



Joe
6/24/93

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June 15, 1993

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

Dear Ms. Chu:

This letter serves as a letter of transmittal for McLaren/Hart "March 1993 Quarterly Groundwater Monitoring and Interim Remediation Report, Former Alameda Service Station A-558, 7608 Amador Valley Boulevard, Dublin, California." This document was prepared at the request of the Alameda County Health Agency.

As requested, a copy of the Bill of Lading for transporting purged groundwater at the site to an oil recycler is also enclosed. If you have any questions please give us a call at (510) 521-5200.

Sincerely,

Handwritten signature of Campbell McLeod in cursive.

Campbell McLeod
Supervising Geoscientist

Handwritten signature of Clifton Davenport in cursive.

Clifton Davenport, CEG #1455
Principal Geoscientist

Enclosures

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**MARCH 1993 QUARTERLY
GROUNDWATER MONITORING
AND
INTERIM REMEDIATION REPORT
FORMER ALAMEDA SERVICE
STATION A-578
7608 AMADOR VALLEY BLVD.
DUBLIN, CALIFORNIA**

JUNE 4, 1993

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ENVIRONMENTAL ENGINEERING CORPORATION

**MARCH 1993 QUARTERLY GROUND WATER MONITORING REPORT
FORMER ALAMEDA SERVICE STATION A-578
7608 AMADOR VALLEY BOULEVARD
DUBLIN, CALIFORNIA**

INTRODUCTION

This report presents the March 1993 quarterly ground water monitoring results at the former Alameda Service Station A-578, 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 10, 1992. The sampling plan followed recommendations presented in the "June 1992 Quarterly Monitoring and Interim Remediation Report" for the site. Recommendations included a schedule of six episodes of interim remediation and four sampling events between September 1992 and June 1993. This work was verbally approved by Ms. Eva Chu of the Alameda County Health Care Services Agency, Department of Environmental Health, Hazardous Materials division.

Based on McLaren/Hart's December 14, 1992 written recommendations for revising the quarterly monitoring program and Ms. Eva Chu's written approval of December 18, 1992, monitoring wells MW-1 and MW-3 were not sampled. Water elevations were collected in all wells.

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-6 serves as interim remediation of impacted ground water in the area of the former underground fuel tanks.

The work associated with the March quarterly monitoring event included: sampling monitoring wells MW-2, MW-4, MW-5, and MW-6 for the presence of gasoline constituents; plus MW-6 for diesel constituents; collecting water elevations from six monitoring wells (MW-1 through MW-6); and extracting 400 gallons of impacted ground water from monitoring well MW-6.

Ground Water Elevations

Ground water surface elevations were measured prior to sampling and pumping activities on March 24, 1993 (Table 1). This data was used to construct the March 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 divide to form. This flow direction is generally consistent with the observed ground water flow direction in December 1992. Based on the observed contour pattern, MW-2 and MW-4 appear to be downgradient of the former excavation area.

The static depth to ground water ranges from 3.57 to 5.38 feet below ground surface or 336.63 to 336.73 feet above mean sea level. The average hydraulic gradient is approximately 0.012 feet/foot. The March water level measurements indicate that ground water levels have increased in all of the six wells since December 1992, ranging from 1.04 to 1.36 feet, with an average increase of 1.20 feet. Historic ground water elevation data are presented in Table 2.

Interim Remediation

Nine interim remediation episodes have occurred at MW-6, six in conjunction with quarterly sampling. The first remediation event occurred on October 17 and 18, 1991, shortly after MW-6 was constructed. The next four episodes took place during quarterly sampling on December 30 and 31, 1991, March 26 and 27, 1992, June 23 and 24, 1992, and September 24 and 25, 1992. Three interim remediation episodes took place between September and December 1992. On both October 29, 1992 and November 30, 1992, 200 gallons of ground water were extracted from MW-6 as part of a monthly interim remediation schedule. The frequency of interim remediation returned to a quarterly schedule in December 1992 when four hundred gallons of ground water were extracted. The most recent interim remediation occurred during March 1993 quarterly sampling when 400 gallons were removed from the well.

Depth to ground water was measured at the six wells during each day of the nine interim remediation episodes, once before pumping started then again just before pumping stopped for the day. As shown on Table 3, the extraction of ground water from MW-6 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.

Water level measurements taken during March 1993 (Table 3) reveal that the greatest response during the first day of pumping was at MW-4 and MW-2 (decreases of 0.25 and 0.15 feet, respectively). Measurements collected after the second day of pumping showed that MW-4 (0.22 feet) and MW-5 (0.11 feet) registered the most response.

Monitoring Well Sampling Protocol

Ground water samples were collected at MW-2 and MW-5 on March 24, and at MW-4 and MW-6 on March 25, 1993. Prior to sampling MW-2, MW-4 and MW-5, 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 5 NTU's, sampling was

performed using a disposable bailer. At MW-6, in conjunction with the interim remediation, 58 casing volumes were removed prior to sample collection and parameters were collected during the last four of these casing volumes. Sampling event data sheets are enclosed as Attachment I.

Ground water samples were stored in a container filled with ice and delivered to McLaren Analytical Laboratory, 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 the California Department of Health Services (DHS) LUFT Manual Method for total petroleum hydrocarbons as gasoline (TPH/G) and for benzene, toluene, ethyl benzene, and xylenes (BTEX) analyses by EPA Method 8020. A sample from MW-6 was also analyzed for total petroleum hydrocarbons as diesel (TPH/D). Trip blanks were included in the shipments to the laboratory to be analyzed for TPH/G and BTEX.

Monitoring Well Sampling Results

Table 4 and Figure 3 present the analytical results of the ground water samples collected during the March 1993 sampling event. For the first time, benzene and TPH/G concentrations were not detected in a water sample from MW-6, constructed within the excavation at the former fuel tanks. Concentrations of TPH/D were not detected in the water sample from MW-6. Petroleum constituents have been decreasing at MW-6 for four consecutive sampling events. Water samples collected at monitoring well MW-5 did not contain concentrations of either TPH/G or BTEX at or above the reporting limit. Gasoline range TPH were not detected during this sampling episode.

Benzene at 4.3 ppb and ethyl benzene at 0.98 ppb were the only petroleum constituents detected at MW-4. The ground water sample from MW-2 contained 3.2 ppb of benzene and 0.86 ppb of xylenes. MW-6 contained detectable concentrations of ethyl benzene (0.37 ppb) and xylenes (0.88 ppb).

Analytical data appears to support the effectiveness of the interim remediation in decreasing the concentration of petroleum constituents in the ground water near MW-4 and MW-6. The concentration levels of benzene and TPH/G detected at MW-2 in December 1992 (35 and 150 ppb, respectively) were not supported by March 1993 analytical results (<50 and 3.2 ppb, respectively). As shown in Table 4, concentrations of toluene, ethyl benzene and total xylenes decreased between December 1992 and March 1993 at MW-2.

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 is present in monitoring wells MW-4 and MW-2 in 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

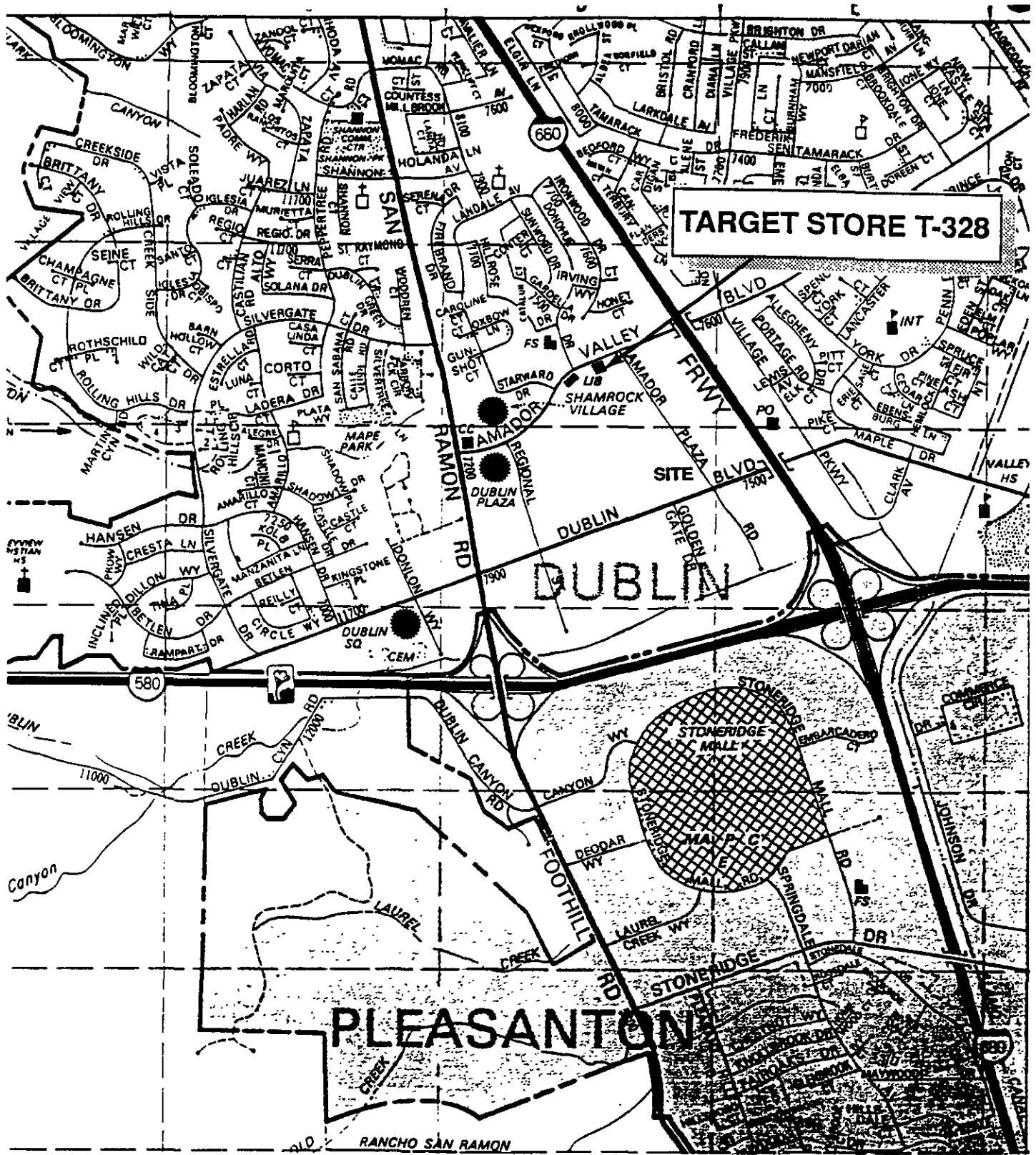
The following conclusions are based on data collected to date:

- No free-floating petroleum product was observed in any of the wells.
- TPH/D was not detected at MW-6.
- The analytical results from water samples collected at MW-6 continue to show a decrease in concentration levels with each of the last four sampling events. Neither benzene nor TPH/G were detected in the March 1993 sampling. The consistent decrease in concentrations of petroleum constituents imply that the interim remediation at MW-6 appears to be cleaning up ground water in the vicinity of MW-6.
- Levels of benzene (35 ppb) and TPH/G (150 ppb) reported in well MW-2 during the December 1992 sampling decreased in March 1993 to historic levels (benzene 3.2 ppb, TPH/G <50 ppm).
- 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 increased an average of 1.20 feet since December 1992.
- 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 petroleum constituents are present in ground water at MW-2.
- The interim remediation at MW-6 has removed a total of approximately 2,900 gallons of ground water and appears to be capable of lowering water levels at other wells on-site.

Future work currently planned at the site includes:

- The interim remediation program schedule will include quarterly extraction of 400 gallons of ground water from MW-6 in June 1993.
- Report describing results of June 1993 sampling will contain recommendations for any future work at the site.

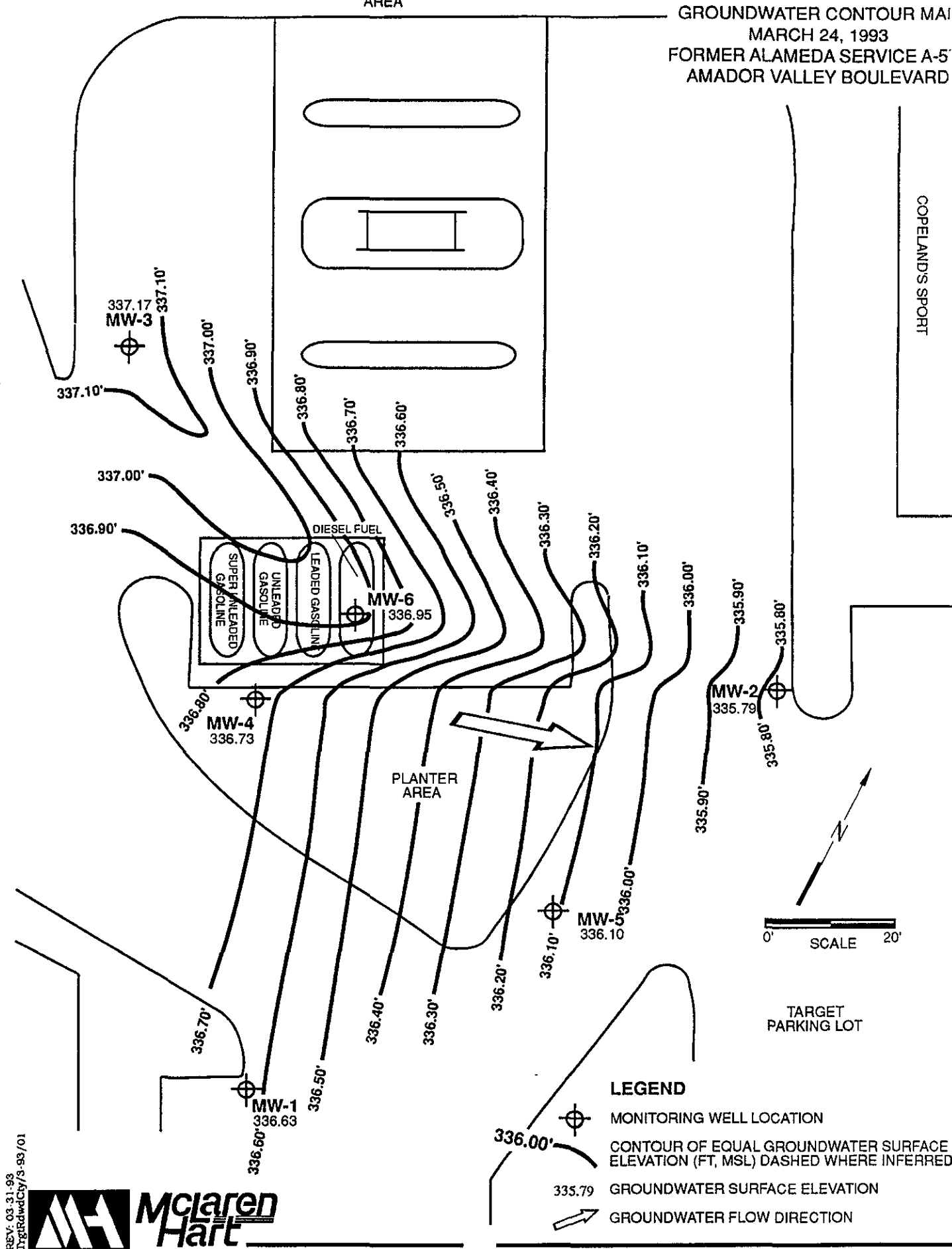
FIGURE 1
SITE LOCATION MAP
TARGET STORE T-328
DUBLIN, CA.



PLANTER AREA

FIGURE 2
GROUNDWATER CONTOUR MAP
MARCH 24, 1993
FORMER ALAMEDA SERVICE A-5
AMADOR VALLEY BOULEVARD


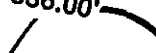

COPELAND'S SPORT



REV: 03.31.93
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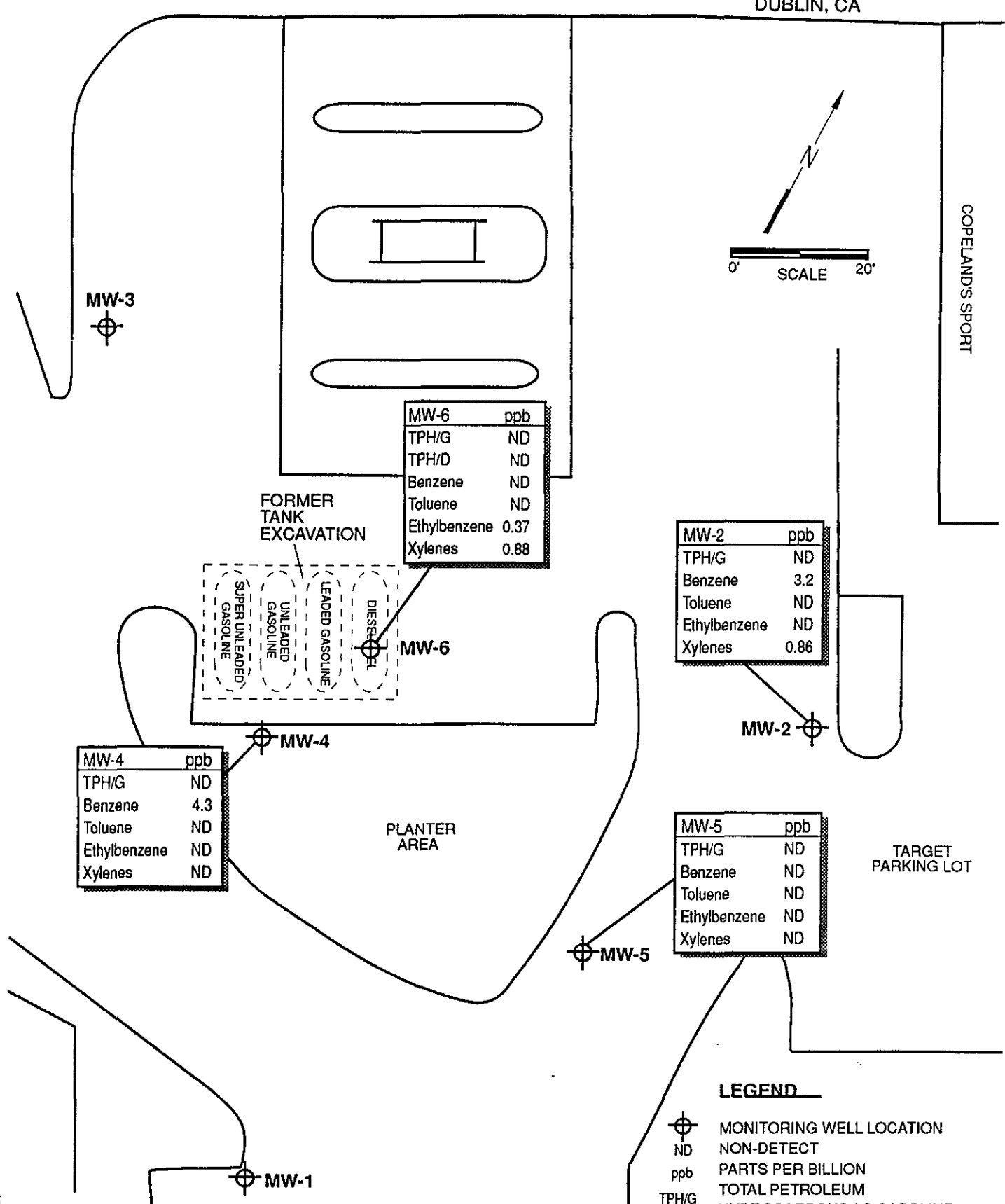
LEGEND

-  MONITORING WELL LOCATION
-  CONTOUR OF EQUAL GROUNDWATER SURFACE ELEVATION (FT, MSL) DASHED WHERE INFERRED
- 335.79 GROUNDWATER SURFACE ELEVATION
-  GROUNDWATER FLOW DIRECTION

GROUNDWATER MONITORING WELL
 CHEMICAL CONCENTRATIONS
 MARCH, 1993
 FORMER ALAMEDA SERVICE STATION A-57E
 DUBLIN, CA

PLANTER AREA

COPELAND'S SPORT

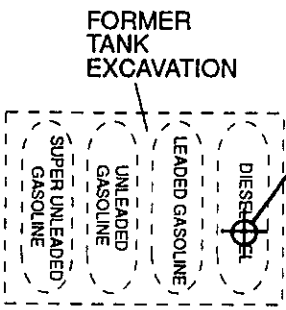


MW-6	ppb
TPH/G	ND
TPH/D	ND
Benzene	ND
Toluene	ND
Ethylbenzene	0.37
Xylenes	0.88

MW-2	ppb
TPH/G	ND
Benzene	3.2
Toluene	ND
Ethylbenzene	ND
Xylenes	0.86

MW-4	ppb
TPH/G	ND
Benzene	4.3
Toluene	ND
Ethylbenzene	ND
Xylenes	ND

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



REV: 04-07-93
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- LEGEND**
- ⊕ MONITORING WELL LOCATION
 - ND NON-DETECT
 - ppb PARTS PER BILLION
 - TPH/G TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
 - TPH/D TOTAL PETROLEUM HYDROCARBONS AS DIESEL

TABLE 1

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

WELL DESIGNATION	SCREENED INTERVAL (feet below grad)	GROUND SURFACE ELEVATION (MSL)*	SCREENED INTERVAL (MSL)	TOP OF CASING ELEVATION (MSL)	STATIC WATER LEVEL 3/24/93 (feet below TOC)	GROUND WATER ELEVATION 3/24/93 (MSL)
MW-1	5-20	340.30	335.30 - 320.30	340.20	3.57	336.63
MW-2	5-20	340.52	335.52 - 320.52	340.27	4.48	335.79
MW-3	5-20	341.67	336.67 - 321.67	341.00	3.83	337.17
MW-4	5-20	342.31	337.31 - 322.31	342.11	5.38	336.73
MW-5	5-20	340.52	335.52 - 320.52	340.09	3.99	336.10
MW-6	4.5-14.5	341.13	336.63-326.63	340.81	3.86	336.95

* 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
		MW-2	340.27	2/28/91	5.46
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
MW-3	341.00			2/28/91	5.61
		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
		MW-4	342.11	2/28/91	7.01
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
MW-5	340.09			6/14/91	5.81
		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
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

* MSL = Mean Sea Level

TABLE 3

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

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

TABLE 3

**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

*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 and 3/24/93
Ground water was pumped from MW-6 at approximately 1.24 gpm during March 1993.

TABLE 4
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	<0.3
	12/92	---	---	---	---	---	---
	3/93	---	---	---	---	---	---
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
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
	12/92	---	---	---	---	---	---
	3/93	---	---	---	---	---	---
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

TABLE 4
(Continued)

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-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
	MW-6	9/91	2,300	---	760	11	360
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

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 dilutions 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	3	24	93	09	10	3.57	SWL	Vault Box Flooded
2	MW-3				09	11	3.83		
3	MW-5				09	12	3.99		
4	MW-2				09	13	4.48		↓
5	MW-4				09	14	5.38		
6	MW-6				09	15	3.86	✓	
7	MW-1				13	37	3.64	SWL	
8	MW-3				13	38	3.97		
9	MW-5				13	39	4.13		
10	MW-2				13	40	4.63		
11	MW-4				13	41	5.63		
12	MW-6	✓	✓	✓	13	42	9.98	✓	Spuzzing
13									
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)²
- 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: J. WATTS

NO.	WELL OR LOCATION	DATE		TIME		MEASUREMENT	CODE	COMMENTS
		MO	DAYR	HR	MIN			
1	MW-1	3	25	09	15	3.53	SWL	
2	MW-3			09	16	3.77		
3	MW-5			09	17	3.97		
4	MW-2			09	18	4.46		
5	MW-4			09	19	5.35		
6	MW-6			09	20	3.79		
7	MW-1			11	25	3.62		
8	MW-3			11	26	3.93		
9	MW-5			11	27	4.10		
10	MW-2			11	29	4.53		
11	MW-4			11	30	5.60		
12	MW-6	∇	∇	∇	11 31	10.36	∇	PURGING
13								
14								
15								
16								
17								
18								
19								
20								

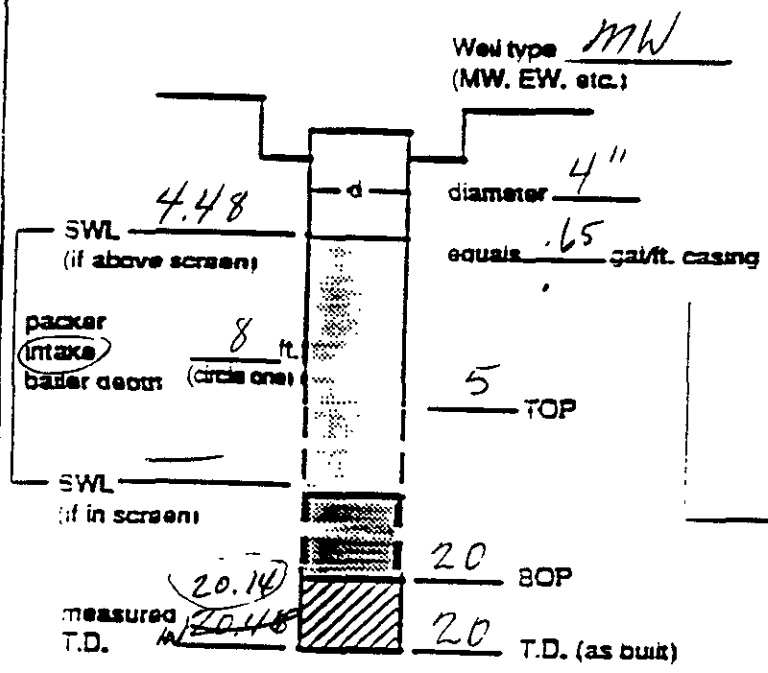
CODES:

- *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)²
- 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 DATE 3/24

Well / Hydrologic statistics



Action	Time	Pump rate	(l)
Start pump / Begin	1215	1.6 PM	
	1225	1.6 PM	6
	1236	1.6 PM	6
	1246	1.6 PM	6
	1256	1.6 PM	7
Stop	1258	↓	5
Sampled	1310		
(Final IWL)	1315		4

Purge calculation
 $.65 \text{ gal/ft.} \cdot 15.66 \text{ ft.} = 10.25 \text{ gals} \times 3 = 41$

SWL to BOP or packer to BOP one volume purge volume 3 casing

Head purge calculation (Airlift only):
 gal/ft.: _____ ft.: _____ gals.: _____
 packer to SWL: _____

Equipment Used / Sampling Method / Description of Event:
Centrifugal Pump @ Disposable Baillet.
USED MEASURED T.D. FOR PURGE CALCULATION.

Actual gallons purged	<u>41</u>
Actual volumes purged	<u>4</u>
Well yield (see below)	<u>17Y</u>
COC #	<u>35134</u>
Sample I.D.	<u>Analysis</u>
<u>235855-58</u>	<u>TPH-6/14/15</u>
	<u>STRY/14/15</u>
	<u>M</u>

Additional comments:
50% RECOVERY: 12.31
80% RECOVERY: 7.61 SAMPLE TURBIDITY: 2.89

Gallons purged	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
1. <u>10</u>	<u>64.8</u>	<u>1600</u>	<u>7.21</u>	<u>1.38</u>
2. <u>21</u>	<u>67.0</u>	<u>1650</u>	<u>7.12</u>	<u>1.43</u>
3. <u>31</u>	<u>69.0</u>	<u>1710</u>	<u>7.26</u>	<u>1.20</u>
4. <u>41</u>	<u>69.4</u>	<u>1640</u>	<u>7.22</u>	<u>1.75</u>
5.				

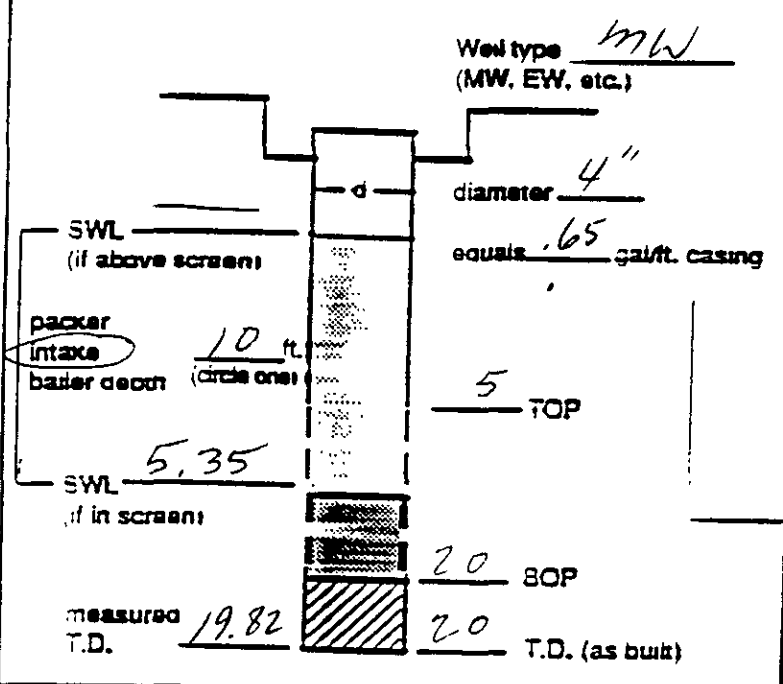
* Take measurement at approximately each casing volume purged.

⊕ 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 rec. unable to pu 3 volumes.

PROJECT TRIZLET DUBLIN EVENT Quarterly SAMPLER D. WATTS DATE 3/25

Well / Hydrologic statistics



Action	Time	Pump rate	(for
Start pump / Begin	0957	1.0 GPM	
	1007	1.0 GPM	8.
	1017	1.0 GPM	8.
	1027	1.0 GPM	8.
	1037	1.0 GPM	9.
Stop	1040		9.
Sampled	1044		7.
(Final IWL)	1050		6.
Purge calculation			
<u>.65</u> gal/ft. * <u>14.65</u> ft. = <u>10</u> gals <u>28</u> = <u>40</u>			
SWL to BOP or packer to BOP	one volume	purge vol:	3 casing
Head purge calculation (Airlift only):			
gal/ft.:	ft.:	gals.:	
packer to SWL:			

Equipment Used / Sampling Method / Description of Event:
CENTRIFUGAL Pump @ Disp. BAILEY.
USED DESIGN T.D. FOR Purge Calculation.
TEMPERATURE ELEVATED DUE TO CENTRIFUGAL operation.

Actual gallons purged	<u>40</u>
Actual volumes purged	<u>4</u>
Well yield (see below)	<u>MY</u>
COC #	<u>35134</u>
Sample I.D.	<u>235859-62</u>
Analysis	<u>TPH-6/LUGT</u> <u>BTX/LUGT</u>
La	<u>MY</u>

Additional comments:
50% RECOVERY: 12.67
80% RECOVERY: 8.28 SAMPLE TURBIDITY: 0.98

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
1. 10	63.7	1080	7.30	2.68
2. 20	65.4	1110	7.28	3.50
3. 30	66.5	1120	7.35	1.84
4. 40	67.9	1140	7.40	0.98
5.				

* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop

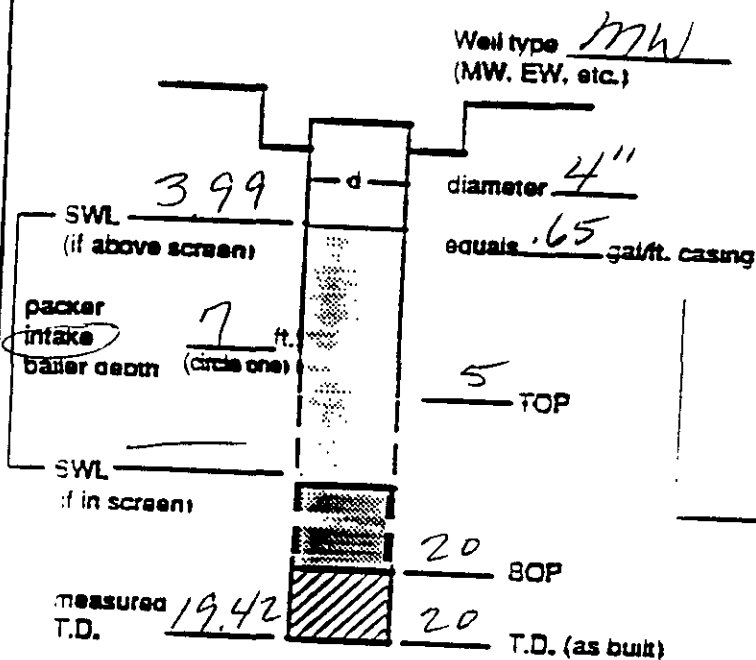
MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - Able to purge 3 volumes by returning later or next day.

VLY - Minimal recr. unable to pt. 3 volumes.

PROJECT TARGET DUBLIN EVENT QUANTITY Quarterly SAMPLER D. WATTS DATE 3/2

Well / Hydrologic statistics



Action	Time	Pump rate
Start pump / Begin	1040	1 GPM
	1050	1 GPM
	1101	1 GPM
	1111	1 GPM
	1122	1 GPM
Stop	1123	
Sampled	1130	
(Final IWL)	1135	

Purge calculation
.65 gal/ft. * 16.01 ft. = 10.5 gals * 4 = 42

SWL to BOP or packer to BOP one volume purge vol: 3 casing

Head purge calculation (Airlift only):
 gal/ft.: _____ ft.: _____ gals: _____

packer to SWL: _____

Equipment Used / Sampling Method / Description of Event:

CENTRIFUGAL PUMP @ DISPOSABLE BAILER.
USED DESIGN T.D. FOR PURGE CALCULATION.

Actual gallons purged 42

Actual volumes purged 4

Well yield (see below) \oplus HY

COC # 35134

Sample I.D. 234897-900 Analysis TPH-G/LUFT (TRIP) BTX/LUFT (BLK) H

235851-54 TPH-G/LUFT BTX/LUFT

Additional comments:

50% RECOVERY: 11.99

80% RECOVERY: 7.19

SAMPLE TURBIDITY: 0.55

Gallons purged *	TEMP °C (°F) (circle one)	EC (us / cm)	PH	TURBIDITY (NTU)
1. <u>10</u>	<u>69.8</u>	<u>1640</u>	<u>7.20</u>	<u>3.19</u>
2. <u>21</u>	<u>70.3</u>	<u>1700</u>	<u>6.89</u>	<u>2.46</u>
3. <u>31</u>	<u>70.7</u>	<u>1680</u>	<u>6.98</u>	<u>2.06</u>
4. <u>42</u>	<u>70.1</u>	<u>1670</u>	<u>6.94</u>	<u>1.18</u>
5.				

* Take measurement at approximately each casing volume purged.

\oplus HY - Minimal W.L. drop

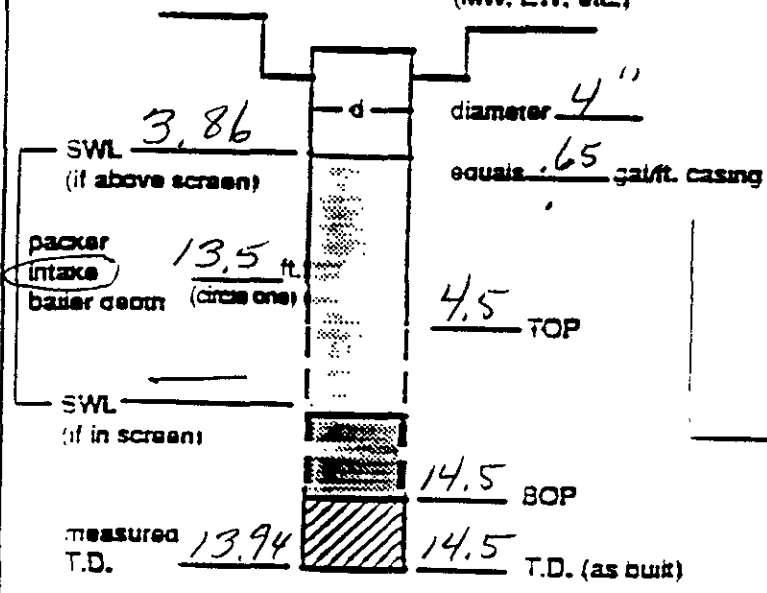
MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - Able to purge 3 volumes by returning later or next day.

VLY - Minimal recharge unable to purge 3 volumes.

PROJECT TARGET DUBLIN EVENT Quarterly SAMPLER D. WATP DATE 3/24/93

Well / Hydrologic statistics



Action	Time	Pump rate	(lit)
Start pump / Begin	1050	1.33 GPM	
STOP (3/24/93)	1400	↓	9
ICE-START (3/25/93)	0935	1.15 GPM	3
		↓	
Stop	1145	1.15 GPM	14
Sampled	1202		
(Final IWL)	1220		
Purge calculation			
<u>.65</u> gal/ft. * <u>10.64</u> ft. = <u>6.92</u> gals x 3 = <u>20.76</u>			
SWL to BOP or packer to BOP		one volume	purge volume 3 casing
Head purge calculation (Airlift only):			
gal/ft.:	ft.:	gals.:	
packer to SWL:			

Equipment Used / Sampling Method / Description of Event:
CENTRIFUGAL PUMP W/ DISP. BAILER.
USED DESIGN T.D. FOR PURGE CALCULATION.

Actual gallons purged	<u>400</u>
Actual volumes purged	<u>57.8</u>
Well yield (see below)	<u>MY</u>

COC #	<u>35134</u>	
Sample I.D.	<u>Analysis</u>	<u>La</u>
<u>235863-66</u>	<u>TPH-4/LUT</u>	<u>17</u>
<u>235867-68</u>	<u>BTEX/LUT</u>	
	<u>TPH/D</u>	<u>4</u>

Additional comments: SLIGHT PETROLEUM ODOOR

50% RECOVERY: 9.18

90% RECOVERY: 5.98 SAMPLE TURBIDITY: 6.79

Gallons purged *	TEMP °C/°F (circle one)	EC (us/cm)	PH	TURBIDITY (NTU)
1. <u>370</u>	<u>65.3</u>	<u>767</u>	<u>7.09</u>	<u>5.99</u>
2. <u>380</u>	<u>65.9</u>	<u>772</u>	<u>7.18</u>	<u>2.41</u>
3. <u>390</u>	<u>65.8</u>	<u>753</u>	<u>7.20</u>	<u>3.34</u>
4. <u>400</u>	<u>66.1</u>	<u>765</u>	<u>7.24</u>	<u>1.58</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 rec: unable to pt 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:	<u>Target Dublin</u>	Project Number:	<u>04.0122617.001</u>
Sample Description:	<u>MW-2</u>	Lab Project-ID Number:	<u>7349-003</u>
Sample Number:	<u>235856</u>	Date Sampled:	<u>03/24/93</u>
Date Received:	<u>03/26/93</u>	Date Analyzed:	<u>03/30/93</u>

<u>ANALYTE</u>	<u>CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	3.2	0.30
Toluene	BRL	0.30
Ethyl Benzene	BRL	0.30
1,2-Xylene	BRL	0.30
1,3-Xylene	BRL	0.30
1,4-Xylene	0.86	0.30
Total Petroleum Hydrocarbons - Gasoline	BRL	50

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	102	80 - 120
a,a,a-Trifluorotoluene (FID)	98	80 - 120

Comments: Non-target analytes are present on the chromatograph.

Approved By: NM Date: 4-6-93
 Nancy McDonald, Quality Control Chemist

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

080492btxtphgw



ENVIRONMENTAL ENGINEERING CORPORATION



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: 04.0122617.000

Sample Description: MW-4

Lab Project-ID Number: 7349-004

Sample Number: 235862

Date Sampled: 03/25/93

Date Received: 03/26/93

Date Analyzed: 03/30/93

<u>ANALYTE</u>	<u>CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	4.3	0.30
Toluene	BRL	0.30
Ethyl Benzene	0.98	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

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	119	80 - 120
a,a,a-Trifluorotoluene (FID)	121 (a)	80 - 120

Comments: Non-target analytes are present on the chromatograph.
 (a) Sample surrogate recovery is beyond acceptance limits.
 All other quality control is acceptable.

Approved By: Nancy McDonald Date: 4-6-93
 Nancy McDonald, Quality Control Chemist

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

080492btxtphgw



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: 04.0122617.000

Sample Description: MW-5

Lab Project-ID Number: 7349-002

Sample Number: 235852

Date Sampled: 03/24/93

Date Received: 03/26/93

Date Analyzed: 03/30/93

<u>ANALYTE</u>	<u>CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	BRL	0.30
Toluene	BRL	0.30
Ethyl Benzene	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

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	95	80 - 120
a,a,a-Trifluorotoluene (FID)	93	80 - 120

Comments:

Approved By: UM Date: 4-6-93
 Nancy McDonald, Quality Control Chemist

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

080492btxtphgw



VOLATILE AROMATIC COMPOUNDS

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

Project Name: <u>Target Dublin</u>	Project Number: <u>04.0122617.006</u>
Sample Description: <u>MW-6</u>	Lab Project-ID Number: <u>7349-005</u>
Sample Number: <u>235865</u>	Date Sampled: <u>03/25/93</u>
Date Received: <u>03/26/93</u>	Date Analyzed: <u>03/30/93</u>

<u>ANALYTE</u>	<u>CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	BRL	0.30
Toluene	BRL	0.30
Ethyl Benzene	0.37	0.30
1,2-Xylene	BRL	0.30
1,3-Xylene	0.41	0.30
1,4-Xylene	0.47	0.30
Total Petroleum Hydrocarbons - Gasoline	BRL	50

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	96	80 - 120
a,a,a-Trifluorotoluene (FID)	96	80 - 120

Comments: Non-target analytes are present on the chromatograph.

Approved By: UM Date: 4-6-93
 Nancy McDonald, Quality Control Chemist

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

080492btxtphgw



TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Diesel by LUFT
Preparation Method: Modified LUFT {a}

Project Name: Target Dublin

Project Number: 04.0122617.000

Sample Description: MW-6

Lab Project- ID Number: 7349-005

Sample Number: 235867

Date Sampled: 03/25/93

Date Received: 03/26/93

Date Extracted: 03/30/93

Date Analyzed: 04/04/93

Batch Number: 930330-0302

PETROLEUM FRACTION

CONCENTRATION
mg/L (ppm)

REPORTING LIMIT
mg/L (ppm)

Total Petroleum Hydrocarbons -
Diesel

BRL

0.50

Comments: (a) Hexane rather than carbon disulfide is used for extraction.

Approved By: um
Nancy McDonald, Quality Control Chemist

Date: 4-6-93

The cover letter and attachments are integral parts of the report.

012793TPHDW



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: 04.0122617.00

Sample Description: Trip Blank

Lab Project- ID Number: 7349-001

Sample Number: 234898

Date Sampled: 03/24/93

Date Received: 03/26/93

Date Analyzed: 03/30/93

<u>ANALYTE</u>	<u>CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	BRL	0.30
Toluene	BRL	0.30
Ethyl Benzene	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

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	91	80 - 120
a,a,a-Trifluorotoluene (FID)	89	80 - 120

Comments: Non-target analytes are present on the chromatograph.

Approved By: UM Date: 4-10-93
 Nancy McDonald, Quality Control Chemist

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

080492btxtphgw





CHAIN OF CUSTODY RECORD

SEE SIDE 2 FOR COMPLETE INSTRUCTIONS

Ship To: McClaren Labs
 Address: 3083 Gold Canal Dr.
Rancho Cordova, CA 95670

Project Name: TARGET DUBLIN
 Project Number: 04.0122617.000
 Project Location: (State) CA

FOR LABORATORY USE ONLY
 Laboratory Project #: 7349
 Storage Refrigerator ID: 1-31, 1
 Storage Freezer ID: _____

Sampler Name: D. WATTS
 Relinquished By: D. Watts
 Relinquished By: Express 2lt
 Relinquished By: _____

Signature: [Signature]
 Date/Time: 3/26/93 0900
 Date/Time: _____
 Date/Time: _____

PPE Worn in Field: D
 Received By or Method of Shipment/shipment I.D.: EXPRESS IT
 Date/Time: 3/26/93 0900
 Received By or Method of Shipment/shipment I.D.: Kelly [Signature]
 Date/Time: 3/26/93 2:30

- Common Analytical Methods
- 413.1
 - 413.2
 - 418.1
 - 418.1 Short Method
 - 420.1
 - 502.2
 - 503E
 - 524.2
 - 601
 - 602
 - 604
 - 608
 - 610
 - 624
 - 625
 - 8010
 - 8015
 - 8015 Mod.
 - 8020
 - 8021
 - 8040
 - 8080
 - 8100
 - 8240
 - 8270
 - 8310
 - Alkalinity
 - BTEX
 - Chloride
 - CLP (see Side 2)
 - COD
 - Color
 - Conductivity
 - 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
 - Org. Lead
 - Org. Mercury
 - Percent Moisture
 - Percent Solid
 - Perchlorate
 - pH
 - Phosphates
 - Phosphorus
 - Sulfate
 - Sulfide
 - Sulfides
 - TCLP:
 - VOA
 - Semivolatile
 - Metals
 - Pesticide
 - TDS
 - Total Hardness
 - Total Solids
 - TPH/O
 - TPH/G
 - TSS
 - Turbidity

Sample Disposal (check one)
 Laboratory Standard
 Other

Level of QC (see Side 2)
 1 2 3 4
 5 6 7

Write in Analysis Method →

FOR LABORATORY USE ONLY		Sample ID		Date	Time	Description		Container(s)		Matrix Type	Pres. Type	TAT	TPH-6 / L/FT	BTEX / L/FT	TPH - D
Lab ID	Number	Locator	Depth			#	Type								
1	7349-001	234897-900	234897-900	3/24/93	1015	TRIP BANK	NA	4	V	H ₂ O	HCl	4	X	X	
2	-002	235851-54	235851-54	↓	1130	MW-5	↓	↓	↓	↓	↓	↓	X	X	
3	-003	235855-58	235855-58	↓	1310	MW-2	↓	↓	↓	↓	↓	↓	X	X	
4	-004	235859-62	235859-62	3/25/93	1044	MW-4	↓	↓	↓	↓	↓	↓	X	X	
5	-005	235863-66	235863-66	↓	1202	MW-6	↓	↓	↓	↓	↓	↓	X	X	
6	↓	235867-68	235867-68	↓	↓	↓	↓	2	A	↓	NP	↓			X
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
Sample: untrack JOC. 3.26.93

SEND DOCUMENTATION AND RESULTS TO (Check one):
 Project Manager/Office: C. McLeod / ALAMEDA
 Client Name: _____
 Company: _____



**McLarensm
Hart**

ENVIRONMENTAL ENGINEERING CORPORATION

Date: April 6, 1993
LP #: 7349

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

Dear Mr. McLeod:

Enclosed are the laboratory results for the five samples submitted by you to the McLaren Analytical Laboratory on March 26, 1993, for the project *Target Dublin*.

The analyses you requested are:

EPA 8020 (BTEX) and TPH/G (5 - Water)
TPH/D (1 - 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 McLaren Analytical Laboratory. We are looking forward to serving you in the future. Should you have any questions concerning this analytical report or the analytical methods employed, please do not hesitate to call.

Sincerely,

Shakoora Azimi
Laboratory Director, Principal Scientist

QUALITY CONTROL DEFINITIONS

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

LABORATORY CONTROL SPIKES

The LCS Program:

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

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

(DC3 - CN7349)



ENVIRONMENTAL ENGINEERING CORPORATION

QUALITY CONTROL REPORT

METHOD BLANK

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

Date Analyzed: 03/30/93

<u>Analyte</u>	<u>Reporting Limit</u>	<u>Concentration</u>
Benzene	0.30	BRL
Toluene	0.30	BRL
Ethyl Benzene	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



ENVIRONMENTAL ENGINEERING CORPORATION

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

LP#: 7349

Analyst: TL

Spike Sample ID: LCS/LCSDW-33

Date Of Analysis: 03/18/93

Spike ID Code: W-1-667

Column: DBWax

Surrogate ID Code: W-1-716

Instrument #: 6

Matrix: Water Units: ug/L

EPA METHOD	COMPOUNDS	(a)	(b)	(c)	(d)	(e)	(f)	(g)	ACCEPTANCE LIMITS	
		SAMPLE CONC.	SPIKE CONC.	SAMPLE + SPIKE CONC.	SPIKE REC.%	SAMPLE DUP. + SPIKE CONC.	SPIKE DUP. REC. %	RPD%	% REC.	RPD
8020	Chlorobenzene	0	4.00	4.49	112	4.35	109	3	80 - 120	≤20
8020	Benzene	0	4.00	3.31	83	4.01	100	19	80 - 120	≤20
8020	Ethyl Benzene	0	4.00	4.65	116	4.50	112	3	80 - 120	≤20

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

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

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

EPA METHOD	SURROGATE COMPOUNDS	DET.	(h)	(i)	(j)	(k)	(l)	ACCEPTANCE LIMITS	
			SUR. SPIKE CONC.	SAMPLE + SUR. SPIKE CONC.	SUR. REC. %	SAMPLE DUP. + SUR.SPIKE CONC.	SUR. DUP. RECOVERY %	% REC.	
8020	a,a,a,-Trifluorotoluene	PID	4.00	3.22	80	4.28	107	80 - 120	

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

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

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

Analyst: TL

LP#: 7349

Date of Analysis: 03/18/93

Spike Sample ID: LCS/LCSD W-27

Column: DB624

Spike ID Code: W-1-676

Instrument #: 6

Surrogate ID Code: W-1-716

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
Gas	0	100	118	118	116	16	2	80 - 120	≤20

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

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

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

SURROGATE COMPOUNDS	(h)	(i)	(j)	ACCEPTANCE LIMITS
	SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE RECOVERY %	% REC.
a,a,a-Trifluorotoluene	4.00	4.01	100	80 - 120

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

QUALITY CONTROL REPORT

METHOD BLANK

Method: TPH/D
Units: mg/L (ppm)

Date Analyzed: 04/04/93
Date Extracted: 03/30/93
Batch Number: 930330-0302

<u>Petroleum Fraction</u>	<u>Reporting Limit</u>	<u>Concentration</u>
Total Petroleum Hydrocarbons - Diesel	0.50	BRL



ENVIRONMENTAL ENGINEERING CORPORATION

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

LP#: 7349

Analyst: EB

Batch #: 930323-0301

Date Of Analysis: 03/27/93

Spike Sample ID: LCSW/LCSDW #52

Column: DB-1

Spike ID Code: W2-1565 W2-1556

Instrument #: PGC #6

Surrogate ID Code: NA

Matrix: Water Units: mg/L

COMPOUNDS	(a) SAMPLE CONC.	(b) SPIKE CONC.	(c) SAMPLE + SPIKE CONC.	(d) SPIKE REC. %	(e) SAMPLE DUP. + SPIKE CONC.	(f) SPIKE DUP. REC. %	(g) RPD %	ACCEPTANCE LIMITS	
								% REC	RPD
Gasoline	0	2.50	1.55	62	1.38	55	12	26 - 90	≤ 25
Diesel	0	2.50	2.04	82	2.16	86	6	43 - 152	≤ 25

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



ENVIRONMENTAL ENGINEERING CORPORATION

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.

Values for total petroleum hydrocarbons diesel were calculated based only on detected peaks.

Values for total petroleum hydrocarbons gasoline were calculated based only on detected peaks.

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

(DC3-CN7349)