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EMISSION TEST REPORT

WESTSIDE FARMERS'

COOPERATIVE GIN #5

TRANQUILITY, CALIFORNIA

Prepared by

PEDCo Environmental, Inc.
11499 Chester Road
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Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Division of Stationary Source Enforcement
Washington, D.C. 20460

John R. Busik, Project Officer
Daniel C. Yee, Task Manager

February 1978

CHESTER TOWERS

BRANCH OFFICES

Crown Center
Kansas City, Mo.

Professional Village
Chapel Hill, N.C.

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REPORT CERTIFICATION

The sampling and analysis performed for this report were carried out under my direction and supervision.

Date: 5/18/78 Signature: [signature]

I have reviewed all testing details and results in this test report and hereby certify that the test report is authentic and accurate.

Date: 5/18/78 Signature: [signature]
Richard W. Gerstle, P.E.

1.0 INTRODUCTION

During the period November 15 through 22, 1977, PEDCo Environmental personnel conducted tests at the Westside Farmers' Cooperative Gin #5 in San Joaquin, California. These tests were carried out to determine the atmospheric emission rate of particulate matter. The gin was operated in a normal manner at full ginning capacity during the test series and plant personnel supplied all operating data.

A total of 49 particulate tests were conducted at ten separate sampling locations in accordance with EPA Methods 1, 2, 3, 4, and 5 as described in the Federal Register, Vol. 42, No. 160, August 18, 1977. In addition, the impinger contents were analyzed for organic and inorganic material.

These tests were performed under the direct supervision of Mr. William G. DeWees, Jr. of PEDCo Environmental, Inc., Cincinnati, Ohio. Mr. Daniel C. Yee of the Environmental Protection Agency's office in San Francisco observed some of these tests.

2.0 SUMMARY OF RESULTS

Cotton gins generally perform the same types of operations, the number and combinations of process emission points can vary greatly. This nonuniform combination of process emissions makes it difficult to determine the exact contribution of emissions to the atmosphere from individual operations. For this reason, later discussions of possible data bias will be made with respect to the total gin emissions which are more easily defined. A block diagram of this gin is shown in Figure 1. The operations are numbered and defined in Table 1 along with their corresponding emission point(s). A detailed explanation, diagram, and picture of each sampling site is included in Sections 3.0 and 4.0 of this report.

Total gin emissions averaged 49 pounds per hour of filterable particulate and 52 pounds per hour of total particulate. The total emissions represent the average of emission points tested as shown in Table 2 and summarized below.

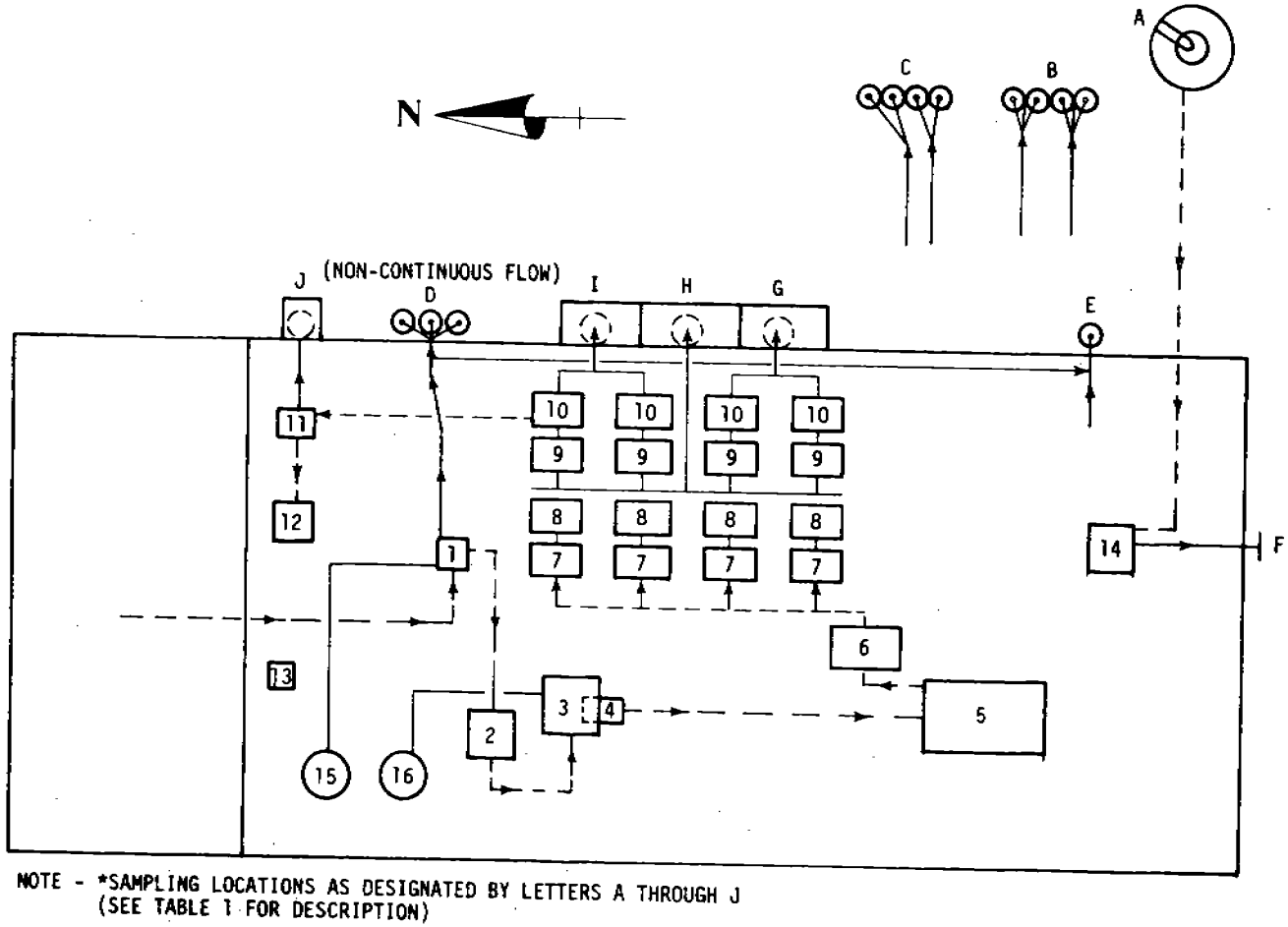


Figure 1. Sampling site locations.

Table 1. PROCESS OPERATIONS AND EMISSION POINT DESCRIPTION

Process operation no.	Process description	Emission point discharge no.	Type of control equipment
1	Unloading separator	D	Cyclones
2	#1 Tower dryer with cleaning cylinder	C	Cyclones
3	#1 Incline cleaner	B	Cyclones
4	Stick machine	C	Cyclones
5	Super volume cotton conditioner	C	Cyclones
6	#2 Incline cleaner	E	Cyclones
7	4-Gin stands with feeders	C	Cyclones
8	4-Super jet lint cleaners	C	Cyclones
9	4-#1 Saw type lint cleaner with condensers on top	H	Lint screen basket
10	4-#2 Saw type lint cleaners with condensers on top	G&I	Lint screen baskets
11	Battery condenser	J	Lint screen basket
12	Bale press	N/A	N/A
13	Automatic sampler	N/A	N/A
14	Mote cleaner	F	Cyclone
15	#1-Heater (3 million Btu/hr)	-	None
16	#2-Heater (3 million Btu/hr)	-	None

NOTE: Site A receives uncleaned motes from Lint Screen Baskets.

Table 2. SUMMARY OF PARTICULATE EMISSION RESULTS

Site No.	Total concentration gr/dscf[a]	Allowable concentration gr/dscf[b]	Allowable concentration dscfh	Filterable particulate lb/h	Total particulate lb/h	
A	0.043	0.1	644,000	3.78	3.82	
B	0.106	0.1	859,000	10.72	10.97	
C	0.047	0.1	721,000	4.34	4.38	
D	0.102	0.1	351,000	4.99	5.07	
E	0.010	0.1	346,000	0.36	0.49	
F	0.087	0.1	144,000	1.71	1.78	
G	0.031	0.1	824,000	3.35	3.63	
H	0.088	0.1	1,100,000	11.86	12.99	
I	0.041	0.1	771,000	4.03	4.41	
J	0.023	0.1	1,500,000	3.64	4.61	

a) Grains per dry standard cubic foot (sum of impinger and filterable concentrations). Each value is the average of all test runs conducted at the site.

b) Allowable particulate matter concentration based on Fresno County Air Pollution Control District Rules and Regulations - revised May 18, 1976 - Rule 404 Particulate Matter Concentration.

c) Flow rate in dry standard cubic feet per hour - 68°F and 29.92 in Hg.

Process Weight input, lb/h	Emission Rate, lb/h		Allowable Emissions* Total lb/h
	Filterable	Total	
20,800	49	52	15.33

*) Based on the Fresno County Air Pollution Control District Rules and Regulations - Rule 405 Particulate Matter Emission Rate. EPA Region IX defined the gin as a single process and calculated the allowable emissions.

At sampling sites A through F, an EPA Method 5 sampling train and an Aerotherm High Volume Sampler were run simultaneously for data comparison. At sampling sites G through J, only an EPA Method 5 sampling train was used with a Teledyne Hastings-Raydist unit in place of an inclined manometer to measure vent gas velocity. This change was necessitated by the low velocity in the exit ducts. Since only one Teledyne Hastings-Raydist unit was available, it was not possible to perform simultaneous testing with the Aerotherm High Volume Sampler at these sites.

Several of the cyclone tests were nonisokinetic. Biasing all the nonisokinetic tests, using the method referenced in the August 18, 1977 Federal Register page 41782 Citation 4, in favor of the gin would still give an average total plant emission in excess of 51 pounds per hour.

The sheet metal stack extensions installed at test sites A through F (for sampling purposes) created a back pressure on each cyclone system. This may have effected the tangential flow in the cyclone causing a possible reduction

in collection efficiency resulting in a positive bias. The two sites most effected were B and C where four cyclones exhausted into a single duct. The other sites probably had little if any effect due to the better configuration of the collecting ducts. The shorter than required stack extensions on Sites G, H and I (lint cages) may have caused a negative bias in the measured emission rate.

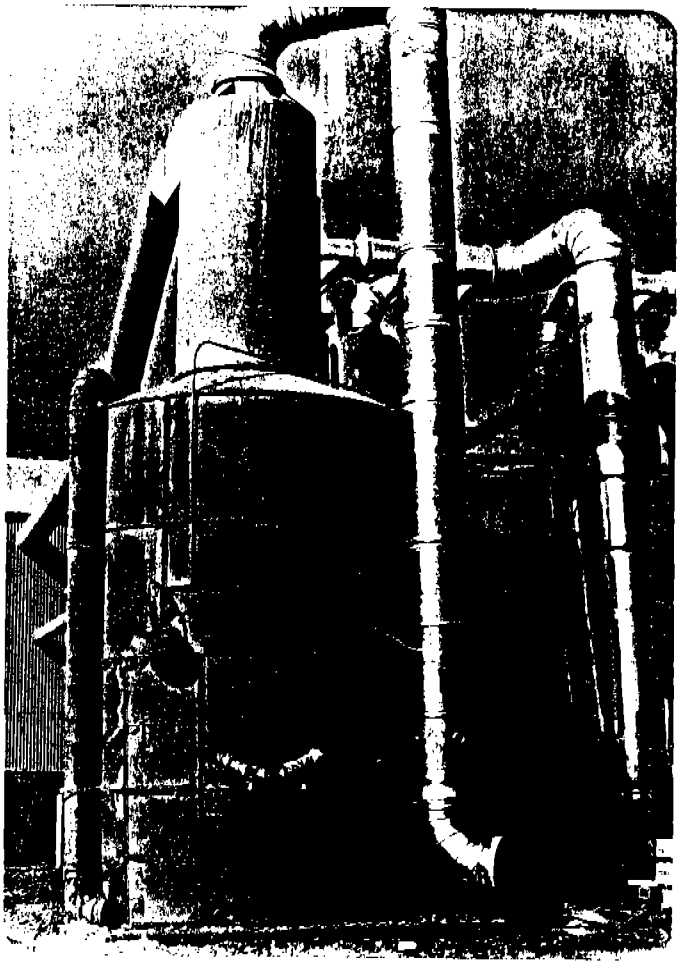
Considering all the possible negative and positive biases, the reported average emissions of 52 pounds per hour seem representative of the emissions during the testing periods.

3.0 DESCRIPTION OF PROCESS

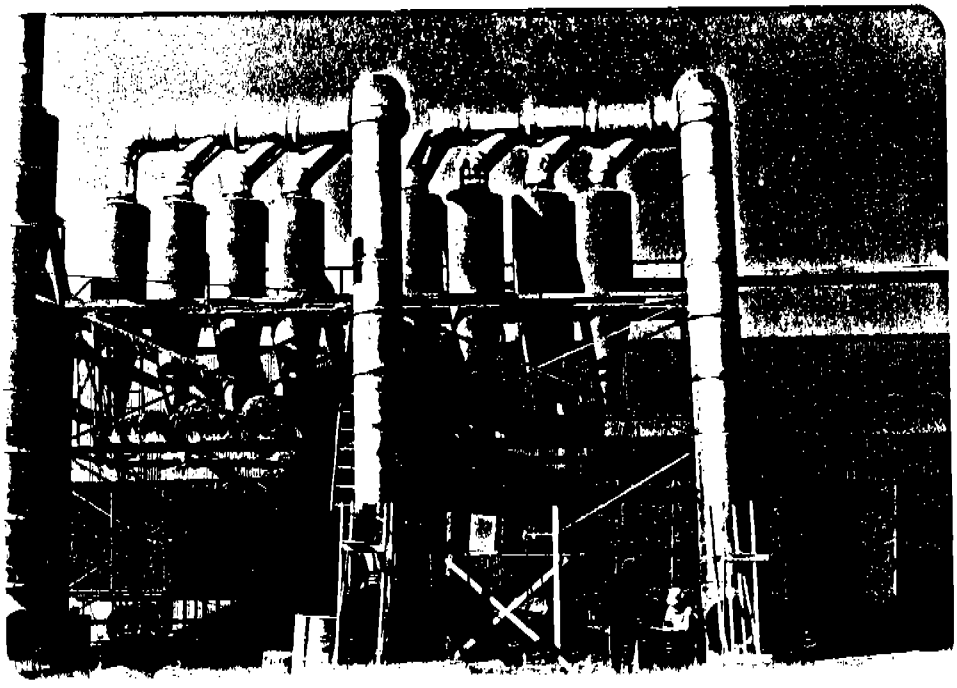
The Westside Cooperative Gin #5 process flow diagram and sampling locations are presented in Figure 1. Corresponding process flow machine descriptions, sampling location, and type of control equipment was summarized in Table 1.

The gin was in operation seven days a week, 24 hours per day with scheduled one hour shutdowns every six hours for maintenance purposes. An average ginning rate of 13 bales of cotton per hour was maintained during the testing period. Each ginned bale of cotton requires approximately 1600 pounds of seed cotton to produce a 500 pound bale. The 1600 pounds per bale times the ginning rate of 13 bale per hour corresponds to a input weight rate of 20,800 pounds per hour.

Particulate emissions from sites A through D are controlled by a series of high-efficiency cyclone dust collectors. Emissions from sites E and F are controlled by single cyclone dust collectors. Emissions are normally vented directly into the atmosphere from the top of each cyclone. However, in order to facilitate sampling at these sites, sheet metal stack extensions were installed as shown in Figure 2.

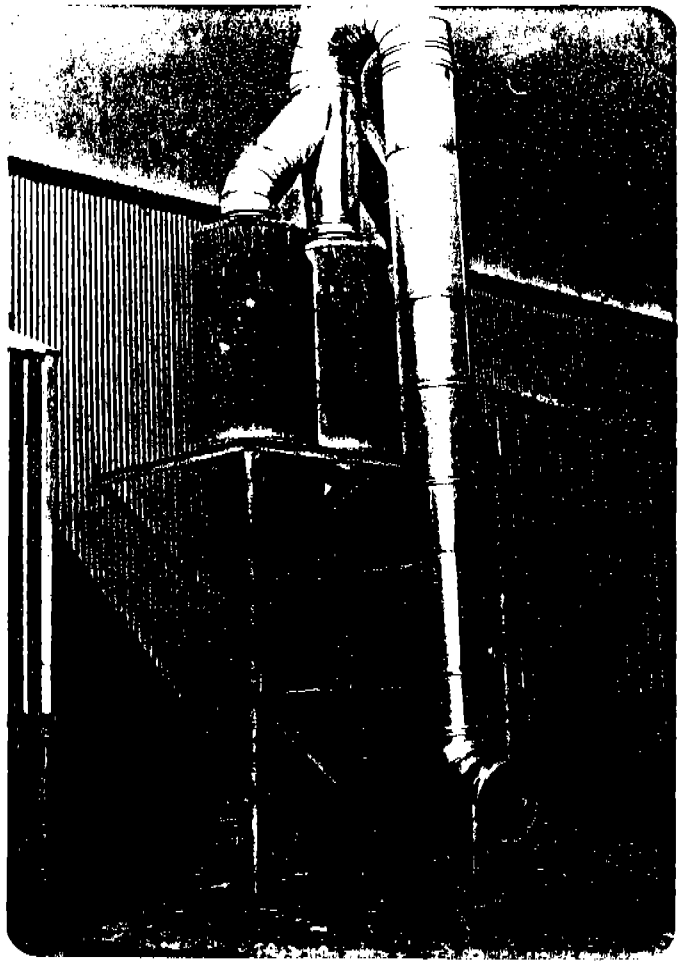


Site A

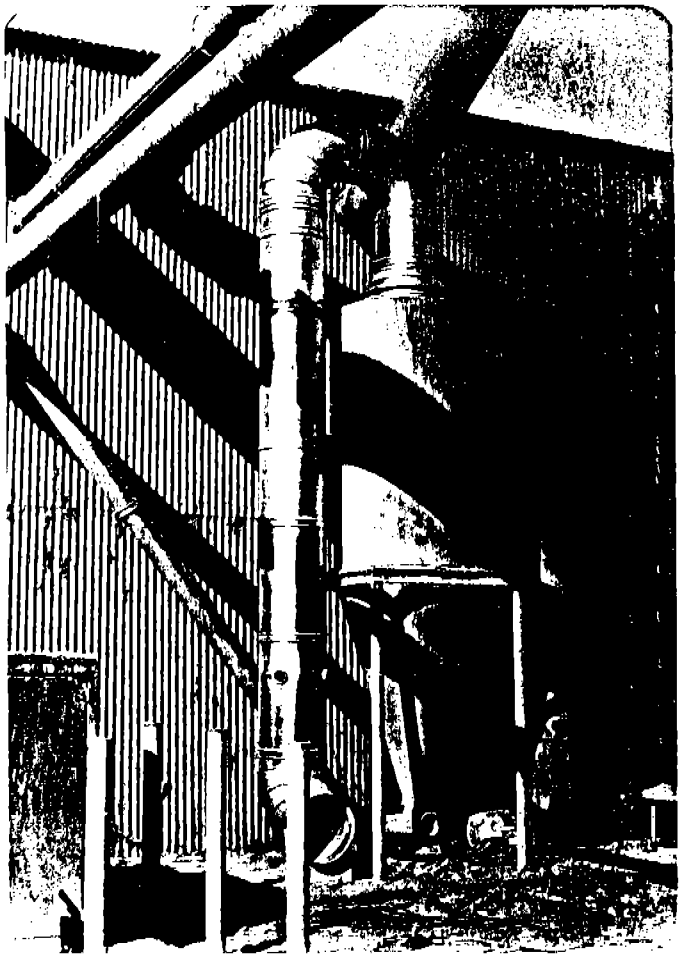


Site B and C

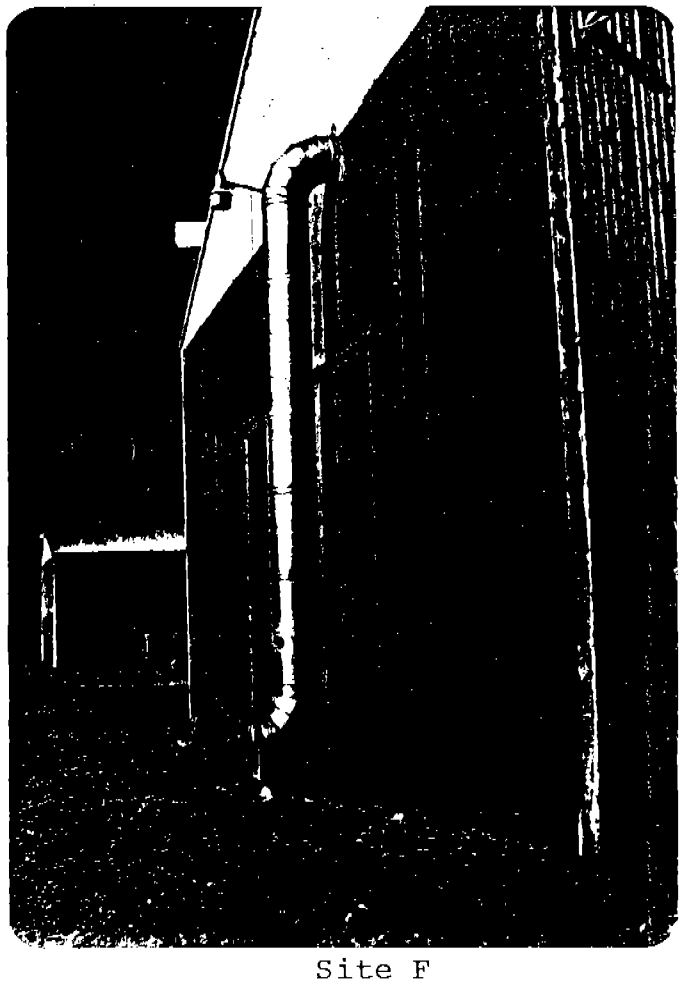
Figure 2. Photograph of test sites.



Site D

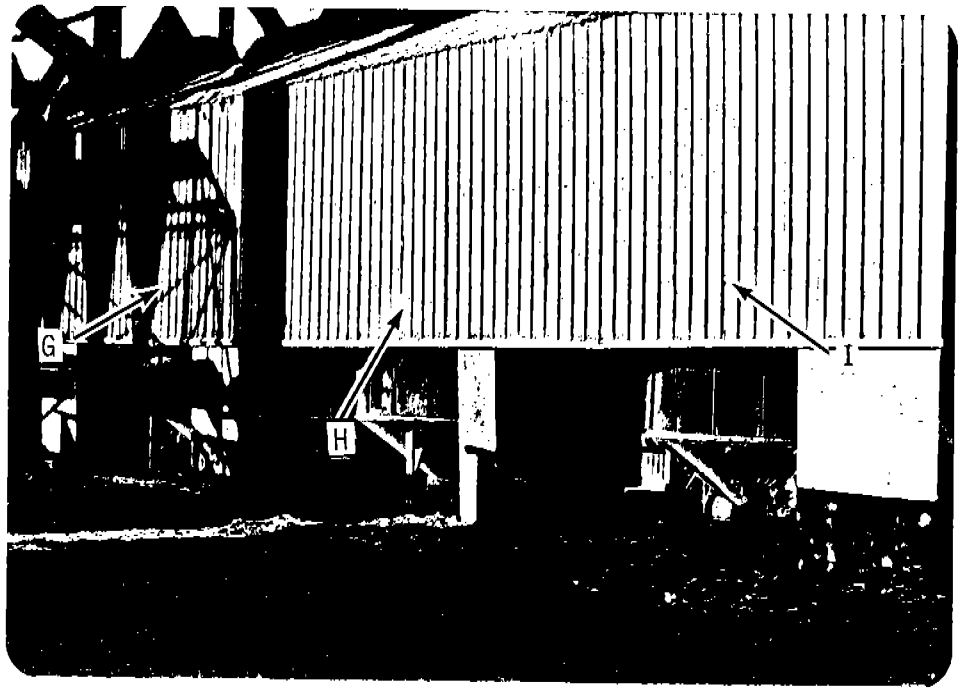


Site E

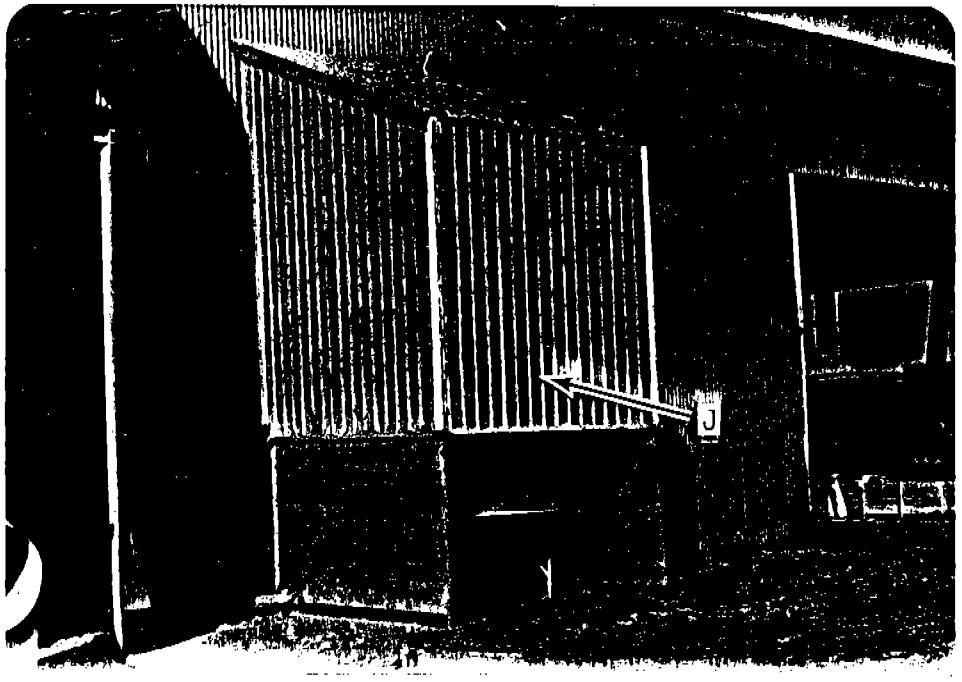


Site F

Figure 2(Continued). Photograph of test sites.



Sites G, H and I



Site J

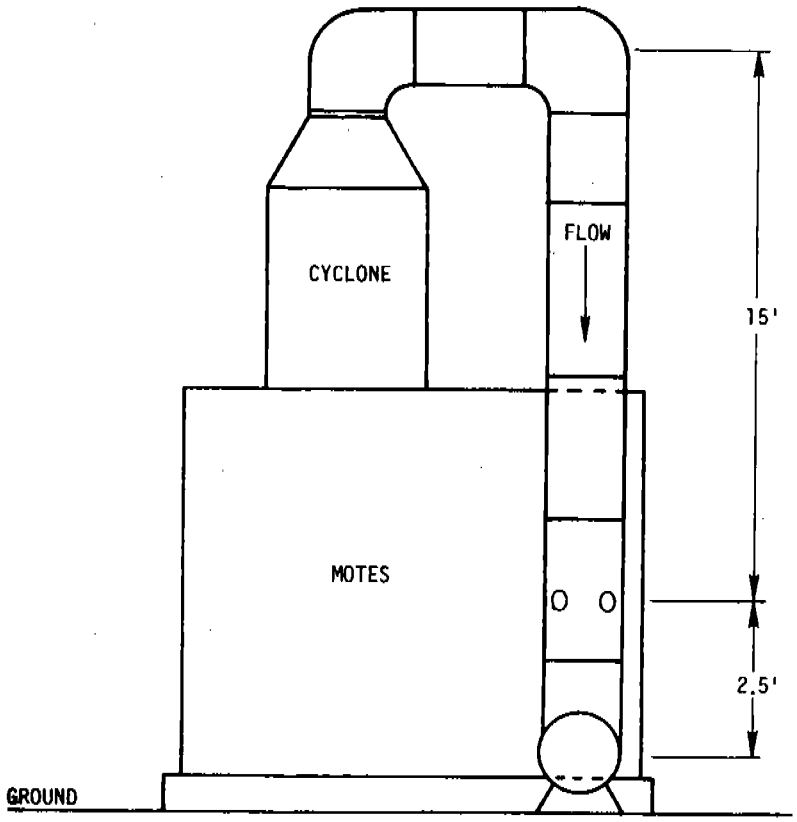
Figure 2(Continued). Photograph of test sites.

Raw cotton entering the gin during the testing period was first-picked which, due to the length of the harvest season, had been stored in the fields for an average of 10 days according to plant personnel. This, in conjunction with an unusually dry harvest season, may have had an effect on the final particulate emission results in comparison to past years operations.

4.0 SAMPLING LOCATIONS

Sampling was conducted at the sites indicated in Figure 1. Pictures of each sampling site are shown in Figure 2. The sample port and point location are shown in Figures 3 through 7 for sites A through F respectively and Figure 8 for sites G through J. The stack extension used for sites G through J was the same portable extension which was moved to each different location prior to testing.

Sampling sites A through F met all requirements of Methods 1 and 2 for upstream and downstream distances from disturbances. These requirements could not be met however with the portable stack extension used on sites G through J. The shorter than required stacks would tend to bias the measured concentration low. Shorter stacks usually tend to bias the measured flow rate high, but in this case the back pressure from the stack extension probably caused some of the flow to go from the measured lint screen basket compartment to an adjoining unmeasured compartment. Therefore the overall measured results on sites G, H and I may be lower than the true emissions.



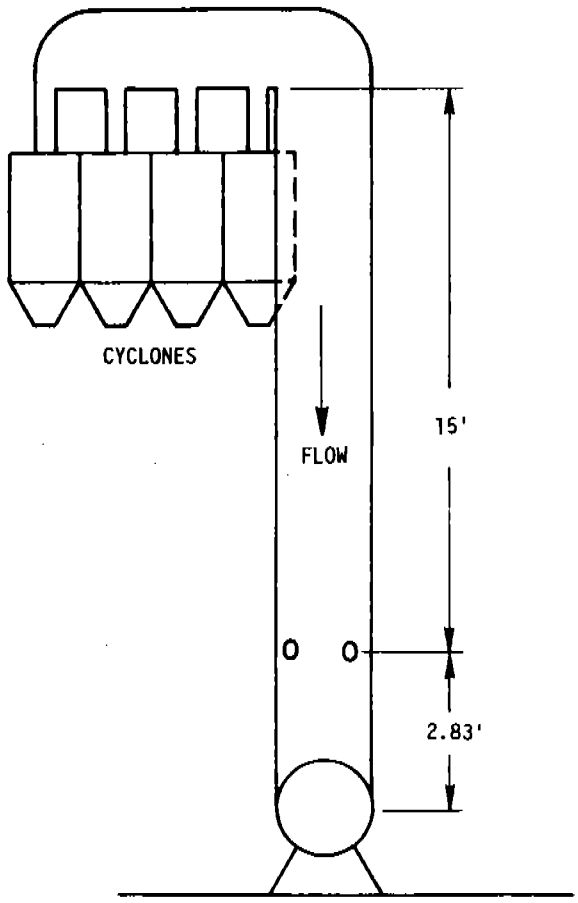
CROSS-SECTION

PORT EXTENDS 1 1/2" FROM STACK I.D.

24" I.D. ROUND STACK
3 1/2" I.D. SAMPLING PORT

TRAVERSE POINT	DISTANCE FROM INSIDE STACK WALL (IN.)
1	2 1/2
2	3 1/2
3	5.0
4	6 1/4
5	9 7/8
6	17 1/4
7	20 1/8
8	22.0
9	28 1/2
10	24 1/2

Figure 3. Diagram of Test Site A.



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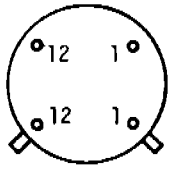
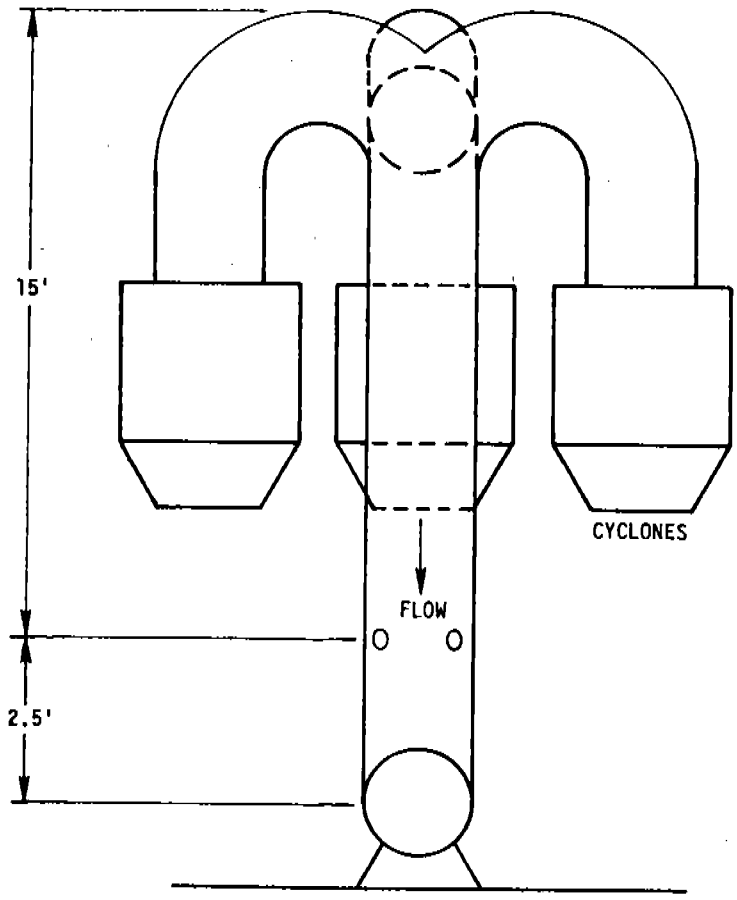


PORT EXTENDS 1/ 12" FROM INSIDE STACK WALL

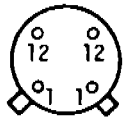
30" I.D. ROUND STACKS
3 1/2 " SAMPLING PORT

TRAVERSE POINTS	DISTANCE FORM INSIDE STACK WALL (IN.)
1	2 1/2
2	3 1/2
3	5
4	6 3/4
5	9
6	12 1/8
7	20 3/4
8	24
9	26 1/8
10	28
11	29 1/2
12	30 1/2

Figure 4. Diagram of Test Sites B or C.



CROSS-SECTION

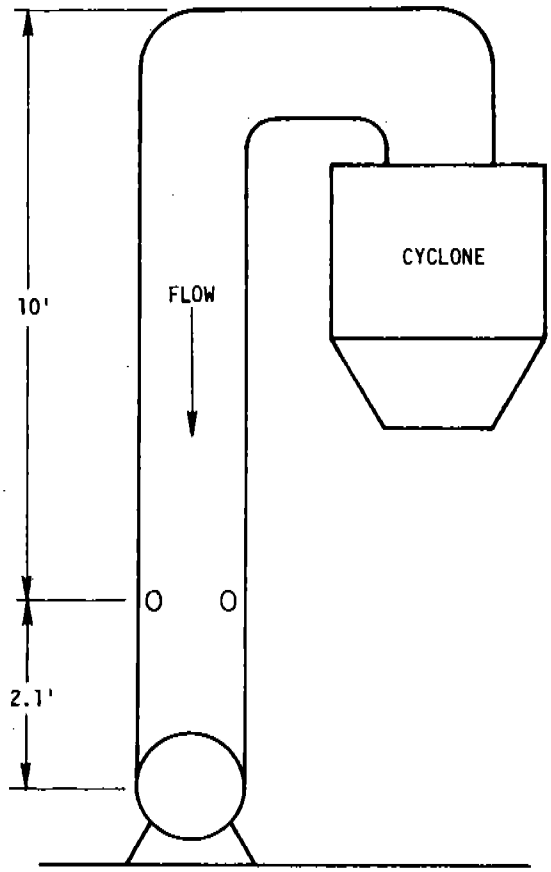


PORTS EXTEND 1 1/2" FROM INSIDE STACK WALL

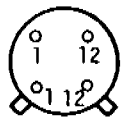
27" I.D. ROUNDING STACK
3 1/2" I.D. SAMPLING PORTS

TRAVERSE POINT	DISTANCE FROM INSIDE STACK WALL (IN.)
1	2 1/2
2	3 1/4
3	4 7/8
4	6 1/4
5	8 1/4
6	11 1/8
7	18 7/8
8	21 3/4
9	23 5/8
10	25 1/4
11	26 3/8
12	27 1/2

Figure 5. Diagram of Test Site D.



CROSS-SECTION

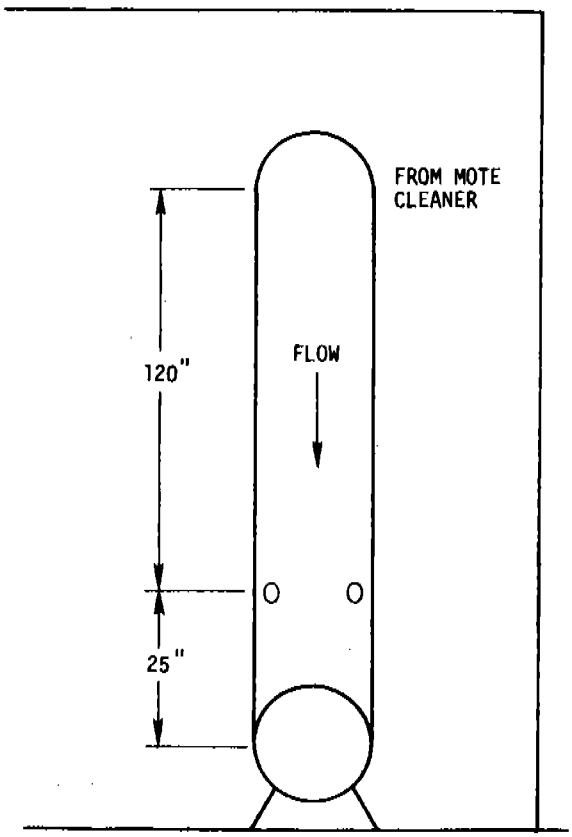


PORT EXTENDS 1 1/2" FROM INSIDE STACK WALL

20" I.D. ROUND STACK
3 1/2" I.D. SAMPLING PORTS

TRAVERSE POINT	DISTANCE FROM INSIDE STACK WALL (IN.)
1	2 1/2
2	2 3/4
3	3 7/8
4	5
5	6 1/2
6	8 1/2
7	14 3/8
8	16 1/2
9	18
10	19 1/4
11	20 1/4
12	20 1/2

Figure 6. Diagram of Test Site E.



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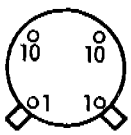

PORT EXTENDS 1 1/2" FROM INSIDE STACK WALL

19" I.D. ROUND STACK
3 1/2" I.D. SAMPLING PORTS

TRAVERSE POINT	DISTANCE FROM INSIDE STACK WALL (IN.)
1	2 1/2
2	2 7/8
3	3 1/2
4	4 3/4
5	6
6	8 1/4
7	14 7/8
8	16
9	17 1/4
10	18 3/4
11	19 1/4
12	19 1/2

Figure 7. Diagram of Test Site F.

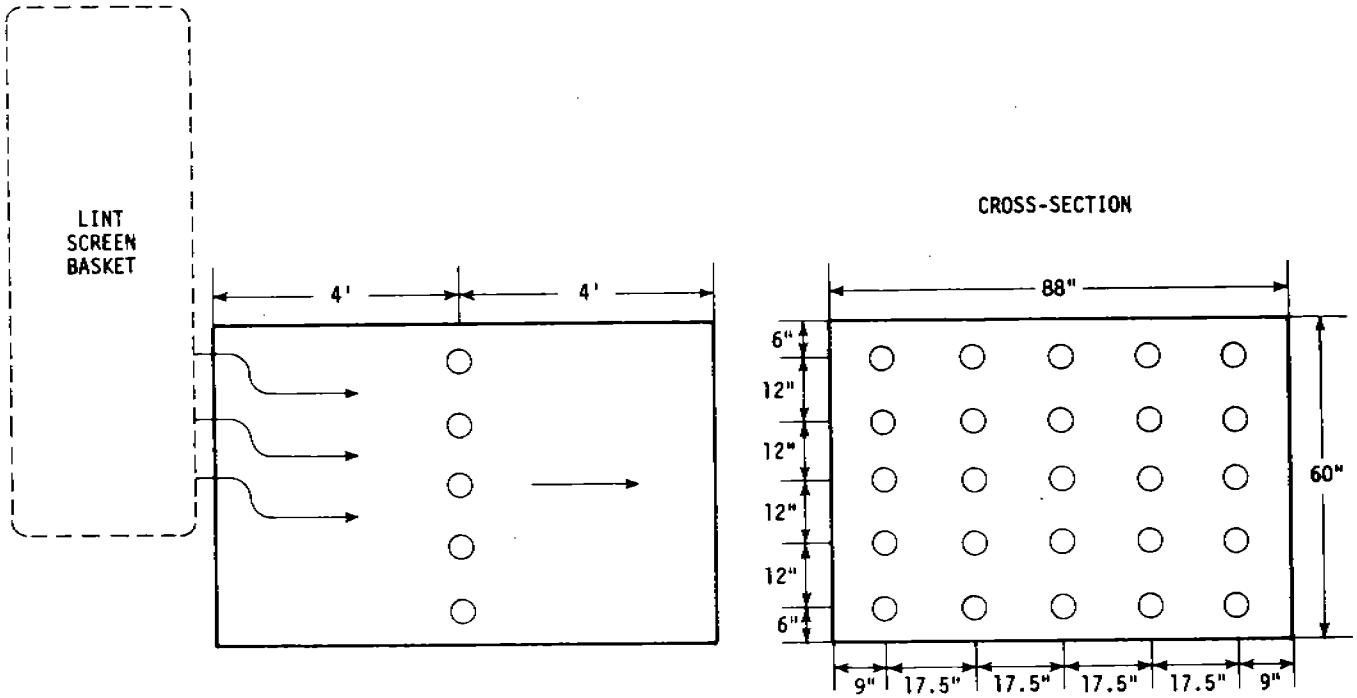

Figure 8. Diagram of Test Sites G, H, I or J.

Tangential or cyclonic flow did not exit at the sampling site locations since the combined cyclones had counter-current flow which nullified any swirling effect. Also, the single cyclones had long stack extensions which sufficiently straightened the cyclonic flow.

5.0 TEST RESULTS AND METHODS

Flue gas and particulate emission data are summarized in Tables 3 and 4, respectively. Sampling was performed at a total of 10 sites designated as A through J. At sampling sites A through F, an EPA Method 5 sample train and an Aerotherm High Volume Sampler sample train were run simultaneous for data comparison. The EPA Method 5 sample train results for sites A through F averaged approximately 27 total pound per hour and the Aerotherm High Volume Sampler sample train averaged approximately 26 total pounds per hour.

For sites G through J, only an EPA Method 5 sample train was used with a Teledyne Hastings-Raydist unit in place of the inclined manometer. This modification was necessary due to the low velocity in the exit duct. Since only one Teledyne Hastings-Raydist unit was available it was not possible to perform simultaneous testing with the Aerotherm High Volume Sampler for data comparison.

Several of these runs were not within 10 percent of the isokinetic rate as indicated in Table 4. A method of interpreting particulate emission test runs which do not meet the isokinetic criteria is to compare the pollutant mass rate

Table 3. SUMMARY OF FLUE GAS CONDITIONS

Site	Run No.	Date (1977)	Sampling train type	Flow rate[a], acfh	Flow rate[b], dscfh	Stack temp., °F	Moisture content %
A	A-1	11/18	Aerotherm	657,959	643,609	78	0.16
	A-2	11/18	Method 5	613,082	596,184	79	0.66
	A-1&2	11/18	Run average	635,521	619,897	78.5	0.41
	A-3	11/18	Aerotherm	659,052	639,526	82	0.0
	A-4	11/18	Method 5	644,986	625,985	82	0.20
	A-3&4	11/18	Run average	652,019	632,756	82	0.10
	A-5	11/18	Aerotherm	664,729	645,451	82	0.0
	A-6	11/18	Method 5	622,227	603,566	82	0.07
	A-5&6	11/18	Run average	643,478	624,509	82	0.035
A	Uncleaned motes		Site average	643,673	625,721	81	0.18
B	B-1	11/15	Method 5	815,356	710,391	140	1.13
	B-2	11/17	Aerotherm	881,808	745,153	150	2.72
	B-3	11/17	Method 5	827,333	695,453	150	3.27
	B-2&3	11/17	Run average	854,571	720,303	150	3.00
	B-4	11/17	Method 5	846,933	714,146	145	3.75
	B-5	11/17	Aerotherm	886,217	747,757	144	3.74
	B-4&5	11/17	Run average	866,575	730,952	144.5	3.745
	B-6	11/17	Method 5	845,864	723,225	137	3.59
	B-7	11/17	Aerotherm	864,066	744,138	138	2.68
	B-6&7	11/17	Run average	854,965	733,682	137.5	3.14
B	#1&2 Inclined cleaners		Site average	858,704	728,312	144	3.30

Table 3(Continued). SUMMARY OF FLUE GAS CONDITIONS

Site	Run No.	Date (1977)	Sampling train type	Flow rate[a], acfh	Flow rate[b], dscfh	Stack temp., °F	Moisture content %
C	C-1	11/15	Method 5	739,791	638,716	125	4.51
	C-2	11/16	Method 5	695,539	629,297	119	1.42
	C-3	11/16	Aerotherm	683,557	628,603	116	0.42
	C-2&3	11/16	Run average	689,548	628,950	117.5	0.92
	C-4	11/16	Method 5	763,904	699,015	114	1.23
	C-5	11/16	Aerotherm	741,105	685,929	114	0.12
	C-4&5	11/16	Run average	752,505	692,472	114	0.675
	C-6	11/22	Aerotherm	792,196	741,121	104	0.79
C	Unloading and dryer		Site average	721,027	660,711	115.8	0.80
D	D-1	11/19	Aerotherm	364,050	364,192	67	0.0
	D-2	11/19	Method 5	325,247	327,989	62	0.0
	D-1&2	11/19	Run average	344,649	346,091	64.5	0.0
	D-3	11/19	Aerotherm	383,068	378,348	73	0.0
	D-4	11/19	Method 5	366,861	361,181	70	0.83
	D-3&4	11/19	Run average	374,965	369,765	71.5	0.415
	D-5	11/19	Aerotherm	346,899	344,629	70	0.0
	D-6	11/19	Method 5	317,726	305,229	71	0.30
	D-5&6	11/19	Run average	332,313	324,929	70.5	0.15
D	Unloading separator		Site average	350,642	346,928	68.8	0.19

Table 3(Continued). SUMMARY OF FLUE GAS CONDITIONS

Site	Run No.	Date (1977)	Sampling train type	Flow rate[a], acfh	Flow rate[b], dscfh	Stack temp., °F	Moisture content %
E	E-1	11/20	Aerotherm	343,815	348,803	62	0.0
	E-2	11/20	Method 5	311,714	317,715	57	0.59
	E-1&2	11/20	Run average	327,764	333,259	58	0.295
	E-3	11/20	Aerotherm	348,847	344,426	76	0.42
	E-4	11/20	Method 5	363,613	359,666	75	0.37
	E-3&4	11/20	Run average	356,230	352,046	75.5	0.40
	E-5	11/20	Aerotherm	357,148	356,028	73	0.0
	E-6	11/20	Method 5	361,736	358,235	72	0.72
	E-5&6	11/20	Run average	359,442	357,132	72.5	0.36
E	Condenser and basket catch		Site average	345,647	345,507	68.7	0.35
F	F-1	11/21	Aerotherm	131,188	131,280	69	0.10
	F-2	11/21	Method 5	199,913	198,614	65	1.45
	F-1&2	11/21	Run average	165,551	164,947	67	0.775
	F-3	11/21	Aerotherm	102,968	102,330	73	0.04
	F-4	11/21	Method 5	143,716	141,270	71	1.37
	F-3&4	11/21	Run average	123,342	121,800	72	0.71
	F-5	11/21	Aerotherm	134,142	133,434	72	0.03
	F-6	11/21	Method 5	149,240	144,183	74	2.59
	F-5&6	11/21	Run average	141,691	138,809	73	1.31
F	Mote cleaner		Site average	143,528	141,852	70.7	0.93

Table 3(Continued). SUMMARY OF FLUE GAS CONDITIONS

Site	Run No.	Date (1977)	Sampling train type	Flow rate[a], acfh	Flow rate[b], dscfh	Stack temp., °F	Moisture content %
G	G-1	11/20	Method 5*	785,676	793,698	63	0.48
	G-2	11/20	Method 5*	816,909	803,151	78	0.33
	G-3	11/20	Method 5*	868,410	850,595	80	0.03
G	#2 Lint cleaner		Site average	823,665	815,815	73.7	0.28
H	H-1	11/22	Method 5*	1,183,366	1,149,698	81	1.03
	H-2	11/22	Method 5*	1,057,932	1,014,448	82	2.11
	H-3	11/22	Method 5*	1,052,716	1,004,418	81	2.87
H	#1 Lint cleaner		Site average	1,098,005	1,056,188	81.3	2.00
I	I-1	11/21	Method 5*	805,633	788,224	75	1.41
	I-2	11/21	Method 5*	693,836	682,357	77	0.30
	I-3	11/21	Method 5*	813,167	790,041	76	2.01
I	#2 Lint cleaner		Site average	770,879	753,541	76	1.24
J	J-1	11/22	Method 5*	1,475,709	1,442,395	75	1.65
	J-2	11/22	Method 5*	1,603,057	1,534,392	82	1.96
	J-3	11/22	Method 5*	1,405,817	1,336,862	90	1.28
J	Battery condenser		Site average	1,494,861	1,437,883	82.3	1.63

* Standard Method 5 sampling train with Hastings-Teledyne Mass flow meter.

[a] Flow rate at stack conditions (actual cubic feet per hour).

[b] Flow rate at standard donsitions, 68°F and 29.92 in. Hg. in dry standard cubic feet per hour.

Table 4. SUMMARY OF PARTICULATE EMISSIONS

Site	Run No.	Sampling train type	Total concentration, gr/dscf[a]	Emission rate (lb/hr)		
				Condensible	Filterable	Total
A	A-1	Aerotherm	0.027	0.05	2.47	2.52
	A-2	Method 5	0.034	0.07	2.84	2.91
	A-1&2	Run average	0.0305	0.06	2.66	2.72
	A-3	Aerotherm	0.052	0.04	4.68	4.72
	A-4	Method 5	0.052	0.03	4.65	4.68
	A-3&4	Run average	0.052	0.035	4.665	4.70
	A-5	Aerotherm	0.044	0.01	4.08	4.09
	A-6	Method 5	0.046	0.02	3.93	3.95
	A-5&6	Run average	0.045	0.015	4.01	4.02
A	Uncleaned motes	Site average	0.043	0.037	3.78	3.82
B	B-1[c]	Method 5	0.052	0.33	5.00	5.33
	B-2	Aerotherm	0.041	0.18	4.17	4.35
	B-3	Method 5	0.040	0.34	3.60	3.94
	B-2&3	Run average	0.0405	0.26	3.89	4.15
	B-4	Method 5	0.125	0.26	12.52	12.78
	B-5	Aerotherm	0.118	0.18	12.38	12.56
	B-4&5	Run average	0.122	0.22	12.45	12.67
	B-6	Method 5	0.159	0.38	16.06	16.44
	B-7	Aerotherm	0.148	0.16	15.57	15.73
	B-6&7	Run average	0.154	0.27	15.82	16.09
B	#1 & #2 inclined cleaners	Site average	0.106	0.25	10.72	10.97

Table 4(Continued). SUMMARY OF PARTICULATE EMISSIONS

Site	Run No.	Sampling train type	Total concentration, gr/dscf[a]	Emission rate (lb/hr)		
				Condensible	Filterable	Total
C	C-1[c]	Method 5	0.049	1.24	3.26	4.50
	C-2	Method 5	0.053	0.02	4.74	4.76
	C-3	Aerotherm[b]	0.046	0.06	4.03	4.09
	C-2&3	Run average	0.0495	0.04	4.39	4.43
	C-4	Method 5	0.040	0.06	3.93	3.99
	C-5	Aerotherm[b]	0.048	0.03	4.64	4.67
	C-4&5	Run average	0.044	0.045	4.29	4.33
	C-6[c]	Aerotherm	0.093	0.13	9.77	9.90
C	Unloading & dryer	Site average	0.047	0.0425	4.34	4.38
D	D-1	Aerotherm	0.117	0.06	6.02	6.08
	D-2	Method 5	0.119	0.09	5.50	5.59
	D-1&2	Run average	0.118	0.075	5.76	5.84
	D-3	Aerotherm	0.107	0.05	5.75	5.80
	D-4	Method 5	0.097	0.15	4.87	5.02
	D-3&4	Run average	0.102	0.10	5.31	5.41
	D-5	Aerotherm[b]	0.069	0.02	3.38	3.40
	D-6	Method 5	0.103	0.06	4.44	4.50
	D-5&6	Run average	0.086	0.04	3.91	3.95
D	Unloading	Site average	0.102	0.072	4.99	5.07

Table 4(Continued). SUMMARY OF PARTICULATE EMISSIONS

Site	Run No.	Sampling train type	Total concentration, gr/dscf[a]	Emission rate (lb/hr)		
				Condensible	Filterable	Total
E	E-1	Aerotherm	0.007	0.05	0.32	0.37
	E-2	Method 5[b]	0.012	0.09	0.48	0.57
	E-1&2	Run average	0.0095	0.07	0.40	0.47
	E-3	Aerotherm	0.009	0.12	0.32	0.44
	E-4	Method 5	0.015	0.24	0.52	0.76
	E-3&4	Run average	0.012	0.18	0.42	0.60
	E-5	Aerotherm	0.005	0.05	0.23	0.28
	E-6	Method 5	0.010	0.20	0.33	0.53
	E-5&6	Run average	0.0075	0.125	0.28	0.405
E	Basket & condenser catch	Site average	0.0097	0.123	0.36	0.49
F	F-1	Aerotherm[b]	0.082	0.05	1.50	1.55
	F-2	Method 5[b]	0.095	0.15	2.54	2.69
	F-1&2	Run average	0.089	0.10	2.02	2.12
	F-3	Aerotherm[b]	0.079	0.02	1.13	1.15
	F-4	Method 5[b]	0.094	0.08	1.82	1.90
	F-3&4	Run average	0.087	0.05	1.48	1.53
	F-5	Aerotherm[b]	0.075	0.03	1.41	1.44
	F-6	Method 5[b]	0.093	0.08	1.84	1.92
	F-5&6	Run average	0.084	0.055	1.63	1.68
F	Mote cleaner	Site average	0.087	0.068	1.71	1.78

Table 4(Continued). SUMMARY OF PARTICULATE EMISSIONS

Site	Run No.	Sampling train type	Total concentration, gr/dscf[a]	Emission rate (lb/hr)		
				Condensible	Filterable	Total
G	G-1	Method 5	0.027	0.29	2.77	3.06
	G-2	Method 5	0.028	0.19	3.01	3.20
	G-3	Method 5	0.038	0.37	4.28	4.65
G	#2 lint cleaner	Site average	0.031	0.28	3.35	3.63
H	H-1	Method 5	0.063	1.13	9.15	10.28
	H-2	Method 5	0.062	1.10	7.83	8.93
	H-3	Method 5	0.138	1.16	18.61	19.77
H	#1 lint cleaner	Site average	0.088	1.13	11.86	12.99
I	I-1	Method 5	0.052	0.70	5.13	5.83
	I-2	Method 5	0.042	0.17	3.96	4.13
	I-3	Method 5	0.029	0.26	3.01	3.27
I	#2 lint cleaner	Site average	0.041	0.38	4.03	4.41
J	J-1	Method 5	0.023	1.08	3.58	4.66
	J-2	Method 5	0.021	1.30	3.19	4.49
	J-3	Method 5	0.024	0.53	4.14	4.67
J	Battery condenser	Site average	0.023	0.97	3.64	4.61

[a] Grains per dry standard cubic foot (sum of condensible and filterable concentrations).

[b] Does not meet Federal requirements for isokinetic sampling variation.

[c] Un-paired sampling trains not included in site average.

NOTE: Averages are of paired trains only.

(pmr) calculated using the ratio of area (pmr_a) method and the concentration (pmr_c) calculation method.* This method of interpreting nonisokinetic sampling results is referenced by EPA.** Table 5 summarizes the pollutant emission rate calculated by both methods for the nonisokinetic tests. If the lower of the two emission rates, whether pmr_a or pmr_c, for the nonisokentic test runs is used, the total particulate emission rate for the plant would be 51.73 pounds per hour. This emission rate would represent the lowest possible emission rate from the plant with this data. This differed from the reported value of 52.15 pounds per hour by only 0.42 pound per hour or less than 1 percent.

The unloading fan (Site D) does not operate continuously during normal process operations. Test personnel estimated that the unloading fan operated randomly about 75 percent of the time. The sample train was not shut down with the intermittant fan shut offs. However, this method of continuously operating the sample train does not affect the measured particulate emission rate.

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* Smith, W. S., R. T. Shigehara and W. F. Todd. A Method of Interpreting Stack Sampling Data. Paper Presented at the 63rd Annual Meeting of the Air Pollution Control Association, St. Louis, Mo. June 14-19, 1970.

** Federal Register, Vol. 42, No. 169. August 18, 1977.

Table 5. NONISOKINETIC TESTS RESULTS COMPARISON

Run No.	I,[a] %	pmr_c,[b] lbs/hr	pmr_a,[c] lbs/hr
C-3	182.2	4.03	7.34
C-5	263.1	4.67	12.26
E-2	82.3	0.48	0.40
F-1	111.8	1.55	1.73
F-2	62.5	2.69	1.68
F-3	116.6	1.15	1.34
F-4	66.1	1.90	1.26
F-5	110.2	1.44	1.59
F-6	66	1.92	1.25

[a] Percent isokinetic.

[b] Pollutant mass rate-concentration method.

[c] Pollutant mass rate-ratio of area method.

A copy of the computer printouts and example calculation are presented in Appendix A. The raw field data are presented in Appendix B and the laboratory data are in Appendix C. A detailed explanation of the EPA Method 5 sample train, Aerotherm High Volume Sampler sample train and the Teledyne Hastings-Raydist unit operations are presented in Appendix D along with their calibration methods in Appendix E. The project participants are presented in Appendix F.

APPENDIX A

EXAMPLE CALCULATIONS

AND

COMPUTER PRINTOUTS

FIELD DATA

PLANT	WESTSIDE GIN, SAN JOAQUIN, CA.	DATE	11/18/77
SAMPLING LOCATION	UNCLEANED MOTES	RUN NUMBER	A-1
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' STAINLESS HEATED
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.5000
AMBIENT TEMP.(DEG.F)	51.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.85	SAMPLE BOX NUMBER	AEL
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	AEL
FILTER NUMBER(S)	0000111	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	24.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	3.0 MINUTES	REFERENCE PRESS. DIFF.	.72

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	827	541.567									
E-10	3.0	0	550.000	.880	2.20	2.20	72.	57.	56.	11.0	232.	58.
E-09	6.0	0	562.500	.800	2.05	2.05	73.	70.	56.	11.0	229.	59.
E-08	9.0	0	575.200	.900	2.28	2.28	74.	77.	59.	11.0	232.	63.
E-07	12.0	0	588.800	1.050	2.62	2.62	75.	83.	61.	13.0	251.	65.
E-06	15.0	0	603.200	1.200	3.00	2.60	76.	89.	64.	14.5	255.	66.
E-05	18.0	0	616.400	1.400	3.50	2.60	76.	92.	67.	15.0	256.	66.
E-04	21.0	0	630.200	1.350	3.40	2.60	76.	93.	69.	15.0	252.	66.
E-03	24.0	0	644.200	1.250	3.10	2.60	76.	93.	71.	15.0	253.	65.
E-02	27.0	0	657.200	.900	2.28	2.28	77.	92.	73.	14.0	252.	66.
E-01	30.0	857	670.807	1.000	2.50	2.50	77.	93.	74.	12.0	252.	64.
S-10	33.0	909	684.300	.900	2.28	2.28	79.	78.	74.	12.0	258.	65.
S-09	36.0	0	697.200	.900	2.28	2.28	79.	85.	75.	12.0	257.	63.
S-08	39.0	0	710.500	.900	2.28	2.28	79.	90.	76.	12.0	256.	63.
S-07	42.0	0	723.800	1.000	2.50	2.50	80.	94.	77.	12.0	257.	62.
S-06	45.0	0	737.700	1.150	2.90	2.65	80.	97.	79.	14.0	257.	61.
S-05	48.0	0	751.800	1.200	3.00	2.65	81.	99.	80.	14.0	257.	62.
S-04	51.0	0	765.800	1.400	3.50	2.65	82.	100.	81.	15.0	257.	61.
S-03	54.0	0	780.200	1.250	3.10	2.65	83.	100.	83.	15.0	257.	60.
S-02	57.0	0	793.800	1.000	2.50	2.50	83.	99.	84.	15.0	256.	62.
S-01	60.0	0	806.582	.850	2.15	2.15	83.	99.	85.	11.0	257.	59.
TOTALS	60.0		265.015									
AVERAGE					2.67	2.45	78.	89.	72.	13.2	252.	63.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, SAN JOAQUIN, CA. — C. BRUFFEY

TEST A-1 UNCLEANED MOTES

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/18/77		11/18/77	
TB	TIME-START	827		827	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	20		20	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.45	IN-H20	62.1	MM-H20
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	265.015	CU-FT	7.504	CU-M
TM	AVERAGE GAS METER TEMP	80.6	F	27.0	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	259.832	SCF	7.358	SCM
VLC	TOTAL H20 COLLECTED IN IMPINGERS & SILICA GEL, ML.	8.9		8.9	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.419	SCF	.012	SCM
BWO	PERCENT MOISTURE BY VOLUME	.16		.16	
FMD	MOLE FRACTION DRY GAS	.998		.998	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.98		28.98	
PB	BAROMETRIC PRESSURE	29.85	IN-HG	758.19	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H20	6.10	MM-H20
PS	STACK PRES, ABS.	29.87	IN-HG	758.64	MM-HG
TS	AVERAGE STACK TEMP	78.	F	26.	C

VS	AVG STACK GAS VELOCITY	58.2	FPS	17.7	MPS
AS	STACK AREA	452.	SQ-IN	.292	SQ-M
QSSTD	STACK FLOW RATE, DRY*	643604.	SCFH	18225.	SCMH
QS	ACTUAL STACK FLOW RATE	657959.	ACFH	18631.	ACMH
ISO	PERCENT ISOKINETIC	93.0		93.0	
MN	FILTERABLE PART. MG. EPA 5	451.5		451.5	
CS	FILTERABLE PART.	.027	GR/DSCF*	61.371	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	2.47	LB/HR	1.12	KG/HR
MN	TOTAL PARTICULATE MG. EPA 5	460.6		460.6	
CS	TOTAL PARTICULATE	.027	GR/DSCF*	62.607	MG/DSCM
PMR	TOTAL PARTICULATE EMISSION RATE.	2.52	LB/HR	1.14	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. A-1

UNCLEANED NOTES

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 265.015 * 1.000 * (29.85 + 2.446 / 13.6)}{(81. + 460.)} = 259.832 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 9. = .42 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .42}{259.832 + .42} = .16 \text{ PERCENT}$$

A-5

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .2}{100.} = .998$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.16/100)) + 18. * (.16/100) = 28.98

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 476.704 / (SQRT(28.98 * 29.87) * 20. = 58.18 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 58.18 * 452. 3600/144 = 657959. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 657959. * 29.87 * (1. - (.16/100))}{(78. + 460.)} = 643609. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*ON)

$$ISO = \frac{(305.58*(78.+460.))*((0.002669* 9.)+(265.015*1.000*(29.85+(2.446/13.6))/(81.+460.)))}{60. * 58.18 * 29.87 * .500 * .500} = 93.02 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 451.5 * 15.43 / 259.832 = .027 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .027 * 643609. / (15.43 * 453.6) = 2.47

FIELD DATA

PLANT	WESTSIDE GIN - SAN JOAQUIN, CA.	DATE	11/18/77
SAMPLING LOCATION	UNCLEANED NOTES	RUN NUMBER	A-2
SAMPLE TYPE	PARTICULATE		
OPERATOR	J. IVERSON	PROBE LENGTH & TYPE	5' HEATED GLASS
AMBIENT TEMP.(DEG.F)	51.	NOZZLE I.D.	.2545
BAR.PRESS.(IN.HG)	29.85	ASSUMED MOISTURE	3.00
STATIC PRESS.(IN.H2O)	.24	SAMPLE BOX NUMBER	FMS
FILTER NUMBER(S)	0000720	METER BOX NUMBER	RAC
STACK INSIDE DIM.(IN)	24.00 .00	METER HEAD DIFF.	1.910
PITOT TUBE COEFF.	.84	C FACTOR	1.10
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY	3.0 MINUTES	HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.42

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	827	516.234									
S-01	3.0	0	519.785	1.000	4.30	4.30	75.	66.	64.	3.0	250.	56.
S-02	6.0	0	522.895	.950	4.10	4.10	75.	70.	64.	3.0	250.	56.
S-03	9.0	0	526.135	1.000	4.30	4.30	75.	74.	64.	3.0	250.	56.
S-04	12.0	0	529.425	1.000	4.41	4.41	75.	80.	66.	3.0	250.	56.
S-05	15.0	0	532.698	1.000	4.41	4.41	75.	83.	68.	3.0	250.	56.
S-06	18.0	0	535.880	.950	4.10	4.10	76.	86.	69.	3.0	250.	56.
S-07	21.0	0	539.055	.900	3.90	3.90	76.	89.	70.	3.0	250.	58.
S-08	24.0	0	542.035	.750	3.30	3.30	77.	90.	72.	3.0	250.	58.
S-09	27.0	0	545.045	.750	3.30	3.30	78.	91.	73.	3.0	250.	59.
S-10	30.0	857	547.712	.650	2.80	2.80	78.	93.	74.	3.0	250.	59.
E-01	33.0	909	550.874	.950	4.10	4.10	78.	80.	74.	3.0	250.	57.
E-02	36.0	0	554.195	1.050	4.41	4.41	79.	88.	76.	3.0	250.	57.
E-03	39.0	0	557.745	1.300	5.60	5.60	79.	95.	78.	3.5	250.	57.
E-04	42.0	0	561.395	1.300	5.60	5.60	80.	96.	78.	3.5	250.	57.
E-05	45.0	0	564.695	1.000	4.30	4.30	81.	96.	79.	3.0	250.	58.
E-06	48.0	0	567.999	1.000	4.30	4.30	82.	98.	81.	3.0	250.	59.
E-07	51.0	0	572.165	.900	3.90	3.90	82.	98.	82.	3.0	250.	60.
E-08	54.0	0	574.235	.750	3.30	3.30	83.	98.	83.	3.0	250.	60.
E-09	57.0	0	577.439	.650	2.80	2.80	83.	99.	83.	3.0	250.	60.
E-10	60.0	939	579.812	.620	2.70	2.70	84.	99.	84.	2.5	250.	62.
TOTALS	60.0		63.578									
AVERAGE					4.00	4.00	79.	88.	74.	3.0	250.	58.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN - SAN JOAQUIN, CA. — J. IVERSON

TEST A-2 UNCLEANED MOTES

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/18/77		11/18/77	
TB	TIME-START	827		827	
TF	TIME-FINISH	939		939	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	20		20	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.254	IN	6.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	4.00	IN-H2O	101.5	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	63.578	CU-FT	1.800	CU-M
TM	AVERAGE GAS METER TEMP	81.3	F	27.4	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	62.743	SCF	1.777	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	8.8		8.8	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.414	SCF	.012	SCM
BWO	PERCENT MOISTURE BY VOLUME	.66		.66	
FMD	MOLE FRACTION DRY GAS	.993		.993	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.93		28.93	
PB	BAROMETRIC PRESSURE	29.85	IN-HG	758.19	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H2O	6.10	MM-H2O
PS	STACK PRES, ABS.	29.87	IN-HG	758.64	MM-HG
TS	AVERAGE STACK TEMP	79.	F	26.	C

VS	AVG STACK GAS VELOCITY	54.2	FPS	16.5	MPS
AS	STACK AREA	452.	SQ-IN	.292	SQ-M
QSSTD	STACK FLOW RATE, DRY*	596184.	SCFH	16882.	SCMH
QS	ACTUAL STACK FLOW RATE	613082.	ACFH	17361.	ACMH
ISO	PERCENT ISOKINETIC	93.6		93.6	
MN	FILTERABLE PART. MG. EPA 5	135.6		135.6	
CS	FILTERABLE PART.	.035	GR/DSCF*	76.329	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	2.84	LB/HR	1.29	KG/HR
MN	TOTAL PARTICULATE MG. EPA 5	138.8		138.8	
CS	TOTAL PARTICULATE	.034	GR/DSCF*	78.130	MG/DSCM
PMR	TOTAL PARTICULATE EMISSION RATE	2.91	LB/HR	1.32	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. A-2

UNCLEANED MOTES

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 63.578 * 1.004 * (29.85 + 3.997 / 13.6)}{(81. + 460.)} = 62.743 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 9. = .41 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .41}{62.743 + .41} = .66 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .7}{100.} = .993$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.66/100)) + 18. * (.66/100) = 28.93

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 443.772 / (SQRT(28.93 * 29.87) * 20. = 54.21 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 54.21 * 452. 3600/144 = 613082. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 613082. * 29.87 * (1. - (.66/100))}{(79. + 460.)} = 596184.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(79.+460.))*((0.002669*9.)+(63.578*1.004*(29.85+(3.997/13.6))/(81.+460.)))}{60. * 54.21 * 29.87 * .254 * .254} = 93.59\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 135.6 * 15.43 / 62.743 = .033 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .033 * 596184. / (15.43 * 453.6) = 2.84

FIELD DATA

PLANT	WESTSIDE GIN - SAN JOAQUIN, CA.	DATE	11/18/77
SAMPLING LOCATION	UNCLEANED MOTES	RUN NUMBER	A-3
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED STAINLESS
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.5000
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.80	SAMPLE BOX NUMBER	0
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	0
FILTER NUMBER(S)	0000112	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	24.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	3.0 MINUTES	REFERENCE PRESS. DIFF.	.72

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1110	807.250									
S-10	3.0	0	821.500	1.100	2.75	2.75	83.	84.	84.	14.0	250.	66.
S-09	6.0	0	835.600	1.100	2.75	2.75	81.	90.	85.	14.0	270.	71.
S-08	9.0	0	849.700	1.250	3.15	2.75	83.	97.	86.	14.0	255.	72.
S-07	12.0	0	863.800	1.350	3.40	2.80	82.	98.	87.	15.0	248.	68.
S-06	15.0	0	879.300	1.250	3.15	2.80	81.	99.	89.	15.0	235.	66.
S-05	18.0	0	892.200	1.200	2.90	2.80	83.	101.	90.	15.0	250.	64.
S-04	21.0	0	906.300	1.100	2.75	2.75	83.	103.	91.	15.0	250.	63.
S-03	24.0	0	919.900	.950	2.35	2.35	82.	103.	92.	11.0	250.	61.
S-02	27.0	0	931.900	.750	1.88	1.88	81.	100.	93.	7.0	250.	61.
S-01	30.0	1140	943.195	.650	1.63	1.63	79.	96.	92.	7.0	250.	60.
F-10	33.0	1150	955.200	.800	2.00	2.00	84.	88.	90.	10.0	248.	62.
E-09	36.0	0	967.200	.750	1.90	1.90	82.	90.	90.	8.0	250.	59.
E-08	37.0	0	979.500	.850	2.00	2.00	83.	94.	90.	10.0	250.	62.
E-07	42.0	0	993.200	1.100	2.75	2.75	82.	95.	90.	15.0	249.	62.
E-06	45.0	0	7.400	1.250	3.15	2.75	83.	99.	91.	15.0	250.	63.
E-05	48.0	0	21.700	1.350	3.40	2.75	84.	102.	92.	15.0	250.	62.
E-04	51.0	0	35.900	1.500	3.72	2.75	83.	102.	93.	15.0	250.	61.
E-03	54.0	0	50.200	1.150	2.90	2.75	83.	102.	93.	15.0	250.	61.
E-02	57.0	0	63.500	.950	2.35	2.35	83.	102.	94.	11.0	249.	60.
E-01	60.0	1220	76.064	.850	2.00	2.00	82.	100.	94.	10.0	250.	59.
TOTALS	60.0		268.814									
AVERAGE					2.64	2.46	82.	97.	90.	12.5	250.	63.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN - SAN JOAQUIN, CA. — C. BRUFFEY

TEST A-3 UNCLEANED MOTES

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/18/77		11/18/77	
TB	TIME-START	1110		1110	
TF	TIME-FINISH	1220		1220	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	20		20	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.46	IN-H2O	62.6	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	268.814	CU-FT	7.612	CU-M
TM	AVERAGE GAS METER TEMP	93.8	F	34.3	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	256.868	SCF	7.274	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	.0		.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.000	SCF	.000	SCM
BWO	PERCENT MOISTURE BY VOLUME	.00		.00	
FMD	MOLE FRACTION DRY GAS	1.000		1.000	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	29.00		29.00	
PB	BAROMETRIC PRESSURE	29.80	IN-HG	756.92	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H2O	6.10	MM-H2O
PS	STACK PRES, ABS.	29.82	IN-HG	757.37	MM-HG
TS	AVERAGE STACK TEMP	82.	F	28.	C

VS	AVG STACK GAS VELOCITY	56.3	FPS	17.8	MPS
AS	STACK AREA	452.	SQ-IN	.292	SQ-M
QSSTD	STACK FLOW RATE, DRY*	639526.	SCFH	18109.	SCMH
QS	ACTUAL STACK FLOW RATE	659052.	ACFH	18662.	ACMH
ISO	PERCENT ISOKINETIC	92.5		92.5	
MN	FILTERABLE PART. MG. EPA 5	853.5		853.5	
CS	FILTERABLE PART.	.051	GR/DSCF*	117.351	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.68	LB/HR	2.12	KG/HR
MN	TOTAL PART. MG. EPA 5	859.4		859.4	
CS	TOTAL PART.	.052	GR/DSCF*	118.162	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.72	LB/HR	2.14	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. A-3

UNCLEANED NOTES

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 268.814 * 1.000 * (29.80 + 2.463 / 13.6)}{(94. + 460.)} = 256.868 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .00 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .00}{256.868 + .00} = .00 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.00/100)) + 18. * (.00/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 477.242 / (SQRT(29.00 * 29.82) * 20. = 58.27 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 58.27 * 452. 3600/144 = 659052. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 659052. * 29.82 * (1. - (.00/100))}{(82. + 460.)} = 639526. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(P8+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(82.+460.))*((0.002669* 0.)+(268.814*1.000*(29.80+(2.463/13.6))/(94.+460.)))}{60. * 58.27 * 29.82 * .500 * .500} = 92.54 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 853.5 * 15.43 / 256.868 = .051 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .051 * 639526. / (15.43 * 453.6) = 4.68

FIELD DATA

PLANT	WESTSIDE GIN, SAN JOAQUIN, CA.	DATE	11/18/77
SAMPLING LOCATION	UNCLEANED MOTES	RUN NUMBER	A-4
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED GLASS
OPERATOR	J. IVERSON	NOZZLE I.D.	.2545
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.85	SAMPLE BOX NUMBER	FM2
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	RAC
FILTER NUMBER(S)	00000920	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	24.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	3.0 MINUTES	REFERENCE PRESS. DIFF.	.42

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1110	580.009									
E-01	3.0	0	583.292	.900	3.90	3.90	82.	74.	72.	4.0	250.	59.
E-02	6.0	0	586.694	1.100	4.70	4.70	82.	84.	72.	4.5	250.	59.
E-03	9.0	0	590.035	1.100	4.70	4.70	82.	86.	74.	5.0	250.	59.
E-04	12.0	0	593.665	1.300	5.69	5.69	82.	90.	76.	6.0	250.	60.
E-05	15.0	0	597.345	1.300	5.69	5.69	82.	93.	77.	6.0	250.	60.
E-06	18.0	0	600.825	1.100	4.70	4.70	83.	94.	78.	6.0	250.	60.
E-07	21.0	0	604.135	1.000	4.30	4.30	82.	98.	80.	5.0	250.	60.
E-08	24.0	0	607.129	.750	3.20	3.20	80.	98.	81.	3.5	250.	60.
E-09	27.0	0	610.130	.800	3.50	3.50	80.	97.	81.	3.5	250.	62.
E-10	30.0	1140	612.975	.700	3.00	3.00	80.	98.	82.	3.5	250.	62.
S-01	33.0	1150	616.233	.950	4.10	4.10	82.	84.	82.	4.0	250.	61.
S-02	36.0	0	619.245	.950	4.10	4.10	82.	85.	82.	4.5	250.	61.
S-03	39.0	0	622.535	1.000	4.30	4.30	82.	94.	82.	5.0	250.	62.
S-04	42.0	0	625.975	1.100	4.70	4.70	83.	98.	83.	5.5	250.	62.
S-05	45.0	0	629.345	1.100	4.70	4.70	83.	101.	84.	5.5	250.	62.
S-06	48.0	0	632.695	1.000	4.30	4.30	83.	102.	84.	5.0	250.	62.
S-07	51.0	0	635.990	1.000	4.30	4.30	83.	104.	86.	5.0	250.	62.
S-08	54.0	0	639.401	1.000	4.70	4.70	83.	104.	86.	5.5	250.	62.
S-09	57.0	0	642.895	1.100	4.70	4.70	83.	104.	86.	5.5	250.	64.
S-10	60.0	1220	646.269	1.000	4.30	4.30	83.	104.	87.	5.0	250.	64.
TOTALS	60.0		66.260									
AVERAGE					4.38	4.38	82.	95.	81.	4.9	250.	61.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, SAN JOAQUIN, CA. — J. IVERSON

TEST A-4 UNCLEANED MOTES

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/18/77		11/18/77	
TB	TIME-START	1110		1110	
TF	TIME-FINISH	1220		1220	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	20		20	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.254	IN	6.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	4.38	IN-H2O	111.2	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	66.260	CU-FT	1.876	CU-M
TM	AVERAGE GAS METER TEMP	87.7	F	30.9	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	64.686	SCF	1.832	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	2.7		2.7	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.127	SCF	.004	SCM
BWO	PERCENT MOISTURE BY VOLUME	.20		.20	
FMD	MOLE FRACTION DRY GAS	.998		.998	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.98		28.98	
PB	BAROMETRIC PRESSURE	29.85	IN-HG	758.19	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H2O	6.10	MM-H2O
PS	STACK PRES, ABS.	29.87	IN-HG	758.64	MM-HG
TS	AVERAGE STACK TEMP	82.	F	28.	C

VS	AVG STACK GAS VELOCITY	57.0	FPS	17.4	MPS
AS	STACK AREA	452.	SQ-IN	.292	SQ-M
QSSTD	STACK FLOW RATE, DRY*	625985.	SCFH	17726.	SCMH
QS	ACTUAL STACK FLOW RATE	644986.	ACFH	18264.	ACMH
ISO	PERCENT ISOKINETIC	91.9		91.9	
MN	FILTERABLE PART. MG. EPA 5	218.1		218.1	
CS	FILTERABLE PART.	.052	GR/DSCF*	119.080	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.65	LB/HR	2.11	KG/HR
MN	TOTAL PART. MG. EPA 5	219.4		219.4	
CS	TOTAL PART.	.052	GR/DSCF*	119.790	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.68	LB/HR	2.12	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. A-4

UNCLEANED NOTES

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 66.260 * 1.004 * (29.85 + 4.379 / 13.6)}{(88. + 460.)} = 64.686 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 3. = .13 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .13}{64.686 + .13} = .20 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMO = (100. - BWO) / 100.

$$FMO = \frac{100. - .2}{100.} = .998$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MO = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MO = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MO * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.20/100)) + 18. * (.20/100) = 28.98

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 467.274 / (SQRT(28.98 * 29.87) * 20. = 57.03 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 57.03 * 452. 3600/144 = 644986. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 644986. * 29.87 * (1. - (.20/100))}{(82. + 460.)} = 625985. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(82.+460.))*((0.002669* 3.)+(66.260*1.004*(29.85+(4.379/13.6))/(88.+460.)))}{60. * 57.03 * 29.87 * .254 * .254} = 91.90 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 218.1 * 15.43 / 64.686 = .052 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .052 * 625985. / (15.43 * 453.6) = 4.65

FIELD DATA

PLANT	WESTSIDE GIN - SAN JOAQUIN, CA.	DATE	11/18/77
SAMPLING LOCATION	UNCLEANED MOTES	RUN NUMBER	A-5
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED STAINLESS
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.5000
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.80	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	AER
FILTER NUMBER(S)	0000113	METER HEAD DIFF.	.090
STACK INSIDE DIM.(IN)	24.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	3.0 MINUTES	REFERENCE PRESS. DIFF.	.72

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1345	76.638									
E-10	3.0	0	88.000	.800	2.00	2.00	81.	83.	84.	10.0	249.	68.
E-09	6.0	0	99.900	.750	1.88	1.88	81.	85.	83.	10.0	249.	69.
E-08	9.0	0	113.200	1.000	2.50	2.50	81.	88.	83.	12.0	249.	71.
E-07	12.0	0	127.100	1.100	2.75	2.60	82.	93.	84.	14.0	250.	74.
E-06	15.0	0	141.100	1.250	3.15	2.60	82.	96.	85.	14.0	249.	72.
E-05	18.0	0	155.200	1.400	3.50	2.60	83.	98.	86.	14.0	249.	70.
E-04	21.0	0	169.200	1.450	3.70	2.60	82.	100.	87.	14.0	250.	68.
E-03	24.0	0	183.200	1.250	3.15	2.60	82.	101.	88.	14.0	249.	68.
E-02	27.0	0	196.700	.950	2.38	2.38	84.	100.	89.	11.0	250.	68.
E-01	30.0	1415	209.834	.900	2.28	2.28	84.	102.	90.	11.0	250.	66.
S-10	33.0	1421	223.900	1.000	2.50	2.50	81.	88.	88.	11.0	251.	66.
S-09	36.0	0	237.800	1.150	2.85	2.60	82.	93.	88.	14.0	251.	67.
S-08	39.0	0	251.800	1.250	3.15	2.60	82.	98.	89.	14.0	250.	67.
S-07	42.0	0	265.700	1.400	3.50	2.60	82.	99.	89.	14.0	251.	67.
S-06	45.0	0	279.700	1.300	3.28	2.60	81.	99.	90.	14.0	251.	66.
S-05	48.0	0	293.700	1.200	3.00	2.60	81.	100.	90.	14.0	250.	66.
S-04	51.0	0	307.500	1.200	3.00	2.60	82.	101.	90.	14.0	250.	66.
S-03	54.0	0	321.000	.950	2.38	2.38	82.	102.	91.	12.0	251.	66.
S-02	57.0	0	333.100	.750	1.88	1.88	82.	102.	91.	10.0	251.	67.
S-01	60.0	1451	344.269	.600	1.53	1.53	83.	99.	91.	8.0	251.	67.
TOTALS	60.0		267.631									
AVERAGE					2.72	2.40	82.	96.	88.	12.5	250.	68.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN - SAN JOAQUIN, CA. — C. BRUFFEY

TEST A-5 UNCLEANED MOTES

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/18/77		11/18/77	
TB	TIME-START	1345		1345	
TF	TIME-FINISH	1451		1451	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	20		20	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.40	IN-H2O	60.9	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	267.631	CU-FT	7.578	CU-M
TM	AVERAGE GAS METER TEMP	92.1	F	33.4	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	256.484	SCF	7.263	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	.0		.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.000	SCF	.000	SCM
BWO	PERCENT MOISTURE BY VOLUME	.00		.00	
FMD	MOLE FRACTION DRY GAS	1.000		1.000	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	29.00		29.00	
PB	BAROMETRIC PRESSURE	29.80	IN-HG	756.92	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H2O	6.10	MM-H2O
PS	STACK PRES, ABS.	29.82	IN-HG	757.37	MM-HG
TS	AVERAGE STACK TEMP	82.	F	28.	C

VS	AVG STACK GAS VELOCITY	58.8	FPS	17.9	MPS
AS	STACK AREA	452.	SQ-IN	.292	SQ-M
QSSTD	STACK FLOW RATE, DRY*	645451.	SCFH	18277.	SCMH
QS	ACTUAL STACK FLOW RATE	664729.	ACFH	18823.	ACMH
ISO	PERCENT ISOKINETIC	91.6		91.6	
MN	FILTERABLE PART. MG. EPA 5	735.6		735.6	
CS	FILTERABLE PART.	.044	GR/DSCF*	101.292	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.08	LB/HR	1.85	KG/HR
MN	TOTAL PART. MG. EPA 5	737.7		737.7	
CS	TOTAL PART.	.044	GR/DSCF*	101.581	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.09	LB/HR	1.86	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. A-5

UNCLEANED NOTES

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 267.631 * 1.000 * (29.80 + 2.396 / 13.6)}{(92. + 460.)} = 256.484 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .00 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .00}{256.484 + .00} = .00 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.00/100)) + 18. * (.00/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 481.353 / (SQRT(29.00 * 29.82) * 20. = 58.78 FPS

STACK GAS VOLUMETHIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 58.78 * 452. 3600/144 = 664729. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 664729. * 29.82 * (1. - (.00/100))}{(82. + 460.)} = 645451. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(82.+460.))*((0.002669* 0.)+(267.631*1.000*(29.80+(2.396/13.6))/(92.+460.)))}{60. * 58.78 * 29.82 * .500 * .500} = 91.55 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 735.6 * 15.43 / 256.484 = .044 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .044 * 645451. / (15.43 * 453.6) = 4.08

FIELD DATA

PLANT	WESTSIDE GIN, SAN JOAQUIN, CA.	DATE	11/18/77
SAMPLING LOCATION	UNCLEANED NOTES	RUN NUMBER	A-6
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED GLASS
OPERATOR	J. IVERSON	NUZZLE I.D.	.2545
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.80	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000726	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	24.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	3.0 MINUTES	REFERENCE PRESS. DIFF.	.42

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1345	646.879									
S-01	3.0	0	650.025	.900	3.90	3.90	81.	72.	71.	3.0	250.	54.
S-02	6.0	0	653.285	.950	4.10	4.10	81.	79.	72.	3.0	250.	54.
S-03	9.0	0	656.554	1.000	4.30	4.30	82.	82.	72.	3.5	250.	54.
S-04	12.0	0	659.795	1.000	4.30	4.30	83.	88.	74.	3.5	250.	55.
S-05	15.0	0	663.175	1.100	4.69	4.69	83.	92.	75.	3.5	250.	55.
S-06	18.0	0	666.435	.950	4.10	4.10	82.	93.	76.	3.5	250.	56.
S-07	21.0	0	669.721	1.000	4.30	4.30	82.	95.	78.	3.5	250.	56.
S-08	24.0	0	673.135	1.100	4.69	4.69	83.	97.	78.	4.0	250.	58.
S-09	27.0	0	676.440	1.000	4.30	4.30	83.	100.	80.	3.5	250.	58.
S-10	30.0	0	679.634	.850	3.80	3.80	82.	102.	82.	4.0	250.	58.
E-01	33.0	0	682.730	.850	3.80	3.80	82.	90.	82.	3.0	250.	57.
E-02	36.0	0	685.035	1.000	4.30	4.30	82.	96.	82.	3.5	250.	57.
E-03	39.0	0	689.476	1.100	4.69	4.69	82.	99.	83.	3.5	250.	58.
E-04	42.0	0	692.995	1.000	5.20	5.20	81.	100.	84.	4.0	250.	58.
E-05	45.0	0	696.575	1.000	5.20	5.20	81.	100.	84.	4.0	250.	58.
E-06	48.0	0	699.945	1.000	4.30	4.30	82.	102.	84.	3.5	250.	58.
E-07	51.0	0	703.131	.850	3.80	3.80	82.	103.	85.	3.0	250.	59.
E-08	54.0	0	706.099	.750	3.30	3.30	82.	104.	85.	3.0	250.	60.
E-09	57.0	0	709.040	.750	3.30	3.30	85.	104.	86.	3.0	250.	60.
E-10	60.0	1451	711.829	.650	2.80	2.80	82.	104.	86.	2.5	250.	61.
TOTALS	60.0		64.950									
AVERAGE					4.16	4.16	82.	95.	80.	3.4	250.	57.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, SAN JOAQUIN, CA. — J. IVERSON

TEST A-6 UNCLEANED MOTES

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/18/77		11/18/77	
TB	TIME-START	1345		1345	
TF	TIME-FINISH	1451		1451	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	20		20	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.254	IN	6.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	4.16	IN-H2O	105.6	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	64.950	CU-FT	1.839	CU-M
TM	AVERAGE GAS METER TEMP	87.5	F	30.8	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	63.285	SCF	1.792	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	1.0		1.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.047	SCF	.001	SCM
BWO	PERCENT MOISTURE BY VOLUME	.07		.07	
FMD	MOLE FRACTION DRY GAS	.999		.999	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.99		28.99	
PB	BAROMETRIC PRESSURE	29.80	IN-HG	756.92	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H2O	6.10	MM-H2O
PS	STACK PRES, ABS.	29.82	IN-HG	757.37	MM-HG
TS	AVERAGE STACK TEMP	82.	F	28.	C

VS	AVG STACK GAS VELOCITY	55.0	FPS	16.8	MPS
AS	STACK AREA	452.	SQ-IN	.292	SQ-M
QSSTD	STACK FLOW RATE, DRY*	603566.	SCFH	17091.	SCMH
QS	ACTUAL STACK FLOW RATE	622227.	ACFH	17620.	ACMH
ISO	PERCENT ISOKINETIC	93.2		93.2	
MN	FILTERABLE PART. MG. EPA 5	187.1		187.1	
CS	FILTERABLE PART.	.046	GR/DSCF*	104.416	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.93	LB/HR	1.78	KG/HR
MN	TOTAL PART. MG. EPA 5	188.0		188.0	
CS	TOTAL PART.	.046	GR/DSCF*	104.918	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	3.95	LB/HR	1.79	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. A-6

UNCLEANED NOTES

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 64.950 * 1.004 * (29.80 + 4.159 / 13.6)}{(88. + 460.)} = 63.285 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 1. = .05 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .05}{63.285 + .05} = .07 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .1}{100.} = .999$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.07/100)) + 18. * (.07/100) = 28.99

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 450.512 / (SQRT(28.99 * 29.82) * 20. = 55.02 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 55.02 * 452. 3600/144 = 622227. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 622227. * 29.82 * (1. - (.07/100))}{(82. + 460.)} = 603566.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(82.+460.))*((0.002669* 1.)+(64.950*1.004*(29.80+(4.159/13.6))/(88.+460.)))}{60. * 55.02 * 29.82 * .254 * .254} = 93.25\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 187.1 * 15.43 / 63.285 = .046 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .046 * 603566. / (15.43 * 453.6) = 3.93

FIELD DATA

PLANT	WESTSIDE GIN - SAN JOAQUIN, CA.	DATE	11/15/77
SAMPLING LOCATION	#1 & 2 INCLINED CLEANERS	RUN NUMBER	B-1
SAMPLE TYPE &	PARTICULATE	PROBE LENGTH & TYPE	5' GLASS
OPERATOR	WD, CB	NOZZLE I.D.	.2545
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.95	SAMPLE BOX NUMBER	FM2
STATIC PRESS.(IN.H2O)	.25	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000917	METER HEAD DIFF.	1.820
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	1.05
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.45

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1440	799.816									
A-01	2.5	0	801.710	.450	1.84	1.84	137.	72.	70.	1.0	250.	55.
A-02	5.0	0	803.795	.600	2.40	2.40	137.	76.	70.	1.0	250.	55.
A-03	7.5	0	806.010	.660	2.70	2.70	136.	80.	70.	1.0	250.	55.
A-04	10.0	0	808.340	.720	2.90	2.90	139.	83.	70.	1.0	250.	55.
A-05	12.5	0	810.640	.690	2.78	2.78	138.	85.	71.	1.0	250.	55.
A-06	15.0	0	812.985	.720	2.90	2.90	135.	88.	72.	1.0	250.	55.
A-07	17.5	0	815.165	.630	2.50	2.50	136.	90.	72.	1.0	250.	55.
A-08	20.0	0	817.450	.660	2.20	2.70	135.	90.	72.	1.0	250.	55.
A-09	22.5	0	819.660	.630	2.50	2.50	135.	90.	73.	1.0	250.	55.
A-10	25.0	0	821.827	.610	2.48	2.48	141.	91.	74.	1.0	250.	55.
A-11	27.5	0	823.985	.590	2.41	2.41	142.	93.	74.	1.0	250.	59.
A-12	30.0	0	826.092	.530	2.18	2.18	139.	96.	75.	1.0	0.	62.
B-01	32.5	1515	827.850	.420	1.72	1.72	145.	86.	76.	1.0	0.	64.
B-02	35.0	0	829.725	.450	1.84	1.84	144.	88.	77.	1.0	0.	64.
B-03	37.5	0	831.740	.530	2.18	2.18	142.	89.	78.	1.0	0.	64.
B-04	40.0	0	833.850	.580	2.31	2.37	143.	90.	78.	1.0	0.	63.
B-05	42.5	0	836.685	.630	2.50	2.50	144.	90.	78.	1.0	0.	63.
B-06	45.0	0	838.320	.650	2.69	2.69	145.	91.	77.	1.0	0.	66.
B-07	47.5	0	840.620	.660	2.70	2.70	145.	91.	76.	1.0	0.	65.
B-08	50.0	0	842.910	.670	2.72	2.72	145.	91.	77.	1.0	0.	65.
B-09	52.5	0	845.180	.660	2.70	2.70	143.	92.	77.	1.0	0.	66.
B-10	55.0	0	847.360	.600	2.40	2.40	143.	91.	78.	1.0	0.	67.
B-11	57.5	0	849.450	.550	2.22	2.22	142.	90.	78.	1.0	0.	66.
B-12	60.0	0	851.438	.470	1.91	1.91	134.	90.	78.	1.0	0.	66.
TOTALS	60.0		51.622									
AVERAGE					2.40	2.43	140.	88.	75.	1.0	115.	60.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN - SAN JOAQUIN, CA. — WD, CB

TEST B-1 #1 & 2 INCLINED CLEANERS

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/15/77		11/15/77	
TB	TIME-START	1440		1440	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.003		1.003	
DN	SAMPLING NOZZLE DIAMETER	.254	IN	6.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.43	IN-H2O	61.6	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	51.622	CU-FT	1.462	CU-M
TM	AVERAGE GAS METER TEMP	81.3	F	27.4	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	50.862	SCF	1.440	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	12.4		12.4	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.584	SCF	.017	SCM
BWD	PERCENT MOISTURE BY VOLUME	1.13		1.13	
FMD	MOLE FRACTION DRY GAS	.989		.989	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.88		28.88	
PB	BAROMETRIC PRESSURE	29.95	IN-HG	760.73	MM-HG
PSI	STATIC PRES OF STACK GAS	.25	IN-H2O	6.35	MM-H2O
PS	STACK PRES, ABS.	29.97	IN-HG	761.20	MM-HG
TS	AVERAGE STACK TEMP	140.	F	60.	C

VS	AVG STACK GAS VELOCITY	46.1	FPS	14.1	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	710391.	SCFH	20116.	SCMH
QS	ACTUAL STACK FLOW RATE	815356.	ACFH	23088.	ACMH
ISO	PERCENT ISOKINETIC	99.5		99.5	
MN	FILTERABLE PART. MG. EPA 5	16.3		16.3	
CS	FILTERABLE PART.	.005	GR/DSCF*	11.319	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	.50	LB/HR	.23	KG/HR
MN	TOTAL PART. MG. EPA 5	173.0		173.0	
CS	TOTAL PART.	.052	GR/DSCF*	120.129	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	5.33	LB/HR	2.42	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. R-1

#1 & 2 INCLINED CLEANERS

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 51.622 * 1.003 * (29.95 + 2.427 / 13.6)}{(81. + 460.)} = 50.862 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 12. = .58 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .58}{50.862 + .58} = 1.13 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.1}{100.} = .989$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.13/100)) + 18. * (1.13/100) = 28.88

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 453.613 / (SQRT(28.88 * 29.97) * 24. = 46.14 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 46.14 * 707. 3600/144 = 815356. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 815356. * 29.97 * (1. - (1.13/100))}{(140. + 460.)} = 710391.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(140.+460.))*((0.002669*12.)+(51.622*1.003*(29.95+(2.427/13.6))/(81.+460.)))}{60. * 46.14 * 29.97 * .254 * .254} = 99.49\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 16.3 * 15.43 / 50.862 = .005 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .005 * 710391. / (15.43 * 453.6) = .50

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/17/77
SAMPLING LOCATION	#1 & 2 INCLINED CLEANERS	RUN NUMBER	B-2
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5 FT. S.S.
OPERATOR	JIM IVERSON	NOZZLE I.D.	.2550
AMBIENT TEMP.(DEG.F)	###	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.00	SAMPLE BOX NUMBER	FMA
STATIC PRESS.(IN.H2O)	.25	METER BOX NUMBER	RAC
FILTER NUMBER(S)		METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		REFERENCE PRESS. DIFF.	.44

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1440	356.112									
E-01	2.5	0	358.065	.580	2.40	2.40	149.	64.	65.	2.0	250.	55.
E-02	5.0	0	359.895	.580	2.40	2.40	148.	72.	65.	3.0	250.	55.
E-03	7.5	0	361.155	.620	2.60	2.60	148.	72.	65.	3.5	250.	56.
E-04	10.0	0	364.225	.650	2.70	2.70	149.	80.	68.	3.5	250.	56.
E-05	12.5	0	366.365	.650	2.70	2.70	148.	82.	68.	3.5	250.	56.
E-06	15.0	0	368.625	.710	2.91	2.91	147.	86.	70.	3.5	250.	55.
E-07	17.5	0	370.395	.600	2.50	2.50	148.	88.	72.	3.5	250.	55.
E-08	20.0	0	373.035	.620	2.60	2.60	148.	90.	72.	3.5	250.	55.
E-09	22.5	0	375.145	.580	2.40	2.40	147.	92.	76.	3.5	250.	55.
E-10	25.0	0	377.695	.560	2.30	2.30	147.	94.	76.	3.5	250.	55.
E-11	27.5	0	379.775	.540	2.20	2.20	147.	96.	80.	3.5	250.	55.
E-12	30.0	0	381.472	.520	2.15	2.15	147.	98.	80.	3.5	250.	55.
S-01	32.5	1515	383.425	.500	2.10	2.10	151.	86.	82.	3.0	250.	55.
S-02	35.0	0	385.545	.550	2.29	2.29	151.	92.	84.	3.0	250.	55.
S-03	37.5	0	387.650	.580	2.40	2.40	151.	92.	84.	3.0	250.	55.
S-04	40.0	0	389.835	.610	2.61	2.61	152.	97.	84.	3.5	250.	57.
S-05	42.5	0	392.085	.650	2.69	2.69	152.	100.	84.	3.5	250.	57.
S-06	45.0	0	394.415	.680	2.80	2.80	152.	101.	86.	3.5	250.	58.
S-07	47.5	0	396.565	.620	2.60	2.60	152.	102.	87.	3.5	250.	58.
S-08	50.0	0	398.945	.650	2.70	2.70	153.	103.	87.	3.5	250.	59.
S-09	52.5	0	401.175	.650	2.70	2.70	153.	103.	88.	3.5	250.	60.
S-10	55.0	0	403.255	.580	2.40	2.40	151.	104.	88.	3.5	250.	60.
S-11	57.5	0	405.375	.580	2.40	2.40	151.	105.	89.	3.5	250.	60.
S-12	60.0	0	407.452	.550	2.29	2.29	150.	105.	90.	3.0	250.	60.
TOTALS	60.0											
AVERAGE			51.340		2.49	2.49	150.	92.	79.	3.3	250.	57.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS: WESTSIDE GIN

TEST TEAM LEADER: JIM IVERSON

TEST 8-2 #1 & 2 INCLINED CLEANERS

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/17/77		11/17/77	
TB	TIME-START	1440		1440	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.255	IN	6.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.49	IN-H2O	63.3	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	51.340	CU-FT	1.454	CU-M
TM	AVERAGE GAS METER TEMP	85.3	F	29.6	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	50.359	SCF	1.426	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	36.2		36.2	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	1.704	SCF	.048	SCM
BWO	PERCENT MOISTURE BY VOLUME	3.27		3.27	
FMD	MOLE FRACTION DRY GAS	.967		.967	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.64		28.64	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.25	IN-H2O	6.35	MM-H2O
PS	STACK PRES, ABS.	30.02	IN-HG	762.47	MM-HG
TS	AVERAGE STACK TEMP	150.	F	65.	C

VS	AVG STACK GAS VELOCITY	46.8	FPS	14.3	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	695453.	SCFH	19693.	SCMH
QS	ACTUAL STACK FLOW RATE	827333.	ACFH	23428.	ACMH
ISO	PERCENT ISOKINETIC	100.2		100.2	
MN	FILTERABLE PART. MG. EPA 5	118.2		118.2	
CS	FILTERABLE PART.	.036	GR/DSCF*	82.897	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.60	LB/HR	1.63	KG/HR
MN	TOTAL PART. MG. EPA 5	129.5		129.5	
CS	TOTAL PART.	.040	GR/DSCF*	90.822	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	3.94	LB/HR	1.79	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. B-2

#1 & 2 INCLINED CLEANERS

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 51.340 * 1.004 * (30.00 + 2.493 / 13.6)}{(85. + 460.)} = 50.359 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 36. = 1.70 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 1.70}{50.359 + 1.70} = 3.27 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 3.3}{100.} = .967$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(3.27/100)) + 18. * (3.27/100) = 28.64

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 456./80 / (SQRT(28.64 * 30.02) * 24. = 46.82 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 46.82 * 707. 3600/144 = 827333. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 827333. * 30.02 * (1. - (3.27/100))}{(150. + 460.)} = 695453.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*ON)

$$ISO = \frac{(305.58*(150.+460.))*((0.002669*36.)+(51.340*1.004*(30.00+(2.493/13.6))/(85.+460.)))}{60. * 46.82 * 30.02 * .255 * .255} = 100.23\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 118.2 * 15.43 / 50.359 = .036 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .036 * 695453. / (15.43 * 453.6) = 3.60

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/17/77
SAMPLING LOCATION	#1 & 2 INCLINED CLEANERS	RUN NUMBER	B-3
SAMPLE TYPE	PARTICULATE		
OPERATOR	CB, WGD	PROBE LENGTH & TYPE	5 FT. STAINLESS
AMBIENT TEMP.(DEG.F)	60.	NOZZLE I.D.	.5000
BAR.PRESS.(IN.HG)	30.00	ASSUMED MOISTURE	3.00
STATIC PRESS.(IN.H2O)	.25	SAMPLE BOX NUMBER	AER
FILTER NUMBER(S)	0000118	METER BOX NUMBER	AER
STACK INSIDE DIM.(IN)	30.00 .00	METER HEAD DIFF.	.070
PITOT TUBE COEFF.	.84	C FACTOR	.00
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.78

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	840	866.045									
S-12	2.5	0	879.200	.650	1.58	1.58	149.	67.	57.	7.0	247.	62.
S-11	5.0	0	888.500	.700	1.70	1.70	149.	75.	58.	8.0	248.	74.
S-10	7.5	0	878.700	.700	1.70	1.70	149.	83.	61.	8.0	247.	78.
S-09	10.0	0	907.400	.700	1.70	1.70	148.	88.	63.	8.0	248.	78.
S-08	12.5	0	916.800	.730	1.74	1.74	148.	92.	66.	8.0	248.	77.
S-07	15.0	0	926.300	.700	1.70	1.70	148.	94.	67.	8.0	248.	73.
S-06	17.5	0	935.500	.680	1.63	1.63	147.	94.	70.	8.0	248.	68.
S-05	20.0	0	945.100	.750	1.80	1.80	148.	94.	72.	8.0	248.	66.
S-04	22.5	0	954.300	.680	1.63	1.63	147.	95.	73.	8.0	248.	67.
S-03	25.0	0	963.400	.650	1.55	1.55	148.	96.	74.	8.0	250.	65.
S-02	27.5	0	972.300	.630	1.50	1.50	147.	96.	76.	8.0	250.	64.
S-01	30.0	910	981.045	.550	1.32	1.32	147.	97.	77.	8.0	249.	64.
E-12	32.5	920	989.800	.680	1.63	1.63	150.	80.	78.	8.0	254.	70.
E-11	35.0	0	998.800	.650	1.55	1.55	151.	84.	78.	8.0	249.	61.
E-10	37.5	0	8.200	.700	1.70	1.70	152.	88.	78.	8.0	250.	67.
E-09	40.0	0	17.500	.680	1.63	1.63	153.	94.	79.	8.0	250.	68.
E-08	42.5	0	26.800	.700	1.70	1.70	152.	97.	80.	8.0	251.	68.
E-07	45.0	0	36.300	.700	1.70	1.70	153.	99.	82.	8.0	251.	67.
E-06	47.5	0	45.700	.730	1.74	1.74	152.	100.	83.	8.0	252.	66.
E-05	50.0	0	55.600	.800	1.90	1.90	153.	101.	84.	8.0	250.	66.
E-04	52.5	0	65.200	.700	1.70	1.70	152.	101.	85.	8.0	252.	67.
E-03	55.0	0	74.500	.680	1.63	1.63	152.	101.	86.	8.0	250.	66.
E-02	57.5	0	83.800	.600	1.44	1.44	152.	101.	87.	8.0	250.	66.
E-01	60.0	950	92.363	.650	1.55	1.55	151.	101.	87.	8.0	249.	65.
TOTALS	60.0		226.318									
AVERAGE					1.64	1.64	150.	92.	75.	8.0	249.	68.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — CB, WGD

TEST B-3 #1 & 2 INCLINED CLEANERS

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/17/77		11/17/77	
TB	TIME-START	840		840	
TF	TIME-FINISH	950		950	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.64	IN-H2O	41.7	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	226.318	CU-FT	6.409	CU-M
TM	AVERAGE GAS METER TEMP	83.7	F	28.7	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	221.283	SCF	6.266	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	131.6		131.6	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	6.194	SCF	.175	SCM
BWO	PERCENT MOISTURE BY VOLUME	2.72		2.72	
FMD	MOLE FRACTION DRY GAS	.973		.973	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.70		28.70	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.25	IN-H2O	6.35	MM-H2O
PS	STACK PRES, ABS.	30.02	IN-HG	762.47	MM-HG
TS	AVERAGE STACK TEMP	150.	F	66.	C

VS	AVG STACK GAS VELOCITY	49.9	FPS	15.2	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	745155.	SCFH	21100.	SCMH
QS	ACTUAL STACK FLOW RATE	881808.	ACFH	24970.	ACMH
ISO	PERCENT ISOKINETIC	106.9		106.9	
MN	FILTERABLE PART. MG. EPA 5	561.3		561.3	
CS	FILTERABLE PART.	.039	GR/DSCF*	89.586	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.17	LB/HR	1.89	KG/HR
MN	TOTAL PART. MG. EPA 5	585.7		585.7	
CS	TOTAL PART.	.041	GR/DSCF*	93.481	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.35	LB/HR	1.97	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. B-3

#1 & 2 INCLINED CLEANERS

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 226.318 * 1.000 * (30.00 + 1.643 / 13.6)}{(84. + 460.)} = 221.283 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 132. = 6.19 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 6.19}{221.283 + 6.19} = 2.72 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 2.7}{100.} = .973$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(2.72/100)) + 18. * (2.72/100) = 28.70

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 889.504 / (SQRT(28.70 * 30.02) * 24. = 49.90 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 49.90 * 707. 3600/144 = 881808. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 881808. * 30.02 * (1. - (2.72/100))}{(150. + 460.)} = 745153.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*ON)

$$ISO = \frac{(305.58*(150.+460.))*((0.002669*132.)+(226.318*1.000*(30.00+(1.643/13.6))/(84.+460.)))}{60. * 49.90 * 30.02 * .500 * .500} = 106.91\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 561.3 * 15.43 / 221.283 = .039 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .039 * 745153. / (15.43 * 453.6) = 4.17

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/17/77
SAMPLING LOCATION	#1 & 2 INCLINED CLEANERS	RUN NUMBER	B-4
SAMPLE TYPE	PARTICULATE		
OPERATOR	JIM IVERSON	PROBE LENGTH & TYPE	5 FT. S.S.
AMBIENT TEMP.(DEG.F)	65.	NOZZLE I.D.	.2550
BAR.PRESS.(IN.HG)	30.00	ASSUMED MOISTURE	3.00
STATIC PRESS.(IN.H2O)	.25	SAMPLE BOX NUMBER	FMS
FILTER NUMBER(S)	0000952	METER BOX NUMBER	RAC
STACK INSIDE DIM.(IN)	30.00 .00	METER HEAD DIFF.	1.910
PITOT TUBE COEFF.	.84	C FACTOR	1.10
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.44

TRAVERSE POINT NO.	SAMPLE TIME (Min.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (Cu.Ft.)	VELOCITY HEAD (In.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	840	407.672									
01	2.5	0	409.785	.550	2.30	2.30	144.	84.	84.	3.0	250.	52.
02	5.0	0	411.835	.600	2.49	2.49	145.	88.	84.	3.0	250.	52.
03	7.5	0	414.155	.700	2.90	2.90	145.	92.	86.	3.0	250.	52.
04	10.0	0	416.465	.720	3.00	3.00	145.	96.	86.	3.0	250.	52.
05	12.5	0	418.762	.750	3.10	3.10	145.	98.	87.	4.5	250.	52.
06	15.0	0	421.145	.760	3.20	3.20	145.	102.	88.	5.0	250.	52.
07	17.5	0	423.465	.650	2.70	2.70	145.	102.	88.	3.5	250.	52.
08	20.0	0	425.725	.650	2.70	2.70	144.	103.	89.	3.5	250.	52.
09	22.5	0	427.935	.600	2.49	2.49	144.	103.	89.	3.5	250.	52.
10	25.0	0	430.192	.620	2.50	2.50	144.	106.	90.	3.5	250.	52.
11	27.5	0	432.335	.580	2.40	2.40	145.	106.	92.	3.5	250.	52.
12	30.0	910	434.449	.550	2.30	2.30	145.	106.	92.	3.5	250.	52.
01	32.5	920	436.542	.550	2.30	2.30	145.	99.	93.	3.0	250.	52.
02	35.0	0	438.535	.550	2.30	2.30	145.	103.	94.	3.0	250.	52.
03	37.5	0	440.630	.600	2.49	2.49	145.	106.	97.	3.5	250.	52.
04	40.0	0	442.945	.700	2.90	2.90	145.	109.	97.	3.5	250.	52.
05	42.5	0	445.298	.700	2.90	2.90	146.	111.	97.	3.5	250.	52.
06	45.0	0	447.650	.720	3.00	3.00	146.	113.	98.	4.0	250.	52.
07	47.5	0	449.945	.650	2.70	2.70	145.	114.	98.	3.5	250.	52.
08	50.0	0	452.165	.680	2.80	2.80	145.	114.	99.	4.0	250.	52.
09	52.5	0	454.450	.620	2.52	2.52	146.	115.	100.	4.0	250.	52.
10	55.0	0	456.635	.580	2.40	2.40	145.	116.	100.	3.5	250.	52.
11	57.5	0	458.825	.580	2.40	2.40	143.	117.	102.	3.5	250.	52.
12	60.0	950	460.973	.550	2.30	2.30	143.	117.	102.	3.5	250.	52.
TOTALS	60.0		53.301									
AVERAGE					2.63	2.63	145.	105.	93.	3.5	250.	52.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST LEADER

JIM IVERSON

TEST B-4 #1 & 2 INCLINED CLEANERS

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/17/77		11/17/77	
TB	TIME-START	840		840	
TF	TIME-FINISH	950		950	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.255	IN	6.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.63	IN-H2O	66.8	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	53.301	CU-FT	1.509	CU-M
TM	AVERAGE GAS METER TEMP	99.0	F	37.2	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	51.017	SCF	1.445	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	42.2		42.2	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	1.986	SCF	.056	SCM
BWO	PERCENT MOISTURE BY VOLUME	3.75		3.75	
FMD	MOLE FRACTION DRY GAS	.963		.963	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.59		28.59	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.25	IN-H2O	6.35	MM-H2O
PS	STACK PRES, ABS.	30.02	IN-HG	762.47	MM-HG
TS	AVERAGE STACK TEMP	145.	F	63.	C

VS	AVG STACK GAS VELOCITY	47.9	FPS	14.6	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	714146.	SCFH	20222.	SCMH
QS	ACTUAL STACK FLOW RATE	846933.	ACFH	23983.	ACMH
ISO	PERCENT ISOKINETIC	98.9		98.9	
MN	FILTERABLE PART. MG. EPA 5	405.7		405.7	
CS	FILTERABLE PART.	.123	GR/DSCF*	280.858	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	12.52	LB/HR	5.68	KG/HR
MN	TOTAL PART. MG. EPA 5	414.0		414.0	
CS	TOTAL PART.	.125	GR/DSCF*	286.604	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	12.78	LB/HR	5.80	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. 8-4

#1 & 2 INCLINED CLEANERS

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 53.301 * 1.004 * (30.00 + 2.629 / 13.6)}{(99. + 460.)} = 51.017 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 42. = 1.99 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 1.99}{51.017 + 1.99} = 3.75 \text{ PERCENT}$$

A-50

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 3.7}{100.} = .963$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(3.75/100)) + 18. * (3.75/100) = 28.59

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 469.221 / (SQRT(28.59 * 30.02) * 24. = 47.93 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 47.93 * 707. 3600/144 = 846933. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 846933. * 30.02 * (1. - (3.75/100))}{(145. + 460.)} = 714146.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(145.+460.))*((0.002669* 42.)+(53.301*1.004*(30.00+(2.629/13.6))/(99.+460.)))}{60. * 47.93 * 30.02 * .255 * .255} = 98.88\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 405.7 * 15.43 / 51.017 = .123 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .123 * 714146. / (15.43 * 453.6) = 12.52

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/17/77
SAMPLING LOCATION	#1 & 2 INCLINED CLEANERS	RUN NUMBER	8-5
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5 FT. HEATED S.S.
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.5000
AMBIENT TEMP.(DEG.F)	70.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.00	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.25	METER BOX NUMBER.	AER
FILTER NUMBER(S)		METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	.0
		HEATER BOX SETTING	.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.72

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1050	92.750									
S-12	2.5	0	101.800	.650	1.58	1.58	144.	90.	90.	7.0	262.	64.
S-11	5.0	0	111.300	.720	1.74	1.74	144.	92.	90.	7.0	256.	59.
S-10	7.5	0	120.600	.700	1.70	1.70	145.	96.	91.	7.0	250.	70.
S-09	10.0	0	130.500	.800	1.90	1.90	145.	100.	92.	7.0	253.	73.
S-08	12.5	0	140.400	.780	1.88	1.88	145.	104.	93.	7.5	254.	73.
S-07	15.0	0	149.900	.730	1.75	1.75	146.	108.	94.	7.5	253.	75.
S-06	17.5	0	159.300	.750	1.80	1.80	145.	109.	95.	7.5	254.	73.
S-05	20.0	0	168.900	.730	1.75	1.75	145.	110.	96.	7.5	253.	70.
S-04	22.5	0	177.900	.650	1.58	1.58	144.	109.	97.	7.5	254.	66.
S-03	25.0	0	186.700	.600	1.43	1.43	143.	109.	98.	7.5	254.	64.
S-02	27.5	0	195.600	.630	1.50	1.50	143.	107.	98.	7.5	255.	63.
S-01	30.0	1120	204.340	.560	1.40	1.40	137.	107.	99.	7.5	253.	61.
E-12	32.5	1130	214.400	.700	1.70	1.70	145.	100.	99.	7.5	255.	67.
E-11	35.0	0	223.900	.700	1.70	1.70	145.	102.	99.	7.5	254.	62.
E-10	37.5	0	233.400	.650	1.58	1.58	145.	106.	99.	7.5	254.	66.
E-09	40.0	0	242.300	.700	1.70	1.70	145.	107.	100.	7.5	254.	66.
E-08	42.5	0	251.700	.700	1.70	1.70	146.	111.	101.	7.5	254.	67.
E-07	45.0	0	261.100	.680	1.65	1.65	147.	113.	101.	7.5	254.	65.
E-06	47.5	0	271.000	.800	1.90	1.90	145.	114.	102.	7.5	253.	65.
E-05	50.0	0	281.100	.800	1.90	1.90	145.	115.	102.	7.5	253.	64.
E-04	52.5	0	290.600	.700	1.70	1.70	145.	116.	103.	7.5	254.	66.
E-03	55.0	0	299.500	.600	1.43	1.43	145.	115.	103.	7.5	254.	65.
E-02	57.5	0	308.600	.650	1.58	1.58	143.	113.	103.	7.5	254.	64.
E-01	60.0	0	317.747	.650	1.58	1.58	145.	111.	103.	7.5	254.	63.
TOTALS	60.0		224.997									
AVERAGE					1.67	1.67	144.	107.	98.	7.4	254.	66.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT NAME AND ADDRESS

WESTSIDE GIN

TEST TEAM LEADER

C. BRUFFEY

TEST B-5 #1 & 2 INCLINED CLEANERS

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/17/77	11/17/77
TB	TIME-START	1050	1050
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.000	1.000
DN	SAMPLING NOZZLE DIAMETER	.500 IN	12.7 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.67 IN-H2O	42.5 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	224.997 CU-FT	6.371 CU-M
TM	AVERAGE GAS METER TEMP	102.3 F	39.1 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	212.728 SCF	6.024 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	175.5	175.5
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	8.261 SCF	.234 SCM
BWO	PERCENT MOISTURE BY VOLUME	3.74	3.74
FMD	MOLE FRACTION DRY GAS	.963	.963
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.59	28.59
PB	BAROMETRIC PRESSURE	30.00 IN-HG	762.00 MM-HG
PSI	STATIC PRES OF STACK GAS	.25 IN-H2O	6.35 MM-H2O
PS	STACK PRES, ABS.	30.02 IN-HG	762.47 MM-HG
TS	AVERAGE STACK TEMP	144. F	62. C

VS	AVG STACK GAS VELOCITY	50.1	FPS	15.3	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	747757.	SCFH	21174.	SCMH
QS	ACTUAL STACK FLOW RATE	886217.	ACFH	25095.	ACMH
ISO	PERCENT ISOKINETIC	102.4		102.4	
MN	FILTERABLE PART. MG. EPA 5	1597.3		1597.3	
CS	FILTERABLE PART.	.116	GR/DSCF*	265.189	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	12.38	LB/HR	5.61	KG/HR
MN	TOTAL PART. MG. EPA 5	1620.7		1620.7	
CS	TOTAL PART.	.118	GR/DSCF*	269.074	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	12.56	LB/HR	5.70	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. B-5

#1 & 2 INCLINED CLEANERS

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 224.997 * 1.000 * (30.00 + 1.672 / 13.6)}{(102. + 460.)} = 212.728 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 176. = 8.26 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 8.26}{212.728 + 8.26} = 3.74 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 3.7}{100.} = .963$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(3.74/100)) + 18. * (3.74/100) = 28.59

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 490.994 / (SQRT(28.59 * 30.02) * 24. = 50.15 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 50.15 * 707. 3600/144 = 886217. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 886217. * 30.02 * (1. - (3.74/100))}{(144. + 460.)} = 747757. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(144.+460.))*((0.002669* 176.)+(224.997*1.000*(30.00+(1.672/13.6))/(102.+460.)))}{60. * 50.15 * 30.02 * .500 * .500} = 102.42 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 1597.3 * 15.43 / 212.728 = .116 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .116 * 747757. / (15.43 * 453.6) = 12.38

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/17/77
SAMPLING LOCATION	#1 & 2 INCLINED CLEANERS	RUN NUMBER	B-6
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	6 FT. - GLASS LINED
OPERATOR	JIM IVERSON	NOZZLE I.D.	.2545
AMBIENT TEMP.(DEG.F)	60.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.98	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.25	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000854	METER HEAD DIFF.	1.920
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.44

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1050	461.399									
01	2.5	0	464.565	.650	2.65	2.65	135.	82.	82.	3.0	250.	69.
02	5.0	0	466.745	.580	2.40	2.40	135.	88.	82.	3.0	250.	69.
03	7.5	0	468.955	.680	2.81	2.81	134.	92.	83.	3.0	250.	70.
04	10.0	0	471.251	.690	2.89	2.89	134.	96.	83.	3.0	250.	70.
05	12.5	0	473.585	.700	2.90	2.90	134.	98.	84.	3.0	250.	72.
06	15.0	0	475.946	.680	2.81	2.81	134.	98.	84.	3.0	250.	74.
07	17.5	0	478.140	.650	2.65	2.65	134.	102.	88.	3.0	250.	74.
08	20.0	0	480.435	.650	2.65	2.65	137.	103.	88.	3.0	250.	76.
09	22.5	0	482.632	.650	2.65	2.65	137.	104.	88.	3.0	250.	76.
10	25.0	0	484.823	.600	2.50	2.50	138.	106.	89.	3.0	250.	76.
11	27.5	0	487.035	.600	2.50	2.50	138.	108.	90.	3.0	250.	76.
12	30.0	0	489.105	.520	2.15	2.15	138.	110.	92.	3.0	250.	76.
01	32.5	0	491.245	.560	2.40	2.40	139.	102.	82.	3.0	250.	72.
02	35.0	0	493.324	.580	2.40	2.40	140.	104.	83.	3.0	250.	72.
03	37.5	0	495.621	.680	2.81	2.81	136.	108.	94.	3.0	250.	71.
04	40.0	0	397.935	.700	2.90	2.90	138.	108.	94.	3.0	250.	71.
05	42.5	0	500.285	.740	3.10	3.10	139.	110.	96.	3.0	250.	71.
06	45.0	0	502.650	.750	3.15	3.15	140.	112.	96.	3.5	250.	70.
07	47.5	0	505.024	.700	2.90	2.90	139.	113.	97.	3.5	250.	70.
08	50.0	0	507.261	.650	2.65	2.65	139.	114.	98.	3.5	250.	70.
09	52.5	0	509.545	.620	2.55	2.55	137.	114.	98.	3.0	250.	70.
10	55.0	0	511.740	.600	2.50	2.50	137.	114.	98.	3.0	250.	70.
11	57.5	0	513.874	.550	2.30	2.30	138.	114.	98.	3.0	250.	70.
12	60.0	1200	516.004	.560	2.32	2.32	139.	114.	98.	3.0	250.	70.
TOTALS	60.0		54.605									
AVERAGE					2.65	2.65	137.	105.	90.	3.1	250.	72.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST LEADER

JIM IVERSON

TEST 8-6 #1 & 2 INCLINED CLEANERS

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/17/77	11/17/77
TB	TIME-START	1050	1050
TF	TIME-FINISH	1200	1200
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.254 IN	6.5 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	2.65 IN-H2O	67.2 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	54.605 CU-FT	1.546 CU-M
TM	AVERAGE GAS METER TEMP	97.5 F	36.4 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	52.375 SCF	1.483 SCM
VLC	TOTAL H20 COLLECTED IN IMPINGERS & SILICA GEL, ML.	41.4	41.4
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	1.949 SCF	.055 SCM
BWO	PERCENT MOISTURE BY VOLUME	3.59	3.59
FMD	MOLE FRACTION DRY GAS	.964	.964
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.61	28.61
PB	BAROMETRIC PRESSURE	29.98 IN-HG	761.49 MM-HG
PSI	STATIC PRES OF STACK GAS	.25 IN-H2O	6.35 MM-H2O
PS	STACK PRES, ABS.	30.00 IN-HG	761.96 MM-HG
TS	AVERAGE STACK TEMP	137. F	58. C

VS	AVG STACK GAS VELOCITY	47.9	FPS	14.6	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSID	STACK FLOW RATE, DRY*	723225.	SCFH	20480.	SCMH
QS	ACTUAL STACK FLOW RATE	845864.	ACFH	23952.	ACMH
ISO	PERCENT ISOKINETIC	100.6		100.6	
MN	FILTERABLE PART. MG. EPA 5	527.6		527.6	
CS	FILTERABLE PART.	.155	GR/DSCF*	355.774	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	16.06	LB/HR	7.29	KG/HR
MN	TOTAL PART. MG. EPA 5	540.0		540.0	
CS	TOTAL PART.	.159	GR/DSCF*	364.136	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	16.44	LB/HR	7.46	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. B-6

#1 & 2 INCLINED CLEANERS

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 54.605 * 1.004 * (29.98 + 2.648 / 13.6)}{(97. + 460.)} = 52.375 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 41. = 1.95 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 1.95}{52.375 + 1.95} = 3.59 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 3.6}{100.} = .964$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(3.59/100)) + 18. * (3.59/100) = 28.61

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 466.617 / (SQRT(28.61 * 30.00) * 24. = 47.87 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 47.87 * 707. 3600/144 = 845864. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 845864. * 30.00 * (1. - (3.59/100))}{(137. + 460.)} = 723225. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB*(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(137.+460.))*((0.002669* 41.)+(54.605*1.004*(29.98+(2.648/13.6))/(97.+460.)))}{60. * 47.87 * 30.00 * .254 * .254} = 100.63 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 527.6 * 15.43 / 52.375 = .155 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .155 * 723225. / (15.43 * 453.6) = 16.06

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/17/77
SAMPLING LOCATION	#1 & 2 INCLINED CLEANERS	RUN NUMBER	B-7
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5 FT. S.S.
OPERATOR	C.B.	NOZZLE I.D.	.5000
AMBIENT TEMP.(DEG.F)	70.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.98	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.25	METER BOX NUMBER	AER
FILTER NUMBER(S)	0000128	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.78

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1352	319.910									
S-12	2.5	0	328.900	.680	1.60	1.60	137.	84.	84.	7.0	254.	59.
S-11	5.0	0	337.500	.600	1.45	1.45	134.	86.	86.	7.0	252.	61.
S-10	7.5	0	346.600	.680	1.60	1.60	135.	90.	86.	7.0	252.	68.
S-09	10.0	0	356.200	.700	1.70	1.70	135.	95.	86.	7.0	252.	69.
S-08	12.5	0	365.600	.730	1.75	1.75	136.	99.	87.	7.0	251.	70.
S-07	15.0	0	375.100	.700	1.70	1.70	137.	102.	88.	7.0	253.	69.
S-06	17.5	0	384.600	.700	1.70	1.70	137.	104.	88.	7.0	251.	67.
S-05	20.0	0	393.700	.650	1.57	1.57	138.	105.	89.	7.5	252.	67.
S-04	22.5	0	402.800	.660	1.60	1.60	138.	106.	90.	7.5	252.	67.
S-03	25.0	0	411.700	.600	1.45	1.45	137.	107.	90.	7.0	252.	68.
S-02	27.5	0	420.500	.600	1.45	1.45	137.	108.	91.	7.0	252.	67.
S-01	30.0	1423	429.416	.620	1.50	1.50	138.	108.	91.	7.0	252.	67.
E-12	32.5	1430	438.200	.650	1.57	1.57	137.	94.	90.	7.0	249.	80.
E-11	35.0	0	447.600	.700	1.70	1.70	140.	97.	90.	7.0	252.	73.
E-10	37.5	0	456.900	.670	1.59	1.59	139.	101.	90.	7.0	253.	72.
E-09	40.0	0	466.600	.700	1.70	1.70	138.	104.	91.	7.0	251.	73.
E-08	42.5	0	475.900	.700	1.70	1.70	158.	108.	92.	7.0	251.	74.
E-07	45.0	0	485.300	.650	1.57	1.57	139.	110.	93.	7.0	252.	75.
E-06	47.5	0	494.700	.700	1.70	1.70	139.	111.	93.	7.0	252.	75.
E-05	50.0	0	504.400	.740	1.79	1.79	138.	112.	94.	7.0	252.	74.
E-04	52.5	0	513.700	.680	1.60	1.60	139.	113.	95.	7.0	252.	74.
E-03	55.0	0	523.200	.700	1.70	1.70	137.	113.	95.	7.0	252.	74.
E-02	57.5	0	532.100	.600	1.45	1.45	138.	112.	96.	7.0	252.	75.
E-01	60.0	1500	541.130	.600	1.45	1.45	139.	112.	96.	7.0	251.	77.
TOTALS	60.0		221.220									
AVERAGE					1.61	1.61	138.	103.	90.	7.0	252.	71.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS | TEST TEAM LEADER

WESTSIDE GIN | C.B.

TEST B-7 #1 & 2 INCLINED CLEANERS

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/17/77		11/17/77	
TB	TIME-START	1352		1352	
TF	TIME-FINISH	1500		1500	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.61	IN-H2O	40.8	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	221.220	CU-FT	6.264	CU-M
TM	AVERAGE GAS METER TEMP	96.9	F	36.1	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	211.018	SCF	5.975	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	123.4		123.4	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	5.808	SCF	.164	SCM
BWO	PERCENT MOISTURE BY VOLUME	2.68		2.68	
FMD	MOLE FRACTION DRY GAS	.973		.973	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.71		28.71	
PB	BAROMETRIC PRESSURE	29.98	IN-HG	761.49	MM-HG
PSI	STATIC PRES OF STACK GAS	.25	IN-H2O	6.35	MM-H2O
PS	STACK PRES, ABS.	30.00	IN-HG	761.96	MM-HG
TS	AVERAGE STACK TEMP	138.	F	59.	C

VS	AVG STACK GAS VELOCITY	48.9	FPS	14.9	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	744138.	SCFH	21072.	SCMH
QS	ACTUAL STACK FLOW RATE	864066.	ACFH	24468.	ACMH
ISO	PERCENT ISOKINETIC	102.1		102.1	
MN	FILTERABLE PART. MG. EPA 5	2003.3		2003.3	
CS	FILTERABLE PART.	.146	GR/DSCF*	335.290	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	15.57	LB/HR	7.06	KG/HR
MN	TOTAL PART. MG. EPA 5	2022.8		2022.8	
CS	TOTAL PART.	.148	GR/DSCF*	338.554	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	15.73	LB/HR	7.13	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. B-7

#1 & 2 INCLINED CLEANERS

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 221.220 * 1.000 * (29.98 + 1.608 / 13.6)}{(97. + 460.)} = 211.018 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 123. = 5.81 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 5.81}{211.018 + 5.81} = 2.68 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 2.7}{100.} = .973$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(2.68/100)) + 18. * (2.68/100) = 28.71

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 479.536 / (SQRT(28.71 * 30.00) * 24. = 48.90 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 48.90 * 707. 3600/144 = 864066. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 864066. * 30.00 * (1. - (2.68/100))}{(138. + 460.)} = 744138. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(138.+460.))*((0.002669* 123.)+(221.220*1.000*(29.98+(1.608/13.6))/(97.+460.)))}{60. * 48.90 * 30.00 * .500 * .500} = 102.09 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 2003.3 * 15.43 / 211.018 = .146 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .146 * 744138. / (15.43 * 453.6) = 15.57

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/15/77
SAMPLING LOCATION	UNLOADING & DRYER	RUN NUMBER	C-1
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	6 FT. GLASS LINED
OPERATOR	CB-JJ	NOZZLE I.D.	.2550
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.95	SAMPLE BOX NUMBER	FMS
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER,	RAC
FILTER NUMBER(S)	0000944	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.44

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1440	115.223									
S-12	2.5	0	117.100	.450	1.95	1.95	125.	70.	70.	2.5	170.	70.
S-11	5.0	0	119.200	.480	2.10	2.10	125.	74.	70.	3.0	170.	65.
S-10	7.5	0	121.200	.480	2.10	2.10	125.	76.	70.	3.0	192.	50.
S-09	10.0	0	123.200	.520	2.20	2.20	125.	79.	70.	3.0	192.	65.
S-08	12.5	0	125.300	.540	2.35	2.35	125.	82.	72.	3.0	192.	55.
S-07	15.0	0	126.500	.540	2.35	2.35	125.	84.	72.	3.0	200.	55.
S-06	17.5	0	129.300	.530	2.25	2.25	125.	86.	73.	3.0	205.	55.
S-05	20.0	0	131.300	.540	2.35	2.35	125.	87.	75.	3.0	225.	55.
S-04	22.5	0	133.300	.510	2.15	2.15	125.	88.	75.	3.0	225.	56.
S-03	25.0	0	135.200	.450	1.95	1.95	125.	89.	76.	3.0	225.	56.
S-02	27.5	0	136.300	.430	1.85	1.85	125.	90.	76.	3.0	230.	56.
S-01	30.0	0	138.600	.370	1.60	1.60	125.	90.	77.	3.0	230.	56.
W-12	32.5	1516	140.400	.460	2.00	2.00	125.	82.	78.	3.0	225.	56.
W-11	35.0	0	142.400	.460	2.10	2.10	125.	86.	79.	3.0	265.	56.
W-10	37.5	0	144.400	.520	2.20	2.20	125.	88.	80.	3.0	275.	56.
W-09	40.0	0	146.500	.540	2.35	2.35	125.	90.	80.	3.0	270.	56.
W-08	42.5	0	148.400	.540	2.35	2.35	125.	92.	81.	3.0	275.	56.
W-07	45.0	0	150.400	.540	2.35	2.35	125.	92.	82.	3.0	265.	56.
W-06	47.5	0	152.400	.550	2.40	2.40	125.	93.	83.	3.0	260.	56.
W-05	50.0	0	154.500	.550	2.40	2.40	125.	94.	83.	3.0	260.	56.
W-04	52.5	0	156.500	.540	2.35	2.35	125.	94.	84.	3.0	275.	57.
W-03	55.0	0	158.500	.520	2.20	2.20	125.	94.	84.	3.0	275.	57.
W-02	57.5	0	160.300	.430	1.85	1.85	125.	94.	84.	3.0	275.	58.
W-01	60.0	0	162.218	.430	1.85	1.85	125.	95.	84.	3.0	275.	58.
TOTALS	60.0		46.995									
AVERAGE					2.15	2.15	125.	87.	77.	3.0	235.	57.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST TEAM LEADER

CH-J1

TEST C-1 UNLOADING & DRYER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/15/77	11/15/77
TB	TIME-START	1440	1440
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.255 IN	6.5 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	2.15 IN-H2O	54.6 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	46.995 CU-FT	1.331 CU-M
TM	AVERAGE GAS METER TEMP	82.2 F	27.9 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	46.241 SCF	1.309 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	46.4	46.4
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	2.184 SCF	.062 SCM
BWO	PERCENT MOISTURE BY VOLUME	4.51	4.51
FMD	MOLE FRACTION DRY GAS	.955	.955
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.50	28.50
PB	BAROMETRIC PRESSURE	29.95 IN-HG	760.73 MM-HG
PSI	STATIC PRES OF STACK GAS	.24 IN-H2O	6.10 MM-H2O
PS	STACK PRES, ABS.	29.97 IN-HG	761.18 MM-HG
TS	AVERAGE STACK TEMP	125. F	52. C

VS	AVG STACK GAS VELOCITY	41.9	FPS	12.8	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	638716.	SCFH	18087.	SCMH
QS	ACTUAL STACK FLOW RATE	739791.	ACFH	20949.	ACMH
ISO	PERCENT ISOKINETIC	100.2		100.2	
MN	FILTERABLE PART. MG. EPA 5	107.2		107.2	
CS	FILTERABLE PART.	.036	GR/DSCF*	81.876	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.26	LB/HR	1.48	KG/HR
MN	TOTAL PART. MG. EPA 5	147.7		147.7	
CS	TOTAL PART.	.049	GR/DSCF*	112.809	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.50	LB/HR	2.04	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. C-1

UNLOADING & DRYER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 46.995 * 1.004 * (29.95 + 2.150 / 13.6)}{(82. + 460.)} = 46.241 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 46. = 2.16 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 2.16}{46.241 + 2.16} = 4.51 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 4.5}{100.} = .955$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(4.51/100)) + 18. * (4.51/100) = 28.50

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 408.414 / (SQRT(28.50 * 29.97) * 24. = 41.86 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 41.86 * 707. 3600/144 = 739791. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 739791. * 29.97 * (1. - (4.51/100))}{(125. + 460.)} = 638716. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(125.+460.))*((0.002669* 46.)+(46.995*1.004*(29.95+(2.150/13.6))/(82.+460.)))}{60. * 41.86 * 29.97 * .255 * .255} = 100.21 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 107.2 * 15.43 / 46.241 = .036 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .036 * 638716. / (15.43 * 453.6) = 3.26

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/16/77
SAMPLING LOCATION	UNLOADING & DRYER	RUN NUMBER	C-2
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5 FT. HEATED GLASS
OPERATOR	CB, JI	NOZZLE I.D.	.2550
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.10	SAMPLE BOX NUMBER	FMA
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000850	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	5.0 MINUTES	REFERENCE PRESS. DIFF.	.44

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	948	162.701									
E-12	5.0	0	166.295	.460	1.96	1.96	104.	68.	69.	1.5	250.	60.
E-11	10.0	0	170.045	.490	2.09	2.09	101.	74.	70.	2.0	250.	60.
E-10	15.0	0	173.910	.510	2.17	2.17	101.	80.	70.	2.5	250.	60.
E-09	20.0	0	177.840	.530	2.26	2.26	102.	86.	73.	2.5	250.	63.
E-08	25.0	0	181.815	.530	2.26	2.26	104.	88.	74.	2.5	250.	63.
E-07	30.0	0	185.760	.520	2.20	2.20	106.	90.	77.	2.5	250.	61.
E-06	35.0	0	189.770	.530	2.26	2.26	108.	93.	78.	2.5	250.	67.
E-05	40.0	0	193.920	.560	2.37	2.37	121.	96.	82.	2.5	250.	68.
E-04	45.0	0	198.125	.570	2.40	2.40	119.	98.	83.	2.5	250.	67.
E-03	50.0	0	202.350	.550	2.32	2.32	123.	100.	85.	3.0	250.	64.
E-02	55.0	0	206.510	.520	2.20	2.20	119.	100.	87.	3.5	250.	62.
E-01	60.0	1048	210.069	.380	1.60	1.60	120.	100.	88.	2.0	250.	64.
S-12	65.0	1102	213.010	.260	1.10	1.10	134.	90.	87.	1.0	250.	68.
S-11	70.0	0	215.815	.250	1.07	1.07	130.	95.	88.	1.0	250.	69.
S-10	75.0	0	218.630	.240	1.02	1.02	138.	100.	90.	1.0	250.	69.
S-09	80.0	0	221.370	.220	.91	.91	149.	102.	90.	1.0	250.	73.
S-08	85.0	0	223.930	.200	.90	.90	152.	103.	92.	1.0	250.	66.
S-07	90.0	0	228.240	.610	2.60	2.60	170.	108.	94.	4.0	250.	69.
S-06	95.0	0	232.800	.580	2.45	2.45	165.	112.	97.	4.0	250.	74.
S-05	100.0	0	237.480	.670	2.88	2.88	159.	113.	99.	4.0	250.	73.
S-04	105.0	0	241.705	.510	2.40	2.40	169.	114.	100.	4.0	250.	72.
S-03	110.0	0	246.200	.520	2.20	2.20	167.	116.	100.	4.0	250.	76.
S-02	115.0	0	250.030	.490	2.09	2.09	0.	116.	101.	4.0	250.	71.
S-01	120.0	0	253.844	.400	1.70	1.70	0.	116.	102.	4.0	250.	72.
TOTALS	120.0		91.143									
AVERAGE					1.98	1.98	119.	98.	87.	2.6	250.	67.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST TEAM LEADER

CB, JI

TEST C-2 UNLOADING & DRYER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/16/77	11/16/77
TB	TIME-START	948	948
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	120.0	120.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.255 IN	6.5 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.98 IN-H2O	50.2 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	91.143 CU-FT	2.581 CU-M
TM	AVERAGE GAS METER TEMP	92.4 F	33.5 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	88.435 SCF	2.504 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	27.0	27.0
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	1.271 SCF	.036 SCM
BWO	PERCENT MOISTURE BY VOLUME	1.42	1.42
FMD	MOLE FRACTION DRY GAS	.986	.986
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.84	28.84
PB	BAROMETRIC PRESSURE	30.10 IN-HG	764.54 MM-HG
PSI	STATIC PRES OF STACK GAS	.24 IN-H2O	6.10 MM-H2O
PS	STACK PRES, ABS.	30.12 IN-HG	764.99 MM-HG
TS	AVERAGE STACK TEMP	119. F	48. C

VS	AVG STACK GAS VELOCITY	39.4	FPS	12.0	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	629297.	SCFH	17820.	SCMH
QS	ACTUAL STACK FLOW RATE	695539.	ACFH	19696.	ACMH
ISO	PERCENT ISOKINETIC	97.3		97.3	
MN	FILTERABLE PART. MG. EPA 5	301.9		301.9	
CS	FILTERABLE PART.	.053	GR/DSCF*	120.568	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.74	LB/HR	2.15	KG/HR
MN	TOTAL PARTICULATE MG. EPA 5	303.2		303.2	
CS	TOTAL PARTICULATE	.053	GR/DSCF*	121.087	MG/DSCM
PMR	TOTAL PARTICULATE EMISSION RATE	4.76	LB/HR	2.16	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. C-2

UNLOADING & DRYER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 91.143 * 1.004 * (30.10 + 1.975 / 13.6)}{(92. + 460.)} = 88.435 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 27. = 1.27 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 1.27}{88.435 + 1.27} = 1.42 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.4}{100.} = .986$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.42/100)) + 18. * (1.42/100) = 28.84

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VM * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 887.708 / (SQRT(28.84 * 30.12) * 24. = 39.36 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 39.36 * 707. 3600/144 = 695539. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 695539. * 30.12 * (1. - (1.42/100))}{(119. + 460.)} = 629297.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(119.+460.))*((0.002669*27.)+(91.143*1.004*(30.10+(1.975/13.6))/(92.+460.)))}{###* 39.36 * 30.12 * .255 * .255} = 97.25\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 301.9 * 15.43 / 88.435 = .053 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .053 * 629297. / (15.43 * 453.6) = 4.74

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/16/77
SAMPLING LOCATION	UNLOADING & DRYER	RUN NUMBER	C-3
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5 FT. STAINLESS
OPERATOR	BD, JI	NOZZLE I.D.	.3750
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.10	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	AEH
FILTER NUMBER(S)	0000130	METER HEAD DIFF.	.270
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY 5.0 MINUTES		REFERENCE PRESS. DIFF.	.16

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	950	898.864									
S-01	5.0	0	911.600	.350	3.95	3.95	111.	80.	73.	4.0	230.	53.
S-02	10.0	0	925.000	.330	3.80	3.80	111.	82.	74.	4.0	230.	66.
S-03	15.0	0	937.300	.350	3.95	3.95	110.	87.	76.	4.5	260.	73.
S-04	20.0	0	953.700	.400	4.60	4.60	113.	90.	78.	4.5	258.	72.
S-05	25.0	0	970.000	.450	5.10	5.10	114.	95.	80.	5.0	260.	73.
S-06	30.0	0	985.100	.450	5.10	5.10	113.	97.	83.	5.0	259.	72.
S-07	35.0	0	1.000	.450	5.10	5.10	115.	100.	84.	5.0	260.	69.
S-08	40.0	0	17.200	.500	5.70	5.70	115.	102.	87.	6.0	260.	66.
S-09	45.0	0	34.000	.520	5.90	5.90	116.	103.	90.	6.0	260.	66.
S-10	50.0	0	50.000	.470	5.30	5.30	116.	105.	90.	6.0	260.	67.
S-11	55.0	0	65.800	.450	5.10	5.10	116.	104.	92.	6.0	260.	68.
S-12	60.0	0	81.100	.430	4.80	4.80	116.	104.	93.	6.0	260.	69.
W-01	65.0	1103	97.000	.420	4.60	4.60	116.	96.	94.	4.0	260.	68.
W-02	70.0	0	113.200	.430	4.80	4.80	116.	104.	97.	5.0	260.	67.
W-03	75.0	0	126.100	.430	4.80	4.80	118.	108.	98.	5.0	260.	64.
W-04	80.0	0	142.400	.470	5.30	5.30	117.	111.	98.	5.0	260.	64.
W-05	85.0	0	158.600	.480	5.40	5.40	117.	111.	99.	5.0	260.	61.
W-06	90.0	0	175.200	.480	5.40	5.40	116.	112.	100.	5.0	260.	62.
W-07	95.0	0	191.600	.470	5.30	5.30	118.	112.	102.	5.0	260.	63.
W-08	100.0	0	207.000	.480	5.40	5.40	118.	112.	103.	5.0	260.	64.
W-09	105.0	0	223.100	.480	5.40	5.40	118.	112.	104.	5.0	257.	64.
W-10	110.0	0	238.900	.460	5.20	5.20	118.	112.	103.	5.0	260.	64.
W-11	115.0	0	254.900	.450	5.10	5.10	119.	112.	102.	5.0	260.	65.
W-12	120.0	0	269.652	.380	4.40	4.40	118.	112.	104.	5.0	260.	66.
TOTALS	120.0		370.788									
AVERAGE					4.98	4.98	116.	103.	92.	5.0	257.	66.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST TEAM LEADER

BD, JI

TEST C-3 UNLOADING & DRYER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/16/77	11/16/77
TB	TIME-START	950	950
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	120.0	120.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.000	1.000
DN	SAMPLING NOZZLE DIAMETER	.375 IN	9.5 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	4.98 IN-H2O	126.5 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	370.788 CU-FT	10.500 CU-M
TM	AVERAGE GAS METER TEMP	97.2 F	36.2 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	357.811 SCF	10.132 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	32.0	32.0
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	1.506 SCF	.043 SCM
BWO	PERCENT MOISTURE BY VOLUME	.42	.42
FMD	MOLE FRACTION DRY GAS	.996	.996
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.95	28.95
PB	BAROMETRIC PRESSURE	30.10 IN-HG	764.54 MM-HG
PSI	STATIC PRES OF STACK GAS	.24 IN-H2O	6.10 MM-H2O
PS	STACK PRES, ABS.	30.12 IN-HG	764.99 MM-HG
TS	AVERAGE STACK TEMP	116. F	46. C

VS	AVG STACK GAS VELOCITY	38.7	FPS	11.8	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	628603.	SCFH	17800.	SCMH
QS	ACTUAL STACK FLOW RATE	683557.	ACFH	19356.	ACMH
ISO	PERCENT ISOKINETIC	182.2		182.2	
MN	FILTERABLE PART. MG. EPA 5	1039.7		1039.7	
CS	FILTERABLE PART.	.045	GR/DSCF*	102.624	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.03	LB/HR	1.83	KG/HR
MN	TOTAL PART. MG. EPA 5	1055.3		1055.3	
CS	TOTAL PART.	.046	GR/DSCF*	104.164	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.09	LB/HR	1.85	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. C-3

UNLOADING & DRYER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 370.788 * 1.000 * (30.10 + 4.979 / 13.6)}{(97. + 460.)} = 357.811 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 32. = 1.51 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 1.51}{357.811 + 1.51} = .42 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .4}{100.} = .996$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.42/100)) + 18. * (.42/100) = 28.95

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 381.754 / (SQRT(28.95 * 30.12) * 24. = 38.68 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 38.68 * 707. 3600/144 = 683557. ACFM

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 683557. * 30.12 * (1. - (.42/100))}{(116. + 460.)} = 628603. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*ON*DN)

$$ISO = \frac{(305.58*(116.+460.))*((0.002669* 32.)+(370.788*1.000*(30.10+(4.979/13.6))/(97.+460.)))}{\#\#\# * 38.68 * 30.12 * .375 * .375} = 182.15 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 1039.7 * 15.43 / 357.811 = .045 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .045 * 628603. / (15.43 * 453.6) = 4.03

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/16/77
SAMPLING LOCATION	UNLOADING & DRYER	RUN NUMBER	C-4
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5 FT. HEATED GLASS
OPERATOR	CB & JI	NOZZLE I.D.	.2550
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.10	SAMPLE BOX NUMBER	FMS
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	RAC
FILTER NUMBER(S)		METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	5.0 MINUTES	REFERENCE PRESS. DIFF.	.44

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1415	254.173									
E-01	5.0	0	258.640	.460	1.90	1.90	113.	76.	76.	1.0	250.	59.
E-02	10.0	0	262.750	.560	2.30	2.30	112.	83.	76.	1.0	250.	64.
E-03	15.0	0	267.025	.590	2.45	2.45	114.	89.	77.	1.5	250.	66.
E-04	20.0	0	271.540	.650	2.70	2.70	112.	93.	80.	2.0	250.	64.
E-05	25.0	0	276.120	.670	2.78	2.78	113.	97.	80.	2.0	250.	65.
E-06	30.0	0	280.750	.680	2.81	2.81	114.	99.	81.	2.0	250.	68.
E-07	35.0	0	285.150	.600	2.49	2.49	115.	100.	84.	2.0	250.	69.
E-08	40.0	0	289.735	.660	2.73	2.73	115.	101.	85.	2.0	250.	72.
E-09	45.0	0	294.196	.610	2.52	2.52	114.	102.	86.	2.0	250.	74.
E-10	50.0	0	298.545	.580	2.40	2.40	114.	104.	89.	2.0	250.	71.
E-11	55.0	0	302.248	.550	2.30	2.30	114.	104.	88.	2.0	250.	71.
E-12	60.0	0	307.315	.580	2.40	2.40	114.	105.	90.	2.0	250.	72.
E-01	65.0	0	310.564	.280	1.25	1.25	113.	94.	88.	1.0	250.	68.
E-02	70.0	0	313.745	.280	1.25	1.25	113.	98.	89.	1.0	250.	69.
E-03	75.0	0	316.935	.260	1.25	1.25	114.	100.	89.	1.0	250.	69.
E-04	80.0	0	320.755	.580	2.40	2.40	115.	102.	89.	2.0	250.	70.
E-05	85.0	0	325.034	.600	2.50	2.50	114.	102.	89.	2.0	250.	70.
E-06	90.0	0	329.625	.650	2.62	2.62	115.	106.	90.	2.0	250.	71.
E-07	95.0	0	333.985	.580	2.40	2.40	116.	106.	90.	2.0	250.	71.
E-08	100.0	0	338.375	.600	2.50	2.50	115.	106.	91.	2.0	250.	72.
E-09	105.0	0	342.745	.590	2.45	2.45	115.	108.	92.	2.0	250.	72.
E-10	110.0	0	347.065	.560	2.30	2.30	113.	108.	92.	2.0	250.	72.
E-11	115.0	0	351.335	.580	2.40	2.40	112.	108.	92.	2.0	250.	72.
E-12	120.0	0	355.738	.580	2.40	2.40	112.	108.	92.	2.0	250.	72.
TOTALS	120.0		101.565									
AVERAGE					2.31	2.31	114.	100.	86.	1.8	250.	69.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN — CB & JI

TEST C-4 UNLOADING & DRYER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/16/77		11/16/77	
TB	TIME-START	1415		1415	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	120.0		120.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.255	IN	6.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.31	IN-H2O	58.7	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	101.565	CU-FT	2.876	CU-M
TM	AVERAGE GAS METER TEMP	93.2	F	34.0	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	98.480	SCF	2.789	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	26.0		26.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	1.224	SCF	.035	SCM
BWO	PERCENT MOISTURE BY VOLUME	1.23		1.23	
FMD	MOLE FRACTION DRY GAS	.988		.988	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.86		28.86	
PB	BAROMETRIC PRESSURE	30.10	IN-HG	764.54	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H2O	6.10	MM-H2O
PS	STACK PRES, ABS.	30.12	IN-HG	764.99	MM-HG
TS	AVERAGE STACK TEMP	114.	F	45.	C

VS	AVG STACK GAS VELOCITY	43.2	FPS	13.2	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	699015.	SCFH	19794.	SCMH
QS	ACTUAL STACK FLOW RATE	763904.	ACFH	21631.	ACMH
ISO	PERCENT ISOKINETIC	97.5		97.5	
MN	FILTERABLE PART. MG. EPA 5	250.9		250.9	
CS	FILTERABLE PART.	.039	GR/DSCF*	89.981	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.93	LB/HR	1.78	KG/HR
MN	TOTAL PART. MG. EPA 5	254.7		254.7	
CS	TOTAL PART.	.040	GR/DSCF*	91.343	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	3.99	LB/HR	1.81	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. C-4

UNLOADING & DRYER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 101.565 * 1.004 * (30.10 + 2.313 / 13.6)}{(93. + 460.)} = 98.480 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 26. = 1.22 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 1.22}{98.480 + 1.22} = 1.23 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.2}{100.} = .988$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.23/100)) + 18. * (1.23/100) = 28.86

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 425.970 / (SQRT(28.86 * 30.12) * 24. = 43.23 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 43.23 * 707. 3600/144 = 763904. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 763904. * 30.12 * (1. - (1.23/100))}{(114. + 460.)} = 699015. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(114.+460.))*((0.002669* 26.)+(101.565*1.004*(30.10+(2.313/13.6))/(93.+460.)))}{### * 43.23 * 30.12 * .255 * .255} = 97.50 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 250.9 * 15.43 / 98.480 = .039 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .039 * 699015. / (15.43 * 453.6) = 3.93

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/16/77
SAMPLING LOCATION	UNLOADING & DRYER	RUN NUMBER	C-5
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5 FT. S.S.
OPERATOR	BD & JI	NOZZLE I.D.	.3750
AMBIENT TEMP.(DEG.F)	65.	ASSUMED MOISTURE	2.00
BAR.PRESS.(IN.HG)	30.10	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER,	AER
FILTER NUMBER(S)	0000116	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	5.0 MINUTES	REFERENCE PRESS. DIFF.	.31

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1406	269.895									
S-12	5.0	0	289.100	.520	2.90	2.90	113.	80.	79.	8.0	255.	58.
S-11	10.0	0	312.800	.530	2.95	2.95	113.	95.	84.	8.0	252.	64.
S-10	15.0	0	337.500	.550	3.00	3.00	113.	102.	84.	10.0	260.	66.
S-09	20.0	0	362.000	.550	3.00	3.00	113.	106.	86.	10.0	260.	62.
S-08	25.0	0	386.800	.560	3.05	3.05	112.	111.	92.	10.0	247.	58.
S-07	30.0	0	409.600	.420	2.35	2.35	114.	111.	91.	8.0	247.	55.
S-06	35.0	0	446.300	.550	3.00	3.00	115.	108.	92.	8.0	247.	56.
S-05	40.0	0	470.800	.550	3.00	3.00	115.	103.	94.	10.0	250.	54.
S-04	45.0	0	495.700	.550	3.00	3.00	114.	111.	93.	10.0	250.	55.
S-03	50.0	0	519.700	.490	2.73	2.73	114.	114.	95.	11.0	251.	59.
S-02	55.0	0	543.300	.450	2.58	2.58	113.	115.	96.	11.0	251.	59.
S-01	60.0	0	566.130	.400	2.25	2.25	111.	113.	97.	11.0	251.	56.
E-12	65.0	0	589.600	.500	2.78	2.78	113.	96.	94.	12.0	235.	57.
E-11	70.0	0	613.900	.510	2.80	2.80	113.	107.	94.	12.0	254.	59.
E-10	75.0	0	639.100	.550	3.00	3.00	113.	113.	95.	12.0	250.	60.
E-09	80.0	0	664.200	.580	3.20	3.00	114.	117.	97.	13.0	251.	61.
E-08	85.0	0	689.000	.560	3.05	3.05	115.	117.	98.	13.0	252.	62.
E-07	90.0	0	714.700	.520	2.90	2.90	115.	118.	99.	13.0	250.	62.
E-06	95.0	0	737.900	.490	2.70	2.70	115.	118.	100.	13.0	248.	63.
E-05	100.0	0	763.000	.550	3.00	3.00	116.	117.	100.	13.0	253.	63.
E-04	105.0	0	788.600	.550	3.00	3.00	115.	119.	101.	13.0	249.	64.
E-03	110.0	0	812.700	.500	2.78	2.78	114.	120.	101.	13.0	249.	64.
E-02	115.0	0	837.600	.520	2.90	2.90	113.	118.	102.	13.0	249.	64.
E-01	120.0	0	862.784	.530	2.98	2.98	112.	118.	102.	13.0	249.	64.
TOTALS	120.0		592.889									
AVERAGE					2.87	2.86	114.	110.	94.	11.2	250.	60.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS | TEST TEAM LEADER

WESTSIDE GIN | BD & JI

TEST C-5 UNLOADING & DRYER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/16/77		11/16/77	
TB	TIME-START	1406		1406	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	120.0		120.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NUZZLE DIAMETER	.375	IN	9.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.86	IN-H2O	72.7	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	592.889	CU-FT	16.789	CU-M
TM	AVERAGE GAS METER TEMP	102.4	F	39.1	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	564.029	SCF	15.971	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	14.0		14.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.659	SCF	.019	SCM
BWO	PERCENT MOISTURE BY VOLUME	.12		.12	
FMD	MOLE FRACTION DRY GAS	.999		.999	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.99		28.99	
PB	BAROMETRIC PRESSURE	30.10	IN-HG	764.54	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H2O	6.10	MM-H2O
PS	STACK PRES, ABS.	30.12	IN-HG	764.99	MM-HG
TS	AVERAGE STACK TEMP	114.	F	45.	C

VS	AVG STACK GAS VELOCITY	41.9	FPS	12.8	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	685929.	SCFH	19423.	SCMH
QS	ACTUAL STACK FLOW RATE	741105.	ACFH	20986.	ACMH
ISO	PERCENT ISOKINETIC	263.1		263.1	
MN	FILTERABLE PART. MG. EPA 5	1730.1		1730.1	
CS	FILTERABLE PART.	.047	GR/DSCF*	108.334	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.64	LB/HR	2.10	KG/HR
MN	TOTAL PART. MG. EPA 5	1740.8		1740.8	
CS	TOTAL PART.	.048	GR/DSCF*	109.004	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.67	LB/HR	2.12	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. C-5

UNLOADING & DRYER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 592.889 * 1.000 * (30.10 + 2.862 / 13.6)}{(102. + 460.)} = 564.029 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 14. = .66 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .66}{564.029 + .66} = .12 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .1}{100.} = .999$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.12/100)) + 18. * (.12/100) = 28.99

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 414.131 / (SQRT(28.99 * 30.12) * 24. = 41.94 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 41.94 * 707. 3600/144 = 741105. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 741105. * 30.12 * (1. - (.12/100))}{(114. + 460.)} = 685929. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(P8+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*ON)

$$ISO = \frac{(305.58*(114.+460.))*((0.002669* 14.)+(592.889*1.000*(30.10+(2.862/13.6))/(102.+460.)))}{\#\#\# * 41.94 * 30.12 * .375 * .375} = 263.13 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 1730.1 * 15.43 / 564.029 = .047 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .047 * 685929. / (15.43 * 453.6) = 4.64

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/22/77
SAMPLING LOCATION	UNLOADING & DRYER	RUN NUMBER	C-6
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' STAINLESS HEATED
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.5000
AMBIENT TEMP.(DEG.F)	55.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.10	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.24	METER BOX NUMBER	AER
FILTER NUMBER(S)	0000102	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	30.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.72

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	816	223.681									
E-12	2.5	0	232.400	.650	1.68	1.68	101.	58.	55.	9.0	250.	55.
E-11	5.0	0	241.800	.650	1.68	1.68	103.	61.	55.	10.0	250.	56.
E-10	7.5	0	251.300	.650	1.68	1.68	103.	70.	56.	9.0	253.	59.
E-09	10.0	0	260.900	.700	1.81	1.81	102.	75.	58.	9.0	253.	63.
E-08	12.5	0	270.100	.600	1.55	1.55	103.	77.	60.	8.5	253.	61.
E-07	15.0	0	279.400	.600	1.55	1.55	103.	78.	60.	7.5	250.	61.
E-06	17.5	0	288.300	.600	1.55	1.55	104.	78.	61.	7.0	254.	61.
E-05	20.0	0	297.600	.600	1.55	1.55	104.	78.	62.	7.0	255.	62.
E-04	22.5	0	306.600	.600	1.55	1.55	104.	78.	63.	7.0	252.	63.
E-03	25.0	0	315.200	.520	1.35	1.35	104.	78.	63.	7.0	253.	62.
E-02	27.5	0	323.200	.400	1.05	1.05	103.	78.	64.	6.5	252.	62.
E-01	30.0	840	330.403	.340	.89	.89	102.	76.	64.	5.0	253.	61.
S-12	32.5	0	340.300	.780	2.00	2.00	103.	68.	63.	9.0	252.	59.
S-11	35.0	0	350.700	.800	2.05	2.05	104.	72.	64.	9.0	252.	56.
S-10	37.5	0	360.900	.800	2.05	2.05	105.	67.	64.	9.0	253.	57.
S-09	40.0	0	371.300	.800	2.05	2.05	105.	80.	65.	9.0	252.	55.
S-08	42.5	0	381.400	.750	1.95	1.95	105.	82.	66.	8.5	253.	55.
S-07	45.0	0	391.300	.700	1.81	1.81	105.	83.	67.	8.0	253.	55.
S-06	47.5	0	400.700	.650	1.68	1.68	105.	84.	68.	8.0	253.	57.
S-05	50.0	0	409.900	.580	1.50	1.50	105.	84.	68.	8.0	254.	58.
S-04	52.5	0	418.600	.550	1.41	1.41	105.	83.	68.	8.0	254.	57.
S-03	55.0	0	427.200	.500	1.30	1.30	104.	83.	68.	6.0	254.	58.
S-02	57.5	0	435.200	.460	1.20	1.20	104.	82.	66.	6.0	253.	57.
S-01	60.0	914	442.640	.350	.92	.92	103.	80.	69.	4.5	254.	57.
TOTALS	60.0		218.959									
AVERAGE					1.58	1.58	104.	76.	63.	7.7	253.	59.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST TEAM LEADER

C. BRUFFEY

TEST C-6 UNLOADING & DRYER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/22/77		11/22/77	
TB	TIME-START	816		816	
TF	TIME-FINISH	914		914	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.58	IN-H2O	40.0	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	218.959	CU-FT	6.200	CU-M
TM	AVERAGE GAS METER TEMP	69.8	F	21.0	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	220.413	SCF	6.241	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	37.4		37.4	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	1.760	SCF	.050	SCM
BWO	PERCENT MOISTURE BY VOLUME	.79		.79	
FMD	MOLE FRACTION DRY GAS	.992		.992	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.91		28.91	
PB	BAROMETRIC PRESSURE	30.10	IN-HG	764.54	MM-HG
PSI	STATIC PRES OF STACK GAS	.24	IN-H2O	6.10	MM-H2O
PS	STACK PRES, ABS.	30.12	IN-HG	764.99	MM-HG
TS	AVERAGE STACK TEMP	104.	F	40.	C

VS	AVG STACK GAS VELOCITY	44.8	FPS	13.7	MPS
AS	STACK AREA	707.	SQ-IN	.456	SQ-M
QSSTD	STACK FLOW RATE, DRY*	741121.	SCFH	20986.	SCMH
QS	ACTUAL STACK FLOW RATE	792196.	ACFH	22433.	ACMH
ISO	PERCENT ISOKINETIC	107.1		107.1	
MN	FILTERABLE PART. MG. EPA 5	1317.4		1317.4	
CS	FILTERABLE PART.	.092	GR/DSCF*	211.094	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	9.77	LB/HR	4.43	KG/HR
MN	TOTAL PART. MG. EPA 5	1335.5		1335.5	
CS	TOTAL PART.	.093	GR/DSCF*	213.994	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	9.90	LB/HR	4.49	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. C-6

UNLOADING & DRYER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 218.959 * 1.000 * (30.10 + 1.575 / 13.6)}{(70. + 460.)} = 220.413 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 37. = 1.76 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 1.76}{220.413 + 1.76} = .79 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .8}{100.} = .992$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.79/100)) + 18. * (.79/100) = 28.91

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/19/77
SAMPLING LOCATION	UNLOADING	RUN NUMBER	D-1
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' STAINLESS
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.6250
AMBIENT TEMP.(DEG.F)	40.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.86	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.04	METER BOX NUMBER,	AER
FILTER NUMBER(S)	0000110	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	27.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.30

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	754	344.854									
E-12	2.5	0	351.800	.130	.81	.81	58.	43.	43.	5.0	246.	44.
E-11	5.0	0	359.100	.170	1.05	1.05	61.	49.	44.	5.0	242.	54.
E-10	7.5	0	367.200	.200	1.22	1.22	61.	53.	44.	6.0	240.	57.
E-09	10.0	0	375.700	.230	1.40	1.40	66.	59.	45.	7.0	242.	59.
E-08	12.5	0	383.900	.200	1.22	1.22	66.	63.	46.	7.0	242.	60.
E-07	15.0	0	391.600	.160	.99	.99	60.	66.	48.	5.0	253.	60.
E-06	17.5	0	399.700	.200	1.22	1.22	65.	67.	48.	6.0	258.	62.
E-05	20.0	0	408.600	.250	1.52	1.52	67.	69.	49.	8.0	255.	62.
E-04	22.5	0	417.500	.250	1.52	1.52	63.	71.	51.	9.0	247.	48.
E-03	25.0	0	425.900	.200	1.22	1.22	65.	73.	52.	8.0	241.	49.
E-02	27.5	0	434.700	.260	1.58	1.58	68.	74.	53.	8.5	254.	50.
E-01	30.0	822	442.701	.170	1.05	1.05	69.	75.	54.	6.0	264.	51.
W-12	32.5	0	450.300	.160	.99	.99	67.	59.	54.	5.0	255.	49.
W-11	35.0	0	458.000	.170	1.05	1.05	64.	61.	54.	6.0	254.	48.
W-10	37.5	0	465.200	.150	.93	.93	69.	65.	55.	5.0	254.	51.
W-09	40.0	0	472.900	.170	1.05	1.05	68.	68.	56.	6.0	252.	53.
W-08	42.5	0	481.100	.200	1.22	1.22	67.	71.	56.	7.0	254.	54.
W-07	45.0	0	489.100	.180	1.10	1.10	68.	75.	58.	6.0	253.	56.
W-06	47.5	0	498.100	.270	1.60	1.60	71.	76.	59.	9.0	255.	57.
W-05	50.0	0	507.900	.300	1.84	1.84	72.	80.	60.	10.0	255.	57.
W-04	52.5	0	518.100	.330	2.00	2.00	71.	83.	62.	10.5	254.	53.
W-03	55.0	0	527.200	.250	1.52	1.52	72.	86.	64.	8.0	256.	52.
W-02	57.5	0	536.400	.270	1.62	1.62	70.	86.	65.	7.0	253.	51.
W-01	60.0	903	543.910	.150	.93	.93	77.	86.	66.	5.0	258.	52.
TOTALS	60.0		199.056									
AVERAGE					1.28	1.28	67.	69.	54.	6.9	252.	54.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — C. BRUFFEY

TEST D-1 UNLOADING

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/19/77	11/19/77
TB	TIME-START	754	754
TF	TIME-FINISH	903	903
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.000	1.000
DN	SAMPLING NOZZLE DIAMETER	.625 IN	15.9 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.28 IN-H2O	32.4 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	199.056 CU-FT	5.637 CU-M
TM	AVERAGE GAS METER TEMP	61.3 F	16.3 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	201.864 SCF	5.716 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	.0	.0
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.000 SCF	.000 SCM
BWO	PERCENT MOISTURE BY VOLUME	.00	.00
FMD	MOLE FRACTION DRY GAS	1.000	1.000
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	29.00	29.00
PB	BAROMETRIC PRESSURE	29.86 IN-HG	758.44 MM-HG
PSI	STATIC PRES OF STACK GAS	.04 IN-H2O	1.02 MM-H2O
PS	STACK PRES, ABS.	29.86 IN-HG	758.52 MM-HG
TS	AVERAGE STACK TEMP	67. F	19. C

VS	AVG STACK GAS VELOCITY	25.4	FPS	7.8	MPS
AS	STACK AREA	573.	SQ-IN	.369	SQ-M
QSSTD	STACK FLOW RATE, DRY*	364192.	SCFH	10313.	SCMH
QS	ACTUAL STACK FLOW RATE	364050.	ACFH	10309.	ACMH
ISO	PERCENT ISOKINETIC	103.4		103.4	
MN	FILTERABLE PART. MG. EPA 5	1512.8		1512.8	
CS	FILTERABLE PART.	.116	GR/DSCF*	264.678	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	6.02	LB/HR	2.73	KG/HR
MN	TOTAL PART. MG. EPA 5	1529.4		1529.4	
CS	TOTAL PART.	.117	GR/DSCF*	267.583	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	6.08	LB/HR	2.76	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. D-1

UNLOADING

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 199.056 * 1.000 * (29.86 + 1.277 / 13.6)}{(61. + 460.)} = 201.864 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .00 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .00}{201.864 + .00} = .00 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.00/100)) + 18. * (.00/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 250.141 / (SQRT(29.00 * 29.86) * 24. = 25.43 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 25.43 * 573. 3600/144 = 364050. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 364050. * 29.86 * (1. - (.00/100))}{(67. + 460.)} = 364192. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(67.+460.))*((0.002669* 0.)+(199.056*1.000*(29.86+(1.277/13.6))/(61.+460.)))}{60. * 25.43 * 29.86 * .625 * .625} = 103.44 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 1512.8 * 15.43 / 201.864 = .116 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .116 * 364192. / (15.43 * 453.6) = 6.02

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/19/77
SAMPLING LOCATION	UNLOADING	RUN NUMBER	D-2
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	6' GLASS LINED
OPERATOR	J.I.	NOZZLE I.D.	.3112
AMBIENT TEMP.(DEG.F)	42.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.80	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.04	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000776	METER HEAD DIFF.	1.920
STACK INSIDE DIM.(IN)	27.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.18

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O) DESIRED	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O) ACTUAL	STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F) INLET	DRY GAS METER TEMP (DEG.F) OUTLET	PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
INIT	0	754	712.191									
N-01	2.5	0	.000	.150	1.60	1.60	61.	60.	47.	2.5	250.	55.
N-02	5.0	0	716.095	.300	3.10	3.10	61.	60.	47.	2.5	250.	55.
N-03	7.5	0	718.075	.250	2.50	2.50	60.	61.	48.	2.5	250.	55.
N-04	10.0	0	720.185	.250	2.50	2.50	60.	62.	48.	2.5	250.	55.
N-05	12.5	0	722.265	.350	2.50	2.50	62.	64.	50.	2.5	250.	55.
N-06	15.0	0	724.305	.200	2.00	2.00	62.	66.	50.	2.5	250.	55.
N-07	17.5	0	726.295	.200	2.00	2.00	65.	66.	50.	2.5	250.	55.
N-08	20.0	0	727.880	.100	1.05	1.05	64.	68.	52.	2.5	250.	56.
N-09	22.5	0	729.325	.100	1.05	1.05	67.	69.	52.	1.5	250.	56.
N-10	25.0	0	730.820	.100	1.05	1.05	65.	70.	54.	1.5	230.	56.
N-11	27.5	0	732.180	.100	1.05	1.05	51.	71.	55.	1.4	250.	56.
N-12	30.0	0	733.569	.100	1.05	1.05	51.	72.	56.	1.4	250.	56.
E-01	32.5	0	735.234	.150	1.58	1.58	65.	72.	60.	1.5	250.	56.
E-02	35.0	0	737.136	.150	1.58	1.58	65.	72.	60.	1.5	250.	58.
E-03	37.5	0	739.225	.250	2.50	2.50	55.	76.	61.	2.5	250.	58.
E-04	40.0	0	740.445	.250	2.50	2.50	55.	78.	61.	2.5	250.	58.
E-05	42.5	0	742.533	.250	2.50	2.50	70.	80.	62.	2.5	250.	58.
E-06	45.0	0	744.098	.150	1.58	1.58	70.	80.	63.	2.0	250.	58.
E-07	47.5	0	745.970	.100	1.05	1.05	60.	78.	64.	1.5	250.	58.
E-08	50.0	0	748.005	.150	1.58	1.58	70.	78.	64.	1.5	250.	58.
E-09	52.5	0	750.195	.150	1.58	1.58	72.	78.	64.	2.0	250.	58.
E-10	55.0	0	752.030	.100	1.05	1.05	64.	78.	64.	1.5	250.	58.
E-11	57.5	0	754.150	.100	1.05	1.05	52.	78.	64.	1.5	250.	58.
E-12	60.0	903	756.985	.150	1.58	1.58	52.	79.	64.	.0	0.	0.
TOTALS	60.0		44.794									
AVERAGE					1.73	1.73	62.	72.	57.	1.9	239.	54.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS: WESTSIDE GIN

TEST LEADER: J.I.

TEST D-2 UNLOADING

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/19/77	11/19/77
TB	TIME-START	754	754
TF	TIME-FINISH	903	903
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.311 IN	7.9 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.73 IN-H2O	44.0 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	44.794 CU-FT	1.268 CU-M
TM	AVERAGE GAS METER TEMP	64.1 F	17.8 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	45.328 SCF	1.284 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	.0	.0
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.000 SCF	.000 SCM
BWO	PERCENT MOISTURE BY VOLUME	.00	.00
FMO	MOLE FRACTION DRY GAS	1.000	1.000
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	29.00	29.00
PB	BAROMETRIC PRESSURE	29.80 IN-HG	756.92 MM-HG
PSI	STATIC PRES OF STACK GAS	.04 IN-H2O	1.02 MM-H2O
PS	STACK PRES, ABS.	29.80 IN-HG	756.99 MM-HG
TS	AVERAGE STACK TEMP	62. F	16. C

VS	AVG STACK GAS VELOCITY	22.7	FPS	6.9	MPS
AS	STACK AREA	573.	SQ-IN	.369	SQ-M
QSSTD	STACK FLOW RATE, DRY*	327989.	SCFH	9288.	SCMH
QS	ACTUAL STACK FLOW RATE	325247.	ACFH	9210.	ACMH
ISO	PERCENT ISOKINETIC	104.0		104.0	
MN	FILTERABLE PART. MG. EPA 5	345.0		345.0	
CS	FILTERABLE PART.	.117	GR/DSCF*	268.811	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	5.50	LB/HR	2.50	KG/HR
MN	TOTAL PART. MG. EPA 5	350.2		350.2	
CS	TOTAL PART.	.119	GR/DSCF*	272.863	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	5.59	LB/HR	2.53	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. D-2

UNLOADING

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 44.794 * 1.004 * (29.80 + 1.733 / 13.6)}{(64. + 460.)} = 45.328 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .00 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .00}{45.328 + .00} = .00 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.00/100)) + 18. * (.00/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 223.255 / (SQRT(29.00 * 29.80) * 24. = 22.72 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 22.72 * 573. 3600/144 = 325247. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 325247. * 29.80 * (1. - (.00/100))}{(62. + 460.)} = 327989. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(62.+460.))*((0.002669* 0.)+(44.794*1.004*(29.80+(1.733/13.6))/(64.+460.)))}{60. * 22.72 * 29.80 * .311 * .311} = 104.03 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 345.0 * 15.43 / 45.328 = .117 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .117 * 327989. / (15.43 * 453.6) = 5.50

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/19/77
SAMPLING LOCATION	UNLOADING	RUN NUMBER	D-3
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED STAINLESS
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.6250
AMBIENT TEMP.(DEG.F)	55.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.80	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.04	METER BOX NUMBER	AER
FILTER NUMBER(S)	0000109	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	27.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		REFERENCE PRESS. DIFF.	.30

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	950	545.428									
N-12	2.5	0	553.100	.220	1.31	1.31	72.	62.	64.	6.0	252.	62.
N-11	5.0	0	561.600	.230	1.40	1.40	75.	63.	64.	7.0	264.	52.
N-10	7.5	0	569.600	.180	1.11	1.11	70.	66.	64.	6.0	258.	61.
N-09	10.0	0	577.700	.200	1.23	1.23	69.	68.	64.	6.0	254.	63.
N-08	12.5	0	586.200	.220	1.31	1.31	72.	70.	64.	7.0	255.	63.
N-07	15.0	0	594.900	.230	1.40	1.40	73.	71.	65.	8.0	256.	62.
N-06	17.5	0	604.600	.320	1.95	1.95	74.	75.	65.	10.0	257.	61.
N-05	20.0	0	614.600	.300	1.84	1.84	75.	80.	66.	10.0	257.	61.
N-04	22.5	0	624.500	.300	1.84	1.84	73.	81.	67.	10.0	257.	60.
N-03	25.0	0	634.000	.270	1.62	1.62	76.	82.	68.	8.5	257.	60.
N-02	27.5	0	645.100	.420	2.55	2.40	75.	82.	69.	12.0	252.	60.
N-01	30.0	1020	653.165	.180	1.11	1.11	75.	82.	70.	5.0	257.	60.
E-12	32.5	1031	660.500	.150	.93	.93	70.	67.	68.	5.0	257.	61.
E-11	35.0	0	667.400	.160	.98	.98	72.	68.	67.	5.0	256.	56.
E-10	37.5	0	674.500	.150	.93	.93	69.	69.	68.	5.0	256.	59.
E-09	40.0	0	681.700	.160	.98	.98	73.	72.	68.	5.0	256.	61.
E-08	42.5	0	689.800	.200	1.23	1.23	73.	73.	69.	7.0	253.	60.
E-07	45.0	0	696.800	.140	.86	.86	69.	74.	68.	4.0	254.	62.
E-06	47.5	0	705.100	.250	1.52	1.52	75.	75.	69.	8.0	253.	62.
E-05	50.0	0	716.100	.480	2.90	2.40	74.	74.	68.	13.0	254.	62.
E-04	52.5	0	725.200	.250	1.52	1.52	73.	79.	70.	7.0	254.	63.
E-03	55.0	0	733.800	.220	1.31	1.31	76.	79.	70.	6.5	253.	60.
E-02	57.5	0	741.700	.180	1.11	1.11	72.	78.	70.	6.0	256.	61.
E-01	60.0	1101	749.165	.150	.93	.93	67.	76.	71.	4.5	254.	61.
TOTALS	60.0		203.757									
AVERAGE					1.41	1.38	73.	74.	67.	7.1	256.	61.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — C. BRUFFEY

TEST D-3 UNLOADING

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/19/77	11/19/77
TB	TIME-START	950	950
TF	TIME-FINISH	1101	1101
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.000	1.000
DN	SAMPLING NOZZLE DIAMETER	.6250 IN	15.9 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.38 IN-H2O	35.2 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	203.757 CU-FT	5.770 CU-M
TM	AVERAGE GAS METER TEMP	70.5 F	21.4 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	202.723 SCF	5.740 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	0.	0.
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.000 SCF	.000 SCM
BWO	PERCENT MOISTURE BY VOLUME	.00	.00
FMD	MOLE FRACTION DRY GAS	1.000	1.000
PCO2	PERCENT CO2 BY VOL., DRY	.00	.00
PO2	PERCENT O2 BY VOL., DRY	.00	.00
PCO	PERCENT CO BY VOL., DRY	.00	.00
PN2	PERCENT N2 BY VOL., DRY	.00	.00
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	29.00	29.00

PB	BAROMETRIC PRESSURE	29.80	IN-HG	756.92	MM-HG
PSI	STATIC PRES OF STACK GAS	.04	IN-H2O	1.02	MM-H2O
PS	STACK PRES, ABS.	29.80	IN-HG	756.99	MM-HG
TS	AVERAGE STACK TEMP	73.	F	23.	C
VS	AVG STACK GAS VELOCITY	26.8	FPS	8.2	MPS
AS	STACK AREA	573.	SQ-IN	.369	SQ-M
QSSTD	STACK FLOW RATE, DRY*	378348.	SCFH	10714.	SCMH
QS	ACTUAL STACK FLOW RATE	383068.	ACFH	10847.	ACMH
ISO	PERCENT ISOKENTIC	100.0		100.0	
MN	FILTERABLE PART. MG. EPA 5	1397.5		1397.5	
CS	FILTERABLE PART.	.106	GR/DSCF*	243.469	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	5.75	LB/HR	2.61	KG/HR
MN	TOTAL PART. MG. EPA 5	1408.9		1408.9	
CS	TOTAL PART.	.107	GR/DSCF*	245.455	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	5.80	LB/HR	2.63	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. D-3

UNLOADING

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 203.757 * 1.000 * (29.80 + 1.384 / 13.6)}{(70. + 460.)} = 202.723 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .00 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .00}{202.723 + .00} = .00 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.00/100)) + 18. * (.00/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 262.944 / (SQRT(29.00 * 29.80) * 24. = 26.76 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 26.76 * 573. 3600/144 = 383068. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 383068. * 29.80 * (1. - (.00/100))}{(73. + 460.)} = 378348. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(73.+460.))*((0.002669* 0.)+(203.757*1.000*(29.80+(1.384/13.6))/(70.+460.)))}{60. * 26.76 * 29.80 * .625 * .625} = 100.00 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 1397.5 * 15.43 / 202.723 = .106 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .106 * 378348. / (15.43 * 453.6) = 5.75

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/19/77
SAMPLING LOCATION	UNLOADING	RUN NUMBER	D-4
SAMPLE TYPE	PARTICULATE		
OPERATOR	J. IVERSON	PROBE LENGTH & TYPE	6' GLASS LINED
AMBIENT TEMP.(DEG.F)	52.	NOZZLE I.D.	.3112
BAR.PRESS.(IN.HG)	29.80	ASSUMED MOISTURE	3.00
STATIC PRESS.(IN.H2O)	.04	SAMPLE BOX NUMBER	FM5
FILTER NUMBER(S)		METER BOX NUMBER	RAC
STACK INSIDE DIM.(IN)	27.00 .00	METER HEAD DIFF.	1.910
PITOT TUBE COEFF.	.84	C FACTOR	1.10
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.18

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	950	756.335									
N-01	2.5	0	757.625	.250	2.50	2.50	61.	50.	52.	1.4	250.	44.
N-02	5.0	0	759.445	.200	2.09	2.09	69.	56.	54.	2.0	250.	44.
N-03	7.5	0	761.255	.200	2.09	2.09	70.	60.	54.	2.0	250.	44.
N-04	10.0	0	763.495	.300	3.00	3.00	74.	66.	54.	2.5	250.	44.
N-05	12.5	0	765.745	.300	3.00	3.00	74.	68.	54.	2.5	250.	44.
N-06	15.0	0	767.670	.200	2.09	2.09	72.	71.	55.	2.0	250.	50.
N-07	17.5	0	769.423	.150	1.58	1.58	72.	72.	56.	2.0	250.	50.
N-08	20.0	0	771.295	.200	2.09	2.09	74.	72.	58.	2.0	250.	50.
N-09	22.5	0	773.048	.150	1.58	1.58	75.	72.	58.	2.0	250.	50.
N-10	25.0	0	774.950	.200	2.09	2.09	75.	72.	58.	2.0	250.	50.
N-11	27.5	0	776.860	.200	2.09	2.09	63.	73.	58.	2.0	250.	56.
N-12	30.0	0	778.774	.200	2.09	2.09	61.	74.	59.	2.0	250.	56.
E-01	32.5	0	782.540	.200	2.09	2.09	51.	62.	58.	4.5	250.	56.
E-02	35.0	0	784.635	.200	2.09	2.09	65.	68.	58.	3.5	250.	58.
E-03	37.5	0	786.755	.250	2.50	2.50	65.	70.	59.	2.5	250.	58.
E-04	40.0	0	788.865	.250	2.50	2.50	73.	72.	59.	2.5	250.	59.
E-05	42.5	0	791.139	.300	3.00	3.00	74.	74.	60.	2.5	250.	60.
E-06	45.0	0	793.145	.200	2.09	2.09	74.	75.	60.	2.0	250.	60.
E-07	47.5	0	795.355	.300	3.00	3.00	73.	75.	61.	2.5	250.	60.
E-08	50.0	0	797.330	.190	1.95	1.95	72.	76.	62.	2.5	250.	59.
E-09	52.5	0	799.075	.150	1.58	1.58	72.	76.	2.	2.0	250.	62.
E-10	55.0	0	800.765	.150	1.58	1.58	72.	76.	62.	2.0	250.	62.
E-11	57.5	0	802.478	.150	1.58	1.58	74.	76.	62.	2.0	250.	60.
E-12	60.0	1101	804.149	.150	1.58	1.58	72.	76.	62.	2.0	250.	60.
TOTALS	60.0		47.814									
AVERAGE					2.16	2.16	70.	70.	56.	2.3	250.	54.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN — J. IVERSON

TEST D-4 UNLOADING

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/19/77		11/19/77	
TB	TIME-START	950		950	
TF	TIME-FINISH	1101		1101	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.311	IN	7.9	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.16	IN-H2O	54.9	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	47.814	CU-FT	1.354	CU-M
TM	AVERAGE GAS METER TEMP	62.9	F	17.1	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	48.549	SCF	1.375	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	8.6		8.6	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.405	SCF	.011	SCM
BWO	PERCENT MOISTURE BY VOLUME	.83		.83	
FMD	MOLE FRACTION DRY GAS	.992		.992	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.91		28.91	
PB	BAROMETRIC PRESSURE	29.80	IN-HG	756.92	MM-HG
PSI	STATIC PRES OF STACK GAS	.04	IN-H2O	1.02	MM-H2O
PS	STACK PRES, ABS.	29.80	IN-HG	756.99	MM-HG
TS	AVERAGE STACK TEMP	70.	F	21.	C

VS	AVG STACK GAS VELOCITY	25.6	FPS	7.8	MPS
AS	STACK AREA	573.	SQ-IN	.369	SQ-M
QSSTD	STACK FLOW RATE, DRY*	361181.	SCFH	10228.	SCMH
QS	ACTUAL STACK FLOW RATE	366861.	ACFH	10388.	ACMH
ISO	PERCENT ISOKINETIC	101.2		101.2	
MN	FILTERABLE PART. MG. EPA 5	297.2		297.2	
CS	FILTERABLE PART.	.094	GR/DSCF*	216.205	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.87	LB/HR	2.21	KG/HR
MN	TOTAL PART. MG. EPA 5	306.1		306.1	
CS	TOTAL PART.	.097	GR/DSCF*	222.679	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	5.02	LB/HR	2.28	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. D-4

UNLOADING

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 47.814 * 1.004 * (29.80 + 2.160 / 13.6)}{(63. + 460.)} = 48.549 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 9. = .40 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .40}{48.549 + .40} = .83 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .8}{100.} = .992$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.83/100)) + 18. * (.83/100) = 28.91

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 251.424 / (SQRT(28.91 * 29.80) * 24. = 25.63 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 25.63 * 573. 3600/144 = 366861. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 366861. * 29.80 * (1. - (.83/100))}{(70. + 460.)} = 361181. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(70.+460.))*((0.002669* 9.)+(47.814*1.004*(29.80+(2.160/13.6))/(63.+460.)))}{60. * 25.63 * 29.80 * .311 * .311} = 101.18 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 297.2 * 15.43 / 48.549 = .094 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .094 * 361181. / (15.43 * 453.6) = 4.87

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/19/77
SAMPLING LOCATION	UNLOADING	RUN NUMBER	D-5
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED STAINLESS
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.6250
AMBIENT TEMP.(DEG.F)	60.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.85	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.04	METER BOX NUMBER	AER
FILTER NUMBER(S)	0000108	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	27.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.30

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1320	749.524									
E-12	2.5	0	757.200	.120	.73	.73	72.	72.	73.	6.0	258.	64.
E-11	5.0	0	764.400	.120	.73	.73	74.	73.	73.	4.0	258.	63.
E-10	7.5	0	771.300	.130	.83	.83	75.	76.	73.	4.0	258.	70.
E-09	10.0	0	779.100	.180	1.11	1.11	76.	77.	73.	6.0	258.	73.
E-08	12.5	0	786.200	.130	.83	.83	72.	79.	74.	4.0	257.	69.
E-07	15.0	0	793.400	.150	.93	.93	73.	79.	74.	5.0	256.	66.
E-06	17.5	0	800.900	.170	1.06	1.06	72.	81.	75.	5.0	259.	65.
E-05	20.0	0	809.300	.220	1.32	1.32	70.	84.	76.	6.5	259.	66.
E-04	22.5	0	817.600	.300	1.84	1.32	74.	86.	76.	7.0	258.	65.
E-03	25.0	0	825.900	.200	1.22	1.22	73.	88.	77.	7.0	258.	64.
E-02	27.5	0	834.100	.220	1.32	1.28	71.	88.	78.	7.0	257.	75.
E-01	30.0	1350	841.946	.170	1.06	1.06	70.	88.	78.	5.0	257.	67.
N-12	32.5	1535	850.100	.210	1.29	1.29	65.	58.	64.	7.0	257.	64.
N-11	35.0	0	858.300	.200	1.22	1.22	64.	61.	64.	7.0	255.	51.
N-10	37.5	0	866.200	.180	1.11	1.11	69.	65.	64.	6.0	255.	61.
N-09	40.0	0	874.400	.210	1.29	1.20	69.	69.	64.	7.0	254.	64.
N-08	42.5	0	882.300	.200	1.22	1.20	71.	72.	64.	7.0	251.	63.
N-07	45.0	0	890.200	.160	1.11	1.11	69.	74.	64.	7.0	250.	63.
N-06	47.5	0	898.200	.200	1.22	1.22	70.	76.	64.	7.0	251.	64.
N-05	50.0	0	906.400	.300	1.84	1.84	71.	75.	65.	7.0	251.	65.
N-04	52.5	0	914.400	.250	1.51	1.22	65.	75.	65.	7.0	253.	64.
N-03	55.0	0	922.300	.180	1.11	1.11	68.	76.	65.	7.0	254.	63.
N-02	57.5	0	929.700	.160	.97	.97	70.	77.	66.	7.0	255.	65.
N-01	60.0	0	9.365	.150	.93	.93	66.	76.	65.	7.0	253.	63.
TOTALS	60.0		259.841									
AVERAGE					1.16	1.12	70.	76.	70.	6.2	256.	65.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — C. BRUFFEY

TEST D-5 UNLOADING

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/19/77		11/19/77	
TB	TIME-START	1320		1320	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.625	IN	15.9	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.12	IN-H2O	28.4	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	259.841	CU-FT	7.358	CU-M
TM	AVERAGE GAS METER TEMP	72.9	F	22.7	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	257.602	SCF	7.294	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	.0		.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.000	SCF	.000	SCM
BWO	PERCENT MOISTURE BY VOLUME	.00		.00	
FMD	MOLE FRACTION DRY GAS	1.000		1.000	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	29.00		29.00	
PB	BAROMETRIC PRESSURE	29.65	IN-HG	758.19	MM-HG
PSI	STATIC PRES OF STACK GAS	.04	IN-H2O	1.02	MM-H2O
PS	STACK PRES, ABS.	29.65	IN-HG	758.26	MM-HG
TS	AVERAGE STACK TEMP	70.	F	21.	C

VS	AVG STACK GAS VELOCITY	24.2	FPS	7.4	MPS
AS	STACK AREA	573.	SQ-IN	.369	SQ-M
QSSTD	STACK FLOW RATE, DRY*	344629.	SCFH	9759.	SCMH
QS	ACTUAL STACK FLOW RATE	346899.	ACFH	9823.	ACMH
ISO	PERCENT ISOKINETIC	139.5		139.5	
MN	FILTERABLE PART. MG. EPA 5	1145.9		1145.9	
CS	FILTERABLE PART.	.069	GR/DSCF*	157.106	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.38	LB/HR	1.53	KG/HR
MN	TOTAL PART. MG. EPA 5	1151.5		1151.5	
CS	TOTAL PART.	.069	GR/DSCF*	157.874	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	3.40	LB/HR	1.54	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. 0-5

UNLOADING

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 259.841 * 1.000 * (29.85 + 1.118 / 13.6)}{(73. + 460.)} = 257.602 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .00 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .00}{257.602 + .00} = .00 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.00/100)) + 18. * (.00/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VM * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 238.317 / (SQRT(29.00 * 29.85) * 24. = 24.24 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 24.24 * 573. 3600/144 = 346899. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 346899. * 29.85 * (1. - (.00/100))}{(70. + 460.)} = 344629.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(70.+460.))*((0.002669* 0.)+(259.841*1.000*(29.85+(1.118/13.6))/(73.+460.)))}{60. * 24.24 * 29.85 * .625 * .625} = 139.50\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 1145.9 * 15.43 / 257.602 = .069 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .069 * 344629. / (15.43 * 453.6) = 3.38

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/19/77
SAMPLING LOCATION	UNLOADING	RUN NUMBER	D-6
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	6' GLASS TUBE
OPERATOR	J. IVERSON	NOZZLE I.D.	.3112
AMBIENT TEMP.(DEG.F)	60.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	29.00	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.04	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000923	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	27.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		REFERENCE PRESS. DIFF.	.18

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1320	804.872									
N-01	2.5	0	806.559	.100	1.58	1.58	74.	56.	58.	2.5	250.	58.
N-02	5.0	0	808.089	.100	1.05	1.05	75.	59.	58.	2.0	250.	58.
N-03	7.5	0	809.539	.100	1.05	1.05	75.	62.	58.	2.0	250.	58.
N-04	10.0	0	811.025	.100	1.05	1.05	75.	64.	58.	2.0	250.	58.
N-05	12.5	0	813.034	.250	2.50	2.50	73.	68.	59.	3.5	250.	58.
N-06	15.0	0	815.140	.250	2.50	2.50	75.	70.	60.	3.5	250.	58.
N-07	17.5	0	817.145	.020	2.09	2.09	74.	73.	61.	3.0	250.	58.
N-08	20.0	0	818.675	.100	1.05	1.05	74.	74.	61.	2.0	250.	58.
N-09	22.5	0	820.489	.190	1.95	1.95	70.	74.	62.	3.0	250.	59.
N-10	25.0	0	822.090	.090	1.01	1.01	70.	75.	63.	2.0	250.	59.
N-11	27.5	0	824.039	.200	2.09	2.09	69.	75.	63.	2.0	250.	60.
N-12	30.0	0	825.754	.150	1.58	1.58	69.	76.	64.	2.5	250.	60.
E-01	32.5	0	827.034	.075	1.57	1.57	69.	55.	53.	2.0	250.	60.
E-02	35.0	0	.000	.050	1.57	1.57	70.	56.	53.	2.5	250.	60.
E-03	37.5	0	830.285	.250	2.50	2.50	70.	59.	54.	2.5	250.	60.
E-04	40.0	0	832.189	.300	3.00	3.00	72.	63.	54.	4.0	250.	60.
E-05	42.5	0	834.345	.300	3.00	3.00	72.	64.	54.	4.0	250.	60.
E-06	45.0	0	836.462	.250	2.50	2.50	72.	66.	53.	4.0	250.	60.
E-07	47.5	0	838.072	.200	2.09	2.09	72.	68.	56.	3.5	250.	60.
E-08	50.0	0	840.389	.200	2.09	2.09	73.	68.	56.	3.0	250.	60.
E-09	52.5	0	842.132	.150	1.58	1.58	69.	69.	57.	3.0	250.	60.
E-10	55.0	0	843.889	.150	1.58	1.58	66.	69.	58.	2.5	250.	60.
E-11	57.5	0	845.574	.150	1.58	1.58	67.	69.	58.	3.0	250.	60.
E-12	60.0	1605	847.286	.150	1.58	1.58	65.	71.	59.	2.5	250.	60.
TOTALS	60.0		42.414									
AVERAGE					1.84	1.84	71.	67.	58.	2.8	250.	59.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST TEAM LEADER

J. IVERSON

TEST D-6 UNLOADING

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/19/77	11/19/77
TB	TIME-START	1320	1320
TF	TIME-FINISH	1605	1605
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.311 IN	7.9 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.84 IN-H2O	46.7 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	42.414 CU-FT	1.201 CU-M
TM	AVERAGE GAS METER TEMP	62.4 F	16.9 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	41.922 SCF	1.187 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	2.7	2.7
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.127 SCF	.004 SCM
BWO	PERCENT MOISTURE BY VOLUME	.30	.30
FMD	MOLE FRACTION DRY GAS	.997	.997
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.97	28.97
PB	BAROMETRIC PRESSURE	29.00 IN-HG	736.60 MM-HG
PSI	STATIC PRES OF STACK GAS	.04 IN-H2O	1.02 MM-H2O
PS	STACK PRES, ABS.	29.00 IN-HG	736.67 MM-HG
TS	AVERAGE STACK TEMP	71. F	22. C

VS	AVG STACK GAS VELOCITY	22.2	FPS	6.8	MPS
AS	STACK AREA	575.	SQ-IN	.369	SQ-M
QSSTD	STACK FLOW RATE, DRY*	305229.	SCFH	8643.	SCMH
QS	ACTUAL STACK FLOW RATE	317726.	ACFH	8997.	ACMH
ISO	PERCENT ISOKINETIC	103.4		103.4	
MN	FILTERABLE PART. MG. EPA 5	276.6		276.6	
CS	FILTERABLE PART.	.102	GR/DSCF*	233.026	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.44	LB/HR	2.01	KG/HR
MN	TOTAL PART. MG. EPA 5	280.6		280.6	
CS	TOTAL PART.	.103	GR/DSCF*	236.396	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.50	LB/HR	2.04	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. D-6

UNLOADING

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 42.414 * 1.004 * (29.00 + 1.839 / 13.6)}{(62. + 460.)} = 41.922 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 3. = .13 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .13}{41.922 + .13} = .30 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .3}{100.} = .997$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.30/100)) + 18. * (.30/100) = 28.97

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 215.022 / (SQRT(28.97 * 29.00) * 24. = 22.20 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 22.20 * 573. 3600/144 = 317726. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 317726. * 29.00 * (1. - (.30/100))}{(71. + 460.)} = 305229. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(71.+460.))*((0.002669* 3.)+(42.414*1.004*(29.00+[1.839/13.6))/(62.+460.)))}{60. * 22.20 * 29.00 * .311 * .311} = 103.39 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 276.6 * 15.43 / 41.922 = .102 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .102 * 305229. / (15.43 * 453.6) = 4.44

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/20/77
SAMPLING LOCATION	BASKET & CONDENSER	RUN NUMBER	E-1
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' STAINLESS(HEATED
OPERATOR	C. BRUFFEY	NUZZLE I.D.	.5000
AMBIENT TEMP.(DEG.F)	45.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.01	SAMPLE BOX NUMBER	AEH
STATIC PRESS.(IN.H2O)	.05	METER BOX NUMBER	AER
FILTER NUMBER(S)	0000107	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	20.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.73

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	835	939.708									
N-12	2.5	0	946.100	.550	1.40	.85	61.	42.	43.	4.0	269.	40.
N-11	5.0	0	952.700	.520	1.32	.80	62.	49.	43.	4.0	266.	36.
N-10	7.5	0	960.800	.480	1.23	1.23	62.	54.	44.	6.5	268.	42.
N-09	10.0	0	969.100	.500	1.29	1.29	62.	60.	45.	7.0	267.	46.
N-08	12.5	0	975.700	.550	1.40	1.40	62.	66.	46.	11.0	266.	49.
N-07	15.0	0	982.468	.600	1.52	.78	63.	65.	47.	15.0	265.	51.
N-06	17.5	0	991.400	.800	2.00	1.00	63.	53.	52.	15.0	268.	45.
N-05	20.0	0	997.700	.600	1.52	1.52	65.	51.	50.	15.0	256.	46.
N-04	22.5	0	6.900	.900	2.25	2.25	65.	54.	50.	8.0	269.	43.
N-03	25.0	0	16.800	.700	1.80	1.80	64.	64.	51.	11.0	267.	43.
N-02	27.5	0	26.400	.650	1.68	1.68	61.	73.	53.	8.0	265.	50.
N-01	30.0	946	34.602	.430	1.10	1.10	60.	77.	54.	6.0	266.	53.
E-12	32.5	955	42.300	.470	1.20	1.20	60.	58.	54.	5.0	260.	47.
E-11	35.0	0	50.100	.450	1.17	1.17	62.	60.	53.	6.0	263.	45.
E-10	37.5	0	57.100	.330	.86	.86	63.	64.	54.	7.8	263.	46.
E-09	40.0	0	64.000	.300	.77	.77	64.	66.	54.	6.0	264.	48.
E-08	42.5	0	71.800	.450	1.17	1.17	61.	68.	55.	7.0	265.	49.
E-07	45.0	0	80.900	.600	1.52	1.52	62.	74.	58.	6.0	264.	51.
E-06	47.5	0	91.800	1.000	2.50	2.40	63.	78.	58.	11.0	265.	51.
E-05	50.0	0	103.100	1.100	2.75	2.50	64.	83.	59.	11.0	265.	52.
E-04	52.5	0	114.400	1.050	2.60	2.50	62.	90.	62.	11.0	265.	52.
E-03	55.0	0	125.200	.850	2.17	2.17	61.	91.	64.	9.0	264.	53.
E-02	57.5	0	135.000	.700	1.80	1.80	60.	92.	66.	7.0	265.	53.
E-01	60.0	0	114.853	.700	1.80	1.80	60.	91.	67.	7.0	265.	53.
TOTALS	60.0		175.145									
AVERAGE					1.62	1.48	62.	68.	53.	8.5	265.	48.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — C. BRUFFEY

TEST E-1 BASKET & CONDENSER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/20/77		11/20/77	
TB	TIME-START	835		835	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.48	IN-H2O	37.6	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	175.145	CU-FT	4.960	CU-M
TM	AVERAGE GAS METER TEMP	60.5	F	15.8	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	178.873	SCF	5.065	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	.0		.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.000	SCF	.000	SCM
BWO	PERCENT MOISTURE BY VOLUME	.00		.00	
FMD	MOLE FRACTION DRY GAS	1.000		1.000	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	29.00		29.00	
PB	BAROMETRIC PRESSURE	30.01	IN-HG	762.25	MM-HG
PSI	STATIC PRES OF STACK GAS	.05	IN-H2O	1.27	MM-H2O
PS	STACK PRES, ABS.	30.01	IN-HG	762.35	MM-HG
TS	AVERAGE STACK TEMP	62.	F	17.	C

VS	AVG STACK GAS VELOCITY	43.6	FPS	13.3	MPS
AS	STACK AREA	514.	SQ-IN	.203	SQ-M
QSSTD	STACK FLOW RATE, DRY*	346803.	SCFH	9877.	SCMH
QS	ACTUAL STACK FLOW RATE	343815.	ACFH	9736.	ACMH
ISO	PERCENT ISOKINETIC	82.1		82.1	
MN	FILTERABLE PART. MG. EPA 5	75.5		75.5	
CS	FILTERABLE PART.	.007	GR/DSCF*	14.907	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	.32	LB/HR	.15	KG/HR
MN	TOTAL PART. MG. EPA 5	85.7		85.7	
CS	TOTAL PART.	.007	GR/DSCF*	16.921	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	.37	LB/HR	.17	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. E-1

BASKET & CONDENSER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 175.145 * 1.000 * (30.01 + 1.482 / 13.6)}{(61. + 460.)} = 178.873 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .00 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .00}{178.873 + .00} = .00 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.00/100)) + 18. * (.00/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 431.629 / (SQRT(29.00 * 30.01) * 24. = 43.78 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 43.78 * 314. 3600/144 = 343815. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 343815. * 30.01 * (1. - (.00/100))}{(62. + 460.)} = 348803. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(62.+460.))*((0.002669* 0.)+(175.145*1.000*(30.01+(1.482/13.6))/(61.+460.)))}{60. * 43.78 * 30.01 * .500 * .500} = 82.05 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 75.5 * 15.43 / 178.873 = .007 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .007 * 348803. / (15.43 * 453.6) = .32

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/20/77
SAMPLING LOCATION	BASKET & CONDENSER	RUN NUMBER	E-2
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED GLASS
OPERATOR	J. IVERSON	NOZZLE : I.D.	.2550
AMBIENT TEMP.(DEG.F)	45.	ASSUMED MOISTURE	30.0
BAR.PRESS.(IN.HG)	30.01	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.05	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000749	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	20.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
THERM. NO.		HEATER BOX SETTING	250.0
LEAK CORR.	.0 IN.HG; .000 CFM	REFERENCE PRESS. DIFF.	.58
METER CALIB. FACTOR	1.0040		
READ & RECORD DATA EVERY	2.5 MINUTES		

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	835	847.568									
E-01	2.5	0	848.495	.950	.48	.48	62.	44.	44.	1.0	250.	54.
E-02	5.0	0	849.399	.900	.45	.45	62.	45.	44.	1.0	250.	54.
E-03	7.5	0	850.472	.100	.50	.50	62.	48.	44.	1.0	250.	54.
E-04	10.0	0	851.325	.100	.50	.50	62.	52.	44.	1.0	250.	54.
E-05	12.5	0	852.345	.120	.60	.60	64.	57.	46.	1.0	250.	56.
E-06	15.0	156	853.555	.150	.74	.74	64.	61.	47.	1.0	250.	56.
E-07	17.5	185	854.535	.650	3.10	3.10	54.	62.	52.	2.0	250.	56.
E-08	21.0	0	855.985	.450	2.19	2.19	54.	62.	52.	2.0	250.	56.
E-09	23.5	0	857.260	.350	1.71	1.71	53.	62.	52.	2.0	250.	56.
E-10	26.0	0	858.540	.450	2.19	2.19	49.	62.	52.	2.0	250.	56.
E-11	28.5	0	860.995	.500	2.40	2.40	49.	68.	53.	2.5	250.	58.
N-01	31.5	0	862.575	.700	3.39	3.39	52.	64.	54.	3.0	250.	58.
N-02	34.0	0	864.989	.650	3.10	3.10	52.	64.	54.	3.0	250.	58.
N-03	36.5	0	867.298	.650	3.10	3.10	52.	76.	56.	3.0	250.	58.
N-04	39.0	0	869.665	.700	3.39	3.39	52.	87.	58.	3.0	250.	58.
N-05	41.5	0	872.485	1.000	4.70	4.70	53.	87.	60.	3.5	250.	58.
N-06	44.0	0	875.355	1.000	4.70	4.70	53.	90.	62.	4.0	250.	60.
N-07	46.5	0	877.876	.750	3.60	3.60	54.	94.	64.	3.0	250.	61.
N-08	49.0	0	880.045	.550	2.70	2.70	58.	94.	65.	2.5	250.	62.
N-09	51.5	0	882.075	.450	2.20	2.20	60.	94.	66.	2.0	250.	62.
N-10	54.0	0	884.135	.500	2.40	2.40	60.	94.	68.	2.0	250.	62.
N-11	56.5	0	886.295	.550	2.70	2.70	61.	94.	69.	2.5	250.	62.
N-12	59.0	1025	888.505	.550	2.70	2.70	61.	96.	70.	2.5	250.	62.
TOTALS	59.0		40.937									
AVERAGE					2.33	2.33	57.	72.	55.	2.2	250.	58.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — J. IVERSON

TEST E-2 BASKET & CONDENSER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/20/77		11/20/77	
TB	TIME-START	835		835	
TF	TIME-FINISH	1025		1025	
TT	NET TIME OF TEST, MIN.	59.0		59.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.255	IN	6.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.23	IN-H2O	56.7	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	40.937	CU-FT	1.159	CU-M
TM	AVERAGE GAS METER TEMP	61.1	F	16.2	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	42.005	SCF	1.189	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	5.3		5.3	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.249	SCF	.007	SCM
BWO	PERCENT MOISTURE BY VOLUME	.59		.59	
FMD	MOLE FRACTION DRY GAS	.994		.994	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.94		28.94	
PB	BAROMETRIC PRESSURE	30.01	IN-HG	762.25	MM-HG
PSI	STATIC PRES OF STACK GAS	.05	IN-H2O	1.27	MM-H2O
PS	STACK PRES, ABS.	30.01	IN-HG	762.35	MM-HG
TS	AVERAGE STACK TEMP	54.	F	12.	C

VS	AVG STACK GAS VELOCITY	38.0	FPS	11.6	MPS
AS	STACK AREA	314.	SQ-IN	.203	SQ-M
QSSTD	STACK FLOW RATE, DRY*	305881.	SCFH	8662.	SCMH
QS	ACTUAL STACK FLOW RATE	298724.	ACFH	8459.	ACMH
ISO	PERCENT ISOKINETIC	85.9		85.9	
MN	FILTERABLE PART. MG. EPA 5	28.5		28.5	
CS	FILTERABLE PART.	.010	GR/DSCF*	23.963	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	.46	LB/HR	.21	KG/HR
MN	TOTAL PART. MG. EPA 5	33.8		33.8	
CS	TOTAL PART.	.012	GR/DSCF*	28.419	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	.54	LB/HR	.25	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. F-2

BASKET & CONDENSER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VmSTD = (17.65 * Vm * Y * (Pb + Pm / 13.6)) / (Tm + 460.)

$$Vm_{STD} = \frac{17.65 * 40.937 * 1.004 * (30.01 + 2.328 / 13.6)}{(64. + 460.)} = 41.602 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

Vwc = .04707 * Vlc

Vwc = .04707 * 5. = .25 SCF

PERCENT MOISTURE IN STACK GAS

Bwo = (100. * Vwc) / (VmSTD + Vwc)

$$Bwo = \frac{100. * .25}{41.602 + .25} = .59 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

Fmo = (100. - Bwo) / 100.

$$Fmo = \frac{100. - .6}{100.} = .994$$

MOLECULAR WEIGHT OF STACK GAS

Ms = Md * (1. - (Bwo/100)) + 18. * (Bwo/100)

Ms = 29.00* (1. -(.59/100)) + 18. * (.59/100) = 28.93

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(Vh * (Ts + 460.))

Vs = 85.49 * Cp * DELP / (SQRT(Ms * Ps) * Pnts)

Vs = 85.49 * .84 * 374.601 / (SQRT(28.93 * 30.01) * 23. = 39.69 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 39.69 * 514. 5000/144 = 311714. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 311714. * 30.01 * (1. - (.59/100))}{(57. + 460.)} = 317715. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/((TM+460.))))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(57.+460.))*((0.002669* 5.)+(40.93/1.004*(30.01+(2.528/13.6))/(64.+460.)))}{59. * 39.69 * 30.01 * .255 * .255} = 82.31 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 28.5 * 15.43 / 41.802 = .011 GM/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .011 * 317715. / (15.43 * 453.6) = .48

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/20/77
SAMPLING LOCATION	BASKET & CONDENSER	RUN NUMBER	E-3
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED STAINLESS
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.5000
AMBIENT TEMP.(DEG.F)	55.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.08	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.05	METER BOX NUMBER:	AER
FILTER NUMBER(S)	0000106	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	20.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.73

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1303	332.254									
E-12	2.5	0	340.700	.460	1.19	1.19	72.	77.	78.	6.0	273.	62.
E-11	5.0	0	348.600	.440	1.12	1.12	73.	76.	78.	5.0	269.	62.
E-10	7.5	0	356.300	.400	1.03	1.03	74.	78.	78.	6.0	259.	67.
E-09	10.0	0	363.800	.400	1.03	1.03	75.	80.	78.	6.0	255.	66.
E-08	12.5	0	371.800	.460	1.22	1.22	76.	83.	78.	6.5	257.	66.
E-07	15.0	0	381.000	.650	1.67	1.67	77.	87.	78.	8.0	258.	66.
E-06	17.5	0	390.000	.600	1.52	1.52	77.	91.	79.	7.5	257.	65.
E-05	20.0	0	399.700	.700	1.80	1.80	77.	94.	80.	8.5	257.	64.
E-04	22.5	0	408.700	.600	1.52	1.52	75.	95.	81.	7.0	257.	64.
E-03	25.0	0	419.700	1.000	2.50	2.50	73.	98.	82.	12.0	257.	64.
E-02	27.5	0	430.000	.750	1.90	1.90	74.	103.	83.	9.0	257.	62.
E-01	30.0	1333	439.862	.700	1.80	1.80	74.	105.	84.	8.0	256.	62.
N-12	32.5	1340	448.800	.600	1.52	1.52	79.	88.	84.	7.5	259.	64.
N-11	35.0	0	457.700	.550	1.40	1.40	78.	88.	84.	6.5	258.	60.
N-10	37.5	0	465.800	.480	1.22	1.22	78.	88.	84.	6.0	256.	60.
N-09	40.0	0	474.700	.500	1.29	1.29	80.	89.	83.	7.0	257.	61.
N-08	42.5	0	483.600	.600	1.52	1.52	78.	91.	83.	7.0	257.	61.
N-07	45.0	0	493.600	.750	1.90	1.90	78.	92.	83.	9.0	257.	61.
N-06	47.5	0	505.000	1.100	2.75	2.75	78.	93.	83.	13.5	253.	60.
N-05	50.0	0	516.200	.900	2.27	2.27	77.	99.	84.	11.0	256.	59.
N-04	52.5	0	526.600	.800	2.00	2.00	75.	101.	85.	10.0	256.	58.
N-03	55.0	0	536.200	.650	1.67	1.67	73.	99.	85.	8.0	256.	59.
N-02	57.5	0	545.500	.600	1.52	1.52	71.	96.	85.	7.5	257.	58.
N-01	60.0	0	553.869	.500	1.29	1.29	71.	93.	85.	6.0	257.	57.
TOTALS	60.0		221.615									
AVERAGE					1.61	1.61	76.	91.	82.	7.9	258.	62.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — C. BRUFFEY

TEST E-3 BASKET & CONDENSER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/20/77		11/20/77	
TB	TIME-START	1303		1303	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.61	IN-H2O	40.9	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	221.615	CU-FT	6.275	CU-M
TM	AVERAGE GAS METER TEMP	86.4	F	30.2	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	216.166	SCF	6.121	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	19.3		19.3	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.908	SCF	.026	SCM
BWO	PERCENT MOISTURE BY VOLUME	.42		.42	
FMD	MOLE FRACTION DRY GAS	.996		.996	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.95		28.95	
PB	BAROMETRIC PRESSURE	30.08	IN-HG	764.03	MM-HG
PSI	STATIC PRES OF STACK GAS	.05	IN-H2O	1.27	MM-H2O
PS	STACK PRES, ABS.	30.08	IN-HG	764.13	MM-HG
TS	AVERAGE STACK TEMP	76.	F	24.	C

VS	AVG STACK GAS VELOCITY	44.4	FPS	13.5	MPS
AS	STACK AREA	314.	SQ-IN	.203	SQ-M
QSSTD	STACK FLOW RATE, DRY*	344426.	SCFH	9753.	SCMH
QS	ACTUAL STACK FLOW RATE	348847.	ACFH	9878.	ACMH
ISO	PERCENT ISOKINETIC	100.4		100.4	
MN	FILTERABLE PART. MG. EPA 5	90.3		90.3	
CS	FILTERABLE PART.	.006	GR/DSCF*	14.753	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	.32	LB/HR	.14	KG/HR
MN	TOTAL PART. MG. EPA 5	125.9		125.9	
CS	TOTAL PART.	.009	GR/DSCF*	20.570	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	.44	LB/HR	.20	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. E-3

BASKET & CONDENSER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 221.615 * 1.000 * (30.08 + 1.610 / 13.6)}{(86. + 460.)} = 216.166 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 19. = .91 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .91}{216.166 + .91} = .42 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .4}{100.} = .996$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.42/100)) + 18. * (.42/100) = 28.95

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 438.109 / (SQRT(28.95 * 30.08) * 24. = 44.42 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 44.42 * 314. 3600/144 = 348847. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 348847. * 30.08 * (1. - (.42/100))}{(76. + 460.)} = 344426. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(76.+460.))*((0.002669* 19.)+(221.615*1.000*(30.08+(1.610/13.6))/(86.+460.)))}{60. * 44.42 * 30.08 * .500 * .500} = 100.42 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 90.3 * 15.43 / 216.166 = .006 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .006 * 344426. / (15.43 * 453.6) = .32

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/20/77
SAMPLING LOCATION	BASKET & CONDENSER	RUN NUMBER	E-4
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED GLASS
OPERATOR	J. IVERSON	NOZZLE I.D.	.2550
AMBIENT TEMP.(DEG.F)	55.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.08	SAMPLE BOX NUMBER	FMS
STATIC PRESS.(IN.H2O)	.05	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000754	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	20.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.38

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1303	869.494									
N-01	2.5	0	891.725	.600	2.85	2.85	75.	66.	58.	4.0	250.	56.
N-02	5.0	0	894.098	.700	3.40	3.40	75.	70.	58.	4.5	250.	56.
N-03	7.5	0	896.625	.850	4.00	4.00	74.	75.	59.	5.0	250.	56.
N-04	10.0	0	899.065	.750	3.60	3.60	75.	80.	70.	5.0	250.	56.
N-05	12.5	0	901.745	.900	4.30	4.30	75.	84.	70.	6.0	250.	56.
N-06	15.0	0	904.535	1.000	4.80	4.80	74.	87.	71.	6.0	250.	56.
N-07	17.5	0	907.150	.800	3.80	3.80	75.	90.	72.	5.0	250.	56.
N-08	20.0	0	909.505	.650	3.10	3.10	75.	92.	74.	4.4	250.	56.
N-09	22.5	0	911.585	.450	2.20	2.20	74.	93.	74.	3.2	250.	56.
N-10	25.0	0	913.575	.450	2.20	2.20	75.	94.	75.	3.3	250.	56.
N-11	27.5	0	915.515	.520	2.50	2.50	74.	96.	76.	3.0	250.	56.
N-12	30.0	0	917.521	.550	2.60	2.60	74.	96.	78.	3.0	250.	56.
E-01	32.5	0	920.031	.750	3.60	3.60	75.	80.	76.	5.0	250.	58.
E-02	35.0	0	922.515	.800	3.80	3.80	75.	87.	77.	5.0	250.	58.
E-03	37.5	0	925.235	.950	4.50	4.50	77.	92.	78.	6.0	250.	58.
E-04	40.0	0	928.069	1.000	4.80	4.80	77.	96.	78.	6.5	250.	58.
E-05	42.5	0	931.015	1.000	4.80	4.80	78.	98.	79.	6.5	250.	58.
E-06	45.0	0	934.035	1.200	5.69	5.69	78.	102.	80.	7.5	250.	58.
E-07	47.5	0	936.585	.700	3.40	3.40	77.	102.	81.	4.5	250.	58.
E-08	50.0	0	938.645	.450	2.20	2.20	75.	102.	82.	3.5	250.	58.
E-09	52.5	0	940.374	.300	1.45	1.45	74.	98.	82.	2.4	250.	58.
E-10	55.0	0	942.130	.350	1.70	1.70	75.	97.	82.	2.5	250.	58.
E-11	57.5	0	944.179	.500	2.40	2.40	70.	97.	82.	3.4	250.	58.
E-12	60.0	1410	946.263	.500	2.40	2.40	70.	98.	82.	3.5	250.	58.
TOTALS	60.0		56.769									
AVERAGE					3.34	3.34	75.	91.	75.	4.5	250.	57.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS: WESTSIDE GIN

TEST TEAM LEADER: J. IVENSON

TEST E-4 BASKET & CONDENSER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/20/77	11/20/77
TB	TIME-START	1303	1303
TF	TIME-FINISH	1410	1410
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.255 IN	6.5 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	3.34 IN-H2O	84.8 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	56.769 CU-FT	1.608 CU-M
TM	AVERAGE GAS METER TEMP	82.6 F	28.1 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	56.221 SCF	1.592 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	4.4	4.4
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.207 SCF	.006 SCM
BWO	PERCENT MOISTURE BY VOLUME	.37	.37
FMD	MOLE FRACTION DRY GAS	.996	.996
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.96	28.96
PB	BAROMETRIC PRESSURE	30.08 IN-HG	764.03 MM-HG
PSI	STATIC PRES OF STACK GAS	.05 IN-H2O	1.27 MM-H2O
PS	STACK PRES, ABS.	30.08 IN-HG	764.13 MM-HG
TS	AVERAGE STACK TEMP	75. F	24. C

VS	AVG STACK GAS VELOCITY	46.3	FPS	14.1	MPS
AS	STACK AREA	314.	SQ-IN	.203	SQ-M
QSSTD	STACK FLOW RATE, DRY*	359666.	SCFH	10185.	SCMH
QS	ACTUAL STACK FLOW RATE	363613.	ACFH	10296.	ACMH
ISO	PERCENT ISOKINETIC	96.2		96.2	
MN	FILTERABLE PART. MG. EPA 5	37.1		37.1	
CS	FILTERABLE PART.	.010	GR/DSCF*	23.306	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	.52	LB/HR	.24	KG/HR
MN	TOTAL PART. MG. EPA 5	53.6		53.8	
CS	TOTAL PART.	.015	GR/DSCF*	33.797	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	.76	LB/HR	.34	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. E-4

BASKET & CONDENSER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 56.769 * 1.004 * (30.08 + 3.337 / 13.6)}{(83. + 460.)} = 56.221 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 4. = .21 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .21}{56.221 + .21} = .37 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .4}{100.} = .996$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.37/100)) + 18. * (.37/100) = 28.96

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 456.697 / (SQRT(28.96 * 30.08) * 24. = 46.30 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 46.30 * 314. 3600/144 = 363613. ACFM

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 363613. * 30.08 * (1. - (.37/100))}{(75. + 460.)} = 359666. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(75.+460.))*((0.002669* 4.)+(56.769*1.004*(30.08+(3.337/13.6))/(83.+460.)))}{60. * 46.30 * 30.08 * .255 * .255} = 96.16 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 37.1 * 15.43 / 56.221 = .010 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .010 * 359666. / (15.43 * 453.6) = .52

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/20/77
SAMPLING LOCATION	BASKET & CONDENSER	RUN NUMBER	E-5
SAMPLE TYPE	PARTICULATE		
OPERATOR	C. BRUFFEY	PROBE LENGTH & TYPE	5' STAINLESS HEATED
AMBIENT TEMP.(DEG.F)	60.	NOZZLE I.D.	.5000
BAR.PRESS.(IN.HG)	30.10	ASSUMED MOISTURE	3.00
STATIC PRESS.(IN.H2O)	.05	SAMPLE BOX NUMBER	AER
FILTER NUMBER(S)	0000105	METER BOX NUMBER	AER
STACK INSIDE DIM.(IN)	20.00 .00	METER HEAD DIFF.	.070
PITOT TUBE COEFF.	.84	C FACTOR	.00
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.73

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1540	555.896									
E-12	2.5	0	564.500	.550	1.40	1.40	77.	67.	67.	7.0	255.	51.
E-11	5.0	0	573.100	.550	1.40	1.40	78.	66.	67.	7.0	253.	57.
E-10	7.5	0	581.400	.480	1.25	1.25	77.	70.	66.	6.0	251.	61.
E-09	10.0	0	589.700	.480	1.25	1.25	77.	72.	67.	6.0	251.	61.
E-08	12.5	0	598.100	.530	1.37	1.37	76.	75.	67.	6.0	253.	60.
E-07	15.0	0	608.100	.800	2.00	2.00	75.	76.	68.	10.0	253.	58.
E-06	17.5	0	618.800	.900	2.30	2.30	74.	81.	68.	12.0	253.	57.
E-05	20.0	0	630.200	1.000	2.50	2.50	75.	85.	69.	13.0	255.	57.
E-04	22.5	0	640.400	.750	1.91	1.91	73.	88.	71.	9.5	252.	57.
E-03	25.0	0	650.300	.700	1.80	1.80	69.	87.	71.	9.0	251.	55.
E-02	27.5	0	659.400	.600	1.55	1.55	68.	86.	73.	8.0	252.	54.
E-01	30.0	1610	668.345	.550	1.40	1.40	69.	84.	72.	7.0	253.	55.
N-12	32.5	1620	676.400	.500	1.30	1.30	70.	66.	69.	7.0	259.	52.
N-11	35.0	0	685.000	.500	1.30	1.30	71.	68.	69.	7.0	255.	53.
N-10	37.5	0	692.700	.400	1.03	1.03	72.	71.	69.	5.5	253.	54.
N-09	40.0	0	700.600	.430	1.11	1.11	72.	73.	68.	6.0	252.	54.
N-08	42.5	0	708.500	.470	1.20	1.20	75.	75.	69.	7.0	255.	54.
N-07	45.0	0	717.900	.650	1.68	1.68	75.	77.	69.	8.5	254.	54.
N-06	47.5	0	728.600	.950	2.40	2.40	75.	81.	69.	12.0	253.	54.
N-05	50.0	0	740.100	1.000	2.50	2.50	75.	85.	70.	13.0	253.	52.
N-04	52.5	0	751.500	1.000	2.50	2.50	73.	91.	71.	11.0	253.	53.
N-03	55.0	0	762.500	.850	2.19	2.19	69.	93.	73.	9.0	252.	52.
N-02	57.5	0	772.800	.800	2.00	2.00	68.	93.	74.	9.0	253.	51.
N-01	60.0	1650	782.624	.650	1.68	1.68	69.	91.	74.	8.0	253.	51.
TOTALS	60.0		226.728									
AVERAGE					1.71	1.71	73.	79.	70.	8.5	253.	55.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS: WESTSIDE GIN, TRANQUILITY, CA.

TEST LEADER: C. BRUFFEY

TEST E-5 BASKET & CONDENSER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/20/77		11/20/77	
TB	TIME-START	1540		1540	
TF	TIME-FINISH	1650		1650	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.71	IN-H2O	43.4	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	226.728	CU-FT	6.420	CU-M
TM	AVERAGE GAS METER TEMP	74.4	F	23.6	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	226.341	SCF	6.409	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	.0		.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.000	SCF	.000	SCM
BWO	PERCENT MOISTURE BY VOLUME	.00		.00	
FMD	MOLE FRACTION DRY GAS	1.000		1.000	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	29.00		29.00	
PB	BAROMETRIC PRESSURE	30.10	IN-HG	764.54	MM-HG
PSI	STATIC PRES OF STACK GAS	.05	IN-H2O	1.27	MM-H2O
PS	STACK PRES, ABS.	30.10	IN-HG	764.65	MM-HG
TS	AVERAGE STACK TEMP	73.	F	23.	C

VS	AVG STACK GAS VELOCITY	45.5	FPS	13.9	MPS
AS	STACK AREA	314.	SQ-IN	.203	SQ-M
QSSTD	STACK FLOW RATE, DRY*	356028.	SCFH	10082.	SCMH
QS	ACTUAL STACK FLOW RATE	357148.	ACFH	10113.	ACMH
ISO	PERCENT ISOKINETIC	101.7		101.7	
MN	FILTERABLE PART. MG. EPA 5	66.4		66.4	
CS	FILTERABLE PART.	.005	GR/DSCF*	10.361	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	.23	LB/HR	.10	KG/HR
MN	TOTAL PART. MG. EPA 5	80.3		80.3	
CS	TOTAL PART.	.005	GR/DSCF*	12.530	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	.28	LB/HR	.13	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. E-5

BASKET & CONDENSER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 226.728 * 1.000 * (30.10 + 1.709 / 13.6)}{(74. + 460.)} = 226.341 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .00 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .00}{226.341 + .00} = .00 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.00/100)) + 18. * (.00/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 449.038 / (SQRT(29.00 * 30.10) * 24. = 45.47 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 45.47 * 314. 3600/144 = 357148. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 357148. * 30.10 * (1. - (.00/100))}{(73. + 460.)} = 356028. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(73.+460.))*((0.002669* 0.)+(226.728*1.000*(30.10+(1.709/13.6))/(74.+460.)))}{60. * 45.47 * 30.10 * .500 * .500} = 101.72 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 66.4 * 15.43 / 226.341 = .005 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .005 * 356028. / (15.43 * 453.6) = .23

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/20/77
SAMPLING LOCATION	CONDENSER & BASKET	RUN NUMBER	E-6
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED GLASS
OPERATOR	J. IVERSON	NOZZLE I.D.	.2550
AMBIENT TEMP.(DEG.F)	50.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.08	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.05	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000883	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	20.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.38

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1540	947.788									
E-01	2.5	0	950.175	.800	3.80	3.80	77.	64.	64.	5.0	250.	50.
E-02	5.0	0	952.525	.750	3.60	3.60	77.	70.	66.	5.0	250.	50.
E-03	7.5	0	955.250	1.000	4.70	4.70	75.	77.	66.	6.0	250.	50.
E-04	10.0	0	958.115	1.100	5.00	5.00	75.	81.	67.	6.5	250.	52.
E-05	12.5	0	961.021	1.100	5.00	5.00	75.	84.	68.	6.5	250.	52.
E-06	15.0	0	963.525	.700	3.30	3.30	72.	87.	69.	4.5	250.	52.
E-07	17.5	0	965.630	.450	2.19	2.19	72.	88.	70.	3.4	250.	54.
E-08	20.0	0	967.425	.350	1.70	1.70	70.	85.	70.	3.0	250.	54.
E-09	22.5	0	969.345	.450	2.19	2.19	68.	88.	71.	3.0	250.	56.
E-10	25.0	0	971.390	.500	2.40	2.40	69.	89.	72.	3.3	250.	56.
E-11	27.5	0	973.450	.500	2.40	2.40	70.	90.	72.	3.0	250.	56.
E-12	30.0	0	975.420	.450	2.19	2.19	69.	90.	72.	3.0	250.	56.
N-01	32.5	0	977.780	.650	3.10	3.10	75.	77.	70.	4.5	250.	56.
N-02	35.0	0	980.095	.700	3.30	3.30	75.	83.	72.	4.5	250.	56.
N-03	37.5	0	982.562	.750	3.60	3.60	72.	88.	73.	5.0	250.	56.
N-04	40.0	0	985.260	.950	4.50	4.50	75.	90.	74.	6.0	250.	56.
N-05	42.5	0	988.085	1.000	4.80	4.80	75.	92.	74.	6.5	250.	56.
N-06	45.0	0	990.932	1.000	4.80	4.80	75.	94.	75.	7.0	250.	56.
N-07	47.5	0	993.421	.700	3.30	3.30	75.	96.	75.	5.0	250.	56.
N-08	50.0	0	955.685	.550	2.60	2.60	70.	96.	76.	4.0	250.	56.
N-09	52.5	0	997.790	.500	2.40	2.40	70.	96.	77.	4.0	250.	60.
N-10	55.0	0	999.945	.500	2.40	2.40	68.	96.	77.	4.0	250.	60.
N-11	57.5	0	2.090	.550	2.60	2.60	68.	95.	77.	4.0	250.	60.
N-12	60.0	1650	4.265	.550	2.60	2.60	68.	95.	77.	4.0	250.	60.
TOTALS	60.0		56.477									
AVERAGE					3.27	3.27	72.	87.	72.	4.6	250.	55.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST LEADER

J. IVERSON

TEST E-6 CONDENSER & BASKET

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/20/77	11/20/77
TB	TIME-START	1540	1540
TF	TIME-FINISH	1650	1650
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.255 IN	6.5 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	3.27 IN-H2O	83.0 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	56.477 CU-FT	1.599 CU-M
TM	AVERAGE GAS METER TEMP	79.5 F	26.4 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	56.248 SCF	1.593 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	8.7	8.7
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.410 SCF	.012 SCM
BWO	PERCENT MOISTURE BY VOLUME	.72	.72
FMD	MOLE FRACTION DRY GAS	.993	.993
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.92	28.92
PB	BAROMETRIC PRESSURE	30.08 IN-HG	764.03 MM-HG
PSI	STATIC PRES OF STACK GAS	.05 IN-H2O	1.27 MM-H2O
PS	STACK PRES, ABS.	30.08 IN-HG	764.13 MM-HG
TS	AVERAGE STACK TEMP	72. F	22. C

VS	AVG STACK GAS VELOCITY	46.1	FPS	14.0	MPS
AS	STACK AREA	314.	SQ-IN	.203	SQ-M
QSSTD	STACK FLOW RATE, DRY*	358235.	SCFH	10144.	SCMH
QS	ACTUAL STACK FLOW RATE	361736.	ACFH	10243.	ACMH
ISO	PERCENT ISOKINETIC	96.6		96.6	
MN	FILTERABLE PART. MG. EPA 5	23.2		23.2	
CS	FILTERABLE PART.	.006	GR/DSCF*	14.567	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	.33	LB/HR	.15	KG/HR
MN	TOTAL PART. MG. EPA 5	37.8		37.8	
CS	TOTAL PART.	.010	GR/DSCF*	23.734	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	.53	LB/HR	.24	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. E-6

CONDENSER & BASKET

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 56.477 * 1.004 * (30.08 + 3.270 / 13.6)}{(79. + 460.)} = 56.248 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 9. = .41 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .41}{56.248 + .41} = .72 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .7}{100.} = .993$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.72/100)) + 18. * (.72/100) = 28.92

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 454.033 / (SQRT(28.92 * 30.08) * 24. = 46.06 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 46.06 * 314. 3600/144 = 361736. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 361736. * 30.08 * (1. - (.72/100))}{(72. + 460.)} = 358235. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(72.+460.))*((0.002669* 9.)+(56.477*1.004*(30.08+(3.270/13.6))/(79.+460.)))}{60. * 46.06 * 30.08 * .255 * .255} = 96.59 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 23.2 * 15.43 / 56.248 = .006 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .006 * 358235. / (15.43 * 453.6) = .33

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/21/77
SAMPLING LOCATION	MOTE CLEANER	RUN NUMBER	F-1
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' STAINLESS HEATED
OPERATOR	C.B.	NOZZLE I.D.	.6250
AMBIENT TEMP.(DEG.F)	50.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.00	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.01	METER BOX NUMBER	AER
FILTER NUMBER(S)	0000104	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	19.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.30

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	825	783.043									
E-12	2.5	0	788.800	.080	.52	.52	68.	51.	48.	10.0	251.	46.
E-11	5.0	0	795.200	.105	.67	.67	69.	55.	48.	4.0	256.	49.
E-10	7.5	0	801.700	.120	.77	.77	69.	59.	49.	4.0	256.	54.
E-09	10.0	0	808.800	.130	.84	.84	70.	62.	50.	4.0	256.	55.
E-08	12.5	0	816.100	.140	.90	.90	69.	63.	51.	4.5	257.	56.
E-07	15.0	0	823.000	.130	.84	.84	70.	64.	51.	4.0	257.	58.
E-06	17.5	0	830.100	.130	.84	.84	70.	64.	52.	4.0	257.	59.
E-05	20.0	0	837.000	.125	.80	.80	69.	64.	53.	4.0	258.	57.
E-04	22.5	0	843.700	.100	.64	.64	69.	64.	54.	4.0	258.	57.
E-03	25.0	0	849.200	.080	.52	.52	69.	64.	54.	4.0	257.	57.
E-02	27.5	0	854.000	.060	.39	.39	69.	63.	54.	1.0	258.	57.
E-01	30.0	855	858.565	.050	.33	.33	69.	62.	54.	1.0	259.	56.
W-12	32.5	910	865.100	.125	.80	.80	68.	55.	54.	4.0	257.	54.
W-11	35.0	0	872.200	.150	.96	.96	68.	57.	54.	2.0	253.	54.
W-10	37.5	0	880.000	.170	1.09	1.09	69.	60.	55.	5.0	255.	58.
W-09	40.0	0	887.600	.170	1.09	1.09	68.	61.	55.	5.0	253.	57.
W-08	42.5	0	895.900	.200	1.27	1.27	68.	62.	56.	6.0	253.	55.
W-07	45.0	0	904.000	.180	1.14	1.14	69.	63.	56.	7.0	254.	54.
W-06	47.5	0	911.000	.110	.70	.70	68.	63.	56.	3.0	254.	54.
W-05	50.0	0	916.400	.090	.58	.58	68.	62.	57.	2.0	250.	54.
W-04	52.5	0	922.200	.085	.55	.55	68.	61.	57.	1.0	250.	53.
W-03	55.0	0	927.600	.070	.46	.46	68.	61.	57.	1.0	251.	54.
W-02	57.5	0	933.000	.065	.42	.42	68.	61.	56.	1.0	253.	54.
W-01	60.0	0	937.860	.050	.33	.33	67.	62.	55.	.5	253.	54.
TOTALS	60.0		154.817									
AVERAGE					.73	.73	69.	61.	54.	3.6	255.	55.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — C.B.

TEST F-1 MOTE CLEANER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/21/77		11/21/77	
TB	TIME-START	825		825	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.625	IN	15.9	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	.73	IN-H2O	18.5	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	154.817	CU-FT	4.384	CU-M
TM	AVERAGE GAS METER TEMP	57.3	F	14.0	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	158.760	SCF	4.496	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	3.3		3.3	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.155	SCF	.004	SCM
BWO	PERCENT MOISTURE BY VOLUME	.10		.10	
FMD	MOLE FRACTION DRY GAS	.999		.999	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.99		28.99	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.01	IN-H2O	.25	MM-H2O
PS	STACK PRES, ABS.	30.00	IN-HG	762.02	MM-HG
TS	AVERAGE STACK TEMP	69.	F	20.	C

VS	AVG STACK GAS VELOCITY	18.5	FPS	5.6	MPS
AS	STACK AREA	284.	SQ-IN	.183	SQ-M
QSSTD	STACK FLOW RATE, DRY*	131280.	SCFH	3717.	SCMH
QS	ACTUAL STACK FLOW RATE	131188.	ACFH	3715.	ACMH
ISO	PERCENT ISOKINETIC	111.8		111.8	
MN	FILTERABLE PART. MG. EPA 5	823.8		823.8	
CS	FILTERABLE PART.	.080	GR/DSCF*	183.264	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	1.50	LB/HR	.68	KG/HR
MN	TOTAL PART. MG. EPA 5	848.3		848.3	
CS	TOTAL PART.	.082	GR/DSCF*	188.703	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	1.55	LB/HR	.70	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. F-1

MOTE CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 154.817 * 1.000 * (30.00 + .727 / 13.6)}{(57. + 460.)} = 158.760 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 3. = .16 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .16}{158.760 + .16} = .10 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .1}{100.} = .999$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.10/100)) + 18. * (.10/100) = 28.99

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 182.414 / (SQRT(28.99 * 30.00) * 24. = 18.51 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 18.51 * 284. 3600/144 = 131188. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 131188. * 30.00 * (1. - (.10/100))}{(69. + 460.)} = 131280. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(69.+460.))*((0.002669* 3.)+(154.817*1.000*(30.00+(.727/13.6))/(57.+460.)))}{60. * 18.51 * 30.00 * .625 * .625} = 111.76 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 823.8 * 15.43 / 158.760 = .080 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .080 * 131280. / (15.43 * 453.6) = 1.50

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/21/77
SAMPLING LOCATION	MOTE CLEANER	RUN NUMBER	F-2
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED GLASS
OPERATOR	J. IVERSON	NOZZLE I.D.	.3112
AMBIENT TEMP.(DEG.F)	50.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.00	SAMPLE BOX NUMBER	
STATIC PRESS.(IN.H2O)	.01	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000682	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	19.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.48

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O) DESIRED	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O) ACTUAL	STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F) INLET	DRY GAS METER TEMP (DEG.F) OUTLET	PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
INIT	0	825	4.550									
M-01	2.5	0	6.035	.150	.60	.60	69.	50.	50.	1.5	250.	40.
M-02	5.0	0	6.951	.100	.41	.41	70.	54.	56.	1.6	250.	46.
M-03	7.5	0	7.825	.100	.41	.41	70.	55.	50.	1.0	250.	40.
M-04	10.0	0	9.261	.500	1.90	1.90	68.	58.	52.	2.5	250.	40.
M-05	12.5	0	11.035	.500	1.90	1.90	68.	60.	52.	2.5	250.	45.
M-06	15.0	0	12.895	.480	1.85	1.85	67.	68.	54.	2.5	250.	45.
M-07	17.5	0	14.555	.480	1.85	1.85	67.	70.	54.	2.5	250.	45.
M-08	20.0	0	16.345	.480	1.85	1.85	68.	74.	56.	2.5	250.	45.
M-09	22.5	0	18.075	.480	1.85	1.85	64.	76.	57.	2.5	250.	45.
M-10	25.0	0	19.878	.460	1.80	1.80	64.	78.	58.	3.0	250.	45.
M-11	27.5	0	21.625	.460	1.80	1.80	58.	79.	59.	3.0	250.	45.
M-12	30.0	0	23.380	.460	1.80	1.80	58.	81.	60.	3.0	250.	45.
E-01	32.5	0	24.360	.150	.60	.60	57.	62.	60.	1.6	250.	40.
E-02	35.0	0	25.445	.150	.60	.60	53.	62.	60.	1.6	250.	40.
E-03	37.5	0	26.515	.160	.64	.64	53.	62.	60.	1.5	250.	46.
E-04	46.0	0	27.595	.170	.68	.68	68.	62.	60.	1.5	250.	46.
E-05	42.5	0	28.815	.200	.78	.78	68.	63.	59.	1.5	250.	40.
E-06	45.0	0	30.990	.170	.68	.68	68.	63.	59.	1.5	250.	40.
E-07	47.5	0	32.970	.260	.78	.78	68.	65.	58.	4.0	250.	40.
E-08	50.0	0	33.156	.170	.68	.68	68.	64.	58.	1.0	250.	40.
E-09	52.5	0	34.225	.150	.60	.60	68.	64.	55.	1.0	250.	40.
E-10	55.0	0	35.298	.150	.60	.60	68.	63.	58.	1.5	250.	40.
E-11	57.5	0	34.215	.160	.41	.41	68.	63.	58.	1.0	250.	40.
E-12	60.0	0	37.065	.100	.41	.41	68.	62.	57.	1.0	250.	40.
TOTALS	60.0		32.515									
AVERAGE					1.06	1.06	65.	65.	57.	2.0	250.	42.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST LEADER

J. IVERSON

TEST F-2 MOTE CLEANER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/21/77	11/21/77
TB	TIME-START	825	825
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.311 IN	7.9 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.06 IN-H2O	27.0 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	32.515 CU-FT	.921 CU-M
TM	AVERAGE GAS METER TEMP	60.8 F	16.0 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	33.277 SCF	.942 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	10.4	10.4
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.490 SCF	.014 SCM
BWO	PERCENT MOISTURE BY VOLUME	1.45	1.45
FMD	MOLE FRACTION DRY GAS	.986	.986
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.84	28.84
PB	BAROMETRIC PRESSURE	30.00 IN-HG	762.00 MM-HG
PSI	STATIC PRES OF STACK GAS	.01 IN-H2O	.25 MM-H2O
PS	STACK PRES, ABS.	30.00 IN-HG	762.02 MM-HG
TS	AVERAGE STACK TEMP	65. F	18. C

VS	AVG STACK GAS VELOCITY	28.2	FPS	8.6	MPS
AS	STACK AREA	284.	SQ-IN	.183	SQ-M
QSSTD	STACK FLOW RATE, DRY*	198614.	SCFH	5624.	SCMH
QS	ACTUAL STACK FLOW RATE	199913.	ACFH	5661.	ACMH
ISO	PERCENT ISOKINETIC	62.5		62.5	
MN	FILTERABLE PART. MG. EPA 5	193.3		193.3	
CS	FILTERABLE PART.	.090	GR/DSCF*	205.153	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	2.54	LB/HR	1.15	KG/HR
MN	TOTAL PART. MG. EPA 5	204.7		204.7	
CS	TOTAL PART.	.095	GR/DSCF*	217.252	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	2.69	LB/HR	1.22	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. F-2

MOTE CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 32.515 * 1.004 * (30.00 + 1.062 / 13.6)}{(61. + 460.)} = 33.277 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 10. = .49 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .49}{33.277 + .49} = 1.45 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.4}{100.} = .986$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.45/100)) + 18. * (1.45/100) = 28.84

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 277.261 / (SQRT(28.84 * 30.00) * 24. = 28.20 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 28.20 * 284. 3600/144 = 199913. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 199913. * 30.00 * (1. - (1.45/100))}{(65. + 460.)} = 198614. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(65.+460.))*((0.002669* 10.)+(32.515*1.004*(30.00+(1.062/13.6))/(61.+460.)))}{60. * 28.20 * 30.00 * .311 * .311} = 62.46 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 193.3 * 15.43 / 33.277 = .090 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .090 * 198614. / (15.43 * 453.6) = 2.54

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/21/77
SAMPLING LOCATION	MOTE CLEANER	RUN NUMBER	F-3
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED STAINLESS
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.6250
AMBIENT TEMP.(DEG.F)	50.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.00	SAMPLE BOX NUMBER	AER
STATIC PRESS.(IN.H2O)	.01	METER BOX NUMBER	AER
FILTER NUMBER(S)	0000103	METER HEAD DIFF.	.070
STACK INSIDE DIM.(IN)	19.00 .00	C FACTOR	.00
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		REFERENCE PRESS. DIFF.	.30

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1035	938.115									
W-12	2.5	0	943.700	.080	.52	.52	70.	55.	55.	1.5	257.	50.
W-11	5.0	0	949.900	.100	.64	.64	70.	56.	55.	1.5	257.	51.
W-10	7.5	0	956.100	.100	.64	.64	70.	57.	55.	1.5	259.	51.
W-09	10.0	0	962.600	.110	.70	.70	70.	59.	55.	2.0	258.	52.
W-08	12.5	0	969.000	.100	.64	.64	71.	61.	55.	2.0	258.	54.
W-07	15.0	0	975.200	.100	.64	.64	71.	62.	56.	3.0	258.	54.
W-06	17.5	0	980.900	.075	.49	.49	71.	63.	56.	2.5	259.	56.
W-05	20.0	0	986.000	.060	.39	.39	72.	65.	56.	1.0	260.	55.
W-04	22.5	0	990.200	.035	.23	.23	72.	67.	57.	.5	258.	57.
W-03	25.0	0	993.500	.025	.17	.17	72.	68.	57.	.5	258.	56.
W-02	27.5	0	996.600	.015	.10	.10	73.	68.	58.	.5	257.	56.
W-01	30.0	1105	999.490	.015	.10	.10	73.	69.	58.	.5	258.	58.
E-12	32.5	1111	3.600	.040	.26	.26	72.	58.	57.	1.0	260.	58.
E-11	35.0	0	9.000	.070	.46	.46	73.	61.	57.	1.5	262.	57.
E-10	37.5	0	15.260	.100	.64	.64	74.	63.	57.	1.5	265.	59.
E-09	40.0	0	21.800	.120	.77	.77	75.	63.	57.	1.5	255.	57.
E-08	42.5	0	28.100	.120	.77	.77	75.	64.	57.	2.0	255.	56.
E-07	45.0	0	34.300	.090	.58	.58	75.	65.	58.	2.0	256.	55.
E-06	47.5	0	41.900	.100	.64	.64	75.	66.	58.	2.0	255.	56.
E-05	50.0	0	47.100	.100	.64	.64	75.	66.	58.	2.0	255.	56.
E-04	52.5	0	53.000	.060	.39	.39	75.	65.	57.	2.0	256.	57.
E-03	55.0	0	57.500	.050	.32	.32	75.	66.	57.	2.0	259.	55.
E-02	57.5	0	61.700	.040	.26	.26	72.	67.	56.	1.0	260.	55.
E-01	60.0	1141	64.700	.020	.14	.14	71.	66.	55.	.5	259.	57.
TOTALS	60.0		126.585									
AVERAGE					.46	.46	73.	63.	57.	1.5	258.	55.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — C. BRUFFEY

TEST F-3 MOTE CLEANER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/21/77		11/21/77	
TB	TIME-START	1035		1035	
TF	TIME-FINISH	1141		1141	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.625	IN	15.9	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	.46	IN-H2O	11.8	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	126.585	CU-FT	3.584	CU-M
TM	AVERAGE GAS METER TEMP	59.9	F	15.5	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	129.060	SCF	3.655	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	1.2		1.2	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.056	SCF	.002	SCM
BWO	PERCENT MOISTURE BY VOLUME	.04		.04	
FMD	MOLE FRACTION DRY GAS	1.000		1.000	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	29.00		29.00	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.01	IN-H2O	.25	MM-H2O
PS	STACK PRES, ABS.	30.00	IN-HG	762.02	MM-HG
TS	AVERAGE STACK TEMP	73.	F	23.	C

VS	AVG STACK GAS VELOCITY	14.5	FPS	4.4	MPS
AS	STACK AREA	284.	SQ-IN	.183	SQ-M
QSSTD	STACK FLOW RATE, DRY*	102330.	SCFH	2898.	SCMH
QS	ACTUAL STACK FLOW RATE	102968.	ACFH	2916.	ACMH
ISO	PERCENT ISOKINETIC	116.6		116.6	
MN	FILTERABLE PART. MG. EPA 5	645.2		645.2	
CS	FILTERABLE PART.	.077	GR/DSCF*	176.563	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	1.13	LB/HR	.51	KG/HR
MN	TOTAL PART. MG. EPA 5	657.8		657.8	
CS	TOTAL PART.	.079	GR/DSCF*	180.011	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	1.15	LB/HR	.52	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. F-3

MOTE CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 126.585 * 1.000 * (30.00 + .464 / 13.6)}{(60. + 460.)} = 129.060 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 1. = .06 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .06}{129.060 + .06} = .04 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.04/100)) + 18. * (.04/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 143.190 / (SQRT(29.00 * 30.00) * 24. = 14.53 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 14.53 * 284. 3600/144 = 102968. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 102968. * 30.00 * (1. - (.04/100))}{(73. + 460.)} = 102330. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(73.+460.))*((0.002669* 1.)+(126.585*1.000*(30.00+(.464/13.6))/(60.+460.)))}{60. * 14.53 * 30.00 * .625 * .625} = 116.56 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 645.2 * 15.43 / 129.060 = .077 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .077 * 102330. / (15.43 * 453.6) = 1.13

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/21/77
SAMPLING LOCATION	MOTE CLEANER	RUN NUMBER	F-4
SAMPLE TYPE	PARTICULATE		
OPERATOR	J. IVERSON	PROBE LENGTH & TYPE	5' HEATED GLASS
AMBIENT TEMP.(DEG.F)	50.	NOZZLE I.D.	.3112
BAR.PRESS.(IN.HG)	30.00	ASSUMED MOISTURE	3.00
STATIC PRESS.(IN.H2O)	.01	SAMPLE BOX NUMBER	RAC
FILTER NUMBER(S)	0000717	METER BOX NUMBER	RAC
STACK INSIDE DIM.(IN)	19.00 .00	METER HEAD DIFF.	1.910
PITOT TUBE COEFF.	.84	C FACTOR	1.10
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.48

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1035	37.507									
E-01	2.5	0	38.591	.100	.41	.41	55.	52.	53.	1.0	250.	45.
E-02	5.0	0	39.475	.110	.44	.44	70.	54.	53.	1.0	250.	45.
E-03	7.5	0	40.442	.170	.67	.67	70.	58.	54.	1.0	250.	45.
E-04	10.0	0	41.465	.150	.66	.66	71.	58.	54.	1.0	250.	45.
E-05	12.5	0	42.568	.170	.67	.67	72.	60.	55.	1.0	250.	45.
E-06	15.0	0	43.634	.150	.60	.60	72.	62.	56.	1.0	250.	45.
E-07	17.5	0	44.725	.160	.64	.64	72.	62.	57.	1.0	250.	45.
E-08	20.0	0	45.830	.160	.64	.64	71.	63.	57.	1.2	252.	45.
E-09	22.5	0	46.930	.150	.60	.60	70.	64.	57.	1.2	250.	45.
E-10	25.0	0	48.060	.170	.67	.67	71.	65.	58.	1.2	250.	45.
E-11	27.5	0	49.005	.100	.41	.41	71.	66.	58.	1.0	250.	45.
E-12	30.0	0	50.052	.170	.61	.61	71.	67.	59.	1.2	250.	45.
W-01	32.5	1111	51.565	.100	.41	.41	70.	63.	59.	1.0	250.	45.
W-02	35.0	0	52.431	.100	.41	.41	70.	63.	60.	1.0	250.	45.
W-03	37.5	0	53.295	.100	.41	.41	73.	64.	60.	1.0	250.	45.
W-04	40.0	0	54.215	.110	.44	.44	72.	65.	60.	1.0	250.	45.
W-05	42.5	0	55.170	.120	.48	.48	75.	66.	61.	1.0	250.	45.
W-06	45.0	0	56.135	.120	.48	.48	74.	66.	61.	1.0	250.	45.
W-07	47.5	0	57.120	.120	.48	.48	73.	66.	61.	1.0	250.	45.
W-08	50.0	0	58.165	.150	.60	.60	74.	67.	62.	1.0	250.	45.
W-09	52.5	0	59.245	.150	.60	.60	73.	67.	62.	1.0	250.	45.
W-10	55.0	0	60.224	.120	.48	.48	74.	67.	62.	1.0	250.	45.
W-11	57.5	0	61.135	.100	.41	.41	73.	67.	62.	1.0	250.	45.
W-12	60.0	1141	62.008	.100	.41	.41	74.	67.	62.	1.0	250.	45.
TOTALS	60.0		24.501									
AVERAGE					.53	.53	71.	63.	58.	1.0	250.	45.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS: WESTSIDE GIN

TEST TEAM LEADER: J. IVERSON

TEST F-4 MOTE CLEANER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/21/77		11/21/77	
TB	TIME-START	1035		1035	
TF	TIME-FINISH	1141		1141	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.004		1.004	
DN	SAMPLING NOZZLE DIAMETER	.311	IN	7.9	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	.53	IN-H2O	13.4	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	24.501	CU-FT	.694	CU-M
TM	AVERAGE GAS METER TEMP	60.9	F	16.0	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	25.039	SCF	.709	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	7.4		7.4	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.348	SCF	.010	SCM
BWO	PERCENT MOISTURE BY VOLUME	1.37		1.37	
FMD	MOLE FRACTION DRY GAS	.986		.986	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.85		28.85	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.01	IN-H2O	.25	MM-H2O
PS	STACK PRES, ABS.	30.00	IN-HG	762.02	MM-HG
TS	AVERAGE STACK TEMP	71.	F	22.	C

VS	AVG STACK GAS VELOCITY	20.3	FPS	6.2	MPS
AS	STACK AREA	284.	SQ-IN	.183	SQ-M
QSSTD	STACK FLOW RATE, DRY*	141270.	SCFH	4000.	SCMH
QS	ACTUAL STACK FLOW RATE	143716.	ACFH	4070.	ACMH
ISO	PERCENT ISOKINETIC	66.1		66.1	
MN	FILTERABLE PART. MG. EPA 5	146.5		146.5	
CS	FILTERABLE PART.	.090	GR/DSCF*	206.644	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	1.62	LB/HR	.83	KG/HR
MN	TOTAL PART. MG. EPA 5	152.8		152.8	
CS	TOTAL PART.	.094	GR/DSCF*	215.530	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	1.90	LB/HR	.86	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. F-4

MOTE CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 24.501 * 1.004 * (30.00 + .526 / 13.6)}{(61. + 460.)} = 25.039 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 7. = .35 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .35}{25.039 + .35} = 1.37 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.4}{100.} = .986$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.37/100)) + 18. * (1.37/100) = 28.85

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 199.351 / (SQRT(28.85 * 30.00) * 24. = 20.28 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 20.28 * 284. 3600/144 = 143716. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 143716. * 30.00 * (1. - (1.37/100))}{(71. + 460.)} = 141270.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*ON)

$$ISO = \frac{(305.58*(71.+460.))*((0.002669* 7.)+(24.501*1.004*(30.00+(.526/13.6))/(61.+460.)))}{60. * 20.28 * 30.00 * .311 * .311} = 66.07\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 146.5 * 15.43 / 25.039 = .090 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .090 * 141270. / (15.43 * 453.6) = 1.82

FIELD DATA

PLANT	WESTSIDE GIN, TRANQUILITY, CA.	DATE	11/21/77
SAMPLING LOCATION	MOTE CLEANER	RUN NUMBER	F-5
SAMPLE TYPE	PARTICULATE		
OPERATOR	C. BRUFFEY	PROBE LENGTH & TYPE	5' HEATED STAINLESS
AMBIENT TEMP.(DEG.F)	60.	NOZZLE I.D.	.6250
BAR.PRESS.(IN.HG)	30.00	ASSUMED MOISTURE	3.00
STATIC PRESS.(IN.H2O)	.01	SAMPLE BOX NUMBER	AER
FILTER NUMBER(S)	0000101	METER BOX NUMBER	AER
STACK INSIDE DIM.(IN)	19.00 .00	METER HEAD DIFF.	.070
PITOT TUBE COEFF.	.84	C FACTOR	.00
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.30

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H20)	ORIFICE PRESSURE DIFFERENTIAL (IN.H20)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1350	65.175									
E-12	2.5	0	70.800	.080	.52	.52	70.	61.	62.	1.5	258.	56.
E-11	5.0	0	77.000	.105	.67	.67	71.	62.	62.	2.0	254.	57.
E-10	7.5	0	83.800	.130	.84	.84	72.	64.	62.	2.0	255.	51.
E-09	10.0	0	91.000	.150	.95	.95	72.	66.	63.	2.5	251.	66.
E-08	12.5	0	98.300	.150	.95	.95	74.	67.	63.	2.5	251.	68.
E-07	15.0	0	105.400	.130	.84	.84	73.	69.	63.	2.0	255.	69.
E-06	17.5	0	112.700	.150	.95	.95	71.	68.	63.	2.5	252.	68.
E-05	20.0	0	119.300	.120	.77	.77	72.	69.	64.	2.0	255.	66.
E-04	22.5	0	125.300	.090	.58	.58	70.	70.	64.	1.5	253.	66.
E-03	25.0	0	131.400	.100	.64	.64	73.	69.	64.	1.5	256.	69.
E-02	27.5	0	136.900	.070	.46	.46	71.	68.	64.	1.0	254.	68.
E-01	30.0	1420	142.174	.065	.42	.42	70.	68.	65.	1.0	255.	67.
W-12	32.5	1427	150.500	.140	.89	.89	80.	64.	65.	1.5	250.	69.
W-11	35.0	0	157.600	.140	.89	.89	76.	67.	65.	2.0	252.	68.
W-10	37.5	0	164.900	.155	.98	.98	74.	68.	64.	3.0	256.	64.
W-09	40.0	0	172.200	.150	.95	.95	73.	69.	63.	3.0	252.	66.
W-08	42.5	0	179.700	.160	1.01	1.01	74.	70.	64.	5.0	252.	65.
W-07	45.0	0	187.500	.170	1.08	1.08	72.	70.	65.	5.0	253.	66.
W-06	47.5	0	194.200	.120	.77	.77	71.	68.	64.	3.5	254.	67.
W-05	50.0	0	200.900	.120	.77	.77	72.	68.	64.	3.0	254.	67.
W-04	52.5	0	207.200	.100	.64	.64	72.	68.	63.	2.0	253.	66.
W-03	55.0	0	212.800	.075	.49	.49	71.	67.	63.	1.5	253.	65.
W-02	57.5	0	218.200	.070	.46	.46	70.	67.	63.	1.5	254.	64.
W-01	60.0	1457	222.830	.050	.33	.33	68.	66.	64.	1.0	257.	63.
TOTALS	60.0		157.655									
AVERAGE					.74	.74	72.	67.	64.	2.3	254.	65.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, TRANQUILITY, CA. — C. BRUFFEY

TEST F-5 MOTE CLEANER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/21/77		11/21/77	
TB	TIME-START	1350		1350	
TF	TIME-FINISH	1457		1457	
TT	NET TIME OF TEST, MIN.	60.0		60.0	
NP	NET SAMPLING POINTS	24		24	
Y	METER CALIBRATION FACTOR	1.000		1.000	
DN	SAMPLING NOZZLE DIAMETER	.625	IN	15.9	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
DPM	AVERAGE ORIFICE PRESSURE DROP	.74	IN-H2O	18.9	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	157.655	CU-FT	4.464	CU-M
TM	AVERAGE GAS METER TEMP	65.4	F	18.6	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	159.176	SCF	4.507	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	1.0		1.0	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.047	SCF	.001	SCM
BWO	PERCENT MOISTURE BY VOLUME	.03		.03	
FMD	MOLE FRACTION DRY GAS	1.000		1.000	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	29.00		29.00	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.01	IN-H2O	.25	MM-H2O
PS	STACK PRES, ABS.	30.00	IN-HG	762.02	MM-HG
TS	AVERAGE STACK TEMP	72.	F	22.	C

VS	AVG STACK GAS VELOCITY	18.9	FPS	5.8	MPS
AS	STACK AREA	284.	SQ-IN	.183	SQ-M
QSSTD	STACK FLOW RATE, DRY*	133434.	SCFH	3778.	SCMH
QS	ACTUAL STACK FLOW RATE	134142.	ACFH	3799.	ACMH
ISO	PERCENT ISOKINETIC	110.2		110.2	
MN	FILTERABLE PART. MG. EPA 5	764.3		764.3	
CS	FILTERABLE PART.	.074	GR/DSCF*	169.582	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	1.41	LB/HR	.64	KG/HR
MN	TOTAL PART. MG. EPA 5	778.7		778.7	
CS	TOTAL PART.	.075	GR/DSCF*	172.777	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	1.44	LB/HR	.65	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. F-5

MOTE CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 157.655 * 1.000 * (30.00 + .744 / 13.6)}{(65. + 460.)} = 159.176 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 1. = .05 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .05}{159.176 + .05} = .03 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (MWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.03/100)) + 18. * (.03/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 186.546 / (SQRT(29.00 * 30.00) * 24. = 18.92 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 18.92 * 284. 3600/144 = 134142. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 134142. * 30.00 * (1. - (.03/100))}{(72. + 460.)} = 133434. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(72.+460.))*((0.002669* 1.)+(157.655*1.000*(30.00+(.744/13.6))/(65.+460.)))}{60. * 18.92 * 30.00 * .625 * .625} = 110.25 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 764.3 * 15.43 / 159.176 = .074 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .074 * 133434. / (15.43 * 453.6) = 1.41

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/21/77
SAMPLING LOCATION	MOTE CLEANER	RUN NUMBER	F-6
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	5' HEATED GLASS
OPERATOR	J. IVERSON	NOZZLE I.D.	.3112
AMBIENT TEMP.(DEG.F)	50.	ASSUMED MOISTURE	3.00
BAR.PRESS.(IN.HG)	30.00	SAMPLE BOX NUMBER	FM5
STATIC PRESS.(IN.H2O)	.01	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000927	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	19.00 .00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		REFERENCE PRESS. DIFF.	.48

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O) DESIRED	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O) ACTUAL	STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F) INLET	DRY GAS METER TEMP (DEG.F) OUTLET	PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
INIT	0	1350	62.867									
W-01	2.5	0	63.761	.100	.41	.41	74.	61.	62.	1.0	250.	60.
W-02	5.0	0	64.680	.100	.41	.41	74.	62.	62.	1.0	250.	60.
W-03	7.5	0	65.601	.110	.44	.44	75.	64.	62.	1.0	250.	60.
W-04	10.0	0	66.615	.130	.53	.53	74.	66.	63.	1.0	250.	60.
W-05	12.5	0	67.675	.150	.60	.60	75.	68.	63.	1.0	250.	60.
W-06	15.0	0	68.710	.130	.53	.53	75.	68.	64.	1.0	250.	60.
W-07	17.5	0	69.795	.160	.64	.64	73.	68.	64.	1.0	250.	60.
W-08	20.0	0	70.864	.150	.60	.60	73.	69.	64.	1.0	250.	60.
W-09	22.5	0	71.949	.150	.60	.60	74.	69.	65.	1.0	250.	60.
W-10	25.0	0	73.015	.150	.60	.60	74.	71.	66.	1.0	250.	60.
W-11	27.5	0	74.080	.150	.60	.60	74.	73.	66.	1.0	250.	60.
W-12	30.0	0	75.146	.150	.60	.60	73.	74.	66.	1.0	250.	60.
E-01	32.5	0	76.585	.140	.57	.57	75.	71.	68.	1.0	250.	60.
E-02	35.2	0	79.645	.140	.57	.57	75.	72.	68.	1.0	250.	60.
E-03	37.5	0	78.720	.150	.60	.60	74.	73.	68.	1.0	250.	60.
E-04	40.0	0	79.755	.140	.57	.57	74.	74.	68.	1.0	250.	60.
E-05	42.5	0	80.821	.150	.60	.60	74.	74.	65.	1.0	250.	60.
E-06	45.0	0	81.842	.140	.57	.57	73.	75.	68.	1.0	250.	60.
E-07	47.5	0	82.915	.140	.57	.57	74.	76.	68.	1.0	250.	60.
E-08	50.0	0	83.995	.140	.57	.57	73.	76.	68.	1.0	256.	60.
E-09	52.5	0	85.045	.140	.57	.57	73.	77.	69.	1.0	250.	60.
E-10	55.0	0	86.125	.150	.60	.60	73.	77.	69.	1.0	250.	60.
E-11	57.5	0	87.172	.140	.57	.57	74.	76.	69.	1.0	250.	60.
E-12	60.0	1457	88.230	.140	.57	.57	74.	76.	69.	1.0	250.	60.
TOTALS	60.0		25.363									
AVERAGE					.56	.56	74.	71.	66.	1.0	250.	60.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST TEAM LEADER

J. IVERSON

TEST F-6 MOTE CLEANER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/21/77	11/21/77
TB	TIME-START	1350	1350
TF	TIME-FINISH	1457	1457
TT	NET TIME OF TEST, MIN.	60.0	60.0
NP	NET SAMPLING POINTS	24	24
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.311 IN	7.9 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
DPM	AVERAGE ORIFICE PRESSURE DROP	.56 IN-H2O	14.3 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	25.363 CU-FT	.718 CU-M
TM	AVERAGE GAS METER TEMP	68.6 F	20.3 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	25.542 SCF	.723 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	14.4	14.4
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.678 SCF	.019 SCM
BWO	PERCENT MOISTURE BY VOLUME	2.59	2.59
FMD	MOLE FRACTION DRY GAS	.974	.974
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.72	28.72
PB	BAROMETRIC PRESSURE	30.00 IN-HG	762.00 MM-HG
PSI	STATIC PRES OF STACK GAS	.01 IN-H2O	.25 MM-H2O
PS	STACK PRES, ABS.	30.00 IN-HG	762.02 MM-HG
TS	AVERAGE STACK TEMP	74. F	23. C

VS	AVG STACK GAS VELOCITY	21.1	FPS	6.4	MPS
AS	STACK AREA	284.	SQ-IN	.183	SQ-M
QSSTD	STACK FLOW RATE, DRY*	144183.	SCFH	4083.	SCMH
QS	ACTUAL STACK FLOW RATE	149240.	ACFH	4226.	ACMH
ISO	PERCENT ISOKINETIC	66.0		66.0	
MN	FILTERABLE PART. MG. EPA 5	147.5		147.5	
CS	FILTERABLE PART.	.089	GR/DSCF*	203.956	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	1.64	LB/HR	.83	KG/HR
MN	TOTAL PART. MG. EPA 5	154.2		154.2	
CS	TOTAL PART.	.093	GR/DSCF*	213.220	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	1.92	LB/HR	.87	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. F-6

MOTE CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 25.363 * 1.004 * (30.00 + .562 / 13.6)}{(69. + 460.)} = 25.542 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 14. = .68 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .68}{25.542 + .68} = 2.59 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 2.6}{100.} = .974$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(2.59/100)) + 18. * (2.59/100) = 28.72

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 206.534 / (SQRT(28.72 * 30.00) * 24. = 21.05 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 21.05 * 284. 3600/144 = 149240. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 149240. * 30.00 * (1. - (2.59/100))}{(74. + 460.)} = 144183. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(74.+460.))*((0.002669* 14.)+(25.363*1.004*(30.00+(.562/13.6))/(69.+460.)))}{60. * 21.05 * 30.00 * .311 * .311} = 66.04 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 147.5 * 15.43 / 25.542 = .089 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .089 * 144183. / (15.43 * 453.6) = 1.84

FIELD DATA

PLANT	WESTSIDE GIN		
SAMPLING LOCATION	#2 LINT CLEANER	DATE	11/20/77
		RUN NUMBER	G-1
SAMPLE TYPE	PARTICULATE		
OPERATOR	R.D.	PROBE LENGTH & TYPE	8' GLASS LINED
AMBIENT TEMP.(DEG.F)	65.	NOZZLE I.D.	.6018
BAR.PRESS.(IN.HG)	30.08	ASSUMED MOISTURE	1.00
STATIC PRESS.(IN.H2O)	.00	SAMPLE BOX NUMBER	RAC
FILTER NUMBER(S)	0000750	METER BOX NUMBER	RAC
STACK INSIDE DIM.(IN)	88.00 60.00	METER HEAD DIFF.	1.000
PITOT TUBE COEFF.	.84	C FACTOR	1.10
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	HEATER BOX SETTING	250.0
		REFERENCE PRESS. DIFF.	.01

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	856	851.572									
01	2.5	859	853.200	.006	6.00	.90	63.	42.	42.	1.0	60.	40.
02	5.0	934	854.400	.016	22.00	2.50	63.	50.	50.	1.0	65.	42.
03	7.5	0	856.400	.016	22.00	2.50	63.	56.	50.	1.0	65.	45.
04	10.0	0	859.400	.027	29.00	3.90	63.	57.	51.	1.0	65.	46.
05	12.5	0	861.100	.010	12.00	1.55	63.	63.	51.	1.0	65.	46.
01	15.0	950	864.600	.008	9.00	1.20	63.	62.	52.	1.0	65.	48.
02	17.5	0	865.700	.012	15.00	1.75	63.	68.	53.	1.0	65.	48.
03	20.0	0	867.000	.018	24.00	2.85	63.	72.	54.	1.0	65.	46.
04	22.5	0	869.000	.014	20.00	2.15	63.	76.	55.	1.0	65.	45.
05	25.0	0	870.600	.010	12.00	1.55	63.	78.	56.	1.0	65.	46.
01	27.5	1006	872.000	.005	5.00	.77	63.	77.	58.	1.0	65.	46.
02	30.0	0	874.200	.015	20.00	2.30	63.	80.	60.	1.0	65.	45.
03	32.5	0	876.000	.012	15.00	1.75	63.	82.	60.	1.0	65.	45.
04	35.0	0	877.600	.009	11.00	1.35	63.	83.	60.	1.0	65.	45.
05	37.5	0	879.300	.008	9.00	1.20	63.	84.	61.	1.0	65.	45.
01	40.0	1021	880.500	.004	4.00	.60	63.	84.	64.	1.0	65.	48.
02	42.5	0	882.000	.013	18.00	2.00	63.	88.	67.	1.0	65.	48.
03	45.0	0	885.000	.018	24.00	2.65	63.	96.	70.	2.0	65.	47.
04	47.5	0	887.100	.023	27.00	3.50	63.	101.	70.	2.0	65.	47.
05	50.0	0	889.300	.007	11.00	1.35	63.	103.	71.	2.0	65.	47.
01	52.5	1034	890.400	.005	5.00	.75	63.	94.	77.	1.0	65.	48.
02	55.0	0	892.100	.013	17.00	2.00	63.	98.	74.	1.0	65.	48.
03	57.5	0	894.000	.010	12.00	1.55	63.	100.	75.	1.0	65.	46.
04	60.0	0	895.700	.013	17.00	2.00	63.	101.	76.	1.0	65.	48.
05	62.5	0	897.616	.009	10.00	1.40	63.	102.	77.	1.0	65.	48.
TOTALS	62.5		46.044									
AVERAGE					15.04	1.85	63.	80.	61.	1.1	65.	46.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST LEADER

R.D.

TEST G-1 #2 LINT CLEANER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/20/77	11/20/77
TB	TIME-START	856	856
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	62.5	62.5
NP	NET SAMPLING POINTS	25	25
Y	METER CALIBRATION FACTOR	1.003	1.003
DN	SAMPLING NOZZLE DIAMETER	.602 IN	15.3 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.85 IN-H2O	47.0 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	46.044 CU-FT	1.304 CU-M
TM	AVERAGE GAS METER TEMP	70.6 F	21.5 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	46.416 SCF	1.314 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	4.8	4.8
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.226 SCF	.006 SCM
BWO	PERCENT MOISTURE BY VOLUME	.48	.48
FMD	MOLE FRACTION DRY GAS	.995	.995
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.95	28.95
PB	BAROMETRIC PRESSURE	30.08 IN-HG	764.03 MM-HG
PSI	STATIC PRES OF STACK GAS	.00 IN-H2O	.00 MM-H2O
PS	STACK PRES, ABS.	30.08 IN-HG	764.03 MM-HG
TS	AVERAGE STACK TEMP	63. F	17. C

VS	AVG STACK GAS VELOCITY	6.0	FPS	1.8	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	793698.	SCFH	22475.	SCMH
QS	ACTUAL STACK FLOW RATE	785676.	ACFH	22248.	ACMH
ISO	PERCENT ISOKINETIC	104.2		104.2	
MN	FILTERABLE PART. MG. EPA 5	73.6		73.6	
CS	FILTERABLE PART.	.024	GR/DSCF*	56.002	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	2.77	LB/HR	1.26	KG/HR
MN	TOTAL PART. MG. EPA 5	81.1		81.1	
CS	TOTAL PART.	.027	GR/DSCF*	61.708	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	3.06	LB/HR	1.39	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. G-1

#2 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 46.044 * 1.003 * (30.08 + 1.849 / 13.6)}{(71. + 460.)} = 46.416 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 5. = .23 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .23}{46.416 + .23} = .48 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .5}{100.} = .995$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.48/100)) + 18. * (.48/100) = 28.95

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 61.144 / (SQRT(28.95 * 30.08) * 25. = 5.95 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 5.95 * 5280. 3600/144 = 785676. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 785676. * 30.08 * (1. - (.48/100))}{(63. + 460.)} = 793698. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(63.+460.))*((0.002669* 5.)+(46.044*1.003*(30.08+(1.849/13.6))/(71.+460.)))}{63. * 5.95 * 30.08 * .602 * .602} = 104.22 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 73.6 * 15.43 / 46.416 = .024 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .024 * 793698. / (15.43 * 453.6) = 2.77

FIELD DATA

PLANT	WESTSIDE GIN - TRANQUILITY	DATE	11/20/77
SAMPLING LOCATION	#2 LINT CLEANER	RUN NUMBER	G-2
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS LINED
OPERATOR	BD	NOZZLE I.D.	.6018
AMBIENT TEMP.(DEG.F)	60.	ASSUMED MOISTURE	1.00
BAR.PRESS.(IN.HG)	30.08	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.00	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000741	METER HEAD DIFF.	1.900
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.01

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1312	897.970									
A-01	2.5	0	899.200	.005	5.00	.80	76.	75.	76.	1.0	65.	50.
A-02	5.0	0	900.600	.009	10.00	1.40	76.	80.	77.	1.0	65.	48.
A-03	7.5	0	902.900	.013	18.00	2.00	76.	84.	77.	1.0	65.	46.
A-04	10.0	0	904.600	.011	13.00	1.60	76.	88.	77.	1.0	65.	46.
A-05	12.5	0	906.300	.009	11.00	1.45	76.	90.	78.	1.0	65.	45.
B-01	15.0	1331	907.600	.005	5.00	.80	77.	88.	80.	1.0	65.	47.
B-02	17.5	0	909.500	.014	19.00	2.20	78.	92.	80.	2.0	65.	47.
B-03	20.0	0	912.100	.019	24.00	2.90	78.	93.	81.	3.0	65.	47.
B-04	22.5	0	914.000	.012	16.00	1.90	78.	97.	83.	2.0	65.	47.
B-05	25.0	0	915.700	.009	11.00	1.45	78.	100.	85.	2.0	65.	47.
C-01	27.5	1346	917.400	.007	8.00	1.10	78.	97.	86.	2.0	65.	48.
C-02	30.0	0	919.200	.012	15.00	1.85	78.	102.	87.	2.0	65.	50.
C-03	32.5	0	921.600	.014	18.00	2.65	78.	103.	88.	2.5	65.	50.
C-04	35.0	0	923.800	.018	23.00	2.80	78.	104.	88.	2.5	65.	51.
C-05	37.5	0	925.700	.011	13.00	1.60	78.	104.	88.	2.0	65.	51.
D-01	40.0	1403	927.300	.007	8.00	1.10	78.	101.	89.	2.0	65.	52.
D-02	42.5	0	929.500	.017	22.00	2.60	79.	103.	90.	2.5	65.	52.
D-03	45.0	0	931.800	.016	20.00	2.50	80.	103.	91.	2.5	65.	52.
D-04	47.5	0	934.200	.021	26.00	3.30	80.	104.	92.	3.0	65.	52.
D-05	50.0	0	936.400	.014	18.00	2.65	80.	105.	92.	2.5	65.	53.
E-01	52.5	1417	938.200	.010	12.00	1.60	80.	102.	93.	2.0	65.	53.
E-02	55.0	0	940.400	.016	19.00	2.45	80.	102.	93.	2.0	65.	53.
E-03	57.5	0	942.500	.013	17.00	2.10	80.	102.	94.	2.0	65.	53.
E-04	60.0	0	944.700	.017	22.00	2.60	80.	103.	94.	2.5	65.	53.
E-05	62.5	0	946.745	.011	14.00	1.65	80.	104.	95.	2.0	65.	53.
TOTALS	62.5		48.775									
AVERAGE					15.48	1.96	78.	97.	86.	2.0	65.	50.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN - TRANQUILITY — BD

TEST G-2 #2 LINT CLEANER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/20/77	11/20/77
TB	TIME-START	1312	1312
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	62.5	62.5
NP	NET SAMPLING POINTS	25	25
Y	METER CALIBRATION FACTOR	1.003	1.003
DN	SAMPLING NOZZLE DIAMETER	.602 IN	15.3 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.96 IN-H2O	49.8 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	48.775 CU-FT	1.381 CU-M
TM	AVERAGE GAS METER TEMP	91.6 F	33.1 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	47.312 SCF	1.340 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	3.3	3.3
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.155 SCF	.004 SCM
BWO	PERCENT MOISTURE BY VOLUME	.33	.33
FMD	MOLE FRACTION DRY GAS	.997	.997
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.96	28.96
PB	BAROMETRIC PRESSURE	30.08 IN-HG	764.03 MM-HG
PSI	STATIC PRES OF STACK GAS	.00 IN-H2O	.00 MM-H2O
PS	STACK PRES, ABS.	30.08 IN-HG	764.03 MM-HG
TS	AVERAGE STACK TEMP	78. F	26. C

VS	AVG STACK GAS VELOCITY	6.2	FPS	1.9	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	803151.	SCFH	22743.	SCMH
QS	ACTUAL STACK FLOW RATE	816909.	ACFH	23132.	ACMH
ISO	PERCENT ISOKINETIC	105.0		105.0	
MN	FILTERABLE PART. MG. EPA 5	80.3		80.3	
CS	FILTERABLE PART.	.026	GR/DSCF*	59.943	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.01	LB/HR	1.36	KG/HR
MN	TOTAL PART. MG. EPA 5	85.5		85.5	
CS	TOTAL PART.	.028	GR/DSCF*	63.824	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	3.20	LB/HR	1.45	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. G-2

#2 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 48.775 * 1.003 * (30.08 + 1.962 / 13.6)}{(92. + 460.)} = 47.312 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 3. = .16 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .16}{47.312 + .16} = .33 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .3}{100.} = .997$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.33/100)) + 18. * (.33/100) = 28.96

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 63.594 / (SQRT(28.96 * 30.08) * 25. = 6.19 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 6.19 * 5280. 3600/144 = 816909. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 816909. * 30.08 * (1. - (.33/100))}{(78. + 460.)} = 803151. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(78.+460.))*((0.002669* 3.)+(48.775*1.003*(30.08+(1.962/13.6))/(92.+460.)))}{63. * 6.19 * 30.08 * .602 * .602} = 104.98 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 80.3 * 15.43 / 47.312 = .026 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .026 * 803151. / (15.43 * 453.6) = 3.01

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/20/77
SAMPLING LOCATION	#2 LINT CLEANER	RUN NUMBER	6-3
SAMPLE TYPE	PARTICULATE		
OPERATOR	BD	PROBE LENGTH & TYPE	8' GLASS LINED
AMBIENT TEMP.(DEG.F)	60.	NOZZLE I.D.	.6018
BAR.PRESS.(IN.HG)	30.00	ASSUMED MOISTURE	1.00
STATIC PRESS.(IN.H2O)	.00	SAMPLE BOX NUMBER	FMS
FILTER NUMBER(S)	0000967	METER BOX NUMBER	RAC
STACK INSIDE DIM.(IN)	88.00 60.00	METER HEAD DIFF.	1.820
PITOT TUBE COEFF.	.84	C FACTOR	1.10
		PROBE HEATER SETTING	250.0
READ & RECORD DATA EVERY 2.5 MINUTES		HEATER BOX SETTING	.0
		REFERENCE PRESS. DIFF.	.01

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1522	948.966									
E-01	2.5	0	951.400	.026	32.00	4.30	80.	70.	70.	2.5	65.	48.
E-02	5.0	0	954.300	.027	34.00	4.50	80.	76.	71.	2.5	65.	46.
E-03	7.5	0	957.200	.027	34.00	4.50	80.	86.	74.	2.5	65.	46.
E-04	10.0	0	960.300	.031	38.00	5.20	80.	94.	77.	3.0	65.	48.
E-05	12.5	0	963.100	.026	32.00	4.30	80.	97.	78.	2.5	65.	48.
D-01	15.0	1544	964.600	.006	6.00	1.00	80.	93.	80.	2.0	65.	49.
D-02	17.5	0	966.800	.016	22.00	2.65	80.	95.	82.	2.0	65.	48.
D-03	20.0	0	969.300	.023	28.00	3.80	80.	97.	83.	2.0	65.	48.
D-04	22.5	0	971.400	.013	18.00	2.15	80.	99.	84.	2.0	65.	47.
D-05	25.0	0	973.400	.013	18.00	2.15	80.	99.	85.	2.0	65.	47.
C-01	27.5	1539	974.900	.006	6.00	1.00	80.	89.	85.	2.0	65.	48.
C-02	30.0	0	976.900	.010	12.00	1.60	80.	90.	85.	2.0	65.	49.
C-03	32.5	0	979.400	.021	26.00	3.40	80.	90.	85.	2.0	65.	49.
C-04	35.0	0	981.600	.013	18.00	2.15	80.	92.	86.	2.0	65.	49.
C-05	37.5	0	983.500	.011	14.00	1.90	81.	93.	86.	2.0	65.	50.
H-01	40.0	1614	985.100	.006	6.00	1.00	81.	93.	86.	2.0	65.	50.
B-02	42.5	0	987.200	.012	16.00	2.00	81.	95.	86.	2.0	65.	50.
B-03	45.0	0	989.200	.014	20.00	2.50	81.	95.	86.	2.0	65.	50.
B-04	47.5	0	991.000	.009	11.00	1.50	81.	95.	86.	2.0	65.	49.
B-05	50.0	0	992.700	.010	12.00	1.60	81.	94.	86.	2.0	65.	49.
A-01	52.5	1629	994.000	.005	5.00	.80	81.	95.	85.	2.0	65.	48.
A-02	55.0	0	995.100	.007	8.00	1.20	81.	95.	85.	2.0	65.	47.
A-03	57.5	0	997.600	.012	16.00	2.00	81.	95.	85.	2.0	65.	47.
A-04	60.0	0	999.500	.009	10.00	1.45	81.	95.	85.	2.0	65.	47.
A-05	62.5	0	1.216	.009	11.00	1.50	81.	95.	84.	2.0	65.	46.
TOTALS	62.5		52.250									
AVERAGE					18.12	2.40	80.	92.	83.	2.1	65.	48.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS | TEST TEAM LEADER

WESTSIDE GIN | BD

TEST G-3 #2 LINT CLEANER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/20/77		11/20/77	
TB	TIME-START	1522		1522	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	62.5		62.5	
NP	NET SAMPLING POINTS	25		25	
Y	METER CALIBRATION FACTOR	1.003		1.003	
DN	SAMPLING NOZZLE DIAMETER	.602	IN	15.3	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.40	IN-H2O	60.9	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	52.250	CU-FT	1.480	CU-M
TM	AVERAGE GAS METER TEMP	87.4	F	30.8	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	50.987	SCF	1.444	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	.3		.3	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.014	SCF	.000	SCM
BWO	PERCENT MOISTURE BY VOLUME	.03		.03	
FMD	MOLE FRACTION DRY GAS	1.000		1.000	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	29.00		29.00	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.00	IN-H2O	.00	MM-H2O
PS	STACK PRES, ABS.	30.00	IN-HG	762.00	MM-HG
TS	AVERAGE STACK TEMP	80.	F	27.	C

VS	AVG STACK GAS VELOCITY	6.6	FPS	2.0	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	850595.	SCFH	24086.	SCMH
QS	ACTUAL STACK FLOW RATE	868410.	ACFH	24591.	ACMH
ISO	PERCENT ISOKINETIC	106.8		106.8	
MN	FILTERABLE PART. MG. EPA 5	116.3		116.3	
CS	FILTERABLE PART.	.035	GR/DSCF*	80.559	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.28	LB/HR	1.94	KG/HR
MN	TOTAL PART. MG. EPA 5	126.4		126.4	
CS	TOTAL PART.	.038	GR/DSCF*	87.555	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.65	LB/HR	2.11	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. G-3

#2 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 52.250 * 1.003 * (30.00 + 2.398 / 13.6)}{(87. + 460.)} = 50.987 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 0. = .01 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .01}{50.987 + .01} = .03 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .0}{100.} = 1.000$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.03/100)) + 18. * (.03/100) = 29.00

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 67.551 / (SQRT(29.00 * 30.00) * 25. = 6.58 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 6.58 * 5280. 3600/144 = 868410. ACFH

STACK GAS VOLUMETHIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 868410. * 30.00 * (1. - (.03/100))}{(80. + 460.)} = 850595.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(80.+460.))*((0.002669* 0.)+(52.250*1.003*(30.00+(2.398/13.6))/(87.+460.)))}{63. * 6.58 * 30.00 * .602 * .602} = 106.82\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 116.3 * 15.43 / 50.987 = .035 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .035 * 850595. / (15.43 * 453.6) = 4.28

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/22/77
SAMPLING LOCATION	#1 LINT CLEANER	RUN NUMBER	H-1
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS
OPERATOR		NOZZLE I.D.	.5002
AMBIENT TEMP.(DEG.F)	50.	ASSUMED MOISTURE	1.00
BAR.PRESS.(IN.HG)	30.10	SAMPLE BOX NUMBER	FM5
STATIC PRESS.(IN.H2O)	.00	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000803	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.08

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1556	614.836									
E-01	2.5	0	615.500	.007	8.00	.50	83.	72.	72.	1.0	250.	64.
E-02	5.0	0	617.200	.016	20.00	1.10	83.	74.	72.	2.0	250.	62.
E-03	7.5	0	619.500	.036	39.00	2.45	83.	78.	72.	5.0	250.	60.
E-04	10.0	0	621.900	.044	45.00	2.95	83.	82.	73.	5.0	250.	60.
E-05	12.5	0	624.100	.044	45.00	2.95	83.	84.	74.	5.0	255.	60.
D-01	15.0	1619	625.400	.013	17.00	.95	83.	87.	75.	2.0	250.	62.
D-02	17.5	0	627.000	.019	27.00	1.35	82.	92.	76.	2.5	255.	61.
D-03	20.0	0	629.400	.056	59.00	4.50	82.	93.	76.	5.5	250.	60.
D-04	22.5	0	631.500	.034	40.00	2.35	82.	98.	78.	3.5	250.	61.
D-05	25.0	0	633.400	.030	34.00	2.05	81.	99.	78.	3.0	250.	63.
C-01	27.5	1639	635.000	.020	24.00	1.40	81.	87.	79.	3.5	250.	63.
C-02	30.0	0	636.700	.025	30.00	1.65	81.	90.	80.	3.5	245.	63.
C-03	32.5	0	639.000	.041	44.00	2.90	81.	92.	80.	5.0	245.	63.
C-04	35.0	0	641.000	.034	40.00	2.35	81.	96.	81.	5.0	250.	64.
C-05	37.5	0	643.100	.032	38.00	2.20	81.	97.	81.	4.5	250.	63.
B-01	40.0	1657	644.800	.021	26.00	1.50	80.	90.	82.	3.0	250.	63.
B-02	42.5	0	646.700	.028	33.00	1.95	80.	94.	82.	3.5	245.	64.
B-03	45.0	0	648.600	.028	33.00	1.95	80.	96.	83.	3.5	250.	64.
B-04	47.5	0	650.500	.025	30.00	1.65	80.	98.	83.	3.5	250.	64.
B-05	50.0	0	652.100	.020	24.00	1.40	80.	99.	83.	3.0	250.	64.
A-01	52.5	1712	653.700	.018	21.00	1.20	80.	92.	84.	3.0	250.	63.
A-02	55.0	0	656.200	.020	24.00	1.40	80.	95.	84.	3.0	250.	63.
A-03	57.5	0	656.800	.016	20.00	1.10	80.	96.	84.	3.0	250.	63.
A-04	60.0	0	658.500	.018	21.00	1.20	80.	96.	84.	3.0	245.	62.
A-05	62.5	0	659.545	.012	16.00	.90	80.	97.	85.	2.5	245.	62.
TOTALS	62.5		44.709									
AVERAGE					30.32	1.84	81.	91.	79.	3.5	249.	62.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN

TEST H-1 #1 LINT CLEANER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/22/77	11/22/77
TB	TIME-START	1556	1556
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	62.5	62.5
NP	NET SAMPLING POINTS	25	25
Y	METER CALIBRATION FACTOR	1.004	1.004
DN	SAMPLING NOZZLE DIAMETER	.500 IN	12.7 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.84 IN-H2O	46.6 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	44.709 CU-FT	1.266 CU-M
TM	AVERAGE GAS METER TEMP	85.1 F	29.5 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	43.945 SCF	1.244 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	9.7	9.7
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.457 SCF	.013 SCM
BWO	PERCENT MOISTURE BY VOLUME	1.03	1.03
FMD	MOLE FRACTION DRY GAS	.990	.990
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.89	28.89
PB	BAROMETRIC PRESSURE	30.10 IN-HG	764.54 MM-HG
PSI	STATIC PRES OF STACK GAS	.00 IN-H2O	.00 MM-H2O
PS	STACK PRES, ABS.	30.10 IN-HG	764.54 MM-HG
TS	AVERAGE STACK TEMP	81. F	27. C

VS	AVG STACK GAS VELOCITY	9.0	FPS	2.7	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	1149698.	SCFH	32556.	SCMH
QS	ACTUAL STACK FLOW RATE	1183366.	ACFH	33509.	ACMH
ISO	PERCENT ISOKINETIC	98.6		98.6	
MN	FILTERABLE PART. MG. EPA 5	158.7		158.7	
CS	FILTERABLE PART.	.056	GR/DSCF*	127.545	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	9.15	LB/HR	4.15	KG/HR
MN	TOTAL PART. MG. EPA 5	178.2		178.2	
CS	TOTAL PART.	.063	GR/DSCF*	143.217	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	10.28	LB/HR	4.66	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. H-1

#1 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 44.709 * 1.004 * (30.10 + 1.836 / 13.6)}{(85. + 460.)} = 43.945 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 10. = .46 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .46}{43.945 + .46} = 1.03 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.0}{100.} = .990$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.03/100)) + 18. * (1.03/100) = 28.89

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * (92.029 / (SQRT(28.89 * 30.10) * 25. = 8.96 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 8.96 * 5280. 3600/144 = 1183366. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 1183366. * 30.10 * (1. - (1.03/100))}{(81. + 460.)} = 1149698. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(81.+460.))*((0.002669* 10.)+(44.709*1.004*(30.10+(1.836/13.6))/(85.+460.)))}{63. * 8.96 * 30.10 * .500 * .500} = 98.60 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 158.7 * 15.43 / 43.945 = .056 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .056 * 1149698. / (15.43 * 453.6) = 9.15

FIELD DATA

PLANT	WESTSIDE GIN - TRANQUILITY
SAMPLING LOCATION	#1 LINT CLEANER
SAMPLE TYPE	PARTICULATE
OPERATOR	BD
AMBIENT TEMP.(DEG.F)	55.
BAR.PRESS.(IN.HG)	30.10
STATIC PRESS.(IN.H2O)	.00
FILTER NUMBER(S)	0000816
STACK INSIDE DIM.(IN)	88.00 60.00
PITOT TUBE COEFF.	.84

DATE	11/22/77
RUN NUMBER	H-2
PROBE LENGTH & TYPE	8' GLASS LINED
NOZZLE I.D.	.5002
ASSUMED MOISTURE	1.00
SAMPLE BOX NUMBER	FM5
METER BOX NUMBER	RAC
METER HEAD DIFF.	1.910
C FACTOR	1.10
PROBE HEATER SETTING	250.0
HEATER BOX SETTING	250.0
REFERENCE PRESS. DIFF.	.08

READ & RECORD DATA EVERY 2.5 MINUTES

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1739	659.600									
A-01	2.5	0	661.400	.017	20.00	1.20	83.	77.	73.	1.0	235.	56.
A-02	5.0	0	663.000	.019	23.00	1.35	83.	83.	73.	1.0	245.	55.
A-03	7.5	0	664.800	.025	30.00	1.75	83.	87.	74.	1.0	245.	55.
A-04	10.0	0	666.500	.021	25.00	1.45	83.	89.	74.	1.0	245.	56.
A-05	12.5	0	668.100	.018	22.00	1.30	83.	91.	75.	1.0	245.	56.
B-01	15.0	1819	669.000	.006	6.00	.47	83.	80.	77.	1.0	250.	55.
B-02	17.5	0	670.400	.016	19.00	1.10	83.	84.	77.	1.0	250.	57.
B-03	20.0	0	672.200	.025	30.00	1.75	83.	87.	78.	1.0	250.	57.
B-04	22.5	0	674.100	.024	28.00	1.70	83.	90.	78.	1.0	255.	58.
B-05	25.0	0	675.700	.018	21.00	1.25	82.	92.	78.	1.0	260.	59.
C-01	27.5	636	677.200	.010	13.00	.70	82.	87.	78.	1.0	255.	59.
C-02	30.0	0	678.300	.014	17.00	1.00	82.	91.	79.	1.0	255.	60.
C-03	32.5	0	680.300	.034	38.00	2.30	82.	93.	80.	2.0	250.	60.
C-09	35.0	0	682.400	.034	38.00	2.20	82.	93.	80.	2.0	250.	60.
C-05	37.5	0	684.500	.024	28.00	1.70	82.	96.	80.	2.0	250.	61.
D-01	40.0	1850	685.400	.004	11.00	.45	82.	89.	80.	1.0	250.	61.
D-02	42.5	0	686.500	.012	15.00	.90	82.	92.	80.	1.0	250.	62.
D-03	45.0	0	689.100	.041	44.00	8.50	82.	93.	80.	2.0	250.	62.
D-04	47.5	0	691.000	.041	44.00	2.90	82.	97.	82.	2.0	250.	62.
D-05	50.0	0	693.000	.030	34.00	2.10	82.	99.	82.	2.0	250.	63.
E-01	52.5	1904	694.000	.006	7.00	.50	82.	91.	83.	1.0	250.	63.
E-02	55.0	0	695.000	.006	7.00	.50	82.	92.	83.	1.0	250.	63.
E-03	57.5	0	696.700	.024	28.00	1.70	82.	92.	83.	1.0	250.	63.
E-04	60.0	0	699.000	.042	45.00	2.95	82.	95.	83.	2.0	250.	63.
E-05	62.5	0	700.915	.026	32.00	1.80	82.	96.	83.	2.0	250.	63.
TOTALS	62.5		41.315									
AVERAGE					25.00	1.74	82.	90.	79.	1.3	250.	60.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN - TRANQUILITY

TEST TEAM LEADER

BD

TEST H-2 #1 LINT CLEANER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/22/77		11/22/77	
TB	TIME-START	1739		1739	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	62.5		62.5	
NP	NET SAMPLING POINTS	25		25	
Y	METER CALIBRATION FACTOR	1.010		1.010	
DN	SAMPLING NOZZLE DIAMETER	.500	IN	12.7	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.74	IN-H2O	44.2	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	41.315	CU-FT	1.170	CU-M
TM	AVERAGE GAS METER TEMP	84.6	F	29.2	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	40.881	SCF	1.158	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	18.7		18.7	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.880	SCF	.025	SCM
BWO	PERCENT MOISTURE BY VOLUME	2.11		2.11	
FMD	MOLE FRACTION DRY GAS	.979		.979	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.77		28.77	
PB	BAROMETRIC PRESSURE	30.10	IN-HG	764.54	MM-HG
PSI	STATIC PRES OF STACK GAS	.00	IN-H2O	.00	MM-H2O
PS	STACK PRES, ABS.	30.10	IN-HG	764.54	MM-HG
TS	AVERAGE STACK TEMP	82.	F	28.	C

VS	AVG STACK GAS VELOCITY	8.0	FPS	2.4	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	1014448.	SCFH	28726.	SCMH
QS	ACTUAL STACK FLOW RATE	1057932.	ACFH	29957.	ACMH
ISO	PERCENT ISOKINETIC	104.0		104.0	
MN	FILTERABLE PART. MG. EPA 5	143.1		143.1	
CS	FILTERABLE PART.	.054	GR/DSCF*	123.627	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	7.83	LB/HR	3.55	KG/HR
MN	TOTAL PART. MG. EPA 5	163.3		163.3	
CS	TOTAL PART.	.062	GR/DSCF*	141.078	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	8.93	LB/HR	4.05	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. M-2

#1 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 41.315 * 1.010 * (30.10 + 1.741 / 13.6)}{(85. + 460.)} = 40.881 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 19. = .88 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .88}{40.881 + .88} = 2.11 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 2.1}{100.} = .979$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(2.11/100)) + 18. * (2.11/100) = 28.77

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 82.105 / (SQRT(28.77 * 30.10) * 25. = 8.01 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 8.01 * 5280. 3600/144 = 1057932. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 1057932. * 30.10 * (1. - (2.11/100))}{(82. + 460.)} = 1014448.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(82.+460.))*((0.002669*19.)+(41.315*1.010*(30.10+(1.741/13.6))/(85.+460.)))}{63. * 8.01 * 30.10 * .500 * .500} = 103.95\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 143.1 * 15.43 / 40.881 = .054 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .054 * 1014448. / (15.43 * 453.6) = 7.83

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/22/77
SAMPLING LOCATION	#1 LINT CLEANER	RUN NUMBER	H-3
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS
OPERATOR	BD	NOZZLE I.D.	.5002
AMBIENT TEMP.(DEG.F)	55.	ASSUMED MOISTURE	1.00
BAR.PRESS.(IN.HG)	30.10	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.00	METER BOX NUMBER	RAC
FILTER NUMBER(S)		METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.08

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1934	701.126									
E-01	2.5	0	702.100	.006	7.00	.43	82.	76.	75.	1.0	250.	55.
E-02	5.0	0	703.000	.007	8.00	.47	82.	79.	75.	1.0	255.	56.
E-03	7.5	0	704.800	.025	31.00	1.75	82.	83.	76.	2.0	260.	57.
E-04	10.0	0	707.000	.049	47.00	5.20	82.	85.	76.	4.0	255.	57.
E-05	12.5	0	709.000	.027	35.00	1.90	82.	93.	78.	3.0	255.	56.
D-01	15.0	1952	710.200	.009	10.00	.60	81.	87.	78.	2.0	255.	56.
D-02	17.5	0	711.500	.011	14.00	.75	81.	89.	78.	2.0	255.	57.
D-03	20.0	0	713.200	.026	33.00	1.85	81.	92.	79.	3.0	255.	59.
D-04	22.5	0	715.300	.034	39.00	2.35	81.	94.	80.	3.0	255.	59.
D-05	25.0	0	717.100	.025	31.00	1.75	81.	96.	80.	3.0	250.	59.
C-01	27.5	2015	718.400	.013	16.00	.90	81.	87.	81.	2.0	250.	60.
C-02	30.0	0	719.900	.021	25.00	1.35	81.	90.	81.	2.0	250.	60.
C-03	32.5	0	721.800	.036	42.00	2.45	81.	92.	81.	3.0	250.	61.
C-04	35.0	0	723.900	.034	39.00	2.35	81.	96.	82.	3.0	250.	61.
C-05	37.5	0	725.800	.025	30.00	1.80	81.	98.	83.	3.0	250.	61.
B-01	40.0	2021	727.100	.014	17.00	.95	81.	89.	84.	2.0	245.	62.
B-02	42.5	0	728.900	.020	24.00	1.70	80.	93.	84.	2.5	245.	62.
B-03	45.0	0	730.800	.026	31.00	1.85	80.	95.	84.	2.5	250.	62.
B-04	47.5	0	732.700	.025	30.00	1.80	80.	97.	85.	2.5	250.	63.
B-05	50.0	0	734.200	.016	20.00	1.10	80.	99.	80.	2.5	250.	63.
A-01	52.5	2038	735.600	.013	16.00	.90	80.	91.	81.	2.0	250.	62.
A-02	55.0	0	737.100	.018	22.00	1.20	80.	94.	82.	2.0	250.	62.
A-03	57.5	0	738.400	.016	20.00	1.10	80.	97.	83.	2.0	250.	61.
A-04	60.0	0	739.800	.013	16.00	.90	80.	100.	84.	2.0	250.	61.
A-05	62.5	0	741.212	.013	16.00	.90	80.	101.	85.	2.0	250.	61.
TOTALS	62.5		40.086									
AVERAGE					24.76	1.53	81.	92.	81.	2.4	251.	60.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS | TEST TEAM LEADER

WESTSIDE GIN | BD

TEST M-3 #1 LINT CLEANER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/22/77	11/22/77
TB	TIME-START	1934	1934
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	62.5	62.5
NP	NET SAMPLING POINTS	25	25
Y	METER CALIBRATION FACTOR	1.010	1.010
DN	SAMPLING NOZZLE DIAMETER	.500 IN	12.7 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.53 IN-H2O	38.9 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	40.086 CU-FT	1.135 CU-M
TM	AVERAGE GAS METER TEMP	86.2 F	30.1 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	39.530 SCF	1.119 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	24.8	24.8
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	1.167 SCF	.033 SCM
BWO	PERCENT MOISTURE BY VOLUME	2.87	2.87
FMD	MOLE FRACTION DRY GAS	.971	.971
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.68	28.68
PB	BAROMETRIC PRESSURE	30.10 IN-HG	764.54 MM-HG
PSI	STATIC PRES OF STACK GAS	.00 IN-H2O	.00 MM-H2O
PS	STACK PRES, ABS.	30.10 IN-HG	764.54 MM-HG
TS	AVERAGE STACK TEMP	81. F	27. C

VS	AVG STACK GAS VELOCITY	8.0	FPS	2.4	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	1004418.	SCFH	28442.	SCMH
QS	ACTUAL STACK FLOW RATE	1052716.	ACFH	29810.	ACMH
ISO	PERCENT ISOKINETIC	101.5		101.5	
MN	FILTERABLE PART. MG. EPA 5	332.3		332.3	
CS	FILTERABLE PART.	.130	GR/DSCF*	296.891	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	18.61	LB/HR	8.44	KG/HR
MN	TOTAL PART. MG. EPA 5	352.9		352.9	
CS	TOTAL PART.	.138	GR/DSCF*	315.296	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	19.77	LB/HR	8.97	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. H-3

#1 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 40.086 * 1.010 * (30.10 + 1.532 / 13.6)}{(86. + 460.)} = 39.530 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 25. = 1.17 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * 1.17}{39.530 + 1.17} = 2.87 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 2.9}{100.} = .971$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(2.87/100)) + 18. * (2.87/100) = 28.68

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 81.581 / (SQRT(28.68 * 30.10) * 25. = 7.98 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 7.98 * 5280. 3600/144 = 1052716. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 1052716. * 30.10 * (1. - (2.87/100))}{(81. + 460.)} = 1004418. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(81.+460.))*((0.002669* 25.)+(40.086*1.010*(30.10+(1.532/13.6))/(86.+460.)))}{63. * 7.98 * 30.10 * .500 * .500} = 101.52 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 332.3 * 15.43 / 39.530 = .130 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .130 * 1004418. / (15.43 * 453.6) = 18.61

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/21/77
SAMPLING LOCATION	#2 LINT CLEANER	RUN NUMBER	I-1
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS
OPERATOR	BD	NOZZLE I.D.	.6018
AMBIENT TEMP.(DEG.F)	48.	ASSUMED MOISTURE	.00
BAR.PRESS.(IN.HG)	30.08	SAMPLE BOX NUMBER	FMA
STATIC PRESS.(IN.H2O)	.00	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000758	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.01

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	835	384.797									
E-01	2.5	0	386.500	.012	16.00	3.30	75.	50.	50.	4.0	245.	50.
E-02	5.0	0	388.900	.016	22.00	3.70	75.	60.	51.	5.0	245.	50.
E-03	7.5	0	391.400	.016	22.00	3.70	75.	66.	51.	5.0	240.	52.
E-04	10.0	0	394.100	.027	28.00	5.20	75.	72.	52.	6.0	240.	54.
E-05	12.5	0	396.600	.016	22.00	3.70	75.	76.	52.	5.0	240.	55.
D-01	15.0	855	398.500	.013	18.00	2.15	75.	64.	52.	4.0	240.	55.
D-02	17.5	0	400.500	.019	24.00	3.30	75.	71.	54.	4.0	245.	55.
D-03	20.0	0	403.100	.028	30.00	4.70	75.	75.	55.	5.0	245.	55.
D-04	22.5	0	405.500	.019	24.00	3.30	75.	80.	56.	4.0	245.	55.
D-05	25.0	0	407.700	.019	24.00	3.30	75.	82.	56.	4.0	245.	56.
C-01	27.5	910	409.300	.011	14.00	1.80	75.	70.	56.	3.0	225.	55.
C-02	30.0	0	411.000	.009	11.00	1.65	75.	74.	56.	3.0	240.	55.
C-03	32.5	0	412.800	.012	16.00	2.00	75.	76.	56.	3.0	245.	50.
C-04	35.0	0	414.400	.009	10.00	1.40	75.	76.	56.	3.0	245.	56.
C-05	37.5	0	415.900	.007	8.00	1.15	75.	76.	56.	3.0	245.	56.
B-01	40.0	929	417.300	.008	9.00	1.30	75.	68.	58.	3.0	245.	56.
B-02	42.5	0	418.900	.007	8.00	1.15	75.	70.	55.	3.0	245.	50.
B-03	45.0	0	420.500	.009	10.00	1.40	75.	73.	60.	3.0	245.	57.
B-04	47.5	0	422.000	.009	10.00	1.40	75.	75.	60.	3.0	245.	57.
B-05	50.0	0	423.500	.007	8.00	1.15	75.	76.	60.	3.0	245.	57.
A-01	52.5	944	424.300	.007	8.00	1.15	75.	69.	59.	3.0	245.	57.
A-02	55.0	0	426.300	.006	7.00	1.10	75.	73.	60.	3.0	250.	57.
A-03	57.5	0	428.000	.009	11.00	1.65	75.	74.	60.	3.0	250.	57.
A-04	60.0	0	429.600	.007	8.00	1.15	75.	75.	60.	3.0	250.	57.
A-05	62.5	0	431.250	.007	8.00	1.15	75.	75.	61.	3.0	250.	57.
TOTALS	62.5		46.453									
AVERAGE					15.04	2.28	75.	72.	56.	3.6	244.	55.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN — BD

TEST 1-1 #2 LINT CLEANER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/21/77		11/21/77	
TB	TIME-START	835		835	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	62.5		62.5	
NP	NET SAMPLING POINTS	25		25	
Y	METER CALIBRATION FACTOR	1.010		1.010	
DN	SAMPLING NOZZLE DIAMETER	.602	IN	15.3	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	2.28	IN-H2O	57.9	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	46.453	CU-FT	1.315	CU-M
TM	AVERAGE GAS METER TEMP	64.0	F	17.8	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	47.805	SCF	1.354	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	14.5		14.5	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.683	SCF	.019	SCM
BWO	PERCENT MOISTURE BY VOLUME	1.41		1.41	
FMD	MOLE FRACTION DRY GAS	.986		.986	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.85		28.85	
PB	BAROMETRIC PRESSURE	30.08	IN-HG	764.03	MM-HG
PSI	STATIC PRES OF STACK GAS	.00	IN-H2O	.00	MM-H2O
PS	STACK PRES, ABS.	30.08	IN-HG	764.03	MM-HG
TS	AVERAGE STACK TEMP	75.	F	24.	C

VS	AVG STACK GAS VELOCITY	6.1	FPS	1.9	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	788224.	SCFH	22320.	SCMH
QS	ACTUAL STACK FLOW RATE	805633.	ACFH	22813.	ACMH
ISO	PERCENT ISOKINETIC	108.1		108.1	
MN	FILTERABLE PART. MG. EPA 5	141.2		141.2	
CS	FILTERABLE PART.	.046	GR/DSCF*	104.318	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	5.13	LB/HR	2.33	KG/HR
MN	TOTAL PART. MG. EPA 5	160.3		160.3	
CS	TOTAL PART.	.052	GR/DSCF*	118.429	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	5.83	LB/HR	2.64	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. I-1

#2 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 46.453 * 1.010 * (30.08 + 2.278 / 13.6)}{(64. + 460.)} = 47.805 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 15. = .68 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .68}{47.805 + .68} = 1.41 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.4}{100.} = .986$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.41/100)) + 18. * (1.41/100) = 28.85

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP_k * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 62.587 / (SQRT(28.85 * 30.08) * 25. = 6.10 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 6.10 * 5280. 3600/144 = 805633. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 805633. * 30.08 * (1. - (1.41/100))}{(75. + 460.)} = 788224. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(75.+460.))*((0.002669* 15.)+(46.453*1.010*(30.08+(2.278/13.6))/(64.+460.)))}{63. * 6.10 * 30.08 * .602 * .602} = 108.08 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 141.2 * 15.43 / 47.805 = .046 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .046 * 788224. / (15.43 * 453.6) = 5.13

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/21/77
SAMPLING LOCATION	#2 LINT CLEANER	RUN NUMBER	I-2
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS LINED
OPERATOR	BD	NOZZLE I.D.	.6018
AMBIENT TEMP.(DEG.F)	0.	ASSUMED MOISTURE	1.00
BAR.PRESS.(IN.HG)	30.00	SAMPLE BOX NUMBER	FMA
STATIC PRESS.(IN.H2O)	.01	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000708	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.01

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1318	431.175									
E-01	2.5	0	432.800	.009	11.00	1.50	76.	62.	67.	2.0	250.	50.
E-02	5.0	0	434.400	.011	14.00	1.85	76.	70.	62.	2.0	250.	50.
E-03	7.5	0	436.000	.008	10.00	1.40	76.	72.	63.	2.0	250.	50.
E-04	10.0	0	437.400	.007	8.00	1.15	76.	76.	63.	2.0	250.	49.
E-05	12.5	0	438.700	.005	5.00	.90	76.	78.	64.	2.0	250.	49.
D-01	15.0	1339	440.100	.006	6.00	1.00	76.	71.	65.	2.0	250.	50.
D-02	17.5	0	441.700	.010	12.00	1.65	76.	78.	66.	2.0	250.	52.
D-03	20.0	0	443.500	.012	15.00	2.00	76.	81.	67.	3.0	250.	53.
D-04	22.5	0	445.100	.007	8.00	1.15	76.	87.	67.	3.0	250.	55.
D-05	25.0	0	446.600	.007	8.00	1.15	76.	89.	67.	3.0	250.	57.
C-01	27.5	1354	448.000	.007	8.00	1.15	76.	81.	67.	3.0	250.	57.
C-02	30.0	0	449.600	.008	10.00	1.40	76.	84.	70.	3.0	250.	58.
C-03	32.5	0	451.300	.011	14.00	1.85	76.	88.	70.	3.0	250.	60.
C-04	35.0	0	453.000	.010	12.00	1.65	76.	90.	71.	3.0	250.	61.
C-05	37.5	0	454.600	.007	8.00	1.15	77.	90.	71.	3.0	250.	62.
B-01	40.0	1410	456.200	.007	8.00	1.15	77.	81.	71.	3.0	250.	62.
B-02	42.5	0	457.900	.011	14.00	1.85	78.	88.	72.	3.0	250.	62.
B-03	45.0	0	459.600	.010	13.00	1.80	78.	89.	72.	3.0	245.	63.
B-04	47.5	0	461.300	.008	10.00	1.40	78.	91.	73.	3.0	250.	64.
B-05	50.0	0	462.900	.008	10.00	1.40	78.	92.	73.	3.0	250.	64.
A-01	52.5	1425	464.200	.006	6.00	1.00	78.	84.	72.	2.5	250.	64.
A-02	55.0	0	465.900	.011	14.00	1.85	78.	86.	72.	3.0	250.	65.
A-03	57.5	0	467.800	.011	14.00	1.85	78.	87.	73.	3.0	245.	66.
A-04	60.0	0	469.700	.013	18.00	2.30	78.	88.	73.	3.0	250.	66.
A-05	62.5	0	471.647	.010	13.00	1.80	78.	89.	74.	3.0	250.	66.
TOTALS	62.5		40.472									
AVERAGE					10.76	1.49	77.	83.	69.	2.7	250.	58.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST TEAM LEADER

BO

TEST I-2 #2 LINT CLEANER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/21/77	11/21/77
TB	TIME-START	1318	1318
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	62.5	62.5
NP	NET SAMPLING POINTS	25	25
Y	METER CALIBRATION FACTOR	1.010	1.010
DN	SAMPLING NOZZLE DIAMETER	.602 IN	15.3 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
PM	AVERAGE ORIFICE PRESSURE DROP	1.49 IN-H2O	37.9 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	40.472 CU-FT	1.146 CU-M
TM	AVERAGE GAS METER TEMP	75.9 F	24.4 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	40.533 SCF	1.148 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	2.6	2.6
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.122 SCF	.003 SCM
BWO	PERCENT MOISTURE BY VOLUME	.30	.30
FMO	MOLE FRACTION DRY GAS	.997	.997
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.97	28.97
PB	BAROMETRIC PRESSURE	30.00 IN-HG	762.00 MM-HG
PSI	STATIC PRES OF STACK GAS	.01 IN-H2O	.25 MM-H2O
PS	STACK PRES, ABS.	30.00 IN-HG	762.02 MM-HG
TS	AVERAGE STACK TEMP	77. F	25. C

VS	AVG STACK GAS VELOCITY	5.3	FPS	1.6	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	682357.	SCFH	19322.	SCMH
QS	ACTUAL STACK FLOW RATE	693836.	ACFH	19647.	ACMH
ISO	PERCENT ISOKINETIC	105.9		105.9	
MN	FILTERABLE PART. MG. EPA 5	106.7		106.7	
CS	FILTERABLE PART.	.041	GR/DSCF*	92.971	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.96	LB/HR	1.80	KG/HR
MN	TOTAL PART. MG. EPA 5	111.3		111.3	
CS	TOTAL PART.	.042	GR/DSCF*	96.979	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.13	LB/HR	1.87	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. I-2

#2 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 40.472 * 1.010 * (30.00 + 1.494 / 13.6)}{(76. + 460.)} = 40.533 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 3. = .12 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .12}{40.533 + .12} = .30 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - .3}{100.} = .997$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(.30/100)) + 18. * (.30/100) = 28.97

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 53.944 / (SQRT(28.97 * 30.00) * 25. = 5.26 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 5.26 * 5280. 3600/144 = 693836. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 693836. * 30.00 * (1. - (.30/100))}{(77. + 460.)} = 682357.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(77.+460.))*((0.002669* 3.)+(40.472*1.010*(30.00+(1.494/13.6))/(76.+460.)))}{63. * 5.26 * 30.00 * .602 * .602} = 105.86\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 106.7 * 15.43 / 40.533 = .041 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .041 * 682357. / (15.43 * 453.6) = 3.96

FIELD DATA

PLANT	WESTSIDE GIN - TRANQUILITY	DATE	11/21/77
SAMPLING LOCATION	#2 LINT CLEANER	RUN NUMBER	I-3
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS
OPERATOR		NOZZLE I.D.	.6018
AMBIENT TEMP.(DEG.F)	51.	ASSUMED MOISTURE	1.00
BAR.PRESS.(IN.HG)	30.10	SAMPLE BOX NUMBER	RAC
STATIC PRESS.(IN.H2O)	.00	METER BOX NUMBER	RAC
FILTER NUMBER(S)		METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.01

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	1554	471.712									
A-01	2.5	0	473.500	.009	10.00	1.50	77.	68.	68.	2.0	230.	65.
A-02	5.0	0	475.500	.016	22.00	2.70	77.	74.	68.	2.5	245.	63.
A-03	7.5	0	477.800	.017	23.00	2.90	77.	79.	70.	2.5	250.	63.
A-04	10.0	0	480.000	.016	22.00	2.70	77.	82.	71.	2.5	250.	63.
A-05	12.5	0	481.800	.010	12.00	1.70	77.	84.	71.	2.0	250.	62.
B-01	15.0	1611	483.700	.012	16.00	2.15	77.	80.	72.	2.0	245.	63.
B-02	17.5	0	485.900	.016	22.00	2.70	77.	86.	74.	2.5	245.	64.
B-03	20.0	0	488.400	.022	26.00	3.80	77.	89.	76.	3.0	250.	65.
B-04	22.5	0	490.500	.014	18.00	2.40	77.	95.	77.	4.0	250.	66.
B-05	25.0	0	492.300	.010	12.00	1.70	77.	98.	78.	2.0	250.	66.
C-01	27.5	1625	494.000	.010	12.00	1.70	77.	92.	79.	2.0	255.	63.
C-02	30.0	0	496.000	.012	16.00	2.15	77.	94.	80.	2.0	250.	64.
C-03	32.5	0	498.100	.016	22.00	2.70	76.	97.	80.	3.5	250.	64.
C-04	35.0	0	500.200	.013	17.00	2.30	76.	100.	80.	2.5	250.	64.
C-05	37.5	0	501.900	.007	8.00	1.20	76.	101.	80.	2.0	245.	65.
D-01	40.0	1639	503.600	.009	10.00	1.50	75.	93.	81.	2.0	250.	63.
D-02	42.5	0	505.300	.010	11.00	1.60	75.	97.	81.	2.0	250.	63.
D-03	45.0	0	507.200	.012	16.00	2.15	75.	99.	82.	3.0	250.	63.
D-04	47.5	0	509.000	.010	11.00	1.60	74.	100.	83.	2.5	245.	64.
D-05	50.0	0	510.500	.007	8.00	1.20	74.	100.	83.	2.0	245.	64.
E-01	52.5	1655	512.200	.011	13.00	1.75	74.	94.	84.	2.0	250.	63.
E-02	55.0	0	514.200	.012	16.00	2.15	74.	97.	84.	3.0	250.	63.
E-03	57.5	0	516.300	.012	16.00	2.15	74.	97.	84.	3.0	250.	63.
E-04	60.0	0	517.900	.010	12.00	1.70	74.	96.	84.	2.5	250.	63.
E-05	62.5	0	519.821	.010	12.00	1.70	74.	96.	84.	2.5	250.	63.
TOTALS	62.5		48.109									
AVERAGE					15.32	2.07	76.	92.	78.	2.5	248.	64.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN - TRANQUILITY

TEST I-3 #2 LINT CLEANER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/21/77		11/21/77	
TB	TIME-START	1554		1554	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	62.5		62.5	
NP	NET SAMPLING POINTS	25		25	
Y	METER CALIBRATION FACTOR	1.010		1.010	
DN	SAMPLING NOZZLE DIAMETER	.602	IN	15.3	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
DPM	AVERAGE ORIFICE PRESSURE DROP	2.07	IN-H2O	52.6	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	48.109	CU-FT	1.362	CU-M
TM	AVERAGE GAS METER TEMP	84.8	F	29.4	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	47.619	SCF	1.348	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	20.8		20.8	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.979	SCF	.028	SCM
BWO	PERCENT MOISTURE BY VOLUME	2.01		2.01	
FMD	MOLE FRACTION DRY GAS	.980		.980	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.78		28.78	
PB	BAROMETRIC PRESSURE	30.10	IN-HG	764.54	MM-HG
PSI	STATIC PRES OF STACK GAS	.00	IN-H2O	.00	MM-H2O
PS	STACK PRES, ABS.	30.10	IN-HG	764.54	MM-HG
TS	AVERAGE STACK TEMP	76.	F	24.	C

VS	AVG STACK GAS VELOCITY	6.2	FPS	1.9	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	790041.	SCFH	22372.	SCMH
QS	ACTUAL STACK FLOW RATE	813167.	ACFH	23026.	ACMH
ISO	PERCENT ISOKINETIC	107.4		107.4	
MN	FILTERABLE PART. MG. EPA 5	82.2		82.2	
CS	FILTERABLE PART.	.027	GR/DSCF*	60.965	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.01	LB/HR	1.36	KG/HR
MN	TOTAL PART. MG. EPA 5	89.3		89.3	
CS	TOTAL PART.	.029	GR/DSCF*	66.231	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	3.27	LB/HR	1.48	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. I-3

#2 LINT CLEANER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 48.109 * 1.010 * (30.10 + 2.072 / 13.6)}{(85. + 460.)} = 47.619 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 21. = .98 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .98}{47.619 + .98} = 2.01 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 2.0}{100.} = .980$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(2.01/100)) + 18. * (2.01/100) = 28.78

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 63.120 / (SQRT(28.78 * 30.10) * 25. = 6.16 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 6.16 * 5280. 3600/144 = 813167. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 813167. * 30.10 * (1. - (2.01/100))}{(76. + 460.)} = 790041. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB*(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*ON)

$$ISO = \frac{(305.58*(76.+460.))*((0.002669* 21.)+(48.109*1.010*(30.10+(2.072/13.6))/(85.+460.)))}{63. * 6.16 * 30.10 * .602 * .602} = 107.41 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 82.2 * 15.43 / 47.619 = .027 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .027 * 790041. / (15.43 * 453.6) = 3.01

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/22/77
SAMPLING LOCATION	BATTERY CONDENSER	RUN NUMBER	J-1
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS
OPERATOR	BD	NOZZLE I.D.	.3730
AMBIENT TEMP.(DEG.F)	51.	ASSUMED MOISTURE	1.00
BAR.PRESS.(IN.HG)	30.11	SAMPLE BOX NUMBER	
STATIC PRESS.(IN.H2O)	.00	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000837	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.09

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	815	519.942									
E-01	2.5	0	521.800	.062	58.00	1.25	75.	54.	54.	2.0	225.	50.
E-02	5.0	0	523.200	.058	55.00	1.22	75.	60.	54.	2.0	235.	50.
E-03	7.5	0	525.000	.117	80.00	2.35	75.	65.	54.	3.5	245.	49.
E-04	10.0	0	526.800	.117	80.00	2.35	75.	70.	55.	3.5	245.	49.
E-05	12.5	0	528.600	.087	69.00	1.78	75.	75.	56.	3.5	250.	48.
D-01	15.0	834	529.500	.021	25.00	.47	77.	67.	55.	3.0	250.	47.
D-02	17.5	0	530.900	.057	54.00	1.20	77.	70.	56.	3.0	250.	46.
D-03	20.0	0	532.800	.145	86.00	3.00	77.	72.	56.	4.0	255.	46.
D-04	22.5	0	534.700	.090	72.00	1.85	77.	80.	58.	4.0	255.	46.
D-05	25.0	0	536.000	.037	42.00	.79	77.	84.	59.	3.0	255.	47.
C-01	27.5	849	536.600	.006	7.00	.14	77.	75.	60.	1.0	255.	48.
C-02	30.0	0	537.800	.047	49.00	1.00	78.	78.	61.	2.0	255.	50.
C-03	32.5	0	539.700	.117	80.00	2.35	78.	83.	61.	3.5	255.	51.
C-04	35.0	0	541.300	.060	57.00	1.25	78.	89.	63.	3.0	255.	52.
C-05	37.5	0	542.100	.010	12.00	.22	78.	90.	64.	2.0	250.	52.
B-01	40.0	907	542.600	.008	8.00	.15	78.	80.	65.	2.0	250.	51.
B-02	42.5	0	543.500	.021	25.00	.47	78.	80.	65.	2.0	250.	51.
B-03	45.0	0	544.700	.050	51.00	1.05	78.	81.	65.	2.5	255.	51.
B-04	47.5	0	545.800	.021	25.00	.47	78.	81.	65.	2.0	255.	51.
B-05	50.0	0	546.800	.025	30.00	.55	78.	80.	65.	2.0	250.	51.
A-01	52.5	924	547.200	.004	4.00	.10	78.	77.	67.	1.0	250.	50.
A-02	55.0	0	547.700	.007	8.00	.15	78.	77.	67.	1.0	250.	50.
A-03	57.5	0	548.500	.020	24.00	.45	18.	76.	67.	1.0	255.	51.
A-04	60.0	0	549.200	.010	12.00	.22	78.	76.	67.	1.0	255.	51.
A-05	62.5	0	549.752	.010	12.00	.22	78.	76.	67.	1.0	250.	51.
TOTALS	62.5		29.810									
AVERAGE					41.00	1.00	75.	76.	61.	2.3	250.	50.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS | TEST TEAM LEADER

WESTSIDE GIN | BD

TEST J-1 BATTERY CONDENSER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/22/77		11/22/77	
TB	TIME-START	815		815	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	62.5		62.5	
NP	NET SAMPLING POINTS	25		25	
Y	METER CALIBRATION FACTOR	1.010		1.010	
DN	SAMPLING NOZZLE DIAMETER	.373	IN	9.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	1.00	IN-H2O	25.5	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	29.810	CU-FT	.844	CU-M
TM	AVERAGE GAS METER TEMP	68.4	F	20.2	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	30.353	SCF	.860	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	10.8		10.8	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.508	SCF	.014	SCM
BWO	PERCENT MOISTURE BY VOLUME	1.65		1.65	
FMD	MOLE FRACTION DRY GAS	.984		.984	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.82		28.82	
PB	BAROMETRIC PRESSURE	30.11	IN-HG	764.79	MM-HG
PSI	STATIC PRES OF STACK GAS	.00	IN-H2O	.00	MM-H2O
PS	STACK PRES, ABS.	30.11	IN-HG	764.79	MM-HG
TS	AVERAGE STACK TEMP	75.	F	24.	C

VS	AVG STACK GAS VELOCITY	11.2	FPS	3.4	MPS
AS	STACK AREA	5280.	SQ-IN.	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	1442395.	SCFH	40844.	SCMH
QS	ACTUAL STACK FLOW RATE	1475709.	ACFH	41788.	ACMH
ISO	PERCENT ISOKINETIC	97.6		97.6	
MN	FILTERABLE PART. MG. EPA 5	34.2		34.2	
CS	FILTERABLE PART.	.017	GR/DSCF*	39.794	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.58	LB/HR	1.63	KG/HR
MN	TOTAL PART. MG. EPA 5	44.5		44.5	
CS	TOTAL PART.	.023	GR/DSCF*	51.779	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.66	LB/HR	2.11	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. J-1

BATTERY CONDENSER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 29.810 * 1.010 * (30.11 + 1.002 / 13.6)}{(68. + 460.)} = 30.353 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 11. = .51 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .51}{30.353 + .51} = 1.65 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.6}{100.} = .984$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.65/100)) + 18. * (1.65/100) = 28.82

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 114.648 / (SQRT(28.82 * 30.11) * 25. = 11.18 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 11.18 * 5280. 3600/144 = 1475709. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 1475709. * 30.11 * (1. - (1.65/100))}{(75. + 460.)} = 1442395.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(75.+460.))*((0.002669*11.)+(29.810*1.010*(30.11+(1.002/13.6))/(68.+460.)))}{63. * 11.18 * 30.11 * .373 * .373} = 97.62\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 34.2 * 15.43 / 30.353 = .017 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .017 * 1442395. / (15.43 * 453.6) = 3.58

FIELD DATA

PLANT	WESTSIDE GIN	DATE	11/22/77
SAMPLING LOCATION	BATTERY CONDENSER	RUN NUMBER	J-2
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS LINED
OPERATOR	BD	NOZZLE I.D.	.3730
AMBIENT TEMP.(DEG.F)	60.	ASSUMED MOISTURE	.00
BAR.PRESS.(IN.HG)	29.98	SAMPLE BOX NUMBER	
STATIC PRESS.(IN.H2O)	.00	METER BOX NUMBER	RAC
FILTER NUMBER(S)	0000925	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.09

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O)		STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F)		PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
					DESIRED	ACTUAL		INLET	OUTLET			
INIT	0	956	549.923									
A-01	2.5	0	550.400	.004	4.00	.10	82.	67.	65.	1.0	250.	50.
A-02	5.0	0	551.100	.009	11.00	.20	82.	67.	65.	1.0	250.	49.
A-03	7.5	0	551.800	.016	20.00	.35	82.	70.	65.	1.0	255.	48.
A-04	10.0	0	552.600	.016	20.00	.35	82.	74.	65.	1.0	255.	48.
A-05	12.5	0	553.300	.008	10.00	.18	82.	77.	66.	1.0	255.	47.
B-01	15.0	1014	554.000	.008	10.00	.18	82.	74.	66.	1.0	250.	47.
B-02	17.5	0	555.000	.026	30.00	.57	82.	78.	66.	1.0	250.	49.
B-03	20.0	0	556.300	.063	59.00	1.28	82.	83.	68.	2.5	250.	50.
B-04	22.5	0	577.600	.041	44.00	.85	82.	87.	68.	2.0	250.	52.
B-05	25.0	0	558.500	.016	20.00	.35	82.	85.	68.	1.0	250.	52.
C-01	27.5	1029	559.400	.018	22.00	.39	82.	80.	69.	1.0	250.	53.
C-02	30.0	0	560.800	.057	54.00	1.20	82.	85.	69.	2.0	255.	54.
C-03	32.5	0	562.900	.148	87.00	3.05	82.	87.	70.	4.0	255.	56.
C-04	35.0	0	565.100	.148	87.00	3.05	82.	98.	71.	4.0	255.	59.
C-05	37.5	0	566.500	.020	24.00	.45	82.	100.	72.	2.0	250.	60.
D-01	40.0	1044	567.500	.021	25.00	.47	82.	89.	71.	1.0	250.	60.
D-02	42.5	0	569.000	.075	64.00	1.55	82.	94.	73.	2.5	250.	61.
D-03	45.0	0	571.400	.175	93.00	3.65	82.	99.	74.	5.0	250.	62.
D-04	47.5	0	573.400	.107	77.00	2.20	82.	105.	75.	4.5	250.	64.
D-05	50.0	0	575.000	.051	52.00	1.10	82.	105.	76.	3.0	250.	66.
E-01	52.5	1058	576.500	.062	58.00	1.25	82.	98.	75.	2.0	255.	67.
E-02	55.0	0	578.000	.058	55.00	1.22	82.	100.	76.	3.0	255.	67.
E-03	57.5	0	580.100	.129	84.00	2.65	82.	104.	78.	3.5	250.	68.
E-04	60.0	0	582.200	.145	86.00	3.05	82.	107.	78.	5.0	250.	68.
E-05	62.5	0	584.327	.010	75.00	2.10	82.	109.	79.	4.0	250.	68.
TOTALS	62.5		34.404									
AVERAGE					46.84	1.27	82.	89.	71.	2.4	252.	57.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS

WESTSIDE GIN

TEST LEADER

BD

TEST J-2 BATTERY CONDENSER

		ENGLISH UNITS	METRIC UNITS
TEST DATE		11/22/77	11/22/77
TB	TIME-START	956	956
TF	TIME-FINISH	0	0
TT	NET TIME OF TEST, MIN.	62.5	62.5
NP	NET SAMPLING POINTS	25	25
Y	METER CALIBRATION FACTOR	1.010	1.010
DN	SAMPLING NOZZLE DIAMETER	.373 IN	9.5 MM
CP	PITOT TUBE COEFFICIENT	.84	.84
DPM	AVERAGE ORIFICE PRESSURE DROP	1.27 IN-H2O	32.3 MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	34.404 CU-FT	.974 CU-M
TM	AVERAGE GAS METER TEMP	79.6 F	26.6 C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	34.169 SCF	.968 SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	14.5	14.5
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.683 SCF	.019 SCM
BWO	PERCENT MOISTURE BY VOLUME	1.96	1.96
FMD	MOLE FRACTION DRY GAS	.980	.980
MD	MOLECULAR WT-DRY STACK GAS	29.00	29.00
MS	MOLECULAR WT-STACK GAS	28.78	28.78
PB	BAROMETRIC PRESSURE	29.98 IN-HG	761.49 MM-HG
PSI	STATIC PRES OF STACK GAS	.00 IN-H2O	.00 MM-H2O
PS	STACK PRES, ABS.	29.98 IN-HG	761.49 MM-HG
TS	AVERAGE STACK TEMP	82. F	28. C

VS	AVG STACK GAS VELOCITY	12.1	FPS	3.7	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	1534392.	SCFH	43449.	SCMH
QS	ACTUAL STACK FLOW RATE	1603057.	ACFH	45394.	ACMH
ISO	PERCENT ISOKINETIC	103.3		103.3	
MN	FILTERABLE PART. MG. EPA 5	32.c		32.2	
CS	FILTERABLE PART.	.015	GR/DSCF*	33.283	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	3.19	LB/HR	1.45	KG/HR
MN	TOTAL PART. MG. EPA 5	45.4		45.4	
CS	TOTAL PART.	.021	GR/DSCF*	46.927	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.49	LB/HR	2.04	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. J-2

BATTERY CONDENSER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 34.404 * 1.010 * (29.98 + 1.272 / 13.6)}{(80. + 460.)} = 34.169 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 15. = .68 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .68}{34.169 + .68} = 1.96 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 2.0}{100.} = .980$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.96/100)) + 18. * (1.96/100) = 28.78

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 124.198 / (SQRT(28.78 * 29.98) * 25. = 12.14 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 12.14 * 5280. 3600/144 = 1603057. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 1603057. * 29.98 * (1. - (1.96/100))}{(82. + 460.)} = 1534392.\ SCFH$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(82.+460.))*((0.002669*15.)+(34.404*1.010*(29.98+(1.272/13.6))/(80.+460.)))}{63. * 12.14 * 29.98 * .373 * .373} = 103.30\ PERCENT$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 32.2 * 15.43 / 34.169 = .015 GM/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .015 * 1534392. / (15.43 * 453.6) = 3.19

FIELD DATA

PLANT	WESTSIDE GIN, CALIFORNIA	DATE	11/22/77
SAMPLING LOCATION	BATTERY CONDENSER	RUN NUMBER	J-3
SAMPLE TYPE	PARTICULATE	PROBE LENGTH & TYPE	8' GLASS
OPERATOR	C. BRUFFEY	NOZZLE I.D.	.3730
AMBIENT TEMP.(DEG.F)	60.	ASSUMED MOISTURE	.00
BAR.PRESS.(IN.HG)	30.00	SAMPLE BOX NUMBER	
STATIC PRESS.(IN.H2O)	.00	METER BOX NUMBER:	RAC
FILTER NUMBER(S)	0000826	METER HEAD DIFF.	1.910
STACK INSIDE DIM.(IN)	88.00 60.00	C FACTOR	1.10
PITOT TUBE COEFF.	.84	PROBE HEATER SETTING	250.0
		HEATER BOX SETTING	250.0
READ & RECORD DATA EVERY	2.5 MINUTES	REFERENCE PRESS. DIFF.	.09

TRAVERSE POINT NO.	SAMPLE TIME (MIN.)	CLOCK TIME (24-HR CLOCK)	GAS METER READING (CU.FT.)	VELOCITY HEAD (IN.H2O)	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O) DESIRED	ORIFICE PRESSURE DIFFERENTIAL (IN.H2O) ACTUAL	STACK TEMP (DEG.F)	DRY GAS METER TEMP (DEG.F) INLET	DRY GAS METER TEMP (DEG.F) OUTLET	PUMP VACUUM (IN.HG)	SAMPLE BOX TEMP (DEG.F)	IMPINGER TEMP (DEG.F)
INIT	0	1245	584.519									
A-01	2.5	0	586.200	.010	12.00	.20	90.	72.	66.	1.0	250.	68.
A-02	5.0	0	587.068	.008	10.00	.18	90.	72.	66.	1.0	250.	67.
A-03	7.5	0	587.798	.011	14.00	.31	90.	72.	66.	1.0	250.	69.
A-04	10.0	1325	588.390	.008	10.00	.18	85.	70.	68.	1.0	250.	65.
A-05	12.5	0	588.830	.004	4.00	.10	85.	70.	68.	1.0	250.	65.
B-01	15.0	0	589.275	.001	2.00	.06	90.	72.	68.	1.0	250.	69.
B-02	17.5	0	589.772	.010	12.00	.20	90.	73.	68.	1.0	250.	56.
B-03	20.0	0	590.850	.037	42.00	.79	90.	81.	60.	1.0	250.	56.
B-04	22.5	0	592.010	.034	40.00	.74	85.	88.	70.	1.0	250.	58.
B-05	25.0	0	592.788	.011	14.00	.24	85.	92.	71.	1.0	253.	59.
C-01	27.5	0	593.240	.005	6.00	.12	86.	93.	72.	1.0	254.	63.
C-02	30.0	0	594.050	.020	24.00	.44	91.	94.	73.	1.0	250.	62.
C-03	32.5	0	595.450	.067	62.00	1.40	92.	94.	74.	1.0	252.	61.
C-04	35.0	0	597.000	.064	60.00	1.30	92.	99.	75.	1.0	254.	62.
C-05	37.5	0	598.017	.018	22.00	.39	91.	100.	75.	1.0	255.	65.
D-01	40.0	0	599.045	.035	34.00	.64	91.	97.	77.	1.0	255.	58.
D-02	42.5	0	600.275	.040	44.00	.84	91.	98.	76.	1.0	255.	55.
D-03	45.0	0	602.050	.097	74.00	2.00	91.	102.	77.	1.0	255.	46.
D-04	47.5	0	603.870	.082	68.00	1.72	91.	105.	79.	1.0	254.	49.
D-05	50.0	0	605.453	.057	54.00	1.20	91.	106.	81.	1.0	254.	50.
E-01	52.5	0	606.925	.064	60.00	1.30	91.	104.	82.	1.0	256.	48.
E-02	55.0	0	608.610	.077	64.00	1.60	91.	103.	82.	1.0	256.	49.
E-03	57.5	0	610.585	.114	76.00	2.30	91.	106.	83.	1.0	255.	50.
E-04	60.0	0	613.013	.150	56.00	3.10	91.	100.	85.	1.0	255.	47.
E-05	62.5	0	614.627	.064	60.00	1.30	91.	110.	86.	1.0	255.	47.
TOTALS	62.5		30.108									
AVERAGE					36.96	.91	90.	91.	74.	1.0	253.	58.

PARTICULATE FIELD DATA & RESULTS TABULATION

PLANT- NAME AND ADDRESS — TEST TEAM LEADER

WESTSIDE GIN, CALIFORNIA — C. BRUFFEY

TEST J-3 BATTERY CONDENSER

		ENGLISH UNITS		METRIC UNITS	
TEST DATE		11/22/77		11/22/77	
TB	TIME-START	1245		1245	
TF	TIME-FINISH	0		0	
TT	NET TIME OF TEST, MIN.	62.5		62.5	
NP	NET SAMPLING POINTS	25		25	
Y	METER CALIBRATION FACTOR	1.010		1.010	
DN	SAMPLING NOZZLE DIAMETER	.373	IN	9.5	MM
CP	PITOT TUBE COEFFICIENT	.84		.84	
PM	AVERAGE ORIFICE PRESSURE DROP	.91	IN-H2O	23.0	MM-H2O
VM	VOLUME OF DRY GAS SAMPLED AT METER CONDITIONS	30.108	CU-FT	.853	CU-M
TM	AVERAGE GAS METER TEMP	82.4	F	28.0	C
VMSTD	VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS*	29.751	SCF	.842	SCM
VLC	TOTAL H2O COLLECTED IN IMPINGERS & SILICA GEL, ML.	8.2		8.2	
VWC	VOLUME OF WATER VAPOR AT STANDARD CONDITIONS*	.386	SCF	.011	SCM
BWO	PERCENT MOISTURE BY VOLUME	1.28		1.28	
FMD	MOLE FRACTION DRY GAS	.987		.987	
MD	MOLECULAR WT-DRY STACK GAS	29.00		29.00	
MS	MOLECULAR WT-STACK GAS	28.66		28.86	
PB	BAROMETRIC PRESSURE	30.00	IN-HG	762.00	MM-HG
PSI	STATIC PRES OF STACK GAS	.00	IN-H2O	.00	MM-H2O
PS	STACK PRES, ABS.	30.00	IN-HG	762.00	MM-HG
TS	AVERAGE STACK TEMP	90.	F	32.	C

VS	AVG STACK GAS VELOCITY	10.7	FPS	3.2	MPS
AS	STACK AREA	5280.	SQ-IN	3.406	SQ-M
QSSTD	STACK FLOW RATE, DRY*	1336862.	SCFH	37856.	SCMH
QS	ACTUAL STACK FLOW RATE	1405817.	ACFH	39809.	ACMH
ISO	PERCENT ISOKINETIC	103.2		103.2	
MN	FILTERABLE PART. MG. EPA 5	41.8		41.8	
CS	FILTERABLE PART.	.022	GR/DSCF*	49.622	MG/DSCM
PMR	FILTERABLE PART. EMISSION RATE	4.14	LB/HR	1.88	KG/HR
MN	TOTAL PART. MG. EPA 5	47.1		47.1	
CS	TOTAL PART.	.024	GR/DSCF*	55.914	MG/DSCM
PMR	TOTAL PART. EMISSION RATE	4.67	LB/HR	2.12	KG/HR

* 68 DEG F, 29.92 IN.HG.

EXAMPLE PARTICULATE CALCULATIONS TEST NO. J-3

BATTERY CONDENSER

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

VMSTD = (17.65 * VM * Y * (PB + PM / 13.6)) / (TM + 460.)

$$VMSTD = \frac{17.65 * 30.108 * 1.010 * (30.00 + .906 / 13.6)}{(82. + 460.)} = 29.751 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

VWC = .04707 * VLC

VWC = .04707 * 8. = .39 SCF

PERCENT MOISTURE IN STACK GAS

BWO = (100. * VWC) / (VMSTD + VWC)

$$BWO = \frac{100. * .39}{29.751 + .39} = 1.28 \text{ PERCENT}$$

MOLE FRACTION OF DRY STACK GAS

FMD = (100. - BWO) / 100.

$$FMD = \frac{100. - 1.3}{100.} = .987$$

AVERAGE MOLECULAR WEIGHT OF DRY STACK GAS

MD = (PCO2 * .44) + (PO2 * .32) + (PN2 + PCO) * .28

MD = (.00*44/100) + (.0*32/100) + ((.0+ .0) * 28/100 = 29.00

MOLECULAR WEIGHT OF STACK GAS

MS = MD * (1. - (BWO/100)) + 18. * (BWO/100)

MS = 29.00* (1. -(1.28/100)) + 18. * (1.28/100) = 28.86

STACK GAS VELOCITY AT STACK CONDITIONS

DELP = SUM. OF THE SQRT(VH * (TS + 460.))

VS = 85.49 * CP * DELP / (SQRT(MS * PS) * PNTS)

VS = 85.49 * .84 * 109.094 / (SQRT(28.86 * 30.00) * 25. = 10.65 FPS

STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS

QS = VS * AS * 3600/144

QS = 10.65 * 5280. 3600/144 = 1405817. ACFH

STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS

QSSTD = 17.65 * QS * PS * (1. - (BWO/100)) / (TS + 460.)

$$QSSTD = \frac{17.65 * 1405817. * 30.00 * (1. - (1.28/100))}{(90. + 460.)} = 1336862. \text{ SCFH}$$

PERCENT ISOKINETIC

ISO = (305.58*(TS+460.))*((0.002669*VLC)+(VM*Y*(PB+(PM/13.6))/(TM+460.)))/(TT*VS*PS*DN*DN)

$$ISO = \frac{(305.58*(90.+460.))*((0.002669* 8.)+(30.108*1.010*(30.00+(.906/13.6))/(82.+460.)))}{63. * 10.65 * 30.00 * .373 * .373} = 103.23 \text{ PERCENT}$$

PARTICULATE LOADING -- EPA METHOD 5 (AT STANDARD CONDITIONS)

CS = 0.001 * MN * 15.43 / VMSTD

CS = 0.001 * 41.8 * 15.43 / 29.751 = .022 GR/DSCF

PARTICULATE LBS/HR -- EPA METHOD 5

PMR = CS * QSSTD / (15.43 * 453.6)

PMR = .022 * 1336862. / (15.43 * 453.6) = 4.14

APPENDIX B

FIELD DATA

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Grid, Headquality, Calif.	11/16/77	Uncleaned Motes	Particulate

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2	A-1	CBuffey	51	29.85	+.24	000111	24.0 x	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	5' Stainless Heated	.500	2	Acke	Acke	.070	—	250	250	0.12	3.0

EMISSION TESTING FIELD DATA

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	827	541.567									
E-10	3.0		550.0	.88	2.20	2.20	72	51	56	11.0	232	58
-9	6.0		562.5	.80	2.05	2.05	73	70	56	11.0	229	59
-8	9.0		575.2	.90	2.28	2.28	74	77	59	11.0	232	63
-7	12.0		588.8	1.05	2.62	2.62	75	83	61	13.0	251	65
-6	15.0		603.2	1.20	3.0	2.60	89 76	89	64	14.5	255	66
-5	18.0		616.4	1.40	3.5	2.60	76	92	67	15.0	256	66
-4	21.0		630.2	1.35	3.4	2.60	76	93	69	15.0	252	66
-3	24.0		644.2	1.25	3.10	2.60	76	93	71	15.0	253	65
-2	27.0		657.2	.90	2.28	2.28	77	92	73	14.0	252	66
-1	30.0	857	670.807	1.00	2.50	2.50	77	93	74	12.0	252	64
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5-10	33.0	909	684.2	.90	2.28	2.28	79	78	74	12.0	258	65
-9	36.0		697.2	.90	2.28	2.28	79	85	75	12.0	257	63
-8	39.0		710.5	.90	2.28	2.28	79	90	76	12.0	256	63
-7	42.0		723.8	1.00	2.50	2.50	80	94	77	12.0	257	62
-6	45.0		737.7	1.15	2.90	2.65	80	91	79	14.0	257	61
-5	48.0		751.8	1.20	3.0	2.65	81	99	80	14.0	257	62
-4	51.0		765.8	1.40	3.5	2.65	82	100	81	15.0	257	61
-3	54.0		780.2	1.25	3.10	2.65	83	100	83	15.0	257	60
-2	57.0		793.8	1.00	2.5	2.5	83	99	84	15.0	256	62
-1	60.8		806.587	.85	2.15	2.15	82	99	85	11.0	257	59
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LEAKAGE @ 15 "Hg = .008 CFM

GAS METER COR. ____

B-2

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 46

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Gin	11/18/77	Uncleaned Motes	Port

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	A-2	J-Iverson	51	29.85	+.24	0000720	24	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	6 ft SS Glass	.2545	3	PM-5	BOC-1	1.91	1.1	250	250	.42	30

EMISSION TESTING FIELD DATA

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	827	516.234									
S-1	3.		519.785	1.00	4.30	4.30	75	66	64	3.0	250	56
2	6.		522.895	.95	4.10	4.10	75	70	64	3.0	250	56
3	9.		526.135	1.00	4.30	4.30	75	74	64	3.0	250	56
4	12.		529.425	1.05	4.41	4.41	75	80	66	3.0	250	56
5	15.		532.698	1.05	4.41	4.41	75	83	68	3.0	250	56
6	18.		535.850	.95	4.10	4.10	76	86	69	3.0	250	57
7	21.		539.055	.90	3.90	3.90	76	89	70	3.0	250	58
8	24.		542.035	.75	3.30	3.30	77	90	72	3.0	250	58
9	27.		545.045	.75	3.30	3.30	78	91	73	3.0	250	58
10	30.	857	547.712	.65	2.80	2.80	78	93	74	3.0	250	58
E-1	33.	909	550.874	.95	4.10	4.10	78	80	74	3.0	250	57
2	36.		554.195	1.05	4.41	4.41	79	88	76	3.0	250	57
3	39.		557.745	1.30	5.60	5.60	79	95	78	3.5	250	57
4	42.		561.395	1.30	5.60	5.60	80	96	78	3.5	250	57
5	45.		564.695	1.00	4.30	4.30	81	96	79	3.0	250	58
6	48.		567.999	1.00	4.30	4.30	82	98	81	3.0	250	59
7	51.		572.145	.90	3.90	3.90	82	98	82	3.0	250	60
8	54.		574.235	.75	3.30	3.30	83	98	83	3.0	250	60
9	57.		577.439	.65	2.80	2.80	83	99	83	3.0	250	60
10	60.	939	579.812	.62	2.70	2.70	87	99	84	2.5	250	62
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LEAKAGE @ 4 "Hg = .004 CFM

GAS METER COR. ___.___ (7 8 9 10 11)

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Con - Taquitity, Calif.	11/18/78	Uncleaned Motes	Part.

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	A-3	CB	65	29.80	-1.24	000112	24.0 X .	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	5' Heated Stainless	.500	3	Aelo	Aelo	1.070	—	250	250	.72	3.0

EMISSION TESTING FIELD DATA

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	1110	807.250									
5-10	3.		821.50	1.10	2.75	2.75	83	84	84	14.0	250	66
9	6.		835.6	1.10	2.75	2.75	81	90	85	14.0	270	71
8	9.		849.1	1.25	3.15	2.75	83	97	86	14.0	255	72
7	12.		863.8	1.35	3.4	2.80	82	98	87	15.0	248	68
6	15.		879.3	1.25	3.15	2.80	81	99	89	15.0	235	66
5	18.		892.2	1.20	2.90	2.80	83	101	90	15.0	250	64
4	21.		906.3	1.10	2.75	2.75	83	103	91	15.0	250	68
3	24.		919.9	.95	2.35	2.35	82	103	92	11.0	250	61
2	27.		931.9	.75	1.88	1.88	81	100	93	7.0	250	61
1	30.	1140	943.195	.65	1.63	1.63	79	96	92	7.0	250	60
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E-10	33.	1150	955.2	.80	2.0	2.0	84	88	90	10.0	248	62
9	36.		967.2	.75	1.90	1.90	82	90	90	8.0	250	59
8	39.		979.5	.85	2.0	2.0	83	94	90	10.0	250	62
7	42.		993.2	1.10	2.75	2.75	82	95	90	15.0	249	62
6	45.		1007.4	1.25	3.15	2.75	83	99	91	15.0	250	63
5	48.		1021.7	1.35	3.40	2.75	84	102	92	15.0	250	62
4	51.		1035.9	1.50	3.72	2.75	83	102	93	15.0	250	61
3	54.		1050.2	1.15	2.90	2.75	83	102	93	15.0	250	61
2	57.		1063.5	.95	2.35	2.35	83	102	94	11.0	249	60
1	60.	1220	1076.064	.85	2.0	2.0	82	100	94	10.0	250	59
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B-4

LEAKAGE @ 15 "Hg = .007 CFM

GAS METER COR. _____

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI OHIO 46

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Gin	11/18/77	Uncleaned Motes	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
A-4	J. Iverson	65	29.80	-1.24	0000920	24	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5ft-SS Glass	.3543	3		RAC-1	1.91	1.1	250	050	.42	30

EMISSION TESTING FIELD DATA

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	1110	580.009									
C-1	3.		583.292	.90	3.80	3.90	82	74	72	4.0	250	59
2	6.		586.694	1.10	4.70	4.70	82	84	72	4.5	250	59
3	9.		590.035	1.10	4.70	4.70	82	86	74	5.0	250	59
4	12.		593.665	1.30	5.69	5.69	82	90	76	6.0	250	60
5	15.		597.345	1.30	5.69	5.69	82	93	77	6.0	250	60
6	18.		600.825	1.10	4.70	4.70	83	94	78	6.0	250	60
7	21.		604.135	1.00	4.30	4.30	82	98	80	5.0	250	60
8	24.		607.129	.75	3.20	3.20	80	98	81	3.5	250	60
9	27.		610.130	.80	3.50	3.50	80	97	81	3.5	250	62
10	30.	1140	612.975	.70	3.00	3.00	80	98	82	3.5	250	62
S-1	33.	1150	616.233	.95	4.10	4.10	82	84	82	4.0	250	61
2	36.		619.045	.95	4.10	4.10	82	85	82	4.0	250	61
3	39.		622.535	1.00	4.30	4.30	82	94	82	5.0	250	62
4	42.		625.975	1.10	4.70	4.70	83	98	83	5.0	250	62
5	45.		629.345	1.10	4.70	4.70	83	101	84	5.0	250	62
6	48.		632.695	1.00	4.30	4.30	83	102	84	5.0	250	62
7	51.		635.990	1.00	4.30	4.30	83	104	86	5.0	250	62
8	54.		639.401	1.10	4.70	4.70	83	104	86	5.0	250	62
9	57.		642.895	1.10	4.70	4.70	83	104	86	5.0	250	64
10	60.	1220	646.269	1.00	4.30	4.30	83	104	87	5.0	250	64
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LEAKAGE @ 5 "Hg = .006 CFM

GAS METER COR. ___.___ (7 8 9 10 11)

B-5

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Grid, Tranquility, Calif.	11/18/77	Uncovered Mote	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. A-5	CA	65	29.80	+.24	6000113	24.0	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	5' Stainless (Heated)	.50	3	Aus	Aus	.070	—	250	250	0-72	3.0

EMISSION TESTING FIELD DATA

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	1345	76.638									
E-10	3.		88.0	.80	2.0	2.0	81	83	84	10.	249	68
-9	6.		99.9	.75	1.88	1.88	81	85	83	10.	249	69
-8	9.		113.2	1.00	2.5	2.5	81	88	83	12.0	249	71
-7	12.		127.1	1.10	2.75	2.60	82	93	84	14.0	250	74
-6	15.		141.1	1.25	3.15	2.60	82	96	85	14.0	249	72
-5	18.		155.2	1.40	3.50	2.60	83	98	86	14.0	249	70
-4	21.		169.2	1.45	3.7	2.60	82	100	87	14.0	250	68
-3	24.		183.2	1.25	3.15	2.60	82	101	88	14.0	249	68
-2	27.		196.7	.95	2.38	2.38	84	100	89	11.0	250	68
-1	30.	1415	209.834	.90	2.28	2.28	84	102	90	11.0	250	66
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S-10	33.	1421	223.9	1.00	2.5	2.5	81	88	88	11.0	251	66
-9	36.		237.8	1.15	2.85	2.60	82	93	88	14.0	251	67
-8	39.		251.8	1.25	3.15	2.60	82	98	89	14.0	250	67
-7	42.		265.7	1.40	3.50	2.60	82	99	89	14.0	251	67
-6	45.		279.1	1.30	3.28	2.60	81	99	90	14.0	251	66
-5	48.		293.7	1.20	3.0	2.60	81	100	90	14.0	250	66
-4	51.		307.5	1.20	3.0	2.60	82	101	90	14.0	250	66
-3	54.		321.0	.95	2.38	2.38	82	102	91	12.0	251	66
-2	57.		333.1	.75	1.88	1.88	82	102	91	10.0	251	67
-1	60.	1451	344.269	.60	1.53	1.53	83	99	91	8.0	251	67
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LEAKAGE @ 17 "Hg = .012 CFM

GAS METER COR. ____

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside GIA	11/18/77	Unlined Mate	port

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PPESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	A-6	J. IVERSON	65	29.80	+.24	0000726	24 x x	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	5/4 SS Glass	.2545	3	A&C	A&C-1	1.91	1.1	250	250	.42	3 0

EMISSION TESTING FIELD DATA

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	1345	646.879									
S-1	3.		650.025	.90	3.90	3.90	81	72	71	3.0	250	54
2	6.		653.285	.95	4.10	4.10	81	79	72	3.0	250	54
3	9.		656.554	1.00	4.30	4.30	82	82	72	3.5	250	54
4	12.		659.795	1.00	4.30	4.30	83	88	74	3.5	250	55
5	15.		663.175	1.10	4.69	4.69	83	92	75	3.5	250	55
6	18.		666.435	.95	4.10	4.10	82	93	76	3.5	250	56
7	21.		669.721	1.00	4.30	4.30	82	95	78	3.5	250	56
8	24.		673.135	1.10	4.69	4.69	83	97	78	4.0	250	58
9	27.		676.440	1.00	4.30	4.30	83	100	80	3.5	250	58
10	30.		679.634	.85	3.80	3.80	82	102	82	4.0	250	58
E 1	33.		682.730	.85	3.80	3.80	82	90	80	3.0	250	57
2	36.		685.035	1.00	4.30	4.30	82	96	82	3.5	250	57
3	39.		689.476	1.10	4.69	4.69	82	99	83	3.5	250	58
4	42.		692.995	1.20	5.20	5.20	81	100	84	4.0	250	58
5	45.		696.575	1.00	5.20	5.20	81	100	84	4.0	250	58
6	48.		699.945	1.00	4.30	4.30	82	102	84	3.5	250	58
7	51.		703.131	.85	3.80	3.80	82	103	85	3.0	250	59
8	54.		706.099	.75	3.30	3.30	82	104	85	3.0	250	60
9	57.		709.040	.75	3.30	3.30	85	104	86	3.0	250	60
10	60.	1451	711.829	.65	2.80	2.80	82	104	86	2.5	250	61
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B-1

LEAKAGE @ 5 "Hg - 0 CFM

GAS METER COR. ___.___

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PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN, TRANQUILITY, CALIF.	11/15/77	#1 and 2 inclined Cleanup	PART

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. B-1	WD, CB	65	29.95	-.25	0000917	300 x	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 6' Heated Glass	.2945 #19L,2545	5	[redacted]-2 FM-	RAC4	1.82	1.05	250	250	0.45	5

EMISSION TESTING FIELD DATA

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	1440	799.816									
W-1	2.5		801.710	.45	1.84	1.84	137	72	70	1.0	250	55
2	5.0		803.795	.60	2.40	2.40	137	76	70	1.0	250	55
3	7.5		806.010	.66	2.70	2.70	136	80	70	1.0	250	55
4	10.0		808.340	.72	2.90	2.90	139	83	70	1.0	250	55
5	12.5		810.640	.69	2.78	2.78	138	85	71	1.0	250	55
6	15.0		812.985	.72	2.90	2.90	135	88	72	1.0	250	55
7	17.5		815.185	.63	2.50	2.50	136	90	72	1.0	250	55
8	20.0		817.450	.66	2.70	2.70	135	90	72	1.0	250	55
9	22.5		819.68	.63	2.50	2.50	135	90	73	1.0	250	55
10	25.0		821.827	.61	2.48	2.48	141	91	74	1.0	250	55
11	27.5		823.985	.59	2.41	2.41	142	93	74	1.0	250 *	59
12	30.0		826.092	.53	2.18	2.18	139	96	75	1.0	—	62
S-1	32.5	1515	827.850	.42	1.72	1.72	145	86	76	1.0	—	64
2	35.0		829.725	.45	1.84	1.84	144	88	77	1.0	—	64
3	37.5		831.140	.53	2.18	2.18	142	89	78	1.0	—	64
4	40.0		833.850	.58	2.37	2.37	143	90	78	1.0	—	63
5	42.5		836.085	.63	2.50	2.50	144	90	78	1.0	—	63
6	45.0		838.32	.65	2.69	2.69	145	91	77	1.0	—	66
7	47.5		840.62	.66	2.70	2.70	145	91	76	1.0	—	65
8	50.0		842.910	.67	2.72	2.72	145	91	77	1.0	—	65
9	52.5		845.180	.66	2.70	2.70	143	92	77	1.0	—	66
10	55.0		847.36	.60	2.40	2.40	143	91	78	1.0	—	67
11	57.5		849.450	.55	2.22	2.22	142	90	78	1.0	—	66
12	60.0		851.438	.47	1.91	1.91	134	90	78	1.0	—	66

LEAKAGE @ 15 "Hg = .008 CFM Pre-Test
1" = 0 afm Post-Test

GAS METER COR. .9[redacted]

* - Loss of Heater Box Heat. (Total)

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CIN[redacted]NATI, OHIO [redacted]246

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PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN	11/17/77	#1 and 2 inclined Cleanout	Port

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. B-2	JIM IVERSON		30.0	[illegible]		38	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 5ft .55	.355	3	FM-A	Roc-1	1.91	1.1	250	250	.44	2.5

EMISSION TESTING FIELD DATA

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	1440	356.112									
E-1	2.5		358.045	.58	2.40	2.40	149	64	65	20	250	55
E-2	5.0		359.895	.58	2.40	2.40	148	72	65	3.0	250	55
E-3	7.5		361.155	.62	2.60	2.60	148	72	65	3.5	250	56
E-4	10.0		364.225	.65	2.70	2.70	149	80	68	3.5	250	56
E-5	12.5		366.345	.65	2.70	2.70	148	82	68	3.5	250	56
E-6	15.0		368.625	.71	2.91	2.91	147	86	70	3.5	250	55
E-7	17.5		370.395	.60	2.50	2.50	148	88	72	3.5	250	55
E-8	20.0		373.035	.62	2.60	2.60	148	90	72	3.5	250	55
E-9	22.5		375.145	.58	2.40	2.40	147	92	74	3.5	250	55
E-10	25.0		377.695	.56	2.30	2.30	147	94	76	3.5	250	55
E-11	27.6		379.275	.54	2.20	2.20	147	96	80	3.5	250	55
E-12	30.0		381.472	.52	2.15	2.15	147	98	80	3.5	250	55
S-1	32.5	1515	383.425	.50	2.10	2.10	151	86	82	3.0	250	55
S-2	35.0		385.545	.55	2.29	2.29	151	92	84	3.0	250	55
S-3	37.5		387.650	.58	2.40	2.40	151	92	84	3.0	250	57
S-4	40.0		389.835	.61	2.61	2.61	152	97	84	3.5	250	57
S-5	42.5		392.085	.65	2.69	2.69	152	100	84	3.5	250	58
S-6	45.0		394.415	.68	2.80	2.80	152	101	86	3.5	250	58
S-7	47.5		396.560	.62	2.60	2.60	152	102	87	3.5	250	59
S-8	50.0		398.945	.65	2.70	2.70	153	103	87	3.5	250	60
S-9	52.5		401.175	.65	2.70	2.70	153	103	88	3.5	250	60
S-10	55.0		403.255	.58	2.40	2.40	151	104	88	3.5	250	60
S-11	57.5		405.375	.58	2.40	2.40	151	105	89	3.5	250	60
S-12	60.0		407.452	.55	2.29	2.29	150	105	90	3.0	250	60

LEAKAGE @ ____ "Hg = ____ CFM

GAS METER COR. ____ (7 8 9 10 11)

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11499 CHESTER ROAD
CINCINNATI OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. Westside Gold, Rodgerlity, Calif.	11/17/77	#1 & 2 Inlet and Cleaners	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. B-9	CB, WGD	60	30.0	+.25	000118	90 X	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 5' STAINless	.500	3	Aero	Aero	1.884 1.07	—	256	250	.78	25

EMISSION TESTING FIELD DATA

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	840	866.045									
5-12	2.5		879.2	.65	1.58	1.58	149	67	57	7.0	247	62
-11	5.0		888.3	.70	1.70	1.70	149	75	58	8.0	248	74
-10	7.5		898.7	.70	1.70	1.70	149	83	61	8.0	247	78
-9	10.0		907.4	.70	1.70	1.70	148	88	63	8.0	248	78
-8	12.5		916.8	.73	1.74	1.74	148	92	66	8.0	248	77
-7	15.0		926.3	.70	1.70	1.70	148	94	69	8.0	248	73
-6	17.5		935.5	.68	1.63	1.63	147	94	70	8.0	248	68
-5	20.0		945.1	.75	1.80	1.80	148	94	72	8.0	248	66
-4	22.5		954.3	.68	1.63	1.63	147	95	73	8.0	248	67
-3	25.0		963.4	.65	1.55	1.55	148	96	74	8.0	250	65
-2	27.5		972.3	.63	1.50	1.50	147	96	76	8.0	250	64
-1	30.0	910	981.045	.55	1.32	1.32	147	97	77	8.0	249	64
E-12	32.5	~920	989.8	.68	1.63	1.63	150	80	78	8.0	254	70
-11	35.0		998.8	.65	1.55	1.55	151	84	78	8.0	249	61
-10	37.5		1008.2	.70	1.70	1.70	152	88	78	8.0	250	67
-9	40.0		1017.5	.68	1.63	1.63	153	94	79	8.0	250	68
-8	42.5		1026.8	.70	1.70	1.70	152	97	80	8.0	251	68
-7	45.0		1036.3	.70	1.70	1.70	153	99	82	8.0	251	67
-6	47.5		1045.7	.73	1.74	1.74	152	100	83	8.0	252	66
-5	50.0		1055.6	.80	1.90	1.90	153	101	84	8.0	250	66
-4	52.5		1065.2	.70	1.70	1.70	152	101	85	8.0	252	67
-3	55.0		1074.5	.68	1.63	1.63	152	101	86	8.0	250	66
-2	57.5		1083.8	.60	1.44	1.44	152	101	87	8.0	250	66
-1	60.0	950	1092.363	.65	1.55	1.56	151	101	87	8.0	249	65

LEAKAGE @ 10 "Hg = .004 CFM

GAS METER COR. 1.9

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11499 CHESTER ROAD
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. Westside Gin	11/17/77	#1&2 inclined Cleaners	Part

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. B-4	JIM IVERSON		30.0	+.25	0000952	28 x	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 6ft SS	.253	3	FM-5	R2C-1	1.91	1.1	250	250	.44	2.5

EMISSION TESTING FIELD DATA

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	840	407.672									
-1	2.5		409.785	.55	2.30	2.30	144	84	84	3.0	250	52
-2	5.0		411.835	.60	2.49	2.49	145	88	84	3.0	250	52
-3	7.5		414.155	.70	2.90	2.90	145	92	86	3.0	250	52
-4	10.0		416.465	.72	3.00	3.00	145	96	86	3.0	250	52
-5	12.5		418.762	.75	3.10	3.10	145	98	87	4.5	250	52
-6	15.0		421.145	.76	3.20	3.20	145	102	88	5.0	250	52
-7	17.5		423.465	.65	2.70	2.70	145	102	88	3.5	250	52
-8	20.0		425.725	.65	2.70	2.70	144	103	89	3.5	250	52
-9	22.5		427.935	.60	2.49	2.49	144	103	89	3.5	250	52
-10	25.0		430.192	.62	2.60	2.62	147	106	90	3.5	250	52
-11	27.5		432.335	.58	2.40	2.40	145	106	92	3.5	250	52
-12	30.0	910	434.449	.55	2.30	2.30	145	106	92	3.5	250	52
-1	32.5	920	436.542	.55	2.30	2.30	145	99	93	3.0	250	52
-2	35.0		438.535	.55	2.30	2.30	145	103	94	3.0	250	52
-3	37.5		440.630	.60	2.49	2.49	145	106	97	3.5	250	52
-4	40.0		442.945	.70	2.90	2.90	145	109	97	3.5	250	52
-5	42.5		445.298	.70	2.90	2.90	146	111	97	3.5	250	52
-6	45.0		447.650	.72	3.00	3.00	146	113	98	4.0	250	52
-7	47.5		449.945	.65	2.70	2.70	145	114	98	3.5	250	52
-8	50.0		452.165	.68	2.80	2.80	145	114	99	4.0	250	52
-9	52.5		454.450	.62	2.52	2.52	146	115	100	4.0	250	52
-10	55.0		456.685	.58	2.40	2.40	145	116	100	3.5	250	52
-11	57.5		458.[illegible]	.58	2.40	2.40	143	117	102	3.5	250	52
-12	60.0	950	460.[illegible]	.55	2.30	2.30	143	117	102	3.5	250	52

LEAKAGE @ ____ "Hg = ____ CFM

GAS METER COR. 7 8 9 10 11

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CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Coal Terre Haute, Ind.	11/17/77	#1&2 Inclined Cleaners	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
B-12	C. Beutky	70	30.0	+1.25		30.0 x	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5' Heated Stainless	.50	3	Aero	Aero	1.07	—	—	—	0.78	2 5

EMISSION TESTING FIELD DATA

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	1050	92.750									
5-12	2.5		101.8	.65	1.58	1.58	144	96	90	7.0	262	64
11	5.0		111.3	.72	1.74	1.74	144	92	90	7.0	256	59
10	7.5		120.6	.70	1.70	1.70	145	96	91	7.0	250	70
9	10.0		130.5	.80	1.90	1.90	145	100	92	7.0	253	73
8	12.5		140.4	.78	1.88	1.88	145	104	93	7.5	254	73
7	15.0		149.9	.73	1.75	1.75	146	108	94	7.5	253	75
6	17.5		159.3	.75	1.80	1.80	145	109	95	7.5	254	73
5	20.0		168.9	.73	1.75	1.75	145	110	96	7.5	253	70
4	22.5		177.9	.65	1.58	1.58	144	109	97	7.5	254	66
3	25.0		186.7	.60	1.43	1.43	143	109	98	7.5	254	64
2	27.5		195.6	.63	1.50	1.50	143	107	98	7.5	255	63
1	30.0	1120	204.340	.58	1.40	1.40	137	107	99	7.5	253	61
E-12	32.5	1130	214.4	.70	1.70	1.70	145	100	99	7.5	255	67
11	35.0		223.9	.70	1.70	1.70	145	102	99	7.5	254	67
10	37.5		233.4	.65	1.58	1.58	145	106	99	7.5	254	66
9	40.0		242.3	.70	1.70	1.70	145	107	100	7.5	254	66
8	42.5		251.7	.70	1.70	1.70	146	111	101	7.5	254	67
7	45.0		261.1	.68	1.65	1.65	147	113	101	7.5	254	65
6	47.5		271.0	.80	1.90	1.90	145	114	102	7.5	253	65
5	50.0		281.1	.80	1.90	1.90	145	115	102	7.5	253	64
4	52.5		290.6	.70	1.70	1.70	145	116	103	7.5	254	66
3	55.0		299.5	.60	1.43	1.43	145	115	103	7.5	254	65
2	57.5		308.6	.65	1.58	1.58	143	113	102	7.5	254	64
1	60.0		317.947	.65	1.58	1.58	145	111	103	7.5	254	63

LEAKAGE @ 10 "Hg = .002 CFM

GAS METER COR. ___ , ___

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CI[redacted]NA[redacted]HIO[redacted]24[redacted]

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN TRANQUILITY	11/17/77	#1,2,2 INCLINED CLEANERS	PARTICULATE

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN. HG)	STATIC PRESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. B-6	JE		29.48		0008854	30.0 X	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 6 ft glass lined	.2545	3	RAC-2	RAC-1	1.92	1.1	250	250	.44	2.5

EMISSION TESTING FIELD DATA

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	1050	461.399									
E-1	2.5		464.565	.65	2.65	2.65	135	82	82	3.0	250	69
2	5.0		466.745	.58	2.40	2.40	135	88	82	2.0	250	69
3	7.5		468.955	.68	2.81	2.81	134	92	83	3.0	250	70
4	10.0		471.251	.69	2.89	2.89	134	96	83	3.0	250	70
5	12.5		473.585	.70	2.90	2.90	134	98	84	3.0	250	72
6	15.0		475.944	.68	2.81	2.81	134	98	84	3.0	250	74
7	17.5		478.140	.65	2.65	2.65	134	102	88	3.0	250	74
8	20.0		480.435	.65	2.65	2.65	137	103	88	3.0	250	76
9	22.5		482.632	.65	2.65	2.65	137	104	88	3.0	250	76
10	25.0		484.893	.60	2.50	2.50	138	106	89	3.0	250	76
11	27.5		487.035	.60	2.50	2.50	138	108	90	3.0	250	76
12	30.0		489.105	.52	2.15	2.15	138	110	92	3.0	250	76
S-1	32.5		491.245	.58	2.40	2.40	139	102	82	3.0	250	72
2	35.0		493.324	.58	2.40	2.40	140	104	83	3.0	250	72
3	37.5		495.621	.68	2.81	2.81	136	108	94	3.0	250	71
4	40.0		497.925	.70	2.90	2.90	138	108	94	3.0	250	71
5	42.5		500.285	.74	3.10	3.10	139	110	96	3.0	250	71
6	45.0		502.650	.75	3.15	3.15	140	112	96	3.5	250	70
7	47.5		505.024	.70	2.90	2.90	139	113	97	3.5	250	70
8	50.0		507.261	.65	2.65	2.65	139	114	98	3.5	250	70
9	52.5		509.545	.62	2.55	2.55	137	114	98	3.0	250	70
10	55.0		511.740	.60	2.50	2.50	137	114	98	3.0	250	70
11	57.5		513.874	.55	2.30	2.30	138	114	98	3.0	250	70
12	60.0	1207	516.004	.56	2.32	2.32	139	114	98	3.0	250	70

LEAKAGE @ ____ °Hg = ____ CFM

GAS METER COR. ____ (7 8 9 10 11)

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

1.	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
	WESTSIDE GIN TRANQUILITY, Calif.	11/17/77	#1,2 Inlined Cyclones	PARTICULATE

2.	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
	B-7	CB	70	29.78	-1.25	0000128	30.0 x	.84

3.	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
	5ft Stainless Steel	.300	3	AERO	AERO	1.070	—	250	250	.78	2.5

EMISSION TESTING FIELD DATA

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	1352	319.910									
S-12	2.5		328.9	.68	1.6	1.6	137	84	84	7.0	254	59
11	5.0		337.5	.60	1.45	1.45	134	86	86	7.0	252	61
10	7.5		346.6	.68	1.6	1.6	135	90	86	7.0	252	68
9	10.0		356.2	.70	1.70	1.70	135	95	86	7.0	252	69
8	12.5		365.6	.73	1.75	1.75	136	99	87	7.0	251	70
7	15.1		375.1	.70	1.70	1.70	137	102	88	7.0	253	69
6	17.5		384.6	.70	1.70	1.70	137	104	88	7.0	251	61
5	20.0		393.7	.65	1.57	1.57	138	105	89	7.5	252	67
4	22.5		402.8	.68	1.60	1.60	138	106	90	7.5	252	67
3	25.0		411.7	.60	1.45	1.45	137	107	90	7.0	252	68
2	27.5		420.5	.60	1.45	1.45	137	108	91	7.0	252	67
1	30.0	1423	429.416	.62	1.50	1.50	138	108	91	7.0	252	67
E-12	32.5	1430	438.2	.65	1.57	1.57	137	94	90	7.0	249	80
11	35.0		447.6	.70	1.70	1.70	140	97	90	7.0	252	73
10	37.5		456.9	.67	1.59	1.59	139	101	90	7.0	253	72
9	40.0		466.6	.70	1.70	1.70	138	104	91	7.0	251	73
8	42.5		475.9	.70	1.70	1.70	138	108	92	7.0	251	74
7	45.0		485.3	.65	1.57	1.57	139	110	93	7.0	252	75
6	47.5		494.7	.70	1.70	1.70	137	111	93	7.0	252	75
5	50.0		504.4	.74	1.79	1.79	138	112	94	7.0	252	74
4	52.5		513.7	.68	1.60	1.60	139	113	95	7.0	252	74
3	55.0		523.2	.70	1.70	1.70	137	113	95	7.0	252	74
2	57.5		532.1	.60	1.45	1.45	138	112	96	7.0	252	73
1	60.0	1500	541.130	.60	1.45	1.45	139	112	96	7.0	251	77

B-14

LEAKAGE @ 11 "Hg = .009 CFM

GAS METER COR. ___

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI OHIO 246

C

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	WESTSIDE GIN TRANQUILITY	11/15/17	unloading ; dryer	PARTICULATE

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	B-15, C-15,	CB-JI	65	29.95	.24	0000944	30D	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	6ft 9lass lined	.2550 #18	5	FM-5	RAC-1	1.91	1.1	250	250	.44	2 5

EMISSION TESTING FIELD DATA

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	1440	115.223									
S-12	2.5		117.1	.45	1.95	1.95	125	70	70	2.5	170	70
11	5.0		119.2	.48	2.1	2.1	125	74	70	3.0	170	65
10	7.5		121.2	.48	2.1	2.1	125	76	70	3.0	192	50
9	10.0		123.2	.52	2.2	2.2	125	79	70	3.0	192	65
8	12.5		125.3	.54	2.35	2.35	125	82	72	3.0	192	55
7	15.0		126.5	.54	2.35	2.35	125	84	72	3.0	200	55
6	17.5		129.3	.53	2.25	2.25	125	86	83	3.0	205	55
5	20.0		131.3	.54	2.35	2.35	125	87	75	3.0	225	55
4	22.5		133.3	.51	2.15	2.15	125	88	75	3.0	225	56
3	25.0		135.2	.45	1.95	1.95	125	89	76	3.0	225	56
2	27.5		136.3	.43	1.85	1.85	125	90	76	3.0	230	56
1	30.0		138.6	.37	1.60	1.60	125	90	77	3.0	230	56
W-12	32.5	1516	140.4	.46	2.0	2.0	125	82	78	3.0	225	56
11	35.0		142.4	.48	2.1	2.1	125	86	79	3.0	265	56
10	37.5		144.4	.52	2.2	2.2	125	88	80	3.0	275	57
9	40.0		146.5	.54	2.35	2.35	125	90	80	3.0	270	56
8	42.5		148.4	.54	2.35	2.35	125	92	81	3.0	275	56
7	45.0		150.4	.54	2.35	2.35	125	92	82	3.0	265	56
6	47.5		152.4	.52	2.40	2.40	125	93	83	3.0	260	56
5	50.0		154.5	.55	2.40	2.40	125	94	83	3.0	260	56
4	52.5		156.5	.54	2.35	2.35	125	94	84	3.0	275	57
3	55.0		158.5	.52	2.2	2.2	125	94	84	3.0	275	57
2	57.5		160.3	.43	1.85	1.85	125	94	84	3.0	275	58
1	60.0		162.218	.43	1.85	1.85	125	95	84	3.0	275	58

B-15

LEAKAGE @ 4 "Hg = .003 CFM

GAS METER COR. ___ (7 8 9 10 11)

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Gin, Tranquility, Calif.	11/16/77	Unloading; dryer	Part.

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PPESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	C-2	CB, JI	65	30.10	-1.24	000850	30.0 x	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	5' Heated Glass -Method 5-	.253	3	14 FM-A	RAC-1	1.91	1.1	250	250	.44	5 0

EMISSION TESTING FIELD DATA

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	948	162.701									
E-12	5.		166.295	.46	1.96	1.96	104	68	69	1.5	250	66
11	10.		170.045	.49	2.09	2.09	101	74	70	2.0	250	60
10	15.		173.910	.51	2.17	2.17	101	80	70	2.5	250	60
9	20.		177.840	.53	2.26	2.26	102	86	73	2.5	250	63
8	25.		181.815	.53	2.26	2.26	104	88	74	2.5	250	63
7	30.		185.760	.52	2.20	2.20	106	90	77	2.5	250	61
6	36.		189.770	.53	2.26	2.26	108	93	78	2.5	250	67
5	40.		193.920	.56	2.37	2.37	121	96	82	2.5	250	68
4	45.		198.125	.51	2.40	2.40	119	98	83	2.5	250	67
3	50.		202.35	.55	2.32	2.32	123	100	85	3.0	250	64
2	55.		206.51	.52	2.20	2.20	119	100	87	3.5	250	62
1	60.	1048	210.069	.38	1.60	1.60	120	100	88	2.0	250	64
S-12	65.	1102	213.010	.26	1.10	1.10	134	90	87	1.0	250	68
11	70.		215.815*	.25	1.07	1.07	130	95	88	1.0	250	69
10	75.		218.63*	.24	1.02	1.02	138	100	90	1.0	250	69
9	80.		221.37*	.22	.91	.91	149	102	90	1.0	250	72
8	85.		223.93	.20	.90	.90	152	103	92	1.0	250	66
7	90.		228.34	.61	2.60	2.60	170 ✓	108	94	4.0	250	69
6	95.		232.80	.58	2.45	2.45	165 ✓	112	97	4.0	250	74
5	100.		237.48	.67	2.88	2.88	159 ✓	113	99	4.0	250	73
4	105.		241.705	.51	2.40	2.40	169 ✓	114	100	4.0	250	72
3	110.		246.200	.52	2.20	2.20	167 ✓	116	100	4.0	250	76
2	115.		250.03	.49	2.09	2.09	✓	116	101	4.0	250	71
1	120.		253.844	.40	1.70	1.70	✓	116	102	4.0	250	72

LEAKAGE @ 6 "Hg = .002 CFM Post-Test

*- Pitot Line Clogged & Changed.

B-16

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN TRANQUILITY	11/16/77	unloading / dryer	PART

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. C-3	BD JI	65	30.10	~~-3.0~~ -2.4	000130	3.90	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 6 ft Stainless	.375	3	AERO	AERO	1.27	-	250	250	1.65	5.0

EMISSION TESTING FIELD DATA

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	950	848.864									
S-1	5.		911.6	.35	3.95	3.95	111	80	73	4.0	230	73
2	10.		925.0	.33	3.80	3.80	111	82	74	4.0	230	66
3	15.		~~937.7~~ 937.3	.35	3.95	3.95	110	87	76	4.5	260	73
4	20.		~~948.0~~ 955.7	.40	4.60	4.60	113	90	78	4.5	258	72
5	25.		970.0	.45	5.1	5.1	114	95	80	5.0	260	73
6	30.		985.1	.45	5.1	5.1	113	97	83	5.0	259	72
7	35.		1.0	.45	5.1	5.1	115	100	84	5.0	260	69
8	40.		17.2	.50	5.7	5.7	115	102	87	6.0	260	66
9	45.		34.0	.52	5.9	5.9	116	103	90	6.0	260	66
10	50.		50.0	.47	5.3	5.3	116	105	90	6.0	260	67
11	55.		65.8	.45	5.1	5.1	116	104	92	6.0	260	68
12	60.		81.10	.43	4.8	4.8	116	104	93	6.0	260	69
W-1	65.	1103	97.0	.42	4.6	4.6	116	96	94	4.0	260	68
2	70.		113.2	.43	4.8	4.8	116	104	97	5.0	260	67
3	75.		176.1	.43	4.8	4.8	118	108	98	5.0	260	64
4	80.		142.4	.47	5.3	5.3	117	111	98	5.0	260	64
5	85.		158.6	.48	5.4	5.4	117	111	99	5.0	260	61
6	90.		175.2	.48	5.4	5.4	116	112	100	5.0	260	62
7	95.		191.6	.47	5.3	5.3	118	112	102	5.0	260	63
8	100.		207.0	.48	5.4	5.4	118	112	103	5.0	260	64
9	105.		223.1	.48	5.4	5.4	118	117	104	5.0	257	64
10	110.		238.9	.46	5.2	5.2	118	112	103	5.0	260	64
11	115.		254.9	.45	5.1	5.1	119	112	102	5.0	260	65
12	120.		269.652	.38	4.4	4.4	118	112	104	5.0	260	66

LEAKAGE @ 10 "Hg = .003 CFM

GAS METER COR. ___ (7 8 9 10 11)

B-11

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

0 181

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. Westside Gin, Tranquility, Calif.	11/16/77	Unloading, dryer	Particulate

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. C-4	C.B., J.I.	65	30.10	-.24		30 x	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 3' Heated Glass	.235	3	FA-5	PAC-1	1.91	1.10	250	250	.44	5 0

EMISSION TESTING FIELD DATA

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	1415	254.173									
E-1	5.		258.61	.46	1.90	1.90	113	96	76	1.0	250	59
2	10.		262.75	.56	2.30	2.30	112	83	76	1.0	250	64
3	15.		267.005	.59	2.45	2.45	114	89	77	1.5	250	66
4	20.		271.54	.65	2.70	2.70	112	93	80	2.0	250	64
5	25.		276.12	.67	2.78	2.78	113	97	80	2.0	250	65
6	30.		280.75	.68	2.81	2.81	114	99	81	2.0	250	68
7	35.		285.15	.60	2.49	2.49	115	100	84	2.0	250	69
8	40.		289.735	.66	2.73	2.73	115	101	85	2.0	250	72
9	45.		294.196	.61	2.52	2.52	114	102	86	2.0	250	74
10	50.		298.545	.58	2.40	2.40	114	104	89	2.0	250	71
11	55.		302.248	.55	2.30	2.30	114	104	88	2.0	250	71
12	60.		309.315	.58	2.40	2.40	114	105	90	2.0	250	72
1	65.		310.564	.28	1.25	1.25	113	94	88	1.0	250	68
2	70.		313.745	.28	1.25	1.25	113	98	89	1.0	250	69
3	75.	*	316.935	.28	1.25	1.27	114	100	89	1.0	250	69
4	80.		320.745	.58	2.40	2.40	115	102	89	2.0	250	70
5	85.		326.034	.60	2.50	2.50	114	102	89	2.0	250	70
6	90.		329.625	.65	2.62	2.62	115	106	90	2.0	250	71
7	95.		333.985	.58	2.40	2.40	114	106	90	2.0	250	71
8	100.		338.375	.60	2.50	2.50	115	106	91	2.0	250	72
9	105.		342.745	.59	2.45	2.45	115	108	92	2.0	250	72
10	110.		347.065	.56	2.30	2.30	113	108	92	2.0	250	72
11	115.		351.335	.58	2.40	2.40	112	108	92	2.0	250	72
12	120.		355.738	.58	2.40	2.40	112	108	92	2.0	250	72

LEAKAGE @ 10 "Hg = .008 CFM

* Clog on pitot tube

GAS METER COR. .

B-18

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 24

,000747 37.25

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	WESTSIDE GIN TRANQUILITY, Calif.	11/16/77	Unloading, Dryer	Particulate

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	C-5	BD,JS	65	30.16	-.74	0000116	30.0	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	5FtSS	.375	2	AERO	AERO	.070	—	250	250	.81	5

EMISSION TESTING FIELD DATA

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	1406	269.895									
S-12	5.		289.1	.52	2.9	2.9	113	80	79	8.	255	58
11	10.		312.8	.53	2.95	2.95	113	95	84	8.	252	64
10	15.		337.5	.55	3.0	3.0	113	102	84	10.	260	66
9	20.		362.0	.55	3.0	3.0	113	106	86	10.	260	62
8	25.		386.8	.56	3.05	3.05	112	111	92	10.	247	58
7	30.		408.6	.42	2.35	2.35	114	111	91	8.	247	55
6	35.		446.3 *	~~.38~~ .55	~~2.10~~ 2.10	~~2.10~~ 2.10	115	108	92	8.	247	56
5	40.		470.88	.55	3.0	3.0	115	103	94	10.	250	54
4	45.		495.7	.55	3.0	3.0	114	111	93	10.	250	55
3	50.		519.70	.49	2.73	2.73	114	114	95	11.	251	59
2	55.		543.30	.45	2.58	2.58	113	115	96	11.	251	59
1	60.		566.130	.40	2.25	2.25	111	113	97	11.	251	56
F-12	65.		589.60	.50	2.78	2.78	113	96	94	12.0	235	57
11	70.		8613.9	.51	2.80	2.80	113	107	94	12.0	254	59
10	75.		639.1	.55	3.0	3.0	113	113	95	12.	250	60
9	80.		664.2	.58	3.20	3.0	114	117	97	13.0	251	61
8	85.		689.0	.56	3.05	3.05	115	117	98	13.0	252	62
7	90.		714.7	.52	2.90	2.90	115	118	99	13.0	250	62
6	95.		737.9	.49	2.70	2.70	115	118	100	13.0	248	63
5	100.		763.0	.55	3.0	3.0	116	117	100	13.0	253	63
4	105.		788.6	.55	3.0	3.0	115	119	101	13.0	249	64
3	110.		812.70	.50	2.78	2.78	114	120	101	13.0	249	64
2	115.		837.6	.52	2.90	2.90	113	118	102	13.0	249	64
1	120.		862.784	.53	2.98	2.98	117	118	102	13.	249	64

B-19

LEAKAGE @ 10 "Hg = .003 CFM

GAS METER COR. ___ (7 8 9 10 11)

* Stopped test momentarily to remove large piece of cotton from probe and pitot tube. Velocity low due to large piece of cotton

EDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. Westside Coin, Youngsville, Co.	11/[illegible]/87	11 N loading + dryer	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PPESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. C-[illegible]-6	Chuffy	55	29.4	-2.4	000102	30 x [illegible]	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 5' Stainless Heated	.500	3	Aero	Aero	1.070	—	250	250	0.72	2.5

EMISSION TESTING FIELD DATA

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	8[illegible]6	223.687									
E-12	2.5		232.4	0.65	1.68	1.68	101	58	55	9.0	250	55
11	5.0		241.8	0.65	1.68	1.68	103	61	55	10.	250	56
10	7.5		251.3	0.65	1.68	1.68	103	70	56	9.0	253	59
9	10.0		260.9	0.70	1.81	1.81	102	75	58	9.0	253	63
8	12.5		270.1	0.60	1.55	1.55	103	77	60	8.5	253	61
7	15.0		279.4	0.60	1.55	1.55	103	78	60	7.5	250	61
6	17.5		288.3	0.60	1.55	1.55	104	78	61	7.0	254	61
5	20.0		297.6	0.60	1.55	1.55	104	78	62	7.0	255	62
4	22.5		306.6	0.60	1.55	1.55	104	78	63	7.0	252	63
3	25.0		315.2	0.52	1.35	1.35	104	78	63	7.0	253	62
2	27.6		323.2	0.40	1.05	1.05	103	78	64	6.5	252	62
1	30.0	840	330.403	0.34	0.89	0.89	102	76	64	5.0	253	61
5-12	32.5		340.3	0.78	2.00	2.00	103	68	63	9.0	252	59
11	35.0		350.7	0.80	2.05	2.05	104	72	64	9.0	252	56
10	37.5		360.9	0.80	2.05	2.05	105	67	64	9.0	253	57
9	40.0		371.3	0.80	2.05	2.05	105	80	65	9.0	252	55
8	42.5		381.4	0.75	1.95	1.95	105	82	66	8.5	253	55
7	45.0		391.3	0.70	1.81	1.81	105	83	67	8.0	253	55
6	47.5		400.7	0.65	1.68	1.68	105	84	68	8.0	253	57
5	50.0		409.9	0.58	1.50	1.50	105	84	68	8.0	254	58
4	52.5		418.6	0.55	1.41	1.41	106	83	68	8.0	254	57
3	55.0		427.2	0.50	1.30	1.30	104	83	68	8.0	254	58
2	57.8		435.2	0.46	1.20	1.20	104	82	66	6.0	253	57
1	60.0	914	442.640	0.35	0.92	0.92	103	80	69	4.5	254	57

LEAKAGE @ 10 "Hg = .01 CFM

GAS METER COR. [illegible]

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO [illegible]246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Gin, Tranquility, Ca.	11/19/77	Unloading	Part

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
D-1	C Bluffy	40	29.86	+.04	0000110	27.0 X	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5' STAINless lined	.625	3	Aus	Aus	.070	—	250	250	0.30	2.5

EMISSION TESTING FIELD DATA

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	754	344.854									
E-12	2.5		351.8	.13	.81	.81	56	43	43	5.	246	49
11	5.0		359.1	.17	1.05	1.05	61	49	44	5.	242	54
10	7.5		361.2	.20	1.22	1.22	61	53	44	6.0	240	57
9	10.0		375.7	.23	1.40	1.40	66	59	45	7.0	242	59
8	12.5		383.9	.20	1.22	1.22	66	63	46	7.0	242	60
7	15.0		391.6	.16	.99	.99	60	66	48	5.0	253	60
6	17.5		399.7	.20	1.22	1.22	65	67	48	6.0	258	62
5	20.0		408.6	.25	1.52	1.52	67	69	49	8.0	255	62
4	22.5		417.5	.25	1.52	1.52	63	71	51	9.0	241	48
3	25.0		425.9	.20	1.22	1.22	65	73	52	8.0	241	49
2	27.5		434.7	.26	1.58	1.58	68	74	53	8.5	254	50
1	30.0	822	442.701	.17	1.05	1.05	69	75	54	6.0	264	51
N-12	32.5		450.3	.16	.99	.99	67	59	54	5.0	255	49
11	35.0		458.0	.17	1.05	1.05	64	61	54	6.0	254	48
10	37.5		465.2	.15	.93	.93	69	65	55	5.0	254	51
7	40.0		472.9	.17	1.05	1.05	68	68	56	6.0	252	53
8	42.5		481.1	.20	1.22	1.22	61	71	56	7.0	254	54
7	45.0		489.1	.18	1.10	1.10	68	75	58	6.0	252	56
6	47.5		498.1	.27	1.60	1.60	71	76	59	9.0	255	57
5	50.0		507.9	.30	1.84	1.84	72	80	60	10.0	255	57
4	52.5		518.1	.33	2.0	2.0	71	83	62	10.5	254	53
3	55.0		527.2	.25	1.52	1.52	72	86	64	8.0	256	52
2	57.5		536.4	.27	1.62	1.62	70	86	65	7.0	253	51
1	60.0	903	542.910	.15	.93	.93	77	86	66	5.0	258	52

B-21

LEAKAGE @ 10 "Hg = .006 CFM

GAS METER COR. 7 8 9 10 11

Note: Non-continuous flow

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Gin	11/19/77	unloading	Part.

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2O)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	D-2	JC	42	29.8	.04	0000776	276 X	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	6ft glass lined	3/12	3	RAC-3	RAC-1	1.92	1.1	250	250	.18	15

EMISSION TESTING FIELD DATA

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	754	712.191									
N-1	2.5	*	.	.15	1.60	1.60	61	60	47	2.5	250	55
2	5.0		716.095	.30	3.10	3.10	61	60	47	2.5	250	55
3	7.5		718.075	.25	2.50	2.50	60	60	48	2.5	250	55
4	10.0		720.185	.25	2.50	2.50	60	62	48	2.5	250	55
5	12.5		722.265	.25	2.50	2.50	62	64	50	2.5	250	55
6	15.0		724.305	.20	2.00	2.00	62	60	50	2.5	250	55
7	17.5		726.295	.20	2.00	2.00	65	64	50	2.5	250	55
8	20.0		727.880	.10	1.05	1.05	64	68	52	1.5	250	55
9	22.5		729.325	.10	1.05	1.05	67	69	52	1.5	250	55
10	25.0		730.820	.10	1.05	1.05	65	70	54	1.5	250	55
11	27.5		732.180	.10	1.05	1.05	67	71	55	1.5	250	55
12	30.0		733.569	.10	1.05	1.05	67	72	55	1.5	250	55
E 1	32.5		735.234	.15	1.58	1.58	65	72	60	1.5	250	58
2	35.0		737.136	.15	1.58	1.58	65	72	60	1.5	250	58
3	37.5		739.225	.25	2.50	2.50	65	76	61	2.5	250	58
4	40.0		740.945	.25	2.50	2.50	65	78	61	2.5	250	58
5	42.5		742.533	.25	2.50	2.50	70	80	62	2.5	250	58
6	45.0		744.098	.15	1.58	1.58	70	80	63	2.0	250	58
7	47.5		745.970	.10	1.05	1.05	60	78	64	1.5	250	58
8	50.0		748.005	.15	1.58	1.58	70	78	64	1.5	250	58
9	52.5		750.195	.15	1.58	1.58	72	78	64	2.0	250	58
10	55.0		752.030	.10	1.05	1.05	64	78	64	1.5	250	58
11	57.5		754.170	.10	1.05	1.05	62	78	64	1.5	250	58
12	60.0	903	756.985	.15	1.58	1.58	57	79	64	.		

B-22

LEAKAGE @ 10 "Hg = 0 CFM * Miss low point Reading

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. Westside Gin, Tranquility, Co.	11/19/77	unloading	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. D-3	Bluffy	65	29.80	-1.0	000109	87.0 X	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 5' Heated Stainless	.625	3	Delo	Delo	0.01	—	250	250	0.30	2.5

EMISSION TESTING FIELD DATA

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	950	545.428									
N-12	2.5		553.1	.22	1.31	1.31	72	62	64	6.0	252	62
11	5.0		561.6	.23	1.40	1.40	75	63	64	7.0	264	52
10	7.6		569.6	.18	1.11	1.11	70	66	64	6.0	258	61
9	10.0		577.7	.20	1.23	1.23	69	68	64	6.0	254	63
8	12.5		586.2	.22	1.31	1.31	72	70	64	7.0	255	63
7	15.0		594.9	.23	1.40	1.40	73	71	65	8.0	256	62
6	17.5		604.6	.32	1.95	1.95	74	75	65	10.0	257	61
5	20.0		614.6	.30	1.84	1.84	75	80	66	10.0	257	61
4	22.5		624.5	.30	1.84	1.84	73	81	67	10.0	257	60
3	25.0		634.0	.27	1.62	1.62	76	82	68	8.5	257	60
2	27.5		645.1	.42	2.55	2.40	75	82	69	12.0	252	60
1	30.0	1020	653.185	.18	1.11	1.11	75	82	70	5.0	257	60
E-12	32.5	1031	660.5	.15	.93	.93	70	67	68	5.0	257	61
11	35.0		667.4	.16	.98	.98	72	68	67	5.0	256	56
10	37.5		674.5	.15	.93	.93	69	69	68	5.0	256	59
9	40.0		681.7	.16	.98	.98	73	72	68	5.0	256	61
8	42.5		689.8	.20	1.23	1.23	73	73	69	7.0	253	60
7	45.0		696.8	.14	.86	.86	69	74	68	4.0	254	62
6	47.5		705.1	.25	1.52	1.52	75	75	69	8.0	253	62
5	50.0		716.1	.48	2.90	2.40	74	74	68	13.0	254	62
4	52.5		725.2	.25	1.52	1.52	73	79	70	7.0	254	63
3	55.0		733.8	.22	1.31	1.31	76	79	70	6.5	253	60
2	57.5		741.7	.18	1.11	1.11	72	78	70	6.0	256	61
1	60.0	1101	749.185	.15	.93	.93	69	76	71	4.5	254	61

LEAKAGE @ 12 "Hg = .008 CFM

NOTE: Non-Continuous flow

GAS METER COR. ___ (7 8 9 10 11)

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI OHIO 45246

1.	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
	Westside Gin	11/19/77	Unloading	Part.

2.	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2O)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
	D-4	J. Iverson	52	29.80	-.04		27.0 x	.84

3.	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
	6 ft Glass tube	.311	3	FM-5	B2C-1	1.91	1.1	250	250	-18	25

EMISSION TESTING FIELD DATA

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	950	756.335									
A-1	2.5		759.625	.25	2.50	2.50	61	50	52	1.4	250	44
2	5.0		759.445	.20	2.09	2.09	69	56	54	2.0	250	44
3	7.5		761.250	.20	2.09	2.09	70	60	54	2.0	250	44
4	10.0		763.495	.30	3.00	3.00	74	66	54	2.5	250	44
5	12.5		765.745	.30	3.00	3.00	74	68	54	2.5	250	44
6	15.0		767.670	.20	2.09	2.09	72	71	55	2.0	250	50
7	17.5		769.423	.15	1.58	1.58	72	72	56	2.0	250	50
8	20.0		771.295	.20	2.09	2.09	74	72	58	2.0	250	50
9	22.5		773.048	.15	1.58	1.58	75	72	58	2.0	250	50
10	25.0		774.950	.20	2.09	2.09	75	72	58	2.0	250	50
11	27.5		776.860	.20	2.09	2.09	63	73	58	2.0	250	50
12	30.0		778.774	.20	2.09	2.09	61	74	59	2.0	250	52
E-1	32.5		782.540	.20	2.09	2.09	51	62	58	4.5	250	52
2	35.0		784.635	.20	2.09	2.09	63	68	58	3.5	250	58
3	37.5		786.755	.25	2.50	2.50	65	70	59	2.5	250	58
4	40.0		788.865	.25	2.50	2.50	68	72	59	2.5	250	58
5	42.5		791.139	.30	3.00	3.00	74	74	60	2.5	250	60
6	45.0		793.145	.20	2.09	2.09	74	75	60	2.0	250	60
7	47.5		795.355	.30	3.00	3.00	78	75	61	2.5	250	60
8	50.0		797.330	.19	1.95	1.95	80	76	62	2.5	250	62
9	52.5		799.075	.15	1.58	1.58	78	74	62	2.0	250	62
10	55.0		800.765	.15	1.58	1.58	77	76	62	2.0	250	62
11	57.5		802.498	.15	1.58	1.58	74	76	62	2.0	250	60
12	60.0	1101	804.149	.15	1.58	1.58	80	74	62	2.0	250	60

LEAKAGE @ 10 "Hg = ~~.044~~ .004 CFM

GAS METER COR. 7 8 9 10 11

B-24

PEDCo - ENVIRONMENTAL

11499 CHESTER ROAD

CIN[redacted]NAT[redacted]HIO [redacted]46[redacted]

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Gin, Tranquility, Calf.	11/17/77	Unloading	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
D-5	Buffey	60	29.85	+1.04	000108	27.0	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5' Heated Stainless	.625	3	Less	Less	1.07	—	250	250	0.30	2.5

EMISSION TESTING FIELD DATA

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	1320	749.524									
E-12	2.5		757.2	.12	.83	.83	72	72	73	6.	258	64
-11	5.0		764.4	.12	.83	.83	74	73	73	4.0	258	63
10	7.5		771.3	.13	.83	.83	75	76	73	4.0	258	70
9	10.0		779.1	.18	1.11	1.11	76	77	73	6.0	258	73
8	12.5		786.2	.13	.83	.83	72	79	74	4.0	257	69
7	15.0		793.4	.15	.93	.93	73	79	74	5.0	256	66
6	17.5		800.9	.17	1.06	1.06	72	81	75	5.0	259	65
5	20.0		809.3	.22	1.32	1.32	70	84	76	6.5	259	66
4	22.5		817.6	.30	1.84	1.32	74	86	76	7.0	258	65
3	25.0		825.9	.20	1.22	1.22	73	88	77	7.0	258	64
2	27.5	1	834.1	.22	1.32	1.28	71	88	78	7.0	257	75
1	* 30.0	1350	841.946	.17	1.06	1.06	70	88	78	5.0	257	67
N-12	* 32.5	1535	850.1	.21	1.29	1.29	65	58	64	7.0	257	64
11	35.0		858.3	.26	1.22	1.22	64	61	64	7.0	255	51
10	37.5		866.2	.18	1.11	1.11	69	65	64	6.0	255	61
9	40.0		874.4	.21	1.29	1.20	69	69	64	7.0	254	64
8	42.5		882.3	.20	1.22	1.20	71	72	64	7.0	251	63
7	45.0		890.2	.18	1.11	1.11	69	74	64	7.0	250	63
6	47.5		898.2	.20	1.22	1.22	70	76	64	7.0	251	64
5	50.0		906.4	.30	1.84	1.22	71	75	65	7.0	251	65
4	52.5		914.4	.25	1.51	1.22	65	75	65	7.0	253	64
3	55.0		922.3	.18	1.11	1.11	68	76	65	7.0	254	63
2	57.5		929.7	.16	.97	.97	70	77	66	7.0	255	65
1	60.0			.15	.93	.93	66	76	65	7.0	253	63

B-25

LEAKAGE @ 11 "Hg = .002 CPM

GAS METER COR. ____ (7 8 9 10 11)

NOTE: Non-Continuous flow

* Gin down due to bearing failure, machine

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Gin	11/19/77	Unloading	Port.

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2O)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	D-6	J. IVERSON	60	29.	.04	0000923	27.0 x	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	6ft Glass tube	.3112	3	Box-3	BOC-1	1.91	1.1	250	250	.78	2.5

EMISSION TESTING FIELD DATA

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	1320	804.872									
A-1	2.5		806.559	.10	1.58	1.58	74	56	58	2.5	250	58
2	5.0		808.089	.10	1.05	1.05	75	59	58	2.0	250	58
3	7.5		809.539	.10	1.05	1.05	75	62	58	2.0	250	58
4	10.0		811.025	.10	1.05	1.05	75	64	58	2.0	250	58
5	12.5		812.654	.25	2.50	2.50	73	68	59	3.5	250	58
6	15.0		814.140	.25	2.50	2.50	75	70	60	3.5	250	58
7	17.5		817.145	.20	2.09	2.09	74	73	61	3.0	250	58
8	20.0		818.675	.10	1.05	1.05	74	74	61	2.0	250	58
9	22.5		820.489	.19	1.95	1.95	70	74	62	3.0	250	59
10	25.0		822.090	.09	1.01	1.01	70	75	63	2.0	250	59
11	27.5		824.039	.20	2.09	2.09	69	75	63	2.0	250	60
12	30.0		825.754	.15	1.58	1.58	69	76	64	2.5	250	60
E-1	32.5	*	827.034	.05	0.51	0.51	69	55	53	2.0	250	60
2	35.0	*	828.	.05	0.51	0.51	70	56	53	2.5	250	60
3	37.5		830.285	.25	2.50	2.50	70	59	54	2.5	250	60
4	40.0		832.189	.30	3.00	3.00	72	63	54	4.0	250	60
5	42.5		834.345	.30	3.00	3.00	72	66	54	4.0	250	60
6	45.0		836.462	.25	2.50	2.50	72	66	55	4.0	250	60
7	47.5		838.072	.20	2.09	2.09	72	68	56	3.5	250	60
8	50.0		840.389	.20	2.09	2.09	73	68	56	3.0	250	60
9	52.5		842.132	.15	1.58	1.58	69	69	57	3.0	250	60
10	55.0		843.889	.15	1.58	1.58	66	69	58	2.5	250	60
11	57.5		845.574	.15	1.58	1.58	67	69	58	3.0	250	60
12	60.0	1405	847.286	.15	1.58	1.58	65	71	59	2.5	250	60

LEAKAGE @ 14 "Hg = .087/.099 CFM

* C\6d Pitot (ΔP_s .05)

GAS METER COR. 1.0 9

B-26

PEDCo - ENVIRONMENTAL

11499 CHESTER ROAD

CIN[redacted]NA[redacted]HIO[redacted]246[redacted]

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Grid, Thousand City, Calif.	11/20/77	Basket + Condenser	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2O)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
E-1	C Bluffy	45	30.01	-.05	0000107	200 x	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5' STAINless (Heated)	.500	5	Auto	Auto	0.070	—	250	250	0.93	2

EMISSION TESTING FIELD DATA

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	835	939.708									
N-12	2.5		946.10	.55	1.40	.85	61	42	43	4.	269	40
11	5.0	*	952.7	.52	1.32	.80	62	49	43	4.	266	36
10	7.5		960.8	.48	1.23	1.23	62	54	44	6.5	268	42
9	10.0		969.10	.50	1.29	1.29	62	60	45	7.0	267	46
8	12.5		975.7	.55	1.40	1.40	62	66	46	11.0	266	49
7	15.0	*	982.468	.60	1.52	.78	63	65	47	15.0	265	51
6	17.5	*	991.4	.80	2.00	1.00	63	53	52	15.0	268	45
5	20.0	*	997.7	.60	1.52	.90	65	51	50	15.0	256	46
4	22.5		1006.9	.90	2.25	2.25	65	54	50	8.0	269	43
3	25.0		1016.8	.70	1.80	1.80	64	64	51	11.0	267	43
2	27.5		1026.4	.65	1.68	1.68	61	73	53	8.0	265	50
1	30.0	946	1034.602	.43	1.10	1.10	60	77	54	6.0	266	53
E-12	32.5	955	1042.3	.47	1.20	1.20	60	58	54	5.0	260	47
11	35.0		1050.1	.45	1.17	1.17	62	60	53	6.0	263	45
10	37.5		1057.1	.33	.86	.86	63	64	54	7.0	263	46
9	40.0		1064.0	.30	.77	.77	64	66	54	6.0	264	48
8	42.5		1071.8	.45	1.17	1.17	61	68	55	7.0	265	49
7	45.0		1080.9	.60	1.52	1.52	62	74	58	6.0	264	51
6	47.5		1091.8	1.00	2.50	2.40	63	78	58	11.0	265	51
5	50.0		1103.1	1.10	2.75	2.50	64	83	59	11.0	265	52
4	52.5		1114.4	1.05	2.60	2.50	62	90	62	11.0	265	52
3	55.0		1125.2	.85	2.17	2.17	61	91	64	9.0	264	53
2	57.5		1135.0	.70	1.80	1.80	60	92	66	7.0	265	53
1	60.0		1114.853	.70	1.80	1.86	60	91	67	7.0	265	53

B-27

LEAKAGE @ 15 "Hg - .02 CFM

GAS METER COR. 7 8 9 10 11

* Shut down to check pump due to low Δp reading
* Pump Repair - & Leak check

REDCo - ENVIRONMENTAL
SUITE 8 • ATKINSON SQUARE
CINCINNATI, OHIO 45246

1. PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
WESTSIDE GIN TRANQUILITY CALIF	11/20/77	Baghouse + Condenser	Part-

2. RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
E-2	J. IVERSON	45	30.01	+.05	000749	20 x	.84

3. PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5 ft Heated Glass	.255	3	B2C-3	B2C-1	1.91	1.1	250	250	.38	24

EMISSION TESTING FIELD DATA

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	935	847.568									
E-1	2.5		848.495	.95	.48	.48	62	44	44	1.0	250	54
2	5.0		849.399	.90	.45	.45	62	45	44	1.0	250	54
3	7.5		850.472	.10	.50	.50	62	48	44	1.0	250	54
4	10.0		851.325	.10	.50	.50	62	52	44	1.0	250	54
5	12.5		852.345	.12	.60	.60	64	57	46	1.0	250	56
6	15.0	15.6 *	853.535	.15	.74	.74	64	61	47	1.0	250	56
7	17.5	18.6 **	854.535	.65	3.10	3.10	54	62	52	2.0	250	56
8	21.0		855.985	.45	2.19	2.19	54	62	52	2.0	250	56
9	23.5		857.260	.35	1.71	1.71	53	62	52	2.0	250	56
10	26.0		858.540	.45	2.19	2.19	49	62	52	2.0	250	56
11	28.5		860.995	.50	2.40	2.40	49	68	53	2.5	250	58
12	29.0	***										
N-1	2.5	***	862.575	.70	3.39	3.39	52	64	54	3.0	250	58
2	5.0		864.989	.65	3.10	3.10	52	64	54	3.0	250	58
3	7.5		867.298	.65	3.10	3.10	52	74	56	3.0	250	58
4	10.0		869.665	.70	3.39	3.39	52	81	58	3.0	250	58
5	12.5		872.485	1.00	4.70	4.70	53	87	60	3.5	250	58
6	15.0		875.355	1.00	4.70	4.70	53	90	62	4.0	250	60
7	17.5		877.870	.75	3.60	3.60	54	94	64	3.0	250	61
8	20.0		880.045	.55	2.70	2.70	58	94	65	2.5	250	62
9	22.5		882.075	.45	2.20	2.20	60	94	66	2.0	250	62
10	25.0		884.135	.50	2.40	2.40	60	94	68	2.0	250	62
11	27.5		886.295	.53	2.70	2.70	61	94	69	2.5	250	62
12	30.0	1025	888.505	.55	2.70	2.70	61	96	70	2.5	250	62

LEAKAGE @ 0 "Hg = 15 CFM 0-26 0-27

* Leak check added (1) MIN For Leak ck loss

** Missed running (#2) Point

*** Re-[illegible] check [illegible]

GAS METER COR. [illegible]

PEDCo - ENVIRONMENTAL

11499 CHESTER ROAD

CIN[illegible]NAT[illegible]HIO [illegible]246[illegible]

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Gin, Tranquility, Calif.	11/20/77	Basket Condenser	PART.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
E-3	C Bruffey	55	30.08	+.05	000106	20.9	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5' SS Pitot Heated	.500	3	Reid	Reid	3.070	—	250	250	0.73	2.5

EMISSION TESTING FIELD DATA

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	1303	332.254									
E-12	2.5		340.7	.46	1.19	1.19	72	77	78	6.	273	62
11	5.0		348.6	.44	1.12	1.12	73	76	78	5.0	269	62
10	7.5		356.3	.40	1.03	1.03	74	78	78	6.0	259	67
9	10.0		363.8	.40	1.03	1.03	75	80	78	6.0	255	66
8	12.5		371.8	.48	1.22	1.22	76	83	78	6.5	257	66
7	15.0		381.0	.65	1.67	1.67	77	87	78	8.0	258	66
6	17.5		390.0	.60	1.52	1.52	77	91	79	7.5	257	65
5	20.0		399.1	.70	1.80	1.80	77	94	80	8.5	257	64
4	22.5		408.1	.60	1.52	1.52	75	95	81	7.0	257	64
3	25.0		419.7	1.01	2.50	2.50	73	98	82	12.0	257	64
2	27.5		430.0	.75	1.90	1.90	74	103	83	9.0	257	62
1	30.0	1333	439.862	.70	1.80	1.80	74	105	84	8.0	256	62
N-12	32.5	1340	448.8	.60	1.52	1.52	79	88	84	7.5	259	64
11	35.0		457.7	.55	1.40	1.40	78	88	84	6.5	258	60
10	37.5		465.8	.48	1.22	1.22	78	88	84	6.0	256	60
9	40.0		474.7	.50	1.29	1.29	80	89	83	7.0	257	61
8	42.5		483.6	.60	1.52	1.52	78	91	83	7.0	257	61
7	45.0		493.6	.75	1.90	1.90	78	92	83	9.0	257	61
6	47.5		505.0	1.10	2.75	2.75	78	93	83	13.5	253	60
5	50.0		516.2	.90	2.27	2.27	77	99	84	11.0	256	59
4	52.5		526.6	.80	2.00	2.00	75	101	85	10.0	256	58
3	55.0		536.2	.65	1.67	1.67	73	99	85	8.0	256	59
2	57.5		545.5	.60	1.52	1.52	71	96	85	7.5	257	58
1	60.0		553.869	.50	1.29	1.29	71	93	85	6.0	257	57

LEAKAGE @ 13.5 "Hg = .009 CFM

GAS METER COR. 7 8 9 10 11

PEDCo - ENVIRONMENTAL
SUITE 8 • ATKINSON SQUARE
CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Gin	11/20/77	Boiler Exhaust	Plant

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	E-4	J. IVERSON	55	30.08	-1.05	0000754	20 x	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	5 ft Heated Glass	.2550	3	FM-5	RAC-1	1.91	1.1	250	250	0.38	315

EMISSION TESTING FIELD DATA

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	1303	889.494									
N 1	2.5		891.725	.60	2.85	2.85	75	66	58	4.0	250	56
2	5.0		894.098	.70	3.40	3.40	73	70	58	4.5	250	56
3	7.5		896.625	.85	4.00	4.00	74	75	59	5.0	250	56
4	10.0		899.065	.75	3.60	3.60	75	80	70	5.0	250	56
5	12.5		901.745	.90	4.30	4.30	75	84	70	6.0	250	56
6	15.0		904.535	1.00	4.80	4.80	74	87	71	6.0	250	56
7	17.5		907.150	.80	3.80	3.80	75	90	72	5.0	250	56
8	20.0		909.505	.65	3.10	3.10	75	92	74	4.0	250	56
9	22.5		911.585	.45	2.20	2.20	74	93	74	3.2	250	56
10	25.0		913.570	.45	2.20	2.20	75	94	75	3.3	250	56
11	27.5		915.515	.52	2.50	2.50	74	96	76	3.0	250	56
12	30.0		917.521	.55	2.60	2.60	74	96	78	3.0	250	56
E 1	32.5		920.031	.75	3.60	3.60	75	80	76	5.0	250	58
2	35.0		922.515	.80	3.80	3.80	75	87	77	5.0	250	58
3	37.5		925.235	.95	4.50	4.50	77	92	78	6.0	250	58
4	40.0		928.069	1.00	4.80	4.80	77	96	78	6.5	250	58
5	42.5		931.015	1.00	4.80	4.80	78	98	79	6.5	250	58
6	45.0		934.035	1.20	5.69	5.69	78	102	80	7.5	250	58
7	47.5		936.585	.70	3.40	3.40	77	102	81	4.5	250	58
8	50.0		938.645	.45	2.20	2.20	75	102	82	3.5	250	58
9	52.5		940.374	.30	1.45	1.45	74	98	82	2.4	250	58
10	55.0		942.130	.35	1.70	1.70	75	97	82	2.5	250	58
11	57.5		944.179	.50	2.40	2.40	70	97	82	3.4	250	58
12	60.0	1411	946.263	.50	2.40	2.40	70	98	82	3.5	250	58

LEAKAGE @ 12 "Hg - .078 / .048 CFM

GAS METER COR. 1.011

B-30

PEDCo - ENVIRONMENTAL
SUITE 8 • ATKINSON SQUARE
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. Westside Gin, Tranquility, Calif.	11/1 20/77	Basket Container	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$))	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE C_p
2. E-5	Chuffy	60	30.10	+.05	000105	20.0	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 5' Stainless Heated	.500	3	Aero	Aero	0.070	—	250	250	.973	2 5

EMISSION TESTING FIELD DATA

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	1540	555.896									
E-12	2.5		564.5	.55	1.40	1.40	77	67	67	7.0	255	51
11	5.0		573.1	.55	1.40	1.40	78	66	67	7.0	253	57
10	7.5		581.4	.48	1.25	1.25	77	70	66	6.0	251	61
9	10.0		589.7	.48	1.25	1.25	77	72	67	6.0	251	61
8	12.5		598.1	.53	1.37	1.37	76	75	67	6.0	253	60
7	15.0		608.1	.80	2.00	2.00	75	76	68	10.0	253	58
6	17.5		618.8	.90	2.30	2.30	74	81	68	12.0	253	57
5	20.0		630.2	1.00	2.50	2.50	75	85	69	13.0	255	57
4	22.5		640.4	.75	1.91	1.91	73	88	71	9.5	252	57
3	25.0		650.3	.70	1.80	1.80	~~87~~ 69	87	71	9.0	251	55
2	27.5	1604	659.4	.60	1.55	1.55	68	86	73	8.0	252	54
1	30.0	1610	668.345	.55	1.40	1.46	69	84	72	7.0	253	55
N-12	32.5	1620	676.4	.50	1.30	1.30	70	66	69	7.0	259	52
11	35.0		685.0	.50	1.30	1.30	71	68	69	7.0	255	53
10	37.5		692.7	.40	1.03	1.03	72	71	69	5.5	253	54
9	40.0		700.6	.43	1.11	1.11	72	73	68	6.0	252	54
8	42.5		708.5	.41	1.20	1.20	75	75	69	7.0	255	54
7	45.0		717.9	.65	1.68	1.68	75	77	69	8.5	254	54
6	47.5		728.6	.95	2.4	2.4	75	81	69	12.0	253	54
5	50.0		740.1	1.00	2.50	2.50	75	85	70	13.0	253	52
4	52.5		751.5	1.00	2.50	2.50	73	91	71	11.0	253	53
3	55.0		762.5	.85	2.19	2.19	69	93	73	9.0	252	52
2	57.5		772.8	.80	2.00	2.00	68	93	74	9.0	253	51
1	60.0	1650	782.624	.65	1.68	1.68	69	91	74	8.0	253	51

LEAKAGE @ 13.5 "Hg = .011 CFM

GAS METER COR. ___ (7 8 9 10 11)

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

1.	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
	WESTSIDE GIN	7/1/2011	Condenser Basket	Part.

2.	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PPRES. (IN.H_2)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
	E 6	J. IVERSON	80	30.08	-0.5	0000883	24	.84

3.	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
	5 ft Heated 6/283	.2552	3	B2C-2	B2C-1	1.91	1.1	256	256	0.38	315

EMISSION TESTING FIELD DATA

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	1540	947.788									
E-1	2.5		950.175	.80	3.80	3.80	77	64	64	5.0	250	50
2	5.0		952.525	.75	3.60	3.60	77	70	65	5.0	250	50
3	7.5		955.250	1.00	4.70	4.70	75	77	66	6.0	250	50
4	10.0		958.115	1.10	5.00	5.00	75	81	67	6.5	250	52
5	12.5		961.021	1.10	5.00	5.00	75	84	68	6.5	250	52
6	15.0		963.525	.70	3.30	3.30	77	87	69	4.5	250	52
7	17.5		965.630	.45	2.19	2.19	78	88	70	3.4	250	54
8	20.0		967.425	.35	1.70	1.70	78	88	70	3.0	250	54
9	22.5		969.345	.45	2.19	2.19	68	88	71	3.0	250	56
10	25.0		971.390	.50	2.40	2.40	69	89	72	3.3	250	56
11	27.5		973.450	.50	2.40	2.40	70	90	72	3.0	250	56
12	30.0		975.420	.45	2.19	2.19	69	90	72	3.0	250	56
N-1	32.5		977.780	.65	3.10	3.10	76	77	70	4.5	250	56
2	35.0		980.095	.70	3.30	3.30	75	83	72	4.5	250	56
3	37.5		982.562	.75	3.60	3.60	72	88	73	5.0	250	56
4	40.0		985.260	.95	4.50	4.50	75	90	74	6.0	250	56
5	42.5		988.085	1.00	4.80	4.80	75	92	74	6.5	250	56
6	45.0		990.932	1.00	4.80	4.80	75	94	75	7.0	250	56
7	47.5		993.421	.70	3.30	3.30	75	96	75	5.0	250	56
8	50.0		995.685	.55	2.60	2.60	70	96	76	4.0	250	56
9	52.5		997.790	.50	2.40	2.40	70	96	77	4.0	250	60
10	55.0		999.945	.50	2.4	2.40	68	96	77	4.0	250	60
11	57.5		02.090	.55	2.60	2.60	68	95	77	4.0	250	60
12	60.0	1650	04.265	.55	2.60	2.60	68	95	77	4.0	250	60

B-32

LEAKAGE @ 11 "Hg = 0.053 CPM

GAS METER COR. _____ (7 8 9 10 11)

PEDCo - ENVIRONMENTAL
SUITE 8 • ATKINSON SQUARE
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. Westside Disp., Tampa, Fla.	11/21/77	F Mate Cleaner	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE C
2. F-1	[redacted]	50	30.00	-0.01	000104	19.0	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 5' Stainless Steel	.625	3	Aero	Aero	2.070	—	250	250	0.30	2 5

EMISSION TESTING FIELD DATA

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	825	783.043									
E-12	2.5		788.8	0.08	0.52	0.52	68	51	48	10.0	251	46
11	5.0		795.2	0.105	0.67	0.67	69	55	48	4.0	256	49
10	7.5		801.7	0.12	0.77	0.77	69	59	49	4.0	256	54
9	10.0		808.8	0.13	0.84	0.84	70	62	50	4.0	256	55
8	12.5		816.1	0.14	0.90	0.90	69	63	51	4.5	257	56
7	15.0		823.0	0.13	0.84	0.84	70	64	51	4.0	257	58
6	17.5		830.1	0.13	0.84	0.84	70	64	52	4.0	257	59
5	20.0		837.0	0.125	0.80	0.80	69	64	53	4.0	258	57
4	22.5		843.7	0.10	0.64	0.64	69	64	54	4.0	258	57
3	25.0		849.2	0.08	0.52	0.52	69	64	54	4.0	257	57
2	27.5		854.9	0.06	0.39	0.39	69	63	54	1.0	258	57
1	30.0	855	858.565	0.05	0.33	0.33	69	62	54	1.0	259	56
W-12	32.5	910	865.1	0.125	0.80	0.80	68	55	54	4.0	257	54
11	35.0		872.2	0.15	0.96	0.96	68	57	54	2.0	253	54
10	37.5		880.0	0.17	1.09	1.09	69	60	55	5.0	255	58
9	40.0		887.6	0.17	1.09	1.09	68	61	55	5.0	253	57
8	42.5		895.9	0.20	1.27	1.27	68	62	56	6.0	253	55
7	45.0		904.0	0.18	1.14	1.14	69	63	56	7.0	254	54
6	47.5		911.0	0.11	0.70	0.70	68	63	56	3.0	254	54
5	50.0		916.4	0.09	0.58	0.58	68	62	57	2.0	250	54
4	52.6		922.2	0.085	0.55	0.55	68	61	57	1.0	250	53
3	55.0		927.6	0.07	0.46	0.46	68	61	57	1.0	251	54
2	57.5		933.0	0.065	0.42	0.42	68	61	56	1.0	253	54
1	60.0		937.869	0.05	0.33	0.33	67	62	55	.5	253	54

LEAKAGE @ 10 "Hg = .002 CFM

GAS METER COR. 7 8 9 10 11

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	Westside Ga	1/11/77	Meter Plenum	PSLT

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	E-2	J. Iverson	52	30.6	-1.01	0000682	18	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	6 ft heated glass	.312	3		BAC-1	1.91	1.1	232	232	.48	25

EMISSION TESTING FIELD DATA

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	925	04.550									
W-1	2.5		06.035	.15	.60	.60	69	50	50	1.5	250	40
2	5.0		06.951	.12	.41	.41	70	54	50	1.0	250	40
3	7.5		07.835	.10	.41	.41	76	55	52	1.0	250	40
4	10.0		09.761	.32	1.90	1.90	68	58	52	2.5	250	40
5	12.5		11.035	.50	1.90	1.90	69	60	52	2.5	250	45
6	15.0		12.895	.48	1.85	1.85	67	68	54	2.5	250	45
7	17.5		14.563	.48	1.85	1.85	67	70	54	2.5	250	45
8	20.0		16.345	.48	1.85	1.85	68	74	56	2.5	250	45
9	22.5		18.075	.48	1.85	1.85	69	76	57	2.5	250	45
10	25.0		19.878	.46	1.80	1.80	64	78	58	3.0	250	45
11	27.5		21.623	.46	1.80	1.80	68	79	59	3.0	250	45
12	30.0		23.380	.46	1.80	1.80	58	81	60	3.0	250	45
E-1	32.5		24.360	.15	.60	.60	53	62	60	1.0	250	40
2	35.0		25.445	.15	.60	.60	53	62	60	1.0	250	40
3	37.5		26.515	.16	.64	.64	53	62	60	1.5	250	40
4	40.0		27.595	.17	.68	.68	68	60	60	1.5	250	40
5	42.5		28.815	.20	.78	.78	68	63	59	1.5	250	40
6	45.0		30.990	.17	.68	.68	68	63	59	1.5	250	40
7	47.5		32.970	.20	.78	.78	68	65	58	2.0	250	40
8	50.0		33.156	.17	.68	.68	68	64	58	1.0	250	40
9	52.5		34.225	.15	.60	.60	68	64	58	1.0	250	40
10	55.0		35.248	.15	.60	.60	68	63	58	1.5	250	40
11	57.5		36.215	.10	.41	.41	68	63	58	1.0	250	40
12	60.0	940	37.065	.10	.41	.41	68	62	57	1.0	250	40

LEAKAGE @ 9 "Hg = 14 CFM

GAS METER COR. [redacted]

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CI[redacted]NNA[redacted]OHI[redacted]24[redacted]

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Gin, Tranquility, Calif.	11/21/77	Note Clouds	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE
E-3	Bruff	50	30.02	-1.01	00000103	19.0 X	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5' Heated Stainless	.625	3	Hello	Hello	0.070	—	250	250	0.30	25

EMISSION TESTING FIELD DATA

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	1035	998.115									
W-12	2.5		943.7	0.08	0.52	0.52	70	55	55	1.5	257	50
11	5.0		949.9	0.10	0.64	0.64	70	56	55	1.5	257	51
10	7.5		956.1	0.10	0.64	0.64	70	57	55	1.5	259	51
9	10.0		962.6	0.11	0.70	0.70	70	59	55	2.0	258	52
8	12.5		969.0	0.10	0.64	0.64	71	61	55	2.0	258	54
7	15.0		975.2	0.10	0.64	0.64	71	62	56	3.0	258	54
6	17.5		980.9	0.075	0.49	0.49	71	63	56	2.5	259	56
5	20.0		986.0	0.06	0.39	0.39	72	65	56	1.0	260	55
4	22.5		990.2	0.035	0.23	0.23	72	67	57	.5	258	57
3	25.0		993.5	0.025	0.17	0.17	72	68	57	.5	258	56
2	27.5		996.6	0.015	0.10	0.10	73	69	58	.5	257	56
1	30.0	1105	999.490	0.015	0.10	0.10	73	69	58	.5	258	58
E-12	32.5	1111	1003.6	0.04	0.26	0.26	72	58	57	1.0	260	58
11	35.0		1009.0	0.07	0.46	0.46	73	61	57	1.5	262	57
10	37.5		1015.2	0.10	0.64	0.64	74	63	57	1.5	265	59
9	40.0		1021.8	0.12	0.77	0.77	75	63	57	1.5	255	57
8	42.5		1028.1	0.12	0.77	0.77	75	64	57	2.0	255	56
7	45.0		1034.3	0.09	0.58	0.58	75	65	58	2.0	256	55
6	47.5	*	1041.9	0.10	0.64	0.64	75	66	59	2.0	255	56
5	50.0		1047.1	0.10	0.64	0.64	75	66	58	2.0	265	56
4	52.5		1053.0	0.06	0.39	0.39	75	65	57	2.0	256	57
3	55.0		1057.5	0.05	0.32	0.32	75	66	57	2.0	259	55
2	57.5		1061.7	0.04	0.26	0.26	72	67	56	1.0	260	53
1	60.0	1114	1064.7	0.02	0.14	0.14	71	66	55	.5	259	57

LEAKAGE @ 5 "Hg = .00 CFM

GAS METER COR. 7 8 9 10 11

* Clock Malfunction
Time taken from wristwatch.

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CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Gin	11/21/77	Mote Illinois	Test

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
F-4	T. IVERSON	55	30.9	-1.0	0000717	19	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5 ft Heated Glass	.3112	3	Roc 3	RAC-1	1.91	1.1	250	250	.48	20

EMISSION TESTING FIELD DATA

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	1035	37.507									
E-1	2.5		38.591	.10	.41	.41	55	52	53	1.0	250	45
2	5.0		39.475	.11	.44	.44	70	54	53	1.0	250	45
3	7.5		40.442	.17	.67	.67	70	58	54	1.0	250	45
4	10.0		41.463	.15	.60	.60	71	58	54	1.0	250	45
5	12.5		42.568	.17	.67	.67	72	60	55	1.0	250	45
6	15.0		43.634	.15	.60	.60	72	62	56	1.0	250	45
7	17.5		44.725	.16	.64	.64	82	62	57	1.0	250	45
8	20.0		45.830	.16	.64	.64	71	63	57	1.2	252	45
9	22.5		46.930	.15	.60	.60	70	64	57	1.2	250	45
10	25.0		48.060	.17	.67	.67	71	65	58	1.2	250	45
11	27.5		49.005	.10	.41	.41	71	66	58	1.0	250	45
12	30.0		50.052	.17	.67	.67	71	67	59	1.2	250	45
W-1	32.5	1111	51.565	.10	.41	.41	70	63	59	1.0	250	45
2	35.0		52.431	.10	.41	.41	70	63	60	1.0	250	45
3	37.5		53.295	.10	.41	.41	73	64	60	1.0	250	45
4	40.0		54.215	.11	.44	.44	72	65	60	1.0	250	45
5	42.5		55.170	.12	.48	.48	75	66	61	1.0	250	45
6	45.0		56.135	.12	.48	.48	74	66	61	1.0	250	45
7	47.5		57.120	.12	.48	.48	73	66	61	1.0	250	45
8	50.0		58.165	.15	.60	.60	74	67	62	1.0	250	45
9	52.5		59.245	.15	.60	.60	73	67	62	1.0	250	45
10	55.0		60.224	.12	.48	.48	74	67	62	1.0	250	45
11	57.5		61.135	.10	.41	.41	73	67	62	1.0	250	45
12	60.0	1141	62.008	.10	.41	.41	74	67	62	1.0	250	45

LEAKAGE @ 6 "Hg = 4 CFM 03 032

PEDCo - ENVIRONMENTAL

[redacted] MET[redacted]COR. [redacted] 7 8 9 10 11

11499 CHESTER ROAD

[redacted] CINN[redacted] OH [redacted] 52 [redacted]

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PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Grs., Bonquilety, Cal	11/21/77	Mote Blower	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE C
P-5	C Buffys	60	30.00	+0.1	0000 01	19.0 x	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
5' Heated Stainless	.625	3	Auto	Auto	1.970	—	250	250	0.20	21

EMISSION TESTING FIELD DATA

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	1350	65.175									
E-12	2.5		70.8	0.08	0.52	0.52	70	61	62	1.5	258	56
11	5.0		77.0	0.105	0.67	0.67	71	62	62	2.0	254	57
10	7.5		83.8	0.13	0.84	0.84	72	64	62	2.0	255	51
9	10.0		91.0	0.15	0.95	0.95	72	66	63	2.5	251	66
8	12.5		98.3	0.15	0.95	0.95	74	67	63	2.5	251	68
7	15.0		105.4	0.13	0.84	0.84	73	69	63	2.0	255	69
6	17.5		112.7	0.15	0.95	0.95	71	68	63	2.5	252	68
5	20.0		119.3	0.12	0.77	0.77	72	69	64	2.0	255	66
4	22.5		125.3	0.09	0.58	0.58	70	70	64	1.5	253	66
3	25.0		131.4	0.10	0.64	0.64	73	69	64	1.5	256	69
2	27.5		136.9	0.07	0.46	0.46	71	68	64	1.0	254	68
1	30.0	1420	142.174	0.065	0.42	0.42	70	68	65	1.0	255	67
W-12	32.5	1427	150.5	0.14	0.89	0.89	80	64	65	1.5	250	69
11	35.0		157.6	0.14	0.89	0.89	76	67	65	2.0	252	68
10	37.5		164.9	0.155	0.98	0.98	74	68	64	3.0	256	64
9	40.0		172.2	0.15	0.95	0.95	73	69	63	3.0	252	66
8	42.5		179.7	0.16	1.01	1.01	74	70	64	5.0	252	65
7	45.0		187.5	0.17	1.08	1.08	72	70	65	5.0	253	66
6	47.5		194.2	0.12	0.77	0.77	71	68	64	3.5	254	67
5	50.0		200.9	0.12	0.77	0.77	72	68	64	3.0	254	67
4	52.5		207.2	0.10	0.64	0.64	72	68	63	2.0	253	66
3	55.0		212.8	0.075	0.49	0.49	71	67	63	1.5	253	65
2	57.5		218.2	0.07	0.46	0.46	70	67	63	1.5	254	64
1	60.0	1457	222.830	0.05	0.33	0.33	68	66	64	1.0	257	63

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LEAKAGE @ 5 "Hg = .008 CFM

GAS METER COR. 7 8 9 10 11

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CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	West Side Cin	11/3/77	Meter Manifold	Part.

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	E-6	J. Iverson	50	30.0	-1.0/1	0000927	19 x	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	5 ft Heated Glass	.3112	5	[illegible]-5	RAC-1	1.91	1.1	250	250	.48	2.5

EMISSION TESTING FIELD DATA

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	1350	62.867									
W-1	2.5		63.761	.10	.41	.41	74	61	62	1.0	250	60
2	5.0		64.680	.10	.41	.41	74	62	62	1.0	250	60
3	7.6		65.601	.11	.44	.44	75	64	62	1.0	250	60
4	10.0		66.615	.13	.53	.53	74	66	63	1.0	250	60
5	12.5		67.675	.15	.60	.60	75	68	63	1.0	250	60
6	15.0		68.710	.13	.53	.53	75	68	64	1.0	250	60
7	17.5		69.795	.16	.64	.64	73	68	64	1.0	250	60
8	20.0		70.864	.15	.60	.60	73	69	64	1.0	250	60
9	22.5		71.949	.15	.60	.60	74	69	65	1.0	250	60
10	25.0		73.015	.15	.60	.60	74	71	66	1.0	250	60
11	27.5		74.080	.15	.60	.60	74	73	66	1.0	250	60
12	30.0		75.146	.15	.60	.60	73	74	66	1.0	250	60
E-1	32.5		76.585	.14	.57	.57	75	71	68	1.0	250	60
2	35.0		77.645	.14	.57	.57	75	72	68	1.0	250	60
3	37.5		78.772	.15	.60	.60	74	73	68	1.0	250	60
4	40.0		79.755	.14	.57	.57	74	74	68	1.0	250	60
5	42.5		80.821	.15	.60	.60	74	74	68	1.0	250	60
6	45.0		81.842	.14	.57	.57	73	75	68	1.0	250	60
7	47.5		82.915	.14	.57	.57	74	76	68	1.0	250	60
8	50.0		83.998	.14	.57	.57	73	76	68	1.0	250	60
9	52.5		85.045	.14	.57	.57	73	77	69	1.0	250	60
10	55.0		86.135	.15	.60	.60	73	77	69	1.0	250	60
11	57.5		87.172	.14	.57	.57	74	76	69	1.0	250	60
12	60	1405	88.[illegible] (230)	.14	.57	.57	74	76	68	1.0	250	60

LEAKAGE @ 0 "Hg = 15 CFM

GAS METER COR. [illegible]

PEDCo - ENVIRONMENTAL

11499 CHESTER ROAD

C[illegible]NNA[illegible]OHI[illegible]524[illegible]

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	WESTSIDE GIN	11/1/2017	#2 Lint Cleaner	PARTICULATE

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	G-1	BD	65	30.08		0000750	88 x 60	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET	REF. ΔP	RECORD DATA MINS.
3.	6-ft glass liner	.6082	1	RAC	RAC-4	1.0	1.11	250	250	.012	

EMISSION TESTING FIELD DATA

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	0856	851.572									
1	2.5	859	853.2	.006	6.	.9	63	42	47	1.	60	40
2	5.0	934	854.4	.016	23.	2.7	63	50	50	1.	65	42
3	7.5		856.4	.016	22.	2.5	63	56	50	1.	65	45
4	10.0		859.4	.027	29.	3.5	63	52	51	1.	65	46
5	12.5		861.1	.010	12.	1.55	63	63	51	1.	65	46
1	15.0	950	864.6	.008	9.	1.2	63	62	52	1.	65	48
2	17.5		865.7	.012	15.	1.75	63	68	53	1.	65	48
3	20.0		867.0	.019	24.	2.85	63	72	54	1.	65	46
4	22.5		869.0	.014	20.	2.15	63	76	55	1.	65	45
5	25.0		870.6	.010	12.	1.55	63	78	56	1.	65	46
1	27.5	1006	872.0	.005	5.	.77	63	77	58	1.	65	46
2	30.0		874.2	.015	20	2.30	63	80	60	1.	65	45
3	32.5		876.0	.012	15.	1.75	63	82	60	1.	65	45
4	35.0		877.6	.009	11.	1.35	63	83	60	1.	65	45
5	37.5		879.3	.008	9.	1.2	63	84	61	1.	65	45
1	40.0	1021	880.5	.004	4.	.6	63	84	64	1.	65	46
2	42.5		882.5	.013	18.	2.0	63	88	67	1.	65	48
3	45.0		8850	.018	24.	2.85	63	96	70	2.	65	47
4	47.5		887.1	.023	27.	3.5	63	101	70	2.	65	47
5	50.0		889.3	.009	11.	1.35	63	103	91	2.	65	45
1	52.5	1034	890.4	.005	5.	.75	63	94	77	1.	65	48
2	55.0		892.1	.013	17.	2.0	63	98	74	1.	65	48
3	57.5		894.0	.010	12.	1.55	63	100	75	1.	65	48
4	60.0		895.7	.013	17.	2.00	63	101	76	1.	65	48
5	62.5		897.6	.009	10	1.4	63	102	77	1.	65	48

LEAKAGE @ $\frac{6}{4}$ "Hg - $\frac{.002}{}$ cfm

GAS METER COR. ___

* Shut down due to injury to personnel

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11499 CHESTER ROAD
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN TRANQUILITY	11/20/72	#2 Lint Cleaner	PARTICULATE

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. G-2	BD	60	30.08		0000741	88 X 64	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 8 ft glass lined	.6018	1	RAC	RMC-4	1.90	1.01	250	—	1.012	15

EMISSION TESTING FIELD DATA

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	1312	897.970									
A-1	2.5		899.2	.005	5.	.8	76	75	76	1.	65	50
2	5.0		900.6	.009	10.	1.4	76	80	77	1.	65	48
3	7.5		902.9	.013	18.	2.0	76	84	77	1.	65	46
4	10.0		904.6	.011	13.	1.6	76	88	77	1.	65	46
5	12.5		906.3	.009	11.	1.45	76	90	78	1.	65	45
B-1	15.0	1331	907.6	.005	5.	.8	77	88	80	1.	65	47
2	17.5		909.5	.014	19.	2.7	78	92	80	2.	65	47
3	20.0		912.1	.019	24.	2.9	78	93	81	3.	65	47
4	22.5		914.0	.012	16.	1.9	78	97	83	2.	65	47
5	25.0		915.7	.009	11.	1.45	78	100	85	2.	65	47
C-1	27.5	1346	917.4	.007	8.	1.1	78	97	86	2.	65	48
2	30.0		919.2	.012	15.	1.85	78	102	87	2.	65	50
3	32.5		921.6	.014	18	2.65	78	103	88	2.5	65	50
4	35.0		923.8	.018	23	2.8	78	104	88	2.5	65	51
5	37.5		925.7	.011	13.	1.6	78	104	88	2.0	65	51
D-1	40.0	1403	927.3	.007	8.	1.1	78	101	87	2.	65	52
2	42.5		929.5	.017	22.	2.6	79	103	90	2.5	65	52
3	45.0		931.8	.016	20.	2.5	80	103	91	2.5	65	52
4	47.5		934.2	.021	26.	3.3	80	104	92	3.0	65	52
5	50.0		936.4	.014	18.	2.65	80	105	92	2.5	65	53
E-1	52.5	1417	938.2	.010	12.	1.6	80	102	93	2.0	65	53
2	55.0		940.4	.016	19.	2.45	80	102	93	2.0	65	53
3	57.5		942.5	.013	17.	2.1	80	102	94	2.0	65	53
4	60.0		944.7	.017	24	2.60	80	103	94	2.5	65	53
5												
AVG	62.5		946.745	.011	14.	1.65	80	104	95	2.0	65	53

LEAKAGE @ $\frac{62.5}{4}$ "Hg - ___ CFM

GAS METER COR 1.004

PEDCO ENVIRONMENTAL

11499 CHESTER ROAD

CIN[redacted]AT[redacted]IO[redacted]46[redacted]

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
WESTSIDE GIN	11/20/77	#2 Lint Cleaner	Post

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
G-3	BD	60	30.00		0000967	88 x 60	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
8ft 9 glass lined	.6018	1	FM-5	RMC-4	1.82	1.1	250	—	.012	215

EMISSION TESTING FIELD DATA

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	1522	948.966									
E-1	2.5		951.4	.026	32.	4.3	80	70	70	2.5	65	48
2	5.0		954.3	.027	34.	4.5	80	76	71	2.5	65	46
3	7.5		957.2	.027	34.	4.5	80	86	74	2.5	65	46
4	10.0		960.3	.031	38.	5.2	80	94	77	3.0	65	48
5	12.5		963.1	.026	32.	4.3	80	97	78	2.5	65	48
D-1	15.0	1544	964.6	.006	8.	1.0	80	93	80	2.0	65	47
2	17.5		966.8	.016	22.	2.65	80	95	82	2.0	65	48
3	20.0		969.3	.023	28.	3.8	80	97	83	2.0	65	48
4	22.5		971.4	.013	18.	2.15	80	99	84	2.0	65	47
5	25.0		973.4	.013	18.	2.15	80	99	85	2.0	65	47
C-1	27.5	1553	974.9	.006	6.	1.0	80	89	85	2.0	65	48
2	30.0		976.9	.010	12.	1.6	80	90	85	2.0	65	49
3	32.5		979.4	.021	26.	3.4	80	90	85	2.0	65	49
4	35.0		981.6	.013	18.	2.15	80	92	86	2.0	65	49
5	37.5		983.5	.011	14.	1.9	81	93	86	2.0	65	50
B-1	40.0	1614	985.1	.006	6.	1.0	81	93	86	2.0	65	50
2	42.5		987.2	.012	16.	2.0	81	95	86	2.0	65	50
3	45.0		989.2	.014	20.	2.3	81	95	86	2.0	65	50
4	47.5		991.0	.009	11.	1.5	81	95	86	2.0	65	49
5	50.0		992.7	.010	12.	1.6	81	94	86	2.0	65	49
A-1	52.5	1629	994.0	.005	5.	.8	81	95	85	2.0	65	48
2	55.0		995.7	.007	8.	1.2	81	95	85	2.0	65	47
3	57.5		997.6	.012	16.	2.0	81	95	85	2.0	65	49
4	60.0		999.5	.009	10.	1.45	81	95	85	2.0	65	47
5	62.5		1.216	.009	11.	1.50	81	95	84	2.0	65	46

LEAKAGE @ 4 IN_{Hg} - ____ CFM

GAS METER COR. 1.005

PEDCO ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

1. PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
Westside Gin	11/22/77	#1 Lint Cleaner	Test

2. RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
A-1		50	30.10	-	0000803	88 x 160	.84

3. PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
8' glass	.5002	1	M-3	M-2	1.97	1.1	250	250	.076	2.5

EMISSION TESTING FIELD DATA

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	1556	614.836									
E-1	2.5		615.5	.007	8.	.60	83	77	72	1.0	250	64
2	5.0		617.2	.016	20.	1.1	83	78	74	2.0	250	62
3	7.5		619.5	.036	39.	2.45	83	78	72	5.0	250	60
4	10.0		621.9	.044	45.	2.95	83	82	73	5.0	250	60
5	12.5		624.1	.044	45.	2.95	83	84	74	5.0	255	60
D-1	15.0	1619	625.4	.013	17.	.95	83	87	75	2.0	250	62
2	17.5		627.0	.019	23.	1.35	82	92	76	2.5	255	61
3	20.0		629.4	.056	59.	4.50	82	93	76	5.5	250	60
4	22.5		631.5	.034	40.	2.35	82	98	78	3.5	250	61
5	25.0		633.4	.030	34.	2.05	81	99	78	3.0	250	63
C-1	27.5	1639	635.0	.020	24.	1.4	81	87	79	3.5	250	63
2	30.0		636.7	.025	30.	1.65	81	90	80	3.5	245	63
3	32.5		639.0	.041	44.	2.90	81	92	80	5.0	245	63
4	35.0		641.0	.034	40.	2.35	81	96	81	5.0	250	64
5	37.5		643.1	.032	38.	2.20	81	97	81	4.5	250	63
B-1	40.0	1657	644.8	.021	26.	1.50	80	90	82	3.0	250	63
2	42.5		646.7	.028	33.	1.95	80	94	82	3.5	245	64
3	45.0		648.6	.028	33.	1.95	80	96	83	3.5	250	64
4	47.5		650.5	.029	30.	1.65	80	98	83	3.5	250	64
5	50.0		652.1	.020	24.	1.40	80	99	83	3.0	250	64
A-1	52.5	1712	653.7	.019	21.	1.20	80	92	84	3.0	250	63
2	55.0		656.2	.022	24.	1.40	80	95	84	3.5	250	63
3	57.5		656.8	.016	20.	1.10	80	96	84	3.0	250	63
4	60.0		658.5	.021	21.	1.20	80	96	84	3.0	245	62
5			659.545	.012	16	.90	80	97	85	2.5	245	62

LEAKAGE @ ___ "Hg = ___ CFM

GAS METER COR. 1.011

B-42

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	WESTSIDE GIN TRANQUILITY	11/22/77	#1 Lint Cleaner	Point

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2O$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	H-2	BD	55	30.10		000816	88 x 60	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	8ft 9/16SS lined	.5002	1	FM-5	RAC3	1.91	1.11	250	250	.076	05

EMISSION TESTING FIELD DATA

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	1739	654.600									
A-1	2.5		661.4	.017	EQ	1.2	83	77	73	1.0	235	56
2	5.0		663.0	.019	23.	1.35	83	83	73	1.0	245	55
3	7.5		664.8	.025	30.	1.75	83	87	74	1.0	245	57
4	10.0		666.5	.021	25.	1.45	83	89	74	1.0	245	56
5	12.5		668.1	.018	22.	1.30	83	91	75	1.0	245	56
B-1	15.0	1819	669.0	.006	6.	.47	83	80	77	1.0	250	55
2	17.5		670.4	.016	19.	1.10	83	84	77	1.0	250	57
3	20.0		672.2	.025	30.	1.75	83	87	78	1.0	250	57
4	22.5		674.1	.024	28.	1.70	83	90	78	1.0	255	58
5	25.0		675.7	.018	21.	1.25	82	92	78	1.0	260	59
C-1	27.5	636	677.0	.010	13.	.70	82	87	78	1.0	255	55
2	30.0		678.3	.014	17.	1.00	82	91	79	1.0	255	60
3	32.5		680.3	.034	38.	2.3	82	93	80	2.0	250	60
4	35.0		682.4	.034	38.	2.2	82	93	80	2.0	250	60
5	37.5		684.5	.024	28.	1.70	82	96	80	2.0	250	61
D-1	40.0	1650	685.4	.009	11.	.45	82	89	80	1.0	250	61
2	42.5		686.5	.012	17.	.90	82	92	80	1.0	250	62
3	45.0		689.1	.041	54.	2.9	82	93	80	2.0	250	62
4	47.5		691.0	.041	54.	2.9	82	97	82	2.0	250	62
5	50.0		693.0	.030	34.	2.1	82	99	82	2.0	250	63
E1	52.5	1904	694.0	.006	7.	.50	82	91	83	1.0	250	63
2	55.0		695.0	.006	7.	.50	82	92	83	1.0	250	63
3	57.5		696.7	.024	28.	1.70	82	92	83	1.0	250	63
4	60.0		699.0	.042	49	2.95	82	95	83	2.0	250	63
5			700.915	.026	32	1.80	82	96	83	2.0	250	63

LEAKAGE @ 6.2.5 in.Hg - ____ CFM

GAS METER COR. 4-.018

B-43

PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN	11/22/17	#1 Lint Cleaner	Part

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. H-3	KD	55	30.10			8.80 x 6.09	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 6' Glass	.502		RHC	RHC3	1.91	1.1	250	250		215

EMISSION TESTING FIELD DATA

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	1934	701.126									
E-1	2.5		702.1	.006	7.	.43	82	76	75	1.0	250	55
2	5.0		703.0	.007	8.	.49	82	79	75	1.0	255	56
3	7.5		704.8	.025	31.	1.75	82	83	76	2.0	260	57
4	10.0		707.0	.049	47.	3.2	82	85	76	4.0	255	57
5	12.5		709.0	.027	35.	1.90	82	93	78	3.0	255	56
D-1	15.0	1952	710.2	.009	10.	.60	81	87	78	2.0	255	56
2	17.5		711.5	.011	14.	.75	81	89	78	2.0	255	57
3	20.0		713.2	.026	33.	1.85	81	92	78	3.0	255	57
4	22.5		715.3	.034	39.	2.35	81	94	80	3.0	255	59
5	25.0		717.1	.025	31.	1.75	81	96	80	3.0	250	59
C-1	27.5	2015	718.4	.013	16.	.90	81	87	81	2.0	250	60
2	30.0		719.9	.021	25.	1.35	81	90	81	2.0	250	60
3	32.5		721.8	.036	42.	2.45	81	92	81	3.0	250	61
4	35.0		723.4	.034	39.	2.35	81	96	82	3.0	250	61
5	37.5		725.8	.025	30.	1.80	81	98	83	3.0	250	61
B-1	40.0	2021	727.1	.014	17.	.95	81	89	84	2.0	245	62
2	42.5		728.9	.020	24.	1.20	80	93	84	2.5	245	62
3	45.0		730.8	.024	31.	1.85	80	95	84	2.5	250	62
4	47.5		732.7	.025	30.	1.80	80	97	85	2.5	250	63
5	50.0		734.2	.016	20.	1.1	80	99	86	2.5	250	63
A-1	52.5	2038	735.6	.013	16.	.90	80	91	81	2.0	250	62
2	55.0		737.1	.018	22.	1.2	80	94	82	2.0	250	62
3	57.5		738.4	.016	20.	1.1	80	97	83	2.0	250	61
4	60.0		739.8	.013	16.	.90	80	100	84	2.0	250	61
5	62.5		741.212	.013	16.	.90	80	101	85	2.0	250	61

LEAKAGE @ 6.2.5 Hg - ___ CFM

GAS METER COR. - [redacted] Y = 0.000

B-44

PEDCo - ENVIRONMENTAL

11499 CHESTER ROAD

[redacted] CINCINNATI, OHIO [redacted]246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN	11/2/77	#2 Lint Cleaner	PARTICULATE

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. I-1	BD	48	30.08		0000 758	88 x 60	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 8' glass	.6018		PM-A	PAC-3	1.91	1.1	250	250	.012	2.3

EMISSION TESTING FIELD DATA

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	835	384.797									
E-1	2.5		386.5	.012	16.	3.3	75	50	50	4.	245	50
2	5.0		388.9	.016	22.	3.7	75	60	51	5.	245	50
3	7.5		391.4	.016	22.	3.7	75	66	51	5.	240	52
4	10.0		394.1	.022	28.	5.2	75	72	52	6.	240	54
5	12.5		396.6	.016	22.	3.7	75	76	52	5.0	240	55
D-1	15.0	855	398.5	.013	16.	2.15	75	64	52	4.	240	55
2	17.5		400.5	.019	24.	3.3	75	71	54	4.	245	55
3	20.0		403.1	.023	30.	4.7	75	75	55	5.	245	55
4	22.5		405.5	.019	24.	3.3	75	80	56	4.	240	55
5	25.0		407.7	.019	24.	3.3	75	82	56	4.	245	56
C-1	27.5	910	409.3	.011	14.	1.8	75	70	56	3.0	225	55
2	30.0		411.0	.009	11.	1.65	75	74	56	3.0	240	55
3	32.5		412.8	.012	16.	2.0	75	76	56	3.0	245	56
4	35.0		414.4	.009	10.	1.4	75	76	56	3.0	245	56
5	37.5		415.9	.008	8.	1.15	75	76	56	3.0	245	56
B-1	40.0	929	417.3	.008	9.	1.3	75	69	58	3.0	245	56
2	42.5		418.5	.007	8.	1.15	75	70	55	3.0	245	56
3	45.0		420.5	.009	10.	1.4	75	73	60	3.0	245	57
4	47.5		422.0	.009	10.	1.4	75	75	60	3.0	245	57
5	50.0		423.2	.007	8.	1.15	75	76	60	3.0	245	57
A-1	52.5	944	424.3	.007	8.	1.15	75	69	55	3.0	245	57
2	55.0		426.3	.006	7.	1.1	75	73	60	3.0	250	57
3	57.5		428.0	.009	11.	1.65	75	74	60	3.0	250	57
4	60.0		429.6	.007	8.	1.15	75	75	60	3.0	250	57
5	62.5		431.250	.007	8.	1.15	75	75	61	3.0	250	57

LEAKAGE @ ____ "Hg = ____ CFM

GAS METER COR. ____ (7 8 9 10 11)

PEDCO - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN	11/21/77	#2 Unit Cleaner	PARTICULATE

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. T-2	BD		30.00	-0.1	000020	8.80 x 6.6	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 8ft glass lined	.6018	1	FMH	RAC-3	1.91	1.11	250	250	.01	2.5

EMISSION TESTING FIELD DATA

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	1318	431.175									
E-1	2.5		432.8	.009	11.	1.5	76	62	67	2.0	250	50
2	5.9		434.4	.011	14.	1.85	76	70	62	2.0	250	50
3	7.5		436.0	.008	10.	1.4	76	72	63	2.0	250	50
4	10.0		437.4	.007	8.	1.15	76	76	63	2.0	250	49
5	12.5		438.7	.005	5.	.9	76	78	64	2.0	250	49
D-1	15.0	1339	440.1	.006	6.	1.0	76	71	65	2.0	250	50
2	17.5		441.7	.010	12.	1.65	76	78	66	2.0	250	52
3	20.0		443.5	.012	15.	2.0	76	81	67	3.0	250	53
4	22.5		445.1	.007	8.	1.15	76	87	67	3.0	250	55
5	25.0		446.6	.007	8.	1.15	76	89	67	3.0	250	57
C-1	27.5	1354	448.0	.007	8.	1.15	76	81	69	3.0	250	57
2	30.0		449.6	.008	10.	1.4	76	84	70	3.0	250	58
3	32.5		451.3	.010	14.	1.85	76	88	70	3.0	250	60
4	35.0		453.0	.010	12.	1.65	76	90	71	3.0	250	61
5	37.5		454.6	.007	8.	1.15	77	90	71	3.0	250	62
B-1	40.0	1410	456.2	.007	8.	1.15	77	81	71	3.0	250	62
2	42.5		457.9	.011	14.	1.85	78	88	72	3.0	250	63
3	45.0		459.6	.010	13.	1.8	78	89	72	3.0	245	63
4	47.5		461.3	.008	10.	1.4	78	91	73	3.0	250	64
5	50.0		462.9	.008	10.	1.4	78	92	73	3.0	250	64
A-1	52.5	1425	464.2	.004	6.	1.0	78	84	72	2.5	250	64
2	55.0		465.9	.011	14.	1.85	78	86	72	3.0	250	65
3	57.5		467.8	.011	14.	1.85	78	87	73	3.0	245	66
4	60.0		469.7	.013	16.	2.30	78	88	73	3.0	250	66
	62.5		471.647	.010	13.	1.80	78	89	74	3.0	248	66

LEAKAGE @ ____ "Hg = ____ CFM

GAS METER COR 4-1.001

PEDCO - ENVIRONMENTAL

11499 CHESTER ROAD

CINCINNATI OHIO 45246

B-46

	PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1.	WESTSIDE GIN TRANQUILITY	11/2/77	#2 Lint Cleaner	Part.

	RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2.	I-3	BD	60	30.04		0000965	88 x 60	.84

	PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3.	8 ft q155	.6018	1	RAC	RAC-3	1.91	1.1	250	250	0.011	2.5

EMISSION TESTING FIELD DATA

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	1554	471.712									
A-1	2.5		473.5	.009	10.	1.5	77	68	68	2.0	230	65
2	5.0		475.5	.016	22.	2.7	77	74	68	2.5	245	63
3	7.5		477.8	.017	23.	2.9	77	76	70	2.5	250	63
4	10.0		480.0	.016	22.	2.7	77	82	71	2.5	250	63
5	12.5		481.8	.010	12.	1.7	77	84	71	2.0	250	62
B-1	15.0	1611	483.7	.012	16.	2.15	77	80	72	2.0	245	63
2	17.5		485.9	.014	22.	2.7	77	86	74	2.5	245	64
3	20.0		488.4	.022	26.	3.8	77	89	76	3.0	250	65
4	22.5		490.5	.014	18.	2.4	77	95	77	4.0	250	66
5	25.0		492.3	.010	12.	1.7	77	98	78	2.0	250	66
C-1	27.5	1625	494.0	.010	12.	1.7	77	92	79	2.0	255	63
2	30.0		496.0	.012	16.	2.15	77	94	80	2.0	250	64
3	32.5		498.1	.016	22.	2.7	76	97	80	3.5	250	64
4	35.0		500.2	.013	17.	2.3	76	100	80	2.5	250	64
5	37.5		501.9	.007	8.	1.2	76	101	80	2.0	245	65
D-1	40.0	1634	503.4	.009	10.	1.5	75	93	81	2.0	250	63
2	42.5		505.3	.010	11.	1.6	75	97	81	2.0	250	63
3	45.0		507.2	.012	16.	2.15	75	99	82	3.0	250	63
4	47.5		509.0	.010	11.	1.6	74	100	83	2.5	245	64
5	50.0		510.5	.007	8.	1.2	74	100	83	2.0	245	64
E-1	52.5	1655	512.2	.011	13.	1.75	74	94	84	2.0	250	63
2	55.0		514.2	.012	16.	2.15	74	97	84	3.0	250	63
3	57.5		516.3	.012	16.	2.15	74	97	84	3.0	250	63
4	60.0		518.9	.010	12.	1.7	74	96	84	2.5	250	63
	60		519.821	.010	12.	1.7	74	96	84	2.5	250	63

LEAKAGE @ 6 2.5 "Hg - ___ CFM

GAS METER COR. 1.11 (7 8 9 10 11)

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PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. WESTSIDE GIN	8/22/77	Battery Condenser	PARTICULATE

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. ($IN.H_2$)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE CP
2. I-1	BD		30.1		0000837	18 x 60	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 6' glass	.373			Pitt-3	1.91	1.1	250	250	.09	2 5

EMISSION TESTING FIELD DATA

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	815	519.942									
E-1	2.5		521.8	.062	58.	1.25	75	54	50	2.	225	50
2	5.0		523.7	.058	55.	1.22	75	60	54	2.	235	50
3	7.5		525.0	.117	80.	2.35	75	65	54	3.5	245	49
4	10.0		526.8	.117	80.	2.35	75	70	55	3.5	245	49
5	12.5		528.6	.087	69.	1.78	75	75	56	3.5	250	48
D-1	15.0	834	529.5	.021	25.	.47	77	67	55	3.0	250	47
2	17.5		530.9	.057	54.	1.20	77	70	56	3.0	250	46
3	20.0		532.8	.145	86.	3.00	77	72	56	4.0	255	46
4	22.5		534.7	.090	72.	1.85	77	80	58	4.0	255	46
5	25.0		536.0	.037	42.	.79	77	84	59	3.0	255	47
C-1	27.5	849	536.6	.006	7.	.14	77	75	60	1.0	255	48
2	30.0		537.9	.047	49.	1.0	78	78	61	2.0	255	50
3	32.5		539.7	.117	80.	2.35	78	83	61	3.5	255	51
4	35.0		541.3	.060	57.	1.25	78	89	63	3.0	255	52
5	37.5		542.1	.010	12.	.22	78	90	64	2.0	250	52
B-1	40.0	907	542.6	.008	8.	0.15	78	80	65	2.0	250	51
2	42.5		543.5	.021	25.	.47	78	80	65	2.0	250	51
3	45.0		544.7	.050	51.	1.05	78	81	65	2.5	255	51
4	47.5		545.8	.021	25.	.47	78	81	65	2.0	255	51
5	50.0		546.8	.025	30.	.55	78	80	65	2.0	250	51
A-1	52.5	924	547.2	.004	4.	.10	78	77	67	1.0	250	50
2	55.0		547.7	.007	8.	0.5	78	77	67	1.0	250	50
3	57.5		548.5	.020	24.	.45	78	76	67	1.0	255	51
4	60.0		549.2	.010	12.	.22	78	76	67	1.0	255	51
5	62.5		549.752	.010	12	.22	78	76	67	1.0	255	51

LEAKAGE @ 6 Hg - .001 CFM

GAS METER COR. 1.001 (7 8 9 10 11)

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PEDCO - ENVIRONMENTAL

11499 CHESTER ROAD

[redacted]

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. West Side Gen	11/1/77 1/1/77	Battery Condenser	Part.

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. J-2	BD	60	29.98		0000925	86 x 60	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 8ft glass lined	.373			BC-3	1.97	1.1	250	250	.109	25

EMISSION TESTING FIELD DATA

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	956	549.923									
A-1	2.5		550.4	.004	4.	.10	82	67	65	1.0	250	50
2	5.0		551.1	.009	11.	.20	82	67	65	1.0	250	49
3	7.5		551.8	.016	20.	.35	82	70	65	1.0	255	48
4	10.0		552.6	.016	20.	.35	82	74	65	1.0	255	48
5	12.5		553.3	.008	10.	.18	82	77	66	1.0	255	47
B-1	15.0	1014	554.0	.008	10.	.18	82	74	66	1.0	250	47
2	17.5		555.0	.026	30.	.57	82	78	66	1.0	250	49
3	20.0		556.3	.063	59.	1.28	82	83	68	2.5	250	50
4	22.5		557.6	.041	44.	.85	82	87	68	2.0	250	52
5	25.0		558.5	.016	20.	.35	82	85	68	1.0	250	52
C-1	27.5	1029	559.4	[illegible]	27.	.59	82	80	69	1.0	250	53
2	30.0		560.8	[illegible]	54.	1.2	82	85	69	2.0	255	54
3	32.5		562.29	[illegible]	87.	3.05	82	87	70	4.0	255	56
4	35.0		563.1	[illegible]	87.	3.05	82	98	71	4.0	255	59
5	37.5		566.5	.020	24.	.45	82	100	72	2.0	250	60
D-1	40.0	1044	567.5	.021	25.	.47	82	89	71	1.6	250	60
2	42.5		569.0	.075	64.	1.55	82	94	73	2.5	250	61
3	45.0		571.4	.175	93.	3.65	82	99	74	5.0	250	62
4	47.5		573.4	.107	77.	2.7	82	105	75	4.5	250	64
5	50.0		575.0	.051	52.	1.1	82	105	76	3.0	250	66
E-1	52.5	1058	576.5	.062	58.	1.25	82	98	75	2.0	255	67
2	55.0		578.0	.058	55.	1.22	82	104	76	3.0	255	67
3	57.5		580.1	.129	84.	2.65	82	104	78	3.5	250	68
4	60.0		582.2	.144	86.	3.05	82	107	78	5.0	250	68
5	62.5		584.327	.110	75.	2.10	82	109	79	4.0	250	68

LEAKAGE @ ____ "Hg - ____ CFM

GAS METER COR. 1.003 (7 8 9 10 11)

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PEDCo - ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

PLANT & CITY	DATE	SAMPLING LOCATION	SAMPLE TYPE
1. Westside Gin, California	11/22/77	Battery Condenser	Port

RUN NO.	OPERATOR	AMB. TEMP (°F)	BAR. PRESS (IN.HG)	STATIC PRESS. (IN.H_2)	FILTER NUMBER(S)	STACK INSIDE DIMEN. (INCHES)	PITOT TUBE Cp
2. #3	C Buffey	60			000826	80 x 60	.84

PROBE LENGTH AND TYPE	NOZZLE I. D. INCHES	H_2O (%)	SAMPLE BOX NO.	METER BOX NO.	METER ΔH @	C FACTOR	PROBE HEAT SET	BOX HEAT SET.	REF. ΔP	RECORD DATA MINS.
3. 8 Heated Glass	.373			RAC-3	1.91	1.1	250	250	.09	2.5

EMISSION TESTING FIELD DATA

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	1245	584.519									
A-1	2.5		586.200	.000	12	0.20	90	72	66	1.0	250	68
2	5.0		587.068	.008	10	0.18	90	72	66	1.0	250	67
3	7.5	*	587.798	.011	14	0.31	90	72	66	1.0	250	69
4	10.0	1325	588.390	.008	10	0.18	85	70	68	1.0	250	65
5	12.5		588.830	.004	4	0.10	85	70	68	1.0	250	65
B-1	15.0		589.215	.001	2	0.06	90	72	68	1.0	250	69
2	17.5		589.772	.010	12	0.20	90	73	68	1.0	250	56
3	20.0		590.850	.037	42	0.79	90	81	60	1.0	250	56
4	22.5		592.010	.034	40	0.74	85	88	70	1.0	250	58
5	25.0		592.788	.011	14	0.24	85	92	71	1.0	253	59
C-1	27.5		593.240	.005	6	0.12	86	93	72	1.0	254	63
2	30.0		594.050	.020	24	0.44	91	94	73	1.0	252	62
3	32.5		595.450	.067	62	1.40	92	94	74	1.0	252	61
4	35.0		597.00	.064	60	1.30	92	99	75	1.0	254	62
5	37.5		598.017	.018	22	0.39	91	100	75	1.0	255	65
D-1	40.0		599.045	.035	34	0.64	91	97	77	1.0	255	59
2	42.5		600.275	.040	44	0.84	91	98	76	1.0	255	55
3	45.0		602.05	.097	74	2.00	91	102	77	1.0	255	46
4	47.5		603.870	.082	68	1.72	91	105	79	1.0	254	49
5	50.0		605.453	.057	54	1.20	91	106	81	1.0	254	50
E-1	52.5		606.925	.064	60	1.30	91	104	82	1.0	256	48
2	55.0		608.610	.077	64	1.60	91	103	82	1.0	256	49
3	57.5		610.585	.114	76	2.30	91	106	83	1.0	255	50
4	60.0		612.013	.150	86	3.10	91	116	95	1.0	255	47
5	62.5		614.617	Short d=.064	60	1.30	91	110	86	1.0	257	44

LEAKAGE @ ____ Hg = ____ CFM 5 .001

PEDCO-ENVIRONMENTAL

[redacted] METER [redacted] R. [redacted]

7 8 9 10 11

11499 CHESTER ROAD

[redacted] CINCINNATI [redacted] OHIO [redacted] 24 [redacted]

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APPENDIX C

LABORATORY DATA

PEDCo ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246
(513) 782-4700

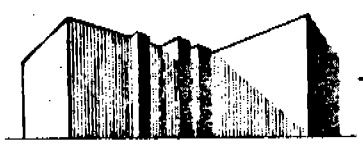
ANALYTICAL BLANK DATA

Plant Westside Fresno Blank no. A
Sample location Blank
Liquid level at mark and container sealed ✓
Density of acetone (ρa) 0.7851 g/ml
Acetone blank volume (Va) 118 ml
Date and time of wt. 12-2-77 10:28 a.m. Gross wt. 94 3246 mg
Date and time of wt. 12-3-77 11:20 a.m. Gross wt. 94 3247 mg
Average gross wt. 94.3246 mg
Tare wt. 94.3240 mg
Weight of blank (ma) 00.0006 mg g
0.6 mg

$$Ca = \frac{ma}{Va\ \rho a} = \frac{(0.6)}{(118)(0.7851)} = 0.006476 \text{ mg/g}$$

Remarks: This Acetone Blank is used for all Blank calculations for acetone washes

Signature of analyst M. H. Khaliq
Signature of reviewer Wade Mason


CHESTER TOWERS

PEDCo ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246
(513) 782-4700

PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/18/77
Sample location: Uncleaned Motes Run no.: A-1
Sample recovery person: CB Recovery date: 11/18
Filter(s) no.: 000111

MOISTURE

Impingers			Silica gel		
Final volume (wt)	475	ml(gm)	Final wt.	433.9g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	-25	ml(gm)	Net wt.	33.9 g	g

Total moisture 8.9 g
Color of silica gel Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. ~~A1~~ sealed ✓
Description of particulate on filter Light Beige
Acetone rinse container no. A1-2 Liquid level marked ✓
Acetone blank container no. A Liquid level marked ✓
Samples stored and locked ✓
Remarks: impinger contents container no. - A1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Felton
Remarks:

CHESTER TOWERS

BRANCH OFFICES

Crown Center
Kansas City, Mo.

Professional Village
Chapel Hill, N.C.

PEDCo ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246
(513) 782-4700

ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. A-1 11-18-77
Sample location Uncleaned Motes (Aero.)
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Final Wt	Yes
filter(s)	111	

Acetone rinse container no. A-2
Acetone rinse volume (Vaw) 185 ml
Acetone blank residue concentration (Ca) 0.000647 mg/g
Wa = Ca Vaw ρa = (.000647)(185)(.7851) = 0.9406 mg
Date and time of wt 12-6-77 929 Gross wt. 113.0709 mg
Date and time of wt 12-7-77 830 Gross wt. 113.0696 mg
Average gross wt. 113.0698 mg
Tare wt. 111.1254 mg FILTER 1491.9
Less acetone blank wt. (Wa) 0.9 mg
Weight of particulate in acetone rinse 451.5 mg + FILTER
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg
Remarks: High Vol. filter included in Acetone rinse

Signature of analyst M. A Khalifa
Signature of reviewer Wade Moore

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/18/77
Sample location: Unlvanized Mote Run no.: A-2
Sample recovery person: CB Recovery date: 11/18
Filter(s) no.: 0000720

MOISTURE

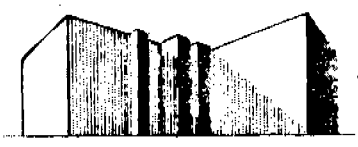
Impingers			Silica gel		
Final volume (wt)	195	ml(gm)	Final wt.	213.8 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-5	ml(gm)	Net wt.	13.8 g	g

Total moisture 18.8 g
Color of silica gel Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. A2-1 sealed ✓
Description of particulate on filter Light Brown
Acetone rinse container no. A2-2 Liquid level marked ✓
Acetone blank container no. A Liquid level marked ✓
Samples stored and locked ✓
Remarks: impinger contents container no. = A2-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Ulton
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westvaco Gas Run no. A-2 11-18-77
Sample location Undiluted Meter
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	✓

Acetone rinse container no. A2-2
Acetone rinse volume (Vaw) 230 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (0.006476)(230)(0.7857) = 1.1694 mg
Date and time of wt 12-6-77 9:27 Gross wt. 108 571.0 mg
Date and time of wt 12-7-77 8:32 Gross wt. 108 570.7 mg
Average gross wt. 108 570.9 mg
Tare wt. 108.4602 mg
Less acetone blank wt. (Wa) 1.2 mg
Weight of particulate in acetone rinse 109.5 mg
Filters(s) container no. A2-1
Date and time of wt 12-5-77 12:48 Gross wt. 485.6 mg
Date and time of wt 12-6-77 9:52 Gross wt. 485.2 mg
Average gross wt. 485.4 mg
Tare wt. 459.3 mg
Weight of particulate on filter(s) 26.1 mg
Weight of particulate in acetone rinse 109.5 mg
Total weight of particulate 135.6 mg

Remarks:

Signature of analyst M. A. Klaas
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/18/77
Sample location: Unclaimed Note Run no.: A-3
Sample recovery person: CB Recovery date: 11/18
Filter(s) no.: 000112

MOISTURE

Impingers			Silica gel		
Final volume (wt)	455	ml(gm)	Final wt.	420.7 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	-45	ml(gm)	Net wt.	20.7 g	g

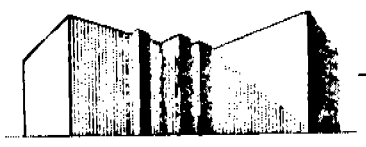
Total moisture 24.3 g
Color of silica gel Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. ~~A3-1~~ sealed ✓
Description of particulate on filter Light Beige

Acetone rinse container no. A3-2 Liquid level marked ✓
Acetone blank container no. A Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents No. - A3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Vetter
Remarks: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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. A-3 11-18-77
Sample location Uncleaned Mites
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	112	✓

Acetone rinse container no. A3-2
Acetone rinse volume (Vaw) 173 ml
Acetone blank residue concentration (Ca) 0.0064% mg/g
Wa = Ca Vaw ρa = (.0064)(173)(0.7851) = 0.8795 mg
Date and time of wt 12-6-77 10:17 Gross wt. 115.2267 mg
Date and time of wt 12-7-77 8:34 Gross wt. 115.2267 mg
Average gross wt. 115.2267 mg FILTER
Tare wt. 112.9286 mg 1.4437
Less acetone blank wt. (Wa) 0.9 mg
Weight of particulate in acetone rinse 853.5 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg
Remarks: High Vol filter included in front half

Signature of analyst M.A. Klaff
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/18/77
Sample location: Uncleaned Motes Run no.: A-4
Sample recovery person: CB Recovery date: 11/18
Filter(s) no.: 0000920

MOISTURE

Impingers			Silica gel		
Final volume (wt)	185	ml(gm)	Final wt.	217.7 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-15	ml(gm)	Net wt.	17.7 g	g

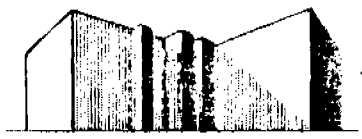
Total moisture 2.7 g
Color of silica gel 1/2 Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. A4-1 sealed
Description of particulate on filter

Acetone rinse container no. A4-2 Liquid level marked
Acetone blank container no. A Liquid level marked
Samples stored and locked
Remarks: Impinger Contents Container No. A4-3

Date of laboratory custody 11/20/77
Laboratory personnel taking custody Richard J Velten
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westvaco Corp. Run no. A-4 11-18-77
Sample location Uncleaned Motes
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	—	

Acetone rinse container no. A4-2
Acetone rinse volume (Vaw) 170 ml
Acetone blank residue concentration (Ca) 0.00647 mg/g
Wa = Ca Vaw ρa = (.00647)(170)(0.7857) = 0.8643 mg
Date and time of wt 12-6-77 10:20 Gross wt. 111.1600 mg
Date and time of wt 12-7-77 8:37 Gross wt. 111.1595 mg
Average gross wt. 111.1598 mg
Tare wt. 110.9700 mg
Less acetone blank wt. (Wa) 0.9 mg
Weight of particulate in acetone rinse 188.9 mg
Filters(s) container no. A4-1
Date and time of wt 12-5-77 12:03 Gross wt. 445.7 mg
Date and time of wt 12-5-77 4:42 Gross wt. 445.4 mg
Average gross wt. 445.5 mg
Tare wt. 416.3 mg
Weight of particulate on filter(s) 29.2 mg
Weight of particulate in acetone rinse 188.9 mg
Total weight of particulate 218.1 mg

Remarks:

Signature of analyst M.A. Klaas
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/18/77
Sample location: UNCleaned Motes Run no.: A-5
Sample recovery person: CB Recovery date: 11/18
Filter(s) no.: 0000113

MOISTURE

Impingers			Silica gel		
Final volume (wt)	440	ml(gm)	Final wt.	430.7g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	-60	ml(gm)	Net wt.	30.7 g	g

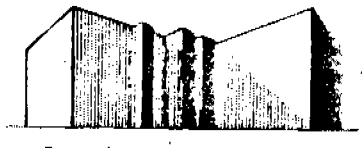
Total moisture 0 g
Color of silica gel Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. A5-1 sealed ✓
Description of particulate on filter Light Brown

Acetone rinse container no. A5-2 Liquid level marked ✓
Acetone blank container no. A Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents Container No. A5-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Vetter
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westvaco Co. Run no. A-5 - 11-18-77
Sample location Uncleaned Motor
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	113	✓

Acetone rinse container no. A5-2
Acetone rinse volume (Vaw) 180 ml
Acetone blank residue concentration (Ca) 0.00507 mg/g
Wa = Ca Vaw ρa = (.00507)(180)(.7857) = 0.9152 mg
Date and time of wt 12-6-77 10:30 Gross wt. 112.3596 mg
Date and time of wt 12-7-77 9:15 Gross wt. 112.3592 mg
Average gross wt. 112.3594 mg FILTER
Tare wt. 110.1707 mg 1505.2
Less acetone blank wt. (Wa) 0.9 mg
Weight of particulate in acetone rinse 735.6 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg
Remarks: Hi Vol filter included in acetone rinse

Signature of analyst M.A. Klaff
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Coil Sample date: 11/18/77
Sample location: uncleaned Motes Run no.: A-6
Sample recovery person: CB Recovery date: 11/18
Filter(s) no.: 0000726

MOISTURE

Impingers			Silica gel		
Final volume (wt)	180	ml(gm)	Final wt.	221 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-20	ml(gm)	Net wt.	21 g	g

Total moisture 1 g
Color of silica gel 1/2 Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. A6-1 sealed
Description of particulate on filter
Spotted (Light & dark brown)
Acetone rinse container no. A6-2 Liquid level marked
Acetone blank container no. A Liquid level marked
Samples stored and locked
Remarks: Impinger Contents Container No. A6-3

Date of laboratory custody 11/20/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. A-6 11-18-77

Sample location Uncleaned Meter

Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	—

Acetone rinse container no. A6-2

Acetone rinse volume (Vaw) 190 ml

Acetone blank residue concentration (Ca) 0.006476 mg/g

Wa = Ca Vaw ρa = (.006476) (190) (.7857) = 0.9660 mg

Date and time of wt 12-6-77 10:33 Gross wt. 109.8946 mg

Date and time of wt 12-7-77 9:18 Gross wt. 109.8940 mg

Average gross wt. 109.8943 mg

Tare wt. 109.7213 mg

Less acetone blank wt. (Wa) 1.0 mg

Weight of particulate in acetone rinse 171.7 mg

Filters(s) container no. A6-1

Date and time of wt 12-5-77 12:06 Gross wt. 483.9 mg

Date and time of wt 12-6-77 4:00 Gross wt. 483.5 mg

Average gross wt. 483.7 mg

Tare wt. 469.3 mg

Weight of particulate on filter(s) 315.4 mg

Weight of particulate in acetone rinse 171.7 mg

Total weight of particulate 487.1 mg

Remarks: _____

Signature of analyst M.A. Ichaels

Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Loop Sample date: 11/15/77
Sample location: #1 & 2 Inclined Cleaner Run no.: B-1
Sample recovery person: C. Bruffey Recovery date: _____
Filter(s) no.: 0000917

MOISTURE

Impingers			Silica gel		
Final volume (wt)	201	ml(gm)	Final wt.	211.4 g	____ g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	____ g
Net volume (wt)	1	ml(gm)	Net wt.	11.4 g	____ g

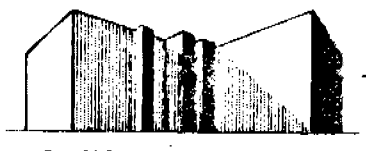
Total moisture 12.4 g
Color of silica gel Blue - 1/10 Spent
Description of impinger water Turbid

RECOVERED SAMPLE

Filter container no. B1-1 sealed X
Description of particulate on filter Light Brown

Acetone rinse container no. B1-2 Liquid level marked ✓
Acetone blank container no. B Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents Contain No. B1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Barbara J Velten
Remarks: _____



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ANALYTICAL PARTICULATE DATA

Plant Westvaco Gin Run no. B-1 11-15-77
Sample location #1 & 2 Inclined Cleaners
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	✓

Acetone rinse container no. B1-2
Acetone rinse volume (Vaw) 165 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(165)(.7851) = 0.8389 mg
Date and time of wt 12-6-77 10:37 Gross wt. 112.0390 mg
Date and time of wt 12-7-77 9:21 Gross wt. 112.0385 mg
Average gross wt. 112.0388 mg
Tare wt. 111.9014 mg
Less acetone blank wt. (Wa) 0.8 mg
Weight of particulate in acetone rinse 136.6 mg
Filters(s) container no. B1-1
Date and time of wt 12-5-77 11:48 Gross wt. 446.4 mg
Date and time of wt 12-5-77 4:32 Gross wt. 446.3 mg
Average gross wt. 446.4 mg
Tare wt. 420.- mg
Weight of particulate on filter(s) 26.4 mg
Weight of particulate in acetone rinse 136.6 mg
Total weight of particulate 163.0 mg
Remarks:

Signature of analyst M. A. Khalil
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Coal Sample date: 11/17/77
Sample location: #1&2 Inlined Cleaners Run no.: [redacted] B-2
Sample recovery person: CB Recovery date: 11/17
Filter(s) no.: _____

MOISTURE

Impingers			Silica gel		
Final volume (wt)	221	ml(gm)	Final wt.	215.2 g	____ g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	____ g
Net volume (wt)	21	ml(gm)	Net wt.	15.2 g	____ g

Total moisture 36.2 g
Color of silica gel Y3 Light Purple
Description of impinger water Slightly Turbid

RECOVERED SAMPLE

Filter container no. B2-1 sealed ✓
Description of particulate on filter Light Beige

Acetone rinse container no. B2-2 Liquid level marked ✓
Acetone blank container no. B Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents Container No. B2-3

Date of laboratory custody _____
Laboratory personnel taking custody Richard J Vetter
Remarks: _____

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. B-2 11-17-77
Sample location #1 & 2 Inclined Cleaners
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	118	

Acetone rinse container no. B2-2
Acetone rinse volume (Vaw) 340 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(340)(0.7851) = 1.7287 mg
Date and time of wt 12-6-77 10:40 Gross wt. 113.27200 mg
Date and time of wt 12-7-77 9:30 Gross wt. 113.27116 mg
Average gross wt. 113.27158 mg
Tare wt. 111.24115 mg FILTER 1467.3
Less acetone blank wt. (Wa) 1.7 mg
Weight of particulate in acetone rinse 561.3 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg
Remarks: High Vol filter included in Acetone rinse.

Signature of analyst M. H. Hall
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/17/77
Sample location: #1 & 2 Inclined Cleaners Run no.: ~~B~~ 3-B
Sample recovery person: CB Recovery date: ~~11/17~~ 11/17
Filter(s) no.: 000118

MOISTURE

Impingers			Silica gel		
Final volume (wt)	600	ml(gm)	Final wt.	431.6g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	100 ml	ml(gm)	Net wt.	31.6 g	g

Total moisture 131.6g
Color of silica gel ½ Lgt. Purple
Description of impinger water Turbid

RECOVERED SAMPLE

Filter container no. B3-1 sealed ✓
Description of particulate on filter Light Beige (caked)

Acetone rinse container no. B3-2 Liquid level marked ✓
Acetone blank container no. _____ Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents No. B3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: _____

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. B-3 11-17-77
Sample location #1, #2 inclined cleaners
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	L

Acetone rinse container no. B3-2
Acetone rinse volume (Vaw) 185 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(185)(0.7851) = 0.9406 mg
Date and time of wt 12-6-77 10150 Gross wt. 106.7155 mg
Date and time of wt 12-7-77 11:00 Gross wt. 106.7150 mg
Average gross wt. 106.7152 mg
Tare wt. 106.5962 mg
Less acetone blank wt. (Wa) 0.9 mg
Weight of particulate in acetone rinse 118.2 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg
Remarks: High Vol. filter included in acetone rinse.

Signature of analyst M. A. Klaes
Signature of reviewer Wade Mann

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/17/77
Sample location: #1,2 Inclined Cleaners Run no.: B-4
Sample recovery person: CB Recovery date: 11/17
Filter(s) no.: 0000952

MOISTURE

Impingers			Silica gel		
Final volume (wt)	225.5	ml(gm)	Final wt.	216.7 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	25.5	ml(gm)	Net wt.	16.7 g	g

Total moisture 42.2 g
Color of silica gel 1/3 Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. B4-1 sealed ✓
Description of particulate on filter —
Acetone rinse container no. B4-2 Liquid level marked ✓
Acetone blank container no. B Liquid level marked —
Samples stored and locked ✓
Remarks: Impinger Container No. B4-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. B-4 11-17-77
Sample location #1 & 2 inclined cleaners
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	✓

Acetone rinse container no. B4-2
Acetone rinse volume (Vaw) 162 ml
Acetone blank residue concentration (Ca) 0.00647% mg/g
Wa = Ca Vaw ρa = (.00647%)(162)(0.7851) = 0.8237 mg
Date and time of wt 12-6-77 4:30 Gross wt. 111.2251 mg
Date and time of wt 12-7-77 9:34 Gross wt. 111.2247 mg
Average gross wt. 111.2249 mg
Tare wt. 110.9539 mg
Less acetone blank wt. (Wa) 0.8 mg
Weight of particulate in acetone rinse 270.2 mg
Filters(s) container no. B4-1
Date and time of wt 12-5-77 12:30 Gross wt. 562.9 mg
Date and time of wt 12-6-77 9:45 Gross wt. 562.7 mg
Average gross wt. 562.8 mg
Tare wt. 427.3 mg
Weight of particulate on filter(s) 135.5 mg
Weight of particulate in acetone rinse 270.2 mg
Total weight of particulate 405.7 mg

Remarks: _____

Signature of analyst M. A. Khadr
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/17/77
Sample location: #1&2 Inclined Cleaners Run no.: 5-B
Sample recovery person: C Bluffey Recovery date: 11/17
Filter(s) no.: _____

MOISTURE

Impingers			Silica gel		
Final volume (wt)	635	ml(gm)	Final wt.	440.5 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	135	ml(gm)	Net wt.	40.5 g	g

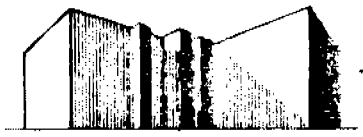
Total moisture 175.5 g
Color of silica gel Yr Pink
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. B5-1 sealed ✓
Description of particulate on filter ✓

Acetone rinse container no. B5-2 Liquid level marked ✓
Acetone blank container no. B Liquid level marked _____
Samples stored and locked ✓
Remarks: Impinger Contents Container No. B5-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: _____



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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. B-5 11-17-77
Sample location #1 & 2 inclined cleaners
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	121	✓

Acetone rinse container no. B5-2
Acetone rinse volume (Vaw) 154 ml
Acetone blank residue concentration (Ca) 0.00647 mg/g
Wa = Ca Vaw ρa = (.00647)(154)(0.7857) = 0.7829 mg
Date and time of wt 12-6-77 10:55 Gross wt. 114.0938 mg
Date and time of wt 12-7-77 9:40 Gross wt. 114.0944 mg
Average gross wt. 114.0941 mg
Tare wt. 111.0216 mg Filter 1474,8
Less acetone blank wt. (Wa) 0.8 mg
Weight of particulate in acetone rinse 1597.3 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg
Remarks: High Vol. filter included in acetone wash

Signature of analyst M.A Khalifa
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/17/77
Sample location: #1,2 inclined cleaners Run no.: B-6
Sample recovery person: CB Recovery date: 11/17
Filter(s) no.: 000854

MOISTURE

Impingers			Silica gel		
Final volume (wt)	216	ml(gm)	Final wt.	225.4 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	16	ml(gm)	Net wt.	25.4 g	g

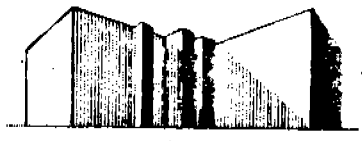
Total moisture 41.4 g
Color of silica gel ½ Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. B6-1 sealed ✓
Description of particulate on filter Brown Coke

Acetone rinse container no. B6-2 Liquid level marked ✓
Acetone blank container no. B Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Contents No. B6-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. B-6 11-17-77
Sample location #1&2 inclined Cleaners
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	—

Acetone rinse container no. B6-2
Acetone rinse volume (Vaw) 162 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (0.006476)(162)(0.7857) = 0.8236 mg
Date and time of wt 12-6-77 11:00 Gross wt. 109.7069 mg
Date and time of wt 12-7-77 9:44 Gross wt. 109.7065 mg
Average gross wt. 109.7067 mg
Tare wt. 109.4090 mg
Less acetone blank wt. (Wa) 0.8 mg
Weight of particulate in acetone rinse 296.9 mg
Filters(s) container no. B6-1
Date and time of wt 12-5-77 1:09 Gross wt. 650.9 mg
Date and time of wt 12-6-77 10:11 Gross wt. 650.4 mg
Average gross wt. 650.7 mg
Tare wt. 420.0 mg
Weight of particulate on filter(s) 230.7 mg
Weight of particulate in acetone rinse 296.9 mg
Total weight of particulate 527.6 mg

Remarks:

Signature of analyst M.A. Klaes
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/17/77
Sample location: #1 & 2 Inclined Cleaners Run no.: B-7
Sample recovery person: CB Recovery date: 11/17
Filter(s) no.: 0000128

MOISTURE

Impingers			Silica gel		
Final volume (wt)	580	ml(gm)	Final wt.	443.4 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	80	ml(gm)	Net wt.	43.4 g	g

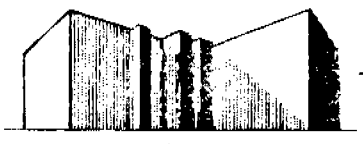
Total moisture 123.4 g
Color of silica gel 1/2 Purple
Description of impinger water Turbid

RECOVERED SAMPLE

Filter container no. B7-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. B7-2 Liquid level marked ✓
Acetone blank container no. B Liquid level marked —
Samples stored and locked
Remarks: Impinger Contents No. B7-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Ulten
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. B-7 11-17-77
Sample location #1, 2 including cleanout
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	128	

Acetone rinse container no. B7-2
Acetone rinse volume (Vaw) 205 ml
Acetone blank residue concentration (Ca) 0.00647 mg/g
Wa = Ca Vaw ρa = (.00647)(205)(0.7857) = 1.0423 mg
Date and time of wt 12-6-77 1105 Gross wt. 113.8126 mg
Date and time of wt 12-7-77 1000 Gross wt. 113.8124 mg
Average gross wt. 113.8125 mg FILTER
Tare wt. 110.3784 mg 1429.7
Less acetone blank wt. (Wa) 1.04 mg
Weight of particulate in acetone rinse 2003.3 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg

Remarks: High Vol filter included in acetone rinse

Signature of analyst M. A. Klaes
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Co-op Sample date: 11/15/77
Sample location: W. Loading dryer Run no.: C-1
Sample recovery person: C. Bruffey Recovery date: _____
Filter(s) no.: 0000 944

MOISTURE

Impingers			Silica gel		
Final volume (wt)	225	ml(gm)	Final wt.	221.4 g	____ g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	____ g
Net volume (wt)	25	ml(gm)	Net wt.	21.4 g	____ g

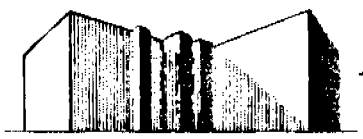
Total moisture 46.4 g
Color of silica gel Blue - Hardly Speck
Description of impinger water Turbid

RECOVERED SAMPLE

Filter container no. C1-1 sealed ✓
Description of particulate on filter Light Brown in color

Acetone rinse container no. C1-2 Liquid level marked ✓
Acetone blank container no. C Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents Contains No. #1C1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: _____



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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. C-1 11-15-77
Sample location unloading dryer
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)		✓

Acetone rinse container no. C1-2
Acetone rinse volume (Vaw) 255 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.00470)(255)(0.7851) = 1.2965 mg
Date and time of wt 12-6-77 11:15 Gross wt. 111.7912 mg
Date and time of wt 12-7-77 10:07 Gross wt. 111.7907 mg
Average gross wt. 111.7909 mg
Tare wt. 111.6968 mg
Less acetone blank wt. (Wa) 1.2965 mg
Weight of particulate in acetone rinse 92.9 mg
Filters(s) container no. C1-1
Date and time of wt 12-5-77 12:36 Gross wt. 428.1 mg
Date and time of wt 12-6-77 9:49 Gross wt. 427.7 mg
Average gross wt. 427.9 mg
Tare wt. 413.5 mg
Weight of particulate on filter(s) 14.4 mg
Weight of particulate in acetone rinse 92.8 mg
Total weight of particulate 107.2 mg

Remarks:

Signature of analyst M. A. Ichel Jr.
Signature of reviewer Wade Mann

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/14/77
Sample location: Unloading & dryer Run no.: C-2
Sample recovery person: E. Bruffey Recovery date: 11/16/77
Filter(s) no.: 0000850

MOISTURE

Impingers			Silica gel		
Final volume (wt)	201	ml(gm)	Final wt.	226 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	1	ml(gm)	Net wt.	26 g	g

Total moisture 27 g
Color of silica gel ½ light Purple - ½ blue
Description of impinger water Clear To Slightly Turbid

RECOVERED SAMPLE

Filter container no. # C2-1 sealed ✓
Description of particulate on filter Light Biege

Acetone rinse container no. C2-2 Liquid level marked ✓
Acetone blank container no. C Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents No. C2-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. C-2 11-16-77
Sample location Unloading - Dryer
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	—	

Acetone rinse container no. C2-2
Acetone rinse volume (Vaw) 300 ml
Acetone blank residue concentration (Ca) 0.00647 mg/g
Wa = Ca Vaw ρa = (.00647)(300)(0.7851) = 1.5252 mg
Date and time of wt 12-6-77 11:18 Gross wt. 111.1205 mg
Date and time of wt 12-7-77 1010 Gross wt. 111.1200 mg
Average gross wt. 111.1203 mg
Tare wt. 110.9119 mg
Less acetone blank wt. (Wa) 1.5 mg
Weight of particulate in acetone rinse 206.9 mg
Filters(s) container no. C2-1
Date and time of wt 12-5-77 1115 Gross wt. 512.9 mg
Date and time of wt 12-5-77 5:00 Gross wt. 512.9 mg
Average gross wt. 512.9 mg
Tare wt. 417.9 mg
Weight of particulate on filter(s) 95.0 mg
Weight of particulate in acetone rinse 206.9 mg
Total weight of particulate 301.9 mg

Remarks:

Signature of analyst M.A. Klaff
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/16/77
Sample location: Unloading and Dryer Run no.: C-3
Sample recovery person: C. B. Recovery date: 11/16
Filter(s) no.: 0000130 (High Vol.)

MOISTURE

Impingers			Silica gel		
Final volume (wt)	515	ml(gm)	Final wt.	417 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	15	ml(gm)	Net wt.	17 g	g

Total moisture 32 g
Color of silica gel Yellow Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. C3-1 sealed ✓
Description of particulate on filter Light Beige

Acetone rinse container no. C3-2 Liquid level marked ✓
Acetone blank container no. C Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents No. C3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. C-3-

Sample location Unloading + Dryer

Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	130	

Acetone rinse container no. C3-2

Acetone rinse volume (Vaw) 300 ml

Acetone blank residue concentration (Ca) 0.00647 mg/g

Wa = Ca Vaw ρa = (.00647)(300)(0.7851) = .15253 mg

Date and time of wt 12-6-77 1123 Gross wt. 110.5723 mg

Date and time of wt 12-7-77 10:15 Gross wt. 110.5725 mg

Average gross wt. 110.57224 mg FILTER

Tare wt. 108.1337 mg 13975

Less acetone blank wt. (Wa) 1.5 mg

Weight of particulate in acetone rinse 1039.7 mg

Filters(s) container no. _____

Date and time of wt _____ Gross wt. _____ mg

Date and time of wt _____ Gross wt. _____ mg

Average gross wt. _____ mg

Tare wt. _____ mg

Weight of particulate on filter(s) _____ mg

Weight of particulate in acetone rinse _____ mg

Total weight of particulate _____ mg

Remarks: High Vol filter included in acetone rinse

Signature of analyst M A Klaff

Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/16/77
Sample location: unloading + dryer Run no.: C-4
Sample recovery person: C.B. Recovery date: 11/16/77
Filter(s) no.: _____

MOISTURE

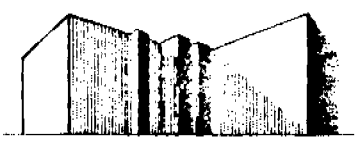
Impingers			Silica gel		
Final volume (wt)	201	ml(gm)	Final wt.	225 g	____ g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	____ g
Net volume (wt)	1	ml(gm)	Net wt.	25 g	____ g

Total moisture 26 g
Color of silica gel ½ Light Purple
Description of impinger water Slightly Turbid

RECOVERED SAMPLE

Filter container no. C4-1 sealed ✓
Description of particulate on filter Light Brown
Acetone rinse container no. C4-2 Liquid level marked ✓
Acetone blank container no. C Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents to C4-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: _____



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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. C 4 11-16-77

Sample location unloading + dryer

Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front-Half	
filter(s)		✓

Acetone rinse container no. C4-2

Acetone rinse volume (Vaw) 225 ml

Acetone blank residue concentration (Ca) 0.00647 mg/g

Wa = Ca Vaw ρa = (.00647)(225)(0.7851) = 1.1439 mg

Date and time of wt 12-6-77 4:05 Gross wt. 114.3197 mg

Date and time of wt 12-7-77 10:20 Gross wt. 114.3192 mg

Average gross wt. 114.3195 mg

Tare wt. 114.0761 mg

Less acetone blank wt. (Wa) 1.1439 mg

Weight of particulate in acetone rinse 242.2 mg

Filters(s) container no. C4-1

Date and time of wt 12-5-77 12:45 Gross wt. 576.9 mg

Date and time of wt 12-6-77 9:55 Gross wt. 576.5 mg

Average gross wt. 576.7 mg

Tare wt. 568.0 mg

Weight of particulate on filter(s) 008.7 mg

Weight of particulate in acetone rinse 242.2 mg

Total weight of particulate 250.9 mg

Remarks:

Signature of analyst M.M. Khalifa

Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Ci'N Sample date: 11/16/77
Sample location: w/loading & dryer Run no.: C-5
Sample recovery person: CB Recovery date: 11/16
Filter(s) no.: 0000116

MOISTURE

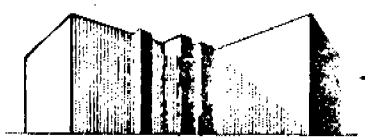
Impingers			Silica gel		
Final volume (wt)	470	ml(gm)	Final wt.	444.0g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	-30	ml(gm)	Net wt.	44.0 g	g

Total moisture 14 g
Color of silica gel ½ Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. C5-1 sealed ✓
Description of particulate on filter Light Brown
Acetone rinse container no. C5-2 Liquid level marked ✓
Acetone blank container no. C Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Container No. C5-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. C-5 11-16-77
Sample location Unloading - Dry
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	116	✓

Acetone rinse container no. C5-2
Acetone rinse volume (Vaw) 300 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(306)(0.7857) = 1.5253 mg
Date and time of wt 12-6-77 4:10 Gross wt. 114 215.0 mg
Date and time of wt 12-7-77 10:25 Gross wt. 114 214.6 mg
Average gross wt. 114 214.6 mg
Tare wt. 110.9858 mg 14972
Less acetone blank wt. (Wa) 1.5253 mg
Weight of particulate in acetone rinse 1730.1 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg

Remarks: High Vol. filter included in acetone rinse

Signature of analyst M. A. Clark
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/22/77
Sample location: Unloading + dryer Run no.: C-6
Sample recovery person: CB Recovery date: 11/22
Filter(s) no.: 0000102

MOISTURE

Impingers			Silica gel		
Final volume (wt)	505	ml(gm)	Final wt.	232.4 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	5	ml(gm)	Net wt.	32.4 g	g

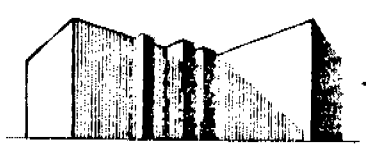
Total moisture 37.4 g
Color of silica gel Yellow spent
Description of impinger water clear

RECOVERED SAMPLE

Filter container no. C6-1 sealed ✓
Description of particulate on filter light

Acetone rinse container no. C6-2 Liquid level marked ✓
Acetone blank container no. C Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Contents to C6-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard Velten
Remarks: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ANALYTICAL PARTICULATE DATA

Plant Westside Gen Run no. C 6 11-22-77
Sample location Unloading Dryers
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	102	

Acetone rinse container no. C6-2
Acetone rinse volume (Vaw) 185 ml
Acetone blank residue concentration (Ca) 0.006474 mg/g
Wa = Ca Vaw ρa = (.006474)(185)(0.7851) = 0.9406 mg
Date and time of wt 12-6-77 4:15 Gross wt. 111.8589 mg
Date and time of wt 12-7-77 10:30 Gross wt. 111.8590 mg
Average gross wt. 111.8590 mg
Tare wt. 109.1705 mg 1370.2
Less acetone blank wt. (Wa) 0.9 mg
Weight of particulate in acetone rinse 1317.4 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg
Remarks: High Vol. filter included in acetone rinse

Signature of analyst M. A. Ichaye
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Grain Sample date: 11/18/77
Sample location: unLoading Run no.: D-1
Sample recovery person: CB Recovery date: 11/18
Filter(s) no.: 000110

MOISTURE

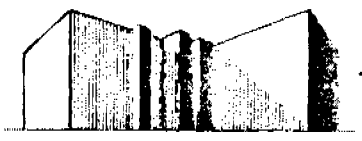
Impingers			Silica gel		
Final volume (wt)	476	ml(gm)	Final wt.	413.7g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	-24	ml(gm)	Net wt.	13.7 g	g

Total moisture 0 g
Color of silica gel 1/3 Light Purple
Description of impinger water Slightly Turbid

RECOVERED SAMPLE

Filter container no. D1-1 sealed ✓
Description of particulate on filter Light Brown
Acetone rinse container no. D1-2 Liquid level marked ✓
Acetone blank container no. D Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Content to . D1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westside Gen Run no. D-1 11-18-77

Sample location LN Loading

Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	11D	✓

Acetone rinse container no. D1-2

Acetone rinse volume (Vaw) 165 ml

Acetone blank residue concentration (Ca) 0.00647G mg/g

Wa = Ca Vaw ρa = (.00647G)(165)(.7857) = 0.8389 mg

Date and time of wt 12-6-77 4:25 Gross wt. 115.8767 mg

Date and time of wt 12-7-77 10:35 Gross wt. 115.8769 mg

Average gross wt. 115.871.8 mg Filter 14904

Tare wt. 112.8678 mg

Less acetone blank wt. (Wa) 0.8 mg

Weight of particulate in acetone rinse 1512.8 mg

Filters(s) container no. _____

Date and time of wt _____ Gross wt. _____ mg

Date and time of wt _____ Gross wt. _____ mg

Average gross wt. _____ mg

Tare wt. _____ mg

Weight of particulate on filter(s) _____ mg

Weight of particulate in acetone rinse _____ mg

Total weight of particulate _____ mg

Remarks: High Vol. filter included in acetone rinse

Signature of analyst M.A. Idaszak

Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/19/77
Sample location: unloading Run no.: D-2
Sample recovery person: CB Recovery date: 11/19
Filter(s) no.: 0000776

MOISTURE

Impingers			Silica gel		
Final volume (wt)	173	ml(gm)	Final wt.	212.3 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-27	ml(gm)	Net wt.	12.3 g	g

Total moisture 0 g
Color of silica gel Y3 Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. D2-1 sealed ✓
Description of particulate on filter Dark brown - some water

Acetone rinse container no. D2-2 Liquid level marked —
Acetone blank container no. D Liquid level marked —
Samples stored and locked ✓
Remarks: Impinger Contents No. D2-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. D-2 11-19-77
Sample location Unloading
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	✓

Acetone rinse container no. D2-2
Acetone rinse volume (Vaw) 200 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(200)(0.7851) = 1.0168 mg
Date and time of wt 12-6-77 4:28 Gross wt. 112 631.6 mg
Date and time of wt 12-7-77 10:38 Gross wt. 112 631.3 mg
Average gross wt. 112 631.5 mg
Tare wt. 112 327.2 mg
Less acetone blank wt. (Wa) 1.0 mg
Weight of particulate in acetone rinse 303.3 mg
Filters(s) container no. D2-1
Date and time of wt 12-5-77 11:54 Gross wt. 506.2 mg
Date and time of wt 12-5-77 4:36 Gross wt. 506.1 mg
Average gross wt. 506.2 mg
Tare wt. 464.5 mg
Weight of particulate on filter(s) 041.7 mg
Weight of particulate in acetone rinse 303.3 mg
Total weight of particulate 345.0 mg

Remarks:

Signature of analyst M. A. Klaff
Signature of reviewer Wade T. Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Coin Sample date: 11/19/77
Sample location: WN Loading Run no.: D-3
Sample recovery person: CB Recovery date: 11/19
Filter(s) no.: 0000109

MOISTURE

Impingers			Silica gel		
Final volume (wt)	475	ml(gm)	Final wt.	422.3g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	-25	ml(gm)	Net wt.	22.3g	g

Total moisture 0 g
Color of silica gel ½ Light Purple
Description of impinger water

RECOVERED SAMPLE

Filter container no. D3-1 sealed
Description of particulate on filter Light Brown

Acetone rinse container no. D3-2 Liquid level marked ✓
Acetone blank container no. D Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Contents No. D3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. D-3 - 11-19-77
Sample location Unloading
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	109	

Acetone rinse container no. D3-2
Acetone rinse volume (Vaw) 190 ml
Acetone blank residue concentration (Ca) 0.0064 mg/g
Wa = Ca Vaw ρa = (0.0064)(190)(0.7857) = 0.9660 mg
Date and time of wt 12-6-77 4:33 Gross wt. 110.9019 mg
Date and time of wt 12-7-77 10:45 Gross wt. 110.9017 mg
Average gross wt. 110.9018 mg Filter 1399.2
Tare wt. 108.1041 mg
Less acetone blank wt. (Wa) 0.96 mg
Weight of particulate in acetone rinse 1397.5 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg

Remarks: Right 1/2 filter excluded in acetone rinse

Signature of analyst M.A. Kloos
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/29/77
Sample location: Unloading Run no.: D-4
Sample recovery person: CB Recovery date: 11/29
Filter(s) no.: _____

MOISTURE

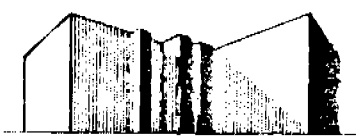
Impingers			Silica gel		
Final volume (wt)	192	ml(gm)	Final wt.	216.6g	____g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	____g
Net volume (wt)	-8	ml(gm)	Net wt.	16.6g	____g

Total moisture 8.6 g
Color of silica gel ½ Light Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. D4-1 sealed ✓
Description of particulate on filter Brown
Acetone rinse container no. D4-2 Liquid level marked ✓
Acetone blank container no. D Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents No. D4-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Vetter
Remarks: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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. D-4 11-19-77
Sample location Unloading
Density of acetone (ρa) 0.785 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	—	

Acetone rinse container no. D4-2
Acetone rinse volume (Vaw) 145 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(145)(0.785) = 0.7372 mg
Date and time of wt 12-6-77 4:37 Gross wt. 112.5272 mg
Date and time of wt 12-7-77 10:48 Gross wt. 112.5270 mg
Average gross wt. 112.5271 mg
Tare wt. 112.2954 mg
Less acetone blank wt. (Wa) 0.74 mg
Weight of particulate in acetone rinse 231.0 mg
Filters(s) container no. D4-1
Date and time of wt 12-5-77 12:09 Gross wt. 529.5 mg
Date and time of wt 12-6-77 9:31 Gross wt. 529.1 mg
Average gross wt. 529.3 mg
Tare wt. 463.1 mg
Weight of particulate on filter(s) 66.2 mg
Weight of particulate in acetone rinse 231.0 mg
Total weight of particulate 297.2 mg
Remarks:

Signature of analyst M. A. Clark
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/19/77
Sample location: unloading Run no.: D-5
Sample recovery person: CBD Recovery date: 11/19
Filter(s) no.: 0000108

MOISTURE

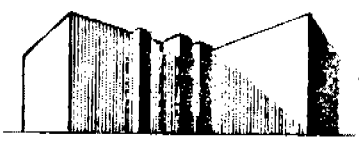
Impingers			Silica gel		
Final volume (wt)	470	ml(gm)	Final wt.	420.2g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	-30	ml(gm)	Net wt.	20.2 g	g

Total moisture 0 g
Color of silica gel 1/3 light purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. D5-1 sealed
Description of particulate on filter Brown Cake ✓
Acetone rinse container no. D5-2 Liquid level marked ✓
Acetone blank container no. D Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Container No. D5-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Barbara J Velten
Remarks: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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. D-5 11-19-77

Sample location Unloading

Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	108	✓

Acetone rinse container no. D5-2

Acetone rinse volume (Vaw) 150 ml

Acetone blank residue concentration (Ca) 0.006476 mg/g

Wa = Ca Vaw ρa = (.006476)(150)(.7857) = 0.7626 mg

Date and time of wt 12-6-77 4:40 Gross wt. 112 8415 mg

Date and time of wt 12-7-77 10:51 Gross wt. 112 8411 mg

Average gross wt. 112 8413 mg FILTER 1477.6

Tare wt. 110 2170 mg

Less acetone blank wt. (Wa) 0.8 mg

Weight of particulate in acetone rinse 1145.9 mg

Filters(s) container no. _____

Date and time of wt _____ Gross wt. _____ mg

Date and time of wt _____ Gross wt. _____ mg

Average gross wt. _____ mg

Tare wt. _____ mg

Weight of particulate on filter(s) _____ mg

Weight of particulate in acetone rinse _____ mg

Total weight of particulate _____ mg

Remarks: Hi-Vol. filter included in acetone rinse

Signature of analyst M. A. Khalifa

Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/19/77
Sample location: WN Loading Run no.: D-6
Sample recovery person: CB Recovery date: 11/19
Filter(s) no.: 0000923

MOISTURE

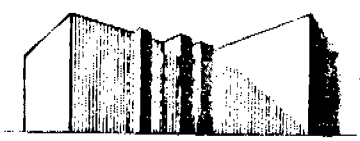
Impingers			Silica gel		
Final volume (wt)	187	ml(gm)	Final wt.	215.7 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-13	ml(gm)	Net wt.	15.7 g	g

Total moisture 2.7 g
Color of silica gel YB Purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. D6-1 sealed ✓
Description of particulate on filter Brown w/ lint
Acetone rinse container no. D6-2 Liquid level marked ✓
Acetone blank container no. D Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contains No. D6-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. D-6 11-19-77
Sample location Unloading
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	✓

Acetone rinse container no. D6-2
Acetone rinse volume (Vaw) 180 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(180)(0.7951) = 0.9152 mg
Date and time of wt 12-6-77 4:43 Gross wt. 109 161.9 mg
Date and time of wt 12-7-77 10:54 Gross wt. 109 161.8 mg
Average gross wt. 109 161.9 mg
Tare wt. 108 968.6 mg
Less acetone blank wt. (Wa) 0.9 mg
Weight of particulate in acetone rinse 192.4 mg
Filters(s) container no. D6-1
Date and time of wt 12-5-77 12:18 Gross wt. 508.3 mg
Date and time of wt 12-6-77 9:32 Gross wt. 507.9 mg
Average gross wt. 508.1 mg
Tare wt. 423.9 mg
Weight of particulate on filter(s) 84.2 mg
Weight of particulate in acetone rinse 192.4 mg
Total weight of particulate 276.6 mg
Remarks:

Signature of analyst M.A. Khalifa
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: Basket + Condenser Run no.: E-1
Sample recovery person: CB Recovery date: 11/20
Filter(s) no.: 0600107

MOISTURE

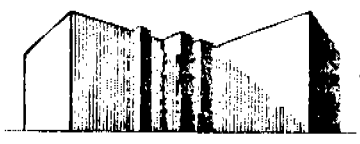
Impingers			Silica gel		
Final volume (wt)	408	ml(gm)	Final wt.	434.8 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	400 g	g
Net volume (wt)	-92	ml(gm)	Net wt.	34.8 g	g

Total moisture 0 g
Color of silica gel Yz Pink
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. E1-1 sealed
Description of particulate on filter
Trace brown Color
Acetone rinse container no. E1-2 Liquid level marked ✓
Acetone blank container no. E Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents in E1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Vetter
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. E-1 11-20-77

Sample location Basket + Condenser

Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	107	

Acetone rinse container no. E1-2

Acetone rinse volume (Vaw) 150 ml

Acetone blank residue concentration (Ca) 0.00646 mg/g

Wa = Ca Vaw ρa = (.00646)(150)(0.7851) = 0.7626 mg

Date and time of wt 12-6-77 4:46 Gross wt. 110.6488 mg

Date and time of wt 12-7-77 11:00 Gross wt. 110.6483 mg

Average gross wt. 110.64856 mg FILTER

Tare wt. 109.18704 mg 13849

Less acetone blank wt. (Wa) 0.7626 mg

Weight of particulate in acetone rinse 75.6 mg

Filters(s) container no. _____

Date and time of wt _____ Gross wt. _____ mg

Date and time of wt _____ Gross wt. _____ mg

Average gross wt. _____ mg

Tare wt. _____ mg

Weight of particulate on filter(s) _____ mg

Weight of particulate in acetone rinse _____ mg

Total weight of particulate _____ mg

Remarks: High Vol. filter included in acetone rinse

Signature of analyst M. A. Khalifa

Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: Basket & Condenser Run no.: E-2
Sample recovery person: CB Recovery date: 11/20
Filter(s) no.: 0000749

MOISTURE

Impingers			Silica gel		
Final volume (wt)	193	ml(gm)	Final wt.	212.3 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-7	ml(gm)	Net wt.	12.3 g	g

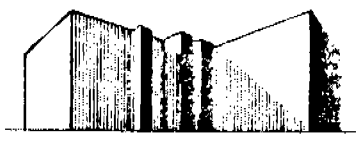
Total moisture 5.3 g
Color of silica gel Yellow light purple
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. E2-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. E2-2 Liquid level marked ✓
Acetone blank container no. E Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Container No. E2-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant West Side Oil Run no. E-2 (front Half)
Sample location Basket & Condenser date / Spl'd 11-20-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse		
filter(s)	front half	✓

Acetone rinse container no. E2-2
Acetone rinse volume (Vaw) 149 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(149)(0.7851) = 0.7576 mg
Date and time of wt 12-5-77 11:20 Gross wt. 98 611.3 mg
Date and time of wt 12-6-77 4:50 Gross wt. 98 611.5 mg
Average gross wt. 98.611.4 mg
Tare wt. 98.5876 mg
Less acetone blank wt. (Wa) 0.76 mg
Weight of particulate in acetone rinse 23.0 mg
Filters(s) container no. E2-1
Date and time of wt 12-5-77 11:57 Gross wt. 473.0 mg
Date and time of wt 12-5-77 4:38 Gross wt. 472.8 mg
Average gross wt. 472.9 mg
Tare wt. 467.4 mg
Weight of particulate on filter(s) 005.5 mg
Weight of particulate in acetone rinse 23.0 mg
Total weight of particulate 28.5 mg

Remarks:

Signature of analyst M. A. Ichelle
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: Basket + Condenser Run no.: E-3
Sample recovery person: CB Recovery date: 11/20
Filter(s) no.: 000106

MOISTURE

Impingers			Silica gel		
Final volume (wt)	763	ml(gm)	Final wt.	256.3 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-37	ml(gm)	Net wt.	56.3 g	g

Total moisture 19.3 g
Color of silica gel Yr Pink
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. E3-1 sealed ✓
Description of particulate on filter —

Acetone rinse container no. E3-2 Liquid level marked ✓
Acetone blank container no. E Liquid level marked —
Samples stored and locked
Remarks: Impinger Catch No. E3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Barbara J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. E-3- 11-20-77
Sample location Basket & Condenser
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	106	✓

Acetone rinse container no. E3-2
Acetone rinse volume (Vaw) 135 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(135)(0.7851) = 0.6864 mg
Date and time of wt 12-6-77 5100 Gross wt. 112.9460 mg
Date and time of wt 12-7-77 11:01 Gross wt. 112.9457 mg
Average gross wt. 112.9459 mg FILTER
Tare wt. 111.3370 mg 1517.8
Less acetone blank wt. (Wa) 0.7 mg
Weight of particulate in acetone rinse 90.3 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg

Remarks: High Vol. filter included in aceton rinse

Signature of analyst M.A. Nichols
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: Packer + Condenser Run no.: E-4
Sample recovery person: CB Recovery date: 11/20
Filter(s) no.: 0000754

MOISTURE

Impingers			Silica gel		
Final volume (wt)	185	ml(gm)	Final wt.	219.4 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-15	ml(gm)	Net wt.	19.4 g	g

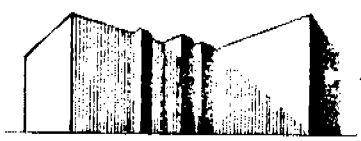
Total moisture 4.4 g
Color of silica gel 1/3 spent
Description of impinger water clear

RECOVERED SAMPLE

Filter container no. E4-1 sealed —
Description of particulate on filter

Acetone rinse container no. E4-2 Liquid level marked
Acetone blank container no. E Liquid level marked —
Samples stored and locked Yes
Remarks: Impinger Contents No. E4-3.

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. E-4 11-20-77
Sample location Bucket - Condenser
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	✓

Acetone rinse container no. E4-2
Acetone rinse volume (Vaw) 130 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(130)(0.7851) = 0.6609 mg
Date and time of wt 12-6-77 5:04 Gross wt. 110.657.2 mg
Date and time of wt 12-7-77 11:10 Gross wt. 110.6572 mg
Average gross wt. 110.657.2 mg
Tare wt. 110.625.5 mg
Less acetone blank wt. (Wa) 0.7 mg
Weight of particulate in acetone rinse 31.0 mg
Filters(s) container no. E4-1
Date and time of wt 12-5-77 12:32 Gross wt. 472.3 mg
Date and time of wt 12-6-77 9:47 Gross wt. 472.0 mg
Average gross wt. 472.2 mg
Tare wt. 466.1 mg
Weight of particulate on filter(s) 6.1 mg
Weight of particulate in acetone rinse 31.0 mg
Total weight of particulate 37.1 mg
Remarks:

Signature of analyst M.A. Kladis
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: Condenser + Bucket Run no.: E-5
Sample recovery person: CB Recovery date: 11/20
Filter(s) no.: 0000105

MOISTURE

Impingers			Silica gel		
Final volume (wt)	470	ml(gm)	Final wt.	214 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-30	ml(gm)	Net wt.	14 g	g

Total moisture 0 g
Color of silica gel Yellow
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. E5-1 sealed
Description of particulate on filter Brown

Acetone rinse container no. E5-2 Liquid level marked ✓
Acetone blank container no. E Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contains No. E5-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Walton
Remarks:


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ANALYTICAL PARTICULATE DATA

Plant Fresno Gin Run no. E-5 - 11-20-77
Sample location Bucket + Condenser
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	105	✓

Acetone rinse container no. E5-2
Acetone rinse volume (Vaw) 270 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(270)(0.7851) = 1.3727 mg
Date and time of wt 12-6-77 5:08 Gross wt. 112.1522 mg
Date and time of wt 12-7-77 11:14 Gross wt. 112.1517 mg
Average gross wt. 112.1519 mg FILTER
Tare wt. 110.5954 mg 14888
Less acetone blank wt. (Wa) 1.4 mg
Weight of particulate in acetone rinse 66.4 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg

Remarks: High Vol. filter included in acetone rinse

Signature of analyst M.A. Klaff
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: Condenser : Basket Run no.: E-6
Sample recovery person: C'B Recovery date: 11/22
Filter(s) no.: 0000883

MOISTURE

Impingers			Silica gel		
Final volume (wt)	194	ml(gm)	Final wt.	214.7 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-6	ml(gm)	Net wt.	14.7 g	g

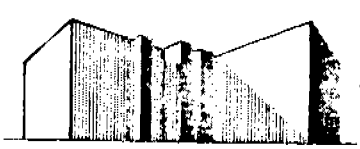
Total moisture 8.7 g
Color of silica gel 1/4 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. EG-1 sealed ✓
Description of particulate on filter ✓

Acetone rinse container no. EG-2 Liquid level marked ✓
Acetone blank container no. E Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Contains No. EG-3.

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Wilkins
Remarks: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ANALYTICAL PARTICULATE DATA

Plant Westside Gin Run no. E-6 11-20-77
Sample location Basket + Condenser
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	—	—

Acetone rinse container no. E6-2
Acetone rinse volume (Vaw) 125 ml
Acetone blank residue concentration (Ca) 0.00647 mg/g
Wa = Ca Vaw ρa = (.00647)(125)(0.7851) = 0.6355 mg
Date and time of wt 12-6-77 10:15 a.m. Gross wt. 111 950.5 mg
Date and time of wt 12-7-77 9:20 A.M. Gross wt. 111 950.0 mg
Average gross wt. 111 950.3 mg
Tare wt. 111.9269 mg
Less acetone blank wt. (Wa) 0.6 mg
Weight of particulate in acetone rinse 22.8 mg
Filters(s) container no. E6-1
Date and time of wt 12/5/77 9:00 AM Gross wt. 432.1 mg
Date and time of wt 12/9/77 3:00 pm Gross wt. 431.9 mg
Average gross wt. 432.0 mg
Tare wt. 431.6 mg
Weight of particulate on filter(s) 200.4 mg
Weight of particulate in acetone rinse 22.8 mg
Total weight of particulate 23.2 mg

Remarks:

Signature of analyst M. A. Kladis
Signature of reviewer Wade Mann

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/21/77
Sample location: Mote Cleaner Run no.: F-1
Sample recovery person: CB Recovery date: 11/21
Filter(s) no.: 0000104

MOISTURE

Impingers			Silica gel		
Final volume (wt)	479	ml(gm)	Final wt.	224.3 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-21	ml(gm)	Net wt.	24.3 g	g

Total moisture 3.3 g
Color of silica gel 1/3 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. F1-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. F1-2 Liquid level marked ✓
Acetone blank container no. F Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Container No. F1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Vetter
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant West Side Gin Run no. F-1 11-21-77
Sample location Mote Cleaner
Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
✓ Acetone rinse	Front Half	
filter(s)	104	✓

Acetone rinse container no. F1-2
Acetone rinse volume (Vaw) 178 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (0.006476)(178)(0.7851) = 0.90500 mg
Date and time of wt 12-6-77 8:10 Gross wt. 112.7483 mg
Date and time of wt 12-7-77 11:22 Gross wt. 112.7483 mg
Average gross wt. 112.7483 mg
Tare wt. 110.4483 mg + 1.4817
Less acetone blank wt. (Wa) 0.90500 mg
Weight of particulate in acetone rinse 823.8 mg
Filters(s) container no. _____
Date and time of wt _____ Gross wt. _____ mg
Date and time of wt _____ Gross wt. _____ mg
Average gross wt. _____ mg
Tare wt. _____ mg
Weight of particulate on filter(s) _____ mg
Weight of particulate in acetone rinse _____ mg
Total weight of particulate _____ mg

Remarks: 1.4817 is the tare wt of filter paper found in the containers. High Vol. filter included in Acetone rinse

Signature of analyst M. A. Ichalfe
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/21/77
Sample location: Note Cleaner Run no.: F-2
Sample recovery person: CS Recovery date: _____
Filter(s) no.: 000682

MOISTURE

Impingers			Silica gel		
Final volume (wt)	195	ml(gm)	Final wt.	215.4 g	____ g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	____ g
Net volume (wt)	-5	ml(gm)	Net wt.	15.4 g	____ g
Total moisture	10.4 g				

Color of silica gel ½ spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. F2-1 sealed ✓
Description of particulate on filter _____

Acetone rinse container no. F2-2 Liquid level marked ✓
Acetone blank container no. F Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contains No. F2-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: _____


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ANALYTICAL PARTICULATE DATA

Plant West Side Gen Run no. F-2 (front Half)
Sample location Mote Cleaner date Spiked 11-21-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	✓ Liquid level marked and/or container sealed
✓ Acetone rinse	Rinse	
filter(s)		✓

Acetone rinse container no. F2-2
Acetone rinse volume (Vaw) 189 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(189)(0.7851) = 0.9609 mg
Date and time of wt 12-6-77 8:15 A.M. Gross wt. 98.4805 mg
Date and time of wt 12-7-77 9:00 A.M. Gross wt. 98.4809 mg
Average gross wt. 98.4807 mg
Tare wt. 98.3311 mg
Less acetone blank wt. (Wa) 0.9609 mg
Weight of particulate in acetone rinse 148.6 mg
Filters(s) container no. F2-1
Date and time of wt 12/8/77 10:15 AM Gross wt. 504.5 mg
Date and time of wt 12/9/77 4:00 PM Gross wt. 504.0 mg
Average gross wt. 504.3 mg
Tare wt. 459.6 mg
Weight of particulate on filter(s) 044.7 mg
Weight of particulate in acetone rinse 148.6 mg
Total weight of particulate 193.3 mg

Remarks: _____

Signature of analyst M. A. Eads Jr.
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Bin Sample date: 11/21/77
Sample location: Meter Cleanup Run no.: F-3
Sample recovery person: CB Recovery date: 11/21
Filter(s) no.: 0000103

MOISTURE

Impingers			Silica gel		
Final volume (wt)	477	ml(gm)	Final wt.	224.2 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-23	ml(gm)	Net wt.	24.2 g	g

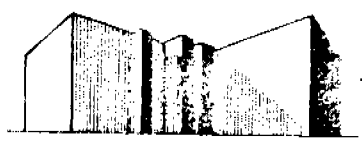
Total moisture 1.7 g
Color of silica gel 1/4 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. F3-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. F3-2 Liquid level marked ✓
Acetone blank container no. F Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Container No. F3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Ulten
Remarks:



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ANALYTICAL PARTICULATE DATA

Plant Westvaco Corp Run no. F-3 11-21-77

Sample location Mote Manor

Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)	103	✓

Acetone rinse container no. F3-2

Acetone rinse volume (Vaw) 170 ml

Acetone blank residue concentration (Ca) 0.00647 mg/g

Wa = Ca Vaw ρa = (.00647)(170)(0.7851) = 0.8643 mg

Date and time of wt 12-6-77 8:25 Gross wt. 111.8147 mg

Date and time of wt 12-7-77 11:26 Gross wt. 111.8145 mg

Average gross wt. 111.8146 mg

Tare wt. 109.6925 mg FILTER 1.4760

Less acetone blank wt. (Wa) 0.86 mg

Weight of particulate in acetone rinse 645.2 mg

Filters(s) container no. _____

Date and time of wt _____ Gross wt. _____ mg

Date and time of wt _____ Gross wt. _____ mg

Average gross wt. _____ mg

Tare wt. _____ mg

Weight of particulate on filter(s) _____ mg

Weight of particulate in acetone rinse _____ mg

Total weight of particulate _____ mg

Remarks: High Vol. filter included in acetone rinse

Signature of analyst M. A. Klaes

Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/21/77
Sample location: Mote Plant Run no.: F-4
Sample recovery person: CB Recovery date: 11/21
Filter(s) no.: 0000717

MOISTURE

Impingers			Silica gel		
Final volume (wt)	195	ml(gm)	Final wt.	212.4 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-5	ml(gm)	Net wt.	12.4 g	g
Total moisture	7.4 g				

Color of silica gel Ys spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. F4-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. F4-2 Liquid level marked ✓
Acetone blank container no. F Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contains No. F4-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Vetter
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant West Side Run no. F-4 (front Half)
Sample location Inang Cal. Mete. Cleanup date Spiked 11-21-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	✓ Liquid level marked and/or container sealed
✓ Acetone rinse	Part 1 (Front)	✓
filter(s)		

Acetone rinse container no. F4-2
Acetone rinse volume (Vaw) 212 ml
Acetone blank residue concentration (Ca) 0.00647 mg/g
Wa = Ca Vaw ρa = (.00647)(212)(0.7851) = 1.0778 mg
Date and time of wt 12-6-77 8:30 Gross wt. 101.7914 mg
Date and time of wt 12-7-77 11:30 Gross wt. 101.7914 mg
Average gross wt. 101.79125 mg
Tare wt. 101.6787 mg
Less acetone blank wt. (Wa) 1.0778 mg
Weight of particulate in acetone rinse 111.5 mg
Filters(s) container no. F4-1
Date and time of wt 12/9/77 9:30 Gross wt. 502.7 mg
Date and time of wt 12/9/77 8:00 Gross wt. 502.3 mg
Average gross wt. 502.5 mg
Tare wt. 467.5 mg
Weight of particulate on filter(s) 035.0 mg
Weight of particulate in acetone rinse 111.5 mg
Total weight of particulate 146.5 mg

Remarks:

Signature of analyst M. A. Khalil
Signature of reviewer Wade Mason


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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/21/77
Sample location: Mote Cleaner Run no.: F-5
Sample recovery person: RB Recovery date: 11/21
Filter(s) no.: 0000 101

MOISTURE

Impingers			Silica gel		
Final volume (wt)	467	ml(gm)	Final wt.	234 g	g
Initial volume (wt)	500	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-33	ml(gm)	Net wt.	34 g	g

Total moisture 1 g
Color of silica gel Yellow spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. F5-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. F5-2 Liquid level marked ✓
Acetone blank container no. F Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Container No. F5-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Walton
Remarks:


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ANALYTICAL PARTICULATE DATA

Plant Westvaco Gas Run no. F-5 11-21-77

Sample location Mote Reactor

Density of acetone (ρa) 0.7857 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)	10	

Acetone rinse container no. FS-2

Acetone rinse volume (Vaw) 245 ml

Acetone blank residue concentration (Ca) 0.000476 mg/g

Wa = Ca Vaw ρa = (.000476)(245)(.7857) = 1.2456 mg

Date and time of wt 12-6-77 8:40 Gross wt. 115.4930 mg

Date and time of wt 12-7-77 8:25 Gross wt. 115.4935 mg

Average gross wt. 115.4933 mg

Tare wt. 113.2447 mg FILTER 14830

Less acetone blank wt. (Wa) 1.2 mg

Weight of particulate in acetone rinse 764.3 mg

Filters(s) container no. _____

Date and time of wt _____ Gross wt. _____ mg

Date and time of wt _____ Gross wt. _____ mg

Average gross wt. _____ mg

Tare wt. _____ mg

Weight of particulate on filter(s) _____ mg

Weight of particulate in acetone rinse _____ mg

Total weight of particulate _____ mg

Remarks: High Vol. filter included in acetone rinse

Signature of analyst M A Klaffs

Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/21/77
Sample location: Note Cleaner Run no.: F-6
Sample recovery person: Pat. Recovery date: 11/21
Filter(s) no.: 0000 927

MOISTURE

Impingers			Silica gel		
Final volume (wt)	201	ml(gm)	Final wt.	213.4 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	1	ml(gm)	Net wt.	13.4 g	g

Total moisture 14.4 g
Color of silica gel 1/5 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. F6-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. F6-2 Liquid level marked ✓
Acetone blank container no. F Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Container No. F6-3 ✓

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Ulton
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Run no. F-6 (Front Half)
Sample location Tarry Car Mate Room date sped 11-21-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)		✓

Acetone rinse container no. F6-2
Acetone rinse volume (Vaw) 121 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(121)(0.7851) = 0.6152 mg
Date and time of wt 12-6-77 8:36 Gross wt. 95 908.4 mg
Date and time of wt 12-7-77 8:20 Gross wt. 95 908.4 mg
Average gross wt. 95 908.4 mg
Tare wt. 95.801.7 mg
Less acetone blank wt. (Wa) 0.6152 mg
Weight of particulate in acetone rinse 106.1 8 mg
Filters(s) container no. F6-1
Date and time of wt 12/8/77 9:35 Gross wt. 458.7 mg
Date and time of wt 12/9/77 8:05 Gross wt. 458.3 mg
Average gross wt. 458.5 mg
Tare wt. 417.1 mg
Weight of particulate on filter(s) 041.4 mg
Weight of particulate in acetone rinse 106.1 mg
Total weight of particulate 147.5 mg

Remarks:

Signature of analyst M. A. Ichaby
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: #2 Lint Cleaner Run no.: G-1
Sample recovery person: CA Recovery date: 1120
Filter(s) no.: 000750

MOISTURE

Impingers			Silica gel		
Final volume (wt)	194	ml(gm)	Final wt.	210.8 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-6	ml(gm)	Net wt.	10.8 g	g

Total moisture 4.8 g
Color of silica gel Y5 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. G1-1 sealed ✓
Description of particulate on filter
✓
Acetone rinse container no. G1-2 Liquid level marked —
Acetone blank container no. G Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Contents No. G1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Vetter
Remarks:


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ANALYTICAL PARTICULATE DATA

Plant West Side Run no. G-1 (Front Half)
Sample location #2 Gas cleaner Sched 11-20-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
✓ Acetone rinse	Front Half	✓
filter(s)		

Acetone rinse container no. G1-2
Acetone rinse volume (Vaw) 240 ml
Acetone blank residue concentration (Ca) 0.000647 mg/g
Wa = Ca Vaw ρa = (0.000647)(240)(0.7851) = 1.2202 mg
Date and time of wt 12-6-77 8:40 Gross wt. 93.7441 mg
Date and time of wt 12-7-77 8:28 Gross wt. 93.7446 mg
Average gross wt. 93.7444 mg
Tare wt. 93.6812 mg
Less acetone blank wt. (Wa) 1.2202 mg
Weight of particulate in acetone rinse 62.0 mg
Filters(s) container no. G1-1
Date and time of wt 12-5-77 12:57 Gross wt. 480.5 mg
Date and time of wt 12-6-77 10:03 Gross wt. 480.0 mg
Average gross wt. 480.3 mg
Tare wt. 468.7 mg
Weight of particulate on filter(s) 11.6 mg
Weight of particulate in acetone rinse 61.9798 mg
Total weight of particulate 73.6 mg

Remarks:

Signature of analyst M.A. Khalfa
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: #2 Lint Cleaner Run no.: G-2
Sample recovery person: CA Recovery date: 11/20
Filter(s) no.: 0000 941

MOISTURE

Impingers			Silica gel		
Final volume (wt)	198	ml(gm)	Final wt.	205.3 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	~~200~~ 5.3 g	g
Net volume (wt)	-2	ml(gm)	Net wt.	5.3 g	g

Total moisture 3.3 g
Color of silica gel Y6 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. G2-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. G2-2 Liquid level marked ✓
Acetone blank container no. G Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contains No. G2-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

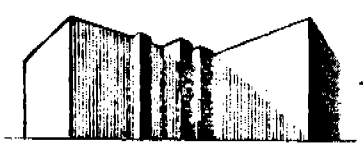
Plant West Side Run no. G-2 (Front-Half)
Sample location Train Cal #2 Final cleaning 11-20-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)		✓

Acetone rinse container no. G2-2
Acetone rinse volume (Vaw) 134 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (.006476)(134)(0.7851) = 0.6813 mg
Date and time of wt 12-6-77 8:44 Gross wt. 100.3208 mg
Date and time of wt 12-7-77 8:40 Gross wt. 100.3205 mg
Average gross wt. 100.3206 mg
Tare wt. 100.2435 mg
Less acetone blank wt. (Wa) 0.6813 mg
Weight of particulate in acetone rinse 76.4 mg
Filters(s) container no. G2-1
Date and time of wt 12-5-77 1:06 Gross wt. 474.1 mg
Date and time of wt 12-6-77 10:09 Gross wt. 473.8 mg
Average gross wt. 473.9 mg
Tare wt. 470.0 mg
Weight of particulate on filter(s) 003.9 mg
Weight of particulate in acetone rinse 76.4187 mg
Total weight of particulate 80.3 mg

Remarks:

Signature of analyst M. A. Schaefer
Signature of reviewer Wade Mason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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/20/77
Sample location: #2 Lint Cleaner Run no.: G-3
Sample recovery person: CB Recovery date: 11/20
Filter(s) no.: 000967

MOISTURE

Impingers			Silica gel		
Final volume (wt)	195	ml (gm)	Final wt.	205.3 g	g
Initial volume (wt)	200	ml (gm)	Initial wt.	~~200.3~~ g	g
Net volume (wt)	-5	ml (gm)	Net wt.	5.3 g	g

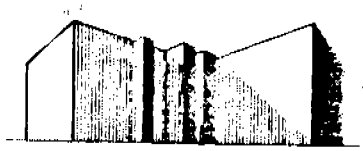
Total moisture 0.3 g
Color of silica gel Yellowish
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. G3-1 sealed ✓
Description of particulate on filter —

Acetone rinse container no. G3-2 Liquid level marked ✓
Acetone blank container no. G Liquid level marked —
Samples stored and locked
Remarks: Impinger Container No. G3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Ulton
Remarks: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ANALYTICAL PARTICULATE DATA

Plant Westside Gen Run no. G-3 (Front Half)
Sample location Train Cal Spiked 11-2-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	✓ Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)		

Acetone rinse container no. G3-2
Acetone rinse volume (Vaw) 211 ml
Acetone blank residue concentration (Ca) 0.00647 mg/g
Wa = Ca Vaw ρa = (0.00647)(211)(0.7851) = 1.0728 mg
Date and time of wt 12-6-77 10:13 Gross wt. 96.2328 mg
Date and time of wt 12-7-77 8:45 Gross wt. 96.2328 mg
Average gross wt. 96.2328 mg
Tare wt. 96.124.9 mg
Less acetone blank wt. (Wa) 1.0728 mg
Weight of particulate in acetone rinse 106.8 mg
Filters(s) container no. G3-1
Date and time of wt 12-5-77 1:15 Gross wt. 414.0 mg
Date and time of wt 12-6-77 10:15 Gross wt. 413.6 mg
Average gross wt. 413.8 mg
Tare wt. 404.3 mg
Weight of particulate on filter(s) 009.5 mg
Weight of particulate in acetone rinse 106.827 mg
Total weight of particulate 116.3 mg

Remarks:

Signature of analyst M. A. Khalra
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/22/77
Sample location: #1 Lint Cleaner Run no.: H-1
Sample recovery person: CB Recovery date: 11/22
Filter(s) no.: 0000 803

MOISTURE

Impingers			Silica gel		
Final volume (wt)	195	ml (gm)	Final wt.	214.7 g	____ g
Initial volume (wt)	200	ml (gm)	Initial wt.	200 g	____ g
Net volume (wt)	-5	ml (gm)	Net wt.	14.7 g	____ g

Total moisture 9.7 g
Color of silica gel 1/4 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. H1-1 sealed ✓
Description of particulate on filter ____
✓
Acetone rinse container no. H1-2 Liquid level marked —
Acetone blank container no. H Liquid level marked —
Samples stored and locked ____
Remarks: Impinger Contains No. H1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J. Helton
Remarks: ____

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ANALYTICAL PARTICULATE DATA

Plant West Side Run no. H 1 (Front Half)
Sample location T. exp. #1 Dust Chamber Spent 11-22-77
Density of acetone (ρa) _____ g/ml

Sample type	Sample identifiable	✓ Liquid level marked and/or container sealed
✓ Acetone rinse	Front Half	
filter(s)		

Acetone rinse container no. H1-2
Acetone rinse volume (Vaw) 65 ml
Acetone blank residue concentration (Ca) 0.00647% mg/g
Wa = Ca Vaw ρa = (0.00647%) (65) (0.7851) = 0.3305 mg
Date and time of wt 12-6-77 10:09 Gross wt. 42.7250 mg
Date and time of wt 12-7-77 10:28 Gross wt. 92.7252 mg
Average gross wt. 92.7251 mg
Tare wt. 92.572.1 mg (11-30-77)
Less acetone blank wt. (Wa) 0.3305 mg 0.3305
Weight of particulate in acetone rinse 152.7 mg
Filters(s) container no. H1-1
Date and time of wt 12-5-77 1:03 PM Gross wt. 474.7 mg
Date and time of wt 12-6-77 10:07 Am. Gross wt. 474.5 mg
Average gross wt. 474.6 mg
Tare wt. 468.6 mg
Weight of particulate on filter(s) 006.0 mg
Weight of particulate in acetone rinse 152.7 mg
Total weight of particulate 158.7 mg

Remarks: _____

Signature of analyst M.A. Khalifa
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/22/77
Sample location: _____ Run no.: H-2
Sample recovery person: WGD Recovery date: 11/22
Filter(s) no.: 000816

MOISTURE

Impingers			Silica gel		
Final volume (wt)	207	ml(gm)	Final wt.	211.7 g	____ g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	____ g
Net volume (wt)	7	ml(gm)	Net wt.	11.7 g	____ g
Total moisture	18.7 g				

Color of silica gel 1/4 spent
Description of impinger water clear

RECOVERED SAMPLE

Filter container no. H2-1 (000816) sealed ✓
Description of particulate on filter light

Acetone rinse container no. H2-2 Liquid level marked ✓
Acetone blank container no. H Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Container No. H2-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Ulton
Remarks: _____

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ANALYTICAL PARTICULATE DATA

Plant Westside Run no. H2 (Front Half)
Sample location #1 Kiln Cleaner Spiked 11-22-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	✓ Liquid level marked and/or container sealed
✓ Acetone rinse	Front Half	
filter(s)		

Acetone rinse container no. H2-2
Acetone rinse volume (Vaw) 225 ml
Acetone blank residue concentration (Ca) 0.6 mg/g
Wa = Ca Vaw ρa = (0.000647)(225)(0.7851) = 1.1439 mg
Date and time of wt 12-6-77 11:30 Gross wt. 101.0770 mg
Date and time of wt 12-7-77 11:30 Gross wt. 101.2765 mg
Average gross wt. 101.0767 mg
Tare wt. 100.9392 mg
Less acetone blank wt. (Wa) 1.1439 mg
Weight of particulate in acetone rinse 136.4 mg
Filters(s) container no. H2-1
Date and time of wt 12-5-77 12:51 Gross wt. 472.2 mg
Date and time of wt 12-6-77 9:59 Gross wt. 472.0 mg
Average gross wt. 472.1 mg
Tare wt. 465.4 mg
Weight of particulate on filter(s) 6.7 mg
Weight of particulate in acetone rinse 136.3541 mg
Total weight of particulate 143.1 mg

Remarks:

Signature of analyst M. A. Khalifa
Signature of reviewer Wade Mason


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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/22/77
Sample location: #1 Lint Cleaner Run no.: H-3
Sample recovery person: BD Recovery date: 11/22
Filter(s) no.: 0000784

MOISTURE

Impingers			Silica gel		
Final volume (wt)	206	ml(gm)	Final wt.	216.8 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	6	ml(gm)	Net wt.	16.8 g	g

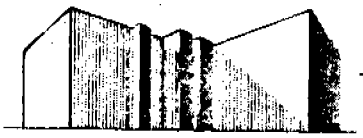
Total moisture 24.8 g
Color of silica gel 1/5 Spent
Description of impinger water Translucent

RECOVERED SAMPLE

Filter container no. H3-1 sealed ✓
Description of particulate on filter Light beige

Acetone rinse container no. H3-2 Liquid level marked ✓
Acetone blank container no. H Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contains No. H3-3.

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:



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ANALYTICAL PARTICULATE DATA

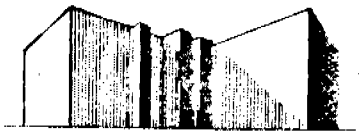
Plant West side Run no. H3 (Front Half)
Sample location Train #1 last cleaned 11-22-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	✓
filter(s)		

Acetone rinse container no. H3-2
Acetone rinse volume (Vaw) 210 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (0.006476)(210)(0.7851) = 1.0677 mg
Date and time of wt 12-6-77 (4:55 PM) Gross wt. 97 811.9 ~~mg~~ g
Date and time of wt 12-7-77 11:35 Gross wt. 97 812.3 ~~mg~~ g
Average gross wt. 97 812.1 ~~mg~~ g
Tare wt. 97 496.7 ~~mg~~ g 11-30-77
Less acetone blank wt. (Wa) 1.0677 mg
Weight of particulate in acetone rinse 314.3 mg
Filters(s) container no. H3-1
Date and time of wt 12/8/77 9:37 Gross wt. 483.9 mg
Date and time of wt 12/9/77 8:10 Gross wt. 483.6 mg
Average gross wt. 483.7 mg
Tare wt. 465.7 mg
Weight of particulate on filter(s) 018.0 mg
Weight of particulate in acetone rinse 314.332 mg
Total weight of particulate 332.3 mg

Remarks:

Signature of analyst M. A. Khalifa
Signature of reviewer Wade Mason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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/21/71
Sample location: #2 Lint Cleaner Run no.: I-1
Sample recovery person: CB Recovery date: 11/21
Filter(s) no.: 000758

MOISTURE

Impingers			Silica gel		
Final volume (wt)	202	ml(gm)	Final wt.	212.5 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	2	ml(gm)	Net wt.	12.5 g	g

Total moisture 14.5 g
Color of silica gel 1/3 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. I-1-1 sealed ✓
Description of particulate on filter Light Beige
Acetone rinse container no. I-1-2 Liquid level marked ✓
Acetone blank container no. I Liquid level marked
Samples stored and locked
Remarks: Impinger Container No. I-1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Barbara J Yelton
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Run no. I-1 (front Half)
Sample location Trans. Cal. — #2 duct Cleaned Sched 11-21-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)		✓

Acetone rinse container no. I-2
Acetone rinse volume (Vaw) 248 ml
Acetone blank residue concentration (Ca) 0.00426 mg/g
Wa = Ca Vaw ρa = (.00646)(248)(0.7851) = 1.2609 mg
Date and time of wt 12-6-77 9:00 Gross wt. 99.091.1 mg
Date and time of wt 12-7-77 8:50 Gross wt. 99 090.9 mg
Average gross wt. 99 091.0 mg
Tare wt. 98 963.8 mg
Less acetone blank wt. (Wa) 1.2609 mg
Weight of particulate in acetone rinse 125.9 mg
Filters(s) container no. I-1
Date and time of wt 12-5-77 12:15 Gross wt. 488.0 mg
Date and time of wt 12-6-77 9:35 Gross wt. 487.6 mg
Average gross wt. 487.8 mg
Tare wt. 472.5 mg
Weight of particulate on filter(s) 015.3 mg
Weight of particulate in acetone rinse 125.94 mg
Total weight of particulate 141.2 mg

Remarks:

Signature of analyst M. H. Khalfe
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/21/77
Sample location: #2 Lint Cleaner Run no.: I-2
Sample recovery person: CB Recovery date: 11/21
Filter(s) no.: 0000708

MOISTURE

Impingers

Final volume (wt) 150 ml(gm)
Initial volume (wt) 200 ml(gm)
Net volume (wt) -10 ml(gm)
Total moisture 2.6 g

Silica gel

Final wt. 212.6g ____g
Initial wt. 207 g ____g
Net wt. 12.6 g ____g

Color of silica gel Y3 orpint
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. I2-1 sealed ✓
Description of particulate on filter

Acetone rinse container no. I2-2 Liquid level marked ✓
Acetone blank container no. I Liquid level marked
Samples stored and locked
Remarks: Impinger Contents to I2-3.

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Run no. I-2 (front Half) Spud 11-21-77

Sample location #2 Unit Cleaner

Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	✓ Front Half	✓
filter(s)		

Acetone rinse container no. I2-2

Acetone rinse volume (Vaw) 133 ml

Acetone blank residue concentration (Ca) 0.001476 mg/g

Wa = Ca Vaw ρa = (0.001476)(133)(0.7851) = 0.6762 mg

Date and time of wt 12-6-77 9:41 Gross wt. 97575 mg

Date and time of wt 12-7-77 11:40 Gross wt. 97587.1 mg

Average gross wt. 97581.3 mg

Tare wt. 97492.0 mg

Less acetone blank wt. (Wa) 0.6762 mg

Weight of particulate in acetone rinse 94.6 mg

Filters(s) container no. I2-1

Date and time of wt 12-5-77 12:21 Gross wt. 475.9 mg

Date and time of wt 12-6-77 9:39 Gross wt. 475.6 mg

Average gross wt. 475.7 mg

Tare wt. 463.6 mg

Weight of particulate on filter(s) 012.1 mg

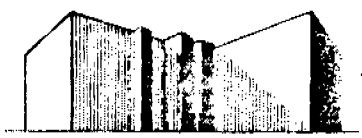
Weight of particulate in acetone rinse 94.6 mg

Total weight of particulate 106.7 mg

Remarks:

Signature of analyst M.A. Khalifa

Signature of reviewer Wade Mason



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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/21/77
Sample location: #2 Lint Cleaner Run no.: I-3
Sample recovery person: CB Recovery date: 11/21/77
Filter(s) no.: 0000 965

MOISTURE

Impingers			Silica gel		
Final volume (wt)	188	ml(gm)	Final wt.	232.8 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	-12	ml(gm)	Net wt.	32.8 g	g

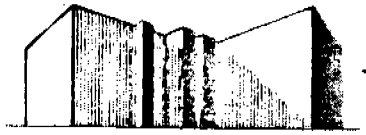
Total moisture 20.8 g
Color of silica gel Very spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. I3-1 sealed ✓
Description of particulate on filter ✓

Acetone rinse container no. I3-2 Liquid level marked ✓
Acetone blank container no. I Liquid level marked ✓
Samples stored and locked
Remarks: Impinger Container No. I3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: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ANALYTICAL PARTICULATE DATA

Plant West Side Run no. I-3 (front half)
Sample location Train CaC - #4 Inlet Sampled 11-21-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	✓	
filter(s)		✓

Acetone rinse container no. I3-2
Acetone rinse volume (Vaw) 186 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (0.006476)(186)(0.7851) = 0.9457 mg
Date and time of wt 12-5-77 1:25 Gross wt. 96.7224 mg
Date and time of wt 12-6-77 11:36 Gross wt. 96.7220 mg
Average gross wt. 96.7222 mg
Tare wt. 96.6493 mg
Less acetone blank wt. (Wa) 0.9457 mg
Weight of particulate in acetone rinse 71.9 mg
Filters(s) container no. I3-1
Date and time of wt 12-5-77 11:45 Gross wt. 419.4 mg
Date and time of wt 12-5-77 6:00 Gross wt. 419.4 mg
Average gross wt. 419.4 mg
Tare wt. 409.1 mg
Weight of particulate on filter(s) 10.3 mg
Weight of particulate in acetone rinse 71.9 mg
Total weight of particulate 82.2 mg
Remarks:

Signature of analyst M. A. Ichalfs
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/22/77
Sample location: Battery Condenser Run no.: J-1
Sample recovery person: CB Recovery date: 11/22
Filter(s) no.: 1000937

MOISTURE

Impingers			Silica gel		
Final volume (wt)	197.5 ml(gm)		Final wt.	213.3 g	____ g
Initial volume (wt)	200 ml(gm)		Initial wt.	200 g	____ g
Net volume (wt)	-2.5 ml(gm)		Net wt.	13.3 g	____ g
Total moisture	~~10.8~~ g				

Color of silica gel 4 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. J1-1 sealed ✓
Description of particulate on filter ✓

Acetone rinse container no. J1-2 Liquid level marked ✓
Acetone blank container no. J Liquid level marked ✓
Samples stored and locked ✓
Remarks: ~~Impinger Contents~~ No. J1-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant Westside Run no. J-1 (Front Half)
Sample location Batting Condenser Spl of 11-27-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
Acetone rinse	Front Half	
filter(s)		

Acetone rinse container no. J1-2
Acetone rinse volume (Vaw) 158 ml
Acetone blank residue concentration (Ca) 0.00647G mg/g
Wa = Ca Vaw ρa = (.00647)(158)(0.7851) = 0.8033 mg
Date and time of wt 12-5-77 11:40 Gross wt. 105.5850 mg
Date and time of wt 12-6-77 11:46 Gross wt. 105.5846 mg
Average gross wt. 105.5848 mg
Tare wt. 105.5510 mg
Less acetone blank wt. (Wa) 0.8033 mg
Weight of particulate in acetone rinse 33.0 mg
Filters(s) container no. J1-1
Date and time of wt 12-5-77 11:35 Gross wt. 469.6 mg
Date and time of wt 12-6-77 11:50 Gross wt. 469.2 mg
Average gross wt. 469.4 mg
Tare wt. 468.2 mg
Weight of particulate on filter(s) 001.2 mg
Weight of particulate in acetone rinse 32.997 mg
Total weight of particulate 34.2 mg
Remarks:

Signature of analyst M. A Eagle
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/22/77
Sample location: Battery Condenser Run no.: J-2
Sample recovery person: CB Recovery date: 11/22
Filter(s) no.: 0000 925

MOISTURE

Impingers			Silica gel		
Final volume (wt)	200	ml(gm)	Final wt.	214.5 g	g
Initial volume (wt)	200	ml(gm)	Initial wt.	200 g	g
Net volume (wt)	0	ml(gm)	Net wt.	14.5 g	g

Total moisture 14.5 g
Color of silica gel 1/5 spent
Description of impinger water Clear

RECOVERED SAMPLE

Filter container no. J2-1 sealed ✓
Description of particulate on filter —

Acetone rinse container no. J2-2 Liquid level marked —
Acetone blank container no. J Liquid level marked —
Samples stored and locked —
Remarks: Impinger Container No. J2-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Kilter
Remarks:

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ANALYTICAL PARTICULATE DATA

Plant West-Side Run no. J-2 (front Half)
Sample location Train Cool Bottle Condenser Spiked - 11-22-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
✓ Acetone rinse	Front Half	
filter(s)		

Acetone rinse container no. J2-2
Acetone rinse volume (Vaw) 136 ml
Acetone blank residue concentration (Ca) 0.006476 mg/g
Wa = Ca Vaw ρa = (0.006476)(136)(0.7851) = 0.6915 mg
Date and time of wt 12-5-77 11:30 Gross wt. 95316.8 mg
Date and time of wt 12-6-77 11:55 Gross wt. 95316 mg
Average gross wt. 95316.0 mg
Tare wt. 95284.0 mg
Less acetone blank wt. (Wa) 0.6915 mg
Weight of particulate in acetone rinse 32.0 mg
Filters(s) container no. J2-1
Date and time of wt 12-5-77 12:42 Gross wt. 415.9 mg
Date and time of wt 12-6-77 9:53 Gross wt. 415.5 mg
Average gross wt. 415.7 mg
Tare wt. 415.5 mg
Weight of particulate on filter(s) 0.2 mg
Weight of particulate in acetone rinse 32.008 mg
Total weight of particulate 32.2 mg

Remarks:

Signature of analyst M. A Khalifa
Signature of reviewer Wade Mason

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PARTICULATE SAMPLE RECOVERY AND INTEGRITY SHEET

Plant: Westside Gin Sample date: 11/22/77
Sample location: _____ Run no.: J-3
Sample recovery person: CB Recovery date: _____
Filter(s) no.: 0000 826

MOISTURE

Impingers			Silica gel		
Final volume (wt)	197	ml(gm)	Final wt.	211.2g	____g
Initial volume (wt)	200	ml(gm)	Initial wt.	200g	____g
Net volume (wt)	-3	ml(gm)	Net wt.	11.2g	____g
Total moisture	8.2 g				

Color of silica gel: Y5 spent
Description of impinger water: Clear

RECOVERED SAMPLE

Filter container no. J3-1 sealed ✓
Description of particulate on filter: —

Acetone rinse container no. J3-2 Liquid level marked ✓
Acetone blank container no. J Liquid level marked ✓
Samples stored and locked ✓
Remarks: Impinger Contents No. J3-3

Date of laboratory custody 11/30/77
Laboratory personnel taking custody Richard J Velten
Remarks: _____

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ANALYTICAL PARTICULATE DATA

Plant West side Run no. J-3 (front Half)
Sample location Train Cal. Battery Condenser Spike 11-22-77
Density of acetone (ρa) 0.7851 g/ml

Sample type	Sample identifiable	Liquid level marked and/or container sealed
✓ Acetone rinse	Front Half	✓
filter(s)		

Acetone rinse container no. J3-2
Acetone rinse volume (Vaw) 191 ml
Acetone blank residue concentration (Ca) 0.001476 mg/g
Wa = Ca Vaw ρa = (0.001476)(191)(0.7851) = 0.9711 mg
Date and time of wt 12-5-77 11:25 Gross wt. 99.3049 mg
Date and time of wt 12-6-77 10:05 Gross wt. 99.3045 mg
Average gross wt. 99.3047 mg
Tare wt. 99.2634 mg
Less acetone blank wt. (Wa) 0.9711 mg
Weight of particulate in acetone rinse 40.3 mg
Filters(s) container no. J3-1
Date and time of wt 12-5-77 12:54 Gross wt. 473.8 mg
Date and time of wt 12-6-77 10:01 Gross wt. 473.4 mg
Average gross wt. 473.6 mg
Tare wt. 472.1 mg
Weight of particulate on filter(s) 1.5 mg
Weight of particulate in acetone rinse 40.329 mg
Total weight of particulate 41.8 mg
Remarks:

Signature of analyst M. A. Klaff
Signature of reviewer Wade Mason

CHESTER TOWERS
BRANCH OFFICES
Crown Center Kansas City, Mo.
Professional Village Chapel Hill, N.C.

PN# 3770 FIELD

CASCADE® LI-C2462

	sample description	Vol. of Spl in mL	Vol of ether for sep	Vol. of ether + chloroform used for wash	wt of Empty Beaker	wt #1 Beaker + Residue	wt #2 Beaker + Residue
54	A-1 org	490	43	300 mL	94.3108	94.3139	94.3142
55	A-1 Inorg	490	—	—	112.7914	112.7999	112.8004
56	A-2 Org.	200	17	150	102.0158	102.0190	102.0194
57	A-2 Inorg	200	—	—	106.2243	106.2254	106.2257
58	A-3 Org	460	40	300	110.5805	110.5853	110.5858
59	A-3 Inorg.	460	—	—	109.2437	109.2472	109.2477
60	A-4 Org	185	17	300	109.9353	109.9394	109.9398
61	A-4 Inorg	185	—	—	100.8854	100.8948	100.8852
62	A-5 Org.	450	40	300	109.0642	109.0669	109.0674
63	A-5 Inorg.	450	—	—	105.8086	105.8104	105.8109
64	A-6 Org.	180	16	150	106.4669	106.4685	106.4689
65	A-6 Inorg.	180	—	—	108.6626	108.6630	108.6634
66	B-1 Org.	210	18	150	108.9640	108.9720	108.9725
67	B-1 Inorg.	210	—	—	109.9729	109.9759	109.9763
68	2-B org.	600	52	300	110.4252	110.4422	110.4427
69	2-B Inorg.	600	—	—	104.7974	104.8087	104.8083
70	4-B org.	225	20	150	109.3941	108.3949	108.3945
71	4 B Inorg.	225	—	—	109.2500	109.2520	109.2524
72	B.4 Org	230	20	150	108.5192	108.5278	108.5280
73	B4 Inorg	230	—	—	104.6765	104.6774	104.6779
74	5-B Org	630	54	300	106.0952	106.1138	106.1138
75	5-B Inorg	630	—	—	110.8600	110.8679	110.8677
76	B-6 Org.	310	27	150	105.3229	105.3309	105.3312
77	B-6 Inorg	310	—	—	105.2924	105.2978	105.2983
78	B-7 Org.	585	50	300	105.6587	105.6751	105.6747
79	B-7 Inorg.	585	—	—	108.0629	108.0691	108.0692
80	C-1 Org	260	23	150	111.9418	111.9817	111.9814
81	C-1 Inorg.	260	—	—	106.4605	106.4625	106.4629
82	C-2 Org.	200	17	150	109.5819	109.5856	109.5858
83	C-2 Inorg.	200	—	—	109.9630	109.9634	109.9636
84	C-3 Org.	660	57	300	112.2000	112.2064	112.2067
85	C-3 Inorg.	660	—	—	107.9382	107.9504	107.9504
86	C-4 Org.	200	17	150	110.5031	110.5080	110.5080
87	C-4 Inorg	200	—	—	112.0671	112.0674	112.0676
88	C-5 Org.	475	41	300	113.2440	113.2543	113.2548
89	C-5 Inorg	475	—	—	111.6849	111.6887	111.6887
90	C-6 Org.	525	45	300	108.1929	108.2066	108.2061
91	C-6 Inorg	525	—	—	104.3172	104.3250	104.3258

[redacted]	Average wt of Bank + Residue	Residue	Blank	Net Residue	Net residue mg		
[redacted]3142	94.31405	0.00325	0.0030	0.00025	0.25		
[redacted]044F	112.8002	0.0088	—	0.0088	8.8		
[redacted]0192	112.0192	0.0034	0.0015	0.0019	1.9		
[redacted]2257	106.2256	0.0013	—	0.0013	1.3		
[redacted]5758	110.5856	0.0051	0.0030	0.0021	2.1		
[redacted]2477	109.2475	0.0038	—	0.0038	3.8		
[redacted]9398	109.9396	0.0043	0.0030	0.0013	1.3		
[redacted]8853	110.8850	—	—	Zero	0		
[redacted]0674	109.0672	0.0030	0.0030	Zero	0		
[redacted]8109	105.8107	0.0021	—	0.0021	2.1		
[redacted].4687	106.4687	0.0018	0.0015	0.0003	0.3		
[redacted]8.6634	108.6632	0.0006	—	0.0006	0.6		
[redacted]9725	108.9723	0.0083	0.0015	0.0068	6.8		
[redacted].9763	109.9761	0.0032	—	0.0032	3.2		
[redacted]4427	110.4425	0.0173	0.0030	0.0133	13.3		
[redacted]8083	104.8085	0.0111	—	0.0111	11.1		
[redacted]8.3945	108.3947	0.0106	0.0015	0.0091	9.1		
[redacted]2524	109.2522	0.0022	—	0.0022	2.2		
[redacted]8.5280	108.5279	0.0087	0.0015	0.0072	7.2		
[redacted]6779	104.6776	0.0011	—	0.0011	1.1		
[redacted]6.1138	106.1138	0.0186	0.0030	0.0156	15.6		
[redacted]8677	110.8678	0.0078	—	0.0078	7.8		
[redacted]3312	105.3311	0.0082	0.0015	0.0067	6.7		
[redacted]2983	105.2981	0.0057	—	0.0057	5.7		
[redacted]6747	105.6749	0.0162	0.0030	0.0132	13.2		
[redacted]8.0692	108.0692	0.0063	—	0.0063	6.3		
[redacted]8814	111.8816	0.0398	0.0015	0.0383	38.3		
[redacted]6.4629	106.4627	0.0022	—	0.0022	2.2		
[redacted]5859	108.5857	0.0038	0.0030	0.0008	0.8		
[redacted]9636	109.8635	0.0005	—	0.0005	0.5		
[redacted]2067	112.2066	0.0066	0.0030	0.0033	3.3		
[redacted]8504	107.8504	0.0123	—	0.0123	12.3		
[redacted].5080	110.5080	0.0049	0.0015	0.0034	3.4		
[redacted]0676	112.0675	0.0004	—	0.0004	0.4		
[redacted]3.2548	113.2546	0.0099	0.0030	0.0069	6.9		
[redacted]6887	111.6887	0.0038	—	0.0038	3.8		
[redacted]0.68	109.2067	0.0088	0.0030	0.0058	5.8		
[redacted]4.3250	104.3250	0.0123	—	0.0123	12.3		

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#	SAMPLE DESCRIPTION	Vol of Sol'n in ML	Vol of Ether used to saturate	Vol of Ether and chloroform used for wash	wt of Graft + Beaker	wt # 1 Beaker + Residue	wt # 2 Beaker + Residue
92	D-1 Org.	482	42	300	91.8185	91.8327	91.837
93	D-1 Inorg.	482	—	—	97.0259	97.0312	97.037
94	D-2 Org	175	15	150	104.4846	104.4893	104.493
95	D-2 Inorg	175	—	—	104.4250	104.4270	104.426
96	D-3 Org.	482	42	300	103.9149	103.9214	103.921
97	D-3 Inorg	482	—	—	108.3023	109.3100	108.310
98	D-4 Org	194	17	150	108.6129	108.6187	108.619
99	D-4 Inorg	194	—	—	105.3771	105.3817	105.816
100	D-5 Org.	473	41	300	103.4735	103.4788	103.478
101	D-5 Inorg	473	—	—	109.8457	109.8487	109.849
102	D-6 org.	187	16	150	106.6631	106.6650	106.665
103	D-6 Inorg	187	—	—	109.0142	109.0181	109.0190
104	E-1 Org	430	37	300	96.8218	96.8310	96.8314
105	E-1 Inorg	430	—	—	109.8242	109.8277	109.8287
106	E-2 Org	195	17	150	102.0496	102.0528	102.052
107	E-2 Inorg	195	—	—	107.0705	107.0742	107.074
108	E-3 Org.	462	40	300	105.2870	105.2947	105.2950
109	E-3 Inorg	462	—	—	145.1069	145.1344	145.134
110	E-4 Org	170	14.5	150	101.4265	101.4346	101.4348
111	E-4 Inorg	170	—	—	102.0882	102.0879	102.0881
112	E-5 Org.	470	41	300	102.6943	102.6985	102.698
113	E-5 Inorg	470	—	—	99.7523	99.7654	99.765
114	E-6 Org	295	20	150	102.6463	102.6548	102.655
115	E-6 Inorg	295	—	—	100.1546	100.1647	100.1622
116	F-1 Org.	485	42	300	101.7822	101.7997	101.799
117	F-1 Inorg.	485	—	—	102.1601	102.1706	102.1710
118	F-2 Org	200	17	150	98.9530	98.9688	98.9610
119	F-2 Inorg	200	—	—	100.4046	100.4093	100.408
120	F-3 Org	315	28	150	102.6638	102.6704	102.670
121	F-3 Inorg	315	—	—	102.7613	102.7677	102.767
122	F-4 Org.	200	17	150	101.2729	101.2773	101.277
123	F-4 Inorg.	200	—	—	101.2238	101.2267	101.227
124	F-5 Org	475	41	300	101.9968	102.0048	102.026
125	F-5 Inorg.	475	—	—	103.2110	103.2230	103.223
126	F-6 Org	200	17	150	100.5123	100.5160	100.516
127	F-6 Inorg	200	—	—	102.3504	102.3530	102.353
128	G-1 Org	190	16	150	96.9760	96.9798	96.980
129	G-1 Inorg	190	—	—	96.2456	96.2568	96.256

	Average wt of Beaker + Residue	Residue	Blank	Net-gain Residue	mg		
	91.8327	0.0142	0.0030	0.0112	11.2		
	97.0313	0.0054	—	0.0054	5.4		
	104.4893	0.0047	0.0015	0.0032	3.2		
	104.4270	0.0020	—	0.0020	2.0		
	103.9216	0.0067	0.0030	0.0037	3.7		
	108.3100	0.0077	—	0.0077	7.7		
	108.6187	0.0058	0.0015	0.0043	4.3		
	105.3817	0.0046	—	0.0046	4.6		
	103.4788	0.0053	0.0030	0.0023	2.3		
	103.8490	0.00325	—	0.0033	3.3		
	106.6652	0.0021	0.0015	0.0006	0.6		
	109.0181	0.0034	—	0.0034	3.4		
	96.8312	0.0094	0.0030	0.0064	6.4		
	109.8280	0.0075	—	0.0038	3.8		
	102.0527	0.0031	0.0015	0.0016	1.6		
	107.0742	0.0037	—	0.0037	3.7		
	105.2949	0.0059	0.0030	0.0029	2.9		
	145.4347	0.3278	—	0.3278	32.78		
	101.4447	0.0182	0.0015	0.0167	16.7		
	102.0880	Zero	—	Zero	0		
	102.6985	0.0037	0.0030	0.0007	0.7		
	99.7655	0.0132	—	0.0132	13.2		
	102.6550	0.0087	0.0015	0.0072	7.2		
	100.1619	0.00735	—	0.0074	7.4		
	101.7989	0.01675	0.0030	0.01375	13.75		
	102.1708	0.0107	—	0.0107	10.7		
	98.9609	0.0079	0.0015	0.0064	6.4		
	100.4096	0.00495	—	0.0050	5.0		
	102.6702	0.0064	0.0015	0.0049	4.9		
	102.7690	0.0077	—	0.0077	7.7		
	101.2776	0.0047	0.0015	0.0032	3.2		
	101.2269	0.0031	—	0.0031	3.1		
	101.1022	0.0056	0.0030	0.0026	2.6		
	103.2228	0.0118	—	0.0118	11.8		
	100.5162	0.0049	0.0015	0.0034	3.4		
	102.3833	0.0033	—	0.0033	3.3		
	106.9990	0.0043	0.0015	0.0028	2.8		
	101.2503	0.0047	—	0.0047	4.7		

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Date	Sample Description	vol of spl in ml	vol. of Ether used for saturation	Vol. of Ether + chloroform used for wash	wt of Empty beaker	wt #1 Beaker + Residue	wt #2 Beaker + Residue
130	G-2 Org	200	17	150	101.6249	101.6285	101.6298
131	G-2 Inorg	200	—	—	102.7507	102.7536	102.7538
132	G-3 Org	195	17	150	101.2457	101.2510	101.2515
133	G-3 Inorg	195	—	—	104.5805	104.5862	104.5867
134	H-1 Org	195	17	150	101.5719	101.5820	101.5825
135	H-1 Inorg	195	—	—	100.9396	100.9489	100.9491
136	H-2 Org	210	18	150	100.1080	100.1179	100.1183
137	H-2 Inorg	210	—	—	99.2382	99.2495	99.2500
138	H-3 Org	200	17	150	98.0374	98.0485	98.0489
139	H-3 Inorg	200	—	—	103.3546	103.3655	103.3653
140	I-1 Org	220	19	150	101.7322	101.7409	101.7418
141	I-1 Inorg	220	—	—	100.1884	100.2000	100.2003
142	I-2 Org	190	17	150	101.1273	101.1306	101.1311
143	I-2 Inorg	190	—	—	102.0870	102.0894	102.0895
144	I-3 Org	190	17	150	101.4866	101.4896	101.4901
145	I-3 Inorg	190	—	—	102.0586	102.0632	102.0633
146	J-1 Org	195	17	150	99.7492	99.7547	99.7543
147	J-1 Inorg	195	—	—	101.1312	101.1377	101.1377
148	J-2 Org	200	19	150	98.4184	98.4258	98.4254
149	J-2 Inorg	200	—	—	102.0936	102.1012	102.1009
150	J-3 Org	200	19	150	111.2982	111.3040	111.3038
151	J-3 Inorg	200	—	—	98.3678	98.3750	98.3748

Average wt of Standard Solution	Residue	Blank	net of Residue	mg		
101.8296	0.0037	0.0015	0.0022	2.2		
100.7537	0.0030	—	0.0030	3.0		
101.2513	0.0056	0.0015	0.0041	4.1		
100.5965	0.0060	—	0.0060	6.0		
101.5823	0.0104	0.0015	0.0089	8.9		
100.8492	0.0106	—	0.0106	10.6		
100.1191	0.0101	0.0015	0.0086	8.6		
99.2498	0.0116	—	0.0116	11.6		
98.0487	0.0113	0.0015	0.0098	9.8		
103.3654	0.0108	—	0.0108	10.8		
101.7417	0.0090	0.0015	0.0075	7.5		
100.2000	0.0116	—	0.0116	11.6		
101.1309	0.0036	0.0015	0.0021	2.1		
102.0895	0.0025	—	0.0025	2.5		
101.4899	0.0039	0.0015	0.0024	2.4		
102.0633	0.0047	—	0.0047	4.7		
99.7545	0.0053	0.0015	0.0038	3.8		
101.1377	0.0065	—	0.0065	6.5		
98.4256	0.0072	0.0015	0.0057	5.7		
102.1011	0.0075	—	0.0075	7.5		
111.3039	0.0057	0.0015	0.0042	4.2		
98.3749	0.0071	—	0.0071	1.1		

APPENDIX D

SAMPLING AND ANALYTICAL PROCEDURES

DETERMINATION OF PARTICULATE EMISSIONS

EPA METHOD 5

The following method was used in this test program. Sampling procedures followed those described in Method 5 of the Federal Register.*

SAMPLING APPARATUS

The particulate sampling train used in these tests at the exit stack met design specifications established by the Federal EPA and was assembled by PEDCo personnel. It consisted of:

Nozzle - Stainless steel (316) with shart, tapered leading edge and accurately measured round opening.

Probe - Glass with a heating system capable of maintaining a minimum gas temperature of 250°F at the exit end during sampling.

Pitot Tube - Type S pitot tube that met all geometry standards was attached to probe to monitor stack gas velocity.

Filter Holder - Pyrex glass with heating system capable of maintaining a filter temperature of approximately 250°F.

Draft Gauge - An inclined manometer made by Dwyer with a readability of 0.01 inches H_2O in the 0-1 inch range was used.

Impingers - Four impingers connected in series with glass ball joints. The first, third, and fourth impingers were of the Greenburg-Smith design, modified by replacing the tip with a 1/2 inch I.D. glass tube extending to 1/2 inch from the bottom of the flask.

* Federal Register, Vol. 42, No. 160, August 18, 1977.

Metering System - Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2% accuracy, and related equipment, to maintain an isokinetic sampling rate and to determine sample volume. The dry gas meter is made by Rockwell and the fiber vane pump is made by Gast.

Barometer - Bourden tube type to measure atmospheric pressures to ±0.1 inches Hg.

SAMPLING PROCEDURE

After selecting the sampling site and the minimum number of traverse points, the stack pressure, temperature, moisture, and range of velocity head were measured according to procedures described in the Federal Register.*

Approximately 200 grams of silica gel were weighed in a sealed impinger prior to each test. Glass fiber filters** (3" diameter) were desiccated for at least 24 hours and weighed to the nearest 0.1 milligram on an analytical balance. One hundred ml of distilled water were placed in each of the first two impingers; the third impinger was initially empty; and the impinger containing the silica gel was placed next in series. The train was set up with the probe as shown in Figure D-1. The sampling train was leak checked at the sampling site prior to each test run by plugging the inlet to the nozzle and pulling a 15 inch Hg vacuum, and at the conclusion of the test by plugging the inlet to the nozzle and pulling a vacuum equal to the highest vacuum reached during the test run.

* Federal Register, Vol. 42, No. 160, August 18, 1977.
** Gelman Type A.

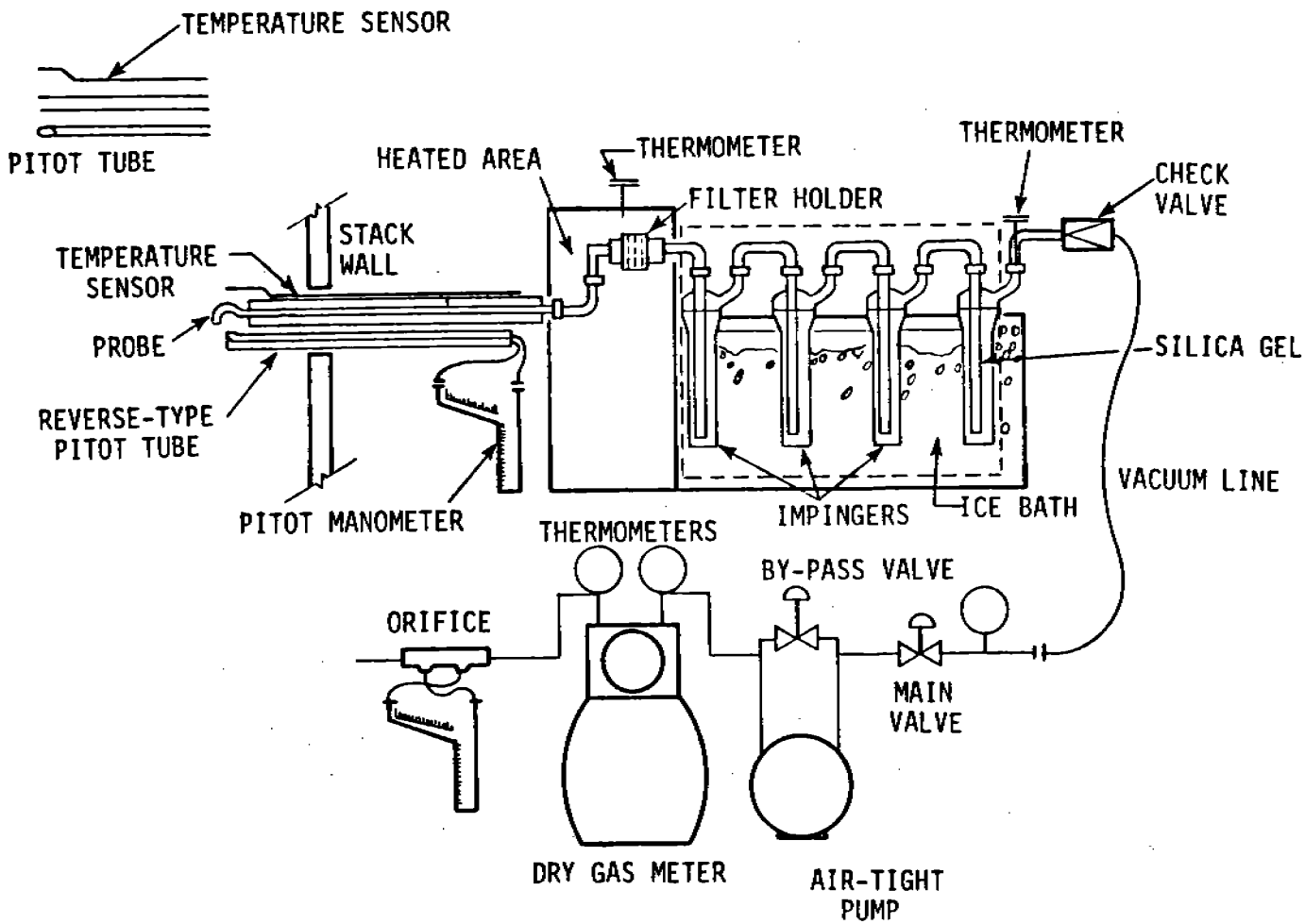

Figure D-1. EPA Method 5 particulate sampling train.

The pitot tube and lines were leak checked at the test site prior to each test run and at the conclusion of each test run. The check was made by blowing into the impact opening of the pitot tube until 3 or more inches of water were recorded on the manometer and then capping the impact opening and holding it for 15 seconds to assure it is leak free. The static pressure side of the pitot tube was leak checked using the same procedure, except suction was used to obtain the 3 in. H_2O manometer reading. Crushed ice was placed around the impingers to keep the temperature of the gases leaving the last impinger at 68°F or less.

During sampling, stack gas and sampling train data were recorded at each sampling point and when significant changes in stack flow conditions occurred. Isokinetic sampling rates were set throughout the sampling period with the aid of a nomograph. All sampling data were recorded on the Particulate Field Data Sheet.

SAMPLE RECOVERY PROCEDURE

The sampling train was moved carefully from the test site to the cleanup area. Samples of the acetone used in the sample recovery were taken for use as blanks. The volume of water from the first three impingers was measured. All data was recorded on the Sample Recovery and Integrity Data Sheet. Sample fractions were recovered as follows:

Container No. 1 - The filter was removed from its holder and placed in a petri dish and sealed.

Container No. 2 - The front half of the train, (probe, front half of filter holder, and cyclone bypass) was rinsed with acetone. Particulate was removed from the probe with the aid of a brush and acetone rinsing. All acetone rinsings were placed in a glass jar, sealed, labeled, and stored.

Container No. 3 - The water from the first three impingers was measured for its volume and placed in a glass sample jar, labeled, sealed, and stored. The sample exposed glassware was then rinsed with distilled water.

The silica gel from the fourth impinger was weighed and recorded on the Sample Recovery and Integrity Data Sheet with other pertinent data.

ANALYTICAL PROCEDURES

The following procedures were used and follow the methods described in the Federal Register.*

Container No. 1 - The filter and any loose particulate matter from this sample container were placed into a tared glass weighing dish, desiccated for 24 hours to a constant weight and weighed to the nearest 0.1 mg.

Container No. 2 - The acetone washings were transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure; desiccated to a constant weight; and weighed to the nearest 0.1 mg.

Container No. 3 - An ether - chloroform extract was made of all the back half water contents. The extractions are put in separate tared glass beakers. The remaining inorganic matter and water are put in a separate tared glass beaker, evaporated to dryness at 105°C, desiccated to a constant weight and weighed to the nearest 0.1 mg.

Container No. 4 - The acetone blank was transferred to a tared beaker, and evaporated to dryness at ambient temperature and pressure. The blank was then desiccated to a constant weight and weighed to the nearest 0.1 mg.

* Federal Register, Vol. 42, No. 160, August 18, 1977.

AEROTHERM SAMPLING TRAIN

The Aerotherm High Volume Stack Sampler used in these tests met all design specifications established by the Federal EPA. It consisted of:

Nozzle - Stainless steel (316) with sharp, tapered leading edge and accurately measured round opening.

Probe - Stainless steel with a fiberglass insulated strip heater capable of maintaining a minimum gas temperature of 250°F at the exit end during sampling.

Pitot Tube - Type S pitot tube that met all geometry standards was attached to the probe to monitor stack gas velocity.

Cyclone and Filter Holder - Stainless steel construction with the interior of the filter housing teflon-coated. The entire assembly was surrounded by an oven capable of maintaining a filter temperature of approximately 250°F.

Pressure Gauges - Two Magnehelic pressure gauges connected in parallel were used to measure the pressure differential of the pitot tube. A third Magnehelic gauge was used to measure the pressure drop across the orifice meter.

Impingers - Four impingers were connected in series with stainless steel tubing and swagelok fittings. These impingers were made of Lexan polycarbonate plastic equipped with demisters to eliminate water carryover.

Metering System - Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2% accuracy, and related equipment to maintain an isokinetic sampling rate and to determine sample volume. The dry gas meter is made by Rockwell and the carbon vane pump is made by Gast.

HIGH VOLUME SAMPLING PROCEDURE

The sampling procedure is primarily the same as with the Method 5 sampling train. Approximately 400 grams of silica gel were weighed prior to each test and placed in the fourth impinger. Glass fiber filters (142 MM diameter) were desiccated for at least 24 hours and weighed to the nearest 0.1 milligram on an analytical balance. The first two impingers contained 250 ml of distilled water each and the third impinger was initially empty. The train was set up with the probe as shown in Figure D-2. All other sampling procedures follow those previously described.

SAMPLE RECOVERY PROCEDURE

The sampling train was moved carefully from the test site to the cleanup area. The sample fractions were recovered as follows:

Container No. 1 - The volume of water from the first three impingers was measured, placed in a glass jar, sealed, and labeled.

Container No. 2 - Loose particulate and acetone washings from all sample-exposed surfaces prior to the filter were placed in a glass jar along with the filter, sealed, and labeled. Particulate was removed from the probe with the aid of a brush and acetone rinsing. The liquid level was marked after the container was sealed.

Container No. 3 - A minimum of 200 ml of acetone was taken for the blank analysis. The blank was obtained and treated in a similar manner as the acetone washing.

The silica gel from the fourth impinger was weighed and recorded on the Sample Recovery and Integrity Data Sheet with other pertinent data.

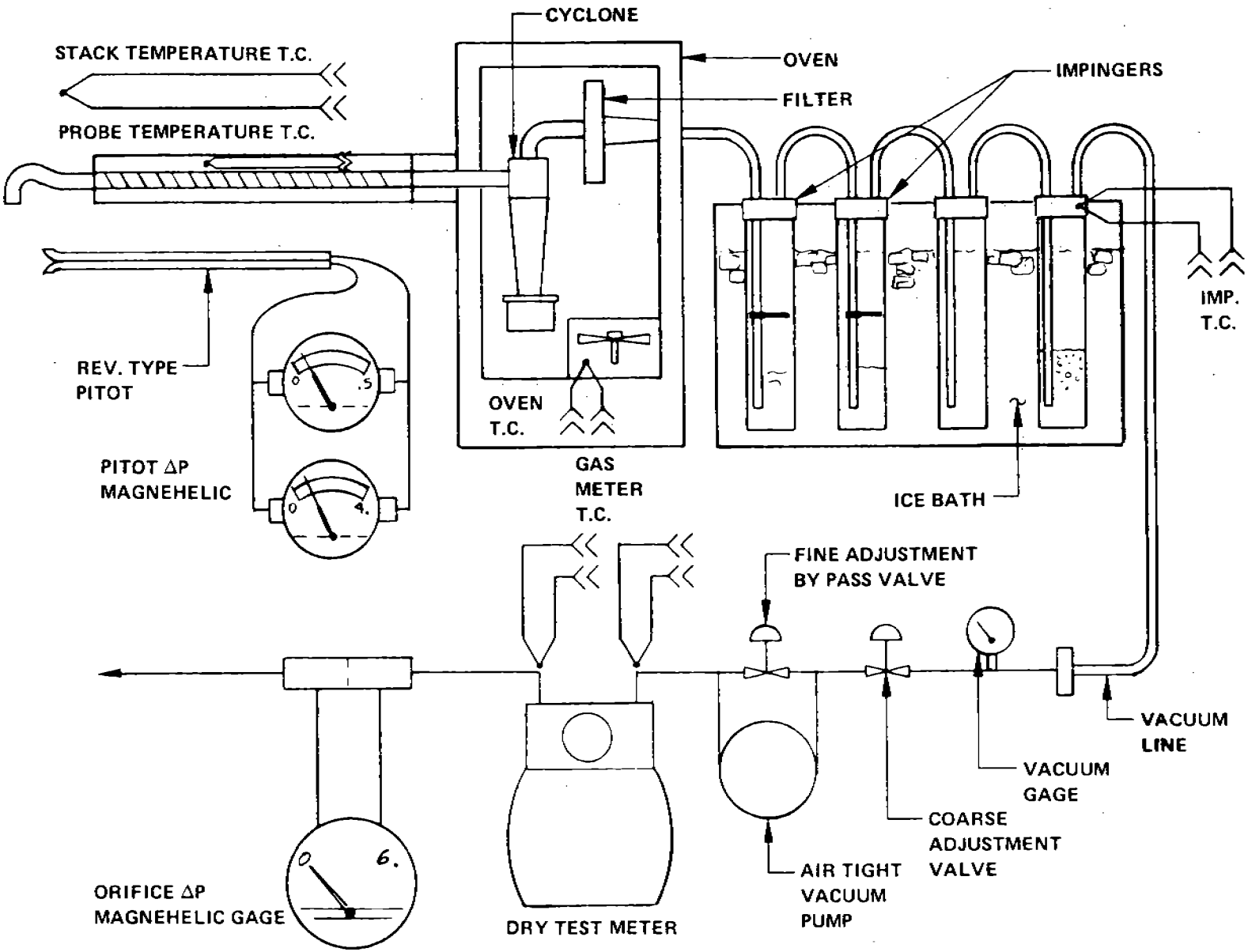

Figure D-2. Aerotherm high volume sampling train.

ANALYTICAL PROCEDURES

The following procedures were used and follow the methods described in the Federal Register*.

Container No. 1 - An ether - chloroform extract was made of all the back half water contents. The extractions are put in separate tared glass beakers. The remaining inorganic matter and water are put in a separate tared glass beaker, evaporated to dryness at 105°C, desiccated to a constant weight and weighed to the nearest 0.1 mg.

Container No. 2 - The acetone washings were transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure; desiccated to a constant weight; and weighed to the nearest 0.1 mg.

Container No. 3 - The acetone blank was transferred to a tared beaker, and evaporated to dryness at ambient temperature and pressure. The blank was then desiccated to a constant weight and weighed to the nearest 0.1 mg.

The term constant weight means a difference of no more than 0.5 mg or 1 percent of total weight less tare weight, whichever is greatest between two consecutive readings, with no less than 6 hours of desiccation between weighings. All analytical data are recorded on the Analytical Particulate Data sheet. Acetone blank data are recorded on the Acetone Blank Data sheet.

* Federal Register, Vol. 42, No. 160, August 18, 1977.

VELOCITY DETERMINATION WITH THE TELEDYNE HASTINGS-RAYDIST MASS FLOW METER

The velocity of sampling sites G, H, I and J were below the normal velocity rate usually measured by the type S pitot tube and inclined manometer. This problem was noted at the pretest meeting which was well in advance of the testing period. To obtain the required accuracy, a Teledyne Hastings-Raydist Mass Flow Meter was acquired for the velocity measurements. This unit is adaptable to the type S pitot. The pitot tube used during the calibration of this unit was also used during these tests. The calibration data sheet is shown in Figure D-3.

The flow meter was operated as described in the instruction manual which is attached to the back of this procedure. To enable the use of the sampling nomograph, a table was generated to allow a scale reading to be converted to a velocity pressure reading (Δp) as shown in Table D-1.

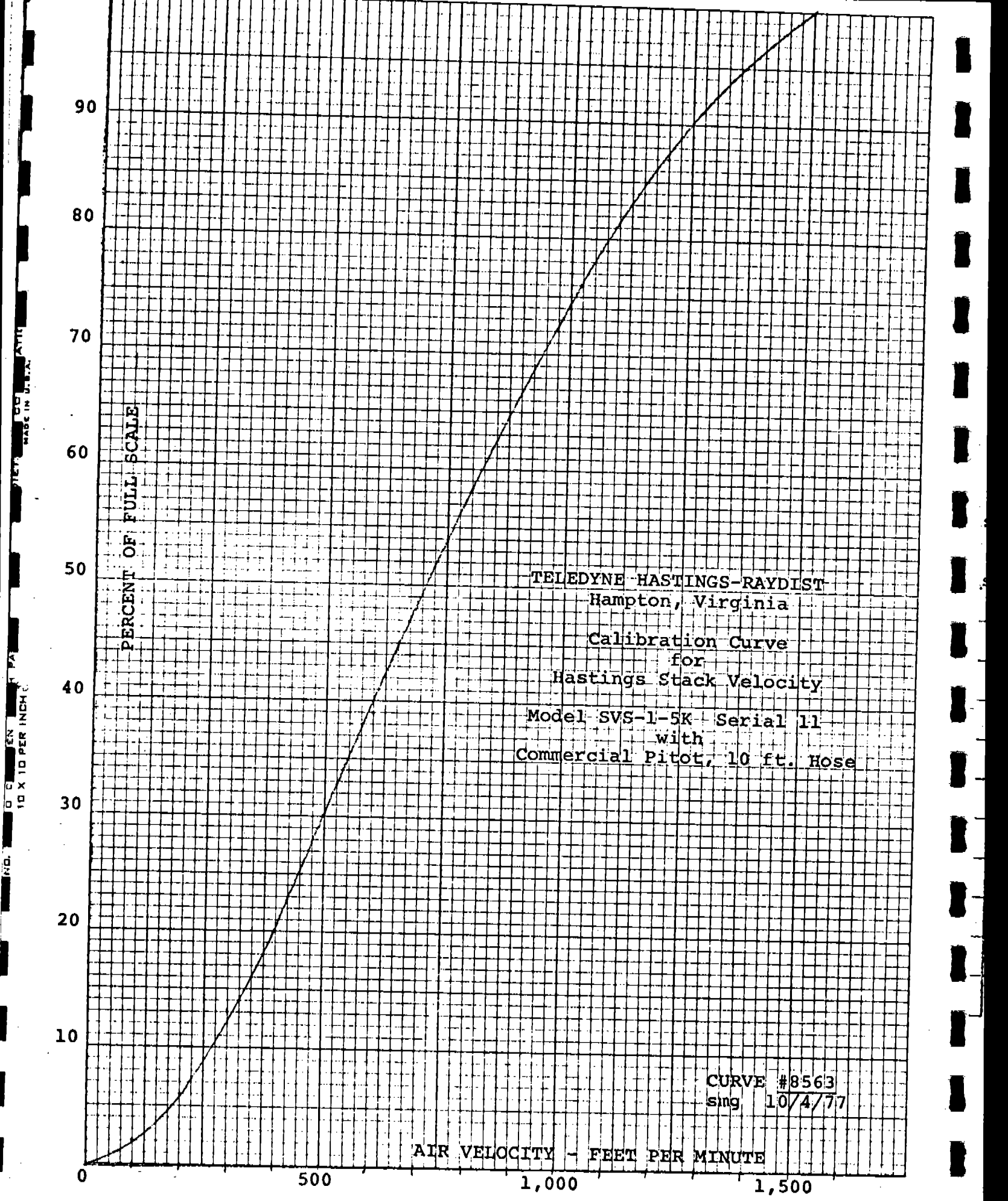
PERCENT OF FULL SCALE
90
80
70
60
50
40
30
20
10
0
500
1,000
1,500
AIR VELOCITY - FEET PER MINUTE
TELEDYNE HASTINGS-RAYDIST
Hampton, Virginia
Calibration Curve
for
Hastings Stack Velocity
Model SVS-1-5K Serial 11
with
Commercial Pitot, 10 ft. Hose
CURVE #8563
smg 10/4/77

Figure D-3.

Table D-1. CONVERSION CHART FOR HASTINGS-RAYDIST UNIT

Hastings-Raydist scale reading, %	Calculate velocity pressure, (Δp) in H_2O
0	0
3	.003
6	.006
9	.008
12	.010
15	.012
18	.013
21	.016
25	.020
30	.025
35	.030
40	.035
45	.044
50	.050
55	.057
60	.064
65	.071
70	.088
75	.100
80	.117
85	.133
90	.160
95	.184

INSTRUCTION MANUAL

HASTINGS MASS FLOWMETER

MODEL SVS-1-5K SERIAL 11

USING
HASTINGS MASS FLOW TRANSDUCER

MODEL _____ SERIAL _____

10 FT. Hose

Important Notice

CHECK CONTENTS of your shipment against the packing slip. Make sure all items are accounted for before destroying container and packing material, otherwise spare parts items or other accessories may be discarded with the packing material.

IN CASE OF DAMAGE advise carrier who delivered the shipment. File claim. Do not return damaged shipment for repair or replacement until you have a Claim Inspection Report.

TELEDYNE HASTINGS-RAYDIST
Hampton, Virginia, 23661, U.S.A.

1.0 INTRODUCTION

1.1 GENERAL - The Hastings Stack Gas Velocity Meter is the result of nearly two decades of experience in dealing with difficult-to-measure, corrosive, wet or dirty gases. A patented thermal principle with continuous purging is utilized so that line gas is prevented from entering the pitot tube, and plugging, fouling, condensation, and corrosion are no longer probelms.

1.2 DESCRIPTION - The Hastings Stack Gas Velocity Meter is a portable test set which can easily be carried to test sites for periodic checks, or can be left in operation for long-term monitoring of stack velocities. The instrument includes solid-state circuitry and a sensitive transducer for measuring the differential pressure across the pitot tube, which is related to velocity. An internal pump supplies a continuous purge of air through the pitot tube and into the line to prevent line gas from entering the instrument, and a connection is provided for using some other purge gas if air is not suitable. A manifold is also included for ease in balancing the purge. A rugged meter provides on-site read-out of velocity indications, and a 0-1 volt d-c output is available to connect to remote data logging devices, meters, recorders, etc.

A pitot tube is included with the instrument and can be interchanged with pitot tubes already in use simply by recalibrating the instrument for the new probe.

1.3 PRINCIPLE OF OPERATION - In the continuous purge mode, purge gas is injected into a pneumatic bridge arrangement formed by the velocity transducer, manifold and pitot tube. At zero line velocity the bridge is balanced so that no flow occurs through the velocity transducer and purge gas exhausts equally through both openings of the pitot tube.

As flow across the tip occurs, a differential pressure is developed, unbalancing the bridge and causing a small amount of purge gas to flow through the transducer. The transducer measures the flow which is related to the main gas flow at the tip of the pitot tube. Purge gas still exhausts through both openings, but at slightly unequal rates.

The purge gas continually exhausts into the main line, thereby preventing contamination in the main line pitot tube.

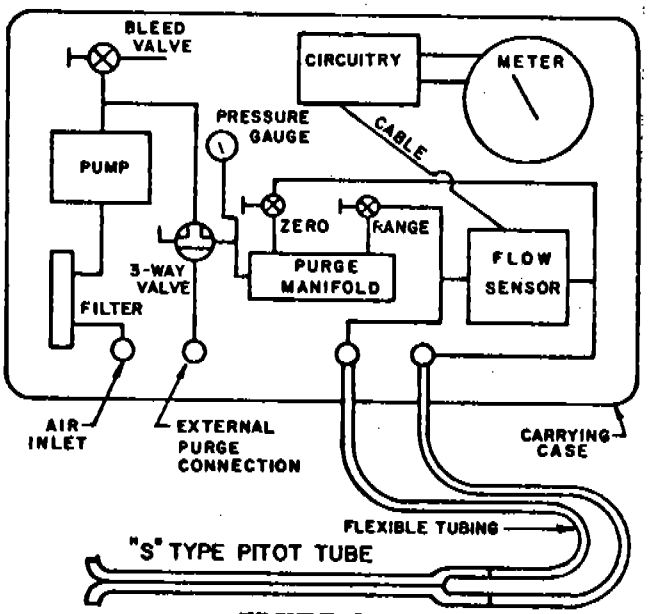

FIGURE 1

STACK GAS VELOCITY METER

BLOCK DIAGRAM

2.0 INSPECTION

Several preliminary checks should be performed to insure that the Hastings Stack Gas Velocity Meter has been received in good working order.

HASTINGS STACK GAS VELOCITY METER

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TELEDYNE HASTINGS-RAYDIST • HAMPTON, VIRGINIA 23661 U.S.A. PHONE (804) 723-6531

2.1 ELECTRICAL CONNECTIONS - Connect the power cord to the 3-pin connector on the Stack Gas Velocity Meter and to a 115 volt, 60 Hertz line. Set the "OFF-1-2" rotary switch to the "1" position and the unit will be ON. Initial transient output signals from the sensor will drive the indicating meter off-scale several times before it stabilizes. Allow 30 minutes for warm-up.

2.1.1 ELECTRICAL ZERO ADJUST - After warm-up adjust the "ZERO" potentiometer for a meter indication of zero. This adjustment should be made with the pitot tube disconnected from the "UPSTREAM" and "DOWNSTREAM" ports on the Stack Gas Velocity Meter.

2.1.2 OUTPUT SIGNAL - Connect the pitot tube to the "UPSTREAM" and "DOWNSTREAM" quick-connect couplings. Blow gently into the UPSTREAM opening at the tip of the pitot tube and the output signal should increase.

2.2 PUMP - Set the "OFF-1-2" rotary switch to the "2" position (circuit and pump) and the internal pump should start to operate. Adjust the "BLEED" valve and the pressure gauge indication should change. *NOTE: As the internal pump begins to operate a change in meter indication may occur due to the purge gas passing through the sensor. Such changes are normal. Refer to section 3.4 - PURGE, and section 3.5 "RANGE" and "ZERO" ADJUSTMENTS.*

3.0 PRELIMINARY OPERATION

It is recommended that the Hastings Stack Gas Velocity Meter be set-up and operated before field use to familiarize personnel with the operation of the Stack Gas Velocity Meter and with problems which may occur due to improper operating procedures.

3.1 ELECTRICAL CONNECTIONS - Connect the power cord to the three-pin connector on the panel of the Stack Gas Velocity Meter, and to a grounded 115 volt, 60 Hertz line. Turn the "OFF-1-2" rotary switch to the "1" position and allow the instrument to warm-up for 30 minutes. *NOTE: In the "1" position only the electrical circuitry is activated. In the "2" position the electrical circuitry and the internal pump are activated.*

3.2 ZERO ADJUSTMENT - After warm-up adjust the ZERO potentiometer for an output of 0.00 volts d-c (zero meter indication). The zero adjustment should be done with the pitot tube disconnected to prevent drafts from causing an output signal which would appear to be a change in zero.

3.3 PITOT TUBE - Connect the desired pitot tube to the "UPSTREAM" and "DOWNSTREAM" quick-connects by means of the twin-tubing provided.

3.4 PURGE CONNECTIONS

3.4.1 INTERNAL PUMP - No external connections are necessary if the internal pump is used since ambient air is pulled in through the "FILTER" connection and compressed for use as the purge source. Set the "PUMP-EXTERNAL" selector valve to the "PUMP" position, and set the "OFF-1-2" rotary switch to the "2" position (circuit and pump). Adjust the "BLEED" valve for an indication of 15 psig on the pressure gauge. *NOTE: The "BLEED" valve may require additional adjustment to maintain the 15 psig purge pressure when setting the "RANGE" and "ZERO" valves.*

3.4.2 EXTERNAL PURGE SOURCE - Connect an externally regulated, 15 psig purge source to the "PURGE" connection and set the "PUMP-EXTERNAL" selector valve to the "EXTERNAL" position. Set the "OFF-1-2" switch to the "1" position (pump off). Purge source must be clean and dry.

3.5 "RANGE" AND "ZERO" PURGE ADJUSTMENTS - Shield the tip of the pitot tube from drafts using a large cup or enclosure. Do not block the openings in the tip of the pitot tube or pinch the tubing and thereby cause a restriction to the flow of purge gas.

3.5.1 "RANGE" - With the desired purge method in operation and the "RANGE" and "ZERO" valves closed, disconnect the "UPSTREAM" quick-connect coupling. Open the "RANGE" valve until the meter indicates full-scale or the output at the binding posts is 1.00 volt d-c. This RANGE setting is not critical, but it does determine the maximum velocity for which the Stack Gas Velocity Meter can be used before line gas starts to enter the pitot tube and sensing element.

3.5.2 "ZERO" - Connect the "UPSTREAM" quick connect coupling and the meter indication and output at the binding posts should begin to decrease. Slowly adjust the "ZERO" valve until the meter indication is zero (0.00 volts d-c at binding posts). Opening the "ZERO" valve further may cause the output to become negative, then return to a FALSE ZERO and start increasing in a positive direction (see Figure 2). Blow *very gently* on the upstream opening in the probe tip. If a TRUE ZERO has been established the output will immediately increase. If a FALSE ZERO has been established, the output will become negative.

NOTE: It may not be possible to open the valve enough to cause a false zero.

3.6 LEAK CHECKING - Check all external connections for leaks by applying a soap solution to the connection and watching for a stream of bubbles. Check for leaks with the openings in the pitot tube tips taped closed.

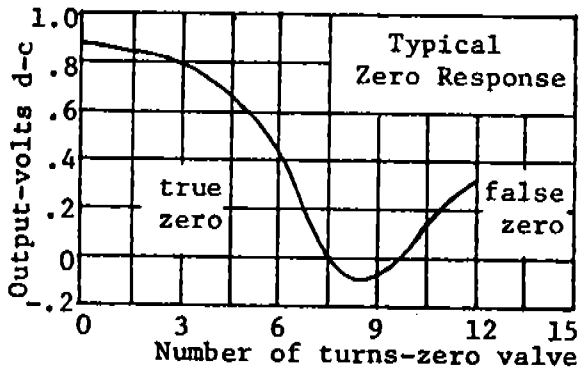


FIGURE 2-TRUE ZERO/FALSE ZERO

3.7 TYPICAL PROBLEMS - Although the unit is now completely operable it is suggested that the following problems be deliberately created so their effect on the output signal may be easily and quickly recognized if they should occur during installation or operation.

3.7.1 INSTALLING PITOT TUBE BACKWARDS - Blow into the upstream opening in the tip from a distance of about 6", first very gently and then vigorously. The output should immediately increase in a positive direction by a small amount and then to a much higher value (0.5 to 1.0 volts d-c depending on the velocity created). Repeat this procedure at the downstream opening in the tip. The output should immediately become negative (0-1 volt) and then become positive. If the pitot tube is installed backwards the output will always be low, indicating a lower velocity than actually exists in the stack.

3.7.2 FALSE ZERO - Open the ZERO valve slowly until the FALSE ZERO is reached (see sec. 3.5.2 and Figure 2). Blow very gently into the upstream opening and the output will become negative. Blow vigorously and the output will indicate a positive, but low value. The results are almost identical to those described in Section 3.7.1 for a backward pitot tube installation. Return to the TRUE ZERO setting.

3.7.3 PITOT TUBE CONNECTION HOSES - When making velocity measurements do not crimp or kink the pitot tube connection hoses or the velocity readings will be affected.

3.7.4 OVERFLOWS - If the Stack Gas Velocity Meter is exposed to a sudden large increase in the velocity of the main stream, such as zero to full scale, the output may momentarily increase to a value greater than 1.0 volt, but will drop to the correct value in less than one minute.

3.7.5 PURGE GAS PRESSURE VARIATIONS - Use the "BLEED" valve to vary the purge gas pressure (or an external regulator if using an external purge gas) and note that the output will change, indicating that the output signal will vary if the pressure is not kept constant.

3.7.6 CLOGGED FILTER - The internal pump pulls air in through a filter mounted on the front panel. This filter should be checked periodically and cleaned with a solvent if necessary. Remove the filter retaining nut and the sintered metal filter should pop-up for easy removal. Wash the filter in any suitable solvent and replace.

4.0 PREPARATION FOR USE

4.1 PITOT TUBE INSERTION - Since the pitot tube must be inserted through the stack into the gas stream, it is necessary to install suitable entrance fittings. Sometimes it is convenient to install a gate valve on test ports that are sampled frequently to eliminate the need to carry tools and fittings on subsequent trips to the test sites.

4.2 ELECTRICAL CONDUCTOR SIZE - When using the unit with long extension power cables be sure to use sufficiently heavy wire to prevent large voltage drops. The minimum allowable voltage at the instrument is 100 vac with the unit in operation. When the internal pump is operating the total power requirement is 165 watts.

4.3 ELECTRICAL SHIELDING - If the Stack Gas Velocity Meter is used on a semi-permanent or a permanent installation with a remote read-out the cable carrying the output signal should not be run in the same conduit with wires carrying high transient or high frequency currents such as those powering solenoid valves or motors. The cable carrying the 115 vac power required to operate the Stack Gas Velocity Meter should also be separated from the cable carrying the output signal. Shielded cable or conduit should be used for any long distance transmission to remote read-outs or other auxiliary equipment.

5.0 ACTUAL OPERATION IN STACK

After all of the preliminary checks and set-up procedures outlined in Sections 3.0 and 4.0 have been performed the Stack Gas Velocity Meter is ready for use.
NOTE: Anytime the pitot tube is inserted into a stack the purge pump or an external purge source must be "ON" to prevent fouling of the pitot tube and sensing element.

5.1 ALIGNING THE PROBE - Insert the pitot tube into the stack and align the tip so that the line gas approaches the upstream opening in the pitot tube tip.

(The upstream and downstream openings can be distinguished by observing the connection of the two-color tubing to the "UPSTREAM" and "DOWNSTREAM" ports on the Stack Gas Velocity Meter.) Slowly rotate the pitot tube 90°. Notice that there is no appreciable change for the first 15° and then the output starts dropping rapidly, almost reaching zero at 90° rotation. If the pitot tube becomes misaligned by more than 15°, the output signal will be low. See Figure 3.

When taking velocity measurements it may prove useful to attach the pitot tube to a length of metal rod or pipe to form a long "HANDLE" for inserting the pitot tube into the stack. The "HANDLE" should not extend to the tip of the pitot tube or it will cause a disturbance at the measuring point and affect readings. (See Figure 3.)

5.2 USE OF OTHER PITOT TUBES - Pitot tubes and connecting tubing other than those provided can be used but calibration corrections may be required. Contact the factory for additional information concerning the use of such pitot tubes and connecting tubing.

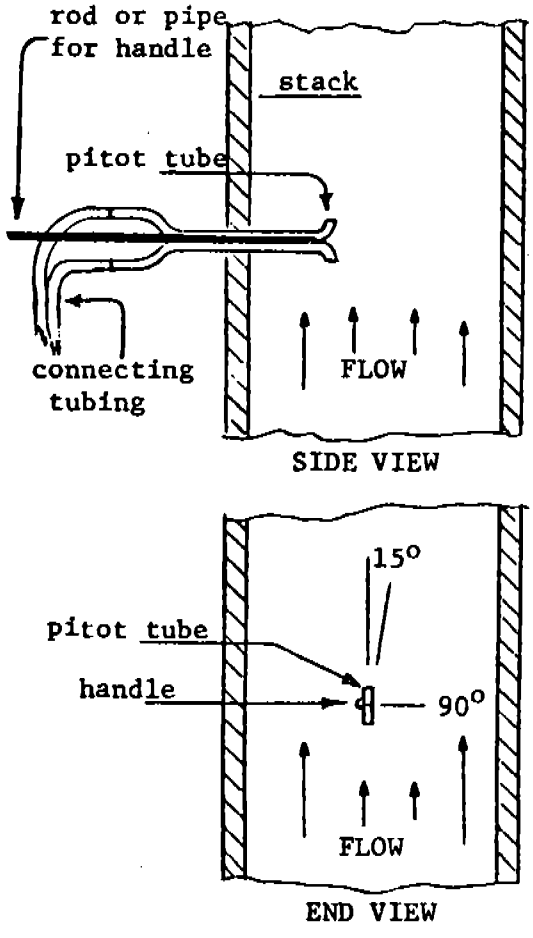


FIGURE 3 - PITOT TUBE ALIGNMENT

6.0 POSITIONING THE PROBE

6.1 VELOCITY PROFILE - The VOLUME FLOW through a line or stack is equal to the AREA X VELOCITY. However, the velocity at various points across the diameter of a stack is not a constant so it is necessary to determine the AVERAGE VELOCITY. Measuring the variation in velocity across the diameter of the stack is known as VELOCITY TRAVERSE and the plot of velocity versus diameter is known as VELOCITY PROFILE. The velocity variation depends on many factors, including Reynolds number, upstream and downstream disturbances, stack surface, etc. It is therefore most difficult to accurately predict the AVERAGE VELOCITY in any installation without making an actual velocity traverse. *

* Spink, L.K. Principles and Practice of Flow Meter Engineering 9th ed. Norwood Mass. Plimpton Press 1967. Pg. 50-53,

Owner, E. and Pankhurst, R.C., The Measurement of Air Flow 4th ed. London: Pergamon Press 1966. Pg. 117.

Normally, the probe is placed at the center of the stack and the indicated velocity is multiplied by a factor (K_1) to convert Center Velocity to Average Velocity. This factor is typically about .82 but should be empirically determined for each system by performing a velocity traverse. The probe can also be inserted in the stack to a position that makes K_1 unity.

6.2 AVERAGE VELOCITY - The average velocity is determined by dividing the area of the stack into concentric rings of equal area and measuring the velocity in the center of each ring on either side of the pipe. The AVERAGE VELOCITY is then the sum of the velocity readings taken divided by the number of readings. A typical velocity traverse would consist of ten velocity readings (see Figure 4). A second velocity traverse at a right angle to the first is always desirable.

EXAMPLE:

Find the average velocity and the K_1 factor, and plot the velocity profile for the installation described and tabulated in Figure 5.

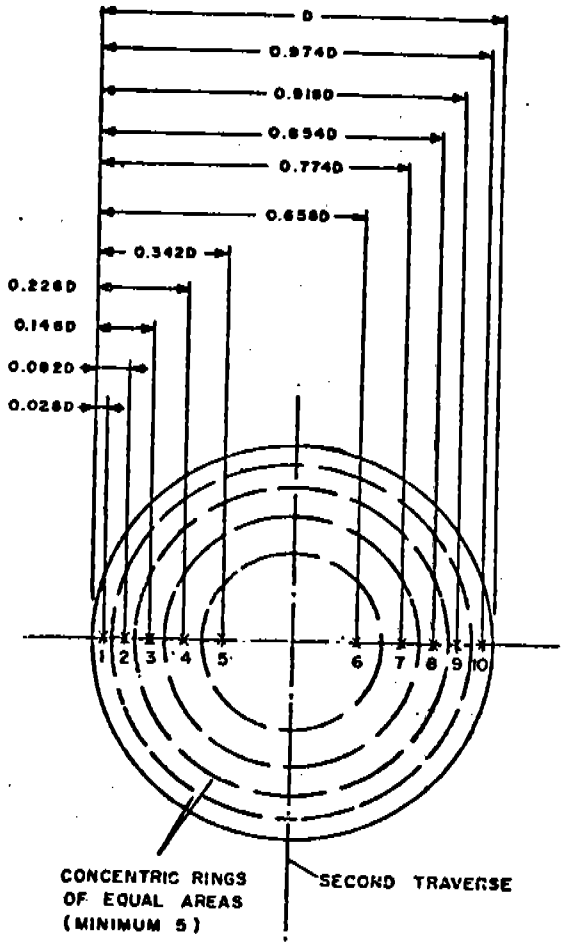


FIGURE 4 - TRAVERSING METHOD

Step 1: Determine the 10 Probe insertion depths using the diameter ratios from Fig. 4.

DEPTH = (Diameter Ratio) x (Diameter)

= (.026) x (36") = 0.94"

Step 2: Measure and record the Velocity at the 10 insertion depths previously determined (equal area points) across the diameter of the stack:

Step 3: Measure and record the Velocity at the center of the stack.

Step 4: Determine Normalized Velocities for each of the 10 readings in step 2:

$$\text{Normalized Velocity} = \frac{\text{Measured Velocity}}{\text{Center Velocity}} = \frac{810 \text{ fpm}}{1256 \text{ fpm}} = .65 \text{ etc.}$$

Step 5: Plot the Velocity Profile:

STACK DESIGNATION *EAST FLARE*

STACK DIAMETER *36"* DATE *1-20-72*

PROBE SER. NO. *186* BY *WCB*

DIAMETER RATIO	INSERTION DEPTH [1]	MEASURED VELOCITY [2]	NORMALIZED VELOCITY [4]
.026	.9"	810	.65
.082	3.0"	960	.77
.146	5.3"	1050	.84
.226	8.1"	1130	.90
.342	12.3"	1210	.97
.658	23.7"	1200	.96
.774	27.9"	1140	.91
.854	30.7"	1050	.84
.918	33.1"	975	.78
.974	35.1"	795	.64

CENTER VELOCITY *1256* FPM [3]

AVERAGE VELOCITY *1030* FPM [6]

K_1 FACTOR *.82* [7]

INSERTION DEPTH *4.3"* (K_1=1) [8]

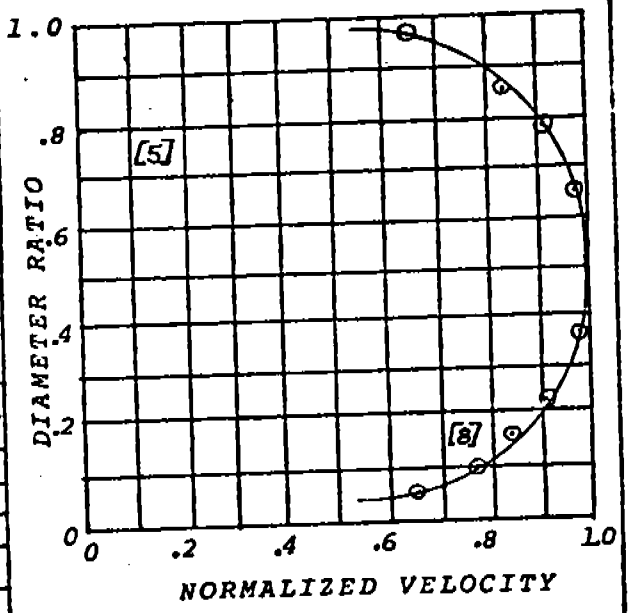


FIGURE 5 - VELOCITY PROFILE CURVE

Step 6: Determine the AVERAGE VELOCITY, $\overline{V}$

$$\overline{V} = \frac{\sum^{10} \text{Measured Velocity}}{10} = \frac{810 + 960 + \ldots\ldots + 795}{10} = 1032 \text{ FPM}$$

Step 7: Determine K_1 Factor:

$$K_1 = \frac{\text{Average Velocity}}{\text{Center Velocity}} = \frac{1030}{1256} = .82$$

Step 8: Determine INSERTION DEPTH for unity K_1 Factor (K_1 = 1):

a) Determine Normalized Insertion Depth for a Normalized Velocity equal to the K_1 factor determined in Step 7 (.82) using Velocity Profile curve.

b) Normalized Insertion Depth = .12

c) Insertion Depth = (.12) x (36") = 4.3"

6.3 INSERTION DEPTH FOR UNITY K_1 FACTOR - Observe caution in attempting to insert the probe to the point of Average Velocity (Unity K_1 Factor). It can be seen from the Velocity Profile curve that a small error in inserting the probe to the Average

Velocity point will result in large velocity errors, whereas a large error in inserting the probe to the center will not cause serious velocity errors. The center method is therefore preferred.

6.4 VELOCITY TRAVERSE OF STACK - Make a velocity traverse of the line or stack and determine the velocity profile and the K1 factor as illustrated in the example on the previous page. (See Page 13 for Profile Charts).

7.0 OPERATING INSTRUCTIONS

It is assumed that the unit is installed with the pitot tube tip in the center of the stack, and that the output signal is 0-1 volt d-c. It is then necessary to determine the relationship between the voltage signal and the AVERAGE VELOCITY.

7.1 VELOCITY EQUATION - The average velocity ($\bar{V}$) in the stack is a function of the velocity profile factor K_1, the gas density factor (K_2), and the indicating velocity (V_{ind}).

$$\bar{V} = (K_1) \times (K_2) \times (V_{ind}) \qquad \text{where}$$

$$K_1 = \frac{\text{AVERAGE VELOCITY}}{\text{CENTER VELOCITY}}$$

$$K_2 = \sqrt{\frac{\text{density of AIR @ STP conditions}}{\text{density of GAS @ ACTUAL conditions}}}$$

$$= \sqrt{\frac{.075 \text{ lbs/ft}^3}{(\gamma_{std} \text{ of gas}) \cdot \frac{528}{460+Tm} \cdot \frac{Pm}{29.92}}}$$

T_{std} = 68°F (528°R absolute) $\qquad$ T_m = gas temperature in °F

γ_{std} = density of gas at STP $\qquad$ P_m = gas pressure, inches of Hg

P_{std} = 29.92 inches of Hg

V_{ind} = Velocity (obtained from calibration curve)

EXAMPLE:

What is the average velocity in a stack flowing Propane at 200°F and 29.54 in. of Hg if the output signal for the Stack Gas Velocity Meter is .75 volts d-c? The density of Propane at STP is .117 lbs/ft^3. Assume the velocity profile factor K_1 has been determined to be .82.

$$K_2 = \sqrt{\frac{(.075)}{(.117) \cdot (528/660) \cdot (29.54/29.92)}} = \sqrt{\frac{.075}{.092}} = .90$$

V_{ind} @ 0.75 volts = 1000 fpm (from calibration curves)

$$V_{avg} = (K_1) \cdot (K_2) \cdot (V_{ind}) = (.82) \cdot (.90) \cdot (1000 \text{ fpm}) = 738 \text{ fpm}$$

7.2 VOLUME FLOW AND MASS FLOW - Normally the flow indication is desired in Volume Flow at actual flowing conditions (Q_{act}), Volume Flow referred to standard conditions (Q_{std}), or Mass Flow (M).

a) $Q_{act} = (V_{avg}) \times (AREA)$

b) $Q_{std} = (Q_{act}) \times \frac{528}{460 + Tm} \times \frac{Pm}{29.92}$

c) $M = (Q_{std}) \cdot (\gamma_{std})$ or $(Q_{act}) \cdot (\gamma_{act})$

EXAMPLE:

What is the Actual Volume Flow, Standard Volume Flow, and the Mass Flow in the previous example, if the stack diameter is 36" ID?

a) $Q_{act} = (738 \text{ fpm}) \cdot (7.07 \text{ ft}^2) = 5218 \text{ CFM}$

b) $Q_{std} = (5218 \text{ cfm}) \times \frac{528}{660} \times \frac{29.54}{29.92} = 4121 \text{ SCFM}$

c) $M = (4121 \text{ scfm}) \quad (.117 \text{ lbs/ft}^3) = 482 \text{ lbs/min}$ or

$M = (5218 \text{ cfm}) \quad (.0924 \text{ lbs/ft}) = 482 \text{ lbs/min}$

7.3 GAS DENSITY - It is necessary to know the DENSITY of the gas in the stack to calculate the actual velocity. If gas mixtures are present a densitometer can be used to obtain the actual density. In practice the density of a gas mixture is usually estimated from knowledge of the expected composition of the mixture. Since the density correction for the mixture appears under the radical sign in the velocity equation, the uncertainty in velocity is always less than the uncertainty in density.

EXAMPLE: If the density of a gas mixture is estimated to be .100 lbs/ft^3 ±10% what is the uncertainty in velocity? Assume $K_1 = .82$ and $V_{ind} = 1000$ fpm.

γ_{mix} (-10%) = .090 lbs/ft^3 $\quad V_{avg}$ (-10%) = (.82) $(\sqrt{.075/.090})$ (1000) = 749

γ_{mix} = .100 lbs/ft^3 $\quad V_{avg}$ = (.82) $(\sqrt{.075/.100})$ (1000) = 710

γ_{mix} (+10%) = .110 lbs/ft^3 $\quad V_{avg}$ (+10%)= (.82) $(\sqrt{.075/.110})$ (1000) = 677

The uncertainty in velocity due to the ±10% uncertainty in the density of the gas mixture is only ±30 to 40 fpm or approximately ±5%.

8.0 PURGE GAS

The Hastings Stack Gas Velocity Meter is calibrated with an air purge supplied by the internal pump. While air is usually the most convenient and economical gas to use, it is possible to use other gases. Nitrogen can be used instead of air with no change in calibration. Gases such as Methane, Propane, or Natural

Gas may also be used but the original air calibration curve is no longer applicable. although it is not possible to multiply the air purge curve by a constant factor to obtain the purge curve for some other gas, Figure 6 shows several typical calibration curves for purge gases other than air. Changing the purge gas only changes the relationship between the output voltage and the indicated velocity, so calculation of factors K_1 and K_2 is unaffected. Consult the factory for additional information on purge gases.

9.0 ACCURACY

The calibrated accuracy of the Hastings Stack Gas Velocity Meter is ±2%, but overall accuracy is determined by the combined parameters of the total system, such as zero stability, the accuracy of the readout, ambient temperature changes, velocity profile, probe alignment, density estimates, etc.

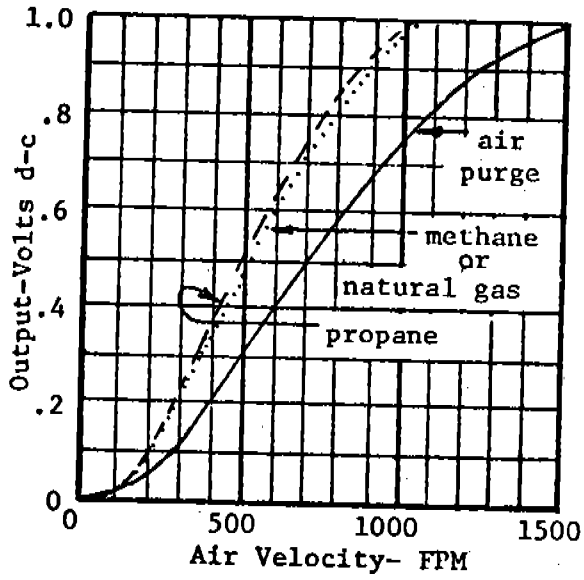


FIGURE 6 - PURGE GASES

9.1 ACCURACY OF PROBE - The accuracy of the probe calibration is ±2% of full scale (0.02 volts). Since the velocity vs voltage curve is non-linear, the tolerance must be determined for each segment of the curve. For example, ±.02 volts represents a velocity tolerance of ±50 fpm at 250 fpm (.05 volts) but represents ±20 fpm at 825 fpm (.50 volts).

9.2 ZERO SHIFTS - The high sensitivity of the probe at low velocities tends to accentuate small zero drifts. A ±5% shift in zero results in less than ±2% error for velocities above 1000 fpm, assuming the shift was caused by purge imbalance and not by electrical components.

9.3 READOUT - Typical panel or test meters used to read the 0-1 volt output signal are accurate to 1 to 2% of F.S. High quality recorders or digital voltmeters are accurate to about 0.5%. Devices used to convert the 0-1 volt output to either a current or pneumatic signal also contribute some error.

9.4 AMBIENT TEMPERATURE - The Stack Gas Velocity Meter will operate satisfactorily at ambient temperatures of -30°F to +120°F but the electrical zero will shift approximately 5% over this range. However, if the zero is adjusted periodically the shift is generally eliminated.

9.5 VELOCITY PROFILE - The velocity profile factor is typically .82 for fully developed turbulent flow in a long, straight, relatively smooth pipe. Such ideal conditions rarely exist in typical stacks so the velocity profile factor could vary from .50 to .95 and must be determined accurately for each installation. Flat or skewed profiles are not uncommon and it is also possible for the profile to change somewhat with flowrate. It would therefore be advisable to traverse the stack at typical high and low velocities.

9.6 INSERTION DEPTH - The placement of the pitot tube in the stack is important. It can be seen from the typical profile in Figure 5 that a positional error of ±1" at the center of a 36" stack would cause a velocity error of approximately 0.5%. However, at the Average Velocity location the 1" positional error would cause a velocity error of about ±5%.

9.7 DENSITY FACTORS - There will be some error in determining the density of the gas. If the density is simply estimated this error could be appreciable. However, the resulting velocity error is much less than the original density error.

9.8 OVERALL ACCURACY - It is impossible to put an accuracy figure on stacks in general. However, with care a good installation should be able to achieve accuracies within ±5%.

10.0 TROUBLESHOOTING

10.1 TROUBLESHOOTING GUIDE

TROUBLE	CHECK	REFERENCE
No output signal	Input power	Section 2.1, 4.2
	Readout	Section 1.2
	Wiring	Section 4.2, 4.3
	Insufficient velocity for indication	Calibration Curve
Velocity indication HIGH	Velocity calculations	Section 6.0, 7.0
	Accuracy	Section 9.0
	Position of Pitot Tube	Section 6.0
	Velocity profile	Section 6.1, 9.5
	Not using air for purge gas	Section 3.4.2, 8.0
	Leaks in purge system	Section 3.6
	Zero valve setting	Section 3.5.2
Velocity indication LOW	Same as for high indication, plus	
	pitot tube not aligned	Section 5.1
	False Zero	Section 3.7.2
Intermittent operation	Dirty or moist purge gas	Section 3.4.2
	Wiring	Section 4.2, 4.3
	Fouling of pitot tube	Section 10.5
	Dirty filter	Section 3.7.6
Unstable zero	Leaks in purge system	Section 3.6
	Unregulated purge	Section 3.7.5
	Dirty or moist purge gas	Section 3.4.2
	Electronic noise	Section 4.3
	Drafts in stack	Section 4.3

10.2 CALCULATIONS - When the calculated flow differs from the expected flow, re-examine all the terms used in the flow equation (sections 6 and 7), being sure that the values used are correct for the particular stack and conditions.

10.3 ESTIMATED ACCURACY - The accuracy of the flow obtained from the flow equation can best be shown by a hypothetical example.

EXAMPLE: Assume that the output signal from the Stack Gas Velocity Meter is .75 volts and density of the gas mixture is estimated to be .141 lbs/ft^3±5%. Also assume the stack diameter to be 36"±1" and K_1=.82±3% (Taken from velocity profile measurements). What is the worst possible error?

At .75 volts output the velocity indicated by the Stack Gas Velocity Meter would be 1000±40 fpm or about ±3%. The cross-sectional area of the stack is 7.07 ft^2±5½%. K_2 is calculated to be .73±2½%. The worst possible error is the sum of the individual errors, or 19%. A more realistic value for the existing error would be the RMS of the sum of the errors, or about 4½%.

If the calculated flow differs from the expected flow, then the expected flow should also be re-examined to be sure that the same density, area, etc., were used. If the calculated and expected flow rates still differ greatly, a general inspection of the probe installation and operation should be performed.

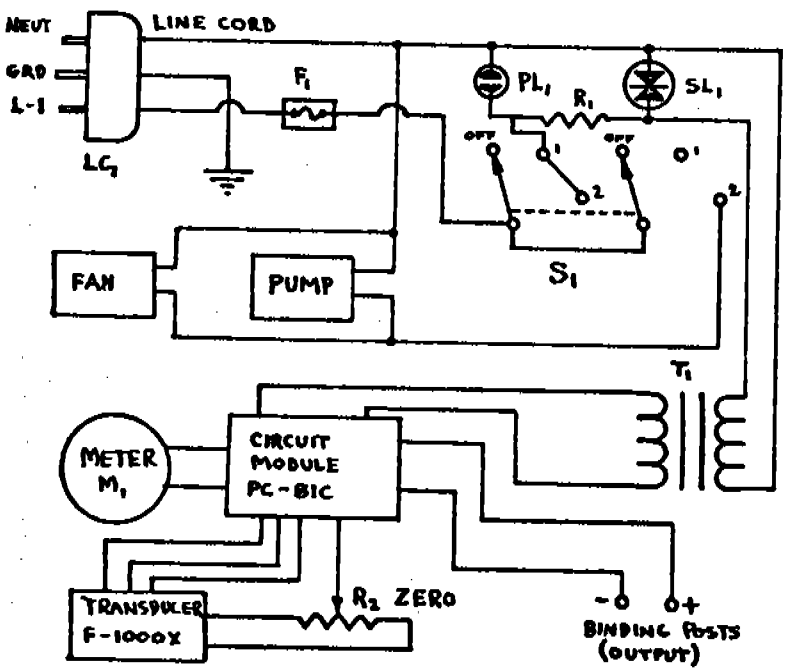
10.4 INSPECTION OF INSTALLATION - Check the following items, referring to the appropriate sections.

1. Alignment of the pitot tube in the stack.....Section 5.1
2. Insertion depth to obtain center velocity or average velocity....Section 6.0
3. Adjustment of purge pressure, zero valve, range valve.....Section 3.0
4. Connection of electrical cables, including inspection for loose or shorted connections.....Section 4.3
5. Line Voltage at Instrument.....Section 4.2

10.5 PITOT TUBE FOULING - The continuous purging of the Stack Gas Velocity Meter normally prevents the line gas from entering the pitot tube. In the case of very dirty gases a deposit may sometimes build up on the outside of the pitot tube tip and eventually close the openings in the tip.

Should fouling occur the pitot tube can be cleaned with steam or with a suitable solvent. In case of severe blockage a wire can be inserted into the openings in the tip.

10.6 ELECTRICAL SCHEMATIC:



SYMBOL	DESCRIPTION	PART NO.
LC_1	Line cord	15-17-9
F_1	Fuse(2 amp slowblow)	23-5-25B
PL_1	Pilot light assembly	22-2-54
R_1	Resistor 10Ω 1w	18-2-182
R_2	Zero pot. 10Ω	19-5-34
SL_1	Surge limiter	13-1-76
SW_1	3-position switch	20-5-32A
T_1	Transformer(115/24V)	12-2-72
M_1	0-1 VDC meter	24-1-432
(1)	F-1000X transducer	
(1)	PC-81C circuit module	
(1)	pump(115 vac)	30-1-113
(1)	fan(115 vac)	30-1-114
(1)	pressure gauge	28-13-60
	FOR 230 VAC	
EPL_1	add 18K ½w resistor	18-2-143
ESL_1	Surge Limiter (2300)	13-1-77
ET_1	Transformer (230v/24v)	12-2-73
(1)	Pump (230v/50 Hz)	30-1-115
(1)	Fan (230v/50 Hz)	30-1-116

STACK DESIGNATION _____

STACK DIAMETER _____ DATE _____

PROBE SER. NO. _____ BY _____

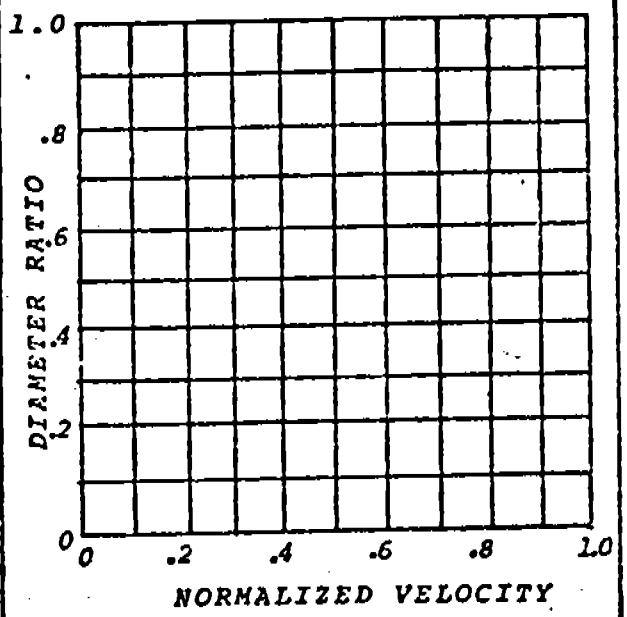
DIAMETER RATIO	INSERTION DEPTH [1]	MEASURED VELOCITY [2]	NORMALIZED VELOCITY [4]

CENTER VELOCITY _____ FPM [3]

AVERAGE VELOCITY _____ FPM [6]

K_1 FACTOR _____ [7]

INSERTION DEPTH _____ (K_1=1) [8]



STACK DESIGNATION _____

STACK DIAMETER _____ DATE _____

PROBE SER. NO. _____ BY _____

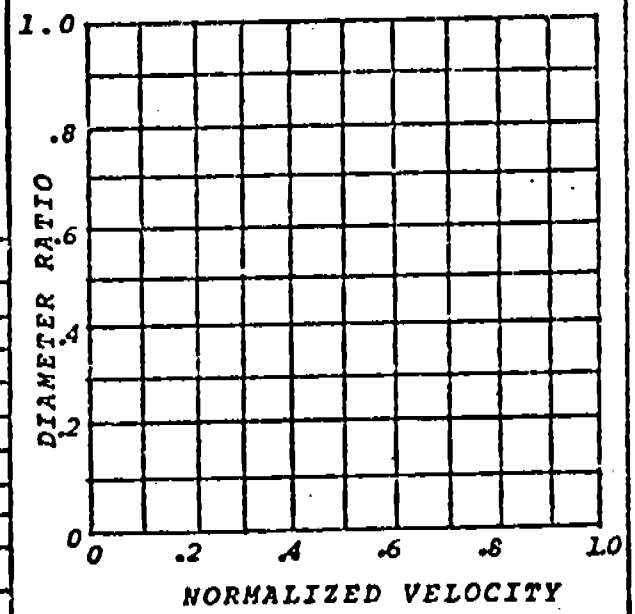
DIAMETER RATIO	INSERTION DEPTH [1]	MEASURED VELOCITY [2]	NORMALIZED VELOCITY [4]

CENTER VELOCITY _____ FPM [3]

AVERAGE VELOCITY _____ FPM [6]

K_1 FACTOR _____ [7]

INSERTION DEPTH _____ (K_1=1) [8]



AIR-METER CALIBRATION DATA SHEET

Customer EPA Administration Cable Order No. open

Indicator Model SVS-1-5K Serial 11

Probe Model 10 FT Telias Calibrated By SMC Date 12-4-17

Probe Serial _____ Temperature _____

Probe Serial _____ Barometric Pressure _____ mmHg

Probe Serial _____ Humidity _____ Density _____

Probe Serial _____ Correction Factor _____

Probe Serial _____

Switching Unit Model _____ Serial _____

Extension Cable _____

Bias (Lo-R) _____ Bias (Hi-R) _____ (With Probe Disconnected)

Probe Output at Zero Velocity: Lo-R _____ Hi-R _____
(Measured with meter disconnected on a high impedance millivolt indicator)

True RMS voltage across dummy load: Lo-R _____ Hi-R _____

Dummy load resistance _____ ohms Indicator padding resistance _____ ohms

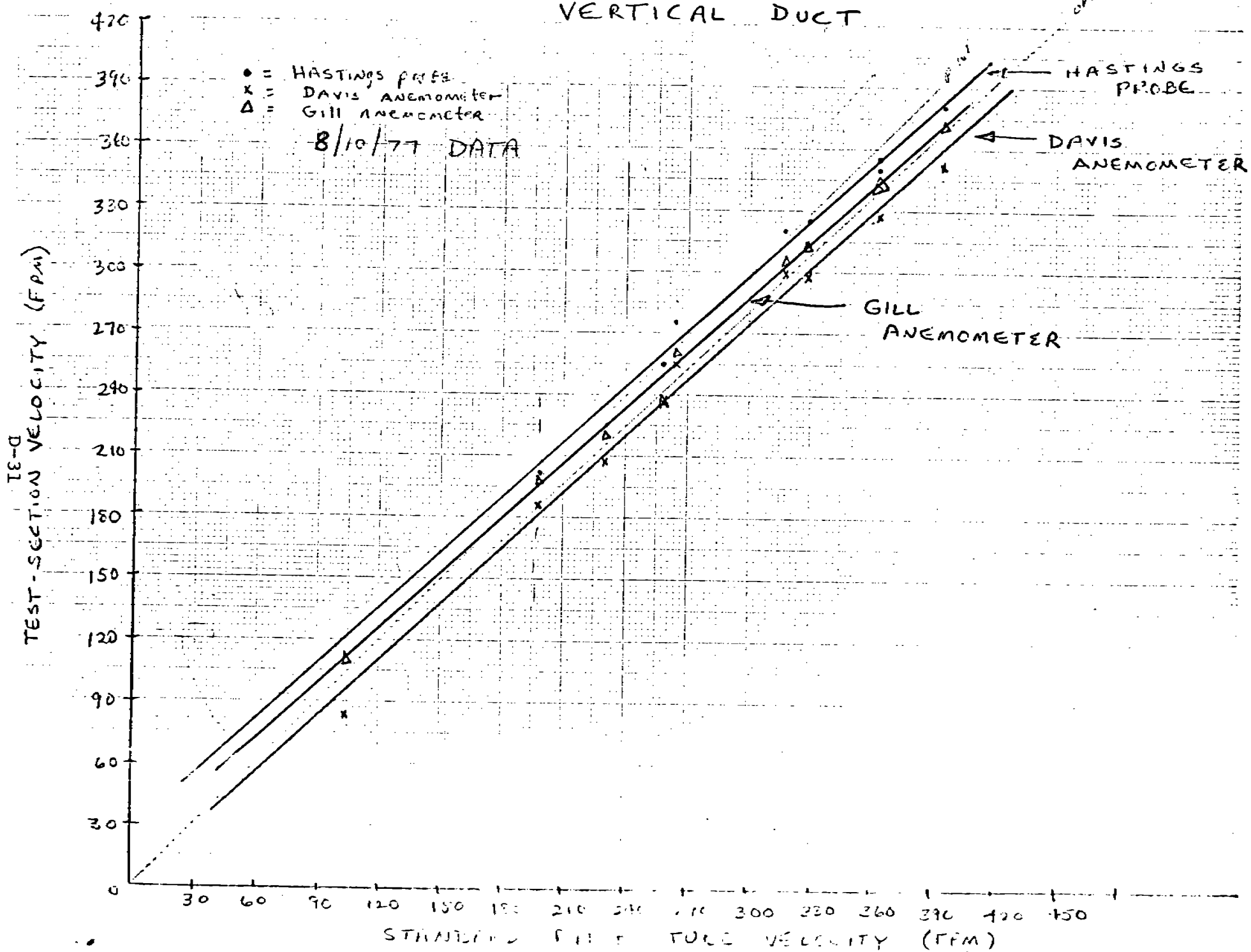
Meter Shunt _____ ohms Probe Shunt _____ ohms

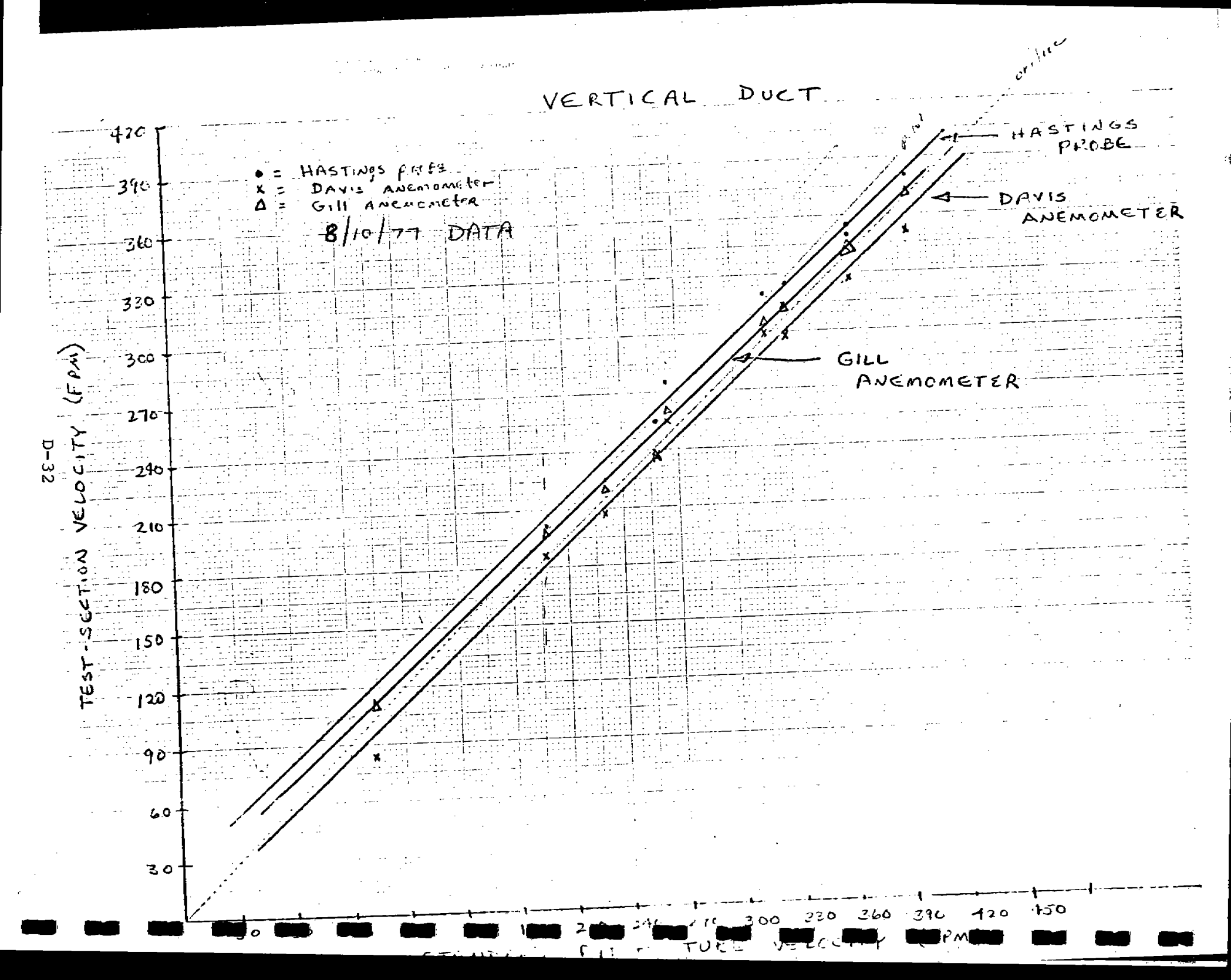
Probe Limiting Resistance _____ ohms DB-22 Limiting Resistance _____ ohms

REF	Volts	Meter												
4	1.57	157.0												
1	.87	87.0												
4	.74	74.0												
3	.59	58.0												
2	.39	39.0												
1	.20	20.0												
1	.20	20.0												
1	.13	13.0												
1	.06	6.0												
1	.02	2.0												

Modifications and Remarks:

Reference Indicator: The Honeywell Recorder as calibrated _____ with circular tunnel data used for velocities of 0-500 FPM and the Pitot Tube with airflow bench manometer for velocities from 500-8000 FPM.


VERTICAL DUCT
• = HASTINGS PROBE
x = DAVIS ANEMOMETER
Δ = GILL ANEMOMETER
8/10/77 DATA
HASTINGS PROBE
DAVIS ANEMOMETER
GILL ANEMOMETER
TEST-SECTION VELOCITY (FPM)
420
390
360
330
300
270
240
210
180
150
120
90
60
30
0
30 60 90 120 150 180 210 240 270 300 330 360 390 420 450
STANDARD PITOT TUBE VELOCITY (FPM)


VERTICAL DUCT
● = HASTINGS probe
x = DAVIS ANEMOMETER
Δ = GILL ANEMOMETER
8/10/77 DATA
HASTINGS PROBE
DAVIS ANEMOMETER
GILL ANEMOMETER
TEST-SECTION VELOCITY (FPM)
420
390
360
330
300
270
240
210
180
150
120
90
60
30
300
330
360
390
420
450
FPM

APPENDIX E

CALIBRATION PROCEDURES AND RESULTS

All of the equipment used was calibrated according to the procedures outlined in Maintenance, Calibration, and Operation of Isokinetic Source-Sampling Equipment.[1]

Nozzle Diameter

The nozzles were calibrated by making 3 separate measurements using different inside diameters and calculating the average. If a deviation of more than 0.002 inches was found the nozzle was either discarded or reamed out and remeasured. A micrometer was used for measuring. This calibration data is shown in Figure E-1.

Dry Gas Meter and Orifice Meter

Figure E-2 was the set-up used for the initial and post-test calibration. A wet test meter with a 2-cubic-feet-per-minute capacity and ±1 percent accuracy was used. The pump was run for approximately 15 minutes at an orifice manometer setting of 0.5 inch of water to heat up the pump and wet the interior surface of the wet test meter. The information on Figure E-3 (example calculation sheet) was gathered for the initial calibration and then, the ratio of accuracy of the wet test meter to the dry test meter, and the ΔH@ were calculated.

---

[1]Office of Air Programs Publication No. APTD-0576.

NOZZLE CALIBRATION

Date 11/14/77 Calibrated by Chuck Bruffey

Nozzle identification number	D_1, in.	D_2, in.	D_3, in.	ΔD, in.	D_{avg}
(A) High Vol. (1)	0.5001	0.4980	0.5007	0.002	0.5000
(B) - Meth. 5 (31)	0.2547	0.2544	0.2544	0.003	0.2545
(C) - Meth. 5 (22)	0.2550	0.2553	0.2549	0.004	0.2550
(D) - Aero. High Vol. (2)	0.3751	0.3748	0.3750	0.003	0.3750
(E) - Aero. (3)	0.626	0.625	0.6245	0.0025	0.625
(F) - Meth. 5 (27)	0.3113	0.3111	0.3112	0.002	0.3112
G - Meth. 5 (17)	0.6020	0.6016	0.6018	0.002	0.6018

where:

$D_{1,2,3,}$ = nozzle diameter measured on a different diameter, in.
Tolerance = measure within 0.001 in.

ΔD = maximum difference in any two measurements, in.
Tolerance = 0.004 in.

D_{avg} = average of D_1, D_2, and D_3.

Figure E-1. Nozzle calibration data.

POST TEST METER CALIBRATION CHECK

A post test meter calibration check was made on each EPA Method 5 meter box used during the tests to check its accuracy against its last calibration check. This post test calibration must be within ± 5 percent of the initial calibration. The initial calibration was performed as described in APTD-0576. The post test calibration was performed using the same method as the initial calibration. Three calibration runs were made using the average orifice setting obtained during the testing period and with the vacuum set at the average value obtained. After running the post calibration check, all three runs were within the ± 5 percent range allowed by the Federal Register.*

The initial and post-test meter box calibration data are presented in Figures E-4 and E-5, respectively.

Only the initial calibration data is available for the Aerotherm High Volume Sampler since this unit was rented for this project.

THERMOCOUPLE

The thermocouples used to measure the stack temperature were compared to a calibrated dial thermometer at the test site.

* Federal Register, Vol. 42, No. 160, August 18, 1977.

PEDCo-ENVIRONMENTAL
SUITE 13 · ATKINSON SQUARE
CINCINNATI, OHIO 45246
513/771-4330

CALIBRATION

DRY GAS METER & ORIFICE

DATE 8/10/77 METER BOX NO. RAC-1

BAROMETRIC PRESSURE, P_b = 29.48 in. Hg. DRY GAS METER NO. Rockwell

Orifice manometer setting ΔH in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Wet test meter t_w, °F	Dry gas meter Inlet t_{di}, °F	Dry gas meter Outlet t_{do}, °F	Dry gas meter Average t_d, °F	Time θ, min.	Y	ΔH@
0.5	5.5	920.200	73	87	80	86	14 11/20	1.012	1.86
		955.762	73	95	82				
1.0	5	957.700	73	101	92	97.25	9 17/20	1.012	1.86
		962.850	73	104	92				
1.5	10.5	946.800	73	97	91	96.5	16 0/60	1.016	1.85
		957.546	73	105	92				
2.0	10	926.000	73	90	84	91	12 57/60	1.018	1.87
		936.102	73	105	87				
3.0	10	936.400	73	100	87	95.75	10 57/60	1.017	1.98
		946.571	73	106	90				
4.0	10	910.000	73	77	77	81.25	9 35/60	1.017	2.06
		917.932	73	92	79				
						Average		1.015	1.91

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t_w + 460)}$	ΔH@: $\frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w} \right]^2$
0.5	0.0368	$\frac{5.5 \times 29.48 \times 546}{5.562 \times 29.5168 \times 533}$	$\frac{.0317 \times .5}{29.48 \times 546} \left[\frac{533 \times 14.18}{5.5} \right]^2$
1.0	0.0737	$\frac{5 \times 29.48 \times 557.25}{5.75 \times 29.5537 \times 533}$	$\frac{.0317 \times 1}{29.48 \times 557.25} \left[\frac{533 \times 9.28}{5} \right]^2$
1.5	0.110	$\frac{10.5 \times 29.48 \times 556.5}{10.746 \times 29.59 \times 533}$	$\frac{.0317 \times 1.5}{29.48 \times 556.5} \left[\frac{533 \times 16}{10.5} \right]^2$
2.0	0.147	$\frac{10 \times 29.48 \times 551}{10.102 \times 29.627 \times 533}$	$\frac{.0317 \times 2}{29.48 \times 551} \left[\frac{533 \times 12.98}{10} \right]^2$
3.0	0.221	$\frac{10 \times 29.48 \times 555.75}{10.17 \times 29.701 \times 533}$	$\frac{.0317 \times 3}{29.48 \times 555.75} \left[\frac{533 \times 10.95}{10} \right]^2$
4.0	0.294	$\frac{10 \times 29.48 \times 541.25}{9.882 \times 29.774 \times 533}$	$\frac{.0317 \times 4}{29.48 \times 541.25} \left[\frac{533 \times 9.58}{10} \right]^2$

Y = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

ΔH@ = Orifice of pressure differential that gives 0.75 cfm of air at 70°F and 29.92 inches of mercury, in. H_2O. Tolerance ~ +0.15.

Figure E-2. Initial calibration data.

PEDCo ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246
(513) 782-4700

CALIBRATION

DRY GAS METER & ORIFICE

DATE 11/10/77

METER BOX NO. RAC-3

BAROMETRIC PRESSURE, P_b = 29.34 in. Hg.

DRY GAS METER NO. _____

Orifice manometer setting ΔH in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Wet test meter t_w, °F	Dry gas meter Inlet t_{di}, °F	Dry gas meter Outlet t_{do}, °F	Dry gas meter Average t_d, °F	Time θ, min.	Y	ΔH@
0.5	5	342.858	72.5	83	73	82.75	12 39/60	1.02	1.83
		347.811	72.3	96	79				
1.0	5	358.984	72.4	106	88	98.5	9 16/60	1.01	1.88
		363.121	22.4	109	91				
1.5	10								
2.0	10	347.811	72.4	92	80	93	13 15/60	1.01	1.94
		358.984	72.4	112	88				
3.0	10	363.121	~~124~~	~~91~~ 109	91	104.5	11 3/60	1.02	1.92
		373.409	72.4	122	96				
4.0	10	373.416	72.4	122	96	109.75	9 18/60	1.00	1.91
		383.429	72.4	122	99				

Average 1.01 1.91

ΔH	ΔH / 13.6	Y = $\frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t_w + 460)}$	ΔH@ = $\frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w} \right]^2$
0.5	0.0368	$\frac{(5)(29.34)(82.75+460)}{(4.954)(29.34+.0368)(72.4+460}$	$\frac{.0317(.5)}{29.34(82.75+460)} \left[\frac{72.4+460(12.33)}{5} \right]^2$
1.0	0.0737	$\frac{5(29.34)(98.5+460)}{(5.137)(29.34+.0737)(72.4+46}$	$\frac{.0317(1)}{29.34(98.5+460)} \left[\frac{(72.4+460)(9.27)}{5} \right]^2$
1.5	0.110		
2.0	0.147	$\frac{(10)(29.34)(93+460)}{(10.167)(29.34+.147)(72.4+460)}$	$\frac{.0317(2)}{29.34(93+460)} \left[\frac{(72.4+460)(13.25)}{10} \right]^2$
3.0	0.221	$\frac{10(29.34)(104.5+460)}{(10.285)(29.34+.221)(72.4+460}$	$\frac{.0317(3)}{29.34(104.5+460)} \left[\frac{72.4+460(11.033)}{10} \right]^2$
4.0	0.294	$\frac{10(29.34)(109.75+460)}{(10.013)(29.34+.294)(72.4+46}$	$\frac{(.0313)(4)}{29.34(109.75+460} \left[\frac{72.4+460(9.22)}{10} \right]^2$

Y = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

ΔH@ = Orifice of pressure differential that gives 0.75 cfm of air at 70°F and 29.92 inches of mercury, in. H_2O. Tolerance — +0.15.

Figure E-3. Initial calibration data.

PEDCo ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246
(513) 782-4700

Test Nos. _____

Date 11/29/77 Meter Box No. RAC-1 Plant FRESNO (EPA Cotton Gin)

Barometric pressure, P_b = 29.85 in. Hg Dry gas meter No. _____ Pretest Y 1.006

Orifice manometer setting, ΔH, in H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test Meter t_w, °F	Temperature: Dry gas meter Inlet t_{di}, °F	Temperature: Dry gas meter Outlet t_{do}, °F	Temperature: Dry gas meter Average[a] t_d, °F	Time θ, min	Vacuum setting in Hg	Yi	Yi $\frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_w + 460)}$
1.0	10	93.520 / 103.637	69	77 / 90	69 / 75	78	18 33	5.0	1.003	(10)(29.85)(538) / (10.117)(29.92)(529)
3.0	10	103.931 / 114.129	69	84 / 97	75 / 79	85	11 07/60	5.0	1.003	(10)(29.85)(545) / (10.198)(30.07)(529)
5.0	10	114.440 / 124.647	69	95 / 101	79 / 82	89	8 42/60	5.0	1.006	(10)(29.85)(550) / (10.207)(30.23)(529)
									Y=	1.004

[a] If there is only one therometer on the dry gas meter record the temperature under t_d.

where:

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry test meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry test meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry test meter, °F.

t_d = Average temperature of the gas in the dry test meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in H_2O.

Y_i = Ratio of accuracy of wet test meter to dry test meter for each run.

Y = Average ratio of accuracy of wet test meter to dry test meter for all three runs. Tolerance = Pretest Y ±0.05 Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, minutes.

Figure E-4. Post test calibration data.

PEDCo ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246
(513) 782-4700

Date 11/24/77 Test Nos. _____

Meter Box No. RAC-3 Plant FRESNO (EPA COTTON GIN)

Barometric pressure, P_b = 29.1 in. Hg Dry gas meter No. _____ Pretest Y 1.01

Orifice manometer setting, ΔH, in H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test Meter t_w, °F	Temperature: Dry gas meter Inlet t_{di}, °F	Temperature: Dry gas meter Outlet t_{do}, °F	Temperature: Dry gas meter Average[a] t_d, °F	Time θ, min	Vacuum setting in Hg	Yi	Yi = $\frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_w + 460)}$
1.0	10.5	750.904 / 761.426	69	93 / 102	73 / 79	87	18 26 / 60	5	1.029	(10.5)(29.65)(547) / (10.522)(29.92)(529)
3.0	10	761.675 / 771.710	69	101 / 113	79 / 83	94	10 42 / 60	5	1.028	(10)(29.85)(534) / (10.11)(30.07)(529)
5.0	10	772.175 / 782.351	69	107 / 116	83 / 87	98	8 32 / 60	5	1.024	(10)(29.91)(538) / (10.176)(30.22)(529)
									Y=	1.027

[a] If there is only one therometer on the dry gas meter record the temperature under t_d.

where:

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry test meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry test meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry test meter, °F.

t_d = Average temperature of the gas in the dry test meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in H_2O.

Y_i = Ratio of accuracy of wet test meter to dry test meter for each run.

Y = Average ratio of accuracy of wet test meter to dry test meter for all three runs. Tolerance = Pretest Y ±0.05 Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, minutes.

Figure E-5. Post test calibration data.

PEDCo ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OHIO 45246
(513) 782-4700

Test Nos. _____

Date 11/29/77 Meter Box No. 12AC-4 Plant Fresno (EPA Cotton Gin)

Barometric pressure, P_b = 29.85 in. Hg Dry gas meter No. — Pretest Y 1.003

Orifice manometer setting, ΔH, in H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test Meter t_w, °F	Temperature: Dry gas meter Inlet t_{di}, °F	Temperature: Dry gas meter Outlet t_{do}, °F	Temperature: Dry gas meter Average[a] t_d, °F	Time θ, min	Vacuum setting in Hg	Yi	Yi = $\frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
1.0	10	9.217 / 19.326	69	88 / 101	70 / 75	84	17 44/60	5	1.015	(10)(29.85)(544) / (10.109)(29.92)(529)
3.0	10	19.759 / 29.967	69	85 / 106	76 / 80	87	10 53/60	5	1.006	(10)(29.85)(547) / (10.208)(30.02)(529)
5.0	10	30.430 / 40.714	69	105 / 113	80 / 83	95	8 29/60	5	1.008	(10)(29.85)(555) / (10.284)(30.22)(524)
									Y = 1.010	

[a] If there is only one therometer on the dry gas meter record the temperature under t_d.

where:

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry test meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry test meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry test meter, °F.

t_d = Average temperature of the gas in the dry test meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in H_2O.

Y_i = Ratio of accuracy of wet test meter to dry test meter for each run.

Y = Average ratio of accuracy of wet test meter to dry test meter for all three runs. Tolerance = Pretest Y ±0.05 Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, minutes.

Figure E-6. Post test calibration data.

APPENDIX F

PROJECT PARTICIPANTS

TEST PARTICIPANTS

W. DeWees - Process Engineer and Field Crew Leader

C. Bruffey - Field Engineer

J. Iverson - Technician

T. Eicher - Technician

R. Gerstle* - Engineering Supervisor

D. Yee - U.S. EPA, Region IX

* Not at field test site.