

# AZURE ENVIRONMENTAL

September 11, 1995

AZ142-528

eva chu  
Alameda County Health Care Services Agency  
Department of Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502-6577

0,3

*Review for closure*

RE: Second Quarter 1995 Ground-Water Monitoring Report  
Former Alameda Service Station A-528/Target Store T-328  
Dublin, California

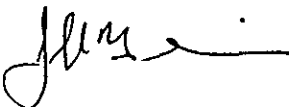
Dear Ms. chu:

Enclosed please find the subject quarterly monitoring report for the former Alameda Service Station A-528, located at 7608 Amador Boulevard in Dublin, California. This report is submitted on behalf of Tesoro Gasoline Marketing Company.

As described in this report, successive quarterly monitoring results indicate only trace concentrations of BTEX compounds remain in Site ground water. Therefore, we recommend that no further monitoring should be conducted and the ACHCSA should proceed with case closure.

Please feel free to call me at 415/485-9740 if you have any questions.

Sincerely,



Jeff Hennier, R.G.  
Principal Hydrogeologist

cc: Rob Donovan, Tesoro  
David Luick, Target Stores

09-12-95 12:00 PM  
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ENVIRONMENTAL  
HEALTH



**SECOND QUARTER 1995  
GROUND-WATER MONITORING REPORT  
Former Alameda Service Station A-528  
Target Store T-328  
Dublin, California**

September 11, 1995  
AZ142-528

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*Prepared for:*  
Tesoro Gasoline Marketing Company

**AZURE ENVIRONMENTAL**

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September 11, 1995

AZ142-528

**SECOND QUARTER 1995  
GROUND-WATER MONITORING REPORT  
Former Alameda Service Station A-528  
Target Store T-328  
Dublin, California**

**1.0 INTRODUCTION**

This Second Quarter 1995 Ground-Water Monitoring Report is submitted on behalf of Tesoro Gasoline Marketing Company ("Tesoro") for the former Alameda Service Station A-528 facility at 7608 Amador Valley Boulevard in Dublin, California ("the Site"; Figures 1 and 2). Ground-water monitoring was performed at the Site in accordance with the requirements contained in the Alameda County Health Services Agency's letter to Mr. Brad Wright of McLaren/Hart dated March 15, 1995.

**2.0 DESCRIPTION OF GROUND-WATER MONITORING PROGRAM**

The ground-water monitoring program at the Site consists of the following activities:

- Quarterly collection of ground-water level measurements from monitoring wells at the Site.
- Quarterly and annual collection and laboratory analysis of ground-water samples from wells at the Site, in accordance with the monitoring schedule summarized in Table 1.
- Quarterly submittal of ground-water monitoring reports.

**3.0 GROUND-WATER MONITORING RESULTS**

**3.1 Ground-Water Elevations and Flow Direction**

Water-level measurements and calculated ground-water elevations in monitoring wells at the Site on June 23, 1995 are summarized in Table 2. Ground-water elevations from on-site monitoring wells were used to construct potentiometric contours for shallow-zone sediments. A water-table map for the shallow ground-water zone is illustrated in Figure 3.

As indicated in Table 2, the depth to ground water measured in on-site wells on June 23, 1995 varied between approximately 3.61 bgs (336.59 feet above mean sea level) and 5.38 bgs (336.73 feet above mean sea level). During the period between February 1991 and June 1995, depth to ground water varied between 3.57 feet below grade (336.63 feet above mean sea level) and 5.97 feet below grade (334.23 feet above mean sea level) in well MW-1. Based upon these data, it appears that water levels at the Site have increased by slightly less than 2.5 feet during the period between February 1991 and June 1995.



Water-level data collected at the Site indicate the general direction of ground-water flow is toward the southeast (Figure 3). These data are generally consistent with potentiometric data and interpretations of ground-water flow direction at the Site presented in previous quarterly monitoring reports. Shallow ground water in the site vicinity flows toward the southeast under an average hydraulic gradient of approximately 0.01 ft/ft.

## **3.2 Ground-Water Sampling and Laboratory Analysis**

On June 23, 1995, ground-water samples were collected from three shallow-zone monitoring wells at the Site. The samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) using EPA Method 8015 (modified) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020. Results of analysis of the field blank quality control sample collected during the sampling event indicated concentrations of benzene (0.37 ppb), toluene (1.4 ppb) and total xylenes (0.91 ppb) were detected. Detection of these compounds in the field blank indicate the presence of contamination in the sampling equipment, sample containers and/or the laboratory analytical equipment. Since contamination of the sampling and/or laboratory equipment introduces variability to the laboratory data and brings into question the validity of the data, we rejected the sample data collected on June 23.

Resampling of three shallow-zone monitoring wells at the Site was conducted on August 7, 1995. A historical summary of laboratory analysis results are presented in Table 3; laboratory certificates are included in Appendix A. Ground-water monitoring data from the most recent sampling event are illustrated in Figure 4.

Water-quality data from wells sampled for this quarterly monitoring event are generally consistent with data presented in previous quarterly monitoring reports. Monitoring data continue to indicate non-detect or trace concentrations of BTEX compounds in the Site monitoring wells. The highest concentrations of petroleum hydrocarbons in ground water were measured at monitoring well MW-2, located downgradient of the former underground storage tanks (Figure 4). Monitoring data for well MW-2 indicate benzene was detected at concentrations of 3.2 ppb and 4.6 ppb (duplicate). Trace concentrations of ethylbenzene (0.66/0.91 ppb), and total xylenes (0.88 ppb) were also detected in well MW-2.

Only a trace concentration of ethylbenzene (0.54 ppb) was detected in monitoring well MW-6, which is located within the tank backfill. Petroleum hydrocarbons were not detected in the sample collected from well MW-4, located adjacent to the former underground storage tanks.



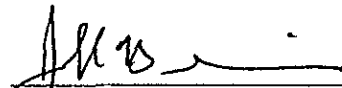
4.0 SUMMARY AND RECOMMENDATIONS

Historical ground-water monitoring results indicate only trace concentrations of BTEX compounds remain in Site ground water. BTEX compounds have not been detected in Site wells MW-1 and MW-3 and only trace concentrations of BTEX compounds were detected in Site wells MW-4, MW-5 and MW-6 during the last four successive sampling events (Table 3). With the exception of well MW-2, the highest concentrations of BTEX compounds detected in Site wells over the last four successive sampling events were 2 ppb benzene, 1.3 ppb ethylbenzene, and 0.67 ppb total xylenes. The September 1994 sample from well MW-2 detected benzene at a concentration of 42 ppb. However, the following three successive sampling events reported benzene concentrations ranging from non-detect (December 1994) to 5.2 ppb (March 1995).

Based on quarterly monitoring results indicating only trace concentrations of BTEX compounds remain in Site ground water, we recommend that no further work should be conducted and the Site should be approved for case closure.

5.0 SIGNATURE PAGE

All hydrogeologic and geologic information, conclusions, and recommendations contained in this report have been prepared and/or reviewed by a California Certified Hydrogeologist.

  
\_\_\_\_\_  
Jeff Hennier  
Principal Hydrogeologist  
California Registered Geologist (4605)  
California Certified Hydrogeologist (105)

9/11/95  
Date



**TABLE 1**  
**1995 GROUND-WATER MONITORING SCHEDULE**  
**Former Alameda Management Company Service Station A-528**  
**Dublin, California**

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**1995 Monitoring Schedule**

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<u>Quarterly</u>	<u>Annually</u>
MW-2 MW-4 MW-6	MW-5

Notes:

All quarterly and semi-annual samples will be analyzed for TPHg and BTEX compounds.

Quarterly monitoring program includes water level measurement at wells MW-1 through MW-6.



TABLE 2  
SUMMARY OF GROUND WATER ELEVATION DATA  
FORMER ALAMEDA SERVICE STATION A-578  
DUBLIN, CALIFORNIA

Well Number	Top of Casing Elevation (MSL) *	Date Measured	Depth to Water (ft)	Water Elevations (MSL)	Change Since Last Reading (ft)
MW-1	340.20	02/28/91	5.00	335.20	
		06/14/91	5.53	334.67	-0.59
		09/26/91	5.97	334.23	-0.38
		12/30/91	5.50	334.70	0.47
		03/26/92	4.65	335.55	0.85
		06/23/92	4.92	335.28	-0.27
		09/24/92	5.10	335.10	-0.18
		12/29/92	4.89	335.31	0.21
		03/24/93	3.57	336.63	1.32
		06/28/93	3.79	336.41	-0.22
		09/28/93	4.24	335.96	-0.45
		12/16/93	4.72	335.48	-0.48
		03/28/94	4.90	335.30	-0.18
		06/16/94	4.93	335.27	-0.03
		09/30/94	5.32	334.88	-0.39
		12/21/94	5.02	335.18	0.30
		01/24/95	3.74	336.46	1.28
06/23/95	3.61	336.59	0.13		
MW-2	340.27	02/28/91	5.46	334.81	
		06/14/91	5.90	334.37	-0.44
		09/26/91	6.54	333.73	-0.64
		12/30/91	5.83	334.44	0.71
		03/27/92	5.35	334.92	0.48
		06/23/92	5.69	334.58	-0.34
		09/24/92	5.70	334.57	-0.01
		12/29/92	5.52	334.75	0.18
		03/24/93	4.48	335.79	1.04
		06/28/93	4.67	335.60	-0.19
		09/28/93	5.01	335.26	-0.34
		12/16/93	5.40	334.87	-0.39
		03/28/94	5.58	334.69	-0.18
		06/16/94	5.59	334.68	-0.01
		09/30/94	5.89	334.38	-0.30
		12/21/94	5.65	334.62	0.24
		01/24/95	4.49	335.78	1.16
06/23/95	4.60	335.67	-0.11		
MW-3	341.00	02/28/91	5.61	335.39	
		06/14/91	5.40	335.60	0.21
		09/26/91	6.29	334.71	-0.89
		12/30/91	5.75	335.25	0.54
		03/26/92	4.58	336.42	1.17
		06/23/92	5.27	335.73	-0.69
		09/24/92	5.47	335.53	-0.20
		12/29/92	5.08	335.92	0.39
		03/24/93	3.83	337.17	1.25
		06/28/93	4.02	336.98	-0.19
		09/28/93	4.42	336.58	-0.40
		12/16/93	4.97	336.03	-0.55
		03/28/94	4.99	336.01	-0.02
		06/16/94	5.06	335.94	-0.07
		09/30/94	5.45	335.55	-0.39
		12/21/94	5.15	335.85	0.30
		01/24/95	3.87	337.13	1.28
06/23/95	3.82	337.18	0.05		

TABLE 2  
(continued)  
SUMMARY OF GROUND WATER ELEVATION DATA  
FORMER ALAMEDA SERVICE STATION A-578  
DUBLIN, CALIFORNIA

Well Number	Top of Casing Elevation (MSL) *	Date Measured	Depth to Water (ft)	Water Elevations (MSL)	Change Since Last Reading (ft)
MW-4	342.11	02/28/91	7.01	335.10	
		06/14/91	7.01	335.10	0.00
		09/26/91	7.81	334.30	-0.80
		12/30/91	7.17	334.94	0.64
		03/27/92	6.44	335.67	0.73
		06/23/92	6.70	335.41	-0.26
		09/24/92	6.84	335.27	-0.14
		12/29/92	6.59	335.52	0.25
		03/24/93	5.38	336.73	1.21
		06/28/93	5.52	336.59	-0.14
		09/28/93	5.89	336.22	-0.37
		12/16/93	6.51	335.60	-0.62
		03/28/94	6.54	335.57	-0.03
		06/16/94	6.58	335.53	-0.04
		09/30/94	6.92	335.19	-0.34
		12/21/94	6.66	335.45	0.26
01/24/95	5.38	336.73	1.28		
06/23/95	5.38	336.73	0.00		
MW-5	340.09	06/14/91	5.81	334.28	
		09/26/91	5.92	334.17	-0.11
		12/30/91	5.52	334.57	0.40
		03/26/92	4.80	335.29	0.72
		06/23/92	5.23	334.86	-0.43
		09/24/92	5.07	335.02	0.16
		12/29/92	5.04	335.05	0.03
		03/24/93	3.99	336.10	1.05
		06/28/93	4.11	335.98	-0.12
		09/28/93	4.50	335.59	-0.39
		12/16/93	4.99	335.10	-0.49
		03/28/94	5.15	334.94	-0.16
		06/16/94	5.15	334.94	0.00
		09/30/94	5.49	334.60	-0.34
		01/24/95	4.00	336.09	1.49
		06/23/95	3.96	336.13	0.04
MW-6	340.81	09/26/91	6.45	334.36	
		12/30/91	5.71	335.10	0.74
		03/27/92	5.03	335.78	0.68
		06/23/92	5.38	335.43	-0.35
		09/24/92	5.57	335.24	-0.19
		12/29/92	5.22	335.59	0.35
		03/24/93	3.86	336.95	1.36
		06/28/93	3.95	336.86	-0.09
		09/28/93	4.30	336.51	-0.35
		12/16/93	5.05	335.76	-0.75
		03/28/94	4.82	335.99	0.23
		06/16/94	4.93	335.88	-0.11
		09/30/94	5.41	335.40	-0.48
		12/21/94	5.07	335.74	0.34
		01/24/95	3.81	337	1.26
		06/23/95	3.62	337.19	0.19

\* MSL = Mean Sea Level

TABLE 3  
ANALYTICAL RESULTS OF GROUND WATER SAMPLES  
FORMER ALAMEDA SERVICE STATION, A-578  
DUBLIN, CALIFORNIA  
parts per billion (ppb)

WELL NUMBER	DATE	TPH/G	TPH/D	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
MW-1	2/91	<50	<500	<0.5	<0.5	<0.5	<0.5
	6/91	<50	--	<0.5	<0.5	<0.5	<0.5
	9/91	<50	--	<0.5	<0.5	<0.5	<0.5
	12/91	<50	--	<0.5	<0.5	<0.5	<0.5
	3/92	<50	--	<0.3	<0.3	<0.3	<0.3
	6/92	<50	--	<0.3	<0.3	<0.3	<0.3
	9/92	<50	--	<0.3	<0.3	<0.3	<0.3
	3/94	<50	--	<0.3	<0.3	<0.3	<0.3
MW-2	2/91	50	<500	2.0	0.8	1.1	5.8
	6/91	51	--	6.6	<0.5	1.1	1.33
	9/91	<50	--	5.0	<0.5	0.64	<0.5
	12/91	<50	--	6.1	<0.5	<0.5	<0.5
	3/92	<50	--	3.6	<0.5	<0.5	<0.5
	6/92	<50	--	9.5	<0.3	<0.3	<0.3
	9/92	<50	--	1.3	<0.3	<0.3	<0.3
	12/92	150	--	35 <sup>b</sup>	0.81	4.0	3.2
	3/93	<50	--	3.2	<0.3	<0.3	0.86
	6/93	<50	--	17.0 <sup>b</sup>	<0.3	0.93	0.41
	9/93	81	--	5.0 <sup>p</sup>	<0.3	3.8	4.06
	12/93	<50	--	0.53	<0.3	<0.3	<0.3
	3/94	67	--	9.2	0.47	2.5	4.40
	6/94	95	--	14.0	<0.5	4.1	4.90
	9/94	130	--	42.0 <sup>b</sup>	<0.3	2.4	<0.3
	12/94	<50	--	<0.3	<0.3	<0.3	<0.3
3/95	<50	--	5.2	<0.3	0.89	0.92	
8/95	<50	--	3.2	<0.3	0.66	<0.6	
8/95-R	<50	--	4.6	<0.3	0.91	0.88	
MW-3	2/91	<50	<500	<0.5	<0.5	<0.5	<0.5
	6/91	<50	--	<0.5	<0.5	<0.5	<0.5
	9/91	<50	--	<0.5	<0.5	<0.5	<0.5
	12/91	<50	--	<0.5	<0.5	<0.5	<0.5
	3/92	<50	--	<0.3	<0.3	<0.3	<0.3
	6/92	<50	--	<0.3	<0.3	<0.3	<0.3
	9/92	<50	--	<0.3	<0.3	<0.3	<0.3
	6/94	<50	--	<0.5	<0.5	<0.5	<0.5
MW-4	2/91	6,000	<500	680	<20	160	250
	6/91	6,100	--	680	<25	150	<25
	9/91	<50	--	100	<0.5	45	8.1
	12/91	180	--	6.4	<1.0	16	25.8
	3/92	560	--	120	6.0	5.0	<0.5
	6/92	<50	--	<0.3	<0.3	<0.3	<0.3
	9/92	<50	--	<0.3	<0.3	<0.3	<0.3
	12/92	<50	--	0.92	<0.3	<0.3	<0.3
	3/93	<50	--	4.3	<0.3	0.98	<0.3
	6/93	<50	--	2.1	<0.3	<0.3	0.31
	9/93	<50	--	2.8	<0.3	<0.3	<0.3
	12/93	<50	--	1.0	<0.3	<0.3	<0.3
	3/94	460 <sup>b</sup>	--	3.2 <sup>b</sup>	<0.3	45 <sup>b</sup>	19 <sup>b</sup>
	6/94	<500 <sup>a</sup>	--	<5 <sup>a</sup>	<5 <sup>c</sup>	<5 <sup>a</sup>	<5 <sup>c</sup>
	9/94	<500 <sup>c</sup>	--	<3 <sup>c</sup>	<3 <sup>c</sup>	<3 <sup>c</sup>	<3 <sup>a</sup>
	12/94	<50	--	<0.3	<0.3	<0.3	<0.3
3/95	<50	--	2	<0.3	<0.3	<0.3	
8/95	<50	--	<0.3	<0.3	<0.3	<0.6	

TABLE 3  
(continued)  
ANALYTICAL RESULTS OF GROUND WATER SAMPLES  
FORMER ALAMEDA SERVICE STATION, A-578  
DUBLIN, CALIFORNIA  
parts per billion (ppb)

WELL NUMBER	DATE	TPH/G	TPH/D	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
MW-5	6/91	<50	<500	<0.5	<0.5	<0.5	<0.5
	9/91	<50	---	<0.5	<0.5	<0.5	<0.5
	12/91	<50	---	<0.5	<0.5	<0.5	<0.5
	3/92	<50	---	<0.3	<0.3	<0.3	<0.3
	6/92	<50	---	<0.3	<0.3	<0.3	<0.3
	9/92	<50	---	<0.3	<0.3	<0.3	<0.3
	12/92	<50	---	<0.3	<0.3	<0.3	<0.3
	3/93	<50	---	<0.3	<0.3	<0.3	<0.3
	6/93	<50	---	<0.3	<0.3	<0.3	<0.3
	9/93	<50	---	<0.3	<0.3	<0.3	<0.3
	12/93	<50	---	<0.3	<0.3	<0.3	<0.3
	3/94	<50	---	<0.3	<0.3	<0.3	<0.3
	6/94	<50	---	1.5	<0.5	<0.5	<0.5
	9/94	<50	---	<0.3	<0.3	<0.3	<0.3
	3/95	<50	---	<0.3	<0.3	<0.3	<0.3
MW-6	9/91	2,300	---	760	11	360	236
	10/91	1,900	---	230	<5	140	12.1
	12/91	2,500	<500	360	<50 <sup>a</sup>	260	<50 <sup>a</sup>
	3/92	2,600	<500	400	<50 <sup>a</sup>	280	<50 <sup>a</sup>
	6/92	1,500	---	220	<3 <sup>b</sup>	190	<3 <sup>b</sup>
	9/92	<480 <sup>b</sup>	---	28	<3 <sup>b</sup>	120	<3 <sup>b</sup>
	12/92	250	---	16 <sup>b</sup>	<0.3	33 <sup>b</sup>	16.4
	3/93	<50	<500	<0.3	<0.3	0.37	0.88
	6/93	<50	---	<0.3	<0.3	0.72	1.48
	9/93	230	---	0.46	<0.3	6.4	12.6
	12/93	<50	---	2.5	<0.3	2.6	3.5
	3/94	45	---	0.34	<0.3	2.2	2.2
	6/94	120	---	0.79	<0.5	5.9	8.7
	9/94	<50	---	<0.3	<0.3	0.47	0.43
	12/94	<50	---	<0.3	<0.3	1.3	0.67
3/95	<50	---	<0.3	<0.3	1.3	0.67	
8/95	<50	---	<0.3	<0.3	0.54	<0.6	

a = The analysis was run at a 1:100 dilution.

b = The analysis was run at a 1:10 dilution.

c = The analysis was run at a 1:10 dilution.

--- Not analyzed.

R = Replicate sample.

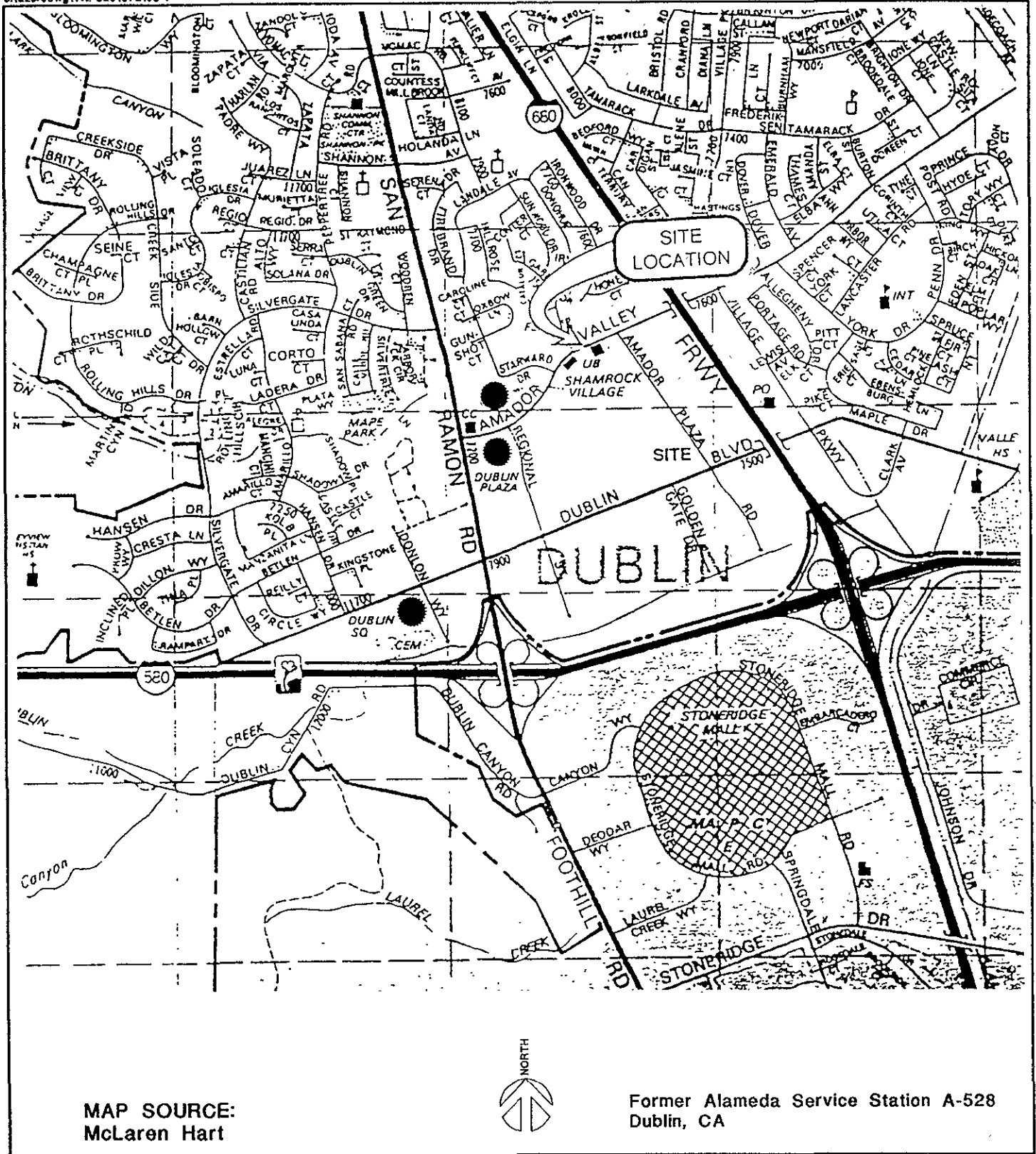


Figure 1: Site Vicinity Map

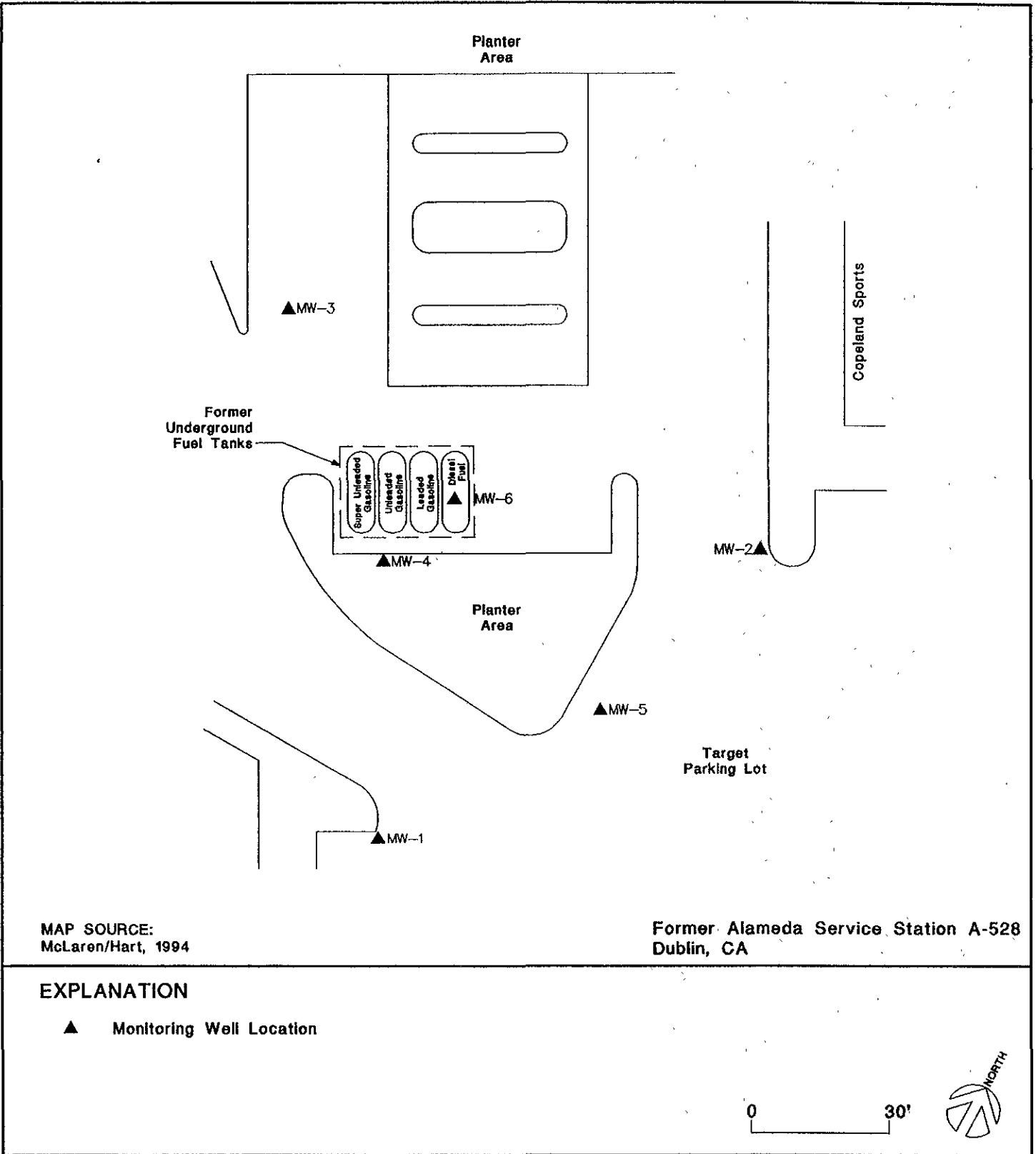
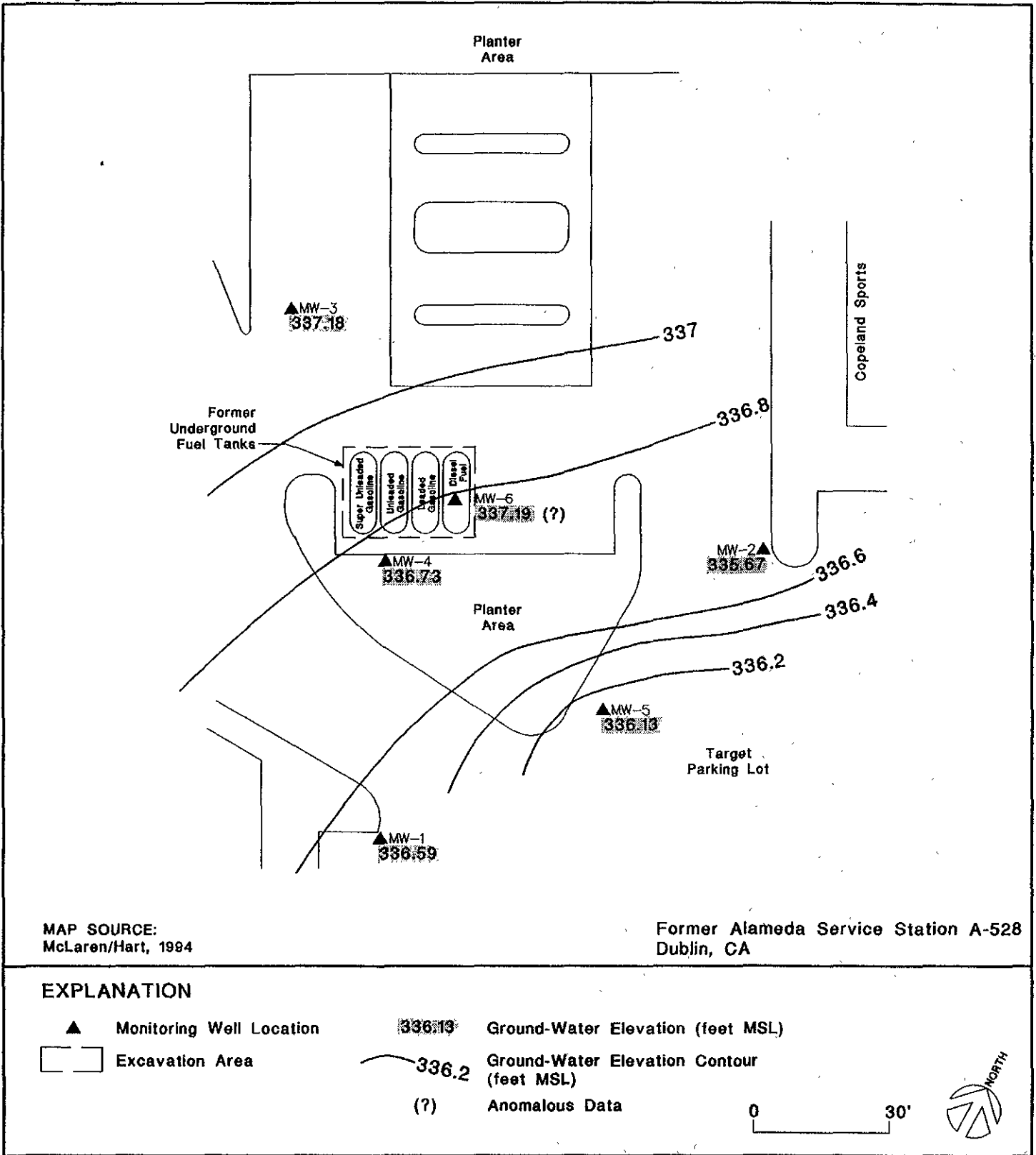
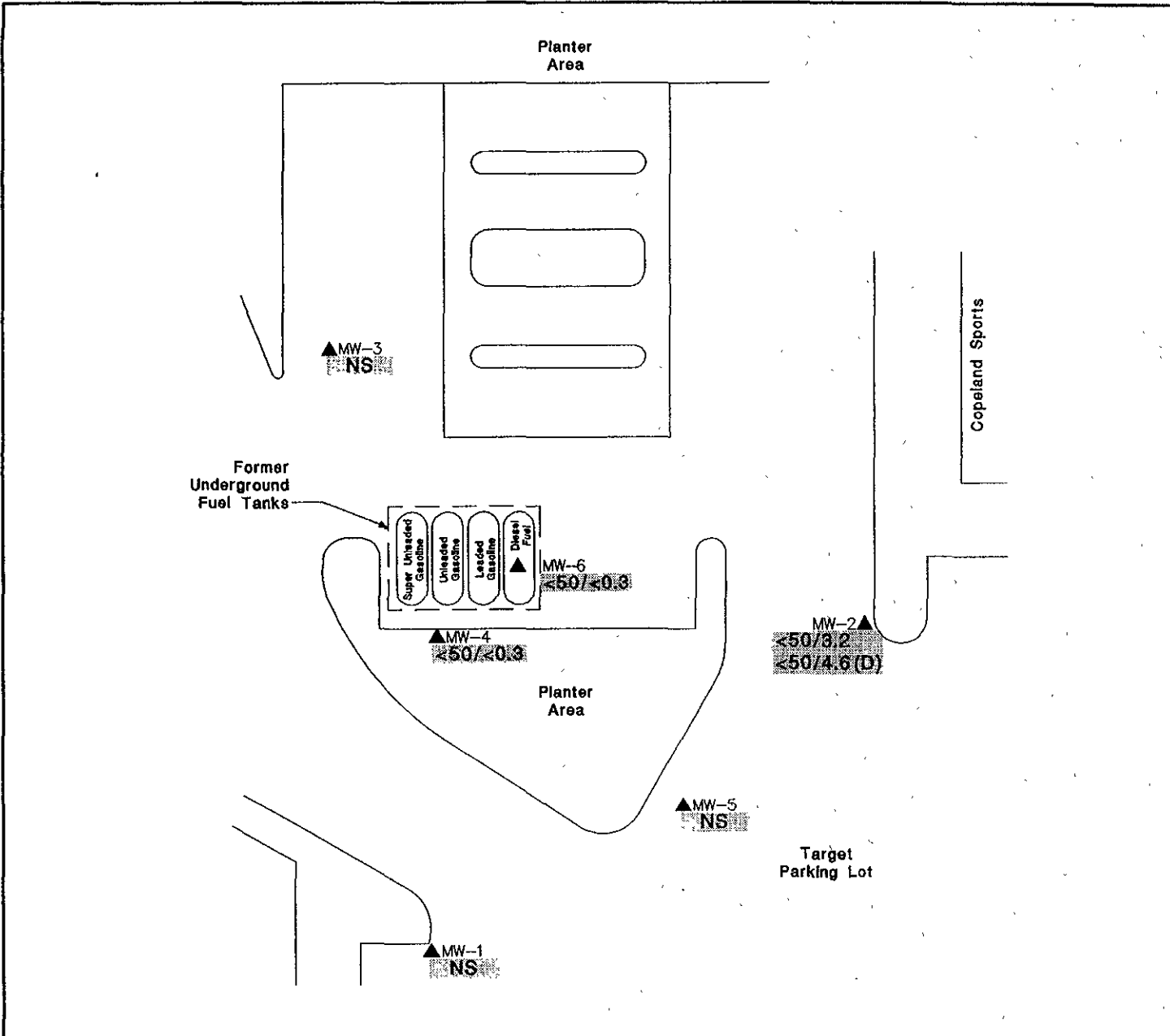


Figure 2: Site Plan



**Figure 3: Ground-Water Elevations Measured on June 23, 1995**



MAP SOURCE:  
McLaren/Hart, 1994

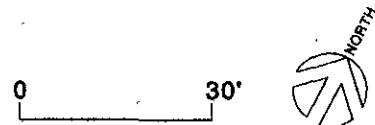
Former Alameda Service Station A-528  
Dublin, CA

**EXPLANATION**

- ▲ Monitoring Well Location
- NS Not Sampled
- (D) Duplicate Sample

0:370.0012  
 — Benzene (ppb)  
 — TPHg (ppb)

Samples collected on 8/7/95



**Figure 4: Ground-Water Sampling Results  
TPHg/Benzene (ppb)**



**APPENDIX A: LABORATORY CERTIFICATES**

Quanterra Incorporated  
880 Riverside Parkway  
West Sacramento, California 95605

916 373-5600 Telephone  
916 372-1059 Fax

August 25, 1995

QUANTERRA PROJECT NUMBER: 083372  
PO/CONTRACT: 142-528.01

Jeff Hennier  
Azure Environmental  
828 Mission Avenue  
San Rafael, CA 94901

Dear Mr. Hennier:

This report contains the analytical results for the five aqueous samples which were received under chain of custody by Quanterra Environmental Services on 08 August 1995. This sample set is associated with your Tesoro/Dublin project.

The case narrative is an integral part of this report.

If you have any questions, please call me at (916)374-4365.

Sincerely,

  
Marybeth Weeks  
Project Manager

MW/jas

Enclosures

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**Includes Samples: 1 - 5**

Sample Data Sheets

Method Blank Report

Laboratory Control Sample Report (SCS/LCS)

Matrix Specific QC Report

Total Petroleum Hydrocarbons (Gasoline) - Method P/T-GAS-TR

**Includes Samples: 1 - 5**

Sample Data Sheets

Method Blank Report

Laboratory Control Sample Report (SCS/LCS)

Matrix Specific QC Report

## CASE NARRATIVE

### QUANTERRA PROJECT NUMBER 083372

#### Total Petroleum Hydrocarbons (Gasoline) - Method P/T-GAS-TR

Sample MWQ-4 (Quanterra ID 083372-0004 had a hydrocarbon pattern atypical of gasoline, but may contain gasoline components. The amount present is about six (6) times the reporting limit. Quantitation is based on a gasoline reference.

No other anomalies were associated with this report.

## QUANTERRA'S QUALITY ASSURANCE PROGRAM

Quanterra has implemented an extensive Quality Assurance (QA) program to ensure the production of scientifically sound, legally defensible data of known documentable quality. A key element of this program is Quanterra's Laboratory Control Sample (LCS) system. Controlling lab operations with LCS (as opposed to matrix spike/matrix spike duplicate samples), allows the lab to differentiate between bias as a result of procedural errors versus bias due to matrix effects. The analyst can then identify and implement the appropriate corrective actions at the bench level, without waiting for extensive senior level review or costly and time-consuming sample re-analyses. The LCS program also provides our client with information to assess batch, and overall laboratory performance.

### Laboratory Control Samples - (LCS)

Laboratory Control Samples (LCS) are well-characterized, laboratory generated samples used to monitor the laboratory's day-to-day performance of routine analytical methods. The results of the LCS are compared to well-defined laboratory acceptance criteria to determine whether the laboratory system is "in control". Three types of LCS are routinely analyzed: Duplicate Control Samples (DCS), Single Control Samples (SCS), and method blanks. Each of these LCS are described below.

**Duplicate Control Samples.** A DCS is a well-characterized matrix (blank water, sand, sodium sulfate or celite) which is spiked with certain target parameters and analyzed at approximately 10% of the sample load in order to establish method-specific control limits.

**Single Control Samples.** An SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g. metals or conventional analyses) a single control sample identical to the DCS serves as the control sample. An SCS is prepared for each sample lot. Accuracy is calculated identically to the DCS.

**Method Blank Results.** A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

SAMPLE DESCRIPTION INFORMATION  
for  
Tesoro Refining, Marketing and Supply

Lab ID	Client ID	Matrix	Sampled Date	Time	Received Date
083372-0001-SA	MW-2-FB	AQUEOUS	07 AUG 95	11:45	08 AUG 95
083372-0002-SA	MW-2	AQUEOUS	07 AUG 95	12:00	08 AUG 95
083372-0003-SA	MW-2-D	AQUEOUS	07 AUG 95	12:10	08 AUG 95
083372-0004-SA	MW-4	AQUEOUS	07 AUG 95	10:40	08 AUG 95
083372-0005-SA	MW-6	AQUEOUS	07 AUG 95	09:45	08 AUG 95

# Chain of Custody Record



QUA-4124-1

Client: **Azure Environmental** Project Manager: **Jeff Hennier** Date: **8/7/95** Chain Of Custody Number: **36884**  
 Address: **828 Mission ave.** Telephone Number (Area Code)/Fax Number: **415 485-9740** Lab Number: \_\_\_\_\_ Page **1** of **1**

City: **San Rafael** State: **CA** Zip Code: **94901** Site Contact: \_\_\_\_\_ Lab Contact: \_\_\_\_\_ Analysis (Attach list if more space is needed)  
 Project Name: **142 - 528.01 Tesoro-Dublin** Carrier/Waybill Number: \_\_\_\_\_

Contract/Purchase Order/Quote No.: **142-528.01** Matrix: \_\_\_\_\_ Containers & Preservatives: \_\_\_\_\_

Sample I.D. No. and Description <small>(Containers for each sample may be combined on one line)</small>	Date	Time	Matrix			Containers & Preservatives							Special Instructions/ Conditions of Receipt		
			Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH				
MW-2-FB (Blank)	8/7/95	11:45	X						X				X	X	Special Instructions/ Conditions of Receipt
MW-2		12:00													
MW-2-D (Duplicate)		12:10													
MW-4		10:40													
MW-6		9:45													

*TPH-gas*  
*BTEX*

*Samples rec'd in good condition. MCD 080895*

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other **15 days** QC Requirements (Specify): **CAU office to ✓**

1. Relinquished By: <b>Ben Wells</b>	Date: <b>8/8/95</b>	Time: <b>8:00 AM</b>	1. Received By: <b>MCD</b>	Date: <b>080895</b>	Time: <b>11:50</b>
2. Relinquished By: _____	Date: _____	Time: _____	2. Received By: _____	Date: _____	Time: _____
3. Relinquished By: _____	Date: _____	Time: _____	3. Received By: _____	Date: _____	Time: _____

Comments: \_\_\_\_\_

*Benzene, Toluene, Ethyl Benzene and Xylenes*  
*(BTEX) -*  
*Method 8020*



Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)

Method 8020

Client Name: Tesoro Refining, Marketing and Supply  
Client ID: MW-2-FB  
Lab ID: 083372-0001-SA  
Matrix: AQUEOUS  
Authorized: 08 AUG 95

Sampled: 07 AUG 95  
Prepared: NA

Received: 08 AUG 95  
Analyzed: 10 AUG 95

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.30
Toluene	ND	ug/L	0.30
Ethylbenzene	ND	ug/L	0.30
Xylenes (total)	ND	ug/L	0.60
Surrogate	Recovery		
a,a,a-Trifluorotoluene	103	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.  
Rev 230787

Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)

Method 8020

Client Name: Tesoro Refining, Marketing and Supply

Client ID: MW-2

Lab ID: 083372-0002-SA

Matrix: AQUEOUS

Authorized: 08 AUG 95

Sampled: 07 AUG 95

Prepared: NA

Received: 08 AUG 95

Analyzed: 21 AUG 95

Parameter	Result	Units	Reporting Limit
Benzene	3.2	ug/L	0.30
Toluene	ND	ug/L	0.30
Ethylbenzene	0.66	ug/L	0.30
Xylenes (total)	ND	ug/L	0.60
Surrogate	Recovery		
a,a,a-Trifluorotoluene	104	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.

Rev 230787



Environmental  
Services

# Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)

## Method 8020

Client Name: Tesoro Refining, Marketing and Supply

Client ID: MW-2-D

Lab ID: 083372-0003-SA

Matrix: AQUEOUS

Authorized: 08 AUG 95

Sampled: 07 AUG 95

Prepared: NA

Received: 08 AUG 95

Analyzed: 21 AUG 95

Parameter	Result	Units	Reporting Limit
Benzene	4.6	ug/L	0.30
Toluene	ND	ug/L	0.30
Ethylbenzene	0.91	ug/L	0.30
Xylenes (total)	0.88	ug/L	0.60
Surrogate	Recovery		
a,a,a-Trifluorotoluene	106	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.

Rev 230787



Environmental  
Services

Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)

Method 8020

Client Name: Tesoro Refining, Marketing and Supply

Client ID: MW-4

Lab ID: 083372-0004-SA

Matrix: AQUEOUS

Authorized: 08 AUG 95

Sampled: 07 AUG 95

Prepared: NA

Received: 08 AUG 95

Analyzed: 21 AUG 95

Parameter	Result	Units	Reporting Limit	
Benzene	ND	ug/L	0.30	
Toluene	ND	ug/L	0.45	G
Ethylbenzene	ND	ug/L	0.40	G
Xylenes (total)	ND	ug/L	0.60	
Surrogate	Recovery			
a,a,a-Trifluorotoluene	133	%		

Note G : Reporting Limit raised due to matrix interference.

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.

Rev 230787

Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)

Method 8020

Client Name: Tesoro Refining, Marketing and Supply  
Client ID: MW-6  
Lab ID: 083372-0005-SA  
Matrix: AQUEOUS  
Authorized: 08 AUG 95

Sampled: 07 AUG 95  
Prepared: NA

Received: 08 AUG 95  
Analyzed: 21 AUG 95

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.30
Toluene	ND	ug/L	0.30
Ethylbenzene	0.54	ug/L	0.30
Xylenes (total)	ND	ug/L	0.60
Surrogate	Recovery		
a, a, a-Trifluorotoluene	109	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.

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QC LOT ASSIGNMENT REPORT - MS QC  
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
083372-0001-SA	AQUEOUS	602-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A
083372-0002-SA	AQUEOUS	602-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A
083372-0003-SA	AQUEOUS	602-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A
083372-0004-SA	AQUEOUS	602-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A
083372-0005-SA	AQUEOUS	602-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A

METHOD BLANK REPORT  
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 8020-BTX-A			
Matrix: AQUEOUS			
QC Lot: 10 AUG 95-211 QC Run: 10 AUG 95-21A			
Benzene	ND	ug/L	0.30
Toluene	ND	ug/L	0.30
Ethylbenzene	ND	ug/L	0.30
Xylenes (total)	ND	ug/L	0.60

SINGLE CONTROL SAMPLE REPORT  
Volatile Organics by GC

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Category: 602-A				
Matrix: AQUEOUS				
QC Lot: 10 AUG 95-211 QC Run: 10 AUG 95-21A				
Concentration Units: ug/L				
a,a,a-Trifluorotoluene	20.0	20.0	100	78-126

Calculations are performed before rounding to avoid round-off errors in calculated results.



LABORATORY CONTROL SAMPLE REPORT  
Volatile Organics by GC  
Project: 083372

Category: 602-A      Aromatic Volatile Organics  
Test: 8020-BTX-A  
Matrix: AQUEOUS  
QC Lot: 10 AUG 95-211  
Concentration Units: ug/L

QC Run: 10 AUG 95-21A

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Benzene	5.00	5.16	103	75-122
Toluene	5.00	5.26	105	76-117
Ethylbenzene	5.00	5.23	105	77-120
Xylenes (total)	15.0	15.6	104	72-128
1,3-Dichlorobenzene	5.00	5.20	104	74-123

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT  
Volatile Organics by GC  
Project: 083372

Category: 602-A Aromatic Volatile Organics  
Test: 8020-BTX-A  
Matrix: AQUEOUS  
Sample: 083372-0002  
S Run: 10 AUG 95-21A  
Units: ug/L

Analyte	Concentration			Spiked MS/MSD	%Recovery		Control Limits	%RPD	RPD Limit
	Sample Result	MS Result	MSD Result		MS	MSD			
Benzene	3.2	8.2	8.2	5.0	100	100	39-150	0.074	50
Toluene	ND	5.4	5.4	5.0	108	107	46-148	0.85	25
Ethylbenzene	0.66	5.9	5.9	5.0	105	104	32-160	0.46	35
Xylenes (total)	ND	17	16	15	111	110	65-135	1.1	35

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

*Total Petroleum Hydrocarbons (Gasoline) -  
Method P/T-GAS-TR*

Total Petroleum Hydrocarbons (Gasoline)

Method P/T-GAS-TR

Client Name: Tesoro Refining, Marketing and Supply

Client ID: MW-2-FB

Lab ID: 083372-0001-SA

Matrix: AQUEOUS

Authorized: 08 AUG 95

Sampled: 07 AUG 95

Prepared: NA

Received: 08 AUG 95

Analyzed: 10 AUG 95

Parameter	Result	Units	Reporting Limit
Gasoline	ND	ug/L	50
Surrogate	Recovery		
4-Bromofluorobenzene	95	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.

Rev 230787

Total Petroleum Hydrocarbons (Gasoline)

Method P/T-GAS-TR

Client Name: Tesoro Refining, Marketing and Supply

Client ID: MW-2

Lab ID: 083372-0002-SA

Matrix: AQUEOUS

Authorized: 08 AUG 95

Sampled: 07 AUG 95

Prepared: NA

Received: 08 AUG 95

Analyzed: 10 AUG 95

Parameter	Result	Units	Reporting Limit
Gasoline	ND	ug/L	50
Surrogate	Recovery		
4-Bromofluorobenzene	98	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.

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Total Petroleum Hydrocarbons (Gasoline)

Method P/T-GAS-TR

Client Name: Tesoro Refining, Marketing and Supply  
Client ID: MW-2-D  
Lab ID: 083372-0003-SA  
Matrix: AQUEOUS  
Authorized: 08 AUG 95

Sampled: 07 AUG 95  
Prepared: NA

Received: 08 AUG 95  
Analyzed: 11 AUG 95

Parameter	Result	Units	Reporting Limit
Gasoline	ND	ug/L	50
Surrogate	Recovery		
4-Bromofluorobenzene	96	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.  
Rev 230787

Total Petroleum Hydrocarbons (Gasoline)

Method P/T-GAS-TR

Client Name: Tesoro Refining, Marketing and Supply  
Client ID: MW-4  
Lab ID: 083372-0004-SA  
Matrix: AQUEOUS  
Authorized: 08 AUG 95

Sampled: 07 AUG 95  
Prepared: NA

Received: 08 AUG 95  
Analyzed: 11 AUG 95

Parameter	Result	Units	Reporting Limit
Gasoline	ND	ug/L	50
Surrogate	Recovery		
4-Bromofluorobenzene	105	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.  
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Total Petroleum Hydrocarbons (Gasoline)

Method P/T-GAS-TR

Client Name: Tesoro Refining, Marketing and Supply  
Client ID: MW-6  
Lab ID: 083372-0005-SA  
Matrix: AQUEOUS  
Authorized: 08 AUG 95

Sampled: 07 AUG 95  
Prepared: NA

Received: 08 AUG 95  
Analyzed: 11 AUG 95

Parameter	Result	Units	Reporting Limit
Gasoline	ND	ug/L	50
Surrogate	Recovery		
4-Bromofluorobenzene	95	%	

ND = Not detected  
NA = Not applicable

Reported By: Jennifer Bavetta

Approved By: Lisa Stafford

The cover letter is an integral part of this report.

Rev 230787



QC LOT ASSIGNMENT REPORT - MS QC  
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number	MS QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
083372-0001-SA	AQUEOUS	TPH-GAS-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A	10 AUG 95-21A
083372-0002-SA	AQUEOUS	TPH-GAS-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A	10 AUG 95-21A
083372-0003-SA	AQUEOUS	TPH-GAS-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A	10 AUG 95-21A
083372-0004-SA	AQUEOUS	TPH-GAS-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A	10 AUG 95-21A
083372-0005-SA	AQUEOUS	TPH-GAS-A	10 AUG 95-211	10 AUG 95-21A	10 AUG 95-21A	10 AUG 95-21A

METHOD BLANK REPORT  
Volatile Organics by GC



Analyte	Result	Units	Reporting Limit
Test: TPH-GAS-TR-A Matrix: AQUEOUS QC Lot: 10 AUG 95-211 QC Run: 10 AUG 95-21A			
Gasoline	ND	ug/L	50

SINGLE CONTROL SAMPLE REPORT  
Volatile Organics by GC

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Category: TPH-GAS-A				
Matrix: AQUEOUS				
QC Lot: 10 AUG 95-211 QC Run: 10 AUG 95-21A				
Concentration Units: ug/L				
4-Bromofluorobenzene	20.0	18.4	92	70-130

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE REPORT  
Volatile Organics by GC  
Project: 083372

Category: TPH-GAS-A TPH by Purge and Trap GC-FID  
Test: TPH-GAS-TR-A  
Matrix: AQUEOUS  
QC Lot: 10 AUG 95-211  
Concentration Units: ug/L

QC Run: 10 AUG 95-21A

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Gasoline	1000	980	98	80-118

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT  
Volatile Organics by GC  
Project: 083372

Category: TPH-GAS-A TPH by Purge and Trap GC-FID  
Test: TPH-GAS-TR-A  
Matrix: AQUEOUS  
Sample: 083372-0002  
S Run: 10 AUG 95-21A  
Units: ug/L

Analyte	Concentration			Spiked MS/MSD	%Recovery		Control Limits	%RPD	RPD Limit
	Sample Result	MS Result	MSD Result		MS	MSD			
Gasoline	ND	1010	931	1000	101	93	80-118	7.7	10

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.