



**ENGINEERING, INC.**  
RCE #27011 Lic. #537901

**FOURTH QUARTER, 1997  
GROUNDWATER MONITORING REPORT**

**USA STATION #57  
10700 MACARTHUR BOULEVARD  
OAKLAND, CALIFORNIA**

**NOVEMBER, 1997**

**PREPARED FOR:**

**USA GASOLINE CORPORATION  
AND  
SAN JOAQUIN COUNTY  
PUBLIC HEALTH SERVICES / ENVIRONMENTAL HEALTH DIVISION**

**PREPARED BY:**

**GHH ENGINEERING, INC.  
8084 OLD AUBURN ROAD, SUITE E  
CITRUS HEIGHTS, CALIFORNIA 95610**

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## **1.0 INTRODUCTION**

GHH Engineering, Inc. (GHH) is currently providing USA Gasoline Corporation (USA) professional engineering services to conduct environmental monitoring and remediation at their former station #57 located at 10700 MacArthur Boulevard, Oakland, California, as shown on Figure 1. Mr. Srikanth Dasappa of USA has authorized GHH to prepare this "Fourth Quarter, 1997, Groundwater Monitoring Report" (QMR) for the site. Investigations and ongoing monitoring and sampling activities conducted at the site are under the direction of the Alameda County Health Care Services Agency (County).

## **2.0 BACKGROUND AND SITE HISTORY**

### **2.1 Site Description**

The site was formerly a retail service station which dispensed gasoline and diesel from four underground storage tanks (USTs) located on the southern portion of the site, as shown on Figures 2 and 3. The buildings have been demolished and the property restored to grade. The property is presently enclosed in a fenced compound within the Foothill Square Shopping Center parking lot.

The site is located at the southeast corner of the Foothill Square Shopping Center, which is bounded by 106th Avenue to the north, Foothill Boulevard to the east, 108th Avenue to the south, and MacArthur Boulevard to the west within the City of Oakland. The property immediately surrounding the site is part of the asphalt parking area for the shopping center. Residential properties are present across 108th Avenue to the south of the site. East of the site beyond Foothill Boulevard is Highway 580, a multi-lane freeway.

On July 19, 1994, three 12,000-gallon gasoline tanks and one 8,000-gallon diesel tank were excavated and removed from the site. Assessment and remediation activities have occurred at the site from July, 1994 to the present. Approximately 775 cubic yards of soil was excavated from the site during tank removal and over-excavation efforts in 1994. This soil was removed from the vicinities of the former UST tanks and the fuel distribution lines.

Sixteen soil borings were drilled and sampled at the site, and eight were completed as groundwater monitoring wells. The following reports describe the assessment and remediation efforts at the former USA site.

- Preliminary Site Assessment Investigation, dated March 13, 1987, Pacific Environmental Group
- UST's Removal Soil Sampling and Over-Excavation, dated October 6, 1994, Western Geo-Engineers
- Supplementary Site Assessment Report, dated April 24, 1995, Alton Geoscience
- Supplementary Site Assessment Report, dated February 26, 1996, Alton Geoscience

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**2.2 Regional Geology**

The site is located in the East Bay Plain in the eastern part of the San Francisco Bay area. Much of the East Bay Plain is underlain by the Temescal formation and the Alameda formation, which are of Pleistocene age (DWR, 1975). The Temescal formation consists of interfingering layers of clayey gravel, sandy silt clay, and various clay silt sand mixtures. The formation varies in thickness to a maximum of approximately 60-feet. Underlying the Temescal formation is the Alameda formation, which consists of unconsolidated continental and marine gravels, sands, silts, and clays, with some shells and organic material in places. The Alameda formation has a maximum known thickness of 1,050-feet (Radbruch, 1957). These formations thin to the east, where they pinch out against the Berkeley Hills.

**2.3 Local Geology**

The site is located in Oakland, California, at an elevation of approximately 80-feet above mean sea level (National Geodetic Vertical Datum, 1929). The site is near the eastern edge of the East Bay Plain and the Berkeley Hills rise abruptly east of the site. The ground surface at the site slopes to the southwest. The underlying geologic formations thin to the east in the East Bay Plain and are very thin in the vicinity of the site. Bedrock which makes up the Berkeley Hills is present at shallow depths beneath the site and outcrops can be seen to the east of the site. This bedrock was encountered during the prior site assessment and remediation activities.

**2.4 Regional Hydrogeology**

The site is located in the East Bay Plain Groundwater Area, a subarea of the Santa Clara Valley Basin. Groundwater occurs in unconsolidated Quaternary alluvium, including the Alameda formation (DWR, 1975). Most water used in the area is imported from other areas of the state by the East Bay Municipal Utilities District. Scattered wells supply individual dwellings and a few commercial and industrial developments (DWR, 1975). No water wells have been identified within 250-feet of the site. Groundwater flows in a generally westerly direction toward San Francisco Bay.

**2.5 Local Hydrogeology**

Groundwater is reportedly present in the bedrock beneath the site. The earlier assessment work documents that bedrock consisting of sandstone and siltstone was found as shallow as 13-feet beneath ground surface beneath the site. Groundwater was first encountered at 40-feet bgs while drilling MW-3, with the groundwater level stabilizing at about 13-feet bgs.

Soil was removed to a depth of approximately 20-feet bgs. During the over-excavation activities no groundwater was encountered. It is expected that the bedrock surface may control the presence and movement of the shallow groundwater in the alluvial deposits beneath the site.

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The earlier reports indicate that groundwater was present in both the alluvial deposits and bedrock. Groundwater monitoring wells have been perforated in only the bedrock and in both the alluvium and bedrock. There appear to be different water levels or piezometric surfaces in the two lithologies. Groundwater flow was reported in 1995 to be in a north-northeasterly direction at a gradient of 0.015-feet per foot. In 1996, there was a perceived piezometric low in the vicinity of S-1, S-2 and MW-7.

### **3.0 SCOPE OF WORK**

The following is a brief summary of the scope of work performed by GHH, which included groundwater monitoring on October 10, 1997.

- Locate and measure depths to groundwater in monitoring wells S-1, S-2 and MW-3 through MW-8.
- Purge a minimum of three equivalent well volumes of groundwater from each of the sampled wells, while monitoring pH and conductivity.
- Collect groundwater samples from the purged monitoring wells.
- Analyze water samples for TPH in the gasoline and diesel ranges (TPH G and TPH D), benzene, toluene, ethylbenzene and xylene (BTEX) and methyl-tert-butyl-ether (MTBE) using EPA Methods 8015 Modified and 8020, respectively.
- Prepare this QMR for submittal to USA and the County.

### **4.0 GROUNDWATER MONITORING**

The following section discusses field protocol used during data collection for this QMR.

#### **4.1 Groundwater Elevations**

Prior to gauging depths to groundwater, the groundwater monitoring wells were checked for the presence of free floating hydrocarbon using an interface probe. A sheen was noted in monitoring well S-2. Depths to groundwater measurements were then taken from each well from surveyed marks on the casing using an electric water level sensor or interface probe. The depth to groundwater could not be accurately measured in MW-6, due to an obstruction in the casing, which was suspected to be roots. Calculated groundwater elevations are summarize in Table 1. The field data sheets are included in Appendix A.

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NOVEMBER, 1997**

**4.2 Monitoring Well Purging**

The monitoring wells were purged using a 2-inch diameter submersible Grundfos groundwater pump, until a minimum of three equivalent well volumes of water were removed from each well. Three well volumes could not be recovered from wells MW-3 and MW-5 prior to sampling. These wells were purged dry and sampled upon recharge. Groundwater purged from the wells was placed into Department of Transportation (DOT) approved 55-gallon drums and stored on-site prior to disposal by USA.

To reduce the potential for cross-contamination between wells, prior to each use all purging and sampling equipment was washed in a trisodium phosphate solution and rinsed in potable water. During the groundwater purging operations, physical parameters such as pH and conductivity were monitored and recorded on field data sheets. Groundwater purging was discontinued when the physical parameters indicated above stabilized in the purged groundwater.

**4.3 Groundwater Sampling**

Prior to sampling, the wells were allowed to recharge to a minimum of 80 percent of their initial static water levels. Groundwater samples were then collected from each well using a new disposable bailer. The samples were placed into the appropriate laboratory prepared containers, using proper sample handling and chain-of-custody (COC) protocol established under applicable SW-846 procedures issued by the USEPA. The samples were labeled with the date, time, identifying well number, stored in a cooler at 4° Centigrade or less, and transported to a state certified laboratory under completed COC documentation.

**4.4 Groundwater Analyses**

Groundwater samples were analyzed for TPH G, TPH D, BTEX, and MTBE using EPA Methods 8015 Modified and 8020, respectively. The analyses were conducted by American Environmental Network (AEN), a California State certified laboratory in accordance with state guidelines and EPA protocol.

**5.0 SUMMARY AND CONCLUSIONS**

The following sections discuss findings from the groundwater gauging and sampling activities conducted on October 10, 1997.

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**5.1 Groundwater Flow and Gradient**

Groundwater data collected at the site on October 10, 1997 indicate that the depths to groundwater ranged from 14.14 to 21.21-feet bgs. The groundwater elevations ranged from 59.29 to 62.28-feet above mean sea level (MSL). The direction of groundwater flow has been calculated to the southeast, or into the hill, at a gradient of 0.31-ft/ft across the northern portion of the site, as shown on Figure 4. In the southern portion of the site the direction of the flow gradient decreases to approximately 0.007-ft/ft. The anomalously steep gradient and direction on the northern portion of the site appear to be the result of a calculation using water elevations from different water bearing zones and treating them as a single zone.

Monitoring wells S-1, MW-6 and MW-7 are completed in the underlying bedrock, while wells MW-4 and MW-5 are in the overburden above the bedrock. Complicating the site hydrology further is the presence of a gravel zone in well MW-4, which is not present in the other shallower well. Therefore, the direction of flow and gradient data presented should be viewed carefully before being relied on too heavily. Continued monitoring of these wells may provide some clarification of the site hydrology.

**5.2 Results of Groundwater Laboratory Analyses**

The October 10, 1997 analytical results reported TPH G in five of the eight monitoring wells sampled (S-1, S-2, MW-3, MW-6, and MW-8). Concentrations of TPH G for this sampling event ranged from 50 micrograms per liter ( $\mu\text{g/l}$ ) in MW-8 to 13,000  $\mu\text{g/l}$  in S-2. TPH G was non-detect (ND) at the method detection limit in monitoring wells MW-4, MW-5 and MW-7. TPH D was ND at the method detection limit in monitoring wells S-1, MW-2 and MW-4 through MW-8. Benzene was ND in all wells except S-2 and MW-3. Benzene concentrations were detected at 260  $\mu\text{g/l}$  in S-2 and 830  $\mu\text{g/l}$  in MW-3. MTBE was detected at concentrations ranging from ND in wells MW-4, MW-5, MW-6, and MW-8 to 600  $\mu\text{g/l}$  in S-2. Analytical results are summarized in Table 2, and shown on Figure 5. Copies of laboratory reports and COC documentation are included in Appendix B.

At this time, GHH recommends that monitoring be continued.

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GROUNDWATER MONITORING REPORT  
USA STATION #57, OAKLAND  
NOVEMBER, 1997

6.0 PREPARATION OF REPORT

Firm Preparing Report

GHH Engineering, Inc.  
8084 Old Auburn Road, Suite E  
Citrus Heights, California 95610

Report Prepared by:

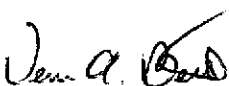
This report was prepared by GHH Engineering, Inc. Mr. Richard J. Zipp, Hydrogeologist, is the qualified person responsible for overseeing this project. This report was written by Ms. Kathleen A. Waldo, Staff Engineer, and reviewed for technical content by Mr. Vern A. Bennett, Project Manager, and Mr. Zipp.

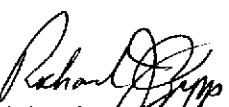
The analyses and recommendations submitted in this report are based upon the best available information obtained from the field investigation, persons knowledgeable about the site, and local government agencies. This report was prepared to assist USA in the evaluation of the site.

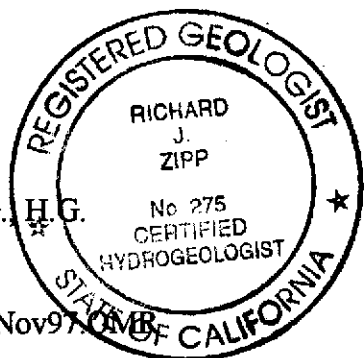
Any conclusions or recommendations are based on GHH's expertise and experience with the site. However, regulatory agencies may have additional recommendations after they have reviewed and evaluated the data.

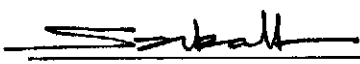
This report has been reviewed by the client and they are responsible for the findings herein. If you have any questions or need additional information please call the undersigned at (916) 723-1776.

Thank You,

  
Vern A. Bennett  
Project Manager

  
Richard J. Zipp, R.G.  
Hydrogeologist

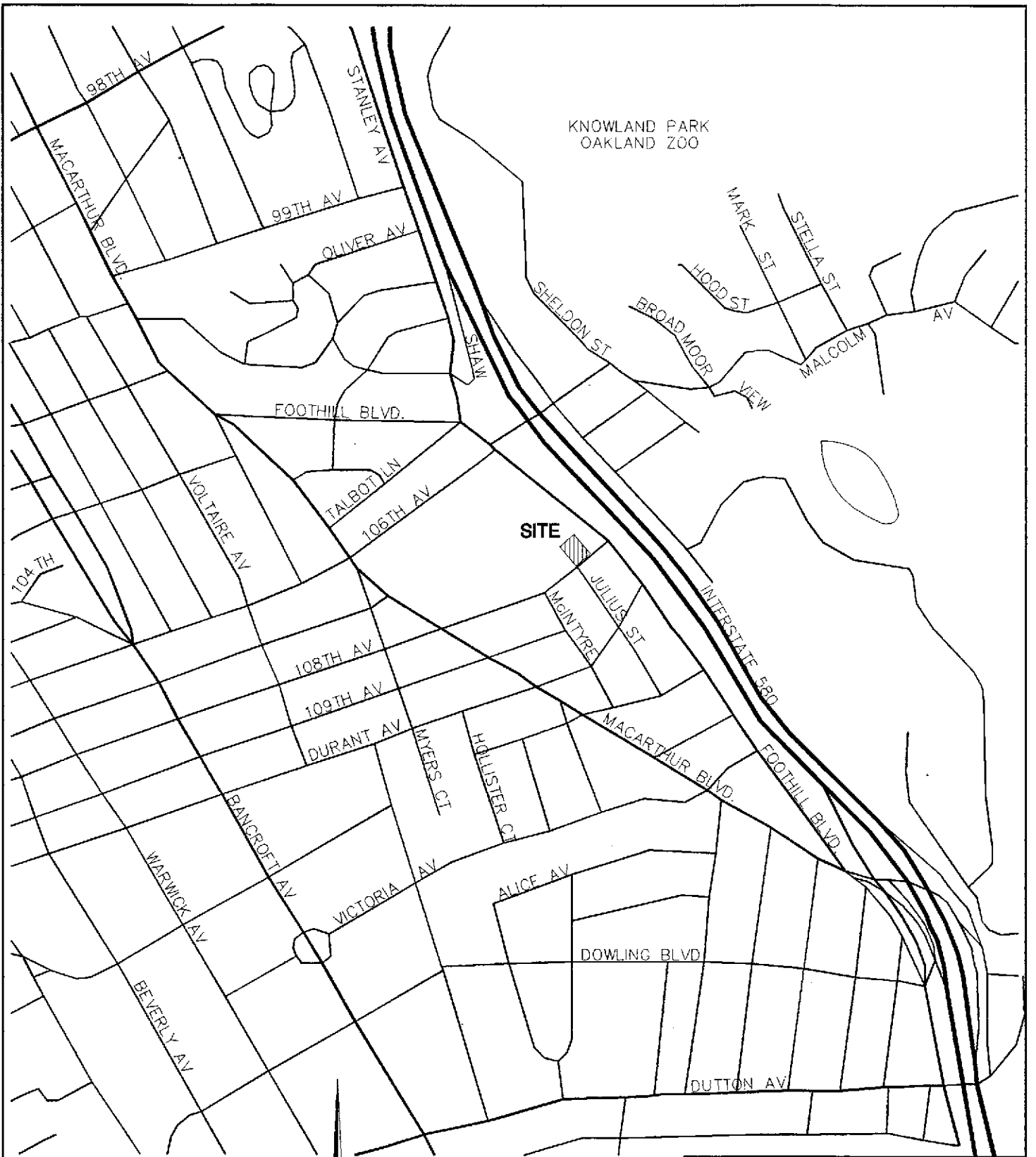


  
Srikanth Dasappa  
USA Gasoline Corporation

1/16/98  
Date

F:\5090.11\KW\naj\Nov97\GMB





KNOWLAND PARK  
OAKLAND ZOO

SITE

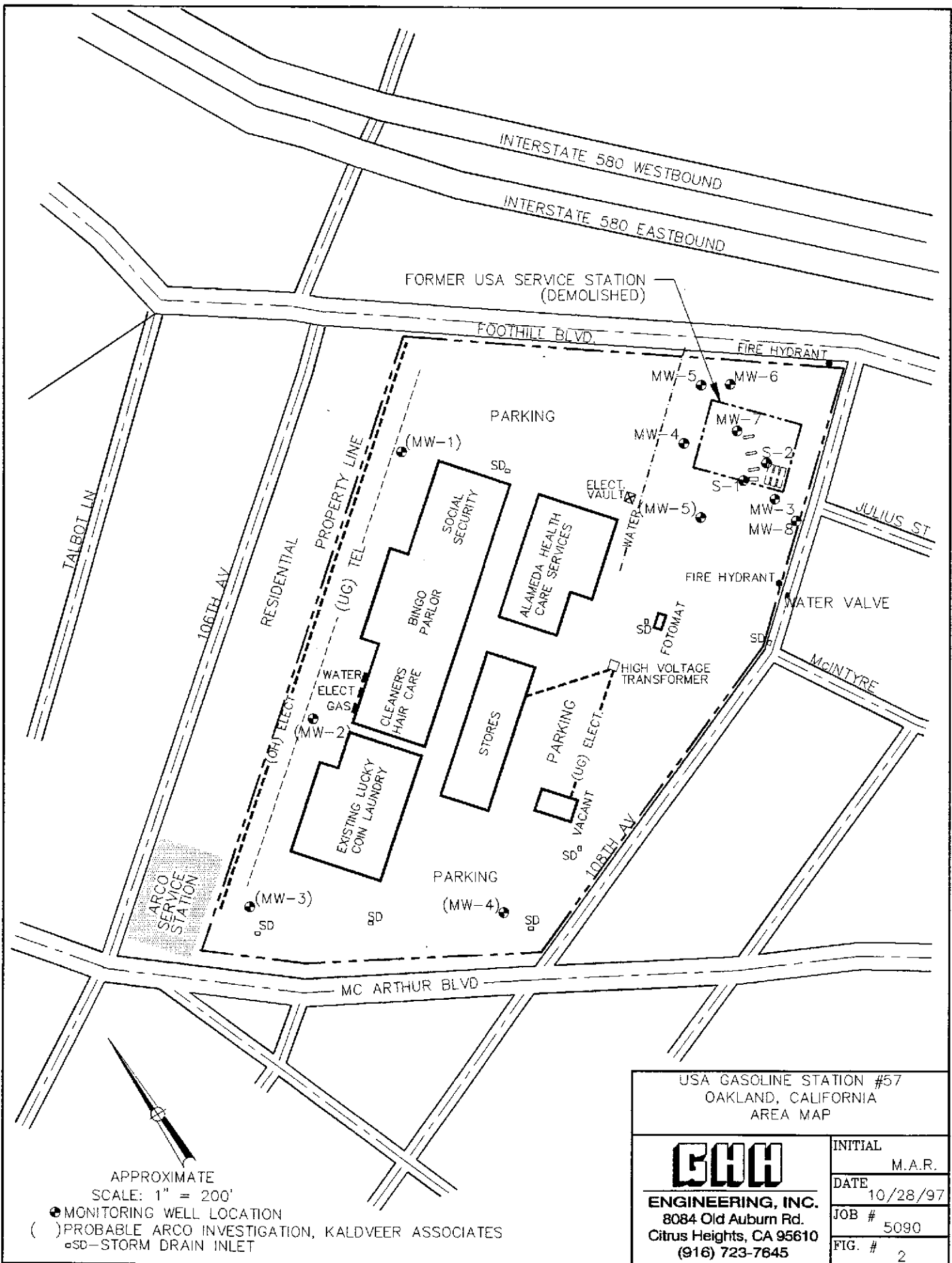


APPROX. SCALE: 1" = 800'

USA GASOLINE STATION #57  
10700 MACARTHUR BLVD.  
OAKLAND, CALIFORNIA  
SITE LOCATION MAP

**GHH**  
ENGINEERING, INC.  
8084 Old Auburn Rd.  
Citrus Heights, CA 95610  
(916) 723-7645

INITIAL	M. A. R.
DATE	10/28/97
JOB #	5090
FIG. #	1



APPROXIMATE  
SCALE: 1" = 200'

- MONITORING WELL LOCATION
- ( ) PROBABLE ARCO INVESTIGATION, KALDVEER ASSOCIATES
- SD - STORM DRAIN INLET

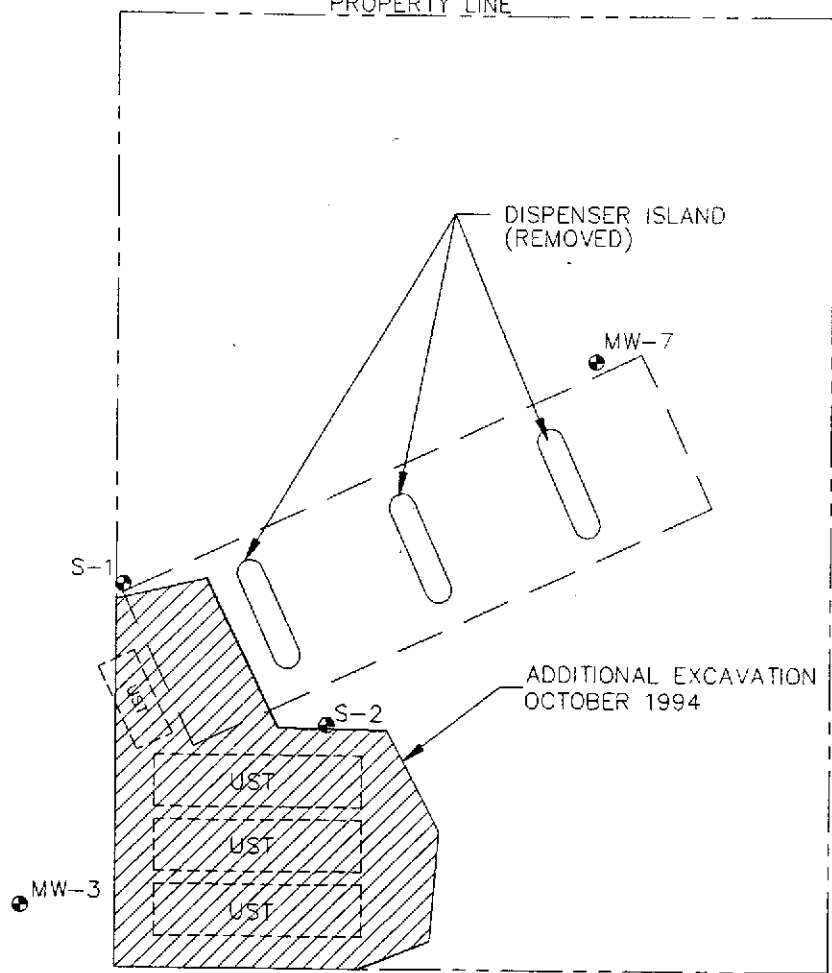
USA GASOLINE STATION #57  
OAKLAND, CALIFORNIA  
AREA MAP

 <b>ENGINEERING, INC.</b> 8084 Old Auburn Rd. Citrus Heights, CA 95610 (916) 723-7645	INITIAL
	M.A.R.
	DATE
	10/28/97
JOB #	
5090	
FIG. #	
2	

MW-4

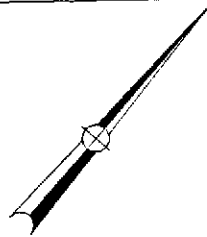
MW-5

PROPERTY LINE



MW-8

108TH AVENUE



SCALE: 1" = 30'

● MONITORING WELL LOCATION

USA GASOLINE STATION #57  
 OAKLAND, CALIFORNIA  
 SITE PLAN

**GHH**

**ENGINEERING, INC.**  
 8084 Old Auburn Rd.  
 Citrus Heights, CA 95610  
 (916) 723-7645

INITIAL	M.A.R.
DATE	10/28/97
JOB #	5090
FIG. #	3

MW-4  
62.68'

MW-5  
62.72'

PROPERTY LINE

62.50'

61.50'

61.00'

60.50'

60.00'

S-1  
59.78'

S-2  
59.72'

S 50° E  
10/10/97  
0.03ft/H

MW-7  
59.83'

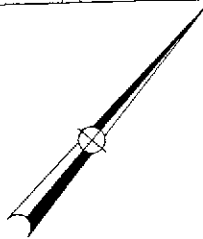
MW-6  
61.09'

MW-3  
59.70'

59.50'

MW-8  
59.29'

108TH AVENUE



SCALE: 1" = 30'

● MONITORING WELL LOCATION

USA GASOLINE STATION #57  
OAKLAND, CALIFORNIA  
GROUNDWATER ELEVATION  
AND GRADIENT MAP

**GHH**

**ENGINEERING, INC.**  
8084 Old Auburn Rd.  
Citrus Heights, CA 95610  
(916) 723-7645

INITIAL	M.A.R.
DATE	11/24/97
JOB #	5090
FIG. #	4

TPHG	ND
TPHD	ND
BENZENE	ND
TOLUENE	ND
ETHYLBENZENE	ND
XYLENE	ND
MTBE	ND

TPHG	ND
TPHD	ND
BENZENE	ND
TOLUENE	ND
ETHYLBENZENE	ND
XYLENE	ND
MTBE	ND

MW-4

MW-5

PROPERTY LINE

TPHG	ND
TPHD	ND
BENZENE	ND
TOLUENE	ND
ETHYLBENZENE	ND
XYLENE	ND
MTBE	15ug/l

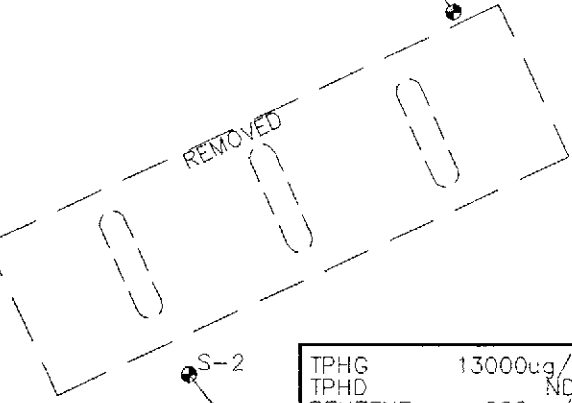
MW-6

TPHG	80ug/l
TPHD	ND
BENZENE	ND
TOLUENE	ND
ETHYLBENZENE	ND
XYLENE	ND
MTBE	ND

TPHG	530ug/l
TPHD	2000ug/l
BENZENE	ND
TOLUENE	2.1ug/l
ETHYLBENZENE	ND
XYLENE	ND
MTBE	230ug/l

MW-7

S-1



TPHG	340ug/L
TPHD	1100ug/L
BENZENE	830ug/l
TOLUENE	4ug/l
ETHYLBENZENE	100ug/l
XYLENE	ND
MTBE	160ug/l

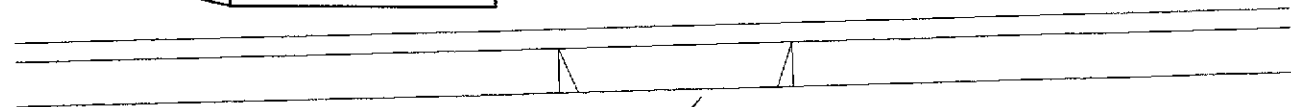
MW-3

TPHG	13000ug/l
TPHD	ND
BENZENE	260ug/l
TOLUENE	38ug/l
ETHYLBENZENE	190ug/l
XYLENE	280ug/l
MTBE	600ug/l

S-2

TPHG	50ug/l
TPHD	ND
BENZENE	ND
TOLUENE	ND
ETHYLBENZENE	ND
XYLENE	ND
MTBE	ND

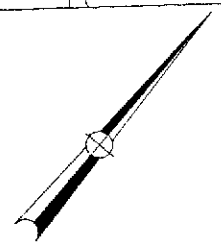
MW-8



108TH AVENUE

**SAMPLING LEGEND**

SAMPLED: OCTOBER 10, 1997  
 ND -NOT DETECTED AT THE  
 METHOD DETECTION LIMIT



SCALE: 1" = 30'

● MONITORING WELL LOCATION

USA GASOLINE STATION #57 OAKLAND, CALIFORNIA TPHG, TPHD, BTEX & MTBE CONCENTRATIONS IN GROUNDWATER	
<b>GWH</b> <b>ENGINEERING, INC.</b> 8084 Old Auburn Rd. Citrus Heights, CA 95610 (916) 723-7645	INITIAL M.A.R.
	DATE 10/29/97
	JOB # 5090
	FIG. # 5

TABLE 1

GROUNDWATER ELEVATION DATA  
 FORMER USA STATION #57  
 10700 MacARTHUR BOULEVARD  
 OAKLAND, CALIFORNIA

Well ID	Date of Measurement	Elevation Top of Casing (feet)	Depth to Groundwater	Elevation of Groundwater (feet MSL)	Product Thickness (feet)
S-1	03/03/95	74.74	13.10	61.64	0.00
	07/24/95		12.35	62.39	0.00
	11/22/95	78.68	19.30	59.38	0.00
	12/06/95		19.59	59.09	0.00
	01/04/96		19.52	59.16	0.00
	01/31/97		15.07	63.61	0.00
	10/10/97		18.90	59.78	0.00
S-2	03/03/95	76.86	15.39	61.47	0.00
	07/24/95		14.47	62.39	0.00
	11/22/95	80.93	21.52	59.41	trace
	12/06/95		21.78	59.15	0.00
	01/04/96		21.75	59.18	0.00
	01/31/97		17.25	63.68	trace
	10/10/97		21.21	59.72	trace
MW-3	03/03/95	76.30	13.99	62.31	0.00
	07/24/95		13.33	62.97	0.00
	11/22/95	80.32	20.94	59.38	0.00
	12/06/95		17.48	62.84	0.00
	01/04/96		20.01	60.31	0.00
	01/31/97		16.63	63.69	0.00
	10/10/97		20.62	59.70	0.00
MW-4	11/22/95	76.42	14.99	61.43	0.00
	12/06/95		11.21	65.21	0.00
	01/04/96		14.62	61.80	0.00
	01/31/97		8.18	68.24	0.00
	10/10/97		14.14	62.28	0.00

MSL Mean sea level

**TABLE 1 (Continued)**

**GROUNDWATER ELEVATION DATA  
FORMER USA STATION #57  
10700 MacARTHUR BOULEVARD  
OAKLAND, CALIFORNIA**

Well ID	Date of Measurement	Elevation Top of Casing (feet)	Depth to Groundwater	Elevation of Groundwater (feet MSL)	Product Thickness (feet)
MW-5	11/22/95	80.52	19.56	60.96	0.00
	12/06/95		15.84	64.68	0.00
	01/04/96		19.36	61.16	0.00
	01/31/97		13.31	67.21	0.00
	10/10/97		17.80	62.72	0.00
MW-6	11/22/95	81.64	21.73	59.91	0.00
	12/06/95		18.03	63.61	0.00
	01/04/96		21.67	59.97	0.00
	01/31/97		16.01	65.63	0.00
	10/10/97		20.55	61.09	0.00
MW-7	11/22/95	78.86	19.38	59.48	0.00
	12/06/95		19.72	59.14	0.00
	01/04/96		19.76	59.10	0.00
	01/31/97		15.25	63.61	0.00
	10/10/97		19.03	59.83	0.00
MW-8	11/22/95	79.55	33.33	46.22	0.00
	12/06/95		17.57	61.98	0.00
	01/04/96		20.08	59.47	0.00
	01/31/97		18.72	60.83	0.00
	10/10/97		20.26	59.29	0.00

MSL      Mean sea level

TABLE 2

**GROUNDWATER ANALYTICAL DATA  
FORMER USA STATION #57  
10700 MacARTHUR BOULEVARD  
OAKLAND, CALIFORNIA**

Well ID	Date Sampled	TPH G (ug/l)	TPH D (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl- benzene (ug/l)	Total Xylene (ug/l)	MTBE 8015 (ug/l)
S-1	12/17/87	-	-	630	4.4	3.5	37	-
	01/27/94	6,900	ND(50)	880	ND(15)	ND(15)	ND(15)	-
	03/03/95	910	5,900	260	7.6	16	14	-
	07/24/95	-	-	-	-	-	-	-
	11/22/95	460	6,100	13	0.69	0.99	1.1	460
	12/06/95	-	-	-	-	-	-	-
	01/04/96	-	-	-	-	-	-	-
	01/31/97	1,100	200*	11	6	3	6	200
10/10/97	530	2,000	ND(0.5)	2.1	ND(0.5)	ND(2)	230	
S-2	12/17/87	-	-	3,400	3,800	1,300	11,000	-
	01/27/94	15,000	ND(50)	660	230	470	1,600	-
	03/03/95	24,000	6,000	1,900	440	600	2,500	-
	07/24/95	-	-	-	-	-	-	-
	11/22/95	-	-	-	-	-	-	-
	12/06/95	-	-	-	-	-	-	-
	01/04/96	-	-	-	-	-	-	-
	01/31/97	-	-	-	-	-	-	-
10/10/97	13,000	ND(50)	260	38	190	280	600	
MW-3	03/03/95	2,500	1,600	540	92	36	200	-
	07/24/95	-	-	-	-	-	-	-
	11/22/95	14,000	5,400	5,700	230	430	650	820
	12/06/95	-	-	-	-	-	-	-
	01/04/96	-	-	-	-	-	-	-
	01/31/97	1,100	ND(50)	130	8	5	5	-
10/10/97	3,400	1,100	830	4	100	ND(10)	160	
MW-4	11/22/95	ND(50)	200	ND(0.5)	1.5	ND(0.5)	1.7	6.4
	12/06/95	-	-	-	-	-	-	-
	01/04/96	-	-	-	-	-	-	-
	01/31/97	ND(50)	ND(50)	ND(0.5)	2	ND(0.5)	2	11
	10/10/97	ND(50)	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2)	ND(5)

TPH G Total petroleum hydrocarbons in the gasoline range

TPH D Total petroleum hydrocarbons in the diesel range

ug/l Micrograms per liter

MTBE Methyl-tert-butyl-ether

ND Not detected at the method detection limit (49)

- Not measured/not analyzed

\* Laboratory indicates the chromatogram does not match the diesel hydrocarbon range pattern

Note: MTBE was confirmed on 01/31/97 with EPA Method 8260 in MW-3 at a concentration of 180 ug/l



TABLE 2 (Continued)

GROUNDWATER ANALYTICAL DATA  
 FORMER USA STATION #57  
 10700 MacARTHUR BOULEVARD  
 OAKLAND, CALIFORNIA

Well ID	Date Sampled	TPH G (ug/l)	TPH D (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl-benzene (ug/l)	Total Xylene (ug/l)	MTBE 8015 (ug/l)
MW-5	11/22/95	ND(50)	280	ND(0.5)	1.8	ND(0.5)	3	2.2
	12/06/95	-	-	-	-	-	-	-
	01/04/96	-	-	-	-	-	-	-
	01/31/97	80	ND(50)	ND(0.5)	0.6	ND(0.5)	2	6
	10/10/97	ND(50)	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2)	ND(5)
MW-6	11/22/95	ND(50)	140	ND(0.5)	1.2	ND(0.5)	1.5	5.3
	12/06/95	-	-	-	-	-	-	-
	01/04/96	-	-	-	-	-	-	-
	01/31/97	70	ND(50)	ND(0.5)	2	ND(0.5)	ND(1)	5
	10/10/97	80	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2)	ND(5)
MW-7	11/22/95	ND(50)	180	ND(0.5)	0.57	ND(0.5)	0.62	0.73
	12/06/95	-	-	-	-	-	-	-
	01/04/96	-	-	-	-	-	-	-
	01/31/97	70	ND(50)	0.7	1	ND(0.5)	ND(1)	8
	10/10/97	ND(50)	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2)	15
MW-8	11/22/95	ND(50)	360	ND(0.5)	1.3	ND(0.5)	2.1	2.1
	12/06/95	-	-	-	-	-	-	-
	01/04/96	-	-	-	-	-	-	-
	01/31/97	80	ND(50)	0.6	1	ND(0.5)	1	8
	10/10/97	50	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2)	ND(5)

TPH G Total petroleum hydrocarbons in the gasoline range

TPH D Total petroleum hydrocarbons in the diesel range

ug/l Micrograms per liter

MTBE Methyl-tert-butyl-ether

ND Not detected at the method detection limit

- Not measured/not analyzed

\* Laboratory indicates the chromatogram does not match the diesel hydrocarbon range pattern

Note: MTBE was confirmed on 01/31/97 with EPA Method 8260 in MW-3 at a concentration of 180 ug/l

**APPENDIX A**  
**FIELD DATA SHEETS**



PROJECT: USA - OAKLAND

EVENT: QTRLY

SAMPLER: C

NO.	WELL OR LOCATION	DATE			TIME		MEASUREMENT PROD/HO	CODE	COMMENTS
		MO	DA	YR	HR	MIN			
1	MW-4	10	10	97			14.14	SWL	
2	MW-5						17.80		
3	MW-6						20.55		
4	MW-7						19.03		
5	MW-8						20.26		
6	MW-3						20.62		
7	S-1						18.90		
8	S-2						21.21		
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

CODE

- \*SWL - Static water level (feet)
- \*IWL - Instant Water Level; Non Static (feet)
- \*OIL - Oil Level (feet)
- \*OWI - Oil/Water Interface (feet)
- \*MTD - Measured Total Depth (feet)
- FLO - Flow Rate (Gallons/Minutes)
- CUM - Cumulative (Gallons)

- HRS - Total (Hours)
- PSI - Pressure (psi)
- VAC - Vacuum
- pH - 1 to 14
- Ec - Conductivity
- TMP - Temperature
- TRB - Turbidity

\* All levels are depth from inner casing - describe any other reference points in comments column  
 Note in comments column if well is not properly labeled, locked, or able to be locked. Describe corrective action.  
 Note flooding of vault box, odor, access problems.



# WELL DEVELOPMENT/SAMPLING DOCUMENTATION FORM

Project Name USA - OAKLAND Job # \_\_\_\_\_ Well # MW4  
 Date 10/10/97 Sample ID \_\_\_\_\_  
 Sampling Team CE  
 Purpose of Sampling:  Initial  Quarterly  Verification  Other: \_\_\_\_\_  
 Weather Conditions \_\_\_\_\_

## GROUNDWATER LEVEL/CASING VOLUME

Description	Time	Depth (TOC to GW)	Total Depth	Feet of Water	Conversion Factor (ft to gals)	Casing Volume (gallons)
Initial		14.14	42.45	28.31	1.65	18.5
After Development/Purging	1030	38.44				
At Time of Sampling	1408	14.15				

Three Casing Volumes 55.5 Gals  
 Ten Casing Volumes \_\_\_\_\_ Gals

## WELL DEVELOPMENT/PURGING

Equipment:  Submersible Pump  Bailer  Sandpiper  Other: \_\_\_\_\_  
 Method: 2<sup>nd</sup> Step PZO  
 Decontamination Method: 1st RINSE Description \_\_\_\_\_  
 Water Containment:  Drums  Baker Tank  Treatment System  Other: \_\_\_\_\_  
 Labeled: \_\_\_\_\_

Start Time	Volume Water Extracted	Temperature °F/C	EC (umhos)	pH	Observations (Color, Turbidity, Oils, Odor)
1017	0		-2.3	7.14	
1022	18.5		-4.4	7.08	
1028	37		-6.6	7.11	
1035	55.5		10.7	7.12	

## SAMPLE INFORMATION

Lab: \_\_\_\_\_

Sampling Containers/No. of Containers: 1 PLD  
 1 Liter Amber  40 ml VOA TR-5137EX, 1/2/97  
 Other \_\_\_\_\_

Preservation:  Ice  Other Ice  
 Ice  Other \_\_\_\_\_  
 Ice  Other \_\_\_\_\_

Device:  Bailer, Disposable  Other \_\_\_\_\_

Pertinent Field Observations: 200 Hz (Flow) PMP RATE

Deviations From Standard Sampling Protocol: \_\_\_\_\_



# WELL DEVELOPMENT/SAMPLING DOCUMENTATION FORM

Project Name USA-OAKLAND

Job # \_\_\_\_\_ Well # NW-5

Date 10/10/97

Sample ID NW-5

Sampling Team CU

Purpose of Sampling:  Initial  Quarterly  Verification  Other: \_\_\_\_\_

Weather Conditions \_\_\_\_\_

## GROUNDWATER LEVEL/CASING VOLUME

Description	Time	Depth (TOC to GW)	Total Depth	Feet of Water	Conversion Factor (ft to gals)	Casing Volume (gallons)
Initial		17.80	37.60	19.80	.65	13
After Development/ Purging	1058	27.83				
At Time of Sampling	1417	17.97				

Three Casing Volumes 39 Gals  
Ten Casing Volumes \_\_\_\_\_ Gals

## WELL DEVELOPMENT/PURGING

Equipment:  Submersible Pump  Bailer  Sandpiper  Other: \_\_\_\_\_

Method: 2nd Phase

Decontamination Method: Top/Runse Description \_\_\_\_\_

Water Containment:  Drums  Baker Tank  Treatment System  Other: \_\_\_\_\_

Labeled: \_\_\_\_\_

Start Time	Volume Water Extracted	Temperature °F/C	EC (umhos)	pH	Observations (Color, Turbidity, Oils, Odor)
1048	0		257.2	11.26	
1054	19		258.0	11.35	
	26				
	39				

## SAMPLE INFORMATION

Lab: \_\_\_\_\_

Sampling Containers/No. of Containers:  1 Liter Amber 1PH-D  
 40 ml VOA PHS + BTEX, MTBE  
 Other \_\_\_\_\_

Preservation:  Ice  Other \_\_\_\_\_  
 Ice  Other Hot  
 Ice  Other \_\_\_\_\_

Device:  Bailer, Disposable  Other \_\_\_\_\_

Pertinent Field Observations: Day After 2:20 AM Purged

Deviations From Standard Sampling Protocol: \_\_\_\_\_

## WELL DEVELOPMENT/SAMPLING DOCUMENTATION FORM

Project Name USA OAKLAND Job # \_\_\_\_\_ Well # U  
 Date 10/10/97 Sample ID NW-6  
 Sampling Team CE  
 Purpose of Sampling:  Initial  Quarterly  Verification  Other: \_\_\_\_\_  
 Weather Conditions \_\_\_\_\_

### GROUNDWATER LEVEL/CASING VOLUME

Description	Time	Depth (TOC to GW)	Total Depth	Feet of Water	Conversion Factor (ft to gals)	Casing Volume (gallons)
Initial		20.55	42.00	21.45	1.65	14
After Development/ Purging						42
At Time of Sampling	1425					32

Three Casing Volumes 32 Gals  
 Ten Casing Volumes \_\_\_\_\_ Gals

### WELL DEVELOPMENT/PURGING

Equipment:  Submersible Pump  Bailer  Sandpiper  Other: \_\_\_\_\_  
 Method: 2nd Bed to Description \_\_\_\_\_  
 Decontamination Method: 1st RINSE Description \_\_\_\_\_  
 Water Containment:  Drums  Baker Tank  Treatment System  Other: \_\_\_\_\_  
 Labeled: \_\_\_\_\_

Start Time	Volume Water Extracted	Temperature °F/C	EC (umhos)	pH	Observations (Color, Turbidity, Oils, Odor)
1109	0		-46.2	7.79	
1115	14		-15.4	7.27	
1120	20		-15.7	7.27	
1125	42		-9.0	7.16	

### SAMPLE INFORMATION

Lab: \_\_\_\_\_

Sampling Containers/No. of Containers: 1 1.5L Amber  
 1 Liter Amber  40 ml VOA  Other: \_\_\_\_\_  
PH + BTEX, Nitrate

Preservation:  Ice  Other: \_\_\_\_\_  
 Ice  Other: Free  
 Ice  Other: \_\_\_\_\_

Device:  Bailer, Disposable  Other: \_\_\_\_\_

Pertinent Field Observations: OBSTRUCTION @ ~21.00' (BOOTS) NOT ABLE TO MEASURE WATER LEVEL ACCURATELY

Deviations From Standard Sampling Protocol: \_\_\_\_\_



# WELL DEVELOPMENT/SAMPLING DOCUMENTATION FORM

Project Name USA-ONLAND Job # \_\_\_\_\_ Well # NW-7  
 Date 10/10/97 Sample ID NW-7  
 Sampling Team [Signature]

Purpose of Sampling:  Initial  Quarterly  Verification  Other: \_\_\_\_\_  
 Weather Conditions \_\_\_\_\_

## GROUNDWATER LEVEL/CASING VOLUME

Description	Time	Depth (TOC to GW)	Total Depth	Feet of Water	Conversion Factor (ft to gals)	Casing Volume (gallons)
Initial		19.09	41.85	22.82	-1.65	15
After Development/ Purging	1158	35.92				
At Time of Sampling	1431					

Three Casing Volumes 45 Gals  
 Ten Casing Volumes \_\_\_\_\_ Gals

## WELL DEVELOPMENT/PURGING

Equipment:  Submersible Pump  Bailer  Sandpiper  Other: \_\_\_\_\_

Method: 2" Reel Flo

Decontamination Method: 1SP/RINSE Description \_\_\_\_\_

Water Containment:  Drums  Baker Tank  Treatment System  Other: \_\_\_\_\_

Labeled: \_\_\_\_\_

Start Time	Volume Water Extracted	Temperature °F/C	EC (umhos)	pH	Observations (Color, Turbidity, Oils, Odor)
1137	0		-5.9	7.10	
1142	15		-221	7.36	
1152	30		-174	7.31	
1431	45		-170	7.29	

## SAMPLE INFORMATION

Lab: \_\_\_\_\_

Sampling Containers/No. of Containers: 1 Ltr - 0  
 1 Liter Amber 1 Ltr - 0  
 40 ml VOA 1 Ltr - 6 + BTEX, NitBE  
 Other \_\_\_\_\_

Preservation:  Ice  Other \_\_\_\_\_  
 Ice  Other None  
 Ice  Other \_\_\_\_\_

Device:  Bailer, Disposable  Other \_\_\_\_\_

Pertinent Field Observations: \_\_\_\_\_

\_\_\_\_\_

Deviations From Standard Sampling Protocol: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# WELL DEVELOPMENT/SAMPLING DOCUMENTATION FORM

Project Name USA OAKLAND Job # \_\_\_\_\_ Well # NW-8  
 Date 10/10/97 Sample ID NW-8  
 Sampling Team C  
 Purpose of Sampling:  Initial  Quarterly  Verification  Other: \_\_\_\_\_  
 Weather Conditions \_\_\_\_\_

## GROUNDWATER LEVEL/CASING VOLUME

Description	Time	Depth (TOC to GW)	Total Depth	Feet of Water	Conversion Factor (ft to gals)	Casing Volume (gallons)
Initial		20.26	37.70	17.44	.65	11.5
After Development/ Purging	1237	34.97				
At Time of Sampling	1438	20.81				

Three Casing Volumes 34.5 Gals  
 Ten Casing Volumes \_\_\_\_\_ Gals

## WELL DEVELOPMENT/PURGING

Equipment:  Submersible Pump  Bailer  Sandpiper  Other: \_\_\_\_\_  
 Method: 2" PEDI FLO Description \_\_\_\_\_  
 Decontamination Method: TSP RINSE Description \_\_\_\_\_  
 Water Containment:  Drums  Baker Tank  Treatment System  Other: \_\_\_\_\_  
 Labeled: \_\_\_\_\_

Start Time	Volume Water Extracted	Temperature °F/C	EC (umhos)	pH	Observations (Color, Turbidity, Oils, Odor)
1222	0		17.5	7.30	
1225	11.5		6.9	6.87	
1229	23		5.8	6.92	
1235	34.5		5.4	6.97	

## SAMPLE INFORMATION

Lab: \_\_\_\_\_

Sampling Containers/No. of Containers  
 1 Liter Amber 1PA-D  
 40 ml VOA 1PA-G + BTEX, Nitrate  
 Other \_\_\_\_\_

Device:  Bailer, Disposable  Other \_\_\_\_\_

Pertinent Field Observations: \_\_\_\_\_

Deviations From Standard Sampling Protocol: \_\_\_\_\_

Preservation  
 Ice  
 Ice  
 Ice  
 Other  
 Other TKL  
 Other \_\_\_\_\_





# WELL DEVELOPMENT/SAMPLING DOCUMENTATION FORM

Project Name USA OAKLAND

Job # \_\_\_\_\_ Well # MW-3

Date 10/10/97

Sample ID MW-3

Sampling Team CU

Purpose of Sampling:  Initial  Quarterly  Verification  Other: \_\_\_\_\_

Weather Conditions \_\_\_\_\_

## GROUNDWATER LEVEL/CASING VOLUME

Description	Time	Depth (TOC to GW)	Total Depth	Feet of Water	Conversion Factor (ft to gals)	Casing Volume (gallons)
Initial		20.62	42.75	22.13	.65	18
After Development/ Purging	1305	42.98				
At Time of Sampling	1441	21.17				

Three Casing Volumes 54 Gals  
Ten Casing Volumes \_\_\_\_\_ Gals

## WELL DEVELOPMENT/PURGING

Equipment:  Submersible Pump  Bailer  Sandpiper  Other: \_\_\_\_\_

Method: 2" Redi Flow

Decontamination Method: TOP RINSE Description \_\_\_\_\_

Water Containment:  Drums  Baker Tank  Treatment System  Other: \_\_\_\_\_

Labeled: \_\_\_\_\_

Start Time	Volume Water Extracted	Temperature °F/C	EC (umhos)	pH	Observations (Color, Turbidity, Oils, Odor)
1250	0		2.8	6.96	
1250	18		4.3	7.09	
1305	36				
	54				

## SAMPLE INFORMATION

Lab: \_\_\_\_\_

Sampling Containers/No. of Containers  
 1 Liter Amber JAN-D  
 40 ml VOA PH-6 + BTEX, METALS  
 Other \_\_\_\_\_

Preservation  
 Ice  Other  
 Ice  Other HEU  
 Ice  Other

Device:  Bailer, Disposable  Other \_\_\_\_\_

Pertinent Field Observations: DRY AFTER ~ 24 GAL PURGED

Deviations From Standard Sampling Protocol: \_\_\_\_\_



# WELL DEVELOPMENT/SAMPLING DOCUMENTATION FORM

Project Name USA-DAYLAND

Job # \_\_\_\_\_ Well # 51

Date 10/10/97

Sample ID 51

Sampling Team CL

Purpose of Sampling:  Initial  Quarterly  Verification  Other: \_\_\_\_\_

Weather Conditions \_\_\_\_\_

## GROUNDWATER LEVEL/CASING VOLUME

Description	Time	Depth (TOC to GW)	Total Depth	Feet of Water	Conversion Factor (ft to gals)	Casing Volume (gallons)
Initial		18.90	40.80	21.90	3.6	8
After Development/ Purging	1325	27.45				
At Time of Sampling	1443	21.77				

Three Casing Volumes 24 Gals  
Ten Casing Volumes \_\_\_\_\_ Gals

## WELL DEVELOPMENT/PURGING

Equipment:  Submersible Pump  Bailer  Sandpiper  Other: \_\_\_\_\_

Method: 2<sup>nd</sup> BED TO

Decontamination Method: REP. RINSE Description \_\_\_\_\_

Water Containment:  Drums  Baker Tank  Treatment System  Other: \_\_\_\_\_

Labeled: \_\_\_\_\_

Start Time	Volume Water Extracted	Temperature °F/C	EC (umhos)	pH	Observations (Color, Turbidity, Oils, Odor)
1310	0		6.2	6.91	
1315	8		7.7	7.14	
1319	16		4.2	7.08	
1324	24		1.5	7.03	

## SAMPLE INFORMATION

Lab: \_\_\_\_\_

Sampling Containers/No. of Containers  
 1 Liter Amber 1 P.D  
 40 ml VOA 1 P.H.G + BTEX, Nitro  
 Other \_\_\_\_\_

Preservation  
 Ice  Other  
 Ice  Other ALL  
 Ice  Other \_\_\_\_\_

Device:  Bailer, Disposable  Other \_\_\_\_\_

Pertinent Field Observations: \_\_\_\_\_

Deviations From Standard Sampling Protocol: \_\_\_\_\_



# WELL DEVELOPMENT/SAMPLING DOCUMENTATION FORM

Project Name USA OAKLAND Job # \_\_\_\_\_ Well # 52

Date 10/10/97 Sample ID 52

Sampling Team CL

Purpose of Sampling:  Initial  Quarterly  Verification  Other: \_\_\_\_\_

Weather Conditions \_\_\_\_\_

## GROUNDWATER LEVEL/CASING VOLUME

Description	Time	Depth (TOC to GW)	Total Depth	Feet of Water	Conversion Factor (ft to gals)	Casing Volume (gallons)
Initial		21.21	42.85	21.64	1.36	8
After Development/ Purging	1350					
At Time of Sampling						

Three Casing Volumes 24 Gals  
Ten Casing Volumes \_\_\_\_\_ Gals

## WELL DEVELOPMENT/PURGING

Equipment:  Submersible Pump  Bailer  Sandpiper  Other: \_\_\_\_\_

Method: 2" Redi Flow Description \_\_\_\_\_

Decontamination Method: ISP RINSE Description \_\_\_\_\_

Water Containment:  Drums  Baker Tank  Treatment System  Other: \_\_\_\_\_

Labeled: \_\_\_\_\_

Start Time	Volume Water Extracted	Temperature °F/C	EC (umhos)	pH	Observations (Color, Turbidity, Oils, Odor)
1335	0		-9.8	7.31	STRONG PETROLEUM ODOR
1339	8		-4.5	7.16	SLT GREEN
1344	16		-4.4	7.09	
1348	24		-2.6	7.04	

## SAMPLE INFORMATION

Lab: \_\_\_\_\_

Sampling Containers/No. of Containers:  1 Liter Amber PA-D  40 ml VOA PA-G + BORE, NODR  Other \_\_\_\_\_

Preservation:  Ice  Other  Ice  Other ALL

Device:  Bailer, Disposable  Other \_\_\_\_\_

Pertinent Field Observations: \* GREEN ON BAILER NOTICED DURING SAMPLING

Deviations From Standard Sampling Protocol: \_\_\_\_\_

**APPENDIX B**

**LABORATORY REPORTS AND CHAIN-OF-CUSTODY DOCUMENTS**

# American Environmental Network

## Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

NOV - 3

GHH ENGINEERING, INC.  
8084 OLD AUBURN RD STE E  
CITRUS HEIGHTS, CA 95610

REPORT DATE: 10/30/97

DATE(S) SAMPLED: 10/10/97

DATE RECEIVED: 10/14/97

AEN WORK ORDER: 9710172

ATTN: VERN BENNETT  
CLIENT PROJ. ID: 5090.10  
CLIENT PROJ. NAME: USA OAKLAND 57  
C.O.C. NUMBER: 15071  
P.O. NUMBER: 8940

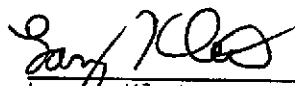
### PROJECT SUMMARY:

On October 14, 1997, this laboratory received 8 water sample(s).

Client requested sample(s) be analyzed for chemical parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.



Larry Klein  
Laboratory Director

## GHH ENGINEERING, INC.

SAMPLE ID: S-1  
AEN LAB NO: 9710172-01  
AEN WORK ORDER: 9710172  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/30/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/19/97
Toluene	108-88-3	2.1 *	0.5	ug/L	10/19/97
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/19/97
Xylenes, Total	1330-20-7	ND	2	ug/L	10/19/97
Purgeable HCs as Gasoline	5030/GCFID	0.53 *	0.05	mg/L	10/19/97
Methyl t-Butyl Ether	1634-04-4	230 *	5	ug/L	10/19/97

MTBE included in gasoline result.

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: S-2  
AEN LAB NO: 9710172-02  
AEN WORK ORDER: 9710172  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/30/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	260 *	5	ug/L	10/19/97
Toluene	108-88-3	38 *	5	ug/L	10/19/97
Ethylbenzene	100-41-4	190 *	5	ug/L	10/19/97
Xylenes, Total	1330-20-7	280 *	20	ug/L	10/19/97
Purgeable HCs as Gasoline	5030/GCFID	13 *	0.5	mg/L	10/19/97
Methyl t-Butyl Ether	1634-04-4	600 *	50	ug/L	10/19/97

MTBE included in gasoline result. Reporting limits elevated due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: MW-3  
AEN LAB NO: 9710172-03  
AEN WORK ORDER: 9710172  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/30/97

---

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	830 *	3	ug/L	10/23/97
Toluene	108-88-3	4 *	3	ug/L	10/23/97
Ethylbenzene	100-41-4	100 *	3	ug/L	10/23/97
Xylenes, Total	1330-20-7	ND	10	ug/L	10/23/97
Purgeable HCs as Gasoline	5030/GCFID	3.4 *	0.3	mg/L	10/23/97
Methyl t-Butyl Ether	1634-04-4	160 *	5	ug/L	10/19/97

MTBE included in gasoline result. Reporting limits elevated due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit



## GHH ENGINEERING, INC.

SAMPLE ID: MW-4  
AEN LAB NO: 9710172-04  
AEN WORK ORDER: 9710172  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/30/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/23/97
Toluene	108-88-3	ND	0.5	ug/L	10/23/97
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/23/97
Xylenes, Total	1330-20-7	ND	2	ug/L	10/23/97
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	10/23/97
Methyl t-Butyl Ether	1634-04-4	ND	5	ug/L	10/23/97

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: MW-5  
AEN LAB NO: 9710172-05  
AEN WORK ORDER: 9710172  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/30/97

---

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/19/97
Toluene	108-88-3	ND	0.5	ug/L	10/19/97
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/19/97
Xylenes, Total	1330-20-7	ND	2	ug/L	10/19/97
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	10/19/97
Methyl t-Butyl Ether	1634-04-4	ND	5	ug/L	10/19/97

ND = Not detected at or above the reporting limit

\* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: MW-6  
AEN LAB NO: 9710172-06  
AEN WORK ORDER: 9710172  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/30/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/19/97
Toluene	108-88-3	ND	0.5	ug/L	10/19/97
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/19/97
Xylenes, Total	1330-20-7	ND	2	ug/L	10/19/97
Purgeable HCs as Gasoline	5030/GCFID	0.08 *	0.05	mg/L	10/19/97
Methyl t-Butyl Ether	1634-04-4	ND	5	ug/L	10/19/97

ND = Not detected at or above the reporting limit

\* = Value at or above reporting limit

GHH ENGINEERING, INC.

SAMPLE ID: MW-7  
 AEN LAB NO: 9710172-07  
 AEN WORK ORDER: 9710172  
 CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
 DATE RECEIVED: 10/14/97  
 REPORT DATE: 10/30/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/19/97
Toluene	108-88-3	ND	0.5	ug/L	10/19/97
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/19/97
Xylenes, Total	1330-20-7	ND	2	ug/L	10/19/97
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	10/19/97
Methyl t-Butyl Ether	1634-04-4	15 *	5	ug/L	10/19/97

ND = Not detected at or above the reporting limit

\* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: MW-8  
AEN LAB NO: 9710172-08  
AEN WORK ORDER: 9710172  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/30/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/19/97
Toluene	108-88-3	ND	0.5	ug/L	10/19/97
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/19/97
Xylenes, Total	1330-20-7	ND	2	ug/L	10/19/97
Purgeable HCs as Gasoline	5030/GCFID	0.05 *	0.05	mg/L	10/19/97
Methyl t-Butyl Ether	1634-04-4	ND	5	ug/L	10/19/97

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

AEN (CALIFORNIA)  
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9710172

CLIENT PROJECT ID: 5090.10

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

## QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9710172  
 INSTRUMENT: H  
 MATRIX: WATER

## Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery	
			Fluorobenzene	
10/19/97	S-1	01	94	
10/19/97	S-2	02	85	
10/23/97	MW-3	03	92	
10/23/97	MW-4	04	100	
10/19/97	MW-5	05	98	
10/19/97	MW-6	06	99	
10/19/97	MW-7	07	98	
10/19/97	MW-8	08	100	

QC Limits: 70-130

DATE ANALYZED: 10/18/97  
 SAMPLE SPIKED: LCS  
 INSTRUMENT: H

## Laboratory Control Sample Recovery

Analyte	Spike Added (ug/L)	Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Benzene	100	97	1	70-130	20
Toluene	100	99	<1	70-130	20
Ethylbenzene	100	100	1	70-130	20
Total Xylenes	300	104	<1	70-130	20

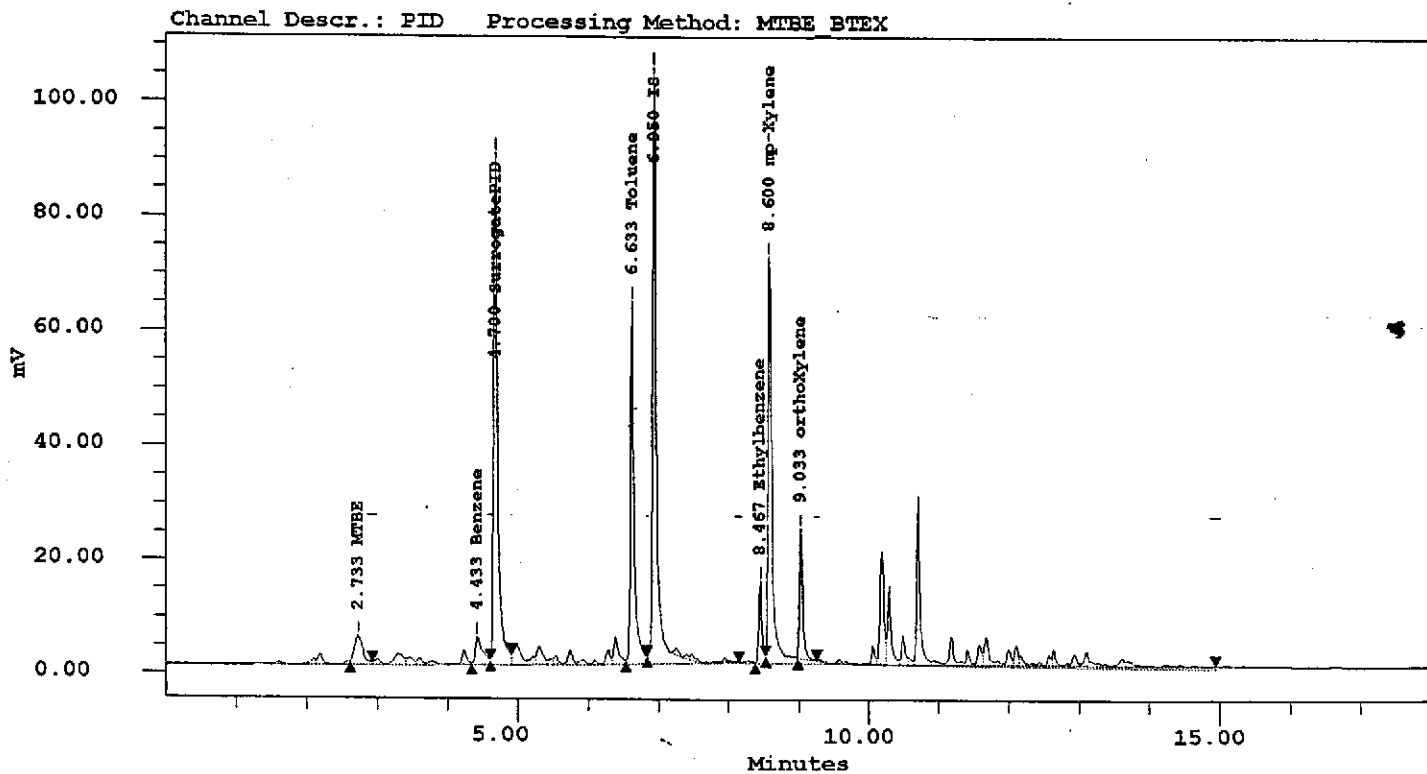
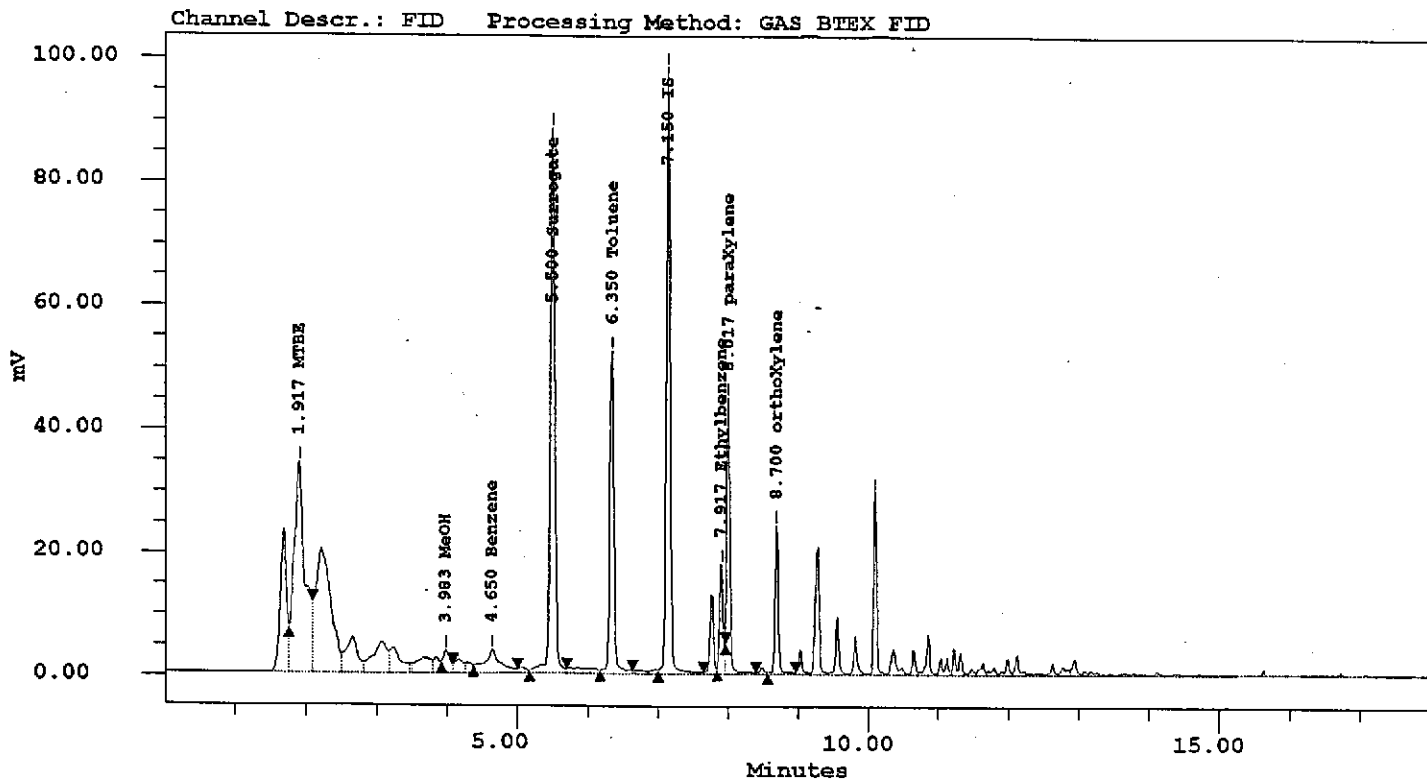
Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

\*\*\* END OF REPORT \*\*\*

SampleName 500 PPB GAS ML  
Date Acquired 10/18/97 05:02:17 PM  
Project H\_1020

SampleType Unknown  
BTEX Range: 0.5-400 ppb  
Gas Range: 50-4000 ppb

SampleWeight 1  
Dilution 1.0  
Vial 1

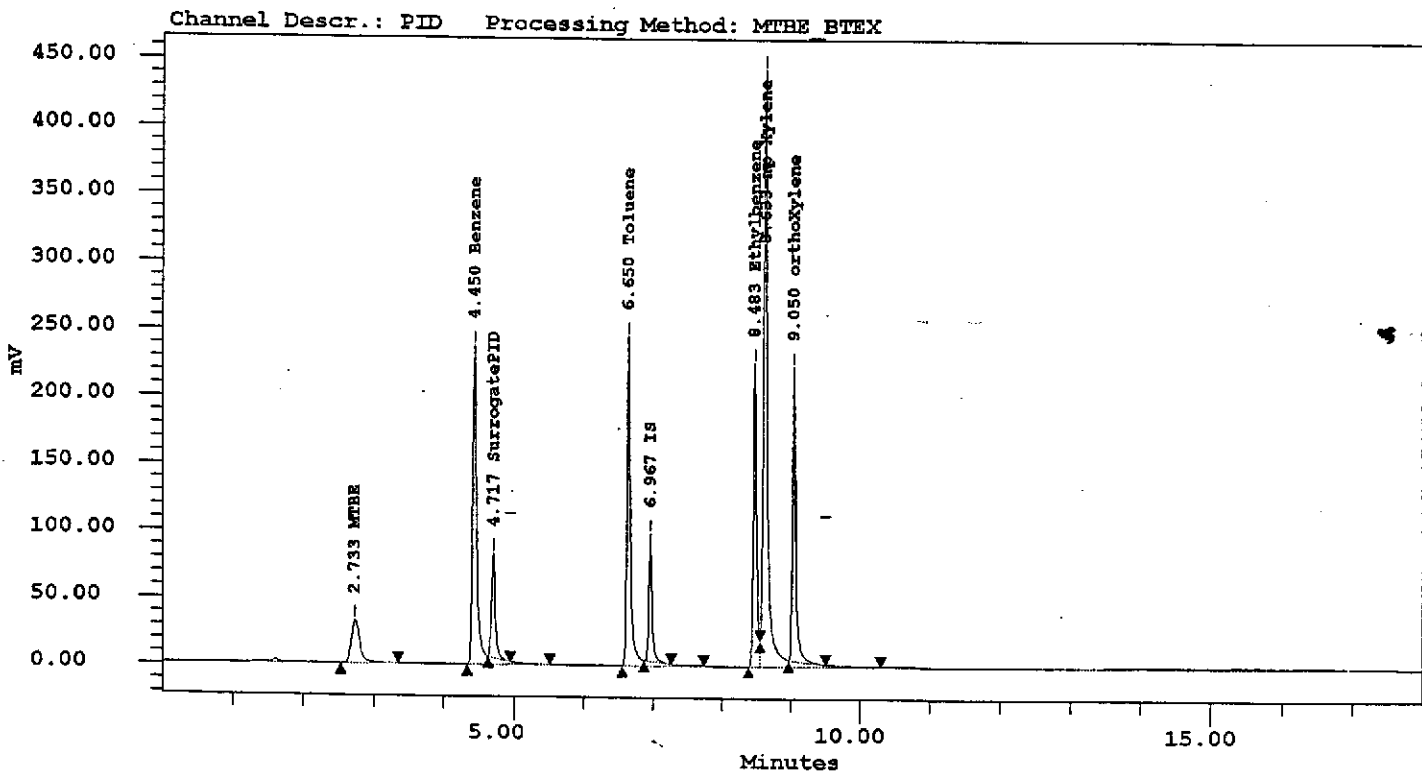
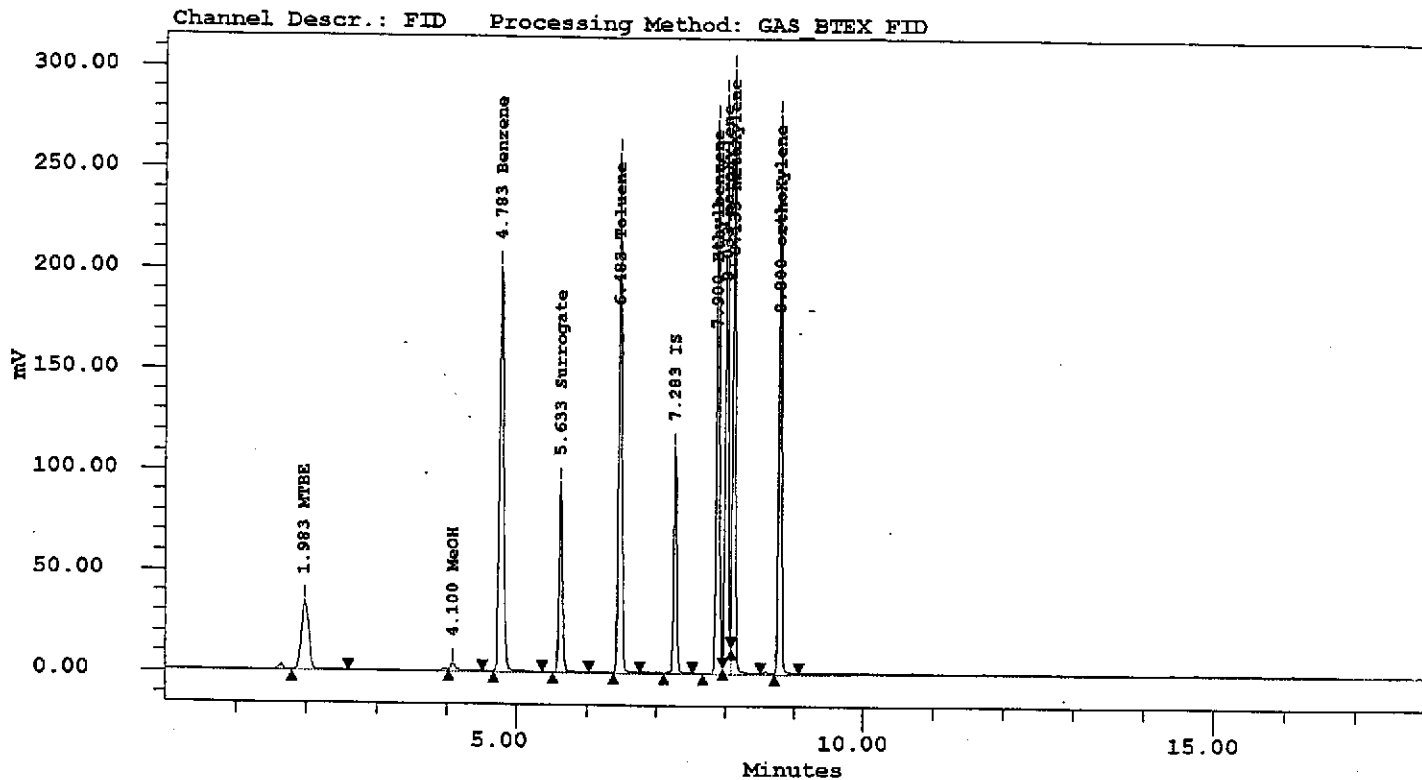




SampleName 200PPBMTBEBTEX  
 Date Acquired 10/18/97 06:12:53 PM  
 Project H\_1020

SampleType Unknown  
 BTEX Range: 0.5-400 ppb  
 Gas Range: 50-4000 ppb

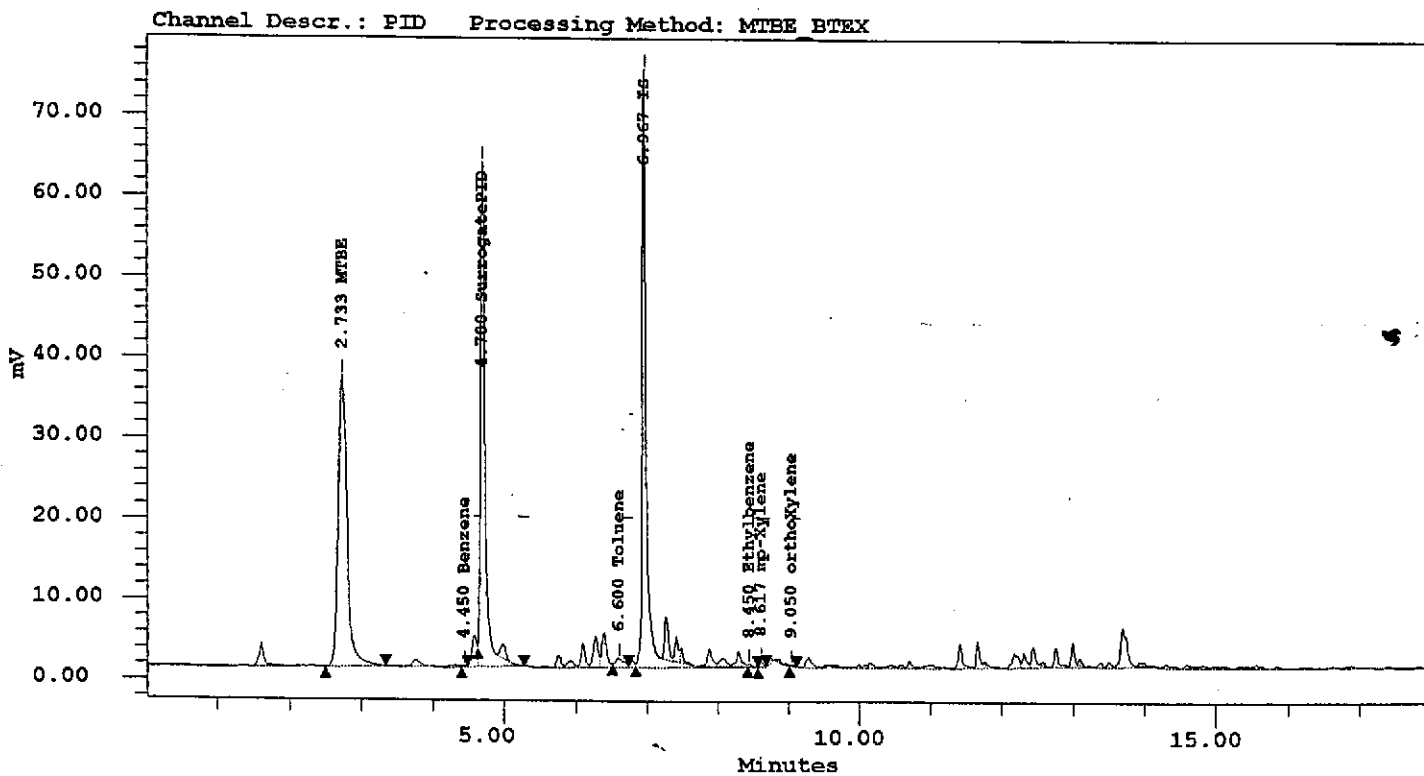
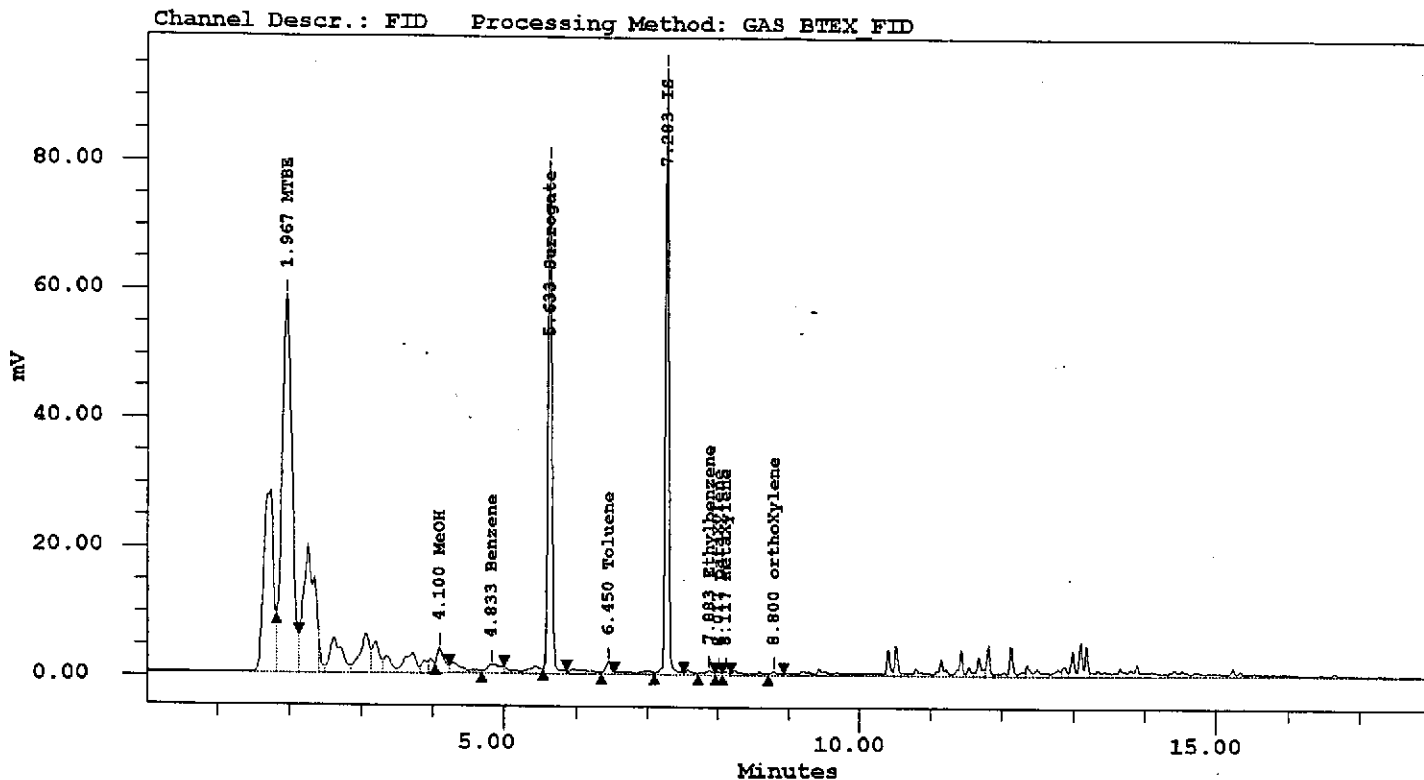
SampleWeight 1  
 Dilution 1.0  
 Vial 4



SampleName 10172-1A  
 Date Acquired 10/19/97 01:32:46 AM  
 Project H\_1020

SampleType Unknown  
 BTEX Range: 0.5-400 ppb  
 Gas Range: 50-4000 ppb

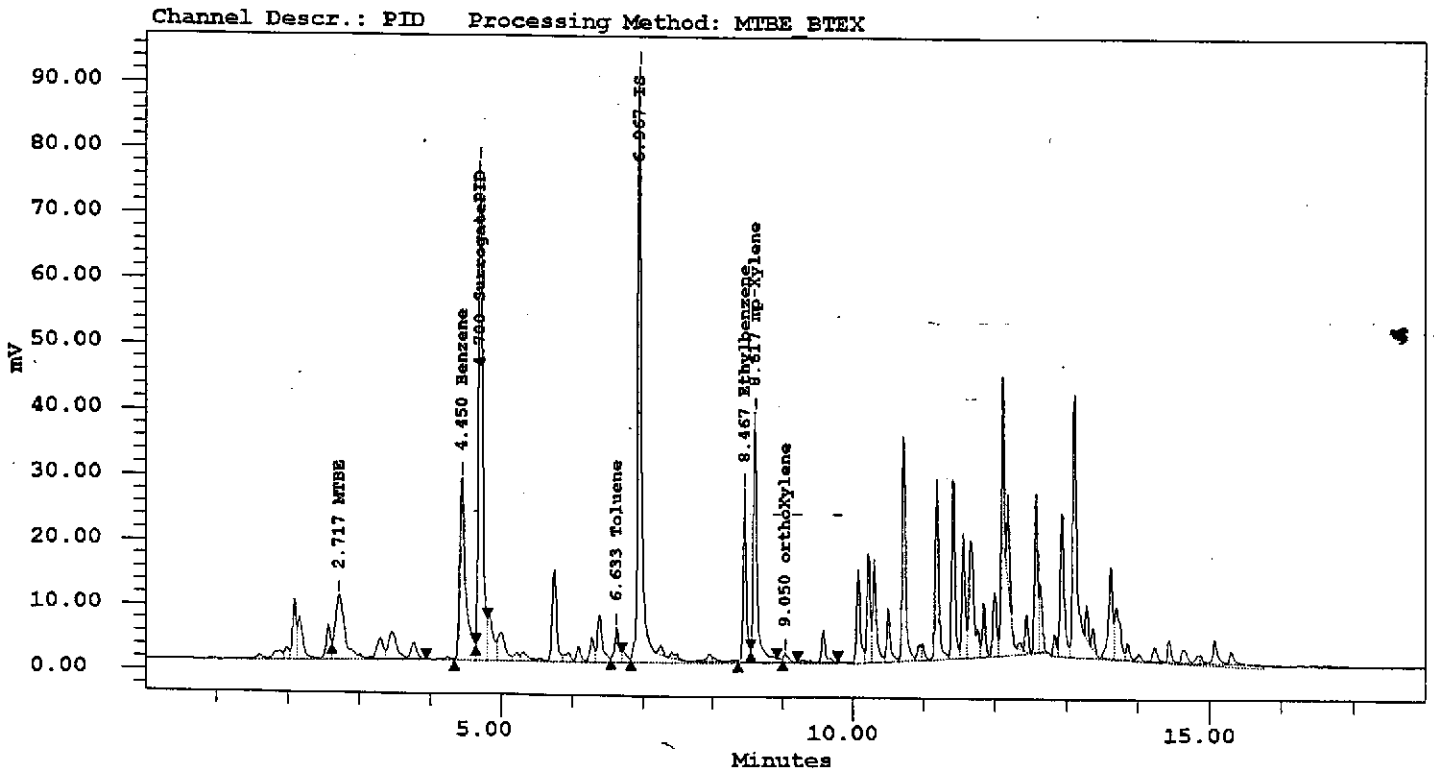
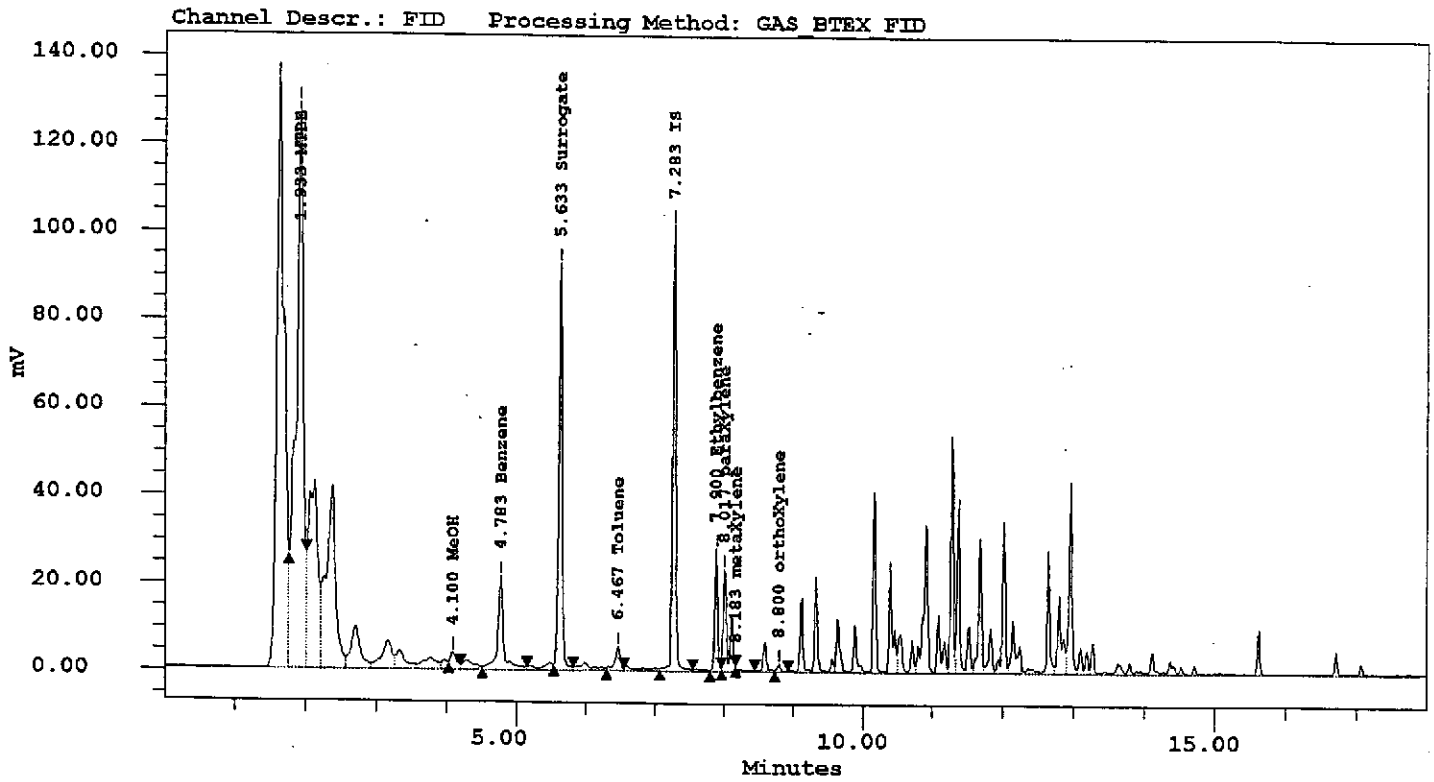
SampleWeight 1  
 Dilution 1.0  
 Vial 14



SampleName 10172-2A 1/10  
 Date Acquired 10/19/97 01:56:34 AM  
 Project H\_1020

SampleType Unknown  
 BTEX Range: 0.5-400 ppb  
 Gas Range: 50-4000 ppb

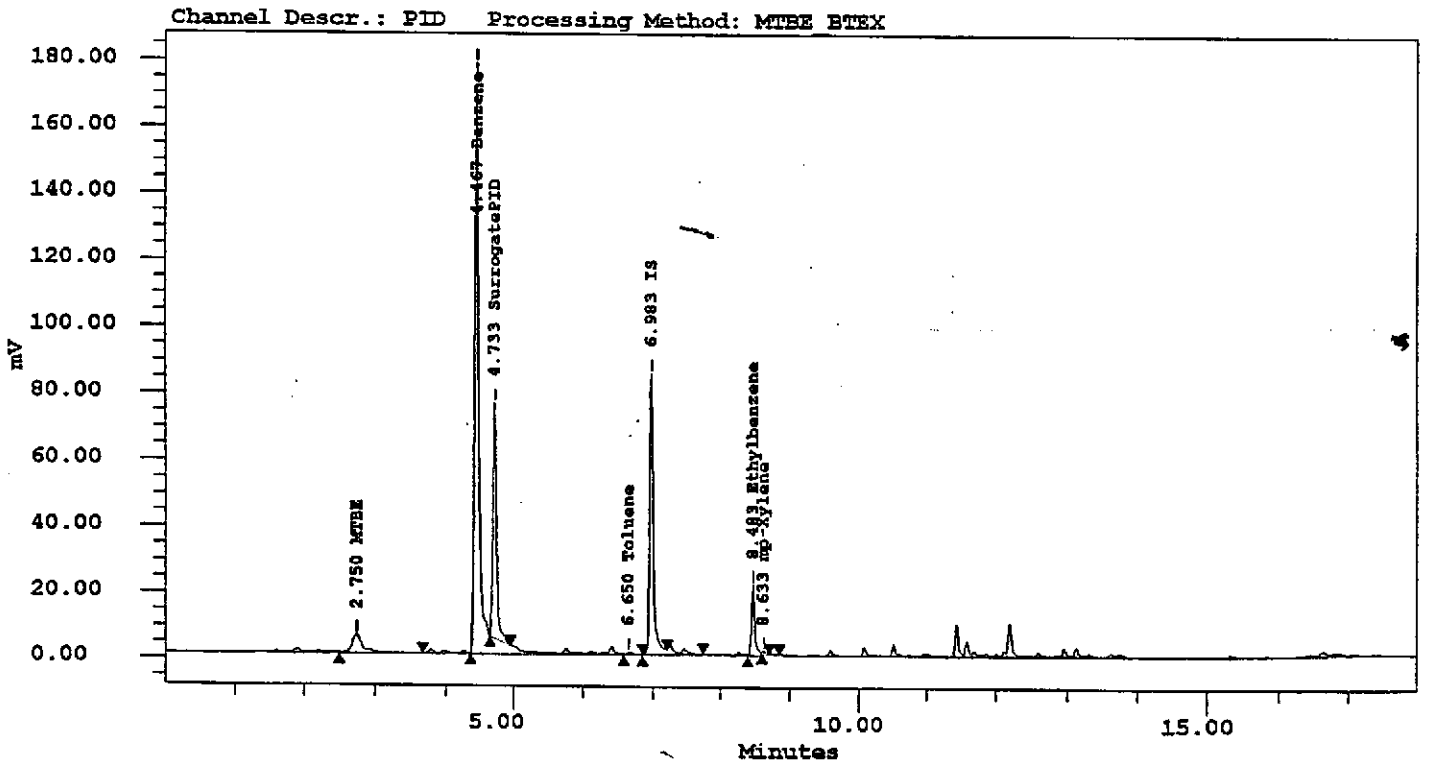
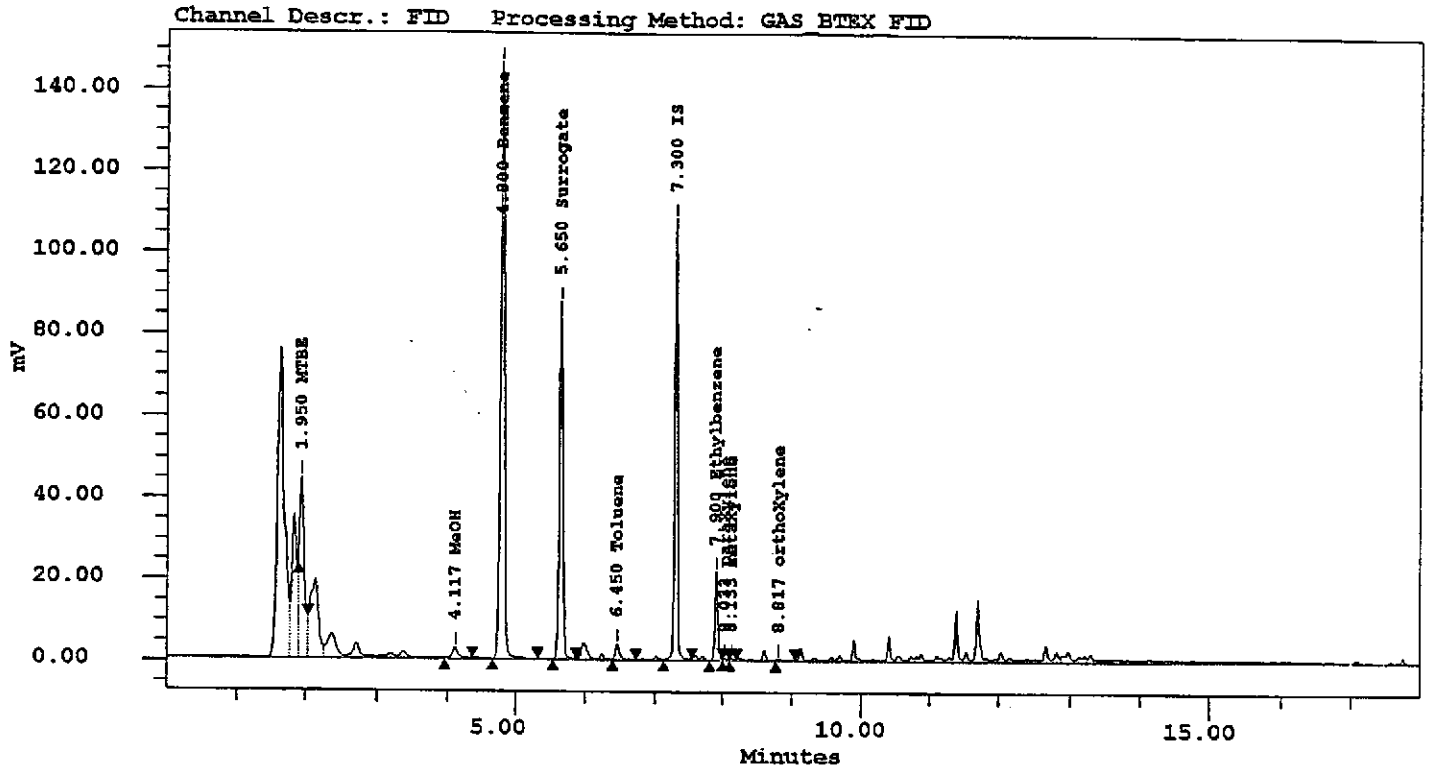
SampleWeight 1  
 Dilution 10.0  
 Vial 15



SampleName 9710172-3B  
 Date Acquired 10/23/97 11:54:47 AM  
 Project H\_1020

SampleType Unknown  
 BTEX Range: 0.5-400 ppb  
 Gas Range: 50-4000 ppb

SampleWeight 1  
 Dilution 5.0  
 Vial 8



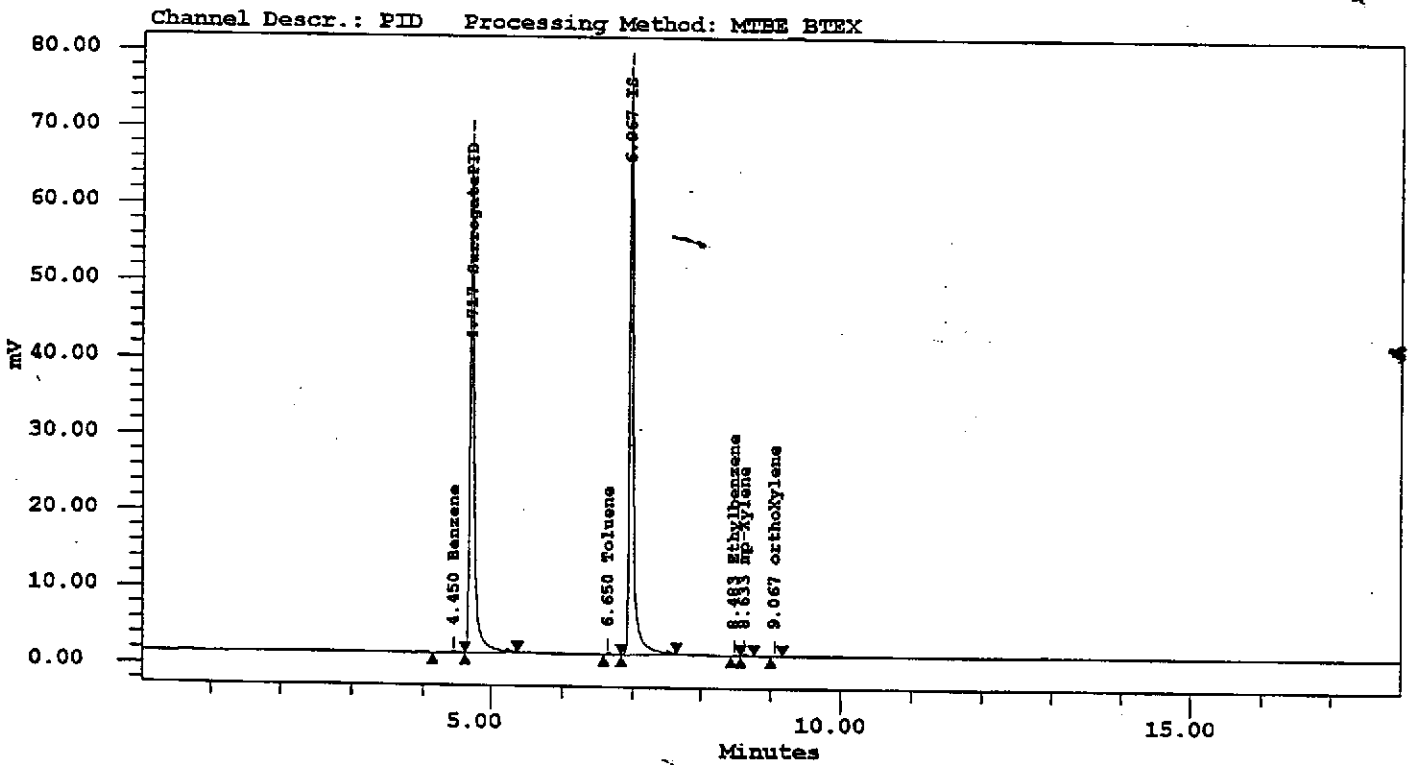
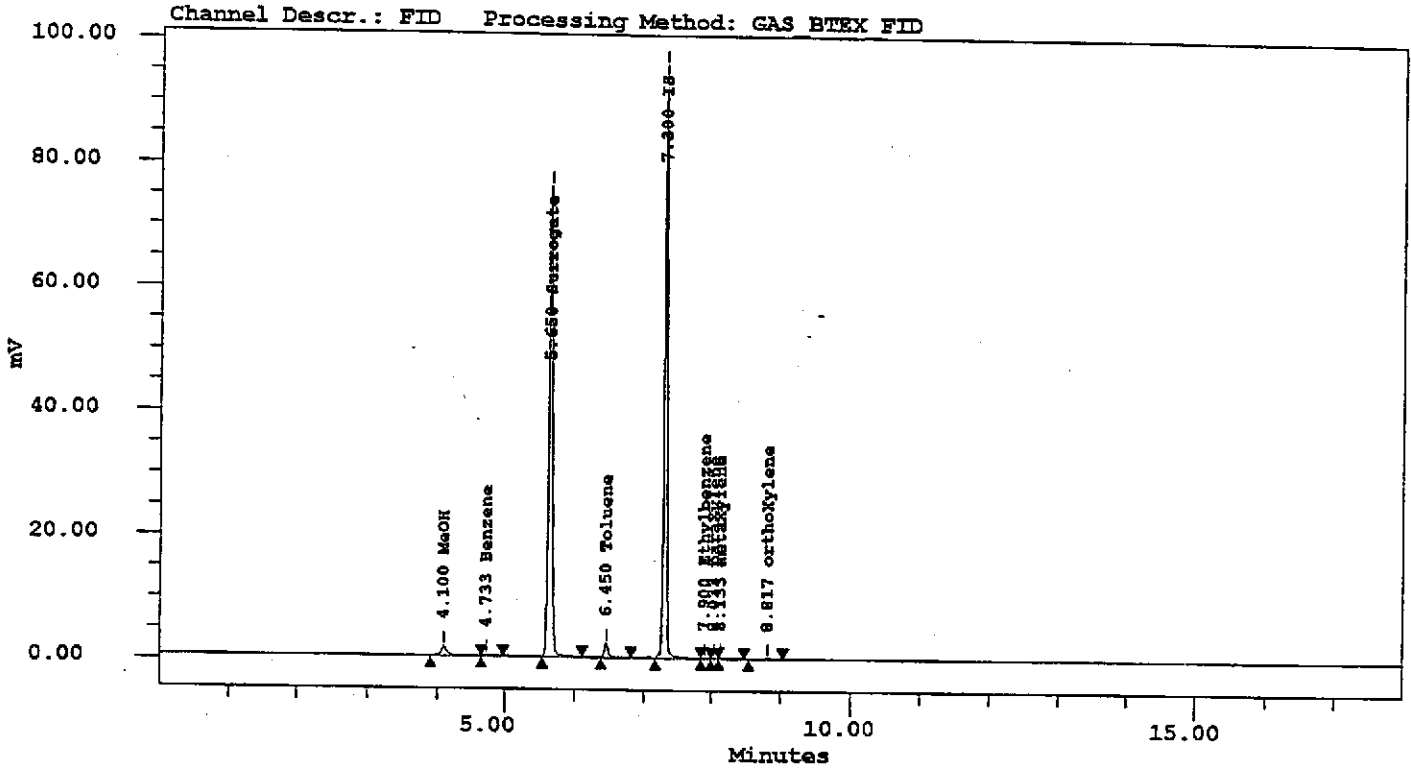
**GASOLINE RESULT**

#	Name	Area (uV*sec)	Gas area (uV*sec)	Gas RF	Gas Amount ppb	Final amount ppb
1	not_Gas	625145				

SampleName 9710172-4B  
 Date Acquired 10/23/97 01:05:03 PM  
 Project H\_1020

SampleType Unknown  
 BTEX Range: 0.5-400 ppb  
 Gas Range: 50-4000 ppb

SampleWeight 1  
 Dilution 1.0  
 Vial 11



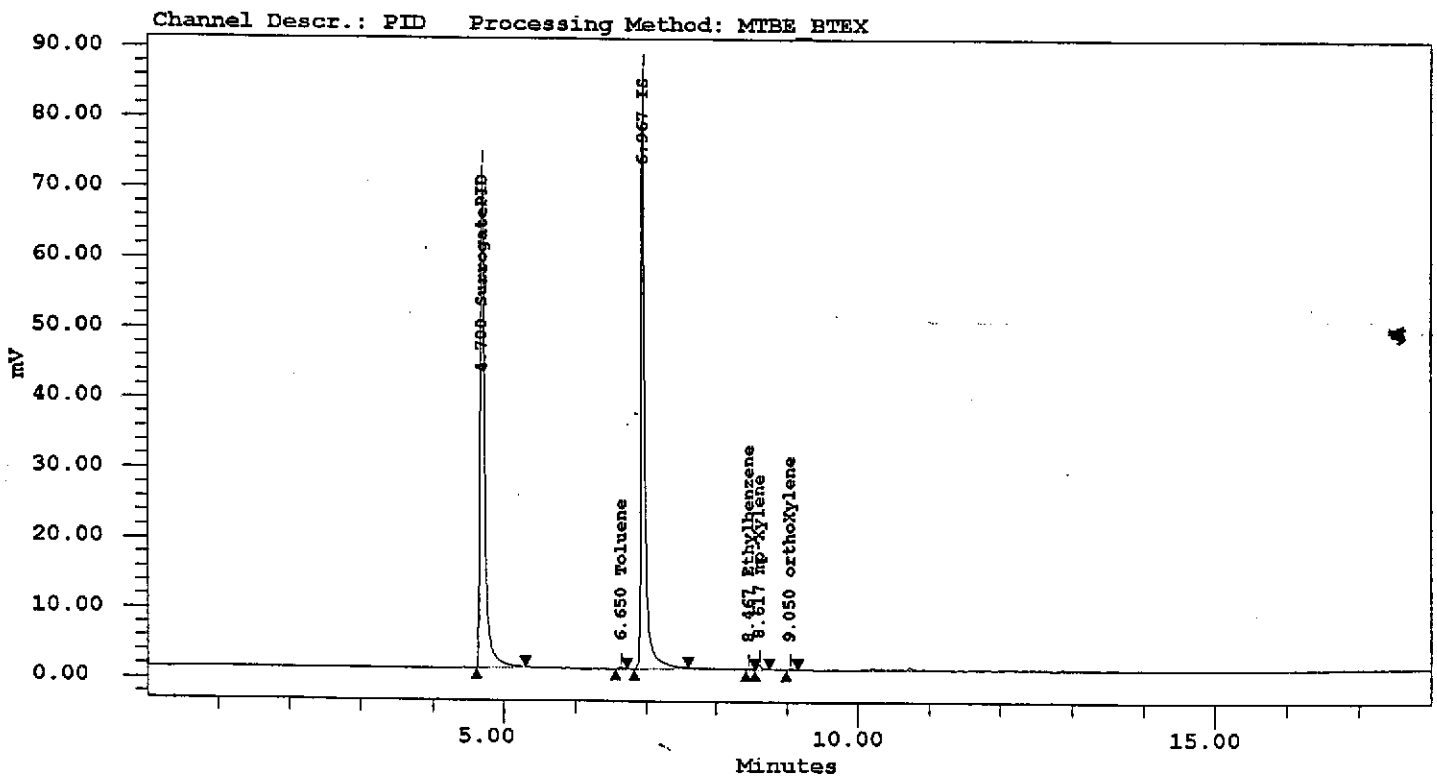
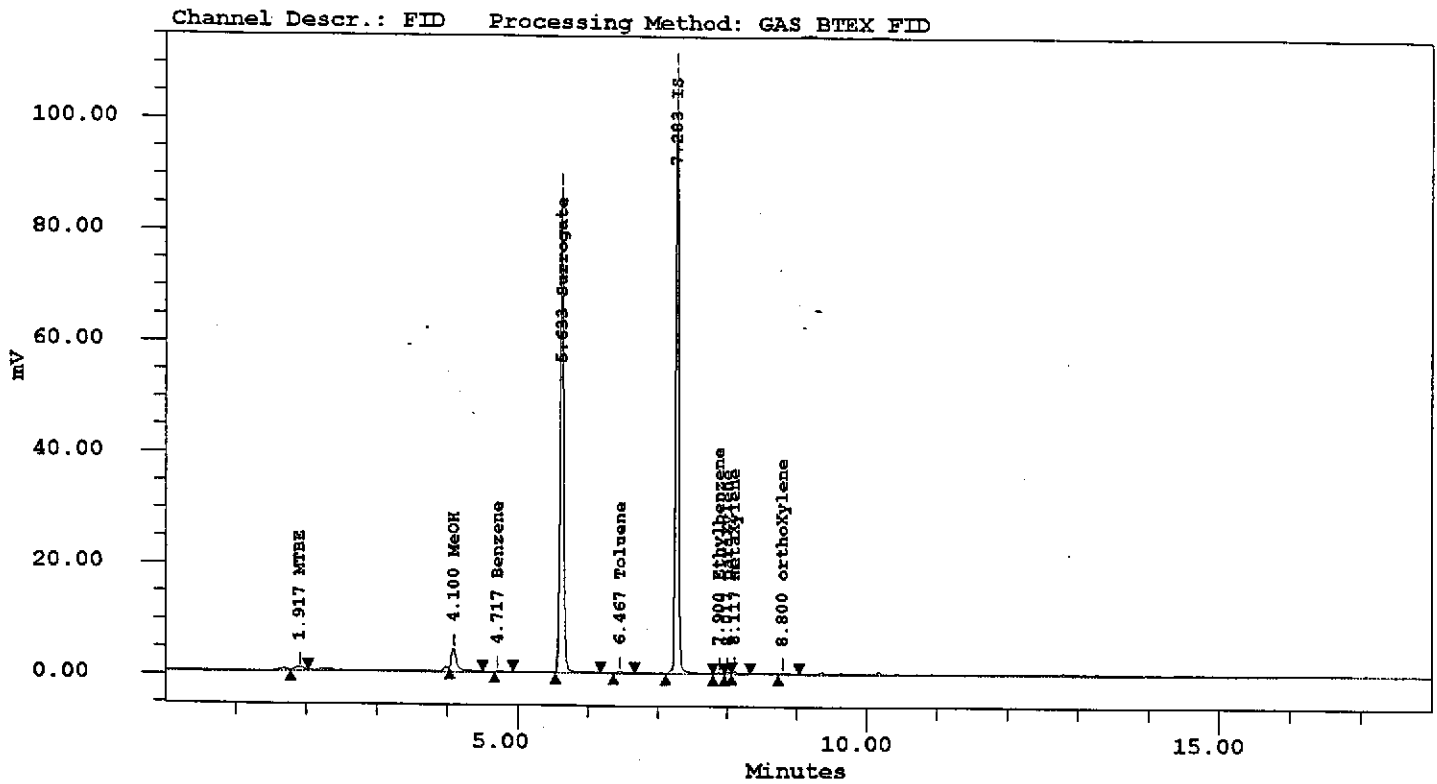
**GASOLINE RESULT**

#	Name	Area (uV*sec)	Gas area (uV*sec)	Gas RF	Gas Amount ppb	Final amount ppb
1	not_Gas	557153				

SampleName 10172-5A  
Date Acquired 10/19/97 04:40:50 AM  
Project H\_1020

SampleType Unknown  
BTEX Range: 0.5-400 ppb  
Gas Range: 50-4000 ppb

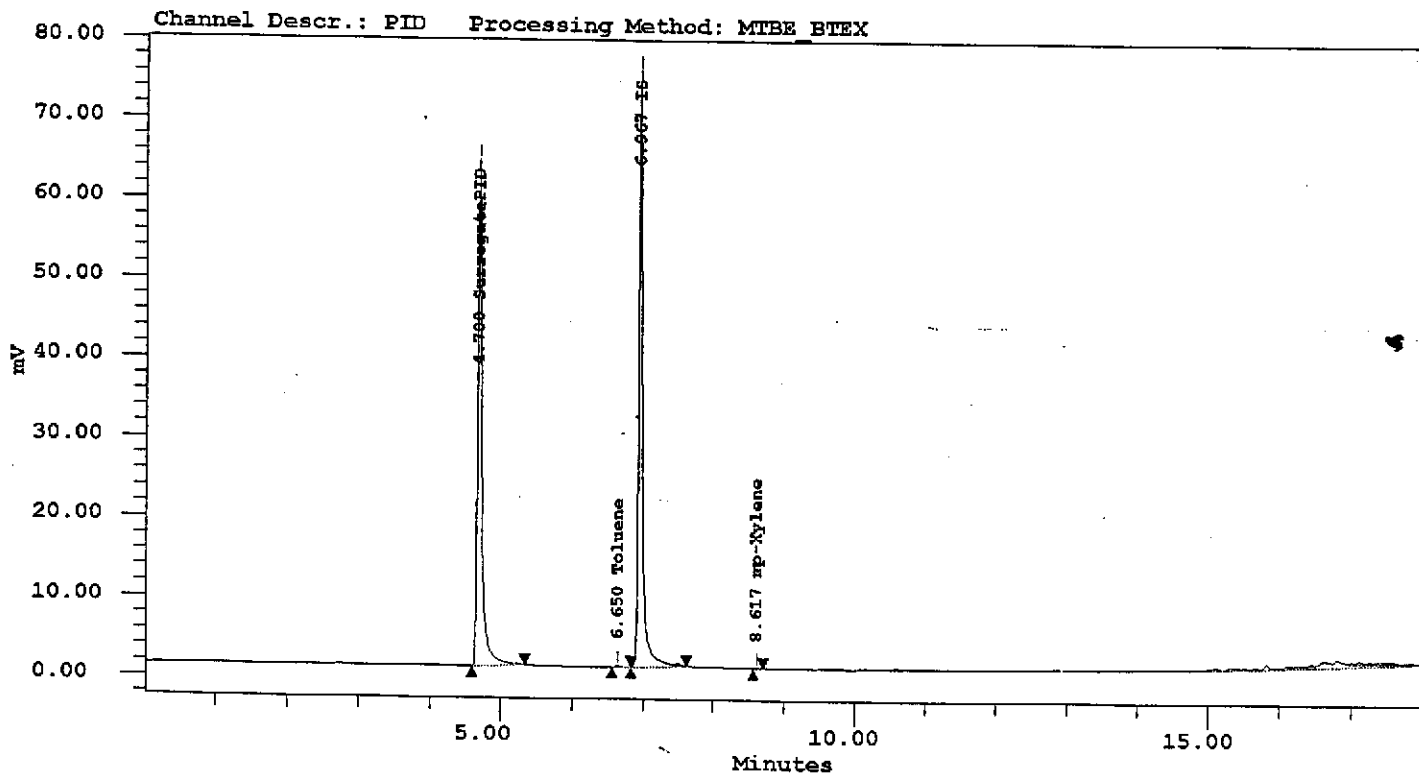
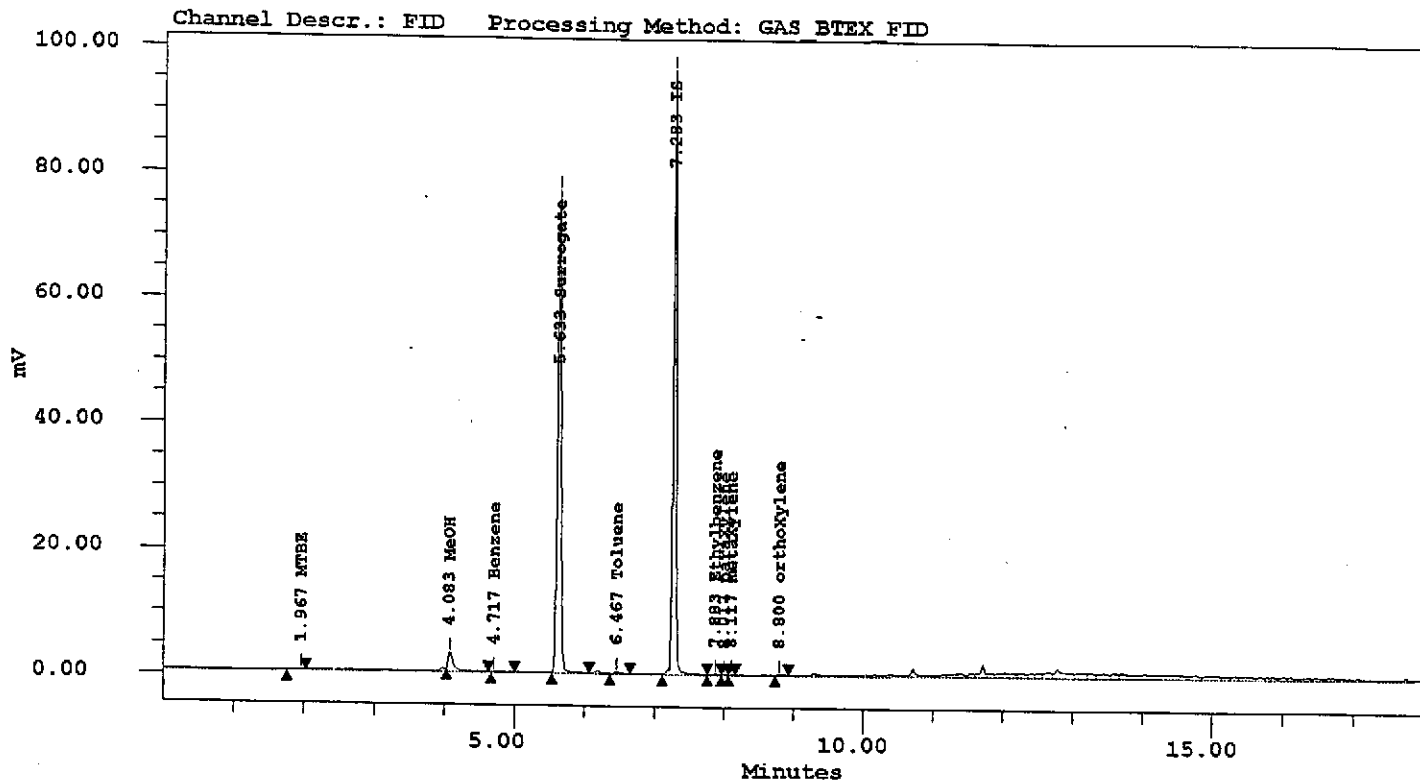
SampleWeight 1  
Dilution 1.0  
Vial 22



SampleName 10172-6A  
Date Acquired 10/19/97 05:04:07 AM  
Project H\_1020

SampleType Unknown  
BTEX Range: 0.5-400 ppb  
Gas Range: 50-4000 ppb

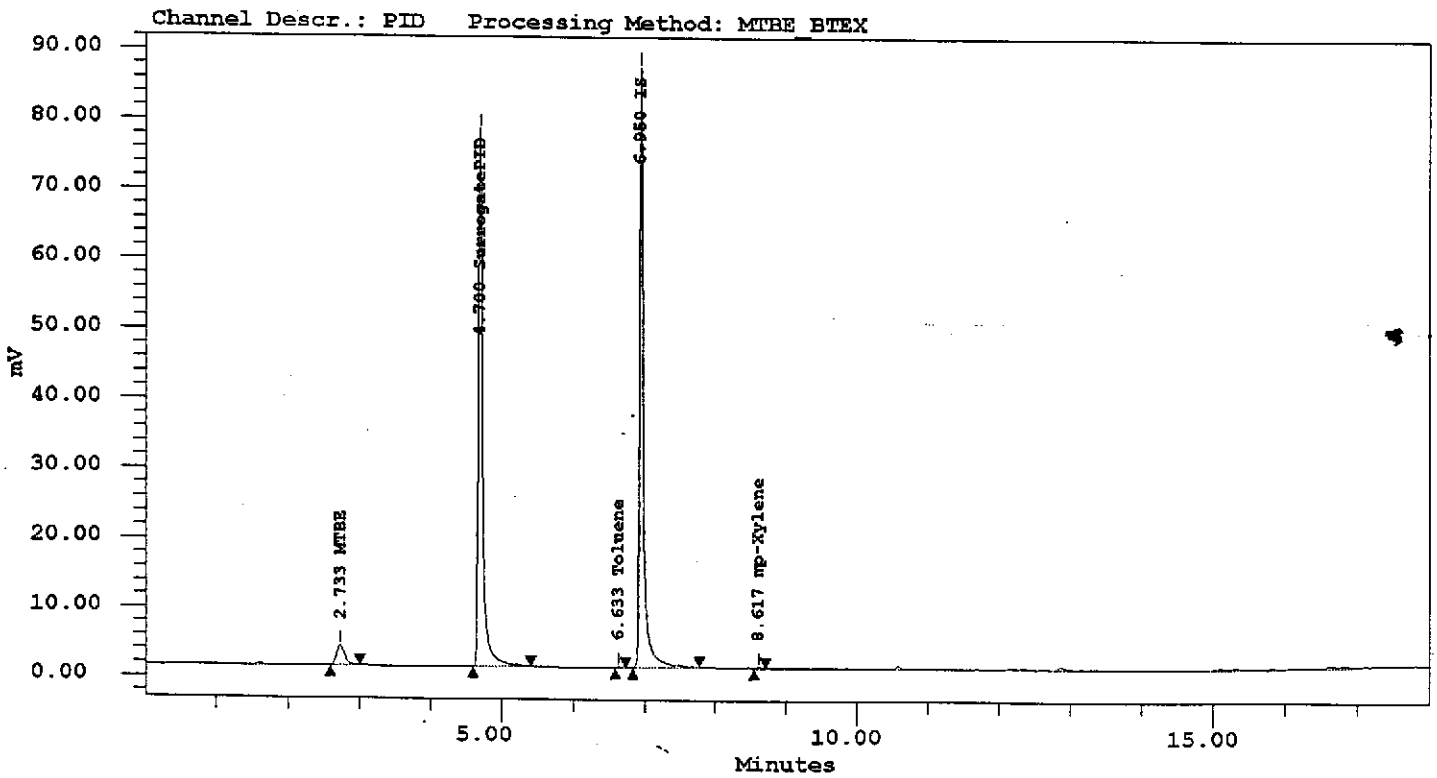
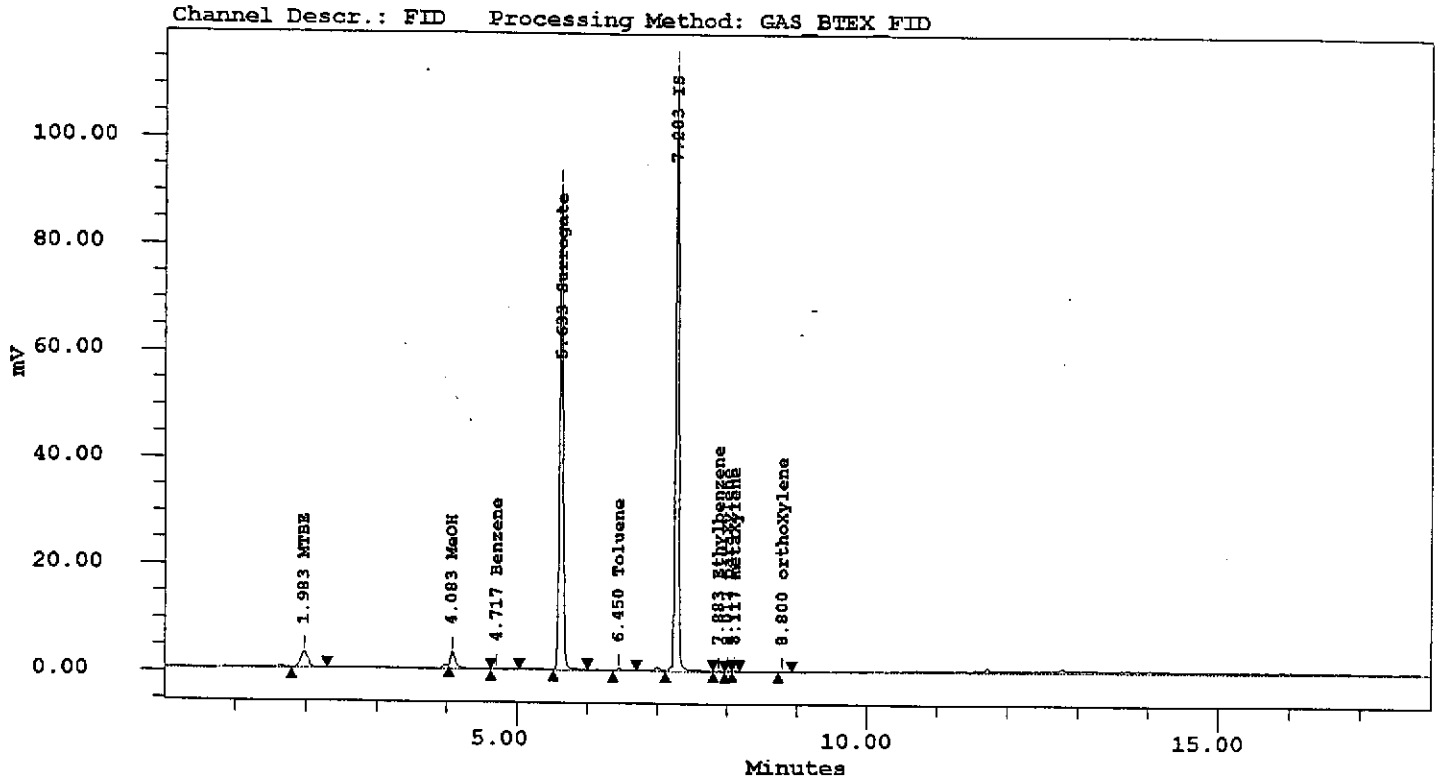
SampleWeight 1  
Dilution 1.0  
Vial 23



SampleName 10172-7A  
Date Acquired 10/19/97 05:27:32 AM  
Project H\_1020

SampleType Unknown  
BTEX Range: 0.5-400 ppb  
Gas Range: 50-4000 ppb

SampleWeight 1  
Dilution 1.0  
Vial 24

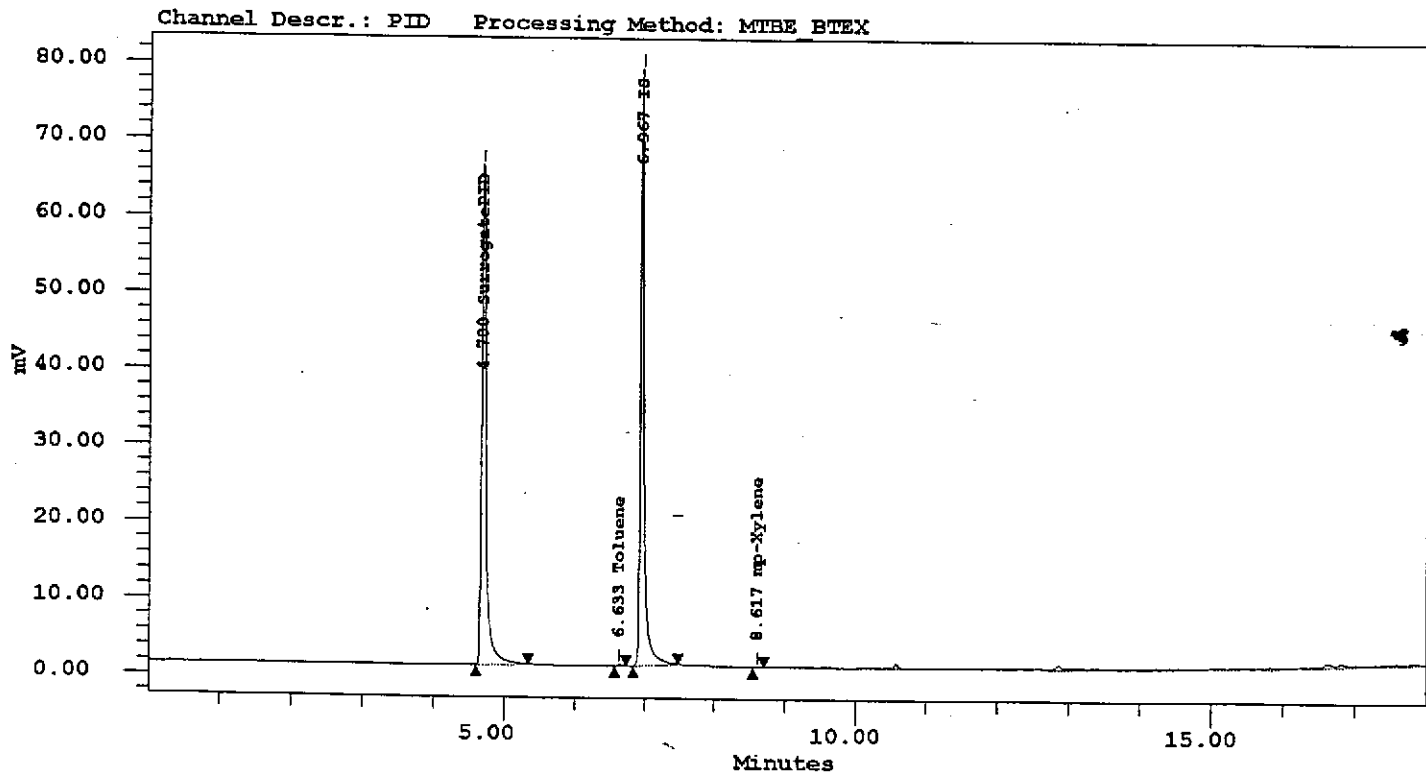
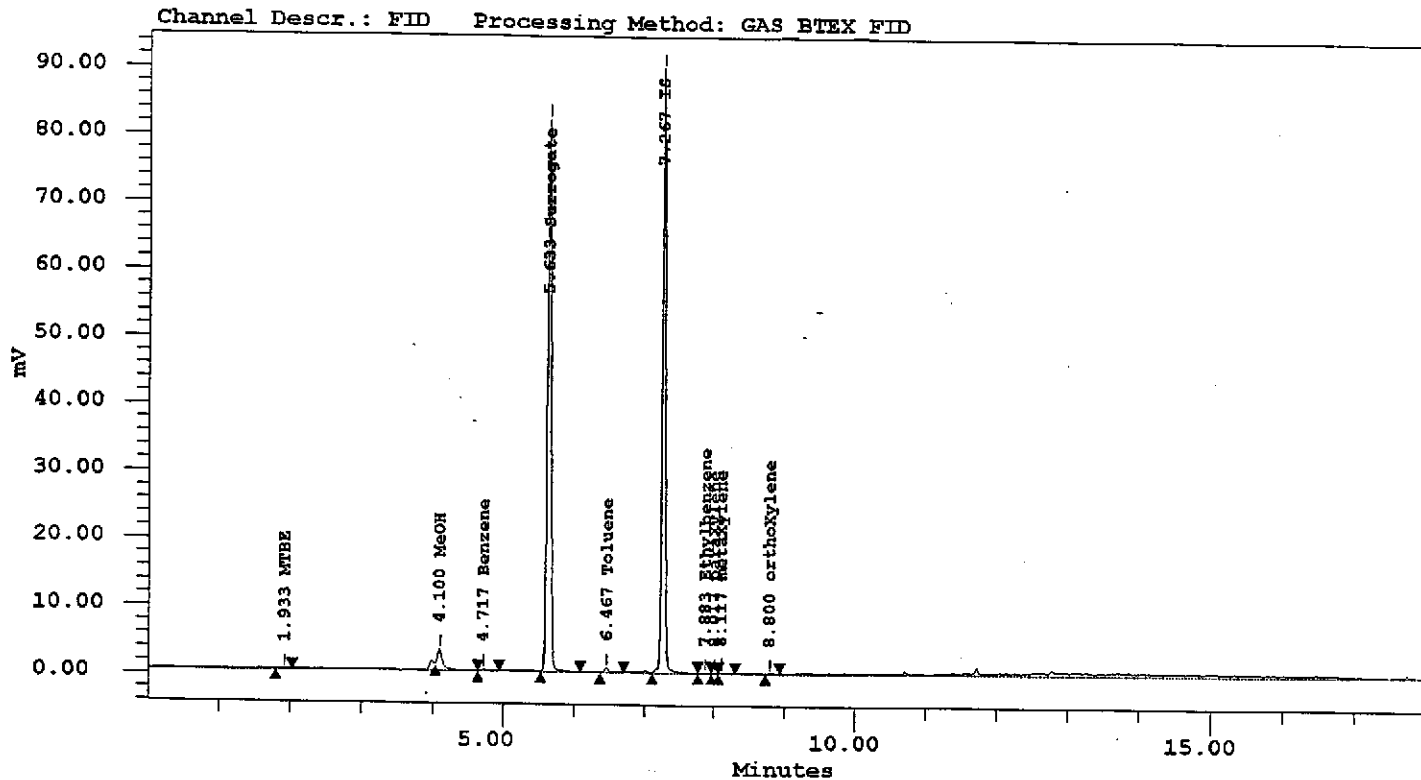




SampleName 10172-8A  
Date Acquired 10/19/97 05:50:59 AM  
Project H\_1020

SampleType Unknown  
BTEX Range: 0.5-400 ppb  
Gas Range: 50-4000 ppb

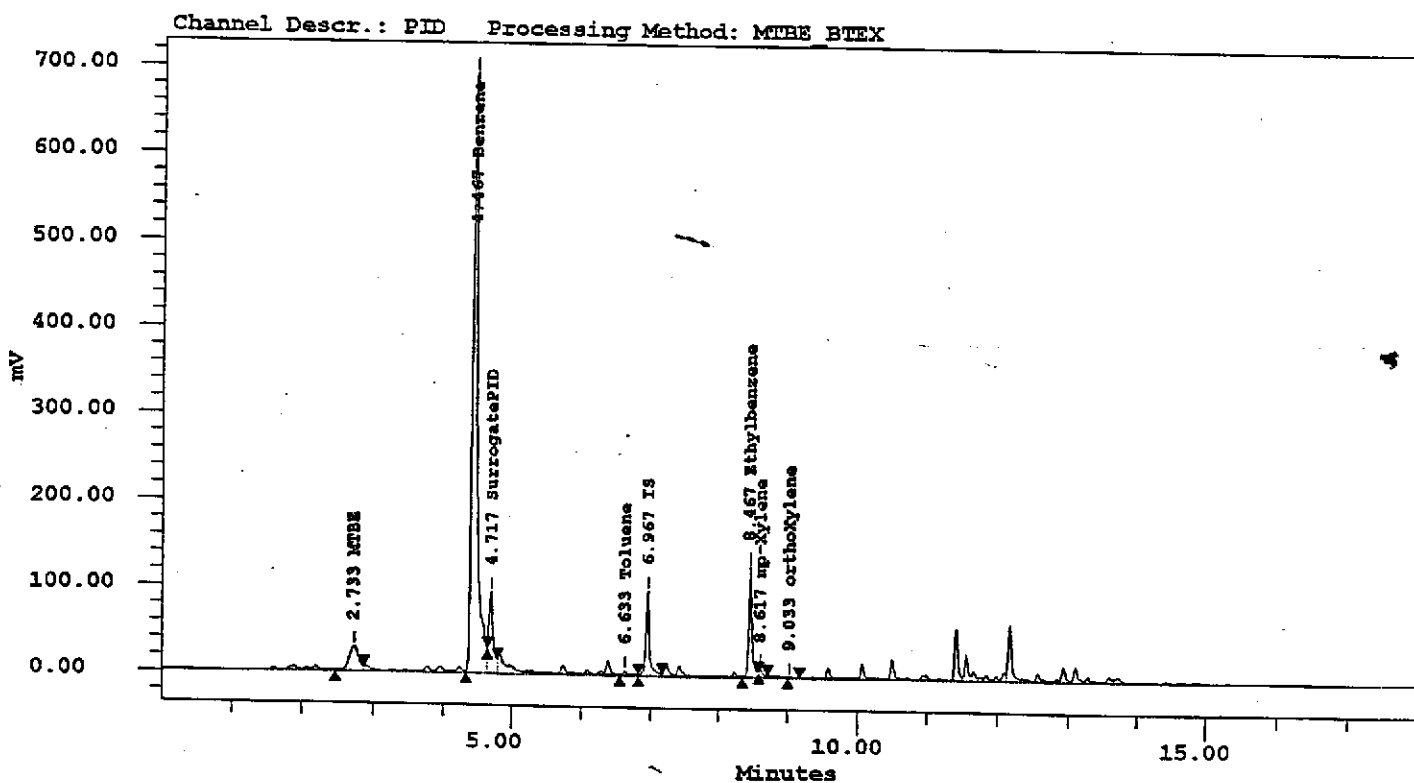
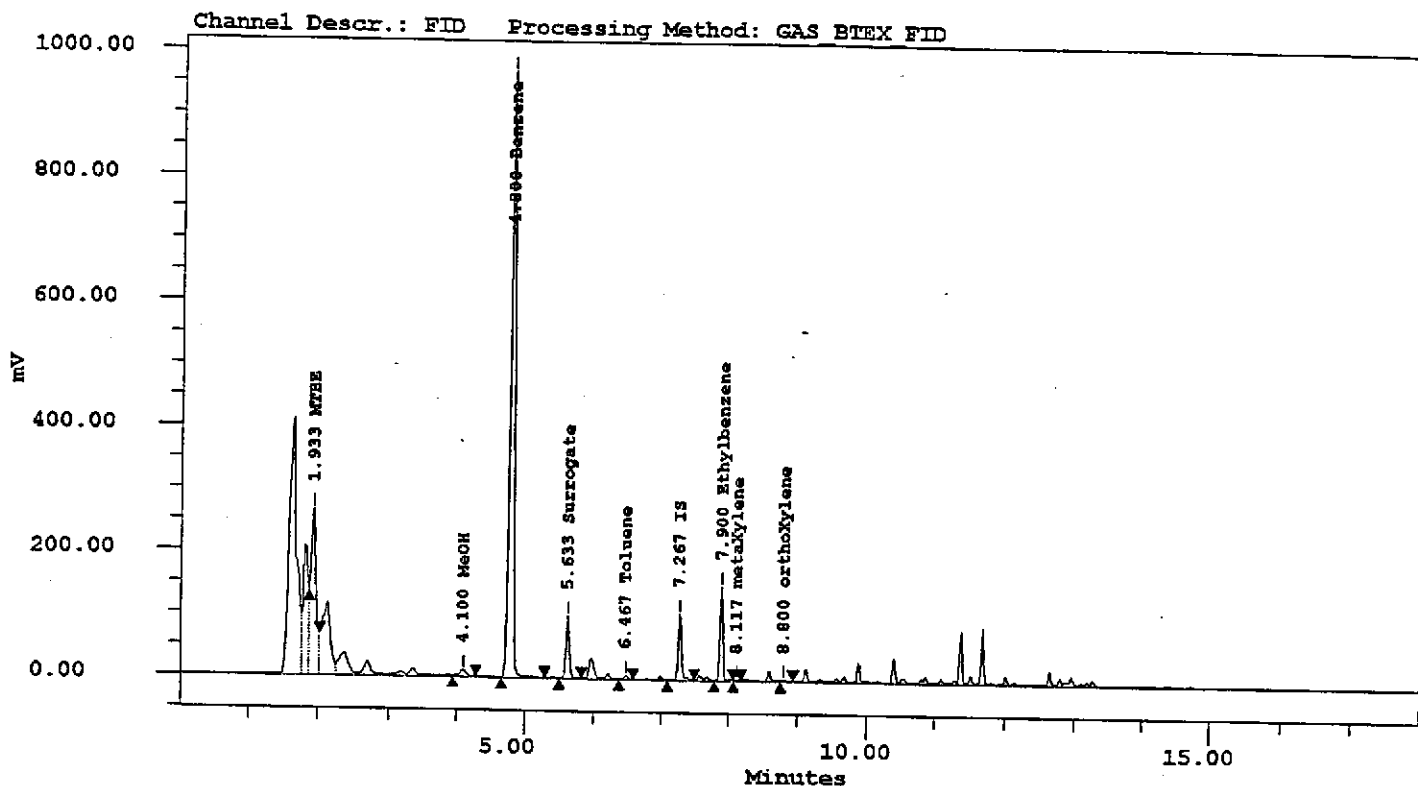
SampleWeight 1  
Dilution 1.0  
Vial 25



SampleName 10172-3A  
 Date Acquired 10/19/97 02:19:58 AM  
 Project H\_1020

SampleType Unknown  
 BTEX Range: 0.5-400 ppb  
 Gas Range: 50-4000 ppb

SampleWeight 1  
 Dilution 1.0  
 Vial 16





**ENGINEERING, INC.**  
RCE #27011 Lic. #537901

8084 OLD AUBURN ROAD  
CITRUS HEIGHTS, CA 95610  
(916) 723-7645  
LIC. # 537901

I.D.# 1507

JOB # 5090.10

P.O.# 8940

\* PLEASE PROVIDE CHROMATOGRAMS

R-3,5-4

CHAIN OF CUSTODY

JOB NAME: USA- OAKLAND #57

LAB: AEN

PROJECT MANAGER: VERN BENNETT

SAMPLES COLLECTED BY: CHRIS LAPOINTE

COMP.	GRAB	SAMPLE LOCATION	DATE	TIME	SAMPLE TYPE			SAMPLE NO.	TYPE CONTAINER(S)	ANALYSIS REQUIRED
					SOIL	AIR	WATER			
01A-C	X	MONITOR WELL 1010	10/14	1443			X	S1	3x VOA(HL)	PH-6 + PTEX MTEE
02A-C	X			1450			X	S2		
03A-C	X			1441			X	MW-3		
04A-C	X			1408			X	MW-4		
05A-C	X			1417			X	MW-5		
06A-C	X			1425			X	MW-6		
07A-C	X			1431			X	MW-7		
08A-C	X			1438			X	MW-8		

PRINT NAME AFTER SIGNATURE

\* PLEASE PROVIDE CHROMATOGRAMS

RELINQUISHED BY:

RELINQUISHED BY:

RELINQUISHED BY:

RECEIVED BY:

RECEIVED BY:

RECEIVED BY:

DATE/TIME

10/14 1200

DATE/TIME

10/14 1330

DATE/TIME

RECEIVED FOR LABORATORY BY:

DATE/TIME

METHOD OF SHIPMENT:

DISPOSITION:

STORAGE  REFRIGERATOR  FREEZER

TURN AROUND TIME

24 HOURS  3 DAYS  1 WEEK  2 WEEKS

NOTE: PLEASE HAVE EACH DATA SHEET SIGNED BY CHEMIST.

SECURED

YES  NO

# American Environmental Network

## Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

OCT 29

GHH ENGINEERING, INC.  
8084 OLD AUBURN RD STE E  
CITRUS HEIGHTS, CA 95610

REPORT DATE: 10/24/97

DATE(S) SAMPLED: 10/10/97

DATE RECEIVED: 10/14/97

AEN WORK ORDER: 9710173

ATTN: VERN BENNETT  
CLIENT PROJ. ID: 5090.10  
CLIENT PROJ. NAME: USA-OAKLAND#57  
C.O.C. NUMBER: 15072  
P.O. NUMBER: 8940

### PROJECT SUMMARY:

On October 14, 1997, this Laboratory received 8 water sample(s).

Client requested sample(s) be analyzed for chemical parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.



Larry Klein  
Laboratory Director

## GHH ENGINEERING, INC.

SAMPLE ID: S-1  
AEN LAB NO: 9710173-01  
AEN WORK ORDER: 9710173  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/24/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/16/97
TPH as Diesel	GC-FID	2.0 *	0.05 mg/L		10/23/97

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: S-2  
AEN LAB NO: 9710173-02  
AEN WORK ORDER: 9710173  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/24/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/16/97
TPH as Diesel	GC-FID	ND	0.2 mg/L		10/24/97

Reporting limits elevated due to high levels of non-target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: MW-3  
AEN LAB NO: 9710173-03  
AEN WORK ORDER: 9710173  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/24/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/16/97
TPH as Diesel	GC-FID	1.1 *	0.05 mg/L		10/23/97

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

GHH ENGINEERING, INC.

SAMPLE ID: MW-4  
AEN LAB NO: 9710173-04  
AEN WORK ORDER: 9710173  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/24/97

---

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/17/97
TPH as Diesel	GC-FID	ND	0.05 mg/L		10/23/97

---

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit



## GHH ENGINEERING, INC.

SAMPLE ID: MW-5  
AEN LAB NO: 9710173-05  
AEN WORK ORDER: 9710173  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/24/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/17/97
TPH as Diesel	GC-FID	ND	0.05 mg/L		10/23/97

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: MW-6  
AEN LAB NO: 9710173-06  
AEN WORK ORDER: 9710173  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/24/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/17/97
TPH as Diesel	GC-FID	ND	0.05 mg/L		10/24/97

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

GHH ENGINEERING, INC.

SAMPLE ID: MW-7  
 AEN LAB NO: 9710173-07  
 AEN WORK ORDER: 9710173  
 CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
 DATE RECEIVED: 10/14/97  
 REPORT DATE: 10/24/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/17/97
TPH as Diesel	GC-FID	ND	0.05	mg/L	10/24/97

ND = Not detected at or above the reporting limit  
 \* = Value at or above reporting limit

## GHH ENGINEERING, INC.

SAMPLE ID: MW-8  
AEN LAB NO: 9710173-08  
AEN WORK ORDER: 9710173  
CLIENT PROJ. ID: 5090.10

DATE SAMPLED: 10/10/97  
DATE RECEIVED: 10/14/97  
REPORT DATE: 10/24/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/17/97
TPH as Diesel	GC-FID	ND	0.05 mg/L		10/24/97

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

AEN (CALIFORNIA)  
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9710173  
CLIENT PROJECT ID: 5090.10

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spikes(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analyses.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behaviour, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrument performance.

D: Surrogates diluted out.

I: Interference.

!: Indicates result outside of established laboratory QC limits.

WORK ORDER: 9710173

## QUALITY CONTROL REPORT

PAGE QR-2

ANALYSIS: TPH as Diesel

MATRIX: Water

## METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank  
 INSTRUMENT: HP 5890  
 UNITS: mg/L  
 METHOD: GC-FID

LAB ID: BLNK-1016-1  
 PREPARED: 10/16/97  
 ANALYZED: 10/20/97

INSTR RUN: GC C\971016000000/1/  
 BATCH ID: DSW101697-1  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Diesel	ND		0.05						
Motor Oil	ND		0.2						
n-Pentacosane (surr)	87.4			100	87.4	65	125		

SAMPLE TYPE: Blank-Method/Media blank  
 INSTRUMENT: HP 5890  
 UNITS: mg/L  
 METHOD: GC-FID

LAB ID: BLNK-1017-1  
 PREPARED: 10/17/97  
 ANALYZED: 10/20/97

INSTR RUN: GC C\971017000000/1/  
 BATCH ID: DSW101797-1  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Diesel	ND		0.05						
Motor Oil	ND		0.2						
n-Pentacosane (surr)	91.1			100		65	125		

## LABORATORY CONTROL SAMPLES

SAMPLE TYPE: Laboratory Control Spike  
 INSTRUMENT: HP 5890  
 UNITS: mg/L  
 METHOD: GC-FID

LAB ID: LCDW-1016-1  
 PREPARED: 10/16/97  
 ANALYZED: 10/20/97

INSTR RUN: GC C\971016000000/3/1  
 BATCH ID: DSW101697-1  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Diesel	1.79	ND	0.05	2.00	89.5	60	110		
Motor Oil	ND	ND	0.2						
n-Pentacosane (surr)	88.7	87.4		100	88.7	65	125		

SAMPLE TYPE: Laboratory Control Spike  
 INSTRUMENT: HP 5890  
 UNITS: mg/L  
 METHOD: GC-FID

LAB ID: LCSW-1016-1  
 PREPARED: 10/16/97  
 ANALYZED: 10/20/97

INSTR RUN: GC C\971016000000/2/1  
 BATCH ID: DSW101697-1  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Diesel	1.86	ND	0.05	2.00	93.0	60	110		
n-Pentacosane (surr)	93.8	87.4		100	93.8	65	125		

SAMPLE TYPE: Laboratory Control Spike  
 INSTRUMENT: HP 5890  
 UNITS: mg/L  
 METHOD: GC-FID

LAB ID: LCDW-1017-1  
 PREPARED: 10/17/97  
 ANALYZED: 10/20/97

INSTR RUN: GC C\971017000000/3/1  
 BATCH ID: DSW101797-1  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Diesel	1.77	ND	0.05	2.00	88.5	60	110		
n-Pentacosane (surr)	90.9	91.1		100	90.9	65	125		

SAMPLE TYPE: Laboratory Control Spike  
 INSTRUMENT: HP 5890  
 UNITS: mg/L  
 METHOD: GC-FID

LAB ID: LCSW-1017-1  
 PREPARED: 10/17/97  
 ANALYZED: 10/20/97

INSTR RUN: GC C\971017000000/2/1  
 BATCH ID: DSW101797-1  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Diesel	1.81	ND	0.05	2.00	90.5	60	110		
n-Pentacosane (surr)	96.1	91.1		100	96.1	65	125		

WORK ORDER: 9710173

## QUALITY CONTROL REPORT

PAGE QR-3

ANALYSIS: TPH as Diesel

MATRIX: Water

## LABORATORY CONTROL DUPLICATES

SAMPLE TYPE: Laboratory Control Sample Duplicate      LAB ID: LCRW-1016-1      INSTR RUN: GC C\971016000000/4/2  
 INSTRUMENT: HP 5890      PREPARED: 10/16/97      BATCH ID: DSCW101697-1  
 UNITS: mg/L      ANALYZED: 10/20/97      DILUTION: 1.000000  
 METHOD: GC-FID

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Diesel	1.79	1.86	0.05	2030				3.84	15
Motor Oil	ND	ND	0.2	200				0	
n-Pentacosane (surr)	88.7	93.8			5.59	65	125		

SAMPLE TYPE: Laboratory Control Sample Duplicate      LAB ID: LCRW-1017-1      INSTR RUN: GC C\971017000000/4/2  
 INSTRUMENT: HP 5890      PREPARED: 10/17/97      BATCH ID: DSCW101797-1  
 UNITS: mg/L      ANALYZED: 10/20/97      DILUTION: 1.000000  
 METHOD: GC-FID

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Diesel	1.77	1.81	0.05	2030				2.23	15
Motor Oil	ND	ND	0.2	200				0	
n-Pentacosane (surr)	90.9	96.1			5.56	65	125		

## SAMPLE SURROGATES

SAMPLE TYPE: Sample-Client      LAB ID: 9710173-01A      INSTR RUN: GC C\971016000000/9/  
 INSTRUMENT: HP 5890      PREPARED: 10/16/97      BATCH ID: DSCW101697-1  
 UNITS: mg/L      ANALYZED: 10/23/97      DILUTION: 1.000000  
 METHOD: GC-FID

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
n-Pentacosane (surr)	84.2			100	84.2	65	125		

SAMPLE TYPE: Sample-Client      LAB ID: 9710173-02A      INSTR RUN: GC C\971016000000/10/  
 INSTRUMENT: HP 5890      PREPARED: 10/16/97      BATCH ID: DSCW101697-1  
 UNITS: mg/L      ANALYZED: 10/24/97      DILUTION: 5  
 METHOD: GC-FID

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
n-Pentacosane (surr)	107			100	107	65	125		

SAMPLE TYPE: Sample-Client      LAB ID: 9710173-03A      INSTR RUN: GC C\971016000000/11/  
 INSTRUMENT: HP 5890      PREPARED: 10/16/97      BATCH ID: DSCW101697-1  
 UNITS: mg/L      ANALYZED: 10/23/97      DILUTION: 1  
 METHOD: GC-FID

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
n-Pentacosane (surr)	85.7			100	85.7	65	125		

SAMPLE TYPE: Sample-Client      LAB ID: 9710173-04A      INSTR RUN: GC C\971017000000/15/  
 INSTRUMENT: HP 5890      PREPARED: 10/17/97      BATCH ID: DSCW101797-1  
 UNITS: mg/L      ANALYZED: 10/23/97      DILUTION: 1.000000  
 METHOD: GC-FID

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
n-Pentacosane (surr)	88.9			100	88.9	65	125		

SAMPLE TYPE: Sample-Client      LAB ID: 9710173-05A      INSTR RUN: GC C\971017000000/16/  
 INSTRUMENT: HP 5890      PREPARED: 10/17/97      BATCH ID: DSCW101797-1  
 UNITS: mg/L      ANALYZED: 10/23/97      DILUTION: 1.000000  
 METHOD: GC-FID

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
n-Pentacosane (surr)	89.9			100	89.9	65	125		

WORK ORDER: 9710173

## QUALITY CONTROL REPORT

PAGE QR-4

ANALYSIS: TPH as Diesel

MATRIX: Water

## SAMPLE SURROGATES

SAMPLE TYPE: Sample-Client		LAB ID: 9710173-06A		INSTR RUN: GC C\971017000000/17/			
INSTRUMENT: HP 5890		PREPARED: 10/17/97		BATCH ID: DSEW101797-1			
UNITS: mg/L		ANALYZED: 10/24/97		DILUTION: 1.000000			
METHOD: GC-FID							
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD LIMIT (%)
n-Pentacosane (surr)	86.2			100	86.2	LOW 65 HIGH 125	

SAMPLE TYPE: Sample-Client		LAB ID: 9710173-07A		INSTR RUN: GC C\971017000000/18/			
INSTRUMENT: HP 5890		PREPARED: 10/17/97		BATCH ID: DSEW101797-1			
UNITS: mg/L		ANALYZED: 10/24/97		DILUTION: 1.000000			
METHOD: GC-FID							
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD LIMIT (%)
n-Pentacosane (surr)	87.7			100	87.7	LOW 65 HIGH 125	

SAMPLE TYPE: Sample-Client		LAB ID: 9710173-08A		INSTR RUN: GC C\971017000000/19/			
INSTRUMENT: HP 5890		PREPARED: 10/17/97		BATCH ID: DSEW101797-1			
UNITS: mg/L		ANALYZED: 10/24/97		DILUTION: 1.000000			
METHOD: GC-FID							
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD LIMIT (%)
n-Pentacosane (surr)	93.0			100	93.0	LOW 65 HIGH 125	

----- End of Quality Control Report -----



SampleName: 500PPM DIE

System: GC CA

Date Acquired: 10/23/97 07:22:05 PM

Processing Method: GC\_CA\_DIESEL

Date Processed: 10/24/97 10:12:53 AM

Set Name: CA1023

Date Printed: October 24, 1997

Column: RTX-1, 15m, 0.53mm ID, 0.5mm FT

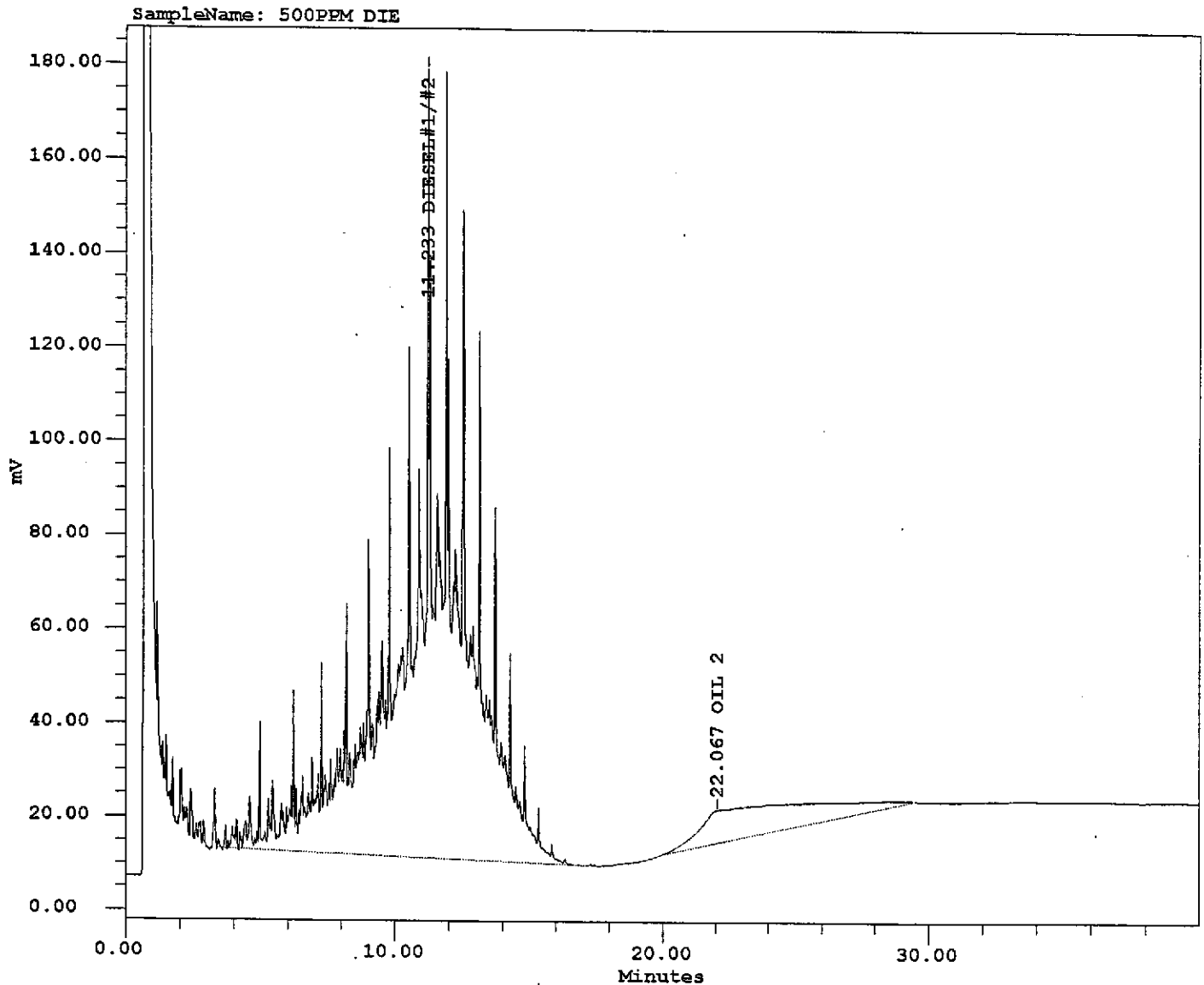
DIESEL CAL: 10/07/97 25-7,500 PPM

Dil X F.Vol : 100.00000

OIL CAL: 10/07/97 100-10,000PPM

SampleWeight: 500.00000

CCV and SSCC Limit: 85-115% Expected Value, (15% Deviation) Vial: 11



## Quant Report

#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	DIESEL#1/#2	11.233	18867152	2.6360	497.338	99.468
2	OIL 2	22.067	2086376	2.8450	59.357	11.871

Table 'Surrogate Recovery' contains no data.

SampleName: 9710173-01A

Date Acquired: 10/23/97 08:18:37 PM

Date Processed: 10/24/97 10:14:16 AM

Date Printed: October 24, 1997

DIESEL CAL: 10/07/97 25-7,500 PPM

OIL CAL: 10/07/97 100-10,000PPM

CCV and SSCC Limit: 85-115% Expected Value, (15% Deviation)

System: GC\_CA

Processing Method: GC\_CA\_DIESEL

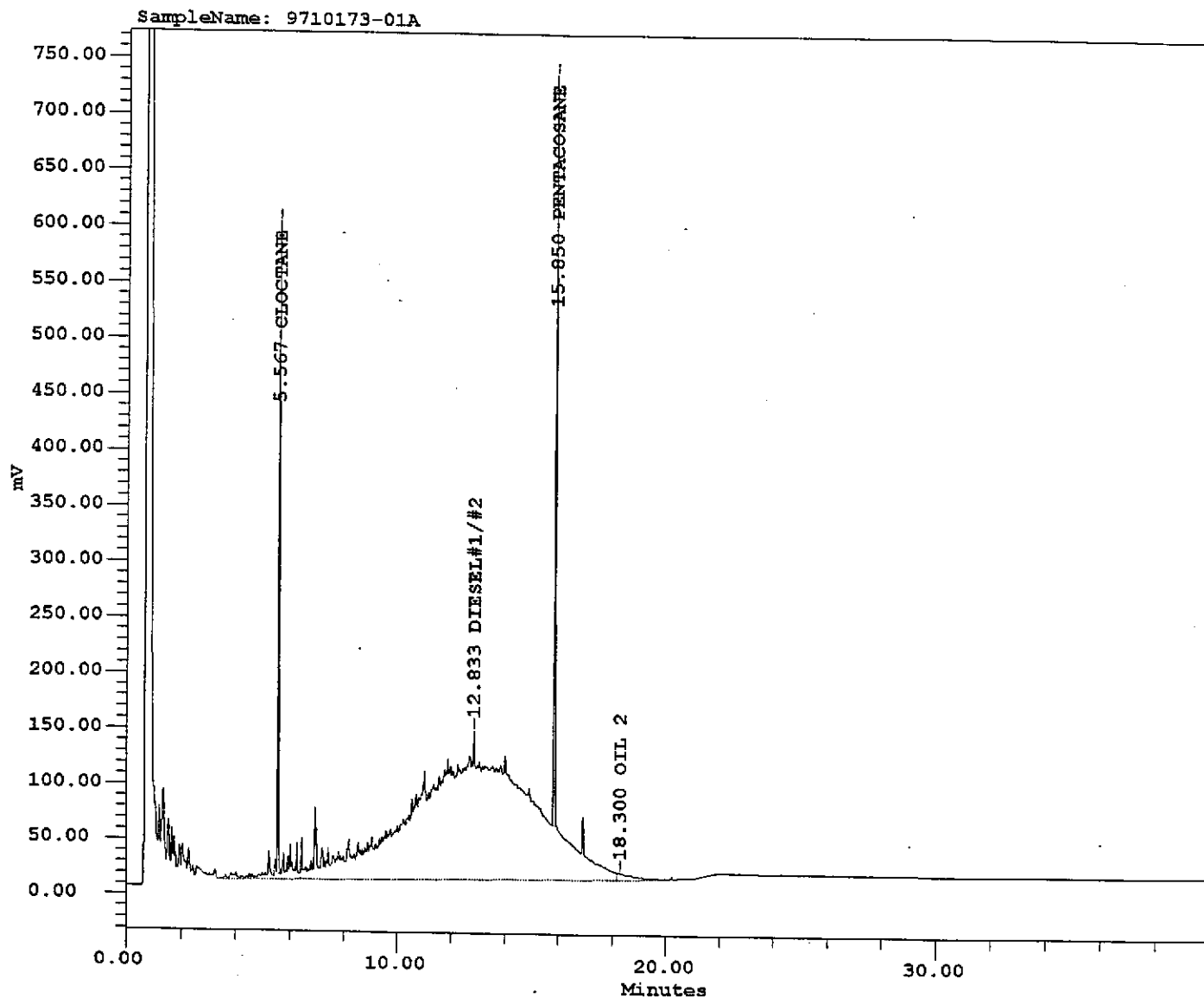
Set Name: CA1023

Column: RTX-1, 15m, 0.53mm ID, 0.5mm FT

Dil X F.Vol : 2.00000

SampleWeight: 1007.00000

Vial: 12



## Quant Report

#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	CLOCTANE	5.567	1414130	2.9890	42.268	0.084
2	DIESEL#1/#2	12.833	38241511	2.6360	1008.046	2.002
3	PENTACOSANE	15.850	1807745	2.3300	42.120	0.084
4	OIL 2	18.300	234027	2.8450	6.658	0.013

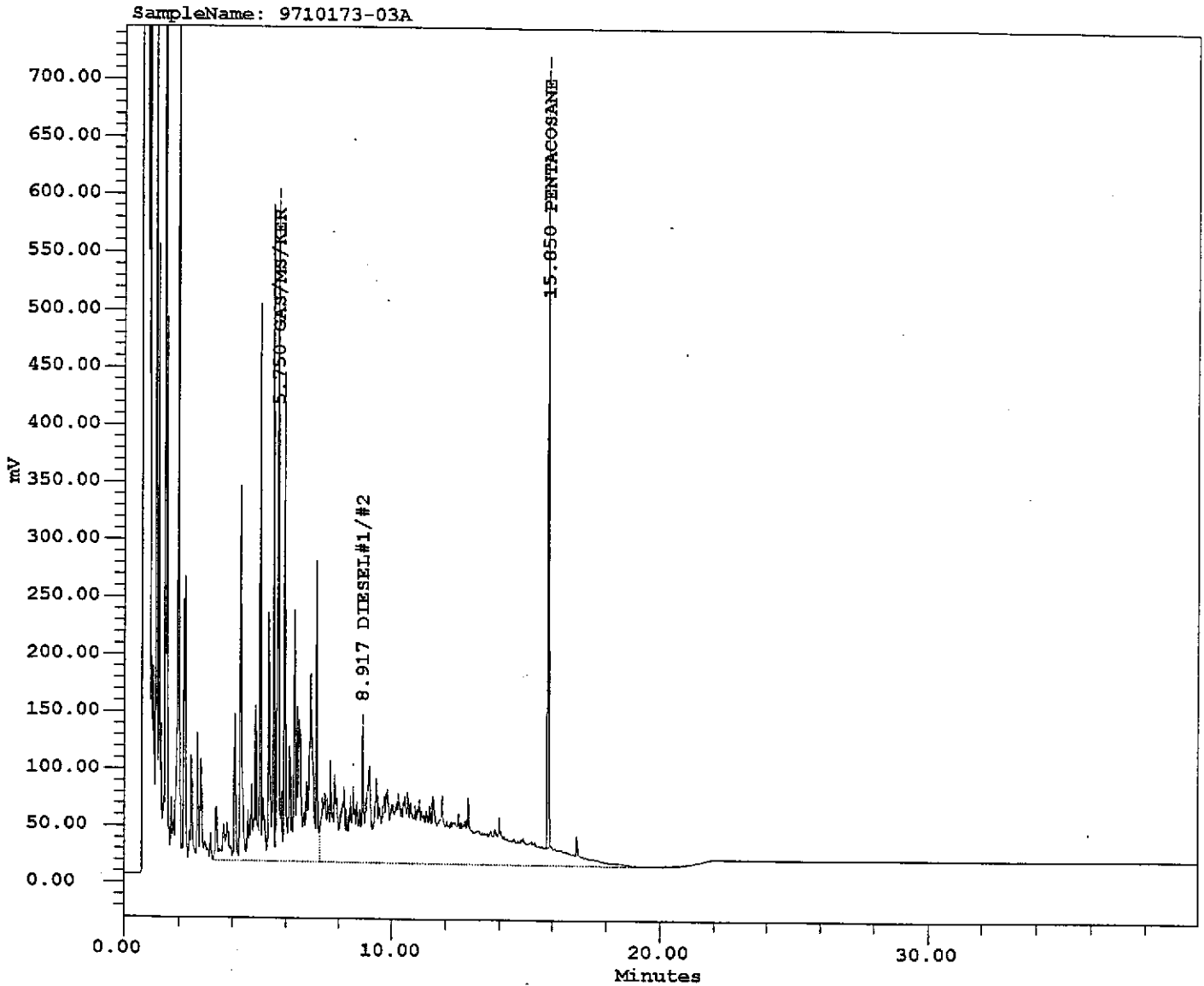
## Surrogate Recovery

#	Name	%REC
1	S	84.2

EXTRACTABLE HYDROCARBONS

SampleName: 9710173-03A  
 Date Acquired: 10/23/97 09:14:35 PM  
 Date Processed: 10/24/97 10:16:07 AM  
 Date Printed: October 24, 1997  
 DIESEL CAL: 10/07/97 25-7,500 PPM  
 OIL CAL: 10/07/97 100-10,000PPM  
 CCV and SSC Limit: 85-115% Expected Value, (15% Deviation)

System: GC\_CA  
 Processing Method: GC\_CA\_DIESEL  
 Set Name: CA1023  
 Column: RTX-1,15m,0.53mm ID,0.5mm FT  
 Dil X F.Vol : 2.00000  
 SampleWeight: 1011.00000  
 Vial: 13



Quant Report

#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	GAS/MS/KER	5.750	17063621	2.6360	449.797	0.890
2	DIESEL#1/#2	8.917	20217141	2.6360	532.924	1.054
3	PENTACOSANE	15.850	1838219	2.3300	42.831	0.085

Surrogate Recovery

#	Name	%REC
1	S	85.7

SampleName: 9710173-04A

Date Acquired: 10/23/97 10:10:05 PM

Date Processed: 10/24/97 10:17:37 AM

Date Printed: October 24, 1997

DIESEL CAL: 10/07/97 25-7,500 PPM

OIL CAL: 10/07/97 100-10,000PPM

CCV and SSCC Limit: 85-115% Expected Value, (15% Deviation)

System: GC CA

Processing Method: GC\_CA\_DIESEL

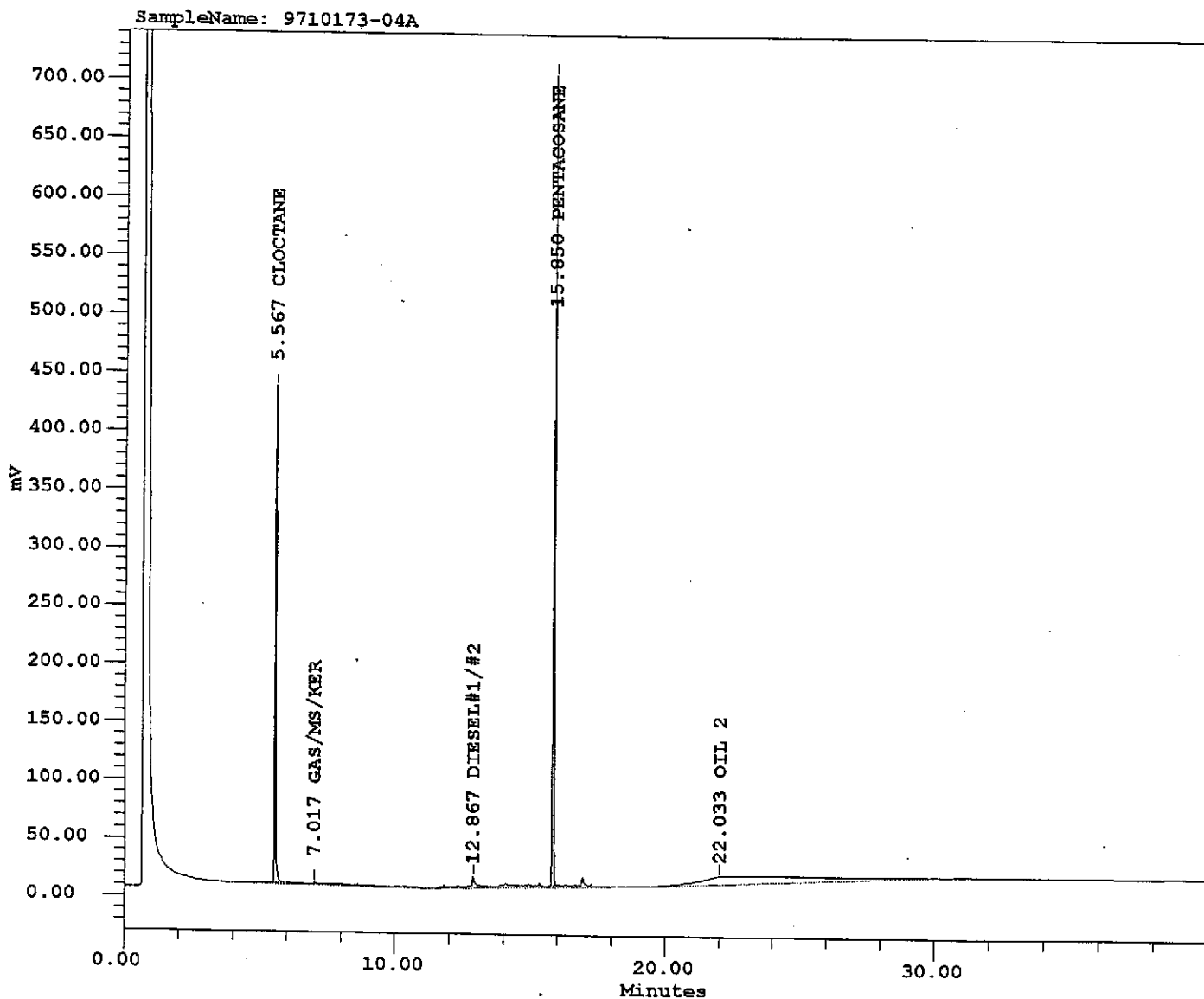
Set Name: CA1023

Column: RTX-1,15m,0.53mm ID,0.5mm FT

Dil X F.Vol : 2.00000

SampleWeight: 1050.00000

Vial: 14



Quant Report

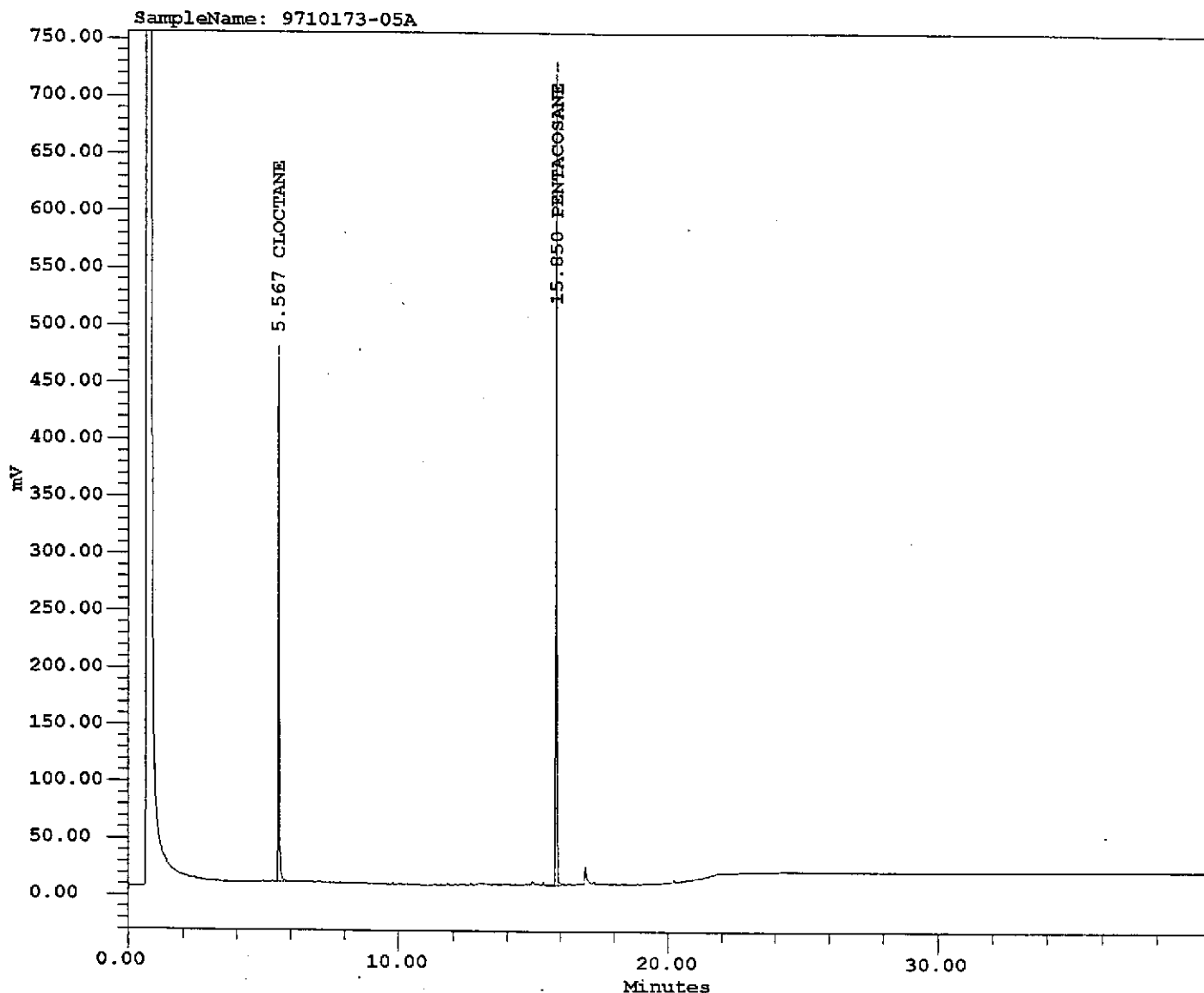
#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	CLOCTANE	5.567	1178550	2.9890	35.227	0.067
2	GAS/MS/KER	7.017	213330	2.6360	5.623	0.011
3	DIESEL#1/#2	12.867	593510	2.6360	15.645	0.030
4	PENTACOSANE	15.850	1907535	2.3300	44.446	0.085
5	OIL 2	22.033	2096925	2.8450	59.658	0.114

Surrogate Recovery

#	Name	%REC
1	S	88.9

SampleName: 9710173-05A  
 Date Acquired: 10/23/97 11:05:24 PM  
 Date Processed: 10/24/97 10:18:00 AM  
 Date Printed: October 24, 1997  
 DIESEL CAL: 10/07/97 25-7,500 PPM  
 OIL CAL: 10/07/97 100-10,000PPM  
 CCV and SSC Limit: 85-115% Expected Value, (15% Deviation)

System: GC\_CA  
 Processing Method: GC\_CA\_DIESEL  
 Set Name: CA1023  
 Column: RTX-1, 15m, 0.53mm ID, 0.5mm FT  
 Dil X F.Vol : 2.00000  
 SampleWeight: 1077.00000  
 Vial: 15



Quant Report

#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	CLOCTANE	5.567	1265711	2.9890	37.832	0.070
2	PENTACOSANE	15.850	1929797	2.3300	44.964	0.083

Surrogate Recovery

#	Name	%REC
1	S	89.9

SampleName: 9710173-06A

Date Acquired: 10/24/97 12:01:01 AM

Date Processed: 10/24/97 10:18:34 AM

Date Printed: October 24, 1997

DIESEL CAL: 10/07/97 25-7,500 PPM

OIL CAL: 10/07/97 100-10,000PPM

CCV and SSC Limit: 85-115% Expected Value, (15% Deviation)

System: GC CA

Processing Method: GC\_CA\_DIESEL

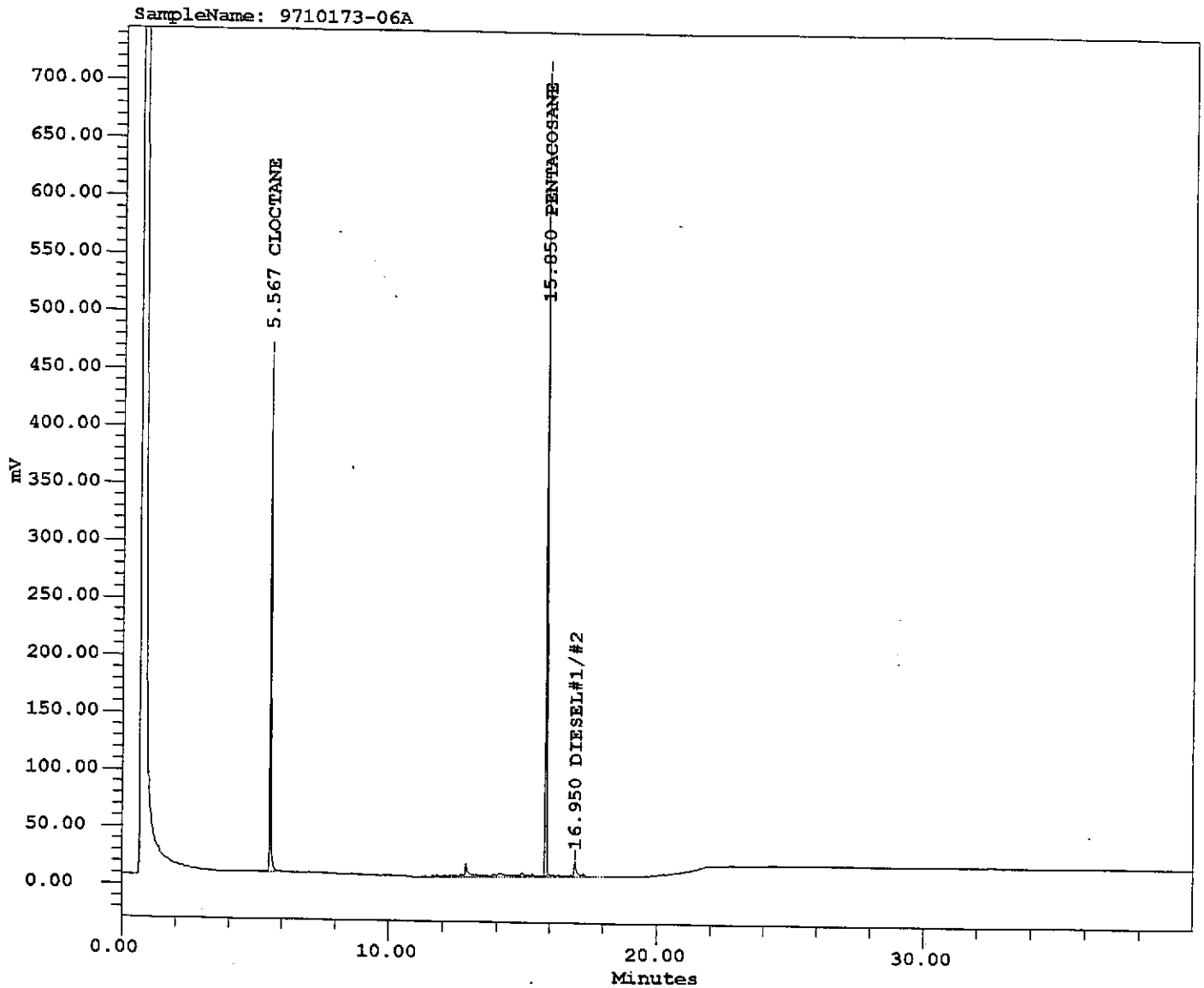
Set Name: CA1023

Column: RTX-1, 15m, 0.53mm ID, 0.5mm FT

Dil X F.Vol : 2.00000

SampleWeight: 1054.00000

Vial: 16



Quant Report

#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	CLOCTANE	5.567	1189623	2.9890	35.558	0.067
2	PENTACOSANE	15.850	1850267	2.3300	43.111	0.082
3	DIESEL#1/#2	16.950	549012	2.6360	14.472	0.027

Surrogate Recovery

#	Name	%REC
1	S	86.2

SampleName: 9710173-07A

Date Acquired: 10/24/97 12:56:43 AM

Date Processed: 10/24/97 10:19:19 AM

Date Printed: October 24, 1997

DIESEL CAL: 10/07/97 25-7,500 PPM

OIL CAL: 10/07/97 100-10,000PPM

CCV and SSC Limit: 85-115% Expected Value, (15% Deviation)

System: GC CA

Processing Method: GC\_CA\_DIESEL

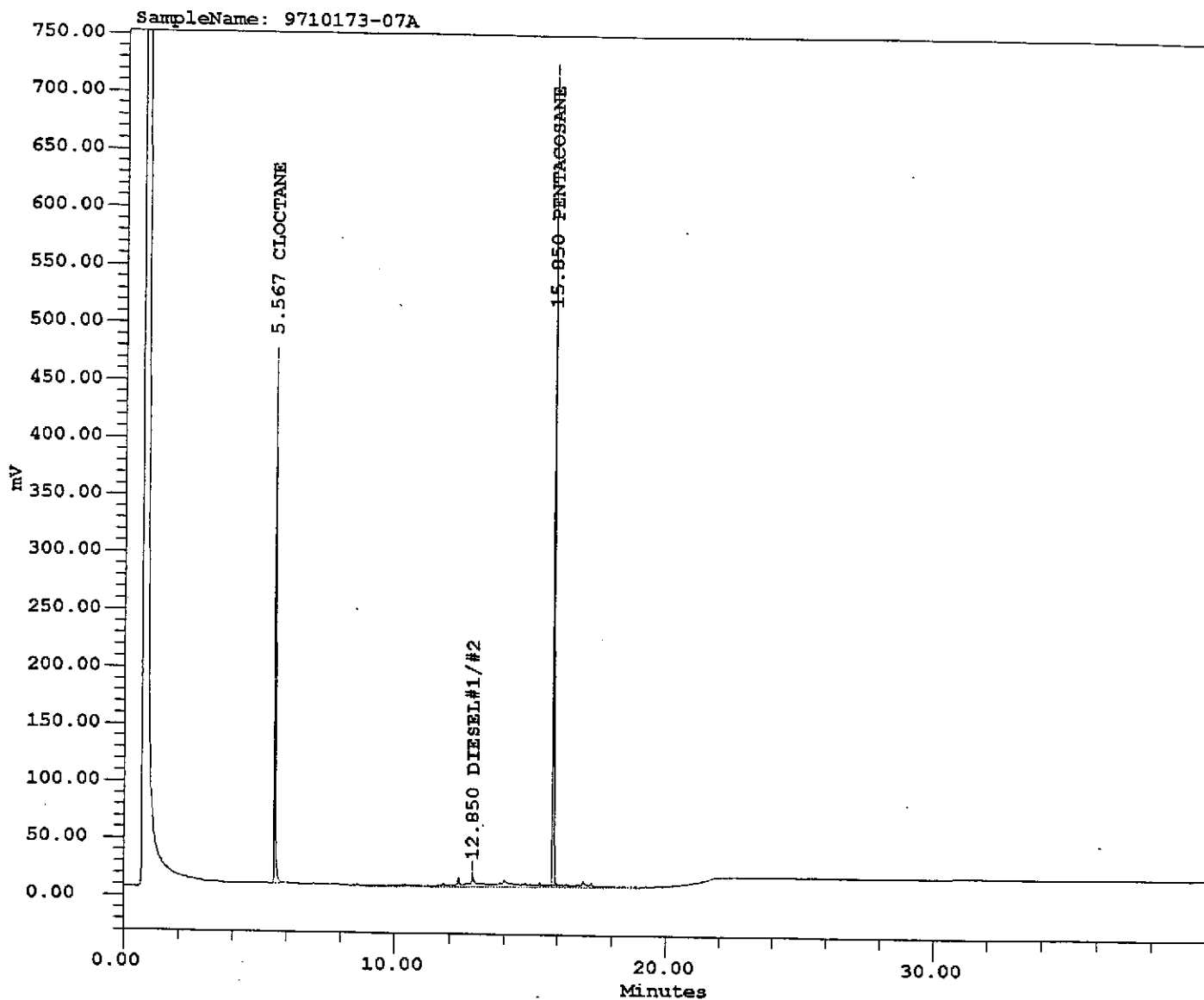
Set Name: CA1023

Column: RTX-1,15m,0.53mm ID,0.5mm FT

Dil X F.Vol : 2.00000

SampleWeight: 1053.00000

Vial: 17



## Quant Report

#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	CLOCTANE	5.567	1185289	2.9890	35.428	0.067
2	DIESEL#1/#2	12.850	855108	2.6360	22.541	0.043
3	PENTACOSANE	15.850	1881775	2.3300	43.845	0.083

## Surrogate Recovery

#	Name	%REC
1	S	87.7

SampleName: 9710173-08A

Date Acquired: 10/24/97 01:52:27 AM

Date Processed: 10/24/97 10:20:21 AM

Date Printed: October 24, 1997

DIESEL CAL: 10/07/97 25-7,500 PPM

OIL CAL: 10/07/97 100-10,000PPM

CCV and SSC Limit: 85-115% Expected Value, (15% Deviation)

System: GC\_CA

Processing Method: GC\_CA\_DIESEL

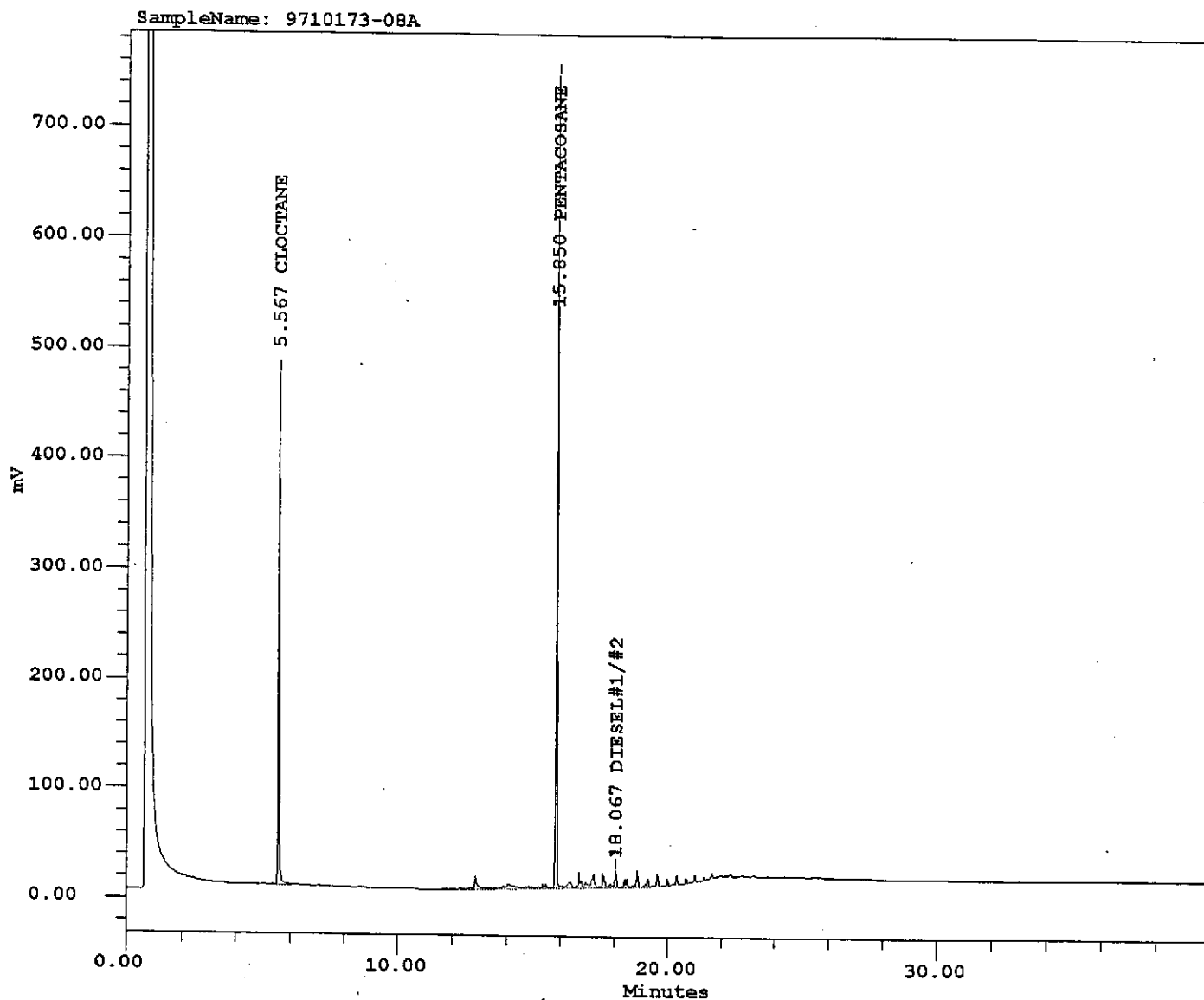
Set Name: CA1023

Column: RTX-1, 15m, 0.53mm ID, 0.5mm FT

Dil X F.Vol : 2.00000

SampleWeight: 1065.00000

Vial: 18



## Quant Report

#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	CLOCTANE	5.567	1233518	2.9890	36.870	0.069
2	PENTACOSANE	15.850	1995744	2.3300	46.501	0.087
3	DIESEL#1/#2	18.067	881367	2.6360	23.233	0.044
4		18.867	165256			

## Surrogate Recovery

#	Name	%REC
1	S	93.0



EXTRACTABLE HYDROCARBONS

SampleName: 9710173-02A 1/5

Date Acquired: 10/24/97 04:38:51 AM

Date Processed: 10/24/97 10:23:28 AM

Date Printed: October 24, 1997

DIESEL CAL: 10/07/97 25-7,500 PPM

OIL CAL: 10/07/97 100-10,000PPM

CCV and SSC Limit: 85-115% Expected Value, (15% Deviation) Vial: 21

System: GC CA

Processing Method: GC\_CA\_DIESEL

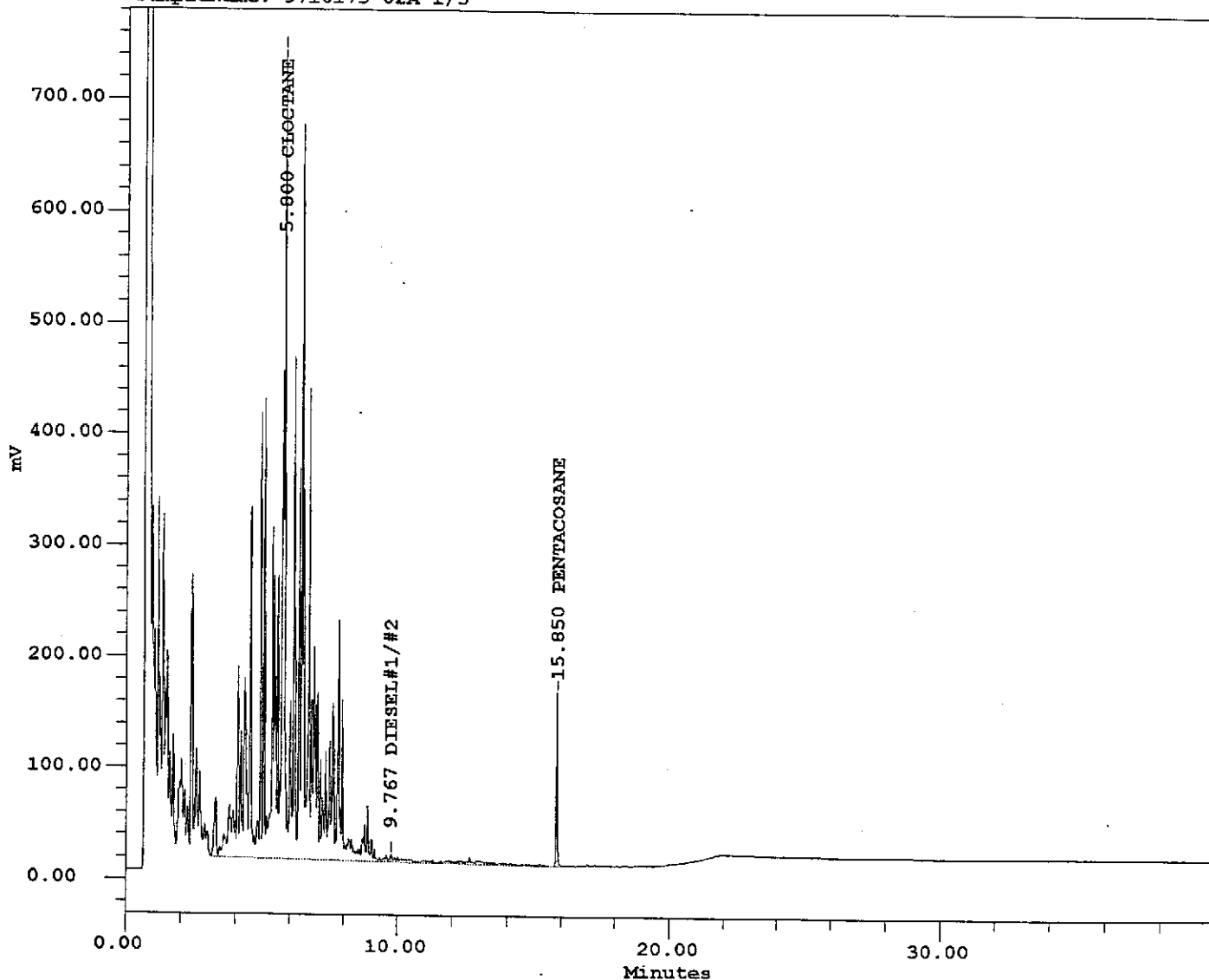
Set Name: CA1023

Column: RTX-1,15m,0.53mm ID,0.5mm FT

Dil X F.Vol : 10.00000

SampleWeight: 1050.00000

SampleName: 9710173-02A 1/5



Quant Report

#	Name	Ret Time (min)	Area (uV*sec)	CF(E-5)	Inst Con(ppm)	Spl Con (ppm)
1	CLOCTANE	5.800	26996929	2.9890	806.938	7.685
2	DIESEL#1/#2	9.767	545660	2.6360	14.384	0.137
3	PENTACOSANE	15.850	459286	2.3300	10.701	0.102

Surrogate Recovery

#	Name	%REC
1	S	107.0

\* PLEASE PROVIDE CHRONOLOGRAMS

CHAIN OF CUSTODY R-5, S-A, B, C

JOB NAME: USA-Oakland #57

LAB: LEN

PROJECT MANAGER: VERN BENNETT

SAMPLES COLLECTED BY: CHRIS LAPOSE

COMP.	GRAB	SAMPLE LOCATION	DATE	TIME	SAMPLE TYPE			SAMPLE NO.	TYPE CONTAINER(S)	ANALYSIS REQUIRED
					SOIL	AIR	WATER			
01A,B	X	MONITOR WELL	10/10/17	1443			X	S-1	2x LAPOSE	TH-D
02A,B	X	[Large handwritten bracket spanning rows 2-9]	[Large handwritten bracket spanning rows 2-9]	1450			X	S-2		
03A,B	X			1441			X	NW-3		
04A,B	X			1408			X	NW-4		
05A,B	X			1417			X	NW-5		
06A,B	X			1425			X	NW-6		
07A,B	X			1431			X	NW-7		
08A,B	X			1438			X	NW-8		

PRINT NAME AFTER SIGNATURE \* PLEASE PROVIDE CHRONOLOGRAMS

RELINQUISHED BY: <u>CHRIS LAPOSE</u>	RECEIVED BY: <u>Michael E. McMiller</u>	DATE/TIME: <u>10/14 1200</u>
RELINQUISHED BY: <u>Michael E. McMiller</u>	RECEIVED BY: <u>Greg Blaser</u>	DATE/TIME: <u>10/14 1330</u>
RELINQUISHED BY:	RECEIVED BY:	DATE/TIME:

RECEIVED FOR LABORATORY BY: \_\_\_\_\_ DATE/TIME: \_\_\_\_\_

METHOD OF SHIPMENT:

DISPOSITION:

- STORAGE
  - REFRIGERATOR
  - FREEZER
- TURN AROUND TIME
- 24 HOURS
  - 3 DAYS
  - 1 WEEK
  - 2 WEEKS

SECURED

YES  NO

NOTE: PLEASE HAVE EACH DATA SHEET SIGNED BY CHEMIST.

AEN Job No: 9710173

Project Footnotes

The following footnotes apply to the indicated project samples and will appear on the final report (except as noted)

AEN Ids	Client Ids	Test	Footnotes
	2A	DSLW	#3

Footnotes

- 01: Reporting limits (RLs) elevated due to matrix interference.
  - 02: RL(s) elevated due to high levels of target compounds. Sample(s) run at dilution.
  - 03: RL(s) elevated due to high levels of non-target compounds. Sample(s) run at dilution. *GASOLINE*
  - 04: RL(s) elevated for \_\_\_\_\_ due to hydrocarbon interference in the \_\_\_\_\_ range.
  - 05: RL(s) elevated for \_\_\_\_\_ due to suspected laboratory contamination.
  - 06: RL(s) elevated due to limited sample.
  - 07: Duplicate analysis showed surrogate recoveries outside of QC limits. Results are estimated.
  - 08: Sample showed non-target compound(s). (will appear by request)
  - 09: Non-typical \_\_\_\_\_ pattern observed. (will appear by request)
  - 10: VOA pH (determined after analysis) was >2. (will appear by request)
- \_\_\_\_\_ Analysis was performed within holding time. (informational footnote)
- \_\_\_\_\_ Analysis was performed outside of hold time due to improper preservation. Results are estimated.

\* : \_\_\_\_\_

\*\* : \_\_\_\_\_

Additional project comments:

If you have any questions, please contact Client Services at (510) 930-9090 or FAX (510) 930-0256.  
Thank you!

Revision: October, 1997