



Rec'd 10/13/94

October 7, 1994

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

Dear Ms. Chu:

**SUBJECT: JUNE 1994 QUARTERLY GROUND WATER MONITORING AND INTERIM
REMEDATION REPORT FOR THE FORMER ALAMEDA SERVICE STATION
A-528, 7608 AMADOR VALLEY BOULEVARD, DUBLIN, CALIFORNIA**

Enclosed please find the above-captioned report, and a copy of a Bill of Lading for the disposal of ground water generated during purging of the monitoring wells. If you should have any questions, please do not hesitate to call Brad Wright at (510) 748-5697.

Sincerely,

A handwritten signature in black ink that reads 'Brad Wright'.

Brad Wright
Senior Geoscientist
Project Manager

A handwritten signature in black ink that reads 'David Watts for'.

David Watts
Environmental Scientist

Enclosures

**JUNE 1994 QUARTERLY GROUND WATER
MONITORING AND INTERIM
REMEDATION REPORT FOR THE
FORMER ALAMEDA
SERVICE STATION A-528
TARGET DUBLIN
7608 AMADOR VALLEY BOULEVARD
DUBLIN, CALIFORNIA**

September 6, 1994

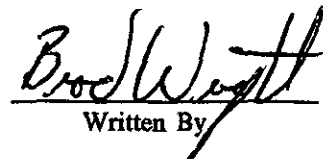
Prepared For:
Target Stores
33 South Sixth Street
Minneapolis, Minnesota 55440-1342

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

INTRODUCTION

This report presents the June 1994 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, 1993a) and followed previously presented recommendations (McLaren/Hart, 1993b). These 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 currently containing the highest detected concentration of benzene.

The work associated with the June 1994 quarterly monitoring event included: sampling monitoring wells MW-2, MW-3, 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 1,200 gallons of impacted ground water from monitoring well MW-2. As specified in a letter dated December 18, 1992 from the Alameda County Health Care Services Agency,

well MW-3 is scheduled for annual sampling. MW-3 was therefore sampled during the June 1994 quarterly sampling event.

Groundwater Elevations and Flow Directions

Groundwater surface elevations were measured on June 16, 1994, prior to sampling and pumping activities (Table 1). These data were used to construct the June 1994 ground water contour map (Figure 2). The inferred groundwater 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 consistent with historic ground water flow directions. Based on the observed contour pattern, MW-2 and MW-5 appear to be downgradient, while MW-4 is down to cross-gradient of the former excavation area.

The static depth to ground water ranges from 4.93 to 6.58 feet below ground surface or 334.68 to 335.94 feet above mean sea level. The average hydraulic gradient is approximately 0.011 feet/foot. The June water level measurements indicate that ground water levels have decreased in all wells except MW-5 since March 1994. These decreases range from 0.01 to 0.11 feet, while the water level at MW-5 was unchanged. The average decrease was .04 feet. Historic ground water elevation data are presented in Table 2.

Groundwater Sampling Activities

Groundwater samples were collected from MW-3, MW-4, MW-5 and MW-6 on June 16, 1994, and from MW-2 on June 17, 1994. Prior to sampling MW-3, MW-4, MW-5, and MW-6, four casing volumes were purged from each well. A centrifugal pump was used to purge MW-2, MW-3, MW-4, and MW-5. A peristaltic pump was used to purge MW-6. Temperature, pH, electrical conductivity, and turbidity were measured after each casing volume was removed. After all parameters had stabilized, with the turbidity at or below 6.9 Nephelometric Turbidity Units (NTUs), sampling was performed using a disposable bailer. At MW-2, in conjunction with the interim remediation, 125 casing volumes were removed prior to sample collection and parameters were collected during the last four 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.

Groundwater Analytical Results

Table 3 and Figure 3 present the June 1994 sampling event analytical results. Consistent with previous results, water samples collected at monitoring well MW-3 did not contain concentrations of either TPH/G or BTEX at or above the reporting limit.

Benzene (14 ppb), ethylbenzene (4.1 ppb), total xylenes (4.9 ppb), and TPH/G (95 ppb) were detected in the sample collected from MW-2. These results represent an increase from the March 1994 sampling event. Toluene at or above the reporting limits was not detected in the sample collected from MW-2.

Benzene (1.5 ppb) was detected in the sample collected from MW-5. This was the first detection of a target analyte in MW-5. No other chemical at or above the reporting limits were detected.

At MW-4, located adjacent to the tank excavation, there were no detections of TPH/G or BTEX at or above the reporting limits.

Benzene (0.79 ppb), ethylbenzene (5.9 ppb), total xylenes (8.7 ppb), and TPH/G (120 ppb) were detected in the sample collected from MW-6. These levels are generally consistent with recent analytical results.

The trip blank sample did not contain any contaminants above the reporting limits. 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-2 and MW-5 at concentrations in excess of the 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 June 16 and 17, 1994, when 1,200 gallons were removed from MW-2 at an average pumping rate of 1.5 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). Three remedial efforts (September 1993, December 1993 and March 1994) have previously occurred at MW-2. Approximately 3,440 gallons of water were extracted during those three episodes. Changes in water elevations at site wells associated with extraction at MW-2 are shown on 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 June 1994 change in water level measurements resulting from extraction of ground water from MW-2 (Table 4) reveal that the greatest response during the first day of pumping was at MW-5, MW-6 and MW-4 (decreases of 0.34, 0.31, and 0.25 feet, respectively). Measurements collected after the second day of pumping showed that MW-5 (0.32 feet) and MW-6 (0.24 feet) registered the most response. These responses indicate the hydraulic connections of the aquifer downgradient from the former tank location.

CONCLUSIONS

The following conclusions are based on data collected to date:

- Free-floating petroleum product was not observed in any of the wells.
- Consistent with previous sampling results, gasoline-related constituents were not detected in up-gradient well MW-3.
- Concentrations of gasoline-related constituents detected in wells MW-2 and MW-6 increased from those detected during the March 1994 quarterly. Concentrations of benzene were observed in well MW-5 for the first time.
- As shown on Figure 2, the apparent ground water flow direction at the site is generally to the east, consistent with historic flow directions.
- Groundwater elevations decreased an average of 0.04 feet since March 1994.
- The interim remediation at MW-2 removed approximately 1,200 gallons of ground water at a flow rate of 1.5 gpm and appears to be capable of effectively lowering water levels at other wells on-site.

Future work at the site consists of:

- Ground water sampling as scheduled in September 1994;
- As per the request of Ms. Eva Chu of the Alameda County Health Care Services Agency, one well sample will be analyzed for total dissolved solids. The interim remediation will be discontinued in order to evaluate what effect such cessation will have on site ground water quality.

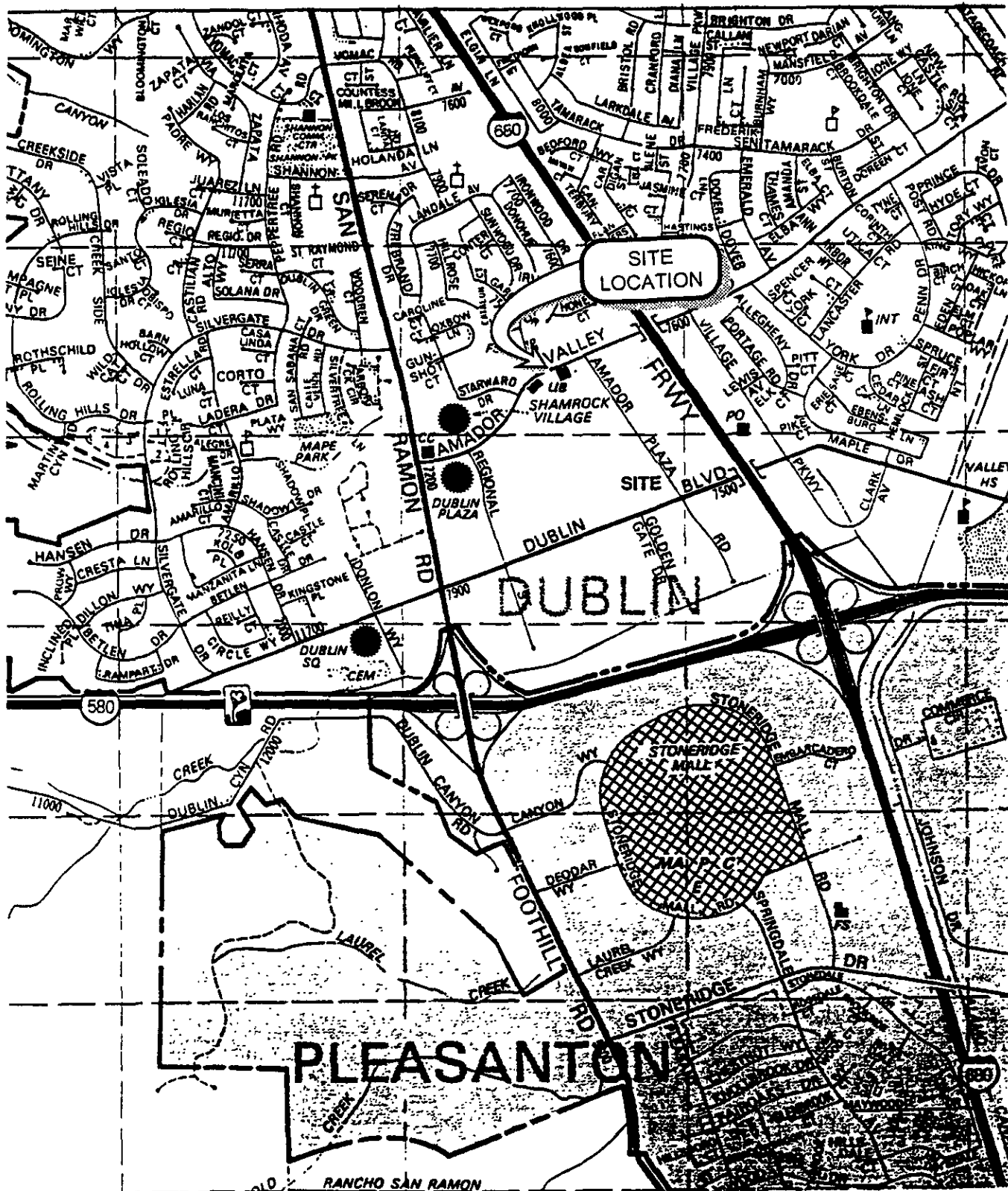
REFERENCES

Alameda County Health Care Service Agency, 1992, "Revision of Quarterly Monitoring Program at the former Alameda Service Station A-558, 7608 Amador Valley Boulevard, Dublin", Letter to McLaren/Hart, December 18, 1992

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

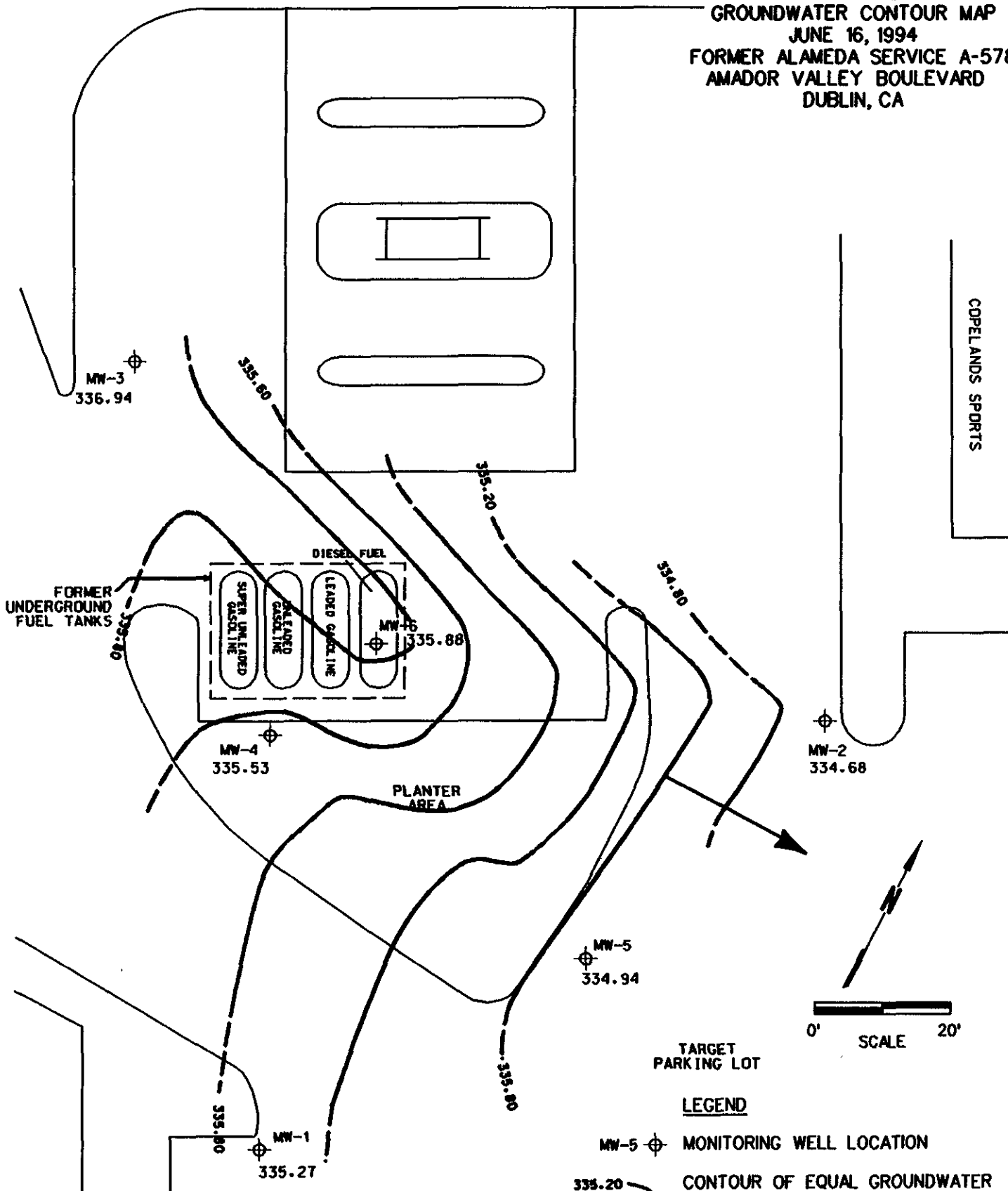
McLaren/Hart, 1993b, "December 1993 Quarterly Ground Water Monitoring and Interim Remediation Report for the Former Alameda Service Station A-528", September 13, 1993

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



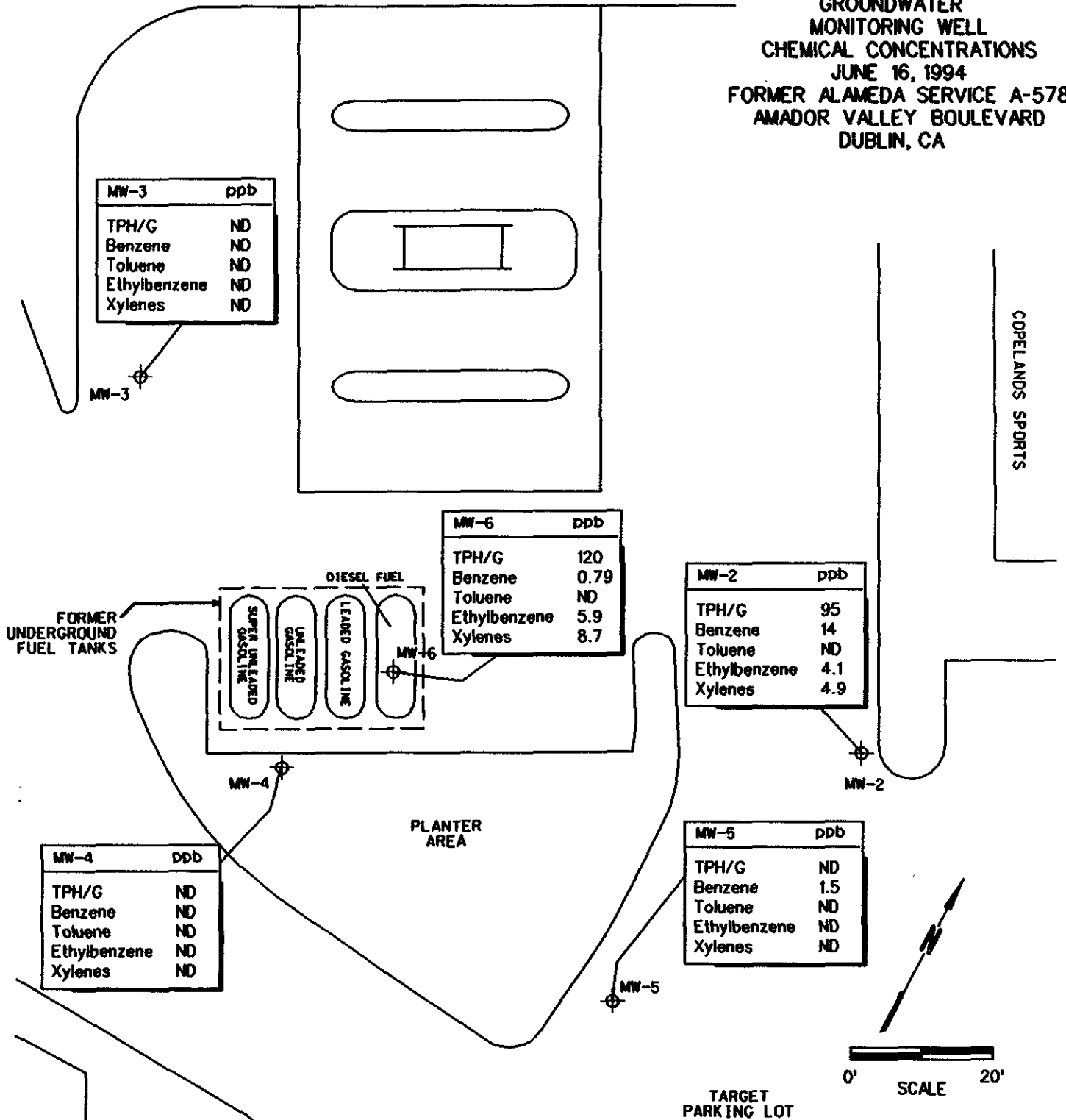
PLANTER AREA

FIGURE 2
GROUNDWATER CONTOUR MAP
JUNE 16, 1994
FORMER ALAMEDA SERVICE A-578
AMADOR VALLEY BOULEVARD
DUBLIN, CA



PLANTER AREA

FIGURE 3
GROUNDWATER
MONITORING WELL
CHEMICAL CONCENTRATIONS
JUNE 16, 1994
FORMER ALAMEDA SERVICE A-578
AMADOR VALLEY BOULEVARD
DUBLIN, CA



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 06/16/94 (feet below TOC)	GROUND WATER ELEVATION 06/16/94 (MSL)
MW-1	5-20	340.30	335.30 - 320.30	340.20	4.93	335.27
MW-2	5-20	340.52	335.52 - 320.52	340.27	5.59	334.68
MW-3	5-20	341.67	336.67 - 321.67	341.00	5.06	335.94
MW-4	5-20	342.31	337.31 - 322.31	342.11	6.58	335.53
MW-5	5-20	340.52	335.52 - 320.52	340.09	5.15	334.94
MW-6	4.5 - 14.5	341.13	336.63 - 326.63	340.81	4.93	335.88

*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
		03/28/94	4.90	335.30	-0.18
		06/16/94	4.93	335.27	-0.03
		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
03/28/94	5.58			334.69	-0.18
06/16/94	5.59			334.68	-0.01
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
		03/28/94	4.99	336.01	-0.02
		06/16/94	5.06	335.94	-0.07

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
		03/28/94	6.54	335.57	-0.03
		06/16/94	6.58	335.53	-0.04
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
		MW-6	340.81	09/26/91	6.45
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

* 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	<0.5
	6/91	<50	—	<0.5	<0.5	<0.5	<0.5	<0.5
	9/91	<50	—	<0.5	<0.5	<0.5	<0.5	<0.5
	12/91	<50	—	<0.5	<0.5	<0.5	<0.5	<0.5
	3/92	<50	—	<0.3	<0.3	<0.3	<0.3	<0.3
	6/92	<50	—	<0.3	<0.3	<0.3	<0.3	<0.3
	9/92	<50	—	<0.3	<0.3	<0.3	<0.3	<0.3
	3/94	<50	—	<0.3	<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 ^b	0.81	4.0	3.2	
3/93		<50	—	3.2	<0.3	<0.3	0.86	
6/93		<50	—	17.0 ^b	<0.3	0.93	0.41	
9/93		81	—	5.0 ^b	<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	
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 ^b	—	3.2 ^b	<3.0	45 ^b	19 ^b	
	6/94	<500 ^c	—	<5 ^c	<5 ^c	<5 ^c	<5 ^c	

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		
	3/94	<50	---	<0.3	<0.3	<0.3	<0.3		
	6/94	<50	---	1.5	<0.5	<0.5	<0.5		
	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 ^a	260	<50 ^a		
3/92		2,600	<500	400	<50 ^a	280	<50 ^a		
6/92		1,500	---	220	<3 ^b	190	<3 ^b		
9/92		<480 ^b	---	28	<3 ^b	120	<3 ^b		
12/92		250	---	16 ^b	<0.3	33 ^b	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		

- 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.
 c = The analysis was run at a 1:10 dilution due to the presence of non-target analyte interferences.
 --- = 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
03-28-94	0910	4.90	---	5.58	---	4.99	---	6.54	---	5.15	---	4.82	---
	1500	5.00	-0.10	14.44	-8.86	5.11	-0.12	6.71	-0.17	5.41	-0.26	4.99	-0.17
03-29-94	0756	4.93	-0.03	5.63	-0.05	5.02	-0.03	6.57	-0.03	5.17	-0.02	4.86	-0.04
	1502	5.01	-0.11	18.18	-12.60	5.12	-0.13	6.71	-0.17	5.42	-0.27	5.03	-0.21
06/16/94	1014	4.93	---	5.59	---	5.06	---	6.58	---	5.15	---	4.93	---
	1835	5.09	-0.16	19.62	-14.03	5.25	-0.19	6.83	-0.25	5.49	-0.34	5.24	-0.31
06/17/94	0829	5.01	-0.08	5.67	-0.08	5.15	-0.09	6.68	-0.10	5.26	-0.11	5.05	-0.12
	1316	5.08	-0.15	19.65	-14.06	5.20	-0.14	6.79	-0.21	5.47	-0.32	5.17	-0.24

*NOTE: Changes in water elevation are measured from the initial depth to ground water on the first day of pumping. Groundwater was pumped from MW-2 at approximately 1.5 gpm during June 1994.

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
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



DIRECT READING AIR MONITORING LOG

DATE: 6/16/94

PROJECT NAME TARGET, DUBLIN

PROJECT NO.: 04.0122628

Time	Location	Activity	Instrument	Substance/ Agent	Concentration	Initials
1003	MW - 1	SAMPLING	OVM	VOC	0 / 0 (SIB)	RLW
1004	MW - 3	↓	↓	↓	0 / 0	↓
1005	MW - 5	↓	↓	↓	0 / 0	↓
1006	MW - 2	↓	↓	↓	14.6 / 0	↓
1007	MW - 4	↓	↓	↓	0 / 0	↓
1008	MW - 6	↓	↓	↓	48.7 / 0	↓
1826	MW - 1	SAMPLING	OVM	VOC	0 / 0 (SIB)	RLW
1827	MW - 3	↓	↓	↓	0 / 0	↓
1828	MW - 5	↓	↓	↓	0 / 0	↓
* 1829	MW - 2	↓	↓	↓	0 / 0	↓
1830	MW - 4	↓	↓	↓	0 / 0	↓
1831	MW - 6	↓	↓	↓	0 / 0	↓

Weather Conditions: CLEAR Wind Speed: TRICE Wind Dir.: N Temp.: 66 F

* Comments: MW-2 PURGING IN PROGRESS DURING SECOND ROUND OF MONITORING



HYDRODATA

DATE: 6/16/94

PROJECT: TARGET, DUBLIN EVENT: QUALITY TESTS

NO.	WELL OR LOCATION	DATE			TIME		MEASUREMENT	CODE	COMMENTS
		MO	DA	YR	HR	MIN			
1	MW-1	6	16	94	10	14	4.93	SWL	
2	MW-3				10	15	5.06		
3	MW-5				10	17	5.15		
4	MW-2				10	18	5.59		
5	MW-4				10	19	6.58		
6	MW-6	↓	↓	↓	10	20	4.93	↓	
7									
8	MW-1	6	16	94	18	35	5.09	SWL	
9	MW-3				18	36	5.25		
10	MW-5				18	39	5.49		
11	MW-2				18	40	19.62		PURGING IN PROGRESS
12	MW-4				18	43	6.83		
13	MW-6	↓	↓	↓	18	44	5.24	↓	
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)
- *TMB - Total Material Balance (Gallons)

- HRS - Total (Hours)
- PSI - Pressure (psi)
- pH - 1 to 14
- EC - Conductivity (µmhos)
- TMP - Temperature (°C)
- TURB - Turbidity (NTU)
- _____ (Additional Code)

*All levels are taken from lower casing - describe any other reference points in comments column; when in doubt.



DIRECT READING AIR MONITORING LOG

DATE: 6/17/94
 PROJECT NAME: TARHET, DUBLIN PROJECT NO.: 04, 0122629, 000

Time	Location	Activity	Instrument	Substance/ Agent	Concentration	Initials
0822	MW - 1	Sampling	DVM	VOC	0/0 (S/B)	J/R
0823	MW - 3	↓	↓	↓	0/0	↓
0824	MW - 5	↓	↓	↓	0/0	↓
0825	MW - 2	↓	↓	↓	59.1/0	↓
0826	MW - 4	↓	↓	↓	0/0	↓
0827	MW - 6	↓	↓	↓	0/0	↓
1306	MW - 1	Sampling	DVM	VOC	0/0 (S/B)	DW
1307	MW - 3	↓	↓	↓	0/0	↓
1308	MW - 5	↓	↓	↓	0/0	↓
* 1309	MW - 2	↓	↓	↓	0/0	↓
1310	MW - 4	↓	↓	↓	0/0	↓
1311	MW - 6	↓	↓	↓	0/0	↓

Weather Conditions: CLEAR Wind Speed: STILL Wind Dir.: N/A Temp.: 62 F

* Comments: MW-2 Purging in Progress During
SECOND ROUND OF MONITORING

FORM 5002 (2/89)



HYDRODATA

DATE: 6/17/94

PROJECT: TARGET, DUBLIN EVENT: 4 WELLS

NO.	WELL OR LOCATION	DATE			TIME		MEASUREMENT	CODE	COMMENTS
		MO	DA	YR	HR	MIN			
1	MW-1	6	17	94	08	29	5.01	SWL	
2	MW-3				08	30	5.15		
3	MW-5				08	31	5.26		
4	MW-2				08	32	5.67		
5	MW-4				08	33	6.68		
6	MW-6	↓	↓	↓	08	34	5.05	↓	
7									
8	MW-1	6	17	94	13	16	5.08	SWL	
9	MW-3				13	19	5.20		
10	MW-5				13	20	5.47		
11	MW-2				13	21	19.65		PURKING IN PROGRESS
12	MW-4				13	24	6.79		
13	MW-6	↓	↓	↓	13	25	5.17	↓	
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 - Maximum Total Depth (Feet)

- HRS - Total (Hours)
- PSI - Pressure (psi)
- PH - pH
- EC - Conductivity (umhos)
- TMP - Temperature (°C)
- TRB - Turbidity (NTU)

(Additional Code)

*All items are subject to change - describe any other reference points in comments column; when in doubt.

SAMPLING EVENT DATA SHEET

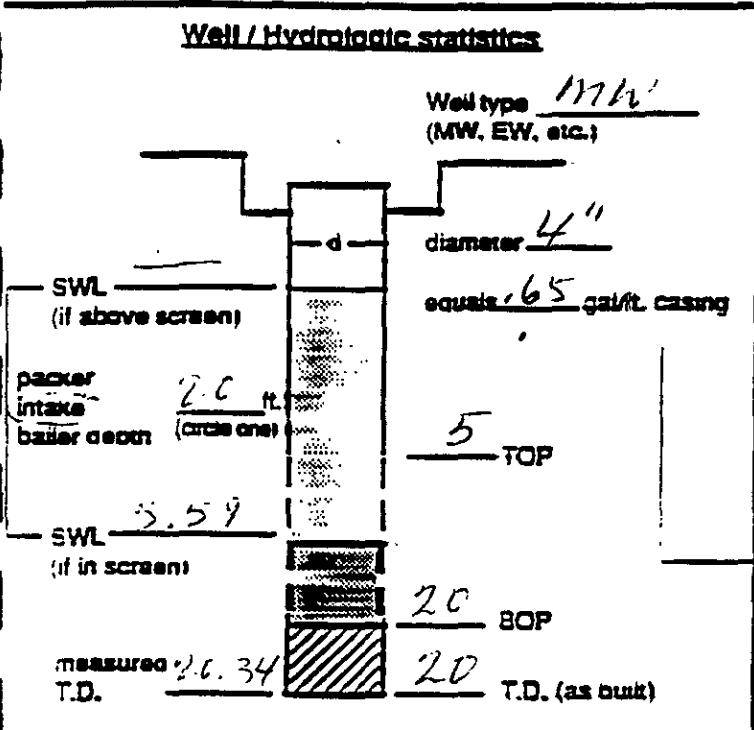
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McLaren

WELL OR LOCATION MW-2

PROJECT TARGET DUBLIN EVENT Quarterly SAMPLER D. WATTS DATE 6/16/94



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1040		
740 GPM	1845	1.23 GPM	19.62
6/17/94 Restart	0843	1.56 GPM	5.67
460 Gallons			
Stop	1333		19.65
Sampled	1349		7.93
(Final IWL)	1400		6.48
Purge calculation			
.65 gal/ft. * 14.75 ft. = 9.59 gals x 3 = 38.36 gals.			
SWL to BOP or one packer to BOP 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 USED TO Purge.
DISPOSABLE BAILER USED TO SAMPLE.

Actual gallons purged	<u>1200</u>
Actual volumes purged	<u>125</u>
Well yield (see below)	<u>114</u>
COC #	<u>7475</u>
Sample I.D.	<u>141259-62</u>
Analysis	<u>PH - 7.32</u>
Lab	<u>MBT</u>

Additional comments:
USED (11275-1277) T.D FOR Purge Calculation.
30% Recovery: 12.96
50% Recovery: 1.54 Sample Turbidity: 3.79

Gallons purged	TEMP °C (°F) (circle one)	EC (us / cm)	PH	TURBIDITY (NTU)
1. <u>1050</u>	<u>73.1</u>	<u>1600</u>	<u>7.32</u>	<u>7.22</u>
2. <u>1100</u>	<u>73.5</u>	<u>1630</u>	<u>7.24</u>	<u>8.03</u>
3. <u>1150</u>	<u>73.5</u>	<u>1640</u>	<u>7.31</u>	<u>11.37</u>
4. <u>1200</u>	<u>73.9</u>	<u>1610</u>	<u>7.30</u>	<u>6.82</u>
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.



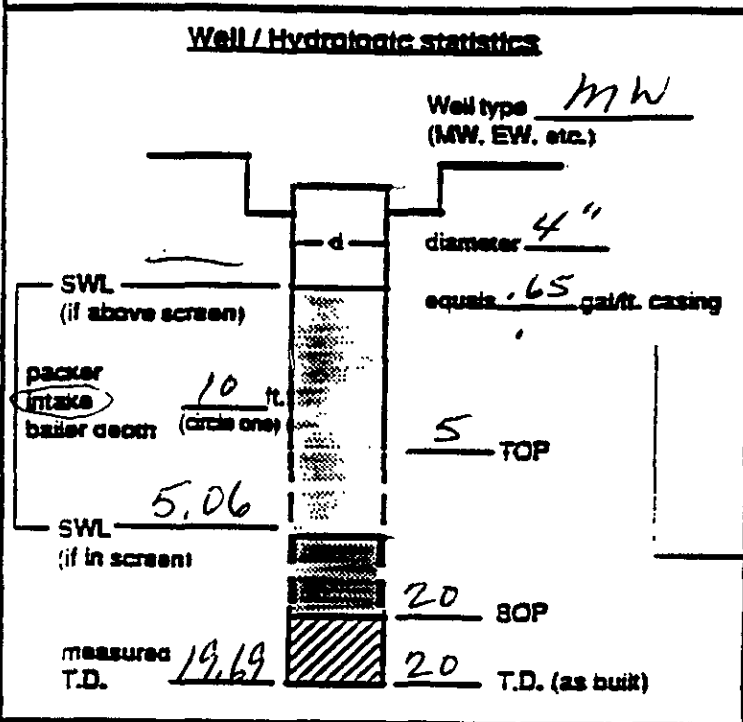
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SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-3

PROJECT TARGET DUBLIN EVENT Quarterly SAMPLER D. WATTS DATE 6/16/94



Action	Time	Pump rate	IWL (low visk)
Start pump / Begin	1122	.75 GPM	
	1135		7.44
	1149		7.78
	1203		7.93
	1217		7.99
Stop	1218		7.99
Sampled	1230		
(Final IWL)	1238		6.29
Purge calculation			
$.65 \text{ gal/ft.} \cdot 14.94 \text{ ft.} = 10 \text{ gals} \times 4 = 40 \text{ gals.}$			
SWL to BOP or packer to BOP one volume purge volume- 3 casings			
Head purge calculation (Airlift only):			
gall/ft. ft. gals. packer to SWL			

Equipment Used / Sampling Method / Description of Event:
 CENTRIFUGAL PUMP USED TO PURGE.
 DISPOSABLE BAILER USED TO SAMPLE.

Actual gallons purged	<u>40</u>	
Actual volumes purged	<u>4</u>	
Well yield (see below)	<u>HY</u>	
COC #	<u>7475</u>	
Sample I.D.	Analysis Lab	
<u>142539-42</u>	<u>TPH-5 (LIFT) (TO)</u>	<u>MBT</u>
<u>142543-46</u>	<u>TPH-5 (LIFT) (TO)</u>	<u>↓</u>

Additional comments:
 USED DESIGN T.D. FOR PURGE CALCULATION.
 50% RECOVERY: 12.53
 80% RECOVERY: 8.04 SAMPLE TURBIDITY: 2.34

Gallons purged	TEMP °C (°F) (circle one)	EC (us / cm)	PH	TURBIDITY (NTU)
1. 10	72.3	2150	7.35	6.41
2. 20	72.2	2160	7.25	2.08
3. 30	72.0	2160	7.22	1.33
4. 40	72.5	2180	7.29	1.04
5.				

* Take measurements at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop MY - W.L. 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.



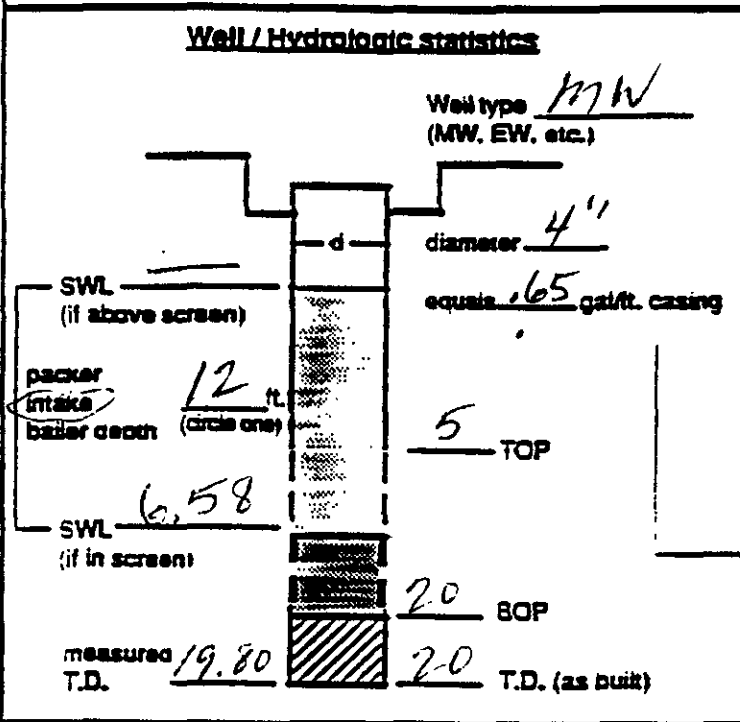
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SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-4

PROJECT TRABET Division EVENT Quarterly SAMPLER D. WITTS DATE 6/16/94



Action	Time	Pump rate	IWL (low visk)
Start pump / Begin	1418	1 GPM	
	1429		9.14
	1439		10.21
	1449		10.41
	1459		10.53
Stop	1459		10.53
Sampled	1505		9.20
(Final IWL)	1518		7.04
Purge calculation			
<u>.65</u> gal/ft. \cdot <u>13.42</u> ft. = <u>9</u> gals \times <u>4</u> = <u>36</u> 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 USED TO PURGE,
 DISPOSABLE BAILER USED TO SAMPLE.

Actual gallons purged	<u>40</u>
Actual volumes purged	<u>4+</u>
Well yield (see below)	<u>MY</u>
COC #	<u>7475</u>
Sample I.D.	<u>141251-54</u>
Analysis	<u>TH-6 (LWT) (STIC) (PA-C)</u>
Lab	<u>MGT</u>

Additional comments:
 USED DESIGN T.D. FOR PURGE CALCULATION
 50% RECOVERY: 13.29
 90% RECOVERY: 9.26 SAMPLE TURBIDITY: 2.23

Gallons purged *	TEMP °C(°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1. 10	71.8	790	7.55	1.55		
2. 20	69.3	810	7.51	1.18		
3. 30	69.4	740	7.63	0.93		
4. 40	69.1	730	7.70	2.22		
5.						

* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop MY - W.L. drop - able to purge 3 volumes during one siding 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.



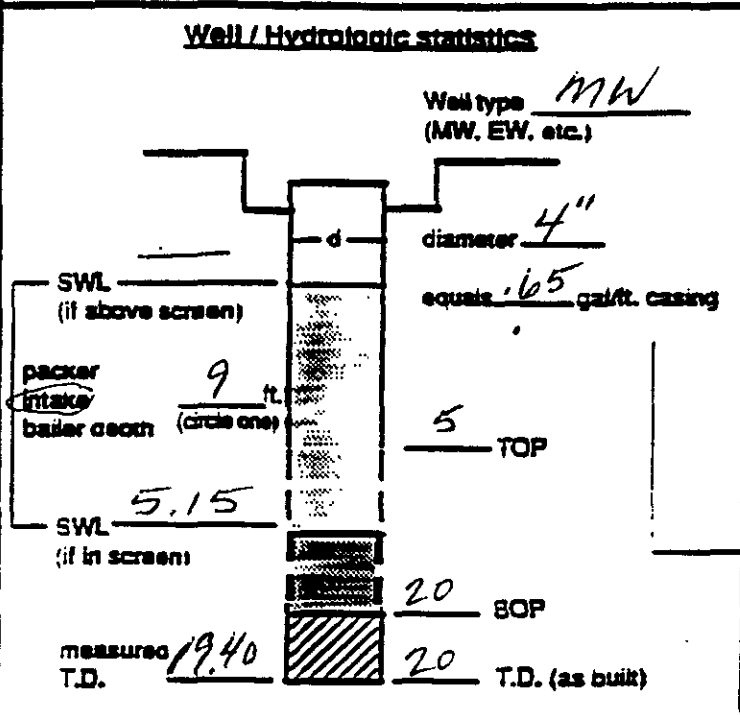
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SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-5

PROJECT TARGET DUBLIN EVENT Quarterly SAMPLER D. WATTS DATE 6/16/94



Action	Time	Pump rate	IWL (low vick)
Start pump / Begin	1258	1 GPM	
	1308		7.21
	1318		7.40
	1328		7.44
	1338		7.59
Stop	1339		7.59
Sampled	1345		
(Final IWL)	1352		5.61

Purge calculation
.65 gal/ft. \cdot 14.85 ft. = 10 gals \times $\frac{3}{4}$ = 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 USED TO PURGE.
DISPOSABLE BAILER USED TO SAMPLE.

Actual gallons purged	<u>40</u>
Actual volumes purged	<u>4</u>
Well yield (see below)	\oplus <u>HY</u>
COC #	<u>7475</u>
Sample I.D.	<u>7475-6 (LIFT)</u> <u>13TEX (RD 26)</u>
Lab	<u>MRT</u>

Additional comments:
USED DESIGN T.D. FOR PURGE CALCULATION
50% RECOVERY: 12.57
80% RECOVERY: 8.12 SAMPLE TURBIDITY: 1.56

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
1. <u>10</u>	<u>74.6</u>	<u>1270</u>	<u>7.39</u>	<u>4.02</u>
2. <u>20</u>	<u>71.1</u>	<u>1220</u>	<u>7.39</u>	<u>2.38</u>
3. <u>30</u>	<u>70.4</u>	<u>1230</u>	<u>7.43</u>	<u>1.19</u>
4. <u>40</u>	<u>71.0</u>	<u>1230</u>	<u>7.42</u>	<u>0.61</u>
5.				

* Take measurement at approximately each casing volume purged.

\oplus HY - Minimal W.L. drop MY - WL drop - able to purge 3 volumes during one sizing 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.

SAMPLING EVENT DATA SHEET

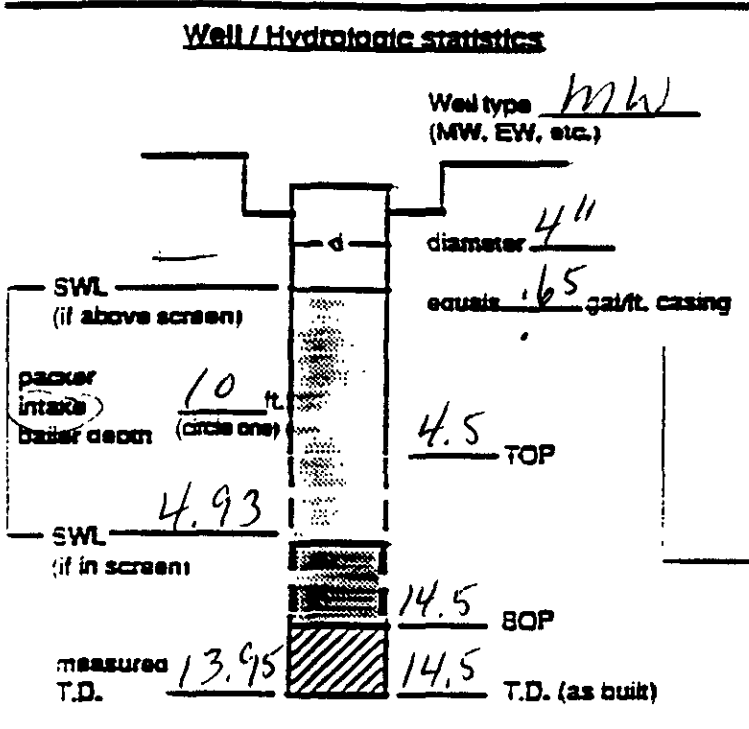
(fill out completely)



McLaren

WELL OR LOCATION MW-6

PROJECT TARHET DUBLIN EVENT Quarterly SAMPLER D. WATTS DATE 6/16/94



Action	Time	Pump rate	IWL (low vick)
Start pump / Begin	1539	.2 gpm	
	1610		7.97
	1641		8.34
	1722		8.36
	1753		8.33
Stop	1754		8.33
Sampled	1759		6.70
(Final IWL)	1811		5.79
Purge calculation			
.65 gal/ft. * <u>9.57</u> ft. = <u>6.25</u> gals * <u>3</u> = <u>25</u> gals.			
SWL to BOP or one packer to BOP <u>4</u> purge volume = 3 casings			
Head purge calculation (Airlift only)			
gal/ft. * _____ ft. = _____ gals.			
packer to SWL: _____			

Equipment Used / Sampling Method / Description of Event:
 DC PERISTALTIC PUMP USED TO PURGE.
 DISPOSABLE BAYLER USED TO SAMPLE.
 GW HAS SLIGHT PETROLEUM ODOR.

Actual gallons purged	<u>25</u>
Actual volumes purged	<u>4</u>
Well yield (see below)	<u>MY</u>
COC #	<u>7475</u>
Sample I.D.	<u>141255-58</u>
Analysis	<u>TPH-6 (LIFT) STX (9020)</u>
Lab	<u>MBT</u>

Additional comments:
 15LD DESIGN T.D. FOR PURGE CALCULATIONS.
 50% RECOVERY: 9.71
 70% RECOVERY: 6.84 SAMPLE TURBIDITY:

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
1. <u>6.25</u>	<u>75.6</u>	<u>720</u>	<u>7.70</u>	<u>4.53</u>
2. <u>12.50</u>	<u>73.1</u>	<u>710</u>	<u>7.73</u>	<u>3.05</u>
3. <u>18.75</u>	<u>72.1</u>	<u>700</u>	<u>7.67</u>	<u>6.22</u>
4. <u>25.00</u>	<u>71.5</u>	<u>680</u>	<u>7.56</u>	<u>5.18</u>
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.

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

**MBT Environmental
Laboratories**

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



Environmental Laboratories

Date: July 5, 1994
LP #: 9479

Bradley Wright
McLaren/Hart Environmental Engineering
1135 Atlantic Avenue
Alameda, CA 94501

Dear Mr. Wright:

Enclosed are the laboratory results for the six samples submitted to MBT Environmental Laboratories on June 18, 1994, for the project *Target Dublin*.

The analyses requested are:

EPA 8020 (BTEX) & TPH-G (6 - Water)

The report consists of the following sections:

1. Cover Page
2. Copy of Chain-of-Custody
3. Quality Control Report
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,

A handwritten signature in black ink, appearing to read 'Shakoora Azimi'. The signature is fluid and cursive, written over a horizontal line.

Shakoora Azimi
Laboratory Director, Principal Scientist

ANALYTICAL REPORT
LABORATORY PROJECT (LP) NUMBER 9479

TARGET DUBLIN

This report complies with the requirements under the following certification/approval:

- | | | | |
|----------------|---|-------------|--|
| ✓ CALIFORNIA: | Hazardous Waste, #1417
Waste Water, # 1417
Drinking Water, #1417 | OKLAHOMA: | Hazardous Waste, #9318
Waste Water, #9318 |
| CONNECTICUT: | Waste Water, #PH0799 | TENNESSEE: | Underground Storage Tank |
| FLORIDA: | Environmental Water,
#E87298 | UTAH: | Hazardous Waste, #E-165
Waste Water, #E-165
Drinking Water, #E-165 |
| KANSAS: | Hazardous Waste, #E-1167
Waste Water, #E-192
Drinking Water, #E-192 | WASHINGTON: | Hazardous Waste, #C048 |
| NEW HAMPSHIRE: | Waste Water, #253193-A | WISCONSIN: | Hazardous Waste, #999940920
Waste Water, #999940920 |
| NEW JERSEY: | Waste Water, #44818 | USACOE: | Hazardous Waste
Waste Water |
| NEW YORK: | Hazardous Waste, #11241
Waste Water, #11241
CLP, #11241 | AFCEE: | |

(CN9479)





M&T Environmental Laboratories
 3663 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: 11715T Project Name: TARGET DUBLIN **FOR LABORATORY USE ONLY**
 Address: 3663 GOLD CANAL DR. Project Number: OK 0122629.010 Laboratory Project #: 9979
Rancho Cordova, CA 95670 Project Location: (State) CA Storage Refrigerator ID: 8
 Storage Freezer ID: _____

Sampler Name: _____ Signature: [Signature] PPE Worn in Field: D
 Relinquished By: [Signature] Date/Time: 6/17/94 1400 Received By or Method of Shipment/ Shipment I.D.: EXPRESS-17 Date/Time: 6/17/94 1400
 Relinquished By: [Signature] Date/Time: _____ Received By or Method of Shipment/ Shipment I.D.: [Signature] Date/Time: 6/18/94/1200
 Relinquished By: Suprenit Date/Time: _____ Received By or Method of Shipment/ Shipment I.D.: _____ Date/Time: _____

- 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
 - 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
 - STLC Level (see Side 2)
 - Nitrate
 - Nitrite
 - Odor
 - Org. Lead
 - Org. Mercury
 - Percent Moisture
 - Percent Solid
 - Perchlorate
 - pH
 - Phosphates
 - Phosphorus
 - Sulfate
 - Sulfides
 - TCLP:
 - VOA
 - Semi-VOA
 - Metals
 - Pesticide
 - TDS
 - Total Hardness
 - Total Solids
 - TPH/D
 - TPH/G
 - TSS
 - Turbidity
- * Specify Total or Dissolved

Sample Disposal (check one)
 Laboratory Standard
 Other

Level of QC (see Side 2):
 1 2 3 4 5 6A 6B
 6C 6D 6E 6F 7 8

Write in Analysis Method → _____

ANALYSES REQUESTED

FOR LABORATORY USE ONLY		Sample ID Number	Date	Time	Description		Container(s)		Matrix Type	Pres. Type	TAT	ANALYSES REQUESTED																														
Lab ID					Locator	Depth	#	Type																																		
19979	001	142539-42	6/16/94	1050	Trip Bunk	N/A	4	✓	H ₂ O	H&C	4	TPH-5 (L&T)	BTEX (8:2:2)																													
2	002	142543-46		1230	MW-3																																					
3	003	142547-50		1345	MW-5																																					
4	004	141251-54		1505	MW-4																																					
5	005	141255-58		1759	MW-6																																					
6	006	141259-62	6/17/94	1349	MW-2																																					
7																																										
8																																										
9																																										
10																																										

Special Instructions/Comments:
PLEASE RETURN COOLERS ASAP

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

FOR LABORATORY USE ONLY Sample Condition Upon Receipt: TEMP GOOD
SAMPLES INTACT

SEND DOCUMENTATION AND RESULTS TO (Check one)
 Project Manager/Office: D. WRIGHT/PLANNEDA
 Client Name: _____
 Company: _____
 Address: _____
 Phone: _____ FAX: _____

QUALITY CONTROL REPORT

METHOD BLANK

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

Date Analyzed: 06/23/94

<u>Analyte</u>	<u>Reporting Limit</u>	<u>Concentration</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Ethylbenzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
Total Petroleum Hydrocarbons - Gasoline	50	BRL
<u>Surrogate</u>	<u>% Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	78	63 - 134
a,a,a-Trifluorotoluene (FID)	92	63 - 134

(CN9479)

QUALITY CONTROL REPORT

METHOD BLANK

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

Date Analyzed: 06/24/94

<u>Analyte</u>	<u>Reporting Limit</u>	<u>Concentration</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Ethylbenzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
Total Petroleum Hydrocarbons - Gasoline	50	BRL
<u>Surrogate</u>	<u>% Recovery</u>	<u>Acceptance Limits</u>
a, a, a-Trifluorotoluene (PID)	83	63 - 134
a, a, a-Trifluorotoluene (FID)	100	63 - 134

(CN9479)



QUALITY CONTROL REPORT

METHOD BLANK

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

Date Analyzed: 06/24/94

<u>Analyte</u>	<u>Reporting Limit</u>	<u>Concentration</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Ethylbenzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
Total Petroleum Hydrocarbons - Gasoline	50	BRL
<u>Surrogate</u>	<u>% Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	81	63 - 134
a,a,a-Trifluorotoluene (FID)	101	63 - 134

(CN9479)

QUALITY CONTROL REPORT

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

LP: 9479

Date of Analysis: 06/23/94

Column: DB624

Instrument #: 6

Spike Sample ID: LCSW - 86

Spike ID Code: W-1-828

Surrogate ID Code: W-1-931

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	98	NA	NA	NA	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)	(k)	(l)	ACCEPTANCE LIMITS % REC.
	SUR. SPIKE CONC.	SAMPLE + SUR. SPIKE CONC.	SUR. REC. %	SAMPLE DUP. + SUR. SPIKE CONC.	SUR. DUP. RECOVERY %	
a,a,a-Trifluorotoluene	4.00	4.12	103	NA	NA	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
Method 8020**

LP: 9479

Spike Sample ID: LCSW - 86

Date Of Analysis: 06/23/94

Spike ID Code: W-1-905

Column: DBWax

Surrogate ID Code: W-1-931

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
602/8020	Chlorobenzene	0	4.00	3.88	97	NA	NA	NA	69 - 131	≤20
602/8020	Benzene	0	4.00	3.91	98	NA	NA	NA	72 - 134	≤20
602/8020	Ethyl Benzene	0	4.00	3.74	94	NA	NA	NA	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.	
602/8020	a,a,a-Trifluorotoluene	PID	4.00	3.22	80	NA	NA	63 - 134	

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

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



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.

(CN9479)

MBT Environmental
Laboratories



Master Builders Technologies

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: 9479-1

Sample Number: 142539

Date Sampled: 06/16/94

Date Received: 06/18/94

Date Analyzed: 06/23/94

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	BRL	0.50
Toluene	BRL	0.50
Ethylbenzene	BRL	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	BRL	0.50
1,4-Xylene	BRL	0.50
Total Petroleum Hydrocarbons - Gasoline	BRL	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	91	63 - 134
a,a,a-Trifluorotoluene (FID)	97	63 - 134

Comments

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

Approved by: CM

Date: 7/5/94

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-3*

Lab Project-ID Number: *9479-2*

Sample Number: *142545*

Date Sampled: *06/16/94*

Date Received: *06/18/94*

Date Analyzed: *06/23/94*

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	BRL	0.50
Toluene	BRL	0.50
Ethylbenzene	BRL	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	BRL	0.50
1,4-Xylene	BRL	0.50
Total Petroleum Hydrocarbons - Gasoline	BRL	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	88	63 - 134
a,a,a-Trifluorotoluene (FID)	108	63 - 134

Comments

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

Approved by: *CM* Date: *7/5/94*

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: 9479-3

Sample Number: 142547

Date Sampled: 06/16/94

Date Received: 06/18/94

Date Analyzed: 06/23/94

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	1.5	0.50
Toluene	BRL	0.50
Ethylbenzene	BRL	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	BRL	0.50
1,4-Xylene	BRL	0.50
Total Petroleum Hydrocarbons - Gasoline	BRL	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	94	63 - 134
a,a,a-Trifluorotoluene (FID)	102	63 - 134

Comments

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

Approved by: CM Date: 7/5/94

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: *9479-4*

Sample Number: *141252*

Date Sampled: *06/16/94*

Date Received: *06/18/94*

Date Analyzed: *06/25/94*

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	BRL	5.0
Toluene	BRL	5.0
Ethylbenzene	BRL	5.0
1,2-Xylene	BRL	5.0
1,3-Xylene	BRL	5.0
1,4-Xylene	BRL	5.0
Total Petroleum Hydrocarbons - Gasoline	BRL	500

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	83	63 - 134
a,a,a-Trifluorotoluene (FID)	114	63 - 134

Comments

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

The sample was diluted 10 fold due to the presence of non-target analyte interferences.

Approved by: *CM* Date: *7/5/94*

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: *9479-5*

Sample Number: *141256*

Date Sampled: *06/16/94*

Date Received: *06/18/94*

Date Analyzed: *06/23/94*

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	0.79	0.50
Toluene	BRL	0.50
Ethylbenzene	5.9	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	{a}{b}	0.50
1,4-Xylene	{b} 8.7	0.50
Total Petroleum Hydrocarbons - Gasoline	120	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	71	63 - 134
a,a,a-Trifluorotoluene (FID)	91	63 - 134

Comments

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

{a} Coelutes with 1,4-Xylene.

{b} The data was reported from a different analytical run on 06/23/94 for which the associated standard was within daily calibration criteria.

Non-target analytes are present on the chromatograph.

Approved by: *CM* Date: *7/5/94*

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: *9479-6*

Sample Number: *141259*

Date Sampled: *06/17/94*

Date Received: *06/18/94*

Date Analyzed: *06/25/94*

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	14	0.50
Toluene	BRL	0.50
Ethylbenzene	4.1	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	{a} {b}	0.50
1,4-Xylene	{b} 4.9	0.50
Total Petroleum Hydrocarbons - Gasoline	95	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	99	63 - 134
a,a,a-Trifluorotoluene (FID)	117	63 - 134

Comments

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

{a} Coelutes with 1,4-Xylene.

{b} The data was reported from a different analytical run on 06/23/94 for which the associated standard was within daily calibration criteria.

Approved by: *CM* Date: *7/5/94*

