Emission Test Report
Kaiser Steel Corporation, Fontana, Ca.
Coke Oven Battery "B" Baghouse

To

ENVIRONMENTAL PROTECTION AGENCY

Contract #68-02-2812
Work Assignment #43

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TRW
ENVIRONMENTAL ENGINEERING DIVISION

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SECTION 1

INTRODUCTION

A test crew from TRW Environmental Engineering Division performed emission testing at Kaiser Steel Corporation's Fontana works between September 17th and 22nd, 1979. The testing was performed simultaneously at the inlet and outlet of a baghouse controlling emissions from Coke oven battery "B". The test results will be used to assist the EPA in establishing performance standards for the iron and steel industry.

The gas constituents monitored included particulates, benzo-a-pyrene, carbon monoxide, oxygen, carbon dioxide, and benzene. Opacity observations of the battery stack were made during the tests. Two engineers monitored the process during the testing to assure normal battery operation.

This report presents the results of the sampling and analysis effort at the Kaiser Steel Corporation Plant in Fontana, California. The following sections of the report contain a summary of the results, description of the process, descriptions of the sampling locations, descriptions of the sampling and analysis procedures, and appendices containing field and laboratory data and example calculations.

SECTION 2

SUMMARY AND DISCUSSION OF RESULTS

The results of the test program at Kaiser Steels baghouse "B" are summarized in Tables 1-5 and figures 1-4. The results of simultaneous inlet and outlet particulate tests are summarized in Tables 1 and 2, respectively. The results of simultaneous inlet and outlet benzo-a-pyrene (BaP) tests are summarized in Tables 3 and 4, respectively. The analysis results of the integrated bag samples for benzene, O_2, CO_2, and CO are given in Table 5. The results of continuous monitoring of the stack gas for carbon monoxide is presented graphically in Figures 1-4.

The data from particulate test number 2 (Baghouse Inlet) is not presented because this run was terminated at the middle of the test. The probe at the inlet sampling location failed to pass the leak check after changing sampling ports and the glass probe liner was found to be broken.

The BaP and particulate tests were done simultaneously except for test number 2 where the particulate test was aborted. The simultaneous testing was accomplished by operating a BaP train in one sampling port and a particulate sampling train in the other port at both the inlet and outlet locations. Continuous carbon monoxide monitoring and an integrated bag sample (for benzene, CO_2, CO, and O_2) were also done simultaneously with the BaP and particulate tests.

Since the baghouse inlet particulate run #2 was aborted, another run was made on Friday. This run (#4) consisted of a particulate sample at both the inlet and outlet. The chart below gives a visual presentation of the sample runs made in order to facilitate the comparison of Inlet and Outlet runs with respect to BAP and particulate testing.

	BAGHOUSE INLET		
Run 1	Run 2	Run 3	Run 4
Particulate and BAP	Particulate Aborted BAP only	Particulate and BAP	Particulate Only
	BAGHOUSE OUTLET		
Particulate and BAP	Particulate and BAP	Particulate and BAP	Particulate Only

Table 1

Baghouse Inlet Particulate Results

RUN NUMBER	1		3		4		AVERAGE	
	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS	ENGLISH UNITS	METRIC UNITS
I DATE	9/18/79	9/18/79	9/20/79	9/20/79	9/21/79	9/21/79		
II STACK PARAMETERS								
Pst - Static Pressure, "Hg (mmHg)	-0.132	-3.36	-0.132	-3.36	-0.132	-3.36	-0.132	-3.36
Ps - Stack Gas Pressure, "Hg Absolute (mmHg)	28.44	722.32	28.60	726.38	28.57	725.62	28.54	724.83
% CO_2 - Volume % Dry	3.80	3.80	4.35	4.35	4.46	4.46	4.20	4.20
% O_2 - Volume % Dry	13.30	18.30	12.00	12.00	12.10	12.10	12.47	12.47
% CO - Volume % Dry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% N_2 - Volume % Dry	82.90	82.90	83.65	83.65	83.44	83.44	83.33	83.33
Ts - Average Stack Temperature °F (°C)	482	250	495	257	480	249	486	252
% H_2O - % Moisture in Stack Gas, By Volume	8.06	8.06	5.49	5.49	6.15	6.15	6.57	6.57
As - Stack Area, FT^2 (M^2)	20.63	1.92	20.63	1.92	20.63	1.92	20.63	1.92
Md - Molecular Weight of Stack Gas, Dry Basis	29.14	29.14	29.18	29.18	29.20	29.20	29.17	29.17
Ms - Molecular Weight of Stack Gas, Wet Basis	28.24	28.24	28.56	28.56	28.51	28.51	28.44	28.44
Vs - Stack Gas Velocity, FT/SEC, (M/SEC)	58.31	17.77	57.12	17.41	58.03	17.69	57.82	17.62
Qa - Stack Gas Volumetric Flow at Stack Conditions, ACFM (Nm^3/MIN)	72040	2040	70569	1999	71702	2031	71437	2023
Qs - Stack Gas Volumetric Flow at Standard Conditions, DSCFM (Nm^3/MIN)	35318	1000	35277	999	36137	1023	35577	1007
III TEST CONDITIONS								
Pb - Barometric Pressure, "Hg (mmHg)	28.57	725.68	28.73	729.74	28.70	728.98	28.67	728.13
Dn - Sampling Nozzle Diameter, IN. (MM)	0.25	6.35	0.25	6.35	0.25	6.35	0.25	6.35
T - Sampling Time, MIN	120	120	120	120	120	120	120	120
Vm - Sample Volume, ACF (M^3)	73.30	2.08	79.32	2.25	80.16	2.27	77.59	2.20
Np - Net Sampling Points	12	12	12	12	12	12	12	12
Cp - Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Tm - Average Meter Temperature °F (°C)	113	45	118	48	102	39	111	44
Pm - Average Orifice Pressure Drop, "H_2O (mmH_2O)	0.88	22.35	1.19	30.23	1.27	32.26	1.11	28.28
Vlc - Condensate Collected (Impingers and Gel), ML	---	123.4	---	88.3	---	103.5	---	105.1
ΔP - Stack Velocity Head "H_2O (mmH_2O)	0.562	14.28	0.540	13.74	0.566	14.38		
IV TEST CALCULATIONS								
Vw - Condensed Water Vapor, SDCF (Nm^3)	5.91	0.17	4.35	0.12	4.93	0.14	5.06	0.14
Vm - Volume of Gas Sampled at Standard Conditions, DSCF (Nm^3)	64.625	1.830	69.802	1.977	72.468	2.052	68.965	1.953
% H_2O - Percent Moisture, By Volume	8.06	8.06	5.49	5.49	6.15	6.15	6.57	6.57
Ms - Molecular Weight of Stack Gas, Wet Basis	28.24	28.24	28.56	28.56	28.51	28.51	28.44	28.44
Vs - Stack Velocity, FT/SEC (M/SEC)	58.31	17.77	57.12	17.41	58.03	17.69	57.82	17.62
% I - Percent Isokinetic	91	91	98	98	99	99	96	96
V ANALYTICAL DATA								
A) Particulates Front Half								
Probe (MG)		260.9		159.6		126.0		182.2
Cyclone (MG)								
Filter (MG)		193.2		162.2		127.0		160.8
Particulates Front Half Total (MG)		454.1		321.8		253.0		343.0
GRS/SDCF, (MG/M^3)	0.108	248.1	0.071	162.77	0.054	123.29	0.078	178.05
#/HR, KG/HR)	32.82	14.89	21.47	9.74	16.69	7.57	23.67	10.64
B) Particulates Back Half (Condensables)								
Impingers (MG)		4.70		52.0		45.4		34.03
GSR/SDCF, (MG/M^3)	0.001	2.56	0.011	26.30	0.01	22.12	0.007	16.99
#/HR, (KG.HR)	0.30	0.14	3.33	1.51	2.99	1.36	2.21	1.00
C) Total Particulate (MG)		458.8		373.8		298.4		377.0
GSR/SDCF, (MG/M^3)	0.109	250.7	0.082	189.07	0.064	145.41	0.085	195.06
#/HR, (KG/HR)	33.16	15.04	24.79	11.25	19.68	8.93	25.88	11.74
D) SO_4 Front Half (MG)								
PPM	17.49	17.49	9.47	9.47	6.54	6.54	11.17	11.17
GRS/SDCF, (MG/M^3)	0.07	71.4	0.017	38.7	0.012	26.7	0.033	45.6
#/HR, (KG/HR)	21.19	9.61	5.08	2.30	3.62	1.64	9.96	4.52

Table 2

Baghouse Outlet 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	9/18/79	9/18/79			9/20/79	9/20/79	9/21/79	9/21/79
II STACK PARAMETERS								
Pst - Static Pressure, "Hg (mmHg)	-0.61	-15.50	-0.30	-15.50	-0.61	-15.50	-0.61	-15.50
Ps - Stack Gas Pressure, "Hg Absolute (mmHg)	27.96	710.18	27.96	710.18	28.12	714.24	28.09	713.48
% CO_2 - Volume % Dry	3.80	3.80	3.03	3.03	4.35	4.35	4.46	4.46
% O_2 - Volume % Dry	13.30	13.30	15.1	15.1	12.00	12.00	12.10	12.10
% CO - Volume % Dry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% N_2 - Volume % Dry	82.9	82.9	81.87	81.87	83.65	83.65	83.44	83.44
Ts - Average Stack Temperature °F (°C)	442	228	443.3	228.5	443	228	444	229
% H_2O - % Moisture in Stack Gas, By Volume	9.04	9.04	2.1	2.1	7.47	7.47	6.88	6.88
As - Stack Area, FT^2 (M^2)	20.63	1.92	20.6	1.92	20.63	1.92	20.63	1.92
Md - Molecular Weight of Stack Gas, Dry Basis	29.14	29.14	29.09	29.09	29.18	29.18	29.20	29.20
Ms - Molecular Weight of Stack Gas, Wet Basis	28.13	28.13	28.86	28.86	28.34	28.34	28.43	28.43
Vs - Stack Gas Velocity, FT/SEC, (M/SEC)	59.27	18.06	58.12	17.71	58.55	17.85	57.24	17.45
Qa - Stack Gas Volumetric Flow at Stack Conditions, ACFM (NM^3/MIN)	73230	2074	71811	2034	72343	2049	70723	2003
Qs - Stack Gas Volumetric Flow at Standard Conditions, DSCFM (NM^3/MIN)	36472	1033	38433	1088	36839	1043	36136	1023
III TEST CONDITIONS								
Pb - Barometric Pressure, "Hg (mmHg)	28.57	725.68	28.57	725.68	28.73	729.74	28.70	728.98
Dn - Sampling Nozzle Diameter, IN. (MM)	0.25	6.35	0.25	6.35	0.25	6.35	0.25	6.35
T - Sampling Time, MIN	120	120	120	120	120	120	120	120
Vm - Sample Volume, ACF (M^3)	78.39	2.22	80.84	2.29	77.76	2.20	75.07	2.13
Np - Net Sampling Points	12	12	12	12	12	12	12	12
Cp - Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Tm - Average Meter Temperature °F (°C)	105	41	107.58	41.99	104	40	103	40
Pm - Average Orifice Pressure Drop, "H_2O (mmH_2O)	1.38	35.05	1.42	36.14	1.36	34.44	1.26	31.95
Vlc - Condensate Collected (Impingers and Gel), ML	---	151.9	---	33.9	---	123.3	---	108.9
ΔP - Stack Velocity Head "H_2O (mmH_2O)	0.594	15.09	0.585	14.86	0.587	14.91	0.561	14.25
IV TEST CALCULATIONS								
Vw - Condensed Water Vapor, SDCF (Nm^3)	7.08	0.20	1.70	0.05	5.81	0.165	5.16	0.15
Vm - Volume of Gas Sampled at Standard Conditions, DSCF (Nm^3)	70.185	1.988	72.058	2.041	70.082	1.985	67.693	1.917
% H_2O - Percent Moisture, By Volume	9.04	9.04	2.1	2.1	7.47	7.47	6.88	6.88
Ms - Molecular Weight of Stack Gas, Wet Basis	28.13	28.13	28.86	28.86	28.34	28.34	28.43	28.43
Vs - Stack Velocity, FT/SEC (M/SEC)	59.27	18.06	58.12	17.71	58.55	17.85	57.24	17.45
% I - Percent Isokinetic	95	95	92.9	92.9	94	94	93	93
V ANALYTICAL DATA								
A) Particulates Front Half								
Probe (MG)		44.8		16.3		82.4		60.8
Cyclone (MG)								
Filter (MG)		79.4		1.6		74.1		1.10
Particulates Front Half Total (MG)		124.2		17.9		156.5		61.9
GRS/SDCF, (MG/M^3)	0.027	62.47	0.004	8.77	0.034	78.84	0.014	32.29
#/HR, KG/HR)	8.54	3.87	1.26	0.57	10.88	4.94	4.37	1.98
B) Particulates Back Half (Condensables)								
[Impingers (MG)		3.41		6.7		33.4		116.0
GRS/SDCF, (MG/M^3)	0.007	17.15	0.001	3.28	0.007	16.83	0.026	60.51
#/HR, (KG/HR)	2.34	1.06	0.47	0.21	2.32	1.05	8.19	3.71
C) Total Particulate								
GRS/SDCF, (MG/M^3)		158.3		24.6		189.9		177.9
#/HR, (KG/HR)	0.0348	79.64	0.005	12.05	0.041	95.67	0.040	92.80
	10.88	4.94	1.73	0.78	13.20	5.99	12.56	5.70
D) SO_4 Front Half (MG)				3.2				
PPM,	6.18	6.18	0.39	0.39	9.32	9.32	6.25	6.25
GRS/SDCF, (MG/M^3)	0.011	25.22	0.004	1.57	0.017	38.06	0.011	25.50
#/HR, (KG/HR)	3.45	1.56	0.144	0.065	5.26	2.39	3.45	1.56

Table 3
Baghouse Inlet BaP 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	9/18/79	9/18/79	9/19/79	9/19/79	9/20/79	9/20/79		
II STACK PARAMETERS								
Pst - Static Pressure, "Hg (mmHg)	-0.132	-3.36	-0.132	-3.36	-0.132	-3.36	-0.132	-3.36
Ps - Stack Gas Pressure, "Hg Absolute (mmHg)	28.44	722.32	28.44	722.32	28.60	726.38	28.49	723.67
% CO_2 - Volume % Dry	3.80	3.80	3.03	3.03	4.35	4.35	3.73	3.73
% O_2 - Volume % Dry	13.30	13.30	15.10	15.10	12.00	12.00	13.47	13.47
% CO - Volume % Dry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% N_2 - Volume % Dry	82.90	82.90	81.87	81.87	83.65	83.65	82.81	82.81
Ts - Average Stack Temperature °F (°C)	480	249	536	280	495	257	504	262
% H_2O - % Moisture in Stack Gas, By Volume	8.06	8.06	9.12	9.12	5.49	5.66	7.56	7.61
As - Stack Area, FT^2 (M^2)	20.63	1.92	20.63	1.92	20.63	1.92	20.63	1.92
Md - Molecular Weight of Stack Gas, Dry Basis	29.14	29.14	29.09	29.09	29.18	29.18	29.14	29.14
Ms - Molecular Weight of Stack Gas, Wet Basis	28.24	28.24	28.08	28.08	28.66	28.54	28.33	28.29
Vs - Stack Gas Velocity, FT/SEC, (M/SEC)	56.99	17.37	59.37	18.10	54.47	16.61	56.94	17.36
Qa - Stack Gas Volumetric Flow at Stack Conditions, ACFM (Nm^3/MIN)	70410	1994	73356	2078	67434	1909	70400	1994
Qs - Stack Gas Volumetric Flow at Standard Conditions, DSCFM (Nm^3/MIN)	34592	980	33625	952	33650	953	33956	962
III TEST CONDITIONS								
Pb - Barometric Pressure, "Hg (mmHg)	28.57	725.68	28.57	725.68	28.73	729.74	28.62	727.03
Dn - Sampling Nozzle Diameter, in. (mm)	0.25	6.35	0.25	6.35	0.25	6.35	0.25	6.35
T - Sampling Time, min	120	120	120	120	120	120	120	120
Vm - Sample Volume, ACF (M^3)	82.14	2.33	75.73	2.14	71.18	2.02	76.35	2.16
Np - Net Sampling Points	12	12	12	12	12	12	12	12
Cp - Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Tm - Average Meter Temperature °F (°C)	113	45	118	48	120	49	117	47
Pm - Average Orifice Pressure Drop, "H_2O (mmH_2O)	1.24	31.50	1.23	31.24	1.10	27.94	1.19	30.23
Vlc - Condensate Collected (Impingers and Gel), mls	---	138.4	---	144.9	---	81.5	---	121.6
ΔP - Stack Velocity Head "H_2O (mmH_2O)	0.538	13.67	0.548	13.92	0.494	12.55	0.527	13.38
IV TEST CALCULATIONS								
Vw - Condensed Water Vapor, SDCF (Nm^3)	5.62	0.13	6.91	0.20	4.03	0.11	5.85	0.17
Vm - Volume of Gas Sampled at Standard Conditions, DSCF (Nm^3)	72.484	2.053	66.253	1.876	62.399	1.766	67.045	1.898
% H_2O - Percent Moisture, By Volume	8.06	8.06	9.12	9.12	5.49	5.66	7.61	7.61
Ms - Molecular Weight of Stack Gas, Wet Basis	28.24	28.24	28.08	28.08	28.66	28.54	28.33	28.29
Vs - Stack Velocity, FT/SEC (M/SEC)	56.99	17.37	59.37	18.10	54.60	16.64	56.99	17.37
% I - Percent Isokinetic	104	104	98	98	93.4	92	98	98
V ANALYTICAL DATA								
A) BaP Front Half								
Probe (ug)	---	4.34	---	5.49	---	7.3	---	5.71
Cyclone (ug)	---	---	---	---	---	---	---	---
Filter (ug)	---	4.14	---	9.5	---	10.0	---	7.88
BaP Front Half Total (ug)	---	8.48	---	14.99	---	17.3	---	13.59
grs/SDCF, (mg/M^3)	1.8×10^{-6}	0.004	3.5×10^{-6}	0.008	4.3×10^{-6}	0.0098	3.2×10^{-6}	0.0073
#/DAY (KG/DAY)	0.0128	0.006	0.024	0.011	0.030	0.013	0.022	0.010
B) BaP Back Half								
Absorbent Sampler (ug)	---	1.67	---	2.05	---	2.10	---	1.94
Impingers (ug)	---	---	---	---	---	1.83	---	1.83
Back Half Total (ug)	---	1.67	---	2.05	---	3.93	---	---
#/DAY (KG/DAY)	3.56×10^{-7}	0.0008	4.8×10^{-7}	0.0011	9.7×10^{-7}	0.0022	6.0×10^{-7}	0.0014
	0.0025	0.0011	0.0033	0.001	0.0067	0.003	0.0042	0.0017
BaP Total (ug)	---	10.42	---	17.34	---	21.23	---	15.14
grs/SDCF, (mg/M^3)	2.16×10^{-6}	0.0048	3.98×10^{-6}	0.009	5.3×10^{-6}	0.012	3.8×10^{-6}	0.0086
#/DAY (KG/DAY)	0.015	0.007	0.027	0.012	0.036	0.016	0.026	0.012

Table 4
Baghouse Outlet BaP 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	9/18/79	9/18/79	9/19/79	9/19/79	9/20/79	9/20/79		
II STACK PARAMETERS								
Pst - Static Pressure, "Hg (mmHg)	-0.61	-15.50	-0.61	-15.50	-0.61	-15.50	-0.61	-15.50
Ps - Stack Gas Pressure, "Hg Absolute (mmHg)	27.96	710.18	27.96	710.18	28.12	714.24	28.01	711.53
% CO_2 - Volume % Dry	3.80	3.80	3.03	3.03	4.35	4.35	3.73	3.73
% O_2 - Volume % Dry	13.30	13.30	15.10	15.10	12.00	12.00	13.47	13.47
% CO - Volume % Dry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% N_2 - Volume % Dry	82.90	82.90	81.87	81.87	83.65	83.65	82.81	82.81
Ts - Average Stack Temperature °F (°C)	440	227	441	228	443	229	441	228
% H_2O - % Moisture in Stack Gas, By Volume	9.04	9.04	3.10	2.10	7.47	7.47	6.2	6.54
As - Stack Area, FT^2 (M^2)	20.63	1.92	20.63	1.92	20.63	1.92	20.63	1.92
Md - Molecular Weight of Stack Gas, Dry Basis	29.14	29.14	29.09	29.09	29.18	29.18	29.14	29.14
Ms - Molecular Weight of Stack Gas, Wet Basis	28.13	28.13	28.86	28.86	28.34	28.34	28.41	28.41
Vs - Stack Gas Velocity, FT/SEC, (M/SEC)	58.35	17.78	57.19	17.43	57.93	17.66	57.82	17.62
Qa - Stack Gas Volumetric Flow at Stack Conditions, ACFM (Nm^3/MIN)	72094	2042	70787	2005	71569	2027	71483	2024
Qs - Stack Gas Volumetric Flow at Standard Conditions, DSCFM (Nm^3/MIN)	35986	1019	37598	1065	3641	1031	36666	1038
III TEST CONDITIONS								
Pb - Barometric Pressure, "Hg (mmHg)	28.57	725.68	28.57	725.68	28.73	729.74	28.62	727.03
Dn - Sampling Nozzle Diameter, IN. (mm)	0.25	6.35	0.25	6.35	0.25	6.35	0.25	6.35
T - Sampling Time, MIN	120	120	120	120	120	120	120	120
Vm - Sample Volume, ACF (M^3)	74.68	2.11	80.82	2.29	78.82	2.23	78.11	2.21
Np - Net Sampling Points	12	12	12	12	12	12	12	12
Cp - Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Tm - Average Meter Temperature °F (°C)	107	42	101	38	105	40	104	40
Pm - Average Orifice Pressure Drop, "H_2O (mmH_2O)	1.41	35.81	1.38	35.05	1.33	33.81	1.37	34.89
Vlc - Condensate Collected (Impingers and Gel), ML	---	144.2	---	50.8	---	124.9	---	106.6
ΔP - Stack Velocity Head "H_2O (mmH_2O)	0.577	14.66	0.568	14.43	0.574	14.58	0.573	14.56
IV TEST CALCULATIONS								
Vw - Condensed Water Vapor, SDCF (Nm^3)	6.75	0.19	2.51	0.07	5.89	0.17	5.05	0.14
Vm - Volume of Gas Sampled at Standard Conditions, DSCF (Nm^3)	66.630	1.887	72.862	2.063	71.003	2.011	70.165	1.99
% H_2O - Percent Moisture, By Volume	9.04	9.04	3.10	3.10	7.47	7.47	6.54	6.54
Ms - Molecular Weight of Stack Gas, Wet Basis	28.13	28.13	28.75	28.75	28.34	28.34	28.41	28.41
Vs - Stack Velocity, FT/SEC (M/SEC)	58.35	17.78	57.31	17.47	57.93	17.66	57.86	17.64
% I - Percent Isokinetic	92	92	96.9	96	97	97	95	95
V ANALYTICAL DATA								
A) BaP Front Half								
Probe (ug)	---	5.0	---	5.42	---	7.35	---	5.92
Cyclone (ug)	---	---	---	---	---	---	---	---
Filter (ug)	---	2.20	---	1.12	---	(.25	---	1.19
BaP Front Half Total (ug)	---	7.20	---	6.54	---	7.60	---	7.11
grs/SDCF, (mg/M^3)	1.7×10^{-6}	0.0038	1.4×10^{-6}	0.0032	1.6×10^{-6}	0.0038	1.6×10^{-6}	0.0036
#/DAY (KG/DAY)	0.012	0.0056	0.011	0.0049	0.012	0.0056	0.012	0.0054
B) BaP Back Half								
Absorbent Sampler (ug)	---	1.12	---	10.60	---	2,75	---	4.82
Impingers (ug)	---	2.28	---	2.56	---	1.91	---	2.26
Back Half Total (ug)	---	3.40	---	13.16	---	4.66	---	7.07
grs/SDCF	7.9×10^{-7}	0.0018	2.8×10^{-6}	0.0064	1.0×10^{-6}	0.0023	1.53×10^{-6}	0.0035
#/DAY (KG/DAY)	0.0058	0.0026	0.022	0.0098	0.0076	0.0034	0.0118	0.0053
BaP Total (ug)	---	10.60	---	19.70	---	12.26	---	14,19
grs/SDCF, (mg/M^3)	2.5×10^{-6}	0.0056	4.2×10^{-6}	0.0096	2.6×10^{-6}	0.0061	3.1×10^{-6}	0,0071
#/DAY (KG/DAY)	0.018	0.0082	0.033	0.0147	0.0196	0.0090	0.0235	0.0106

Table 5

Gaseous Constituent Concentrations

Test No.	Date	Benzene (ppm)	Carbon Monoxide (ppm)	Carbon Dioxide (%)	Oxygen (%)
1	9/18/79	1.8	153	3.80	13.30
2	9/19/79	2.9	111	3.03	15.10
3	9/20/79	2.5	97	4.35	12.00
4	9/21/79	4.1	139	4.46	12.10

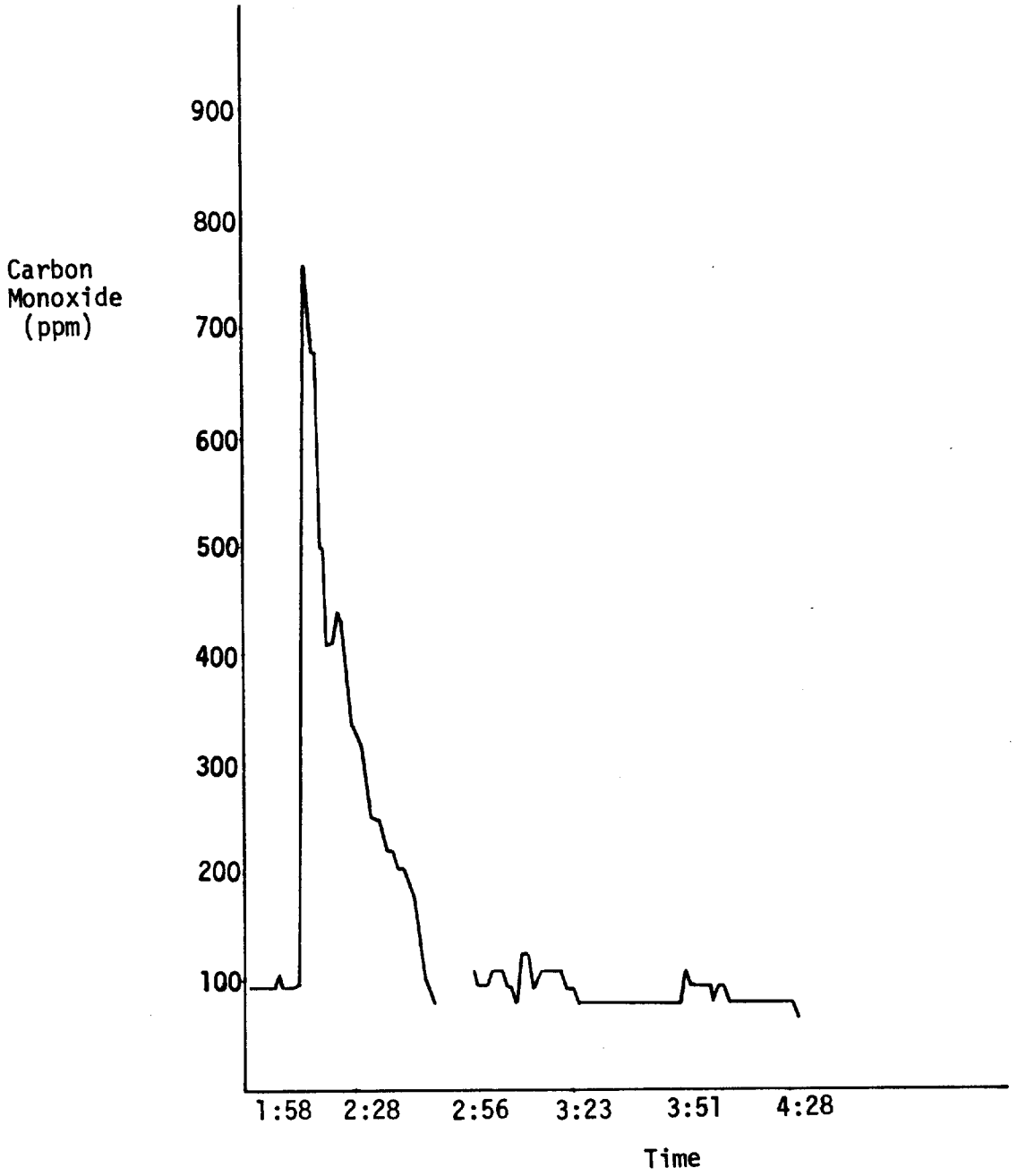
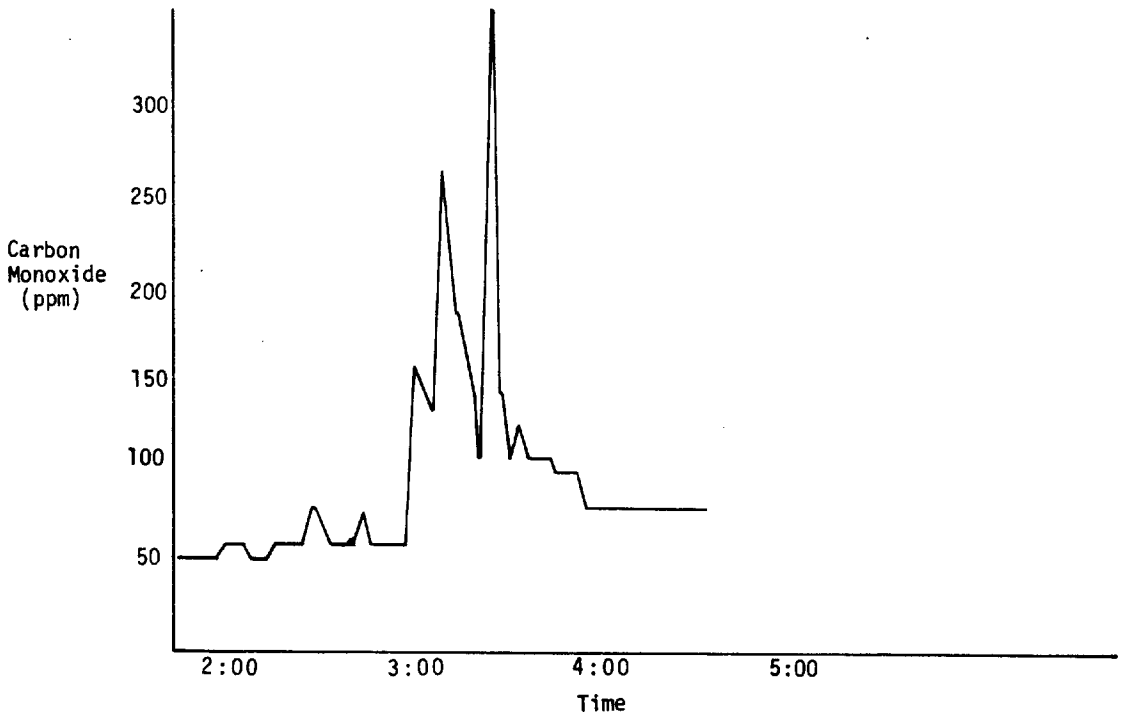


Figure 1

Carbon Monoxide Concentration, 9/18/79



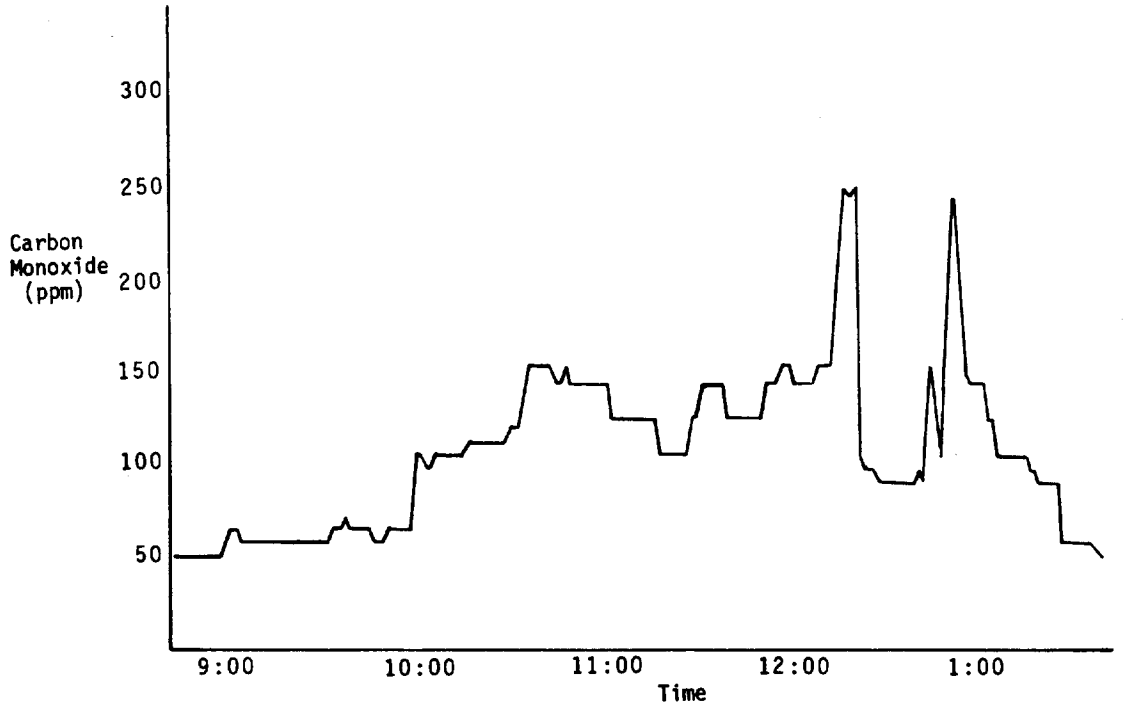


Figure 2

Carbon Monoxide Concentrations, 9/19/79

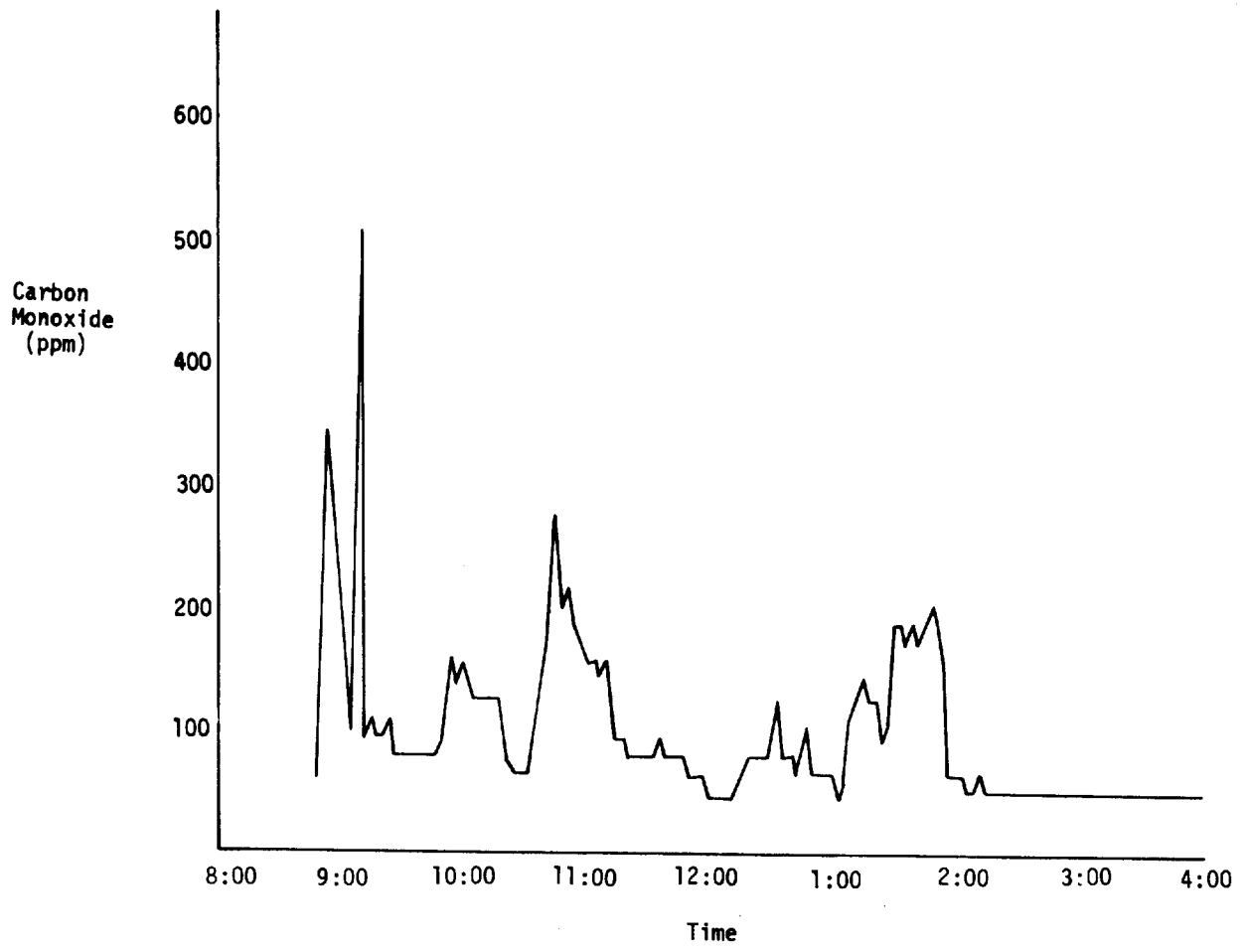


Figure 3

Carbon Monoxide Concentrations, 9/20/79

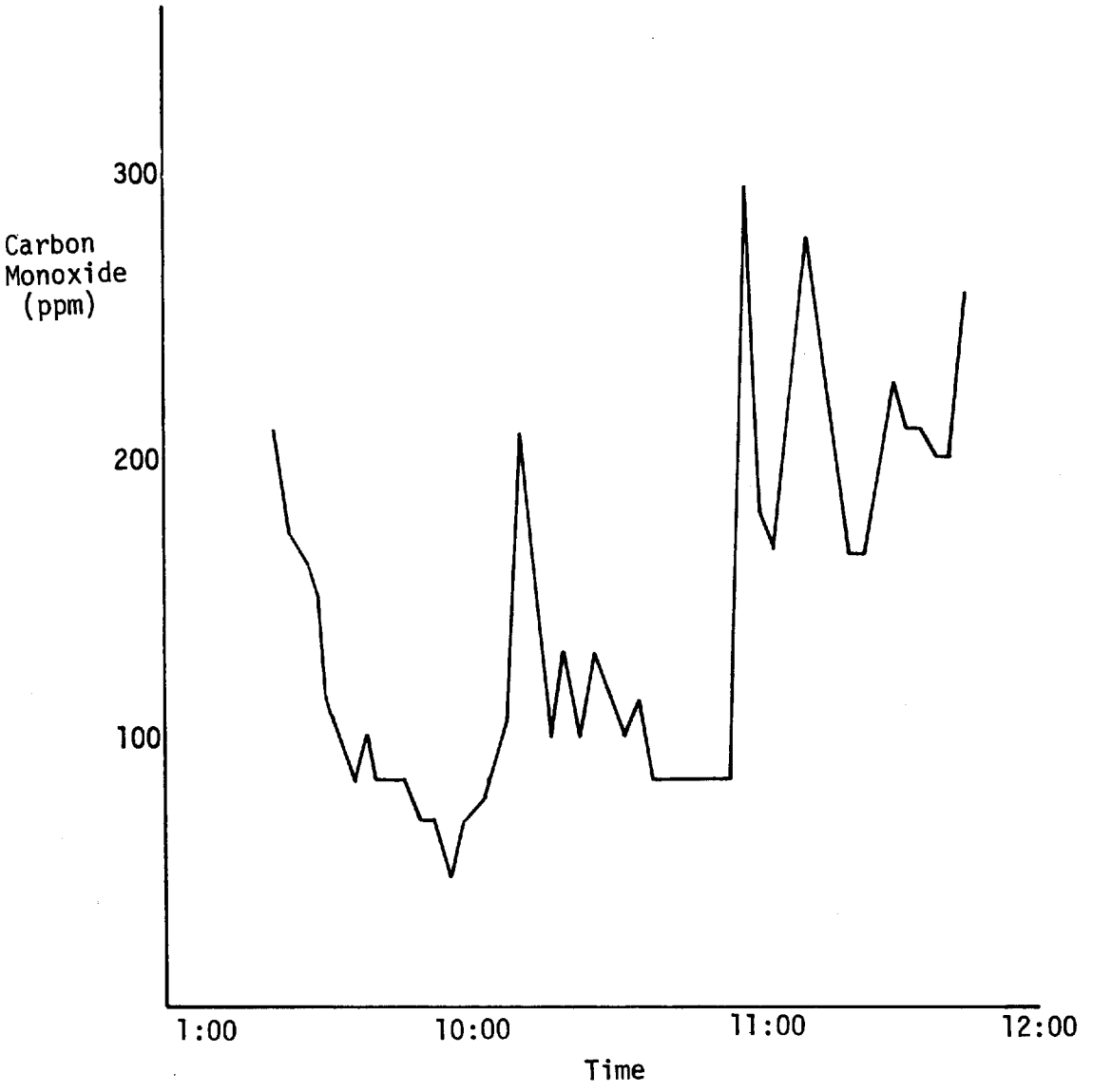


Figure 4
Carbon Monoxide Concentration, 9/21/79

A TRW crew member certified by the California Air Resources Board to read visible emissions made opacity observations of the coke oven stack during each test. No visible emissions were evident during any of the tests.

3. PROCESS DESCRIPTION

Kaiser Steel Corporation operates seven metallurgical coke oven batteries at its steel plant located in Fontana, California. This is the only domestic steel plant which uses fabric filters to control particulate emissions from coke oven battery stacks. Currently, four batteries (B, C, D, and E) are equipped with fabric filter controls. Kaiser plans to install similar controls on the remaining three batteries in the near future (A, F, and G).

Of the four batteries equipped with fabric filter controls, Battery "B" was selected for testing because the duct run configurations to and from the fabric filter were considered more amenable to representative sampling. As discussed previously in Section 2.0 of this report, the emission tests conducted included simultaneous inlet and outlet measurements for mass particulate and benzo-a-pyrene (BaP), continuous carbon monoxide measurements, benzene measurements, and visible emission observations on the battery stack itself. The purpose for these tests was to (a) characterize emissions from battery stacks and (b) assess the performance of a fabric filter on these emissions.

Salient facts on the design and operation of the battery are summarized in Table 3-1. As indicated, the battery is a Koppers-Becker

TABLE 3-1. PLANT DESIGN AND OPERATING RECORD

Date 9/17/79

Plant Name Kaiser Steel
Plant Location Fontana, California
Battery No. B
Name of Plant Contact Gerald Rounds

Type of Ovens and Designer Koppers-Becker Underjet
Date Built 1941
Date of Last Rehabilitation 1973-1974
Type of Last Rehabilitation Hot End Flue Rehabilitation

Number of Ovens Total 45 In Service 33[a/]
Size of Ovens Height 13 ft, Width 13-1/2" avg., Length 40 ft

Type of Coke Produced Furnace
Normal Coking Time (hr) 17 hr
Coal Charged Per Oven (tons) 14
Reversal Period (min) 30 min

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.
Stage Charging (Double Collecting Main)
Stack Height and Top Diameter 225 ft, 10 ft diameter
Test Location (Stack or Waste Heat Canal) Filter Duct (inlet and outlet)

Control Method Used Fabric Filter

a/ Ovens permanently out of service are Nos. 83, 85, 95, 87, 97, 92, 64, 74, 94, 86, 68, and 98.

design and was originally built in 1941. It underwent its most recent rehabilitation, consisting of hot end-flue repairs in 1974. The battery is equipped with double collecting mains and consists of 45 ovens each measuring 4 m (13 ft) in height and capable of coking about 14 tons of coal per charge. During the test period, 12 of the 45 ovens were permanently out of service.

The battery is fired with undesulfurized coke oven gas (COG) using underjet firing. Charging of the ovens is performed by larry car using stage charging techniques. Fuel gas flow was not measurable during the test; however, we were told that the fuel flow rate is generally about 220,000 SCFH. Analysis of the fuel gas and the coal charged to the ovens during the emission tests are included in Appendix D. During the test period, the battery was operated on a 17-hr coking cycle. With 12 ovens out of service, this resulted in a charging frequency of about 1.94 charges per hour.

Normal maintenance practices on the battery include the patching of cracks in the end flues using a hand-held slurry patching gun. Each oven is patched every 30 to 45 days. A complete rebuild of the battery is planned sometime in 1980.

The fabric filter unit used to collect particulate emissions contained in the underfiring exhaust gases was installed in June 1979. The unit is a closed-suction design with reverse air cleaning. It consists of five compartments with a total filtering area of 39,600 sq ft. Each

compartment contains 140 graphite-silicone treated glass fiber bags, each measuring 8 in. in diameter and 22 ft in length. The fabric filter was designed to handle about 88,000 acfm at a net air-to-cloth ratio of 2.76:1 with one compartment isolated for cleaning. The design operating temperature was 450°F. Actual operating conditions are closer to 71,000 acfm at 450°F and the net air-to-cloth ratio nearer 2.23:1. Exhaust gases from the fabric 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 at least once every 6 hr for 50 sec or whenever the pressure drop across a compartment exceeds a preset level (about 8.5 in. of water).

It was observed that the total pressure drop across the fabric filter was higher than expected, usually exceeding 8 in. w.c. and that the pressure drop did not decrease by more than 1 in. w.c. after a cleaning cycle. Kaiser engineers were aware of this and were trying to determine the reason for it.

During each of the test periods, the amount of dust captured by the two filters serving Batteries B and C was collected and weighed. Both of these filters are served by one common hopper discharge dust conveyor so it was not possible to separate the dust collected by each filter. Based on the three dust weights most closely associated with each Method 5 test, it was calculated that the dust collection rate was 1.3, 0.2, and < 0.03 kg/hr. These quantities are considerably less

than expected, based on the filter inlet/outlet particulate concentrations. These dust weights may indicate that dust was not being properly discharged from the filter. On the other hand, the weighings were of rather short duration, so the quantities collected may not be representative of longer term operation.

During the periods when the emission testing was conducted, both the battery and fabric filter operations were monitored. The process operating data obtained and observations made are summarized in Appendix D. Tests were conducted only when the battery was operating within normal limits.

SECTION 4

LOCATION OF SAMPLING POINTS

(1) Baghouse inlet - The inlet duct to baghouse "B" is a 5'1" self supported duct connected to an underground duct from the coke ovens. The duct goes up to an elevation of 24 feet above the ground and has a straight run of 128 feet to the baghouse. The sampling location is 63 feet (12.6 diameters) downstream from the nearest bend and 65 feet (13 diameters) upstream from the baghouse. Sampling was done at twelve traverse points. Figures 5 and 6 show this sampling location.

(2) Baghouse outlet - The duct carrying the treated stack gas from the baghouse to the battery stack is also a 5 feet 1 inch I.D. duct which is 31 feet above the ground at the sampling location. There is a 51 foot (10 diameters) run of straight ducting upstream from the sampling location. The induced draft fan is 44 feet downstream from the sampling location. Samples were taken at twelve traverse points across the duct. Figures 5 and 7 show this sampling location.

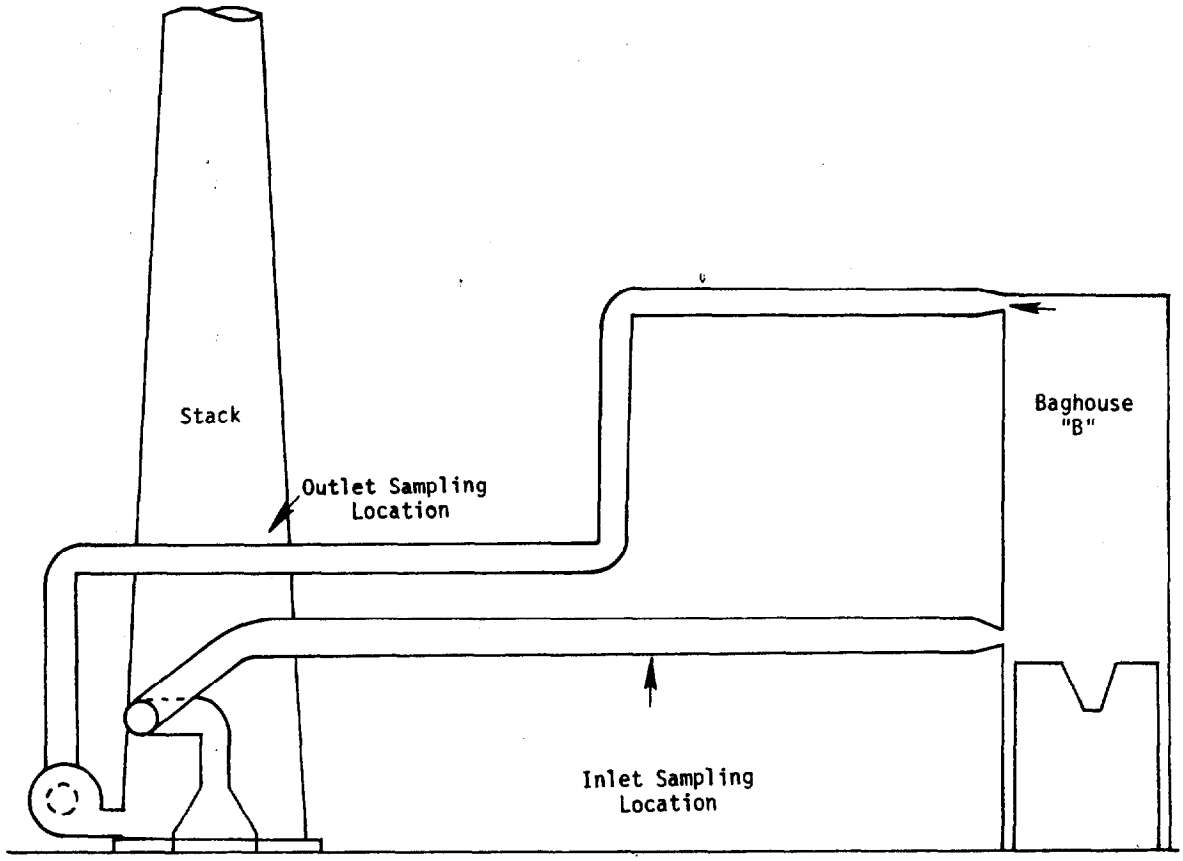
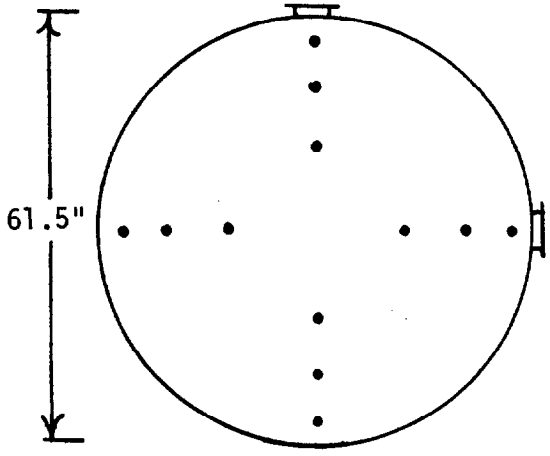


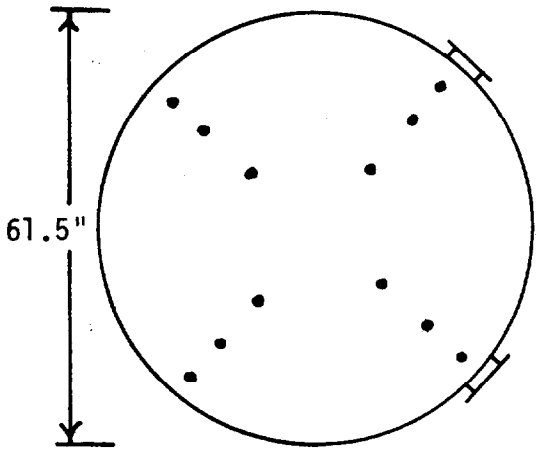
Figure 5 Baghouse "B" Ducting Schematic



Traverse Point Locations

Traverse Point Number	Percentage of Stack ID	Distance From Inside Wall (inc)
1	4.4	2.71
2	14.6	8.98
3	29.6	18.20
4	70.4	43.30
5	85.4	52.52
6	95.6	58.79

Figure 6 Inlet Sampling Location



Traverse Point Locations

Traverse Point Number	Percentage of Stack I.D.	Distance from Inside Wall (inc)
1	4.4	2.71
2	14.6	8.98
3	29.6	18.98
4	70.4	43.30
5	85.4	52.52
6	95.6	58.79

Figure 7 Outlet Sampling Location

SECTION 5

SAMPLING AND ANALYSIS PROCEDURES

(A) Particulate Sampling

Particulate sampling was performed according to EPA Method 5 (as revised August 10, 1977). The sampling train varied from the usual Method 5 train in that a flexible teflon line was used between the probe and the filter holder. Figure 8 is a diagram of the sampling train.

The front half of the sampling train consisted of a calibrated nozzle, glass probe liner, flexible teflon line, and heated glass fiber filter. Filterable particulates were collected in the front half of the sampling train.

The back half of the sampling train consisted of four glass impingers in series kept in an ice bath. The first, third and fourth impingers were modified Greenburg-Smith design, with the tip replaced with a ½ inch I.D. glass tube extending to ½ inch of the bottom of the flask. The second impinger was the Greenburg-Smith type. The first and second impinger was empty, and the fourth impinger contained 250 grams silica gel. The impingers collected moisture and other gas constituents condensing at 32°F.

Before sampling a velocity traverse was done at each sampling location to determine the average temperature and velocity. A moisture test according to EPA method 4 was done at the inlet to the baghouse before the first test to get an estimate of the stack gas moisture content. These data were used in nozzle size selection and adjustment of nomographs for isokinetic sampling.

After assembling the sampling train it was leak checked at 15 inches of mercury vacuum and sampling was not begun until a leak rate of less than 0.02 cfm was achieved. Leak checks were done before each traverse change, and at the end of each test run at the maximum vacuum encountered during each portion of the test.

Sampling was done at the centers of twelve equal areas within the stack at both the inlet and outlet locations. Inlet and outlet sampling of particulates and BaP (benzo-a-pyrene) were done simultaneously.

Sample Recovery

The sampling nozzle, probe liner, flexible line, and front half of the filter holder were rinsed with acetone and brushed with a nylon probe brush with a polypropylene handle. This acetone rinse was placed in a 250 ml nalgene bottle.

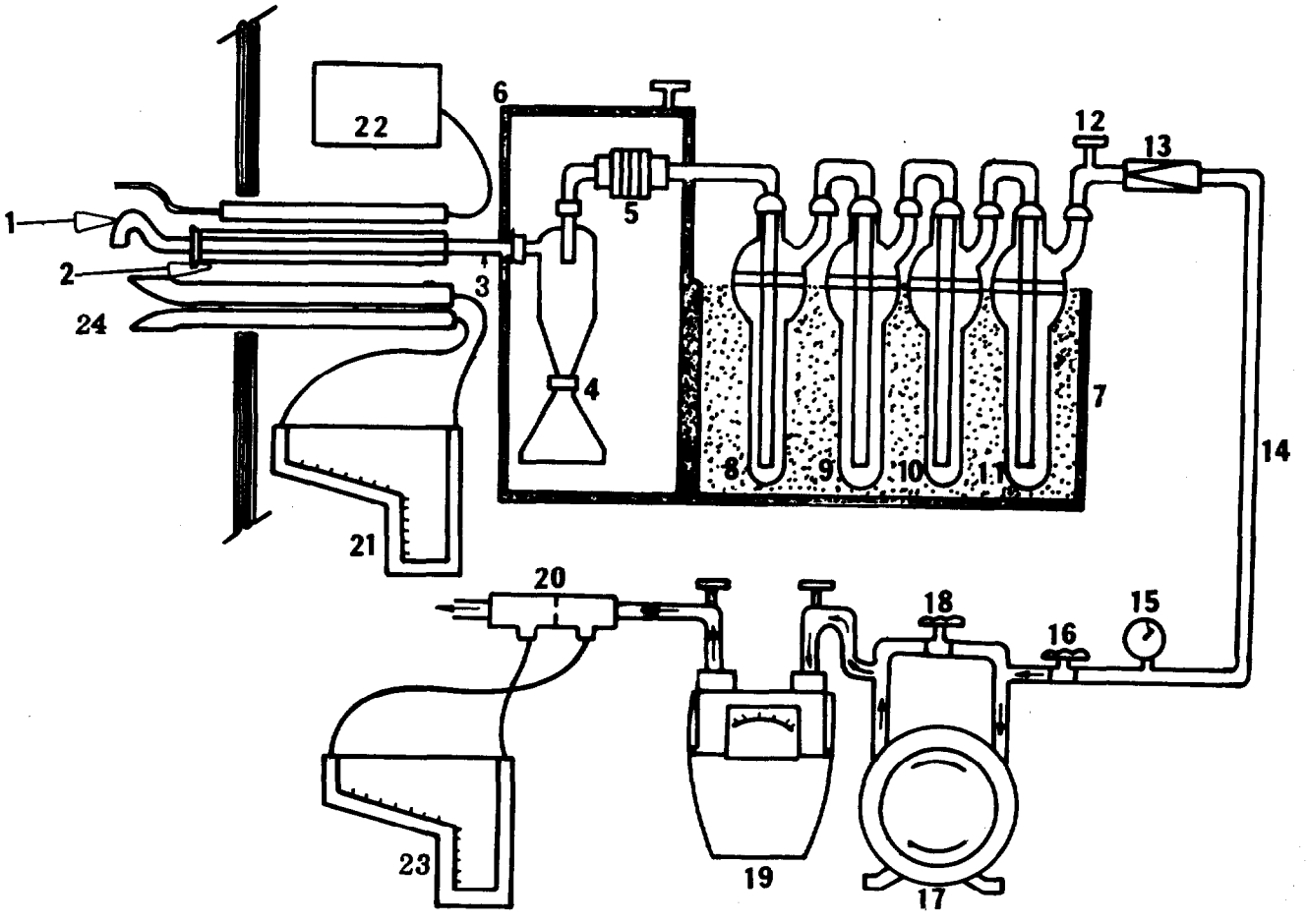


Figure 8. EPA method 5 particulate sampling train

1) Calibrated nozzle
2) Glass lined probe
3) Flexible teflon sample line
4) Cyclone
5) Filter holder
6) Heated box
7) Ice bath
8) Impinger (water)
9) Impinger (water)
10) Impinger (empty)
11) Impinger (silica gel)
12) Thermometer
13) Check value
14) Vacuum line
15) Vacuum gauge
16) Main value
17) Air tight pump
18) Bypass value
19) Dry test meter
20) Orifice
21) Pitot manometer
22) Potentiometer
23) Orifice manometer
24) S type pitot tube

The particulate filter was removed from the filter holder and placed in a sealed polyethylene jar.

The impinger solutions were measured and placed in a glass sample container. The acetone rinse of the impingers, back half of the filter holder, and connecting glassware were placed in a separate glass sample container with a teflon lid liner.

The front half acetone rinses were placed in tared beakers and evaporated. The impinger solutions were placed in tared beakers and dried on a steam bath. The filters and beakers were then placed in a dessicator until they reached a constant weight, and were weighed to within a tenth of a milligram.

After the front half rinses and filters had been weighed to determine the amount of filterable particulate collected, the particulates in the beakers were redissolved with 100 milliliters of 80% isopropanol. The filter for each test was then added to this solution, and macerated to dissolve sulfate collected on it. The resultant solution was then filtered and titrated with standardized barium perchlorate against thorin indicator to determine the amount of sulfate collected.

(B) Benzo-a-Pyrene (BaP) Sampling

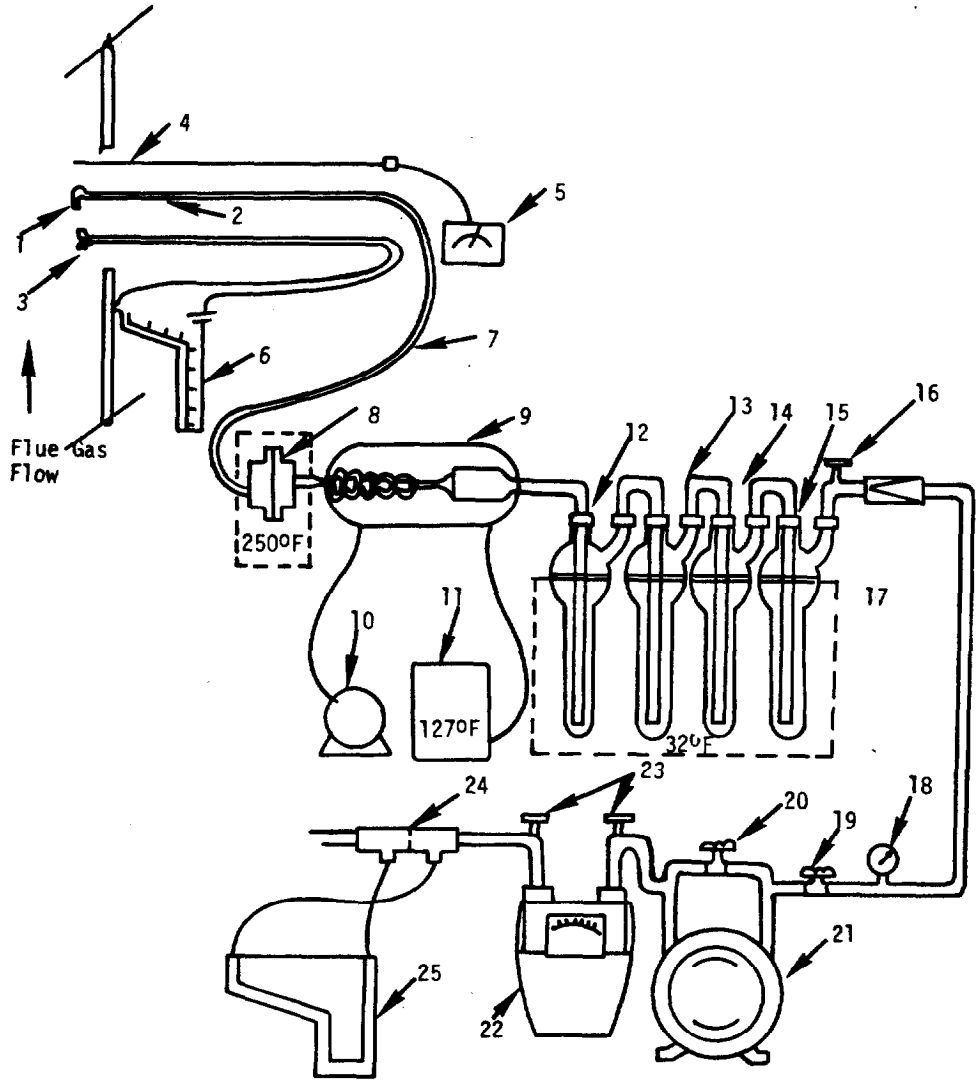
The sampling train used to collect BaP was identical to the train used for particulates except that it contained an absorbent module between the filter and the first impinger. Figure 9 is a diagram of this sampling train.

A schematic diagram of the BaP adsorbent module is hown in figure 10. The module was packed with XAD-2, (styrene divinyl Benzene) a polymeric adsorbent. The temperature of the water circulating through the cooling jacket was kept at 127^{o}F so that the sampled gas would be cooled to this temperature as it passed through the adsorbent material. The adsorbent module was covered with aluminum foil throughout the testing to prevent deterioration of the sample by exposure to ultraviolet light. Aside from operation of the adsorbent module the BaP train was operated the same as the particulate trains.

Since the BaP adsorbent module is located immediately behind the heated filter, and water cooled to 127^{o}F, some moisture in the stack gas will condense in the module prior to reaching the impingers. Water collected in the impingers and silica gel will not accurately reflect the true moisture content of the stack gas since all the water collected in the BaP train is not accounted for. In operating a BaP train at a source with a high moisture content, either a moisture train or a Method 5 train should be operated during the run for accurate moisture determination. For the purposes of this report, the moisture content determined from the Method 5 train is also used for the BaP train - in data reduction.

Sample Extraction

The filter was extracted with 100 milliliters of cyclohexane in a soxhlet extractor for 7 hours. The probe rinse was agitated in an ultrasonic



1. Calibrated Nozzle
2. Glass Lined Probe
3. S-Type Pitot Tube
4. Thermocouple
5. Thermocouple Potentiometer
6. Pitot Tube Manometer
7. Teflon Flex Line
8. Heated Filter
9. Adsorbent Sampler
10. Water Pump
11. Temperature Controlled Reservior
12. Modified G-S Impinger-Water
13. G-S Impinger-Water
14. Modified G-S Impinger-Empty
15. Modified G-S Impinger-Silicagel
16. Thermometer
17. Ice Water Bath
18. Vacuum Gauge
19. Main Valve
20. Bypass Valve
21. Vacuum Pump
22. Dry Gas Meter
23. Thermometers
24. Calibrated Orifice
25. Orifice Manometer

Figure 9 - BaP Sampling Train

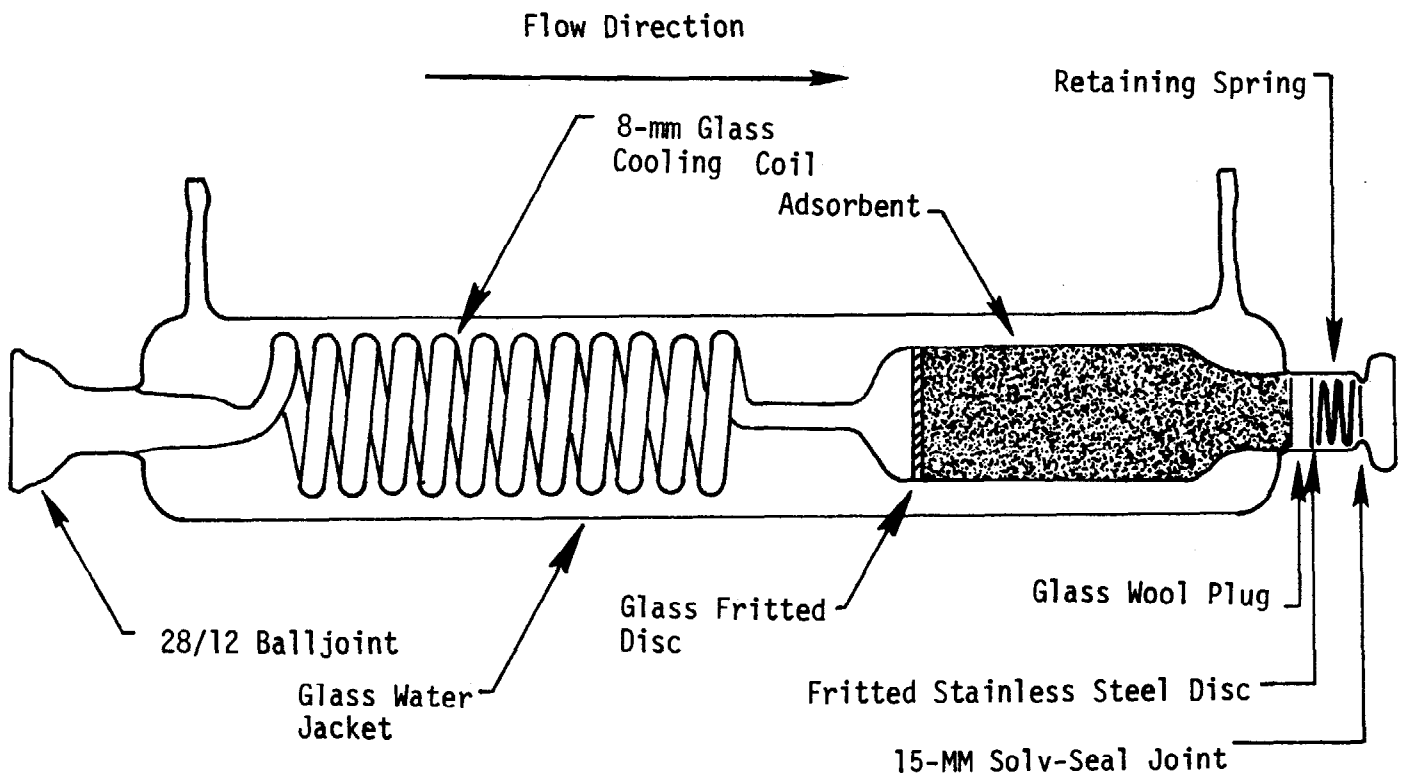


Figure 10 Adsorbent Sampling System

bath for one hour and filtered through a Whatman No. 40 filter. The adsorbent module was extracted with 180 milliliters of cyclohexane for 24 hours in a continuous extraction device. These extraction procedures were done under yellow safe lights and the extract stored in amber glass bottles.

BaP Sample Analysis

The sample extract was concentrated in a Kuderna-Danish Concentrator which was heated in a water bath to 50°C. The Samples were concentrated to 7 milliliters and brought up to 10 milliliters with washings of the concentrator flask. The concentrated samples were stored in the dark at 1°C until the final analysis step.

Analysis of the BaP samples entailed spotting the concentrate extracts on thin layer chromatography (TLC) plates and reading the fluorescence of the plates with an Aminco 125F spectrofluorometer. The TLC plates were read at an excitation wavelength of 378 nm and an emission wavelength of 403 nm for BaP. Since anthanthrene has an excitation wavelength of 420 nm and an emission wavelength of 430 nm it does not interfere in the analysis. The sample fluorescence was compared with the fluorescence of BaP standard solutions to determine the amount of BaP in the sample.

Benzene Sampling

An integrated bag sample of the stack gas was taken during the BaP and particulate test. Figure 11 is a diagram of the integrated-bag sampling train. The contents of the bag were analyzed for benzene with a Shimadzu Mini-1 gas chromatograph equipped with a flame ionization detector, and for fixed gases (O_2, CO_2, CO) with a Carle Basic gas chromatograph equipped with a thermal conductivity detector.

Benzene Analysis

The sample was injected through a 1 milliliter sample loop into a 6 feet by 1/8 inch stainless steel column containing 5 percent SP 1200 and 1.75 percent Bentone 34 on 100/120 mesh Supelcoport. The column and detector were maintained at 75°C and 225°C, respectively. The peak area was measured with a disc integrator on a Linear Strip chart recorder. Sample values were compared with values obtained from certified standards to calculate sample concentrations.

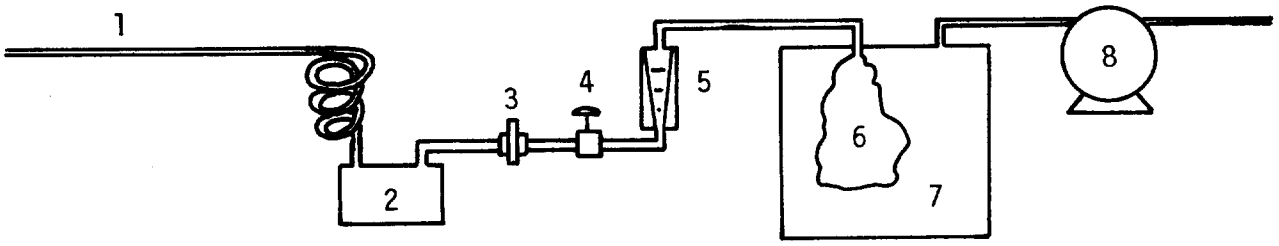
Carbon Monoxide Sampling

A sample of the stack gas was extracted continuously from the duct and analyzed for carbon monoxide. The analysis was performed according to EPA method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources". Figure 12 is a schematic diagram of the sampling system used.

Carbon Monoxide Analysis

The Continuous analyzer used was an Infrared Industries Model 702-352

nondispersive infrared (NDIR) analyzer with detectors for carbon monoxide and carbon dioxide. The sample gas was drawn through impingers containing ascarite and silica gel to remove carbon dioxide and moisture, respectively, from the sample gas to prevent them from interfering with the carbon monoxide concentration. Quantification of the sample concentration was done by comparison of the response of the analyzer with certified standard gas concentrations.



1) probe

2) air cooled condenser

3) filter

4) needle valve

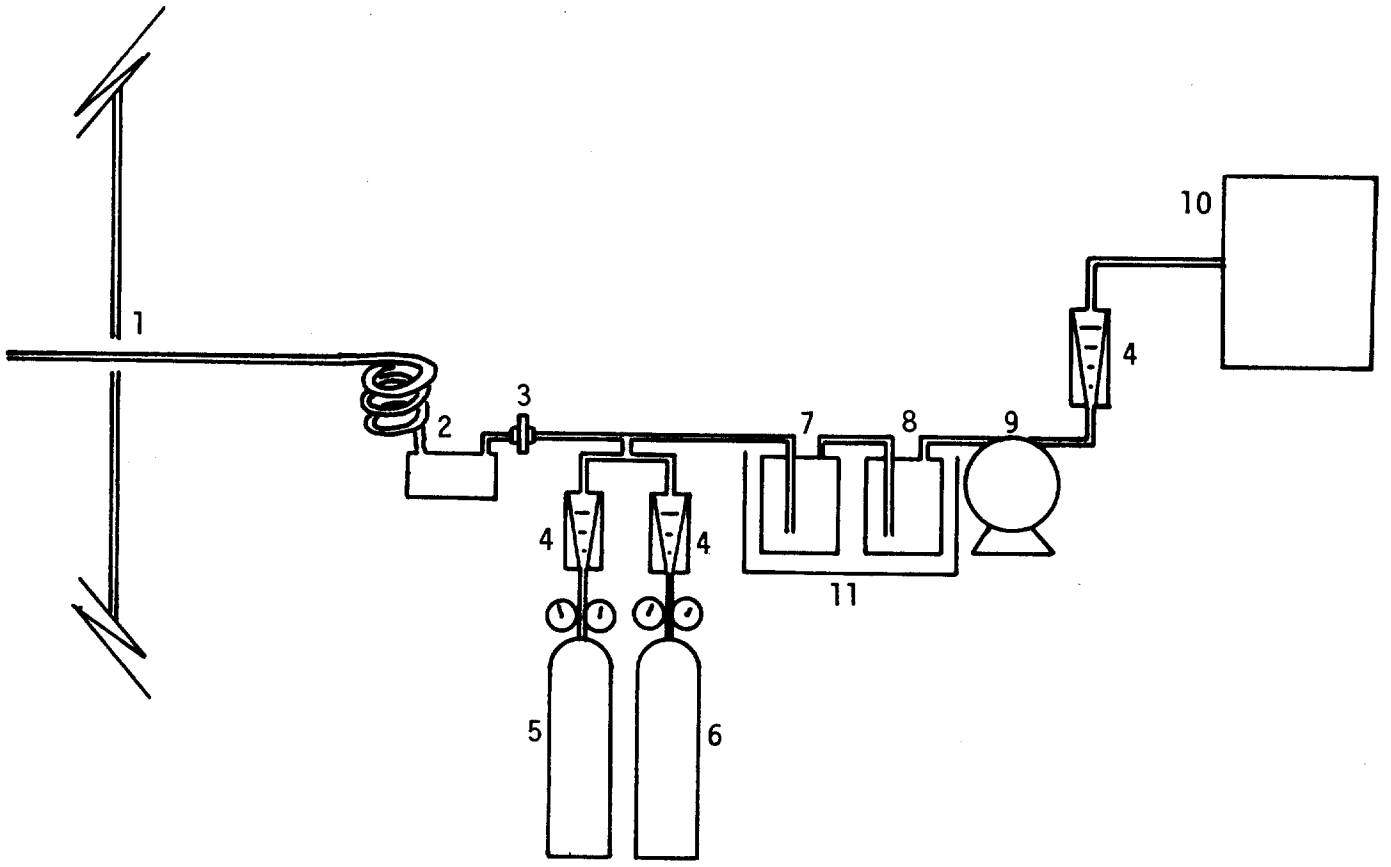
5) flow meter

6) Aluminized Mylar bag

7) Air-tight drum

8) pump

Figure 11 Integrated - Bag Sampling Train



1) Probe
2) Air-Cooled Condenser
3) filter
4) flow meter
5) Zero gas
6) span gas
7) Ascarite
8) silica gel
9) pump
10) NDIR
11) ice bath

Figure 12 CO Continuous Sampling System

SECTION 6

APPENDIX A

A. Field and Laboratory Data

1. Traverse Point Location

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Kaiser Steel
DATE 9/17/79
SAMPLING LOCATION INLET AND OUTLET
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) 69 1/4
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) 6 1/2
STACK I.D., (DISTANCE A - DISTANCE B) 62.75
NEAREST UPSTREAM DISTURBANCE Reducer 8/2
NEAREST DOWNSTREAM DISTURBANCE
CALCULATOR

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	4.4				9.23
2	14.6				15.69
3	29.6				25.07
4	70.4				50.68
5	85.4				60.06
6	95.6				66.52

SECTION 6

APPENDIX A

2. Field Data Sheets

Sample Coding System

Test	Sample Code
Particulate - baghouse inlet	KSC-IN-Part-1, KSC-IN-Part-2,KSC-in-Part 3 KSC-IN-Part-4
Particulate - baghouse outlet	KSC-OUT-Part-1, KSC-OUT-Part-2, KSC-OUT-Part-3, KSC-Out-Part-4
BaP - baghouse inlet	KSC-IN-BaP-1, KSC-IN-BaP-2, KSC-In-BaP-3
BaP - baghouse outlet	KSC-OUT-BaP-1, KSC-OUT-BaP-2, KSC-OUT-BaP-3

DP ENT--
TS #A
LAST # DH.

FIELD DATA

PLANT KAISER, FONTANA
DATE 9-18-79
SAMPLING LOCATION INLET
SAMPLE TYPE "PARTICAL"
RUN NUMBER 1
OPERATOR DIESEL
AMBIENT TEMPERATURE 104°
BAROMETRIC PRESSURE 29.6 / 29.57
STATIC PRESSURE, (P_s) -1.8 "H_2O
FILTER NUMBER (s) #5

PROBE LENGTH AND TYPE 6'
NOZZLE I.D. 1/4"
ASSUMED MOISTURE, % 6%
SAMPLE BOX NUMBER
METER BOX NUMBER 2499
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING 250
HEATER BOX SETTING
REFERENCE Δp .75

SCHEMATIC OF TRAVERSE POINT LAYOUT

"P"

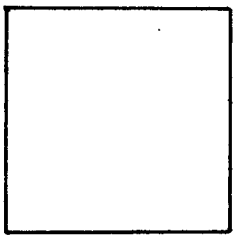
READ AND RECORD ALL DATA EVERY 10 MINUTES

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
1ST "1/2"	0 / 2[illegible]	382.342									
1	10 / 220	385.68	~~.55~~	.30	.30	489	110	106	2	250	~~79~~
2	20 / 230	387.90	~~.65~~	.21	.21	435	120	116	2	250	78
3	30 / 240	390.42	~~.65~~	.21	.21	449	121	108	2	250	78
4	40 / 250	392.72	~~.55~~	.21	.21	450	124	118	2	250	77
5	50 / [illegible]	395.42	~~.43~~	.21	.21	453	128	110	2	250	79
6	60 / 310	402.32	.65	1.4	1.4	451	139	112	5	250	81
2ND "1/2"		058.72									
	00 / 410	[illegible]	.58	1.4	1.4	478	110	104	3.5	250	70
1	10 / 420	066.92	.58	1.4	1.4	474	120	106	3.5	250	76
2	20 / 430	074.11	.65	1.6	1.6	490	129	110	4	250	80
3	30 / 440	082.15									
[illegible]	[illegible] / 927	082.56									
4	40 / 937	092.35	.57	1.4	1.4	535	110	82	7	250	60
5	50 / 947	102.41	.52	1.3	1.3	537	120	98	7		70
6	60 / 957	112.45	.40	.97	.97	539	128	104	9		74
		73.298	0.562	0.88		482	113				

[illegible] 1/2 - POINTS 1-5; MONOMETER VALVE # 2 WAS NOT OPEN ALL THE WAY

[illegible] 1/2 - STOPPED DUE TO LACK OF TIME AT POINT 3 - 9/18 START UP - 9/19

PLANT Kaiser Steel
LOCATION outlet
OPERATOR Powell
DATE 9/19/79
SAMPLE TYPE RAP
RUN NO. two
SAMPLE BOX NO.
METER BOX NO.
METER ΔH@ 1.85
C FACTOR
PITOT TUBE COEFFICIENT, C_p 0.84
SAMPLE TYPE



SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 100
BAROMETRIC PRESSURE 28.57
ASSUMED MOISTURE, % 8%
PROBE LENGTH, m (FT) 6'
NOZZLE IDENTIFICATION NO. 0.25
AVERAGE CALIBRATED NOZZLE DIAMETER, CM (IN) 0.25
PROBE HEATER SETTING
LEAK RATE, m^3/MIN. (CFM)
PROBE LINER MATERIAL glass
STATIC PRESSURE, mm H_g (IN. H_g) −8.3 in H_2O
FILTER NO. #7

TRAVERSE POINT NUMBER	SAMPLING TIME (θ) CLOCK / MIN.	VACUUM mm Hg (IN. H_g)	STACK TEMPERATURE (T_s) °C (°F)	VELOCITY HEAD (ΔP_s), mm (IN.) H_2O	PRESSURE DIFFERENTIAL ACTOSS ORIFICE METER (IN. H_2O)	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET °C (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: OUTLET °C (°F)	FILTER HOLDER TEMPERATURE °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER
1	1:40	11	440	0.5	1.21	179.533	100	100	250	75
2	1:50	15	445	0.6	1.45	186.0	118	102	250	75
3	2:00	11	445	0.62	1.50	194.0	118	102	250	75
4	2:10	16.5	440	0.57	1.4	199.5	120	105	250	75
5	2:20	17.0	440	0.62	1.5	206.9	119	105	250	75
6	2:30	16.0	440	0.55	1.33	213.8	120	106	250	75
	2:40	leak check + change ports				220.10				
						220.330				
1	3:30	7.0	440	.53	1.28	226.8	100	100	250	75
2	3:40	9.0	440	.68	1.64	233.94	112	100	250	75
3	3:50	8.0	445	.59	1.40	240.75	115	102	250	75
4	4:00	8.0	440	.58	1.40	247.5	115	102	250	75
5	4:10	8.5	440	0.60	1.45	2550	115	102	250	75
6	4:20	6.0	440	0.4	0.97	260.355	115	103	250	75
	4:30									
TOTAL										
AVERAGE			441	0.568	1.38	30.822	101			

COMMENTS pretest leak check <0.01 cfm @ 10 in Hg
leak check at port change <0.02 cfm @ 21 in. Hg.
Post test leak check <0.01 cfm @ 10 in. Hg

PLANT Kaiser Steel
LOCATION outlet
OPERATOR Mangum
DATE 3/19/89
SAMPLE TYPE particulate
RUN NO. Tower (2)
SAMPLE BOX NO.
METER BOX NO.
METER ΔH@ 1.84
C FACTOR
PITOT TUBE COEFFICIENT, C_p 0.84
SAMPLE TYPE

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 100°F
BAROMETRIC PRESSURE 28.57
ASSUMED MOISTURE, % 8
PROBE LENGTH, m (FT) 6' glass
NOZZLE IDENTIFICATION NO.
AVERAGE CALIBRATED NOZZLE DIAMETER, CM (IN) 0.25
PROBE HEATER SETTING
LEAK RATE, m^3/MIN. (CFM)
PROBE LINER MATERIAL glass
STATIC PRESSURE, mm H_g (IN. H_g) −8.3 in H_2O
FILTER NO. 8

TRAVERSE POINT NUMBER	SAMPLING TIME (θ) 1340 / CLOCK MIN. 0	VACUUM mm Hg (IN.Hg)	STACK TEMPERATURE (T_S) °C (°F)	VELOCITY HEAD (ΔPS), mm (IN.) H2O	PRESSURE DIFFERENTIAL ACTOSS ORIFICE METER (IN. H_2O)	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET °C (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: OUTLET °C (°F)	FILTER HOLDER TEMPERATURE °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER
1	10 1350	4	450	.66	1.6	471.688	100	100		80
2	20 1400	4	445	.69	1.66	478.67	112	103		80
3	30 1410	4	450	.63	1.52	486.35	114	105		80
4	40 1420	4	450	.63	1.52	192.61	116	105		80
5	50 1430	4	445	.63	1.52	499.81	115	107		81
6	60 1440	3	440	.42	1.04	506.55	117	107		81
				leak check		512.682				
	0 1530					513.007				
1	10 1540	3.5	440	.42	1.02	513.007	100	100		80
2	20 1550	4	440	.63	1.52	518.54	109	101		80
3	30 1600	4	440	.69	1.66	525.12	113	103		79
4	40 1610	4	440	.58	1.5	532.65	113	105		79
5	50 1620	4	440	.58	1.4	539.28	112	105		79
6	60 1630	4	440	.46	1.11	545.85	114	106		79
						552.855				
TOTAL										
AVERAGE	120		443.33	.585	1.423	80.842	107.58			

COMMENTS Pre: Leak Test: .004 cfm Post Leak Test:
leak check at port change < 0.01 @ 5 in Hg.

FIELD DATA

PLANT Kaiser, Fontana
DATE 9/19/79
SAMPLING LOCATION INLET
SAMPLE TYPE B A P
RUN NUMBER 2
OPERATOR Jesse
AMBIENT TEMPERATURE 110
BAROMETRIC PRESSURE 29.50
STATIC PRESSURE, (P_s) -1.8 "H_2O
FILTER NUMBER (s) # 6

PROBE LENGTH AND TYPE 6'
NOZZLE I.D. 1/4"
ASSUMED MOISTURE, % 8%
SAMPLE BOX NUMBER
METER BOX NUMBER 2499
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING
HEATER BOX SETTING 250
REFERENCE Δp .83

SCHEMATIC OF TRAVERSE POINT LAYOUT

"B"

READ AND RECORD ALL DATA EVERY 10 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		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			
	cc	1500	120115									
1	10	2^00	126.77	.55	1.2	1.2	537	108	106	12	250	80
2	20	2^10	133.80	.65	1.4	1.4	541	124	106	15	↓	86
3	30	2^20	140.46	.70	1.6	1.6	534	130	108	17	↓	82
4	40	2^30	147.51	.58	1.3	1.3	536	130	110	13	↓	88
5	50	2^40	152.93	.50	1.1	1.1	539	134	112	10	↓	86
6	60	2^50	157.45	.35	.78	.78	533	126	112	7	↓	86
	00	3^00	498.152									
1	10	3^50	503.52	.35	.78	.78	535	104	104	7	250	98
2	20	4^00	509.70	.48	1.1	1.1	↓	126	104	11	↓	67
3	30	4^10	516.35	.60	1.4	1.4	↓	136	108	19	↓	70
4	40	4^20	523.00	.62	1.4	1.4	↓	138	110	24	↓	72
5	50	4^30	529.75	.62	1.4	1.4	↓	136	110	23	↓	72
6	60	4^40	536.55	.58	1.3	1.3	↓	138	112	23	↓	71
	120		75.733	.548		1.23	535.3	118.00				

COMMENTS:
- STOPPED MOMENTARILY DUE TO [illegible] FAILURE AT POINT 3
- STOPPED " " " " " " POINT 5
- STOPPED " " " " " " POINT 6

EPA (Dur) 235
4/77

FIELD DATA

PLANT KAISER, FONTANA
DATE 9-18-79
SAMPLING LOCATION INLET
SAMPLE TYPE [redacted] "BAP"
RUN NUMBER 1
OPERATOR DESSEL
AMBIENT TEMPERATURE 103°
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) # 3

PROBE LENGTH AND TYPE 6'
NOZZLE I.D. 1/4"
ASSUMED MOISTURE, % 6%
SAMPLE BOX NUMBER
METER BOX NUMBER 2235
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING
HEATER BOX SETTING 250
REFERENCE Δp .83

"B"

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 10 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		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			
1ST 1/2"	00	210	021.465									
1	10	220	028.43	.55	1.1	1.1	489	106	102	9	250	80
2	20	230	034.95	.65	1.4	1.4	455	120	112	12	250	91
3	30	240	041.12	.65	1.4	1.4	449	126	106	12	250	98
4	40	250	047.52	.65	1.42	1.42	450	132	110	10	250	74
5	50	300	053.92	.43	.93	.93	453	132	112	8	250	72
6	60	310	058.95	.26	.54	.54	451	130	112	5.5	250	72
2ND 1/2"												
	00	410	403.00	.41	1.0	1.0	478	110	104	10	250	69
1	10	420	410.72	.56	1.4	1.4	474	136	106	12	250	74
2	20	430	417.92	.65	1.6	1.6	470	142	110	12	250	77
3	30	440	425.91									
[redacted]	[redacted]											
		927	427.10									
4	40	937	433.57	.65	1.5	1.5	535	94	84	12	250	66
5	50	947	440.71	.63	1.4	1.4	537	118	88	12		69
6	60	957	447.465	.55	1.2	1.2	539	130	94	11		69
			82.135	.538	1.24		480					

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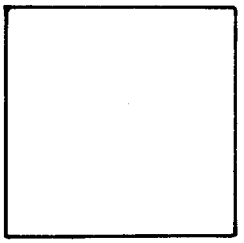
COMMENTS: 1ST 1/2 • LOST PROBE MOMENTARILY AT POINT "2"
" " " AT POINT "3" TWO TIMES

EPA (Dur) 2ND 1/2 • STOPED DUE TO LACK OF TIME POINT 3 • 9/18 START UP 9/19
4/77

PLANT Kaiser Steel
LOCATION outlet
OPERATOR Powell
DATE 9/18/79
SAMPLE TYPE BAP
RUN NO. one
SAMPLE BOX NO.
METER BOX NO.
METER ΔH@ 1.84
C FACTOR
PITOT TUBE COEFFICIENT, C_p 0.84
SAMPLE TYPE



SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 85
BAROMETRIC PRESSURE 28.57
ASSUMED MOISTURE, % 6.0
PROBE LENGTH, m (FT) 5' glass
NOZZLE IDENTIFICATION NO. ~~0.25~~
AVERAGE CALIBRATED NOZZLE DIAMETER, CM (IN) 0.25
PROBE HEATER SETTING
LEAK RATE, m^3/MIN. (CFM) <0.01
PROBE LINER MATERIAL glass
STATIC PRESSURE, mm H_g (IN. H_g) - 8.3 in. H_2O
FILTER NO. 4

TRAVERSE POINT NUMBER	SAMPLING TIME (θ) CLOCK / MIN.	VACUUM mm Hg (IN. H_g)	STACK TEMPERATURE (T_S) °C (°F)	VELOCITY HEAD (ΔP_S), mm (IN.) H_2O	PRESSURE DIFFERENTIAL ACTOSS ORIFICE METER (IN. H_2O)	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET °C (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: OUTLET °C (°F)	FILTER HOLDER TEMPERATURE °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER
H 1	2:07	4.5	440	0.53	1.30	~~91.652~~	102	100	250	70
2	2:17	4.5	440	0.6	1.43	~~98.218~~ 100.3	112	100	250	70
3	2:27-2:26	Power went off				105.05				
3 #	2:27-2:28	5.0	440	0.6	1.43	106.9	116	102	250	70
4 #	2:38	4.8	425	0.57	1.37	114.0	120	106	250	75
5 #	2:48	5.2	440	0.65	1.6	121.2	120	105	250	75
6	2:58	5.0	440	0.6	1.43	128.0	120	107	250	75
	3:09					135.233				
V	4:07		leak check			137.857				
1	4:17	6.5	450	0.65	1.6	146.2	110	104	250	75
2	9:27	5.5	445	0.53	1.28	151.353	120	105	250	75
	stopped for night									
3	9:25	4.5	425	0.43	1.06	157.9	90	86	250	75
4	9:35	6.0	445	0.63	1.59	164.8	108	90	250	75
5	9:45	6.0	445	0.59	1.44	171.3	122	95	250	75
TOTAL 6	9:55	6.0	445	0.56	1.39	177.863	126	100	25	75
AVERAGE	10:05		440	0.577	1.41	74.678	107			

COMMENTS pretest leak check <0.01 @ 20 in. Hg.
Power off one minute 2:36 - 2:37
leak check at point change <0.02 cfm @ 7 in Hg.
post test leak check <0.01 cfm @ 8 in. Hg.

PLANT Kaiser Steel
LOCATION ~~Outlet~~ Outlet
OPERATOR L. Morgan
DATE 9/18/79
SAMPLE TYPE Particulate
RUN NO. One
SAMPLE BOX NO.
METER BOX NO.
METER ΔH@ 1.8
C FACTOR
PITOT TUBE COEFFICIENT, C_p
SAMPLE TYPE

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 85
BAROMETRIC PRESSURE 28.57
ASSUMED MOISTURE, % 6.0
PROBE LENGTH, m (FT) 5' glass
NOZZLE IDENTIFICATION NO.
AVERAGE CALIBRATED NOZZLE DIAMETER, CM (IN) 0.25
PROBE HEATER SETTING
LEAK RATE, m^3/MIN. (CFM) <0.02
PROBE LINER MATERIAL glass
STATIC PRESSURE, mm H_g (IN. H_g) 0 -8.3 in H_2O
FILTER NO. #1

TRAVERSE POINT NUMBER	SAMPLING TIME (θ) 1.408 CLOCK / MIN	VACUUM mm Hg (IN.H_g)	STACK TEMPERATURE (T_s) °C (°F)	VELOCITY HEAD (ΔP_s), mm (IN.) H_2O	PRESSURE DIFFERENTIAL ACTOSS ORIFICE METER (IN. H_2O) 1.2	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET °C (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: OUTLET °C (°F)	FILTER HOLDER TEMPERATURE °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER
1	10 ~~1443~~ 1440	7	~~440~~ 440	.49	1.2	392.858	101	101		80
2	20 1428	7	440	.52	1.2	396.87	108	101		82
3	30 ~~1433~~ 1428	Power off 2 min. 1426-1428 6.5	440	.6	1.43	Power off 2 min. 407.14	118	105		82
4	40 ~~1443~~ 1438	5	440	.62	1.40	413.37	118	108		82
5	50 1455	5	440	.65	1.60	422.53	118	108		82
6	60 15:08	5	440	.66	1.60	431.45	118	108		85
	0 4:07		leak check			431.547				
1	10 4:17	8	440	.52	1.2	431.547	107	103		85
2	20 4:27	4	440	.5	1.23	438.19	107	103		80
3	30 ~~8:35~~ stopped for night		~~440~~	~~.58~~	~~1.23~~	444.04				
3	30 9:35	4	440	.57	1.06	444.712	90	90		80
4	40 9:45	4	445	.68	1.5	450.99	105	93		80
5	50 9:55	4	450	.67	1.63	457.38	104	98		80
6	60 10:05	4	445	.67	1.49	464.35	120	104		80
						471.346				
TOTAL										
AVERAGE			442	.594	1.38	78.391	105			

COMMENTS pretest leak check <0.02 cfm @ 15 in Hg
post change leak check <0.01 @ 15 in Hg
post test leak check <0.02 cfm @ 10 in Hg.

FIELD DATA

PLANT _____
DATE _____
SAMPLING LOCATION _____
SAMPLE TYPE _____
RUN NUMBER _____
OPERATOR _____
AMBIENT TEMPERATURE 102 °F
BAROMETRIC PRESSURE 29.55
STATIC PRESSURE, (P_s) _____
FILTER NUMBER (s) _____

PROBE LENGTH AND TYPE _____
NOZZLE I.D. _____
ASSUMED MOISTURE, % _____
SAMPLE BOX NUMBER _____
METER BOX NUMBER _____
METER $\Delta H_@$ _____
C FACTOR _____
PROBE HEATER SETTING _____
HEATER BOX SETTING 250
REFERENCE Δp _____

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 10 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		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			
	00 / 1145	540.600									
1	10 / 1155	545.02	.25	.55	.55	[illegible]	104	98	2	[illegible]	88
2	20 / 1205	551.62	.50	1.1	1.1	495	128	102	3		88
3	30 / 1215	558.75	.60	1.3	1.3	495	140	108	3		80
4	40 / 1225	565.28	.60	1.3	1.3	495	146	112	3		80
5	50 / 1235	572.11	.55	1.2	1.2	495	150	116	2		80
6	60 / 1245	578.63	.50	1.1	1.1	495	152	120	2		80
	00 / 1300	197.960									
1	10 / 1310	204.08	.55	1.2	1.2	495	108	106	3	250	76
2	20 / 1320	211.34	.68	1.5	1.5	495	114	106	3		76
3	30 / 1330	219.39	.72	1.6	1.6	495	120	106	4		70
4	40 / 1340	226.86	.60	1.4	1.4	495	122	108	3		70
5	50 / 1350	233.26	.55	1.2	1.2	495	122	110	3		70
6	60 / 1400	239.250	.40	0.9	0.9	495	120	110	2		70
	60	24.32	.541		1.19	495	117.75		*		

COMMENTS: (2nd 1/2). LOST POWER @ Pt. 1

* FINAL LEAK CHECK .001

EPA (Dur) 235
4/72

FIELD DATA

PLANT _____
DATE _____
SAMPLING LOCATION _____
SAMPLE TYPE _____
RUN NUMBER _____
OPERATOR _____
AMBIENT TEMPERATURE 102
BAROMETRIC PRESSURE _____
STATIC PRESSURE, (P_s) _____
FILTER NUMBER (s) _____

PROBE LENGTH AND TYPE _____
NOZZLE I.D. _____
ASSUMED MOISTURE, % _____
SAMPLE BOX NUMBER _____
METER BOX NUMBER _____
METER $\Delta H_@$ _____
C FACTOR _____
PROBE HEATER SETTING _____
HEATER BOX SETTING _____
REFERENCE Δp _____

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 10 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	1142	160.735									
1	10	1153	165.54	.53	1.2	1.2		100	96	11	250	66
2	20	1203	169.23	.65	1.4	1.4	495	112	100	11		66
3	30	1215	176.70	.70	1.6	1.6	495	118	102	16		66
4	40	1225	183.76	.60	1.3	1.3	495	128	106	16		68
5	50	1235	190.18	.45	1.0	1.0	495	136	112	10		70
6	60	1245	196.15	.40	0.9	0.9	495	138	116	9		70
	00	1350	594.080				495				250	
1	10	1405	597.92	.20	.44	.44		122	114	10		69
2	20	1415	603.93	.40	[redacted]	[redacted]		138	114	22		67
3	30	2005	610.47	.50	1.1	1.1		140	115	23		69
4	40	2015	616.84	.50	1.1	1.1		140	116	23		69
5	50	2025	622.94	.50	1.1	1.1		139	116	23		71
6	60	2035	629.85	.50	1.1	1.1		140	116	23		
	120		71.180	.494		1.1	495	119.83				

COMMENTS: 1/2 LOST POWER MOMENTARILY AT POINT 1
" LOST " " " POINT 2 IIII TIMES
" LOST " " " POINT 1

EPA (Dur) 2350 1/2

FIELD DATA

PLANT KAISER, FONTANA
DATE 9-21-79
SAMPLING LOCATION INLET
SAMPLE TYPE PARTICULATE
RUN NUMBER # 4
OPERATOR [illegible]
AMBIENT TEMPERATURE 80°
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) GENNAN GLASS # 14

PROBE LENGTH AND TYPE 6'
NOZZLE I.D. .44"
ASSUMED MOISTURE, % 8%
SAMPLE BOX NUMBER
METER BOX NUMBER 2393
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING
HEATER BOX SETTING 250°
REFERENCE Δp .83

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 10 MINUTES

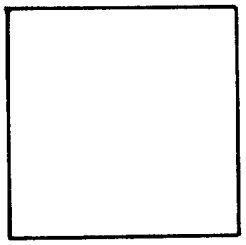
TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F			
	00 / 9[illegible]	241.300									
1	10 / 9[illegible]	246.50	.30	.66	.66	468°	80°	78°	3	250	56°
2	20 / 9[illegible]	252.83	.49	1.1	1.1	474°	90°	80°	5	250	57°
3	30 / 10[illegible]	259.63	.58	1.3	1.3	491°	98°	84°	7	250	58°
4	40 / 10[illegible]	267.13	.70	1.6	1.6	473°	106°	88°	8	250	62°
5	50 / 10[illegible]	274.39	.65	1.5	1.5	478°	108°	92°	7	250	64°
6	60 / 10[35]	281.300	.60	1.3	1.3	487°	110°	94°	6	250	64°
	00 / 10[35]	281.435									
1	10 / 11[05]	286.27	.30	.66	.66	478°	102°	92°	3	250	60°
2	20 / 11[15]	292.99	.55	1.2	1.2	470°	114°	100°	6	250	57°
3	30 / 11[25]	300.32	.65	1.5	1.5	481°	120°	104°	7	250	60°
4	40 / 11[35]	307.68	.68	1.5	1.5	492°	124°	106°	7	250	66°
5	50 / 11[45]	314.61	.70	1.6	1.6	478°	128°	110°	8	250	67°
6	60 / 11[55]	321.59	.60	1.3	1.3	485°	128°	110°	7	250	69°
	120	80.155	.566		1.27	479.6		101.9			

COMMENTS: • PRE LEAK CHECK .002

EPA (Dur) 235
4/72

PLANT Kaiser Steel
LOCATION outlet
OPERATOR manguna
DATE 9/20/79
SAMPLE TYPE particulate
RUN NO. 3
SAMPLE BOX NO.
METER BOX NO.
METER ΔH@ 1.84
C FACTOR
PITOT TUBE COEFFICIENT, C_p 0.84
SAMPLE TYPE

17



SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 80
BAROMETRIC PRESSURE 28.73
ASSUMED MOISTURE, % 8
PROBE LENGTH, m (FT) 6'
NOZZLE IDENTIFICATION NO.
AVERAGE CALIBRATED NOZZLE DIAMETER, CM (IN) 0.25
PROBE HEATER SETTING
LEAK RATE, m^3/MIN. (CFM)
PROBE LINER MATERIAL glass
STATIC PRESSURE, mm H_g (IN. H_g) -8.3 in H_2O
FILTER NO. 12

TRAVERSE POINT NUMBER	SAMPLING TIME (θ) 11:34 / CLOCK / MIN. 0	VACUUM mm Hg (IN. H_g)	STACK TEMPERATURE (T_s) °C (°F)	VELOCITY HEAD (ΔP_s), mm (IN.) H_2O	PRESSURE DIFFERENTIAL ACTOSS ORIFICE METER (IN. H_2O)	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET °C (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: OUTLET °C (°F)	FILTER HOLDER TEMPERATURE °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER
1	10 11:44	6	445	.45	1.07	558.352	95	94		80
2	20 11.59	8	445	.63	1.43	564.96	106	96		80
3	30 12:09	8	450	.66	1.5	571.12	111	99		80
4	12:19	7	440	.53	1.23	578.49	117	101		80
5	12.29	4	440	.61	1.41	585.33	115	103		80
6	12:39	3	440	.54	1.25	592.11	112	104		80
						597.937				
	0 13.24				Leak Check	598.901				
1	10 13:34	4	440	.59	1.37	598.901	97	96		80
2	20 13.44	4	440	.61	1.41	603.86	106	98		80
3	30 13:54	4.5	440	.65	1.5	610.52	110	100		80
4	40 14.04	4.3	440	.58	1.34	617.74	112	102		80
5	50 14:14	4.5	445	.57	1.34	622.98	112	103		80
6	60 14.24	4.5	445	.63	1.43	630.09	113	104		80
						637.081				
TOTAL	120									
AVERAGE			442.5	.587	1.356	77.765	104.4			

COMMENTS pretest leak check <0.01 cfm @ 15 in Hg.
mid test leak check <0.01 cfm @ 15 in Hg.
post test leak check <0.01 cfm @ 15" Hg

PLANT Kaiser Steel

LOCATION outlet from BH "B"

OPERATOR Powell

DATE 9/21/79

SAMPLE TYPE particulate

RUN NO. 4

SAMPLE BOX NO. _____

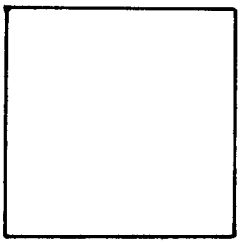
METER BOX NO. _____

METER ΔH@ 1.84

C FACTOR _____

PITOT TUBE COEFFICIENT, C_p 0.84

SAMPLE TYPE _____



SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 80

BAROMETRIC PRESSURE _____

ASSUMED MOISTURE, % 8

PROBE LENGTH, m (FT) 6'

NOZZLE IDENTIFICATION NO. _____

AVERAGE CALIBRATED NOZZLE DIAMETER, CM (IN) 0.25

PROBE HEATER SETTING _____

LEAK RATE, m^3/MIN. (CFM) _____

PROBE LINER MATERIAL glass

STATIC PRESSURE, mm H_g (IN. H_g) -8.3 in H2O

FILTER NO. 11

TRAVERSE POINT NUMBER	SAMPLING TIME (θ) CLOCK / MIN.	VACUUM mm Hg (IN. H_g)	STACK TEMPERATURE (T_s) °C (°F)	VELOCITY HEAD (ΔP_s), mm (IN.) H_2O	PRESSURE DIFFERENTIAL ACTOSS ORIFICE METER (IN. H_2O)	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER		FILTER HOLDER TEMPERATURE °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER
							INLET °C (°F)	OUTLET °C (°F)		
1	9:38	5.0	440	0.50	1.1	638.973	85	85	250	75
2	9:48	5.0	435	0.53	1.17	644.7	98	86	250	70
3	9:58	7.2	445	0.63	1.4	650.5	106	90	250	70
4	10:08	9.0	440	0.70	1.61	656.8	112	98	250	70
5	10:18	8.0	440	0.62	1.42	664.3	120	100	250	70
6	10:28	7.0	440	0.53	1.17	670.9	120	106	250	70
	10:38					676.382				
			leak check							
1	11:00	9.0	450	0.48	1.1	676.618	106	100	250	70
2	11:10	6.0	450	0.50	1.1	683.50	110	100	250	75
3	11:20	7.0	447	0.58	1.33	689.0	112	100	250	75
4	11:30	7.0	445	.53	1.17	696.5	113	101	250	75
5	11:40	7.0	450	0.60	1.35	701.3	112	102	250	75
6	11:50	7.0	450	0.53	1.17	709.3	115	104	250	75
	12:00					714.282				
TOTAL	120			leak check						
AVERAGE			444.3	0.561	1.258	75.073		103.375		

COMMENTS pretest leak check < 0.01 cfm @ 10" Hg
mid test leak check < 0.02 cfm @ 10" Hg
final leak check < 0.02 cfm @ 12" Hg

PLANT Kaiser Steel
LOCATION outlet
OPERATOR Powell
DATE 9/20/79
SAMPLE TYPE BAP
RUN NO. 3
SAMPLE BOX NO.
METER BOX NO.
METER ΔH@ 1.84
C FACTOR
PITOT TUBE COEFFICIENT, C_p 0.84
SAMPLE TYPE

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 85
BAROMETRIC PRESSURE 28.73
ASSUMED MOISTURE, % 8
PROBE LENGTH, m (FT) 6'
NOZZLE IDENTIFICATION NO.
AVERAGE CALIBRATED NOZZLE DIAMETER, CM (IN) 0.25"
PROBE HEATER SETTING
LEAK RATE, m^3/MIN. (CFM)
PROBE LINER MATERIAL glass
STATIC PRESSURE, mm H_g (IN. H_g) -8.3 in Hg
FILTER NO. 10

TRAVERSE POINT NUMBER	SAMPLING TIME (θ) CLOCK / MIN.	VACUUM mm Hg (IN. H_g)	STACK TEMPERATURE (T_s) °C (°F)	VELOCITY HEAD (ΔP_s), mm (IN.) H_2O	PRESSURE DIFFERENTIAL ACTOSS ORIFICE METER (IN. H_2O)	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET °C (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: OUTLET °C (°F)	FILTER HOLDER TEMPERATURE °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER
1	11:39	11.0	445	.60	1.42	~~266.987~~	92	91	250	69
2	11:49	11.5	445	.66	1.50	274.3	109	92	250	70
3	11:59	12.5	450	.70	1.6	281.1	112	96	250	72
4	12:09	12.3	440	.66	1.5	288.7	118	99	250	72
5	12:19	11.0	450	.6	1.42	295.6	120	102	250	75
6	12:29	8.0	440	~~.40~~	.93	302.0	119	102	250	75
	12:39					308.028				
				leak check		308.138	~~95~~	~~95~~	~~250~~	~~75~~
1	1:29	8.0	440	.45	1.04	313.5	95	95	250	75
2	1:34	8.5	440	.45	1.04	320.4	108	96	250	75
3	1:44	9.5	440	.57	1.34	327.0	112	100	250	75
4	1:54	12.5	445	.70	1.61	333.0	116	102	250	75
5	2:04	10.5	445	.60	1.42	341.8	116	102	250	75
6	2:14	8.5	440	.5	1.15	345.918	115	102	250	75
	2:24									
TOTAL										
AVERAGE	120		443	.574	1.331	78.82	104.62			

COMMENTS pretest leak check < 0.02 cfm @ 15 in Hg
midtest leak check < 0.02 cfm @ 15 in Hg.
post test leak check < 0.02 cfm @ 15 in Hg

STATE OF CALIFORNIA
AIR RESOURCES BOARD

This Certifies That

THOMAS ROONEY

Has Attended The

VISIBLE EMISSION EVALUATION

From OCTOBER 25 **to** OCTOBER 27, 1977

S. E. Macomber

Chief, Division of Legal Affairs and Enforcement

Chief, Enforcement Branch

44910-110 9-76 500 ⓘ OBP

STATE OF CALIFORNIA — EDMUND G. BROWN JR., Governor

AIR RESOURCES BOARD
1102 Q STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

April 20, 1979

Thomas Rooney, Project Engineer
TRW
One Space Park R4/2158
Redondo Beach, CA 90278

Dear Mr. Rooney:

RE: Visible Emission Evaluation Certification

This is to certify that on April 5, 1979 in Sacramento, California you attended the course "Visible Emissions Evaluation."

Based on the score you achieved and the criteria established by the Environmental Protection Agency, you are certified as a visible emission evaluator for the following conditions:

__X__ Day Readings

_____ Day Readings with Sunglasses

_____ Night Readings

_____ Night Readings with Starlight Scope

Qualification is based on 50 consecutive readings (25 black or gray readings and 25 white readings) with no reading deviating by more than 3/4 Ringelmann Number or 15 percent opacity and the average deviation for each run of 25 readings not exceeding 7.5 percent.

In accordance with criteria established by EPA, this certification is valid until October 4, 1979. A copy of the certification paper for each condition is attached.

Sincerely,

James J. Morgester, Chief
Enforcement Branch

Enclosure

WITH SUNGLASSES NO

STATE OF CALIFORNIA – AIR RESOURCES BOARD

VISIBLE EMISSION EVALUATION TRAINING FORM

PLEASE PRINT

1. NAME THOMAS ROONEY (PROJECT ENGINEER) DATE 4/5/79
2. AFFILIATION TRW
3. BUSINESS ADDRESS ONE SPACE PARK, REDONDO BEACH ZIP CODE 90278

RUN NUMBER 2A TIME 1025 CORRECTED BY Tom Armstrong

READING NO.	1	2	3	4	5	6	7	8	9	10 DW	11 DW	12	13
OBSERVER READ	35	60	40	30	45	20	40	50	40	~~60~~ 65	~~35~~ 30	50	30
TRANSMISSIOMETER	40	70	55	35	60	30	45	40	50	65	35	50	45
+ DEVIATION								10		/		/	
– DEVIATION	5	10	15	5	15	10	5		10	/	5	/	15

10 / 25 / 10 105

READING NO.	14	15	16	17	18 DW	19 DW	20	21	22	23	24	25
OBSERVER READ	20	70	50	25	~~25~~ 60	~~45~~ 40	50	25	65	50	20	70
TRANSMISSIOMETER	30	70	40	25	55	35	45	30	60	40	25	55
+ DEVIATION		/	10	/	5	5	5		5	10		15
– DEVIATION	10	/		/				5			5	

75

55 / 7 / 20 / 3

RUN NUMBER 2B TIME 1100 CORRECTED BY Tom Kessler

READING NO.	1	2	3	4	5	6	7 DW	8	9	10 DW	11	12	13
OBSERVER READ	2	1½	3¼	2	3½	1¼	~~2¾~~ 2½	1	2¾	~~2~~ 1¾	2½	1	3¼
TRANSMISSIOMETER	2¼	1½	3	2	3¼	1½	2¾	1	3	1½	2½	1½	3½
+ DEVIATION		/	5	/	5		/	/		5	/		
– DEVIATION	5	/		/		5	/	/	5		/	10	5

15 / 3 / 30 / 5

READING NO.	14	15	16	17	18	19	20 DW	21	22	23	24 DW	25
OBSERVER READ	2	2½	1	2½	3¾	3	~~2¼~~ 2	2¾	1½	3	~~2¼~~ 2½	2
TRANSMISSIOMETER	2	2¾	1	2¼	4½	3	1¾	2½	1½	3¼	2	2
+ DEVIATION	/		/	5		/	5	5	/		10	/
– DEVIATION	/	5	/		10	/			/	5		/

25 / 4 / 20 / 3

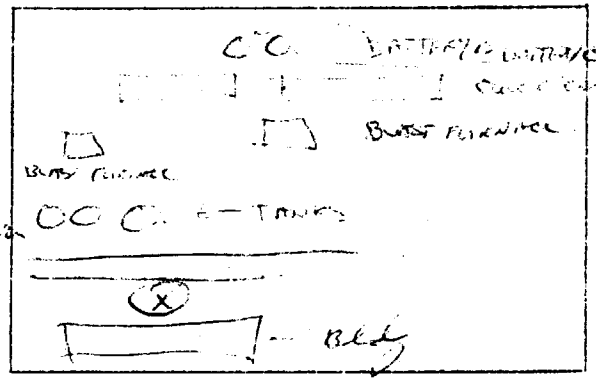
	W	B
4. RUN NUMBER	2	2
5. TOTAL DEVIATION (SUM OF PLUS AND MINUS DEVIATIONS)	180	90
6. AVERAGE DEVIATION (TOTAL DEVIATION DIVIDED BY 25	7.2	3.6
7. NUMBER OF READINGS 20% DEVIATION OR MORE	0	0

4-1

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE ___ of ___

COMPANY Kaiser Steel
LOCATION Fontana, Calif
TEST NUMBER #4
DATE 9/21/79
TYPE FACILITY Steel Mill Coke Oven
CONTROL DEVICE Baghouse



HOURS OF OBSERVATION ___
OBSERVER T. Scott
OBSERVER CERTIFICATION DATE 4/8/79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack Outlet
HEIGHT OF DISCHARGE POINT ≈ 100'

	Initial			Final
CLOCK TIME	935			1030
OBSERVER LOCATION Distance to Discharge	1/8 mile			1/8
Direction from Discharge	S			S
Height of Observation Point	0'			0'
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction	VAR			VAR
Wind Speed	0-5			0-5
Ambient Temperature	87			87
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Smog			Smog
PLUME DESCRIPTION Color	Black			Black
Distance Visible	0			0
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average

Readings ranged from ___ to ___ % opacity

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

4-2

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION Fontana Calif
TEST NUMBER #4
DATE 9/21/79

OBSERVER T. Roony
TYPE FACILITY Coke Oven Stack
POINT OF EMISSIONS Stack Battery D

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
935	0	0	0	0	0			
936	1	0	0	0	0			
937	2	0	0	0	0			
938	3	0	0	0	0			
939	4	0	0	0	0			
940	5	0	0	0	0			
941	6	0	0	0	0			
942	7	0	0	0	0			
943	8	0	0	0	0			
944	9	0	0	0	0			
945	10	0	0	0	0			
946	11	0	0	0	0			
947	12	0	0	0	0			
948	13	0	0	0	0			
949	14	0	0	0	0			
950	15	0	0	0	0			
951	16	0	0	0	0			
952	17	0	0	0	0			
953	18	0	0	0	0			
954	19	0	0	0	0			
955	20	0	0	0	0			
956	21	0	0	0	0			
957	22	0	0	0	0			
958	23	0	0	0	0			
959	24	0	0	0	0			
1000	25	0	0	0	0			
1001	26	0	0	0	0			
1002	27	0	0	0	0			
1003	28	0	0	0	0			
1004	29	0	0	0	0			

Reference

0 = "0" opacity
1 = 20% opacity
2 = 40% opacity
3 = 60% opacity
4 = 80% opacity
5 = 100% opacity

FIGURE 9-2 OBSERVATION RECORD (Continued) PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION Fontana Calif
TEST NUMBER #4
DATE 9/21/79

OBSERVER T. Rogers
TYPE FACILITY Coke Oven
POINT OF EMISSIONS Steel Battery B

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1005	30	0	0	0	0			
1006	31	0	0	0	0			
1007	32	0	0	0	0			
1008	33	0	0	0	0			
1009	34	0	0	0	0			
1010	35	0	0	0	0			
1011	36	0	0	0	0			
1012	37	0	0	0	0			
1013	38	0	0	0	0			
1014	39	0	0	0	0			
1015	40	0	0	0	0			
1016	41	0	0	0	0			
1017	42	0	0	0	0			
1018	43	0	0	0	0			
1019	44	0	0	0	0			
1020	45	0	0	0	0			
1021	46	0	0	0	0			
1022	47	0	0	0	0			
1023	48	0	0	0	0			
1024	49	0	0	0	0			
1025	50	0	0	0	0			
1026	51	0	0	0	0			
1027	52	0	0	0	0			
1028	53	0	0	0	0			
1029	54	0	0	0	0			
1030	55	0	0	0	0			
1031	56							
1032	57							
1033	58							
1034	59							

4-4

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE ___ of ___

COMPANY Kaiser Steel
LOCATION Fontana Calif
TEST NUMBER #4
DATE 9/21/79
TYPE FACILITY Steel Mill Coke Oven
CONTROL DEVICE Baghouse

See 4-1

HOURS OF OBSERVATION 1100 - 1156
OBSERVER T. Rooney
OBSERVER CERTIFICATION DATE 4/8/79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack 7 Battery "B"
HEIGHT OF DISCHARGE POINT ___

	Initial			Final
CLOCK TIME	1100			1156
OBSERVER LOCATION Distance to Discharge	1/2 mile			1/2 mile
Direction from Discharge	S			S
Height of Observation Point	0'			01
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction	VAR			Variable
Wind Speed	0-5			0-5 mph
Ambient Temperature	95			95°F
SKY CONDITIONS (clear, overcast, % clouds, etc.)	SMOG			SMOG
PLUME DESCRIPTION Color	Black			BLACK
Distance Visible	0'			01
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time	Opacity	
	Start--End	Sum	Average

Readings ranged from ___ to ___ % opacity

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

4-5

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser
LOCATION Fontana
TEST NUMBER #4
DATE 9/21/79

OBSERVER T. Rogers
TYPE FACILITY Battery #1 Coke Oven
POINT OF EMISSIONS Stack

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1100	0	0	0	0	0			NO SMOKE
1101	1	0	0	0	0			
1102	2	0	0	0	0			
1103	3	0	0	0	0			
1104	4	0	0	0	0			
1105	5	0	0	0	0			
1106	6	0	0	0	0			
1107	7	0	0	0	0			
1108	8	0	0	0	0			
1109	9	0	0	0	0			
1110	10	0	0	0	0			
1111	11	0	0	0	0			
1112	12	0	0	0	0			
1113	13	0	0	0	0			
1114	14	0	0	0	0			
1115	15	0	0	0	0			
1116	16	0	0	0	0			
1117	17	0	0	0	0			
1118	18	0	0	0	0			
1119	19	0	0	0	0			
1120	20	0	0	0	0			
1121	21	0	0	0	0			
1122	22	0	0	0	0			
1123	23	0	0	0	0			
1124	24	0	0	0	0			FUGITIVE EMISSIONS FROM BLAST FURNACE BLEEDING
1125	25	—	—	—	—			STACK FOR READINGS
1126	26	—	0	0	0			
1127	27	0	0	0	0			
1128	28	0	0	0	0			
1129	29	0	0	0	0			

Reference

0 = 0% Opacity
1 = 20% Opacity
2 = 40% Opacity
3 = 60% Opacity
4 = 80% Opacity
5 = 100% Opacity

4-6

FIGURE 9-2 OBSERVATION RECORD (Continued) PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION Fontana
TEST NUMBER #4
DATE 9/21/79

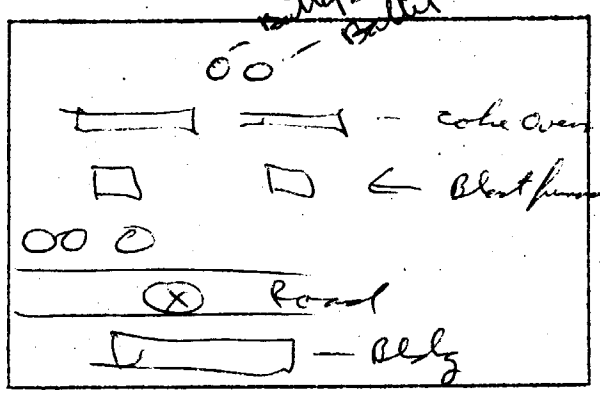
OBSERVER Rooney
TYPE FACILITY Coke Oven Stack Battery "D"
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1130	30	0	0	0	0			
1131	31	0	0	0	0			
1132	32	0	0	0	0			
1133	33	0	0	0	0			
1134	34	0	0	0	0			
1135	35	0	0	0	0			
1136	36	0	0	0	0			
1137	37	0	0	0	0			
1138	38	0	0	0	0			
1139	39	0	0	0	0			
1140	40	0	0	0	0			
1141	41	0	0	.5	0			
1142	42	0	0	0	0			
1143	43	0	0	0	0			
1144	44	0	0	0	0			
1145	45	0	0	0	0			
1146	46	0	0	0	0			
1147	47	0	0	0	0			
1148	48	0	0	0	0			
1149	49	0	0	0	0			
1150	50	0	0	0	0			
1151	51	0	0	0	0			
1152	52	0	0	0	0			
1153	53	0	0	0	0			
1154	54	0	0	0	0			
1155	55	0	0	0	0			
	56							
	57							
	58							
	59							

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE ___ of ___

COMPANY Rowe Steel
LOCATION Fontana Calif
TEST NUMBER #3
DATE 9/20/79
TYPE FACILITY STEEL MILL
CONTROL DEVICE BAGHOUSE BATTERY "B"



HOURS OF OBSERVATION 1400 Pm
OBSERVER T. Rowe
OBSERVER CERTIFICATION DATE 4/8/79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack Batt "B"
HEIGHT OF DISCHARGE POINT Max 100'

	Initial			Final
CLOCK TIME	1400 Pm			
OBSERVER LOCATION Distance to Discharge	1/8 miles			
Direction from Discharge	S			
Height of Observation Point	0'			
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction	Variable			
Wind Speed	0-5			
Ambient Temperature	90			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Clear			
PLUME DESCRIPTION Color	Black			
Distance Visible	0			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time	Opacity	
	Start--End	Sum	Average

Readings ranged from ___ to ___ % opacity

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

A-8.

FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION Coke Oven Battery B
TEST NUMBER #3
DATE 9/20/79

Fontana, Calif

OBSERVER Roam
TYPE FACILITY Coke Oven
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1340	0	0	0	0	0			
41	1	0	0	0	0			
42	2	0	0	0	0			
43	3	0	0	0	0			
44	4	0	0	0	0			
45	5	0	0	0	0			
46	6	0	0	0	0			
47	7	0	0	0	0			
48	8	0	0	0	0			
49	9	0	0	0	0			
50	10	0	0	0	0			
51	11	0	0	0	0			
52	12	0	0	0	0			
53	13	0	0	0	0			
54	14	0	0	0	0			
55	15	0	0	0	0			
56	16	0	0	0	0			
57	17	0	0	0	0			
58	18	0	0	0	0			
59	19	0	0	0	0			
1400	20	0	0	0	0			
01	21	0	0	0	0			
02	22	0	0	0	0			
03	23	0	0	0	0			
1404	24	0	0	0	0			
1405	25	0	0	0	0			
1406	26	0	0	0	0			
1407	27	0	0	0	0			
1408	28	0	0	0	0			
1409	29	0	0	0	0			

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FIGURE 9-2 OBSERVATION RECORD (Continued) PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION Fontana, Calif
TEST NUMBER #3
DATE 9/20/79

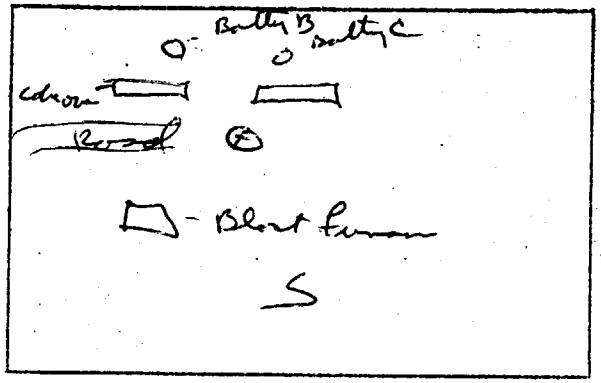
OBSERVER T. Rooney
TYPE FACILITY Coke Oven Battery "B"
POINT OF EMISSIONS Stack

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1410	30	0	0	0	0			
1411	31	0	0	0	0			
1412	32	0	0	0	0			
1413	33	0	0	0	0			
1414	34	0	0	0	0			
1415	35	0	0	0	0			
1416	36	0	0	0	0			
1417	37	0	0	0	0			
1418	38	0	0	0	0			
1419	39	0	0	0	0			
1420	40	0	0	0	0			
1421	41	0	0	0	0			
1422	42	0	0	0	0			
1423	43	0	0	0	0			
1424	44	0	0	0	0			
1425	45	0	0	0	0			
1426	46	0	0	0	0			
1427	47	0	0	0	0			
1428	48	0	0	0	0			
1429	49	0	0	0	0			
1430	50	0	0	0	0			
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE ___ of ___

COMPANY Kaiser Steel
LOCATION Fontana
TEST NUMBER 3
DATE 9/20/79
TYPE FACILITY Coke Oven B
CONTROL DEVICE Baghouse



HOURS OF OBSERVATION 1200
OBSERVER T. Roong
OBSERVER CERTIFICATION DATE 4/21/79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Stack
HEIGHT OF DISCHARGE POINT ≅ 100'

	Initial			Final
CLOCK TIME	1200			
OBSERVER LOCATION Distance to Discharge	500's			
Direction from Discharge	S			
Height of Observation Point	0			
BACKGROUND DESCRIPTION	Blue			
WEATHER CONDITIONS Wind Direction	○			
Wind Speed	0			
Ambient Temperature	95			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	Black			
Distance Visible	0			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time	Opacity	
	Start--End	Sum	Average

Readings ranged from ___ to ___ % opacity

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

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FIGURE 9-2 OBSERVATION RECORD PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION Fontana
TEST NUMBER #3
DATE 9/2-17-79

OBSERVER T. Rooney
TYPE FACILITY Coke Oven
POINT OF EMISSIONS Stack 1001

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
1200	0	0	0	0	0			
1201	1	0	0	0	0			
2	2	0	0	0	0			
3	3	0	0	0	0			
4	4	0	0	0	0			
5	5	0	0	0	0			
6	6	0	0	0	0			
7	7	0	0	0	0			
8	8	0	0	0	0			
9	9	0	0	0	0			
10	10	0	0	0	0			
11	11	0	0	0	0			
12	12	0	0	0	0			
13	13	0	0	0	0			
14	14	0	0	0	0			
15	15	0	0	0	0			
16	16	0	0	0	0			
17	17	0	0	0	0			
18	18	0	0	0	0			
19	19	0	0	0	0			
20	20	0	0	0	0			
21	21	0	0	0	0			
22	22	0	0	0	0			
23	23	0	0	0	0			
24	24	0	0	0	0			
25	25	0	0	0	0			
26	26	0	0	0	0			
27	27	0	0	0	0			
28	28	0	0	0	0			
29	29	0	0	0	0			

FIGURE 9-2 OBSERVATION RECORD (Continued) PAGE ___ OF ___

COMPANY Kaiser Steel
LOCATION Fontana
TEST NUMBER #3
DATE 9/20/79

OBSERVER T. Brown
TYPE FACILITY Steel mill "Coke Oven B"
POINT OF EMISSIONS Stack after Baghouse

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
12	30	0	0	0	0			
1	31	0	0	0	0			
12	32	0	0	0	0			
12	33	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							
	47							
	48							
	49							
	50							
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							

TRW / ENVIRONMENTAL ENGINEERING DIVISION

RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 2 of 2

COMPANY Kaiser Steel
LOCATION Fontana Calif
TEST NUMBER 72
DATE 9/19/79
TYPE FACILITY STEEL MILL
CONTROL DEVICE BAG HOUSE

See page 1

HOURS OF OBSERVATION 4-445
OBSERVER T. Reony
OBSERVER CERTIFICATION DATE 4/17/79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS BATTERY B STACK COKE OVEN
HEIGHT OF DISCHARGE POINT 100'

	Initial			Final
CLOCK TIME	348			438
OBSERVER LOCATION Distance to Discharge	1/8 mile			1/8 mile
Direction from Discharge	S			S
Height of Observation Point	0			0
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction	0			0
Wind Speed	0			0
Ambient Temperature	90			90
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Smog			Smog
PLUME DESCRIPTION Color	Black			Black
Distance Visible	0			0
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average

Readings ranged from ___ to ___ % opacity

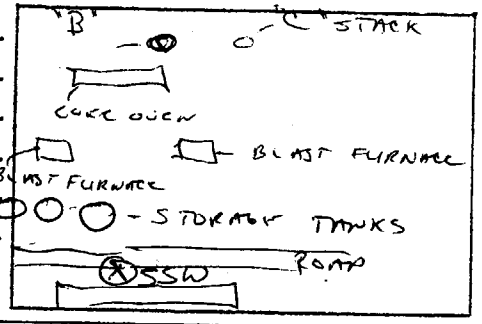
The source was/was not in compliance with ___ at the time evaluation was made.

TRW / ENVIRONMENTAL ENGINEERING DIVISION

RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE ___ of ___

COMPANY Kaiser Steel
LOCATION Coke Oven 'D' Fontana
TEST NUMBER #2
DATE 9/19/79
TYPE FACILITY Steel Mill
CONTROL DEVICE



HOURS OF OBSERVATION 2:00 - 4:30
OBSERVER T. Rooney
OBSERVER CERTIFICATION DATE 4/8/79
OBSERVER AFFILIATION TRW
POINT OF EMISSIONS Battery D Stack Coke Oven
HEIGHT OF DISCHARGE POINT 50-100'

	Initial			Final
CLOCK TIME	2058			
OBSERVER LOCATION Distance to Discharge	1/8 mile			
Direction from Discharge	W→E			
Height of Observation Point	100'			
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction	~~E~~ SW			
Wind Speed	0-5			
Ambient Temperature	100			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Blue			
PLUME DESCRIPTION Color	Black			
Distance Visible	0			
OTHER INFORMATION				

Santa Ana Wind

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average

Readings ranged from ___ to ___ % opacity

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

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OBSERVATION RECORD PAGE ___ OF ___

COMPANY KAISER STEEL
LOCATION BATTERY B STACK
TEST NUMBER #1
DATE 9/13/79

OBSERVER T. Rooney
TYPE FACILITY Steel Mill
POINT OF EMISSIONS Battery B "Stack" Coke Oven

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
416	0	0	0	.5	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	.5			
	9	.5	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			
441	17	0	0	0	0			
	18							
	19							
	20							
	21							
	22							
	23							
	24							
	25							
	26							
	27							
	28							
	29							

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OBSERVATION RECORD PAGE ___ OF ___

COMPANY KAISER STEEL
LOCATION BATTERY "B" STACK
TEST NUMBER 1
DATE 9/13/79

OBSERVER T. Rooney
TYPE FACILITY Steel Mill
POINT OF EMISSIONS Battery B Stack

934 start

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
934	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			
10	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			
20	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			
26	55	0	0	0	0			
	56							
	57							
	58							
	59							

Wind 0-5
WD W
T 95
Combustion Smoggy
Smoke Black

OBSERVATION RECORD PAGE ___ OF ___

COMPANY KAISER STEEL
LOCATION BATTERY 3
TEST NUMBER 1
DATE 9/18/79

OBSERVER T. ROONEY
TYPE FACILITY COKE OVEN
POINT OF EMISSIONS BATTERY B

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	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	5	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	5	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			

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OBSERVATION RECORD PAGE ___ OF ___

COMPANY
LOCATION
TEST NUMBER
DATE

OBSERVER
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	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	5	0	0			
	42	0	0	0	0			
	43	0	0	0	0			
	44	0	0	0	0			
310	45	0	0	0	0			
	46							
	47							
	48							
	49							
	50							
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							

Pre-Test

FIELD DATA

PLANT Bayou Steel
DATE 9/17/79
SAMPLING LOCATION OUTLET Battery B
SAMPLE TYPE
RUN NUMBER
OPERATOR
AMBIENT TEMPERATURE 100°F
BAROMETRIC PRESSURE 29.6
STATIC PRESSURE, (P_s) - 8.3" H_2O
FILTER NUMBER (s)

PROBE LENGTH AND TYPE
NOZZLE I.D.
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER
METER BOX NUMBER
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING
HEATER BOX SETTING
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY _____ 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			
	Traverse 1		.48			200					
	2		.62			450					
	3		.62			450					
	4		.62			450					
	5		.62			450					
	6		.64			450					

COMMENTS:

Pre Test

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FIELD DATA

PLANT Kaiser Steel
DATE 9/12/79
SAMPLING LOCATION INLET Baffle & Baghouse
SAMPLE TYPE PRE TEST MOISTURE
RUN NUMBER
OPERATOR
AMBIENT TEMPERATURE 100°
BAROMETRIC PRESSURE 29.6
STATIC PRESSURE, (P_s) -1.8 "H_2O
FILTER NUMBER (s)

PROBE LENGTH AND TYPE
NOZZLE I.D.
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER
METER BOX NUMBER
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING
HEATER BOX SETTING
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY _____ MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		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			
	TRAVERSE	1	.56			650					
		2	.54			650					
		3	.55			650					
		4	.55			650					
		5	.54			650					
		6	.38			650					
	0 / 1404	998.000			4.5		100	100		Meter Collected (29 mls)	
	18 / 422	021.162			4.5		124	114			
	18	23.162			4.5		109.50				
										V_w	1.37
										V_{msstd}	21.50
										% H_2O	5.98 %

COMMENTS:

EPA (Dur) 235
4/72

SECTION 6

APPENDIX A

3. Analytical Data Sheets

DATE 10/18/79 PROJECT KSC - BaP Analysis JOB NO. _____

74

	µg/ml	VOL	µg
KSC-IN-1 rinse	.0362	120	4.34 µg
KSC-IN-1 filter	.0414	100	4.14
KSC-IN-1 impinger	—	—	
KSC-IN-1 XAD-2	.0067	250	1.67
KSC-OUT-1-rinse	.0424	118	5.00
OUT-1 filter	.022	100	2.20
OUT-1 impinger	.0055	415	2.28
OUT-1 XAD-2	.0045	250	1.12
KSC-IN-2 rinse	.0352	156	5.49
filter	.095	100	9.5
impinger	—	—	
XAD-2	.0082	250	2.05
KSC-OUT-2 rinse	.0352	154	5.42
filter	.0062	100	.62
impinger	.0064	400	2.56
XAD-2	.0425	250	10.6
filter rinse	.05		.5
KSC-IN-3 rinse	.0280	262	7.3
filter	.1	100	10.0
impinger	.0042	435	1.83
XAD-2	.0084	250	2.1
KSC-OUT-3 rinse	.0350	210	7.35
filter	.0025	100	.25
impinger	.0045	425	1.91
XAD-2	.011	250	2.75

WITNESS: RH Rm 2158 DATE: _____ SIGNED _____

WITNESS: _____ DATE: _____ DATE _____

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run #1

	Stack gas		5 ppm benzene std	
replicate	int. area	height x width (at ½ ht)	int. area	ht x width (at ½ ht)
1	28	52.5	60	105
2	18	41.3	57	99
3	16	36.0	58	104
avg	20.7	43.3	58.3	102.7
std. dev.	6.43	8.42	1.53	2.95

conc benzene by int. area = 1.8 ppm ± 0.6
by ht x width (½ ht) = 2.1 ppm ± 0.4 *

run #2

	Stack gas		5 ppm benzene std.	
replicate	int area	height x width (@ ½ ht)	int. area	height x width (@ ½ ht)
1	28.0	60.0	39.0	81.0
2	23.0	48.0	37.0	72.5
3	18.0	42.0	40.0	78.0
avg	23.0	50.0	39.0	77.2
std dev.	5.00	9.16	1.00	4.31

conc. benzene by int area = 2.9 ± 0.6
by ht x width (½ ht) = 3.2 ± 0.6

run #3

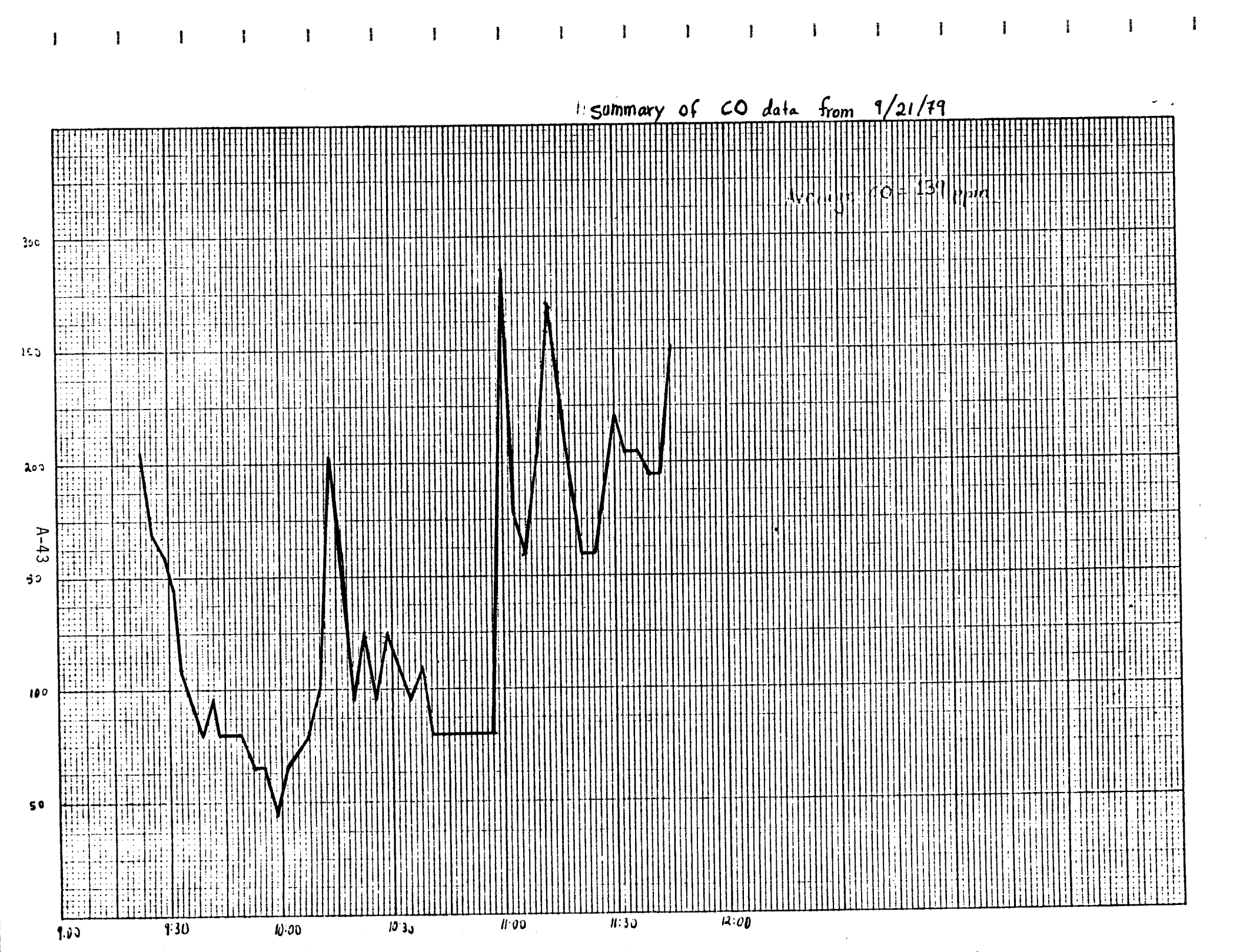
replicate	stack gas int. area	stack gas height x width @ ½ ht	5ppm benzene std int. area	5ppm benzene std height x width @ ½ ht
1	42.5	74.8	21.0	38.5
2	38.0	77.0	21.0	32.5
3			18.0	27.0
avg	40.3	75.9	20.0	32.7
std. dev.			1.73	5.75

conc. benzene by int. area = 2.5 ± 0.2 *
by ht x width @ ½ ht = 2.2 ± 0.4

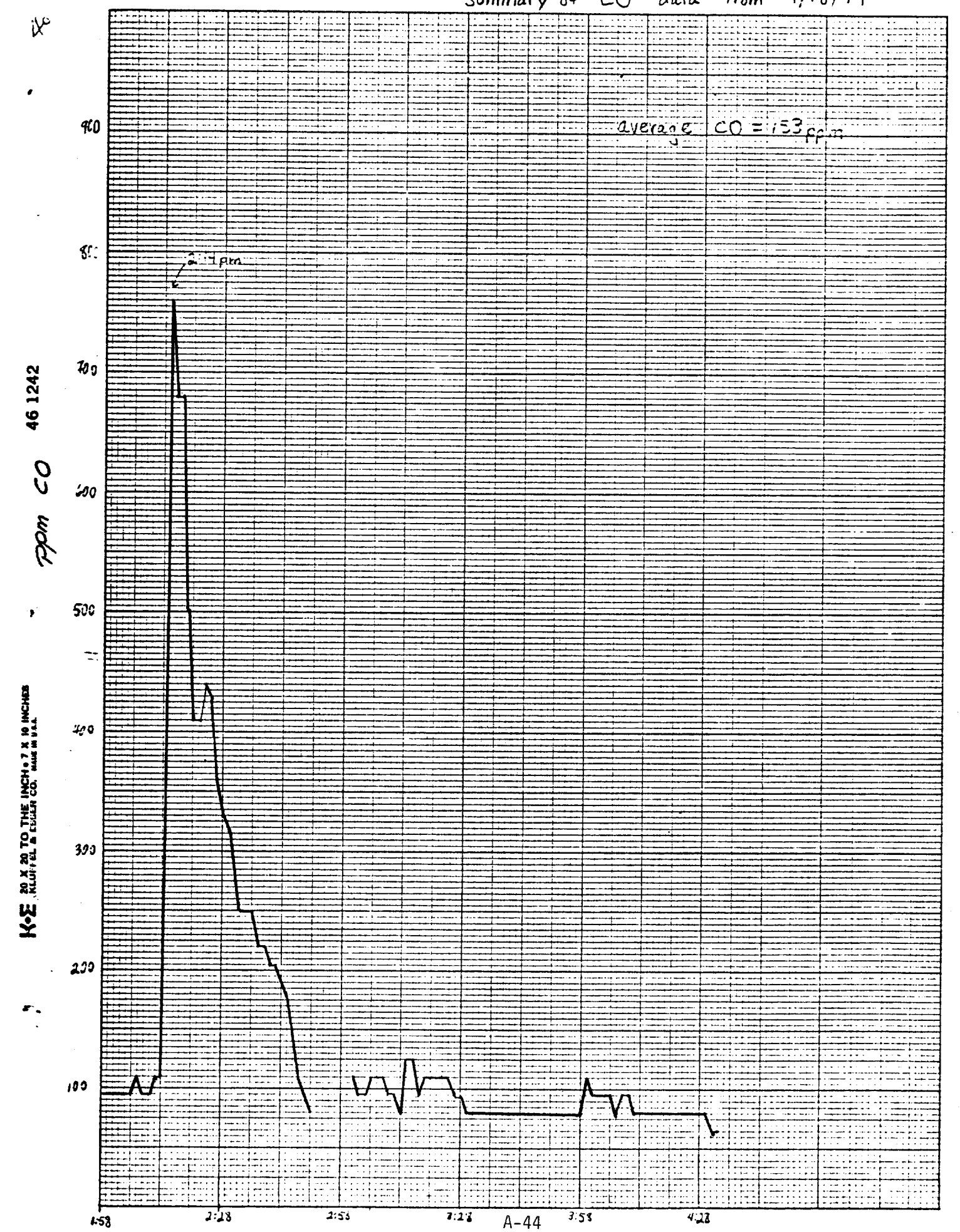
run #4

replicate	stack gas int. area	stack gas height x width @ ½ ht	5ppm benzene std int. area	5ppm benzene std height x width @ ½ ht
1	38.7	71.5	45.4	81.0
2	35.5	57.0	44.2	91.0
3	33.4	49.5	41.8	84.0
avg.	35.9	59.3	43.8	85.3
std. dev.	2.67	11.25	1.84	5.13

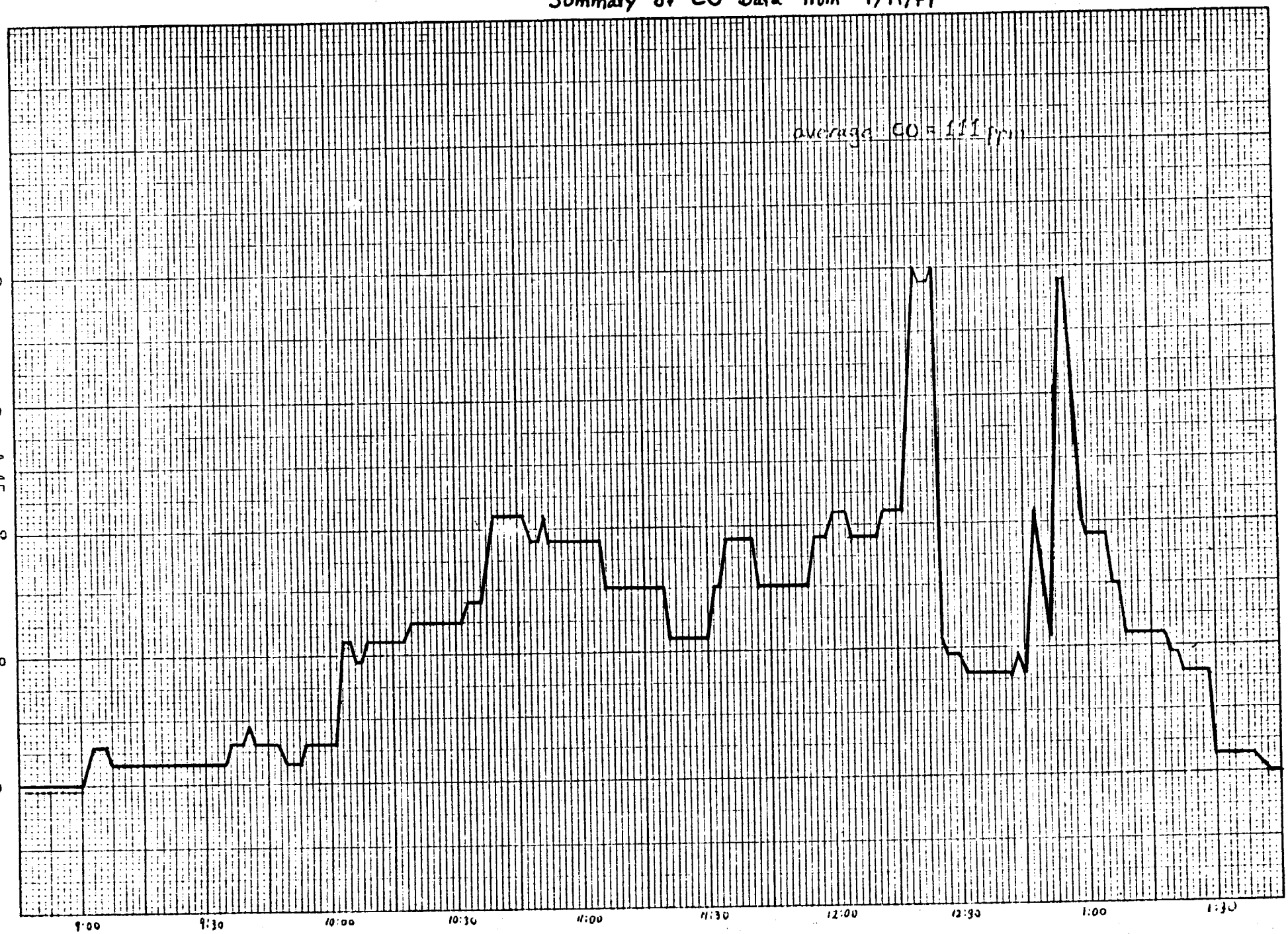
conc. benzene by int. area = 4.1 ± 0.3 *
by ht x width @ ½ ht = 3.5 ± 0.7


Summary of CO data from 9/21/79
Average CO = 139 ppm
300
200
100
50
9:00
9:30
10:00
10:30
11:00
11:30
12:00

Summary of CO data from 7/18/74

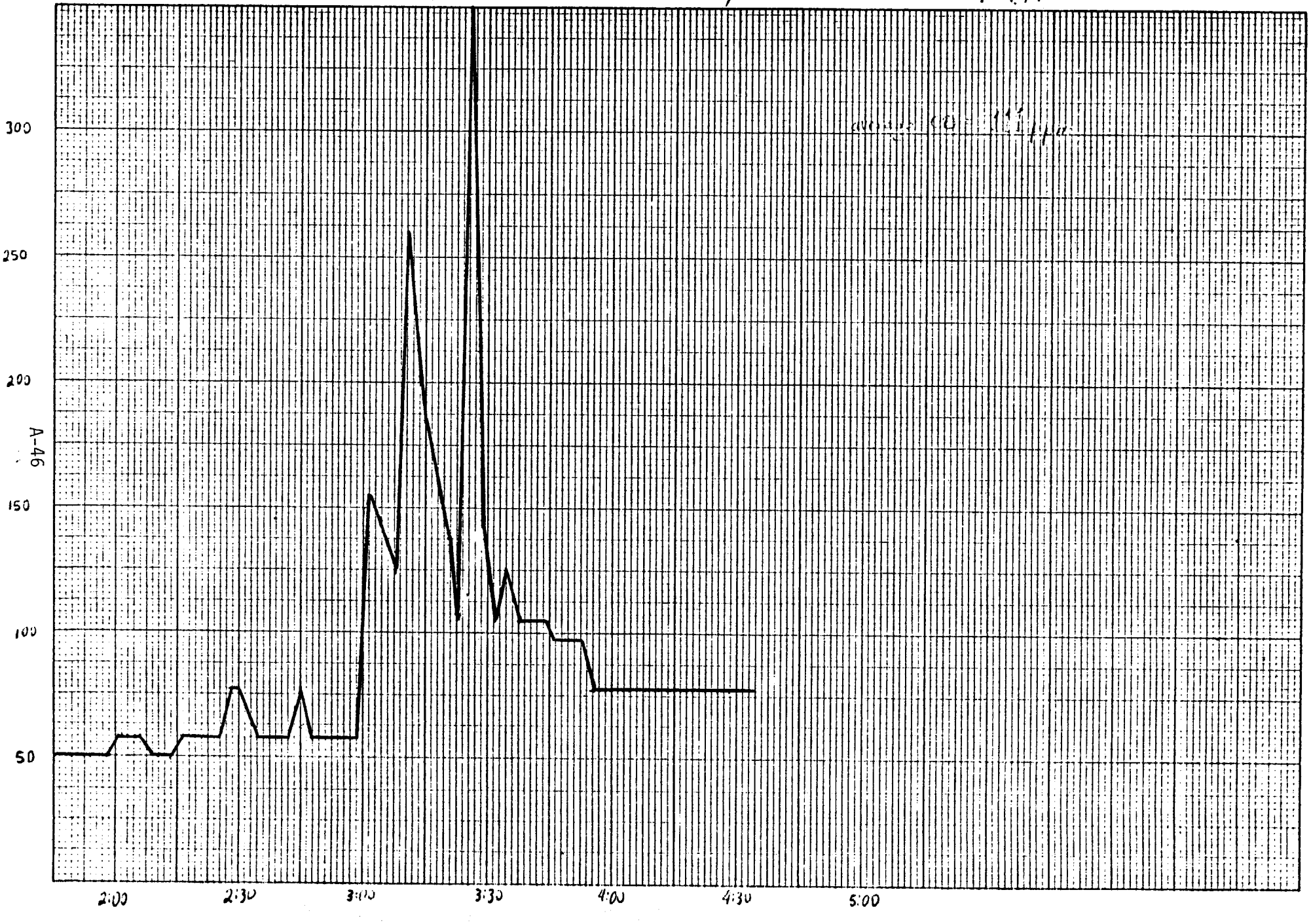


Summary of CO Data from 9/19/79

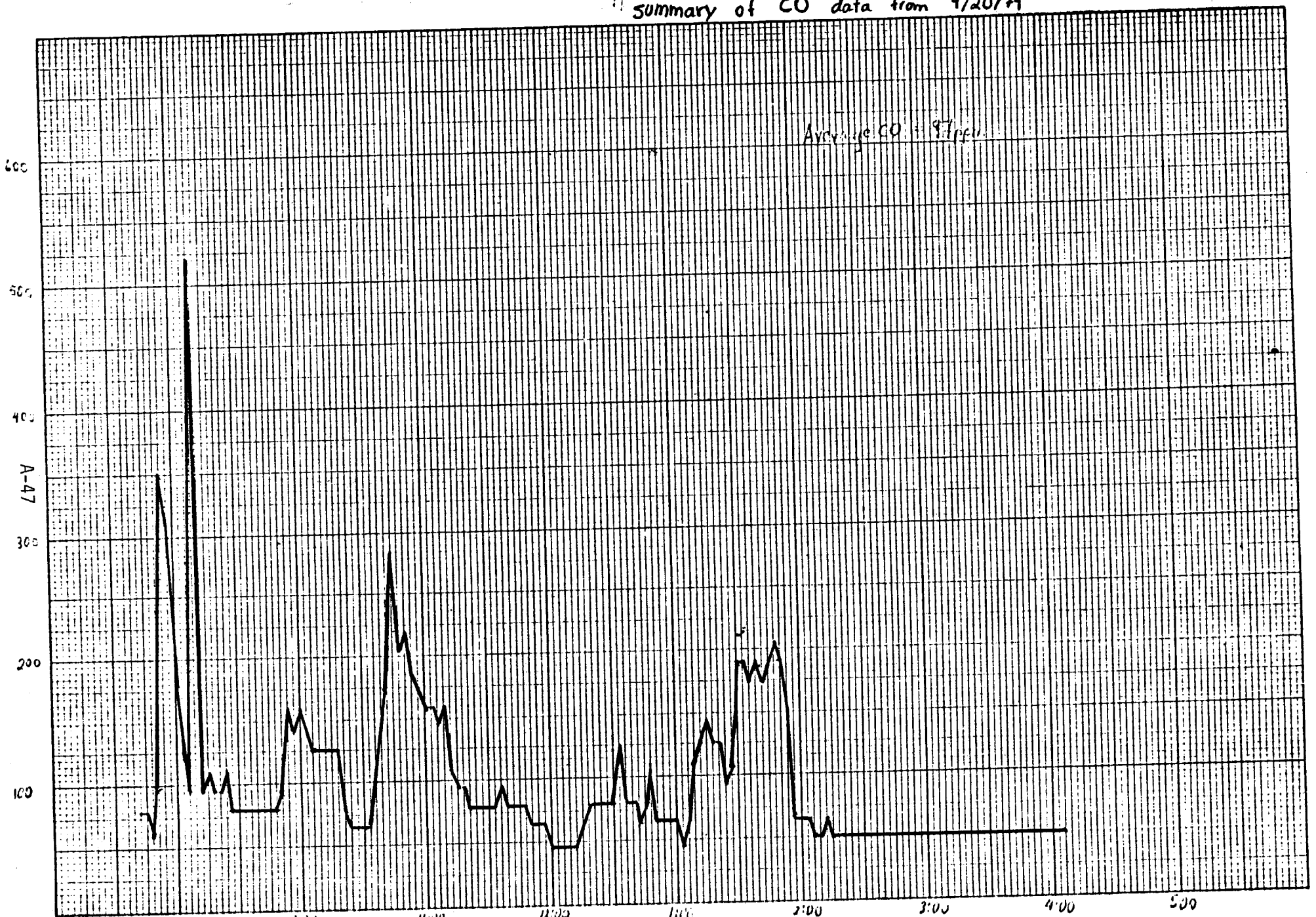


A-45

Summary of CO data from 9/19/79



Summary of CO data from 9/20/79



SECTION 6

APPENDIX A

4. Meter Box Calibration Data Sheets

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DATE 17 Nov 79 BOX # 2343

BAROMETRIC PRESSURE P_b 30.10 in. Hg DRY GASMETER #

Wally 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	ΔH@
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	5.628	66	104	92	98	10	.990	1.953
6.0									
8.0									
							Average	~~.988~~ .993	1.886

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (T_d + 460)}{V_d (P_b + \frac{H}{13.6} (T_w + 460}$	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		

P

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				Time θ (min.)	Y	ΔH@
			Wet Test Meter T_w (°F)	Dry Gas Meter Inlet Td (°F)	Dry Gas Meter Outlet T_{do} (°F)	Dry Gas Meter Average T_d (°F)			
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 $\frac{V_w P_b (T_d + 460)}{V_d (P_b + \frac{H}{13.6} (T_w + 460}$	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		

DATE 16 nov. 79 BOX # 2363

BAROMETRIC PRESSURE P_b 30.05 in. Hg DRY GASMETER # 1: 1 1

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	ΔH@
0.5	3.937	4.061	66	96	79	85.0	10	.992	1.686
1.0	3.973	4.171	66	98	79	88.5	10	1.003	1.725
2.0	5.303	5.610	66	110	84	97.0	10	.979	1.863
4.0	5.297	5.639	66	110	88	99.0	10	.976	1.861
6.0									
8.0									
							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@: $\frac{0.0317 \Delta H}{P_b (T_d + 460)}$ $\left[\frac{(T_w + 460)\theta}{V_w}\right]^2$
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 26 nov 79

BOX # 2499

BAROMETRIC PRESSURE P_b 30.01 in. Hg

DRY GASMETER # " "

Wally 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	ΔH@
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		

SECTION 6

APPENDIX B

Sample Calculations

Nomenclature

P_b	Barometric Pressure, mm. Hg.
P_m	Average Orifice Pressure Drop, mm. H_2O
T_m	Average Dry Gas Meter Temperature, °C
V_m	Volume of Dry Gas Sampled at Meter Conditions, Am^3
$V_{m_{std}}$	Volume of Dry Gas Sampled at Standard Conditions(1), Nm^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), Nm^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, mm. Hg., absolute
PPM	Parts per million
T_s	Stack Gas Temperature, °C
$\bar{T}_s$	Average Stack Gas Temperature, °C
ΔP_s	Velocity head, mm. H_2O
V_s	Average Stack Gas Velocity, Stack Conditions, Am/s
A_s	Stack Area, m^2
Q_s	Stack Gas Flow Rate at Standard Conditions(1), dry Nm^3/min.

Q_a	Stack gas flow rate at stack conditions, $Am^3/min.$
T_t	Net ime of test, min.
D_n	Sampling nozzle diameter, mm.
%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, mg/Nm^3
C_{st}	Particulate concentration at standard conditions(1), dry, based on total catch, mg/Nm^3
C_{af}	Particulate concentration at stack conditions, based on probe, cyclone and filter catch, mg/Am^3
C_{at}	Particulate concentration at stack conditions, based on total catch, mg/Am^3
E_f	Particulate emission rate, based on probe, cyclone and filter catch, kg/hr.
E_t	Particulate emission rate; based on total particulate catch, kg/hr.
P_u	Unit process rate, _____ _____
PE_f	Particulate emission rate on a process basis, probe, cyclone and filter catch, kg/_____
PE_t	Particulate emission rate on a process basis, total catch kg/_____
%EA	Percent excess air in stack gas

Calculations

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

$$V_{m_{std}} = \frac{0.3855 \times V_m \times (P_b + \frac{P_m}{13.6})}{(T_m + 273)} = N_m^3$$

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

$$V_{w_{gas}} + 0.0013 \times V_w = Nm^3$$

3. Percent moisture in stack gas by volume

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

4. Mole fraction dry stack gas

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

5. Molecular weight of dry stack gas

$$MW_d = (\%CO \times \frac{44}{100}) + (\%O_2 \times \frac{32}{100}) + [\%CO + \%N_2 \times \frac{28}{100}]$$

$$= \text{gm/gm-mole}$$

51

Calculations

1. Volume of dry gas sampled at standard conditions[1]

$$V_{m_{std}} = \frac{0.3855 \times V_m \times (P_b + \frac{P_m}{13.6})}{(T_m + 273)} \text{ - volume of } SO_2 \text{ collected} = Nm^3$$

2. Volume of water vapor at standard conditions[1]

$$V_{w_{gas}} + 0.0013 \times V_w = Nm^3$$

3. Percent moisture in stack gas by volume

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

4. Mole fraction dry stack gas

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

5. Molecular weight of dry stack gas

$$MW_d = (\%CO \times \frac{44}{100}) + (\%O_2 \times \frac{32}{100}) + [\%CO + \%N_2 \times \frac{28}{100}]$$

$$= \text{gm/gm-mole}$$

6. Molecular weight of wet stack gas

$$MW = MW_d \times M_d + 18(1-M_d) = \text{gm/gm-mole}$$

7. Stack gas velocity at stack conditions[2]

$$V_s = 34.97 \times C_p \times \sqrt{\Delta P_s \times (T_s + 273)} \quad \frac{1}{P_s \times MW} \quad ^{1}/_{2} = \text{Am/sec.}$$

8. Stack gas volumetric flow rate at standard conditions[1], dry

$$Q_s = \frac{2.325 \times V_s \times A_s \times M_d \times P_s}{} = \text{Nm}^3/\text{min.}$$

9. Stack gas volumetric flow rate at stack conditions

$$Q_a = \frac{2.59 \times Q_s (T_s + 273)}{P_s \times M_d} = \text{Am}^3/\text{min.}$$

10. Percent isokinetic

$$\%I = \frac{54{,}120 \times (T_s + 273) \times V_{m_{std}}}{V_s \times T_t \times P_s \times M_d \times (D_n)^2} = \%$$

11. Particulate concentration at standard conditions[1], dry, based on probe, cyclone and filter catch

$$C_{sf} = \frac{m_f}{V_{m_{std}}} = \text{mg/Nm}^3$$

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

$$C_{st} = \frac{m_t}{V_{m_{std}}} = mg/Nm^3$$

13. Particulate concentration at stack conditions, based on probe, cyclone, and filter catch

$$C_{af} = \frac{0.3855 \times C_{sf} \times P_s \times M_d}{} = mg/Am^3$$

14. Particulate concentration at stack conditions, based on total catch

$$C_{at} = \frac{0.3855 \times C_{sf} \times P_s \times M_d}{\bar{T}_s + 273)} = mg/Am^3$$

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

$$E_f = 1{,}000{,}000 \times C_{sf} \times Q_s = kg/hr.$$

16. Particulate emission rate, based on total catch

$$E_t = 1{,}000{,}000 \times C_{st} \times Q_s = kg/hr.$$

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

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

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

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

19. Particulate emission rate, part per million

$$PPM = \frac{M_t}{V_{m_{std(NM^3)}}} \times \frac{22,0226}{MW_{(c)}}$$

---

(1) Standard conditions: 20 C, 760 mm. Hg.

(2) $\sqrt{\Delta P_s \times (T_s + 273)}$ is determined by averaging the square root of the product of the velocity head (ΔP_s) and the absolute stack temperature ($T_s + 273$) at each sampling point.

SECTION 6

APPENDIX C

Daily Activity Log

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Daily Activity Log

9/17/79 - Arrived on site. Met with plant personnel. Were briefed on safety and security. Began setting up equipment.

9/18/79 - Ran test number one for Particulates, BaP, Benzene, and CO.

9/19/79 - Ran test number two for Particulate, BaP, Benzene, and CO. Had trouble with particulate test. Broken probe liner in middle of inlet particulate test.

9/20/79 Ran test number three for Particulate, BaP, Benzene, and CO.

9/21/79 Ran fourth test for particulates to replace test aborted on 9/19/79. Also ran Benzene and Co. packed up equipment and left site.

APPENDIX D

PROCESS DATA *

* Note - Data is grouped by Date (Test Number). For each data, the information is presented in the following order:

Tables

1. Record of Pushes and Charges
2. Process Operating Data
3. Filter Operating Data
4. Notes
5. Analysis of Coal and COG fuel gas
6. Battery Temperature Record

Figures (Circular Charts)

1. Fuel Gas Pressure (Reading x 4 = mm H_2O)
2. C.S. Stack Draft (mm H_2O)
3. P.S. Stack Draft (mm H_2O)
4. P.S. Collecting Main Pressure (mm H_2O)
5. C.S. Collecting Main Pressure (mm H_2O)

TEST NO. 1

September 18, 1979 (and September 19, 1979)*

* Note - Test No. 1 was conducted on the afternoon of 9/18/79, and continued the morning of 9/19/79. See charts for 9/19/79 in the next section (Test No. 2).

Date 9/18/79
Plant Name Kaiser Steel
Location Fontana
Battery No. B

COKE OVEN BATTERY LOG SHEET

Oven Pushing Data			Oven Charging Data		
Oven No.	Time Pushed	Push Greenness*	Oven No.	Time Charged/ Level	Comments
57	12:54	2	57	1:12	
67	1:05	1	67	1:19	
77	1:15	~~2~~ 3	77	1:34	
59	1:47	NR	59	2:20	↘
69	2:13	2	69	2:30	Test No. 1 started at about 2:10 pm
79	2:27	2	79	2:41	Weather is clear about 90°F
89	2:43	3	89	2:55	Just flame held [illegible] later
94	2:5[illegible] pm	2	94	3:10 pm	
	7/19/79 Continuation of Run No. 1				
52	10:07 am	1	52	10:24 am	
62	10:20 am	3	62	10:39 am	
72	10:28 am	3	72	10:47 am	
82	10:36 am	1	82	10:54	

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

Ovens permanently out of service on B battery
[illegible]

Date: Tuesday 7/15/79

Heater Room

Time	Stack Draft mm H_2O PS	Stack Draft mm H_2O CS	Fuel Press. mm H_2O	Temperatures °C Preheat After	Preheat Before	Waste Ht PS	Waste Ht CS	Cell Water PS	Cell Water CS	Ambient Temp of Heater Room PS	Ambient Temp of Heater Room C
				Preheat Not in service							
10:47a	22	26	176	40	41	270	265	85	83	7.0	7.
			Natural gas pressure during lunch break								
11:57	22	25	176	40	41	270	270	85	84	7.0	7.
12:57	22	25	352	41	41	260	270	84	82	7.0	7.0
1:53	22	25	352	41	41	265	267	85	83	7.5	7.0
2:56	22	25	352	41	41	270	270	88	85	7.5	7.0
3:55	22	26	352	41	41	269	270	88	82	7.5	7.0
4:35 pm	22	25	352	41	42	280	270	90	84	7.5	7.0
				7/19/79 Construction of Room No 1							
2:45 pm	21	27	352	41	41	276	267	90	87	7.5	7.0
1:50	22	26	352	44	45	270	268	91	86	8.0	7.0
0:55	22	25	352	45	45	272	271	96	46	8.0	7.5
	water in trap										

Burned at 7 min + 37 min gas shut off

Note, Fuel Gas Flowmeter was being bypassed — No Readings

Date - 7/18/79

Filter Instruments

Time	Manometers, in.w.c. Compartment 1	2	3	4	5	Total ΔP in.w.c.	Inlet Temp °F	Inlet Draft mm H_2O	Fan Load amps	Trans[illegible]
11:05	[illegible] needles - couldn't get in to [illegible] readings									
11:50	5.6	5.6	4.6	5.5	4.1	8.2	475	31	20	11
12:50	5.9	5.3	4.8	5.8	4.4	8.5	475	31	20	11
1:50	5.6	5.2	4.8	5.7	4.4	8.6	475	32	20	11
2:50	6.0	5.4	4.9	5.8	4.5	8.5	475	29	20	11
3:50	6.0	5.4	4.9	5.9	4.5	8.8 [illegible] at 9.2	475	31	20	11
4:30 pm	5.9	5.3	4.9	5.8	4.5	8.4	475	30	20	11
7/19/79 Continuation of Run No. 1										
8:45 am	6.1	5.5	5.1	6.0	4.7	8.5	475	29	20	11
9:45 am	5.7	5.1	4.8	5.7	4.5	8.4	480	30	20	11
10:50 am	5.9	5.3	4.9	5.8	4.6	8.4	480	29	20	11

Date: Tues 9/18/79

Notes

This is supposed to be the first test day.

Ovens are numbered 51-59, 61-69, 71-79, 81-89, 41-99
Ovens permanently out of service are:
83|85, 95|87, 97|92|64, 74, 94|86|68, 98|

9:10 am - Filter is in a cleaning cycle.
Checked the dust discharge chute and can see more dust being discharged into collecting bin.

10:70 am Put box under dust discharge chute for B-C filter
Next cleaning cycle is at 11:00 am for B filter
Removed box at 3:10. Weighed 14 lbs of dust.
(2.9 lbs/hr)

1:45 Filter is in a cleaning cycle

3:00 Looked in flue caps on No 84 oven
Flue 13+H PS, ~~one~~ wall 84, were obviously leaking

See Mike Bonner or Mr Biddlow for copies of charts

4:30 pm Frank Clay says he has decided to stop the run about 3/4 done, and finish it up tomorrow morning

8:30 am 7/19/79 In for continuation of Run No 1

9:00 am 7/19 Put dust bucket under B-C filter dust discharge line
9:30 am Restarted continuation of No 1 run
10:05 am Finish " " " "

6 ovens are out of service on C battery
Fuel gas meter is also bypassed

Heater room operator estimates that fuel gas usage would be 220,000 SCFH which is the most that they can get regardless of how many ovens are in service

9/18/79

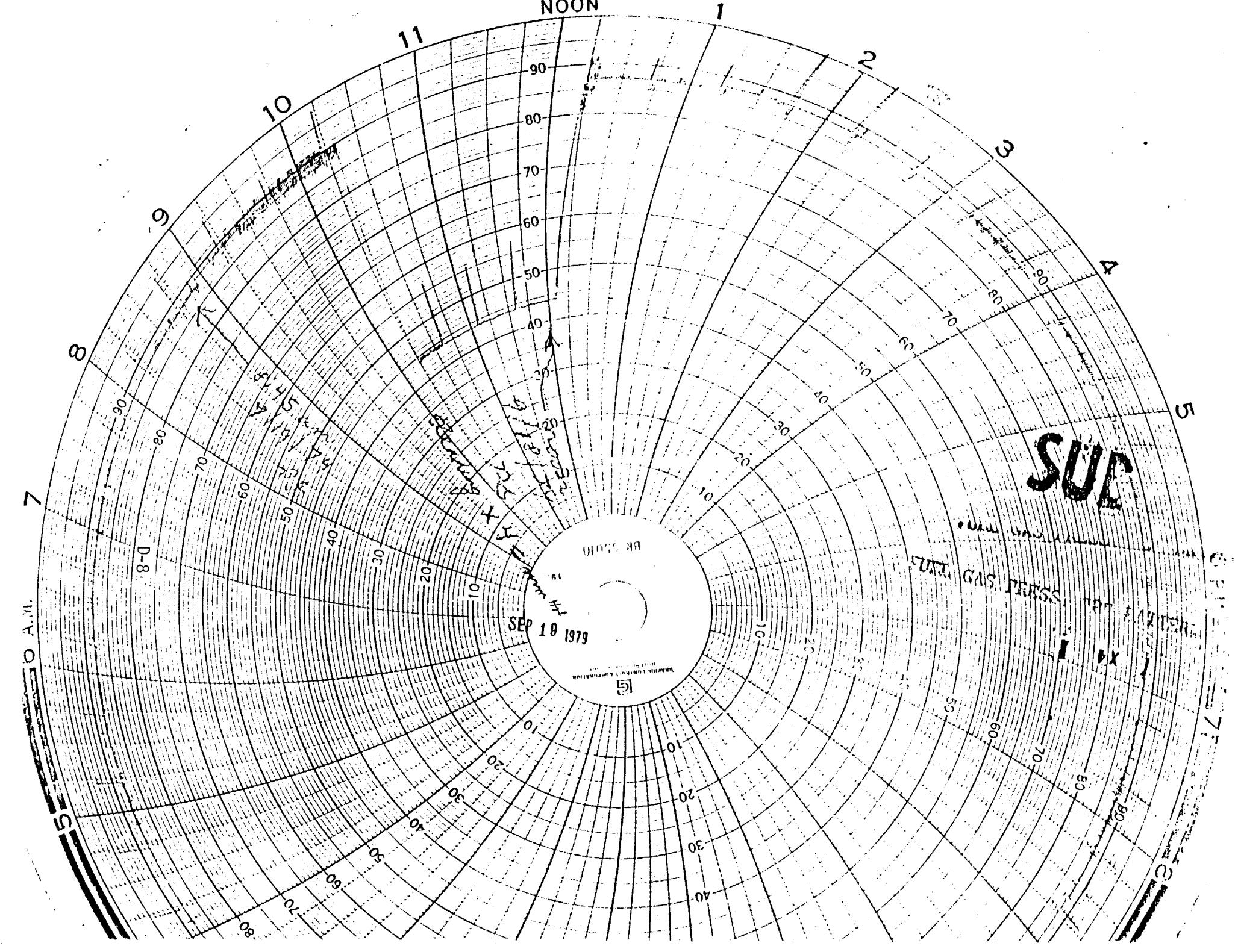
Coke Oven Gas Analysis.

CO_2 = 2.8%
Illuminants = 4.4%
O_2 = 1.8%
CO = 8.4%
H_2 = 41.0%
CH_4 = 25.6%
N_2 = 16.0%

9/15/79 Coal Mix to Battery "B"

Sunnyside = 30%
York Canyon = 41%
Coal Basin = 21%
Petroleum Coke = 8%

No analysis of mix available for 9/15/79 due to equipment failure.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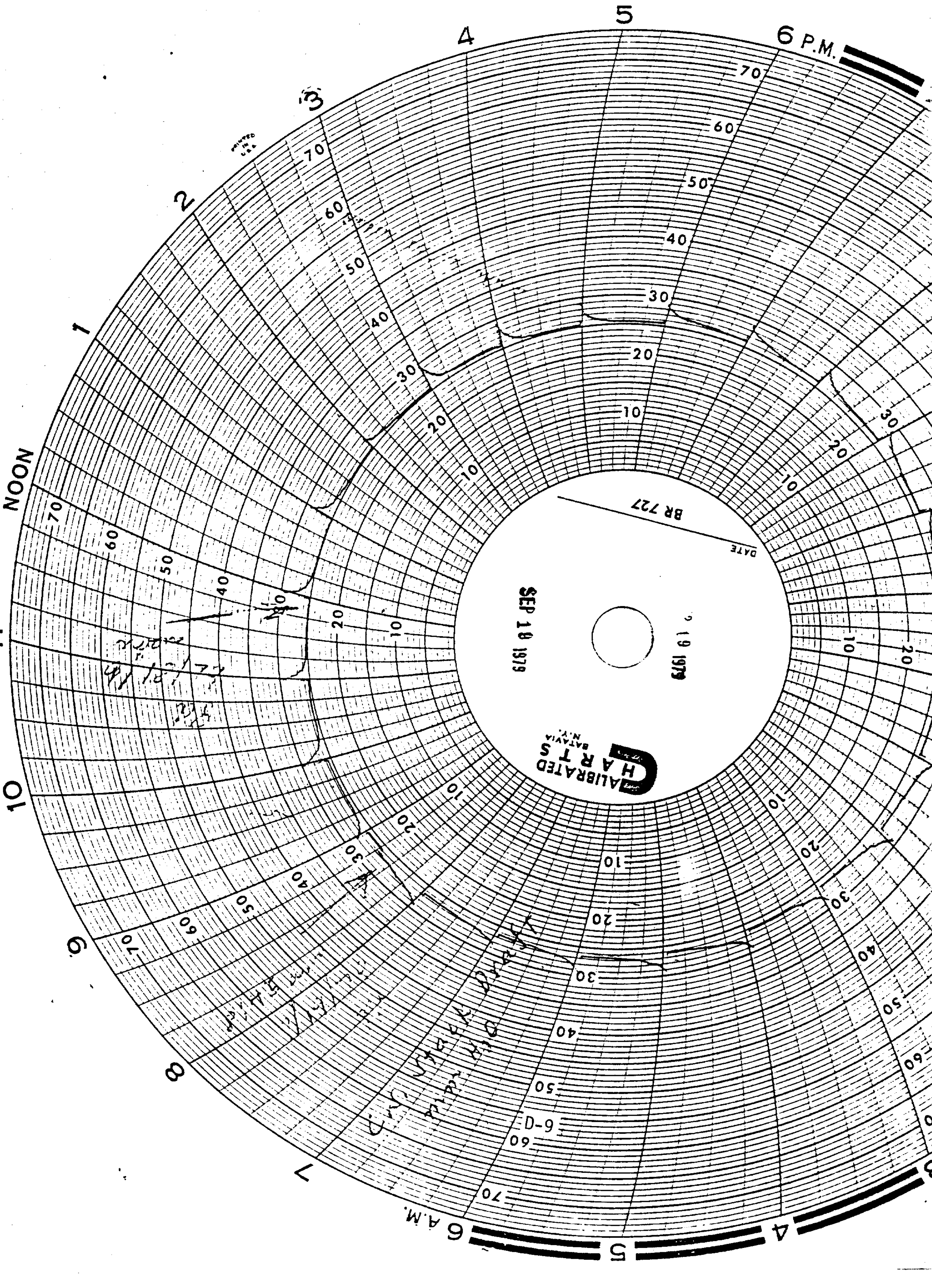
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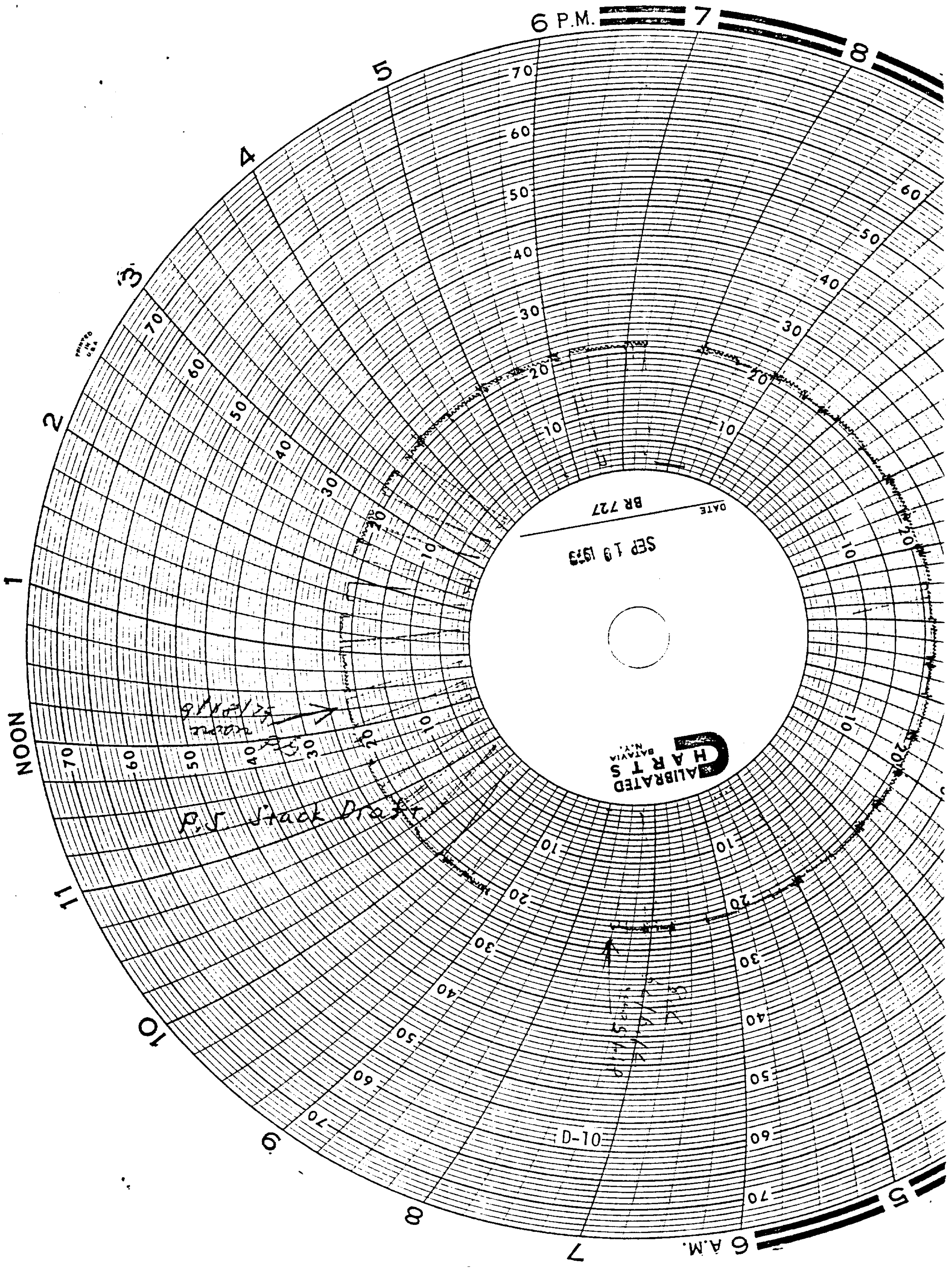
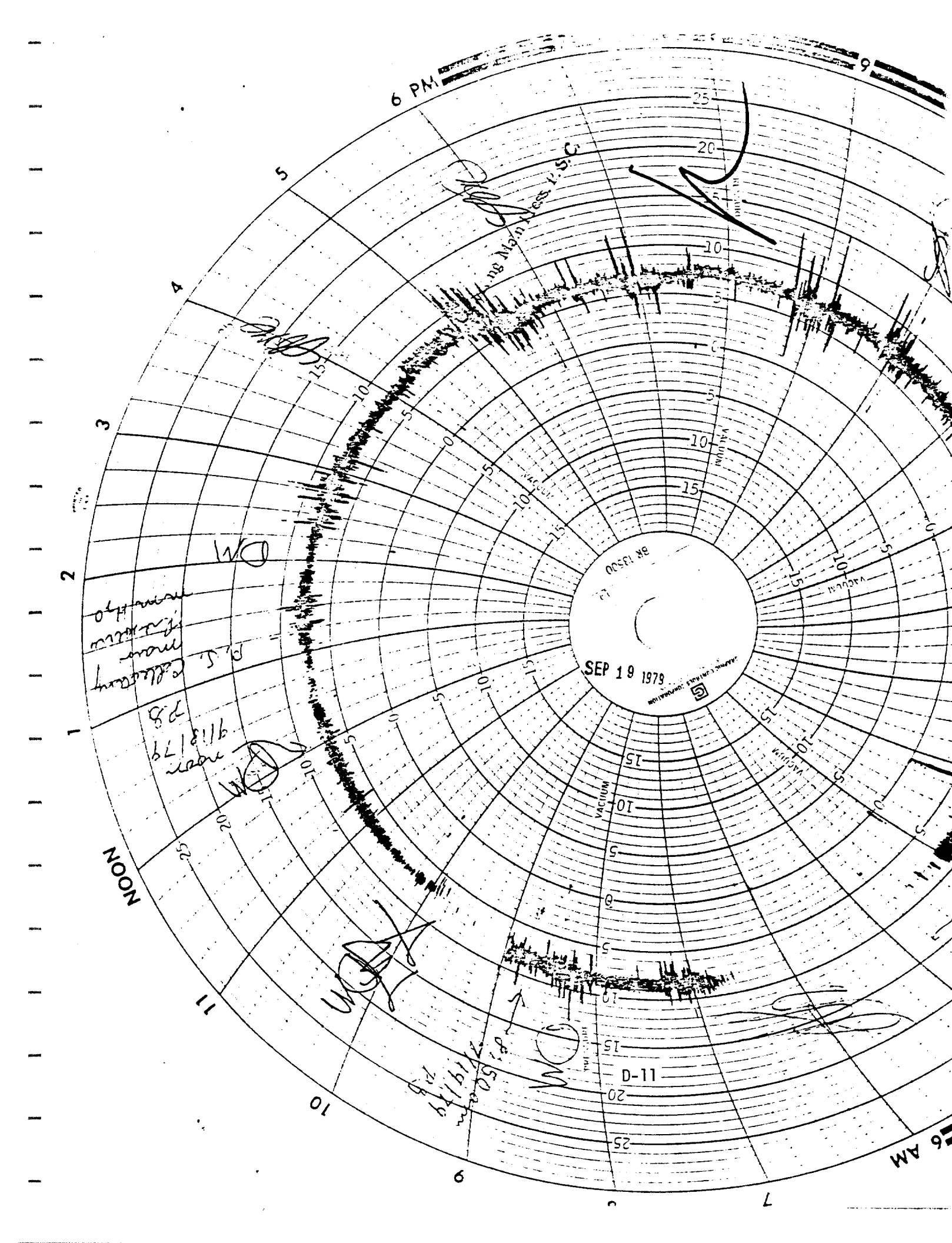
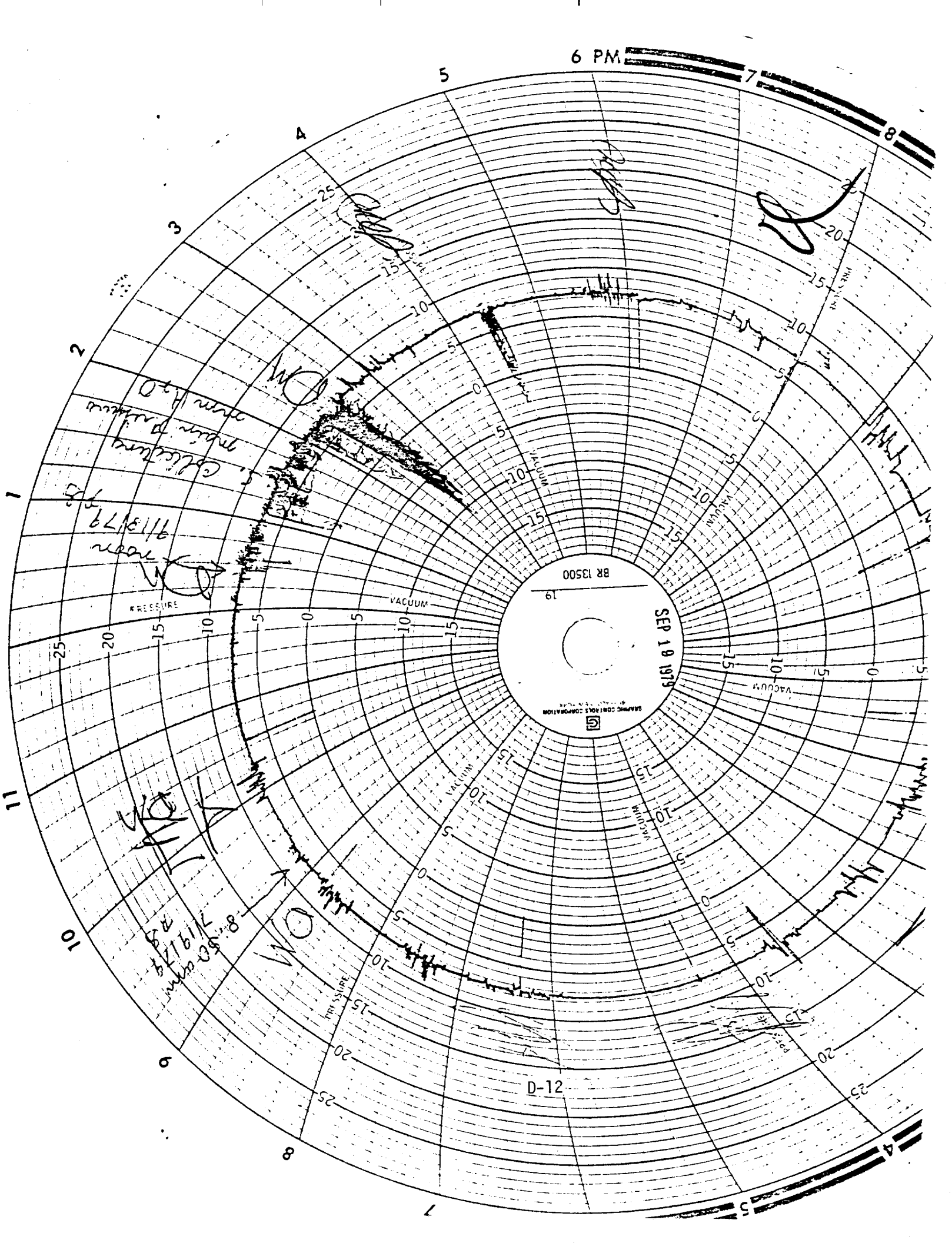
6 A.M.
D-6



6 P.M.
7
8
5
4
3
2
1
NOON
11
10
9
8
7
6 A.M.
5
PRINTED IN U.S.A.
BR 727
DATE
SEP 19 1973
CALIBRATED CHARTS
BATAVIA N.Y.
D-10
P.S. Stack Draft


6 PM
NOON
6 AM
SEP 19 1979
D-11


6 PM
PRESSURE
VACUUM
BR 13500
SEP 18 1979
GRAPHIC CONTROLS CORPORATION

COKE OVEN SPAN AND BATTERY CROSSWALL TEMPERATURES

READER: Martin DATE: 9-18-79 TIME: 2:15

"A" Battery Pusher Side		Wall No.	"A" Battery Coke Side		"B" Battery Pusher Side		Wall No.	"B" Battery Coke Side	
24	/	1	34	/	60	/	51	10	/
xxx	25	2 / 3	xxx	31 / 35	xxx	14 / 29	52 / 53	xxx	25 / 29
24 / 32	xxx	4 / 5	26 / 23	xxx	32 / 28	xxx	54 / 55	30	xxx
xxx	35 / 32	6 / 7	xxx	22 / 27	xxx	34 / 30	56 / 57	xxx	32 / 28
35 / 16	xxx	8 / 9	26 / 15	xxx	33 / 31	xxx	58 / 59	26 / 30	xxx
xxx	02 / 25	10 / 12	xxx	03 / 26	xxx	33 / 27	61 / 62	xxx	28 / 32
24 / 27	xxx	13 / 14	22 / 30	xxx	22 / 20	xxx	63 / 64	26 / 3	xxx
xxx	33 / 31	15 / 16	xxx	30 / 33	xxx	23 / 20	65 / 66	Chg	27 / 23
19 / 04	xxx	17 / 18	27 / 10	xxx	25	xxx	67 / 68	21 / 14	xxx
xxx	24 / 34	19 / 21	xxx	33 / 25	xxx	22 / 15	69 / 71	xxx	19 / 21
35 / 32	xxx	22 / 23	27 / 37	xxx	15 / 13	xxx	72 / 73	31 / 23	xxx
xxx	33 / 25	24 / 25	xxx	34 / 24	xxx	27 / 37	74 / 75	xxx	14 / 22
21 / 14	xxx	26 / 27	30 / 25	xxx	30 / 33	xxx	76 / 77	27 / 32	xxx
xxx	90 / 85	28 / 29	xxx	09 / 95	xxx	25 / 29	78 / 79	Chg	28 / 20
88 / 10	xxx	31 / 32	00 / 08	xxx	25 / 19	xxx	81 / 82	20 / 15	xxx
xxx	14 / 20	33 / 34	xxx	16 / 24	xxx	26 / 31	83 / 84	xxx	26 / 38
28 / 18	xxx	35 / 36	24 / 15	xxx	10 / 92	xxx	85 / 86	21 / 19	xxx
xxx	23 / 20	37 / 38	xxx N/A	20 / 1890	xxx	90 / 30	87 / 88	xxx	90 / 31
16 / 18	xxx	39 / 40	SM / 40	xxx	25 / 30	xxx	89 / 91	29 / 32	xxx
xxx	98 / 85	42 / 43	xxx	31 / 02	xxx	55 / 32	92 / 93	xxx	33 / 25
20 / 25	xxx	44 / 45	21 / 18	xxx	21 / 09	xxx	94 / 95	24 / 06	xxx
xxx	27 / 19	46 / 47	xxx	16 / 2	xxx	28 / 25	96 / 97	xxx D-13	28 / 24
00 / 92	xxx	48 / 49	01 / 96	xxx	95 / 20	xxx	98 / 99	03 / 22	xxx
/	75	51	/	70	/	30	101	/	27
280	273	"A"	260	260	263	264	"B"	261	278
2276 (2268)			2260		2263 (2266)			2269	

Wall Number PS 27		Wall Number PS 28	
1	SM	1	SM
2		2	
3	09	3	85
4	14	4	90
5	15	5	93
6	OUT	6	98
7	20	7	75
8	22	8	96
9	23	9	
10	24	10	99
11	25	11	96
12		12	98
13	28	13	98
14	31	14	00
CS		CS	
14	30	14	01
13	27	13	
12		12	02
11	28	11	
10	TAR	10	05
9		9	02
8		8	05
7	27	7	08
6	24	6	98
5	21	5	92
4	20	4	84
3	15	3	75
2	12	2	59
1	01	1	63

Wall thin

REMARKS:

COKE OVEN SPAN AND BATTERY CROSSWALL TEMPERATURES

READER: *Martin* DATE: *9-19-79* TIME: *1:45 AB 1?*

"A" Pusher Side		Wall No.	"A" Coke Side		"B" Pusher Side		Wall No.	"B" Coke Side	
25	—	T	34	—	25	—	51	15	—
xxx	28	2	xxx	31	xxx	26	52	xxx	22
		3		30		36	53	Chg	34
32	xxx	(4)	30	xxx	SM	xxx	54	35	xxx
35		T	27		27		55	30	
xxx	31	6	xxx	22	xxx	38	56	xxx	36
	25	7		23		31	57		31
34	xxx	8	22	xxx	32	xxx	58	20	xxx
19		(9)	17		34		59	30	
xxx	00+	(11)	xxx	04	xxx	27	61	xxx	34
	21	T	69	25		23	62		31
33	xxx	13	29	xxx	28	xxx	63	31	xxx
35		14	36		25		(64)	27	
xxx	32	15	xxx	30	xxx	15	T	xxx	34
	27	16		37		20	66		29
17	xxx	(17)	24	xxx	24	xxx	67	16	xxx
02		+(18)	09		22		(68)	10	
xxx	23	T	xxx	31	xxx	50	T	xxx	15
	30	21		25		29	71		35
35	xxx	22	33	xxx	15	xxx	72	32	xxx
29 27		(23)	27		19		73	24	
xxx	33	24	xxx	23	xxx	27	(74)	xxx	21
	25	25		24		33	75		17
25	xxx	26	25	xxx	29	xxx	76	21	xxx
19		(27)	27		30		77	26	
xxx	11	(28)	xxx	21	xxx	30	78	xxx	27
	96	(29)		03		26	79		11
95	xxx	(31)	01	xxx	30	xxx	81	18	xxx
SM		T	10		25		82	20	
xxx	14	33	Chg	11	xxx	30	(83)	xxx	23
	01	34		22		20	84		28
SM	xxx	(35)	SM	xxx	05	xxx	(85)	20	xxx
10		(36)	05		80		+(86)	91	
xxx	14	T	xxx	25	xxx	58	+(87)	xxx	24
	25	38		2		23	T		23
22	xxx	(39)	30	xxx	23	xxx	89	26	xxx
20		T	28		31		91	32	
xxx	21	(42)	xxx	27	xxx	35	(92)	xxx	21
	99	+(43)		07		35	T		28
15	xxx	T	20	xxx	26	xxx	(94)	28	xxx
26		45	26		02		(95)	05	
xxx	25	46	xxx	23	xxx	14	T	D-14	20
	19	(47)		96		01	(97)		11
95	xxx	+(48)	98	xxx	98	xxx	(98)	06	xxx
85		+(49)	85		18		T	22	
—	65	+(51)	—	80	—	32	101	—	34
297	232	"A"	247	252	262	260	"B"	255	278
2264 (2256)			2249		2261 (2263)			2266	

Wall Number	PS #29	Wall Number	PS 31
1	OUT	1	OUT
2	62	2	
3	77	3	63
4	82	4	78
5	85	5	85
6	90	6	90
7		7	95
8	93	8	72
9	83	9	90
10	85	10	93
11	92	11	94
12	75	12	96
13	95	13	95
14	97	14	97
CS		CS	
14		14	95
13		13	98
12	97	12	98
11	77	11	78
10	98	10	02
9	00	9	00
8	01	8	06
7	00	7	01
6	97	6	97
5	72	5	72
4	58	4	88
3	75	3	80
2	58	2	64
1	45	1	60

Both walls

REMARKS:

COKE OVEN SPAN AND BATTERY CROSSWALL TEMPERATURES

HEATER: W.H DATE: 9-18-79 TIME: 8 15 AM

"A" BATTERY FLUE TEMPERATURES		Wall No.	"A" BATTERY FLUE TEMPERATURES		"B" BATTERY FLUE TEMPERATURES		Wall No.	"B" BATTERY FLUE TEMPERATURES	
70	68		47	79	70			50	
PUSHER SIDE			COKE SIDE		PUSHER SIDE			COKE SIDE	
20		1	34		90		(51)	17	
xxx	25/7	2	xxx	32/28	xxx	07/37	52	xxx	29/42
		3					(53)		
22/45	xxx	(4)	20/31	xxx	38/37	xxx	54	38/44	xxx
		5					55		
xxx	43/25	6	xxx	21/26	xxx	41/33	56	xxx	43/29
		7					57		
38/03	xxx	8	22/05	xxx	31/38	xxx	58	15/33	xxx
		(9)					59		
xxx	95/23	(11)	xxx	95/33	xxx	38/25	61	xxx	35/35
		12					62		
27/26	xxx	13	25/28	xxx	20/15	xxx	63	25/2	xxx
		14					(64)		
xxx	37/6	15	xxx	37/35	xxx	17/21	65	xxx	36/26
		16					66		
13/90	xxx	(17)	18/00	xxx	30/27	xxx	67	15/0	xxx
		(18)					(68)		
xxx	26/34	19	xxx	35/29	xxx	23/19	69	xxx	10/35
		21					71		
33/92	xxx	22	27/42	xxx	13/03	xxx	72	37/21	xxx
		(23)					73		
xxx	43/33	24	xxx	42/28	xxx	25/47	(74)	xxx	15/31
		25					[redacted]		
28/17	xxx	26	29/1	xxx	35/5	xxx	76	21/34	xxx
		27					77		
xxx	13/97	(28)	xxx	28/07	xxx	30/25	78	xxx	37/14
		(29)					79		
95/04	xxx	(31)	07/13	xxx	22/18	xxx	81	10/10	xxx
		32					82		
xxx	15/28	[redacted]	xxx	31/37	xxx	36/37	(83)	xxx	30/42
		34					84		
26/11	xxx	(35)	28/07	xxx	05/95	xxx	(85)	22/00	xxx
		(36)					(86)		
xxx	21/36	37	xxx	15/30	xxx	97/25	(87)	xxx	00/27
		38					88		
25/16	xxx	(39)	38/36	xxx	19/28	xxx	89	29/32	xxx
		41					91		
xxx	28/27	(42)	xxx	32/06	xxx	36/37	(92)	xxx	32/28
		(43)					93		
18/28	xxx	44	20/5	xxx	24/00	xxx	(94)	25/98	xxx
		45					(95)		
xxx	31/18	46	xxx	14/05	xxx	22/2	96	x	23/32
		(47)					(97)	D-15	
06/86	xxx	(48)	02/93	xxx	92/13	xxx	(9)	97/24	xxx
		(49)					99		
	76	(5)		80		36	(10)		31
254	319	"A"	252	297	253	285	"B"	253	307
2287			2275		2269			2280	

WALL NUMBER		WALL NUMBER	
PS	73	PS	74
1	65	1	80
2	80	2	90
3	84	3	06
4	82	4	15
5	86	5	21
6	02/3	6	21
7		7	25
8	05/7	8	26
9		9	26
10	10	10	25/7
11	95/3	11	
12		12	28
13	96	13	29/9
14	03	14	
CS		CS	
14	96	14	25/3
13	92	13	
12	96	12	21
11	73	11	16
10	86	10	00
9	06	9	05
8	92	8	14/18
7	12	7	
6	15	6	22
5	10	5	22
4	14	4	25/5
3	19	3	
2	14	2	26
1	11	1	18

REMARKS:

COKE OVEN SPAN AND BATTERY CROSSWALL TEMPERATURES

READER: TATUM DATE: 9-18-79 TIME: 6:45

"A" BATTERY FLUE TEMPERATURES							"B" BATTERY FLUE TEMPERATURES						
PUSHER SIDE		Wall No.	COKE SIDE				PUSHER SIDE		Wall No.	COKE SIDE			
27		T	32				14		51	07			
xxx	31	2	xxx	38			xxx	21	52	xxx	22		
	28	3		27				30	53		34		
23	xxx	4	23	xxx			36	xxx	54	41	xxx		
26		5	T 23				17		55	21			
xxx	34	6	xxx	34			xxx	41	56	xxx	41		
	34	7		33				35	57		30		
33	xxx	8	24	xxx			36	xxx	58	21	xxx		
15		9	10				42		59	35			
xxx	24	10	xxx	90			xxx	35	61	xxx	30		
	21	11 T		31				40	62		31		
26	xxx	13	25	xxx			18	xxx	63	28	xxx		
34		14	32				10		64	15			
xxx	31	15	xxx	32			xxx	05	65 T	xxx	23		
	31	16		32				20	66		23		
21	xxx	0	26	xxx			27	xxx	67	17	xxx		
90		0	08				17		68	05			
xxx	20	T	xxx	28			xxx	16	69 T	xxx	06		
	31	21		28				16	71		32		
34	xxx	22	30	xxx			17	xxx	72	43	xxx		
34		23	35				09		73	17			
xxx	39	24	xxx	40			xxx	14	74	xxx	09		
	31	25		25				20	75		13		
24	xxx	26	26	xxx			37	xxx	76	24	xxx		
24		27	29				45		77	33			
xxx	23	28	xxx	34			xxx	30	78 T	xxx	35		
	90	29		93				29	79 T		17		
75	xxx	30	90	xxx			23	xxx	81	09	xxx		
08		31 T	11				23		82	15			
xxx	98	33	xxx	99			xxx	33	83	xxx	29		
	18	34		19				33	84		47		
32	xxx	35	24	xxx			15	xxx	85	23	xxx		
06		36	01				75		86	94			
xxx	11	T	xxx	08			xxx	25	87	xxx	90		
	18	38		18				29	88 T		29		
27	xxx	39	29	xxx			23	xxx	89	31	xxx		
17		40 T	27				25		91	23			
xxx	00	42	xxx	30			xxx	28	92	xxx	26		
	90	43		94				24	93 T		20		
19	xxx	44 T	21	xxx			17	xxx	94	12	xxx		
35		45	21				94		95	97			
xxx	21	46	xxx	09			xxx	22	T		22		
	21	47		12				22	0	D-16	16		
80	xxx	48	90	xxx			94	xxx	95	01	xxx		
75		49	80				13		T	20			
	75	51		75				29	T		24		
260	274	"A"	255	260			261	290	"B"	255	304		
2268			2258				2276			2280			

WALL NUMBER		WALL NUMBER	
PS	~~1~~ 2	PS	~~1~~ 13
1	15	1	FIRE
2	23	2	FIRE
3	20	3	17
4	99	4	23
5	21	5	26
6	28	6	26
7	28	7	24
8	33	8	26
9	33	9	28
10	33	10	25
11	28	11	25
12	11	12	25
13	33	13	22
14	33	14	20
CS		CS	
14	36	14	20
13	36	13	28
12	36	12	17
11	36	11	25
10	38	10	26
9	38	9	28
8	24	8	29
7	04	7	25
6	95	6	26
5	21	5	28
4	27	4	31
3	27	3	32
2	10	2	30
1	95	1	FROZE

REMARKS:

TEST NO. 2 *

September 19, 1979 *

* Note - Test No. 2 on 9/19/79 did not produce a valid method 5 test due to a broken probe liner, although other tests (e.g., BaP) were successfully completed. Therefore, the No.2 Method 5 test was carried out on 9/21/79.

Test No 2 *

Test No 2, 1979 *

* Note - Test No 2 on 9/19/79 did not produce a valid Method 5 test due to a broken probe liner, although other tests (e.g. 3-D) were successfully completed. Therefore, the No 2 Method 5 test was conducted on 9/21/79.

Date 9/14/79 Test 2
Plant Name Kaiser Steel
Location Fontana
Battery No. 73

COKE OVEN BATTERY LOG SHEET

Oven Pushing Data			Oven Charging Data		
Oven No.	Time Pushed	Push Greenness*	Oven No.	Time Charged/ Level	Comments
54	12:56	4	54	1:07	
84	1:04	1	84	1:12	
56	2:56	3	56	3:01	
66	3:06	4	66	3:15	
76	3:08	~~[illegible]~~ 3	76	3:25	
96	3:21	4	96	3:29	
58	~4:30	NR	58	4:39	
78	4:35	NR	78	4:48	
88	4:42 pm	NR	88	~4:55	

Above data is for 9/14/79
Test No 2 (Bat 7 only) - Not method 5 (see notes)

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

[illegible] 4:35

Date: 9/14/74

Heater Room

Time	Stack Draft mm H_2O		Fuel Press. mm H_2O	Temperatures °C Prehtr		Waste Ht		Cell Main		[illegible] Pressure	
	P.S.	C.S.		After	Before	F.S.	C.S.	F.S.	C.S.	P.S.	C[illegible]
2:57	25	25	352	47	44	271	270	102	84	7.5	8.5
2:00	[illegible] 22	25	352	47	47	275	273	97	82	8.0	5.0
:53	22	25	352	47	47	271	270	105	84	Not Read	
1:00	22	27	352	47	47	272	270	105	85 [illegible]	8.0	-7.[illegible]
1:40 pm	22	26	352	47	47	280	272	110	90	8.0	7.0

Above data is for 9/14/74
Test No. 2 (not including model 5) - see notes

Note, Fuel Gas Flowmeter was being bypassed — No Readings

Date - 9/14/74

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 Pulse Control
12:47	5.8	5.2	4.4	5.7	4.5	8.4	480	29	20	11
1:45	5.8	5.3	4.4	5.7	4.4	8.3	480	28	20	11
2:48	5.7	5.1	4.7	5.6	4.2	8.3	480	29	20	11
3:55	6.0	5.4	4.9	5.4	4.5	8.4	480	30	20	11
4:50 pm	6.0	5.3	4.4	5.9	4.4	8.3	480	30	20	11

Above data as for 9/14/74
Test No 2 (wet including weight of 5) equipment

Notes
Run No. 2

Date: Wed 9/19/79

Tested No 1 run up this morning. Setting ready to start No. 2

1:45 pm Getting some visible gray emissions from C stack

1:50 Approx start of Run No 2

2:15 pm Slight visible emissions from B stack

2:43 pm B baghouse is in a cleaning cycle

3:45 pm Had opr pull flue caps in both walls of #96 oven
Wall #96 had bad leaks in #1 & #2 flues P.S.
Also, several of the burners in the flues were plugged up and not burning or burning very weakly.

4.20 Removed dust collection bucket. Only collected a very small amount (less than 1 lb)

For this test on 9/19/79, it was found that the Method 5 test was invalid (broken probe liner)
Therefore, the data is for test No 2 But, but not Method 5. Tomorrow 9/20/79 will be test No 3.
The No 2 method 5 test will be done on Fri 9/21/79

JB

Coke Gas Analysis – 9/19/79

	%
CO_2	2.2
H_2	3.6
O_2	2.4
CO	4.8
H_2	? (Reported 56.0% but suspect in error)
CH_4	25.4
N_2	?

Analyses. % –

	VM	FC	Ash	Sulf.
Coke	0.9	88.3	10.8	0.72
Petroleum Coke	11.9	87.8	0.3	1.51
Sunnyside	39.3	54.0	6.7	1.26
Coal Basin	24.3	69.4	6.3	0.59
York	36.1	56.5	7.4	0.44
Coal Mix	32.3	61.2	6.5	0.79

Coal Mix* by % → 30% Sunnyside, 41% York, 21% Coal Basin, 8% Pet Coke.

* Trying to 4% S mix may not hit it exactly.

COKE OVEN SPAN AND BATTERY CROSSWALL TEMPERATURES

READER: O.J DATE: 9-19-79 TIME: 6:45

"A" BATTERY FLUE TEMPERATURES

PUSHER SIDE		Wall No.	COKE SIDE	
38		1	47	
xxx	33	2	xxx	40
	38	3		36
30	xxx	4	31	xxx
38		5	24	
xxx	31	6	xxx	18
	28	7		17
36	xxx	8	14	xxx
07		9	02	
xxx	86	11	xxx	85
	18	12		33
37	xxx	13	27	xxx
38		14	40	
xxx	35	15	xxx	36
	28	16		33
17	xxx	17	21	xxx
89		18	00	
xxx	22	19	xxx	30
	38	21		30
39	xxx	22	28	xxx
11		23	17	
xxx	19	24	xxx	23
	28	25		20
24	xxx	26	27	xxx
03		27	07	
xxx	84	28	xxx	94
	72	29		69
75	xxx	31	86	xxx
09		32	17	
xxx	27	33	xxx	33
	24	34		35
23	xxx	35	20	xxx
95		36	95	
xxx	13	37	xxx	15
	34	38		20
09	xxx	39	06	xxx
23		41	28	
xxx	06	42	xxx	35
	83	43		91
14	xxx	44	16	xxx
35		45	30	
xxx	32	46	xxx	19
	23	47		10
83	xxx	48	82	xxx
66		49	57	
	62	51		50
285	281	"A"	240	266
2283			2253	

"B" BATTERY FLUE TEMPERATURES

PUSHER SIDE		Wall No.	COKE SIDE	
49		51	31	
xxx	39	52	xxx	38
	42	53		43
45	xxx	54	46	xxx
42		55	41	
xxx	46	56	xxx	49
	33	57		32
42	xxx	58	24	xxx
37		59	31	
xxx	42	61	xxx	36
	28	62		41
24	xxx	63	30	xxx
16		64	19	
xxx	14	65	xxx	33
	18	66		25
24	xxx	67	11	xxx
23		68	03	
xxx	22	69	xxx	07
	28	71		46
20	xxx	72	49	xxx
20		73	25	
xxx	36	74	xxx	17
	47	75		24
39	xxx	76	28	xxx
41		77	33	
xxx	35	78	xxx	37
	25	79		08
18	xxx	81	06	xxx
28		82	21	
xxx	26	83	xxx	22
	14	84		29
97	xxx	85	19	xxx
71		86	78	
xxx	74	87	xxx	82
	24	88		27
09	xxx	89	19	xxx
38		91	34	
xxx	51	92	xxx	34
	37	93		26
30	xxx D-24	94	23	xxx
90		95	85	
xxx	09	96	xxx	01
	05	97		91
87	xxx	98	92	xxx
15		99	21	
	32	10		27
296	290	"B"	283	299
2293			2291	

WALL NUMBER		WALL NUMBER	
PS	95	PS	96
1	—	1	47
2	—	2	85
3	70	3	97
4	81	4	94
5	85	5	00
6	80	6	07
7	90	7	09
8	92	8	05
9	94	9	02
10	92	10	80
11	93	11	05
12	93	12	07
13	92	13	10
14	92	14	06
CS		CS	
14	91	14	82
13	90	13	82
12	91	12	84
11	92	11	78
10	91	10	70
9	88	9	84
8	87	8	80
7	85	7	01
6	85	6	95
5	83	5	86
4	80	4	74
3	75	3	74
2	75	2	93
1	63	1	83

Wall off. No Coke being pushed on either side

Wall throttled too much. over to close [illegible]

REMARKS:

COKE OVEN SPAN AND BATTERY CROSSWALL TEMPERATURES

KSEO 1043 R-2

READER: K. SIMPSON DATE: 9-19-79 TIME: 9 15 AM

"A" BATTERY FLUE TEMPERATURES		Wall No.			"B" BATTERY FLUE TEMPERATURES		Wall No.		
40 77			59 50		70 103			51 70	
PUSHER SIDE			COKE SIDE		PUSHER SIDE			COKE SIDE	
28		(1)	41	82	34		(51)	22	
xxx	25 33	2 3	xxx	N/A 92 32	xxx	32 32	52 53	xxx	36 39
02 28	xxx	(4) 5	28 24	xxx	37 41	xxx	54 55	38 42	xxx
xxx	34 33	6 7	xxx	17 20	xxx	38 36	56 57	xxx	42 33
22 21	xxx	8 (9)	24 21	xxx	35 40	xxx	58 59	25 36	xxx
xxx	08 29	(11) 12	xxx	08 41	xxx	35 28	61 62	xxx	33 41
33 37	xxx	13 14	27 38	xxx	25 16	xxx	63 (64)	32 17	xxx
xxx	35 24	15 16	xxx	32 24	xxx	08 18	65 66	xxx	32 22
20 02	xxx	(17) (18)	24 09	xxx	26 21	xxx	67 (68)	18 12	xxx
xxx	24 34	19 21	xxx	21 24	xxx	27 22	69 71	xxx	28 34
39 40	xxx	22 (23)	27 38	xxx	24 24	xxx	72 73	43 28	xxx
xxx	34 32	24 25	xxx	28 21	xxx	34 29	(74) 75	xxx	21 21
22 23	xxx	26 (27)	25 25	xxx	38 29	xxx	76 77	21 30	xxx
xxx	95 94	(28) (29)	xxx	13 04	xxx	33 35	78 79	xxx	32 20
84 20	xxx	(31) 32	14 18	xxx	25 31	xxx	81 82	43 21	xxx
xxx	19 24	33 34	xxx	27 27	xxx	45 27	(83) 84	xxx	36 38
31 96	xxx	(35) (36)	25 03	xxx	02 82	xxx	(85) (86)	18 26	xxx
xxx	17 33	37 38	xxx	16 20	xxx	28 26	(87) 88	xxx	88 29
42 21	xxx	39 41	36 22	xxx	24 29	xxx	89 91	40 29	xxx
xxx	96 91	(42) (43)	xxx	26 86	xxx	35 29	(92) 93	xxx	28 24
32 34	xxx	44 45	06 22	xxx	15 92	D-25	(94) (95)	25 67	xxx
xxx	27 31	46 (47)	xxx	02 12	xxx	18 13	96 (97)	xxx	16 04
96 76	xxx	(48) (49)	93 77	xxx	86 22	xxx	(98) 99	94 31	xxx
	68	(51)		67		41	(101)		32
300	292	"A"	245	240	300	278	"B"	316	306
2296			2242		2289			2311	

WALL NUMBER		WALL NUMBER
PS	75	PS
1	85	1
2	93	2
3	20	3
4	22	4
5	22	5
6	27	6
7	29	7
8	28	8
9	29	9
10	31	10
11	28	11
12	27	12
13	26	13
14	25	14
CS		CS
14	19	14
13	21	13
12	—	12
11	—	11
10	21	10
9	20	9
8	18	8
7	21	7
6	—	6
5	28	5
4	31	4
3	26	3
2	23	2
1	90	1

REMARKS:

COKE OVEN SPAN AND BATTERY CROWN WALL TEMPERATURES

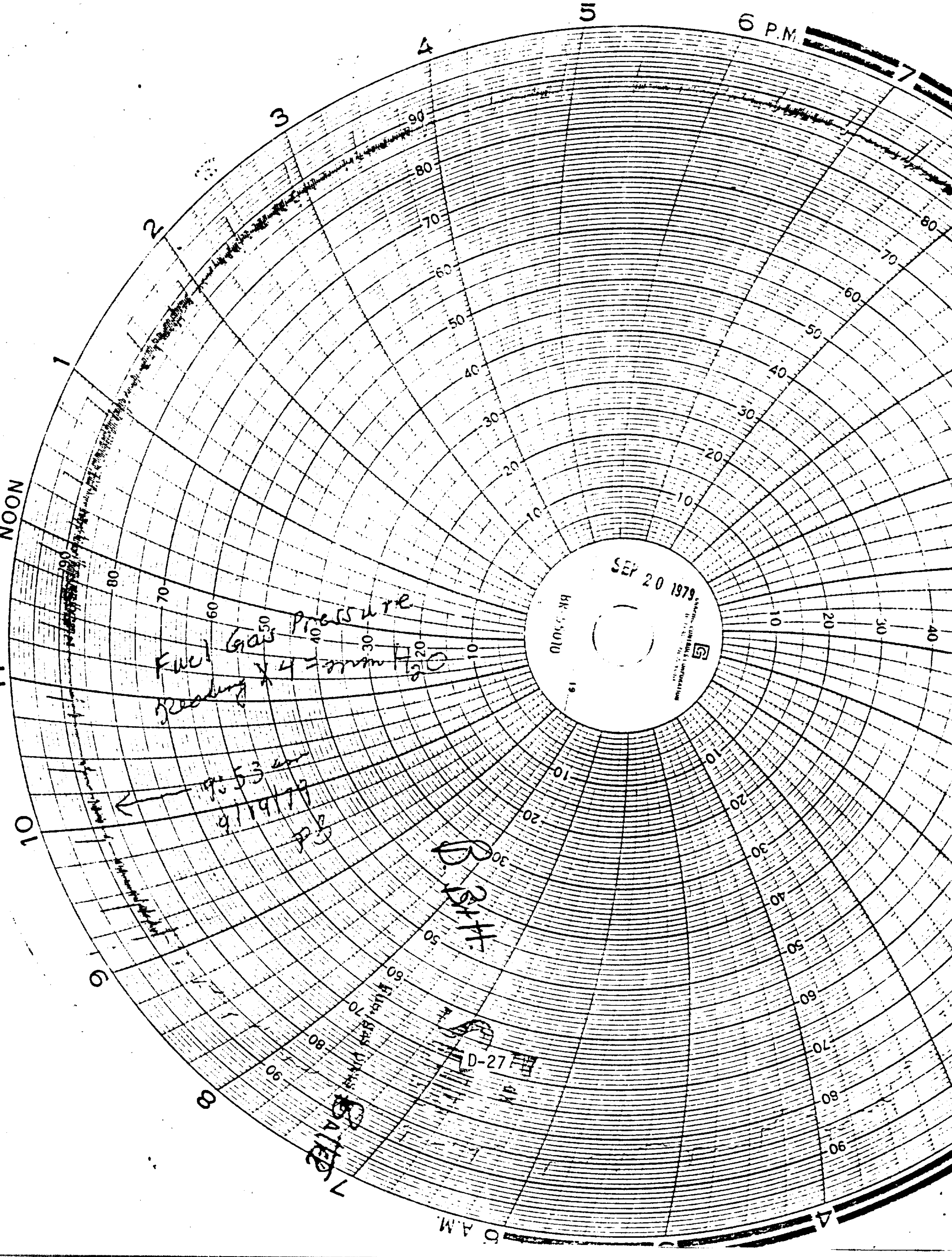
KSGO 1043 R-2

READER: Martin DATE: 9-20-79 TIME: 1:15

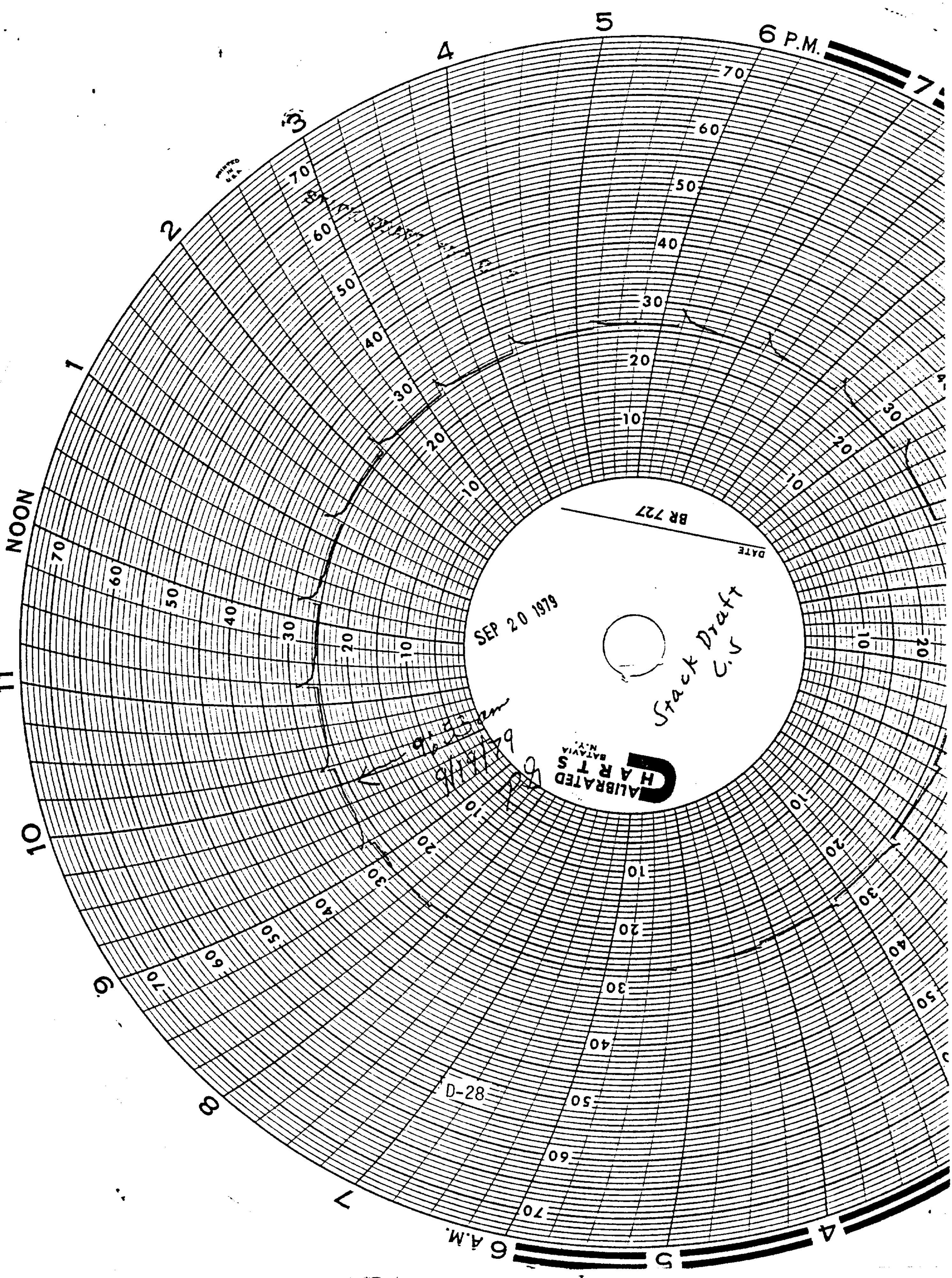
"A" BATTERY FLUE TEMPERATURES						"B" BATTERY FLUE TEMPERATURES					
55		Wall No.	42			102		Wall No.	101		
PUSHER SIDE			COKE SIDE			PUSHER SIDE			COKE SIDE		
28		T	33			34		51	28		
xxx	27/35	2	xxx	34/31		xxx	37/35	52	xxx	33/37	
		3						53			
26/36	xxx	4	31/27	xxx		25/28	xxx	54	28/32	xxx	
		T						55			
xxx	35/33	6	xxx	28		xxx	28/36	56	xxx	34/36	
		7						57			
35/11	xxx	8	25/17	xxx		32/39	xxx	58	26/36	xxx	
		9						59			
xxx	18/29	10	xxx	13/34		xxx	41/35	61	xxx	37/34	
		T						62			
38/36	xxx	13	33/35	xxx		24/21	xxx	63	34/25	xxx	
		14						64			
xxx	34/29	15	xxx	35/30		xxx	19/34	65	xxx	36/25	
		16						66			
26/09	xxx	17	26/17	xxx		29/25	xxx	67	22/17	xxx	
		8						68			
xxx	31/35	T	xxx	36/33		xxx	30/38	69	xxx	23/38	
		21						71			
34/35	xxx	22	20/25	xxx		16/38	xxx	72	27	xxx	
		23						73			
xxx	25	24	xxx	27/23		xxx	30/35	74	xxx	25/24	
		25						75			
19/03	xxx	26	25	xxx		35	xxx	76	29	xxx	
		27	11					77	36		
xxx	95/92	28	xxx	98/70		xxx	34/39	78	xxx	37/15	
		29						79			
92/21	xxx	31	98/22	xxx		18/14	xxx	81	16/18	xxx	
		T						82			
xxx	29	33	xxx	26/23		xxx	30/14	83	xxx	29/33	
		34						84			
24/07	xxx	35	21/08	xxx		12	xxx	85	30/96	xxx	
		66						86			
xxx	40/43	T	xxx	19/23		xxx	90/21	87	xxx	08/22	
		38						T			
91/98	xxx	39	03/95	xxx		23/29	xxx	89	20/30	xxx	
		T						91			
xxx	10/06	42	xxx	26/13		xxx	27/25	92	xxx	20/26	
		43						93			
21/27	xxx	T	29/26	xxx		12/99	D-26	94	21/01	xxx	
		45						95			
xxx	27/23	46	xxx	28/18		xxx	07/85	T	xxx	10/00	
		47						97			
95/85	xxx	48	05/82	xxx		82/37	xxx	98	07/31	xxx	
		49						T			
	48	51		75			32	101		27	
285	311	"A"	243	274		268	284	"B"	273	301	
2298			2261			2276			2287		

WALL NUMBER		WALL NUMBER	
PS	#38	PS	#38
1	frozen cap	1	LEAK
2	06	2	76
3	14	3	90
4	14	4	00
5	31	5	09
6	35	6	14
7	27	7	19
8	30	8	17
9	30	9	16
10	30	10	10
11	32	11	16
12	32	12	12
13	32	13	16
14	30	14	20
CS		CS	
14	26	14	22
13	30	13	20
12	35	12	17
11	33	11	20
10	35	10	24
9	35	9	25
8	33	8	23
7	29	7	22
6	28	6	20
5	25	5	17
4	25	4	17
3	27	3	16
2	25	2	10
1	25	1	85

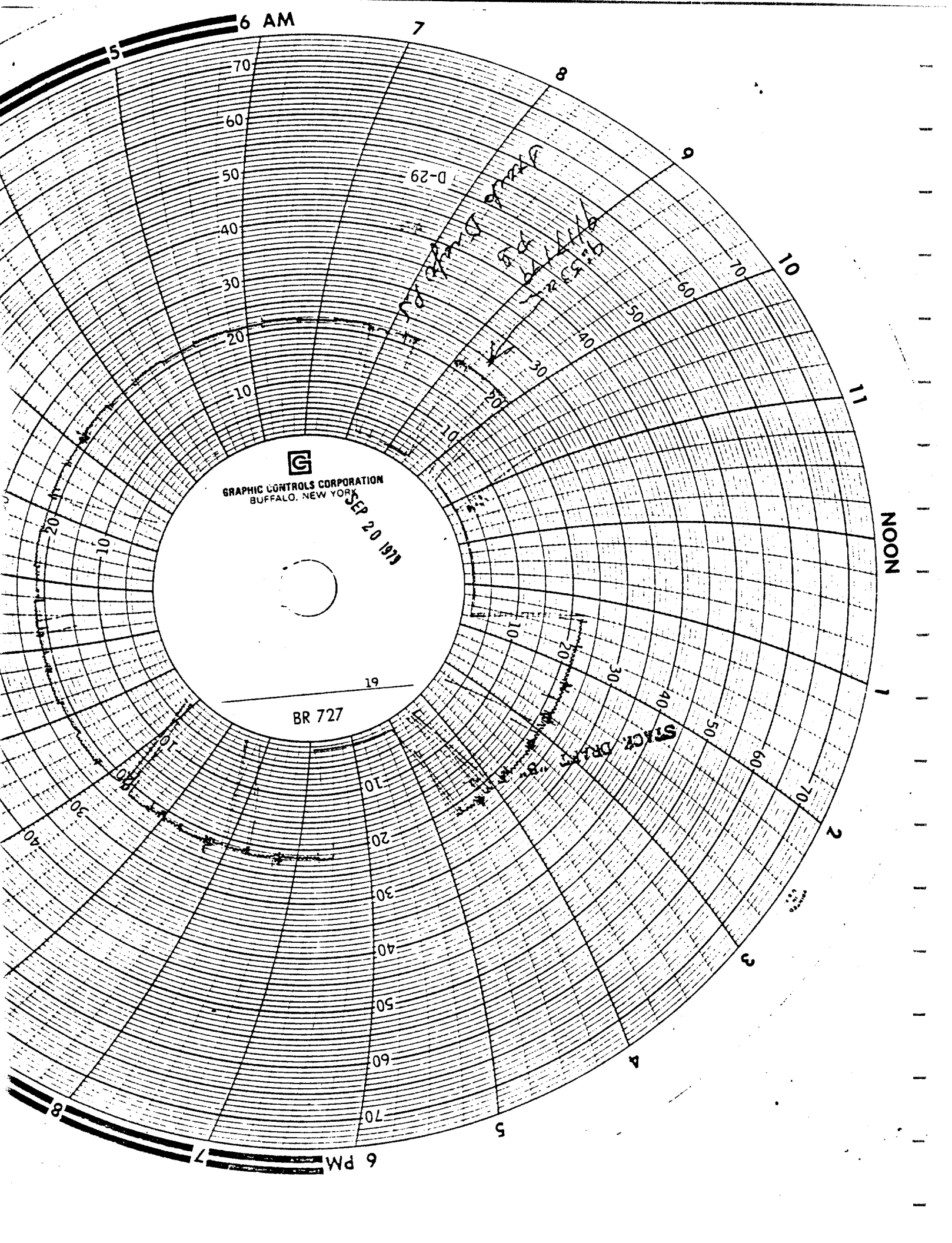
REMARKS:

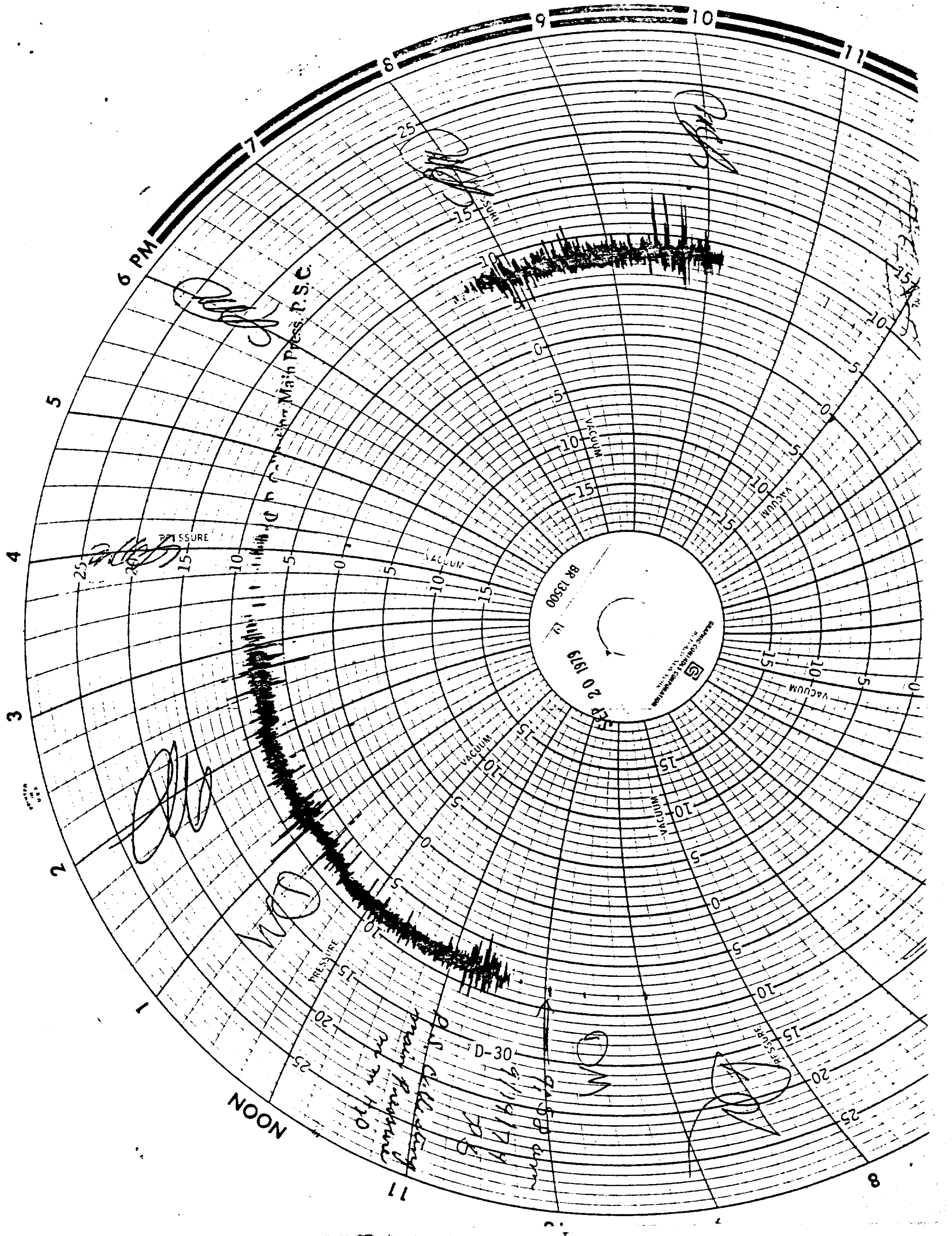


6 P.M.
NOON
6 A.M.
SEP 20 1979
Fuel Gas Pressure
Reading x 4 = mm H2O
9/19/79
D-27

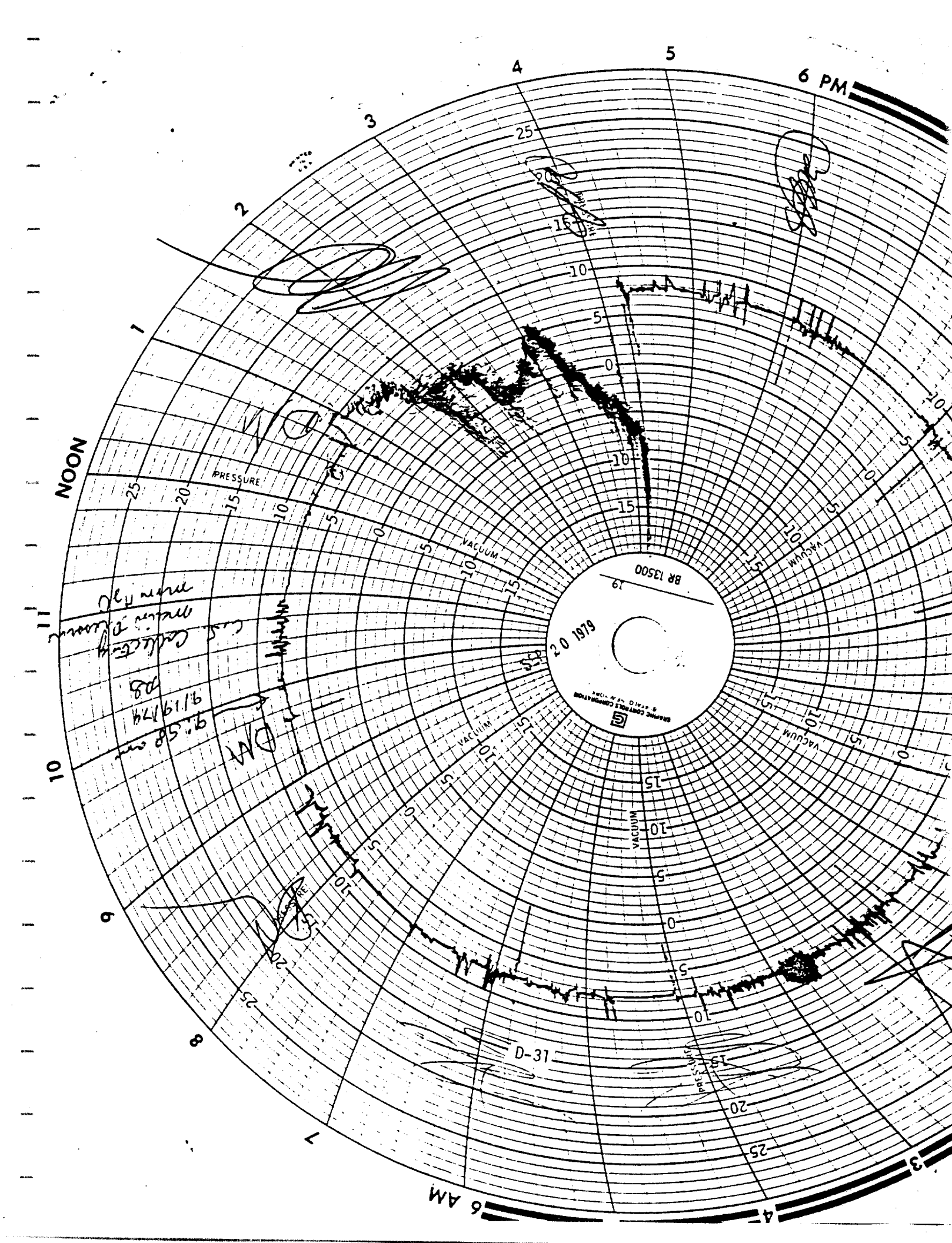


NOON
1
2
3
4
5
6 P.M.
7
11
10
9
8
7
6 A.M.
5
4
BR 727
DATE
SEP 20 1979
Stack Draft
C.S
CALIBRATED CHARTS
BATAVIA N.Y.
D-28


6 AM
7
8
9
10
11
NOON
1
2
3
4
5
6 PM
7
8
5
70
60
50
40
30
20
10
GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
SEP 20 1979
19
BR 727
D-29



6 PM
7
8
9
10
11
5
4
3
2
1
NOON
11
8
PRESSURE
VACUUM
Main Press. P.S.C.
BR 13500
SEP 2 0 1979
D-30


NOON
6 PM
6 AM
PRESSURE
VACUUM
BR 13500
D-31

TEST NO. 3

September 20, 1979

Thurs
Date 4/20/74 Test 3
Plant Name Kanawha Stack
Location Fortney
Battery No. B

COKE OVEN BATTERY LOG SHEET

Oven Pushing Data			Oven Charging Data		
Oven No.	Time Pushed	Push Greenness*	Oven No.	Time Charged/ Level	Comments
96	9:02am	4+			
58	Not Read		58	10:36	Loss of charging emissions
78	10:36	2	78	10:46	
88	10:43	3	88	10:57	
51	11:28	2	51	12:45	
61	12:42	2	61	~1:50	Did not see this oven for charge
71	12:50	3	71	1:12	
81	12:58	1	81	1:21	
91	1:10	3	91	1:34	

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

Date: 4/20/74

Heater Room

Time	Stack Draft mm H_2O PS	CS	Fuel Press. mm H_2O	Temperatures °C Preh Tr After	Before	Warm Ht PS	CS	Cell Main PS.	CS	Comm Collect. Main Pressure PS	C
~~1:03~~	21	22	3.52	41	42	276	274	87	85	7.0 ↓	7.0 ↓
2:04	22	25	3.52	41	42	274	271	86	85 12:25	Not Read P.C	Not Read P.C
1:00	22	25	18	3.52	42	43	271	269	86	86	4.0	7.0
1:58	22	25	14	3.52	44	44	270	268	84	85	7.5	7.0
2:50	22	25	14	3.52	43	43	268	265	83	84	7.5	7.0

Note, Fuel Gas Flowmeter was being bypassed — No Readings

Date - 9/20/79

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	Tran... % O... Outlet
10:48 a.m.	6.1	5.5	5.1	6.1	4.7	8.6	480	30	20	11
12:00	5.7	5.1	4.7	5.7	4.3	8.2	480	30	20	11
1:53	5.8	5.2	4.8	5.8	4.4	8.3	480	29	20	11
3:50	5.8	5.2	4.7	5.7	4.2	8.2	480	30	20	11
4:45	5.8	5.2	4.7	5.7	4.3	8.2	480	29	20	11

Notes
Run No 3

Date: Thurs 9/20/74

This is to be Run No 3. (method 5 test for Run No 2 is planned for tomorrow 9/21/74)

9:48 am – Put dust collection bucket under dust discharge chute from B&C filter, removed bucket at 3:05. Too little dust to weigh. Estimate 0.3–0.5 lbs

Operator says they cleaned nozzles on No 9 & 10 over last night. Watched push at 9:02 am. No improvement in push greenness from yesterday

Report is that ~~they~~ there was a fire in the byproducts plant early this morning. Mainly in the cotrell precipitator

11:45 Test started

2:45 Test over.

Did not do any flue inspections today

DATA FOR COKE PLANT BATTERY "B" - TRW - EPA - MRI TESTS.

COKE OVEN GAS 9/20/79

	%
CO_2	2.4
Ill.	4.0
O_2	1.2
CO	4.6
H_2	52.4
CH_4	26.6
N_2	8.8

Gross heating value = 535 BTU/cf.
Net heating value = 482 BTU/cf.

COKE OVEN GAS 9/21/79

	%
CO_2	2.6
Ill.	3.8
O_2	1.4
CO	4.6
H_2	48.4
CH_4	25.0
N_2	14.2

Gross heating value = 501 BTU/cf.
Net heating value = 452 BTU/cf.

Coal and Coke Analysis - 9/20/79

Item	%VM	%FC	%Ash	%Sulf.
Coke	1.9	87.4	10.7	0.74
Petroleum Coke	11.8	88.1	0.1	1.87
Sunnyside Coal	40.4	52.8	6.8	1.22
Coal Basin	24.6	68.2	7.2	0.62
York Canyon	36.2	56.2	7.5	0.45
Coal Mix	32.9	60.4	6.7	0.84

Coal Mix by % (Aim) →30% Sunnyside, 41% York Canyon, 21% Coal Basin 8% Petroleum Coke

Coal and Coke Analysis - 9/21/79

Item	%VM	%FC	%Ash	%Sulf.
Coke	1.4	88.2	10.4	0.75
Petroleum Coke	10.8	89.1	0.1	1.85
Sunnyside Coal	39.0	54.1	6.9	1.20
Coal Basin	----------Lost Sample ----------			
York Canyon	36.4	55.8	7.8	0.44
Coal Mix	32.3	60.8	6.9	0.88

Coal Mix by % (Aim) ⟶30% Sunnyside, 41% York Canyon, 21% Coal Basin and 8% Petroleum Coke

OVEN PAN AND BATTERY CROSSWALL TEMPERATURES

READER: HARTMAN DATE: 9-20 TIME: 8:45 AM

"A" BATTERY FLUE TEMPERATURES				Wall No.	"B" BATTERY FLUE TEMPERATURES				Wall No.	WALL NUMBER	WALL NUMBER
PUSHER SIDE		COKE SIDE			PUSHER SIDE		COKE SIDE				
39	36	46	31	1	28	48	30	39	51	PS 51 B	PS 52
xxx	31	xxx	32	2	xxx	34	xxx	32	52	1 24	04
28	xxx	34	xxx	3	33	xxx	35	xxx	53	2 37	14
38	29	29	19	4	45	40	35	45	54	3 45	33
xxx	24	xxx	21	5	xxx	58	xxx	50	55	4 49	36
40	xxx	26	xxx	6	57	xxx	41	xxx	56	5 44	42
50	95	11	01	7	48	36	42	36	57	6 56	48
xxx	21	xxx	29	8	xxx	35	xxx	43	58	7 2600	50
30	xxx	22	xxx	9	25	xxx	24	xxx	59	8 2610	49
32	38	35	31	10	21	16	20	36	60	9 62	49
xxx	34	xxx	30	11	xxx	22	xxx	25	61	10 61	45
31	xxx	30	xxx	12	38	xxx	69	N/A	62	11 60	44
05	20	18	31	13	28	26	07	09	63	12 50	
xxx	26	xxx	30	14	xxx	25	xxx	41	64	13 35	13
40	xxx	31	xxx	15	25	xxx	41	xxx	65	14 22	14 C
23	23	26	30	16	25	32	27	25	66	CS	CS
xxx	22	xxx	21	17	xxx	35	xxx	25	67	14 COAL	14 A
28	xxx	27	xxx	18	50	xxx	29	xxx	68	13	13 L
06	90	24	90	19	50	39	40	34	69	12 15	12 38
xxx	95	xxx	95	20	xxx	35	xxx	13	70	11 35	11 37
95	xxx	08	xxx	21	29	xxx	17	xxx	71	10 41	10 38
31	25	18	32	22	49	45	32	49	72	9 40	9 45
xxx	25	xxx	30	23	xxx	40	xxx	40	73	8 28	8 42
26	xxx	13	xxx	24	96	xxx	22	xxx	74	7 26	7 39
97	08	00	32	25	95	03	99	25	75	6 16	6 29
xxx	31	xxx	20	26	xxx	38	xxx	32	76	5 07	07
99	xxx	14	xxx	27	18	xxx	31	xxx	77	4 41	4 95
13	96	16	30	28	24	35	28	28	78	3 41	3 19
xxx	86	xxx	00	29	xxx	14	xxx	23	79	2 42	2 30
23	xxx	19	xxx	30	97	D-38	02	xxx	80	1 29	1 15
34	30	01	23	31	96	19	95	17	81	REMARKS:	
xxx	38	xxx	24	32	xxx	10	xxx	17	82		
01	xxx	02	xxx	33	01	xxx	97	xxx	83		
35	64	74	50	34	17	35	86	27	84		
271	275	"A" 244	276		346	325	"B" 320	317			
27-3		2260			2335		2319				

COKE OVEN SPAN AND BATTERY CROSSWALL TEMPERATURES
F-1043 P-1

READER: O.J DATE: 9-20-79 TIME: 6:45

"A" Pusher Side		Wall No.	"A" Coke Side		"B" Pusher Side		Wall No.	"B" Coke Side	
28		1	36		31		51	11	
xxx	39	2	xxx	32	xxx	37	52	xxx	27
	39	3		27		42	53		39
14	xxx	4	13	xxx	34	xxx	54	32	xxx
36		5	22		42		55	40	
xxx	27	6	xxx	11	xxx	41	56	xxx	40
	30	7		07		08	57		05
31	xxx	8	15	xxx	95	xxx	58	98	xxx
94		9	97		23		59	20	
xxx	83	11	xxx	88	xxx	33	61	xxx	28
	22	12		33		22	62		34
38	xxx	13	20	xxx	21	xxx	63	37	xxx
33		14	30		14		64	19	
xxx	23	15	xxx	24	xxx	17	65	xxx	36
	23	16		26		17	66		23
13	xxx	17	18	xxx	25	xxx	67	07	xxx
92		18	00		26		68	01	
xxx	23	19	xxx	31	xxx	25	69	xxx	11
	32	21		24		23	71		31
33	xxx	22	20	xxx	07	xxx	72	28	xxx
22		23	23		18		73	18	
xxx	17	24	xxx	15	xxx	24	74	xxx	16
	20	25		15		46	75		24
19	xxx	26	24	xxx	33	xxx	76	23	xxx
02		27	08		42		77	32	
xxx	80	28	xxx	80	xxx	33	78	xxx	45
	66	29		78		25	79		00
72	xxx	31	85	xxx	24	xxx	81	05	xxx
12		32	17		17		82	14	
xxx	29	33	xxx	22	xxx	31	83	xxx	26
	20	34		24		19	84		24
27	xxx	35	18	xxx	91	xxx	85	12	xxx
88		36	87		72		86	74	
xxx	03	37	xxx	13	xxx	76	87	xxx	77
	24	38		12		10	88		06
96	xxx	39	78	xxx	17	xxx	89	25	xxx
99		41	02		26		91	24	
xxx	92	42	xxx	20	xxx	18	92	xxx	12
	85	43		88		14	93		10
12	xxx	44	13	xxx	SMK	D-39	94	00	xxx
33		45	31		80		95	77	
xxx	28	46	xxx	16	xxx	07	96	xxx	99
	24	47		09		02	97		83
83	xxx	48	85	xxx	86	xxx	98	89	xxx
60		49	58		21		99	28	
	51	50		1480		40	100		29
265	270	"A"	233	243	295	287	"B"	274	299
2268			2238		2291			2288	

	Wall Number 97		Wall Number 98
PS		PS	
1	50	1	50
2	—	2	—
3	88	3	67
4	95	4	71
5	74	5	79
6	82	6	76
7	02	7	86
8	04	8	90
9	02	9	89
10	83	10	83
11	83	11	85
12	87	12	88
13	81	13	97
14	86	14	90
CS		CS	
14	96	14	90
13	01	13	90
12	10	12	91
11	09	11	91
10	98	10	90
9	96	9	93
8	83	8	85
7	83	7	89
6	88	6	83
5	85	5	81
4	23	4	91
3	70	3	84
2	57	2	73
1	45	1	58

Wall Throttled - Coke pushed on west side of wall only

Walls [illegible] No Coke [illegible]

REMARKS:

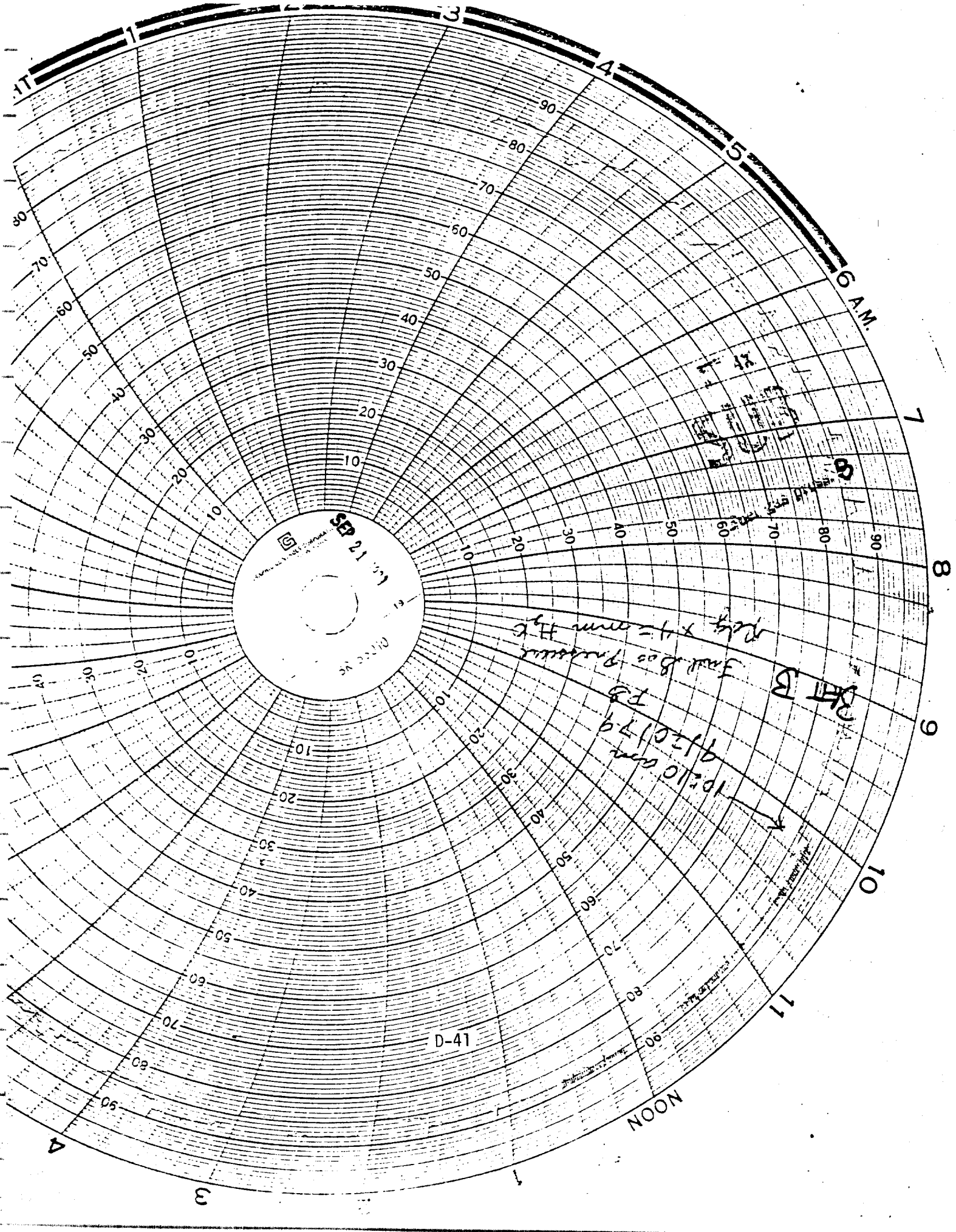
COKE OVEN SPAN AND BATTERY CROSSWALL TEMPERATURES

READER: MARSCHIEDER DATE: 9-21 TIME: 1:45 PM

"A" BATTERY FLUE TEMPERATURES						"B" BATTERY FLUE TEMPERATURES					
PUSHER SIDE		Wall No.	COKE SIDE			PUSHER SIDE		Wall No.	COKE SIDE		
34		1	33			45		51	13		
xxx	29	2	xxx	33		xxx	45	52	xxx	33	
	30	3		26			37	53		35	
14	xxx	4	17	xxx		40	xxx	54	34	xxx	
32		5	26			12		55	41		
xxx	23	6	xxx	14		xxx	26	56	xxx	38	
	28	7		15			30	57		31	
28	xxx	8	16	xxx		37	xxx	58	15	xxx	
10		9	27			31		59	32		
xxx	95	10	xxx	04		xxx	29	61	xxx	22	
	24	12		30			32	62		39	
23	xxx	13	17	xxx		23	xxx	63	26	xxx	
37		14	39			14		64	19		
xxx	34	15	xxx	33		xxx	99	65	xxx	27	
	26	16		30			15	66		21	
27	xxx	17	30	xxx		26	xxx	67	10	xxx	
03		18	13			20		68	04		
xxx	18	19	xxx	25		xxx	17	69	xxx	27	
	31	21		28			19	71		26	
34	xxx	22	26	xxx		25	xxx	72	34	xxx	
24		23	20			22		73	26		
xxx	33	24	xxx	31		xxx	23	74	xxx	15	
	35	25		23			12	75		02	
19	xxx	26	18	xxx		36	xxx	76	20	xxx	
1		27	12			44		77	35		
xxx	75	28	xxx	20		xxx	33	78	xxx	29	
	72	29		02			28	79		10	
23	xxx	31	99	xxx		23	xxx	81	10	xxx	
26		32	27			13		82	19		
xxx	30	33	xxx	22		xxx	14	83	xxx	18	
	32	34		37			34	84		42	
31	xxx	35	28	xxx		08	xxx	85	27	xxx	
41		36	93			76		86	95		
xxx	90	37	xxx	15		xxx	17	87	xxx	95	
	24	38		13			23	88		25	
93	xxx	39	75	xxx		18	xxx	89	26	xxx	
00		41	09			21		91	19		
xxx	94	42	xxx	26		xxx	27	92	xxx	16	
	38	43		99			26	93		41	
21	xxx	44	27	xxx		15	D-40	94	16	xxx	
41		45	34			96		95	81		
xxx	30	46	xxx	17		xxx	15	96	xxx	17	
	35	47		20			4	97		08	
94	xxx	48	02	xxx		87	xxx	98	00	xxx	
07		49	69			28		99	32		
	57	51		62			38	101		33	
279	275		236	253		287	248		246	228	
22	72		22	45		22	-8		22	37	

WALL NUMBER		WALL NUMBER	
PS	34	PS	35
1	10	1	BLOCKED
2	14	2	
3	15	3	19
4	27	4	25
5	2	5	27
6	32	6	30
7	32	7	31
8	32	8	27
9	32	9	30
10	31	10	35
11	28	11	35
12	28	12	34
13	33	13	34
14	2	14	33
CS		CS	
14	36	14	33
13	37	13	33
12	37	12	34
11	39	11	34
10	36	10	36
9	38	9	31
8	36	8	33
7	36	7	28
6	30	6	24
5	27	5	22
4	24	4	23
3	10	3	19
2	24	2	25
1	20	1	15

REMARKS:


6 A.M.
7
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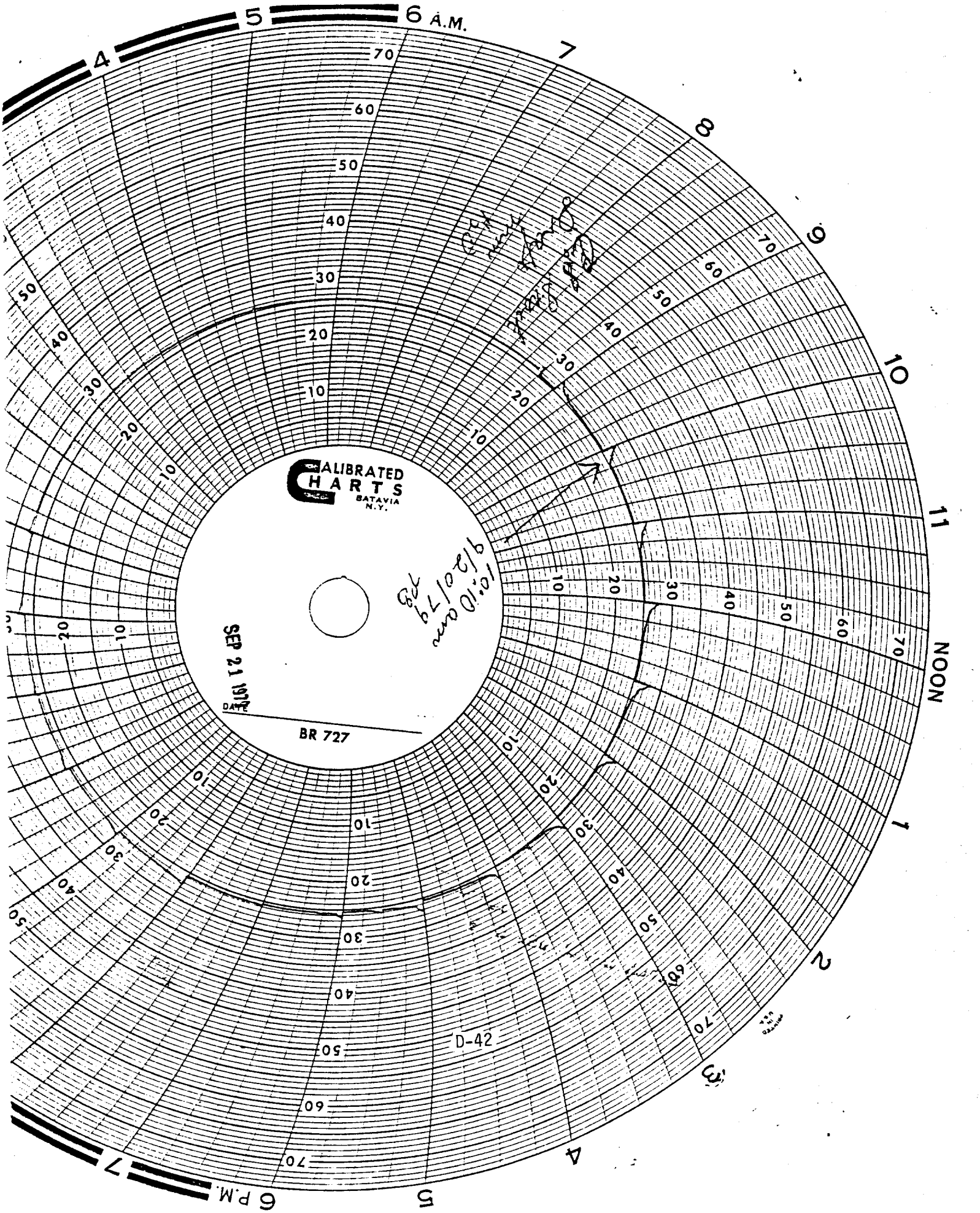
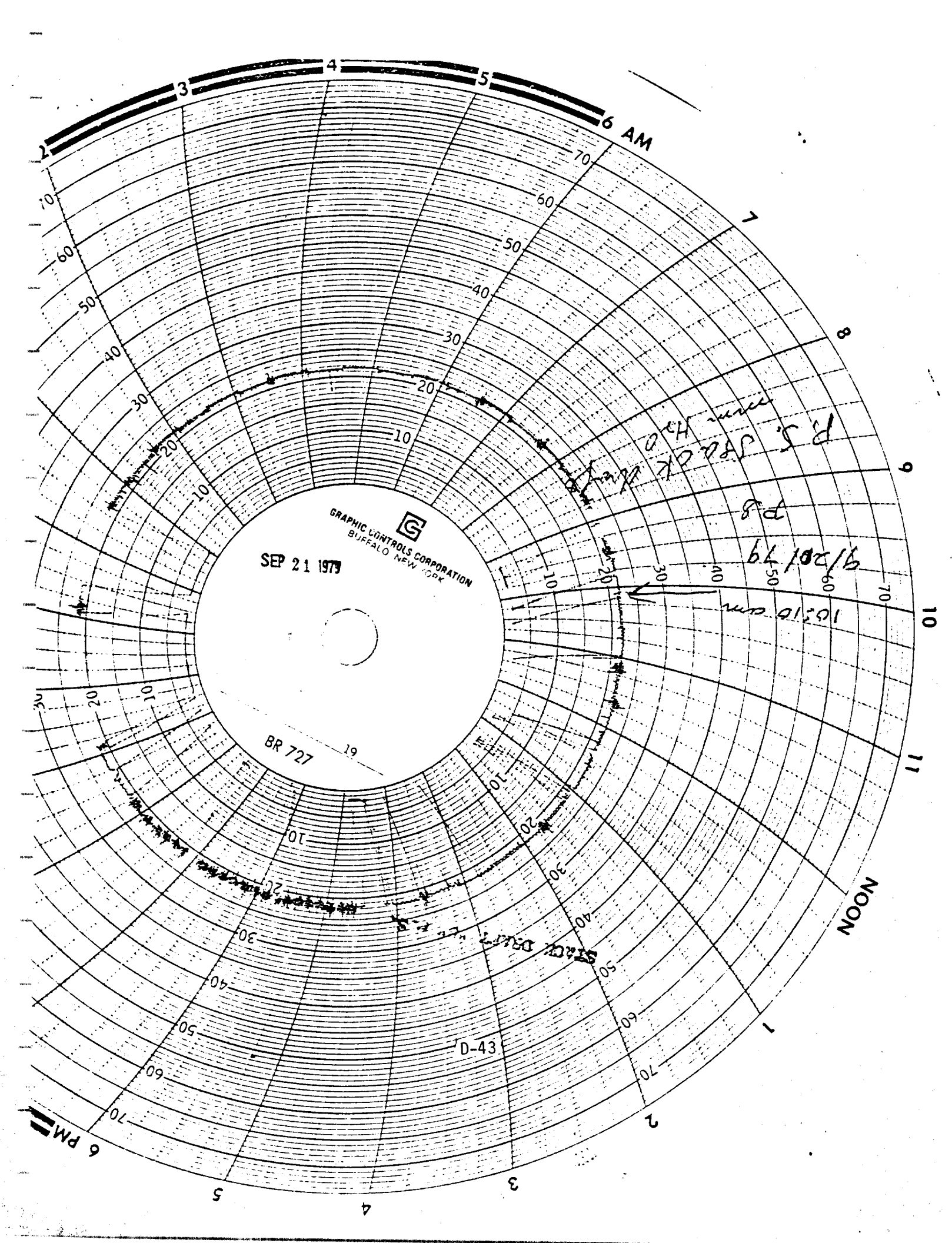
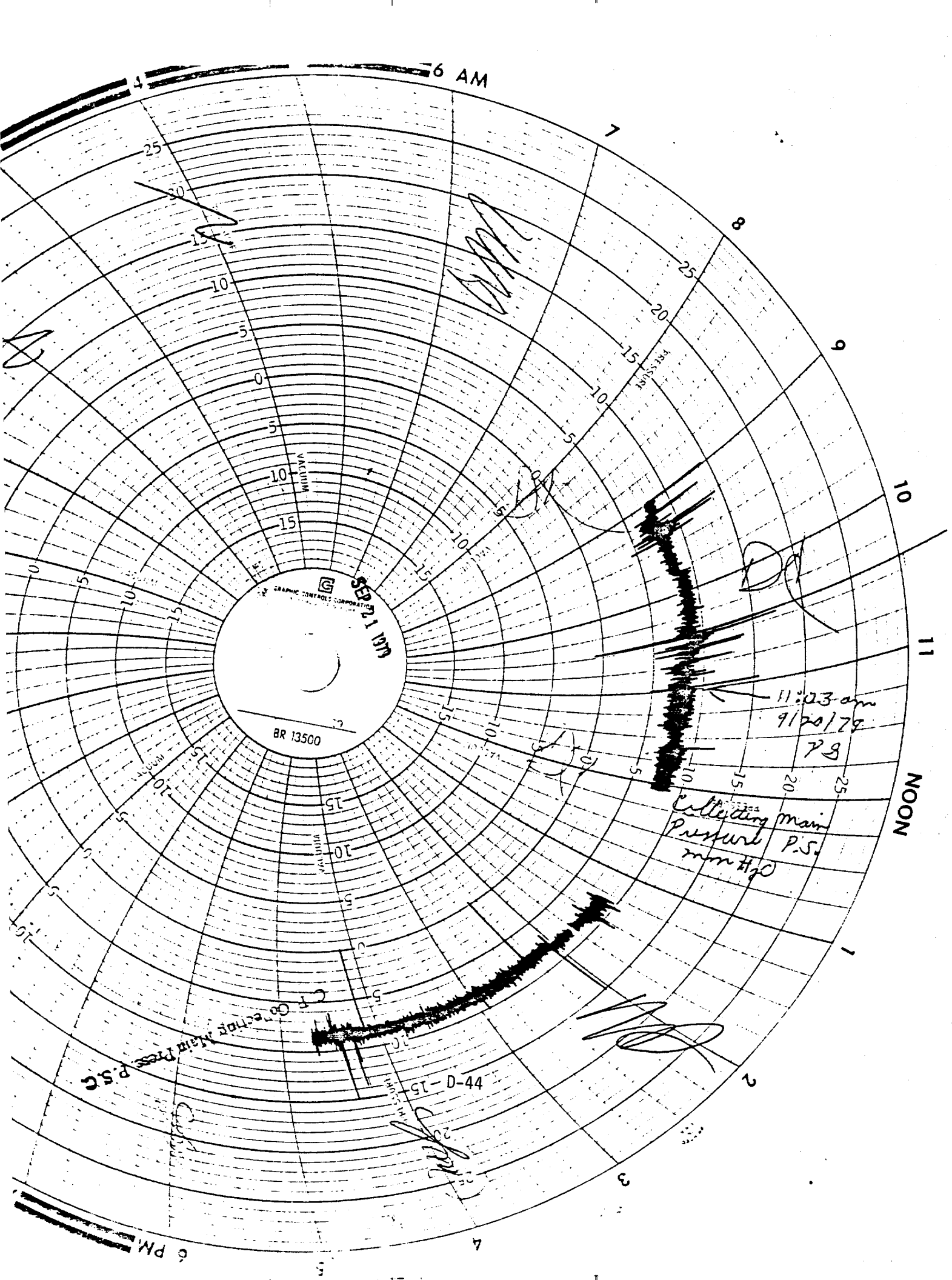
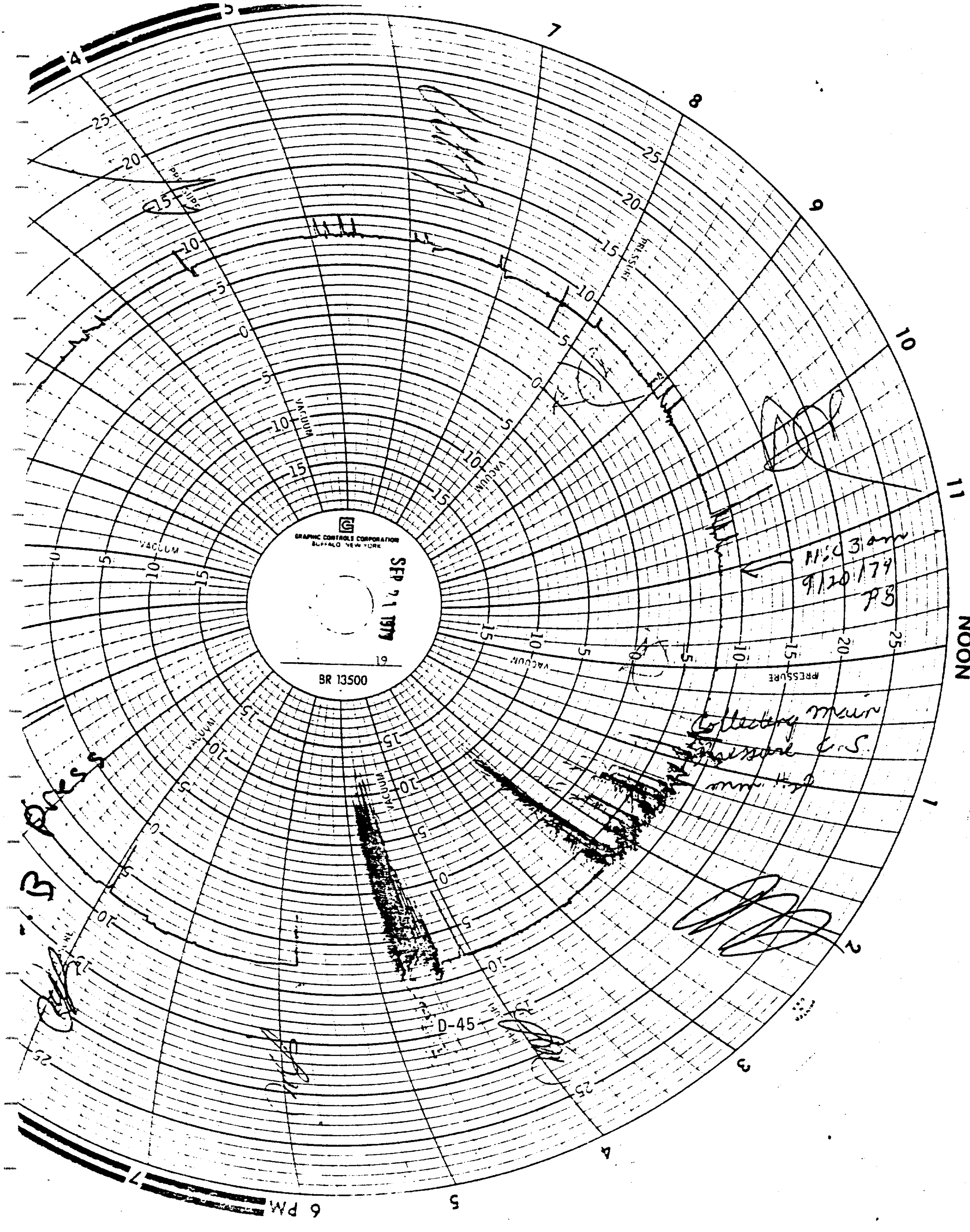
11
NOON
1
2
3
4
D-41


CALIBRATED CHARTS BATAVIA N.Y.
DATE SEP 21 1978
BR 727
D-42
6 A.M.
NOON
6 P.M.


GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
SEP 21 1979
BR 727
19
D-43
6 AM
NOON
6 PM


6 AM
NOON
6 PM
SEP 21 1979
BR 13500
11:23 am
9/20/79
P.S.
Collecting main
Pressure P.S.
mm H2O
D-44



GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
SEP 21 1979
BR 13500
D-45
NOON
6 PM
PRESSURE
VACUUM
MSC 3 am
9/20/79
PS
Collecting main
pressure C.S.
mm H2O
B Press

TEST NO. 2 (EPA Method 5 only) *

September 21, 1979

* Note - The Method 5 test on 9/19/79 (Test No. 2) was invalid. Therefore, it was re-run on 9/21/79.

Page 1 of ___

Fri
Date 9/21/79
Plant Name Kaiser Steel
Location Fontana Co.
Battery No. B

COKE OVEN BATTERY LOG SHEET

Test No. 2 – Method 5

Oven Pushing Data			Oven Charging Data		
Oven No.	Time Pushed	Push Greenness*	Oven No.	Time Charged/ Level	Comments
81 ~~31~~	missed reading	–	81	10:13 am	no ovens charged before start of test, which was ~ 9:45 am.
91	10:11 am	3	91 Not charged		Life smoke for while for carbon burnout
53	10:50	2	53	11:00	
63	10:55	3	63	11:14	
73	11:04	1	73	11:25	
93	11:19	3	93	11:40	
	No other pushing or charging		prior		
	to end of test at 12:00				

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

Friday
Date: 4/21/74

Heater Room

[Time]	Stack Draft mm H_2O			Fuel Press. mm H_2O	Temperatures °C						Comm. Selector Main Pressure	
					Prehtr		Waste Ht		Cell Man			
	P.S.	C.S	Manometer		After	Before	P.S	C.S	P.S.	C.S	P.S	C[illegible]
Noon	.22	.26	19	3.52	40	40	274	270	78	80	7.5	7.0
.35	.22	.26	NR	3.46	41	41	273	263	86	85	8.5	8.[illegible]
1:00	.22	.26	19	3.52	41	42	273	264	84	86	8.0	8.0

Note; Fuel Gas Flowmeter was being bypassed — No Readings

Date - Friday 9/21/79

Filter Instruments

Time	Manometers, in. w.c. Compartment 1	2	3	4	5	Total ΔP in. w.c.	Inlet Temp °F	Inlet Draft -mm H_2O	Fan Load amps	Tra... % C... Cut...
9:30 am	5.1	4.7	4.3	5.1	3.8	7.6	480	29	20	11
10:55	5.3	4.9	4.4	5.2	3.4	8.0	480	29	20	16
11:50	5.7	5.1	4.7	5.6	4.2	Pump reading - cleaning cycle started				
12:15	5.0	4.6	4.1	5.0	3.6	7.5	480	27	19	11

Friday

Notes — Date: 9/21/79

Run No 2 - Method 5

Test No 2 was originally supposed to be done last Wed (9/19/79) However, per notes, the method 5 test was invalid. Therefore, test No 2 will be carried out today

9:00 am Checked all process instruments. Fuel gas pressure was a little lower than yesterday but they are at max fuel gas flow. Therefore, we will proceed with test

9:00 am B filter had just started a cleaning cycle. Finished at 9:35

9:30 am / 12:30 pm Put dust bucket under dust discharge chute from B+C filter. Removed " " " ", Collected 1.1 lbs of dust ←

10:00 am Checked all the No 7 flues C.S. Could not see any leaks. Same on P.S.

Note: Test started approx 9:45 am

11:00 am Seeing some visible emissions from C stack

11:50 B filter started a cleaning cycle

12:08 Checked flues on back walls of No 73 oven (Note that No 74 is on empty oven
#10 Wall 73 back legs flues C.S.
#1+2 " " P.S. had obvious leaks (Same as #74 wall)
Other than those above, all flues looked good (no leaks)

Note: Test finished about 12:00

DATA FOR COKE PLANT BATTERY "B" - TRW - EPA - MRI TESTS.

COKE OVEN GAS
9/20/79

	%
CO_2	2.4
Ill.	4.0
O_2	1.2
CO	4.6
H_2	52.4
CH_4	26.6
N_2	8.8

Gross heating value = 535 BTU/cf.
Net heating value = 482 BTU/cf.

COKE OVEN GAS
9/21/79

	%
CO_2	2.6
Ill.	3.8
O_2	1.4
CO	4.6
H_2	48.4
CH_4	25.0
N_2	14.2

Gross heating value = 501 BTU/cf.
Net heating value = 452 BTU/cf.

Coal and Coke Analysis - 9/20/79

Item	%VM	%FC	%Ash	%Sulf.
Coke	1.9	87.4	10.7	0.74
Petroleum Coke	11.8	88.1	0.1	1.87
Sunnyside Coal	40.4	52.8	6.8	1.22
Coal Basin	24.6	68.2	7.2	0.62
York Canyon	36.2	56.2	7.5	0.45
Coal Mix	32.9	60.4	6.7	0.84

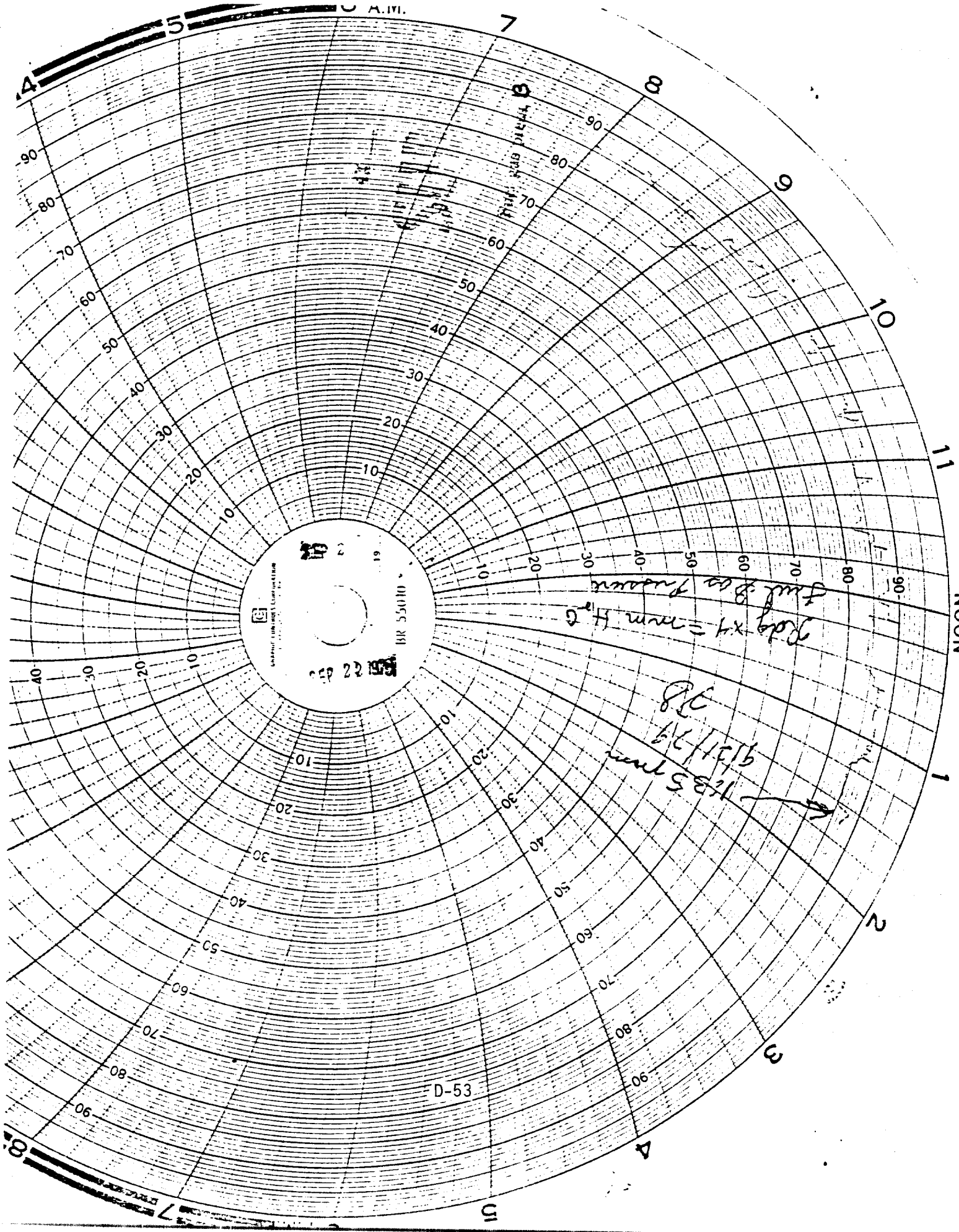
Coal Mix by % →30% Sunnyside, 41% York Canyon, 21% Coal Basin
(Aim) 8% Petroleum Coke

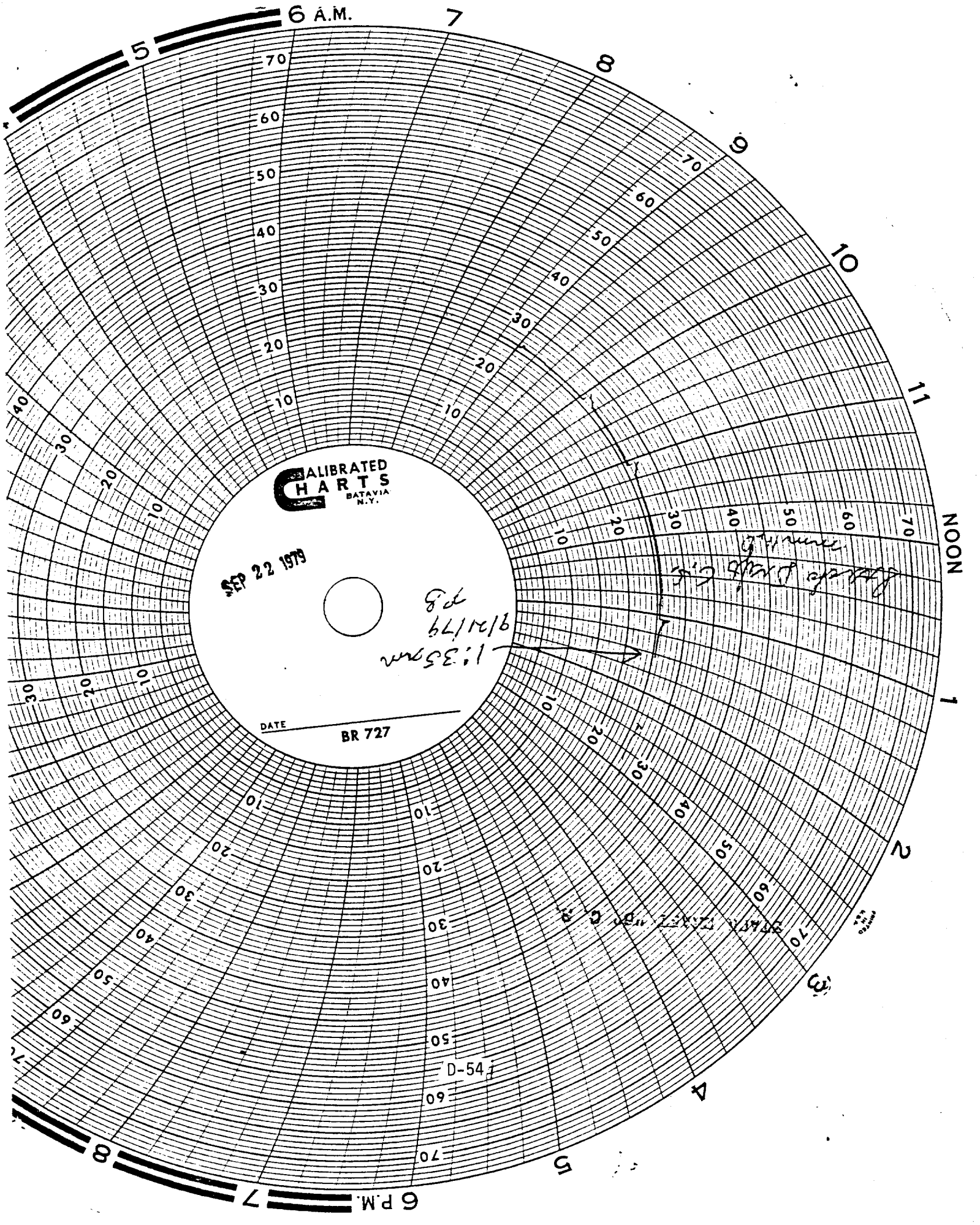
Coal and Coke Analysis - 9/21/79

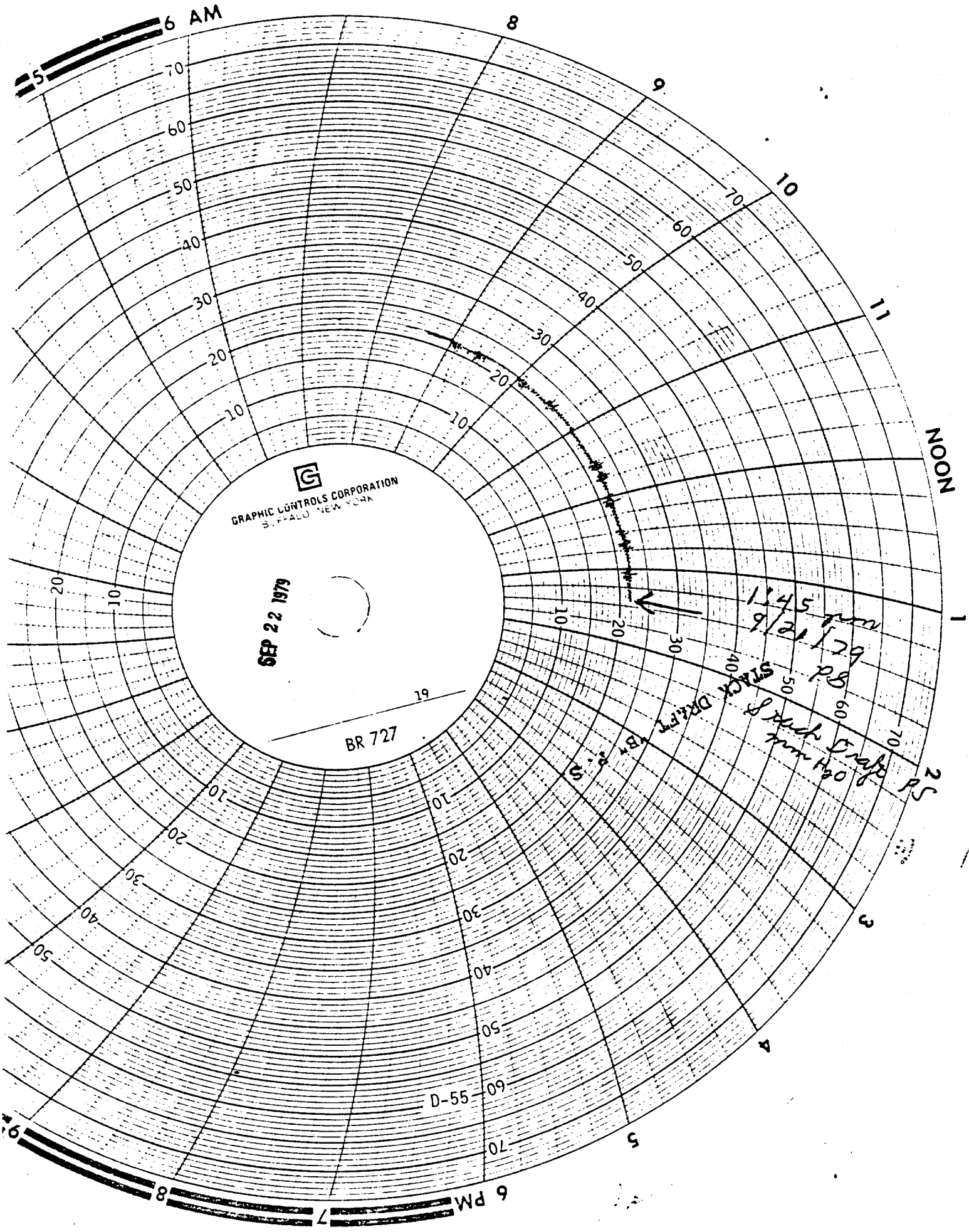
Item	%VM	%FC	%Ash	%Sulf.
Coke	1.4	88.2	10.4	0.75
Petroleum Coke	10.8	89.1	0.1	1.85
Sunnyside Coal	39.0	54.1	6.9	1.20
Coal Basin	----------Lost Sample ----------			
York Canyon	36.4	55.8	7.8	0.44
Coal Mix	32.3	60.8	6.9	0.88

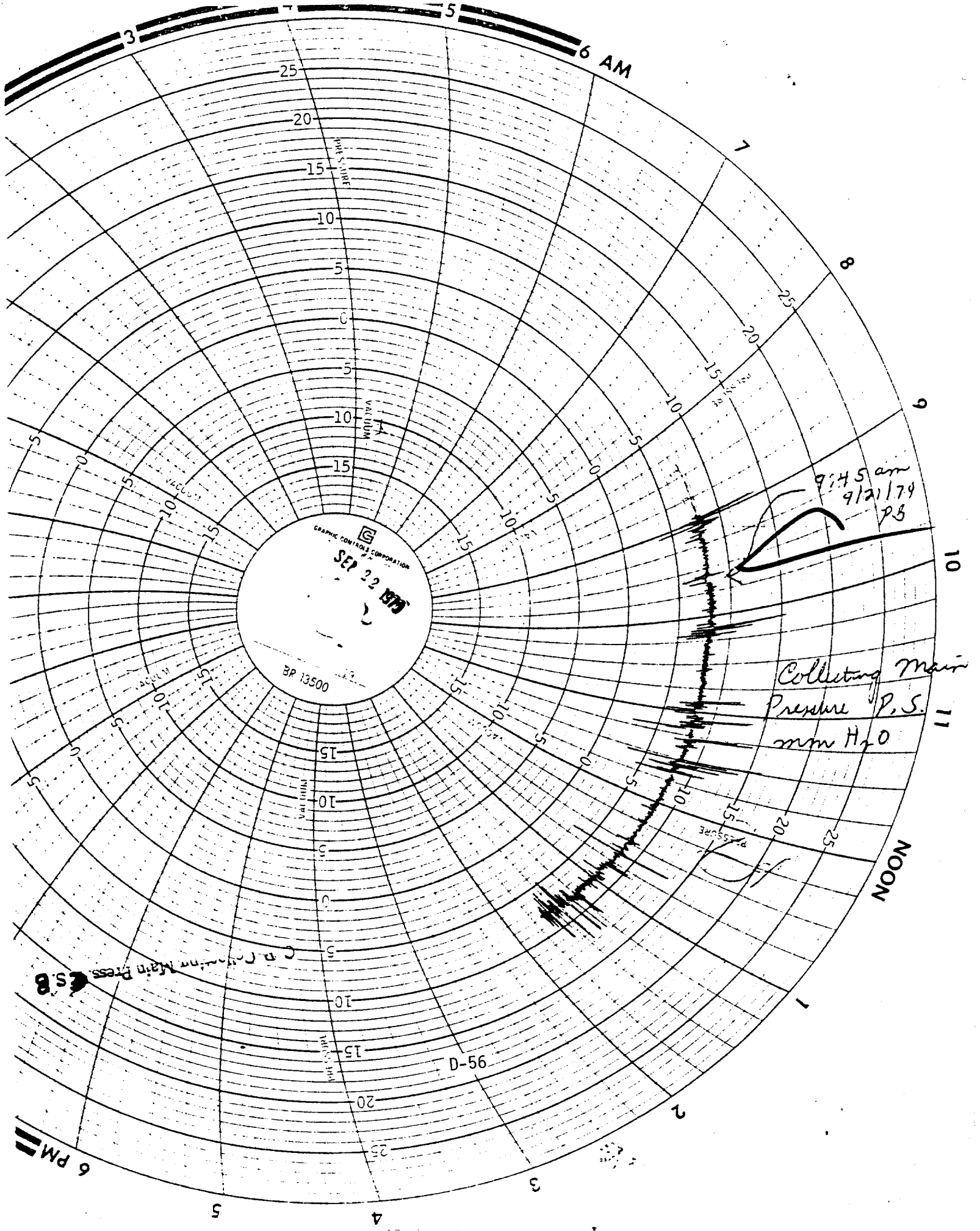
Coal Mix by % →30% Sunnyside, 41% York Canyon, 21% Coal Basin
(Aim) and 8% Petroleum Coke

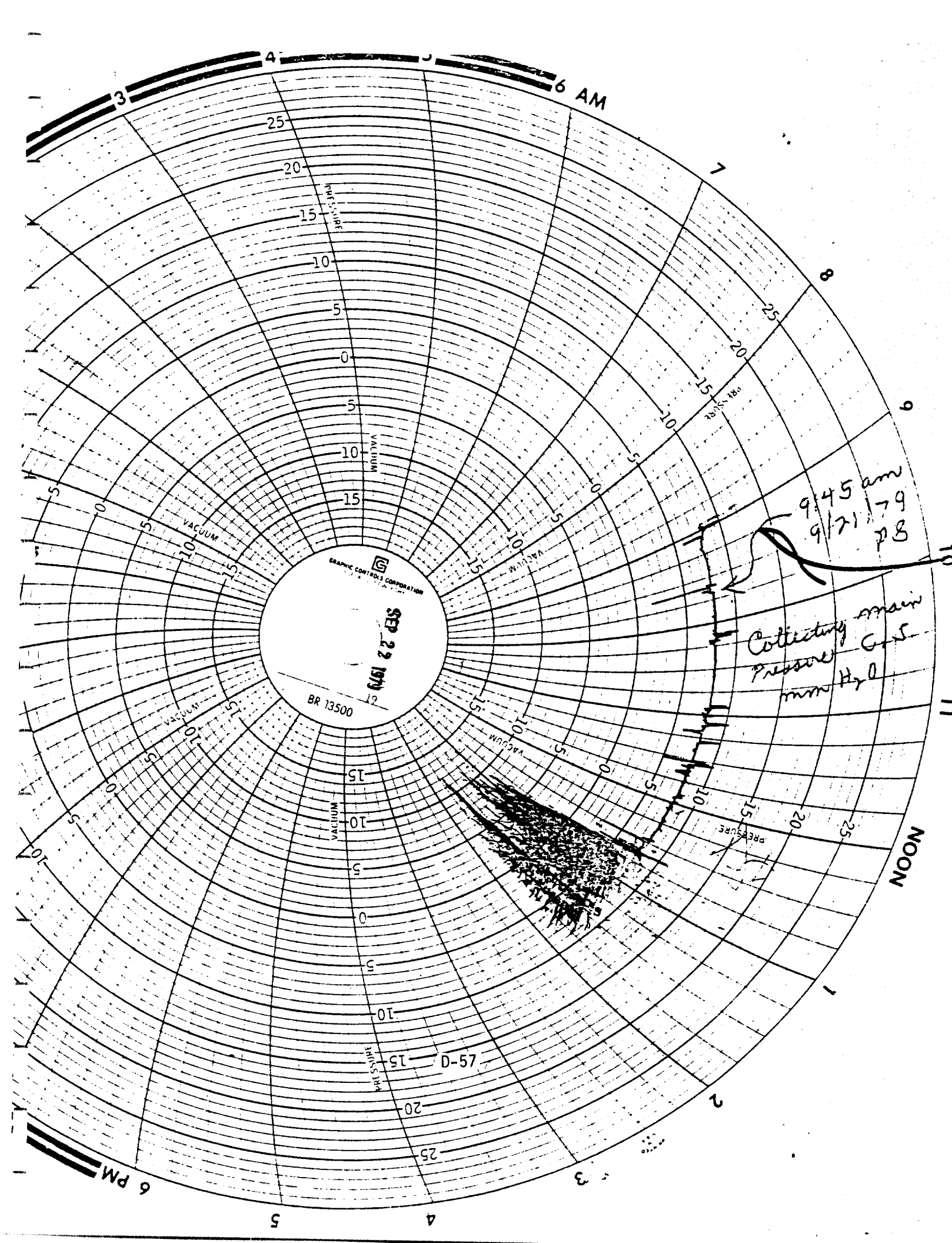
Battery temperature record for ~~S~~ 8-4 life on 9/21/79 was not available.


A.M.
NOON
D-53


6 A.M.
7
8
9
10
11
NOON
1
2
3
4
5
6 P.M.
7
8
5
CALIBRATED CHARTS BATAVIA N.Y.
SEP 22 1979
DATE
BR 727
D-54


6 AM
NOON
6 PM
GRAPHIC CONTROLS CORPORATION
SEP 22 1979
19
BR 727
D-55
STACK DRAFT
1145 hrs
9/22/79
PS
Stack Draft
mm H2O


6 AM
7
8
9
10
11
NOON
1
2
3
4
5
6 PM
9:45 am
9/21/79
PB
Collecting Main
Pressure P.S.
mm H2O
SEP 22
BP 13500
D-56


6 AM
NOON
6 PM
9:45 am
9/21-9
PB
Collecting main
Pressure 6.5
mm Hg
SEP 22 1979
BR 13500
D-57
GRAPHIC CONTROLS CORPORATION
VACUUM
PRESSURE