std}}$	(V_{l_c})		STO 5	
				R/S	$V_{m_{std}}$
	d. Compute B_{wo}	$(V_{m_{std}})$		STO 7	
		$(V_{m_{std}})$		R/S	B_{wo}
	e. Compute mass loading, c'_s,	(M_n)		STO 6	
	grams/DSCF	$(V_{m_{std}})$		STO 7	
				C	c'_s
	f. Compute mass loading, c_s,	(M_n)		STO 6	
	lbs/DSCF	$(V_{m_{std}})$		STO 7	
				D	c_s
	g. Compute mass loading, c''_s,	(M_n)		STO 6	
	gr/DSCM	$(V_{m_{std}})$		STO 7	
				E	c''_s
3	Load program card APar-05B				
4	a. Store (if Line No. 2 has been	(V_m)	3.095	STO 1	
	omitted, storage registers 1-5	(P_{bar})	30.01	STO 2	
	must be loaded first)	(ΔH)	.045	STO 3	
		(T_m)	74	STO 4	
		(V_{l_c})	5.8	STO 5	
	b. Compute percent of isokinetic				
	sampling (°F)	T_s	142	↑	
		θ	25	↑	
	÷	V_s	34.14	A	1
		P_s	29.99	↑	
		A_n	2.607×10^{-5}	R/S	2
	(Note: Card APar-05B does not				
	overwrite any storage register used				
	by card APar-05A)				

97.64

$E_P = (60)(C_{BP})(Q) = (60)(\quad)(\quad)$

Emission rate front half (lbs/Hr) = E_P = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$VS = 85.48(.77)\sqrt{\frac{602}{29.99(29.1)}}\sqrt{.34} = 34.14$

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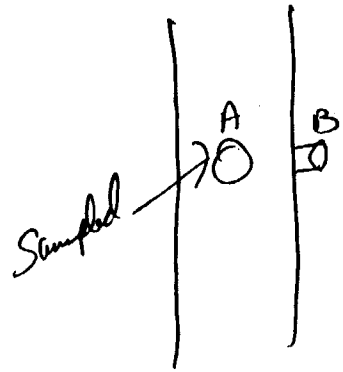
FIELD DATA

PLANT St. Joe Paper Co.
DATE 1-16-80
SAMPLING LOCATION Boiler #4 outlet
SAMPLE TYPE Anderson
RUN NUMBER #3-0A
OPERATOR C. Clark
AMBIENT TEMPERATURE 60°
BAROMETRIC PRESSURE 30.01
STATIC PRESSURE, (P_s) 0-.3
FILTER NUMBER (s) Impactor # 561



PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 20%
SAMPLE BOX NUMBER —
METER BOX NUMBER #8
METER $\Delta H_@$ 1.877
C FACTOR .116
PROBE HEATER SETTING Hi
HEATER BOX SETTING —
REFERENCE Δp .39

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 17 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	[redacted] TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			Condenser
	0	1428	787.001									
Single	1	1429	787.121	.39	.045	.045	142	70		1.0		
PT.	2	1430	787.238	.39	.045	.045	142	72		1.0		
	3	1431	787.358	.39	.045	.045	142	72		1.0		
	4	1432	787.479	.39	.045	.045	142	72		1.3		
	5	1433	787.596	.39	.045	.045	142	72		1.3		
	6	1434	787.716	.39	.045	.045	142	74		1.3		
	7	1435	787.834	.39	.045	.045	142	74		1.3		
	8	1436	787.953	.39	.045	.045	142	74		1.5		
	9	1437	788.072	.39	.045	.045	142	74		1.5		
	10	1438	788.192	.39	.045	.045	142	74		1.5		
	11	1439	788.311	.39	.045	.045	142	74		1.5		
	12	1440	788.429	.39	.045	.045	142	74		1.6		
	13	1441	788.550	.39	.045	.045	142	74		1.6		
	14	1442	788.665	.39	.045	.045	142	74		1.6		
	15	1443	788.786	.39	.045	.045	142	74		1.6		
	16	1444	788.907	.39	.045	.045	142	74		1.6		

PLANT St. Joe Paper Co. DATE 1-16-90 RUN NO. #3-OA

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
Simple Pt.	16	1445	789.029									condenser
	17	1446	789.143	.39	.045	.045	142	74		1.7		66
	18	1447	789.262	.39	.045	.045	142	74		1.7		66
	19	1448	789.381	.39	.045	.045	142	74		1.7		66
	20	1449	789.500	.39	.045	.045	142	74		1.7		66
	21	1450	789.620	.39	.045	.045	142	75		1.7		66
	22	1451	789.738	.39	.045	.045	142	75		1.7		66
	23	1452	789.857	.39	.045	.045	142	75		1.7		66
	24	1453	789.977	.39	.045	.045	142	75		1.7		66
	25	1454	790.096	.39	.045	.045	142	75		1.7		66
			3.094									

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CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:

Date 1-16-80

Sampling Location Boiler #4 outlet

Sample Type Anderson

Run Number #3-0A

Sample Box Number Impactor #

Clean-up Man W. McDonald

Condenser ~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1120.0 ml	ml	ml	ml	ml
Initial Vol.	1117.0 ml	ml	ml	ml	ml
Net Vol.	3.0 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 3.0 ml

SILICA GEL

Final Weight	738.1 g	g	g
Initial Weight	735.3 g	g	g
Net Weight	2.8 g	g	g

Total Net Weight in Silica Gel 2.8 g

Total Moisture 5.8 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

Plant: St. Joe Date: _____

Run # 3-0 Location Sampled: Boiler AH outlet

LINE	INSTRUCTIONS	DATA		KEYS	DISPLAY
1	Load program card APst-05A				
2	a. Store variables	V_m		↑	
		P_{bar}		↑	
		ΔH		↑	
	(°F)	T_m		A	2
		V_{l_c}		↑	
		M_n		R/S	2
	b. Compute $V_{m_{std}}$	(V_m)		STO 1	
		(P_{bar})		STO 2	
		(ΔH)		STO 3	
		(T_m)		STO 4	
				B	$V_{m_{std}}$
	c. Compute $V_{m_{std}}$	(V_{l_c})		STO 5	
				R/S	$V_{m_{std}}$
	d. Compute B_{wo}	$(V_{m_{std}})$		STO 7	
		$(V_{m_{std}})$		R/S	B_{wo}
	e. Compute mass loading, c'_s,	(M_n)		STO 6	
	grams/DSCF	$(V_{m_{std}})$		STO 7	
				C	c'_s
	f. Compute mass loading, c_s,	(M_n)		STO 6	
	lb/DSCF	$(V_{m_{std}})$		STO 7	
				D	c_s
	g. Compute mass loading, c''_s,	(M_n)		STO 6	
	gr/DSCM	$(V_{m_{std}})$		STO 7	
				E	c''_s
3	Load program card APst-05B				
4	a. Store (if Line No. 2 has been	(V_m)	3.054	STO 1	
	omitted, storage registers 1-5	(P_{bar})	30.00	STO 2	
	must be loaded first)	(ΔH)	.045	STO 3	
		(T_m)	73	STO 4	
		(V_{l_c})	12.3	STO 5	
	b. Compute percent of isokinetic				
	sampling (°F)	T_s	142	↑	
		θ	25	↑	
		V_s	34.14	A	1
		P_s	29.98	↑	
		A_n	2.607×10^{-3}	R/S	2 102.81
	(Note: Card APst-05B does not				
	overwrite any storage register used				
	by card APst-05A)				

E_P = (60) (C_{BP}) (Q) = (60) ( ) ( )

Emission rate front half (lbs/Hr) = E_P = _____

E_T = (60) (C_{BT}) (Q) = (60) ( ) ( )

Emission rate total (lbs/Hr) = E_T = _____

$V_s = 85.48 (.77) \sqrt{\frac{602}{(29.98)(29.1)}} \sqrt{.39} = 34.14$

CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:

Date Jan. 23, 1980

Sampling Location Boiler #4 outlet

Sample Type Anderson Particle Sizing

Run Number #3-0 Impactor #562

Sample Box Number ——

Clean-up Man _____

Condenser ~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1186.7 ml	ml	ml	ml	ml
Initial Vol.	1180.6 ml	ml	ml	ml	ml
Net Vol.	6.1 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 6.1 ml

SILICA GEL

Final Weight	720.5 g	g	g	
Initial Weight	716.3 g	g	g	
Net Weight	4.2 g	g	g	

Total Net Weight in Silica Gel 4.2 g

Total Moisture 10.3 g

Filter Number(s) _____ _____

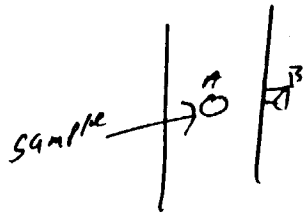
_____ _____

_____ _____

MRC 7/73

FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 23 1980
SAMPLING LOCATION Boiler #4 outlet
SAMPLE TYPE Anderson Particle Sizing
RUN NUMBER #2-0
OPERATOR C. Clark
AMBIENT TEMPERATURE 40°F
BAROMETRIC PRESSURE 30.00
STATIC PRESSURE, (P_s) -.3
FILTER NUMBER (s) Balston # 562



PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 20%
SAMPLE BOX NUMBER —
METER BOX NUMBER #8
METER $\Delta H_@$ 1.877
K @ FACTOR 0.116
PROBE HEATER SETTING High
HEATER BOX SETTING —
REFERENCE Δp .39

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 20" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
Single Pt.	0	2006	096.664									
	1	2007	096.752	.39	.045	.045	142	73		1.0		
	2	2008	096.863	.39	.045	.045				1.5		
	3	2009	096.979		.045	.045				1.5		
	4	2010	097.096		.045	.045				1.5		
	5	2011	097.217		.045	.045				1.5		
	6	2012	097.337			.045				1.5		
	7	2013	097.462			.045				1.5		
	8	2014	097.588			.045				1.5		
	9	2015	097.714			.045				1.5		
	10	2016	097.840			.045				1.5		
	11	2017	097.964			.045				1.5		
	12	2018	098.090			.045				1.5		
	13	2019	098.217			.045				1.5		
	14	2020	098.341			.045				1.5		
	15	2021	098.467			.045				1.5		
	16	2022	098.592			.045				1.5		

B-119

PLANT St. Joe Pipe Co. DATE Jan. 23, 1980 RUN NO. #3-0

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F			
	16	2022	098.592									
	17	2023	098.717	.39	.045	.045	142			1.5		
	18	2024	098.842			.045				1.5		
	19	2025	098.965			.045				1.5		
	20	2026	099.093			.045				1.5		
	21	2027	099.218			.045				1.		
	22	2028	099.342			.045				1.5		
	23	2029	099.465			.045				1.5		
	24	2030	099.591			.045				1.5		
	25	2031	099.718			.045				1.5		
			End	of	Run							
			3.054									

E-120

Plant: St. Joe Date: _____

Run # 1-5 Location Sampled: Boiler #4 inlet

LINE	INSTRUCTIONS	DATA		KEYS	DISPLAY
1	Load program card APst-05A				
2	a. Store variables	V_m			
		P_{bar}			
		ΔH			
	(°F)	T_m			2
		V_{l_c}			
		M_n			2
	b. Compute $V_{m_{std}}$	(V_m)		STO 1	
		(P_{bar})		STO 2	
		(ΔH)		STO 3	
		(T_m)		STO 4	
				B	$V_{m_{std}}$
	c. Compute $V_{m_{std}}$	(V_{l_c})		STO 5	
				R/S	$V_{m_{std}}$
	d. Compute B_{wo}	$(V_{m_{std}})$		STO 7	
		$(V_{m_{std}})$		R/S	B_{wo}
	e. Compute mass loading, c'_p	(M_n)		STO 6	
	grams/DSCF	$(V_{m_{std}})$		STO 7	
				C	c'_p
	f. Compute mass loading, c_p	(M_n)		STO 6	
	lbs/DSCF	$(V_{m_{std}})$		STO 7	
				D	c_p
	g. Compute mass loading, c''_p	(M_n)		STO 6	
	gm/DSCM	$(V_{m_{std}})$		STO 7	
				E	c''_p
3	Load program card APst-05B				
4	a. Store (If Line No. 2 has been	(V_m)	.788	STO 1	
	omitted, storage registers 1-5	(P_{bar})	30.01	STO 2	
	must be loaded first)	(ΔH)	.1075	STO 3	
		(T_m)	83	STO 4	
		(V_{l_c})	7.7	STO 5	
	b. Compute percent of isokinetic				
	sampling (°F)	T_s	~~389~~		
		θ	5		129.06
	=	V_s	60.01	A	1
		P_s	~~26.6~~ 30.08		~~138.2~~
		A_n	7.601×10^{-5}	R/S	%
	(Note: Card APst-05B does not				
	overwrite any storage register used				
	by card APst-05A)				

$E_P = (60)(C_{BP})(Q) = (60)(\quad)(\quad)$

Emission rate front half (lbs/Hr) = E_P = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$V_s = 85.48\,(.77)\sqrt{\frac{829}{30.08\,(\cancel{26.15})}}\sqrt{.79} = \cancel{60.01}\ 60.01$

FIELD DATA

PLANT St. Joe Paper Co
DATE Sept. 16, 1980
SAMPLING LOCATION Boiler #4 Outlet
SAMPLE TYPE Cadmium Particulate
RUN NUMBER E 1-I
OPERATOR C. Clark
AMBIENT TEMPERATURE 60°F
BAROMETRIC PRESSURE 30.01
STATIC PRESSURE, (P_s) +9
FILTER NUMBER (s) Anderson
Head # 575

PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER —
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
C FACTOR —
PROBE HEATER SETTING High
HEATER BOX SETTING —
REFERENCE Δp —

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 8.2" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	1357	425.443									
Single	0	1358	425.443	.79	.075	.075		83	83	1.0		
Pt.	1	1359	425.699	.79	.075			83	83	1.0		
	2	1400	425.752	.79	.075			83	83	1.		
	3	1401	425.915	.79				83	83	1.0		
	4	1402	426.079					83	83	1.0		
	5	1403	426.231					83	83	1.0		
		Volume =	0.788									

B-122

CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:

Date Jan. 16, 1980

Sampling Location Boiler #4 Inlet

Sample Type Anderson

Run Number # 1-I

Sample Box Number —

Clean-up Man [illegible] + W. McDonald

Condenser ~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1099.2 ml	ml	ml	ml	ml
Initial Vol.	1095.0 ml	ml	ml	ml	ml
Net Vol.	4.2 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 4.2 ml

SILICA GEL

Final Weight	684.5	g	g	g
Initial Weight	681.0	g	g	g
Net Weight	3.5	g	g	g

Total Net Weight in Silica Gel 3.5 g

Total Moisture 7.7 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

Plant: St. Joe Date: _____

Run # 2-1 Location Sampled: Boiler #4 Inlet

LINE	INSTRUCTIONS	DATA		KEYS		DISPLAY
1	Load program card APol-05A					
2	a. Store variables	V_m		↑		
		P_{bar}		↑		
		ΔH		↑		
	(°F)	T_m		A		2
		$V\rho_c$		↑		
		M_n		R/S		2
	b. Compute $V_{m_{std}}$	(V_m)		STO	1	
		(P_{bar})		STO	2	
		(ΔH)		STO	3	
		(T_m)		STO	4	
				B		$V_{m_{std}}$
	c. Compute $V_{m_{std}}$	$(V\rho_c)$		STO	5	
				R/S		$V_{m_{std}}$
	d. Compute B_{wo}	$(V_{m_{std}})$		STO	7	
		$(V_{m_{std}})$		R/S		B_{wo}
	e. Compute mass loading, c'_s,	(M_n)		STO	6	
	grains/DSCF	$(V_{m_{std}})$		STO	7	
				C		c'_s
	f. Compute mass loading, c_s,	(M_n)		STO	6	
	lbs/DSCF	$(V_{m_{std}})$		STO	7	
				D		c_s
	g. Compute mass loading, c''_s,	(M_n)		STO	6	
	gm/DSCM	$(V_{m_{std}})$		STO	7	
				E		c''_s
3	Load program card APol-05B					
4	a. Store (If Line No. 2 has been	(V_m)	.220	STO	1	
	omitted, storage registers 1-5	(P_{bar})	30.01	STO	2	
	must be loaded first)	(ΔH)	.025	STO	3	
		(T_m)	82	STO	4	
		$(V\rho_c)$	77	STO	5	
	b. Compute percent of isokinetic					
	sampling (°F)	T_s	370	↑		
		θ	5	↑		
		V_s	~~56.11~~ 60.09	A		1
		P_s	30.08	↑		
		A_n	2.607 < 1.25	R/S		1
	(Note: Card APol-05B does not					
	overwrite any storage register used					
	by card APol-05A)					

121.62

$E_p = (60)(C_{BP})(Q) = \cancel{(60)}(\quad)(\quad)$

Emission rate front half (lbs/Hr) = Ep = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$VS = 85.48\sqrt{\frac{830}{30.08(\cancel{80})}}\ (.77)\sqrt{.79}$ ~~56.11~~

26.15

B-124 60.09

FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 16, 1980
SAMPLING LOCATION Boiler #4 Outlet
SAMPLE TYPE Reference Point
RUN NUMBER 2-I
OPERATOR C. Clark
AMBIENT TEMPERATURE 60° F
BAROMETRIC PRESSURE 30.01
STATIC PRESSURE, (P_s) +9
FILTER NUMBER (s) Andersen Impactor #562

PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .181
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER —
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
C FACTOR
PROBE HEATER SETTING high
HEATER BOX SETTING —
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 8.9 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	1605	426.987									
Single pt.	0	1605	426.987	.79	.075	.075		82	81	1.0		Cold
	1	1606	427.098			.075		82	81	1.0		
	2	1607	427.337			.075		83	81	1.0		
	3	1608	427.496			.075		83	81	1.0		
	4	1609	427.543			.075		83	82	1.0		
	5	1610	427.707			.075		83	82	1.0		
		Volume	0.720									
			Avg. 0.72 volume					Avg	Avg.			

Revision
10/79

MOISTURE IN STACK GAS DETERMINATION

METHOD 4

Plant St Joe Paper Co. Date 1-16-80

Run # 2 Location Sampled Inlet #4 Boiler

Volume of gas at meter conditions (CF) = VM = 0.7200

Average meter temperature (°F) = TM = 83

Barometric pressure absolute (in Hg) = PB = 30.01

VMS = Volume of gas sampled at standard conditions (SCF)

$$VMS = \frac{(17.64)(VM)(PB)}{(TM + 460)} = \frac{17.64\ (.720)(30.01)}{(83 + 460)} = 0.7019$$

Volume of water final 1183.8 Wt. of silica gel final 704.5

Volume of water initial 1179.6 Wt. of silica gel initial 701.0

Volume collected V_1 = 4.2 Wt. of water V_2 = 3.5 gm

Total volume of water collected (ml) = $V_1 + V_2$ = VL = 7.7

Volume of water vapor at standard conditions (CF) = VW

VW = (.0471)(VL) = .0471 (7.7) = 0.3627

Mole fraction of water vapor = M

$$M = \frac{VW}{VMS + VW} = \frac{(0.3627)}{(0.7019) + (0.3627)} = M = .3407$$

Percent moisture = (100)(M) = 100 (.3407) = %M 34.1

CLEAN-UP DATA

Plant St Joe Paper Co Comments:
Date 1-16-80
Sampling Location Boiler Inlet #4
Sample Type Andersen Particle Sizing
Run Number 2-I
Sample Box Number ———
Clean-up Man C. Clark + W. McDonald

Condenser
~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1183.8 ml	ml	ml	ml	ml
Initial Vol.	1179.6 ml	ml	ml	ml	ml
Net Vol.	4.2 ml	ml	ml	ml	ml

Total Net Volume in ~~Impingers~~ Condenser 4.2 ml

SILICA GEL impinger

Final Weight	704.5 g	g	g	g
Initial Weight	701.0 g	g	g	g
Net Weight	3.5 g	g	g	g

Total Net Weight in Silica Gel 3.5 g

Total Moisture 7.7 g

Filter Number(s) ——— ———
——— ———
——— ———

MRC 7/73

Plant: St. Joe Date: _____

Run # 3-I Location Sampled: Boiler #4 Inlet

LINE	INSTRUCTIONS	DATA		KEYS		DISPLAY	
1	Load program card APol-05A						
2	a. Store variables	V_m		↑			
		P_{bar}		↑			
		ΔH		↑			
	(°F)	T_m		A		1	
		$V\rho_c$		↑			
		M_n		R/S		2	
	b. Compute $V_{m_{std}}$	(V_m)		STO	1		
		(P_{bar})		STO	2		
		(ΔH)		STO	3		
		(T_m)		STO	4		
				B		$V_{m_{std}}$	
	c. Compute $V_{w_{std}}$	$(V\rho_c)$		STO	5		
				R/S		$V_{w_{std}}$	
	d. Compute B_{wo}	$(V_{m_{std}})$		STO	7		
		$(V_{w_{std}})$		R/S		B_{wo}	
	e. Compute mass loading, c'_s,	(M_n)		STO	6		
	grains/DSCF	$(V_{m_{std}})$		STO	7		
				C		c'_s	
	f. Compute mass loading, c_s,	(M_n)		STO	6		
	lbs/DSCF	$(V_{m_{std}})$		STO	7		
				D		c_s	
	g. Compute mass loading, c''_s,	(M_n)		STO	6		
	gm/DSCM	$(V_{m_{std}})$		STO	7		
				E		c''_s	
3	Load program card APol-05B						
4	a. Store (If Line No. 2 has been	(V_m)	.269	STO	1		
	omitted, storage registers 1-5	(P_{bar})	30.01	STO	2		
	must be loaded first)	(ΔH)	.025	STO	3		
		(T_m)	81	STO	4		
		$(V\rho_c)$	3.3	STO	5		
	b. Compute percent of isokinetic						
	sampling (°F)	T_s	320	↑			
		β	5	↑			
		V_s	58.73	A		1	
		P_s	30.08	↑			
		A_n	7.607×10^{-3}	R/S		SI	107.09
	(Note: Card APol-05B does not						
	overwrite any storage register used						
	by card APol-05A)						

$E_P = (60)(C_{BP})(Q) = \cancel{(60)}(\quad)(\quad)$

Emission rate front half (lbs/Hr) = E_P = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$$V_s = 85.46(.77)\sqrt{.79}\sqrt{\frac{830}{(30.08)(27.95)}} = 58.73$$

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FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 16, 1980
SAMPLING LOCATION Boiler #4 Inlet
SAMPLE TYPE Ambient Particulate
RUN NUMBER 3-F
OPERATOR C.C. Smith
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 30.01
STATIC PRESSURE, (P_s) +.9
FILTER NUMBER (s) Anderson #
Impactor #561

PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER —
METER BOX NUMBER 6
METER $\Delta H_@$ 1.83
C FACTOR
PROBE HEATER SETTING high
HEATER BOX SETTING —
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 9 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	1715	427.709									
Single pt.	0	1715	427.709	.79	.075	.075		81	82	1.0		Cold
	1	1716	427.961	.79	.075	.075		81	81	1.0		
	2	1717	428.045	.79				81	81	1.0		
	3	1718	428.109					81	81	1.0		
	4	1719	428.452					81	81	1.0		
	5	1720	428.478					81	81	1.0		
		volume = 0.769										

3-129

CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:

Date Jan. 16, 1980

Sampling Location Boiler #4 Outlet

Sample Type Anderson

Run Number 3-I

Sample Box Number _____

Clean-up Man C. Clark & W. McDonald

Condenser
~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1122.1 ml	ml	ml	ml	ml
Initial Vol.	1120.3 ml	ml	ml	ml	ml
Net Vol.	1.8 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 1.8 ml

SILICA GEL

Final Weight	686.0 g	g	g	g
Initial Weight	684.5 g	g	g	g
Net Weight	1.5 g	g	g	g

Total Net Weight in Silica Gel 1.5 g

Total Moisture 3.3 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

Revision
10/79

MOISTURE IN STACK GAS DETERMINATION

METHOD 4

Plant St Joe Paper Co. Date 1-16-80

Run # 3 I Location Sampled Inlet #4 Boiler

Volume of gas at meter conditions (CF) = VM = 0.769

Average meter temperature (°F) = TM = 81

Barometric pressure absolute (in Hg) = PB = 30.01

VMS = Volume of gas sampled at standard conditions (SCF)

$$VMS = \frac{(17.64)(VM)(PB)}{(TM + 460)} = \frac{17.64\ (0.769)(30.01)}{(81 + 460)} = 0.7525$$

Volume of water final 1122.1 Wt. of silica gel final 686.0

Volume of water initial 1120.3 Wt. of silica gel initial 684.5

Volume collected V_1 = 1.8 Wt. of water V_2 = 1.5 gm

Total volume of water collected (ml) = $V_1 + V_2$ = VL = 3.3

Volume of water vapor at standard conditions (CF) = VW

VW = (.0471)(VL) = .0471 (3.3) = 0.1554

Mole fraction of water vapor = M

$$M = \frac{VW}{VMS + VW} = \frac{(0.1554)}{(0.7525) + (.1554)} = M = .1712$$

Percent moisture = (100)(M) = 100 (.1712) = %M 17.1

Plant: St. Joe Date: _____

Run # 4-I Location Sampled: Boiler #4 Inlet

LINE	INSTRUCTIONS	DATA		KEYS		DISPLAY	
1	Load program card APol-05A						
2	a. Store variables	V_m		↑			
		P_{bar}		↑			
		ΔH		↑			
	(°F)	T_m		A		1	
		V_{ℓ_c}		↑			
		M_n		R/S		2	
	b. Compute $V_{m_{std}}$	(V_m)		STO	1		
		(P_{bar})		STO	2		
		(ΔH)		STO	3		
		(T_m)		STO	4		
				B		$V_{m_{std}}$	
	c. Compute $V_{m_{std}}$	(V_{ℓ_c})		STO	5		
				R/S		$V_{m_{std}}$	
	d. Compute B_{wo}	$(V_{m_{std}})$		STO	7		
		$(V_{m_{std}})$		R/S		B_{wo}	
	e. Compute mass loading, c'_s,	(M_n)		STO	6		
	grains/DSCF	$(V_{m_{std}})$		STO	7		
				C		c'_s	
	f. Compute mass loading, c_s,	(M_n)		STO	6		
	lbs/DSCF	$(V_{m_{std}})$		STO	7		
				D		c_s	
	g. Compute mass loading, c''_s,	(M_n)		STO	6		
	gm/DSCM	$(V_{m_{std}})$		STO	7		
				E		c''_s	
3	Load program card APol-05B						
4	a. Store (If Line No. 2 has been	(V_m)	.802	STO	1		
	omitted, storage registers 1-5	(P_{bar})	30.01	STO	2		
	must be loaded first)	(ΔH)	.075	STO	3		
		(T_m)	83	STO	4		
		(V_{ℓ_c})	2.6	STO	5		
	b. Compute percent of isokinetic						
	sampling (°F)	T_s	370	↑			
		θ	5	↑			
		V_s	58.49	A		1	
		P_s	30.08	↑			
		A_n	7.607×10^{-5}	R/S		%	106.02
	(Note: Card APol-05B does not						
	overwrite any storage register used						
	by card APol-05A)						

$E_p = (60)(C_{BP})(Q) = \cancel{(60)}(\quad)(\quad)$

Emission rate front half (lbs/Hr) = Ep = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

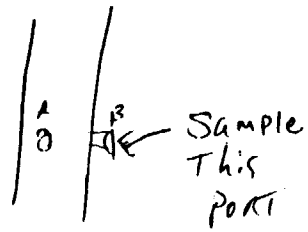
Emission rate total (lbs/Hr) = E_T = _____

$V_s = 85.48(.77)(\sqrt{.79})\sqrt{\frac{830}{30.08 \quad 27.60}} = 58.49$

3-132

FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 24, 1980
SAMPLING LOCATION Boiler #4 Inlet
SAMPLE TYPE Anderson Particle Sizing
RUN NUMBER #4-I
OPERATOR C. Clark
AMBIENT TEMPERATURE 60° F
BAROMETRIC PRESSURE 30.90
STATIC PRESSURE, (P_s) -.9
FILTER NUMBER (s) Impactor #561



PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER —
METER BOX NUMBER 6
METER $\Delta H_@$
K@ FACTOR
PROBE HEATER SETTING High
HEATER BOX SETTING —
REFERENCE Δp .79

SCHEMATIC OF TRAVERSE POINT LAYOUT

Pt. #12 50 1/8"

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 11.9" Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
Single	0	1032	612.355									
	1	1033	612.515	.79	.075	.075				1.0		Cold
	2	1034	612.655	.79	.075	.075				1.0		
	3	1035	612.830		.075	.075				1.0		
	4	1036	612.989		.075	.075				1.0		
	5	1037	613.157		.075	.075				1.0		
			0.802									

CLEAN-UP DATA

Plant St. Joe Paper Co.

Comments:

Date Jan. , 1980

Sampling Locat: Boiler #4 Inlet

Sample Type Anderson - Particle Sizing

Run Number #4-I

Sample Box Number —

Clean-up Man C. Clark

Condenser ~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1121.9 ml	ml	ml	ml	ml
Initial Vol.	1120.5 ml	ml	ml	ml	ml
Net Vol.	1.4 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 1.4 ml

SILICA GEL

Final Weight	741.2 g	g	g	g
Initial Weight	740.0 g	g	g	g
Net Weight	1.2 g	g	g	g

Total Net Weight in Silica Gel 1.2 g

Total Moisture 2.6 g

Filter Number(s)

MRC 7/73

Plant: St. Joe Date: _____

Run # S-1 Location Sampled: Boiler #4 Inlet

LINE	INSTRUCTIONS	DATA		KEYS		DISPLAY	
1	Load program card APol-05A						
2	a. Store variables	V_m		↑			
		P_{bar}		↑			
		ΔH		↑			
	(°F)	T_m		A		1	
		$V\rho_c$		↑			
		M_n		R/S		2	
	b. Compute $V_{m_{std}}$	(V_m)		STO	1		
		(P_{bar})		STO	2		
		(ΔH)		STO	3		
		(T_m)		STO	4		
				B		$V_{m_{std}}$	
	c. Compute $V_{m_{std}}$	$(V\rho_c)$		STO	5		
				R/S		$V_{m_{std}}$	
	d. Compute B_{wo}	$(V_{m_{std}})$		STO	7		
		$(V_{m_{std}})$		R/S		B_{wo}	
	e. Compute mass loading, c'_s,	(M_n)		STO	6		
	grains/DSCF	$(V_{m_{std}})$		STO	7		
				C		c'_s	
	f. Compute mass loading, c_s,	(M_n)		STO	6		
	lbs/DSCF	$(V_{m_{std}})$		STO	7		
				D		c_s	
	g. Compute mass loading, c''_s,	(M_n)		STO	6		
	gm/DSCM	$(V_{m_{std}})$		STO	7		
				E		c''_s	
3	Load program card APol-05B						
4	a. Store (If Line No. 2 has been	(V_m)	1814	STO	1		
	omitted, storage registers 1-5	(P_{bar})	30.01	STO	2		
	must be loaded first)	(ΔH)	.075	STO	3		
		(T_m)	83	STO	4		
		$(V\rho_c)$	4.8	STO	5		
	b. Compute percent of isokinetic						
	sampling (°F)	T_s	370	↑			
		θ	5	↑			
		V_s	58.49	A		1	119.53
		P_s	30.08	↑			
		A_n	7.60 x 10^-5	R/S		%I	
	(Note: Card APol-05B does not						
	overwrite any storage register used						
	by card APol-05A)						

$E_P = (60)(C_{BP})(Q) = (60)(\quad)(\quad)$

Emission rate front half (lbs/Hr) = Ep = _____

$E_T = (60)(C_{BT})(Q) = (60)(\quad)(\quad)$

Emission rate total (lbs/Hr) = E_T = _____

$V_S = 85.48(.77)\sqrt{.79}\sqrt{\frac{830}{30.08 \cdot 27.60}} = 58.49$ 58.14

3-125

FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 24, 1980
SAMPLING LOCATION Boiler #4 Inlet
SAMPLE TYPE Anderson - Particle Sizing
RUN NUMBER #5-I
OPERATOR G. Clark
AMBIENT TEMPERATURE 60°F
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) Impactor #599

PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER —
METER BOX NUMBER
METER $\Delta H_@$ 1.83
K @ FACTOR
PROBE HEATER SETTING High
HEATER BOX SETTING —
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .0019 CFM @ 11 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
Single	0	1135	613.655									
	1	1136	613.842	.179	.075	.075				1.0		
	2	1137	~~614~~ 613.999	.179	.075	.075				1.0		
	3	1138	614.145	↓	↓	.075				1.0		
	4	1139	614.315	↓	↓	.075				1.0		
	5	1140	614.469	↓	↓	.075				1.0		
			~~.004~~									
			.814									

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CLEAN-UP DATA

Plant St. Joe Paper Co.

Date Jan. 24, 1980

Sampling Location Boiler #4 Inlet

Sample Type Anderson - Particle Sizing

Run Number #5 - I

Sample Box Number Impactor #599

Clean-up Man C. Clark

Comments:

Condenser ~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1187.7 ml	ml	ml	ml	ml
Initial Vol.	1186.2 ml	ml	ml	ml	ml
Net Vol.	1.5 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 1.5 ml

SILICA GEL

Final Weight	719.6 g	g	g	g
Initial Weight	716.3 g	g	g	g
Net Weight	3.3 g	g	g	g

Total Net Weight in Silica Gel 3.3 g

Total Moisture 4.8 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

Plant: St. Joe Date: _____

Run # 6 Location Sampled: Boiler #4 Tail

LINE	INSTRUCTIONS	DATA		KEYS	DISPLAY
1	Load program card APM-05A				
2	a. Store variables	V_m		↑	
		P_{bar}		↑	
		ΔH		↑	
	(°F)	T_m		A	2
		V_{P_c}		↑	
		M_n		R/S	2
	b. Compute $V_{m_{std}}$	(V_m)		STO 1	
		(P_{bar})		STO 2	
		(ΔH)		STO 3	
		(T_m)		STO 4	
				B	$V_{m_{std}}$
	c. Compute $V_{m_{std}}$	(V_{P_c})		STO 5	
				R/S	$V_{m_{std}}$
	d. Compute B_{wo}	$(V_{m_{std}})$		STO 7	
		$(V_{m_{std}})$		R/S	B_{wo}
	e. Compute mass loading, c_s,	(M_n)		STO 6	
	gram/DSCF	$(V_{m_{std}})$		STO 7	
				C	c_s
	f. Compute mass loading, c_s,	(M_n)		STO 6	
	lbs/DSCF	$(V_{m_{std}})$		STO 7	
				D	c_s
	g. Compute mass loading, c_s,	(M_n)		STO 6	
	gm/DSCM	$(V_{m_{std}})$		STO 7	
				E	c_s
3	Load program card APM-05B				
4	a. Store (If Line No. 2 has been	(V_m)	125.1	STO 1	
	omitted, storage registers 1-5	(P_{bar})	30.10	STO 2	
	must be loaded first)	(ΔH)	.025	STO 3	
		(T_m)	83	STO 4	
		(V_{P_c})	5.1	STO 5	
	b. Compute percent of isokinetic				
	sampling (°F)	T_s	370	↑	
		θ	5	↑	
		V_s	58.40	A	1
		P_s	30.08	↑	
		A_n	7.60740^{-5}	R/S	2
	(Note: Card APM-05B does not				
	overwrite any storage register used				
	by card APM-05A)				

114.02

E_P = (60) (C_{BP}) (Q) = (60) ( ) ( )

Emission rate front half (lbs/Hr) = E_P = _____

E_T = (60) (C_{BT}) (Q) = (60) ( ) ( )

Emission rate total (lbs/Hr) = E_T = _____

VS 9 ~~SEN 9~~ $85.46 \times (.77)(\sqrt{.74})\sqrt{\frac{830}{30.18 \cdot 27.60}} = 58.40$

FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 1980
SAMPLING LOCATION Boiler #4 Inlet
SAMPLE TYPE Anderson - Particle Sizing
RUN NUMBER # 6-I Jan
OPERATOR C. Clark
AMBIENT TEMPERATURE 60°F
BAROMETRIC PRESSURE 30.10
STATIC PRESSURE, (P_g) 1.02
FILTER NUMBER (s) Impactor #575

PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % —
SAMPLE BOX NUMBER —
METER BOX NUMBER #6
METER $\Delta H_@$ 1.83
Kp FACTOR 0.095
PROBE HEATER SETTING Hot
HEATER BOX SETTING —
REFERENCE Δp .78

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 1 MINUTES LEAK RATE .001 CFM @ 8 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	1252	614.538									Condensed
	1	1253	614.679	.79	.075	.075				1.0		~~104~~
	2	1254	614.837		.075	.075				1.0		
	3	1255	614.995			.075				1.0		
	4	1256	615.139			.075				1.0		
	5	1257	615.289			.075				1.0		
			0.7510									

CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:

Date Jan. 24, 1980

Sampling Location Boiler #4 Inlet

Samp. Type Released - Particle Sizing

Run Number #6-I Impactor #575

Sample Box Number _____

Clean-up Man C. Clark

Condenser ~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1190.0 ml	ml	ml	ml	ml
Initial Vol.	1185.4 ml	ml	ml	ml	ml
Net Vol.	4.6 ml	ml	ml	ml	ml

Total Net Volume in Condenser ~~Impingers~~ 4.6 ml

SILICA GEL

Final Weight	720.1 g	g	g	g
Initial Weight	719.6 g	g	g	g
Net Weight	.5 g	g	g	g

Total Net Weight in Silica Gel 0.50 g

Total Moisture 5.1 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

B-140

Revision
10/79

MOISTURE IN STACK GAS DETERMINATION

METHOD 4

Plant St Joe Paper Co Date 1-16-80

Run # 1-I Location Sampled Inlet #4

Volume of gas at meter conditions (CF) = VM = 0.7880

Average meter temperature (°F) = TM = 83

Barometric pressure absolute (in Hg) = PB = 30.01

VMS = Volume of gas sampled at standard conditions (SCF)

$$VMS = \frac{(17.64)(VM)(PB)}{(TM + 460)} = \frac{17.64\ (0.7880)(30.01)}{(83 + 460)} = 0.7682$$

Volume of water final 1099.2 Wt. of silica gel final 684.5

Volume of water initial 1095.0 Wt. of silica gel initial 681.0

Volume collected V_1 = 4.2 Wt. of water V_2 = 3.5 gm

Total volume of water collected (ml) = $V_1 + V_2$ = VL = 7.7

Volume of water vapor at standard conditions (CF) = VW

VW = (.0471)(VL) = .0471 (7.7) = 0.3627

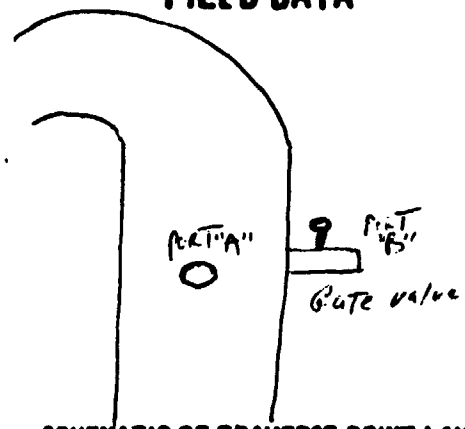
Mole fraction of water vapor = M

$$M = \frac{VW}{VMS + VW} = \frac{(0.3627)}{(0.7682) + (0.3627)} = M = 0.3207$$

Percent moisture = (100)(M) = 100 (0.3207) = %M 32.1

FIELD DATA

PLANT St. Joe Paper Co.
DATE Jan. 16, 1980
SAMPLING LOCATION Boiler #4 Inlet
SAMPLE TYPE Anderson
RUN NUMBER Sample Run
OPERATOR C. Clark
AMBIENT TEMPERATURE 20° F
BAROMETRIC PRESSURE 30.1
STATIC PRESSURE, (P_s) +9
FILTER NUMBER (s) Anderson Filters
Impactor # 599



SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 6' S.S.
NOZZLE I.D. .1181
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER —
METER BOX NUMBER #4
METER $\Delta H_@$ 1.83
C FACTOR
PROBE HEATER SETTING Night
HEATER BOX SETTING —
REFERENCE Δp

READ AND RECORD ALL DATA EVERY 2 MINUTES LEAK RATE .0012 CFM @ 10 "Hg

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACU in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0		~~422.533~~ 422.589									
8	0		422.594	.79	.075	.075		83	83	1.0		
	2		423.662		.075			84	83	1.0		
	4		424.045					84	83	1.0		
	6		424.336					84	83	1.0		
	8		424.667					84	83	1.0		
	10		425.002					83	83	1.0		
Single Pt.			1.453									

B-142

CLEAN-UP DATA

Plant St. Joe Paper Co. Comments:

Date Jan. 16, 1980

Sampling Location Boiler #4 Inlet

Sample Type Anderson

Run Number ~~[illegible]~~ Sample Run

Sample Box Number _____

Clean-up Man _____

Condensin ~~IMPINGERS~~

	#1	#2	#3	#4	#5
Final Vol.	1200.1 ml	ml	ml	ml	ml
Initial Vol.	1183.9 ml	ml	ml	ml	ml
Net Vol.	16.2 ml	ml	ml	ml	ml

Total Net Volume in Impingers 16.2 ml

SILICA GEL

Final Weight	701.0 g	g	g	g
Initial Weight	697.6 g	g	g	g
Net Weight	3.4 g	g	g	g

Total Net Weight in Silica Gel 3.4 g

Total Moisture 19.6 g

Filter Number(s) _____ _____

_____ _____

_____ _____

MRC 7/73

NOMOGRAPH DATA (HP-65)

PLANT St Joe Paper
DATE 1-24-80
SAMPLING LOCATION Inlet

USED ON RUN NO.: 4 Inlet
CALCULATOR: W McDonald

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Run card			—
2	Initialize program		A	0.00
3	Enter average T_m (meter temp. °F + 460) If meter temp. unknown, use ambient + 20°F	525 °R	R/S	525 T_m
4	Enter P_m (Barometric pressure at meter)	30.10 In. Hg	R/S	17.44 T_m/P_m
5	Enter P_s (static pressure in stack) [P_m ± .073 x stack gauge pressure in In. H_2O] 14	1.02 31.12 In. Hg	R/S	31.12 P_s
6	Enter average T_s (stack temperature + 460)	369. 466 ~~924~~ 829 °R	R/S	.0375 P_s/T_s
7	Enter B_{ms} (mole fraction of H_2O vapor in gas stream)	.22 Fraction of H_2O	R/S	.78 Fraction Dry
8	Enter MD (molecular weight of dry gas)	30 lbs/lb mole	R/S	27.36 MW molecular wt of stack gas lbs/lb mole
9	Enter C_p (type "S" pitot tube coefficient)	.85 —	R/S	728.84
10	Enter average Δ_p Highest Δ_p (_____)	.79 In. H_2O	R/S	D_n theo. .265 (nozzle dia. in inches)
11	Initialize "B"	—	B	—
12	Enter actual D_n	.1181 In.	R/S	.00019
13	Enter $\Delta H_@$ (Calibrated pressure differential across orifice)	1.83 In. H_2O	R/S	.095 K factor
14_1	Enter actual Δ_{p_1}	.34	E	ΔH_1 .032 In. H_2O
14_2	Enter actual Δ_{p_2}	.79	E	ΔH .075 In. H_2O
14_3	Enter actual Δ_{p_3}	.66	E	ΔH .063 In. H_2O

NOMOGRAPH DATA (HP-65)

PLANT St. Joe Paper Co.
DATE Jan. 16, 1980
SAMPLING LOCATION Boiler #4 Outlet

Anderson-Part
USED ON RUN
CALCULATOR:

STEP	INSTRUCTIONS	INPUT DATA/UNITS
1	Run card	
2	Initialize program	
3	Enter average T_m (meter temp. °F + 460) If meter temp. unknown, use ambient + 20°F	525 °R
4	Enter P_m (Barometric pressure at meter)	30.04 In. Hg
5	Enter P_s (static pressure in stack) [P_m ± .073 x stack gauge pressure in In. H_2O]	30.11 In. Hg
6	Enter average T_s (stack temperature + 460)	850 810 °R
7	Enter B_{ms} (mole fraction of H_2O vapor in gas stream)	.22 Fraction of H_2O
8	Enter MD (molecular weight of dry gas)	30.23 lbs/lb mole
9	Enter C_p (type "S" pitot tube coefficient)	.85 —
10	Enter average Δ_p Highest Δ_p (_____)	.79 In. H_2O
11	Initialize "B"	—
12	Enter actual D_n	.1181 In.
13	Enter $\Delta H_@$ (Calibrated pressure differential across orifice)	1.83 In. H_2O
14_1	Enter actual Δ_{p_1}	.79
14_2	Enter actual Δ_{p_2}	
14_3	Enter actual Δ_{p_3}	

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NOMOGRAPH DATA (HP-65)

PLANT St Joe Paper Co.
DATE 1-16-80
SAMPLING LOCATION outlet Boiler #4

USED ON RUN NO.: 1A 2A 3A outlet
CALCULATOR: W. McDonald

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Run card			—
2	Initialize program		A	0.00
3	Enter average T_m (meter temp. °F + 460) If meter temp. unknown, use ambient + 20°F 65	525 °R	R/S	525 T_m
4	Enter P_m (Barometric pressure at meter)	30.04 In. Hg	R/S	17.48 T_m/P_m
5	Enter P_s (static pressure in stack) [P_m ± .073 x stack gauge pressure in In. H_2O]	30.11 In. Hg	R/S	30.11 P_s
6	Enter average T_s (stack temperature + 460) 143	610 °R	R/S	0.0372 P_s/T_s
7	Enter B_{ms} (mole fraction of H_2O vapor in gas stream)	.22 Fraction of H_2O	R/S	0.78 Fraction Dry
8	Enter MD (molecular weight of dry gas)	30.23 lbs/lb mole	R/S	27.54 MW molecular wt of stack gas lbs/lb mole
9	Enter C_p (type "S" pitot tube coefficient)	.85	R/S	740.8
10	Enter average Δ_p Highest Δ_p (_____)	.79 In. H_2O	R/S	D_n theo. .266 (nozzle dia. in inches)
11	Initialize "B"	—	B	—
12	Enter actual D_n	.1181 In.	R/S	0.00019
13	Enter $\Delta H_@$ (Calibrated pressure differential across orifice)	1.83 In. H_2O	R/S	0.095 K factor
14_1	Enter actual Δ_{p_1}	.79	E	ΔH_1 0.075 In. H_2O
14_2	Enter actual Δ_{p_2}	.85	E	ΔH .081 In. H_2O
14_3	Enter actual Δ_{p_3}	.50	E	ΔH 0.047 In. H_2O

APPENDIX C

ANALYTICAL DATA SHEETS

SAMPLE IDENTIFICATION LOG St Joe Paper Co.

EPA Number	Sample Location	Run	Contents	Comments
FEL Samples	Bin (1-17-80	1	Wood Bark & Sawdust	
" "	" (1-21-80	2	" " " "	
" "	" (1-22-80	3	" " "	
" "	" (1-22-80	4	" " "	
" "	" (1-23-80	5	" " "	
" "	" (1-23-80	6	" " "	
Acetone Washes	F½ Washes			
Run# 1	Inlet (1-17-80	1	Probe Wash & F½ Filter Wash	
" 2	" (1-21-80	2	" " "	
" 3	" (1-22-80	3	" " "	
" 4	" (1-22-80	4	" " "	
5	" (1-23-80	5	" " "	
6	" (1-23-80	6	" " "	
Run# 1	Outlet (1-17-80	1	Probe Wash & F½ Acetone	
" 2	Outlet (1-21-80	2	" " "	
" 3	Outlet (1-22-80	3	" " "	
" 4	Outlet (1-22-80	4	" " "	
" 5	Outlet (1-23-80	5	" " "	
" 6	Outlet (1-23-80	6	" " "	
Blank Acetone	Inlet & Outlet	Blank	Blanks for ALL Runs	
Filters				
206672-25	Blank Filter	ALL Runs	Blank Filters	
206671-15	Inlet	1	Run#1 I 206671-15	EPA-5-Filters
206672-15	Inlet	2	Run#2 I 206672-15	" "
206671-17	Inlet	3	Run#3 I 206671-17	" "
206672-18	Inlet	4	Run#4 I 206672-18	" "
206672-27	Inlet	5	Run#5 I 206672-27	" "
206672-16	Inlet	6	Run#6 I 206672-16	" "
SO2 Analysis				
Run# 1	Inlet 1-17-80	1	Impinger Contents for SO2	
2	Inlet 1-21-80	2	" " " "	
3	Inlet 1-22-80	3	" " " "	

SAMPLE IDENTIFICATION LOG

EPA Number	Sample Location	Run	Contents	Comments
Filter 20667 2-14	Outlet	1	Particulate Filter.	EPA-5-Filters
20667 1-16	Outlet	2	Run# 2 - outlet	
20667 2-17	Outlet	3	Run# 3 - outlet	
20667 2-19	Outlet	4	Run# 4 - outlet	
20667 2-20	Outlet	5	Run# 5 Outlet	
20667 2-18	Outlet	6	Run# 6 Outlet	
Anderson Particulate Sizing Probe Wash -				
Blank Acetone	ALL Runs - 1, 2, 3, 4, 5, 6,			
Run# 1	Inlet 1-16-80	1	Probe Washing & Pre Impactor Rinse	
Run 2	Inlet 1-16-80	2	" " "	"
Run 3	Inlet 1-16-80	3	" " "	"
Run# 4	Inlet 1-24-80	4	" " "	"
Run# 5	Inlet 1-24-80	5	" " "	"
Run# 6	Inlet 1-24-80	6	" " "	"
Run# 1	Outlet 1-22-80	1	Probe Washing	
Run# 2	Outlet "	2	" "	
Run 3	Outlet "	3	" "	
Run# 4	Outlet "	4	" "	
Run 5	Outlet "	5	" "	
Run 6	Outlet "	6	" "	
			"	
SO2 Analysis				
Run# 1	Outlet	1	Impinger Contents for SO2	
" " 2	Outlet	2	" " "	
" " 3	Outlet	3	" " "	
Blank H2O2	Inlet & Outlet for All Runs 3% H2O2 Blank			

SAMPLE IDENTIFICATION LOG

EPA Number	Sample Location	Run	Contents	Comments
Nox Samples				
Blank All Runs				
H_2O Blank	outlet	All Runs	H_2O Blank	Blank
Absorbing Solution	outlet	All Runs	Absorbing Solution	Blank
3% H_2O_2	Outlet	All Runs	3% H_2O_2	Blank
Flask 16/16	outlet	1	Run #1 1-21-80	
" 2/2	outlet	2	Run #1 1-21-80	
" 15/15	Outlet	3	Run #1 1-21-80	
" 55/55	outlet	4	Run #1 1-21-80	
Flask 24/55	outlet	1	Run #2 1-22-80	
55/55	Outlet	2	Run 2 1-22-80	
15/15	Outlet	3	Run #2 1-22-80	
16/16	Outlet	4	Run #2 1-22-80	
Flask 11/11	Outlet	1	Run 3 1-23-80	
10/10	Outlet	2	Run 3 1-23-80	
46/54	Outlet	3	Run 3 1-23-80	
50/50	Outlet	4	Run 3 1-23-80	

ANALYSIS REPORT	DATE 1-29-80	cc:Files W. McDonell F. Kulik
TO Jim Peters	RECORD NUMBER 1-80-01-28-04	
FROM ANALYTICAL SERVICES MONSANTO RESEARCH CORPORATION Dayton, Ohio	PROJECT NUMBER 101.1067	CK
	NOTEBOOK REFERENCE Filter notebook H2 206667 and 206671	

EPA-5 Filters [redacted]

Title: Particulates

Method: Gravimetric

Sample Description		Total Particulate in mg Corrected for Blank.
Run #1	Inlet	214.5 mg
Run #2	Inlet	52.5 mg
Run #3	Inlet	593.0 mg
Run #4	Inlet	663.3 mg
Run #5	Inlet	363.7 mg
Run #6	Inlet	515.5 mg
Run #1	Outlet	75.0 ~~60.0~~ mg
Run #2	Outlet	2/18/80 65.8 mg
Run #3	Outlet	62.5 mg
Run #4	Outlet	54.4 mg
Run #5	Outlet	50.8 mg
Run #6	Outlet	52.2 mg

Run #2

Outlet is 10 mg higher than Inlet. Filters were reweighed and recalculated and found no error in analytical

ANALYST: F. Phillips

ANALYSIS REPORT	DATE 2-4-80	cc: Files
TO ~~[illegible]~~	RECORD NUMBER 1-80-01-28 01	W. McDonald F. Kulik
FROM ANALYTICAL SERVICES MONSANTO RESEARCH CORPORATION Dayton, Ohio	PROJECT NUMBER 101.1067	CA
	NOTEBOOK REFERENCE 1731208 and 1731209	

[redacted]

Title: Total Particulates [redacted]

Method: Gravimetric

Sample Description (Acetone washes)	Total Particulate / mg corrected for Blank
Run #1 Inlet (1-17-80)	274.7 mg
Run #2 Inlet (1-21-80)	470.9 mg
Run #3 Inlet (1-22-80)	438.0 mg
Run #4 Inlet (1-22-80)	1246.8 mg
Run #5 Inlet (1-23-80)	230.5 mg
Run #6 Inlet (1-23-80)	833.4 mg
Run #1 Outlet (1-17-80)	4.3 mg
Run #2 Outlet (1-21-80)	7.2 mg
Run #3 Outlet (1-22-80)	5.3 mg
Run #4 Outlet (1-22-80)	73.7 mg
Run #5 Outlet (1-23-80)	22.0 mg
Run #6 Outlet (1-23-80)	13.3 mg

[redacted]

C-5 ANALYST: F. L. Phillips

ANALYSIS REPORT	DATE 2-4-80	cc: Files W. McDonald F. Kulik ok
TO [illegible]	RECORD NUMBER 1-80-01-28-02	
FROM ANALYTICAL SERVICES MONSANTO RESEARCH CORPORATION [illegible], Ohio	PROJECT NUMBER 13-022-760.51-101.1067	
	NOTEBOOK REFERENCE 1731210	

[redacted]

Title: Total Particulate [redacted]

Method: Gravimetric

Sample Description	Total Particulate / mg Corrected for the Blank
Run #1 Inlet	17.218 = 17.2 mg
Run #2 Inlet	11.534 = 11.5 mg
Run #3 Inlet	8.585 = 8.6 mg
Run #4 Inlet	13.009 = 13.0 mg
Run #5 Inlet	16.478 = 16.5 mg
Run #6 Inlet	15.658 = 15.7 mg
Run #1 Outlet	13.698 = 13.7 mg
Run #2 Outlet	6.538 = 16.5 mg
Run #3 Outlet	None detected
Run #4 Outlet	0.3672 = 0.4 mg
Run #5 Outlet	None detected
Run #6 Outlet	None detected

Detection limit = 4 mg

[redacted]

[redacted] ANALYST: Flo Phillips

ANALYSIS REPORT	DATE 2/6/80	cc:Files W. McDonald Kulito
TO Jim Peters	RECORD NUMBER 1-80-01-28-06	
FROM ANALYTICAL SERVICES MONSANTO RESEARCH CORPORATION Dayton, Ohio	PROJECT NUMBER 101-1067	
	NOTEBOOK REFERENCE 1731212	

Title: SO_2 EPA method 6
Method:

		mg/dscm
QC lot 1177 #2318	4077	~~ppm~~
True Value	4347	~~ppm~~ mg/dscm

See attached sheets for data on samples

C-7 ANALYST: Flo Phillips

ANALYSIS REPORT

TO	J. Peters - St. Joe Paper
FROM	ANALYTICAL SERVICES MONSANTO RESEARCH CORPORATION Dayton, Ohio
DATE	2-12-80
RECORD NUMBER	1-80-01-28-05
PROJECT NUMBER	101.1067
NOTEBOOK REFERENCE	1207395

cc:Files
~~C. Hayes~~
F. Kulik
W. McDonald

Title: NO_x Analysis
Method: Method 7 - Federal Register

Samples	Absorbance	Dilution factor
Run 1 16/16	0.1719	2
" 2/2	0.0128	2
" 15/15	0.1418	2
" 55/55	0.0874	2
Run 2 2/55	0.1540	2
55/55	0.0636	2
15/15	0.1636	2
16/16	0.1690	2
Run 3 11/11	0.1631	2
10/10	0.0163	2
46/54	0.1792	2
50/50	0.0080	2
Absorb. Soln.	0.0016	2

STANDARDS		
S-0 0 ug NO_2	0.0040	—
S-1 100 " " (1 ug/ml)	0.1261	—
S-2 200 " " (2 ug/ml)	0.2609	—
S-3 300 " " (3 ug/ml)	0.4066	—
S-4 400 " " (4 ug/ml)	0.6065	—

QC Lot 0379
No. 3068 0.5173* = 359 mg/dscm x $\frac{25}{100}$ = 897 mg/dscm
True Value = 857 mg/dscm

* Diluted 10 ml QC/15 ml H_2O to 25 ml

C-8 ANALYST: N.F. May

ANALYSIS REPORT	DATE 2-26-80	cc:Files
TO J. PETERS	RECORD NUMBER 1-80-01-28-03	
FROM ANALYTICAL SERVICES MONSANTO RESEARCH CORPORATION Dayton, Ohio	PROJECT NUMBER 101.1067	
	NOTEBOOK REFERENCE	

Title: ULTIMATE ANALYSIS & BTU

Method: ASTM BY INDUSTRIAL TESTING LABRATORY, St. Louis Mo.

RESULTS ARE ATTACHED FOR SAMPLES:

FUEL BARK RUN #1
" " RUN #2
" " RUN #3
" " RUN #4
" " RUN #5
" " RUN #6

C-9

ANALYST: MS

INDUSTRIAL TESTING LABORATORIES inc.

MRC Log # I-80-01-28-03

Chemists

Engineers

Metallurgists

2350 Seventh Blvd. • St. Louis, Missouri 63104 | 314/771-7111

Report No. 80-2-79

February 21, 1980

Examination of one (1) sample submitted marked,"Bark Fuel, Run # 1".

Monsanto Company
1515 Nicholas Road
Dayton, Ohio 45407

P.O.: D100011
Attn: Mr. Norman F. May

TEST REPORT

A. Proximate Analysis:

	As Received	Dry Basis
Moisture	48.51	---
Volatile Matter	-----	---
Fixed Carbon	-----	---
Ash	0.47	0.92
Sulfur	0.02	0.04
Btu/lb.	4778	9279

B. Ultimate Analysis:

Carbon	25.98	50.45
Hydrogen	8.27	5.59
Nitrogen	0.08	0.15
Sulfur	0.02	0.04
Ash	0.47	0.92
Oxygen	65.18	42.85

*Includes that from Moisture.

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel

Allan M. Siegel, P.E.
Director

Lab No. 04079

RK/hj

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

2360 Seventh Blvd. • St. Louis, Missouri 63104 | 314/771-7111

MRC Log # 1-80-01-28-03

Report No. 80-2-79A

February 21, 1980

Examination of one (1) sample submitted marked,"Bark Fuel, Run # 2".

Monsanto Company
1515 Nicholas Road
Dayton, Ohio 45407

P.O.: D100011
Attn: Mr. Norman F. May

TEST REPORT

A. Proximate Analysis:	As Received	Dry Basis
Moisture	48.04	---
Volatile Matter	-----	---
Fixed Carbon	-----	---
Ash	0.64	1.23
Sulfur	0.02	0.03
Btu/lb.	4931	9490
B. Ultimate Analysis:		
Carbon	26.19	50.40
Hydrogen	8.25	5.60
Nitrogen	0.05	0.10
Sulfur	0.02	0.03
Ash	0.64	1.23
Oxygen	64.85	42.64

*Includes that from Moisture.

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel

Allan M. Siegel, P.E.
Director

Lab No. 04080

RK/hj

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

2360 Seventh Blvd. • St. Louis, Missouri 63104 | 314/771-7111

MKL Log # 1-80-01-28-03

Report No. 80-2-79B

February 21, 1980

Examination of one (1) sample submitted marked,"Bark Fuel, Run # 3".

Monsanto Company
1515 Nicholas Road
Dayton, Ohio 45407

P.O.: D100011
Attn: Mr. Norman F. May

TEST REPORT

A. Proximate Analysis:	As Received	Dry Basis
Moisture	48.54	---
Volatile Matter	-----	---
Fixed Carbon	-----	---
Ash	2.30	4.47
Sulfur	0.01	0.02
Btu/lb.	4651	9038
B. Ultimate Analysis:		
Carbon	25.61	49.76
Hydrogen	8.08	5.22
Nitrogen	0.07	0.14
Sulfur	0.01	0.02
Ash	2.30	4.47
Oxygen	63.93	40.39

*Includes that from Moisture.

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel, P.E.
Director

Lab No. 04081

RK/hj

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
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Metallurgists

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MRC Log # 1-80-01-28-03

Report No. 80-2-79C

February 21, 1980

Examination of one (1) sample submitted marked,"Bark Fuel, Run #4".

Monsanto Company
1515 Nicholas Road
Dayton, Ohio 45407

P.O.: D100011
Attn: Mr. Norman F. May

TEST REPORT

A. Proximate Analysis:	As Received	Dry Basis
Moisture	47.57	---
Volatile Matter	-----	---
Fixed Carbon	-----	---
Ash	0.61	1.17
Sulfur	0.01	0.02
Btu/lb.	4802	9159
B. Ultimate Analysis:		
Carbon	26.01	49.60
Hydrogen	8.12	5.40
Nitrogen	0.06	0.11
Sulfur	0.01	0.02
Ash	0.61	1.17
Oxygen	65.19	43.70

*Includes that from Moisture.

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel

Allan M. Siegel, P.E.
Director

Lab No. 04082

RK/hj

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

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MEC Log # 1-80-01-20-03

Report No. 80-2-79D

February 21, 1980

Examination of one (1) sample submitted marked,"Bark Fuel, Run #5".

Monsanto Company
1515 Nicholas Road
Dayton, Ohio 45407

P.O.: D100011
Attn: Mr. Norman F. May

TEST REPORT

A. Proximate Analysis:	As Received	Dry Basis
Moisture	51.95	---
Volatile Matter	-----	---
Fixed Carbon	-----	---
Ash	1.04	2.17
Sulfur	0.00	0.01
Btu/lb.	4429	9218
B. Ultimate Analysis:		
Carbon	20.69	43.06
Hydrogen	7.99	4.62
Nitrogen	0.04	0.08
Sulfur	0.00	0.01
Ash	1.04	2.17
Oxygen	70.24	50.06

*Includes that from Moisture.

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel, P.E.
Director

Lab No. 04083

RK/hj

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

2360 Seventh Blvd. • St. Louis, Missouri 63104 | 314/771-7111

MRC Log # 1-80-01-28-03

Report No. 80-2-79E

February 21, 1980

Examination of one (1) sample submitted marked,"Bark Fuel, Run # 6".

Monsanto Company
1515 Nicholas Road
Dayton, Ohio 45407

P.O.: D100011
Attn: Mr. Norman F. May

TEST REPORT

A. Proximate Analysis:	As Received	Dry Basis
Moisture	49.90	---
Volatile Matter	-----	---
Fixed Carbon	-----	---
Ash	1.21	2.42
Sulfur	0.01	0.01
Btu/lb.	4558	9097
B. Ultimate Analysis:		
Carbon	23.85	47.61
Hydrogen	8.15	5.21
Nitrogen	0.07	0.13
Sulfur	0.01	0.01
Ash	1.21	2.42
Oxygen	66.71	44.62

*Includes that from Moisture.

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel, P.E.
Director

Lab No. 04084

RK/hj

APPENDIX D

BaP FIELD AND ANALYTICAL RESULTS

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Port St. Joe Paper Company
DATE January 18, 1980
SAMPLING LOCATION Scrubber Inlet A+B
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) 94½"
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) 22½"
STACK I.D., (DISTANCE A - DISTANCE B) 72"
NEAREST UPSTREAM DISTURBANCE 1 Dia.
NEAREST DOWNSTREAM DISTURBANCE 5 Dia
CALCULATOR Eric

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	A STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	.011	72"	1"	22"	23"
2	.032	"	2.3"	"	24.3"
3	.055	"	4"	"	26"
4	.079	"	5.7"	"	27.7"
5	.105	"	7.6"	"	29.6"
6	.132	"	9.5"	"	31.5"
7	.161	"	11.6"	"	33.6"
8	.194	"	14"	"	36.0"
9	.230	"	16.6"	"	38.6"
10	.272	"	19.6"	"	41.6"
11	.323	"	23.3"	"	45.3"
12	.398	"	28.7"	"	50.7"
13	.602	"	43.4"	"	65.4"
14	.677	"	48.7"	"	70.7"
15	.728	"	52.4"	"	74.4"
16	.770	"	55.4"	"	77.4"
17	.806	"	58"	"	80"
18	.839	"	60.4"	"	82.4"
19	.863	"	62.1"	"	84.1"
20	.895	"	64.4"	"	86.4"
21	.921	"	66.3"	"	88.3"
22	.945	"	68.0"	"	90.0"
23	.968	"	69.7"	"	91.7"
24	.989	"	71.2"	"	93.2"

EPA (Dur) 232
4/72 A-5

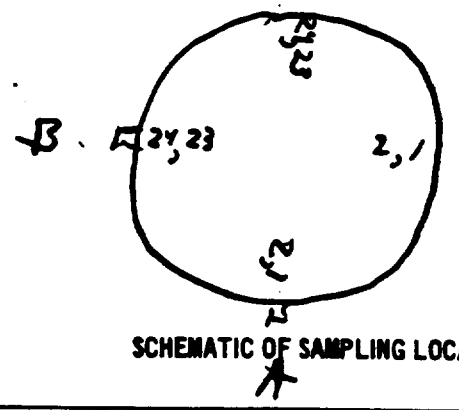
D-1

1.84

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Bay

PLANT St. Joe Paper
DATE 1-15-80
SAMPLING LOCATION #4 Boiler Outlet
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) 86
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) 2
STACK I.D., (DISTANCE A - DISTANCE B) 84"
NEAREST UPSTREAM DISTURBANCE 2 dia.
NEAREST DOWNSTREAM DISTURBANCE 2 dia.
CALCULATOR MCA



SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	1.1	84"	.92 = 1"	2"	3
2	3.2		2.69		4.7
3	5.5		4.62		6.6
4	7.9		6.64		8.6
5	10.5		8.82		10.8
6	13.2		11.09		13.1
7	16.1		13.52		15.5
8	19.4		16.30		18.3
9	23.0		19.32		21.3
10	27.2		22.85		24.8
11	32.3		27.13		29.1
12	39.8		33.43		35.4
13	60.2		50.57		52.6
14	67.7		56.87		58.9
15	72.8		61.15		63.1
16	77.0		64.68		66.7
17	80.6		67.70		69.7
18	83.9		70.48		72.5
19	86.8		72.91		74.9
20	89.5		75.18		77.2
21	92.1		77.36		79.4
22	94.6		79.38		81.4
23	96.9		81.31		83.3
24	99.9		83.08		85.1

EPA (Dur) 232
4/72

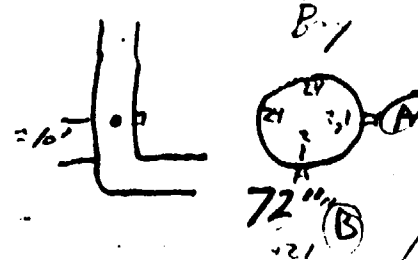
A-10

D-2

FIELD DATA

1 #2

PLANT St. Joe Paper
DATE 1-13-80
SAMPLING LOCATION #4 Boiler Inlet
SAMPLE TYPE BAP
RUN NUMBER SJI-1
OPERATOR E.B. P.H.
AMBIENT TEMPERATURE 60
BAROMETRIC PRESSURE 30.05
STATIC PRESSURE, (P_s) 0.9 (Hg)
FILTER NUMBER (s) N.H.



PROBE LENGTH AND TYPE 10' SS RAC.
NOZZLE I.D. .22
ASSUMED MOISTURE, % 23%
SAMPLE BOX NUMBER 9E
METER BOX NUMBER 10E
METER $\Delta H_@$ 1.80
C FACTOR .76
PROBE HEATER SETTING 50%
HEATER BOX SETTING 250
REFERENCE Δp 1.1

Final leak Check .015

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY _____ MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	~~SAMPLE BOX~~ Filter TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Battell Trap Temp
		401.525										
1A	0930	403.39	2.16	2.6	2.6	376	78	77	16	230	79°	104
2"	0933	406.56	2.7	3.2	3.0	377	84	76	20	229	Can't Read	108
3"	0936	409.64	3.0	3.6	3.0	376	89	78	20	233	around 60°	105
4"	0939	412.85	3.2	4.0	3.0	376	92	78	20	225		106
5"	0942	415.02	2.7	3.1	3.0	376	98	80	20	226		105
6"	0945	418.075	2.9	3.4	3.0	375	100	80	20	225		105
7"	0948	420.43	2.1	2.5	2.5	375	104	82	17.5	232		105
8"	0951	423.185	2.2	2.6	2.6	375	106	83	17.5	235		107
9	0954	425.875	2.8	3.3	3.0	375	110	84	20	235		107
10"	0957	428.31	1.6	1.9	1.9	376	110	86	12.5	230		106
11"	1000	430.64	1.7	2.0	2.0	376	111	86	13	234		108
12	1003	433.01	1.8	2.15	2.15	379	112	88	15	234		104
13	1006	435.44	1.8	2.15	2.15	375	114	89	15	234		108
14	1009	438.02	1.7	2.1	2.1	375	116	90	15	236		108
15	1012	440.34	1.6	1.9	1.9	376	116	91	13	224		109
16	1015	442.865	1.8	2.2	2.2	374	117	92	16	223		110
17	1018	445.34	1.7	2.0	2.0	375	117	93	13	228		109
18	1021	447.55	1.7	2.0	2.0	375	117	94	13	232		109
19	1024	449.84	1.7	2.0	2.0	377	118	94	13	223		110
20	1027	452.77	2.5	3.0	2.8	375	118	95	20	226		110
21	1030	459.96	1.5	1.8	1.8	375	118	96	12	227		107
22	1033	457.395	1.8	2.15	2.15	375	118	96	15	226		108
23	1036	459.92	1.8	2.15	2.15	375	118	96	15	224		107
24	1039		2.1	2.4	2.4	371	119	97	14	223		107
	1042	462.55										

COMMENTS:

EPA (Out) 235

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S JI-1

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM in Hg	Filter ~~SAMPLE BOX~~ TEMPERATURE °F	IMPINGER TEMPERATURE °F	Bottle tr
	1115	462.55										
1	1118	464.35	1.7	2.0	2.0	375	90	86	13	135	79°	117
2	1121	466.61	1.8	2.15	2.15	378	95	86	14	145	Can't Read	118
3	1124	469.00	1.7	2.0	2.0	376	99	86	13	148	approx 60°	118
4	1127	471.33	1.6	1.9	1.9	377	102	86	12.5	151		120
5	1130	473.57	1.6	1.9	1.9	376	104	80	12	152		122
6	1133	476.11	1.4	1.7	1.7	376	106	87	11	154		124
7	1136	477.97	1.4	1.7	1.7	373	106	88	11	151		123
8	1139	480.12	1.3	1.55	1.55	375	106	88	11	151		124
9	1142	482.145	1.2	1.4	1.4	375	107	89	10	151		124
10	1145	484.12	1.2	1.4	1.4	375	107	87	9	151		125
11	1148	486.07	1.1	1.3	1.3	378	107	90	10	150		126
12	1151	487.96	1.1	1.3	1.3	381	107	90	10	150		125
13	1154	489.82	1.3	1.6	1.6	380	108	90	12	151		126
14	1157	491.71	1.4	1.7	1.7	383	108	91	11	150		123
15	1200	494.765	1.4	1.7	1.7	406	108	92	11	145		123
16	1203	496.88	1.4	1.7	1.7	373	108	92	11	133		128
17	1206	499.25	1.5	1.8	1.8	380	108	92	12	135		124
18	1209	501.185	1.4	1.7	1.7	384	108	92	11	134		130
19	1212	503.32	1.5	1.8	1.8	378	108	92	12	135		127
20	1215	505.505	1.5	1.8	1.8	381	108	92	12	136		126
21	1218	[illegible]	1.6	1.9	1.9	383	108	92	12.5	138		127
22	1221	509.77	1.6	1.9	1.9	380	108	92	12	137		132
23	1224	512.245	1.5	1.8	1.8	378	108	92	13	137		128
24	1227	514.614	1.5	1.8	1.8	378	106	92	13	137		128
	144	112.915			2.06	377.3		97.7				
		166609.798										

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EPA (Dur) 236
4 72

TRW

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-15-80

SAMPLING LOCATION Boiler #4 Inlet

SAMPLE TYPE BaP

RUN NUMBER SJI-1

SAMPLE BOX NUMBER

CLEAN-UP MAN MSR

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

FILTER NUMBER N.A _____ — CONTAINER _____ _____ mg

FRONT HALF SUBTOTAL _____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT _____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 632 ml

INITIAL VOLUME 200 ml

NET VOLUME 432 ml

SILICA GEL

FINAL WEIGHT 237 g _____ g _____ g

INITIAL WEIGHT 200 g _____ g _____ g

NET WEIGHT 37 g _____ g _____ g

TOTAL MOISTURE 469 g

A-13

D-5

ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

PLANT St Joe Paper
DATE 1-19-88
SAMPLING LOCATION
SAMPLE TYPE
RUN NUMBER
OPERATOR
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) NA

PROBE LENGTH AND TYPE 10' SS
NOZZLE I.D. .19 - 3/16
ASSUMED MOISTURE, % 20
SAMPLE BOX NUMBER 9E
METER BOX NUMBER 10E
METER ΔH@ 1.50
C FACTOR .22
PROBE HEATER SETTING 70
HEATER BOX SETTING 350
REFERENCE Δp 2.6

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY _____ MINUTES

Filter

SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	~~SAMPLE BOX~~ TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
0	0800	515.065									
3	0803	516.085	1.3	.93	.93	384	65	65	7.5	271	5
6	0806	517.67	1.1	.77	.77	381	67	66	7	268	Cool
9	0809	519.13	2.5	1.8	1.8	382	74	66	15	272	
12	0812	521.23	2.6	1.85	1.85	386	75	66	15	285	
15	0815	523.39	2.5	1.8	1.8	388	80	67	15	286	
18	0818	525.57	2.7	1.9	1.9	389	82	68	15.5	272	
21	0821	527.795	2.6	1.85	1.85	389	85	68	15	276	
24	0824	529.91	2.4	1.7	1.7	389	86	69	14	277	
27	0827	532.08	2.5	1.8	1.8	383	87	70	15	263	
30	0830	534.105	2.2	1.6	1.6	388	88	71	14	264	
33	0833	536.26	2.0	1.45	1.45	388	90	72	13	257	
36	0836	538.29	1.7	1.2	1.2	388	91	73	12	256	
39	0839	539.92	1.9	1.4	1.4	388	91	74	12	245	
42	0842	541.80	1.65	1.2	1.2	388	90	75	12	250	
45	0845	543.28	.75	.58	.58	390	90	75	7	250	
48	0848	544.61	.8	.57	.57	390	89	76	7	240	
51	0851	545.56	.82	.57	.57	395	89	76	7	240	
54	0854	547.26	.88	.62	.62	395	89	77	7	245	
57	0857	548.49	.69	.49	.49	390	89	78	6	255	
60	0860	549.67	.66	.47	.47	390	89	78	6	235	
63	0863	550.915	.64	.5	.5	390	89	79	6	240	
66	0866	552.18	.73	.52	.52	383	88	79	6	230	
69	0869	553.49	.8	.58	.58	385	88	79	6	240	
72	0872	554.73	.75	.54	.54	390	88	79	6	235	

SJI-2

2 of 2

Traverse Point Number	Sampling Time, min / Clock Time (24 hr Clock)	Gas Meter Reading (V_m), ft³	Velocity Head (Δp_s), in H_2O	Orifice Pressure Differential (ΔH), in H_2O Desired	Orifice Pressure Differential (ΔH), in H_2O Actual	Stack Temperature (T_s), °F	Dry Gas Meter Temperature Inlet ($T_{m\,in}$), °F	Dry Gas Meter Temperature Outlet ($T_{m\,out}$), °F	Pump Vacuum, in Hg	Filter ~~Sample Box~~ Temperature, °F	Impinger Temperature, °F	Battel Trap Temp
	3 1200	554.73										
1	1203	555.41	.5	.35	.35	380	78	77	5	220	60°	120
2	1206	556.465	1.5	1.1	1.1	385	80	78	10	230	↓	120
3	1209	558.33	1.6	1.15	1.15	385	84	77	11	225		125
4	1212	560.14	1.5	1.05	1.05	390	86	78	11	240	Cant Read	120
5	1215	562.20	2.1	1.5	1.5	385	90	78	13	255		120
6	1218	564.27	2.0	1.45	1.45	385	92	79	13	260		125
7	1221	566.07	1.5	1.05	1.05	380	96	80	10	255		125
8	1224	567.345	.64	.46	.46	380	95	80	5	250		125
9	1227	568.675	.89	.63	.63	380	95	82	6.5	250		125
10	1230	570.09	.99	.70	.70	380	96	83	7.0	250		125
11	1233	571.62	.97	.69	.69	380	96	84	7.0	255		125
12	1236	573.38	1.1	.78	.78	380	97	85	8.0	245		125
13	1239	574.67	1.3	.94	.94	380	98	86	9.0	245		125
14	1242	576.50	1.7	1.2	1.2	380	98	86	10.5	245		125
15	1245	578.77	1.5	1.1	1.1	380	100	87	11	245		125
16	1248	580.01	1.1	.77	.77	380	101	87	7	245		120
17	1251	581.375	.74	.53	.53	380	101	88	5	245		125
18	1254	582.895	.95	.68	.68	385	102	89	7	245		125
19	1257	584.27	1.0	.70	.70	385	102	90	7	240		125
20	1300	585.79	1.05	.74	.74	380	102	90	6	240		130
21	1303	586.93	.7	.5	.5	380	102	91	6	240		125
22	1306	588.33	.92	.65	.65	375	102	92	7	240		125
23	1309	589.82	1.05	.75	.75	375	102	92	8	245		125
24	1311	590.800	1.1	.78	.78	375	103	93	8	245	↓	125
	143	75.735			.98	384.2	84.5					
		143798.539										

EPA (Rev. 2/6)

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TRW

400
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ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-19-80

SAMPLING LOCATION #4 Boiler Inlet

SAMPLE TYPE BAP

RUN NUMBER SJI-2

SAMPLE BOX NUMBER

CLEAN-UP MAN M & R

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
FILTER NUMBER _____ _____	CONTAINER _____	_____ mg
_____ _____		
_____ _____		
	FRONT HALF SUBTOTAL	_____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	ETHER-CHLOROFORM EXTRACTION	_____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	BACK HALF SUBTOTAL	_____ mg
	TOTAL WEIGHT	_____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 526 ml

INITIAL VOLUME 200 ml

NET VOLUME 326 ml

SILICA GEL

FINAL WEIGHT	221 g	_____ g	_____ g
INITIAL WEIGHT	200 g	_____ g	_____ g
NET WEIGHT	21 g	_____ g	_____ g

TOTAL MOISTURE 347 g

EPA (Dur) 231
4/72

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ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

SJI 3

PLANT SJ Joe Paper
DATE 1-19-80
SAMPLING LOCATION Inlet
SAMPLE TYPE BAP
RUN NUMBER SJI-3
OPERATOR P.H. + E.B.
AMBIENT TEMPERATURE 69
BAROMETRIC PRESSURE 30.13
STATIC PRESSURE, (P_s) +8.9" H_2O
FILTER NUMBER (s) N.A.

PROBE LENGTH AND TYPE 10' SS
NOZZLE I.D. .19
ASSUMED MOISTURE, % 20
SAMPLE BOX NUMBER 9
METER BOX NUMBER 10
METER $\Delta H_@$ 1.80
C FACTOR .78
PROBE HEATER SETTING 80%
HEATER BOX SETTING 250
REFERENCE Δp 2.6

Final Leak Ck.

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	~~SAMPLE BOX~~ Filter TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Bottel Trap T
	1515	591.485										
1	1518	592.66	.98	.69	.69	390	69	69	6	175	62	80
2	1521	594.265	1.3	.93	.93	390	72	70	10	250	Can't read	110
3	1524	596.05	1.5	1.05	1.05	385	76	70	11	250		125
4	1527	597.94	1.7	1.2	1.2	385	80	70	11.5	245		120
5	1530	599.865	1.8	1.3	1.3	385	82	71	11.5	260		120
6	1533	602.01	2.15	1.55	1.55	385	84	72	13	255		120
7	1536	604.06	2.0	1.4	1.4	385	85	72	12	265		115
8	1539	606.08	1.95	1.4	1.4	370	86	73	12	255		110
9	1542	608.06	1.95	1.4	1.4	360	88	74	12	250		110
10	1545	609.93	2.0	1.4	1.4	350	88	74	11.5	245		110
11	1548	611.83	1.95	1.4	1.4	365	89	75	11	250		110
12	1552	613.69	1.6	1.2	1.2	365	91	77	10.5	250		[illegible]
13	1554	615.54	1.3	.95	.95	360	92	78	9.5	260		[illegible]
14	1557	617.10	1.3	.95	.95	360	92	78	9	260		[illegible]
15	1600	618.65	1.2	.86	.86	360	92	79	8	250		[illegible]
16	1603	620.02	.95	.68	.68	365	92	79	7	265		105
17	1606	621.50	1.0	.71	.71	360	92	80	7	250		105
18	1609	623.04	.95	.68	.68	360	93	81	7	245		110
19	1612	624.52	1.0	.71	.71	360	92	82	7	245		110
20	1615	626.44	1.5	1.1	1.1	365	92	82	9	250		105
21	1618	628.46	1.3	.95	.95	365	94	82	11	250		110
22	1621	630.61	2.2	1.6	1.6	360	95	83	12	250		110
23	1624	632.56	2.2	1.6	1.6	360	96	83	13	240		110
COMMENTS	1627	634.725	2.3	1.7	1.7	350	96	83	14	240		[illegible]

EPA-Dwt 235

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SJ1-3

[illegible]	SAMPLING TIME, min	CLOCK TIME [illegible]	GAS METER READING (V_M), ft^3	VELOCITY HEAD (ΔP_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	Filter SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Bottle Temp
[illegible]	[illegible]	[illegible]	637.02	1.8	1.3	1.3	355	96	96	10.5	185	65	14[illegible]
[illegible]	[illegible]	[illegible]	639.96	2.6	1.5	1.5	355	102	97	13	185	Continued	13[illegible]
[illegible]	[illegible]	[illegible]	641.12	2.6	1.85	1.85	355	106	98	14	185		18[illegible]
[illegible]	[illegible]	[illegible]	643.35	2.6	1.85	1.85	360	110	98	14	215		[illegible]
[illegible]	[illegible]	[illegible]	645.59	2.6	1.85	1.85	360	113	100	14.5	225		[illegible]
[illegible]	[illegible]	[illegible]	647.94	3	2.1	2.1	360	[illegible]	100	16	210		[illegible]
[illegible]	[illegible]	[illegible]	649.615	1.0	.71	.71	360	116	100	7	200		[illegible]
[illegible]	[illegible]	[illegible]	651.29	1.3	.92	.92	360	115	101	8	175		[illegible]
[illegible]	[illegible]	[illegible]	652.88	1.05	.74	.74	360	115	102	7	165		[illegible]
[illegible]	[illegible]	[illegible]	654.44	1.1	.77	.77	360	115	102	7.5	165		[illegible]
[illegible]	[illegible]	[illegible]	655.93	.95	.68	.68	360	114	103	7	160		[illegible]
[illegible]	[illegible]	[illegible]	657.79	1.9	1.4	1.4	360	118	104	12	150		[illegible]
[illegible]	[illegible]	[illegible]	659.61	1.5	1.1	1.1	360	120	104	10	150		[illegible]
[illegible]	[illegible]	[illegible]	661.39	1.1	.77	.77	360	120	106	7	155		[illegible]
[illegible]	[illegible]	[illegible]	663.24	2.6	1.8	1.8	360	122	108	15	150		[illegible]
[illegible]	[illegible]	[illegible]	665.73	3.7	2.6	2.4	360	123	108	21	150		[illegible]
[illegible]	[illegible]	[illegible]	667.63	1.4	1.0	1.0	365	122	108	9.5	150		[illegible]
[illegible]	[illegible]	[illegible]	669.71	3	2.1	2.1	365	122	108	18	150		[illegible]
[illegible]	[illegible]	[illegible]	671.1	.82	.59	.59	365	118	108	6.5	140		[illegible]
[illegible]	[illegible]	[illegible]	672.55	.92	.65	.65	365	116	108	7	135		130
[illegible]	[illegible]	[illegible]	674.12	1.1	.77	.77	365	115	108	8	130		[illegible]
[illegible]	[illegible]	[illegible]	675.1	.87	.62	.62	365	114	107	7	130		12[illegible]
[illegible]	[illegible]	[illegible]	677.99	1.0	.71	.71	360	115	107	7	125		12[illegible]
[illegible]	[illegible]	[illegible]	678.31	.76	.54	.54	360	114	107	6	120		120
	144		86.905			1.17	364.5	95.7					
			156871.215										

EPA (Bull) 236
4 72

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TRW

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-19-80

SAMPLING LOCATION #4 Boiler Inlet

SAMPLE TYPE BAP

RUN NUMBER SDI-3

SAMPLE BOX NUMBER

CLEAN-UP MAN McR

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
FILTER NUMBER _____ _____	CONTAINER _____	_____ mg
_____ _____		
_____ _____		
	FRONT HALF SUBTOTAL	_____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	ETHER-CHLOROFORM EXTRACTION	_____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	BACK HALF SUBTOTAL	_____ mg
	TOTAL WEIGHT	_____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 494 ml

INITIAL VOLUME 200 ml

NET VOLUME 294 ml

SILICA GEL

FINAL WEIGHT	224.4 g	_____ g	_____ g
INITIAL WEIGHT	200 g	_____ g	_____ g
NET WEIGHT	24.4 g	_____ g	_____ g

TOTAL MOISTURE 318.4 g

EPA (Dur) 231
4/72

H-1,

D-11

ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

1 of 2

PLANT SSP
DATE 1-26-90
SAMPLING LOCATION Inlet
SAMPLE TYPE BAP
RUN NUMBER SSI-4
OPERATOR E.B. P.A.
AMBIENT TEMPERATURE 31
BAROMETRIC PRESSURE 30.12
STATIC PRESSURE, (P_s) +74.5 in. H_2O
FILTER NUMBER (s) N.A.

31.19 STACK pressure

PROBE LENGTH AND TYPE 10' SS
NOZZLE I.D. .19
ASSUMED MOISTURE, % 3.6
SAMPLE BOX NUMBER 9E
METER BOX NUMBER 10E
METER $\Delta H_@$ 1.50
C FACTOR .77
PROBE HEATER SETTING 60%
HEATER BOX SETTING 320
REFERENCE Δp 2.6

Final leak check .02

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY _____ MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	~~SAMPLE BOX~~ Filter TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Batte Trap Tem
	1045	678.87										
1	1048	680.09	.77	.68	.68	350	74	73	6	245	70	115
2	1051	681.525	1.05	.73	.73	350	76	73	6	275	65	120
3	1054	683.15	1.5	1.05	1.05	355	80	74	8	255	Can't Read	120
4	1057	685.11	2.1	1.5	1.5	360	84	75	10	250		120
5	1100	686.46	.78	.52	.52	360	88	76	4.5	270		120
6	1103	687.42	.29	.20	.20	360	89	77	1	260		120
7	1106	688.77	.96	.68	.68	360	91	79	6	250		120
8	1109	690.115	.84	.59	.59	360	94	80	5	265		120
9	1112	691.49	.93	.65	.65	360	95	82	6	250		125
10	1115	693.00	1.1	.77	.78	360	95	83	6	250		125
11	1118	694.83	1.7	1.2	1.2	360	96	84	9	270		120
12	1121	696.84	2.2	1.6	1.6	360	98	85	11	255		120
13	1124	698.92	2.2	1.6	1.6	360	100	85	11	255		120
14	1127	700.99	2.2	1.6	1.6	360	100	86	11	265		120
15	1130	703.31	2.8	2.0	2.0	360	102	87	15	250		120
16	1133	705.785	3.1	2.3	2.3	360	104	88	16.5	270		120
17	1136	708.20	2.9	2.1	2.1	360	104	88	16	250		120
18	1139	710.74	3.2	2.4	2.4	360	105	88	18	245		120
19	1142	712.34	.94	.66	.66	360	104	89	6	265		120
20	1145	713.85	1.1	.77	.77	360	101	89	6	245		120
21	1148	715.615	1.5	1.05	1.05	360	100	89	9	250		120
22	1151	717.53	1.8	1.3	1.3	360	100	89	10.5	250		120
23	1154	719.75	2.3	1.7	1.7	360	100	89	12.5	240		120
24	1157	721.875	2.9	2.1	2.1	360	101	89	15	260		120

A-20

A-20

SJI-4

2 of 2

TRAVERSE POINT NUMBER	CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	~~SAMPLE BOX~~ TEMPERATURE, °F Filter	IMPINGER TEMPERATURE, °F	Bottled Trap
	1230	723.55										
1	1233	725.275	1.9	1.9	1.4	355	75	76	11	245	63	100
2	1236	727.49	2.5	1.8	1.8	360	80	76	13.5	260	54	110
3	1239	729.56	2.5	1.8	1.8	360	84	76	14	260	Can't Read	110
4	1242	731.72	2.4	1.7	1.7	360	88	76	14	260		110
5	1245	733.87	2.6	1.85	1.85	360	90	77	14.5	260		110
6	1248	736.20	2.8	2	2	360	90	77	15	260		110
7	1251	738.44	2.9	2.1	2.1	360	90	77	17.5	270		110
8	1254	740.82	2.9	2.1	2.1	360	92	77	17.5	250		110
9	1257	743.28	3.1	2.3	2.3	360	93	78	19.5	265		110
10	1300	745.81	3.3	2.6	2.4	360	94	78	21	255		110
11	1303	748.01	1.6	1.2	1.2	360	92	78	13	245		110
12	1306	749.91	1.6	1.2	1.2	360	91	78	12	220		110
13	1309	752.01	2.1	1.5	1.5	360	90	78	12.5	205		110
14	1312	753.99	2.2	1.6	1.6	360	91	78	13.5	200		110
15	1315	756.15	2.5	1.8	1.8	360	90	78	14.5	190		110
16	1318	758.36	2.4	1.75	1.75	360	90	78	15	180		110
17	1321	759.80	2.5	1.8	1.8	360	90	78	15	180		110
18	1324	762.66	2.2	1.6	1.6	360	90	78	14	170		110
19	1327	764.79	2.2	1.6	1.6	360	90	77	14	160		110
20	1330	766.82	1.9	1.4	1.4	360	92	78	13	160		110
21	1333	768.93	2.3	1.75	1.75	360	92	78	14	160		110
22	1336	771.11	2.1	1.55	1.55	360	91	78	14.5	150		110
23	1339	773.23	2.5	1.8	1.8	355	89	78	14.5	150		110
24	1342	775.370	2.1	1.5	1.5	350	89	77	13.5	145		110
	144	96.500			1.48	359.06	86.2					
		174426.785										

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TRW

378
226
604

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-20-80

SAMPLING LOCATION #4 Boiler Inlet

SAMPLE TYPE BAP

RUN NUMBER SJI-4

SAMPLE BOX NUMBER

CLEAN-UP MAN M&R

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER	mg
FILTER NUMBER	CONTAINER	mg
FRONT HALF SUBTOTAL		mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
BACK HALF SUBTOTAL		mg
TOTAL WEIGHT		mg

MOISTURE

IMPINGERS

FINAL VOLUME 604 ml

INITIAL VOLUME 200 ml

NET VOLUME 404 ml

SILICA GEL

FINAL WEIGHT	228.6 g	g	g
INITIAL WEIGHT	200 g	g	g
NET WEIGHT	28.6 g	g	g

TOTAL MOISTURE 432.6 g

EPA (Dur) 231
4/72

D-14

ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

SJL-5

PLANT Sasol
DATE 2-10-98
SAMPLING LOCATION Inlet
SAMPLE TYPE BAG
RUN NUMBER 5
OPERATOR E.R. P.H.
AMBIENT TEMPERATURE 71
BAROMETRIC PRESSURE 30.12
STATIC PRESSURE (P_s) -14.5 H2O
FILTER NUMBER (s) N.A.

Nomograph Slipped

31.19

Final Leak Check .005

PROBE LENGTH AND TYPE 10' SS
NOZZLE I.D. .19
ASSUMED MOISTURE, % 20
SAMPLE BOX NUMBER 4E
METER BOX NUMBER 10E
METER ΔH@ 1.8
C FACTOR .77
PROBE HEATER SETTING 65%
HEATER BOX SETTING 320
REFERENCE Δp 2.6

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Filter / Bottle Trap
	1545	777.115										
	1548	778.065	.55	.38	.38	345	74	74	5	230	70°	125
	1551	779.23	.80	.60	.60	350	77	75	7.5	240	Can't Read	140
	1554	781.27	2.5	1.8	1.7	350	81	76	22	250		140
	1557	782.815	.95	.58	.58	355	84	76	13	255		140
	1600	784.285	1.05	.65	.65	355	84	76	9	230		140
	1603	785.84	1.5	.99	.99	355	86	77	12.5	250		135
	1606	787.47	1.1	.7	.79	350	88	77	10	235		140
	1609	788.86	1.0	.71	.71	355	88	77	9	235		135
	1612	790.3	1.0	.71	.71	355	88	78	9	240		135
10	1615	792.78	1.4	1.0	1.0	350	90	78	12	235		135
11	1618	793.93	1.9	1.4	1.4	355	92	78	17	245		135
12	1621	795.93	1.9	1.4	1.4	355	93	80	17.5	240		135
13	1624	797.90	2.1	1.5	1.5	355	94	80	18	235		135
14	1627	799.99	2.2	1.6	1.6	355	96	81	21	250		135
15	1630	801.61	.68	.49	.49	355	94	82	7	235		135
16	1633	802.575	.75	.53	.53	355	92	82	7	235		135
17	1636	803.79	.7	.49	.49	355	92	82	7	240		135
18	1639	805.005	.68	.49	.49	355	90	83	7	220		135
19	1642	806.29	.65	.46	.46	355	90	83	6.5	235		140
20	1645	807.21	.44	.31	.31	355	90	83	5	220		140
21	1648	808.39	.X	.51	.51	355	89	84	7	220		140
22	1651	809.755	.85	.60	.57	355	90	84	8	235		140
23	1654	811.16	.93	.66	.51	355	90	84	8.5	215		140
COMMENTS 24	1657	812.54	.95	.67	.67	355	90	84	9	230		

EPA (Dwt 235

A

SJI-5

TRAVERSE POINT NUMBER	CLOCK TIME (24 hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	~~SAMPLE BOX~~ Filter TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Battell Trap Temp
	1230	812.54										
1	1233	814.27	1.4	1.0	1.0	355	74	77	12	250	65°	110
2	1236	816.08	2.0	1.4	1.4	355	78	77	13	230	54°	115
3	1239	818.07	2.2	1.6	1.6	360	83	77	17.5	260	Can't Read	110
4	1242	820.16	2.3	1.75	1.75	360	87	78	21	250		120
5	1245	822.11	1.6	1.15	1.15	360	90	78	17	250		120
6	1248	823.80	1.2	.88	.88	360	91	78	13	250		120
7	1251	825.47	1.3	.95	.95	360	92	79	12.5	250		120
8	1254	827.22	1.6	1.15	1.15	360	92	79	14	260		120
9	1257	829.08	1.8	1.3	1.3	360	92	80	16	255		120
10	1800	831.07	2.1	1.5	1.5	360	93	80	18.5	240		120
11	1803	833.06	2.1	1.5	1.5	360	93	80	18.5	260		125
12	1806	835.10	2.2	1.6	1.6	360	94	80	20	255		125
13	1809	837.22	2.2	1.6	1.6	360	94	80	20	255		125
14	1812	839.20	2.2	1.6	1.6	360	94	81	21	255		125
15	1815	841.30	2.3	1.65	1.65	360	94	82	22.5	240		125
16	1818	842.89	1.1	.79	.79	360	94	81	12	250		125
17	1821	844.51	1.3	.93	.93	360	94	81	12.5	240		125
18	1824	846.19	1.4	1.0	1.0	360	94	81	13.5	235		130
19	1827	847.88	1.4	1.0	1.0	360	95	82	13.5	250		130
20	1830	849.54	1.3	.93	.93	360	95	82	13	230		125
21	1833	851.19	1.3	.93	.93	360	95	82	13	245		130
22	1836	852.86	1.4	1.0	1.0	360	94	82	13.5	245		130
23	1839	854.64	1.6	1.15	1.15	360	95	83	16	245		130
24	1842	856.435	1.6	1.15	1.15	365	95	83	16	250		130
	144	79.320			1.01	356.77	84.9					
		145143.212										

EPA (Dur) 236
4 72

TRW

400
16.

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-20-80

SAMPLING LOCATION #4 Inlet

SAMPLE TYPE BAP

RUN NUMBER SJI-5

SAMPLE BOX NUMBER

CLEAN-UP MAN M.S.R

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
FILTER NUMBER _____ _____	CONTAINER _____	_____ mg
_____ _____		
_____ _____		
	FRONT HALF SUBTOTAL	_____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	ETHER-CHLOROFORM EXTRACTION	_____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	BACK HALF SUBTOTAL	_____ mg
	TOTAL WEIGHT	_____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 560 ml

INITIAL VOLUME 200 ml

NET VOLUME 360 ml

SILICA GEL

FINAL WEIGHT	226.6 g	_____ g	_____ g
INITIAL WEIGHT	200 g	_____ g	_____ g
NET WEIGHT	26.6 g	_____ g	_____ g

TOTAL MOISTURE 386.6 g

EPA (Dwr) 231
4/72

H 15

D-17

ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

SJE-6

Final leak Check .02

PLANT St. Joe Paper
DATE 1-21-80
SAMPLING LOCATION Inlet
SAMPLE TYPE NAF
RUN NUMBER 6
OPERATOR P.H. E.B.
AMBIENT TEMPERATURE 70
BAROMETRIC PRESSURE 30.1
STATIC PRESSURE, (P_s) +14.5" H_2O
FILTER NUMBER (s) N.A.

PROBE LENGTH AND TYPE 10' SS
NOZZLE I.D. .17
ASSUMED MOISTURE, % 20
SAMPLE BOX NUMBER 9E
METER BOX NUMBER 10E
METER $\Delta H_@$ 1.80
C FACTOR .78
PROBE HEATER SETTING 65%
HEATER BOX SETTING 320
REFERENCE Δp 2.6

3/17

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY _____ MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	~~SAMPLE BOX~~ Filter TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Battell Trap Temp
	0900	857.35										
1	0903	858.64	1.3	.93	.93	355	72	72	8	205	62	100
2	0906	860.45	2.0	1.4	1.4	355	74	73	13	230	62	105
3	0909	862.715	2.7	1.9	1.9	355	79	73	19	240	Cont	100
4	0912	864.18	.95	.68	.68	355	81	73	7.5	240		100
5	0915	865.67	1.05	.75	.75	355	80	73	8.5	250		110
6	0918	867.22	1.2	.86	.86	355	82	72	9	245		110
7	0921	868.84	1.3	.93	.93	355	84	72	9.5	240		110
8	0924	870.445	1.3	.93	.93	355	86	73	9.5	255		110
9	0927	872.05	1.3	.93	.93	355	88	74	9.5	245		110
10	0930	873.72	1.4	1.0	1.0	355	89	74	10	250		110
11	0933	875.53	1.6	1.15	1.15	355	90	75	12	250		105
12	0936	877.48	1.9	1.4	1.4	355	92	76	14.5	240		105
13	0939	879.46	1.9	1.4	1.4	355	92	76	14.5	260		110
14	0942	881.355	1.7	1.2	1.2	355	94	77	13	250		110
15	0945	883.175	1.5	1.1	1.1	355	94	77	12	240		105
16	0948	885.06	1.7	1.2	1.2	360	94	78	13	250		105
17	0951	886.96	1.7	1.2	1.2	360	96	78	13	240		105
18	0954	888.88	1.8	1.3	1.3	360	96	80	14	240		105
19	0957	890.595	1.4	.98	.98	360	98	80	10.5	245		105
20	1000	892.235	1.3	.93	.93	360	98	81	10	235		105
21	1003	893.66	.88	.63	.63	360	99	82	7.5	245		105
22	1006	894.90	.68	.49	.49	360	100	84	6	235		105
23	1009	896.08	1.9	1.4	1.4	360	100	86	5	225		105
COMMENTS: 24	1012	898.03	2.1	1.5	1.5	355	105	88	15	245		105

EPA Dwt 235

[illegible] 557-6

Filter

Traverse Point Number	Sampling Time, min	Gas Meter Reading (V_m), ft³	Velocity Head (Δp_s), in. H_2O	Orifice Pressure Differential (ΔH), in. H_2O Desired	Orifice Pressure Differential (ΔH), in. H_2O Actual	Stack Temperature (T_s), °F	Dry Gas Meter Temperature Inlet ($T_{m\,in}$), °F	Dry Gas Meter Temperature Outlet ($T_{m\,out}$), °F	Pump Vacuum, in. Hg	Sample Box Temperature, °F	Impinger Temperature, °F
		898.03									
1	1048	899.89	1.7	1.2	1.2	355	99	98	12.5	[illegible]	60
2	1051	901.92	1.8	1.3	1.3	355	104	98	13	240	[illegible]
3	1054	903.805	1.9	1.4	1.4	360	110	99	14.5	240	Can't Read
4	1057	905.82	1.9	1.4	1.4	355	114	100	17.5	255	
5	1100	907.94	2.1	1.5	1.5	360	117	102	17	250	
6	1103	909.78	1.5	1.1	1.1	360	117	102	12	260	
7	1106	912.03	2.6	1.85	1.85	360	117	102	20	255	
8	1109	913.975	1.6	1.15	1.15	360	117	102	14	250	
9	1112	916.25	2.6	1.85	1.85	360	116	102	21	265	
10	1115	917.84	.98	.70	.70	360	110	100	9	255	
11	1118	919.745	1.8	1.3	1.3	360	105	98	14.5	245	
12	1121	921.815	2.1	1.5	1.5	360	104	97	17	255	
13	1124	924.98	2.5	1.7	1.7	360	104	96	19	245	
14	1127	926.25	2.7	1.9	1.9	360	104	94	21	255	120
15	1130	928.18	1.6	1.15	1.15	370	102	93	15	255	120
16	1133	929.705	.95	.68	.68	360	100	92	9	245	120
17	1136	931.15	.95	.68	.68	360	98	91	9	250	120
18	1139	932.735	1.2	.85	.85	360	96	90	10	230	120
19	1142	934.605	1.6	1.15	1.15	360	96	92	14	240	120
20	1145	936.62	2.0	1.4	1.4	360	96	89	16	235	120
21	1148	938.735	2.2	1.6	1.6	355	98	88	17.5	225	120
22	1151	940.09	2.4	1.7	1.7	360	98	88	19	245	120
23	1154	943.095	2.5	1.8	1.8	360	100	88	20	225	120
24	1157	945.355	2.7	1.9	1.9	355	99	87	22	230	120
	1200	Damn Whistle!									
	144	88.005			1.23	358.02	91.8				
		161029.105									

EPA (Rev) 236
4/72

TRW

498
72
570

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-21-80

SAMPLING LOCATION #4 Boiler Inlet

SAMPLE TYPE BAP

RUN NUMBER SJI-6

SAMPLE BOX NUMBER _____

CLEAN-UP MAN MSR

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
FILTER NUMBER _____ _____	CONTAINER _____	_____ mg
_____ _____		
_____ _____		
	FRONT HALF SUBTOTAL	_____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	ETHER-CHLOROFORM EXTRACTION	_____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	BACK HALF SUBTOTAL	_____ mg
	TOTAL WEIGHT	_____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 570 ml

INITIAL VOLUME 200 ml

NET VOLUME 370 ml

SILICA GEL

FINAL WEIGHT	233.2 g	_____ g	_____ g
INITIAL WEIGHT	200 g	_____ g	_____ g
NET WEIGHT	33.2 g	_____ g	_____ g

TOTAL MOISTURE 403.2 g

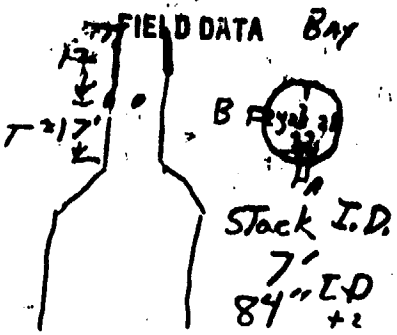
EPA (Dur) 231
4/73

ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

Bay

PLANT ST. Joe Paper
DATE 1-[illegible]-80
SAMPLING LOCATION #4 Boiler Outlet
SAMPLE TYPE BAP
RUN NUMBER SJO-1
OPERATOR B.J. - D.P
AMBIENT TEMPERATURE 60
BAROMETRIC PRESSURE 30.[illegible]
STATIC PRESSURE, (P_s) +.01 Check
FILTER NUMBER (s) N.A.



PROBE LENGTH AND TYPE 10' SS RAC
NOZZLE I.D. .245
ASSUMED MOISTURE, % 25
SAMPLE BOX NUMBER
METER BOX NUMBER
METER $\Delta H_@$ 1.54
C FACTOR .74
PROBE HEATER SETTING 80 %
HEATER BOX SETTING 260
REFERENCE Δp .80

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	~~IMPINGER~~ TEMPERATURE, °F SKIN
	00	0930	657.725									
A-24	03	0934	659.6	.80	1.95	1.9	142	70	70	15	255	113
A-23	06	0937	661.5	.82	2.0	2.0	145	71	70	15	240	115
A-22	09	0940	663.4	.75	1.85	1.85	138	72	71	15	235	111
A-21	12	0943	665.3	.64	1.6	1.6	142	74	72	15	240	113
A-20	15	0946	667.1	.55	1.38	1.38	142	76	72	16	244	114
A-19	18	0949	668.9	.44	1.1	1.1	140	78	72	12	260	113
A-18	21	0952	67[illegible]	.35	.92	.95	140	80	72	10	265	111
A-17	24	0955	671[illegible]	.30	.70	.70	140	80	72	8	255	111
A-16	27	0958	673.3	.30	.70	.70	140	80	72	8	250	109
A-15	30	1001	674.7	.28	.65	.65	140	80	72	7.5	260	110
A-14	33	1004	676.0	.30	.70	.70	140	80	72	7.8	270	110
A-13	36	1007	677.5	.35	.87	.87	140	80	72	8.5	278	110
A-12	39	1010	679.1	.38	.94	.94	140	80	72	10	260	106
A-11	42	1013	680.8	.40	.98	.98	140	80	72	10	255	113
A-10	45	1016	682.4	.38	.94	.94	140	82	72	10	260	114
A-9	48	1019	684.1	.38	.94	.94	140	82	72	9	270	113
A-8	51	1022	685.5	.38	.94	.94	140	84	74	9	270	113
A-7	54	1025	687.2	.35	.87	.87	138	84	74	8.5	250	113
A-6	57	1028	688.7	.35	.87	.87	140	84	74	8.5	250	113
A-5	60	1031	690.2	.35	.87	.87	140	82	74	8.5	265	113
A-4	63	1034	691.6	.33	.81	.81	140	82	75	8	270	116
A-3	66	1037	693.1	.28	.65	.65	140	82	75	7	265	114
A-2	69	1040	694.4	.24	.58	.58	140	82	76	6	260	111

65°

A-29

D-21

SJO-1

TRAVERSE POINT NUMBER	SAMPLING TIME, Min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	TEMPERATURE R.TEMP SKIN
	69	1040	694.4									
B-1	72	1043	695.835	.27	.65	.65	140	80	76	6.5	+250	114
B-24	75	1082	697.8	.90	2.2	1.8	140	70	68	18	+250	107
B-23	78	1125	699.6	.84	2.0	1.5	140	72	68	18	+250	107
B-22	81	1128	701.6	.73	1.8	1.5	135	72	68	18	+250	108
B-21	84	1131	703.3	.55	1.35	1.35	135	74	70	18	+250	107
B-20	87	1134	705.3	.45	1.1	1.1	135	74	70	18	+250	107
B-19	90	1137	706.9	.35	.87	.87	135	74	70	10	+250	106
B-18	93	1140	708.4	.32	.80	.87	135	74	70	10	+250	106
B-17	96	1143	709.89	.30	.73	.73	140	76	70	10	+250	106
B-16	99	1146	711.25	.25	.62	.62	140	78	70	7	+250	108
B-15	102	1149	712.46	.21	.47	.48	140	78	72	6	+250	108
B-14	105	1152	713.58	.23	.45	.46	140	78	72	6	+250	108
B-13	108	1155	714.70	.24	.6	.58	155	78	72	6.5	+250	113
B-12	111	1158	716.20	.44	1.1	.78	145	78	72	10.0	+250	110
B-11	114	1201	717.92	.50	1.2	1.2	140	80	74	12.0	+250	107
B-10	117	1204	719.80	.48	1.2	1.2	140	84	74	13.0	+250	105
[illegible]	120	1207	721.68	.50	1.2	1.2	140	86	74	12.5	+250	107
[illegible]	123	1210	723.48	.50	1.2	1.3	140	89	76	12.0	+250	106
[illegible]	126	1213	725.27	.53	1.3	1.3	135	90	76	12.0	+250	108
[illegible]	129	1216	726.95	.54	1.3	1.3	135	92	78	13.0	+250	107
[illegible]	132	1219	728.87	.52	1.3	1.2	140	94	78	12.0	250	107
[illegible]	135	1221	730.16	.58	1.4	.93	150	96	80	20.0	250	108
[illegible]	138	1224	731.34	.55	1.3	[illegible]	135	94	80	20.0	250	107
[illegible]	141	1227	732.84	.57	1.4	.83	140	96	80	21.0	250	106
[illegible]	144	1230	734.617	.50	1.2	1.1	135	98	82	20.0	250	108
	144		76.792			1.09	139.8	77.0				
			70119.998									

Imp. around 65

EPA (Dun 236
1 72

TRW

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-15-80

SAMPLING LOCATION #4 Boiler Outlet

SAMPLE TYPE BaP

RUN NUMBER SJO-1

SAMPLE BOX NUMBER

CLEAN-UP MAN McR

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER	mg
FILTER NUMBER N.A.	CONTAINER	mg
FRONT HALF SUBTOTAL		mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
BACK HALF SUBTOTAL		mg
TOTAL WEIGHT		mg

MOISTURE

NOTE

LOSS OF APPROXIMATE (80-100ML) OF CONDENSATE AT PORT CHANGE

IMPINGERS 447.5+44=

FINAL VOLUME 491.5 ml

INITIAL VOLUME 200 ml

NET VOLUME 291.5 ml

SILICA GEL

FINAL WEIGHT 2365 g

INITIAL WEIGHT 200 g

NET WEIGHT 365 g

TOTAL MOISTURE 328 g

408

EPA (Dur) 231

A-31

D-23

ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

30.13

PLANT Port St. Joe
DATE 1/19/80
SAMPLING LOCATION scrubber outlet
SAMPLE TYPE B20
RUN NUMBER SJO-2
OPERATOR Jurieux, Pickett
AMBIENT TEMPERATURE 75
BAROMETRIC PRESSURE 30.12
STATIC PRESSURE, (P_s) +.1" H_2O
FILTER NUMBER (s) N.A.

PROBE LENGTH AND TYPE 10' S.S.
NOZZLE I.D. .245
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER
METER BOX NUMBER 3E
METER $\Delta H_@$ 1.96
C FACTOR .76
PROBE HEATER SETTING maximum
HEATER BOX SETTING maximum
REFERENCE Δp [illegible]

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

Preliminary leak check <.02 — final leak check / Trap, ± in

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	~~IMPINGER~~ TEMPERATURE, °F
		1004	735.180									
24	3	1007	736.74	.42	1.0	1.1	140°	60	60	10	240°	91
23	6	1010	738.31	.41	1.0	1.0	140	62	60	10		89
22	9	1013	740.00	.49	1.2	1.2	140	62	60	11		89
21	12	1015	741.10	.38	.93	.93	140	68	60	10		92
20	15	1018	742.32	.20	.49	.50	140	68	62	6		92
19	18	1021	743.44	.12	.29	.30	140	68	62	4	275	92
18	21	1024	744.34	.04	.20	.20	141	68	62	2	265	92
17	24	1027	745.17	.06	.15	.15	141	68	64	2		93
16	27	1030	745.94	.05	.12	.12	141	68	64	2		92
15	30	1033	746.82	.12	.29	.30	141	68	64	5		96
14	33	1036	747.90	.16	.39	.38	135	70	64	6	278	96
13	36	1039	749.14	.12	.30	.31	135	70	66	5		93
12	39	1042	750.22	.27	.65	.65	135	70	66	9		95
11	42	1045	751.68	.41	1.0	1.0	150	72	66	12	275	99
10	45	1047	752.88	.45	1.1	1.1	150	78	68	13	275	97
9	47	1051	755.05	.47	1.2	1.2	142	78	66	14		98
8	50	1054	756.87	.50	1.2	1.2	142	78	68	14		98
7	53	1057	758.49	.55	1.35	1.2	142	80	70	14		103
6	56	1100	760.67	.52	1.3	1.3	142	80	70	15	304	101
5	59	1103	762.03	.52	1.3	1.3	142	81	70	15	304	99
4	62	1106	763.96	.55	1.3	1.4	140	81	70	15		99
3	65	1109	765.70	.57	1.4	1.4	140	82	70	15		102
2	68	1112	767.64	.58	1.4	1.4	142	82	70	15	294	103

COMMENTS:

EPA (Dur) 235

A-32

D-26

550-2

trap skin

[illegible] NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr VELOCITY)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	~~IMPINGER TEMPERATURE~~ °F	
			764.64										
1	71	1115	769.666	.52	1.5	1.5	140	84	70	15	294	102	
		1200											
		1203	771.4	.74	1.75	1.6	140	70	70	20	220	124	50
3		1206	773.5	.84	2.0	1.5	140	72	70	20		122	
2		1209	775.6	.74	1.75	1.5	140	74	70	20		125	
1		1212	777.4	.60	1.5	1.5	140	70	71	20	220	126	58
20		1215	779.3	.50	1.2	1.2	140	80	72	20	245	128	
19		1218	781.6	.35	.87	.87	140	82	72	15	—	127	
18		1221	782.6	.25	.6	.6	140	82	72	9	—	123	
17		1224	783.9	.20	.48	.48	140	82	72	7	256	125	
16		1227	785.0	.15	.37	.37	140	82	74	6	—	126	
15		1230	786.1	.15	.37	.37	140	82	74	6	—	124	
14		1233	787.5	.20	.49	.49	140	82	76	6	—	123	
13		1236	788.7	.22	.51	.51	140	82	76	7	—	128	
12		1239	790.2	.26	.64	.64	140	82	76	8	—	129	
11		1242	791.4	.26	.64	.64	140	82	76	8	298	126	
10		1245	792.8	.26	.64	.64	140	82	76	8	300	127	
9		1248	794.2	.30	.73	.73	142	82	76	9	—	126	
8		1251	795.8	.29	.71	.71	142	82	77	9	—	129	
7		1254	797.1	.29	.71	.71	142	82	77	9	—	128	
6		1257	798.7	.30	.73	.73	142	86	78	9	—	129	
5		1300	800.5	.27	.65	.65	142	86	79	8	—	133	
4		1303	801.4	.20	.49	.49	142	86	80	6	—	130	
3		1306	802.7	.22	.51	.51	142	88	80	6	—	124	
2		1309	804.0	.21	.50	.50	142	88	80	6	—	132	
1		1312	805.351	.22	.51	.51	142	88	80	6	265	132	
	POST LEAK CHECK @ 15" Hg .025 CFM												
	143		70.171			.82	140.8	73.8					
			60078.509										

Corrected Meter Vol. to account for Leakage over .02 CFM

D-25

(Dun) 236
72

A-3

A-33

TRW

425
112

ANALYTICAL DATA

PLANT St Joe Paper

DATE 1-19-80

SAMPLING LOCATION #4 Boiler Outlet

SAMPLE TYPE BAP

RUN NUMBER SJO-2

SAMPLE BOX NUMBER

CLEAN-UP MAN M&R

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

FILTER NUMBER _____ _____ — CONTAINER _____ _____ mg

_____ _____

_____ _____

FRONT HALF SUBTOTAL _____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT _____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 549 ml

INITIAL VOLUME 200 ml

NET VOLUME 349 ml

SILICA GEL

FINAL WEIGHT 228.8 g _____ g _____ g

INITIAL WEIGHT 208 g _____ g _____ g

NET WEIGHT 20.8 g _____ g _____ g

TOTAL MOISTURE 369.8 g

EPA (Dur) Z31
4/72

D-26

VIRONMENTAL ENGINEERING DIVISION

FIELD DATA

SJO-3

PLANT Port St Joe Paper Company
DATE 1/19/80
SAMPLING LOCATION Scrubber Outlet
SAMPLE TYPE Bap
RUN NUMBER SJO-3
OPERATOR Jonleux / Pickett
AMBIENT TEMPERATURE 80°F
BAROMETRIC PRESSURE 30.12
STATIC PRESSURE, (P_s) +.1" H2O
FILTER NUMBER (s) N.A

30.13

PROBE LENGTH AND TYPE 10' S.S
NOZZLE I.D. 0.245
ASSUMED MOISTURE, % 22%
SAMPLE BOX NUMBER
METER BOX NUMBER 3E
METER $\Delta H_@$ 1.96
C FACTOR .13
PROBE HEATER SETTING Maximum
HEATER BOX SETTING maximum
REFERENCE Δp 0.75

SCHEMATIC OF TRAVERSE POINT LAYOUT

Initial Leak Check <.02 CFM RO READ AND RECORD ALL DATA EVERY 3 MINUTES Final Leak Check <.02 trap skin

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		1516	807.151									
[illegible]	3	1519	809.3	.95	2.3	2.2	140	76	76	18	235	106
[illegible]	6	1522	811.6	.90	2.2	2.2	140	74	74	18	—	121
[illegible]	9	1525	813.9	.80	1.95	1.95	140	76	74	16.5	—	122
[illegible]	12	1528	816.2	.70	1.7	1.7	140	78	74	13	—	125
[illegible]	15	1531	818.1	.55	1.35	1.35	140	82	75	9.5	298	127
[illegible]		1534	819.8	.43	1.05	1.05	140	82	75	8	290	129
[illegible]		1537	821.5	.39	.95	.95	140	82	75	7	—	130
[illegible]		1540	823.1	.31	.75	.75	140	82	75	6	—	132
[illegible]		1543	824.5	.29	.70	.70	140	82	75	5	—	131
[illegible]		1546	826.1	.32	.75	.75	140	82	75	5	260	133
[illegible]		1549	827.5	.35	.86	.86	140	82	75	5	260	132
[illegible]		1552	829.1	.40	.98	.98	140	82	75	6.5	260	131
[illegible]		1555	830.8	.44	1.1	1.1	140	80	74	7.5	280	130
[illegible]		1558	833.3	.45	1.10	1.10	140	80	74	8.0	270	129
[illegible]		1601	834.3	.45	1.10	1.10	140	80	74	8.0	268	137
[illegible]		1604	836	.45	1.10	1.10	140	82	76	8.0	667	136
[illegible]		1607	837.8	.47	1.15	1.15	140	82	76	8.0	268	133
[illegible]		1610	839.8	.47	1.15	1.15	140	84	78	8.0	280	126
[illegible]		1613	841.8	.49	1.2	1.2	140	84	78	8.5	250	122
[illegible]		1616	843.3	.45	1.10	1.10	140	85	78	8.5	280	122
[illegible]		1619	845.1	.44	1.1	1.1	140	85	78	8.5	278	124
[illegible]		1622	846.68	.39	.95	.96	140	84	78	7.5	250	129
[illegible]		1625	848.22	.37	.95	.95	140	80	74	7.0	260	121

COMMENTS:

EPA FORM 225

H-35

D-27

550-

trap skip

port B

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
			948.22									
1		1628	849.89	.35	.85	.84	140	80	74	6.5	266	120
		1631	851.550									
		1755	849.550	~~.80~~	~~2.0~~		~~145~~	~~80~~	~~76~~	13.		94
24	3	17[illegible]	853.59	.80	2.0	2.0	145	80	76	13	[illegible]	~~116~~ 94
23	6	[illegible]	855.48	.78	1.9	1.9	142	72	72	13	240	116
22	9	[illegible]	857.51	.74	1.8	1.8	141	78	72	13	240	119
[illegible]	12	1807	859.62	.66	1.8	1.8	142	80	74	13	245	120
[illegible]	15	1810	861.68	.56	1.4	1.5	142	82	74	11	250	120
[illegible]	18	1813	863.44	.48	1.2	1.3	142	84	74	9	240	121
[illegible]	21	1816	865.19	.46	1.1	1.1	142	84	74	9	245	120
[illegible]	24	1819	866.79	.37	.91	.92	142	84	76	8	250	126
[illegible]	27	1822	868.48	.30	.73	.74	142	82	74	6	230	122
[illegible]	30	1825	869.72	.30	.73	.74	141	82	76	6	240	127
[illegible]	33	1828	871.28	.26	.64	.64	141	80	74	5	250	127
[illegible]	36	1831	872.67	.29	.71	.71	142	80	74	5	230	127
[illegible]	39	1834	874.18	.45	1.1	1.1	140	80	76	9	250	127
[illegible]	42	1837	875.89	.50	1.2	1.2	141	81	75	9	250	127
[illegible]	45	1840	877.68	.50	1.2	1.1	141	82	74	9	240	127
[illegible]	48	1843	879.42	.53	1.3	1.3	140	84	76	9	240	127
8	51	1846	881.48	.56	1.4	1.4	141	86	80	10	260	124
7	54	1849	883.14	.56	1.4	1.4	140	84	80	10	240	124
[illegible]	57	1852	885.39	.56	1.4	1.4	141	86	78	10	240	124
[illegible]	60	1855	886.91	.51	1.2	1.3	140	88	78	9	250	131
[illegible]	63	1858	888.77	.60	1.5	1.4	140	88	78	10	245	132
3	66	1901	890.64	.55	1.3	1.3	140	88	80	9	250	131
2	69	1904	892.47	.54	1.3	1.3	140	89	80	9	255	136
1	72	1909	894.535	.56	1.4	1.4	140	89	80	10	240	136
	144		87.384			1.23	140.6	78.9				
		74536.037										

D-28

EPA (Run 236
4 72

TRW

17
385
254

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-19-80

SAMPLING LOCATION #4 Boiler Outlet

SAMPLE TYPE BAP

RUN NUMBER SJO-3

SAMPLE BOX NUMBER

CLEAN-UP MAN MCR

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
FILTER NUMBER _____ _____	CONTAINER _____	_____ mg
_____ _____		
_____ _____		
	FRONT HALF SUBTOTAL	_____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	ETHER-CHLOROFORM EXTRACTION	_____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	BACK HALF SUBTOTAL	_____ mg
	TOTAL WEIGHT	_____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 658 ml

INITIAL VOLUME 200 ml

NET VOLUME 458 ml

SILICA GEL

FINAL WEIGHT	231.5 g	_____ g	_____ g
INITIAL WEIGHT	200 g	_____ g	_____ g
NET WEIGHT	31.5 g	_____ g	_____ g

TOTAL MOISTURE 689.5 g

EPA (Dur) 231
4/72

A-37

D-29

ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

SJO-4

PLANT [illegible]
DATE [illegible]
SAMPLING LOCATION Scrubber Outlet
SAMPLE TYPE [illegible]
RUN NUMBER SJO-4
OPERATOR Pickett, Jonleux
AMBIENT TEMPERATURE 75
BAROMETRIC PRESSURE 30.12
STATIC PRESSURE, (P_s) .1" H_2O
FILTER NUMBER (s) N.A.

PROBE LENGTH AND TYPE 10' s.s.
NOZZLE I.D. 0.245
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER 2E
METER BOX NUMBER 3E
METER $\Delta H_@$ 1.96
C FACTOR .77
PROBE HEATER SETTING maximum
HEATER BOX SETTING maximum
REFERENCE Δp 0.75

30.13

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

initial leak check < .02 final leak check .015 trap skim

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		~~1046~~	897.886									
24	3	1048	899.66	.69	1.65	1.65	140	70	70	11	243	135
23	6	1051	901.77	.81	2.0	1.9	140	74	70	16	231	129
22	9	1054	903.86	.70	1.7	1.9	140	76	70	15	231	126
21	12	1057	905.75	.56	1.35	1.4	140	80	72	10	258	124
20	15	1100	907.56	.45	1.1	1.2	140	82	72	9	261	126
19	18	1103	909.11	.39	.95	.98	141	84	72	8	242	128
18	21	1106	910.54	.32	.69	.69	142	88	74	6	245	133
17	24	1109	911.90	.28	.68	.69	141	90	76	6	265	130
16	27	1112	913.25	.25	.61	.61	142	90	78	5	250	133
15	30	1115	914.56	.22	.53	.52	141	92	80	4	244	138
14	33	1118	915.67	.20	.50	.50	141	94	80	4.5	270	138
13	36	1121	917.01	.22	.53	.53	141	94	82	5	255	130
12	39	1124	918.27	.34	.84	.84	142	98	84	7	260	131
11	42	1127	920.11	.39	.95	.95	141	98	84	7	275	128
10	45	1130	921.49	.42	1.0	1.0	141	100	86	8	250	123
9	48	1133	993.31	.42	1.0	1.0	142	100	86	7	240	123
8	51	1136	924.83	.40	.98	1.0	142	104	90	8	270	122
7	54	1139	926.42	.38	.93	.94	142	106	90	8	255	123
6	57	1142	928.06	.39	.95	.95	142	104	92	8	245	122
5	60	1145	929.66	.36	.88	.88	142	108	94	7	270	123
4	63	1148	931.13	.32	.69	.69	143	108	94	6	250	122
3	66	1151	932.56	.33	.82	.82	142	110	96	6.5	260	123
2	69	1154	934.09	.33	.82	.82	143	110	96	7	270	122

COMMENTS:

A

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EPA Report 235

S 80-4

trap skin

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
1	72	1157	935.640	.31	.76	.76	143	108	98	6	245	121
		1232	935.640 ✓									
B 24	3	1238	937.6	.72	1.8	1.8	142	90	94	15	132	129
23	6	1238	939.32	.68	1.7	1.7	143	92	90	15	135	126
22	9	1241	941.40	.89	2.15	2.0	142	96	92	19	135	126
21	12	1244	943.62	.81	2.0	1.9	142	99	90	19	140	123
20	15	1247	945.78	.83	1.9	1.9	141	100	90	18.5	145	122
19	18	1250	947.93	.72	1.8	1.8	143	100	90	17.0	139	121
18	21	1253	949.96	.63	1.5	1.5	142	102	90	14.0	138	122
17	24	1256	951.02	.56	1.35	1.4	143	104	90	11.5	140	127
16	27	1259	953.72	.49	1.2	1.2	141	105	92	10.0	139	130
15	30	1302	955.21	.34	.84	.84	142	106	92	8.0	139	131
14	33	1305	957.07	.50	1.25	1.2	140	106	92	10.0	140	132
13	36	1308	958.58	.35	.85	.85	142	104	92	7.5	139	129
12	39	1311	960.42	.47	1.15	1.1	140	104	92	9.0	139	130
11	42	1314	962.3	.47	1.15	1.1	142	104	93	9.0	139	128
10	45	1317	963.68	.45	1.1	1.1	142	104	92	9.5	137	127
9	48	1320	965.38	.45	1.1	1.1	142	104	92	9.5	138	126
8	51	1323	967.45	.44	1.05	1.05	140	100	92	9.0	130	125
7	54	1326	964.78	.44	1.05	1.1	140	98	90	9.0	131	123
6	57	1329	970.48	.42	1.0	1.0	140	94	90	9.0	130	124
5	60	1332	972.14	.42	1.0	1.0	140	92	88	9.0	125	129
4	63	1335	973.95	.40	.99	.99	146	92	86	9.0	125	131
3	66	1338	975.42	.39	.95	.95	145	94	86	9.0	124	131
2	69	1341	977.03	.37	0.90	.90	139	94	86	9.0	125	131
1	72	1344	978.551	.32	.79	.79	136	92	86	7.0	125	131
	144		80.665			1.11	141.44	91.6				
	71133.510											

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4 72

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TRW

773
412
3
588

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-20-80

SAMPLING LOCATION #4 Boiler Outlet

SAMPLE TYPE BAP

RUN NUMBER SJO-4

SAMPLE BOX NUMBER

CLEAN-UP MAN MGR

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
FILTER NUMBER _____ _____	CONTAINER _____	_____ mg
_____ _____		
_____ _____		
	FRONT HALF SUBTOTAL	_____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	ETHER-CHLOROFORM EXTRACTION	_____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	BACK HALF SUBTOTAL	_____ mg
	TOTAL WEIGHT	_____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 588 ml

INITIAL VOLUME 200 ml

NET VOLUME 388 ml

SILICA GEL

FINAL WEIGHT 225.6 g _____ g _____ g

INITIAL WEIGHT 200 g _____ g _____ g

NET WEIGHT 25.6 g _____ g _____ g

TOTAL MOISTURE 413.6 g

EPA (Dur) 231
4/72

H-40

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ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

5JO-5

PLANT Port St Joe Paper Mill
DATE 1/20/80
SAMPLING LOCATION scrubber outlet
SAMPLE TYPE B2P
RUN NUMBER 5JO-5
OPERATOR Jonleux, Pickett
AMBIENT TEMPERATURE 75 °F
BAROMETRIC PRESSURE 30.12
STATIC PRESSURE, (P_s) +.1" H_2O
FILTER NUMBER (s) N.A.

PROBE LENGTH AND TYPE 10' S.S.
NOZZLE I.D. 0.245
ASSUMED MOISTURE, % 20
SAMPLE BOX NUMBER 2E
METER BOX NUMBER 3E
METER $\Delta H_@$ 1.96
C FACTOR .78
PROBE HEATER SETTING maximum
HEATER BOX SETTING maximum
REFERENCE Δp 0.75

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

Preliminary leak check < .02 final leak check

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	[redacted] TEMPERATURE, °F TRAP SKIN
	0	1545	981.399									
24	3	1548	982.7	.70	1.7	1.7	142	68	67	11	240	117
23	6	1551	985.0	.73	1.8	1.8	142	70	69	11	260	120
22	9	1554	986.8	.68	1.68	1.68	142	71	69	11	255	120
21	12	1557	988.8	.60	1.45	1.45	142	72	68	9	235	116
20	15	1600	990.5	.49	1.2	1.2	135	72	68	8	248	118
19	18	1603	992.2	.43	1.05	1.05	136	72	68	7	258	114
18	21	1606	995.9	.37	.90	.90	140	73	68	6	240	114
17	24	1609	995.4	.34	.84	.87	140	73	68	5.5	255	120
16	27	1612	996.9	.34	.84	.84	139	73	68	5.5	262	120
15	30	1615	998.5	.34	.84	.84	138	75	68	5.5	240	119
14	33	1618	1000.0	.37	.90	.90	139	80	70	6	260	120
13	36	1621	1001.7	.37	.95	.95	140	80	72	6	265	116
12	39	1624	1003.4	.39	.95	.95	139	82	72	6	248	116
11	42	1627	1004.3	.37	.90	.90	137	82	73	6	262	116
10	45	1630	1006.38	.37	.90	.90	135	78	72	6	265	119
9	48	1633	1008.00	.37	.90	.90	135	78	72	6	250	119
8	51	1636	1009.52	.37	.90	.90	135	76	72	6	266	120
7	54	1639	1011.13	.37	.90	.90	134	78	72	6	273	120
6	57	1642	1012.62	.35	.75	.75	135	76	72	5	250	120
5	60	1645	1014.11	.34	.73	.73	135	76	72	5	262	120
4	63	1648	1015.57	.35	.75	.75	135	80	73	5	260	121
3	66	1651	1017.06	.37	.90	.90	135	80	74	5	250	121
2	69	1654	1018.53	.35	.75	.75	134	79	74	5	264	120

COMMENTS:

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D-33

5JO-

[illegible]	[illegible]	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	[illegible] DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	[illegible] TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	[illegible] TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
7[illegible]	[illegible]	1020.034	.34	.73	.23	12[illegible]	80	74	5	[illegible]	117
0	[illegible]	1020.034									
3	1733	1021.4	.80	2.0	.8	145 ✓	70	70	15	210 ✓	122
6	1736	1022.2	.75	1.85	.97	142	72	70	20	200	120
9	1739	1024.08	.79	1.85	1.[illegible]	143 ✓	74	70	20	213	12[illegible]
12	1742	1026.[illegible]	.57	1.4	1.3	140 ✓	78	72	20	230	12[illegible]
15	1745	1027.48	.38	.93	.93	138 ✓	80	72	12	225 ✓	120
18	1748	1029.19	.40	.98	.98	142	80	72	12	220	120
21	1751	1030.79	.36	.89	.89	142	80	74	12	225 ✓	118
24	1754	1032.33	.33	.82	.82	141	80	74	11	230 ✓	118
27	1757	1033.69	.32	.79	.79	142	78	74	10	235 ✓	117
30	1800	1035.21	.28	.69	.69	142	76	72	9	242	116
33	1803	1036.49	.28	.69	.69	142	74	72	9.5	248	120
36	1806	1037.89	.28	.69	.69	139	76	72	9.0	232	121
39	1809	1039.58	.33	.82	.81	142	78	72	10.0	230	124
42	1812	1041.10	.45	1.1	1.1	143	84	74	12.0	246	124
45	1815	1042.76	.51	1.25	1.2	144	84	78	14.0	243	125
48	1818	1044.56	.53	1.3	1.3	143	84	80	16.0	235	124
51	1821	1046.47	.55	1.35	1.35	144	84	78	16.0	242	120
54	1824	1048.22	.55	1.35	1.35	143	82	80	17.0	251	118
57	1827	1050.21	.57	1.45	1.45	143	80	78	19.0	233	117
60	1830	1052.00	.55	1.35	1.35	141	80	72	19.0	223	117
63	1833	1053.90	.57	1.45	1.45	141	80	72	19.0	238	118
66	1836	1056.39	.55	1.35	1.35	142	80	73	19.0	250	120
69	1839	1058.36	.54	1.3	1.3	142	82	73	19.0	231	120
72	1842	1060.285	.49	1.2	1.2	141	82	74	18.0	240	120
144		78.886			1.05	139.73	74.8				
		71040.065									

A-42

TRW

5/5
85
00

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-20-80

SAMPLING LOCATION #4 OUTLET

SAMPLE TYPE BAP

RUN NUMBER SJO-5

SAMPLE BOX NUMBER

CLEAN-UP MAN M & R.

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

FILTER NUMBER _____ _____ — CONTAINER _____ _____ mg

FRONT HALF SUBTOTAL _____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT _____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 600 ml

INITIAL VOLUME 200 ml

NET VOLUME 400 ml

SILICA GEL

FINAL WEIGHT 230.5 g _____ g _____ g

INITIAL WEIGHT 200 g _____ g _____ g

NET WEIGHT 30.5 g _____ g _____ g

TOTAL MOISTURE 430.5 g

EPA (Dur) 231

D-35

ENVIRONMENTAL ENGINEERING DIVISION

FIELD DATA

S30-6

PLANT: Jon-Paper Co.
DATE:
LOCATION: Rubber Outlet
SOURCE TYPE: S30-6
OPERATOR: Williams, Pickett
AMBIENT TEMPERATURE: 65-75°F
BAROMETRIC PRESSURE: 30.10
STATIC PRESSURE, (P_s): T_s 1" H_2O
METER NUMBER (s): N.A.

PROBE LENGTH AND TYPE: 10's, S
NOZZLE I.D.: 0.245
ASSUMED MOISTURE, %:
SAMPLE BOX NUMBER: 3E
METER BOX NUMBER: 3E
METER ΔH@: 1.96
C FACTOR: .78
PROBE HEATER SETTING: maximum
HEATER BOX SETTING: maximum
REFERENCE Δp: 0.75

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

Preliminary leak check 4.02 /min final leak check .02 /min

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	0900	1060.578									
24	3	0903	1062.9	.74	1.8	1.8	136	68	68	11	200	125
23	6	0906	1064.3	.75	1.8	1.8	142	68	68	13.5		127
22	9	0909	1065.9	.65	1.6	1.6	142	70	68	14		
	12	0912	1067.8	.55	1.35	1.35	142	72	68	13		
20	15	0915	1069.46	.43	1.05	1.1	144	72	68	9		
19	18	0918	1071.04	.36	0.9	0.9	148	72	66	9		
18	21	0921	1072.53	.33	.82	.82	145	74	66	7	255	135
17	24	0924	1073.93	.29	.71	.71	140	76	68	6.5	270	137
16	27	0927	1075.29	.28	.69	.69	144	78	68	6.0	285	135
15	30	0930	1076.62	.26	.64	.64	135	76	68	6.0	285	135
14	33	0933	1077.95	.25	.62	.62	140	80	70	6.0	260	137
13	36	0936	1079.31	.28	.69	.69	142	78	70	6.0	273	137
12	39	0939	1081.00	.38	.93	.93	145	80	70	8.0	290	132
11	42	0942	1082.45	.41	1.05	1.0	140	80	72	9.0	260	130
10	45	0945	1084.13	.45	1.15	1.15	142	82	72	9.0	272	130
9	48	0948	1085.89	.47	1.15	1.15	140	84	72	9.0	298	132
8	51	0951	1087.66	.49	1.2	1.2	135	84	74	9.5	275	135
7	54	0954	1089.40	.50	1.25	1.25	138	84	74	10.0	262	132
6	57	0957	1091.12	.49	1.2	1.2	135	85	74	10.0	280	132
5	60	1000	1092.86	.47	1.15	1.15	132	86	76	10.0	290	130
4	63	1003	1094.55	.47	1.15	1.15	138	88	76	10.0	265	130
3	66	1006	1096.24	.47	1.15	1.15	132	88	76	10.0	282	130
2	69	1009	1097.92	.48	1.15	1.15	135	90	78	9.0	292	132

COMMENTS:

EPA Form 235

A-114

P-34

SJO-6

Traverse Point Number	Sampling Time, min	Clock Time (24 hr Clock)	Gas Meter Reading (V_m), ft³	Velocity Head (Δp_s), in H_2O	Orifice Pressure Differential (ΔH), in H_2O Desired	Orifice Pressure Differential (ΔH), in H_2O Actual	Stack Temperature (T_s), °F	Dry Gas Meter Temperature Inlet ($T_{m\,in}$), °F	Dry Gas Meter Temperature Outlet ($T_{m\,out}$), °F	Pump Vacuum, in Hg	Sample Box Temperature, °F	Impinger Temperature, °F
1	72	1012	1099.871	.45	1.15	1.15	139	90	84	9.0	281	140
		1045	1099.871									
4	03	1048	1101.8	.67	1.68	1.68	135	79	78	11.5	235	128
3	06	1051	1103.6	.67	1.68	1.68	142	80	80	11.5	268	129
[illegible]	09	1054	1105.4	.62	1.55	1.55	135	84	81	11.5	242	130
21	12	1057	1107.1	.42	1.05	1.05	147	86	82	11.0	260	132
20	15	1060	1108.6	.33	.82	.82	140	87	80	9	255	132
19	18	1103	1110.2	.28	.71	.71	139	86	82	8	240	137
18	21	1106	1111.9	.30	.72	.72	139	86	82	7.5	270	142
17	24	1109	1113.0	.25	.61	.61	138	87	82	6.5	268	145
16	27	1112	1114.4	.26	.62	.62	139	86	80	6.5	259	139
15	30	1115	1115.8	.28	.70	.70	135	86	80	6.0	258	140
14	33	1118	1117.3	.30	.72	.72	137	86	80	7.5	268	135
13	36	1121	1118.3	.32	.80	.80	137	89	81	8.0	250	135
12	39	1124	1120.1	.33	.82	.82	137	94	82	8.0	255	130
11	42	1127	1121.6	.30	.74	.74	140	98	84	7.5	275	130
10	45	1130	1122.9	.29	.72	.72	139	100	85	7.0	260	126
9	48	1133	1124.6	.28	.70	.70	137	102	86	7.0	250	127
8	51	1136	1125.9	.27	.68	.68	137	104	86	7.0	260	135
7	54	1139	1127.3	.25	.61	.61	139	106	90	6.5	268	130
6	57	1142	1128.6	.24	.54	.54	138	106	92	5.5	250	126
5	60	1145	1129.8	.20	.49	.49	140	106	93	5.0	265	125
4	63	1148	1131.2	.19	.46	.46	139	106	94	4.75	270	125
3	66	1151	1132.2	.20	.49	.49	138	104	94	5.0	265	130
2	69	1154	1133.5	.15	.36	.36	137	102	94	4	268	127
1	72	1157	1134.339	.10	.25	.25	140	101	94	3	278	126
	144		73.8.21			.93	139.14	82.5				
			64242.544									

EPA (Dur) 236
4 72

A-45

D-37

TRW

418
160
578

ANALYTICAL DATA

PLANT St. Joe Paper

DATE 1-21-80

SAMPLING LOCATION #4 Boiler Outlet

SAMPLE TYPE BAP

RUN NUMBER SJO-6

SAMPLE BOX NUMBER

CLEAN-UP MAN MGR

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
FILTER NUMBER _____ _____	CONTAINER _____	_____ mg
FRONT HALF SUBTOTAL		_____ mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
	ETHER-CHLOROFORM EXTRACTION	_____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER _____	_____ mg
BACK HALF SUBTOTAL		_____ mg
TOTAL WEIGHT		_____ mg

MOISTURE

IMPINGERS

FINAL VOLUME 578 ml

INITIAL VOLUME 200 ml

NET VOLUME 378 ml

SILICA GEL

FINAL WEIGHT	221.0 g	_____ g	_____ g
INITIAL WEIGHT	200 g	_____ g	_____ g
NET WEIGHT	21.0 g	_____ g	_____ g

TOTAL MOISTURE 399.0 g

EPA (Dur) 231
4/72

A-14 D-38

BαP - CALCULATIONS

TABLE 3

Test #	BαP (μg)	Meter (DSCF)	Meter (DSCM)	Stack (DSCFM)	Stack (DSCMM)	BαP (lb/DSCF)	BαP (mg/DSCM)	BαP (lb/hr)	BαP (kg/hr)
SJI - 1	0.1497	107.864	3.053	86,680	2453.0	3.0×10^{-12}	4.90×10^{-5}	1.6×10^{-5}	7.2×10^{-6}
SJO - 1	0.0384	75.996	2.151	66,364	1878.1	1.1×10^{-12}	1.78×10^{-5}	0.4×10^{-5}	2.0×10^{-6}
SJI - 2	0.0000	74.078	2.096	73,190	2071.3	0.00	0.00	0.00	0.00
SJO - 2	0.0273	69.271	1.960	56,886	1609.9	0.8×10^{-12}	1.39×10^{-5}	0.3×10^{-5}	1.2×10^{-6}
SJI - 3	0.0155	83.329	2.358	84,073	2379.3	0.4×10^{-12}	0.66×10^{-5}	0.2×10^{-5}	0.9×10^{-6}
SJO - 3	0.1374	86.413	2.445	70,250	1988.1	3.4×10^{-12}	5.62×10^{-5}	1.4×10^{-5}	6.5×10^{-6}
SJI - 4	0.0300	94.210	2.666	92,399	2614.9	0.6×10^{-12}	1.12×10^{-5}	0.3×10^{-5}	1.5×10^{-6}
SJO - 4	0.0000	77.909	2.205	67,349	1906.0	0.00	0.00	0.00	0.00
SJI - 5	0.0150	77.533	2.194	76,136	2154.7	0.4×10^{-12}	0.68×10^{-5}	0.2×10^{-5}	0.8×10^{-6}
SJO - 5	0.2060	78.573	2.224	67,093	1898.7	5.7×10^{-12}	9.26×10^{-5}	2.3×10^{-5}	10.4×10^{-6}
SJI - 6	0.2075	84.936	2.404	84,962	2404.4	0.7×10^{-12}	1.14×10^{-5}	0.4×10^{-5}	1.6×10^{-6}
SJO - 6	0.0075	72.415	2.049	60,655	1716.5	0.2×10^{-12}	0.37×10^{-5}	0.07×10^{-5}	0.3×10^{-6}

BαP TEST RESULTS

SAMPLE	BαP (μg/ml)	Sample Volume (ml)	BαP (μg)	Blank (μg/ml)	Blank (ml)	Blank Total (μg)	BαP (μg)	Sample Total (μg)
SJI - 1								
Filter	.00017	150	.0255	.00023	150	.0345	------	
XAD - 2	.00034	250	.0850	.00029	250	.0725	.0125	
Rinse	.00040	343	.1372	0	200	0	.1372	
Total								0.1497
SJO - 1								
Filter	.00025	150	.0375	.00023	150	.0345	.0030	
XAD - 2	.00029	250	.0725	.00029	250	.0725	0	
Rinse	.00012	295	.0354	0	200	0	.0354	
Total								.0384
SJI - 2								
Filter	.00019	150	.0285	.00023	150	.0345	----	
XAD - 2	.00026	250	.0650	.00029	250	.0725	----	
Rinse	0	363	0	0	200	0	0	
Total								0.0
SJO - 2								
Filter	.00021	150	.0315	.00023	150	.0345	----	
XAD - 2	.00024	250	.0600	.00029	250	.0725	----	
Rinse	.00014	195	.0273	0	200	0	.0273	
Total								0.0273

BαP TEST RESULTS

SAMPLE	BαP (μg/ml)	Sample Volume (ml)	BαP (μg)	Blank (μg/ml)	Blank (ml)	Blank Total (μg)	BαP (μg)	Sample Total (μg)
SJI - 3								
Filter	.00029	150	.0435	.00027	150	.0405	.0030	
XAD - 2	.00033	250	.0825	.00028	250	.0700	.0125	
Rinse	0	365	0	0	200	0	0	
Total								0.0155
SJO - 3								
Filter	.00024	150	.0360	.00027	150	.0405	-----	
XAD - 2	.00032	250	.0800	.00028	250	.0700	.0100	
Rinse	.00052	245	.1274	0	200	0	.1274	
Total								0.1374
SJI - 4								
Filter	.00018	150	.0270	.00023	150	.0345	----	
XAD - 2	.00041	250	.1025	.00029	250	.0725	.0300	
Rinse	0	402	0	0	200	0	0	
Total								0.0300
SJO - 4								
Filter	.00017	150	.0255	.00023	150	.0345	----	
XAD - 2	.00018	250	.0450	.00029	250	.0725	----	
Rinse	0	330	0	0	200	0	0	
Total								0.0

BαP TEST RESULTS

SAMPLE	BαP (μg/ml)	Sample Volume (ml)	BαP (μg)	Blank (μg/ml)	Blank (ml)	Blank Total (μg)	BαP (μg)	Sample Total (μg)
SJI - 5								
Filter	.00023	150	.0345	.00027	150	.0405	----	
XAD - 2	.00034	250	.0850	.00028	250	.0700	.0150	
Rinse	0	375	0	0	200	0	0	
Total								0.0150
SJO - 5								
Filter	.00031	150	.0465	.00027	150	.0405	.0060	
XAD - 2	.00024	250	.0600	.00028	250	.0700	----	
Rinse	.00050	400	.2000	0	200	0	.2000	
Total								0.2060
SJI - 6								
Filter	.00021	150	.0315	.00027	150	.0405	----	
XAD - 2	.00039	250	.0975	.00028	250	.0700	.0275	
Rinse	0	303	0	0	200	0	0	
Total								0.0275
SJO - 6								
Filter	.00027	150	.0405	.00027	150	.0405	0	
XAD - 2	.00031	250	.0775	.00028	250	.0700	.0075	
Rinse	0	195	0	0	200	0	0	
Total								0.0075

TABLE 4. TYPICAL ELEMENTAL ANALYSIS FOR A 8" x 10" FILTER

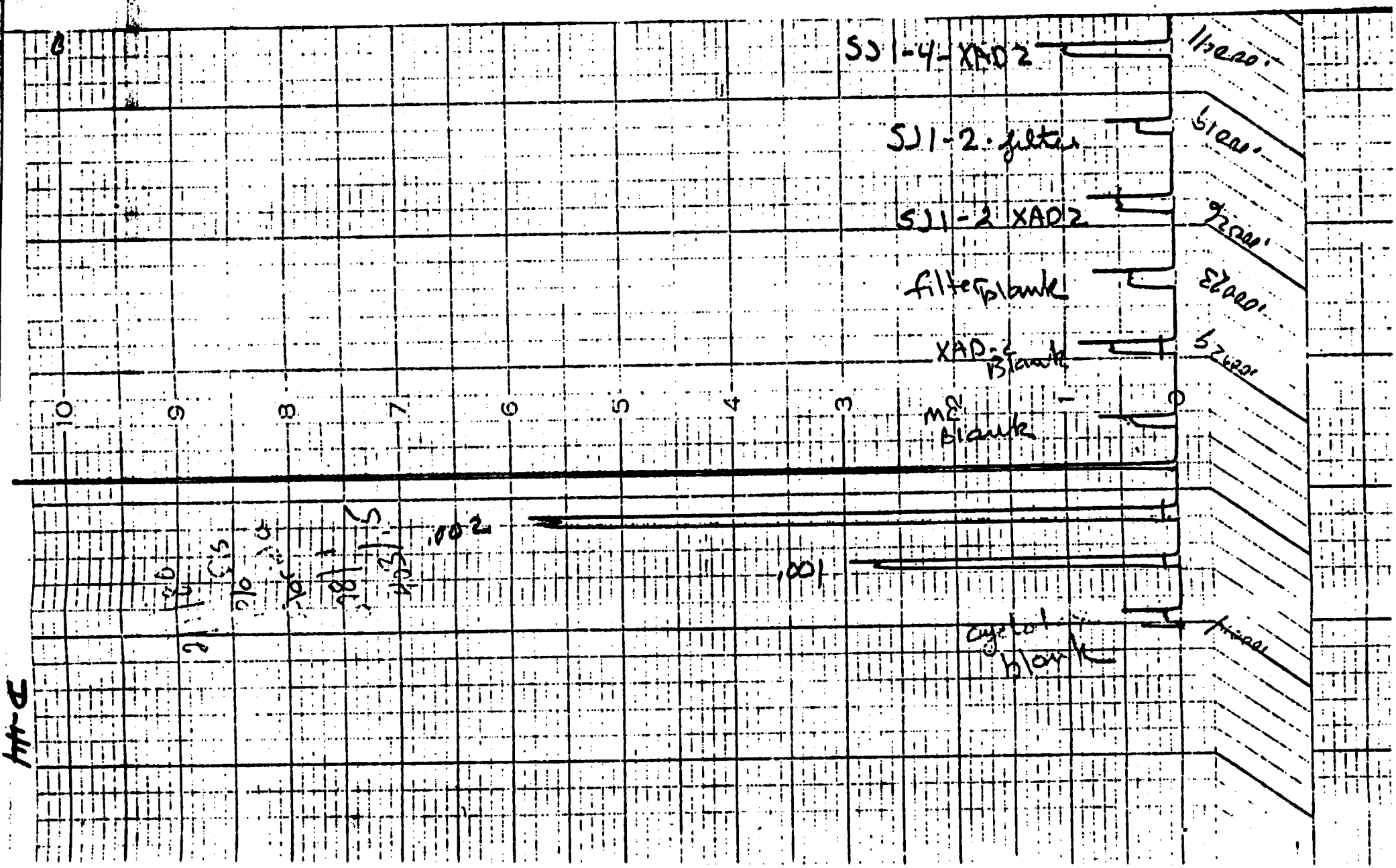
ELEMENT	#25 GLASS
Antimony (Sb)	ND
Arsenic (As)	ND
Benzo(a) Pyrene (BaP)	<.2
Beryllium (Be)	ND
Bismuth (Bi)	ND
Cadmium (Cd)	ND
Chromium (Cr)	<15
Cobalt (Co)	ND
Copper (Cu)	<7.5
Iron (Fe)	140
Lead (Pb)	10
Manganese (Mn)	<10
Molybdenum (Mo)	<10
Nickel (Ni)	6
Tin (Sn)	18
Titanium (Ti)	12
Vanadium (V)	ND
Zinc (Zn)	100
Extractable Ions	
Ammonium (NH_4 +)	238
Fluoride (F^-)	169
Nitrate (No_3-)	25
Phosphate (PO_4)	4.5
Sulfate (So_4=)	4250
OTHER CHARACTERISTICS	
pH	9.0
DOP	99.95%
Tensile strength*	375g
Weight (8" x 10" sheet)	4.2g
Maximum use temperature	540°C

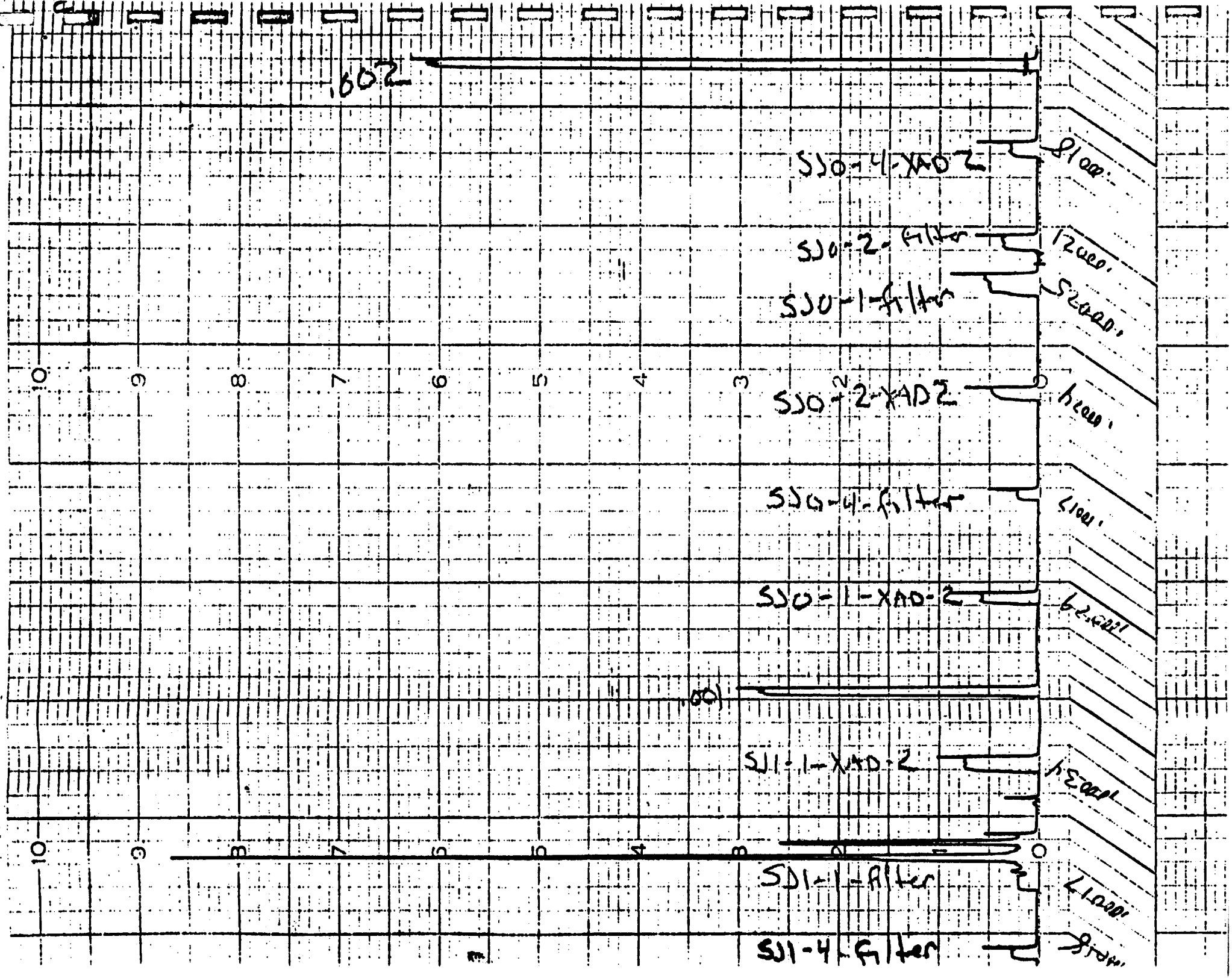
*Expressed in grams per 20 mm wide by 50mm long strip, pulled at rate of 1/2 inch per minute.

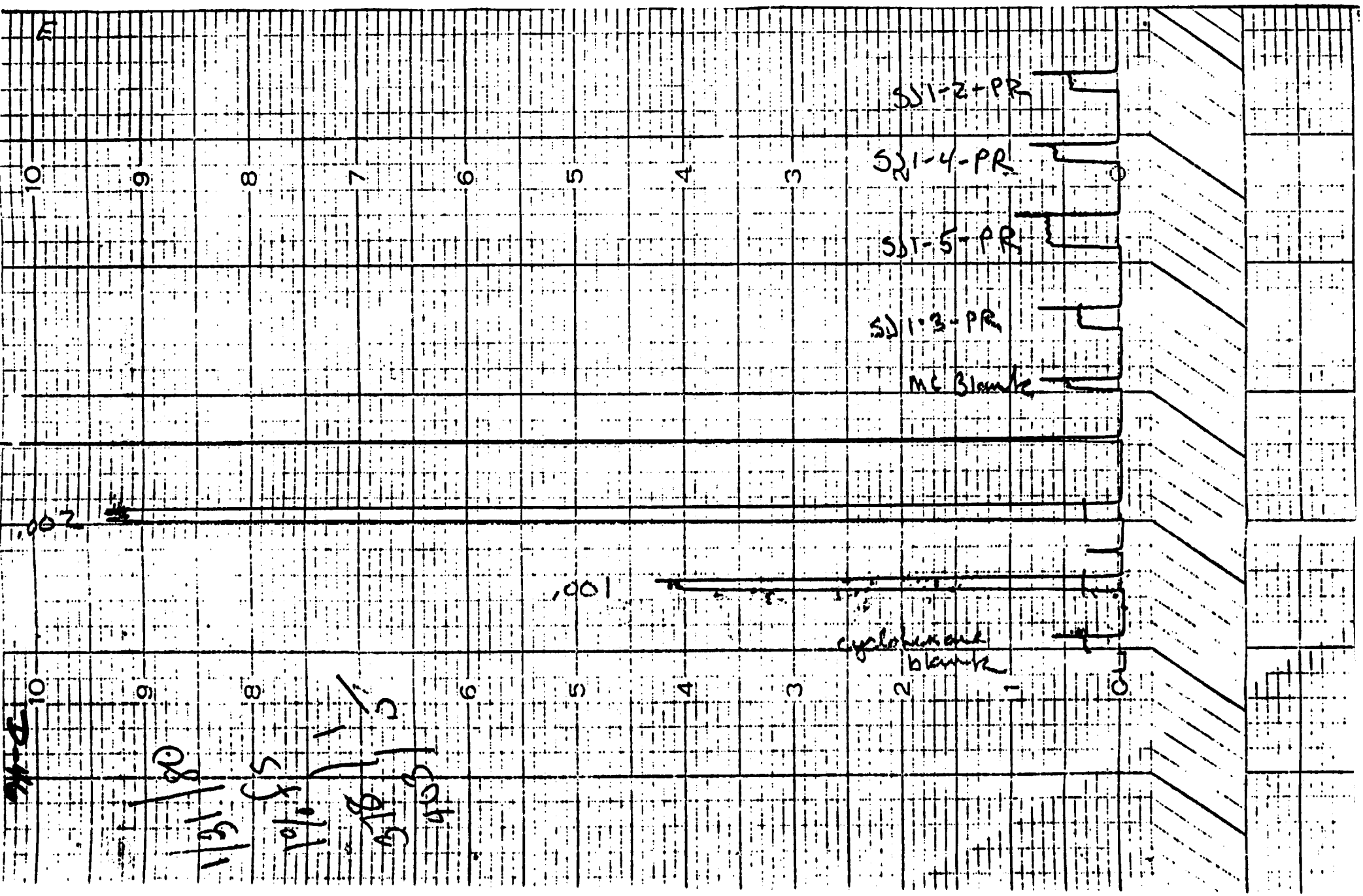
ND = non-detectable

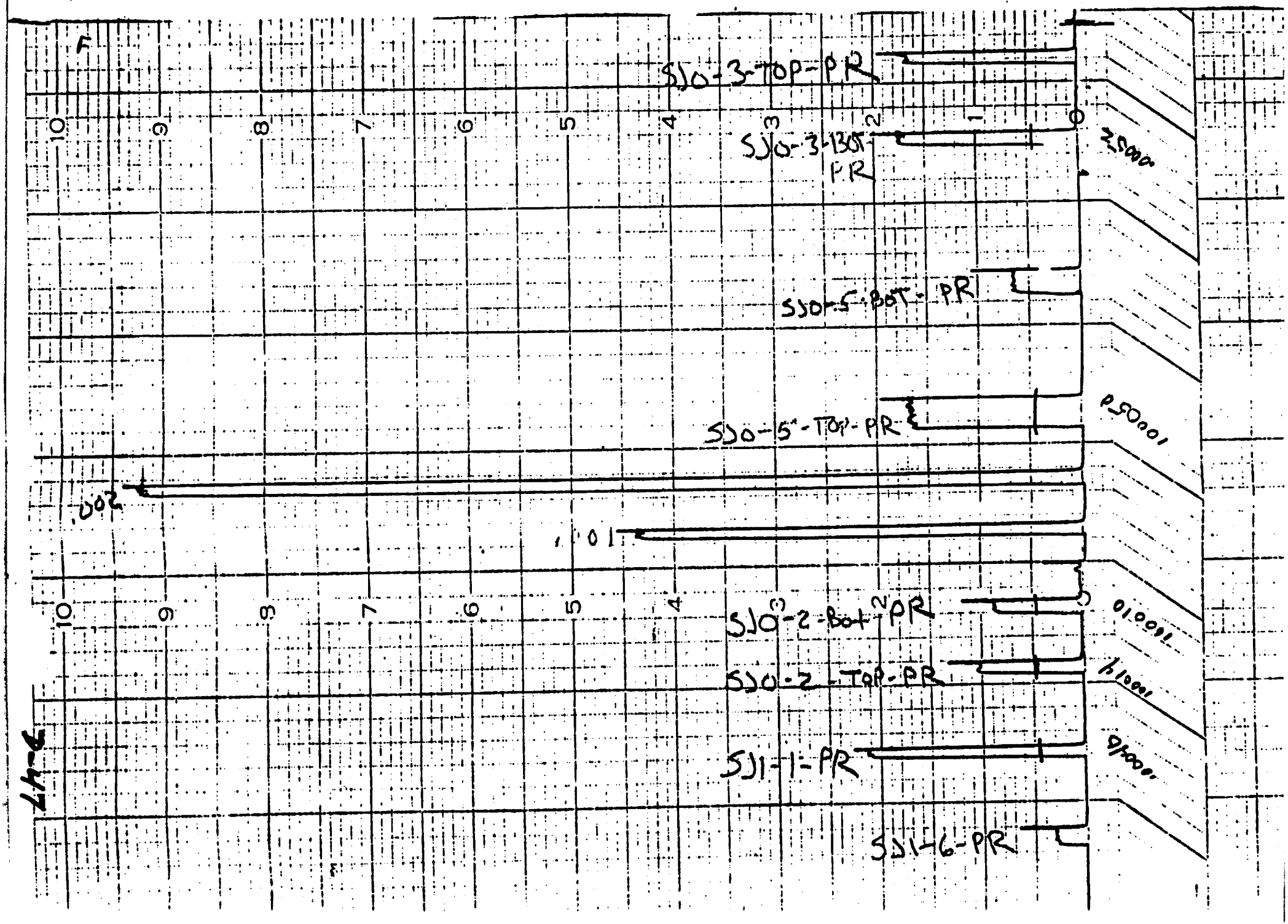
The above physical/chemical properties represent typical values obtained in accordance with accepted EPA test procedures as described in EPA contract #68-02-2952 dated June 16, 1978. Trace elements and extractable ions are expressed as micrograms per 25.4 x 20.3cm sheet.

Fluorescence Spectrophotometer Curves

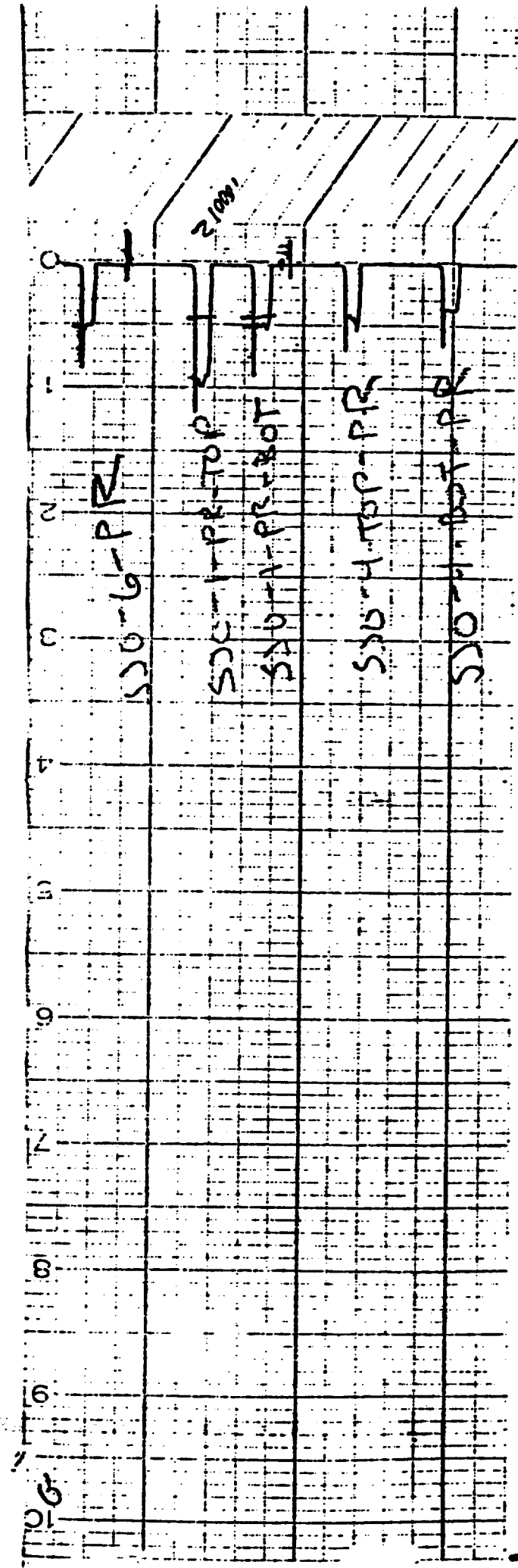


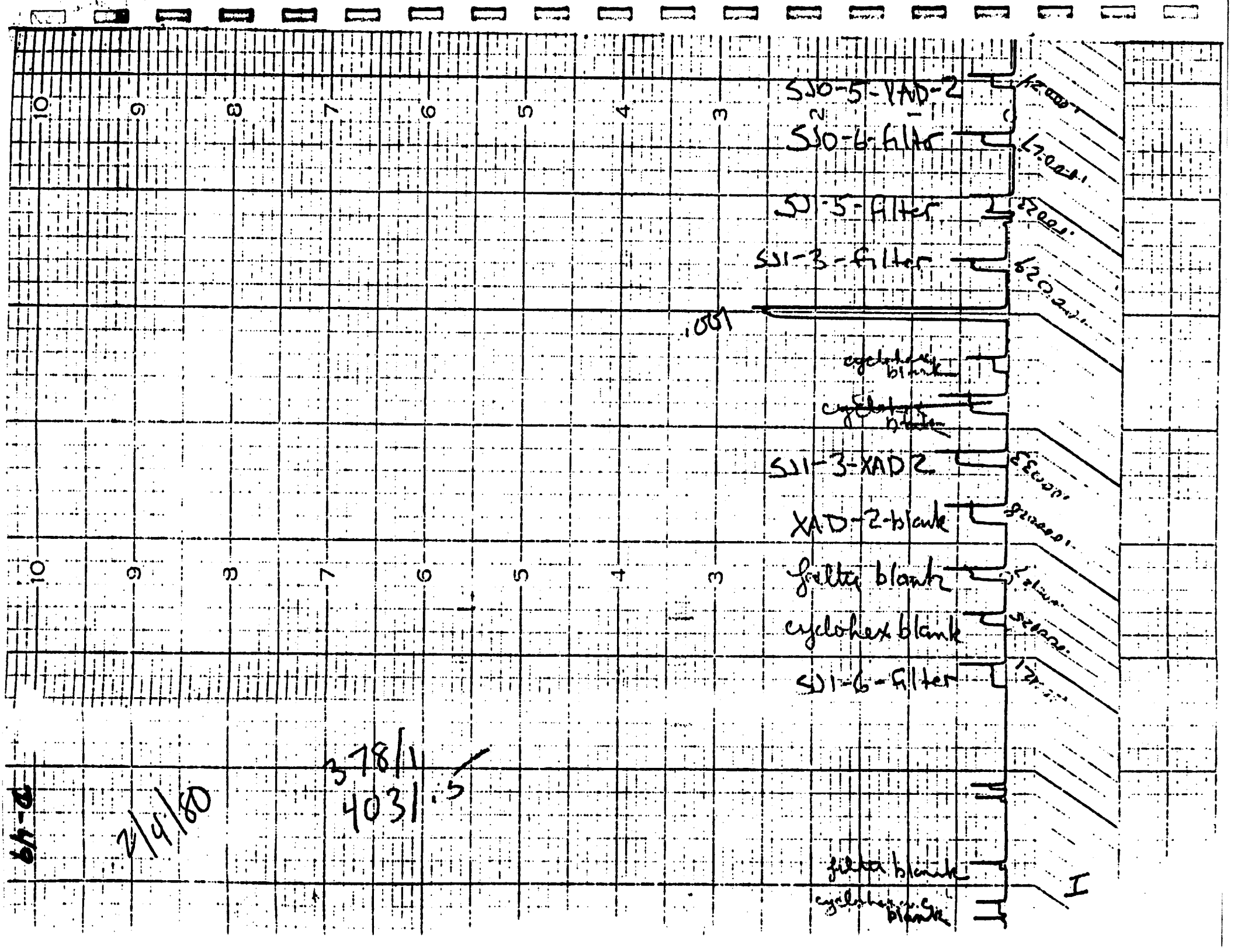

.002
SJO-4-XAD2
SJO-2-Filter
SJO-1-Filter
SJO-2-XAD2
SJO-4-Filter
SJO-1-XAD-2
.001
SJ1-1-XAD-2
SJ1-1-Filter
SJ1-4-Filter
0
9
8
7
6
5
4
3
2
1
0

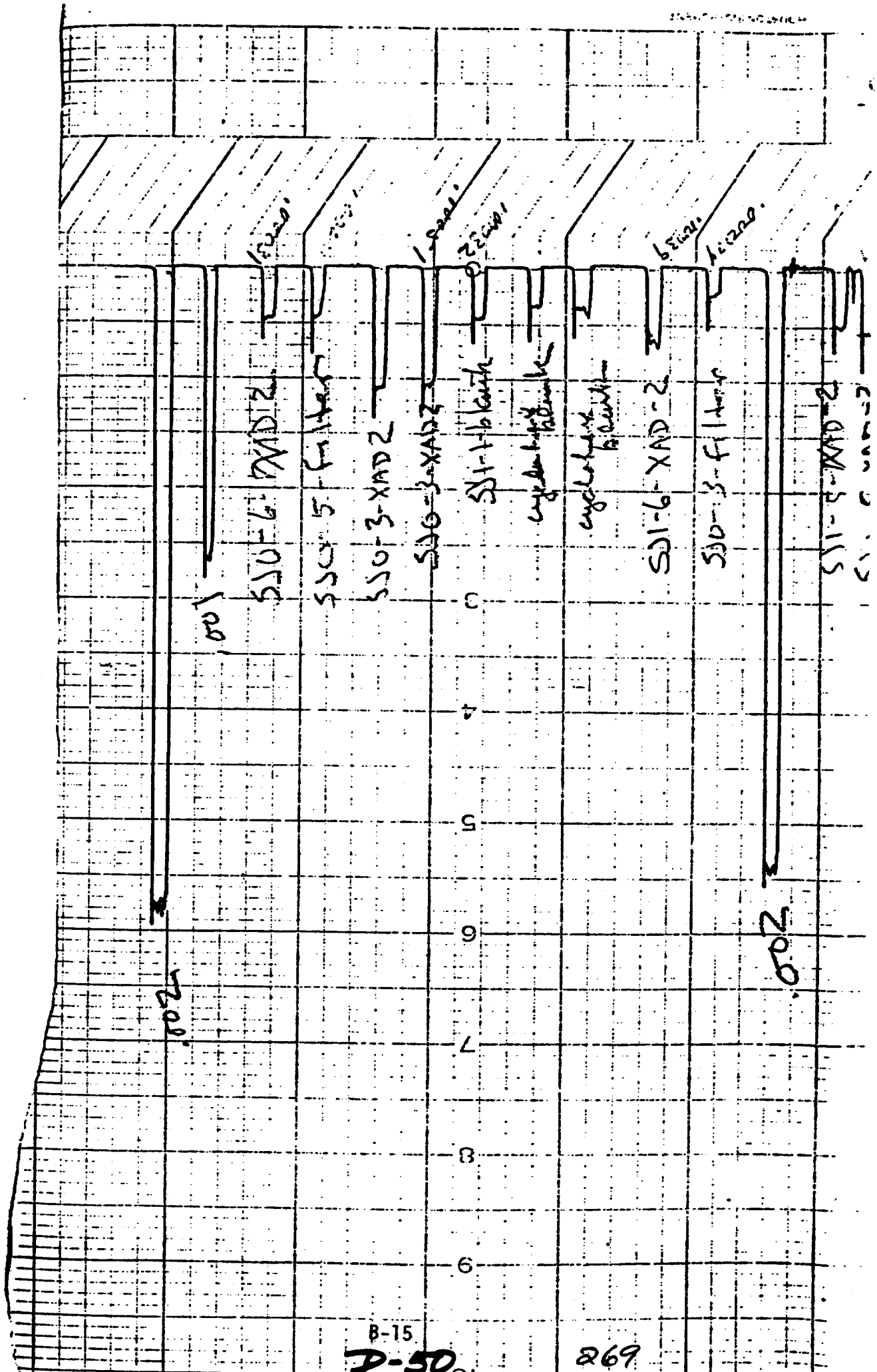

E
SJ1-2-PR
SJ1-4-PR
SJ1-5-PR
SJ1-3-PR
MC Blank
.002
.001
cyclohexane blank
10
9
8
7
6
5
4
3
2
1
0



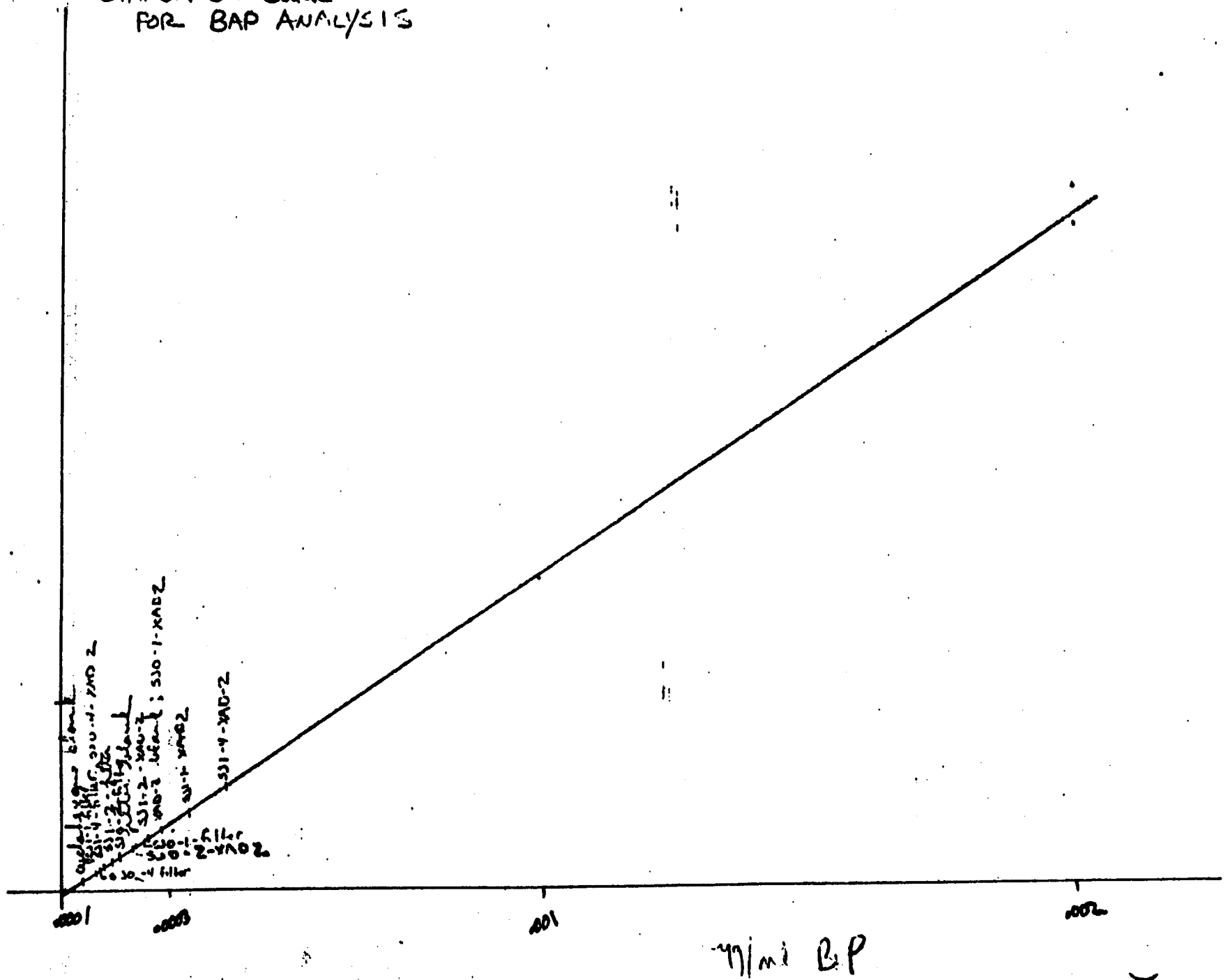
F
SJO-3-TOP-PR
SJO-3-BOT-PR
SJO-5-BOT-PR
SJO-5-TOP-PR
SJO-2-BOT-PR
SJO-2-TOP-PR
SJ1-1-PR
SJ1-6-PR
.002
.001
10
9
8
7
6
5
4
3
2
1
0


SDO-6-PR
SDO-1-PR-TOP
SDO-1-PR-BOT
SDO-4-TOP-PR
SDO-4-BOT-PR


SJO-5-XAD-2
SJO-6-filter
SJ-5-filter
SJ1-3-filter
.001
cyclohex blank
SJ1-3-XAD2
XAD-2-blank
filter blank
cyclohex blank
SJ1-6-filter
filter blank
cyclohex blank
I
378/1
403/.5
2/4/80
D-49

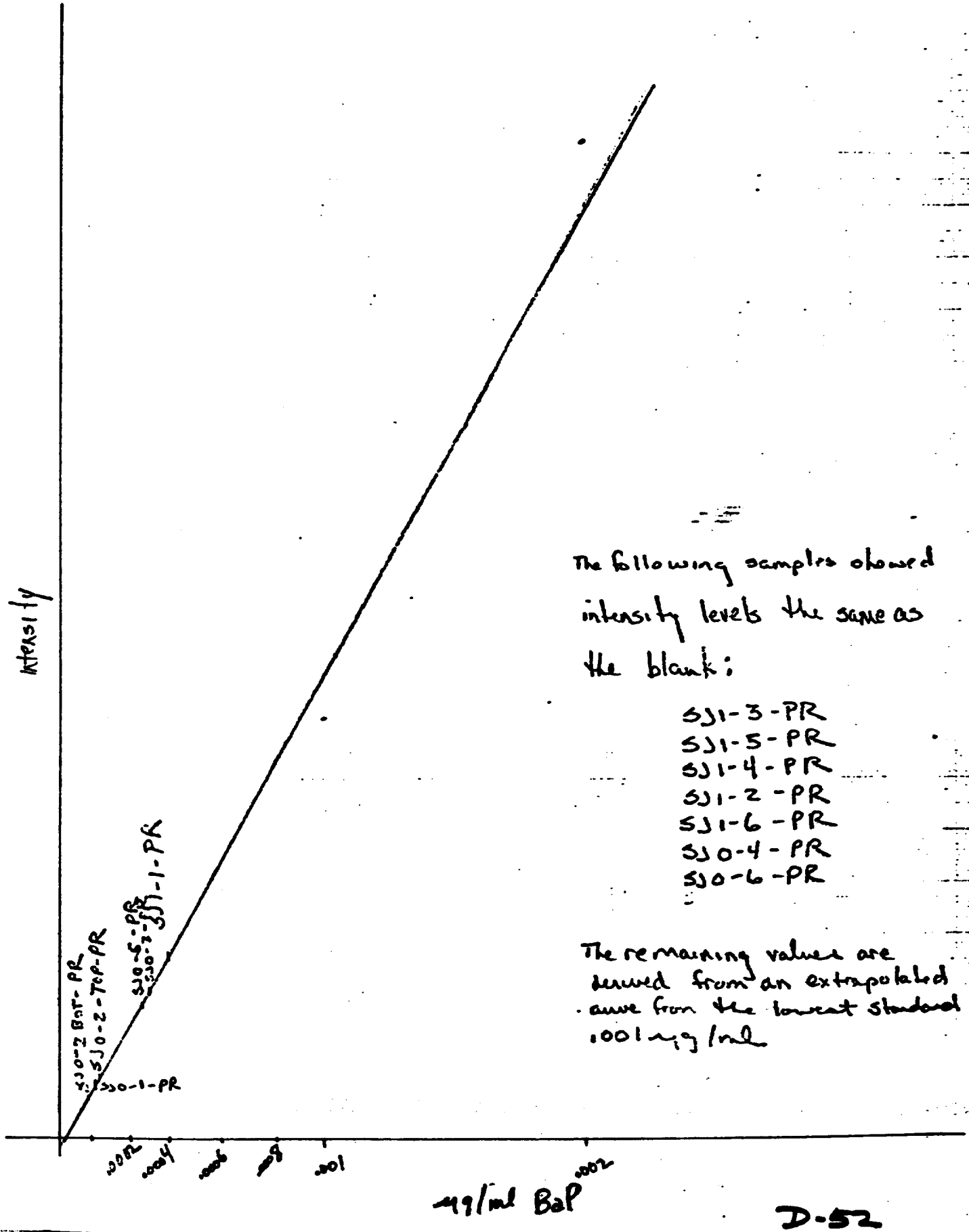

SJ0-6-XAD2
SJ0-5-Filter
SJ0-3-XAD2
SJ0-3-XAD2
SJ1-1-blank
SJ1-6-XAD-2
SJ0-3-Filter
.001
.002
.002
8
4
5
6
7
8
6

STANDARDS CURVE
FOR BAP ANALYSIS



1% f.s.

STANDARDS CURVE
FOR BaP ANALYSIS

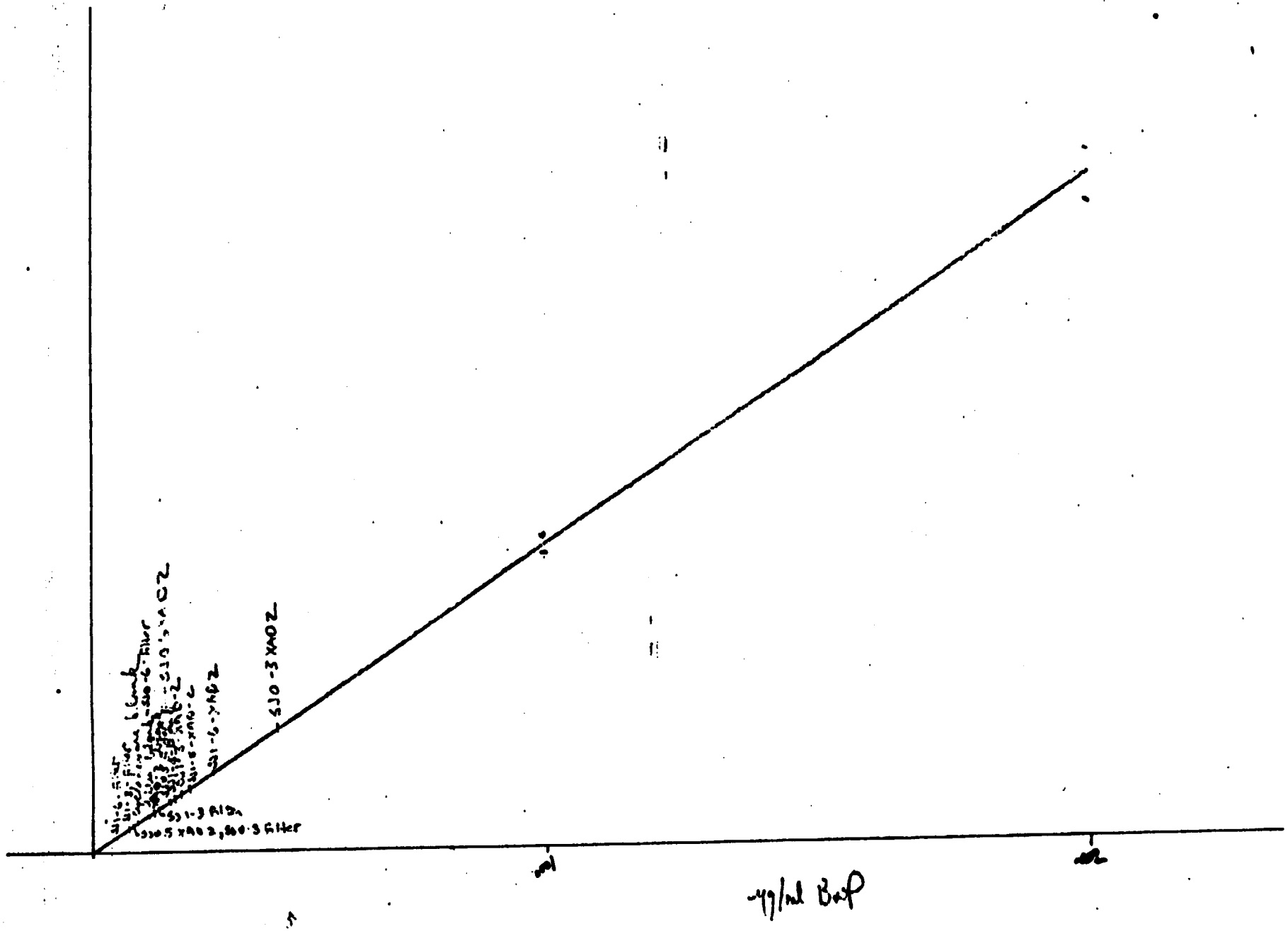


The following samples showed intensity levels the same as the blank:

SJ1-3-PR
SJ1-5-PR
SJ1-4-PR
SJ1-2-PR
SJ1-6-PR
SJ0-4-PR
SJ0-6-PR

The remaining values are derived from an extrapolated curve from the lowest standard .001 µg/ml

STANDARDS CURVE FOR
BAP ANALYSIS



Y.A

APPENDIX E

BOILER OPERATION REPORT

EMISSION TEST TRIP REPORT

PROJECT NAME: Nonfossil-Fueled Boilers (NFFB)

DATE: February 1980

AUTHOR: A. Walter Wyss

I PURPOSE

The emission testing was performed to provide emissions and process data for the NFFB standard. Testing was conducted by Monsanto Research Corporation, Dayton, Ohio and their subcontractor, TRW, Inc., Research Triangle Park, North Carolina.

II PLACE AND DATE

Number 4 wood-fired boiler at St. Joe Paper Company, Port St. Joe, Florida. January 14 to 24, 1980.

III BOILER AND SCRUBBER SYSTEM DESCRIPTION

The number 4 power boiler at the St. Joe Paper Company production facility is a Babcock & Wilcox speader stoker equipped to burn wastewood (90 percent southern pine bark, 10 percent southern pine sawdust) and oil. The boiler, installed in 1953, is normally 100 percent wood-fired with oil being burned for emergency or start-up use. Design parameters of the boiler include a steam production rate of 110,000 lb/hr, a furnace size of 7,192 cubic feet, and a wood burning rate of 32,000 lb/hr. Steam is produced at 740° to 760°F and 600 to 630 psig.

Wastewood is supplied from the pulp mill wood yard and conveyed to a feeder bin located above the furnace area. As the wastewood is moved to the feeder bin, it passes over a weightometer where its rate of delivery is measured and integrated.

Once in the feeder bin, the wastewood is moved to one edge of the bin by variable speed screws where it then drops into a plenum and is pneumatically carried into the furnace. The rate at which wood fuel is fed to the boiler is controlled by manual adjustment of the screw speed so that a steam production rate in excess of 100,000 lb/hr is maintained. The boiler is also equipped to burn number 6 fuel oil, however, the burning of oil as supplementary fuel constitutes less than 1 percent of the total fuel usage. Oil is only used on startup for about 6 hours, and when the wood feed is interrupted, for periods of time usually less then 2 hours in duration.

The air pollution control system, designed to reduce particulate emissions, consists of multicyclones followed by a variable throat venturi scrubber with a cyclonic separator. The Buell Rotoclone multicyclone unit is made up of six 4.5-foot diameter cyclones. Particulate matter collected by the cyclones is screened with the fines being reinjected to the boiler and the material which passes theough the screens (sand) being slurried and sent to the municipal wastewater treatment plant.

The Air Pol variable throat venturi scrubber, installed in 1978, is capable of operating at a pressure drop of up to approximately 14 inches w.g. The adjustable throat is controlled such that a preselected pressure drop is maintained across the scrubber under varying gas and scrubbing liquid flowrates. The boiler operators currently operate the scrubber at 8 inches w.g. pressure drop. Scrubbing liquid consists of relatively clean process wastewater which is passed through the scrubber at a rate of 2,100 gpm. The once-through scrubbing liquid is injected via four tangential nozzles located ahead of the adjustable control damper and via pipes located in the throat.

IV BOILER AND SCRUBBER OPERATIONAL DATA

Boiler and scrubber operational data obtained during the performance of the particulate mass, benzo-a-pyrene (BAP), and particle size distribution tests are tabulated for each test in Attachment A. Copies of the continuously recorded process parameters (steam production, air flow, steam temperature) as well as pertinent sections of the operator's log sheet are presented in Attachment B. Please note that the time at which soot-blowing was performed is indicated for boiler number 4 on these sheets. Average values of pertinent parameters are summarized in Table 1, while steam production and wastewood feed values of the 2-week testing period are given in Table 2.

Because of the variable fuel feed bin lag time, fuel feedrates listed for the test period may not accurately reflect the quantity of fuel burned in the furnace. Boiler heat input for the test period should be calculated based upon the fuel heat value (obtained from samples taken during the test period) and fuel feedrate. If these values correlate well with the steam produced, it could be reasonably assumed that the fuel input values are representative. If correlation is poor, the input heat value should be based upon the steam production and an assumed boiler efficiency.

V CONCLUSIONS

Boiler number 4 and its associated air pollution control equipment operated normally during this emission test, and its emissions should be typical of this type of boiler and abatement equipment.

TABLE 1. POWER BOILER NUMBER 4 PROCESS DATA FOR EMISSION TEST TIME PERIODS, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA

Date	Test	Test start time	Average steam production (1000 lb/hr)	Average bin fuel feedrate[a] (lb/hr)	Venturi pressure drop (inches w.g.)
1/16	Part. size	1:59 p.m.	102	NR	8
1/16	Part. size	4:05 p.m.	94	NR	8
1/16	Part. size	5:15 p.m.	110	NR	8
1/17	Part. mass	9:40 a.m.	101	50,293	8
1/18	BAP	9:30 a.m.	100	28,015	8
1/19	BAP	10:00 a.m.	106	37,896	8
1/19	BAP	3:15 p.m.	100	52,098	8
1/20	BAP	10:45 a.m.	103	49,485	13.5
1/20	BAP	3:45 p.m.	108	57,184	13.5
1/21	BAP	9:00 a.m.	104	41,814	13.5
1/21	Part. mass	6:00 p.m.	99	34,311	8
1/22	Part. mass	9:35 a.m.	101	32,682	8
1/22	Part. size	1:37 p.m.	109	NR	13.5
1/22	Part. mass	6:20 p.m.	102	38,183	13.5
1/23	Part. size	10:10 a.m.	111	NR	13.5
1/23	Part. mass	12:00 noon	104	56,714	13.5
1/23	Part. mass	5:05 p.m.	108	56,542	13.5

[a]Average hourly feedrates were based upon wastewood weightometer integration readings taken at the start and end of each test. It should be pointed out that the values reported represent the fill rate of the feed bin located above the boiler and that fuel in this bin has a residence time of approximately 10 to 40 minutes.
NR = not recorded.

TABLE 2. AVERAGE POWER BOILER NUMBER 4 FUEL FEED AND STEAM PRODUCTION FOR TEST PERIOD, ST. JOE PAPER COMPANY, PORT ST. JOE, FLORIDA

Date	Feed integrator values (24-hr difference)	Average fuel feed (lb/hr, as is)	Average production (lb x 100/day)
1/13	315,808	39,739	2,472
1/14	307,644	38,712	2,452
1/15	318,128	40,031	2,434
1/16	328,716	41,363	2,485
1/17	347,621	43,742	2,459
1/18	327,408	41,199	2,505
1/19	327,456	41,205	2,488
1/20	325,217	40,923	2,485
1/21	348,074	43,799	2,497
1/22	317,840	39,995	2,499
1/23	386,289	48,608	2,575
1/24	347,501	43,727	2,349
1/25	343,578	43,234	2,387
1/26	335,842	42,260	2,452

ATTACHMENT A

EXPLANATION OF PROCESS PARAMETER DATA

Process Parameters	Description
Venturi ΔP	Pressure drop across venturi scrubber as set on automatic controller in boiler control room. Specific value is set and venturi throat is adjusted automatically so that specified value is maintained.
Bark Feed	Bark feed values represent initial and final integrator readings taken at the start and end of particulate mass and BAP tests. The difference in integrator readings represents the quantity of wastewood (measured "as-is") fed to the fuel feed bin located above the boiler. The values are in terms of pounds per hour and need to be multiplied by a factor of 3.02 to yield actual values. In addition to the wastewood feed integrator, the rate of feed is also measured and displayed in the control room. During particulate mass and BAP tests the displayed values were recorded. It is important to note that these values do not represent the fuel conveyed to the feed bin. It was estimated that the feed bin could contain a 30- to 40-minute supply of fuel when full.

Steam Production	Stream production values are continuously recorded and were thus recorded during the test periods. The recorded values represent 1000 pounds per hour of steam produced.
ID Fan Amps and RPM	These values represent the electrical current and rotational speed in revolutions per minute of the induced draft (ID) fan.
Air Flow	Air flow provided by the forced draft fan (FD) is recorded continuously. Its units are unknown, however, its relative value is adjusted so that the numerical value is close or slightly higher than the steam production rate value.
Steam Temperature and Steam Pressure	These values represent the temperature (in degrees Farenheit) and pressure (in pound per square inch, gauge) of the steam produced.
Duct and Separator Temperatures	The temperature of the flue gas upstream of the venturi scrubber and in the cyclone separator (located downstream of the venturi) are indicated and were thus recorded. These values are in degrees Farenheit.
Separator Pressure	The pressure drop across the cyclone separator is indicated and thus recorded in units of inches of water.
Venturi H_2O Pressure	This value represents the pressure of the scrubbing liquid measured on the delivery side of the pumps which supply liquid to the venturi tangential nozzles and throat.

1 (Both inlet and outlet)

TEST # [redacted] START TIME 1:59

FIRST 1/2 END TIME

Anderson Particle Size Run

SECOND 1/2 START TIME

SECOND 1/2 END TIME 2:04

VENTURI ΔP 8.0" H_2O

BARK FEED: INITIAL READING

FINAL READING

FACTOR

TOTAL FEED

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
:59	105	0	120	910	108	730	640	394	150	1.0 [redacted]	49		
:00	100	0	120	910	110	735	640	389	150	1.0	49		
:02	100	0	120	910	110	735	640	388	150	1.0	49		

1/10/80

Both Inlet and outlet

TEST # 2

Anderson Particle Sizing Run

START TIME ~4:05

FIRST 1/2 END TIME

SECOND 1/2 START TIME

SECOND 1/2 END TIME ~4:10

VENTURI ΔP 8" H_2O

BARK FEED: INITIAL READING

FINAL READING

FACTOR

TOTAL FEED

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
1:05	95	29.4	120	900	110	735	640	384	145	1.0	49		
1:08	95	31.5	120	910	115	735	640	384	125	1.0	49		
1:10	93	41.0	125	920	110	735	640	390	125	1.0	49		

'/16/80

Both Inlet and Outlet

TEST # 3 START TIME 5:15

FIRST 1/2 END TIME

Anderson Particle Sizing Run SECOND 1/2 START TIME

SECOND 1/2 END TIME 5:20

VENTURI ΔP 8" H_2O

BARK FEED: INITIAL READING

FINAL READING

FACTOR

TOTAL FEED

TIME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS		SOOT BLOWIN
5:15	105	46.2	130	960	120	735	640	386	150	1.4	49		
5:17	113	0	130	950	120	735	640	385	150	1.2	49		
:20	110	0	130	950	120	735	640	385	150	1.2	49		
5:22	110	0	130	950	120	735	640	385	150	1.2	49		

E-10

BOILER #4 PROCESS DATA

1/17/80

INLET & OUTLET

TEST # 1

START TIME ~ ~~9:35~~ 9:40

JAY & THOMAS

FIRST 1/2 END TIME 10:28

PM, SO_2, NO_x
CO, CO_2, O_2

SECOND 1/2 START TIME 12:10

SECOND 1/2 END TIME

Stopped at 12:43
Started at 2:45

VENTURI ΔP 8" H_2O

BARK FEED: INITIAL READING 4347790 @ 9:40AM

FINAL READING 4442214 @ 3:20 PM

(TO BW) FACTOR 3.02

#/min TOTAL FEED 302X 94424/5.67 lb = 50,293/HR

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
25	100	43.8	130	960	120	740	630	380	140	1.4	49		
40	100	24.8	125	950	118	740	630	380	140	1.2	49		
45	95	21.0	123	960	118	740	630	380	140	1.2	49		
50	98	0	130	960	118	740	630	379	140	1.4	49		
55	100	0	130	960	120	740	630	380	140	1.4	49		
:00	95	0	130	960	117	740	630	380	140	1.3	49		
:05	103	0	130	960	119	740	630	382	140	1.5	49		
:10	101	0	132	970	123	740	630	384	140	1.4	49		
:15	100	0	132	970	121	740	630	384	140	1.5	49		
:20	100	0	128	960	118	740	630	384	141	1.3	49		
:25	103	40	128	960	117	740	630	382	141	1.3	49		
:30	101	28	128	960	117	740	630	382	142	1.2	49		
:10	115	19	133	970	125	740	630	386	142	3.0	49		
:15	110	44	123	960	130	740	630	386	142	3.8	49	* Problems with	
:20	110	44	123	960	130	740	630	386	142	4.5	49	Venturi ΔP	
45	103	35	140	1010	128	740	630	380	140	1.5	49		
60	100	46	140	1010	128	740	630	380	140	1.8	49		
55	100	0	142	1010	128	740	630	382	140	1.8	49		
00	100	0	140	1010	128	740	630	382	140	1.4	49		
05	100	0	140	1010	128	740	630	380	140	1.5	49		
10	85	0	140	1010	128	740	630	378	145	1.6	49		
15	101	0	143	1010	127	740	630	377	140	1.6	49		
20	100	0	142	1010	127	740	630	380	140	1.5	49		
00													
05													

E-11

1/18/80

Inlet & Outlet

Test #1 BAP

Start Time 9:30 AM

First 1/2 End Time 10:42

Second 1/2 Start Time 11:15 AM

Second 1/2 End Time 12:27

3 min/pt, 24 pts/hour
48 pts total

Venturi ΔP 8" H_2O

Bark Feed: Initial Reading 4677353

Final Reading 4705183

Factor 3.02

Total Feed (3.02)(27,830)/3 hrs = 28,015 #/hr

me	Steam Prod.	Bark Feed	ID Fan Amps	ID Fan RPM	Air Flow	Steam Temp	Steam Press	Duct Temp	Sep. Temp	Sep. Press	Venturi H_2O Press	Soot Blowing
:30	105	0	127	950	115	730	630	374	140	1.2	50	
:45	100	0	125	940	115	730	630	373	138	1.0	49	
:00	100	27	126	950	113	730	630	373	142	1.1	49	
:15	100	31	126	950	115	730	630	373	143	1.2	49	
:30	100	0	126	950	115	73[illegible]	630	373	143	1.1	49	
:45	100	0	126	950	115	740	630	373	142	1.3	49	
:15	103	97	130	950	115	740	630	373	139	1.1	49	
:30	100	0	125	950	112	740	630	373	140	1.1	49	
:45	100	0	126	940	112	740	630	373	142	1.0	49	
:00	100	0	127	960	117	740	630	373	145	1.3	49	
:15	100	0	130	960	118	740	630	373	146	1.3	49	
:30	95	44	126	950	117	740	630	373	148	1.2	49	

OUTLET & INLET

TEST # 2 BAP

START TIME 10:00 AM
FIRST 1/2 END TIME 11:12 AM
SECOND 1/2 START TIME 12:00 N
SECOND 1/2 END TIME 1:12 PM

3 min per point.
24 points per traverse.
two traverses per location.

VENTURI ΔP 8" H_2O

BARK FEED: INITIAL READING 5019599 @ 10:00
FINAL READING 5060381 @ 1:15
FACTOR 3.02
TOTAL FEED (3.02) 40782 / 3.25 HRS = 37,896 #/HR

TIME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
10:00	107	52.0	131	970	120	740	630	374	155	1.0	49		---
10:15	107	21	131	970	120	740	630	374	155	1.4	49		
10:30	107	19	130	960	118	740	630	374	152	1.3	49		
10:45	109	0	130	960	118	740	630	374	152	1.2	49		---
11:00	110	0	127	960	118	740	630	374	151	1.2	49		---
11:15	108	0	131	960	120	740	630	374	150	1.3	49		
~~11:30~~													
12:00	108	0	128	950	118	740	630	374	145	1.2	49		
12:15	105	0	125	940	115	740	630	375	145	1.2	49		
12:30	105	0	125	940	125	740	630	375	145	1.1	49		
12:45	105	0	128	940	115	740	630	374	140	1.0	49		
1:00	104	10	120	920	110	740	630	374	140	1.0	49		
1:15	100	27	125	940	115	740	630	373	140	1.1	49		

7/17/80

Both inlet & Outlet

TEST # 3 BAP

START TIME 3:15 PM
FIRST 1/2 END TIME 4:27 PM
SECOND 1/2 START TIME 6:00 PM
SECOND 1/2 END TIME 7:12 PM

VENTURI ΔP 8" H_2O

BARK FEED: INITIAL READING 5094575 @ 3:15
FINAL READING 5163579 @ 7:15
FACTOR 3.02
TOTAL FEED 3.02(69004)/4HR = 52,098 #/HR

TIME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.	SOOT BLOWING
3:15	98	16	135	980	115	740	630	374	145	1.5	49	
3:30	95	41	130	960	118	740	630	373	143	1.3	49	
3:45	96	0	130	950	118	740	630	374	143	1.2	49	
4:00	98	0	130	960	118	740	630	374	142	1.2	49	
4:15	96	50	126	950	115	740	630	374	138	1.2	49	
4:30	96	48	126	940	115	740	630	372	137	1.3	49	
6:00	100	0	126	950	115	740	630	373	135	1.2	49	
6:15	105	34	128	950	115	740	630	373	138	1.2	49	
6:30	104	19	127	940	115	740	630	372	138	1.2	49	
6:45	100	0	127	950	115	740	630	372	140	1.3	49	
7:00	105	36	128	950	118	740	630	372	140	1.2	49	
7:15	103	0	130	950	118	740	630	372	140	1.2	49	

Inlet and Outlet

TEST # 4 BAP

START TIME 10:45 AM
FIRST 1/2 END TIME 11:57 AM
SECOND 1/2 START TIME 12:30 AM
SECOND 1/2 END TIME 1:42 PM

3 min / pt
24 pts / traverse
2 traverses / site

VENTURI ΔP 13.4 " H_2O

BARK FEED:
INITIAL READING 5354390 @ 10:45
FINAL READING 5403547 @ 1:45
FACTOR 3.02
TOTAL FEED 3.02(49157) / 3 = 49,485 #/HR

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
10:45	108	13	133	1010	112	735	630	373	149	1.1	49		
1:00	105	10	133	1010	112	735	630	373	145	1.1	49		
1:15	100	24	133	1010	112	740	630	373	145	1.1	49		
1:30	105	13	134	1010	112	740	630	374	147	1.0	49		
11:45	105	45	133	1010	112	740	630	374	147	1.1	49		
12:00	110	40	133	1010	112	740	630	374	150	1.1	49		
12:30	105	0	133	1010	112	740	630	374	151	1.1	49		
12:45	105	6	133	1010	112	740	630	374	150	1.1	49		
:00	105	0	133	1010	112	740	630	373	151	1.1	49		
:15	103	48	133	1010	112	740	630	373	151	1.1	49		
:30	93	0	133	1010	112	740	630	373	150	1.1	49		
:45	90	0	134	1010	112	740	630	373	150	1.1	49		

← decrease in steam production caused by a shift from burning sawdust to bark. The quantity input was initially not adjusted. After the operator noticed the steam production decrease, the fuel feed rate was increased and the steam production increased.

Inlet & Outlet

TEST # 5 BAP

START TIME 3:45 PM
FIRST 1/2 END TIME 4:57 PM
SECOND 1/2 START TIME 5:30
SECOND 1/2 END TIME 6:42

3 min/pt 24 pt/trav
2 traverses/location

VENTURI ΔP 13.4 - 13.6 "ΔP

BARK FEED: INITIAL READING 5427579 @ 3:45
FINAL READING 5484384 @ 6:45
FACTOR 3.02
TOTAL FEED 3.02(56805)/3 = 57,184 #/HR

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
:45	100	0	133	1020	112	740	630	373	145	1.1	49		
4:00	100	0	133	1020	112	740	630	373	145	1.1	49		
4:15	97	6	133	1020	111	740	630	373	145	1.1	49		
4:30	105	46	133	1020	111	740	630	372	143	1.1	49		
4:45	110	9	133	1020	113	740	630	372	141	1.1	49		
5:00	105	7	133	1010	112	740	630	372	140	1.2	49		
:30	110	7	133	1010	112	735	630	373	145	1.1	49		
:45	112	0	133	1010	112	735	630	373	145	1.1	49		
6:00	115	20	133	1010	112	735	630	374	148	1.1	49		
:15	112	52	133	1010	112	735	630	374	148	1.1	49		
6:30	115	8	133	1010	112	735	630	374	149	1.1	49		
6:45	118	0	133	1010	112	735	630	374	149	1.1	49		

INLET & OUTLET

TEST # #6 BAP START TIME 9:00 AM 3 min / pt 24 pts / traverse
FIRST ½ END TIME 10:12 AM 2 traverses / site
SECOND ½ START TIME 10:45
SECOND ½ END TIME 11:57

VENTURI ΔP 13.4 - 13.6 " H_2O

BARK FEED: INITIAL READING 5662188 @ 9:00
FINAL READING 5703725 @ 12:00
FACTOR 3.02
TOTAL FEED 3.02 (41537) / 3 = 41,814 # / HR

TIME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
:00	100	0	133	1000	110	730	630	373	151	1.1	49		
:15	102	48	133	1010	110	730	630	373	155	1.0	49		
:30	104	23	133	1010	110	730	630	373	155	1.1	49		
:45	100	0	133	1010	110	730	630	373	155	1.0	49		
:00	103	0	132	1010	110	730	630	373	155	1.1	49		
:15	100	0	132	1010	110	730	630	373	150	1.1	49		
:45	105	41	133	1010	112	730	630	373	145	1.0	49		
:00	105	0	132	1010	112	740	630	373	145	1.1	49		
:15	105	0	133	1010	112	730	630	373	143	1.1	49		
:30	115	11	132	1010	112	720	630	373	148	1.1	49		
:45	106	22	132	1010	112	725	630	373	149	1.1	49		
2:00	108	9	132	1010	112	720	630	372	150	1.1	49		

Inlet & Outlet

TEST # 2

START TIME 6:00 PM
FIRST 1/2 END TIME 6:48 PM
SECOND 1/2 START TIME 7:15 PM
SECOND 1/2 END TIME 8:03 PM

JAY - OUTLET
CHARLIE - INLET
JOE - NO_x

PM, SO_2, NO_x
CO, CO_2, O_2

VENTURI ΔP 8" H_2O

2 min/pt 24 pts/trav.
2 traverses/site

BARK FEED: INITIAL READING 5787880 @ 6:00 PM
FINAL READING 5811549 @ 8:05 PM
FACTOR 3.02
TOTAL FEED 3.02(23669)/2.1 = 34311 #/HR

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
:00	103	31	115	890	105	720	630	370	145	1.0	49		
:05	96	31	115	880	105	720	630	370	145	1.1	49		
:10	96	40	115	890	105	720	630	370	145	1.0	49		
:15	100	0	116	890	106	720	630	370	141	1.0	49		
:20	103	0	117	890	107	720	630	370	141	1.0	49		
:25	104	0	116	890	107	720	630	370	141	1.1	49		
:30	98	0	118	890	108	740	630	370	143	1.2	49		
:35	115	69	120	890	108	740	630	370	143	1.2	49		
:40	102	58	117	890	107	720	630	370	143	1.2	49		
:45	101	59	117	890	108	730	630	370	143	1.2	49		
:50	100	0	118	890	108	730	630	370	143	1.2	49		
:55													
:15	88	0	115	880	105	730	630	369	140	1.1	49		
:20	90	0	114	880	105	730	630	369	140	1.1	49		
:25	98	0	116	880	105	730	630	368	142	1.0	49		
:30	99	0	118	890	107	730	630	368	142	1.3	49		
:35	99	0	118	890	108	730	630	369	141	1.2	49		
:40	99	0	120	890	108	730	630	369	140	1.1	49		
:45	100	0	119	890	109	730	630	369	142	1.2	49		
:50	100	0	116	890	108	730	630	369	142	1.1	49		
:55	96	0	116	890	108	730	630	370	141	1.1	49		
:00	95	0	116	890	107	730	630	370	140	1.2	49		
:05	95	29	116	890	107	730	630	370	141	1.1	49		

BOILER # 4 TRUCKEE DATA

1/22/80

Inlet & Outlet

TEST # 3 START TIME 9:35 AM * ERIC - INLET

FIRST 1/2 END TIME 10:28 AM JAY - OUTLET

PM, SO_x, NO_x SECOND 1/2 START TIME 11:00 AM

CO, CO_2, O_2 SECOND 1/2 END TIME 12:48 AM 2 min/pt, 24 pts/traverse, 2 traverses/test

VENTURI ΔP 8" H_2O * INLET STARTED AT 9:55

BARK FEED: INITIAL READING 5992250 @ 9:35 AM

FINAL READING 6016599 @ 11:50 AM

FACTOR 3.02

TOTAL FEED (3.02) 24349 / 2.25 = 32,682 #/HR

TIME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.	SOOT BLOWING
:30	105	50	120	910	108	720	630	370	140	1.1	49	
:35	105	30	120	910	108	730	630	370	140	1.1	49	
:40	105	45	120	910	108	730	630	370	139	1.2	49	
:45	100	0	118	910	108	720	630	370	137	1.0	49	
:50	100	0	118	900	107	720	630	370	135	1.1	49	
:55	96	0	117	900	108	720	630	370	134	1.3	49	
:00	96	0	116	900	105	720	630	370	132	1.1	49	
:05	98	0	118	900	106	720	630	370	132	1.1	49	
:10	95	0	116	900	105	720	630	370	130	1.0	49	
:15	100	0	115	900	108	720	630	370	130	1.1	49	
:20	95	0	118	900	108	720	630	370	128	1.0	49	
:25	96	0	117	900	106	720	630	370	127	1.1	49	
:30	104	93	120	910	108	720	630	370	127	1.1	49	
:35	105	60	120	910	108	720	630	370	127	1.1	49	
:40	96	60	118	910	108	720	630	370	125	1.1	49	
:45	98	60	117	900	108	720	630	370	125	1.1	49	
:00	90	0	118	900	105	720	630	370	120	1.0	49	
:05	95	0	115	910	108	720	630	370	125	1.1	49	
:10	98	0	115	910	110	720	630	370	125	1.2	49	
:15	98	0	115	910	108	720	630	370	125	1.1	49	
:20	104	0	120	920	110	735	630	370	128	1.2	49	
:25	105	0	121	920	110	735	630	370	128	1.1	49	
:30	108	0	121	920	110	735	630	371	129	1.2	49	
:35	113	0	122	920	112	735	630	371	128	1.2	49	

TEST # 3 (Cont)

START TIME _____

FIRST ½ END TIME _____

PM, SO_x, NO_x

SECOND ½ START TIME _____

CO, CO_2, O_2

SECOND ½ END TIME _____

VENTURI ΔP _____

BARK FEED: INITIAL READING _____

FINAL READING _____

FACTOR _____

TOTAL FEED _____

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRES	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
11:40	105	0	120	920	110	735	630	372	125	1.1	49		
11:45	102	0	118	910	108	730	630	370	125	1.1	49		
11:50	108	54	120	910	108	730	630	370	128	1.2	49		

BOILER - T PROCESS DATA

1/22/80

TEST # TRIAL

Particle Size on the outlet

START TIME 1:37 PM

FIRST ½ END TIME

SECOND ½ START TIME

~~SECOND ½~~ END TIME 1:52 PM

CHARLIE - (OUTLET)

VENTURI ΔP 13.5" ΔP

BARK FEED: INITIAL READING

FINAL READING

FACTOR

TOTAL FEED

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
:35	120	19	131	1020	110	730	630	373	120	1.1 ~~1.20~~	49		
:40	110	19	130	1010	110	730	630	373	120	1.1	49		
:45	107	20	131	1020	110	730	630	373	120	1.1	49		
:50	105	26	130	990	106	730	630	373	120	1.0	49	} Venturi ΔP	
:55	105	25	126	490	102	730	630	373	120	1.0	49	} dropped to 12.5	

1/22/80

TEST # 4

START TIME 6:20 PM

FIRST 1/2 END TIME 7:08 PM

SECOND 1/2 START TIME 7:30 PM

SECOND 1/2 END TIME 8:18 PM

JAY - OUTLET

ERIC - INLET

PM

$CO, CO_2 + O_2$

VENTURI ΔP 13.4 - 13.6" H_2O

BARK FEED: INITIAL READING 6112470 @ 6:20 PM

FINAL READING 6137757 @ 8:20 PM

FACTOR 3.02

TOTAL FEED 3.02 (25287)/2 = 38,183 #/HR

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
:20	100	38	130	1020	112	730	600	373	123	1.1	49		
:25	105	44	130	1020	112	730	600	373	120	1.1	49		
:30	103	0	131	1020	112	730	600	372	120	1.0	49		
:35	100	0	132	1020	112	730	600	370	120	1.1	49		
:40	96	0	132	1020	112	730	600	370	120	1.1	49		
:45	96	0	132	1020	112	735	600	371	121	1.0	49		
:50	95	0	132	1020	112	730	600	370	125	1.1	49		
:55	100	0	133	1020	112	720	600	371	125	1.1	49		
:00	100	0	133	1020	112	720	600	370	125	1.1	49		
:05	100	0	133	1020	112	720	600	370	125	1.1	49		
:10	100	48	133	1020	112	720	600	370	125	1.1	49		
:30	104	0	133	1020	112	730	600	371	130	1.1	49		
:35	105	0	133	1020	112	730	600	371	130	1.1	49		
:40	100	0	133	1020	112	730	600	371	130	1.1	49		
:45	100	0	133	1020	112	730	600	371	130	1.1	49		
:50	100	21	133	[illegible]	112	720	600	370	130	1.0	49		
:55	104	28	133	1020	112	720	600	370	130	1.0	49		
:00	105	28	[illegible]	1020	112	720	600	370	130	1.1	49		
:05	107	23	133	1020	112	730	610	370	140	1.1	49		
:10	112	0	133	1020	112	720	620	371	145	1.1	49		
:15	110	0	133	1020	112	720	620	371	145	1.1	49		
:20	109	0	133	1020	112	720	620	371	145	1.1	49		

~~Inlet~~ Outlet

TEST # ~~[illegible]~~ PARTICLE SIZE

START TIME ~ 10:10

FIRST 1/2 END TIME _____

SECOND 1/2 START TIME _____

~~SECOND 1/2~~ END TIME 10:35

VENTURI ΔP 13.4 - 13.6 " H_2O

BARK FEED: INITIAL READING _____

FINAL READING _____

FACTOR _____

TIME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	TOTAL FEED AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
10:10	110	30	131	1010	112	740	620	373	167	1.0	49		
10:15	110	0	131	1010	112	740	620	373	167	1.0	49		
10:20	115	0	131	1000	112	740	620	374	166	1.0	49		
10:25	110	0	132	1010	112	740	620	373	165	1.0	49		
10:30	110	0	132	1000	112	740	620	373	165	1.0	49		
10:35	110	0	132	1010	112	740	620	373	165	1.0	49		

Inlet & Outlet

TEST # 5

PM, CO, O_2, CO_2

START TIME 12:00 N → Stopped test at 12:20 for 10 minutes

FIRST ½ END TIME 12:58

SECOND ½ START TIME 1:10

SECOND ½ END TIME 2:00 PM

VENTURI ΔP 13.4 – 13.6 " ΔP

BARK FEED: INITIAL READING 6392724 @ 12:00 N JAY - OUTLET

FINAL READING 6430283 @ 2:00 ERIC - INLET

FACTOR 3.02

TOTAL FEED (3.02) 37,559 / 2 = 56,714 #/HR

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.		SOOT BLOWING
2:00	110	0	131	1010	112	740	620	373	163	1.0	49		
2:05	108	0	131	1010	112	740	620	373	163	1.0	49		
2:10	110	38	131	1010	112	740	620	373	163	1.0	49		
2:15	111	52	131	1010	112	740	620	373	163	1.0	49		
2:20	115	21	131	1010	112	740	620	373	163	1.0	49		
2:25	113	31	132	1010	112	740	620	373	163	1.0	49		
2:30	105	54	131	1010	112	740	620	373	163	1.0	49		
2:35	112	51	132	1010	112	740	620	372	165	1.0	49		
2:40	106	7	132	1010	112	740	620	372	167	1.0	49		
2:45	105	2	132	1010	112	740	620	372	168	1.0	49		
2:50	107	0	132	1010	112	740	620	372	168	1.0	49		
2:55	110	0	133	1010	112	740	620	372	168	1.0	49		
3:00	115	0	133	1010	112	740	620	372	168	1.0	49		
3:10	102	52	133	1010	112	740	620	372	165	1.0	49		
3:15	110	26	133	1010	112	750	620	372	165	1.0	49		
3:20	105	49	132	1010	112	740	620	372	165	1.0	49		
3:25	106	27	133	1010	111	740	620	372	165	1.0	49		
3:30	105	24	133	1010	111	740	620	372	165	1.0	49		
3:35	110	54	133	1010	111	740	620	372	165	1.0	49		
3:40	107	0	133	1010	111	740	620	372	165	1.0	49		
3:45	110	0	133	1010	111	740	620	372	165	1.0	49		
3:50	101	0	133	1010	111	740	620	372	165	1.0	49		
3:55	105	0	133	1010	111	740	620	372	165	1.0	49		
4:00	110	0	133	1010	111	740	620	372	165	1.0	49		

BOILER [illegible] PROCESS DATA

1/23/80

TEST # 6 START TIME 5:05 PM TAY - OUTLET

FIRST 1/2 END TIME 5:53 ERIC - INLET

PM, CO, CO_2, O_2 SECOND 1/2 START TIME 6:05 PM

SECOND 1/2 END TIME 6:53 PM

VENTURI ΔP 13.4 - 13.6 " H_2O

BARK FEED: INITIAL READING 6484850 @ 5:05 PM

FINAL READING 6519112 @ 6:55 PM

FACTOR 3.02

TOTAL FEED (3.02) 34262 / 1.83 = 56,542

ME	STEAM PROD.	BARK FEED	ID FAN AMPS	ID FAN RPM	AIR FLOW	STEAM TEMP	STEAM PRESS	DUCT TEMP.	SEP. TEMP.	SEP. PRES.	VENTURI H_2O PRESS.	SOOT BLOWING
5:05	110	16	133	1010	112	740	620	372	165	1.0	49	
5:10	106	22	134	1010	112	740	620	372	163	1.0	49	
5:15	106	24	132	1010	112	740	620	372	163	1.0	49	
5:20	105	3	132	1010	112	740	620	372	163	1.0	49	
5:25	110	0	132	1010	112	740	620	372	163	1.0	49	
5:30	110	0	133	1010	112	740	620	372	164	1.0	49	
5:35	106	0	132	1010	112	740	620	372	165	1.0	49	
5:40	110	0	133	1010	112	740	620	372	164	1.0	49	
5:45	105	0	133	1010	112	740	620	372	163	1.0	49	
5:50	109	0	133	1010	112	740	620	372	162	1.0	49	
5:55	105	0	133	1010	112	740	620	372	162	1.0	49	
6:05	105	16	133	1010	112	740	610	372	165	1.0	49	
6:10	110	27	133	1010	112	740	610	372	165	1.0	49	
6:15	110	60	133	1010	112	740	610	372	167	1.0	49	
6:20	108	20	131	1010	112	740	610	372	168	1.0	49	
6:25	111	34	132	1010	112	740	610	372	168	1.0	49	
6:30	110	0	133	1010	112	740	610	372	169	1.0	49	
6:35	110	0	132	[illegible]	112	740	610	372	169	1.0	49	
6:40	109	29	132	1010	112	740	610	372	169	1.0	49	
6:45	110	41	133	1010	112	740	610	372	169	1.0	49	
6:50	107	32	133	1010	112	740	610	372	169	1.1	49	
6:55	107	0	133	1010	112	740	610	372	170	1.1	49	

APPENDIX F

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

Environmental Protection Agency

Dan Bivins	Project Officer Emission Measurement Branch

Acurex Corporation

A. Walter Wyss	Staff Engineer Energy & Environmental Division

Monsanto Research Corporation

George Ball	Contract Manager
James Peters	Industry Principal Investigator
Daryl DeAngelis	Field Sampling Group Supervisor
Tim Thalman	Team Leader, Fyrite
Barat Desai	Research Engineer, Method 5 probe
Jay Yeager	Co-op Student, Method 5 console
Thomas Malone	Research Technician, Method 5 console
Charles Clark	Research Technician, Method 5 console
John Ford	Research Technician, Method 5 probe
Windle McDonald	Research Technician, Andersen
Jose Jimenez	Co-op Student, Method 7
Florence Phillips	Research Technician, Methods 5 and 8 analysis
Norman May	Senior Research Technician, Method 7 analysis
Francine Kulik	Analysis Unit Leader
Connie Hayes	QA/QC Supervisor

TRW, Inc

James McReynolds	Team Leader, BaP train cleanup
Bob Jongleux	Technician, BaP train console
Eric Black	Technician, BaP train console
Dorie Pickett	Technician, BaP train probe
Phil Holz	Technician, BaP train probe

Environmental Science and Engineering, Inc.

Eric H. Johnson	Senior Environmental Specialist, Method 5 console