ONMENTAL
CES, INC.

3207 A
Bakersfield
(805) 327-7
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ANCE SOURCE TEST REPORT

L PETROLEUM OPERATIONS, INC.
28590 HIGHWAY 119
UPMAN, CALIFORNIA 93276

TENTION: DENNIS CHAMPION

UNIT TESTED:

K-59 3BR
APCD #4091075A

DATE TESTED:

APRIL 14, 1992

DATE REPORTED:

MAY 5, 1992

DETERMINATIONS:

IONS OF NOx, CO, O_2, AND NMHC

REPORT: #10-101 C

TESTED BY: John K. [illegible]
JOHN [illegible]

REVIEWED BY: [illegible]

RECEIVED

MAY 1[illegible]

ENVIRONM[illegible]

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JUN 03 1992

SAN JOAQUIN VALLEY UNIFIED
APCD—SOUTHERN REGION

SUMMARY OF SOURCE TEST RESULTS

COMPANY: BECHTEL PETROLEUM OPERATIONS, INC.

TEST DATE: APRIL 14, 1992

APCD #: 4091075(A)
UNIT #: K-59 36R

EMISSIONS

	gr/scf	@12%CO	ppm	15% O2	lb/hr	g/BHP-hr	Permit Limits
SO2 (wet)			As H2S = <1.0 ppm		< .00093		.0100 lbs/hr
Mean:							
NOx (dry)			190	102	2.30	1.32	
			187	99	2.23	1.30	2.00 g/BHP-hr
			183	97	2.17	1.26	4.41 lbs/hr
Mean:			187	99	2.23	1.29	
NMHC			484	260	2.04	1.17	
			493	265	2.08	1.21	
			484	260	2.04	1.19	7.95 lbs/hr
Mean:			487	262	2.05	1.19	
CO			585	314	4.31	2.47	
			587	311	4.27	2.48	
			583	310	4.22	2.45	8.82 lbs/hr
Mean:			585	312	4.27	2.47	

Comments: ANNUAL 2004 - PUC GAS F 1000 Hp w P.C.C.

For Kern County Use Only:

7/1/92

Petro Chem Environmental Services, Inc.

INTRODUCTION

INTRODUCTION

On April 14, 1992, 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 a 1000 HP Waukesha Internal Combustion Engine equipped with PCC (K-59 36R) fired on natural gas. The purpose of the testing was for determination of compliance with Kern County APCD and EPA regulations. Emissions of NOx, CO, O_2, and NMHC were determined using the following procedures:

Parameters	Method	# Test Runs
NOx	CARB Method 100; TECO Chemiluminescent NO/NOx Analyzer	3 - 40 minute
CO	CARB Method 100; GFC Analyzer	3 - 40 minute
O_2	CARB Method 100; Fuel Cell Analyzer	3 - 40 minute
NMHC	EPA Method 18; Bag Sample, C_1-C_6+ FID Analysis	3
Fuel Analysis, Fuel Sulfur	ASTM D-3588 H_2S by Microcoulombeter	1 per site
DSCFM	Fuel Flow/Fuel Analysis Stoichiometric Calculations	3

All sampling was performed by John Hinkle of Petro Chem Environmental Services, Inc. (PCES). The fuel analysis was performed by Zalco Laboratories of Bakersfield, California. Mike Carr of Bechtel Petroleum Operations, Inc. supervised the operation of the test unit.

OUS MONITORING DATA

COMPANY : BECHTEL PETROLEUM OPERATIONS,INC.
UNIT : K-59 36R
DATE : 4-14-92
REPORT : 10-101C

NOx/CO/O2 DATA

RUN #1

TIME INTERVAL			CONCENTRATIONS			% Full Scale		
BEGIN	-	END	O2;%	NOx;ppm	CO;ppm	O2%fs	NOx%fs	CO%fs
02:38 PM	-	02:48 PM	9.93	188	584	49.7	47.3	68.3
02:48 PM	-	02:58 PM	9.91	187	586	49.6	47.0	68.5
02:58 PM	-	03:08 PM	9.89	197	585	49.5	48.9	68.4
03:08 PM	-	03:18 PM	9.90	187	585	49.6	47.2	68.5
		Averages:	9.91	190	585	49.6	47.6	68.4

	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.6	50.9	90.7
FINAL zero	10	10	10
FINAL span	93.7	51.3	90.9
ZERO DRIFT %/ppm	0.00	0.00	0.00
CALIB. DRIFT %/ppm	0.03	2.02	2.00
ZERO DRIFT %fs	0.00	0.00	0.00
CALIB.DRIFT %fs	0.10	0.40	0.20
CAL GAS value	20.9	206.1	807
FULL SCALE RANGE	25	500	1000

Meter Positive	6.4	MCF/Day	133
Meter Static	5.2	DSCFM	1666
Meter Coefficient	0.004		
MMBtu/SCF	0.001112		
F'60	8529		
Operating BHP	793		
RPM	848		

NOx	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
	9.91	190	310	102	2.30	1.32

CO	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
	9.91	585	953	314	4.31	2.47

COMPANY : BECHTEL PETROLEUM OPERATIONS,INC.
UNIT : K-59 36R
DATE : 4-14-92
REPORT : 10-101C

NOx/CO/O2 DATA

RUN #2

TIME INTERVAL			CONCENTRATIONS			% Full Scale		
BEGIN	-	END	O2;%	NOx;ppm	CO;ppm	O2%fs	NOx%fs	CO%fs
03:28 PM	-	03:38 PM	9.76	192	590	49.2	48.7	69.0
03:38 PM	-	03:48 PM	9.77	183	586	49.3	46.8	68.6
03:48 PM	-	03:58 PM	9.78	180	585	49.4	46.3	68.5
03:58 PM	-	04:08 PM	9.81	191	585	49.3	48.4	68.5
		Averages:	**9.78**	**187**	**587**	**49.3**	**47.6**	**68.7**

	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.8	51.4	90.7
FINAL zero	10	10	10
FINAL span	93.5	51.2	90.7
ZERO DRIFT %/ppm	0.00	0.00	0.00
CALIB. DRIFT %/ppm	-0.07	-1.00	0.00
ZERO DRIFT %fs	0.00	0.00	0.00
CALIB.DRIFT %fs	-0.30	-0.20	0.00
CAL GAS value	20.9	206.1	807
FULL SCALE RANGE	25	500	1000

Meter Positive	6.4	MCF/Day	133
Meter Static	5.2	**DSCFM**	**1646**
Meter Coefficient	0.004		
MMBtu/SCF	0.001112		
F'60	8529		
Operating BHP	781		
RPM	848		

NOx	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
	9.78	187	300	99.0	2.23	1.30

CO	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
	9.78	587	944	311	4.27	2.48

COMPANY : BECHTEL PETROLEUM OPERATIONS,INC.
UNIT : K-59 36R
DATE : 4-14-92
REPORT : 10-101C

NOx/CO/O2 DATA
RUN #3

TIME INTERVAL			CONCENTRATIONS			% Full Scale		
BEGIN	-	END	O2;%	NOx;ppm	CO;ppm	O2%fs	NOx%fs	CO%fs
04:18 PM	-	04:28 PM	9.79	172	581	49.1	44.7	68.2
04:28 PM	-	04:38 PM	9.79	183	584	49.1	47.0	68.5
04:38 PM	-	04:48 PM	9.79	189	586	49.1	48.3	68.7
04:48 PM	-	04:58 PM	9.79	186	583	49.1	47.5	68.4
		Averages:	**9.79**	**183**	**583**	**49.1**	**46.9**	**68.5**

	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.5	51.5	90.9
FINAL zero	10	10	10
FINAL span	93.5	51.2	90.9
ZERO DRIFT %/ppm	0.00	0.00	0.00
CALIB. DRIFT %/ppm	0.00	-1.49	0.00
ZERO DRIFT %fs	0.00	0.00	0.00
CALIB.DRIFT %fs	0.00	-0.30	0.00
CAL GAS value	20.9	206.1	807
FULL SCALE RANGE	25	500	1000

Meter Positive	6.4	MCF/Day	132
Meter Static	5.15	**DSCFM**	**1635**
Meter Coefficient	0.004		
MMBtu/SCF	0.001112		
F'60	8529		
Operating BHP	782		
RPM	849		

NOx	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
	9.79	**183**	**294**	**97.0**	**2.17**	**1.26**

CO	%O2	ppm	@ 3%O2	@15%O2	lb/hr	gr/BHP-hr
	9.79	**583**	**939**	**310**	**4.22**	**2.45**

CALCULATIONS

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

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

$$PPM\ @\ 3\%\ O_2$$

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

$$@\ 15\% O_2$$

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

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

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

DROCARBON DATA

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-59 36R
DATE : 4-14-92
REPORT : 10-101C

HYDROCARBON RESULTS

RUN No.: 1							
DSCFM: 1666						OPERATING BHP	793
% O2: 9.91							
				ppm	ppm @15% O2	lb/hr	gr/BHP-hr
		ppm	lb/hr		(as methane)		
Methane	(C1)	1414	5.96	1414	759	5.96	3.41
Ethane	(C2)	178	1.41	356	191	1.50	0.86
Propane	(C3)	36	0.42	108	58	0.46	0.26
Butane	(C4)	5	0.08	20	11	0.08	0.05
Pentane	(C5)	0	0	0	0	0	0
Hexane	(C6)	0	0	0	0	0	0
	Total	1633	7.86	1898	1019	8.00	4.58
	Total (non methane)	219	1.90	484	260	2.04	1.17

RUN No.: 2							
DSCFM: 1646						OPERATING BHP	781
% O2: 9.78							
				ppm	ppm @15% O2	lb/hr	gr/BHP-hr
		ppm	lb/hr		(as methane)		
Methane	(C1)	1509	6.36	1509	810	6.36	3.70
Ethane	(C2)	179	1.41	358	192	1.51	0.88
Propane	(C3)	37	0.43	111	60	0.47	0.27
Butane	(C4)	6	0.09	24	13	0.10	0.06
Pentane	(C5)	0	0	0	0	0	0
Hexane	(C6)	0	0	0	0	0	0
	Total	1731	8.29	2002	1075	8.44	4.90
	Total (non methane)	222	1.93	493	265	2.08	1.21

RUN No.: 3							
DSCFM: 1635						OPERATING BHP	782
% O2: 9.79							
				ppm	ppm @15% O2	lb/hr	gr/BHP-hr
		ppm	lb/hr		(as methane)		
Methane	(C1)	1463	6.17	1463	785	6.17	3.58
Ethane	(C2)	178	1.41	356	191	1.50	0.87
Propane	(C3)	36	0.42	108	58	0.46	0.26
Butane	(C4)	5	0.08	20	11	0.08	0.05
Pentane	(C5)	0	0	0	0	0	0
Hexane	(C6)	0	0	0	0	0	0
	Total	1682	8.07	1947	1045	8.21	4.77
	Total (non methane)	219	1.90	484	260	2.04	1.19

EMISSION FACTORS

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-59 36R
DATE : 4-14-92
REPORT : 10-101C

SULFUR DIOXIDE EMISSION RESULTS

RUN #	H2S, ppm	MCF/DAY	FUEL SCFM	SO2 LBS/HR
1	< 1.0	133	92	< 0.00093
2	< 1.0	133	92	< 0.00093
3	< 1.0	132	92	< 0.00093
AVERAGE	< 1.0	133	92	< 0.00093

EQUATION:

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

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

MW SO2 = 64

LAB ANALYSIS

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-59
DATE : 4-14-92
REPORT : 10-101C

EPA F Factor - ref Method 19, 40 CFR

Fuel analysis	Lab #: 030362-002
% Carbon	72.88
% Hydrogen	22.27
% Oxygen	3.71
% Nitrogen	1.14
% Sulfur	0.00
BTU/lb	22060

Fd @ 68 °F	8659	Oxygen Based DSCF/MMBtu @ 68° F
Fd @ 60 °F	8529	Oxygen Based DSCF/MMBtu @ 60° F
Fc @ 68 °F	1061	Carbon Dioxide Based DSCF/MMBtu @ 68° F
Fc @ 60 °F	1045	Carbon Dioxide Based DSCF/MMBtu @ 60° F

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-59
DATE : 4-14-92
REPORT : 10-101C

CONSTITUENT	WT. %
CO2	4.636
O2	0.344
N2	1.142
CO	0.000
METHANE	70.955
ETHANE	14.489
PROPANE	6.272
I-BUTANE	0.548
N-BUTANE	1.338
I-PENTANE	0.145
N-PENTANE	0.111
HEXANES +	0.021
TOTAL	100.00

CHONS	WT. %
CARBON	72.88
HYDROGEN	22.27
OXYGEN	3.71
NITROGEN	1.14
SULFUR	0.00
TOTAL	100.00
TOTAL H/C	0.31

ZALCO LABORATORIES, INC.
Analytical & Consulting Services

PETRO-CHEM ENVIRONMENTAL
3207 Antonino Avenue
Bakersfield, CA 93308

Lab. No.: 031208_001
Received: Apr 15, 1992
Reported: Apr 15, 1992

Attention: Terry Rowles

Sample Description: Bechtel K-51, 50, 59 10-101 4/14/92

* CHROMATOGRAPHIC ANALYSIS (Z 1610) *

Components	Mole %	Wt %	C.P.M.
Carbon Dioxide	2.010	4.636	
Oxygen	.205	.344	
Nitrogen	.778	1.142	
Carbon Monoxide	0.000	0.000	
Methane	84.405	70.955	
Ethane	9.196	14.489	
Propane	2.714	6.272	.746
IsoButane	.180	.548	.059
N-Butane	.439	1.338	.138
IsoPentane	.038	.145	.014
N-Pentane	.029	.111	.011
Hexanes+	.005	.021	.002
Totals =	100.000	100.000	.970

	SPECIFIC GRAVITY (Air = 1)	.6604
*	SPECIFIC VOLUME, cu.ft./lb	19.84
*	GROSS CALORIFIC VALUE, BTU/cu.ft.	1092.92
**	GROSS CALORIFIC VALUE, BTU/cu.ft.	1111.82
**	GROSS CALORIFIC VALUE, BTU/lb	22059.68
*	NET CALORIFIC VALUE, BTU/cu.ft.	988.20
**	NET CALORIFIC VALUE, BTU/cu.ft.	1005.29
	COMPRESSIBILITY FACTOR 'Z' (60 F,1 ATM)	.9973

* Water Saturated ** Dry Gas @ 60 F, 14.73 psia

Kathe Zimmerman
Analyst

Jim Etherton
Laboratory Director

4309 Armour Avenue Bakersfield, California 93308
(805) 395-0539 FAX (805) 395-3069

ZALCO LABORATORIES, INC.
Analytical & Consulting Services

Petro Chem Environmental Service
3207 Antonino Avenue
Bakersfield, CA 93308

Laboratory No: 31208
Date Received: 4-15-92
Date Reported: 4-16-92
P O #: 1871

Attention: Terry Rowles

Sample: Gas

Sample Description: Bechtel K-50, K-51 & K-59 Fuel Gas, Job #10-101
Sampled by JH on 4-14-92

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/tds

4309 Armour Avenue Bakersfield, California 93308
(805) 395-0539 FAX (805) 395-3069

EMISSION FACTOR CALCULATIONS

EPA F-FACTOR

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

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

$$F_{60^\circ F} = F_{68^\circ F} \times 0.985$$

GENERAL POLLUTANT LB/MMBtu EQUATION

$$E = F_{60^\circ F} \, C \left(\frac{20.9}{20.9 - \% \, O_2 \text{ of } C} \right)$$

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

$F_{60^\circ F}$ = *F-FACTOR @ 60° F*

C = *Concentration of pollutant,* $\frac{LB}{DSCF}$

SULFUR EMISSION FACTOR

$$E = \frac{LB_S}{MMBtu} = F_{60^\circ F} \, C_{SO_2} \left(\frac{20.9}{20.9 - \% \, O_2 \text{ of } C} \right)$$

METHODOLOGY

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
METHODS AND EQUATIONS

REF: EPA METHOD 18; FID ANALYSIS

Sampling Procedures

The sample will be pressurized down stream of a sample pump or drawn via an evacuated cannister through a stainless steel/teflon probe into a tedlar bag. Each sample bag will be evacuated, and then filled.

Analytical Procedures

The contents of the tedlar bag will be analyzed by gas chromatography. The gas chromatograph will be calibrated with an appropriate standard for each carbon #, before and after each set of samples are analyzed. The sample is speciated by carbon #-C1, C2, C3, C4, C5, and C6+ 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

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

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

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

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

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

Note 1: *If* $\frac{lbs}{hr}$ *as methane is required, MW will equal* 16.0 (*MW of methane*)

Note 2: # *of carbons: ethane* = 2; *propane* = 3; *etc...*

COMPANY : PETRO CHEM ENVIRONMENTAL SERVICES
UNIT : BV-1
DATE : 3-17-92

CONTINUOUS MONITORING INSTRUMENT DATA

ANALYZER	MANUFACTURER & MODEL	SERIAL #
NOx ANALYZER	THERMO ELECTRON MODEL 10	10A/R-26616-226
CO ANALYZER	THERMO ELECTRON MODEL 48	48-23438-210
O2 ANALYZER	TELEDYNE MODEL 320AX	SN 93834

RAW DATA

I.C. ENGINE SOURCE TEST REPORT

COMPANY - Bechtel DATE - 4-14-92

APCD/EPA NUMBERS - K-59 4091075

REASON FOR TEST - Compliance TEST COMPANY - P.C.E.S

EQUIPMENT DESCRIPTION - Waukesha 1000 Hp. Ic Engine

NOx CONTROL - CAT. CONV. ___ PSC ___ PCC ✓ O2 ___

POLLUTANTS TESTED - PM ___ SO4 ___ SO2 ___ NOX ✓ CO ✓ H2S ___ HC ✓

APPLICABLE RULES - 210.1 ___ 427 ___ VEE PERFORMED - YES ___ NO ___

ENGINE LOCATION - ___

TIME		14:38-15:18	15:25-16:05	16:07-16:47			
RPM		848	848	849			
HORSEPOWER		753	742	743			
CATALYST TEMP.		—	—	—			
FUEL	READING						
	RATE MCFH	133	133	132			
SUCTION	PRESS. 1	150	150	150			
	PRESS. 2	45	45	45			
DISCHARGE	PRESS. 1	500	500	480			
	PRESS. 2	150	150	150			

FUEL TYPE NAT GAS FUEL RATE - 132.67 % OF LOAD 92.57 FUEL COEF. .604

POLLUTANT	SPAN GAS	RANGE	INSTR. ANALYSIS	INSTR. MFG.
NOx	206.1	500	Chemiluminescent	Teco
CO	807	1000	GAS FILTER CORRELATION	Teco
O2	20.9	25	Fuel Cell	Teledyne
SPAN / ZERO DRIFT < 5% OF RANGE - YES ( ) NO ( )				

TIME	14:40	15:00	15:18	15:30	16:00	16:18	16:38	16:58
NOx	205	185	185	185	175	175	190	185
CO	585	585	585	590	585	585	585	585
O2	9.8	9.8	9.8	9.75	9.75	9.75	9.75	9.75

COMMENTS -

OBSERVER - John Hinkle P.C.E.S.

John Hinkle

Petro Chem Environmental Services, Inc.

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

LOCATION: SEC 36/30S/23E					DATE: 04-14-92	
APCD # 4091075 A	K-59				RELEASE # AER 486	
REASON FOR TEST:	ANNUAL SOURCE TEST				TEST COMPANY: PCES	
EQUIPMENT DESCRIPTION: 1000HP WAUKESHA					VEE PERFORMED: YES	
NOx CONTROL:	CAT.	PSC	PCC X	O2 X	OXIDIZING CAT.	
POLLUTANTS:	PM	NOx X	CO X	HC X	H2S X	SO2 X

EMISSIONS DATA

TIME	02:38-03:18	03:25-04:05	04:07-04:47			
NOX PPM	195	180	180			
CO PPM	580	585	575			
% 02	9.80	9.75	9.75			

CALIBRATION GASES

POLLUTANT	SPAN GAS	RANGE	EXP DATE		INST. MFG	MODEL
NOX	206	0-500	02-6-92		TECO	10
CO	807	0-1000	03-15-91		TECO	48
O2 %	20.9	0-25	AMBIENT		TELEDYNE	

ENGINE PARAMETERS

RPM'S	848	848	849			
TOTAL BHP LOAD	793	793	782			
PERCENT LOAD	93.0	93.0	92.0			
CATALYST TEMP.	N/A	N/A	N/A			
FUEL STATIC	5.20	5.20	5.15			
FUEL DIFF.	6.40	6.40	6.40			
COEF.	0.004	0.004	0.004			
RATE (MCF/DAY)	133	133	132			
SUCTION PSI	45	45	45			
DISCHARGE PSI	500	500	480			

COMMENTS: (OUTLET)

COPY GIVEN TO APCD AS REQUIRED.

OBSERVER: M Barrett

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 265308

SITE: 36R CS Units: K59 Date: 04-14-92

START	02:40PM
END	03:20PM
IGNITION TIMING	6
RPM	
ENGINE	848
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	12
A/F MANIFOLD R/B	12
PCC FUEL	N/A
BAROMETRIC	28.56
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	130
R/B	130
AMBIENT	75
ENGINE J/W IN	N/A
ENGINE J/W OUT	170
ENGINE OIL IN	N/A
ENGINE OIL OUT	154
POWER CYL # 1	879
# 2	870
# 3	862
# 4	842
# 5	859
# 6	846
# 7	863
# 8	838
# 9	843
#10	828
#11	832
#12	805
TURBO EX. #13	N/A
TURBO EX. #14	N/A
#15	N/A
#16	N/A
TURBO EX. #17	N/A

CYLINDER PRESSURE	SUCT.	DISCH.
CYL. #1 HE	150	500
CYL. #2 HE	45	150
CYL. #3 HE	150	500
CYL. #4 HE	45	150
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE		
Coeff.		0.004
Static		5.20
Diff.		6.40
mcf/d		133.1
scfm		92.4
Exp. Factor (CAL.)		9.6
Avg. 02%		9.8
Exhst. Flow, dscfm		1671
AVG.	NOx ppm	187
	Corrected 15%	100
	lbs./hr.	2.27
	gms/BHP-hr.	1.30
AVG.	CO ppm	582
	Corrected 15%	310
	lbs./hr.	4.31
	gms/BHP-hr.	2.47
ACTUAL	HC lbs./hr.	0.00
	gms-BHP-hr.	0.00
TOTAL IN. H.P.		753
LOSSES		0.95
TOTAL BHP LOAD		793
PERCENT LOAD		93.5
RATED H.P.		1000
DERATED H. P.		848
LOG #		N/A
STACK GAS ANALYSIS		MOLE %
OXYGEN	O2	0
NITROGEN	N2	0
CARBON DIOXIDE	CO2	0
METHANE	C1	0
ETHANE	C2	0
PROPANE	C3	0
ISO BUTANE	IC4	0
NORMAL BUTANE	NC4	0
ISO PENTANE	IC5	0
NORMAL PENTANE	NC5	0
HEXANES PLUS	C6+	0

RUN # 1

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 4RDS

Unit name: K59 Date: 14-Apr-92 14:50:45

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU (dg F)	TEMPS DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	16	148.8	456.2*	100	232	.84	50.5	13	61C
1C	Stage2	16	148.0	459.3*	100	232	1.85	121.3	12	61T
2H	Stage1	23	42.4	53.8	88	232	0.0	14.2	Unloaded	10C
2C	Stage1	13	40.3	149.0	88	232	1.77	125.9	27	62T
3H	Stage2	16	145.1	480.9*	100	232	.66	52.0	3	63C
3C	Stage2	16	150.2	452.6*	100	232	1.89	124.1	16	63T
4H	Stage1	23	39.3	167.4*	88	232	1.79	133.1	11	70C
4C	Stage1	13	42.1	154.7	88	232	1.88	131.6	26	67T

Total indicated horsepower (IHP) = 753 @ 848 RPM
Gas horsepower (GHP) = 792 @ 848 RPM
Compressor total horsepower (BHP) = 792 @ 848 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 848 for 848 RPM
Percent Load = 93%

* WARNING: Check the measured line pressures

Recommendations and Observations:
ANNUAL SOURCE TEST RUN # 1

Analyst signature: M Bennett

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 265308
SITE: 36R CS Units: K59 Date: 04-14-92

START	03:25PM
END	04:05PM
IGNITION TIMING	6
RPM	
ENGINE	848
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	12
A/F MANIFOLD R/B	12
PCC FUEL	N/A
BAROMETRIC	28.56
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	130
R/B	130
AMBIENT	75
ENGINE J/W IN	N/A
ENGINE J/W OUT	170
ENGINE OIL IN	N/A
ENGINE OIL OUT	154
POWER CYL # 1	880
# 2	870
# 3	865
# 4	845
# 5	866
# 6	846
# 7	863
# 8	840
# 9	843
#10	831
#11	832
#12	800
TURBO EX. #13	N/A
TURBO EX. #14	N/A
#15	N/A
#16	N/A
TURBO EX. #17	N/A

CYLINDER PRESSURE	SUCT.	DISCH.
CYL. #1 HE	150	500
CYL. #2 HE	45	150
CYL. #3 HE	150	500
CYL. #4 HE	45	150
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.004
Static	5.20
Diff.	6.40
mcf/d	133.1
scfm	92.4
Exp. Factor (CAL.)	9.6
Avg. O2%	9.8
Exhst. Flow, dscfm	1664
AVG. NOx ppm	180
Corrected 15%	95
lbs./hr.	2.18
gms/BHP-hr.	1.27
AVG. CO ppm	585
Corrected 15%	310
lbs./hr.	4.31
gms/BHP-hr.	2.50
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	742
LOSSES	0.95
TOTAL BHP LOAD	781
PERCENT LOAD	92.1
RATED H.P.	1000
DERATED H. P.	848
LOG #	N/A

STACK GAS ANALYSIS		MOLE %
OXYGEN	O2	0
NITROGEN	N2	0
CARBON DIOXIDE	CO2	0
METHANE	C1	0
ETHANE	C2	0
PROPANE	C3	0
ISO BUTANE	IC4	0
NORMAL BUTANE	NC4	0
ISO PENTANE	IC5	0
NORMAL PENTANE	NC5	0
HEXANES PLUS	C6+	0

RUN # 2

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 4RDS

Unit name: K59 Date: 14-Apr-92 15:30:29

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	16	146.0	445.4	100 232	.89	51.7	14	60C
1C	Stage2	16	144.9	449.0	100 232	1.81	119.7	12	60T
2H	Stage1	23	42.2	53.4	88 232	0.0	13.6	Unloaded	9C
2C	Stage1	13	39.8	147.4*	88 232	1.75	125.6	27	61T
3H	Stage2	16	142.6	481.1	100 232	.59	48.8	0	63C
3C	Stage2	16	144.4	440.6	100 232	1.83	123.9	15	62T
4H	Stage1	23	39.0	165.2	88 232	1.80	133.7	11	68C
4C	Stage1	13	41.4	152.9*	88 232	1.81	125.4	26	66T

Total indicated horsepower (IHP) = 742 @ 848 RPM
Gas horsepower (GHP) = 782 @ 848 RPM
Compressor total horsepower (BHP) = 782 @ 848 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 848 for 848 RPM
Percent Load = 92%

* WARNING: Check the measured line pressures

Recommendations and Observations:
ANNUAL SOURCE TEST RUN # 2

Analyst signature: M Barnett

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 265308

SITE: 36R CS Units: K59 Date: 04-14-92

START	04:07PM
END	04:47PM
IGNITION TIMING	6
RPM	
ENGINE	849
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	12
A/F MANIFOLD R/B	12
PCC FUEL	N/A
BAROMETRIC	28.56
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	130
R/B	130
AMBIENT	75
ENGINE J/W IN	N/A
ENGINE J/W OUT	170
ENGINE OIL IN	N/A
ENGINE OIL OUT	154
POWER CYL # 1	889
# 2	870
# 3	865
# 4	849
# 5	866
# 6	845
# 7	866
# 8	845
# 9	843
#10	833
#11	832
#12	806
TURBO EX. #13	N/A
TURBO EX. #14	N/A
#15	N/A
#16	N/A
TURBO EX. #17	N/A

CYLINDER PRESSURE	SUCT.	DISCH.
CYL. #1 HE	150	480
CYL. #2 HE	45	150
CYL. #3 HE	150	480
CYL. #4 HE	45	150
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.004
Static	5.15
Diff.	6.40
mcf/d	131.8
scfm	91.6
Exp. Factor (CAL.)	9.6
Avg. O2%	9.8
Exhst. Flow, dscfm	1648
AVG. NOx ppm	180
Corrected 15%	95
lbs./hr.	2.16
gms/BHP-hr.	1.25
AVG. CO ppm	575
Corrected 15%	305
lbs./hr.	4.19
gms/BHP-hr.	2.43
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	743
LOSSES	0.95
TOTAL BHP LOAD	782
PERCENT LOAD	92.1
RATED H.P.	1000
DERATED H. P.	849
LOG #	N/A

STACK GAS ANALYSIS		MOLE %
OXYGEN	O2	0
NITROGEN	N2	0
CARBON DIOXIDE	CO2	0
METHANE	C1	0
ETHANE	C2	0
PROPANE	C3	0
ISO BUTANE	IC4	0
NORMAL BUTANE	NC4	0
ISO PENTANE	IC5	0
NORMAL PENTANE	NC5	0
HEXANES PLUS	C6+	0

RUN # 3

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 4RDS

Unit name: K59 Date: 14-Apr-92 16:05:55

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	16	145.3	435.3	100	232	.80	51.5	17	59C
1C	Stage2	16	143.1	445.6	100	232	1.79	117.0	12	59T
2H	Stage1	23	43.0	53.8	88	232	0.0	13.7	Unloaded	9C
2C	Stage1	13	40.2	146.3*	88	232	1.78	125.0	28	59T
3H	Stage2	16	140.1	477.3	100	232	.65	52.3	-1	62C
3C	Stage2	16	142.0	428.5	100	232	1.80	122.5	16	62T
4H	Stage1	23	39.2	165.8	88	232	1.76	132.3	12	69C
4C	Stage1	13	41.9	149.8*	88	232	1.88	128.7	30	65T

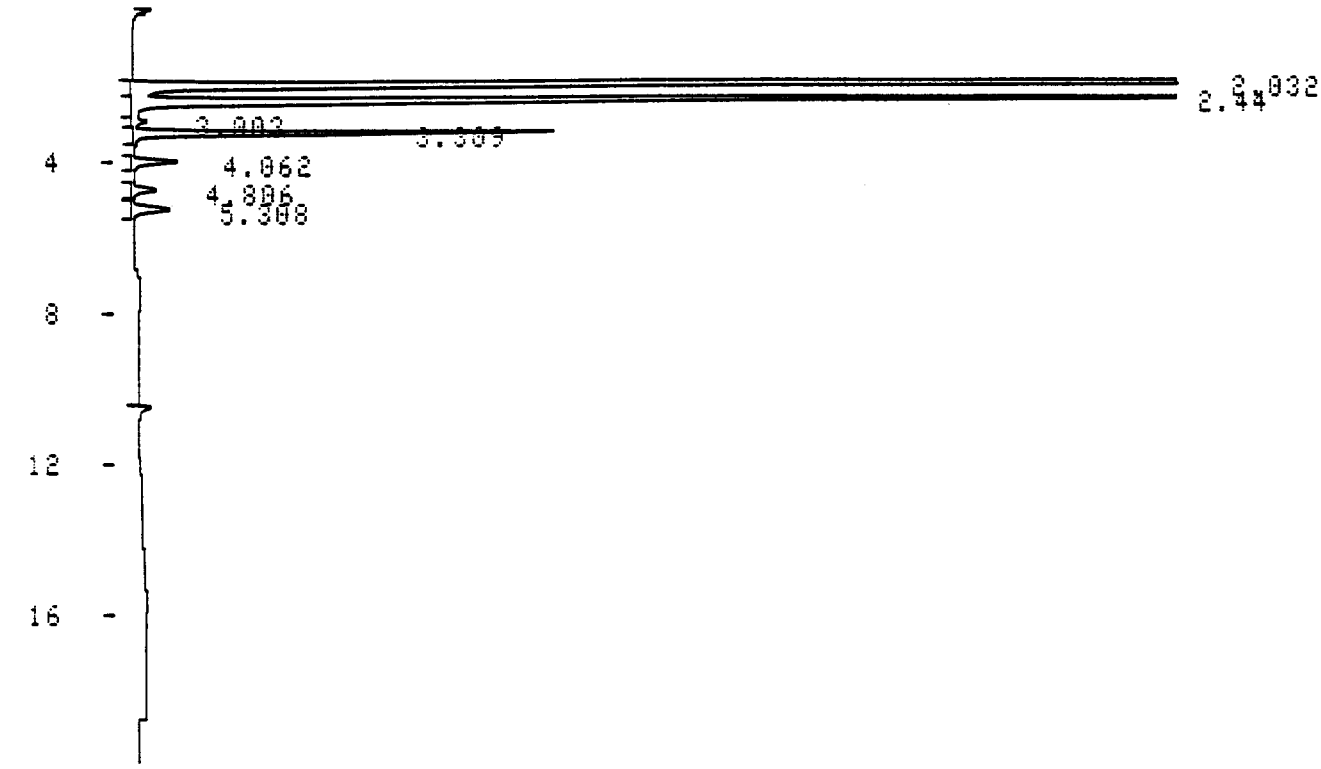
Total indicated horsepower (IHP) = 743 @ 849 RPM
Gas horsepower (GHP) = 782 @ 849 RPM
Compressor total horsepower (BHP) = 782 @ 849 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 849 for 849 RPM
Percent Load = 92%

* WARNING: Check the measured line pressures

Recommendations and Observations:
ANNUAL SOURCE TEST RUN # 3

Analyst signature: M Bennett

BECHTEL UNIT # K-59
4-14-92 REPORT # 10-101
HC SAMPLE # 1

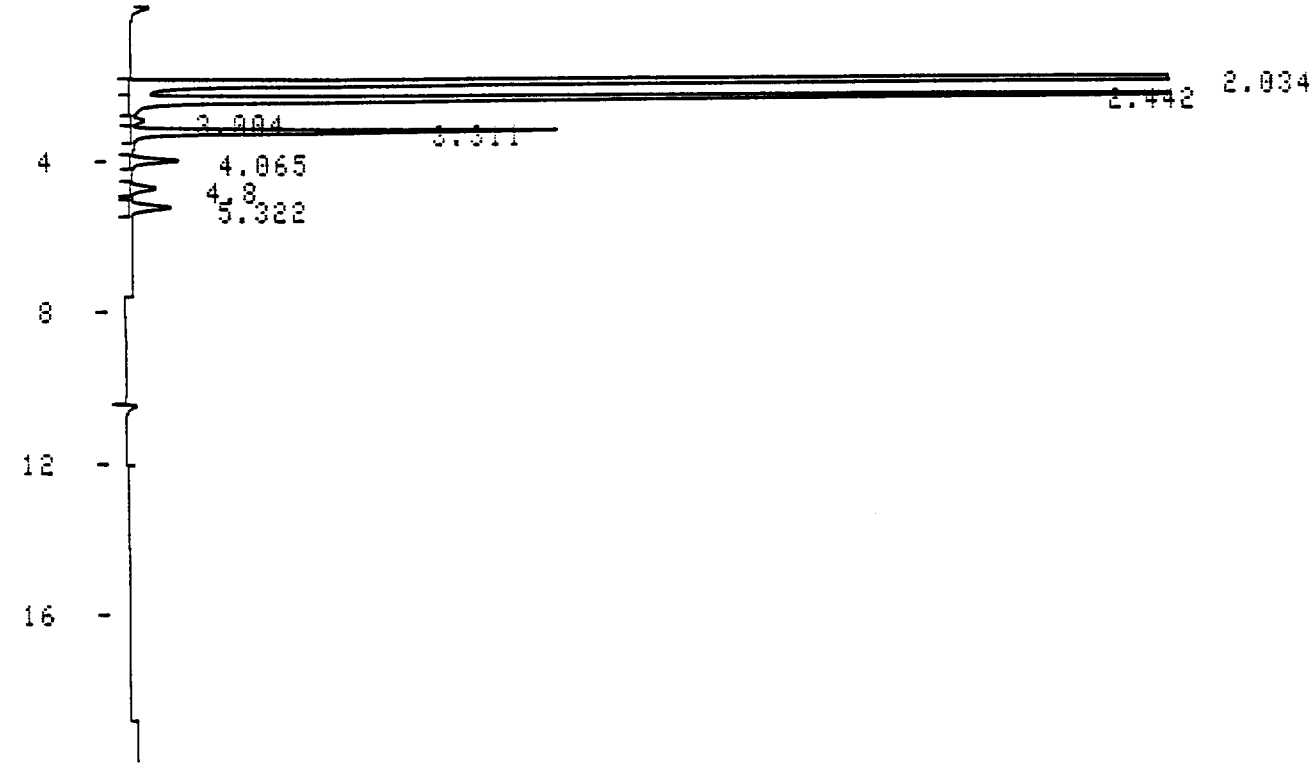


CHROMATOGRAM 1 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.032	318004		1	1414.4114	C-1
2	2.44	78636	V	2	175.7933	C-2
3	3.003	866	V	10	1.9355	C-2
4	3.309	21196	V	3	31.8294	C-3
5	4.062	3002		11	4.5083	C-3
6	4.806	1683		7	1.9436	C-4
7	5.308	2964		4	3.4222	C-4
	TOTAL	426350			1633.8436	

GROUP(NAME)	CONC
C-1	1414.4114
C-2	177.7288
C-3	36.3377
C-4	5.3658
C-5	0
C-6+	0

BECHTEL UNIT # K-59
4-15-92 REPORT # 10-101
HC SAMPLE # 2

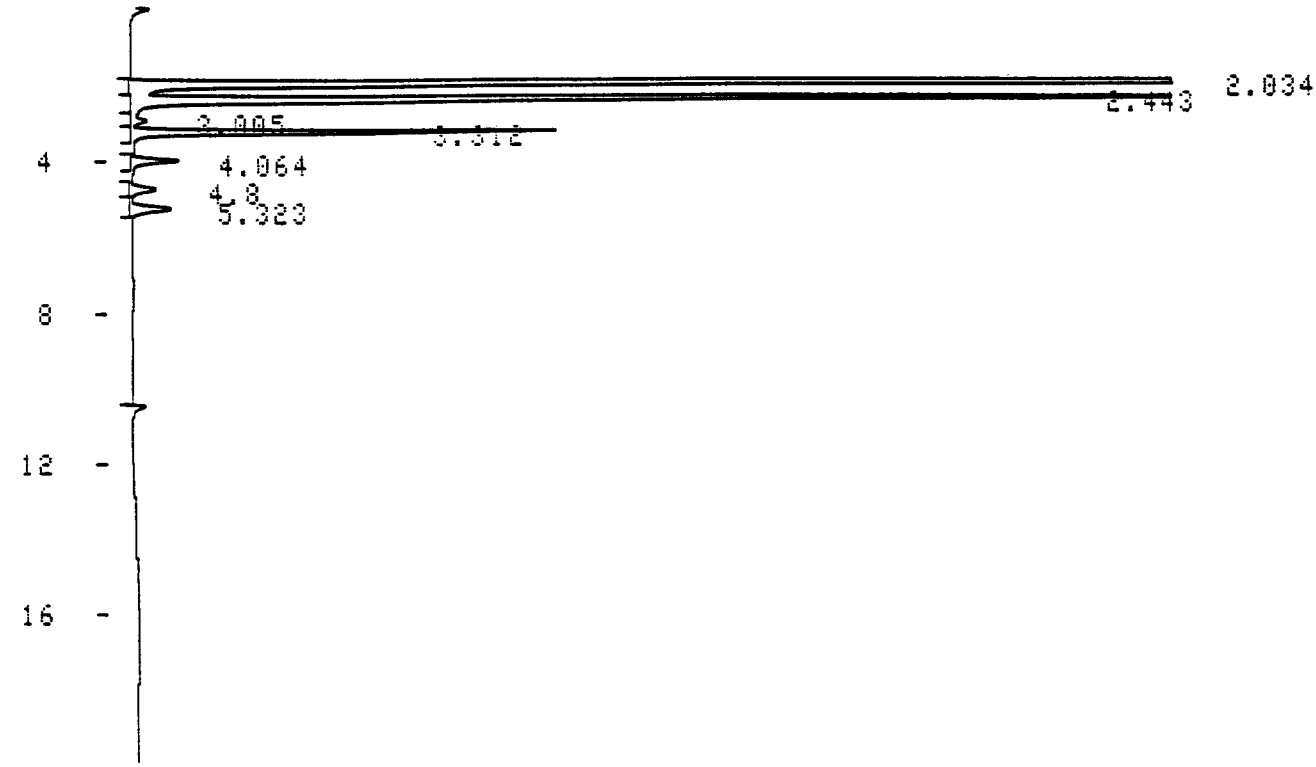


CHROMATOGRAM 1 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.034	339265		1	1508.9788	C-1
2	2.442	79124	V	2	176.8847	C-2
3	3.004	786	V	10	1.7576	C-2
4	3.311	21427	V	3	32.1765	C-3
5	4.065	3030		11	4.5498	C-3
6	4.8	1780		7	2.0552	C-4
7	5.322	2998		4	3.4619	C-4
	TOTAL	448411			1729.8642	

GROUP(NAME)	CONC
C-1	1508.9788
C-2	178.6423
C-3	36.7264
C-4	5.517
C-5	0
C-6+	0

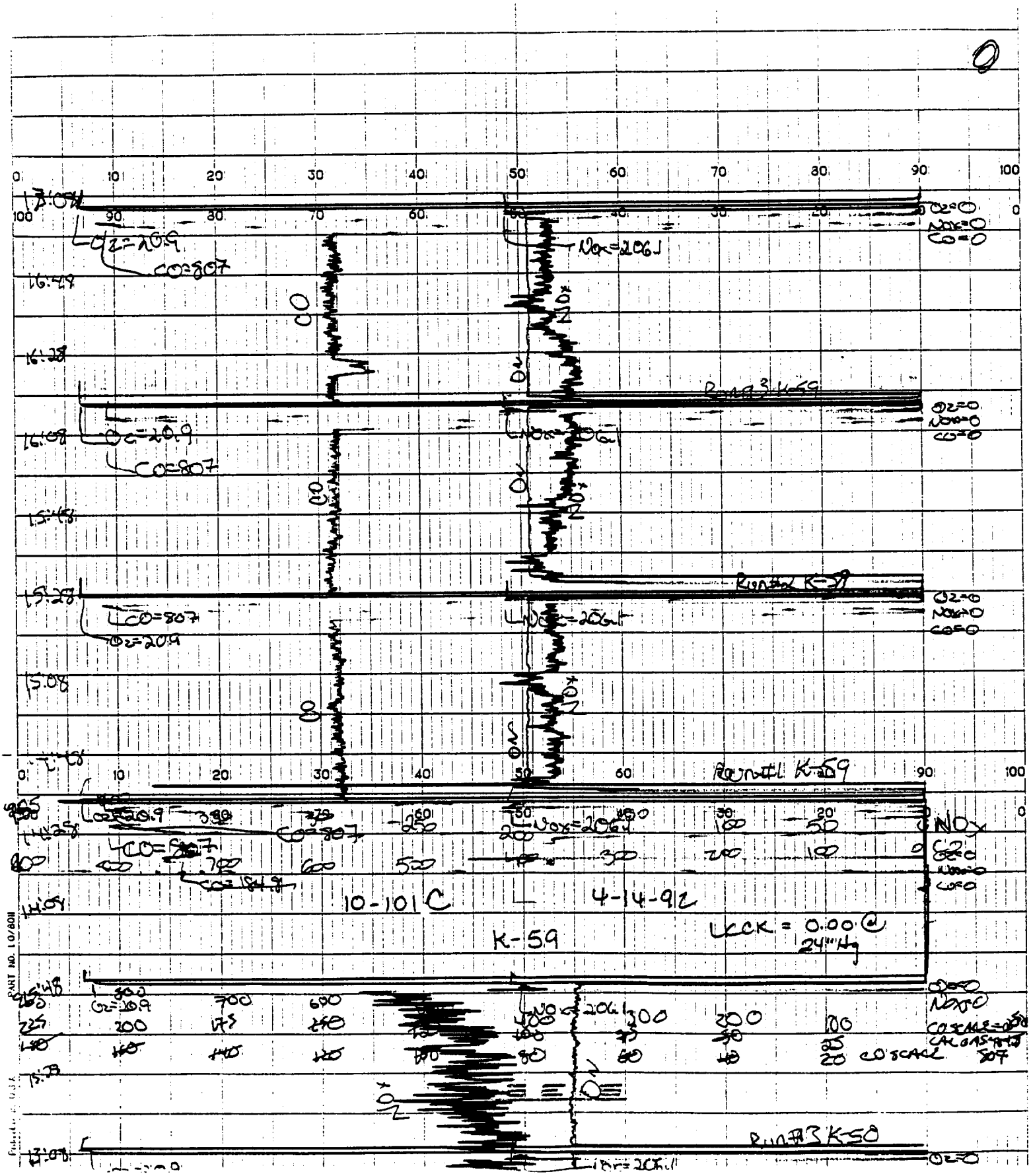
BECHTEL UNIT # K-59
4-15-92 REPORT # 10-101
HC SAMPLE # 3



CHROMATOGRAM 1 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.034	328936		1	1463.0377	C-1
2	2.443	78622	V	2	175.7625	C-2
3	3.005	1005	V	10	2.246	C-2
4	3.312	21274	V	3	31.9465	C-3
5	4.064	3001		11	4.5061	C-3
6	4.8	1745		7	2.0144	C-4
7	5.323	2888	V	4	3.3345	C-4
	TOTAL	437470			1682.8474	

GROUP(NAME)	CONC
C-1	1463.0377
C-2	178.0085
C-3	36.4526
C-4	5.3489
C-5	0
C-6+	0



Run #3 K-59
Run #2 K-59
Run #1 K-59
Run #3 K-50
10-101 C
4-14-92
K-59
LCCK = 0.00 @ 24" Hg
CO=807
O2=20.9
NOx=206.1
O2=0
NOx=0
CO=0
CO SCALE

UALITY CONTROL

CHAIN OF CUSTODY RECORD

Submitted to: Zalco Labs

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT
Bechtel Petroleum	K-50, K-51, K-59

REPORT NO.	SAMPLER
10-101	JH

METHOD	REPORT ATTN.	PO#
	Terry Rowles	1871

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	O_2/N_2 Split	Low Range Total Sulfur as H_2S				
Bomb	Fuel Gas	4-14-92			✓	✓					
Bag	Fuel Gas	4-14-92			✓		✓				

COMMENTS:

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Terry Rowles	4-15-92		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[illegible]	4-15-92		
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

PETRO CHEM ENVIRONMENTAL SERVICES, INC.
3207 Antonino Avenue, Bakersfield, CA 93308
(805) 327-7300 FAX (805) 327-3459

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

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

PETRØ1

TO:

SCOTT DAVIS
PETROCHEM ENVIRONMENTAL
3207 ANTONINO AVE.
BAKERSFIELD, CA 93388

DATE : 05/24/91

RECEIVED JUN - 6 1991

CUSTOMER ORDER NUMBER: 1316

PAGE 1

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.:	CC713					
			Monitor Labs Model 8440		05/06/91	05/20/91
Nitric Oxide	206.1 ± 2.1 ppm	GMIS	S/N 136	11/20/91	206.2 ppm	206.5 ppm
		Cylinder #	Continuous		205.4 ppm	205.9 ppm
		CC7341	Chemiluminescence		205.8 ppm	206.3 ppm
		@ 247.6 ppm	Last Cal Date: 05/01/91	Mean:	205.8 ppm	206.3 ppm
			Carle Insts Model 8000		05/09/91	05/21/91
Carbon Monoxide	184.8 ± 1.8 ppm	GMIS	S/N 8249	11/21/91	185.8 ppm	185.4 ppm
		Cylinder #	Methanation/FID		184.1 ppm	183.7 ppm
		CC87840	Gas Chromatography		184.4 ppm	185.5 ppm
		@ 277.6 ppm	Last Cal Date: 02/26/91	Mean:	184.7 ppm	184.9 ppm
			Interscan Model RM2450P		05/06/91	05/16/91
Sulfur Dioxide	211.5 ± 2.1 ppm	GMIS	S/N 72138	11/16/91	211.9 ppm	211.3 ppm
		Cylinder #	Electrochemical		210.1 ppm	211.7 ppm
Nitrogen,O2-Free Balance		CC37855	Gas Chromatography		211.7 ppm	212.2 ppm
Cylinder Pressure: 2000 psig		@ 266.9 ppm	Last Cal Date: 05/02/91	Mean:	211.2 ppm	211.7 ppm

ppm = umole/mole % = mole-%

The above analyses were performed in accordance with EPA-1987 Traceability Protocol # 1, Section 3.0.4, Procedure G1.

Analyst: Mark Monson
M.J. Monson

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.

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

Petro Chem Environmental Services Inc

SCOTT - MARRIN, INC. 2001 THIRD ST., UNIT H RIVERSIDE, CALIFORNIA 92507

REPORT OF ANALYSIS

CUSTOMER ORDER NUMBER: 1653/Reanalysis

CYLINDER NUMBER CC83789

COMPONENT	CONCENTRATION (v/v)
Carbon Monoxide	807 ± 8 ppm
Nitric Oxide	727 ± 7 ppm
Sulfur Dioxide	906 ± 9 ppm
Nitrogen*	Balance

Cylinder pressure: 1100 psig

*Oxygen-free

Replicate	01/06/92	813 ppm
Analysis		816 ppm
Data On		809 ppm
CO:	Mean	813 ppm

Expiration Date CO: 07/06/92

Replicate	01/03/92	733 ppm
Analysis		732 ppm
Data On		734 ppm
NO:	Mean	733 ppm

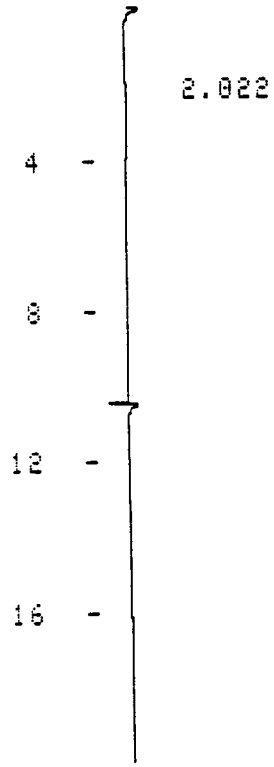
Expiration Date NO: 07/03/92

Replicate	01/03/92	901 ppm
Analysis		903 ppm
Data On		904 ppm
SO2:	Mean	903 ppm

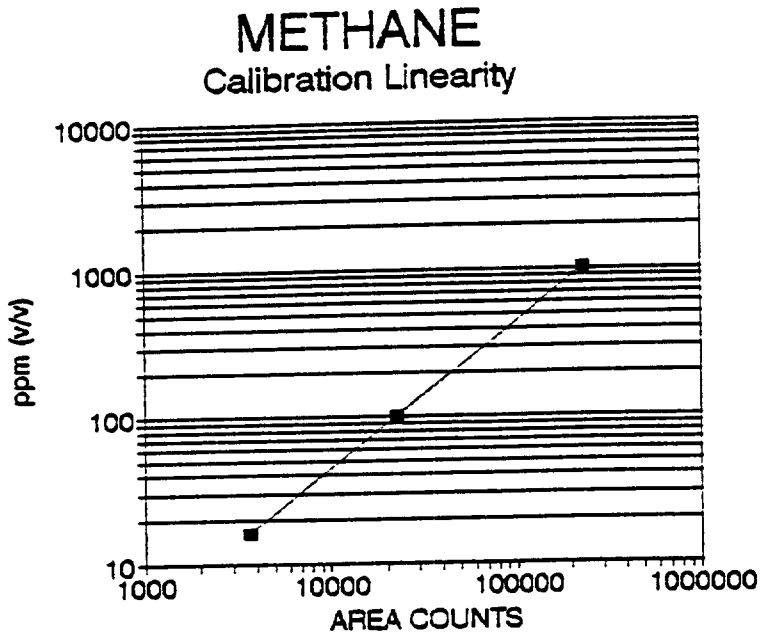
Expiration Date SO2: 07/03/92

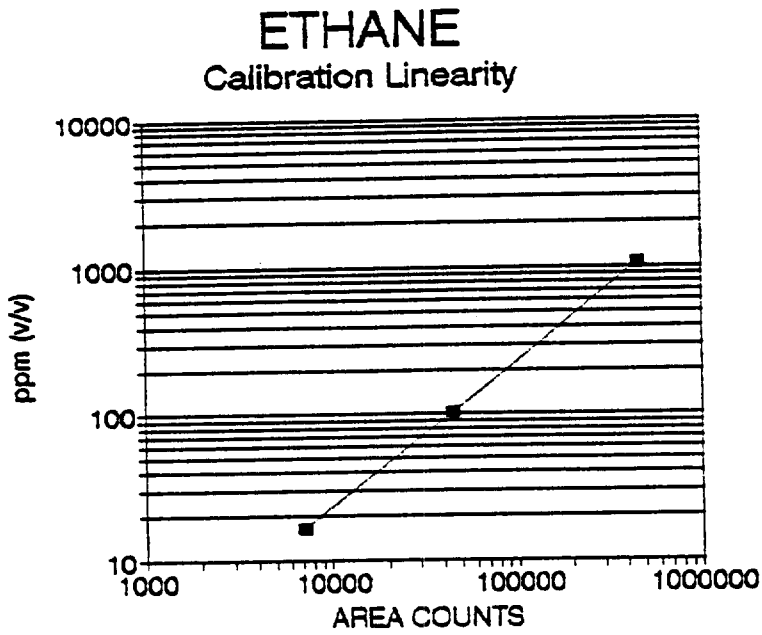
Petro Chem Environmental Services, Inc.

SYSTEM BLANK
UHP NITROGEN

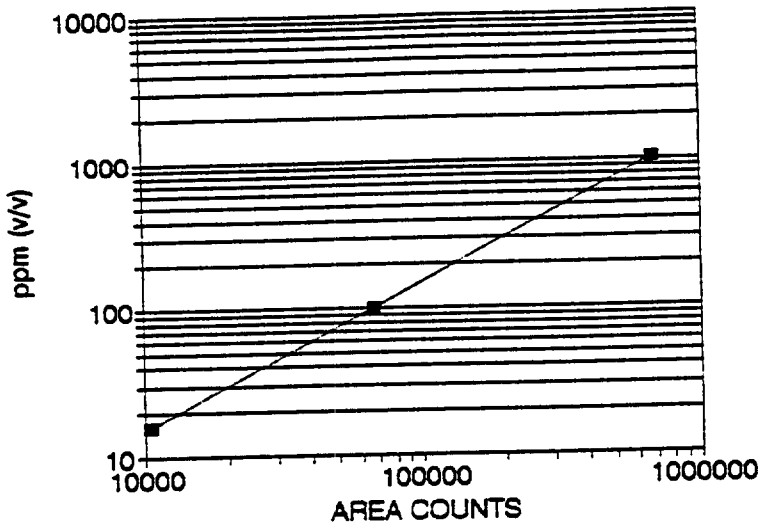


CHROMATOGRAM 1 MEMORIZED
WARNING NO PEAK

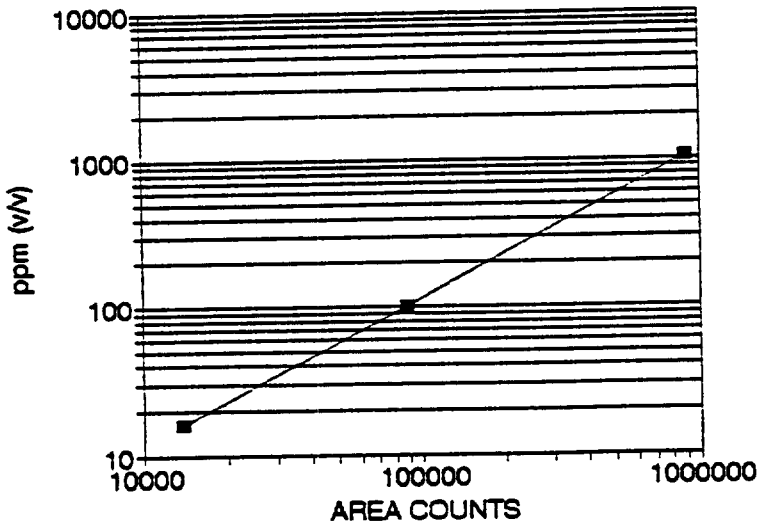

METHANE
Calibration Linearity
10000
1000
100
10
ppm (v/v)
1000
10000
100000
1000000
AREA COUNTS


ETHANE
Calibration Linearity
10000
1000
100
10
ppm (v/v)
1000
10000
100000
1000000
AREA COUNTS

PROPANE
Calibration Linearity

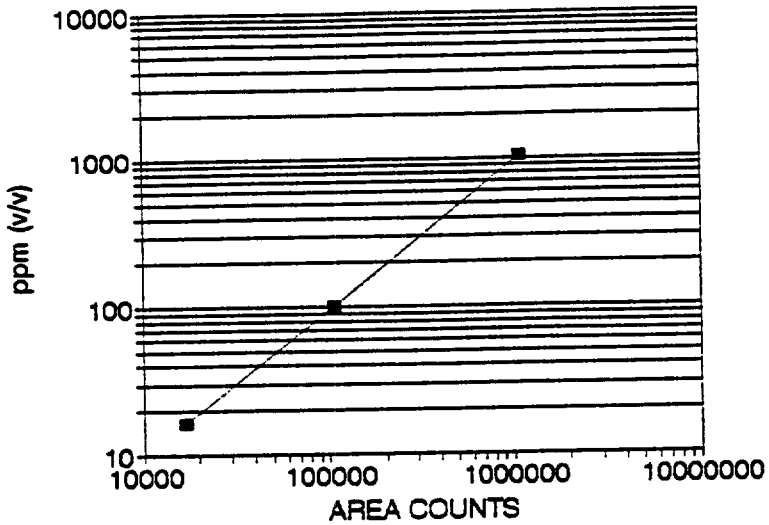


BUTANE
Calibration Linearity



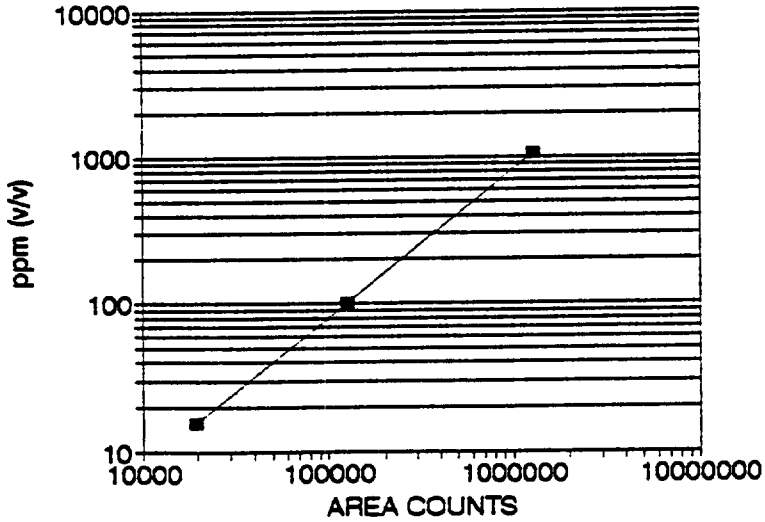
PENTANE

Calibration Linearity

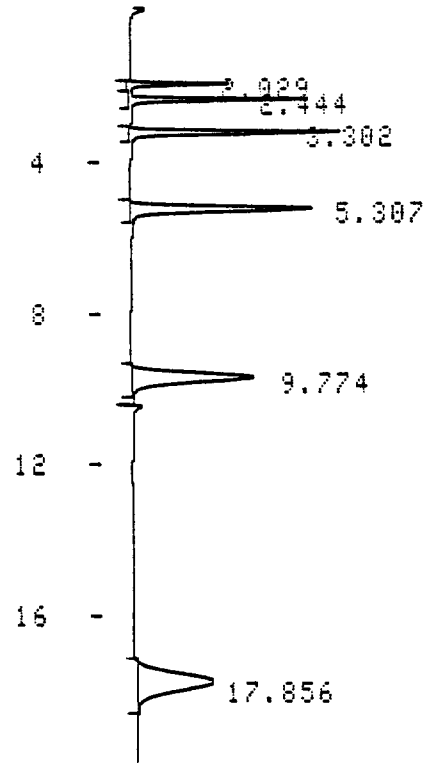


HEXANES+

Calibration Linearity



15PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 1

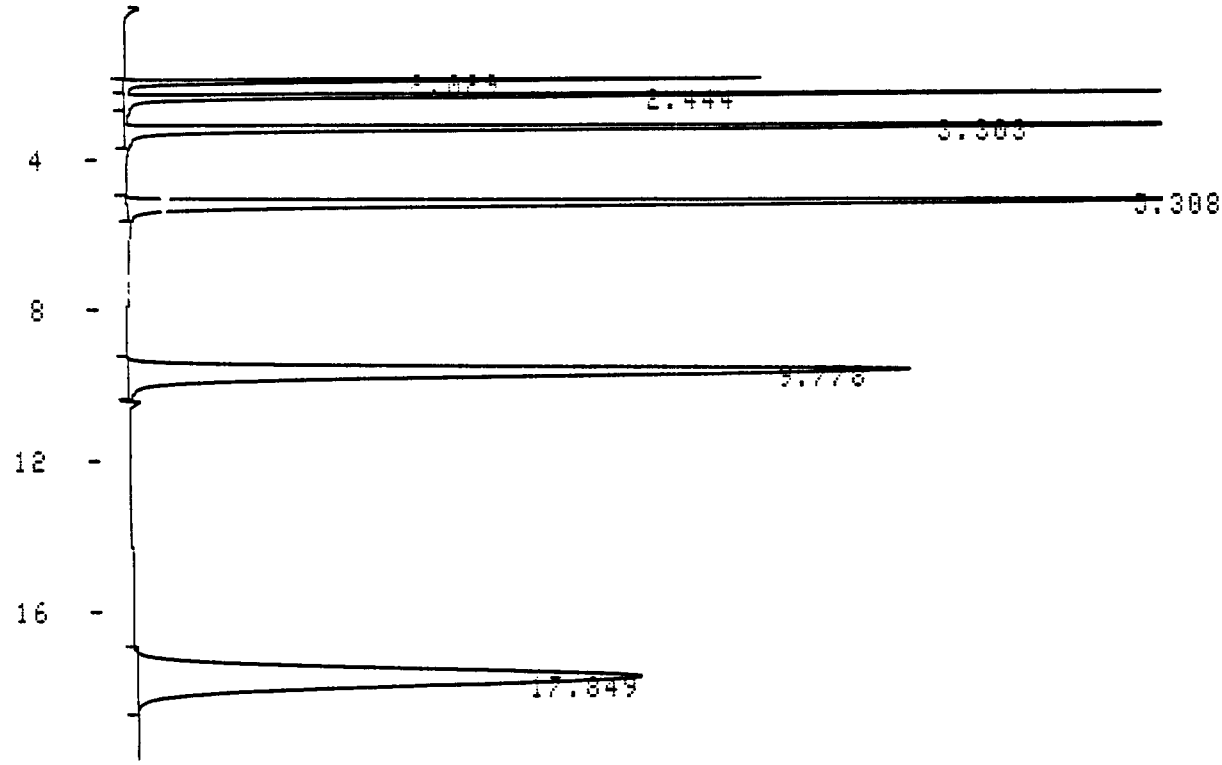


CHROMATOGRAM 1 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.029	3642		1	16.72	C-1
2	2.444	7159	V	2	16.6654	C-2
3	3.302	10524		3	16.6191	C-3
4	5.307	13881		4	16.4416	C-4
5	9.774	16877		5	14.818	C-5
6	17.856	19390		6	15.413	C-6+
	TOTAL	71474			96.677	

GROUP(NAME)	CONC
C-1	16.72
C-2	16.6654
C-3	16.6191
C-4	16.4416
C-5	14.818
C-6+	15.413

100PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 220

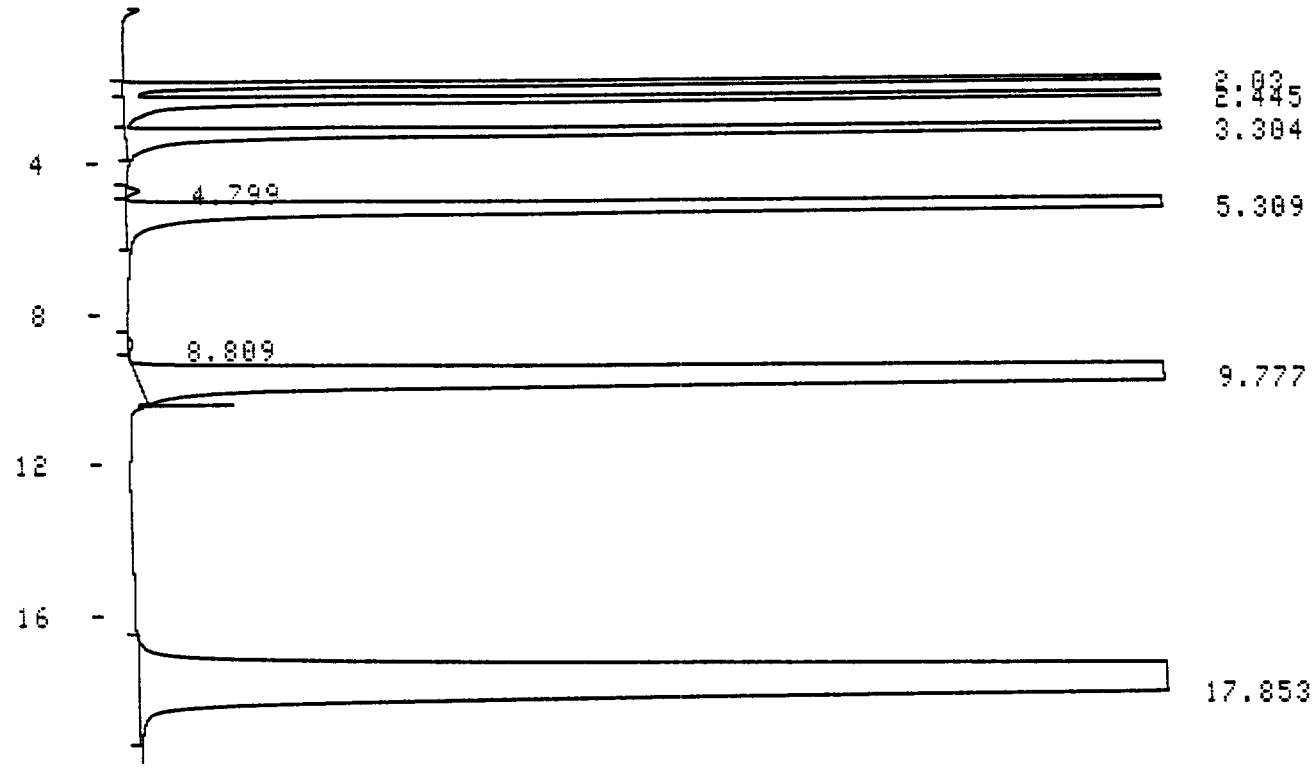


CHROMATOGRAM 1 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.029	22708		1	102.3671	C-1
2	2.444	45179	V	2	102.1317	C-2
3	3.303	66593	V	3	102.2429	C-3
4	5.308	87472		4	100.0008	C-4
5	9.778	106771		5	105.1865	C-5
6	17.849	126698		6	114.9388	C-6+
	TOTAL	455421			626.8677	

GROUP(NAME)	CONC
C-1	102.3671
C-2	102.1317
C-3	102.2429
C-4	100.0008
C-5	105.1865
C-6+	114.9388

1000PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 220

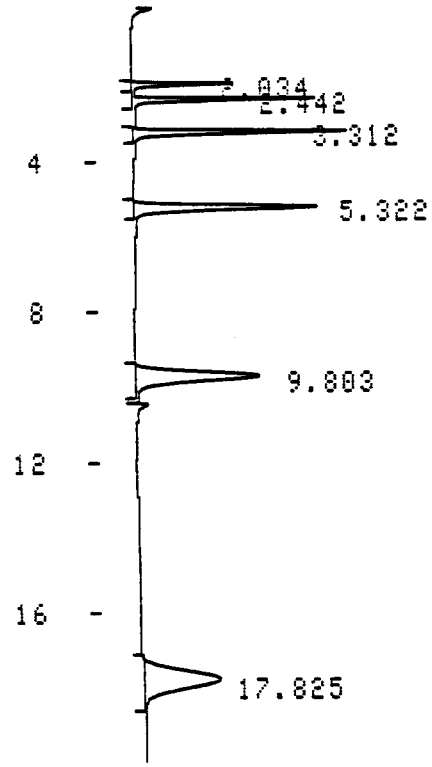


CHROMATOGRAM 1 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.03	231007		1	1019.5303	C-1
2	2.445	461944	V	2	1062.6281	C-2
3	3.304	681745		3	1026.9259	C-3
4	4.799	943		7	1.0821	C-4
5	5.309	902564		4	1035.6925	C-4
6	8.809	769		9	0.7294	C-5
7	9.777	1094152		5	1038.1333	C-5
8	17.853	1311696		6	1045.9266	C-6+
		---			---	
	TOTAL	4684820			6230.6469	

GROUP(NAME)	CONC
C-1	1019.5303
C-2	1062.6281
C-3	1026.9259
C-4	1036.7745
C-5	1038.8626
C-6+	1045.9266

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

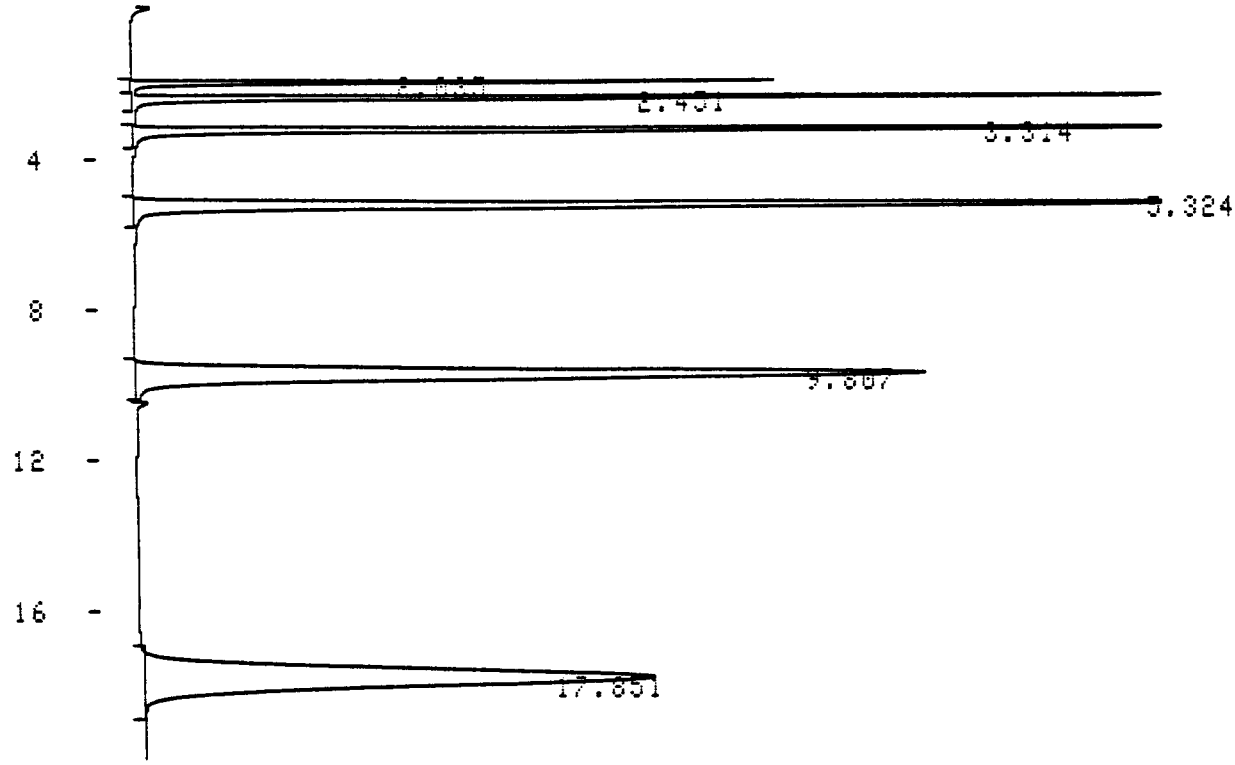


CHROMATOGRAM 1 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.034	3694		1	16.7344	C-1
2	2.442	7264	V	2	16.7413	C-2
3	3.312	10762		3	16.8736	C-3
4	5.322	14142		4	16.8094	C-4
5	9.803	17244		5	15.1213	C-5
6	17.825	19714		6	15.4533	C-6+
	TOTAL	72819			97.7334	

GROUP(NAME)	CONC
C-1	16.7344
C-2	16.7413
C-3	16.8736
C-4	16.8094
C-5	15.1213
C-6+	15.4533

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



CHROMATOGRAM 1 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.035	22848		1	101.6221	C-1
2	2.451	45451	V	2	101.608	C-2
3	3.314	67555		3	101.445	C-3
4	5.324	89178		4	102.9698	C-4
5	9.807	108165		5	100.3934	C-5
6	17.851	128730		6	101.6037	C-6+
	TOTAL	461927			609.6419	

GROUP(NAME)	CONC
C-1	101.6221
C-2	101.608
C-3	101.445
C-4	102.9698
C-5	100.3934
C-6+	101.6037

COMPANY : PETRO CHEM ENVIRONMENTAL SERVICES, INC.
UNIT : BV-1
DATE : 3-17-92

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

QUARTERLY LINEARITIES

CYL #	RANGE = 2500	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
ALM023356	HIGH	1987	1987	0
CC83789	MID	727	727	0
	ZERO	0	0	0

CYL #	RANGE = 1000	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC83789	HIGH	727	727	0
SA2954	MID	441	441	0
	ZERO	0	0	0

CYL #	RANGE = 250	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC28365	HIGH	202	206.3	-1.72
CC43767	MID	81.7	81.7	0
	ZERO	0	0	0

CYL #	RANGE = 100	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC43767	HIGH	81.5	81.7	-0.2
ALM002359	MID	41.8	41.82	-0.02
	ZERO	0	0	0

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

COMPANY : PETRO CHEM ENVIRONMENTAL SERVICES, INC.
UNIT : BV-1
DATE : 3-17-92

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

QUARTERLY LINEARITIES

CYL #	RANGE = 5000	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
ALM023356	HIGH	1992	1986	0.12
CC83789	MID	806	807	-0.02
	ZERO	0	0	0

CYL #	RANGE = 1000	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC83789	HIGH	806	807	-0.1
SA2954	MID	382	382	0
	ZERO	0	0	0

CYL #	RANGE = 100	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
CC43767	HIGH	81.5	82.8	-1.3
ALM002359	MID	40.5	40.53	-0.03
	ZERO	0	0	0

CHECK LIST:

OPTICS CHECK AND CLEAN	✓
DUST	✓
	✓

COMPANY : PETRO CHEM ENVIRONMENTAL SERVICES, INC.
UNIT : BV-1
DATE : 3-17-92

ANALYZER : O2 TELEDYNE MODEL 320AX
SERIAL # : SN 93834

QUARTERLY LINEARITIES

CYL #	RANGE = 25	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
AMBIENT	HIGH	20.7	20.9	-0.8
LK273312	MID	15	15	0
	ZERO	0.00	0	0

CYL #	RANGE = 25	ANALYZER VALUE %	ACTUAL VALUE%	%OF RANGE DEVIATION
T623349	HIGH	7	7	0
HKL34717	MID	4	4	0
	ZERO	0.00	0	0

CHECK LIST:

DUST	✓
FUEL CELL	✓
ELECTRICAL CONNECTION	✓