AP42 Section:	9.10.1.2
Background Chapter	4
Reference:	15
Title:	Report to Great Lakes Sugar Company on Stack Particulate Samples Collected on the Pulp Drier at Fremont, Ohio, Affiliated Environmental Services, Inc., Sandusky, OH, December 8, 1992.

APPENDIX O

REPORT EXCERPTS FROM REFERENCE 15

(Great Lakes Sugar Company, December 8, 1992)

affiliated Environmental services, inc.

Great Lakes Sugar Co.
Attn: Mr. Joe Flynn
3rd Floor Plaza North
P.O. Box 1348
Saginaw, MI 48605

REPORT TO GREAT LAKES SUGAR CO.

ON

STACK PARTICULATE SAMPLES
COLLECTED ON THE PULP DRIER AT
FREMONT, OH

SUBMITTED BY

AFFILIATED ENVIRONMENTAL SERVICES, INC.
3606 VENICE RD.
SANDUSKY, OH 44870

DATE OF TESTING: 12-2-92

DATE OF REPORT: 12-8-92

Joe Gillingham
FIELD TEST SUPERVISOR

Don Dauch
MANAGER, AIR SAMPLING DIVISION

INTRODUCTION

This report contains the results of stack particulate emissions testing performed by Affiliated Environmental Services, Inc. for Great Lakes Sugar at Fremont, OH. Testing was performed on 12-2-92 on the pulp drier. Beet pulp is dried in direct fired rotary drum dryers and the exhaust is cleaned by cyclones and vented out a 6' diameter stack. Production during the emissions test were monitored by Great Lakes Sugar. The times for testing can be found on the field data sheets. This was a 3 repetition test.

AFFILIATED ENVIRONMENTAL SERVICES, INC.
3606 VENICE RD.
SANDUSKY, OHIO 44870

PLANT NAME: Great Lakes Sugar Pulp Dryer

DATE OF TEST: 12-2-92

STACK SAMPLING PARAMETERS

TEST RUN NUMBER 1

MINUTES OF TEST	60
VOLUME OF GAS COLLECTED cubic feet	44.646
METER CALIBRATION FACTOR Y	.93
BAROMETRIC PRESSURE	30.12
PRESSURE DIFFERENTIAL ACROSS ORIFICE DELTA H	1.48
METER TEMPERATURE (+460)	559
STACK STATIC PRESSURE (HG)	.0029
STACK TEMPERATURE (+460)	727
AVERAGE SQUARE ROOT OF VELOCITY HEAD	.855
VOLUME OF IMPINGER WATER COLLECTED ml	455
WEIGHT OF SILICA COLLECTED gms	10
AREA OF SAMPLING NOZZLE square feet	.0003436
PITOT TUBE COEFFICIENT	.84
AREA OF STACK square feet	28.27
CARBON DIOXIDE (DRY FRACTION)	5.5
CARBON MONOXIDE (DRY FRACTION)	0
OXYGEN (DRY FRACTION)	15.5
NITROGEN (DRY FRACTION)	79

STACK PARTICULATE DATA

GAS VOLUME STANDARD CONDITIONS DSCF	39.607
VOLUME OF WATER VAPOR cubic feet	21.902
PERCENT MOISTURE IN STACK GAS	35.6
DRY GAS MOLECULAR WEIGHT	29.5
STACK GAS MOLECULAR WEIGHT	25.406
VELOCITY OF STACK GAS feet per second	59.836
FLOW RATE OF STACK GAS DSCFH	2867553
FLOW RATE OF STACK GAS DSCFM	47793
ISOKINICITY %	113.7
WEIGHT GAIN OF IMPINGERS mg	0
WEIGHT GAIN OF FILTER mg	71.1
WEIGHT GAIN OF PROBE WASH mg	58.8
PARTICULATES COLLECTED POUNDS/HOUR	20.71
PARTICULATES COLLECTED GRAINS/DSCF	.0504
PARTICULATES COLLECTED POUNDS/DSCF	7.2234E-06

PLANT NAME: GREAT LAKES Sugar

SOURCE I.D.: Pulp dryer outlet DATE: 12-2-92

STACK PARTICULATE SAMPLE LABORATORY DATA SHEET

Run # 3

Lab Analysis by: Joe Gillingham

Date: 12-8-92

	FINAL WEIGHT mg	INITIAL WEIGHT mg	NET WEIGHT GAIN mg
Filter	708.3	635.8	72.5
Probe wash	109643.2	109591.3	51.9
* Impingers	—	—	—

SILICA	IMPINGER
Final Weight = 563	Final Volume = 412
Initial Weight = 550	Initial Volume = 200
Total Gain +13	Total Gain + 212

Total gain mg	124.4
Filter & Wash mg	124.4
- Acetone blank mg	- .15
Net Particulate Weight mg	124.25

Net particulate weight refers to the filter and wash minus the acetone blank.

* IMPINGERS ANALYZED for SO_2

AFFILIATED ENVIRONMENTAL SERVICES, INC.
3606 VENICE RD.
SANDUSKY, OHIO 44870

PLANT NAME: Great Lakes Sugar

DATE OF TEST: 12-2-92

STACK SAMPLING PARAMETERS

TEST RUN NUMBER 2

MINUTES OF TEST	60
VOLUME OF GAS COLLECTED cubic feet	43.251
METER CALIBRATION FACTOR Y	.93
BAROMETRIC PRESSURE	30.12
PRESSURE DIFFERENTIAL ACROSS ORIFICE DELTA H	1.41
METER TEMPERATURE (+460)	563
STACK STATIC PRESSURE (HG)	.0029
STACK TEMPERATURE (+460)	733
AVERAGE SQUARE ROOT OF VELOCITY HEAD	.864
VOLUME OF IMPINGER WATER COLLECTED ml	430
WEIGHT OF SILICA COLLECTED gms	10
AREA OF SAMPLING NOZZLE square feet	.0003409
PITOT TUBE COEFFICIENT	.84
AREA OF STACK square feet	28.27
CARBON DIOXIDE (DRY FRACTION)	5.5
CARBON MONOXIDE (DRY FRACTION)	0
OXYGEN (DRY FRACTION)	15.5
NITROGEN (DRY FRACTION)	79

STACK PARTICULATE DATA

GAS VOLUME STANDARD CONDITIONS DSCF	38.09
VOLUME OF WATER VAPOR cubic feet	20.724
PERCENT MOISTURE IN STACK GAS	35.2
DRY GAS MOLECULAR WEIGHT	29.5
STACK GAS MOLECULAR WEIGHT	25.452
VELOCITY OF STACK GAS feet per second	60.66
FLOW RATE OF STACK GAS DSCFH	2901155
FLOW RATE OF STACK GAS DSCFM	48353
ISOKINICITY %	109
WEIGHT GAIN OF IMPINGERS mg	0
WEIGHT GAIN OF FILTER mg	98.1
WEIGHT GAIN OF PROBE WASH mg	65.6
PARTICULATES COLLECTED POUNDS/HOUR	27.47
PARTICULATES COLLECTED GRAINS/DSCF	.0661
PARTICULATES COLLECTED POUNDS/DSCF	9.4678E-06

AFFILIATED ENVIRONMENTAL SERVICES, INC.
3606 VENICE RD.
SANDUSKY, OHIO 44870

PLANT NAME: Great Lakes Sugar

DATE OF TEST: 12-2-92

STACK SAMPLING PARAMETERS

TEST RUN NUMBER 3

MINUTES OF TEST	60
VOLUME OF GAS COLLECTED cubic feet	39.961
METER CALIBRATION FACTOR Y	.93
BAROMETRIC PRESSURE	30.12
PRESSURE DIFFERENTIAL ACROSS ORIFICE DELTA H	1.12
METER TEMPERATURE (+460)	565
STACK STATIC PRESSURE (HG)	.0029
STACK TEMPERATURE (+460)	741
AVERAGE SQUARE ROOT OF VELOCITY HEAD	.856
VOLUME OF IMPINGER WATER COLLECTED ml	412
WEIGHT OF SILICA COLLECTED gms	13
AREA OF SAMPLING NOZZLE square feet	.0003409
PITOT TUBE COEFFICIENT	.84
AREA OF STACK square feet	28.27
CARBON DIOXIDE (DRY FRACTION)	6.5
CARBON MONOXIDE (DRY FRACTION)	0
OXYGEN (DRY FRACTION)	13.5
NITROGEN (DRY FRACTION)	80

STACK PARTICULATE DATA

GAS VOLUME STANDARD CONDITIONS DSCF	35.044
VOLUME OF WATER VAPOR cubic feet	20.018
PERCENT MOISTURE IN STACK GAS	36.4
DRY GAS MOLECULAR WEIGHT	29.58
STACK GAS MOLECULAR WEIGHT	25.365
VELOCITY OF STACK GAS feet per second	60.529
FLOW RATE OF STACK GAS DSCFH	2810605
FLOW RATE OF STACK GAS DSCFM	46843
ISOKINICITY %	103.4
WEIGHT GAIN OF IMPINGERS mg	0
WEIGHT GAIN OF FILTER mg	72.5
WEIGHT GAIN OF PROBE WASH mg	51.9
PARTICULATES COLLECTED POUNDS/HOUR	21.97
PARTICULATES COLLECTED GRAINS/DSCF	.0546
PARTICULATES COLLECTED POUNDS/DSCF	7.8179E-06

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To	Don Dauch	From	Joe Flynn
Co.		Co.	
Dept.		Phone #	
Fax #		Fax #	

Don Dauch

AES

Ref: Fremont stack test

Don:

pulp DRIER STANDARD formulars:

wet pulp to DRIER (tons/hr) =

(process weight rate)

$$\text{tons beet sliced (tons/hr)} \times \text{\% solids in beets} \div \left(1 - \left(\frac{\text{wet pulp moisture (\%)}}{100}\right)\right)$$

process weight DATA

tons beets sliced	171 tons/hr
wet pulp moisture	77.2% moisture
% solids	6%

$$\text{process weight RATE} = \frac{171 \text{ tons/hr} \times 0.06}{1 - \left(\frac{77.2}{100}\right)} =$$

45 tons/hr

19

Allowable discharge tons/hr =

Ohio EPA formula

$$\frac{55(45)^{.11} - 40}{55(PWR)^{.11} - 40} = 43.60 \text{ lbs/hr}$$

If you have any questions give me a call (512) 799-7300

Joe

		DIFFUSER #1 SHIFTS			DIFFUSER #2 SHIFTS			BEETS SLICED			SUGAR IN COSSETES				STEAM ON BEETS					
DATE	DAYS	1ST	2ND	3RD	1ST	2ND	3RD	TOTAL DAY	TONS SLICED TODATE	AVE.	% SUGAR DAY	% SUGAR TODATE	TONS SUGAR DAY	TONS SUGAR TODATE	TEMP C BTS	TEMP C COSS	% STEAM DAY	% STEAM TD	PRODUCT DAY	PRODUCT TD
11/29	57.62	701	727	652	633	701	689	4103	222714	3865	15.52	16.94	636.79	37733.57	5	21	2.73	2.13	112.0	4742.1
11/30	58.62	678	659	718	527	618	686	3886	226600	3866	14.84	16.91	576.68	38310.25	6	24	3.07	2.15	119.3	4861.4
12/01	59.62	688	661	656	662	619	574	3860	230460	3865	14.90	16.87	575.14	38885.39	7	25	3.07	2.16	118.5	4979.9
12/02	60.62	636	678	687	483	632	580	3696	234156	3863	15.35	16.85	567.34	39452.73	7	24	2.90	2.17	107.2	5087.1
12/03	61.62	662	679	570	637	657	423	3628	237784	3859	14.69	16.82	532.95	39985.68	5	24	3.24	2.19	117.5	5204.6
12/04	62.62	670	686	668	576	668	662	3930	241714	3860	15.95	16.80	626.84	40612.52	2	20	3.07	2.20	120.7	5325.3
12/05	63.62	680	638	615	613	576	618	3740	245454	3858	15.46	16.78	578.20	41190.72	3	15	2.05	2.20	76.7	5402.0
WK 9								26843		3835	15.25		4093.94							
TD									245454	3858		16.78		41190.72				2.20		5402.0
12/06	64.62	690	602	663	499	437	688	3579	249033	3854	15.68	16.77	561.19	41751.91	3	20	2.90	2.21	103.8	5505.8
12/07	65.62	694	653	615	566	616	563	3707	252740	3852	16.03	16.75	594.23	42346.14	6	22	2.73	2.22	101.2	5607.0
12/08	66.62	670	645	641	641	653	629	3879	256619	3852	15.86	16.74	615.21	42961.35	8	25	2.90	2.23	112.5	5719.5
12/09	67.62	649	632	698	344	241	189	2753	259356	3835	16.00	16.73	440.48	43399.15	7	24	2.90	2.24	79.8	5799.3
12/10	68.62	616	499	640	488	555	434	3232	262588	3827	16.39	16.73	529.72	43928.87	7	25	3.07	2.25	99.2	5898.5
12/11	69.62	644	639	652	577	536	407	3455	266043	3821	16.62	16.73	574.22	44503.09	7	26	3.24	2.26	111.9	6010.4
12/12	70.62	568	655	653	468	515	602	3461	269504	3816	16.69	16.73	577.64	45080.73	7	26	3.24	2.27	112.1	6122.5
WK 10								24066		3438	16.18		3892.69							
TD									269504	3816		16.73		45080.73				2.27		6122.5
12/13	71.62	612	661	683	449	316	662	3383	272887	3810	16.98	16.73	574.43	45655.16	7	28	3.58	2.29	121.1	6243.6
12/14	72.62	671	634	665	666	608	625	3869	276756	3811	16.87	16.73	652.70	46307.86	7	24	2.90	2.30	112.2	6355.8
12/15	73.62	675	469	648	651	290	621	3354	280110	3805	17.22	16.74	577.56	46885.42	5	22	2.90	2.30	97.3	6453.1
12/16	74.62	700	581	307	320	314	332	2554	282647	3788	16.66	16.74	425.50	47308.07	5	22	2.90	2.31	74.1	6527.2
12/17	75.62	667	586	643	506	513	332	3247	285894	3781	16.83	16.74	546.47	47854.54	4	25	3.58	2.32	116.2	6643.4
12/18	76.62	657	585	590	366	580	585	3363	289257	3775	17.09	16.74	574.74	48429.28	1	24	3.92	2.34	131.8	6775.2
12/19	77.62	598	632	643	560	622	661	3716	292973	3774	16.35	16.74	607.57	49036.85	1	24	3.92	2.36	145.7	6920.9
WK 11								23486		3355	16.86		3958.97							
TD									292973	3774		16.74		49036.85				2.36		6920.9
12/20	78.62	655	655	653	566	588	609	3726	296699	3774	16.11	16.73	600.26	49637.11	2	25	3.92	2.38	146.1	7067.0
12/21	79.62	603	655	655	486	660	647	3706	300405	3773	16.42	16.73	608.53	50245.64	3	25	3.75	2.40	139.0	7206.0
12/22	80.62	673	669	651	663	655	645	3956	304361	3775	16.38	16.72	647.99	50893.63	5	24	3.24	2.41	128.2	7334.2
12/23	81.62	470	607	632	513	584	641	3447	307808	3771	16.45	16.72	567.03	51460.66	4	26	3.75	2.42	129.3	7463.5
12/24	82.62	637	653	656	647	442	662	3697	311505	3770	16.38	16.71	605.57	52066.23	4	25	3.58	2.44	132.4	7595.9
12/25	83.62	633	305	649	636	218	661	3102	314607	3762	16.45	16.71	510.28	52576.51	4	26	3.75	2.45	116.3	7712.2
12/26	84.62	547	584	643	583	581	637	3575	318182	3760	16.25	16.71	580.94	53157.45	6	25	3.24	2.46	115.8	7828.0
WK 12								25209		3601	16.35		4120.60							
TD									318182	3760		16.71		53157.45				2.46		7828.0

		PULP PRODUCED					PRESSED PULP			DRY PULP			PELLET PULP			% SUGAR IN PRESSED PULP			
		TONS		% ON BEETS			% MOISTURE			% MOISTURE			% MOISTURE			% SUGAR		TONS	
DATE	DAY	DAY	TODATE	DAY	TD	AVE	DAY	TOTAL	TODATE	DAY	TOTAL	TODATE	DAY	TOTAL	TODATE	DAY	TD	DAY	TD
11/29	58	234	13189	5.70	5.92	227	73.05	4271.37	73.64	12.19	660.00	11.38	10.49	611.72	10.55	.36	.35	14.77	786.
11/30	59	216	13405	5.56	5.92	227	73.47	4344.84	73.64	11.30	671.30	11.38	10.95	622.67	10.55	.38	.35	14.77	801.
12/01	60	215	13620	5.57	5.91	227	73.55	4418.39	73.64	12.34	683.64	11.39	11.06	633.73	10.56	.31	.35	11.97	813.6
12/02	61	210	13830	5.68	5.91	227	74.83	4493.22	73.66	11.06	694.70	11.39	10.31	644.04	10.56	.39	.35	14.41	828.07
12/03	62	201	14031	5.54	5.90	226	72.47	4565.69	73.64	9.78	704.48	11.36	10.34	654.38	10.55	.35	.35	12.70	840.77
12/04	63	229	14260	5.83	5.90	226	73.08	4638.77	73.63	10.67	715.15	11.35	10.70	665.08	10.56	.29	.35	11.40	852.17
12/05	64	214	14474	5.72	5.90	226	74.57	4713.34	73.65	11.14	726.29	11.35	10.85	675.93	10.56	.37	.35	13.84	866.01
WK 9		1519		5.66			73.57			11.21			10.67			.35		93.86	
TD			14474		5.90				73.65			11.35			10.56		.35		866.01
12/06	65	206	14680	5.76	5.89	226	71.77	4785.11	73.62	12.79	739.08	11.37	11.14	687.07	10.57	.38	.35	13.60	879.61
12/07	66	217	14897	5.85	5.89	226	74.15	4859.26	73.63	10.90	749.98	11.36	10.88	697.95	10.58	.47	.35	17.42	897.03
12/08	67	225	15122	5.80	5.89	226	76.77	4936.03	73.67	11.60	761.58	11.37	9.87	707.82	10.56	.44	.36	17.07	914.10
12/09	68	161	15283	5.85	5.89	225	73.78	5009.81	73.67	10.93	772.51	11.36	10.85	718.67	10.57	.45	.36	12.39	926.49
12/10	69	192	15475	5.94	5.89	224	73.60	5083.41	73.67	9.78	782.29	11.34	10.24	728.91	10.56	.41	.36	13.25	939.74
12/11	70	207	15682	5.99	5.89	224	75.58	5158.99	73.70	10.98	793.27	11.33	10.57	739.48	10.56	.45	.36	15.55	955.29
12/12	71	208	15890	6.01	5.90	224	73.55	5232.54	73.70	12.16	805.43	11.34	10.73	750.21	10.57	.45	.36	15.57	970.86
WK 10		1416		5.88			74.17			11.31			10.61			.44		104.85	
TD			15890		5.90				73.70			11.34			10.57		.36		970.86
12/13	72	206	16096	6.09	5.90	224	73.68	5306.22	73.70	11.53	816.96	11.35	10.25	760.46	10.56	.40	.36	13.53	984.39
12/14	73	234	16330	6.05	5.90	224	73.72	5379.94	73.70	10.73	827.69	11.34	10.27	770.73	10.56	.38	.36	14.70	999.09
12/15	74	206	16536	6.14	5.90	223	74.98	5454.92	73.72	10.66	838.35	11.33	9.53	780.26	10.54	.41	.36	13.75	1012.84
12/16	75	153	16689	5.99	5.90	223	77.28	5532.20	73.76	11.75	850.10	11.33	10.05	790.31	10.54	.40	.36	10.22	1023.06
12/17	76	196	16885	6.04	5.91	222	72.30	5604.50	73.74	11.25	861.35	11.33	10.74	801.05	10.54	.31	.36	10.07	1033.13
12/18	77	205	17090	6.10	5.91	222	73.80	5678.30	73.74	12.70	874.05	11.35	10.83	811.88	10.54	.35	.36	11.77	1044.90
12/19	78	220	17310	5.92	5.91	222	74.35	5752.65	73.75	12.21	886.26	11.36	10.99	822.87	10.55	.41	.36	15.24	1060.14
WK 11		1420		6.05			74.30			11.55			10.38			.38		89.28	
TD			17310		5.91				73.75			11.36			10.55		.36		1060.14
12/20	79	219	17529	5.88	5.91	222	74.38	5827.03	73.76	13.35	899.61	11.39	11.34	834.21	10.56	.29	.36	10.81	1070.95
12/21	80	220	17749	5.94	5.91	222	74.42	5901.45	73.77	12.90	912.51	11.41	10.95	845.16	10.56	.38	.36	14.08	1085.03
12/22	81	235	17984	5.94	5.91	222	76.32	5977.77	73.80	11.46	923.97	11.41	11.09	856.25	10.57	.46	.36	18.20	1103.23
12/23	82	205	18189	5.95	5.91	222	73.72	6051.49	73.80	11.12	935.09	11.40	10.24	866.49	10.57	.36	.36	12.41	1115.64
12/24	83	219	18408	5.92	5.91	222	74.05	6125.54	73.80	10.20	945.29	11.39	10.70	877.19	10.57	.32	.36	11.83	1127.47
12/25	84	185	18593	5.96	5.91	221	73.73	6199.27	73.80	10.43	955.72	11.38	10.90	888.09	10.57	.29	.36	9.00	1136.47
12/26	85	211	18804	5.90	5.91	221	71.82	6271.09	73.78	12.64	968.36	11.39	10.08	898.17	10.57	.40	.36	14.30	1150.77
WK 12		1494		5.93			74.06			11.73			10.76			.36		90.63	
TD			18804		5.91				73.78			11.39			10.57		.36		1150.77

Filename: BEET15.WQ1
Date: 26-Jan-95
Facility: Great Lakes Sugar Cooperative
Location: Fremont, Ohio
Source: Fuel oil-fired rotary drum beet pulp dryer with cyclones
Test date: December 2, 1992

D. Emission Data/Mass Flux Rates/Emission Factors

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
1	Stack temperature	Deg F	267	273	281	
	Pressure	in. HG	30.12	30.12	30.12	
	Moisture	%	35.6	35.2	36.4	
	Oxygen	%	15.5	15.5	15.5	
	Volumetric flow, actual	acfm	101493.82	102891.49	102669.29	
	Volumetric flow, standard*	dscfm	47788	48348	46839	
	Isokinetic variation	%	113.7	109	103.4	
Wet pulp feed to dryer		TPH	45.00	45.00	45.00	
	Pollutant concentrations:					
	Filterable PM	G/dscf	0.0504	0.0661	0.0546	
	CO2	% dv	5.5	5.5	6.50	
	SO2	lb/dscf	1.934E-05	2.002E-05	2.065E-05	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	20.6	27.4	21.9	
	CO2	lb/hr	18013	18224	20865	
	SO2	lb/hr	55.5	58.1	58.0	
	Emission factors (ENGLISH UNITS):		run 1 void			AVERAGE
	Filterable PM	lb/ton		0.61	0.49	0.55
	CO2	lb/ton		405	464	434
	SO2	lb/ton		1.3	1.3	1.3
	Emission factors (METRIC UNITS):					AVERAGE
	Filterable PM	kg/Mg		0.30	0.24	0.27
	CO2	kg/Mg		202	232	217
	SO2	kg/Mg		0.65	0.64	0.65

*DSCFM BASED ON A STANDARD TEMPERATURE OF 68 DEGREES FAHRENHEIT

DESCRIPTION OF TEST

All tests were performed in accordance with EPA methods 1,2,3,4, 5 and 8 as described in the Federal Register. A twenty point sampling traverse was selected with sampling at three minutes per point. The equipment used for testing consisted of a fyrite gas analyzer and a RAC Stack Train Sampler (EPA type). A RAC type "S" pitot and heated glass sampling probe was used with the sampling train. All equipment was calibrated in the laboratory prior to the test. The calculations for the stack sampling parameters were performed on a computer. A description of the method 1-5 test follows on the next few pages. The data sheets can be found in the appendix.

METHOD 1

Sample and Velocity Traverses for Stationary Sources.

The location of the sampling site and traverse points are determined based on stack diameters and length of the stack.

METHOD 2

Determination of Stack Gas Velocity and Volumetric Flow Rate.

Velocities are measured with a type "S" pitot tube. Temperatures are measured with thermocouples.

METHOD 3

Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight.

A gas sample is extracted by using a bag simultaneously with the particulate tests. Analyses are performed using an Orsat and/or Fyrite Analyzer.

METHOD 4

Determination of Moisture Content.

A gas sample is extracted at a constant rate from the source. Moisture is determined either volumetrically or gravimetrically.

METHOD 5

Determination of Particulate Emissions from Stationary Sources.

Particulate matter is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at 248 ± 25° F. A schematic of the sampling train is shown in Figure 1.

STACK PARTICULATE AND SO_2 SUMMARY

Test No.	gr/dscf(A)	$x10^{-6}$ lbs/dscf(B)	lbs/hr	lbs/hr SO_2
1	0.0504	7.2234	20.71	55.46
2	0.0661	9.4678	27.47	58.08
3	0.0546	7.8179	21.97	58.04

(A) = Grains per dry standard cubic feet at 68°F and 29.92 inches Hg

(B) = Pounds per dry standard cubic feet at 68°F and 29.92 inches Hg

STACK GAS DATA SUMMARY

Temt No.	FLow Rate(A)	Temp. °F	Moisture %	CO_2 %	O_2 %
1	47,793	267	35.6	5.5	15.5
2	48,353	273	35.2	5.5	15.5
3	46,843	281	36.4	6.5	13.5

(A) = Dry standard cubic feet per minute at 29.92 inches and 68°F

PLANT NAME: Great Lakes Sugar

SOURCE I.D.: Pulp dryer outlet DATE: 12-2-92

STACK PARTICULATE SAMPLE LABORATORY DATA SHEET

Run # 1 Lab Analysis by: Joe Gillingham

Date: 12-8-92

	FINAL WEIGHT mg	INITIAL WEIGHT mg	NET WEIGHT GAIN mg
Filter	705.0	633.9	71.1
Probe wash	103 888.8	103830.0	58.8
* Impingers	—	—	—

SILICA	IMPINGER
Final Weight = 560	Final Volume = 455
Initial Weight = 550	Initial Volume = 200
Total Gain +10	Total Gain +255

Total gain mg	129.9
Filter & Wash mg	129.9
- Acetone blank mg	- .15
Net Particulate Weight mg	129.75

Net particulate weight refers to the filter and wash minus the acetone blank.

* Impingers analyzed for SO_2

PLANT NAME: Great Lakes Sugar

SOURCE I.D.: pulp dryer outlet DATE: 12-2-92

STACK PARTICULATE SAMPLE LABORATORY DATA SHEET

Run # 2

Lab Analysis by: Joe Gillingham

Date: 12-8-92

	FINAL WEIGHT mg	INITIAL WEIGHT mg	NET WEIGHT GAIN mg
Filter	729.2	631.1	98.1
Probe wash	103408.1	103342.5	65.6
* Impingers	—	—	—

SILICA	IMPINGER
Final Weight = 560	Final Volume = 430
Initial Weight = 550	Initial Volume = 200
Total Gain +10	Total Gain +230

Total gain mg	163.7
Filter & Wash mg	163.7
- Acetone blank mg	-.15
Net Particulate Weight mg	163.55

Net particulate weight refers to the filter and wash minus the acetone blank.

* Impingers analyzed for SO_2

SULFUR DIOXIDE CALCULATION FORM
(English units)

Sample Volume[a]

R-1

SO_2 Concentration

N = 0.0100 (g-eq)/ml, V_t = 10.85 ml, V_{tb} = 0.0 ml

V_{soln} = 1000.00 ml, V_a = 10.0 ml

$$C_{SO_2} = 7.06 \times 10^{-5} \frac{N\,(V_t - V_{tb})\,(V_{soln}/V_a)}{V_{m(std)}} = 1.934 \times 10^{-5} \text{ lb/dscf}$$

Equation 6-2

19.34×10^{-6} lb/dscf $\times$ 2.867553×10^{6} dscf/hr = 55.46 lb/hr SO_2

[a] Calculation form for data collected using Method 6 type equipment. The alternative use of Method 5 or Method 8 equipment will change V_m and $V_{m(std)}$ to $V_{m(std)}$ = 39.607 ft^3.

R-2

SO_2 Concentration

N = 0.0100 (g-eq)/ml, V_t = 10.80 ml, V_{tb} = 0.0 ml

V_{soln} = 1000.00 ml, V_a = 10.0 ml

$$C_{SO_2} = 7.06 \times 10^{-5} \frac{N\,(V_t - V_{tb})\,(V_{soln}/V_a)}{V_{m(std)}} = 2.002 \times 10^{-5} \text{ lb/dscf}$$

Equation 6-2

20.02×10^{-6} lb/dscf $\times$ 2.901155×10^{6} dscf/hr = 58.08 lb/hr SO_2

[a] Calculation form for data collected using Method 6 type equipment. The alternative use of Method 5 or Method 8 equipment will change V_m and $V_{m(std)}$ to $V_{m(std)}$ = 38.090 ft^3.

SULFUR DIOXIDE CALCULATION FORM
(English units)

R-3

Sample Volume[a]

SO_2 Concentration

$N = 0.010$ (g-eq)/ml, $V_t = 10.25$ ml, $V_{tb} = 0.0$ ml

$V_{soln} = 1000.00$ ml, $V_a = 10.0$ ml

$$C_{SO_2} = 7.06 \times 10^{-5} \frac{N\,(V_t - V_{tb})\,(V_{soln}/V_a)}{V_{m(std)}} = 2.065 \times 10^{-5} \text{ lb/dscf}$$

Equation 6-2

20.65×10^{-6} lb/dscf $\times$ 2.810605 $\times 10^{6}$ dscf/hr $= 58.04$ lb/hr SO_2

[a] Calculation form for data collected using Method 6 type equipment. The alternative use of Method 5 or Method 8 equipment will change V_m and $V_{m(std)}$ to $V_{m(std)} = 35.044$ ft^3.

SO_2 Concentration

$N =$ _._____ (g-eq)/ml, $V_t =$ __.__ ml, $V_{tb} =$ __.__ ml

$V_{soln} =$ ___.__ ml, $V_a =$ __.__ ml

$$C_{SO_2} = 7.06 \times 10^{-5} \frac{N\,(V_t - V_{tb})\,(V_{soln}/V_a)}{V_{m(std)}} = \_.\_\_\_ \times 10^{-5} \text{ lb/dscf}$$

Equation 6-2

[a] Calculation form for data collected using Method 6 type equipment. The alternative use of Method 5 or Method 8 equipment will change V_m and $V_{m(std)}$ to $V_{m(std)} =$ __.___ ft^3.