ONMENTAL
CES, INC.

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88 SOURCE TEST REPORT

PETROLEUM OPERATIONS, INC.
28590 HIGHWAY 119
PMAN, CALIFORNIA 93276

RECEIV
OCT 15 19
SAN JOAQUIN VALLE
APCD—SOUTHERN

NTION: DENNIS CHAMPION

UNIT TESTED:

K-70 30R
APCD #4091082A

DATE TESTED:

FEBRUARY 6 & 7, 1992

RECEIVED
APR 21 1992
ENVIRONMENTAL

DATE REPORTED:

APRIL 17, 1992

DETERMINATIONS:

EMISSIONS OF AB2588:
D 410A: B, T, X, E, & PROPYLENE
THOD 422.102: 1,3-BUTADIENE
ARB METHOD 429: PAH
RMALDEHYDE, ACETALDEHYDE, & ACROLEIN

REPORT: #10-849 B

TESTED BY: Mark Ready
MARK READY

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COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6-92
REPORT : 10-849B

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 *	2.02	1267	1.2E-02
Ethylbenzene *	2.52	53.3	5.0E-04
Toluene	41.3	601	5.7E-03
Xylenes, Total *	14.1	191	1.8E-03
Propylene *	23.6 **	5957	5.6E-02

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

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

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6-92
REPORT : 10-849B

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	435	962	9.5E-03

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6&7-92
REPORT : 10-849B

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	470	690000	690	2.0E+02	3.9E+01	2.0E-03
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2/7/92
REPORT : 10-849B

CARB METHOD 430 RESULTS
FORMALDEHYDE, ACETALDEHYDE, & ACROLEIN

COMPOUND		Field Blank Total ug	STACK SAMPLE AVERAGE Total ug	ug/CM	lbs/hr
Formaldehyde	* 1,2,3	2.0	3.5	74.5	7.3E-04
Acetaldehyde	* 1,3	15.1	8.7	177	1.7E-03
Acrolein	* 1,3	3.1 **	2.7	55.6	5.5E-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-70.

INTRODUCTION
(con't)

On February 6 and 7, 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-70. 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.

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.

ARB METHOD 410A
,T,X, E & PROPLYENE

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6-92
REPORT : 10-849 B

CARB METHOD 410A

SUMMARY OF RESULTS

LIGHT MOLECULAR WEIGHT HYDROCARBONS, GCMS

	TOTAL ug/CM			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Benzene *	1400	1200	1200	1267
Ethylbenzene *	70	36	54	53.3
Toluene	851	441	512	601
Xylenes, Total *	290	74	210	191
Propylene *	6322	5322	6227	5957

	LBS/HR			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Benzene *	0.0132	0.0113	0.0113	0.0119
Ethylbenzene *	0.0007	0.0003	0.0005	0.0005
Toluene	0.0080	0.0042	0.0048	0.0057
Xylenes, Total *	0.0027	0.0007	0.0020	0.0018
Propylene *	0.0597	0.0503	0.0588	0.0563

* Not detected in the condensable fraction for each run, 1/2 detection limit reported.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6-92
REPORT : 10-8498

METHOD 410A
@ 60° F

RUN #:	1	2	3
TIME :	1430	1507	1545
Vm (dry gas sampled)	0.71	0.73	0.60
Y (meter calib. factor)	0.98517	0.98517	0.98517
P bar (Barometric pressure)	28.66	28.66	28.66
P static (stack pressure, " H2O)	0	0	0
Delta H (differential meter press, " H2O)	0	0	0
Tm (meter temperature, R°)	514.7	514.2	514.5
Vm(std),dscf	0.68	0.70	0.57
Vm(std),dscm	0.0192	0.0197	0.0162

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6-92
REPORT : 10-849B

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	400	1400	** 0.05	0.112	1400	0.0132
Ethylbenzene	15	70	** 0.05	0.112	70	0.0007
Toluene	210	850	0.50	1.1	851	0.0080
Xylenes, Total	61	290	** 0.05	0.112	290	0.0027
Propylene	3400	6300	** 10	22.4	6322	0.0597
				Total	8934	0.0844

Vm(std), DSCM = 0.0192
DSCFM = 2553

RUN #2

Compound	Non-Condensable ppb	Non-Condensable ug/CM	Condensable ug/L *	Condensable ug/CM	TOTAL ug/CM	TOTAL lbs/hr
Benzene	340	1200	** 0.05	0.109	1200	0.0113
Ethylbenzene	8	36	** 0.05	0.109	36	0.0003
Toluene	110	440	0.6	1.3	441	0.0042
Xylenes, Total	16	74	** 0.05	0.109	74	0.0007
Propylene	2800	5300	** 10	22	5322	0.0503
				Total	7073	0.0668

Vm(std), DSCM = 0.0197
DSCFM = 2553

RUN #3

Compound	Non-Condensable ppb	Non-Condensable ug/CM	Condensable ug/L *	Condensable ug/CM	TOTAL ug/CM	TOTAL lbs/hr
Benzene	340	1200	** 0.05	0.133	1200	0.0113
Ethylbenzene	11	54	** 0.05	0.133	54	0.0005
Toluene	120	510	0.8	2.1	512	0.0048
Xylenes, Total	44	210	** 0.05	0.133	210	0.0020
Propylene	3300	6200	** 10	27	6227	0.0588
				Total	8203	0.0775

Vm(std), DSCM = 0.0162
DSCFM = 2553

* 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

** Not detected, used 1/2 detection limit

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6-92
REPORT : 10-849 B

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

Compound	Non-Condensable		Condensable		TOTAL
	ppb	ug/CM	ug/L *	ug/CM	ug/CM
Benzene	0.5	1.9	** 0.05	0.117	2.02
Ethylbenzene	0.5	2.4	** 0.05	0.117	2.52
Toluene	9.5	39	1.0	2.34	41.3
Xylenes, Total	3	14	** 0.05	0.117	14.1
Propylene	** 0.1	0.172	** 10	23.4	23.6

AVERAGE
Vm(std), DSCM = 0.0184

** Not detected, used 1/2 detection limit

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

Lab Number : I-0525-1
Project : 10-849 Bechtel

Analyzed : 02/09/92
Analyzed by: EA
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-70 30R Noncondensable #1	Air	Mark Ready	02/06/92	02/08/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	400.	1400.	
Toluene	1.	210.	850.	
Ethylbenzene	1.	15.	70.	
Xylenes	1.	61.	290.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	3400.	6300.	

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
MSD1/1B78E
LRH/ge
IB09M1

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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CLIENT: Terry Rowles
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3207 Antonino Ave
Bakersfield, CA 93308

Lab Number : I-0525-2
Project : 10-849 Bechtel

Analyzed : 02/09/92
Analyzed by: EA
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-70 3OR Noncondensable #2	Air	Mark Ready	02/06/92	02/08/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	340.	1200.	
Toluene	1.	110.	440.	
Ethylbenzene	1.	8.	36.	
Xylenes	1.	16.	74.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	2800.	5300	

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
MSD1/1B76E
LRH/ge
IB09M1

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

Gesheng Dai

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

Lab Number : I-0525-3
Project : 10-849 Bechtel

Analyzed : 02/09/92
Analyzed by: EA
Method : EPA TO-14

R E V I S E D
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-70 30R Noncondensable #3	Air	Mark Ready	02/06/92	02/08/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	340.	1200.	
Toluene	1.	120.	510.	
Ethylbenzene	1.	11.	54.	
Xylenes	1.	44.	210.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	3300.	6200	

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
MSD1/1B75E
LRH/ge
IB09M1

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

Lab Number : I-0525-4
Project : 10-849 Bechtel

Analyzed : 02/09/92
Analyzed by: EA
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K36-4 K-70 30R Noncondensable Blank	Air	Mark Ready	02/06/92	02/08/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	0.1	0.5	1.9	
Toluene	0.1	9.5	39.	
Ethylbenzene	0.1	0.5	2.4	
Xylenes	0.1	3.	14.	
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
MSD1/1B83E
LRH/ge
IB09M1

Respectfully submitted,
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CLIENT: Terry Rowles
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Bakersfield, CA 93308

Lab Number : I-0525-5
Project : 10-849 Bechtel

Analyzed : 02/18/92
Analyzed by: DZ
Method : EPA 8260

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-70 30R Condensable #1	Aqueous	Mark Ready	02/06/92	02/08/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				
Benzene	(71432)	0.1	ND	1
Ethylbenzene	(100411)	0.1	ND	
Toluene	(108883)	0.2	0.5	
Xylenes, Total		0.1	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			125.	
p-Bromofluorobenzene (% Surrogate Recovery)			106.	
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
MSD2/2Q98C
MH/bpl/aaa/cmo
IB182WVP

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

Mary Havlicek, Ph.D.
President

COAST TO COAST ANALYTICAL SERVICES

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

Lab Number : I-0525-6
Project : 10-849 Bechtel

Analyzed : 02/18/92
Analyzed by: DS
Method : EPA 8260

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-70 30R Condensable #2	Aqueous	Mark Ready	02/06/92	02/08/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				
Benzene	(71432)	0.1	ND	1
Ethylbenzene	(100411)	0.1	ND	
Toluene	(108883)	0.2	0.6	
Xylenes, Total		0.1	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			109.	
p-Bromofluorobenzene (% Surrogate Recovery)			102.	
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
MSD2/2Q99C
MH/bpl/aea/cmo
IB182WVP

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

Mary Havlicek, Ph.D.
President

COAST TO COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
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CLIENT: Terry Rowles
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Bakersfield, CA 93308

Lab Number : I-0525-7
Project : 10-849 Bechtel

Analyzed : 02/18/92
Analyzed by: DZ
Method : EPA 8260

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-70 30R Condensable #3	Aqueous	Mark Ready	02/06/92	02/08/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.1	ND	
Ethylbenzene	(100411)	0.1	ND	
Toluene	(108883)	0.2	0.8	
Xylenes, Total		0.1	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			95.	
p-Bromofluorobenzene (% Surrogate Recovery)			101.	
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
MSD2/2R03C
MH/bpl/aea/cmo
IB182WVP

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

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

Lab Number : I-0525-8
Project : 10-849 Bechtel

Analyzed : 02/18/92
Analyzed by: DZ
Method : EPA 8260

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-70 30R Condensable Blank	Aqueous	Mark Ready	02/06/92	02/08/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.1	ND	
Ethylbenzene	(100411)	0.1	ND	
Toluene	(108883)	0.2	1.0	
Xylenes, Total		0.1	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			100.	
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
MSD2/2R04C
MH/bpl/aea/cmo
IB182WVP

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

Mary Havlicek, Ph.D.
President

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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

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

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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

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

RB METHOD 422.102:
1,3- BUTADIENE

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-06-92
REPORT : 10-849B

CARB METHOD 422.102
1,3-BUTADIENE RESULTS

TEST	#1	#2	#3	
TIME	1154	1217	1229	AVERAGE
ppb	428	433	443	435
ug/CM	947	958	980	962
lbs/hr	0.0093	0.0094	0.0097	0.0095

DSCFM = 2553 (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-70
DATE : 2-06-92
REPORT : 10-849B

ANALYSIS REPORT

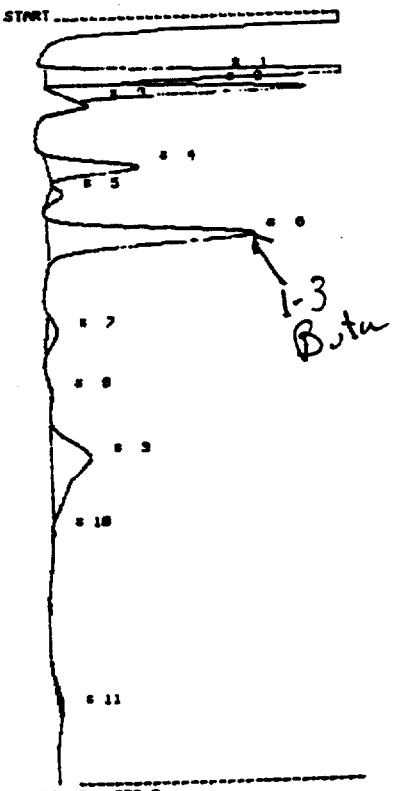
METHOD 422.102
1, 3-BUTADIENE

RESULTS

	RUN # 1	RUN # 2	RUN # 3	AVERAGE
TIME	11:54	12:17	12:29	
AREA COUNTS (mVS)	9000	9100	9300	9133
ppbv 1, 3-BUTADIENE	428	433	443	435

Petro Chem Environmental Services, Inc.

PHOTOVAC



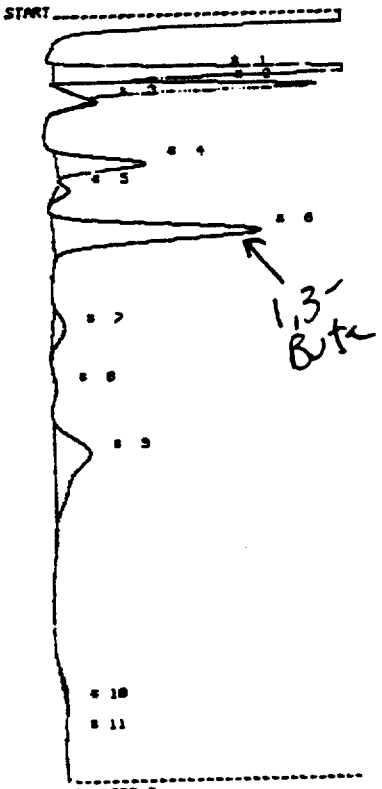
STOP @ 600.0
SAMPLE LIBRARY 1 FEB 6 1992 12:29
ANALYSIS # 22 BECHTEL
INTERNAL TEMP 20 UNIT K-70
GAIN 50 SAMPLE RUN

OFFSET 2.0 mV
CHART SPEED 1 cM/Min
SLOPE SENS. 10 10 2 mV/Sec
WINDOW +/- 5 Percent
MINIMUM AREA 100 uVSec
TIMER DELAY 40.0 Sec
ANALYSIS TIME 600.0 Sec
CYCLE TIME 0 Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	46.2	3.3 US
UNKNOWN	2	58.5	5.3 US
UNKNOWN	3	63.7	100.1 mUS
UNKNOWN	4	118.4	3.2 US
UNKNOWN	5	138.1	337.7 mUS
UNKNOWN	6	173.5	3.3 US
UNKNOWN	7	248.6	618.8 mUS
UNKNOWN	8	346.4	4.4 US
UNKNOWN	11	543.8	137.1 mUS

RUN #3

PHOTOVAC



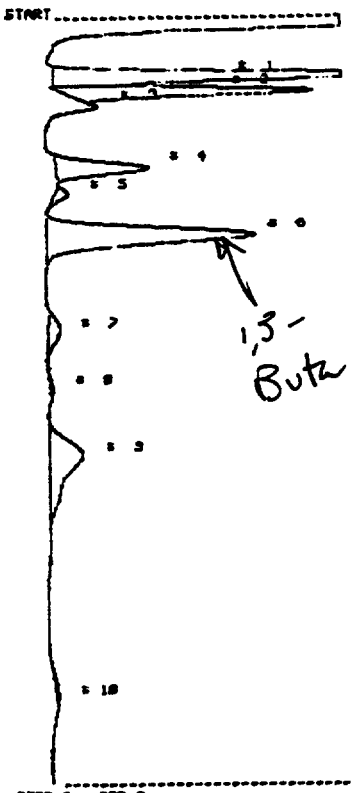
STOP @ 600.0
SAMPLE LIBRARY 1 FEB 6 1992 12:17
ANALYSIS # 21 BECHTEL
INTERNAL TEMP 20 UNIT K-70
GAIN 50 SAMPLE RUN

OFFSET 1.0 mV
CHART SPEED 1 cM/Min
SLOPE SENS. 10 10 2 mV/Sec
WINDOW +/- 5 Percent
MINIMUM AREA 100 uVSec
TIMER DELAY 40.0 Sec
ANALYSIS TIME 600.0 Sec
CYCLE TIME 0 Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	46.0	10.0 US
UNKNOWN	2	58.5	5.4 US
UNKNOWN	3	63.4	104.2 mUS
UNKNOWN	4	118.0	3.0 US
UNKNOWN	5	138.5	411.2 mUS
UNKNOWN	6	172.5	3.1 US
UNKNOWN	7	247.4	681.0 mUS
UNKNOWN	9	345.5	4.0 US
UNKNOWN	10	540.0	132.5 mUS

RUN #2

PHOTOVAC



STOP @ 600.0
SAMPLE LIBRARY 1 FEB 6 1992 11:54
ANALYSIS # 19 BECHTEL
INTERNAL TEMP 25 UNIT K-70
GAIN 50 SAMPLE RUN

OFFSET 1.0 mV
CHART SPEED 1 cM/Min
SLOPE SENS. 10 10 2 mV/Sec
WINDOW +/- 5 Percent
MINIMUM AREA 100 uVSec
TIMER DELAY 40.0 Sec
ANALYSIS TIME 600.0 Sec
CYCLE TIME 0 Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	46.0	3.0 US
UNKNOWN	2	58.4	5.3 US
UNKNOWN	4	117.0	3.1 US
UNKNOWN	5	138.7	404.0 mUS
UNKNOWN	6	172.1	5.0 US
UNKNOWN	7	248.0	782.7 mUS
UNKNOWN	9	345.2	3.0 US
UNKNOWN	10	536.0	138.0 mUS

RUN #1

COMPANY : BECHTEL PETROLEUM
UNIT : K-70
DATE : 2-06-92
REPORT : 10-849B

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	2500	4.17%	+/- 30%

ADDITIONAL CALIBRATION STANDARD

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

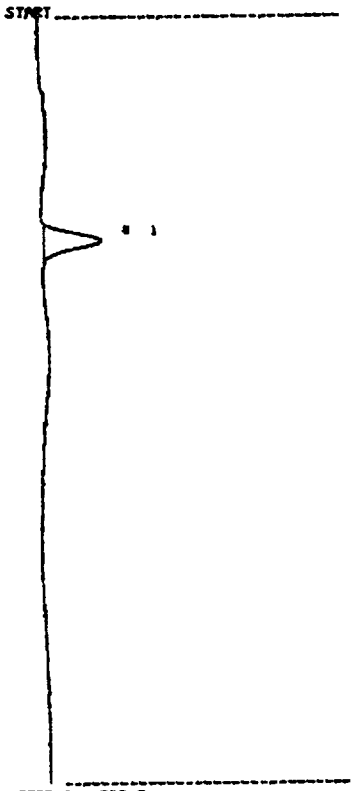
POST ANALYSIS CALIBRATION STANDARD

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

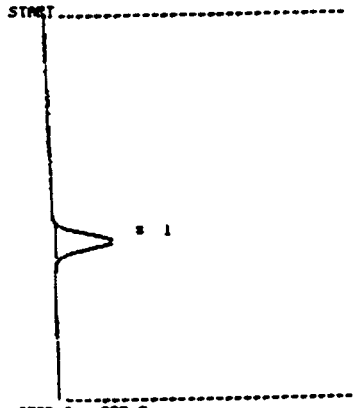


STOP @ 600.0
SAMPLE LIBRARY 1 FEB 6 1992 12:42
ANALYSIS # 23 POST CAL
INTERNAL TEMP 26 BUTADIENE
GAIN 50 114 PPB

OFFSET	1.0	mV
CHART SPEED	1	cM/Min
SLOPE SENS.	10 10 2	mV/Sec
WINDOW +/-	5	Percent
MINIMUM AREA	100	mVSec
TIMER DELAY	40.0	Sec
ANALYSIS TIME	600.0	Sec
CYCLE TIME	0	Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	178.3	2.5 US

PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 6 1992 13:34
ANALYSIS # 27 BIAS CHECK
INTERNAL TEMP 26 BUTADIENE
GAIN 50 114 PPB

OFFSET	1.0	mV
CHART SPEED	1	cM/Min
SLOPE SENS.	10 10 2	mV/Sec
WINDOW +/-	5	Percent
MINIMUM AREA	100	mVSec
TIMER DELAY	40.0	Sec
ANALYSIS TIME	300.0	Sec
CYCLE TIME	0	Min

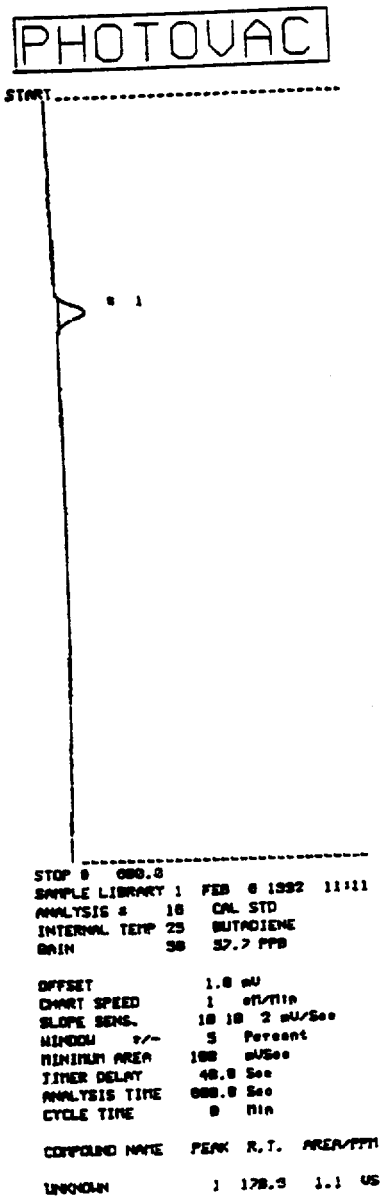
COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	178.7	2.5 US

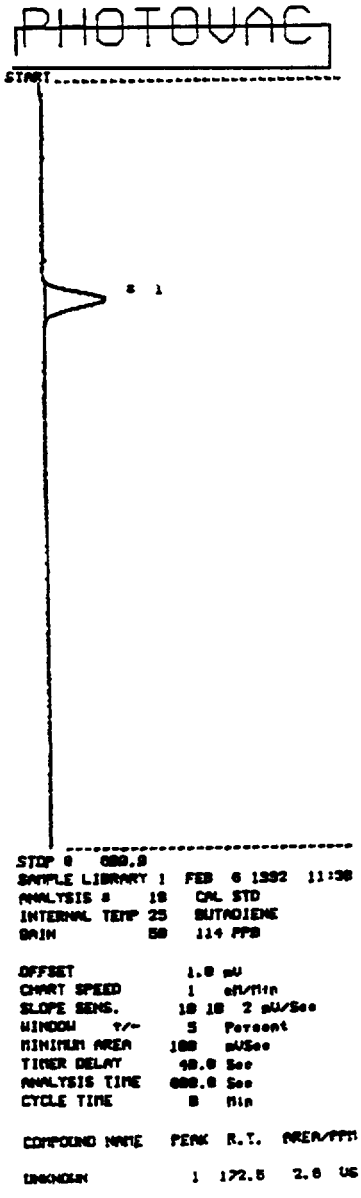
PHOTOVAC

STOP @ 600.0
SAMPLE LIBRARY 1 FEB 6 1992 13: 0
ANALYSIS # 24 PROBE BLANK
INTERNAL TEMP 25 ULTRA ZERO
GAIN 50 AIR

OFFSET	1.0	mV
CHART SPEED	1	cM/Min
SLOPE SENS.	10 10 2	mV/Sec
WINDOW +/-	5	Percent
MINIMUM AREA	100	mVSec
TIMER DELAY	40.0	Sec
ANALYSIS TIME	600.0	Sec
CYCLE TIME	0	Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM


PHOTOVAC
START
1
STOP 0 600.0
SAMPLE LIBRARY 1 FEB 6 1992 11:11
ANALYSIS # 18 CAL STD
INTERNAL TEMP 25 BUTADIENE
GAIN 50 57.7 PPB
OFFSET 1.0 mV
CHART SPEED 1 cM/Min
SLOPE SENS. 10 10 2 uV/Sec
WINDOW +/- 5 Percent
MINIMUM AREA 100 uVSec
TIMER DELAY 40.0 Sec
ANALYSIS TIME 600.0 Sec
CYCLE TIME 0 Min
COMPOUND NAME PEAK R.T. AREA/PPM
UNKNOWN 1 170.5 1.1 US


PHOTOVAC
START
1
STOP 0 600.0
SAMPLE LIBRARY 1 FEB 6 1992 11:30
ANALYSIS # 18 CAL STD
INTERNAL TEMP 25 BUTADIENE
GAIN 50 114 PPB
OFFSET 1.0 mV
CHART SPEED 1 cM/Min
SLOPE SENS. 10 10 2 uV/Sec
WINDOW +/- 5 Percent
MINIMUM AREA 100 uVSec
TIMER DELAY 40.0 Sec
ANALYSIS TIME 600.0 Sec
CYCLE TIME 0 Min
COMPOUND NAME PEAK R.T. AREA/PPM
UNKNOWN 1 172.5 2.6 US

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:

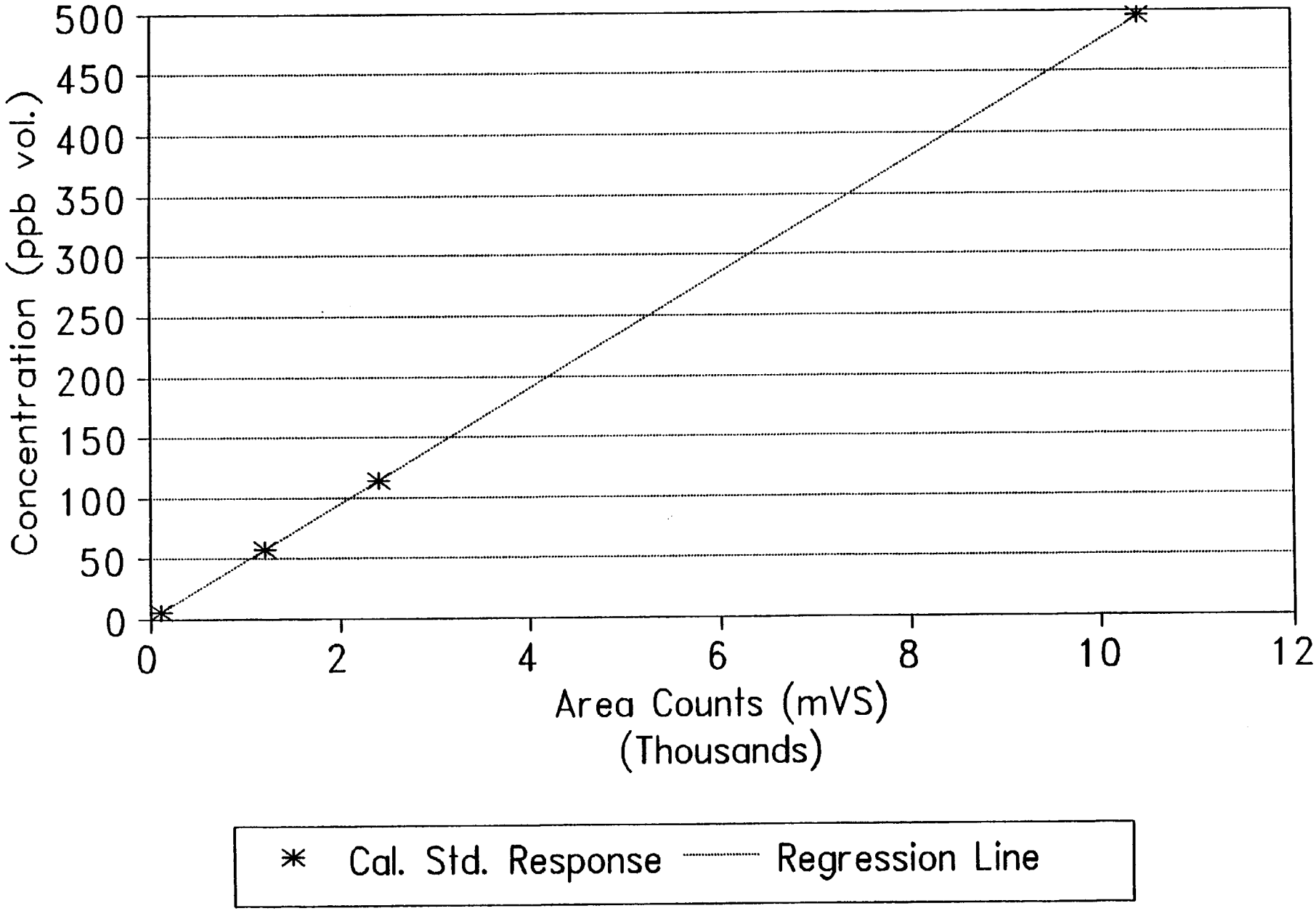
Constant	0.222491
Std Err of Y Est	0.394959
R Squared	0.999998
No. of Observations	4
Degrees of Freedom	2

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

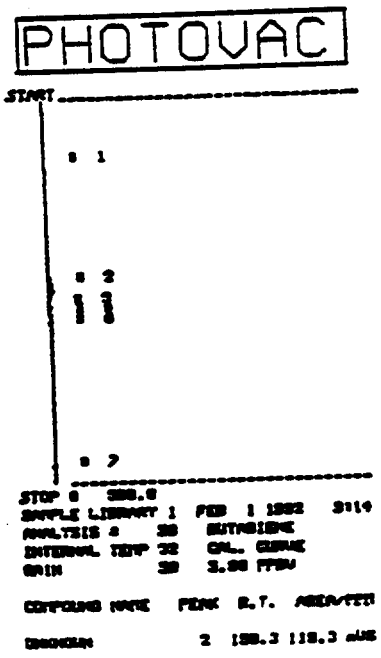
1, 3-Butadiene (gain=50)

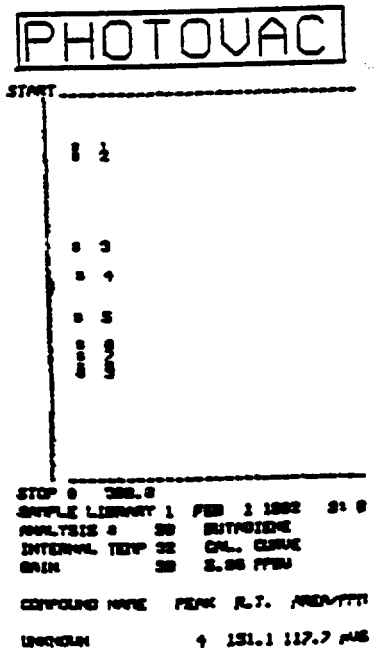


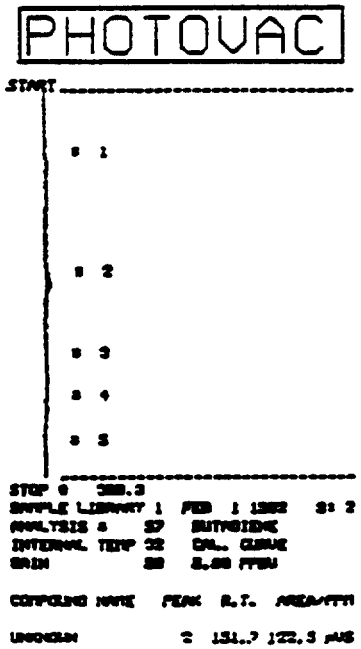
5.86ppmv 1.3-Butadiene

Calibration Gas Standard

Instrument Gain = 50



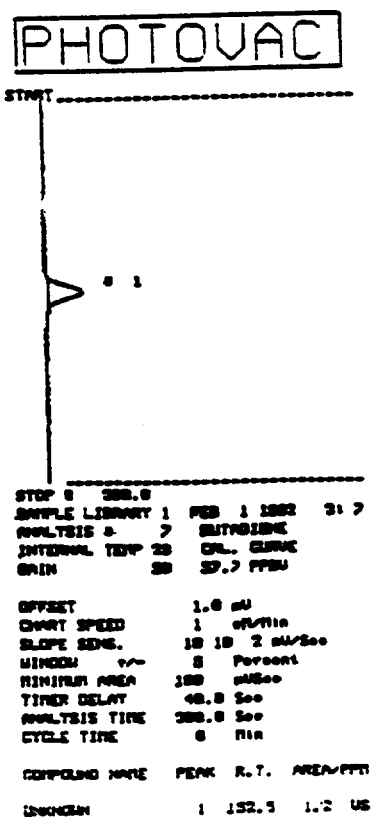


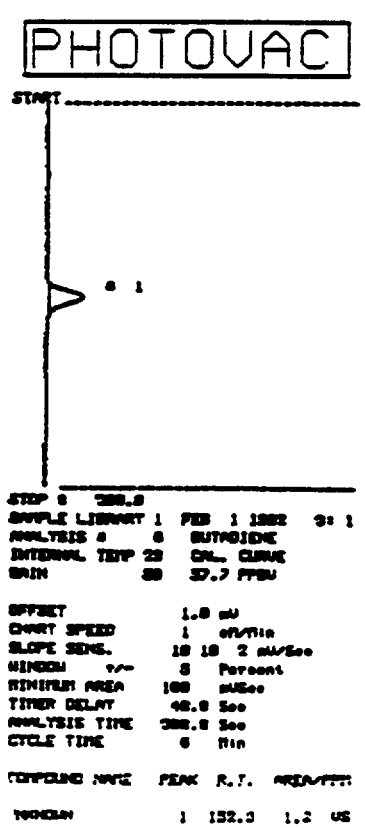


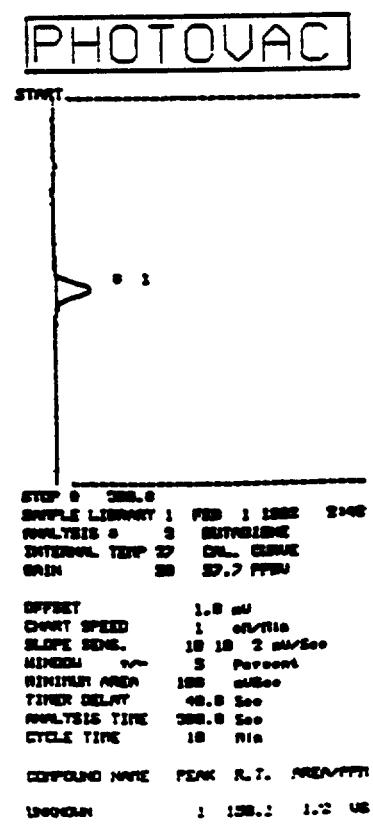
57.7ppmv 1,3-Butadiene

Calibration Gas Standard

Instrument Gain = 50



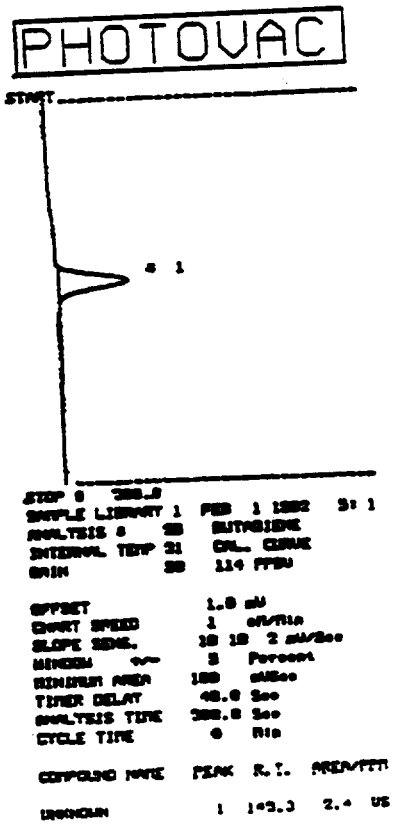


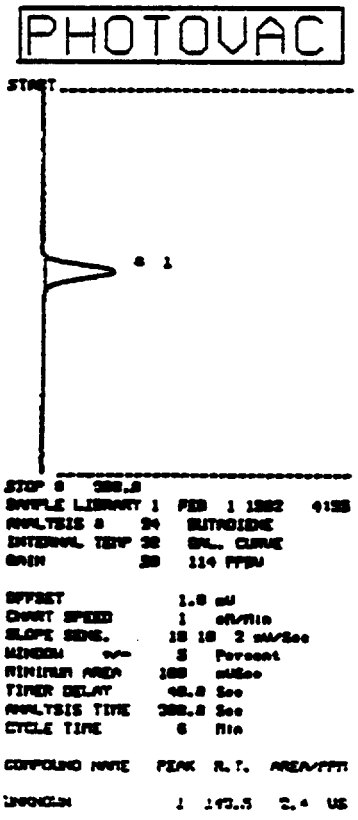


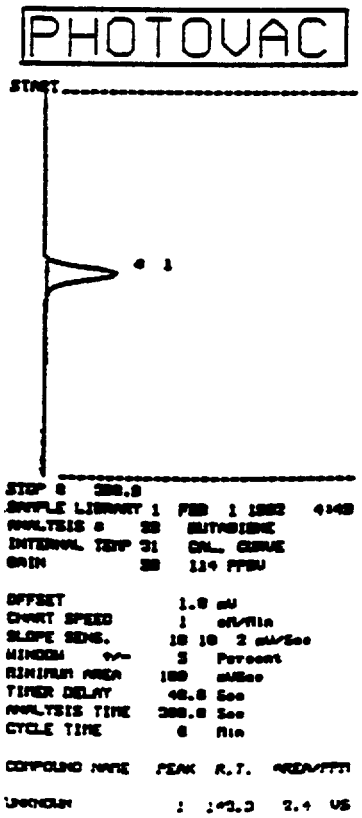
114ppmv 1,3-Butadiene

Calibration Gas Standard

Instrument Gain = 50



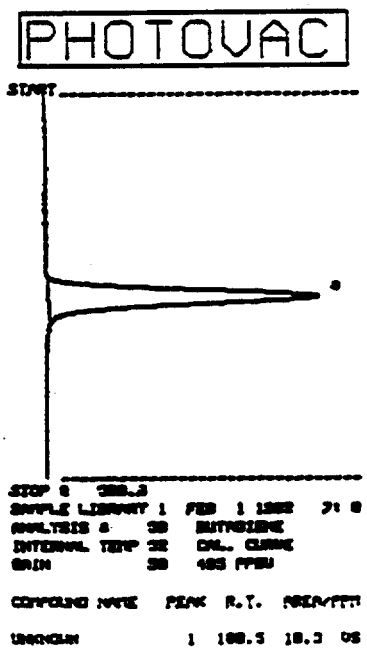


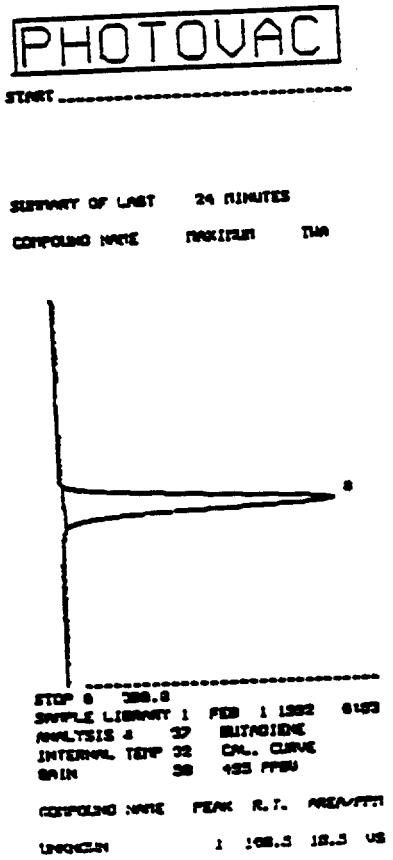


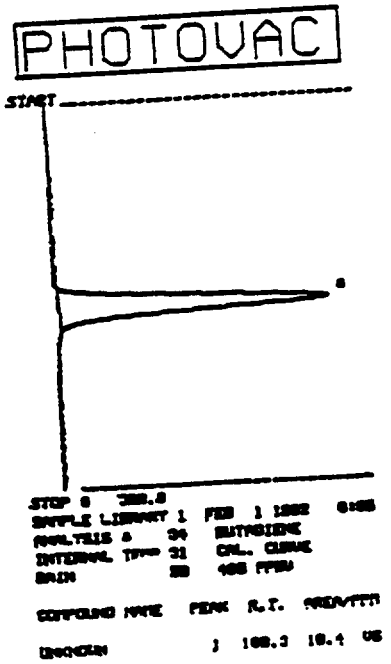
495ppmv 1,3-Butadiene

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: Tom Sassman APPROVED BY: Mal S Sirinides
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 #: 01029210070 CL
DATE: 1/16/92

CYLINDER #: 3L5603

ANALYTICAL ACCURACY: +/-10%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
1,3-BUTADIENE	100.	PPB	114.	PPB
NITROGEN		BAL		BAL

MICROGRAV - TM

ANALYST: Tony Scaramuzza

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

Petro Chem Environmental Services, Inc.

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-70 30R
DATE : 2-6&7-92
REPORT : 10-849B

METHOD 429
@ 60° F

DATE :	2-6	2-7	2-7
RUN #:	1	2	3
TIME :	1430	905	1405
Vm (dry gas sampled)	126.95	150.96	102.94
Y (meter calib. factor)	0.98517	0.98517	0.98517
P bar (Barometric pressure)	28.66	28.62	28.62
P static (stack pressure, " H2O)	0	0	0
Delta H (differential meter press, " H2O)	0.88	1.26	0.625
Tm (meter temperature, R°)	517	516	520.7
Vol H2O mls	313.3	371.6	257.8
Vm(std),dscf	120.77	143.83	97.03
Bws-H2O vapor	0.1076	0.1072	0.1099
MF-moisture factor	0.892436	0.892827	0.890125
% CO2	6.32	6.28	6.21
% O2	9.8	9.9	10
% N2	83.88	83.82	83.79
Md-MW stk gas,dry	29.40	29.40	29.39
Ms-MW stk gas,wet	28.18	28.18	28.14
Cp-pitot tube	0.84	0.84	0.84
Avg sq rt ^p	1.57	1.67	1.59
T stack, R°	1021	1020	1018
Stack area,ft2	0.753	0.753	0.753
Vs-fps	126.83	134.65	128.03
Qstd-dscfm	2495	2649	2516
Area noz,ft2	2.05E-04	2.27E-04	1.61E-04
Sample time	180	180	180
% Isokinetic	98.7	100.1	100.0

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6&7-92
REPORT : 10-849B

METHOD 429
RUN #2

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	840000	840	5.8E+00	2.1E+02	3.9E+01	2.1E-03
Acenaphthylene	53000	53	3.7E-01	1.3E+01	2.1E+00	1.3E-04
Acenaphthene	5300	5.3	3.7E-02	1.3E+00	2.1E-01	1.3E-05
Fluorene	24000	24	1.7E-01	5.9E+00	8.7E-01	6.0E-05
Phenanthrene	31000	31	2.2E-01	7.6E+00	1.0E+00	7.8E-05
Anthracene	1900	1.9	1.3E-02	4.7E-01	6.4E-02	4.8E-06
Fluoranthene	12000	12	8.3E-02	2.9E+00	3.6E-01	3.0E-05
Pyrene	17000	17	1.2E-01	4.2E+00	5.0E-01	4.3E-05
Benz (a) anthracene	5800	5.8	4.0E-02	1.4E+00	1.5E-01	1.5E-05
Chrysene	6000	6.0	4.2E-02	1.5E+00	1.6E-01	1.5E-05
Benzo(b) fluoranthene	8100	8.1	5.6E-02	2.0E+00	1.9E-01	2.0E-05
Benzo(k) fluoranthene	1200	1.2	8.3E-03	2.9E-01	2.9E-02	3.0E-06
Benzo(a)pyrene	400	0.40	2.8E-03	9.8E-02	9.5E-03	1.0E-06
Indeno(1,2,3-cd) pyrene	4000	4.0	2.8E-02	9.8E-01	8.7E-02	1.0E-05
Dibenzo(a,h) anthracene	260	0.26	1.8E-03	6.4E-02	5.6E-03	6.5E-07
Benzo(g,h,i) perylene	4800	4.8	3.3E-02	1.2E+00	1.0E-01	1.2E-05

Vm(std), dscf = 143.83
Vm(std), dscm = 4.07
DSCFM = 2649

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6&7-92
REPORT : 10-849B

METHOD 429

RUN #1

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	650000	650	5.4E+00	1.9E+02	3.6E+01	1.8E-03
Acenaphthylene	44000	44	3.6E-01	1.3E+01	2.1E+00	1.2E-04
Acenaphthene	5200	5.2	4.3E-02	1.5E+00	2.4E-01	1.5E-05
Fluorene	19000	19	1.6E-01	5.6E+00	8.2E-01	5.3E-05
Phenanthrene	62000	62	5.1E-01	1.8E+01	2.5E+00	1.7E-04
Anthracene	320	0.32	2.6E-03	9.4E-02	1.3E-02	9.0E-07
Fluoranthene	9900	9.9	8.2E-02	2.9E+00	3.5E-01	2.8E-05
Pyrene	14000	14	1.2E-01	4.1E+00	4.9E-01	3.9E-05
Benz (a) anthracene	3300	3	2.7E-02	9.6E-01	1.0E-01	9.3E-06
Chrysene	1100	1.1	9.1E-03	3.2E-01	3.4E-02	3.1E-06
Benzo(b) fluoranthene	2500	2.5	2.1E-02	7.3E-01	7.1E-02	7.0E-06
Benzo(k) fluoranthene	640	0.64	5.3E-03	1.9E-01	1.8E-02	1.8E-06
Benzo(a)pyrene	690	0.69	5.7E-03	2.0E-01	2.0E-02	1.9E-06
Indeno(1,2,3-cd) pyrene	3600	3.6	3.0E-02	1.1E+00	9.3E-02	1.0E-05
Dibenzo(a,h) anthracene	130	0.13	1.1E-03	3.8E-02	3.3E-03	3.7E-07
Benzo(g,h,i) perylene	3900	3.9	3.2E-02	1.1E+00	1.0E-01	1.1E-05

Vm(std), dscf = 120.77
Vm(std), dscm = 3.42
DSCFM = 2495

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6&7-92
REPORT : 10-849B

SUMMARY OF RESULTS

METHOD 429
(AVERAGE OF 3 RUNS)

Emittent	Field Blank ng	TOTAL ng	TOTAL ug	ug/DSCM	ppb	lb/hr
Naphthalene	470	690000	690	2.0E+02	3.9E+01	2.0E-03
Acenaphthylene	**5	45333	45.33	1.3E+01	2.1E+00	1.3E-04
Acenaphthene	**5	4667	4.67	1.4E+00	2.2E-01	1.3E-05
Fluorene	**5	20333	20.33	6.0E+00	8.8E-01	5.9E-05
Phenanthrene	**13	50333	50.33	1.6E+01	2.1E+00	1.5E-04
Anthracene	**5	1407	1.41	4.3E-01	5.9E-02	4.2E-06
Fluoranthene	**5	10400	10.40	3.1E+00	3.7E-01	3.0E-05
Pyrene	**5	14000	14.00	4.1E+00	4.9E-01	4.0E-05
Benz (a) anthracene	**5	4433	4.43	1.3E+00	1.4E-01	1.3E-05
Chrysene	**5	2800	2.80	7.6E-01	8.1E-02	7.6E-06
Benzo(b) fluoranthene	**5	5033	5.03	1.5E+00	1.4E-01	1.4E-05
Benzo(k) fluoranthene	**5	910	0.91	2.7E-01	2.6E-02	2.7E-06
Benzo(a)pyrene	**5	610	0.61	1.9E-01	1.8E-02	1.9E-06
Indeno(1,2,3-cd) pyrene	**5	3533	3.53	1.0E+00	9.2E-02	1.0E-05
Dibenzo(a,h) anthracene	**5	210	0.21	6.3E-02	5.5E-03	6.2E-07
Benzo(g,h,i) perylene	**5	4200	4.20	1.2E+00	1.1E-01	1.2E-05

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

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-6&7-92
REPORT : 10-849B

METHOD 429

RUN #3

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	580000	580	6.0E+00	2.1E+02	4.0E+01	2.0E-03
Acenaphthylene	39000	39	4.0E-01	1.4E+01	2.3E+00	1.4E-04
Acenaphthene	3500	3.5	3.6E-02	1.3E+00	2.0E-01	1.2E-05
Fluorene	18000	18	1.9E-01	6.6E+00	9.6E-01	6.4E-05
Phenanthrene	58000	58	6.0E-01	2.1E+01	2.9E+00	2.0E-04
Anthracene	2000	2	2.1E-02	7.3E-01	1.0E-01	7.1E-06
Fluoranthene	9300	9.3	9.6E-02	3.4E+00	4.1E-01	3.3E-05
Pyrene	11000	11	1.1E-01	4.0E+00	4.8E-01	3.9E-05
Benz (a) anthracene	4200	4.2	4.3E-02	1.5E+00	1.6E-01	1.5E-05
Chrysene	1300	1.3	1.3E-02	4.7E-01	5.1E-02	4.6E-06
Benzo(b) fluoranthene	4500	4.5	4.6E-02	1.6E+00	1.6E-01	1.6E-05
Benzo(k) fluoranthene	890	0.89	9.2E-03	3.2E-01	3.1E-02	3.1E-06
Benzo(a)pyrene	740	0.74	7.6E-03	2.7E-01	2.6E-02	2.6E-06
Indeno(1,2,3-cd) pyrene	3000	3.0	3.1E-02	1.1E+00	9.7E-02	1.1E-05
Dibenzo(a,h) anthracene	240	0.24	2.5E-03	8.7E-02	7.7E-03	8.5E-07
Benzo(g,h,i) perylene	3900	3.9	4.0E-02	1.4E+00	1.3E-01	1.4E-05

Vm(std), dscf = 97.03
Vm(std), dscm = 2.75
DSCFM = 2516

ALTA

K-70

February 24, 1992

Alta Batch I.D.: 11005

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

Dear Mr. Brennan,

Enclosed are the results for the four MM5 trains received at Alta Analytical Laboratory on February 12, 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). 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 1, 2, and 3 dilutions of 1:50 were performed and the extracts re-analyzed. Results from this 1:50 dilution 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
Director of Operations

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

ALTA

Section I. Sample Inventory

Date Received: 12-Feb-92

K-70

Alta Lab ID.		Client ID.
11005-1-A	K-70 Field Blank	B-100 FILTER BLK
11005-1-B		B-105 XAD BLK
11005-1-C		B-101 PROBE BLK
11005-1-D		B-102 CONDENSER BLK
11005-1-E		B-103 1ST IMP BLK
11005-1-F		B-104 2ND IMP BLK
11005-2-A	K-70 RUN #1	B-1 FILTER #1
11005-2-B		B-6 XAD #1
11005-2-C		B-2 PROBE #1
11005-2-D		B-3 CONDENSER #1
11005-2-E		B-4 1ST IMP #1 1of2
11005-2-F		B-5 2ND IMP #1
11005-2-G		B-13 1ST IMP #1 2of2
11005-3-A	K-70 RUN #2	B-7 FILTER #2
11005-3-B		B-12 XAD #2
11005-3-C		B-8 PROBE #2
11005-3-D		B-9 CONDENSER #2
11005-3-E		B-10 1ST IMP #2 1of2
11005-3-F		B-14 1ST IMP #1 2of2
11005-3-G		B-11 2ND IMP #1
11005-4-A	K-70 RUN #3	B-15 FILTER #3
11005-4-B		B-21 XAD #3
11005-4-C		B-16 PROBE #3
11005-4-D		B-17 CONDENSER #3
11005-4-E		B-18 1ST IMP #3 1of2
11005-4-F		B-19 1ST IMP #3 2of2
11005-4-G		B-20 2ND IMP #3
11005-5-SA	Reagent Blanks HOLD	B-106 HEXANE BLK ARCHIVE
11005-6-SA		B-107 METHANOL BLK ARCHIVE
11005-7-SA		B-108 MeCl2 BLK ARCHIVE
11005-8-SA		B-109 DIST H2O BLK ARCHIVE

ALTA

SECTION II.

ALTA

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

Sample ID: BLANK
Lab ID: 11005-001-PAH
Matrix: MM5

Date Received: 2/12/92
Date Extracted: 2/12/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0210M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	470		B
Acenaphthylene	ND	10	
Acenaphthene	ND	10	
Fluorene	ND	10	
Phenanthrene	ND	25	
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-70 Field Blank

Analyst: JMA

Reviewer: bhm

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: BLANK
Lab ID: 11005-001-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	80	
d_8-Acenaphthylene	82	
d_{10}-Acenaphthene	91	
d_{10}-Fluorene	84	
d_{10}-Phenanthrene	81	
d_{10}-Anthracene	75	
d_{10}-Fluoranthene	98	
d_{10}-Pyrene	98	
d_{12}-Chrysene	74	
d_{12}-Benz(a)anthracene	74	
d_{12}-Benzo(b)fluoranthene	75	
d_{12}-Benzo(k)fluoranthene	71	
d_{12}-Benzo(a)pyrene	67	
d_{12}-Indeno(1,2,3-c,d)pyrene	59	
d_{12}-Benzo(g,h,i)perylene	65	
d_{14}-Dibenz(a,h)anthracene	52	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	95	
d_{14}-Terphenyl	81	

Date Analyzed: 2/20/92

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: Run #1
Lab ID: 11005-002-PAH
Matrix: MM5

Date Received: 2/12/92
Date Extracted: 2/12/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0210M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	650000		*,B
Acenaphthylene	44000		*
Acenaphthene	5200		
Fluorene	19000		*
Phenanthrene	62000		*
Anthracene	320		
Fluoranthene	9900		*
Pyrene	14000		*
Chyrsene	1100		
Benz(a)anthracene	3300		
Benzo(b)fluoranthene	2500		
Benzo(k)fluoranthene	640		
Benzo(a)pyrene	690		
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	3600		
Dibenz(a,h)anthracene	130		
Benzo(g,h,i)perylene	3900		

K-70 RUN #1

Analyst: [illegible]

Page 1 of 2

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: Run #1
Lab ID: 11005-002-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	80	
d_8-Acenaphthylene	92	
d_{10}-Acenaphthene	78	
d_{10}-Fluorene	112	
d_{10}-Phenanthrene	121	
d_{10}-Anthracene	67	
d_{10}-Fluoranthene	109	
d_{10}-Pyrene	107	
d_{12}-Chrysene	146	
d_{12}-Benz(a)anthracene	101	
d_{12}-Benzo(b)fluoranthene	69	
d_{12}-Benzo(k)fluoranthene	40	H
d_{12}-Benzo(a)pyrene	61	
d_{12}-Indeno(1,2,3-c,d)pyrene	43	H
d_{12}-Benzo(g,h,i)perylene	52	
d_{14}-Dibenz(a,h)anthracene	62	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	114	
d_{14}-Terphenyl	91	

Date Analyzed: 2/21/92

Analyst: JM

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: Run #2
Lab ID: 11005-003-PAH
Matrix: MM5

Date Received: 2/12/92
Date Extracted: 2/12/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0210M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	840000		*,B
Acenaphthylene	53000		*
Acenaphthene	5300		
Fluorene	24000		*
Phenanthrene	31000		*
Anthracene	1900		
Fluoranthene	12000		*
Pyrene	17000		*
Chyrsene	6000		
Benz(a)anthracene	5800		
Benzo(b)fluoranthene	8100		
Benzo(k)fluoranthene	1200		
Benzo(a)pyrene	400		
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	4000		
Dibenz(a,h)anthracene	260		
Benzo(g,h,i)perylene	4800		

K-70 RUN #2

Analyst: [illegible]

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: Run #2
Lab ID: 11005-003-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	84	
d_8-Acenaphthylene	102	
d_{10}-Acenaphthene	57	
d_{10}-Fluorene	109	
d_{10}-Phenanthrene	105	
d_{10}-Anthracene	96	
d_{10}-Fluoranthene	141	
d_{10}-Pyrene	127	
d_{12}-Chrysene	67	
d_{12}-Benz(a)anthracene	46	H
d_{12}-Benzo(b)fluoranthene	38	H
d_{12}-Benzo(k)fluoranthene	120	
d_{12}-Benzo(a)pyrene	84	
d_{12}-Indeno(1,2,3-c,d)pyrene	91	
d_{12}-Benzo(g,h,i)perylene	135	
d_{14}-Dibenz(a,h)anthracene	141	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	90	
d_{14}-Terphenyl	91	

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: Run #3
Lab ID: 11005-004-PAH
Matrix: MM5

Date Received: 2/12/92
Date Extracted: 2/12/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0210M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	580000		*,B
Acenaphthylene	39000		*
Acenaphthene	3500		
Fluorene	18000		*
Phenanthrene	58000		*
Anthracene	2000		
Fluoranthene	9300		*
Pyrene	11000		*
Chyrsene	1300		
Benz(a)anthracene	4200		
Benzo(b)fluoranthene	4500		
Benzo(k)fluoranthene	890		
Benzo(a)pyrene	740		
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	3000		
Dibenz(a,h)anthracene	240		
Benzo(g,h,i)perylene	3900		

K-70 RUN #3

Analyst: JMR

Reviewer: DG

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: Run #3
Lab ID: 11005-004-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	65	
d_8-Acenaphthylene	87	
d_{10}-Acenaphthene	94	
d_{10}-Fluorene	101	
d_{10}-Phenanthrene	112	
d_{10}-Anthracene	101	
d_{10}-Fluoranthene	123	
d_{10}-Pyrene	125	
d_{12}-Chrysene	50	
d_{12}-Benz(a)anthracene	31	H
d_{12}-Benzo(b)fluoranthene	43	H
d_{12}-Benzo(k)fluoranthene	58	
d_{12}-Benzo(a)pyrene	60	
d_{12}-Indeno(1,2,3-c,d)pyrene	104	
d_{12}-Benzo(g,h,i)perylene	101	
d_{14}-Dibenz(a,h)anthracene	149	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	97	
d_{14}-Terphenyl	96	

Date Analyzed: 2/21/92

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: 11005-MB-PAH
Matrix: MM5

Date Received: NA
Date Extracted: 2/12/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0210M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	25		
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-70 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: 11005-MB-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	62	
d_8-Acenaphthylene	64	
d_{10}-Acenaphthene	72	
d_{10}-Fluorene	69	
d_{10}-Phenanthrene	73	
d_{10}-Anthracene	57	
d_{10}-Fluoranthene	77	
d_{10}-Pyrene	80	
d_{12}-Chrysene	52	
d_{12}-Benz(a)anthracene	65	
d_{12}-Benzo(b)fluoranthene	55	
d_{12}-Benzo(k)fluoranthene	59	
d_{12}-Benzo(a)pyrene	47	H
d_{12}-Indeno(1,2,3-c,d)pyrene	47	H
d_{12}-Benzo(g,h,i)perylene	52	
d_{14}-Dibenz(a,h)anthracene	46	H

Pre-spike Recovery Standard:

d_{12}-Benzo(e)pyrene	NA	
d_{14}-Terphenyl	NA	K-70 Lab QC

Date Analyzed: 2/20/92

Analyst: _____ **Page 2 of 2** **Reviewer:** _____

Petro Chem Environmental Services, Inc.

ALTA

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

LCS RESULTS
Lab ID: 11005-LCS1/LCS2
Matrix: MM5

Date Received: NA
Date Extracted: 2/10/92
Sample Amount: Sample

ICAL ID: IPNAFE
QC Lot: LC0210M
Units: NA

COMPOUND	LCS1 % R	LCS2 % R	RPD %
Naphthalene	111	119	7.0
Acenaphthylene	77	92	18
Acenaphthene	95	89	6.5
Fluorene	122	106	12
Phenanthrene	114	79	36
Anthracene	83	88	5.9
Fluoranthene	111	114	2.7
Pyrene	101	104	2.9
Chrysene	79	78	1.3
Benza(a)anthracene	92	85	7.9
Benzo(b)fluoranthene	91	81	13
Benzo(k)fluoranthene	92	84	9.1
Benzo(a)pyrene	95	84	12
Benzo(e)pyrene	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	94	95	1.1
Dibenz(a,h)anthracene	98	86	13
Benzo(g,h,i)perylene	99	85	15

K-70 Lab QC

Analyst: JMW

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

ALTA

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

LCS RESULTS
Lab ID: 11005-LCS1/LCS2

Isotopic Recovery Results

Internal Standard:	LCS1 % R	LCS2 % R
d_8-Napththalene	55	59
d_8-Acenaphthylene	71	75
d_{10}-Acenaphthene	73	81
d_{10}-Fluorene	58	91
d_{10}-Phenanthrene	64	133
d_{10}-Anthracene	60	109
d_{10}-Fluoranthene	79	50
d_{10}-Pyrene	93	58
d_{12}-Chrysene	90	76
d_{12}-Benz(a)anthracene	77	65
d_{12}-Benzo(b)fluoranthene	87	97
d_{12}-Benzo(k)fluoranthene	81	82
d_{12}-Benzo(a)pyrene	80	85
d_{12}-Indeno(1,2,3-c,d)pyrene	77	98
d_{12}-Benzo(g,h,i)perylene	77	117
d_{14}-Dibenz(a,h)anthracene	80	136

K-70 Lab QC

Date Analyzed: 2/13/92

Analyst: JMP

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-7-92
REPORT : 10-849B

CARB METHOD 430
SUMMARY OF RESULTS

	TOTAL ug/CM			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Formaldehyde *1	9.4	145	69.7	74.5
Acetaldehyde *1,3	19	498	15	177
Acrolein *1,3	18.9	133	15.2	55.6

	LBS/HR			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Formaldehyde *1	9.3E-05	1.4E-03	6.9E-04	7.3E-04
Acetaldehyde *1,3	1.9E-04	4.9E-03	1.5E-04	1.7E-03
Acrolein *1,3	1.9E-04	1.3E-03	1.5E-04	5.5E-04

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

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-7-92
REPORT : 10-849B

METHOD 430
@ 60° F

RUN #:	1	2	3
TIME :	931	1137	1357
Vm (dry gas sampled)	1.75	1.75	1.75
Y (meter calib. factor)	1.00	1.00	1.00
P bar (Barometric pressure)	28.62	28.62	28.62
P static (stack pressure, " H2O)	0	0	0
Delta H (differential meter press, " H2O)	0	0	0
Tm (meter temperature, R°)	514.3	517.3	511.3
Vm(std),dscf	1.69	1.68	1.70
Vm(std),dscm	0.0479	0.0476	0.0482

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-07-92
REPORT : 10-849B

Method 430

Formaldehyde Results

Test Run	#1 *	#2	#3
ug/l	30	430	280
Sample vol, l	0.015	0.016	0.012
Total ug	0.45	7	3
Vm std DSCF	1.69	1.68	1.70
Vm std DSCM	0.0479	0.0476	0.0482
Volume Flow, DSCFM	2553	2553	2553

*Not Detected, used 1/2 detection limit

Concentrations **AVERAGE**

ug/dscf	0.27	4.10	1.98	2.11
ug/dscm	9.4	145	69.7	74.5
ppb	7.6	117.6	56.7	60.7

Emissions

lb/hr	9.3E-05	1.4E-03	6.9E-04	7.3E-04

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-07-92
REPORT : 10-849 B

Method 430

Acetaldehyde Results

Test Run	#1 *	#2	#3 *
ug/l	60	1500	60
Sample vol, l	0.0151	0.0158	0.0122
Total ug	1	24	1
Vm std DSCF	1.69	1.68	1.70
Vm std DSCM	0.0479	0.0476	0.0482
Volume Flow, DSCFM	2553	2553	2553

*Not Detected, used 1/2 detection limit

Concentrations **AVERAGE**

ug/dscf	0.536	14.1	0.431	5.0
ug/dscm	19	498	15	177
ppb	10	276	8.4	98

Emissions

lb/hr	1.9E-04	4.9E-03	1.5E-04	1.7E-03

Petro Chem Environmental Services, Inc.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-07-92
REPORT : 10-849 B

Method 430

Acrolein Results

Test Run	#1 *	#2	#3 *
ug/l	60	400	60
Sample vol, l	0.015	0.016	0.012
Total ug	1	6	1
Vm std DSCF	1.69	1.68	1.70
Vm std DSCM	0.0479	0.0476	0.0482
Volume Flow, DSCFM	2553	2553	2553

*Not Detected, used 1/2 detection limit

Concentrations **AVERAGE**

ug/dscf	0.54	3.76	0.43	1.58
ug/dscm	18.9	133	15.2	55.6
ppb	8.24	57.9	6.62	24.2

Emissions

lb/hr	1.9E-04	1.3E-03	1.5E-04	5.5E-04

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-07-92
REPORT : 10-849B

Method 430

Formaldehyde Results

FIELD BLANK

Test Run	#1	#2	#3 *	AVERAGE
ug/l	220	260	30	170
Sample vol, l	0.0102	0.0134	0.0098	0.0111
Total ug	2.2	3.5	0.29	2.0

* Not detected, used 1/2 detection limit

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-07-92
REPORT : 10-849 B

Method 430

Acetaldehyde Results

FIELD BLANK

Test Run	#1	#2	#3 *	AVERAGE
ug/l	1900	1900	60	1287
Sample vol, l	0.0102	0.0134	0.0098	0.0111
Total ug	19.4	25.5	0.59	15.1

* Not detected, used 1/2 detection limit

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-70 30R
DATE : 2-07-92
REPORT : 10-849B

Method 430

Acrolein Results

FIELD BLANK

Test Run	#1	#2	#3 *	AVERAGE
ug/l	380	370	60	270
Sample vol, l	0.0102	0.0134	0.0098	0.0111
Total ug	3.9	5.0	0.59	3.1

* 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

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

Project: K70-30R Bechtel

Lab number: I0574
Date received: 02/12/92
Date sampled: 02/07/92
Sampled by: Mark Ready
Date extracted: 02/13/92
Extracted by: Mark Diehl
Date analyzed: 02/24/92
Analyzed by: Mark Diehl

Lab number: I0574-1 Sample Description: Run 1, impingers #1 & #2
QC ID: IB13IMP

	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.	800.	ND.	ND.	15.	1300.
Result	ND.	ND.	ND.	ND.	ND.	ND.
Average Field Blank	2.	160.	ND.	ND.	3.	250.
Sample/Blank Ratio	<1	<1	<1	<1	<1	<1
Volume (combined impingers)		15.1 mL				

Sample Description: Matrix spike of I0574-1, Run 1, Impinger #1
QC ID: IB13IMP Spiked with: 5 ug or 0.77 ug/L

	Formaldehyde	
	Total ug	ug/L
PQL*	1.	60.
Result	1.4	210.
Original Result	ND.	ND.
Percent recovery	27.	28.
Volume (split from I0574-1A)		6.5 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.

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President

03/03/92
HPLC 0224-72
IB13FORM
FORM1,1992

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

Project: K70-30R Bechtel

Lab number: I0574
Date received: 02/12/92
Date sampled: 02/07/92
Sampled by: Mark Ready
Date extracted: 02/13/92
Extracted by: Mark Diehl
Date analyzed: 02/25/92
Analyzed by: Mark Diehl

Lab number: I0574-2 Sample Description: Run 2, impingers #1 & #2
QC ID: IB13IMP

	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.	800.	75.	6500.	15	1300.
Result	7.	430.	23.	1500.	6.	400.
Average Field Blank	2.	160.	15.	1300.	3.	250.
Sample/Blank Ratio	3.5	2.70	1.5	1.2	2.0	1.6
Volume (combined impingers)		15.8 mL				

Lab number: I0574-3 Sample Description: Run 3, impingers #1 & #2
QC ID: IB13IMP

	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.	800.	75.	6500.	15.	1300.
Result	3.4	280.	ND.	ND.	ND.	ND.
Average Field Blank	2.	160.	15.	1300.	3.	250.
Sample/Blank Ratio	1.7	1.8	<1	<1	<1	<1
Volume (combined impingers)		12.2 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.

03/02/92
HPLC 0225-16
IB13FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

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

Project: K70-30R Bechtel

Lab number: I0574
Date received: 02/12/92
Date sampled: 02/07/92
Sampled by: Mark Ready
Date extracted: 02/13/92
Extracted by: Mark Diehl
Date analyzed: 02/25/92
Analyzed by: Mark Diehl

Lab number: I0574-4 Sample Description: Field Blank, Imp#1
QC ID: IB13IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Result	2.	220.	20.	1900.	4.	380.
Volume	10.2 mL					

Lab number: I0574-5 Sample Description: Field Blank, Imp#2
QC ID: IB13IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Result	4.	260.	25.	1900.	5.	370.
Volume	13.4 mL					

Lab number: I0574-6 Sample Description: Field Blank, Imp#3
QC ID: IB13IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Result	ND.	ND.	ND.	ND.	ND.	ND.
Volume	9.8 mL					
Average Field Blank	2.	160.	15.	1300.	3.	250.

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).

03/02/92
HPLC 0225-17
IB13FORM
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

QC Batch ID: IB13form
Date extracted: 02/13/92
Extracted by: MD
Date analyzed: 02/20/92
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	10	1000	9.6	960	96
Spike 2	10	1000	8.0	800	80
Spike 3	5.0	500	3.8	760	76
Spike 4**	5.0	500	1.3	130	26
Reagent blank	NS	NS	1.1	110	

Formaldehyde
Practical Quantitation Limit: 60 ug/L
Response factor: 2 ng/mm
Average % recovery: 84
Standard deviation of % rec: 11
Relative standard deviation of % rec: 13

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).
**Spike result was not used in statistical calculations. A gross error was suspected.

03/02/92
IB13FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President

Petro Chem Environmental Services, Inc.

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

METHOD 410A SAMPLING AND ANALYSIS

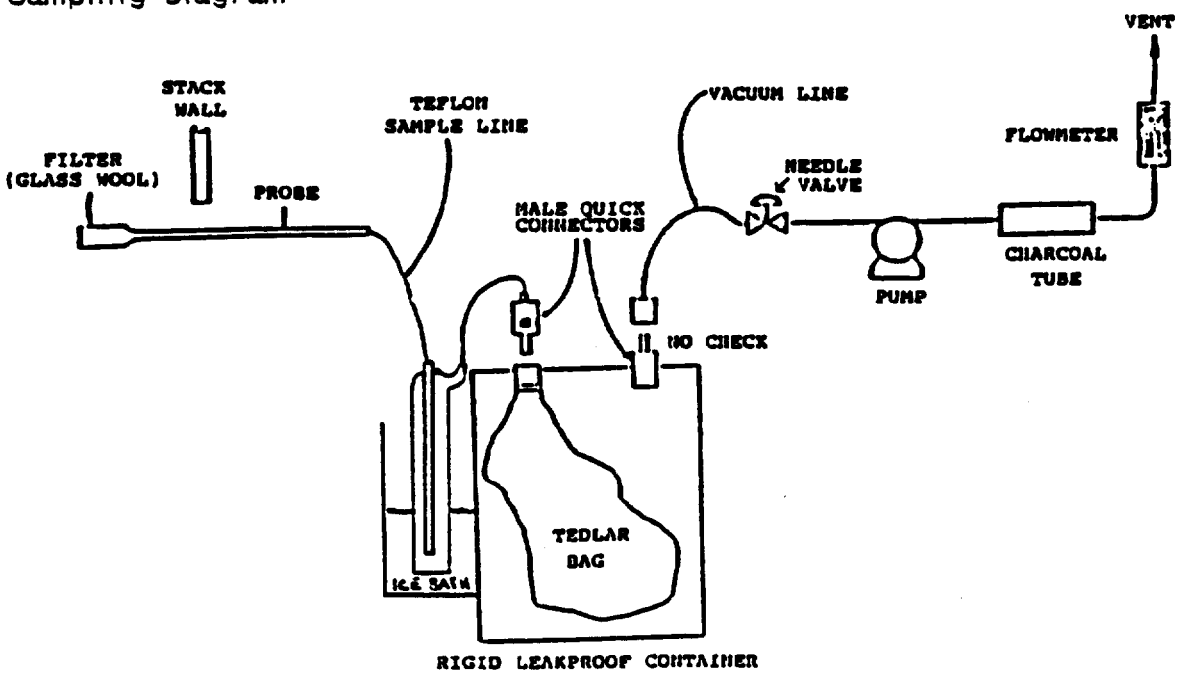
The sampling apparatus consisted of a heat traced stainless steel probe, teflon sample line, midget impinger moisture knockout, and a twenty liter tedlar bag housed in a rigid air tight container. The container was connected to a vacuum pump/rotameter/dry gas meter assembly.

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.

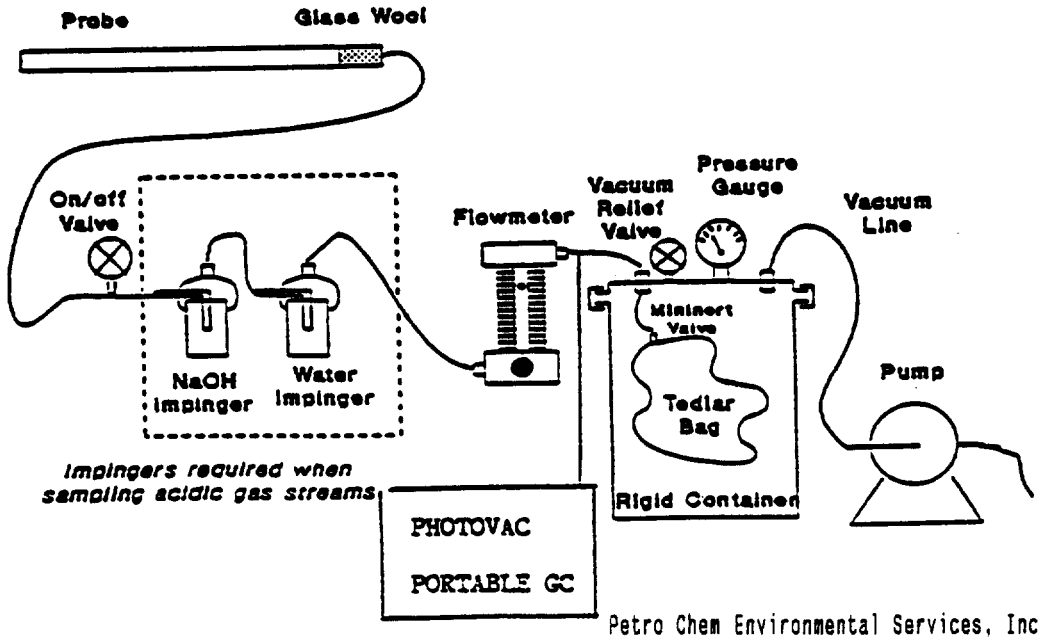
Prior to sampling the Photovac was calibrated with a known standard and the calibration was confirmed to be within the requirements when compared to the initial in-house calibration curves. The standard which was used was a mid point (with respect to the instrument range) standard or as close to the 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.

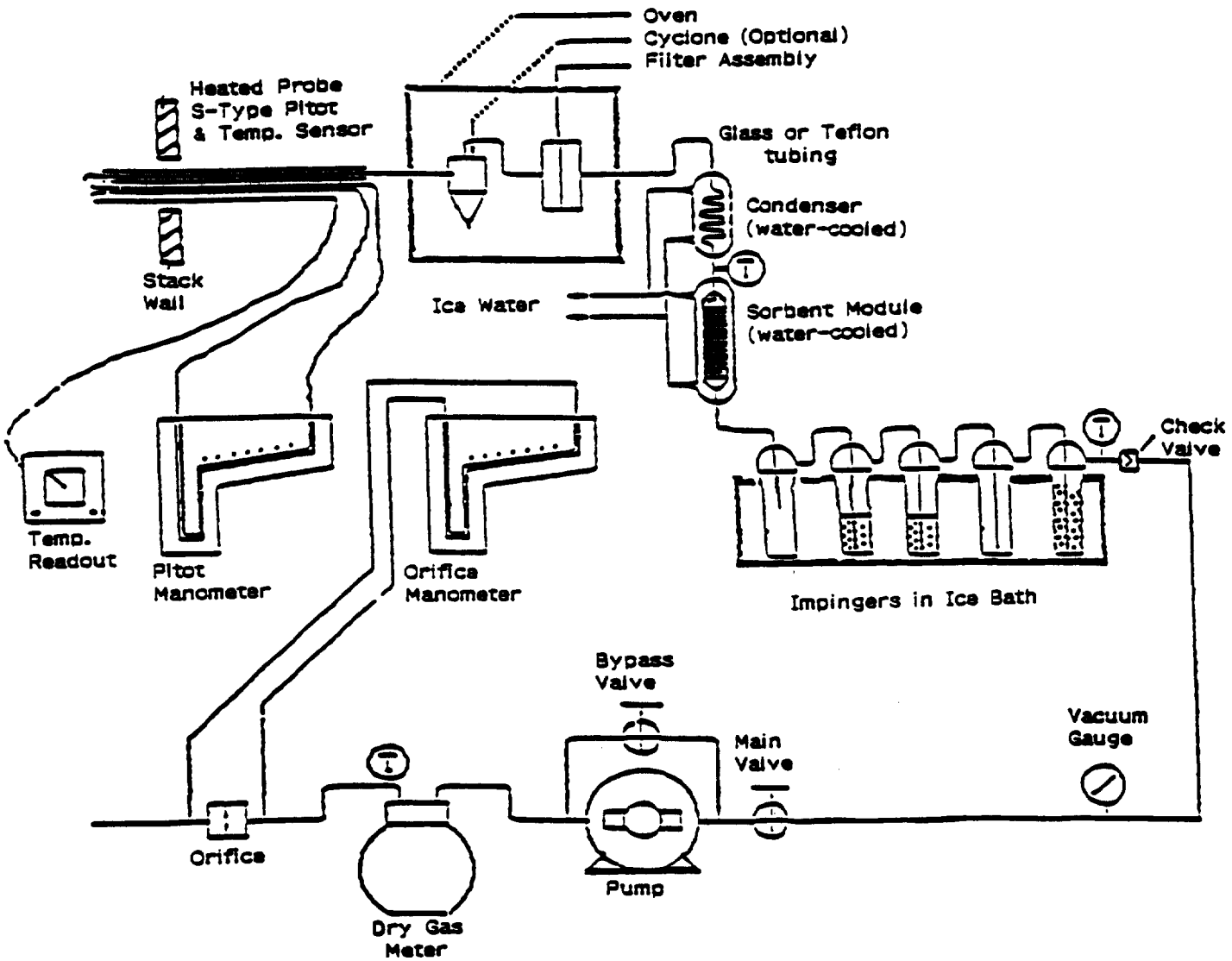
All impingers were disassembled and weighed. The contents of the first impinger were transferred to an amber sample bottle. The impinger was rinsed three times each with methanol, hexane, and methylene chloride. The rinsings were combined with the impinger contents.

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

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.

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

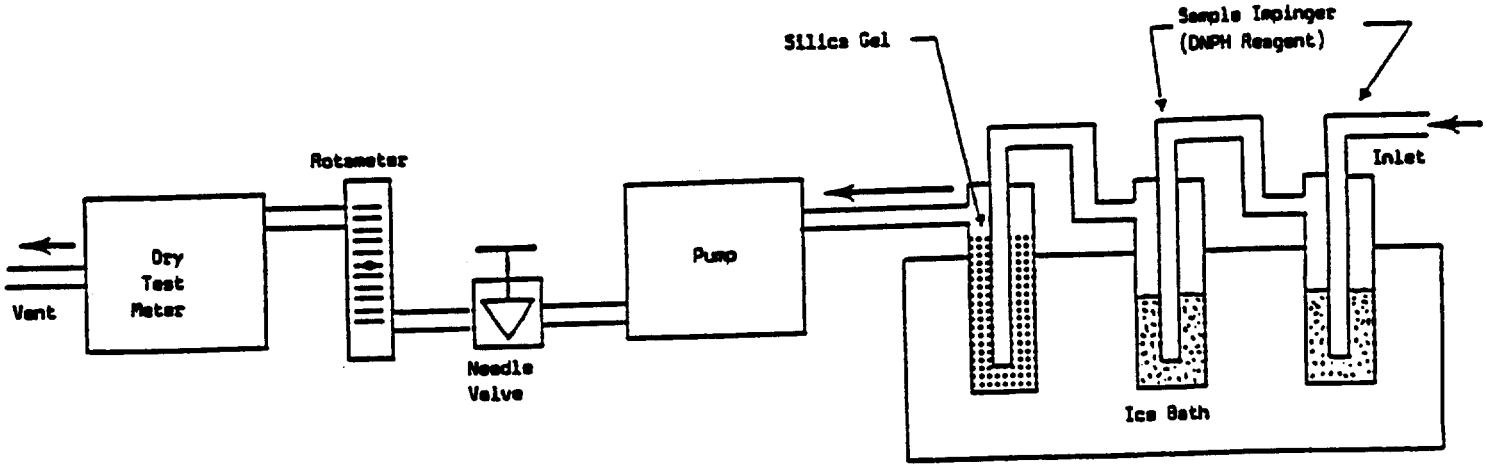
$$DSCM = DSCF \times .0283$$

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

$$\frac{LBS}{HR} = \frac{PPb \times MW \times DSCFM \times 1.581 \times 10^{-7}}{1000}$$

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	0.987329	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	0.983042	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	K70 - 30-R
REPORT NO.	**SAMPLER**
10-8498	Mark T. Ready
METHOD	**REPORT ATTN.** / **PO#**
429 PAH	Terry Rowles

HRGCMS FOR ACC LISTED METH 429 PAH

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	
B-14	First Impinger #2 Run 2 of 2	2/17	✓			COMPOSITE #2
B-15	Filter #3	2/17		✓		COMPOSITE #3
B-16	P/N/FT #3	"	✓			
B-17	CONDENSER #3	"	✓			
B-18	First Impinger #3 1 of 2	"	✓			
B-19	First Impinger #3 2 of 2	"	✓			
B-20	Second Impinger #3	"	✓			
B-21	Resin Trap #3	"		✓		

COMMENTS: Analyze within seven days of collection

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
MTR by [illegible]	2/7/92	[illegible]	2-7-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
[illegible]	2/11/92	[illegible] Kenneth J. Flatt	2-12-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

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

CHAIN OF CUSTODY RECORD

Submitted to: ALTA LABS

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT
Bechtel	K70 30-R ~~[illegible]~~ 1

REPORT NO.	SAMPLER
10-849B	Mark T. Ready

METHOD	REPORT ATTN.	PO#
429-PAH	Terry Rowles	

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	HRGCMS FOR ALL LISTED METH 429 PAH	
B-1	Filter #1	2-6-92		x			
B-2	Probe + Nozzle #1	"	x				
B-3	Condenser Rinse #1	"	x				
B-4	First Impinger #1 1of2	"	x			COMPOSITE	
B-5	Second Impinger #1	"	x			#1	
B-6	Resin Trap #1 (Trap #NA)	"		x			
B-13	FIRST Impinger #1 2of2	"	x				
B-7	Filter #2	2-7-92		x			
B-8	Probe + Nozzle #2	"	x				
B-9	Condenser Rinse #2	"	x			COMPOSITE	
B-10	First Impinger #2 1of2	"	x			#2	
B-11	Second Impinger #2	"	x			plus sample	
B-12	Resin Trap #2 (Trap #)	"		x		B-14	

COMMENTS: #1 equals Run #1
#2 equals Run #2
#3 equals Run #3

Analyze Within 7 days of collection

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-8-92	Terry Rowles	2-8-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Terry Rowles	2-11-92	Kenneth J. Flatt	2-12-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

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

CHAIN OF CUSTODY RECORD

Submitted to: ALTA LABS

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT	
BECHTEL	~~SK-36~~ ~~LTS~~ K-70 30-R	
REPORT NO. 10-849B	SAMPLER MARK T. READY	
METHOD 429 - PAH	REPORT ATTN. TERRY Rowles	PO#

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	AR GCMS FOR ALL LISTED METHANE PAH					
B-100	FITTER BLANK	2-6-92	X	X		COMPOSITE #4					
B-101	PROBE & NOZZLE BLANK	"	X								
B-102	CONDENSER RINSE BLANK	"	X								
B-103	FIRST IMPINGER BLANK	"	X								
B-104	SECOND IMPINGER BLANK	"	X								
B-105	RESIN TRAP BLANK	"	X								
B-106	HEXANE BLANK	"	X								
B-107	METHANOL BLANK	"	X								
B-108	MeCl2 BLANK	"	X								
B-109	DIST H2O BLANK	"	X								

COMMENTS: Analyze Within 7 days of collection

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-6-92	Terry Rowles	2-7-92
RELINQUISHED BY: Terry Rowles	DATE 2-11-92	RECEIVED BY: Kenneth J. Flatt	DATE 2-12-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

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

I0574

CHAIN OF CUSTODY RECORD

Submitted to: Coast to Coast

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT
Bechtel	K70 - 30R

REPORT NO.	SAMPLER	
10-849B	Mark Reagy	

METHOD	REPORT ATTN.	PO#
CARB 430	Terry Rowles	

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	Formaldehyde PQL = 50 ug/l	Acetaldehyde PQL = 100 ug/l	Acrolein PQL = 100 ug/l				
1	Run #1 Imp #1	2/7	✓			X	X	X				
2	Run #1 Imp #2		✓									1
3	Run #2 Imp #1		✓			X	X	X				
4	Run #2 Imp #2		✓									2
5	Run #3 Imp #1		✓			X	X	X				
6	Run #3 Imp #2		✓									3
7	Field Blank Imp #1		✓			X	X	X				4
8	Field Blank Imp #2		✓			X	X	X				5
9	Field Blank Imp #3		✓			X	X	X				6

Composite (1–2)

Composite (3–4)

COMMENTS: For blanks extract and analyze within 14 hrs, Report ug/l and Total ug

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Terry Rowles	2-11-92	[illegible]	2-12-92 1110
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

CHAIN OF CUSTODY RECORD

Submitted to: COAST TO COAST

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT	
BECHTEL	K-70 30R / K-36 LTS-1	
REPORT NO.	SAMPLER	
10-849B	MARK T. READY	
METHOD	REPORT ATTN.	PO#
VOA - 422	TERRY ROWLES	

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	TO 14	8240 Benzene, Toluene, Xylene ethylbenzene Propylene PQL = .1 PPB	Benzene, Toluene, Xylene ethylbenzene Propylene PQL = .01 µg				
									I0525			
10	Condensable #1	2-6-92	X				X		—	5		
11	Condensable #2	"	X				X		—	6		
12	Condensable #3	"	X				X		—	7		
13	Condensable Blank	"	X				X		—	8		
14	NonCondensable #1	"			X	X			—	1		
15	Non Condensable #2	"			X	X			—	2		
16	Non Condensable #3	"			X	X			—	3		
17	Non Condensable Blank	"			X	X			—	4		
2	Condensable #1	2-5-92	X				X		—	9		
3	Condensable #2	"	X				X		—	10		
4	Condensable #3	"	X				X		—	11		

K-70 30R

K-36 LTS-1

COMMENTS: GAS ANALYSIS WITHIN 72 HRS REPORT AS ppb and µg/cm

REPORT WITHIN 21 DAYS

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-6-92	Kelley Nielsen	2/8/92 1200
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

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:

Petro Chem Environmental Services, Inc.

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: [signature] Date Rcv'd: 2-12-92

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 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: [signature] Date Rcv'd: 2-18-97

Comments:

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

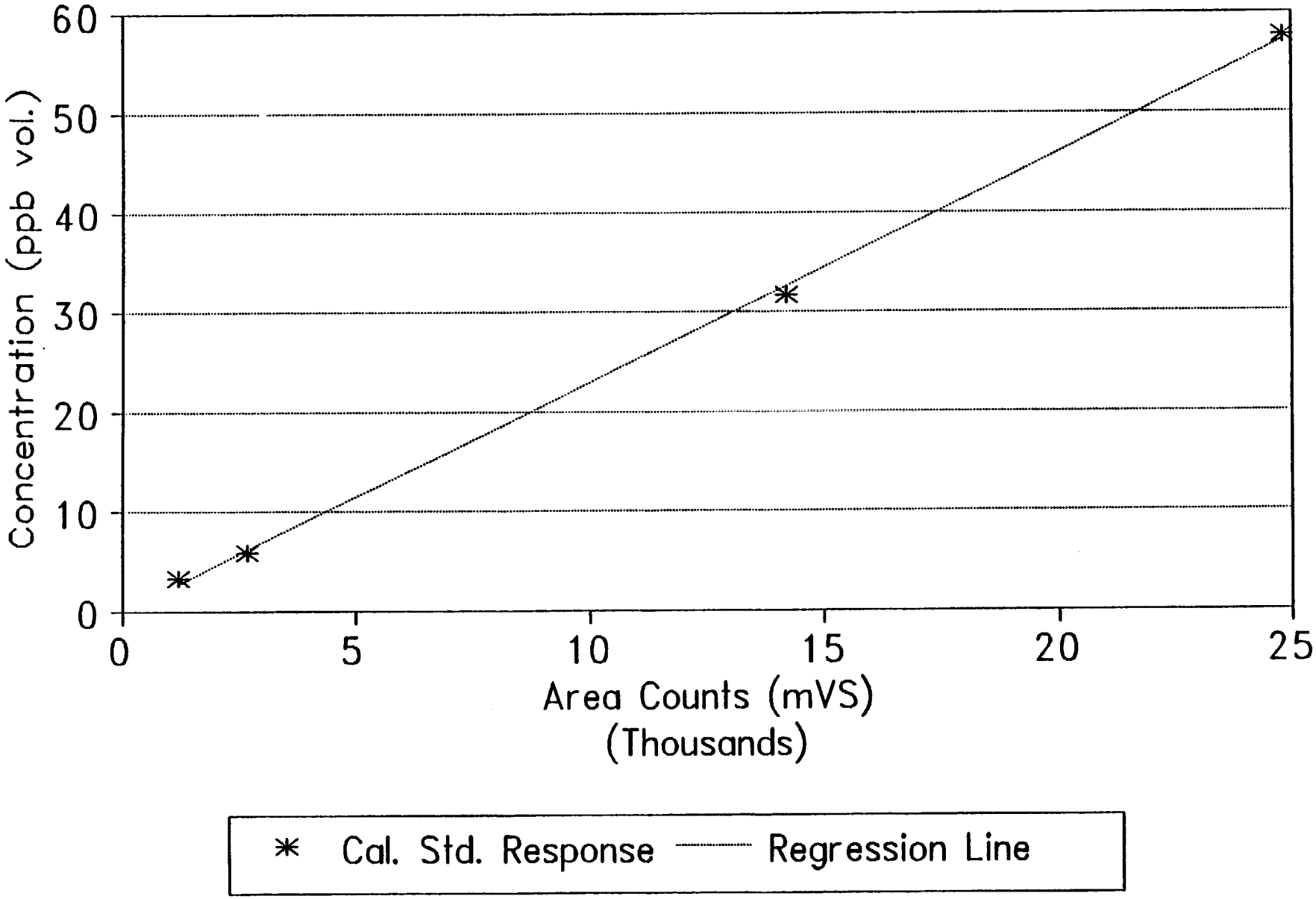
Regression Output:

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



COMPANY : BECHTEL
UNIT : K-70
DATE : 2/6 & 7/92
REPORT : 10-8498

ON-SITE DATA

		2-6-92	2-7-92	2-7-92
	RUN	#1	#2	#3
	TIME	2:30-3:48	9:05-12:56	2:05-5:15
Vm	Dry sampled gas volume, dcf	126.95	150.96	102.94
Y	Meter calibration factor (met# 1001, 1001, 1001)	.985170	.985170	.985170
Pbar	Barometric Pressure, "Hg	28.66	28.62	28.62
Pstatic	Stack static pressure, "Hg	-0-	-0-	-0-
ΔH	Differential meter pressure, "H2O	.88	1.26	.625
Tm	Meter temperature, °F	57	56	60.7

	RUN 1			RUN 2			RUN 3		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
KO	727.3	454.1	273.2	787.1	447.3	339.8	689.7	452.9	236.8
H_2O	638.9	626.9	12.0	612.7	607.3	5.4	627.5	627.0	.50
KO	492.9	489.1	3.8	516.4	515.1	1.3	494.0	492.6	1.4
Silica	885.3	871.0	14.3	803.9	778.8	25.1	821.9	802.8	19.1
V lc volume of H2O, gms			313.3			371.6			257.8

		RUN #1	#2	#3
CO2	% Dry Volume	6.32	6.28	6.21
O2	% Dry Volume	9.8	9.9	10.0
N2	% Dry Volume	83.88	83.82	83.79
Cp	Pitot tube coefficient (Pit#_____)	.84	.84	.84
ΔP	Avg P, "H2O	2.467	2.780	2.515
Ts	Stack temperature, °F	561	560	558
As	Stack area, sq. ft.	.753	.753	.753
Ds	Stack diameter, inches	11.75	11.75	11.75
Dn	Nozzle diameter, inches	.194	.204	.172
Dur	Sampling time, min	180	180	180
% Iso	Mini iso			
	Resin Trap#			
	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

COMPANY: BECHTEL
UNIT: K-70
DATE: 9-6-92
REPORT: 16-849B
TECH: JH
PUMP #: GAST
METER BOX#: 1001
METER coeff: .985710
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: .008 cfm
VACUUM: 12 "Hg

AMBIENT TEMP, °F: 54°
Pbar: 28.66
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM(''): .193
PROBE LINER MATERIAL: QUARTZ
FILTER #:
DUCT DIAM (''): 11.75

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
12	0	12:30	5	597	3.13	.784	1.11	280.95	58	58	247	248	
11	7.5		5	596	3.14	.781	1.10	286.8	56	54	271	252	
10	15	12:45	5	598	3.12	.779	1.10	292.7	59	53	295	253	
9	22.5		4.5	602	2.89	.746	1.02	298.5	57	51	321	256	
8	30	1:00	4	604	2.50	.694	.89	304.1	58	51	324	256	
7	37.5		3.5	606	2.30	.664	.83	309.3	57	51	328	257	
6	45	1:15	3.25	588	1.99	.625	.74	314.3	60	52	332	259	
5	52.5		3.25	511	2.00	.651	.80	319.0	59	53	326	256	
4	60	1:30	3.5	479	2.05	.672	.84	323.9	59	55	321	255	
3	67.5		3.5	474	2.09	.679	.86	328.9	60	52	309	254	
2	75	1:45	4	460	2.23	.707	.92	334.0	60	52	296	253	
1	82.5		3.25	461	1.70	.617	.72	339.3	60	52	310	255	
1C	90	2:00						343.9					
AVERAGE													

METHOD 429 RUN # 1 cont'd

COMPANY: BECHTEL
UNIT: K-70
DATE: 2-6-92
REPORT: 10-849B
TECH: JH
PUMP #: GAST
METER BOX#: 1601
METER coeff: .9985710
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: .015 cfm
VACUUM: 9 " Hg

AMBIENT TEMP, °F: 56°
Pbar: 28.66
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM("): .193
PROBE LINER MATERIAL: QUARTZ
FILTER #:
DUCT DIAM ("): 11.75

TRAVERSE PT. NUMBER		TIME (e) 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	
12	0	2:18	6	601	3.20	.799	1.13	343.9	63	63	258	253	43	51
11	7.5		5	604	3.09	.774	1.09	349.8	62	58	289	225	46	50
10	15	2:30	5	605	2.90	.754	1.03	355.6	62	57	294	251	44	50
9	22.5		5	604	2.75	.732	.98	361.3	60	55	301	255	45	49
8	30	2:48	4.5	606	2.65	.718	.94	366.8	61	55	297	247	45	50
7	37.5		4.5	606	2.61	.712	.93	372.2	60	54	310	266	46	50
6	45	3:03	3.5	600	2.30	.670	.84	377.5	60	55	314	256	44	51
5	52.5		3.5	566	2.31	.684	.86	382.5	61	55	297	241	47	51
4	60	3:18	4	549	2.40	.701	.91	387.6	59	54	301	256	46	51
3	67.5		4	527	2.29	.693	.89	392.9	60	54	284	261	45	51
2	75	3:33	3	517	2.05	.658	.81	398.1	60	53	297	232	46	51
1	82.5		3	502	1.99	.652	.80	403.0	59	52	304	249	46	52
EOT	90	3:48						407.9						
								126.95			150=100	.01		
											VEL PRS	=121.38		
AVERAGE				561	2.467		.88			57				

METHOD 429 RUN # 2 NE Port

COMPANY: Bechtel
UNIT: K70 R30
DATE: 2-7-92
REPORT: 10-8498
TECH: SH/DCT
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950 .985170
PITOT TUBE#: .84

PREV POST TEST LEAK CHECK
LEAK RATE: .018 cfm
VACUUM: 10 "Hg

AMBIENT TEMP, °F: 50
Pbar: 28.62
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8
AVG. CALIB. NOZZLE DIAM("): .204
PROBE LINER MATERIAL: Quartz
FILTER #:
DUCT DIAM ("): 11.75

TRAVERSE PT. NUMBER		TIME (e) 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	
12	0	9:05	9	588	3.71	.965	1.62	411.765	60	63	280	270	51	52
11	7.5		9	602	3.69	.947	1.58	419.0	58	55	320	276	51	52
10	15	9:20	9	605	3.33	.899	1.43	426.1	60	54	340	276	52	52
9	22.5		10	607	3.08	.862	1.32	432.8	60	52	391	275	52	52
8	30	9:35	10	602	2.81	.824	1.22	439.3	60	50	403	279	52	53
7	37.5		9	603	2.54	.781	1.11	445.5	60	48	402	274	53	53
6	45	9:50	8	606	2.36	.750	1.03	451.4	59	46	385	274	52	53
5	52.5		8	602	2.38	.754	1.01	457.0	59	45	366	274	52	53
4	60	10:05	8	541	2.12	.734	.99	462.6	60	46	344	276	52	52
3	67.5		7	478	2.19	.773	1.08	468.1	61	48	328	271	52	53
2	75	10:20	6	454	2.32	.808	1.17	473.9	61	51	309	270	52	52
1	82.5		7	450	2.28	.802	1.16	479.9	60	50	297	269	52	52
—	90	10:35						486.0						
AVERAGE														

METHOD 429 RUN #2 NW Port

COMPANY: Bechtel
UNIT: K70 B30
DATE: 2-7-92
REPORT: 10-8498
TECH: JH | DCT
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950 .985170
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE: .019 cfm
VACUUM: 10 "Hg

AMBIENT TEMP, °F: 50
Pbar: 28.62
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM("): .204
PROBE LINER MATERIAL: Quartz
FILTER #:
DUCT DIAM ("): 11.75

TRAVERSE PT. NUMBER		TIME (e) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft) 411.765	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	
12	0	11:26.0	10	602	3.67	.955	1.59	486.0	62	63	169	266	51	52
11	7.5		10	600	3.62	.943	1.56	493.2	62	56	312	268	51	52
10	15	11:41.0	10	600	3.49	.922	1.50	500.3	61	53	344	269	52	52
9	22.5		10	605	3.25	.889	1.40	507.2	63	52	358	269	51	52
8	30	11:56.0	10	604	2.94	.884	1.27	513.9	61	52	372	269	51	52
7	37.5		9	605	2.88	.834	1.24	520.5	61	51	377	268	52	53
6	45	12:11.0	9	605	2.61	.794	1.13	526.8	61	50	376	267	51	53
5	52.5		9	555	2.57	.806	1.17	532.8	61	49	368	268	51	52
4	60	12:26.0	9	523	2.65	.832	1.24	538.8	62	49	354	268	51	51
3	67.5		9	478	2.60	.844	1.27	545.0	62	49	339	268	51	52
2	75	12:41.0	8	470	2.23	.785	1.11	551.3	62	49	322	267	50	51
1	82.5		7	458	2.02	.754	1.03	557.2	62	52	303	267	50	51
—	90	12:56.0						562.72						
								Vm 150.96						
				560	2.780		1.26	ISO 100.41		56				
AVERAGE								VF: 136.33						

METHOD 429 RUN #3

COMPANY: Bechtel
UNIT: K70 R30
DATE: 2-7-92
REPORT: 10-849B
TECH: JH
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950 .985170
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE: .006 cfm
VACUUM: 10 "Hg

AMBIENT TEMP, °F: 50°
Pbar: 28.62
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM("): .204 .172
PROBE LINER MATERIAL: Quartz
FILTER #:
DUCT DIAM ("): 11.75

TRAVERSE PT. NUMBER		TIME (e) 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	
12	0	2:05	9	602	3.42	.656	.79	564.36	62	64	262	249	52	52
11	7.5		9	602	3.49	.658	.80	569.3	61	57	253	247	48	50
10	15	2:20	8	604	3.27	.636	.76	574.2	61	57	273	251	50	51
9	22.5		8	605	3.14	.624	.73	579.0	62	57	293	256	50	50
8	30	2:35	8	608	3.00	.609	.70	583.7	62	57	307	257	51	51
7	37.5		7	610	2.73	.581	.65	588.3	63	58	313	258	51	51
6	45	2:50	6.5	608	2.56	.564	.61	592.7	64	59	317	257	52	51
5	52.5		6.5	570	2.54	.572	.63	596.9	64	59	317	257	52	52
4	60	3:05	6.25	534	2.29	.552	.59	601.2	64	59	313	258	53	52
3	67.5		6.25	494	2.24	.558	.60	605.3	64	57	307	258	53	52
2	75	3:20	6.25	485	2.10	.541	.57	609.5	63	56	292	255	53	52
1	82.5		6	471	2.02	.536	.56	613.6	65	57	282	257	53	52
-	90	3:35						617.6						
AVERAGE														

METHOD 429 RUN #3

COMPANY: Bechtel
UNIT: K70 R30
DATE: 2-7-92
REPORT: 10-849B
TECH: JH
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950 .985170
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK
LEAK RATE: .01 @ 9 Hg cfm
VACUUM: " Hg

AMBIENT TEMP, °F: 50°
Pbar: 28.62
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8
AVG. CALIB. NOZZLE DIAM(''): .204
PROBE LINER MATERIAL: Quartz
FILTER #:
DUCT DIAM (''): 11.75

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) 564.36	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	
12	0	3:45	8	587	3.21	.642	.76	617.6	64	65	235	278	52	52
11	7.5		8	601	3.20	.632	.75	622.4	63	58	268	256	51	52
10	15	4:00	8	600	3.00	.612	.71	627.1	63	58	275	259	52	52
9	22.5		7	602	2.70	.580	.64	631.7	63	57	300	259	53	52
8	30	4:15	6.25	602	2.41	.550	.58	636.1	65	59	313	259	54	53
7	37.5		6	602	2.19	.522	.54	640.2	63	57	320	261	54	53
6	45	4:30	5.5	590	2.00	.504	.50	644.1	65	59	321	260	54	53
5	52.5		6	527	2.02	.521	.53	647.9	64	58	321	260	55	53
4	60	4:45	6	482	2.01	.533	.55	651.8	64	59	316	259	54	53
3	67.5		6	479	2.00	.531	.55	655.8	63	58	312	262	54	52
2	75	5:00	5.5	479	1.79	.502	.50	659.8	63	58	298	258	54	52
1	82.5		5	479	1.72	.493	.48	663.6	62	59	315	259	53	52
–	90	5:15						667.3	62	57	321	260	53	52
				558	2.515		.625	102.94'	60.7					
AVERAGE														

COMPANY : Bechtel
UNIT : K-70
DATE : 2/6 & 7/92
REPORT : 10-8498

PAH Rinse Volumes

RUN #	1	2	3	Field BLANK		
N/FT MeOH	4.8 48.9	53.8	42.9	29.3		
Hexane	4.0 40.4	47.3	48.6	26.7		
$MeCl_2$	18.0 63.7	83.5	71.1	52.6		
Sample line Condenser/FB MeOH	9.8 36.1	41.9	47.1	29.6		
Hexane	7.2 32.4	42.5	40.1	30.3		
$MeCl_2$	31.3 54.0	66.4	54.6	39.6		
1st Imp MeOH	34.6	29.6	35.2	30.4		
Hexane	29.7	26.7	31.7	19.6		
$MeCl_2$	30.0	30.3	40.4	27.4		
2nd Imp H_2O	37.1	56.6	49.4	47.5		
Date	2/6/92	2/7/92	2/7/92	2/6/92		

METHOD Formaldehyde RUN # 1

COMPANY: Bechtel
UNIT: K-70
DATE: 2-7-92
REPORT: 10-849B
TECH: JH
PUMP #: ~~BASF~~ MEM-18
METER BOX#: ~~1001~~
METER coeff: ~~.98571~~
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: .000 cfm
VACUUM: 5 " Hg

AMBIENT TEMP, °F: 54°
Pbar: 28.62
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM(''): —
PROBE LINER MATERIAL: Quartz
FILTER #:
DUCT DIAM (''): 11.75

TRAVERSE PT. NUMBER	TIME (e) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft) Ro To	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	9:31	2	601				.5	57	47			
							.5	5	~~47~~			
20	9:51	2	603				.5	57	43			
40	10:11	2	536				.5	62	49			
60	10:31	2	449				.5	60	50			
80	10:51	2	454				.5	62	56			
100	11:11											
							Rotameter Flow 1.75 CF	54.3				
AVERAGE												

METHOD FORMALDEHYDE RUN # 2

COMPANY: BECHTEL
UNIT: K-30
DATE: 2-7-92
REPORT: 10-849B
TECH: JH
PUMP #: METHIS
METER BOX#:
METER coeff:
PITOT TUBE#:

PRE/POST TEST LEAK CHECK

LEAK RATE: .000 cfm
VACUUM: 5 "Hg

AMBIENT TEMP, °F: 59
Pbar: 28.62
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM("): —
PROBE LINER MATERIAL: QUARTZ
FILTER #:
DUCT DIAM ("): 11.75

TRAVERSE PT. NUMBER	TIME (e) 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
0	11:37	2	600				.5	62	56			
20	11:57	2	603				.5	62	52			
40	12:17	2	601				.5	64	51			
60	12:37	2	474				.5	63	50			
80	12:57	2	445				.5	63	50			
100	1:17											
							ROTAMETER					
							1.75 CF	57.3				
AVERAGE												

METHOD Formaldehyde RUN # 3

COMPANY: Bechtel
UNIT: K-70
DATE: 2-7-92
REPORT: 10-849B
TECH: DCM
PUMP #: Meth 18
METER BOX#:
METER coeff:
PITOT TUBE#:

PRE / (POST) TEST LEAK CHECK

LEAK RATE: .000 cfm
VACUUM: 5 "Hg

AMBIENT TEMP, °F: 58
Pbar: 28.62
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM("): —
PROBE LINER MATERIAL: Quartz
FILTER #:
DUCT DIAM ("): 11.75

TRAVERSE PT. NUMBER	TIME (e) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft) Roto	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	13:57:30	2	602				.5	62	64			
								61	57			
20	14:17:30	2	604				.5	61	57			
40	14:37:30	2	608				.5	62	57			
60	14:57:30	2	570				.5	64	58			
80	15:17:30	2	494				.5	64	57			
100	15:37:30	2	482				.5	65	63			
							Rotameter 1.75 CF	51.3				
AVERAGE												

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

LOCATION: SEC 30/T30S/R23E				DATE: 03-13-92		
APCD # 4091082 A K-70				RELEASE # AEQ 681		
REASON FOR TEST: AIR TOXICS				TEST COMPANY: BPOI		
EQUIPMENT DESCRIPTION: 1500HP WAUKESHA				VEE PERFORMED: YES		
NOx CONTROL:	CAT.	PSC	PCC X	O2	OXIDIZING CAT.	
POLLUTANTS:	PM	NOx X	CO X	HC	H2S	SO2

EMISSIONS DATA

TIME	11:00-12:00					
NOX PPM	80					
CO PPM	525					
% 02	9.75					

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	909					
TOTAL BHP LOAD	939					
PERCENT LOAD	69.0					
CATALYST TEMP.	N/A					
FUEL STATIC	6.60					
FUEL DIFF.	2.70					
COEF.	0.010					
RATE (MCF/DAY)	178					
SUCTION PSI	53					
DISCHARGE PSI	495					

COMMENTS:

OBSERVER: M. Carr

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # AEQ 681
Date: 03-13-92

SITE: 30R CS Units: K70

START	11:00AM	
END	12:00PM	
IGNITION TIMING	8	
RPM		
ENGINE	909	
N. TURBO	N/A	
S. TURBO	N/A	
PRESSURE		
FUEL MANIFOLD	N/A	
AIR MANIFOLD	L/B 22	R/B 23
PCC FUEL	N/A	
BAROMETRIC	28.2	
% BY PASS OPEN	N/A	
TEMPERATURE		
CONVERTOR IN	N/A	
CONVERTOR OUT	751	
AIR MANIFOLD	125	R/B 122
AMBIENT	68	
ENGINE J/W IN	107	
ENGINE J/W OUT	166	
ENGINE OIL IN	N/A	
ENGINE OIL OUT	162	
POWER CYL # 1	971	
# 2	982	
# 3	974	
# 4	965	
# 5	965	
# 6	948	968
# 7	953	
# 8	950	
# 9	933	
#10	935	
#11	907	
#12	898	929
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	182	495
CYL. #2 HE	53	182
CYL. #3 HE	N/A	N/A
CYL. #4 HE	N/A	N/A
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE		
Coeff.		0.010
Static		6.60
Diff.		2.70
mcf/d		178.2
scfm		123.8
Exp. Factor (CAL.)		9.6
Avg. O2%		9.8
Exhst. Flow, dscfm		2227
AVG.	NOx ppm	80
	Corrected 15%	42
	lbs./hr.	1.29
	gms/BHP-hr.	0.62
AVG.	CO ppm	525
	Corrected 15%	278
	lbs./hr.	5.18
	gms/BHP-hr.	2.50
ACTUAL	HC lbs./hr.	0.00
	gms-BHP-hr.	0.00
TOTAL IN. H.P.		864
LOSSES		0.92
TOTAL BHP LOAD		939
PERCENT LOAD		69
RATED H.P.		1500
DERATED H. P.		1364

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 TEST

Petro Chem Environmental Services, Inc.

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

W.O. # AEQ 681

SITE: 30R CS Units: K70 Date: 03-13-92

Times : Beg.Cal@ 10:55AM START@ 11:00AM STOP@ 12:00PMEnd Cal@ 12:05PM

** 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	25.0	1000

** RAW EMISSIONS DATA **

11:00AM			
_____5	80	9.8	525
_____10	80	9.8	525
_____15	80	9.8	525
_____20	80	9.8	525
_____25	80	9.8	525
_____30	80	9.8	525
_____35	80	9.8	525
_____40	80	9.8	525
_____45	80	9.8	525
_____50	80	9.8	525
_____55	80	9.8	525
_____60	80	9.8	525
Raw Avg. :	80	9.8	525
Maximum :	80	9.8	525
Minimum :	80	9.8	525

** CALIBRATION ADJUSTMENTS **

Zero :	0	0.0	0
Span :	-2	0.0	0

** DRIFT CORRECTED EMISSIONS **

Average :	80	9.8	525

** 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: 2HOS

Unit name: K70

Date: 13-Mar-92 11:33:38

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	46	174.5	533.1*	89 220	2.01	136.6	0	146C
1C	Stage2	18	170.5	513.5	89 220	4.49	247.6	3	168T
2H	Stage1	35	49.7	185.9	89 230	2.33	183.3	4	165C
2C	Stage1	14	47.6	177.9	89 230	4.29	296.7	5	166T

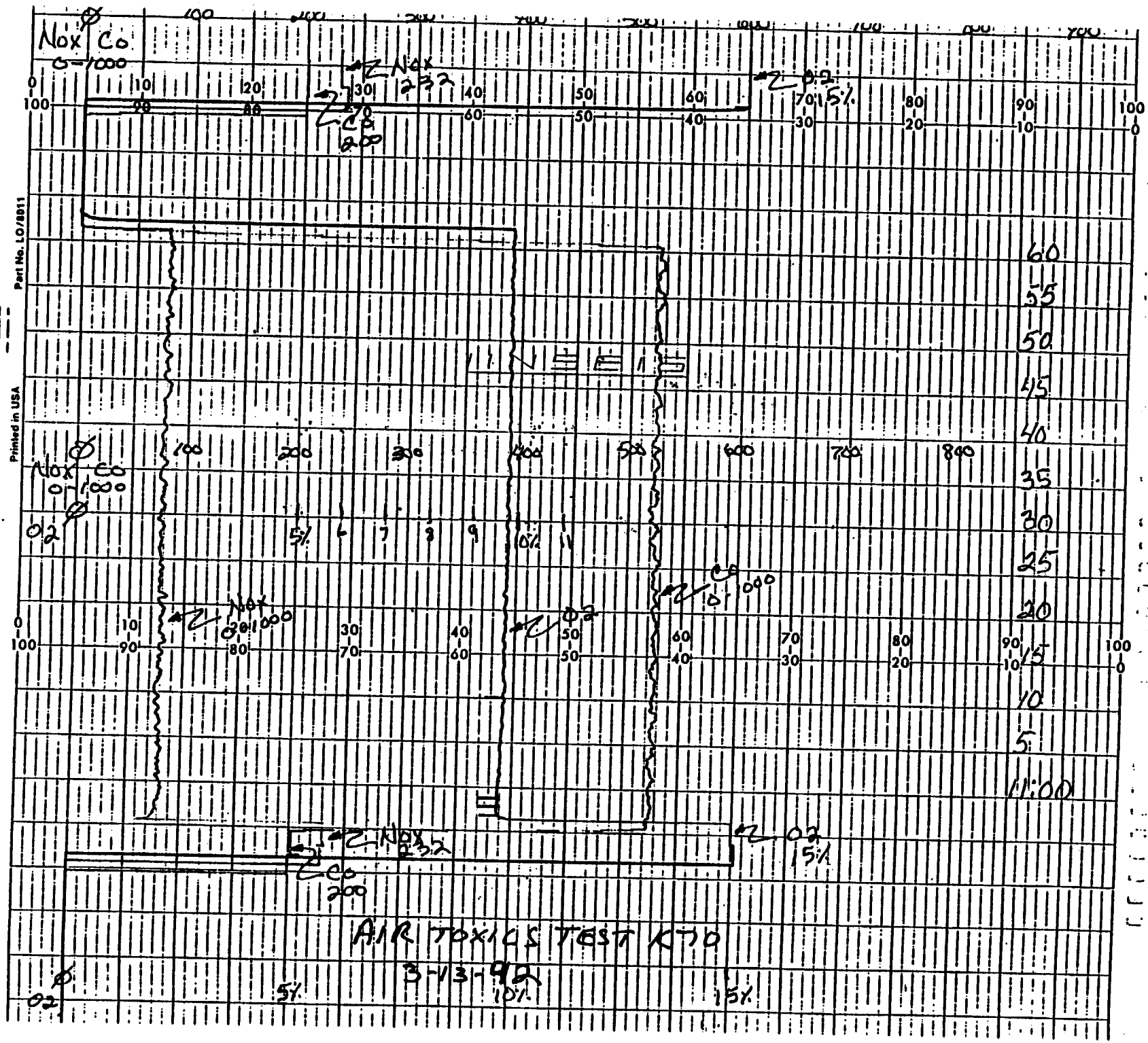
Total indicated horsepower (IHP) = 864 @ 909 RPM
Gas horsepower (GHP) = 939 @ 909 RPM
Compressor total horsepower (BHP) = 939 @ 909 RPM
Rated horsepower (BHP) = 1500 @1000 RPM
Derated horsepower (BHP) = 1364 for 909 RPM
Percent Load = 69%

* WARNING: Check the measured line pressures

Recommendations and Observations:
AIR TOXICS TEST K-70

Analyst signature: Chuck Holman

Petro Chem Environmental Services, Inc.


Nox Co
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232
Co
200
O2
15%
AIR TOXICS TEST KTO
3-13-92
O2
5%
10%
15%
Part No. LO/5811
Printed in USA

I.C. ENGINE SOURCE TEST REPORT

COMPANY - Naval Petroleum Reserve No. 1 DATE - 2-6-92

APCD/EPA NUMBERS - 4091082 A

REASON FOR TEST - Air Toxics TEST COMPANY - BPOI

EQUIPMENT DESCRIPTION - 1500 HP Waukesha

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

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

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

ENGINE LOCATION - Sec 30 / T30S / R23E

TIME		12:45	2:15				
RPM		924	924				
HORSEPOWER		889	889				
CATALYST TEMP							
FUEL	READING	6.0 / 2.4	6.0 / 2.4				
	RATE	144	144				
SUCTION	PRESS. 1	48	45				
	PRESS. 2						
DISCHARGE	PRESS. 1	505	490				
	PRESS. 2						

FUEL TYPE natural gas FUEL RATE - 144 % OF LOAD 64 FUEL COEF. .010

POLLUTANT	SPAN GAS	RANGE	INSTR. ANALYSIS	INSTR. MFG.
NOx	233	0-250		Teco 10
CO	209	0-1000		Teco 48
O2	15	0-25		Teledyne
Cal Gas Expiration	NOx 4-1-92	CO 4-1-92		
SPAN / ZERO DRIFT < 5% OF RANGE - YES ( ) NO ( )				

TIME	12:15 / 1:15	1:45 / 2:45						
NOx	137	136						
CO	655	668						
O2	9.8	9.7						

COMMENTS -

OBSERVER - M. Carr

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 30R CS Units: K70

W.O. # 254904
Date: 02-06-92

START	01:45PM
END	02:45PM
IGNITION TIMING	6
RPM	
ENGINE	924
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	9.4
A/F MANIFOLD R/B	10.5
PCC FUEL	N/A
BAROMETRIC	28.4
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	110 R/B 110
AMBIENT	61
ENGINE J/W IN	158
ENGINE J/W OUT	N/A
ENGINE OIL IN	155
ENGINE OIL OUT	N/A
POWER CYL # 1	895
# 2	915
# 3	910
# 4	900
# 5	886
# 6	886
# 7	909
# 8	912
# 9	900
#10	891
#11	886
#12	848
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	176	490
CYL. #2 HE	45	176
CYL. #3 HE	N/A	N/A
CYL. #4 HE	N/A	N/A
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.01
Static	6.00
Diff.	2.40
mcf/d	144.0
scfm	100.0
Exp. Factor (CAL.)	9.6
Avg. O2%	9.7
Exhst. Flow, dscfm	1793
AVG. NOx ppm	136
Corrected 15%	72
lbs./hr.	1.78
gms/BHP-hr.	0.91
AVG. CO ppm	668
Corrected 15%	353
lbs./hr.	5.30
gms/BHP-hr.	2.71
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	818
LOSSES	0.92
TOTAL BHP LOAD	889
PERCENT LOAD	64.2
RATED H.P.	1500
DERATED H. P	1385
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

NOTES: RUN # 2.

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 30R CS Units: K70 W.O. # 254904
Date: 02-06-92

START	12:15PM
END	01:15PM
IGNITION TIMING	6
RPM	
ENGINE	924
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	9.8
A/F MANIFOLD R/B	10.9
PCC FUEL	N/A
BAROMETRIC	28.4
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	115
R/B	115
AMBIENT	64
ENGINE J/W IN	155
ENGINE J/W OUT	N/A
ENGINE OIL IN	155
ENGINE OIL OUT	N/A
POWER CYL # 1	902
# 2	917
# 3	915
# 4	904
# 5	888
# 6	886
# 7	908
# 8	910
# 9	899
#10	889
#11	863
#12	840
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	180	505
CYL. #2 HE	48	180
CYL. #3 HE	N/A	N/A
CYL. #4 HE	N/A	N/A
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.01
Static	6.00
Diff.	2.40
mcf/d	144.0
scfm	100.0
Exp. Factor (CAL.)	9.6
Avg. 02%	9.8
Exhst. Flow, dscfm	1808
AVG. NOx ppm	137
Corrected 15%	73
lbs./hr.	1.80
gms/BHP-hr.	0.92
AVG. CO ppm	655
Corrected 15%	349
lbs./hr.	5.24
gms/BHP-hr.	2.68
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	818
LOSSES	0.92
TOTAL BHP LOAD	889
PERCENT LOAD	64.2
RATED H.P.	1500
DERATED H. P.	1385
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

NOTES: RUN # 1.

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 2HOS

Unit name: K70 Date: 6-Feb-92 12:12:33

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	46	174.5	540.5*	83 200	1.99	120.6	-19	162C
1C	Stage2	18	168.3	516.2	83 200	4.62	254.7	-17	177T
2H	Stage1	35	45.0	176.9	64 200	2.35	163.5	-4	156C
2C	Stage1	14	42.8	176.4	64 200	4.10	279.5	-9	164T

Total indicated horsepower (IHP) = 818 @ 924 RPM
Gas horsepower (GHP) = 889 @ 924 RPM
Compressor total horsepower (BHP) = 889 @ 924 RPM
Rated horsepower (BHP) = 1500 @1000 RPM
Derated horsepower (BHP) = 1385 for 924 RPM
Percent Load = 64%

* WARNING: Check the measured line pressures

Recommendations and Observations:.
CONTINUOUS EMISSIONS MONITORING DURING AIR TOXIC EVALUATION.RUN 1 & 2.

Analyst signature: MAB

Petro Chem Environmental Services, Inc.

I.C. ENGINE SOURCE TEST REPORT

COMPANY - Naval Petroleum Reserve No. 1 DATE - 2-7-92

APCD/EPA NUMBERS - 4091082 A

REASON FOR TEST - Air Toxics TEST COMPANY - BPOI

EQUIPMENT DESCRIPTION - 1500 HP Waukesha

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

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

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

ENGINE LOCATION - Sec 30 / T30S / R23E

		1	2	3	4	5	6
TIME		9:30	10:40	12:00	1:10	2:25	3:40
RPM		932	932	932	932	929	929
HORSEPOWER		894	894	901	901	906	906
CATALYST TEMP.							
FUEL	READING	6.0 / 2.3	6.0 / 2.5	6.0 / 2.5	6.0 / 2.5	6.0 / 2.6	6.0 / 2.5
	RATE	138	150	150	150	156	150
SUCTION	PRESS. 1	48	47	47	48	48	46
	PRESS. 2						
DISCHARGE	PRESS. 1	509	505	505	504	478	467
	PRESS. 2						

FUEL TYPE natural gas FUEL RATE - ___ % OF LOAD ___ FUEL COEF. .010

POLLUTANT	SPAN GAS	RANGE	INSTR. ANALYSIS	INSTR. MFG.
NOx	233	0-250		Teco 10
CO	209	0-1000		Teco 48
O2	15	0-25		Teledyne
Cal Gas Expiration	NOx 4-1-92	CO 4-1-92		

SPAN / ZERO DRIFT < 5% OF RANGE - YES ( ) NO ( )

	1	2	3	4	5	6		
TIME	9:00 / 10:00	10:10 / 11:10	11:30 / 12:30	12:40 / 1:40	1:55 / 2:55	3:10 / 4:30		
NOx	126	116	117	125	116	119		
CO	640	647	650	645	650	650		
O2	9.8	10.0	9.9	10.1	9.9	10.0		

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: 2HOS

Unit name: K70

Date: 7-Feb-92 08:23:02

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	46	170.4	554.4*	72 200	1.64	118.8	-12	157C
1C	Stage2	18	178.8	523.4	72 200	4.75	260.1	4	178T
2H	Stage1	35	59.6	195.1*	60 200	2.35	163.4	19	144C
2C	Stage1	14	70.1	205.4*	60 200	4.74	280.4	31	178T

Total indicated horsepower (IHP) = 823 @ 932 RPM
Gas horsepower (GHP) = 894 @ 932 RPM
Compressor total horsepower (BHP) = 894 @ 932 RPM
Rated horsepower (BHP) = 1500 @1000 RPM
Derated horsepower (BHP) = 1398 for 932 RPM
Percent Load = 64%

* WARNING: Check the measured line pressures

Recommendations and Observations:
CONTINUOUS EMISSION MONITORING DURING AIR TOXIC EVALUATION RUN # 1-2.

Analyst signature: MXB

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 30R CS Units: K70 W.O. # 254904
Date: 02-07-92

START	09:00AM
END	10:00AM
IGNITION TIMING	6
RPM	
ENGINE	932
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	10.8
A/F MANIFOLD R/B	11.8
PCC FUEL	N/A
BAROMETRIC	28.4
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	115
R/B	110
AMBIENT	62
ENGINE J/W IN	155
ENGINE J/W OUT	N/A
ENGINE OIL IN	155
ENGINE OIL OUT	N/A
POWER CYL # 1	901
# 2	920
# 3	920
# 4	909
# 5	894
# 6	896
# 7	906
# 8	907
# 9	894
#10	882
#11	885
#12	842
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	184	509
CYL. #2 HE	48	184
CYL. #3 HE	N/A	N/A
CYL. #4 HE	N/A	N/A
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.01
Static	6.00
Diff.	2.30
mcf/d	138.0
scfm	95.8
Exp. Factor (CAL.)	9.6
Avg. O2%	9.8
Exhst. Flow, dscfm	1737
AVG. NOx ppm	126
Corrected 15%	67
lbs./hr.	1.59
gms/BHP-hr.	0.80
AVG. CO ppm	640
Corrected 15%	342
lbs./hr.	4.92
gms/BHP-hr.	2.50
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	823
LOSSES	0.92
TOTAL BHP LOAD	895
PERCENT LOAD	64.0
RATED H.P.	1500
DERATED H. P.	1398
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

NOTES: RUN # 1.

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 30R CS Units: K70 W.O. # 254904
Date: 02-07-92

START	10:10AM
END	11:10AM
IGNITION TIMING	6
RPM	
ENGINE	932
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	10.5
A/F MANIFOLD R/B	11.4
PCC FUEL	N/A
BAROMETRIC	28.4
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	116
AIR MANIFOLD R/B	110
AMBIENT	66
ENGINE J/W IN	158
ENGINE J/W OUT	N/A
ENGINE OIL IN	155
ENGINE OIL OUT	N/A
POWER CYL # 1	899
# 2	917
# 3	917
# 4	906
# 5	893
# 6	899
# 7	899
# 8	903
# 9	892
#10	884
#11	857
#12	844
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	180	505
CYL. #2 HE	47	180
CYL. #3 HE	N/A	N/A
CYL. #4 HE	N/A	N/A
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE		
Coeff.		0.01
Static		6.00
Diff.		2.50
mcf/d		150.2
scfm		104.3
Exp. Factor (CAL.)		9.6
Avg. O2%		10.0
Exhst. Flow,	dscfm	1914
AVG.	NOx ppm	116
	Corrected 15%	63
	lbs./hr.	1.62
	gms/BHP-hr.	0.82
AVG.	CO ppm	647
	Corrected 15%	350
	lbs./hr.	5.48
	gms/BHP-hr.	2.78
ACTUAL	HC lbs./hr.	0.00
	gms-BHP-hr.	0.00
TOTAL IN. H.P.		823
LOSSES		0.92
TOTAL BHP LOAD		895
PERCENT LOAD		64.0
RATED H.P.		1500
DERATED H. P.		1398
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

NOTES: RUN # 2.

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand

Model: 2HOS

Unit name: K70

Date: 7-Feb-92 11:41:12

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	46	172.4	553.4*	72 200	1.78	123.8	-10	159C
1C	Stage2	18	175.6	522.2	72 200	4.72	257.4	2	178T
2H	Stage1	35	57.9	189.6	60 200	2.53	167.2	20	153C
2C	Stage1	14	56.6	191.3*	60 200	4.43	280.2	16	164T

Total indicated horsepower (IHP) = 829 @ 932 RPM
Gas horsepower (GHP) = 901 @ 932 RPM
Compressor total horsepower (BHP) = 901 @ 932 RPM
Rated horsepower (BHP) = 1500 @1000 RPM
Derated horsepower (BHP) = 1397 for 932 RPM
Percent Load = 64%

* WARNING: Check the measured line pressures

Recommendations and Observations:
CONTINUOUS EMISSION MONITORING DURING AIR TOXIC EVALUATION RUN # 3-4.

Analyst signature: MKB

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 30R CS Units: K70 W.O. # 254904
Date: 02-07-92

START	11:30AM
END	12:30PM
IGNITION TIMING	6
RPM	
ENGINE	932
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	10.2
A/F MANIFOLD R/B	11.3
PCC FUEL	N/A
BAROMETRIC	28.4
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	118 R/B 110
AMBIENT	64
ENGINE J/W IN	155
ENGINE J/W OUT	N/A
ENGINE OIL IN	155
ENGINE OIL OUT	N/A
POWER CYL # 1	898
# 2	917
# 3	918
# 4	908
# 5	894
# 6	900
# 7	899
# 8	901
# 9	891
#10	884
#11	854
#12	842
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	175	505
CYL. #2 HE	47	179
CYL. #3 HE	N/A	N/A
CYL. #4 HE	N/A	N/A
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE		
Coeff.		0.01
Static		6.00
Diff.		2.50
mcf/d		150.2
scfm		104.3
Exp. Factor (CAL.)		9.6
Avg. O2%		10.0
Exhst. Flow, dscfm		1914
AVG.	NOx ppm	118
	Corrected 15%	64
	lbs./hr.	1.64
	gms/BHP-hr.	0.82
AVG.	CO ppm*	647
	Corrected 15%	350
	lbs./hr.	5.48
	gms/BHP-hr.	2.76
ACTUAL	HC lbs./hr.	0.00
	gms-BHP-hr.	0.00
TOTAL IN. H.P.		829
LOSSES		0.92
TOTAL BHP LOAD		901
PERCENT LOAD		64.5
RATED H.P.		1500
DERATED H. P.		1397
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

NOTES: RUN # 3.

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 30R CS Units: K70

W.O. # 254904
Date: 02-07-92

START	12:40PM
END	01:40PM
IGNITION TIMING	6
RPM	
ENGINE	932
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	10.5
A/F MANIFOLD R/B	11.6
PCC FUEL	N/A
BAROMETRIC	28.4
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	118
R/B	117
AMBIENT	64
ENGINE J/W IN	155
ENGINE J/W OUT	N/A
ENGINE OIL IN	155
ENGINE OIL OUT	N/A
POWER CYL # 1	906
# 2	923
# 3	922
# 4	913
# 5	901
# 6	904
# 7	907
# 8	910
# 9	896
#10	888
#11	866
#12	847
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	182	504
CYL. #2 HE	48	182
CYL. #3 HE	N/A	N/A
CYL. #4 HE	N/A	N/A
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.01
Static	6.00
Diff.	2.50
mcf/d	150.2
scfm	104.3
Exp. Factor (CAL.)	9.6
Avg. O2%	10.2
Exhst. Flow, dscfm	1950
AVG. NOx ppm	126
Corrected 15%	69
lbs./hr.	1.78
gms/BHP-hr.	0.90
AVG. CO ppm	642
Corrected 15%	353
lbs./hr.	5.54
gms/BHP-hr.	2.79
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	829
LOSSES	0.92
TOTAL BHP LOAD	901
PERCENT LOAD	64.5
RATED H.P.	1500
DERATED H. P.	1397
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

NOTES: RUN # 4.

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand

Model: 2HOS

Unit name: K70

Date: 7-Feb-92 13:53:53

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	Stage2	46	172.4	497.1	72 200	2.19	128.0	7	156C
1C	Stage2	18	152.3	488.6	72 200	4.36	252.7	-8	161T
2H	Stage1	35	41.6	173.6	60 200	2.35	171.1	-4	153C
2C	Stage1	14	40.2	173.1	60 200	4.17	282.2	-7	164T

Total indicated horsepower (IHP) = 834 @ 929 RPM
Gas horsepower (GHP) = 906 @ 929 RPM
Compressor total horsepower (BHP) = 906 @ 929 RPM
Rated horsepower (BHP) = 1500 @1000 RPM
Derated horsepower (BHP) = 1394 for 929 RPM
Percent Load = 65%

Recommendations and Observations:
CONTINUOUS EMISSION MONITORING DURING AIR TOXIC EVALUATION RUN # 5-6.

Analyst signature: _____

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 30R CS Units: K70

W.O. # 254904
Date: 02-07-92

START	03:10PM
END	04:30PM
IGNITION TIMING	6
RPM	
ENGINE	929
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	9.8
A/F MANIFOLD R/B	10.8
PCC FUEL	N/A
BAROMETRIC	28.4
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	N/A
CONVERTOR OUT	N/A
AIR MANIFOLD L/B	119 R/B 119
AMBIENT	61
ENGINE J/W IN	155
ENGINE J/W OUT	N/A
ENGINE OIL IN	155
ENGINE OIL OUT	N/A
POWER CYL # 1	905
# 2	925
# 3	924
# 4	912
# 5	896
# 6	903
# 7	901
# 8	904
# 9	891
#10	884
#11	856
#12	846
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	170	467
CYL. #2 HE	46	170
CYL. #3 HE	N/A	N/A
CYL. #4 HE	N/A	N/A
CYL. #5 HE	N/A	N/A
CYL. #6 HE	N/A	N/A

FUEL RATE	
Coeff.	0.01
Static	6.00
Diff.	2.50
mcf/d	150.0
scfm	104.2
Exp. Factor (CAL.)	9.6
Avg. 02%	10.0
Exhst. Flow, dscfm	1917
AVG. NOx ppm	119
Corrected 15%	65
lbs./hr.	1.66
gms/BHP-hr.	0.83
AVG. CO ppm	650
Corrected 15%	352
lbs./hr.	5.52
gms/BHP-hr.	2.76
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	834
LOSSES	0.92
TOTAL BHP LOAD	907
PERCENT LOAD	65.0
RATED H.P.	1500
DERATED H. P.	1394
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

NOTES: RUN # 6.

Petro Chem Environmental Services, Inc.

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

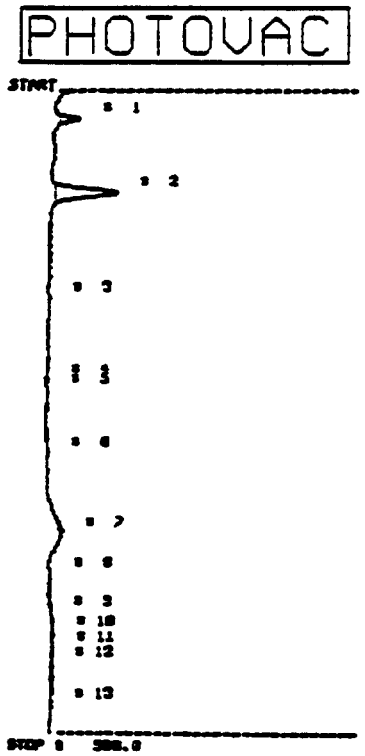
$$LOQ= 3.3*LOD$$

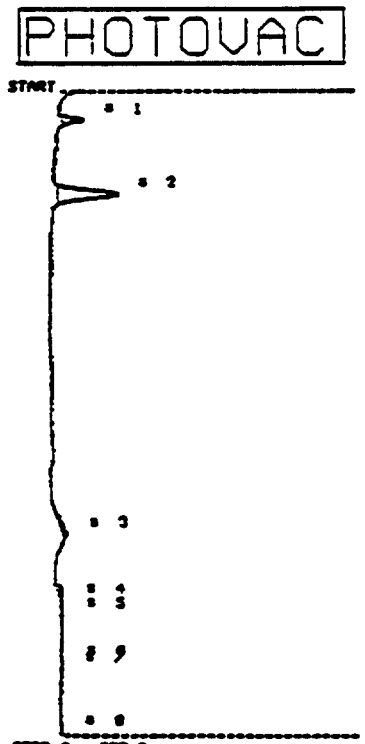
MILLIVOLTSECONDS

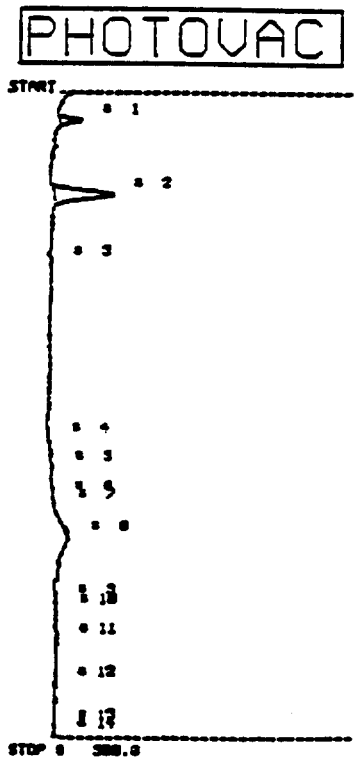
$$mVS= VS * 1000$$

3.22ppmv 1,3-Butadiene

Calibration Gas Standard

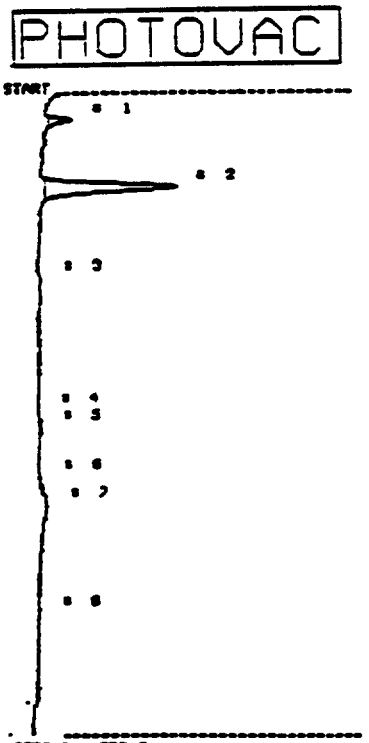


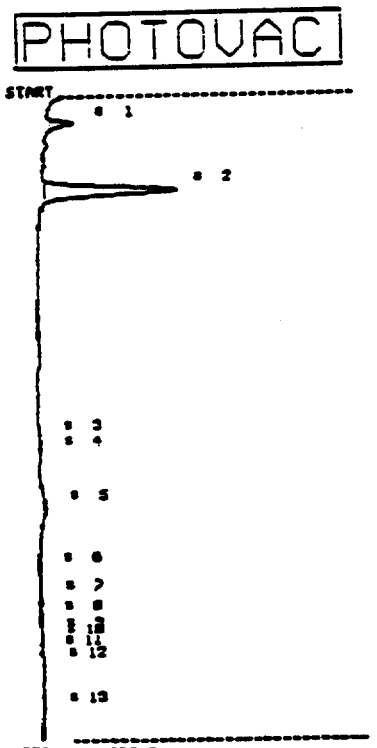


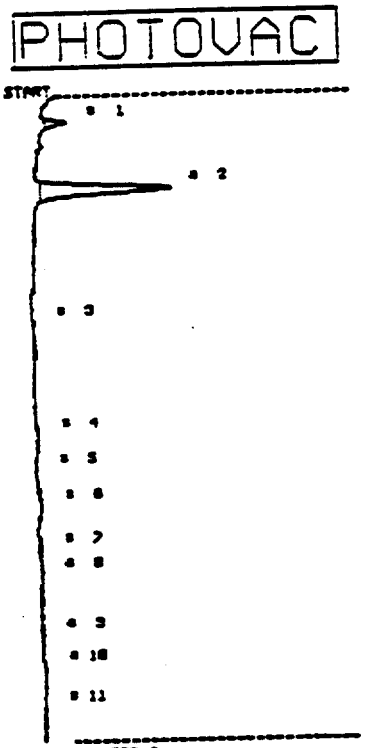


5.86ppmv 1,3-Butadiene

Calibration Gas Standard

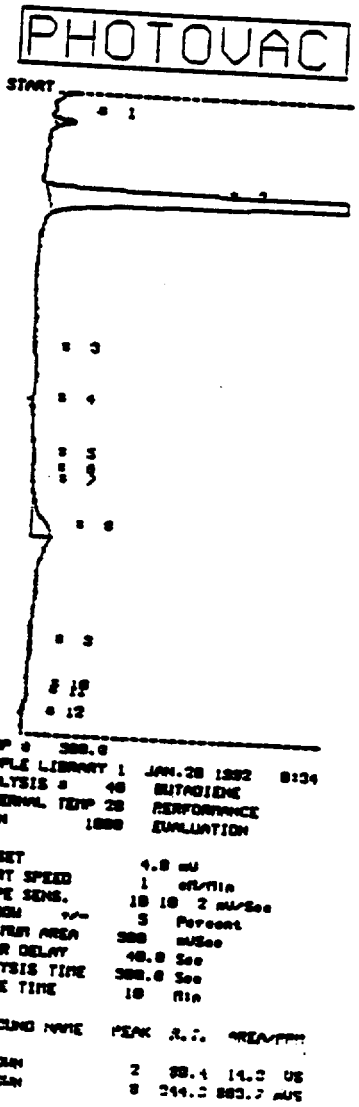


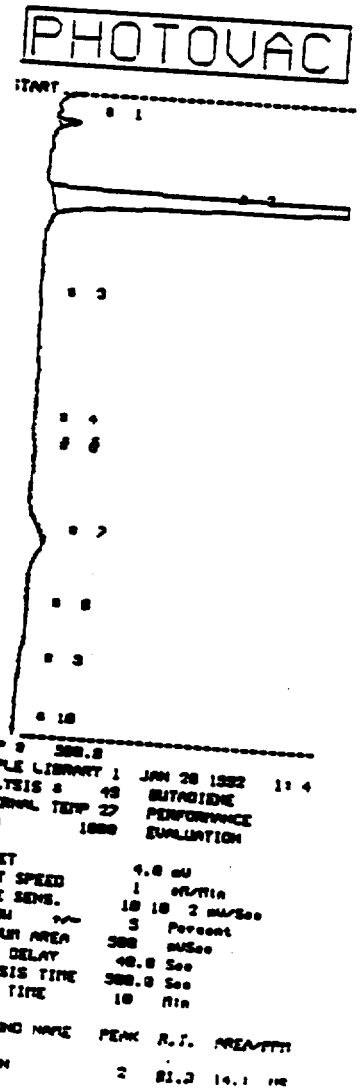




31.7ppmv 1,3-Butadiene

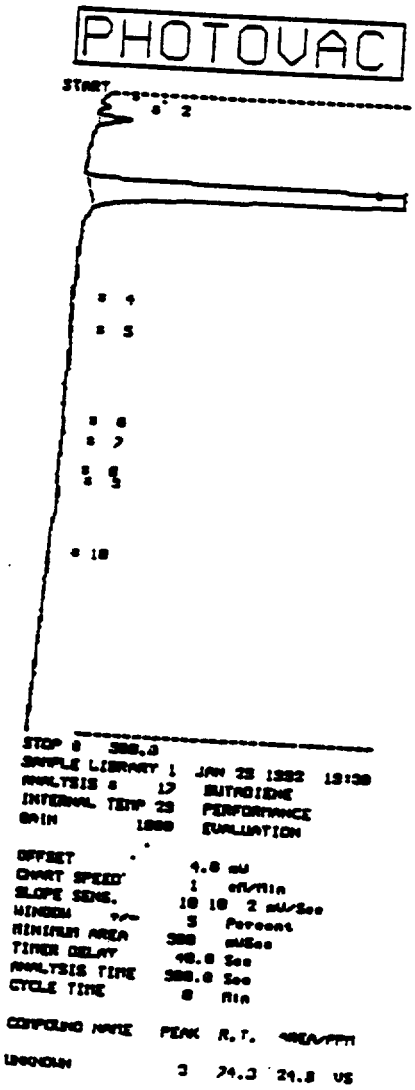
Calibration Gas Standard

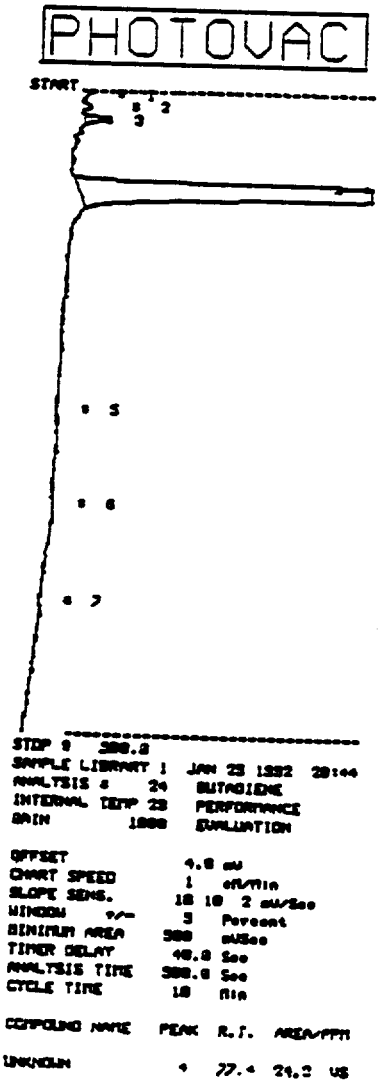


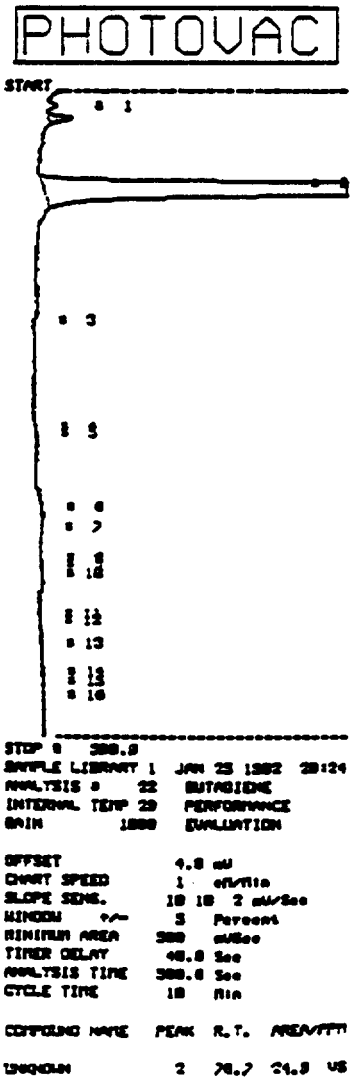


57.7ppmv 1,3-Butadiene

Calibration Gas Standard







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 Sorensen APPROVED BY: Hal S. Sirinides
M.SIRINIDES/T.NEEME

METHOD 10A 410A RUN # 1

COMPANY: BECHTEL
UNIT: K-70
DATE: 2-6-92
REPORT: 10-8498
TECH: JH
PUMP #: GAST
METER BOX#: 1C01
METER coeff: .985710
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: .000 cfm
VACUUM: 2 "Hg

AMBIENT TEMP, °F: 54
Pbar: 28.66
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8
AVG. CALIB. NOZZLE DIAM("): ~~0~~
PROBE LINER MATERIAL: QUARTZ
FILTER #:
DUCT DIAM ("): 11.75

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~~ METER TEMP Inlet °F ~~Probe~~	Outlet ~~Box~~	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER °F
0	2:30	<2			.02	0	265.0			54.6	54.4	
10	2:40	<2			.02	0	265.21			54.2	54.7	
20	2:50	<2			.02	0	265.43			55.1	54.8	
30	3:00	<2			.02	0	265.71			55.3	54.8	
										METER		
AVERAGE							.71			54.7		

METHOD ~~10A~~ 410A RUN #2

COMPANY: BECHTEL
UNIT: K-70
DATE: 2-6-92
REPORT: 10-849B
TECH: JH
PUMP #: GAST
METER BOX#: 1001
METER coeff: .985710
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: 1000 cfm
VACUUM: 2 "Hg

AMBIENT TEMP, °F: 54°
Pbar: 28.66
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM("): /
PROBE LINER MATERIAL: QUARTZ
FILTER #:
DUCT DIAM ("): 11.75

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 Probe	Meter Inlet Outlet Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGR °F
0	3:07	<2	/	/	.02	0	265.81	/		54.2	53.7	/
10	3:17	<2			.02	0	266.01			54.4	54.1	
20	3:27	<2			.02	0	266.22			54.4	54.2	
30	3:37	<2			.02	0	266.54			54.6	53.8	
										Meter		
										54.2		
AVERAGE							.73					

475

METHOD VOA 410A RUN #3

COMPANY: BECHTEL
UNIT: K-70
DATE: 2-6-92
REPORT: 10-8498
TECH: JH
PUMP #: GAST
METER BOX#: 1001
METER coeff: .985710
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: .000 cfm
VACUUM: 2 "Hg

AMBIENT TEMP, °F: 54°
Pbar: 28.66
STATIC PRESSURE("Hg): 0
ASSUMED MOISTURE,%: 10.8

AVG. CALIB. NOZZLE DIAM(\"): —
PROBE LINER MATERIAL: QUARTZ
FILTER #:
DUCT DIAM (\"): 11.75

TRAVERSE PT. NUMBER	TIME (e) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft) 267.57	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	3:45	<2	—	—	.02	0	~~260.14~~	54.8	53.6	—	—	—
10	3:55	<2			.02	0	~~267.77~~	54.8	53.8			
20	4:05	<2			.02	0	~~267.97~~	55.2	53.8			
30	4:15	<2			.02	0	~~268.17~~	55.4	54.2			
							.60		54.5			
AVERAGE												