



PACIFIC  
ENVIRONMENTAL  
GROUP, INC.

92 JUN 27 11:41

June 19, 1992  
Project 330-40.03

Mr. Michael Whelan  
ARCO Products Company  
P.O. Box 5811  
San Mateo, California 94402

Re: ARCO Service Station 276 Off Site  
10600 MacArthur Boulevard  
Oakland, California

Dear Mr. Carmel:

Pacific Environmental Group, Inc. (PACIFIC) presents this summary of the operation of the catalytic oxidation (Cat-Ox) unit located at the above referenced site. Included is a discussion of the results of the Tedlar bag sample analysis for the period of operation between March 31 and May 27, 1992.

The Cat-Ox unit was sampled three times during this period; April 27, May 11 and 27, 1992. Tedlar bag samples were obtained from the influent and effluent vapor streams, and the well field on April 27 and May 27, 1992. The bag sample taken on May 11 was obtained from the influent vapor stream. These samples were analyzed for total volatile hydrocarbons calculated as gasoline (TVH-g), and its components: benzene, toluene, ethylbenzene, and xylenes (BTEX compounds).

The influent vapor samples indicated a TVH-g concentration of <6.0 micrograms per liter (ug/L) on April 27 and May 27, and 8.2 ug/L on May 11, 1992. The effluent TVH-g concentration was reported as <6.0 ug/L on April 27 and May 27, 1992. The influent and effluent vapor samples from April 27 and May 27 indicated <0.060 ug/L. The corresponding destruction rates for TVH-g and benzene for the April 27 and May 27 samples were calculated at 99+ percent. Soil vapor extraction data is presented in Table 1. Certified analytical reports and chain-of-custody documents are attached.

The Cat-Ox system operated at a flow rate of 500 cubic feet per minute (cfm), with a vacuum pressure from the well field of 4 inches of water. The extraction rate

between March 31 and May 27, 1992 was approximately 0.30 pounds per day for TVH-g and 0.00 pounds per day for benzene (Table 1).

During this period the Cat-Ox unit had two automatic shut down occurrences. Both of these shut downs appear to be caused by power failures at the site. The system was shut down on May 11 to determine if soil vapor concentrations would increase after a period of inoperation, thus indicating the possible need for further off-site extraction.

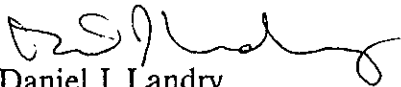
If you have any questions, please call.

Sincerely,

**Pacific Environmental Group, Inc.**



Steve Towle  
Staff Scientist



Daniel J. Landry  
Project Engineer

Attachments: Table 1 - Soil Vapor Extraction Data Evaluation  
Operation and Performance Form

cc: Mr. Chris Winsor, ARCO Products Company  
Mr. Brad Jones, ARCO Products Company  
Mr. Barney Chan, Alameda County Environmental Health Department  
Mr. Alex Saschin, Bay Area Air Quality Management District

# Soil Vapor Extraction Data Evaluation

ARCO Service Station 276 Off site  
10600 MacArthur Boulevard  
Oakland, California

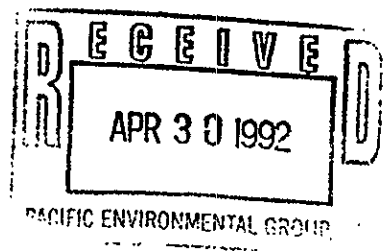
Sample Date	t (days)	td (days)	TVH-g (ug/L)	Benzene (ug/L)	Sample Flow Rate (scfm)	Well Flow Rate (scfm)	TVH-g (lb/day)	Benzene (lb/day)	Hours of Operation	TVH-g Net (lb)	Benzene Net (lb)	TVH-g Total (lb)	Benzene Total (lb)
06/12/91	0	0	0	0.1	500	25	0.00	0.00	0.0	0.0	0.0	0.0	0.0
06/19/91	7	0	140	2.8	500	25	3.15	0.06	168.0	22.1	0.9	22.1	0.9
07/11/91	22	0	140	4.0	500	25	6.30	0.15	528.0	138.6	4.0	160.7	4.8
08/22/91	42	0	130	3.4	500	25	6.08	0.17	1008.0	255.2	6.4	415.8	11.3
09/05/91	14	0	86	3.2	500	25	4.86	0.15	336.0	68.0	2.0	483.8	13.3
11/22/91	78	48	130	2.5	500	25	4.86	0.13	720.0	145.8	3.4	629.6	16.7
12/06/91	14	2	35	0.5	500	25	3.71	0.07	288.0	44.6	0.3	674.2	16.9
12/20/91	14	0	32	0.4	500	25	1.51	0.02	336.0	21.1	0.3	695.3	17.2
01/03/92	14	0	7.5	0.1	500	25	0.89	0.01	336.0	12.4	0.1	707.7	17.2
01/17/92	14	0	6	0.1	500	25	0.30	0.00	336.0	4.3	0.0	712.0	17.3
02/03/92	17	0	7.5	0.1	500	25	0.30	0.00	408.0	5.2	0.1	717.2	17.4
02/18/92	15	0	6	0.1	500	25	0.30	0.00	360.0	4.6	0.0	721.7	17.4
03/02/92	13	13	9.7	0.1	500	25	0.35	0.00	0.0	0.0	0.0	721.7	17.4
03/17/92	15	0	6	0.1	500	25	0.35	0.00	360.0	5.3	0.0	727.0	17.4
03/31/92	14	8	6	0.1	500	25	0.27	0.00	144.0	1.6	0.0	728.6	17.5
04/27/92	27	6	6	0.1	500	25	0.27	0.00	504.0	5.7	0.1	734.3	17.5
05/11/92	14	8	8.2	0.1	500	25	0.32	0.00	144.0	1.9	0.0	736.2	17.5
05/27/92	16	16	0	0.0	0	0	0.00	0.00	0.0	0.0	0.0	736.2	17.5
<b>TOTAL POUNDS REMOVED:</b>											<b>736.2</b>	<b>17.5</b>	
<b>TOTAL GALLONS REMOVED:</b>											<b>110.3</b>		
<b>TOTAL HOURS OF OPERATION:</b>									<b>5976</b>				
<b>% OF OPERABLE HOURS:</b>									<b>71%</b>				

t = time of period since last sampling  
 td = down time during period since last sampling  
 TVH-g = total volatile hydrocarbons (calculated as gasoline)  
 ug/L = micrograms per liter  
 scfm = standard cubic feet per minute  
 lb/day = pounds per day  
 Net = net pounds removed during period  
 Total = total pounds removed to date



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233



Pacific Environmental Group  
1601 Civic Center Drive, Suite 202  
Santa Clara, CA 95050  
Attention: Dan Landry

Project: 330-40.03, arco 0276, Oakland

Enclosed are the results from 3 special matrix samples received at Sequoia Analytical on April 28, 1992. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
2044910	Air, Influent	4/27/92	EPA 5030/8015/8020
2044911	Air, Effluent	4/27/92	EPA 5030/8015/8020
2044912	Air, Well Field	4/27/92	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

  
Vickie Tague  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Pacific Environmental Group	Client Project ID: 330-40.03, arco 0276, Oakland	Sampled: Apr 27, 1992
1601 Civic Center Drive, Suite 202	Matrix Descript: Air	Received: Apr 28, 1992
Santa Clara, CA 95050	Analysis Method: EPA 5030/8015/8020	Analyzed: Apr 28, 1992
Attention: Dan Landry	First Sample #: 204-4910	Reported: Apr 30, 1992

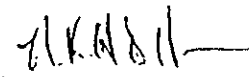
## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L	Benzene µg/L	Toluene µg/L	Ethyl Benzene µg/L	Xylenes µg/L
204-4910	Influent	N.D.	N.D.	N.D.	N.D.	0.078
204-4911	Effluent	N.D.	N.D.	N.D.	N.D.	0.089
204-4912	Well Field	N.D.	N.D.	0.085	N.D.	0.21

<b>Detection Limits:</b>	<b>6.0</b>	<b>0.060</b>	<b>0.060</b>	<b>0.060</b>	<b>0.12</b>
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline fuel standard. Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

  
 Vickie Tague  
 Project Manager



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Pacific Environmental Group  
1601 Civic Center Drive, Suite 202  
Santa Clara, CA 95050  
Attention: Dan Landry

Client Project ID: 330-40.03, arco 0276, Oakland

QC Sample Group: 2044910-12

Reported: Apr 30, 1992

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
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Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M. Nipp	M. Nipp	M. Nipp	M. Nipp
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Apr 28, 1992	Apr 28, 1992	Apr 28, 1992	Apr 28, 1992
QC Sample #:	GBLK042892	GBLK042892	GBLK042892	GBLK042892

Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	10	9.9	9.8	30
Matrix Spike % Recovery:	100	99	98	100
Conc. Matrix Spike Dup.:	9.8	9.8	9.7	29
Matrix Spike Duplicate % Recovery:	98	98	97	97
Relative % Difference:	2.0	1.0	1.0	3.4

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Vickie Tague  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$

SEQUOIA ANALYTICAL SAMPLE RECEIPT LOG

CLIENT NAME:

PCG

MASTER LOG NO. / PAGE:

REC. BY (PRINT):

MM

DATE OF LOG-IN:

4/28

CIRCLE THE APPROPRIATE RESPONSE		LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION (ETC)
1. Custody Seal(s):	Present / <u>Absent</u> Intact / Broken*	2044910	A/B	influent	air bag	air	4/27	
2. Custody Seal Nos.:	X	↓ 11 ↓ 12	↓	effluent well field	↓	↓	↓	
3. Chain-of-Custody Records:	<u>Present</u> / Absent*							
4. Traffic Reports or Packing List:	Present / <u>Absent</u>							
5. Airbill:	Airbill / Sticker Present / <u>Absent</u>							
6. Airbill No.:	X							
7. Sample Tags:	<u>Present</u> / Absent*							
8. Sample Tag Nos.:	<u>Listed</u> / Not Listed on Chain-of-Custody							
9. Sample Condition:	<u>Intact</u> / Broken / Leaking*							
10. Does information on custody reports, traffic reports and sample tags agree?	<u>Yes</u> / No*							
11. Proper Preservatives Used:	<u>Yes</u> / No*							
12. Date Rec. at Lab:	<u>4/28</u>							
13. Time Rec. at Lab:	<u>1105</u>							

\* If Circled, contact Project Manager and attach record of resolution

ARCO Facility no. 276	City (Facility) Oakland	Project manager (Consultant) Dan Landry	Laboratory name SERVOIA
ARCO engineer Chuck Carmel	Telephone no. (ARCO) 984 1536	Fax no. (Consultant) 243 3911	Contract number 07-073
Consultant name PACIFIC ENV. GROUP	Address (Consultant) 1601 CIVIC CENTER DR. #202 95051		

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 8020	BTEX/TPH EPA 16020/8020/8015	TPH Modified 8015 Gas Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM808E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCPLP Metals VOA VOA	Semi Metals VOA VOA	CAM Metals EPA 601/8020 TTLC STLC	Lead Org./DHS Lead EPA 7420/7421		
			Soil	Water	Other Air	Ice	Acid																
TWFL	2				X	NO	NP4-27-92	11:30		X												2044910	
EFFL	2				X																		11
21FE	2				X																		12

Method of shipment

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number

Turnaround time

Priority Rush 1 Business Day

Rush 2 Business Days

Expedited 5 Business Days

Standard 10 Business Days

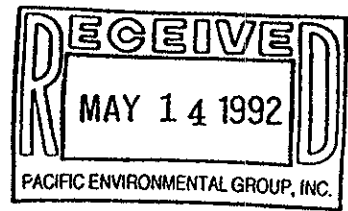
Condition of sample: good	Temperature received:
Relinquished by sampler [Signature]	Received by [Signature]
Date 4-28-92 Time 9:45	Date 4-28-92 Time 11:05
Relinquished by [Signature]	Received by [Signature]
Date 4-28-92 Time 11:05	Received by laboratory [Signature]
Date 4/28 Time 1105	





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Pacific Environmental Group  
1601 Civic Center Drive, Suite 202  
Santa Clara, CA 95050  
Attention: Dan Landry

Project: 330-40.03, Arco 0276, Oakland

Enclosed are the results from 1 special matrix sample received at Sequoia Analytical on May 11, 1992. The requested analysis is listed below:

2051546	Air, Influent	5/11/92	EPA 5030/8015/8020
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Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL:

Vickie Tague  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Pacific Environmental Group	Client Project ID: 330-40.03, Arco 0276, Oakland	Sampled: May 11, 1992
1601 Civic Center Drive, Suite 202	Matrix Descript: Air	Received: May 11, 1992
Santa Clara, CA 95050	Analysis Method: EPA 5030/8015/8020	Analyzed: May 11, 1992
Attention: Dan Landry	First Sample #: 205-1546	Reported: May 14, 1992

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L	Benzene µg/L	Toluene µg/L	Ethyl Benzene µg/L	Xylenes µg/L
205-1546	Influent	8.2	0.068	0.23	0.064	0.44

<b>Detection Limits:</b>	<b>6.0</b>	<b>0.060</b>	<b>0.060</b>	<b>0.060</b>	<b>0.12</b>
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline fuel standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Vickie Tague  
Project Manager



# SEQUOIA ANALYTICAL

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Pacific Environmental Group  
1601 Civic Center Drive, Suite 202  
Santa Clara, CA 95050  
Attention: Dan Landry

Client Project ID: 330-40.03, Arco 0276, Oakland

QC Sample Group: 205-1546

Reported: May 14, 1992

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M. Ripp	M. Ripp	M. Ripp	M. Ripp
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	May 11, 1992	May 11, 1992	May 11, 1992	May 11, 1992
QC Sample #:	GBLK051192	GBLK051192	GBLK051192	GBLK051192
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	8.7	11	11	32
Matrix Spike % Recovery:	87	110	110	107
Conc. Matrix Spike Dup.:	8.9	11	10	32
Matrix Spike Duplicate % Recovery:	89	110	100	107
Relative % Difference:	2.3	0.0	9.5	0.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Vickie Tague  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$

CLIENT NAME:  
REC. BY (PRINT):

P.E. G.  
SP

MASTER LOG NO. / PAGE:

DATE OF LOG-IN:

5-11

CIRCLE THE APPROPRIATE RESPONSE		LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION (ETC)
1. Custody Seal(s):	Present / <u>Absent</u> Intact / Broken*	2051546	A-B	INFL.	2 AIR BAG	A	5-11	
2. Custody Seal Nos.:								
3. Chain-of-Custody Records:	<u>Present</u> / Absent*							
4. Traffic Reports or Packing List:	Present / <u>Absent</u>							
5. Airbill:	Airbill / <u>Sticker</u> Present / Absent							
6. Airbill No.:								
7. Sample Tags:	<u>Present</u> / Absent*							
Sample Tag Nos.:	<u>Listed</u> / Not Listed on Chain-of-Custody							
8. Sample Condition:	<u>Intact</u> / Broken* / Leaking*							
9. Does information on custody reports, traffic reports and sample tags agree?	Yes / No*							
10. Proper Preservatives Used:	Yes / No*							
11. Date Rec. at Lab:	<u>5-11</u>							
12. Time Rec. at Lab:	<u>4 PM</u>							

\* If Circled, contact Project Manager and attach record of resolution

ARCO Facility no. 0276	City (Facility) Oakland	Project manager (Consultant) Dan Jandry	Laboratory name Sequoia
ARCO engineer LC Chuck Carmel	Telephone no. (ARCO)	Telephone no. (Consultant) 408-984-6536	Contract number 07-673
Consultant name Pacific Environ. Group	Address (Consultant) 1101 Civic Center Dr. Santa Clara CA		

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 802	BTEX/TPH EPA 1631 EPA 1632 EPA 1631/15	TPH Modified 8015 Gas Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCMP Metals	Semi Metals VOA	CAA Metals EPA 601/7006 TLTC STLC	Lead Org./DHS Lead EPA 7420/7421		
			Soil	Water	Other	Ice	Acid																
INFL		2 bags			Air			5-11-92	13:30		X												

Method of shipment  
Common

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number  
2051546

Turnaround time

Priority Rush 1 Business Day

Rush 2 Business Days

Expedited 5 Business Days

Standard 10 Business Days

Condition of sample: GOOD

Temperature received: \_\_\_\_\_

Relinquished by sampler  
Richard [Signature]

Date 11/1/92 Time 3:5

Received by  
Amy McDonald

Relinquished by  
Amy McDonald

Date 5/11/92 Time 4:00

Received by  
Sophia [Signature]

Relinquished by

Date

Received by laboratory  
Sophia [Signature]

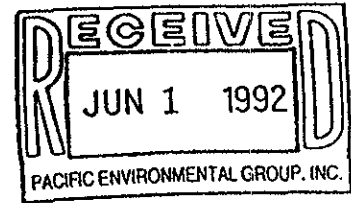
Date 5-11

Time 4



# SEQUOIA ANALYTICAL

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Pacific Environmental Group  
601 Civic Center Drive, Suite 202  
Santa Clara, CA 95050  
Attention: Dan Landry

Project: 330-40.03, Arco 276, Oakland

Enclosed are the results from 3 special matrix samples received at Sequoia Analytical on May 27, 1992. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
054820	Air, Influent	5/27/92	EPA 5030/8015/8020
054821	Air, Effluent	5/27/92	EPA 5030/8015/8020
054822	Air, Well Field	5/27/92	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Mark D. Herrera  
Project Manager



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(415) 364-9600 • FAX (415) 364-9233

Pacific Environmental Group	Client Project ID: 330-40.03, Arco 276, Oakland	Sampled: May 27, 1992
601 Civic Center Drive, Suite 202	Matrix Descript: Air	Received: May 27, 1992
Santa Clara, CA 95050	Analysis Method: EPA 5030/8015/8020	Analyzed: May 27, 1992
Attention: Dan Landry	First Sample #: 205-4820	Reported: Jun 1, 1992

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L	Benzene µg/L	Toluene µg/L	Ethyl Benzene µg/L	Xylenes µg/L
205-4820	Influent	N.D.	N.D.	0.13	N.D.	0.097
205-4821	Effluent	N.D.	N.D.	0.097	N.D.	0.060
205-4822	Well Field	33	N.D.	0.28	0.14	0.42

<b>Detection Limits:</b>	<b>6.0</b>	<b>0.060</b>	<b>0.060</b>	<b>0.060</b>	<b>0.060</b>
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline fuel standard. Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

*DKH*  
Derkowhat D. Herrera  
Project Manager



# SEQUOIA ANALYTICAL

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Pacific Environmental Group  
601 Civic Center Drive, Suite 202  
Santa Clara, CA 95050  
Attention: Dan Landry

Client Project ID: 330-40.03, Arco 276, Oakland

QC Sample Group: 2054820 - 22

Reported: Jun 1, 1992

## QUALITY CONTROL DATA REPORT

NALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
--------	---------	---------	---------------	---------

Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	L.Laikhtman	L.Laikhtman	L.Laikhtman	L.Laikhtman
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	May 27, 1992	May 27, 1992	May 27, 1992	May 27, 1992
QC Sample #:	GBLK052792	GBLK052792	GBLK052792	GBLK052792

Sample Conc.:	N.D.	N.D.	N.D.	N.D.
---------------	------	------	------	------

Spike Conc. Added:	10	10	10	30
--------------------	----	----	----	----

Conc. Matrix Spike:	9.7	9.6	9.7	29
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Matrix Spike % Recovery:	97	96	97	97
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Conc. Matrix Spike Dup.:	9.9	9.8	9.7	30
--------------------------	-----	-----	-----	----

Matrix Spike Duplicate % Recovery:	99	98	97	100
------------------------------------	----	----	----	-----

Relative % Difference:	2.0	2.1	0.0	3.4
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Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Dan Landry  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



