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

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

EMISSION TESTING AT KAISER STEEL'S FONTANA WORKS COKE OVEN BAGHOUSES C AND E

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SECTION 1
INTRODUCTION

In accordance with the Environmental Protection Agency's program for developing New Source Performance Standards, personnel from the TRW Environmental Engineering Division performed emission testing on the outlets of two coke oven baghouses at Kaiser Steel Corporation's Fontana works. The testing was done between April 14 and April 17, 1980.

The testing program was designed to provide additional information on the use of baghouses for controlling particulate emissions from coke oven battery stacks.

The emission testing was done at the outlets of the baghouses serving coke oven batteries C and E. The testing at Battery C consisted of three Method 5 particulate runs. The testing at Battery E consisted of three Method 5 particulate runs and three Method 17 in-stack filter particulate tests. The Method 5 and Method 17 tests were done simultaneously to provide comparison data on these two test methods. Each test consisted of a two hour sample and a composite gas sample for inorganic analysis.

This report presents the results of the sampling and analysis program. The following sections of the report will present a summary and discussion of the results, a process description, the description of the sampling location, and sampling and analytical procedures. The appendices contain field and laboratory data sheets, calibration data, and example calculations.

SECTION 2

SUMMARY AND DISCUSSION OF RESULTS

The Method 5 samples taken at Baghouse C and Baghouse E were analyzed for front half (filterable) and back half (condensable) particulates, and front half (aerosol) and back half (vapor phase) sulfates. Since the sampling methodology used does not separate sulfuric acid and sulfate salts, the results are expressed as SO_4. Tables 1 and 2 summarize the Method 5 tests at Baghouse C and Baghouse E, respectively.

Method 17 samples were taken simultaneously with the Method 5 test at Baghouse E. Since Method 17, the in-stack filtration method, specifies recovery of only the front half of the sampling train, data is given only for front half particulates and front half sulfates. The data from these tests are summarized in Table 3.

The results of all of the tests show a large proportion of the particulate catch to be sulfate. The percentage of the total particulate catch attributable to sulfate ranged from 33% to 67%. The proportion of sulfate to total particulate was higher at Baghouse E than at Baghouse C (58% at Baghouse E as opposed to 43% at Baghouse C).

A comparison of the filterable particulate catches for the simultaneous Method 5 and Method 17 tests at Baghouse E shows a much lower grain loading for the Method 17 tests. The average front half grain loading for the first two Method 5 tests was 0.052 gr/SCF, while the corresponding Method 17 tests had an average grain loading of only 0.01 gr/SCF. The Method 17 tests also had a much lower total sulfate grain loading: 0.006 gr/SCF average for the first two tests, (front 1/2 as apposed to 0.030 gr/SCF for the corresponding Method 5 tests. (front 1/2)

The difference in sulfate and particulate catch is probably due to the difference in filter temperature of the two methods. The Method 17 filter was in the stack at 400°F, while the Method 5 probe and filter were maintained at 250°F. The method 17 filter was above the acid dewpoint, while the Method 5 probe and filter cooled the gas and allowed condensation to occur.

The particulate filter for the third Method 5 test at Baghouse E was found to have been contaminated in shipment to the laboratory, consequently front half data is not available for that test. The back half particulate and sulfate data for the test is presented in Table 2.

During each test visible emissions observations were made of both baghouse stacks. These data are summarized in Tables 4 and 5 for Baghouse C and Baghouse E, respectively. Observations were done at 15 second intervals in six minute

During each test visible emissions observations were made of both baghouse stacks. These data are summarized in Tables 4 and 5 for Baghouse C and Baghouse E, respectively. Observations were done at 15 second intervals in six minute sets in accordance with EPA Method 9. Visible emissions from the two baghouses were intermittent and rarely exceeded 5% opacity.

TABLE 1 BATTERY C BAGHOUSE OUTLET METHOD 5 PARTICULATE RESULTS

RUN NUMBER	1		2		3		AVERAGE	
	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS
I DATE	4/15/80	4/15/80	4/16/80	4/16/80	4/17/80	4/17/80		
II STACK PARAMETERS								
Pst - Static Pressure, "Hg (mmHg)	-.68	-17.27	-.68	-17.27	-.68	-17.27	-.68	-17.27
Ps - Stack Gas Pressure, "Hg Absolute (mmHg)	28.37	720.60	28.43	722.12	28.45	722.63	28.42	721.87
% CO_2 - Volume % Dry	4.17	4.17	3.38	3.38	4.87	4.87	4.14	4.14
% O_2 - Volume % Dry	14.27	14.27	14.80	14.80	14.38	14.38	14.48	14.48
% CO - Volume % Dry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% N_2 - Volume % Dry	81.56	81.56	81.82	81.82	80.75	80.75	81.38	81.38
Ts - Average Stack Temperature °F (°C)	323	162	336	169	333	167	331	166
% H_2O - % Moisture in Stack Gas, By Volume	7.67	7.67	8.02	8.02	10.66	10.66	8.78	8.78
As - Stack Area, ft^2 (cm^2)	20.62	1.92	20.63	1.92	20.63	1.92	20.63	1.92
Md - Molecular Weight of Stack Gas, Dry Basis	29.24	29.24	29.13	29.13	29.35	29.35	29.24	29.24
Ms - Molecular Weight of Stack Gas, Wet Basis	28.38	28.38	28.24	28.24	28.14	28.14	28.25	28.25
Vs - Stack Gas Velocity, ft/sec, (m/sec)	55.21	16.83	51.41	15.67	54.64	16.66	53.75	16.39
Qa - Stack Gas Volumetric Flow at Stack Conditions, ACFM (Nm^3/min)	63340	1935.9	63636	1802.7	67635	1916.0	66537.0	1884.9
Qs - Stack Gas Volumetric Flow at Standard Conditions, DSCFM (Nm^3/min)	40353	1143.6	36909	1045.6	38261	1083.9	38507.7	1090.9
% EA - Percent Excess Air								
III TEST CONDITIONS								
Pb - Barometric Pressure, "Hg (mmHg)	29.05	737.87	29.11	739.39	29.13	739.90	29.10	739.06
Dn - Sampling Nozzle Diameter, in. (mm)	.185	4.70	.248	6.30	.248	6.30	.227	5.77
T - Sampling Time, min	120	120	120	120	120	120	120	120
Vm - Sample Volume, ACF (m^3)	47.673	1.35	77.900	2.21	78.659	2.23	68.077	1.93
Np - Net Sampling Points	48	48	48	48	48	48	48	48
Cp - Pitot Tube Coefficient	.85	.85	.85	.85	.85	.85	.85	.85
Tm - Average Meter Temperature °F (°C)	100	38	114	46	105	41	106	41
Pm - Average Orifice Pressure Drop, "H_2O (mmH_2O)	.45	11.43	1.31	33.27	1.46	37.08	1.07	27.26
Vlc - Condensate Collected (Impingers and Gel), mls	---	77	---	129	---	182	---	129
	.59	14.99	.51	13.21	.57	14.48	.56	14.22
IV TEST CALCULATIONS								
Vw - Condensed Water Vapor, SDCF (Nm^3)	3.62	.10	6.07	.17	8.57	.24	6.09	.17
Vm - Volume of Gas Sampled at Standard Conditions, DSCF (Nm^3)	43.674	1.24	69.920	1.98	71.802	2.03	61.799	1.75
%H_2O - Percent Moisture, By Volume	7.67	7.67	8.02	8.02	10.66	10.66	8.78	8.78
Ms - Molecular Weight of Stack Gas, Wet Basis	28.38	28.38	28.24	28.24	28.14	28.14	29.24	29.24
Vs - Stack Velocity, ft/sec (m/sec)	55.21	16.83	51.41	15.67	54.64	16.66	53.75	16.39
% I - Percent Isokinetic	99.73	99.73	97.14	97.14	96.23	96.23	97.70	97.70
V ANALYTICAL DATA								
A) Particulates Front Half	---	17.4	---	36.9	---	33.6	---	29.3
Probe (mg)	---	---	---	---	---	---	---	---
Cyclone (mg)	---	20.7	---	32.8	---	52.6	---	35.4
Filter (mg)	---	38.1	---	69.7	---	86.2	---	64.7
Particulates Front Half Total (mg)	.0135	30.7948	.0154	35.1889	.0215	49.2380	.0168	38.4072
grs/SDCF, (mg/m^3)	4.6524	2.1118	4.8625	2.2072	7.0905	3.2222	5.5378	2.5138
#hr, (kg/hr)								
B) Particulates - Condensables (mg)	---	19.3	---	243.5	---	406.0	---	222.9
grs/SDCF, (mg/m^3)	.0068	15.5994	.0537	122.9341	.1014	231.9098	.0540	123.4811
#/hr, (kg/hr)	2.3567	1.0698	16.9873	7.7110	33.4334	15.1766	17.5927	7.9858
C) Total Particulates (mg)	---	57.4	---	313.2	---	492.2	---	287.6
grs/SDCF, (mg/m^3)	.0203	46.3942	.0691	158.1230	.1229	281.1478	.0708	161.888
#/hr, (kg/hr)	7.0091	3.1816	21.8498	9.9182	40.5324	18.3988	23.1305	10.4995
D) Front Half SO_4 (mg)	---	10.2	---	33.5	---	45.2	---	29.6
grs/SDCF, (mg/m^3)	.0036	8.2443	.0074	16.9129	.0097	22.2217	.0069	15.7929
#/hr, (kg/hr)	1.2455	.5654	2.3371	1.0609	3.1831	1.4449	2.2552	1.0237
E) Back Half SO_4 (mg)	---	8.7	---	162.6	---	257.9	---	143.1
grs/SDCF,(mg/m^3)	.0031	7.0319	.0359	82.0907	.0554	126.7913	.0315	71.9713
#/hr, (kg/hr)	1.0623	.4822	11.3435	5.1491	18.1621	8.2443	10.1893	4.6252
F) Total SO_4 (mg)	---	18.9	---	196.1	---	303.1	---	172.7
grs/SDCF, (mg/m^3)	.0067	15.2767	.0433	99.0036	.0651	149.0130	.0384	87.7642
#/hr, (kg/hr)	2.3078	1.476	13.6806	6.2100	21.3452	9.6872	12.4445	5.6489

TABLE 2 BATTERY E BAGHOUSE OUTLET METHOD 5 PARTICULATE RESULTS

RUN NUMBER	1		2		3		AVERAGE	
	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS
I DATE	4/15/80	4/15/80	4/16/80	4/16/80	4/17/80	4/17/80		
II STACK PARAMETERS								
Pst - Static Pressure, "Hg (mmHg)	-.64	-16.26	-.64	-16.26	-.64	-16.26	-.64	-16.26
Ps - Stack Gas Pressure, "Hg Absolute (mmHg)	28.41	721.61	28.47	723.14	28.49	723.65	28.46	722.88
% CO_2 - Volume % Dry	2.15	2.15	3.82	3.82	4.77	4.77	3.58	3.58
% O_2 - Volume % Dry	16.66	16.66	14.29	14.29	13.13	13.13	14.69	14.69
% CO - Volume % Dry	0.00	0.00	0.00	0100	0.00	0.00	0.00	0.00
% N_2 - Volume % Dry	81.19	81.19	81.83	81.83	82.10	82.10	81.71	81.71
Ts - Average Stack Temperature °F (°C)	386	197	398	203	403	206	396	202
% H_2O - % Moisture in Stack Gas, By Volume	9.13	9.13	9.34	9.34	9.49	9.49	9.32	9.32
As - Stack Area, ft^2 (cm^2)	20.00	1.86	20.00	1.86	20.00	1.86	20.00	1.86
Md - Molecular Weight of Stack Gas, Dry Basis	29.01	29.01	29.17	29.17	29.29	29.29	29.16	29.16
Ms - Molecular Weight of Stack Gas, Wet Basis	28.00	28.00	28.12	28.12	28.22	28.22	28.11	28.11
Vs - Stack Gas Velocity, ft/sec, (m/sec)	55.93	17.05	58.49	17.83	61.64	18.79	58.69	1.66
Qa - Stack Gas Volumetric Flow at Stack Conditions, ACFM (Nm^3/min)	67116	1901.3	70192	1988.4	73971	2090.4	70426.3	1995.1
Qs - Stack Gas Volumetric Flow at Standard Conditions, DSCFM (Nm^3/min)	36146	1023.9	37270	1055.8	39010	1105.1	37475.3	1061.6
% EA - Percent Excess Air								
III TEST CONDITIONS								
Pb - Barometric Pressure, "Hg (mmHg)	29.05	737.87	29.11	739.39	29.13	739.90	29.10	739.06
Dn - Sampling Nozzle Diameter, in. (mm)	.250	6.35	.250	6.35	.250	6.35	.250	6.35
T - Sampling Time, min	120	120	120	120	120	120	120	120
Vm - Sample Volume, ACF (m^3)	85.815	2.43	87.170	2.47	89.635	2.54	87.540	2.48
Np - Net Sampling Points	24	24	24	24	24	24	24	24
Cp - Pitot Tube Coefficient	111	44	118	48	109	43	113	45
Tm - Average Meter Temperature °F (°C)	1.34	34.04	1.39	35.31	1.54	39.12	1.42	36.15
Pm - Average Orifice Pressure Drop, "H_2O (mmH_2O)	---	165	---	170	---	181	---	172
Vlc - Condensate Collected (Impingers and Gel), mls	.57	14.48	.62	15.75	.69	17.53	.63	15.92
IV TEST CALCULATIONS								
Vw - Condensed Water Vapor, SDCF (Nm^3)	7.77	.22	8.00	.23	8.52	.24	8.09	.23
Vm - Volume of Gas Sampled at Standard Conditions, DSCF (Nm^3)	77.276	2.189	77.715	2.202	81.262	2.302	78.751	2.231
%H_2O - Percent Moisture, By Volume	9.13	9.13	9.34	9.34	9.49	9.49	9.32	9.32
Ms - Molecular Weight of Stack Gas, Wet Basis	28.00	28.00	28.12	28.12	28.22	28.22	28.11	28.11
Vs - Stack Velocity, ft/sec (m/sec)	55.93	17.05	58.49	17.83	61.64	18.79	58.69	1.66
% I - Percent Isokinetic	104.6	104.6	102.0	102.0	101.9	101.9	102.8	102.8
V ANALYTICAL DATA								
A) Particulates Front Half								
Probe (mg)	---	85.9	---	101.5	---	83.4	---	84.6
Cyclone (mg)	---	---	---	---	---	---	---	---
Filter (mg)	---	149.4	---	187.7	---	*	*	---
Particulates Front Half Total (mg)	---	253.3	---	289.2	---	---	---	262.3
grs/SDCF, (mg/m^3)	.0470	107.4860	.0574	131.3615	---	---	.0522	119.4238
#/hr, (kg/hr)	14.5456	6.6027	18.3284	8.3202	---	---	16.4375	7.4614
B) Particulates - Condensables (mg)	---	1163.7	---	28.3	---	33.4	---	596.0
grs/SDCF, (mg/m^3)	.2324	531.5830	.0056	12.8545	.0063	14.5089	.1190	272.2188
#/hr, (kg/hr)	71.9370	32.6541	1.7936	.8142	2.1190	.9619	36.8653	16.7341
C) Total Particulates (mg)	---	1399.0	---	317.5000	---	---	---	858.2500
grs/SDCF, (mg/m^3)	.2793	639.0691	.0630	144.2160	---	---	.1712	391.6425
#/hr, (kg/hr)	86.4826	39.2567	20.1230	9.1344	---	---	53.3028	24.1950
D) Front Half SO_4 (mg)	---	137.1	---	166.4	---	46.3	---	116.6
grs/SDCF, (mg/m^3)	.0274	62.6279	.0330	75.5828	.008	20.1126	.0231	52.7744
#/hr, (kg/hr)	8.4752	3.8471	10.5464	4.7873	2.9374	1.3334	7.3197	3.3226
E) Back Half SO_4 (mg)	---	806.0	---	15.1	---	15.4	---	278.8
grs/SDCF, (mg/m^3)	.1609	368.1842	.0030	6.8588	.0029	6.6897	.0556	127.2442
#/hr, (kg/hr)	49.8249	22.6168	.9570	.4344	.9770	.4435	17.2530	7.8316
F) Total SO_4 (mg)	---	943.1	---	181.5	---	61.7	---	395.4
ppm	.1883	430.8121	.0360	82.4416	.0117	26.8023	.0787	180.0186
grs/SDCF, (mg/m^3)	58.3001	26.4639	11.5034	5.2217	3.9144	1.7769	24.5726	11.1542
#/hr, (kg/hr)								

* Test # 3 filter contaminated
Note - Averages include only tests 1 and 2 for front half data.

TABLE 3 BATTERY E OUTLET METHOD 17 PARTICULATE RESULTS

RUN NUMBER	1		2		3		4	
	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS
I DATE	4/15/80	4/15/80	4/16/80	4/16/80	4/17/80	4/17/80		
II STACK PARAMETERS								
PST - STATIC PRESSURE, "HG (MMHG)	-.64	-16.25	-.64	-16.25	-.64	-16.25	-.64	-16.25
PS - STACK GAS PRESSURE, "HG ABSOLUTE (MMHG)	28.41	721.61	28.47	723.14	28.49	723.65	28.46	722.80
% CO_2 - VOLUME % DRY	2.15	2.15	3.82	3.82	4.77	4.77	3.58	3.58
% O_2 - VOLUME % DRY	16.66	16.66	14.29	14.29	13.13	13.13	14.69	14.69
% CO - VOLUME % DRY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% N_2 - VOLUME % DRY	81.19	81.19	81.83	81.83	82.10	82.10	81.71	81.71
TS - AVERAGE STACK TEMPERATURE °F (°C)	386	197	398	203	403	206	396	202
% H_2O - % MOISTURE IN STACK GAS, BY VOLUME	8.31	8.81	8.76	8.76	8.54	8.54	8.70	8.70
AS - STACK AREA, FT^2 (M^2)	20.0	1.86	20.0	1.86	20.0	1.86	20.0	1.86
MD - MOLECULAR WEIGHT OF STACK GAS, DRY BASIS	29.01	29.01	29.18	29.18	29.29	29.29	29.16	29.16
MS - MOLECULAR WEIGHT OF STACK GAS, WET BASIS	28.04	28.04	28.20	28.20	28.32	28.32	28.19	28.19
VS - STACK GAS VELOCITY, FT/SEC, (M/SEC)	52.84	16.11	54.38	16.58	55.08	16.80	54.10	16.49
QA - STACK GAS VOLUMETRIC FLOW AT STACK CONDITIONS, ACFM (NM^3/MIN)	63410	1796.3	65257	1848.6	66097	1872.4	64921.3	1839.1
QS - STACK GAS VOLUMETRIC FLOW AT STANDARD CONDITIONS, DSCFM (NM^3/MIN)	34272	970.9	34871	987.8	35222	997.8	34788.3	985.5
% EA - PERCENT EXCESS AIR								
III TEST CONDITIONS								
PB - BAROMETRIC PRESSURE, "HG (MMHG)	29.05	737.87	29.11	739.39	29.13	739.90	29.10	739.06
DN - SAMPLING NOZZLE DIAMETER, IN. (MM)	.250	6.35	.250	6.35	.250	6.35	.250	6.35
T - SAMPLING TIME, MIN	120	120	120	120	120	120	120	120
VM - SAMPLE VOLUME, ACF (M^3)	82.610	2.34	81537	2.31	81.854	2.32	82.000	2.32
NP - NET SAMPLING POINTS	24	24	24	24	24	24	24	24
CP - PITOT TUBE COEFFICIENT	.84	.84	.84	.84	.84	.84	.84	.84
TM - AVERAGE METER TEMPERATURE °F (°C)	106	41	111	44	102	39	106	41
PV - AVERAGE ORIFICE PRESSURE DROP, "H_2O (MMH_2O)	1.23	31.24	1.29	32.77	1.30	33.02	1.27	32.34
VLC - CONDENSATE COLLECTED (IMPINGERS AND GEL), MLS	---	154	---	150	---	149	---	151
ΔP - STACK VELOCITY HEAD "H_2O (MMH_2O)	.51	12.95	.54	13.72	.55	13.97	.53	13.46
IV TEST CALCULATIONS								
VW - CONDENSED WATER VAPOR, SDCF (NM^3)	7.24	.21	7.06	.20	7.01	.20	7.10	.20
VM - VOLUME OF GAS SAMPLED AT STANDARD CONDITIONS, DSCF (NM^3)	75.026	2.125	73.565	2.084	75.087	2.127	74.560	2.112
% H_2O - PERCENT MOISTURE, BY VOLUME	8.81	8.81	8.76	8.76	8.54	8.54	8.70	8.70
MS - MOLECULAR WEIGHT OF STACK GAS, WET BASIS	28.04	28.04	28.20	28.20	28.32	28.32	28.19	28.19
VS - STACK VELOCITY, FT/SEC (M/SEC)	52.84	16.11	54.38	16.58	55.08	16.80	54.10	16.49
% I - PERCENT ISOKINETIC	107.1	107.1	103.2	103.2	104.3	104.3	104.9	104.9
V ANALYTICAL DATA								
A) PARTICULATES FRONT HALF								
PROBE (MG)	---	2.9	---	8.9	---	11.9	---	7.9
CYCLONE (MG)	---	---	---	---	---	---	---	---
FILTER (MG)	---	48.5	---	40.4	---	44.0	---	44.3
PARTICULATES FRONT HALF TOTAL (MG)	---	51.4	---	49.3	---	55.9	---	52.2
GRS/SDCF, (MG/M^3)	.0106	24.1839	.0103	23.6565	.0115	26.2798	.0108	24.7076
#/HR, KG/HR)	3.1030	1.4085	3.0884	1.4019	3.4654	1.5730	3.2189	1.4611
B) FRONT HALF SO_4 (MG)	---	42.1	---	17.63	---	38.2	---	32.64
PPM, (MG/M3)	.0087	19.8082	.0037	8.4597	.0078	17.9586	.0067	15.4088
#/HR, (KG,HR)	2.5416	1.1537	1.1044	.5013	2.3681	1.0750	2.0047	.9100

TABLE 4. BAGHOUSE C VISIBLE EMISSION SUMMARY

Test No. 1			Test No. 2			Test No. 3		
Time	Set#	Avg.% Opacity	Time	Set#	Avg.% Opacity	Time	Set#	Avg.% Opacity
11:15	1	10	10:15	1	0	9:00	1	0
11:21	2	5	10:21	2	0	9:06	2	0
11:27	3	0.16	10:27	3	0	9:12	3	0
11:33	4	0.125	10:33	4	0	9:18	4	0
11:39	5	0	10:39	5	0	9:24	5	0
11:45	6	0	10:45	6	0	9:30	6	0
11:50	7	0	10:51	7	0	9:36	7	0
11:56	8	0.03	10:57	8	0.4	9:42	8	0
12:03	9	0	11:03	9	0.8	9:48	9	0
12:09	10	0	11:09	10	5.4	9:54	10	3.75
12:15	11	0	11:15	11	6.0	10:00	11	9.0
12:21	12	3.75	11:21	12	0	10:06	12	2.3
12:27	13	0	11:27	13	1.7	10:12	13	2.1
12:32	14	0	11:33	14	0	10:18	14	0.4
12:35	15	0	11:39	15	0	10:24	15	4.6
12:41	16	0	13:00	16	0	10:30	16	1.5
12:47	17	0	13:06	17	0	10:36	17	1.3
12:53	18	0	13:12	18	0	10:42	18	2.3
12:59	19	0.83	13:18	19	0	10:48	19	0.6
13:05	20	0	13:24	20	0	10:54	20	0
13:11	21	0	13:30	21	0	11:00	21	0
13:17	22	0	13:36	22	0	11:06	22	0
13:23	23	0.42	13:41	23	0	11:12	23	0
13:35	24	0	13:47	24	0.4	11:18	24	0.6
13:41	25	0	13:53	25	0.2			
13:47	26	0.6						
13:53	27	0.2						
13:59	28	0.2						

TABLE 5. BAGHOUSE E VISIBLE EMISSION SUMMARY

Test No.1			Test No. 2			Test No. 3		
Time	Set#	Avg.% Opacity	Time	Set#	Avg.% Opacity	Time	Set#	Avg.% Opacity
11:25	1	0	10:15	1	0	9:00	1	0
11:31	2	0	10:21	2	0	9:06	2	0
11:36	3	0.4	10:26	3	0	9:12	3	0
11:42	4	0.4	10:36	4	0	9:18	4	0
11:48	5	0.4	10:38	5	0	9:24	5	0
11:54	6	0	10:44	6	3.13	9:30	6	0
12:00	7	0	10:50	7	1.25	9:36	7	0
12:06	8	0	10:56	8	0	9:42	8	0
12:12	9	0	11:02	9	0	9:48	9	1.25
12:18	10	0	11:08	10	0	9:54	10	0
12:25	11	0	11:15	11	0	10:00	11	0
12:31	12	0	11:21	12	0	10:06	12	0
12:37	13	0	11:27	13	0	10:12	13	0
12:43	14	1.9	11:33	14	0	10:18	14	0
12:49	15	0.4	11:39	15	0	10:24	15	0
12:55	16	0	11:45	16	3.96	10:30	16	0
13:01	17	0	11:51	17	1.04	10:36	17	0
13:07	18	0	11:57	18	0	10:42	18	0
13:13	19	0	12:03	19	0	10:48	19	0
13:19	20	0	12:09	20	0	10:54	20	0
13:40	21	0	12:15	21	0	11:00	21	0
13:46	22	0	12:21	22	0	11:06	22	0.63
			12:27	23	3.54	11:12	23	4.4
			12:33	24	5.0	11:18	24	0.63
			12:39	25	5.0	11:24	25	0
			12:45	26	5.0			
			12:51	27	1.67			

SECTION 3
PROCESS DESCRIPTION

Kaiser Steel Corporation operates seven furnace coke batteries at its steel plant in Fontana, California. This is the only U.S. steel plant which uses fabric filters to control particulate emissions from coke oven battery stacks. Currently, four filters are in operation serving batteries B, C, D, and E. The filters on batteries F and G are nearing completion. The filter on battery A is presently under construction while the battery is down for rehabilitation.

During the period of April 15-17, 1980, emissions tests were conducted on the outlets of the filter serving battery C and battery E. The filters for batteries B and D were not selected for testing, because battery D was fired with blast furnace gas and the filter serving batter B was not operating properly. TUMV filter was cleaning nearly continuously. In addition, Kaiser personnel said that it was believed that the bags were partially blinded and they plan to replace all bags in the B filter in the near future. They also will install a new reverse air fan and modify the reverse air ducting system.

The purpose of the tests was to quantify the particulate emissions from the fabric filters. Particulate (EPA method 5) and opacity (EPA method 9) were measured for both battery C and E. In addition, simultaneous test were conducted at the outlet of E filter using method 17 (in-stack filter).

Salient facts on the design and operation of batteries C and E are summarized in Tables 3-1 and 3-2. As indicated, both C and E batteries are Koppers-Becker underjet ovens built in 1949 and 1952 respectively. Brickwork in battery C has not been rebuilt since 1949, although the battery did have some mechanical repairs in 1974. A hot end-flue rehabilitation was performed on battery E in 1978. Both batteries are equipped with double collecting mains and each consists of 45 ovens measuring 13 ft in height. Each is charged with 13.5-14.0 tons of coal. However, during the test period both of the batteries had 8 ovens out of service (37 ovens were in service). Coking time on battery C was 17 hours, and on battery E was 16 hours. Kaiser personnel said that the end-flues on each oven are spray-patched an average of once every 3 months.

Both of these underjet batteries were fired with coke oven gas (COG) during the entire test period. Charging of the ovens is performed by a larry car using stage charging techniques. Fueld gas flow to C battery was not measureable during the tests, although the operators said they were at a maximum fuel rate. The fuel flow instrument for E battery was operating, and varied from 130,000 to 150,000 scfm. However, the proper chart paper was not available for this instrument so none of these charts are included in Appendix D,

TABLE 3-1. PROCESS DATA FOR BATTERY C

Date 4/14/80

Plant Name Kaiser Steel
Plant Location Fontana, California
Battery No. C
Name of Plant Contact Jake Martzolf

Type of Ovens and Designer Koppers-Becker (underjet)
Date Built 1949
Date of Last Rehabilitation 1976
Type of Last Rehabilitation Buckstays and jambs

Number of Ovens Total 45 In Service 37[a]
Size of Ovens Height 13 ft Width 13-1/2 in. Length 40 ft

Type of coke produced Furnace
Normal coking time (hr) 17 hr
Coal charged per oven (tons 13.5-14
Reversal period (min) 30

Nozzle decarbonization method Recirculating duct
Is flue gas recirculated? Yes

Type of fuel gas COG Heating value 500 Btu/scf
Is fuel gas desulfurized? No
Note use of stage charging, preheated coal, etc.
State charging, double collecting main
Stack height and top diameter 225 ft; 10 ft diameter
Test location (stack or waste heat canal) Filter outlet duct (provide sketch)

Control Method Used Fabric filter

Manufacturer of Filter American Air Filter
Date Installed February 1979, start-up

Number of Compartments 5
Total Filter Area 42,770 ft^2
Number of Bags 900
Fan Hp 450 Hp
Cleaning Frequency and Duration Specified ΔP; clean for 50 sec
Cleaning Set Point (ΔP) 7.3 inches of water

[a] Ovens 108, 109, 111, 115, 116, 134, 147, 149 were out of service.

TABLE 3-2. PROCESS DATA FOR BATTERY E

Date 4/14/80

Plant Name Kaiser Steel
Plant Location Fontana, California
Battery No. E
Name of Plant Contact Jake Martzolf

Type of Ovens and Designer Koppers-Becker (underjet)
Date Built 1953
Date of Last Rehabilitation 1978
Type of Last Rehabilitation Hot end flue rehabilitation

Number of Ovens Total 45 In Service 37[a]
Size of Ovens Height 13 ft Width 13-1/2 in. Length 40 ft

Type of coke produced Furnace
Normal coking time (hr) 16 hr
Coal charged per oven (tons 13.5-14
Reversal period (min) 30

Nozzle decarbonization method Recirculating duct
Is flue gas recirculated? Yes

Type of fuel gas COG (can burn BFG) Heating value 500 Btu/scf
Is fuel gas desulfurized? No
Note use of stage charging, preheated coal, etc.
State charging, double collecting main
Stack height and top diameter 225 ft; 10 ft diameter
Test location (stack or waste heat canal) Outlet of filter (provide sketch)
at ID fan inlet duct

Control Method Used Fabric filter

Manufacturer of Filter American Air Filter
Date Installed December 1978 - start-up

Number of Compartments 6
Total Filter Area 51,324 ft^2
Number of Bags 1,080
Fan Hp 500 Hp
Cleaning Frequency and Duration Specified ΔP; clean for 30 to 40 sec
Cleaning Set Point (ΔP) 7.3 inches of water

[a] Ovens 228, 233, 238, 242, 243, 247, 248, 249 were out of service.

although the instrument readings were recorded on an hourly basis during the tests and are included in the data in Appendix D.

The fabric filter units used to collect particulate emissions from the underfiring exhaust gases were started up in February 1979 (battery C) and December 1978 (battery E). Both are closed-suction design with reverse air cleaning. Battery C filter consists of five compartments containing 900 bags with a total filtering area of 42,770 ft^2. Battery E filter consists of six compartments containing 1,080 bags with a total filtering area of 51,324 ft^2. Both are equipped with graphite-silicone treated glass fiber bags. No pre-coating of the bags is used.

The fabric filter serving battery C was designed to handle 88,000 acfm at a net air-to-cloth ration of 2.76:1 with one compartment isolated for cleaning. Design operating temperature was 450°F and the actual temperature during test tests was 332°F. Exhaust gases from this filter are pulled through a 450 Hp induced draft fan and are then discharged to the atmosphere through a 225 ft stack. Each compartment is cleaned automatically whenever the total pressure drop reaches a preset level of 7.3 inches of water.

The fabric filter serving battery E was designed to handle 118,000 acfm at a net air-to-cloth ration of 2.76:1 with one compartment isolated for cleaning. Design operating temperature was 450°F and the actual temperature during these tests was 394°F. Exhaust gases from this filter are pulled through a 450 Hp induced draft fan and are then discharged to the atmosphere through a 225 ft stack. Each compartment is cleaned automatically whenever the total pressure drop reaches a preset level of 7.5 inches of water.

Dust collected by each filter is landfilled and Kaiser personnel said they are experimenting with methods to stabilize all such dust that goes to the landfill.

After each of the daily emission test periods, supplemental tests were performed to determine the approximate quantity of dust collected by the battery E filter. This procedure consisted of manually activating the cleaning cycle. One hour later, the cleaning cycle was again activated and the dust discharged from the filter hopper screw conveyor system was collected and weighed. Three such tests were conducted, one one each of the three test days, and showed that the quantity of dust was 33, 35, and 25 lbs. Assuming that these quantities are representative of the amount of dust captured by the filter during the 1-hour peirod between cleaning cycles, the dust collection rates were 33, 35, and 25 lb/hour. Similar tests could not be performed on battery C because the filters serving batteries B and C share a common discharge system for the collected dust.

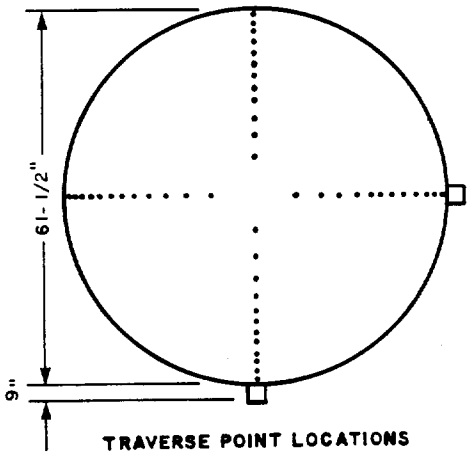
During the periods when the emission tests were conducted on the outlets of C and E filters, both the battery and filter operations were monitored. This process operating data and observations are presented in Appendix D. All tests were conducted when the battery and filter were operating within normal limits.

SECTION 4

LOCATION OF SAMPLING POINTS

A) Outlet from Baghouse C - The discharge from Baghouse C passes through a 61.5 inch round duct to an induced draft fan and to the stack. The discharge was sampled at a point 10 feet (2 diameters) upstream from the induced draft fan, and 8 feet (1.6 diameters) downstream from a 45° bend. The samples were taken at 48 traverse points. Figure 1 is a diagram of the sampling location.

B) Outlet from Baghouse E - The discharge from Baghouse E passes through a rectangular duct with inside dimensions of 8 feet by 2 1/2 feet. The duct goes to an induced draft fan and then to the stack. The sampling location was located 15 feet (4.7 diameters) downstream from a 90° bend and 10 feet (3 diameters) upstream from the induced draft fan. Samples were taken at 24 traverse points. Figure 2 is a diagram of this sampling location.



POINT LOCATION	FRACTION OF STACK I.D.	DISTANCE FROM INSIDE WALL (IN.)
1	1.1	0.65
2	3.2	1.99
3	5.5	3.39
4	7.9	4.87
5	10.5	6.44
6	13.2	8.12
7	16.1	9.93
8	19.4	11.92
9	23.0	14.14
10	27.2	16.71
11	32.3	19.88
12	39.8	24.47
13	60.2	37.03
14	67.7	41.62
15	72.8	44.79
16	77.0	47.36
17	80.6	49.58
18	83.9	51.57
19	86.8	53.38
20	89.5	55.06
21	92.1	56.63
22	94.5	58.11
23	96.8	59.51
24	98.9	60.85

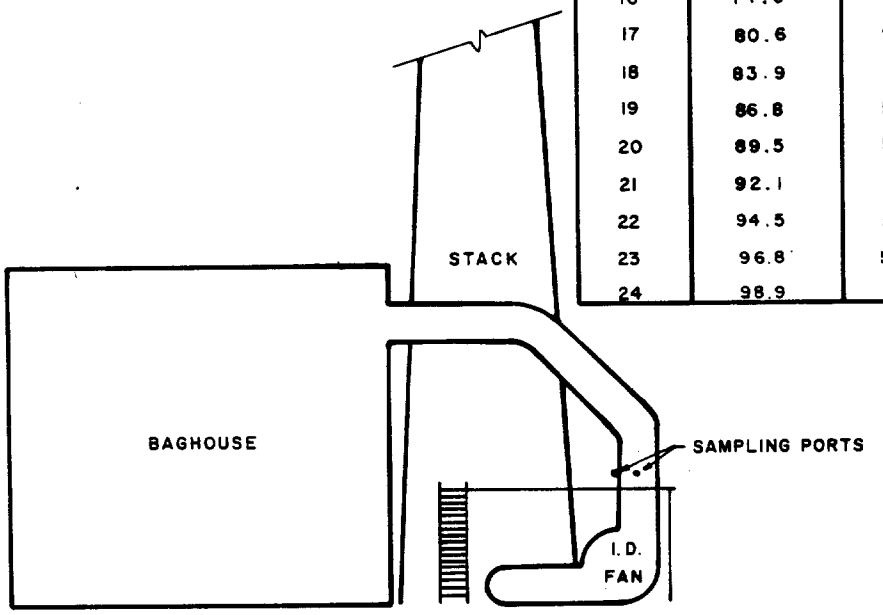
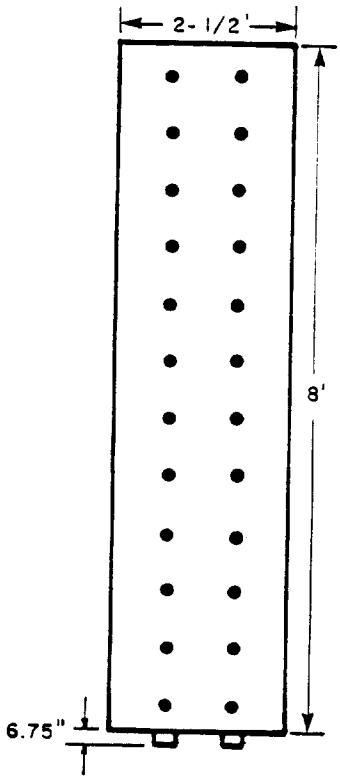


FIGURE 1 **BAGHOUSE "C" PLANT SCHEMATIC & TRAVERSE POINT LOCATIONS**



TRAVERSE POINT LOCATIONS

TRAVERSE POINT LOCATIONS	FRACTION OF STACK LENGTH	DISTANCE FROM INSIDE WALL (IN.)
1	4.17	4.0
2	12.50	12.0
3	20.83	20.0
4	29.17	28.0
5	37.50	36.0
6	45.83	44.0
7	54.17	52.0
8	62.50	60.0
9	70.83	68.0
10	79.17	76.0
11	87.50	84.0
12	95.83	92.0

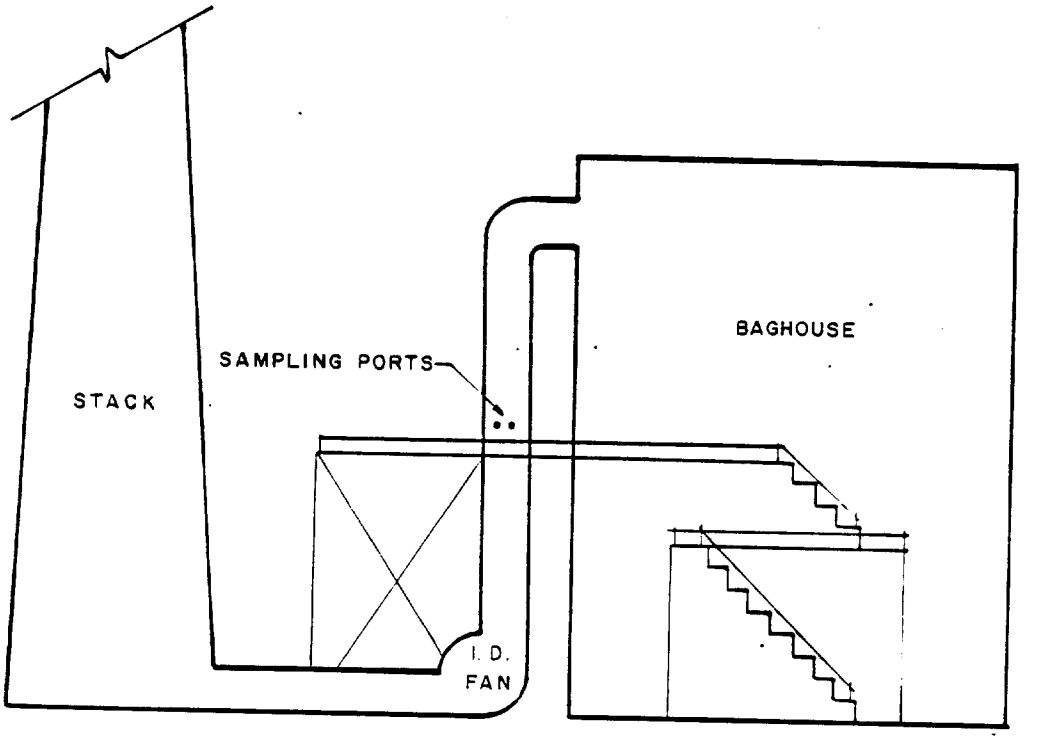


FIGURE 2 BAGHOUSE "E" PLANT SCHEMATIC & TRAVERSE POINT LOCATION

SECTION 5
SAMPLING AND ANALYTICAL PROCEDURE

A) METHOD 5

EPA Method 5 sampling was done in accordance with the method as revised on August 18, 1977 (Federal Register, Vol. 42, No. 160). Figure 3 is a diagram of the sampling train. At the Baghouse C sampling location a vertical steel girder restricted the clearance so that some of the traverse points could not be reached with the ten foot probe. In order to provide more clearance, the impinger box was removed from the filter oven and connected to it by a flexible teflon line. Figure 4 is a diagram of this sampling train configuration.

Before each test a velocity traverse was done to determine the average velocity and temperature in the duct. The calibrated nozzle size selection was made based on the preliminary velocity traverse and an estimate of the stack gas moisture content. The sampling rate was adjusted to isokinetic conditions using a calculator programmed with the operating nomograph equation. The particulate samples were taken at traverse points at the centers of equal areas within the duct.

After assembling the sampling train at the location it was leak checked, and sampling was not begun until a leak rate of less than 0.02 cfm at 15 inches of mercury vacuum had been achieved. At each sampling port change the sampling train was inspected for cracked or broken glassware and to assure that the filter remained intact. Leak checks were done at the end of each test at the maximum vacuum encountered during the test.

Sample Recovery

Upon completion of the test the probe was removed from the sampling train, the nozzle wiped off to prevent possible contamination of the sample, and the probe and nozzle were rinsed with acetone. A nylong brush with a polypropylene handle was used to remove particulates from the probe. The probe rinse was placed in a glass container with a teflon lid liner. The filter holder and impingers were sealed and moved to the mobile laboratory for sample recovery.

The collected particulates were placed in three containers. The glass fiber filter was removed from the filter holder and placed in a polyethylene sample jar. The acetone probe rinse was placed in a glass sample bottle with a teflon lide liner. The impinger solutions were measured and placed in a glass container along with the back half rinse.

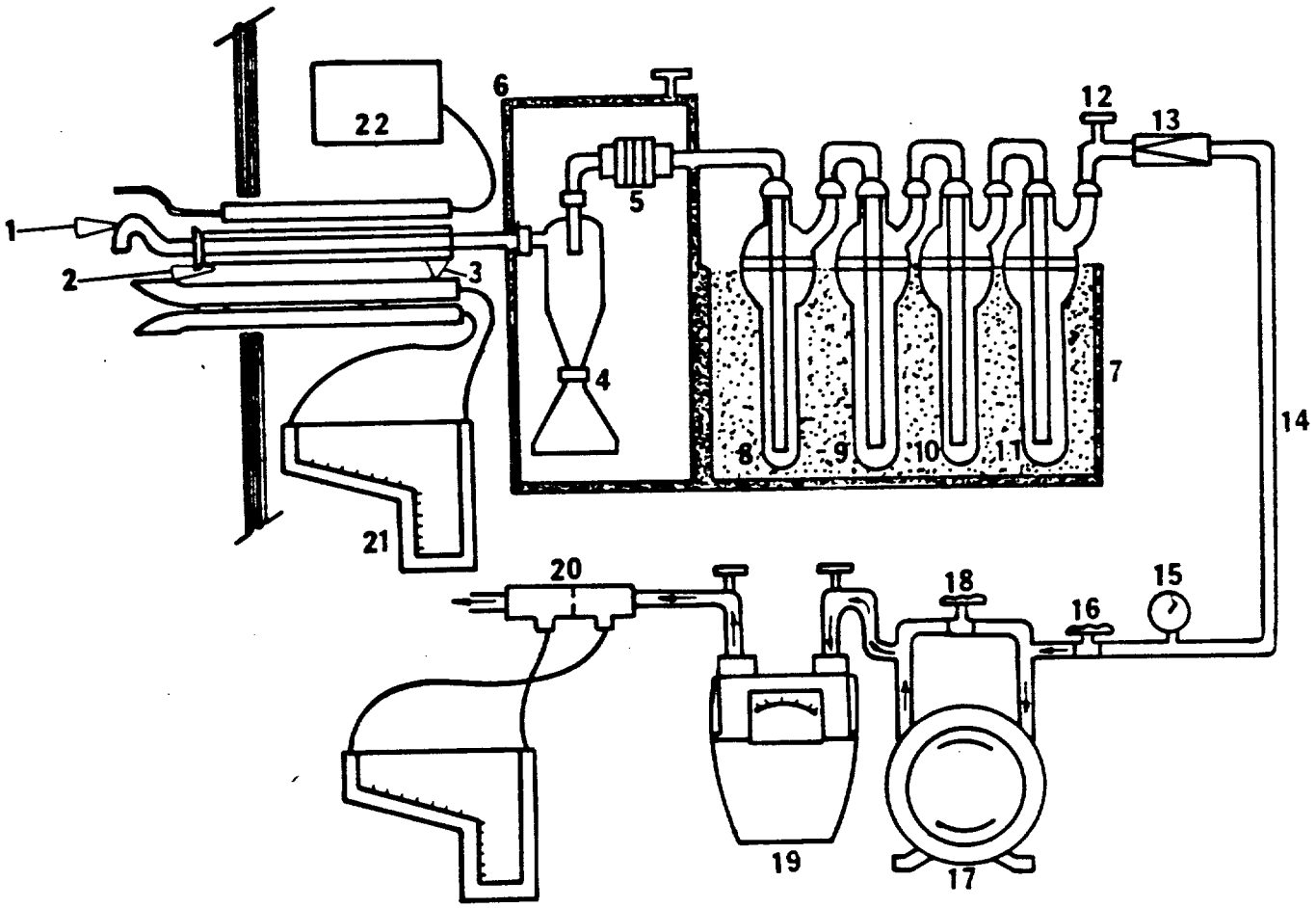


Figure 3 EPA method 5 particulate sampling train

KEY

1. Calibrated Nozzle
2. Heated Probe
3. Reverse Type Pitot
4. Cyclone Assembly
5. Filter Holder
6. Heated Box
7. Ice Bath
8. Impinger - (Water)
9. Impinger - (Water)
10. Impinger - (Water)
11. Impinger - (Silica Gel)
12. Thermometer
13. Check Valve
14. Vacuum Line
15. Vacuum Gauge
16. Main Valve
17. Air Tight Pump
18. ByPass Valve
19. Dry Test Meter
20. Orifice
21. Pitot Manometer
22. Thermometer

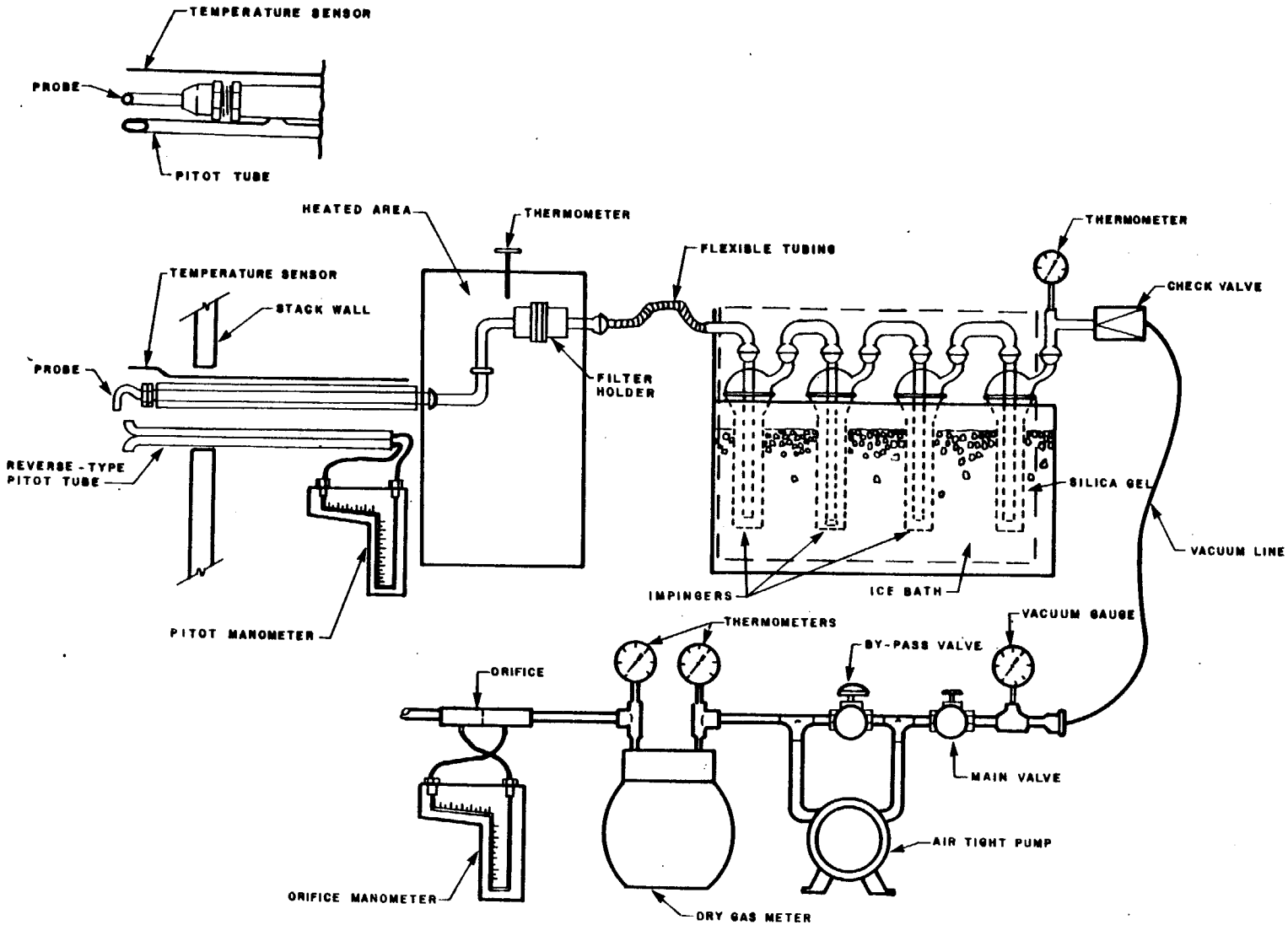


FIGURE 4 MODIFIED EPA METHOD 5 SAMPLING TRAIN

Particulate Analysis

The front half acetone rinse was placed in a tared beaker and evaporated to dryness. The impinger solution and back half rinse was placed in a tared beaker and evaporated on a steam bath. The beakers with residue and glass fiber filter were then placed in a desiccator until they reach a constant weight. The beakers and filter were weighed to within 0.1 milligrams to determine the amount of particulate collected.

Sulfate Analysis

After the particulate analysis was completed 100 milliliters of distilled water was added to each beaker. The particulate filter was then added to the probe rinse beaker and macerated to dissolve all collected sulfate. The redissolved residue was then filtered through a Whatman 541 cellulose fiber filter to remove turbidity. The solutions were then titrated with standardized barium perchlorate solution against thorin indicator to determine the amount of sulfate present in the front and back half particulate catches.

B. METHOD 17

EPA Method 17 entails isokinetic collection of particulates on a glass fiber filter located inside the duct being sampled. The calibrated nozzle and and filter holder are located at the end of the probe and sampling is done at traverse points within the duct as in EPA Method 5. Figure 5 is a diagram of the Method 17 sampling train.

Preparations for sampling were the same as those for Method 5. The same size calibrated nozzle was used for both the Method 17 and Method 5 trains which were operated simultaneously. This made it possible to use the same nomograph calculations for both trains and assured that the sample volume would be approximately the same. Leak tests were done before and after the test as with the Method 5 tests.

Sample Recovery

Upon completion of the test and final leak check, the probe was removed from the train and the nozzle sealed. The filter holder and nozzle were removed from the probe and taken to the mobile laboratory for recovery. The filter was removed from the filter holder and placed in a sample container. The nozzle and front half of the filter holder were rinsed with acetone and brushed to remove particulates. The front half rinse was placed in a glass container with a teflon lide liner. The impinger solutions were measured to determine moisture collected and discarded. The silica gel was weighed to determine moisture gain.

Particulate Analysis

The front half rinse was placed in a tared beaker and evaporated. The beaker and the filter were then placed in a desiccator and dried to a constant weight. They were then weighed to within 0.1 milligrams to determine the amount of particulate collected.

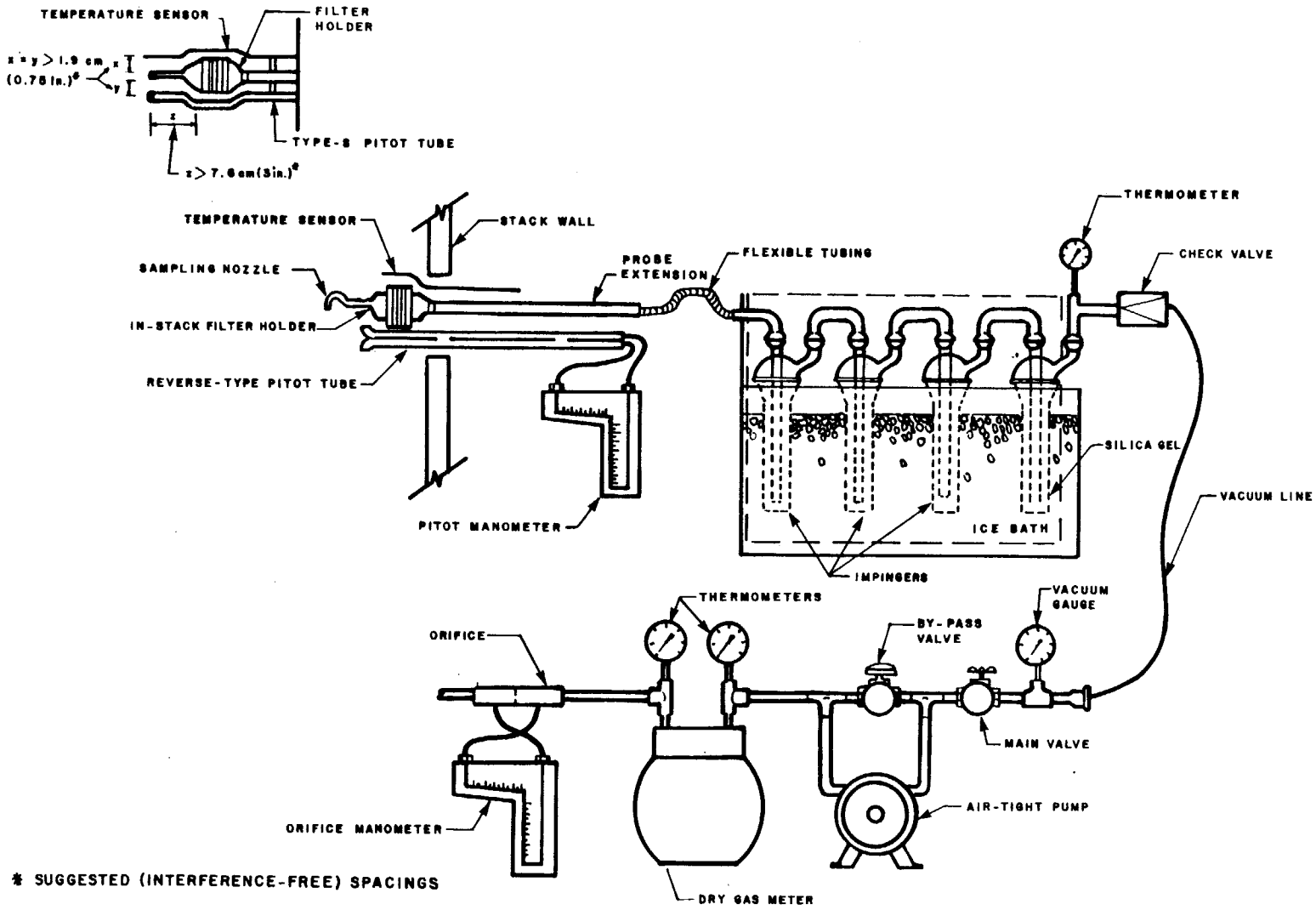


FIGURE 5 PARTICULATE SAMPLING TRAIN, EQUIPPED WITH IN-STACK FILTER
EPA METHOD 17

Sulfate Analysis

After completion of the particulate analysis 100 milliliters of distilled water was added to the beaker. The filter was placed into the beaker and macerated. The redissolved solution was filtered through a Whatman 541 filter to remove turbidity. An aliquot of the filtrate was then titrated with standardized barium perchlorate against thorin indicator to determine the amount of sulfate present.

C. INORGANIC GAS ANALYSIS

A sample of the stack gas was taken in a tedlar bag at each sampling location during each test. These bag samples were analyzed for carbon monoxide, carbon dioxide, oxygen, and nitrogen concentrations with a Carle Basic gas chromatograph with a thermal conductivity detector. One of the advantages of this detector over the orsat analyzer is that it gives the nitrogen concentration directly rather than by difference.

APPENDIX A

FIELD AND LABORATORY DATA

APPENDIX A

1. Traverse Point Location

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT KAISER STEEL
DATE
SAMPLING LOCATION BAGHOUSE C OUTLET
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A)
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) 9.0
STACK I.D., (DISTANCE A - DISTANCE B) 61.5"
NEAREST UPSTREAM DISTURBANCE 6' - 1 DIAM.
NEAREST DOWNSTREAM DISTURBANCE 16' - 3.1 DIAM.
CALCULATOR POWELL

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	0.011	61.5	0.7	9	10
2	0.032		2.0		11.0
3	0.055		3.4		12.4
4	0.079		4.9		13.9
5	0.105		6.5		15.5
6	0.132		8.1		17.1
7	0.161		9.9		18.9
8	0.194		11.9		20.9
9	0.230		14.1		23.1
10	0.272		16.7		25.7
11	0.323		19.7		28.7
12	0.398		24.5		33.5
13	0.602		37.0		46.0
14	0.677		41.6		50.6
15	0.728		44.8		53.8
16	0.770		47.4		56.4
17	0.806		49.6		58.6
18	0.839		51.6		60.6
19	0.868		53.4		62.4
20	0.895		55.0		64.0
21	0.921		56.6		65.6
22	0.945		53.1		67.1
23	0.968		59.5		68.5
24	0.989		60.8		69.5

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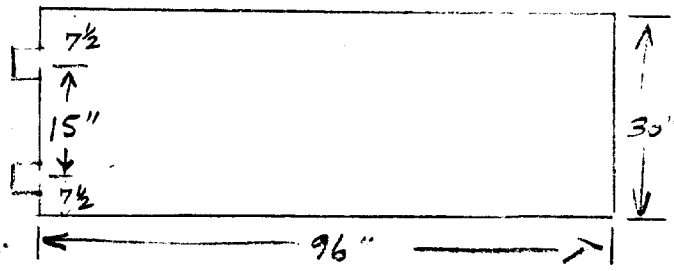
$D_c = \frac{2LW}{L+W}$ 45.7"

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Kaiser Steel
DATE
SAMPLING LOCATION Baghouse E outlet
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A)
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B)
STACK I.D., (DISTANCE A - DISTANCE B) 96" x 30"
NEAREST UPSTREAM DISTURBANCE 28' — 7.35 equiv diam.
NEAREST DOWNSTREAM DISTURBANCE 16' — 4.2 equiv. diam
CALCULATOR Powell



SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	1/16		6"	6.75	12.75
2	3/16		18"		24.75
3	5/16		30"		36.75
4	7/16		42"		48.75
5	9/16		54"		60.75
6	11/16		66"		72.75
7	13/16		78"		84.75
8	15/16		90"		96.75

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APPENDIX A

2. Field Data Sheets

FIELD DATA

PLANT Kaiser Steel
DATE 4/13/80
SAMPLING LOCATION Battery E
SAMPLE TYPE Part. Meth. 5
RUN NUMBER
OPERATOR DEARBORN
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.05
STATIC PRESSURE, (P_s) -8.65
FILTER NUMBER (s) ~~4.033~~ 4.033

PROBE LENGTH AND TYPE 10' Glass
NOZZLE I.D. 1/4" 250
ASSUMED MOISTURE, % 9%
SAMPLE BOX NUMBER
METER BOX NUMBER
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING 300
HEATER BOX SETTING 250
REFERENCE Δp .84

SCHEMATIC OF TRAVERSE POINT LAYOUT

Pre leak test <.0/CFM

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	1130	650.085 ~~649.548~~									
B12	5	1135	653.21	.60	1.36	1.35	384	90	86	1	250	78
B11	10	1140	656.70	.58	1.30	1.30	388	104	89	1	250	78
B10	15	1145	660.25	.62	1.38	1.38	391	109	91	1	250	78
B9	20	11:50	663.75	.57	1.28	1.28	394	112	93	1	250	70
B8	25	11:55	667.20	.58	1.30	1.30	390	116	96	1	250	70
B7	30	12:00	670.67	.54	1.20	1.20	385	119	99	1	250	70
B6	35	12:05	674.03	.53	1.19	1.19	382	121	101	1	250	70
B5	40	12:10	677.43	.53	1.19	1.19	382	122	102	1	250	60
B4	45	12:15	680.80	.54	1.20	1.20	383	124	104	1	250	60
B3	50	12:20	684.59	.67	1.58	1.58	385	124	106	1	250	60
B2	55	12:25	688.25	.63	1.40	1.40	382	124	106	1	250	60
B2	60	12:30	691.950	.60	1.36	1.36	383	126	107	1	250	60
		~~12~~		PORT CHANGE								
		12:42	692.40	~~.60~~	~~1.36~~	~~1.36~~						
A12	5	12:47	695.80	.60	1.36	1.36	392	106	104	1	250	60
A11	10	12:52	699.33	.57	1.28	1.28	395	115	103	1	250	60
A10	15	12:57	703.00	.58	1.40	1.40	386	120	104	1	250	64
A9	20	13:02	706.51	.52	1.30	1.30	384	123	104	1	250	66
A8	25	13:08	710.29	.50	1.24	1.24	383	124	105	1	250	66
A7	30	13:13	~~LOST~~ 713.85	.50	1.24	1.24	384	126	106	1	250	66
A6	35	13:18	717.38	.52	1.28	1.28	385	128	108	1	250	66
A5	40	13:23	721.05	.57	1.40	1.40	385	128	109	1	250	64
A4	45	13:28	724.78	.60	1.48	1.48	381	131	110	1	250	64

LOST POWER 1 MIN.

COMMENTS:

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
A 3	50	13:33	728.53	.59	1.45	1.45	383	132	111	1	250	64
A 2	55	13:38	732.25	.59	1.45	1.45	385	130	111	1	250	64
A 2	60	13:43	736.00	.58	1.43	1.43	387	130	111	1	250	66
			END TEST									
				LEAK TEST			.02 ~~.0095~~ CFM					
	120		83.365	.57		1.32	385.8	111.4				

EPA (Dur) 236
4/72

ANALYTICAL DATA

PLANT Kaiser

DATE 4/15/80

SAMPLING LOCATION

SAMPLE TYPE

RUN NUMBER KSC-E-5-1

SAMPLE BOX NUMBER

CLEAN-UP MAN

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 3 — 85.9 mg

FILTER NUMBER 4.0333 — CONTAINER — 149.4 mg

FRONT HALF SUBTOTAL 235.3 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER 4 — 1163.7 mg

ETHER-CHLOROFORM EXTRACTION — mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER — mg

BACK HALF SUBTOTAL mg

TOTAL WEIGHT 1399.0 mg

MOISTURE

IMPINGERS

FINAL VOLUME 250 + ml 194 = 444

INITIAL VOLUME 300 ml 144

NET VOLUME ~~444~~ ml 21.4

165.4

250
194
444

SILICA GEL

FINAL WEIGHT 271.4 g g g

INITIAL WEIGHT 250.0 g g g

NET WEIGHT ~~21.4~~ g g g

379.4
108
271.4

TOTAL MOISTURE 165.4 g

EPA (Dur) 231
4/72

FIELD DATA

PLANT Kaiser Steel
DATE 4/15/
SAMPLING LOCATION Battery E
SAMPLE TYPE Part 1 MTD 17
RUN NUMBER #1
OPERATOR ECCLESTON
AMBIENT TEMPERATURE 80
BAROMETRIC PRESSURE 29.05
STATIC PRESSURE, (P_s) -8.65
FILTER NUMBER (s) 27

A 1 → 12
B 1 → 12

PROBE LENGTH AND TYPE MTD 17
NOZZLE I.D. .250
ASSUMED MOISTURE, % 9
SAMPLE BOX NUMBER 2235
METER BOX NUMBER 2235
METER $\Delta H_@$ 1.86
C FACTOR
PROBE HEATER SETTING N/A
HEATER BOX SETTING N/A
REFERENCE Δp .84

SCHEMATIC OF TRAVERSE POINT LAYOUT

Pre leak test <.01 CFM

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	00	1133	764.47								N/A	
A-12	00	1138	768.0	.48	1.1	1.1	384	86	84	2		60
11	10	1143	771.1	.47	1.05	1.05	388	96	84	2		55
10	15	1148	774.1	.43	.98	.98	392	102	86	2		50
9	20	1153	776.4	.38	.87	.87	395	106	88	2		50
8	25	1158	780.1	.46	1.06	1.06	396	108	90	2		50
7	30	1203	783.2	.44	1.03	1.03	384	110	94	2		55
6	35	1208	786.4	.44	1.04	1.04	382	114	94	2		55
5	40	1213	789.8	.48	1.14	1.14	382	116	98	2		55
4	45	1218	793.5	.54	1.3	1.3	382	118	98	2		55
3	50	1223	796.7	.57	1.35	1.35	385	118	100	2		55
2	55	1228	800.5	.62	1.48	1.48	382	120	102	2		60
1	60	1233	804.9	.56	1.33	1.33	383	120	102	2		60
			PORT CHANGE									
~~B-12~~	60	~~1253~~	804.9									
B-12	65	1253	808.7	.52	1.2	1.2	394	100	100	2		50
11	70	1258	812.35	.62	1.45	1.45	390	110	100	2		50
10	75	1303	816.3	.62	1.46	1.46	385	114	102	2		50
9	80	1308	819.7	.59	1.40	1.40	383	118	102	2		55
8	85	1313	823.1	.58	1.44	1.44	383	118	104	2		55
7	90	1318	826.8	.52	1.3	1.3	384	120	104	2		55
6	95	1323	830.1	.50	1.25	1.25	386	122	104	2		55
5	100	1328	833.1	.49	1.23	1.23	390	122	106	2		55
4	105	1333	836.5	.50	1.25	1.25	383	122	108	2		50

(Temp. N/A in sun)

Lost power for 1 min — watch changed

COMMENTS:

EPA (Dur) 235

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
B-3	110	1330	840.1	.52	1.31	1.30	325	124	108	2	N/A	50
B-2	115	1343	843.5	.55	1.37	1.37	387	124	108	2		55
B-1	120	1340	847.050	.47	1.17	1.17	390	124	108	2		55
			END TEST									
			POST TEST LEAK CHECK: 0.005 cfm									
	120		82.610	.514	1.23		386.04		106.33			

EPA (Dur) 236

ANALYTICAL DATA

PLANT Kaiser

DATE 4/15/80

SAMPLING LOCATION E

SAMPLE TYPE KSC-E-17-1

RUN NUMBER

SAMPLE BOX NUMBER

CLEAN-UP MAN Eggleston

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 5	2.9 mg
FILTER NUMBER 31	CONTAINER	48.5 mg
FRONT HALF SUBTOTAL		51.4 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	N.A. mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	N.A. mg
BACK HALF SUBTOTAL		mg
TOTAL WEIGHT		51.4 mg

MOISTURE

IMPINGERS

FINAL VOLUME	[illegible] ml	250+
INITIAL VOLUME	300 ml	
NET VOLUME	ml	

SILICA GEL

FINAL WEIGHT	269 g	g	g
INITIAL WEIGHT	250 g	g	g
NET WEIGHT	19 g	g	g

TOTAL MOISTURE 154 g

EPA (Dur) 231
4/72

102.07 2/1

FIELD DATA

PLANT Kaiser
DATE 4/15/80
SAMPLING LOCATION outlet Baghouse C
SAMPLE TYPE Method 5
RUN NUMBER BHC-M5-1
OPERATOR Powell / Murphy
AMBIENT TEMPERATURE 75
BAROMETRIC PRESSURE 29.05
STATIC PRESSURE, (P_s) -9.2 in H_2O
FILTER NUMBER (s) 4.035

PROBE LENGTH AND TYPE 10' glass
NOZZLE I.D. ~~0.185~~ 0.183
ASSUMED MOISTURE, % 9
SAMPLE BOX NUMBER
METER BOX NUMBER
METER $\Delta H_@$ 1.8
C FACTOR
PROBE HEATER SETTING 250
HEATER BOX SETTING 250
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	11:20 / 0.0	691.005									
1	11:22.5	692.15	0.5	0.375	0.375	318	84	82	1.0	250	70
2	11:25	692.9	0.55	0.41	0.41	318	90	84	1.0	250	70
3	11:27.5	694.2	0.55	0.41	0.41	316	90	85	1.0	250	70
4	11:30	694.8	0.5	0.375	0.375	317	93	85	1.0	250	70
5	11:32.5	695.9	0.5	0.37	0.37	316	95	85	1.0	250	70
6	11:35	696.4	0.5	0.37	0.37	316	95	88	1.0	250	70
7	11:37.5	697.35	0.4	0.29	0.29	318	98	88	1.0	250	70
8	11:40	698.32	0.5	0.37	0.37	319	98	88	1.0	250	70
9	11:42.5	700.0	0.45	.34	.34	319	102	88	1.0	250	70
10	11:45.00	700.4	.45	.35	.35	323	102	89	1.0	250	70
11	11:47.5	701.45	.5	.375	.37	323	104	90	1.0	250	70
12	11:50.00	702.6	.45	.4	.4	325	106	91	1.0	248	70
13	11:52.5	703.74	.55	.4	.4	326	107	92	1.0	240	70
14	11:55.00	704.90	.67	.5	.5	328	110	94	1.0	244	70
15	11:57.5	705.82	.70	.53	.53	329	112	95	1.0	250	70
16	12:00.00	707.17	.78	.58	.58	326	114	95	1.0	250	70
17	12:02.50	708.73	.99	.61	.61	325	114	95	1.0	290	70
18	12:05.0	709.5	.80	.61	.61	324	114	96	1.0	270	69
19	12:07.5	710.9	.72	.54	.54	323	114	96	1.0	250	70
20	12:10.0	712.6	.77	.58	.58	323	116	98	1.0	240	70
24	12:20.0	714.876	.72	.54	.54	321	116	98	1.0	240	70

COMMENTS: pretest leak check = 0.005 @ 15"Hg

EPA

2nd Traverse

TRAVERSE POINT NUMBER	CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		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	714.376									
1	1:05.00	715.356	.55	.42	.42	325	90	90	1.0	250	70
2	1:07.5	716.38	.55	.42	.42	324	92	90	1.0	250	70
3	1:10.0	717.300	.52	.39	.39	322	98	90	1.0	250	70
4	1:12.5	718.203	.52	.39	.39	322	99	91	1.0	250	70
5	1:15.0	719.27	.52	.39	.39	322	102	92	1.0	249	70
6	1:17.5	720.100	.47	.35	.35	323	104	92	1.0	250	70
7	1:20.0	721.050	.50	.37	.37	322	106	93	1.0	250	70
8	1:22.5	722.015	.50	.37	.37	322	108	93	1.0	250	70
9	1:25.0	722.45	.47	.34	.34	323	108	94	1.0	250	70
10	1:27.5	723.885	.52	.38	.38	321	108	95	1.0	250	70
11	1:30.0	724.80	.52	.38	.38	322	109	95	1.0	250	70
12	1:32.5	725.90	.49	.36	.36	322	110	96	1.0	255	70
13	1:35.0	726.70	.49	.36	.36	322	110	98	1.0	255	70
14	1:37.5	727.63	.52	.38	.38	323	112	98	1.0	255	70
15	1:40.0	728.60	.55	.41	.41	324	111	98	1.0	255	70
16	1:42.5	729.64	.60	.45	.45	325	112	98	1.0	254	70
17	1:45.0	730.78	.61	.46	.46	327	113	98	1.0	253	70
18	1:47.5	731.75	.67	.50	.50	328	112	99	1.0	250	70
19	1:50.0	732.84	.71	.53	.53	320	112	99	1.0	250	70
20	1:52.5	733.96	.73	.55	.55	330	114	99	1.0	250	70
21	1:55.0	735.18	.77	.58	.58	332	114	100	1.0	252	70
22	1:57.5	736.25	.77	.58	.58	332	114	100	1.0	252	70
23	2:00.0	737.48	.84	.63	.63	329	114	100	1.0	251	71
24	2:02.5	738.678	.88	.66	.66	327	114	100	1.0	250	70
	120	47.373	.594		.44	323.3	99.55				

Post test leak check – < 0.02 cfm @ 2" Hg

EPA (Dur) 236
4/72

ANALYTICAL DATA

PLANT Kaiser

DATE 4/15/80

SAMPLING LOCATION C

SAMPLE TYPE

RUN NUMBER KSC-C-5-1

SAMPLE BOX NUMBER

CLEAN-UP MAN

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 1	17.4 mg
FILTER NUMBER 4.035	CONTAINER	20.7 mg
FRONT HALF SUBTOTAL		38.1 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER 2	19.3 mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	57.4 mg

MOISTURE

IMPINGERS

FINAL VOLUME ~~250 + 112~~ = 362 ml

INITIAL VOLUME 300 ml

NET VOLUME 62 ml

250
112
362 − 369
− 104
265

SILICA GEL

FINAL WEIGHT	265 g	g	g
INITIAL WEIGHT	250 g	g	g
NET WEIGHT	15 g	g	g

TOTAL MOISTURE 77 g

EPA (Dur) 231
4/72

77

FIELD DATA

PLANT Kaiser Steel
DATE 7/16/80
SAMPLING LOCATION E Battery
SAMPLE TYPE ~~MFD~~ + METH. 5
RUN NUMBER
OPERATOR DEARBORN
AMBIENT TEMPERATURE 85-90
BAROMETRIC PRESSURE 29.15
STATIC PRESSURE, (P_s) -865
FILTER NUMBER (s) 4.037

PROBE LENGTH AND TYPE 10' Meth 5
NOZZLE I.D. .250
ASSUMED MOISTURE, % 8%
SAMPLE BOX NUMBER HOE
METER BOX NUMBER 2656
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING
HEATER BOX SETTING
REFERENCE Δp .84

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	1020	737.080									
12A	5	1030	740.980	.66	1.40	1.40	390	96	90	1	250	64
11A	10	10:35	744.510	.61	1.38	1.38	393	105	92	1	250	64
10A	15	10:41	748.090	.59	1.32	1.32	395	113	94	1	250	65
9A	20	10:46	751.550	.57	1.29	1.29	400	117	96	1	250	67
8A	25	10:51	754.930	.51	1.17	1.17	403	121	99	1	250	68
7A	30	10:56	758.350	.54	1.23	1.23	390	123	101	1	250	64
6A	35	11:01	761.910	.52	1.18	1.18	395	124	104	1	250	62
5A	40	11:06	765.170	.57	1.29	1.29	394	124	105	1	250	62
4A	45	11:11	768.750	.61	1.38	1.38	393	124	107	1	250	62
3A	50	11:16	772.430	.66	1.40	1.40	393	131	109	1	250	66
2A	55	11:21	776.000	.60	1.35	1.35	390	132	111	1	250	66
2A	60	11:26	779.600	.60	1.35	1.35	390	133	112	1	250	66
				PORT CHANGE								
	0	11:37	779.732				404					
12B	65	11:42	783.450	.67	1.50	1.50	~~390~~	116	111	1	250	70
11B	70	11:47	787.000	.70	1.57	1.57	405	123	112	1	250	70
10B	75	11:52	790.790	.68	1.53	1.53	409	129	112	1	250	70
9B	80	11:57	794.650	.69	1.55	1.55	404	132	114	1	250	70
8B	85	12:02	798.450	.65	1.47	1.47	401	132	114	1	250	70
7B	90	12:07	802.080	.63	1.40	1.40	401	132	115	1	250	70
6B	95	12:12	805.630	.55	1.25	1.25	400	131	116	1	250	70
5B	100	12:17	809.130	.55	1.25	1.25	400	130	116	1	250	70
4B	105	12:22	812.870	.67	1.50	1.50	402	131	117	1	250	74

10:39 - Power Off 1 min.

COMMENTS:

EPA (Rev) 235

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			
3B	110	12:27	816.700	.73	1.62	1.62	399	135	117	1	250	78
2B	115	12:32	820.480	.67	1.50	1.50	403	135	118	1	250	78
2B	120	12:37	824.250	.67	1.50	1.50	400	135	119	1	250	78
			END TEST									

EPA (Dur) 236

ANALYTICAL DATA

PLANT Kaiser

DATE 4/15/80

SAMPLING LOCATION BH E

SAMPLE TYPE M-5

RUN NUMBER KSC-E-5-2

SAMPLE BOX NUMBER

CLEAN-UP MAN

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 8 — 101.5 mg

FILTER NUMBER H.037 — CONTAINER — 187.7 mg

FRONT HALF SUBTOTAL 289.2 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER 9 — 28.3 mg

ETHER-CHLOROFORM EXTRACTION — mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER — mg

BACK HALF SUBTOTAL — mg

TOTAL WEIGHT 317.5 mg

MOISTURE

IMPINGERS

FINAL VOLUME 450 ml

INITIAL VOLUME 300 ml

NET VOLUME 150 ml

378
108
270

SILICA GEL

FINAL WEIGHT 270 g

INITIAL WEIGHT 250 g

NET WEIGHT 20 g

378.4 - 108

TOTAL MOISTURE 170 g

EPA (Dur) 231
4/72

FIELD DATA

PLANT Kaiser Steel
DATE 4/11/80
SAMPLING LOCATION 1 Roaster
SAMPLE TYPE M 10 17
RUN NUMBER 2
OPERATOR Eggleston
AMBIENT TEMPERATURE 85-90
BAROMETRIC PRESSURE 27.15
STATIC PRESSURE, (P_s) -3.65
FILTER NUMBER (s) 29

SAME

A 5 1 — 12
B 5 1 — 12

PROBE LENGTH AND TYPE MT017
NOZZLE I.D. .250
ASSUMED MOISTURE, % 8%
SAMPLE BOX NUMBER
METER BOX NUMBER W-20
METER $\Delta H_@$ 1.77
C FACTOR — N/A
PROBE HEATER SETTING N/A
HEATER BOX SETTING N/A
REFERENCE Δp — N/A

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	1027	848.100								N/A	
12	05	1032	852.3	.58	1.34	1.34	389	88	88	1.5		70
11	10	1037	855.9	.57	1.37	1.37	393	98	86	1.5		65
10	15	1042	859.5	.60	1.39	1.39	395	104	90	1.5		60
9	20	1047	862.9	.57	1.33	1.33	400	108	92	1.5		60
8	25	1052	866.6	.57	1.33	1.33	404	111	94	1.5		65
7	30	1057	869.9	.55	1.30	1.30	398	112	96	1.5		60
6	35	1102	873.1	.50	1.19	1.19	395	115	98	1.5		60
5	40	1107	876.4	.48	1.15	1.15	394	116	100	1.5		60
4	45	1112	879.4	.50	1.20	1.20	395	118	101	1.5		65
3	50	1117	882.5	.57	1.37	1.37	394	120	102	1.5		60
2	55	1122	885.0	.59	1.44	1.44	393	121	105	2.0		65
1	60	1127	887.81	.40	0.97	0.97	392	120	106	2.5		65
	60	1128	887.2 (887.30)									
A-12	65	1133	873.3	.55	1.30	1.30	401	110	106	2.0		60
11	70	1138	876.7	.52	1.24	1.24	405	120	108	2.0		60
10	75	1143	879.8	.45	1.07	1.07	409	124	109	2.0		65
9	80	1148	883.0	.48	1.15	1.15	404	126	115	2.5		65
8	85	1153	886.1	.46	1.10	1.10	401	125	110	2.5		65
7	90	1158	889.3	.45	1.09	1.09	398	126	110	2.5		65
6	95	1203	892.3	.43	1.04	1.04	400	126	112	2.5		65
5	100	1208	895.7	.52	1.26	1.26	399	125	112	2.5		70
4	105	1213	898.4	.61	1.47	1.47	402	126	112	3.0		70
3	110	1218		.60	1.45	1.45	399	128	112	3.0		70

DIAL IN SUN

power off 1040 on 1041 water set back

COMMENTS: Initial leak check less than 0.01 cfm

PA (D

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			
	1:00	1233	923.0									
A-2	15	1233	926.0	.64	1.54	1.54	403	121	112	3.0		
A-1	15	1233	929.437	.70	1.70	1.70	400	125	114	3.5		
			END TEST									
			POST TEST	LEAK	CHECK		0.008	OK	OK			

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4/72

ANALYTICAL DATA

PLANT [illegible]

DATE [illegible]

SAMPLING LOCATION [illegible]

SAMPLE TYPE DSC-1-17-2

RUN NUMBER [illegible]

SAMPLE BOX NUMBER

CLEAN-UP MAN

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 10	8.9 mg
FILTER NUMBER 28	CONTAINER	40.4 mg
FRONT HALF SUBTOTAL		49.3 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	N.A. mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
BACK HALF SUBTOTAL		mg
TOTAL WEIGHT		49.3 mg

MOISTURE

IMPINGERS

FINAL VOLUME [illegible] ml

INITIAL VOLUME [illegible] ml

NET VOLUME [illegible] ml

SILICA GEL

FINAL WEIGHT [illegible] g

INITIAL WEIGHT [illegible] 250 g

NET WEIGHT [illegible] g

TOTAL MOISTURE [illegible] g

EPA (Dur) 231
4/72

FIELD DATA

PLANT Kaiser
DATE 4/16/80
SAMPLING LOCATION Baghouse C outlet
SAMPLE TYPE Method 5 - particulate
RUN NUMBER KSC-C-2
OPERATOR Powell / Murphy
AMBIENT TEMPERATURE 75
BAROMETRIC PRESSURE 29.11
STATIC PRESSURE, (P_s) -9.2 in H_2O
FILTER NUMBER (s) C1.034

PROBE LENGTH AND TYPE 10' glass
NOZZLE I.D. 0.248
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER
METER BOX NUMBER 2363
METER $\Delta H_@$ 1.8
C FACTOR
PROBE HEATER SETTING 250°
HEATER BOX SETTING 250°
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

TRAVERSE POINT NUMBER	CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		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			
	0:00 10:25	742.102									
1	10:27.5	743.430	.32	.80	.80	319	90	90	1.0	250	70
2	10:30.0	744.700	.32	.80	.80	320	104	90	1.0	250	70
3	10:32.5	746.980	.32	.80	.80	317	110	92	1.0	250	70
4	10:35.0	747.392	.40	1.0	1.0	322	112	94	1.5	250	70
5	10:37.5	748.920	.43	1.10	1.10	324	114	94	1.5	250	70
6	10:40.0	750.010	.46	1.15	1.15	325	114	95	1.5	250	70
7	10:42.5	752.330	.48	1.24	1.24	327	120	100	1.5	250	70
8	10:45.0	753.790	.48	1.24	1.24	329	120	100	1.5	249	70
9	10:47.5	755.24	.46	1.15	1.15	329	122	102	1.5	251	70
10	10:50.0	756.670	.48	1.24	1.24	332	123	103	1.5	252	70
11	10:52.5	758.120	.48	1.24	1.24	333	124	106	1.5	250	70
12	10:55.0	760.310	.52	1.34	1.34	337	125	107	1.5	250	70
13	10:57.5	762.183	.65	1.67	1.67	337	128	108	1.5	249	70
14	11:00.0	763.670	.69	1.70	1.70	338	127	110	1.5	250	70
15	11:02.5	765.440	.83	2.10	2.10	339	128	110	3.8	250	70
16	11:05.0	767.520	.88	2.10	2.10	340	130	110	3.8	249	70
17	11:07.5	769.535	.80	2.06	2.06	340	131	110	3.9	250	70
18	11:10.0	771.758	.81	2.06		336	132	110	4.5	249	70
19	11:12.5	773.730	.91	2.3	2.3	334	135	110	4.5	251	70
20	11:15.0	776.920	.91	2.3	2.3	335	137	110	4.5	250	70
21	11:17.5	777.82	.85	2.2	2.2	335	139	110	4.0	249	70
22	11:20.0	780.235	.87	2.24	2.24	336	140	111	4.2	250	70
23	11:22.5	782.370	.79	2.03	2.03	336	138	115	4.0	250	70

COMMENTS: final leak check less than .02 cfm at 4" of Hg

EPA (Dur) 235

2nd Trav.

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			
	11:22.5	782.370									
24	11:25.0	784.512	.78	2.01	2.01	336	138	118	3.2	250	70
1	1:02.5	786.013	.45	1.10	1.1	344	103	103	0.5	248	70
2	1:05.0	787.548	.45	1.10	1.10	342	106	103	2.0	250	70
3	1:07.5	789.362	.62	1.54	1.54	340	108	104	2.5	250	70
4	1:10.0	790.970	.56	1.38	1.38	339	112	103	2.0	250	70
5	1:12.5	792.634	.56	1.38	1.38	338	114	104	2.0	249	70
6	1:15.0	794.312	.53	1.31	1.31	339	115	104	2.0	250	70
7	1:17.5	795.940	.53	1.31	1.31	338	118	104	2.0	248	71
8	1:20.0	797.610	.51	1.26	1.26	339	119	105	2.0	249	70
9	1:22.5	799.220	.51	1.26	1.26	338	120	105	2.0	250	70
10	1:25.0	800.778	.49	1.21	1.21	338	124	108	2.0	249	70
11	1:27.5	802.348	.48	1.19	1.19	340	125	108	2.0	250	70
12	1:30.0	803.870	.43	1.06	1.06	340	123	108	2.0	249	71
13	1:32.5	805.342	.41	1.01	1.01	338	125	109	2.0	248	70
14	1:35.0	806.800	.40	0.99	0.99	339	126	108	2.0	248	70
15	1:37.5	808.240	.39	.96	.96	338	125	108	2.0	248	70
16	1:40.0	809.690	.38	.94	.94	340	124	109	2.0	249	69
17	1:42.5	810.101	.36	.89	.89	339	125	110	0.5	250	70
18	1:45.0	812.480	.35	.86	.86	340	126	111	0.5	250	70
19	1:47.5	813.830	.33	.81	.81	342	128	112	0.5	249	71
20	1:50.0	815.010	.30	.74	.74	344	128	112	0.5	248	72
21	1:52.5	816.352	.29	.71	.71	344	125	112	0.5	250	70
22	1:55.0	817.599	.28	.69	.69	345	126	114	0.5	248	71
23	1:57.5	818.800	.27	.66	.66	348	127	112	0.5	249	70
24	2:00.0	820.010	.27	.66	.66	350	125	112	0.5	250	70

EPA (Dur) 236

ANALYTICAL DATA

PLANT Kaiser Steel Corp

DATE 4/16/80

SAMPLING LOCATION BHC

SAMPLE TYPE M-5

RUN NUMBER KSC-C-2

SAMPLE BOX NUMBER

CLEAN-UP MAN

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 6	36.9 mg
FILTER NUMBER 4,034	CONTAINER	32.8 mg
	FRONT HALF SUBTOTAL	69.7 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER 7	243.5 mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	313.2 mg

MOISTURE

IMPINGERS

FINAL VOLUME	400 ml	ml	ml
INITIAL VOLUME	300 ml	ml	ml
NET VOLUME	ml	ml	ml

SILICA GEL

FINAL WEIGHT	279.4 g	g	g
INITIAL WEIGHT	250 g	g	g
NET WEIGHT	29.4 g	g	g

TOTAL MOISTURE g

EPA (Dur) 231
4/72

FIELD DATA

PLANT Kaiser Steel
DATE 4/17/80
SAMPLING LOCATION Baghouse E
SAMPLE TYPE Meth 5
RUN NUMBER 3
OPERATOR DEARDEN
AMBIENT TEMPERATURE 80-95
BAROMETRIC PRESSURE 29.1
STATIC PRESSURE, (P_s) -8.65
FILTER NUMBER (s) 4:028

PROBE LENGTH AND TYPE 10'
NOZZLE I.D. .250
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER ~~26~~ 8E
METER BOX NUMBER 265~~8~~
METER $\Delta H_@$
C FACTOR 0.85
PROBE HEATER SETTING
HEATER BOX SETTING
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	09:00	825.765									
12 B	5	9:05	829.400	.70	1.57	1.57	396	82	81	1	250	56
11 B	10	9:10	833.080	.75	1.68	1.68	398	84	82	1	250	60
10 B	15	9:15	836.880	.74	1.65	1.65	400	100	84	1	250	60
9 B	20	9:20	840.600	.71	1.60	1.60	401	106	86	1	250	60
8 B	25	9:25	844.330	.70	1.57	1.57	398	110	90	1	250	62
7 B	30	9:30	848.000	.66	1.50	1.50	399	113	92	1	250	64
6 B	35	9:35	851.670	.65	1.48	1.48	402	114	94	1	250	60
5 B	40	9:40	855.390	.64	1.43	1.43	404	116	96	1	250	64
4 B	45	9:45	859.000	.69	1.53	1.53	407	119	99	1	250	68
3 B	50	9:50	862.770	.71	1.60	1.60	411	120	100	1	250	60
2 B	55	9.55	866.670	.74	1.65	1.65	409	122	103	1	250	66
2 B	60	10:00	870.500	.73	1.63	1.63	404	124	105	1	250	68
				PORT	CHANGE							
	START	10:06	870.630									
12 A	65	10:11	874.150	.70	1.57	1.57	399	114	106	1	250	65
11 A	70	10:16	877.930	.67	1.50	1.50	400	120	107	1	250	66
10 A	75	10:21	881.570	.62	1.40	1.40	402	123	108	1	250	65
9 A	80	10:26	885.150	.59	1.34	1.34	402	123	108	1	250	64
8 A	85	10:31	888.670	.57	1.28	1.28	401	124	109	1	250	65
7 A	90	10:36	892.240	.60	1.35	1.35	402	124	110	1	250	65
6 A	95	10:41	895.850	.62	1.38	1.38	404	126	110	1	250	65
5 A	100	10:46	899.540	.64	1.43	1.43	408	128	112	1	250	65
4 A	105	10:51	903.290	.69	1.53	1.53	409	129	112	1	250	65

COMMENTS:

EPA 1 5

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			
3A	110	10:56	907.245	.80	1.80	1.80	406	129	113	1	250	65
2A	115	11:01	911.350	.80	1.80	1.80	400	129	113	1	250	65
2A	120	11:06	915.400	.80	1.80	1.80	400	133	115	1	250	65
			END	TEST								

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ANALYTICAL DATA

PLANT Kaiser Steel

DATE 4/16/80

SAMPLING LOCATION Battery E

SAMPLE TYPE M-17

RUN NUMBER KSC-E-17-3

SAMPLE BOX NUMBER

CLEAN-UP MAN

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 13	11.9 mg
FILTER NUMBER 34	CONTAINER	44.0 mg
FRONT HALF SUBTOTAL		55.9 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	N.A. mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
BACK HALF SUBTOTAL		mg
TOTAL WEIGHT		55.9 mg

MOISTURE

IMPINGERS

250 + 180 =

250
180
430

FINAL VOLUME 430 ml

INITIAL VOLUME 300 ml

NET VOLUME 130 ml

SILICA GEL

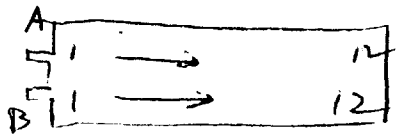
FINAL WEIGHT	264 g	g	g
INITIAL WEIGHT	250 g	g	g
NET WEIGHT	14 g	g	g

TOTAL MOISTURE 149 g

EPA (Dur) 231
4/72

FIELD DATA

PLANT Kaiser / Fontana
DATE 4/17/80
SAMPLING LOCATION E Bagh
SAMPLE TYPE MTD 17
RUN NUMBER 3
OPERATOR Eggleston
AMBIENT TEMPERATURE 80-45
BAROMETRIC PRESSURE 29.1
STATIC PRESSURE, (P_s) -8.65
FILTER NUMBER (s) 29



PROBE LENGTH AND TYPE MTD 17 10'
NOZZLE I.D. .250
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER W-23
METER BOX NUMBER W-20
METER $\Delta H_@$
C FACTOR N/A
PROBE HEATER SETTING N/A
HEATER BOX SETTING N/A
REFERENCE Δp N/A

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	00	0901	931.356								N/A	
A-12	05	0906	934.6	.60	1.35	1.35	396	78	78	4.0		55
11	10	0911	938.1	.55	1.27	1.27	398	88	78	4.0		50
10	15	0916	941.3	.53	1.23	1.23	399	92	80	4		50
9	20	0921	944.5	.48	1.12	1.12	402	96	82	4		50
8	25	0926	947.7	.47	1.10	1.10	398	100	84	4		55
7	30	0931	950.7	.45	1.06	1.06	400	103	85	4		55
6	35	0936	954.0	.49	1.16	1.16	401	104	88	4		60
5	40	0941	957.5	.55	1.30	1.30	404	107	90	4		65
4	45	0946	960.9	.56	1.33	1.33	407	110	92	4		65
3	50	0951	964.6	.55	1.30	1.30	411	111	93	4		65
2	55	0956	967.9	.62	1.47	1.47	406	114	96	4		
1	60	1001	971.67	.68	1.63	1.63	405	116	97	4		65
	65	1006	Post Change 971.67									
B 12	65	1013	975.1	.42	1.01	1.01	400	114	98	4		65
11	70	1018	978.6	.61	1.47	1.47	400	116	100	4		65
10	75	1023	982.2	.64	1.51	1.51	402	114	102	4		65
9	80	1028	985.8	.60	1.42	1.42	403	117	102	4		65
8	85	1033	989.4	.57	1.35	1.35	401	117	103	4		65
7	90	1038	992.8	.54	1.28	1.28	403	117	104	4		65
6	95	1043	996.2	.55	1.30	1.30	405	118	105	4		65
5	100	1048	999.2	.43	1.01	1.01	408	118	106	4		65
4	105	1053	1002.4	.51	1.20	1.20	410	117	106	4		65
3	110	1058	1006.2	.68	1.61	1.61	406	118	106	4		65

Thermometer in error

COMMENTS: Pre test leak check 0.005 cfm 7.5"

EPA (Dur) 235

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
	110	1055	1006.2								N/A	
B-2	115	1103	1010.0	.64	1.50	1.52	401	119	106	4		65
B-1	120	1108	1013.210	.55	1.31	1.31	400	122	107	4		65
			END TEST									
			POST TEST LEAK CHECK		0.015 cfm @ 15" Hg							

EPA (Dur) 236
4-72

ANALYTICAL DATA

PLANT Kaiser Steel

DATE 4/17/80

SAMPLING LOCATION Battery E

SAMPLE TYPE M-5

RUN NUMBER KSC-E-5-3

SAMPLE BOX NUMBER

CLEAN-UP MAN

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER

CONTAINER 18 — 83.4 mg

FILTER NUMBER 4.038

CONTAINER — The filter was dropped on the floor — mg

FRONT HALF SUBTOTAL mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER 11 & 12 — 33.4 mg

ETHER-CHLOROFORM EXTRACTION — mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER — mg

BACK HALF SUBTOTAL mg

TOTAL WEIGHT mg

MOISTURE

IMPINGERS

FINAL VOLUME 468 ml

INITIAL VOLUME 300 ml

NET VOLUME ~~168~~ ml

218 + 250 = 468

370 − 107.5 =

370
107.5
262.5

SILICA GEL

FINAL WEIGHT 262.5 g

INITIAL WEIGHT 250 g

NET WEIGHT ~~12.5~~ g

TOTAL MOISTURE 180.5 g

EPA (Dur) 231
4/72

FIELD DATA

PLANT Kaiser Steel
DATE 4/17/80
SAMPLING LOCATION Baghouse Outlet
SAMPLE TYPE Method 5 Particulate
RUN NUMBER KSC-C-3
OPERATOR Powell / Murphy
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.13
STATIC PRESSURE, (P_s) -9.2
FILTER NUMBER (s)

PROBE LENGTH AND TYPE 10' glass
NOZZLE I.D. 0.248
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER
METER BOX NUMBER 2363
METER $\Delta H_@$ 1.8
C FACTOR
PROBE HEATER SETTING 250
HEATER BOX SETTING 250
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

TRAVERSE POINT NUMBER	CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	00.00 0900	820.343									
1	0902.5	821.880	.51	1.23	1.23	329	80	80	.5	250	70
2	905.0	823.490	.57	1.38	1.38	330	82	80	2.0	250	70
3	9:07.2	825.105	.57	1.38	1.38	330	86	80	2.0	250	70
4	9:10.0	826.690	.57	1.38	1.38	328	89	80	2.0	250	70
5	9:12.5	828.300	.55	1.33	1.33	328	90	82	2.0	250	70
6	9:15.0	829.920	.53	1.28	1.28	327	96	84	2.0	251	70
7	9:17.5	831.412	.55	1.33	1.33	327	98	84	2.0	250	70
8	9:20.0	832.983	.56	1.36	1.36	327	102	84	2.0	250	70
9	9:22.5	834.540	.53	1.28	1.28	328	102	84	2.0	250	70
10	9:25.0	836.109	.55	1.33	1.33	328	104	84	2.0	250	70
11	9:27.5	837.77	.53	1.28	1.28	328	106	84	2.0	250	70
12	9:30.0	839.20	.48	1.16	1.16	329	108	84	2.0	250	70
13	9:32.5	840.800	.52	1.26	1.26	328	108	86	2.0	250	70
14	9:35.0	842.43	.57	1.38	1.38	329	108	86	2.0	250	70
15	9:37.5	844.120	.59	1.45	1.45	329	108	86	2.0	250	70
16	9:40.0	845.970	.63	1.53	1.53	329	108	86	2.0	250	70
17	9:42.5	847.65	.70	1.70	1.70	329	109	86	2.0	249	71
18	9:45.0	849.520	.76	1.84	1.84	329	100	86	2.0	249	70
19	9:47.5	851.480	.81	1.96	1.96	329	109	86	2.0	248	70
20	9:50.0	853.426	.79	1.94	1.94	329	115	86	2.9	250	70
21	9:52.5	855.428	.84	2.11	2.11	329	117	84	2.9	250	70
22	9:55.0	857.490	.86	2.16	2.16	330	116	85	3.2	250	70
23	9:57.5	859.580	.85	2.14	2.14	333	116	85	3.5	250	70

COMMENTS: pretest: Leak check Less than .02 ~~in Hg~~ cfm at 4.5 in hg

EPA (C

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			
	09:57	859.58									
24	10:00	861.540	.82	2.06	2.06	335	116	84	3.8	250	70
2nd Trav. 1	10:17.5	862.830	.24	.60	.60	330	100	98	0.5	250	70
2	10:20.0	864.090	.30	.75	.75	329	106	100	0.5	250	70
3	10:22.5	865.388	.31	.78	.78	329	108	100	.5	250	70
4	10:25.0	866.740	.32	.80	.80	329	110	98	.5	250	70
5	10:27.5	868.020	.33	.83	.83	333	114	100	.8	250	70
6	10:30.0	869.352	.35	.88	.88	332	115	100	.5	250	70
7	10:32.5	870.720	.35	.88	.88	333	116	102	.5	250	70
8	10:35.0	872.225	.37	.93	.93	332	117	102	.5	250	70
9	10:37.5	873.510	.37	.93	.93	331	118	104	.5	250	70
10	10:40.0	874.950	.38	.95	.95	333	118	104	.5	250	70
11	10:42.5	876.413	.40	1.00	1.00	332	118	104	.6	250	70
12	10:45.0	877.875	.41	1.03	1.03	335	122	104	2.0	250	70
13	10:47.5	879.580	.40	1.00	1.00	339	124	106	2.0	250	70
14	10:50.0	880.394	.58	1.46	1.46	339	124	106	2.0	250	70
15	10:52.5	881.200	.63	1.63	1.63	338	125	106	2.5	250	70
16	10:55.0	882.950	.66	1.70	1.70	342	126	108	2.5	250	70
17	11:57.5	884.920	.70	1.81	1.81	342	128	108	2.5	250	70
18	11:00.0	885.835	.75	1.94	1.94	345	129	109	2.5	250	70
19	11:02.5	887.940	0.89	2.30	2.30	345	129	109	2.5	250	70
20	11:05.0	888.990	.83	2.14	2.14	348	130	109	2.9	250	70
21	11:07.5	890.800	.84	2.19	2.19	342	131	110	3.9	250	70
22	11:10.0	892.310	.86	2.24	2.24	343	130	110	3.9	250	70
23	11:12.5	895.150	.84	2.14	2.14	342	130	110	3.8	250	70
24	11:15.0	897.24	.70	1.81	1.71	339	130	110	3.0	250	70
	11:17.5	899.002	.64	1.67	1.67	339	128	109	3.0	250	70

EPA (Dur) 236
4/72

ANALYTICAL DATA

PLANT Kaiser Steel

DATE 4/17/80

SAMPLING LOCATION BH C

SAMPLE TYPE M-5

RUN NUMBER KSC-C-3

SAMPLE BOX NUMBER

CLEAN-UP MAN

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 17	33.6 mg
FILTER NUMBER 4.039	CONTAINER	52.6 mg
	FRONT HALF SUBTOTAL	86.2 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER 15 & 16	406.0 mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	492.2 mg

MOISTURE

IMPINGERS

FINAL VOLUME 460 ml

INITIAL VOLUME 300 ml

NET VOLUME 160 ml

SILICA GEL

FINAL WEIGHT	g	g	g
INITIAL WEIGHT	250 g	g	g
NET WEIGHT	g	g	g

TOTAL MOISTURE g

EPA (Dur) 231
4/72

APPENDIX A

3. Inorganic Gas Determination

INORGANIC GASES

NORMALIZED

Test No. 1

Battery C

	HT X Att = TOTAL HEIGHT
CO_2	10.5 x 256 = 2688
O_2	41.0 x 256 = 10496
N_2	44.5 x 512 = 22784
CO	0 x 16 = 0

Battery E

CO_2	10.5 x 128 = 1344
O_2	93. x 128 = 11904
N_2	43 x 512 = 22046
CO	0 x 16 = 0

Span

	%	HT
CO_2	15.0	10496
O_2	5.13	4096
N_2	72.64	22016
CO	7.23x	2176

Battery C

CO_2	4.17
O_2	14.27
N_2	81.56
CO	0
	100.00

Battery E

CO_2	2.15
O_2	16.66
N_2	81.19
CO	0
	100.00

INORGANIC GASES

NORMALIZED RESULTS

Test No. 2

Battery C

CO_2	16	x 128	=	2048
O_2	40	x 256	=	10240
N_2	42	x 512	=	21504
CO	0	x 8	=	0

Battery E

CO_2	16	x 128	=	2432
O_2	81	x 128	=	10368
N_2	44	x 512	=	22528
CO	1	x 16	=	16

Span Gas

		%	HT
CO_2	=	7.23	2176
CO_2	=	15.0	10496
O_2	=	5.13	4096
N_2	=	72.64	22016

Battery C

%		%
CO_2	=	3.38
O_2	=	14.80
N_2	=	81.82
CO	=	0 ppm

Battery E

%		%
CO_2	=	3.82
O_2	=	14.29
N_2	=	81.83
CO	=	5.50 ppm

INORGANIC GASES

NORMALIZED RESULTS

Test No. 3

Battery C

CO_2	19 x 128 =	2432
O_2	80 x 128 =	10240
N_2	44 x 512 =	22528
CO^2	0 x 16 =	0

Battery E

CO_2	24.5 x 128 =	3136
O_2	38 x 256 =	9728
N_2	45 x 512 =	23040
CO^2	0 x 16 =	0

Span Gas

	%	HT
CO_2	15.0	9856
O_2	5.13	3968
N_2	72.64	22016
CO^2	7.23	2312

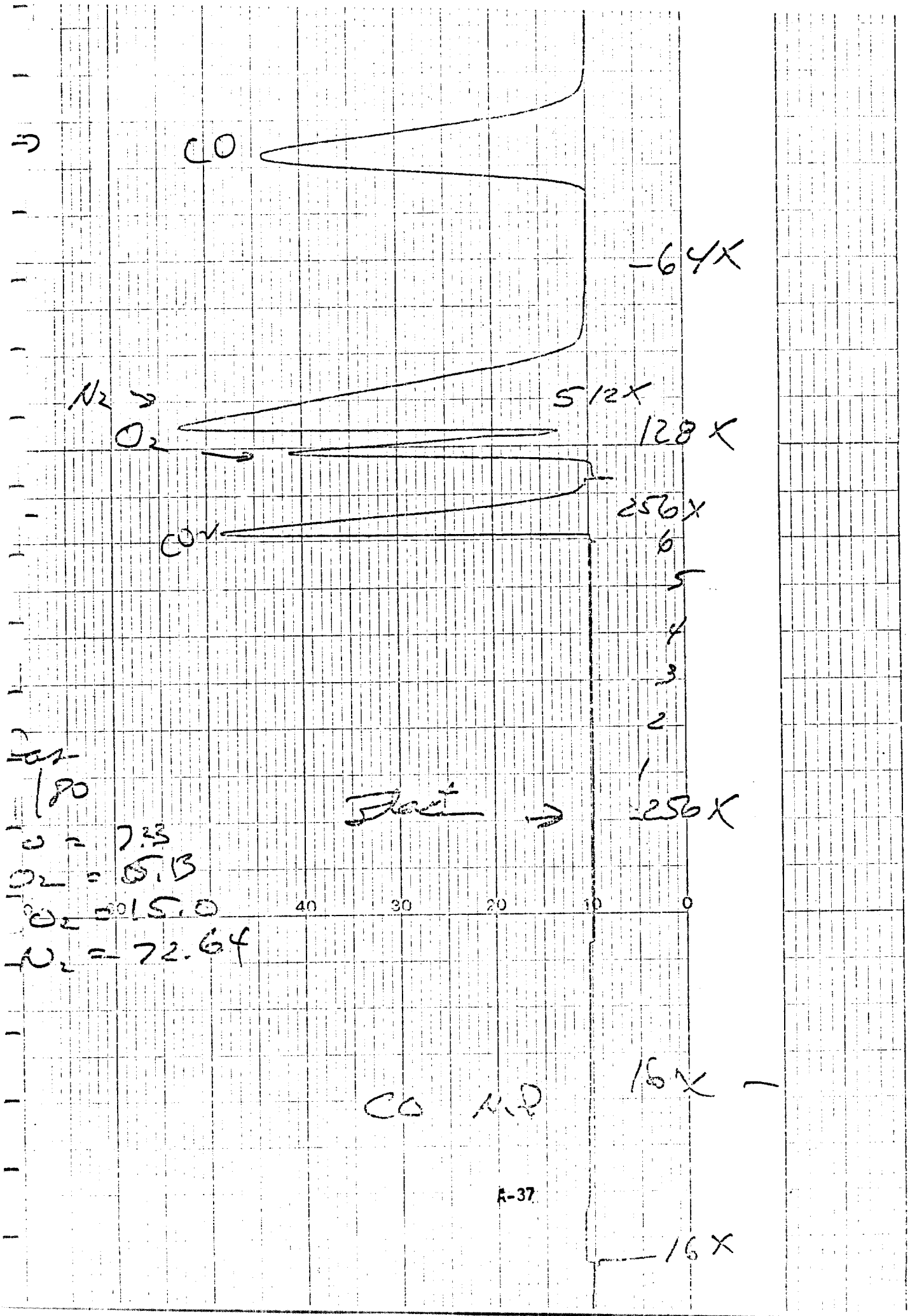
Battery C

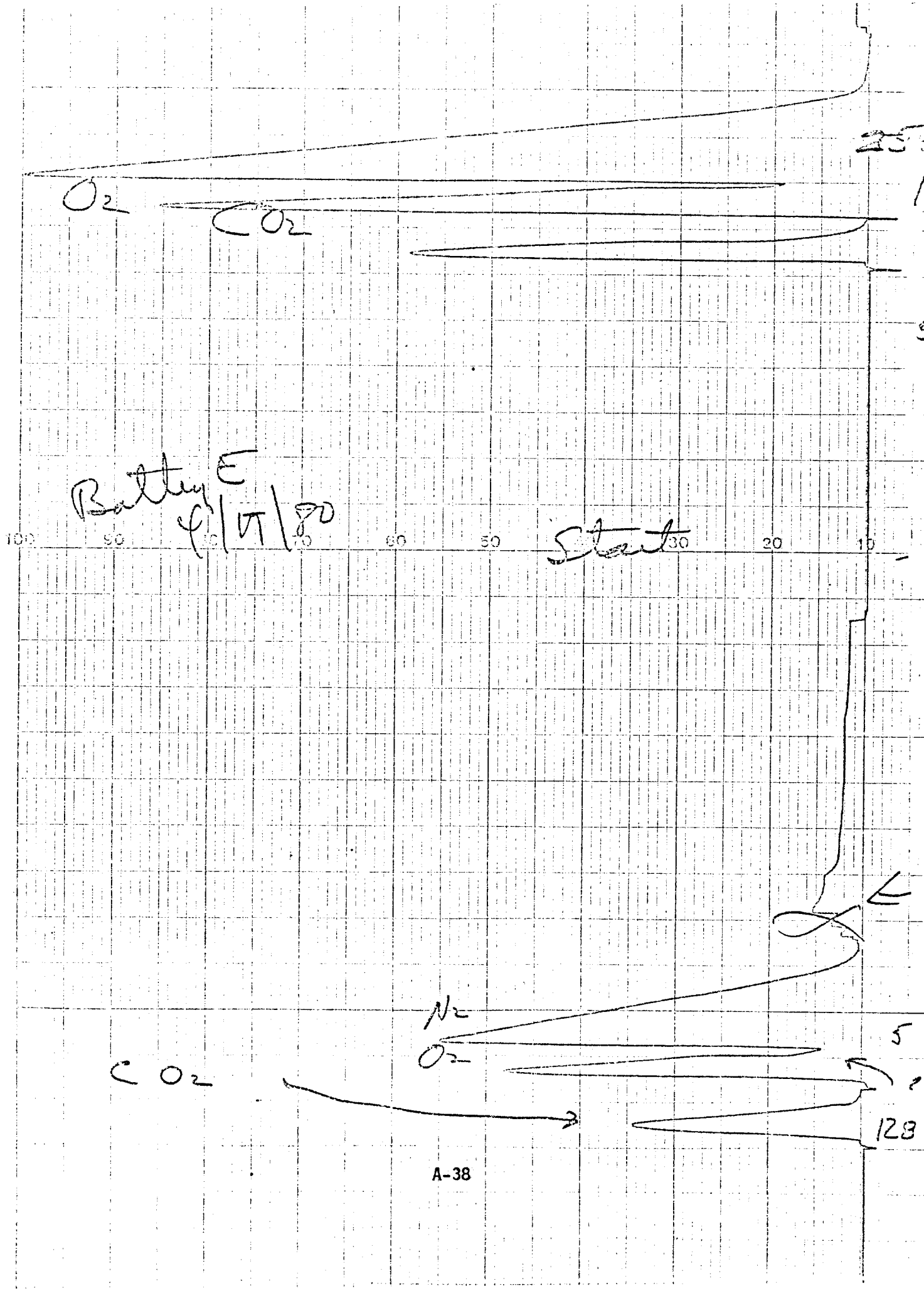
%		%
CO_2	=	4.87
O_2	=	14.38
N_2	=	80.75
CO^2	=	N.D.

Battery E

%		%
CO_2	=	4.77
O_2	=	13.13
N_2	=	82.10
CO^2	=	N.D.

N.D. = None Detected


CO
64X
N2
512X
O2
128X
256X
CO2
6
5
4
3
2
1
256X
40
30
20
10
0
16X
CO AP
16X


O2
CO2
Battery E
C|VT|80
100
90
80
70
60
50
Start
30
20
10
N2
O2
CO2
5
128

APPENDIX A

4. Visible Emission Data

a. Battery C

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 of ____

COMPANY KAISER STEEL
LOCATION 1200 ft south east
TEST NUMBER ONE
DATE 15 APRIL 80
TYPE FACILITY COKE OVEN BATTERY C
CONTROL DEVICE BAGHOUSE

HOURS OF OBSERVATION ____
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 OCT. 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS STACK
HEIGHT OF DISCHARGE POINT 200 ft

	Initial			Final
CLOCK TIME	1115			
OBSERVER LOCATION Distance to Discharge	1200 ft			
Direction from Discharge	south east			
Height of Observation Point	ground level			
BACKGROUND DESCRIPTION	hazy			
WEATHER CONDITIONS Wind Direction	east			
Wind Speed	8-10			
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	none black			
Discharge Visible	?			
Duration				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	11:15-11:20	13	1/2
2	11:20-11:25	21	1/4
3	11:27-11:32	4	0.16
4	11:33-11:38	3	0.125
5	11:39-11:44	0	0
6	11:45-11:50	0	0
7	11:50-11:55	0	0
8	11:56-12:02	0.75	0.03
9	12:03-12:08	0	0
10	12:09-12:14	0	0
11	12:15-12:20	0	0
12	12:21-12:26	3.75	0.15
13	12:27-12:29		

Readings ranged from 0 to 15 ~~% opacity~~ Ringlemann

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1200 ft southeast
TEST NUMBER ONE
DATE 15 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY ~~Steel Plant~~
POINT OF EMISSIONS Coke Oven C Stack

Reading in Ringlemann units

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
11	150	1/2	1/2	3/4	3/4			
	16 1	3/4	3/4	3/4	1/2			
	17 2	1/2	1/2	1/2	3/4			
	18 3	1/2	1/2	1/2	1/2			
	19 4	1/2	1/4	1/2	1/2			
	20 5	1/2	1/2	1/2	1/4			
	21 6	1/4	1/4	1/4	1/4			
	22 7	1/4	1/4	1/4	1/4			
	23 8	1/4	1/4	1/4	1/4			
	24 9	1/4	1/4	1/4	1/4			
	25 10	1/4	1/4	1/4	1/4			
	11	1/4	0					
	12							
	28 13		1/4	1/4	1/4			
	29 14	1/4	1/4	1/4	1/2			
	30 15	1/4	0	1/4	1/2			
	16	1/2	1/4	1/4	0			
	17	0	0	0	0			
	18	0	0	0	1/4			
	19	0	1/4	0	0			
	35 20	1/4	1/4	1/4	1/4			
	21	1/4	1/4	1/4	1/4			
	22	1/4	1/4	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
	40 25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1200 ft southeast
TEST NUMBER ONE
DATE 15 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS STACK

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
11	4530	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
	5035	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			Plume passed just above stack & approx. 2 miles behind stack – plume remained clearly visible
	39	0	0	0	0			
	5540	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
12	0045	0	0	0	0			
	46	0	0	1/4	1/4			
	47	1/4	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
	0550	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	0	0	0			
	54	0	0	0	0			
	1055	0	0	0	0			
	56	0	0	0	0			
	57	0	0	0	0			
	58	0	0	0	0			
12	14 59	0	0	0	0			
	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
11	18	0	0	0	0			
	19	0	0	0	0			
	20	0	0	0	0			
	21	0	0	1/4	1/4			
	22	1/4	1/4	1/4	1/4			
	23	1/4	1/4	1/4	1/4			
12	24	1/4	1/4	1/4	1/4			
	25	1/4	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
13	28	0	0	0	0			
	29	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 4 of ____

COMPANY Kaiser Steel
LOCATION 1200 ft south east
TEST NUMBER one
DATE 15 APRIL
TYPE FACILITY Coke Oven Battery C
CONTROL DEVICE Baghouse

HOURS OF OBSERVATION ____
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 Oct 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack
HEIGHT OF DISCHARGE POINT 200 ft.

	Initial			Final
CLOCK TIME	1235			
OBSERVER LOCATION Distance to Discharge	1000 ft			
Direction from Discharge	south			
Height of Observation Point	ground			
BACKGROUND DESCRIPTION	hazy			
WEATHER CONDITIONS Wind Direction	west			
Wind Speed	8-10			
Ambient Temperature	85°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	clear - black			
Distance Visible				
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	12:35 - 12:40	0	0
2	12:40 - 12:45	0	0
3	12:45 - 12:50	0	0
4	12:50 - 12:55	0	0
5	12:55 - 13:00	0	0
6	13:00 - 13:05	20	0.83
7	13:05 - 13:10	0	0
8	13:10 - 13:15	0	0
9	13:15 - 13:20	0	0
10	13:20 - 13:25	10	0.42

Readings ranged from ____ to ____ % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1200 ft south east
TEST NUMBER one
DATE 15 APR 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

Reading in % opacity

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
12	350	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
	405	0	0	0	0			Emissions partially obscurred by faint plume directly west of coke oven C stack (from coke oven B stack)
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
	450	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
	515	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
	520	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
13	0025	0	0	0	0			
	26	0	0	5	10			
	27	5	0	0	0			
	28	0	0	0	0			
	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1200 ft south east
TEST NUMBER One
DATE 15 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
13	0530	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
	1035	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
	1540	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
	2045	0	0	0	0			
	46	0	0	0	0	}		Upset from Coke oven B occassionally partially obscurring stack
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
	2550	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	0	0	0			
	54	0	0	0	0			
	3055	0	0	0	0			
	56	5	5	0	0			
	57	0	0	0	0			
	58	0	0	0	0			
	3459	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION 1000 ft south
TEST NUMBER one
DATE 15 APRIL 80
TYPE FACILITY Coke Oven Battery C
CONTROL DEVICE Baghouse

HOURS OF OBSERVATION ___
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 Oct 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack
HEIGHT OF DISCHARGE POINT 200 ft.

	Initial			Final
CLOCK TIME	1335			
OBSERVER LOCATION Distance to Discharge	1000 ft			
Direction from Discharge	south ~~west~~			
Height of Observation Point	ground level			
BACKGROUND DESCRIPTION	hazy			
WEATHER CONDITIONS Wind Direction	west			
Wind Speed	10			
Ambient Temperature	90°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	clear-black			
Distance Visible	?			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	13:35 - 13:40	0	0
2	13:41 - 13:46	0	0
3	13:47 - 13:52	15	0.6
4	13:53 - 13:58	5	.2
5	13:59 - 14:04 end test	5	.2
6	14:05 - 14:10	0	0
7	14:11 - 14:16	0	0
8	14:17 - 14:22	0	0
9	14:23 - 14:28	0	0
10	14:29 - 14:34	25	1.0

Readings ranged from ____ to ____ % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1000 ft South
TEST NUMBER One
DATE 15 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

% opacity units

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
13	350	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
	405	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
	490	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	5	5			
	14	5	0	0	0			
	5015	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
	5520	0	0	5	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
13	5924	0	0	0	0			
14	0025	0	0	0	0			
	26	0	0	0	5			
	27	0	0	0	0			Stack partially obscurred by another plume
	28	0	0	0	0			
14	0429	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1000 ft south
TEST NUMBER one
DATE 15 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

% opacity units

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
14	05 30	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
	10 35	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
	15 40	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
	20 45	0	0	0	0			
	46	0	0	0	0			
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
	25 50	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	0	0	0			
	54	0	0	0	0			
	30 55	0	0	0	5			
	56	5	5	5	5			
	57	0	0	0	0			
	58	0	0	0	0			
	3 59	0	0	0	0			

~~1435~~

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 10 of ___

COMPANY Kaiser Steel
LOCATION 1000 ft South
TEST NUMBER One
DATE 15 April 80
TYPE FACILITY Coke oven battery C
CONTROL DEVICE Baghouse

HOURS OF OBSERVATION
OBSERVER M Drehsen
OBSERVER CERTIFICATION DATE 18 Oct 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack
HEIGHT OF DISCHARGE POINT 200 ft

	Initial			Final
CLOCK TIME	1435			
OBSERVER LOCATION Distance to Discharge	1000			
Direction from Discharge	South			
Height of Observation Point	ground level			
BACKGROUND DESCRIPTION	hazy			
WEATHER CONDITIONS Wind Direction	west			
Wind Speed	10			
Ambient Temperature	90°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	black			
Distance Visible				
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	14:35 - 14:40	0	0
2	14:41 - 14:46	0	0
3	14:47 - 14:52	0	0
4	14:53 - 14:58	0	0
5	14:59 - 15:05	0	0
6	15:06 - 15:11	0	0
7	15:12 - 15:17	0	0
8	15:18 - 15:23	0	0
9	15:24 - 15:29	0	0
10	15:30 - 15:35	20	0.8

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1000 ft south
TEST NUMBER one
DATE 15 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
14	350	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
	405	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
	4510	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
	5015	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
	5520	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
14	5524	0	0	0	0			
15	0025	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
15	0429	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1000 ft south
TEST NUMBER one
DATE 15 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

% opacity units

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
15	05 30	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
	10 35	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
	15 40	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
	20 45	0	0	0	0			
	46	0	0	0	0			
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
	25 50	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	0	0	0			
	54	0	0	0	0			
	30 55	0	0	0	0			
	56	5	5	5	5			
	57							Stack obscurred by another plume
	58	0	0	0	0			
15	35 59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION 1000 ft South
TEST NUMBER one
DATE 15 APRIL 80
TYPE FACILITY Coke Oven Battery C
CONTROL DEVICE Baghouse

HOURS OF OBSERVATION ____
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 Oct 79
OBSERVER AFFILIATION RW
POINT OF EMISSIONS Stack
HEIGHT OF DISCHARGE POINT 200 ft

	Initial			Final
CLOCK TIME	1535			
OBSERVER LOCATION Distance to Discharge				
Direction from Discharge				
Height of Observation Point				
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction				
Wind Speed				
Ambient Temperature				
SKY CONDITIONS (clear, overcast, % clouds, etc.)				
PLUME DESCRIPTION Color				
Distance Visible				
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	15:35 - 15:40	0	0
2	15:41 - 15:46	0	0
3	15:47 - 15:52	0	0
4	15:53 - 15:58	0	0

Readings ranged from ____ to ____ % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1000 ft South
TEST NUMBER one
DATE 15 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
15	350	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
	405	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
	450	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
	505	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
	520	0	0	0	0			
	21	0	0					
	22							
	23							
	24							
16	0025							
	26							
	27							
	28							
	29							

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 of ___

COMPANY KAISER STEEL
LOCATION 1500 ft so.E of stack
TEST NUMBER #2
DATE 16 APRIL 80
TYPE FACILITY STEEL MILL
CONTROL DEVICE BAGHOUSE

HOURS OF OBSERVATION 1015-
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 OCT ~~80~~ 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS COKE OVEN BATTERY
HEIGHT OF DISCHARGE POINT 200 ft

	Initial			Final
CLOCK TIME	1015			1114
OBSERVER LOCATION Distance to Discharge	~~1~~ 1500 ft			1500 ft
Direction from Discharge	SE			SE
Height of Observation Point	ground level			ground level
BACKGROUND DESCRIPTION	hazy			hazy
WEATHER CONDITIONS Wind Direction	south east ~~west~~			south east
Wind Speed	2			2
Ambient Temperature	80			80+
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			clear
PLUME DESCRIPTION Color	none			none
Distance Visible	—			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	10:15 - 10:20	0	0
2	10:21 - 10:26	0	0
3	10:27 - 10:32	0	0
4	10:33 - 10:38	0	0
5	18:39 - 10:44	0	0
6	10:45 - 10:50	0	0
7	10:51 - 10:56	0	0
8	10:57 - 11:02	10	0.4
9	11:03 - 11:08	20	0.8
10	11:09 - 11:14	130	5.4

Readings ranged from 0 to 15 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD

PAGE 2 OF ___

COMPANY KAISER STEEL
LOCATION 800 ft south east
TEST NUMBER #2
DATE 16 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY ~~STEEL MILL~~
POINT OF EMISSIONS COKE OVEN BATTERY C STACK

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1015	0	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
1020	5	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
1025	10	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
1030	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
1035	20	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
1040	25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
1045	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

COMPANY KAISER STEEL
LOCATION 1500 south east
TEST NUMBER #2
DATE 16 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY COKE OVEN BATTERY C
POINT OF EMISSIONS STACK

% opacity units

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1045	30	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
50	35	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
55	40	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
1100	45	0	0	5	5			
	46	0	0	0	0			
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
1105	50	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	5	5	10			
	54	10	5	10	10			
1110	55	15	10	5	10			
	56	10	10	5	5			
	57	5	5	5	5			
	58	5	5	0	0			
1114	59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION 1500 ft south east
TEST NUMBER #2
DATE 16 April 80
TYPE FACILITY Coke Oven Battery C
CONTROL DEVICE Baghouse

HOURS OF OBSERVATION ___
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 OCT 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack
HEIGHT OF DISCHARGE POINT 200 ft

	Initial			Final
CLOCK TIME	1115			1144
OBSERVER LOCATION Distance to Discharge	1500 ft			1500 ft
Direction from Discharge	SE			SE
Height of Observation Point	ground level			ground
BACKGROUND DESCRIPTION	hazy			hazy
WEATHER CONDITIONS Wind Direction	south east			south east
Wind Speed	2			2
Ambient Temperature	80			80
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			clear
PLUME DESCRIPTION Color	none			none
Distance Visible				
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	11:15 - 11:20	145	6.0
2	11:21 - 11:26	0	0
3	11:27 - 11:32	40	1.7
4	11:33 - 11:38	0	0
5	11:39 - 11:44	0	0
6	11:45 - 11:50	0	0
7	11:51 - 11:56		
8	11:57 - 12:02		
9	12:03 - 12:08		
10	12:09 - 12:14		

Readings ranged from 0 to 20 % opacity

The source was/was not in compliance with ___ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 5 OF ___

COMPANY Kaiser Steel
LOCATION 1500 ft south east
TEST NUMBER 2
DATE 16 April 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

% opacity units

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1	1115	0	0	0	0	0			
	16	1	0	10	20	15			
		2	10	5	10	10			
		3	10	5	5	5			
		4	5	5	5	5			
	1120	5	5	5	5	5			
2		6	0	0	0	0			
		7	0	0	0	0			
		8	0	0	0	0			
		9	0	0	0	0			
	25	10	0	0	0	0			
		11	0	0	0	0			
3		12	0	0	0	0			
		13	0	0	0	0			
		14	0	0	0	5			
	30	15	5	5	5	0			
		16	0	0	0	0			
		17	5	5	5	5			
4		18	0	0	0	0			
		19	0	0	0	0			
	35	20	0	0	0	0			
		21	0	0	0	0			
		22	0	0	0	0			
		23	0	0	0	0			
5		24	0	0	0	0			
	40	25	0	0	0	0			
		26	0	0	0	0			
		27	0	0	0	0			
		28	0	0	0	0			
	1144	29	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 2 of ___

COMPANY Kaiser Steel
LOCATION 800 ft south of stack
TEST NUMBER 2
DATE 16 APRIL 80
TYPE FACILITY Coke Oven Battery C
CONTROL DEVICE Baghouse

HOURS OF OBSERVATION 1300-~~1400~~ 13
OBSERVER M. Drelsen
OBSERVER CERTIFICATION DATE 18 OCT 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack
HEIGHT OF DISCHARGE POINT 200 ft

	Initial			Final
CLOCK TIME	1300			1400
OBSERVER LOCATION Distance to Discharge	800 ft			800 ft
Direction from Discharge	South			South
Height of Observation Point	ground level			ground level
BACKGROUND DESCRIPTION	slightly hazy			slightly hazy
WEATHER CONDITIONS Wind Direction	south ~~2-5~~			south
Wind Speed	2-5			8-10
Ambient Temperature	85			90
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			clear
PLUME DESCRIPTION Color	clear-black			clear-black
Distance Visible				
OTHER INFORMATION	some plumes blowing north - others blowing east.			

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	13:00 - 13:05	0	0
2	13:06 - 13:11	0	0
3	13:12 - 13:17	0	0
4	13:18 - 13:23	0	0
5	13:24 - 13:29	0	0
6	13:30 - 13:35	0	0
7	13:36 - 13:41	0	0
8	13:41 - 13:46	0	0
9	13:47 - 13:52	10	0.4
10	13:53 - 14:00	5	0.2

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 8 OF ___

COMPANY Kaiser Steel
LOCATION 800 ft south
TEST NUMBER 2
DATE 16 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS STACK

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1300	0	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
1305	5	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
1310	10	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
1315	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
1320	20	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
1325	25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
1329	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

COMPANY KAISER STEEL
LOCATION 800 ft south
TEST NUMBER 2
DATE 16 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY COKE OVEN BATTERY C
POINT OF EMISSIONS STACK

% opacity units

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1330	30	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
35	35	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
	40	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
	45	0	0	0	0			
	46	0	0	0	0			
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
	50	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	5	0	0	5			
	54	5	0	0	0			
	55	0	0	0	0			
	56	0	0	0	0			
	57	0	0	0	0			
	58	0	0	0	0			
13	59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY KAISER STEEL
LOCATION 800 ft south of stack
TEST NUMBER 2
DATE 16 APRIL 80
TYPE FACILITY COKE OVEN BATTERY C
CONTROL DEVICE BAGHOUSE

HOURS OF OBSERVATION 1400 – 1429
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 OCT. 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS STACK
HEIGHT OF DISCHARGE POINT 200' ft.

	Initial			Final
CLOCK TIME	1400			1429
OBSERVER LOCATION Distance to Discharge	800 ft			800'
Direction from Discharge	south			south
Height of Observation Point	ground level			ground
BACKGROUND DESCRIPTION	slightly hazy			slightly hazy
WEATHER CONDITIONS Wind Direction	South			west-South
Wind Speed	8-10			8-10
Ambient Temperature	90			90
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			clear
PLUME DESCRIPTION Color	clear black			clear-black
Distance Visible				
OTHER INFORMATION	some others	plumes blowing	blowing east.	north-

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	14:00 – 14:05 end Test	0	0
2	14:06 – 14:11	0	0
3	14:12 – 14:17	0	0
4	14:18 – 14:23	0	0
5	14:24 – 14:29	0	0
6	14:30 – 14:35	45	1.88

Readings ranged from ____ to ____ % opacity

The source was/was not in compliance with ____ a the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD

PAGE 11 OF ___

COMPANY Kaiser Steel
LOCATION 800 ft.
TEST NUMBER 2
DATE 16 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven BATTERY C
POINT OF EMISSIONS STACK

% opacity units

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1400	0	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
	5	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
	10	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			Plume partially obscurred by another plume
	19	0	0	0	0			
	20	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			Plume partially obscurred
	24	0	0	0	0			
	25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	5			
	28	5	5	5	5			
1429	29	5	5	5	5			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 of ____

COMPANY KAISER STEEL
LOCATION 1500 ft South East
TEST NUMBER 3
DATE 17 APRIL 80
TYPE FACILITY COKE OVEN BATTERY C
CONTROL DEVICE BAGHOUSE

HOURS OF OBSERVATION 0900 –
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 OCT 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS STACK
HEIGHT OF DISCHARGE POINT 200 ft.

	Initial			Final
CLOCK TIME	0900			
OBSERVER LOCATION Distance to Discharge	1500 ft			
Direction from Discharge	~~south~~ north west			
Height of Observation Point	ground level			
BACKGROUND DESCRIPTION	hazy			
WEATHER CONDITIONS Wind Direction	east			
Wind Speed	3-5			
Ambient Temperature	75			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	none – black			
Distance Visible				
OTHER INFORMATION	~~Plume~~ Stack partially obscured by emissions [illegible]			

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	900	0	0
2	906	0	0
3	912	0	0
4	918	0	0
5	924	0	0
6	930	0	0
7	936	0	0
8	942	0	0
9	948	0	0
10	952	90	3.75

Readings ranged from 0 to 20 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 2 OF ___

COMPANY Kaiser Steel
LOCATION 1500 ft south east
TEST NUMBER 3
DATE 17 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
0900	0	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
	5	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
	10	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
	20	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
	25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

COMPANY Kaiser Steel
LOCATION 1500 ft south east
TEST NUMBER 3
DATE 17 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

% opacity units

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
0930	30	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
	35	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
	40	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
	45	0	0	0	0			
	46	0	0	0	0			
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
	50	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	0	0	0			
	54	0	0	0	0			
	55	0	5	5	10			
	56	10	10	15	10			
	57	5	5	5	5			
	58	5	0	0	0			
	59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 4 of ___

COMPANY Kaiser Steel
LOCATION 1300-1500 ft south east
TEST NUMBER 3
DATE 17 APRIL 80
TYPE FACILITY Coke Oven Battery
CONTROL DEVICE Baghouse

HOURS OF OBSERVATION 1000-
OBSERVER M. Drohen
OBSERVER CERTIFICATION DATE 18 OCT 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS STACK
HEIGHT OF DISCHARGE POINT 200 ft

	Initial			Final
CLOCK TIME	1000			
OBSERVER LOCATION Distance to Discharge	1500 ft			1300 ft
Direction from Discharge	north west			north west
Height of Observation Point	ground leve			
BACKGROUND DESCRIPTION	hazy			
WEATHER CONDITIONS Wind Direction	south east			
Wind Speed	3-5			
Ambient Temperature	80			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	clear-black			
Distance Visible				
OTHER INFORMATION	Stack sometimes obscured by fugitive emissions			

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	1000	215	9.0
2	1006	55	2.3
3	1012	50	2.1
4	1018	10	0.4
5	1024	110	4.6
6	1030	35	1.5
7	1036	30	1.3
8	1042	55	2.3
9	1048	15	0.6
10	1054	0	0

Readings ranged from 0 to 15 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1500 ft. south east
TEST NUMBER 3
DATE 17 APRIL 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

% opacity units

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	1000	0	0	5	15	15			
		1	15	10	10	10			
		2	15	10	10	5			
1		3	5	10	10	5			
		4	10	5	5	5			
		5	10	10	5	5			
		6	0	0	5	0			
		7	0	0	0	0			
		8	0	0	5	0			
2		9	0	0	5	0			
		10	5	5	5	5			
		11	5	5	5	5			
		12	10	10	5	0			
		13	0	0	0	0			Another plume obscurring stack
3		14	0	5	0	5			
		15	5	0	0	0			
		16	0	0	5	5			
		17	0	0	0	0			
		18	0	5	0	0			
		19	0	0	0	0			
4		20	0	0	0	0			Changed observer location now approx 1300 feet south east
		21	0	0	0	0			
		22	0	0	0	0			
		23	0	0	5	5			
		24	5	0	0	0			
		25	0	0	0	0			
5		26	–	–	–	0			Stack totally obscurred by plume from a[redacted] Coke oven
		27	0	0	10	15			
		28	15	15	10	10			
		29	5	5	5	15			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1300 feet south east
TEST NUMBER 3
DATE 17 April 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

% opacity units

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	1030	30	10	5	5	5			
		31	5	5	0	0			
6		32	0	0	0	0			
		33	0	0	0	0			
		34	0	0	0	0			
		35	0	0	0	0			
		36	0	0	5	5			
		37	5	5	5	5			
		38	–	–	–	0			~~plu~~ stack totally or partially obscurred by another plume from coke oven and white dust
7		39	–	0	0	0			
		40	0	0	–	–			
		41	–	–	–	–			
		42	–	–	0	0			
		43	0	0	0	–			
		44	0	0	0	0			
8		45	0	5	5	5			
		46	5	5	5	5			
		47	5	5	5	5			
		48	5	5	5	0			
		49	0	0	0	0			
9		50	0	0	0	0			
		51	0	0	5	5			
		52	5	0	0	0			
		53	0	0	0	0			
		54	0	0	0	0			
		55	0	0	0	0			
10		56	0	0	0	0			
		57	0	0	0	0			
		58	0	0	0	0			
	1059	59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION 1300 ft south east
TEST NUMBER 3
DATE 17 APRIL 80
TYPE FACILITY Coke Oven Battery C
CONTROL DEVICE Baghouse

HOURS OF OBSERVATION 1100 -
OBSERVER M. Drehsen
OBSERVER CERTIFICATION DATE 18 Oct 79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack
HEIGHT OF DISCHARGE POINT 200 ft

	Initial			Final
CLOCK TIME	1100			
OBSERVER LOCATION Distance to Discharge	300 ft			
Direction from Discharge from observer?	~~South~~ north west			
Height of Observation Point	ground level			
BACKGROUND DESCRIPTION	hazy			
WEATHER CONDITIONS Wind Direction	south east			
Wind Speed	3-5			
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	clear-black			
Distance Visible	none			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	11:00	0	0
2	11:06	0	0
3	11:12	0	0
4	11:18 end test	15	0.6
5	11:24	0	0

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION 1300 ft south east
TEST NUMBER 3
DATE 17 April 80

OBSERVER M. Drehsen
TYPE FACILITY Coke Oven Battery C
POINT OF EMISSIONS Stack

% opacity units

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1	1100	0	0	0	0	0			
		1	0	0	0	0			
		2	0	0	0	0			
		3	0	0	0	0			
		4	0	0	0	0			
		5	0	0	0	0			
2		6	0	0	0	0			
		7	0	0	0	0			
		8	0	0	0	0			
		9	0	0	0	0			
		10	0	0	0	0			
		11	0	0	0	0			
3		12	0	0	0	0			
		13	0	0	0	0			
		14	0	0	0	0			
		15	0	0	0	0			
		16	0	0	0	0			
		17	0	0	0	0			
4		18	0	0	0	0			
		19	5	5	5	0			
		20	0	0	0	0			
		21	0	0	0	0			
		22	0	0	0	0			
		23	0	0	0	0			
5		24	0	0	0	0			
		25	0	0	0	0			
		26	0	0	0	0			
		27	0						
		28							
		29							

APPENDIX A

4. Visible Emission Data

b. Battery E

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION Fontana
TEST NUMBER # 1
DATE 4-15-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION 2 Hrs.
OBSERVER Dessel
OBSERVER CERTIFICATION DATE 10/18/79
OBSERVER AFFILIATION T.R.W.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 Ft.

	Initial			Final
CLOCK TIME	11:25			12:20
OBSERVER LOCATION Distance to Discharge	300 ft			
Direction from Discharge	South			
Height of Observation Point	ground level			
BACKGROUND DESCRIPTION	White Sky			
WEATHER CONDITIONS Wind Direction	East			
Wind Speed				
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Clear Smoggy			
PLUME DESCRIPTION Color				
Distance Visible	10 mi.			
PLUME EMPHASIS				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	11:25	0	0
2	11:31	0	0
3	11:36	10	0.4
4	11:42	10	0.4
5	11:48	10	0.4
6	11:54	0	0
7	12:00	0	0
8	12:06	0	0
9	12:12	0	0
10	12:18	0	0

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 1 OF ___

COMPANY T.R.D.
LOCATION BATTERY E
TEST NUMBER #1
DATE 4-15-80

OBSERVER Dessel
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS Stack

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1	1125	0	[redacted]						
		1	0	0	0	0			
		2	0	0	0	0			
		3	0	0	0	0			
		4	0	0	0	0			
	1130	5	0	0	0	0			
2		6	0	0	0	0			
		7	0	0	0	0			
		8	0	0	0	0			
		9	0	0	0	0			
	1135	10	0	0	0	0			
		11	0	0	0	0			
3		12	0	0	0	0			
		13	0	0	0	0			
		14	0	0	0	0			
	1140	15	0	0	0	0			
		16	0	0	5	5			
		17	0	0	0	0			
4		18	0	0	0	0			
		19	0	0	0	0			
	1145	20	0	0	0	5			
		21	0	0	0	0			
		22	0	0	0	0			
		23	5	0	0	0			
5		24	0	0	0	0			
	1150	25	0	0	0	0			
		26	0	0	5	5			
		27	0	0	0	0			
		28	0	0	0	0			
		29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 2 OF ___

COMPANY T.R. Co.
LOCATION BATTERY E
TEST NUMBER #1
DATE 4-15-80

OBSERVER WESSEL
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
6	1155	30	0	0	0	0			
		31	0	0	0	0			
		32	0	0	0	0			
		33	0	0	0	0			
		34	0	0	0	0			
	1200	35	0	0	0	0			
7		36	0	0	0	0			
		37	0	0	0	0			
		38	0	0	0	0			
		39	0	0	0	0			
	1205	40	0	0	0	0			
		41	0	0	0	0			
8		42	0	0	0	0			
		43	0	0	0	0			
		44	0	0	0	0			
	1210	45	0	0	0	0			
		46	0	0	0	0			
	[redacted]	47	0	0	0	0			
9		48	0	0	0	0			
		49	0	0	0	0			
	1215	50	0	0	0	0			
		51	0	0	0	0			
		52	0	0	0	0			
		53	0	0	0	0			
10		54	0	0	0	0			
	1220	55	0	0	0	0			
		56	0	0	0	0			
		57	0	0	0	0			
		58	0	0	0	0			
		59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER # 1
DATE 4-15-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION 2 hrs.
OBSERVER Wessel
OBSERVER CERTIFICATION DATE 10-18-80
OBSERVER AFFILIATION T.R.D.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 Ft.

	Initial			Final
CLOCK TIME	12:25			
OBSERVER LOCATION Distance to Discharge	300 Ft.			
Direction from Discharge	South			
Height of Observation Point	Ground Level			
BACKGROUND DESCRIPTION	Smoggy Grey with sky			
WEATHER CONDITIONS Wind Direction	East			
Wind Speed	8-10			
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Very Smoggy			
PLUME DESCRIPTION Color	None			
Distance Visible	10 mi.			
[illegible]				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	12:25	0	0
2	12:31	0	0
3	12:37	0	0
4	12:43	4/5	1.9
5	12:49	10	0.4
6	12:55	0	0
7	1301	0	0
8	1307	0	0
9	1313	0	0
10	1319	0	0

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 3 OF ___

COMPANY T.R.W.
LOCATION BATTERY E
TEST NUMBER #1
DATE 4-15-80

OBSERVER Wessel
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS ___

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1	1225	0	0	0	0	0			
		1	0	0	0	0			
		2	0	0	0	0			
		3	0	0	0	0			
		4	0	0	0	0			
	1230	5	0	0	0	0			
2		6	0	0	0	0			
		7	0	0	0	0			
		8	0	0	0	0			
		9	0	0	0	0			
	1235	10	0	0	0	0			
		11	0	0	0	0			
3		12	0	0	0	0			
		13	0	0	0	0			
		14	0	0	0	0			
	1240	15	0	0	0	0			
		16	0	0	0	0			
		17	0	0	0	0			
4		18	0	0	0	0			
		19	0	0	0	0			
	1245	20	0	0	0	0			
		21	5	5	5	5			
		22	5	5	5	5			
		23	5	0	0	0			
5		24	0	5	0	5			
	1250	25	0	0	0	0			
		26	0	0	0	0			
		27	0	0	0	0			
		28	0	0	0	0			
		29	0	0	0				

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 1 OF ___

COMPANY T.R.D.
LOCATION BATTERY E
TEST NUMBER #1
DATE 4-15-80

OBSERVER Dessel
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
6	1255	30	0	0	0	0			
		31	0	0	0	0			
		32	0	0	0	0			
		33	0	0	0	0			
		34	0	0	0	0			
	100	35	0	0	0	0			
7		36	0	0	0	0			
		37	0	0	0	0			
		38	0	0	0	0			
		39	0	0	0	0			
	105	40	0	0	0	0			
		41	0	0	0	0			
8		42	0	0	0	0			
		43	0	0	0	0			
		44	0	0	0	0			
	110	45	0	0	0	0			
		46	0	0	0	0			
		47	0	0	0	0			
9		48	0	0	0	0			
		49	0	0	0	0			
	115	50	0	0	0	0			
		51	0	0	0	0			
		52	0	0	0	0			
		53	0	0	0	0			
10		54	0	0	0	0			
	120	55	0	0	0	0			
		56	0	0	0	0			
		57	0	0	0	0			
		58	0	0	0	0			
		59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY KAISER STEEL
LOCATION BATTERY E
TEST NUMBER # 1
DATE 4-15-80
TYPE FACILITY STEEL MILL
CONTROL DEVICE BAG HOUSE

HOURS OF OBSERVATION
OBSERVER [illegible]
OBSERVER CERTIFICATION DATE 10-18-79
OBSERVER AFFILIATION T.R.W.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 FT.

	Initial			Final
CLOCK TIME	13:40			14:40
OBSERVER LOCATION Distance to Discharge	300 FT.			
Direction from Discharge	SOUTH, WEST			
Height of Observation Point	GROUND LEVEL			
BACKGROUND DESCRIPTION	SNAGGY, GREY, WHITE SKY			
WEATHER CONDITIONS Wind Direction	EAST			
Wind Speed				
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	VERY SNAGGY			
PLUME DESCRIPTION Color	NONE			
Distance Visible	10 MI.			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	13:40	0	0
2	13:46 end of test	0	0
3	13:52	0	0
4	13:58	0	0
5	14:04	0	0
6	14:10	0	0
7	14:16	0	0
8	14:22	0	0
9	14:28	5	0.2
10	14:34	40	1.7

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 5 OF ___

COMPANY T.R.D.
LOCATION BATTERY E
TEST NUMBER #1
DATE 4-15-80

OBSERVER Wessels
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS ___

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
140	0	c	c	c	c			
	1	c	c	c	c			
	2	c	c	c	c			
	3	c	c	c	c			
	4	c	c	c	c			
145	5	c	c	c	c			
	6	c	c	c	c			
	7	c	c	c	c			
	8	c	c	c	c			
	9	c	c	c	c			
150	10	c	c	c	c			
	11	c	c	c	c			
	12	c	c	c	c			
	13	c	c	c	c			
	14	c	c	c	c			
155	15	c	c	c	c			
	16	c	c	c	c			
	17	c	c	c	c			
	18	c	c	c	c			
	19	c	c	c	c			
200	20	c	c	c	c			
	21	c	c	c	c			
	22	c	c	c	c			
	23	c	c	c	c			
	24	c	c	c	c			
205	25	c	c	c	c			
	26	c	c	c	c			
	27	c	c	c	c			
	28	c	c	c	c			
	29	c	c	c	c			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 6 OF ___

COMPANY T.B.W.
LOCATION BATTERY E
TEST NUMBER #1
DATE 4-15-80

OBSERVER Wood
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
210	30	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
215	35	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
220	40	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
225	45	0	0	0	0			
	46	0	0	0	0			
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
230	50	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	0	0	5			
	54	5	5	5	5			
235	55	5	5	0	0			
	56	0	0	0	0			
	57	5	5	0	0			
	58	0	0	0	0			
	59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER #1
DATE 4-15-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION
OBSERVER Wesser
OBSERVER CERTIFICATION DATE 10-18-79
OBSERVER AFFILIATION T.R.W.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 Ft.

	Initial			Final
CLOCK TIME	14:40			15:40
OBSERVER LOCATION Distance to Discharge				
Direction from Discharge	South, West			
Height of Observation Point				
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction				
Wind Speed				
Ambient Temperature				
SKY CONDITIONS (clear, overcast, % clouds, etc.)				
PLUME DESCRIPTION Color				
Distance Visible				
[illegible]				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	14:40	80	3.3
2	14:46	15	0.6
3	14:52	5	0.2
4	14:58	0	0
5	15:04	0	0
6	15:10	0	0
7	15:16	75	3.1
8	15:21	10	0.4
9	15:27	5	0.2
10	15:33	0	0

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 7 OF ___

COMPANY T.R.D.
LOCATION BATTERY E
TEST NUMBER #1
DATE 4-15-80

OBSERVER [illegible]
TYPE FACILITY Steel Mill
POINT OF EMISSIONS ___

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1	2-10	0	0	0	0	5			
		1	5	5	5	5			
		2	5	5	5	5			
		3	0	5	5	0			
		4	0	0	0	5			
	2-15	5	5	5	5	5			
2		6	5	5	5	0			
		7	0	0	0	0			
		8	0	0	0	0			
		9	0	0	0	0			
	2-30	10	0	0	0	0			
		11	0	0	0	0			
3		12	0	0	0	0			
		13	0	0	0	0			
		14	0	0	0	0			
	2-45	15	0	0	0	5			
		16	0	0	0	0			
		17	0	0	0	0			
4		18	0	0	0	0			
		19	0	0	0	0			
	3-00	20	0	0	0	0			
		21	0	0	0	0			
		22	0	0	0	0			
		23	0	0	0	0			
5		24	0	0	0	0			
	3-15	25	0	0	0	0			
		26	0	0	0	0			
		27	0	0	0	0			
		28	0	0	0	0			
		29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

COMPANY T.R.D.
LOCATION Battery E
TEST NUMBER #1
DATE 4-15-80

OBSERVER Wessel
TYPE FACILITY Steel Mill
POINT OF EMISSIONS

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
6	510	30	0	0	0	0			
		31	0	0	0	0			
		32	0	0	0	0			
		33	0	0	0	0			
		34	0	0	0	0			
	515	35	0	0	0	0			
7		36	0	0	5	5			
		37	5	5	5	5			
		38	5	5	5	5			
		39	0	0	5	0			
	520	40	0	5	5	0			
		41	0	5	5	0			
8		42	0	0	0	0			
		43	0	0	0	0			
		44	0	0	0	0			
	525	45	0	0	0	0			
		46	0	0	0	0			
		47	0	5	5	0			
9		48	0	0	0	0			
		49	0	0	0	5			
	530	50	0	0	0	0			
		51	0	0	0	0			
		52	0	0	0	0			
		53	0	0	0	0			
10		54	0	0	0	0			
	535	55	0	0	0	0			
		56	0	0	0	0			
		57	0	0	0	0			
		58	0	0	0	0			
		59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER #1
DATE 4-15-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION
OBSERVER Wessel
OBSERVER CERTIFICATION DATE 10 18 79
OBSERVER AFFILIATION T.R.D.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 Ft.

	Initial			Final
CLOCK TIME	3:40			3:53
OBSERVER LOCATION Distance to Discharge				
Direction from Discharge	South West			
Height of Observation Point				
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction				
Wind Speed				
Ambient Temperature				
SKY CONDITIONS (clear, overcast, % clouds, etc.)				
PLUME DESCRIPTION Color				
Distance Visible				
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	15:40	0	0
2	15:46	0	0
3	15:52	0	0

Readings ranged from 0 to 0 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 9 OF ___

COMPANY T.R.J.
LOCATION BATTERY E
TEST NUMBER #1
DATE 4-15-80

OBSERVER [illegible]
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS ___

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
340	0	o	o	o	o			
	1	o	o	o	o			
	2	o	o	o	o			
	3	o	o	o	o			
	4	o	o	o	o			
345	5	o	o	o	o			
	6	o	o	o	o			
	7	o	o	o	o			
	8	o	o	o	o			
	9	o	o	o	o			
350	10	o	o	o	o			
	11	o	o	o	o			
	12	o	o	o	o			
	13	o	o	o	o			
	14							
355	15							
	16							
	17							
	18							
	19							
400	20							
	21							
	22							
	23							
	24							
	25							
	26							
	27							
	28							
	29							

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY KAISER STEEL
LOCATION BATTERY E
TEST NUMBER #2
DATE 4-16-80
TYPE FACILITY STEEL MILL
CONTROL DEVICE BAG HOUSE

HOURS OF OBSERVATION
OBSERVER Dessel
OBSERVER CERTIFICATION DATE 10-18-80
OBSERVER AFFILIATION T.R.D.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 FT

	Initial			Final
CLOCK TIME		A.M. 10:15		
OBSERVER LOCATION Distance to Discharge	1000 FT.			1000
Direction from Discharge	SOUTH, EAST			S.E.
Height of Observation Point	GROUND LEVEL			G.L.
BACKGROUND DESCRIPTION	BLUE SKY			Blue/white
WEATHER CONDITIONS Wind Direction	STEEL			West
Wind Speed	0 MPH			2-3
Ambient Temperature				80°
SKY CONDITIONS (clear, overcast, % clouds, etc.)	CLEAR			smoggy
PLUME DESCRIPTION Color	NONE			none
Distance Visible	20 MI.			20 mi
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	10:15	0	0
2	10:21	0	0
3	10:26	0	0
4	10:32	0	0
5	10:38	0	0
6	10:44	75	3.13
7	10:50	30	1.25
8	10:56	0	0
9	11:02	0	0
10	11:08	0	0

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 2 OF ___

COMPANY KAISER STEEL
LOCATION BATTERY E
TEST NUMBER #2
DATE 4-16-80

OBSERVER WESSEL
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS ___

% opacity

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1015	0	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
1020	5	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
1025	10	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
1030	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
1035	20	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
1040	25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER #2
DATE 4-16-80

OBSERVER [illegible]
TYPE FACILITY Steel Mill
POINT OF EMISSIONS ___

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
6	1045	30	5	5	5	5			
		31	5	5	5	5			
		32	5	0	0	0			
		33	0	5	5	5			
		34	0	0	0	0			
	1050	35	0	5	5	5			
7		36	0	0	0	0			
		37	5	5	5	5			
		38	5	5	0	0			
		39	0	0	0	0			
	1055	40	0	0	0	0			
		41	0	0	0	0			
8		42	0	0	0	0			
		43	0	0	0	0			
		44	0	0	0	0			
	1100	45	0	0	0	0			
		46	0	0	0	0			
		47	0	0	0	0			
9		48	0	0	0	0			
		49	0	0	0	0			
	1105	50	0	0	0	0			
		51	0	0	0	0			
		52	0	0	0	0			
		53	0	0	0	0			
10		54	0	0	0	0			
	1110	55	0	0	0	0			
		56	0	0	0	0			
		57	0	0	0	0			
		58	0	0	0	0			
		59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER # 2
DATE 4-16-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION
OBSERVER Wessel
OBSERVER CERTIFICATION DATE 10-18-79
OBSERVER AFFILIATION T.R.D.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 Ft.

	Initial	A.M. 11:15		Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	1000 Ft.			
Direction from Discharge	South East			
Height of Observation Point	Ground Level			
BACKGROUND DESCRIPTION	Blue Sky			
WEATHER CONDITIONS Wind Direction	West Bound			
Wind Speed	2-3 MPH			
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Slightly Smoggy			
PLUME DESCRIPTION Color	None			
Distance Visible	20 Mi.			
[illegible] INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	11:15	0	0
2	11:21	0	0
3	11:27	0	0
4	11:33	0	0
5	11:39	0	0
6	11:45	95	3.96
7	11:51	25	1.04
8	11:57	0	0
9	12:03	0	0
10	12:09	0	0

Readings ranged from 0 to 15 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 5 OF ___

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER # 2
DATE 4-16-80

OBSERVER Wessel
TYPE FACILITY Steel Mf
POINT OF EMISSIONS _____

% opacity

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1115	0	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
1120	5	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
1125	10	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
1130	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
1135	20	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
1140	25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 6 OF ___

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER #2
DATE 4-16-80

OBSERVER [illegible]
TYPE FACILITY Steel Mill
POINT OF EMISSIONS ___

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1145	30	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	5	5	10	10			
	34	10	10	15	10			
1150	35	5	5	5	5			
	36	5	5	5	5			
	37	5	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
1155	40	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
1200	45	0	0	0	0			
	46	0	0	0	0			
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
1205	50	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	0	0	0			
	54	0	0	0	0			
1210	55	0	0	0	0			
	56	0	0	0	0			
	57	0	0	0	0			
	58	0	0	0	0			
	59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Jones & Laughlin Steel
LOCATION Battery E
TEST NUMBER # 3
DATE 4-16-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION
OBSERVER [illegible]
OBSERVER CERTIFICATION DATE 10-18-79
OBSERVER AFFILIATION T.R.W.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 Ft

	Initial	P.M. 12:15		Final 12:52
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	1000 Ft.			
Direction from Discharge	South, East			
Height of Observation Point	Ground Level			
BACKGROUND DESCRIPTION	Slightly Grey Blue Sky			
WEATHER CONDITIONS Wind Direction	West ~~[illegible]~~ Bound			
Wind Speed	2-3 MPH			
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Slightly Smoggy			
PLUME DESCRIPTION Color	None			
Distance Visible	20 Mi.			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	12:15	0	0
2	12:21	0	0
3	12:27	85	3.54
4	12:33	120	5
5	12:39	120	5
6	12:45	120	5
7	12:51	40	1.67

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD

PAGE 8 OF ___

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER # 2
DATE 4-16-80

OBSERVER Dessel
TYPE FACILITY Steel Mill
POINT OF EMISSIONS _____

% opacity

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1	1215	0	0	0	0	0			
		1	0	0	0	0			
		2	0	0	0	0			
		3	0	0	0	0			
		4	0	0	0	0			
	1220	5	0	0	0	0			
2		6	0	0	0	0			
		7	0	0	0	0			
		8	0	0	0	0			
		9	0	0	0	0			
	1225	10	0	0	0	0			
		11	0	0	0	0			
3		12	0	0	0	0			
		13	0	5	5	5			
		14	5	5	5	5			
	1230	15	5	5	5	5			
		16	5	5	5	5			
		17	5	0	0	5			
4		18	5	5	5	5			
		19	5	5	5	5			
	1235	20	5	5	5	5			
		21	5	5	5	5			
		22	5	5	5	5			
		23	5	5	5	5			
5		24	5	5	5	5			
	1240	25	5	5	5	5			
		26	5	5	5	5			
		27	5	5	5	5			
		28	5	5	5	5			
		29	5	5	5	5			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 9 OF ___

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER # 2
DATE 4-16-80

OBSERVER Weber
TYPE FACILITY Steel Mill
POINT OF EMISSIONS ___

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1245	30	5	5	5	5			
	31	5	5	5	5			
	32	5	5	5	5			
	33	5	5	5	5			
	34	5	5	5	5			
1255	35	5	5	5	5			
	36	5	5	5	5			
	37							
	38							
	39							
	40							
	41							
	42							
	43							
	44							
	45							
	46							
	47							
	48							
	49							
	50							
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER #3
DATE 4-17-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION
OBSERVER Wessel
OBSERVER CERTIFICATION DATE 10-18-79
OBSERVER AFFILIATION T.R.D.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 228 Ft.

	Initial	9:00 A.M.		Final 10:00
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	300 Ft.			
Direction from Discharge	South East			
Height of Observation Point	Ground Level			
BACKGROUND DESCRIPTION	Blue Sky			
WEATHER CONDITIONS Wind Direction	West Bound			
Wind Speed	2-3 MPH			
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Slightly Smoky			
PLUME DESCRIPTION Color	None			
Distance Visible	15 MI.			

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	9:00 - 9:05	0	0
2	9:06	0	0
3	9:12	0	0
4	9:18	0	0
5	9:24	0	0
6	9:30	0	0
7	9:36	0	0
8	9:42	0	0
9	9:48	30	1.25
10	9:54 - 10:00	0	0

Readings ranged from 0 to 5 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD

PAGE 2 OF ___

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER # 3
DATE 4-17-80

OBSERVER Wessel
TYPE FACILITY Steel Mill
POINT OF EMISSIONS ___

0/2 opacity

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
9.00	0	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
9:05	5	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
9:10	10	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
9:15	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
9:20	20	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
8:25	25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 3 OF ___

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER #3
DATE 4-17-80

OBSERVER [illegible]
TYPE FACILITY Steel Mill
POINT OF EMISSIONS ___

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
6	9:30	30	0	0	0	0			
		31	0	0	0	0			
		32	0	0	0	0			
		33	0	0	0	0			
		34	0	0	0	0			
	9:35	35	0	0	0	0			
7		36	0	0	0	0			
		37	0	0	0	0			
		38	0	0	0	0			
		39	0	0	0	0			
	9:40	40	0	0	0	0			
		41	0	0	0	0			
8		42	0	0	0	0			
		43	0	0	0	0			
		44	0	0	0	0			
	9:45	45	0	0	0	0			
		46	0	0	0	0			
		47	0	0	0	0			
9		48	0	0	0	0			
		49	0	0	0	0			
	9:50	50	0	0	0	0			
		51	0	5	5	5			
		52	5	5	5	0			
		53	0	0	0	0			
10		54	0	0	0	0			
	9:55	55	0	0	0	0			
		56	0	0	0	0			
		57	0	0	0	0			
		58	0	0	0	0			
		59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION Fontana
TEST NUMBER # 3
DATE 4-17-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION
OBSERVER [illegible]
OBSERVER CERTIFICATION DATE 10-18-79
OBSERVER AFFILIATION T.R.A.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 Ft.

	Initial			Final
CLOCK TIME		10:00 AM		11:00
OBSERVER LOCATION Distance to Discharge	300 Ft.			
Direction from Discharge	South East			
Height of Observation Point	Ground Level			
BACKGROUND DESCRIPTION	Grey Blue Sky			
WEATHER CONDITIONS Wind Direction	West Bound			
Wind Speed	2-3 MPH			
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Slight Smoggy			
PLUME DESCRIPTION Color	None			
Distance Visible	15 MI.			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	10:00	0	0
2	10:06	0	0
3	10:12	0	0
4	10:18	0	0
5	10:24	0	0
6	10:30	0	0
7	10:36	0	0
8	10:42	0	0
9	10:48	0	0
10	10:54 - 11:00	0	0

Readings ranged from 0 to 0 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 3 OF ___

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER # 3
DATE 4-17-80

OBSERVER Wessel
TYPE FACILITY Steel Mill
POINT OF EMISSIONS ___

% opacity

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1000	0	0	0	0	0			
	1	0	0	0	0			
	2	0	0	0	0			
	3	0	0	0	0			
	4	0	0	0	0			
1005	5	0	0	0	0			
	6	0	0	0	0			
	7	0	0	0	0			
	8	0	0	0	0			
	9	0	0	0	0			
1010	10	0	0	0	0			
	11	0	0	0	0			
	12	0	0	0	0			
	13	0	0	0	0			
	14	0	0	0	0			
1015	15	0	0	0	0			
	16	0	0	0	0			
	17	0	0	0	0			
	18	0	0	0	0			
	19	0	0	0	0			
1020	20	0	0	0	0			
	21	0	0	0	0			
	22	0	0	0	0			
	23	0	0	0	0			
	24	0	0	0	0			
1025	25	0	0	0	0			
	26	0	0	0	0			
	27	0	0	0	0			
	28	0	0	0	0			
	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 6 OF ___

COMPANY KAISER STEEL
LOCATION FONTANA, CA
TEST NUMBER #3
DATE 4-17-80

OBSERVER WESSEL
TYPE FACILITY STEEL MILL
POINT OF EMISSIONS ___

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1030	30	0	0	0	0			
	31	0	0	0	0			
	32	0	0	0	0			
	33	0	0	0	0			
	34	0	0	0	0			
1035	35	0	0	0	0			
	36	0	0	0	0			
	37	0	0	0	0			
	38	0	0	0	0			
	39	0	0	0	0			
1040	40	0	0	0	0			
	41	0	0	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
1045	45	0	0	0	0			
	46	0	0	0	0			
	47	0	0	0	0			
	48	0	0	0	0			
	49	0	0	0	0			
1050	50	0	0	0	0			
	51	0	0	0	0			
	52	0	0	0	0			
	53	0	0	0	0			
	54	0	0	0	0			
1055	55	0	0	0	0			
	56	0	0	0	0			
	57	0	0	0	0			
	58	0	0	0	0			
	59	0	0	0	0			

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY Kaiser Steel
LOCATION Battery F
TEST NUMBER # 3
DATE 4-17-80
TYPE FACILITY Steel Mill
CONTROL DEVICE Bag House

HOURS OF OBSERVATION
OBSERVER Wessel
OBSERVER CERTIFICATION DATE 10-18-79
OBSERVER AFFILIATION T.R.C.
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 220 Ft.

	Initial			Final
CLOCK TIME		11:00 A.M.		11:26
OBSERVER LOCATION Distance to Discharge	300 Ft.			
Direction from Discharge	South East			
Height of Observation Point	Ground Level			
BACKGROUND DESCRIPTION	Smoggy Grey Sky			
WEATHER CONDITIONS Wind Direction	West Bound			
Wind Speed	2-3 MPH			
Ambient Temperature	80°			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Very Smoggy			
PLUME DESCRIPTION Color	None			
Distance Visible	10 MI.			

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	11:00	0	0
2	11:06	15	0.625
3	11:12	105	4.375
4	11:18	15	0.625
5	11:24	0	0

Readings ranged from ____ to ____ % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 8 OF ___

COMPANY Kaiser Steel
LOCATION Battery E
TEST NUMBER # 3
DATE 4-17-80

OBSERVER Dessel
TYPE FACILITY Steel Mill
POINT OF EMISSIONS ___

% opacity

	Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1	1100	0	0	0	0	0			
		1	0	0	0	0			
		2	0	0	0	0			
		3	0	0	0	0			
		4	0	0	0	0			
	1105	5	0	0	0	0			
2		6	0	0	0	0			
		7	0	0	0	0			
		8	0	0	0	0			
		9	0	0	0	0			
	1110	10	0	0	0	0			
		11	0	5	5	5			
3		12	5	5	5	5			
		13	5	5	5	5			
		14	5	5	5	5			
	1115	15	5	5	5	5			
		16	5	5	5	5			
		17	5	0	0	0			
4		18	0	0	0	0			
		19	0	0	5	5			
	1120	20	5	0	0	0			
		21	0	0	0	0			
		22	0	0	0	0			
		23	0	0	0	0			
5		24	0	0	0	0			
	1125	25	0	0	0	0			
		26	0	0	0	0			
		27							
		28							
		29							

APPENDIX A

5. LABORATORY ANALYSIS DATA

March 9, 1980

DATE _____ PROJECT _____ MJO NO. _____

88

F

498-23 - 0

498-32 - 0

498-22 - 0

498-13 - 0

Blank #2 - 0

SO_4 Analysis

Blank - 0.1, 0.1

Particulate Analysis / Kaiser Steel

KSC - C - PR - 1 4/15/80

K Prolic - Acetone

Volume - 106 mls.

aliquot factor 20/100 - 4.4 mls titrant used

(1)

Final wt.	85.4516	85.4533	85.4527	
Tare wt.	- 85.4352	85.4352	- 87.4352	
	0.0164	0.0181	85.4527 - 85.4352 = 0.0174	0.0172

K (2) KSC - C - 2nd p. - 1 4/15/80 20/50 - 2.4

Volume - 400 mls.

87.4527	87.4537	87.4540
- 87.4338	87.4338	87.4338
0.0186	0.0199	0.0202

K (3) KSC - E PR - 5 - 1 4/15/80 20/100 - 75.0

Prolic - Acetone

Volume - 122 mls 5/100 - 14.5

86.9525	86.9556	86.9525	86.9597
- 86.8710	86.8710	86.8710	86.8710
0.0815	0.0846	0.0916	0.0888

86.9651 - 86.8710 = 0.0941

K (4) KSC - E - 2nd p. 5 - 1 4/15/80 - 1/50 - 34.0

Volume - 510 mls. 5/50 = 5 = 0.5/50 - 17.2 mls.

87.1499	87.1807	
- 85.9862	85.9862	
1.1637	1.1945	

WITNESS: _____ DATE: _____ SIGNED: _____

WITNESS: _____ DATE: _____ DATE _____

DATE _____ PROJECT _____ MJO NO. _____

KSC - PR - 17 - 1 4/16

Part - Metal - 17 - Volume - 32 mls. $Ba(ClO_4)_2$

(5)

88.5193	88.5198	88.5193	$\frac{20}{100}$ = 17.8 mls.
− 88.5167	− 88.5162	− 88.5167	
0.0026	0.0031	0.0029	

88.5193
88.5167
0.0026

KSC - 2 - PR - 2 Volume - 18 mls.

(6)

85.4087	85.4095	85.4118	$\frac{20}{100}$ = 14.2
− 85.3728	85.3728	85.3728	
0.0359	0.0367	0.0382	

85.4149
85.3728
0.0421

(7) KSC - C - Imp - 2 4/16/80
Volume - 525 mls.

84.5812	84.6090	$\frac{5}{50}$ = 34.3
− 84.3377	84.3377	
0.2435	0.2713	

(8) KSC - E PR - 5 - 2 4/16/80
Volume - 210 mls.

93.5146	93.5165	93.5183	$\frac{20}{100}$ = 68.9
− 93.4150	93.4150	93.4150	
0.0996	0.1015	0.1033	$\frac{5}{100}$ = 17.6

93.5221
93.4150
0.1071

(9) KSC - E - 2nd - 5 - 2 4/16/80
Volume - 520 mls.

95.5594	95.5613	$\frac{20}{50}$ = 12.8 mls.
− 95.5311	− 95.5311	
0.0283	0.0302	

Std. - $Ba(ClO_4)_2$ -

20 X 0.0244 = 49.7 X X

0.488 = 49.7 X

X = 0.0098 N - $Ba(ClO_4)_2$

WITNESS: _____ DATE: _____ SIGNED _____

WITNESS: _____ DATE: _____ DATE _____

DATE _____ PROJECT 4/1.1 _____ MJO NO. _____

20 X 0.02 = 0.40
0.480

K (10) KSC-E-Probe-17
Volume - 20 mls.

X = 0.0098 N
X = 0.01956
5.1 mls.

82.9365	82.9370	82.9375	20/100
- 82.9278	82.9278	82.9228	
0.0087	0.0092	0.0147	

82.9313
82.9278
0.0085

Acetone (?)

(20 of 2)

K (11) -KSC-E-2mfoaming-3 4/17/80
Volume - 110 mls.

104.1149	104.1152	104.1152
-104.1116	-104.1116	-104.1116
0.0033	0.0036	0.0036

104.1149
104.1116
0.0033

20/50 — 0.3 mls.

K (12) -KSC-E-2mfoaming-5-3 4/17/80
Volume - 490 mls.

93.8549	93.8591	20/50 — 12.9 mls.
-93.8250	93.8250	
0.0299	0.0341	

K (13) KSC-E-Probe-17-3 4/15/80
acetone
Volume - 42 mls.

90.5213	90.5212	90.5204	20/100 — 16.6 mls.
-90.5093	-90.5093	90.5093	
0.0120	0.0119	0.0111	

K (14) Acetone Blank
Volume - 150 mls.

95.3573	95.3573	20/50 — 0.2 mls.
-95.3568	-95.3568	
0.0005	0.0009	

95.3573
95.3568
0.0006

K (15) KSC-C-2mfoaming-3 4/17/80 - 1 of 2
Volume - 480 mls.

84.9266	85.0083	
-84.5995	84.5991	
0.3271	0.4092	

(240)

250

WITNESS: _____ DATE: _____ SIGNED _____

WITNESS: _____ DATE: _____ DATE _____

150

20/50

DATE _____ PROJECT _____ MJO NO. _____

91

K

(16) KSC-C-2mlp-3 4/17/80

Volume - 151 mls.

$\frac{20}{50}$ - 6.3 mls.

82.0974	82.0976	82.0988
-82.0686	-82.0686	82.0686
0.0288	0.0290	0.0302

K

(17) KSC-C-Crude-3 4/17/80

Volume - 150 mls.

$\frac{20}{100}$ - 19.1 mls.

86.9112	86.9135	86.9125
-86.8782	86.8782	86.8782
0.0330	0.0343	0.0343

K

(18) KSC-E-Crude-5-3 4/17/80

Volume - 135 mls.

$\frac{20}{100}$ - 19.6 mls

95.2379	95.2424	95.2412
-95.1568	-95.1568	95.1568
0.0811	0.0856	0.0844
	95.2454	
	95.1568	
	0.0886	

K

(19) -H_2O Blank

Volume - 125 mls.

$\frac{20}{50}$ - 0.1 ml.

85.3129	85.3131
-85.3123	-85.3123
0.0006	0.0008

CROSS OUT UNUSED SPACE

WITNESS: _____ DATE: _____ SIGNED _____

WITNESS: _____ DATE: _____ DATE _____

DATE _____ PROJECT Filters - Kennedy St. MJO NO. _____

92

KSC-E-F-17-1 4/15/80
Filter # 27

0.5423	0.5443	0.5465	0.5451
- 0.4962	- 0.4962	0.4962	0.4962
0.0461	0.0481	0.0503	0.0496

KSC-E-Filter 17-2 4/16/80
Filter #28

0.5308	0.5333	0.5335	0.5335
- 0.4924	- 0.4924	0.4924	0.4924
0.0384	0.0409	0.0411	0.0411

KSC-E-Filter #17-3 4/17/80
Filter #34

0.5270	0.5282	0.5298	0.5313
- 0.4851	- 0.4851	- 0.4851	- 0.4851
0.0419	0.0431	0.0442	0.0462

KSC-E-F-5-1 4/15/80
Filter 4.033

0.5230	0.6576	0.6791	0.6790
- 0.5225	- 0.5225	0.5225	0.5225
0.0005	0.1351	0.1566	0.1565

KSC-C-F-1 4/15/80
Filter 4.035

- 0.5511	0.5505	0.5517	0.5501
0.5302	- 0.5302	- 0.5302	- 0.5302
0.0209	0.0203	0.0215	0.0199

CROSS OUT UNUSED SPACE

WITNESS: _____ DATE: _____ SIGNED _____

WITNESS: _____ DATE: _____ DATE _____

DATE _____ PROJECT _____ MJO NO. _____

✓ KSC-C-Filter-2 4/16/80
filter # 4.034

0.5517	0.5512	0.5540	0.5545
−0.5201	−0.5201	0.5201	−0.5201
0.0316	0.0311	0.0339	0.0344

✓ KSC-E-Filter-5-2 4/16/80
filter # 4.032

0.6998	0.7024	0.7228	0.7235
−0.5244	−0.5244	0.5244	0.5244
0.1754	0.1780	0.1984	0.1991

✓ KSC-E-Filter-5-3 4/17/80
filter # 4.032

0.5230	0.5222	0.5228	0.5205
−0.5202	−0.5202	0.5202	0.5202
0.0028	0.0020	0.0026	0.0023

✓ KSC-C-Filter 5-3 4/17/80
filter # 4.039

0.5729	0.5684	0.5759	0.5782
−0.5213	−0.5213	0.5213	0.5213
0.0516	0.0471	0.0546	0.0569

CROSS OUT UNUSED SPACE

WITNESS: _____ DATE: _____ SIGNED _____

WITNESS: _____ DATE: _____ DATE _____

Filter and Beaker weights

4-21-80

Beakers for Kaiser

0.000 #	0.000 #
4.0320 #	0.0005 -
0.5222 +	0.0004 -
0.5512 +	1.0000 #
4.034 #	85.4352 +
4.0394039 #	2.0000 #
4.039 #	87.4338 +
0.5684 +	3.0000 #
4.037 #	86.8710 +
0.7024 +	4.0000 #
4.033 #	85.9862 +
0.6576 +	5.0000 #
4.035 #	88.5167 +
0.5505 +	6.0000 #
34.000 #	85.3728 +
0.5282 +	77.0000 #
28.000 #	7.0000 #
0.5333 +	84.3377 +
0.5443 +	8.0000 #
27.000 #	93.4150 +
	9.0000 #
	95.5311 +
	10.0000 #
	82.9278 +
	11.0000 #
	104.1116 +
11.000 #	12.0000 #
104.1149 +	93.8250 +
5.000 #	
88.5193 +	
10.000 #	
82.9365 +	
3.000 #	
86.9525 +	
8.000 #	
93.5146 +	
1.000 #	
85.4516 +	

4-24-80

0.000	0.000 #
6.000 #	0.0007 -
85.4095 +	13.0000 #
16.000 #	90.5093 +
82.0974 +	14.0000 #
1.000 #	95.3568 +
85.4533 +	15.0000 #
8.000 #	84.5995 +
93.5165 +	16.0000 #
18.000 #	82.0686 +
95.2379 +	17.0000 #
17.000 #	86.8782 +
86.9112 +	18.0000 #
13.000 #	95.1568 +
90.5213 +	
14.000 #	
95.3573 +	
2.000 #	
87.4524 +	
3.000 #	
86.9556 +	2.5466 +
10.000 #	4.0350 #
82.937 +	2.6953 +
5.000 #	4.0370 #
88.5198 +	2.5472 +
11.000 #	4.0340 #
104.1152 +	2.6591 +
28.000 #	4.0330 #
2.0699 +	2.5378 +
2.6034 +	27.0000 #
27.000 #	1.0000 #
2.6164 +	17.0000 #
4.037 #	2.5185 +
2.7927 +	4.0320 #
4.032 #	2.5263 +
2.5927 +	28.0000 #
4.039 #	2.0000 #
2.6458 +	17.0000 #
4.033 #	2.5684 +
2.749 +	4.0390 #
4.034 #	2.5225 +
2.6239 +	34.0000 #
34.000 #	5.0000 #
2.5997 +	17.0000 #
4.035 #	1.9955 +
2.6216 +	0.0001 -

A-111

Filter and Beaker weights

0.000 #
0.0002 -
~~7.000~~ #
~~84.5812~~ +
~~15.000~~ #
~~84.9766~~ +
2.0703 +
~~34.000~~ #
~~2.6016~~ +
~~4.035~~ #
~~4.036~~ #
~~415.000~~ #
~~2.6204~~ +
~~4.039~~ #
~~417.000~~ #
~~2.6485~~ +
~~4.034~~ #
~~2.6248~~ +
~~4.033~~ #
~~2.7493~~ +
~~28.000~~ #
~~2.6038~~ +
~~4.037~~ #
~~2.7938~~ +
~~27.000~~ #
~~2.6161~~ +
2.032 #
~~2.5928~~ +
~~6.000~~ #
~~85.411~~ +
~~8.000~~ #
~~93.5183~~ +
~~16.000~~ #
~~82.0976~~ +
1.000 #
~~85.4529~~ +
~~13.000~~ #
~~90.5212~~ +
~~14.000~~ #
~~95.3577~~ +
~~41.000~~ #
~~104.1152~~ +
~~5.000~~ #
~~88.5196~~ +
~~2.000~~ #
~~87.4537~~ +
~~17.000~~ #
~~86.9135~~ +
10.000 #
10.000 #
~~18.000~~ #
~~95.2424~~ +
~~3.000~~ #
~~86.9626~~ +

4-25-90

0.000 #
0.0002 -
~~15.000~~ #
~~85.0087~~ +
~~5.000~~ #
~~88.5193~~ +
~~8.000~~ #
~~93.5221~~ +
~~11.000~~ #
~~104.1149~~ +
~~17.000~~ #
~~86.9125~~ +
~~7.000~~ #
~~84.609~~ +
~~6.000~~ #
~~85.4149~~ +
~~13.000~~ #
~~90.5204~~ +
~~14.000~~ #
~~95.3574~~ +
~~1.000~~ #
~~85.4526~~ +
~~2.000~~ #
~~87.454~~ +
~~16.000~~ #
~~82.0988~~ +
~~10.000~~ #
~~82.9425~~ +
~~18.000~~ #
~~95.2412~~ +
~~3.000~~ #
~~86.9598~~ +
19.000 #
~~85.313~~ +
~~85.3131~~ +
~~9.000~~ #
~~95.5613~~ +
~~18.000~~ #
~~95.2454~~ +
~~10.000~~ #
~~82.9363~~ +
~~3.000~~ #
~~86.9651~~ +
~~4.000~~ #
~~87.1807~~ +
~~12.000~~ #
~~93.8591~~ +

Rerun wts
Kaw
4-28-80

0.000 #
0.000 #
0.000 -
0.0003 -
~~85.3129~~ +
~~19.000~~ #
~~9.000~~ #
~~95.5594~~ +
~~12.000~~ #
~~93.8549~~ +
~~4.000~~ #
~~87.1499~~ +

0.000 #
0.0001 -
19.000 #
85.3123 +

Sulfate analysis of M5 & M-17 probe rinse, filter & impinger solns

Test #	K_2 (gm/meq)	N (g eq./l)	V_t	V_{tB}	V_{soln}	V_a	gm H_2SO_4	gm $^{=}SO_4$
KSC-E-Imp-5-1	0.04904	0.0099	34.0	0.1	50	1.0	0.823	0.806
KSC-E-Pr-5-1	0.04904	0.0099	14.5	0.1	100	5.0	0.140	0.137
KSC-E-Pr-17-1	0.04904	0.0099	17.8	0.1	100	20.0	0.043	0.042
KSC-E-Imp-5-2	0.04904	0.0099	13.2	0.1	50	20	0.0154	0.0151
KSC-E-Pr-5-2	0.04904	0.0099	17.6	0.1	100	5	0.1699	0.1664
KSC-E-Pr-17-2	0.04904	0.0098	15.1	0.1	50	20	0.0180	0.0176
KSC-E-Pr-5-3	0.04904	.0099	19.6	.1	100	20	.0473 gm H_2SO_4	0.0463
KSC-E-Imp5-3	0.04904	0.0098	13.2	0.1	50	20	0.0157	0.0154
KSC-E-Pr-17-3	0.04904	0.0098	16.6	0.1	100	20	0.0396	0.0388
KSC-C-Pr-1	0.04904	0.0099	4.4	0.1	100	20	0.0104	0.0102
KSC-C-Imp-1	0.04904	0.0099	7.4	0.1	50	20	0.0089	0.0087
KSC-C-Pr-2	0.04904	0.0099	14.2	0.1	100	20	0.0342	0.00335
KSC-C-Imp-2	0.04904	0.0099	34.3	0.1	50	5	0.1660	0.1626
KSC-C-Pr-3	.04904	.0099	19.1	.1	100	20	.0461	0.0452
	0.04904	0.0098	6.3	.1	50	20	.00745	0.0073

APPENDIX A

6. Meter Box Calibration Data Sheets

ATE 19 NOV 79

BOX # 2343

ROMETRIC PRESSURE P_b 30.10 in. Hg

DRY GASMETER # _____

Tally Murphy

Orifice Manometer Setting H (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 Td (°F)	Temperature: Dry Gas Meter Outlet T_{do} (°F)	Temperature: Dry Gas Meter Average T_d (°F)	Time θ (min.)	Y	Δ HΘ
0.5	3.820	4.010	65	98	84	91	10	.998	1.805
~~1.0~~ .5	3.802	4.029	66	98	88	93	10	.991	1.823
~~2.0~~ 1.0	5.165	5.617	66	104	90	97	10	.991	1.961
~~4.0~~ 1.0	5.181	5.528	66	104	92	98	10	.990	1.953
6.0									
8.0									
							Average	993 ~~.988~~	1.886

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (T_d + 460)}{V_d (P_b + \frac{H}{13.6} (T_w + 460)}$	ΔHΘ: $\frac{0.0317 \Delta H}{P_b (T_d + 460)} \left[\frac{(T_w + 460)\theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

DATE 16 nov 79

BOX # 2315

BAROMETRIC PRESSURE P_b 30.03 in. Hg

DRY GASMETER # " "

Wally Murphy

Orifice Manometer Settling H (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 Td (°F)	Temperature: Dry Gas Meter: Outlet T_{do} (°F)	Temperature: Dry Gas Meter: Average T_d (°F)	Time θ (min.)	Y	ΔHθ
0.5	4.010	4.148	66	98	78	88.0	10	1.006	1.657
1.0	3.910	4.077	67	104	83	93.5	10	1.006	1.732
2.0	5.404	5.715	67	112	88	100	10	1.002	1.793
4.0	5.414	5.619	68	112	87	99.5	10	1.001	1.797
6.0									
8.0									
							Average	1.004	1.745

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (T_d + 460)}{V_d (P_b + \frac{H}{13.6} (T_w + 460)}$	ΔHθ: $\frac{0.0317 \Delta H}{P_b (T_d + 460)} \left[\frac{(T_w + 460)\theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

16 nov. 79

BOX # 2363

TRIC PRESSURE P_b 30.05 in. Hg

DRY GASMETER # 11 11

Wally Murphy

ice eter ing H 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 Td (°F)	Temperature: Dry Gas Meter Outlet T_{do} (°F)	Temperature: Dry Gas Meter Average T_d (°F)	Time θ (min.)	Y	Δ H@
5	3.937	4.061	66	96	79	85.0	10	.992	1.686
.0	3.973	4.171	66	98	79	88.5	10	1.003	1.725
.0	5.303	5.610	66	110	84	97.0	10	.999	1.862
0	5.297	5.639	66	110	88	99.0	10	.996	1.861
.0									
.0									
						Average		.9975	1.784

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (T_d + 460)}{V_d (P_b + \frac{H}{13.6} (T_w + 460}$	ΔH@: $\frac{0.0317 \Delta H}{P_b (T_d + 460)}$	ΔH@: $\left[\frac{(T_w + 460)\theta}{V_w}\right]^2$
0.5	0.0368			
1.0	0.0737			
2.0	0.147			
4.0	0.294			
6.0	0.431			
8.0	0.588			

E 26 nov 79 BOX # 2499

:OMETRIC PRESSURE P_b 30.01 in. Hg DRY GASMETER # " "

Dolby Murphy

rifice nometer ettling H n. 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 Td (°F)	Temperature: Dry Gas Meter Outlet T_{do} (°F)	Temperature: Dry Gas Meter Average T_d (°F)	Time θ (min.)	Y	Δ H@
0.5	4.052 ~~4.42~~	4.431	68	108	79	93.5	11	.957	1.960
1.0	4.307	4.451	68	106	82	94.0	11	1.014	1.734
2.0	6.181	6.434	69	106	86	96.0	11	1.008	1.684
4.0	6.093	6.345	69	109	86	97.5	11	1.011	1.728
6.0									
8.0									
							Average	.998	1.777

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (T_d + 460)}{V_d (P_b + \frac{H}{13.6} (T_w + 460}$	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		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

APPENDIX B

Sample Calculations

Nomenclature

P_b	Barometric Pressure, in. Hg.
P_m	Average Orifice Pressure Drop, in. Hg.
T_m	Average Dry Gas Meter Temperature, ^oF.
V_m	Volume of Dry Gas Sampled at Meter Conditions, ft^3
$V_{m_{std}}$	Volume of Dry Gas Sampled at Standard Conditions (1), ft^3
V_w	Total H_2O Collected in Impingers and Silica Gel, ml
$V_{w_{std}}$	Volume of Water Vapor Collected at Standard Conditions (1), ft^3
%M	Percent Moisture in Stack Gas, by Volume
M_d	Mole Fraction Dry Stack Gas
$\%CO_2$	Percent CO_2 by volume, dry
$\%O_2$	Percent O_2 by volume, dry
%CO	Percent CO by volume, dry
$\%N_2$	Percent N_2 by volume, dry
MW_d	Molecular Weight of Dry Stack Gas, gm/gm-mole
MW	Molecular Weight of Wet Stack Gas, gm/gm-mole
MW_c	Molecular Weight of Chemical
C_p	Pitot Tube Coefficient
P_s	Stack Gas Pressure, in. Hg., absolute
PPM	Parts per million
T_s	Stack Gas Temperature, ^oF
$\bar{T}_s$	Average Stack Gas Temperature, ^oF
T_{std}	Standard Temperature, ^oF

P	Velocity head, in. H_2O
V_s	Average Stack Gas Velocity, Stack Conditions, ft/sec
A_s	Stack Area, ft^2
Q_s	Stack Gas Flow Rate at Standard Conditions (1), dry ft^3/min
Q_a	Stack gas flow rate at stack conditions, ft^3/min
T_t	Net time of test min.
D_n	Sampling nozzle diameter, in.
%I	Percent isokinetic
M_f	Particulate collected in probe, cyclone and filter, mg.
M_t	Total particulate collected mg.
I_c	Percent of particulate caught in impingers
C_{sf}	Particulate concentrations at standard conditions (1), dry, based on probe, cyclone and filter catch, GRS/SDCF
C_{st}	Particulate concentration at standard conditions (1), dry based on total catch, GRS/SDCF
E_f	Particulate emission rate, based on probe, cyclone and filter catch, lbs/hr
E_t	Particulate emission rates based on total particulate catch, lbs/hr
P_u	Unit process rate
PE_f	Particulate emission rate on a process basis, probe, cyclone and filter catch
PE_t	Particulate emission rate on a process basis, total catch
%EA	Percent excess air in stack gas

Calculations

1. Volume of water vapor at standard conditions (1)

$$V_{w_{std}} = .00267 \times \frac{460 + Tstd}{29.92} \times Vlc$$

2. Volume of dry gas sampled at standard conditions (1)

$$V_{m_{std}} = 17.64 \times \frac{Vm\ (Pb + Pm)}{(Tm + 460)}$$

3. Percent moisture in stack gas by volume

$$\%M = \frac{100 \times V_{w_{std}}}{V_{w_{std}} + V_{m_{std}}}$$

4. Mole fraction dry stack gas

$$M_s = \frac{100 - \%M}{100}$$

5. Molecular weight of dry stack gas (gm/gm - Mole)

$$MW_d = \left[(\%\ CO_2 \times .44) + (\%\ O_2 \times .32) + (\%\ N_2 \times .28) + (\%\ CO \times .28) + (\%\ \text{Additional Gas} \times \text{MW of Additional Gas})\right]$$

6. Molecular weight of wet stack gas (gm/gm - Mole)

$$MW = (18 \times Bwo) + \left[(1 - Bwo) \times MW_d\right]$$

7. Stack gas velocity at stack conditions [2], (ft/sec)

$$V_s = 85.49 \times CP \times \sqrt{\Delta p} \times \sqrt{\frac{(Ts + 460)}{Ms \times Ps}}$$

8. Stack gas volumetric flow rate at stack conditions

$$Qa = Vs \times As \times 60$$

9. Stack gas volumetric flow rate at standard conditions [1]

$$Q_s = Qa \times \frac{528}{460 + Ts} \times \frac{Ps}{29.92} \times (1.00 - Bwo)$$

10. Percent isokinetic $\%I = \left[\frac{(Ts + 460) \times Vmstd}{Ps \times Vs \times AN \times T_t \times (1-Bwo)} \right] X.0945$

11. Particulate concentrations at standard conditions (1), dry, based on probe, cyclone and filter catch

$$Csf = \frac{MF \times 15.43}{Vmstd \times 1000}$$

12. Particulate concentration at standard conditions (1), dry, based on total catch

$$Cst = \frac{Mt \times 15.43}{Vmstd \times 1000}$$

13. Particulate emission rate, based on probe, cyclone, and filter catch

$$Ef = \frac{MF \times 60 \times Qs}{454000 \times (Vm(std))}$$

14. Particulate emission rate, based on total catch

$$Et = \frac{Mt \times 60 \times Qs}{454000 \times (Vm(std))}$$

15. Particulate emission rate on a process basis, probe, cyclone, and filter catch

$$PF_f = \frac{E_f}{P_u}$$

16. Particulate emission rate on a process basis, total catch

$$PE_t = \frac{E_t}{P_u}$$

17. Particulate emission rate, part per million

$$PPM = \frac{M_t}{V_{m_{std}}} \times \frac{863.3}{MW_{(c)}}$$

(1) Standard conditions: 68°, 29.92 "Hg

(2) $\sqrt{\Delta P_s \times (T_s + 460)}$ is determined by averaging the square root of the product of the velocity head (ΔP_s) and the absolute stack temperature (T_s + 460) for each individual point

APPENDIX C

C. Daily Activity Log

Monday, April 14

All TRW personnel travel to Kaiser Steel, Fontana, California. Test crew met with plant officials then set up and prepared for test No. 1.

Tuesday, April 15

TRW personnel performed test No. 1 at both baghouse C and baghouse E. TRW personnel then recovered the samples then set up the sampling train for test No. 2.

Wednesday, April 16

TRW personnel performed test No. 2 at all the sampling locations. TRW recovered samples for the second test then set up for test No. 3.

Thursday, April 17

TRW personnel performed test No. 3 at baghouse C and baghouse E. TRW personnel then recovered the samples, packed up and left the site to travel back to the main office.

APPENDIX D

PROCESS DATA

Battery C

Test No. 1

April 15, 1980

Page ___ of ___

Date 4/15/80
Plant Name Kaiser
Location Fontana, Ca.
Battery No. C

COKE OVEN BATTERY LOG SHEET

Oven Pushing Data			Oven Charging Data		
Oven No.	Time Pushed	Push Greenness*	Oven No.	Time Charged/ Level	Comments
~~124~~	—	—	~~124~~	~~11:15~~	
146	11:23	—	146	12:21	
118	1:00	—	118	1:11	
128	1:08	—	128	1:22	
138	1:17	—	138	1:32	
~~148~~	~~1:20~~	—	—	—	
148	1:29	—	148	1:41	

* Coke Greenness Rating: 1 - denotes coke is not green;
5 - denotes very green coke pushed.

Battery "C"
Date: 4/15/80

Heater Room

Time	Stack Draft mm H_2O CS	Stack Draft mm H_2O PS	Fuel Press. mm H_2O	Temperatures °C Prehtr After (5)	Prehtr Before (6)	Waste Ht PS (1)	Waste Ht CS (2)	Coll. Main PS (3)	Coll. Main CS (4)	(mm H_2O Collecting Main Pressure PS	CS
11:32	19	15	270	—	—	—	—	—	—		
11:53	20	15	255	43	42	185	175	85	85		
12:33	20	15	260	43	42	167	175	85	84		
1:05	19	15	300	44	42	180	170	85	84		
1:34	20	15	265	44	44	167	172	87	85		
2:03	20	15	305	45	45	185	174	86	84		

Note: Fuel Gas Flowmeter was being bypassed — No Readings

8

Battery "C"
Date - 4/15/80

Filter Instruments

Time	Manometers, in.wc Compartment 1	2	3	4	5	Total ΔP in. w.c.	Inlet Temp °F	Inlet Draft -mm H_2O	Fan Load amps	Trans % Opacity Outlet
11:30	4.7	5.5	3.6	4.7	4.2	5.6	320	29	22	See
11:45	4.5	5.4	3.8	3.9	4.2	5.5	325	35	22	data
12:00	5.2	5.2	3.9	4.6	4.8	5.8	335	32	22	for
12:15	4.8	5.5	3.6	4.3	4.6	5.6	315	32	22	Battery E
12:30	4.5	5.5	3.7	4.5	5.0	6.0	315	35	22	
12:45	4.4	5.6	3.8	4.2	5.0	5.7	325	33	22	
1:00	5.6	5.2	4.0	4.7	4.8	5.9	315	32	22	
1:15	6.0	4.7	3.8	5.0	4.3	5.5	315	32	22	
1:30	5.7	4.7	3.8	4.9	4.3	6.1	320	35	22	
1:45	4.2	5.5	3.8	4.8	4.1	5.8	330	33	22	
2:00	5.4	5.4	4.1	4.6	4.7	5.7	345	32	22	

9

N. N N

Tues April 15, 1980

NOTES

In for what is to be first test day
Al Verzuert and Simon Brown are here
Al will take readings on C, PB take readings on E

A battery is down for repair, and installation of filter

Test No 1 on battery E started at about 11:25 am

Jerry Brown says collected dust is going to landfill.
He also said they are experimenting with methods to "stabilize" all dust that goes to the landfill

Test finished at ~2:00 pm

Coal Mix Analysis

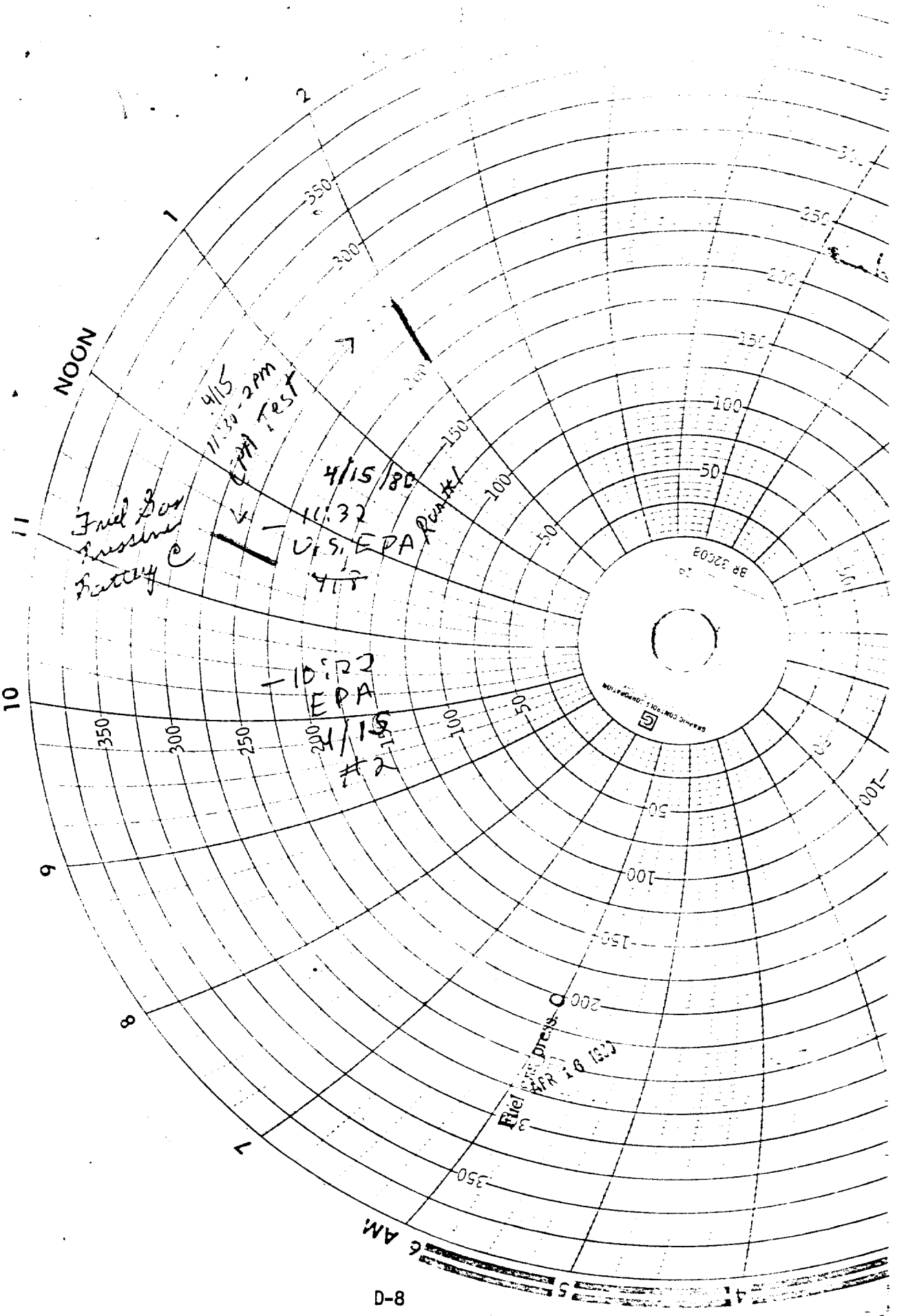
Component	4/15/80	4/16/80	4/17/80
Volatile Matter)	34.0	33.0	32.8
Fixed Carbon)*	59.3	60.2	60.5
Ash)	6.7	6.8	6.7
H_2O	7.3	7.6	7.0
Sulfur**	0.66	0.70	0.70

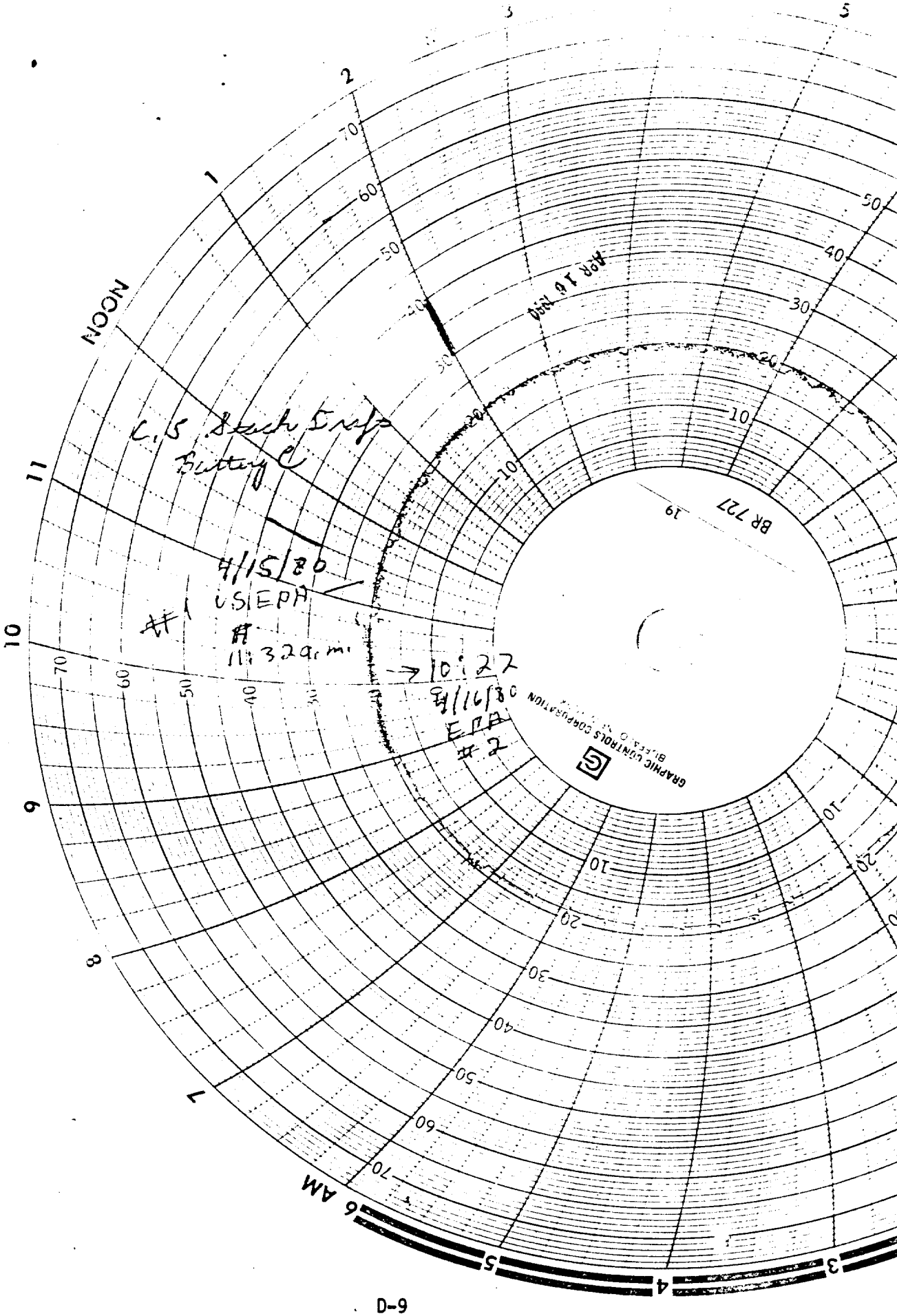
*Dry Basis % By Weight
**Included in V.M. and Ash

Coke Oven Gas Analysis

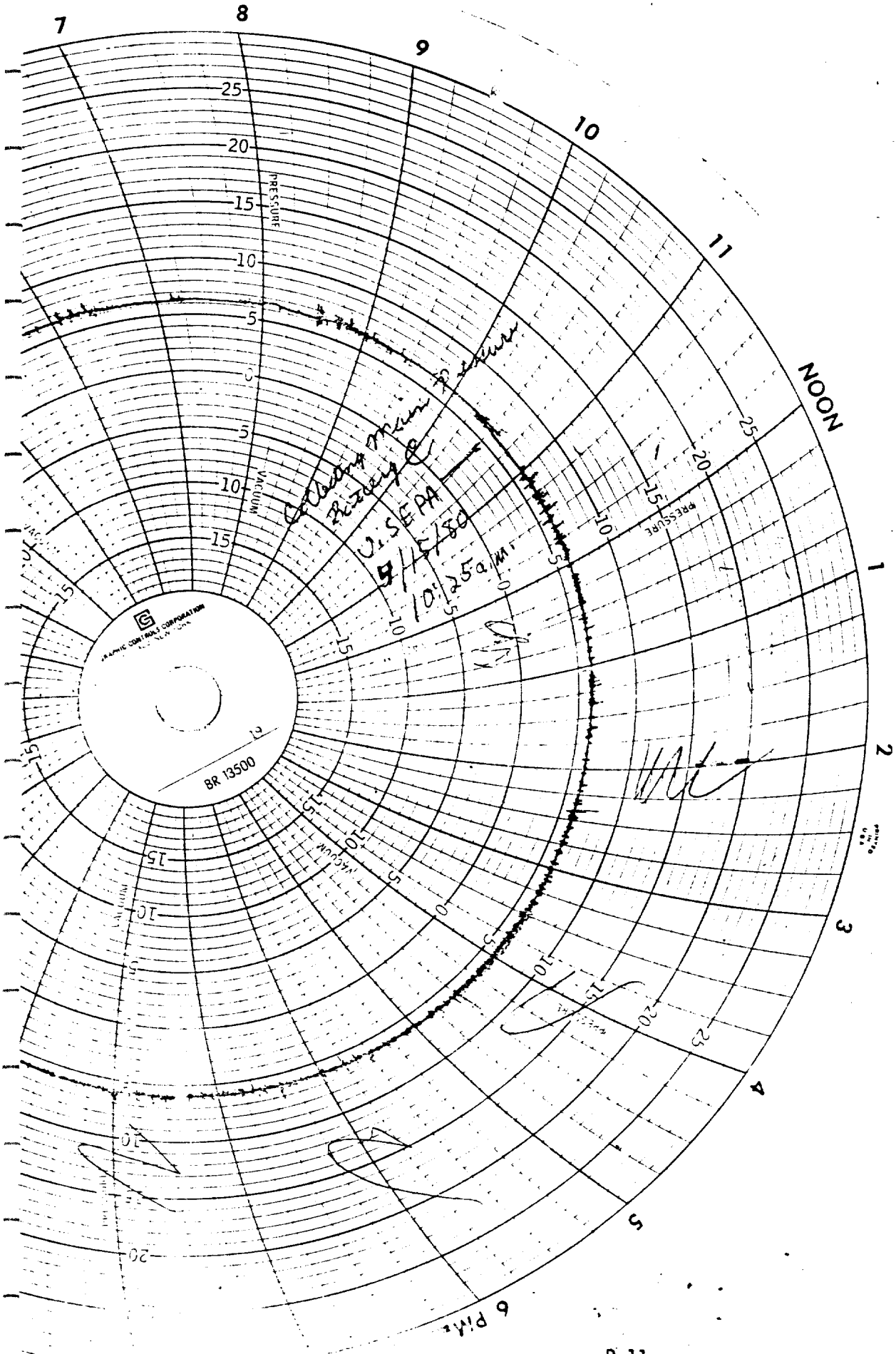
Component	4/15/80	4/16/80	4/17/80
CO_2	3.0	2.6	2.0
Illuminants***	3.8	4.0	4.8
O_2	2.2	1.4	3.2
CO	6.6	6.0	5.4
H_2	40.4	44.6	41.6
CH_4	24.4	24.8	25.6
N_2(by diff.)	19.6	16.6	17.4
	100.0	100.0	100.0
Gross BTU/cf.	475	495	507

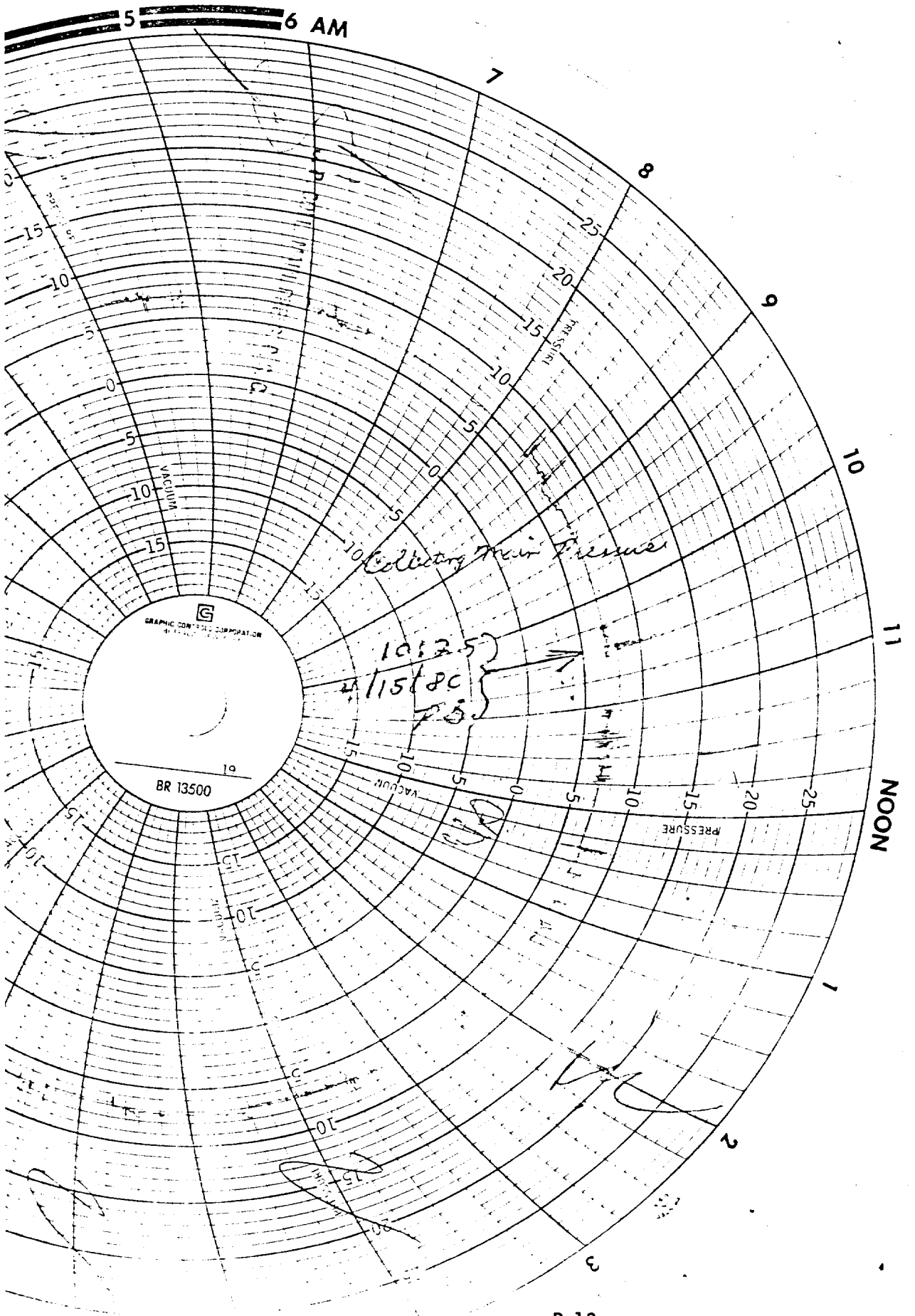
***Illuminants calc. as C_2H_4


NOON
1
2
3
4
5
6 AM
7
8
9
10
11
350
300
250
200
150
100
50
4/15
11:30-2PM
EPA Test
4/15/80
11:32
U.S. EPA Run #1
4/15
Fuel Bar
Pressure
Factory
10:22
EPA
4/15
#2
Fuel Bar Pressure
APR 16 1980


NOON
1
2
3
4
5
6 AM
7
8
9
10
11
BR 727
19
GRAPHIC CONTROLS CORPORATION
BUFFALO
APR 16 1980
U.S Steel Trip
Butler
4/15/80
USEPA
#1
11:32 a.m.
10:27
4/16/80
EPA
#2

NOON
6 AM
APR 15 1980
BR 727
GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
C.P. Stack Draft P.S.C.
P.S. Stack Draft Rotary C
11:32
10:22
EPA
#2
U.S. EPA
4/15/80


7
8
9
10
11
NOON
1
2
3
4
5
6 P.M.
PRESSURE
VACUUM
GRAPHIC CONTROLS CORPORATION
BR 13500
Calibration Recorder
U.S. EPA
9/15/80
10:25 a.m.


5
6 AM
7
8
9
10
11
NOON
1
2
3
VACUUM
PRESSURE
BR 13500
Calibrating Main Pressure
10:25
115 DC
75

COKE OVEN BATTERY WALL TEMPERATURES

DIA 2 — 4/15/80 — TIME 8:45

"B" BATTERY FLUE TEMPERATURES		Wall No.			"C" BATTERY FLUE TEMPERATURES		Wall No.			WALL NUMBER	WALL NUMBER
PUSHER SIDE			COKE SIDE		PUSHER SIDE			COKE SIDE		PS 84	PS 85
43		51	13		041		101	39		1 74	1 05
xxx	97 / 18	52	xxx	25 / 1	xxx	26	102	xxx	06 / 00	2 07	2 50
		53					103			3 11	3 00
29 / 30	xxx	54	44 / 22	xxx	20 / 17	xxx	104	32 / 1	xxx	4 18	4 07
		55					105			5 21	5 12
xxx	28 / 30	56	xxx	15 / 7	xxx	19	106		09	6 24	6 23 / 15
		57						NIA	1840		
10 / 35	xxx	58	31 / 28	xxx	15 / 2	xxx	107	27 / 19	xxx	7 32	7 19
		59					108				
xxx	29 / 15	61	xxx	28 / 31	xxx	11 / 22	109	xxx	00 / 31	8 30	8 21
		62					110			9 31	9 24
08	xxx	63	10 / 6	xxx	20	xxx	113	02 / 7	xxx	10 32	10 26
		64					114				
xxx	18	65	xxx	25 / 31	xxx	27	115	xxx	22 / 34	11 32	11 6
		66					116			12 32	12 27
16	xxx		15 / 5	xxx	18	xxx	117	23 / 3	xxx	13 30	13 18
							118			14 27	14 1.0
xxx	23 / 19		xxx	07 / 18	xxx	00	119	xxx	26		
					1940	1650		NIA	1540	CS	CS
11 / 20	xxx		23 / 8	xxx	00	xxx	120	07 / 22	xxx	14 29	14 22
							121			13 30	13 20
xxx	07 / 15		xxx	10 / 36	xx	02 / 26	124	xxx	17 / 7	12 30	12 18
							125				
03 / 18	xxx		08 / 9	xxx	09 / 13	xxx	126	04 / 14	xxx	11 25	11 15
							127				
xxx	22 / 18	78	xxx	28 / 1	xxx	21 / 19	128	xxx	16 / 11	10 22	10 17
		79					129			9 15	9 12
14	xxx	81	20 / 02	xxx	04 / 15	xxx	131	07 / 21	xxx	8 09	8 14
							132				
xxx	22 / 32	83	xxx	18 / 10	xxx	21 / 15	133	xxx	14 / 13	7 10	7 14
							134			6 20	6 14
19 / 23	xx	85	13 / 7	xxx	21	xxx	135	11	xxx	5 20	5 12
					1840		136	23			
xxx	10 / 28	87	xxx	08 / 22	xxx	20 / 59	137	xxx	38 / 24	4 21	4 17
		88					138				
24 / 15	xx	89	12 / 0	xxx	19	xxx	139	15 / 9	xxx	3 18	3 14
							141			2 15	2
xxx	94 / 27	92	xxx	99 / 19	xxx	27 / 43	142	xxx	33 / 40	1 14	1
		93					143				
09 / 24	xxx	94	12 / 9	xxx	08 / 44	xxx	144	45 / 34	xxx		
		95					145				
xxx	20	96	xxx	20 / 1	xxx	12 / 32	146	xxx	27 / 34F		
		97					147				
5 / 31	xxx	98	35 / 02	xxx	52 / 39	xxx	148	1.0	xxx		
		99					149	27			
12				14		55	150		24		
213			22	208	180	194	151	182	184		
2223			2224		2187	2187		2183			
2221											

REMARKS:

D-13

Battery C

Test No. 2*

April 16, 1980

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* Circular charts not available:
Battery C: 1. Collecting Main Pressure
2. P.S. Stack Draft

Date 4/10/80
Plant Name Kaiser
Location Fontana
Battery No. C

COKE OVEN BATTERY LOG SHEET

Oven Pushing Data			Oven Charging Data		
Oven No.	Time Pushed	Push Greenness*	Oven No.	Time Charged/ Level	Comments
101	10:42	4			
121	10:49	5			
			101	10:58	High VE-Delay
131	11:02	4+			
			121	11:05	High VE
141	11:11	2			
			131	11:13	moderate VE
			141	11:20	" "
←		2nd Traverse			→
103	1:59	2			
113	2:07	3			
			103	2:15	High VE

* Coke Greenness Rating: 1 - denotes coke is not green;
5 - denotes very green coke pushed.

Battery C

Date: 4/16/80

Heater Room

Time	Stack Draft mm H_2O CS	Stack Draft mm H_2O PS	Fuel Press. mm H_2O	Temperatures °C Preht'r After (5)	Preht'r Before (6)	Waste Ht PS (1)	Waste Ht CS (2)	Coll. Main PS (3)	Coll. Main CS (4)	mm H_2O Collecting Main Pressure PS	Collecting Main Pressure CS
10:19	20	15	245	42	42	168	176	85	86		
11:25	23	3 ?	250	44	43	171	185	85	86		
← 2nd Traverse →											
1:03	23	4	260	45	45	192	179	85	85		
2:03	23	4	255	46	45	193	180	82	84		

Note; Fuel Gas Flowmeter was being bypassed — No Readings

Date – 4/16/80
Battery C

Filter Instruments

Time	Manometers, in.wc Compartment 1	2	3	4	5	Total ΔP in. w.c.	Inlet Temp °F	Inlet Draft -mm H_2O	Fan Load amps	Trans % Opacit Outlet
10:15	5.0	6.2	4.1	5.2	4.5	5.6	320	31	22	See data for Battery E
10:35	5.2	6.1	4.0	4.5	5.5	6.0	320	34	22	
10:46	5.3	6.0	4.3	4.6	5.8	5.8	330	34	22	
11:00	7.1	6.6	4.8	5.7	5.7	7.0	350	30	22	
11:05	Cleaning cycle initiated									
11:22*	3.6	3.7	3.0	3.0	3.2	5.7	330	32	22	
11:31	4.2	4.1	3.1	3.3	3.6	5.2	330	33	22	
	~~2nd Traverse~~									2nd ~~traverse~~
1:00	4.8	4.6	3.6	3.8	4.0	5.7	325	33	22	
1:15	4.1	4.7	3.7	3.7	4.2	5.3	335	33	22	
1:30	4.4	4.2	3.5	3.9	3.8	5.6	340	33	22	
1:45	4.4	4.6	3.5	3.9	3.9	5.4	345	35	22	
2:00	4.9	4.5	3.7	3.9	4.2	5.6	355	32	22	
2:15	5.2	4.7	3.8	4.1	4.4	5.5	335	31	22	

* End cleaning cycle

Wed: April 16, 1980

NOTES

Brunswick Metal in Clairmont

This is to be run #2
Jake said he will get fuel and coal analysis for me

Battery E - reversals are at 20 min after the hr, and 50 min after the hour

Went with heater when checking #7 flue temps. Only saw one leaker

Battery B went thru 2 cleaning cycles at ~ 9:15 am

~~Problem~~	1	2	3	4	5	Total	
Preclean	NR	8.7	6.0	6.7	5.2	8.0	Total was down 1.5"
Post clean	5.9	5.4	4.7	5.0	4.1	6.5	

Battery E test started at 10:25 am
" " " over at 12:45

Asked Rick Fredricks about doing a manual cleaning cycle on C + D filters. Rick said don't do it on D because he has bag problems in the filter and they are going to change out the bags in about 2 months.

B filter is cleaning very often (almost continuously)
(Is set to clean at 7.0)

D filter is set to clean at 8.0. Running at 5.4
Inlet temp 390°F

1	2	3	4	5	6	Total
2.6	2.7	2.7	2.8	3.3	3.7	5.4

Coal Mix Analysis

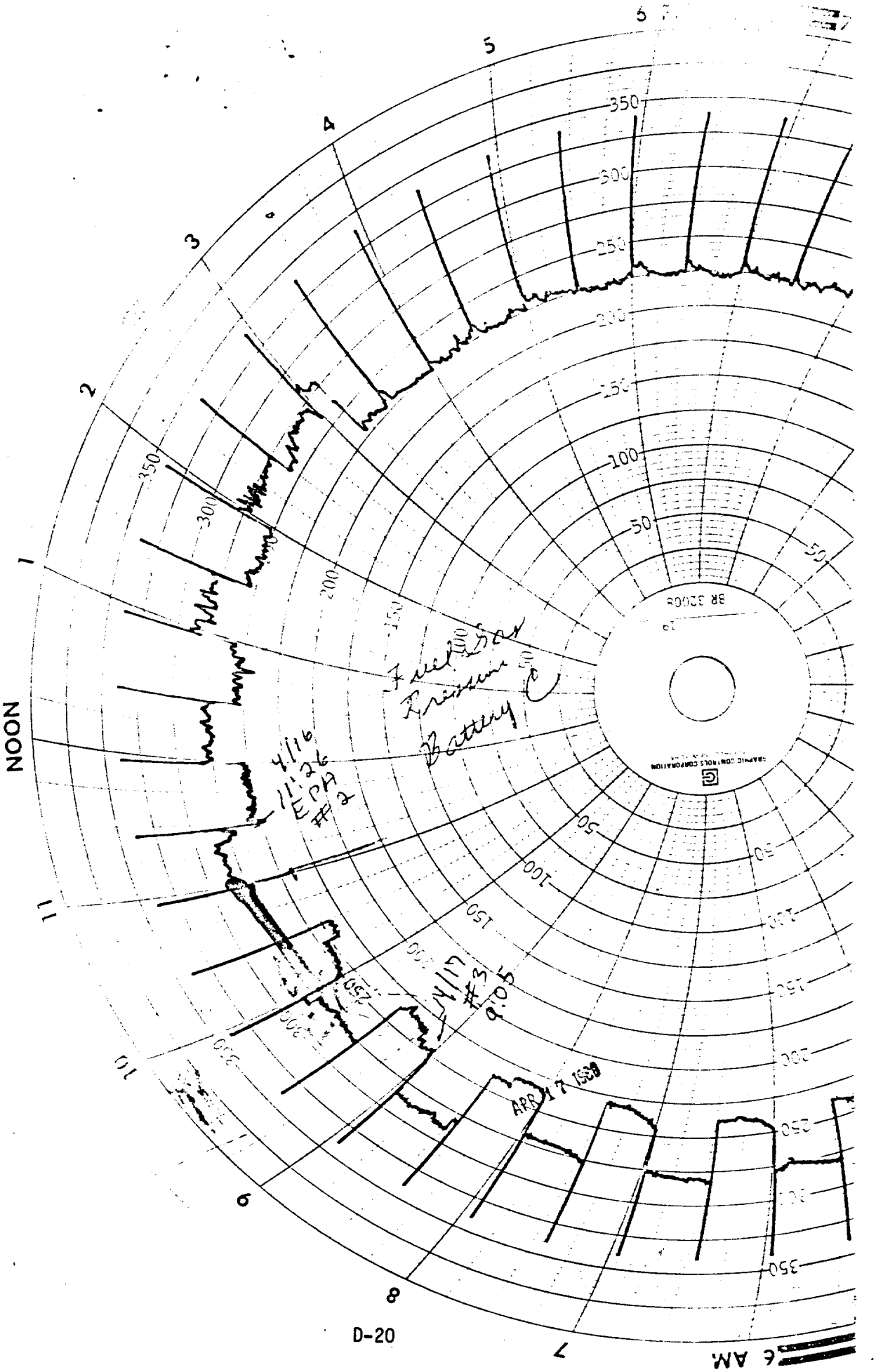
Component	4/15/80	4/16/80	4/17/80
Volatile Matter)	34.0	33.0	32.8
Fixed Carbon)*	59.3	60.2	60.5
Ash)	6.7	6.8	6.7
H_2O	7.3	7.6	7.0
Sulfur**	0.66	0.70	0.70

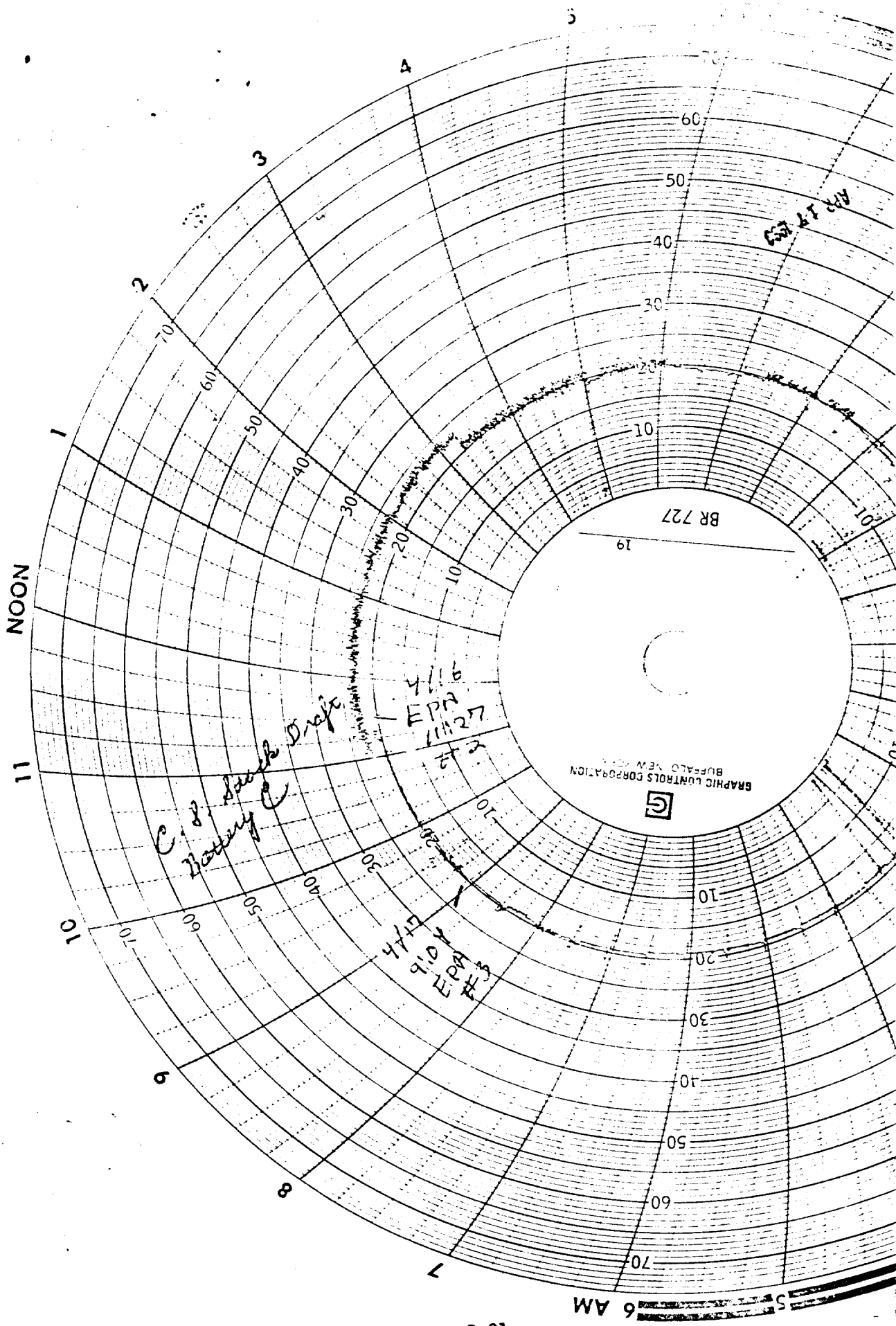
*Dry Basis % By Weight
**Included in V.M. and Ash

Coke Oven Gas Analysis

Component	4/15/80	4/16/80	4/17/80
CO_2	3.0	2.6	2.0
Illuminants***	3.8	4.0	4.8
O_2	2.2	1.4	3.2
CO	6.6	6.0	5.4
H_2	40.4	44.6	41.6
CH_4	24.4	24.8	25.6
N_2 (by diff.)	19.6	16.6	17.4
	100.0	100.0	100.0
Gross BTU/cf.	475	495	507

***Illuminants calc. as C_2H_4


NOON
6 AM
4/16
11:26
EPA
#2
4/17
#3
9:05
APR 17 1989
Fuel Gas
Pressure
Battery C
GRAPHIC CONTROLS CORPORATION
BR 32008


NOON
1
2
3
4
5
6 AM
7
8
9
10
11
BR 727
GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
C.S. Stack Drift
Battery C
4/16
EPA
11:27
#2
4/17
9:04
EPA
#3
Apr 17 1979

6 PM
7
5
4
3
2
1
NOON
11
10
9
8
BR 727
GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
U.S. Strat Drift
Survey Co.
4/16/80

ONE OVEN UP ... BATTERY CROSSWALL TEMPERATURES

READER: Simpson-Diaz DATE: 4-16-90 TIME: 09:15

"B" BATTERY FLUE TEMPERATURES					"C" BATTERY FLUE TEMPERATURES				
		Wall No.			110		Wall No.	105	
PUSHER SIDE			COKE SIDE		PUSHER SIDE			COKE SIDE	
		51			11		101	22	
xxx	28	52	xxx	17	xxx	26	102	xxx	26
	25	53		32		31	103		31
27	xxx	54	32	xxx	23	xxx	104	11	xxx
29		55	15		14		105	22	
xxx	17	56	xxx	27	xxx	24	106	xxx	24
	18	57		30		14	107		16
34	xxx	58	33	xxx	31	xxx	108	40	xxx
32		59	23		19		109	26	
xxx	37	61	xxx	41	xxx	15	110	xxx	09
	34	62		21		12	111		22
21	xxx	63	36	xxx	27	xxx	112	29	xxx
16		64	35		18		113	26	
xxx	32	65	xxx	33	xxx	22	114	xxx	26
	42	66		19		12	115		
06	xxx	67	18	xxx	15	xxx	116	32	xxx
17		68	19		8		117	28	
xxx	12	69	xxx	27	xxx	01	118	111A	1920
	38	70		29		16	119		11
22	xxx	71	21	xxx	16	xxx	120	25	xxx
19		72	33		3		121	4	
xxx	24	73	xxx	14	xxx	06	122	xxx	33
	45	75		23		21	123		19
16	xxx	76	12	xxx	22	xxx	124	32	xxx
22		77	31		7		125	27	
xxx	24	78	xxx	29	xxx	37	126	xxx	18
	26	79		25		1	127		24
27	xxx	81	33	xxx	29	xxx	128	27	xxx
18		82	08		7		129	15	
xxx	08	83	xxx	13	xxx	12	130	xxx	28
	6	84		28		27	131		18
21	xxx	85	12	xxx	24	xxx	132	06	xxx
22		86	16		1		133	27	
xxx	12	87	xxx	12	xxx	21	134	xxx	29
	22	88		24		09	135		40
17	xxx	89	09	xxx	14	xxx	136	36	xxx
22		90	21		29		137	26	
xxx	13	91	xxx	13	xxx	36	138	xxx	23
	27	93		31		7	139		10
14	xxx	94	18	xxx	10	xxx	140	14	xxx
30		95	26		31		141	32	
xxx	24	96	xxx	26	xxx	12	142	xxx	23
	3	97		2		29	143		10
26	xxx	98	31	xxx	45	xxx	144	14	xxx
28		99	04		37		145	33	
	21	101		10		38	146		12
253	285	B	236	265	223	203	C	238	235
2269		2260	2250		2213	2275		2237	

WALL NUMBER		WALL NUMBER	
PS	86	PS	87
1	1620	1	1680
2	03	2	1840
3	09	3	1930
4	13	4	1990
5	15	5	01
6	18	6	09
7	20	7	12
8		8	13
9	21	9	12
10	22	10	10
11	23	11	08
12	29	12	1930
13	30	13	12
14	27	14	10
CS		CS	
14	26	14	
13	0	13	18
12		12	
11	18	11	32
10	16	10	20
9	08	9	15
8	19	8	12
7	13	7	12
6	14	6	10
5	07	5	09
4	—	4	08
3	14	3	06
2	12	2	02
1	—	1	1730

REMARKS:

#61 08 09 - 07
92 93 89

D-23

Battery C

Test No. 3*

April 17, 1980

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* Circular charts are not included.

See charts for 4/16, Test 3. These charts continued through the start of tests on 4/17.

Page ___ of ___

Date 4/17/80
Plant Name Kaiser
Location Fontana Ca
Battery No. C

COKE OVEN BATTERY LOG SHEET

Oven Pushing Data			Oven Charging Data		
Oven No.	Time Pushed	Push Greenness*	Oven No.	Time Charged/ Level	Comments
107	9:50	2			
			145	9:54	
117	10:00	3			
			107	10:04	
127	10:11	3			
			117	10:16	Very high VE
137	10:26	5			
			127	10:36	
			137	10:37	Very high VE

* Coke Greenness Rating: 1 - denotes coke is not green;
5 - denotes very green coke pushed.

Battery C

Date: 4/17/80

Heater Room

Time	Stack Draft mm H_2O CS	Stack Draft mm H_2O PS	Fuel Press. mm H_2O	Temperatures °C Prehtr After (5)	Prehtr Before (6)	Waste Ht PS (1)	Waste Ht CS (2)	Coll. Main PS (3)	Coll. Main CS (4)	(mm H_2O) Collecting Main Pressure PS	Collecting Main Pressure CS
9:04	20	4	245	44	44	185	176	86	87	—	—
10:06	20	4	255	44	44	185	177	86	86	—	—
10:51	—	—	—	—	—	—	—	—	—	6.5	7
11:02	20	6	245	46	45	191	177	85	86	—	—

Note; Fuel Gas Flowmeter was being bypassed — No Readings

Date – 4/17/80
Battery C

Filter Instruments

Time	Manometers, in. wc Compartment 1	2	3	4	5	Total ΔP in. w.c.	Inlet Temp °F	Inlet Draft – mm H_2O	Fan Load amps	Trans % Opacit Outlet
9:00	5.8	5.4	4.1	4.8	4.9	6.1	350	32	21	See data for Battery E
9:15	5.2	5.4	4.1	4.7	4.7	6.0	325	32	21	
9:30	5.5	5.3	4.0	4.7	4.9	6.2	330	30	21	
9:45	5.4	5.2	4.0	4.7	4.9	6.1	340	32	21	
10:01	6.0	5.5	4.1	4.8	5.0	6.1	345	32	21	
10:17	5.7	5.3	4.0	4.6	4.8	6.0	330	32	21	
10:31	5.4	5.3	4.0	4.7	4.8	6.0	330	33	21	
10:45	5.2	5.2	3.9	4.6	4.9	6.0	340	33	21	
11:00	6.1	5.4	4.0	4.7	4.9	6.2	355	32	22	
11:15	5.7	5.3	4.0	4.8	5.0	6.4	330	32	21	

April 17, 1980

Notes

EG&G rep Dave Poulson

Mr. Jerry Beason said that, on the average, each oven is patched once every three months, although some are patched more often

Battery E test started at 9:00 am
" " " over at 11:08 am

[redacted]

Coal Mix Analysis

Component	4/15/80	4/16/80	4/17/80
Volatile Matter)	34.0	33.0	32.8
Fixed Carbon)*	59.3	60.2	60.5
Ash)	6.7	6.8	6.7
H_2O	7.3	7.6	7.0
Sulfur**	0.66	0.70	0.70

*Dry Basis % By Weight
**Included in V.M. and Ash

Coke Oven Gas Analysis

Component	4/15/80	4/16/80	4/17/80
CO_2	3.0	2.6	2.0
Illuminants***	3.8	4.0	4.8
O_2	2.2	1.4	3.2
CO	6.6	6.0	5.4
H_2	40.4	44.6	41.6
CH_4	24.4	24.8	25.6
N_2 (by diff.)	19.6	16.6	17.4
	100.0	100.0	100.0
Gross BTU/cf.	475	495	507

***Illuminants calc. as C_2H_4

Battery E

Test No. 1

April 15, 1980

Note: Circular charts for battery E were not operating or were not available.

Page ___ of ___

Date 4/15/80
Plant Name Kaiser
Location Fontana Ca
Battery No. E

COKE OVEN BATTERY LOG SHEET

Oven Pushing Data			Oven Charging Data		
Oven No.	Time Pushed	Push Greenness*	Oven No.	Time Charged/ Level	Comments
205	Before start of test, at about 10:00 am				
	Test started about 11:25, but no charges until 12:23				
215	12:23	Not Read	215	12:54	
225	12:50	—	225	1:04	
235	1:01	—	235	1:12	
207	1:58	—	207	2:10	
217	2:04	—			

* Coke Greenness Rating: 1 - denotes coke is not green;
5 - denotes very green coke pushed.

Date: 4/15/80
Battery E

Heater Room

Time	Stack Draft - mm H_2O	Fuel Press. mm H_2O	Temperatures °C Prehtr After 5	Prehtr Before 6	Waste Ht PS 1	Waste Ht CS 2	Coll. Main PS 3	Coll. Main CS 4	mm H_2O Collecting Main Pressure PS	CS
11:20	~~20~~ 16	150,000 cfh 200 mm	62	40	-225-		95	100	Crossover 6.0	
12:20	16	144,000 200 mm	64	40	-230-		95	102	6.0	
1:20	16	130,000 cfh 200 mm	65	40	-230-		90	108	6.0	
2:20	16	130,000 cfh 200 mm	65	40	-232-		94	106	6.0	

~~Note: Fuel Gas Flow meter was being bypassed - No Readings~~

Date – 4/15/80 YB
Battery E

Filter Instruments

Time	Manometers, in.wc Compartment 1	2	3	4	5	6	Total ΔP in. w.c.	Inlet Temp °F	Inlet Draft –mm H_2O	Fan Load amps	Trans ~~Opacity~~ milliamps Outlet C	E
11:15 am	3.9	4.6	4.6	5.5	5.5	5.9	6.4	385	31	23	0.67	4.33
11:45	4.1	4.3	4.5	5.4	5.3	5.9	6.4	385	31	23	0.33	4.28
12:00	3.9	4.9	4.6	5.6	5.5	6.0	6.4	385	31	23	0.33	4.36
12:15	4.1	4.5	4.8	5.3	5.4	5.8	6.4	385	31	23	0.33	4.24
12:30	4.2	4.6	4.6	5.5	5.3	5.9	6.4	385	31	23	0.33	4.22
12:45	3.9	4.5	4.6	5.5	5.4	6.0	6.4	385-90	31	23	0.32	4.15
1:00	4.2	5.0	4.8	5.6	5.5	6.0	6.5	385	31	23	0.32	4.20
1:15	4.2	4.6	4.5	5.6	5.4	6.0	6.4	385	31	23	0.58	4.19
1:30	4.0	4.5	4.7	5.7	5.4	6.1	6.5	385	31	23	0.32	4.18
1:45	3.8	4.6	4.6	5.4	5.4	6.0	6.5	390	31	23	0.31	4.16
2:00	4.4	4.7	4.8	5.6	5.5	6.0	6.5	385	31	23	0.31	4.19
2:15	4.2	4.7	4.7	5.5	5.5	6.0	6.5	385	31	23	0.31	4.15

Test over at about 2:00 pm
Filter did not clean during test period, to my knowledge

Manually initiated cleaning at 2:25 pm. Completed at 2:40

2:45	2.4	3.1	3.0	4.1	3.8	4.2	4.8	385	31	23	0.32	4.15

ΔP come down 1.7" after cleaning

3:00	3.1	4.0	3.9	4.8	4.7	5.2	5.7	385	31	23	0.32	4.12
3:15	3.5	4.2	4.0	5.0	4.8	5.4	5.9	385	31	23	0.32	4.12

Again, manually initiated cleaning cycle at 3:25 pm. Completed at 3:40
Quantity of dust collected during dust cleaning cycle was 33 lbs
and opacities are collected in a one hour period

3:45	2.7	3.3	3.2	4.2	4.1	4.4	5.1	385	31	23	0.32	4.10

Notes: Opacity Readings by Transmissometer

milliamps	opacity
4.0	0%
8.0	25
12.0	50
16.0	75
20.0	100