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COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

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	0.271 **	418	1.4E-03
Ethylbenzene *1,2,3	0.328 **	17.4	6.0E-05
Toluene *2,3	4.62 **	154	5.1E-04
Xylenes, Total *1,2,3	0.328 **	90	2.9E-04
Propylene *1,2,3	22.4 **	547	1.8E-03

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

** Not detected in blank in the condensable and/or non-condensable fraction, used 1/2 detection limit (See Field Blank data)

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-11-92
REPORT : 10-849C

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	.5	96	69	152	5.2E-04

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-11&12-92
REPORT : 10-849C

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	860	376667	377	1.2E+02	2.2E+01	4.0E-04
Acenaphthylene	**5	70333	70.33	2.2E+01	3.5E+00	7.5E-05
Acenaphthene	17	9733	9.73	2.9E+00	4.6E-01	1.0E-05
Fluorene	52	33333	33.33	1.1E+01	1.5E+00	3.6E-05
Phenanthrene	280	35000	35.00	1.1E+01	1.5E+00	3.7E-05
Anthracene	16	9000	9.00	2.8E+00	3.8E-01	9.5E-06
Fluoranthene	57	4867	4.87	1.5E+00	1.8E-01	5.1E-06
Pyrene	58	8900	8.90	2.7E+00	3.2E-01	9.2E-06
Benz (a) anthracene	14	1427	1.43	4.4E-01	4.8E-02	1.5E-06
Chrysene	12	1500	1.50	4.7E-01	5.0E-02	1.6E-06
Benzo(b) fluoranthene	20	1157	1.16	3.6E-01	3.5E-02	1.2E-06
Benzo(k) fluoranthene	**5	487	0.49	1.6E-01	1.5E-02	5.4E-07
Benzo(a)pyrene	**5	563	0.56	1.7E-01	1.7E-02	5.9E-07
Indeno(1,2,3-cd) pyrene	12	827	0.83	2.6E-01	2.3E-02	8.7E-07
Dibenzo(a,h) anthracene	**5	61	0.06	1.9E-02	1.7E-03	6.5E-08
Benzo(g,h,i) perylene	25	953	0.95	2.9E-01	2.6E-02	1.0E-06
					3.0E+01	**5.8E-04**

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

Petro Chem Environmental Services, Inc.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

CARB METHOD 430 RESULTS
FORMALDEHYDE, ACETALDEHYDE, & ACROLEIN

		STACK SAMPLE AVERAGE		
COMPOUND	Field Blank Total ug	Total ug	ug/CM	lbs/hr
Formaldehyde	19.4	23	468	1.6E-03
Acetaldehyde	8.1	4.3	91	3.1E-04
Acrolein	41.5	41.7	861	2.9E-03

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-27.

INTRODUCTION
(con't)

On February 11 and 12, 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-27. Concentrations (ug/CM) and emissions (lbs/hr) of various organic compounds from the exhaust of the test units were determined using the following methods.

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

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

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

TABLE 1:
AB2588 TEST SCHEDULE

RUN #-TEST DESCRIPTION	DATE	SAMPLE TIME FROM/TO	TEST UNIT #	SOURCE OWNER	CARB METHOD
1-PAH	2-11-92	1014-1416	K-27	BECHTEL	429
2-PAH	2-11-92	1530-1835	K-27	BECHTEL	429
1-1,3-Butadiene	2-11-92	1215	K-27	BECHTEL	422.102
2-1,3-Butadiene	2-11-92	1225	K-27	BECHTEL	422.102
3-1,3-Butadiene	2-11-92	1237	K-27	BECHTEL	422.102
1-B,T,X,E, & PROPYLENE	2-11-92	1525-1545	K-27	BECHTEL	410A
2-B,T,X,E, & PROPYLENE	2-11-92	1555-1615	K-27	BECHTEL	410A
3-B,T,X,E, & PROPYLENE	2-11-92	1430-1650	K-27	BECHTEL	410A
3-PAH	2-12-92	1000-1320	K-27	BECHTEL	429
1-Form, Acet, Acro	2-12-92	940-1120	K-27	BECHTEL	430
2-Form, Acet, Acro	2-12-92	1136-1316	K-27	BECHTEL	430
3-Form, Acet, Acro	2-12-92	1350-1530	K-27	BECHTEL	430

DISCUSSION

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

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

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

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

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849 C

CARB METHOD 410A

SUMMARY OF RESULTS

LIGHT MOLECULAR WEIGHT HYDROCARBONS, GCMS

	TOTAL ug/CM			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Benzene	492	461	301	418
Ethylbenzene	19.1	21.6	11.5	17.4
Toluene	161	141	161	154
Xylenes, Total	100	111	58.5	90
Propylene	653	563	426	547

	LBS/HR			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Benzene	0.00161	0.00151	0.00099	0.00137
Ethylbenzene	0.00006	0.00007	0.00004	0.00006
Toluene	0.00053	0.00046	0.00053	0.00051
Xylenes, Total	0.00033	0.00036	0.00019	0.00029
Propylene	0.00214	0.00185	0.00140	0.00180

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

METHOD 410A
@ 60° F

RUN #:	1	2	3
TIME :	1540	1601	1625
Vm (dry gas sampled)	0.71	0.77	0.76
Y (meter calib. factor)	0.98517	0.98517	0.98517
P bar (Barometric pressure)	29.24	29.24	29.24
P static (stack pressure, " H2O)	-0.32	-0.32	-0.32
Delta H (differential meter press, " H2O)	0	0	0
Tm (meter temperature, R°)	534	535	534.5
Vm(std),dscf	0.67	0.67	0.71
Vm(std),dscm	0.0188	0.0190	0.0202

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

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	140	490	0.70	1.60	492	0.00161
Ethylbenzene	4	19	** 0.05	0.114	19.1	0.00006
Toluene	39	160	0.60	1.37	161	0.00053
Xylenes, Total	21	100	** 0.05	0.114	100	0.00033
Propylene	340	630	** 10	22.9	653	0.00214

Vm(std), DSCM = 0.0188
DSCFM = 887

RUN #2

Compound	Non-Condensable ppb	Non-Condensable ug/CM	Condensable ug/L *	Condensable ug/CM	TOTAL ug/CM	TOTAL lbs/hr
Benzene	130	460	** 0.25	0.566	461	0.00151
Ethylbenzene	4	21	** 0.25	0.566	21.6	0.00007
Toluene	34	140	** 0.5	1.13	141	0.00046
Xylenes, Total	23	110	** 0.25	0.566	111	0.00036
Propylene	240	450	** 50	113	563	0.00185

Vm(std), DSCM = 0.0190
DSCFM = 887

RUN #3

Compound	Non-Condensable ppb	Non-Condensable ug/CM	Condensable ug/L *	Condensable ug/CM	TOTAL ug/CM	TOTAL lbs/hr
Benzene	86	300	0.60	1.28	301	0.00099
Ethylbenzene	2	11	** 0.25	0.532	11.5	0.00004
Toluene	39	160	** 0.5	1.06	161	0.00053
Xylenes, Total	12	58	** 0.25	0.532	58.5	0.00019
Propylene	170	320	** 50	106	426	0.00140

Vm(std), DSCM = 0.0202
DSCFM = 887

* 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

Petro Chem Environmental Services, Inc.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849 C

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	**	0.05	0.160	**	0.05	0.111	0.271
Ethylbenzene	**	0.05	0.217	**	0.05	0.111	0.328
Toluene	**	0.6	2.4		1.0	2.22	4.62
Xylenes, Total	**	0.05	0.217	**	0.05	0.111	0.328
Propylene	**	0.1	0.172	**	10	22.2	22.4

AVERAGE
Vm(std), DSCM = 0.0193

** 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-0611-5
Project : 10-849 Bechtel

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

REVISED
REPORT OF ANALYTICAL RESULTS

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

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

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

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

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

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CLIENT: Terry Rowles
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Lab Number : I-0588-5
Project : 10-849 Bechtel

Analyzed : 02/13/92
Analyzed by: CR
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
K-27 17R Noncondensable #1	Air	Mark Ready	02/11/92	02/13/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	140.	490.	
Toluene	1.	39.	160.	
Ethylbenzene	1.	4.	19.	
Xylenes	1.	21.	100.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	340.	630	

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
MSD1/1C37E
LRH/ge
IB13M1

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Bakersfield, CA 93308

Lab Number : I-0588-6
Project : 10-849 Bechtel

Analyzed : 02/13/92
Analyzed by: CR
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-27 17R Noncondensable #2	Air	Mark Ready	02/11/92	02/13/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	130.	460.	
Toluene	1.	34.	140.	
Ethylbenzene	1.	4.	21.	
Xylenes	1.	23.	110.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	240.	450	

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
MSD1/1C38E
LRH/ge
IB13M1

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Lab Number : I-0588-7
Project : 10-849 Bechtel

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

Analyzed : 02/13/92
Analyzed by: CR
Method : EPA TO-14

R E V I S E D
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-27 17R Noncondensable #3	Air	Mark Ready	02/11/92	02/13/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	1.	86.	300.	
Toluene	1.	39.	160.	
Ethylbenzene	1.	2.	11.	
Xylenes	1.	12.	58.	
Ethylene Dichloride	1.	ND	ND	
Ethylene Dibromide	1.	ND	ND	
Propylene	2.	170.	320	

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
MSD1/1C39E
LRH/ge
IB13M1

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Lab Number : I-0588-8
Project : 10-849 Bechtel

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

Analyzed : 02/13/92
Analyzed by: CR
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-27 17R Noncondensable Blank	Air	Mark Ready	02/11/92	02/13/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR				
Benzene	0.1	ND	ND	
Toluene	0.1	0.6	2.4	
Ethylbenzene	0.1	ND	ND	
Xylenes	0.1	ND	ND	
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
MSD1/1C36E
LRH/ge
IB13M1

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

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Lab Number : I-0588-1
Project : 10-849 Bechtel

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

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

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-27 17R Condensable #1	Aqueous	Mark Ready	02/11/92	02/13/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.1	0.7	
Ethylbenzene	(100411)	0.1	ND	
Toluene	(108883)	0.2	0.6	
Xylenes, Total		0.1	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			98.	
p-Bromofluorobenzene (% Surrogate Recovery)			104.	
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
MSD2/2R13-14C
MH/bpl/aea/cmo
IB182WVP

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

Mary Havlicek

Mary Havlicek, Ph.D.
President

COAST-TO-COAST ANALYTICAL SERVICES

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

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

Lab Number : I-0588-2
Project : 10-849 Bechtel

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

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

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-27 17R Condensable #2	Aqueous	Mark Ready	02/11/92	02/13/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.5	ND	
Ethylbenzene	(100411)	0.5	ND	
Toluene	(108883)	1.	ND	
Xylenes, Total		0.5	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			101.	
p-Bromofluorobenzene (% Surrogate Recovery)			100.	
Propylene		100.	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
MSD2/2R15C
MH/bpl/aea/cmo
IB182WVP

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

Marie Havlicek, Ph.D.
President

COAST-TO-COAST ANALYTICAL SERVICES

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

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

Lab Number : I-0588-3
Project : 10-849 Bechtel

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

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

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-27 17R Condensable #3	Aqueous	Mark Ready	02/11/92	02/13/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.5	0.6	
Ethylbenzene	(100411)	0.5	ND	
Toluene	(108883)	1.	ND	
Xylenes, Total		0.5	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			96.	
p-Bromofluorobenzene (% Surrogate Recovery)			102.	
Propylene		100.	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
MSD2/2R16C
MH/bpl/aea/cmo
IB182WVP

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

Lab Number : I-0588-4
Project : 10-849 Bechtel

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

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

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
K-27 17R Condensable Blank	Aqueous	Mark Ready	02/11/92	02/13/92

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
PRIORITY POLLUTANT VOLATILE ORGANICS				1
Benzene	(71432)	0.5	ND	
Ethylbenzene	(100411)	0.5	ND	
Toluene	(108883)	1.	ND	
Xylenes, Total		0.5	ND	
1,2-Dichloroethane-d4 (% Surrogate Recovery)			100.	
p-Bromofluorobenzene (% Surrogate Recovery)			97.	
Propylene		100.	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
MSD2/2R17C
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

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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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FAX (805) 543-2685

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

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

QC Batch ID: IB14M1

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

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

INSTRUMENT BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
INSTRUMENT BLANK	Air			

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

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

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

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

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-11-92
REPORT : 10-849C

CARB METHOD 422.102
1,3-BUTADIENE RESULTS

TEST	#1	#2	#3	AVERAGE
TIME	1215	1225	1237	
ppb	72	67	67	69
ug/CM	159	148	148	152
lbs/hr	0.00055	0.00051	0.00051	0.00052

DSCFM = 887 (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-27
DATE : 2-11-92
REPORT : 10-849 C

ANALYSIS REPORT

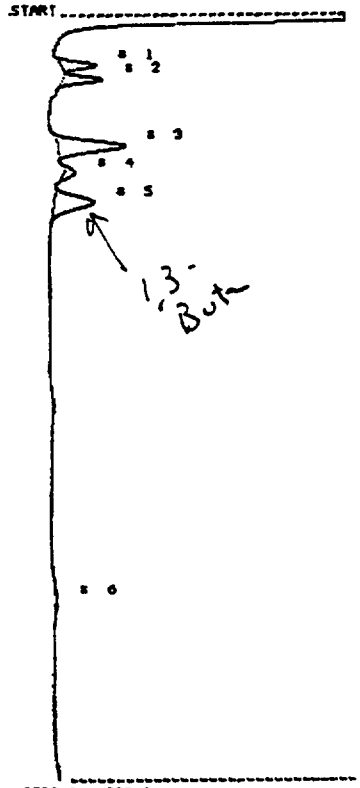
METHOD 422.102
1, 3-BUTADIENE

RESULTS

	RUN # 1	RUN # 2	RUN # 3	AVERAGE
TIME	12:15	12:25	12:37	
AREA COUNTS (mVS)	1500	1400	1400	1433
ppbv 1, 3-BUTADIENE	72	67	67	68

Petro Chem Environmental Services, Inc.

PHOTOVAC

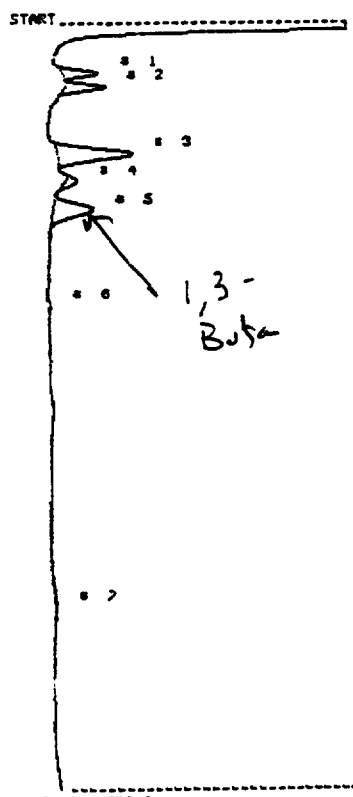


STOP @ 600.0
SAMPLE LIBRARY 1 FEB 11 1992 12:37
ANALYSIS # 17 BECHTEL
INTERNAL TEMP 29 UNIT K-27
GAIN 50 SAMPLE RUN

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	48.4	684.7 µVS
UNKNOWN	2	51.3	787.5 µVS
UNKNOWN	3	184.1	1.3 VS
UNKNOWN	4	125.7	291.2 µVS
UNKNOWN	5	148.3	1.4 VS

RUN 3

PHOTOVAC

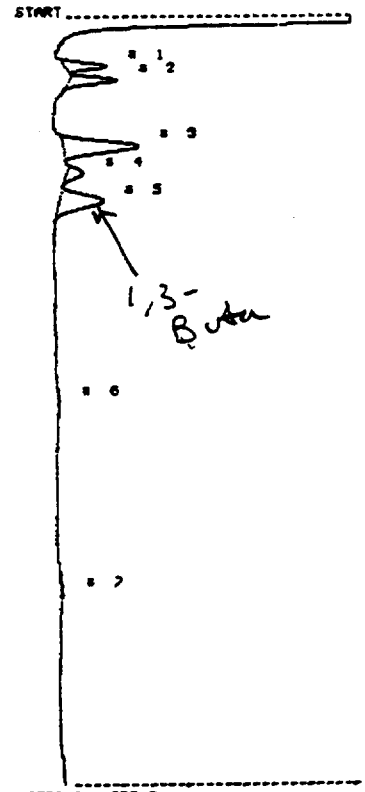


STOP @ 600.0
SAMPLE LIBRARY 1 FEB 11 1992 12:25
ANALYSIS # 16 BECHTEL
INTERNAL TEMP 29 UNIT K-27
GAIN 50 SAMPLE RUN

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	35.3	631.7 µVS
UNKNOWN	2	50.3	751.9 µVS
UNKNOWN	3	193.3	2.1 VS
UNKNOWN	4	124.3	296.0 µVS
UNKNOWN	5	147.5	1.4 VS

RUN 2

PHOTOVAC



STOP @ 600.0
SAMPLE LIBRARY 1 FEB 11 1992 12:14
ANALYSIS # 15 BECHTEL
INTERNAL TEMP 28 UNIT K-27
GAIN 50 SAMPLE RUN

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	35.6	718.2 µVS
UNKNOWN	2	50.5	961.3 µVS
UNKNOWN	3	182.5	2.1 VS
UNKNOWN	4	124.1	418.7 µVS
UNKNOWN	5	145.7	1.5 VS

RUN 1

COMPANY : BECHTEL PETROLEUM
UNIT : K-27
DATE : 2-11-92
REPORT : 10-849C

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	2300	-4.17%	+/- 30%

ADDITIONAL CALIBRATION STANDARD

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

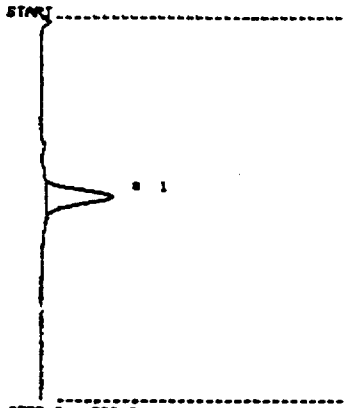
POST ANALYSIS CALIBRATION STANDARD

CONCENTRATION (ppbv)	RESPONSE (mVS)	DIFFERENCE FROM INITIAL	ALLOWABLE DIFFERENCE
114	2300	-4.17%	+/- 30%

BIAS CHECK CALIBRATION

ACTUAL CONCENTRATION (ppbv)	MEASURED CONCENTRATION (ppbv)	RESPONSE (mVS)	DIFFERENCE FROM INITIAL
114	110	2300	-4.17%

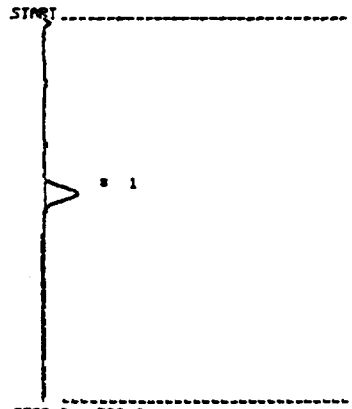
PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 11 1992 11:51
ANALYSIS # 13 CAL GAS
INTERNAL TEMP 28 BUTADIENE
GAIN 50 114 PPB

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	142.3	2.4 US

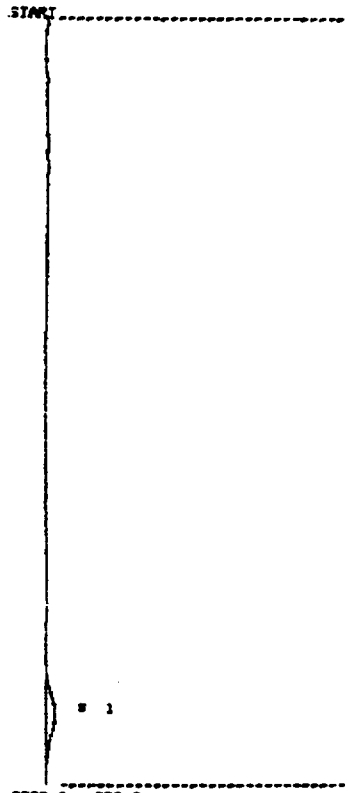
PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 11 1992 11:33
ANALYSIS # 10 CAL GAS
INTERNAL TEMP 27 BUTADIENE
GAIN 50 57.7 PPB

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	139.5	1.1 US

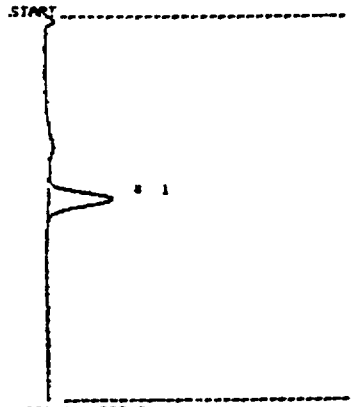
PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 11 1992 10:50
ANALYSIS # 9 SYSTEM BLANK
INTERNAL TEMP 25 ZERO AIR
GAIN 50

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	550.3	300.0 pUS

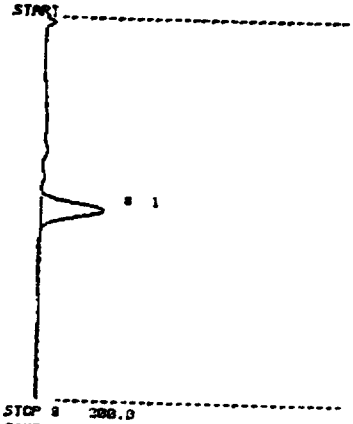
PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 11 1992 11:59
ANALYSIS # 14 BIAS CHECK
INTERNAL TEMP 28 BUTADIENE
GAIN 50 114 PPB

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	144.7	2.[illegible] US

PHOTOVAC



STOP @ 300.0
SAMPLE LIBRARY 1 FEB 11 1992 12:56
ANALYSIS # 15 POST CAL CHK
INTERNAL TEMP 29 114 PPB
GAIN 50 BUTADIENE

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	[illegible]	[illegible] 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)

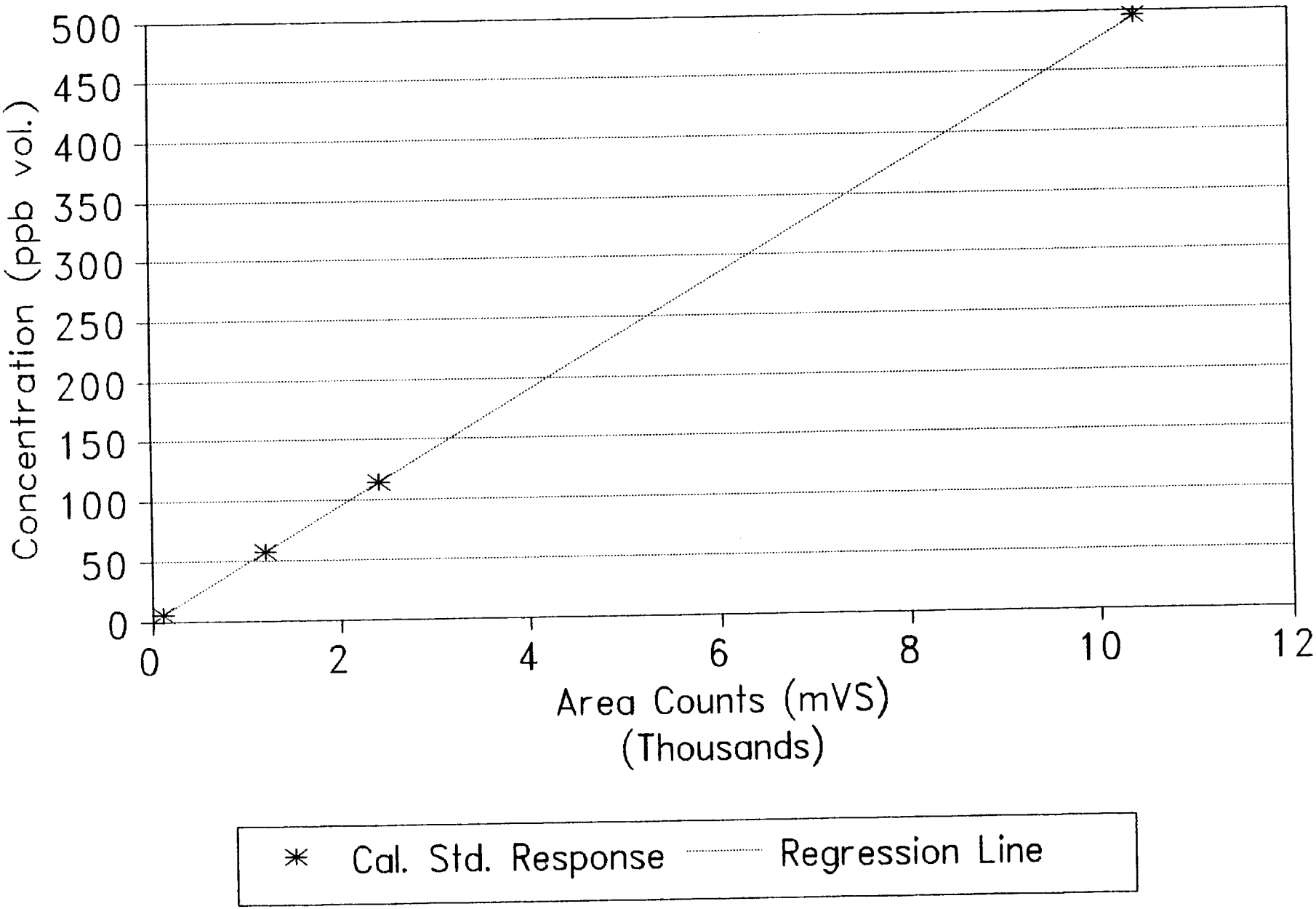
Regression Output:

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

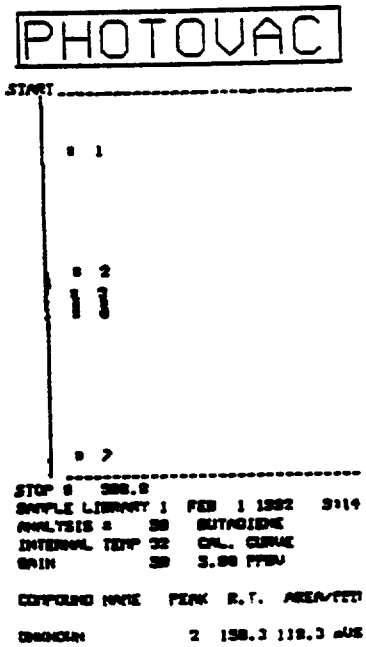
1, 3-Butadiene (gain=50)

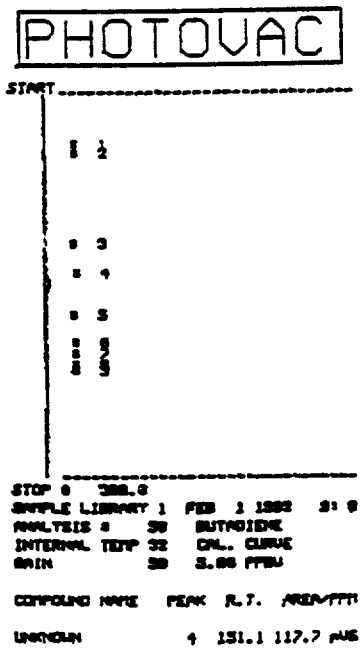


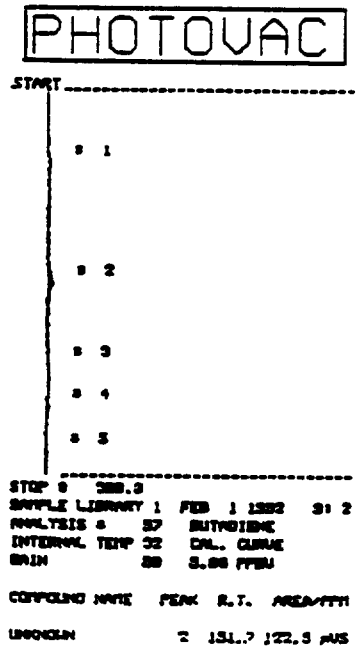
5.86ppmv 1.3-Butadiene

Calibration Gas Standard

Instrument Gain = 50



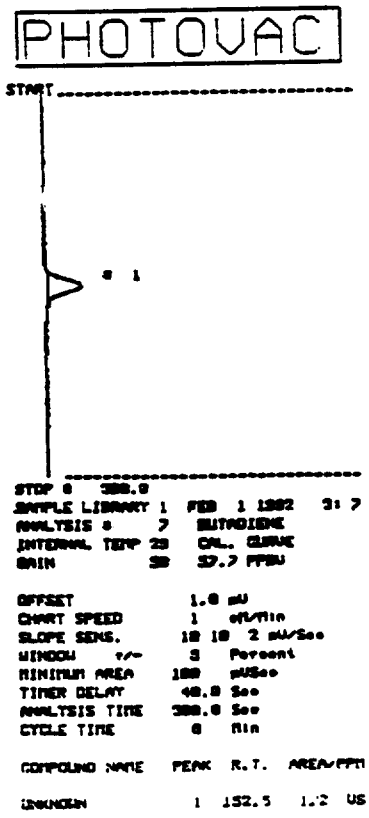


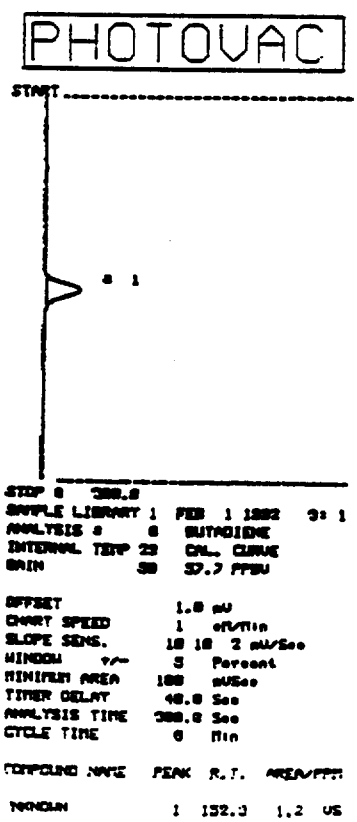


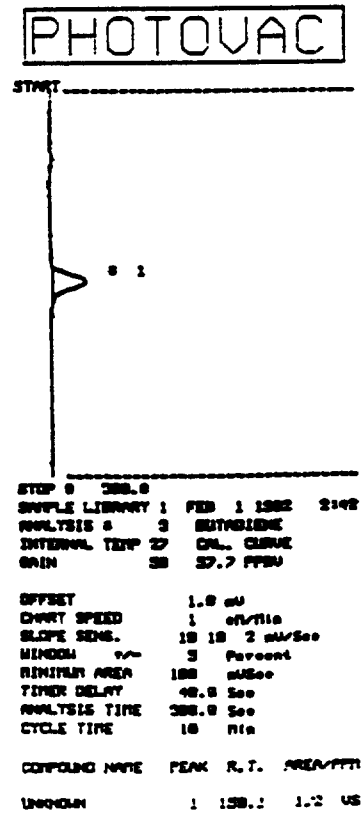
57.7ppmv 1,3-Butadiene

Calibration Gas Standard

Instrument Gain = 50





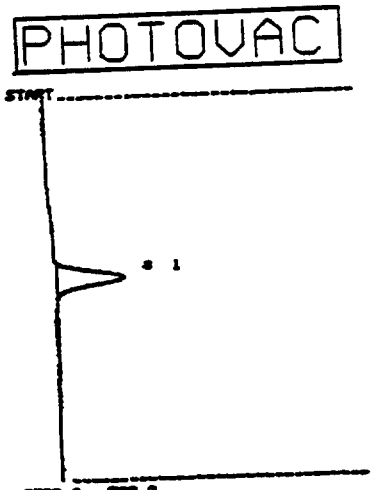


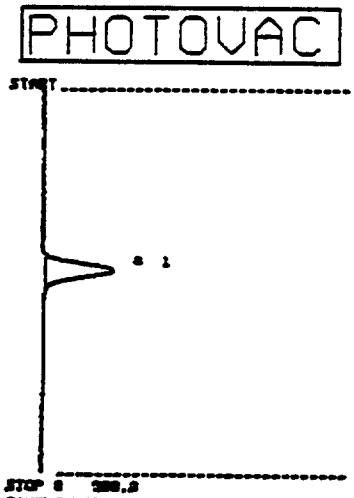
Petro Chem Environmental Services, Inc.

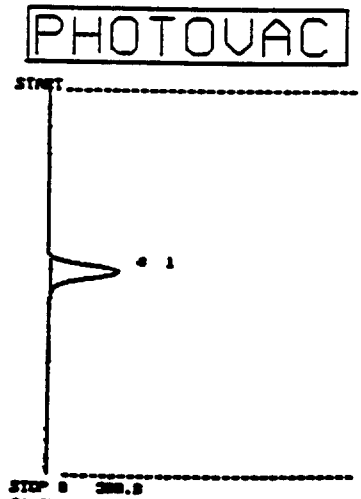
114ppmv 1,3-Butadiene

Calibration Gas Standard

Instrument Gain = 50



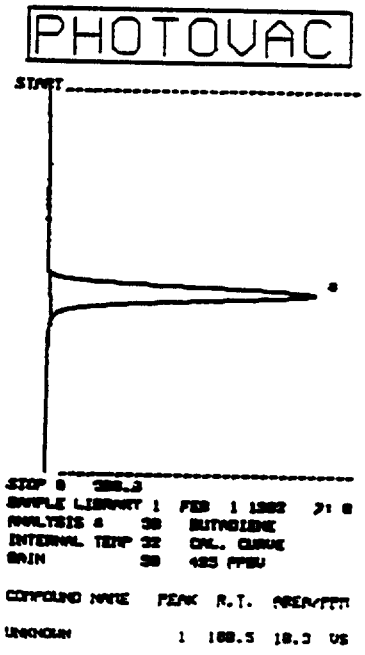


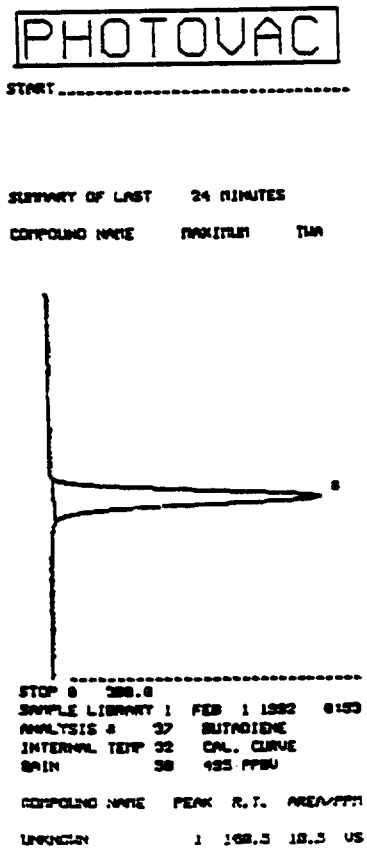


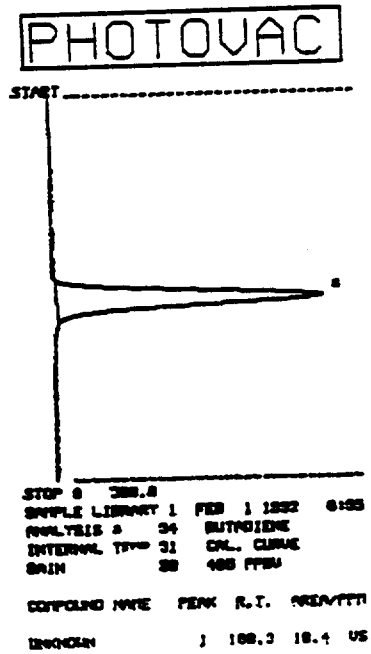
495ppmv 1,3-Butadiene

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: Tom Swanson APPROVED BY: Mat Sirinides
M.SIRINIDES/T.NEEME

PLUMSTEADVILLE, PENNSYLVANIA / TROY, MICHIGAN / HOUSTON, TEXAS / DURHAM, NORTH CAROLINA
SOUTH PLAINFIELD, NEW JERSEY / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO
BATON ROUGE, LOUISIANA

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: Mal Sirinides
M.SIRINIDES/T.NEEME

PLUMSTEADVILLE, PENNSYLVANIA / TROY, MICHIGAN / HOUSTON, TEXAS / DURHAM, NORTH CAROLINA
SOUTH PLAINFIELD, NEW JERSEY / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO
BATON ROUGE, LOUISIANA

Petro Chem Environmental Services, Inc.

Scott Specialty Gases, Inc.

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

CERTIFICATE OF ANALYSIS

PETRO CHEM ENV SERVICES

3207 ANTONINO AVENUE

BAKERSFIELD CA 93308

PROJECT #: 01-34565
PO#: 1673
ITEM #: 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: _____ 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-27 17R
DATE : 2-11&12-92
REPORT : 10-849C

SUMMARY OF RESULTS

METHOD 429

(AVERAGE OF 3 RUNS)

Emittent	Field Blank ng	TOTAL ng	TOTAL ug	ug/DSCM	ppb	lb/hr
Naphthalene	860	376667	377	1.2E+02	2.2E+01	4.0E-04
Acenaphthylene	**5	70333	70.33	2.2E+01	3.5E+00	7.5E-05
Acenaphthene	17	9733	9.73	2.9E+00	4.6E-01	1.0E-05
Fluorene	52	33333	33.33	1.1E+01	1.5E+00	3.6E-05
Phenanthrene	280	35000	35.00	1.1E+01	1.5E+00	3.7E-05
Anthracene	16	9000	9.00	2.8E+00	3.8E-01	9.5E-06
Fluoranthene	57	4867	4.87	1.5E+00	1.8E-01	5.1E-06
Pyrene	58	8900	8.90	2.7E+00	3.2E-01	9.2E-06
Benz (a) anthracene	14	1427	1.43	4.4E-01	4.8E-02	1.5E-06
Chrysene	12	1500	1.50	4.7E-01	5.0E-02	1.6E-06
Benzo(b) fluoranthene	20	1157	1.16	3.6E-01	3.5E-02	1.2E-06
Benzo(k) fluoranthene	**5	487	0.49	1.6E-01	1.5E-02	5.4E-07
Benzo(a)pyrene	**5	563	0.56	1.7E-01	1.7E-02	5.9E-07
Indeno(1,2,3-cd) pyrene	12	827	0.83	2.6E-01	2.3E-02	8.7E-07
Dibenzo(a,h) anthracene	**5	61	0.06	1.9E-02	1.7E-03	6.5E-08
Benzo(g,h,i) perylene	25	953	0.95	2.9E-01	2.6E-02	1.0E-06

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

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-11&12-92
REPORT : 10-849C

METHOD 429
@ 60°F

	DATE :	2-11	2-11	2-12
	RUN #:	1	2	3
	TIME :	1014	1530	1000
Vm (dry gas sampled)		136.23	137.82	81.53
Y (meter calib. factor)		0.98517	0.98517	0.98517
P bar (Barometric pressure)		29.24	29.24	29.07
P static (stack pressure, " H2O)		-0.37	-0.37	-0.32
Delta H (differential meter press, " H2O)		1.11	1.13	0.4
Tm (meter temperature, R°)		528	526	518
Vol H2O mls		548.8	626.8	382.7
Vm(std),dscf		129.53	131.55	78.42
Bws-H2O vapor		0.1645	0.1812	0.1848
MF-moisture factor		0.835533	0.818752	0.815173
% CO2		11.6	11.65	11.63
% O2		0.5	0.5	0.5
% N2		87.9	87.85	87.87
Md-MW stk gas,dry		29.88	29.88	29.88
Ms-MW stk gas,wet		27.92	27.73	27.68
Cp-pitot tube		0.84	0.84	0.84
Avg sq rt ^p , Initial Traverse		0.74	0.74	0.68
T stack, R°, Initial Traverse		1269	1249	1251
Stack area,ft2		0.690	0.690	0.690
Vs-fps		66.49	66.19	60.70
Qstd-dscfm		921	912	827
Area noz,ft2		5.55E-04	5.55E-04	3.41E-04
Sample time		180	180	180
% Isokinetic		97.2	99.6	106.7

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-10/12-92
REPORT : 10-849C

METHOD 429

RUN #1

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	460000	460	3.6E+00	1.3E+02	2.4E+01	4.5E-04
Acenaphthylene	77000	77	5.9E-01	2.1E+01	3.4E+00	7.5E-05
Acenaphthene	18000	18	1.4E-01	4.9E+00	7.8E-01	1.7E-05
Fluorene	27000	27	2.1E-01	7.4E+00	1.1E+00	2.6E-05
Phenanthrene	47000	47	3.6E-01	1.3E+01	1.8E+00	4.6E-05
Anthracene	12000	12	9.3E-02	3.3E+00	4.5E-01	1.2E-05
Fluoranthene	5100	5.1	3.9E-02	1.4E+00	1.7E-01	4.9E-06
Pyrene	8200	8.2	6.3E-02	2.2E+00	2.7E-01	7.9E-06
Benz (a) anthracene	1500	1.5	1.2E-02	4.1E-01	4.4E-02	1.5E-06
Chrysene	1300	1.3	1.0E-02	3.5E-01	3.8E-02	1.3E-06
Benzo(b) fluoranthene	1100	1.1	8.5E-03	3.0E-01	2.9E-02	1.1E-06
Benzo(k) fluoranthene	420	0.42	3.2E-03	1.1E-01	1.1E-02	4.1E-07
Benzo(a)pyrene	550	0.55	4.2E-03	1.5E-01	1.5E-02	5.3E-07
Indeno(1,2,3-cd) pyrene	850	0.85	6.6E-03	2.3E-01	2.0E-02	8.2E-07
Dibenzo(a,h) anthracene	62	0.062	4.8E-04	1.7E-02	1.5E-03	6.0E-08
Benzo(g,h,i) perylene	960	0.96	7.4E-03	2.6E-01	2.3E-02	9.3E-07

Vm(std), dscf = 129.53
Vm(std), dscm = 3.67
DSCFM = 921

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-11-92
REPORT : 10-849C

METHOD 429
RUN #2

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	450000	450	3.4E+00	1.2E+02	2.3E+01	4.3E-04
Acenaphthylene	86000	86	6.5E-01	2.3E+01	3.7E+00	8.1E-05
Acenaphthene	7000	7.0	5.3E-02	1.9E+00	3.0E-01	6.6E-06
Fluorene	48000	48	3.6E-01	1.3E+01	1.9E+00	4.5E-05
Phenanthrene	39000	39	3.0E-01	1.0E+01	1.4E+00	3.7E-05
Anthracene	9400	9.4	7.1E-02	2.5E+00	3.5E-01	8.9E-06
Fluoranthene	6400	6.4	4.9E-02	1.7E+00	2.1E-01	6.0E-06
Pyrene	14000	14	1.1E-01	3.8E+00	4.5E-01	1.3E-05
Benz (a) anthracene	1800	1.8	1.4E-02	4.8E-01	5.2E-02	1.7E-06
Chrysene	2100	2.1	1.6E-02	5.6E-01	6.0E-02	2.0E-06
Benzo(b) fluoranthene	1600	1.6	1.2E-02	4.3E-01	4.2E-02	1.5E-06
Benzo(k) fluoranthene	600	0.6	4.6E-03	1.6E-01	1.6E-02	5.7E-07
Benzo(a)pyrene	800	0.8	6.1E-03	2.1E-01	2.1E-02	7.6E-07
Indeno(1,2,3-cd) pyrene	1100	1.1	8.4E-03	3.0E-01	2.6E-02	1.0E-06
Dibenzo(a,h) anthracene	77	0.077	5.9E-04	2.1E-02	1.8E-03	7.3E-08
Benzo(g,h,i) perylene	1300	1.3	9.9E-03	3.5E-01	3.1E-02	1.2E-06

Vm(std), dscf = 131.55
Vm(std), dscm = 3.73
DSCFM = 912

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

METHOD 429
RUN #3

Emittent	TOTAL ng	TOTAL ug	ug/DSCF	ug/DSCM	ppb	lb/hr
Naphthalene	220000	220	2.8E+00	9.9E+01	1.9E+01	3.2E-04
Acenaphthylene	48000	48	6.1E-01	2.2E+01	3.5E+00	6.9E-05
Acenaphthene	4200	4.2	5.4E-02	1.9E+00	3.0E-01	6.0E-06
Fluorene	25000	25	3.2E-01	1.1E+01	1.7E+00	3.6E-05
Phenanthrene	19000	19	2.4E-01	8.6E+00	1.2E+00	2.7E-05
Anthracene	5600	5.6	7.1E-02	2.5E+00	3.5E-01	8.0E-06
Fluoranthene	3100	3.1	4.0E-02	1.4E+00	1.7E-01	4.5E-06
Pyrene	4500	4.5	5.7E-02	2.0E+00	2.4E-01	6.5E-06
Benz (a) anthracene	980	0.98	1.2E-02	4.4E-01	4.7E-02	1.4E-06
Chrysene	1100	1.1	1.4E-02	5.0E-01	5.3E-02	1.6E-06
Benzo(b) fluoranthene	770	0.77	9.8E-03	3.5E-01	3.4E-02	1.1E-06
Benzo(k) fluoranthene	440	0.44	5.6E-03	2.0E-01	1.9E-02	6.3E-07
Benzo(a)pyrene	340	0.34	4.3E-03	1.5E-01	1.5E-02	4.9E-07
Indeno(1,2,3-cd) pyrene	530	0.53	6.8E-03	2.4E-01	2.1E-02	7.6E-07
Dibenzo(a,h) anthracene	43	0.043	5.5E-04	1.9E-02	1.7E-03	6.2E-08
Benzo(g,h,i) perylene	600	0.60	7.7E-03	2.7E-01	2.4E-02	8.6E-07

* Not detected

Vm(std), dscf = 78.42
Vm(std), dscm = 2.22
DSCFM = 827

ALTA

February 26, 1992

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

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

Dear Mr. Brennan,

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

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

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

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

Sincerely,

Robert S. Mitzel

Robert S. Mitzel
Director of Operations

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

ALTA

SECTION II.

ALTA

Section I. Sample Inventory

Date Received: 17-Feb-92

K-27 & K-49

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

ALTA

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

Sample ID: C-1 thru C-6 Blank
Lab ID: 11028-001-PAH
Matrix: MM5

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

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

Compound	Conc.	R.L.	Qualifier
Naphthalene	860		B
Acenaphthylene	ND	10	
Acenaphthene	17		
Fluorene	52		
Phenanthrene	280		
Anthracene	16		
Fluoranthene	57		
Pyrene	58		
Chyrsene	12		
Benz(a)anthracene	14		
Benzo(b)fluoranthene	20		
Benzo(k)fluoranthene	ND	10	
Benzo(a)pyrene	ND	10	
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	12		
Dibenz(a,h)anthracene	ND	10	
Benzo(g,h,i)perylene	25		

K-27 Field Blank

Analyst: [illegible]

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: C-1 thru C-6 Blank
Lab ID: 11028-001-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	72	
d_8-Acenaphthylene	77	
d_{10}-Acenaphthene	80	
d_{10}-Fluorene	79	
d_{10}-Phenanthrene	69	
d_{10}-Anthracene	84	
d_{10}-Fluoranthene	64	
d_{10}-Pyrene	68	
d_{12}-Chrysene	74	
d_{12}-Benz(a)anthracene	80	
d_{12}-Benzo(b)fluoranthene	68	
d_{12}-Benzo(k)fluoranthene	78	
d_{12}-Benzo(a)pyrene	67	
d_{12}-Indeno(1,2,3-c,d)pyrene	57	
d_{12}-Benzo(g,h,i)perylene	60	
d_{14}-Dibenz(a,h)anthracene	58	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	110	
d_{14}-Terphenyl	125	

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: C-7 thru C-13 #1
Lab ID: 11028-002-PAH
Matrix: MM5

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

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

Compound	Conc.	R.L.	Qualifier
Naphthalene	460000		*,B
Acenaphthylene	77000		*
Acenaphthene	18000		
Fluorene	27000		*
Phenanthrene	47000		*
Anthracene	12000		*
Fluoranthene	5100		*
Pyrene	8200		*
Chyrsene	1300		
Benz(a)anthracene	1500		
Benzo(b)fluoranthene	1100		*
Benzo(k)fluoranthene	420		*
Benzo(a)pyrene	550		
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	850		
Dibenz(a,h)anthracene	62		
Benzo(g,h,i)perylene	960		

K-27 RUN #1

Analyst: [illegible]

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: C-7 thru C-13 #1
Lab ID: 11028-002-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	49	H
d_8-Acenaphthylene	94	
d_{10}-Acenaphthene	75	
d_{10}-Fluorene	105	
d_{10}-Phenanthrene	126	
d_{10}-Anthracene	117	
d_{10}-Fluoranthene	83	
d_{10}-Pyrene	77	
d_{12}-Chrysene	47	H
d_{12}-Benz(a)anthracene	51	
d_{12}-Benzo(b)fluoranthene	88	
d_{12}-Benzo(k)fluoranthene	56	
d_{12}-Benzo(a)pyrene	45	H
d_{12}-Indeno(1,2,3-c,d)pyrene	49	H
d_{12}-Benzo(g,h,i)perylene	52	
d_{14}-Dibenz(a,h)anthracene	52	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	135	
d_{14}-Terphenyl	78	

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: C-14 to C-20 #2
Lab ID: 11028-003-PAH
Matrix: MM5

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

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

Compound	Conc.	R.L.	Qualifier
Naphthalene	450000		*,B
Acenaphthylene	86000		*
Acenaphthene	7000		*
Fluorene	48000		*
Phenanthrene	39000		*
Anthracene	9400		*
Fluoranthene	6400		*
Pyrene	14000		*
Chyrsene	2100		
Benz(a)anthracene	1800		
Benzo(b)fluoranthene	1600		
Benzo(k)fluoranthene	600		
Benzo(a)pyrene	800		
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	1100		
Dibenz(a,h)anthracene	77		
Benzo(g,h,i)perylene	1300		

K-27 RUN #2

Analyst: [signature]

Reviewer: [signature]

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: C-14 to C-20 #2
Lab ID: 11028-003-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	52	
d_8-Acenaphthylene	106	
d_{10}-Acenaphthene	85	
d_{10}-Fluorene	98	
d_{10}-Phenanthrene	128	
d_{10}-Anthracene	100	
d_{10}-Fluoranthene	105	
d_{10}-Pyrene	42	H
d_{12}-Chrysene	49	H
d_{12}-Benz(a)anthracene	52	
d_{12}-Benzo(b)fluoranthene	40	H
d_{12}-Benzo(k)fluoranthene	46	H
d_{12}-Benzo(a)pyrene	67	
d_{12}-Indeno(1,2,3-c,d)pyrene	86	
d_{12}-Benzo(g,h,i)perylene	90	
d_{14}-Dibenz(a,h)anthracene	99	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	94	
d_{14}-Terphenyl	107	

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: C-21 to C-27 #3
Lab ID: 11028-004-PAH
Matrix: MM5

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

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

Compound	Conc.	R.L.	Qualifier
Naphthalene	220000		*,B
Acenaphthylene	48000		*
Acenaphthene	4200		
Fluorene	25000		*
Phenanthrene	19000		*
Anthracene	5600		*
Fluoranthene	3100		*
Pyrene	4500		*
Chyrsene	1100		
Benz(a)anthracene	980		
Benzo(b)fluoranthene	770		
Benzo(k)fluoranthene	440		
Benzo(a)pyrene	340		
Benzo(e)pyrene	NA		
Indeno(1,2,3-c,d)pyrene	530		
Dibenz(a,h)anthracene	43		
Benzo(g,h,i)perylene	600		

K-27 RUN #3

Analyst: [illegible]

Reviewer: [illegible]

Petro Chem Environmental Services, Inc.

ALTA

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

Sample ID: C-21 to C-27 #3
Lab ID: 11028-004-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	99	
d_8-Acenaphthylene	91	
d_{10}-Acenaphthene	53	
d_{10}-Fluorene	126	
d_{10}-Phenanthrene	33	H
d_{10}-Anthracene	135	
d_{10}-Fluoranthene	102	
d_{10}-Pyrene	101	
d_{12}-Chrysene	41	H
d_{12}-Benz(a)anthracene	44	H
d_{12}-Benzo(b)fluoranthene	38	H
d_{12}-Benzo(k)fluoranthene	37	H
d_{12}-Benzo(a)pyrene	70	
d_{12}-Indeno(1,2,3-c,d)pyrene	111	
d_{12}-Benzo(g,h,i)perylene	107	
d_{14}-Dibenz(a,h)anthracene	126	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	78	
d_{14}-Terphenyl	120	

Date Analyzed: 2/21/92

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

Petro Chem Environmental Services, Inc.

ALTA

APPENDIX

ALTA

DATA QUALIFIERS & ABBREVIATIONS

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

ALTA

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

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

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

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

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

K-27 & K-49

Lab QC

Analyst: JMD

Reviewer: BG

Petro Chem Environmental Services, Inc.

ALTA

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

METHOD BLANK
Lab ID: 11028-MB-PAH

Isotopic Recovery Results

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

Lab QC

Pre-spike Recovery Standard:	
d_{12}-Benzo(e)pyrene	NA
d_{14}-Terphenyl	NA

Date Analyzed: 2/21/92

Analyst: JMS

Reviewer: bm

Petro Chem Environmental Services, Inc.

ALTA

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

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

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

ICAL ID: IPAH
QC Lot: LC0218M
Units: NA

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

Lab QC

Analyst: SMP

Reviewer: BSM

Petro Chem Environmental Services, Inc.

ALTA

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

LCS RESULTS
Lab ID: 11028-LCS1/LCS2

Isotopic Recovery Results

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

Lab QC

Date Analyzed: 2/22/92

Analyst: GMB

Reviewer: BAJ

Petro Chem Environmental Services, Inc.

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849 C

CARB METHOD 430
SUMMARY OF RESULTS

	TOTAL ug/CM			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Formaldehyde	462	447	496	468
Acetaldehyde	91	102	79	91
Acrolein	943	1023	617	861

	LBS/HR			
COMPOUND	RUN #1	RUN #2	RUN #3	AVERAGE
Formaldehyde	1.6E-03	1.5E-03	1.7E-03	1.6E-03
Acetaldehyde	3.1E-04	3.5E-04	2.7E-04	3.1E-04
Acrolein	3.2E-03	3.5E-03	2.1E-03	2.9E-03

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

METHOD 430
@ 60° F

RUN #:	1	2	3
TIME :	940	1136	1350
Vm (dry gas sampled)	1.75	1.75	1.75
Y (meter calib. factor)	1.00	1.00	1.00
P bar (Barometric pressure)	29.07	29.07	29.07
P static (stack pressure, " H2O)	-0.32	-0.32	-0.32
Delta H (differential meter press, " H2O)	0	0	0
Tm (meter temperature, R°)	514	520.7	513.5
Vm(std),dscf	1.72	1.70	1.72
Vm(std),dscm	0.0487	0.0481	0.0488

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

Method 430

Formaldehyde Results

Test Run	#1	#2	#3
ug/l	1500	860	1100
Sample vol, l	0.015	0.025	0.022
Total ug	23	22	24
Vm std DSCF	1.72	1.70	1.72
Vm std DSCM	0.0487	0.0481	0.0488
Volume Flow, DSCFM	887	887	887

Concentrations **AVERAGE**

ug/dscf	13.1	12.6	14.1	13.3
ug/dscm	462	447	496	468
ppb	376	364	403	381

Emissions

lb/hr	1.6E-03	1.5E-03	1.7E-03	1.6E-03

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

Method 430

Acetaldehyde Results

Test Run	#1	#2	#3
ug/l	290	200	180
Sample vol, l	0.0153	0.0246	0.0215
Total ug	4	5	4
Vm std DSCF	1.72	1.70	1.72
Vm std DSCM	0.0487	0.0481	0.0488
Volume Flow, DSCFM	887	887	887

Concentrations **AVERAGE**

ug/dscf	2.58	2.89	2.25	2.57
ug/dscm	91	102	79	91
ppb	51	57	44	50

Emissions

lb/hr	3.1E-04	3.5E-04	2.7E-04	3.1E-04

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

Method 430

Acrolein Results

Test Run	#1	#2	#3
ug/l	3000	2000	1400
Sample vol, l	0.0153	0.0246	0.0215
Total ug	46	49	30
Vm std DSCF	1.72	1.70	1.72
Vm std DSCM	0.0487	0.0481	0.0488
Volume Flow, DSCFM	887	887	887

Concentrations **AVERAGE**

ug/dscf	26.7	28.9	17.5	24.4
ug/dscm	943	1023	617	861
ppb	411	446	269	375

Emissions

lb/hr	3.2E-03	3.5E-03	2.1E-03	2.9E-03

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

Method 430

Formaldehyde Results

FIELD BLANK

Test Run	#1	#2	#3	AVERAGE
ug/l	1400	2100	1600	1700
Sample vol, l	0.0118	0.0114	0.0110	0.0114
Total ug	16.5	23.9	17.6	19.4

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

Method 430

Acetaldehyde Results

FIELD BLANK

Test Run	#1	#2	#3	AVERAGE
ug/l	330	860	970	720
Sample vol, l	0.0118	0.0114	0.0110	0.0114
Total ug	3.9	9.8	10.7	8.1

COMPANY : BECHTEL PETROLEUM OPERATIONS, INC.
UNIT : K-27 17R
DATE : 2-12-92
REPORT : 10-849C

Method 430

Acrolein Results

FIELD BLANK

Test Run	#1	#2	#3	AVERAGE
ug/l	3100	5000	2800	3633
Sample vol, l	0.0118	0.0114	0.0110	0.0114
Total ug	36.6	57.0	30.8	41.5

COAST TO COAST ANALYTICAL SERVICES

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2400 Cumberland Dr.	Valparaiso, Indiana 46383	(219) 464-2389	Fax (219) 462-2953

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

Project: K-27 17-R

Lab number: I0611
Date received: 02/14/92
Date sampled: 02/12/92
Sampled by: Mark Ready
Date extracted: 02/19/92
Extracted by: Mark Diehl
Date analyzed: 02/28/92
Analyzed by: Mark Diehl

Lab number: I0611-9 Sample Description: Blank #1
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Result	17.	1400.	4.	330.	36.	3100.
Volume	11.8 mL					

Lab number: I0611-10 Sample Description: Blank #2
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Result	24.	2100.	10.	860.	57.	5000.
Volume	11.4 mL					

Lab number: I0611-11 Sample Description: Blank #3
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Result	17.	1600.	11.	970.	31.	2800.
Volume	11.0 mL					
Average Field Blank	19.	1700.	8.	720.	41.	3600.

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

03/04/92
HPLC 0228-19
IB19FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek, Ph.D.
President

Petro Chem Environmental Services, Inc.

COAST TO COAST ANALYTICAL SERVICES

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

Project: K-27 17-R

Lab number: I0611
Date received: 02/14/92
Date sampled: 02/12/92
Sampled by: Mark Ready
Date extracted: 02/19/92
Extracted by: Mark Diehl
Date analyzed: 02/28/92
Analyzed by: Mark Diehl

Lab number: I0611-12 Sample Description: Run 1, impingers #1 & #2
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	60.	2.	120.	2.	120.
Corrected Result**	95.	8500.	40.	3600.	210.	18000.
Result	23.	1500.	4.	290.	47.	3000.
Average Field Blank	19.	1700.	8.	720.	41.	3600.
Sample/Blank Ratio	1.2	0.88	0.5	0.4	1.14	0.8
Volume (combined impingers)		15.3 mL				

Sample Description: Matrix spike of I0611-12, Run 1, Impinger #1
QC ID: IB19IMP Spiked with: 5 ug or 0.85 ug/L of Formaldehyde

***Matrix spike was destroyed during analysis. No results are available.

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, Ph.D.
President

03/05/92
HPLC 0228-17
IB19FORM
FORM1,1992

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

Project: K-27 17-R Bechtel

Lab number: I0611
Date received: 02/14/92
Date sampled: 02/12/92
Sampled by: Mark Ready
Date extracted: 02/19/92
Extracted by: Mark Diehl
Date analyzed: 02/28/92
Analyzed by: Mark Diehl

Lab number: I0611-13 Sample Description: Run 2, impingers #1 & #2
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	6.	2.	12.	2.	12.
Corrected Result**	95.	8500.	40.	3600.	210.	18000.
Result	21.	860.	5.	200.	49.	2000.
Average Field Blank	19.	1700.	8.	720.	41.	3600.
Sample/Blank Ratio	1.1	0.5	0.6	0.3	1.2	0.6
Volume (combined impingers)		24.6 mL				

Lab number: I0611-14 Sample Description: Run 3, impingers #1 & #2
QC ID: IB19IMP

	Formaldehyde		Acetaldehyde		Acrolein	
	Total ug	ug/L	Total ug	ug/L	Total ug	ug/L
PQL*	1.	6.	2.	12.	2.	12.
Corrected Result**	95.	8500.	40.	3600.	210.	18000.
Result	23.	1100.	4.	180.	30.	1400.
Average Field Blank	19.	1700.	8.	720.	41.	3600.
Sample/Blank Ratio	1.2	0.6	0.5	0.3	0.7	0.4
Volume (combined impingers)		21.5 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.

03/05/92
HPLC 0228-13
IB19FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President

Petro Chem Environmental Services, Inc.

COAST TO COAST ANALYTICAL SERVICES

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

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

LABORATORY QC SPIKES AND BLANKS
FORMALDEHYDE

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

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

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

03/10/92
IC05FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President

Petro Chem Environmental Services, Inc.

COAST TO-COAST ANALYTICAL SERVICES

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

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

LABORATORY QC SPIKES AND BLANKS
ACETALDEHYDE

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

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

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

03/10/92
IC05FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President

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

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

LABORATORY QC SPIKES AND BLANKS
ACROLEIN

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

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

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

03/10/92
IC05FORM
FORM1,1992

Respectfully submitted,
COAST TO COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D.
President

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

METHOD 410A SAMPLING AND ANALYSIS

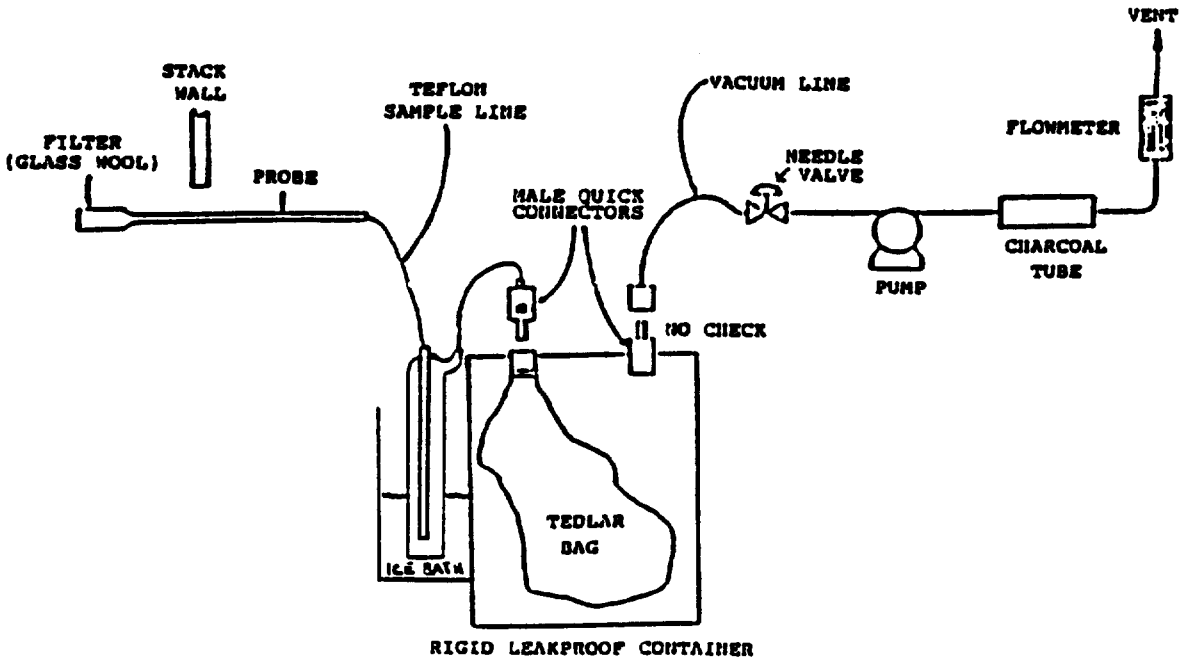
The sampling apparatus consisted of a heat traced stainless steel probe, teflon sample line, midget impinger moisture knockout, and a twenty liter tedlar bag housed in a rigid air tight container. The container was connected to a vacuum pump/rotameter/dry gas meter assembly.

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.

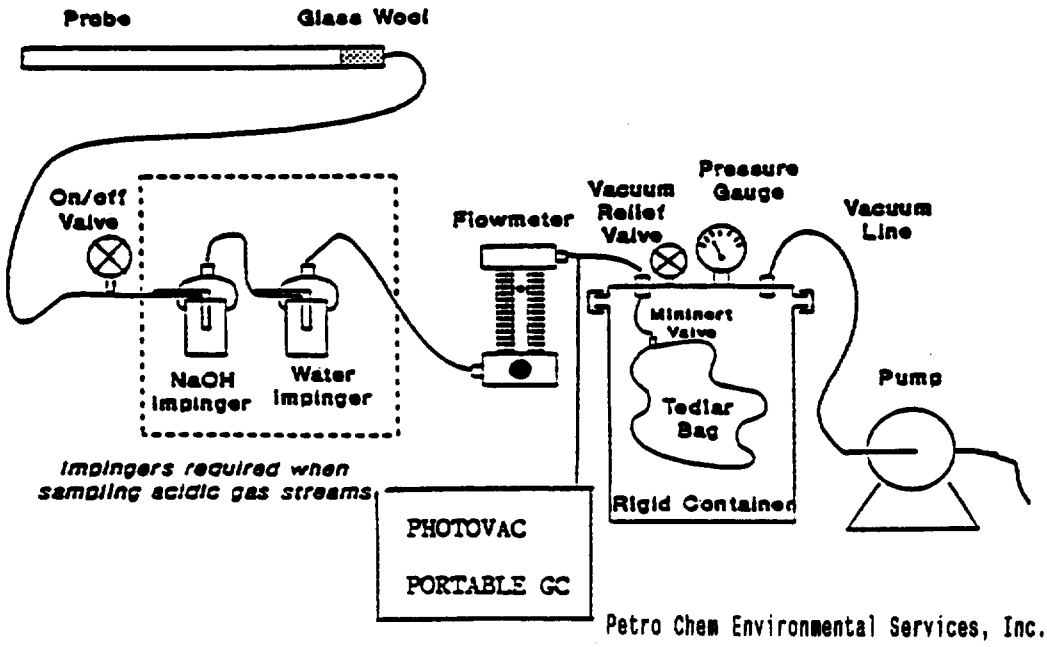
Prior to sampling the Photovac was calibrated with a known standard and the calibration was confirmed to be within the requirements when compared to the initial in-house calibration curves. The standard which was used was a mid point (with respect to the instrument range) standard or as close to the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

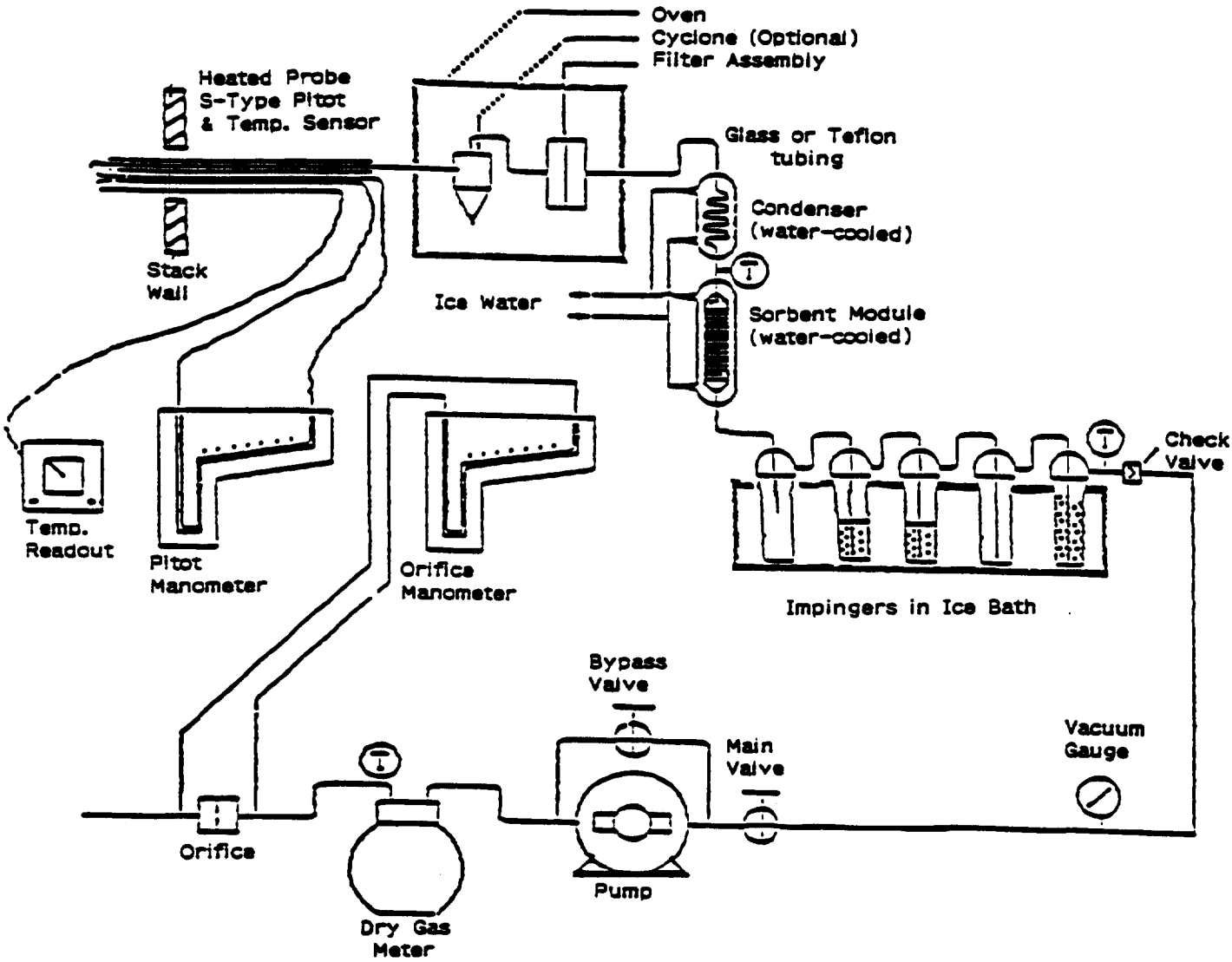
All impingers were disassembled and weighed. The contents of the first impinger were transferred to an amber sample bottle. The impinger was rinsed three times each with methanol, hexane, and methylene chloride. The rinsings were combined with the impinger contents.

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.

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

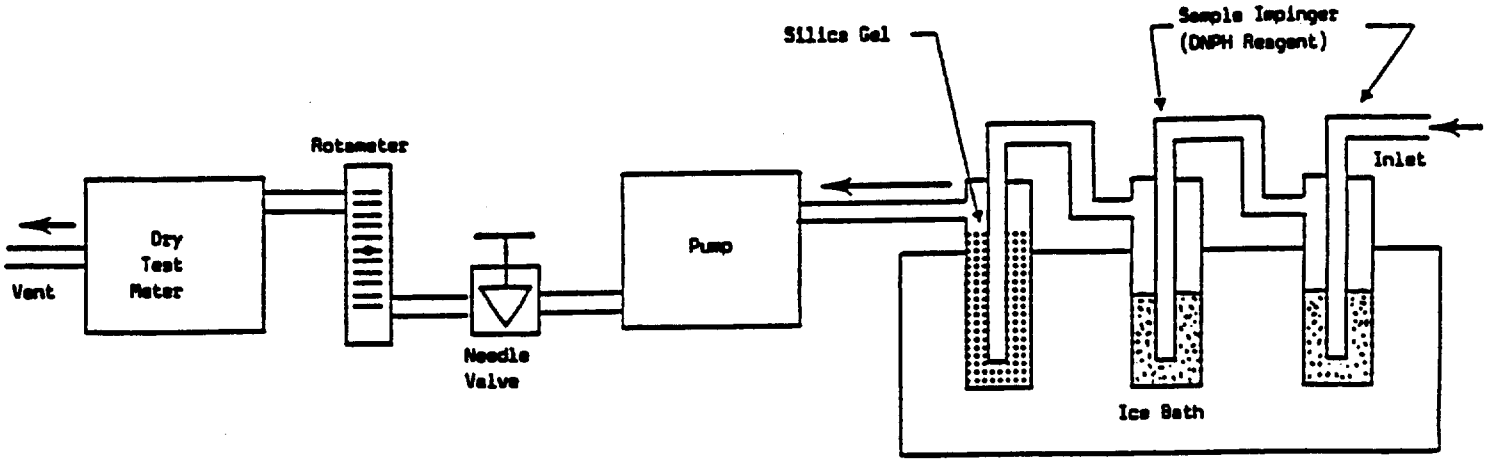
$$DSCM = DSCF \times .0283$$

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

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

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.

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

DRY GAS METER CALIBRATION

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

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

FIELD AVERAGE Mcf:	0.985846	H@:	1.2829

Petro Chem Environmental Services, Inc.

Method 430
Pretest Rotameter Calibration

FLOW ROTAMETER CALIBRATION

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

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

Petro Chem Environmental Services, Inc.

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

Petro Chem Environmental Services, Inc.

CHAIN OF CUSTODY RECORD

Submitted to: ALTA LABS

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT
BECHTEL	K-27 17-R

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

METHOD	REPORT ATTN.	PO#
429 - PAH	TERRY ROWLES	

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	HR GCMS FULL ALL LISTED 429 PAH
C-1	FILTER BLANK	2-10-92		X		
C-2	PROBE: NOZZLE BLANK	"	X			
C-3	CONDENSER RINSE BLANK	"	X			composite
C-4	FIRST IMPINGER BLANK	"	X			
C-5	SECOND IMPINGER BLANK	"	X			
C-6	RESIN TRAP BLANK (#7)	"		X		
C-13	First Impinger #1 2 of 2	2-11-92	X			
C-7	FILTER RUN #1	2-11-92				
C-8	PROBE: NOZZLE #1	"		X		composite
C-9	CONDENSER RINSE #1	"	X			
C-10	FIRST IMPINGER #1 (1 of 2)	"	X			
C-11	SECOND IMPINGER #1	"	X			
C-12	RESIN TRAP #1 (Trap # 11)	"		X		

COMMENTS:
Analyze within 7 days of collection

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-12-92	Terry Rowles	2-12-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Terry Rowles	2-13-92	Herbert J Flatt	2-13-92
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: AITA LABS

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT
BECHTEL	K-27 17-R

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

METHOD	REPORT ATTN.	PO#
429- PAH	TERRY ROWLES	

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	HR GCMS FOR ALL LISTED METH 429 PAH
C-14	Filter #2	2-11-92		X		composite
C-15	Probe; Nozzle #2	"	X			
C-16	Condenser Rinse #2	"	X			
C-17	First Impinger #2 (1 of 2)	"	X			
C-18	First Impinger #2 (2 of 2)	"	X			
C-19	Second Impinger #2	"	X			
C-20	Resin Trap #2 (#15)	"		X		

COMMENTS:
Analyze within 7 days of collection

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-12-92	Terry Rowles	2-12-92
RELINQUISHED BY: Terry Rowles	DATE 2-17-92	RECEIVED BY: Kenneth J. Pratt	DATE 2-17-92
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	K-27-17-R

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

METHOD	REPORT ATTN.	PO#
429 - PAH	TERRY ROWLES	

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	PAHS PER ALL LISTED METH 429 PAH
C-21	Filter #3	2-12-92		X		composite
C-22	PROBE & Nozzle #3		X			
C-23	CONDENSER RINSE #3		X			
C-24	First Impinger #3 (1 of 2)		X			
C-25	First Impinger #3 (2 of 2)		X			
C-26	SECOND Impinger #3		X			
C-27	RESIN TRAP #3 (#16)			X		

COMMENTS:
Analyze within 7 days of collection

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-12-92	Terry Rowles	2-12-92
RELINQUISHED BY: Terry Rowles	DATE 2-17-92	RECEIVED BY: Kenneth J. Tait	DATE 2-17-92
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: COAST TO COAST

I0611

ANALYSIS REQUEST

COMPANY	LOCATION/UNIT
BECHTEL	K-27 17-R

REPORT NO.	SAMPLER
10-849C	MARK J. READY

METHOD	REPORT ATTN.	PO#
430-FORM	TERRY ROWLES	

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	Formaldehyde PQL = 50 µg/Li	Acetaldehyde PQL = 100 µg/Li	Acrolein PQL = 100 µg/Li	Formaldehyde PQL = 100 µg/Li	Acetaldehyde PQL = 50 µg/Li	Acrolein PQL = 100 µg/Li	
1	BLANK #1 DNPH	2-12-92	X			X	X	X				-9
2	BLANK #2 DNPH	"	X			X	X	X				-10
3	BLANK #3 DNPH	"	X			X	X	X				-11
4	IMP #1 RUN #1	"	X	Composite					X	X	X	-12
5	IMP #2 RUN #1	"	X									
6	IMP #1 RUN #2	"	X	Composite					X	X	X	-13
7	IMP #2 RUN #2	"	X									
8	IMP #1 RUN #3	"	X	Composite					X	X	X	-14
9	IMP #2 RUN #3	"	X									
	*PERFORM MATRIX SPIKE											
	ON 1/2 OF SAMPLE											
	8/9 COMPOSITE											

COMMENTS: For Blanks extract and Analyze within 24 hrs, Report µg/Li
For Samples extract and Analyze within 7 days, Report µg/Li & Total µg

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-12-92	Terry Rowles	2-12-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Terry Rowles	2-13-92	[illegible]	2-14-92 1130
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

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

CHAIN OF CUSTODY RECORD

Submitted to: COAST TO COAST

ANALYSIS REQUEST

PQL = 0.1 ppb
PQL = 0.01 mg

COMPANY	LOCATION/UNIT
BECHTEL	K-27 17-R

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

METHOD	REPORT ATTN.	PO#
422-VOA	TERRY ROWLES	1776

Sample No./ID	Sample Description	Sample Date	Liq.	Filter	Gas	TO 14	Benzene, Toluene, Xylenes, Ethylbenzene, Propylbenzene	Benzene, Toluene, Xylenes, Ethylbenzene, Propylbenzene				
C-75	CONDENSABLE #1	2-11-92	K				X			I0588-		1
C-76	CONDENSABLE #2	"	K				X				-	2
C-77	CONDENSABLE #3	"	K				X				-	3
C-78	CONDENSABLE BLANK	"	K				X				-	4
C-79	NONCONDENSABLE #1	"			K	X					-	5
C-80	NONCONDENSABLE #2	"			K	X					-	6
C-81	NONCONDENSABLE #3	"			K	X					-	7
C-82	NONCONDENSABLE BLANK	"			K	X					-	8

COMMENTS: RUN #1 - 3:30 end
" #2 - 4:00 end
" #3 - 4:30 end
Ending Times for Runs 1-3 - PM -
Gas analysis within 72 hrs of sampling
Report as ppb and mg/cm - Report within 21 days

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Mark Ready	2-12-92	Terry Rowles	2-12-92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
Terry Rowles	2-12-92	Kelly Nelson	2/13/92 1040
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

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

DISCUSSION

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

Mark T. Ready
March 26, 1992

ALTA Analytical Laboratory

Batch ID: 10995

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

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

Comments:

ALTA Analytical Laboratory

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

Comments:

Petro Chem Environmental Services, Inc.

ALTA Analytical Laboratory

Batch ID: 11028

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

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

Comments:

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

Petro Chem Environmental Services, Inc.

PETRO CHEM ENVIRONMENTAL SERVICES INC.

CALIFORNIA AIR RESOURCES BOARD

METHOD 422.102

ANALYSIS OF 1,3-BUTADIENE

INITIAL PERFORMANCE EVALUATION

1/24/92

INTRODUCTION

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

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

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

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

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

Summary of Results

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

Method 422.102 1,3-Butadiene

Linear Regression Analysis

Regression Output:

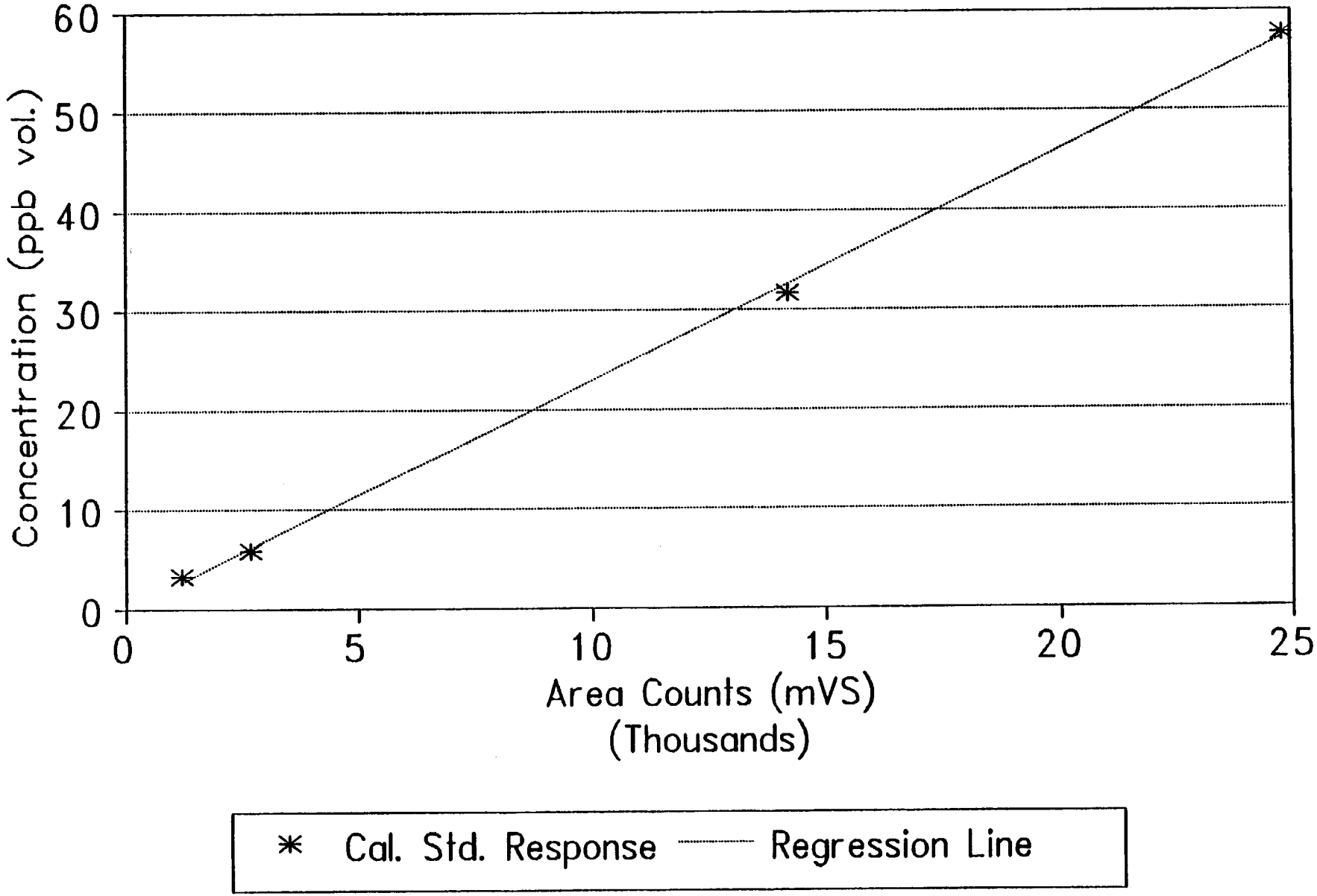
Constant	-0.164061
Std Err of Y Est	0.8797852
R Squared	0.9992079
No. of Observations	4
Degrees of Freedom	2

X Coefficient(s)	0.0023091
Std Err of Coef.	4.597E-05

CONC.	REGR. CONC.
3.22	2.6066
5.86	6.0704
31.7	32.6246
57.7	57.1779

Linear Regression Graph

1, 3-Butadiene



PETRO CHEM ENVIRONMENTAL SERVICES INC.

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

Initial Performance Evaluation
Raw Data and Response Factors

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

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

Calibration Gas Source and Concentrations

Certified Gasses

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

Blended Gasses

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

FORMULAS

AVERAGE

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

STANDARD DEVIATION

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

RELATIVE STANDARD DEVIATION

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

RESPONSE FACTOR

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

CORRELATION COEFFICIENT

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

REGRESSION LINE EQUATION

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

GAS DILUTION CONCENTRATION CALCULATION

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

Where:

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

LIMIT OF DETECTION

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

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

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

LIMIT OF QUANTITATION

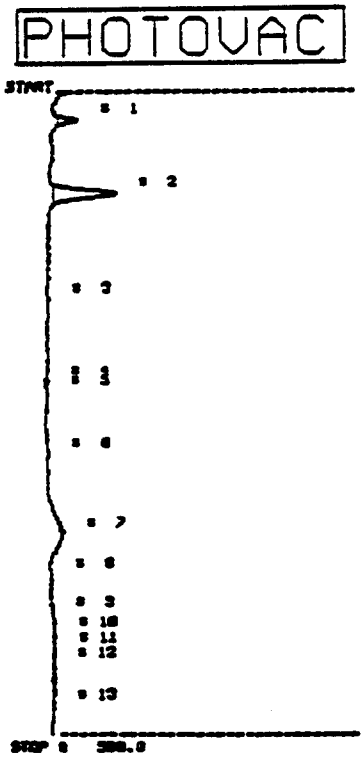
$$LOQ= 3.3*LOD$$

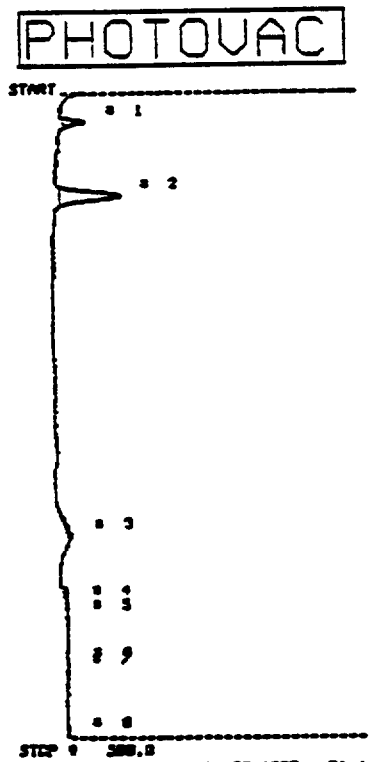
MILLIVOLTSECONDS

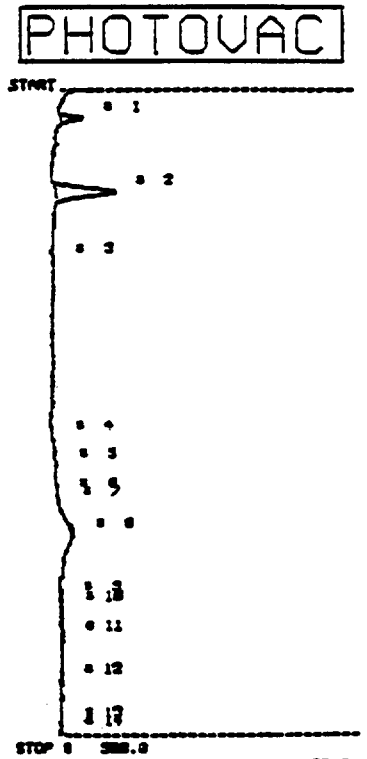
$$mVS= VS * 1000$$

3.22ppmv 1,3-Butadiene

Calibration Gas Standard

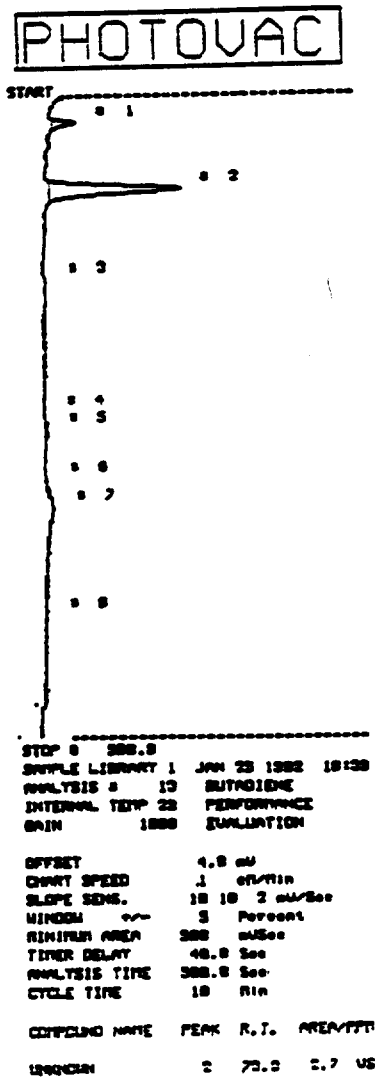


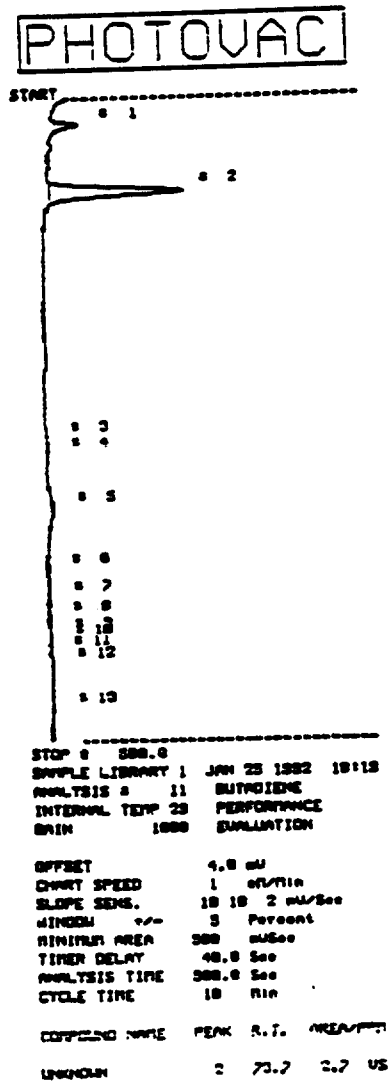


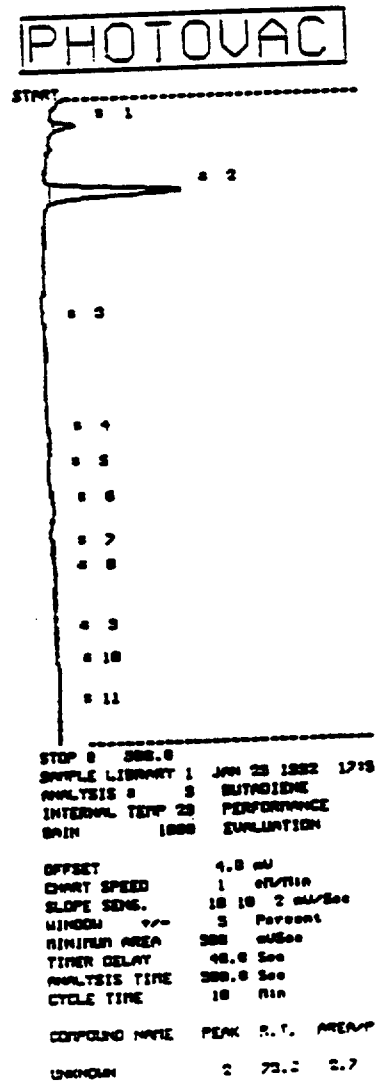


5.86ppmv 1,3-Butadiene

Calibration Gas Standard

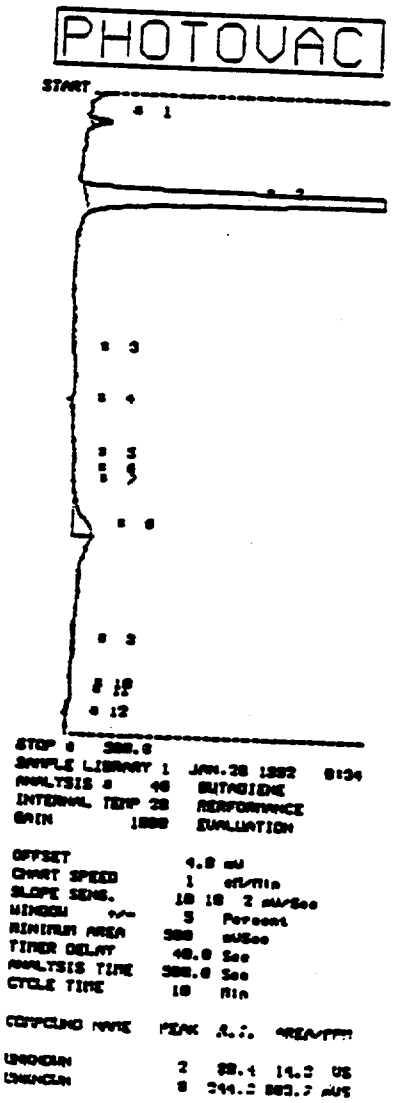


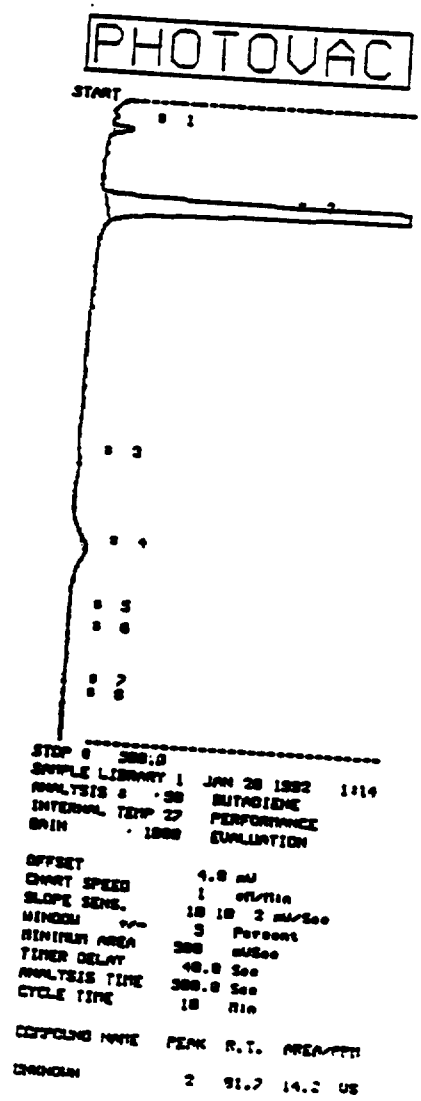


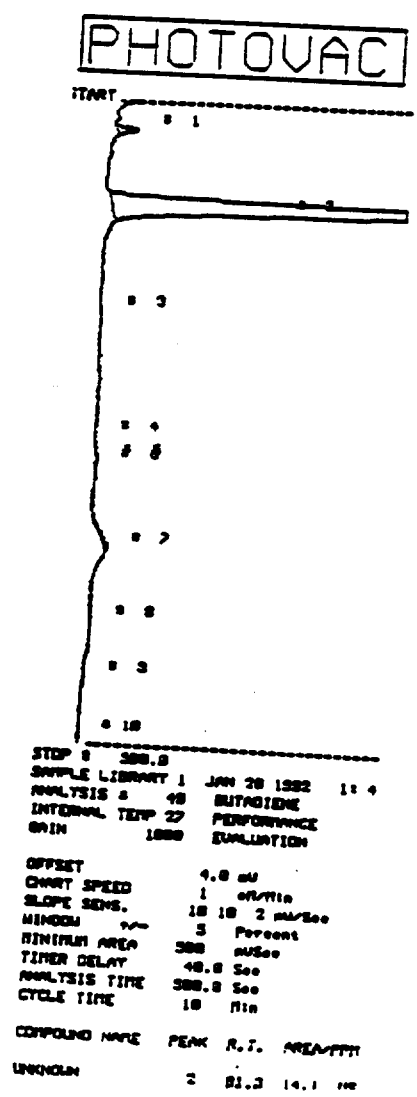


31.7ppmv 1,3-Butadiene

Calibration Gas Standard



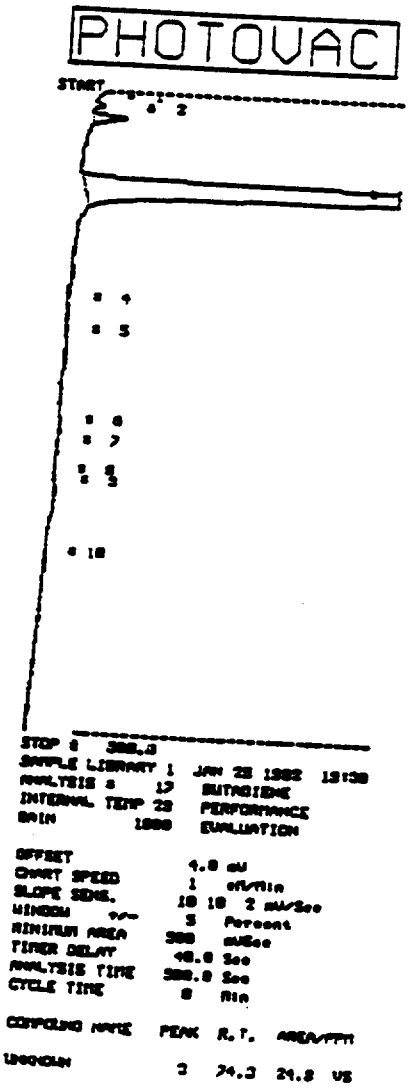


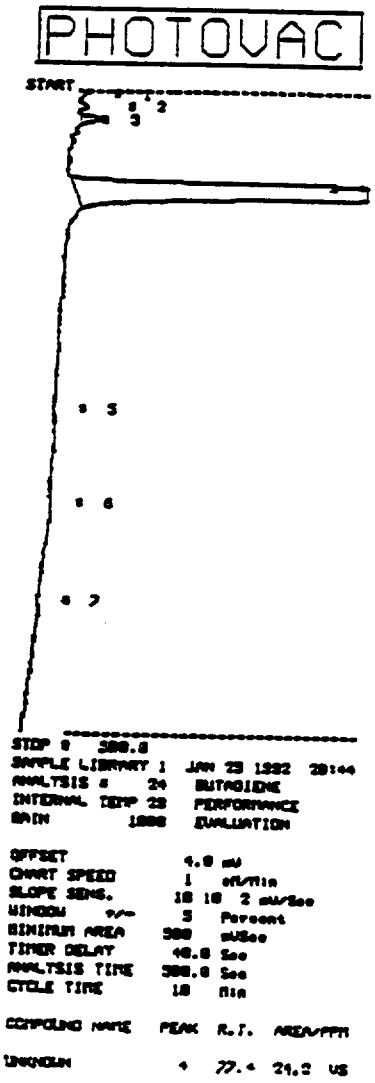


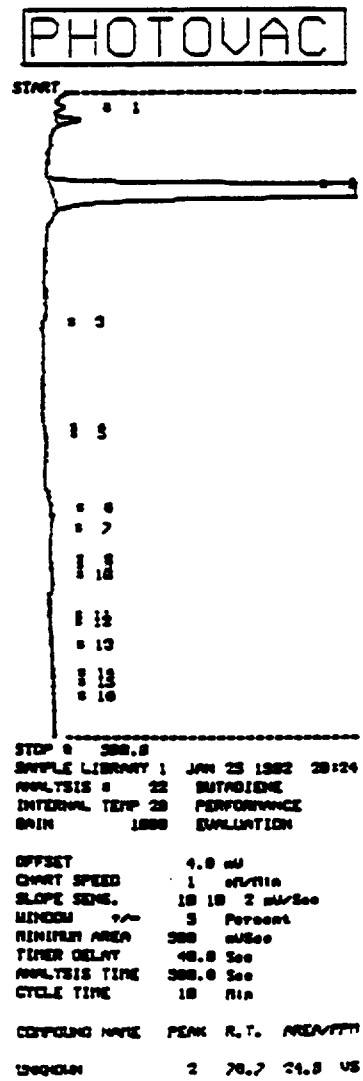
Petro Chem Environmental Services, Inc.

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: 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 Sacramento APPROVED BY: Mal Sirinides
M.SIRINIDES/T.NEEME

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

COMPANY: BECHTEL
UNIT: K-27 - 17-R
DATE: 2-12-92 2-11-92
REPORT: 10-849C
TECH: DCT
PUMP #: Pump Meter
METER BOX#: -
METER coeff: -
PITOT TUBE#: -

PRE / POST TEST LEAK CHECK

LEAK RATE: .00 cfm
VACUUM: 3 "Hg

All Post leak rates are 0.00 @ 3 Hg

AMBIENT TEMP, °F: 58°
Pbar: 29.24
STATIC PRESSURE("Hg): -.32
ASSUMED MOISTURE,%: 27.5 18%

AVG. CALIB. NOZZLE DIAM("): -
PROBE LINER MATERIAL: -
FILTER #: -
DUCT DIAM ("): 41.25

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 IMPNGR °F
RUN #1												
START	3:25.00	1	805		≈.04	0	269.29	74	73			
STOP	3:45.00	1	805			0	270.00	75	73			
							.71	(74)				
RUN #2	15:55.00	1										
START	4:15.00	1	808		≈.04	0	272.18	75	75			
STOP			810			0	272.95	75	74			
							.77	(75)				
RUN #3												
START	4:30.00	1	808		≈.04	0	273.75	74	75			
STOP	4:50.00	1	806			0	274.51	74	75			
							.76					
AVERAGE												

COMPANY : BECHTEL
UNIT : K-27 17-R
DATE : 2-11-92
REPORT : 10-849C

ON-SITE DATA

		2-11	2-11	2-12
	RUN	#1	#2	#3
	TIME	10:14-14:16	15:30-18:35	10:00-13:20
Vm	Dry sampled gas volume, dcf	136.23	137.82	81.53
Y	Meter calibration factor (met# 1001, 1001, 1001)	.985170	.985170	.985170
Pbar	Barometric Pressure, "Hg	29.24	29.24	29.07
Pstatic	Stack static pressure, "Hg	-.37	-.37	-.32
ΔH	Differential meter pressure, "H2O	1.11	1.13	.40
Tm	Meter temperature, °F	68	66	58

CONTENTS	RUN 1 FINAL	RUN 1 TARE	RUN 1 NET	RUN 2 FINAL	RUN 2 TARE	RUN 2 NET	RUN 3 FINAL	RUN 3 TARE	RUN 3 NET
KO	966.4	446.9	519.5	1001.6	453.1	548.5	814.3	447.3	367.0
H2O	617.0	607.7	9.30	680.1	626.1	54.0	610.2	607.1	3.1
KO	515.2	513.7	1.50	490.9	489.4	1.5	516.5	515.7	.80
Silica	848.1	829.6	18.5	884.2	861.4	22.8	867.5	855.7	11.8
V lc volume of H2O, gms			548.8			626.8			382.7

		RUN #1	#2	#3
CO2	% Dry Volume	11.6	11.65	11.63
O2	% Dry Volume	.5	.5	.5
N2	% Dry Volume	87.9	87.85	87.87
Cp	Pitot tube coefficient (Pit# - , - , -)	.84	.84	.84
ΔP	Avg P, "H2O	.551	.551	.462
Ts	Stack temperature, °F	809	789	791
As	Stack area, sq. ft.	.785	.785	.785
Ds	Stack diameter, inches	11.25	11.25	11.25
Dn	Nozzle diameter, inches	.319	.319	.25
Dur	Sampling time, min	180	180	180
% Iso	Mini iso	99.92	100.57	106.89

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 East

COMPANY: Bechtel
UNIT: K27 17R
DATE: 2-11-92
REPORT: 10-849C
TECH: DCJ
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

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

AMBIENT TEMP, °F: 68
Pbar: 29.24
STATIC PRESSURE("Hg): -.37
ASSUMED MOISTURE,%: 27.5, 18%
AVG. CALIB. NOZZLE DIAM(''): .319
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM (''): 11.25

TRAVERSE PT. NUMBER (from midpoint times)		TIME (θ) min. 7.5 min/pt	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER °F	
0	12	10:14.0	9	914	.44	.647	.82	670.90	62	64	248	230	60	61
7.5	11	:21.9	9	919	.45	.649	.85	675.7	62	57	314	254	48	52
15	10	:29	9	921	.46	.655	.84	680.6	63	55	350	263	48	50
22.5	9	:36.30	9	924	.49	.675	.89	685.5	64	54	430	222	50	50
30	8	:44	10	925	.53	.704	.95	690.6	66	56	457	260	50	51
37.5	7	:51.30	10	922	.59	.744	1.05	695.9	66	56	465	261	52	53
45	6	:59	11	870	.67	.812	1.23	701.5	68	59	474	261	53	54
52.5	5	11:06.30	11	744	.71	.880	1.43	707.6	68	60	478	261	55	54
60	4	:14	11	650	.68	.900	1.48	714.2	69	63	469	260	55	55
67.5	3	:21.30	12	651	.62	.860	1.36	720.9	70	63	458	261	56	57
75	2	:29	11	646	.39	.685	.90	727.4	71	64	445	262	57	57
82.5	1	:36.30	9	631	.04	.221	.12	732.5	71	64	416	261	56	57
90	—	11:44.00						734.1						
AVERAGE														

METHOD 429 RUN # 1 North

COMPANY: Bechtel
UNIT: K27 17R
DATE: 2-11-92
REPORT: 10-849C
TECH: DCJ
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

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

AMBIENT TEMP, °F: 60°
Pbar: 29.24
STATIC PRESSURE("Hg): -.37
ASSUMED MOISTURE,%: 27.5, 18%
AVG. CALIB. NOZZLE DIAM(''): .319
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM (''): 11.25

TRAVERSE PT. NUMBER		TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate	ΔH "H2O	GAS SAMPLE VOLUME (cu. ft) 670.90	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F	
0	12	12:46.00	10	877	.56	.754	1.05	734.1	73	73	301	264	62	63
7.5	11	53.30	10	911	.69	.824	1.24	739.8	71	72	289	260	50	51
15	10	13:01.00	11	916	.74	.851	1.32	745.9	71	71	288	260	50	51
22.5	9	08.30	11	917	.76	.861	1.35	752.4	71	70	359	263	51	52
30	8	16.0	12	917	.79	.878	1.40	758.8	71	70	407	264	52	53
37.5	7	23.30	12	919	.74	.849	1.32	765.4	71	70	426	266	56	55
45	6	31.0	11	897	.68	.785	1.14	771.8	72	70	432	263	56	57
52.5	5	38.30	11	784	.58	.794	1.16	777.6	73	71	430	263	57	57
60	4	46.0	10	689	.64	.798	1.17	783.6	74	71	414	266	57	57
67.5	3	53.30	10	644	.60	.859	1.34	789.6	75	71	402	263	58	59
75	2	14:01.00	10	629	.54	.822	1.23	796.0	75	73	390	263	58	58
82.5	1	08.30	10	610	.42	.732	1.00	802.2	75	74	365	249	59	59
90	–	14:16.00						807.13						
								Vm 136.23						
				809	.551		1.11	Ism 99.92		68				
AVERAGE								VF 66.98						

273.95
274.70

METHOD 429 RUN # 2 East

COMPANY: Bechtel
UNIT: K27 17R
DATE: 2-11-92
REPORT: 10-849C
TECH: DCJ
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

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

AMBIENT TEMP, °F: 60°
Pbar: 29.24
STATIC PRESSURE("Hg): -.37
ASSUMED MOISTURE,%: 27.5, 18%
AVG. CALIB. NOZZLE DIAM("): .319
PROBE LINER MATERIAL: Qtz.
FILTER #:
DUCT DIAM ("): 11.25

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	
0	12	15:30.00	8	903	.44	.661	.83	807.50	73	71	283	251	63	64
7.5	11	37.30	8	907	.45	.663	.85	812.5	71	67	342	259	50	49
15	10	45.0	8	915	.46	.672	.86	817.4	74	69	419	260	51	52
22.5	9	52.3	8	914	.49	.687	.90	822.5	70	62	455	258	51	52
30	8	16:00.00	9	922	.53	.728	.98	827.6	83	72	473	268	60	59
37.5	7	07.30	9	916	.59	.759	1.07	833.1	75	65	482	261	55	57
45	6	15	9	881	.67	.813	1.23	838.8	71	62	471	258	54	56
52.5	5	22.30	9	683	.71	.910	1.51	844.9	72	64	467	259	53	54
60	4	30	8	575	.68	.933	1.59	851.7	71	62	434	258	52	54
67.5	3	37.30	9	590	.62	.885	1.43	858.7	72	62	413	259	52	53
75	2	45	8	603	.39	.694	.92	866.3	69	60	404	259	51	52
82.5	1	52.00	7	583	.04	.225	.12	870.5	69	60	402	256	49	51
90	—	17:00.00						872.2						
AVERAGE														

METHOD 429 RUN #2 North

COMPANY: Bechtel
UNIT: K27 17B
DATE: 2-11-92
REPORT: 10-849C
TECH: DCJ
PUMP #: GAST
METER BOX#: 1001
METER coeff: .980
PITOT TUBE#: .84

PRE / (POST) TEST LEAK CHECK
LEAK RATE: .006 cfm
VACUUM: 12 "Hg

AMBIENT TEMP, °F: 60°
Pbar: 29.24
STATIC PRESSURE("Hg): -.37
ASSUMED MOISTURE,%: 27.5, 18%
AVG. CALIB. NOZZLE DIAM("): .319
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("): 11.25

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) 807.50	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER °F	
0	12	17:05.00	9	881	.56	.744	1.04	872.2	69	64	351	261	60	61
7.5	11	12.30	9	900	.69	.818	1.24	877.8	69	62	379	261	50	50
15	10	20.0	9	904	.74	.844	1.32	883.9	67	61	441	264	50	51
22.5	9	27.30	9	907	.76	.856	1.35	890.3	68	62	470	264	51	51
30	8	35.0	10	907	.79	.870	1.40	896.7	67	60	476	264	51	52
37.5	7	42.3	10	907	.74	.844	1.32	903.2	69	61	480	265	52	52
45	6	50.0	9	877	.62	.778	1.14	909.5	67	59	473	262	52	53
52.5	5	57.3	9	757	.58	.790	1.17	915.4	68	59	469	263	52	53
60	4	18:05.00	9	667	.54	.791	1.17	921.3	67	59	459	264	52	53
67.5	3	12.30	9	622	.60	.852	1.34	927.2	67	60	450	265	52	52
75	2	20.0	10	607	.54	.812	1.23	933.6	66	59	442	262	52	52
82.5	1	27.30	9	605	.42	.718	.98	939.7	66	60	435	263	52	53
90	~	18:35.00						945.32						
								VM 137.82						
				789	.551		1.13	ISO 100.51		66				
AVERAGE								VP 66.43						

METHOD 429 RUN # 3 EAST

COMPANY: Bechtel
UNIT: K-27 17-R
DATE: 2-12-92
REPORT: 10-849C
TECH: DCT
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

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

AMBIENT TEMP, °F: 50°
Pbar: 29.07
STATIC PRESSURE("Hg): -.32
ASSUMED MOISTURE,%: 27.5 - 18%
AVG. CALIB. NOZZLE DIAM("): .25
PROBE LINER MATERIAL: QTZ
FILTER #: —
DUCT DIAM ("): 11.25

TRAVERSE PT. NUMBER		TIME (θ) min. 75/pt	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F	
0	12	10:00.0	7	878	.42	.390	.34	969.7	56	57	241	238	51	52
7.5	11	7.3	7	885	.41	.382	.33	972.6	55	54	293	236	40	41
15	10	15.0	7	885	.42	.386	.34	975.5	55	51	351	235	40	41
22.5	9	22.3	7	889	.43	.389	.34	978.5	55	49	377	257	41	41
30	8	30.0	7	887	.48	.412	.38	981.4	56	48	390	270	41	42
37.5	7	37.3	8	889	.54	.437	.42	984.5	57	48	410	272	41	43
45	6	45.0	8	832	.65	.490	.51	987.8	58	48	428	262	42	43
52.5	5	52.3	8	694	.65	.519	.56	991.5	59	49	438	264	43	45
60	4	11:00.0	7	603	.59	.511	.56	995.4	60	50	437	261	43	45
67.5	3	7.3	7	600	.53	.491	.51	999.2	60	52	431	263	44	45
75	2	15.0	7	568	.35	.406	.36	1002.9	61	53	409	261	44	45
82.5	1	22.3	6	555	.02	.098	.03	1005.95	62	54	396	261	44	46
90	~	11:30.0						1006.71						
								37.01 dm						
								100.32-iso						
AVERAGE														

Petro Chem Environmental Services, Inc.

METHOD 429 RUN # 3 NORTH

COMPANY: BECHTEL
UNIT: K-27 17-R
DATE: 2-12-92
REPORT: 10-849C
TECH: DCT
PUMP #: GAST
METER BOX#: 1001
METER coeff: .950
PITOT TUBE#: .84

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

AMBIENT TEMP, °F: 50°
Pbar: 29.07
STATIC PRESSURE("Hg): -.32
ASSUMED MOISTURE,%: 27.5 18%
AVG. CALIB. NOZZLE DIAM("): .25
PROBE LINER MATERIAL: QTZ
FILTER #: -
DUCT DIAM ("): 11.25

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) 969.7	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F	
0	12	11:50.0	6	884	.43	.398	.35	1006.71	63	63	240	258	55	55
7.5	11	57.3	6	883	.54	.444	.42	10.20	62	58	315	315	45	46
15	10	12:05.0	6	887	.54	.442	.42	13.8	62	55	365	365	45	45
22.5	9	12.3	6	888	.58	.458	.45	18.1	63	54	397	397	45	46
30	8	20.0	7	889	.58	.459	.45	21.8	64	55	407	407	46	46
37.5	7	27.3	7	888	.59	.464	.46	25.6	65	56	412	412	46	46
45	6	35.0	7	881	.50	.428	.40	30.2	65	56	414	414	47	48
52.5	5	42.3	7	863	.49	.427	.40	33.7	67	56	416	416	51	52
60	4	50.0	7	789	.46	.427	.39	37.1	68	57	413	413	51	53
67.5	3	57.3	7	704	.46	.443	.42	40.5	68	59	407	407	51	53
75	2	13:05.0	7	649	.44	.446	.42	43.9	70	61	401	401	52	54
82.5	1	12.3	7	620	.38	.421	.38	47.5	71	62	393	393	53	44
90	-	13:20.0						1051.23						
				791	.462		.40	91.53-Vm		58			vel fps=61.12	
								106.89 iso						
AVERAGE														

2-10-92 K-27

FIELD BLANK | RINSE VOLUMES | RESIN TRAP # ST617 # 7 (obstructed) (covered)

SAMPLE	MeOH	HEXANE	$MeCl_2$	H_2O
P/N + FT	12.[illegible]+9.1+18.7	10.2+10.1+27.0	20.9+23.8+14.1	—
CONDENSER/SL/FB	10.8+15.9+53.3	19.6+13.0+46.2	37.0+18.9+37.0	—
Imp #1	19.5	20.9	34.6	—
Imp #2	—	—	—	32.6

2-11-92 RUN #1 RESIN TRAP # ST617 #11

SAMPLE	MeOH	HEXANE	$MeCl_2$	H_2O
PN / FT	11.0+9.1+7.5 34.1	12.4+7.9+6.5 27.6	10.7+13.5+8.5 56.9	—
CONDENSER/SL/FB	25.4+8.2 45.6	25.7+6.4 32.9	28.5+11.8 44.8	—
Imp #1	28.2	32.0	38.6	—
Imp #2	—	—	—	105.8

K27
2-11-92

RINSE VOLUMES

RESIN TRAP # ST617 # 15

RUN #2

SAMPLE	MeOH	HEXANE	MeCl2	H2O
PN/FT	10.0+6.0+6.2 34.8	10.3+9.4+4.6 29.8	14.6+9.5+10.5 40.1	—
CONDENSER/SC/FB	8.6+10.6+25.3	7.1+11.6+18.6	12.2+19.5+14.2	—
First Imp	7.3+12.1+8.4	10.5+7.9+11.7	18.4+25.4+16.9	—
Second Imp	—	—	—	30.2

2-12-92

RUN #3

RESIN TRAP # ST617 #16

Sample	MeOH	HEXANE	MeCl2	H2O
PN/FT	10.1+10.6+6.9 34.7	10.8+6.3+8.0 21.1	14.7+15.1+10.3 44.5	—
CONDENSER/SC/FB	14.9+16.9+28.9	8.7+11.1+28.2	16.7+19.0+65.3	—
FIRST Imp.	31.31	28.1	35.8	—
Second Imp	—	—	—	97.9

METHOD Formal RUN # 1

COMPANY: Bechtel
UNIT: K-27 - 17R
DATE: 2-12-92
REPORT: 10 - 849C
TECH: DCT
PUMP #: HC Sample Pump
METER BOX#: -
METER coeff: -
PITOT TUBE#: -

PRE / POST TEST LEAK CHECK

LEAK RATE: cfm
VACUUM: "Hg

Pre 0.00 @ 3 Hg
Post 0.00 @ 3 Hg

AMBIENT TEMP, °F: 50°
Pbar: 29.07
STATIC PRESSURE("Hg): -.32
ASSUMED MOISTURE,%: 27.5, 45%
AVG. CALIB. NOZZLE DIAM(''):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM (''):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	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	9:40.30		877				.5 L/m	55	58			
20	10:00.30		883				.5 L/m	55	58			
40	10:20.30		889				.5 L/m	55	49			
60	10:40.30		887				.5 L/m	57	48			
80	11:00.30		885				.5 L/m	55	51			
100	11:20.30		887				.5 L/m	57	50			
								54				
AVERAGE												

METHOD Formal RUN # 2

COMPANY: Bechtel
UNIT: K27 17R
DATE: 2-12-92
REPORT: 10-849C
TECH: DCJ
PUMP #:
METER BOX#:
METER coeff:
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: cfm
VACUUM: "Hg

Pre 0.00 @ 3 1/2
Post 0.00 @ 3 1/2

AMBIENT TEMP, °F: 50°
Pbar: 29.07
STATIC PRESSURE("Hg): -.32
ASSUMED MOISTURE,%: 27.5, 45%
AVG. CALIB. NOZZLE DIAM("): —
PROBE LINER MATERIAL: Qtz.
FILTER #:
DUCT DIAM ("):

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	11:36.0		882				.5 L/M	64	64			
20	11:56.0		883				.5 L/M	62	58			
40	12:16.0		889				.5 L/M	63	54			
60	12:36.0		884				.5 L/M	66	56			
80	12:56.0		881				.5 L/M	65	56			
100	13:16.0		882				.5 L/M	62	58			
								60.7				
AVERAGE												

METHOD Formal RUN # 3

COMPANY: Bechtel
UNIT: K27 17R
DATE: 2-12-92
REPORT: 10-849C
TECH: DCJ
PUMP #:
METER BOX#:
METER coeff:
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: cfm
VACUUM: "Hg

Pre 0.00 @ 3 Hg
Post 0.00 @ 3 Hg

AMBIENT TEMP, °F: 50°
Pbm: 29.07
STATIC PRESSURE("Hg): -.32
ASSUMED MOISTURE,%: 27.5, 13%

AVG. CALIB. NOZZLE DIAM(\"): —
PROBE LINER MATERIAL: Qtz.
FILTER #:
DUCT DIAM (\"): 11.

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
0	13:50.0		883				.54M	62	63			
20	14:10.0		883				.54M	55	58			
40	14:30.0		885				.54M	55	51			
60	14:50.0		887				.54M	55	51			
80	15:10.0		884				.54M	57	51			
100	15:30.0		887				.54M	55	49			
								53.5				
AVERAGE												

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

LOCATION: SEC 17/T30S/R23E				DATE: 02-11-92		
APCD # 4091058 C K-27				RELEASE # AEP 355		
REASON FOR TEST: AIR TOXICS				TEST COMPANY: BPOI		
EQUIPMENT DESCRIPTION: 650HP WAUKESHA				VEE PERFORMED: YES		
NOx CONTROL:	CAT. X	PSC	PCC	O2	OXIDIZING CAT.	
POLLUTANTS:	PM	NOx X	CO X	HC X	H2S	SO2

EMISSIONS DATA

TIME	10:00–11:00	11:15–12:15	12:25–01:25	01:55–02:55	03:55–04:55	05:05–06:05
NOX PPM	51	52	49	55	50	49
CO PPM	1500	2300	3000	2500	1400	1000
% O2	0.5	0.5	0.5	0.5	0.5	0.5

CALIBRATION GASES

POLLUTANT	SPAN GAS	RANGE	EXP DATE		INST. MFG	MODEL
NOX	233	0–250	04-01-92		TECO	10
CO	299	0–10000	04-01-92		TECO	48
O2 %	15	0–25	04-01-92		TELEDYNE	

ENGINE PARAMETERS

RPM'S	953	953	954	954	953	953
TOTAL BHP LOAD	594	594	579	579	590	590
PERCENT LOAD	96.0	96.0	93.0	93.0	95.0	95.0
CATALYST TEMP.	936	924	936	936	936	936
FUEL STATIC	6.00	6.05	6.00	6.00	6.00	6.00
FUEL DIFF.	4.15	4.20	3.90	3.90	3.90	3.90
COEF.	0.005	0.005	0.005	0.005	0.005	0.005
RATE (MCF/DAY)	125	127	117	117	117	117
SUCTION PSI	50	51	50	50	50	50
DISCHARGE PSI	470	470	480	470	470	470

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: 2RDS

Unit name: K27

Date: 11-Feb-92 09:59:01

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	STAGE1	10	151.5	514.0*	66 232	2.03	145.8	47	77C
1C	STAGE1	10	150.7	493.1	66 232	2.07	138.3	52	68T
2H	STAGE2	10	46.3	191.1*	53 232	1.88	139.0	59	74C
2C	STAGE2	10	46.2	180.8	53 232	2.16	141.4	65	68T

Total indicated horsepower (IHP) = 565 @ 953 RPM
Gas horsepower (GHP) = 594 @ 953 RPM
Compressor total horsepower (BHP) = 594 @ 953 RPM
Rated horsepower (BHP) = 650 @1000 RPM
Derated horsepower (BHP) = 619 for 953 RPM
Percent Load = 96%

* WARNING: Check the measured line pressures

Recommendations and Observations:

1H RATTLE
2H RATTLE
1C RATTLE
2C RATTLE

CONTINUOUS EMISSION MONITORING DURING AIR TOXIC EVALUATION RUN # 1-2.

Analyst signature: _____

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410
Date: 02-11-92

SITE: 17R CS Units: K27

START	10:00AM
END	11:00AM
IGNITION TIMING	24
RPM	
ENGINE	953
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	28.5
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	936
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	66
ENGINE J/W IN	185
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
TURBO EX. #13	IN-OP
TURBO EX. #14	IN-OP
#15	IN-OP
#16	IN-OP
TURBO EX. #17	IN-OP

CYLINDER PRESSURE	SUCT.	DISCH.
CYL. #1 HE	172	470
CYL. #2 HE	50	172
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.	0.005
Static	6.00
Diff.	4.15
mcf/d	124.5
scfm	86.5
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	975
AVG. NOx ppm	51
Corrected 15%	15
lbs./hr.	0.36
gms/BHP-hr.	0.27
AVG. CO ppm	1500
Corrected 15%	435
lbs./hr.	6.47
gms/BHP-hr.	4.94
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	565
LOSSES	0.95
TOTAL BHP LOAD	595
PERCENT LOAD	96.1
RATED H.P.	650
DERATED H. P.	619
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #1

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410
Date: 02-11-92

SITE: 17R CS Units: K27

START	11:15AM
END	12:15PM
IGNITION TIMING	24
RPM	
ENGINE	953
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	29.2
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	924
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	66
ENGINE J/W IN	185
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	172	470
CYL. #2 HE	51	172
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.	0.005
Static	6.05
Diff.	4.20
mcf/d	127.1
scfm	88.2
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	996
AVG. NOx ppm	52
Corrected 15%	15
lbs./hr.	0.37
gms/BHP-hr.	0.29
AVG. CO ppm	2300
Corrected 15%	668
lbs./hr.	10.14
gms/BHP-hr.	7.74
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	565
LOSSES	0.95
TOTAL BHP LOAD	595
PERCENT LOAD	96.1
RATED H.P.	650
DERATED H. P.	619
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #2

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand

Model: 2RDS

Unit name: K27

Date: 11-Feb-92 13:05:37

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	STAGE1	10	150.8	510.5*	66 232	1.89	142.5	47	77C
1C	STAGE1	10	144.9	496.9	66 232	1.93	133.8	46	71T
2H	STAGE2	10	45.4	188.9*	53 232	1.82	133.7	58	72C
2C	STAGE2	10	46.7	191.1*	53 232	2.00	140.3	59	69T

Total indicated horsepower (IHP) = 550 @ 954 RPM
Gas horsepower (GHP) = 579 @ 954 RPM
Compressor total horsepower (BHP) = 579 @ 954 RPM
Rated horsepower (BHP) = 650 @1000 RPM
Derated horsepower (BHP) = 620 for 954 RPM
Percent Load = 93%

* WARNING: Check the measured line pressures

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

Analyst signature: [illegible]

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410
Date: 02-11-92

SITE: 17R CS Units: K27

START	12:25PM
END	01:25PM
IGNITION TIMING	24
RPM	
ENGINE	954
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	29.1
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	936
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	66
ENGINE J/W IN	185
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	480
CYL. #2 HE	50	175
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.	0.005
Static	6.00
Diff.	3.90
mcf/d	117.0
scfm	81.3
Exp. Factor (CAL.)	11
Avg. 02%	0.5
Exhst. Flow, dscfm	917
AVG. NOx ppm	49
Corrected 15%	14
lbs./hr.	0.33
gms/BHP-hr.	0.26
AVG. CO ppm	3000
Corrected 15%	871
lbs./hr.	12.17
gms/BHP-hr.	9.55
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	550
LOSSES	0.95
TOTAL BHP LOAD	579
PERCENT LOAD	93.4
RATED H.P.	650
DERATED H. P.	620
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #3

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410
Date: 02-11-92

SITE: 17R CS Units: K27

START	01:55PM
END	02:55PM
IGNITION TIMING	24
RPM	
ENGINE	954
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	28.5
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	936
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	66
ENGINE J/W IN	185
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	172	470
CYL. #2 HE	50	172
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	

FUEL RATE	
Coeff.	0.005
Static	6.00
Diff.	3.90
mcf/d	117.0
scfm	81.3
Exp. Factor (CAL.)	11
Avg. 02%	0.5
Exhst. Flow, dscfm	917
AVG. NOx ppm	55
Corrected 15%	16
lbs./hr.	0.37
gms/BHP-hr.	0.29
AVG. CO ppm	2500
Corrected 15%	726
lbs./hr.	10.15
gms/BHP-hr.	7.96
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	550
LOSSES	0.95
TOTAL BHP LOAD	579
PERCENT LOAD	93.4
RATED H.P.	650
DERATED H. P.	620

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

COMMENTS:
AIR TOXICS TESTING
RUN #4

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand

Model: 2RDS

Unit name: K27

Date: 11-Feb-92 15:53:44

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	STAGE1	10	150.9	505.3	66 232	1.99	143.0	49	75C
1C	STAGE1	10	150.1	484.5	66 232	2.01	133.9	54	66T
2H	STAGE2	10	48.2	191.5*	53 232	1.90	139.4	62	74C
2C	STAGE2	10	47.7	189.5*	53 232	2.13	144.0	62	70T

Total indicated horsepower (IHP) = 560 @ 953 RPM
Gas horsepower (GHP) = 590 @ 953 RPM
Compressor total horsepower (BHP) = 590 @ 953 RPM
Rated horsepower (BHP) = 650 @1000 RPM
Derated horsepower (BHP) = 620 for 953 RPM
Percent Load = 95%

* WARNING: Check the measured line pressures

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

Analyst signature: MKS

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

SITE: 17R CS Units: K27 W.O. # 255410
Date: 02-11-92

START	03:55PM
END	04:55PM
IGNITION TIMING	24
RPM	
ENGINE	953
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	28.5
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	936
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	66
ENGINE J/W IN	185
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	172	470
CYL. #2 HE	50	172
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.	0.005
Static	6.00
Diff.	3.90
mcf/d	117.0
scfm	81.3
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	917
AVG. NOx ppm	50
Corrected 15%	14
lbs./hr.	0.33
gms/BHP-hr.	0.25
AVG. CO ppm	1400
Corrected 15%	406
lbs./hr.	5.68
gms/BHP-hr.	4.37
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	560
LOSSES	0.95
TOTAL BHP LOAD	589
PERCENT LOAD	95.1
RATED H.P.	650
DERATED H. P.	620
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #5

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410

SITE: 17R CS Units: K27 Date: 02-11-92

START	05:05PM
END	06:05PM
IGNITION TIMING	24
RPM	
ENGINE	953
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	28.5
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	936
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	66
ENGINE J/W IN	185
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	172	470
CYL. #2 HE	50	172
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.	0.005
Static	6.00
Diff.	3.90
mcf/d	117.0
scfm	81.3
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	917
AVG. NOx ppm	49
Corrected 15%	14
lbs./hr.	0.33
gms/BHP-hr.	0.25
AVG. CO ppm	1000
Corrected 15%	290
lbs./hr.	4.06
gms/BHP-hr.	3.12
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	560
LOSSES	0.95
TOTAL BHP LOAD	589
PERCENT LOAD	95.1
RATED H.P.	650
DERATED H. P.	620
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #6

Petro Chem Environmental Services, Inc.

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

LOCATION: SEC 17/T30S/R23E				DATE: 02-12-92		
APCD # 4091058 C K-27				RELEASE # AEP 355		
REASON FOR TEST: AIR TOXICS				TEST COMPANY: BPOI		
EQUIPMENT DESCRIPTION: 650HP WAUKESHA				VEE PERFORMED: YES		
NOx CONTROL:	CAT. X	PSC	PCC	O2	OXIDIZING CAT.	
POLLUTANTS:	PM	NOx X	CO X	HC X	H2S	SO2

EMISSIONS DATA

TIME	09:40-10:40	10:50-11:50	12:00-01:00	01:15-02:15	02:25-03:25	
NOX PPM	42	42	42	44	43	
CO PPM	4200	2800	1900	3000	3200	
% O2	0.50	0.51	0.50	0.50	0.49	

CALIBRATION GASES

POLLUTANT	SPAN GAS	RANGE	EXP DATE		INST. MFG	MODEL
NOX	233	0-250	04-01-92		TECO	10
CO	209	0-10000	04-01-92		TECO	48
O2 %	15	0-25	04-01-92		TELEDYNE	

ENGINE PARAMETERS

RPM'S	951	951	950	950	950	
TOTAL BHP LOAD	563	563	552	552	552	
PERCENT LOAD	91.0	91.0	89.0	89.0	89.0	
CATALYST TEMP.	928	928	928	928	928	
FUEL STATIC	6.10	6.05	6.10	6.10	6.10	
FUEL DIFF.	4.10	4.20	4.10	4.10	4.10	
COEF.	0.005	0.005	0.005	0.005	0.005	
RATE (MCF/DAY)	125	127	125	125	125	
SUCTION PSI	51	51	51	51	51	
DISCHARGE PSI	470	470	470	470	470	

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: 2RDS

Unit name: K27 Date: 12-Feb-92 09:53:35

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	STAGE1	10	131.6	496.4	75 232	1.68	130.3	22	79C
1C	STAGE1	10	134.5	485.6	75 232	1.74	123.7	27	70T
2H	STAGE2	10	55.1	185.1	53 232	2.12	140.0	78	61C
2C	STAGE2	10	52.2	174.9	53 232	2.42	140.9	79	58T

Total indicated horsepower (IHP) = 535 @ 951 RPM
Gas horsepower (GHP) = 563 @ 951 RPM
Compressor total horsepower (BHP) = 563 @ 951 RPM
Rated horsepower (BHP) = 650 @1000 RPM
Derated horsepower (BHP) = 618 for 951 RPM
Percent Load = 91%

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

Analyst signature: _____

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410
SITE: 17R CS Units: K27 Date: 02-12-92

START	09:40AM
END	10:40AM
IGNITION TIMING	24
RPM	
ENGINE	951
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	28.9
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	928
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	168
ENGINE J/W OUT	N/A
ENGINE OIL IN	152
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	470
CYL. #2 HE	51	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.	0.005
Static	6.10
Diff.	4.10
mcf/d	125.0
scfm	86.8
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	979
AVG. NOx ppm	42
Corrected 15%	12
lbs./hr.	0.30
gms/BHP-hr.	0.24
AVG. CO ppm	4200
Corrected 15%	1218
lbs./hr.	18.20
gms/BHP-hr.	14.67
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	535
LOSSES	0.95
TOTAL BHP LOAD	563
PERCENT LOAD	91.1
RATED H.P.	650
DERATED H. P.	618
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #1

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410
Date: 02-12-92

SITE: 17R CS Units: K27

START	10:50AM
END	11:50AM
IGNITION TIMING	24
RPM	
ENGINE	951
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	29.2
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	928
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	152
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	470
CYL. #2 HE	51	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.	0.005
Static	6.05
Diff.	4.20
mcf/d	127.1
scfm	88.2
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	995
AVG. NOx ppm	42
Corrected 15%	12
lbs./hr.	0.30
gms/BHP-hr.	0.25
AVG. CO ppm	2800
Corrected 15%	812
lbs./hr.	12.33
gms/BHP-hr.	9.94
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	535
LOSSES	0.95
TOTAL BHP LOAD	563
PERCENT LOAD	91.1
RATED H.P.	650
DERATED H. P.	618
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #2

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 2RDS

Unit name: K27 Date: 12-Feb-92 12:11:05

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	STAGE1	10	133.3	496.8	75 232	1.63	127.4	23	79C
1C	STAGE1	10	129.9	473.4	75 232	1.74	122.8	27	70T
2H	STAGE2	10	48.3	172.7*	53 232	2.05	137.2	74	59C
2C	STAGE2	10	46.6	169.2*	53 232	2.19	136.6	73	56T

Total indicated horsepower (IHP) = 524 @ 953 RPM
Gas horsepower (GHP) = 552 @ 953 RPM
Compressor total horsepower (BHP) = 552 @ 953 RPM
Rated horsepower (BHP) = 650 @1000 RPM
Derated horsepower (BHP) = 620 for 953 RPM
Percent Load = 89%

* WARNING: Check the measured line pressures

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

Analyst signature: _____

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410
SITE: 17R CS Units: K27 Date: 02-12-92

START	12:00PM
END	01:00PM
IGNITION TIMING	24
RPM	
ENGINE	953
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	29.2
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	928
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	152
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	470
CYL. #2 HE	51	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.	0.005
Static	6.10
Diff.	4.10
mcf/d	125.0
scfm	86.8
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	979
AVG. NOx ppm	42
Corrected 15%	12
lbs./hr.	0.30
gms/BHP-hr.	0.25
AVG. CO ppm	1900
Corrected 15%	551
lbs./hr.	8.23
gms/BHP-hr.	6.78
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	524
LOSSES	0.95
TOTAL BHP LOAD	552
PERCENT LOAD	89.0
RATED H.P.	650
DERATED H. P.	620
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #3

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410

SITE: 17R CS Units: K27 Date: 02-12-92

START	01:15PM
END	02:15PM
IGNITION TIMING	24
RPM	
ENGINE	953
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	28.5
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	928
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	152
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	470
CYL. #2 HE	51	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.	0.005
Static	6.10
Diff.	4.10
mcf/d	125.0
scfm	86.8
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	979
AVG. NOx ppm	44
Corrected 15%	13
lbs./hr.	0.31
gms/BHP-hr.	0.26
AVG. CO ppm	3000
Corrected 15%	870
lbs./hr.	13.00
gms/BHP-hr.	10.70
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	524
LOSSES	0.95
TOTAL BHP LOAD	552
PERCENT LOAD	89.0
RATED H.P.	650
DERATED H. P.	620
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #4

Petro Chem Environmental Services, Inc.

COMPRESSOR PERFORMANCE REPORT

Bechtel Petroleum Operations, Inc

Location : Elk Hills, California

Unit Mfr : Dresser Rand Model: 2RDS

Unit name: K27 Date: 12-Feb-92 12:11:05

CYL	SERVICE (stage)	CLR SET (%)	PRESSURES Ps (psi)	PRESSURES Pd (psi)	TEMPS SU (dg F)	TEMPS DIS (dg F)	CALC CAPACITY (MMSCFD)	IHP (hp)	DIS T DELTA (dg F)	ROD LOAD (%)
1H	STAGE1	10	133.3	496.8	75	232	1.63	127.4	23	79C
1C	STAGE1	10	129.9	473.4	75	232	1.74	122.8	27	70T
2H	STAGE2	10	48.3	172.7*	53	232	2.05	137.2	74	59C
2C	STAGE2	10	46.6	169.2*	53	232	2.19	136.6	73	56T

Total indicated horsepower (IHP) = 524 @ 953 RPM
Gas horsepower (GHP) = 552 @ 953 RPM
Compressor total horsepower (BHP) = 552 @ 953 RPM
Rated horsepower (BHP) = 650 @1000 RPM
Derated horsepower (BHP) = 620 for 953 RPM
Percent Load = 89%

* WARNING: Check the measured line pressures

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

Analyst signature: _____

Petro Chem Environmental Services, Inc.

ELK HILLS NAVAL PETROLEUM RESERVE #1
EMISSION DATA

W.O. # 255410
SITE: 17R CS Units: K27 Date: 02-12-92

START	02:25PM
END	03:25PM
IGNITION TIMING	24
RPM	
ENGINE	953
N. TURBO	N/A
S. TURBO	N/A
PRESSURE	
A/F MANIFOLD L/B	-2
A/F MANIFOLD R/B	-2
PCC FUEL	N/A
BAROMETRIC	28.5
% BY PASS OPEN	N/A
TEMPERATURE	
CONVERTOR IN	IN-OP
CONVERTOR OUT	928
AIR MANIFOLD L/B	N/A R/B N/A
AMBIENT	63
ENGINE J/W IN	152
ENGINE J/W OUT	N/A
ENGINE OIL IN	157
ENGINE OIL OUT	N/A
POWER CYL # 1	IN-OP
# 2	IN-OP
# 3	IN-OP
# 4	IN-OP
# 5	IN-OP
# 6	IN-OP
# 7	IN-OP
# 8	IN-OP
# 9	IN-OP
#10	IN-OP
#11	IN-OP
#12	IN-OP
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	470
CYL. #2 HE	51	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.	0.005
Static	6.10
Diff.	4.10
mcf/d	125.0
scfm	86.8
Exp. Factor (CAL.)	11
Avg. O2%	0.5
Exhst. Flow, dscfm	978
AVG. NOx ppm	43
Corrected 15%	13
lbs./hr.	0.31
gms/BHP-hr.	0.25
AVG. CO ppm	3200
Corrected 15%	927
lbs./hr.	13.86
gms/BHP-hr.	11.40
ACTUAL HC lbs./hr.	0.00
gms-BHP-hr.	0.00
TOTAL IN. H.P.	524
LOSSES	0.95
TOTAL BHP LOAD	552
PERCENT LOAD	89.0
RATED H.P.	650
DERATED H. P.	620
LOG #	0

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

COMMENTS:
AIR TOXICS TESTING
RUN #5

Petro Chem Environmental Services, Inc.