

# REPUBLIC SOIL GAS SURVEY

## REPUBLIC, WASHINGTON

### SEPTEMBER 1993

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## Introduction

This memorandum documents the results of the soil gas survey conducted September 1993 in the town of Republic, located in northeast Washington in Ferry County. These results have already been transmitted informally to Ecology's Eastern Regional Office (ERO). Based on these results ERO staff initiated leaking underground storage tank (LUST) inspections at two potential source areas, Anderson Grocery/Gas Store and the Texaco gas station.

The soil gas survey was conducted in response to residents' complaint of gasoline odors in their home. Ecology's ERO conducted an initial investigation at the home in April 1993. Gasoline constituents were identified in air samples from the house and from sanitary sewer manholes in the immediate area. The objective of the soil gas survey was to determine the pathway and possible source of the hydrocarbon odor. Initially, the target source area was the bulk storage facility located near the residence (Figure 1). The focus of the survey was relocated to town when contamination was observed in a construction trench near the school (Figure 2). A total of 22 soil gas samples and one soil sample were collected and tested. Soil gas samples were analyzed in the field using a portable gas chromatograph.

## Results

Sample locations are shown in Figures 1 and 2. Table 1 presents a summary of the soil gas survey results. Concentrations of compounds that were not identified by the gas chromatograph are summed in the Unknown column of Table 1. Soil gas sample chromatograms are included in Appendix A. Distribution of the identified compounds is discussed below.

### North of Residence Around Bulk Plant

Soil gas samples were initially collected between the affected residence and a fuel bulk plant located about 525 feet north of the residence. Primary gasoline compounds (benzene, toluene, and xylenes (BTX)) were identified in soil gas samples between these two locations at low concentrations (less than 1 ppm). Higher concentrations were detected at sample station REP10 located on the east side of the fuel bulk plant (Figure 1). However, contaminated soil from a 1992 diesel spill at the bulk plant was land treated near the REP10 location.

### Downtown Republic

The survey was relocated to downtown because of hydrocarbon contamination observed in a construction trench alongside the school. Soil gas samples REP12 through REP20 were collected in the vicinity of the sanitary sewer line on Kean Street (Figure 2). High concentrations of light

hydrocarbons were primarily detected in samples REP12 (See chromatograph trace #41 and #42) and REP14 (See chromatograms #57) between Anderson's Grocery/Gas Store and the school. Sample REP12 was collected next to the construction trench. High concentrations of benzene, toluene, and xylene, and other contaminants were detected in sample REP18, located on Kean Street (See chromatograms #11 and #12).

A soil sample was collected from the construction trench and analyzed for BTEX, total petroleum hydrocarbons as gasoline (TPH-G) and diesel (TPH-D). Three of the four BTEX compounds were detected: toluene (17 mg/kg), ethylbenzene (7 mg/kg), and xylenes (91 mg/kg). Xylene concentrations exceeded the soil cleanup standard of 20.0 mg/kg as established by the Model Toxics Control Act (MTCA), WAC 173-340. TPH-G was detected at 3900 mg/kg and TPH-D at 250 mg/kg. These concentrations exceeded MTCA soil cleanup standards of 100 mg/kg and 200 mg/kg, respectively. Petroleum hydrocarbons detected in the soil sample appeared to exhibit a pattern match for gasoline and not diesel (Appendix B). Petroleum hydrocarbons detected in the TPH-D analysis are most likely the result of late-eluting gasoline peaks.

Based on the survey results, the source of the contamination probably originated in town and the sanitary sewer line acted as a migration pathway. Two potential source areas located on Clark Street are Anderson's Grocery/Gas Store and the Texaco gas station. The Texaco station did have a leaky gasoline pipe about seven years ago. This release was never reported to Ecology (Leinart, 1994). A utility maintenance shop located on the corner of 6th and Kean Street had an underground tank which was removed about four years ago after a diesel release. At the time of the soil gas study a leaking watermain on Clark Street was repaired between the Texaco Station and Anderson's Grocery. I suspect that the water from the leaking main helped transport contaminants along the sewer line. Since the soil gas survey LUST inspections have been conducted at both the Texaco station and Anderson's Grocery. In the meantime, the hydrocarbon odor at the residence seems to have decreased.

## **METHODS**

### **Sample Collection**

Twenty-two soil gas and one soil sample were collected and tested. Sample locations are shown in Figures 1 and 2. Soil gas samples were collected between the affected residence and the fuel bulk plant. Soil gas and a soil sample were also collected in downtown Republic from a suspected contaminated area in the vicinity of the sanitary sewer line. Pam Marti, Denis Erickson, Bernard Strong, and Phil Leinart collected soil gas samples on September 22-24, 1993. Weather conditions were cool and clear.

### **Soil Gas Sampling**

Soil gas samples were obtained using portable sampling equipment. Sample stations in paved areas were drilled with an electric percussion drill equipped with a 1½-inch asphalt bit. A pilot hole was advanced to the required depth by driving a 1/2-inch diameter, solid steel rod. After removing the pilot hole rod, a stainless steel retractable soil gas sampling tip (Retract-a-Tip) was driven into the pilot hole. The retractable tip was then pulled back (about 2 inches) to expose the sampling screen. A bentonite plug was installed at the surface to prevent air flow from the atmosphere to the sample

area. Soil gas samples were withdrawn using a suction pump through 3/16-inch ID teflon tubing and collected under vacuum pressure in one-liter Tedlar bags. Test holes were plugged using hydrated bentonite. Overlying fill and asphalt cover (cold mix) were placed as necessary.

Due to the presence of coarse gravel, cobbles, and boulders, depth profile sampling was not possible. Soil gas samples were collected from one to three feet below the ground surface.

Soil gas samples were analyzed in the field using a portable gas chromatograph (Sentex Scentograph Plus), equipped with an Argon Ionization Detector (AID) and a 12-foot, 10% SP-1000 (80/100 mesh) packed column. Prior to sample analysis, the gas chromatograph was calibrated using a mixture of 1.0 ppm benzene, 1.3 ppm toluene and 1.5 ppm m-xylene. An industrial solvents chemical compound library (Sentex) was used to identify other gasoline constituents. Operating parameters such as sample time, temperature, and chart duration were adjusted to maximize results. Copies of soil gas analyses, as well as operating parameter information are included in Appendix A.

All non-disposable down-hole equipment was decontaminated between test holes using sequential washes of tap water with Liquinox® detergent, deionized water, and laboratory grade methanol. Retractable tips were completely disassembled for cleaning and decontaminated between holes. Teflon® tubing was discarded between test holes.

### **Soil Sampling**

A soil sample was collected from an existing construction trench. The sample was collected with a stainless steel spoon and placed directly into a four-ounce glass jar. All sampling equipment was decontaminated using a tap water/Liquinox® wash and sequential rinses with deionized water and methanol.

Upon sample collection and proper labeling, the soil sample was stored on ice in an ice chest and transported to the laboratory. Chain-of-custody was maintained on all samples using Manchester Laboratory protocols (Ecology, 1994). The soil sample was analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), total petroleum hydrocarbons as gasoline (TPH-G) and total petroleum hydrocarbons as diesel (TPH-D).

## **Quality Assurance Samples**

### **Soil Gas**

In general, soil gas results are considered to be good and usable. Because sample results were determined using a portable gas chromatograph, all reported analytes are considered tentatively identified and concentrations are estimates. Soil gas quality assurance samples consisted of calibration, duplicates, and blanks. The gas chromatograph was calibrated about once every five analytical runs with a standard pressurized mixture of 1.0 ppm benzene, 1.3 ppm toluene and 1.5 ppm m-xylene. Duplicate samples (repeat analyses of the same sample) were analyzed for at least 10% of all soil gas samples. Duplicate results were considered qualitative and within expected ranges. Blank samples of ambient air were run frequently to ensure that equipment contamination had not occurred. Soil gas sample results from REP13 and REP15 should be disregarded do to equipment contamination from the analysis of sample REP12.

## Soil Samples

Karin Feddersen of the Manchester Laboratory evaluated laboratory quality assurance results for the soil sample (Appendix A). The quality of the organic results is good. The petroleum hydrocarbons detected in the sample appeared to exhibit a pattern match for gasoline and not diesel. Petroleum hydrocarbons detected in the TPH-D analysis are most likely the result of late-eluting gasoline peaks. Spike recoveries were within acceptable limits of 50-150%. Relative percent difference (%RPD) for the spike and spike duplicates were within  $\pm 20\%$ , except for TPH-D at 32%.

## References

EPA, 1986. Test Methods for Evaluating Solid Waste, SW-846. Office of Emergency Response, Washington, D.C.

Leinart, P., 1994. Department of Ecology, Eastern Region Office LUST Inspector. Personal communication, July 1994.

Washington State Department of Ecology, 1991. Manchester Environmental Laboratory - Laboratory Users Manual. Edited by D. Huntamer and J. Hyre.

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## Contacts

Pamela B. Marti                      Washington State Department of Ecology  
Environmental Investigations and Laboratory Services Program  
(206) 407-6768

Larry Goldstein                      Washington State Department of Ecology  
Environmental Investigations and Laboratory Services Program  
(206) 407-6573

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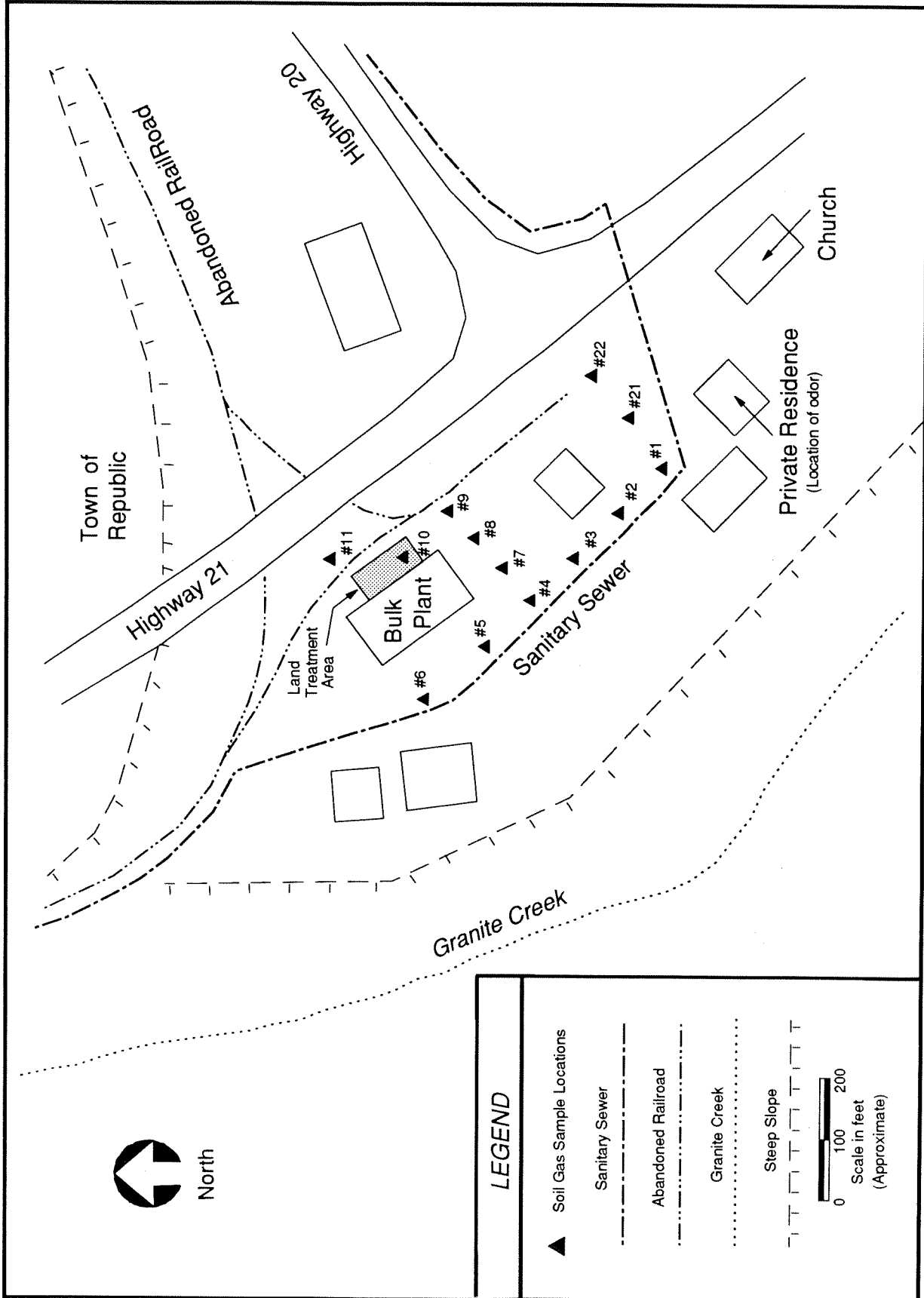


Figure 1: Soil Gas Sample Locations near Fuel Bulk Plant

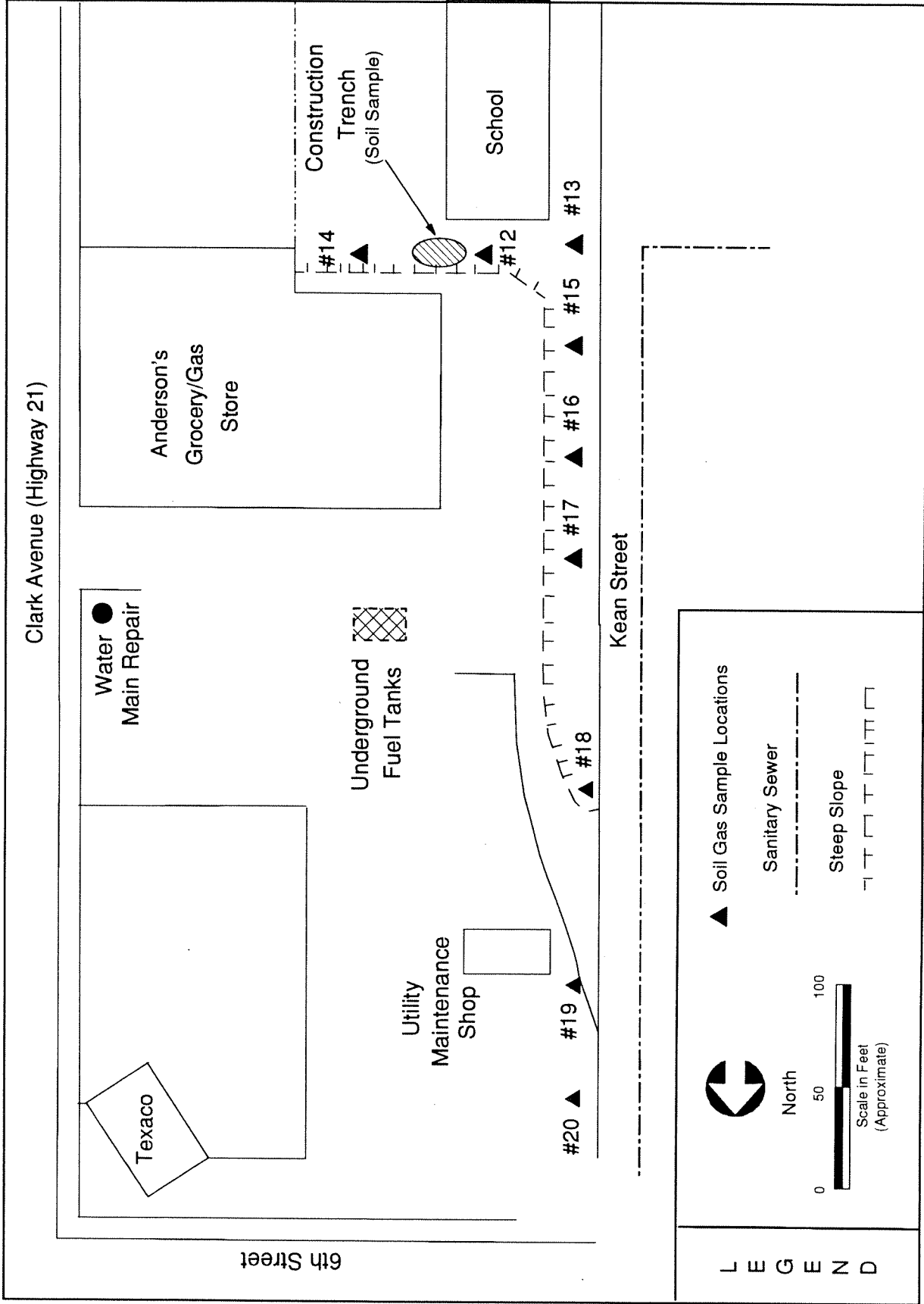


Figure 2: Soil Gas Sample Locations in Downtown Republic

Table 1: Summary of Soil-Gas Results collected September, 1994 Republic, WA

NOTE: Results were determined using a Sentex portable gas chromatograph. Analytes are considered tentatively identified and concentrations are estimates.

Trace #	Station I.D. (REP-)	Depth (feet)	Benzene		Toluene		Xylenes		Unknowns	
			Retention Time (seconds)	Conc. (ppm) (estimate)	Retention Time (seconds)	Conc. (ppm) (estimate)	Retention Time (seconds)	Conc. (ppm) (estimate)	Retention Time (seconds)	Total Conc. (ppm) (estimate)
2	1	3	287	0.01	-	-	-	-	398-791	0.01
4	2	1.3	291	0.01	437	0.01	662	0.002	120-760	0.02
5	3	3	291	0.001	438	0.003	657	0.001	163-404	0.02
7	4	3	-	-	-	-	-	-	412	0.01
9	5	3	-	-	-	-	873	0.004	303-555	0.03
11	6	1	-	-	-	-	-	-	388	0.01
14	7	1.3	292	0.01	440	0.01	-	-	404	0.01
18	8	3	284	0.002	425	0.003	-	-	391	0.01
21	9	1.3	285	0.002	423	0.004	666	0.001	171-879	0.02
22	10	3	-	-	-	-	-	-	118-494	0.55
25	11	3	288	0.004	429	0.005	-	-	395	0.01
41	12	3	-	-	-	-	-	-	116-666	5.45
51	13	1.5	-	-	-	-	-	-	-	-
53	15	3	-	-	-	-	-	-	-	-
57	14	3	282	0.03	419	0.02	-	-	111-388	8.5
8	16	3	285	0.004	426	0.02	-	-	157-753	0.02
9	17	3	-	-	426	0.01	644	0.001	173-393	0.01
11	18	3	291	2.6	429	10.1	636-660	5.0	118-437	89
26	19	3	275	0.004	406	0.01	625-640	0.01	92-762	0.04
27	20	3	274	0.003	407	0.04	-	-	119-374	0.09
36	21	2.1	-	-	402	0.002	-	-	173-374	0.05
37	22	3	-	-	-	-	-	-	212-744	0.06

= Soil gas samples with high detections.

**APPENDIX A**  
Republic Soil Gas Survey  
Select Soil Gas Chromatograms  
September 1994



TRACE PRINTOUT

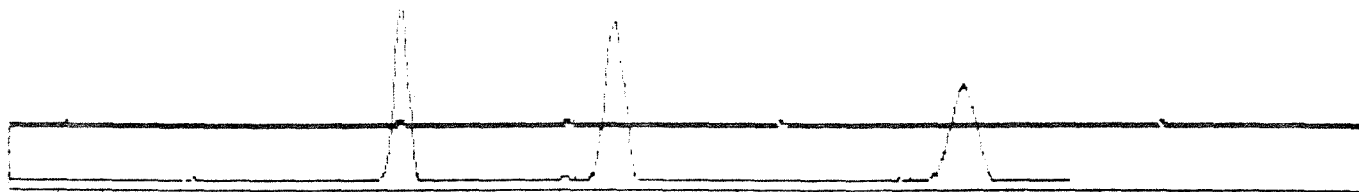
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NAME:      REP1                      CHART DURATION:      15  
COLUMN: 10%SP1000                  DETECTOR: AID  
COLUMN PRESSURE: 26      SAMPLE TIME:              5  
TEMPERATURE:      100      INHIBIT TIME:              30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	BENZENE	287	7924	0.007 PPM
2	UNKNOWN	398	5337	0.005 PPM
3	UNKNOWN	791	10044	0.009 PPM
TOTAL AREA:		23305		

NAME: REP1  
UPPER TRACE #2      0.63% Sep 22, 93 11:53  
LOWER TRACE #1      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, 0 Secs  
SAMPLE TIME: 5  
GAIN: 1.250  
DURATION: 15 Minutes



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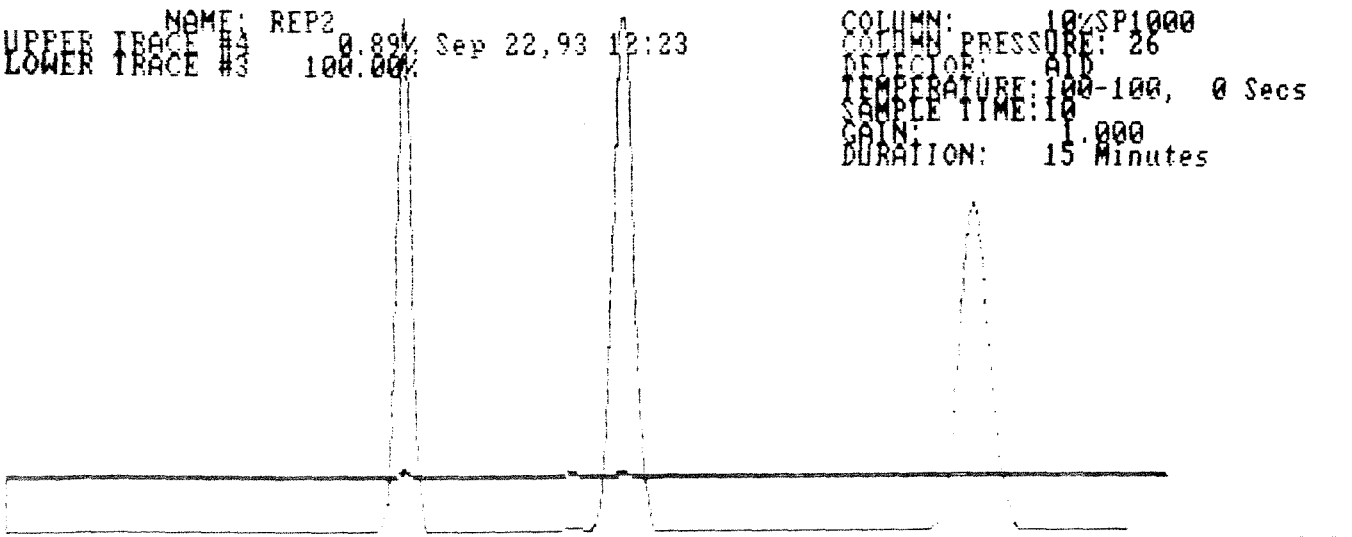
NAME:      REP2                      CHART DURATION:      15  
 COLUMN: 10%SP1000                  DETECTOR: AID  
 COLUMN PRESSURE:    26      SAMPLE TIME:            10  
 TEMPERATURE:        100      INHIBIT TIME:          30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	120	5710	0.001 PPM
2	UNKNOWN	132	2945	0.001 PPM
3	<del>#11DCB</del> UNK	141	2512	0.001 PPM P3m
4	<del>#13CBONE</del> UNK	177	5273	0.001 PPM P3m
5	UNKNOWN	190	8628	0.002 PPM
6	UNKNOWN	229	2943	0.001 PPM
7	BENZENE	291	35982	0.008 PPM
8	UNKNOWN	367	9162	0.002 PPM
9	UNKNOWN	402	23914	0.005 PPM
10	TOLUENE	437	30766	0.007 PPM
11	XYLENE	662	6626	0.002 PPM
12	UNKNOWN	747	4450	0.001 PPM
13	UNKNOWN	760	8085	0.002 PPM

TOTAL AREA: 146996

UPPER TRACE #1      NAME: REP2      0.89%      Sep 22, 93 12:23  
 LOWER TRACE #3      100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, @ Secs  
 SAMPLE TIME: 10  
 GAIN: 1.000  
 DURATION: 15 Minutes



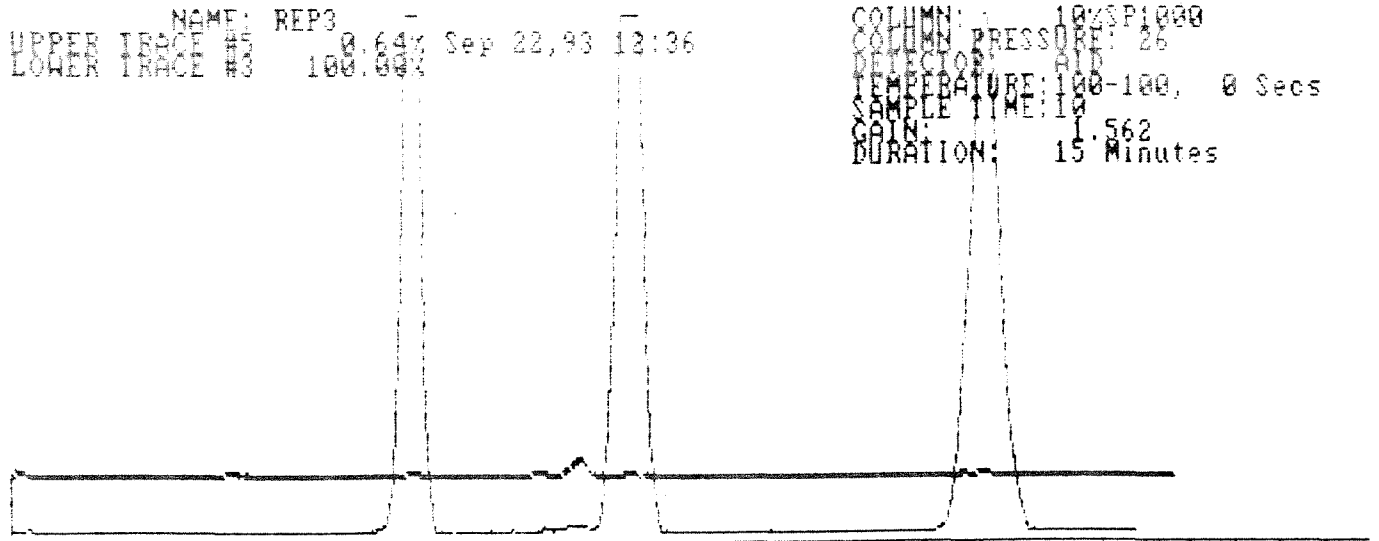
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TRACE #5      DATE: Wed Sep 22 12:36:54 1993

NAME:      REP3                      CHART DURATION:      15  
COLUMN: 10%SP1000                  DETECTOR: AID  
COLUMN PRESSURE:    26      SAMPLE TIME:            10  
TEMPERATURE:        100      INHIBIT TIME:          30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	163	8686	0.002 PPM
2	BENZENE	291	3962	0.001 PPM
3	UNKNOWN	373	8986	0.002 PPM
4	UNKNOWN	404	68248	0.016 PPM
5	TOLUENE	438	11039	0.003 PPM
6	XYLENE	657	4883	0.001 PPM

TOTAL AREA: 105804



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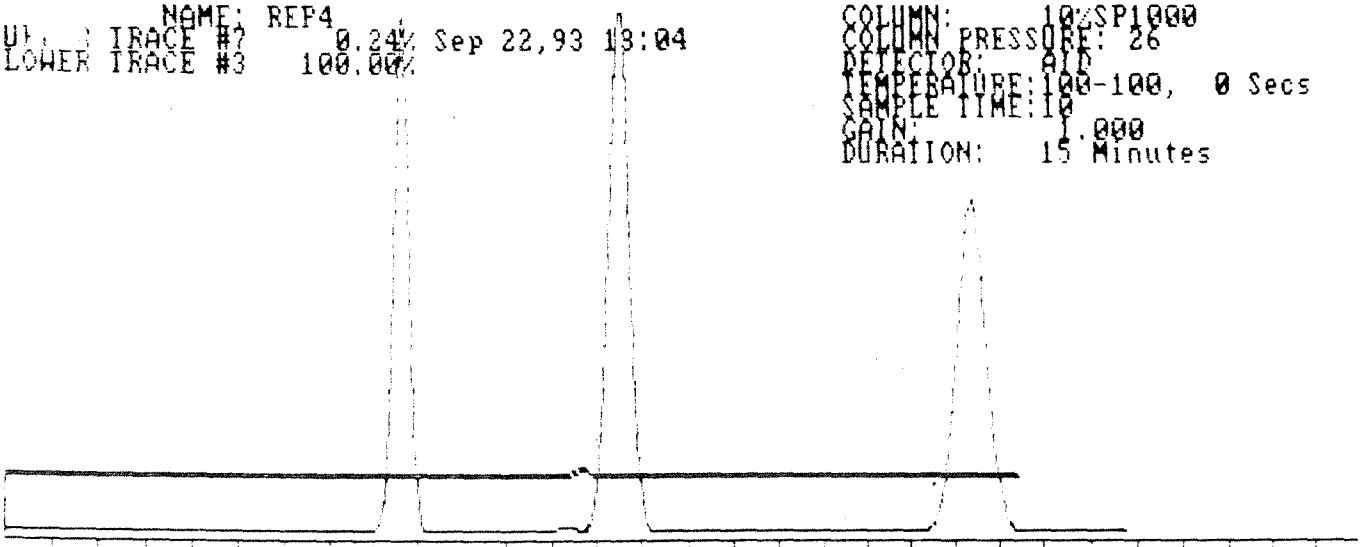
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NAME:      REP4                      CHART DURATION:      15  
COLUMN: 10%SP1000      DETECTOR: AID  
COLUMN PRESSURE: 26      SAMPLE TIME:      10  
TEMPERATURE:      100      INHIBIT TIME:      30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	412	40087	0.009 PPM
TOTAL AREA:			40087	

NAME: REP4  
UPPER TRACE #7      0.24%      Sep 22, 93 13:04  
LOWER TRACE #3      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, 0 Secs  
SAMPLE TIME: 10  
GAIN: 1.000  
DURATION: 15 Minutes



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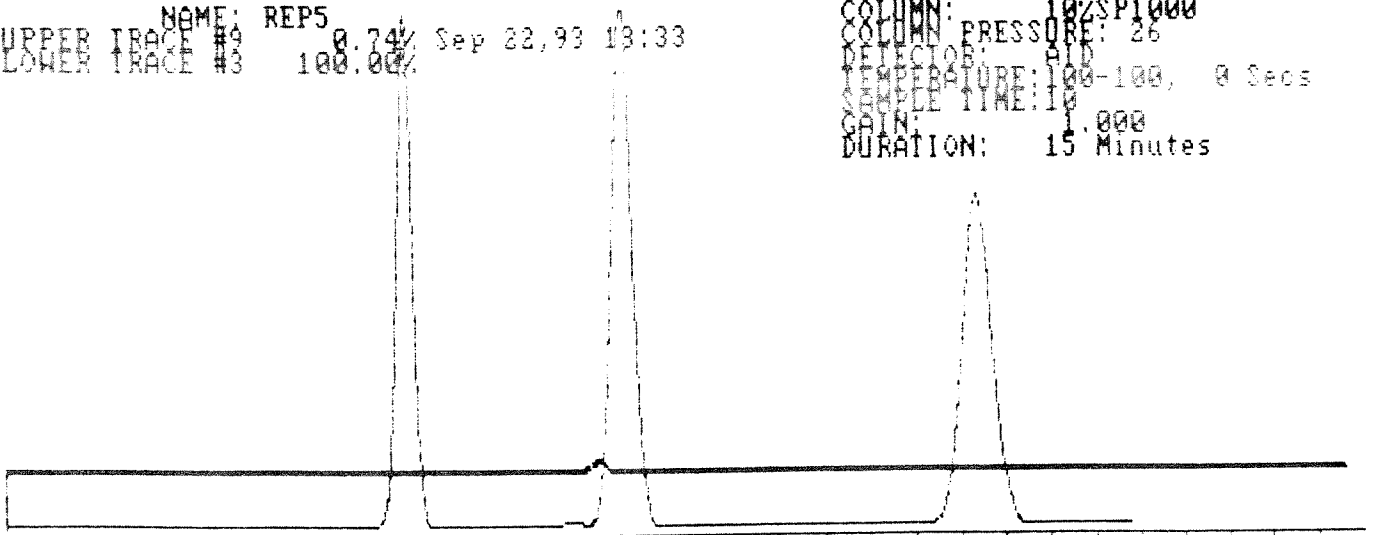
NAME:      REP5                      CHART DURATION:      15  
COLUMN: 10%SP1000                  DETECTOR: AID  
COLUMN PRESSURE:    26      SAMPLE TIME:            10  
TEMPERATURE:        100      INHIBIT TIME:          30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	303	9191	0.002 PPM
2	<del>UNKNOWN</del> unk	396	7656	0.002 PPM P3m
3	UNKNOWN	420	72554	0.017 PPM
4	UNKNOWN	555	16237	0.004 PPM
5	#O-XYLENE	873	16432	0.004 PPM

TOTAL AREA: 122070

NAME: REP5  
UPPER TRACE #4      0.74%      Sep 22, 93 13:33  
LOWER TRACE #3      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, 8 Secs  
SAMPLE TIME: 10  
GAIN: 1.000  
DURATION: 15 Minutes



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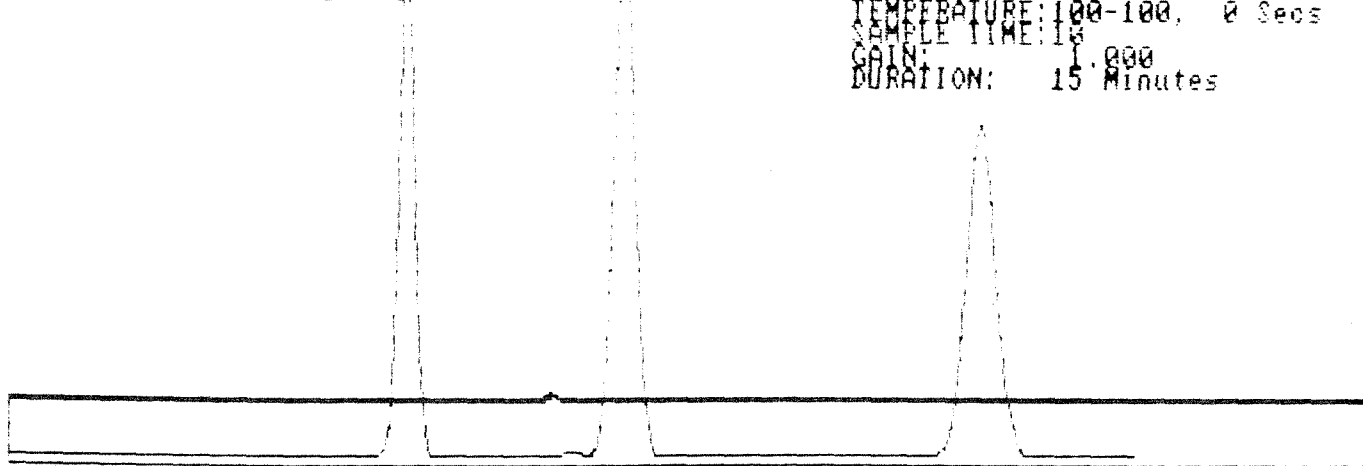
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NAME:      REP6                      CHART DURATION:      15  
COLUMN: 10%SP1000                  DETECTOR: AID  
COLUMN PRESSURE: 26      SAMPLE TIME:              10  
TEMPERATURE:      100      INHIBIT TIME:              30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	279	431	0.000 PPM
2	<del>11100000</del> UUK	388	34881	0.008 PPM P3m
TOTAL AREA:		35312		

NAME: REP6  
UPPER TRACE #11      0.21%      Sep 22, 93 14:06  
LOWER TRACE #3      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
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SAMPLE TIME: 10  
GAIN: 1.000  
DURATION: 15 Minutes



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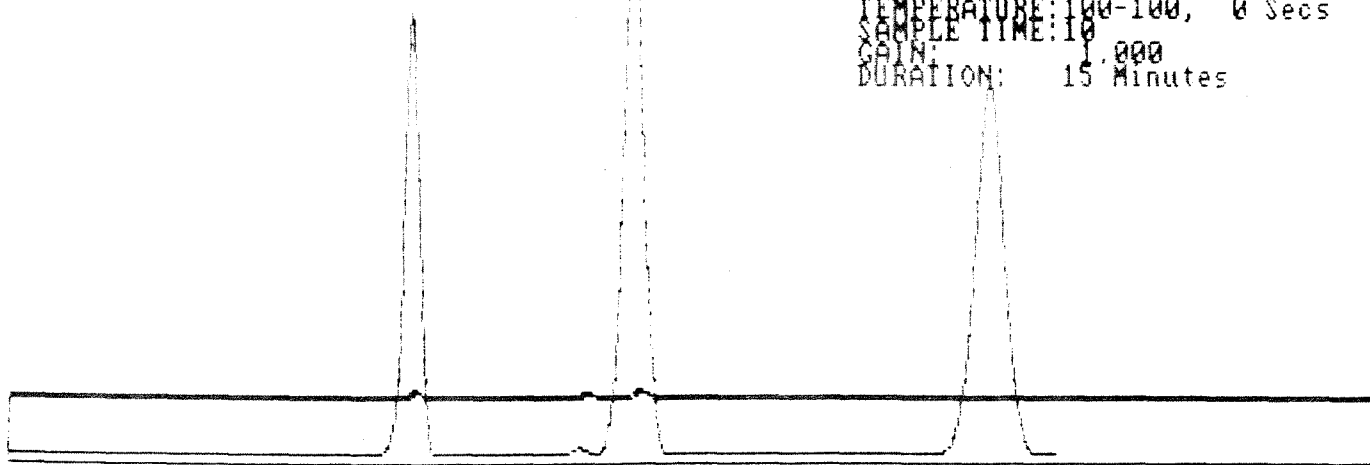
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NAME:      REP7(2)      CHART DURATION:      15  
COLUMN: 10%SP1000      DETECTOR: AID  
COLUMN PRESSURE: 26      SAMPLE TIME:      10  
TEMPERATURE:      100      INHIBIT TIME:      30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	BENZENE	292	23843	0.007 PPM
2	UNKNOWN	404	26581	0.007 PPM
3	TOLUENE	440	47480	0.011 PPM
TOTAL AREA:			97904	

NAME: REP7(2)  
UPPER TRACE #14      0.61%      Sep 22, 93 15:14  
LOWER TRACE #13      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, 0 Secs  
SAMPLE TIME: 10  
GAIN: 1.000  
DURATION: 15 Minutes



TRACE PRINTOUT

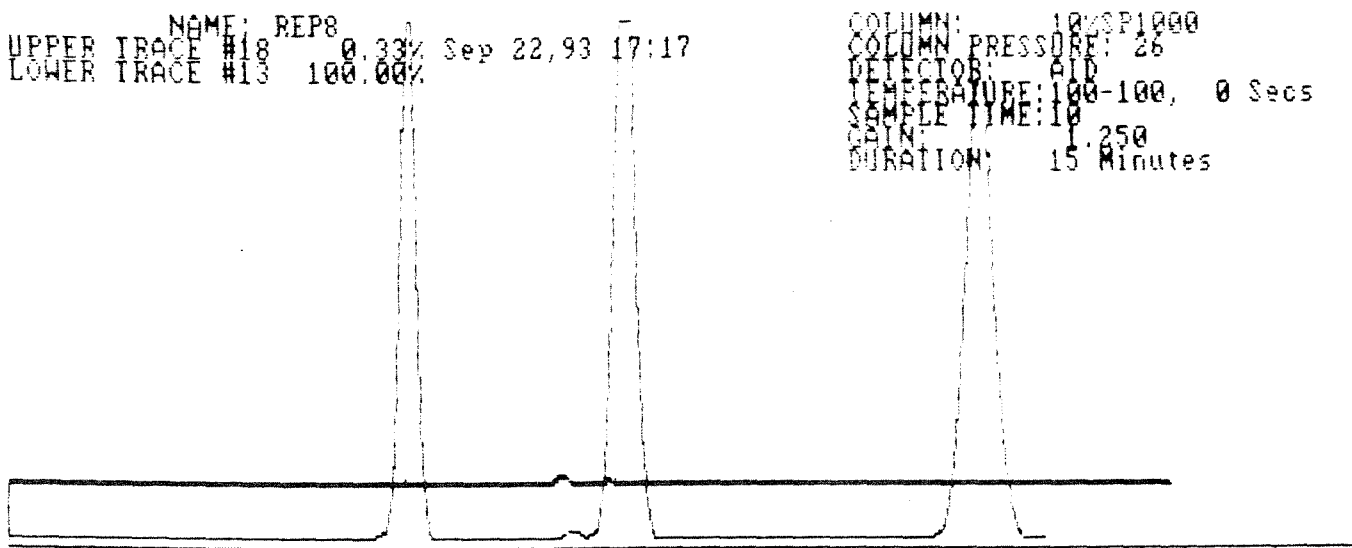
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NAME:      REP8                      CHART DURATION:      15  
COLUMN: 10%SP1000      DETECTOR: AID  
COLUMN PRESSURE: 26      SAMPLE TIME:      10  
TEMPERATURE:      100      INHIBIT TIME:      30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	BENZENE	284	7274	0.002 PPM
2	<del>XXXXXXXXXX</del> UNK	391	33868	0.009 PPM P3m
3	TOLUENE	425	12377	0.003 PPM
TOTAL AREA:			53519	

NAME: REP8  
UPPER TRACE #18      0.33%      Sep 22, 93 17:17  
LOWER TRACE #13      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, 0 Secs  
SAMPLE TIME: 10  
GAIN: 1.250  
DURATION: 15 Minutes





TRACE PRINTOUT

TRACE #21      DATE: Wed Sep 22 17:57:19 1993

NAME:      REP9                      CHART DURATION:      15  
COLUMN: 10%SP1000                  DETECTOR: AID  
COLUMN PRESSURE: 26      SAMPLE TIME:              10  
TEMPERATURE:              100      INHIBIT TIME:              30

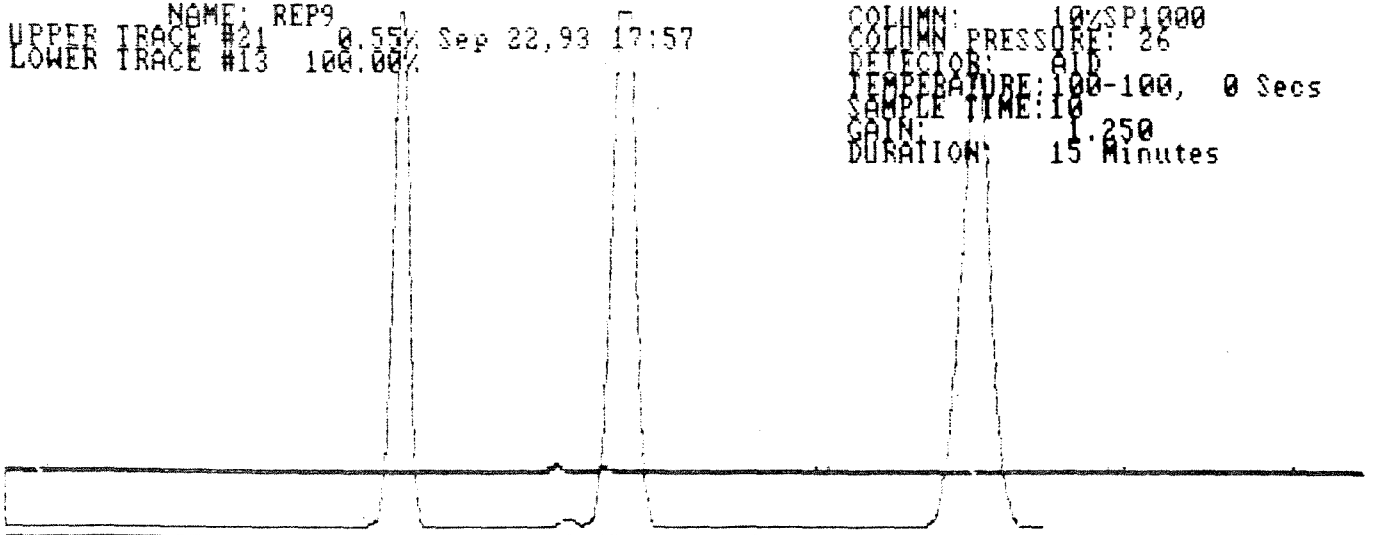
PEAK#      NAME                              RT              AREA              CONCENTRATION

<del>1</del>	<del>UNKNOWN</del>	<del>10</del>	<del>997</del>	<del>1179.671</del>	<del>PPM</del> P3m
2	UNKNOWN	171	10773	0.003	PPM
3	BENZENE	285	8591	0.002	PPM
4	<del>XXXXXXXXXX</del> UNK	392	26894	0.007	PPM P3m
5	#TOLUENE	423	14265	0.004	PPM
6	UNKNOWN	562	11971	0.003	PPM
7	XYLENE	666	3391	0.001	PPM
8	UNKNOWN	756	8659	0.002	PPM
9	UNKNOWN	879	4274	0.001	PPM

TOTAL AREA:      87911

NAME: REP9  
UPPER TRACE #21      0.55%      Sep 22, 93 17:57  
LOWER TRACE #13      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, 0 Secs  
SAMPLE TIME: 10  
GAIN: 1.250  
DURATION: 15 Minutes



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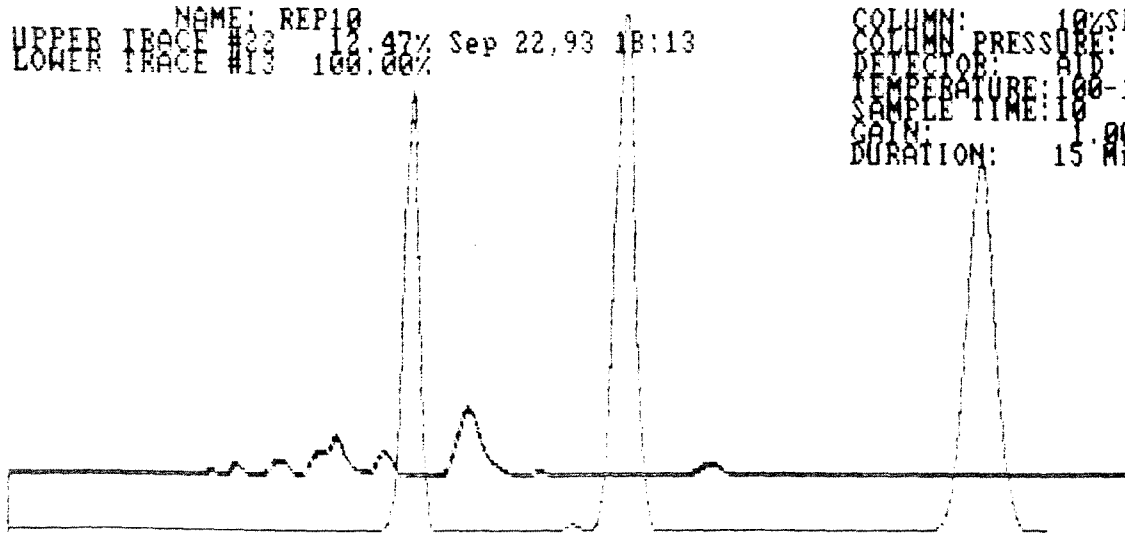
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 COLUMN: 10%SP1000      DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME:          10  
 TEMPERATURE:      100      INHIBIT TIME:          30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	118	9182	0.003 PPM
2	UNKNOWN	132	3325	0.001 PPM
3	UNKNOWN	159	17099	0.005 PPM
4	<del>XXXXXXXXXX</del> UNK	175	58623	0.016 PPM Pr3m
5	UNKNOWN	204	124356	0.034 PPM
6	UNKNOWN	241	546141	0.150 PPM
7	UNKNOWN	272	184055	0.051 PPM
8	<del>XXXX</del> UNK	328	927711	0.255 PPM Pr3m
9	UNKNOWN	378	19385	0.005 PPM
10	UNKNOWN	494	114488	0.031 PPM

TOTAL AREA: 2004365

NAME: REP10  
 UPPER TRACE #23      12.47%      Sep 22, 93 18:13  
 LOWER TRACE #13      100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, 0 Secs  
 SAMPLE TIME: 10  
 GAIN: 1.000  
 DURATION: 15 Minutes



TRACE PRINTOUT

TRACE #41      DATE: Thu Sep 23 12:13:42 1993

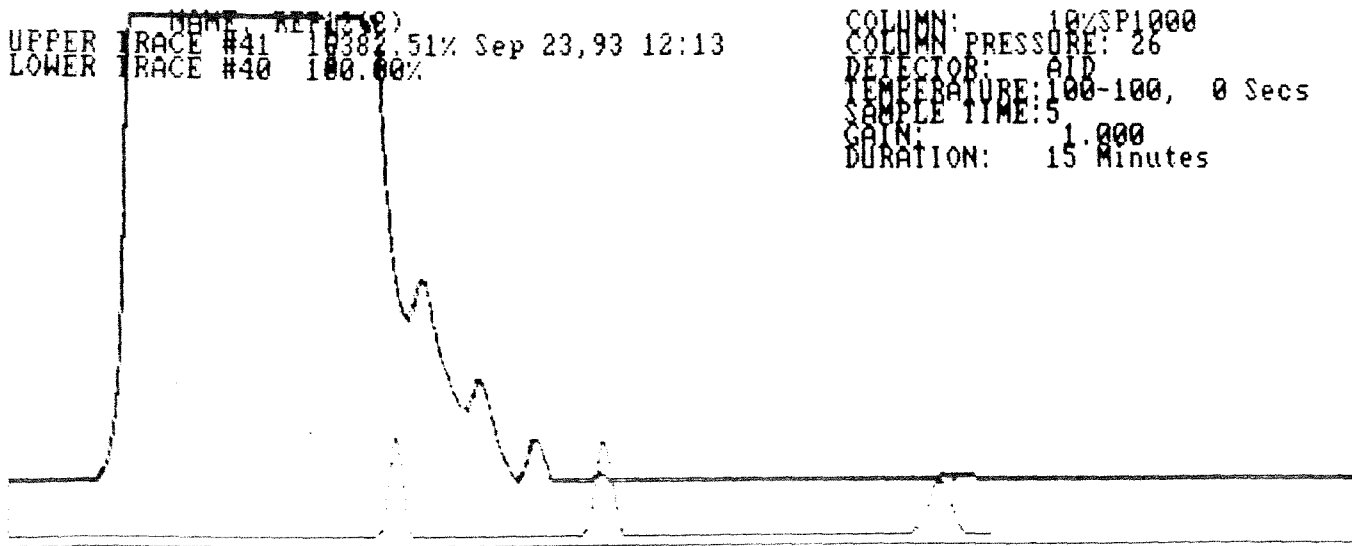
NAME:      REP12(2)      CHART DURATION:      15  
 COLUMN: 10%SP1000      DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME:      5  
 TEMPERATURE:      100      INHIBIT TIME:      30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	116	193499286	254.922 PPM
2	UNKNOWN	143	106690983	140.558 PPM
3	UNKNOWN	160	34207022	45.065 PPM
4	UNKNOWN	168	18892619	24.890 PPM
5	<del>XXXXXXXXXX</del> UNK	196	30795246	40.571 PPM P3m
6	<del>XXXX</del> UNK	225	6613920	8.713 PPM P3m
7	<del>XXXXXXXXXX</del> UNK	249	11431724	15.060 PPM P3m
8	UNKNOWN	267	5914973	7.793 PPM
9	UNKNOWN	300	3786736	4.989 PPM
10	<del>XXXXXXXXXX</del> UNK	338	1385561	1.825 PPM P3m
11	<del>XXXXXXXXXX</del> UNK	375	361778	0.477 PPM P3m
12	TOLUENE	420	37734	0.055 PPM
13	#M-XYLENE	666	64331	0.085 PPM

TOTAL AREA: 413681913

UPPER TRACE #41 100.00%  
 LOWER TRACE #40 100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, 0 Secs  
 SAMPLE TIME: 5  
 GAIN: 1.000  
 DURATION: 15 Minutes



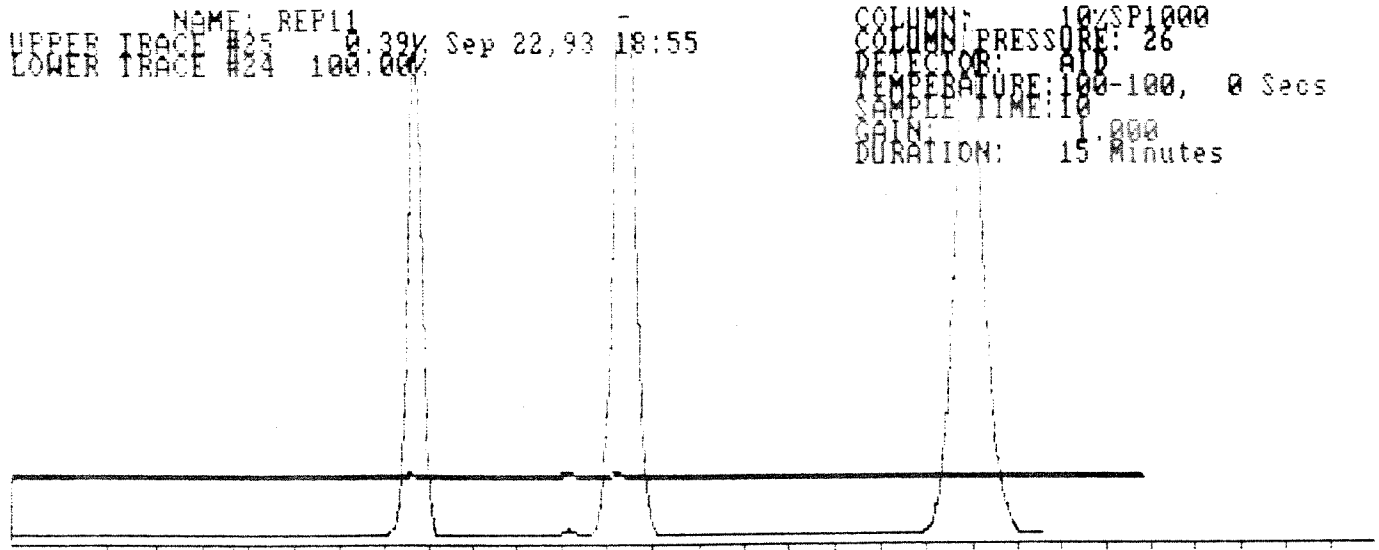
TRACE PRINTOUT

TRACE #25      DATE: Wed Sep 22 18:55:08 1993

NAME:      REP11              CHART DURATION:      15  
COLUMN: 10%SP1000      DETECTOR: AID  
COLUMN PRESSURE:    26      SAMPLE TIME:            10  
TEMPERATURE:        100      INHIBIT TIME:          30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	204	1494	0.000 PPM
2	BENZENE	288	14605	0.004 PPM
3	<del>1100000</del> WIK	395	34105	0.009 PPM P3m
4	TOLUENE	429	26690	0.005 PPM

TOTAL AREA:      76894



TRACE PRINTOUT

TRACE #42      DATE: Thu Sep 23 12:30:08 1993

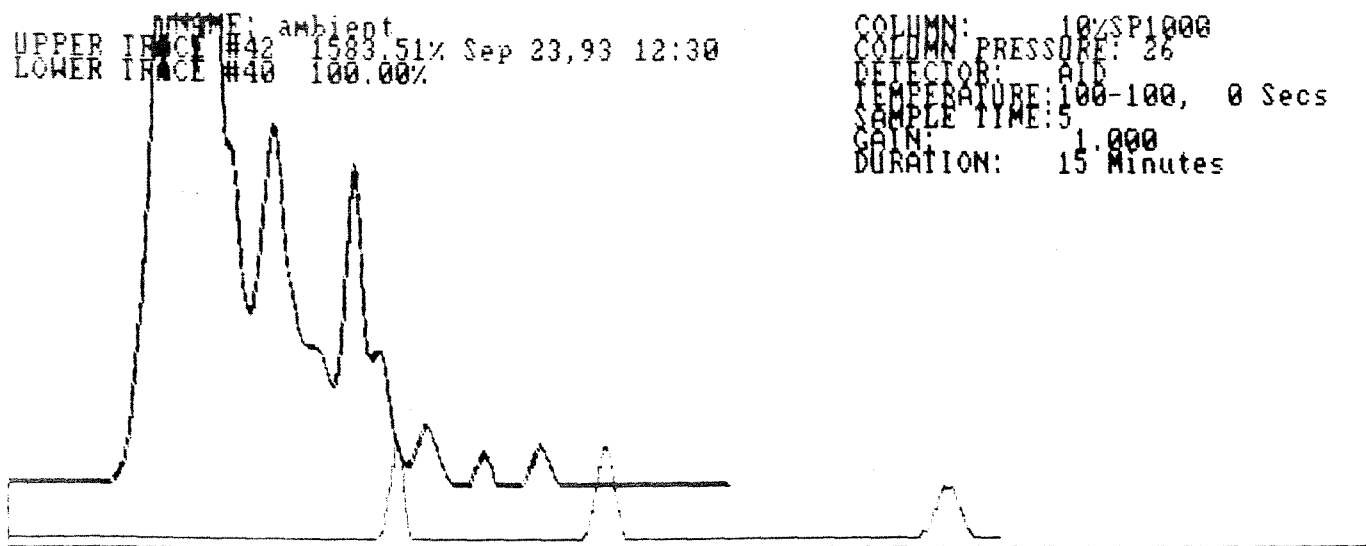
NAME: ambient      CHART DURATION: 15  
 COLUMN: 10%SP1000      DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME: 5  
 TEMPERATURE: 100      INHIBIT TIME: 30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	<del>XXXXXXXXXX</del> UNK	121	4590363	6.047 PPM P3m
2	UNKNOWN	132	8883711	11.704 PPM
3	UNKNOWN	155	12055730	15.883 PPM
4	UNKNOWN	198	8216045	10.824 PPM
5	<del>XXXXXXXXXX</del> UNK	251	3631407	4.784 PPM P3m
6	UNKNOWN	270	1321645	1.741 PPM
7	UNKNOWN	302	687444	0.906 PPM
8	<del>XXXXXXXXXX</del> UNK	341	241395	0.318 PPM P3m
9	<del>XXXXXXXXXX</del> UNK	378	358059	0.472 PPM P3m

TOTAL AREA: 39985799

UPPER TRACE #42      NAME: ambient  
 LOWER TRACE #40      1583.51% Sep 23, 93 12:30  
 100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, 0 Secs  
 SAMPLE TIME: 5  
 GAIN: 1.000  
 DURATION: 15 Minutes



TRACE PRINTOUT

TRACE #43      DATE: Thu Sep 23 12:39:17 1993

NAME: ambient      CHART DURATION: 15  
 COLUMN: 10%SP1000      DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME: 10  
 TEMPERATURE: 100      INHIBIT TIME: 30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	119	489754	0.645 PPM
2	<del>111808</del> UNK	137	1418592	1.869 PPM P3m
3	UNKNOWN	154	1606784	2.117 PPM
4	UNKNOWN	168	684305	0.902 PPM
5	<del>111808</del> UNK	196	1645032	2.167 PPM P3m
6	<del>111808</del> UNK	225	367546	0.484 PPM P3m
7	<del>111808</del> UNK	249	804036	1.059 PPM P3m
8	UNKNOWN	268	239042	0.315 PPM
9	UNKNOWN	300	84857	0.112 PPM
10	<del>111808</del> UNK	338	47687	0.063 PPM P3m
11	<del>111808</del> UNK	376	155573	0.205 PPM P3m

TOTAL AREA: 7543208

NAME: ambient  
 UPPER TRACE #43 298.72% Sep 23, 93 12:39  
 LOWER TRACE #46 100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, 0 Secs  
 SAMPLE TIME: 10  
 GAIN: 1.000  
 DURATION: 15 Minutes



TRACE PRINTOUT

TRACE #51      DATE: Thu Sep 23 13:41:24 1993

NAME:      REP13                  CHART DURATION:      15  
COLUMN: 10%SP1000      DETECTOR: AID  
COLUMN PRESSURE: 26      SAMPLE TIME:          5  
TEMPERATURE:      100      INHIBIT TIME:          30

PEAK#    NAME                                  RT      AREA      CONCENTRATION

<del>1</del>	<del>#120000000</del>	<del>126</del>	<del>10060</del>	<del>0.010 PPM</del>	<del>PPM</del>
<del>2</del>	<del>#CARB DS</del>	<del>145</del>	<del>77473</del>	<del>0.101 PPM</del>	<del>PPM</del>
<del>3</del>	<del>UNKNOWN</del>	<del>161</del>	<del>74400</del>	<del>0.090 PPM</del>	<del>PPM</del>
<del>4</del>	<del>#ACETONE</del>	<del>175</del>	<del>8851</del>	<del>0.010 PPM</del>	<del>PPM</del>
<del>5</del>	<del>UNKNOWN</del>	<del>200</del>	<del>13450</del>	<del>0.000 PPM</del>	<del>PPM</del>
<del>6</del>	<del>UNKNOWN</del>	<del>101</del>	<del>8210</del>	<del>0.011 PPM</del>	<del>PPM</del>

TOTAL AREA: ~~150760~~ 0

NAME: REP13  
UPPER TRACE #51      7.87%      Sep 23, 93 13:41  
LOWER TRACE #40      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, 0 Secs  
SAMPLE TIME: 5  
GAIN: 1.250  
DURATION: 15 Minutes



TRACE PRINTOUT

TRACE #53      DATE: Thu Sep 23 13:58:53 1993

NAME:      REP15                      CHART DURATION:      15  
COLUMN: 10%SP1000                      DETECTOR: AID  
COLUMN PRESSURE:    26                      SAMPLE TIME:            5  
TEMPERATURE:        100                      INHIBIT TIME:           30

PEAK#    NAME                      RT      AREA      CONCENTRATION

<del>1</del>	<del>UNKNOWN</del>	<del>110</del>	<del>6013</del>	<del>0.000 PPM</del>	<del>PPM</del>
<del>2</del>	<del>UNKNOWN</del>	<del>127</del>	<del>20100</del>	<del>0.016 PPM</del>	<del>PPM</del>
<del>3</del>	<del>#11202</del>	<del>130</del>	<del>20100</del>	<del>0.021 PPM</del>	<del>PPM</del>
<del>4</del>	<del>#SARS BS</del>	<del>145</del>	<del>21265</del>	<del>0.000 PPM</del>	<del>PPM</del>
<del>5</del>	<del>UNKNOWN</del>	<del>162</del>	<del>51600</del>	<del>0.050 PPM</del>	<del>PPM</del>
<del>6</del>	<del>#FRETONE</del>	<del>176</del>	<del>2000</del>	<del>0.004 PPM</del>	<del>PPM</del>
<del>7</del>	<del>UNKNOWN</del>	<del>205</del>	<del>2347</del>	<del>0.012 PPM</del>	<del>PPM</del>
<del>8</del>	<del>UNKNOWN</del>	<del>302</del>	<del>5115</del>	<del>0.005 PPM</del>	<del>PPM</del>
<del>9</del>	<del>UNKNOWN</del>	<del>315</del>	<del>1000</del>	<del>0.000 PPM</del>	<del>PPM</del>
<del>10</del>	<del>UNKNOWN</del>	<del>450</del>	<del>2002</del>	<del>0.010 PPM</del>	<del>PPM</del>

TOTAL AREA: ~~150000~~ 0

NAME: REP15  
UPPER TRACE #53      6.27% Sep 23,93 13:58  
LOWER TRACE #40    100.00%

COLUMN:            10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR:          AID  
TEMPERATURE: 100-100, 0 Secs  
SAMPLE TIME: 5  
GAIN:                1.000  
DURATION:          15 Minutes





TRACE PRINTOUT

TRACE #57      DATE: Thu Sep 23 14:44:26 1993

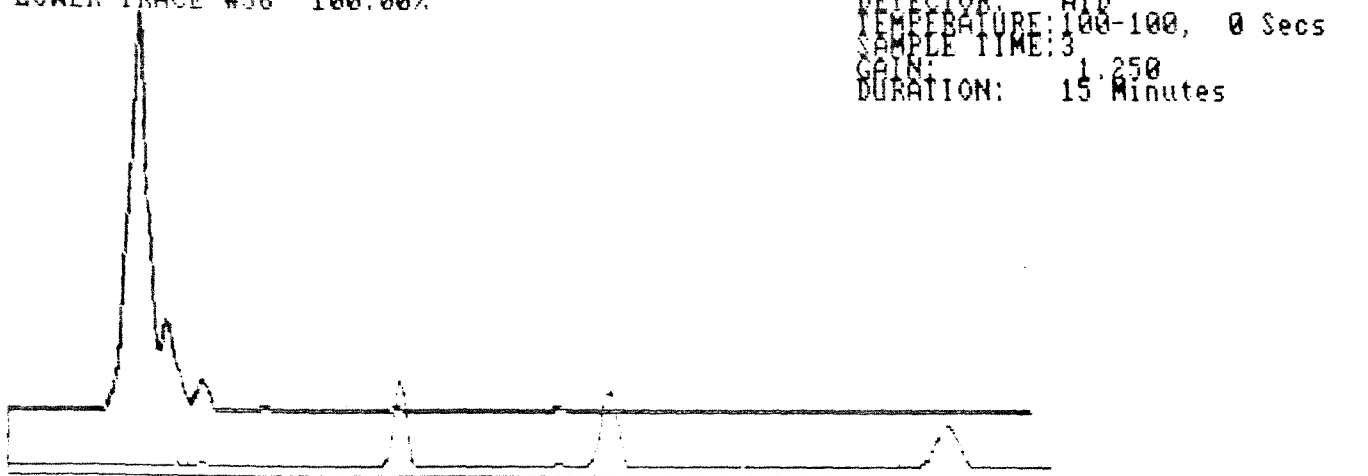
NAME:      REP14                      CHART DURATION:      15  
 COLUMN: 10%SP1000                  DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME:              3  
 TEMPERATURE:              100      INHIBIT TIME:              30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	111	3307455	6.887 PPM
2	UNKNOWN	132	601343	1.252 PPM
3	UNKNOWN	156	148460	0.309 PPM
4	<del>XXXXXXXXXX</del> UNK	196	16828	0.035 PPM P3M
5	<del>XXXXXXXXXX</del> UNK	248	9580	0.020 PPM P3M
6	BENZENE	282	13286	0.028 PPM
7	<del>XXXXXXXXXX</del> UNK	388	8389	0.017 PPM P3M
8	TOLUENE	419	5392	0.013 PPM

TOTAL AREA: 4110733

NAME: REP14  
 UPPER TRACE #57 263.32% Sep 23, 93 14:44  
 LOWER TRACE #56 100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, 0 Secs  
 SAMPLE TIME: 3  
 GAIN: 1.250  
 DURATION: 15 Minutes



TRACE PRINTOUT

TRACE #5      DATE: Thu Sep 23 17:04:02 1993

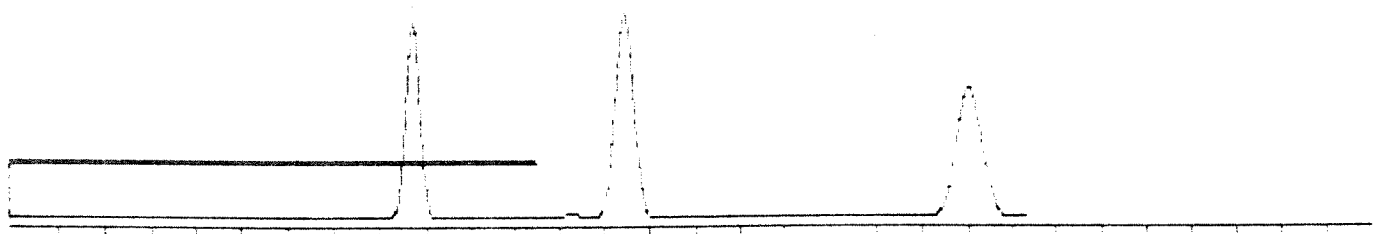
NAME:    REP15(2)            CHART DURATION:    15  
COLUMN: 10%SP1000        DETECTOR: AID  
COLUMN PRESSURE:    26    SAMPLE TIME:        5  
TEMPERATURE:        100    INHIBIT TIME:      30

PEAK#    NAME                            RT        AREA        CONCENTRATION

~~1    UNKNOWN                            2.102    2307.226    100%    P3m~~  
TOTAL AREA: ~~2307.226~~ 0

NAME: REP15(2)  
UPPER TRACE #5    75.736.99% Sep 23, 93 17:04  
LOWER TRACE #1    100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, 0 Secs  
SAMPLE TIME: 5  
GAIN: 1.000  
DURATION: 15 Minutes



TRACE PRINTOUT

TRACE #8      DATE: Thu Sep 23 17:32:30 1993

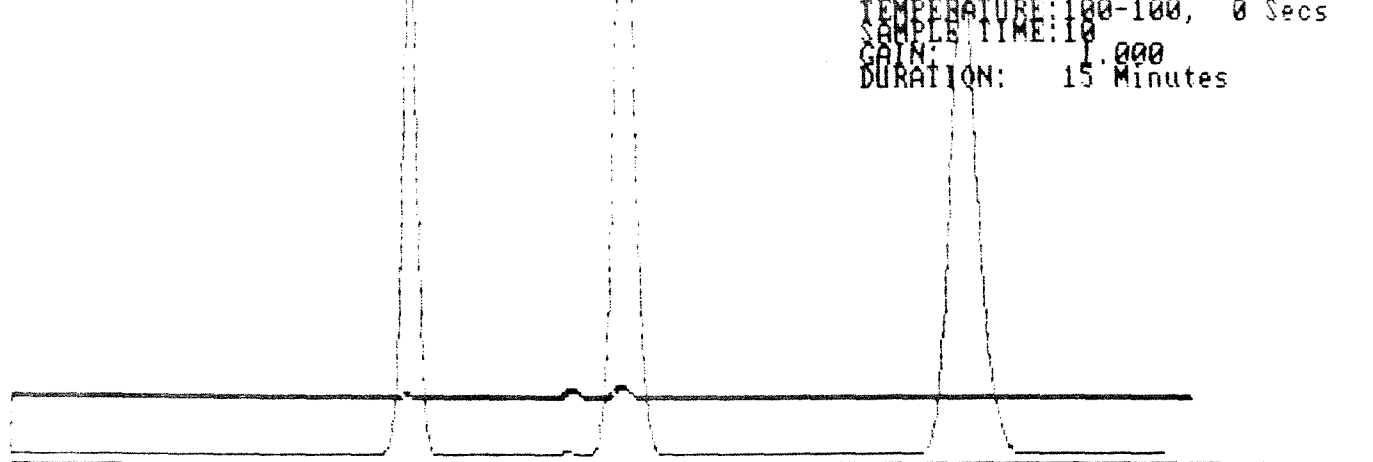
NAME:      REP16(2)      CHART DURATION:      15  
 COLUMN: 10%SP1000      DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME:      10  
 TEMPERATURE:      100      INHIBIT TIME:      30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	157	1860	0.000 PPM
2	BENZENE	285	17419	0.004 PPM
3	UNKNOWN	312	7475	0.002 PPM
4	<del>UNKNOWN</del> UNK	393	54937	0.014 PPM P3m
5	TOLUENE	426	89978	0.018 PPM
6	UNKNOWN	559	5123	0.001 PPM
7	UNKNOWN	753	6362	0.002 PPM

TOTAL AREA: 183154

NAME: REP16(2)  
 UPPER TRACE #6      0.95%      Sep 23, 93 17:32  
 LOWER TRACE #7      100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, 0 Secs  
 SAMPLE TIME: 10  
 GAIN: 1.000  
 DURATION: 15 Minutes



TRACE PRINTOUT

TRACE #9      DATE: Thu Sep 23 17:47:28 1993

NAME:      REP17                      CHART DURATION:      15  
COLUMN: 10%SP1000                      DETECTOR: AID  
COLUMN PRESSURE:    26      SAMPLE TIME:            10  
TEMPERATURE:        100      INHIBIT TIME:          30

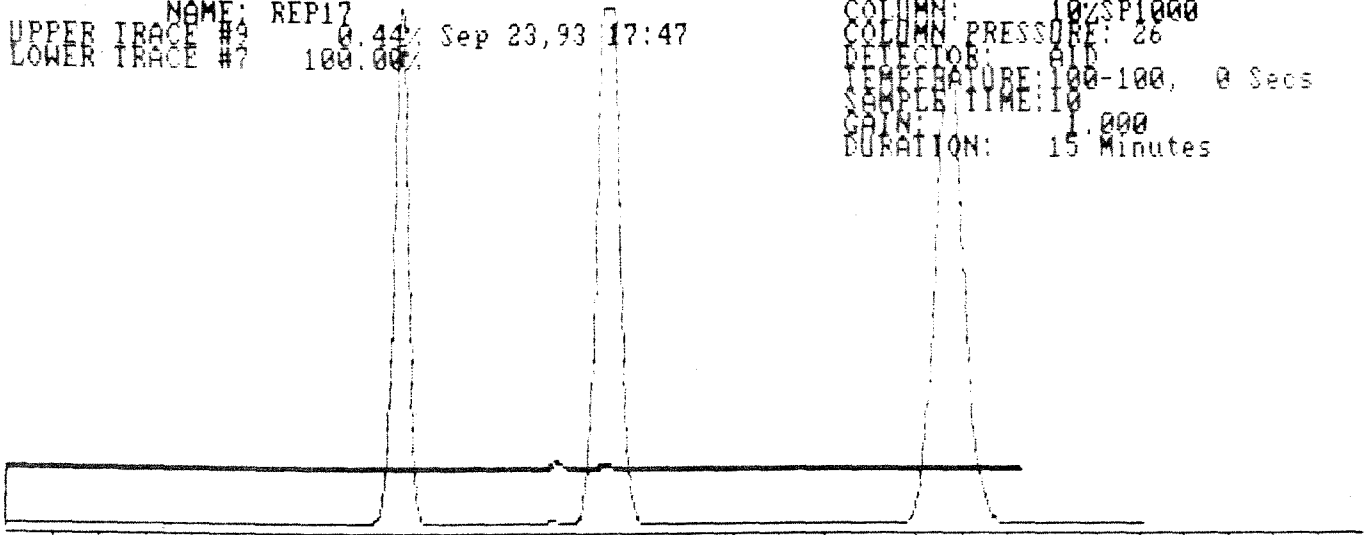
PEAK#    NAME                                      RT      AREA      CONCENTRATION

<del>1</del>	<del>11111111</del>	<del>100</del>	<del>0000</del>	<del>1065.170</del>	<del>PPM</del>	<del>P3M</del>
2	<del>11111111</del> LINK	173	1586	0.000	PPM	P3M
3	<del>11111111</del> LINK	393	40505	0.010	PPM	P3M
4	TOLUENE	426	36953	0.007	PPM	
5	XYLENE	644	7035	0.001	PPM	

TOTAL AREA:    83781

NAME: REP17  
UPPER TRACE #9      0.44%      Sep 23, 93      17:47  
LOWER TRACE #7      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, @ Secs  
SAMPLE TIME: 10  
GAIN: 1.000  
DURATION: 15 Minutes



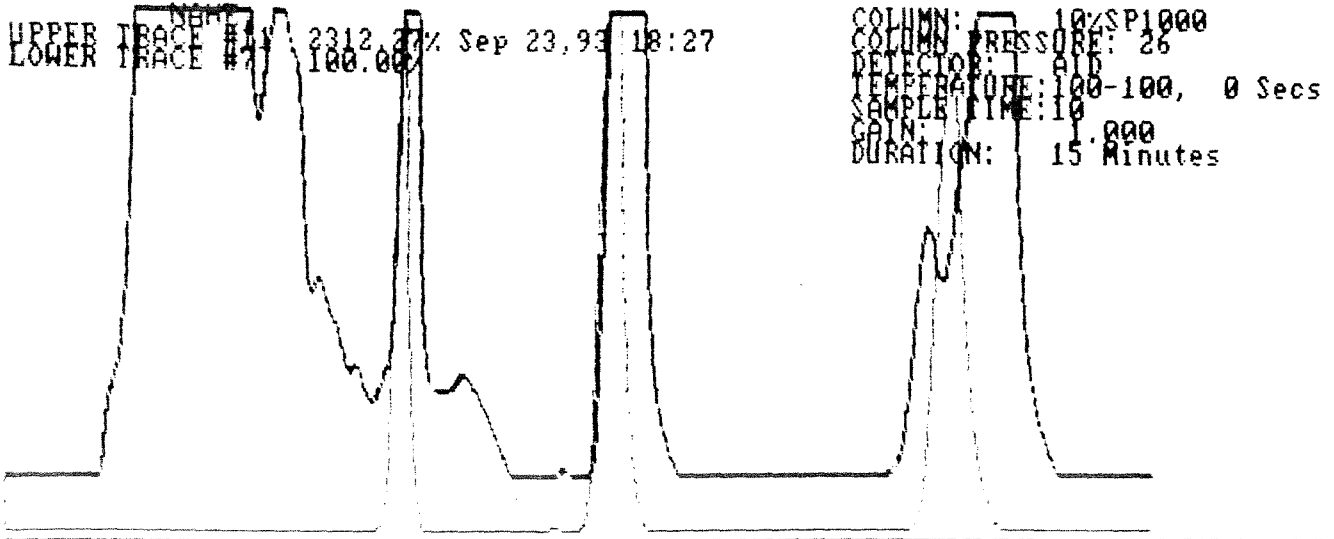
TRACE PRINTOUT

TRACE #11      DATE: Thu Sep 23 18:27:28 1993

NAME: REP18      CHART DURATION: 15  
 COLUMN: 10%SP1000      DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME: 10  
 TEMPERATURE: 100      INHIBIT TIME: 30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	118	229739612	56.977 PPM
2	UNKNOWN	161	70012282	17.363 PPM
3	<del>UNKNOWN</del> UNIK	175	9761872	2.421 PPM    PPM
4	UNKNOWN	202	10521826	2.609 PPM
5	<del>UNKNOWN</del> UNIK	231	2880662	0.714 PPM    PPM
6	UNKNOWN	257	1018652	0.253 PPM
7	BENZENE	291	10549889	2.616 PPM
8	<del>UNKNOWN</del> UNIK	330	2043122	0.507 PPM    PPM
9	UNKNOWN	396	36665	0.009 PPM
10	TOLUENE	429	51323120	10.060 PPM
11	UNKNOWN	437	31684556	7.858 PPM
12	XYLENE	636	4231523	0.830 PPM
13	m-XYLENE	680	19922851	4.941 PPM

TOTAL AREA: 443726632



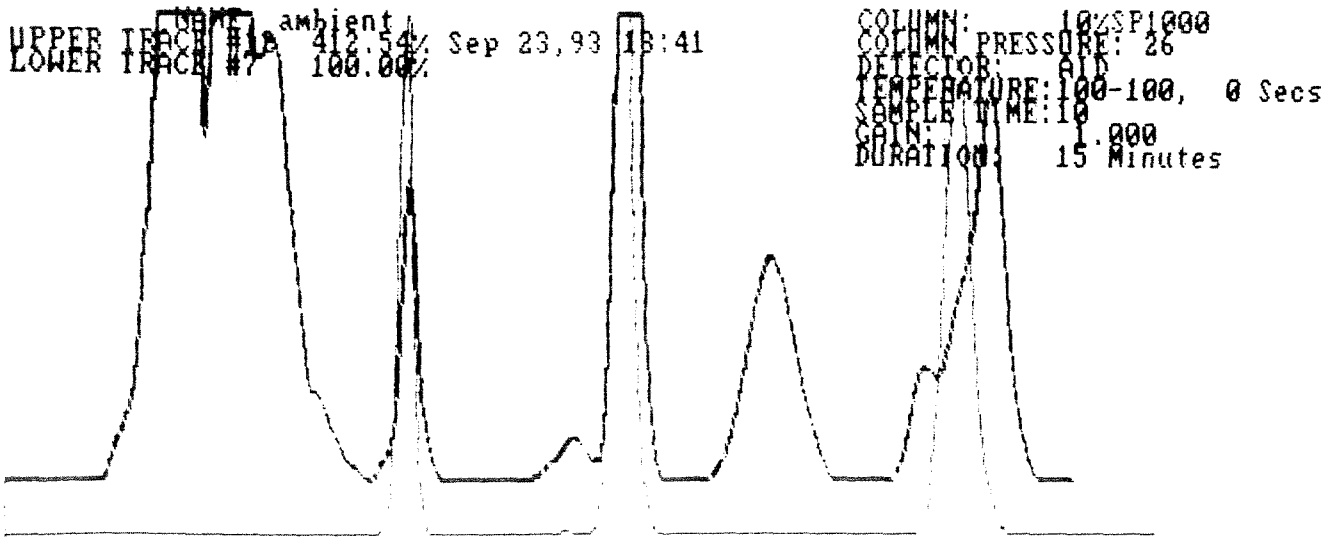
TRACE PRINTOUT

TRACE #12      DATE: Thu Sep 23 18:41:02 1993

NAME: ambient      CHART DURATION: 15  
 COLUMN: 10%SP1000      DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME: 10  
 TEMPERATURE: 100      INHIBIT TIME: 30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	<del>#10000000</del> UNK	126	9837636	2.440 PPM P3m
2	<del>#11000</del> UNK	143	15205565	3.771 PPM P3m
3	UNKNOWN	162	6330600	1.570 PPM
4	<del>#120000</del> UNK	175	6529919	1.619 PPM P3m
5	<del>#130000</del> UNK	194	9073370	2.250 PPM P3m
6	BENZENE	289	2894269	0.718 PPM
7	<del>#14000</del> UNK	326	25435	0.006 PPM P3m
8	<del>#150000</del> UNK	348	5769	0.001 PPM P3m
9	UNKNOWN	395	657056	0.163 PPM
10	TOLUENE	429	11745355	2.302 PPM
11	UNKNOWN	526	6362133	1.578 PPM
12	#ETHBENZ	630	1477643	0.366 PPM
13	#P-XYLENE	672	9022035	2.238 PPM

TOTAL AREA: 79166785



TRACE PRINTOUT

TRACE #26      DATE: Thu Sep 23 23:28:48 1993

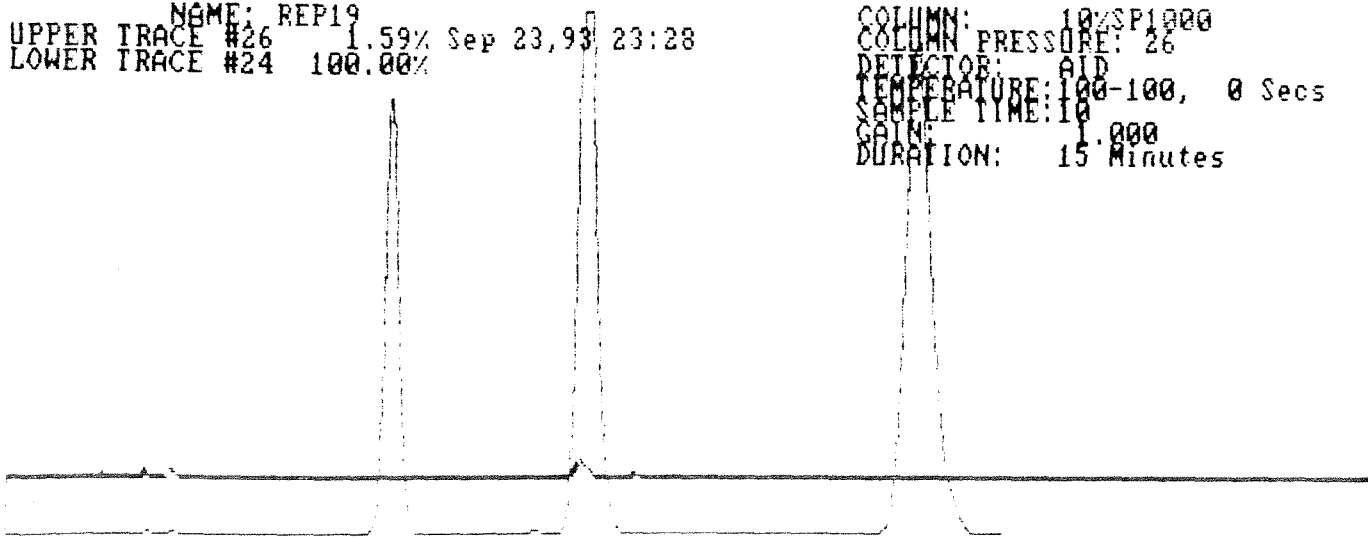
NAME:      REP19                      CHART DURATION:      15  
 COLUMN: 10%SP1000                  DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME:              10  
 TEMPERATURE:              100      INHIBIT TIME:              30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	92	10545	0.003 PPM
2	<del>XXXXXXXXXX</del> UNIK	118	21012	0.007 PPM P3m
3	<del>XXXXXX</del> UNIK	136	33249	0.011 PPM P3m
4	UNKNOWN	151	9572	0.003 PPM
5	UNKNOWN	164	6471	0.002 PPM
6	BENZENE	275	11256	0.004 PPM
7	UNKNOWN	287	2565	0.001 PPM
8	<del>XXXXXXXXXX</del> UNIK	373	8213	0.003 PPM P3m
9	TOLUENE	406	105696	0.025 PPM
10	UNKNOWN	443	20413	0.007 PPM
11	#P-XYLENE	625	19497	0.006 PPM
12	#P-XYLENE	640	2848	0.001 PPM
13	UNKNOWN	762	14935	0.005 PPM

TOTAL AREA: 266272

NAME: REP19  
 UPPER TRACE #26 1.59% Sep 23, 93 23:28  
 LOWER TRACE #24 100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, 0 Secs  
 SAMPLE TIME: 10  
 GAIN: 1.000  
 DURATION: 15 Minutes



TRACE PRINTOUT

TRACE #27      DATE: Thu Sep 23 23:49:49 1993

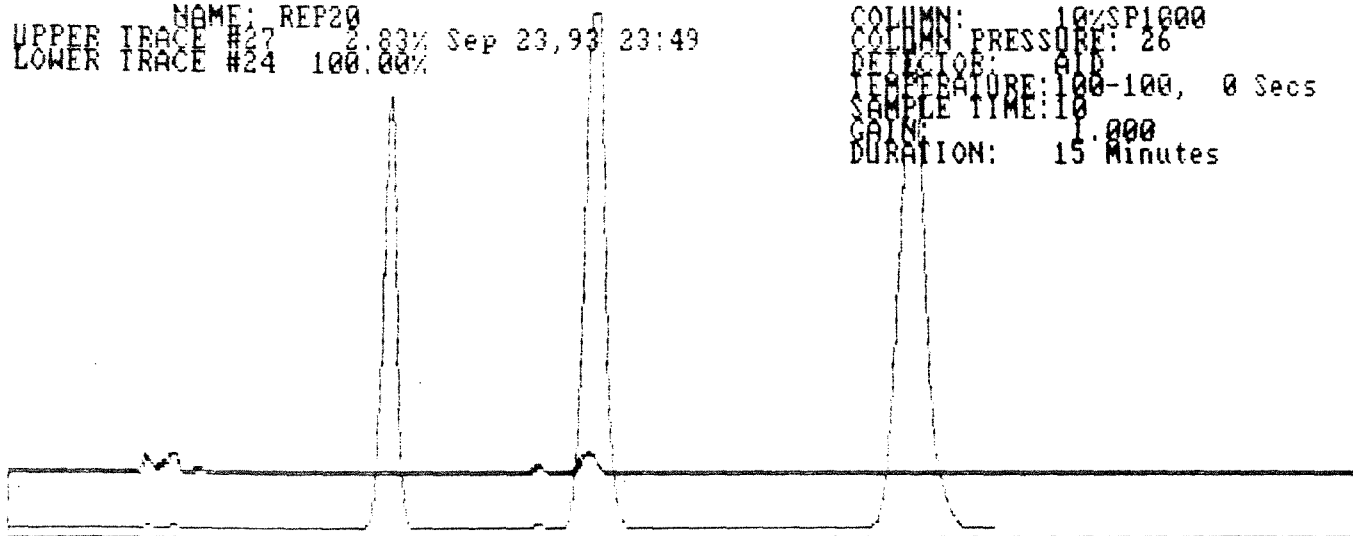
NAME:      REP20                      CHART DURATION:      15  
 COLUMN: 10%SP1000                  DETECTOR: AID  
 COLUMN PRESSURE: 26      SAMPLE TIME:              10  
 TEMPERATURE:      100      INHIBIT TIME:              30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	<del>#1000000</del> UNK	119	63649	0.020 PPM P3M
2	<del>#11000</del> UNK	136	124301	0.040 PPM P3M
3	UNKNOWN	152	32433	0.010 PPM
4	UNKNOWN	165	8242	0.003 PPM
5	UNKNOWN	217	4004	0.001 PPM
6	BENZENE	274	9957	0.003 PPM
7	<del>#1111100</del> UNK	374	38266	0.012 PPM P3M
8	TOLUENE	407	172115	0.040 PPM
9	#ETHBENZ	598	22098	0.007 PPM

TOTAL AREA: 475065

NAME: REP20  
 UPPER TRACE #27      2.83% Sep 23, 93 23:49  
 LOWER TRACE #24      100.00%

COLUMN: 10%SP1000  
 COLUMN PRESSURE: 26  
 DETECTOR: AID  
 TEMPERATURE: 100-100, 0 Secs  
 SAMPLE TIME: 10  
 GAIN: 1.000  
 DURATION: 15 Minutes





TRACE PRINTOUT

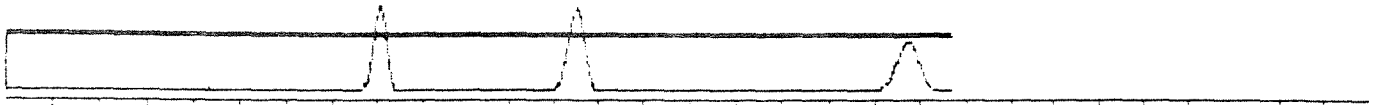
TRACE #36      DATE: Fri Sep 24 11:30:56 1993

NAME:      REP21                      CHART DURATION:      15  
COLUMN: 10%SP1000                      DETECTOR: AID  
COLUMN PRESSURE: 26      SAMPLE TIME:              5  
TEMPERATURE:              100      INHIBIT TIME:              30

PEAK#	NAME	RT	AREA	CONCENTRATION
1	UNKNOWN	173	3986	0.006 PPM
2	<del>#11111111</del> UNK	212	7673	0.013 PPM PPM
3	<del>#11111111</del> UNK	338	9361	0.015 PPM PPM
4	<del>#11111111</del> UNK	374	9885	0.016 PPM PPM
5	TOLUENE	402	1314	0.002 PPM
TOTAL AREA:		32219		

NAME: REP21  
UPPER TRACE #36      1.52% Sep 24, 93 11:30  
LOWER TRACE #34      100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, @ Secs  
SAMPLE TIME: 5  
GAIN: 1.000  
DURATION: 15 Minutes



TRACE PRINTOUT

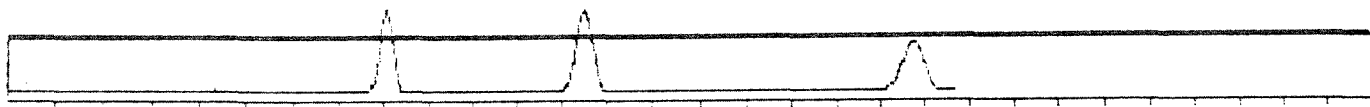
TRACE #37      DATE: Fri Sep 24 11:42:36 1993

NAME:      REP22              CHART DURATION:      15  
COLUMN: 10%SP1000      DETECTOR: AID  
COLUMN PRESSURE:    26      SAMPLE TIME:            5  
TEMPERATURE:        100      INHIBIT TIME:          30

PEAK#	NAME	RT	AREA	CONCENTRATION
<del>1</del>	<del>UNKNOWN</del>	<del>159</del>	<del>152</del>	<del>7000.500 PPM</del> P3m
2	<del>#3445-555</del> UNK	212	6633	0.011 PPM P3m
3	<del>1100000</del> UNK	374	11196	0.018 PPM P3m
4	UNKNOWN	528	6694	0.011 PPM
5	UNKNOWN	744	10844	0.018 PPM
TOTAL AREA:		35195		

NAME: REP22  
UPPER TRACE #37    1.66% Sep 24, 93 11:42  
LOWER TRACE #34    100.00%

COLUMN: 10%SP1000  
COLUMN PRESSURE: 26  
DETECTOR: AID  
TEMPERATURE: 100-100, @ Secs  
SAMPLE TIME: 5  
GAIN: 1.000  
DURATION: 15 Minutes



# APPENDIX B

Republic Soil Gas Survey  
Soil Sample Results  
September 1994

State of Washington Department of Ecology  
Manchester Environmental Laboratory  
7411 Beach Dr. East Port Orchard WA. 98366

Data Review  
November 17, 1993

Project: **Republic**  
Samples: 408000  
Laboratory: CCI Laboratories 03-09014  
By: Karin Feddersen *KF*

### Case Summary

This sample was received at the Manchester Environmental Laboratory on September 27, 1993, and transported to CCI on September 27, 1992 for BTEX, WTPH-G and WTPH-D analysis.

These analyses were reviewed for qualitative and quantitative accuracy, validity, and usefulness.

There is no need to assimilate the "dilution factor" or "sample wt/vol" into the final values reported; these calculations have already been figured into the reported values.

### DATA QUALIFIER DEFINITIONS

- U - The analyte was not detected at or above the reported result.
- UJ - The analyte was not detected at or above the reported estimated result.
- J - The analyte was positively identified. The associated numerical result is an estimate.

## **BTEX/WTPH-G**

### **Holding Times:**

This sample was initially analyzed within the W.D.O.E. method maximum suggested holding time at a 1:100 dilution for the BTEX analysis. The sample was reanalyzed at a 1:5 dilution thirty-four (34) days past the suggested holding time. The results were not significantly different from the initial analysis, therefore, no qualification was warranted.

### **Method Blank:**

No target analytes were detected in the method blank.

### **Initial Calibration:**

The initial calibration % Relative Standard Deviations were within the maximum of 20%.

### **Continuing Calibration:**

The percent differences between the initial and continuing calibration standards were within the maximum of 15%.

### **Surrogates:**

Surrogate recoveries for this sample, the duplicate and the method blank are reasonable, acceptable, and within WTPH method QC limits of 50 to 150 % surrogate recovery with several exceptions. Surrogate recoveries for the initial Xylene analysis were most likely out of QC limits because the dilution performed prior to analysis resulted in surrogate quantities that fell well below the calibration curve, hence the recoveries were estimated from an extrapolation of the calibration curve. The dilution for the second analysis (for Benzene, Toluene, and Ethylbenzene) may also have been responsible for the slightly high surrogate recovery. These outliers are not significant enough to warrant qualification or rejection of the results.

### **Duplicate:**

The duplicate analysis is in acceptable agreement with the original analysis.

### **Sample results:**

The petroleum hydrocarbons detected in this sample appeared to exhibit a pattern match for gasoline. This data is acceptable for use as amended.

## **WTPH-D**

### **Holding Times:**

This sample was extracted and analyzed within the W.D.O.E. method maximum suggested holding time.

### **Method Blank:**

No target analytes were detected in the method blank.

### **Initial Calibration:**

The initial calibration % Relative Standard Deviations were within the maximum of 20%.

### **Continuing Calibration:**

The percent differences between the initial and continuing calibration standards were within the maximum of 15%.

### **Surrogates:**

Surrogate recoveries for this sample, the duplicate and the associated method blank are reasonable, acceptable, and within WTPH method QC limits of 50 to 150 % surrogate recovery.

### **Duplicate:**

The duplicate analysis is in acceptable agreement with the original analysis.

### **Sample results:**

Although petroleum hydrocarbons were detected in this sample, they did not exhibit a pattern match for diesel. They are most likely the result of late-eluting gasoline peaks. This data is acceptable for use without the need for additional data qualifiers.



Laboratories

Serving the Environmental, Aerospace and Defense Industries

October 27, 1993

Mrs. Karin Feddersen  
Washington State Dept. of Ecology  
7411 Beach Drive East  
Port Orchard, WA 98366-8204

Dear Mrs. Feddersen

On September 28, 1993 one sample was received at our Everett laboratory. The sample was identified as the Republic project and contained the following sample:

408000

This project was given our job number 309014 and WTPH-G, BTEX, and WTPH-D analyses were performed on the sample. A duplicate analysis was also requested.

A holding time violation occurred for Benzene, Toluene, and Ethylbenzene while these parameters were being rediluted for a second injection. This was due to instrument failure. No other abnormalities or nonconformances were observed.

The following data package includes data results and also those deliverables appropriate to your attachment #1 and my letter dated March 25, 1993.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely

CCI Laboratories

A handwritten signature in black ink, appearing to read 'Chuck B. Rancatti'.

Chuck B. Rancatti  
Laboratory Director



Laboratories

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CERTIFICATE OF ANALYSIS

CLIENT: WASHINGTON STATE DEPT OF ECOLOGY DATE: 10/27/93
7411 BEACH DRIVE EAST CCIL JOB #: 309014
PORT ORCHARD, WA 98366-8204 CCIL SAMPLE #: 1
DATE RECEIVED: 9/28/93
WDOE ACCREDITATION #: C142

CLIENT CONTACT: KARIN FEDDERSEN

CLIENT PROJECT ID: REPUBLIC PROJECT
CLIENT SAMPLE ID: 408000 REP 1255 9/23/93 10:15

DATA RESULTS

Table with 7 columns: ANALYTE, METHOD, RESULTS\*, UNITS\*\*, ACTION LEVEL\*\*\*, ANALYSIS DATE, ANALYSIS BY. Rows include TPH-GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, and TPH-DIESEL.

1 ANALYSES WERE PERFORMED OUTSIDE OF WDOE SUGGESTED HOLDING TIMES

2 RESULT IS PARTIALLY DUE TO END OF GASOLINE RANGE PRODUCT ELUTING IN DIESEL RANGE

\* "U" INDICATES COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. REPORTING LIMIT IS SPECIFIED

\*\* UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

\*\*\* ACTIONS LEVELS ARE PROVIDED AS GUIDELINES ONLY. THE APPROPRIATE REGULATORY DOCUMENT SHOULD BE CONSULTED BEFORE MAKING ANY DECISIONS BASED ON ANALYTICAL DATA

APPROVED BY: [Signature]





ESI Laboratories

Serving the Environmental, Aerospace and Defense Industries

CERTIFICATE OF ANALYSIS

CLIENT: WASHINGTON STATE DEPT OF ECOLOGY DATE: 10/27/93
7411 BEACH DRIVE EAST CCIL JOB #: 309014
PORT ORCHARD, WA 98366-8204 CCIL SAMPLE #: 1 DUP
DATE RECEIVED: 9/28/93
WDOE ACCREDITATION #: C142

CLIENT CONTACT: KARIN FEDDERSEN

CLIENT PROJECT ID: REPUBLIC PROJECT
CLIENT SAMPLE ID: 408000 REP 1255 9/23/93 10:15 (DUPLICATE)

DATA RESULTS

Table with 8 columns: ANALYTE, METHOD, RESULTS\*, UNITS\*\*, ACTION LEVEL\*\*\*, ANALYSIS DATE, ANALYSIS BY. Rows include TPH-GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, and TPH-DIESEL.

1 ANALYSES WERE PERFORMED OUTSIDE OF WDOE SUGGESTED HOLDING TIMES

2 RESULT IS PARTIALLY DUE TO END OF GASOLINE RANGE PRODUCT ELUTING IN DIESEL RANGE

\* "U" INDICATES COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. REPORTING LIMIT IS SPECIFIED

\*\* UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

\*\*\* ACTIONS LEVELS ARE PROVIDED AS GUIDELINES ONLY. THE APPROPRIATE REGULATORY DOCUMENT SHOULD BE CONSULTED BEFORE MAKING ANY DECISIONS BASED ON ANALYTICAL DATA

APPROVED BY: [Signature]



Environmental Laboratories

Serving the Environmental, Aerospace and Defense Industries

CERTIFICATE OF ANALYSIS

CLIENT: WASHINGTON STATE DEPT OF ECOLOGY DATE: 10/27/93
7411 BEACH DRIVE EAST CCIL JOB #: 309014
PORT ORCHARD, WA 98366-8204 CCIL SAMPLE #: BLK
DATE RECEIVED: 9/28/93
WDOE ACCREDITATION #: C142

CLIENT CONTACT: KARIN FEDDERSEN

CLIENT PROJECT ID: REPUBLIC PROJECT
CLIENT SAMPLE ID: EXTRACTION BLK (APPLIES TO ALL SMPLS IN PRJCT)

DATA RESULTS

Table with 7 columns: ANALYTE, METHOD, RESULTS\*, UNITS\*\*, ACTION LEVEL\*\*\*, ANALYSIS DATE, ANALYSIS BY. Rows include TPH-GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, and TPH-DIESEL.

1 ANALYSES WERE PERFORMED OUTSIDE OF WDOE SUGGESTED HOLDING TIMES

\* "U" INDICATES COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. REPORTING LIMIT IS SPECIFIED

\*\* UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

\*\*\* ACTIONS LEVELS ARE PROVIDED AS GUIDELINES ONLY. THE APPROPRIATE REGULATORY DOCUMENT SHOULD BE CONSULTED BEFORE MAKING ANY DECISIONS BASED ON ANALYTICAL DATA

APPROVED BY: [Signature]



Environmental Laboratories

Serving the Environmental, Aerospace and Defense Industries

CERTIFICATE OF ANALYSIS

CLIENT: WASHINGTON STATE DEPT OF ECOLOGY
7411 BEACH DRIVE EAST
PORT ORCHARD, WA 98366-8204

DATE: 10/27/93
CCIL JOB #: 309014

DATE RECEIVED: 9/28/93
WDOE ACCREDITATION #: C142

CLIENT CONTACT: KARIN FEDDERSEN

CLIENT PROJECT ID: REPUBLIC PROJECT

QUALITY CONTROL RESULTS

SURROGATE RECOVERY

Table with 7 columns: CCIL SAMPLE ID, ANALYTE, SUR ID, EXP'D AMT, AMT RECV, % RECV, CONTROL LIMITS. Contains 14 rows of data for various samples and analytes, including XYLENES and B.T.E. with handwritten values and initials 'KF'.

\* SURROGATE DILUTED OUT OF CALIBRATION RANGE

APPROVED BY: [Handwritten Signature]