

OCTOBER 1991 QUARTERLY
GROUNDWATER MONITORING AND
WELL INSTALLATION REPORT

TARGET STORE T-328
7608 AMADOR VALLEY BLVD.
DUBLIN, CALIFORNIA

NOVEMBER 12, 1991

94550





LETTER OF TRANSMITTAL

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DATE	11	22	91	JOB NO.
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RE:				

TO: DR. RAVI ARULANATHAN
ALAMEDA COUNTY HEALTH AGENCY

91 NOV 25 10:39

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1		UPDATE OF INTERIM REMEDIATION SCHEDULE AT TARGET STONE DUBLIN

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REMARKS Please call if you have ANY QUESTIONS REGARDING THE REPORT OR LETTER

COPY TO: _____

Campbell M'Leod
(Signature)



November 15, 1991

Mr. Michael Bell
Property Manager
Target Stores
33 South Sixth Street
Minneapolis, Minnesota 55440

Dear Mr. Bell:

**UPDATE OF SCHEDULE FOR INTERIM GROUNDWATER REMEDIATION AT
THE FORMER TARGET STORE T-328 DUBLIN, CALIFORNIA**

This letter presents a revised schedule to the interim remediation plans at Target Store T-328 located in Dublin, California. The interim remediation scope of work and schedule was discussed in a letter to Dr. Ravi Arulanantham of the Alameda County Department of Environmental Health entitled "Recommendations for Quarterly Groundwater Sampling and Interim Remediation at the Former Target Store T-328", dated September 12, 1991. The plan called for continuous extraction from the newly constructed monitoring well (MW-6) over a four day period. However, due to the less-than-expected flow rate, McLaren/Hart proposes that groundwater extraction from the recovery well take place during quarterly monitoring episodes rather than as a separate four day groundwater extraction event.

Groundwater Extraction

Groundwater monitoring well MW-6 was installed in the backfill material of the tank excavation on September 19, 1991. MW-6 was installed for the purpose of removing up to 15,000 gallons of groundwater impacted by petroleum hydrocarbons. The water would then be disposed of at an oil recycler. This plan was approved by the Alameda County Department of Environmental Health and authorized under Target purchase order number 11334. The maximum volume of groundwater to be extracted was estimated assuming that MW-6 would produce 5 to 10 gallons per minute (gpm), and extraction groundwater would take place over a four-day period.

On October 17, 1991, groundwater extraction began as scheduled at MW-6, and it was determined that MW-6 could only produce groundwater at 0.7 gpm. The groundwater extraction was halted after two days because it was cost-inefficient to continue pumping at that low flow rate. Based on the observed sustainable flow rate of 0.7 gpm at MW-6, McLaren/Hart believes it would be more efficient to, and proposes that future groundwater extraction take place during the next three quarterly sampling events, scheduled for December 1991 and March and June 1992.

Mr. Michael Bell
November 15, 1991
Page 2

Approximately 420 gallons of groundwater were extracted during this interim groundwater remediation episode. After this groundwater had been removed, a groundwater sample was collected from MW-6 for analysis for total petroleum hydrocarbons/gasoline (TPH/G) by the Luft Method and benzene, toluene, ethylbenzene and xylene (BTEX) by EPA Method 8020. The analytical results of this sample will be presented in the December 1991 quarterly report.

Recommended Scope of Work

The activities proposed for new interim remediation schedule includes:

- Groundwater will be extracted from MW-6 during the next three scheduled quarterly monitoring episodes. Approximately 400 gallons of groundwater would be removed during each episode. Approximately 1,200 gallons of groundwater would be extracted from MW-6 during the quarterly monitoring year.
- MW-6 would be sampled for TPH/Diesel, TPH/Gasoline and BTEX during quarterly sampling after groundwater removal at MW-6 has been completed.
- The water generated from MW-6 will be temporarily stored on site in a 400-gallon tank and 55-gallon D.O.T. drums. The water will be disposed of as originally proposed at an oil recycler.

Water samples collected at MW-6 will be analyzed for TPH/Diesel as proposed in the October quarterly sampling report. The additional analysis for diesel will take place in the December 1991 and March 1992 sampling episodes. The data will be reviewed and evaluated to determine if further testing for TPH/Diesel is required.

If you have any questions or comments regarding this letter, please do not hesitate to call us at (510) 521-5200.

Sincerely,



Campbell McLeod
Supervising Geologist



Clifton Davenport, CEG #1455
Principal Hydrogeologist

cc: Dr. Ravi Arulanantham
Attachment

1104RN2





**McLaren
Hart**

November 12, 1991

Mr. Jack Franzen
Director of Building Services
Target Stores
33 South Sixth Street
Minneapolis, Minnesota 55440

Dear Mr. Jack Franzen:

**OCTOBER 1991 QUARTERLY GROUNDWATER MONITORING AND WELL
INSTALLATION REPORT FOR TARGET STORE T-328, LOCATED AT 7608
AMADOR VALLEY BOULEVARD, DUBLIN, CALIFORNIA**

Enclosed is the "Quarterly Groundwater Monitoring Report" for the former Target store (T-328) at 7608 Amador Valley Boulevard in Dublin, California. This report was prepared in accordance with McLaren/Hart's work plan entitled "Proposal and Cost Estimate to Conduct Quarterly Groundwater Sampling and Interim Remediation at the Target Store T-328 Dublin, California" dated September 4, 1991. The work plan was approved by the Alameda County Department of Environmental Health. This report includes a summary of the installation of an additional well and associated findings, as approved in the above-mentioned workplan.

If you have any questions or comments, please do not hesitate to call us at (510) 521-5200.

Sincerely

Campbell McLeod
Supervising Geologist

Clifton Davenport, CEG #1455
Principal Hydrogeologist

Enclosure

**OCTOBER 1991 QUARTERLY GROUNDWATER MONITORING REPORT
TARGET STORE T-328
7608 AMADOR VALLEY BOULEVARD
DUBLIN, CALIFORNIA**

INTRODUCTION

This letter report presents the results of the October 1991 quarterly groundwater monitoring activities at the former Target store (T-328) gasoline station located at 7608 Amador Valley Boulevard in Dublin, California. This report was prepared in accordance with McLaren/Hart's work plan entitled "Proposal and Cost Estimate to Conduct Quarterly Groundwater Sampling and Interim Remediation at the Target Store T-328 Dublin, California" dated September 4, 1991 and approved by the Alameda County Department of Environmental Health.

SCOPE OF WORK AND OBJECTIVES

The work associated with this quarterly monitoring event included the installation and development of one monitoring well (MW-6), and sampling of six monitoring wells (MW-1 through MW-6) for petroleum-related hydrocarbons. A map showing the site location is presented as Figure 1 and a site map showing monitoring well locations is included as Figure 2. The quarterly monitoring is conducted to aid in determining the lateral extent of petroleum hydrocarbons in the shallow groundwater beneath the site. The additional well was installed to refine our understanding of groundwater flow patterns and to serve as a vehicle for interim extraction of impacted groundwater, if appropriate.

Well Installation

Monitoring well MW-6 was drilled and constructed on September 19, 1991. The drilling and well construction was supervised in the field by a McLaren/Hart geologist. MW-6 was installed in the former tank excavation area (Figure 2), to monitor water quality and to be used to extract groundwater impacted by petroleum hydrocarbons.

Drilling and well construction was performed using a Mobile B-53 drill rig equipped with hollow stem augers. The boring was drilled and soil samples continuously collected for lithologic description with 8-inch augers to a depth of 15 feet below ground surface (bgs). The borehole was then reamed with 10-inch augers for well construction. The 4-inch diameter well was constructed using a 0.020-inch wire wrap stainless steel well screen, from 4.5 to 14.5 feet bgs, and an 8/20 mesh silica sand filter pack. The filter pack was installed to 0.75 foot above the top of the well screen. A one foot thick transition seal, consisting of 30 mesh sand, was placed above the filter pack, and then a sanitary seal consisting of portland cement and 5% bentonite powder was installed to a depth of 0.5 feet below grade. The casing was fitted with a locking pressure cap, and a traffic rated vault box was installed to complete the well construction. The top of casing, vault box rim, and ground surface of MW-6 were then surveyed to a common benchmark.

Table 1 presents well construction and survey details for the six wells. A lithologic log and a well construction as-built for MW-6 are included in this report as Attachment I.

Soil generated during the drilling activities was stored on-site in two 55-gallon drums. A composite sample has been collected from the drums, and the soil will be properly disposed of once the analytical results have been evaluated and disposal options determined.

Well Development

Monitoring well MW-6 was developed on September 23, 1991. The well was developed using a centrifugal pump, surge block tool, and bailer. Sixteen casing volumes were removed from the well. Development was conducted until the turbidity was below 100 NTU. The well produced water at 0.7 gallons per minute during development. The well development log is presented in Attachment 1.

Groundwater Elevations

The groundwater surface elevations were collected on September 26 and 27, 1991, and are presented in Table 1. This data was used to construct the September 1991 groundwater contour map, presented as Figure 2. The inferred groundwater flow direction is generally toward the east-northeast with local variations, which may be related to the former tank excavation. Based on the observed contour pattern, MW-2 and MW-4 both appear to be downgradient of the former excavation area.

The depth to groundwater ranges from 5.92 to 7.81 feet below ground surface or 334.17 to 334.71 feet above mean sea level. The hydraulic gradient is approximately 0.007 feet/foot.

Monitoring Well Sampling

Groundwater samples were collected at MW-1, MW-2, MW-3, and MW-5 on September 26, and at MW-4 and MW-6 on September 27, 1991. Prior to sampling, three casing volumes were purged from each well using a centrifugal pump and the temperature, pH, electric conductivity, and turbidity were measured after each casing volume was removed. These parameters had stabilized, with the turbidity below 100 NTU, before sampling was performed using a disposable bailer.

The groundwater samples were stored in a container filled with ice and delivered to McLaren/Hart 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 (DHS) LUFT Manual Method for Total Petroleum Hydrocarbons as gasoline (TPH/G), and for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) analyses by EPA Method 8020. Trip blanks were included in the shipments to the laboratory to be analyzed for TPH/G and BTEX.

GROUNDWATER QUALITY SAMPLING AND ANALYTICAL RESULTS

The analytical results of the groundwater sampling are presented in this section. Also discussed are lithologic observations and analytical results from the soil boring for MW-6.

Monitoring Well Sampling Results

Table 2 presents the analytical results of the groundwater samples collected during this sampling event as well as the February and June 1991 sample results. Figure 3 presents this quarter's chemical concentrations for each monitoring well.

Water samples collected at monitoring wells MW-1, MW-3, and MW-5 did not contain concentrations of either TPH/G or BTEX at or above the reporting limit. Benzene and ethylbenzene were detected in samples from MW-2 at 5.0 parts per billion (ppb), and 0.64 ppb, respectively. Benzene, ethylbenzene, and xylenes were detected in groundwater from MW-4 at 100 ppb, 45 ppb, and 8.1, respectively. The highest petroleum concentrations were detected in sample from MW-6 which contained 2,300 ppb TPH/G, 760 ppb benzene, 11 ppb toluene, 360 ppb ethylbenzene, and 236 ppb total xylenes. A review of the data presented in Table 2 reveals the concentrations in MW-2 and MW-4 have decreased since the June sampling event.

The trip blank sample did not contain TPH/G or BTEX at concentrations at or above the reporting limits. The analytical data sheets and chain-of-custody records for the groundwater samples are included as Attachment II.

The DHS Maximum Contaminant Levels (MCLs) for these compounds in drinking water are: 5 ppb benzene; 2,000 ppb toluene; 680 ppb ethylbenzene; and 1,750 ppb total xylenes. The Federal MCL for toluene is 100 ppb. There is no state action level for TPH/G. Benzene is present in monitoring wells MW-2, MW-4, and MW-6 in concentrations in excess of its MCL. However, the MCL concentrations are drinking water standards and are presented for purposes of comparison. As previously stated in the Phase I report, the groundwater beneath the site is apparently not used for drinking water or other beneficial uses.

Lithologic Observations and Analytical Results

During the drilling of MW-6, saturated soil was first encountered at 8 feet bgs. When sounded on September 27, 1991, the depth to groundwater was 6.45 feet bgs. The level at which groundwater equilibrated after well construction at MW-1 through MW-5 was also higher than where saturated soil was first encountered. These observations, recorded after well construction, indicate that MW-6 is screened in a semi-confined aquifer.

During construction of the well, soil samples were monitored for organic vapor with a photoionization detector (PID). These recordings are presented on the lithologic log in Attachment I. Organic vapors were not reported above 10 ppm in the vadose zone. The highest reported concentration was 395 ppm at 13 feet.

A composite sample was collected from the soil cuttings resulting from construction of MW-6 and analyzed for organic lead, TPH/G, BTEX, and Total Petroleum Hydrocarbons/Diesel (TPH/D) before disposal at a local Class III Landfill. The TPH/D analysis was performed because this borehole was drilled where the former diesel tank was located. The composited soil sample from MW-6 cuttings contained 78 ppm of TPH/D.

As discussed in the "Results of the Phase I Investigation for Target Store T-328" dated April 16, 1991, water samples from MW-1 through MW-4 and soil samples from SB-1 through SB-4 were analyzed for the presence of diesel hydrocarbons. Diesel hydrocarbons were not detected in any of the water samples or in SB-1, SB-2, or SB-3. Diesel hydrocarbons were detected at 24 ppm at 5.5 to 6.0 feet in SB-4, located near MW-6.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on the data collected to date:

- As shown on Figure 2, the apparent groundwater flow direction at the site is generally to the east-northeast, with local variations.
- Based on the analytical results of composited samples from MW-6, diesel hydrocarbons are present in the soil at this location.
- The first analytical results from water samples collected at MW-6 reported relatively high petroleum chemical concentrations of TPH/G and benzene.
- The addition of MW-6 gives additional insight into the presence of petroleum-related chemicals detected in MW-4 and MW-2. Groundwater flow patterns indicate that both of these wells are downgradient of the former tank excavation area.
- The September 1991 analytical data indicates that chemical concentrations in MW-2 and MW-4 have decreased since the June sampling event. Concentrations in MW-4 have decreased significantly from the previous analytical results. The concentration of benzene in MW-2 had dropped to the MCL value (5 ppb).
- Based on the analytical results from MW-3, no petroleum chemicals appear to be migrating in the groundwater beneath the site from off-site locations.
- Based on the analytical results from MW-1 and MW-5, no petroleum hydrocarbons are present in the groundwater in a crossgradient direction southeast of the former tank excavation.

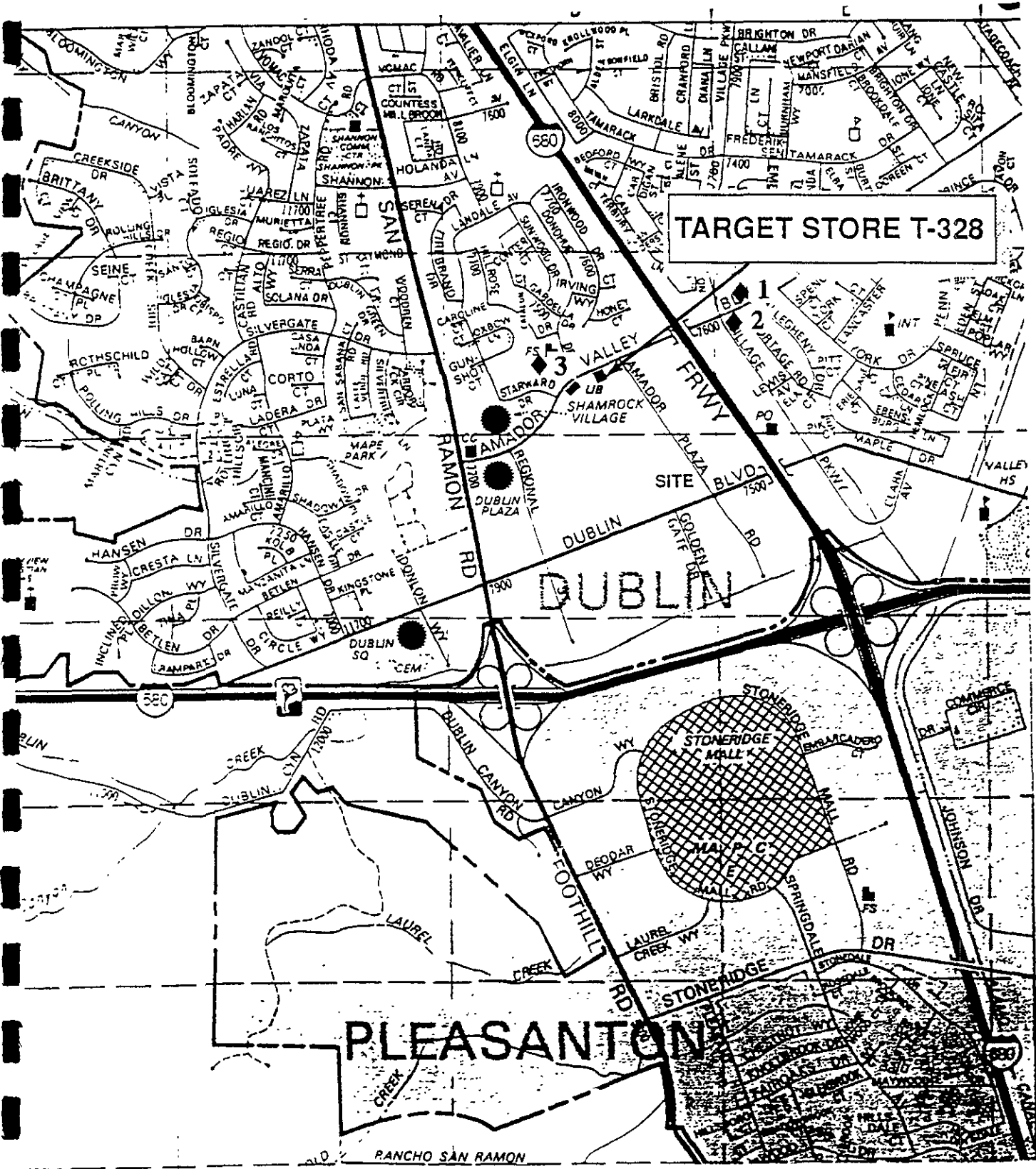
Based on the above conclusions, McLaren/Hart recommends:

- Quarterly monitoring of all six wells should be continued. Additionally, analysis of TPH/Diesel should be conducted at monitoring well MW-6 for the

next two quarters (December 1991 and March 1992). At that time the data will be evaluated to determine if additional testing is required.

- Groundwater extraction from MW-6 in the area of the tank excavation should be conducted as proposed.

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



TARGET STORE T-328

- 1 UNOCAL SERVICE STATION
- 2 FORMER SHELL SERVICE STATION
- 3 DSRD #1 (FIRE STATION)



FIGURE 2
 GROUNDWATER CONTOUR MAP
 SEPTEMBER 26 & 27, 1991
 TARGET STORE GASOLINE STATION
 AMADOR VALLEY BOULEVARD

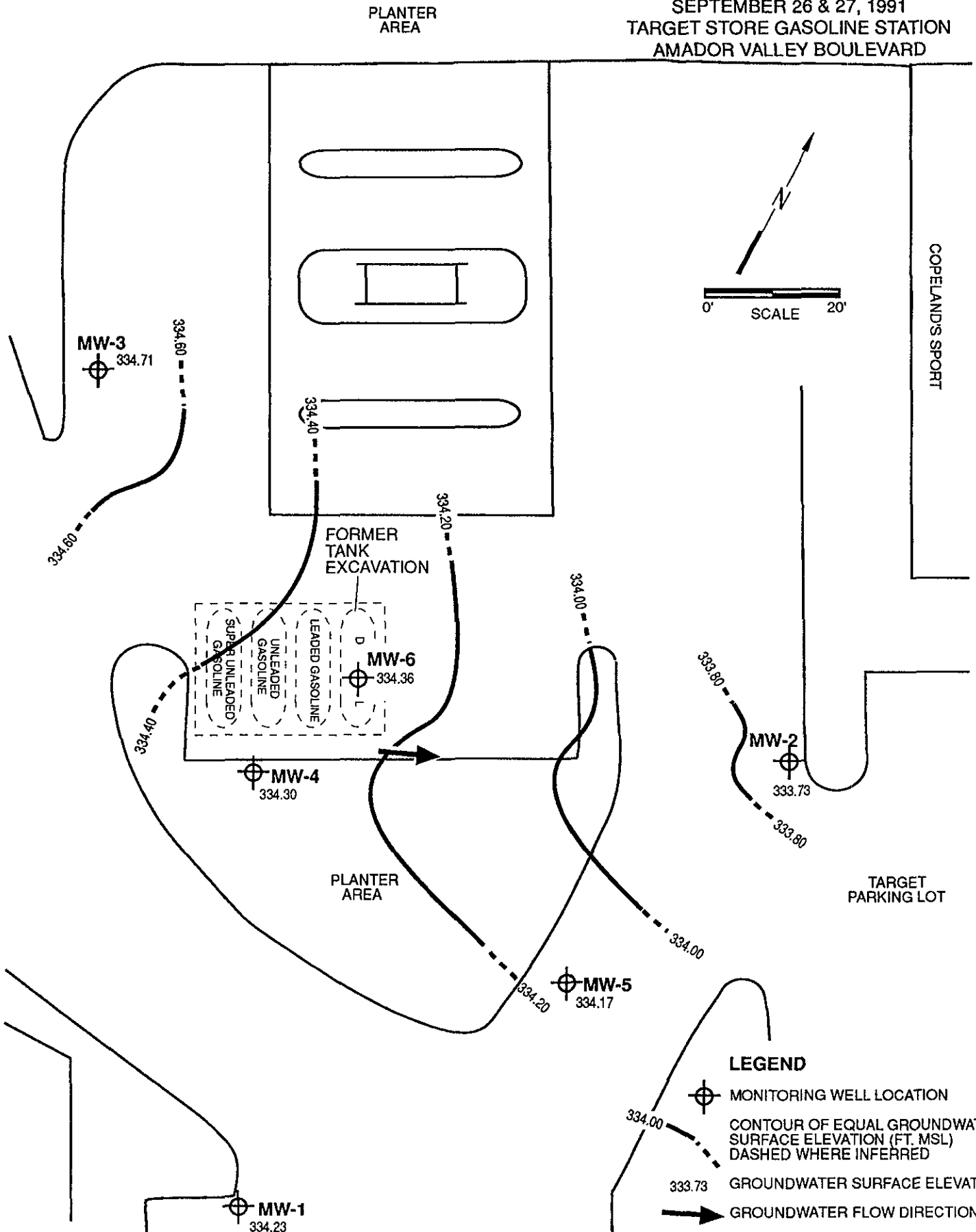
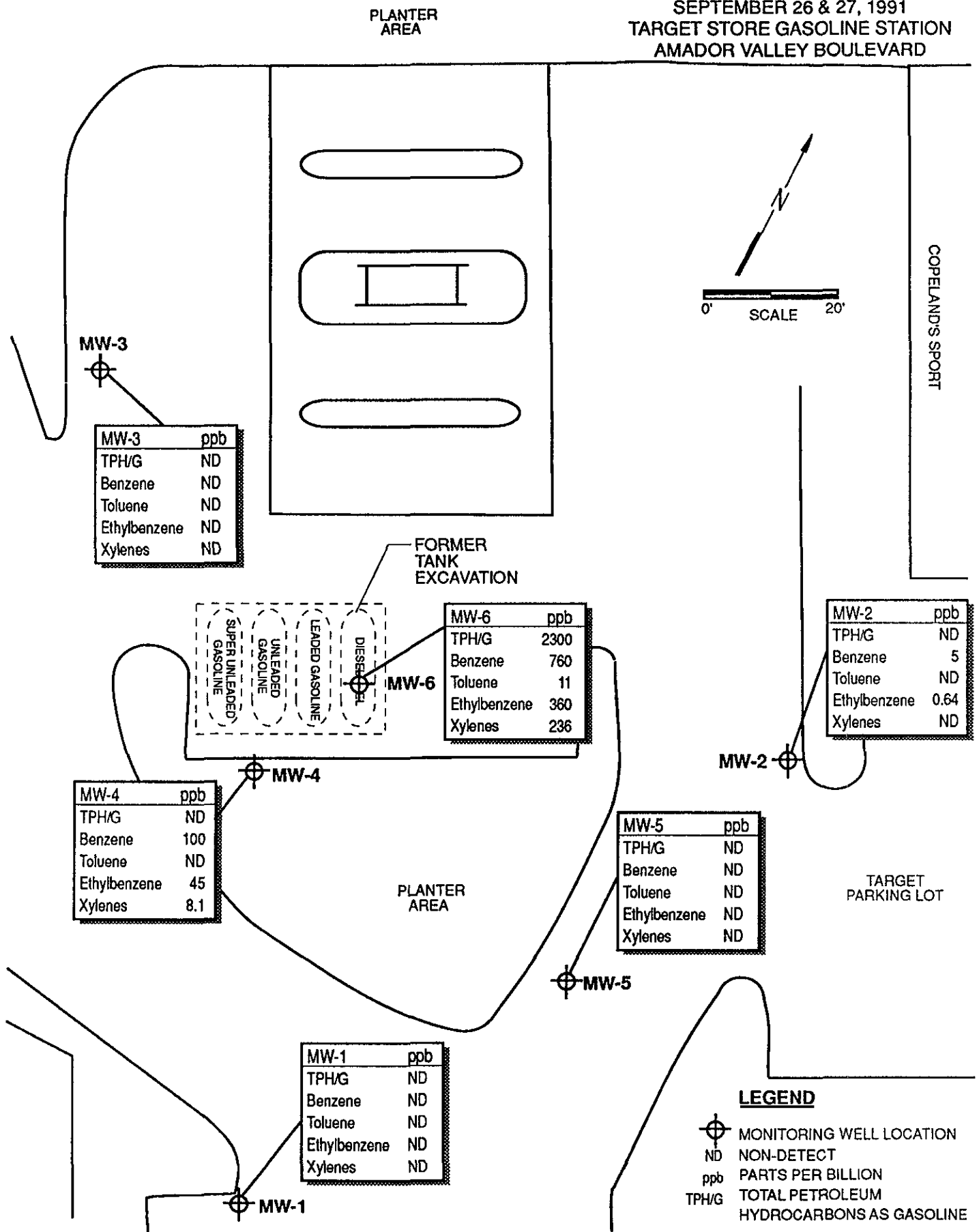


FIGURE 3
 GROUNDWATER MONITORING WELL
 CHEMICAL CONCENTRATIONS
 SEPTEMBER 26 & 27, 1991
 TARGET STORE GASOLINE STATION
 AMADOR VALLEY BOULEVARD

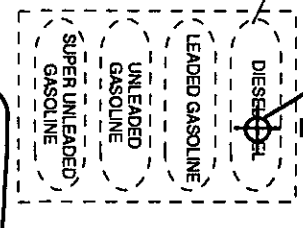


MW-3

MW-3	ppb
TPH/G	ND
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylenes	ND

PLANTER AREA

FORMER TANK EXCAVATION



MW-6

MW-6	ppb
TPH/G	2300
Benzene	760
Toluene	11
Ethylbenzene	360
Xylenes	236

MW-2	ppb
TPH/G	ND
Benzene	5
Toluene	ND
Ethylbenzene	0.64
Xylenes	ND

MW-2

MW-4	ppb
TPH/G	ND
Benzene	100
Toluene	ND
Ethylbenzene	45
Xylenes	8.1

MW-4

PLANTER AREA

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

MW-5

TARGET PARKING LOT

MW-1	ppb
TPH/G	ND
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylenes	ND

MW-1

LEGEND

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

TABLE 1

WELL CONSTRUCTION DETAILS AND GROUNDWATER SURFACE ELEVATIONS
TARGET STORE, DUBLIN

WELL DESIGNATION	SCREENED INTERVAL (feet below grade)	GROUND SURFACE ELEVATION (MSL)*	SCREENED INTERVAL (MSL)	TOP OF CASING ELEVATION (MSL)	STATIC WATER LEVEL 9/26/91 (feet below grade)	GROUNDWATER ELEVATION 9/26/91 (MSL)
MW-1	5-20	340.30	335.30-320.30	340.20	5.97	334.23
MW-2	5-20	340.52	335.52-320.52	340.27	6.54	333.73
MW-3	5-20	341.67	336.67-321.67	341.00	6.29	334.71
MW-4	5-20	342.31	337.31-322.31	342.11	7.81	334.30
MW-5	5-20	340.52	335.52-320.52	340.09	5.92	334.17
MW-6	4.5-14.5	341.13	336.63-326.63	340.81	6.45	334.36

* Feet above mean sea level

TABLE 2
 ANALYTICAL RESULTS OF GROUNDWATER SAMPLES (ppb)
 TARGET STORE GASOLINE STATION
 DUBLIN, CALIFORNIA

<u>WELL DESIGNATION</u>	<u>DATE</u>	<u>TPH/G</u>	<u>BENZENE</u>	<u>TOLUENE</u>	<u>ETHYL BENZENE</u>	<u>TOTAL XYLENES</u>
MW-1	2/91	<50	<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
MW-2	2/91	50	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
MW-3	2/91	<50	<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
MW-4	2/91	6,000	680	<20	160	250
	6/91	6,100	680	<25	150	<25
	9/91	<50	100	<0.5	45	8.1
MW-5	6/91	<50	<0.5	<0.5	<0.5	<0.5
	9/91	<50	<0.5	<0.5	<0.5	<0.5
MW-6	9/91	2,300	760	11	360	236

ATTACHMENT I

SOIL DRILLING LOG

SB/MW # : MW-6
 # D- 23085
 Page 1 of 1
 Sampler: M. CHRISTENSEN



SIGNATURE OF SAMPLER

PROJECT TARGET - DUBLIN LOCATION 25' N NE from MW-4
 TOC ELEVATION _____ (MSL) DATE(S) 9/19/91 TOTAL DEPTH 15.0'
 MONITORING DEVICE 580B OVM, LEL, DREAGER SCREENED INTERVAL 4.5' - 14.5'
 SAMPLING METHOD 5.0' CORE BARREL SUBCONTRACTOR & EQPT GREGG DRILLING MOBILE B-53
 PERCENTAGE ORDER: (GRAVEL,SAND,SILT,CLAY) MEMO _____
 MEMO LEL- 3% DRILL CUTTINGS; BENZENE DREAGER - 7 ppm DRILL CUTTINGS.

Depth Below Surface (ft.)	Penetration Results		Sampler Interval (ft.)	Sample ID #	PID reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
	Blows 6"-6"-6"	BPF								
2.5			0.0-5.0		2.2	0.0' - 12.0' SILTY GRAVEL with SAND: (50,35,15,0); light yellowish brown (10YR6/4); fine grained; angular to sub-angular gravel; well graded; dense; slightly moist.		GM	2.75'	Vault Box Locking Cap Portland Cement 4" ID Sch 40 PVC Blank Casing
5			5.0-10.0		2.9	5.0' - (45,35,15,5); brown (10YR5/3).		GM	3.75'	30 Mesh Sand Bridge
7.5						8.0' - Saturated.			4.5'	4" ID Wire Wrap Stainless Steel Screen 0.020" Slot
10			10.0-15.0		6.1	10.0' - Product Sheen on sample and cuttings.		SW		11" Borehole
12.5					395	12.0' - 13.0' SAND with GRAVEL: (15,80,5,0); variegated; fine to coarse grained; well graded; dense; saturated. Product Sheen.		CH		8/20 Mesh Sand Pack
15					35.1	13.0' - 15.0' CLAY with SAND: (0,20,40,40); grayish brown (2.5Y5/2) streaked with gray (2.5Y6/0) and light gray (10YR 7/1); high plastic fines; fine sand; stiff moist.			14.5' 15.0'	TD

Campbell M. Reed
 SIGNATURE OF FIELD SUPERVISOR AND REVIEWER
 SUPERVISING GEOLOGIST
 TITLE _____

Chitra Danyant
 SIGNATURE OF REVIEWER
 PRINCIPAL HYDROGEOLOGIST CEG # 1455
 TITLE _____

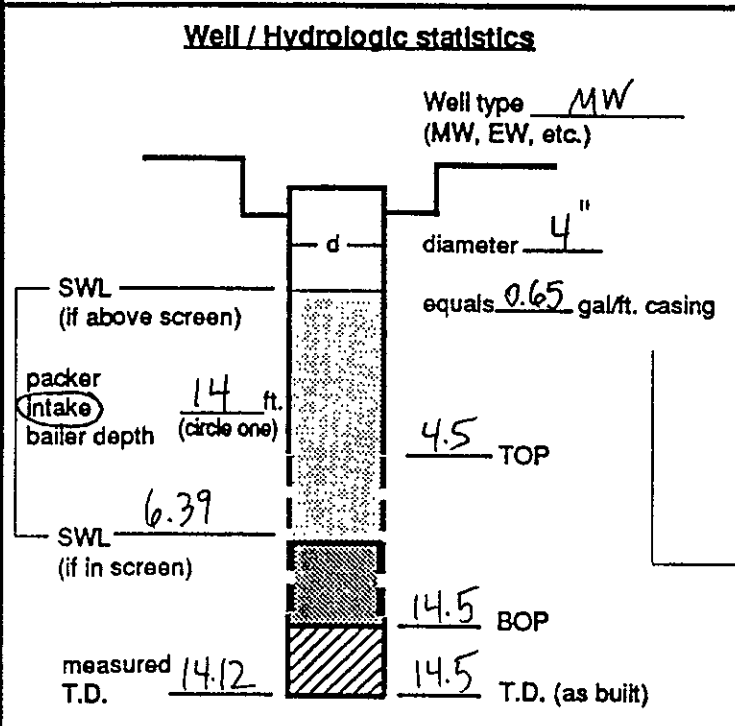


WELL DEVELOPMENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-6

PROJECT Target Dublin SAMPLER CGW DATE 9/23/91



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1143	0.86 GPM	
	1200		10.51
	1215		11.27
	1215	1.6 GPM	
STOP	1221		13.81
START	1255	0.75 GPM	6.40
	1315		9.73
Stop	1405		10.66
Sampled			
(Final IWL)			

Purge calculation

$0.65 \text{ gal/ft.} \times 8.11 \text{ ft.} = 5.3 \text{ gals} \times 10 = 53 \text{ gals.}$

SWL to BOP or one packer to BOP volume

purge volume 10 casings

Head purge calculation (Airlift only)

gal/ft. * ft. = gals.

packer to SWL

Actual gallons purged _____

Actual volumes purged _____

Well yield \oplus HY/MY

(see below)

Equipment Used / Sampling Method / Description of Event/Comments:

2" bailer
4" surge block
centrifugal pump
PID

Bailed first to determine amount and size of any sediment in casing. Little or no sediment. Surged casing to flush filter pack. Began pumping below 1 GPM. Increased to 0.69 gpm to de-water and determine recharge rate. Full recovery in 30 minutes. Surged again. Continue purging.

Gallons purged *	TEMP °C(°F) (circle one)	EC (µs/cm)	Ph	TURBIDITY (NTU)	After 10 vols, all parameters stable except turbidity. Continue monitoring turbidity.
1. 5	81.6	2,930	7.35	offscale	
2. 10	82.6	1,943	7.19	"	
3. 15	82.5	1,944	7.09	"	
4. 20	82.3	1,923	7.01	92.6	
5. 25	81.9	1,919	7.00	56.1	
6. 30	76.9	1,839	7.04	offscale	increased GPM
7. 35	81.7	2,060	7.08	"	reduced GPM
8. 40	81.3	1,955	7.08	"	
9. 45	80.6	1,990	6.96	"	
10. 50	80.6	1,937	6.93	139.2	
11. 55	80.1	1,946	6.95	70.5	
12. 60	-	-	-	37.6	

* 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.

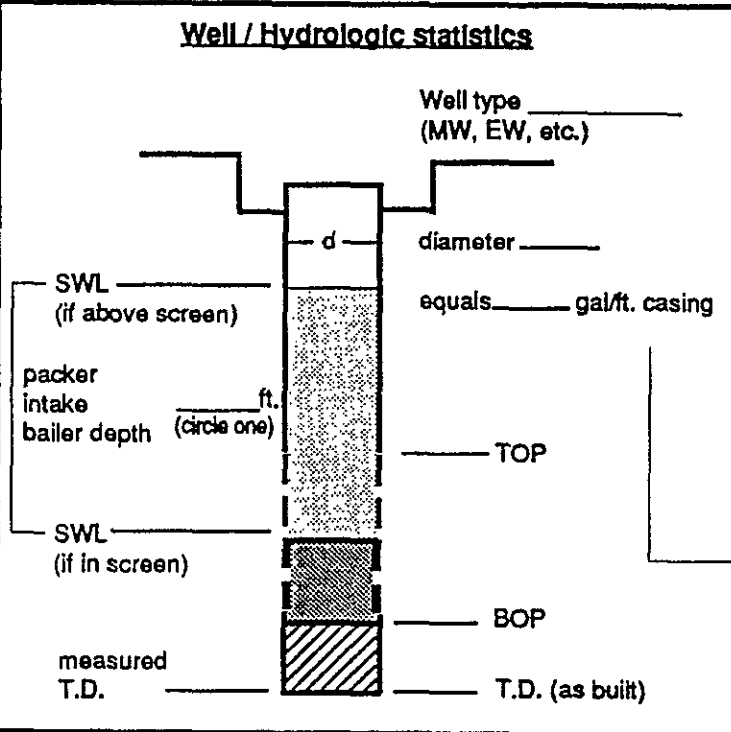


WELL DEVELOPMENT DATA SHEET

(fill out completely)

WELL OR LOCATION _____

PROJECT _____ SAMPLER _____ DATE _____



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin			
Stop			
Sampled			
(Final IWL)			

Purge calculation

gal/ft. * ft. = gals x 10 = gals.

SWL to BOP or packer to BOP one volume purge volume- 10 casings

Head purge calculation (Airlift only)

gal/ft. * ft. = gals.

packer to SWL

Actual gallons purged _____

Actual volumes purged _____

Well yield ⊕ (see below) _____

Equipment Used / Sampling Method / Description of Event/Comments:

Ideal pump rate in the 0.70 to 0.75 GPM range.

Gallons purged *	TEMP °C/°F (circle one)	EC (µs / cm)	Ph	TURBIDITY (NTU)		
13. 65	-	-	-	19.52		
14. 70	-	-	-	12.92		
15. 75	-	-	-	6.70		
16. 80	-	-	-	4.61		
17. 85	-	-	-	4.57		
6.						
7.						
8.						
9.						
10.						
11.						
12.						

* 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.

ATTACHMENT II



Date: October 15, 1991
LP #: 4998

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

Dear Mr. McLeod:

Enclosed are the laboratory results for the seven samples submitted by you to the McLaren Analytical Laboratory on September 28, 1991, for the project *Target Dublin*.

The analysis you requested is:

EPA 8020 and TPH/G (7 - Waters)

The report consists of the following sections:

1. A copy of the chain of custody
2. Quality Control Definitions and Report
3. Comments
4. Analytical results
5. Copy of final billing submitted to accounting.

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,

A handwritten signature in cursive script that reads 'Anthony S. Wong'.

Anthony S. Wong, Ph.D.
Director, Laboratory/Managing Principal



CHAIN OF CUSTODY RECORD

P6 1/4

22.1.00

FOR LABORATORY USE ONLY

Laboratory Project No.: 4998 Secured: Yes No
 Storage Refrigerator ID: 8
 Storage Freezer ID: _____

Project Name: Target DUBLIN Project #: 122606 Sampler: Chris Walsh Chris Walsh
 Relinquished by: (Signature and Printed Name) Chris Walsh Received by: (Signature and Printed Name) Fedex Date: 9/27/91 Time: 12:45
 Relinquished by: (Signature and Printed Name) FED EX Received by: (Signature and Printed Name) [Signature] Date: 9/28/91 Time: 1000
 Relinquished by: (Signature and Printed Name) _____ Received by: (Signature and Printed Name) Logged By Kathleen Fontaine Date: 9/30/91 Time: 09:55
 Relinquished by: (Signature and Printed Name) _____ Received by: (Signature and Printed Name) _____ Date: _____ Time: _____

SHIP TO:
 McLaren Analytical Laboratory
 11101 White Rock Road
 Rancho Cordova, CA 95670
 (916) 638-3696
 FAX (916) 638-2842

Method of Shipment: FEDEX
 Shipment ID: 1217410526

Circle or Add Analysis(es) Requested

- 601/8010 (Halogenated Volatiles-GC)
- 602/8020 (Aromatic Volatiles-GC)
- 604/8040 (Phenols-GC)
- 608/8080 (Pesticides/PDB-GC)
- 610/8100 (PNA-GC)
- 624/8240 (Volatiles-GC/MS)
- 625/8250 (BNA-GC/MS)
- TPH(G) (Gasoline-GC)
- TPHD (Diesel-GC)
- 418-1 (IR)
- 8015 Modified (GC)
- Metals-Total a
- Metals-Soluble a
- Fluoride/Perchlorate
- Chloride/PH
- TDS/Percent Solid
- Specific Conductivity (EC)

a) Identify specific metals requested under Special Instructions

Sample ID Number	Sample Description		Description	Analysis Requested												Container(s)		FOR LABORATORY USE ONLY						
	Date	Time		601/8010	602/8020	604/8040	608/8080	610/8100	624/8240	625/8250	TPH(G)	TPHD	418-1	8015	Metals-Total a	Metals-Soluble a	Fluoride/Perchlorate	Chloride/PH	TDS/Percent Solid	Specific Conductivity (EC)	TAT	#	Type	Lab ID
1	185901	9/26/91	9:30	Trip Blank	X						X										4	1	V(HCl)	4998-201
2	185902			(SPARE)																				
3	185903			(SPARE)																				
4	185904			(SPARE)																				
5	185905		11:00	MW-3																				
6	185906			(SPARE)																				
7	185907			(SPARE)																				
8	185908			(SPARE)																				
9																								
10																								

Special Instructions/Comments: Perform 8020/TPH(G) analyses using Luft Method

Sample Archive/Disposal:
 Laboratory Standard
 Other _____

TAT (Analytical Turn-Around Times) 1 = 24 hours 2 = 48 hours 3 = 1 week 4 = 2 weeks
 Container Types: B=Brass Tube, V=VOA Vial, A=1-Liter Amber, G=Glass Jar, C=Cassette, O = Other _____

SEND DOCUMENTATION AND RESULTS TO (Check one):

Project Manager/Office: Campbell McLeod / Alameda

Client Name: _____

Company: _____

Address: _____

Phone: () _____

Fax: _____

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt: GOOD CONDITION - RSP
Sample 185901 contains Air bubble



CHAIN OF CUSTODY RECORD

P6 2/4

227189

FOR LABORATORY USE ONLY
 Laboratory Project No.: 4998 Secured: Yes No
 Storage Refrigerator ID: 3
 Storage Freezer ID: _____

Project Name: Target DUBLIN Project #: 122606 Sampler: Chris Walsh Chris Walsh
 Relinquished by: (Signature and Printed Name) Chris Walsh Received by: (Signature and Printed Name) Fedex Date: 9/27/91 Time: 12:45
 Relinquished by: (Signature and Printed Name) FED EX Received by: (Signature and Printed Name) [Signature] Date: 9/28/91 Time: 1000
 Relinquished by: (Signature and Printed Name) [Signature] Received by: (Signature and Printed Name) Kathleen Fontana Date: 9/30/91 Time: 09:55
 Relinquished by: (Signature and Printed Name) [Signature] Received by: (Signature and Printed Name) [Signature] Date: _____ Time: _____

SHIP TO:
 McLaren Analytical Laboratory
 11101 White Rock Road
 Rancho Cordova, CA 95670
 (916) 638-3696
 FAX (916) 638-2842

Method of Shipment: FEDEX
 Shipment ID: 1217410526

Circle or Add Analysis(es) Requested

- 601/8010 (Halogenated Volatiles-GC)
- 602/8020 (Aromatic Volatiles-GC)
- 604/8040 (Phenols-GC)
- 808/8080 (Pesticides/PCB-GC)
- 610/8100 (PNA-GC)
- 624/8240 (Volatiles-GC)
- 625/8250 (BNA-GC/MS)
- TPH/G (Gasoline-GC)
- 418.1 (IR)
- 8015 (Diesel-GC)
- Metals: Modified (GC)
- Metals: Total a
- Fluoride/Soluble a
- Chloride/pH
- TDS/Percent Solid
- Specific Conductivity (EC)

a) Identify specific metals requested under Special Instructions

Sample ID Number	Sample Description			TAT	Container(s)		FOR LABORATORY USE ONLY Lab ID
	Date	Time	Description		#	Type	
1	185909	9/26/91	1200 MW-1	X		4	1 V(HCI) 4998-003
2	185910		(SPARE)				/ / /
3	185911		(SPARE)				/ / /
4	185912		(SPARE)				/ / /
5	185913		1325 MW-5				-604
6	185914		(SPARE)				/ / /
7	185915		(SPARE)				/ / /
8	185916		(SPARE)				/ / /
9							/ / /
10							/ / /

Special Instructions/Comments: ~~None~~ Please perform 8020/TPH(G) analyses using Luff Method

Sample Archive/Disposal:
 Laboratory Standard
 Other _____

TAT (Analytical Turn-Around Times) 1 = 24 hours 2 = 48 hours 3 = 1 week 4 = 2 weeks
 Container Types: B=Brass Tube, V=VOA Vial, A=1-Liter Amber, G=Glass Jar, C=Cassette, O = Other _____

SEND DOCUMENTATION AND RESULTS TO (Check one):
 Project Manager/Office: Campbell McLeod / Alameda
 Client Name: _____
 Company: _____
 Address: _____
 Phone: () _____ Fax: _____

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt: GOOD CONDITION - RSP



CHAIN OF CUSTODY RECORD

163/4

22-1490

FOR LABORATORY USE ONLY
 Laboratory Project No.: 4998 Secured: _____
 Storage Refrigerator ID: 8 Yes
 Storage Freezer ID: _____ No

Project Name: Target DUBLIN Project #: 122606 Sampler: Chris Walsh Chris Walsh
 Relinquished by: (Signature and Printed Name) Chris Walsh Received by: (Signature and Printed Name) Fedex Date: 9/27/91 Time: 12:45
 Relinquished by: (Signature and Printed Name) FED EX Received by: (Signature and Printed Name) [Signature] Date: 9/28/91 Time: 1000
 Relinquished by: (Signature and Printed Name) _____ Received by: (Signature and Printed Name) Tasha Fontenot Date: 9/30/91 Time: 0955
 Relinquished by: (Signature and Printed Name) _____ Received by: (Signature and Printed Name) _____ Date: _____ Time: _____

SHIP TO: McLaren Analytical Laboratory
 11101 White Rock Road
 Rancho Cordova, CA 95670
 (916) 638-3696
 FAX (916) 638-2842

Method of Shipment: FEDEX
 Shipment ID: 1217410526

Sample ID Number	Sample Description		Date	Time	Description	Circle or Add Analysis(es) Requested													TAT	Container(s)		FOR LABORATORY USE ONLY			
	Date	Time				Description	601/8010 (Halogenated Volatiles-GC)	602/8020 (Aromatic Volatiles-GC)	604/8040 (Phenols-GC)	608/8080 (Pesticides/PCB-GC)	610/8100 (PNA-GC)	624/8240 (Volatiles-GC)	625/8250 (BNA-GC/MS)	TPH/G (Gasoline-GC)	TPH/D (Diesel-GC)	418.1 (IR)	8015 Modified (GC)	Metals-Total a		Metals-Soluble a	Fluoride/Perchlorate Chloride/pH	TDS/Percent Solid	Specific Conductivity (EC)	#	Type
1	185917	9/26/91	1440	MW-2	X						X											4	1	V(HCl)	4998-1005
2	185918			(SPARE)																					
3	185919			(SPARE)																					
4	185920			(SPARE)																					
5	185921	9/27/91	1025	MW-4																					-1006
6	185922			(SPARE)																					
7	185923			(SPARE)																					
8	185924			(SPARE)																					
9																									
10																									

Special Instructions/Comments: Please perform 8020/TPH(G) Analyses using the Luft Method.

Sample Archive/Disposal:
 Laboratory Standard
 Other _____

TAT (Analytical Turn-Around Times) 1 = 24 hours 2 = 48 hours 3 = 1 week 4 = 2 weeks
 Container Types: B=Brass Tube, V=VOA Vial, A=1-Liter Amber, G=Glass Jar, C=Cassette, O = Other _____

SEND DOCUMENTATION AND RESULTS TO (Check one):
 Project Manager/Office: Campbell McLeod/Alameda
 Client Name: _____

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt: GOOD CONDITION - RSP

Company: _____
 Address: _____
 Phone: () _____ Fax: _____



CHAIN OF CUSTODY RECORD

Pg 4/4

225219

FOR LABORATORY USE ONLY

Laboratory Project No.: 4998 Secured: Yes No
 Storage Refrigerator ID: 8
 Storage Freezer ID: _____

Project Name: Target DUBLIN Project #: 122606 Sampler: Chris Walsh Chris Walsh
 Relinquished by: (Signature and Printed Name) Chris Walsh Received by: (Signature and Printed Name) Fedex Date: 9/27/91 Time: 12:45
 Relinquished by: (Signature and Printed Name) FED EX Received by: (Signature and Printed Name) [Signature] Date: 9/28/91 Time: 1000
 Relinquished by: (Signature and Printed Name) Received by: (Signature and Printed Name) [Signature] Date: 9/30/91 Time: 09:55
 Relinquished by: (Signature and Printed Name) Received by: (Signature and Printed Name)

SHIP TO:
 McLaren Analytical Laboratory
 11101 White Rock Road
 Rancho Cordova, CA 95670
 (916) 638-3696
 FAX (916) 638-2842

Method of Shipment: Fedex
 Shipment ID: 1217410526

- Circle or Add Analysis(es) Requested
- 601/8010 (Halogenated Volatiles-GC)
 - 602/8020 (Aromatic Volatiles-GC)
 - 604/8040 (Phenols-GC)
 - 608/8080 (Pesticides/PCB-GC)
 - 610/8100 (PMA-GC)
 - 624/8240 (Volatiles-GC/MS)
 - 825/8270 (BNA-GC/MS)
 - TPH(G) (Gasoline-GC)
 - TPHD (Diesel-GC)
 - 418.1 (IR)
 - 8015 Modified (GC)
 - Metals-Total a
 - Metals-Soluble a
 - Fluoride/Perchlorate
 - Chloride/PH
 - TD5/Percent Solid
 - Specific Conductivity (EC)

a) Identify specific metals requested under Special Instructions

Sample ID Number	Sample Description			Analysis Requested												Container(s)		FOR LABORATORY USE ONLY							
	Date	Time	Description	601/8010	602/8020	604/8040	608/8080	610/8100	624/8240	825/8270	TPH(G)	TPHD	418.1 (IR)	8015 Modified (GC)	Metals-Total a	Metals-Soluble a	Fluoride/Perchlorate	Chloride/PH	TD5/Percent Solid	Specific Conductivity (EC)	TAT	#	Type	Lab ID	
1	185925	9/27/91	1125	MW-6	X					X												4	1	V(HCl)	4998-007
2	185926			(SPARE)																					
3	185927			(SPARE)																					
4	185928			(SPARE)																					
5																									
6																									
7																									
8																									
9																									
10																									

Special Instructions/Comments: Please perform 8020/TPH(G) analyses using the Luft Method

Sample Archive/Disposal:
 Laboratory Standard
 Other _____

TAT (Analytical Turn-Around Times) 1 = 24 hours 2 = 48 hours 3 = 1 week 4 = 2 weeks
 Container Types: B=Brass Tube, V=VOA Vial, A=1-Liter Amber, G=Glass Jar, C=Cassette, O = Other _____

SEND DOCUMENTATION AND RESULTS TO (Check one):
 Project Manager/Office: Campbell McLeod / Alameda
 Client Name: _____
 Company: _____
 Address: _____
 Phone: () _____ Fax: _____

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt: GOOD CONDITION - RSP

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. The method blank results associated with your samples are attached.

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. The results of the laboratory control spike associated with your samples are attached.

Accuracy is measured using percent recovery, i.e.:

$$\text{Percent Recovery} = \frac{\text{(measured concentration)}}{\text{(actual concentration)}} \times 100$$

Precision is measured using the relative percent difference (RPD) from duplicate tests, i.e.:

$$\text{RPD} = \frac{\% \text{ Recovery of Spike}_{(1)} - \% \text{ Recovery of Spike}_{(2)}}{(\% \text{ Recovery of Spike}_{(1)} + \% \text{ Recovery of Spike}_{(2)})/2} \times 100$$

Control limits for accuracy and precision are different for different methods. They may also 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-CN4998)



QUALITY CONTROL REPORT

METHOD BLANK

Method: TPH/G
Units: ug/L (ppb)

Date Analyzed: 10/02/91

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Total Petroleum Hydrocarbons - Gasoline	50.	BRL

(DC3-CN4998)



QUALITY CONTROL REPORT

METHOD BLANK

Method: TPH/G
Units: ug/L (ppb)

Date Analyzed: 10/07/91

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Total Petroleum Hydrocarbons - Gasoline	50.	BRL

(DC3 - CN4998)



QUALITY CONTROL REPORT

METHOD BLANK

Method: EPA 8020
Units: ug/L (ppb)

Date Analyzed: 10/02/91

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Chlorobenzene	0.50	BRL
Ethyl Benzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
1,2-Dichlorobenzene	0.50	BRL
1,3-Dichlorobenzene	0.50	BRL
1,4-Dichlorobenzene	0.50	BRL

(DC3-CN4998)



QUALITY CONTROL REPORT

METHOD BLANK

Method: EPA 8020
Units: ug/L (ppb)

Date Analyzed: 10/07/91

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Chlorobenzene	0.50	BRL
Ethyl Benzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
1,2-Dichlorobenzene	0.50	BRL
1,3-Dichlorobenzene	0.50	BRL
1,4-Dichlorobenzene	0.50	BRL

(DC3 - CN4998)



QUALITY CONTROL REPORT

METHOD BLANK

Method: EPA 8020
Units: ug/L (ppb)

Date Analyzed: 10/03/91

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Chlorobenzene	0.50	BRL
Ethyl Benzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
1,2-Dichlorobenzene	0.50	BRL
1,3-Dichlorobenzene	0.50	BRL
1,4-Dichlorobenzene	0.50	BRL

(DC3-CN4998)



QUALITY CONTROL REPORT

METHOD BLANK

Method: EPA 8020
Units: ug/L (ppb)

Date Analyzed: 10/04/91

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Chlorobenzene	0.50	BRL
Ethyl Benzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
1,2-Dichlorobenzene	0.50	BRL
1,3-Dichlorobenzene	0.50	BRL
1,4-Dichlorobenzene	0.50	BRL

(DC3 - CN4998)



QUALITY CONTROL REPORT

METHOD BLANK

Method: EPA 8020
Units: ug/L (ppb)

Date Analyzed: 10/04/91

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Chlorobenzene	0.50	BRL
Ethyl Benzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
1,2-Dichlorobenzene	0.50	BRL
1,3-Dichlorobenzene	0.50	BRL
1,4-Dichlorobenzene	0.50	BRL

(DC3 - CN4998)



QUALITY CONTROL REPORT

METHOD BLANK

Method: EPA 8020
Units: ug/L (ppb)

Date Analyzed: 10/07/91

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Benzene	0.50	BRL
Toluene	0.50	BRL
Chlorobenzene	0.50	BRL
Ethyl Benzene	0.50	BRL
1,2-Xylene	0.50	BRL
1,3-Xylene	0.50	BRL
1,4-Xylene	0.50	BRL
1,2-Dichlorobenzene	0.50	BRL
1,3-Dichlorobenzene	0.50	BRL
1,4-Dichlorobenzene	0.50	BRL

(DC3 - CN4998)



QUALITY CONTROL REPORT

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Total Petroleum Hydrocarbons/TPH-Gasoline**

Analyst: TB

LP#: 4998

Date of Analysis: 09/09/91

Spike Sample ID: LCS/DW-20

Column: DB5

Spike ID Code: W-1-294

Instrument #: 3

Surrogate ID Code: W-1-298

Batch #: NA

Units: ug/L Matrix: Water

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	NA	100.	97.	97	96.	96	1	80 - 120	≤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	4.0	4.2	105	80 - 120

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

Comments: _____

QUALITY CONTROL REPORT

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Total Petroleum Hydrocarbons/TPH-Gasoline**

Analyst: TB

LP#: 4998

Date of Analysis: 09/24/91

Spike Sample ID: LCS/LCSDW-21

Column: DB5

Spike ID Code: W-1-294

Instrument #: 3

Surrogate ID Code: W-1-298

Batch #: NA

Units: ug/L Matrix: Water

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	NA	100.	96.	96	80.	80	18	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	4.0	4.8	120	80 - 120

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

Comments: _____

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Method 8010 (Modified)/8020**

LP#: 4998

Analyst: CP

Batch #: NA

Date Of Analysis: 09/26 - 27/91^a

Spike Sample ID: 10LCSW/LCSDW28

Column: DB624

Spike ID Code: W-1-295

Instrument #: 10

Surrogate ID Code: W-1-282

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
1,1 - Dichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Chlorobenzene	NA	4.0	4.1	102	3.8	95	8	80 - 120	≤20
Benzene	NA	4.0	4.0	100	3.9	98	3	80 - 120	≤20
Ethyl Benzene	NA	4.0	3.6	90	3.5	88	3	80 - 120	≤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	DET.	(h)	(i)	(j)	(k)	(l)	ACCEPTANCE LIMITS
		SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE REC. %	SAMPLE DUP + SURROGATE SPIKE CONC.	SURROGATE DUP. RECOVERY %	
Bromochloromethane	HALL	8.0	7.4	92	6.7	84	80 - 120
o-Chlorotoluene	HALL	8.0	7.5	94	7.1	89	80 - 120
o-Chlorotoluene	PID	8.0	9.0	112	8.2	102	80 - 120

$$\begin{aligned} \text{Surrogate \% Recovery} &= j = (i/h) \times 100 \\ \text{Surrogate Dupe \% Recovery} &= l = (k/h) \times 100 \end{aligned}$$

Comments:

^aSamples and the associated blanks are loaded on the autosampler at the end of the first date and the analysis of samples is continued until the beginning of the second date.



QUALITY CONTROL REPORT

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Method 8010 (Modified)/8020**

LP#: 4998

Analyst: TL

Batch #: NA

Date Of Analysis: 10/02 - 03/91^a

Spike Sample ID: LCS/LCSD-W-10

Column: DB624

Spike ID Code: W-1-294

Instrument #: 4

Surrogate ID Code: W-1-339

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
1,1 - Dichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Chlorobenzene	NA	4.0	4.4	110	4.0	100	10	80 - 120	≤20
Benzene	NA	4.0	4.5	110	4.0	100	10	80 - 120	≤20
Ethyl Benzene	NA	4.0	4.0	100	4.0	100	0	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	DET.	(h)	(i)	(j)	(k)	(l)	ACCEPTANCE LIMITS
		SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE REC. %	SAMPLE DUP + SURROGATE SPIKE CONC.	SURROGATE DUP. RECOVERY %	
a,a,a,-Trifluorotoluene	PID	4.0	4.1	102	4.1	102	80 - 120

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

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

Comments:

*Samples and the associated blanks are loaded on the autosampler at the end of the first date and the analysis of samples is continued until the beginning of the second date.

8010-20W.91



(DC3-CN4998)

QUALITY CONTROL REPORT

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Method 8010 (Modified)/8020**

LP#: 4998

Analyst: TL

Batch #: NA

Date Of Analysis: 09/27 - 28/91^a

Spike Sample ID: LCSW-26/LCSD-W2

Column: DB5

Spike ID Code: W-1-294

Instrument #: 3

Surrogate ID Code: W-1-332

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
1,1 - Dichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Chlorobenzene	NA	10.	10.	100	11.	110	10	80 - 120	≤20
Benzene	NA	10.	9.0	90	10.	100	10	80 - 120	≤20
Ethyl Benzene	NA	10.	10.	100	11.	110	10	80 - 120	≤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	DET.	(h)	(i)	(j)	(k)	(l)	ACCEPTANCE LIMITS
		SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE REC. %	SAMPLE DUP + SURROGATE SPIKE CONC.	SURROGATE DUP. RECOVERY %	
a,a,a,-Trifluorotoluene	FID	4.0	4.6	115	4.6	115	80 - 120

$$\begin{aligned} \text{Surrogate \% Recovery} &= j = (i/h) \times 100 \\ \text{Surrogate Dupe \% Recovery} &= l = (k/h) \times 100 \end{aligned}$$

Comments:

^aSamples and the associated blanks are loaded on the autosampler at the end of the first date and the analysis of samples is continued until the beginning of the second date.

8010-20W.91



(DC3-CN4998)

QUALITY CONTROL REPORT

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Method 8010 (Modified)/8020**

LP#: 4998

Analyst: TB

Batch #: NA

Date Of Analysis: 10/02 - 03/91^a

Spike Sample ID: LCS/LCSD-W10

Column: DB1

Spike ID Code: W-1-294

Instrument #: 4

Surrogate ID Code: W-1-339

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
1,1 - Dichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Chlorobenzene	NA	4.0	4.4	110	4.0	100	10	80 - 120	≤20
Benzene	NA	4.0	4.8	120	4.4	110	9	80 - 120	≤20
Ethyl Benzene	NA	4.0	4.9	120	4.7	120	0	80 - 120	≤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	DET.	(h)	(i)	(j)	(k)	(l)	ACCEPTANCE LIMITS
		SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE REC. %	SAMPLE DUP + SURROGATE SPIKE CONC.	SURROGATE DUP. RECOVERY %	
a,a,a,-Trifluorotoluene	PID	4.0	4.0	100	4.2	105	80 - 120

$$\begin{aligned} \text{Surrogate \% Recovery} &= j = (i/h) \times 100 \\ \text{Surrogate Dupe \% Recovery} &= l = (k/h) \times 100 \end{aligned}$$

Comments:

^aSamples and the associated blanks are loaded on the autosampler at the end of the first date and the analysis of samples is continued until the beginning of the second date.

8010-20W.91



(DC3-CN4998)

QUALITY CONTROL REPORT

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Method 8010 (Modified)/8020**

LP#: 4998

Analyst: TL

Batch #: NA

Date Of Analysis: 10/03 - 04/91^a

Spike Sample ID: 4998-005MS

Column: DB624

Spike ID Code: W-1-294

Instrument #: 4

Surrogate ID Code: W-1-339

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
1,1 - Dichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethane	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	80 - 120	≤20
Chlorobenzene	BRL	4.0	4.2	105	NA	NA	NA	80 - 120	≤20
Benzene	BRL	4.0	5.2	130 ^b	NA	NA	NA	80 - 120	≤20
Ethyl Benzene	BRL	4.0	4.4	110	NA	NA	NA	80 - 120	≤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

SURROGATE COMPOUNDS	DET.	(h)	(i)	(j)	(k)	(l)	ACCEPTANCE LIMITS
		SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE REC. %	SAMPLE DUP. + SURROGATE SPIKE CONC.	SURROGATE DUP. RECOVERY %	
a,a,a,-Trifluorotoluene	PID	4.0	4.1	102	NA	NA	80 - 120

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

Surrogate Dupe % Recovery = l = (k/h) x 100

Comments:

^aSamples and the associated blanks are loaded on the autosampler at the end of the first date and the analysis of samples is continued until the beginning of the second date.

^bMatrix spike recovery for Benzene is beyond advisory quality control limits; however, LCS QC data are acceptable.

8010-20W.91



(DC3-CN4998)

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. Blank results are reported in the Case Narrative.

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

Results are reported on the attached data sheets.

(DC3-CN4998)



VOLATILE AROMATIC COMPOUNDS

Analytical Method: EPA 8020 and
 Total Petroleum Hydrocarbons Gasoline by LUFT
 Preparation Method: EPA 5030

Project Name: Target Dublin

Project Number: 122606

Sample Description: Trip Blank

Lab Project-ID Number: 4998-001

Sample Number: 185902

Date Sampled: 09/26/91

Date Received: 09/28/91

Date Analyzed: 10/02/91

<u>COMPOUND</u>	<u>ANALYTE CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	BRL	0.50
Toluene	BRL	0.50
Chlorobenzene	BRL	0.50
Ethyl Benzene	BRL	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	BRL	0.50
1,4-Xylene	BRL	0.50
1,2-Dichlorobenzene	BRL	0.50
1,3-Dichlorobenzene	BRL	0.50
1,4-Dichlorobenzene	BRL	0.50
Total Petroleum Hydrocarbons Gasoline	BRL	50.

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	90	80 - 120
a,a,a-Trifluorotoluene (FID)	100	80 - 120

Dilution: None

Comments:

Approved By: Chris Phillips for C.M. Date: 10/15/91
 Cheryl Matterson, Associate Chemist

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

070191



VOLATILE AROMATIC COMPOUNDS

Analytical Method: EPA 8020 and
 Total Petroleum Hydrocarbons Gasoline by LUFT
 Preparation Method: EPA 5030

Project Name: Target Dublin

Project Number: 122606

Sample Description: MW-1

Lab Project-ID Number: 4998-003

Sample Number: 185912

Date Sampled: 09/26/91

Date Received: 09/28/91

Date Analyzed: 10/07/91

<u>COMPOUND</u>	<u>ANALYTE CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	BRL	0.50
Toluene	BRL	0.50
Chlorobenzene	BRL	0.50
Ethyl Benzene	BRL	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	BRL	0.50
1,4-Xylene	BRL	0.50
1,2-Dichlorobenzene	BRL	0.50
1,3-Dichlorobenzene	BRL	0.50
1,4-Dichlorobenzene	BRL	0.50
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)	87	80 - 120

Dilution: None

Comments:

Approved By: Cheryl Matterson Date: 10/15/91
 Cheryl Matterson, Associate Chemist

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

070191



VOLATILE AROMATIC COMPOUNDS

Analytical Method: EPA 8020 and
 Total Petroleum Hydrocarbons Gasoline by LUFT
 Preparation Method: EPA 5030

Project Name: <u>Target Dublin</u>	Project Number: <u>122606</u>
Sample Description: <u>MW-2</u>	Lab Project-ID Number: <u>4998-005</u>
Sample Number: <u>185917</u>	Date Sampled: <u>09/26/91</u>
Date Received: <u>09/28/91</u>	Date Analyzed: <u>10/03/91</u>

<u>COMPOUND</u>	<u>ANALYTE CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	5.0	0.50
Toluene	BRL	0.50
Chlorobenzene	BRL	0.50
Ethyl Benzene	0.64	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	BRL	0.50
1,4-Xylene	BRL	0.50
1,2-Dichlorobenzene	BRL	0.50
1,3-Dichlorobenzene	BRL	0.50
1,4-Dichlorobenzene	BRL	0.50
Total Petroleum Hydrocarbons Gasoline	BRL (a)	50.

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	105	80 - 120
a,a,a-Trifluorotoluene (FID)	92	80 - 120

Dilution: None

Comments: (a) Data is taken from a different run on 10/02/91 undiluted to obtain results from the appropriate detector.

Approved By: Chris Phillips for P.M. Date: 10/15/91
 Cheryl Matterson, Associate Chemist

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

070191



VOLATILE AROMATIC COMPOUNDS

Analytical Method: EPA 8020 and
 Total Petroleum Hydrocarbons Gasoline by LUFT
 Preparation Method: EPA 5030

Project Name: Target Dublin

Project Number: 122606

Sample Description: MW-3

Lab Project-ID Number: 4998-002

Sample Number: 185905

Date Sampled: 09/26/91

Date Received: 09/28/91

Date Analyzed: 10/03/91

<u>COMPOUND</u>	<u>ANALYTE CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	BRL	0.50
Toluene	BRL	0.50
Chlorobenzene	BRL	0.50
Ethyl Benzene	BRL	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	BRL	0.50
1,4-Xylene	BRL	0.50
1,2-Dichlorobenzene	BRL	0.50
1,3-Dichlorobenzene	BRL	0.50
1,4-Dichlorobenzene	BRL	0.50
Total Petroleum Hydrocarbons Gasoline	BRL (a)	50.

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	107	80 - 120
a,a,a-Trifluorotoluene (FID)	72 (b)	80 - 120

Dilution: None

Comments: (a) Data taken from a different run on 10/02/91 to obtain results from the appropriate detector.
 (b) Sample surrogate compound was beyond quality control limits. All other quality control is acceptable.

Approved By: Chris Phillips for C.M. Date: 10/15/91
 Cheryl Matterson, Associate Chemist

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

070191



VOLATILE AROMATIC COMPOUNDS

Analytical Method: EPA 8020 and
 Total Petroleum Hydrocarbons Gasoline by LUFT
 Preparation Method: EPA 5030

Project Name: Target Dublin

Project Number: 122606

Sample Description: MW-4

Lab Project-ID Number: 4998-006

Sample Number: 185922

Date Sampled: 09/27/91

Date Received: 09/28/91

Date Analyzed: 10/04/91

<u>COMPOUND</u>	<u>ANALYTE CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	100.	5.0
Toluene	BRL	5.0
Chlorobenzene	BRL	5.0
Ethyl Benzene	45.	5.0
1,2-Xylene	BRL	5.0
1,3-Xylene	(b)	5.0
1,4-Xylene	8.1	5.0
1,2-Dichlorobenzene	BRL	5.0
1,3-Dichlorobenzene	BRL	5.0
1,4-Dichlorobenzene	BRL	5.0
Total Petroleum Hydrocarbons Gasoline	BRL (a)	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)	95	80 - 120

Dilution: The sample was diluted 10 fold to bring target compounds within linear working range.
 Comments: (a) Data is taken from a different run on 10/09/91 undiluted to obtain results from the appropriate detector.
 (b) Coelutes with 1,4-Xylene.

The chromatographic pattern of gasoline in the sample does not exactly match the standard chromatograph.

Approved By: Chris Phillips for C.M. Date: 10/15/91
 Cheryl Matterson, Associate Chemist

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

070191



VOLATILE AROMATIC COMPOUNDS

Analytical Method: EPA 8020 and
 Total Petroleum Hydrocarbons Gasoline by LUFT
 Preparation Method: EPA 5030

Project Name: Target Dublin

Project Number: 122606

Sample Description: MW-5

Lab Project-ID Number: 4998-004

Sample Number: 185915

Date Sampled: 09/26/91

Date Received: 09/28/91

Date Analyzed: 10/02/91

<u>COMPOUND</u>	<u>ANALYTE CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	BRL	0.50
Toluene	BRL	0.50
Chlorobenzene	BRL	0.50
Ethyl Benzene	BRL	0.50
1,2-Xylene	BRL	0.50
1,3-Xylene	BRL	0.50
1,4-Xylene	BRL	0.50
1,2-Dichlorobenzene	BRL	0.50
1,3-Dichlorobenzene	BRL	0.50
1,4-Dichlorobenzene	BRL	0.50
Total Petroleum Hydrocarbons Gasoline	BRL	50.

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	90	80 - 120
a,a,a-Trifluorotoluene (FID)	95	80 - 120

Dilution: None

Comments:

Approved By: Cheryl Matterson for C.M. Date: 10/15/91
 Cheryl Matterson, Associate Chemist

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

070191



VOLATILE AROMATIC COMPOUNDS

Analytical Method: EPA 8020 and
 Total Petroleum Hydrocarbons Gasoline by LUFT
 Preparation Method: EPA 5030

Project Name: Target Dublin

Project Number: 122606

Sample Description: MW-6

Lab Project-ID Number: 4998-007

Sample Number: 185926

Date Sampled: 09/27/91

Date Received: 09/28/91

Date Analyzed: 10/04/91

<u>COMPOUND</u>	<u>ANALYTE CONCENTRATION</u> ug/L (ppb)	<u>REPORTING LIMIT</u> ug/L (ppb)
Benzene	760. (a)	50.
Toluene	11.	5.0
Chlorobenzene	BRL	5.0
Ethyl Benzene	360. (a)	50.
1,2-Xylene	56. (a)	50.
1,3-Xylene	{c}{a}	50.
1,4-Xylene	180. (a)	50.
1,2-Dichlorobenzene	BRL	5.0
1,3-Dichlorobenzene	BRL	5.0
1,4-Dichlorobenzene	BRL	5.0
Total Petroleum Hydrocarbons Gasoline	2300. (b)	500.

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	110	80 - 120
a,a,a-Trifluorotoluene (FID)	82 (b)	80 - 120

Dilution: The sample was diluted 10 fold to bring target compounds within linear working range.

- Comments:
- (a) The data was reported from a different analytical run on 10/08/91 at a 100 fold dilution to obtain results within linear range.
 - (b) Data taken from a different run on 10/09/91 at 10 fold dilution to obtain results from the appropriate detector.
 - (c) Coelutes with 1,4-Xylene.

Approved By: Chris Phillips ^{ep10115} ~~for C.M.~~
 Cheryl Matterson, Associate Chemist Date: 10/15/91

The cover letter and attachments are integral parts of this report.
 070191





Date: October 4, 1991
LP #: 4962

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

Dear Mr. McLeod:

Enclosed are the laboratory results for the one sample submitted by you to the McLaren Analytical Laboratory on September 20, 1991, for the project *Target-Dublin*.

The analyses you requested are:

Mod. EPA 8020 & TPH/G (1 - Soil)
TPH/D (1 - Soil)
Organic Pb (1 - Soil)

The report consists of the following sections:

1. A copy of the chain of custody
2. Quality Control Definitions and Report
3. Comments
4. Analytical results
5. Copy of final billing submitted to accounting.

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,

A handwritten signature in cursive script that reads 'Anthony S. Wong'.

Anthony S. Wong, Ph.D.
Director, Laboratory/Managing Principal



CHAIN OF CUSTODY RECORD

Pg 1/1

221532

FOR LABORATORY USE ONLY

Laboratory Project No.: 4962 Secured: _____
Storage Refrigerator ID: 12, 4-8 Yes
Storage Freezer ID: _____ No

Project Name: Target - Dublin Project #: 422601 122606 Sampler: Mark Christensen Mark Christensen
(Printed Name) (Signature)

Relinquished by: (Signature and Printed Name) Mark Christensen Christensen Received by: (Signature and Printed Name) Fed Ex Date: 9/19/91 Time: 15:30

Relinquished by: (Signature and Printed Name) Fed Ex Received by: (Signature and Printed Name) Kathleen Fontecilla Date: 9-20-91 Time: 09:30

Relinquished by: (Signature and Printed Name) _____ Received by: (Signature and Printed Name) _____ Date: _____ Time: _____

Relinquished by: (Signature and Printed Name) _____ Received by: (Signature and Printed Name) _____ Date: _____ Time: _____

SHIP TO:
McLaren Analytical Laboratory
11101 White Rock Road
Rancho Cordova, CA 95670
(916) 638-3696
FAX (916) 638-2842

Method of Shipment: Fed. Ex.

Shipment ID: 805807412

Circle or Add Analysis(es) Requested	601/8010 (Halogenated Volatiles-GC)	602/8020 (Aromatic Volatiles-GC)	604/8040 (Phenols-GC)	608/8080 (Pesticides/PCB-GC)	610/8100 (PMA-GC)	624/8240 (Volatiles-GC/MS)	TPH/G (BNA-GC/MS)	TPH/D (Diesel-GC)	418-1 (IR)	8015 Modified GC	Metals: <u>As</u> <u>Cr</u> <u>Co</u> <u>Cu</u> <u>Fe</u> <u>Mn</u> <u>Ni</u> <u>Pb</u> <u>Sb</u> <u>Se</u> <u>Tl</u> <u>Zn</u>	Metals: <u>LEAD</u> <u>by AA</u>	Fluoride/Soluble a	Chloride/pH	TDS/Percent Solid	Specific Conductivity (EC)	TPH/G + BTXE	by LUFT
							X			X						X		

a) Identify specific metals requested under Special Instructions

Sample ID Number	Sample Description		FOR LABORATORY USE ONLY																	
	Date	Time	Description	TAT	#	Type	Lab ID													
1	9/19		Soil Pile (Composite)	4		B	4962-001													
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Special Instructions/Comments: Metals - analyze for LEAD ONLY (by AA)
no other metals

Sample Archive/Disposal: Laboratory Standard Other _____

TAT (Analytical Turn-Around Times) 1 = 24 hours 2 = 48 hours 3 = 1 week 4 = 2 weeks
Container Types: B=Brass Tube, V=VOA Vial, A=1-Liter Amber, G=Glass Jar, C=Cassette, O = Other _____

SEND DOCUMENTATION AND RESULTS TO (Check one):
 Project Manager/Office: Campbell McLeod
 Client Name: _____
Company: McLaren/Hart Alameda
Address: _____

FOR LABORATORY USE ONLY Sample Condition Upon Receipt: Good Condition 8.7 9-20-91
CHANGES PER MARK CHRISTENSEN 9-20-91 (ESP)

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. The method blank results associated with your samples are attached.

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. The results of the laboratory control spike associated with your samples are attached.

Accuracy is measured using percent recovery, i.e.:

$$\text{Percent Recovery} = \frac{\text{(measured concentration)}}{\text{(actual concentration)}} \times 100$$

Precision is measured using the relative percent difference (RPD) from duplicate tests, i.e.:

$$\text{RPD} = \frac{\% \text{ Recovery of Spike}_{(1)} - \% \text{ Recovery of Spike}_{(2)}}{(\% \text{ Recovery of Spike}_{(1)} + \% \text{ Recovery of Spike}_{(2)})/2} \times 100$$

Control limits for accuracy and precision are different for different methods. They may also 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-CN4962)



QUALITY CONTROL REPORT

METHOD BLANK

Method: Mod. EPA 8020 (BTEX)
Units: mg/Kg (ppm)

Date Analyzed: 09/27/91
Date Extracted: 09/23/91
Batch Number: 910923-1301

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Benzene	0.010	BRL
Toluene	0.010	BRL
Ethyl Benzene	0.010	BRL
1,2-Xylene	0.010	BRL
1,3-Xylene	0.010	BRL
1,4-Xylene	0.010	BRL

(DC3-CN4962)



QUALITY CONTROL REPORT

McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Total Petroleum Hydrocarbons/TPH-Gasoline

Analyst: TL

LP#: 4962

Date of Analysis: 09/26-27/91^a

Spike Sample ID: LCSS/LCSDS -16

Column: DB5

Spike ID Code: W1-316

Instrument #: 3

Surrogate ID Code: W1-332

Batch #: 910918-1302

Units: mg/Kg Matrix: Soil

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	NA	5.0	5.8	120	5.9	120	0	75 - 125	≤25

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

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

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

SURROGATE COMPOUNDS	(h)	(i)	(j)	ACCEPTANCE LIMITS
	SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE RECOVERY %	% REC.
a,a,a-Trifluorotoluene	0.0040	0.0036	90	75 - 125

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

Comments: ^aSamples and the associated blanks are loaded on the autosampler at the end of the first date and the analysis of samples is continued until the beginning of the second date.



QUALITY CONTROL REPORT

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Method 8010 (Modified)/8020**

LP#: 4962

Analyst: TL

Batch #: 910923-1301

Date Of Analysis: 10/01/91

Spike Sample ID: LCS/LCSDS-50

Column: DB1

Spike ID Code: W1-316

Instrument #: 4

Surrogate ID Code: W1-339

Matrix: Soil Units: mg/Kg

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
1,1 - Dichloroethane	NA	NA	NA	NA	NA	NA	NA	75 - 125	≤25
Trichloroethane	NA	NA	NA	NA	NA	NA	NA	75 - 125	≤25
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	75 - 125	≤25
Chlorobenzene	NA	0.10	0.091	91	0.091	91	0	75 - 125	≤25
Benzene	NA	0.10	0.099	99	0.10	100	1	75 - 125	≤25
Ethyl Benzene	NA	0.10	0.10	100	0.11	110	10	75 - 125	≤25

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

SURROGATE COMPOUNDS	DET.	(h)	(i)	(j)	(k)	(l)	ACCEPTANCE LIMITS
		SURROGATE SPIKE CONC.	SAMPLE + SURROGATE SPIKE CONC.	SURROGATE REC. %	SAMPLE DUP + SURROGATE SPIKE CONC.	SURROGATE DUP. RECOVERY %	% REC.
a,a,a,-Trifluorotoluene	PID	0.0040	0.0040	100	0.0042	105	75 - 125

$$\begin{aligned} \text{Surrogate \% Recovery} &= j = (i/h) \times 100 \\ \text{Surrogate Dupe \% Recovery} &= l = (k/h) \times 100 \end{aligned}$$

Comments:

QUALITY CONTROL REPORT

METHOD BLANK

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

Date Analyzed: 09/27/91
Date Extracted: 09/25/91
Batch Number: 910925-0302

<u>Compound</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Total Petroleum Hydrocarbons - Diesel	10.	BRL



QUALITY CONTROL REPORT

**McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Method 8015 - Modified
Total Petroleum Hydrocarbons/TPH - Diesel**

LP#: 4962

Analyst: EB

Batch #: 910920-0301

Date Of Analysis: 09/23/91

Spike Sample ID: LCSS/LCSDS #38

Column: DB-5

Spike ID Code: W2-599/W2-495

Instrument #: PGC#4

Surrogate ID Code: NA

Matrix: Soil Units: mg/Kg

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	NA	82.	55.	67	53.	65	4	40 - 84	≤ 25
Diesel	NA	82.	87.	106	84.	102	4	50 - 121	≤ 25

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

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

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

Comments: _____

8015M3DR.391



QUALITY CONTROL REPORT

METHOD BLANK

Method: 7420
Units: mg/Kg

Date Analyzed: 10/02/91
Date Extracted: 09/27/91
Batch Number: 910927-0402

<u>Compounds</u>	<u>Reporting Limit</u>	<u>Results of the MB</u>
Organic Lead (Pb)	0.50	BRL



QUALITY CONTROL REPORT

McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Metals

LP#: 4962

Instrument #: AA

Analyst: FR

Batch #: 910927-0402

Date Of Analysis: 10/02/91

Spike Sample ID: LCSS/LCSDS

Date of Digestion: 09/27/91

Spike ID Code: W4-1166

Matrix: Soil Units: mg/Kg

METALS	(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
Org. Pb	NA	10.0	9.0	90	10.6	106	16	75 - 125	≤20

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

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

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



QUALITY CONTROL REPORT

McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Metals

LP#: 4962

Instrument #: AA

Analyst: FR

Batch #: 910927-0402

Date Of Analysis: 10/02/91

Spike Sample ID: 4962-001 MSS

Date of Digestion: 09/27/91

Spike ID Code: W4-1166

Matrix: Soil Units: mg/Kg

METALS	(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
Org. Pb	BRL	10.0	10.8	108	NA	NA	NA	75 - 125	≤20

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

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

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



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. Blank results are reported in the Case Narrative.

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

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

Results are reported on the attached data sheets.

(DC3-CN4962)



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>122606</u>
Sample Description:	<u>Soil Pile (Composite)</u>	Lab Project-ID Number:	<u>4962-001</u>
Sample Number:	<u>57301</u>	Date Sampled:	<u>09/19/91</u>
Date Received:	<u>09/20/91</u>	Date Extracted:	<u>09/23/91</u>
Date Analyzed:	<u>09/27/91</u>	Batch Number:	<u>910923-1301</u>

<u>COMPOUND</u>	<u>ANALYTE CONCENTRATION</u> mg/Kg (ppm)	<u>REPORTING LIMIT</u> mg/Kg (ppm)
Benzene	BRL	1.0
Toluene	BRL	1.0
Ethyl Benzene	5.4	1.0
1,2-Xylene	6.7	1.0
1,3-Xylene	{a}	1.0
1,4-Xylene	25.	1.0
Total Petroleum Hydrocarbons - Gasoline	290. {b}	100.

<u>Surrogates</u>	<u>Percent Recovery</u>	<u>Acceptance Limits</u>
a,a,a-Trifluorotoluene (PID)	112	75 - 125
a,a,a-Trifluorotoluene (FID)	107	75 - 125

Dilution: 1:100

Comments: (a) Coelutes with 1,4-Xylene.
 (b) Data taken from a different run on 09/23/91 to obtain results from the appropriate detector.

Approved By: Vicente A. Weiss for CM Date: 10/7/91
 Cheryl Matterson, Associate Chemist

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

070191



TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Diesel by LUFT
Preparation Method: Modified EPA 3550 (a)

Project Name: Target-Dublin

Project Number: 122606

Sample Description: Soil Pile (Composite)

Lab Project- ID Number: 4962-001

Sample Number: S-57301

Date Sampled: 09/19/91

Date Received: 09/20/91

Date Extracted: 09/25/91

Date Analyzed: 09/27/91

Batch Number: 910925-0302

PETROLEUM HYDROCARBONS

CONCENTRATION
mg/Kg (ppm)

REPORTING LIMIT
mg/Kg (ppm)

Total Petroleum Hydrocarbons - Diesel 78. 10.

Dilution: None

Comments: (a) Shaker is used instead of sonicator for extraction.

The sample contains early eluting hydrocarbons in the C7 - C12 boiling point range.

Approved By: Victor A. Weir for CM Date: 10/7/91
Cheryl Matterson, Associate Chemist

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

070191



METALS

Analysis: Organic Lead (Pb)

Method: EPA 7420

Project Name: Target-Dublin

Project Number: 122606

Date Sampled: 09/19/91

Date Received: 09/20/91

Date Prepared: 09/27/91

Batch Number: 910927-0402

Date Analyzed: 10/02/91

<u>LAB PROJECT- ID NUMBER</u>	<u>SAMPLE NUMBER</u>	<u>SAMPLE DESCRIPTION</u>	<u>CONCENTRATION mg/Kg</u>	<u>REPORTING LIMIT</u>
4962-001	S-57301	Soil Pile (Composite)	BRL	0.50

Approved by: Victor A. Weiss Jr. CC M Date: 10/7/91
Cheryl Matterson, Associate Chemist

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