TABLE OF CONTENTS

I. SUMMARY OF RESULTS 3

II. INTRODUCTION 8

A. Source Information/Test Procedures 9
B. Discussion 12

III. CARB METHOD 410A: B,T,X,E & PROPYLENE 13

A. Results & Data Reduction 14
B. Lab Analysis 18
C. Lab QC 26

IV. CARB METHOD 422.102: 1,3-BUTADIENE 35

A. Results & Data Reduction 36
B. Lab Analysis 37
C. Lab QC 41

V. CARB METHOD 429: PAH 53

A. Results & Data Reduction 54
B. Lab Analysis 59
C. Lab QC 72

VI. CARB METHOD 430: FORMALDEHYDE, ACETALDEHYDE, ACROLEIN . . . 76

A. Results & Data Reduction 77
B. Lab Analysis 85

APPENDICES

I. METHODOLOGY 91

II. QUALITY ASSURANCE 100

A. Meter calibration 101
B. Chain of Custodys 105
C. Discussion of packing procedures 108
D. Alta Analytical Log-In Checklist 109
E. CARB Method 422.102; Initial Performance Evaluation 113

III. RAW FIELD DATA 128

A. CARB Method 410A Field Data 129
B. CARB Method 429 Field Data 131
C. CARB Method 430 Field Data 141

IV. OPERATIONAL DATA (Supplied by BPOI) 145

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13-92
REPORT : 10-849 D

CARB METHOD 410A RESULTS
B, T, X, E, & PROPYLENE

COMPOUND		Field Blank ug/CM	STACK SAMPLE AVERAGE ug/CM	STACK SAMPLE AVERAGE lbs/hr
Benzene	*2,3	0.267 **	214	1.8E-03
Ethylbenzene	*1,2,3	0.324 **	43.4	4.0E-04
Toluene	*1,2,3	4.54	148	1.3E-03
Xylenes, Total	*1,2,3	2.31	460	4.0E-03
Propylene	*1,2,3	214 **	3650	3.1E-02

* Not detected in the condensable fraction for runs stated, used 1/2 detection limit.

** Not detected in field blank, used 1/2 detection limit.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13-92
REPORT : 10-849 D

CARB METHOD 422.102 RESULTS

1,3-BUTADIENE

			STACK SAMPLE AVERAGE		
	Blank	Bias Spike	EMISSIONS		
POLLUTANT	ppb	% Recovery	ppb	ug/CM	lbs/hr
1,3-Butadiene	0.5	96	159	351	3.1E-03

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-12/14-92
REPORT : 10-849 D

SUMMARY OF RESULTS

METHOD 429

(AVERAGE OF 3 RUNS)

		STACK SAMPLE AVERAGE				
Emittent	Field Blank ng	TOTAL ng	TOTAL ug	ug/DSCM	ppb	lb/hr
Naphthalene	1400	61000	61.0	2.0E+01	3.8E+00	1.8E-04
Acenaphthylene	**5	1600	1.60	5.2E-01	8.4E-02	4.7E-06
Acenaphthene	**5	293	0.29	9.6E-02	1.5E-02	8.6E-07
Fluorene	**5	853	0.85	2.8E-01	4.1E-02	2.5E-06
Phenanthrene	28	3533	3.53	1.2E+00	1.6E-01	1.0E-05
Anthracene	**5	240	0.24	7.8E-02	1.1E-02	7.0E-07
Fluoranthene	**5	437	0.44	1.4E-01	1.7E-02	1.3E-06
Pyrene	**5	307	0.31	1.0E-01	1.2E-02	9.0E-07
Benz (a) anthracene	**5	237	0.237	7.7E-02	8.3E-03	6.9E-07
Chrysene	**5	46	0.046	1.5E-02	1.6E-03	1.3E-07
Benzo(b) fluoranthene	**5	74	0.074	2.4E-02	2.4E-03	2.2E-07
Benzo(k) fluoranthene	**5	21	0.021	7.0E-03	6.8E-04	6.2E-08
Benzo(a)pyrene *1,2,3	**5	5	0.005	1.6E-03	1.6E-04	1.5E-08
Indeno(1,2,3-cd) pyrene	**5	14	0.014	4.7E-03	4.1E-04	4.2E-08
Dibenzo(a,h) anthracene *1,2,3	**5	5	0.005	1.6E-03	1.4E-04	1.5E-08
Benzo(g,h,i) perylene *2,3	**5	7	0.007	2.3E-03	2.0E-04	2.0E-08
				TOTAL	4.2E+00	2.0E-04

* Not detected in run(s) stated, used 1/2 detection limit

** Not detected in blank, used 1/2 detection limit

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-14-92
REPORT : 10-849 D

CARB METHOD 430 RESULTS
FORMALDEHYDE, ACETALDEHYDE, & ACROLEIN

COMPOUND	Field Blank Total ug	STACK SAMPLE AVERAGE Total ug	ug/CM	lbs/hr
Formaldehyde * 1	2.5	2	43.6	3.9E-04
Acetaldehyde * 1,2,3	2.0 **3	1	24.5	2.2E-04
Acrolein * 1,2,3	30	1	24.5	2.2E-04

* Not detected in runs stated, used 1/2 detection limit.

** Not detected in field blank, used 1/2 detection limit.

INTRODUCTION

Facility Description:

Bechtel Petroleum Operations, Inc. operates the Naval Petroleum Reserve #1 (NPR1) for the Department of Energy (DOE) and Chevron, U.S.A. (CUSA) at Elk Hills, California. The field comprises 75 square miles and is the largest producer of natural gas in California. The facility produces light crude oil and related natural gas products for sale.

Process Description:

NPR1 utilizes internal combustion engines for various functions in gas/petroleum processing at Elk Hills, including transport to and from the gas plants, pressure maintenance of the reservoir, pressure maintenance of gas plants, vapor recovery, and various other functions necessary for the operation of a producing oil field.

Source Description:

Four typical internal combustion engines were selected for the AB2588 test program. The sources are typical natural gas fired internal combustion engines utilized at Elk Hills.

Engine & Location	HP	Model # & Configuration	APCD #
K-27 17R	650	L7042GU Naturally aspirated w/ catalytic convertor	4091058 C
K-36 LTS-1	5500	616KVR Turbocharged w/precombustion chamber (PCC)	4091023 B
K-49 17R	1000	L7042GSI Turbocharged w/prestratified charge (PSC)	4091031 B
K-70 30R	1500	-NA- Turbocharged w/precombustion chamber (PCC)	4091082 A

This report contains the data and results of all testing performed on engine K-49.

INTRODUCTION
(con't)

On February 13 and 14, 1992, a series of source tests were conducted by Petro Chem Environmental Services, Inc. for Bechtel Petroleum Operations, Inc. on behalf of the Department of Energy (DOE) and Chevron, U.S.A., (CUSA). The purpose of the test was to document emissions for AB2588. The test unit was one internal combustion engine: K-49. Concentrations (ug/CM) and emissions (lbs/hr) of various organic compounds from the exhaust of the test units were determined using the following methods.

Parameters	Method	# Test Runs	Analytical Lab
B,T,X,E & Propylene	A	3 + Blank	Coast to Coast Analytical
Formaldehyde, Acetaldehyde, & Acrolein	B	3 + 3 Blanks + spike	Coast to Coast Analytical
PAH Total and speciated	C	3 + Blank + 3 spikes	Alta Analytical Laboratory, Inc.
1,3-Butadiene	D	3 + Blank + spike	Petro Chem Environmental Services, Inc.

Methods	
A. B, T, X, E, & Propylene	CARB Method 410A: Bag Sample with condensate trap. Bag analysis by EPA Method T014 GCMS. Condensate analysis by EPA Method 8260 GCMS.
B. Formaldehyde, Acetaldehyde, & Acrolein	CARB Method 430: DNPH impingement analysis by HPLC.
C. PAH	CARB Method 429: Analysis by high resolution GCMS.
D. 1,3-Butadiene	CARB Method 422.102: On site analysis by GC/PID. CARB Method 422.199: Quality assurance

All testing and sampling was performed by various PCES technicians under the supervision of Mark Ready of PCES. All source testing was carried out according to the test schedule (Table 1). Terry Rowles of PCES performed and supervised all 1,3-Butadiene testing. Mike Carr of Bechtel Petroleum Operations, Inc. supervised the operation of the test unit. Frank Ripepi of KCAPCD reviewed all of the testing procedures and observed some of the testing.

TABLE 1:
AB2588 TEST SCHEDULE

RUN #-TEST DESCRIPTION	DATE	SAMPLE TIME FROM/TO	TEST UNIT #	SOURCE OWNER	CARB METHOD
1-1,3-Butadiene	2-13-92	914	K-49	BECHTEL	422.102
2-1,3-Butadiene	2-13-92	926	K-49	BECHTEL	422.102
3-1,3-Butadiene	2-13-92	938	K-49	BECHTEL	422.102
1-B,T,X,E, & PROPYLENE	2-13-92	1115-1135	K-49	BECHTEL	410A
2-B,T,X,E, & PROPYLENE	2-13-92	1146-1206	K-49	BECHTEL	410A
3-B,T,X,E, & PROPYLENE	2-13-92	1215-1235	K-49	BECHTEL	410A
1-PAH	2-13-92	944-1316	K-49	BECHTEL	429
2-PAH	2-13-92	1406-1710	K-49	BECHTEL	429
3-PAH	2-14-92	916-1225	K-49	BECHTEL	429
1-Form, Acet, Acro	2-14-92	901-1041	K-49	BECHTEL	430
2-Form, Acet, Acro	2-14-92	1052-1232	K-49	BECHTEL	430
3-Form, Acet, Acro	2-14-92	1247-1427	K-49	BECHTEL	430

DISCUSSION

All data which is reported has not been corrected for blank analysis. The average amount of target compound stack sample has been reported and the average amount of target compound blank has been report in an adjacent column.

Where no target compound has been detected, one-half of the detection limit has been used to calculate emissions. That target compound has been asterisked and the run (or runs) which are non-detect are stated.

All testing prodeeded smoothly, without delays associated with either the test unit or the sampling equipment.

All samples were analysed within the required holding time stated in the method.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13-92
REPORT : 10-849 D

CARB METHOD 410A

SUMMARY OF RESULTS

LIGHT MOLECULAR WEIGHT HYDROCARBONS, GCMS

	TOTAL ug/CM			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Benzene	231	210	200	214
Ethylbenzene	74.1	35.1	21.1	43.4
Toluene	240	120	83	148
Xylenes, Total	790	370	220	460
Propylene	3221	4123	3606	3650

	LBS/HR			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Benzene	0.0020	0.0018	0.0017	0.0018
Ethylbenzene	0.0006	0.0003	0.0002	0.0004
Toluene	0.0021	0.0010	0.0007	0.0013
Xylenes, Total	0.0068	0.0032	0.0019	0.0040
Propylene	0.0276	0.0353	0.0309	0.0313

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13-92
REPORT : 10-849 D

METHOD 410A
@ 60° F

RUN #:	1	2	3
TIME :	1140	1153	1204
Vm (dry gas sampled)	0.765	0.76	0.79
Y (meter calib. factor)	0.98517	0.98517	0.98517
P bar (Barometric pressure)	29.12	29.12	29.12
P static (stack pressure, " H2O)	0	0	0
Delta H (differential meter press, " H2O)	0	0	0
Tm (meter temperature, R°)	535	532	534
Vm(std),dscf	**0.71**	**0.67**	**0.74**
Vm(std),dscm	**0.0202**	**0.0191**	**0.0209**

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13-92
REPORT : 10-849 D

CARB METHOD 410A

Light Molecular Weight Hydrocarbons, GCMS

RUN #1

Compound	Non-Condensable ppb	Non-Condensable ug/CM		Condensable ug/L *	Condensable ug/CM	TOTAL ug/CM	TOTAL lbs/hr
Benzene	66	230		0.3	0.639	231	0.0020
Ethylbenzene	16	74	**	0.05	0.106	74.1	0.0006
Toluene	58	240	**	0.1	0.213	240	0.0021
Xylenes, Total	170	790	**	0.05	0.106	790	0.0068
Propylene	1700	3200	**	10	21	3221	0.0276

Vm(std), DSCM	=	0.0202
DSCFM	=	2313

RUN #2

Compound	Non-Condensable ppb	Non-Condensable ug/CM		Condensable ug/L *	Condensable ug/CM	TOTAL ug/CM	TOTAL lbs/hr
Benzene	60	210		0.2	0.450	210	0.0018
Ethylbenzene	7	35	**	0.05	0.113	35.1	0.0003
Toluene	29	120	**	0.1	0.225	120	0.0010
Xylenes, Total	78	370	**	0.05	0.113	370	0.0032
Propylene	2200	4100	**	10	22.5	4123	0.0353

Vm(std), DSCM	=	0.0191
DSCFM	=	2313

RUN #3

Compound	Non-Condensable ppb	Non-Condensable ug/CM		Condensable ug/L *	Condensable ug/CM	TOTAL ug/CM	TOTAL lbs/hr
Benzene	57	200	**	0.05	0.103	200	0.0017
Ethylbenzene	4	21	**	0.05	0.103	21.1	0.0002
Toluene	20	83	**	0.10	0.206	83	0.0007
Xylenes, Total	46	220	**	0.05	0.103	220	0.0019
Propylene	1800	3400	**	100	206	3606	0.0309

Vm(std), DSCM	=	0.0209
DSCFM	=	2313

* ug/L of liquid sample

Calculations :

ug/CM (aqueous) = (ug/L * .043 Liter)/Vm(std),DSCM
lbs/hr = ug/CM * 2.205 * 10^-9 * .02832 CM/CF * 60 min/hr * DSCFM

Petro Chem Environmental Services, Inc.

**Not detected, used 1/2 detection limit

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13-92
REPORT : 10-849 D

CARB METHOD 410A
FIELD BLANK
Light Molecular Weight Hydrocarbons, GCMS

Compound	Non-Condensable ppb	Non-Condensable ug/CM	Condensable ug/L *	Condensable ug/CM	TOTAL ug/CM
Benzene	** 0.05	0.160	** 0.05	0.107	0.267
Ethylbenzene	** 0.05	0.217	** 0.05	0.107	0.324
Toluene	0.6	2.4	** 1.0	2.14	4.54
Xylenes, Total	0.5	2.2	** 0.05	0.107	2.31
Propylene	** 0.1	0.172	** 100	214	214

AVERAGE
Vm(std), DSCM = 0.0201

** Not detected, used 1/2 detection limit

COAST TO COAST ANALYTICAL SERVICES

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San Luis Obispo Division (805) 543-2553
141 Suburban Road, San Luis Obispo, California 93401 FAX (805) 543-2685

Lab Number : I-0611-5
Project : 10-849 Bechtel

CLIENT: Terry Rowles
Petro Chem Enviromental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/14/92
Analyzed by: GD
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-49 17R Noncondensable #1	Air	Mark Ready	01/13/92	02/14/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	66.	230.	
Toluene	1.	58.	240.	
Ethylbenzene	1.	16.	74.	
Xylenes	1.	170.	790.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	1700.	3200.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

03/09/92
MSD1/1C62E
LRH/ge
IB14M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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Lab Number : I-0611-6
Project : 10-849 Bechtel

CLIENT: Terry Rowles
Petro Chem Enviromental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/14/92
Analyzed by: GD
Method : EPA TO-14

R E V I S E D
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-49 17R Noncondensable #2	Air	Mark Ready	01/13/92	02/14/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	60.	210.	
Toluene	1.	29.	120.	
Ethylbenzene	1.	7.	35.	
Xylenes	1.	78.	370.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	2200.	4100	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

03/09/92
MSD1/1C63E
LRH/ge
IB14M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

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Lab Number : I-0611-7
Project : 10-849 Bechtel

CLIENT: Terry Rowles
Petro Chem Enviromental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/14/92
Analyzed by: GD
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-49 17R Noncondensable #3	Air	Mark Ready	01/13/92	02/14/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	57.	200.	
Toluene	1.	20.	83.	
Ethylbenzene	1.	4.	21.	
Xylenes	1.	46.	220.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	1800.	3400	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

03/09/92
MSD1/1C64E
LRH/ge
IB14M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

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Vice President

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Lab Number : I-0611-8
Project : 10-849 Bechtel

CLIENT: Terry Rowles
Petro Chem Environmental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/14/92
Analyzed by: GD
Method : EPA TO-14

R E V I S E D
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-48 17R Noncondensable Blank	Air	Mark Ready	01/13/92	02/14/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	0.1	ND	ND	
Toluene	0.1	0.6	2.4	
Ethylbenzene	0.1	ND	ND	
Xylenes	0.1	0.5	2.2	
Ethylene Dichloride	0.1	ND	ND	
Ethylene Dibromide	0.1	ND	ND	
Propylene	0.2	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

03/09/92
MSD1/1C61E
LRH/ge
IB14M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

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Lab Number : I-0611-1
Project : 10-849 Bechtel

CLIENT: Terry Rowles
Petro Chem Environmental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/21/92
Analyzed by: RF
Method : EPA 8260

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-49 17R Condensable #1	Aqueous	Mark Ready	02/13/92	02/14/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.1	0.3	
Ethylbenzene	(100411)	0.1	ND	
Toluene	(108883)	0.2	ND	
Xylenes, Total		0.1	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			115.	
Toluene-d8 (% Surrogate Recovery)			102.	
p-Bromofluorobenzene (% Surrogate Recovery)			98.	
Propylene		20.	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)

03/09/92
MSD2/2R56-7M04A
MH/bpl/cmo/dez
IB212WV

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Mary Havlicek, Ph.D.
President

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141 Suburban Road, San Luis Obispo, California 93401 FAX (805) 543-2685

Lab Number : I-0611-2
Project : 10-849 Bechtel

CLIENT: Terry Rowles
Petro Chem Environmental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/21/92
Analyzed by: RF
Method : EPA 8260

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-49 17R Condensable #2	Aqueous	Mark Ready	02/13/92	02/14/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.1	0.2	
Ethylbenzene	(100411)	0.1	ND	
Toluene	(108883)	0.2	ND	
Xylenes, Total		0.1	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			110.	
Toluene-d8 (% Surrogate Recovery)			99.	
p-Bromofluorobenzene (% Surrogate Recovery)			103.	
Propylene		20.	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)

03/09/92
MSD2/2R57-7M05A
MH/bpl/cmo/dez
IB212WV

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Mary Havlicek

Mary Havlicek, Ph.D.
President

COAST TO COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

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141 Suburban Road, San Luis Obispo, California 93401

(805) 543-2553
FAX (805) 543-2685

Lab Number : I-0611-3
Project : 10-849 Bechtel

CLIENT: Terry Rowles
Petro Chem Enviromental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/21/92
Analyzed by: BL
Method : EPA 8260

R E V I S E D
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
K-49 17R Condensable #3	Aqueous	Mark Ready	02/13/92	02/14/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1,2
Benzene	(71432)	1.	ND	
Ethylbenzene	(100411)	1.	ND	
Toluene	(108883)	2.	ND	
Xylenes, Total		1.	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			108.	
Toluene-d8 (% Surrogate Recovery)			97.	
p-Bromofluorobenzene (% Surrogate Recovery)			99.	
Propylene		200.	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) High concentration of some analytes caused the sample to be run diluted resulting in raised Practical Quantitation Limits for analytes. Refer to instrument blank for undiluted Practical Quantitation Limits.

03/09/92
MSD2/2R63C
MH/bpl/cmo/dez
IB212WV

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Mary Havlicek, Ph.D.
President

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San Luis Obispo Division
141 Suburban Road, San Luis Obispo, California 93401

(805) 543-2553
FAX (805) 543-2685

Lab Number : I-0611-4
Project : 10-849 Bechtel

CLIENT: Terry Rowles
Petro Chem Environmental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/21/92
Analyzed by: BL
Method : EPA 8260

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
K-49 17R Condensable Blank	Aqueous	Mark Ready	02/13/92	02/14/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1,2
Benzene	(71432)	1.	ND	
Ethylbenzene	(100411)	1.	ND	
Toluene	(108883)	2.	ND	
Xylenes, Total		1.	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			114.	
Toluene-d8 (% Surrogate Recovery)			99.	
p-Bromofluorobenzene (% Surrogate Recovery)			102.	
Propylene		200.	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) High concentration of some analytes caused the sample to be run diluted resulting in raised Practical Quantitation Limits for analytes. Refer to instrument blank for undiluted Practical Quantitation Limits.

03/09/92
MSD2/2R65C
MH/bpl/cmo/dez
IB212WV

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Mary Havlicek, Ph.D.
President

COAST - TO - COAST ANALYTICAL SERVICES

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QC Batch ID: IB14M1 I-0611-7
Project : K-49 17-R Bechtel

CLIENT: Terry Rowles
Petro Chem Enviromental
3207 Antonino Ave
Bakersfield, CA 93308

Analyzed : 02/14/92
Analyzed by: GD
Method : EPA TO-14

QC DUPLICATE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
Noncondensable #3	Air	Mark Ready	01/13/92	02/14/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	%DIFF	NOTE
FUEL FINGERPRINT in AIR					
Benzene	1.	66.	230.	14.	
Toluene	1.	24.	100.	19.	
Ethylbenzene	1.	3.6	17.	21.	
Xylenes	1.	38.	180.	20.	
Ethylene Dichloride	1.	ND	ND		
Ethylene Dibromide	1.	ND	ND		
PROPYLENE	2.	2000.	3700.	8.5	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/18/92
MSD1/1C65E
LRH/ge
I0611-7

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

COAST - TO - COAST ANALYTICAL SERVICES

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QC Batch ID: IB212WV

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/21/92
Analyzed by: RF
Method : EPA 8260

METHOD BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
METHOD BLANK	Aqueous			

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.1	ND	
Bromochloromethane	(74975)	0.1	ND	
Bromodichloromethane	(75274)	0.1	ND	
Bromoform	(75252)	0.2	ND	
Bromomethane (Methyl Bromide)	(74839)	0.1	ND	
Carbon Tetrachloride	(56235)	0.1	ND	
Chlorobenzene	(108907)	0.1	ND	
Chloroethane (Ethyl Chloride)	(75003)	0.1	ND	
Chloromethane (Methyl Chloride)	(74873)	0.1	ND	
2-Chloroethyl Vinyl Ether	(110758)	1.	ND	
Chloroform	(67663)	0.5	ND	
Dibromochloromethane	(124381)	0.1	ND	
1,2-Dichlorobenzene	(95501)	0.1	ND	
1,3-Dichlorobenzene	(541731)	0.1	ND	
1,4-Dichlorobenzene	(106467)	0.1	ND	
Dichlorodifluoromethane	(75718)	1.	ND	
1,1-Dichloroethane	(75343)	0.1	ND	
1,2-Dichloroethane (EDC)	(107062)	0.1	ND	
1,1-Dichloroethene	(75354)	0.1	ND	
cis-1,2-Dichloroethene	(156694)	0.1	ND	
trans-1,2-Dichloroethene	(156605)	0.1	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)

02/27/92
MSD2/2R47C
MH/bpl/cmo/dez
I0611-1

COAST-TO-COAST ANALYTICAL SERVICES

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QC Batch ID: IB212WV

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/21/92
Analyzed by: RF
Method : EPA 8260

METHOD BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
METHOD BLANK	Aqueous			

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
1,2-Dichloropropane	(78875)	0.1	ND	
cis-1,3-Dichloropropene	(10061015)	0.1	ND	
trans-1,3-Dichloropropene	(10061026)	0.1	ND	
Dichlorotrifluoroethane	(306832)	0.1	ND	
Ethylbenzene	(100411)	0.1	ND	
Methylene Chloride	(75092)	1.	ND	
1,1,2,2-Tetrachloroethane	(79345)	0.5	ND	
Tetrachloroethene (PCE)	(127184)	0.1	ND	
1,1,1-Trichloroethane (TCA)	(71556)	0.1	ND	
1,1,2-Trichloroethane	(79005)	0.1	ND	
Trichloroethene (TCE)	(79016)	0.1	ND	
Trichlorotrifluoroethane (F-113)	(76131)	0.5	ND	
Trichlorofluoromethane (F-11)	(75694)	0.5	ND	
Toluene	(108883)	0.2	ND	
Vinyl Chloride	(75014)	0.1	ND	
Xylenes, Total		0.1	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			97.	
Toluene-d8 (% Surrogate Recovery)			107.	
p-Bromofluorobenzene (% Surrogate Recovery)			100.	
Propylene		20.	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/27/92
MSD2/2R47C
MH/bpl/cmo/dez
I0611-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Mary Havlicek, Ph.D.
President

Petro Chem Environmental Services, Inc.

COAST - TO - COAST ANALYTICAL SERVICES

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QC Batch ID: IB212WV

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/21/92
Analyzed by: RF
Method : EPA 8260

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
QC SPIKE	Aqueous			

CONSTITUENT	*PQL µg/L	SPIKE AMOUNT	RESULT µg/L	%REC	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS					1,2
Benzene	0.1	10.	12.	120.	
Bromochloromethane	0.1	10.	11.	110.	
Bromodichloromethane	0.1	10.	11.	110.	
Bromoform	0.2	10.	8.4	84.	
Bromomethane (Methyl Bromide)	0.1	10.	12.	120.	
Carbon Tetrachloride	0.1	10.	13.	130.	
Chlorobenzene	0.1	10.	13.	130.	
Chloroethane (Ethyl Chloride)	0.1	10.	12.	120.	
Chloromethane (Methyl Chloride)	0.1	10.	11.	110.	
2-Chloroethyl Vinyl Ether	1.		NS		
Chloroform	0.5	10.	11.	110.	
Dibromochloromethane	0.1	10.	11.	110.	
1,2-Dichlorobenzene	0.1	10.	11.	110.	
1,3-Dichlorobenzene	0.1	10.	12.	120.	
1,4-Dichlorobenzene	0.1	10.	12.	120.	
Dichlorodifluoromethane	1.	10.	10.	100.	
1,1-Dichloroethane	0.1	10.	11.	110.	
1,2-Dichloroethane (EDC)	0.1	10.	6.8	68.	
1,1-Dichloroethene	0.1	10.	11.	110.	
cis-1,2-Dichloroethene	0.1	10.	11.	110.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) Spike was in analyte-free water.

02/27/92
MSD2/2R41C
MH/bpl/cmo/dez
I0611-1

COAST - TO - COAST ANALYTICAL SERVICES

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QC Batch ID: IB212WV

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/21/92
Analyzed by: RF
Method : EPA 8260

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
QC SPIKE	Aqueous			

CONSTITUENT	*PQL µg/L	SPIKE AMOUNT	RESULT µg/L	%REC	NOTE
trans-1,2-Dichloroethene	0.1	10.	11.	110.	
1,2-Dichloropropane	0.1	10.	11.	110.	
cis-1,3-Dichloropropene	0.1	10.	10.	100.	
trans-1,3-Dichloropropene	0.1	10.	10.	100.	
Dichlorotrifluoroethane	0.1		NS		
Ethylbenzene	0.1	10.	12.	120.	
Methylene Chloride	1.	10.	11.	110.	
1,1,2,2-Tetrachloroethane	0.5	10.	10.	100.	
Tetrachloroethene (PCE)	0.1	10.	12.	120.	
1,1,1-Trichloroethane (TCA)	0.1	10.	10.	100.	
1,1,2-Trichloroethane	0.1	10.	11.	110.	
Trichloroethene (TCE)	0.1	10.	13.	130.	
Trichlorotrifluoroethane (F-113)	0.5	10.	12.	120.	
Trichlorofluoromethane (F-11)	0.5	10.	11.	110.	
Toluene	0.2	10.	12.	120.	
Vinyl Chloride	0.1	10.	12.	120.	
Xylenes, Total	0.1	10.	12.	120.	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			107.	NS	
Toluene-d8 (% Surrogate Recovery)			104.	NS	
p-Bromofluorobenzene (% Surrogate Recovery)			102.	NS	
Propylene	20.		NS		

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit

02/27/92
MSD2/2R41C
MH/bpl/cmo/dez
I0611-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Mary Havlicek, Ph.D.
President

Petro Chem Environmental Services, Inc.

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QC Batch ID: IB212WV

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/21/92
Analyzed by: RF
Method : EPA 8260

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
QC SPIKE DUPLICATE	Aqueous			

CONSTITUENT	*PQL µg/L	SPIKE AMOUNT	RESULT µg/L	%REC	%DIFF	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS						1,2
Benzene	0.1	10.	12.	120.	0.	
Bromochloromethane	0.1	10.	12.	120.	8.7	
Bromodichloromethane	0.1	10.	12.	120.	8.7	
Bromoform	0.2	10.	9.4	94.	11.	
Bromomethane (Methyl Bromide)	0.1	10.	12.	120.	0.	
Carbon Tetrachloride	0.1	10.	13.	130.	0.	
Chlorobenzene	0.1	10.	13.	130.	0.	
Chloroethane (Ethyl Chloride)	0.1	10.	12.	120.	0.	
Chloromethane (Methyl Chloride)	0.1	10.	11.	110.	0.	
2-Chloroethyl Vinyl Ether	1.		NS			
Chloroform	0.5	10.	12.	120.	8.7	
Dibromochloromethane	0.1	10.	12.	120.	8.7	
1,2-Dichlorobenzene	0.1	10.	11.	110.	0.	
1,3-Dichlorobenzene	0.1	10.	12.	120.	0.	
1,4-Dichlorobenzene	0.1	10.	12.	120.	0.	
Dichlorodifluoromethane	1.	10.	12.	120.	18.	
1,1-Dichloroethane	0.1	10.	11.	110.	0.	
1,2-Dichloroethane (EDC)	0.1	10.	7.8	78.	14.	
1,1-Dichloroethene	0.1	10.	12.	120.	8.7	
cis-1,2-Dichloroethene	0.1	10.	12.	120.	8.7	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) Spike was in analyte-free water.

02/27/92
MSD2/2R45C
MH/bpl/cmo/dez
I0611-1

COAST-TO-COAST ANALYTICAL SERVICES

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QC Batch ID: IB212WV

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/21/92
Analyzed by: RF
Method : EPA 8260

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
QC SPIKE DUPLICATE	Aqueous			

CONSTITUENT	*PQL µg/L	SPIKE AMOUNT	RESULT µg/L	%REC	%DIFF	NOTE
trans-1,2-Dichloroethene	0.1	10.	12.	120.	8.7	
1,2-Dichloropropane	0.1	10.	12.	120.	8.7	
cis-1,3-Dichloropropene	0.1	10.	12.	120.	18.	
trans-1,3-Dichloropropene	0.1	10.	13.	130.	26.	
Dichlorotrifluoroethane	0.1		NS			
Ethylbenzene	0.1	10.	12.	120.	0.	
Methylene Chloride	1.	10.	11.	110.	0.	
1,1,2,2-Tetrachloroethane	0.5	10.	11.	110.	9.5	
Tetrachloroethene (PCE)	0.1	10.	13.	130.	8.	
1,1,1-Trichloroethane (TCA)	0.1	10.	12.	120.	18.	
1,1,2-Trichloroethane	0.1	10.	12.	120.	8.7	
Trichloroethene (TCE)	0.1	10.	13.	130.	0.	
Trichlorotrifluoroethane (F-113)	0.5	10.	13.	130.	8.	
Trichlorofluoromethane (F-11)	0.5	10.	12.	120.	8.7	
Toluene	0.2	10.	12.	120.	0.	
Vinyl Chloride	0.1	10.	13.	130.	8.	
Xylenes, Total	0.1	10.	11.	110.	8.7	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			112.	NS		
Toluene-d8 (% Surrogate Recovery)			101.	NS		
p-Bromofluorobenzene (% Surrogate Recovery)			95.	NS		
Propylene	20.		NS			

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit

02/27/92
MSD2/2R45C
MH/bpl/cmo/dez
I0611-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Mary Havlicek, Ph.D.
President

Petro Chem Environmental Services, Inc.

COAST - TO - COAST ANALYTICAL SERVICES

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QC Batch ID: IB14M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/14/92
Analyzed by: GD
Method : EPA TO-14

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
QC SPIKE	Air			

CONSTITUENT	*PQL µg/cu M	SPIKE AMOUNT	RESULT µg/cu M	%REC	NOTE
FUEL FINGERPRINT in AIR					1
Benzene	0.5	17.	17.	100.	
Toluene	0.5	20.	17.	85.	
Ethylbenzene	0.5	22.	22.	100.	
Xylenes	0.5	24.	23.	96.	
Ethylene Dichloride	0.5	22.	25.	114.	
Ethylene Dibromide	1.	40.	41.	103.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit
(1) Zero Air spiked with NIST SRM 1804, Cylinder # ALM-000881.

02/18/92
MSD1/1C68E
LRH/ge
I0611-5

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

COAST-TO-COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Goleta, CA • Benicia, CA • Camarillo, CA • Newport Beach, CA • Valparaiso, IN

San Luis Obispo Division
141 Suburban Road, San Luis Obispo, California 93401

(805) 543-2553
FAX (805) 543-2685

QC Batch ID: IB14M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/14/92
Analyzed by: CR
Method : EPA TO-14

INSTRUMENT BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
INSTRUMENT BLANK	Air			

CONSTITUENT	(CAS RN)	*PQL µg/cu M	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	(71432)	0.5	ND	
Toluene	(108883)	0.5	ND	
Ethylbenzene	(100411)	0.5	ND	
Xylenes		0.5	ND	
Ethylene Dichloride	(107062)	0.5	ND	
Ethylene Dibromide	(106934)	1.	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/18/92
MSD1/1C52E
LRH/ge
I0611-5

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13-92
REPORT : 10-849 D

CARB METHOD 422.102
1,3-BUTADIENE RESULTS

TEST	#1	#2	#3	
TIME	914	926	938	AVERAGE
ppb	162	152	162	159
ug/CM	358	336	358	351
lbs/hr	0.0032	0.0030	0.0032	0.0031

DSCFM = 2313 (AVERAGE OF METHOD 429 TRAVERSE)

EQUATIONS:
ug/CM = ppb * MW/24.41
lbs/hr = ppb * 1.581 * 10 ^-10 * MW * DSCFM

MW = 54

COMPANY : BECHTEL PETROLEUM
UNIT : K-49
DATE : 2-13-92
REPORT : 10-849 D

ANALYSIS REPORT

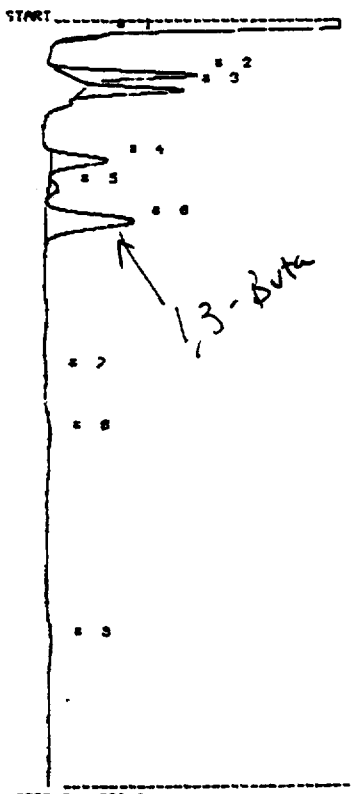
METHOD 422.102
1, 3-BUTADIENE

RESULTS

	RUN # 1	RUN # 2	RUN # 3	AVERAGE
TIME	9:14	9:26	9:38	
AREA COUNTS (mVS)	3400	3200	3400	3333
ppbv 1, 3-BUTADIENE	162	152	162	159

Petro Chem Environmental Services, Inc.

PHOTOVAC

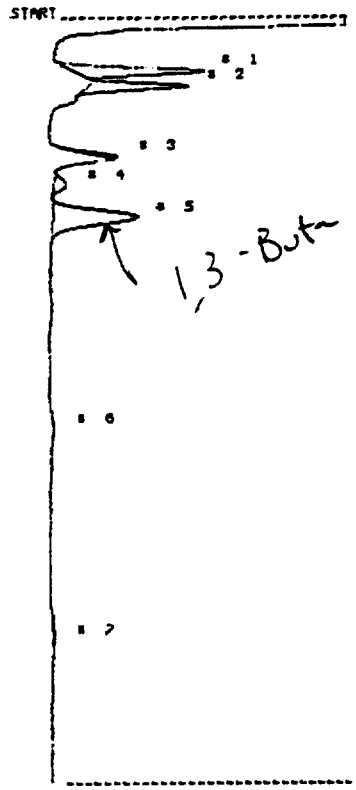


STOP @ 600.0
SAMPLE LIBRARY 1 FEB 13 1992 9:38
ANALYSIS # 9 BECHTEL
INTERNAL TEMP 25 UNIT K-49
GAIN 50 SAMPLE RUN

COMPOUND NAME	PEAK	R.T.	AREA/PPM	
UNKNOWN	2	43.4	2.4	US
UNKNOWN	3	55.1	1.9	US
UNKNOWN	4	118.3	1.5	US
UNKNOWN	5	132.7	256.2	mUS
UNKNOWN	6	158.5	2.4	US

RUN #3

PHOTOVAC

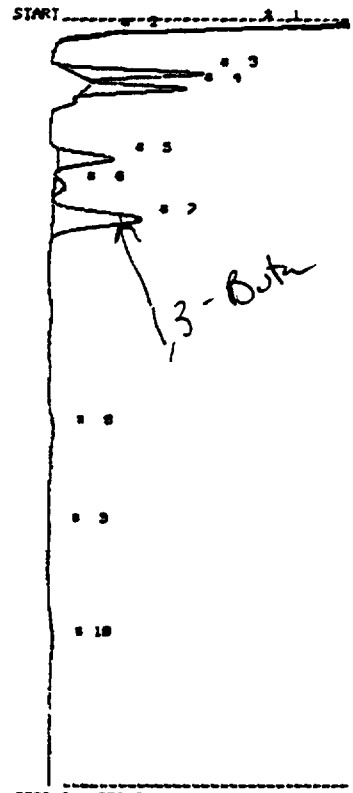


STOP @ 600.0
SAMPLE LIBRARY 1 FEB 13 1992 9:26
ANALYSIS # 8 BECHTEL
INTERNAL TEMP 24 UNIT K-49
GAIN 50 SAMPLE RUN

COMPOUND NAME	PEAK	R.T.	AREA/PPM	
UNKNOWN	1	43.5	2.4	US
UNKNOWN	2	55.1	1.8	US
UNKNOWN	3	118.4	151.5	mUS
UNKNOWN	4	132.7	314.8	mUS
UNKNOWN	5	158.3	3.2	US

RUN #2

PHOTOVAC



STOP @ 600.0
SAMPLE LIBRARY 1 FEB 13 1992 9:14
ANALYSIS # 7 BECHTEL
INTERNAL TEMP 24 UNIT K-49
GAIN 50 SAMPLE RUN

COMPOUND NAME	PEAK	R.T.	AREA/PPM	
UNKNOWN	1	5.5	728.2	mUS
UNKNOWN	3	43.5	2.5	US
UNKNOWN	4	55.2	1.8	US
UNKNOWN	5	118.5	1.5	US
UNKNOWN	6	132.7	271.9	mUS
UNKNOWN	7	158.3	3.4	US

RUN #1

COMPANY : BECHTEL PETROLEUM
UNIT : K-49
DATE : 2-13-92
REPORT : 10-849

QUALITY CONTROL REPORT

METHOD 422.102
1, 3-BUTADIENE

INSTRUMENT GAIN = 50
REGRESSION FORMULA Y = 0.222 + 0.0476X

MIDPOINT CALIBRATION STANDARD

CONCENTRATION (ppbv)	RESPONSE (mVS)	DIFFERENCE FROM INITIAL	ALLOWABLE DIFFERENCE
114	2400	0.00%	+/- 30%

ADDITIONAL CALIBRATION STANDARD

CONCENTRATION (ppbv)	RESPONSE (mVS)	DIFFERENCE FROM INITIAL	ALLOWABLE DIFFERENCE
57.7	1100	-8.33%	+/- 30%

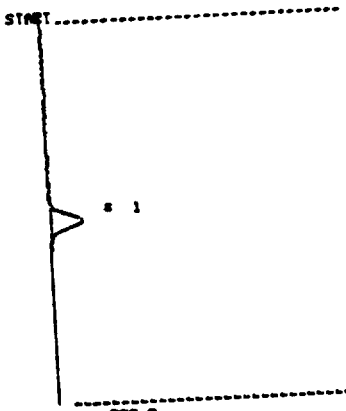
POST ANALYSIS CALIBRATION STANDARD

CONCENTRATION (ppbv)	RESPONSE (mVS)	DIFFERENCE FROM INITIAL	ALLOWABLE DIFFERENCE
114	2500	4.17%	+/- 30%

BIAS CHECK CALIBRATION

ACTUAL CONCENTRATION (ppbv)	MEASURED CONCENTRATION (ppbv)	RESPONSE (mVS)	DIFFERENCE FROM INITIAL
114	119	2500	4.17%

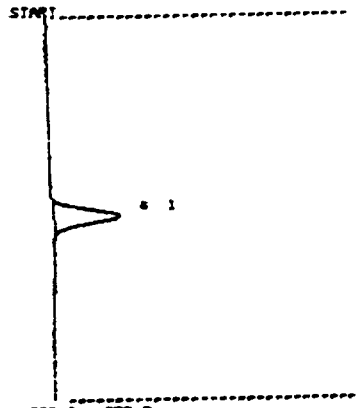
PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 13 1992 8:23
ANALYSIS # 4 CAL GAS
INTERNAL TEMP 23 57.7 PPB
GAIN 50 BUTADIENE

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	157.7	1.1 VS

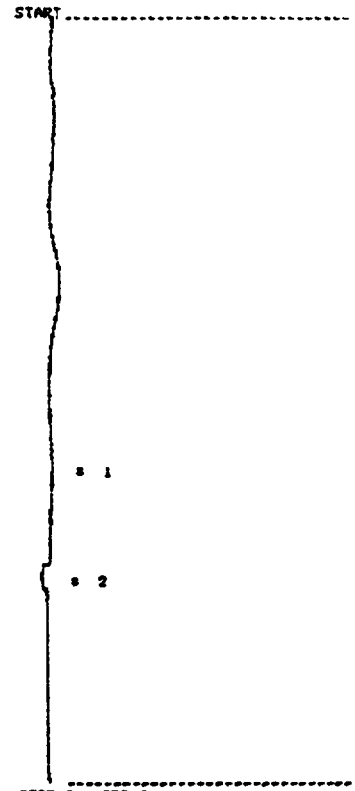
PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 13 1992 8:36
ANALYSIS # 5 CAL GAS
INTERNAL TEMP 23 114 PPB
GAIN 50 BUTADIENE

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	157.9	2.4 VS

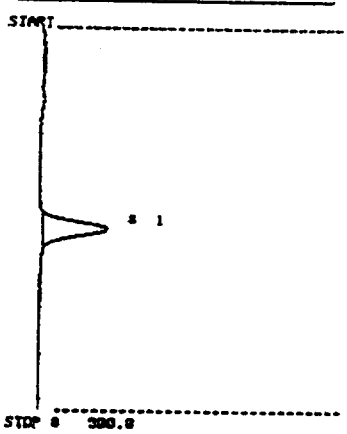
PHOTOVAC



STOP @ 600.0
SAMPLE LIBRARY 1 FEB 13 1992 8:21
ANALYSIS # 3 SYSTEM BLANK
INTERNAL TEMP 21 ZERO AIR
GAIN 50

COMPOUND NAME	PEAK	R.T.	AREA/PPM

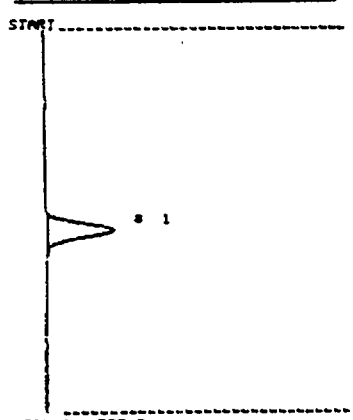
PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 13 1992 9:46
ANALYSIS # 10 POST CAL CHK
INTERNAL TEMP 25 BUTADIENE
GAIN 50 114 PPB

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	155.5	2.5 VS

PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 13 1992 8:50
ANALYSIS # 6 BIAS CHECK
INTERNAL TEMP 33 114 PPB
GAIN 50 BUTADIENE

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	158.0	2.5 VS

California Air Resources Board Method 422.102
Chromatographic Analysis of 1, 3-Butadiene from Stationary Sources

Calibration Curve for Gain = 50
Raw Data and Response Factors

STANDARD CONCENTRATION (ppb v/v)	AREA RUN 1	AREA RUN 2	AREA RUN 3	AREA AVERAGE	AREA STANDARD DEVIATION
5.86	122.5	117.7	118.3	119.50	2.62
57.7	1200	1200	1200	1200.00	0.00
114	2400	2400	2400	2400.00	0.00
495	10400	10500	10300	10400.00	100.00

STANDARD CONCENTRATION (ppb v/v)	RESPONSE FACTOR RUN 1	RESPONSE FACTOR RUN 2	RESPONSE FACTOR RUN 3	RESPONSE FACTOR AVERAGE	RESPONSE FACTOR STANDARD DEVIATION
5.86	4.7837E-02	4.9788E-02	4.9535E-02	4.9053E-02	1.0610E-03
57.7	4.8083E-02	4.8083E-02	4.8083E-02	4.8083E-02	0.0000E+00
114	4.7500E-02	4.7500E-02	4.7500E-02	4.7500E-02	0.0000E+00
495	4.7596E-02	4.7143E-02	4.8058E-02	4.7599E-02	4.5770E-04
			RF AVG.=	4.8059E-02	
			RF STD.DEV.=	0.0007101409	
			RF RSD% =	1.48%	

Method 422.102 1, 3-Butadiene

Linear Regression Analysis (gain = 50)

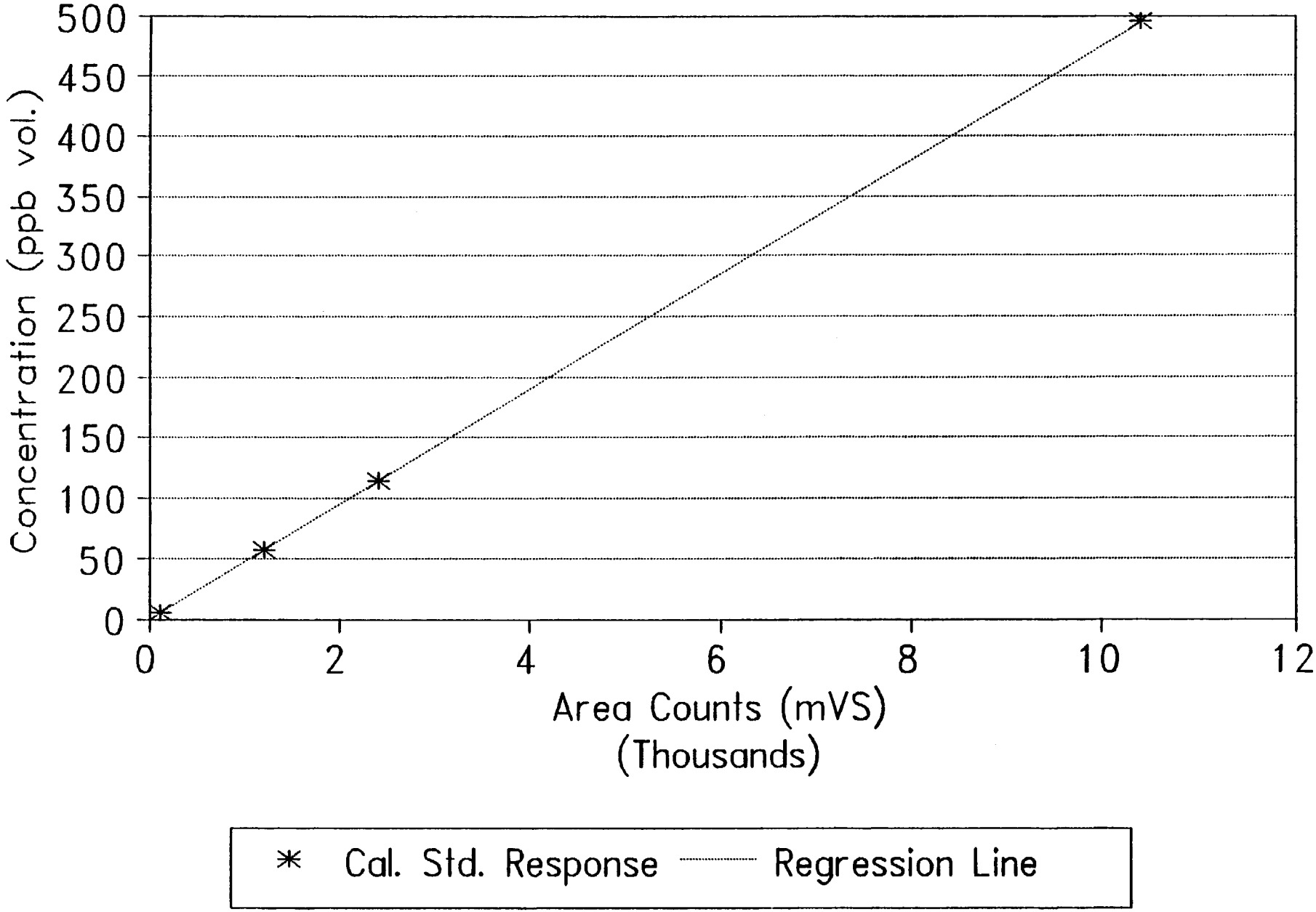
Regression Output:

Constant	0.222491
Std Err of Y Est	0.394959
R Squared	0.999998
No. of Observations	4
Degrees of Freedom	2
X Coefficient(s)	0.04757
Std Err of Coef.	4.88E-05

CONC.	REGR. CONC.
5.86	5.9072
57.7	57.3070
114	114.3914
495	494.9545

Linear Regression Graph

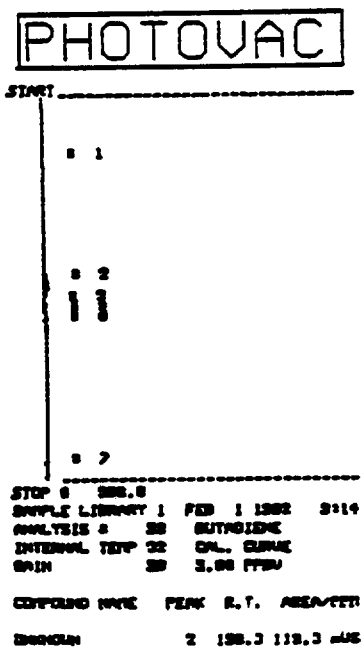
1, 3-Butadiene (gain=50)

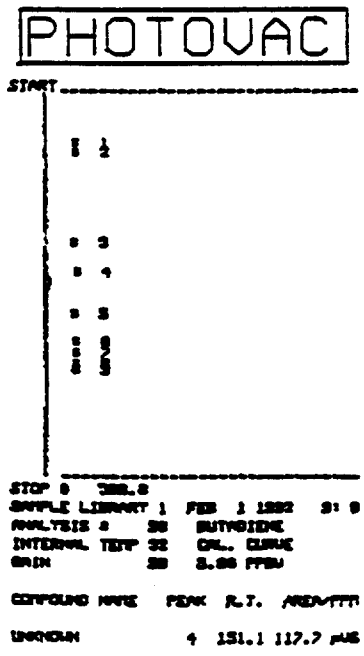


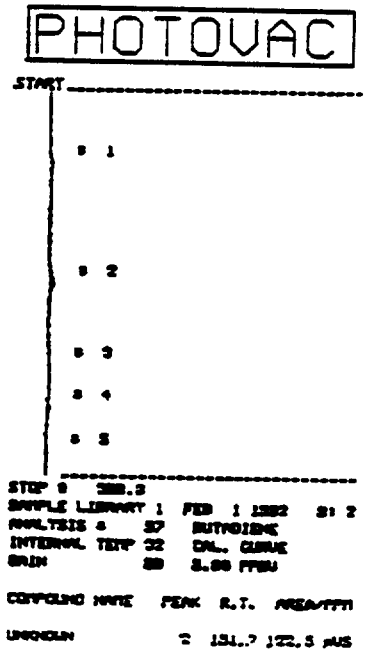
5.86ppmv 1.3-Butadiene

Calibration Gas Standard

Instrument Gain = 50



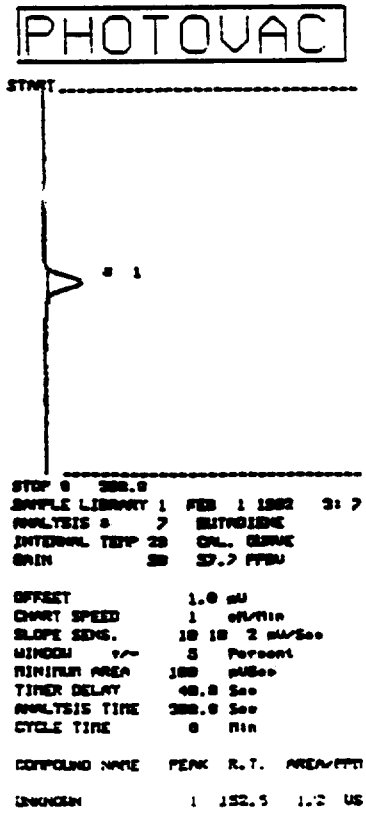


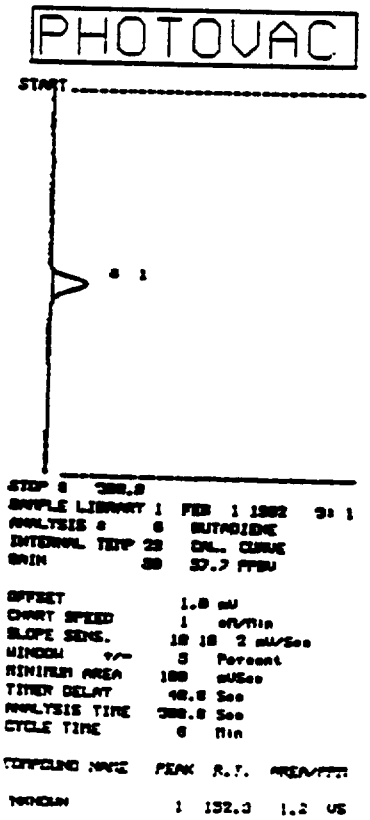


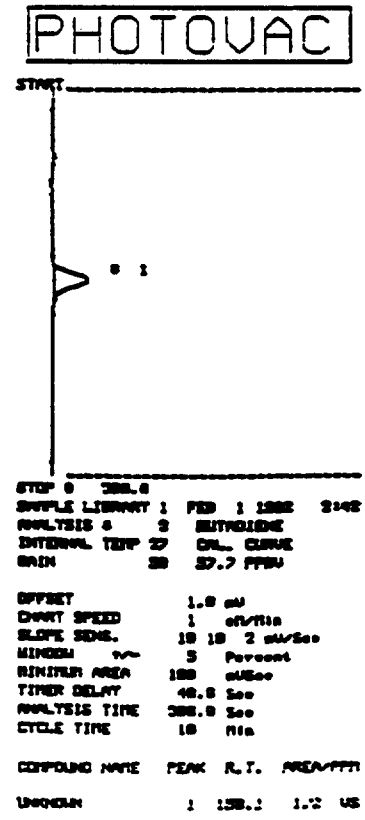
57.7ppmv 1,3-Butadiene

Calibration Gas Standard

Instrument Gain = 50



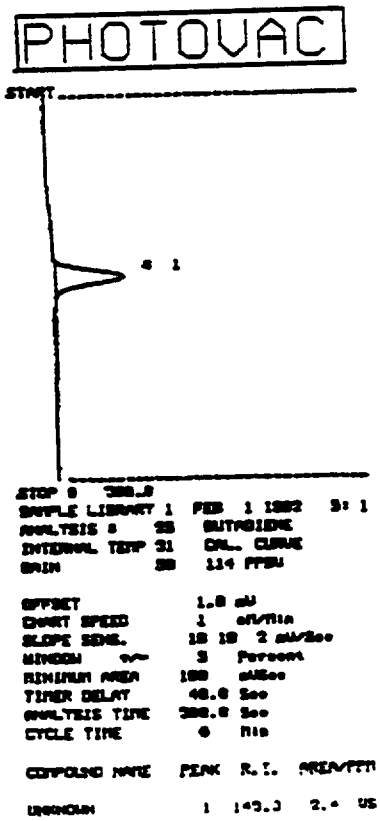


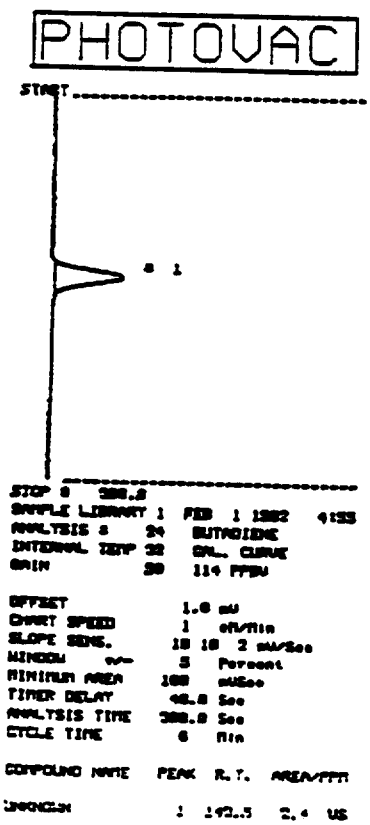


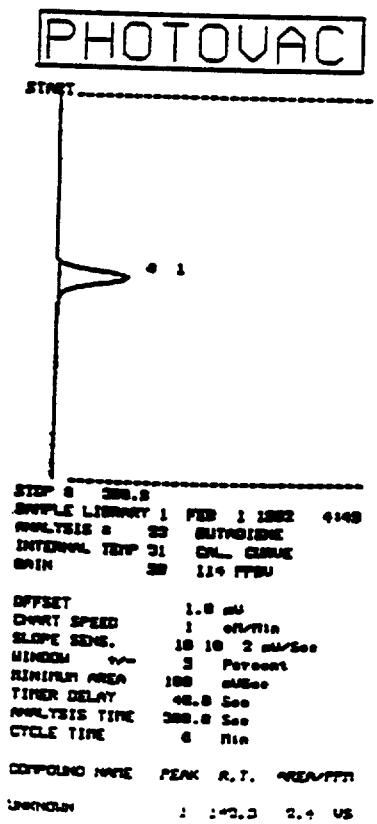
114ppmv 1,3-Butadiene

Calibration Gas Standard

Instrument Gain = 50



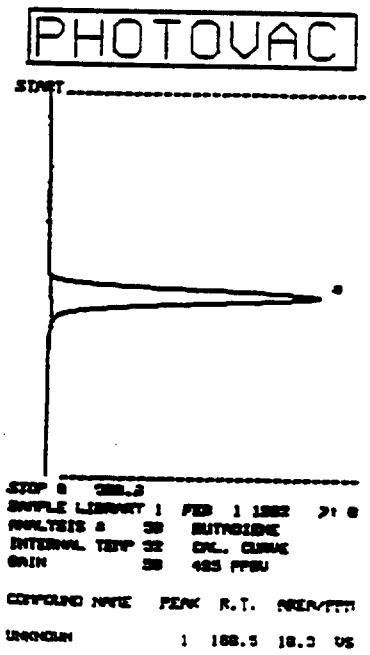


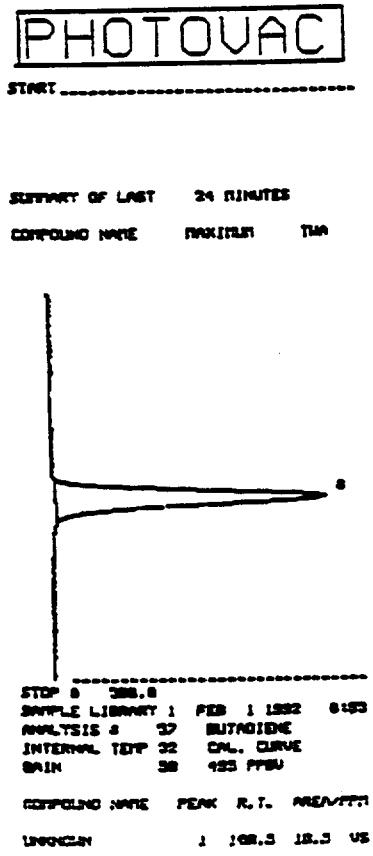


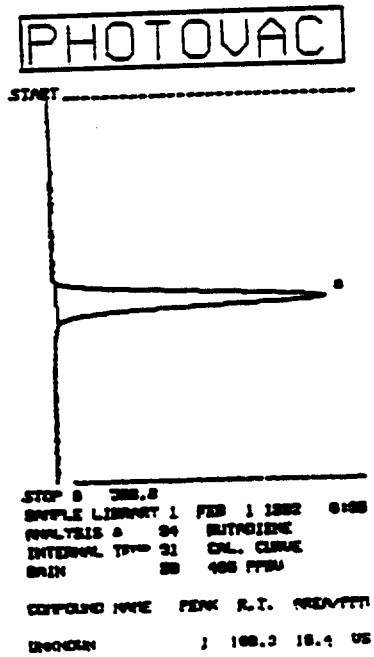
495ppmv 1,3-Butadiene

Calibration Gas Standard

Instrument Gain = 50







Scott Specialty Gases, Inc.

Shipped From: 6141 EASTON ROAD PLUMSTEADVILLE PA 18949-0310
Phone: 215-766-8861 Fax: 215-766-0320

CERTIFICATE OF ANALYSIS

PETRO CHEM ENV SERVICES

3207 ANTONINO AVENUE

BAKERSFIELD CA 93308

PROJECT #: 01-34565
PO#: 1673
ITEM #: 01029230000 CL
DATE: 1/16/92

CYLINDER #: CAL10818 ANALYTICAL ACCURACY: +/-10%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
1,3-BUTADIENE	5.	PPB	5.86	PPB
NITROGEN		BAL		BAL

MICROGRAV - TM

ANALYST: APPROVED BY:
M.SIRINIDES/T.NEEME

Scott Specialty Gases, Inc.

Shipped From: 6141 EASTON ROAD PLUMSTEADVILLE PA 18949-0310
Phone: 215-766-8861 Fax: 215-766-0320

CERTIFICATE OF ANALYSIS

PETRO CHEM ENV SERVICES

3207 ANTONINO AVENUE

BAKERSFIELD CA 93308

PROJECT #: 01-34565
PO#: 1673
ITEM #: 01029220060 CL
DATE: 1/16/92

CYLINDER #: CAL10937 ANALYTICAL ACCURACY: +/-10%

COMPONENT	REQUESTED GAS CONC	MOLES	ANALYSIS (MOLES)	
1,3-BUTADIENE	50.	PPB	57.7	PPB
NITROGEN		BAL		BAL

MICROGRAV - TM

ANALYST: APPROVED BY:
M.SIRINIDES/T.NEEME

CALIBRATION GAS BLENDING RECORD
1-1-92
1, 3-Butadiene

BLEND GAS

SOURCE : Scott Specialty Gas Certified Gas Mix (Can Mix # 250)

CONCENTRATION : 9.99ppmv +/- 2%

DILUTION GAS

Ultra High Purity Nitrogen

FLOW RATES (L/min.)

BLEND GAS :	0.05
DILUTION GAS :	0.96

FINAL CONCENTRATION

1, 3-Butadiene :	0.495	ppmv
	495	ppbv

CAN MIX 250
PPM (BY VOLUME) IN NITROGEN
1,3 BUTADIENE = 9.99
ACCURACY OF ANALYSIS +/-2%

CONTENTS: 8 SCF @ 260 PSIG
Store and use at room temperature (70° F

FORMULAS

AVERAGE

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

STANDARD DEVIATION

$$s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}$$

RELATIVE STANDARD DEVIATION

$$RSD\text{-}\% = \frac{s}{\bar{x}} \times 100$$

RESPONSE FACTOR

$$RF = \frac{area}{concentration}$$

CORRELATION COEFFICIENT

$$R = \sqrt{R^2}$$

REGRESSION LINE EQUATION

$$\bar{y} = C + bx$$

GAS DILUTION CONCENTRATION CALCULATION

$$\frac{a}{a + b} \times c = d$$

Where:

a = Flow setting of calibration gas
b = Flow setting of dilution gas
c = Concentration of calibration gas
d = Concentration of new gas blend

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-12/14-92
REPORT : 10-849D

SUMMARY OF RESULTS

METHOD 429
(AVERAGE OF 3 RUNS)

Emittent	Field Blank ng	TOTAL ng	TOTAL ug	ug/DSCM	ppb	lb/hr
Naphthalene	1400	61000	61.0	2.0E+01	3.8E+00	1.8E-04
Acenaphthylene	**5	1600	1.60	5.2E-01	8.4E-02	4.7E-06
Acenaphthene	**5	293	0.29	9.6E-02	1.5E-02	8.6E-07
Fluorene	**5	853	0.85	2.8E-01	4.1E-02	2.5E-06
Phenanthrene	28	3533	3.53	1.2E+00	1.6E-01	1.0E-05
Anthracene	**5	240	0.24	7.8E-02	1.1E-02	7.0E-07
Fluoranthene	**5	437	0.44	1.4E-01	1.7E-02	1.3E-06
Pyrene	**5	307	0.31	1.0E-01	1.2E-02	9.0E-07
Benz (a) anthracene	**5	237	0.237	7.7E-02	8.3E-03	6.9E-07
Chrysene	**5	46	0.046	1.5E-02	1.6E-03	1.3E-07
Benzo(b) fluoranthene	**5	74	0.074	2.4E-02	2.4E-03	2.2E-07
Benzo(k) fluoranthene	**5	21	0.021	7.0E-03	6.8E-04	6.2E-08
Benzo(a)pyrene *1,2,3	**5	5	0.005	1.6E-03	1.6E-04	1.5E-08
Indeno(1,2,3-cd) pyrene	**5	14	0.014	4.7E-03	4.1E-04	4.2E-08
Dibenzo(a,h) anthracene *1,2,3	**5	5	0.005	1.6E-03	1.4E-04	1.5E-08
Benzo(g,h,i) perylene *2,3	**5	7	0.007	2.3E-03	2.0E-04	2.0E-08

* Not detected in run(s) stated, used 1/2 detection limit

** Not detected in blank, used 1/2 detection limit

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13&14-92
REPORT : 10-849 D

METHOD 429
@ 60° F

DATE :	2-13	2-13	2-14
RUN #:	1	2	3
TIME :	944	1406	916
Vm (dry gas sampled)	114.92	116.08	113.09
Y (meter calib. factor)	0.98517	0.98517	0.98517
P bar (Barometric pressure)	29.12	29.12	29.3
P static (stack pressure, " H2O)	-1.35	-1.35	-1.35
Delta H (differential meter press, " H2O)	0.76	0.78	0.75
Tm (meter temperature, R°)	532	532	533
Vol H2O mls	327.5	328.7	326.8
Vm(std),dscf	107.91	109.00	106.64
Bws-H2O vapor	0.1236	0.1229	0.1246
MF-moisture factor	0.876421	0.877116	0.875370
% CO2	7.35	7.25	7.35
% O2	8.0	8.2	8.0
% N2	84.65	84.55	84.65
Md-MW stk gas,dry	29.50	29.49	29.50
Ms-MW stk gas,wet	28.08	28.08	28.06
Cp-pitot tube	0.84	0.84	0.84
Avg sq rt ^p , Initial Traverse	1.55	1.56	1.54
T stack, R°, Initial Traverse	1242	1224	1245
Stack area,ft2	0.785	0.785	0.785
Vs-fps	137.64	137.29	136.35
Qstd-dscfm	2309	2338	2293
Area noz,ft2	2.03E-04	2.03E-04	2.03E-04
Sample time	180	180	180
% Isokinetic	100.4	100.1	99.9

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-12/14-92
REPORT : 10-849 D

METHOD 429

RUN #1

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	66000	66	6.1E-01	2.2E+01	4.1E+00	1.9E-04
Acenaphthylene	2000	2.00	1.9E-02	6.5E-01	1.1E-01	5.8E-06
Acenaphthene	360	0.36	3.3E-03	1.2E-01	1.9E-02	1.0E-06
Fluorene	1200	1.20	1.1E-02	3.9E-01	5.8E-02	3.5E-06
Phenanthrene	4500	4.5	4.2E-02	1.5E+00	2.0E-01	1.3E-05
Anthracene	280	0.28	2.6E-03	9.2E-02	1.3E-02	8.2E-07
Fluoranthene	540	0.54	5.0E-03	1.8E-01	2.1E-02	1.6E-06
Pyrene	430	0.43	4.0E-03	1.4E-01	1.7E-02	1.3E-06
Benz (a) anthracene	270	0.270	2.5E-03	8.8E-02	9.5E-03	7.9E-07
Chrysene	52	0.052	4.8E-04	1.7E-02	1.8E-03	1.5E-07
Benzo(b) fluoranthene	100	0.100	9.3E-04	3.3E-02	3.2E-03	2.9E-07
Benzo(k) fluoranthene	33	0.03	3.1E-04	1.1E-02	1.0E-03	9.6E-08
Benzo(a)pyrene *	5	0.01	4.6E-05	1.6E-03	1.6E-04	1.5E-08
Indeno(1,2,3-cd) pyrene	23	0.023	2.1E-04	7.5E-03	6.7E-04	6.7E-08
Dibenzo(a,h) anthracene *	5	0.01	4.6E-05	1.6E-03	1.4E-04	1.5E-08
Benzo(g,h,i) perylene	11	0.011	1.0E-04	3.6E-03	3.2E-04	3.2E-08

* Not detected, used 1/2 detection limit

Vm(std), dscf = 107.91
Vm(std), dscm = 3.06
DSCFM = 2309

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-12/14-92
REPORT : 10-849 D

METHOD 429

RUN #2

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	61000	61	5.6E-01	2.0E+01	3.8E+00	1.8E-04
Acenaphthylene	1400	1.40	1.3E-02	4.5E-01	7.3E-02	4.1E-06
Acenaphthene	260	0.26	2.4E-03	8.4E-02	1.3E-02	7.6E-07
Fluorene	700	0.70	6.4E-03	2.3E-01	3.3E-02	2.0E-06
Phenanthrene	3100	3.1	2.8E-02	1.0E+00	1.4E-01	9.1E-06
Anthracene	270	0.27	2.5E-03	8.7E-02	1.2E-02	7.9E-07
Fluoranthene	420	0.42	3.9E-03	1.4E-01	1.6E-02	1.2E-06
Pyrene	310	0.31	2.8E-03	1.0E-01	1.2E-02	9.1E-07
Benz (a) anthracene	260	0.260	2.4E-03	8.4E-02	9.0E-03	7.6E-07
Chrysene	61	0.061	5.6E-04	2.0E-02	2.1E-03	1.8E-07
Benzo(b) fluoranthene	90	0.090	8.3E-04	2.9E-02	2.8E-03	2.6E-07
Benzo(k) fluoranthene	19	0.019	1.7E-04	6.2E-03	6.0E-04	5.6E-08
Benzo(a)pyrene *	5	0.005	4.6E-05	1.6E-03	1.6E-04	1.5E-08
Indeno(1,2,3-cd) pyrene	15	0.015	1.4E-04	4.9E-03	4.3E-04	4.4E-08
Dibenzo(a,h) anthracene *	5	0.005	4.6E-05	1.6E-03	1.4E-04	1.5E-08
Benzo(g,h,i) perylene *	5	0.005	4.6E-05	1.6E-03	1.4E-04	1.5E-08

* Not detected, used 1/2 detection limit

Vm(std), dscf = 109.00
Vm(std), dscm = 3.09
DSCFM = 2338

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-12/14-92
REPORT : 10-849 D

METHOD 429
RUN #3

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	56000	56	5.3E-01	1.9E+01	3.5E+00	1.6E-04
Acenaphthylene	1400	1.4	1.3E-02	4.6E-01	7.4E-02	4.1E-06
Acenaphthene	260	0.26	2.4E-03	8.6E-02	1.4E-02	7.6E-07
Fluorene	660	0.66	6.2E-03	2.2E-01	3.2E-02	1.9E-06
Phenanthrene	3000	3.00	2.8E-02	9.9E-01	1.4E-01	8.8E-06
Anthracene	170	0.17	1.6E-03	5.6E-02	7.7E-03	5.0E-07
Fluoranthene	350	0.35	3.3E-03	1.2E-01	1.4E-02	1.0E-06
Pyrene	180	0.18	1.7E-03	6.0E-02	7.2E-03	5.3E-07
Benz (a) anthracene	180	0.18	1.7E-03	6.0E-02	6.4E-03	5.3E-07
Chrysene	25	0.025	2.3E-04	8.3E-03	8.9E-04	7.3E-08
Benzo(b) fluoranthene	33	0.033	3.1E-04	1.1E-02	1.1E-03	9.7E-08
Benzo(k) fluoranthene	12	0.012	1.1E-04	4.0E-03	3.8E-04	3.5E-08
Benzo(a)pyrene *	5	0.005	4.7E-05	1.7E-03	1.6E-04	1.5E-08
Indeno(1,2,3-cd) pyrene *	5	0.005	4.7E-05	1.7E-03	1.5E-04	1.5E-08
Dibenzo(a,h) anthracene *	5	0.005	4.7E-05	1.7E-03	1.5E-04	1.5E-08
Benzo(g,h,i) perylene *	5	0.005	4.7E-05	1.7E-03	1.5E-04	1.5E-08

* Not detected, used 1/2 detection limit

Vm(std), dscf = 106.64
Vm(std), dscm = 3.02
DSCFM = 2293

ALTA

February 26, 1992

Alta Batch I.D.: 11028 K-27 & K-49

Mr. Tim Brennan
PetroChem Environmental Serv.
3207 Antonino Ave.
Bakersfield, CA 93388

Dear Mr. Brennan,

Enclosed are the results for the eight MM5 trains received at Alta Analytical Laboratory on February 17, 1992. This work was authorized under your Purchase Order Number 01757. These samples were analyzed using CARB Method 429 for polycyclic aromatic hydrocarbons (PAH) using High Resolution Mass Spectrometry (HRMS). As documented on the chain-of-custody Sample ID. D-21 Condenser rinse blank was received broken. A standard turnaround time was requested for this work.

The following difficulties were associated with the analysis of these samples. For Sample ID.'s Run C-1, C-2, and C-3 dilutions of 1:50 were performed and for Sample ID.'s D-1, D-2, and D-3 dilutions of 1:20 were performed. The diluted extracts were re-analyzed. Results from the dilutions are designated on the data sheet with an " * " asterisk. Some samples had internal standard recoveries below 50%. However, in every instance the signal-to-noise ratio was greater than 10:1, therefore no further action was required, as per the method.

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix. The Appendix contains a copy of the chain-of-custody, a list of data qualifiers and abbreviations and copies of the raw data (if requested).

If you have any questions regarding this report please feel free to contact me.

Sincerely,

Robert S. Mitzel

Robert S. Mitzel
Director of Operations

Alta Analytical Laboratory Inc.
5070 Robert J. Mathews Pkwy., Suite 2
El Dorado Hills, CA. 95630

ALTA

SECTION II.

ALTA

Section I. Sample Inventory

Date Received: 17-Feb-92

K-27 & K-49

Alta Lab ID.		Client ID.
11028-1-A	K-27 Field BLANK	C-1 BLANK, FILTER
11028-1-B		C-6 BLANK, XAD
11028-1-C		C-2 BLANK, PROBE
11028-1-D		C-3 BLANK, CONDENSER
11028-1-E		C-4 BLANK, 1ST IMP
11028-1-F		C-5 BLANK, 2ND IMP
11028-2-A	K-27 RUN #1	C-7 #1, FILTER
11028-2-B		C-12 #1, XAD
11028-2-C		C-8 #1, PROBE
11028-2-D		C-9 #1, CONDENSER
11028-2-E		C-10 #1, 1ST IMP 1of2
11028-2-F		C-13 #1, 1ST IMP 2of2
11028-2-G		C-11 #1, 2ND IMP
11028-3-A	K-27 RUN #2	C-14 #2, FILTER
11028-3-B		C-20 #2, XAD
11028-3-C		C-15 #2, PROBE
11028-3-D		C-16 #2, CONDENSER
11028-3-E		C-17 #2, 1ST IMP 1of2
11028-3-F		C-18 #2, 1ST IMP 2of2
11028-3-G		C-19 #2, 2ND IMP
11028-4-A	K-27 RUN #3	C-21 #3, FILTER
11028-4-B		C-27 #3, XAD
11028-4-C		C-22 #3, PROBE
11028-4-D		C-23 #3, CONDENSER
11028-4-E		C-24 #3, 1ST IMP 1of2
11028-4-F		C-25 #3, 1ST IMP 2of2
11028-4-G		C-26 #3, 2ND IMP
11028-5-A	K-49 Field Blanks	D-19 BLANK, FILTER
11028-5-B		D-24 BLANK, XAD
11028-5-C		D-20 BLANK, PROBE
11028-5-D		D-22 BLANK, 1ST IMP
11028-5-E		D-23 BLANK, 2ND IMP
11028-6-A	K-49 RUN #1	D-1 #1, FILTER
11028-6-B		D-6 #1, XAD
11028-6-C		D-2 #1, PROBE
11028-6-D		D-3 #1, CONDENSER
11028-6-E		D-4 #1, 1ST IMP
11028-6-F		D-5 #1, 2ND IMP
11028-7-A	K-49 RUN #2	D-7 #2, FILTER
11028-7-B		D-12 #2, XAD
11028-7-C		D-8 #2, PROBE
11028-7-D		D-9 #2, CONDENSER
11028-7-E		D-10 #2, 1ST IMP
11028-7-F		D-11 #2, 2ND IMP
11028-8-A	K 49 RUN #3	D-13 #3, FILTER
11028-8-B		D-18 #3, XAD
11028-8-C		D-14 #3, PROBE
11028-8-D		D-15 #3, CONDENSER
11028-8-E		D-16 #3, 1ST IMP
11028-8-F		D-17 #3, 2ND IMP

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: D-19 to D-24 Blank
Lab ID: 11028-005-PAH
Matrix: MM5

Date Received: 2/17/92
Date Extracted: 2/18/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0218M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	1400		B
Acenaphthylene	ND	10	
Acenaphthene	ND	10	
Fluorene	ND	10	
Phenanthrene	28		
Anthracene	ND	10	
Fluoranthene	ND	10	
Pyrene	ND	10	
Chyrsene	ND	10	
Benz(a)anthracene	ND	10	
Benzo(b)fluoranthene	ND	10	
Benzo(k)fluoranthene	ND	10	
Benzo(a)pyrene	ND	10	
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	ND	10	
Dibenz(a,h)anthracene	ND	10	
Benzo(g,h,i)perylene	ND	10	

K-49 Field Blank

Analyst: GMD

Reviewer: BJ

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: D-19 to D-24 Blank
Lab ID: 11028-005-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	62	
d_8-Acenaphthylene	66	
d_{10}-Acenaphthene	71	
d_{10}-Fluorene	69	
d_{10}-Phenanthrene	78	
d_{10}-Anthracene	62	
d_{10}-Fluoranthene	76	
d_{10}-Pyrene	74	
d_{12}-Chrysene	67	
d_{12}-Benz(a)anthracene	70	
d_{12}-Benzo(b)fluoranthene	69	
d_{12}-Benzo(k)fluoranthene	74	
d_{12}-Benzo(a)pyrene	65	
d_{12}-Indeno(1,2,3-c,d)pyrene	59	
d_{12}-Benzo(g,h,i)perylene	58	
d_{14}-Dibenz(a,h)anthracene	54	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	112	
d_{14}-Terphenyl	115	

Date Analyzed: 2/21/92

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: D-1 thru D-6 #1
Lab ID: 11028-006-PAH
Matrix: MM5

Date Received: 2/17/92
Date Extracted: 2/18/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0218M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	66000		*,B
Acenaphthylene	2000		
Acenaphthene	360		
Fluorene	1200		*
Phenanthrene	4500		
Anthracene	280		
Fluoranthene	540		
Pyrene	430		
Chyrsene	52		
Benz(a)anthracene	270		
Benzo(b)fluoranthene	100		
Benzo(k)fluoranthene	33		
Benzo(a)pyrene	ND	10	
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	23		
Dibenz(a,h)anthracene	ND	10	
Benzo(g,h,i)perylene	11		

K-49 RUN #1

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: D-1 thru D-6 #1
Lab ID: 11028-006-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	95	
d_8-Acenaphthylene	75	
d_{10}-Acenaphthene	94	
d_{10}-Fluorene	55	
d_{10}-Phenanthrene	148	
d_{10}-Anthracene	141	
d_{10}-Fluoranthene	26	H
d_{10}-Pyrene	29	H
d_{12}-Chrysene	40	H
d_{12}-Benz(a)anthracene	42	H
d_{12}-Benzo(b)fluoranthene	40	H
d_{12}-Benzo(k)fluoranthene	47	H
d_{12}-Benzo(a)pyrene	61	
d_{12}-Indeno(1,2,3-c,d)pyrene	129	
d_{12}-Benzo(g,h,i)perylene	115	
d_{14}-Dibenz(a,h)anthracene	147	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	94	
d_{14}-Terphenyl	134	

Date Analyzed: 2/21/92

Analyst: [signature]

Reviewer: BM

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: D-7 to D-12 #2
Lab ID: 11028-007-PAH
Matrix: MM5

Date Received: 2/17/92
Date Extracted: 2/18/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0218M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	61000		*,B
Acenaphthylene	1400		
Acenaphthene	260		
Fluorene	700		
Phenanthrene	3100		
Anthracene	270		
Fluoranthene	420		
Pyrene	310		
Chyrsene	61		
Benz(a)anthracene	260		
Benzo(b)fluoranthene	90		
Benzo(k)fluoranthene	19		
Benzo(a)pyrene	ND	10	
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	15		
Dibenz(a,h)anthracene	ND	10	
Benzo(g,h,i)perylene	ND	10	

K-49 RUN #2

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: D-7 to D-12 #2
Lab ID: 11028-007-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	90	
d_8-Acenaphthylene	63	
d_{10}-Acenaphthene	82	
d_{10}-Fluorene	132	
d_{10}-Phenanthrene	32	H
d_{10}-Anthracene	22	H
d_{10}-Fluoranthene	23	H
d_{10}-Pyrene	25	H
d_{12}-Chrysene	36	H
d_{12}-Benz(a)anthracene	41	H
d_{12}-Benzo(b)fluoranthene	44	H
d_{12}-Benzo(k)fluoranthene	57	
d_{12}-Benzo(a)pyrene	59	
d_{12}-Indeno(1,2,3-c,d)pyrene	113	
d_{12}-Benzo(g,h,i)perylene	120	
d_{14}-Dibenz(a,h)anthracene	133	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	99	
d_{14}-Terphenyl	127	

Date Analyzed: 2/22/92

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: D-13 to D-18 #3
Lab ID: 11028-008-PAH
Matrix: MM5

Date Received: 2/17/92
Date Extracted: 2/18/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0218M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	56000		*,B
Acenaphthylene	1400		
Acenaphthene	260		
Fluorene	660		
Phenanthrene	3000		
Anthracene	170		
Fluoranthene	350		
Pyrene	180		
Chyrsene	25		
Benz(a)anthracene	180		
Benzo(b)fluoranthene	33		
Benzo(k)fluoranthene	12		
Benzo(a)pyrene	ND	10	
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	ND	10	
Dibenz(a,h)anthracene	ND	10	
Benzo(g,h,i)perylene	ND	10	

K-49 RUN #3

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: D-13 to D-18 #3
Lab ID: 11028-008-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	107	
d_8-Acenaphthylene	64	
d_{10}-Acenaphthene	83	
d_{10}-Fluorene	130	
d_{10}-Phenanthrene	43	H
d_{10}-Anthracene	33	H
d_{10}-Fluoranthene	20	H
d_{10}-Pyrene	23	H
d_{12}-Chrysene	33	H
d_{12}-Benz(a)anthracene	38	H
d_{12}-Benzo(b)fluoranthene	37	H
d_{12}-Benzo(k)fluoranthene	41	H
d_{12}-Benzo(a)pyrene	56	
d_{12}-Indeno(1,2,3-c,d)pyrene	132	
d_{12}-Benzo(g,h,i)perylene	113	
d_{14}-Dibenz(a,h)anthracene	147	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	78	
d_{14}-Terphenyl	114	

Date Analyzed: 2/22/92

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

APPENDIX

ALTA

DATA QUALIFIERS & ABBREVIATIONS

A	The amount detected is below the Method Quantitation Limit.
B	This compound was also detected in the blank.
C	The amount detected is less than five times the Method Quantitation Limit.
D	The amount reported is the maximum possible concentration.
E	The detection limit was raised above the Method Quantitation Limit due to chemical interferences.
F	This result has been reported off the DB-225 column.
G	This resulted has been reported off the SP-2331 column.
H	The signal-to-noise ratio is greater than 10:1.
I	Chemical Interference
Conc.	Concentration
D.L.	Detection Limit
NA	Not applicable
S/N	Signal-to-noise
MPC	Maximum Possible Concentration
*	See Cover Letter
R.L.	Reporting Limit

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

METHOD BLANK
Lab ID: 11028-MB-PAH
Matrix: MM5

Date Received: NA
Date Extracted: 2/18/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0218M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	26		
Acenaphthylene	ND	10	
Acenaphthene	ND	10	
Fluorene	ND	10	
Phenanthrene	ND	25	
Anthracene	ND	10	
Fluoranthene	ND	10	
Pyrene	ND	10	
Chrysene	ND	10	
Benz(a)anthracene	ND	10	
Benzo(b)fluoranthene	ND	10	
Benzo(k)fluoranthene	ND	10	
Benzo(a)pyrene	ND	10	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	10	
Dibenz(a,h)anthracene	ND	10	
Benzo(g,h,i)perylene	ND	10	

K-27 & K-49

Lab QC

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

METHOD BLANK
Lab ID: 11028-MB-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	69	
d_8-Acenaphthylene	70	
d_{10}-Acenaphthene	70	
d_{10}-Fluorene	72	
d_{10}-Phenanthrene	61	
d_{10}-Anthracene	38	H
d_{10}-Fluoranthene	78	
d_{10}-Pyrene	75	
d_{12}-Chrysene	66	
d_{12}-Benz(a)anthracene	77	
d_{12}-Benzo(b)fluoranthene	60	
d_{12}-Benzo(k)fluoranthene	75	
d_{12}-Benzo(a)pyrene	56	
d_{12}-Indeno(1,2,3-c,d)pyrene	56	
d_{12}-Benzo(g,h,i)perylene	59	
d_{14}-Dibenz(a,h)anthracene	50	

Lab QC

Pre-spike Recovery Standard:

d_{12}-Benzo(e)pyrene	NA
d_{14}-Terphenyl	NA

Date Analyzed: 2/21/92

Analyst: [signature] **Page 2 of 2** **Reviewer:** [signature]

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

LCS RESULTS
Lab ID: 11028-LCS1/LCS2
Matrix: MM5

Date Received: NA
Date Extracted: 2/18/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0218M
Units: NA

COMPOUND	LCS1 % R	LCS2 % R	RPD %
Naphthalene	99	87	13
Acenaphthylene	84	91	8.0
Acenaphthene	72	87	19
Fluorene	77	82	6.3
Phenanthrene	94	102	8.2
Anthracene	77	88	13
Fluoranthene	93	96	3.2
Pyrene	91	98	7.4
Chrysene	78	90	14
Benza(a)anthracene	82	88	7.1
Benzo(b)fluoranthene	83	91	9.2
Benzo(k)fluoranthene	77	85	9.9
Benzo(a)pyrene	87	92	5.6
Benzo(e)pyrene	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	90	101	12
Dibenz(a,h)anthracene	93	94	1.1
Benzo(g,h,i)perylene	101	93	8.3

Lab QC

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

LCS RESULTS
Lab ID: 11028-LCS1/LCS2

Isotopic Recovery Results

Internal Standard:	LCS1 % R	LCS2 % R
d_8-Napththalene	61	71
d_8-Acenaphthylene	85	63
d_{10}-Acenaphthene	93	72
d_{10}-Fluorene	133	102
d_{10}-Phenanthrene	150	114
d_{10}-Anthracene	115	93
d_{10}-Fluoranthene	36	56
d_{10}-Pyrene	37	57
d_{12}-Chrysene	56	58
d_{12}-Benz(a)anthracene	58	63
d_{12}-Benzo(b)fluoranthene	82	73
d_{12}-Benzo(k)fluoranthene	86	80
d_{12}-Benzo(a)pyrene	71	70
d_{12}-Indeno(1,2,3-c,d)pyrene	79	76
d_{12}-Benzo(g,h,i)perylene	65	77
d_{14}-Dibenz(a,h)anthracene	83	78

Lab QC

Date Analyzed: 2/22/92

Analyst: JMH

Page 2 of 2

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-14-92
REPORT : 10-849 D

CARB METHOD 430
SUMMARY OF RESULTS

	TOTAL ug/CM			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Formaldehyde *1	13.2	72.1	45.4	43.6
Acetaldehyde *1,2,3	26.4	28.8	18.2	24.5
Acrolein *1,2,3	26.4	28.8	18.2	24.5

	LBS/HR			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Formaldehyde *1	1.2E-04	6.4E-04	4.1E-04	3.9E-04
Acetaldehyde *1,2,3	2.4E-04	2.6E-04	1.6E-04	2.2E-04
Acrolein *1,2,3	2.4E-04	2.6E-04	1.6E-04	2.2E-04

* Not detected in runs stated, used 1/2 detection limit

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-13-92
REPORT : 10-849D

METHOD 430
@ 60° F

RUN #:	1	2	3
TIME :	901	1052	1247
Vm (dry gas sampled)	1.75	1.75	1.75
Y (meter calib. factor)	1.00	1.00	1.00
P bar (Barometric pressure)	29.12	29.12	29.12
P static (stack pressure, " H2O)	0	0	0
Delta H (differential meter press, " H2O)	0	0	0
Tm (meter temperature, R°)	527.7	537.7	534.3
Vm(std),dscf	1.68	1.65	1.66
Vm(std),dscm	0.0475	0.0466	0.0469

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-14-92
REPORT : 10-849 D

Method 430

Formaldehyde Results

Test Run	#1 *	#2	#3		
ug/l	30	150	150	1100	1100/2
Sample vol, l	0.021	0.022	0.014	.021	.021
Total ug	1	3	2	23.1	11.55
Vm std DSCF	1.68	1.65	1.66	1.68	
Vm std DSCM	0.0475	0.0466	0.0469	0.0475	
Volume Flow, DSCFM	2313	2313	2313	2313	

*Not Detected, used 1/2 detection limit

Concentrations **AVERAGE**

ug/dscf	0.37	2.04	1.28	1.23	13.75	6.875
ug/dscm	13.2	72.1	45.4	43.6	486.31	243.165
ppb	10.7	58.7	37.0	35.5		

Emissions

lb/hr	1.2E-04	6.4E-04	4.1E-04	3.9E-04	0.00420764 lb/hr

36.85 lb/yr

Petro Chem Environmental Services, Inc.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-14-92
REPORT : 10-849 D

Method 430

Acetaldehyde Results

Test Run	#1 *	#2 *	#3 *
ug/l	60	60	60
Sample vol, l	0.0209	0.0224	0.0142
Total ug	1	1	1
Vm std DSCF	1.68	1.65	1.66
Vm std DSCM	0.0475	0.0466	0.0469
Volume Flow, DSCFM	2313	2313	2313

*Not Detected, used 1/2 detection limit

Concentrations **AVERAGE**

ug/dscf	0.746	0.815	0.513	0.691
ug/dscm	26.4	28.8	18.2	24.5
ppb	14.6	16.0	10.1	13.6

Emissions

lb/hr	2.4E-04	2.6E-04	1.6E-04	2.2E-04

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-14-92
REPORT : 10-849 D

Method 430

Acrolein Results

Test Run	#1 *	#2 *	#3 *
ug/l	60	60	60
Sample vol, l	0.0209	0.0224	0.0142
Total ug	1	1	1
Vm std DSCF	1.68	1.65	1.66
Vm std DSCM	0.0475	0.0466	0.0469
Volume Flow, DSCFM	2313	2313	2313

* Not detected, used 1/2 detection limit.

Concentrations				AVERAGE
ug/dscf	0.746	0.815	0.513	0.691
ug/dscm	26.4	28.8	18.2	24.5
ppb	11.5	12.6	7.9	10.7

Emissions

lb/hr	2.4E-04	2.6E-04	1.6E-04	2.2E-04

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-14-92
REPORT : 10-849 D

Method 430

Formaldehyde Results

FIELD BLANK

Test Run	#1	#2	#3	AVERAGE
ug/l	410	170	90	223
Sample vol, l	0.0106	0.0121	0.0119	0.0115
Total ug	4.3	2.1	1.1	2.5

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-14-92
REPORT : 10-849 D

Method 430

Acetaldehyde Results

FIELD BLANK

Test Run	#1	#2	#3 *	AVERAGE
ug/l	200	270	60	177
Sample vol, l	0.0106	0.0121	0.0119	0.0115
Total ug	2.1	3.3	0.7	2.0

*Not Detected, used 1/2 detection limit

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-49 17R
DATE : 2-14-92
REPORT : 10-849D

Method 430

Acrolein Results

FIELD BLANK

Test Run	#1	#2	#3	AVERAGE
ug/l	3400	3200	1400	2667
Sample vol, l	0.0106	0.0121	0.0119	0.0115
Total ug	36	39	17	30

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Terry Rowles
Petro Chem Environmental
3207 Antonino Ave.
Bakersfield, CA 93308

Project: K-49 17-R Bechtel

Lab number: I0621
Date received: 02/15/92
Date sampled: 02/14/92
Sampled by: Mark Ready
Date extracted: 02/19/92
Extracted by: Mark Diehl
Date analyzed: 03/02/92
Analyzed by: Mark Diehl

Lab number: I0621-1 Sample Description: Blank #1
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60. ng/ml	2.	120.	2.	120.
Result	4.	410. ng/ml	2.	200.	35.	3400.
Volume	10.6 mL					

Lab number: I0621-2 Sample Description: Blank #2
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Result	2.	170. ng/ml	3.	270.	38.	3200.
Volume	12.1 mL					

Lab number: I0621-3 Sample Description: Blank #3
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60. ng/ml	2.	120.	2.	120.
Result	1.	90. ng/ml	ND.	ND.	17.	1400.
Volume	11.9 mL					
Average Field Blank	2.	220.	2.	160.	30.	2700.

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, AALA#0136-01.
*Results listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

03/04/92
HPLC 0302-19
IB19FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President

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Terry Rowles
Petro Chem Environmental
3207 Antonino Ave.
Bakersfield, CA 93308

Project: K-49 17-R Bechtel

Lab number: I0621
Date received: 02/15/92
Date sampled: 02/14/92
Sampled by: Mark Ready
Date extracted: 02/19/92
Extracted by: Mark Diehl
Date analyzed: 03/04/92
Analyzed by: Mark Diehl

Lab number: I0621-4 Sample Description: Run 1, impingers #1 & #2
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Corrected Result**	10.	1100.	10.	800.	150.	13500.
Result	ND.	ND.	ND.	ND.	ND.	ND.
Average Field Blank	2.	220.	2.	160.	30.	2700.
Sample/Blank Ratio	<1	<1	>1	>1	>1	>1
Volume (combined impingers)		20.9 mL				

Impinger #2 was cracked upon receipt and had leaked substantially.

Lab number: I0621-5 Sample Description: Run 2, impingers #1 & #2
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Corrected Result**	10.	1100.	10.	800.	150.	13500.
Result	3.	150.	ND.	ND.	ND.	ND.
Average Field Blank	2.	220.	2.	160.	30.	2700.
Sample/Blank Ratio	1.3	0.7	<1	<1	<1	<1
Volume (combined impingers)		22.4 mL				

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, AALA#0136-01.
*Results listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).
Results listed as N/A have calculations that are not applicable.
Corrected result is listed as the average field blank subtracted from the result, unless denoted by **.
**Corrected result is listed as the reporting limit (5.0 multiplied by the average field blank) according to CARB 430, section 11.9.

03/05/92
HPLC 0304-14
IB19FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek, Ph.D.
President

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Terry Rowles
Petro Chem Environmental
3207 Antonino Ave.
Bakersfield, CA 93308

Project: K-49 17-R Bechtel

Lab number: I0621
Date received: 02/15/92
Date sampled: 02/14/92
Sampled by: Mark Ready
Date extracted: 02/19/92
Extracted by: Mark Diehl
Date analyzed: 02/28/92
Analyzed by: Mark Diehl

Lab number: I0621-6 Sample Description: Run 3, impingers #1 & #2
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Corrected Result**	10.	1100.	10.	800.	150.	13500.
Result	2.	150.	ND.	ND.	ND.	ND.
Average Field Blank	2.	220.	2.	160.	30.	2700.
Sample/Blank Ratio	1.0	0.7	>1	>1	>1	>1
Volume (combined impingers)		14.2 mL				

Sample Description: Matrix spike of I0621-6, Run 3, Impinger #1
QC ID: IB19IMP Spiked with: 5 ug or 0.60 ug/L of Formaldehyde

	Total ug	ug/L
PQL*	1.	60.
Result	5.	550.
Original Result	2.	150.
Percent recovery	60.	67.
Volume (split from I0621-6A)		8.4 mL

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, AALA#0136-01.
*Results listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit). Results listed as N/A have calculations that are not applicable.
Corrected result is listed as the average field blank subtracted from the result, unless denoted by **.
**Corrected result is listed as the reporting limit (5.0 multiplied by the average field blank) according to CARB 430, section 11.9.

03/05/92
HPLC 0228-19
IB19FORM
FORM1,1992

Respectfully submitted,
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Terry Rowles
Petro Chem Environmental
3207 Antonino Ave.
Bakersfield, CA 93308

QC Batch ID: IC05form
Date extracted: 03/05/92
Extracted by: MD
Date analyzed: 03/09/92
Analyzed by: MD
Method: CARB 430

LABORATORY QC SPIKES AND BLANKS
FORMALDEHYDE

	Spike amount		Result		% Recovery
	Total ug	ug/L	Total ug	ug/L	
Spike 1	2.	200.	2.6	260.	130
Spike 2	2.	200.	2.3	230.	115
Spike 3	2.	200.	2.3	230.	115
Spike 4	2.	200.	2.1	210.	105
Reagent blank	NS	NS	ND.	ND.	

Formaldehyde
Practical Quantitation Limit: 20 ug/L
Response factor: 0.0002 ng/integrator height unit
Average % recovery: 116
Standard deviation of % rec: 8.9
Relative standard deviation of % rec: 7.7

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, AALA#0136-01.
*Results listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

03/10/92
IC05FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President
Petro Chem Environmental Services, Inc.

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Terry Rowles
Petro Chem Environmental
3207 Antonino Ave.
Bakersfield, CA 93308

QC Batch ID: IC05form
Date extracted: 03/05/92
Extracted by: MD
Date analyzed: 03/09/92
Analyzed by: MD
Method: CARB 430

LABORATORY QC SPIKES AND BLANKS
ACROLEIN

	Spike amount Total ug	Spike amount ug/L	Result Total ug	Result ug/L	% Recovery
Spike 1	2.	200.	0.6	60.	30
Spike 2	2.	200.	0.8	80.	40
Spike 3	2.	200.	0.7	70.	35
Spike 4	2.	200.	0.8	80.	40
Reagent blank	NS	NS	ND.	ND.	

Acetaldehyde
Practical Quantitation Limit: 50 ug/L
Response factor: 0.0006 ng/integrator height unit
Average % recovery: 36
Standard deviation of % rec: 4.1
Relative standard deviation of % rec: 11

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, AALA#0136-01.
*Results listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

03/10/92
IC05FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President

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Terry Rowles
Petro Chem Environmental
3207 Antonino Ave.
Bakersfield, CA 93308

QC Batch ID: IC05form
Date extracted: 03/05/92
Extracted by: MD
Date analyzed: 03/09/92
Analyzed by: MD
Method: CARB 430

LABORATORY QC SPIKES AND BLANKS
ACETALDEHYDE

	Spike amount Total ug	Spike amount ug/L	Result Total ug	Result ug/L	% Recovery
Spike 1	2.	200.	1.8	180.	90
Spike 2	2.	200.	1.5	150.	75
Spike 3	2.	200.	1.5	150.	75
Spike 4	2.	200.	1.4	140.	70
Reagent blank	NS	NS	ND.	ND.	

Acetaldehyde
Practical Quantitation Limit: 50 ug/L
Response factor: 0.0006 ng/integrator height unit
Average % recovery: 78
Standard deviation of % rec: 7.5
Relative standard deviation of % rec: 9.6

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, AALA#0136-01.
*Results listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

03/10/92
IC05FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek, Ph.D.
President

CARB METHOD 410A WITH ANALYSIS BY GCMS
BENZENE, TOLUENE, XYLENE, ETHYL BENZENE, & PROPYLENE
(BTXE&P)

METHOD 410A SAMPLING AND ANALYSIS

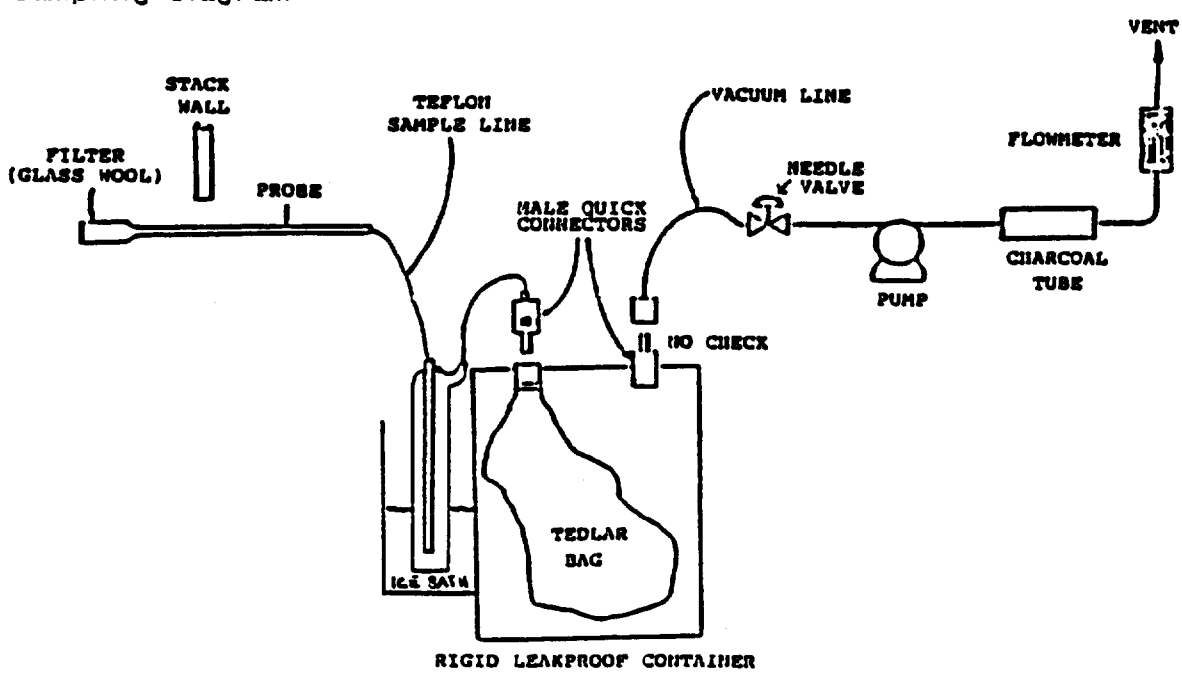
The sampling apparatus consisted of a heat traced stainless steel probe, teflon sample line, midget impinger moisture knockout, and a twenty liter tedlar bag housed in a rigid air tight container. The container was connected to a vacuum pump/rotameter/dry gas meter assembly.

The sampling apparatus was transported to the sample site and set up and leak tested by observing a zero reading on the rotameter. The sample probe/teflon line was purged with stack gas and the teflon stopcock of the midget impinger was open to initiate sampling. Sampling was conducted over a twenty minute period, a final leak test was performed and the bag was recovered from the sample container. The contents of the impinger and distilled water rinsings were recovered into a villi vial; the vial was completely filled.

The samples were stored out of sunlight, packaged and sent to the analytical laboratory. The bag sample was analyzed within 72 hours of sampling by EPA Method TO-14, GCMS. The condensate sample was analyzed within 7 days of sampling by EPA Method 8260 GCMS.

A bag blank (zero grade nitrogen) and condensable blank (distilled water) were included with each sample set. The results of the field blank were reported as ug/cm assuming that a sample volume (average of stack sample) was pulled the sample system.

Sampling Diagram



Petro Chem Environmental Services, Inc.

CARB METHOD 422.102 SAMPLING AND ANALYSIS

The sampling apparatus consisted of a heated quartz probe followed immediately by a double midget impinger system containing 0.1N NaOH in the first impinger and distilled water in the second impinger. The purpose of the impinger system is to remove acid gasses from the sample stream which can potentially react with 1,3-butadiene. The impinger system was followed by a 1/4 inch teflon line tee-ed into a Photovac GC/PID analyzer. A low flow vacuum pump/rotameter assembly was located downstream of the Photovac and provided continuous flow of sample past the Photovac.

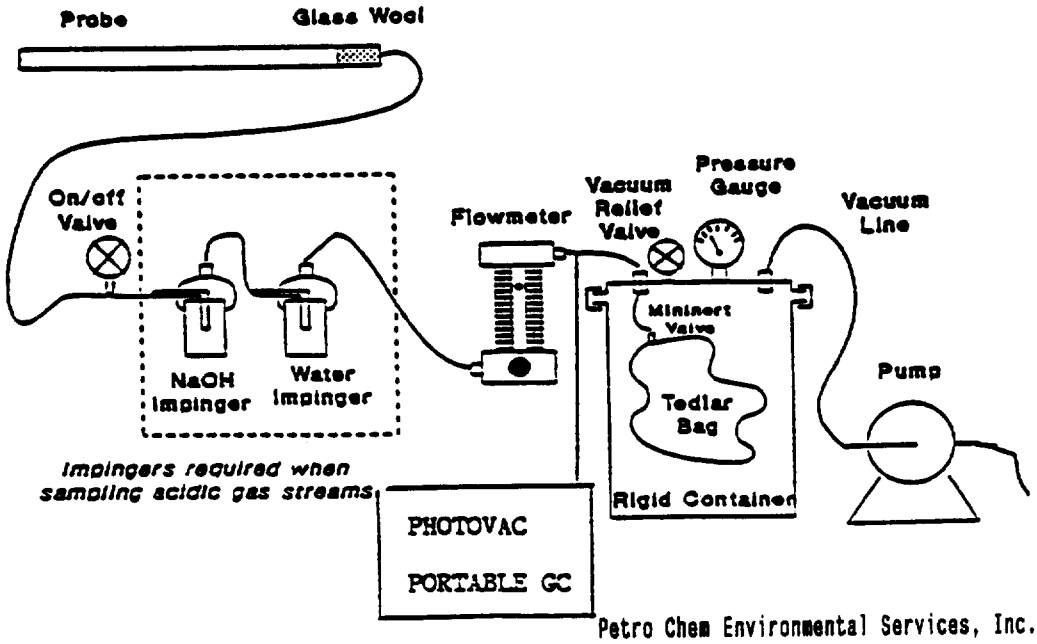
Prior to sampling the Photovac was calibrated with a known standard and the calibration was confirmed to be within the requirements when compared to the initial in-house calibration curves. The standard which was used was a mid point (with respect to the instrument range) standard or as close to the anticipated stack gas concentration as possible. If, after sampling, it was determined that another range was more applicable than the instrument was recalibrated in the new range.

Zero grade nitrogen was purged through the sample system and then analyzed as a field blank check. A known standard was purged through the sample system and analyzed as a system bias or spike check. The value was compared to the initial in-house calibration.

A minimum of three stack samples were analyzed. Upon completion of stack analysis a final field calibration was performed to confirm non instrument drift.

All data was compared to the in-house linear regression calibration curves and calculated as ppb 1,3-butadiene. A separate linear regression curve was performed for each range in which the Photovac was operated.

Sampling Diagram



Petro Chem Environmental Services, Inc.

FORMULAS

1,3-Butadiene

AVERAGE

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

STANDARD DEVIATION

$$s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}$$

RELATIVE STANDARD DEVIATION

$$RSD\text{-}\% = \frac{s}{\bar{x}} \times 100$$

RESPONSE FACTOR

$$RF = \frac{area}{concentration}$$

CORRELATION COEFFICIENT

$$R = \sqrt{R^2}$$

REGRESSION LINE EQUATION

$$\bar{y} = C + bx$$

GAS DILUTION CONCENTRATION CALCULATION

$$\frac{a}{a + b} \times c = d$$

Where:

a = Flow setting of calibration gas
b = Flow setting of dilution gas
c = Concentration of calibration gas
d = Concentration of new gas blend

CARB METHOD 429 SAMPLING

The sampling apparatus consisted of a quartz nozzle, heat traced quartz probe, heated borosilicate filter holder with a teflon-coated screen filter support, a teflon filter to condenser line, XAD-2 resin trap, and five modified Greenburg Smith impingers with the following contents: empty, 100 ml DI H_2O, 100 ml DI H_2O, dry, and silica gel. Pitot tubes and a stack gas thermocouple were attached adjacent to the sample probe.

Prior to the testing all sampling equipment was cleaned with successive rinses of soapy water, tap water, chromic acid, distilled water, methanol, hexane, and methylene chloride. All sample containers were new and pre-cleaned by rinsing with methanol, hexane, and methylene chloride. All chemicals used were reagent grade the distilled water was predistilled in glass.

The sample filters and resin traps were transported to the analytical laboratory for cleaning. The filters were extracted and the extract was analyzed to confirm non contamination. The resin trap was cleaned, charged with pre-cleaned XAD-2 resin and spiked with radio-labeled surrogate standards.

The sample train was charged; a pre-cleaned Whatman QMA Quartz fiber filter was placed into the filter holder, the probe/nozzle/filter was put together, all sampling equipment was sealed with hexane rinsed foil and transported to the stack for assembly.

The sampling equipment was assembled and leak tested at 15 inches Hg vacuum. The probe and filter components were heated to 250 (± 25 °F). The probe was inserted into the stack and isokinetic sampling was initiated as per EPA Method #5.

Triplicate test runs were performed all lasting a minimum of 180 minutes. Upon completion of a test the probe was withdrawn from the stack and leak tested at a vacuum equal to or greater than the maximum vacuum observed during the test. The equipment was then disassembled and the components were then sealed with hexane rinsed aluminum foil and transported to the mobile laboratory for sample recovery.

A field blank was similarly treated: charged, transported to the stack, leak tested, disassembled, and transported to the mobile laboratory for sample recovery. No additional gases were pulled through the field blank train.

SAMPLE RECOVERY AND ANALYSIS

The filter and nozzle were separated from the probe. The probe was tilted and rotated while brushing three successive times and rinsing with methanol, hexane, and methylene chloride. Sterile surgical gloves were used during this process. All rinses were caught in an amber glass sample bottle. The nozzle, and filter top half were then similarly cleaned and the rinsings were combined with the probe wash.

The filter back-half, impinger line and condenser were similarly cleaned and the combined rinsings were recovered into an amber glass sample bottle.

The filter was removed from the filter holder with teflon coated forceps, folded and wrapped in hexane rinsed aluminum foil, placed into a petri dish and sealed with teflon tape.

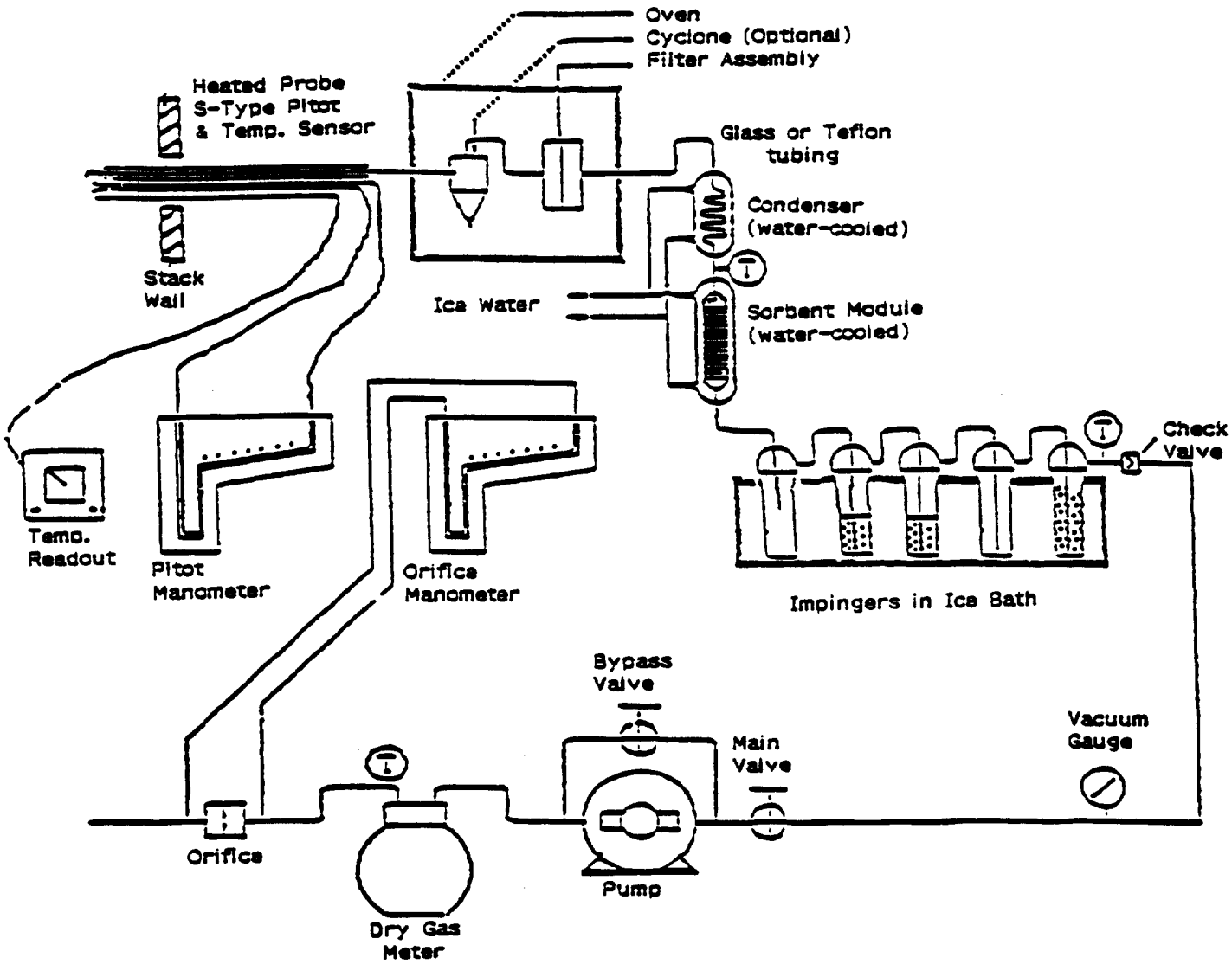
All impingers were disassembled and weighed. The contents of the first impinger were transferred to an amber sample bottle. The impinger was rinsed three times each with methanol, hexane, and methylene chloride. The rinsings were combined with the impinger contents.

The second, third, and fourth impinger contents were transferred to one or more amber glass sample bottles. These impingers and crossovers were each rinsed three times with distilled water and the rinsings were combined with the impinger contents.

Aliquots of the reagents grade chemicals and filters were recovered for analysis as reagent blanks. All samples were sealed, fluid levels marked, labeled, and logged on a chain of custody form. The samples were placed in a shipping container. All liquid samples were stored under blue ice. All filter samples were stored under dry ice.

The samples were transported to the laboratory for analysis where they were logged and inspected for abnormalities. Each sample fraction underwent an extraction and concentration. The extracts were combined and further concentrated. The final concentrate was analyzed by high resolution GCMS (HRGCMS) for all listed PAH compounds. If necessary the sample was diluted to a larger volume and reanalyzed for those PAH compounds which saturated the detector due to high concentration.

CARB Method 429
PAH SAMPLING TRAIN



Filter - Whatman QMA Quartz on Teflon Screen Support
Imp. #1 - Dry
Imp. #2 - 100 mls Distilled Water
Imp. #3 - 100 mls Distilled Water
Imp. #4 - Dry
Imp. #5 - Indicating Silica Gel

Petro Chem Environmental Services, Inc.

CARB METHOD 430
ALDEHYDES

SAMPLE RECOVERY AND ANALYSIS

The sampling apparatus consisted of a heated quartz probe, followed by three midget impingers containing 10 ml of acidified DNPH in the first two and silica gel in the third. The impinger train was connected to a vacuum pump/rotameter/dry gas meter assembly. Prior to the test, the impingers was cleaned with chromic acid, distilled water, methylene chloride, methanol, and oven dried. The impinger bottoms were then sent to the analytical laboratory for charging. The impinger bottoms were charged, capped, and returned to PCES for sampling within a 48 hour period of making the DNPH solution.

The charged impinger bottoms were stored in a friction top can with 1-2 inches of activated charcoal and shipped to the sample location. The impingers were then uncapped, the impinger tops added, and then the sampling train was assembled. The train was transported to the stack and leak tested by closing the teflon stopcock at the first impinger while applying the vacuum to the system. The stopcock was then opened and sampling proceeded at a sample rate of 0.5 L/min. (.018 CFM). Upon completion of the test, the train was leak tested again, and a 2 ml DNPH/ 1 ml H_2O probe wash will be performed and allowed to drain into the first impinger. The train was then disconnected from the probe and lowered down to the mobile laboratory where the impinger tops were removed; impingers were capped and sealed with teflon tape, labeled and placed back into the friction top can with activated charcoal. The samples were then shipped back to the analytical laboratory for extraction and analysis of aldehydes by CARB Method 430, HPLC.

Three field blank impingers were similarly treated however, no gas was sampled through them. A sample spike was performed by the analytical laboratory by dividing a stack sample in half and performing a matrix spike on one half.

$$DSCF = V_{m(std)}$$

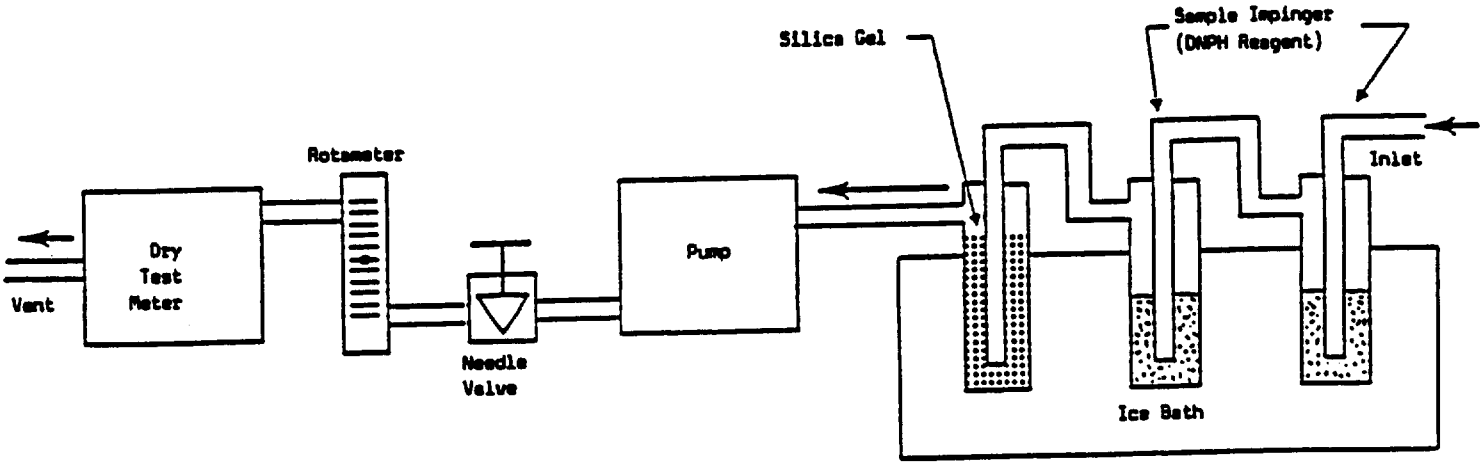
$$DSCM = DSCF \times .0283$$

$$PPb = \frac{(DSCM \times 24.40985)}{MW}$$

$$\frac{LBS}{HR} = \frac{PPb \times MW \times DSCFM \times 1.581 \times 10^{-4}}{1000}$$

CARB METHOD 430
ALDEHYDES
(con't)

Sampling Diagram



PETRO CHEM ENVIRONMENTAL SERVICES, INC.

DRY GAS METER CALIBRATION

DATE:	1-29-92	AMBIENT TEMP (°F):	46
TECH:	BDM	BAROMETRIC Pbar:	29.74
		TEST METER ID#:	S5M104564
METER I.D.#	1001	TEST METER Mcf:	1.015

APPROXIMATE CFM		1.00	0.75	0.50	0.30
STD TEST METER VOLUME CF	INITIAL	0.00	0.00	0.00	0.00
	FINAL	10.05	7.34	10.01	10.01
	TOTAL	10.05	7.34	10.01	10.01
FIELD GAS METER VOLUME CF	INITIAL	805.50	819.90	828.40	839.80
	FINAL	815.52	827.37	838.81	850.26
	TOTAL	10.02	7.47	10.41	10.46
STD TEST METER TEMP (°F)		46.0	49.0	46.5	53.0
FIELD GAS METER TEMP (°F)	IN	51.0	52.0	53.5	53.0
	OUT	36.0	39.0	44.0	49.0
	AVERAGE	43.5	45.5	48.8	51.0
STD TEST METER PRESSURE ("H2O)		-1.30	-0.60	-0.30	-0.15
FIELD GAS METER PRESSURE ("H2O)		2.33	1.29	0.52	0.20
FIELD GAS METER, Mcf		1.007207	0.967329	0.979076	0.967069

FIELD AVERAGE Mcf:	0.985170	H@:	1.3081

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

DRY GAS METER CALIBRATION

DATE:	3-18-92	AMBIENT TEMP (°F):	59
TECH:	BDM	BAROMETRIC Pbar:	30
		TEST METER ID#:	S5M104564
METER I.D.#	1001	TEST METER Mcf:	1.015

APPROXIMATE CFM		1.00	0.75	0.50	0.30
STD TEST METER VOLUME CF	INITIAL	0.00	0.00	0.00	0.00
	FINAL	10.06	7.31	10.14	10.01
	TOTAL	10.06	7.31	10.14	10.01
FIELD GAS METER VOLUME CF	INITIAL	648.00	638.40	659.10	670.30
	FINAL	658.20	645.82	669.58	680.76
	TOTAL	10.20	7.42	10.48	10.46
STD TEST METER TEMP (°F)		57.5	57.0	57.5	60.0
FIELD GAS METER TEMP (°F)	IN	61.0	58.5	62.5	65.0
	OUT	49.5	51.5	55.5	60.0
	AVERAGE	55.3	55.0	59.0	62.5
STD TEST METER PRESSURE ("H2O)		-1.30	-0.60	-0.30	-0.15
FIELD GAS METER PRESSURE ("H2O)		2.30	1.25	0.51	0.20
FIELD GAS METER, Mcf		0.991129	0.993042	0.983688	0.975525

FIELD AVERAGE Mcf:	0.985846

H@:	1.2829

Petro Chem Environmental Services, Inc.

Method 430
Pretest Rotameter Calibration

FLOW ROTAMETER CALIBRATION

ROTAMETER # 01
DATE: 1-31-92
Pbar 29.56 "Hg

	ROTAMETER SETTING	TEMP °F	VOLUME ml	TIME sec	RATE L/min
5 a	5.00	68.00	500.00	59.81	0.50
b	5.00	68.00	500.00	60.52	0.50
c	5.00	68.00	500.00	60.88	0.49
AVG	5.00	68.00	500.00	60.40	0.50
4 a	4.00	68.00	500.00	79.71	0.38
b	4.00	68.00	500.00	79.22	0.38
c	4.00	68.00	500.00	79.53	0.38
AVG	4.00	68.00	500.00	79.47	0.38
3 a	3.00	68.00	500.00	105.56	0.28
b	3.00	68.00	500.00	105.01	0.29
c	3.00	68.00	500.00	104.75	0.29
AVG	3.00	68.00	500.00	105.29	0.29
2 a	2.00	68.00	500.00	158.09	0.19
b	2.00	68.00	500.00	157.88	0.19
c	2.00	68.00	500.00	158.30	0.19
AVG	2.00	68.00	500.00	157.99	0.19

Method 430
Post test Rotameter Calibration

FLOW ROTAMETER CALIBRATION

ROTAMETER # 01
DATE: 2-18-92
Pbar 29.39 "Hg

	ROTAMETER SETTING	TEMP °F	VOLUME ml	TIME sec	RATE L/min
5 a	5.00	82.00	500.00	59.76	0.50
b	5.00	82.00	500.00	61.12	0.49
c	5.00	82.00	500.00	60.96	0.49
AVG	5.00	82.00	500.00	60.61	0.49
4 a	4.00	82.00	500.00	79.68	0.38
b	4.00	82.00	500.00	79.00	0.38
c	4.00	82.00	500.00	79.20	0.38
AVG	4.00	82.00	500.00	79.34	0.38
3 a	3.00	82.00	500.00	105.40	0.28
b	3.00	82.00	500.00	105.12	0.29
c	3.00	82.00	500.00	104.84	0.29
AVG	3.50	82.00	500.00	105.26	0.29
2 a	2.00	82.00	500.00	158.12	0.19
b	2.00	82.00	500.00	157.92	0.19
c	2.00	82.00	500.00	158.48	0.19
AVG	2.00	82.00	500.00	158.02	0.19

CHAIN OF CUSTODY RECORD

Submitted to: ALTA LABS

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT
BECHTEL	K-49 17-R
REPORT NO.	**SAMPLER**
10-849D	MARK T. READY
METHOD	**REPORT ATTN.** / **PO#**
429 - PAH	TERRY Rowles

HRGCMS FOR ACL LISTED 429 PAH

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	
D-19	Filter Blank	2-12-92		X		
D-20	Probe & Nozzle Blank		X			
D-21	Condenser Rinse Blank		X			Composite
D-22	First Impinger Blank		X			
D-23	Second Impinger Blank		X			
D-24	Resin Trap Blank (#10)			X		
D-1	Filter #1	2-13-92		X		
D-2	Probe & Nozzle #1	"	X			
D-3	Condenser Rinse #1	"	X			Composite
D-4	First Impinger #1	"	X			
D-5	Second Impinger #1	"	X			
D-6	Resin Trap (#)	"		X		

* RKF

COMMENTS:

Analyze within 7 days of collection

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-14-92	Kenneth J. Flatt	2-14-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

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

*. Sample Recieved Broken RKF

CHAIN OF CUSTODY RECORD

Submitted to: ALTA LABS

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT
BECHTEL	K-49 17-R

REPORT NO.	SAMPLER
10-849D	MARK T. READY

METHOD	REPORT ATTN.	PO#
429 - PAH	TERRY ROWLES	

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	HR GCMS FOR AH LISTED 429 PAH
D-7	FILTER #2	2-13-92		X		
D-8	PROBE & NOZZLE #2	"	X			
D-9	Condenser Rinse #2	"	X			Composite
D-10	First Impinger #2	"	X			
D-11	Second Impinger #2	"	X			
D-12	RESIN TRAP #2	"		X		
D-13	FILTER #3	2-14-92		X		
D-14	PROBE & NOZZLE #3	"	X			
D-15	Condenser Rinse #3	"	X			Composite
D-16	First Impinger #3	"	X			
D-17	Second Impinger #3	"	X			
D-18	Resin Trap #3	"		X		

COMMENTS:

Analyze within 7 days of Collection

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-14-92	Kenneth I Fuff	2-19-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

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

I0611

CHAIN OF CUSTODY RECORD

Submitted to: COAST TO COAST

COMPANY	LOCATION/UNIT
BECHTEL	K-49 17-R

REPORT NO.	SAMPLER
10-849D	MARK READY

METHOD	REPORT ATTN.	PO#
422 - VOA	TERRY ROWLES	

ANALYSIS REQUEST

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	TO 14 (Benzene, Toluene, Xylenes) PQL = 0.1 ppb	8240 (Benzene, Toluene, Xylene, Xylene, Propylene) PQL = 0.01 mg					
D-50	CONDENSABLE #1	2-13-92	X				+					-1
D-51	CONDENSABLE #2	"	X				+					-2
D-52	CONDENSABLE #3	"	X				+					-3
D-53	CONDENSABLE BLANK	"	X				+					-4
D-54	NON CONDENSABLE #1	"			X	+						-5
D-55	NON CONDENSABLE #2	"			X	+						-6
D-56	NON CONDENSABLE #3	"			X	+						-7
D-57	NON CONDENSABLE BLANK	"			X	+						-8

COMMENTS: RUN #1 end - 10:30 AM
RUN #2 end - 11:00 AM
RUN #3 end - 11:30 AM

Gas analysis within 72 hrs of Sampling
Report as ppb and ug/cm
Report within 21 days

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-13-91	Terry Rowles	2-13-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Terry Rowles	2-13-92	[illegible] 2-13-92 1130	
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

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

DISCUSSION

CARB Method 429, PAH, requires that the filter samples be stored and shipped on dry ice. The samples were packed following the guidelines as stated in the method. Mark Ready supervised sample storage and shipping and verifies proper sample handling.

Mark T. Ready
March 26, 1992

ALTA Analytical Laboratory

Batch ID: 10995

Sample Log-In Checklist	Yes	No
1. Samples Arrived by: Federal Express		
2. Airbill Present? Number 9462230724	X	
3. Shipping Container is Intact?	X	
4. Custody Seals Present? Number _____		X
If yes, are they intact? N/A		
5. Sample Containers Intact?	X	
6. Shipping Preservation: Ice/Blue Ice/None		
7. Temperature: 6°C		
8. Chain of Custody Present?	X	
9. Discrepancies in Chain of Custody?		X
10. Packing Retained? Alta chest	X	

Name: [illegible] Date Rcv'd: 2-8-92

Comments:

ALTA Analytical Laboratory

Batch ID: 11005

Sample Log-In Checklist	Yes	No
1. Samples Arrived by: Federal Express		
2. Airbill Present? Number 9462229383	X	
3. Shipping Container is Intact?	X	
4. Custody Seals Present? Number _____		X
If yes, are they intact? N/A		
5. Sample Containers Intact?	X	
6. Shipping Preservation: Ice/Blue Ice/None		
7. Temperature: 6°C		
8. Chain of Custody Present?	X	
9. Discrepancies in Chain of Custody?		X
10. Packing Retained?	X	

Name: [illegible] Date Rcv'd: 2-12-92

Comments:

ALTA Analytical Laboratory

Batch ID: 11028

Sample Log-In Checklist	Yes	No
1. Samples Arrived by: Federal Express		
2. Airbill Present? Number 946 2231 925	X	
3. Shipping Container is Intact?	X	
4. Custody Seals Present? Number _____		X
If yes, are they intact? N/A		
5. Sample Containers Intact?	X	
6. Shipping Preservation: Ice/Blue Ice/None		
7. Temperature: 6°C		
8. Chain of Custody Present?	X	
9. Discrepancies in Chain of Custody?		X
10. Packing Retained?	X	

Name: [illegible] Date Rcv'd: 2-18-92

Comments:

Petro Chem Environmental Services, Inc.

ALTA Analytical Laboratory

Batch ID: 11028

Sample Log-In Checklist	Yes	No
1. Samples Arrived by: Federal Express		
2. Airbill Present? Number 9462231940	X	
3. Shipping Container is Intact?	X	
4. Custody Seals Present? Number _____		X
If yes, are they intact? N/A		
* 5. Sample Containers Intact?		X
6. Shipping Preservation: Ice/Blue Ice/None		
7. Temperature: 4°C		
8. Chain of Custody Present?	X	
9. Discrepancies in Chain of Custody?		X
10. Packing Retained? Alta Chest	X	

Name: [signature] Date Rcv'd: 2-18-92

Comments:

* The condenser rinse blank. Sample I.D. D-21 was received broken.

Petro Chem Environmental Services, Inc.

PETRO CHEM ENVIRONMENTAL SERVICES INC.

CALIFORNIA AIR RESOURCES BOARD

METHOD 422.102

ANALYSIS OF 1,3-BUTADIENE

INITIAL PERFORMANCE EVALUATION

1/24/92

INTRODUCTION

Analysis of four concentrations of 1,3-Butadiene was performed in triplicate according to California Air Resources Board method 422.199 part 4 "Calibration and Quality Control Procedures for Analysis Methods-Initial Performance Evaluation". Two of these standards were supplied by Scott Specialty Gasses. The other two standards were blended from the certified standards and ultra high purity nitrogen using a calibrated Charlton Technology Microblend model BC precision gas blender with mass flow controllers. A summary of certified gas concentrations, gas blender instrument settings and blended standard gas concentration calculations are included in this report.

All peak areas in the raw data section are in millivoltseconds (mVS) to allow larger numbers to be used in calculations. These units differ from those reported on the actual chromatograms which are in voltseconds (VS).

Linear regression was performed using the "least squares" regression analysis program found in the QUATTRO PRO spreadsheet program. In the regression output table the constant" equals the y intercept and R Squared is the square of the correlation coefficient.

All analysis and calculations were performed by Terry Rowles of Petro Chem Environmental Services Inc. All analysis for initial performance evaluation were performed on 1/24/92 using a PHOTOVAC model 10S55 gas chromatograph equipped with a photoionization detector. The columns used were (1) a 4" by 1/8" CSP 20M precolumn and (2) a 10M by .53mm KCL/Al2O3 analytical column. A backflush technique was used to remove interferences from the analytical system and to help isolate the compound of interest.

California Air Resources Board Method 422.102
1,3-Butadiene Initial Performance Evaluation

Summary of Results

Limit of Detection (LOD)	0.16ppbv
Limit of Quantitation (LOQ)	0.54ppbv
Correlation Coefficient	0.9996
Regression Formula	Y=-0.164+0.0023X

Method 422.102 1,3-Butadiene

Linear Regression Analysis

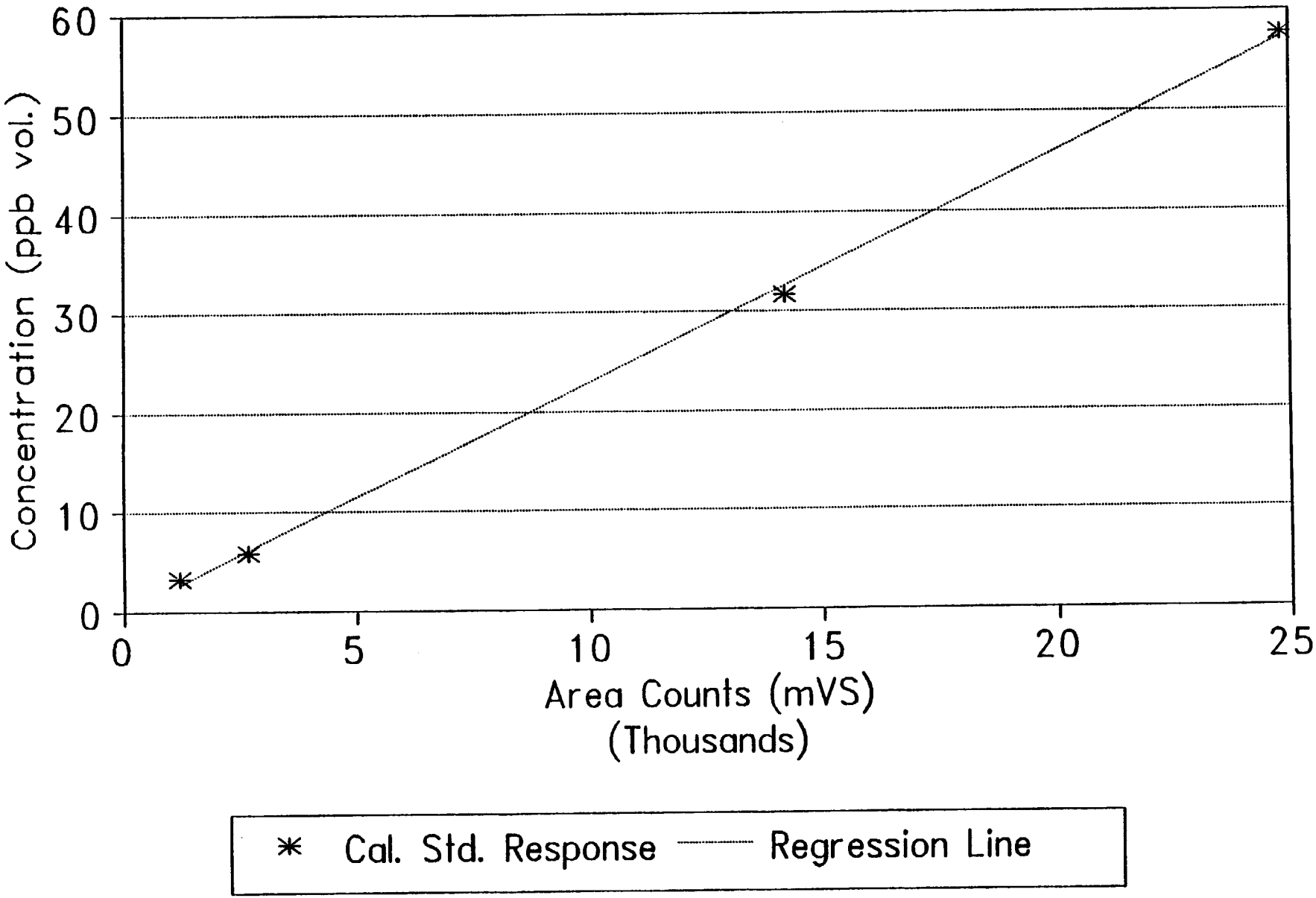
Regression Output:

Constant		-0.164061
Std Err of Y Est		0.8797852
R Squared		0.9992079
No. of Observations		4
Degrees of Freedom		2
X Coefficient(s)	0.0023091	
Std Err of Coef.	4.597E-05	

CONC.	REGR. CONC.
3.22	2.6068
5.86	6.0704
31.7	32.6248
57.7	57.1779

Linear Regression Graph

1, 3-Butadiene



PETRO CHEM ENVIRONMENTAL SERVICES INC.

California Air Resources Board Method 422.102
Chromatographic Analysis of 1,3-Butadiene from Stationary Sources

Initial Performance Evaluation
Raw Data and Response Factors

STANDARD CONCENTRATION (ppb v/v)	AREA RUN 1	AREA RUN 2	AREA RUN 3	AREA AVERAGE	AREA STANDARD DEVIATION
3.22	1200	1200	1200	1200.00	0.00
5.86	2700	2700	2700	2700.00	0.00
31.7	14300	14200	14100	14200.00	100.00
57.7	24800	24900	24800	24833.33	57.74

STANDARD CONCENTRATION (ppb v/v)	RESPONSE FACTOR RUN 1	RESPONSE FACTOR RUN 2	RESPONSE FACTOR RUN 3	RESPONSE FACTOR AVERAGE	RESPONSE FACTOR STANDARD DEVIATION
3.22	2.6833E-03	2.6833E-03	2.6833E-03	2.6833E-03	0.0000E+00
5.86	2.1704E-03	2.1704E-03	2.1704E-03	2.1704E-03	0.0000E+00
31.7	2.2168E-03	2.2324E-03	2.2482E-03	2.2325E-03	1.5722E-05
57.7	2.3266E-03	2.3173E-03	2.3266E-03	2.3235E-03	5.3947E-06
			RF AVG.=	2.3524E-03	
			RF STD.DEV.=	0.0002293982	
			RF RSD% =	9.75%	

Calibration Gas Source and Concentrations

Certified Gasses

Source	Concentration	Constituents	Certificate Date
Scott	5.86ppbv +/- 10%	1,3-Butadiene Nitrogen	1/16/92
Scott	57.7ppbv +/- 10%	1,3-Butadiene Nitrogen	1/16/92

Blended Gasses

Source	Concentration	Flow Rates (L/min.) Dilution Gas	Cal. Gas	Date Blended
5.86ppm UHP N2	3.22ppmv	0.9	1.1	1/24/92
57.7ppm UHP N2	31.7ppmv	0.9	1.1	1/24/92

FORMULAS

AVERAGE

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

STANDARD DEVIATION

$$s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}$$

RELATIVE STANDARD DEVIATION

$$RSD\ \% = \frac{s}{\bar{x}} \times 100$$

RESPONSE FACTOR

$$RF = \frac{area}{concentration}$$

CORRELATION COEFFICIENT

$$R = \sqrt{R^2}$$

REGRESSION LINE EQUATION

$$\bar{y} = C + bx$$

GAS DILUTION CONCENTRATION CALCULATION

$$\frac{a}{a + b} \times c = d$$

Where:

a = Flow setting of calibration gas
b = Flow setting of dilution gas
c = Concentration of calibration gas
d = Concentration of new gas blend

LIMIT OF DETECTION

$$LOD=|A|+3s$$

Where:
A=the least squares intercept
("C" in the regression output table)

s=the standard deviation of replicate determinations
of the lowest standard

LIMIT OF QUANTITATION

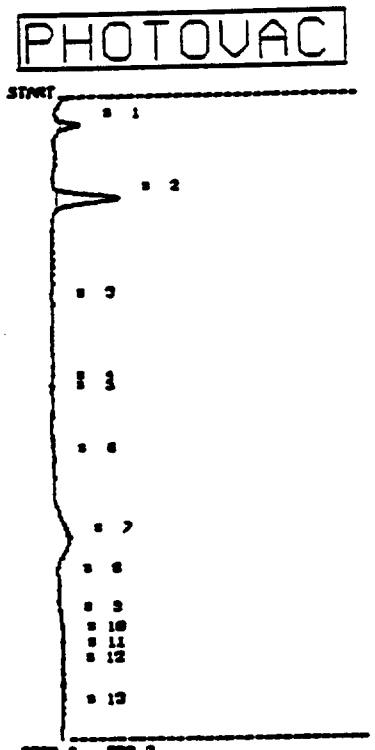
$$LOQ= 3.3*LOD$$

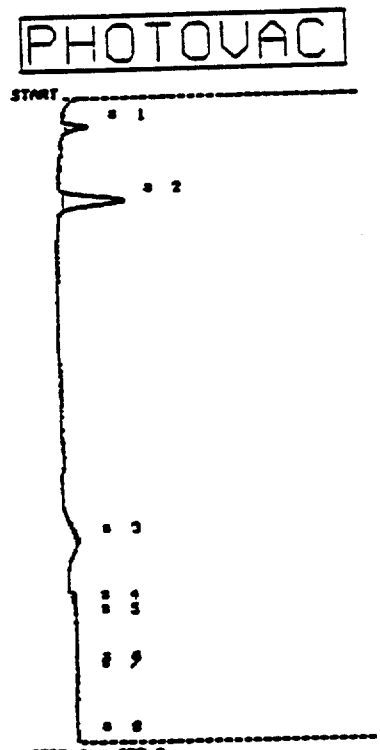
MILLIVOLTSECONDS

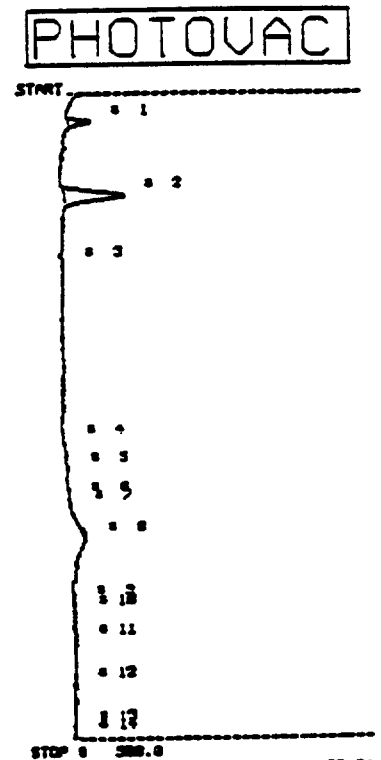
$$mVS= VS * 1000$$

3.22ppmv 1,3-Butadiene

Calibration Gas Standard

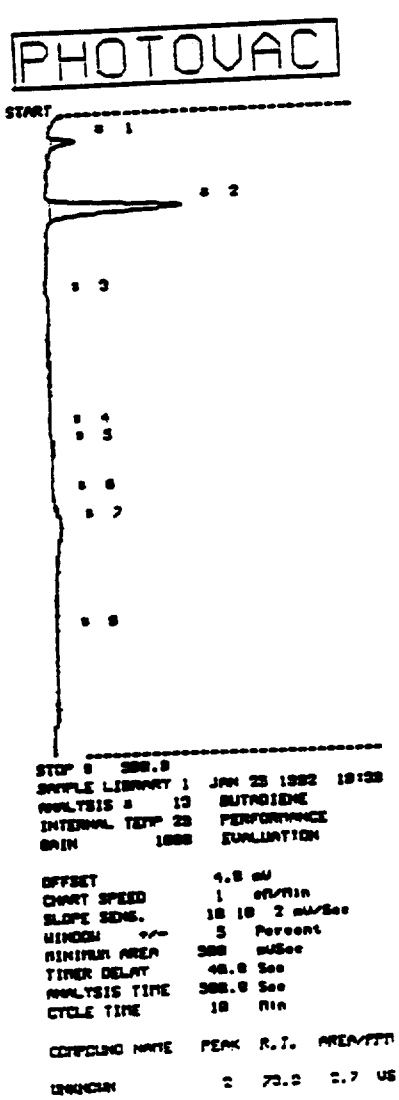


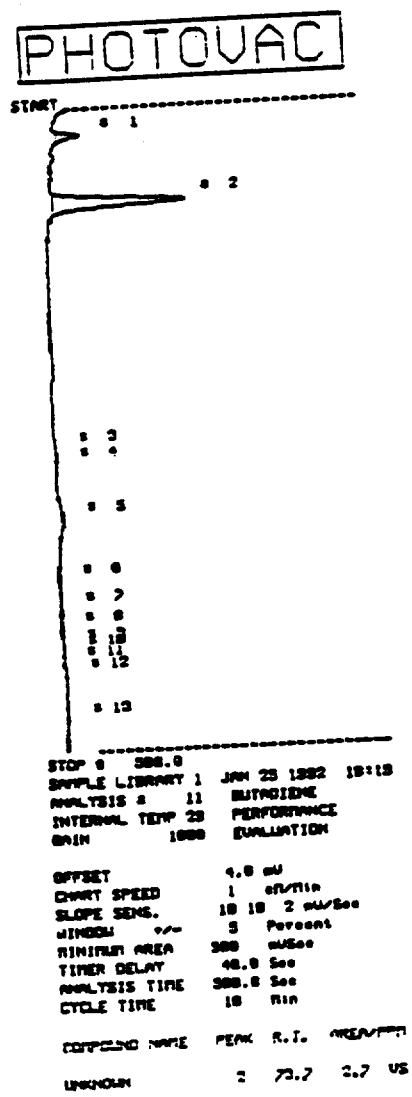


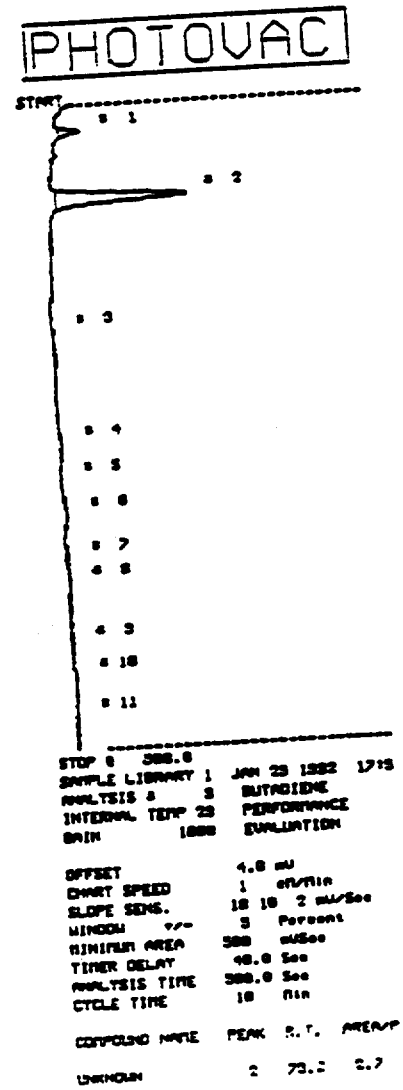


5.86ppmv 1,3-Butadiene

Calibration Gas Standard



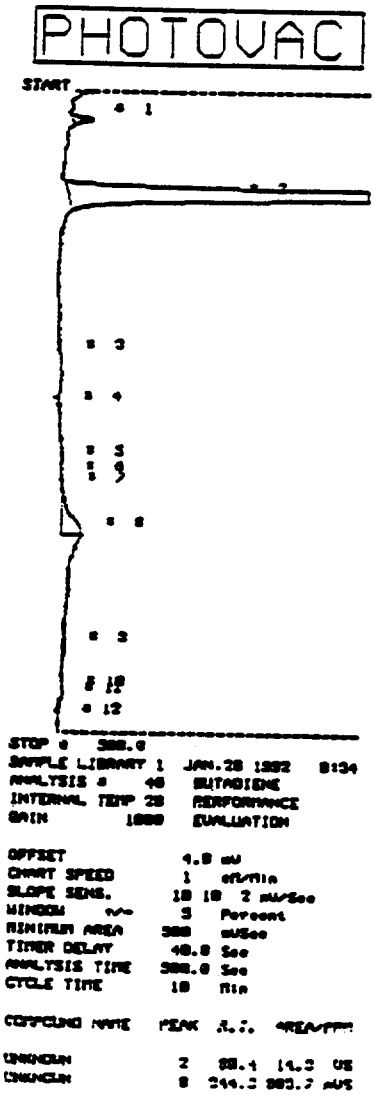


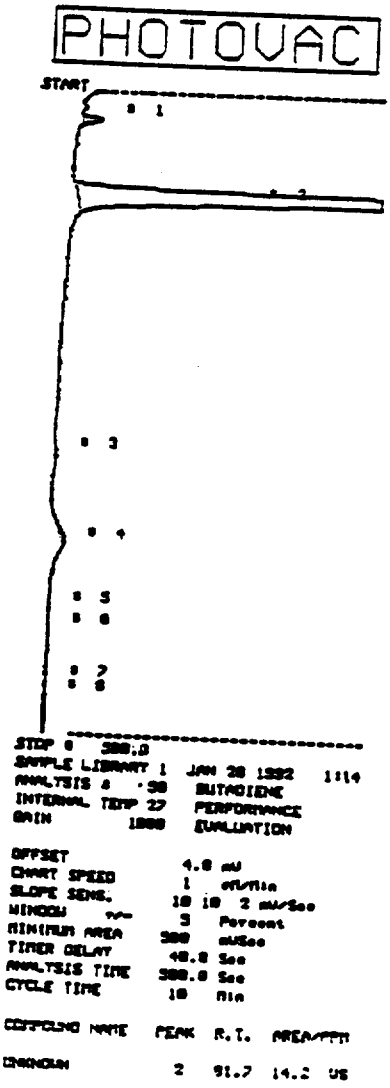


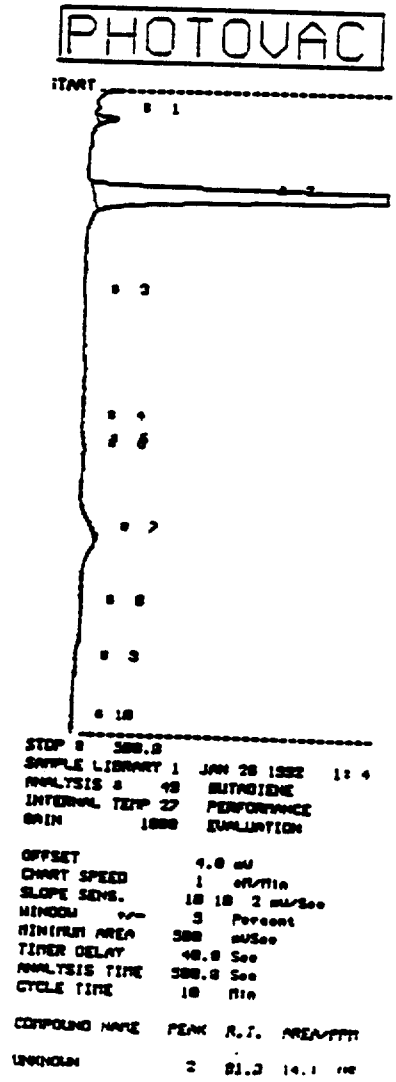
Petro Chem Environmental Services, Inc.

31.7ppmv 1,3-Butadiene

Calibration Gas Standard



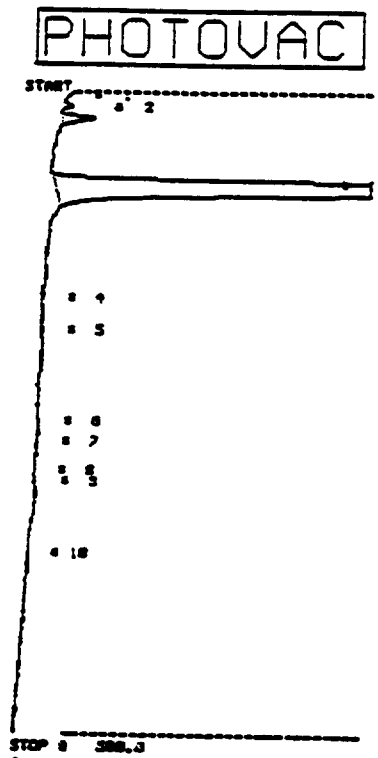


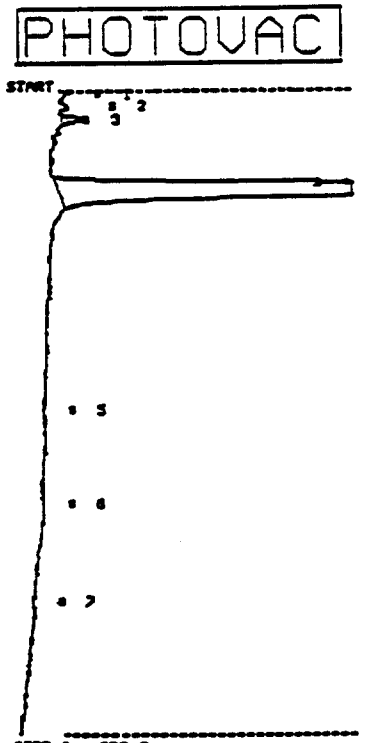


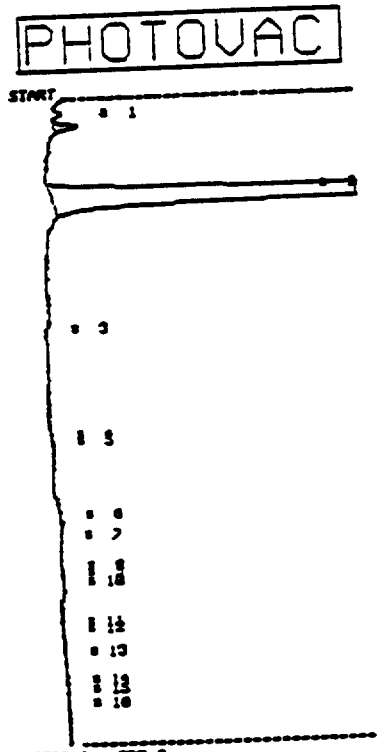
Petro Chem Environmental Services, Inc.

57.7ppmv 1,3-Butadiene

Calibration Gas Standard







Petro Chem Environmental Services, Inc.

Scott Specialty Gases, Inc.

Shipped From: 6141 EASTON ROAD PLUMSTEADVILLE PA 18949-0310
Phone: 215-766-8861 Fax: 215-766-0320

CERTIFICATE OF ANALYSIS

PETRO CHEM ENV SERVICES

3207 ANTONINO AVENUE

BAKERSFIELD CA 93308

PROJECT #: 01-34565
PO#: 1673
ITEM #: 01029230000 CL
DATE: 1/16/92

CYLINDER #: CAL10818

ANALYTICAL ACCURACY: +/-10%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
1,3-BUTADIENE	5.	PPB	5.86	PPB
NITROGEN		BAL		BAL

MICROGRAV - TM

ANALYST: [signature] APPROVED BY: [signature]
M.SIRINIDES/T.NEEME

Scott Specialty Gases, Inc.

Shipped From: 6141 EASTON ROAD PLUMSTEADVILLE PA 18949-0310
Phone: 215-766-8861 Fax: 215-766-0320

CERTIFICATE OF ANALYSIS

PETRO CHEM ENV SERVICES

3207 ANTONINO AVENUE

BAKERSFIELD CA 93308

PROJECT #: 01-34565
PO#: 1673
ITEM #: 01029220060 CL
DATE: 1/16/92

CYLINDER #: CAL10937

ANALYTICAL ACCURACY: +/-10%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
1,3-BUTADIENE	50.	PPB	57.7	PPB
NITROGEN		BAL		BAL

MICROGRAV - TM

ANALYST: Tom Sassaman APPROVED BY: Hal Sirinides
M.SIRINIDES/T.NEEME

METHOD 410A VOA #1-3 RUN # 1-3

COMPANY: Bechtel
UNIT: K[redacted]49[redacted] 17R
DATE: 2-13-92
REPORT: 10-849D
TECH: DC7
PUMP #: GAST Pump Meter
METER BOX#: 100T
METER coeff:
PITOT TUBE#:

PRE/POST TEST LEAK CHECK

LEAK RATE: .00 cfm
VACUUM: 3 "Hg

All post leak RATES ARE 0.00 @ 3 Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.12
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%: 27.5 12%

AVG. CALIB. NOZZLE DIAM("): –
PROBE LINER MATERIAL: –
FILTER #: –
DUCT DIAM ("): 120

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER °F
Run #1												
START	11:15.00	1	820		≈.04	0	279.550	76	75			
STOP	11:35.00	1	828			0	280.315	75	73			
							.765	75				
Run #2												
START	11:46.00	1	829		≈.04	0	280.36	75	69			
STOP	12:06.30	1	826			0	281.12	75	69			
							.76	75				
Run #3												
START	12:15.30	1	822		≈.04	0	281.135	75	72			
STOP	12:35.30	1	825			0	281.925	75	73			
							.79	75				
AVERAGE												

METHOD 410A VOA #1-3 RUN # 1-3

COMPANY: Bechtel
UNIT: K [redacted] 17R
DATE: 2-13-92
REPORT: 10-849D
TECH: DCJ
PUMP #: GAST Pump Meter
METER BOX#: ~~1-OT~~
METER coeff:
PITOT TUBE#:

PRE / (POST) TEST LEAK CHECK

LEAK RATE: .00 cfm
VACUUM: 3 "Hg

All post leak RATES ARE 0.00 @ 3 Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.12
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%: 27.5 12%

AVG. CALIB. NOZZLE DIAM("): –
PROBE LINER MATERIAL: –
FILTER #: –
DUCT DIAM ("): 120

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
Run #1												
Start	11:15.00	1	820		≈.04	0	279.550	76	75			
Stop	11:35.00	1	828			0	280.315	75	73			
							.765	75				
Run #2												
Start	11:46.00	1	829		≈.04	0	280.36	75	69			
Stop	12:06 30	1	826			0	281.12	75	69			
							.76	75				
Run #3												
Start	12:15 30	1	822		≈.04	0	281.135	75	72			
Stop	12:35.30	1	825			0	281.925	75	73			
							.79	75				
AVERAGE												

COMPANY : Bechtel
UNIT : K-49 17-R
DATE : 2-13-92
REPORT : 10-849D

ON-SITE DATA

		2-13	2-13	2-14
	RUN	#1	#2	#3
	TIME	9:44-13:16	14:06-17:10	9:16-12:25
Vm	Dry sampled gas volume, dcf	114.92	116.08	113.09
Y	Meter calibration factor (met# 1001, 1001, 1001)	.985170	.985170	.985170
Pbar	Barometric Pressure, "Hg	29.12	29.12	29.30
Pstatic	Stack static pressure, "Hg	-1.35	-1.35	-1.35
ΔH	Differential meter pressure, "H2O	.76	.78	.75
Tm	Meter temperature, °F	72	72	73

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
KO	745.5	453.5	292.0	742.5	446.8	295.7	754.0	453.2	300.8
H2O	637.5	626.5	11.0	599.2	595.5	3.7	630.1	626.8	3.3
KO	494.3	491.5	2.8	522.1	516.2	5.9	490.1	489.6	.5
Silica	906.2	884.5	21.7	885.4	862.0	23.4	843.7	821.5	22.2
V lc volume of H2O, gms			327.5			328.7			326.8

		RUN #1	#2	#3
CO2	% Dry Volume	7.35	7.25	7.35
O2	% Dry Volume	8.0	8.2	8.0
N2	% Dry Volume	84.65	84.55	84.65
Cp	Pitot tube coefficient (Pit# - , - , -)	.84	.84	.84
ΔP	Avg P, "H2O	2.410	2.433	2.373
Ts	Stack temperature, °F	782	764	785
As	Stack area, sq. ft.	.785	.785	.785
Ds	Stack diameter, inches	12.0	12.0	12.0
Dn	Nozzle diameter, inches	.193	.193	.193
Dur	Sampling time, min	180	180	180
% Iso	Mini iso			

Filter # _____ _____ _____
Filter tare weights, gms _____ _____ _____

INITIALS
CONTROL BOX#:
Hi P_____ Lo P_____ Avg P_____ Duct Temp _____
Diameters before disturb_____ After_____
# of points, total _____
Overall (inches)_____ Coupling _____

Petro Chem Environmental Services, Inc.

METHOD 429 RUN # 1 West

COMPANY: Bechtel
UNIT: K27 17R
DATE: 2-13-92
REPORT: 10-849D
TECH: DCS
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

(PRE)/ POST TEST LEAK CHECK
LEAK RATE: .004 @ 10 Hg cfm
VACUUM: "Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.12
STATIC PRESSURE("Hg): -1.35
ASSUMED MOISTURE,%: 27.5, 12%
AVG. CALIB. NOZZLE DIAM("): .193
PROBE LINER MATERIAL: Qtz.
FILTER #:
DUCT DIAM ("): 12.0

TRAVERSE PT. NUMBER		TIME (θ) min. 1.5 min/pt.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGR °F	
0	12	9:44.0	8	833	2.85	.670	.84	054.30	60	70	234	230	60	61
7.5	11	:51.3	8	830	2.65	.647	.79	059.3	62	68	304	242	54	54
15	10	:59.0	7	828	2.38	.595	.68	064.2	64	71	361	249	53	54
22.5	9	10:06.3	7	830	2.22	.597	.68	068.6	67	73	386	249	53	54
	8	:14.0	7	829	2.21	.599	.68	073.1	70	74	410	250	66	68
	7	:21.3	8	833	2.48	.633	.75	077.6	70	73	410	252	66	67
	6	:29.0	8	820	2.30	.613	.71	082.4	73	71	411	254	58	57
	5	:36.3	8	787	2.25	.618	.72	086.9	75	76	408	254	58	59
	4	:44.0	8	689	2.20	.636	.75	091.6	75	75	404	255	59	60
	3	:51.3	8	635	2.19	.653	.78	096.4	77	77	397	241	59	60
	2	:59.0	8	624	2.32	.674	.83	101.3	77	76	384	252	59	59
	1	11:06.3	8	615	2.30	.675	.83	106.3	77	77	375	253	59	60
	–	11:14.0						111.4						
AVERAGE														

METHOD 429 RUN #1 ~~East~~ South

COMPANY: Bechtel
UNIT: K27 17R
DATE: 2-13-92
REPORT: 10-8490
TECH: DCJ
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK
LEAK RATE: .004 @ 10 Hg cfm
VACUUM: "Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.12
STATIC PRESSURE("Hg): -1.35
ASSUMED MOISTURE,%: 27.5, 12%
AVG. CALIB. NOZZLE DIAM("): .193
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("): 12.0

TRAVERSE PT. NUMBER		TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft) 054.30	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER °F	
0	12	11:46.0	8	820	2.60	.656	.79	111.4	76	75	234	254	58	59
7.5	11	:53.3	8	830	2.61	.650	.79	116.3	75	69	307	256	58	59
	10	12:01.0	8	820	2.61	.653	.79	121.2	74	71	353	253	57	59
	9	:08.3	8	828	2.65	.658	.80	126.1	75	73	386	255	57	59
	8	:16.0	8	829	2.59	.650	.78	131.0	75	72	398	252	57	58
	7	:23.3	8	830	2.42	.625	.74	135.9	73	69	405	259	57	58
	6	:31.0	7	831	2.20	.596	.68	140.6	73	69	408	258	58	59
	5	:38.3	7	830	2.24	.600	.69	145.0	72	68	407	238	58	60
	4	:46.0	8	825	2.42	.626	.74	149.5	73	68	405	257	58	60
	3	:53.3	8	771	2.40	.636	.76	154.2	73	67	399	259	57	60
	2	13:01.0	8	720	2.48	.663	.81	159.0	74	70	393	256	58	59
	1	:08.3		669	2.35	.658	.80	163.9	72	69	384	260	58	60
	—	13:16.0						169.22						
								Vm 114.92						
				782	2.410		.76	Vso 100.56		72				
AVERAGE								Vp 138.86						

METHOD 429 RUN #2 West

COMPANY: Bechtel
UNIT: K49 17R
DATE: 2-13-92
REPORT: 10-849D
TECH: DCZ
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

PRE/ POST TEST LEAK CHECK
LEAK RATE: .003 @ 10 Hg cfm
VACUUM: "Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.12
STATIC PRESSURE("Hg): -1.35
ASSUMED MOISTURE,%: 27.5, 12%
AVG. CALIB. NOZZLE DIAM("): .193
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("): 12.0

TRAVERSE PT. NUMBER		TIME (θ) min. 7.5 min/pt.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER °F	
0	12	14:06.0	7	819	2.80	.680	.85	169.50	75	75	248	258	55	56
7.5	11	:13.3	7	822	2.70	.661	.81	174.6	73	67	312	263	55	57
15	10	:21.0	7	825	2.42	.626	.74	179.6	74	67	364	264	56	57
22.5	9	:28.3	7	821	2.25	.605	.69	184.3	76	66	399	264	55	57
30	8	:36	7	820	2.25	.605	.69	188.8	75	67	409	264	57	58
37.5	7	:43.3	7	820	2.35	.618	.72	193.3	75	66	411	264	55	58
45	6	:51.0	7	827	2.48	.635	.75	197.9	76	68	414	265	55	57
52.5	5	:58.3	7	827	2.40	.624	.73	202.7	76	67	415	270	56	57
60	4	15:06.0	7	790	2.30	.621	.72	207.4	78	67	414	265	56	58
67.5	3	:13.3	7	687	2.18	.631	.75	212.1	78	68	406	266	56	59
75	2	:21.0	7	690	2.30	.648	.78	216.8	78	69	398	266	55	59
82.5	1	:28.3	7	676	2.28	.650	.78	221.7	78	70	388	267	55	59
90	-	15:36.0						226.5						
AVERAGE														

METHOD 4B RUN #2 South

COMPANY: Bechtel
UNIT: K49 17R
DATE: 2-13-92
REPORT: 10-849D
TECH: DCT
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK
LEAK RATE: .003 @ 10 Hg cfm
VACUUM: "Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.12
STATIC PRESSURE("Hg): -1.35
ASSUMED MOISTURE,%: 27.5 12%
AVG. CALIB. NOZZLE DIAM("): .193
PROBE LINER MATERIAL: Qtz.
FILTER #:
DUCT DIAM ("): 12.0

TRAVERSE PT. NUMBER		TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGR °F	
								169.50						
0	12	15:40.0	7	824	2.62	.659	.80	226.5	78	76	335	262	58	60
7.5	11	:47.3	7	823	2.63	.659	.80	231.5	77	74	340	266	57	60
15	10	:55.0	7	822	2.68	.664	.81	236.4	78	71	392	265	57	60
22.5	9	16:02.3	7	825	2.65	.658	.80	241.4	76	70	414	266	58	60
30	8	:10.0	7	823	2.60	.650	.79	246.3	75	68	424	266	58	59
37.5	7	:17.3	7	825	2.45	.630	.75	251.2	75	67	427	266	57	59
45	6	:25.0	7	817	2.25	.605	.70	255.9	74	67	424	267	58	59
52.5	5	:32.3	7	725	2.20	.621	.73	260.5	74	66	420	269	58	58
60	4	:40.0	7	643	2.35	.665	.82	265.1	75	66	415	269	58	58
67.5	3	:47.3	8	614	2.42	.683	.86	270.1	74	65	410	269	57	57
75	2	:55.0	8	601	2.50	.698	.90	275.2	74	65	399	267	56	57
82.5	1	17:02.3		573	2.40	.699	.89	280.5	74	64	379	261	56	57
90	–	17:10.0						285.58						
								VM 116.08						
								Ho 100.26		72				
				764	2.433		.79	Vf 138.72						
AVERAGE														

METHOD 429 RUN # 3 West

COMPANY: Bechtel
UNIT: K49 17R
DATE: 2-14-92
REPORT: 10-8190
TECH: DCJ
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK
LEAK RATE: .002 @ 10 Hg cfm
VACUUM: "Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.30
STATIC PRESSURE("Hg): -1.30
ASSUMED MOISTURE,%: 27.5, 12%
AVG. CALIB. NOZZLE DIAM("): .193
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("): 12.0

TRAVERSE PT. NUMBER		TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F	
0	12	9:16.00	6	834	2.30	.597	.69	771.80	62	64	241	250	58	60
7.5	11	:23.3	7	835	2.64	.639	.78	776.3	65	60	271	252	58	60
15	10	:30.0	7	836	2.47	.621	.74	781.1	68	62	301	237	59	60
22.5	9	:38.3	6	836	2.39	.613	.72	785.7	69	64	389	256	59	60
30	8	:46.0	6	839	2.21	.590	.67	790.3	66	70	415	257	58	60
37.5	7	:53.3	6	840	2.17	.586	.66	794.8	72	67	427	258	58	59
45	6	10:01.0	6	838	2.15	.585	.66	799.2	73	68	430	257	58	59
52.5	5	:08.3	6	836	2.18	.589	.67	803.5	74	67	430	258	57	59
60	4	:16.0	6	830	2.21	.595	.68	807.9	74	67	427	256	58	59
67.5	3	:23.3	7	807	2.27	.610	.71	812.4	76	68	422	254	58	59
75	2	:31.0	7	741	2.38	.642	.77	816.9	76	68	415	258	58	59
82.5	1	:38.3	7	690	2.39	.658	.81	821.8	77	69	408	242	58	60
90	-	10:46.0						826.7						
AVERAGE														

Petro Chem Environmental Services, Inc.

METHOD 429 RUN #3 South

COMPANY: Bechtel
UNIT: K49 17R
DATE: 2-14-92
REPORT: 10-849D
TECH: DCT
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

PRE / (POST) TEST LEAK CHECK

LEAK RATE: .006 cfm
VACUUM: 10 "Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.50
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%: 27.5, 12%

AVG. CALIB. NOZZLE DIAM("): .193
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("): 12.0

TRAVERSE PT. NUMBER		TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft) 771.80	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER °F	
0	12	10:55.00	7	831	2.60	.655	.79	826.7	79	79	263	245	59	61
7.5	11	11:02.30	7	834	2.51	.639	.76	831.7	78	73	331	257	59	60
15	10	:10.0	7	832	2.52	.640	.77	836.4	78	71	395	254	58	60
22.5	9	:17.3	7	831	2.60	.654	.79	841.2	80	75	419	257	58	60
30	8	:25.0	7	833	2.38	.626	.73	846.1	79	78	433	258	58	60
37.5	7	:32.3	7	831	2.28	.615	.71	850.8	80	81	438	256	59	60
45	6	:40.0	7	823	2.24	.611	.70	855.5	79	80	439	258	59	61
52.5	5	:47.50	7	746	2.37	.648	.78	860.0	79	80	437	254	59	61
60	4	:55.00	8	654	2.49	.689	.87	864.9	78	78	426	258	58	60
67.5	3	12:02.30	8	630	2.44	.689	.87	870.1	78	77	414	259	58	61
75	2	:10.0	8	623	2.46	.693	.88	875.2	78	75	400	258	57	61
82.5	1	:17.3	8	602	2.35	.684	.86	880.4	78	76	388	258	57	61
90	–	12:25.00						884.89						
								Vm 113.09						
								Vmstd 99.78						
				785	2.373		.75	Vf 137.71		73				
AVERAGE														

K-49
2-12-92

RINSE VOLUMES

RESIN TRAP # ST617 # 10

BLANK for Unit K-49

SAMPLE	MeOH	HEXANE	MeCl2	H2O
PN & FT	6.6 + 11.9 20.3 + 4.8	2.5 + 10.2 18.9 + 6.3	9.5 + 13.1 + 10.7 25.9	—
Condenser/SL/FB	33.3 + 8.7 15.2	21.9 + 8.5 14.8	40.1 + 12.6 15.6	—
First Impinger	26.4	23.7	31.3	—
Second Impinger	—	-	—	38.8

2-13-92

RUN #1

RESIN TRAP # ST617 # D-6

	MeOH	Hexane	MeCl2	H2O
PN & FT	5.5 + 4.9 9.4 + 39.7	4.2 + 4.2 4.8 + 29.5	8.8 + 7.5 8.1 + 21.2	—
Condenser/SL/FB	17.5 + 10.6 40.0 +	13.3 + 8.0 22.7	33.0 + 17.0 36.7	—
First Impinger	24.1	23.3	40.7	—
Second Impinger	—	—	—	43.3

Petro Chem Environmental Services, Inc.

K-49
2-8-92

RINSE VOLUMES

RESIN TRAP # ST617 #

RUN #2

SAMPLE	MeOH	Hexane	Me Cl2	H2O
PN/FT	5.4+4.7 6.7+40.6	6.5+7.8 5.3+23.4	8.6+16.6 12.6+72.3	—
Condenser/SC/FB	6.2+11.0 11.8	6.4+16.5 19.3	7.1+27.6 33.7	—
First Imp.	23.6	26.9	33.3	—
Second Imp.	33.2	26.1	38.2	47.2

2-18-92

RUN #3

Resin Trap # ST617 # 4

Sample	MeOH	Hexane	Me Cl2	H2O
P/N/FT	4.4+2.7 7.5+~~14.3~~ 22.9	7.8+5.4 6.2+29.0	9.8+6.8 19.1+29.9	—
Condenser/SC/FB	14.3+7.8 24.6	12.1+8.0 26.4	23.5+12.6 35.4	—
First Imp	28.6	21.8	30.0	
Second Imp				43.1

Petro Chem Environmental Services, Inc.

METHOD Formaldehyde RUN # 1

COMPANY: Bechtel
UNIT: K49
DATE: 2-14-92
REPORT: 10-849D
TECH: DGT
PUMP #:
METER BOX#:
METER coeff:
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: .000 cfm
VACUUM: 2 "Hg

AMBIENT TEMP, °F: 60° F
Pbar:
STATIC PRESSURE("Hg):
ASSUMED MOISTURE, %:
AVG. CALIB. NOZZLE DIAM(''):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM (''):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft) Roto LPM	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGR °F
0	9:01.00		835				.5	63	55			
20	9:21.00		835				.5	66	60			
40	9:41.00		837				.5	71	66			
60	10:01.00		838				.5	73	68			
80	10:21.00		836				.5	76	68			
100	10:41.00		835				.5	77	69			
							1.75 CF	70	2			
AVERAGE												

METHOD Formaldehyde RUN # 2

COMPANY: Bechtel
UNIT: K49 17R
DATE: 2-14-92
REPORT: 10-849D
TECH: DCJ
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE: .000 cfm
VACUUM: 3 "Hg

AMBIENT TEMP, °F: 60°
Pbar:
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM ("):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate	PRESSURE DIFFERENTIAL ΔH "H2O ΔH	GAS SAMPLE VOLUME (cu. ft) Roto LPM	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 °F
0	10:52.00		831				.5	79	79			
20	11:12.00		832				.5	78	71			
40	11:32.00		831				.5	80	81			
60	11:52.00		830				.5	78	78			
80	12:12.00		829				.5	78	75			
100	12:32.00		815				.5	78	77			
							1.75 cuf	77.7				
AVERAGE												

METHOD Formaldehyde RUN # 3

COMPANY: Bechtel
UNIT: K49 17R
DATE: 2·14·92
REPORT: 10 849D
TECH: DCT
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE: .000 cfm
VACUUM: 3 "Hg

AMBIENT TEMP, °F: 60°
Pbar:
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM(''):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM (''):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft) ROTO LPM	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
0	12:47.30		806				.5	77	76			
20	13:07.30		800				.5	77	72			
40	13:27.30		809				.5	78	71			
60	13:47.30		802				.5	78	71			
80	14:07.30		793				.5	76	70			
100	14:27.30		798				.5	76	69			
AVERAGE							1.75 CF	74	73			

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

LOCATION: SEC 17/T30S/R23E				DATE: 02-14-92		
APCD # 4091058 C K-49				RELEASE # AEP 356		
REASON FOR TEST: AIR TOXICS				TEST COMPANY: BPOI		
EQUIPMENT DESCRIPTION: 650HP WAUKESHA				VEE PERFORMED: YES		
NOx CONTROL:	CAT.	PSC X	PCC	O2	OXIDIZING CAT.	
POLLUTANTS:	PM	NOx X	CO X	HC X	H2S	SO2

EMISSIONS DATA

TIME	09:45-10:45	09:50-10:50	11:25-12:25	12:35-01:35		
NOX PPM	173	166	167	170		
CO PPM	245	248	245	245		
% 02	8.00	8.00	8.00	8.00		

CALIBRATION GASES

POLLUTANT	SPAN GAS	RANGE	EXP DATE		INST. MFG	MODEL
NOX	233	0-250	04-01-92		TECO	10
CO	209	0-500	04-01-92		TECO	48
O2 %	15	0-25	04-01-92		TELEDYNE	

ENGINE PARAMETERS

RPM'S	920	920	919	919		
TOTAL BHP LOAD	882	882	885	885		
PERCENT LOAD	96.0	96.0	96.0	96.0		
CATALYST TEMP.	N/A	N/A	N/A	N/A		
FUEL STATIC	9.05	9.05	9.05	9.05		
FUEL DIFF.	3.40	3.40	3.40	3.40		
COEF.	0.006	0.006	0.006	0.006		
RATE (MCF/DAY)	185	185	185	185		
SUCTION PSI	40	40	40	40		
DISCHARGE PSI	440	440	440	440		

COMMENTS:

OBSERVER: M. Carr

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 17R CS Units: K49

W.O. # AEP 356
Date: 02-14-92

START		12:35PM
END		01:35PM
IGNITION TIMING		21
RPM		
ENGINE		919
N. TURBO		N/A
S. TURBO		N/A
PRESSURE		
A/F MANIFOLD L/B		8
A/F MANIFOLD R/B		8
PCC FUEL		N/A
BAROMETRIC		29.1
% BY PASS OPEN		N/A
TEMPERATURE		
CONVERTOR IN		N/A
CONVERTOR OUT		N/A
AIR MANIFOLD L/B		N/A
AMBIENT		68
ENGINE J/W IN		170
ENGINE J/W OUT		100
ENGINE OIL IN		160
ENGINE OIL OUT		155
POWER CYL.	# 1	1082
	# 2	1101
	# 3	1065
	# 4	1078
	# 5	1063
	# 6	1032
	# 7	IN/OP
	# 8	1081
	# 9	1050
	#10	1044
	#11	1043
	#12	1029
TURBO EX.	#13	N/A
TURBO EX.	#14	N/A
	#15	N/A
	#16	N/A
TURBO EX.	#17	N/A

R/B N/A

CYLINDER PRESSURE	SUCT.	DISCH.
CYL. #1 HE	40	102
CYL. #2 HE	102	385
CYL. #3 HE	40	102
CYL. #4 HE	385	440
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE		
Coeff.		0.006
Static		9.05
Diff.		3.40
mcf/d		184.6
scfm		128.2
Exp. Factor (CAL.)		9.6
Avg. 02%		8.0
Exhst. Flow, dscfm		2000
AVG.	NOx ppm	170
	Corrected 15%	78
	lbs./hr.	2.47
	gms/BHP-hr.	1.27
AVG.	CO ppm	245
	Corrected 15%	113
	lbs./hr.	2.17
	gms/BHP-hr.	1.11
ACTUAL	HC lbs./hr.	0.00
	gms-BHP-hr.	0.00
TOTAL IN. H.P.		841
LOSSES		0.95
TOTAL BHP LOAD		885
PERCENT LOAD		96.3
RATED H.P.		1000
DERATED H. P.		919
LOG #		N/A

STACK GAS ANALYSIS		MOLE %
OXYGEN	02	0
NITROGEN	N2	0
CARBON DIOXIDE	C02	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

COMMENTS:
AIR TOXICS TESTING
RUN #4

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 17R CS Units: K49

W.O. # AEP 356
Date: 02-14-92

START		11:25AM
END		12:25PM
IGNITION TIMING		21
RPM		
ENGINE		919
N. TURBO		N/A
S. TURBO		N/A
PRESSURE		
A/F MANIFOLD L/B		8
A/F MANIFOLD R/B		8
PCC FUEL		N/A
BAROMETRIC		29.1
% BY PASS OPEN		N/A
TEMPERATURE		
CONVERTOR IN		N/A
CONVERTOR OUT		N/A
AIR MANIFOLD L/B		N/A
AMBIENT		68
ENGINE J/W IN		170
ENGINE J/W OUT		100
ENGINE OIL IN		160
ENGINE OIL OUT		155
POWER CYL.	# 1	1082
	# 2	1101
	# 3	1065
	# 4	1078
	# 5	1063
	# 6	1032
	# 7	IN/OP
	# 8	1081
	# 9	1050
	#10	1044
	#11	1043
	#12	1029
TURBO EX.	#13	N/A
TURBO EX.	#14	N/A
	#15	N/A
	#16	N/A
TURBO EX.	#17	N/A

R/B N/A

CYLINDER PRESSURE	SUCT.	DISCH.
CYL. #1 HE	40	102
CYL. #2 HE	102	385
CYL. #3 HE	40	102
CYL. #4 HE	385	440
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE		
Coeff.		0.006
Static		9.05
Diff.		3.40
mcf/d		184.6
scfm		128.2
Exp. Factor (CAL.)		9.6
Avg. 02%		8.0
Exhst. Flow, dscfm		2000
AVG.	NOx ppm	167
	Corrected 15%	77
	lbs./hr.	2.42
	gms/BHP-hr.	1.24
AVG.	CO ppm	245
	Corrected 15%	113
	lbs./hr.	2.17
	gms/BHP-hr.	1.11
ACTUAL	HC lbs./hr.	0.00
	gms-BHP-hr.	0.00
TOTAL IN. H.P.		841
LOSSES		0.95
TOTAL BHP LOAD		885
PERCENT LOAD		96.3
RATED H.P.		1000
DERATED H. P.		919
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

COMMENTS:
AIR TOXICS TESTING
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: K49

Date: 14-Feb-92 11:31:46

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	Stage1	13	38.1	113.9*	64 179	.58	48.9	24	40C
1C	Stage1	13	35.6	108.2*	64 179	2.03	111.7	24	35T
2H	Stage2	14	88.1	294.1	75 194	2.61	171.2	-2	90C
2C	Stage2	14	86.1	302.7	75 194	2.69	175.7	-8	85T
3H	Stage1	13	33.5	105.8	64 170	.32	37.3	12	40C
3C	Stage1	13	34.8	108.9*	64 170	1.98	117.3	12	43T
4H	Stage3	10	272.3	468.4*	72 145	2.61	81.4	18	28C
4C	Stage3	10	268.9	502.7*	72 145	2.40	70.7	5	21T

Total indicated horsepower (IHP) = 814 @ 919 RPM
Gas horsepower (GHP) = 885 @ 919 RPM
Compressor total horsepower (BHP) = 885 @ 919 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 919 for 919 RPM
Percent Load = 96%

* WARNING: Check the measured line pressures

Recommendations and Observations:
CONTINUOUS MONITORING DURING AIR TOXICS EVALUATION RUN # 3-4

Analyst signature: MKB

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # AEP 356
SITE: 17R CS Units: K49 Date: 02-14-92

START		09:50AM
END		10:50AM
IGNITION TIMING		21
RPM		
ENGINE		920
N. TURBO		N/A
S. TURBO		N/A
PRESSURE		
A/F MANIFOLD L/B		7
A/F MANIFOLD R/B		7
PCC FUEL		N/A
BAROMETRIC		29.1
% BY PASS OPEN		N/A
TEMPERATURE		
CONVERTOR IN		N/A
CONVERTOR OUT		N/A
AIR MANIFOLD L/B		N/A R/B N/A
AMBIENT		65
ENGINE J/W IN		175
ENGINE J/W OUT		90
ENGINE OIL IN		160
ENGINE OIL OUT		160
POWER CYL.	# 1	1077
	# 2	1100
	# 3	1068
	# 4	1078
	# 5	1061
	# 6	1048
	# 7	IN/OP
	# 8	1088
	# 9	1052
	#10	1045
	#11	1043
	#12	1030
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	40	100
CYL. #2 HE	100	280
CYL. #3 HE	40	100
CYL. #4 HE	280	440
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE		
Coeff.		0.006
Static		9.05
Diff.		3.40
mcf/d		184.6
scfm		128.2
Exp. Factor (CAL.)		9.6
Avg. O2%		8.0
Exhst. Flow, dscfm		1994
AVG.	NOx ppm	165
	Corrected 15%	76
	lbs./hr.	2.39
	gms/BHP-hr.	1.23
AVG.	CO ppm	248
	Corrected 15%	114
	lbs./hr.	2.19
	gms/BHP-hr.	1.13
ACTUAL	HC lbs./hr.	0.00
	gms-BHP-hr.	0.00
TOTAL IN. H.P.		838
LOSSES		0.95
TOTAL BHP LOAD		882
PERCENT LOAD		95.9
RATED H.P.		1000
DERATED H. P.		920
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

COMMENTS:
AIR TOXICS TESTING
RUN #2

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 17R CS Units: K49

W.O. # AEP 356
Date: 02-14-92

START		08:45AM
END		09:45AM
IGNITION TIMING		21
RPM		
ENGINE		920
N. TURBO		N/A
S. TURBO		N/A
PRESSURE		
A/F MANIFOLD L/B		7
A/F MANIFOLD R/B		7
PCC FUEL		N/A
BAROMETRIC		29.1
% BY PASS OPEN		N/A
TEMPERATURE		
CONVERTOR IN		N/A
CONVERTOR OUT		N/A
AIR MANIFOLD L/B		N/A
AMBIENT		65
ENGINE J/W IN		175
ENGINE J/W OUT		90
ENGINE OIL IN		160
ENGINE OIL OUT		160
POWER CYL.	# 1	1077
	# 2	1100
	# 3	1068
	# 4	1078
	# 5	1061
	# 6	1048
	# 7	IN/OP
	# 8	1088
	# 9	1052
	#10	1045
	#11	1043
	#12	1030
TURBO EX.	#13	N/A
TURBO EX.	#14	N/A
	#15	N/A
	#16	N/A
TURBO EX.	#17	N/A

R/B N/A

CYLINDER PRESSURE	SUCT.	DISCH.
CYL. #1 HE	40	104
CYL. #2 HE	104	290
CYL. #3 HE	40	104
CYL. #4 HE	290	440
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE		
Coeff.		0.006
Static		9.05
Diff.		3.40
mcf/d		184.6
scfm		128.2
Exp. Factor (CAL.)		9.6
Avg. 02%		8.1
Exhst. Flow, dscfm		2004
AVG.	NOx ppm	173
	Corrected 15%	79
	lbs./hr.	2.52
	gms/BHP-hr.	1.29
AVG.	CO ppm	245
	Corrected 15%	113
	lbs./hr.	2.17
	gms/BHP-hr.	1.12
ACTUAL	HC lbs./hr.	0.00
	gms-BHP-hr.	0.00
TOTAL IN. H.P.		838
LOSSES		0.95
TOTAL BHP LOAD		882
PERCENT LOAD		95.9
RATED H.P.		1000
DERATED H. P.		920
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

COMMENTS:
AIR TOXICS TESTING
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: K49 Date: 14-Feb-92 08:17:54

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	Stage1	13	40.1	117.6*	64	179	.63	52.0	25	40C
1C	Stage1	13	37.6	115.1*	64	179	2.10	114.3	22	38T
2H	Stage2	14	92.5	315.4*	75	194	2.91	183.9	-6	90C
2C	Stage2	14	92.1	299.5	75	194	2.96	181.5	1	86T
3H	Stage1	13	34.8	110.9*	64	170	.31	38.3	9	42C
3C	Stage1	13	36.0	110.6*	64	170	2.02	120.2	13	46T
4H	Stage3	10	275.4	486.0*	72	145	2.79	78.6	14	26C
4C	Stage3	10	278.5	484.6*	72	145	2.50	69.0	16	20T

Total indicated horsepower (IHP) = 838 @ 920 RPM
Gas horsepower (GHP) = 882 @ 920 RPM
Compressor total horsepower (BHP) = 882 @ 920 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 920 for 920 RPM
Percent Load = 96%

* WARNING: Check the measured line pressures

Recommendations and Observations:
CONTINUOUS MONITORING DURING AIR TOXICS EVALUATION RUN # 1-2

Analyst signature: MXB

Petro Chem Environmental Services, Inc.

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

LOCATION: SEC 17/T30S/R23E				DATE: 02-13-92		
APCD # 4091058 C K-49				RELEASE # AEP 356		
REASON FOR TEST: AIR TOXICS				TEST COMPANY: BPOI		
EQUIPMENT DESCRIPTION: 650HP WAUKESHA				VEE PERFORMED: YES		
NOx CONTROL:	CAT.	PSC X	PCC	O2	OXIDIZING CAT.	
POLLUTANTS:	PM	NOx X	CO X	HC X	H2S	SO2

EMISSIONS DATA

TIME	09:30-10:30	10:40-11:40	11:50-12:50	01:00-0200	02:15-03:15	03:30-04:30
NOX PPM	178	195	185	186	185	180
CO PPM	250	246	245	243	241	240
% O2	8.00	8.10	8.10	8.15	8.25	8.20

CALIBRATION GASES

POLLUTANT	SPAN GAS	RANGE	EXP DATE		INST. MFG	MODEL
NOX	233	0-250	04-01-92		TECO	10
CO	209	0-500	04-01-92		TECO	48
O2 %	15	0-25	04-01-92		TELEDYNE	

ENGINE PARAMETERS

RPM'S	925	925	927	927	926	926
TOTAL BHP LOAD	876	876	844	844	840	840
PERCENT LOAD	95.0	95.0	91.0	91.0	91.0	91.0
CATALYST TEMP.	N/A	N/A	N/A	N/A	N/A	N/A
FUEL STATIC	9.10	9.00	9.00	9.10	9.10	9.10
FUEL DIFF.	3.30	3.40	3.40	3.40	3.40	3.40
COEF.	0.006	0.006	0.006	0.006	0.006	0.006
RATE (MCF/DAY)	180	184	184	186	186	186
SUCTION PSI	39	39	39	38	39	39
DISCHARGE PSI	450	450	450	425	425	425

COMMENTS:

OBSERVER: M. Carr

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 4RDS

Unit name: K49 Date: 13-Feb-92 08:29:23

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	Stage1	13	36.6	112.8*	96 232	.45	49.3	47	41C
1C	Stage1	13	36.4	113.1*	96 232	1.90	112.4	46	38T
2H	Stage2	14	88.7	317.3*	77 192	2.78	180.9	-15	93C
2C	Stage2	14	90.3	300.3	77 192	2.99	182.3	-5	88T
3H	Stage1	13	33.4	109.4*	96 232	.32	39.2	43	40C
3C	Stage1	13	34.6	108.1*	96 232	1.85	119.8	47	46T
4H	Stage3	10	275.2	497.2*	50 150	2.80	79.3	49	26C
4C	Stage3	10	278.4	470.1*	50 150	2.57	69.1	59	20T

Total indicated horsepower (IHP) = 832 @ 925 RPM
Gas horsepower (GHP) = 876 @ 925 RPM
Compressor total horsepower (BHP) = 876 @ 925 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 925 for 925 RPM
Percent Load = 95%

* WARNING: Check the measured line pressures

Recommendations and Observations:
CONTINUOUS MONITORING DURING AIR TOXICS EVALUATION RUN 1&2

Analyst signature: MKB

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # AEP 356
SITE: 17R CS Units: K49 Date: 02-13-92

START	10:40AM
END	11:40AM
IGNITION TIMING	21
RPM	
ENGINE	925
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	7
A/F MANIFOLD R/B	7
PCC FUEL	N/A
BAROMETRIC	28.9
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	175
ENGINE J/W OUT	90
ENGINE OIL IN	160
ENGINE OIL OUT	150
POWER CYL # 1	1070
# 2	1086
# 3	1070
# 4	1064
# 5	1049
# 6	1040
# 7	IN/OP
# 8	1074
# 9	1052
#10	1047
#11	1056
#12	1032
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	39	100
CYL. #2 HE	100	290
CYL. #3 HE	39	100
CYL. #4 HE	290	450
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.006
Static	9.00
Diff.	3.40
mcf/d	183.6
scfm	127.5
Exp. Factor (CAL.)	9.6
Avg. 02%	8.1
Exhst. Flow, dscfm	2002
AVG. NOx ppm	165
Corrected 15%	76
lbs./hr.	2.40
gms/BHP-hr.	1.24
AVG. CO ppm	246
Corrected 15%	114
lbs./hr.	2.18
gms/BHP-hr.	1.13
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	832
LOSSES	0.95
TOTAL BHP LOAD	876
PERCENT LOAD	94.7
RATED H.P.	1000
DERATED H. P.	925
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

COMMENTS:
AIR TOXICS TESTING
RUN #2

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # AEP 356

SITE: 17R CS Units: K49 Date: 02-13-92

START	09:30AM
END	10:30AM
IGNITION TIMING	21
RPM	
ENGINE	925
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	7
A/F MANIFOLD R/B	7
PCC FUEL	N/A
BAROMETRIC	28.9
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	175
ENGINE J/W OUT	90
ENGINE OIL IN	160
ENGINE OIL OUT	150
POWER CYL # 1	1070
# 2	1086
# 3	1070
# 4	1064
# 5	1049
# 6	1040
# 7	IN/OP
# 8	1074
# 9	1052
#10	1047
#11	1056
#12	1032
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	39	100
CYL. #2 HE	100	290
CYL. #3 HE	39	100
CYL. #4 HE	290	450
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.006
Static	9.05
Diff.	3.30
mcf/d	179.2
scfm	124.4
Exp. Factor (CAL.)	9.6
Avg. 02%	8.0
Exhst. Flow, dscfm	1931
AVG. NOx ppm	178
Corrected 15%	81
lbs./hr.	2.50
gms/BHP-hr.	1.30
AVG. CO ppm	250
Corrected 15%	114
lbs./hr.	2.14
gms/BHP-hr.	1.11
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	832
LOSSES	0.95
TOTAL BHP LOAD	876
PERCENT LOAD	94.7
RATED H.P.	1000
DERATED H. P.	925
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

COMMENTS:
AIR TOXICS TESTING
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: K49 Date: 13-Feb-92 12:02:48

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	Stage1	13	34.7	109.1*	96 232	.48	45.6	46	41C
1C	Stage1	13	33.8	103.2	96 232	1.84	108.1	49	35T
2H	Stage2	14	85.3	292.0	77 192	2.64	170.2	-8	90C
2C	Stage2	14	82.0	296.7	77 192	2.74	175.3	-14	87T
3H	Stage1	13	32.7	102.2	96 232	.55	34.1	48	39C
3C	Stage1	13	33.6	106.9	96 232	1.78	113.5	45	42T
4H	Stage3	10	268.6	465.8	50 150	2.59	82.7	55	28C
4C	Stage3	10	261.1	473.0*	50 150	2.40	71.8	49	21T

Total indicated horsepower (IHP) = 801 @ 927 RPM
Gas horsepower (GHP) = 844 @ 927 RPM
Compressor total horsepower (BHP) = 844 @ 927 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 927 for 927 RPM
Percent Load = 91%

* WARNING: Check the measured line pressures

Recommendations and Observations:
CONTINUOUS EMISSIONS MONITORING DURING AIR TOXICS EVALUATION RUN 3&4.

Analyst signature: MKS

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # AEP 356
SITE: 17R CS Units: K49 Date: 02-13-92

START	11:50AM
END	12:50PM
IGNITION TIMING	21
RPM	
ENGINE	927
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	7
A/F MANIFOLD R/B	7
PCC FUEL	N/A
BAROMETRIC	28.9
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	175
ENGINE J/W OUT	90
ENGINE OIL IN	160
ENGINE OIL OUT	150
POWER CYL # 1	1070
# 2	1086
# 3	1070
# 4	1064
# 5	1049
# 6	1040
# 7	IN/OP
# 8	1074
# 9	1052
#10	1047
#11	1056
#12	1032
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	39	100
CYL. #2 HE	100	290
CYL. #3 HE	39	100
CYL. #4 HE	290	450
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.006
Static	9.00
Diff.	3.40
mcf/d	183.6
scfm	127.5
Exp. Factor (CAL.)	9.6
Avg. O2%	8.1
Exhst. Flow, dscfm	1993
AVG. NOx ppm	165
Corrected 15%	76
lbs./hr.	2.39
gms/BHP-hr.	1.29
AVG. CO ppm	245
Corrected 15%	113
lbs./hr.	2.16
gms/BHP-hr.	1.16
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	801
LOSSES	0.95
TOTAL BHP LOAD	843
PERCENT LOAD	91.0
RATED H.P.	1000
DERATED H. P.	927
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

COMMENTS:
AIR TOXICS TESTING
RUN #3

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # AEP 356
SITE: 17R CS Units: K49 Date: 02-13-92

START	01:00PM
END	02:00PM
IGNITION TIMING	21
RPM	
ENGINE	927
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	7
A/F MANIFOLD R/B	7
PCC FUEL	N/A
BAROMETRIC	28.9
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	175
ENGINE J/W OUT	90
ENGINE OIL IN	160
ENGINE OIL OUT	150
POWER CYL # 1	1070
# 2	1086
# 3	1070
# 4	1064
# 5	1049
# 6	1040
# 7	IN/OP
# 8	1074
# 9	1052
#10	1047
#11	1056
#12	1032
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	38	95
CYL. #2 HE	95	270
CYL. #3 HE	38	95
CYL. #4 HE	270	425
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.006
Static	9.10
Diff.	3.40
mcf/d	185.6
scfm	128.9
Exp. Factor (CAL.)	9.6
Avg. 02%	8.2
Exhst. Flow, dscfm	2032
AVG. NOx ppm	166
Corrected 15%	77
lbs./hr.	2.45
gms/BHP-hr.	1.32
AVG. CO ppm	243
Corrected 15%	113
lbs./hr.	2.18
gms/BHP-hr.	1.18
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	801
LOSSES	0.95
TOTAL BHP LOAD	843
PERCENT LOAD	91.0
RATED H.P.	1000
DERATED H. P.	927
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

COMMENTS:
AIR TOXICS TESTING
RUN #4

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 4RDS

Unit name: K49 Date: 13-Feb-92 14:18:37

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	Stage1	13	37.3	110.6*	72 232	.62	47.4	78	37C
1C	Stage1	13	34.6	108.8*	72 232	1.90	109.8	74	34T
2H	Stage2	14	85.9	290.9	77 192	2.69	173.1	-6	87C
2C	Stage2	14	84.1	292.8	77 192	2.80	175.9	-10	86T
3H	Stage1	13	32.9	101.7	72 232	.28	36.5	76	39C
3C	Stage1	13	33.8	104.2*	72 232	1.79	115.5	76	42T
4H	Stage3	10	266.3	452.1	53 150	0.0	75.8	Unloaded	24C
4C	Stage3	10	264.9	459.2	53 150	0.0	64.4	Unloaded	18T

Total indicated horsepower (IHP) = 798 @ 926 RPM
Gas horsepower (GHP) = 840 @ 926 RPM
Compressor total horsepower (BHP) = 840 @ 926 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 926 for 926 RPM
Percent Load = 91%

* WARNING: Check the measured line pressures

Recommendations and Observations:
CONTINUOUS EMISSIONS MONITORING DURING AIR TOXICS EVALUATION RUN 5&6.

Analyst signature: MKB

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # AEP 356
SITE: 17R CS Units: K49 Date: 02-13-92

START	02:15PM
END	03:15PM
IGNITION TIMING	21
RPM	
ENGINE	926
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	7
A/F MANIFOLD R/B	7
PCC FUEL	N/A
BAROMETRIC	28.9
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	61
ENGINE J/W IN	175
ENGINE J/W OUT	90
ENGINE OIL IN	160
ENGINE OIL OUT	155
POWER CYL # 1	1075
# 2	1098
# 3	1065
# 4	1074
# 5	1060
# 6	1046
# 7	IN/OP
# 8	1083
# 9	1089
#10	1040
#11	1042
#12	1028
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	39	97
CYL. #2 HE	97	270
CYL. #3 HE	39	97
CYL. #4 HE	270	425
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.006
Static	9.10
Diff.	3.40
mcf/d	185.6
scfm	128.9
Exp. Factor (CAL.)	9.6
Avg. O2%	8.3
Exhst. Flow, dscfm	2045
AVG. NOx ppm	165
Corrected 15%	77
lbs./hr.	2.45
gms/BHP-hr.	1.33
AVG. CO ppm	241
Corrected 15%	113
lbs./hr.	2.18
gms/BHP-hr.	1.18
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	798
LOSSES	0.95
TOTAL BHP LOAD	840
PERCENT LOAD	90.7
RATED H.P.	1000
DERATED H. P.	926
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

COMMENTS:
AIR TOXICS TESTING
RUN #5

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # AEP 356
SITE: 17R CS Units: K49 Date: 02-13-92

START	03:30PM
END	04:30PM
IGNITION TIMING	21
RPM	
ENGINE	926
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	7
A/F MANIFOLD R/B	7
PCC FUEL	N/A
BAROMETRIC	28.9
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	61
ENGINE J/W IN	175
ENGINE J/W OUT	90
ENGINE OIL IN	160
ENGINE OIL OUT	155
POWER CYL # 1	1075
# 2	1098
# 3	1065
# 4	1074
# 5	1060
# 6	1046
# 7	IN/OP
# 8	1083
# 9	1089
#10	1040
#11	1042
#12	1028
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	39	97
CYL. #2 HE	97	270
CYL. #3 HE	39	97
CYL. #4 HE	270	425
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.006
Static	9.10
Diff.	3.40
mcf/d	185.6
scfm	128.9
Exp. Factor (CAL.)	9.6
Avg. 02%	8.2
Exhst. Flow, dscfm	2037
AVG. NOx ppm	160
Corrected 15%	74
lbs./hr.	2.37
gms/BHP-hr.	1.28
AVG. CO ppm	240
Corrected 15%	112
lbs./hr.	2.16
gms/BHP-hr.	1.17
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	798
LOSSES	0.95
TOTAL BHP LOAD	840
PERCENT LOAD	90.7
RATED H.P.	1000
DERATED H. P.	926
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

COMMENTS:
AIR TOXICS TESTING
RUN #6

Petro Chem Environmental Services, Inc.

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

LOCATION: SEC 17/T30S/R23E				DATE: 03-12-92		
APCD # 4091031 D K-49				RELEASE # AEQ 681		
REASON FOR TEST: AIR TOXICS				TEST COMPANY: BPOI		
EQUIPMENT DESCRIPTION: 1000HP WAUKESHA				VEE PERFORMED: YES		
NOx CONTROL:	CAT.	PSC X	PCC	O2	OXIDIZING CAT.	
POLLUTANTS:	PM	NOx X	CO X	HC	H2S	SO2

EMISSIONS DATA

TIME	12:00-1:00					
NOX PPM	186					
CO PPM	249					
% 02	8.30					

CALIBRATION GASES

POLLUTANT	SPAN GAS	RANGE	EXP DATE		INST. MFG	MODEL
NOX	232	0-1000	04-01-92		TECO	10
CO	200	0-1000	04-01-92		TECO	48
O2 %	15	0-25	04-01-92		TELEDYNE	

ENGINE PARAMETERS

RPM'S	830					
TOTAL BHP LOAD	790					
PERCENT LOAD	95.0					
CATALYST TEMP.	N/A					
FUEL STATIC	8.40					
FUEL DIFF.	3.44					
COEF.	0.006					
RATE (MCF/DAY)	173					
SUCTION PSI	40					
DISCHARGE PSI	430					

COMMENTS:

OBSERVER: M. Carr

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 17R CS Units: K49

W.O. # AEQ 681
Date: 03-12-92

START	12:00PM
END	1:00PM
IGNITION TIMING	21
RPM	
ENGINE	830
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	14
A/F MANIFOLD R/B	14
PCC FUEL	N/A
BAROMETRIC	28.64
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	72
ENGINE J/W IN	105
ENGINE J/W OUT	178
ENGINE OIL IN	N/A
ENGINE OIL OUT	170
POWER CYL # 1	1037
# 2	1061
# 3	1057
# 4	1040
# 5	1029
# 6	1006
# 7	IN-OP
# 8	1045
# 9	1025
#10	1010
#11	1011
#12	948
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	40	104
CYL. #2 HE	104	265
CYL. #3 HE	40	104
CYL. #4 HE	265	430
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.006
Static	8.40
Diff.	3.44
mcf/d	173.4
scfm	120.4
Exp. Factor (CAL.)	9.6
Avg. O2%	8.3
Exhst. Flow, dscfm	1910
AVG. NOx ppm	185
Corrected 15%	87
lbs./hr.	2.58
gms/BHP-hr.	1.48
AVG. CO ppm	249
Corrected 15%	116
lbs./hr.	2.10
gms/BHP-hr.	1.21
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	727
LOSSES	0.92
TOTAL BHP LOAD	790
PERCENT LOAD	95
RATED H.P.	1000
DERATED H. P.	830
LOG #	0

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

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA
C.A.R.B. METHOD 100

W.O. # AEQ 681
SITE: 17R CS Units: K49 Date: 03-12-92

Times : Beg.Cal@11:55AM START@ 12:00PM STOP@ 1:00PM End Cal@1:05PM

** MEASURED EMISSIONS COMPONENTS **

Source :	Out	Out	Out
Component:	NOx	O2	CO
Units :	ppm	%	ppm

** INSTRUMENT CAL RANGE, SPAN & DATA RANGE **

C. Range :	1000	25.0	1000
Span :	232.0	15.0	200
D. RANGE :	1000	2.0	10000

** RAW EMISSIONS DATA **

12:00PM

_____5	185	8.20	250
_____10	190	8.25	250
_____15	187	8.25	250
_____20	185	8.25	250
_____25	175	8.20	250
_____30	185	8.35	245
_____35	190	8.25	250
_____40	205	8.25	250
_____45	180	8.30	245
_____50	185	8.25	247
_____55	195	8.25	249
_____60			
Raw Avg. :	187	8.3	249
Maximum :	205	8.4	250
Minimum :	175	8.2	245

** CALIBRATION ADJUSTMENTS **

Zero :	0	0.00	0
Span :	-4	-0.01	0

** DRIFT CORRECTED EMISSIONS **

Average :	186	8.3	249

** NOTES **

Petro Chem Environmental Services, Inc.

DCAvg = (RawAvg+(ZeroAdj/2)*(DataRng/CalRng)) * (1+(SpanAdj/(2*CalSpan)))

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 4RDS

Unit name: K49 Date: 12-Mar-92 11:32:34

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	Pd (psi)	TEMPS SU (dg F)	DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage1	13	39.1	113.5*	90	235	.24	44.0	58	40C
1C	Stage1	13	38.3	108.7	90	235	1.77	101.2	61	35T
2H	Stage2	14	93.2	268.8	90	214	2.56	159.0	21	76C
2C	Stage2	14	93.8	266.8	90	214	2.65	159.2	23	73T
3H	Stage1	13	35.4	111.0	90	197	.53	31.2	10	39C
3C	Stage1	13	36.4	116.0*	90	197	1.76	103.9	8	44T
4H	Stage3	10	258.8	472.9*	86	163	2.10	68.0	14	26C
4C	Stage3	10	259.6	427.7	86	163	2.10	60.3	29	20T

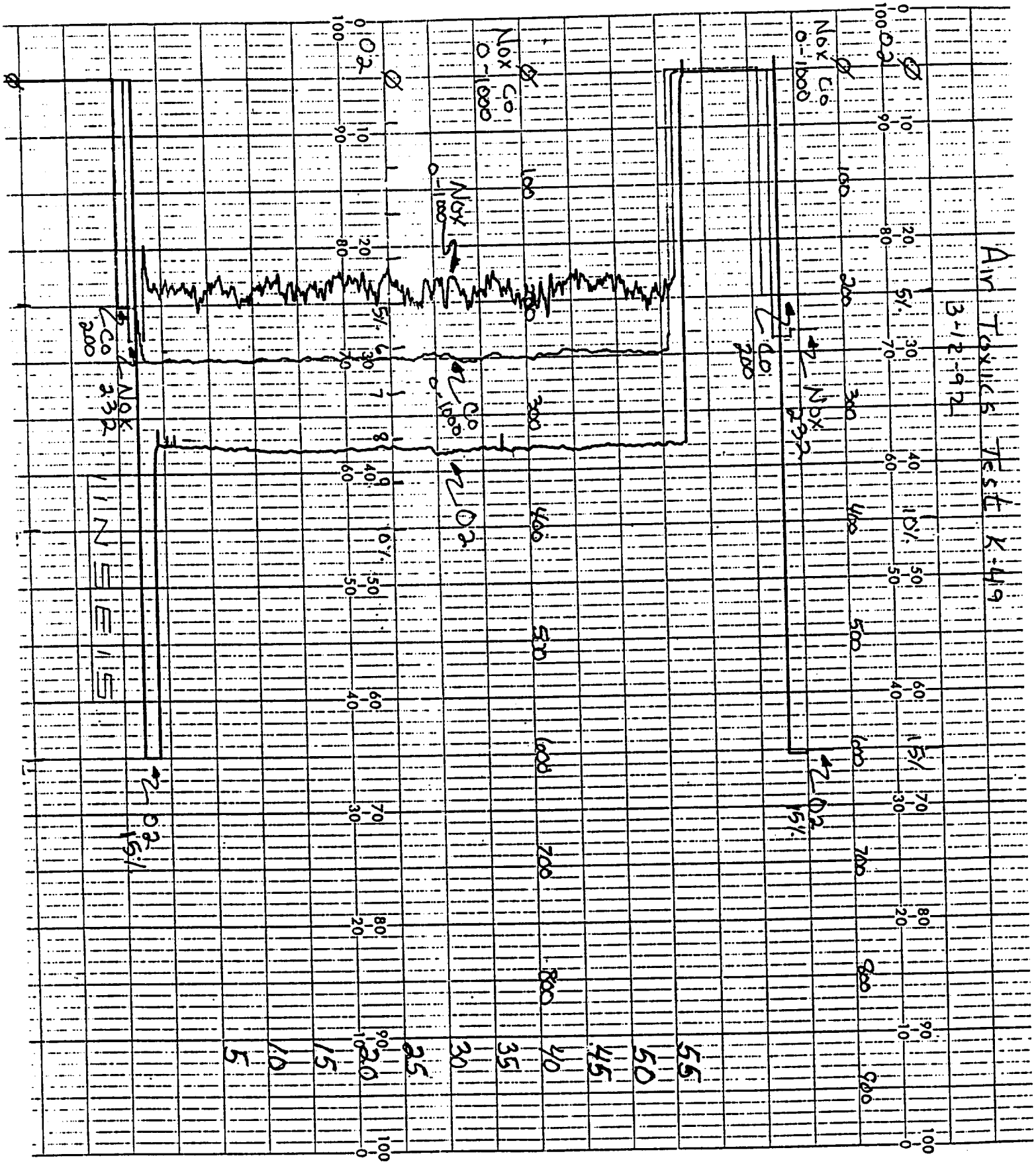
Total indicated horsepower (IHP) = 727 @ 830 RPM
Gas horsepower (GHP) = 790 @ 830 RPM
Compressor total horsepower (BHP) = 790 @ 830 RPM
Rated horsepower (BHP) = 1000 @1000 RPM
Derated horsepower (BHP) = 830 for 830 RPM
Percent Load = 95%

* WARNING: Check the measured line pressures

Recommendations and Observations:
AIR TOXICS RE-TEST K49

Analyst signature: Chuck Holman

Petro Chem Environmental Services, Inc.


Air Toxics Test #49
3-12-97
NOx CO
0-1000
CO2
0-20
5%
10%
15%
NOx
0-100
CO
0-1000
CO2
0-20
5%
10%
15%
NOx
0-100
CO
0-1000
CO2
0-20
5%
10%
15%
0
5
10
15
20
25
30
35
40
45
50
55