[illegible]
ES, INC.

[illegible]

[illegible]

ATTENTION: [illegible]

[illegible]

[illegible]
A[illegible]A

[illegible]

[illegible]

DATE REPORTED:

AUGUST [illegible]

[illegible]

[illegible]
[illegible]

PROJECT [illegible]

TESTED BY [illegible]

REVIEWED [illegible]

TABLE OF CONTENTS

I. SUMMARY OF RESULTS 3

II. INTRODUCTION 5

III. METHOD 5 DATA 7

IV. CONTINUOUS MONITORING DATA 10

- A. Results 11
- B. Sample Calculations 14

V. HYDROCARBON DATA 15

VI. EMISSION FACTORS 17

- A. Lb/hr - SO_2 18
- B. Lb/MMCF - NOx, CO & NMHC 19

VII. LAB ANALYSIS 20

- A. Fuel Analysis 21
- B. Fuel Expansion Factor Calculations 23

VIII. METHODOLOGY 24

- A. Reference Methods 25
- B. Continuous Analyzer Data 38

IX. RAW DATA 39

- A. Field Data 40
- B. Lab Data 49
- C. Hydrocarbon Chromotagrams 51
- D. Instrument Strip Charts 56

X. QUALITY CONTROL 58

- A. Chain of Custody 59
- B. Meter & Pitot Tube Calibrations 60
- C. Gas Certification Forms 63
- D. Hydrocarbon Linearities 69
- E. Instrument Linearities 79

XI. CORRESPONDENCE 82

MARY OF RESULTS

SUMMARY OF SOURCE TEST RESULTS

COMPANY: **BECHTEL PETROLEUM OPERATIONS, INC.** APCD #: 4091082 A

TEST DATE: JULY 22, 1993 UNIT #: K-70 30R

EMISSIONS	gr/scf	gr/dscf @12%CO2	ppm	ppm @ 15% O2	lb/hr	gr/ BHP-hr	Permit Limits
PARTICULATE	0.00187 0.00211	0.00448 0.00497			0.037 0.047		
Mean:	0.00199	0.00473			0.042		0.05 lb/hr
FUEL SULFUR			Total Sulfur as H2S =				
			< 1.0 ppm		< .0014		0.0100 lb/hr
NOx (dry)			78.4 77.1 79.3	44.5 43.8 45.4	1.37 1.41 1.41	0.71 0.73 0.73	2.00 gr/BHP-hr
Mean:			78.3	44.6	1.40	0.72	6.60 lb/hr
CO			585 591 602	332 336 344	6.21 6.58 6.51	3.24 3.42 3.38	
Mean:			593	337	6.43	3.35	8.00 lb/hr
NMHC			607 599 608	345 340 348	3.68 3.82 3.76	1.92 1.98 1.95	
Mean:			605	344	3.75	1.95	6.00 lb/hr

Comments:

For San Joaquin Valley Unified APCD (Southern Region) Use Only:

INTRODUCTION

On July 22, 1993, Petro Chem Environmental Services, Inc. (PCES) performed a series of emission source tests for Bechtel Petroleum Operations, Inc. located at the Elk Hills Naval Petroleum Reserve No. 1 in Tupman, California. The unit tested was K-70, a gas fired Waukesha IC engine. The unit is rated at 1500 HP and is equipped with PCC. Concentrations and emissions of particulate, NOx, CO, O_2, NMHC and fuel sulfur were determined using the following procedures:

PARAMETERS	METHOD	# TEST RUNS
Particulate	EPA Method 5; Gravimetric	2
NOx	EPA Method 7E; TECO 10 Chemiluminescent NO/NOx Analyzer	3 - 40 minute
CO	EPA Method 10; TECO 48 Gas Filter Correlation Analyzer	3 - 40 minute
O_2	EPA Method 3A; Teledyne 320 AX Fuel Cell Analyzer	3 - 40 minute
NMHC	EPA Method 18; Bag Sample, C_1-C_6+ FID Analysis	3 + blank
Fuel Sulfur	GC-FPD Tedlar Bag Total Sulfur referenced to an H_2S Standard	1
Volume Flow	EPA Method 19; Fuel Rates and Fuel Analysis	3
Fuel Analysis F-Factor Calorific Value	GC-TCD Stainless Steel Bomb C_1-C_6+, O_2, CO_2, N_2 and Btu/lb	1

All sampling was performed by James Taplin and Scott Harrison of Petro Chem Environmental Services, Inc. The hydrocarbons and fuel gas were performed by Terry Rowles of PCES. The fuel sulfur was analyzed by Zalco Laboratories, Inc. of Bakersfield, California. Mike Carr of Bechtel Petroleum Operations, Inc. supervised the operation of the test unit.

METHODS DATA

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 7-22-93
PROJECT : 010-577

METHOD 1-5
FIELD DATA @ 60° F

RUN #:	1	2
TIME :	915	1248
Vm (dry gas sampled)	113.64	119.02
Y (meter calib. factor)	0.988345	0.988345
P bar (Barometric pressure)	30.05	30.05
P static (stack pressure, " H2O)	-0.85	-0.85
Delta H (differential meter press, " H2O)	0.72	0.97
Tm (meter temperature, R°)	551	554
Vol H2O mls	263.1	280.9
Vm(std),dscf	106.64	111.16
Bws-H2O vapor	0.1028	0.1051
MF-moisture factor	0.8972	0.8949
% CO2	5.6	5.7
% O2	10.7	10.6
% N2	83.7	83.7
Md-MW stk gas,dry	29.32	29.34
Ms-MW stk gas,wet	28.16	28.14
Cp-pitot tube	0.809	0.822
Avg sq rt ^p	1.23	1.43
T stack, R°	987	1048
Stack area,ft2	0.785	0.785
Vs-fps	92.06	111.82
Qstd-dscfm	2055	2345
Area noz,ft2	2.10E-04	2.10E-04
Sample time	180	180
% Isokinetic	108.0	98.7

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 7-22-93
PROJECT : 010-577

EPA METHOD 5 DATA
@ 60°F

RUN #1

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	3.10	0.00045	0.00040	0.00096	0.008
Filter:	1.30	0.00019	0.00017	0.00040	0.003
Condensables:	10.06	0.00145	0.00130	0.00311	0.026
Total:	14.46	0.00209	0.00187	0.00448	0.037

ADDITIONAL DATA:

TIME start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
915	1220	10.7	5.6	10.28	106.64	2055

RUN #2

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	3.30	0.00046	0.00041	0.00096	0.009
Filter:	1.90	0.00026	0.00024	0.00055	0.005
Condensables:	11.83	0.00164	0.00147	0.00345	0.033
Total:	17.03	0.00236	0.00211	0.00497	0.047

ADDITIONAL DATA:

TIME start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
1248	1549	10.6	5.7	10.51	111.16	2345

OUS MONITORING DATA

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 7-22-93
PROJECT : 010-577

RUN #1

NOx/CO/O2 DATA

Stack Gas Measurement Data							
TIME INTERVAL			CONCENTRATIONS			% FULL SCALE	
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
09:13 AM	-	09:23 AM	10.54	74.3	586	52.5	39.6	68.8
09:23 AM	-	09:33 AM	10.55	78.0	585	52.8	41.0	69.0
09:33 AM	-	09:43 AM	10.50	80.2	586	52.9	41.8	69.5
09:43 AM	-	09:53 AM	10.43	81.4	583	52.9	42.2	69.5
	Averages:		10.51	78.4	585	52.8	41.2	69.2

Calibration Data	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	94	42.8	88.6
FINAL zero	10	10	10
FINAL span	95.1	42.5	90
ZERO DRIFT %/ppm	0.00	0.00	0.00
CALIB. DRIFT %/ppm	0.27	-0.75	14.00
ZERO DRIFT %fs	0.00	0.00	0.00
CALIB.DRIFT %fs	1.10	-0.30	1.40
CAL GAS value	20.9	82.2	786
FULL SCALE RANGE	25	250	1000

Meter Differential	3.00		
Meter Static	6.10		
Meter Coefficient	0.010	MCF/DAY	183
MMBtu/SCF	0.001101	DSCFM	2398
F-Factor @ 60°F	8519		
Operating BHP	869		
RPM	931		

	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
NOx values:	10.51	78.4	135.1	44.5	1.37	0.71

	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
CO values:	10.51	585	1008	332	6.21	3.24

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 7-22-93
PROJECT : 010-577

RUN #2

NOx/CO/O2 DATA

Stack Gas Measurement Data							
TIME INTERVAL			CONCENTRATIONS			% FULL SCALE	
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
10:03 AM	-	10:13 AM	10.51	77.6	596	52.2	41.0	69.7
10:13 AM	-	10:23 AM	10.49	79.4	589	52.1	41.8	69.2
10:23 AM	-	10:33 AM	10.53	76.7	590	52.2	40.8	69.5
10:33 AM	-	10:43 AM	10.54	74.5	588	52.2	40.0	69.5
	Averages:		10.52	77.1	591	52.2	40.9	69.5

Calibration Data	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	94	42.8	88.6
FINAL zero	10	10	9.9
FINAL span	93.8	43.1	89.5
ZERO DRIFT %/ppm	0.00	0.00	-1.00
CALIB. DRIFT %/ppm	-0.05	0.75	9.00
ZERO DRIFT %fs	0.00	0.00	-0.10
CALIB.DRIFT %fs	-0.20	0.30	0.90
CAL GAS value	20.9	82.2	786
FULL SCALE RANGE	25	250	1000

Meter Differential	3.10		
Meter Static	6.18		
Meter Coefficient	0.010	MCF/DAY	192
MMBtu/SCF	0.001101	DSCFM	2518
F-Factor @ 60°F	8519		
Operating BHP	873		
RPM	930		

	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
NOx values:	10.52	77.1	132.9	43.8	1.41	0.73

	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
CO values:	10.52	591	1019	336	6.58	3.42

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 7-22-93
PROJECT : 010-577

RUN #3

NOx/CO/O2 DATA

TIME INTERVAL			Stack Gas Measurement Data CONCENTRATIONS			% FULL SCALE		
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
10:51 AM	-	11:01 AM	10.57	79.0	603	52.5	39.4	70.4
11:01 AM	-	11:11 AM	10.60	79.1	606	52.6	39.5	71.0
11:11 AM	-	11:21 AM	10.60	79.3	599	52.6	39.6	70.6
11:21 AM	-	11:31 AM	10.60	79.7	600	52.6	39.8	71.0
	Averages:		10.59	79.3	602	52.6	39.6	70.8

Calibration Data	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	94	42.8	88.6
FINAL zero	10	10	10
FINAL span	94	43	89.8
ZERO DRIFT %/ppm	0.00	0.00	0.00
CALIB. DRIFT %/ppm	0.00	0.54	12.00
ZERO DRIFT %fs	0.00	0.00	0.00
CALIB.DRIFT %fs	0.00	0.20	1.20
CAL GAS value	20.9	88.2	786
FULL SCALE RANGE	25	250	1000

Meter Differential	3.00		
Meter Static	6.15		
Meter Coefficient	0.010	MCF/DAY	185
MMBtu/SCF	0.001101	DSCFM	2443
F-Factor @ 60°F	8519		
Operating BHP	875		
RPM	932		

	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
NOx values:	10.59	79.3	137.6	45.4	1.41	0.73

	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
CO values:	10.59	602	1044	344	6.51	3.38

CALCULATIONS

$$\frac{MCF}{DAY} = meter\ positive \times meter\ static \times meter\ coefficient$$

$$DSCFM = \frac{MCF}{DAY} \times .6944 \times \frac{MMBtu}{SCF} \times F\text{-}factor \times O_2 correction$$

$$ppm\ @\ 3\%\ O_2$$

$$ppm \times \frac{(20.9 - 3)}{(20.9 - actual\ O_2)}$$

$$ppm\ @\ 15\%\ O_2$$

$$ppm \times \frac{(20.9 - 15)}{(20.9 - actual\ O_2)}$$

$$\frac{LBS}{HR} = ppm \times MW \times 1.581 \times 10^{-7} \times DSCFM$$

$$\frac{GR}{BHP\text{-}hr} = \left(\frac{\left(\frac{lbs}{hr} \times 454\right)}{Operating\ BHP} \right)$$

LOCATION DATA

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 7-22-93
PROJECT : 010-577

HYDROCARBON RESULTS

RUN No.: 1							
DSCFM: 2398						OPERATING BHP	869
% O2: 10.51							
		ppm	lb/hr	ppm	ppm @15% O2 (as methane)	lb/hr	gr/BHP-hr
Methane	(C1)	1996	12.11	1996	1133	12.19	6.37
Ethane	(C2)	222	2.52	444	252	2.69	1.41
Propane	(C3)	41	0.68	123	70	0.75	0.39
Butane	(C4)	10	0.22	40	23	0.24	0.13
Pentane	(C5)	0	0.00	0	0	0.00	0
Hexane	(C6)	0	0.00	0	0	0.00	0
	Total	2269	15.54	2603	1478	15.87	8.29
	Total (non methane)	273	3.43	607	345	3.68	1.92

RUN No.: 2							
DSCFM: 2518						OPERATING BHP	873
% O2: 10.52							
		ppm	lb/hr	ppm	ppm @15% O2 (as methane)	lb/hr	gr/BHP-hr
Methane	(C1)	2002	12.75	2002	1138	12.75	6.63
Ethane	(C2)	220	2.63	440	250	2.80	1.46
Propane	(C3)	41	0.72	123	70	0.78	0.41
Butane	(C4)	9	0.21	36	20	0.23	0.12
Pentane	(C5)	0	0.00	0	0	0.00	0
Hexane	(C6)	0	0.00	0	0	0.00	0
	Total	2272	16.31	2601	1478	16.57	8.62
	Total (non methane)	270	3.55	599	340	3.82	1.98

RUN No.: 3							
DSCFM: 2443						OPERATING BHP	875
% O2: 10.59							
		ppm	lb/hr	ppm	ppm @15% O2 (as methane)	lb/hr	gr/BHP-hr
Methane	(C1)	2008	12.41	2008	1149	12.41	6.44
Ethane	(C2)	224	2.60	448	256	2.77	1.44
Propane	(C3)	40	0.68	120	69	0.74	0.38
Butane	(C4)	10	0.22	40	23	0.25	0.13
Pentane	(C5)	0	0.00	0	0	0.00	0
Hexane	(C6)	0	0.00	0	0	0.00	0
	Total	2282	15.91	2616	1497	16.17	8.39
	Total (non methane)	274	3.50	608	348	3.76	1.95

SSION FACTORS

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 7-22-93
PROJECT : 010-577

SULFUR DIOXIDE EMISSION RESULTS

RUN	H2S, ppm	MCF/DAY	FUEL SCFM	SO2 LBS/HR
1	< 1.0	183	127	0.0013
2	< 1.0	192	133	0.0013
3	< 1.0	185	128	0.0013
			AVERAGE	0.0013

EQUATION:

SCFM = MCF/DAY * 1000/24 * 1/60

SO2 LBS/HR = H2S ppm * 64 * SCFM * 1.581 * 10^-7

MW SO2 = 64

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 7-22-93
PROJECT : 010-577

EMISSION FACTORS

	LB/HR	MCF/DAY	MMCF/HR	LB/MMCF
NOx				
RUN 1	1.37	183	0.008	171.3
RUN 2	1.41	192	0.008	176.3
RUN 3	1.41	185	0.008	176.3
			AVERAGE	174.6

CO				
RUN 1	6.21	183	0.008	776
RUN 2	6.58	192	0.008	823
RUN 3	6.51	185	0.008	814
			AVERAGE	804

NMHC				
RUN 1	3.68	183	0.008	460
RUN 2	3.82	192	0.008	478
RUN 3	3.76	185	0.008	470
			AVERAGE	469

MMCF/HR = (MCF/DAY * 1/24) / 1000

LB/MMCF = (LB/HR) / (MMCF/HR)

LAB ANALYSIS

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

3207 Antonino Avenue
Bakersfield, California 93308
(805) 327-7300
FAX (805) 327-3459

COMPANY : BECHTEL PETROLEUM
UNIT : K-70
DATE : 7-22-93
PROJECT : 010-577

DATE RECEIVED : JULY 23,1993
DATE ANALYZED : JULY 23,1993
DATE REPORTED: JULY 27,1993

FUEL GAS ANALYSIS

CONSTITUENT	MOLE %	WT. %	CHONS Wt.%	
CARBON DIOXIDE	1.471	3.491	CARBON	73.75
OXYGEN	0.054	0.093	HYDROGEN	22.87
NITROGEN	0.496	0.749	OXYGEN	2.63
CARBON MONOXIDE	0.000	0.000	NITROGEN	0.75
			SULFUR	0.00
METHANE	87.253	75.508	H/C	0.310
ETHANE	7.711	12.508		
PROPANE	2.474	5.885		
ISOBUTANE	0.166	0.521		
N-BUTANE	0.304	0.953		
ISOPENTANE	0.032	0.124		
N-PENTANE	0.024	0.095		
HEXANES+	0.016	0.072		
TOTALS:	100.000	100.000		

SPECIFIC GRAVITY (AIR = 1)	0.6401
SPECIFIC VOLUME, cu.ft./lb.	20.47
GROSS CALORIFIC VALUE (DRY), BTU/cu.ft.	1101.18
GROSS CALORIFIC VALUE (WET), BTU/cu.ft.	1079.12
GROSS CALORIFIC VALUE (DRY), BTU/lb.	22543.65
NET CALORIFIC VALUE (DRY), BTU/cu.ft.	995.10
NET CALORIFIC VALUE (WET), BTU/cu.ft.	975.16
COMPRESSABILITY FACTOR "Z" @ 60° F, 1 ATM	0.9974
EXPANSION FACTOR (DSCF/CF)	9.38
EPA "F" FACTOR @ 68° F (DSCF/MM BTU)	8649
EPA "F" FACTOR @ 60° F (DSCF/MM BTU)	8519

ASTM METHODS D-1945-81 & D-3588-91

Terry Rowles
Laboratory Manager

ZALCO LABORATORIES, INC.

Analytical & Consulting Services

Petro Chem Environmental Service
3207 Antonino Avenue
Bakersfield, CA 93308

Laboratory No: 36645
Date Received: 7-23-93
Date Reported: 7-28-93
P O #: 3174

Attention: Terry Rowles

Sample: Gas

Sample Description: Bechtel Unit #K-70 Fuel Gas, Job #010-577
Sampled by SAH on 7-22-93

Total Sulfur
(ASTM D 3246)

As H_2S, ppm (vol.)	< 1.0
As S, Grains/100 SCF*	< 0.06

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

Jim Etherton
Lab Operations Manager

JE/pjm

4309 Armour Avenue Bakersfield, California 93308

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

EPA METHOD 19
EPA F-FACTOR

EMISSION FACTOR CALCULATIONS

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

Where: GVC = *Gross calorific value of fuel combusted,* $\frac{Btu}{LB}$

$$F_{60°F} = F_{68°F} \times 0.985$$

GENERAL POLLUTANT LB/MMBtu EQUATION

$$E = ppmvd \times F_{60°F} \times C \times \left[\frac{20.9}{20.9 - \%O_2} \right] \times MW$$

Where: $E = \frac{LB}{MMBtu}$

$F_{60°F}$ = *F-FACTOR @ 60° F*

$$C = 2.635 \times 10^{-9}$$

MW = *NOx as 46; CO as 28;* SO_2 *as 64*

METHODOLOGY

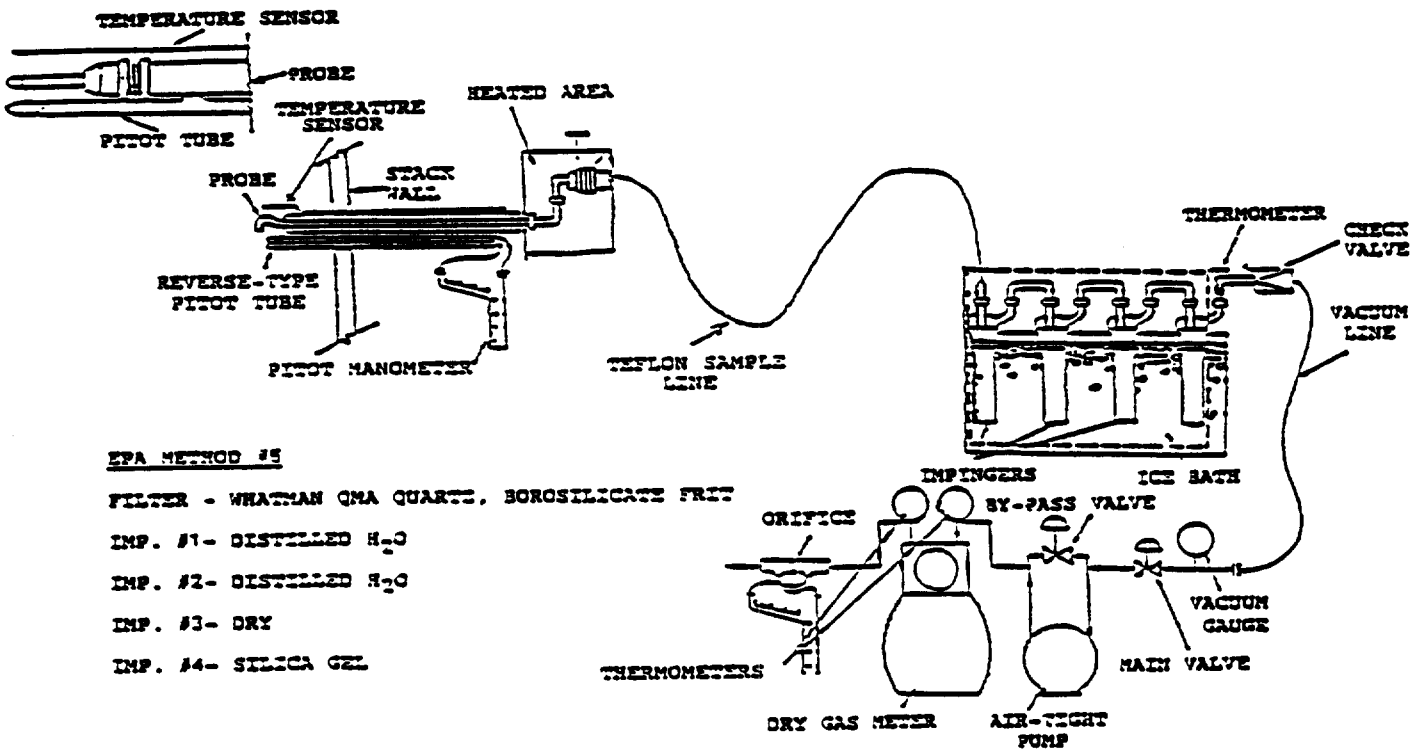
SAMPLING AND ANALYTIC PROCEDURES

REF: EPA Code of Federal Regulations, Title 40, Part 60, Appendix A. Method 1, 2, 3, 4, and 5

Sampling Apparatus

The sampling apparatus consisted of a nozzle, a heater wrapped probe, and a heated filter holder (see data sheets for type of nozzle, probe, and filter). The filter was connected to a heated teflon filter-to-impinger line. A series of impingers (see data sheet for type and contents) was connected in tandem and immersed in an ice bath. Following the absorption train was a gas pump, dry test meter, and a calibrated restriction orifice fitted with a magnehelic differential pressure gauge. A type 'S' pitot tube and temperature probe was then positioned alongside the probe terminating at the sample nozzle for the purpose of monitoring duct conditions throughout the test.

Sampling Diagram



EPA Method 1: Sampling and Velocity Traverses for Stationary Sources

Prior to the source test a site assessment was performed in order to locate sample points for obtaining the best representative measurements of pollution concentrations and volumetric flow rates. EPA Method 1 takes into account duct area, straight run and cyclonic or stratified flow patterns.

SAMPLING AND ANALYTIC PROCEDURES
(continued)

EPA Method 2: Velocity and Volumetric Flow Rates

A computer was used in selection of suitable sample/traverse points. The calibrated pitot tube was connected to a magnehelic gauge and leak checked. A temperature and Δ-P was then recorded at each traverse point and a duct static pressure was also measured and recorded. A volume flow rate was calculated from the measured required traverse points.

EPA Method 3: % CO_2, % O_2, Dry Molecular Weight

Concurrent with each particulate sampling, an integrated gas sample was withdrawn from the summation of the traverse points through the train and collected at the outlet of the meter into a sample bag. Then the contents of the sample bladder were analyzed by Orsat for fixed gas composition.

EPA Method 4: Percent Water

Tare weights of the charged individual impingers was recorded. After sampling, the final weights was then recorded. Percent water was calculated from the weight of water collected and the dry gas volume sampled.

EPA Method 5: Particulate Emissions

A series of preliminary measurements was made prior to conducting the particulate test. EPA Methods 1, 2, and 3 was performed to determine location and number of traverse points, average gas velocity, and pressure and gas molecular weight. Percent water was determined by a psychometric chart or from combustion analysis of the fixed gases. The results of these measurements were entered into the field computer for the purpose of determining an appropriate nozzle size for isokinetic sampling.

The Method 5 apparatus was then prepared on-site in the mobile laboratory. The absorption train was charged with freshly prepared chemicals, weighted on a calibrated digital balance to the nearest 0.1 grams, and assembled. The probe was brushed out and rinsed with distilled water and acetone, then the filter holder was charged. The sampling apparatus was sealed and transported to the sampling site were it was assembled and leak tested at 15 inches mercury vacuum.

The probe, filter and impinger line heaters were set at 250 °F and the probe was then positioned into the duct at the first traverse point with the nozzle out of the flow.

The nozzle was positioned into the gas flow and the vacuum pump was started immediately and adjusted to obtain an isokinetic sample rate. A complete traverse was performed while sampling at a minimum of two minutes per sample point. Upon completion of the traverse the vacuum pump was turned off and the probe was transferred into the next sample EPA port where an identical sample-traverse was then performed. Duct conditions (temperature, Δ-P) and sampling

conditions (meter temperature, volume and pressure, probe, filter, sample line, impinger temperatures, and absorption train vacuum) was monitored and recorded regularly for each sample point.

Upon completion of sampling, the apparatus was leak tested at a vacuum greater than the highest observed vacuum. The leak was recorded and the apparatus was then sealed and transported to the mobile laboratory. The heated filter-to-impinger line was rinsed with a known amount of distilled water into the first impinger.

The filter and any loose particulate was carefully removed from the filter holder with tweezers. It was then placed in a labeled petri dish and transported to the P.C.E.S. laboratory. The nozzle, probe, and filter top housing was rinsed and brushed three times with distilled water and acetone. The sample fractions were combined, bottled, labeled, and fluid level marked for transportation to the P.C.E.S. laboratory. Aliquots of distilled water and acetone were similarly treated for blank analysis.

The absorption train was inspected for abnormalities and disassembled. The impingers were weighed on a digital balance for a percent moisture determination. The contents of the impingers were quantitatively transferred into separate bottles, sealed, labeled, and fluid level marked for transportation to the P.C.E.S. laboratory for analysis, if required. Aliquots of the reagent grade impinger contents were saved for blank analysis.

The filter was transferred to an oven and heated at 105 °F for 2-3 hours and then placed in a desiccator for 24 hours. The filter was then weighed on a Mettler digital balance to the nearest 0.01 mg. Additional six hour desiccations and weighings were then performed until the difference between consecutive weighings were less than 0.5 mg or one percent of the total filtrate weight (weighed to a constant weight).

The nozzle/probe/filter top wash was then examined for any leakage during transportation and transferred to a tared evaporation dish. The wash was then evaporated at an elevated temperature, below the boiling point of the wash, with occasional swirling. The dish and wash residue was then desiccated and weighed to a constant weight.

If required by the regulatory agency, the contents of the first impinger were recovered and diluted volumetrically to a known volume. An aliquot of this sample was then evaporated, desiccated, and then weighed to a constant weight.

The net weight of particulate was calculated from the two fractions (three fractions including the impinger contents, if required). Concentrations (gr/DSCF) and emissions (lbs/hr) or other applicable units were then calculated and reported.

EPA METHOD 2
STACK GAS VELOCITY AND VOLUMETRIC FLOWRATE

Average Stack Gas Velocity
Eq. 2-6 & Eq. 2-9

$$P_g = \frac{\text{Static Pressure, } H_2O}{13.6}$$

$$P_s = P_{bar} + P_g$$

$$V_s = K_p\, C_p \left(\sqrt{\Delta P}\right) avg \sqrt{\frac{T_{s\,(avg)}}{P_s\, M_s}}$$

Average Stack Gas Dry Volumetric Flow Rate
Eq. 2-10

$$Q_{std} = 60\,(1 - B_{ws})\, v_s\, A \left[\frac{T_{std}}{T_{s\,(avg)}}\right] \left[\frac{P_s}{P_{std}}\right]$$

$$\frac{Q_{std}}{MF} = SCFM$$

EPA METHOD 3
DRY MOLECULAR WEIGHT OF STACK GAS
Eq. 3-2

$$M_d = 0.44\,(\%\,CO_2) + 0.320\,(\%\,O_2) + 0.280\,(\%\,N_2 + \%\,CO)$$

Wet Molecular Weight of Stack Gas

$$M_s = M_d\,(1 - B_{ws}) + 18\,(B_{ws})$$

EPA METHOD 4
DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Volume of Water Vapor Condensed
Eq. 4-1

$$V_{wc\,(std)} = \frac{(V_f - V_i)\rho_w \; RT_{std}}{P_{std} \; M_w} = K_1 \, (V_f - V_i)$$

$$\textit{Where:} \quad K_1 = 0.04646 \; \frac{ft^3}{ml} \; @ \; 520° \, R$$

Volume of Water Vapor Collected in Silica Gel
Eq. 4-2

$$V_{wsg\,(std)} = \frac{(W_f - W_i) \; RT_{std}}{P_{std} \; M_w \; (453.6 \; g/lb)}$$

$$= K_2 \, (W_f - W_i)$$

$$\textit{Where:} \quad K_2 = 0.04651 \; \frac{ft^3}{g} \; @ \; 520 \; ° \, R$$

Sample Gas Volume
Eq. 4-3

$$V_{m\,(std)} = V_m\ Y \left[\frac{(P_m)\ (T_{std})}{(P_{std})\ (T_m)} \right]$$

$$= K_3\ Y\ \frac{V_m\ \ P_m}{T_m}$$

Where: $K_3 = 17.38\ \frac{°\,R}{in.\ Hg}$ @ 520 ° R

Moisture Content
Eq. 4-4

$$B_{ws} = \frac{V_{wc\ (std)} + V_{wsg\ (std)}}{V_{wc\ (std)} + V_{wsg\ (std)} + V_{m\,(std)}}$$

$$B_{ws} \times 100 = \%\ H_2O\ \ in\ gas\ stream$$

$$MF = 1 - B_{ws}$$

EPA METHOD 5
DETERMINATION OF PARTICULATE EMISSIONS FROM STATIONARY SOURCES
Use in Method 5 and 8 combinations runs

Dry Gas Volume - Eq. 5-1

$$V_{m\,(std)} = V_m\, Y \left[\frac{T_{std}}{T_m}\right] \left[P_{bar} + \frac{\Delta H}{13.6}\right]$$

$$= K_1\, V_m\, Y \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right]$$

$$= K_1 = 17.38\ \frac{^\circ R}{in.Hg}\ @\ 520\ ^\circ R$$

*In case of leak rate beyond allowable limits, correct Eq. 5-1 as follows:
Case 1 - No component changes made during run.

$$V_m = V_m - (L_p - L_a)\theta$$

Case 2 - One or more component changes made during run.

$$V_m = \left[V_m - (L_1 - L_a)\,\theta_1 - \sum_{i=2}^{n} (L_i - L_a)\,\theta_i - (L_p - L_a)\,\theta_p\right]$$

Volume of Water Vapor - Eq. 5-2

$$V_{wc\,(std)} = V_{1\,c} \left[\frac{\rho_w}{M_w}\right] \left[\frac{RT_{std}}{P_{std}}\right]$$

$$= K_2\, V_{1\,c}$$

Where: $K_2 = 0.04646\ \frac{ft^3}{ml}\ @\ 60\ ^\circ F$

Moisture Content - Eq. 5-3

$$B_{ws} = \frac{V_{wc\ (std)}}{V_{m\ (std)} + V_{wc\ (std)}}$$

Acetone Blank Concentration - Eq. 5-4

$$C_a = \frac{M_a}{V_a\ \rho_a}$$

Acetone Wash Blank - Eq. 5-5

$$W_a = C_a\ V_{aw}\ \ \rho_a$$

Particulate Concentration - Eq. 5-6

$$C_s = \frac{gr}{dscf} = \left[\ 0.001\ \frac{g}{mg}\right]\left[\ \frac{M_n}{V_{m\ (std)}}\right](15.432)$$

$$gr/dscf\ (MF) = \frac{gr}{scf}$$

Corrected to 12 % CO_2

$$\frac{gr}{dscf}\ @\ 12\%\ CO_2 = \frac{\frac{gr}{dscf} \times 12\ \%\ CO_2}{\%\ CO_2\ (dry)}$$

Isokinetic Variation - Eq. 5-7 and 5-8

$$\% I = 100 \times \frac{T_s \left[V_{1c} K_3 + \frac{V_m}{T_m} \left[P_b + \frac{\Delta H}{13.6} \right] \right]}{60 \, \theta \, A_n \, V_s \, P_s}$$

Where: $K_3 = 0.002669$

Mass Emission Rate

$$\frac{lbs}{hr} = \frac{gr}{dscf} \times dscfm \times 60 \, \frac{m}{hr} \times \frac{1 \, lb}{7000 \, gr}$$

NOMENCLATURE
(continued)

V_{lc} = Volume of water vapor condensed in impingers and silica gel, (ml)
V_f = Final volume of condensed water, ml
V_i = Initial volume of condensed water, ml
v_s = Average stack gas velocity, (ft/sec)
V_{soln} = Total volume of solution in which the sulfur dioxide sample is contained (ml)
V_t = Volume of barium perchlorate titrant used for the sample, (ml)
V_{tb} = Volume of barium perchlorate titrant used for the blank, (ml)
W_f = Final weight of silica gel or silica gel plus impinger, (g)
W_i = Initial weight of silica gel or silica gel plus impinger, (g)
Y = Dry gas meter calibration factor
ρ_w = Density of water, (0.002202 lb/ml @ 60°F)
ρa = Density of acetone, (g/ml)(see bottle label)
MF = Moisture factor
$\%CO_2$ = Percent CO_2 by volume (dry basis)
$\%O_2$ = Percent O_2 by volume (dry basis)
%CO = Percent CO by volume (dry basis)
$\%N_2$ = Percent N_2 by volume (dry basis)
0.264 = Ratio of O_2 to N_2 in air v/v
0.280 = Molecular weight of N_2 or CO, divided by 100
0.320 = Molecular weight of O_2, divided by 100
0.440 = Molecular weight of CO_2, divided by 100
60 = Conversion factor, (sec/min)
18.0 = Molecular weight of water, (lb/lb-mole)
32.03 = Equivalent weight of sulfur dioxide
θ = Total sampling time (min)
θ_i = Sampling time interval, between two successive component changes, beginning with the interval between the first and second changes, (min)
θ_1 = Sampling time interval, from the run beginning until first component change, (min)
θ_p = Sampling time interval, from the final (n^{th}) component change until the end of the sampling run, (min)

NOMENCLATURE

A = Cross-sectional area of stack (ft^2)
A_n = Cross-sectional area of nozzle, (ft^2)
B_{ws} = Proportion of water vapor, by volume, in the gas stream
C_a = Acetone blank residue concentration, (mg/g)
C_p = Pitot tube coefficient, dimensionless
C_s = Concentration of particulate matter in stack gas, dry basis corrected to standard conditions, (gr/dscf)
C_{SO2} = Concentration of sulfur dioxide dry basis corrected to standard conditions, (lb/dscf)
C_{H2SO4} = Sulfuric acid (including SO3) concentration, corrected to standard conditions, (lb/dscf)
ΔH = Average pressure differential across the orifice meter, (in H_2O)
K_p = Pitot tube constant, $85.49 \frac{ft\,[(lb/lb\text{-}mole)(in\ Hg)]^{1/2}}{sec[\ (°R)\ (in\ H_2O)\ ]}$
L_p = Leakage rate observed during the post-test leak check, (cfm)
L_a = Maximum acceptable leakage rate, (0.02 cfm or 4% of average sampling rate, whichever is less)
L_i = Individual leakage rate observed during the leak check conducted prior to the "i^{nth}" component change, (cfm)
M_a = Mass of residue of acetone after evaporation, mg
M_d = Molecular weight of stack gas, dry basis, (lb/lb-mole)
M_n = Total weight of particulate matter collected, mg
M_s = Molecular weight of stack gas, wet basis, (lb/lb-mole)
M_w = Molecular weight of water, 18 lb/lb-mole
N = Normality of barium perchlorate titrant, (milliequivalents/ml)
ΔP = Velocity head of stack gas, (in H_2O)
P_{bar} = Barometric pressure at measurement site (in Hg)
P_g = Stack static pressure, (in Hg)
P_m = Absolute pressure at the dry gas meter, ($P_{bar} + \Delta H/13.6$)
P_s = Absolute stack gas pressure, (inches Hg)
$P_{(std)}$ = Standard absolute pressure, 29.92 in Hg
$Q_{(std)}$ = Dry volumetric stack gas flow rate, standard conditions, (dscfm)
R = Ideal gas constant, 21.85 (in Hg) (ft^3)/(lb-mole)(°R)
t_s = Stack temperature, (°F)
T_m = Absolute temperature at meter, (°R)
$T_{(std)}$ = Standard absolute temperature, (520°R)
T_s = Absolute stack temperature, (460° + t_s)
V_a = Volume of sample aliquot titrated, (ml)
V_{ab} = Volume of acetone blank, ml
V_m = Dry gas volume measured by dry gas meter, (dcf)
$V_{m(std)}$ = Dry gas volume measured by dry gas meter, corrected to standard conditions, (dscf)
$V_{wc(std)}$ = Volume of water vapor condensed corrected to standard conditions,(scf)
$V_{wsg(std)}$ = Volume of water vapor collected in silica gel corrected to standard conditions (scf)

CONTINUOUS EMISSION MONITORING SYSTEM (CEMS)

Reference: Manual of Procedures; ST-13A, ST-19A, Jan 1982, State of California, Air Resources Board, Test Methods 1-100, June 1979.
EPA CFR Title 40, Pt. 60, Appendix A, Method 3A, 6C, 7E, & 10.

Instrument Summary

A constant sample of flue gas was extracted, dried, filtered and delivered to an instrument manifold system for distribution to one or more analyzers. Instrument results are recorded on an analog strip chart recorder. System calibration checks are performed as well as calibration checks at the beginning and end of each test run. Final data reduction includes zero and calibration drift corrections.

Sample Conditioning System

Consists of a borosilicate glass tube or 316 grade stainless steel probe fitted with a cindered stainless steel or pyrex glass wool particulate filter. The probe is fitted with a teflon (TFE) sample line which connects to a water condensation system located at the source. The condensation system consists of three 500-ml short stem glass impingers connected in a series, immersed in an ice bath. The gas is delivered to the instrument trailer with a teflon line (3/8" O.D.) through an in-line Balston particulate filter drawn by a teflon-coated diaphragm pump. The sample system is leak checked prior to sampling by plugging the end of the sample probe and adjusting the sample pump to its maximum rate (approximately 22" Hg). The manifold is by-passed and the leak rate monitored through a gas meter or low range flow meter.

Manifold System

Sample gas is delivered to each analyzer through a five way valve and regulated with a needle valve flow meter. Manifold pressure is controlled by a back pressure regulator which is typically set at three psi. Zero gas (N_2) and calibrated gases are delivered to the analyzers using the same five way valve and flow meter. All manifold parts are glass, stainless steel, or teflon materials.

Analog Strip Chart Data Reduction

Analog recordings consists of averaged time increments as shown on the data pages (typically 5,10, or 20 minute increments). Data for each increment was recorded at an average percent of full scale. The readings were then compared with the zero and calibration readings for calculation of the average concentration for each time increment. Any deviation of the zero and calibration readings from the start to the end of a test period was corrected by calculating apparent zero and calibration readings for the mid-point of each time increment. The average concentrations were then calculated from the sample readings and the apparent zero and span readings.

HYDROCARBON EMISSIONS TESTING
EPA METHOD 18 - FID ANALYSIS

SAMPLING PROCEDURES

The sample was drawn via evacuated cannister through a stainless steel/teflon probe into a tedlar bag. Each sample bag was evacuated, and then filled.

ANALYTICAL PROCEDURES

The contents of the tedlar bag was analyzed by gas chromatography. The gas chromatograph was calibrated with an appropriate standard for each carbon #, before and after each set of samples are analyzed. The sample is speciated by carbon #-C_1, C_2, C_3, C_4, C_5, and C_{6+} backflush.

SYMBOL IDENTIFICATION

i = carbon #; i = 1 to 6+
s = refers to standard for that carbon #
Rx_i = response factor for C_i
MW = molecular weight - g/mole
DSCFM = Average volume flow rate of unit tested

EQUATIONS

$$Rx_i = \frac{Area\ std}{ppm\ std}$$

$$Sample\ ppm_i = \frac{1}{Rx_i} \times Area_i$$

$$Sample\ ppm\ (as\ C_1) = Sample\ ppm \times \#\ of\ Carbons$$

$$\frac{lbs}{hr_i} = ppm_i \times MW_i \times DSCFM \times 1.581 \times 10^{-7}$$

$$Total\ non\text{-}methane\ \frac{lbs}{hr} = \sum_{2}^{6+} \frac{lbs}{hr_i}$$

Note 1: If lbs/hr as methane is required, MW will equal 16.0 (MW of methane, CH_4)
Note 2: # of carbons: ethane = 2, propane = 3, etc...

COMPANY : PETRO CHEM ENVIRONMENTAL SERVICES, INC.
UNIT : BV-1
DATE : 4-5-93

CONTINUOUS MONITORING INSTURMENT DATA

ANALIZER	MANUFACTURER & MODEL	SERIAL #
NOX ANALIZER	THERMO ELECTRON MODEL 10	SN 10A/R-26616-226
CO ANALIZER	THERMO ELECTRON MODEL 48	SN 48-23438-210
O2 ANALIZER	TELEDYNE MODEL 320AX	SN 65039

I. C. ENGINE OBSERVATION REPORT
NAVAL PETROLEUM RESERVE NO. 1

LOCATION: SEC 30/T30S/R23E				DATE: 07-22-93		
APCD # S-0382-0073-01 K70				RELEASE # AFG 957		
REASON FOR TEST: ANNUAL SOURCE TEST				TEST COMPANY: PCES		
EQUIPMENT DESCRIPTION: 1500HP WAUKESHA				VEE PERFORMED: YES		
NOx CONTROL:	CAT.	PSC	PCC X	O2	OXIDIZING CAT.	
POLLUTANTS:	PM	NOx X	CO X	HC X	H2S X	SO2 X

EMISSIONS DATA

TIME	09:13	10:03	10:51			
NOX PPM	78	77	75			
CO	590	595	605			
% 02	10.65	10.60	10.65			

CALIBRATION GASES

POLLUTANT	SPAN GAS	RANGE	EXP DATE		INST. MFG	MODEL
NOX	82.2	0-250	12-93		TECO	10
CO	786.0	0-1000	N/A		TECO	48
O2 %	20.9	0-25	AMBIENT		TELEDYNE	

ENGINE PARAMETERS

RPM'S	931	930	932			
TOTAL BHP LOAD	869	873	875			
PERCENT LOAD	62.0	63.0	63.0			
CATALYST TEMP.	N/A	N/A	N/A			
FUEL STATIC	6.10	6.18	6.15			
FUEL DIFF.	3.00	3.10	3.00			
COEF.	0.010	0.010	0.010			
RATE (MCF/DAY)	183.00	191.58	184.50			
SUCTION PSI	45	46	47			
DISCHARGE PSI	445	445	445			

COMMENTS:

NO VISIBLE EMISSIONS

OBSERVER: M. Carr

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand

Model: 2HOS

Unit name: K70

Date: 22-Jul-93 09:23:49

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	46	158.0	441.3	85 226	2.35	128.9	27	133C
1C	Stage2	18	150.6	456.0	85 226	4.11	226.2	16	147T
2H	Stage1	35	42.8	160.3	80 224	2.33	168.8	12	133C
2C	Stage1	14	42.4	156.6	80 224	4.09	275.2	14	143T

Total indicated horsepower (IHP) = 799 @ 931 RPM
Gas horsepower (GHP) = 869 @ 931 RPM
Compressor total horsepower (BHP) = 869 @ 931 RPM
Rated horsepower (BHP) = 1500 @1000 RPM
Derated horsepower (BHP) = 1397 for 931 RPM
Percent Load = 62%

Recommendations and Observations:
SJVUAPCD ANNUAL SOURCE TEST RUN # 1.

Analyst signature: _____

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand

Model: 2HOS

Unit name: K70

Date: 22-Jul-93 09:40:30

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS.T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	46	157.9	437.9	86 227	2.48	129.5	28	130C
1C	Stage2	18	150.1	456.1	86 227	4.09	225.8	15	147T
2H	Stage1	35	44.4	159.9	80 224	2.44	171.3	16	132C
2C	Stage1	14	43.1	160.1	80 224	4.13	276.7	13	142T

Total indicated horsepower (IHP) = 803 @ 930 RPM
Gas horsepower (GHP) = 873 @ 930 RPM
Compressor total horsepower (BHP) = 873 @ 930 RPM
Rated horsepower (BHP) = 1500 @1000 RPM
Derated horsepower (BHP) = 1395 for 930 RPM
Percent Load = 63%

Recommendations and Observations:
SJVUAPCD ANNUAL SOURCE TEST RUN # 2.

Analyst signature: M X Barnett

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 2HOS

Unit name: K70 Date: 22-Jul-93 10:09:35

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	46	158.2	435.6*	88 228	2.41	130.4	28	131C
1C	Stage2	18	148.8	454.4*	88 228	4.08	225.3	13	146T
2H	Stage1	35	44.7	157.9*	82 225	2.44	172.6	17	136C
2C	Stage1	14	42.9	159.5*	82 225	4.15	276.4	11	141T

Total indicated horsepower (IHP) = 805 @ 932 RPM
Gas horsepower (GHP) = 875 @ 932 RPM
Compressor total horsepower (BHP) = 875 @ 932 RPM
Rated horsepower (BHP) = 1500 @1000 RPM
Derated horsepower (BHP) = 1398 for 932 RPM
Percent Load = 63%

* WARNING: Check the measured line pressures

Recommendations and Observations:
SJVUAPCD ANNUAL SOURCE TEST RUN # 3.

Analyst signature: _____

COMPANY: Bechtel
UNIT : K-70
DATE : 7-22-93
PROJECT : 010-577

ON-SITE DATA

		RUN #1	RUN #2	RUN #3
	TIME:	915-1220	1248-1549	
Vm,	Dry sampled gas volume, dcf	113.64	119.02	
Y,	Meter calibration factor (Met# 1001 , 1001 ,)	.988345	.988345	
Pbar,	Barometric Pressure, "Hg	30.05	30.05	
Pstatic	Stack static pressure, "Hg	-.85	-.85	
ΔH,	Differential meter pressure, "H2O	0.72	0.97	
Tm,	Meter temperature, °F	91	94	

CONTENTS	RUN #1 FINAL	RUN #1 TARE	RUN #1 NET	RUN #2 FINAL	RUN #2 TARE	RUN #2 NET	RUN #3 FINAL	RUN #3 TARE	RUN #3 NET
H_2O	887.0	616.8	270.2	859.4	581.8	277.6			
H_2O	649.6	629.6	20.0	625.4	604.6	20.8			
KO	455.9	453.1	2.8	485.6	482.8	2.8			
Silicagel	814.8	793.5	21.3	767.0	737.2	29.8			
L/W			(-51.2)			(-50.1)			
Vlc, volume of H2O, gms			263.1			280.9			

		RUN #1	RUN #2	RUN #3
CO2,	% Dry Volume	5.6	5.7	
O2,	% Dry Volume	10.7	10.6	
N2,	% Dry Volume			
Cp,	Pitot Tube Coefficient (# P305-3 , P3 as H-4 ,)	.809	.822	
Δp,	Avg P, "H2O	1.516	2.039	
Ts,	Stack temperature, °F	527	588	
As,	Stack Area, sq.ft.			
Ds,	Stack diameter, inches	12	12	
Dn,	Nozzle diameter, inches	.196	.196	
Dur,	Sampling time, min	180	180	
% ISO	Mini iso			

Filter #	661	662	
Filter tare weights, gms	.5960	.5969	

Additional Comments:

METHOD 5 RUN # 1 Con T

COMPANY: Bechtel	PRE / POST TEST LEAK CHECK		AMBIENT TEMP, °F: ~ 80°
UNIT: K-70			Pbar: 30.05
DATE: 7-22-93			STATIC PRESSURE ("Hg): -.85
PROJECT: 010-577			ASSUMED MOISTURE,%: 11% 28 MWW
TECH: JAT	LEAK RATE: < .012	cfm	NOZZLE ID#:
PUMP #: Gast	VACUUM: 7"	"Hg	AVG. CALIB. NOZZLE DIAM.("): .196
METER BOX#: 1001			PROBE LINER MATERIAL: QTZ
METER COEFF: .988345			FILTER #:
PROBE #: P39S-3 Cp: .809			DUCT DIAM ("): 12"

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Δ Ps)in. H20	PRESSURE DIFFERENTIAL,"H2O RATE	PRESSURE DIFFERENTIAL,"H2O ΔH	GAS SAMPLE VOLUME (cu.ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET,°F	FILTER HOLDER TEMP, °F PROBE	FILTER HOLDER TEMP, °F BOX	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER
10	10:50	3	582	2.35	.852	1.17	1003.01	93	90	251	262	
9	:59	3	584	2.35	.841	1.14	1010.68	91	90	251	262	
8	11:08	3	580	1.15	.565	0.56	1018.25	89	89	250	262	
7	:17	3	581	1.10	.547	0.53	1023.34	90	89	251	262	
6	:26	2.5	580	.85	.481	0.43	1028.26	92	88	250	261	
5	:35	2.5	581	.80	.469	0.41	1032.59	91	88	251	262	
4	:44	2.5	580	.75	.457	0.39	1034.84	94	88	251	262	
3	:53	2.5	582	.75	.458	0.39	1039.05	94	89	251	261	
2	12:02	2.5	580	.75	.458	0.39	1043.17	93	89	250	262	
1	:11	2.5	580	.80	.483	0.43	1047.29	94	89	251	262	
EOT	12:20						1051.84					
							43.64 ft³					
AVG			527	1.516		0.72	1.50 98.76		91			VEL EPS 82.92

METHOD 5 RUN # 1

COMPANY: Bechtel	PRE / POST TEST LEAK CHECK		AMBIENT TEMP, °F: ~80°
UNIT: K-70			Pbar: 30.05
DATE: 7-22-93			STATIC PRESSURE ("Hg): -.85
PROJECT: 010-577			ASSUMED MOISTURE,%: 11% 28 min
TECH: JAT	LEAK RATE: <.012	cfm	NOZZLE ID#: -
PUMP #: Gast	VACUUM: 10	"Hg	AVG. CALIB. NOZZLE DIAM.("): .196
METER BOX#: 1001			PROBE LINER MATERIAL: QTZ
METER COEFF: 988345			FILTER #:
PROBE #: P395-3 Cp: .809			DUCT DIAM ("): 12"

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Δ Ps)in. H20	PRESSURE DIFFERENTIAL,"H2O RATE	PRESSURE DIFFERENTIAL,"H2O ΔH	GAS SAMPLE VOLUME (cu.ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET,°F	FILTER HOLDER TEMP, °F PROBE	FILTER HOLDER TEMP, °F BOX	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER
10	9:15	3	594	2.75	.744	0.92	938.40	90	84	250	261	
9	:24	3	590	2.80	.826	1.11	945.10	90	85	250	261	
8	:33	3.5	591	2.90	.862	1.20	952.53	90	86	251	261	
7	:42	3	590	1.95	.717	0.86	960.29	93	87	251	261	
6	:51	3	590	1.95	.722	0.86	966.74	94	89	250	261	
5	10:00	3	581	1.75	.691	0.80	973.24	95	90	250	262	
4	:09	3	584	1.75	.692	0.80	979.46	95	90	250	262	
3	:18	3	585	1.85	.715	0.85	985.69	97	91	251	262	
2	:27	3	583	1.55	.656	0.73	992.13	94	91	250	262	
1	:36	2.5	582	1.10	.553	0.54	998.03	94	91	250	262	
P/L	10:45						1003.01			250	262	
AVG												

METHOD 5 RUN # 2

COMPANY: Bechtel	PRE / POST TEST LEAK CHECK		AMBIENT TEMP, °F: 85°
UNIT: K-70			Pbar: 30.05
DATE: 7-22-93			STATIC PRESSURE ("Hg): -.85
PROJECT: 010-577			ASSUMED MOISTURE,%: 11%
TECH: SAH	LEAK RATE: 0.005 cfm		NOZZLE ID#: MWW= 28.0
PUMP #: GAST PP07	VACUUM: 10 "Hg		AVG. CALIB. NOZZLE DIAM.("): .196
METER BOX#: 1001 (.88)			PROBE LINER MATERIAL: Qtz
METER COEFF: .9883215			FILTER #:
PROBE #: P3QSH-4 Cp: .822			DUCT DIAM ("): 12"

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (▲Ps) in. H20	PRESSURE DIFFERENTIAL, "H2O RATE	PRESSURE DIFFERENTIAL, "H2O ▲H	GAS SAMPLE VOLUME (cu.ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP, °F PROBE	FILTER HOLDER TEMP, °F BOX	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER
10	12:48	2	586	2.6	.752	1.19	53.00	98	96	280	243	
9	:57	2	603	2.6	.741	1.17	59.75	96	91	285	248	
8	1:06	2	607	2.3	.698	1.04	66.40	96	94	285	253	
7	:15	2	610	2.1	.664	0.96	72.70	95	92	283	252	
6	:24	2	604	2.0	.660	0.92	78.68	95	93	289	260	
5	:33	2	586	1.9	.638	0.89	84.51	94	91	280	254	
4	:42	2	580	1.8	.622	0.86	90.27	93	91	278	250	
3	:51	2	578	1.4	.549	0.69	95.85	93	91	282	250	
2	2:00	2	573	1.3	.531	0.65	100.80	94	92	284	248	
1	:09	2	570	1.3	.531	0.65	105.55	93	90	280	249	
PC	2:18						110.33					
AVG												

METHOD 5 RUN # 2 cont

COMPANY:	Bechtel
UNIT:	R-70
DATE:	7-22-93
PROJECT:	010-577
TECH:	SAH
PUMP #:	GAST PD07
METER BOX#:	1001 (.88)
METER COEFF:	.988345
PROBE #:	P3QSH-4 Cp: .822

PRE / POST TEST LEAK CHECK

LEAK RATE: <.006 cfm

VACUUM: 8 "Hg

AMBIENT TEMP, °F:	85°
Pbar:	30.05
STATIC PRESSURE ("Hg):	-.85
ASSUMED MOISTURE,%:	11%
NOZZLE ID#:	MWW= 28.0
AVG. CALIB. NOZZLE DIAM.("):	.196
PROBE LINER MATERIAL:	Qtz.
FILTER #:	
DUCT DIAM ("):	12"

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Δ Ps) in. H20	PRESSURE DIFFERENTIAL, "H2O RATE	PRESSURE DIFFERENTIAL, "H2O ΔH	GAS SAMPLE VOLUME (cu.ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP, °F PROBE	FILTER HOLDER TEMP, °F BOX	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER
10	2:19	2	596	3.5	.867	1.55	110.33	97	95	285	248	
9	:28	2	600	3.5	.862	1.54	118.15	96	92	290	250	
8	:37	2	603	3.5	.861	1.53	125.90	96	92	283	250	
7	:46	2	605	2.6	.740	1.16	133.62	94	92	287	250	
6	:55	2	604	2.4	.711	1.08	140.34	94	92	285	248	
5	3:04	2	598	1.6	.587	0.77	146.70	98	97	280	251	
4	:13	2	580	1.5	.573	0.73	152.00	97	97	279	254	
3	:22	2	578	1.4	.553	0.69	157.13	96	96	265	248	
2	:31	2	562	1.3	.545	0.67	162.16	96	95	280	251	
1	:40	2	558	1.4	.557	0.70	167.00	95	95	281	249	
END	3:49						172.02					
							Vol= 119.02					
							ISO= 100.09					
			588	2.039		0.97	VF= 112.08		94			
AVG												

$$V_{mstd} = 119.02(.988345)\left(\frac{520}{554}\right)\left(\frac{30.05 + \frac{0.97}{13.6}}{29.92}\right) = \boxed{111.16}$$

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

COMPANY: Bechtel

PROJECT: 010-577

LOCATION/UNIT: K-70

DATE TESTED: 7/22/93

ANALYST: DGS

RUN # 1

PROBE/NOZZLE/FILTER TOP

VOL- 238 ml

DISH # 65 #1	#2	#3	AVERAGE
FINAL (g) 80.9417	80.9416		80.9417
TARE (g) 80.9386			80.9386
NET (g)			0.0031

FILTER # 6161

#1	#2	#3	AVERAGE
FINAL (g) 0.5993	0.5993		0.5993
TARE (g) 0.5980			0.5980
NET (g)			0.0013

CONDENSABLE (aliquot 250 ml / 680 ml)

DISH # 60 #1	#2	#3	AVERAGE
FINAL (g) 72.4719	72.4717		72.4718
TARE (g) 72.4681			72.4681
NET (g)			0.0037

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

COMPANY: Bechtel

PROJECT: 010-577

LOCATION/UNIT: K-70

DATE TESTED: 7/22/93

ANALYST: DGS

RUN # 2

PROBE/NOZZLE/FILTER TOP

VOL- 236 ml

DISH # 55 #1	#2	#3	AVERAGE
FINAL (g) 77.8261	77.8263		77.8262
TARE (g) 77.8229			77.8229
NET (g)			0.0033

FILTER # 662

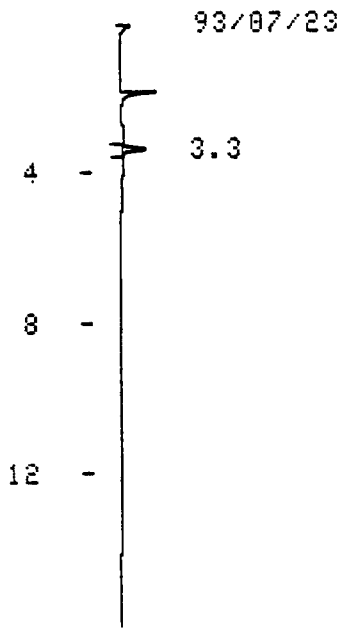
#1	#2	#3	AVERAGE
FINAL (g) 0.5988	0.5988		0.5988
TARE (g) 0.5969			0.5969
NET (g)			0.0019

CONDENSABLE (aliquot 250 ml / 657 ml)

DISH # 45 #1	#2	#3	AVERAGE
FINAL (g) 80.2145	80.2144		80.2145
TARE (g) 80.2100			80.2100
NET (g)			0.0045

BECHTEL 7-22-93
PROJECT # 010-577
HC SAMPLE BLANK

93/07/23 14:56:23

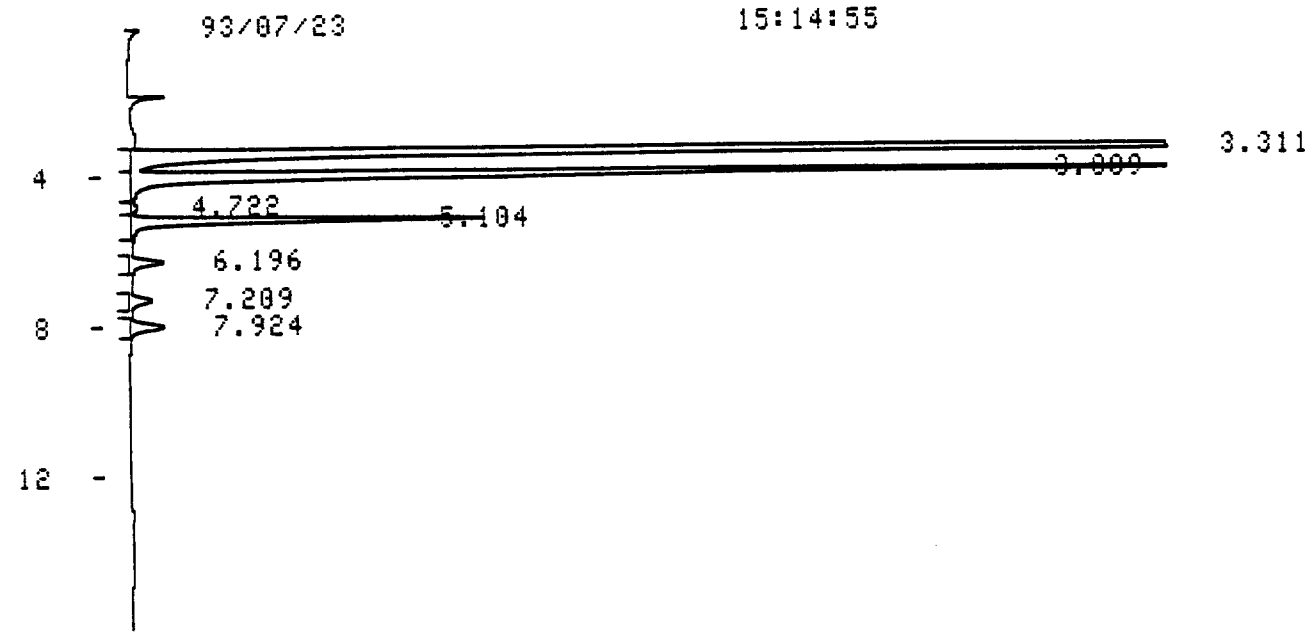


CHROMATOGRAM 8 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	3.3	1183		1	6.4014	C-1
	TOTAL	1183			6.4014	

GROUP(NAME)	CONC
C-1	6.4014
C-2	0
C-3	0
C-4	0
C-5	0
C-6+	0

BECHTEL 7-22-93
PROJECT # 010-577
K-70 HC SAMPLE # 1

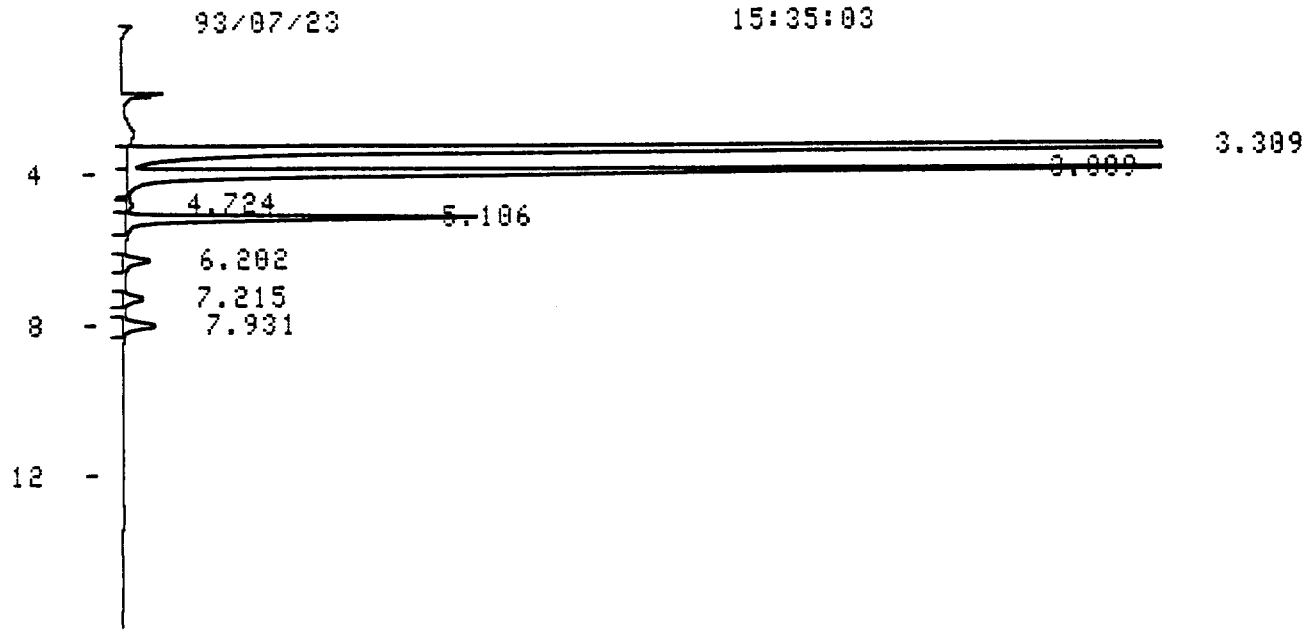


CHROMATOGRAM 9 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	3.311	368896		1	1995.6447	C-1
2	3.889	82641	V	2	222.0128	C-2
3	4.722	419		8	0.7502	C-3
4	5.104	22286		3	39.9105	C-3
5	6.196	2512		9	3.4291	C-4
6	7.209	1845		10	2.5193	C-4
7	7.924	3056		4	4.1721	C-4
	TOTAL	481654			2268.4377	

GROUP(NAME)	CONC
C-1	1995.6447
C-2	222.0128
C-3	40.6607
C-4	10.1204
C-5	0
C-6+	0

BECHTEL 7-22-93
PROJECT # 010-577
K-70 HC SAMPLE # 2

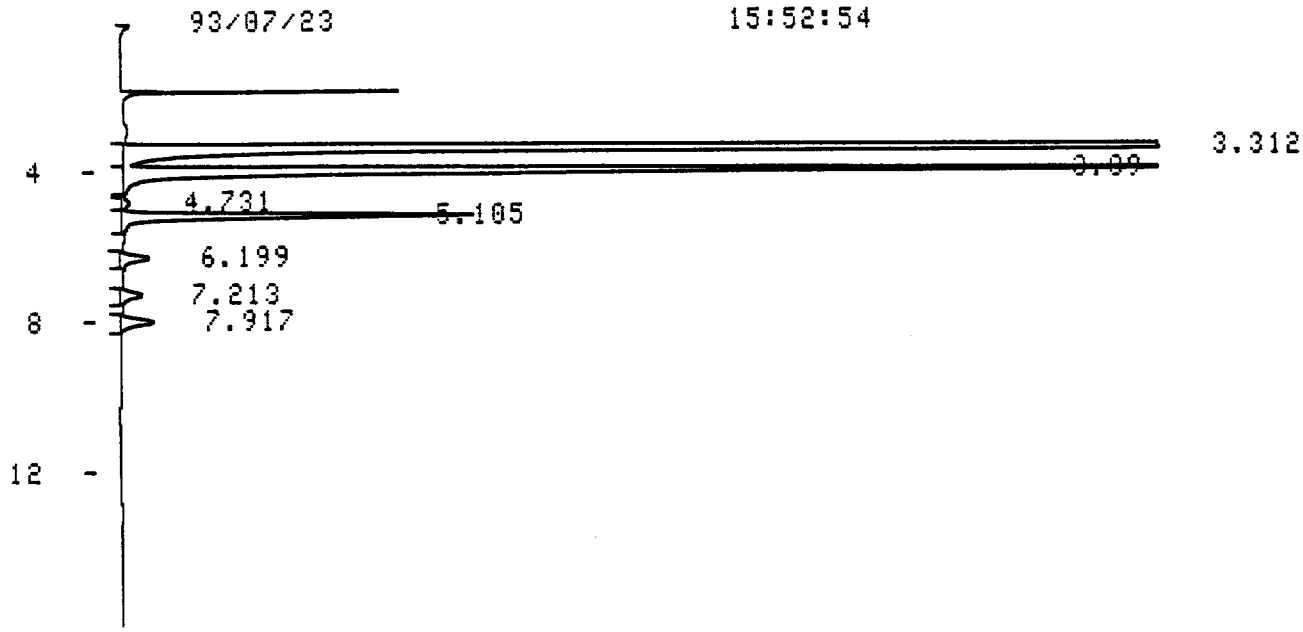


CHROMATOGRAM 10 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	3.309	370061		1	2001.9489	C-1
2	3.889	81946	V	2	220.1462	C-2
3	4.724	422		8	0.7559	C-3
4	5.106	22258		3	39.861	C-3
5	6.202	2078		9	2.8375	C-4
6	7.215	1769		10	2.4147	C-4
7	7.931	3035		4	4.1439	C-4
	TOTAL	481570			2272.1074	

GROUP(NAME)	CONC
C-1	2001.9489
C-2	220.1462
C-3	40.6169
C-4	9.3961
C-5	0
C-6+	0

BECHTEL 7-22-93
PROJECT # 010-577
K-70 HC SAMPLE # 3



CHROMATOGRAM 11 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	3.312	371088		1	2007.5051	C-1
2	3.89	83266	V	2	223.6929	C-2
3	4.731	508				
4	5.105	22317	V	3	39.9664	C-3
5	6.199	2267		9	3.0951	C-4
6	7.213	1736		10	2.37	C-4
7	7.917	2972		4	4.0573	C-4
	TOTAL	484155			2280.6862	

GROUP(NAME)	CONC
C-1	2007.5051
C-2	223.6929
C-3	39.9664
C-4	9.5224
C-5	0
C-6+	0

PETRO
CHEM
ENVIRONMENTAL
SERVICES, INC.

3207 Antonino Avenue
Bakersfield, California 93308
(805) 327-7300
FAX (805) 327-3459

COMPANY	: BECHTEL PETROLEUM	DATE RECEIVED :	7-23-93
DATE	: 7-22-93	DATE ANALYZED :	7-23-93
PROJECT	: 010-577	DATE REPORTED:	7-26-93

EPA METHOD 18
HYDROCARBON ANALYSIS REPORT

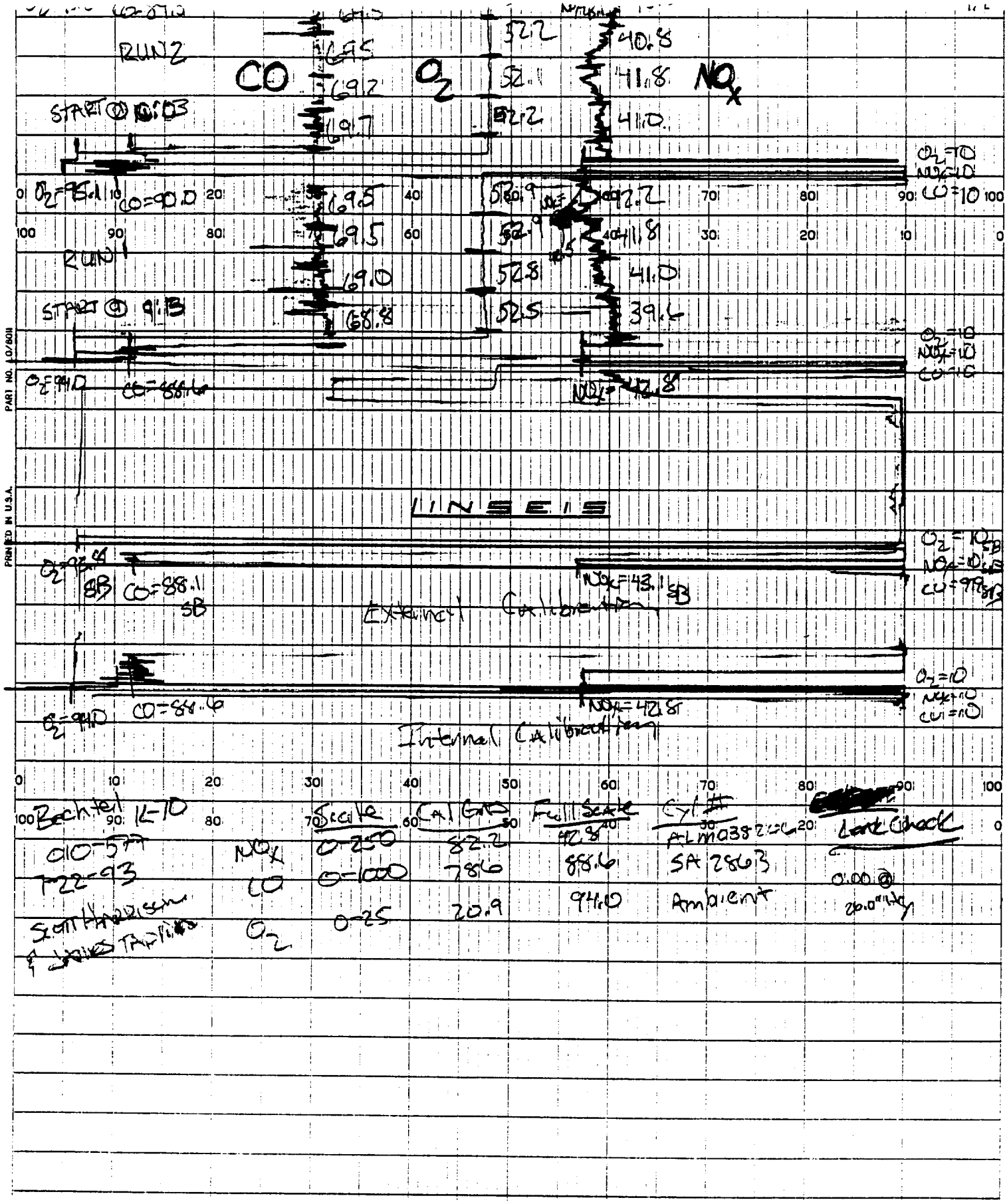
UNIT : K-70

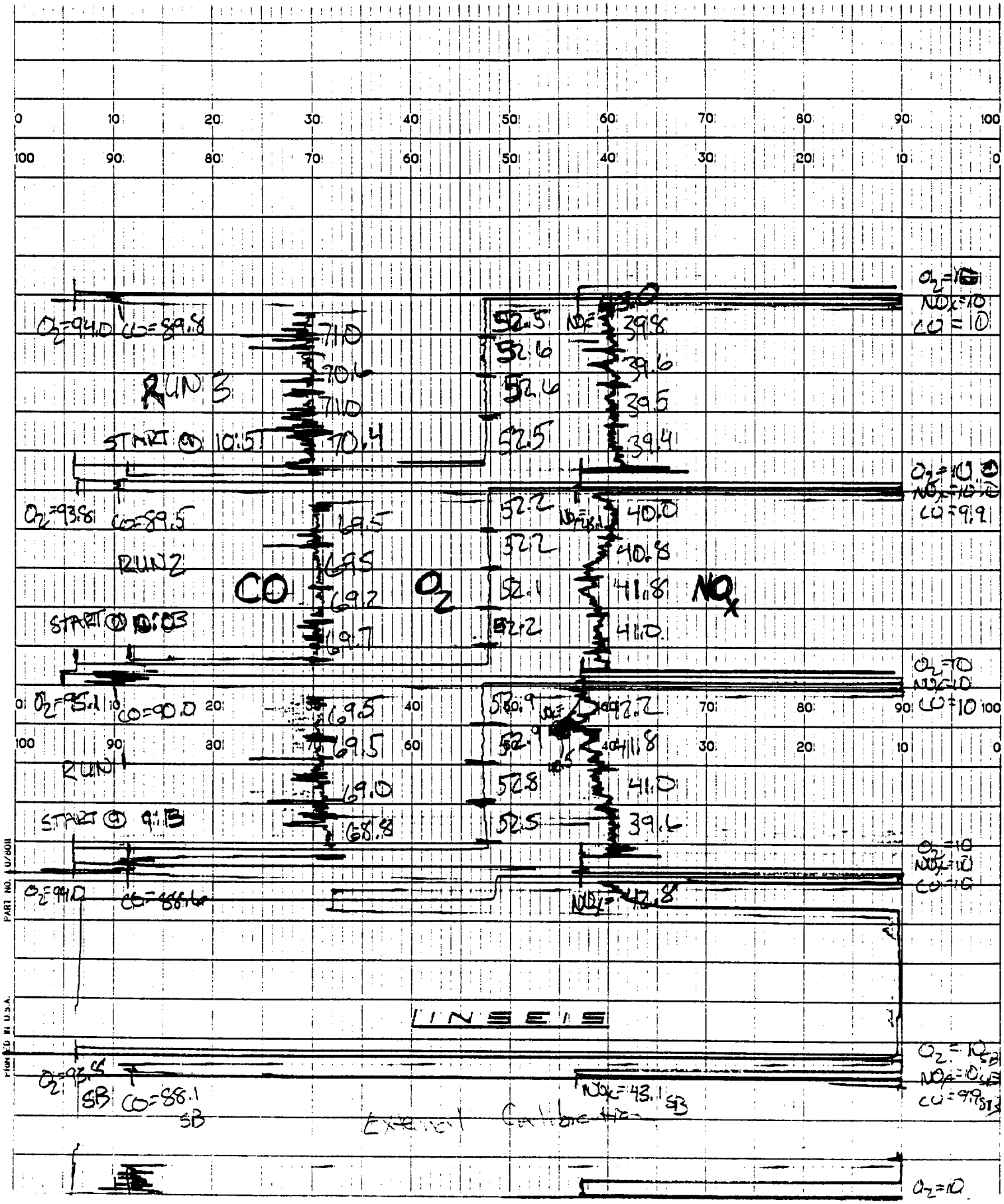
CONSTITUENT	RUN # 1 ppm(v/v)	RUN # 2 ppm(v/v)	RUN # 3 ppm(v/v)
METHANE	1995.64	2001.95	2007.51
ETHANE	222.01	220.15	223.69
PROPANE	40.66	40.62	39.97
BUTANE	10.12	9.40	9.52
PENTANE	ND	ND	ND
HEXANES+	ND	ND	ND
TOTAL	2268.43	2272.12	2280.69
NON-METHANE	272.79	270.17	273.18

UNIT : HYDROCARBON SAMPLE BLANK 7-22-93

CONSTITUENT	ppm(v/v)
METHANE	6.40
ETHANE	ND
PROPANE	ND
BUTANE	ND
PENTANE	ND
HEXANES+	ND
TOTAL	6.40
NON-METHANE	0.00

ND = NOT DETECTED < 1ppm


RUN 2
CO
O2
NOx
START @ 0:03
O2=95.1 CO=90.0
O2=10 NOx=10 CO=10
RUN 1
START @ 9:13
O2=94.0 CO=88.6
O2=10 NOx=10 CO=10
LINSEIS
O2=98.4 SB CO=88.1 SB
NOx=43.1 SB
External Calibration
O2=10 NOx=10 CO=99.8 SB
O2=94.0 CO=88.6
NOx=42.8
Internal Calibration
Bechtel K-70
010-577
7-22-93
Scott Hanson
Scale
0-250
0-100
0-25
NOx
CO
O2
Cal Gas
82.2
78.6
20.9
Full Scale
42.8
88.6
94.0
Cyl #
ALM038
SA 2863
Ambient
Last Check
0.00 @
20.0 "H2O


RUN 3
START @ 10:57
O2=94.0 CO=89.8
71.0
70.6
71.0
70.4
52.5
52.6
52.6
52.5
39.8
39.6
39.5
39.4
RUN 2
START @ 10:03
O2=93.8 CO=89.5
69.5
69.5
69.2
69.7
52.2
52.2
52.1
52.2
40.0
40.8
41.8
41.0
CO
O2
NOx
RUN 1
START @ 9:13
O2=95.1 CO=90.0
69.5
69.5
69.0
68.8
52.9
52.9
52.8
52.5
42.2
41.8
41.0
39.6
O2=94.0
NOx=43.8
LINSEIS
O2=93.6
SB CO=88.1
SB
NOx=43.1
SB
O2=10
NOx=10
CO=10
O2=10
NOx=10
CO=9.9
O2=10
NOx=10
CO=10
O2=10
NOx=10
CO=10
O2=10

UALITY CONTROL

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

CHAIN OF CUSTODY RECORD

MAIN OFFICE
313 Daniels Lane
Bakersfield, CA 93307
(805) 327-7300 FAX (805) 327-3459

LAB OFFICE
3207 Antonino Avenue
Bakersfield, CA 93308
(805) 631-9332 FAX (805) 327-0860

ANALYSIS REQUEST

LABORATORY: ZALCO LABORATORIES		LAB ID#: 36645	
COMPANY: Bechtel	LOCATION/UNIT: K-70		
PROJECT: 010-577	SAMPLED BY: SAH		
METHOD	DELIVER REPORT TO: TERRY ROWLES	PCES PO#: 3174	

SAMPLE ID#	SAMPLE DESCRIPTION	SAMPLE DATE	Liq	Filter	Gas	LOW RANGE TOTAL SULFUR as H2S				
BAG	FUEL GAS	7/22/93			X	X				

COMMENTS:

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[signature]	7/23/93	[signature]	7-23-93
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

PETRO CHEM ENVIRONMENTAL SERVICES, INC.
PITOT TUBE CALIBRATION

PITOT TUBE I ID.# P3QSH-4
DATE: 6-21-93
CALIBRATED BY: SAH

	"A" SIDE CALIBRATION			
RUN #	ΔPstd cm H2O (in.H2O)	ΔP(s) cm H2O (in. H2O)	Cp(s)	DEVIATION Cp(s) -Cp(A)
1	0.240	0.345	0.826	-0.001
2	0.240	0.345	0.826	-0.001
3	0.245	0.350	0.828	0.002
		Cp (SIDE A)	0.827	

	"B" SIDE CALIBRATION			
RUN #	ΔPstd cm H2O (in.H2O)	ΔP(s) cm H2O (in. H2O)	Cp(s)	DEVIATION Cp(s) -Cp(B)
1	0.240	0.350	0.820	0.003
2	0.245	0.360	0.817	0.000
3	0.240	0.355	0.814	-0.003
		Cp (SIDE B)	0.817	

Cp (SIDE A) - Cp (SIDE B) =	0.010	0.822

Cp=.99 * ΔPstd / ΔP(s)

PETRO CHEM ENVIRONMENTAL SERVICES, INC.
PITOT TUBE CALIBRATION

PITOT TUBE ID. # P3Q-3
DATE: 6-21-93
CALIBRATED BY: SAH

	"A" SIDE CALIBRATION			
RUN #	ΔPstd cm H2O (in.H2O)	ΔP(s) cm H2O (in. H2O)	Cp(s)	DEVIATION Cp(s) -Cp(A)
1	0.235	0.350	0.811	0.001
2	0.235	0.355	0.805	-0.005
3	0.240	0.355	0.814	0.004
		Cp (SIDE A)	0.810	

	"B" SIDE CALIBRATION			
RUN #	ΔPstd cm H2O (in.H2O)	ΔP(s) cm H2O (in. H2O)	Cp(s)	DEVIATION Cp(s) -Cp(B)
1	0.240	0.360	0.808	0.001
2	0.235	0.355	0.805	-0.002
3	0.240	0.360	0.808	0.001
		Cp (SIDE B)	0.807	

Cp (SIDE A) - Cp (SIDE B) =	0.003	0.809

Cp=.99 * ΔPstd / ΔP(s)

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

DRY GAS METER CALIBRATION

DATE:	7-21-93	AMBIENT TEMP °F:	79
TECH:	BDM	BAROMETRIC Pbar:	29.425
METER I.D.#	1001	TEST METER ID#:	S5M104564
		TEST METER Mcf:	1.023

APPROXIMATE CFM		0.75	0.50	0.30
STD TEST METER VOLUME CF	INITIAL	0.00	0.00	0.00
	FINAL	7.24	10.01	10.01
	TOTAL	7.24	10.01	10.01
FIELD GAS METER VOLUME CF	INITIAL	906.30	914.20	926.10
	FINAL	913.73	924.67	936.62
	TOTAL	7.43	10.47	10.52
STD TEST METER TEMP (°F)		77.5	78.0	80.0
FIELD GAS METER TEMP (°F)	IN	77.5	79.0	81.5
	OUT	86.0	86.0	85.0
	AVERAGE	81.8	82.5	83.3
STD TEST METER PRESSURE ("H2O)		-0.60	-0.30	-0.15
FIELD GAS METER PRESSURE ("H2O)		1.39	0.52	0.18
FIELD GAS METER, Mcf		1.001257	0.984955	0.978824

FIELD AVERAGE Mcf:	0.988345	H@:	1.5180

213 585-2154
FAX # 213 585-0582

LIQUID CARBONIC

SPECIALTY GAS CORPORATION

5700 SOUTH ALAMEDA STREET • LOS ANGELES, CALIFORNIA 90058

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER PETRO-CHEM P.O NUMBER 1690

REFERENCE STANDARD

COMPONENT		NIST SRM NO.	CYLINDER NO.	CONCENTRATION
NITRIC OXIDE	GMIS	vs 1687b	SGAL 2874	944 ppm
CARBON MONOXIDE	GMIS	vs 1680b	SGAL 2540	948 ppm
SULFUR DIOXIDE	GMIS	vs 1662a	SGAL 2810	999 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. COMPONENT NITRIC OXIDE GMIS ANALYZER MAKE-MODEL-S/N Beckman 951A S/N 0101354
   ANALYTICAL PRINCIPLE Chemiluminescence LAST CALIBRATION DATE 03/05/92
   FIRST ANALYSIS DATE 03/02/92 SECOND ANALYSIS DATE 03/11/92

Z	0.0	R	76.1	C	64.7	CONC. 803 ppm	Z	0.0	R	94.4	C 80.0	CONC. 800 ppm
R	76.1	Z	0.0	C	64.6	CONC. 801 ppm	R	94.4	Z	0	C 80.1	CONC. 801 ppm
Z	0.0	C	64.7	R	76.1	CONC. 803 ppm	Z	0.0	C	80.0	R 94.4	CONC. 800 ppm
U/M	mV			MEAN TEST ASSAY		802 ppm	U/M	mV			MEAN TEST ASSAY	800 ppm

2. COMPONENT CARBON MONOXIDE GMIS ANALYZER MAKE-MODEL-S/N Siemens Ultramat 5E S/N A12-729
   ANALYTICAL PRINCIPLE NDIR LAST CALIBRATION DATE 03/06/92
   FIRST ANALYSIS DATE 03/02/92 SECOND ANALYSIS DATE 03/11/92

Z	0	R	948	C	786	CONC. 786 ppm	Z	0	R	948	C 786	CONC. 786 ppm
R	948	Z	0	C	786	CONC. 786 ppm	R	948	Z	0	C 786	CONC. 786 ppm
Z	0	C	786	R	948	CONC. 786 ppm	Z	0	C	786	R 948	CONC. 786 ppm
U/M	ppm			MEAN TEST ASSAY		786 ppm	U/M	ppm			MEAN TEST ASSAY	786 ppm

3. COMPONENT SULFUR DIOXIDE GMIS ANALYZER MAKE-MODEL-S/N Siemens Ultramat 5E S/N C1-009
   ANALYTICAL PRINCIPLE NDIR LAST CALIBRATION DATE 02/11/92
   FIRST ANALYSIS DATE 03/02/92 SECOND ANALYSIS DATE 03/11/92

Z	0	R	1000	C	798	CONC. 797 ppm	Z	0	R	1000	C 798	CONC. 797 ppm
R	1000	Z	0	C	798	CONC. 797 ppm	R	1000	Z	0	C 798	CONC. 797 ppm
Z	0	C	798	R	1000	CONC. 797 ppm	Z	0	C	798	R 998	CONC. 799 ppm
U/M	ppm			MEAN TEST ASSAY		797 ppm	U/M	ppm			MEAN TEST ASSAY	798 ppm

THIS CYLINDER NO. SA 2863
HAS BEEN CERTIFIED ACCORDING TO SECTION 3.0.4
OF TRACEABILITY PROTOCOL NO. 1
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 1650 PSIG
CERTIFICATION DATE 03/11/92
EXPIRATION DATE 09/11/92

CERTIFIED CONCENTRATION

NITRIC OXIDE	801 ppm
CARBON MONOXIDE	786 ppm
SULFUR DIOXIDE	798 ppm
NITROGEN	BALANCE
NOx	806 ppm

ANALYZED BY DOUG GRANT CERTIFIED BY KWAN YOUNG

Scott Specialty Gases, Inc.

2600 CAJON BOULEVARD, SAN BERNARDINO, CA 92411 (909) 887-2571 FAX: (909) 887-0549

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
PETRO. CHEM. ENV. SERVICES
313 DANIELS LANE
BAKERSFIELD, CA 93307

Assay Laboratory
Scott Specialty Gases
2600 Cajon Boulevard
San Bernardino, CA 92411

Purchase Order 3148
Project # 25976.002

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM038206 **Certification Date** 06-23-93 **Expiration Date** * 12-23-94
Cylinder Pressure 2000 psig **Previous Certification Dates** NONE | **06-23-95

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
CARBON MONOXIDE	82.56 PPM	± 1 % NIST Traceable
NITRIC OXIDE	82.00 PPM	
SULFUR DIOXIDE	79.53 PPM	
Balance Gas: Nitrogen		
NOX	82.21 PPM	

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
GMIS	06-94	ALM026614	96.23 ppm
GMIS	09-94	ALM033883	99.12 ppm
GMIS	06-94	AAL1977	236.8 ppm

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Horiba / OPE-135D / 56565502	04-09-93	NDIR
TECO / 10AR / 38644-258	05-11-93	Chemi-Luminescent
Horiba / OPE-135D / 56463601	03-31-93	NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components | **First Triad Analysis** | **Second Triad Analysis** | **Calibration Curve**

Carbon Monoxide

First Triad Analysis — Date: 06-14-93 Response Units: mv

Z1=	0.00	R1=	97.0	T1=	83.8
R2=	97.0	Z2=	0.00	T2=	83.9
Z3=	0.00	T3=	83.9	R3=	97.0

Ave. Conc. of Cust Cyl. 82.65 ppm

Second Triad Analysis — Date: 06-23-93 Response Units: mv

Z1=	0.00	R1=	97.0	T1=	83.7
R2=	97.0	Z2=	0.00	T2=	83.7
Z3=	0.00	T3=	83.7	R3=	97.0

Ave. Conc. of Cust Cyl. 82.47 ppm

Calibration Curve — Concentration= $Ax^4-Bx^3+Cx^2+DX+E$
A =0.000000006893
B =-0.000002034
C =0.0006716
D =0.9393
E =0.004754

Nitric Oxide

First Triad Analysis — Date: 06-14-93 Response Units: mv

Z1=	0.00	R1=	96.50	T1=	80.05
R2=	96.55	Z2=	0.00	T2=	80.08
Z3=	0.00	T3=	80.09	R3=	96.56

Ave. Conc. of Cust Cyl. 82.21 ppm

Second Triad Analysis — Date: 06-23-93 Response Units: mv

Z1=	0.00	R1=	96.63	T1=	79.76
R2=	96.61	Z2=	0.00	T2=	79.68
Z3=	0.00	T3=	79.72	R3=	96.60

Ave. Conc. of Cust Cyl. 81.79 ppm

Calibration Curve — Concentration= Ax^2+Bx+C
A =-0.0005080
B =1.054
C =-0.1090

Sulfur Dioxide

First Triad Analysis — Date: 06-14-93 Response Units: mv

Z1=	0.00	R1=	97.0	T1=	33.9
R2=	97.0	Z2=	0.00	T2=	33.9
Z3=	0.00	T3=	33.9	R3=	97.0

Ave. Conc. of Cust Cyl. 79.17 ppm

Second Triad Analysis — Date: 06-23-93 Response Units: mv

Z1=	0.00	R1=	97.0	T1=	34.2
R2=	97.0	Z2=	0.00	T2=	34.2
Z3=	0.00	T3=	34.2	R3=	97.0

Ave. Conc. of Cust Cyl. 79.89 ppm

Calibration Curve — Concentration= Ax^2+Bx+C
A =0.001689
B =2.279
C =-0.03358

Special Notes : If this product is used for Acid Rain Rule Compliance, the Acid Rain Expiration Date noted above applies per 40 CFT Part 75, Appendix H. Otherwise the General Expiration Date applies

Analyst Joseph De La Torre

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

COMPANY: Bechtel

PROJECT: 010-577

LOCATION/UNIT: K-70

DATE TESTED: 7/22/93

ANALYST: DGS

RUN # Train 1 Blanks

PROBE/NOZZLE/FILTER TOP

VOL- 150 ml

DISH # 57 #1	#2	#3	AVERAGE
FINAL (g) 73.7469	73.7469		73.7469
TARE (g) 73.7450			73.7450
NET (g)			0.0019

FILTER # 4664

#1	#2	#3	AVERAGE
FINAL (g) 0.5944	0.5942		0.5943
TARE (g) 0.5944			0.5946
NET (g)			0

CONDENSABLE (aliquot 250 ml / 390 ml)

DISH # 46 #1	#2	#3	AVERAGE
FINAL (g) 81.4325	81.4323		81.4324
TARE (g) 81.4309			81.4309
NET (g)			0.0015

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

COMPANY: Bechtel

PROJECT: 010-577

LOCATION/UNIT: K-10

DATE TESTED: 7/22/93

ANALYST: DGS

RUN # Train 2 Blanks

PROBE/NOZZLE/FILTER TOP

VOL- 190 ml

DISH # 53 #1	#2	#3	AVERAGE
FINAL (g) 77.6707	77.6705		77.6706
TARE (g) 77.6692			77.6692
NET (g)			0.0014

FILTER # _____

#1	#2	#3	AVERAGE
FINAL (g)			
TARE (g)			
NET (g)			

CONDENSABLE (aliquot 250 ml / 395 ml)

DISH # 66 #1	#2	#3	AVERAGE
FINAL (g) 82.0673	82.0672		82.0673
TARE (g) 82.0667			82.0667
NET (g)			0.0006

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

COMPANY: Bechtel

PROJECT: 010-577

LOCATION/UNIT: K-70

DATE TESTED: 7/22/93

ANALYST: DGS

RUN # Blank

PROBE/NOZZLE/FILTER TOP VOL-

DISH #	#1	#2	#3	AVERAGE
FINAL (g)				
TARE (g)				
NET (g)				

FILTER # _____

	#1	#2	#3	AVERAGE
FINAL (g)				
TARE (g)				
NET (g)				

Reagent CONDENSABLE (aliquot 100 ml / 120 ml)

DISH # 39	#1	#2	#3	AVERAGE
FINAL (g)	78.8787	78.8787		78.8787
TARE (g)	78.8784			78.8784
NET (g)				0.0003

PETRO CHEM ENVIRONMENTAL SERVICES LABORATORY

QUALITY CONTROL - METHOD 5 **Q A BATCH #:** 5-93-0043

DI H_2O FROM ANTONINO AVE **VOLUME (ml):** 250 ml

DISH #: 37	#2	#3	AVERAGE
FINAL WT. (g): 80.6390	80.6390		80.6390
TARE WT. (g): 80.6384			80.6384
NET WT. (g):			0.0006

DI H_2O FROM DANIELS LN. **VOLUME (ml):** 250 ml

DISH #: 24	#2	#3	AVERAGE
FINAL WT. (g): 75.5849	75.5850		75.5850
TARE WT. (g): 75.5842			75.5842
NET WT. (g):			0.0008

EMPTY DISH

DISH #: 18	#2	#3	AVERAGE
FINAL WT. (g): 65.8815	65.8818		65.8817
TARE WT. (g): 65.8810			65.8810
NET WT. (g):			0.0007

FILTER BLANK

FILTER #: 669	#2	#3	AVERAGE
FINAL WT. (g): 0.5976	0.5977		0.5977
TARE WT. (g): 0.5978			0.5978
NET WT. (g):			0

RECOVERY SAMPLE **VOLUME (ml):** 100 ml

DISH #: 56	#2	#3	AVERAGE
FINAL WT. (g): 77.5549	77.5548		77.5349
TARE WT. (g): 77.5322			77.5322
NET WT. (g):			0.0227

CONC (g/l): 0.2247 g/l Na_2SO_4	% RECOVERY: 101.0%
WT (g): 0.02247g	(0.0227/0.02247)100

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

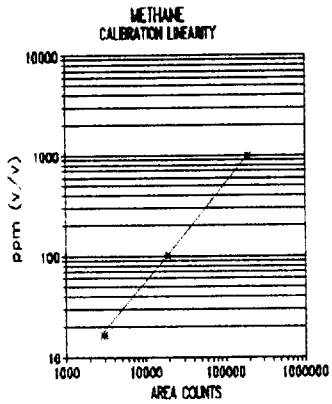
3207 Antonino Avenue
Bakersfield, California 93308
(805) 327-7300
FAX (805) 327-3459

COMPANY	: BECHTEL PETROLEUM	DATE RECEIVED :	7-23-93
DATE	: 7-22-93	DATE ANALYZED :	7-23-93
PROJECT	: 010-577	DATE REPORTED:	7-26-93

EPA METHOD 18
HYDROCARBON ANALYSIS
CALIBRATION DATA AND STATISTICS

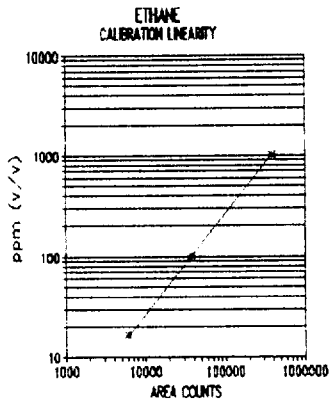
METHANE

CONC. (ppmv)	AREA COUNTS	RESPONSE FACTOR ppmv/AC
16.5	2984	5.53E-03
101	18670	5.41E-03
1000	192687	5.19E-03
	AVERAGE RF	5.38E-03
	STD. DEVIATION	1.41E-04
	RSD%	2.62%



ETHANE

CONC. (ppmv)	AREA COUNTS	RESPONSE FACTOR ppmv/AC
16.5	5964	2.77E-03
101	37596	2.69E-03
1030	383456	2.69E-03
	AVERAGE RF	2.71E-03
	STD. DEVIATION	3.79E-05
	RSD%	1.40%



PETRO CHEM ENVIRONMENTAL SERVICES, INC.

3207 Antonino Avenue
Bakersfield, California 93308
(805) 327-7300
FAX (805) 327-3459

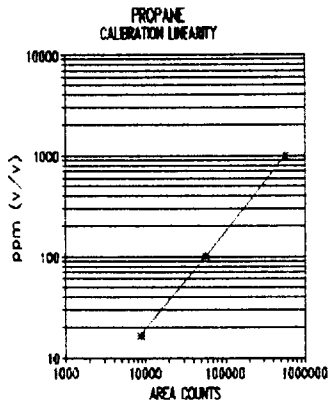
COMPANY: BECHTEL PETROLEUM
DATE : 7-22-93
PROJECT : 010-577

DATE RECEIVED : 7-23-93
DATE ANALYZED : 7-23-93
DATE REPORTED: 7-26-93

EPA METHOD 18
HYDROCARBON ANALYSIS
CALIBRATION DATA AND STATISTICS

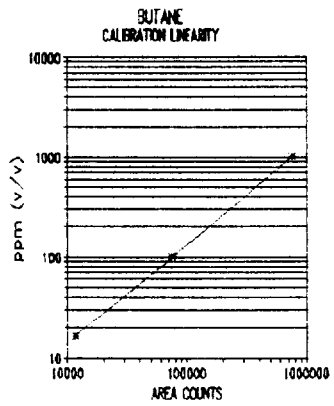
PROPANE

CONC. (ppmv)	AREA COUNTS	RESPONSE FACTOR ppmv/AC
16.5	8721	1.89E-03
100	55839	1.79E-03
1000	570189	1.75E-03
	AVERAGE RF	1.81E-03
	STD. DEVIATION	5.84E-05
	RSD%	3.22%



BUTANE

CONC. (ppmv)	AREA COUNTS	RESPONSE FACTOR ppmv/AC
16.5	11616	1.42E-03
101	73979	1.37E-03
1010	754811	1.34E-03
	AVERAGE RF	1.37E-03
	STD. DEVIATION	3.43E-05
	RSD%	2.49%



PETRO CHEM ENVIRONMENTAL SERVICES, INC.

3207 Antonino Avenue
Bakersfield, California 93308
(805) 327-7300
FAX (805) 327-3459

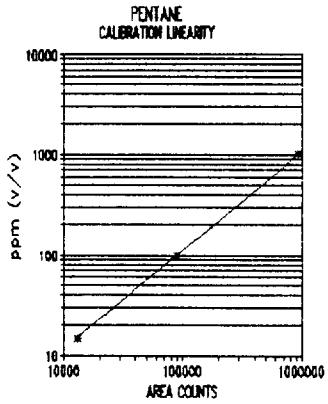
COMPANY: BECHTEL PETROLEUM
DATE : 7-22-93
PROJECT : 010-577

DATE RECEIVED : 7-23-93
DATE ANALYZED : 7-23-93
DATE REPORTED: 7-26-93

EPA METHOD 18
HYDROCARBON ANALYSIS
CALIBRATION DATA AND STATISTICS

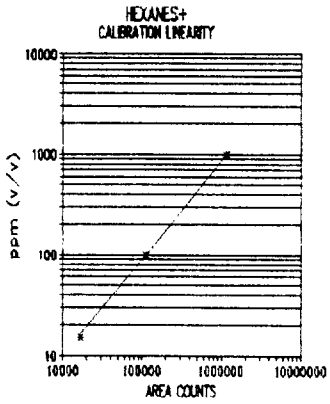
PENTANE

CONC. (ppmv)	AREA COUNTS	RESPONSE FACTOR ppmv/AC
14.8	13166	1.12E-03
99.1	88532	1.12E-03
1020	922943	1.11E-03
	AVERAGE RF	1.12E-03
	STD. DEVIATION	8.05E-06
	RSD%	0.72%



HEXANE

CONC. (ppmv)	AREA COUNTS	RESPONSE FACTOR ppmv/AC
15.2	16529	9.20E-04
100	111011	9.01E-04
1005	1147807	8.76E-04
	AVERAGE RF	8.99E-04
	STD. DEVIATION	1.80E-05
	RSD%	2.01%



PETRO
CHEM
ENVIRONMENTAL
SERVICES, INC.

3207 Antonino Avenue
Bakersfield, California 93308
(805) 327-7300
FAX (805) 327-3459

COMPANY: BECHTEL PETROLEUM
DATE : 7-22-93
PROJECT : 010-577

DATE RECEIVED : 7-23-93
DATE ANALYZED : 7-23-93
DATE REPORTED: 7-26-93

EPA METHOD 18
CALIBRATION DRIFT ANALYSIS

POST ANALYSIS CALIBRATION CHECK (15ppm STD.)

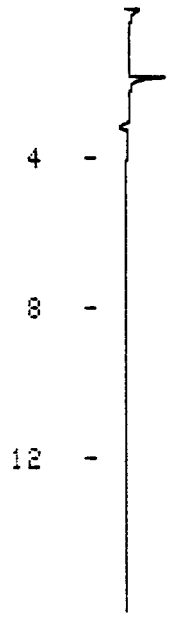
CONSTITUENT	INITIAL RF	POST RF	%DIFF.
METHANE	5.53E-03	5.55E-03	-0.44%
ETHANE	2.77E-03	2.76E-03	0.42%
PROPANE	1.89E-03	1.87E-03	0.95%
BUTANE	1.42E-03	1.41E-03	0.97%
PENTANE	1.12E-03	1.10E-03	2.48%
HEXANES+	9.20E-04	9.04E-04	1.69%

POST ANALYSIS CALIBRATION CHECK (100ppm STD.)

CONSTITUENT	INITIAL RF	POST RF	%DIFF.
METHANE	5.41E-03	5.37E-03	0.75%
ETHANE	2.69E-03	2.66E-03	0.86%
PROPANE	1.79E-03	1.78E-03	0.82%
BUTANE	1.37E-03	1.36E-03	0.25%
PENTANE	1.12E-03	1.11E-03	0.46%
HEXANES+	9.01E-04	8.94E-04	0.71%

SYSTEM BLANK
UHP HELIUM

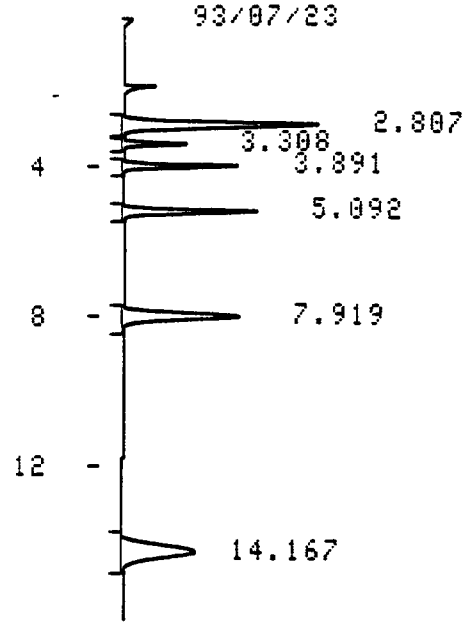
93/07/23 12:00:25



CHROMATOGRAM 21 MEMORIZED
WARNING NO PEAK

15PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 1

93/07/23 12:18:54



PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.807	16529		6		C-6+
2	3.308	2984		1		C-1
3	3.891	5964		7		C-2
4	5.092	8721		3		C-3
5	7.919	11616		4		C-4
6	14.167	13166		5		C-5

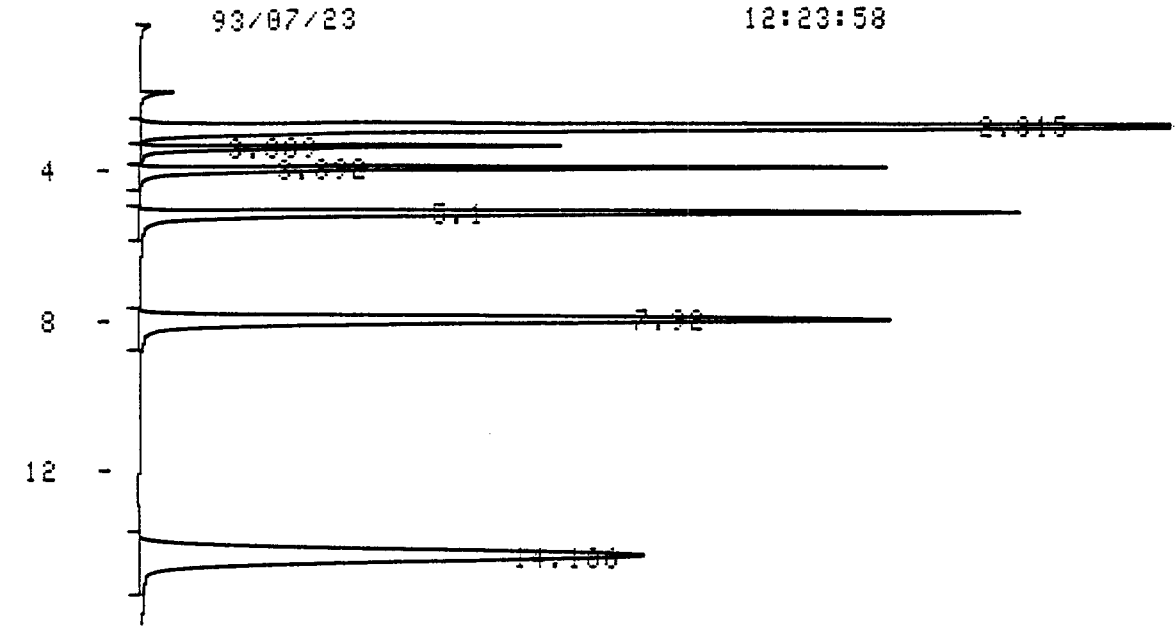
	TOTAL	58980				

CALIBRATION MADE IN IDENTIFICATION FILE 0
MODE$ 101 WINDOW 3

IDENTIFICATION FILE 0
MODE$ 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC
1	C-1	3.29	0.00553032	16.5
2	C-2	3.87	0.00281868	16.5
3	C-3	5.08	0.00189202	16.5
4	C-4	7.9	0.00142043	16.5
5	C-5	14.15	0.00112408	14.8
6	C-6+	2.8	0.000919612	15.2
7	C-2	3.89	0.00281868	16.5
8	C-3	4.3	0.00189202	16.5
9	C-4	5.7	0.00142043	16.5
10	C-4	6.65	0.00142043	16.5
11	C-5	10.24	0.00112408	14.8
12	C-5	10.59	0.00112408	14.8
13	C-5	12.73	0.00112408	14.8
14	C-5	11.3	0.00112408	14.8
15	C-5	15.43	0.00112408	14.8
16	C-5	8.79	0.00112408	14.8
17	C-5	11.82	0.00112408	14.8

100PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 220



CHROMATOGRAM 2 MEMORIZED

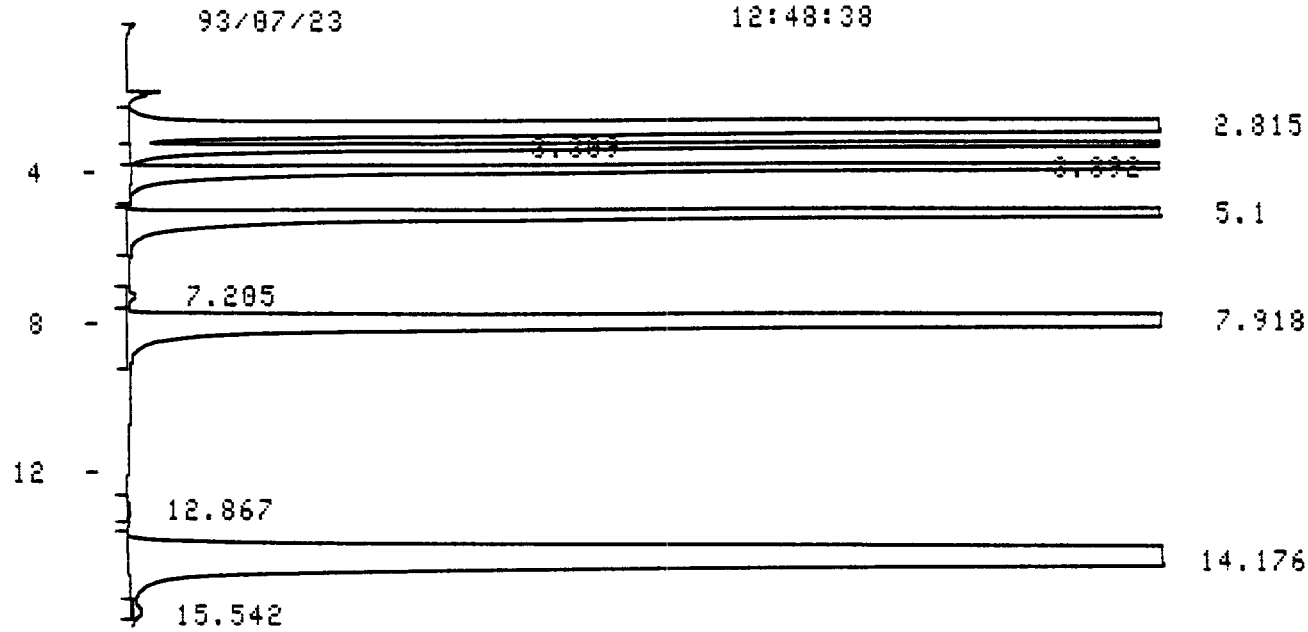
PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.815	111011		6		C-6+
2	3.309	18670		1		C-1
3	3.892	37596		2		C-2
4	5.1	55839		3		C-3
5	7.92	73979		4		C-4
6	14.186	88532		5		C-5

	TOTAL	385627				

IDENTIFICATION FILE 1
MODE$ 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC
1	C-1	3.29	0.00540978	101
2	C-2	3.88	0.00268648	101
3	C-3	5.09	0.00179086	100
4	C-4	7.91	0.00136524	101
5	C-5	14.16	0.00111937	99.1
6	C-6+	2.8	0.000900811	100
7	C-2	4.18	0.00268648	101
8	C-3	4.58	0.00179086	100
9	C-4	6.05	0.00136524	101
10	C-4	7.04	0.00136524	101
11	C-5	10.21	0.00111937	99.1
12	C-5	10.59	0.00111937	99.1
13	C-5	12.71	0.00111937	99.1
14	C-5	11.3	0.00111937	99.1
15	C-5	15.27	0.00111937	99.1
16	C-5	12.19	0.00111937	99.1
17	C-5	11.61	0.00111937	99.1

1000PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 224



CHROMATOGRAM 3 MEMORIZED

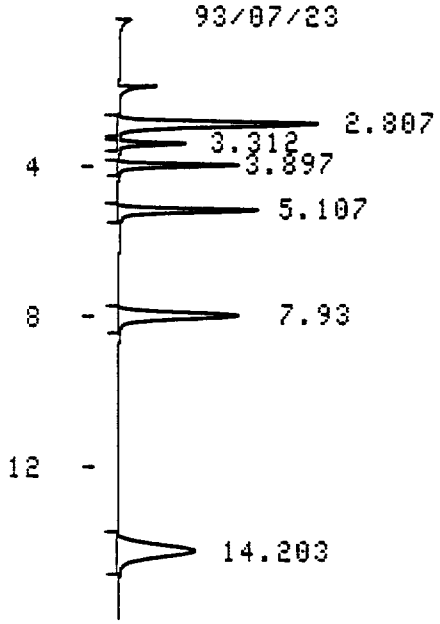
PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.815	1147807		6		C-6+
2	3.309	192687	V	1		C-1
3	3.892	383456		7		C-2
4	5.1	570189		3		C-3
5	7.205	851				
6	7.918	754811		4		C-4
7	12.867	663		13		C-5
8	14.176	922943	S	5		C-5
9	15.542	880	T			
	TOTAL	3974286				

IDENTIFICATION FILE 2
MODE$ 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC
1	C-1	3.29	0.00518977	1000
2	C-2	3.87	0.00271564	1030
3	C-3	5.09	0.0017538	1000
4	C-4	7.9	0.00133808	1010
5	C-5	14.15	0.00110516	1020
6	C-6+	2.8	0.000875583	1005
7	C-2	3.89	0.00271564	1030
8	C-3	4.52	0.0017538	1000
9	C-4	5.94	0.00133808	1010
10	C-4	6.73	0.00133808	1010
11	C-5	10.21	0.00110516	1020
12	C-5	10.59	0.00110516	1020
13	C-5	12.84	0.00110516	1020
14	C-5	12.61	0.00110516	1020
15	C-5	14.73	0.00110516	1020

POST ANALYSIS CALIBRATION CHECK
15PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 1

93/07/23 16:11:12

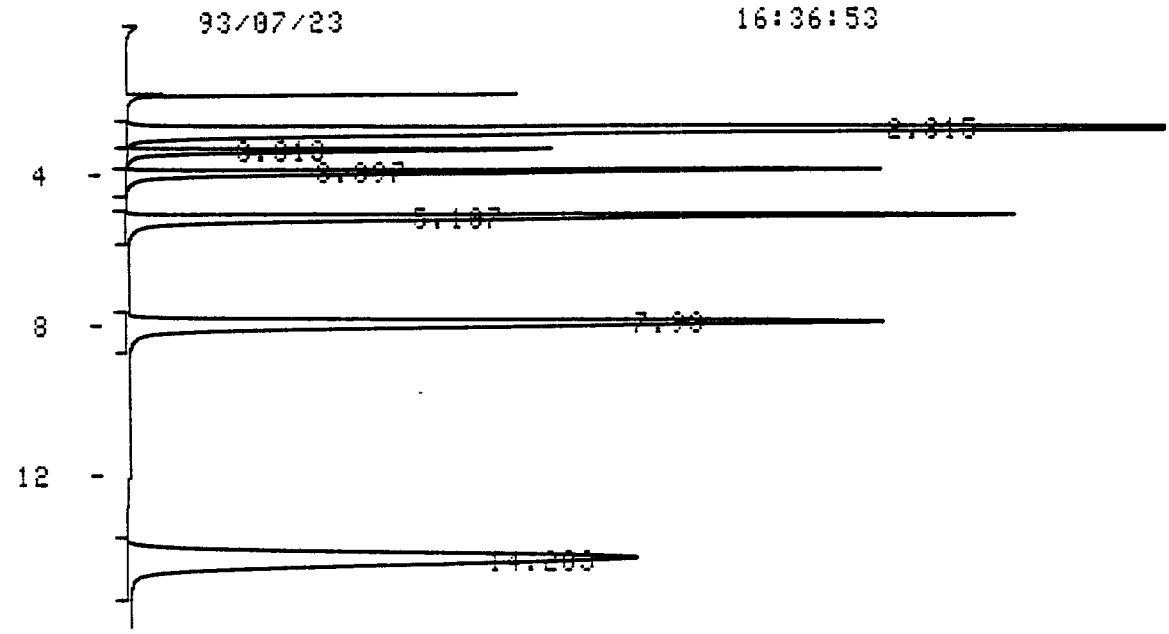


CHROMATOGRAM 12 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.807	16813		6	15.145	C-6+
2	3.312	2971		1	16.073	C-1
3	3.897	5989		2	16.0893	C-2
4	5.107	8805		3	15.7688	C-3
5	7.93	11730		4	16.0148	C-4
6	14.203	13501		5	15.1125	C-5
	TOTAL	59809			94.2033	

GROUP(NAME)	CONC
C-1	16.073
C-2	16.0893
C-3	15.7688
C-4	16.0148
C-5	15.1125
C-6+	15.145

POST ANALYSIS CALIBRATION CHECK
100PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 220



CHROMATOGRAM 13 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.815	111802		6	100.7125	C-6+
2	3.313	18812		1	101.7665	C-1
3	3.897	37924		2	101.8827	C-2
4	5.107	56299		3	100.8233	C-3
5	7.93	74166		4	101.2549	C-4
6	14.203	88939		5	99.5549	C-5
	TOTAL	387942			605.9947	

GROUP(NAME)	CONC
C-1	101.7665
C-2	101.8827
C-3	100.8233
C-4	101.2549
C-5	99.5549
C-6+	100.7125

COMPANY : PETRO CHEM ENVIRONMENTAL SERVICES, INC.
UNIT : BV-1
DATE : 4-5-93

ANALYZER : NOx THERMO ELECTRON MODEL 10
SERIAL # : SN 10A/R-26616-226

QUARTERLY LINEARITIES

CYL #	RANGE = 2500	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC16997	HIGH	2064	2065	-0.04
SGAL2591	MID	794	794	0.00
	ZERO	0	0	0.00

CYL #	RANGE = 1000	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
SGAL2591	HIGH	794	794	0.00
ALM11747	MID	415.2	415.2	0.00
	ZERO	0	0	0.00

CYL #	RANGE = 250	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC713	HIGH	206	206.1	-0.04
CC96574	MID	79.1	79.1	0.00
	ZERO	0	0	0.00

CYL #	RANGE = 100	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC96574	HIGH	79.1	79.1	0.00
CC48477	MID	39.8	39.8	0.00
	ZERO	0	0	0.00

CHECK LIST:		DUST	Bom
OIL CHANGE	ok	OZONE SCRUBBER	ok
DRIERITE	ok	REACTION CHAMBER CLEANOUT	ok
FILTER	ok	CAPILLARIES	ok

COMPANY : PETRO CHEM ENVIRONMENTAL SERVICES, INC.
UNIT : BV-1
DATE : 4-5-93

ANALYZER : CO THERMO ELECTRIOL MODEL 48
SERIAL # : SN 48-23438-210

QUARTERLY LINEARITIES

CYL #	RANGE = 5000	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC16997	HIGH	2108	2110	-0.04
SGAL2591	MID	830	830	0
	ZERO	0	0	0

CYL #	RANGE = 1000	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
SGAL2591	HIGH	828	830	-0.2
CC12121	MID	358	358	0
	ZERO	0	0	0

CYL #	RANGE = 100	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC96574	HIGH	79.5	79.7	-0.2
CC48477	MID	40.0	40.0	0
	ZERO	0	0	0

CHECK LIST:

OPTICS CHECK AND CLEAN	BDM
DUST	BDM

COMPANY : PETRO CHEM ENVIRONMENTAL SERVICES, INC.
UNIT : BV-1
DATE : 4-5-93

ANALYZER : O2 TELEDYNE MODEL 320AX
SERIAL # : SN 65039

QUARTERLY LINEARITIES

CYL #	RANGE = 25	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
AMBIENT	HIGH	20.9	20.9	0.00
LK273312	MID	15	15	0.00
	ZERO	0.0	0.0	0.00

CYL #	RANGE = 25	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
N110964	HIGH	6.9	6.93	-0.12
S43449	MID	4	4	0.00
	ZERO	0.0	0.0	0.00

CHECK LIST:

DUST	Bom
FUEL CELL	Bom
ELECTRICAL CONNECTION	Bom

CORRESPONDENCE

Dennis Champion
Bechtel Petroleum Operations, Inc.
June 30, 1993

Project: 010-577
K-70 Retest

SOURCE TEST PROTOCOL

I. Source Information

A. Unit

K-70 30R Retest

Permit #4091082 A

B. Company

Bechtel Petroleum Operations, Inc.
28590 Highway 119
P.O. Box 127
Tupman, CA 93276

Attention: Dennis Champion

II. Testing Firm

Petro Chem Environmental Services, Inc.
313 Daniels Lane
Bakersfield, California 93307

Attention: Scott Davis

III. Regulatory Agency

San Joaquin Valley Unified APCD
Southern Region

IV. Summary

Determination of compliance with San Joaquin Valley Unified APCD Permit # 4091082 A annual source test requirements

V. Testing Date

July 13, 1993

Dennis Champion
Bechtel Petroleum Operations, Inc.
June 30, 1993

Project: 010-577
K-70 Retest

PROPOSAL FOR COMPLIANCE TESTING

The purpose of the test is to document compliance with annual source test requirements for one IC Engine Permit # 4091082 A. The unit is a 1500 HP natural gas fired Waukesha Engine equipped with PCC. The unit will be tested for particulate, NOx, CO and fuel sulfur using the methods outlined in the following table. Particulate will be measured in gr/SCF and lb/hr. NOx, CO and fuel sulfur will be measured in ppm and lb/hr units. In addition NOx and CO will be measured in ppm @ 3% and 15% O_2 and gr/BHP-HR. All testing will be performed in accordance with San Joaquin Valley Unified APCD rules and regulations.

Parameter	Method	Test Runs	Limit
Velocity fps	EPA Method 1,2; Pitot Tube Traverse	2	—
Fixed Gases % O_2, CO_2, N_2	EPA Method 3; Orsat Analysis	2	—
% H_2O	EPA Method 4; Condensation	2 - 3 hour	—
Particulate	EPA Method 5; Gravimetric Front and Back Half	2 - 3 hour	0.05 lb/hr
% O_2	CARB Method 1-100; Teledyne 320 AX Fuel Cell - 25% scale	3 - 40 minute	—
NOx	CARB Method 1-100; TECO 10; Chemiluminescent 0-1000 scale	3 - 40 minute	6.6 lb/hr 2.0 gr/BHP-HR
CO	CARB Method 1-100; Gas Filter Correlation/NDIR 0-500 scale	3 - 40 minute	8.0 lb/hr
Fuel Analysis F-Factor Calorific Value	GC-TCD Stainless Steel Bomb C_1-C_6+, O_2, CO_2, N_2 and Btu/lb	1	—
Fuel Analysis Fuel Sulfur	GC-FPD, Tedlar Bag Referenced to an H_2S standard in ppm calculated based on EPA Method 19	1	0.0100 lb/hr