E. & J. GALLO WINERY

Modesto, California

October 2, 1992

Mr. Simeon Bugay
San Joaquin Valley Unified APCD
1999 Tuolumne St., Suite 200
Fresno, CA 93721

Dear Mr. Bugay,

We have completed the burner retrofit project at Gallo Winery, Fresno that is described in Authority To Construct #3030140101, #3030140104, #3030140105, and #3030140106. Source tests have been conducted and were observed by Jovencio Refuerzo, a representative of the SJVUAPCD. Results of those source tests are enclosed.

Please arrange for a final inspection of the project in order that we may obtain a Permit to Operate.

If you need anything further, please contact me at (209) 579-4217.

Sincerely,

E. & J. Gallo Winery

Dave Wolf
Project Manager

cc: B. Slayton
J. Stout
J. Fraga

ZIP CODE 95353 TELEPHONE (209) 579-3111

GALLO WINERY

Fresno Plant
Boilers #1, #2, #3. & #4
Emissions Compliance Testing
Test Dates: April 30,
May 18 & 19, 1992

Source Test results for the retrofit of the above boilers. E. J. Gallo, requests that their PtoO's be issued.

BEST ENVIRONMENTAL, INC.
15890 Foothill Boulevard
San Leandro, California 94578
(510) 278-4011 FAX (510) 278-4018

June 3, 1992

Gallo Winery
P.O. Box 1130
Modesto, CA 95353

To: Mr. Dave Wolf

Subject: Compliance Emissions Testing on boilers #1, #2, #3 & #4

Test Date: April 30, May 18 & 19, 1992.

Sampling Location: Outlet stacks of boilers #1, #2, #3 & #4 located at the Gallo Winery facility in Fresno, CA.

Sampling Personnel: Sherman Smith ,Tracy Prevo and Dan Ashlin of BEST ENVIRONMENTAL.

Observing Personnel: Jovencio Refuerzo of the Fresno County Air Pollution Control District.

Test Program: Boiler emissions were continuously monitored for CO, O2, CO2, Total Hydrocarbons (THC), Total Non-Methane Hydrocarbons (TNMHC) and NOx concentration for three 40 minute periods with calibrations done before and after each test. Volumetric flowrate was calculated using fuel rate information provided by the plant gas meter. Traverses were performed only on boiler #2 to validate the flowrate calculated by fuel usage. Traverses were not performed on the other boilers due to poor access and/or inadequate port distance from upstream disturbances.

Sampling Methods: The following Source Test Methods of the US Environmental Protection Agency (EPA) and California Air Resources Board (CARB) were used:

EPA Method 19	Flowrate Determination By Fuelrate
Method 1-100	NOx, O2, CO2, THC, and CO
Method 1-4	Volumetric Flowrate Determination

New Address!!!!!!

BEST ENVIRONMENTAL

15890 Foothill Boulevard

San Leandro, CA 94578

(510) 278-4011 Fax (510) 278-4018

Date: 10/7/92

Job: _____

From: Craig Thiry

To: Gary Martin

Company: SJVUAPCD

Fax #: (209) 233-2057

Comments: I just talked with Sherman Smith. The traverse that was completed on boiler #2 was done approximately 6" above the economizer. It is not hard to get a 20% variation when the sampling location that is available does not even meet the minimum criteria for traverse location. This is why we believe the flowrate from fuelrate was the most accurate data we collected.

DISREGARD THE REST, GO WITH BEST!!!!

Craig

Total # pages = 1 (including cover sheet)

Original Being Mailed Yes___ No✓

STACK VOLUMETRIC FLOWRATE DETERMINATION

Date 4.30.92 Client Gallo (Fresno) Operators SS/DA
Time 1220 Barometric (Pb) Static
Location Boiler #2 O-Kt Pressure 29.34 Pressure -.04
Pitot Factor .84 Stack/Duct dimen. 58.5" ID.
CO2% 10.1 Stack Area(As) 18.66 ft²
O2% 3.3 Round duct=π r² ÷ 144 (radius in inches)
H2O% 16.2

Velocity Traverse Data Remarks

Port ID & Pnt#	Inches f.wall w/port	Time	Delta P	Stack Temp	sqrt. ΔP
1	4.7		.34	330°	.583
2	7.4		.42		.648
3	10.4		.46		.678
4	13.7		.34		.583
5	18.1		.27		.520
6	24.3		.19		.436
7	46.8		.10		.316
8	47.6		.10		.316
9	52.9		.12		.346
10	55.1		.17		.412
11	58.1		.17		.412
12	60.8		.15		.387
1			.43	332°	.656
2			.45		.671
3			.43		.656
4			.38		.616
5			.33		.574
6			.28		.529
7			.15		.387
8			.11		.Y00
9			.33		.574
10			.38		.616
11			.40		.632
12			.42		.648
Averages					.523

Stack Gas Velocity @ Stack conditions (feet per second)

Vs = 85.49 x (Cp) x sqrt ΔP avg. x sqrt[Tsavgx460/PsxMWs]

Where,
Vs=velocity stack
Cp=pitot factor
Ts=Stack Temperature
Ps=Stack pressure
MWs=Molecular Wt.gas

where,
MWs=MWd x(1-Bwo)+18(Bwo)

MWd=.44(%CO2)+.32(%O2) +.28(%CO+%N2)

Bwo=%moisture/100
Ps=static/13.6 + Pb

Stack Gas Volume at Standard Conditions
Qs = SDCFM

Qs=60(1-Bwo) x Vsavg x As x (528/Tsavg(460) x (Ps/29.92)

MW=

Vs= 36.761

Qs= 22,811.6
19,182.5 lb/fuel rate

Notes/Comments Does not meet 8/12 criteria

New Address!!!!!!

BEST ENVIRONMENTAL

15890 Foothill Boulevard

San Leandro, CA 94578

(510) 278-4011 Fax (510) 278-4018

Date: 10/7/92

Job: _____

From: Craig Thiry

To: Gary Martin

Company: SJVUAPCD

Fax #: (209)233-2057

Comments: Traverse sheet follows for [illegible]

Our normal operating procedure is to include all data in the appendix. This should have been included.

I have contacted Eric Betterman of AV Hydrotech who was on site at this testing site. You will probably be hearing from him.

Please keep me informed of your decisions on the sampling program.

Thanks,

Craig

DISREGARD THE REST, GO WITH BEST!!!!

Total # pages = 2 **(including cover sheet)**

Original Being Mailed **Yes**___ **No** ✓

Instrumentation:

Horiba Model PIR-2000 CO2 Analyzer

Thermal Electron Model 48 CO Analyzer

Thermal Electron Model 10 NOx Analyzer

Combustion Eng. Model 8214TM Total Hydrocarbon Analyzer

Teledyne Model 326RA O2 Analyzer

Test Results: Tables 1 thru 4 presents the results of the compliance emissions testing. The summary table presents the results of all boilers and also includes the heat input of each boiler during the test period. The comparison of the pitot traverse and the volumetric flowrate calculated by fuel usage showed a variance of 18.9%. The difference can be attributed to significant flow variations observed during each point during the traverse. The fuel rate was deemed the most accurate and was used to calculate stack volumetric flowrate and pounds per hour for each boiler.

Field data sheets, calculations, strip chart recordings and calibration gas certifications are appended to this report.

If there are any questions concerning this report, please contact Craig Thiry or myself at (510)278-4011.

Submitted by,

Sherman Smith
Project Manager

Reviewed by,

Craig Thiry
Operations Manager

Table 1

Gallo Winery - Fresno

Unit #1

Emissions Test Results

TEST	1	2	3	AVERAGE
TEST LOCATION	OUTLET	OUTLET	OUTLET	
TEST DATE	5/19/92	5/19/92	5/19/92	
TEST TIME	1122-1202	1238-1318	1328-1408	
FLOWRATE, SDCFM	9920.3	9999.6	9963.0	9961.0
O2, %	2.8	2.9	2.8	2.8
CO2,%	10.65	10.2	10.25	10.4
H2O, %	16.6	16.5	16.5	16.5
NOx, ppm	21.0	21.4	21.6	21.3
NOx, ppm (@3% O2)	20.8	21.3	21.4	21.1
NOx, lbs/mmBTU	0.025	0.026	0.026	0.026
NOx, lbs/hr	1.495	1.536	1.544	1.525
CO, ppm	154.0	149.4	165.0	156.1
CO, ppm (@3% O2)	152.3	148.6	163.2	154.7
CO, lbs/mmBTU	0.113	0.110	0.121	0.114
CO, lbs/hr	6.673	6.526	7.181	6.793
THC, ppm	53.5	18.4	22.4	31.4
TNMHC, ppm	5.0	<1.0	<1.0	<2.3
TNMHC, lbs/mmBTU	0.0021	<0.0004	<0.0004	<0.0010
TNMHC, lbs/hr	0.124	<0.025	<0.025	<0.058

WHERE,

NOx = Oxides of Nitrogen
CO2 = Carbon Dioxide
CO = Carbon Monoxide
TNMHC = Total Non-methane Hydrocarbon
lbs/mmBtu = Pounds per Million Btu
ppm = Parts Per Million Concentration
lbs/hr = Pound Per Hour Emission Rate
F = 8740 (EPA F Factor for Natural Gas)

CALCULATIONS,

3% correction = (17.9/(20.9 - O2%)) x ppm of pollutant
lbs/hr = 1.56e-7 x SDCFM x ppm x Molecular Wgt. of pollutant
lbs/mmBtu = F x Molecular Wgt. x ppm x 2.59e-9 x (20.9/(20.9 - %O2))

Table 2

Gallo Winery - Fresno

Unit #2

Emissions Test Results

TEST	1	2	3	AVERAGE
TEST LOCATION	OUTLET	OUTLET	OUTLET	
TEST DATE	4/30/92	4/30/92	4/30/92	
TEST TIME	1110-1150	1203-1243	1317-1357	
FLOWRATE, SDCFM	19182.5	19182.5	19182.5	19182.5
O2, %	3.3	3.3	3.3	3.3
CO2, %	10.1	10.2	10.1	10.1
H2O, %	16.2	16.2	16.2	16.2
NOx, ppm	26.9	25.0	25.6	25.8
NOx, ppm (@3% O2)	27.4	25.4	26.0	26.3
NOx, lbs/mmBTU	0.033	0.031	0.032	0.032
NOx, lbs/hr	3.703	3.441	3.524	3.556
CO, ppm	140.3	133.0	115.8	129.7
CO, ppm (@3% O2)	142.7	135.3	117.8	131.9
CO, lbs/mmBTU	0.106	0.100	0.087	0.098
CO, lbs/hr	11.756	11.144	9.703	10.867
THC, ppm	4.0	6.0	3.0	4.3
TNMHC, ppm	1.0	2.0	1.0	1.3
TNMHC, lbs/mmBTU	0.0004	0.0009	0.0004	0.001
TNMHC, lbs/hr	0.048	0.096	0.048	0.064

WHERE,

NOx = Oxides of Nitrogen
CO2 = Carbon Dioxide
CO = Carbon Monoxide
TNMHC = Total Non-methane Hydrocarbon
lbs/mmBtu = Pounds per Million Btu
ppm = Parts Per Million Concentration
lbs/hr = Pound Per Hour Emission Rate
F = 8740 (EPA F Factor for Natural Gas)

CALCULATIONS,

3% correction = (17.9/(20.9 - O2%)) x ppm of pollutant
lbs/hr = 1.56e-7 x SDCFM x ppm x Molecular Wgt. of pollutant
lbs/mmBtu = F x Molecular Wgt. x ppm x 2.59e-9 x (20.9/(20.9 - %O2))

Table 3

Gallo Winery - Fresno

Unit #3

Emissions Test Results

TEST	1	2	3	AVERAGE
TEST LOCATION	OUTLET	OUTLET	OUTLET	
TEST DATE	5/18/92	5/18/92	5/18/92	
TEST TIME	1205-1245	1257-1337	1410-1450	
FLOWRATE, SDCFM	12477.3	12400.7	12300.0	12392.7
O2, %	3.8	3.8	3.9	3.8
CO2,%	9.3	9.3	9.6	9.4
H2O, %	15.7	15.7	15.7	15.7
NOx, ppm	24.0	24.0	24.0	24.0
NOx, ppm (@3% O2)	25.1	25.1	25.3	25.2
NOx, lbs/mmBTU	0.031	0.031	0.031	0.031
NOx, lbs/hr	2.149	2.136	2.118	2.134
CO, ppm	163.0	165.8	117.5	148.8
CO, ppm (@3% O2)	170.6	173.6	123.7	156.0
CO, lbs/mmBTU	0.126	0.128	0.092	0.115
CO, lbs/hr	8.884	8.981	6.313	8.059
THC, ppm	53.6	55.3	56.5	55.1
TNMHC, ppm	<1.0	<1.0	<1.0	<1.0
TNMHC, lbs/mmBTU	<0.0004	<0.0004	<0.0004	<0.0004
TNMHC, lbs/hr	<0.031	<0.031	<0.031	<0.031

WHERE,

NOx = Oxides of Nitrogen
CO2 = Carbon Dioxide
CO = Carbon Monoxide
TNMHC = Total Non-methane Hydrocarbon
lbs/mmBtu = Pounds per Million Btu
ppm = Parts Per Million Concentration
lbs/hr = Pound Per Hour Emission Rate
F = 8740 (EPA F Factor for Natural Gas)

CALCULATIONS,

3% correction = (17.9/(20.9 - O2%)) x ppm of pollutant
lbs/hr = 1.56e-7 x SDCFM x ppm x Molecular Wgt. of pollutant
lbs/mmBtu = F x Molecular Wgt. x ppm x 2.59e-9 x (20.9/(20.9 - %O2))

Table 4

Gallo Winery - Fresno

Unit #4

Emissions Test Results

TEST	1	2	3	AVERAGE
TEST LOCATION	OUTLET	OUTLET	OUTLET	
TEST DATE	5/18/92	5/18/92	5/18/92	
TEST TIME	1605-1655	1705-1745	1753-1833	
FLOWRATE, SDCFM	11875.6	11890.7	11912.6	11893.0
O2, %	3.6	3.6	3.6	3.6
CO2,%	9.5	9.45	9.4	9.5
H2O, %	15.9	15.9	15.9	15.9
NOx, ppm	20.0	19.9	20.0	20.0
NOx, ppm (@3% O2)	20.7	20.6	20.7	20.7
NOx, lbs/mmBTU	0.025	0.025	0.025	0.025
NOx, lbs/hr	1.704	1.698	1.710	1.704
CO, ppm	169.0	152.7	154.0	158.6
CO, ppm (@3% O2)	174.9	158.0	159.3	164.1
CO, lbs/mmBTU	0.129	0.117	0.118	0.121
CO, lbs/hr	8.766	7.931	8.013	8.237
THC, ppm	88.6	19.8	21.3	43.2
TNMHC, ppm	<1.0	1.5	<1.0	<1.2
TNMHC, lbs/mmBTU	<0.0004	0.0007	<0.0004	<0.0005
TNMHC, lbs/hr	<0.030	0.045	<0.030	<0.035

WHERE,

NOx = Oxides of Nitrogen
CO2 = Carbon Dioxide
CO = Carbon Monoxide
TNMHC = Total Non-methane Hydrocarbon
lbs/mmBtu = Pounds per Million Btu
ppm = Parts Per Million Concentration
lbs/hr = Pound Per Hour Emission Rate
F = 8740 (EPA F Factor for Natural Gas)

CALCULATIONS,

3% correction = (17.9/(20.9 - O2%)) x ppm of pollutant
lbs/hr = 1.56e-7 x SDCFM x ppm x Molecular Wgt. of pollutant
lbs/mmBtu = F x Molecular Wgt. x ppm x 2.59e-9 x (20.9/(20.9 - %O2))

Summary Table

Gallo Winery - Fresno

Units 1, 2, 3, & 4

Emissions Test Results

Boiler #	1	2	3	4
TEST LOCATION	OUTLET	OUTLET	OUTLET	OUTLET
TEST DATE	5/19/92	4/30/92	5/18/92	5/18/92
HEAT INPUT, mmBtu/hr	59.1	110.9	69.9	67.5
FLOWRATE, SDCFM	9961.0	19182.5	12392.7	11893.0
O2, %	2.8	3.3	3.8	3.6
CO2,%	10.4	10.1	9.4	9.5
H2O, %	16.5	16.2	15.7	15.9
NOx, ppm	21.3	25.8	24.0	20.0
NOx, ppm (@3% O2)	21.1	26.2	25.1	20.7
NOx, lbs/mmBTU	0.026	0.032	0.031	0.025
NOx, lbs/hr	1.523	3.551	2.134	1.707
CO, ppm	156.1	129.7	148.8	158.6
CO, ppm (@3% O2)	154.4	131.9	155.8	164.1
CO, lbs/mmBTU	0.114	0.098	0.115	0.121
CO, lbs/hr	6.792	10.867	8.055	8.239
THC, ppm	31.4	4.3	5.1	43.2
TNMHC, ppm	<2.3	1.3	<1.0	<1.2
TNMHC, lbs/mmBTU	<0.0010	0.0006	<0.0004	<0.0005
TNMHC, lbs/hr	<0.057	0.062	<0.031	<0.036

WHERE,

NOx = Oxides of Nitrogen, MW = 46
CO2 = Carbon Dioxide
CO = Carbon Monoxide, MW = 28
TNMHC = Total Non-methane Hydrocarbon, measured as CH4, MW = 16
lbs/mmBtu = Pounds per Million Btu
ppm = Parts Per Million Concentration
lbs/hr = Pound Per Hour Emission Rate
F = 8740 (EPA F Factor for Natural Gas)

CALCULATIONS,

3% correction = (17.9/(20.9 - O2%)) x ppm of pollutant
lbs/hr = 1.56e-7 x SDCFM x ppm x Molecular Wgt. of pollutant
lbs/mmBtu = F x Molecular Wgt. x ppm x 2.59e-9 x (20.9/(20.9 - %O2))

APPENDIX

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #1
Run 1

Date: 5/19/92

# cubic feet/rev	100	cubic feet
# of seconds/rev	19.67	seconds
Gas Line Pressure(PSIG)	30.1	pounds per square inch
Gas Line Pressure(PSIA)	44.8	pounds per square inch
Gross Calorific Value	1040	Btu / cubic foot
Stack Oxygen	2.8	%
Gas F-Factor	8740	SDCF/MMBtu
Gas Temperature (degrees F)	50.99	degrees
Realtime Fuel Rate(CFM)	**305.0**	**CFM**
Corrected Fuel Rate(SCFM)	**945.2**	**SCFM**
Million Btu per minute	**0.983**	**MMBtu/min**
Stack Gas Flowrate(SDCFM)	**9,920.3**	**SDCFM**
Heat Input (MMBtu/hour)	**59.0**	**MMBtu/HR**
Fuel Flowrate (SCFH)	**56,710**	**SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #1
Run 2

Date: 5/19/92

# cubic feet/rev	100 cubic feet
# of seconds/rev	19.56 seconds
Gas Line Pressure(PSIG)	30.0 pounds per square inch
Gas Line Pressure(PSIA)	44.7 pounds per square inch
Gross Calorific Value	1040 Btu / cubic foot
Stack Oxygen	2.9 %
Gas F-Factor	8740 SDCF/MMBtu
Gas Temperature (degrees F)	51.93 degrees
Realtime Fuel Rate(CFM)	**306.7 CFM**
Corrected Fuel Rate(SCFM)	**947.5 SCFM**
Million Btu per minute	**0.985 MMBtu/min**
Stack Gas Flowrate(SDCFM)	**9,999.6 SDCFM**
Heat Input (MMBtu/hour)	**59.1 MMBtu/HR**
Fuel Flowrate (SCFH)	**56,848 SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #1
Run 3

Date: 5/19/92

# cubic feet/rev	100 cubic feet
# of seconds/rev	19.5 seconds
Gas Line Pressure(PSIG)	30.0 pounds per square inch
Gas Line Pressure(PSIA)	44.7 pounds per square inch
Gross Calorific Value	1040 Btu / cubic foot
Stack Oxygen	2.8 %
Gas F-Factor	8740 SDCF/MMBtu
Gas Temperature (degrees F)	52.43 degrees
Realtime Fuel Rate(CFM)	**307.7 CFM**
Corrected Fuel Rate(SCFM)	**949.2 SCFM**
Million Btu per minute	**0.987 MMBtu/min**
Stack Gas Flowrate(SDCFM)	**9,963.0 SDCFM**
Heat Input (MMBtu/hour)	**59.2 MMBtu/HR**
Fuel Flowrate (SCFH)	**56,955 SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #2

Date: 4/30/92

# cubic feet/rev	100 cubic feet
# of seconds/rev	10.57 seconds
Gas Line Pressure(PSIG)	29.8 pounds per square inch
Gas Line Pressure(PSIA)	44.5 pounds per square inch
Gross Calorific Value	1040 Btu / cubic foot
Stack Oxygen	3.3 %
Gas F-Factor	8740 SDCF/MMBtu
Gas Temperature (degrees F)	42.8 degrees

Realtime Fuel Rate(CFM)	**567.6 CFM**
Corrected Fuel Rate(SCFM)	**1777.2 SCFM**
Million Btu per minute	**1.848 MMBtu/min**
Stack Gas Flowrate(SDCFM)	**19,182.5 SDCFM**
Heat Input (MMBtu/hour)	**110.9 MMBtu/HR**
Fuel Flowrate (SCFH)	**106,630 SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #3
Run 1

Date: 5/18/92

# cubic feet/rev	100	cubic feet
# of seconds/rev	16.47	seconds
Gas Line Pressure(PSIG)	29.9	pounds per square inch
Gas Line Pressure(PSIA)	44.6	pounds per square inch
Gross Calorific Value	1040	Btu / cubic foot
Stack Oxygen	3.8	%
Gas F-Factor	8740	SDCF/MMBtu
Gas Temperature (degrees F)	51.63	degrees
Realtime Fuel Rate(CFM)	**364.3**	**CFM**
Corrected Fuel Rate(SCFM)	**1124.1**	**SCFM**
Million Btu per minute	**1.169**	**MMBtu/min**
Stack Gas Flowrate(SDCFM)	**12,488.5**	**SDCFM**
Heat Input (MMBtu/hour)	**70.1**	**MMBtu/HR**
Fuel Flowrate (SCFH)	**67,447**	**SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #3
Run 2

Date: 5/18/92

# cubic feet/rev	100	cubic feet
# of seconds/rev	16.61	seconds
Gas Line Pressure(PSIG)	30.0	pounds per square inch
Gas Line Pressure(PSIA)	44.7	pounds per square inch
Gross Calorific Value	1040	Btu / cubic foot
Stack Oxygen	3.8	%
Gas F-Factor	8740	SDCF/MMBtu
Gas Temperature (degrees F)	51.71	degrees
Realtime Fuel Rate(CFM)	**361.2**	**CFM**
Corrected Fuel Rate(SCFM)	**1116.2**	**SCFM**
Million Btu per minute	**1.161**	**MMBtu/min**
Stack Gas Flowrate(SDCFM)	**12,400.7**	**SDCFM**
Heat Input (MMBtu/hour)	**69.7**	**MMBtu/HR**
Fuel Flowrate (SCFH)	**66,973**	**SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #4
Run 1

Date: 5/18/92

# cubic feet/rev	100 cubic feet
# of seconds/rev	17.07 seconds
Gas Line Pressure(PSIG)	29.9 pounds per square inch
Gas Line Pressure(PSIA)	44.6 pounds per square inch
Gross Calorific Value	1040 Btu / cubic foot
Stack Oxygen	3.6 %
Gas F-Factor	8740 SDCF/MMBtu
Gas Temperature (degrees F)	52.43 degrees
Realtime Fuel Rate(CFM)	**351.5 CFM**
Corrected Fuel Rate(SCFM)	**1081.5 SCFM**
Million Btu per minute	**1.125 MMBtu/min**
Stack Gas Flowrate(SDCFM)	**11,875.6 SDCFM**
Heat Input (MMBtu/hour)	**67.5 MMBtu/HR**
Fuel Flowrate (SCFH)	**64,888 SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #4
Run 2

Date: 5/18/92

# cubic feet/rev	100 cubic feet
# of seconds/rev	17.075 seconds
Gas Line Pressure(PSIG)	29.9 pounds per square inch
Gas Line Pressure(PSIA)	44.6 pounds per square inch
Gross Calorific Value	1040 Btu / cubic foot
Stack Oxygen	3.6 %
Gas F-Factor	8740 SDCF/MMBtu
Gas Temperature (degrees F)	51.63 degrees
Realtime Fuel Rate(CFM)	**351.4 CFM**
Corrected Fuel Rate(SCFM)	**1082.8 SCFM**
Million Btu per minute	**1.126 MMBtu/min**
Stack Gas Flowrate(SDCFM)	**11,890.7 SDCFM**
Heat Input (MMBtu/hour)	**67.6 MMBtu/HR**
Fuel Flowrate (SCFH)	**64,970 SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

VOLUMETRIC FLOWRATE BY FUEL RATE CALCULATIONS

GALLO - Fresno Unit #4
Run 3

Date: 5/18/92

# cubic feet/rev	100 cubic feet
# of seconds/rev	17.074 seconds
Gas Line Pressure(PSIG)	29.9 pounds per square inch
Gas Line Pressure(PSIA)	44.6 pounds per square inch
Gross Calorific Value	1040 Btu / cubic foot
Stack Oxygen	3.6 %
Gas F-Factor	8740 SDCF/MMBtu
Gas Temperature (degrees F)	50.95 degrees
Realtime Fuel Rate(CFM)	**351.4 CFM**
Corrected Fuel Rate(SCFM)	**1084.8 SCFM**
Million Btu per minute	**1.128 MMBtu/min**
Stack Gas Flowrate(SDCFM)	**11,912.6 SDCFM**
Heat Input (MMBtu/hour)	**67.7 MMBtu/HR**
Fuel Flowrate (SCFH)	**65,090 SCFH**

Calculations,

SCFM = (cfm x gas line pressure + 14.7) / 14.7
MMBTU/MIN = (SCFM x BTU/ft3) / 1,000,000
SDCFM = Gas F-Factor x MMBTU/Minute x (20.9/ 20.9 - stack 02)
SCFH = SCFM x 60
Heat Input = MMBtu/min x 60

BEST ENVIRONMENTAL
CONTINUOUS MONITOR DATA SHEET

Plant: Gallo - Fresno
Date: 4-30-92
Test Location: Unit # 2 Stack
Run Number: 1 2
Operator: SS/DA

Ambient Temperature:
Barometric Pressure: 29.64
Static Pressure Duct:
Fuel: Nat Gas
Number:

Time	Sample Point	Fuel Flow	Dry Uncorrected O_2 %	Dry Uncorrected CO_2 %	Dry Uncorrected CO ppm	Dry Uncorrected SO_2 ppm	Dry Uncorrected NO ppm	Dry Uncorrected NO_x ppm	3% O_2 Dry ppm	3% O_2 Dry NO_x ppm	Hydrocarbons THC	Hydrocarbons CH_4	Hydrocarbons Non CH_4	TOC ppm	CO2 ppm	VOC ppm	Comments
1110	cal		7.8	12.2	78.2			88.7			88.6						
1115			3.3	10.1	146			26			4.0						44.5 PSIA
1120			3.3	10.1	112			26.5			4.0						
1125			3.3	10.1	140			26.5			4.0						
1130			3.3	10.1	128			27			4.0	3.0	1.0				
1135			3.3	10.1	156			27			4.0						100ft³ 10.56
1140			3.3	10.1	154			27.0			4.0						10.60 } SEC.
1145			3.3	10.1	150			27.5			4.0						10.55 }
1150			3.3	10.1	136			28.0			4.0						
	AVG		3.3	10.1	(140.3)			26.9			4.0	3.0	1.0				~~19,182.5 scfm~~
	zero		0	.15	0			3.5			.02						19,182.5 scfm
	span		8.1	12.2	77.6			91.0			91.0						
1203	cal		7.8	12.2	78.2			88.7			86.6						
1208			3.2	10.2	150			25				4.0					
1213			3.2	10.2	124			25				4.0					
1218			3.2	10.2	140			25				4.0					
1223			3.3	10.2	134			25				4.0					
1228			3.3	10.2	122			25				4.0					
1233			3.1	10.2	140			25				4.0					
1238			3.2	10.2	138			25			6.0	4.0	2.0				
1243			3.3	10.2	118			25									
	AVG		3.3	10.2	(133)			25.0			6.0	4.0	2.0				
	zero		-0.05	[illegible]	0			1.0			0						
	span		7.8	12.3	78.1			88.0			86.6						

BEST ENVIRONMENTAL
CONTINUOUS MONITOR DATA SHEET

Plant Gallo-Fresno
Date 4-30-92
Test Location #2 Outlet
Run Number 3
Operator [illegible]/DA

Ambient Temperature
Barometric Pressure
Static Pressure Duct
Fuel
Number

Time	Sample Point	Fuel Flow	Dry Uncorrected O_2 %	Dry Uncorrected CO_2 %	Dry Uncorrected CO ppm	Dry Uncorrected SO_2 ppm	Dry Uncorrected NO ppm	Dry Uncorrected NO_x ppm	3% O_2 Dry ppm	3% O_2 Dry NO_x ppm	Hydrocarbons THC	Hydrocarbons CH_4	Hydrocarbons Non CH_4	TOC ppm	CO2 ppm	VOC ppm	Comments
1217	cal		7.8	12.2	78.2			[illegible]			86.6						
	1		3.2	10.1	112			25			3.0						
	2		3.2	10.1	124			25			3.0						
	3		3.3	10.1	117			25			3.0						
	4		3.3	10.1	108			25			3.0						
	5		3.3	10.1	113			26			3.0						
	6		3.3	10.1	128			26			3.0						
	7		3.3	10.1	106			26			3.0						
	8		3.3	10.1	118			26.5			3.0		1.0				
	AVG		3.3	10.1	115.8			25.6			3.0		1.0				
	zero		-0.1	0	-0.1			2.0			0						
	span		7.85	12.2	78.2			90			86.5						

STACK VOLUMETRIC FLOWRATE DETERMINATION

Date 4-30-92 client Gallo (Fresno) Operators SS/DA
Time 1220 Barometric (Pb) Static
Location Boiler #2 O-kt Pressure 29.34 Pressure -.04
Pitot Factor .84 Stack/Duct dimen. 58.5" ID.
CO2% 10.1 Stack Area(As) 18.665
O2% 3.3 Round duct=π r_2 ÷ 144 (radius in inches)
H2O% 16.2
Velocity Traverse Data Remarks

Port ID & Pnt#	Inches f.wall w/port	Time	Delta P	Stack Temp	sqrt. ^P
1	4.7		.34	330°	.583
2	4.4		.42		.648
3	10.4		.46		.632
4	13.9		.34		.583
5	18.1		.27		.520
6	24.3		.19		.436
7	46.3		.10		.316
8	47.6		.10		.316
9	51.6		.12		.346
10	55.1		.17		.412
11	58.1		.17		.412
12	60.8		.15		.387
1			.43	332°	.656
2			.45		.671
3			.43		.656
4			.38		.616
5			.33		.574
6			.28		.529
7			.15		.387
8			.16		.400
9			.33		.574
10			.38		.616
11			.40		.632
12			.42		.648
Averages					.523

Stack Gas Velocity @ Stack conditions (feet per second)

Vs = 85.49 x (Cp) x sqrt^p avg. x sqrt[Tsavgx460/PsxMWs]

Where,
Vs=velocity stack
Cp=pitot factor
Ts=Stack Temperature
Ps=Stack pressure
MWs=Molecular Wt.gas

where,
MWs=MWd x(1-Bwo)+18(Bwo)

MWd=.44(%CO2)+.32(%O2) +.28(%CO+%N2)

Bwo=%moisture/100
Ps=static/13.6 + Pb

Stack Gas Volume at Standard Conditions
Qs = SDCFM

Qs=60(1-Bwo) x Vsavg x As x (528/Tsavg+460) x (Ps/29.92)

MW=

Vs= 36.761

Qs= 22,811.6
19,182.5 by fuel rate

Notes/Comments Does not meet 8/2 criteria

BEST ENVIRONMENTAL
CONTINUOUS MONITOR DATA SHEET

Plant Gallo Fresno
Date 5/19/92
Test Location Blr #1 outlet
Run Number #1
Operator TP, RA

Ambient Temperature 78°
Barometric Pressure
Static Pressure Duct
Fuel
Number

200ft³ fuel in < 38 sec = full load

Time	Sample Point	Fuel Flow	Dry Uncorrected O_2 %	Dry Uncorrected CO_2 %	Dry Uncorrected CO ppm	Dry Uncorrected SO_2 ppm	Dry Uncorrected NO ppm	Dry Uncorrected NO_x ppm	3% O_2 Dry ppm	3% O_2 Dry NO_x ppm	Hydrocarbons THC	Hydrocarbons CH_4	Hydrocarbons Non CH_4	TOC ppm	CO_2 ppm	VOC ppm	Comments
1115	CAL		8.0	12.12	82.5			53.8			84						
1122			2.8	10.7	140			21.3			36	35	1				
1127			2.7	10.7	137			21.1			36						
1132			2.7	10.7	165			20.8			50						
1137			2.7	10.7	172			20.5			70						
1142			2.7	10.7	170			20.5			72						
1147			3.0	10.6	165			20.4			69	60	9				
1152			2.9	10.6	165			21.0			66						
1157			2.9	10.5	120			22.5			29						
1202																	
	AVG		(2.8	10.66	154.0)			(21.0)			(53.5		(.5)				
	ZERO		0	0	0			0			-1.0						
	CAL		8.0	12.4	87.1			87			84						
	Adj			12.2	87.6			88.6			84						

BEST ENVIRONMENTAL
CONTINUOUS MONITOR DATA SHEET

Plant Gallo Fresno
Date 5/19/92
Test Location Blr #1 out
Run Number 2
Operator TP, DA

Ambient Temperature
Barometric Pressure
Static Pressure Duct
Fuel
Number

Time	Sample Point	Fuel Flow	Dry Uncorrected O_2 %	Dry Uncorrected CO_2 %	Dry Uncorrected CO ppm	Dry Uncorrected SO_2 ppm	Dry Uncorrected NO ppm	Dry Uncorrected NO_x ppm	3% O_2 Dry ppm	3% O_2 Dry NO_x ppm	Hydrocarbons THC	Hydrocarbons CH_4	Hydrocarbons Non CH_4	TOC ppm	CO2 ppm	VOC ppm	Comments
1205	CAL		8.0	12.2	82.6			88.6			84						
1238	[illegible]		2.8	10.2	155			21.2			19						
1243	[illegible]		2.8	10.2	165			21.0			24						
1248	[illegible]		2.9	10.2	155			21.0			23	23	< 1				
1253	[illegible]		2.9	10.2	150			21.0			23						
1258	[illegible]		3.0	10.2	125			22.0			22						
1303	[illegible]		2.8	10.2	[illegible]	NS		22.0			11						
1308	[illegible]		2.8	10.2	145			21.8			12						
1313	[illegible]		3.0	10.2	155			21.0			13						
1318	[illegible]																
	Avg		<2.9	<10.2	<149.4			<21.4			<18.4		(<1)				
	zero		0	0	0			0			0						
	CAL		8.0	12.2	81.6			87			82						
	adj				82.6			88.4			84						

BEST ENVIRONMENTAL
CONTINUOUS MONITOR DATA SHEET

Plant Gallo Fresno
Date 5/19/92
Test Location Blr #1 out
Run Number 3
Operator TP, DA

Ambient Temperature
Barometric Pressure
Static Pressure Duct
Fuel
Number

2.12 ppm/div

Time	Sample Point	Fuel Flow	Dry Uncorrected O_2 %	Dry Uncorrected CO_2 %	Dry Uncorrected CO ppm	Dry Uncorrected SO_2 ppm	Dry Uncorrected NO ppm	Dry Uncorrected NO_x ppm	3% O_2 Dry ppm	3% O_2 Dry NO_x ppm	Hydrocarbons THC	Hydrocarbons CH_4	Hydrocarbons Non CH_4	TOC ppm	CO2 ppm	VOC ppm	Comments
1325	CAL		8.0	12.2	82.6			85.4		8	84						
328			2.9	10.2	165.2			21.5			25						
1333			2.8	10.2	180.0			21.4			25	25	<1				
1338			2.8	10.2	167.2			21.8			20						
1343			2.7	10.3	140.4			22.2			14						
1348			2.8	10.3	175.8			21.4			25						
1353			2.7	10.3	196.4			21.2			26						
1358			2.8	10.2	158.8			21.4			22	22	<1				
1403			2.9	10.2	146.1			21.5			22.5						
1408																	
	AVG		2.8	10.25	165.0			21.6			22.4		(<1)				
	Zero		0	0	0			0.3			0.5						
	Cal		8.0	12.2	82.1			87.5			83						
	Adj																
	Linear ✓				408												

Zip page 544-7625 #111

BEST ENVIRONMENTAL
CONTINUOUS MONITOR DATA SHEET

Plant Gallo - Fresno
Date 5/18/92
Test Location Unit #3 Stack
Run Number 1, 2
Operator TP, DA

Ambient Temperature
Barometric Pressure
Static Pressure Duct
Fuel Natl Gas
Number Horiba CO

Time	Sample Point	Fuel Flow	Dry Uncorrected O_2 %	Dry Uncorrected CO_2 %	Dry Uncorrected CO ppm	Dry Uncorrected SO_2 ppm	Dry Uncorrected NO ppm	Dry Uncorrected NO_x ppm	3% O_2 Dry ppm	3% O_2 Dry NO_x ppm	Hydrocarbons THC	Hydrocarbons CH_4	Hydrocarbons Non CH_4	TOC ppm	CO2 ppm	VOC ppm	Comments
1200	CAL		3.9	12.8	401			88			85						
1205			3.9	9.3	169			240			54						
1210			3.8	9.3	157			238			54	54	<1				
1215			3.8	9.3	164			23.9			54						
1220			3.7	9.4	165			24.0			55						
1225			3.9	9.3	170			23.8			55	55	<1				
1230			3.8	9.3	168			24.0			54						
1235			3.9	9.3	154			24.1			52						
1240			3.8	9.3	170			24.0			51	51	<1				
1245																	
	AVG		(3.8	9.3	163)			(24.0)			(53.6)		(<1)				
	Zero		0	0	18			0			0						
1250	Cal		3.9	12.8	415			88			84						
1257			3.9	9.3	159.4			24			52						
1302			3.9	9.3	156.7			24			53						
1307			3.8	9.3	161			24			55						
1312			3.7	9.3	167			24			56						
1317			3.7	9.3	172.8			24			56	56	<1				
1322			3.8	9.3	172.8			24			55						
1327			3.8	9.3	172			24			57						
1332			3.8	9.3	170			24			58						
1337																	
	Avg		(3.8	9.3	165.8)			(24)			(55.3		(<1)				
	Zero							0			1.0						
	Cal							88			82						

BEST ENVIRONMENTAL
CONTINUOUS (.ITOR DATA SHEET

Plant Gallo Fresno
Date 5/18/92
Test Location Unit 3 Stack
Run Number 3, 4
Operator TP, DA

Ambient Temperature
Barometric Pressure
Static Pressure Duct
Fuel Natl Gas
Number TECO CO

Time	Sample Point	Fuel Flow	Dry Uncorrected O_2 %	Dry Uncorrected CO_2 %	Dry Uncorrected CO ppm	Dry Uncorrected SO_2 ppm	Dry Uncorrected NO ppm	Dry Uncorrected NO_x ppm	3% O_2 Dry ppm	3% O_2 Dry NO_x ppm	Hydrocarbons THC	Hydrocarbons CH_4	Hydrocarbons Non CH_4	TOC ppm	CO2 ppm	VOC ppm	Comments
1400	Cal		7.9	12.12	82.7			88			84						
1410			3.9	9.6	118			24			59						
1415			3.9	9.6	118			24			57						
1420			3.9	9.6	120			24			56						
1425			3.9	9.6	112			24			54						
1430			3.9	9.6	122			24			56	56	<1				
1435			3.9	9.6	120			24			56						
1440			3.9	9.6	118			24			57						
1445			3.9	9.6	115			24			56						
1450																	
	Avg		(3.9)	(9.6)	(117.5)			(84.0)			(56.5)						
	Zero		0	0	0			0			-0.5						
	Cal		8.0	12.2	80.7			87.4			86						

BEST ENVIRONMENTAL
CONTINUOUS MONITOR DATA SHEET

Plant Gallo Fresno
Date 5/18/92
Test Location Unit #4, Stack
Run Number 1, 2
Operator TP, PA

Ambient Temperature
Barometric Pressure
Static Pressure Duct
Fuel
Number

.108 lb/MMBtu 2.81 ppm/lb/MMBtu

Time	Sample Point	Fuel Flow	Dry Uncorrected O_2 %	Dry Uncorrected CO_2 %	Dry Uncorrected CO ppm	Dry Uncorrected SO_2 ppm	Dry Uncorrected NO ppm	Dry Uncorrected NO_x ppm	3% O_2 Dry ppm	3% O_2 Dry NO_x ppm	Hydrocarbons THC	Hydrocarbons CH_4	Hydrocarbons Non CH_4	TOC ppm	CO2 ppm	VOC ppm	Comments
1600	CAL		8.0	12.5	83.2			88			86						
1605			3.6	9.5	180.3			20			65						
1610			3.7	9.5	178			20			69						
1615			3.7	9.5	—			20			102						
1620			3.6	9.5	—			20			79						
1625			3.6	9.5	162			20			80	80	<1				
1630			3.6	9.5	171			20			69						
1635			3.6	9.5	171			20			61						
1640			3.0	9.5	166			20			64						
1645			3.6	9.5	164			20			59						
1650	AMB		3.6	9.5	162			20			61						
1655	[illegible]																
	[illegible]		(3.6	9.5	169)			(20)			(86)		<1				
	ZERO		0	0	0			0			0						
	CAL		8.0	12.12	83.2			89.9			86						
	ADJ				82.6												

BEST ENVIRONMENTAL
CONTINUOUS (ITOR DATA SHEET

Plant Gallo Fresno
Date 5/18/92
Test Location Unit #4 Outlet
Run Number 2
Operator JP, DA

Ambient Temperature
Barometric Pressure
Static Pressure Duct
Fuel
Number

0.9N ppm/div

Time	Sample Point	Fuel Flow	Dry Uncorrected						3% O_2 Dry		Hydrocarbons			TOC ppm	CO2 ppm	VOC ppm	Comments
			O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	ppm	NO_x ppm	THC	CH_4	Non CH_4				
					82.6												
1900	CAL		8.0	12.12	~~89.2~~			87.3			86						
1705			3.6	9.5	150.8			20			20						
1710			3.5	9.5	155.4			20			20						
1715			3.6	9.5	153.6			20			20						
1720			3.6	9.5	155.4			20			20	18.5	1.5				
1725			3.5	9.4	155.4			20			19						
1730			3.6	9.4	150.8			19.8			19						
1735			3.6	9.4	149.0			19.8			20						
1740			3.6	9.4	150.9			19.8			20						
1745																	
	AVG		3.6	9.45	152.7			19.9			19.8		(1.5)				
	Zero		0	0	0			0			-1.0						
	Cal		8.0	12.1	82.6			87			82						
	Adj							88			84						

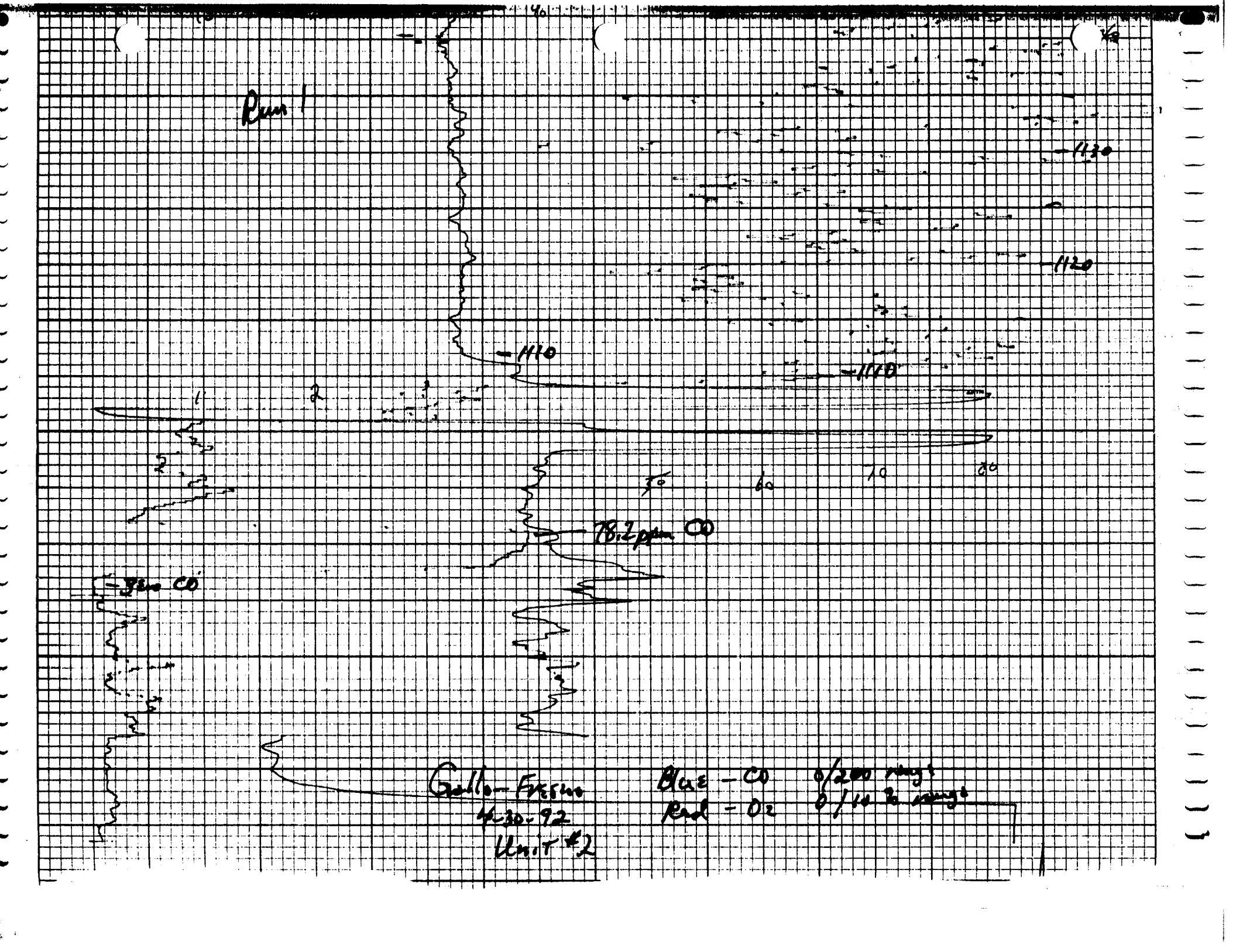
BEST ENVIRONMENTAL
CONTINUOUS (ITOR DATA SHEET

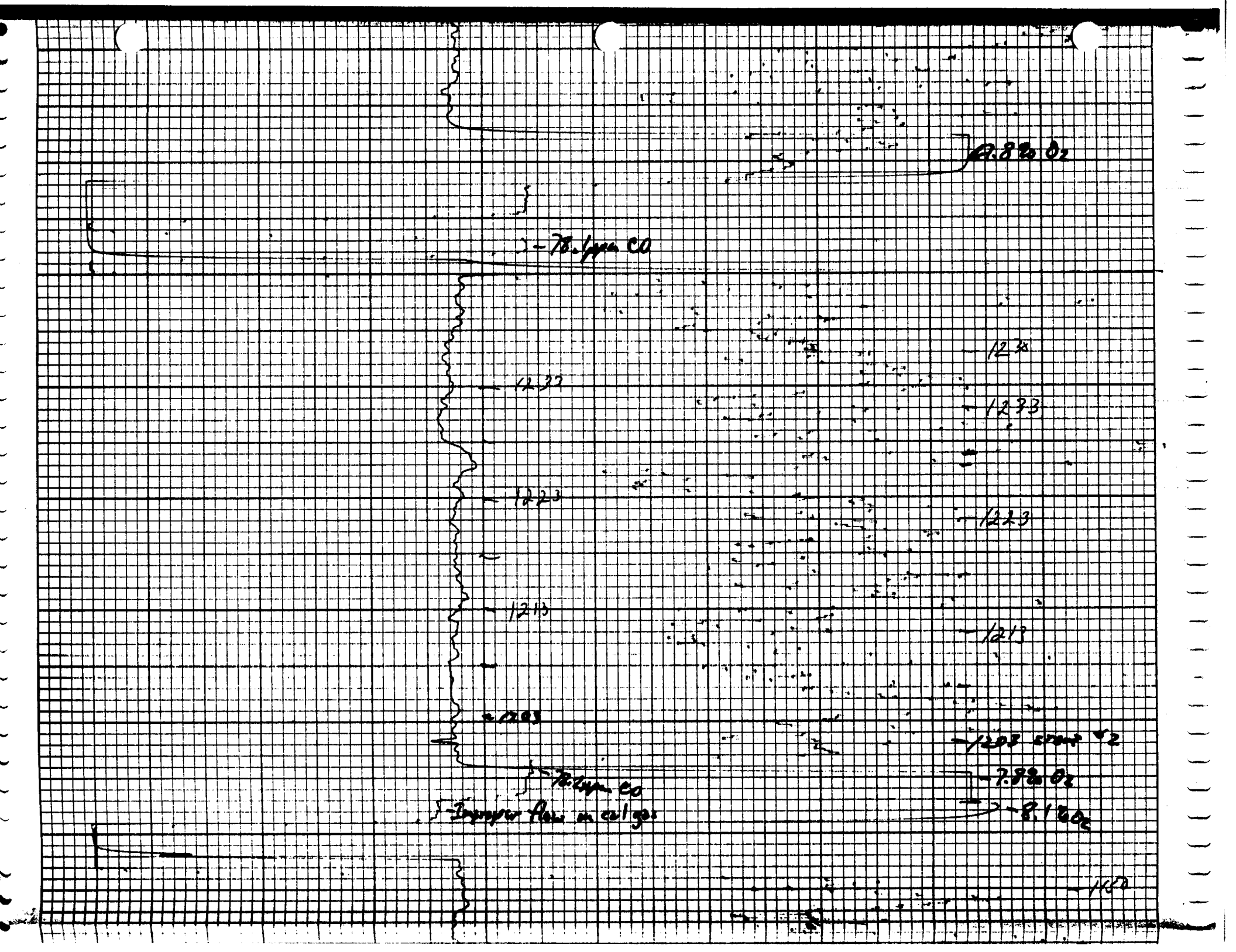
Plant Gallo Fresno
Date 5/18/92
Test Location Unit #4 Outlet
Run Number 3
Operator TP, DA

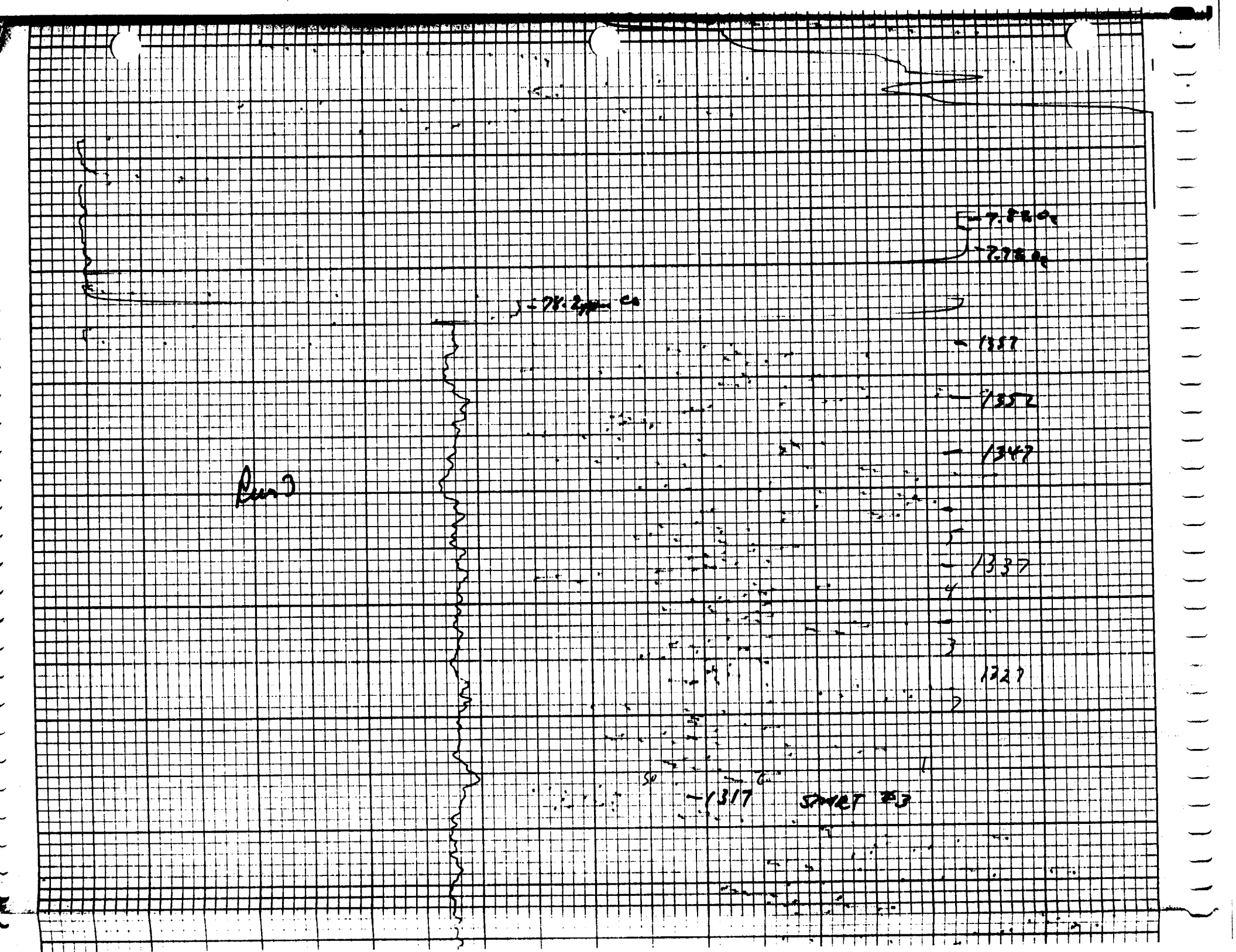
Ambient Temperature
Barometric Pressure
Static Pressure Duct
Fuel
Number

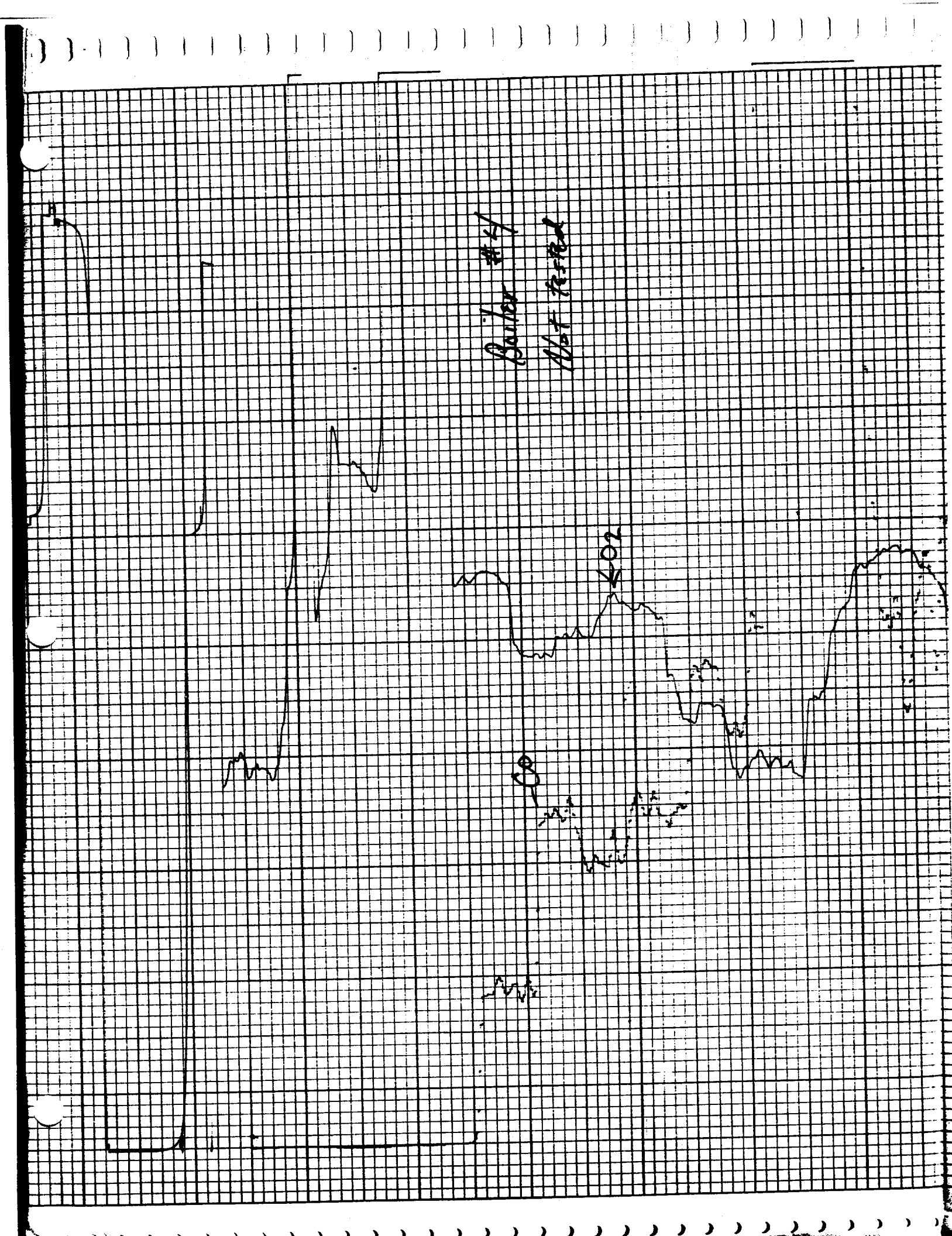
a.w. graphics

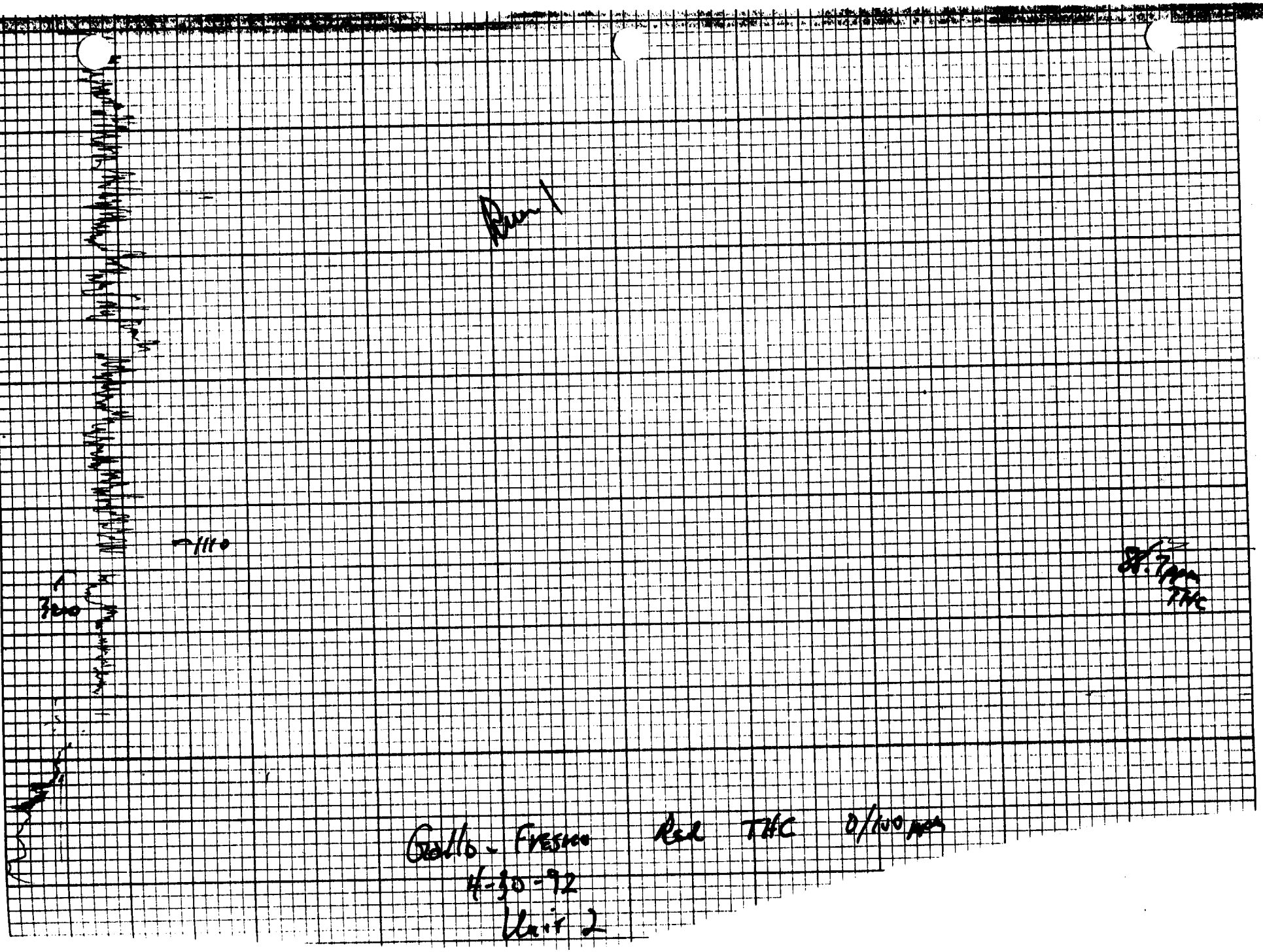
Time	Sample Point	Fuel Flow	Dry Uncorrected						3% O_2 Dry		Hydrocarbons			TOC ppm	CO2 ppm	VOC ppm	Comments
			O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	ppm	NO_x ppm	THC	CH_4	Non CH_4				
1755	CAL		8.0	12.1	82.6			88			84						
1753			3.5	9.4	156.4			20			22						
1758			3.6	9.4	157.3			20			23						
1803			3.6	9.4	158.2			20			23						
1808			3.6	9.4	153.6			20			21						
1813			3.6	9.4	155.0			20			21	21	<1				
1818			3.6	9.4	150.8			20			20						
1823			3.6	9.4	149.0			20			20						
1828			3.6	9.4	152.7			20			20						
1833																	
	AVG		(3.6	9.4	154.0)			(20)			(21.3)						
	Zero		0	0	0			-0.2			1.0						
	Cal		8.0	12.1	82.8			88.6			85						
	Adj																


Run 1
1120
1120
1110
1110
1
2
10
20
30
60
78.2 ppm CO
Gallon-Fresno
4-30-92
Unit #2
Blue - CO 0/200 range
Red - O2 0/10 % range


2.8% O2
78.1ppm CO
1233
1223
1213
1208 ppm CO
7.8% O2
8.1% O2


Run 3
1357
1352
1347
1337
1327
1317
START #3

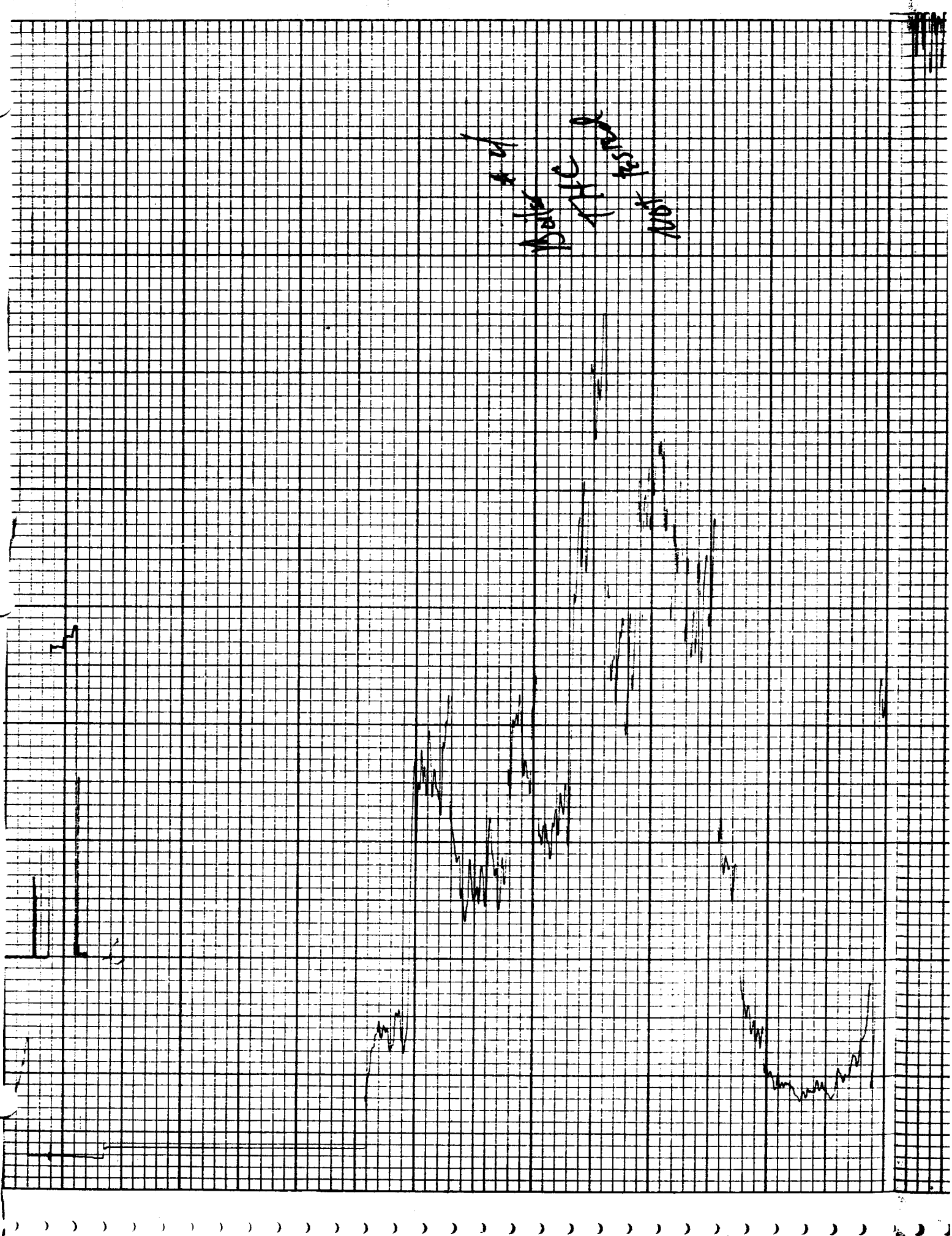

Baylor #1
Not Tested
CO2
O2

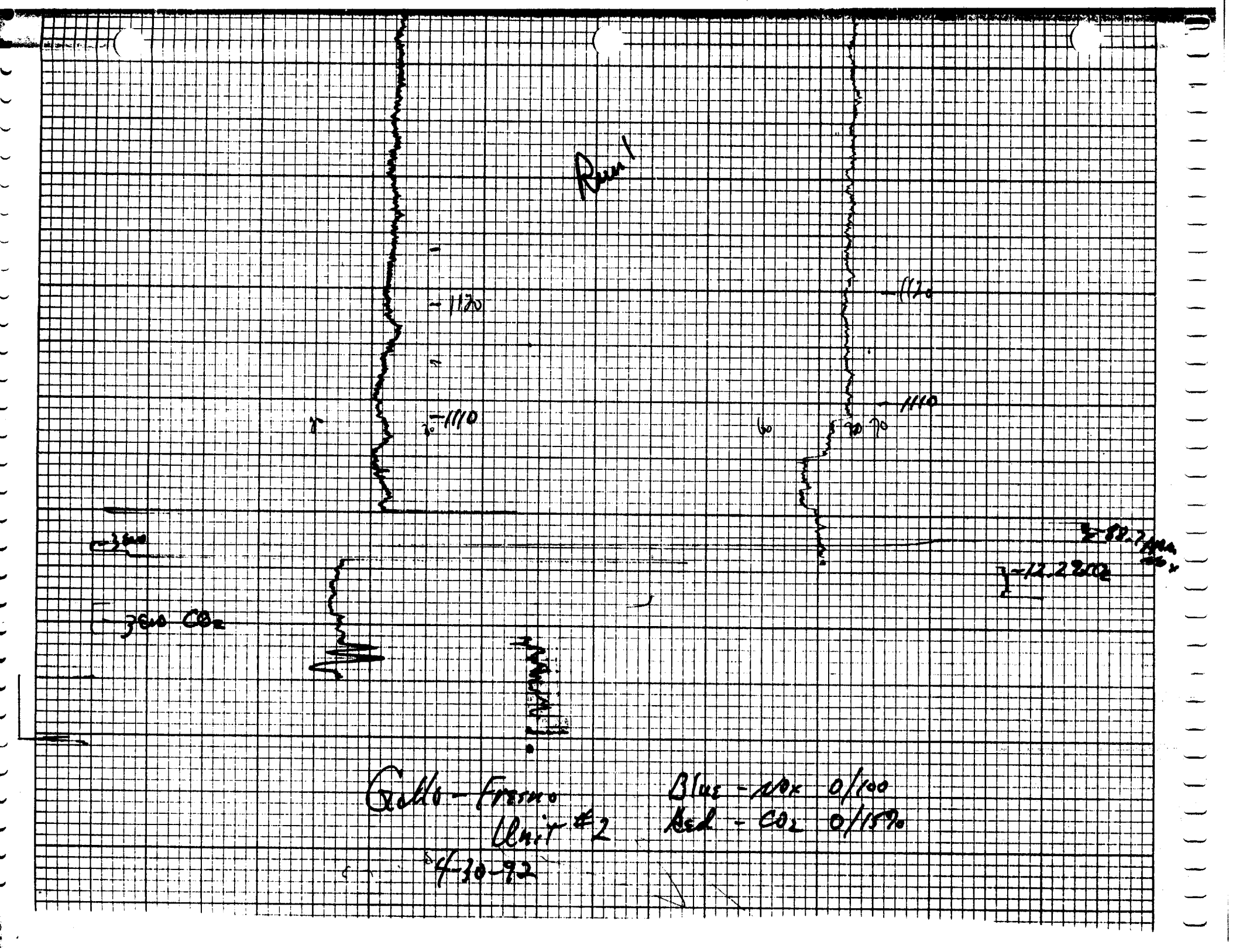

Run 1
~1110
3200
Gallo - Fresno
4-30-92
Unit 2
Red THC 0/100 mm

Drug?

Start Exercise 1:37

Stop




Run 1
1120
1110
1110
-3600
-3600 CO2
-12.2200
Gallo - Fresno
Unit #2
4-30-72
Blue - 100% 0/100
Red - CO2 0/15%

Ch1 20.0mV
Ch2 -1.28V
Ch1 20.0mV
Ch1
Ch1
Ch2 200mV
2.5 μs

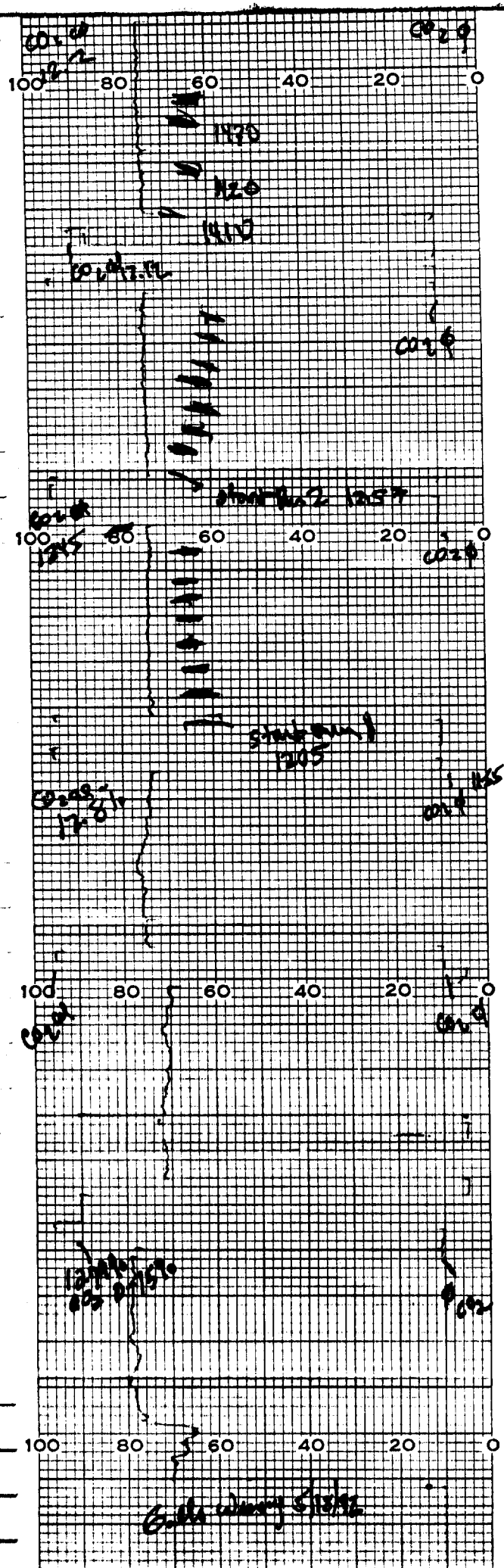
Run 3

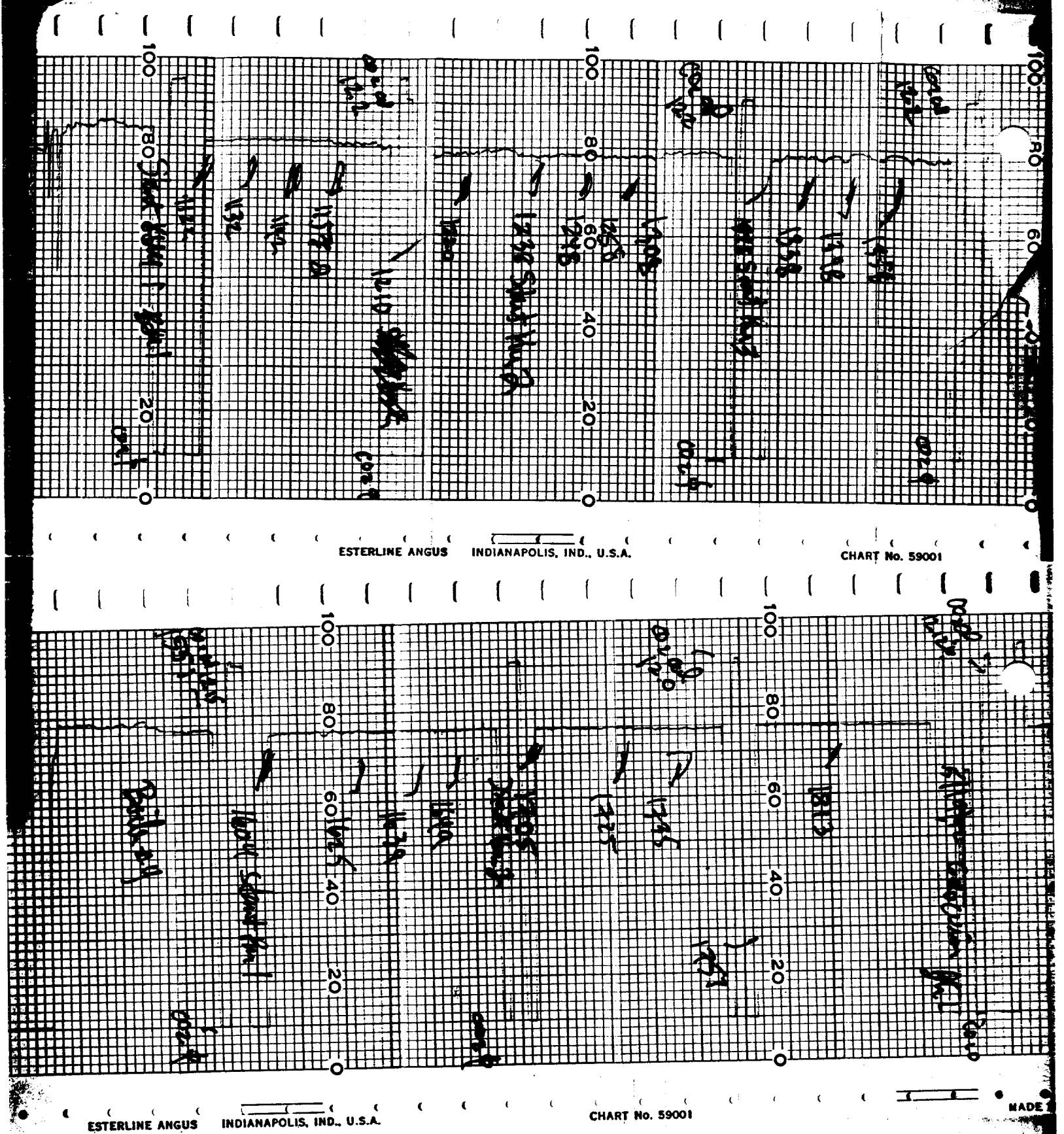
-1317 - 1317

-1317 - 1317

-2.0 x 10^-4 M

Boiler fill
Con
Test
Key


100
80
60
40
20
0
ESTERLINE ANGUS INDIANAPOLIS, IND., U.S.A.
CHART No. 59001
MADE IN CANADA


100
80
60
40
20
0
ESTERLINE ANGUS INDIANAPOLIS, IND., U.S.A.
CHART No. 59001
100
80
60
40
20
0
ESTERLINE ANGUS INDIANAPOLIS, IND., U.S.A.
CHART No. 59001

Bridge #1

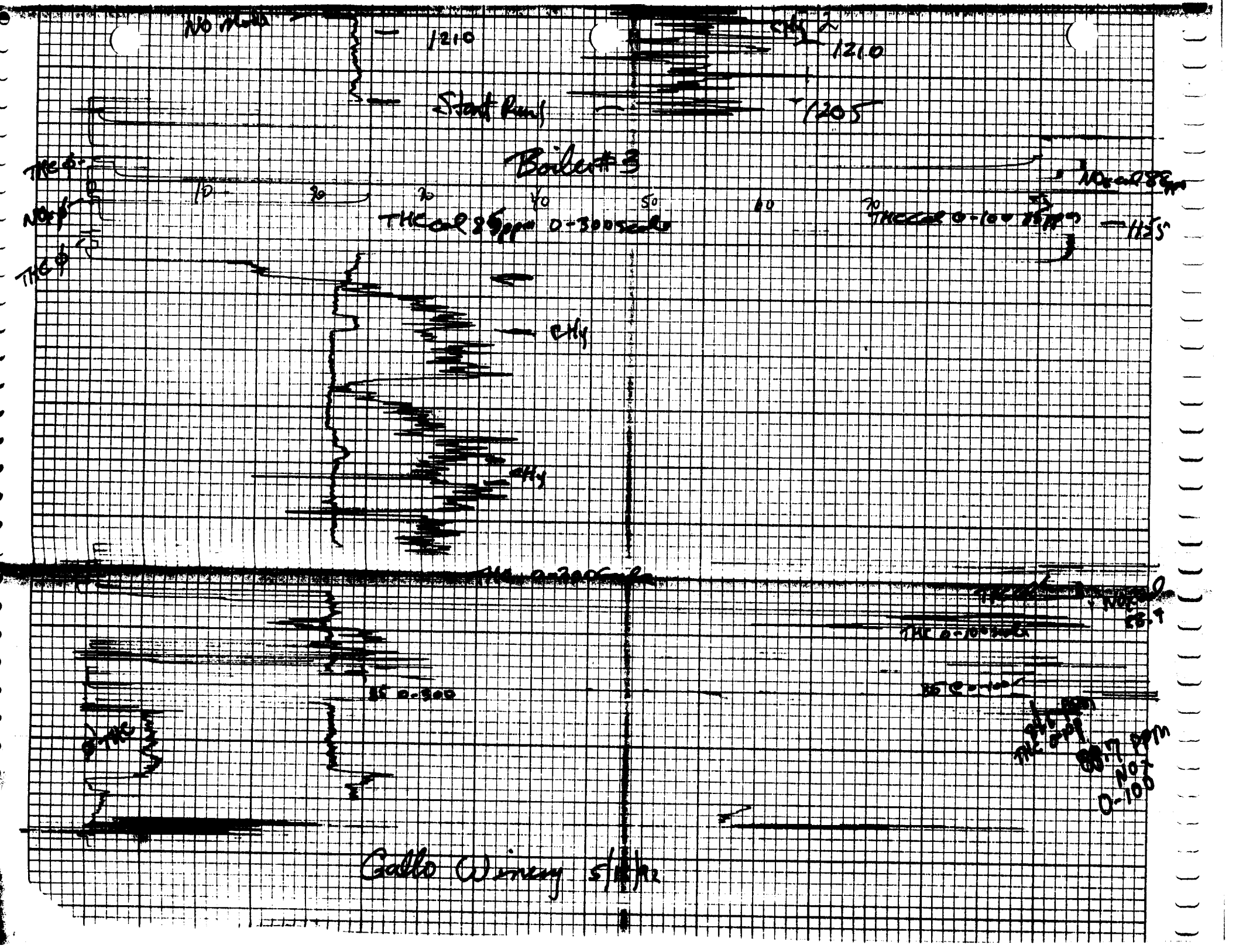
Bridge #3 Cable Bridge Shifter

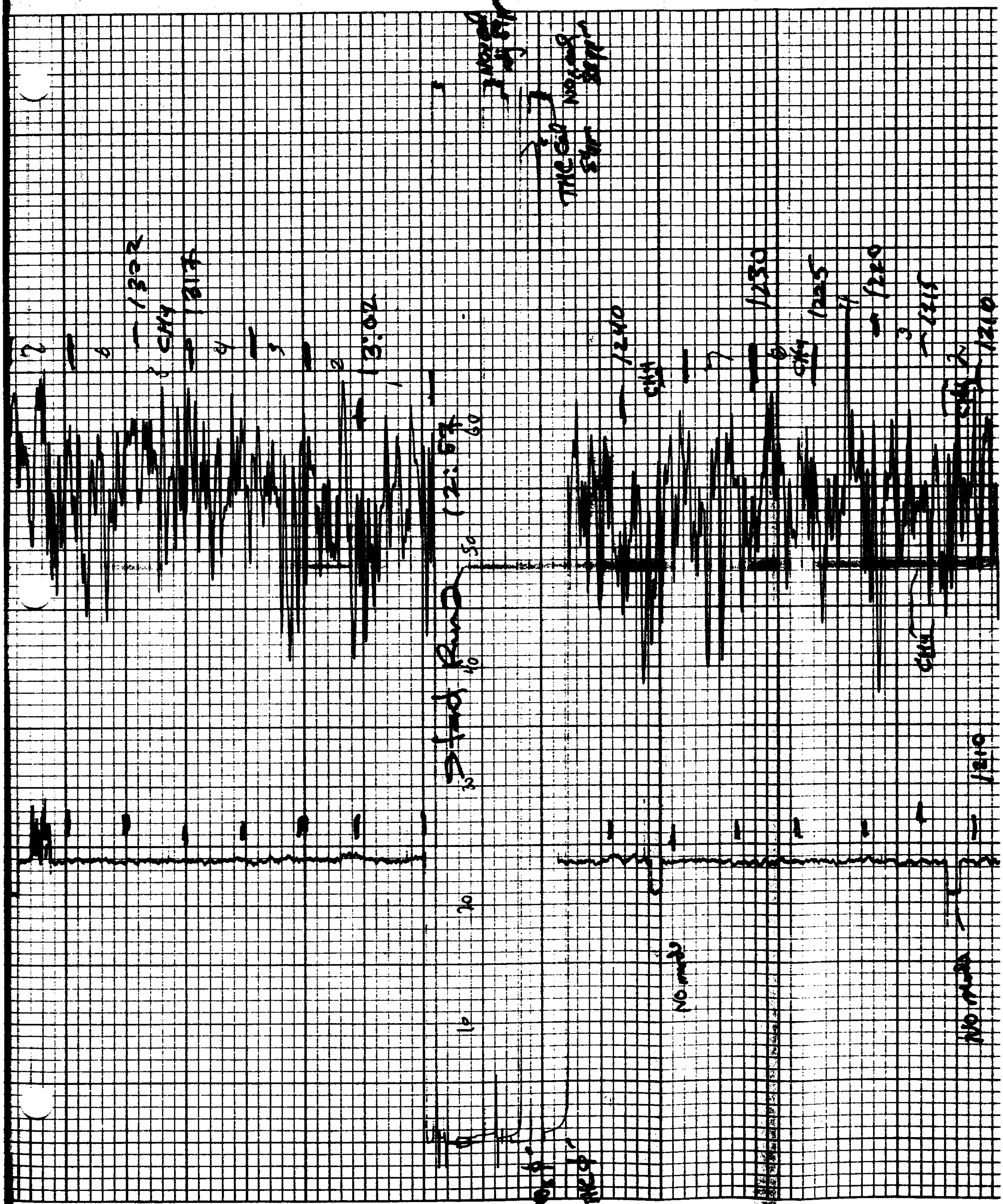
Overboard

X-Ray

Test

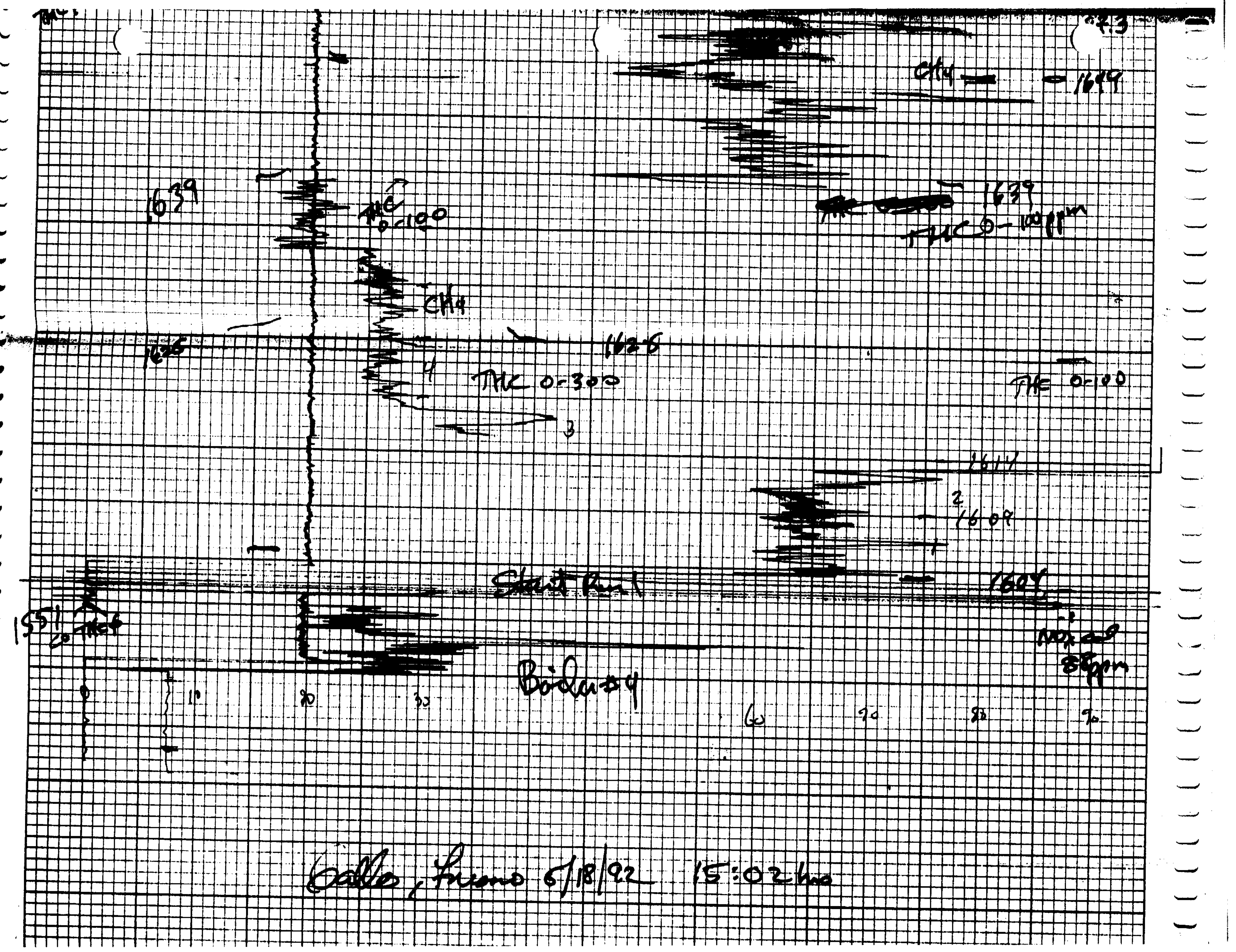
Control Unit

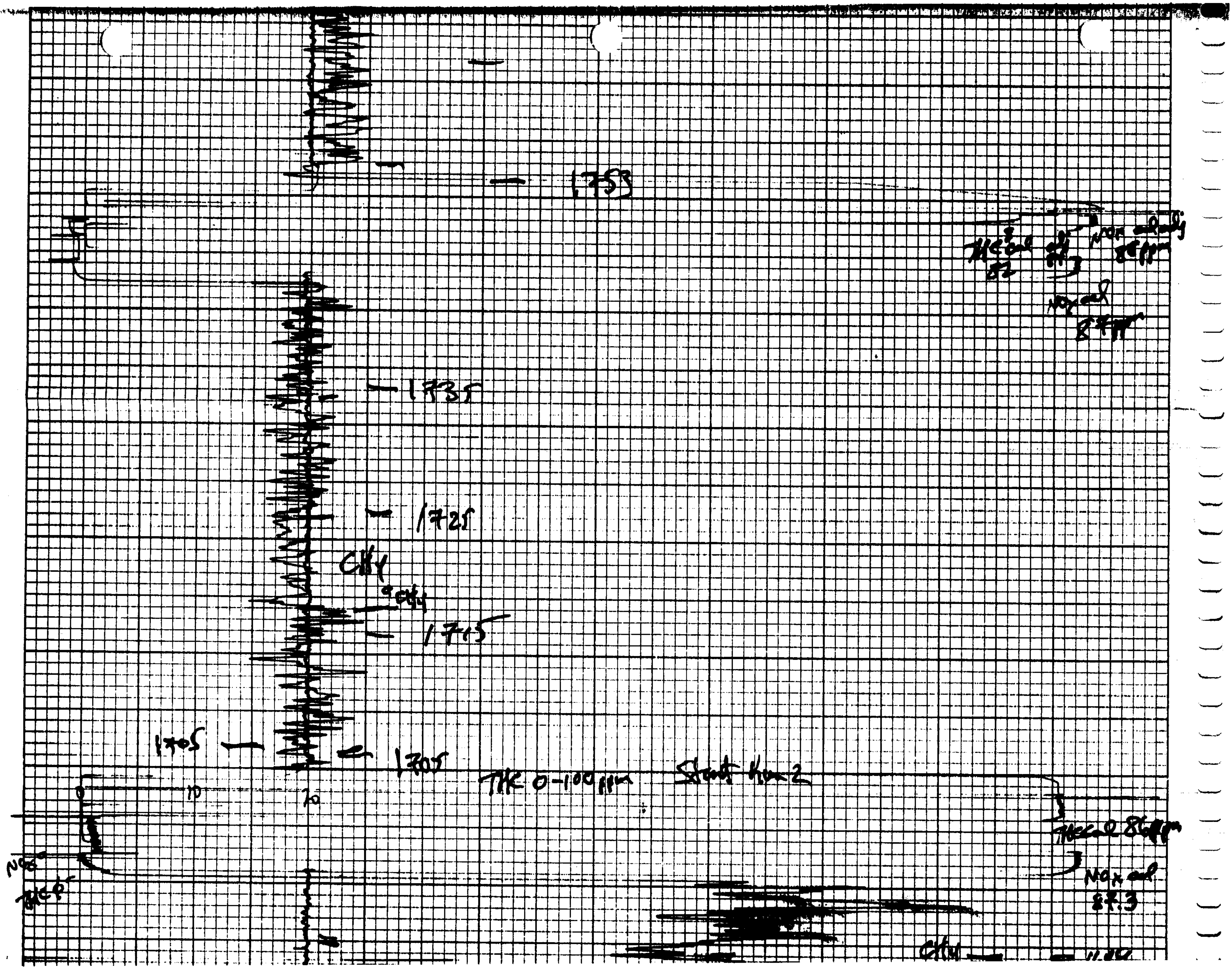

Start Run
Boiler #3
Gallo Winery

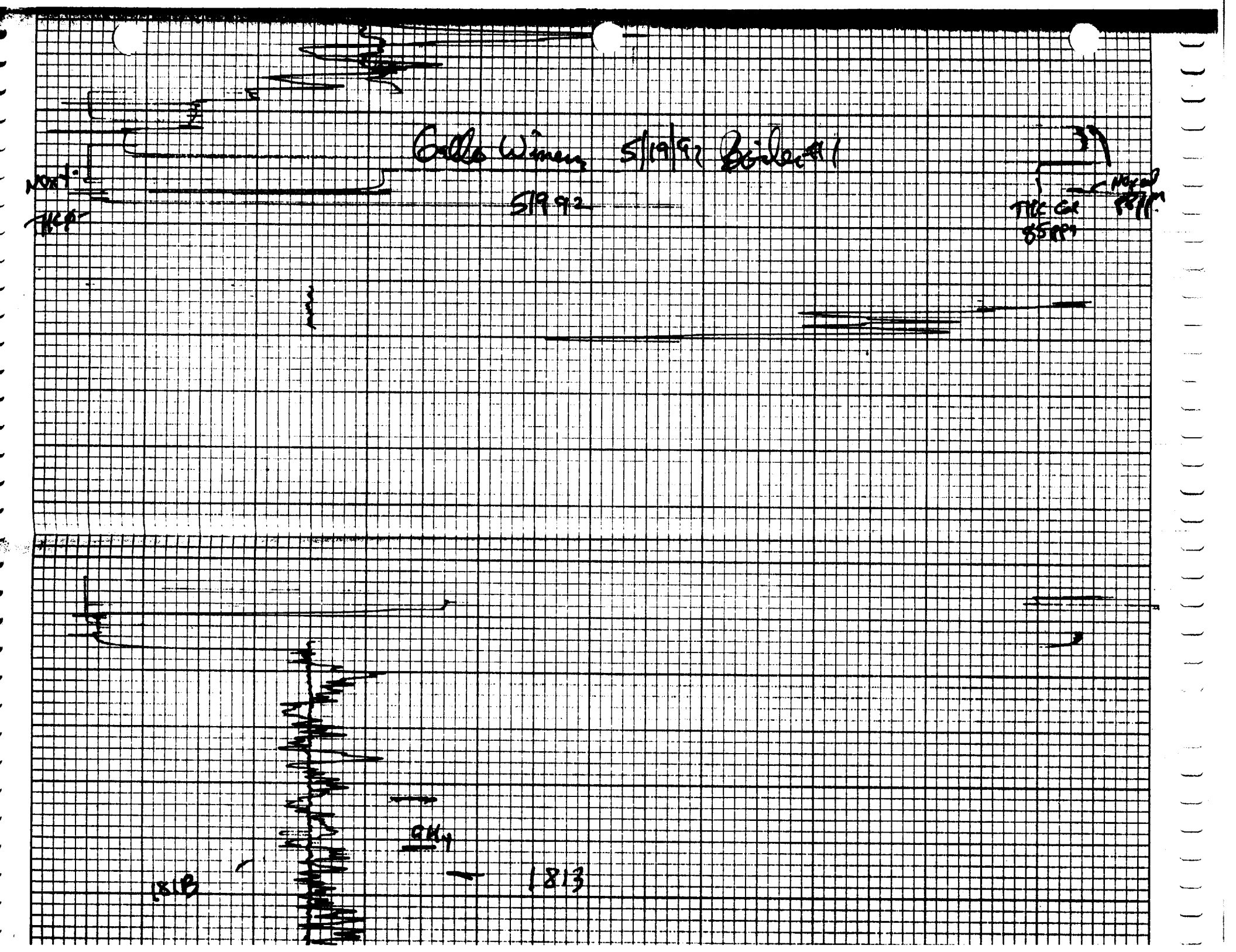


Start Run 12:57
CH4
1240
1230
1225
1220
1215
1210
No mode
THC Cal

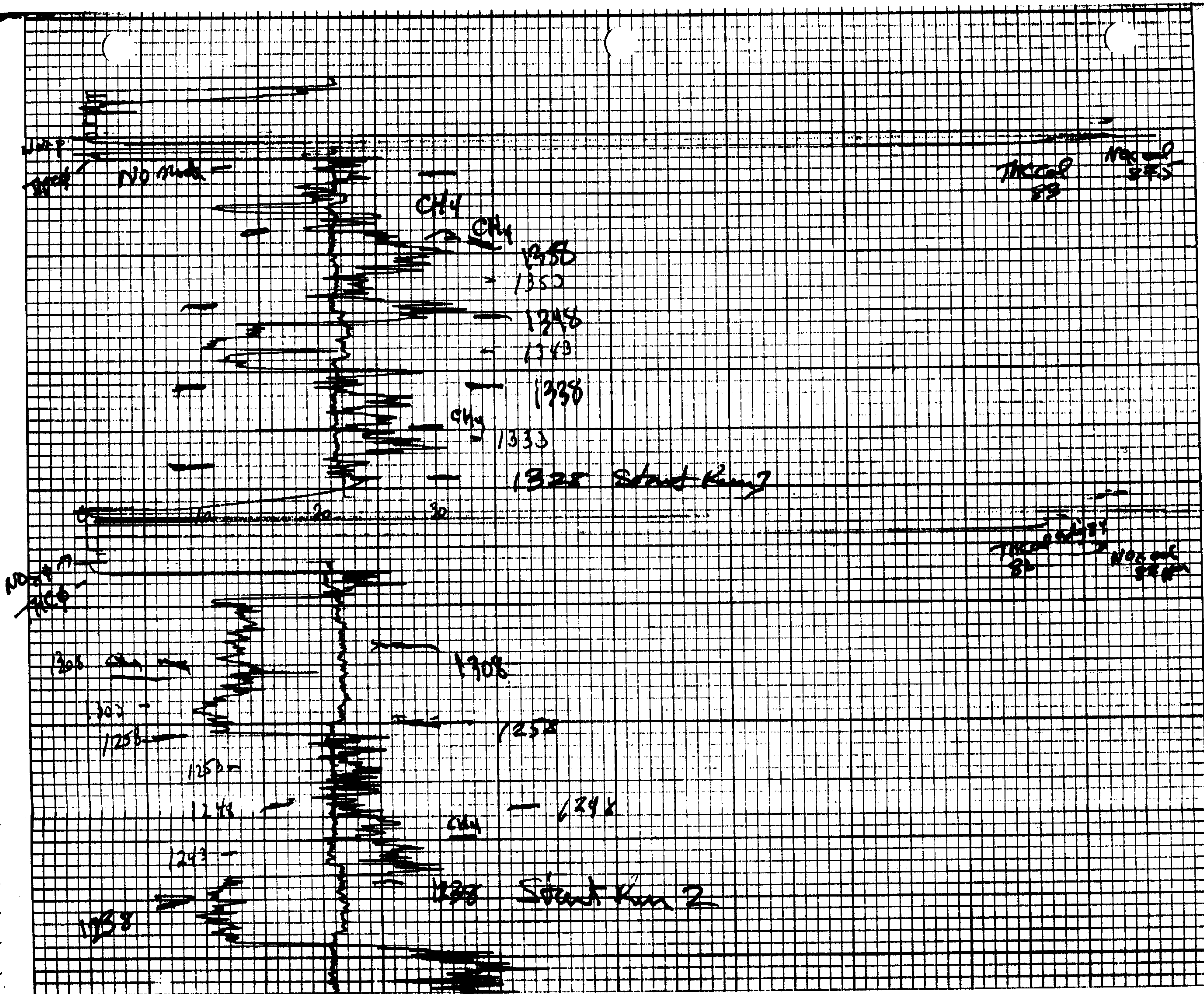
1320
1330
1340
1350
1400
1410
1420
1430
1440
1450
1500
1510
1520
1530
1540
1550
1600
1610
1620
1630
1640
1650
1700
1710
1720
1730
1740
1750
1800
1810
1820
1830
1840
1850
1900
1910
1920
1930
1940
1950
2000
2010
2020
2030
2040
2050
2100
2110
2120
2130
2140
2150
2200
2210
2220
2230
2240
2250
2300
2310
2320
2330
2340
2350
0000
0010
0020
0030
0040
0050
0100
0110
0120
0130
0140
0150
0200
0210
0220
0230
0240
0250
0300
0310
0320
0330
0340
0350
0400
0410
0420
0430
0440
0450
0500
0510
0520
0530
0540
0550
0600
0610
0620
0630
0640
0650
0700
0710
0720
0730
0740
0750
0800
0810
0820
0830
0840
0850
0900
0910
0920
0930
0940
0950
1000
1010
1020
1030
1040
1050
1100
1110
1120
1130
1140
1150
1200
1210
1220
1230
1240
1250
1300
1310


CH4 — 1649
1639
THC 0-100 ppm
1639
THC 0-100
CH4
1626
1628
4
THC 0-300
3
THC 0-100
1611
2
1609
Start Run 1
1608
1551
NOx 0-
85ppm
Boiler #4
10
20
30
60
70
80
90
Gallo, Fresno 6/18/92 15:02 hrs


1735
1725
CH4
1715
1705
1705
0
10
20
THC 0-100 ppm
Start Run 2
NOx cal
87.3


Bells Wimen 5/19/92 Bird.#1
5/19/92
9KHz
1813

11kHz
2kHz
0-20kHz
0-1kHz
0-2kHz
0-12kHz



CH4
CH4
1358
1353
1348
1343
1338
CH4
1333
1328 Start Run 1
10
20
30
1308
1258
1248
CH4
1238 Start Run 2

Charts-h

(1236)

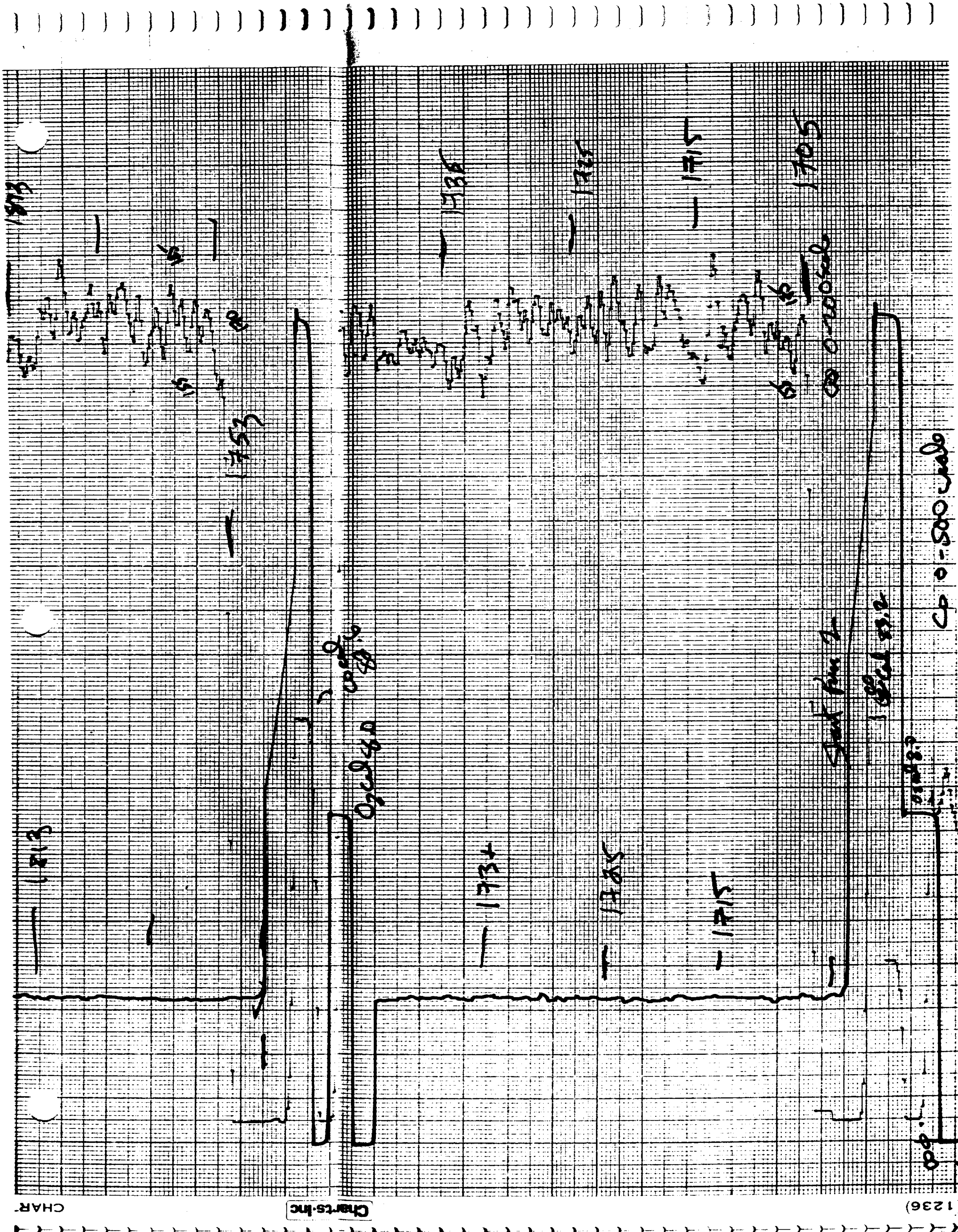
0289

Start
Stop
Cells Grown
Charts-Inc
CHART NO. 9280-0289
(1236

Charts-Inc
(1236)

1435
1430
1420
1410
1410
1322
1317
CHART NO. 9280-0289

CHART NO. 9280-0289


1713
1753
1736
1725
1715
1705
1734
1725
1715
1713
Start Run 2
Co 0-500 scale
Charts-Inc
(1236)

NO. 9280-0289

CHART NO. 9280-0289
Charts-Inc
(1236)

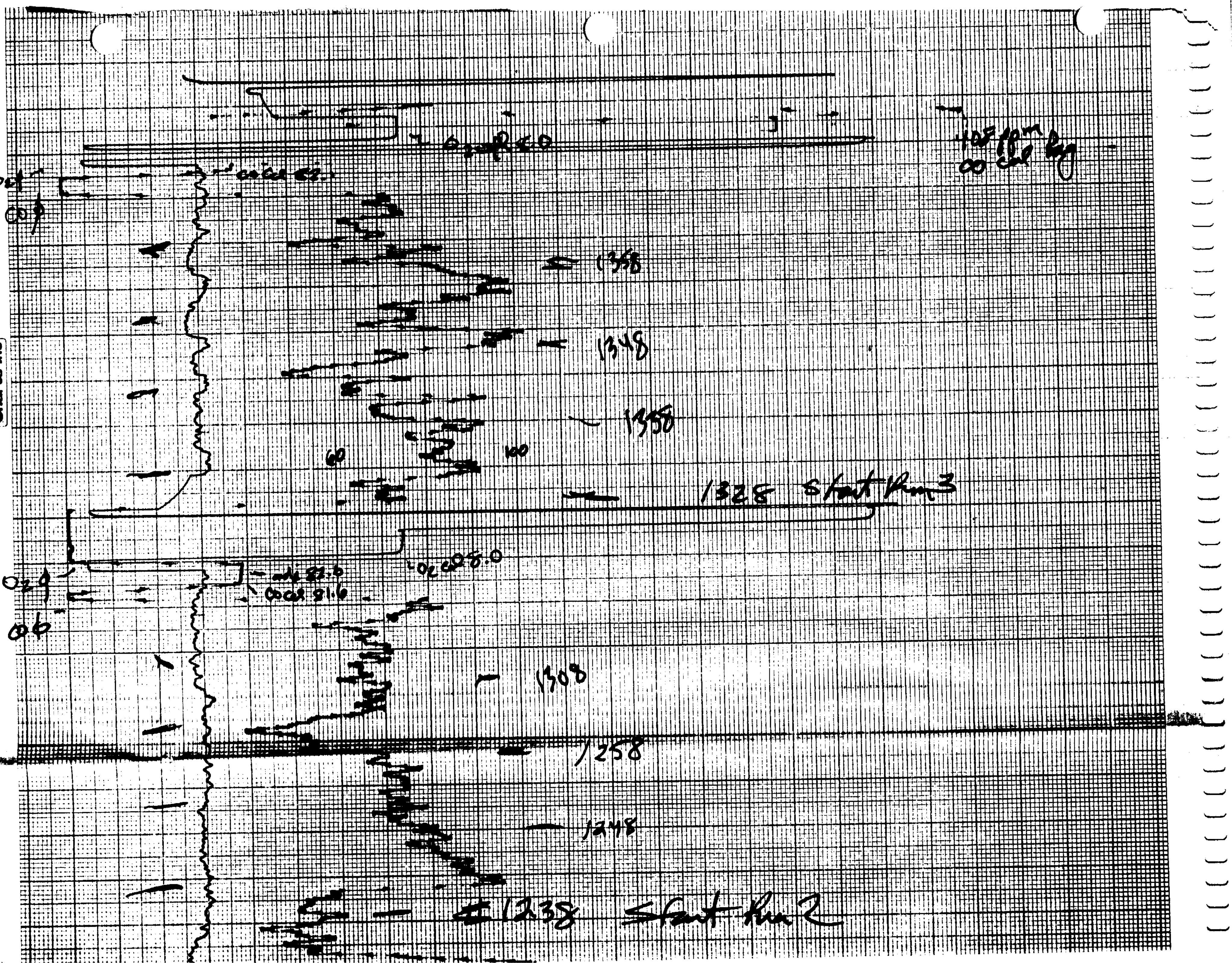


CHART NO.

Charts-Inc

1.: 812 pph

63,768 PPH

5/19/92

BOILER # 3

FEED WATER TANK –

START @ 13:03 – 20.5'

FINISH @ 13:29 – 17.0'

~~26 min~~

DA. TANK –

PRESSURE	8.5 PSIG / 8.0
TEMP	- 235°F / 232

FEED WATER PUMP PRESSURE –

SUCTION	12.5 PSIG / 12
DISCHARGE	210 PSIG / 215

BOILER STEAM PRESSURE –	146 PSIG / 144
STACK TEMP. –	420°F
ECON. WATER OUT TEMP –	292°F / 286
FEEDWATER TANK TEMP –	70°F

GAS METER –

START - 258530

FINISH - 258540 in 27m - 26.69 sec.

10 x 10 = 100 REV.

CORR. -	799161	
UNCORR -	258540	0,000 cf.
GAS PRESS -	44.46	
GAS TEMP -	> 51.63	
ATM PRESS -	14.53	76.49 x 10⁶
SP. GR GAS -	.583	82.6%
% N_2 -	.630	

T + Q.D / Q.D

FEED WATER TANK –

START @ 14: 14:20 – 21.5'

FINISH @ 14:45 – 17.5'

~~30 min~~

DA. TANK –

PRESSURE	8.5 / 8.5
TEMP	- 235 / 235

FEED WATER PUMP PRESSURE –

SUCTION	12.5 / 12.5
DISCHARGE	- 215 / 212

BOILER STEAM PRESSURE –	146 / 148
STACK TEMP –	420°F
ECON. WATER OUT TEMP –	288 / 292
FEEDWATER TANK TEMP –	70°F

GAS METER –

START - 258557

FINISH - 258568 in 30m 27.21 sec

11 x 10 = 110 rev.

CORR -	799248	
UNCORR —	258568	
GAS PRESS —	44.49	75.53 x 10⁶
GAS TEMP —	51.71	
ATM PRESS —	14.53	81.1%
SP. GR. GAS —	.585	
% N_2 -		

1.20

BOILER #4

IRE(: 100 cu ft.

4/13/92

1st TEST

FEED WATER TANK –

START @ 16:07:30 23.0'

@ 16:35:30 19.5'

FINISH 28:00 minutes 3.5 ft.

D.A. TANK –

PRESSURE 9.0 / 8.5

TEMP 235°F / 232

FEED WATER PUMP PRESSURE –

SUCTION 12.5 / 12.0

DISCHARGE 215 / 220

BOILER STEAM PRESSURE – 149 PSIG / 148

STACK TEMP – 450°F /

ECON - WATER OUT TEMP – 290°F / 285

FEEDWATER TANK TEMP – 70°F

GAS METER – 10 x 10 = 100

START – 258598

FINISH – 258608 in 28m, 27 sec

CORR – 799371

UNCORR – 258608

GAS PRESS – 44.40

GAS TEMP – 52.43

ATM PRESS – 14.53

SP GR GAS – .583

%N2 – .630

2nd TEST

FEED WATER TANK –

START @ 17:08 22.0'

FINISH @ ~~17:45~~ 17.5

37 m, 4.5 ft.

D.A. TANK –

PRESSURE 9.5 / 8.5

TEMP 236 / 233

FEED WATER PUMP PRESSURE –

SUCTION 130 / 12.5

DISCHARGE 215 / 205

BOILER STEAM PRESSURE – 142 / 140

STACK TEMP – 445 / 445

ECON WATER OUT – 284 / 283

FEEDWATER TANK TEMP – 70°F

GAS METER – 12 x 10 = 120

START – 258620

FINISH – 258632 in 34 m 9 sec.

CORR – 799444

UNCORR – 258632

GAS PRESS – 44.40

GAS TEMP – 51.63

ATM PRESS – 14.53

SP GR GAS – .583

%N2 – .630

BOILER # 4 4/18/02

3rd TEST

FEED WATER TANK –

START @ 18:09:30 – 18.0'

18.37-00 – 14.5

FINISH ~~27-30~~ 3.5'

D.A. TANK –

PRESSURE 8.5/10

TEMP 235/232

FEED WATER PUMP PRESSURE –

SUCTION 14.2/12.5

DISCHARGE 210/215

BOILER STEAM PRESSURE – 137/134

STACK TEMP – 445/447

ECON WATER OUT TEMP – 281/279

FEEDWATER TANK TEMP – 70°

GAS METER – 10 x 10 = 100

START – 258639

FINISH – 258649 in 28m, 27, 37sec

CORR – 799497

UNCORR – 258649

GAS PRESS – 40.42

GAS TEMP – 50.95

ATM PRESS – 14.53

SP. GR. GAS – .683

%N2 – .630

FEED WATER TANK –

START

FINISH

D.A. TANK –

PRESSURE

TEMP

FEED WATER PUMP PRESSURE –

SUCTION

DISCHARGE

BOILER STEAM PRESSURE –

FEEDWATER TANK TEMP –

(BOILER #1 5/11/72

1st TEST

FEED WATER TANK –

START @ 11:32 17.5'

12:00 14.5'

FINISH 28m 3 ft.

D.A. TANK –

PRESSURE 7.5 / 8.0

TEMP 230° / 233

FEED WATER PUMP PRESSURE –

SUCTION 11 / 12.5

DISCHARGE 225 ✓

BOILER STEAM PRESSURE – 142 / 147

STACK TEMP – 540 / 545

ECON. WATER OUT TEMP – >300°F ✓

FEEDWATER TANK TEMP – 69 ✓

GAS METER –

START – 259249

FINISH – 259257

8 x 10 = 80 REV

in 26m 13.36 rec.

CORR – 801394

UNCORR – 259257

GAS PRESS – 44.59

GAS TEMP – 50.99

ATM PRESS – 14.53

SP. GR. GAS – .583

% N_2 – .630

% CO_2 – 1.190

2nd TEST

FEED WATER TANK –

START 12:43:30 15.5'

13:14:30 12.5

FINISH ~~37 ft.~~ 3

D.A. TANK –

PRESSURE 7.5 / 7.6

TEMP 232

FEED WATER PUMP PRESSURE –

SUCTION 12 / 11

DISCHARGE 220 / 215

BOILER STEAM PRESSURE – 145 / 147

STACK TEMP – 545 ✓

ECON. WATER OUT TEMP – 296 / >300°

FEEDWATER TANK TEMP – 69

GAS METER –

START – 259272

FINISH 259280

8 x 10 = 80

26m = 4.6?

CORR – 801466

UNCORR – 259280

GAS PRESS – 44.53

GAS TEMP – 51.93

SP. GR. GAS – .583

% N_2 – .630

% CO_2 – 1.190

ATM. PRESS – 14.53

BOILER #1 5/9/92

3rd TEST

FEED WATER TANK –

START	13:32	17.5'
	14:09	14.0'
FINISH	~~37 mi~~	~~3.5 H~~

D.A. TANK –

PRESSURE	7.5 ✓
TEMP	230

FEED WATER PUMP PRESSURE –

SUCTION	12 / 11
DISCHARGE	215 / 210

BOILER STEAM PRESSURE –	145 / 142
STACK TEMP –	545 / 540
ECON. WATER OUT TEMP –	> 300°F / 299
FEEDWATER TANK TEMP –	69.5°F

GAS METER –

START – 259287

FINISH – 259297

32 ~ 30:14

10 X 10 = 100 REV.

CORR –	80 1517
UNCORR –	259297
GAS PRESS –	44.52
GAS TEMP –	52.43
ATM PRESS –	14.53
SP. GR. GAS –	.633
% N_2 –	.630
	1190

FGR FAN INLET TEMP. 298°F

FEED WATER TANK –

START –

FINISH –

D.A. TANK –

PRESSURE

TEMP

FEED WATER PUMP PRESSURE –

SUCTION

DISCHARGE

BOILER STEAM PRESSURE –

STACK TEMP –

ECON. WATER OUT TEMP –

FEEDWATER TANK TEMP –

GAS METER –

START –

FINISH

CORR –	
UNCORR –	
GAS PRESS –	
GAS TEMP –	
SP. GR. GAS –	
% N_2 –	
% CO_2 –	

SCOTT-MARRIN, INC.
2001 THIRD ST. • UNIT H • RIVERSIDE, CA 92507
TELEPHONE (714) 784-1240

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

BEST01
TO:
CRAIG THIRY
BEST ENVIRONMENTAL
15890 FOOTHILL BLVD.
SAN LEANDRO, CA 94578-

DATE: 01/03/92

CUSTOMER ORDER NUMBER: 8370

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC101278	Propane	18.80 ± 0.19 ppm	SRM 1667b
	Methane	30.2 ± 0.3 ppm	L2293
	Ultrapure Air	Balance	
CC97909	Propane	1.211 ± 0.012 %	VOLUMETRIC
	Zero Air	Balance	

ppm = umole/mole % = mole-%

The above analyses are traceable to the National Institute of Standards and Technology by intercomparison with the reference standards listed above.
Where indicated, volumetric and gravimetric reference standards are traceable thru use of our analytical balance. NIST Report No. MMAP 232.09/202491.

Analyst: _____ M.S. Calhoun

Approved: _____ J.T. Marrin

SCOTT-MARRIN, INC.
6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (714) 653-6780 • FAX (714) 653-2430

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

BEST01

TO:
CRAIG THIRY
BEST ENVIRONMENTAL
15890 FOOTHILL BLVD
SAN LEANDRO, CA 94578-2101

DATE: 04/27/92

CUSTOMER ORDER NUMBER: 8418

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC56492	Propane	19.79 ± 0.20 ppm	SRM 1667b
	Methane	25.22 ± 0.25 ppm	L2293
	Ultrapure Air	Balance	
CC56495	Propane	19.25 ± 0.19 ppm	SRM 1667b
	Methane	25.25 ± 0.25 ppm	L2293
	Ultrapure Air	Balance	

ppm = umole/mole % = mole-%

The above analyses are traceable to the National Institute of Standards and Technology by intercomparison with the reference standards listed above.
Where indicated, volumetric and gravimetric reference standards are traceable thru use of our analytical balance. NIST Report No. MMAP 232.09/202491.

Analyst: Mark Monson
M.J. Monson

Approved:
J.T. Marrin

SCOTT-MARRIN, INC.
2001 THIRD ST. • UNIT H • RIVERSIDE, CA 92507
TELEPHONE (714) 784-1240

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

BEST01

TO:
REGAN BEST
BEST ENVIRONMENTAL
27343 INDUSTRIAL BLVD.#E
HAYWARD, CA 94545

DATE: 05/10/91

CUSTOMER ORDER NUMBER: 8271

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC28696	Nitric Oxide Nitrogen,O2-Free	88.1 ± 0.9 ppm Balance	SRM 1684b
CC293	Nitric Oxide Nitrogen,O2-Free	88.7 ± 0.9 ppm Balance	SRM 1684b

ppm = umole/mole % = mole-%

The above analyses are traceable to the National Institute of Standards and Technology by intercomparison with the reference standards listed above.
Where indicated, volumetric and gravimetric reference standards are traceable thru use of our analytical balance. NIST Report No. MMAP 232.09/202491.

Analyst: B.E. Gross Approved: J.T. Marrin

SCOTT-MARRIN, INC.
2001 THIRD ST. • UNIT H • RIVERSIDE, CA 92507
TELEPHONE (714) 784-1240

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

BEST01
TO:

DATE: 01/10/92

CRAIG THIRY
BEST ENVIRONMENTAL
15890 FOOTHILL BLVD.
SAN LEANDRO, CA 94578-

CUSTOMER ORDER NUMBER: 8370

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC122500	Carbon Dioxide	12.12 ± 0.12 %	SRM 1675b
	Oxygen	7.89 ± 0.08 %	SRM 2658a
	Carbon Monoxide	82.6 ± 0.8 ppm	SRM 1679c
	Nitrogen	Balance	
CC127006	Sulfur Dioxide	194.3 ± 1.9 ppm	SRM 1661
	Nitrogen	Balance	

ppm = umole/mole % = mole-%

The above analyses are traceable to the National Institute of Standards and Technology by intercomparison with the reference standards listed above.
Where indicated, volumetric and gravimetric reference standards are traceable thru use of our analytical balance. NIST Report No. MMAP 232.09/202491.

Analyst: Mark Monson
M.J. Monson

Approved:
J.T. Marrin

SCOTT-MARRIN, INC.
6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (714) 653-6780 • FAX (714) 653-2430

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

BEST01

TO:
CRAIG THIRY
BEST ENVIRONMENTAL
15890 FOOTHILL BLVD.
SAN LEANDRO, CA 94578-

DATE: 03/31/92

CUSTOMER ORDER NUMBER: 8398

PAGE 1

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC97819	Propane	3.08 ± 0.03 ppm	SRM 1667b
	Ultrapure Air	Balance	
CC60419	Carbon Monoxide	78.2 ± 0.8 ppm	SRM 1679c
	Carbon Dioxide	12.20 ± 0.12 %	SRM 1675b
	Oxygen	7.81 ± 0.08 %	SRM 2658a
	Nitrogen	Balance	
CC292	Carbon Monoxide	401 ± 4 ppm	SRM 1680b
	Carbon Dioxide	12.79 ± 0.13 %	SRM 1675b
	Oxygen	3.91 ± 0.04 %	SRM 2658a
	Nitrogen	Balance	

ppm = umole/mole % = mole-%

The above analyses are traceable to the National Institute of Standards and Technology by intercomparison with the reference standards listed above.
Where indicated, volumetric and gravimetric reference standards are traceable thru use of our analytical balance. NIST Report No. MMAP 232.09/207491.

Analyst: _____ M.S. Calhoun

Approved: _____ J.T. Marrin