KCAPCD

GENESIS
ENVIRONMENTAL SERVICES COMPANY

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

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

Rec 7/25/91
NPH

CHEVRON U.S.A. INC.
P.O. BOX 1392
BAKERSFIELD, CALIFORNIA 93302

# CHEVRON U.S.A.
# SECTION 26C STEAM PLANT
# STEAM GENERATOR # 50-6 and 50-7

## INITIAL COMPLIANCE TEST
## JUNE 11, 1991

PREPARED BY:
GENESIS ENVIRONMENTAL SERVICES COMPANY
1145 WEST COLUMBUS AVENUE
BAKERSFIELD, CALIFORNIA 93301

KCAPCD PERMIT #'s 4008175 AND 4008176

REPORT #7777-0268

RECEIVED
JUL 25 1991
KERN COUNTY AIR
POLLUTION CONTROL DISTRICT

TEST CONDUCTED BY KEVIN ORTON
RESULTS VERIFIED BY MICHAEL L. BAKALOR
OPERATIONS MANAGER

SUMMARY OF SOURCE TEST RESULTS

Company: Chevron U.S.A. APCD No. 4008176 E
Test Date: 6-11-91 Unit No. # 50-7

EMISSIONS

| POLLUTANT | Concentration gr/scf | @12% | PPMv | @3% O2 | lb/hr | lb/MMBTU |
|---|---|---|---|---|---|---|
| Particulate | | | | | | |
| Sulfate | | | | | | |
| Sulfur | | | | | | |
| NOx as NO2 (dry) | | | 35.6<br>37.5<br>37.9<br>---<br>37.0 | 32.9<br>34.8<br>35.1<br>---<br>34.3 | 2.04<br>2.15<br>2.17<br>---<br>2.12 | 0.0416 lb/MMBTU |
| HC (as methane) | | | N/D<br>N/D<br>N/D<br>---<br>N/D* | | N/D<br>N/D<br>N/D<br>---<br>N/D* | |
| CO* | | | 5.2<br>2.5<br>5.2<br>---<br>4.3 | | 0.18<br>0.09<br>0.01<br>---<br>0.09 | |

INITIAL 210.1, 424, 425.1, GAS F 62.5 W FGR

Comments: HC reported as non-detected.

8/9/91

SUMMARY OF SOURCE TEST RESULTS

Company: Chevron U.S.A. APCD No. 4008175
Test Date: 6-11-91 Unit No. # 50-6

EMISSIONS

| POLLUTANT | Concentration gr/scf | @12% | PPMv | @3% O2 | lb/hr | lb/MMBTU |
|---|---|---|---|---|---|---|
| Particulate | | | | | | |
| Sulfate | | | | | | |
| Sulfur | | | | | | |
| NOx as NO2 (dry) | | | 38.5<br>37.9<br>39.0<br>---<br>38.4 | 35.9<br>35.3<br>36.3<br>---<br>35.8 | 2.15<br>2.12<br>2.18<br>---<br>2.15 | 0.0435 lb/MMBTU |
| HC (as methane) | | | N/D<br>N/D<br>N/D<br>---<br>N/D* | | N/D<br>N/D<br>N/D<br>---<br>N/D* | |
| CO* | | | 0.1<br>2.7<br>0.1<br>---<br>1.0 | | 0.00<br>0.09<br>0.07<br>---<br>0.05 | |

INITIAL 210.1, 424, 425.1 - GAS F 62.5 w FGR

Comments: HC reported as non-detected.

8/9/91

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# INTRODUCTION

At the request of Mr. Stephen Miller of Chevron U.S.A. Inc., Genesis Environmental Services Company conducted an Initial Compliance Test on Steam Generator's #50-7 and #50-6, located at Chevron's 26C Steam Plant.

Steam Generator's # 50-7 and # 50-6 are manufactured by Struthers and are rated at 62.5 MMBTU/hr.

The purpose of these tests is to comply with Kern County Air Pollution Control District rules as required in KCAPCD Permit #'s 4008176 and 4008175.

The 1991 Initial Compliance Tests were conducted on June 11, 1991 by Mr.Kevin Orton of Genesis Environmental. Chevron representative, Mr. Stephen Miller was present during the tests.

Table 1-1 contains a summary of test results. Figure 1-1 contains the calculations used to determine the results. The following is a summary of tests performed on Steam Generator #'s 50-7 and 50-6.

Test Summary
Steam Generator #'s 50-7 and 50-6
June 11, 1991

| CONSTITUENT | METHOD | QUANTITY |
|---|---|---|
| NOx | CARB 1-100 FOR NOx (TECO MODEL 10AR) | TRIPLICATE |
| CO | CARB 1-100 FOR CO (TECO MODEL 48) | TRIPLICATE |
| $O_2$ | CARB 1-100 FOR $O_2$ (TELEDYNE MODEL 326RA) | TRIPLICATE |
| HYDROCARBON | EPA METHOD 18 (GAS CHROMATOGRAPH) | TRIPLICATE |

As per KCAPCD requirements, a total of three forty minute tests were performed with an initial calibration at the start of run #1. A post calibration was performed after each 40 minutes of continuous measurement.

Figure 1-1

## Calculation of Results

1. $Fd_{68} = \left[\frac{10^6 \ (3.64\%H + 1.53\%C + 0.57\%S + 0.14\%N - 0.46\%O)}{GCV}\right]$

   $Fd_{60} = \frac{520 \ Fd_{68}}{528}$ Note: $Fd_{68}$ for EPA
   $Fd_{60}$ for KCAPCD

2. $SDCFM = \left[\frac{(Fd) \ (GCV) \ (FR)}{1440}\right] \left[\frac{(20.9)}{(20.9-O_2\%)}\right]$

   Where: GCV - $10_6$ BTU/cu.ft.
   FR - Fuel Rate (cu.ft./day)

3. Corrected to 3% $O_2$

   $ppm @ 3\% \ O_2 = ppm\left[\frac{(17.9)}{(20.9 - O_2\%)}\right]$

4. $C_s = (ppm) \ (X)$

   Where: $C_s$ = pollutant concentration (lbs/scf)

| | EPA | KCAPCD |
|---|---|---|
| X = NOx | $1.194 \times 10^{-7}$ | $1.212 \times 10^{-7}$ |
| X = CO | $7.268 \times 10^{-8}$ | $7.378 \times 10^{-8}$ |
| X = HC | $4.153 \times 10^{-8}$ | $4.216 \times 10^{-8}$ |

5. $E = (C_s) \ (Fd) \left[\frac{(20.9)}{(20.9-O_2\%)}\right]$

   Where: E = emission rate (lbs/MMBTU)

6. $E = (C_s) \ (SDCFM) \ (60)$

   Where: E = emission rate (lbs/hr)

# Section 2.0

# Continuous Emission Monitoring

## SECTION 2.0

## CONTINUOUS EMISSION MONITORING: NOx, CO & $O_2$

The analyzers utilized in the Genesis continuous monitor test trailer are presented in Table 2-2. Figure 2-1 is a schematic of the continuous monitoring systems. The protocol used to continuously monitor stack gases for $NO_x$, Oxygen and CO follow CARB Method 100 recommendations.

Stack gas is extracted from the stack using a 316 stainless steel probe. A stainless steel sintered filter (99 percent efficiency @ 0.6 micron particles) is attached to the inlet of the probe. From the sample probe, sample gas is transported through a heated Teflon sample line by a Teflon-lined diaphragm pump to a series of Greenburg-Smith knock-out impingers and condenser system.The clean, dry sample gas is then transported to the continuous analyzer system through a Teflon line. Prior to the analyzers another filter (Balston glass fiber filter, efficiency of 99% @ 0.3 microns) is installed. A series of flowmeters, valves, and a by-pass regulator maintain constant flow through the system at a constant pressure.

At the onset of each test series, a leak-check is performed on the continuous monitor sampling system. The sample probe is removed from the stack and the inlet is sealed. A leak free system is verified when flow through rotameters to the individual analyzers all drop to zero. A mandatory leak-check is performed at the completion of each test series.

Analyzer calibrations are performed at the start of the test run by introducing zero and span gases for each analyzer and making the necessary adjustments. EPA Protocol 1 certified calibration gas values are recorded on the strip chart and field data sheet. A calibration check is also performed at the end of each one hour test run and recorded on the strip chart. If adjustments are necessary to the analyzers they are made after documentation has been made of any zero or calibration drift. At the conclusion of the test series, a system calibration (bias check) is performed of the sample system. This is accomplished by first removing the sample probe from the stack and allowing ambient air to purge the system. After the system has been purged to verify a zero reading, a system gas which has been named against the standard EPA protocol gas is introduced at the sample nozzle. System pressure and vacuum are maintained as in normal operation during this procedure. The system gas is then allowed to flow through the sample conditioning system to the analyzers. Once a stable reading has been achieved, it is recorded and used to calculate the system efficiency which has a tolerance of 5% of the system gas introduced.

Data is recorded in 10 minute averages for each sixty minute test run. Table 2-1 gives a summary of 10 minute averages and calculated emission factors.

TABLE 1-1

Continuous Monitor Data Summary
Chevron, 26C Steam Plant
June 11, 1991
SG# 50-7

| Time | % O2 | CO ppm | NOx ppm | SDCFM | CO Lbs/hr | NOx Lbs/hr | NOx lb/MMBTU |
|---|---|---|---|---|---|---|---|
| 1 | 1.55 | 5.23 | 35.6 | 7879 | 0.18 | 2.04 | 0.0399 |
| 2 | 1.62 | 2.50 | 37.5 | 7879 | 0.09 | 2.15 | 0.0422 |
| 3 | 1.59 | 0.20 | 37.9 | 7879 | 0.01 | 2.17 | 0.0426 |
| AVG. | 1.59 | 2.64 | 37.0 | 7879 | 0.09 | 2.12 | 0.0416 |

Continuous Monitor Data Summary
Chevron, 26C Steam Plant
June 11, 1991
SG# 50-6

| Time | % O2 | CO ppm | NOx ppm | SDCFM | CO Lbs/hr | NOx Lbs/hr | NOx lb/MMBTU |
|---|---|---|---|---|---|---|---|
| 1 | 1.72 | 0.10 | 38.5 | 7691 | 0.00 | 2.15 | 0.0435 |
| 2 | 1.71 | 2.65 | 37.9 | 7691 | 0.09 | 2.12 | 0.0429 |
| 3 | 1.71 | 2.08 | 39.0 | 7691 | 0.07 | 2.18 | 0.0441 |
| AVG. | 1.71 | 1.61 | 38.4 | 7691 | 0.05 | 2.15 | 0.0435 |

TABLE 2-1a

Continuous Monitor Data Summary
Ten Minute Averages
Test # 1
SG# 50-7

| Time | % O2 | CO ppm | NOx ppm | SDCFM | CO Lbs/hr | NOx Lbs/hr |
|---|---|---|---|---|---|---|
| 1055 | 1.62 | 7.0 | 34.5 | 7879 | 0.24 | 1.98 |
| 1105 | 1.55 | 5.5 | 35.7 | 7879 | 0.19 | 2.05 |
| 1115 | 1.53 | 4.5 | 35.7 | 7879 | 0.16 | 2.05 |
| 1125 | 1.49 | 3.9 | 36.4 | 7879 | 0.14 | 2.09 |
| AVG. | 1.55 | 5.2 | 35.6 | 7879 | 0.18 | 2.04 |

Calibration Data

| | % O2 | CO ppm | NOxppm |
|---|---|---|---|
| ZERO | 0.00 | 0.0 | -1.0 |
| Span | 3.80 | 18.5 | 74.7 |
| Gas Value | 4.00 | 18.0 | 76.0 |
| Zero Factor | 0 | 0 | 0 |
| Span Factor | 0 | 0 | 0 |

TABLE 2-1b

Continuous Monitor Data Summary
Ten Minute Averages
Test # 2
SG# 50-7

| Time | % O2 | CO ppm | NOx ppm | SDCFM | CO Lbs/hr | NOx Lbs/hr |
|---|---|---|---|---|---|---|
| 1141 | 1.63 | 3.0 | 37.5 | 7879 | 0.10 | 2.15 |
| 1151 | 1.63 | 2.8 | 37.6 | 7879 | 0.10 | 2.15 |
| 1201 | 1.58 | 2.4 | 37.0 | 7879 | 0.08 | 2.12 |
| 1211 | 1.63 | 1.8 | 37.8 | 7879 | 0.06 | 2.17 |
| AVG. | 1.62 | 2.5 | 37.5 | 7879 | 0.09 | 2.15 |

Calibration Data

| | % O2 | CO ppm | NOxppm |
|---|---|---|---|
| ZERO | 0.00 | 0.0 | -0.5 |
| Span | 4.00 | 18.5 | 77.3 |
| Gas Value | 4.00 | 18.0 | 76.0 |
| Zero Factor | 0 | 0 | 0 |
| Span Factor | 0 | 0 | 0 |

TABLE 2-1c

Continuous Monitor Data Summary
Ten Minute Averages
Test # 3
SG# 50-7

| Time | % O2 | CO ppm | NOx ppm | SDCFM | CO Lbs/hr | NOx Lbs/hr |
|---|---|---|---|---|---|---|
| 1240 | 1.58 | 0.2 | 37.7 | 7879 | 0.01 | 2.16 |
| 1250 | 1.60 | 0.2 | 37.9 | 7879 | 0.01 | 2.17 |
| 1300 | 1.58 | 0.2 | 38.0 | 7879 | 0.01 | 2.18 |
| 1310 | 1.60 | 0.2 | 37.8 | 7879 | 0.01 | 2.17 |
| AVG. | 1.59 | 0.2 | 37.9 | 7879 | 0.01 | 2.17 |

Calibration Data

| | % O2 | CO ppm | NOxppm |
|---|---|---|---|
| ZERO | 0.00 | -1.5 | 0.0 |
| Span | 3.98 | 16.8 | 76.0 |
| Gas Value | 4.00 | 18.03 | 76.02 |
| Zero Factor | 0 | 0 | 0 |
| Span Factor | 0 | 0 | 0 |

TABLE 2-1d

Continuous Monitor Data Summary
Ten Minute Averages
Test # 1
SG# 50-6

| Time | % O2 | CO ppm | NOx ppm | SDCFM | CO Lbs/hr | NOx Lbs/hr |
|---|---|---|---|---|---|---|
| 1340 | 1.73 | 0.1 | 38.2 | 7691 | 0.00 | 2.14 |
| 1350 | 1.68 | 0.1 | 38.5 | 7691 | 0.00 | 2.15 |
| 1410 | 1.72 | 0.1 | 38.3 | 7691 | 0.00 | 2.14 |
| 1125 | 1.73 | 0.1 | 38.8 | 7691 | 0.00 | 2.17 |
| AVG. | 1.72 | 0.1 | 38.5 | 7691 | 0.00 | 2.15 |

Calibration Data

| | % O2 | CO ppm | NOxppm |
|---|---|---|---|
| ZERO | 0.00 | -1.0 | 0.5 |
| Span | 3.98 | 17.0 | 76.9 |
| Gas Value | 4.00 | 18.03 | 76.02 |
| Zero Factor | 0 | 0 | 0 |
| Span Factor | 0 | 0 | 0 |

TABLE 2-1e

Continuous Monitor Data Summary
Ten Minute Averages
Test # 2
SG# 50-6

| Time | % O2 | CO ppm | NOx ppm | SDCFM | CO Lbs/hr | NOx Lbs/hr |
|---|---|---|---|---|---|---|
| 1430 | 1.70 | 0.2 | 38.6 | 7691 | 0.01 | 2.16 |
| 1440 | 1.70 | 0.1 | 38.5 | 7691 | 0.00 | 2.15 |
| 1450 | 1.73 | 0.5 | 38.3 | 7691 | 0.02 | 2.14 |
| 1500 | 1.70 | 9.8 | 36.0 | 7691 | 0.33 | 2.01 |
| AVG. | 1.71 | 2.7 | 37.9 | 7691 | 0.09 | 2.12 |

Calibration Data

| | % O2 | CO ppm | NOxppm |
|---|---|---|---|
| ZERO | 0.00 | 0.0 | -0.8 |
| Span | 4.01 | 18.0 | 75.7 |
| Gas Value | 4.00 | 18.03 | 76.02 |
| Zero Factor | 0 | 0 | 0 |
| Span Factor | 0 | 0 | 0 |

TABLE 2-1f

Continuous Monitor Data Summary
Ten Minute Averages
Test # 3
SG# 50-6

| Time | % O2 | CO ppm | NOx ppm | SDCFM | CO Lbs/hr | NOx Lbs/hr |
|---|---|---|---|---|---|---|
| 1520 | 1.70 | 3.8 | 38.5 | 7691 | 0.13 | 2.15 |
| 1530 | 1.70 | 2.5 | 38.8 | 7691 | 0.09 | 2.17 |
| 1540 | 1.72 | 1.5 | 39.0 | 7691 | 0.05 | 2.18 |
| 1550 | 1.73 | 0.5 | 39.5 | 7691 | 0.02 | 2.21 |
| AVG. | 1.71 | 2.1 | 39.0 | 7691 | 0.07 | 2.18 |

Calibration Data

| | % O2 | CO ppm | NOxppm |
|---|---|---|---|
| ZERO | 0.00 | -1.0 | 1.0 |
| Span | 3.98 | 16.8 | 78.6 |
| Gas Value | 4.00 | 18.03 | 76.02 |
| Zero Factor | 0 | 0 | 0 |
| Span Factor | 0 | 0 | 0 |

Table 2-2

Analyzer Specifications

$NO_x$ CHEMILUMINESCENT ANALYZER -- THERMO ELECTRON MODEL 10AR

| | | |
|---|---|---|
| Response time | (0-90%) | 1.5 sec-- NO mode<br>1.7 sec -- $NO_x$ mode |
| Zero Drift | | Negligible after 1/2 hour warmup |
| Linearity | | less than 1% of full scale |
| Accuracy | | Derived from the NO or $NO_2$ calibration gas, 1% of full scale |
| Output | | 0.100 mV, 0-10 mV, 0-5 V, 0-10 V |

$O_2$ ANALYZER, FUEL TYPE -- TELEDYNE MODEL 326RA

| | | |
|---|---|---|
| Response Time | (0-90%) | 60 seconds |
| Accuracy | | less than 1% of scale at constant temperatures; less than 1% of scale of less than 5%of reading, whichever is greater, over the operating temp. range 0-1 V |

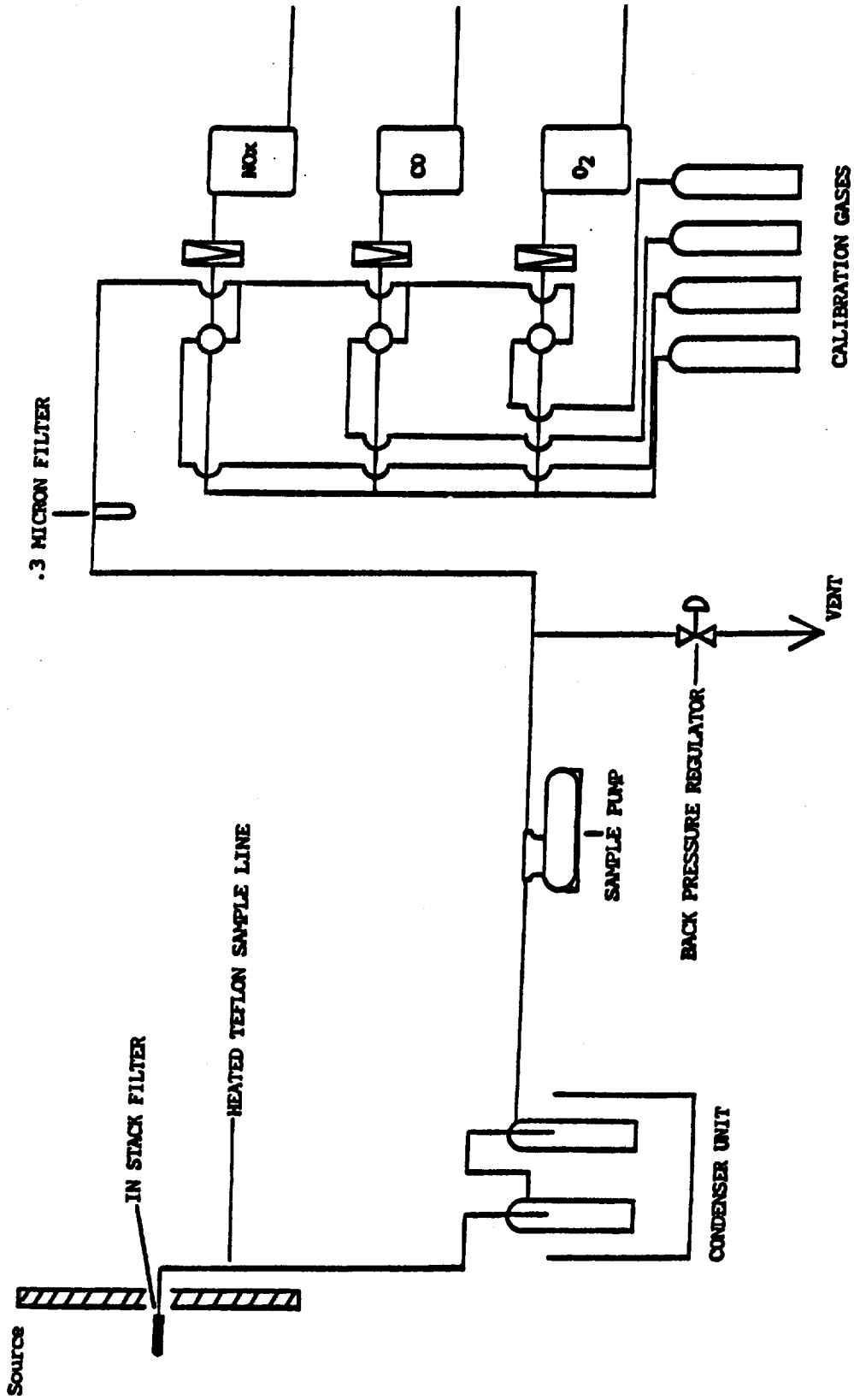
CO INFRARED ANALYZER -- TECO MODEL 48

| | | |
|---|---|---|
| Response Time | (0-90%) | 1.2 seconds |
| Zero Drift | | less than 1% / 24 hr full scale |
| Span Drift | | less than 1% / 24 hr full scale |
| Linearity | | 1% |
| Repeatability | | less than 0.5% of full scale |
| Output | | 0-1 V |

STRIP CHART RECORDED (4 PEN) -- Linseis Model 7045

| | |
|---|---|
| Response Time | less than 0.35 sec. |
| Span -- Full Scale | 1 mV through 10 V |
| Zero Set | Electronically adjustable full scale with 1 full scale of zero suppression |
| Accuracy | Plus or minus 0.35 % |
| Linearity | Plus or minus 0.25 % |

Figure 2-1


NOx
CO
$O_2$
CALIBRATION GASES
.3 MICRON FILTER
VENT
BACK PRESSURE REGULATOR
SAMPLE PUMP
HEATED TEFLON SAMPLE LINE
IN STACK FILTER
CONDENSER UNIT
Source

# Appendix A-1

## Fuel Analysis

# ZALCO LABORATORIES, INC.

Analytical & Consulting Services

GENESIS ENVIRONMENTAL
1145 W. Columbus Ave.
Bakersfield, CA 93301

Lab. No.: 027897_001
Received: Jun 20, 1991
Reported: Jun 21, 1991

Attention: Mike Bakalor

Sample Description: Chevron S6-50-6 Test #1 6/11/91

* CHROMATOGRAPHIC ANALYSIS (Z 1635) *

| Components | Mole % | Wt % | CHONS | Wt % |
|---|---|---|---|---|
| Hydrogen | 0.000 | 0.000 | CARBON | 63.07 |
| Carbon Dioxide | 6.711 | 14.488 | HYDROGEN | 18.60 |
| Oxygen | 1.260 | 1.978 | OXYGEN | 12.51 |
| Nitrogen | 4.225 | 5.806 | NITROGEN | 5.81 |
| Carbon Monoxide | 0.000 | 0.000 | SULFUR | 0.00 |
| Hydrogen Sulfide | 0.000 | 0.000 | | |
| Methane | 78.824 | 62.033 | Totals | 99.99 |
| Ethane | 6.310 | 9.308 | Total H/C | .29 |
| Propane | 2.007 | 4.341 | | |
| IsoButane | .177 | .505 | | |
| N-Butane | .304 | .868 | | |
| IsoPentane | .101 | .357 | | |
| N-Pentane | .036 | .128 | | |
| Hexanes+ | .045 | .188 | | |
| Totals = | 100.000 | 100.000 | | |

| | | |
|---|---|---|
| SPECIFIC GRAVITY (Air = 1) | | .7064 |
| SPECIFIC VOLUME, cu.ft./lb | * | 18.55 |
| GROSS CALORIFIC VALUE, BTU/cu.ft. | * | 969.19 |
| GROSS CALORIFIC VALUE, BTU/cu.ft. | ** | 985.95 |
| GROSS CALORIFIC VALUE, BTU/lb | ** | 18288.11 |
| NET CALORIFIC VALUE, BTU/cu.ft. | ** | 890.88 |
| NET CALORIFIC VALUE, BTU/lb | ** | 16524.75 |
| DSCF EXHAUST PER SCF FUEL (0% Oxygen) | | 8.4840 |
| COMPRESSIBILITY FACTOR 'Z' (60 F,1 ATM) | | .9976 |
| EPA 'F' Factor @ 68 F: | 8708.563 DSCF / MM Btu. | |
| KCAPCD 'F' Factor @ 60 F: | 8577.935 DSCF / MM Btu. | |

* Water Saturated

** Dry Gas @ 60 F, 14.73 psia

Maryann W. Benoit
Organics Supervisor

Richard L. Penner
Laboratory Director

4309 Armour Avenue Bakersfield, California 93308

(805) 395-0539 FAX (805) 395-3069

RECEIVED JUN 1991

# ZALCO LABORATORIES, INC.

Analytical & Consulting Services

Genesis Environmental
1145 West Columbus
Bakersfield, CA 93305

Laboratory No: 27897-1
Date Received: 6-20-91
Date Reported: 6-25-91

Attention: Mike Bakalor

Sample: Fuel Gas

Sample Description: Chevron S6-50-6; Sampled on 6-11-91
Sampled by Mike Bakalor

| Total Sulfur (ASTM D 3246) | Results |
|---|---|
| As $H_2S$, ppm (vol. | < 1.0 |
| As S, Grains/100 SCF* | < 0.06 |

* Standard cubic feet (60 °F, 14.7 psia)

Richard L. Penner
Laboratory Director

RLP/tds

4309 Armour Avenue Bakersfield, California 93308

(805) 395-0539 FAX (805) 395-3069

# Appendix A-2

## Hydrocarbon Analysis

CHEVRON HC#1 5°-7
START

CHROMATOPAC CR601 FILE 1
SAMPLE NO 0 METHOD 44
REPORT NO 706 SAMPLE WT 100

| PKNO | TIME | AREA | MK | IDNO | CONC | NAME |
|---|---|---|---|---|---|---|
| 1 | 6.092 | 640 | | 2 | 4.5587 | METHAN |
| | TOTAL | 640 | | | 4.5587 | |

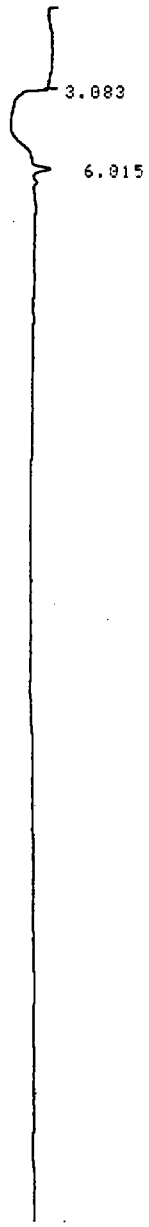
CHEVRON 59-7 HC#2
START

CHROMATOPAC CR601
SAMPLE NO 9
REPORT NO 707

FILE 1
METHOD 44
SAMPLE WT 100

| PKNO | TIME | AREA | MK | IDNO | CONC | NAME |
|---|---|---|---|---|---|---|
| : | 6.132 | 271 | | 2 | 1.9344 | METHAN |
| | TOTAL | 271 | | | 1.9344 | |

CHEVRON 5 W0-7,HC#3
START

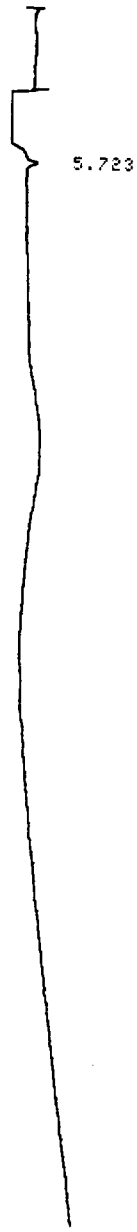



CHROMATOPAC CR601
SAMPLE NO 0
REPORT NO 731

FILE 1
METHOD 44
SAMPLE WT 100

| PKNO | TIME | AREA | MK | IDNO | CONC | NAME |
|---|---|---|---|---|---|---|
| 1 | 6.015 | 228 | | 2 | 1.5761 | METHAN |
| | TOTAL | 228 | | | 1.5761 | |

/CHEVRON 5/0-6 HC#1
START

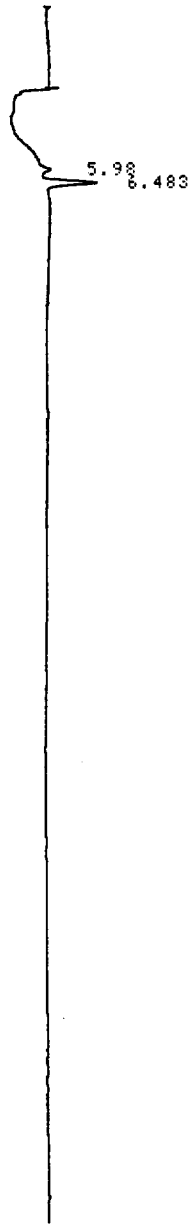



CHROMATOPAC CR601
SAMPLE NO 0
REPORT NO 710

FILE 1
METHOD 44
SAMPLE WT 100

| PKNO | TIME | AREA | MK | IDNO | CONC | NAME |
|---|---|---|---|---|---|---|
| 1 | 5.723 | 140 | | 2 | 0.9943 | METHAN |
| | TOTAL | 140 | | | 0.9943 | |

CHEVRON, HC#2
50-6
START

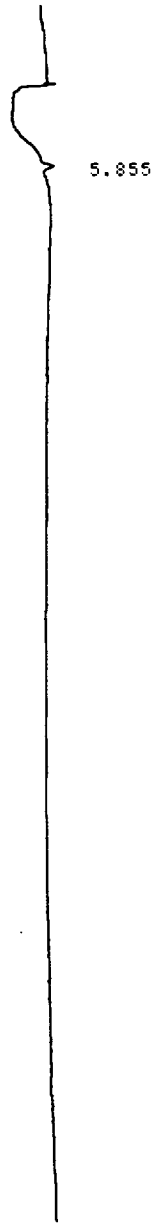



CHROMATOPAC CR601 FILE 1
SAMPLE NO 0 METHOD 44
REPORT NO 733 SAMPLE WT 100

| PKNO | TIME | AREA | MK | IDNO | CONC | NAME |
|---|---|---|---|---|---|---|
| 1 | 5.98 | 142 | | 2 | 0.9847 | METHAN |
| 2 | 6.483 | 797 | | 2 | 5.5096 | METHAN |
| | TOTAL | 940 | | | 6.4942 | |

CHEVRON, HC#3
50-6
START
STOP

WARNING NO PEAK
START

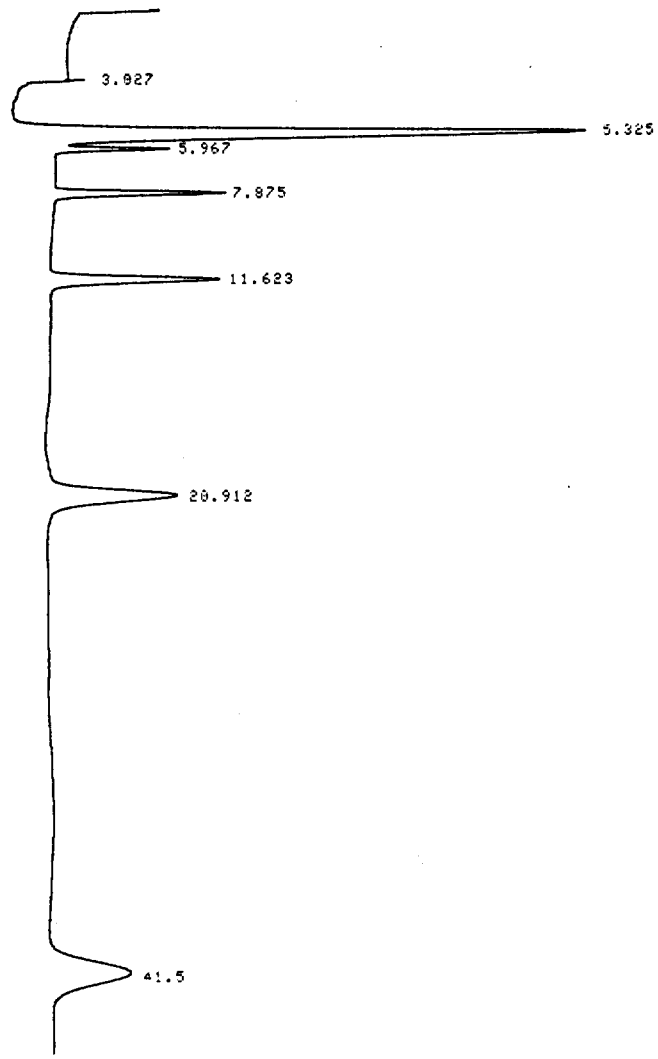



CHROMATOPAC CR601 FILE 1
SAMPLE NO 0 METHOD 44
REPORT NO 734 SAMPLE WT 100

| PKNO | TIME | AREA | MK | IDNO | CONC | NAME |
|---|---|---|---|---|---|---|
| 1 | 5.855 | 141 | | 2 | 0.9715 | METHAN |
| | TOTAL | 141 | | | 0.9715 | |

NEW CHART

START




CHROMATOPAC CR601 FILE 1
SAMPLE NO 0 METHOD 44
REPORT NO 722 SAMPLE WT 100

| PKNO | TIME | AREA | MK | IDNO | CONC | NAME |
|---|---|---|---|---|---|---|
| 1 | 3.027 | 167 | | | | |
| 2 | 5.325 | 23482 | | 1 | 28.474 | HEXANE |
| 3 | 5.967 | 2185 | V | 2 | 15.5753 | METHAN |
| 4 | 7.875 | 3688 | | 3 | 14.4822 | ETHANE |
| 5 | 11.623 | 5460 | | 4 | 14.6717 | PROPAN |
| 6 | 20.912 | 7460 | | 5 | 14.7517 | BUTANE |
| 7 | 41.5 | 8906 | | 6 | 14.7115 | PENTAN |
| | TOTAL | 51347 | | | 102.6664 | |

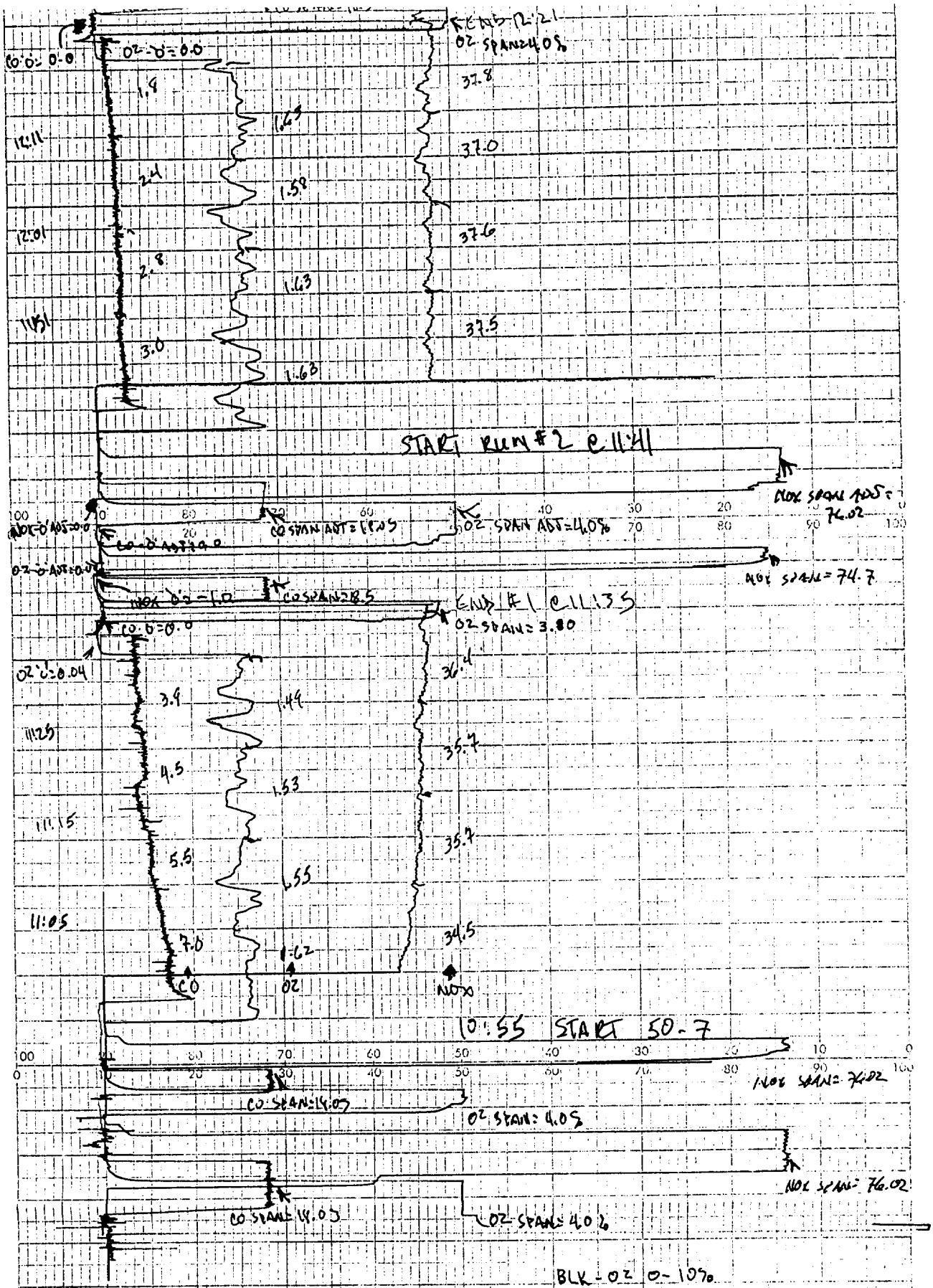
| PKNO | TIME | AREA | MK | IDNO | CONC | NAME |
|---|---|---|---|---|---|---|
| 1 | 3.027 | 167 | | | | |
| 2 | 5.325 | 23482 | | 1 | | HEXANE |
| 3 | 5.967 | 2185 | V | 2 | | METHAN |
| 4 | 7.875 | 3688 | | 3 | | ETHANE |
| 5 | 11.623 | 5460 | | 4 | | PROPAN |
| 6 | 20.912 | 7460 | | 5 | | BUTANE |
| 7 | 41.5 | 8906 | | 6 | | PENTAN |
| | TOTAL | 51347 | | | | |

CALIBRATION MADE IN IDENTIFICATION FILE 1
MODE# 1 WINDOW 9

| IDNO | NAME | TIME | FACTOR | CONC |
|---|---|---|---|---|
| 1 | HEXANE | 5.32 | 0.00126481 | 29.7 |
| 2 | METHAN | 5.96 | 0.00690985 | 15.1 |
| 3 | ETHANE | 7.87 | 0.0040948 | 15.1 |
| 4 | PROPAN | 11.62 | 0.00280222 | 15.3 |
| 5 | BUTANE | 20.91 | 0.00201072 | 15 |
| 6 | PENTAN | 41.5 | 0.00168435 | 15 |

# Appendix A-3

## Raw Data



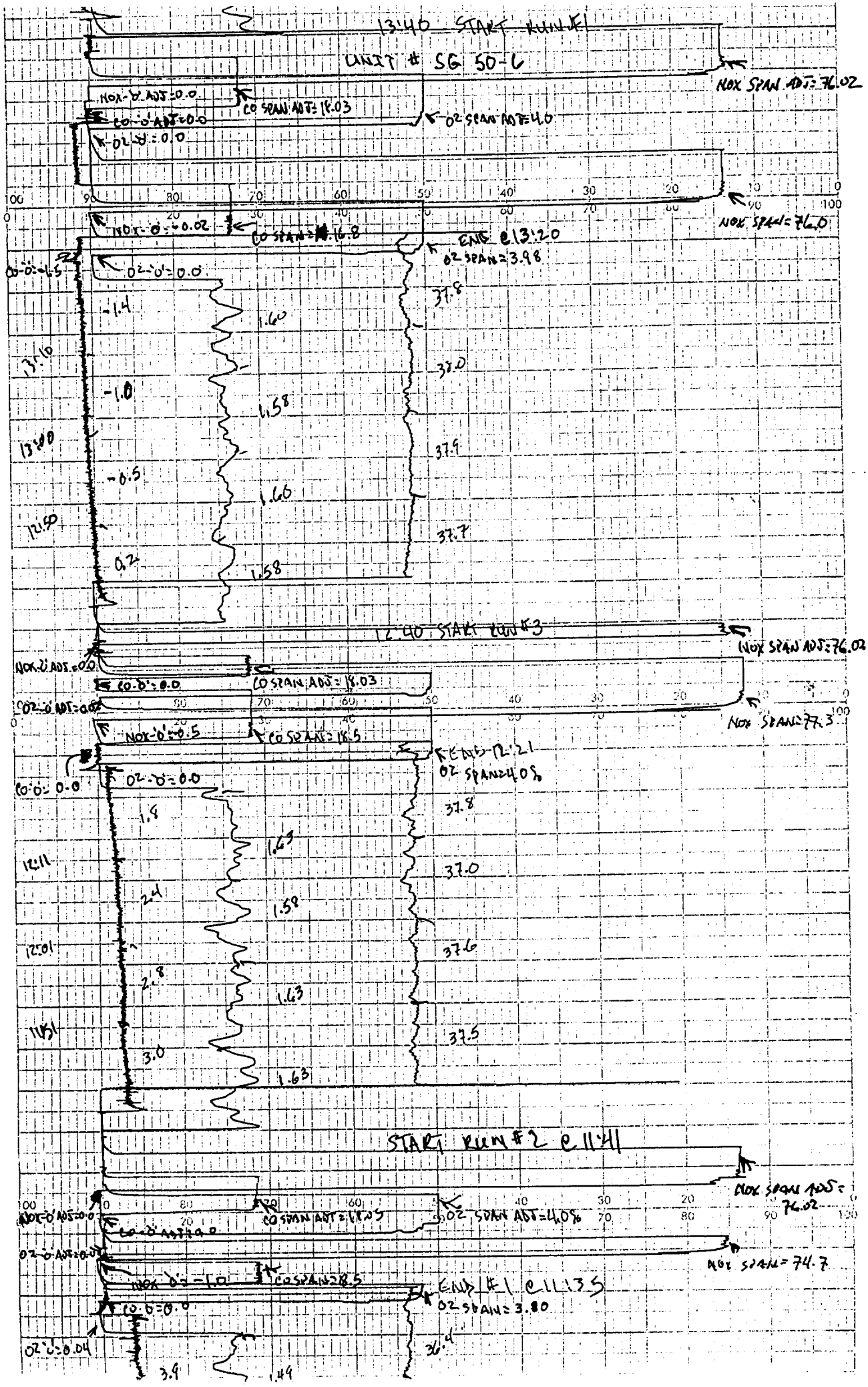

BLK - O2 0-10%
RED - CO 0-100
BLUE - NOX 0-100

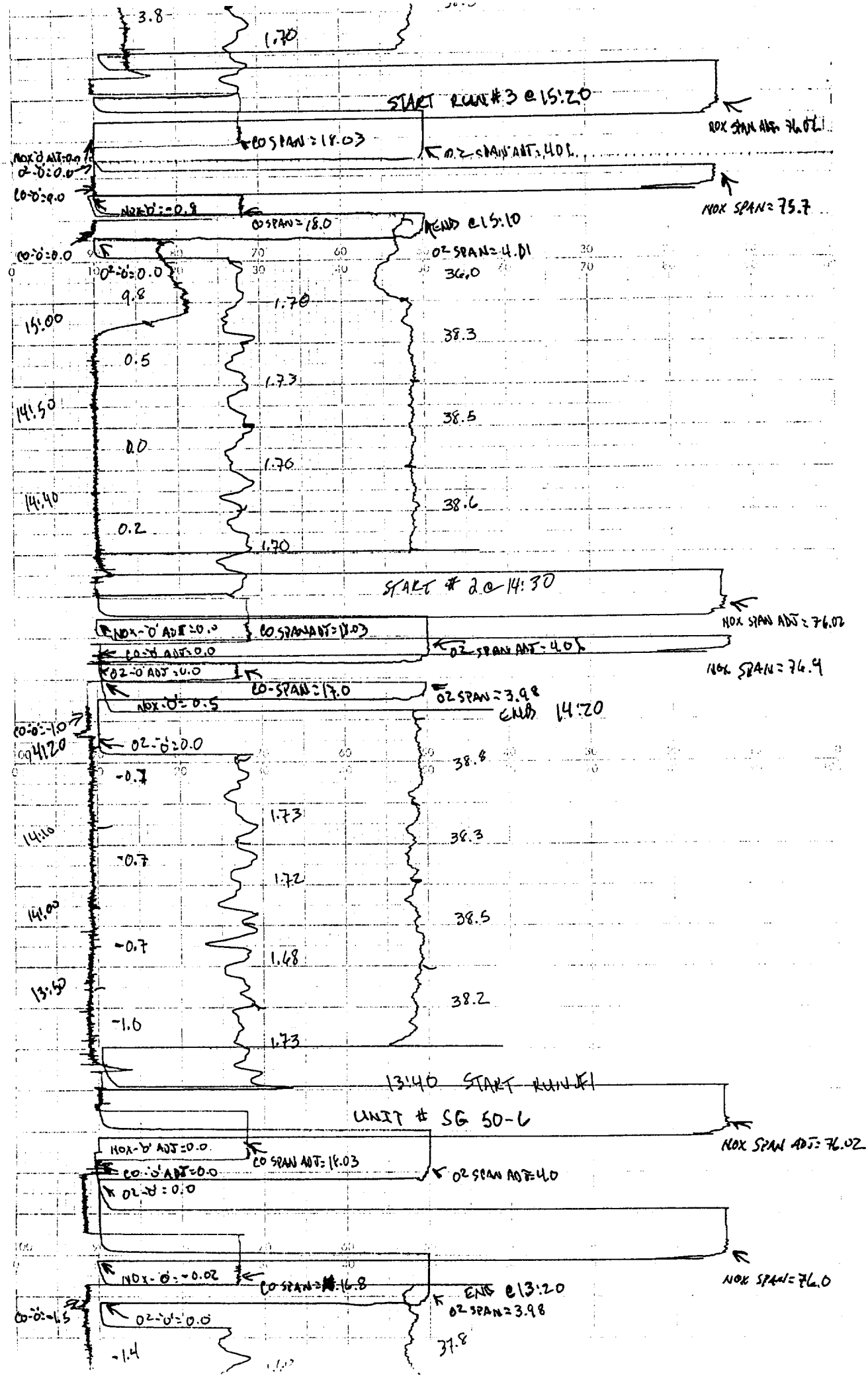
CHART SPD @ 6.0"/HR

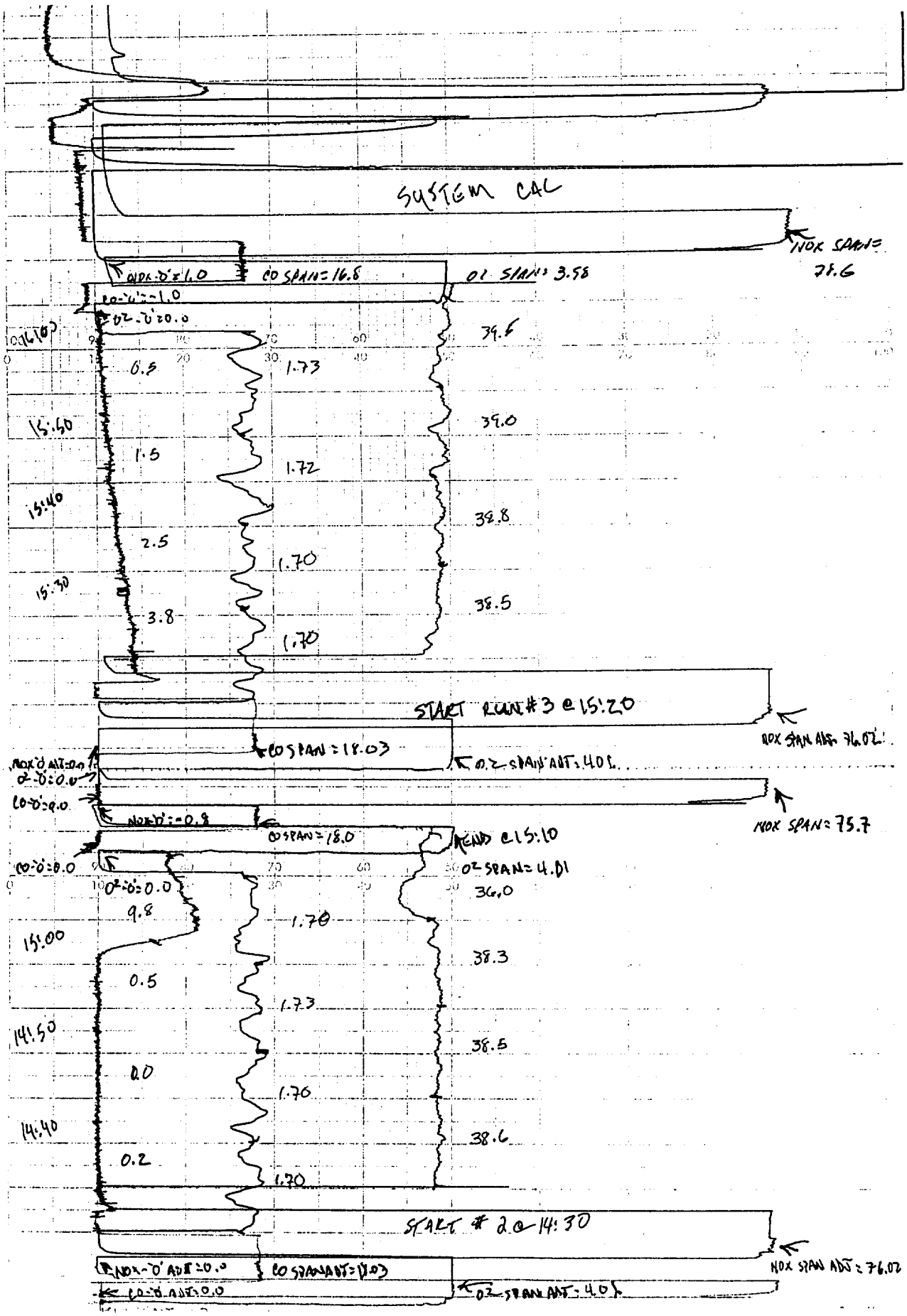
07:30 ON SITE
6-11-91 Cheuron 26C SG 50-7
50-6

NOX SPAN GAS = 76.02 ppm CYL # ALM 12220
CO " " = 14.03 ppm " CE 60293
O2 " " = 4.0 % " ALM 15888

K. Okon Genesis
S. Miller Cheuron


13:40 START RUN #1
UNIT # SG 50-6
NOX SPAN ADJ: 76.02
NOX-0' ADJ: 0.0
CO SPAN ADJ: 16.03
CO-0' ADJ: 0.0
O2 SPAN ADJ: 4.0
O2-0': 0.0
NOX SPAN: 76.0
NOX-0': -0.02
CO SPAN: 16.8
END @ 13:20
O2 SPAN: 3.98
CO-0': -1.5
O2-0': 0.0
-1.4
1.60
37.8
13:10
-1.0
1.58
38.0
13:00
-0.5
1.60
37.9
12:50
0.2
1.58
37.7
12:40 START RUN #3
NOX SPAN ADJ: 76.02
NOX-0' ADJ: 0.0
CO-0': 0.0
CO SPAN ADJ: 16.03
O2-0' ADJ: 0.0
NOX SPAN: 77.3
NOX-0': -0.5
CO SPAN: 16.5
END 12:21
O2 SPAN: 4.0%
CO-0': 0.0
O2-0': 0.0
1.8
1.69
37.8
12:11
2.4
1.58
37.0
12:01
2.8
1.63
37.6
11:51
3.0
1.63
37.5
START RUN #2 @ 11:41
NOX SPAN ADJ: 76.02
NOX-0' ADJ: 0.0
CO SPAN ADJ: 16.05
O2 SPAN ADJ: 4.0%
CO-0' ADJ: 0.0
O2-0' ADJ: 0.0
NOX SPAN: 74.7
NOX-0': -1.0
CO SPAN: 28.5
END #1 @ 11:35
O2 SPAN: 3.80
CO-0': 0.0
O2-0': 0.04
3.9
1.49
36.4


START RUN#3 @ 15:20
NOX SPAN ADJ 76.02
CO SPAN = 18.03
O2 SPAN ADJ = 4.01
NOX-0 ADJ = 0.0
O2-0 = 0.0
CO-0 = 0.0
NOX SPAN = 75.7
NOX-0 = 0.9
CO SPAN = 18.0
END @ 15:10
O2 SPAN = 4.01
CO-0 = 0.0
O2-0 = 0.0
15:00
14:50
14:40
START # 2 @ 14:30
NOX SPAN ADJ = 76.02
NOX-0 ADJ = 0.0
CO SPAN ADJ = 18.03
CO-0 ADJ = 0.0
O2 SPAN ADJ = 4.01
O2-0 ADJ = 0.0
NOX SPAN = 76.9
CO-SPAN = 17.0
O2 SPAN = 3.98
NOX-0 = 0.5
END 14:20
CO-0 = -1.0
O2-0 = 0.0
14:20
14:10
14:00
13:50
13:40 START RUN #1
UNIT # SG 50-6
NOX SPAN ADJ = 76.02
NOX-0 ADJ = 0.0
CO SPAN ADJ = 18.03
CO-0 ADJ = 0.0
O2 SPAN ADJ = 4.0
O2-0 = 0.0
NOX SPAN = 76.0
NOX-0 = -0.02
CO SPAN = 16.8
END @ 13:20
O2 SPAN = 3.98
CO-0 = -1.5
O2-0 = 0.0


SYSTEM CAL
NOX SPAN= 78.6
NOX-0'=1.0
CO SPAN=16.8
O2 SPAN= 3.58
CO-0'=-1.0
O2-0'=0.0
39.6
0.5
1.73
15:50
39.0
1.5
1.72
15:40
38.8
2.5
1.70
15:30
38.5
3.8
1.70
START RUN#3 @15:20
NOX SPAN ADJ= 76.02
CO SPAN=18.03
O2 SPAN ADJ=4.01
NOX-0' ADJ=0.0
O2-0'=0.0
CO-0'=0.0
NOX SPAN= 75.7
NOX-0'=-0.8
CO SPAN=18.0
END @15:10
CO-0'=0.0
O2 SPAN=4.01
O2-0'=0.0
36.0
9.8
1.70
15:00
38.3
0.5
1.73
14:50
38.5
0.0
1.70
14:40
38.6
0.2
1.70
START # 2 @ 14:30
NOX SPAN ADJ = 76.02
NOX-0' ADJ=0.0
CO SPAN ADJ=18.03
CO-0' ADJ=0.0
O2 SPAN ADJ=4.01

Company Chevron

Station 26-C SG 50-6

Date 6-11-91

Test Run 1

| Time | $\%O_2$ | $\%CO_2$ | ppm CO | | ppm $SO_2$ | | ppm $NO_x$ | |
|---|---|---|---|---|---|---|---|---|
| | | | drift not corrected | drift corrected | drift not corrected | drift corrected | drift not corrected | drift corrected |
| 13:40 | 1.73 | N/A | -1.0 | | N/A | N/A | 38.2 | |
| 13:50 | 1.68 | | -0.7 | | | | 38.5 | |
| 14:00 | 1.72 | | -0.7 | | | | 38.3 | |
| 14:10 | 1.73 | | -0.7 | | | | 38.8 | |
| Mean | 1.72 | | -.78 | | | | 38.45 | |

| | Calibration | $\%O_2$ | $\%CO_2$ | ppm CO | ppm $SO_2$ | ppm $NO_x$ |
|---|---|---|---|---|---|---|
| | zero reading | 0.0 | N/A | -1.0 | N/A | 0.5 |
| | span reading | 3.98 | | 17.0 | | 76.9 |
| | span gas value | 4.0% cyl# ALM15818 | | 18.03 cyl# CC60243 | | 96.02 cyl# ALM12220 |
| * | span drift corr. factor | | | | | |
| * | zero drift corr. factor | | | | | |

*Apply drift correction factors to the mean value only, for each test run.
See calculations on next page.

Company Chevron

Station 26-C SG 50-6

Date 6-11-91

Test Run 2

| Time | %$O_2$ | %$CO_2$ | ppm CO drift not corrected | ppm CO drift corrected | ppm $SO_2$ drift not corrected | ppm $SO_2$ drift corrected | ppm $NO_x$ drift not corrected | ppm $NO_x$ drift corrected |
|---|---|---|---|---|---|---|---|---|
| 14:30 | 1.70 | N/A | 0.2 | | N/A | N/A | 38.6 | |
| 14:40 | 1.70 | | 0.0 | | | | 38.5 | |
| 14:50 | 1.73 | | 0.5 | | | | 38.3 | |
| 15:00 | 1.70 | | 9.8 | | | | 36.0 | |
| Mean | 1.71 | | 2.63 | | | | 35.35 | |

| | Calibration | %$O_2$ | %$CO_2$ | ppm CO | ppm $SO_2$ | ppm $NO_x$ |
|---|---|---|---|---|---|---|
| | zero reading | 0.0 | N/A | 0.0 | N/A | -0.8 |
| | span reading | 4.01 | | 18.0 | | 75.7 |
| | span gas value | 4.0% cyl# ALM15818 | | 18.03 cyl# CC60243 | | 76.02 cyl# ALM12220 |
| * | span drift corr. factor | | | | | |
| * | zero drift corr. factor | | | | | |

*Apply drift correction factors to the mean value only, for each test run.
See calculations on next page.

Company Chevron

Date 6-11-91

Station 26-C SG 50-6

Test Run 3

| Time | %$O_2$ | %$CO_2$ | ppm CO drift not corrected | ppm CO drift corrected | ppm $SO_2$ drift not corrected | ppm $SO_2$ drift corrected | ppm $NO_x$ drift not corrected | ppm $NO_x$ drift corrected |
|---|---|---|---|---|---|---|---|---|
| 15:20 | 1.70 | N/A | 3.8 | | N/A | N/A | 38.5 | |
| 15:30 | 1.70 | | 2.5 | | | | 38.8 | |
| 15:40 | 1.72 | | 1.5 | | | | 39.0 | |
| 15:50 | 1.73 | | 0.5 | | | | 39.5 | |
| Mean | 1.71 | | 2.08 | | | | 38.95 | |

| | Calibration | %$O_2$ | %$CO_2$ | ppm CO | ppm $SO_2$ | ppm $NO_x$ |
|---|---|---|---|---|---|---|
| | zero reading | 0.0 | N/A | -1.0 | N/A | 1.0 |
| | span reading | 3.98 | | 16.8 | | 78.6 |
| | span gas value | 4.0% cyl # ALM15818 | | 18.03 cyl # CC60243 | | 76.02 cyl # ALM12220 |
| * | span drift corr. factor | | | | | |
| * | zero drift corr. factor | | | | | |

*Apply drift correction factors to the mean value only, for each test run.
See calculations on next page.

Company Chevron.

Station 26-C SG. 50-7.

Date 6-11-91.

Test Run 1

| Time | $\%O_2$ | $\%CO_2$ | ppm CO | | ppm $SO_2$ | | ppm $NO_x$ | |
|---|---|---|---|---|---|---|---|---|
| | | | drift not corrected | drift corrected | drift not corrected | drift corrected | drift not corrected | drift corrected |
| 10:55 | 1.62 | N/A | 7.0 | | N/A | N/A | 34.5 | |
| 11:05 | 1.55 | | 5.5 | | | | 35.7. | |
| 11:15 | 1.53 | | 4.5 | | | | 35.7 | |
| 11:25 | 1.49 | | 3.9 | | | | 36.4, | |
| Mean | 1.55 | | 5.23 | | | | 35.58 | |

| | Calibration | $\%O_2$ | $\%CO_2$ | ppm CO | ppm $SO_2$ | ppm $NO_x$ |
|---|---|---|---|---|---|---|
| | zero reading | 0.0 | N/A | 0.0 | N/A | -1.0 |
| | span reading | 3.8 | | 18.5 | | 74.7. |
| | span gas value | 4.0 %. cyl# KM15818 | | 18.03 cyl# CC60243 | | 76.02. cyl# AL/112220 |
| * | span drift corr. factor | | | | | |
| * | zero drift corr. factor | | | | | |

*Apply drift correction factors to the mean value only, for each test run.
See calculations on next page.

Company Chevron.

Date 6-11-91.

Station 26-C SG. 50-7.

Test Run 2

| Time | $\%O_2$ | $\%CO_2$ | ppm CO | | ppm $SO_2$ | | ppm $NO_x$ | |
|---|---|---|---|---|---|---|---|---|
| | | | drift not corrected | drift corrected | drift not corrected | drift corrected | drift not corrected | drift corrected |
| 11:41 | 1.63 | N/A | 3.0 | | N/A | N/A | 37.5 | |
| 11:51 | 1.63 | | 2.8 | | | | 37.6 | |
| 12:01 | 1.58 | | 2.4 | | | | 37.0 | |
| 12:11 | 1.63 | | 1.8 | | | | 37.8 | |
| Mean | 1.62 | | 2.5 | | | | 37.48 | |

| | Calibration | $\%O_2$ | $\%CO_2$ | ppm CO | ppm $SO_2$ | ppm $NO_x$ |
|---|---|---|---|---|---|---|
| | zero reading | 0.0 | N/A | 0.0 | N/A | -0.5 |
| | span reading | 4.0 | | 18.5 | | 77.3 |
| | span gas value | 4.0 % cyl# ALM15918 | | 18.03 cyl# CC60243 | | 76.02 cyl# ALM12220 |
| * | span drift corr. factor | | | | | |
| * | zero drift corr. factor | | | | | |

*Apply drift correction factors to the mean value only, for each test run.
See calculations on next page.

Company Chevron.

Date 6-11-91.

Station 26-C SG. 50-7.

Test Run 3

| Time | %$O_2$ | %$CO_2$ | ppm CO drift not corrected | ppm CO drift corrected | ppm $SO_2$ drift not corrected | ppm $SO_2$ drift corrected | ppm $NO_x$ drift not corrected | ppm $NO_x$ drift corrected |
|---|---|---|---|---|---|---|---|---|
| 12:40 | 1.58 | N/A | 0.2 | | N/A | N/A | 37.7 | |
| 12:50 | 1.60 | | -0.5 | | | | 37.9 | |
| 13:00 | 1.58 | | -1.0 | | | | 38.0 | |
| 13:10 | 1.60 | | -1.4 | | | | 37.8 | |
| Mean | 1.59 | | -0.6 | | | | 37.85 | |

| | Calibration | %$O_2$ | %$CO_2$ | ppm CO | ppm $SO_2$ | ppm $NO_x$ |
|---|---|---|---|---|---|---|
| | zero reading | 0.0 | N/A | -1.5 | N/A | -0.02 |
| | span reading | 3.98 | | 16.8 | | 76.0 |
| | span gas value | 4.0% cyl# ALM 15818 | | 18.03 cyl# CC60243 | | 76.02 cyl# ALM12220 |
| * | span drift corr. factor | | | | | |
| * | zero drift corr. factor | | | | | |

*Apply drift correction factors to the mean value only, for each test run.
See calculations on next page.

# Appendix A-4

## Calibrations and Certifications

# Scott Specialty Gases, Inc.

FAX: 714-887-0549
PHONE: 714-887-2571

2600 CAJON BLVD., SAN BERNARDINO, CA 92405

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 7/19/90
Our Project No: 7758
Your P.O. No: 7113
Page 1 of 1
Expiration Date: 1/92

GENESIS ENVIRONMENTAL
1145 W. COLUMBUS AVE
BAKERSFIELD, CA 93301

## CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM-12220 Cylinder Pressure 1900 psig Certified Accuracy ±1% % NBS Traceable

| COMPONENTS | CERTIFIED CONC | REFERENCE STD SRM/CRM NO. | REFERENCE STD CYL. NO. | REFERENCE STD CONC. | GAS ANALYZER MAKE/MODEL/SERIAL NO. | GAS ANALYZER LAST CAL. DATE | GAS ANALYZER ANALYTICAL PRINCIPLE |
|---|---|---|---|---|---|---|---|
| NITRIC OXIDE | 75.88 ppm | CRM1684B | AAL-6032 | 94.82 ppm | THERMO-ELECTRON 10 AR 14853-150 | 6/2/90 | CHEMI-LUMINENSCENT |
| NOX | 76.02 ppm | | | | | | |

BALANCE GAS NITROGEN

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component NITRIC OXIDE
First Analysis Date 7/11/90 Units ppm

| | | |
|---|---|---|
| Z 0.00 | R 94.75 | T 75.58 |
| R 94.74 | Z 0.08 | T 75.56 |
| Z 0.08 | T 75.60 | R 94.78 |

Mean Test Assay 75.62 ppm

Second Analysis Date 7/18/90 Units ppm

| | | |
|---|---|---|
| Z 0.00 | R 94.78 | T 76.02 |
| R 94.98 | Z 0.02 | T 75.88 |
| Z 0.01 | T 75.95 | R 94.74 |

Mean Test Assay 75.88 ppm

Component ____ Date ____ Units ____

| | | |
|---|---|---|
| Z | R | T |
| R | Z | T |
| Z | T | R |

Mean Test Assay ____

Component ____ Date ____ Units ____

| | | |
|---|---|---|
| Z | R | T |
| R | Z | T |
| Z | T | R |

Mean Test Assay ____

Date ____ Units ____

| | | |
|---|---|---|
| Z | R | T |
| R | Z | T |
| Z | T | R |

Mean Test Assay ____

Date ____ Units ____

| | | |
|---|---|---|
| Z | R | T |
| R | Z | T |
| Z | T | R |

Mean Test Assay ____

Chronology: Date ____
Assay ____

Analyst L. OLDHAM

Approved By R. Sheady

RECEIVED JUL 0 5 1991

# Scott Specialty Gases, Inc.

2600 CAJON BLVD., SAN BERNARDINO, CA 92411-0000
PHONE: 714-887-2571 FAX:714-887-0549

11/30/90

GENESIS ENVIRONMENTAL
1145 W. COLUMBUS AVENUE

BAKERSFIELD CA 93301-0000

PROJECT #: 02-10721
PO #: 7158

CYLINDER #: ALM015818

ANALYTICAL ACCURACY: +/-2%

| COMPONENT | REQUESTED CONCENTRATION | | ANALYSIS 1 ( MOLES) | U/M |
|---|---|---|---|---|
| OXYGEN | 4.0 | PCT | 4.00 | PCT |
| NITROGEN | BALANCE | | | N/A |

DATE OF ANALYSIS:11/20/90

ANALYST: MAYNARD JOHNSON

APPROVED BY: ROBERT SHEALY

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

# REPORT OF ANALYSIS
# NIST TRACEABLE GAS MIXTURES

GENE01

TO:

DATE : 03/06/90

Mike Bakalor
Genesis Environmental
1145 West Columbus
Bakersfield, CA 93301

CUSTOMER ORDER NUMBER: 8286

PAGE 1

| CYLINDER NUMBER | COMPONENT | CONCENTRATION(v/v) | NIST TRACEABLE REFERENCE STANDARD |
|---|---|---|---|
| CC60293 | Carbon Monoxide<br>Nitrogen | 18.03 ± 0.18 ppm<br>Balance | SRM 2613a |

ppm = umole/mole % = mole-%

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

Analyst: J.W. Gay

Approved: J.T.Marrin

The only liability of this company for gas which fails to comply with this analysis shall be replacement or reanalysis thereof by the company without extra cost.