AUG 15 1990

Texaco USA
P. O. Bin H
Taft, California 93268

LOST HILLS GAS PLANT
IC ENGINES 1 THROUGH 6

Prepared by

Pape & Steiner Environmental Services
5801 Norris Road
Bakersfield, California 93308

ANNUAL COMPLIANCE TEST

July 9, 10, 11 and 27, 1990

Kern County APCD Numbers 2025013E through 2025018E

Report PS-90-2215/Project 6838-90

Test Team Leaders: Gary McRae and Charles Reshard

Approved by : Jim Steiner
Jim Steiner, Project Manager
August 2, 1990

SUMMARY OF SOURCE TEST RESULTS

APCD No.: 2025016E

Unit No. : ENGINE #4

Company : TEXACO LOST HILLS

Test Date: JULY 9,1990

POLLUTANT	INLET Concentration gr/scf	INLET Concentration @12% CO2	INLET Concentration ppm(v)	INLET Mass Flow Rate lb/hr	OUTLET Concentration gr/scf	OUTLET Concentration @12% CO2	OUTLET Concentration ppm(v)	OUTLET Concentration @O2 CORR*	OUTLET Mass Flow Rate lb/hr	Removal Percent	Emission Factor Outlet
Particulate avg.											
Sulfate avg.											lb/MMBtu as Sulfur
SO2 (wet) avg.											lb/MMBtu as Sulfur
NOx as NO2 (dry)							62.54 56.09	38.48 34.58	0.93 0.84		0.1333
avg.							59.32	36.53	0.88		lb/MMBtu
HC (> C1)							13.98 9.78		0.07 0.05		
avg.							11.88		0.06		
CO							464.58 450.26		4.20 4.11		
avg.							457.42		4.15		
avg.											

Scrubber Liquor Analysis : Chlorides - mg/l Specific Gravity -

For Kern County Use Only ANNUAL 712 Hr PUC Q 5x5 F

9/25/90

Comments : 15.0 % O2 correction. NO_x = 0.52 gm/bhp-hr; CO = 2.46 gm/bhp-hr; HC = 0.04 gm/bhp-hr

H_2S in fuel gas was <1 ppm; therefore, sulfur emissions are zero.

SUMMARY OF SOURCE TEST RESULTS

APCD No.: 2025013E

Unit No. : ENGINE #1

Company : TEXACO LOST HILLS

Test Date: JULY 10,1990

POLLUTANT	INLET Concentration gr/scf	INLET Concentration @12% CO2	INLET Concentration ppm(v)	INLET Mass Flow Rate lb/hr	OUTLET Concentration gr/scf	OUTLET Concentration @12% CO2	OUTLET Concentration ppm(v)	OUTLET Concentration @O2 CORR*	OUTLET Mass Flow Rate lb/hr	Removal Percent	Emission Factor Outlet
Particulate											
avg.											
Sulfate											lb/MMBtu as Sulfur
avg.											
SO2 (wet)											lb/MMBtu as Sulfur
avg.											
NOx as NO2 (dry)							77.03 67.37	43.08 36.50	1.16 0.90		0.1451 lb/MMBtu
avg.							72.20	39.79	1.03		
HC (> C1)							19.75 31.50		0.10 0.15		
avg.							25.63		0.13		
CO							588.94 620.87		5.38 5.07		
avg.							604.91		5.22		
avg.											

Scrubber Liquor Analysis : Chlorides - mg/l Specific Gravity -

For Kern County Use Only ANNUAL 1100 Hp PUC Q FACE

M A N 9/25/90

Comments : 15.0 % O2 correction. NO_x = 0.53 gm/bhp-hr; CO = 2.68 gm/bhp-hr; HC = 0.06 gm/bhp-hr

H_2S in fuel gas <1 ppm; therefore, sulfur emissions are zero.

SUMMARY OF SOURCE TEST RESULTS

APCD No.: 2025017E

Unit No. : ENGINE #5

Company : TEXACO LOST HILLS

Test Date: JULY 11,1990

POLLUTANT	INLET Concentration gr/scf	INLET Concentration @12% CO2	INLET Concentration ppm(v)	INLET Mass Flow Rate lb/hr	OUTLET Concentration gr/scf	OUTLET Concentration @12% CO2	OUTLET Concentration ppm(v)	OUTLET Concentration @O2 CORR*	OUTLET Mass Flow Rate lb/hr	Removal Percent	Emission Factor Outlet
Particulate											
avg.											
Sulfate											lb/MMBtu as Sulfur
avg.											
SO2 (wet)											lb/MMBtu as Sulfur
avg.											
NOx as NO2 (dry)							84.69 90.72	47.59 51.57	0.96 1.04		0.1811 lb/MMBtu
avg.							87.71	49.58	1.00		
HC (> C1)							37.12 45.58		0.15 0.18		
avg.							41.35		0.16		
CO							498.55 503.58		3.42 3.53		
avg.							501.07		3.48		
avg.											

Scrubber Liquor Analysis : Chlorides - mg/l Specific Gravity -

For Kern County Use Only ANNUAL 712 Hp PUC QUALITY GAS F
M-AN- 9/25/90

Comments : 15.0 % O2 correction. NO_x = 0.68 gm/bhp-hr; CO = 2.35 gm/bhp-hr; HC = 0.11 gm/bhp-hr
H_2S in fuel gas <1 ppm; therefore, sulfur emissions are zero.

SUMMARY OF SOURCE TEST RESULTS

Company : TEXACO LOST HILLS

Test Date: JULY 11,1990

APCD No.: 2025014E

Unit No. : ENGINE #2

POLLUTANT	INLET Concentration gr/scf	INLET Concentration @12% CO2	INLET Concentration ppm(v)	INLET Mass Flow Rate lb/hr	OUTLET Concentration gr/scf	OUTLET Concentration @12% CO2	OUTLET Concentration ppm(v)	OUTLET Concentration @O2 CORR*	OUTLET Mass Flow Rate lb/hr	Removal Percent	Emission Factor Outlet
Particulate avg.											
Sulfate avg.											lb/MMBtu as Sulfur
SO2 (wet) avg.											lb/MMBtu as Sulfur
NOx as NO2 (dry)							92.57	55.96	1.40		0.2077
							101.04	57.77	1.44		lb/MMBtu
avg.							96.81	56.86	1.42		
HC (> C1)							149.44		0.79		
							113.55		0.56		
avg.							131.50		0.68		
CO							593.70		5.49		
							600.64		5.20		
avg.							597.17		5.34		
avg.											

Scrubber Liquor Analysis : Chlorides - mg/l Specific Gravity -

For Kern County Use Only ANNUAL 1100 Hp PJC Q FASF

M. Alvarez 9/25/90

Comments : 15.0 % O2 correction. NO_x = 0.73 gm/bhp-hr; CO = 2.74 gm/bhp-hr; HC = 0.35 gm/bhp-hr

H_2S in fuel gas was <1 ppm; therefore, sulfur emissions are zero.

SUMMARY OF SOURCE TEST RESULTS

APCD No.: 2025015E

Unit No. : ENGINE #3

Company : TEXACO LOST HILLS

Test Date: JULY 27,1990

POLLUTANT	INLET Concentration gr/scf	INLET Concentration @12% CO2	INLET Concentration ppm(v)	INLET Mass Flow Rate lb/hr	OUTLET Concentration gr/scf	OUTLET Concentration @12% CO2	OUTLET Concentration ppm(v)	OUTLET Concentration @O2 CORR*	OUTLET Mass Flow Rate lb/hr	Removal Percent	Emission Factor Outlet
Particulate											
avg.											
Sulfate											lb/MMBtu as Sulfur
avg.											
SO2 (wet)											lb/MMBtu as Sulfur
avg.											
NOx as NO2 (dry)							104.78 98.53	59.56 56.06	1.48 1.41		0.2109 lb/MMBtu
avg.							101.66	57.81	1.45		
HC (> C1)							101.60 68.78		0.50 0.34		
avg.							85.19		0.42		
CO							469.78 462.86		4.03 4.04		
avg.							466.32		4.04		
avg.											

Scrubber Liquor Analysis : Chlorides - mg/1 Specific Gravity -

For Kern County Use Only ANNUAL 1100 Hp PUC QKASF

9/25/90

Comments : 15.0 % O2 correction. NO_x = 0.71 gm/bhp-hr; CO = 1.99 gm/bhp-hr; HC = 0.21 gm/bhp-hr

H_2S in fuel gas was <1 ppm; therefore, sulfr emissions are zero.

SUMMARY OF SOURCE TEST RESULTS

Company : TEXACO LOST HILLS

Test Date: JULY 27,1990

APCD No.: 2025018E

Unit No. : ENGINE #6

POLLUTANT	INLET Concentration gr/scf	INLET Concentration @12% CO2	INLET Concentration ppm(v)	INLET Mass Flow Rate lb/hr	OUTLET Concentration gr/scf	OUTLET Concentration @12% CO2	OUTLET Concentration ppm(v)	OUTLET Concentration @O2 CORR*	OUTLET Mass Flow Rate lb/hr	Removal Percent	Emission Factor Outlet
Particulate avg.											
Sulfate avg.											lb/MMBtu as Sulfur
SO2 (wet) avg.											lb/MMBtu as Sulfur
NOx as NO2 (dry) avg.							86.48 78.99 82.74	47.73 43.64 45.68	1.22 1.12 1.17		0.1667 lb/MMBtu
HC (> C1) avg.							5.93 9.72 7.83		0.03 0.05 0.04		
CO avg.							671.72 689.17 680.44		5.78 5.94 5.86		
avg.											

Scrubber Liquor Analysis : Chlorides - mg/l Specific Gravity -

For Kern County Use Only

ANNUAL 712 HP PUC Q GASE

AN 9/25/90

Comments : 15.0 % O2 correction. NO_x = 0.67 gm/bhp-hr; CO = 3.36 gm/bhp-hr; HC = 0.02 gm/bhp-hr

H_2S in fuel gas was <1 ppm; therefore, sulfur emissions are zero.

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SECTION 1

INTRODUCTION

At the request of Texaco USA, Pape & Steiner Environmental Services conducted a series of emission tests on the effluent of six IC engines located at the Lost Hills Gas Plant on July 9, 10, 11 and 27, 1990. The purpose of these tests was to determine compliance with Kern County Rules and Regulations. During this same time period, Grisanti and Associates (under subcontract to Pape & Steiner) performed fugitive emission tests on approximately 20% of the valves and flanges in the plant (2025010C). A separate report will be issued for the fugitive study.

IC engines 1 through 3 (A/C 2025013E, 2025014E and 2025015E) are Cooper Superior Model 8GTLA lean-burn engines which drive gas compressors. IC engines 4 through 6 (A/C 2025016E, 2025017E and 2025018E) are Cooper Superior Model 6GTLA lean-burn engines which drive refrigeration units.

Duplicate 1-hour NO_x, CO, CO_2 and O_2 tests were performed on the effluent of each engine using CARB Method 1-100. Duplicate hydrocarbon samples were collected and analyzed using GC-FID. A sample of the fuel gas burned in the engines was collected and analyzed each day for CHNOS, specific gravity, moisture and Btu using ASTM Methods. The fuel analysis, fuel flowrate and engine exhaust O_2 were used to calculate a volumetric flowrate.

Messrs. Gary McRae and Charles Reshard conducted these tests for Pape & Steiner. Mr. Jack Grisanti conducted the tests for Grisanti and Associates. Mr. Jim Oblak of Texaco USA was on-site to oversee the operation of the engines and to collect fuel flow data. A Kern County representative was not on-site to witness these tests.

SECTION 2

WET METHOD DATA SUMMARIES

E. HYDROCARBON DATA

Lost Hills Gas Plant
Engine #4, 07/09/90

CALIBRATIONS

Methane Calibration gas = 21.19 ppm

	Area Count	ppm	
Initial Cal.	4504	21.19	C1
Final Cal. Check	4524	21.28	C1

% cal. diff. = 0.42
ppm/area count = 4.70E-03

SAMPLES

	AREA COUNTS		ppm	
Run. No.	1	2	1	2
HC C1	312460	285290	1470.03	1342.21
HC >C1 ¦	103	140	0.48	0.66
" ¦	2580	1628	12.14	7.66
" ¦	289	310	1.36	1.46
" ¦				
" ¦				
Total HC >C1 =	2972	2078	13.98	9.78

	lb/hr	
Run. No.	1	2
HC C1	7.60	7.01
HC >C1 ¦	0.00	0.00
" ¦	0.06	0.04
" ¦	0.01	0.01
" ¦		
" ¦		
Total HC >C1 =	0.07	0.05

E. HYDROCARBON DATA

Lost Hills Gas Plant
Engine #1, 07/10/90

CALIBRATIONS

Methane Calibration gas = 21.19 ppm

	Area Count	ppm	
Initial Cal.	4526	21.19	C1
Final Cal. Check	4497	21.05	C1

% cal. diff. = 0.66
ppm/area count = 4.68E-03

SAMPLES

	AREA COUNTS		ppm	
Run. No.	1	2	1	2
HC C1	230190	264930	1077.71	1240.36
HC >C1	88	151	0.41	0.71
"	2986	5565	13.98	26.05
"	365	462	1.71	2.16
"	779	550	3.65	2.58
"				
Total HC >C1 =	4218	6728	19.75	31.50

	lb/hr	
Run. No.	1	2
HC C1	5.64	5.80
HC >C1	0.00	0.00
"	0.07	0.12
"	0.01	0.01
"	0.02	0.01
"		
Total HC >C1 =	0.10	0.15

E. HYDROCARBON DATA

Lost Hills Gas Plant
Engine #5, 07/11/90

CALIBRATIONS

Methane Calibration gas = 21.19 ppm

	Area Count	ppm	
Initial Cal.	4504	21.19	C1
Final Cal. Check	4546	21.39	C1

% cal. diff. = 0.94
ppm/area count = 4.70E-03

SAMPLES

	AREA COUNTS		ppm	
Run. No.	1	2	1	2
HC C1	303870	335140	1429.62	1576.74
HC >C1	202	258	0.95	1.21
"	6381	7839	30.02	36.88
"	482	623	2.27	2.93
"	824	969	3.88	4.56
"				
Total HC >C1 =	7889	9689	37.12	45.58

	lb/hr	
Run. No.	1	2
HC C1	5.62	6.33
HC >C1	0.00	0.00
"	0.12	0.15
"	0.01	0.01
"	0.02	0.02
"		
Total HC >C1 =	0.15	0.18

E. HYDROCARBON DATA

Lost Hills Gas Plant
Engine #2, 07/11/90

CALIBRATIONS

Methane Calibration gas = 21.19 ppm

	Area Count	ppm	
Initial Cal.	4504	21.19	C1
Final Cal. Check	4546	21.39	C1

% cal. diff. = 0.94
ppm/area count = 4.70E-03

SAMPLES

	AREA COUNTS		ppm	
Run. No.	1	2	1	2
HC C1	526910	443080	2478.96	2084.56
HC >C1	31764	24136	149.44	113.55
"				
"				
"				
"				
Total HC >C1 =	31764	24136	149.44	113.55

	lb/hr	
Run. No.	1	2
HC C1	13.12	10.34
HC >C1	0.79	0.56
"		
"		
"		
"		
Total HC >C1 =	0.79	0.56

E. HYDROCARBON DATA

Lost Hills Gas Plant
Engine #3, 07/27/90

CALIBRATIONS

Methane Calibration gas = 21.19 ppm

	Area Count	ppm	
Initial Cal.	4550	21.19	C1
Final Cal. Check	4586	21.36	C1

% cal. diff. = 0.80
ppm/area count = 4.66E-03

SAMPLES

	AREA COUNTS		ppm	
Run. No.	1	2	1	2
HC C1	350600	390440	1632.79	1818.33
HC >C1	21816	16500	101.60	76.84
"				
"				
"				
"				
Total HC >C1 =	21816	16500	101.60	76.84

lb/hr

Run. No.	1	2
HC C1	8.03	9.10
HC >C1	0.50	0.38
"		
"		
"		
"		
Total HC >C1 =	0.50	0.38

E. HYDROCARBON DATA

Lost Hills Gas Plant
Engine #6, 07/27/90

CALIBRATIONS

Methane Calibration gas = 21.19 ppm

	Area Count	ppm	
Initial Cal.	4550	21.19	C1
Final Cal. Check	4586	21.36	C1

% cal. diff. = 0.80
ppm/area count = 4.66E-03

SAMPLES

	AREA COUNTS		ppm	
Run. No.	1	2	1	2
HC C1	238140	263800	1109.05	1228.55
HC >C1 ¦	28	1927	0.13	8.97
" ¦	1246	161	5.80	0.75
" ¦				
" ¦				
" ¦				
Total HC >C1 =	1274	2088	5.93	9.72

lb/hr

Run. No.	1	2
HC C1	5.47	6.06
HC >C1 ¦	0.00	0.04
" ¦	0.03	0.00
" ¦		
" ¦		
" ¦		
Total HC >C1 =	0.03	0.05

G. CONTINUOUS MONITOR DATA

TEXACO LOST HILLS
ENGINE #4

Date : 7/9/90

3 % O2 Correction

Nitrogen Dioxide

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @O2 Corr.*	lb/hr
1	11.31	62.54	116.80	0.93
2	11.33	56.09	104.92	0.84
Average	11.32	59.32	110.86	0.88

Sulfur Dioxide

Run #	ppm (wet)	ppm (dry)	lb/hr
1			
2			
Average			

Carbon Monoxide

Run #	Corrected ppm (dry)	lb/hr
1	464.58	4.20
2	450.26	4.11
Average	457.42	4.15

G. CONTINUOUS MONITOR DATA

TEXACO LOST HILLS
ENGINE #1

Date : 7/10/90

3 % O2 Correction

Nitrogen Dioxide

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @O2 Corr.*	lb/hr
1	10.35	77.03	130.65	1.16
2	10.01	67.37	110.74	0.90
Average	10.18	72.20	120.70	1.03

Sulfur Dioxide

Run #	ppm (wet)	ppm (dry)	lb/hr
1			
2			
Average			

Carbon Monoxide

Run #	Corrected ppm (dry)	lb/hr
1	588.94	5.38
2	620.87	5.07
Average	604.90	5.22

G. CONTINUOUS MONITOR DATA

TEXACO LOST HILLS
ENGINE #5

Date : 7/11/90

3 % O2 Correction

Nitrogen Dioxide

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @O2 Corr.*	lb/hr
1	10.40	84.69	144.38	0.96
2	10.52	90.72	156.50	1.04
Average	10.46	87.70	150.44	1.00

Sulfur Dioxide

Run #	ppm (wet)	ppm (dry)	lb/hr
1			
2			
Average			

Carbon Monoxide

Run #	Corrected ppm (dry)	lb/hr
1	498.55	3.42
2	503.58	3.53
Average	501.06	3.48

G. CONTINUOUS MONITOR DATA

TEXACO LOST HILLS
ENGINE #2

Date : 7/11/90

3 % O2 Correction

Nitrogen Dioxide

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @O2 Corr.*	lb/hr
1	11.14	92.57	169.70	1.40
2	10.58	101.04	175.24	1.44
Average	10.86	96.81	172.47	1.42

Sulfur Dioxide

Run #	ppm (wet)	ppm (dry)	lb/hr
1			
2			
Average			

Carbon Monoxide

Run #	Corrected ppm (dry)	lb/hr
1	593.70	5.49
2	600.64	5.20
Average	597.17	5.34

G. CONTINUOUS MONITOR DATA

TEXACO LOST HILLS
ENGINE #3

Date : 7/27/90

3 % O2 Correction

Nitrogen Dioxide

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @O2 Corr.*	lb/hr
1	10.52	104.78	180.75	1.48
2	10.53	98.53	170.12	1.41
Average	10.53	101.66	175.44	1.45

Sulfur Dioxide

Run #	ppm (wet)	ppm (dry)	lb/hr
1			
2			
Average			

Carbon Monoxide

Run #	Corrected ppm (dry)	lb/hr
1	469.78	4.03
2	462.86	4.04
Average	466.32	4.04

G. CONTINUOUS MONITOR DATA

TEXACO LOST HILLS
ENGINE #6

Date : 7/27/90

3 % O2 Correction

Nitrogen Dioxide

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @O2 Corr.*	lb/hr
1	10.21	86.48	144.76	1.22
2	10.22	78.99	132.34	1.12
Average	10.21	82.73	138.55	1.17

Sulfur Dioxide

Run #	ppm (wet)	ppm (dry)	lb/hr
1			
2			
Average			

Carbon Monoxide

Run #	Corrected ppm (dry)	lb/hr
1	671.72	5.78
2	689.17	5.94
Average	680.44	5.86

SECTION 3

WET TEST METHOD CALCULATIONS

FUEL / FLOWRATE CALCULATIONS

PLANT	TEXACO LOST HILLS		
SOURCE	ENGINE #4	Temp. Std.:	60
DATE	JULY 9,1990	Press. Std:	29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2
Barometric Press., in.Hg..	29.58	29.58
Brake Horsepower	784.00	748.00
Fuel Flow, scfh	6200.00	6245.83
Oxygen, %	11.31	11.33
Fuel Flow, acfh		
Fuel Press, psig		
" " psia		
Fuel Temp, dF		

FUEL ANALYSIS DATA :

	RUN 1	RUN 2
Btu/scf, Gross Cal. Value:	1066.00	1066.00
Btu/lb, Gross Cal. Value :	23070.00	23070.00
Hydrogen, Wt.% :	23.66	23.66
Carbon, Wt.% :	74.00	74.00
Sulfur, Wt.% :	0.00	0.00
Nitrogen, Wt.% :	1.15	1.15
Oxygen, Wt.% :	1.18	1.18

CALCULATIONS :

	RUN 1	RUN 2	AVERAGE
F-Factor,dscf/MMBtu :	8,493.54	8,493.54	8,493.54
Fuel Rate, scfh :	6200.00	6245.83	6222.92
Heat Rate, MMBtu/hr :	6.609	6.658	6.634
Flue gas flowrate, dscfm :	2038.99	2058.35	2048.67

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

FUEL / FLOWRATE CALCULATIONS

PLANT	TEXACO LOST HILLS		
SOURCE	ENGINE #1	Temp. Std.:	60
DATE	JULY 10,1990	Press. Std:	29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2
Barometric Press., in.Hg..	29.58	29.58
Brake Horsepower	926.00	845.00
Fuel Flow, scfh	6879.17	6345.83
Oxygen, %	10.35	10.01
Fuel Flow, acfh		
Fuel Press, psig		
" " psia		
Fuel Temp, dF		

FUEL ANALYSIS DATA :

	RUN 1	RUN 2
Btu/scf, Gross Cal. Value:	1069.00	1069.00
Btu/lb, Gross Cal. Value :	22721.00	22721.00
Hydrogen, Wt.% :	23.20	23.20
Carbon, Wt.% :	73.18	73.18
Sulfur, Wt.% :	0.00	0.00
Nitrogen, Wt.% :	1.85	1.85
Oxygen, Wt.% :	1.77	1.77

CALCULATIONS :

	RUN 1	RUN 2	AVERAGE
F-Factor,dscf/MMBtu :	8,489.53	8,489.53	8,489.53
Fuel Rate, scfh :	6879.17	6345.83	6612.50
Heat Rate, MMBtu/hr :	7.354	6.784	7.069
Flue gas flowrate, dscfm :	2061.29	1842.12	1951.71

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

FUEL / FLOWRATE CALCULATIONS

PLANT	TEXACO LOST HILLS		
SOURCE	ENGINE #5	Temp. Std.:	60
DATE	JULY 11,1990	Press. Std:	29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2
Barometric Press., in.Hg..	29.58	29.58
Brake Horsepower	672.00	669.00
Fuel Flow, scfh	5091.67	5133.33
Oxygen, %	10.40	10.52
Fuel Flow, acfh		
Fuel Press, psig		
" " psia		
Fuel Temp, dF		

FUEL ANALYSIS DATA :

	RUN 1	RUN 2
Btu/scf, Gross Cal. Value:	1080.00	1080.00
Btu/lb, Gross Cal. Value :	23062.00	23062.00
Hydrogen, Wt.% :	23.57	23.57
Carbon, Wt.% :	74.19	74.19
Sulfur, Wt.% :	0.00	0.00
Nitrogen, Wt.% :	1.31	1.31
Oxygen, Wt.% :	0.94	0.94

CALCULATIONS :

	RUN 1	RUN 2	AVERAGE
F-Factor,dscf/MMBtu :	8,500.59	8,500.59	8,500.59
Fuel Rate, scfh :	5091.67	5133.33	5112.50
Heat Rate, MMBtu/hr :	5.499	5.544	5.522
Flue gas flowrate, dscfm :	1550.74	1581.50	1566.12

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

FUEL / FLOWRATE CALCULATIONS

PLANT	TEXACO LOST HILLS		
SOURCE	ENGINE #2	Temp. Std.:	60
DATE	JULY 11,1990	Press. Std:	29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2
Barometric Press., in.Hg..	29.58	29.58
Brake Horsepower	885.00	882.00
Fuel Flow, scfh	6366.67	6312.50
Oxygen, %	11.14	10.58
Fuel Flow, acfh		
Fuel Press, psig		
" " psia		
Fuel Temp, dF		

FUEL ANALYSIS DATA :

	RUN 1	RUN 2
Btu/scf, Gross Cal. Value:	1080.00	1080.00
Btu/lb, Gross Cal. Value :	23062.00	23062.00
Hydrogen, Wt.% :	23.57	23.57
Carbon, Wt.% :	74.19	74.19
Sulfur, Wt.% :	0.00	0.00
Nitrogen, Wt.% :	1.31	1.31
Oxygen, Wt.% :	0.94	0.94

CALCULATIONS :

	RUN 1	RUN 2	AVERAGE
F-Factor,dscf/MMBtu :	8,500.59	8,500.59	8,500.59
Fuel Rate, scfh :	6366.67	6312.50	6339.59
Heat Rate, MMBtu/hr :	6.876	6.818	6.847
Flue gas flowrate, dscfm :	2086.08	1956.09	2021.08

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

FUEL / FLOWRATE CALCULATIONS

PLANT	TEXACO LOST HILLS		
SOURCE	ENGINE #3	Temp. Std.:	60
DATE	JULY 27,1990	Press. Std:	29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2
Barometric Press., in.Hg..	29.58	29.58
Brake Horsepower	924.00	916.00
Fuel Flow, scfh	6345.83	6450.00
Oxygen, %	10.52	10.53
Fuel Flow, acfh		
Fuel Press, psig		
" " psia		
Fuel Temp, dF		

FUEL ANALYSIS DATA :

	RUN 1	RUN 2
Btu/scf, Gross Cal. Value:	1072.00	1072.00
Btu/lb, Gross Cal. Value :	23180.00	23180.00
Hydrogen, Wt.% :	23.75	23.75
Carbon, Wt.% :	74.32	74.32
Sulfur, Wt.% :	0.00	0.00
Nitrogen, Wt.% :	0.94	0.94
Oxygen, Wt.% :	0.98	0.98

CALCULATIONS :

	RUN 1	RUN 2	AVERAGE
F-Factor,dscf/MMBtu :	8,490.62	8,490.62	8,490.62
Fuel Rate, scfh :	6345.83	6450.00	6397.92
Heat Rate, MMBtu/hr :	6.803	6.914	6.859
Flue gas flowrate, dscfm :	1938.30	1972.01	1955.16

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

FUEL / FLOWRATE CALCULATIONS

PLANT	TEXACO LOST HILLS		
SOURCE	ENGINE #6	Temp. Std.:	60
DATE	JULY 27,1990	Press. Std:	29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2
Barometric Press., in.Hg..	29.58	29.58
Brake Horsepower	801.00	780.00
Fuel Flow, scfh	6550.00	6550.00
Oxygen, %	10.21	10.22
Fuel Flow, acfh		
Fuel Press, psig		
" " psia		
Fuel Temp, dF		

FUEL ANALYSIS DATA :

	RUN 1	RUN 2
Btu/scf, Gross Cal. Value:	1072.00	1072.00
Btu/lb, Gross Cal. Value :	23180.00	23180.00
Hydrogen, Wt.% :	23.75	23.75
Carbon, Wt.% :	74.32	74.32
Sulfur, Wt.% :	0.00	0.00
Nitrogen, Wt.% :	0.94	0.94
Oxygen, Wt.% :	0.98	0.98

CALCULATIONS :

	RUN 1	RUN 2	AVERAGE
F-Factor,dscf/MMBtu :	8,490.62	8,490.62	8,490.62
Fuel Rate, scfh :	6550.00	6550.00	6550.00
Heat Rate, MMBtu/hr :	7.022	7.022	7.022
Flue gas flowrate, dscfm :	1942.64	1944.46	1943.55

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

SECTION 4

CONTINUOUS METHODS DATA

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #4

Date : 7/9/90

Test Run : 1

Test Condition: 784 HP

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	11.63	11.61	5.60	5.60	435.00	434.09			52.50	52.36
2	11.25	11.19	6.00	6.01	510.00	507.32			72.50	72.14
3	11.50	11.40	5.70	5.71	480.00	475.50			62.50	61.84
4	11.25	11.11	5.70	5.71	465.00	458.67			70.00	69.13
5	11.50	11.31	5.60	5.61	450.00	441.83			60.00	58.77
6	11.50	11.27	5.65	5.67	480.00	470.08			62.50	61.03
MEAN		11.31		5.72		464.58				62.54

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.16	12.00		2.50
Span Check	15.40	5.00	810.00		201.25
Cal. Gas	15.07	5.00	800.00		201.70
Scf	0.00365	-0.00533	-0.00042		-0.00244
Zcf	0.00000	0.02667	2.00000		0.41667

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #4

Date : 7/9/90

Test Run : 2

Test Condition: 748 HP

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	11.33	11.35	5.70		450.00	450.52			62.50	62.38
2	11.33	11.38	5.60		456.00	457.61			60.00	59.63
3	11.25	11.33	5.70		440.00	442.47			55.00	54.35
4	11.25	11.36	5.70		445.00	448.58			53.75	52.82
5	11.13	11.27	5.70		447.00	451.68			55.00	53.82
6	11.13	11.30	5.70		445.00	450.69			55.00	53.55
MEAN		11.33	5.68			450.26				56.09

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	-0.03	0.00	9.00		2.50
Span Check	14.83	5.00	782.00		200.75
Cal. Gas	15.07	5.00	800.00		201.70
Scf	-0.00232		-0.00563		-0.00285
Zcf	-0.00500		1.50000		0.41667

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #1

Date : 7/10/90

Test Run : 1

Test Condition: 926 HP

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.25	10.27	5.80	5.82	620.00	617.30			82.50	82.43
2	10.25	10.31	5.70	5.77	595.00	587.29			78.75	78.53
3	10.13	10.22	5.70	5.82	620.00	606.73			81.25	80.91
4	10.25	10.39	5.65	5.81	600.00	582.17			77.50	76.98
5	10.25	10.43	5.60	5.81	595.00	572.46			72.50	71.75
6	10.25	10.47	5.60	5.86	595.00	567.68			72.50	71.57
MEAN		10.35		5.81		588.94				77.03

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.18	0.00	0.00		2.50
Span Check	14.65	4.76	842.00		200.00
Cal. Gas	15.07	5.00	800.00		201.70
Scf	-0.00664	-0.00800	0.00875		-0.00347
Zcf	0.03000	0.00000	0.00000		0.41667

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #1

Date : 7/10/90

Test Run : 2

Test Condition: 845 HP

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	10.00	10.00	5.80		610.00	609.33			66.25	66.19
2	10.00	10.00	5.80		610.00	607.98			68.75	68.59
3	10.00	10.01	5.85		620.00	616.60			66.25	65.95
4	10.00	10.01	5.90		625.00	620.22			67.50	67.10
5	10.00	10.01	6.00		645.00	638.71			68.75	68.26
6	10.00	10.02	6.00		640.00	632.37			68.75	68.14
MEAN		10.01	5.89			620.87				67.37

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.08	0.00	2.00		2.25
Span Check	15.00	5.00	810.00		199.25
Cal. Gas	15.07	5.00	800.00		201.70
Scf	-0.00166		0.00167		-0.00388
Zcf	0.01333		0.33333		0.37500

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #5

Date : 7/11/90

Test Run : 1

Test Condition: 672 HP

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	10.38	10.38	5.80	5.82	505.00	504.47			88.75	88.67
2	10.38	10.38	5.80	5.85	490.00	488.47			82.50	82.23
3	10.38	10.38	5.80	5.89	495.00	492.44			82.50	82.05
4	10.38	10.38	5.80	5.93	510.00	506.31			91.25	90.73
5	10.38	10.38	5.80	5.96	505.00	500.31			85.00	84.22
6	10.50	10.50	5.80	6.00	505.00	499.28			81.25	80.21
MEAN		10.40		5.91		498.55				84.69

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.15	-0.10	0.00		3.00
Span Check	15.00	4.80	810.00		200.00
Cal. Gas	15.07	5.00	800.00		201.70
Scf	-0.00243	-0.00333	0.00208		-0.00388
Zcf	0.02500	-0.01667	0.00000		0.50000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS
Station : ENGINE #5

Date : 7/11/90
Test Run : 2
Test Condition: 669 HP

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	10.50		5.95	5.95	510.00	507.95			87.50	87.50
2	10.63		5.90	5.90	510.00	503.88			83.75	83.72
3	10.50		6.00	6.00	505.00	494.90			77.50	77.37
4	10.50		6.00	6.00	510.00	495.85			86.25	86.21
5	10.63		5.90	5.90	520.00	501.68			100.00	100.25
6	10.38		6.00	5.99	540.00	517.20			108.75	109.29
MEAN	10.52			5.96		503.58				90.72

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	-0.03	10.00		2.50
Span Check	15.07	5.00	833.00		198.50
Cal. Gas	15.07	5.00	800.00		201.70
Scf		0.00100	0.00479		-0.00471
Zcf		-0.00500	1.66667		0.41667

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #2

Date : 7/11/90

Test Run : 1

Test Condition: 885 HP

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	11.00	11.01	5.70	5.71	585.00	583.68			87.50	87.37
2	11.00	11.03	5.70	5.73	605.00	601.00			93.75	93.37
3	11.00	11.04	5.70	5.75	610.00	603.32			95.00	94.37
4	11.00	11.06	5.70	5.77	605.00	595.69			93.75	92.86
5	11.25	11.33	5.60	5.69	605.00	593.05			95.00	93.87
6	11.25	11.35	5.60	5.71	600.00	585.47			95.00	93.61
MEAN		11.14		5.73		593.70				92.57

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.18	10.00		3.00
Span Check	14.93	4.92	818.00		201.50
Cal. Gas	15.07	5.00	800.00		201.70
Scf	-0.00155	-0.00867	0.00167		-0.00264
Zcf	0.00000	0.03000	1.66667		0.50000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #2

Date : 7/11/90

Test Run : 2

Test Condition: 882 HP

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	10.75	10.74	5.80	5.79	580.00	578.55			90.00	89.98
2	10.63	10.59	5.80	5.78	615.00	610.42			100.00	99.99
3	10.63	10.57	5.90	5.87	623.00	615.31			112.50	112.57
4	10.63	10.55	5.85	5.81	615.00	604.42			105.00	105.03
5	10.63	10.52	5.85	5.80	615.00	601.47			102.50	102.50
6	10.63	10.50	5.90	5.84	610.00	593.67			96.25	96.15
MEAN		10.58		5.82		600.64				101.04

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	0.00	0.00		1.75
Span Check	15.25	5.06	824.00		200.00
Cal. Gas	15.07	5.00	800.00		201.70
Scf	0.00144	0.00200	0.00500		-0.00285
Zcf	0.00833	0.00000	0.00000		0.29167

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #3

Date : 7/27/90

Test Run : 1

Test Condition: 924 HP

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.40	10.41	5.60		470.00	469.61			103.00	102.98
2	10.45	10.49	5.55		480.00	478.80			100.00	99.94
3	10.55	10.61	5.45		445.00	443.15			95.00	94.90
4	10.60	10.69	5.40		438.00	435.46			93.50	93.36
5	10.48	10.60	5.50		455.00	451.61			95.00	94.82
6	10.20	10.34	5.70		545.00	540.05			143.00	142.67
MEAN		10.52	5.53			469.78				104.78

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	-0.10	0.00		0.00
Span Check	14.85	7.90	404.00		80.00
Cal. Gas	15.07	8.00	400.00		79.80
Scf	-0.00243		0.00167		0.00042
Zcf	0.00000		0.00000		0.00000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #3

Date : 7/27/90

Test Run : 2

Test Condition: 916 HP

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.60	10.60	5.55	5.55	450.00	450.19			90.00	89.82
2	10.60	10.61	5.60	5.61	445.00	445.56			87.50	86.96
3	10.70	10.72	5.60	5.62	430.00	430.90			85.00	84.09
4	10.55	10.58	5.60	5.63	445.00	446.30			95.00	93.75
5	10.35	10.39	5.65	5.69	460.00	461.73			110.00	108.43
6	10.25	10.29	5.75	5.80	540.00	542.49			130.00	128.15
MEAN		10.53		5.65		462.86				98.53

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.05	0.00		2.50
Span Check	15.00	7.90	398.00		82.00
Cal. Gas	15.07	8.00	400.00		79.80
Scf	-0.00077	-0.00313	-0.00083		-0.00063
Zcf	0.00000	0.00833	0.00000		0.41667

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #6

Date : 7/27/90

Test Run : 1

Test Condition: 801 HP

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.25	10.25	5.65	5.66	660.00	660.55			83.50	83.48
2	10.20	10.21	5.65	5.68	660.00	661.65			85.00	84.95
3	10.20	10.22	5.65	5.71	670.00	672.80			88.00	87.91
4	10.15	10.18	5.62	5.70	675.00	678.96			88.00	87.87
5	10.15	10.19	5.62	5.72	660.00	664.99			87.50	87.34
6	10.15	10.19	5.63	5.75	685.00	691.34			87.50	87.30
MEAN		10.21		5.70		671.72				86.48

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	-0.10	0.00		0.05
Span Check	15.00	7.85	396.00		80.00
Cal. Gas	15.07	8.00	400.00		79.80
Scf	-0.00077	-0.00104	-0.00167		0.00031
Zcf	0.00000	-0.01667	0.00000		0.00833

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO LOST HILLS

Station : ENGINE #6

Date : 7/27/90

Test Run : 2

Test Condition: 780 HP

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.20	10.20	5.65	5.66	680.00				73.00	73.10
2	10.20	10.21	5.65	5.68	690.00				75.00	75.31
3	10.20	10.22	5.65	5.70	700.00				77.50	78.03
4	10.20	10.23	5.70	5.77	695.00				81.50	82.28
5	10.15	10.19	5.70	5.79	710.00				85.00	86.05
6	10.20	10.24	5.65	5.76	660.00				78.00	79.18
MEAN		10.22		5.72	689.17					78.99

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.10	8.00		0.05
Span Check	15.00	7.80	408.00		78.50
Cal. Gas	15.07	8.00	400.00		79.80
Scf	-0.00077	-0.00625			-0.00282
Zcf	0.00000	0.01667			0.00833

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO LOST HILLS Date : 7/9/90

Station : ENGINE #4

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	5.00	800.00		201.70
Measured Span	15.40	5.00	810.00		201.25
Zero Drift	0.00	0.16	12.00		2.50
Final, Actual Span	15.40	4.84	798.00		198.75
Percent Drift	2.2	-3.2	-0.3		-1.5

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	5.00	800.00		201.70
Measured Span	14.83	5.00	782.00		200.75
Zero Drift	-0.03	0.00	9.00		2.50
Final, Actual Span	14.86	5.00	773.00		198.25
Percent Drift	-1.4	0.0	-3.4		-1.7

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO LOST HILLS Date : 7/10/90

Station : ENGINE #1

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	5.00	800.00		201.70
Measured Span	14.65	4.76	842.00		200.00
Zero Drift	0.18	0.00	0.00		2.50
Final, Actual Span	14.47	4.76	842.00		197.50
Percent Drift	-4.0	-4.8	5.3		-2.1

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	5.00	800.00		201.70
Measured Span	15.00	5.00	810.00		199.25
Zero Drift	0.08	0.00	2.00		2.25
Final, Actual Span	14.92	5.00	808.00		197.00
Percent Drift	-1.0	0.0	1.0		-2.3

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO LOST HILLS Date : 7/11/90

Station : ENGINE #5

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	5.00	800.00		201.70
Measured Span	15.00	4.80	810.00		200.00
Zero Drift	0.15	-0.10	0.00		3.00
Final, Actual Span	14.85	4.90	810.00		197.00
Percent Drift	-1.5	-2.0	1.3		-2.3

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	5.00	800.00		201.70
Measured Span	15.07	5.00	833.00		198.50
Zero Drift	0.00	-0.03	10.00		2.50
Final, Actual Span	15.07	5.03	823.00		196.00
Percent Drift	0.0	0.6	2.9		-2.8

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO LOST HILLS Date : 7/11/90

Station : ENGINE #2

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	5.00	800.00		201.70
Measured Span	14.93	4.92	818.00		201.50
Zero Drift	0.00	0.18	10.00		3.00
Final, Actual Span	14.93	4.74	808.00		198.50
Percent Drift	-0.9	-5.2	1.0		-1.6

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	5.00	800.00		201.70
Measured Span	15.25	5.06	824.00		200.00
Zero Drift	0.05	0.00	0.00		1.75
Final, Actual Span	15.20	5.06	824.00		198.25
Percent Drift	0.9	1.2	3.0		-1.7

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO LOST HILLS Date : 7/27/90

Station : ENGINE #3

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	8.00	400.00		79.80
Measured Span	14.85	7.90	404.00		80.00
Zero Drift	0.00	-0.10	0.00		0.00
Final, Actual Span	14.85	8.00	404.00		80.00
Percent Drift	-1.5	0.0	1.0		0.3

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	8.00	400.00		79.80
Measured Span	15.00	7.90	398.00		82.00
Zero Drift	0.00	0.05	0.00		2.50
Final, Actual Span	15.00	7.85	398.00		79.50
Percent Drift	-0.5	-1.9	-0.5		-0.4

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO LOST HILLS Date : 7/27/90

Station : ENGINE #6

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	8.00	400.00		79.80
Measured Span	15.00	7.85	396.00		80.00
Zero Drift	0.00	-0.10	0.00		0.05
Final, Actual Span	15.00	7.95	396.00		79.95
Percent Drift	-0.5	-0.6	-1.0		0.2

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.07	8.00	400.00		79.80
Measured Span	15.00	7.80	408.00		78.50
Zero Drift	0.00	0.10	8.00		0.05
Final, Actual Span	15.00	7.70	400.00		78.45
Percent Drift	-0.5	-3.7	0.0		-1.7

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

EMISSION RATE CALCULATIONS

PLANT : TEXACO LOST HILLS
SOURCE : ENGINE #4
DATE : JULY 9,1990

Temp. Std. : 60 dF
Press. Std.: 29.92 in. Hg. 15 % O2 Correction

	RUN 1	RUN 2	AVERAGE
Oxygen (%)	11.31	11.33	11.32
Qs(std), dscfm	2038.99	2058.35	2048.67
NOx, ppm	62.54	56.09	59.32
CO, ppm	464.58	450.26	457.42
HC, ppm	13.98	9.78	11.88
F-Factor	8493.54	8493.54	8493.54
NOx, MW = 46.005			
NOx, lb/hr	0.93	0.84	0.88
NOx, ppm @ O2	38.48	34.58	36.53
NOx, lb/MMBtu	0.1404	0.1262	0.1333
NOx, g/HP-hr	0.54	0.51	0.52
CO, MW = 28.010			
CO, lb/hr	4.20	4.11	4.15
CO, ppm @ O2	285.82	277.59	281.71
CO, lb/MMBtu	0.6351	0.6168	0.6260
CO, g/HP-hr	2.43	2.49	2.46
HC, MW = 16.043			
HC, lb/hr	0.07	0.05	0.06
HC, ppm @ O2	8.60	6.03	7.32
HC, lb/MMBtu	0.0109	0.0077	0.0093
HC, g/HP-hr	0.04	0.03	0.04

* lb/hr = 8.223E-5 x Qs(std) x MW x ppm / (Tstd + 460)

* ppm @ O2 = ppm measured x [(20.9 - O2% correction) / (20.9 - %O2 measured)]

* lb/MMBtu = F-Factor x MW x [1.3711E-6 / (Tstd + 460)] x [20.9 / (20.9 - O2%)] x ppm

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

EMISSION RATE CALCULATIONS

PLANT : TEXACO LOST HILLS
SOURCE : ENGINE #1
DATE : JULY 10,1990

Temp. Std. : 60 dF
Press. Std.: 29.92 in. Hg. 15 % O2 Correction

	RUN 1	RUN 2	AVERAGE
Oxygen (%)	10.35	10.01	10.18
Qs(std), dscfm	2061.29	1842.12	1951.71
NOx, ppm	77.03	67.37	72.20
CO, ppm	588.94	620.87	604.91
HC, ppm	19.75	31.50	25.63
F-Factor	8489.53	8489.53	8489.53
NOx, MW = 46.005			
NOx, lb/hr	1.16	0.90	1.03
NOx, ppm @ O2	43.08	36.50	39.79
NOx, lb/MMBtu	0.1571	0.1331	0.1451
NOx, g/HP-hr	0.57	0.48	0.53
CO, MW = 28.010			
CO, lb/hr	5.38	5.07	5.22
CO, ppm @ O2	329.36	336.38	332.87
CO, lb/MMBtu	0.7315	0.7471	0.7393
CO, g/HP-hr	2.63	2.72	2.68
HC, MW = 16.043			
HC, lb/hr	0.10	0.15	0.13
HC, ppm @ O2	11.05	17.07	14.06
HC, lb/MMBtu	0.0141	0.0217	0.0179
HC, g/HP-hr	0.05	0.08	0.06

* lb/hr = 8.223E-5 x Qs(std) x MW x ppm / (Tstd + 460)

* ppm @ O2 = ppm measured x [(20.9 - O2% correction) / (20.9 - %O2 measured)]

* lb/MMBtu = F-Factor x MW x [1.3711E-6 / (Tstd + 460)] x [20.9 / (20.9 - O2%)] x ppm

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

EMISSION RATE CALCULATIONS

PLANT : TEXACO LOST HILLS
SOURCE : ENGINE #5
DATE : JULY 11,1990

Temp. Std. : 60 dF
Press. Std.: 29.92 in. Hg.

15 % O2 Correction

	RUN 1	RUN 2	AVERAGE
Oxygen (%)	10.40	10.52	10.46
Qs(std), dscfm	1550.74	1581.50	1566.12
NOx, ppm	84.69	90.72	87.71
CO, ppm	498.55	503.58	501.07
HC, ppm	37.12	45.58	41.35
F-Factor	8500.59	8500.59	8500.59
NOx, MW = 46.005			
NOx, lb/hr	0.96	1.04	1.00
NOx, ppm @ O2	47.59	51.57	49.58
NOx, lb/MMBtu	0.1738	0.1884	0.1811
NOx, g/HP-hr	0.64	0.71	0.68
CO, MW = 28.010			
CO, lb/hr	3.42	3.53	3.48
CO, ppm @ O2	280.14	286.24	283.19
CO, lb/MMBtu	0.6230	0.6366	0.6298
CO, g/HP-hr	2.31	2.39	2.35
HC, MW = 16.043			
HC, lb/hr	0.15	0.18	0.16
HC, ppm @ O2	20.86	25.91	23.38
HC, lb/MMBtu	0.0266	0.0330	0.0298
HC, g/HP-hr	0.10	0.12	0.11

* lb/hr = 8.223E-5 x Qs(std) x MW x ppm / (Tstd + 460)

* ppm @ O2 = ppm measured x [(20.9 - O2% correction) / (20.9 - %O2 measured)]

* lb/MMBtu = F-Factor x MW x [1.3711E-6 / (Tstd + 460)] x [20.9 / (20.9 - O2%)] x ppm

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

EMISSION RATE CALCULATIONS

PLANT : TEXACO LOST HILLS
SOURCE : ENGINE #2
DATE : JULY 11,1990

Temp. Std. : 60 dF
Press. Std.: 29.92 in. Hg. 15 % O2 Correction

	RUN 1	RUN 2	AVERAGE
Oxygen (%)	11.14	10.58	10.86
Qs(std), dscfm	2086.08	1956.09	2021.08
NOx, ppm	92.57	101.04	96.81
CO, ppm	593.70	600.64	597.17
HC, ppm	149.44	113.55	131.50
F-Factor	8500.59	8500.59	8500.59
NOx, MW = 46.005			
NOx, lb/hr	1.40	1.44	1.42
NOx, ppm @ O2	55.96	57.77	56.86
NOx, lb/MMBtu	0.2044	0.2110	0.2077
NOx, g/HP-hr	0.72	0.74	0.73
CO, MW = 28.010			
CO, lb/hr	5.49	5.20	5.34
CO, ppm @ O2	358.90	343.39	351.14
CO, lb/MMBtu	0.7982	0.7637	0.7809
CO, g/HP-hr	2.81	2.68	2.74
HC, MW = 16.043			
HC, lb/hr	0.79	0.56	0.68
HC, ppm @ O2	90.34	64.92	77.63
HC, lb/MMBtu	0.1151	0.0827	0.0989
HC, g/HP-hr	0.41	0.29	0.35

* lb/hr = 8.223E-5 x Qs(std) x MW x ppm / (Tstd + 460)

* ppm @ O2 = ppm measured x [(20.9 - O2% correction) / (20.9 - %O2 measured)]

* lb/MMBtu = F-Factor x MW x [1.3711E-6 / (Tstd + 460)] x [20.9 / (20.9 - O2%)] x ppm

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

EMISSION RATE CALCULATIONS

PLANT : TEXACO LOST HILLS
SOURCE : ENGINE #3
DATE : JULY 27,1990

Temp. Std. : 60 dF
Press. Std.: 29.92 in. Hg. 15 % O2 Correction

	RUN 1	RUN 2	AVERAGE
Oxygen (%)	10.52	10.53	10.53
Qs(std), dscfm	1938.30	1972.01	1955.16
NOx, ppm	104.78	98.53	101.66
CO, ppm	469.78	462.86	466.32
HC, ppm	101.60	76.84	85.19
F-Factor	8490.62	8490.62	8490.62
NOx MW = 46.005			
NOx, lb/hr	1.48	1.41	1.45
NOx, ppm @ O2	59.56	56.06	57.81
NOx, lb/MMBtu	0.2173	0.2045	0.2109
NOx, g/HP-hr	0.73	0.70	0.71
CO, MW = 28.010			
CO, lb/hr	4.03	4.04	4.04
CO, ppm @ O2	267.02	263.34	265.18
CO, lb/MMBtu	0.5931	0.5850	0.5891
CO, g/HP-hr	1.98	2.00	1.99
HC, MW = 16.043			
HC, lb/hr	0.50	0.38	0.42
HC, ppm @ O2	57.75	39.13	48.44
HC, lb/MMBtu	0.0735	0.0498	0.0616
HC, g/HP-hr	0.25	0.17	0.21

* lb/hr = 8.223E-5 x Qs(std) x MW x ppm / (Tstd + 460)

* ppm @ O2 = ppm measured x [(20.9 - O2% correction) / (20.9 - %O2 measured)]

* lb/MMBtu = F-Factor x MW x [1.3711E-6 / (Tstd + 460)] x [20.9 / (20.9 - O2%)] x ppm

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

EMISSION RATE CALCULATIONS

PLANT : TEXACO LOST HILLS
SOURCE : ENGINE #6
DATE : JULY 27,1990

Temp. Std. : 60 dF
Press. Std.: 29.92 in. Hg. 15 % O2 Correction

	RUN 1	RUN 2	AVERAGE
Oxygen (%)	10.21	10.22	10.22
Qs(std), dscfm	1942.64	1944.46	1943.55
NOx, ppm	86.48	78.99	82.74
CO, ppm	671.72	689.17	680.44
HC, ppm	5.93	9.72	7.83
F-Factor	8490.62	8490.62	8490.62
NOx, MW = 46.005			
NOx, lb/hr	1.22	1.12	1.17
NOx, ppm @ O2	47.73	43.64	45.68
NOx, lb/MMBtu	0.1741	0.1592	0.1667
NOx, g/HP-hr	0.69	0.65	0.67
CO, MW = 28.010			
CO, lb/hr	5.78	5.94	5.86
CO, ppm @ O2	370.73	380.72	375.73
CO, lb/MMBtu	0.8235	0.8457	0.8346
CO, g/HP-hr	3.27	3.45	3.36
HC, MW = 16.043			
HC, lb/hr	0.03	0.05	0.04
HC, ppm @ O2	3.27	5.37	4.32
HC, lb/MMBtu	0.0042	0.0068	0.0055
HC, g/HP-hr	0.02	0.03	0.02

* lb/hr = 8.223E-5 x Qs(std) x MW x ppm / (Tstd + 460)

* ppm @ O2 = ppm measured x [(20.9 - O2% correction) / (20.9 - %O2 measured)]

* lb/MMBtu = F-Factor x MW x [1.3711E-6 / (Tstd + 460)] x [20.9 / (20.9 - O2%)] x ppm

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

SECTION 5

ANALYSIS PROCEDURES

This section of the report describes the procedures used to analyze the samples collected during the test program. All analyses were performed in the Pape & Steiner laboratory in Bakersfield except the fuel analyses. The fuel analyses were done by Pacific Gas Technology.

5.1 HYDROCARBONS

The grab sample of hydrocarbons was analyzed using a Carle Model 211 GC-FID. After purging the sample loop three times, a 1-ml sample was extracted from the Tedlar sample bag and injected onto a 6-foot long, 1/8-inch stainless steel column containing 80/100 mesh PoraPac Q, maintained at 150°C. The C_1 hydrocarbon was separated and the greater than C_1 hydrocarbons were backflushed to the detector for quantitation as a single peak. An HP Model 3390A reporting integrator was used to record and integrate the signal from the GC. A ±1 percent certified calibration gas (C_1-C_6 HC in N_2) was used to calibrate the GC before and after sample analysis to quantitate the C_1 and greater than C_1 hydrocarbons. The beginning and end calibrations must agree within ±5% for the data to be acceptable.

5.2 FUEL

A sample of the gas fired each day during this test program was collected and sent to Pacific Gas Technology for analysis. Analysis was

performed by PGT in accordance with EPA Title 40 Section 60.45. The specific procedures are itemized in Table 5-1. The results appear at the end of this section.

TABLE 5-1. FUEL ANALYSIS METHODS

LABORATORY TEST PROCEDURES FOR FUEL OILS AND FUEL GASES

Reference: EPA Title 40, Section 60.45

FUEL OIL TESTS:	
Sediment and Water, Vol. %	ASTM D4007-81
Gravity by Hydrometer (API)	ASTM D1298-80
API Gravity Corrected to 60°F	ASTM Table 5A
Gross Calorific Value (Btu/lb)	ASTM D2015-77
Ultimate Analysis (C, H, O, N, S, wt. %)	
Carbon, Hydrogen	ASTM D3178-73
Nitrogen (chemiluminescence detector)	ASTM D3431-80
Sulfur	ASTM D2622-82
Ash	ASTM D482
Oxygen	ASTM D3176-74
GASEOUS FUELS BY GAS-LIQUID CHROMATOGRAPHY:	
Gas Analysis	ASTM D1945-81
Sulfur Analysis	CPA B16
Calculation of Gross Calorific Value	ASTM D3588-81
Component Weight %, F-factor calculations	EPA 40:60.45
PROCEDURES FOR SCRUBBER LIQUOR ANALYSIS:	
Specific Gravity	ASTM D1429
Chlorides	ASTM D512-67

PACIFIC GAS TECHNOLOGY

4700 Easton Drive - Suite 39
Bakersfield, California 93309
805/324-1317
Fax: 805/324-2746

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GAS ANALYSIS BY CHROMATOGRAPH

PAPE & STEINER ENVIRONMENTAL SERVICES
5801 Norris Road
Bakersfield, CA 93308

SAMPLED: JULY 9, 1990
SUBMITTED: JULY 11, 1990
REPORTED: JULY 12, 1990

Attention: Jim Steiner

LAB # 2893

Sample ID : TEXACO LOST HILLS
FUEL GAS

P&S ID # : 21720
21721 ****

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	ND	0.00	CARBON	74.00
NITROGEN	0.72	1.15	HYDROGEN	23.66
CARBON DIOXIDE	0.65	1.63	OXYGEN	1.18
HYDROGEN	ND	0.00	NITROGEN	1.15
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	90.26	82.44		
ETHANE	7.93	13.58		
PROPANE	0.38	0.95		
iso-BUTANE	0.01	0.03		
n-BUTANE	0.01	0.03		
iso-PENTANE	0.01	0.04		
n-PENTANE	0.01	0.04		
HEXANE +	0.02	0.05		

SPECIFIC GRAVITY * : 0.606

SPECIFIC VOLUME : 21.64 cu ft/lb

HYDROGEN SULFIDE : TR < 1 ppm
(Draeger) **** (PS # : 21721)

TOTAL * BTU/cu ft DRY : 1066
WET : 1047

NET * BTU/cu ft DRY : 962
WET : 945

BTU/lb : 23070

BTU/lb : 20819

* CALCULATED ACCORDING TO : ASTM D-3588

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GAS ANALYSIS BY CHROMATOGRAPH

PAPE & STEINER ENVIRONMENTAL SERVICES
5801 Norris Road
Bakersfield, CA 93308

Attention: Jim Steiner

SAMPLED: JULY 10, 1990
SUBMITTED: JULY 11, 1990
REPORTED: JULY 12, 1990

LAB # 2896

Sample ID : TEXACO LOST HILLS
FUEL GAS

P&S ID # : 21714
21713 ****

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	0.10	0.18	CARBON	73.18
NITROGEN	1.18	1.85	HYDROGEN	23.20
CARBON DIOXIDE	0.89	2.19	OXYGEN	1.77
HYDROGEN	ND	0.00	NITROGEN	1.85
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	88.70	79.50		
ETHANE	8.15	13.69		
PROPANE	0.88	2.17		
iso-BUTANE	0.02	0.06		
n-BUTANE	0.02	0.06		
iso-PENTANE	0.01	0.04		
n-PENTANE	0.01	0.04		
HEXANE +	0.04	0.10		

SPECIFIC GRAVITY * : 0.618

SPECIFIC VOLUME : 21.25 cu ft/lb

HYDROGEN SULFIDE : TR < 1 ppm
(Draeger) **** (PS # : 21713)

TOTAL * BTU/cu ft DRY : 1069
WET : 1050

NET * BTU/cu ft DRY : 965
WET : 948

BTU/lb : 22721

BTU/lb : 20506

* CALCULATED ACCORDING TO : ASTM D-3588

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GAS ANALYSIS BY CHROMATOGRAPH

PAPE & STEINER ENVIRONMENTAL SERVICES
5801 Norris Road
Bakersfield, CA 93308

Attention: Jim Steiner

SAMPLED: JULY 11, 1990
SUBMITTED: JULY 12, 1990
REPORTED: JULY 13, 1990

LAB # 2899

Sample ID : TEXACO LOST HILLS
FUEL GAS

P&S ID # : 21709
21710 ****

ANALYZED GAS

	MOLE %	WT %
OXYGEN	0.02	0.04
NITROGEN	0.83	1.31
CARBON DIOXIDE	0.50	1.24
HYDROGEN	ND	0.00
CARBON MONOXIDE	ND	0.00
HYDROGEN SULFIDE	ND	0.00
METHANE	89.18	80.40
ETHANE	8.36	14.13
PROPANE	1.00	2.48
iso-BUTANE	0.03	0.10
n-BUTANE	0.04	0.13
iso-PENTANE	0.01	0.04
n-PENTANE	0.01	0.04
HEXANE +	0.02	0.05

CHONS WT %	
CARBON	74.19
HYDROGEN	23.57
OXYGEN	0.94
NITROGEN	1.31
SULFUR	0.00

SPECIFIC GRAVITY * : 0.614

SPECIFIC VOLUME : 21.35 cu ft/lb

HYDROGEN SULFIDE : TR < 1 ppm
(Draeger) **** (PS # : 21710)

TOTAL * BTU/cu ft DRY : 1080
WET : 1061

BTU/lb : 23062

NET * BTU/cu ft DRY : 975
WET : 958

BTU/lb : 20823

5-6

* CALCULATED ACCORDING TO : ASTM D-3588

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Bakersfield, California 93309
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Ans'd.....

GAS ANALYSIS BY CHROMATOGRAPH

PAPE & STEINER ENVIRONMENTAL SERVICES
5801 Norris Road
Bakersfield, CA 93308

SAMPLED: JULY 27, 1990
SUBMITTED: JULY 30, 1990
REPORTED: JULY 30, 1990

Attention: Jim Steiner

LAB = 2931

Sample ID : TEXACO LOST HILLS
ENGINES #3 & #6
FUEL GAS

P&S ID # : 23950

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	ND	0.00	CARBON	74.32
NITROGEN	0.59	0.94	HYDROGEN	23.75
CARBON DIOXIDE	0.54	1.35	OXYGEN	0.98
HYDROGEN	ND	0.00	NITROGEN	0.94
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	90.19	82.33		
ETHANE	8.08	13.83		
PROPANE	0.57	1.43		
iso-BUTANE	0.01	0.03		
n-BUTANE	0.01	0.03		
iso-PENTANE	TR<0.01	0.00		
n-PENTANE	TR<0.01	0.00		
HEXANE +	TR<0.01	0.00		

SPECIFIC GRAVITY * : 0.607

SPECIFIC VOLUME : 21.62 cu ft/lb

HYDROGEN SULFIDE : ND < 1 ppm
(Draeger) (P&S ID #: 23951)

TOTAL * BTU/cu ft	DRY :	1072	NET * BTU/cu ft	DRY :	968
	WET :	1053		WET :	951
BTU/lb	:	23180	BTU/lb	:	20925

* CALCULATED ACCORDING TO : ASTM D-3588

SECTION 6

SAMPLING PROCEDURES

This section of the report describes the equipment and procedures used to conduct the gaseous tests on this program.

6.1 HYDROCARBONS

The sampling train for hydrocarbons consisted of a probe (short piece of stainless steel), a Tygon sample line, a Tedlar bag and a hand pump. The entire train was purged with stack gas three times before collecting a sample. An integrated grab sample of the stack gases was collected over the test period. After sample collection, the Tedlar bag was lowered to the mobile lab for subsequent analysis. Duplicate grab samples were collected during the test series.

6.2 SAMPLING PROCEDURES FOR CONTINUOUS MONITORING

The continuous monitors used in the Pape & Steiner Mobile Monitoring Lab are shown in Table 6-1. Figure 6-1 is a schematic of the continuous monitoring system. The procedures used to continuously monitor stack gases for NO_x, O_2, CO, and CO_2 strictly follow CARB Method 1-100.

Sample was taken from the stack (at a single point) using a 316 stainless steel probe. A heated Balston filter holder and fiberglass filter (99.9999 percent efficiency retention of 0.6 micron particles) was connected to the outlet of the probe. Sample gas was transported through heated Teflon sample line (maintained at >250°F) by a Teflon-lined dia-

TABLE 6-1 . CONTINUOUS MONITORING LAB - TRAILERS 1, 2, AND 4

NO_x CHEMILUMINESCENT ANALYZER -- THERMO ELECTRON MODEL 10

Response Time (0-90%)	1.5 sec -- NO mode; 1.7 sec -- NO_x mode
Zero Drift	Negligible after 1/2 hour warmup
Linearity	±1% of full scale
Accuracy	Derived from the NO or NO_2 calibration gas, ±1% of full scale
Output	0-10 V
Operating Ranges	0-2, 5, 10, 25, 100, 250 ,1000, 2500, and 10,000 ppm

O_2 ANALYZER, FUEL TYPE -- TELEDYNE MODEL 326

Response Time (0-90%)	60 seconds
Accuracy	±1% of scale at constant temperatures; ±1% of scale of ±5% of reading, whichever is greater, over the operating temperature range
Output	0-1 V
Operating Ranges	0-5%, 10%, 25% O_2

CO_2/CO INFRARED ANALYZER -- ANARAD MODEL AR-600

Response Time (0-90%)	5 seconds
Zero Drift	±1%
Span Drift	±1%
Linearity	1%
Resolution	Less than 1% of full scale
Output	0-1 V
Operating Ranges	0-20% CO_2/0-10,000 ppm CO

CO GAS FILTER CORRELATION - THERMO ELECTRON MODEL 48

Response Time (0-95%)	1 minute
Zero Drift	±0.2 ppm CO
Span Drift	Less than 1% full scale in 24 hours
Linearity	±1% full scale, all ranges
Accuracy	±0.1 ppm CO
Output	0-10V
Operating Ranges	1, 2, 5, 10, 20, 50 ,100, 200, 500, 1000 ppm

SO_2 UV ANALYZER -- DUPONT MODEL 400

Response Time (0-90%)	Less than 1 second
Zero Drift	Less than 1% full scale in 24 hours
Linearity	±1% full scale
Accuracy	±2% full scale
Output	0-5 V
Operating Ranges	0-100 ppm, 0-1000 ppm

STRIP CHART RECORDERS (3) -- MOLYTEK MODEL 2800

Pen Response	0.75 seconds Full Scale
Input Spans	10, 20, 50, 100 MV; 1, 5, 10 VDC
Zero Set	LH standard, adjustable to 100% of Full Scale
Accuracy	±0.25% of Span
Dead Band	±0.15% of Span
Linearity	±0.25% of Span
Chart Speed	0.5, 1, 2, 3, 6, 12 inches/hour; 0.5, 1, 2, 4, 10 inches/minute
Recording Pen	Fiber tip cartridge
Chart Width	10 inches

SCOTSMAN TRAILER

Fully Insulated	Air conditioned	8-ft x 14-ft x 11-ft

1. Filter 0.6 μ, 99.9999 percent efficient
2. Duct
3. 316 stainless steel probe
4. 3/8-inch, heated (250°F) Teflon
5. Four-pass conditioner-dryer, 316 stainless steel internals
6. 3/8-inch, unheated Teflon
7. Teflon-lined sample pump
8. 3/8-inch unheated Teflon
9. Rotameter
10. 1/4-inch Teflon tubing
11. Calibration gas manifold
12. Calibration gas selector valve
13. Calibration gas cylinders
14. Backpressure regulator
15. Auxiliary analysis port

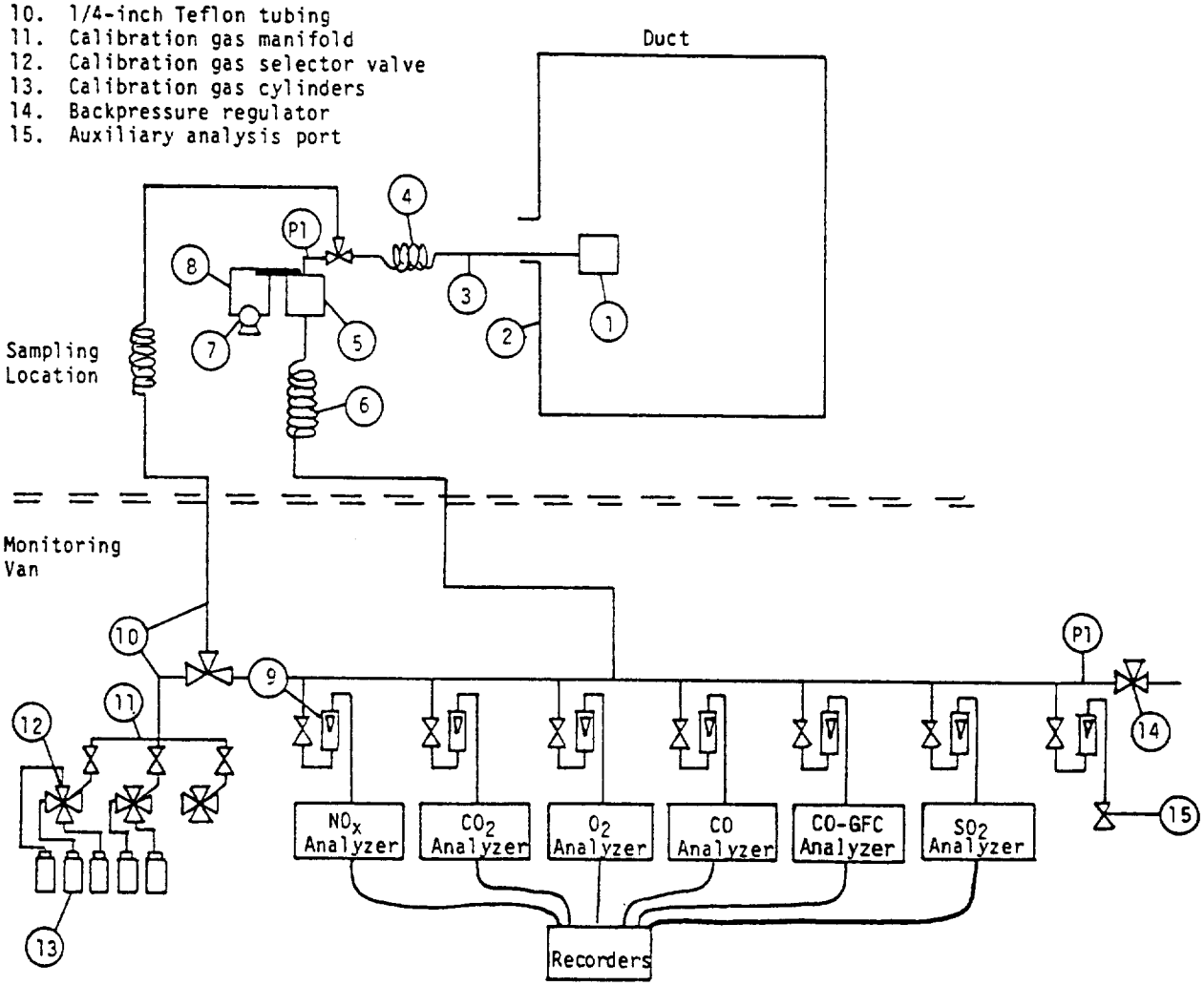


FIGURE 6-1. SCHEMATIC OF CONTINUOUS MONITORING SYSTEM

phragm pump to a 316 stainless steel refrigeration type conditioner (Hankison Model E-4G-SS). The sample gas was passed through the conditioner two separate times under vacuum before entering the pump, then two additional times under pressure. The clean, dry sample gas (~35°F) was then transported to the continuous analyzer system through an unheated Teflon line. A series of flowmeters, valves, and regulators maintain constant flow through the system at a constant pressure.

Calibrations of the continuous analyzers were performed using EPA Protocol 1 calibration gases (±1%) for NO_x and NBS certified calibration gases (±1%) for CO, CO_2 and O_2. Copies of the gas certifications are included in the Quality Assurance Section of this report. All pertinent data (date, time, test locations, analyzer range, cal gas value) were recorded on both the field data sheets and continuous analyzer strip charts in the field.

At the start of a test day, a leak-check was performed. The sample probe was removed from the stack and the end was sealed. A leakcheck was successful only if pressure at the analyzer system and flow through the rotameters to the individual analyzers all dropped to zero. A mandatory leak-check was performed at the completion of each test day.

An initial calibration was performed at the start of a test period by introducing zero and span gases for each analyzer and making the necessary adjustments. Calibration gas values were recorded on the continuous monitor strip charts and field data sheets. A calibration check was completed at the end of a test and adjustments (if necessary) to the analyzers were made in preparation for another test.

An external calibration of the sampling system was performed at the start of a test day. EPA Protocol 1 gas was flowed through the entire sampling system from the probe tip. The response of the analyzers had to be within ±5% of the certified tank value before testing could proceed. An external calibration was also performed at the end of each test day.

Test data was collected by recording 10-minute averages from the strip chart recordings onto the field data sheets. Data collected over the test period was averaged and reported. A fuel analysis was used to calculate the F-factor, dscf/MMBtu corrected to zero percent O_2 (standard conditions 60°F, 29.92 inches Mercury), as described in 40 CFR 60.45. The pollutant concentration and the F-factor were used to calculate an emission factor in lb/MMBtu.

SECTION 7

RAW DATA

Pape & Steiner Environmental Services

CONTINUOUS MONITOR DATA SHEET

Plant TEXACO LOST HILLS

Date 7/9/90 Run No. 1-2

Test Location ENGINE #4

Operator GWM

Fuel Type FUEL GAS Trailer No. 2

APCD Witness/Number

Generator Type

Burner Type

O_2 Controller Type

Gas Cylinder Nos. O_2, CO_2, CO 159, 10245, 8168
NOx 12670, 13433

Time	Sample Point	Fuel Flow	Dry Uncorrected						Response Time		NO-NOx Converter Gas						Comments
			O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Up (sec)	Down (sec)	NO	NO2	NOx				
			15.07	5.00	400.0			81.90									SPAN GAS VALUES
			0.08	—	392.0			81.80									EXTERNAL RESPONSE
			15.07	5.00	800.0			201.7									CAL ADJUST
1040			11.63	5.60	435.0			52.50									RUN 1
50			11.25	6.00	510.0			72.5									ENGINE #4
1100			11.50	5.70	480.0			62.5									
10			11.25	5.70	465.0			70.0									
20			11.50	5.60	450.0			60.0									
30			11.50	5.65	480.0			62.5									
1140	CAL		0.0	0.16	12.0			2.50									ZERO
			15.40	5.00	810.0			201.25									SPAN
1155			11.33	5.70	450.0			62.5									RUN 2
1205			11.33	5.60	456.0			60.0									ENGINE #4
15			11.25	5.70	440.0			55.0									
25			11.25	5.70	445.0			53.75									
35			11.13	5.70	447.0			55.0									
45			11.13	5.70	445.0			55.0									
1255	CAL		-0.03	0.0	9.0			2.5									ZERO
			14.83	5.0	782.0			200.75									SPAN

Pape & Steiner Environmental Services

CONTINUOUS MONITOR DATA SHEET

Plant TEXACO LOST HILLS

Date 7/10/90 Run No. 1-2

Test Location ENGINE # 1

Operator TD

Fuel Type FUEL GAS Trailer No. 2

APCD Witness/Number

Generator Type

Burner Type

O_2 Controller Type

Gas Cylinder Nos.

Time	Sample Point	Fuel Flow	Dry Uncorrected						Response Time		NO-NOx Converter Gas						Comments
			O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Up (sec)	Down (sec)	NO	NO2	NOx				
			15.07	5.00	800.0			201.7									SPAN GAS VALUES
			0.10	4.80	781.0			202.0									EXTERNAL RESPONSE
1435			10.25	5.80	620.0			82.50									RUN 1
45			10.25	5.70	595.0			78.75									ENGINE #1
55			10.13	5.70	620.0			81.25									
1505			10.25	5.65	600.0			77.50									
15			10.25	5.60	595.0			72.50									
25			10.25	5.60	595.0			72.50									
1535	CAL		0.18	0.0	0.0			2.50									ZERO
			14.65	4.76	842.0			200.0									SPAN
1605			10.00	5.80	610.0			66.25									RUN 2
15			10.00	5.80	610.0			68.75									ENGINE #1
25			10.00	5.85	620.0			66.25									
35			10.00	5.90	625.0			67.50									
45			10.00	6.00	645.0			68.75									
55			10.00	6.00	640.0			68.75									
1705	CAL		0.08	0.0	2.0			2.25									ZERO
			15.00	5.00	810.0			199.25									SPAN
			0.08	4.78	799.0			198.5									EXTERNAL RESPONSE

Pape & Steiner Environmental Services

CONTINUOUS MONITOR DATA SHEET

Plant TEXACO LOST HILLS

Date 7/11/90 Run No. 1 - 2

Test Location ENGINE # 5

Operator GWM

Fuel Type FUEL GAS Trailer No. 2

APCD Witness/Number

Generator Type

Burner Type

O_2 Controller Type

Gas Cylinder Nos.

Time	Sample Point	Fuel Flow	Dry Uncorrected						Response Time		NO-NOx Converter Gas						Comments
			O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Up (sec)	Down (sec)	NO	NO2	NOx				
			15.07	0.0	800.0			201.7									SPAN GAS VALUES
			0.0	4.80	812.0			196.8									EXTERNAL RESPONSE
0807			10.38	5.8	505.0			88.75									RUN 1
17			10.38	5.8	490.0			82.50									ENGINE #5
27			10.38	5.8	495.0			82.50									
37			10.38	5.8	510.0			91.25									
47			10.38	5.8	505.0			85.00									
57			10.50	5.8	505.0			81.25									
0907	CAL		0.15	-0.10	0.0			3.00									ZERO
			15.00	4.80	810.0			200.0									SPAN
0927			10.50	5.95	5100			87.50									RUN 2
37			10.63	5.90	510.0			83.75									ENGINE # 5
47			10.50	6.00	505.0			77.50									
57			10.50	6.00	510.0			86.25									
1007			10.63	5.90	520.0			100.0									
17			10.38	6.00	540.0			108.75									
1027	CAL		0.0	-0.03	10.0			2.50									ZERO
			15.07	5.00	833.0			198.5									SPAN

Pape & Steiner Environmental Services

CONTINUOUS MONITOR DATA SHEET

Plant TEXACO LOST HILLS

Date 7/11/90 Run No. 1-2

Test Location ENGINE # 2

Operator TD

Fuel Type FUEL GAS Trailer No. 2

APCD Witness/Number

Generator Type

Burner Type

O_2 Controller Type

Gas Cylinder Nos.

Time	Sample Point	Fuel Flow	Dry Uncorrected						Response Time		NO-NOx Converter Gas						Comments
			O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Up (sec)	Down (sec)	NO	NO2	NOx				
			15.07	5.0	8000			201.7									SPAN GAS VALUE
1107			11.00	5.70	585.0			87.50									RUN 1
17			11.00	5.70	605.0			93.75									ENGINE # 2
27			11.00	5.70	610.0			95.0									
37			11.00	5.70	605.0			93.75									
47			11.25	5.60	605.0			95.0									
57			11.25	5.60	600.0			95.0									
1207	CAL		0.0	0.18	10.0			3.0									ZERO
			14.93	4.92	818.0			201.50									SPAN
																	RUN 2
1220			10.75	5.80	580.0			90.00									ENGINE # 2
30			10.63	5.80	615.0			100.00									
40			10.63	5.90	623.0			112.50									
50			10.63	5.85	615.0			105.00									
1300			10.63	5.85	615.0			102.5									
10			10.63	5.90	610.0			96.25									
1320			0.05	0.0	0.00			1.75									ZERO
			15.25	5.06	824.0			200.0									SPAN

Pape & Steiner Environmental Services

CONTINUOUS MONITOR DATA SHEET

Plant TEXACO Lost Hills
Date 7-27-90 Run No. 1 + 2
Test Location Engine # 3
Operator CR
Fuel Type Nat. Gas Trailer No. 1

APCD Witness/Number
Client Rep Jim Oblak
Generator Type
Burner Type
O_2 Controller Type

NOX - 5581, CO, CO2 - 7727, O2 - 010195

[Dry Uncorrected]

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		15.07	8.00	400.0			79.80	SPAN Gas Values
		0.15	7.80	394.0			77.50	External Response
1000		10.40	5.60	470.0			103.0	Run 1
10		10.45	5.55	480.0			100.0	
20		10.55	5.45	445.0			95.0	23946
30		10.60	5.40	438.0			93.5	HC # 1
40		10.48	5.50	455.0			95.0	
50		10.20	5.70	545.0			143.0	
1100		14.85	7.90	404.0			80.0	SPAN
		0.0	-0.10	0.0			0.0	ZERO
1115		10.60	5.55	450.0			90.0	Run 2
25		10.60	5.60	445.0			87.5	
35		10.70	5.60	430.0			85.0	23947
45		10.55	5.60	445.0			95.0	HC # 2
55		10.35	5.65	460.0			110.0	
05		10.25	5.75	540.0			130.0	
1215		15.00	7.90	398.0			82.0	SPAN
		0.0	0.05	0.0			2.5	ZERO

Miscellaneous Information

CALIBRATION GASES
NO_x 79.80
SO_2
CO 400.0
$CO/CO_2/O_2$ CO2 - 8.0, O2 - 15.07

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME
Upscale: Downscale:
Upscale: Downscale:
Upscale: Downscale:

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Pape & Steiner Environmental Services

CONTINUOUS MONITOR DATA SHEET

Plant TEXACO Lost Hills
Date 7-27-90 Run No. 1 + 2
Test Location Engine #6
Operator CR
Fuel Type Nat. Gas Trailer No. 1

APCD Witness/Number
Client Rep Jim Oblak
Generator Type
Burner Type
O_2 Controller Type

[Dry Uncorrected]

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		15.07	8.00	400.0			79.80	SPAN GAS Values
1245		10.25	5.65	660.0			83.50	Run 1
55		10.20	5.65	660.0			85.00	
05		10.20	5.65	670.0			88.00	23948
15		10.15	5.62	675.0			88.00	HC #1
25		10.15	5.62	660.0			87.50	
35		10.15	5.63	685.0			87.50	
1345		15.00	7.85	396.0			80.00	SPAN
		0.0	-0.10	0.0			0.05	ZERO
1400		10.20	5.65	680.0			73.00	Run 2
10		10.20	5.65	690.0			75.00	
20		10.20	5.65	700.0			77.50	23949
30		10.20	5.70	695.0			81.50	HC #2
40		10.15	5.70	710.0			85.00	
50		10.20	5.65	660.0			78.00	
1500		15.00	7.85	408.0			78.50	SPAN
		0.0	0.10	8.0			0.05	ZERO
		0.15	7.75	392.0			80.00	External Response
								23950
								FR All
								Sulfur Anal.
								23951
								FR All

Miscellaneous Information

CALIBRATION GASES
NO_x 79.80
SO_2
CO 400.0
$CO/CO_2/O_2$ CO2-8.0, O2-15.07

Wet Bulb: Dry Bulb:
Barometric Press:

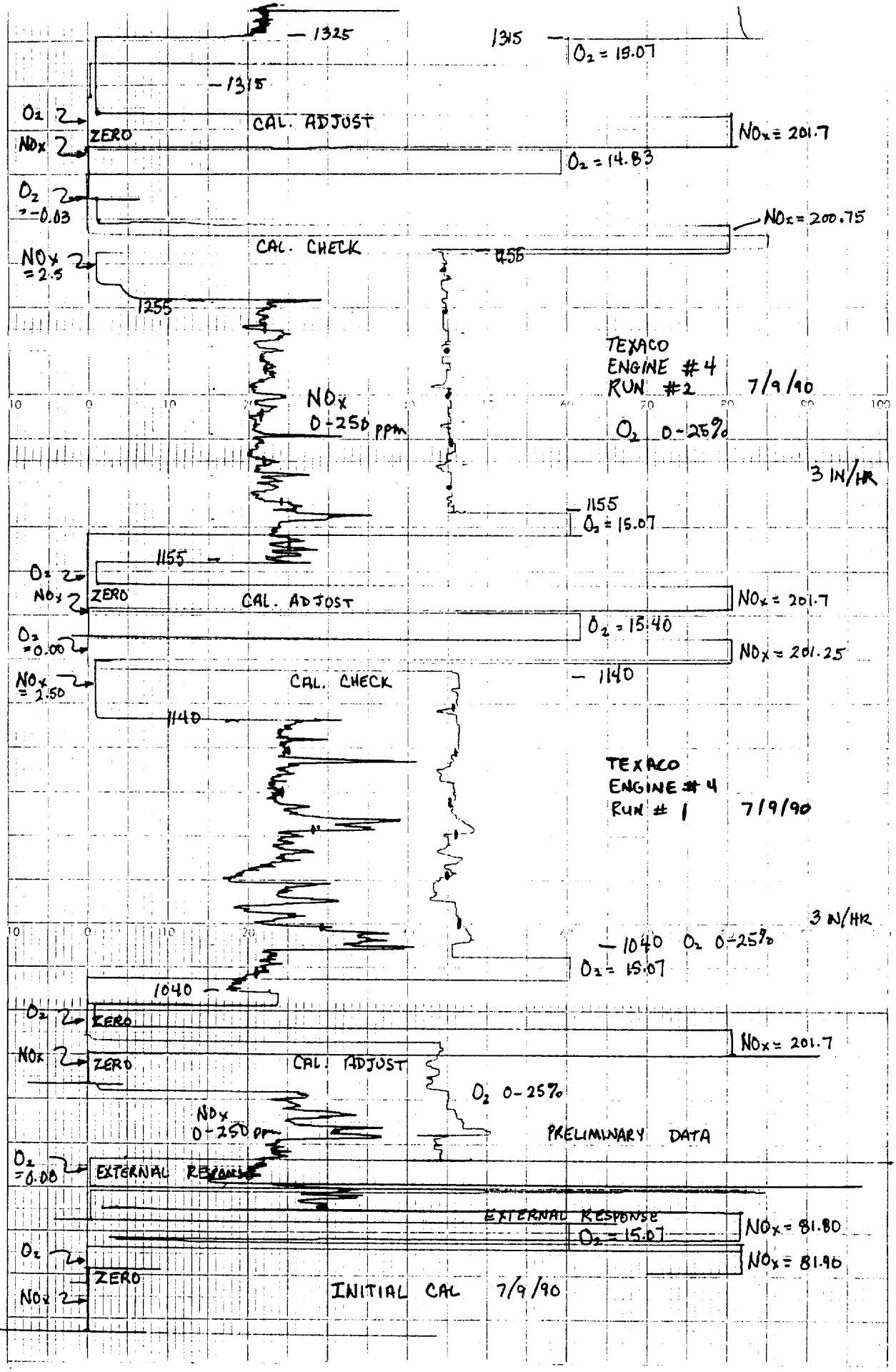
RESPONSE TIME
Upscale: Downscale:
Upscale: Downscale:
Upscale: Downscale:

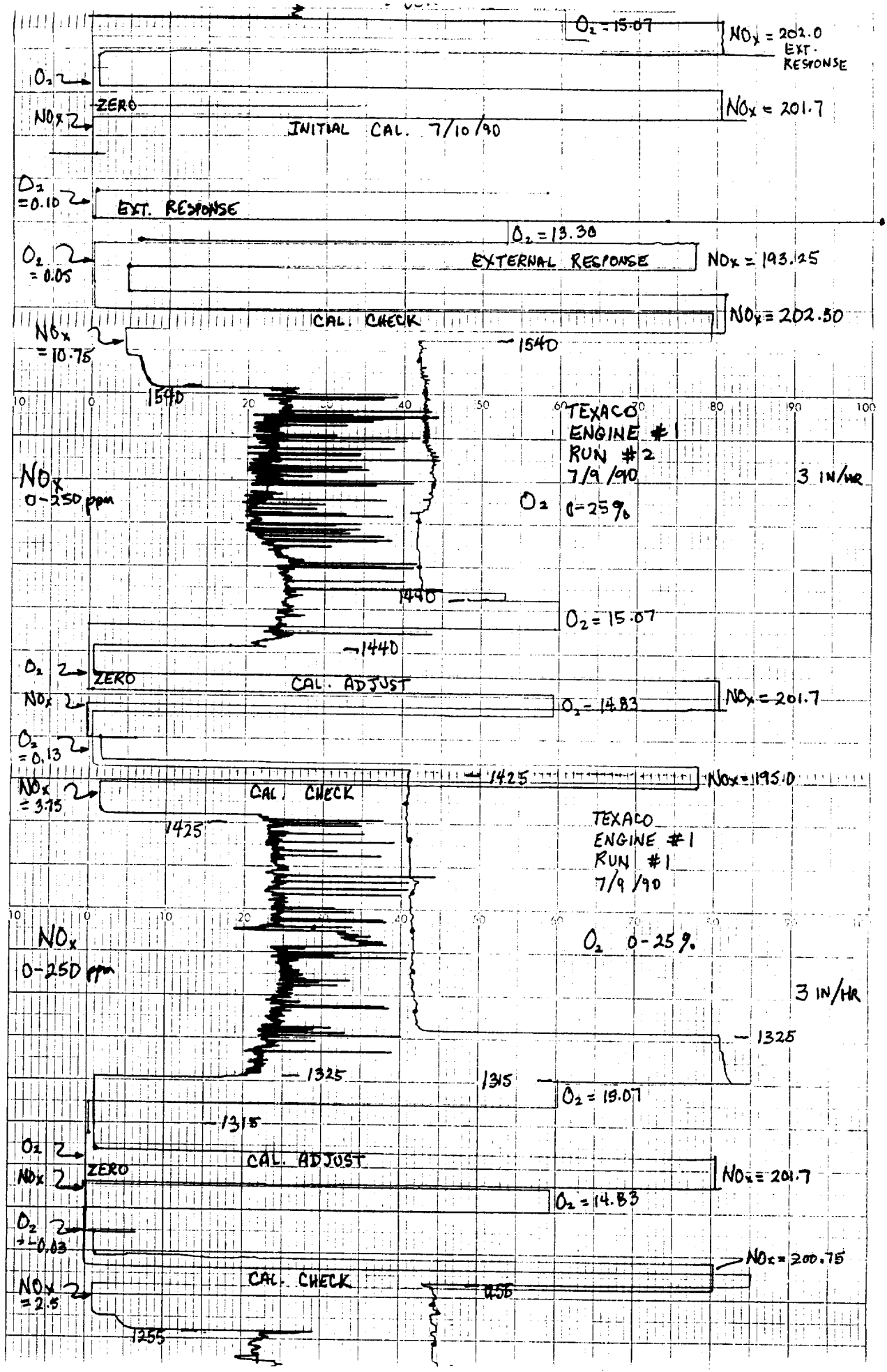
PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

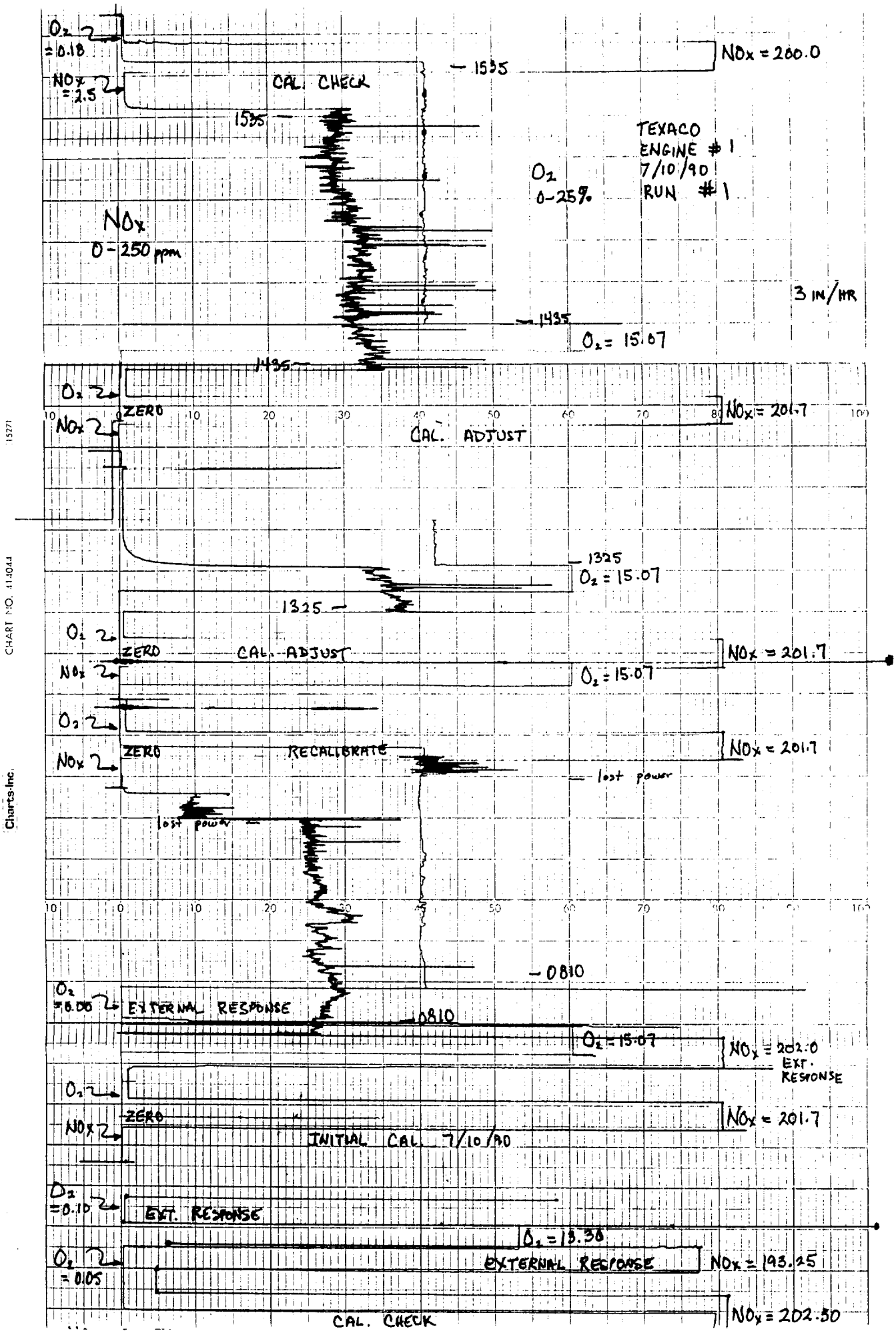
CONVERTER GAS

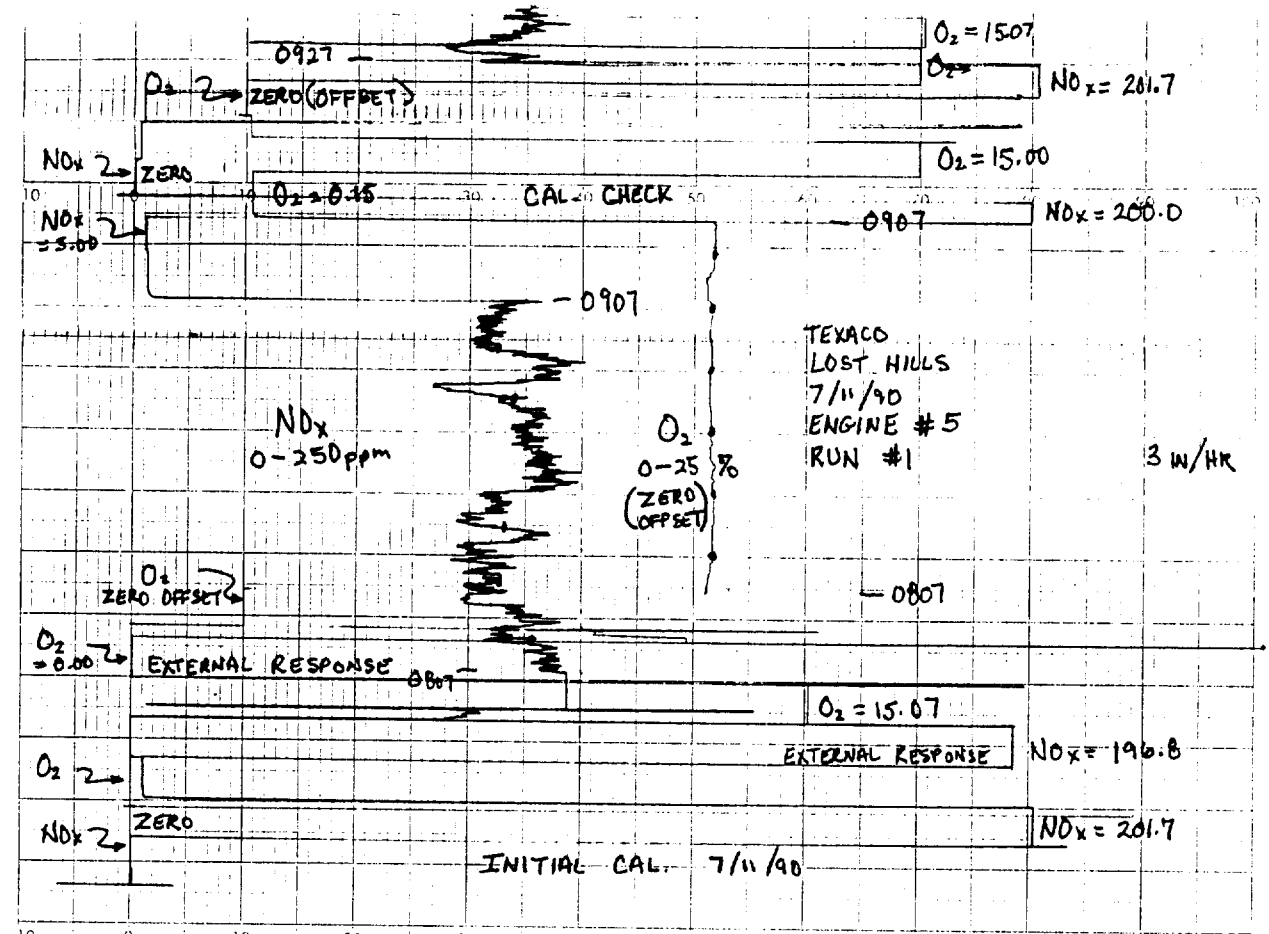
	Cal Gas Values	Actual Values
NO		
NO_2		

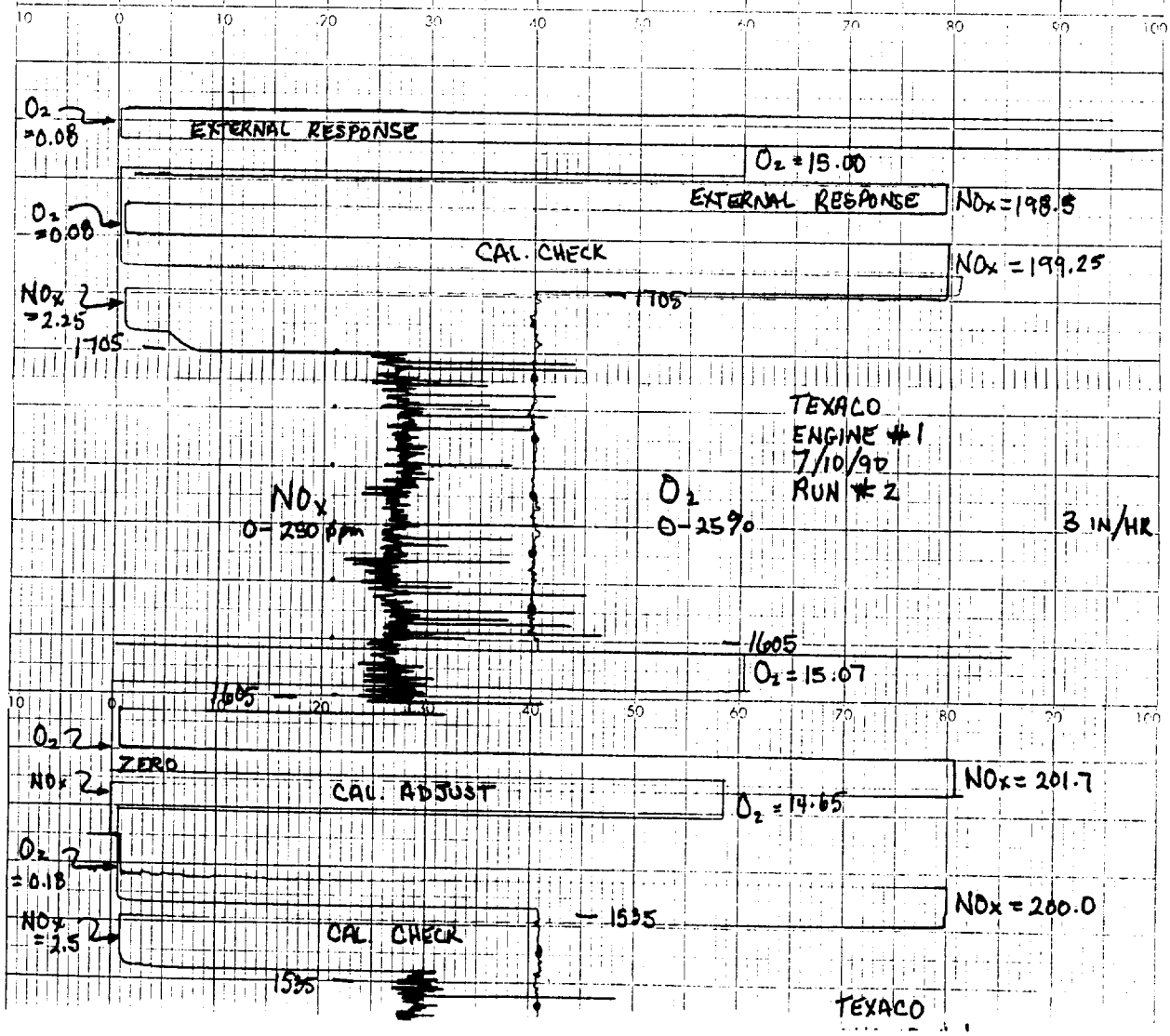
Conv. Efficiency:

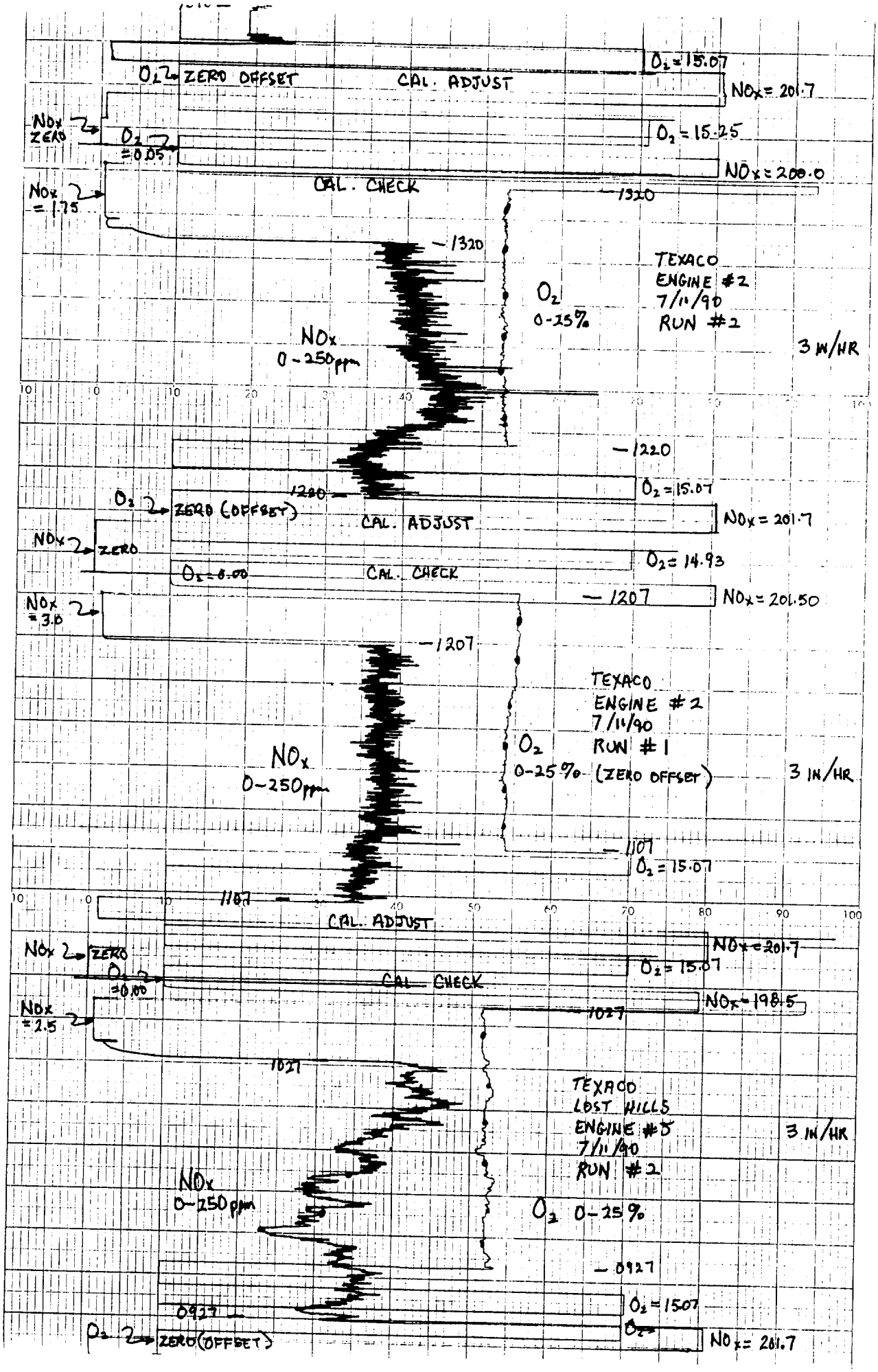

1325
1315
O2 = 15.07
1315
O2 2
CAL. ADJUST
NOx = 201.7
NOx 2
ZERO
O2 = 14.83
O2 2
= -0.03
NOx = 200.75
CAL. CHECK
1255
NOx 2
= 2.5
1255
TEXACO
ENGINE #4
RUN #2
7/9/90
NOx
0-250 ppm
O2 0-25%
3 IN/HR
1155
O2 = 15.07
1155
O2 2
NOx 2
ZERO
CAL. ADJUST
NOx = 201.7
O2 = 15.40
O2
= 0.00
NOx = 201.25
1140
NOx
= 2.50
CAL. CHECK
1140
TEXACO
ENGINE #4
RUN # 1
7/9/90
3 IN/HR
1040
O2 0-25%
O2 = 15.07
1040
O2 2
ZERO
NOx = 201.7
NOx 2
ZERO
CAL. ADJUST
O2 0-25%
NOx
0-250 ppm
PRELIMINARY DATA
O2
= 0.00
EXTERNAL RESPONSE
EXTERNAL RESPONSE
NOx = 81.80
O2 = 15.07
O2
NOx = 81.90
ZERO
NOx 2
INITIAL CAL 7/9/90

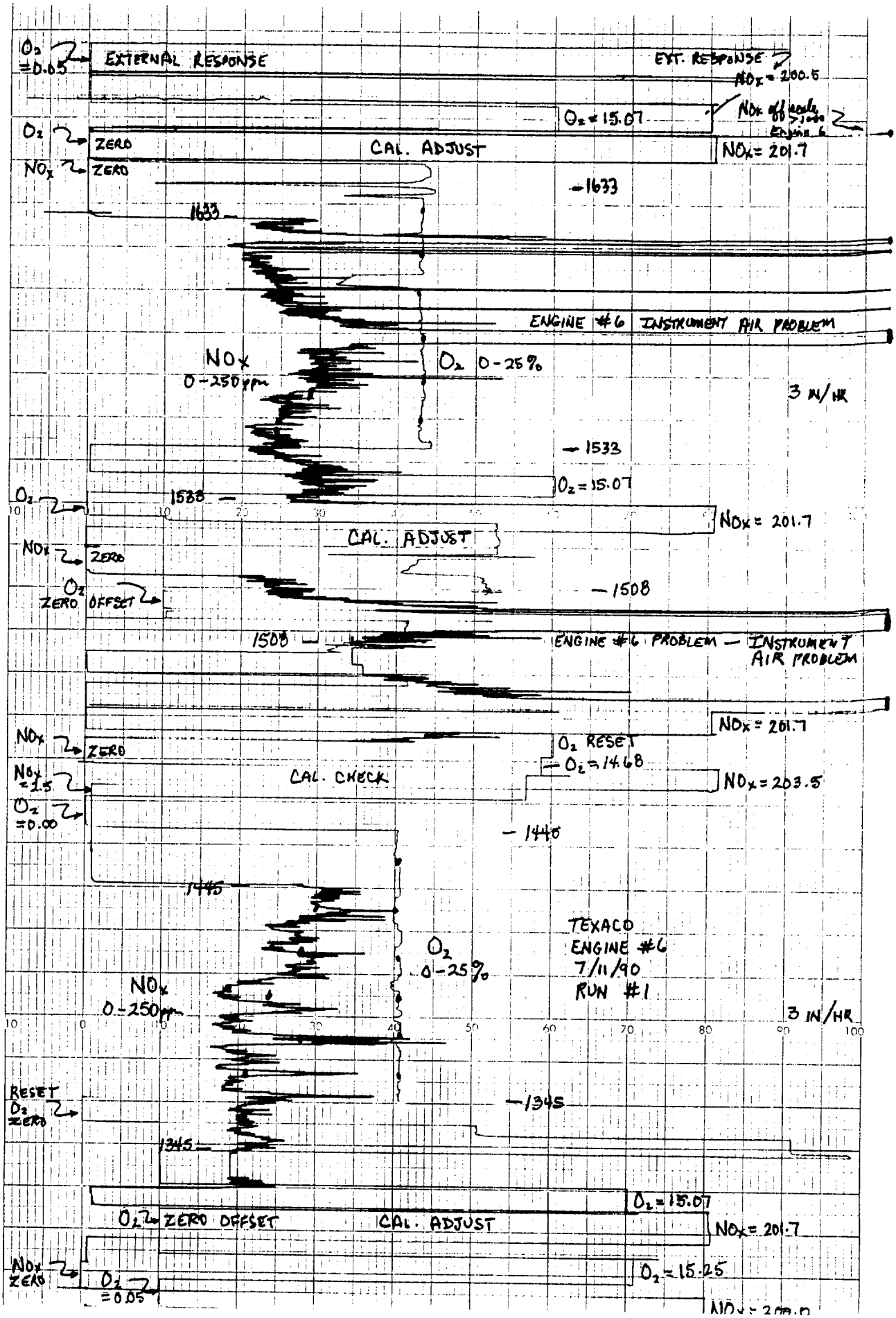

O2 = 15.07
NOx = 202.0
EXT. RESPONSE
O2
ZERO
NOx
NOx = 201.7
INITIAL CAL. 7/10/90
O2 = 0.10
EXT. RESPONSE
O2 = 13.30
O2 = 0.05
EXTERNAL RESPONSE
NOx = 193.25
CAL. CHECK
NOx = 202.50
NOx = 10.75
1540
TEXACO
ENGINE #1
RUN #2
7/9/90
3 IN/HR
NOx 0-250 ppm
O2 0-25%
1440
O2 = 15.07
CAL. ADJUST
O2 = 14.83
NOx = 201.7
O2 = 0.13
1425
NOx = 195.0
NOx = 3.75
CAL. CHECK
TEXACO
ENGINE #1
RUN #1
7/9/90
O2 0-25%
NOx 0-250 ppm
3 IN/HR
1325
1315
O2 = 15.07
CAL. ADJUST
NOx = 201.7
O2 = 14.83
O2 = 0.03
NOx = 200.75
CAL. CHECK
NOx = 2.5
1255

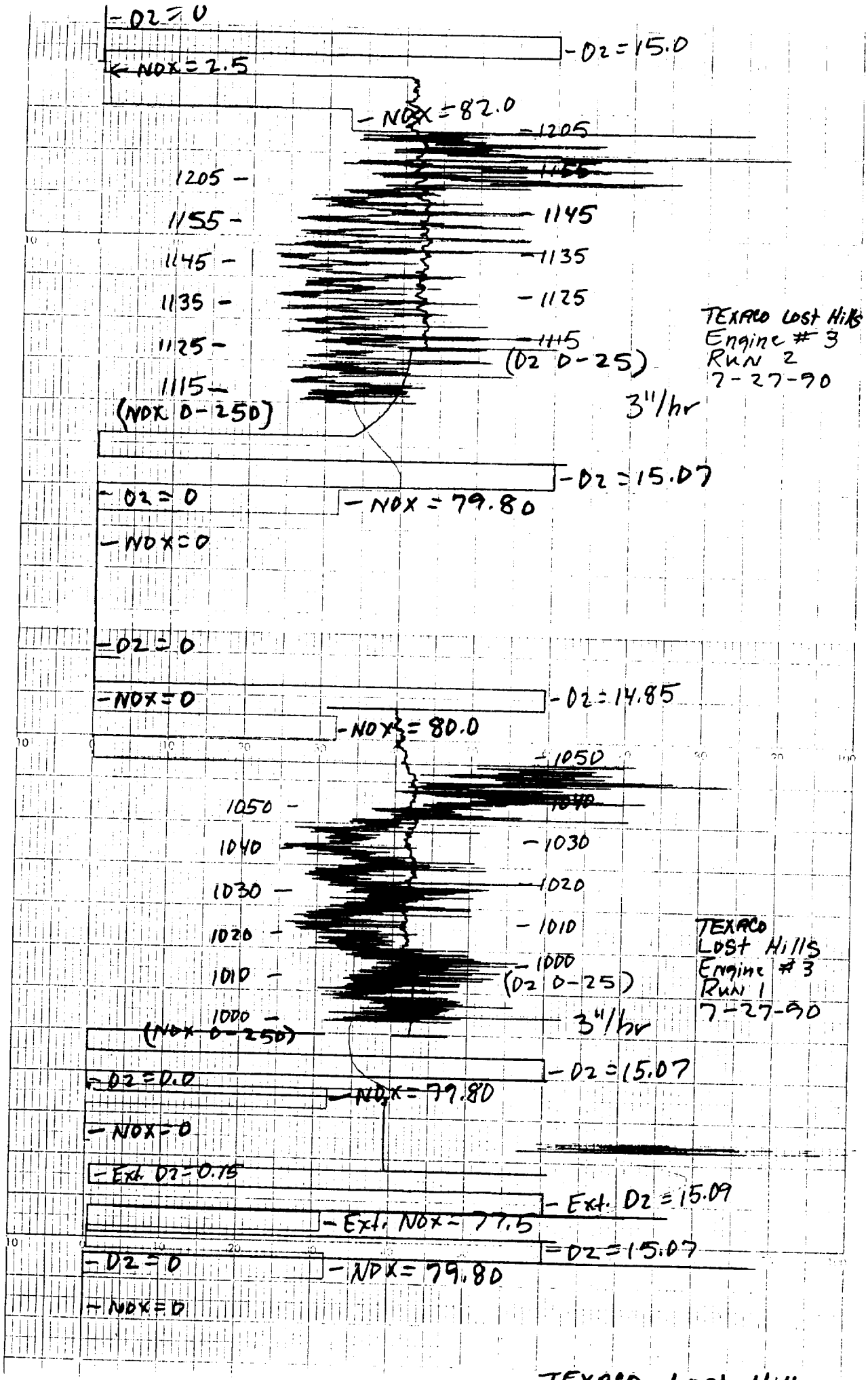

O2 = 0.18
NOx = 2.5
CAL. CHECK
1535
NOx = 200.0
TEXACO
ENGINE #1
7/10/90
RUN #1
O2
0-25%
NOx
0-250 ppm
3 IN/HR
1435
O2 = 15.07
O2
NOx
ZERO
CAL. ADJUST
NOx = 201.7
1325
O2 = 15.07
RECALIBRATE
lost power
0810
O2 = 0.00
EXTERNAL RESPONSE
O2 = 15.07
NOx = 202.0
EXT. RESPONSE
INITIAL CAL. 7/10/90
O2 = 0.10
EXT. RESPONSE
O2 = 13.30
EXTERNAL RESPONSE
NOx = 193.25
O2 = 0.05
CAL. CHECK
NOx = 202.50

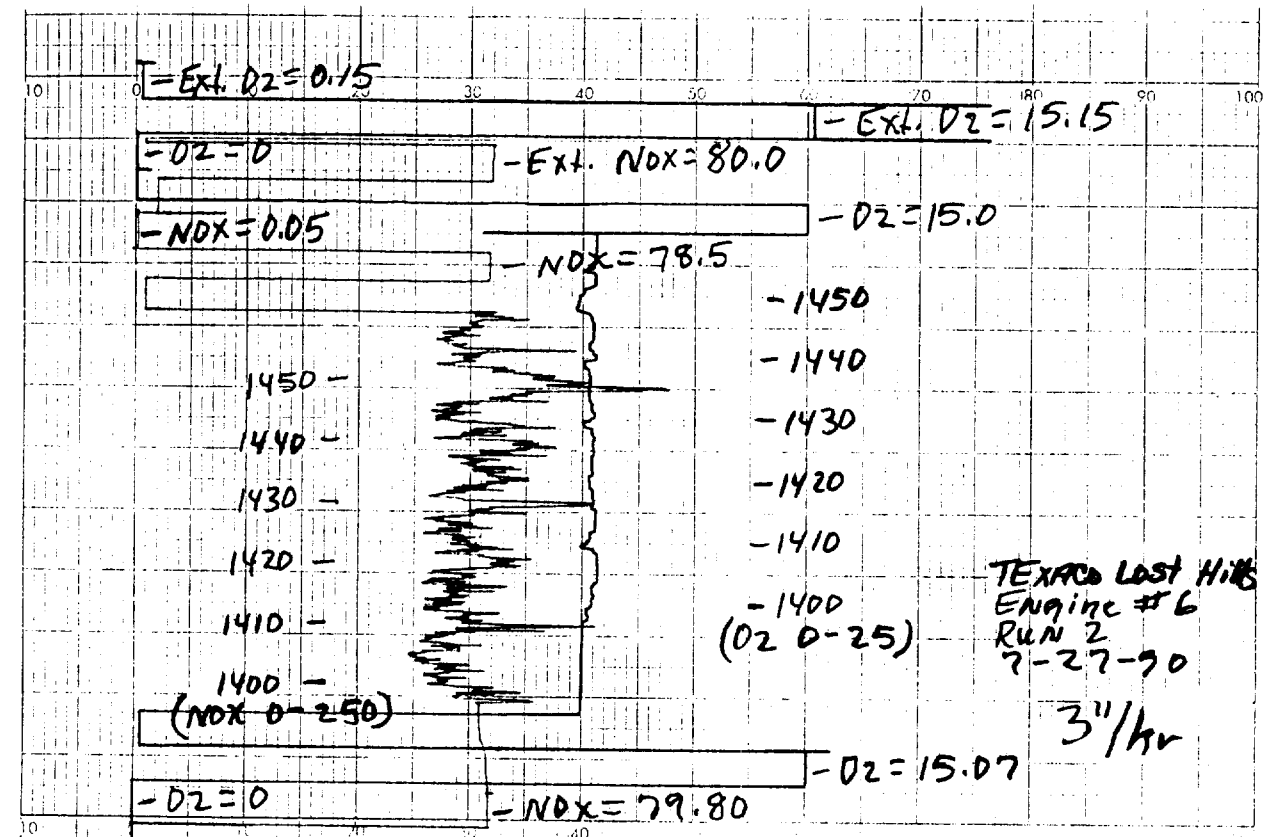

0927
O_2 = 15.07
O_2
NO_x = 201.7
O_2 2
ZERO (OFFSET)
NO_x 2
ZERO
O_2 = 15.00
O_2 = 0.15
CAL. CHECK
NO_x = 200.0
0907
NO_x = 5.00
0907
TEXACO
LOST HILLS
7/11/90
ENGINE #5
RUN #1
3 IN/HR
NO_x
0-250 ppm
O_2
0-25 %
(ZERO OFFSET)
O_2
ZERO OFFSET
0807
O_2 = 0.00
EXTERNAL RESPONSE
0807
O_2 = 15.07
EXTERNAL RESPONSE
NO_x = 196.8
O_2 2
NO_x 2
ZERO
NO_x = 201.7
INITIAL CAL. 7/11/90

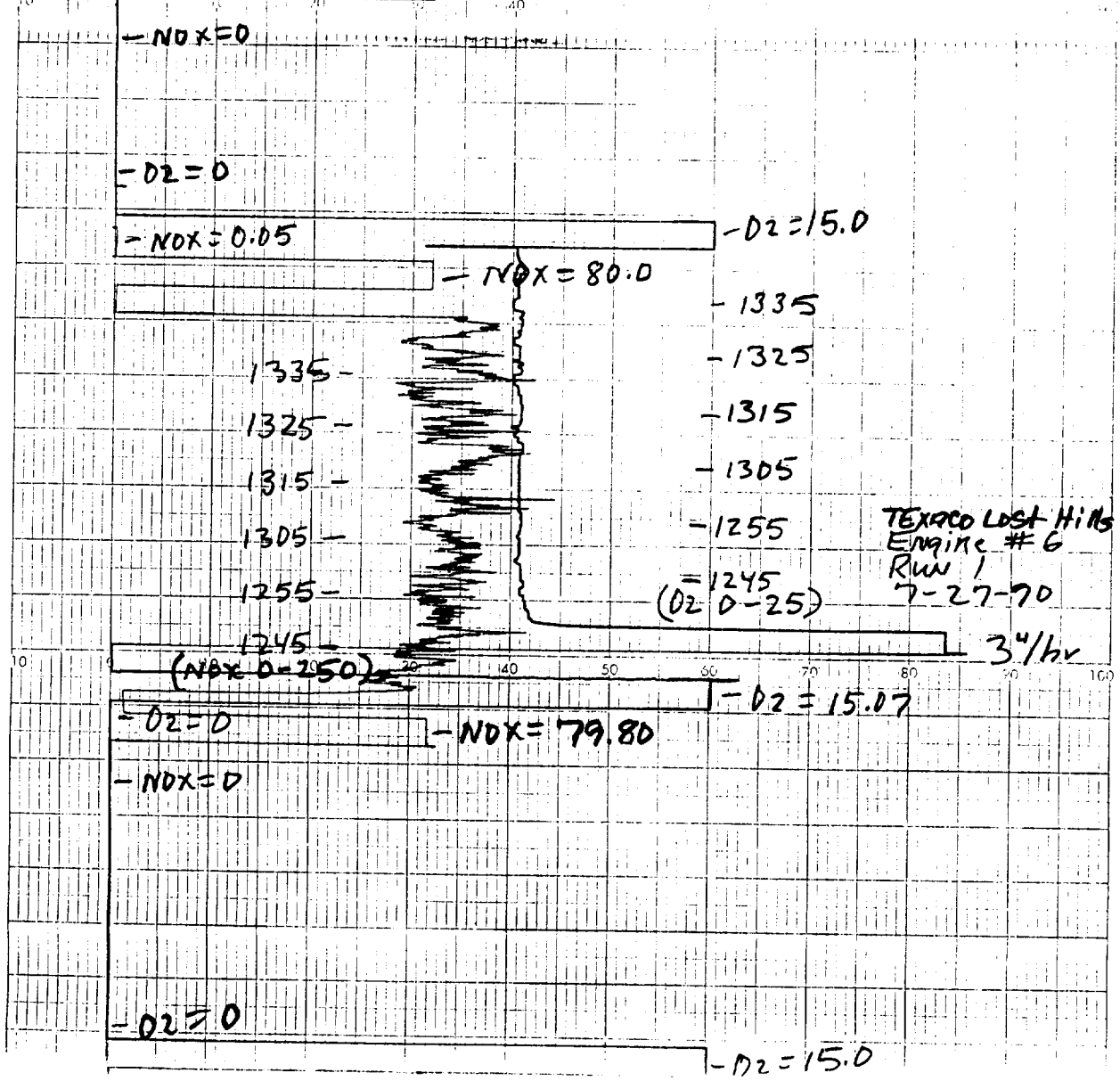

O_2 = 0.08
EXTERNAL RESPONSE
O_2 = 15.00
EXTERNAL RESPONSE
NO_x = 198.5
O_2 = 0.08
CAL. CHECK
NO_x = 199.25
NO_x 2
= 2.25
1705
1705
TEXACO
ENGINE #1
7/10/90
RUN #2
NO_x
0-250 ppm
O_2
0-25%
3 IN/HR
1605
O_2 = 15.07
1605
O_2 2
ZERO
NO_x 2
CAL. ADJUST
NO_x = 201.7
O_2 = 14.65
O_2 2
= 0.18
NO_x = 200.0
NO_x 2
= 2.5
CAL. CHECK
1535
1535
TEXACO

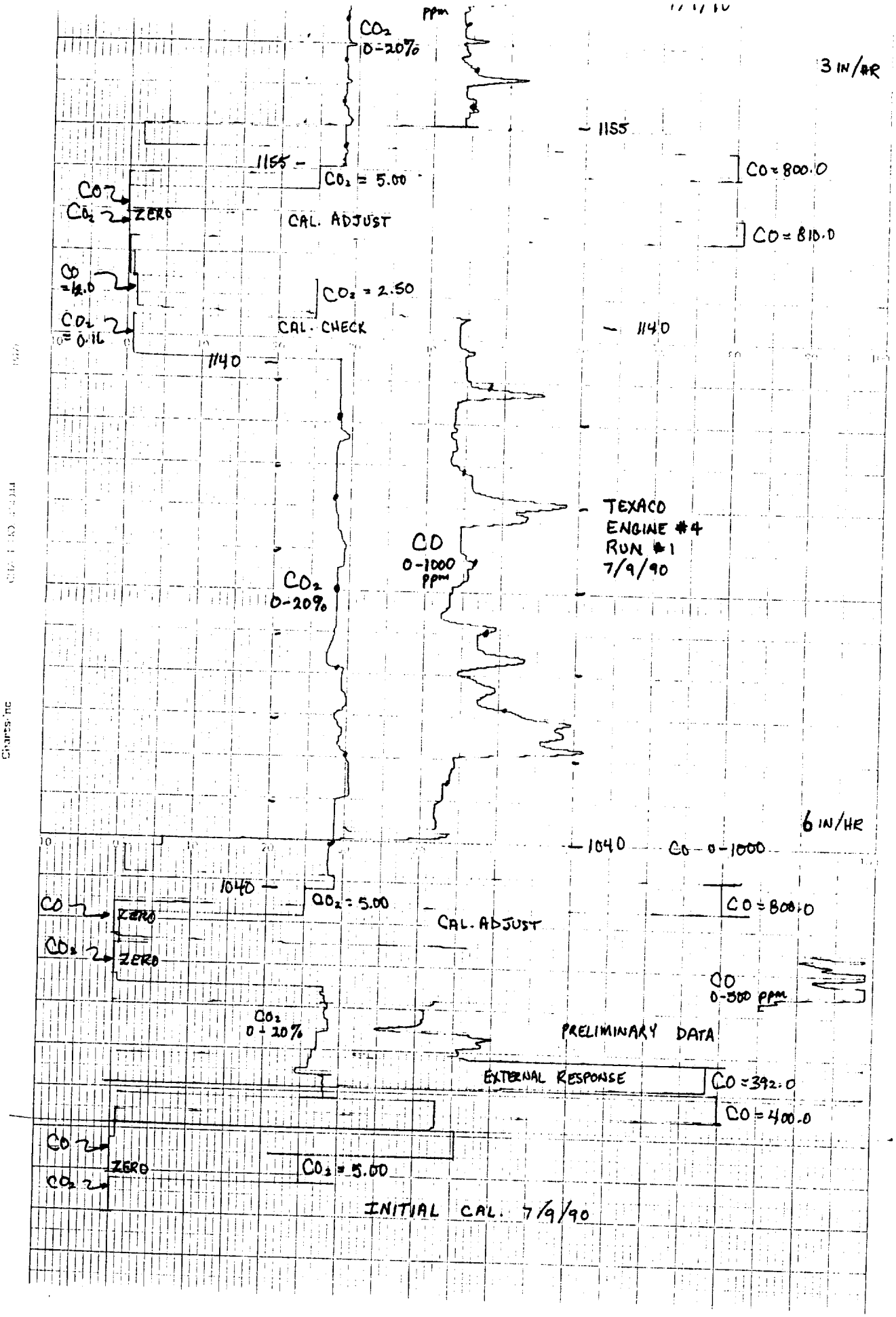

O2 = 15.07
O2 ZERO OFFSET
CAL. ADJUST
NOx = 201.7
NOx ZERO
O2 = 15.25
O2 = 0.05
NOx = 200.0
CAL. CHECK
NOx = 1.75
1320
TEXACO
ENGINE #2
7/11/90
RUN #2
O2
0-25%
NOx
0-250ppm
3 IN/HR
1220
O2 = 15.07
O2 ZERO (OFFSET)
CAL. ADJUST
NOx = 201.7
NOx ZERO
O2 = 14.93
O2 = 0.00
CAL. CHECK
1207
NOx = 201.50
NOx = 3.0
TEXACO
ENGINE #2
7/11/90
RUN #1
O2
0-25% (ZERO OFFSET)
NOx
0-250ppm
3 IN/HR
1107
O2 = 15.07
CAL. ADJUST
NOx = 201.7
NOx ZERO
O2 = 15.07
O2 = 0.00
CAL. CHECK
NOx = 198.5
NOx = 2.5
1027
TEXACO
LOST HILLS
ENGINE #5
7/11/90
RUN #2
3 IN/HR
NOx
0-250ppm
O2 0-25%
0927
O2 = 15.07
O2 ZERO (OFFSET)
NOx = 201.7

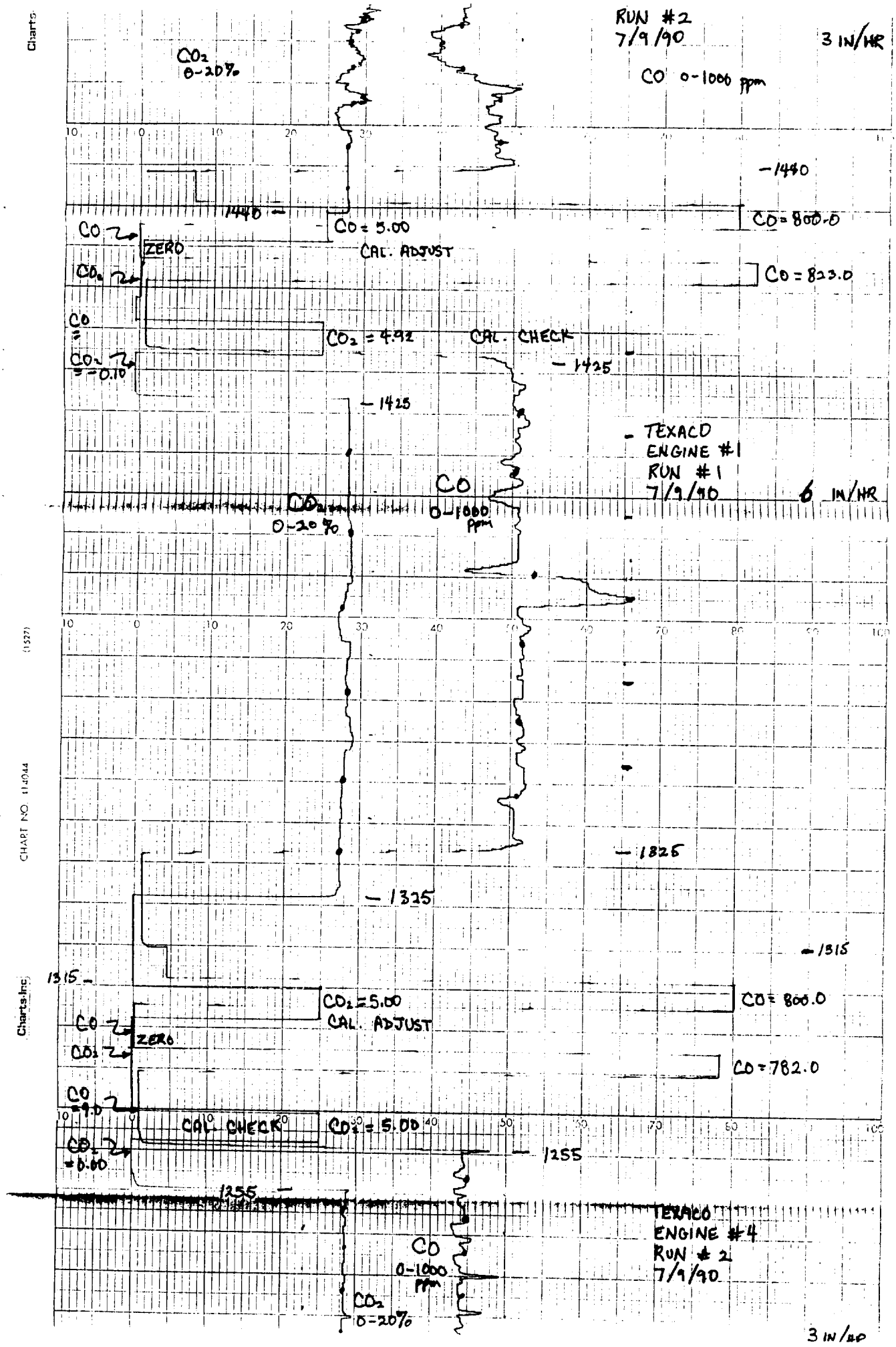

O2 =0.05
EXTERNAL RESPONSE
EXT. RESPONSE
NOx = 200.5
O2 = 15.07
NOx off scale
O2
ZERO
CAL. ADJUST
NOx = 201.7
NOx
ZERO
1633
ENGINE #6 INSTRUMENT AIR PROBLEM
NOx
0-250 ppm
O2 0-25%
3 IN/HR
1533
O2 = 15.07
O2
1508
NOx = 201.7
CAL. ADJUST
NOx
ZERO
O2
ZERO OFFSET
1508
ENGINE #6 PROBLEM — INSTRUMENT AIR PROBLEM
NOx = 201.7
NOx
ZERO
O2 RESET
O2 = 14.68
NOx
=1.5
CAL. CHECK
NOx = 203.5
O2
=0.00
1445
1445
TEXACO
ENGINE #6
7/11/90
RUN #1
O2
0-25%
NOx
0-250 ppm
3 IN/HR
RESET
O2
ZERO
1345
1345
O2 = 15.07
O2 ZERO OFFSET
CAL. ADJUST
NOx = 201.7
NOx
ZERO
O2 = 15.25
O2
=0.05

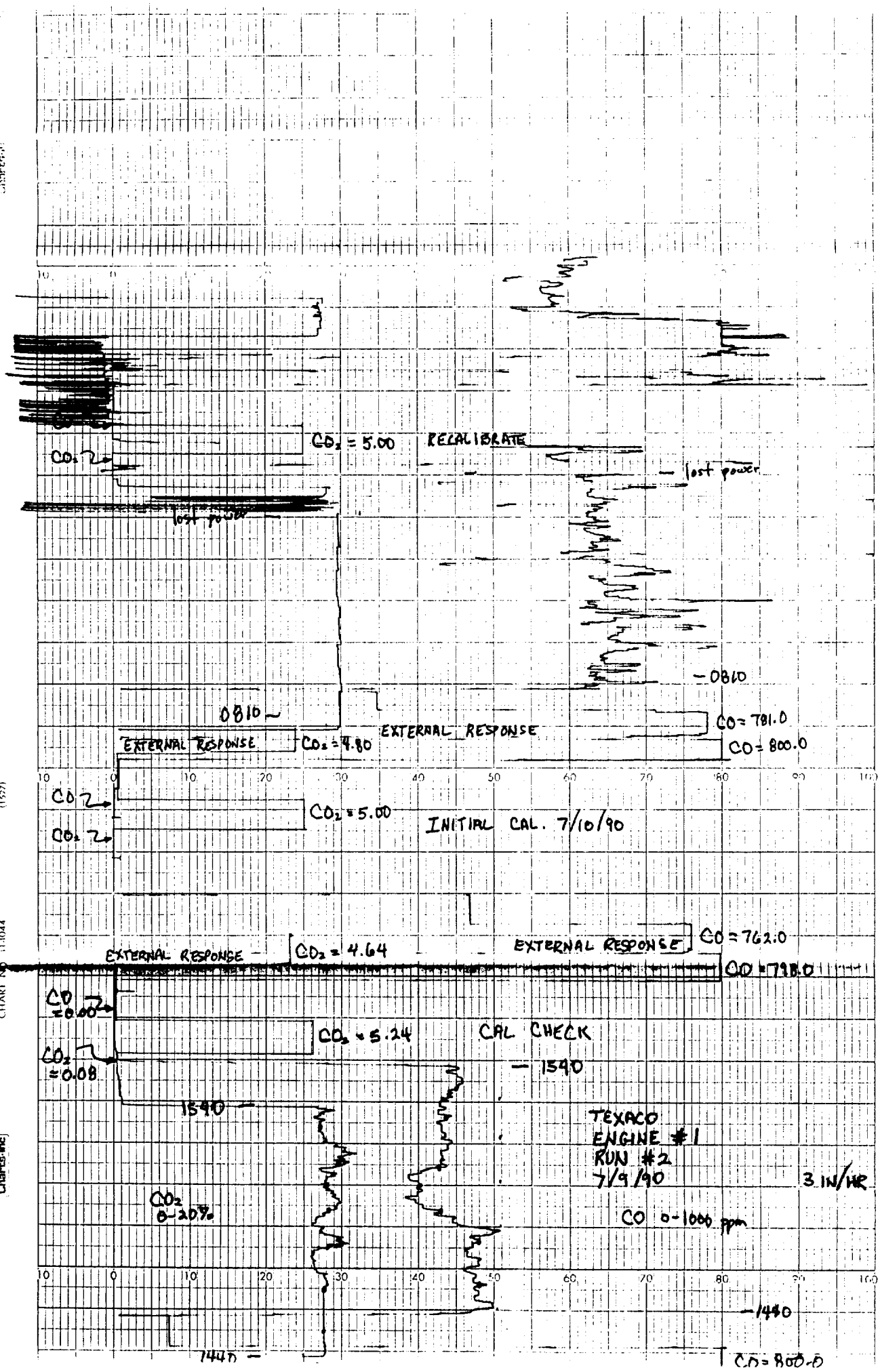

O2 = 0
O2 = 15.0
NOX = 2.5
NOX = 82.0
1205
1155
1145
1135
1125
1115
1205 -
1155 -
1145 -
1135 -
1125 -
1115 -
(NOX 0-250)
(O2 0-25)
3"/hr
TEXACO Lost Hills
Engine # 3
Run 2
7-27-90
O2 = 15.07
O2 = 0
NOX = 79.80
NOX = 0
O2 = 0
O2 = 14.85
NOX = 0
NOX = 80.0
1050
1040
1030
1020
1010
1000
1050 -
1040 -
1030 -
1020 -
1010 -
1000 -
(NOX 0-250)
(O2 0-25)
3"/hr
TEXACO
Lost Hills
Engine # 3
Run 1
7-27-90
O2 = 15.07
O2 = 0.0
NOX = 79.80
NOX = 0
Ext. O2 = 0.15
Ext. O2 = 15.09
Ext. NOX = 77.5
O2 = 15.07
O2 = 0
NOX = 79.80
NOX = 0
Charts-Inc
CHART NO. 114044
TEXACO Lost Hills

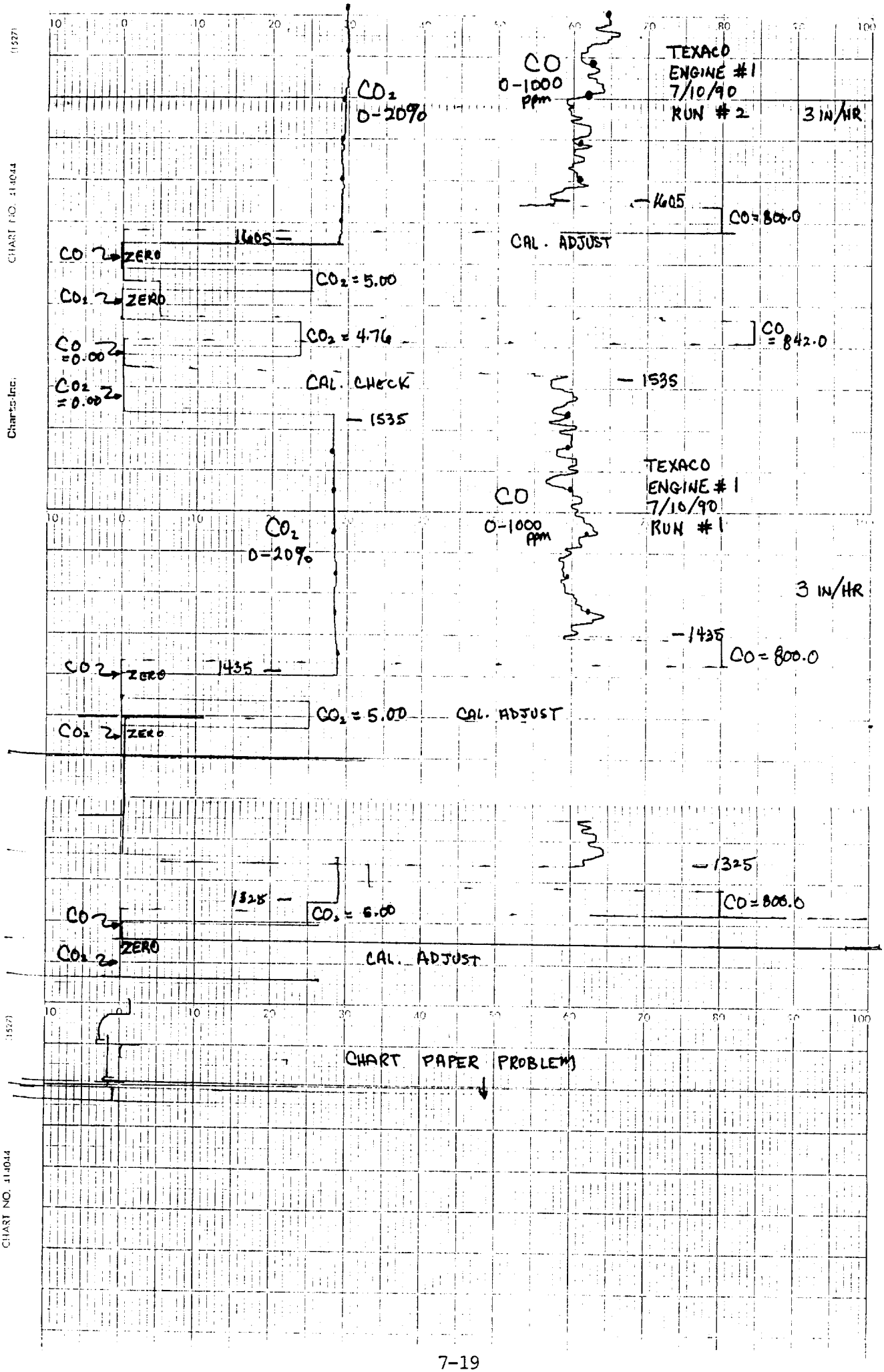

Ext. O2 = 0.15
Ext. O2 = 15.15
O2 = 0
Ext. NOx = 80.0
NOx = 0.05
O2 = 15.0
NOx = 78.5
1450
1440
1430
1420
1410
1400
(NOx 0-250)
1450
1440
1430
1420
1410
1400
(O2 0-25)
TEXACO LOST HILLS
Engine #6
RUN 2
7-27-90
3"/hr
O2 = 15.07
O2 = 0
NOx = 79.80

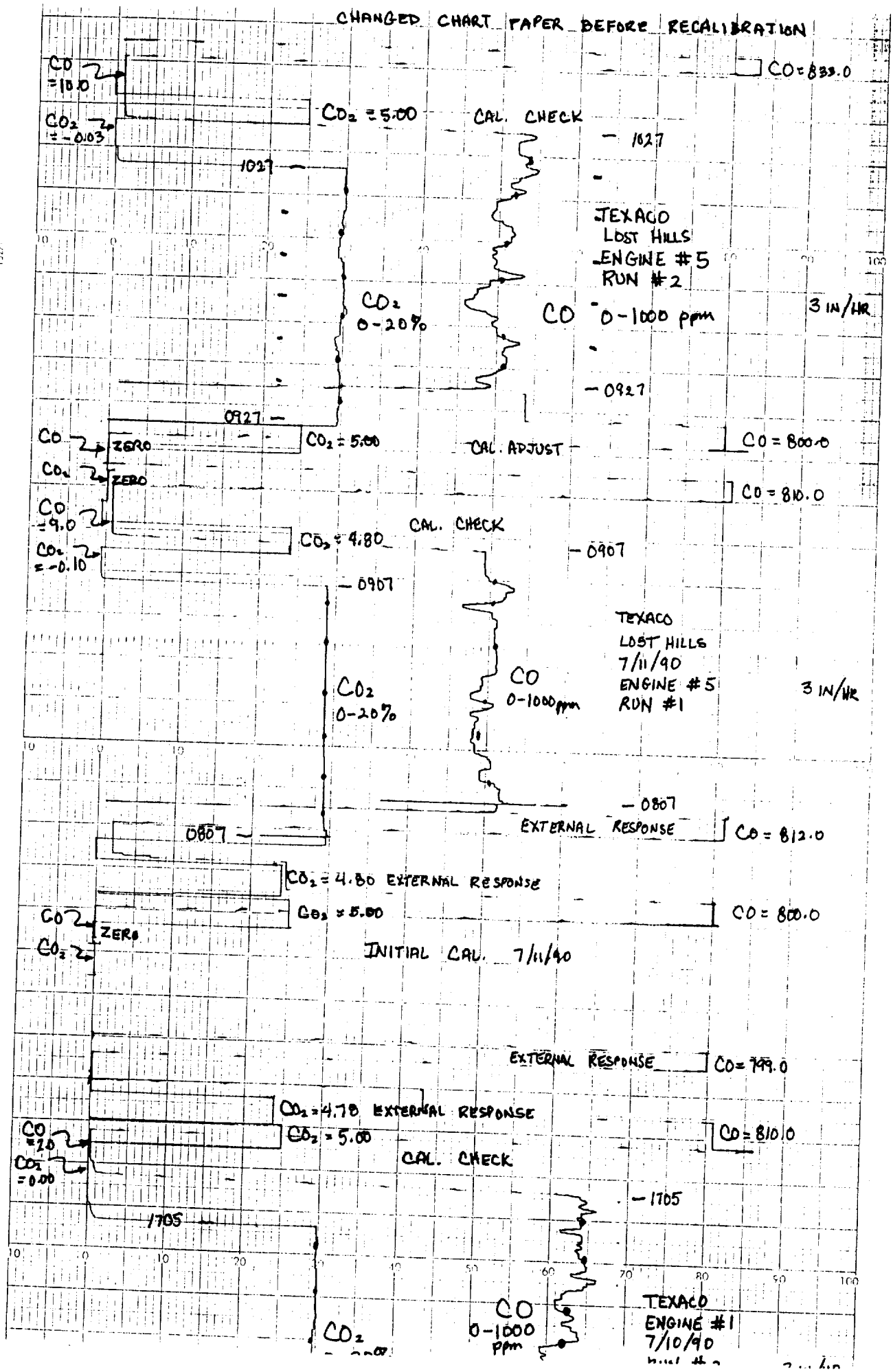

NOx = 0
O2 = 0
NOx = 0.05
O2 = 15.0
NOx = 80.0
1335
1325
1315
1305
1255
1245
(NOx 0-250)
1335
1325
1315
1305
1255
1245
(O2 0-25)
TEXACO LOST HILLS
Engine #6
RUN 1
7-27-90
3"/hr
O2 = 15.07
O2 = 0
NOx = 79.80
NOx = 0
O2 = 0
O2 = 15.0

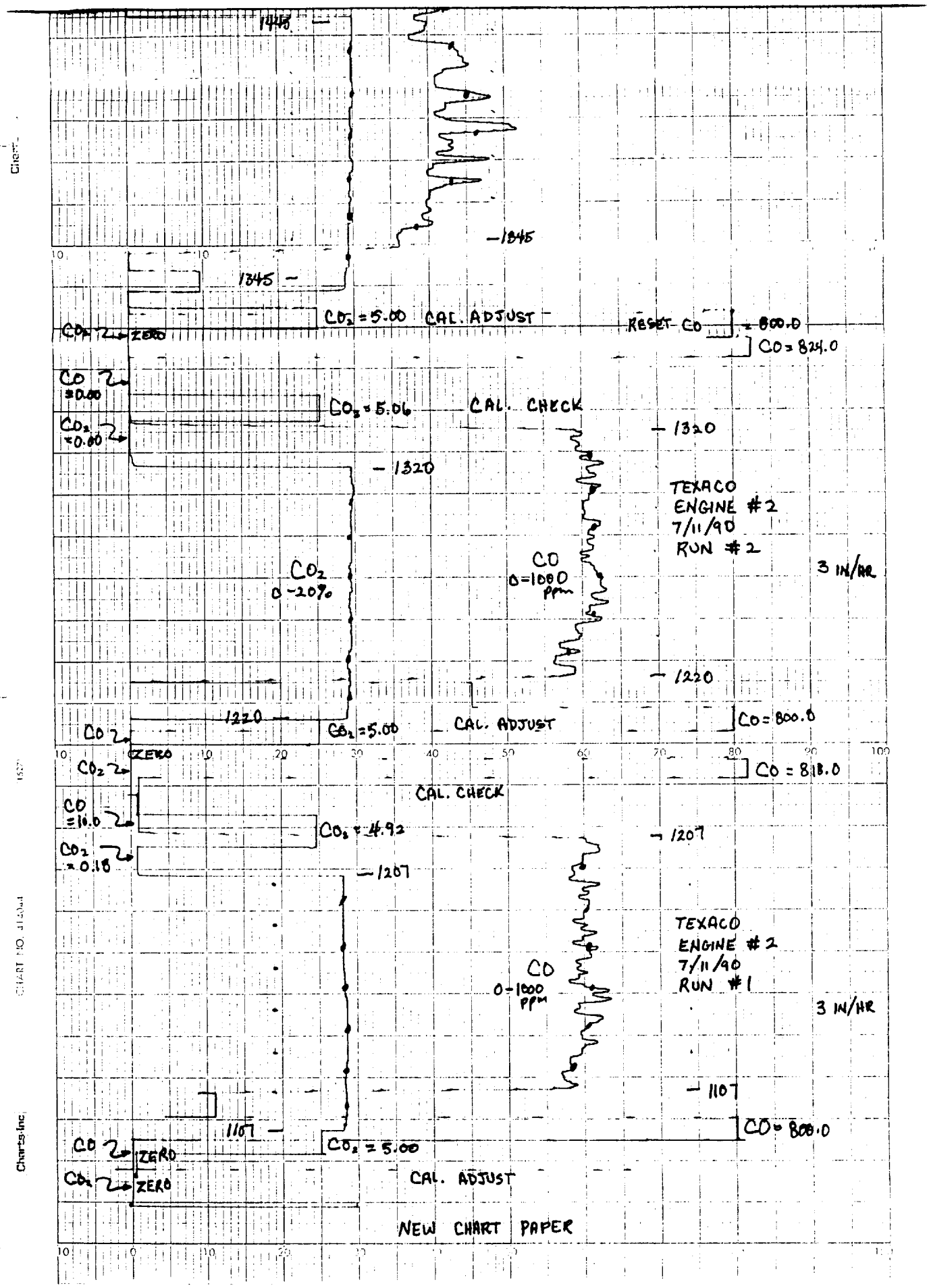

ppm
CO2
0-20%
3 IN/HR
1155
1155
CO2 = 5.00
CO = 800.0
CO
CO2
ZERO
CAL. ADJUST
CO = 810.0
CO
= 12.0
CO2 = 2.50
CO2
= 0.16
CAL. CHECK
1140
1140
TEXACO
ENGINE #4
RUN #1
7/9/90
CO
0-1000
ppm
CO2
0-20%
6 IN/HR
1040
CO 0-1000
1040
CO2 = 5.00
CO
ZERO
CAL. ADJUST
CO = 800.0
CO2
ZERO
CO
0-500 ppm
CO2
0-20%
PRELIMINARY DATA
EXTERNAL RESPONSE
CO = 392.0
CO = 400.0
CO
ZERO
CO2 = 5.00
CO2
INITIAL CAL. 7/9/90

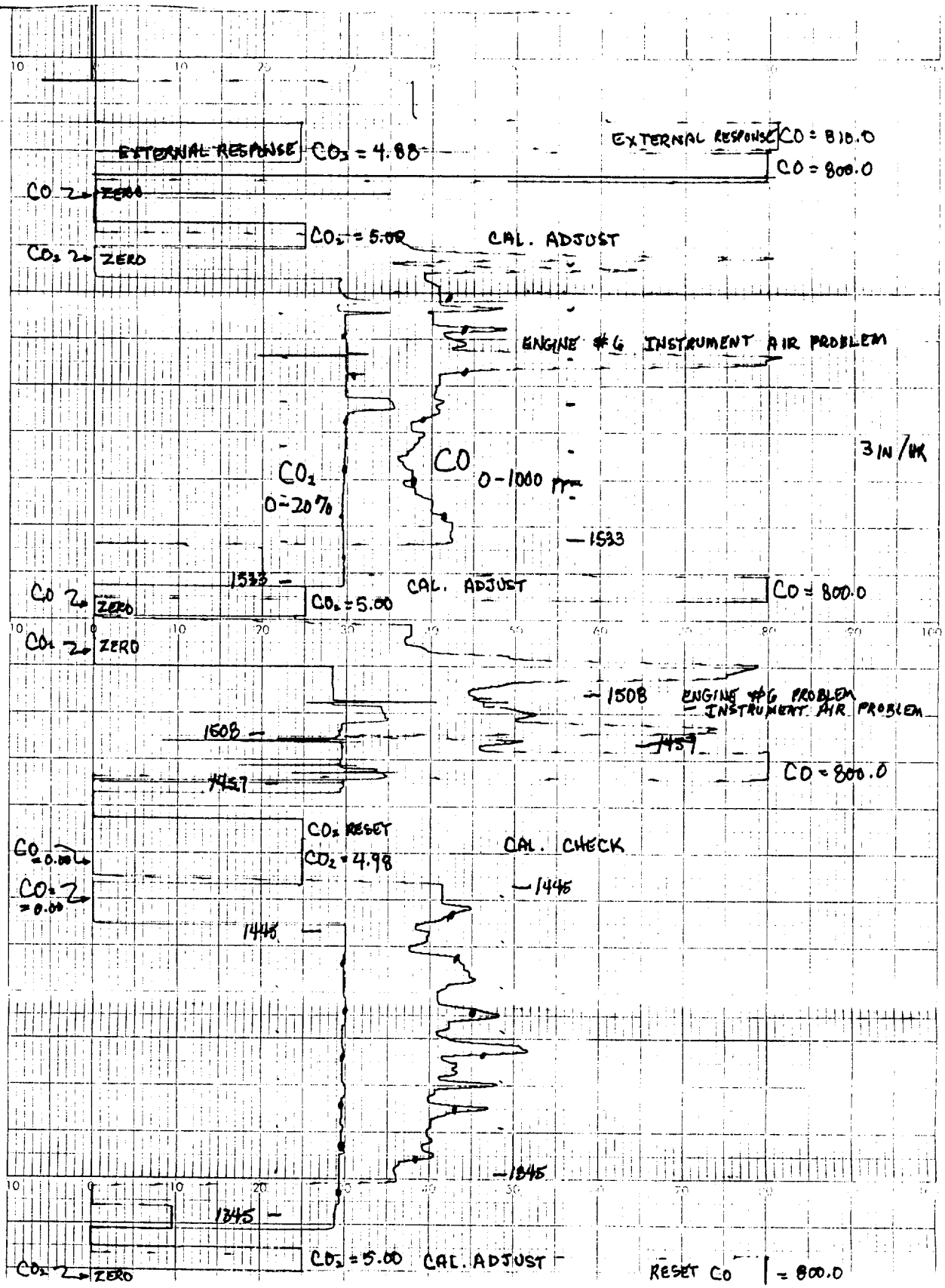

RUN #2
7/9/90
3 IN/HR
CO2
0-20%
CO 0-1000 ppm
1440
CO = 800.0
CO = 5.00
CAL. ADJUST
ZERO
CO = 823.0
CO2 = 4.92
CAL. CHECK
CO2 = 0.10
1425
TEXACO
ENGINE #1
RUN #1
7/9/90
6 IN/HR
CO
0-1000 ppm
CO2
0-20%
1325
1315
CO2 = 5.00
CAL. ADJUST
CO = 800.0
ZERO
CO = 782.0
CO = 9.0
CAL. CHECK
CO2 = 5.00
CO2 = 0.00
1255
TEXACO
ENGINE #4
RUN # 2
7/9/90
CO
0-1000 ppm
CO2
0-20%
3 IN/HR

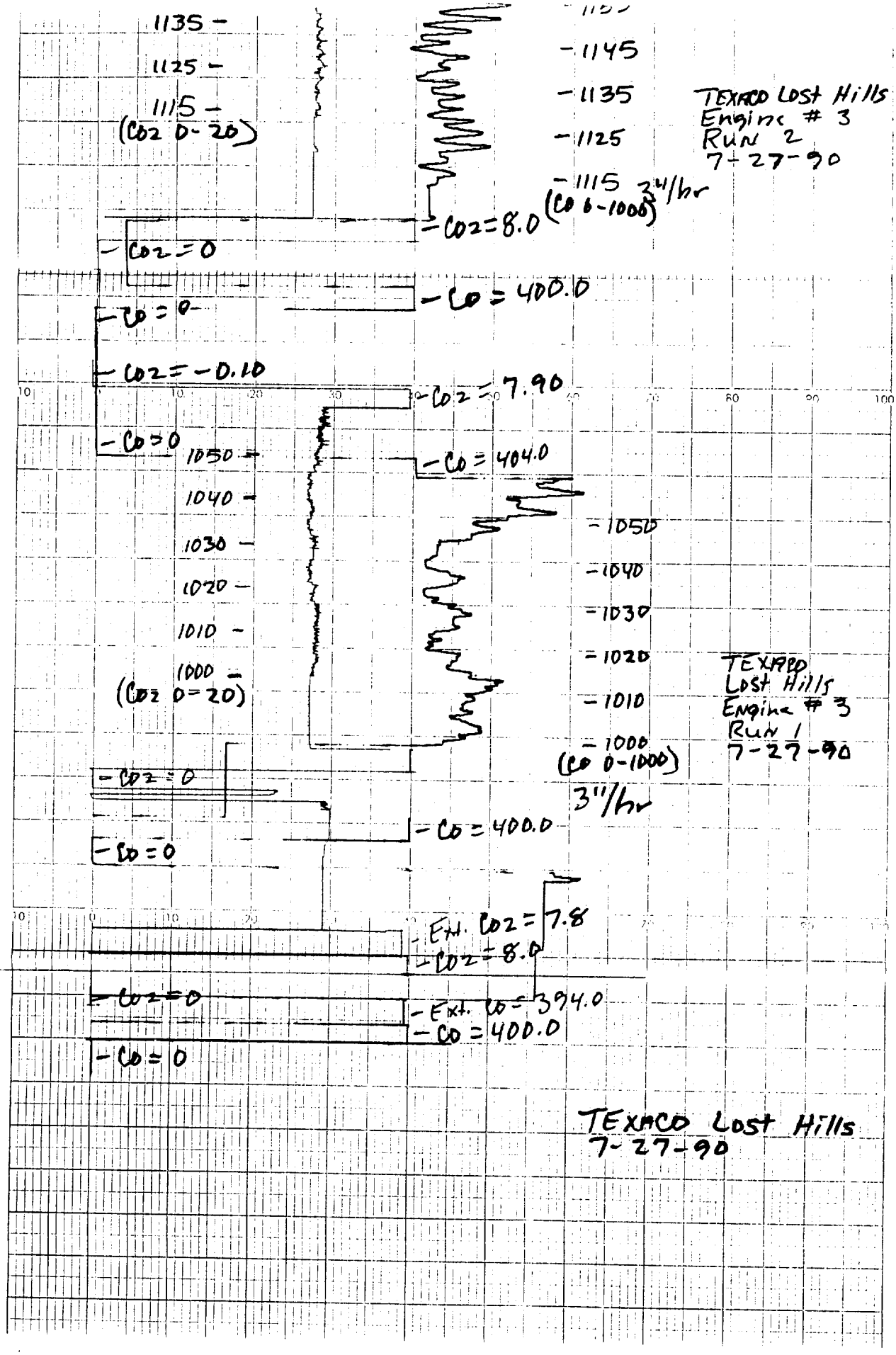

CO2 = 5.00
RECALIBRATE
CO2
lost power
lost power
0810
0810
CO = 781.0
EXTERNAL RESPONSE
EXTERNAL RESPONSE
CO2 = 4.80
CO = 800.0
CO2
CO2 = 5.00
INITIAL CAL. 7/10/90
CO2
EXTERNAL RESPONSE
CO2 = 4.64
EXTERNAL RESPONSE
CO = 762.0
CO = 798.0
CO = 0.00
CO2 = 5.24
CAL CHECK
CO2 = 0.08
1540
1540
TEXACO
ENGINE #1
RUN #2
7/9/90
3 IN/HR
CO2 0-20%
CO 0-1000 ppm
1440
1440
CO = 800.0

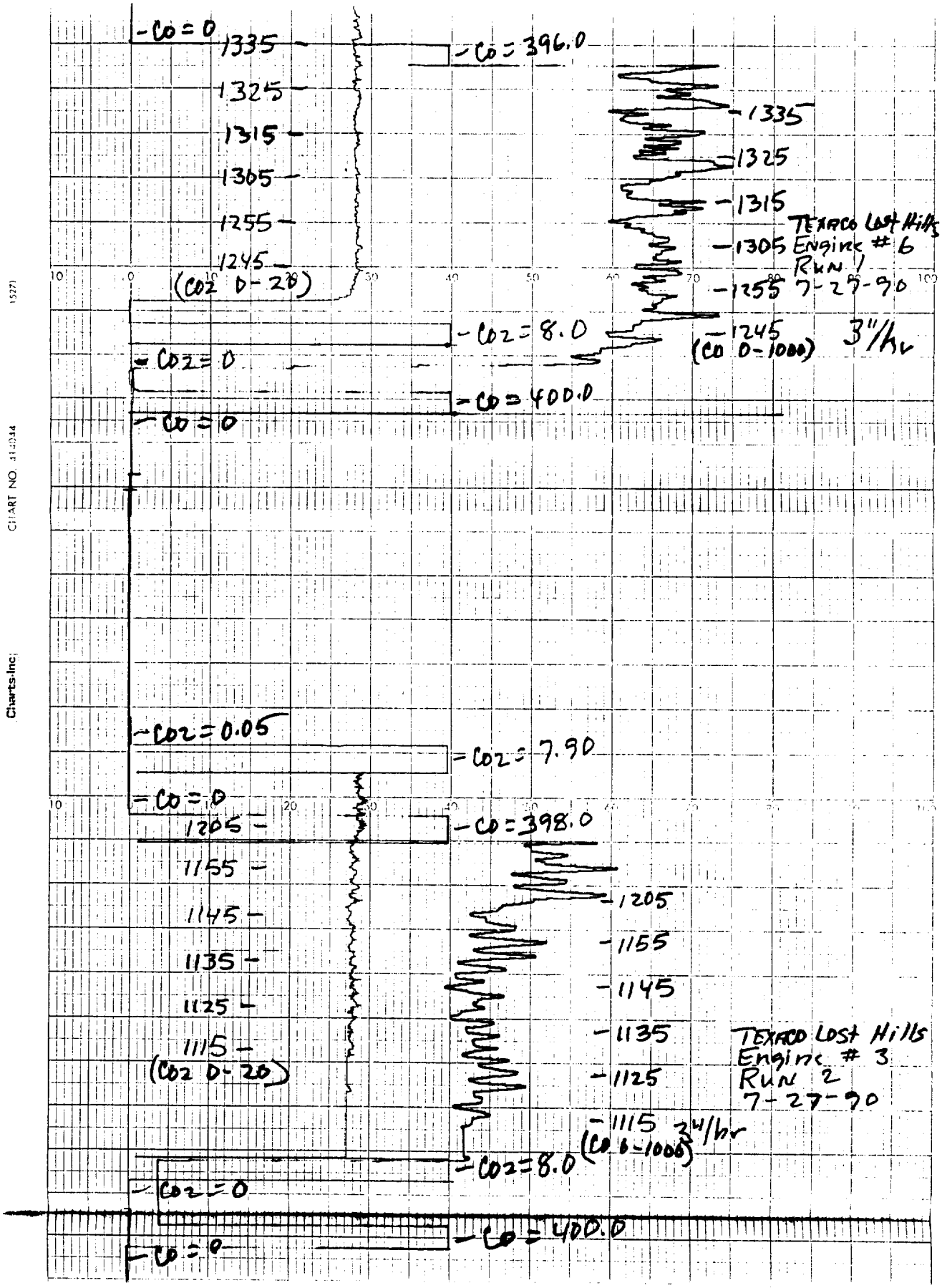

CO2
0-20%
CO
0-1000 ppm
TEXACO
ENGINE #1
7/10/90
RUN #2
3 IN/HR
1605
CO = 800.0
CAL. ADJUST
1605
CO2 ZERO
CO2 = 5.00
CO2 ZERO
CO2 = 4.76
CO = 842.0
CO = 0.00
CO2 = 0.00
CAL. CHECK
1535
1535
TEXACO
ENGINE #1
7/10/90
RUN #1
CO2
0-20%
CO
0-1000 ppm
3 IN/HR
1435
CO = 800.0
CO2 ZERO
1435
CO2 = 5.00
CAL. ADJUST
CO2 ZERO
1325
1325
CO = 800.0
CO2 ZERO
CO2 = 6.00
CO2 ZERO
CAL. ADJUST
CHART PAPER PROBLEM
CHART NO. 41-4044
Charts Inc.

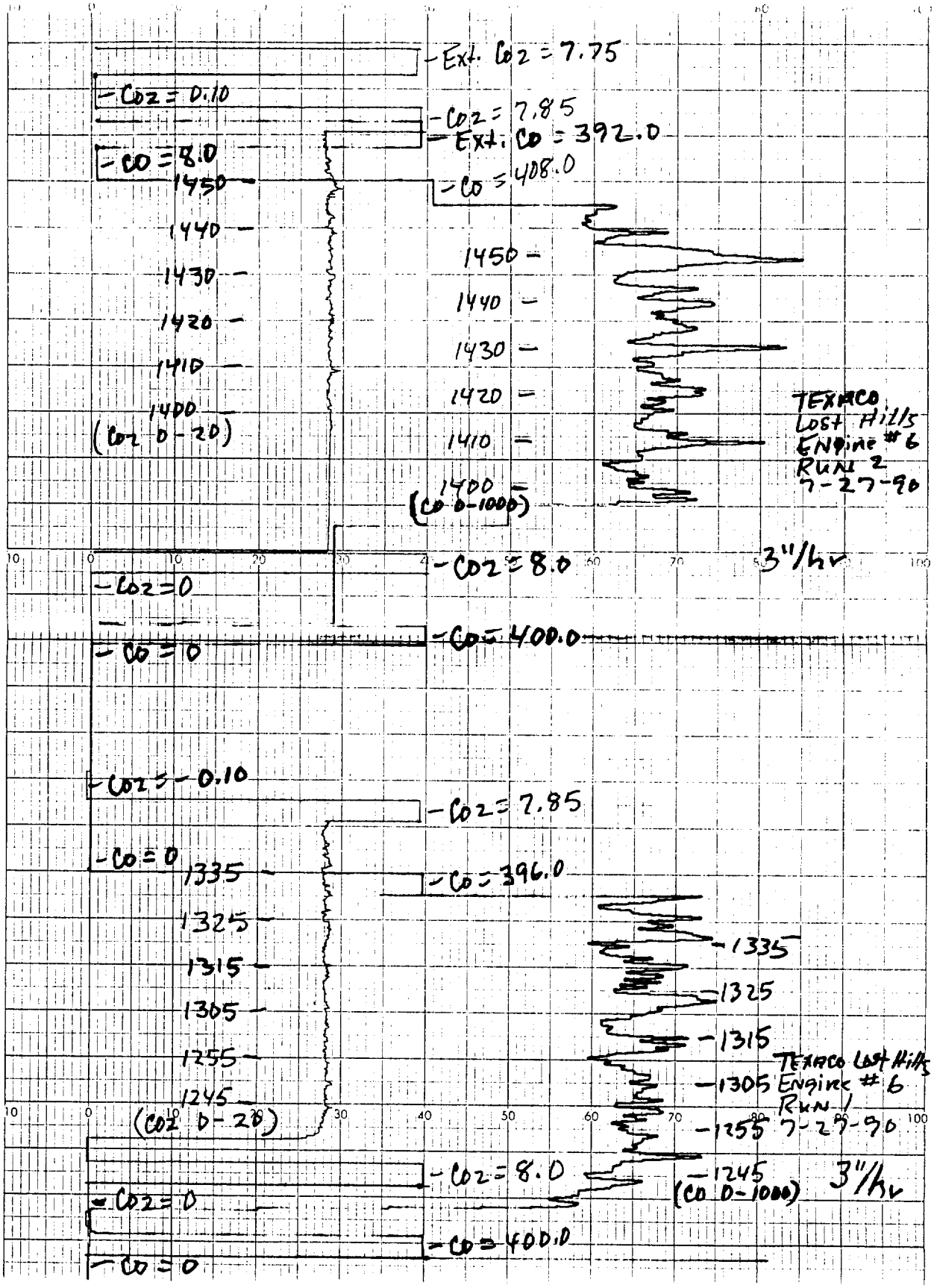

CHANGED CHART PAPER BEFORE RECALIBRATION
CO = 10.0
CO2 = -0.03
CO2 = 5.00
CAL. CHECK
CO = 833.0
1027
TEXACO
LOST HILLS
ENGINE #5
RUN #2
CO2
0-20%
CO
0-1000 ppm
3 IN/HR
0927
CO
ZERO
CO2 = 5.00
CAL. ADJUST
CO = 800.0
CO2
ZERO
CO = 810.0
CO
= 9.0
CO2
= -0.10
CO2 = 4.80
CAL. CHECK
0907
TEXACO
LOST HILLS
7/11/90
ENGINE #5
RUN #1
CO2
0-20%
CO
0-1000 ppm
3 IN/HR
0807
EXTERNAL RESPONSE
CO = 812.0
CO2 = 4.80 EXTERNAL RESPONSE
CO2 = 5.00
CO = 800.0
CO
ZERO
CO2
INITIAL CAL. 7/11/90
EXTERNAL RESPONSE
CO = 799.0
CO2 = 4.78 EXTERNAL RESPONSE
CO2 = 5.00
CO = 810.0
CO
= 2.0
CO2
= 0.00
CAL. CHECK
1705
TEXACO
ENGINE #1
7/10/90
CO2
CO
0-1000
ppm


1445
1345
CO2 = 5.00 CAL. ADJUST
RESET CO = 800.0
CO = 824.0
CO2 → ZERO
CO → 0.00
CO2 = 5.06 CAL. CHECK
CO2 → 0.00
1320
TEXACO
ENGINE #2
7/11/90
RUN #2
CO2
0-20%
CO
0=1000 ppm
3 IN/HR
1220
CO2 = 5.00 CAL. ADJUST
CO = 800.0
CO2 → ZERO
CO = 818.0
CAL. CHECK
CO → 10.0
CO2 = 4.92
CO2 → 0.18
1207
TEXACO
ENGINE #2
7/11/90
RUN #1
CO
0-1000 ppm
3 IN/HR
1107
CO = 800.0
CO2 = 5.00
CO → ZERO
CO2 → ZERO
CAL. ADJUST
NEW CHART PAPER


EXTERNAL RESPONSE
CO2 = 4.88
EXTERNAL RESPONSE
CO = 810.0
CO = 800.0
CO → ZERO
CO2 = 5.00
CAL. ADJUST
CO2 → ZERO
ENGINE #6 INSTRUMENT AIR PROBLEM
3 IN/HR
CO2
0-20%
CO
0-1000 ppm
1533
1533
CAL. ADJUST
CO = 800.0
CO2 → ZERO
CO2 = 5.00
CO2 → ZERO
1508
ENGINE #6 PROBLEM
INSTRUMENT AIR PROBLEM
1508
1457
1457
CO = 800.0
CO2 RESET
CO2 = 4.98
CAL. CHECK
CO = 0.00
CO2 = 0.00
1446
1446
1845
1845
CO2 = 5.00
CAL. ADJUST
CO2 → ZERO
RESET CO
= 800.0


1135
1125
1115
(CO2 0-20)
1145
1135
1125
1115
(CO 0-1000)
2"/hr
TEXACO Lost Hills
Engine # 3
Run 2
7-27-90
CO2 = 8.0
CO2 = 0
CO = 400.0
CO = 0
CO2 = -0.10
CO2 = 7.90
CO = 0
CO = 404.0
1050
1040
1030
1020
1010
1000
(CO2 0-20)
1050
1040
1030
1020
1010
1000
(CO 0-1000)
3"/hr
TEXACO
Lost Hills
Engine # 3
Run 1
7-27-90
CO2 = 0
CO = 400.0
CO = 0
Ext. CO2 = 7.8
CO2 = 8.0
CO2 = 0
Ext. CO = 394.0
CO = 400.0
CO = 0
TEXACO Lost Hills
7-27-90


CO = 0
1335
1325
1315
1305
1255
1245
(CO2 0-20)
CO = 396.0
1335
1325
1315
1305
1255
1245
(CO 0-1000)
TEXACO Lost Hills
Engine # 6
RUN 1
7-27-90
3"/hr
CO2 = 8.0
CO2 = 0
CO = 400.0
CO = 0
CO2 = 0.05
CO2 = 7.90
CO = 0
1205
1155
1145
1135
1125
1115
(CO2 0-20)
CO = 398.0
1205
1155
1145
1135
1125
1115
(CO 0-1000)
TEXACO Lost Hills
Engine # 3
RUN 2
7-27-90
3"/hr
CO2 = 8.0
CO2 = 0
CO = 400.0
CO = 0


Ext. CO2 = 7.75
CO2 = 0.10
CO2 = 7.85
Ext. CO = 392.0
CO = 8.0
CO = 408.0
1450
1440
1430
1420
1410
1400
(CO2 0-20)
1450
1440
1430
1420
1410
1400
(CO 0-1000)
TEXACO
Lost Hills
Engine #6
Run 2
7-27-90
CO2 = 8.0
3"/hr
CO2 = 0
CO = 400.0
CO = 0
CO2 = 0.10
CO2 = 7.85
CO = 0
CO = 396.0
1335
1325
1315
1305
1255
1245
(CO2 0-20)
1335
1325
1315
1305
1255
1245
(CO 0-1000)
TEXACO Lost Hills
Engine #6
Run 1
7-27-90
CO2 = 8.0
3"/hr
CO2 = 0
CO = 400.0
CO = 0

Pape & Steiner Environmental Services

SAMPLE HANDLING/LOG-IN

Date 7/9/90 Test Location TEXACO, LOST HILLS

	Sample Type	Volume	Comments
1.	21722 GC (Meth) HC (Sample) 1 (Test)	RUN#1	INTEGRATED HC, ENGINE # 4
2.	21721 ASTM (Meth) SUL (Sample) 1 (Test)		FUEL SULFUR
3.	21720 ASTM (Meth) FG (Sample) 1 (Test)		FUEL GAS
4.	21719 GC (Meth) HC (Sample) 2 (Test)	RUN #2	INTEGRATED HC, ENGINE # 4
5.	21718 GC (Meth) HC (Sample) 1 (Test)	RUN #1	INTEGRATED HC, ENGINE # 1
6.	21717 GC (Meth) HC (Sample) 2 (Test)	RUN #2	INTEGRATED HC, ENGINE # 1
	Gom		
7.			
8.			
9.			
10.			
11.			
12.			

CHAIN OF CUSTODY

Pape & Steiner Environmental Services

SAMPLE HANDLING/LOG-IN

Date 7/10/90 Test Location LOST HILLS

	Sample Type	Volume	Comments
1.	21716 GC (Meth) HC (Sample) 1 (Test)		ENGINE #1
2.	21715 GC (Meth) HC (Sample) 2 (Test)		ENGINE #1
3.	21714 ASTM (Meth) FG (Sample) ___ (Test)		
4.	21713 ASTM (Meth) SUL (Sample) ___ (Test)		
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

CHAIN OF CUSTODY

Pape & Steiner Environmental Services

SAMPLE HANDLING/LOG-IN

Date 7/11/90 SAMPLED Test Location TEXACO, LOST HILLS

	Sample Type	Volume	Comments
1.	21712 GC (Meth) HC (Sample) 1 (Test)		
2.	21711 GC (Meth) HC (Sample) 2 (Test)	ENGINE #5	
3.	21710 ASTM (Meth) SUL (Sample) ___ (Test)		
4.	21709 ASTM (Meth) FG (Sample) ___ (Test)	Fuel Samples taken by Texaco.	
5.	21708 GC (Meth) HC (Sample) 1 (Test)		
6.	21707 GC (Meth) HC (Sample) 2 (Test)	ENGINE #2	
7.	21706 GC (Meth) HC (Sample) 1 (Test)		
8.	21705 GC (Meth) HC (Sample) 2 (Test)	ENGINE #6	
9.	Samples delivered to lab 7/11/90 Germ Germ		
10.			
11.			
12.			

CHAIN OF CUSTODY

LW.

Pape & Steiner Environmental Services

SAMPLE HANDLING/LOG-IN

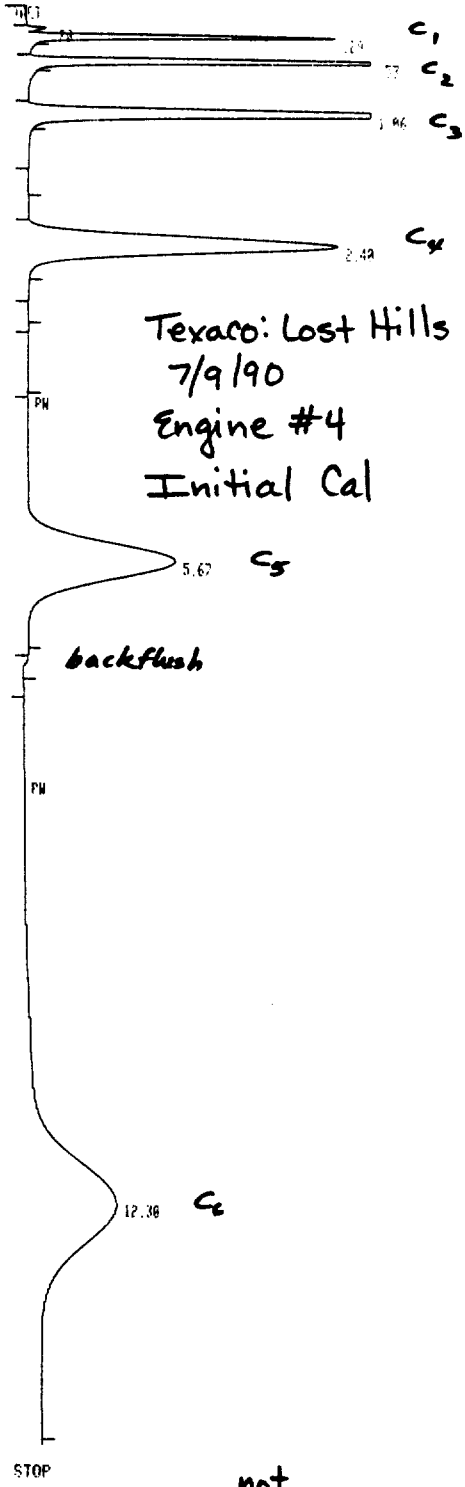
Date 7-27-90 Test Location TEXACO Lost Hills Engines # 3 + 6

	Sample Type	Volume	Comments
1.	23946 GC (Meth) HC (Sample) 1 (Test)		Engine # 3
2.	23947 GC (Meth) HC (Sample) 2 (Test)		" " "
3.	23948 GC (Meth) HC (Sample) 1 (Test)		" " 6
4.	23949 GC (Meth) HC (Sample) 2 (Test)		" " "
5.	23950 ___ (Meth) FG (Sample) All (Test)		Fuel Gas
6.	23951 ___ (Meth) FG (Sample) All (Test) Sulfur Anal.		Fuel Gas For Sulfur Anal.
7.			
8.			
9.			
10.			
11.			
12.			

CHAIN OF CUSTODY

Charles Reshard

LW.



Initial Cal → not calibrated (% Area)

RUN # 1 JUL/10/90 07:30:42

AREA%

RT	AREA	TYPE	AR/HT	AREA%	
0.20	219	PV	0.034	0.225	
0.29	4504	VB	0.042	4.628	C1
0.53	9321	PB	0.046	9.577	
1.06	14724	PB	0.082	15.128	
2.40	19955	BB	0.184	20.502	
5.67	22820	BB	0.441	23.446	
12.30	25789	BB	0.922	26.496	

TOTAL AREA= 97332
MUL FACTOR= 1.0000E+00

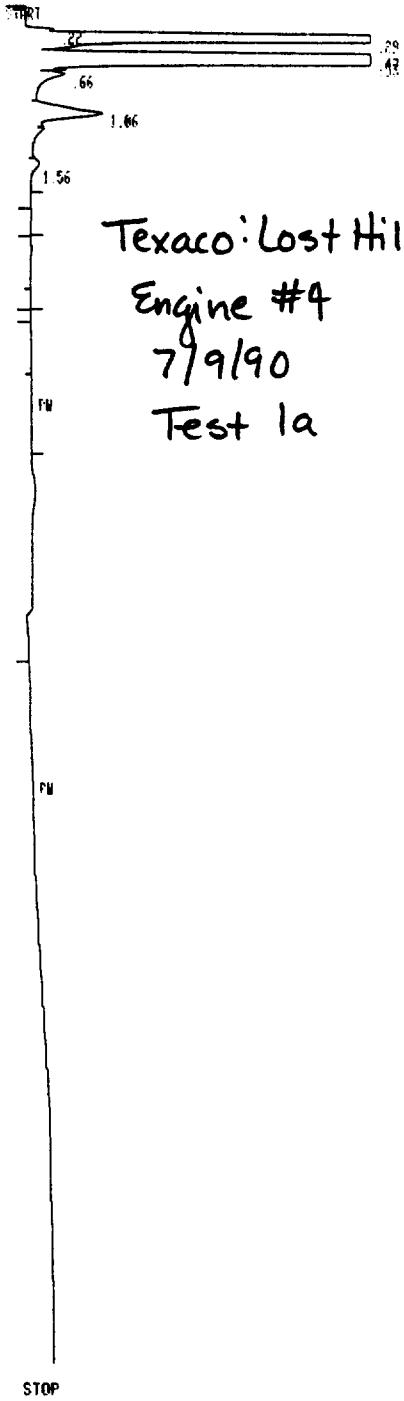
Initial Cal → calibrated

RUN # 1 JUL/10/90 07:30:42

ESTD

RT	AREA	TYPE	CAL#	AMOUNT ppm	
0.20	219	PV	2	1.000 1.030	
0.29	4504	VB	1R	20.190 21.190	C1
0.53	9321	PB		41.783 43.853	
1.06	14724	PB		66.003 69.272	
2.40	19955	BB		89.452 93.882	
5.67	22820	BB		102.300 107.361	
12.30	25789	BB		115.600 121.330	

TOTAL AREA= 97332
MUL FACTOR= 1.0000E+00

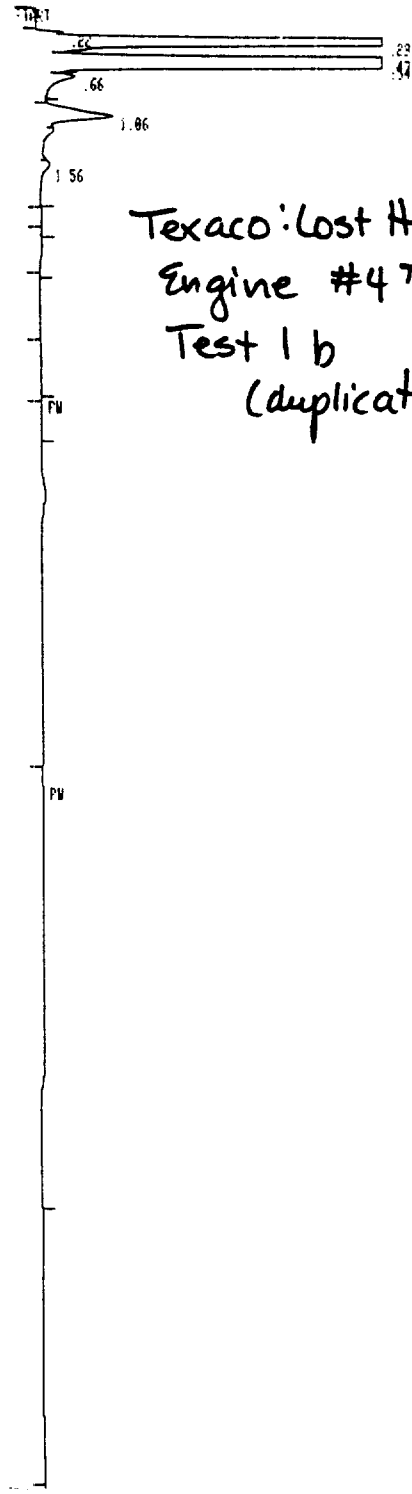


RUN # 5 JUL/10/90 13:20:52
ID 21722-1a

ESTD

RT	AREA	TYPE	CAL#	AMOUNT		
0.22	0	PP	2	0.000	0.000	
0.29	312460	PB	1R	1400.700	1470.08	c_1
0.47	23525	PV		105.460	110.678	
0.53	29921	VB		134.138	140.769	
0.66	103	BP		0.462	0.485	
1.06	2580	PV		11.565	12.138	$>c_2$
1.56	289	PB		1.296	1.360	

TOTAL AREA= 368880
MUL FACTOR= 1.0000E+00

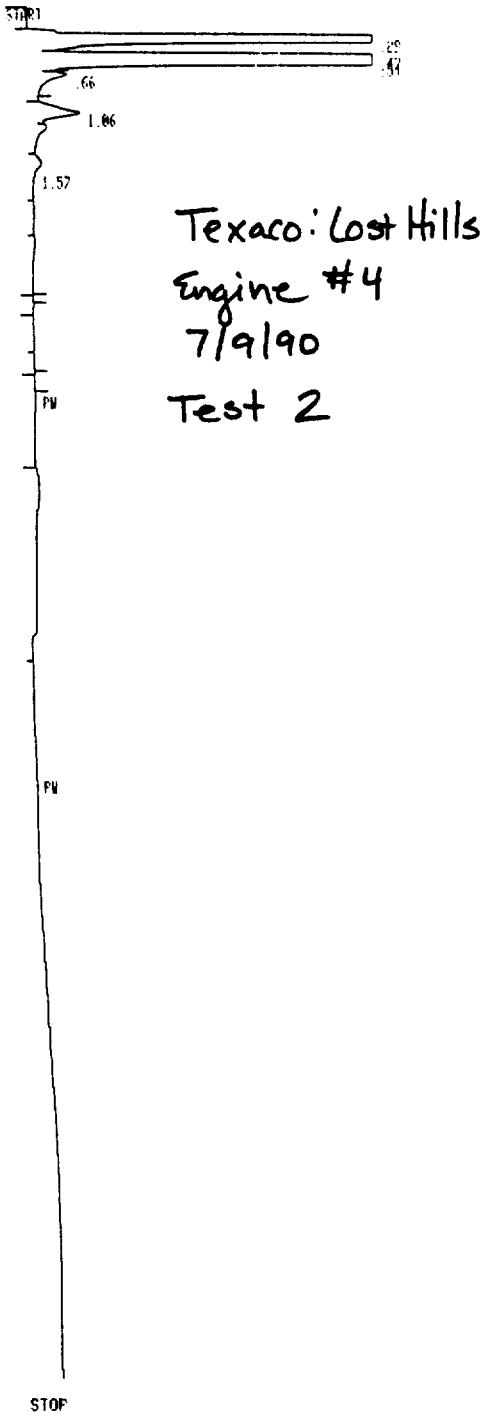


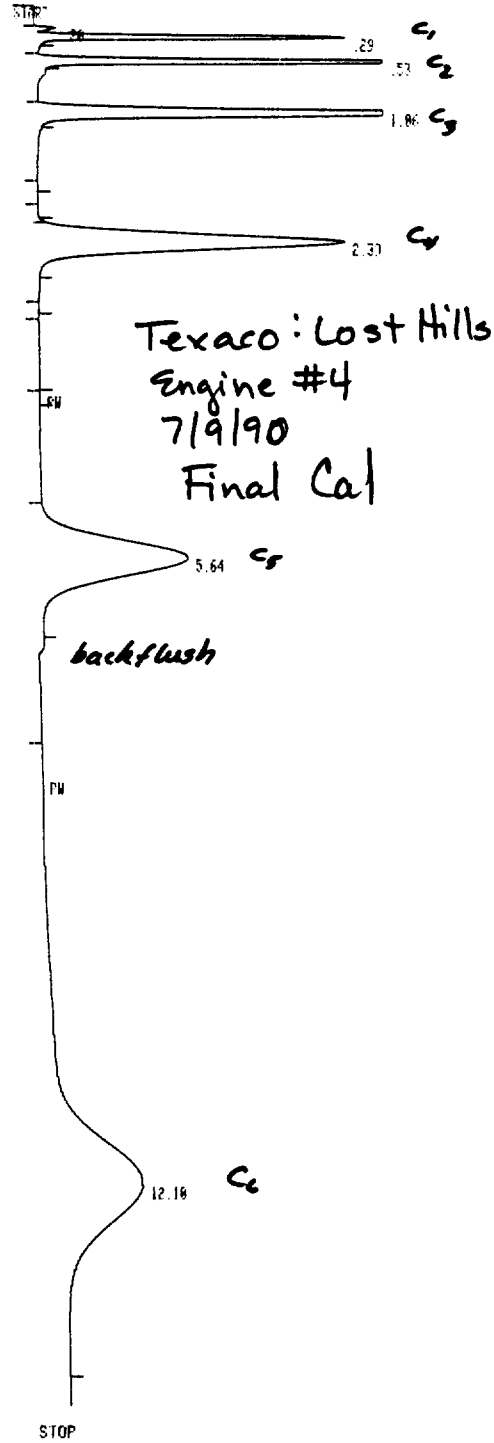
RUN # 6 JUL/10/90 13:46:21
ID 21722-1b

ESTD

RT	AREA	TYPE	CAL#	AMOUNT		
0.22	0	PV	2	0.000	0.000	
0.29	313260	VB	1R	1404.700	1473.744	c_1
0.47	23550	BV		105.570	110.796	
0.54	30004	VB		134.500	141.160	
0.66	215	BB		0.964	1.012	
1.06	2592	PV		11.619	12.195	$>c_2$
1.56	224	PB		1.004	1.054	

TOTAL AREA= 369840
MUL FACTOR= 1.0000E+00





RUN # 8 JUL/10/90 14:51:16
ID 21719-2

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	ppm	
0.29	285290	PB	1R	1278.800	1542.204	C_1
0.47	20735	PV		92.949	97.552	
0.54	27523	VB		123.380	129.937	
0.66	140	BB		0.628	0.659	
1.06	1628	BV		7.298	7.657	$>C_2$
1.57	310	PP		1.390	1.458	

TOTAL AREA= 335620
MUL FACTOR [illegible]

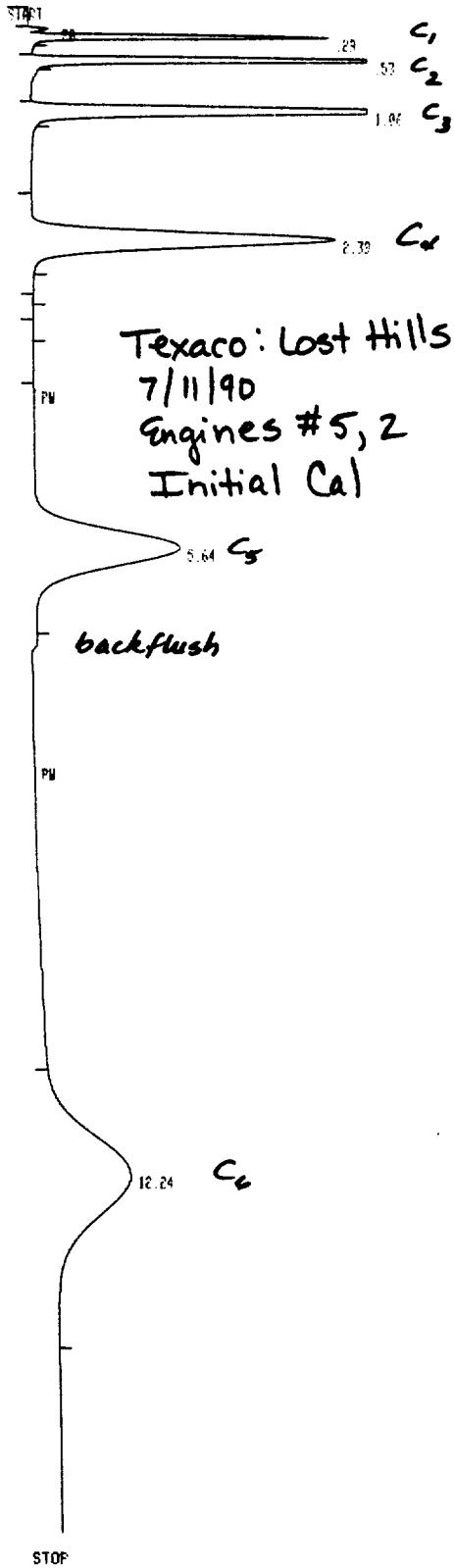
Final Cal

RUN # 10 JUL/10/90 15:49:05

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	ppm	
0.20	239	PV	2	1.191	1.124	
0.29	4524	VB	1R	20.288	21.284	C_1
0.53	9074	PB		40.676	42.690	
1.06	14334	BB		64.255	67.437	
2.39	19247	BB		86.279	90.551	$>C_2$
5.64	22203	BB		99.529	104.458	
12.10	26273	PB		117.770	123.607	

TOTAL AREA= 95894
MUL FACTOR= 1.0000E+00



Initial Cal → % Area

RUN # 1 JUL/12/90 08:16:13

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.20	229	PV	0.035	0.228
0.29	4504	VB	0.043	4.486 C_1
0.53	9262	PB	0.045	9.225
1.06	14579	BB	0.081	14.521
2.39	19771	PB	0.183	19.692
5.64	22841	BB	0.443	22.750
12.24	29213	BB	1.027	29.097

TOTAL AREA= 100400
MUL FACTOR= 1.0000E+00

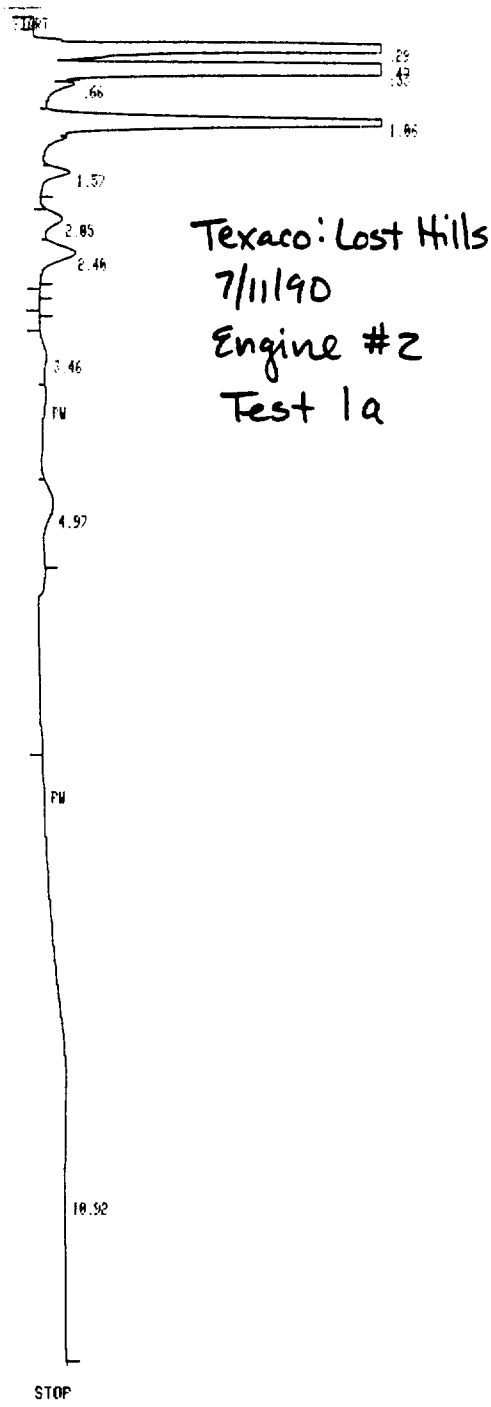
Initial Cal → calibrated

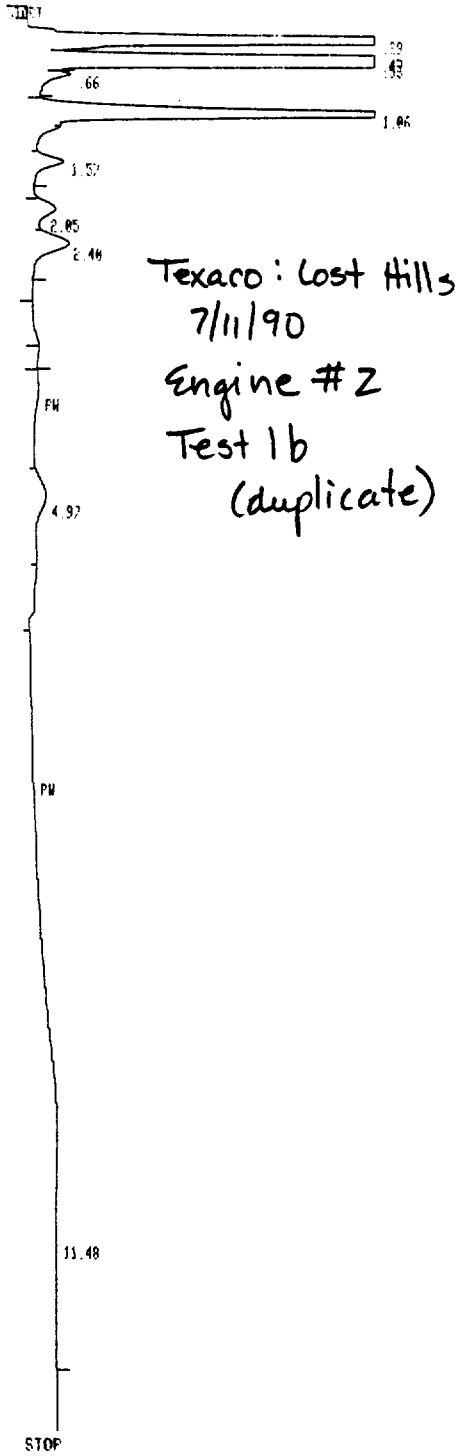
RUN # 1 JUL/12/90 08:16:13

ESTD

RT	AREA	TYPE	CAL#	AMOUNT
0.20	229	PV	2	1.090
0.29	4504	VB	1R	21.190 C_1
0.53	9262	PB		43.575
1.06	14579	BB		68.590
2.39	19771	PB		93.017
5.64	22841	BB		107.460
12.24	29213	BB		137.440

TOTAL AREA= 100400
MUL FACTOR= 1.0000E+00





RUN # 5 JUL/12/90 12:36:51
ID 21708-1a

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.29	526910	PB	1R	2478.900	C_1
0.47	28870	PV		135.820	
0.53	59391	VB		279.420	
0.66	0	BP		0.000	
1.06	18964	PV		89.220	
1.57	1213	VB		5.707	
2.05	1074	BV		5.053	ΣC_2
2.40	2292	VB		10.783	
3.46	583	BV		2.743	
4.97	1274	PB		5.994	
10.92	6364	PB		29.941	

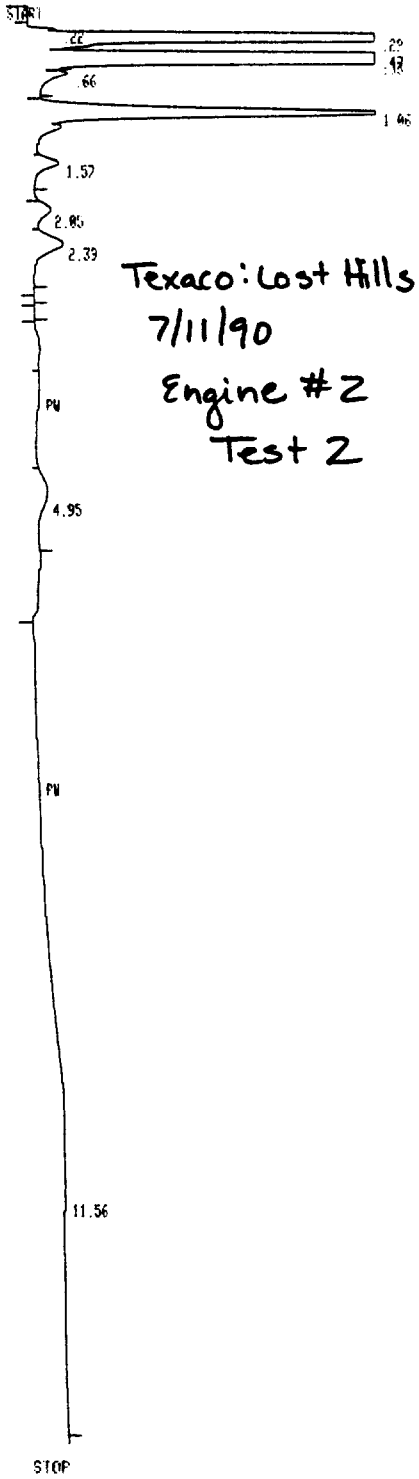
TOTAL AREA= 646930
MUL FACTOR= 1.0000E+00

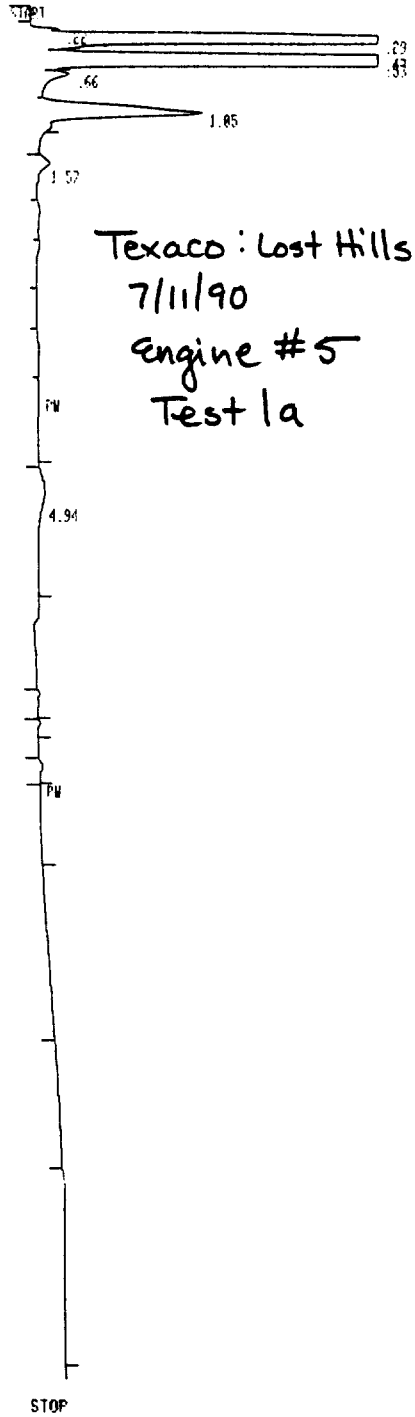
RUN # 6 JUL/12/90 13:26:54
ID 21708-1b

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.29	525330	PB	1R	2471.500	C_1
0.47	28829	PV		135.630	
0.53	59246	VB		278.730	
0.66	51	BB		0.240	
1.06	18952	BV		89.163	
1.57	1200	VB		5.646	
2.05	1171	BV		5.509	ΣC_2
2.40	2385	VB		11.221	
4.97	2073	PV		9.753	
11.48	5976	PB		28.115	

TOTAL AREA= 645210
MUL FACTOR= 1.0000E+00





RUN # 8 JUL/12/90 15:10:49
ID 21707-2

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	0	PP	2	0.000	
0.29	443080	PB	1R	2084.600	C_1
0.47	24976	BV		117.500	
0.53	48110	VB		226.340	
0.66	53	BB		0.249	
1.06	12901	BV		60.695	
1.57	1004	PB		4.724	
2.05	917	BV		4.314	ΣC_2
2.39	1958	VB		9.212	
4.95	1208	PB		5.683	
11.56	6095	PB		28.675	

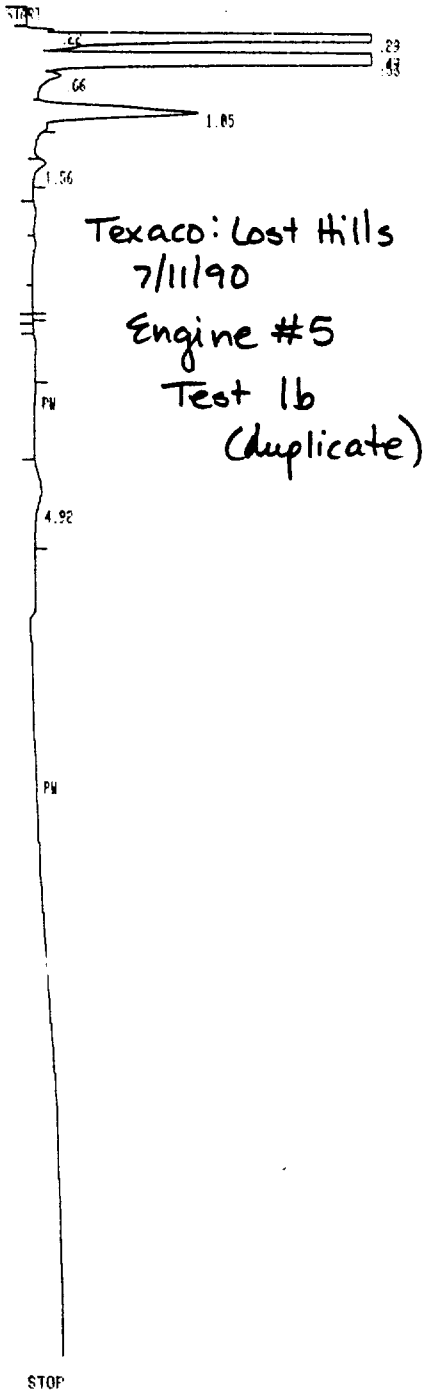
TOTAL AREA= 540300
MUL FACTOR= 1.0000E+00

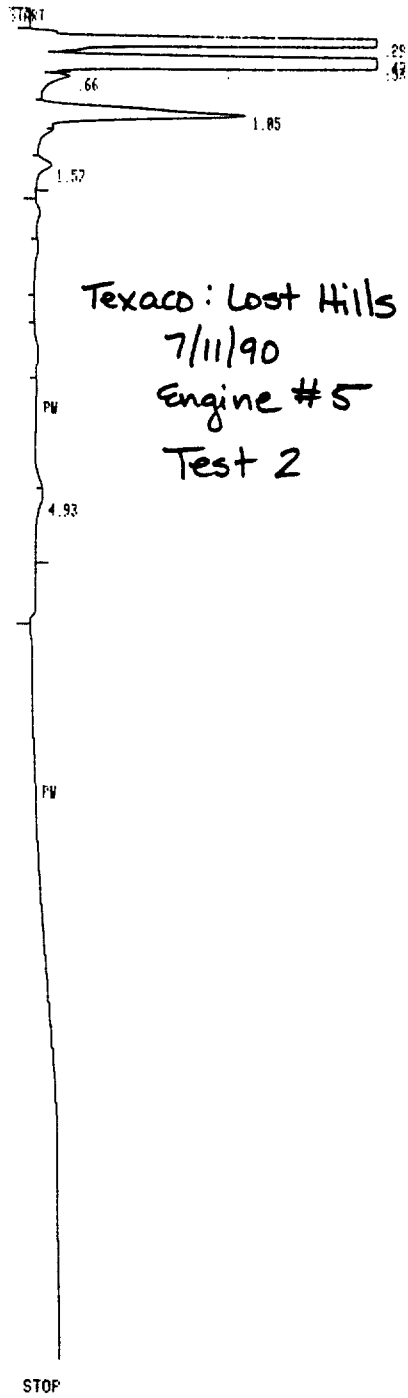
RUN # 9 JUL/12/90 15:40:42
ID 21712-1a

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	0	PV	2	0.000	
0.29	303870	VB	1R	1429.600	C_1
0.47	27661	BV		130.140	
0.53	27062	VB		127.320	
0.66	202	BP		0.950	
1.05	6381	PB		30.021	ΣC_2
1.57	482	BP		2.268	
4.94	824	PB		3.877	

TOTAL AREA= 366480
MUL FACTOR= 1.0000E+00





RUN # 11 JUL/12/90 16:33:22
ID 21712-1b

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	0	PV	2	0.000	
0.29	306210	VB	1R	1440.600	c_1
0.47	27938	BV		131.440	
0.53	27448	VV		129.130	
0.66	373	VP		1.755	
1.05	6404	PB		30.129	$>c_2$
1.56	333	BB		1.567	
4.92	852	BB		4.008	

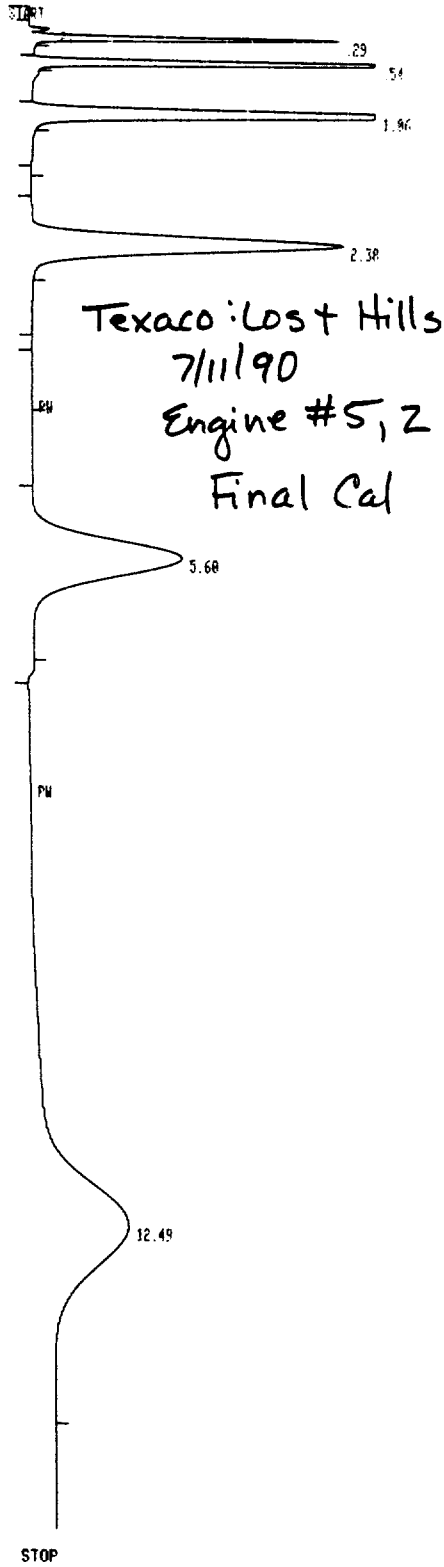
TOTAL AREA= 369550
MUL FACTOR= 1.0000E+00

RUN # 12 JUL/12/90 17:04:45
ID 21711-2

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.29	335140	PB	1R	1576.700	c_1
0.47	27829	BV		130.930	
0.53	30980	VB		145.380	
0.66	258	BP		1.214	
1.05	7839	PV		36.880	$>c_2$
1.57	623	PB		2.931	
4.93	969	PB		4.559	

TOTAL AREA= 403560
MUL FACTOR= 1.0000E+00



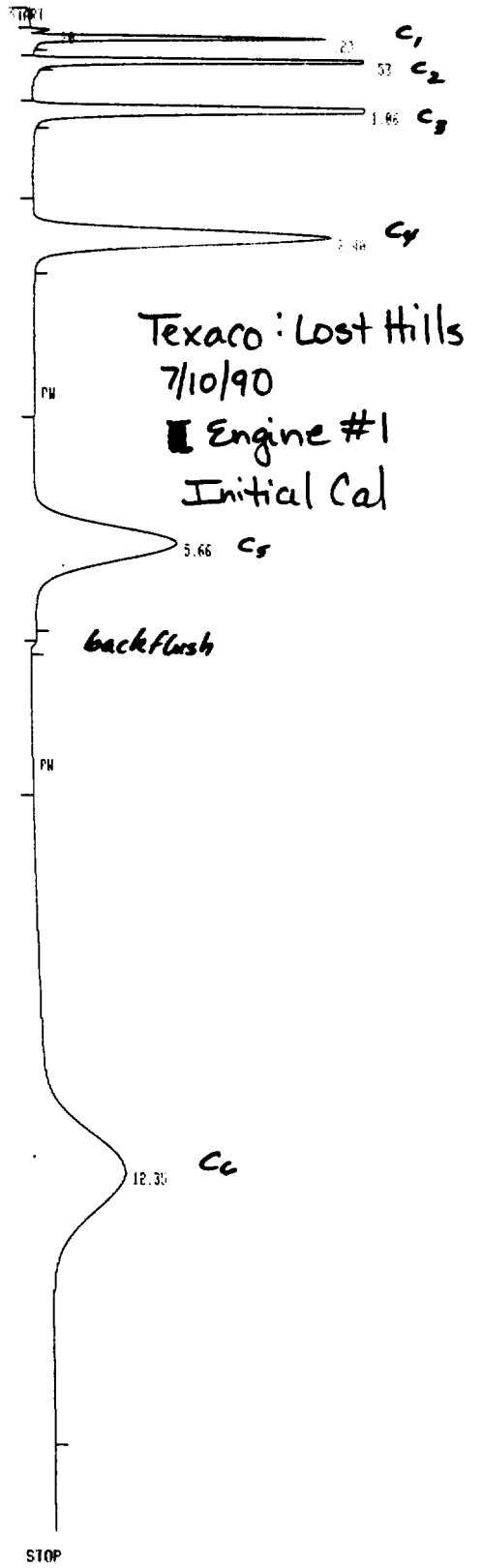
Final Cal

RUN # 13 JUL/12/90 17:28:31

ESTD

RT	AREA	TYPE	CAL#	AMOUNT
0.21	186	PV	2	0.812
0.29	4546	VB	1R	21.388 c_1
0.54	9250	PB		43.518
1.06	14538	PB		68.397
2.38	19831	BB		93.299
5.60	22597	PB		106.310
12.49	25013	PB		117.680

TOTAL AREA= 95961
MUL FACTOR= 1.0000E+00



Initial Cal → % Area

RUN # 1 JUL/11/90 08:19:44

AREA%

RT	AREA	TYPE	AR/HT	AREA%	
0.20	237	PV	0.035	0.239	
0.29	4526	VB	0.043	4.564	C_1
0.53	9204	PB	0.045	9.281	
1.06	14518	BB	0.081	14.640	
2.40	19746	PB	0.184	19.911	$\times C_2$
5.66	22235	BB	0.436	22.421	
12.35	28704	PB	1.020	28.944	

TOTAL AREA= 99170
MUL FACTOR= 1.0000E+00

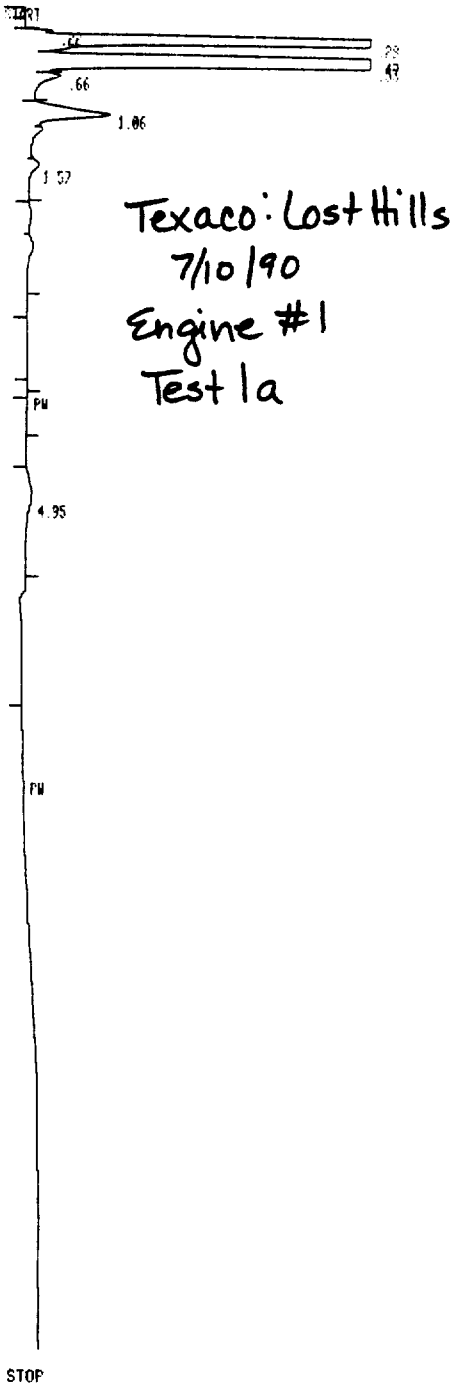
Initial Cal → calibrated

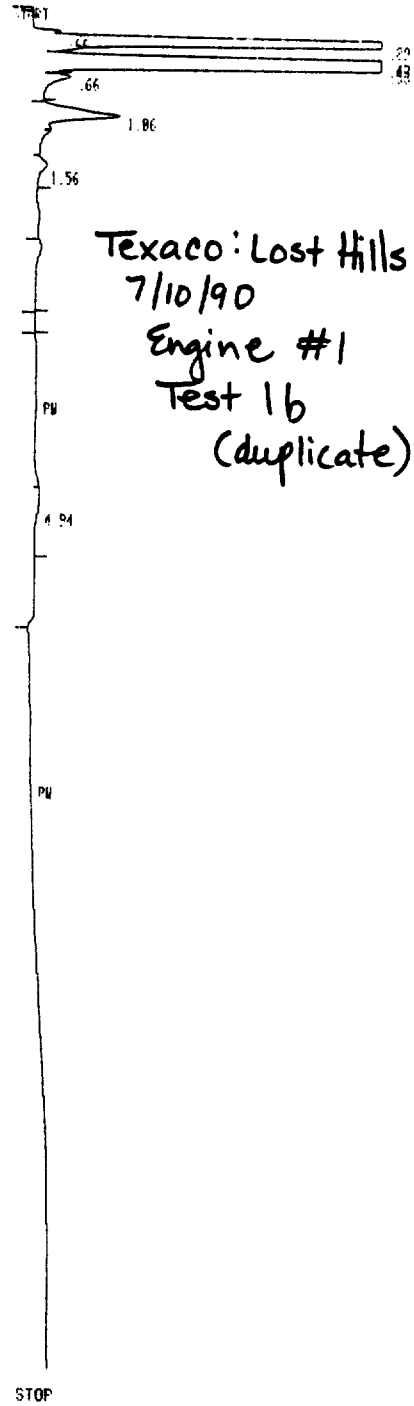
RUN # 1 JUL/11/90 08:19:44

ESTD

RT	AREA	TYPE	CAL#	AMOUNT
0.20	237	PV	2	1.000
0.29	4526	VB	1R	21.190
0.53	9204	PB		43.091
1.06	14518	BB		67.970
2.40	19746	PB		92.447
5.66	22235	BB		104.100
12.35	28704	PB		134.390

TOTAL AREA= 99170
MUL FACTOR= 1.0000E+00





RUN # 4 JUL/11/90 10:38:45
ID 21716-1a

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	124	PV	2	0.523	
0.29	230190	VB	1R	1077.700	C_1
0.47	20837	PV		97.555	
0.53	19241	VB		90.082	
0.66	88	BB		0.412	$>C_2$
1.06	2986	BV		13.980	
1.57	365	PB		1.709	
4.95	779	BB		3.647	

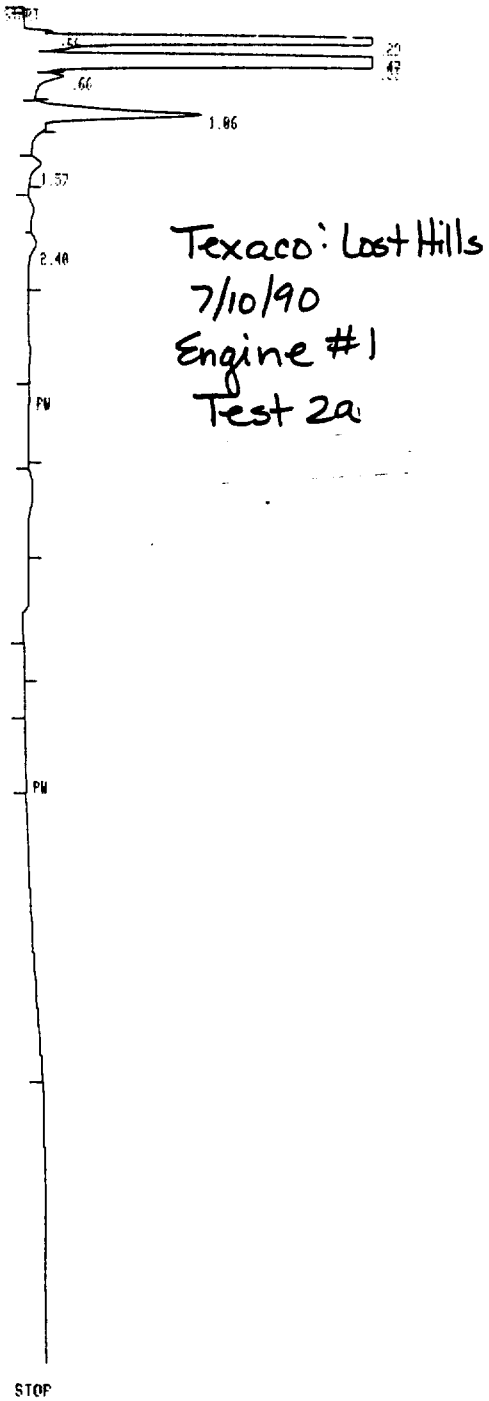
TOTAL AREA= 274610
MUL FACTOR= 1.0000E+00

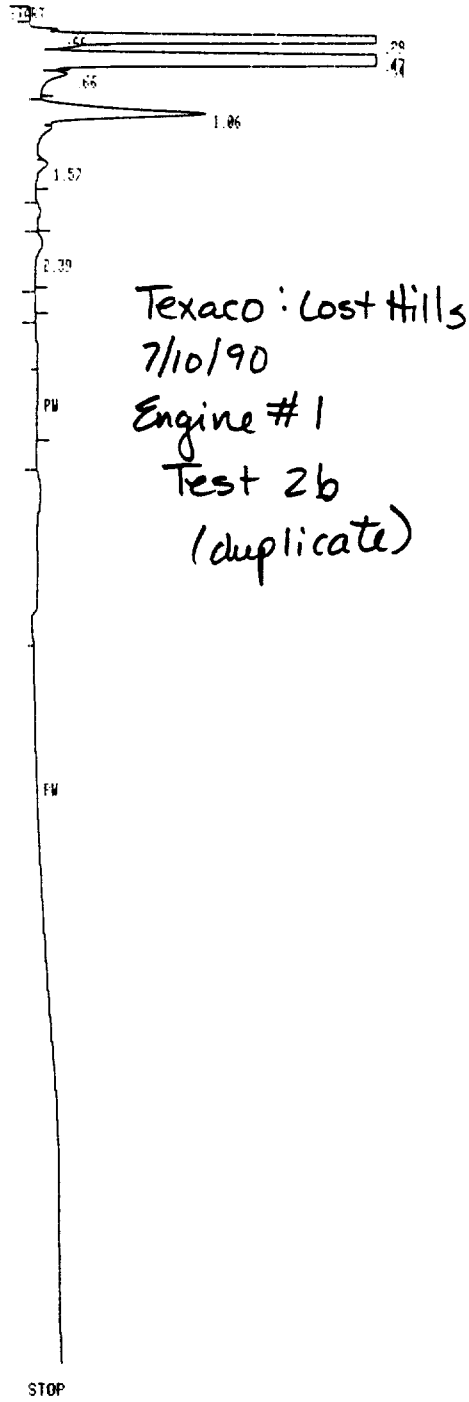
RUN # 5 JUL/11/90 11:30:36
ID 21716-1b

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	0	PP	2	0.000	
0.29	229710	PB	1R	1075.500	C_1
0.47	20778	PV		97.278	
0.53	19217	VB		89.970	
0.66	138	BB		0.646	$>C_2$
1.06	2984	BV		13.970	
1.56	314	PB		1.470	
4.94	771	PB		3.610	

TOTAL AREA= 273910
MUL FACTOR= 1.0000E+00





RUN # 8 JUL/11/90 13:38:59
ID 21715-2a

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	0	PP	2	0.000	
0.29	264930	PB	1R	1240.300	c_1
0.47	22200	PV		103.940	
0.53	26074	VB		122.070	
0.66	151	BB		0.707	Σc_2
1.06	5565	PB		26.054	
1.57	462	BB		2.163	
2.40	550	VB		2.575	

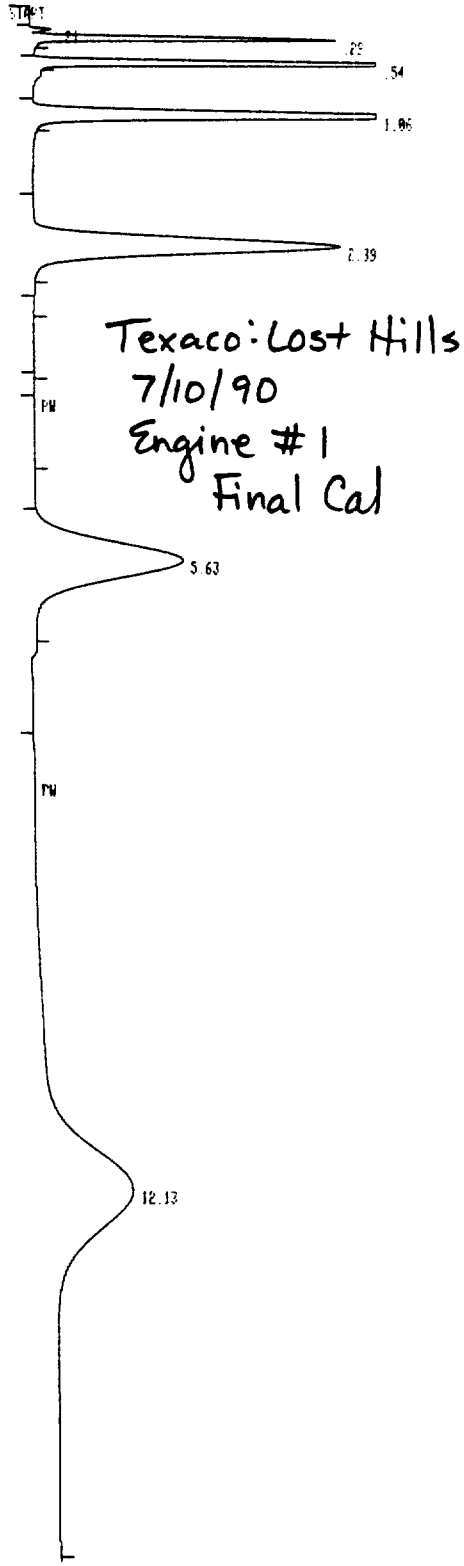
TOTAL [illegible] A= 319930
MUL FACTOR= 1.0000E+00

RUN # 9 JUL/11/90 14:02:24
ID 21715-2b

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	0	PV	2	0.000	
0.29	263720	VB	1R	1234.700	c_1
0.47	22096	PV		103.450	
0.54	25969	VB		121.580	
0.66	165	BB		0.773	Σc_2
1.06	5916	BV		27.698	
1.57	449	PB		2.102	
2.39	351	BB		1.643	

318660
[illegible]3E+00



Texaco: Lost Hills
7/10/90
Engine #1
Final Cal

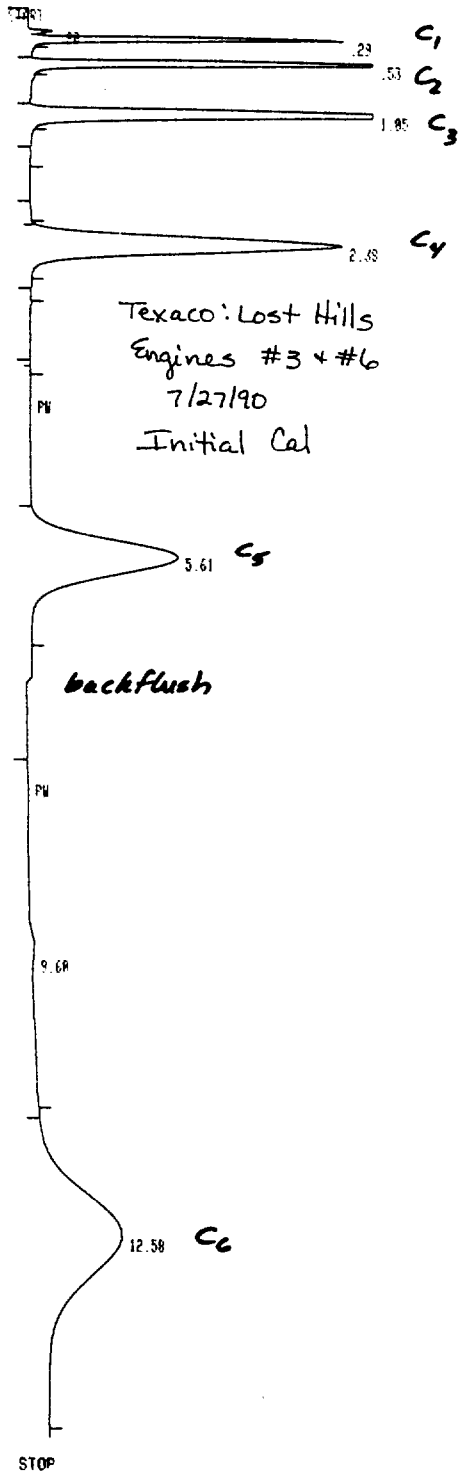
Final Cal

RUN # 10 JUL/11/90 14:29:33

ESTD

RT	AREA	TYPE	CAL#	AMOUNT
0.21	212	PV	2	0.895
0.29	4497	VB	1R	21.054
0.54	9096	PB		42.586
1.06	14324	PB		67.062
2.39	19535	PB		91.459
5.63	22223	BB		104.040
12.13	28809	PB		134.880

TOTAL AREA= 98696
MUL FACTOR= 1.0000E+00



Initial Cal → % Area

RUN # 1 JUL/31/90 08:17:18

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.20	170	PV	0.024	0.169
0.29	4550	VB	0.042	4.515
0.53	9400	PB	0.045	9.336
1.05	14654	PB	0.080	14.542
2.38	19827	BB	0.102	19.676
5.61	22553	BB	0.435	22.381
9.60	0	PB	0.000	0.000
12.58	29606	BB	1.052	29.380

TOTAL AREA= 100770
MUL FACTOR= 1.0000E+00

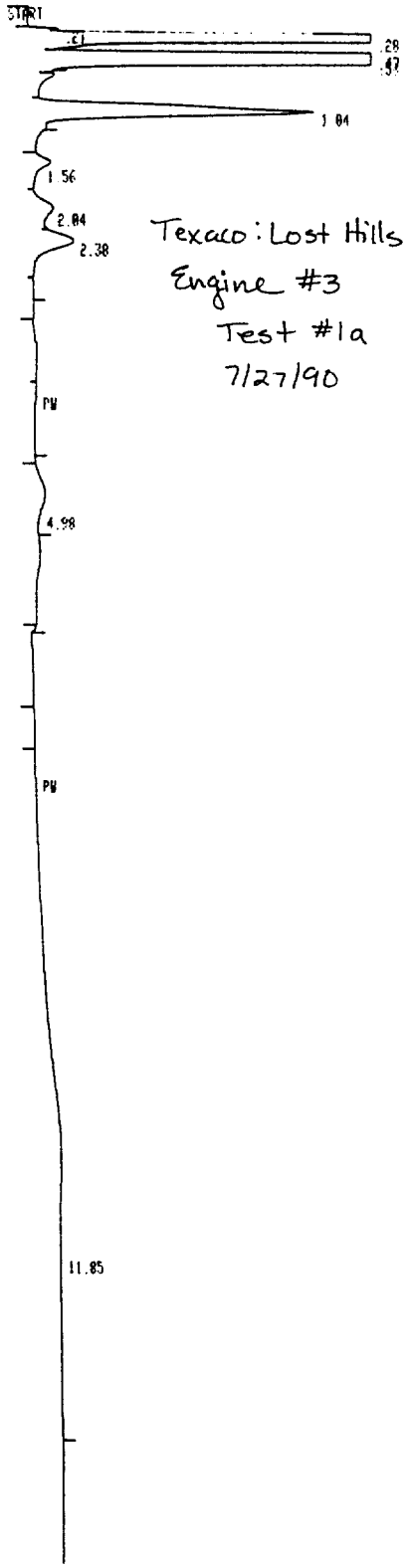
Initial Cal → calibrated

RUN # 1 JUL/31/90 08:17:18

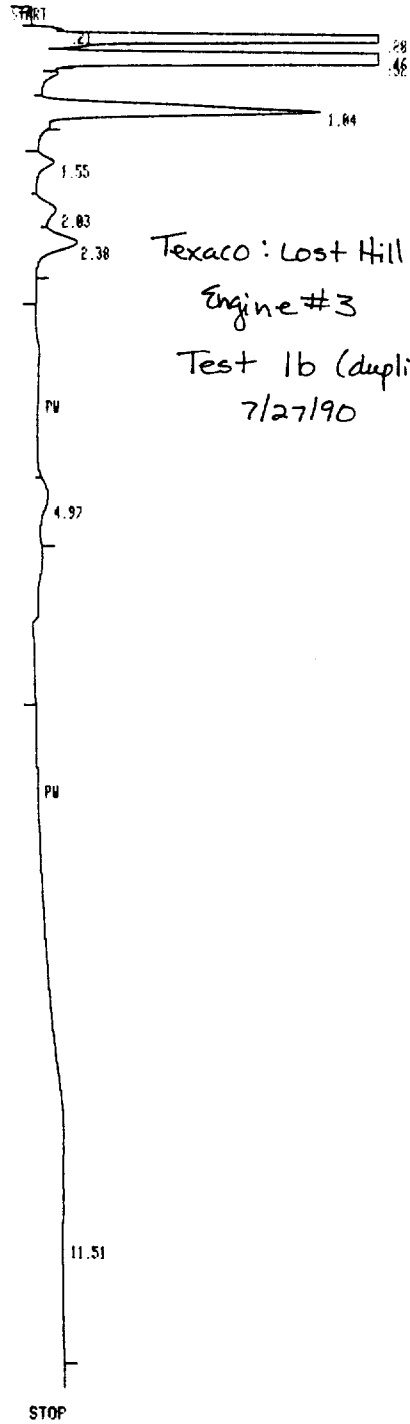
ESTD

RT	AREA	TYPE	CAL#	AMOUNT
0.20	170	PV	2	1.000
0.29	4550	VB	1R	21.190
0.53	9400	PB		43.814
1.05	14654	PB		68.245
2.38	19827	BB		92.336
5.61	22553	BB		105.030
9.60	0	PB		0.000
12.58	29606	BB		137.800

TOTAL AREA= 100770
MUL FACTOR= 1.0000E+00



Texaco: Lost Hills
Engine #3
Test #1a
7/27/90



Texaco: Lost Hills
Engine #3
Test 1b (duplicate)
7/27/90

RUN # 3 JUL/31/90 10:32:13
ID 23946-1a

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.21	175	PV	2	1.029	
0.28	350600	VB	1R	1632.800	C_1
0.47	28550	BV		132.960	
0.53	38547	VB		179.520	
1.04	10720	PB		49.924	
1.56	711	BP		3.311	
2.04	1527	PV		7.111	ΣC_2
2.38	2921	VP		13.603	
4.98	1043	PB		4.857	
11.85	4894	PB		22.792	

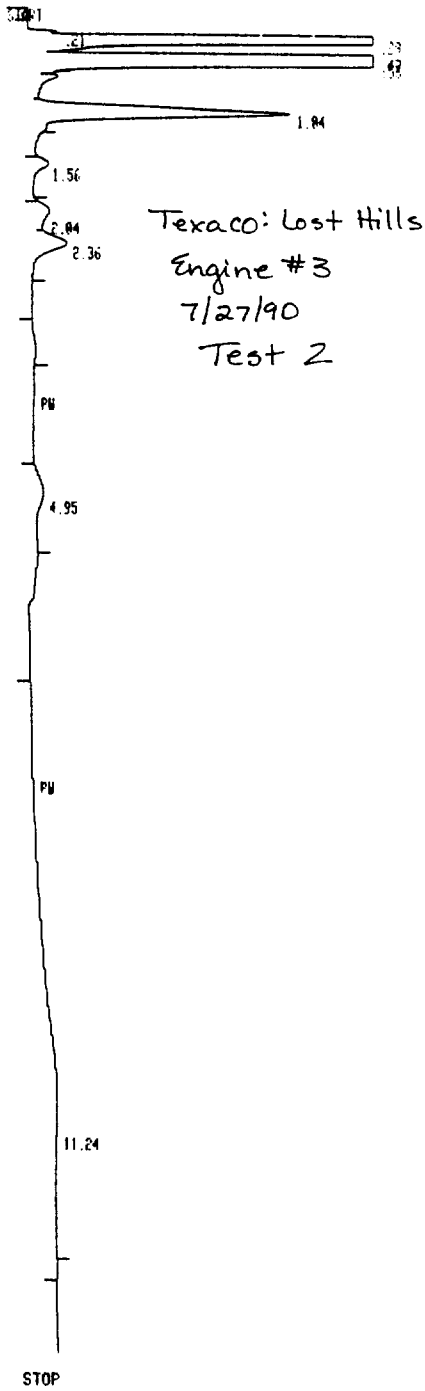
TOTAL AREA= 439690
MUL FACTOR=

RUN # 4 JUL/31/90 11:07:23
ID 23946-1b

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.21	155	PV	2	0.912	
0.28	349830	VB	1R	1629.200	C_1
0.46	28490	PV		132.680	
0.52	38368	VB		178.680	
1.04	10749	PB		50.859	
1.55	686	PP		3.195	
2.03	1411	PV		6.571	ΣC_2
2.38	2918	VB		13.589	
4.97	959	PB		4.466	
11.51	4669	PB		21.744	

TOTAL AREA= 438240
MUL. FACTOR= 1.0000E+00

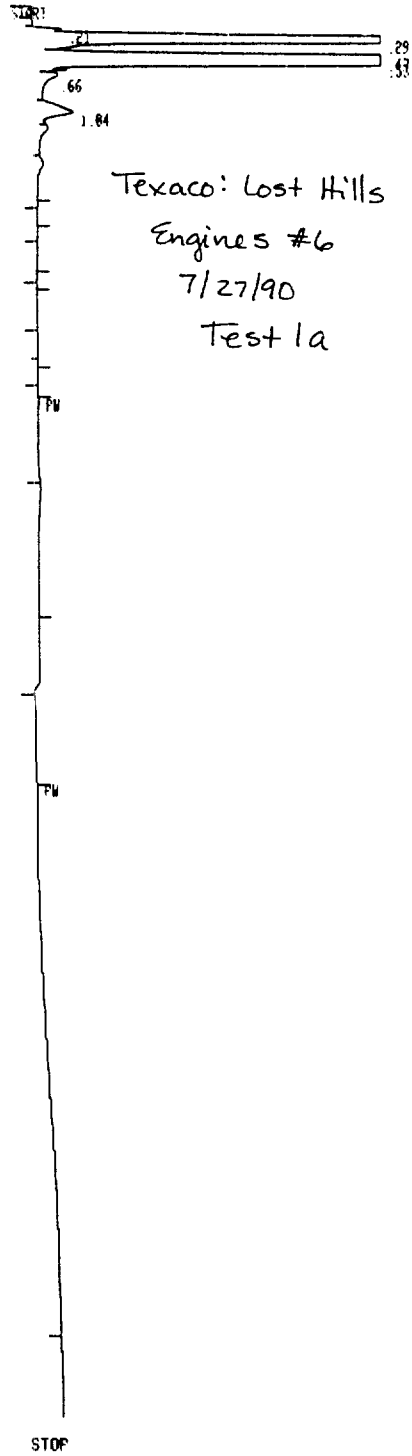


RUN # 6 JUL/31/90 15:37:55
ID 23947-2

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.21	0	PP	2	0.000	
0.29	390440	PB	IR	1818.300	C_1
0.47	27353	BV		127.390	
0.53	44154	VB		205.630	
1.04	9408	PB		43.814	
1.56	551	BB		2.566	
2.04	1135	BV		5.286	$>C_4$
2.36	2389	VB		11.126	
4.95	879	PB		4.094	
11.24	2138	PB		9.957	

TOTAL AREA= 478440
MUL FACTOR= 1.0000E+00

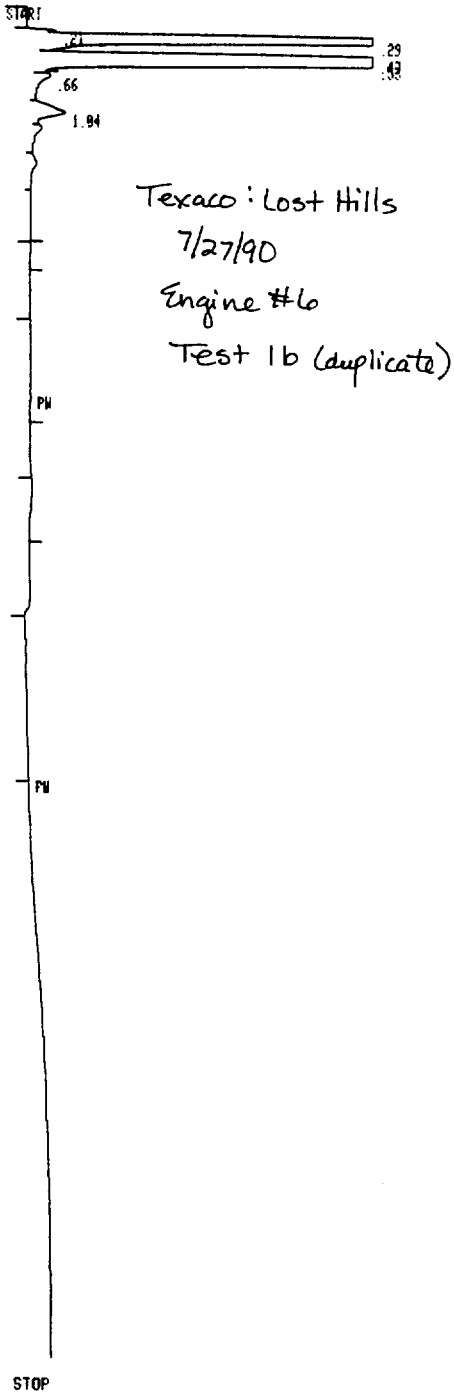


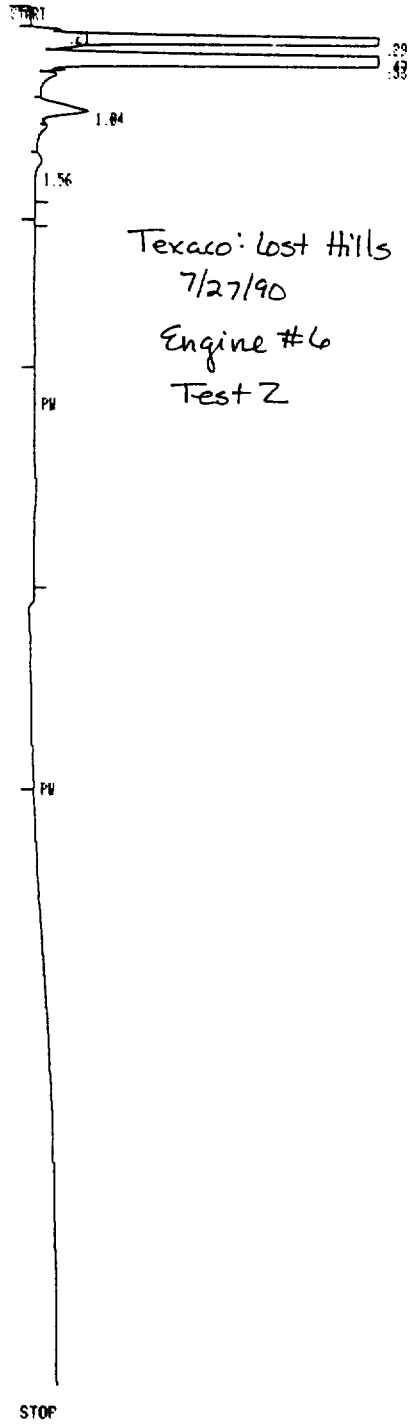
RUN # 7 JUL/31/90 16:11:54
ID 23948-1a

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.21	156	PV	2	0.918	
0.29	238140	VB	IR	1109.100	C_1
0.47	24490	PV		114.050	
0.53	15029	VB		69.992	
0.66	28	BP		0.130	$>C_2$
1.04	1246	PV		5.803	

TOTAL AREA= 279090
MUL FACTOR= 1.0000E+00





RUN # 8 JUL/31/90 16:37:25
ID 23948-1 b

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.21	150	PV	2	0.882	
0.29	237900	VB	1R	1107.900	c_1
0.47	24477	BV		113.990	
0.53	15028	VB		69.987	
0.66	51	BP		0.238	c_2
1.04	1238	PV		5.766	c_2

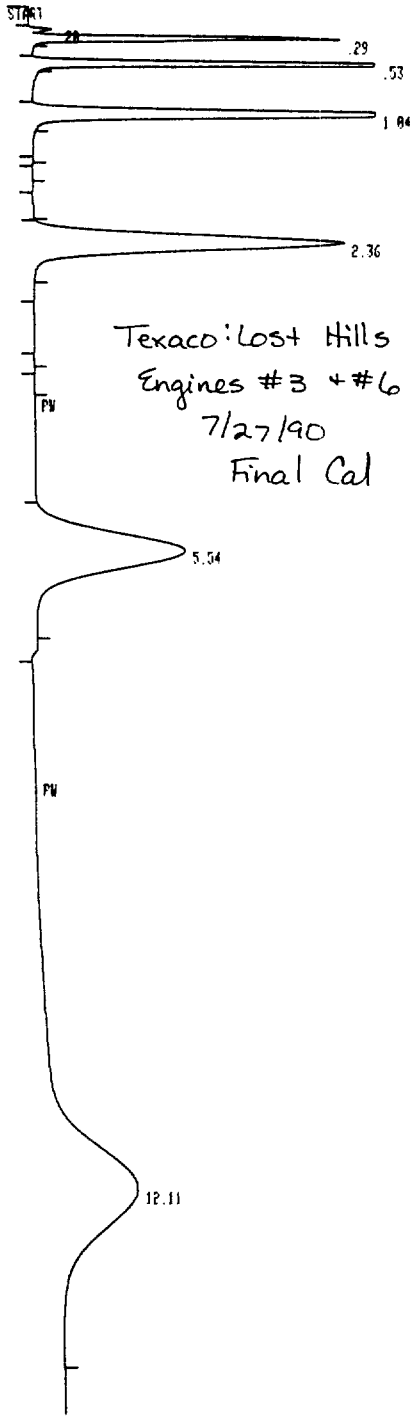
TOTAL AREA= 278840
MUL FACTOR= 1.0000E+00

RUN # 9 JUL/31/90 17:02:27
ID 23949-2

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.21	0	PV	2	0.000	
0.29	263000	VB	1R	1228.500	c_1
0.47	27920	BV		130.030	
0.53	17617	VB		82.044	
1.04	1927	PV		8.974	c_2
1.56	161	PB		0.750	c_2

TOTAL AREA= 311420
MUL FACTOR= 1.0000E+00



STOP

Final Cal

RUN # 10 JUL/31/90 17:26:34

ESTD

RT	AREA	TYPE	CAL#	AMOUNT
0.20	255	PV	2	1.500
0.29	4586	VB	1R	21.358 C_1
0.53	9228	PB		42.976
1.04	14502	BB		67.537
2.36	19578	BB		91.177
5.54	22293	BB		103.820
12.11	24257	PB		112.970

TOTAL AREA= 94699
MUL FACTOR= 1.0000E+00

SECTION 8

QUALITY ASSURANCE

8.1 HYDROCARBONS

Each sample container is purged in the field with sample prior to the actual tests. A certified gas is used to calibrate the gas chromatograph used to measure the hydrocarbons. The calibration certificate for the gas used appears at the end of this section. Duplicate analyses of some samples were conducted. Table 8-1 presents results of these quality assurance checks.

8.2 CONTINUOUS MONITORS

The NO_x analyzer is calibrated before and after each test using an EPA Protocol 1 gas (±1%) traceable to NBS. The CO, CO_2, and O_2 analyzers are calibrated before and after each test using a NBS certified gas mixture (±1%). Copies of the calibration gas certificates appear in the at the end of this section.

A sampling system check was performed at the beginning and end of each test day. This was done by introducing an EPA Protocol 1 gas at the sampling probe and measuring the system response. The purpose of this was to check the system for leaks and sample loss.

Multipoint calibration linearity checks of the continuous analyzers were performed on January 4-5, 1990. These results were well within CARB limitations of ±2% of full scale. Tables 8-2 through 8-7 list the results of these checks.

TABLE 8-1. QUALITY ASSURANCE CHECKS

Engine No.	Test No.	Test Parameter	Duplicate %
4	1	$>C_2$ HC	102.0
2	1	$>C_2$ HC	100.1
5	1	$>C_2$ HC	100.9
1	1	$>C_2$ HC	99.8
1	2	$>C_2$ HC	102.3
3	1	$>C_2$ HC	98.1
6	1	$>C_2$ HC	101.2

Pape & Steiner Environmental Services

TABLE 8-2.

NO_x CALIBRATION SUMMARY

1. Station T-2

2. Analyzer TECO NOX
   Model 10AR S/N 8816-103-5
3. Calibration by JP Date 1/4/90
4. Calibrator Manufacturer ENVIRONICS
   Model 201-1520 S/N 1122
5. NO_x Standard ALM 2355 / ALM 2862 / AAL 21147 Concentration 8805 ppm / 2973 ppm / 80.72 ppm
   Cylinder Pressure 1650 PSI / 1800 PSI / 1100

NO_x CALIBRATION AND LINEARITY CHECKS

0 - 1000 ppm Range

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(NO_x)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero	9000	-	0	0	0
80% URL	8193.4	817.8	799.0	799.0	0
1	8395.6	613.3	599.4	605	+.56%
2	8597.9	409	400	409	+.9%
3	8800.6	205	200.4	210	+.96%

0 - 100 ppm Range

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(NO_x)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero	9000	—	0	0	0
80% URL	8765.1	242.8	80	80	0
1	8825.0	182.1	60.1	61	+.9%
2	8887.5	121.6	40.1	41	+.9%
3	8944.8	61.2	20.2	22	1.8%

Cross check Bottle # AAL 21149 Conc = 80.72 ppm
Reading = 81.8 ppm % F. Scale =

Forms 1.20 03/20/89

TABLE 8-2. (Concluded)

NO_x CALIBRATION AND LINEARITY CHECKS

0-25ppm Range

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(NO_x)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero		—	0	0	0
80% URL	3013.1	990.7	20	20	0
1	3262.8	743.7	15	15.25	+1%
2	3510	495.6	10	10.33	+1.32%
3	3757	248.2	5.0	5.35	+1.4%

Pape & Steiner Environmental Services

TABLE 8-3.

SO_2 CALIBRATION SUMMARY

1. Station T-2

2. Analyzer DuPONT SO_2
   Model 400 S/N 6328
3. Calibration by JP Date 1-5-90
4. Calibrator Manufacturer ENVIRONICS
   Model 201-1520 S/N 1122
5. SO_2 Standard AAL-9414 Concentration 572 ppm
   Cylinder Pressure 1700 PSI

SO_2 CALIBRATION AND LINEARITY CHECKS

0 - 1000 ppm RANGE

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(SO_2)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero	1000	—	0	0	0
80% URL	192.1	822.9	786.1	786.1	0
1	391.8	617.4	593.1	611	+1.79%
2	1300.5	905.3	398.9	410	+1.11%
3	1752.4	453.2	199.9	211	-1.11%

0 - 100 ppm RANGE

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(SO_2)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero		—	0	0	0
80% URL	9089.7	813.8	79.88	79.88	0
1	9294.4	610.6	59.92	60.9	+.98%
2	9499.1	407.3	39.97	41.7	+1.73%
3	9701.3	204	20.02	21.6	+1.58%

Forms 1.18 03/20/89

Pape & Steiner Environmental Services

TABLE 8-4.

CO_2 CALIBRATION SUMMARY

1. Station T-2

2. Analyzer ANARAD CO_2

Model AR 602 S/N 1793

3. Calibration by [illegible] Date 1-5-90

4. Calibrator Manufacturer ENVIRONICS

Model 201-1520 S/N 1122

5. CO_2 Standard AAL-799 Concentration 20%

Cylinder Pressure 1000 PSI

CO_2 CALIBRATION AND LINEARITY CHECKS

0 - 20% RANGE

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(CO_2)_{\%out}$	4 Chart %	% Difference + 2% Full Scale
Zero	1000	—	0	0	0
80% URL	214.5	798.8	15.77	15.77	0
1	409.3	599.2	11.88	12.2	+1.6%
2	609	399.5	7.92	8.26	+1.7%
3	806.2	200.1	3.98	4.32	+1.7%

Forms 1.19 03/20/89

Pape & Steiner Environmental Services

TABLE 8-5.

CO CALIBRATION SUMMARY

1. Station T-2

2. Analyzer ANARAD CO

Model AR 602 S/N 1793

3. Calibration by [illegible] Date 1-5-90

4. Calibrator Manufacturer ENVIRONICS

Model 201-1520 S/N 1122

5. CO Standard AAL-5660 Concentration 9942 PPM

Cylinder Pressure 1450 PSI

CO CALIBRATION AND LINEARITY CHECKS

0 - 10,000 PPM RANGE

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(CO)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero	1000	—	0	0	0
80% URL	214.5	804.2	7848	7848	0
1	411.8	602.9	5907	5900	-.07%
2	606.5	402.4	3955	4112	+1.57%
3	808.7	201.6	1982	2140	+1.58%

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(CO)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero					
80% URL					
1					
2					
3					

Forms 1.16 03/20/89

Pape & Steiner Environmental Services

TABLE 8-6.

CO CALIBRATION SUMMARY

1. Station T-2

2. Analyzer TECO CO
   Model 48 S/N 25149-219
3. Calibration by [illegible] Date 1-5-90
4. Calibrator Manufacturer ENVIRONICS
   Model 201-1520 S/N 1122
5. CO Standard AAL-5660/AAL-114/AAL 1335 Concentration 9942 PPM/1003 PPM/200 PPM
   Cylinder Pressure 1450 PSI/1300 PSI/750 PSI

CO CALIBRATION AND LINEARITY CHECKS

0-1000 PPM RANGE

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(CO)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero	9000	—	0	0	0
80% URL	8290.8	827.5	802	802	0
1	8473	545.2	601	599	-.2%
2	8647.8	363.6	401.5	409	+.75%
3	8830	182.1	200.9	212	+1.11%

0-100 PPM RANGE

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(CO)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero	9000	—	0	0	0
80% URL	8293.3	718.4	80	80	0
1	8470.5	538.5	59.96	60	+.04%
2	8650.3	359.2	40.0	40.2	+.2%
3	8827.5	179.9	20.0	20.5	+.5%

Forms 1.16 03/20/89

TABLE 8-6. (Concluded)

CO CALIBRATION AND LINEARITY CHECKS

0-20ppm Range

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(CO)_{out}$ ppm	4 Chart ppm	% Difference + 2% Full Scale
Zero	9000	—	0	0	0
80% URL	8290.8	719.4	15.97	15.97	0
1	8470.5	540.1	11.99	11.99	0
2	8650.3	360.1	7.99	8.0	+.05%
3	8827.5	180.5	4.00	4.2	+1%

Pape & Steiner Environmental Services

TABLE 8-7.

O_2 CALIBRATION SUMMARY

1. Station T-2

2. Analyzer TELEDYNE
   Model 326A S/N 43292
3. Calibration by JAP Date 1-4-90
4. Calibrator Manufacturer ENVIRONICS
   Model 201-1520 S/N 1122
5. O_2 Standard A-14722 Concentration 4.5%
   Cylinder Pressure 1800 PSI

O_2 CALIBRATION AND LINEARITY CHECKS

0-25% RANGE

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(O_2)_{\%}$ out	4 Chart %	% Difference + 2% Full Scale
Zero	2000	—	0	0	0
80% URL	1125.8	889.4	19.9%	19.9%	0
1	1348	667.2	14.9%	14.88%	-.08%
2	1570.2	444.9	10.0%	10.05%	+.2%
3	1792.3	222.9	4.98%	5.2%	+.88%

0-10% RANGE

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	3 $(O_2)_{\%}$ out	4 Chart %	% Difference + 2% Full Scale
Zero	2000	—	0	0	0
80% URL	1657.5	356.1	7.95%	7.95%	0
1	1744.9	267.1	5.98%	6.06%	+.8%
2	1832.3	178.4	3.99%	4.1%	+1.1%
3	1924.7	89.6	2.0%	2.12%	+1.2%

Forms 1.17 03/20/89

TABLE 8-7. (Concluded)

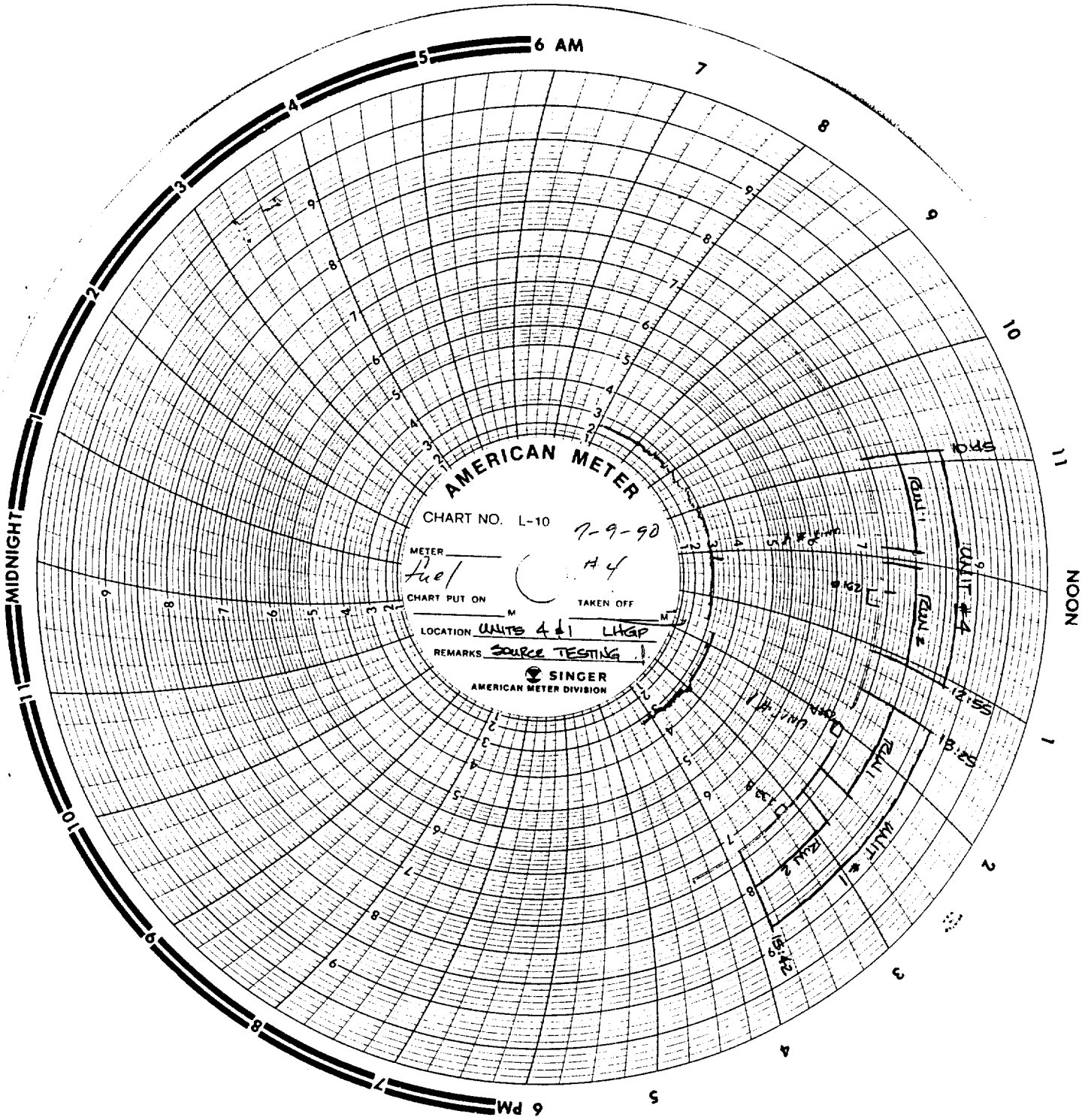
O_2 CALIBRATION AND LINEARITY CHECKS

Calibration Points	Flow, Dil. 1 cc/min	Flow, Std 2 cc/min	0-5% 3 $(O_2)_{\%out}$	4 Chart %	% Difference + 2% Full Scale
Zero		—	0	0	0
80% URL	6388.4	622.7	4%	4%	0
1	6543.2	467.2	3%	3.04%	+.8%
2	6698	311.6	2%	2.06%	+1.2%
3	6855.3	156.1	1%	1.06%	+1.2%

Forms 1.17 03/20/89

APPENDIX A

FUEL FLOW DATA


AMERICAN METER
CHART NO. L-10
7-9-90
METER
fuel
CHART PUT ON
TAKEN OFF
LOCATION UNITS 4 & 1 LHGP
REMARKS SOURCE TESTING
SINGER
AMERICAN METER DIVISION
6 AM
6 PM
MIDNIGHT
NOON
10:45
12:55
13:25
13:42
UNIT #4
UNIT #1
RUN 1
RUN 2
RUN 3

"PROPCOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PROPANE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: JED

DATE: 7/9/90

COMMENTS: UNIT 4 SOURCE TEST (23A 11:33)

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 6GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 4948

EST AUX HP ON ENGINE = 30

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
### EQUIP DIMENSIONS ####				
CYLINDER DIA (in)	25.50	25.50	14.00	14.00
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	14.33	14.34	14.40	14.40
% CL PER INCH VVP STROKE		13.56		
% CL PER SPLIT YOKE (HE)	1.57	1.57	1.68	1.68
MIN CLEARANCE CE (%)	14.46	14.46	14.38	14.38
% CL PER SPLIT YOKE (CE)	1.58	1.58	1.73	1.73
## RUNNING CONDITIONS ###				
UNIT RPM	840	840	840	840
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	6	6	6	6
# OF SPLIT YOKES IN CE	6	6	6	6
VVP SETTING (inches)	0.0	0.0	0.0	0.0
### P, T, K & Z ENTRY ###				
SUCTION PRESS (psig)	7.0	7.0	55.0	55.0
DISCHARGE PRESS (psig)	56.0	56.0	222.0	222.0
COMPRESSION RATIO	3.28	3.28	3.40	3.40
MEASURED Ts (deg F)	-10	-10	100	100
MEASURED Td (deg F)	125	125	200	200
Kavg USED IN CALC'S BELOW	1.130	1.130	1.112	1.112
EST CYLINDER EFFICIENCY	0.55	0.55	0.76	0.76
CALC'D Td (F, using Kavg)	109	109	196	196
Zs (from chart or calc)	0.9436	0.9436	0.9256	0.9256
Zd (from chart or calc)	0.9352	0.9352	0.8393	0.8393
##### HP FROM GPSA ######				
BHP/MMCFD	66.1	66.1	67.8	67.8
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.10	1.10	1.10	1.10
#### CAPACITY & HORSEPOWER CALCULATIONS ##################				
Zavg	0.9394	0.9394	0.8825	0.8825
HEAD END CLEARANCE (%)	23.75	23.76	24.48	24.48
CRANK END CLEARANCE (%)	23.94	23.94	24.76	24.76
VOLUMETRIC EFF HE (%)	47.97	47.95	35.87	35.87
VOLUMETRIC EFF CE (%)	47.61	47.61	35.22	35.22
CAPACITY (mmacfd)	2.04	2.04	0.45	0.45
CAPACITY (mmscfd)	3.66	3.66	2.15	2.15
BHP	201	201	142	142
CORRECTED BHP	221	221	156	156
ESTIMATED AUXILIARY HP	30			
EST TOTAL CORRECTED BHP	784			
FULL LOAD HP (RATED @rpm)	770			
% OF ENGINE FULL LOAD	102			

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
######COMPOSITION######	----------MOLE FRACTION---------			
METHANE (CH4)				
ETHANE (C2H6)	5.5261	5.5261		
PROPANE (C3H8)	89.3556	89.3556		
ISO-BUTANE (C4H10)				
N-BUTANE (C4H10)				
ISO-PENTANE (C5H12)				
N-PENTANE (C5H12)				
N-HEXANE (C6H14)	3.9287	3.9287		
OXYGEN (O2)				
NITROGEN (N2)	1.1897	1.1897		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)				
TOTALS	100.00	100.00	0.00	0.00
#####VALUES CALCULATED FROM GAS COMPOSITION#####				
MOLECULAR WEIGHT	44.78	44.78	ERR	ERR
SPECIFIC GRAVITY	1.546	1.546	ERR	ERR
MCp (@ Tavg)	17.313	19.779	ERR	ERR
MCv (@ Tavg)	15.327	17.793	ERR	ERR
CALC'D Kavg (@ Tavg)	1.130	1.112	ERR	ERR
PSEUDO CRIT PRESS (pPc)	612.5	612.5	ERR	ERR
PSEUDO CRIT TEMP (pTc)	664.1	664.1	ERR	ERR
Pr (suct, P from below)	0.035	0.114	ERR	ERR
Tr (suct, T from below)	0.678	0.843	ERR	ERR
Pr (disch, P from below)	0.115	0.386	ERR	ERR
Tr (disch, T from below)	0.881	0.994	ERR	ERR
######GAS CONDITIONS######				
SG (from gas comp or est)	1.546	1.546		
T suction (deg F)	-10	100		
T discharge (deg F)	125	200		
T avg (deg F)	58	150	0	0
P suction (psig)	7.0	55		
P discharge (psig)	56.0	222		
######Z CALCULATED FROM CORRELATION######				
Z suction	0.9436	0.9256	1.0000	1.0000
Z discharge	0.9352	0.8393	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
########### CAPACITY & HORSEPOWER CALCULATIONS ##################				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	1489.6	1489.6	449.0	449.0
PISTON DISPL CE (cfm)	1478.0	1478.0	437.4	437.4
GAS ROD LOAD, TENS (ksi)	24.7	24.7	24.8	24.8
GAS ROD LOAD, COMP (ksi)	25.1	25.1	26.0	26.0

"PROPCOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PROPANE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: JEO

DATE: 7/9/90

COMMENTS: UNIT 4 SOURCE TEST (231B 12:15)

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 6GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 4948

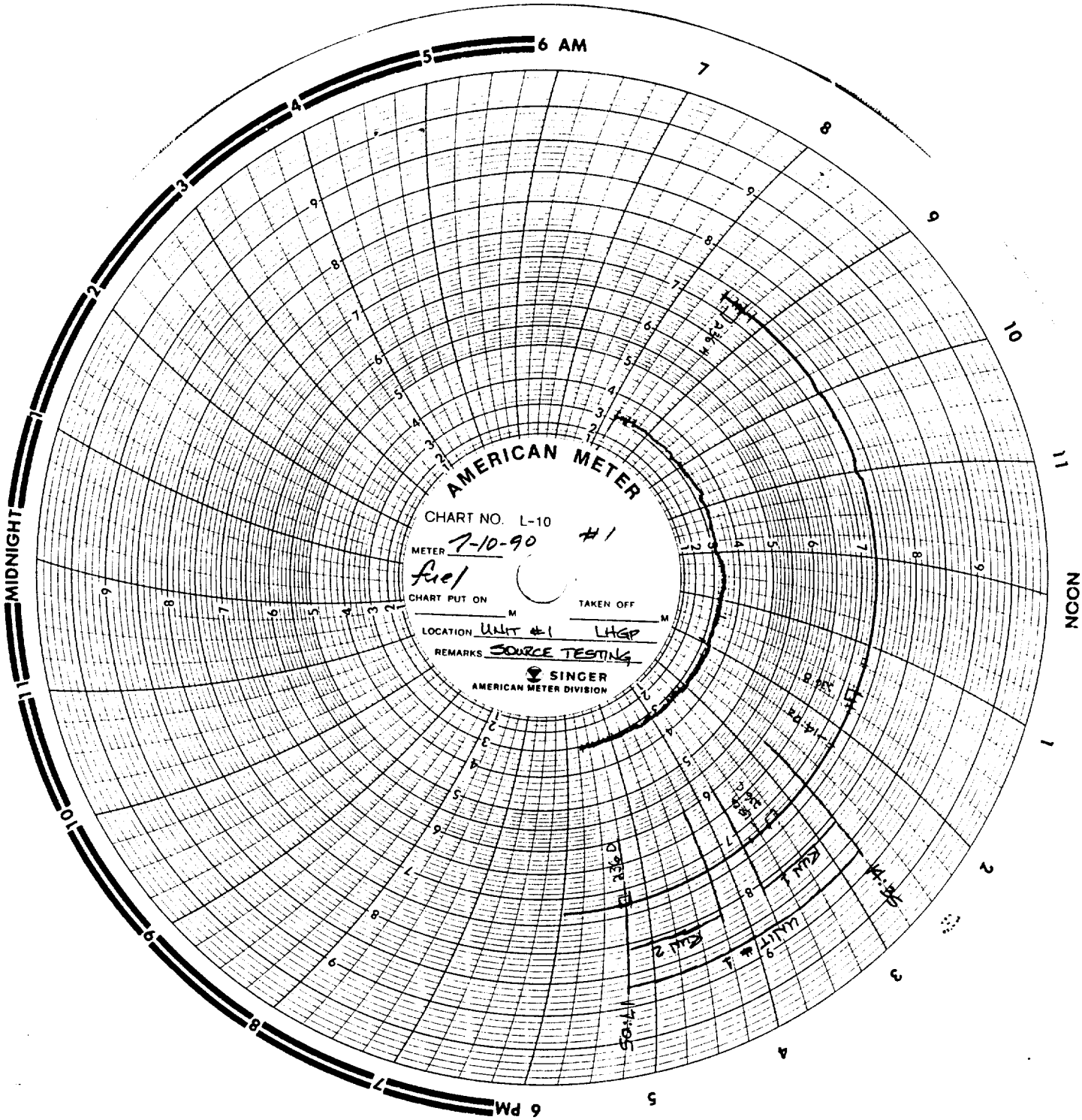
EST AUX HP ON ENGINE = 30

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
*** EQUIP DIMENSIONS ****				
CYLINDER DIA (in)	25.50	25.50	14.00	14.00
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	14.33	14.34	14.40	14.40
% CL PER INCH VVP STROKE		13.56		
% CL PER SPLIT YOKE (HE)	1.57	1.57	1.68	1.68
MIN CLEARANCE CE (%)	14.46	14.46	14.38	14.38
% CL PER SPLIT YOKE (CE)	1.58	1.58	1.73	1.73
** RUNNING CONDITIONS ***				
UNIT RPM	838	838	838	838
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	6	6	6	6
# OF SPLIT YOKES IN CE	6	6	6	6
VVP SETTING (inches)	0.0	0.0	0.0	0.0
*** P, T, K & Z ENTRY ***				
SUCTION PRESS (psig)	6.2	6.2	51.0	51.0
DISCHARGE PRESS (psig)	52.7	52.7	210.0	210.0
COMPRESSION RATIO	3.24	3.24	3.43	3.43
MEASURED Ts (deg F)	-10	-10	103	103
MEASURED Td (deg F)	115	115	200	200
Kavg USED IN CALC'S BELOW	1.131	1.131	1.111	1.111
EST CYLINDER EFFICIENCY	0.55	0.55	0.76	0.76
CALC'D Td (F, using Kavg)	109	109	200	200
Zs (from chart or calc)	0.9457	0.9457	0.9307	0.9307
Zd (from chart or calc)	0.9340	0.9340	0.8479	0.8479
***** HP FROM GPSA ******				
BHP/MMCFD	65.6	65.6	68.2	68.2
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.10	1.10	1.10	1.10
**** CAPACITY & HORSEPOWER CALCULATIONS **********				
Zavg	0.9398	0.9398	0.8893	0.8893 *
HEAD END CLEARANCE (%)	23.75	23.76	24.48	24.48 *
CRANK END CLEARANCE (%)	23.94	23.94	24.76	24.76 *
VOLUMETRIC EFF HE (%)	48.44	48.42	35.68	35.68 *
VOLUMETRIC EFF CE (%)	48.08	48.08	35.03	35.03 *
CAPACITY (mmacfd)	2.06	2.06	0.45	0.45 *
CAPACITY (mmscfd)	3.54	3.54	1.99	1.99 *
BHP	193	193	133	133
CORRECTED BHP	212	212	147	147
ESTIMATED AUXILIARY HP	30			
EST TOTAL CORRECTED BHP	748			
FULL LOAD HP (RATED @rpm)	768			
% OF ENGINE FULL LOAD	97			

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
******COMPOSITION******	----------MOLE FRACTION---------			
METHANE (CH4)				
ETHANE (C2H6)	5.5261	5.5261		
PROPANE (C3H8)	89.3556	89.3556		
ISO-BUTANE (C4H10)				
N-BUTANE (C4H10)				
ISO-PENTANE (C5H12)				
N-PENTANE (C5H12)				
N-HEXANE (C6H14)	3.9287	3.9287		
OXYGEN (O2)				
NITROGEN (N2)	1.1897	1.1897		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)				
TOTALS	100.00	100.00	0.00	0.00
*****VALUES CALCULATED FROM GAS COMPOSITION*****				
MOLECULAR WEIGHT	44.78	44.78	ERR	ERR
SPECIFIC GRAVITY	1.546	1.546	ERR	ERR
MCp (@ Tavg)	17.185	19.820	ERR	ERR
MCv (@ Tavg)	15.199	17.834	ERR	ERR
CALC'D Kavg (@ Tavg)	1.131	1.111	ERR	ERR
PSEUDO CRIT PRESS (pPc)	612.5	612.5	ERR	ERR
PSEUDO CRIT TEMP (pTc)	664.1	664.1	ERR	ERR
Pr (suct, P from below)	0.034	0.107	ERR	ERR
Tr (suct, T from below)	0.678	0.848	ERR	ERR
Pr (disch, P from below)	0.110	0.367	ERR	ERR
Tr (disch, T from below)	0.866	0.994	ERR	ERR
******GAS CONDITIONS******				
SG (from gas comp or est)	1.546	1.546		
T suction (deg F)	-10	103		
T discharge (deg F)	115	200		
T avg (deg F)	53	152	0	0
P suction (psig)	6.2	51		
P discharge (psig)	52.7	210		
******Z CALCULATED FROM CORRELATION******				
Z suction	0.9457	0.9307	1.0000	1.0000
Z discharge	0.9340	0.8479	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
********** CAPACITY & HORSEPOWER CALCULATIONS **********				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	1486.0	1486.0	447.9	447.9
PISTON DISPL CE (cfm)	1474.4	1474.4	436.3	436.3
GAS ROD LOAD, TENS (ksi)	23.5	23.5	23.6	23.6
GAS ROD LOAD, COMP (ksi)	23.8	23.8	24.7	24.7


AMERICAN METER
CHART NO. L-10
METER 7-10-90 #1
fuel
CHART PUT ON
TAKEN OFF
LOCATION UNIT #1 LHGP
REMARKS SOURCE TESTING
SINGER
AMERICAN METER DIVISION
6 AM
NOON
6 PM
MIDNIGHT

"PRECOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PRE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: JEO

DATE: 7/10/90

COMMENTS: UNIT 1 SOURCE TEST (236C 14:59)

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 8GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 6597

EST AUX HP ON ENGINE = 0

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
### EQUIP DIMENSIONS ####				
CYLINDER DIA (in)	15.75	9.50	9.50	9.50
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	15.80	17.40	17.40	17.40
% CL PER INCH VVP STROKE	10.50	7.21	7.21	7.21
% CL PER SPLIT YOKE (HE)				
MIN CLEARANCE CE (%)	13.60	15.70	15.70	15.70
% CL PER SPLIT YOKE (CE)				
## RUNNING CONDITIONS ###				
UNIT RPM	819	819	819	819
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	0	0	0	0
# OF SPLIT YOKES IN CE	0	0	0	0
VVP SETTING (inches)	0.0	1.5	1.5	1.5
### P, T, K & Z ENTRY ###				
SUCTION PRESS (psig)	37.0	130.0	130.0	130.0
DISCHARGE PRESS (psig)	137.0	425.0	425.0	425.0
COMPRESSION RATIO	2.94	3.04	3.04	3.04
MEASURED Ts (deg F)	104	118	118	118
MEASURED Td (deg F)	240	270	270	270
Kavg USED IN CALC'S BELOW	1.217	1.212	1.212	1.212
EST CYLINDER EFFICIENCY	0.83	0.80	0.80	0.80
CALC'D Td (F, using Kavg)	248	273	273	273
Zs (from chart or calc)	0.9930	0.9758	0.9758	0.9758
Zd (from chart or calc)	0.9872	0.9644	0.9644	0.9644
##### HP FROM GPSA ######				
BHP/MMCFD	62.2	64.1	64.1	64.1
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.04	1.04	1.04	1.04
#### CAPACITY & HORSEPOWER CALCULATIONS ##################				
Zavg	0.9901	0.9701	0.9701	0.9701
HEAD END CLEARANCE (%)	15.80	28.22	28.22	28.22
CRANK END CLEARANCE (%)	13.60	15.70	15.70	15.70
VOLUMETRIC EFF HE (%)	70.31	49.73	49.73	49.73
VOLUMETRIC EFF CE (%)	73.48	68.91	68.91	68.91
CAPACITY (mmacfd)	1.14	0.33	0.33	0.33
CAPACITY (mmscfd)	3.69	3.01	3.01	3.01
BHP	252	213	213	213
CORRECTED BHP	262	222	222	222
ESTIMATED AUXILIARY HP	0			
EST TOTAL CORRECTED BHP	926			
FULL LOAD HP (RATED @rpm)	1001			
% OF ENGINE FULL LOAD	93			

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
######COMPOSITION######	----------MOLE FRACTION---------			
METHANE (CH4)	78.2697	75.5472		
ETHANE (C2H6)	8.2293	7.6009		
PROPANE (C3H8)	4.9159	5.2220		
ISO-BUTANE (C4H10)	0.7000	0.7316		
N-BUTANE (C4H10)	1.8821	2.0134		
ISO-PENTANE (C5H12)	0.5391	0.5248		
N-PENTANE (C5H12)	0.5726	0.5303		
N-HEXANE (C6H14)	1.2097	1.0418		
OXYGEN (O2)	0.0314	0.0195		
NITROGEN (N2)	0.1753	0.1130		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)	3.4743	6.6547		
TOTALS	100.00	100.00	0.00	0.00
#####VALUES CALCULATED FROM GAS COMPOSITION#####				
MOLECULAR WEIGHT	22.13	22.93	ERR	ERR
SPECIFIC GRAVITY	0.764	0.792	ERR	ERR
MCp (@ Tavg)	11.133	11.334	ERR	ERR
MCv (@ Tavg)	9.147	9.348	ERR	ERR
CALC'D Kavg (@ Tavg)	1.217	1.212	ERR	ERR
PSEUDO CRIT PRESS (pPc)	673.1	686.0	ERR	ERR
PSEUDO CRIT TEMP (pTc)	406.2	411.9	ERR	ERR
Pr (suct, P from below)	0.077	0.211	ERR	ERR
Tr (suct, T from below)	1.389	1.403	ERR	ERR
Pr (disch, P from below)	0.225	0.641	ERR	ERR
Tr (disch, T from below)	1.723	1.772	ERR	ERR
######GAS CONDITIONS######				
SG (from gas comp or est)	0.764	0.792		
T suction (deg F)	104	118		
T discharge (deg F)	240	270		
T avg (deg F)	172	194	0	0
P suction (psig)	37.0	130.0		
P discharge (psig)	137.0	425.0		
######Z CALCULATED FROM CORRELATION######				
Z suction	0.9930	0.9758	1.0000	1.0000
Z discharge	0.9872	0.9644	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
########### CAPACITY & HORSEPOWER CALCULATIONS ##################				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	554.0	201.6	201.6	201.6
PISTON DISPL CE (cfm)	542.7	190.3	190.3	190.3
GAS ROD LOAD, TENS (ksi)	18.9	19.2	19.2	19.2
GAS ROD LOAD, COMP (ksi)	19.7	21.5	21.5	21.5

"PRECOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PRE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: JEO

DATE: 7/10/90

COMMENTS: UNIT 1 SOURCE TEST (236D 17:00)

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 8GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 6597

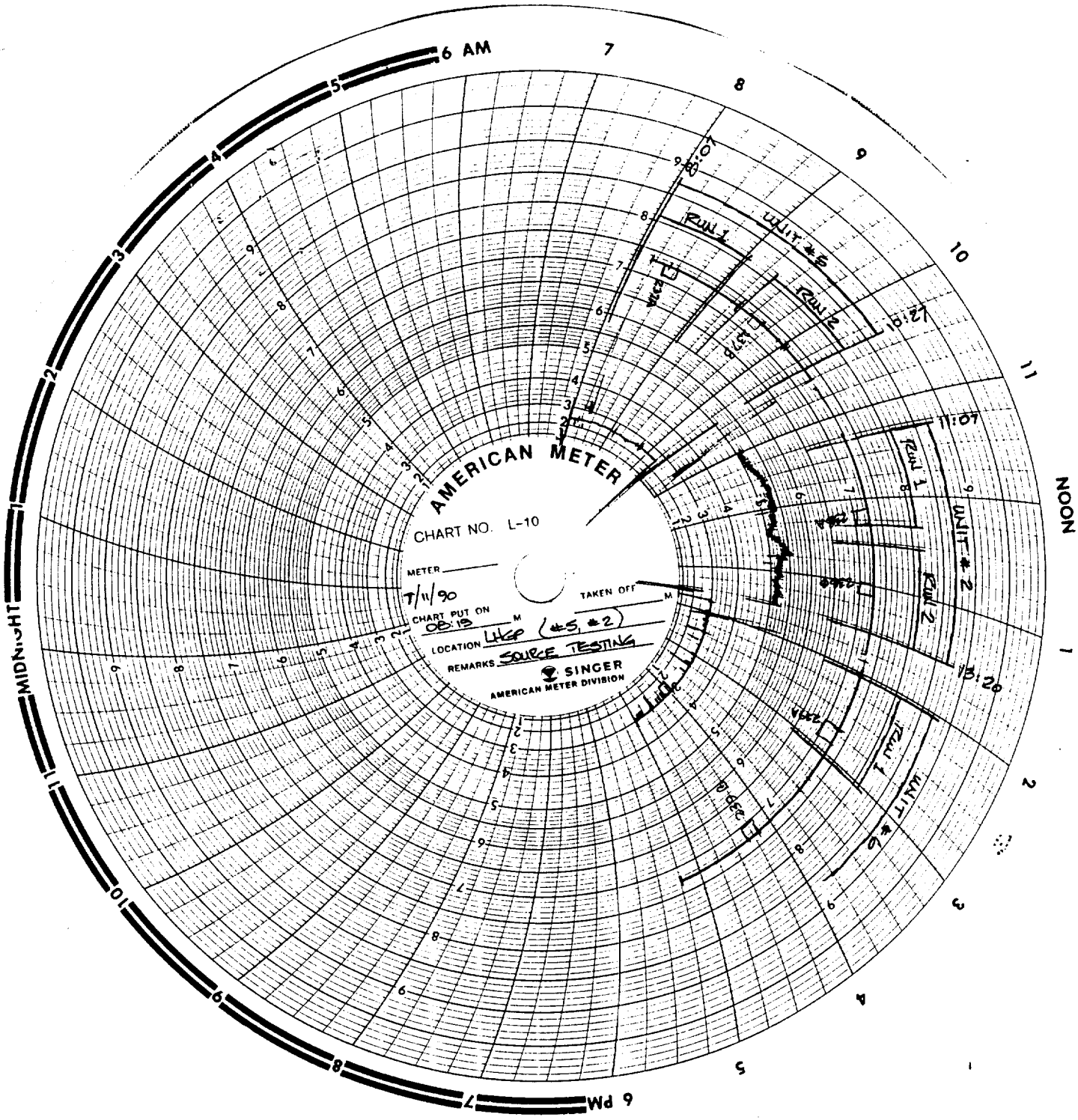
EST AUX HP ON ENGINE = 0

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
### EQUIP DIMENSIONS ####				
CYLINDER DIA (in)	15.75	9.50	9.50	9.50
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	15.80	17.40	17.40	17.40
% CL PER INCH VVP STROKE	10.50	7.21	7.21	7.21
% CL PER SPLIT YOKE (HE)				
MIN CLEARANCE CE (%)	13.60	15.70	15.70	15.70
% CL PER SPLIT YOKE (CE)				
## RUNNING CONDITIONS ###				
UNIT RPM	822	822	822	822
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	0	0	0	0
# OF SPLIT YOKES IN CE	0	0	0	0
VVP SETTING (inches)	0.0	1.5	1.5	1.5
### P, T, K & Z ENTRY ###				
SUCTION PRESS (psig)	23.0	123.0	123.0	123.0
DISCHARGE PRESS (psig)	127.0	419.0	419.0	419.0
COMPRESSION RATIO	3.77	3.15	3.15	3.15
MEASURED Ts (deg F)	110	115	115	115
MEASURED Td (deg F)	265	268	268	268
Kavg USED IN CALC'S BELOW	1.213	1.213	1.213	1.213
EST CYLINDER EFFICIENCY	0.83	0.80	0.80	0.80
CALC'D Td (F, using Kavg)	291	276	276	276
Zs (from chart or calc)	0.9958	0.9767	0.9767	0.9767
Zd (from chart or calc)	0.9895	0.9645	0.9645	0.9645
##### HP FROM GPSA ######				
BHP/MMCFD	77.6	66.3	66.3	66.3
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.04	1.04	1.04	1.04
#### CAPACITY & HORSEPOWER CALCULATIONS ##################				
Zavg	0.9926	0.9706	0.9706	0.9706 #
HEAD END CLEARANCE (%)	15.80	28.22	28.22	28.22 #
CRANK END CLEARANCE (%)	13.60	15.70	15.70	15.70 #
VOLUMETRIC EFF HE (%)	60.55	47.45	47.45	47.45 #
VOLUMETRIC EFF CE (%)	64.97	67.59	67.59	67.59 #
CAPACITY (mmacfd)	0.99	0.32	0.32	0.32 #
CAPACITY (mmscfd)	2.32	2.80	2.80	2.80 #
BHP	200	204	204	204
CORRECTED BHP	209	212	212	212
ESTIMATED AUXILIARY HP	0			
EST TOTAL CORRECTED BHP	845			
FULL LOAD HP (RATED @rpm)	1004			
% OF ENGINE FULL LOAD	84			

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
######COMPOSITION######	----------MOLE FRACTION---------			
METHANE (CH4)	78.2697	75.5472		
ETHANE (C2H6)	8.2293	7.6009		
PROPANE (C3H8)	4.9159	5.2220		
ISO-BUTANE (C4H10)	0.7000	0.7316		
N-BUTANE (C4H10)	1.8821	2.0134		
ISO-PENTANE (C5H12)	0.5391	0.5248		
N-PENTANE (C5H12)	0.5726	0.5303		
N-HEXANE (C6H14)	1.2097	1.0418		
OXYGEN (O2)	0.0314	0.0195		
NITROGEN (N2)	0.1753	0.1130		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)	3.4743	6.6547		
TOTALS	100.00	100.00	0.00	0.00
#####VALUES CALCULATED FROM GAS COMPOSITION#####				
MOLECULAR WEIGHT	22.13	22.93	ERR	ERR
SPECIFIC GRAVITY	0.764	0.792	ERR	ERR
MCp (@ Tavg)	11.290	11.308	ERR	ERR
MCv (@ Tavg)	9.304	9.322	ERR	ERR
CALC'D Kavg (@ Tavg)	1.213	1.213	ERR	ERR
PSEUDO CRIT PRESS (pPc)	673.1	686.0	ERR	ERR
PSEUDO CRIT TEMP (pTc)	406.2	411.9	ERR	ERR
Pr (suct, P from below)	0.056	0.200	ERR	ERR
Tr (suct, T from below)	1.403	1.396	ERR	ERR
Pr (disch, P from below)	0.210	0.632	ERR	ERR
Tr (disch, T from below)	1.785	1.768	ERR	ERR
######GAS CONDITIONS######				
SG (from gas comp or est)	0.764	0.792		
T suction (deg F)	110	115		
T discharge (deg F)	265	268		
T avg (deg F)	188	192	0	0
P suction (psig)	23.0	123.0		
P discharge (psig)	127.0	419.0		
######Z CALCULATED FROM CORRELATION######				
Z suction	0.9958	0.9767	1.0000	1.0000
Z discharge	0.9895	0.9645	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
########### CAPACITY & HORSEPOWER CALCULATIONS ##################				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	556.1	202.3	202.3	202.3
PISTON DISPL CE (cfm)	544.7	191.0	191.0	191.0
GAS ROD LOAD, TENS (ksi)	19.7	19.3	19.3	19.3
GAS ROD LOAD, COMP (ksi)	20.4	21.5	21.5	21.5


AMERICAN METER
CHART NO. L-10
METER
7/11/90
CHART PUT ON
08:18 M
TAKEN OFF
M
LOCATION LHGP (#5, #2)
REMARKS SOURCE TESTING
SINGER
AMERICAN METER DIVISION
6 AM
NOON
MIDNIGHT
6 PM
UNIT #5
RUN 1
RUN 2
UNIT #2
RUN 1
RUN 2
UNIT #6
RUN 1
RUN 2
10:07
12:01
11:07
13:26

"ROPCOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PROPANE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: TAR

DATE: 7/11/90

COMMENTS: UNIT 5 SOURCE TEST (237A 8:36)

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 6GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 4948

EST AUX HP ON ENGINE = 30

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
*** EQUIP DIMENSIONS ****				
CYLINDER DIA (in)	25.50	25.50	14.00	14.00
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	14.33	14.34	14.40	14.40
% CL PER INCH VVP STROKE		13.56		
% CL PER SPLIT YOKE (HE)	1.57	1.57	1.68	1.68
MIN CLEARANCE CE (%)	14.46	14.46	14.38	14.38
% CL PER SPLIT YOKE (CE)	1.58	1.58	1.73	1.73
** RUNNING CONDITIONS ***				
UNIT RPM	800	800	800	800
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	6	6	6	6
# OF SPLIT YOKES IN CE	6	6	6	6
VVP SETTING (inches)	0.0	0.0	0.0	0.0
*** P, T, K & Z ENTRY ***				
SUCTION PRESS (psig)	4.2	4.2	50.0	50.0
DISCHARGE PRESS (psig)	50.7	50.7	200.0	200.0
COMPRESSION RATIO	3.48	3.48	3.32	3.32
MEASURED Ts (deg F)	-10	-10	92	92
MEASURED Td (deg F)	104	104	195	195
Kavg USED IN CALC'S BELOW	1.132	1.132	1.113	1.113
EST CYLINDER EFFICIENCY	0.55	0.55	0.76	0.76
CALC'D Td (F, using Kavg)	118	118	186	186
Zs (from chart or calc)	0.9509	0.9509	0.9272	0.9272
Zd (from chart or calc)	0.9314	0.9314	0.8544	0.8544
***** HP FROM GPSA ******				
BHP/MMCFD	69.8	69.8	66.5	66.5
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.10	1.10	1.10	1.10
**** CAPACITY & HORSEPOWER CALCULATIONS **********				
Zavg	0.9411	0.9411	0.8908	0.8908
HEAD END CLEARANCE (%)	23.75	23.76	24.48	24.48
CRANK END CLEARANCE (%)	23.94	23.94	24.76	24.76
VOLUMETRIC EFF HE (%)	43.25	43.23	38.96	38.96
VOLUMETRIC EFF CE (%)	42.86	42.86	38.35	38.35
CAPACITY (mmacfd)	1.75	1.75	0.47	0.47
CAPACITY (mmscfd)	2.71	2.71	2.09	2.09
BHP	157	157	134	134
CORRECTED BHP	173	173	148	148
ESTIMATED AUXILIARY HP	30			
EST TOTAL CORRECTED BHP	672			
FULL LOAD HP (RATED @rpm)	733			
% OF ENGINE FULL LOAD	92			

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
******COMPOSITION******	----------MOLE FRACTION---------			
METHANE (CH4)				
ETHANE (C2H6)	5.5261	5.5261		
PROPANE (C3H8)	89.3556	89.3556		
ISO-BUTANE (C4H10)				
N-BUTANE (C4H10)				
ISO-PENTANE (C5H12)				
N-PENTANE (C5H12)				
N-HEXANE (C6H14)	3.9287	3.9287		
OXYGEN (O2)				
NITROGEN (N2)	1.1897	1.1897		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)				
TOTALS	100.00	100.00	0.00	0.00
*****VALUES CALCULATED FROM GAS COMPOSITION*****				
MOLECULAR WEIGHT	44.78	44.78	ERR	ERR
SPECIFIC GRAVITY	1.546	1.546	ERR	ERR
MCp (@ Tavg)	17.044	19.602	ERR	ERR
MCv (@ Tavg)	15.058	17.616	ERR	ERR
CALC'D Kavg (@ Tavg)	1.132	1.113	ERR	ERR
PSEUDO CRIT PRESS (pPc)	612.5	612.5	ERR	ERR
PSEUDO CRIT TEMP (pTc)	664.1	664.1	ERR	ERR
Pr (suct, P from below)	0.031	0.105	ERR	ERR
Tr (suct, T from below)	0.678	0.831	ERR	ERR
Pr (disch, P from below)	0.107	0.350	ERR	ERR
Tr (disch, T from below)	0.849	0.986	ERR	ERR
******GAS CONDITIONS******				
SG (from gas comp or est)	1.546	1.546		
T suction (deg F)	-10	92		
T discharge (deg F)	104	195		
T avg (deg F)	47	144	0	0
P suction (psig)	4.2	50		
P discharge (psig)	50.7	200		
******Z CALCULATED FROM CORRELATION******				
Z suction	0.9509	0.9272	1.0000	1.0000
Z discharge	0.9314	0.8544	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
********** CAPACITY & HORSEPOWER CALCULATIONS **********				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	1418.6	1418.6	427.6	427.6
PISTON DISPL CE (cfm)	1407.6	1407.6	416.6	416.6
GAS ROD LOAD, TENS (ksi)	23.5	23.5	22.2	22.2
GAS ROD LOAD, COMP (ksi)	23.8	23.8	23.3	23.3

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*PROPCOMP*              COMPRESSOR HORSEPOWER/SIZING PROGRAM    COMPRESSOR DESCRIPTION:  COOPER SUPERIOR MW64
LOCATION:               LOST HILLS GAS PLANT PROPANE COMPRESSOR ENGINE DESCRIPTION:      COOPER SUPERIOR 6GTLA
ELEVATION > > > > > > > =    300                                ENGINE RATED BMEP (PSI) =  146.7
DATA ENTERED BY:        JEO                                     ENGINE DISPL (CU IN)    =   4948
DATE:                   7/11/90                                 EST AUX HP ON ENGINE    =     30
COMMENTS:               UNIT 5 SOURCE TEST  (237B  09:46)       # OF STROKES PER CYCLE   =      4
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DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
*** EQUIP DIMENSIONS ****				
CYLINDER DIA (in)	25.50	25.50	14.00	14.00
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	14.33	14.34	14.40	14.40
% CL PER INCH VVP STROKE		13.56		
% CL PER SPLIT YOKE (HE)	1.57	1.57	1.68	1.68
MIN CLEARANCE CE (%)	14.46	14.46	14.38	14.38
% CL PER SPLIT YOKE (CE)	1.58	1.58	1.73	1.73
** RUNNING CONDITIONS ***				
UNIT RPM	800	800	800	800
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	6	6	6	6
# OF SPLIT YOKES IN CE	6	6	6	6
VVP SETTING (inches)	0.0	0.0	0.0	0.0
*** P, T, K & Z ENTRY ***				
SUCTION PRESS (psig)	4.0	4.0	50.0	50.0
DISCHARGE PRESS (psig)	50.0	50.0	200.0	200.0
COMPRESSION RATIO	3.48	3.48	3.32	3.32
MEASURED Ts (deg F)	-10	-10	92	92
MEASURED Td (deg F)	105	105	195	195
Kavg USED IN CALC'S BELOW	1.132	1.132	1.113	1.113
EST CYLINDER EFFICIENCY	0.55	0.55	0.76	0.76
CALC'D Td (F, using Kavg)	118	118	186	186
Zs (from chart or calc)	0.9514	0.9514	0.9272	0.9272
Zd (from chart or calc)	0.9324	0.9324	0.8544	0.8544
***** HP FROM GPSA ******				
BHP/MMCFD	69.8	69.8	66.5	66.5
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.10	1.10	1.10	1.10
**** CAPACITY & HORSEPOWER CALCULATIONS **********				
Zavg	0.9419	0.9419	0.8908	0.8908 *
HEAD END CLEARANCE (%)	23.75	23.76	24.48	24.48 *
CRANK END CLEARANCE (%)	23.94	23.94	24.76	24.76 *
VOLUMETRIC EFF HE (%)	43.29	43.27	38.96	38.96 *
VOLUMETRIC EFF CE (%)	42.90	42.90	38.35	38.35 *
CAPACITY (mmacfd)	1.75	1.75	0.47	0.47 *
CAPACITY (mmscfd)	2.68	2.68	2.09	2.09 *
BHP	156	156	134	134
CORRECTED BHP	172	172	148	148
ESTIMATED AUXILIARY HP	30			
EST TOTAL CORRECTED BHP	669			
FULL LOAD HP (RATED @rpm)	733			
% OF ENGINE FULL LOAD	91			

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
******COMPOSITION******	----------MOLE FRACTION---------			
METHANE (CH4)				
ETHANE (C2H6)	5.5261	5.5261		
PROPANE (C3H8)	89.3556	89.3556		
ISO-BUTANE (C4H10)				
N-BUTANE (C4H10)				
ISO-PENTANE (C5H12)				
N-PENTANE (C5H12)				
N-HEXANE (C6H14)	3.9287	3.9287		
OXYGEN (O2)				
NITROGEN (N2)	1.1897	1.1897		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)				
TOTALS	100.00	100.00	0.00	0.00
*****VALUES CALCULATED FROM GAS COMPOSITION*****				
MOLECULAR WEIGHT	44.78	44.78	ERR	ERR
SPECIFIC GRAVITY	1.546	1.546	ERR	ERR
MCp (@ Tavg)	17.057	19.602	ERR	ERR
MCv (@ Tavg)	15.071	17.616	ERR	ERR
CALC'D Kavg (@ Tavg)	1.132	1.113	ERR	ERR
PSEUDO CRIT PRESS (pPc)	612.5	612.5	ERR	ERR
PSEUDO CRIT TEMP (pTc)	664.1	664.1	ERR	ERR
Pr (suct, P from below)	0.030	0.105	ERR	ERR
Tr (suct, T from below)	0.678	0.831	ERR	ERR
Pr (disch, P from below)	0.105	0.350	ERR	ERR
Tr (disch, T from below)	0.851	0.986	ERR	ERR
******GAS CONDITIONS******				
SG (from gas comp or est)	1.546	1.546		
T suction (deg F)	-10	92		
T discharge (deg F)	105	195		
T avg (deg F)	48	144	0	0
P suction (psig)	4.0	50		
P discharge (psig)	50.0	200		
******Z CALCULATED FROM CORRELATION******				
Z suction	0.9514	0.9272	1.0000	1.0000
Z discharge	0.9324	0.8544	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
********** CAPACITY & HORSEPOWER CALCULATIONS **********				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	1418.6	1418.6	427.6	427.6
PISTON DISPL CE (cfm)	1407.6	1407.6	416.6	416.6
GAS ROD LOAD, TENS (ksi)	23.2	23.2	22.2	22.2
GAS ROD LOAD, COMP (ksi)	23.6	23.6	23.3	23.3

PRECOMP	COMPRESSOR HORSEPOWER/SIZING PROGRAM	COMPRESSOR DESCRIPTION:	COOPER SUPERIOR MW64
LOCATION:	LOST HILLS GAS PLANT PRE COMPRESSOR	ENGINE DESCRIPTION:	COOPER SUPERIOR 8GTLA
ELEVATION > > > > > > > =	300	ENGINE RATED BMEP (PSI) =	146.7
DATA ENTERED BY:	JEO	ENGINE DISPL (CU IN) =	6597
DATE:	7/11/90	EST AUX HP ON ENGINE =	0
COMMENTS:	UNIT 2 SOURCE TEST (238A 11:56)	# OF STROKES PER CYCLE =	4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
*** EQUIP DIMENSIONS ****				
CYLINDER DIA (in)	15.75	9.50	9.50	9.50
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	15.80	17.40	17.40	17.40
% CL PER INCH VVP STROKE	10.50	7.21	7.21	7.21
% CL PER SPLIT YOKE (HE)				
MIN CLEARANCE CE (%)	13.60	15.70	15.70	15.70
% CL PER SPLIT YOKE (CE)				
** RUNNING CONDITIONS ***				
UNIT RPM	800	800	800	800
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	0	0	0	0
# OF SPLIT YOKES IN CE	0	0	0	0
VVP SETTING (inches)	0.0	1.5	1.5	1.5
*** P, T, K & Z ENTRY ***				
SUCTION PRESS (psig)	29.0	130.0	130.0	130.0
DISCHARGE PRESS (psig)	138.0	425.0	425.0	425.0
COMPRESSION RATIO	3.50	3.04	3.04	3.04
MEASURED Ts (deg F)	106	95	95	95
MEASURED Td (deg F)	259	260	260	260
Kavg USED IN CALC'S BELOW	1.215	1.216	1.216	1.216
EST CYLINDER EFFICIENCY	0.83	0.80	0.80	0.80
CALC'D Td (F, using Kavg)	275	247	247	247
Zs (from chart or calc)	0.9946	0.9725	0.9725	0.9725
Zd (from chart or calc)	0.9882	0.9626	0.9626	0.9626
***** HP FROM GPSA ******				
BHP/MMCFD	72.9	64.2	64.2	64.2
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.04	1.04	1.04	1.04
**** CAPACITY & HORSEPOWER CALCULATIONS **********				
Zavg	0.9914	0.9676	0.9676	0.9676
HEAD END CLEARANCE (%)	15.80	28.22	28.22	28.22
CRANK END CLEARANCE (%)	13.60	15.70	15.70	15.70
VOLUMETRIC EFF HE (%)	63.65	50.05	50.05	50.05
VOLUMETRIC EFF CE (%)	67.67	69.08	69.08	69.08
CAPACITY (mmacfd)	1.01	0.33	0.33	0.33
CAPACITY (mmscfd)	2.76	3.09	3.09	3.09
BHP	223	209	209	209
CORRECTED BHP	232	218	218	218
ESTIMATED AUXILIARY HP	0			
EST TOTAL CORRECTED BHP	885			
FULL LOAD HP (RATED @rpm)	978			
% OF ENGINE FULL LOAD	91			

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
******COMPOSITION******	----------MOLE FRACTION---------			
METHANE (CH4)	78.2697	75.5472		
ETHANE (C2H6)	8.2293	7.6009		
PROPANE (C3H8)	4.9159	5.2220		
ISO-BUTANE (C4H10)	0.7000	0.7316		
N-BUTANE (C4H10)	1.8821	2.0134		
ISO-PENTANE (C5H12)	0.5391	0.5248		
N-PENTANE (C5H12)	0.5726	0.5303		
N-HEXANE (C6H14)	1.2097	1.0418		
OXYGEN (O2)	0.0314	0.0195		
NITROGEN (N2)	0.1753	0.1130		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)	3.4743	6.6547		
TOTALS	100.00	100.00	0.00	0.00
*****VALUES CALCULATED FROM GAS COMPOSITION*****				
MOLECULAR WEIGHT	22.13	22.93	ERR	ERR
SPECIFIC GRAVITY	0.764	0.792	ERR	ERR
MCp (@ Tavg)	11.239	11.166	ERR	ERR
MCv (@ Tavg)	9.253	9.180	ERR	ERR
CALC'D Kavg (@ Tavg)	1.215	1.216	ERR	ERR
PSEUDO CRIT PRESS (pPc)	673.1	686.0	ERR	ERR
PSEUDO CRIT TEMP (pTc)	406.2	411.9	ERR	ERR
Pr (suct, P from below)	0.065	0.211	ERR	ERR
Tr (suct, T from below)	1.394	1.347	ERR	ERR
Pr (disch, P from below)	0.227	0.641	ERR	ERR
Tr (disch, T from below)	1.770	1.748	ERR	ERR
******GAS CONDITIONS******				
SG (from gas comp or est)	0.764	0.792		
T suction (deg F)	106	95		
T discharge (deg F)	259	260		
T avg (deg F)	183	178	0	0
P suction (psig)	29.0	130.0		
P discharge (psig)	138.0	425.0		
******Z CALCULATED FROM CORRELATION******				
Z suction	0.9946	0.9725	1.0000	1.0000
Z discharge	0.9882	0.9626	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
********** CAPACITY & HORSEPOWER CALCULATIONS **********				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	541.2	196.9	196.9	196.9
PISTON DISPL CE (cfm)	530.1	185.9	185.9	185.9
GAS ROD LOAD, TENS (ksi)	20.6	19.2	19.2	19.2
GAS ROD LOAD, COMP (ksi)	21.4	21.5	21.5	21.5

"PRECOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PRE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: TAR

DATE: 7/11/90

COMMENTS: UNIT 2 SOURCE TEST (238B 12:48)

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 8GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 6597

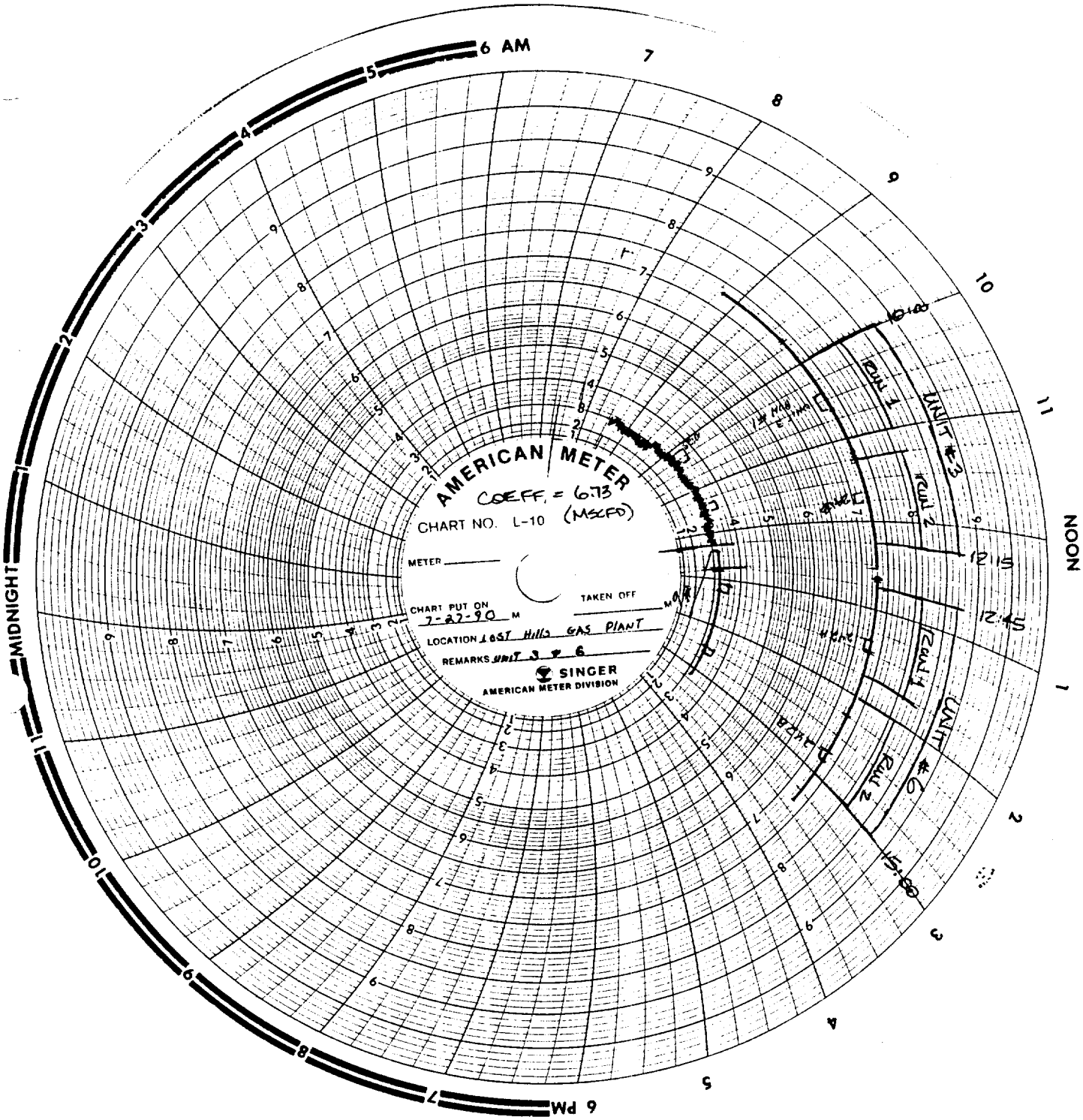
EST AUX HP ON ENGINE = 0

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
### EQUIP DIMENSIONS ####				
CYLINDER DIA (in)	15.75	9.50	9.50	9.50
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	15.80	17.40	17.40	17.40
% CL PER INCH VVP STROKE	10.50	7.21	7.21	7.21
% CL PER SPLIT YOKE (HE)				
MIN CLEARANCE CE (%)	13.60	15.70	15.70	15.70
% CL PER SPLIT YOKE (CE)				
## RUNNING CONDITIONS ###				
UNIT RPM	788	788	788	788
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	0	0	0	0
# OF SPLIT YOKES IN CE	0	0	0	0
VVP SETTING (inches)	0.0	1.5	1.5	1.5
### P, T, K & Z ENTRY ###				
SUCTION PRESS (psig)	29.5	132.0	132.0	132.0
DISCHARGE PRESS (psig)	140.0	435.0	435.0	435.0
COMPRESSION RATIO	3.51	3.07	3.07	3.07
MEASURED Ts (deg F)	107	104	104	104
MEASURED Td (deg F)	249	263	263	263
Kavg USED IN CALC'S BELOW	1.216	1.215	1.215	1.215
EST CYLINDER EFFICIENCY	0.83	0.80	0.80	0.80
CALC'D Td (F, using Kavg)	277	259	259	259
Zs (from chart or calc)	0.9945	0.9734	0.9734	0.9734
Zd (from chart or calc)	0.9875	0.9624	0.9624	0.9624
##### HP FROM GPSA ######				
BHP/MMCFD	73.1	64.7	64.7	64.7
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.04	1.04	1.04	1.04
#### CAPACITY & HORSEPOWER CALCULATIONS ###################				
Zavg	0.9910	0.9679	0.9679	0.9679 #
HEAD END CLEARANCE (%)	15.80	28.22	28.22	28.22 #
CRANK END CLEARANCE (%)	13.60	15.70	15.70	15.70 #
VOLUMETRIC EFF HE (%)	63.60	49.34	49.34	49.34 #
VOLUMETRIC EFF CE (%)	67.62	68.68	68.68	68.68 #
CAPACITY (mmacfd)	1.00	0.32	0.32	0.32 #
CAPACITY (mmscfd)	2.75	3.00	3.00	3.00 #
BHP	222	209	209	209
CORRECTED BHP	231	217	217	217
ESTIMATED AUXILIARY HP	0			
EST TOTAL CORRECTED BHP	882			
FULL LOAD HP (RATED @rpm)	963			
% OF ENGINE FULL LOAD	92			

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
######COMPOSITION######	----------MOLE FRACTION---------			
METHANE (CH4)	78.2697	75.5472		
ETHANE (C2H6)	8.2293	7.6009		
PROPANE (C3H8)	4.9159	5.2220		
ISO-BUTANE (C4H10)	0.7000	0.7316		
N-BUTANE (C4H10)	1.8821	2.0134		
ISO-PENTANE (C5H12)	0.5391	0.5248		
N-PENTANE (C5H12)	0.5726	0.5303		
N-HEXANE (C6H14)	1.2097	1.0418		
OXYGEN (O2)	0.0314	0.0195		
NITROGEN (N2)	0.1753	0.1130		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)	3.4743	6.6547		
TOTALS	100.00	100.00	0.00	0.00
#####VALUES CALCULATED FROM GAS COMPOSITION#####				
MOLECULAR WEIGHT	22.13	22.93	ERR	ERR
SPECIFIC GRAVITY	0.764	0.792	ERR	ERR
MCp (@ Tavg)	11.193	11.227	ERR	ERR
MCv (@ Tavg)	9.207	9.241	ERR	ERR
CALC'D Kavg (@ Tavg)	1.216	1.215	ERR	ERR
PSEUDO CRIT PRESS (pPc)	673.1	686.0	ERR	ERR
PSEUDO CRIT TEMP (pTc)	406.2	411.9	ERR	ERR
Pr (suct, P from below)	0.065	0.214	ERR	ERR
Tr (suct, T from below)	1.396	1.369	ERR	ERR
Pr (disch, P from below)	0.230	0.655	ERR	ERR
Tr (disch, T from below)	1.746	1.755	ERR	ERR
######GAS CONDITIONS######				
SG (from gas comp or est)	0.764	0.792		
T suction (deg F)	107	104		
T discharge (deg F)	249	263		
T avg (deg F)	178	184	0	0
P suction (psig)	29.5	132.0		
P discharge (psig)	140.0	435.0		
######Z CALCULATED FROM CORRELATION######				
Z suction	0.9945	0.9734	1.0000	1.0000
Z discharge	0.9875	0.9624	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
########### CAPACITY & HORSEPOWER CALCULATIONS ################				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	533.1	193.9	193.9	193.9
PISTON DISPL CE (cfm)	522.2	183.1	183.1	183.1
GAS ROD LOAD, TENS (ksi)	20.9	19.7	19.7	19.7
GAS ROD LOAD, COMP (ksi)	21.7	22.1	22.1	22.1


AMERICAN METER
COEFF. = 6.73
CHART NO. L-10
(MSCFD)
METER
CHART PUT ON
7-27-90
TAKEN OFF
LOCATION LOST HILLS GAS PLANT
REMARKS UNIT 3 & 6
SINGER
AMERICAN METER DIVISION
MIDNIGHT
6 AM
NOON
6 PM
UNIT #3
UNIT #6

"PRECOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PRE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: JEO

DATE: 7/27/90

COMMENTS: UNIT 3 SOURCE TEST (241A, 10:25)

RUN #1

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 8GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 6597

EST AUX HP ON ENGINE = 0

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4	
*** EQUIP DIMENSIONS ****					
CYLINDER DIA (in)	15.75	9.50	9.50	9.50	
ROD DIA (in)	2.25	2.25	2.25	2.25	
PISTON STROKE (in)	6.00	6.00	6.00	6.00	
MIN CLEARANCE HE (%)	15.80	17.40	17.40	17.40	
% CL PER INCH VVP STROKE	10.50	7.21	7.21	7.21	
% CL PER SPLIT YOKE (HE)					
MIN CLEARANCE CE (%)	13.60	15.70	15.70	15.70	
% CL PER SPLIT YOKE (CE)					
** RUNNING CONDITIONS ***					
UNIT RPM	862	862	862	862	
HE LOADED? (1=yes 0=no)	1	1	1	1	
CE LOADED? (1=yes 0=no)	1	1	1	1	
# OF SPLIT YOKES IN HE	0	0	0	0	
# OF SPLIT YOKES IN CE	0	0	0	0	
VVP SETTING (inches)	0.0	1.5	1.5	1.5	
*** P, T, K & Z ENTRY ***					
SUCTION PRESS (psig)	34.0	122.0	122.0	122.0	
DISCHARGE PRESS (psig)	128.0	400.0	400.0	400.0	
COMPRESSION RATIO	2.94	3.04	3.04	3.04	
MEASURED Ts (deg F)	93	98	98	98	
MEASURED Td (deg F)	237	250	250	250	
Kavg USED IN CALC'S BELOW	1.219	1.217	1.217	1.217	
EST CYLINDER EFFICIENCY	0.83	0.80	0.80	0.80	
CALC'D Td (F, using Kavg)	235	251	251	251	
Zs (from chart or calc)	0.9931	0.9746	0.9746	0.9746	
Zd (from chart or calc)	0.9879	0.9630	0.9630	0.9630	
***** HP FROM GPSA ******					
BHP/MMCFD	62.1	64.1	64.1	64.1	
HP CORRECTION					
low intake pressure	1.00	1.00	1.00	1.00	
specific gravity	1.00	1.00	1.00	1.00	
high speed unit	1.04	1.04	1.04	1.04	
**** CAPACITY & HORSEPOWER CALCULATIONS **********					
Zavg	0.9905	0.9688	0.9688	0.9688	*
HEAD END CLEARANCE (%)	15.80	28.22	28.22	28.22	*
CRANK END CLEARANCE (%)	13.60	15.70	15.70	15.70	*
VOLUMETRIC EFF HE (%)	70.42	50.07	50.07	50.07	*
VOLUMETRIC EFF CE (%)	73.57	69.09	69.09	69.09	*
CAPACITY (mmacfd)	1.20	0.35	0.35	0.35	*
CAPACITY (mmscfd)	3.73	3.12	3.12	3.12	*
BHP	250	213	213	213	
CORRECTED BHP	260	221	221	221	
ESTIMATED AUXILIARY HP	0				
EST TOTAL CORRECTED BHP	924				
FULL LOAD HP (RATED @rpm)	1053				
% OF ENGINE FULL LOAD	88				

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
******COMPOSITION******	----------MOLE FRACTION---------			
METHANE (CH4)	78.2697	75.5472		
ETHANE (C2H6)	8.2293	7.6009		
PROPANE (C3H8)	4.9159	5.2220		
ISO-BUTANE (C4H10)	0.7000	0.7316		
N-BUTANE (C4H10)	1.8821	2.0134		
ISO-PENTANE (C5H12)	0.5391	0.5248		
N-PENTANE (C5H12)	0.5726	0.5303		
N-HEXANE (C6H14)	1.2097	1.0418		
OXYGEN (O2)	0.0314	0.0195		
NITROGEN (N2)	0.1753	0.1130		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)	3.4743	6.6547		
TOTALS	100.00	100.00	0.00	0.00
*****VALUES CALCULATED FROM GAS COMPOSITION*****				
MOLECULAR WEIGHT	22.13	22.93	ERR	ERR
SPECIFIC GRAVITY	0.764	0.792	ERR	ERR
MCp (@ Tavg)	11.062	11.131	ERR	ERR
MCv (@ Tavg)	9.076	9.145	ERR	ERR
CALC'D Kavg (@ Tavg)	1.219	1.217	ERR	ERR
PSEUDO CRIT PRESS (pPc)	673.1	686.0	ERR	ERR
PSEUDO CRIT TEMP (pTc)	406.2	411.9	ERR	ERR
Pr (suct, P from below)	0.072	0.199	ERR	ERR
Tr (suct, T from below)	1.362	1.355	ERR	ERR
Pr (disch, P from below)	0.212	0.604	ERR	ERR
Tr (disch, T from below)	1.716	1.724	ERR	ERR
******GAS CONDITIONS******				
SG (from gas comp or est)	0.764	0.792		
T suction (deg F)	93	98		
T discharge (deg F)	237	250		
T avg (deg F)	165	174	0	0
P suction (psig)	34.0	122.0		
P discharge (psig)	128.0	400.0		
******Z CALCULATED FROM CORRELATION******				
Z suction	0.9931	0.9746	1.0000	1.0000
Z discharge	0.9879	0.9630	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
********** CAPACITY & HORSEPOWER CALCULATIONS **********				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	583.1	212.2	212.2	212.2
PISTON DISPL CE (cfm)	571.2	200.3	200.3	200.3
GAS ROD LOAD, TENS (ksi)	17.7	18.1	18.1	18.1
GAS ROD LOAD, COMP (ksi)	18.5	20.2	20.2	20.2

Fuel RATE 152-3 MCFD

"PRECOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PRE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: JEO

DATE: 7/27/90

COMMENTS: UNIT 3 SOURCE TEST (241B, 11:37)

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 8GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 6597

EST AUX HP ON ENGINE = 0

OF STROKES PER CYCLE = 4

RUN #2

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4	
*** EQUIP DIMENSIONS ****					
CYLINDER DIA (in)	15.75	9.50	9.50	9.50	
ROD DIA (in)	2.25	2.25	2.25	2.25	
PISTON STROKE (in)	6.00	6.00	6.00	6.00	
MIN CLEARANCE HE (%)	15.80	17.40	17.40	17.40	
% CL PER INCH VVP STROKE	10.50	7.21	7.21	7.21	
% CL PER SPLIT YOKE (HE)					
MIN CLEARANCE CE (%)	13.60	15.70	15.70	15.70	
% CL PER SPLIT YOKE (CE)					
** RUNNING CONDITIONS ***					
UNIT RPM	873	873	873	873	
HE LOADED? (1=yes 0=no)	1	1	1	1	
CE LOADED? (1=yes 0=no)	1	1	1	1	
# OF SPLIT YOKES IN HE	0	0	0	0	
# OF SPLIT YOKES IN CE	0	0	0	0	
VVP SETTING (inches)	0.0	1.5	1.5	1.5	
*** P, T, K & Z ENTRY ***					
SUCTION PRESS (psig)	28.2	122.0	122.0	122.0	
DISCHARGE PRESS (psig)	126.0	422.0	422.0	422.0	
COMPRESSION RATIO	3.29	3.20	3.20	3.20	
MEASURED Ts (deg F)	97	101	101	101	
MEASURED Td (deg F)	249	259	259	259	
Kavg USED IN CALC'S BELOW	1.217	1.216	1.216	1.216	
EST CYLINDER EFFICIENCY	0.83	0.80	0.80	0.80	
CALC'D Td (F, using Kavg)	256	262	262	262	
Zs (from chart or calc)	0.9944	0.9750	0.9750	0.9750	
Zd (from chart or calc)	0.9887	0.9627	0.9627	0.9627	
***** HP FROM GPSA ******					
BHP/MMCFD	69.0	67.2	67.2	67.2	
HP CORRECTION					
low intake pressure	1.00	1.00	1.00	1.00	
specific gravity	1.00	1.00	1.00	1.00	
high speed unit	1.04	1.04	1.04	1.04	
**** CAPACITY & HORSEPOWER CALCULATIONS **********					
Zavg	0.9916	0.9689	0.9689	0.9689	*
HEAD END CLEARANCE (%)	15.80	28.22	28.22	28.22	*
CRANK END CLEARANCE (%)	13.60	15.70	15.70	15.70	*
VOLUMETRIC EFF HE (%)	66.24	46.68	46.68	46.68	*
VOLUMETRIC EFF CE (%)	69.93	67.14	67.14	67.14	*
CAPACITY (mmacfd)	1.15	0.34	0.34	0.34	*
CAPACITY (mmscfd)	3.12	3.00	3.00	3.00	*
BHP	234	216	216	216	
CORRECTED BHP	243	224	224	224	
ESTIMATED AUXILIARY HP	0				
* EST TOTAL CORRECTED BHP	916				
FULL LOAD HP (RATED @rpm)	1067				
% OF ENGINE FULL LOAD	86				

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
******COMPOSITION******	----------MOLE FRACTION---------			
METHANE (CH4)	78.2697	75.5472		
ETHANE (C2H6)	8.2293	7.6009		
PROPANE (C3H8)	4.9159	5.2220		
ISO-BUTANE (C4H10)	0.7000	0.7316		
N-BUTANE (C4H10)	1.8821	2.0134		
ISO-PENTANE (C5H12)	0.5391	0.5248		
N-PENTANE (C5H12)	0.5726	0.5303		
N-HEXANE (C6H14)	1.2097	1.0418		
OXYGEN (O2)	0.0314	0.0195		
NITROGEN (N2)	0.1753	0.1130		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)	3.4743	6.6547		
TOTALS	100.00	100.00	0.00	0.00
*****VALUES CALCULATED FROM GAS COMPOSITION*****				
MOLECULAR WEIGHT	22.13	22.93	ERR	ERR
SPECIFIC GRAVITY	0.764	0.792	ERR	ERR
MCp (@ Tavg)	11.143	11.192	ERR	ERR
MCv (@ Tavg)	9.157	9.206	ERR	ERR
CALC'D Kavg (@ Tavg)	1.217	1.216	ERR	ERR
PSEUDO CRIT PRESS (pPc)	673.1	686.0	ERR	ERR
PSEUDO CRIT TEMP (pTc)	406.2	411.9	ERR	ERR
Pr (suct, P from below)	0.063	0.199	ERR	ERR
Tr (suct, T from below)	1.371	1.362	ERR	ERR
Pr (disch, P from below)	0.209	0.636	ERR	ERR
Tr (disch, T from below)	1.746	1.746	ERR	ERR
******GAS CONDITIONS******				
SG (from gas comp or est)	0.764	0.792		
T suction (deg F)	97	101		
T discharge (deg F)	249	259		
T avg (deg F)	173	180	0	0
P suction (psig)	28.2	122.0		
P discharge (psig)	126.0	422.0		
******Z CALCULATED FROM CORRELATION******				
Z suction	0.9944	0.9750	1.0000	1.0000
Z discharge	0.9887	0.9627	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
********** CAPACITY & HORSEPOWER CALCULATIONS **********				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	590.6	214.9	214.9	214.9
PISTON DISPL CE (cfm)	578.5	202.8	202.8	202.8
GAS ROD LOAD, TENS (ksi)	18.5	19.5	19.5	19.5
GAS ROD LOAD, COMP (ksi)	19.2	21.8	21.8	21.8

Fuel RATE 154.8 MCFD

"PROPCOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PROPANE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: JEO

DATE: 7/27/90

COMMENTS: UNIT 6 SOURCE TEST (242A 13:19)

RUN #1

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 6GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 4948

EST AUX HP ON ENGINE = 30

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
*** EQUIP DIMENSIONS ****				
CYLINDER DIA (in)	25.50	25.50	14.00	14.00
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	14.33	14.34	14.40	14.40
% CL PER INCH VVP STROKE		13.56		
% CL PER SPLIT YOKE (HE)	1.57	1.57	1.68	1.68
MIN CLEARANCE CE (%)	14.46	14.46	14.38	14.38
% CL PER SPLIT YOKE (CE)	1.58	1.58	1.73	1.73
** RUNNING CONDITIONS ***				
UNIT RPM	837	837	837	837
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	6	6	6	6
# OF SPLIT YOKES IN CE	6	6	6	6
VVP SETTING (inches)	0.0	0.0	0.0	0.0
*** P, T, K & Z ENTRY ***				
SUCTION PRESS (psig)	7.2	7.2	56.0	56.0
DISCHARGE PRESS (psig)	58.0	58.0	218.0	218.0
COMPRESSION RATIO	3.34	3.34	3.30	3.30
MEASURED Ts (deg F)	-2	-2	115	115
MEASURED Td (deg F)	115	115	220	220
Kavg USED IN CALC'S BELOW	1.130	1.130	1.109	1.109
EST CYLINDER EFFICIENCY	0.55	0.55	0.76	0.76
CALC'D Td (F, using Kavg)	122	122	209	209
Zs (from chart or calc)	0.9476	0.9476	0.9310	0.9310
Zd (from chart or calc)	0.9292	0.9292	0.8593	0.8593
***** HP FROM GPSA ******				
BHP/MMCFD	67.2	67.2	65.9	65.9
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.10	1.10	1.10	1.10
**** CAPACITY & HORSEPOWER CALCULATIONS **********				
Zavg	0.9384	0.9384	0.8952	0.8952 *
HEAD END CLEARANCE (%)	23.75	23.76	24.48	24.48 *
CRANK END CLEARANCE (%)	23.94	23.94	24.76	24.76 *
VOLUMETRIC EFF HE (%)	46.03	46.01	39.40	39.40 *
VOLUMETRIC EFF CE (%)	45.65	45.65	38.79	38.79 *
CAPACITY (mmacfd)	1.95	1.95	0.50	0.50 *
CAPACITY (mmscfd)	3.45	3.45	2.31	2.31 *
BHP	196	196	154	154
CORRECTED BHP	216	216	170	170
ESTIMATED AUXILIARY HP	30			
* EST TOTAL CORRECTED BHP	801			
FULL LOAD HP (RATED @rpm)	767			
% OF ENGINE FULL LOAD	104			

Fuel RATE 157.2 MCFD

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
******COMPOSITION******	----------MOLE FRACTION---------			
METHANE (CH4)				
ETHANE (C2H6)	5.5261	5.5261		
PROPANE (C3H8)	89.3556	89.3556		
ISO-BUTANE (C4H10)				
N-BUTANE (C4H10)				
ISO-PENTANE (C5H12)				
N-PENTANE (C5H12)				
N-HEXANE (C6H14)	3.9287	3.9287		
OXYGEN (O2)				
NITROGEN (N2)	1.1897	1.1897		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)				
TOTALS	100.00	100.00	0.00	0.00
*****VALUES CALCULATED FROM GAS COMPOSITION*****				
MOLECULAR WEIGHT	44.78	44.78	ERR	ERR
SPECIFIC GRAVITY	1.546	1.546	ERR	ERR
MCp (@ Tavg)	17.287	20.257	ERR	ERR
MCv (@ Tavg)	15.301	18.271	ERR	ERR
CALC'D Kavg (@ Tavg)	1.130	1.109	ERR	ERR
PSEUDO CRIT PRESS (pPc)	612.5	612.5	ERR	ERR
PSEUDO CRIT TEMP (pTc)	664.1	664.1	ERR	ERR
Pr (suct, P from below)	0.035	0.115	ERR	ERR
Tr (suct, T from below)	0.690	0.866	ERR	ERR
Pr (disch, P from below)	0.118	0.380	ERR	ERR
Tr (disch, T from below)	0.866	1.024	ERR	ERR
******GAS CONDITIONS******				
SG (from gas comp or est)	1.546	1.546		
T suction (deg F)	-2	115		
T discharge (deg F)	115	220		
T avg (deg F)	57	168	0	0
P suction (psig)	7.2	56		
P discharge (psig)	58.0	218		
******Z CALCULATED FROM CORRELATION******				
Z suction	0.9476	0.9310	1.0000	1.0000
Z discharge	0.9292	0.8593	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
********** CAPACITY & HORSEPOWER CALCULATIONS **********				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	1484.2	1484.2	447.4	447.4
PISTON DISPL CE (cfm)	1472.7	1472.7	435.8	435.8
GAS ROD LOAD, TENS (ksi)	25.7	25.7	24.0	24.0
GAS ROD LOAD, COMP (ksi)	26.0	26.0	25.2	25.2

"PROPCOMP" COMPRESSOR HORSEPOWER/SIZING PROGRAM

LOCATION: LOST HILLS GAS PLANT PROPANE COMPRESSOR

ELEVATION > > > > > > > = 300

DATA ENTERED BY: JEO

DATE: 7/27/90

COMMENTS: UNIT 6 SOURCE TEST (242B 14:40)

RUN #2

COMPRESSOR DESCRIPTION: COOPER SUPERIOR MW64

ENGINE DESCRIPTION: COOPER SUPERIOR 6GTLA

ENGINE RATED BMEP (PSI) = 146.7

ENGINE DISPL (CU IN) = 4948

EST AUX HP ON ENGINE = 30

OF STROKES PER CYCLE = 4

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
*** EQUIP DIMENSIONS ****				
CYLINDER DIA (in)	25.50	25.50	14.00	14.00
ROD DIA (in)	2.25	2.25	2.25	2.25
PISTON STROKE (in)	6.00	6.00	6.00	6.00
MIN CLEARANCE HE (%)	14.33	14.34	14.40	14.40
% CL PER INCH VVP STROKE		13.56		
% CL PER SPLIT YOKE (HE)	1.57	1.57	1.68	1.68
MIN CLEARANCE CE (%)	14.46	14.46	14.38	14.38
% CL PER SPLIT YOKE (CE)	1.58	1.58	1.73	1.73
** RUNNING CONDITIONS ***				
UNIT RPM	854	854	854	854
HE LOADED? (1=yes 0=no)	1	1	1	1
CE LOADED? (1=yes 0=no)	1	1	1	1
# OF SPLIT YOKES IN HE	6	6	6	6
# OF SPLIT YOKES IN CE	6	6	6	6
VVP SETTING (inches)	0.0	0.0	0.0	0.0
*** P, T, K & Z ENTRY ***				
SUCTION PRESS (psig)	7.0	7.0	56.0	56.0
DISCHARGE PRESS (psig)	58.0	58.0	228.0	228.0
COMPRESSION RATIO	3.37	3.37	3.44	3.44
MEASURED Ts (deg F)	-1	-1	120	120
MEASURED Td (deg F)	120	120	215	215
Kavg USED IN CALC'S BELOW	1.129	1.129	1.109	1.109
EST CYLINDER EFFICIENCY	0.55	0.55	0.76	0.76
CALC'D Td (F, using Kavg)	123	123	218	218
Zs (from chart or calc)	0.9487	0.9487	0.9331	0.9331
Zd (from chart or calc)	0.9313	0.9313	0.8475	0.8475
***** HP FROM GPSA ******				
BHP/MMCFD	67.8	67.8	68.3	68.3
HP CORRECTION				
low intake pressure	1.00	1.00	1.00	1.00
specific gravity	1.00	1.00	1.00	1.00
high speed unit	1.10	1.10	1.10	1.10
**** CAPACITY & HORSEPOWER CALCULATIONS **********				
Zavg	0.9400	0.9400	0.8903	0.8903 *
HEAD END CLEARANCE (%)	23.75	23.76	24.48	24.48 *
CRANK END CLEARANCE (%)	23.94	23.94	24.76	24.76 *
VOLUMETRIC EFF HE (%)	45.46	45.44	34.93	34.93 *
VOLUMETRIC EFF CE (%)	45.08	45.08	34.28	34.28 *
CAPACITY (mmacfd)	1.97	1.97	0.45	0.45 *
CAPACITY (mmscfd)	3.43	3.43	2.07	2.07 *
BHP	197	197	143	143
CORRECTED BHP	217	217	158	158
ESTIMATED AUXILIARY HP	30			
* EST TOTAL CORRECTED BHP	780			
FULL LOAD HP (RATED @rpm)	783			
% OF ENGINE FULL LOAD	100			

Fuel RATE 157.2 MSCFD

GAS CALCULATIONS	STG 1	STG 2	STG 3	STG 4
******COMPOSITION******	----------MOLE FRACTION---------			
METHANE (CH4)				
ETHANE (C2H6)	5.5261	5.5261		
PROPANE (C3H8)	89.3556	89.3556		
ISO-BUTANE (C4H10)				
N-BUTANE (C4H10)				
ISO-PENTANE (C5H12)				
N-PENTANE (C5H12)				
N-HEXANE (C6H14)	3.9287	3.9287		
OXYGEN (O2)				
NITROGEN (N2)	1.1897	1.1897		
HYDROGEN SULFIDE (H2S)				
CARBON DIOXIDE (CO2)				
TOTALS	100.00	100.00	0.00	0.00
*****VALUES CALCULATED FROM GAS COMPOSITION*****				
MOLECULAR WEIGHT	44.78	44.78	ERR	ERR
SPECIFIC GRAVITY	1.546	1.546	ERR	ERR
MCp (@ Tavg)	17.364	20.257	ERR	ERR
MCv (@ Tavg)	15.378	18.271	ERR	ERR
CALC'D Kavg (@ Tavg)	1.129	1.109	ERR	ERR
PSEUDO CRIT PRESS (pPc)	612.5	612.5	ERR	ERR
PSEUDO CRIT TEMP (pTc)	664.1	664.1	ERR	ERR
Pr (suct, P from below)	0.035	0.115	ERR	ERR
Tr (suct, T from below)	0.691	0.873	ERR	ERR
Pr (disch, P from below)	0.118	0.396	ERR	ERR
Tr (disch, T from below)	0.873	1.016	ERR	ERR
******GAS CONDITIONS******				
SG (from gas comp or est)	1.546	1.546		
T suction (deg F)	-1	120		
T discharge (deg F)	120	215		
T avg (deg F)	60	168	0	0
P suction (psig)	7.0	56		
P discharge (psig)	58.0	228		
******Z CALCULATED FROM CORRELATION******				
Z suction	0.9487	0.9331	1.0000	1.0000
Z discharge	0.9313	0.8475	1.0000	1.0000

DESCRIPTION	CYL 1	CYL 2	CYL 3	CYL 4
********** CAPACITY & HORSEPOWER CALCULATIONS **********				
ATMOSPHERIC PRESS (psia)	14.53	14.53	14.53	14.53
PISTON DISPL HE (cfm)	1514.4	1514.4	456.5	456.5
PISTON DISPL CE (cfm)	1502.6	1502.6	444.7	444.7
GAS ROD LOAD, TENS (ksi)	25.8	25.8	25.5	25.5
GAS ROD LOAD, COMP (ksi)	26.1	26.1	26.8	26.8