



JW  
2/25

February 21, 1994

Ms. Eva Chu  
Alameda County Health Agency  
80 Swan Way, Room 200  
Oakland, California 94621

Dear Ms. Chu:

**SUBJECT: DECEMBER 1993 QUARTERLY GROUND WATER MONITORING AND INTERIM REMEDIATION REPORT FOR THE FORMER ALAMEDA SERVICE STATION A-528, 7608 AMADOR VALLEY BOULEVARD, DUBLIN, CALIFORNIA**

Enclosed please find the above-captioned report, and copy of a Bill of Lading for the disposal of ground water generated during purging of the monitoring wells. If you should have any comments or questions, please do not hesitate to call me at (510) 748-5620.

Sincerely,

A handwritten signature in cursive script that reads 'Campbell McLeod'.

Campbell McLeod  
Supervising Geoscientist

Enclosures

ALCO  
HAZMAT  
94 FEB 25 AM 8:26

ALCO  
HAZMAT

94 FEB 25 AM 8:26

DECEMBER 1993 QUARTERLY GROUND WATER  
MONITORING AND INTERIM  
REMEDATION REPORT FOR THE  
FORMER ALAMEDA  
SERVICE STATION A-528  
TARGET DUBLIN  
7608 AMADOR VALLEY BOULEVARD  
DUBLIN, CALIFORNIA

February 21, 1994


Prepared For:  
Target Stores  
33 South Sixth Street  
Minneapolis, Minnesota 55440-1342

Prepared By:  
McLaren/Hart Environmental Engineering  
1135 Atlantic Avenue  
Alameda, California 94501  
(510) 521-5200

Project No: 04.0122629.000

*The Information Contained Herein Is Submitted in Partial Fulfillment of Contract No. 465 For the Sole and Exclusive Use of Target Stores and Shall Not Be Disclosed or Furnished to Any Other Entity, Corporation, or Third Party, For Purposes Outside the Specific Scope and Intent of This Contract Without the Express Written Consent of McLaren/Hart.*

  
Reviewed By

  
Written By



ENVIRONMENTAL ENGINEERING CORPORATION

## **INTRODUCTION**

This report presents the December 1993 quarterly ground water monitoring results for the former Alameda Service Station A-528, located at 7608 Amador Valley Boulevard in Dublin, California ("the site"). This report was prepared in accordance with McLaren/Hart's quarterly ground water sampling and interim remediation measure plan (McLaren/Hart, 1993b) and followed previously presented recommendations (McLaren/Hart, 1993a). Recommendations included extracting ground water from MW-2 as part of quarterly interim remediation and conducting four sampling events between September 1993 and June 1994. This work was approved by Ms. Eva Chu of the Alameda County Health Care Services Agency, Department of Environmental Health, Hazardous Materials Division in a September 27, 1993 letter.

## **OBJECTIVES AND SCOPE OF WORK**

A site location map is presented as Figure 1 and a site map showing monitoring well locations is included as Figure 2. Quarterly monitoring of site wells is being conducted to monitor lateral extent of petroleum hydrocarbons in shallow ground water beneath the site, while ground water removal from MW-2 serves as interim remediation of impacted ground water from the well containing the highest detected concentration of benzene.

The work associated with the December 1993 quarterly monitoring event included: sampling monitoring wells MW-2, MW-4, MW-5, and MW-6 for the presence of gasoline-

related constituents; collecting water elevations from six monitoring wells (MW-1 through MW-6); and extracting 1,190 gallons of impacted ground water from monitoring well MW-2.

### **Ground Water Elevations and Flow Directions**

Ground water surface elevations were measured prior to sampling and pumping activities on December 16, 1993 (Table 1). These data were used to construct the December 1993 ground water contour map (Figure 2). The inferred ground water flow direction is generally toward the east and is apparently influenced by the presence of more permeable materials in the excavation area causing a small ground water mound to form. This flow direction is generally consistent with historic ground water flow directions. Based on the observed contour pattern, MW-2, MW-4, and MW-5 appear to be downgradient of the former excavation area.

The static depth to ground water ranges from 4.72 to 6.51 feet below ground surface or 334.87 to 336.03 feet above mean sea level. The average hydraulic gradient is approximately 0.011 feet/foot. The December water level measurements indicate that ground water levels have decreased in all of the six wells since September 1993. These decreases range from 0.39 to 0.75 feet, with an average decrease of 0.55 feet. Historic ground water elevation data are presented in Table 2.

### **Ground Water Sampling Activities**

Ground water samples were collected from MW-4, MW-5, and MW-6 on December 16, and from MW-2 on December 17, 1993. Prior to sampling MW-4, MW-5, and MW-6, four

**TARGET DUBLIN  
DECEMBER 1993  
QUARTERLY REPORT  
February 21, 1994  
Page 3**

casing volumes were purged from each well using a centrifugal pump. Temperature, pH, electric conductivity, and turbidity were measured after each casing volume was removed. After all parameters had stabilized, with the turbidity at or below 1.0 Nephelometric Turbidity Unit (NTU), sampling was performed using a disposable bailer. At MW-2, in conjunction with the interim remediation, 119 casing volumes were removed prior to sample collection and parameters were collected during the last five casing volumes. Sampling Event Data Sheets are enclosed as Appendix I.

Ground water samples were stored in a container filled with ice and delivered to MBT Environmental Laboratories, a state-certified laboratory located in Rancho Cordova, California. A chain-of-custody record was completed during sampling and accompanied each sample shipment to the laboratory. The samples were submitted for analysis by EPA Method 5030 (LUFT) for total petroleum hydrocarbons as gasoline (TPH/G) and for benzene, toluene, ethyl benzene, and xylenes (BTEX) analyses by EPA Method 8020. Trip blanks were included in the shipments to the laboratory to be analyzed for TPH/G and BTEX.

#### **Ground Water Analytical Results**

Table 3 and Figure 3 present the December 1993 sampling event analytical results. Consistent with previous results, water samples collected at monitoring well MW-5 did not contain concentrations of either TPH/G or BTEX at or above the reporting limit.

Benzene (2.5 ppb) was detected in the sample collected from MW-6, located within the excavation backfill for the former fuel tanks. Although TPH/G was not detected,

**TARGET DUBLIN  
DECEMBER 1993  
QUARTERLY REPORT  
February 21, 1994  
Page 4**

ethylbenzene (2.6 ppb) and total xylenes (3.5 ppb) were detected in ground water from well MW-6. These levels are generally consistent with recent analytical results.

Benzene (0.53 ppb) was the only gasoline-related constituent detected in the water sample collected from well MW-2 and represents the lowest level of benzene reported to date at this well. This sampling result represents a marked decrease from the September 1993 sampling results at this well of: 81 ppb TPH/G; 5 ppb benzene, 3.8 ppb ethylbenzene, and 4.06 ppb total xylenes. Based upon the decreasing levels of benzene since June 1993 (17 ppb), it appears that interim remediation at MW-2 is improving water quality in the vicinity of MW-2.

At MW-4, located adjacent to the tank excavation, benzene (1.0 ppb) was the only gasoline-related constituent detected. This is consistent with recent sampling results at MW-4.

The trip blank sample did contain BTEX compounds at concentrations very near the 0.30 ppb reporting limit (benzene at 0.37 ppb, toluene at 0.40 ppb, ethylbenzene at 0.36 ppb, and total xylenes 0.38 ppb). TPH-G was not detected in the trip blank. The Analytical Data Sheets and Chain-of-Custody Records for the ground water samples are included as Appendix II.

The DHS Maximum Contaminant Levels (MCLs) for BTEX compounds in drinking water include: 1 ppb benzene; 680 ppb ethyl benzene; and 1,750 ppb total xylenes. The Federal MCL for toluene is 1,000 ppb. There is no state action level for TPH/G. Benzene was detected in ground water from monitoring wells MW-4 and MW-6 at concentrations slightly

in excess of its MCL. However, ground water beneath the site is reportedly not used for drinking water or other beneficial uses, and the MCL concentrations are presented only for purposes of comparison.

### **Interim Remediation**

The most recent interim remediation at the site occurred on December 16 and 17, 1993, when 1,190 gallons were removed from MW-2 at an average pumping rate of 1.4 gpm. Depth to ground water was measured at the six wells during each day of interim remediation, once before pumping started, then again just before pumping stopped for the day (Table 4).

Prior to this remedial effort, ten interim remediation episodes occurred at MW-6 between October 1991 and June 1993. Changes in ground water elevations at the monitoring wells as a result of extracting ground water from MW-6 during this time period are shown in Table 5. A total of approximately 3,300 gallons of ground water were extracted during the ten interim remediation episodes, at an average pumping rate of 0.9 gallons per minute (gpm).

As shown on Tables 4 and 5, the extraction of ground water from MW-2 and MW-6 typically reduces the water level in each of the six wells. The exception to this was in October and December 1992, when water levels rose during interim remediation pumping as a result of excessive rainfall during the remediation.

The December 1993 change in water level measurements resulting from extraction of ground water from MW-2 (Table 3) reveal that the greatest response during the first day of pumping was at MW-4 and MW-5 (decreases of 0.20 and 0.28 feet, respectively). Measurements collected after the second day of pumping again showed that MW-4 (0.36 feet) and MW-5 (0.35 feet) registered the most response.

## **CONCLUSIONS**

The following conclusions are based on data collected to date:

- Free-floating petroleum product was not observed in any of the wells.
- The low levels of gasoline-related constituents detected in wells MW-4 and MW-6 (located respectively adjacent to and within the tank excavation) are generally consistent with recent sampling events.
- Consistent with previous sampling results, gasoline-related constituents were not detected in down-gradient well MW-5.
- The level of benzene (0.53 ppb) reported in well MW-2 during the December 1993 sampling was lower than recent sampling results (5 ppb in September 1993 and 17 ppb in June 1993). Based upon the implementation of interim remediation measures (ground water extraction) at MW-2 during the September 1993 sampling event and the consistent decrease in benzene



**TARGET DUBLIN  
DECEMBER 1993  
QUARTERLY REPORT  
February 21, 1994  
Page 7**

concentrations at MW-2 since then, it appears that the interim remediation is improving water quality near MW-2.

- As shown on Figure 2, the apparent ground water flow direction at the site is generally to the east, consistent with historic flow directions.
- Ground water elevations in all six wells decreased an average of 0.55 feet since September 1993.
- Based on historical analytical results from downgradient wells MW-2 and MW-5, chemicals of concern do not appear to be migrating towards MW-5. However, low levels of gasoline-related constituents are present in ground water at MW-2.
- The interim remediation at MW-2 removed approximately 1,190 gallons of ground water at a flow rate of 1.4 gpm and appears to be capable of lowering water levels at other wells on-site.

Future work at the site consists of:

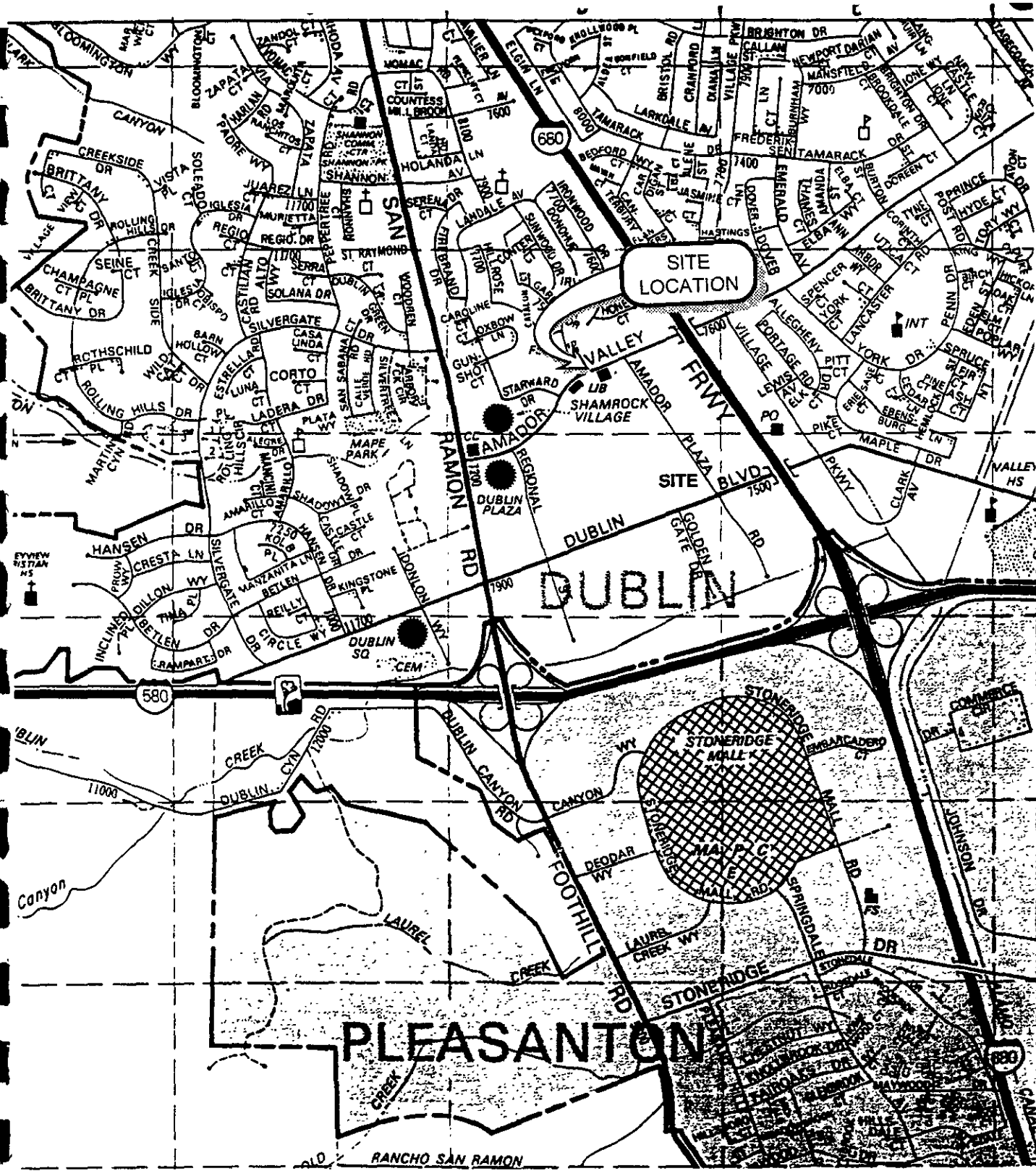
- Ground water sampling as scheduled in March 1993, and
- Extraction of impacted ground water from well MW-2 as part of interim remediation.

**REFERENCES**

McLaren/Hart 1993a, "June 1993 Quarterly Ground Water Monitoring and Interim Remediation Report for the Former Alameda Service Station A-528", September 13, 1993.

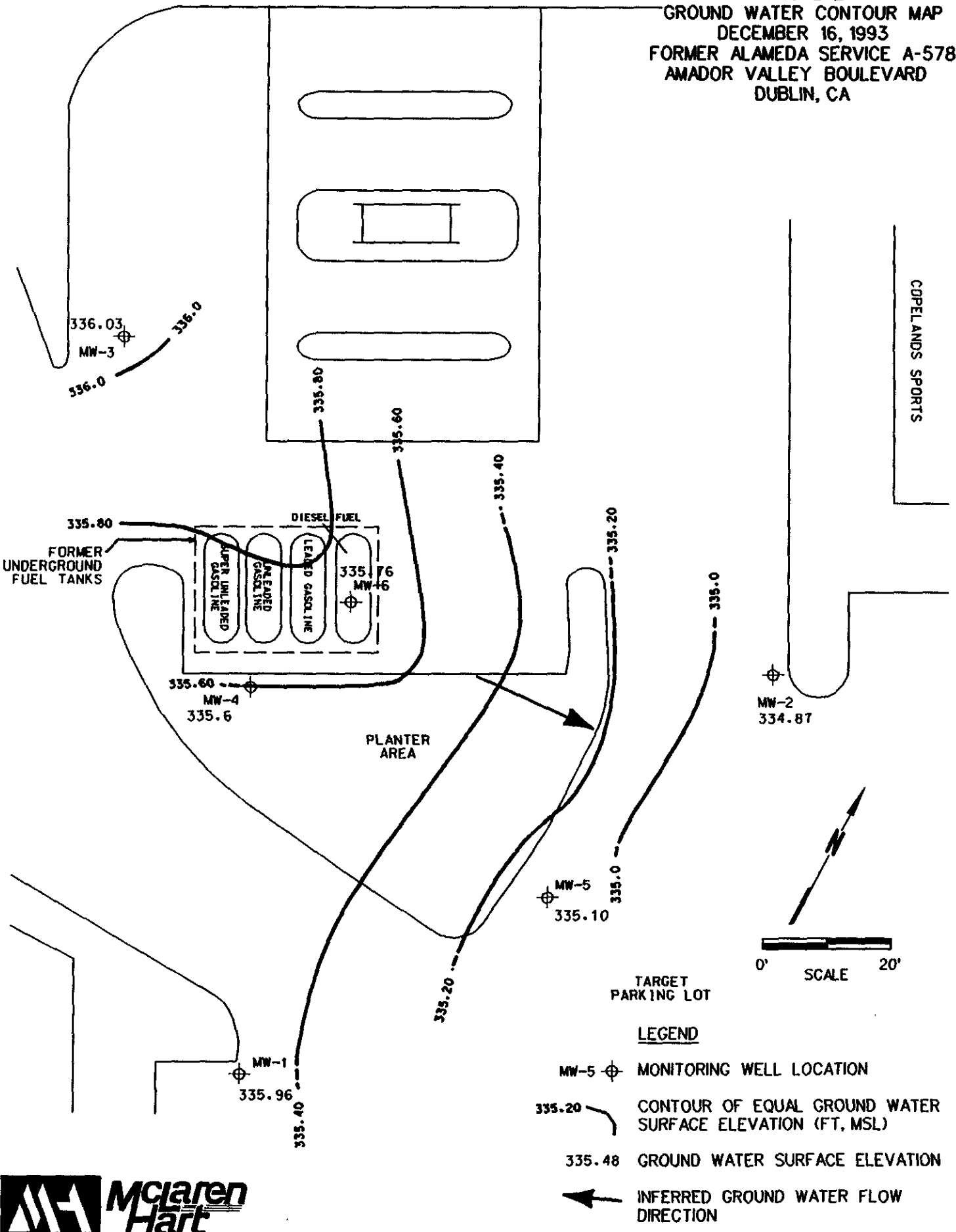
McLaren/Hart 1993b, "Proposal to Conduct Quarterly Ground Water Sampling and Interim Remediation at the Target Store T-328 Dublin, California", dated September 13, 1993

FIGURE 1  
SITE LOCATION MAP  
FORMER ALAMEDA SERVICE STATION  
A-578  
DUBLIN, CA



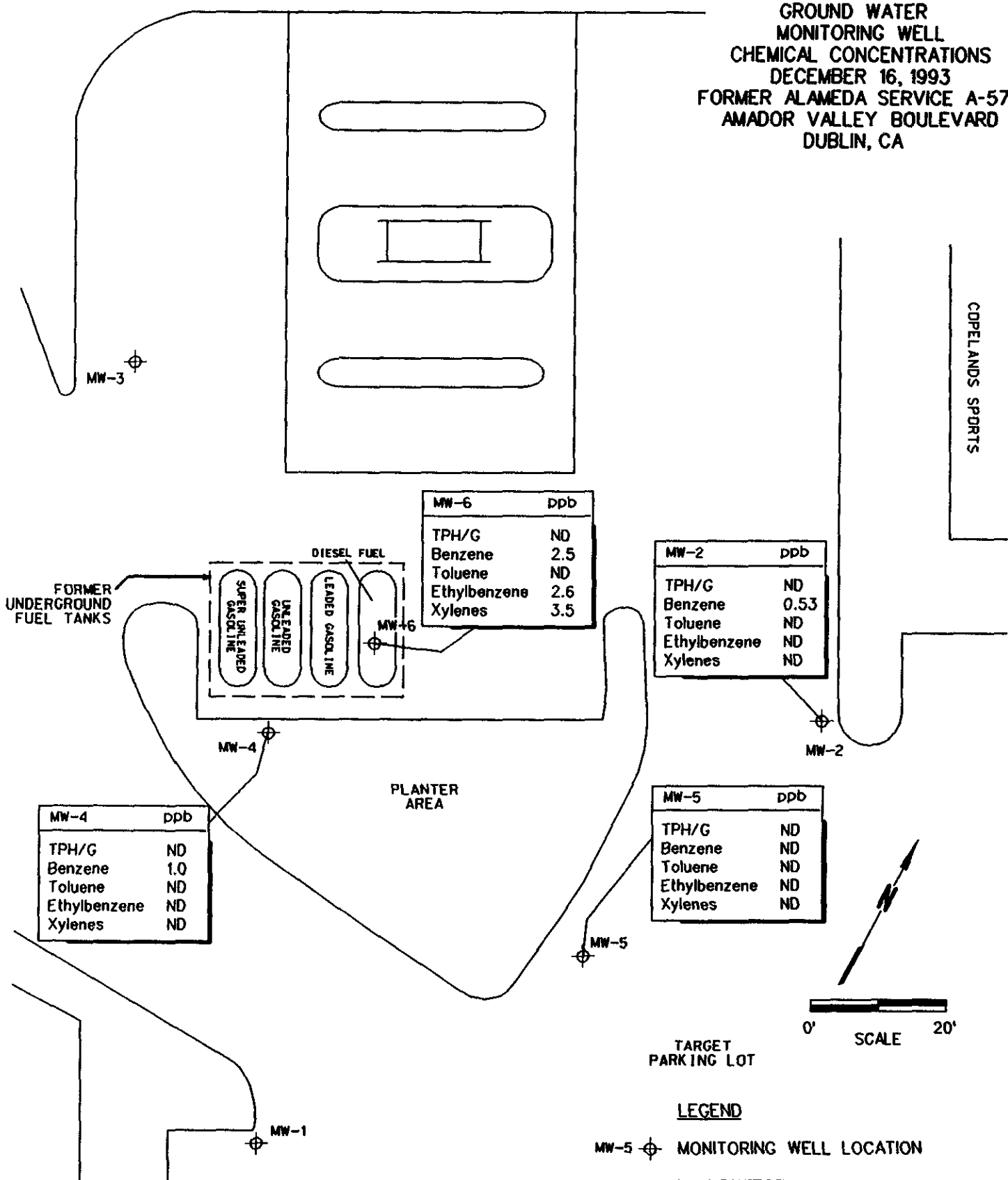
PLANTER AREA

FIGURE 2  
GROUND WATER CONTOUR MAP  
DECEMBER 16, 1993  
FORMER ALAMEDA SERVICE A-578  
AMADOR VALLEY BOULEVARD  
DUBLIN, CA



PLANTER AREA

FIGURE 3  
GROUND WATER  
MONITORING WELL  
CHEMICAL CONCENTRATIONS  
DECEMBER 16, 1993  
FORMER ALAMEDA SERVICE A-578  
AMADOR VALLEY BOULEVARD  
DUBLIN, CA



MW-6	ppb
TPH/G	ND
Benzene	2.5
Toluene	ND
Ethylbenzene	2.6
Xylenes	3.5

MW-2	ppb
TPH/G	ND
Benzene	0.53
Toluene	ND
Ethylbenzene	ND
Xylenes	ND

MW-4	ppb
TPH/G	ND
Benzene	1.0
Toluene	ND
Ethylbenzene	ND
Xylenes	ND

MW-5	ppb
TPH/G	ND
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylenes	ND

0' SCALE 20'

TARGET PARKING LOT

LEGEND

- MW-5 ⊕ MONITORING WELL LOCATION
- ND NON-DETECT
- ppb PARTS PER BILLION
- TPH/G TOTAL PETROLEUM HYDROCARBONS AS GASOLINE



TABLE 1

**WELL CONSTRUCTION DETAILS AND GROUND WATER SURFACE ELEVATIONS  
FORMER ALAMEDA SERVICE STATION, A-578  
DUBLIN, CALIFORNIA**

WELL DESIGNATION	SCREENED INTERVAL (feet below grade)	GROUND SURFACE ELEVATION (MSL)*	SCREENED INTERVAL (MSL)	TOP OF CASING ELEVATION (MSL)	STATIC WATER LEVEL 12/16/93 (feet below TOC)	GROUND WATER ELEVATION 12/16/93 (MSL)
MW-1	5-20	340.30	335.30 - 320.30	340.20	4.72	335.48
MW-2	5-20	340.52	335.52 - 320.52	340.27	5.40	334.87
MW-3	5-20	341.67	336.67 - 321.67	341.00	4.97	336.03
MW-4	5-20	342.31	337.31 - 322.31	342.11	6.51	335.60
MW-5	5-20	340.52	335.52 - 320.52	340.09	4.99	335.10
MW-6	4.5 - 14.5	341.13	336.63 - 326.63	340.81	5.05	336.76

\*Feet above mean sea level

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

WELL I.D.	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
		MW-2	340.27	02/28/91	5.46
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
MW-3	341.00			02/28/91	5.61
		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

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

WELL I.D.	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
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		
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

\* MSL = Mean Sea Level



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

<u>WELL DESIGNATION</u>	<u>DATE</u>	<u>TPH/G</u>	<u>TPH/D</u>	<u>BENZENE</u>	<u>TOLUENE</u>	<u>ETHYL BENZENE</u>	<u>XYLENES</u>	<u>TOTAL</u>
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	
	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>b</sup>	<0.3	3.8	4.06	
12/93		<50	---	0.53	<0.3	<0.3	<0.3	
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	
	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	

TABLE 3

ANALYTICAL RESULTS OF GROUND WATER SAMPLES (ppb)  
 FORMER ALAMEDA SERVICE STATION, A-578  
 DUBLIN, CALIFORNIA  
 (Continued)

<u>WELL DESIGNATION</u>	<u>DATE</u>	<u>TPH/G</u>	<u>TPH/D</u>	<u>BENZENE</u>	<u>TOLUENE</u>	<u>ETHYL BENZENE</u>	<u>XYLENES</u>	<u>TOTAL</u>
MW-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	
	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	
	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	

a = The analysis was run at a 1:100 dilution to bring target analytes within linear working range of the GC.

b = The analysis was run at a 1:10 dilution to bring target analytes within linear working range of the GC.

--- = Not analyzed.

TABLE 4

CHANGE IN GROUND WATER ELEVATION AT MONITORING WELLS  
DURING INTERIM REMEDIATION AT MW-2  
FORMER ALAMEDA SERVICE STATION A-578  
DUBLIN, CALIFORNIA

DATE	TIME	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6	
		Depth	Change *	Depth	Change *	Depth	Change *	Depth	Change *	Depth	Change *	Depth	Change *
09-28-93	0959	4.24	---	5.01	---	4.42	---	5.89	---	4.50	---	4.30	---
	1809	4.37	-0.13	12.85	-7.84	4.55	-0.13	6.09	-0.20	4.79	-0.29	4.42	-0.12
09-29-93	0809	4.30	-0.06	5.09	-0.08	4.48	-0.06	5.97	-0.08	4.61	-0.11	4.35	-0.05
	1321	4.40	-0.16	19.51	-14.50	4.57	-0.15	6.14	-0.25	4.86	-0.36	4.47	-0.17
12-16-93	0826	4.72	---	5.40	---	4.97	---	6.51	---	4.99	---	5.05	---
	1605	4.88	-0.16	16.90	-11.5	5.11	-0.14	6.71	-0.20	5.27	-0.28	5.22	-0.17
12-17-93	0750	4.86	-0.14	5.52	-0.12	5.10	-0.13	6.65	-0.14	5.11	-0.12	5.18	-0.13
	1326	4.94	-0.22	17.03	-11.63	5.18	-0.21	6.78	-0.27	5.34	-0.35	5.30	-0.25

\*NOTE: Changes in water elevation are measured from the initial depth to ground water on 9/28/93 and 12/16/93. Ground water was pumped from MW-2 at approximately 1.4 gpm during December 1993.

TABLE 5

CHANGE IN GROUND WATER ELEVATION AT MONITORING WELLS  
DURING INTERIM REMEDIATION AT MW-6  
FORMER ALAMEDA SERVICE STATION A-578  
DUBLIN, CALIFORNIA

DATE	TIME	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6	
		Depth	Change	Depth	Change	Depth	Change	Depth	Change	Depth	Change	Depth	Change
10-17-91	1000	6.19	---	6.74	---	6.40	---	7.96	---	6.28	---	6.65	---
	1600	6.24	-0.05	6.80	-0.06	6.59	-0.19	8.10	-0.14	6.45	-0.17	11.26	-4.61
10-18-91	0900	6.24	-0.05	6.82	-0.08	6.55	-0.15	8.04	-0.08	6.40	-0.12	6.72	-0.07
	1600	6.28	-0.09	6.84	-0.10	6.64	-0.24	8.13	-0.17	6.48	-0.20	12.80	-6.15
12-30-91	0800	5.50	---	5.83	---	5.75	---	7.17	---	5.52	---	5.72	---
12-31-91	1500	5.69	-0.19	6.00	-0.17	5.83	-0.08	7.29	-0.12	5.68	-0.16	7.36	-1.65
3/26/92	1000	4.65	---	5.35	---	4.58	---	6.44	---	4.80	---	5.03	---
	1500	4.82	-0.17	5.43	-0.08	5.01	-0.43	6.70	-0.26	5.15	-0.35	12.72	-7.69
3/27/92	0845	4.74	-0.09	5.41	-0.06	4.95	-0.37	6.52	-0.08	5.01	-0.21	5.10	-0.07
	1400	4.80	-0.15	5.48	-0.13	5.04	-0.46	6.72	-0.28	6.11	-1.31	13.12	-8.07
6/23/92	0930	4.92	---	5.69	---	5.27	---	6.70	---	5.23	---	5.38	---
	1830	5.04	-0.12	5.82	-0.13	5.38	-0.11	6.95	-0.25	5.39	-0.16	13.70	-8.32
6/24/92	0900	5.04	-0.12	5.76	-0.07	5.33	-0.06	6.84	-0.14	5.34	-0.11	5.48	-0.10
	1130	5.09	-0.17	5.79	-0.10	5.38	-0.11	6.95	-0.25	5.39	-0.16	9.77	-4.39
9/24/92	0845	5.10	---	5.70	---	5.47	---	6.84	---	5.07	---	5.57	---
	1530	5.33	-0.23	5.91	-0.21	5.68	-0.21	7.16	-0.32	5.50	-0.43	13.50	-7.93

TABLE 5

CHANGE IN GROUND WATER ELEVATION AT MONITORING WELLS  
DURING INTERIM REMEDIATION AT MW-6  
FORMER ALAMEDA SERVICE STATION A-578  
DUBLIN, CALIFORNIA  
(continued)

DATE	TIME	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6	
		Depth	Change	Depth	Change	Depth	Change	Depth	Change	Depth	Change	Depth	Change
9/25/92	0705	5.35	-0.25	5.98	-0.28	5.69	-0.22	7.14	-0.30	5.53	-0.46	5.79	-0.22
	1005	5.42	-0.32	6.07	-0.37	5.76	-0.29	7.64	-0.80	5.66	-0.59	13.50	-7.93
10/29/92	1030	5.95	---	6.77	---	6.46	---	8.00	---	6.34	---	6.65	---
	1556	6.03	-0.08	6.64	0.13	6.47	-0.01	7.94	-0.06	6.21	0.13	13.16	-6.51
11/20/92	0820	6.06	---	6.85	---	6.47	---	8.04	---	6.42	---	6.73	---
	1325	6.22	-0.16	6.88	-0.03	6.67	-0.20	8.12	-0.08	6.48	-0.06	13.85	-7.12
12/29/92	1150	4.89	---	5.52	---	5.08	---	6.59	---	5.04	---	5.22	---
	1605	4.89	0.00	5.57	-0.05	5.08	0.00	6.71	-0.12	5.09	-0.05	12.25	-7.03
12/30/92	0935	4.66	0.23	5.26	0.26	4.82	0.26	6.33	0.26	4.83	0.21	4.81	0.41
	1420	4.72	0.17	5.31	0.21	4.92	0.16	6.54	0.05	4.93	0.11	13.90	-8.68
3/24/93	0912	3.57	---	4.48	---	3.83	---	5.38	---	3.99	---	3.86	---
	1340	3.64	-0.07	4.63	-0.15	3.97	-0.14	5.63	-0.25	4.13	-0.14	9.98	-6.12
3/25/93	0918	3.53	0.04	4.46	0.02	3.77	0.06	5.35	0.03	3.97	0.02	3.79	0.07
	1130	3.62	-0.05	4.53	-0.05	3.93	-0.10	5.60	-0.22	4.10	-0.11	10.36	-6.50

TABLE 5

CHANGE IN GROUND WATER ELEVATION AT MONITORING WELLS  
DURING INTERIM REMEDIATION AT MW-6  
FORMER ALAMEDA SERVICE STATION A-578  
DUBLIN, CALIFORNIA  
(continued)

DATE	TIME	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6	
		Depth	Change	Depth	Change	Depth	Change	Depth	Change	Depth	Change	Depth	Change
06-28-93	1120	3.79	---	4.67	---	4.02	---	5.52	---	4.11	---	3.95	---
	1541	3.90	-0.11	4.82	-0.15	4.18	-0.16	5.77	-0.25	4.29	-0.18	8.05	-4.10
06-29-93	1032	3.77	0.02	4.59	0.08	3.99	0.03	5.50	0.02	4.04	0.07	3.87	0.08
	1347	3.85	-0.06	4.70	-0.03	4.14	-0.12	5.76	-0.24	4.19	-0.08	11.26	-7.31

\*NOTE: Changes in water elevation are measured from the initial depth to ground water on 10/17/91, 12/30/91, 3/26/92, 6/23/92, 9/24/92, 10/29/92, 11/20/92, 12/29/92, 3/24/93 and 6/28/93.  
Ground water was pumped from MW-6 at approximately 0.96 gpm during June 1993.

**APPENDIX I**  
**SAMPLING EVENT DATA SHEETS**

PROJECT: TARGET-DUBLIN EVENT: QTRLY SAMPLER: CUMUL

NO.	WELL OR LOCATION	DATE			TIME		MEASUREMENT	CODE	COMMENTS
		MO	DA	YR	HR	MIN			
1	MW-1	12	16	93	8	23	4.72	SWL	
2	MW-2				8	29	5.40		
3	MW-3				8	26	4.97		
4	MW-4				8	27	6.51		
5	MW-5				8	24	4.99		
6	MW-6				8	30	5.05		
7									
8	MW-1				16	00	4.88	IWL	MW-2 PURGING
9	MW-2				16	07	10.90		
10	MW-3				16	04	5.11		
11	MW-4				16	03	6.71		
12	MW-5				16	01	5.27		
13	MW-6				16	06	5.22		
14									
15									
16									
17									
18									
19									
20									

**CODES:**

\*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/Minute)  
 CUM - Cumulative (Gallons)

HRS - Total (Hours)  
 PSI - Pressure (psi)<sup>2</sup>  
 pH - 1 to 14  
 Ec - Conductivity (µm HOS)  
 TMP - Temperature (°C)  
 TRB - Turbidity (NTU)  
 \_\_\_\_\_ (Additional Code)

\*All levels are depth from inner casing - describe any other reference points in comments column; when in doubt, describe reference point.

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.

†Negative pressure (Vacuum) not to exceed \_\_\_\_\_



PROJECT: TARGET DUBUN EVENT: QTRLY SAMPLER: CGIUNTO LI

NO.	WELL OR LOCATION	DATE			TIME		MEASUREMENT	CODE	COMMENTS
		MO	DA	YR	HR	MIN			
1	MW-1	12	17	93	7	50	4.86	SWL	
2	MW-2				7	52	5.52		
3	MW-3				7	48	5.10		
4	MW-4				7	49	6.65		
5	MW-5				7	51	5.11		
6	MW-6				7	53	5.18		
7									
8	MW-1				13	23	4.94	IWL	MW-2 PURGING
9	MW-2				13	30	17.03		
10	MW-3				13	22	5.18		
11	MW-4				13	26	6.78		
12	MW-5				13	25	5.34		
13	MW-6				13	27	5.30		
14									
15									
16									
17									
18									
19									
20									

**CODES:**

\*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/Minute)  
 CUM - Cumulative (Gallons)

HRS - Total (Hours)  
 PSI - Pressure (psi)<sup>2</sup>  
 pH - 1 to 14  
 Ec - Conductivity (µm HOS)  
 TMP - Temperature (°C)  
 TRB - Turbidity (NTU)  
 \_\_\_\_\_ (Additional Code)

\*All levels are depth from inner casing - describe any other reference points in comments column; when in doubt, describe reference point.

Note in comments column if well is not: properly labeled, locked, or able to be locked. Describe corrective action.

\*Negative pressure (Vacuum) not allowed.



McLaren

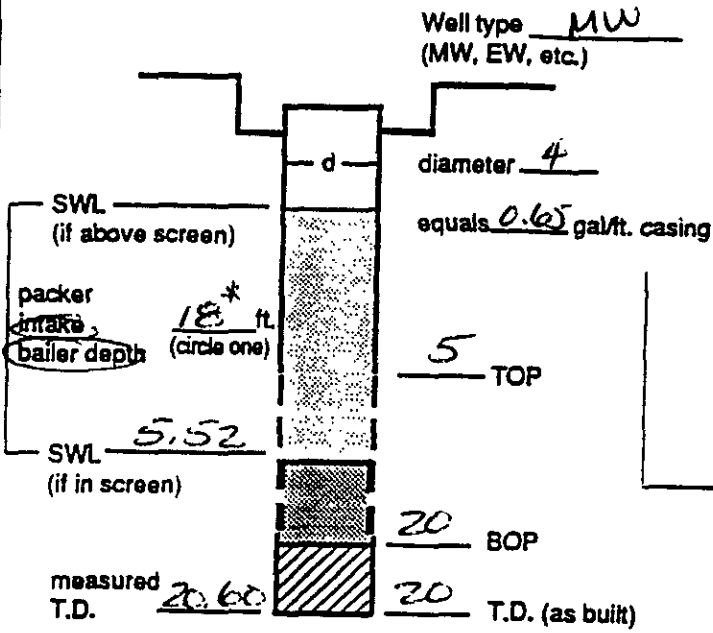
# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-2

PROJECT TARGET-DUBLIN EVENT CTRL4 SAMPLER CA DATE 12/17/93

### Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	755	1.46 GPM	
	915		15.05
(893 GAL)	1037		15.70
(1135 GAL)	1330	1.0 GPM	17.03
	1340		15.00
	1354		13.50
	1408		12.30
Stop	1425		11.40
Sampled	1427		10.50
(Final IWL)	1435		6.70

**Purge calculation**  
0.65 gal/ft. \* 15.08 ft. = 10 gals x 4 = 40 gals.  
 SWL to BOP or one purge volume -  
 packer to BOP volume 3 casings

**Head purge calculation (Airlift only)**  
 gal/ft. \_\_\_\_\_ ft. = \_\_\_\_\_ gals.  
 packer to SWL \_\_\_\_\_

Equipment Used / Sampling Method / Description of Event:  
CENTRIFUGAL PUMP w/ DISPOSABLE BAILER

REPOSITIONED INTAKE AS WATER LEVEL ROSE DURING LAST HOUR OF PURGING. FINAL INTAKE @ 12.0'

Actual gallons purged	<u>1190</u>
Actual volumes purged	<u>119</u>
Well yield (see below)	<u>MY</u>
COC #	<u>4692</u>
Sample I.D.	<u>223367-70</u>
Analysis	<u>TPH-6 (LIFT)</u>
Lab	<u>MBI</u>
	<u>BTEX (E020)</u>

Additional comments:

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs/cm)	PH	TURBIDITY (NTU)		
1. <u>1140</u>	<u>70.0</u>	<u>1420</u>	<u>6.75</u>	<u>0.80</u>		
2. <u>1155</u>	<u>70.5</u>	<u>1380</u>	<u>6.89</u>	<u>1.00</u>		
3. <u>1170</u>	<u>71.0</u>	<u>1380</u>	<u>6.98</u>	<u>1.00</u>		
4. <u>1185</u>	<u>71.5</u>	<u>1390</u>	<u>7.03</u>	<u>0.80</u>		
5. <u>SAMPLE</u>	<u>71.5</u>	<u>1420</u>	<u>7.07</u>	<u>0.50</u>		

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop    MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.    LY - Able to purge 3 volumes by returning later or next day.    VLY - Minimal recharge - unable to purge 3 volumes.

15  
35  
50  
65  
80



McLaren

# SAMPLING EVENT DATA SHEET

(fill out completely)

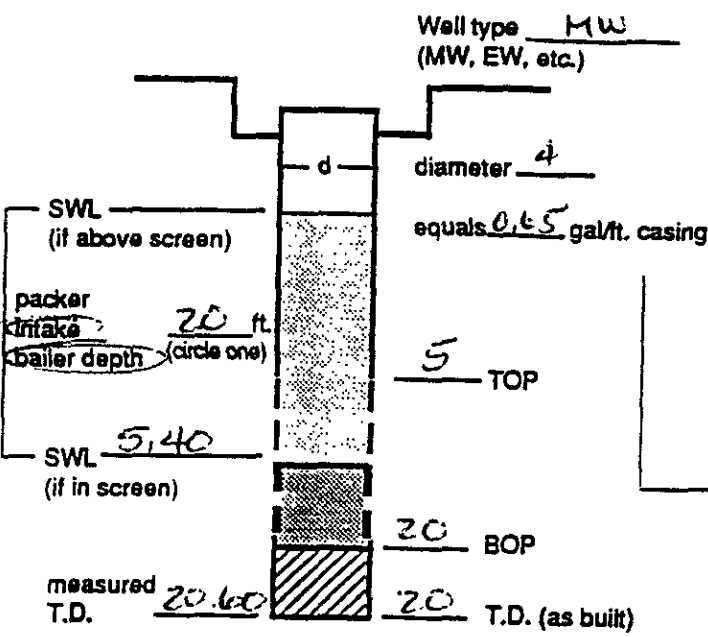
WELL OR LOCATION MW-2

PROJECT TARGET-DUBLIN EVENT QTR 2

SAMPLER CA

DATE 12/16/93

### Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	<u>8:47</u>	<u>2 GPM</u>	
<u>(152 GAL)</u>	<u>10:06</u>	<u>1.4 GPM</u>	<u>19.00'</u>
	<u>10:40</u>		<u>18.00'</u>
<u>(354 GAL)</u>	<u>12:26</u>		<u>17.15</u>
<u>(523 GAL)</u>	<u>14:27</u>		<u>17.15</u>
Stop (667 GAL)	<u>16:10</u>		<u>16.90</u>
Sampled			
(Final IWL)			

**Purge calculation**

0.15 gal/ft. \* 15.20 ft. = 10 gals x  $\frac{3}{4}$  = 40 gals.

SWL to BOP or packer to BOP one volume  
purge volume- 3 casings

**Head purge calculation (Airlift only)**

gal/ft. \* ft. = gals.

packer to SWL

Equipment Used / Sampling Method / Description of Event:  
CENTRIFUGAL PUMP w/ DISPOSABLE BAILER

Actual gallons purged	_____
Actual volumes purged	_____
Well yield (see below)	<u>⊕ MY</u>
COC #	_____
Sample I.D.	_____
Analysis	_____
Lab	_____

Additional comments:

Gallons purged *	TEMP °C/°F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
3.						
4.						
5.						

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop    MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.    LY - Able to purge 3 volumes by returning later or next day.    VLY - Minimal recharge - unable to purge 3 volumes.



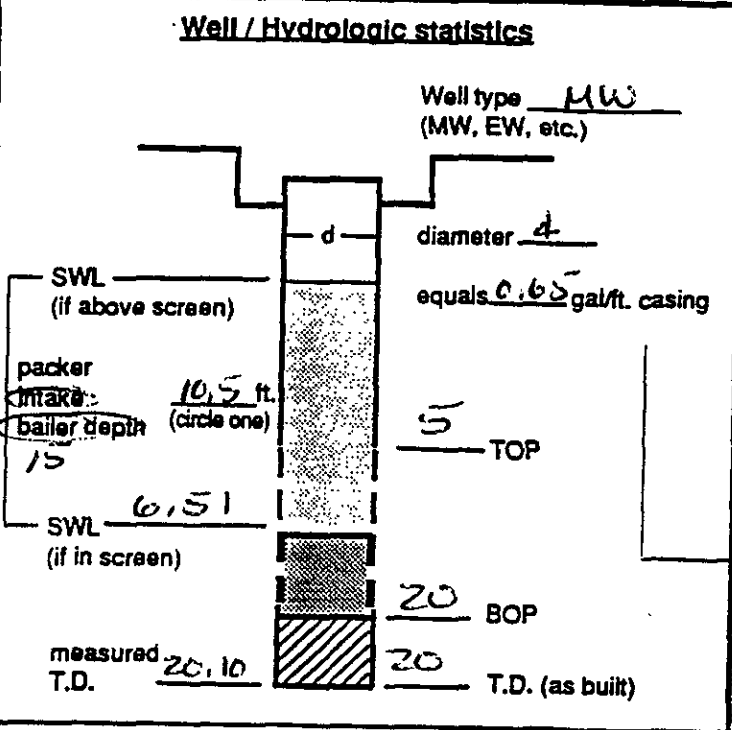
McLaren

# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-4

PROJECT TAIRGET-DUBLIAEVENT GTRLY SAMPLER CA DATE 12/16/93



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	934	1 GPM	
	938		8.80
	947		9.60
Stop	1012	✓	9.95
Sampled	1014		9.00
(Final IWL)	1020		7.20

**Purge calculation**  
 $0.65 \text{ gal/ft.} \cdot 13.69 \text{ ft.} = 9 \text{ gals} \times \frac{1}{4} = 36 \text{ gals.}$   
 SWL to BOP or one volume  
 packer to BOP one volume  
 purge volume- 3 casings

**Head purge calculation (Airlift only)**  
 gal/ft. \* ft. = gals.  
 packer to SWL

9  
43  
52  
03  
10

Equipment Used / Sampling Method / Description of Event:  
CENTRIFUGAL PUMP w/ DISPOSABLE BAILER

Actual gallons purged	<u>36</u>
Actual volumes purged	<u>4</u>
Well yield (see below)	<u>MY</u>
COC #	<u>4692</u>
Sample I.D.	<u>223355-58</u>
Analysis	<u>PH-6 (LUFT)</u>
Lab	<u>MBT</u>
	<u>BTX (BOD)</u>
	<u>✓</u>

Additional comments:

Gallons purged *	TEMP °C / (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
1. <u>9</u>	<u>65.0</u>	<u>1370</u>	<u>6.87</u>	<u>1.50</u>
2. <u>18</u>	<u>66.0</u>	<u>1080</u>	<u>7.06</u>	<u>1.20</u>
3. <u>27</u>	<u>68.0</u>	<u>860</u>	<u>7.20</u>	<u>0.80</u>
4. <u>36</u>	<u>68.0</u>	<u>820</u>	<u>7.27</u>	<u>0.60</u>
5. <u>SAMPLE</u>				<u>0.50</u>

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop    MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - Able to purge 3 volumes by returning later or next day.    VLY - Minimal recharge - unable to purge 3 volumes.



McLaren

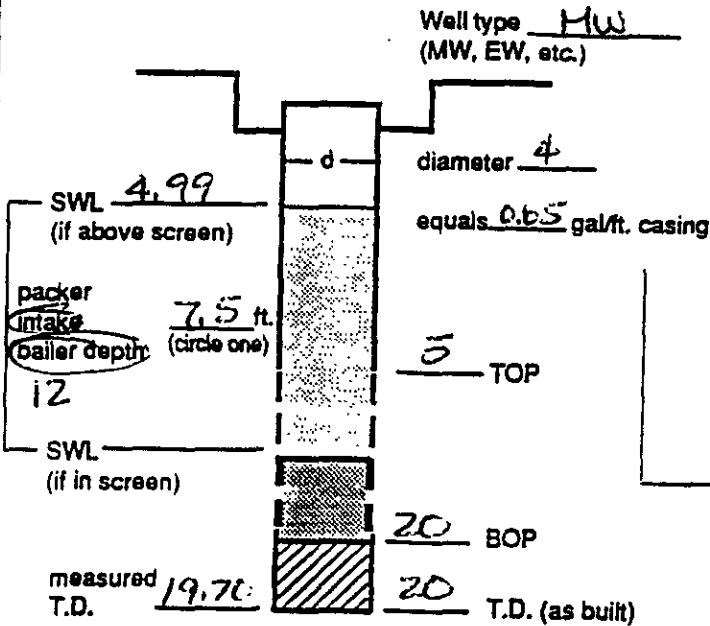
# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-5

PROJECT TARGET-DUBLIN EVENT ONLY SAMPLER CA DATE 12/16/93

### Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	<u>1118</u>	<u>1 GPM</u>	
	<u>1133</u>		<u>7.03</u>
Stop	<u>1201</u>		<u>7.25</u>
Sampled	<u>1204</u>		
(Final IWL)	<u>1219</u>		<u>5.32</u>

**Purge calculation**

0.65 gal/ft. \* 15.01 ft. = 10 gals x 3 = 40 gals.

SWL to BOP or packer to BOP one volume 4 purge volume- 3 casings

**Head purge calculation (Airlift only)**

gal/ft. \* \_\_\_\_\_ ft. = \_\_\_\_\_ gals.

packer to SWL

10  
28  
38  
48  
58

Equipment Used / Sampling Method / Description of Event:  
CENTRIFUGAL PUMP w/ DISPOSABLE BAILER

Actual gallons purged 43

Actual volumes purged 4

Well yield  $\oplus$  HY  
(see below)

COC # 4692

Sample I.D.	Analysis	Lab
<u>223363-66</u>	<u>TPH-6 (LUFT)</u>	<u>MBT</u>
	<u>BTEX (8020)</u>	<u>↓</u>

Additional comments:

Gallons purged *	TEMP °C/F (circle one)	EC (µs/cm)	PH	TURBIDITY (NTU)
<u>1. 10</u>	<u>67.0</u>	<u>1430</u>	<u>7.27</u>	<u>0.70</u>
<u>2. 20</u>	<u>67.5</u>	<u>1480</u>	<u>7.27</u>	<u>0.60</u>
<u>3. 30</u>	<u>67.5</u>	<u>1470</u>	<u>7.27</u>	<u>0.60</u>
<u>4. 40</u>	<u>67.5</u>	<u>1470</u>	<u>7.27</u>	<u>0.50</u>
<u>5. SAMPLE</u>				<u>0.30</u>

\* Take measurement at approximately each casing volume purged.

$\oplus$  HY - Minimal W.L. drop    MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - Able to purge 3 volumes by returning later or next day.    VLY - Minimal recharge - unable to purge 3 volumes.



McLaren

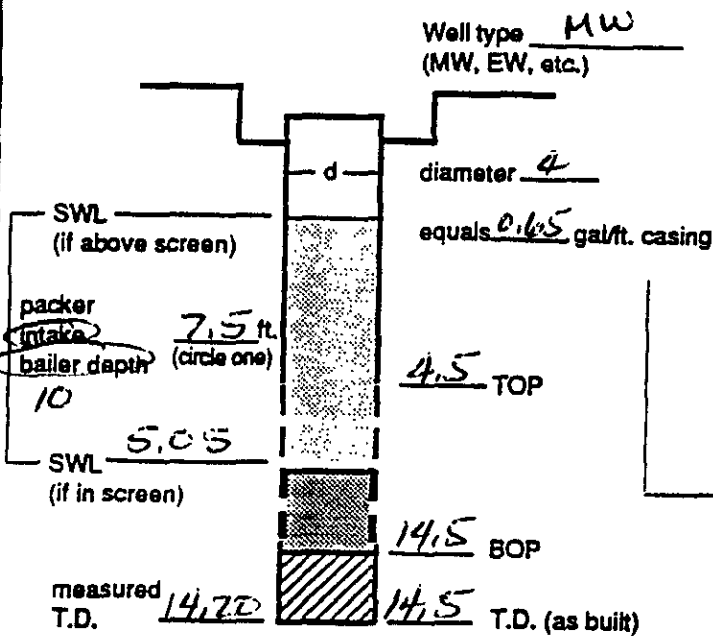
# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-6

PROJECT TARGET-DUBLIN EVENT GTRLY SAMPLER CM DATE 12/16/93

### Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	<u>859</u>	<u>0.26 GPM</u>	
	<u>1021</u>		<u>7.10</u>
Stop	<u>1109</u>		<u>7.05</u>
Sampled	<u>1111</u>		
(Final IWL)	<u>1116</u>		<u>6.10</u>

**Purge calculation**

$0.65 \text{ gal/ft.} \cdot 9.45 \text{ ft.} = 6.15 \text{ gals} \times \frac{3}{4} = 2.6 \text{ gals.}$

SWL to BOP or one packer to BOP volume = 4 purge volume - 3 casings

**Head purge calculation (Airlift only)**

gal/ft. \* \_\_\_\_\_ ft. = \_\_\_\_\_ gals.

packer to SWL

Equipment Used / Sampling Method / Description of Event:  
PERISTALTIC PUMP w/ DISPOSABLE BAIER

Actual gallons purged	<u>26</u>	
Actual volumes purged	<u>4</u>	
Well yield (see below)	<u>MY</u>	
COC #	<u>4692</u>	
Sample I.D.	Analysis Lab	
<u>223354-62</u>	<u>TPH-6 (LUFT)</u>	<u>MBT</u>
	<u>BTEX (B020)</u>	<u>↓</u>
<u>223351-57</u>	<u>TPH-6 (LUFT)</u>	<u>MBT</u>
	<u>BTEX (B020)</u>	<u>↓ ↓</u>

Additional comments:

Gallons purged *	TEMP °C / (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
<u>1. 6.5</u>	<u>62.0</u>	<u>540</u>	<u>7.21</u>	<u>3.50</u>
<u>2. 13</u>	<u>62.0</u>	<u>540</u>	<u>7.38</u>	<u>2.20</u>
<u>3. 19.5</u>	<u>62.0</u>	<u>550</u>	<u>7.54</u>	<u>1.20</u>
<u>4. 26</u>	<u>62.0</u>	<u>570</u>	<u>7.58</u>	<u>1.00</u>
<u>5. SAMPLE</u>				<u>0.50</u>

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop    MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.    LY - Able to purge 3 volumes by returning later or next day.    VLY - Minimal recharge - unable to purge 3 volumes.

**APPENDIX II**  
**ANALYTICAL DATA SHEETS**  
**AND**  
**CHAIN-OF-CUSTODY RECORDS**

# VOLATILE AROMATIC COMPOUNDS

Analytical Method: Modified EPA 8020 (BTEX) and  
Total Petroleum Hydrocarbons Gasoline by LUFT  
Preparation Method: EPA 5030

Project Name: *Target-Dublin*

Project Number: 040122629000

Sample Description: *MW-2*

Lab Project-ID Number: 8587-5

Sample Number: 223370

Date Sampled: 12/17/93

Date Received: 12/18/93

Date Analyzed: 12/21/93

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	0.53	0.30
Toluene	BRL	0.30
Ethylbenzene	BRL	0.30
1,2-Xylene	BRL	0.30
1,3-Xylene	BRL	0.30
1,4-Xylene	BRL	0.30
Total Petroleum Hydrocarbons - Gasoline	BRL	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	107	63 - 134
a,a,a-Trifluorotoluene (FID)	98	63 - 134

## Comments

*The cover letter and enclosures are integral parts of this report.*

Approved by: *[Signature]*

Date: 12-30-93





# VOLATILE AROMATIC COMPOUNDS

**Analytical Method: Modified EPA 8020 (BTEX) and  
Total Petroleum Hydrocarbons Gasoline by LUFT  
Preparation Method: EPA 5030**

Project Name: *Target-Dublin*

Project Number: 040122629000

Sample Description: *MW-4*

Lab Project-ID Number: 8587-2

Sample Number: 223358

Date Sampled: 12/16/93

Date Received: 12/18/93

Date Analyzed: 12/21/93

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	1.0	0.30
Toluene	BRL	0.30
Ethylbenzene	BRL	0.30
1,2-Xylene	BRL	0.30
1,3-Xylene	BRL	0.30
1,4-Xylene	BRL	0.30
Total Petroleum Hydrocarbons - Gasoline	BRL	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	101	63 - 134
a,a,a-Trifluorotoluene (FID)	69	63 - 134

## Comments

*The cover letter and enclosures are integral parts of this report.*

*Non-target analytes are present on the chromatograph.*

Approved by: *KLO*

Date: 12-30-93



# VOLATILE AROMATIC COMPOUNDS

Analytical Method: Modified EPA 8020 (BTEX) and  
Total Petroleum Hydrocarbons Gasoline by LUFT  
Preparation Method: EPA 5030

Project Name: *Target-Dublin*

Project Number: 040122629000

Sample Description: *MW-5*

Lab Project-  
ID Number: 8587-4

Sample Number: 223366

Date Sampled: 12/16/93

Date Received: 12/18/93

Date Analyzed: 12/21/93

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	BRL	0.30
Toluene	BRL	0.30
Ethylbenzene	BRL	0.30
1,2-Xylene	BRL	0.30
1,3-Xylene	BRL	0.30
1,4-Xylene	BRL	0.30
Total Petroleum Hydrocarbons - Gasoline	BRL	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	107	63 - 134
a,a,a-Trifluorotoluene (FID)	96	63 - 134

## Comments

*The cover letter and enclosures are integral parts of this report.*

Approved by: *KD*

Date: 12-30-93



# VOLATILE AROMATIC COMPOUNDS

Analytical Method: Modified EPA 8020 (BTEX) and  
Total Petroleum Hydrocarbons Gasoline by LUFT  
Preparation Method: EPA 5030

Project Name: *Target-Dublin*

Project Number: 040122629000

Sample Description: *MW-6*

Lab Project-ID Number: 8587-3

Sample Number: 223362

Date Sampled: 12/16/93

Date Received: 12/18/93

Date Analyzed: 12/21/93

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	2.5	0.30
Toluene	BRL	0.30
Ethylbenzene	2.6	0.30
1,2-Xylene	BRL	0.30
1,3-Xylene	{a}	0.30
1,4-Xylene	3.5	0.30
Total Petroleum Hydrocarbons - Gasoline	BRL	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	106	63 - 134
a,a,a-Trifluorotoluene (FID)	113	63 - 134

## Comments

*The cover letter and enclosures are integral parts of this report.*

*Non-target analytes are present on the chromatograph.*

{a} Coelutes with 1,4-Xylene.

Approved by: *AKO*

Date: 12-30-93



# VOLATILE AROMATIC COMPOUNDS

**Analytical Method: Modified EPA 8020 (BTEX) and  
Total Petroleum Hydrocarbons Gasoline by LUFT  
Preparation Method: EPA 5030**

Project Name: *Target-Dublin*

Project Number: *040122629000*

Sample Description: *Trip Blank*

Lab Project-ID Number: *8587-1*

Sample Number: *223354*

Date Sampled: *12/16/93*

Date Received: *12/18/93*

Date Analyzed: *12/21/93*

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	0.37	0.30
Toluene	0.40	0.30
Ethylbenzene	0.36	0.30
1,2-Xylene	0.38	0.30
1,3-Xylene	BRL	0.30
1,4-Xylene	BRL	0.30
Total Petroleum Hydrocarbons - Gasoline	BRL	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	107	63 - 134
a,a,a-Trifluorotoluene (FID)	97	63 - 134

## Comments

*The cover letter and enclosures are integral parts of this report.*

Approved by: *KO*

Date: *12-30-93*





MBT Environmental Laboratories  
 3083 Gold Canal Drive  
 Rancho Cordova  
 CA 95670  
 Phone 916/852-6600  
 Fax 916/852-7292

# CHAIN OF CUSTODY RECORD

SEE SIDE 2 FOR COMPLETE INSTRUCTIONS

Ship To: MBT

Project Name: TARGET- DUBLIN

FOR LABORATORY USE ONLY

Address: \_\_\_\_\_

Project Number: 04.0122629.000

Laboratory Project #: 8587

Project Location: (State) CA

Storage Refrigerator ID: 1

Storage Freezer ID: \_\_\_\_\_

Sampler Name  
CHRIS GIUNTOLI

Signature  
*Chris Giuntoli*

PPE Worn in Field  
D

Relinquished By: *Chris Giuntoli*

Date/Time  
12/17/93 1600

Received By or Method of Shipment/Shipment I.D. Date/Time  
EXPRESS-IT 12/17/93 1600

Relinquished By: Express IT

Date/Time

Received By or Method of Shipment/Shipment I.D. Date/Time  
BRIAN COUGHLIN 12-18-93 1000

Relinquished By: \_\_\_\_\_

Date/Time

Received By or Method of Shipment/Shipment I.D. Date/Time

Sample Disposal (check one)

- Laboratory Standard
- Other

Level of QC (see Side 2)  
 1  2  3  4  5  6A  
 6B  6C  6D  6E  7

Write in Analysis Method →

## ANALYSES REQUESTED

TPH-G (LWFT)	BTEX (B020)																		
X	X																		
X	X																		
X	X																		
X	X																		

## SAMPLE INFORMATION

FOR LABORATORY USE ONLY Lab ID	Sample ID Number	Date	Time	Description		Container(s)		Matrix Type	Pres. Type	TAT	TPH-G (LWFT)	BTEX (B020)								
				Locator	Depth	#	Type													
18587-001	223351-54	12/16/93	925	TRIP BLANK	-	4	V	H2O	NCI	3	X	X								
2	223355-58		1014	MW-4							X	X								
3	223359-62		1110	MW-6							X	X								
4	223363-66		1204	MW-5							X	X								
5	223367-70	12/17/93	1427	MW-2							X	X								
6																				
7																				
8																				
9																				
10																				

Special Instructions/Comments: \_\_\_\_\_

Container Types: A=1 Liter Amber TAT (Analytical Turn Around Time)  
 B=Brass Tube C=Cassette 1 = 24 hours 2 = 48 hours  
 G=Glass Jar P=Polyethylene 3 = 1 week 4 = 2 weeks  
 O=Other V=Voa Vial 0 = Other

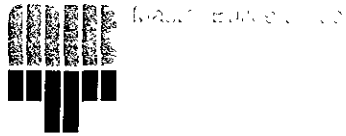
FOR LABORATORY USE ONLY Sample Condition Upon Receipt: BRN. GOOD SAMPLES INTACT, AIR BUBBLES (223359-54)

SEND DOCUMENTATION AND RESULTS TO (Check one):  
 Project Manager/Office: CAMPBELL M CLEOD/ALAMEDA  
 Client Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone: \_\_\_\_\_ FAX: \_\_\_\_\_

- Common Analytical Methods
- 413.1
  - 413.2 Long Method
  - 413.2 Short Method
  - 418.1 Long Method
  - 418.1 Short Method
  - 420.1
  - 502.2
  - 503E
  - 503.1
  - 524.2
  - 601
  - 602
  - 604
  - 608
  - 610
  - 624
  - 625
  - 8010
  - 8015
  - 8015 Mod.
  - 8020
  - 8021
  - 8040
  - 8080
  - 8100
  - 8150
  - 8240
  - 8270
  - 8310
  - Acidity
  - Alkalinity
  - BTEX
  - Chloride
  - CLP (see Side 2)
  - COD
  - Color
  - Conductivity
  - Corrosivity
  - Cyanide
  - Flashpoint
  - Fluoride
  - General Mineral
  - Hex. Chromium
  - Ion Balance
  - Metals (write specific metal & method \*)
  - Metals 6010\*
  - Metals PP\*
  - Metals Title 22.
  - TTLIC Level
  - STLIC Level (see Side 2)
  - Nitrate
  - Nitrite
  - Odor
  - Org. Lead
  - Org. Mercury
  - Percent Moisture
  - Percent Solid
  - Perchlorate
  - pH
  - Phosphates
  - Phosphorus
  - Sulfate
  - Sulfides
  - TCLP:
  - VOA
  - Semivola
  - Metals
  - Pesticide
  - TDS
  - Total Hardness
  - Total Solids
  - TPH/D
  - TPH/G
  - TSS
  - Turbidity
- \* Specify Total or Dissolved

**MBT Environmental  
Laboratories**

3083 Gold Canal Drive  
Rancho Cordova  
CA 95670  
Phone 916/852-6600  
Fax 916/852-7292



Date: December 30, 1993  
LP #: 8587

Campbell McLeod  
McLaren/Hart Environmental Engineering  
1135 Atlantic Avenue  
Alameda, CA 94501

Dear Mr. McLeod:

Enclosed are the laboratory results for the five samples submitted to MBT Environmental Laboratories on December 18, 1993, for the project *Target-Dublin*.

The analyses requested are:

EPA 8020 BTEX & TPH/G (5 - Water)

The report consists of the following sections:

1. A copy of the Chain-of-Custody
2. Quality Control Definitions and Report
3. Abbreviations and Comments
4. Analytical results

Unless otherwise instructed by you, samples will be disposed of two weeks from the date of this letter.

Thank you for choosing MBT Environmental Laboratories. We are looking forward to serving you in the future. Should you have any questions concerning this analytical report or the analytical methods employed, please do not hesitate to call.

Sincerely,

Shakoora Azimi  
Laboratory Director, Principal Scientist

## QUALITY CONTROL DEFINITIONS

---

**METHOD BLANK RESULTS:** A method blank (MB) is a laboratory generated sample free of any contamination. The method blank assesses the degree to which the laboratory operations and procedures cause false-positive analytical results for your samples.

### LABORATORY CONTROL SPIKES

The LCS Program:

The laboratory control spike is a well-characterized matrix (organic pure type II water for water samples and contamination-free sand for soil samples) which is spiked with certain target parameters, and analyzed in duplicate at approximately 5% of the sample load, in order to assure the accuracy and precision of the analytical method.

Control limits for accuracy and precision are different for different methods and may vary with the different sample matrices. They are based on laboratory average historical data and EPA limits which are approved by the Quality Assurance Department.

(CN8587)

MBT Environmental  
Laboratories



Mass. Surface Technologies



QUALITY CONTROL REPORT

METHOD BLANK

Method: Mod. EPA 8020 (BTEX) & TPH/G  
Units: ug/L (ppb)

Date Analyzed: 12/21/93

<u>Analyte</u>	<u>Reporting Limit</u>	<u>Concentration</u>
Benzene	0.30	BRL
Toluene	0.30	BRL
Ethylbenzene	0.30	BRL
1,2-Xylene	0.30	BRL
1,3-Xylene	0.30	BRL
1,4-Xylene	0.30	BRL
Total Petroleum Hydrocarbons - Gasoline	50	BRL
<u>Surrogate</u>	<u>% Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	108	63 - 134
a,a,a-Trifluorotoluene (FID)	94	63 - 134





**QUALITY CONTROL REPORT**

**Laboratory Control Sample/Laboratory Control Sample Duplicate  
Method 8020**

LP: 8587

Spike Sample ID: LCS/LCSD W-57

Date Of Analysis: 12/22/93

Spike ID Code: W-1-835

Column: DB624

Surrogate ID Code: W-1-827

Instrument #: 6

Matrix: Water Units: ug/L

EPA METHOD	COMPOUNDS	(a)	(b)	(c)	(d)	(e)	(f)	(g)	ACCEPTANCE LIMITS	
		SAMPLE CONC.	SPIKE CONC.	SAMPLE + SPIKE CONC.	SPIKE REC.%	SAMPLE DUP. + SPIKE CONC.	SPIKE DUP. REC. %	RPD%	% REC.	RPD
8020	Chlorobenzene	0	4.00	4.49	112	4.28	107	5	69 - 131	≤20
8020	Benzene	0	4.00	4.10	102	4.02	100	2	72 - 134	≤20
8020	Ethyl Benzene	0	4.00	4.20	105	4.05	101	4	72 - 128	≤20

$$\text{Spike Recovery} = d = ((c-a)/b) \times 100$$

$$\text{Spike Duplicate Recovery} = f = ((e-a)/b) \times 100$$

$$\text{Relative Percent Difference} = g = (|c-e|)/((c+e) \times .5) \times 100$$

EPA METHOD	SURROGATE COMPOUNDS	DET.	(h)	(i)	(j)	(k)	(l)	ACCEPTANCE LIMITS
			SUR. SPIKE CONC.	SAMPLE + SUR. SPIKE CONC.	SUR. REC. %	SAMPLE DUP. + SUR. SPIKE CONC.	SUR. DUP. RECOVERY %	% REC.
8020	a,a,a,-Trifluorotoluene	PID	4.00	3.76	94	3.87	97	63 - 134

$$\text{Surrogate \% Recovery} = j = (i/h) \times 100$$

$$\text{Surrogate Dup \% Recovery} = l = (k/h) \times 100$$



**QUALITY CONTROL REPORT**

**Laboratory Control Sample/Laboratory Control Sample Duplicate  
Total Petroleum Hydrocarbons/TPH-Gasoline**

LP: 8587

Date of Analysis: 12/24/93

Spike Sample ID: LGS/LGSD W-55

Column: DB624

Spike ID Code: W-1-760

Instrument #: 6

Surrogate ID Code: W-1-827

Matrix: Water Units: ug/L

COMPOUNDS	(a)	(b)	(c)	(d)	(e)	(f)	(g)	ACCEPTANCE LIMITS	
	SAMPLE CONC.	SPIKE CONC.	SAMPLE + SPIKE CONC.	SPIKE REC. %	SAMPLE DUP. + SPIKE CONC.	SPIKE DUP. REC. %	RPD %	% REC.	RPD
Gasoline	0	100	98.4	98	99.2	99	1	100 - 127	≤20

$$\text{Spike Recovery} = d = ((c-a)/b) \times 100$$

$$\text{Spike Duplicate Recovery} = f = ((e-a)/b) \times 100$$

$$\text{Relative Percent Difference} = g = (|c-e|)/((c+e) \times .5) \times 100$$

SURROGATE COMPOUNDS	(h)	(i)	(j)	ACCEPTANCE LIMITS % REC.
	SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE RECOVERY %	
a,a,a-Trifluorotoluene	4.00	3.97	99	63 - 134

$$\text{Surrogate \% Recovery} = j = (i/h) \times 100$$



## ABBREVIATIONS USED IN THIS REPORT

---

BRL	Below Reporting Limit
MB	Method Blank
MS	Matrix Spike
MSD	Matrix Spike Duplicate
LCS	Laboratory Control Spike
LCSD	Laboratory Control Spike Duplicate
RPD	Relative Percent Difference
NS	Not Specified
NA	Not Applicable

## COMMENTS

---

Test methods may include minor modifications of published EPA methods (e.g., reporting limits or parameter lists). Reporting limits are adjusted to reflect dilution of the sample when appropriate. Solids and waste are analyzed with no correction made for moisture content.

The reporting limits for BTEX meet those specified in the California LUFT Manual.

(CN8587)

MBT Environmental  
Laboratories



Waste Builders Technologies