



December 16, 1993

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

Dear Ms. Chu:

**SUBJECT: SEPTEMBER 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

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ALCO  
HAZMAT

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## **INTRODUCTION**

This report presents the September 1993 quarterly ground water monitoring results at the former Alameda Service Station A-528, located at 7608 Amador Valley Boulevard in Dublin, California. This report was prepared in accordance with McLaren/Hart's sampling plan entitled "Proposal to Conduct Quarterly Ground Water Sampling and Interim Remediation at the Target Store T-328 Dublin, California" dated September 13, 1993. The sampling plan followed recommendations presented in the "June 1993 Quarterly Monitoring and Interim Remediation Report" for the site. Recommendations included extracting ground water from MW-2 as part of quarterly interim remediation and 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 the lateral extent of petroleum hydrocarbons in the 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 September 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 1,050 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 September 28, 1993 (Table 1). This data was used to construct the September 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 4.24 to 5.89 feet below ground surface or 335.26 to 336.58 feet above mean sea level. The average hydraulic gradient is approximately 0.011 feet/foot. The September water level measurements indicate that ground water levels have decreased in all of the six wells since June 1993, ranging from 0.34 to 0.45 feet, with an average decrease of 0.38 feet. Historic ground water elevation data are presented in Table 2.

### **Interim Remediation**

The most recent interim remediation at the site occurred during September 1993 quarterly sampling when 1,050 gallons were removed from MW-2 at an average pumping rate of 1.3

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 3).

Ten interim remediation episodes occurred at MW-6 between October 1991 and June 1993. The change 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 4. A total of approximately 3,300 gallons of ground water were extracted during the ten interim remediation episodes at an average pump rate of 0.9 gallons per minute (gpm).

As shown on Tables 3 and 4, the extraction of ground water from MW-6 and MW-2 typically reduces the water level in each of the six wells. The exception to this was during the excessive rainfall in October and December 1992 when water levels rose during interim remediation pumping.

The September 1993 change in water level measurements resulting from extraction of ground water from MW-2 (Table 3) reveals that the greatest response during the first day of pumping was at MW-4 and MW-5 (decreases of 0.20 and 0.29 feet, respectively). Measurements collected after the second day of pumping again showed that MW-4 (0.25 feet) and MW-5 (0.36 feet) registered the most response.

#### **Monitoring Well Sampling Protocol**

Ground water samples were collected at MW-5, MW-4, and MW-6 on September 28, and at MW-2 on September 29, 1993. Prior to sampling MW-5, MW-4 and MW-6, four casing

volumes were purged from each well using a centrifugal pump. During purging, the temperature, pH, electric conductivity, and turbidity were measured after each casing volume was removed. After all parameters had stabilized, with the turbidity below 3 Nephelometric Turbidity Units (NTUs), sampling was performed using a disposable bailer. At MW-2, in conjunction with the interim remediation, 105 casing volumes were removed prior to sample collection and parameters were collected during the last casing volume. Sampling event data sheets are enclosed as Attachment I.

Ground water samples were stored in a container filled with ice and delivered to MBT Environmental Laboratories, 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.

#### **Monitoring Well Sampling Results**

Table 5 and Figure 3 present the analytical results of the ground water samples collected during the September 1993 sampling event. 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 and TPH/G concentrations were detected in the sample from MW-6, constructed within excavation backfill for the former fuel tanks, at concentrations of 0.46 ppb and 230 ppb, respectively. Ethyl benzene (0.72 ppb) and total xylenes (1.48 ppb) were also detected in ground water from well MW-6. As shown in Table 5, petroleum constituents had been decreasing at MW-6 for the previous five sampling events, which included interim remediation at MW-6.

*Concentrations of benzene at 5 ppb were detected in the water sample collected at well MW-2 during September sampling; this represents a decrease from the benzene concentration reported at this well in June 1993 (17 ppb). As shown in Table 5, the reported concentration of benzene at well MW-2 has fluctuated since monitoring began in February 1991, from 1.3 ppb (September 1992) to 35 ppb (December 1992). TPH/G (81 ppb), ethyl benzene (3.8 ppb), and total xylenes (4.06 ppb) were detected in well MW-2 during September 1993 sampling at levels generally consistent with previous sampling results.*

At MW-4, located adjacent to the tank excavation, benzene at 2.8 ppb was the only gasoline-related constituent detected. This is consistent with recent sampling results at MW-4.

The trip blank sample did not contain TPH/G or BTEX compounds at or above the reporting limits. The analytical data sheets and chain-of-custody records for the ground water samples are included as Attachment 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 or TPH/D. Benzene was detected in ground water from monitoring wells MW-2 and MW-4 at concentrations 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.

#### CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on data collected to date:

- Free-floating petroleum product was not observed in any of the wells.
- The analytical results for TPH/G and total xylenes from water samples collected at MW-6 are somewhat higher than recent sampling results (Table 5). The decreasing trend in detected gasoline-related constituents previously noted at this well appear to be related to ground water extraction performed at MW-6 as part of interim remediation.
- The level of benzene (5 ppb) reported in well MW-2 during the September 1993 sampling was lower than recent sampling results (June 1993 was 17.0 ppb). Interim remediation measures (ground water extraction) were implemented for the first time at MW-2 during the September 1993 sampling event.



- The only gasoline-related constituent detected at MW-4 was benzene (28 ppb), consistent with recent sampling results.
- 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 0.38 feet since June 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 1,050 gallons of ground water at a flow rate of 1.3 gpm and appears to be capable of lowering water levels at other wells on-site.

Future work at the site consists of:

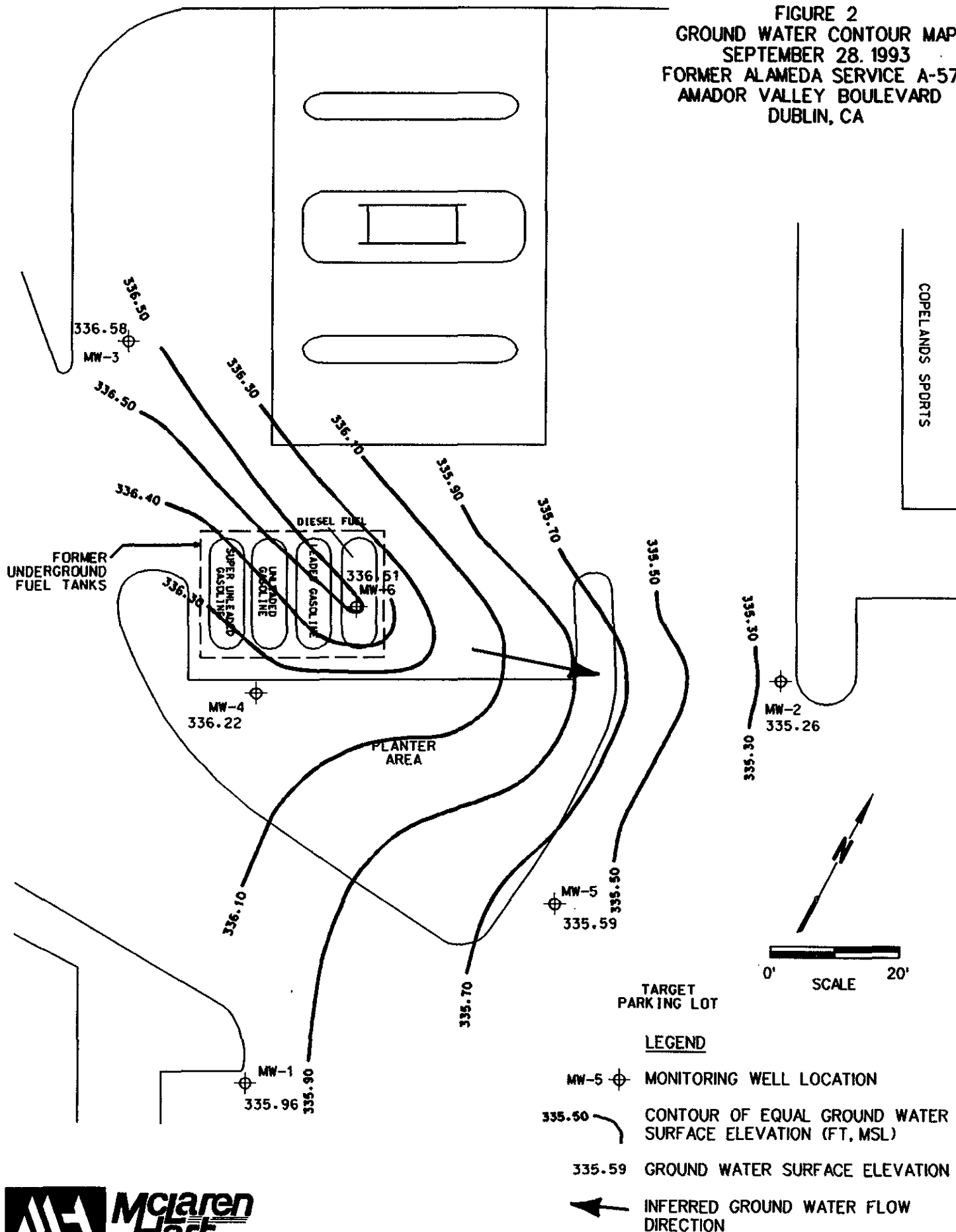
- Ground water sampling as scheduled in December 1993, and extraction of impacted ground water from well MW-2 as part of interim remediation.

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



PLANTER AREA

FIGURE 2  
GROUND WATER CONTOUR MAP  
SEPTEMBER 28, 1993  
FORMER ALAMEDA SERVICE A-578  
AMADOR VALLEY BOULEVARD  
DUBLIN, CA



PLANTER AREA

FIGURE 3  
GROUND WATER  
MONITORING WELL  
CHEMICAL CONCENTRATIONS  
SEPTEMBER 28, 1993  
FORMER ALAMEDA SERVICE A-578  
AMADOR VALLEY BOULEVARD  
DUBLIN, CA

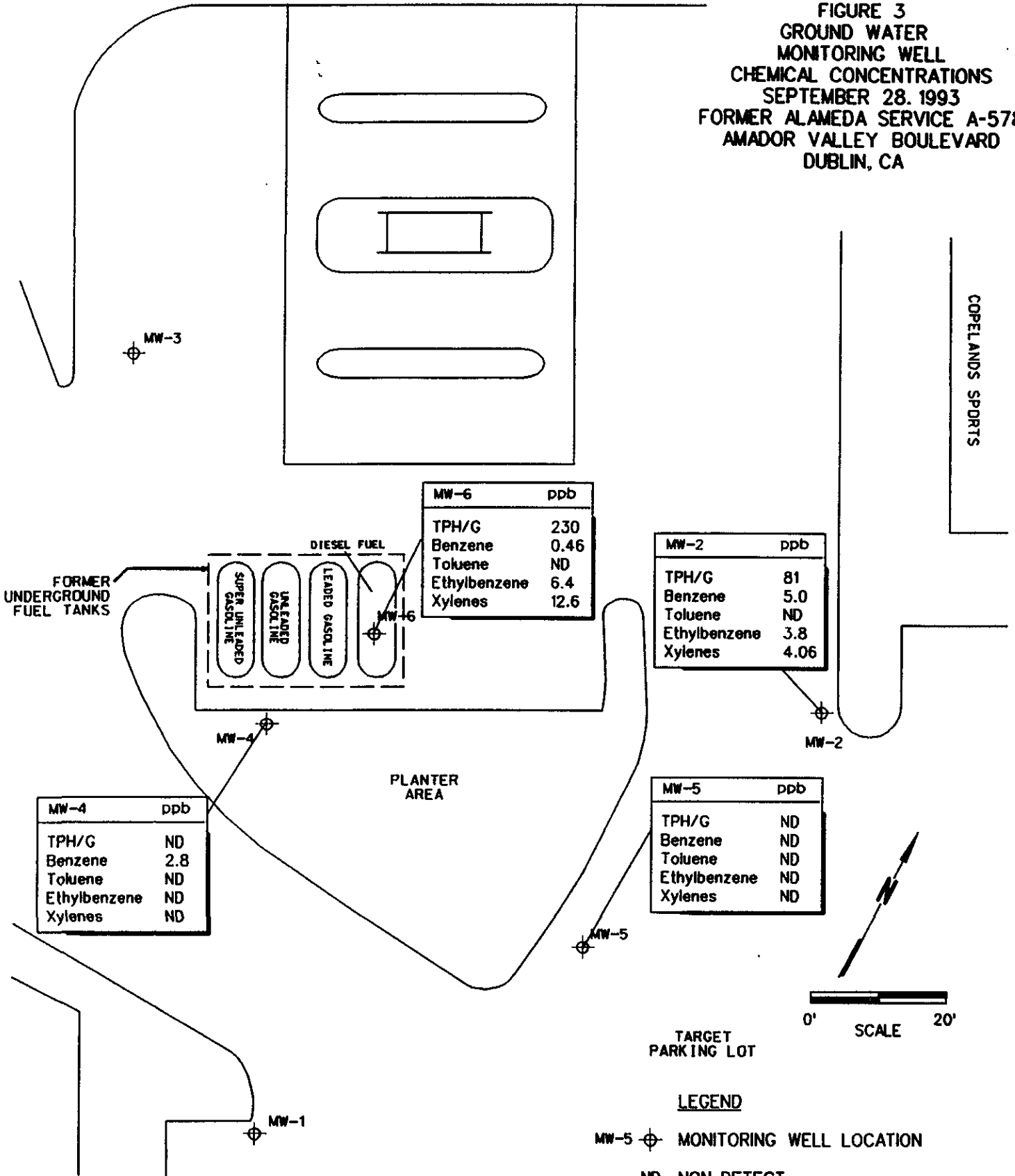


TABLE 1

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 9/28/93 (feet below TOC)	GROUND WATER ELEVATION 9/28/93 (MSL)
MW-1	5-20	340.30	335.30 - 320.30	340.20	4.24	335.96
MW-2	5-20	340.52	335.52 - 320.52	340.27	5.01	335.26
MW-3	5-20	341.67	336.67 - 321.67	341.00	4.42	336.58
MW-4	5-20	342.31	337.31 - 322.31	342.11	5.89	336.22
MW-5	5-20	340.52	335.52 - 320.52	340.09	4.50	335.59
MW-6	4.5 - 14.5	341.13	336.63 - 326.63	340.81	4.30	336.51

\*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	2/28/91	5.00	335.20	
		6/14/91	5.53	334.67	-0.59
		9/26/91	5.97	334.23	-0.38
		12/30/91	5.50	334.70	0.47
		3/26/92	4.65	335.55	0.85
		6/23/92	4.92	335.28	-0.27
		9/24/92	5.10	335.10	-0.18
		12/29/92	4.89	335.31	0.21
		3/24/93	3.57	336.63	1.32
		6/28/93	3.79	336.41	-0.22
9/28/93	4.24	335.96	-0.45		
MW-2	340.27	2/28/91	5.46	334.81	
		6/14/91	5.90	334.37	-0.44
		9/26/91	6.54	333.73	-0.64
		12/30/91	5.83	334.44	0.71
		3/27/92	5.35	334.92	0.48
		6/23/92	5.69	334.58	-0.34
		9/24/92	5.70	334.57	-0.01
		12/29/92	5.52	334.75	0.18
		3/24/93	4.48	335.79	1.04
		6/28/93	4.67	335.60	-0.19
9/28/93	5.01	335.26	-0.34		
MW-3	341.00	2/28/91	5.61	335.39	
		6/14/91	5.40	335.60	0.21
		9/26/91	6.29	334.71	-0.89
		12/30/91	5.75	335.25	0.54
		3/26/92	4.58	336.42	1.17
		6/23/92	5.27	335.73	-0.69
		9/24/92	5.47	335.53	-0.20
		12/29/92	5.08	335.92	0.39
		3/24/93	3.83	337.17	1.25
		6/28/93	4.02	336.98	-0.19
9/28/93	4.42	336.58	-0.40		
MW-4	342.11	2/28/91	7.01	335.10	
		6/14/91	7.01	335.10	0.00
		9/26/91	7.81	334.30	-0.80
		12/30/91	7.17	334.94	0.64
		3/27/92	6.44	335.67	0.73
		6/23/92	6.70	335.41	-0.26
		9/24/92	6.84	335.27	-0.14
		12/29/92	6.59	335.52	0.25
		3/24/93	5.38	336.73	1.21
		6/28/93	5.52	336.59	-0.14
9/28/93	5.89	336.22	-0.37		
MW-5	340.09	6/14/91	5.81	334.28	
		9/26/91	5.92	334.17	-0.11
		12/30/91	5.52	334.57	0.40
		3/26/92	4.80	335.29	0.72
		6/23/92	5.23	334.86	-0.43
		9/24/92	5.07	335.02	0.16
		12/29/92	5.04	335.05	0.03
		3/24/93	3.99	336.10	1.05
		6/28/93	4.11	335.98	-0.12
		9/28/93	4.50	335.59	-0.39
MW-6	340.81	9/26/91	6.45	334.36	
		12/30/91	5.71	335.10	0.74
		3/27/92	5.03	335.78	0.68
		6/23/92	5.38	335.43	-0.35
		9/24/92	5.57	335.24	-0.19
		12/29/92	5.22	335.59	0.35
		3/24/93	3.86	336.95	1.36
		6/28/93	3.95	336.86	-0.09
		9/28/93	4.30	336.51	-0.35

\* MSL = Mean Sea Level

TABLE 3

**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

\*NOTE: Ground water was pumped from MW-2 at approximately 1.3 gpm during September 1993.

TABLE 4

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 4

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 4

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.

TABLE 5  
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>TOTAL XYLENES</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
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	
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	

TABLE 5

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>TOTAL XYLENES</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
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

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.

**ATTACHMENT I**  
**SAMPLING EVENT DATA SHEETS**

PROJECT: TARGET DUBLIN EVENT: Quarterly SAMPLER: D. WATTS

NO.	WELL OR LOCATION	DATE			TIME		MEASUREMENT	CODE	COMMENTS
		MO	DA	YR	HR	MIN			
1	MW-1	9	28	93	09	59	4.24	SWL	
2	MW-3				10	01	4.42		
3	MW-5				10	03	4.50		
4	MW-2				10	05	5.01		
5	MW-4				10	07	5.89		
6	MW-6	↓	↓	↓	10	08	4.30	↓	
7									
8	MW-1	9	28	93	12	09	4.37	SWL	
9	MW-3				18	10	4.55		
10	MW-5				18	12	4.79		
11	MW-2				18	13	12.85		PURGING
12	MW-4				18	16	6.09		
13	MW-6	↓	↓	↓	18	17	4.42	↓	
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) psi = approx -(1/2 x mmHg)

PROJECT: TARGET DUBLIN EVENT: QUARTERLY SAMPLER: D. WATTS

NO.	WELL OR LOCATION	DATE			TIME		MEASUREMENT	CODE	COMMENTS
		MO	DA	YR	HR	MIN			
1	MW-1	9	29	93	08	09	4.30	SWL	
2	MW-3				08	10	4.48		
3	MW-5				08	12	4.61		
4	MW-2				08	13	5.09		
5	MW-4				08	14	5.97		
6	MW-6	↓	↓	↓	08	15	4.35	↓	
7									
8	MW-1	9	29	93	13	21	4.40	SWL	
9	MW-3				13	22	4.57		
10	MW-5				13	26	4.86		
11	MW-2				13	27	19.51		PURGING
12	MW-4				13	30	6.14		
13	MW-6	↓	↓	↓	13	31	4.47	↓	
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) psi = approx -1/2 x mmHg



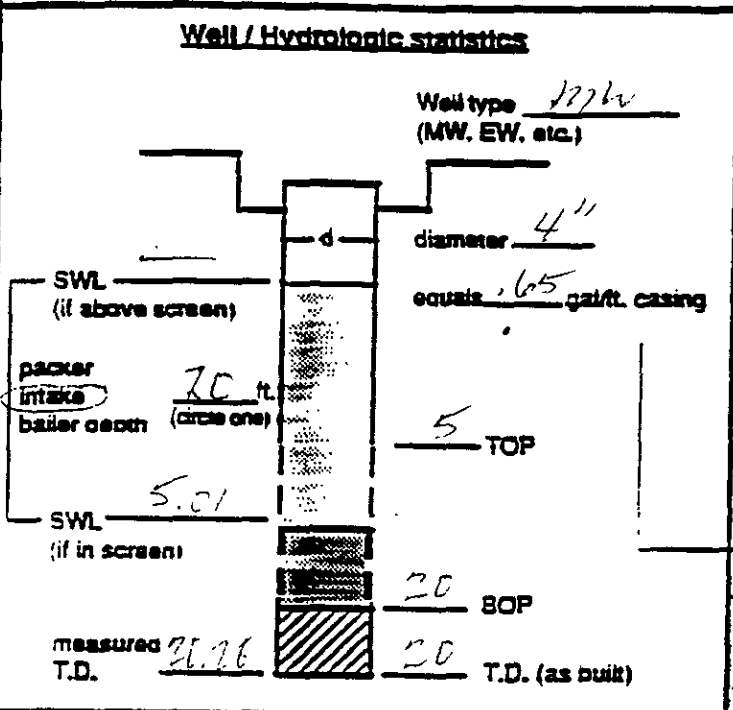
McLaren

# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-2

PROJECT TARGET Dublin EVENT Quarterly SAMPLER D. WATTS DATE 9/28/93



Action	Time	Pump rate	IWL (low visk)
Start pump / Begin	1029	1.17 GPM	
STOP	1818	↓	12.85
(550 Gallons Purged)			
(9/28/93) RE-START	0815	1.45 GPM	5.09
(500 Gallons Purged)			
Stop	1400	↓	19.51
Sampled	1415	:	7.43
(Final IWL)	1425	:	6.01
<b>Purge calculation</b>			
<u>.65</u> gal/ft. * <u>15.27</u> ft. = <u>10</u> gals * <u>4</u> = <u>40</u> gals.			
SWL to BOP or packer to BOP		one volume	purge volume - 3 casings
<b>Head purge calculation (Airlift only)</b>			
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>1050</u>
Actual volumes purged	<u>105</u>
Well yield (see below)	<u>HY</u>
COC #	<u>03559</u>
Sample I.D.	<u>220221-24</u>
Analysis	<u>220/10 (with) (1/28/93)</u>
Lab	<u>MRT</u>

**Additional comments:**  
 USED MEASURED T.D. FOR PURGE CALCULATION.  
 50% RECOVERY: 12.64  
 40% RECOVERY: 2.06 SAMPLE TURBIDITY: 11.25

Gallons purged *	TEMP °C/°F (circle one)	EC (us/cm)	PH	TURBIDITY (NTU)
1. 900	83.4	1360	7.54	7.65
2. 950	85.3	1370	7.29	8.31
3. 1000	86.4	1390	7.24	16.30
4. 1050	87.2	1410	7.35	8.13
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 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.





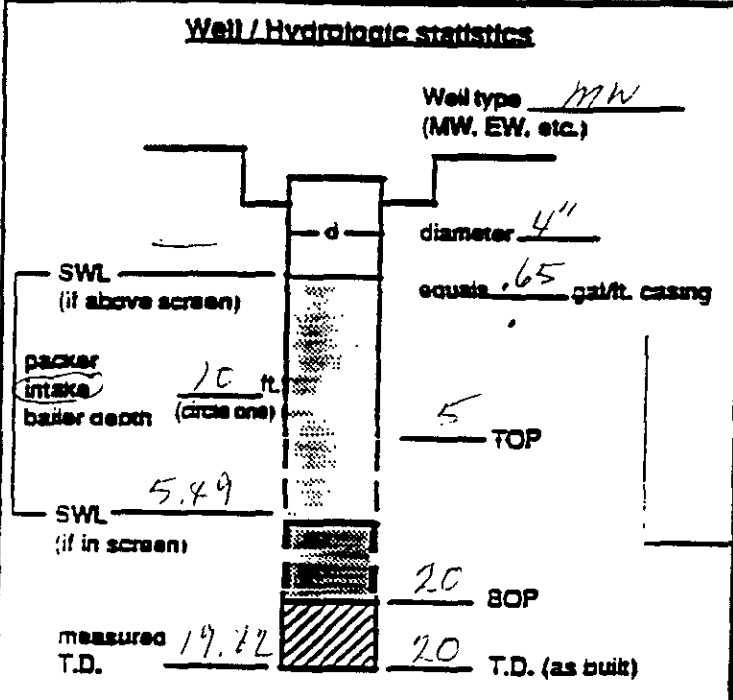
McLaren

# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-4

PROJECT TARGET DUBLIN EVENT Quarterly SAMPLER D. WATTS DATE 9/28/93



Action	Time	Pump rate	IWL (low visk)
Start pump / Begin	1226	1.6 gpm	
	1236	1.6 gpm	8.21
	1246	1.6 gpm	8.49
	1256	1.6 gpm	8.71
	1306	1.6 gpm	9.11
Stop	1306		9.11
Sampled	1310		8.05
(Final IWL)	1320		6.21

**Purge calculation**

.65 gal/ft. \* 14.11 ft. = 10 gals \* 2 = 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)	<u>MY</u>
COC #	<u>03559</u>
Sample I.D.	<u>220213-16</u>
Analysis	<u>737 (5 LWT)</u>
Lab	<u>INBT</u>

Additional comments:  
USED DESIGN T.D. FOR Purge Calculation.  
50% RECOVERY: 12.94  
20% RECOVERY: 8.91 SAMPLE TURBIDITY: 1.79

Gallons purged *	TEMP °C (°F) (circle one)	EC (us / cm)	PH	TURBIDITY (NTU)
1. 10	76.8	830	7.30	4.09
2. 20	76.4	720	7.50	2.06
3. 30	76.5	690	7.56	1.13
4. 40	77.4	690	7.47	2.30
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.



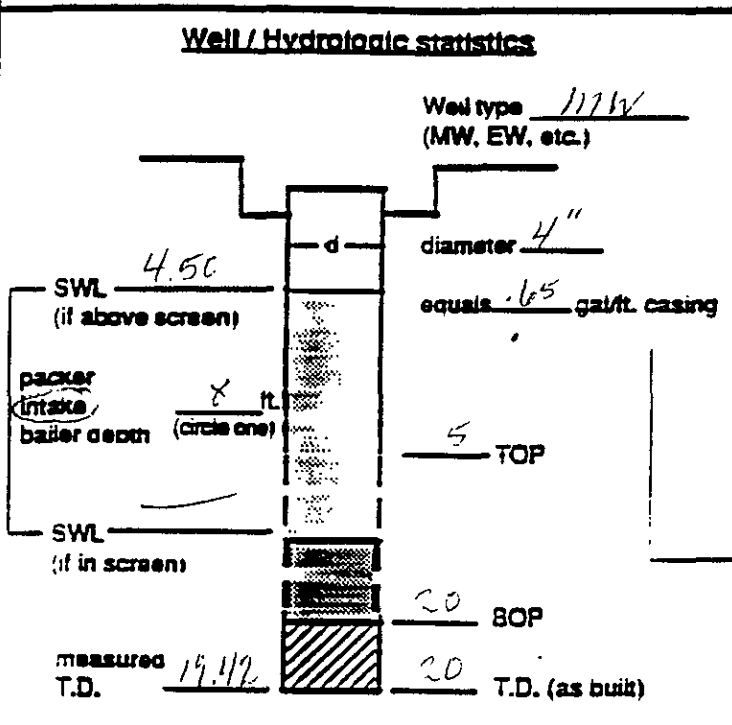
McLaren

# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION M1-5

PROJECT TARGET DUBLIN EVENT Quarterly SAMPLER D. WATTS DATE 9/28/93



Action	Time	Pump rate	IWL (low view)
Start pump / Begin	1053	1.6 gpm	
	1103	1.5 gpm	6.21
	1113	1.6 gpm	6.29
	1123	1.6 gpm	6.38
	1133	1.6 gpm	6.50
Stop	1133		6.50
Sampled	1140		
(Final IWL)	1150		4.83

**Purge calculation**

.65 gal/ft. \* 15.50 ft. = 10 gals \* 3 = 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)	<u>HY</u>

Additional comments:  
USED DESIGN T.D. FOR PURGE CALCULATION.

50% RECOVERY: 12.25

20% RECOVERY: 7.60 SAMPLE TURBIDITY: 1.23

COC #	<u>13559</u>	
Sample I.D.	<u>Analysis</u>	<u>Lab</u>
<u>220205-18</u>	<u>TPH/6 (LWGT)</u>	<u>MRT</u>
<u>220209-12</u>	<u>TPH/6 (LWGT)</u>	<u>↓</u>

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
1. <u>10</u>	<u>77.5</u>	<u>1280</u>	<u>7.52</u>	<u>1.18</u>
2. <u>20</u>	<u>74.6</u>	<u>1290</u>	<u>7.49</u>	<u>0.49</u>
3. <u>30</u>	<u>73.2</u>	<u>1260</u>	<u>7.44</u>	<u>1.26</u>
4. <u>40</u>	<u>72.5</u>	<u>1240</u>	<u>7.43</u>	<u>1.70</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.



McLaren

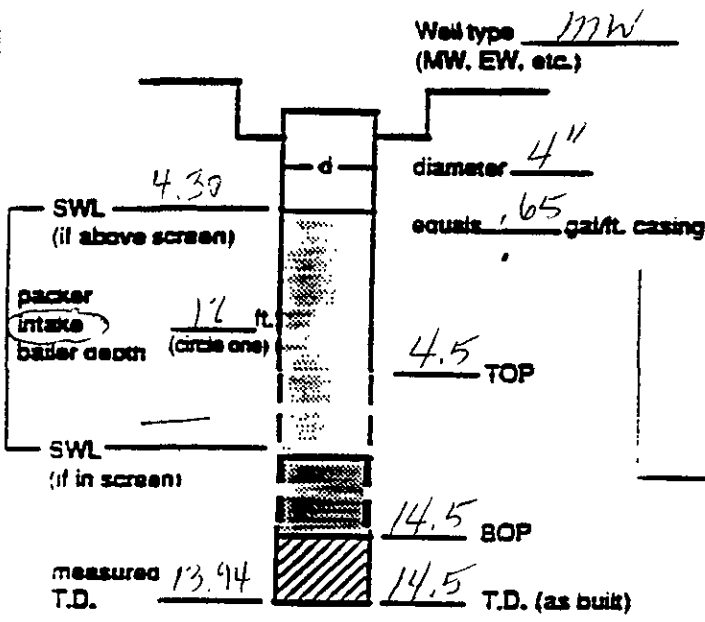
# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-6

PROJECT TARGET DUBLIN EVENT Quarterly SAMPLER D. WATTS DATE 9/28/93

### Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low vick)
Start pump / Begin	1405	1 GPM	
	1412	1 GPM	8.92
	1419	1 GPM	9.88
	1426	1 GPM	10.23
	1433	1 GPM	10.67
Stop	1433		10.67
Sampled	1447		6.15
(Final IWL)	1456		4.57

**Purge calculation**

.65 gal/ft. \* 10.20 ft. = 7 gals \* 3 = 28 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  
BAUER used to sample.  
MIDDLEBURY PETROLEUM, CDR.

Actual gallons purged	<u>28</u>
Actual volumes purged	<u>4</u>
Well yield (see below)	<u>MY</u>
COC #	<u>03559</u>
Sample I.D.	<u>200219-5D</u>
Analysis	<u>PH/6 (uwt)</u> <u>TOC (uwt)</u>
Lab	<u>MBT</u>

Additional comments:  
USED DESIGN T.D. FOR PURGE CALCULATION.  
50% RECOVERY: 9.40  
80% RECOVERY: 6.34 Sample Turbidity: 6.64

Gallons purged *	TEMP °C/°F (circle one)	EC (us/cm)	PH	TURBIDITY (NTU)
1. 11	84.1	400	7.70	15.71
2. 14	83.4	410	7.46	3.73
3. 11	83.9	440	7.50	2.00
4. 14	83.6	460	7.56	1.53
5.				

\* Take measurement at approximately each casing volume purged.

⊕ 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.

**ATTACHMENT II**  
**ANALYTICAL DATA SHEETS**  
**AND**  
**CHAIN-OF-CUSTODY**

# 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: 040122617000

Sample Description: *MW-2*

Lab Project-ID Number: 8164-5

Sample Number: 220221

Date Sampled: 09/29/93

Date Received: 10/01/93

Date Analyzed: 10/04/93

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	{a} 5.0	3.0
Toluene	BRL	0.30
Ethylbenzene	3.8	0.30
1,2-Xylene	BRL	0.30
1,3-Xylene	0.76	0.30
1,4-Xylene	3.3	0.30
Total Petroleum Hydrocarbons - Gasoline	81	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	95	63 - 134
a,a,a-Trifluorotoluene (FID)	99	63 - 134

## Comments

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

*{a} The data is reported from a different analytical run on 10/05/93 at a 10 fold dilution to obtain a result within linear range.*

Approved by: \_\_\_\_\_

Date: 10-11-93

# 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: *040122617000*

Sample Description: *MW-4*

Lab Project-ID Number: *8164-3*

Sample Number: *220213*

Date Sampled: *09/28/93*

Date Received: *10/01/93*

Date Analyzed: *10/04/93*

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	2.8	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)	123	63 - 134
a,a,a-Trifluorotoluene (FID)	{a} 149	63 - 134

## Comments

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

*{a} Sample surrogate recovery is beyond acceptance limits. The presence of a matrix interferent is suspected in the sample.*

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

Approved by: *[Signature]*

Date: *10-11-93*

# 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: *040122617000*

Sample Description: *MW-5*

Lab Project-ID Number: *8164-2*

Sample Number: *220209*

Date Sampled: *09/28/93*

Date Received: *10/01/93*

Date Analyzed: *10/04/93*

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)	97	63 - 134
a,a,a-Trifluorotoluene (FID)	101	63 - 134

## Comments

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

Approved by: *KLP* Date: *10-11-93*



# 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: 040122617000

Sample Description: *MW-6*

Lab Project-ID Number: 8164-4

Sample Number: 220217

Date Sampled: 09/28/93

Date Received: 10/01/93

Date Analyzed: 10/04/93

Analyte	Concentration ug/L (ppb)	Reporting Limit ug/L (ppb)
Benzene	0.46	0.30
Toluene	BRL	0.30
Ethylbenzene	{a} 6.4	3.0
1,2-Xylene	BRL	0.30
1,3-Xylene	4.5	0.30
1,4-Xylene	{a} 8.1	3.0
Total Petroleum Hydrocarbons - Gasoline	230	50

Surrogates	Percent Recovery	Acceptance Limits
a,a,a-Trifluorotoluene (PID)	87	63 - 134
a,a,a-Trifluorotoluene (FID)	111	63 - 134

## Comments

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

*{a} The data is reported from a different analytical run on 10/06/93 at a 10 fold dilution to obtain a result within linear range.*

Approved by: \_\_\_\_\_

Date: 10-11-93



# 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: *040122617000*

Sample Description: *Trip Blank*

Lab Project-ID Number: *8164-1*

Sample Number: *220205*

Date Sampled: *09/28/93*

Date Received: *10/01/93*

Date Analyzed: *10/04/93*

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)	91	63 - 134
a,a,a-Trifluorotoluene (FID)	95	63 - 134

## Comments

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

Approved by: *Kel*

Date: *10-11-93*



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: \_\_\_\_\_ Project Name: MARSH DUBLIN FOR LABORATORY USE ONLY  
 Address: \_\_\_\_\_ Project Number: 04-122617-000 Laboratory Project #: 8164  
 \_\_\_\_\_ Project Location: (State) CA Storage Refrigerator ID: 8  
 Storage Freezer ID: \_\_\_\_\_

Sampler Name: \_\_\_\_\_ Signature: \_\_\_\_\_ PPE Worn in Field: \_\_\_\_\_  
 Relinquished By: \_\_\_\_\_ Date/Time: 9/30/93 1600 Received By or Method of Shipment/Shipment I.D.: EXPRESS-17 Date/Time: 9/30/93 1600  
 Relinquished By: Expressnet Date/Time: \_\_\_\_\_ Received By or Method of Shipment/Shipment I.D.: Expressnet Date/Time: 10/1/93 815  
 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: \_\_\_\_\_

FOR LABORATORY USE ONLY Lab ID	Sample ID Number	Date	Time	Description		Container(s)		Matrix Type	Pres. Type	TAT	TPH/5 (LuFT)	BTEX (LuFT)
				Locator	Depth	#	Type					
1 8164-001	220205-06	9/28/93	1101	Top Blank	NA	4	V	H <sub>2</sub> O	HCl	4	X	X
2	-002		1140	MW-5							X	X
3	-003		1310	MW-4							X	X
4	-004		1447	MW-6							X	X
5	-005	9/29/93	1415	MW-2	NA	4	V	H <sub>2</sub> O	HCl	4	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: Temp OK  
SAMPLES IN TALS (AD) 220205-08 AND 220224 HAVE AIR BUBBLES (AD)  
 SEND DOCUMENTATION AND RESULTS TO (Check one):  
 Project Manager/Office: C. M. LEE / 1264 MEDIT  
 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:
  - TTL 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
  - Semivolatile Metals
  - Pesticide
  - TDS
  - Total Hardness
  - Total Solids
  - TPH/D
  - TPH/G
  - TSS
  - Turbidity

MBT Environmental  
Laboratories

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



Master Builders Technologies

Date: October 11, 1993  
LP #: 8164

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 October 1, 1993, for the project *Target Dublin*.

The analyses requested are:

EPA 8020 (BTEX) and 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,

*Carlton King for:*

Shakoora Azimi  
Laboratory Director, Principal Scientist

## QUALITY CONTROL DEFINITIONS

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**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.

(CN8164)

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QUALITY CONTROL REPORT

METHOD BLANK

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

Date Analyzed: 10/04/93

<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)	105	63 - 134
a,a,a-Trifluorotoluene (FID)	106	63 - 134



QUALITY CONTROL REPORT

METHOD BLANK

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

Date Analyzed: 10/05/93

<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)	101	63 - 134
a,a,a-Trifluorotoluene (FID)	103	63 - 134



# QUALITY CONTROL REPORT

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## METHOD BLANK

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

Date Analyzed: 10/06/93

<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)	100	63 - 134
a,a,a-Trifluorotoluene (FID)	104	63 - 134

**QUALITY CONTROL REPORT**

**Laboratory Control Sample/Laboratory Control Sample Duplicate  
Method 8020 (Modified)**

LP#: 8164

Analyst: TL

Spike Sample ID: LCS/LGSDW-50

Date Of Analysis: 09/30/93

Spike ID Code: W-1-733

Column: DBWax

Surrogate ID Code: W-1-740

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	4.65	116	4.43	111	5	69 - 131	≤20
8020	Benzene	0	4.00	4.74	118	4.41	110	7	72 - 134	≤20
8020	Ethyl Benzene	0	4.00	4.66	116	4.33	108	7	72 - 128	≤20

Spike Recovery = d = ((c-a)/b) x 100  
 Spike Duplicate Recovery = f = ((e-a)/b) x 100  
 Relative Percent Difference = g = (|c-e|)/((c+e) x .5) x 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	4.23	106	4.16	104	63 - 134	

Surrogate % Recovery = j = (i/h) x 100  
 Surrogate Dup % Recovery = l = (k/h) x 100





**QUALITY CONTROL REPORT**

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

Analyst: TL

LP#: 8164

Date of Analysis: 09/30/93

Spike Sample ID: LCS/LCSD W-40

Column: DB 624

Spike ID Code: W-1-760

Instrument #: 6

Surrogate ID Code: W-1-740

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	118	118	111	111	6	100 - 127	≤20

$$\begin{aligned} \text{Spike Recovery} &= d = ((c-a)/b) \times 100 \\ \text{Spike Duplicate Recovery} &= f = ((e-a)/b) \times 100 \\ \text{Relative Percent Difference} &= g = (|c-e|)/((c+e) \times .5) \times 100 \end{aligned}$$

SURROGATE COMPOUNDS	(h)	(i)	(j)	ACCEPTANCE LIMITS
	SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE RECOVERY %	% REC.
a,a,a-Trifluorotoluene	4.00	4.41	110	63 - 134

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



## ABBREVIATIONS USED IN THIS REPORT

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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

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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.

(CN8164)

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