Chevron U.S.A. Products Company
2410 Camino Ramon, San Ramon, California • Phone (510) 842-9500
Mail Address: P.O. Box 5004, San Ramon, CA 94583-0804

Marketing Department

August 10, 1992

STID 3028

Ms. Susan Hugo
Alameda County Health Care Services
Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, CA 94621

Re: Chevron Service Station #9-0121
3026 Lakeshore, Oakland

94610

Dear Ms. Hugo:

Enclosed we are forwarding the **Environmental Assessment Report** dated July 31, 1992, prepared by our consultant Groundwater Technology, Inc. (GTI) for the above referenced site. As indicated in the report, four (4) borings were advanced and completed into ground water monitor wells designated MW-5 through MW-8. These wells were installed in an attempt to delineate the extent of the hydrocarbon plume. In addition, existing monitor well MW-1 was drilled out and replaced as a 4-inch diameter well for future recovery. Soil samples collected from the drill cuttings were analyzed for total petroleum hydrocarbons as gasoline (TPH-G), total petroleum hydrocarbons as diesel (TPH-D) and BTEX. All samples reported concentrations below the method detection limits for these constituents with the exception of the sample collected from MW-8 which reported a concentration of 13 ppm TPH-G at a sample depth of 10-feet. MW-8 is located off-site hydraulically up-gradient of the site. **Ground water samples were collected and analyzed for the same constituents. Laboratory analysis reported benzene concentrations ranging from ND to 4.7 ppb.**

Groundwater samples were also collected from the existing wells at this time. **Benzene was detected in monitor wells MW-1, MW-3 and MW-4 at concentrations of 40, 43 and 380 ppb, respectively.** Separate-phase hydrocarbons were observed in monitor well MW-2 at a measured thickness of .02-feet. Depth to groundwater was measured at approximately 4.4 to 24-feet below grade and the direction of flow is to the west-southwest. GTI has stated in the report that the deeper groundwater levels measured in MW-3 and MW-8 suggest that the shallow ground water encountered during drilling may be perched on the clay material.

Based on these findings, **Chevron recommends collecting monthly water level measurements for three (3) consecutive months to confirm ground water flow direction and gradient.** At completion of the next quarterly sampling event, additional monitor wells will be proposed, if appropriate, and the site evaluated for appropriate corrective actions.

If you have any questions or comments, please do not hesitate to contact me at (510) 842-9581.

Very truly yours,
CHEVRON U.S.A. PRODUCTS COMPANY

Nancy Vukelich
Site Assessment and Remediation Engineer

Enclosures

cc: Mr. Rich Hiett, RWQCB-Bay Area
Mr. M.R. Purcell
File (9-0121A1)

GROUNDWATER
TECHNOLOGY, INC.

AUG 06 '92 PWM
4057 Port Chicago Highway, Concord, CA 94520 (415) 671-2387
FAX: (415) 685-9148

ENVIRONMENTAL ASSESSMENT REPORT
CHEVRON SERVICE STATION NO. 9-0121
3026 LAKESHORE AVENUE
OAKLAND, CALIFORNIA

020202781

JULY 31, 1992

Prepared for:
Ms. Nancy Vukelich
Chevron U.S.A. Products Company
2410 Camino Ramon
San Ramon, California 94583-0804

Groundwater Technology, Inc.
Written/Submitted by

Gregory A. Mischel
Project Geologist

Sandra L. Lindsey
Project Manager

Groundwater Technology, Inc.
Reviewed/Approved by

David R. Kleesattel
Registered Geologist
No. 5136

For:
John S. Gaines
Vice President,
West Region Manager

REGISTERED GEOLOGIST
DAVID R. KLEESATTEL
NO. 5136
STATE OF CALIFORNIA

R2781A1.GM
(030503)

CONTENTS

FIGURES

TABLES

CONTENTS
(continued)

APPENDICES

ENVIRONMENTAL ASSESSMENT REPORT
CHEVRON SERVICE STATION NO. 9-0121
3026 LAKESHORE AVENUE
OAKLAND, CALIFORNIA

JULY 31, 1992

1.0 INTRODUCTION

This report presents a summary of environmental assessment work conducted by Groundwater Technology, Inc. at the Chevron Service Station No. 9-0121 located at 3026 Lakeshore Avenue, Oakland, California (Figure 1). The assessment work completed during June 1992 included drilling four soil borings, installing monitoring wells in the four borings, destroying and replacing one on-site monitoring well, soil and groundwater sampling, laboratory analyses of the samples, and preparing this report. The objective of this work was to further evaluate the lateral extent of dissolved gasoline hydrocarbons previously encountered at the site.

2.0 BACKGROUND

Chevron Service Station No. 9-0121 is located on the southern corner of the intersection of MacArthur Boulevard and Lakeshore Avenue in Oakland. South of the site are residential apartment complexes. West of the site is an annex building owned by the Chancery Office Diocese of Oakland. Interstate 580 is east of the site, running roughly parallel to MacArthur Boulevard, and east of the interstate overpass are mixed commercial and residential buildings.

Chevron Service Station No. 9-0121 has been active since the 1950s. In the mid-1960s, the owner of the property abutting the site to the west reported apparent gasoline odors in the basement of his building. The problem was corrected with improved ventilation. In 1969, all tanks and lines were replaced. In 1980, the adjacent property owner again reported the apparent presence of gasoline odors within the building. This prompted another assessment of the condition of the site tanks and fuel lines. The tanks did not pass the tightness test and were replaced. A separate-phase

1980

hydrocarbon recovery system was installed along the side of the adjacent building. In 1981, Groundwater Technology was contracted by Chevron to oversee the expansion of the recovery system. Several monitoring wells and additional recovery wells were installed at this time. However, the system was never activated. No additional assessment or remedial work was performed at the site until December 1989.

In 1989 and 1990, Groundwater Technology performed a general assessment of site conditions, including collecting groundwater samples from the existing groundwater monitoring wells. Analytical results of the groundwater samples detected dissolved gasoline hydrocarbons in the groundwater beneath the site as well as possible separate-phase hydrocarbon emulsions in some wells. One well could not be located, presumably having been demolished during station reconstruction. None of the existing wells had appropriate surface seals. Groundwater Technology recommended destroying all the existing wells and installing new groundwater monitoring wells to assess current groundwater conditions beneath the site. The existing wells were destroyed in July 1991 under a permit issued by the Alameda County Flood Control and Water Conservation District. During August 1991, four 3/4-inch-diameter monitoring wells (MW-1 through MW-4) were installed at the site (Figure 2).

3.0 SCOPE OF WORK

3.1 Site-Specific Health and Safety Plan/Permitting

Groundwater Technology prepared a Site-Specific Health and Safety Plan required by the Occupational Health and Safety Administration (OSHA) Standard "Hazardous Waste Operations and Emergency Response" guidelines (29 CFR 1910.120). The Site-Specific Health and Safety Plan was prepared by Groundwater Technology personnel, following a review of site conditions and any existing Site-Specific Health and Safety Plans for the site. The health and safety plan was reviewed and signed by all Groundwater Technology's personnel and subcontractors before performing work at the site.

Groundwater Technology reviewed the site history and information with Chevron representatives before beginning work at the site. Drilling permits to install the monitoring wells were obtained from the Alameda County Flood Control and Water Conservation District (Appendix A). Prior to drilling in the public right of way, encroachment and excavation permits were obtained from the City of Oakland.

3.2 Soil Borings

On June 12, 1992, Groundwater Technology supervised the drilling of three off-site soil borings (MW-5, MW-6, and MW-7) utilizing a truck-mounted drill rig equipped with 8-inch-diameter hollow-stem augers. An additional off-site soil boring (MW-8) was drilled on June 19, 1992. The depths of the off-site soil borings ranged between 19 feet and 35 feet below surface grade. On June 19, 1992, on-site monitoring well MW-1 was destroyed by removing the casing and well screen, and drilling out the surface seal and filter pack using 10-inch-diameter hollow-stem augers. Monitoring well MW-1 was subsequently replaced with a 4-inch-diameter well. A field geologist, under the supervision of a California Registered Geologist, logged the materials encountered during drilling using the Unified Soil Classification System (Appendix B).

The hollow-stem augers were steam cleaned between each boring. The steam cleaning water was stored in a labeled 55-gallon drum pending disposal. The soil from the borings was placed on, and covered by polyethylene plastic pending characterization and disposal.

3.3 Soil Sampling

During drilling, soil samples were collected at 5-foot intervals, from approximately 5 feet below grade to the bottom of the boring. Samples were collected using a 2.5-inch outside diameter (O.D.) split-spoon sampler, lined with three 2-inch-diameter by 6-inch-long brass sample tubes. The sampler was driven 18 inches ahead of the augers at each sample point. Soil samples were field screened using a photo-ionization detector (PID). One sample from every 5-foot interval was sealed with aluminum foil, capped, taped, labeled, placed on ice in an insulated container and delivered to a California-certified laboratory. All sampling was performed according to Groundwater Technology standard operating procedures (SOPs) (Appendix C).

At least one soil sample from each soil boring was selected for chemical analysis. Each selected sample was analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), TPH-as-gasoline, and TPH-as-diesel fuel by Environmental Protection Agency (EPA) Methods 5030/8020/8015.

3.4 Monitoring Well Installation

Monitoring wells MW-5, MW-6, MW-7, and MW-8 were constructed of 2-inch-diameter, Schedule 40 polyvinyl chloride (PVC) casing with flush threads, and between 15 feet and 20 feet of 0.020-inch-slot well screen. The depth of the well screen varied depending on the depth to groundwater at each boring location. The replacement for monitoring well MW-1 was constructed using 5 feet of 4-inch-diameter, Schedule 40 PVC casing and 15 feet of 0.020-inch-slot well screen. A sand filter was placed around each well screen to a height of approximately 1 foot above the top of the screen. The wells were completed with 1 foot of bentonite and a neat-cement seal to grade. The wellhead was protected by a locking cap and a traffic-rated street box with a water-tight bolted lid. Well construction details are presented on the drill logs (Appendix B). The top of casing elevation of each monitoring well was surveyed to a City of Oakland benchmark by a professional licensed surveyor.

3.5 Groundwater Monitoring

On June 23, 1992, each monitoring well was monitored to determine the depth to groundwater and the thickness of any separate-phase hydrocarbons. The water levels in monitoring wells MW-1, MW-5, MW-6, MW-7, and MW-8 were measured using an ORS Environmental Equipment INTERFACE PROBE™ Well Monitoring System, consisting of a dual optical sensor and electrical conductivity probe, that distinguishes between water and petroleum products. Because the INTERFACE PROBE™ was too large to fit within the small diameter well casings, an electrical conductivity probe was used to measure water levels in wells MW-2, MW-3, and MW-4. Approximately 0.02 feet of separate-phase hydrocarbons were found in monitoring well MW-2 during purging.

3.6 Monitoring Well Development

Subsequent to monitoring water levels on June 23, 1992, monitoring wells MW-1, MW-5, MW-6, MW-7, and MW-8 were developed by surging and bailing groundwater from each well using a PVC bailer. This technique promotes an even sand filter pack, removes fine-grained sediments from the well screen and filter pack, and improves the hydraulic communication between the well and aquifer. The groundwater from each well was bailed until visibly clear. Approximately three well casing volumes were extracted from each well prior to sample collection.

3.7 Groundwater Sampling

On June 23, 1992, each of the site monitoring wells were purged and groundwater samples were collected from wells MW-1, MW-3, MW-4, MW-5, MW-7, and MW-8 using a Teflon sampler. A groundwater sample was not collected from MW-2 because a separate-phase hydrocarbon thickness of approximately 0.02 feet was observed while purging the well. Immediately prior to the collection of each water sample, a distilled water rinsate blank was collected from the Teflon sampler as a quality control check on the cleanliness of the sampler. A trip/lab blank was also collected for quality control. Each sample was acidified, labeled, and placed on ice in an insulated container, and delivered to a California-certified laboratory. The samples were accompanied by a chain-of-custody record during transport. Each sample was analyzed for BTEX, TPH-as-gasoline, and TPH-as-diesel using EPA Methods 5030/8020/8015. Water generated during the purging and development process was stored in a Department of Transportation (DOT)-approved water trailer and transported to the Chevron refinery in Richmond, California for recycling.

4.0 SITE CONDITIONS

4.1 Hydrogeology

Geographically, the site is situated approximately 3 miles southwest of the Gudde Ridge, a northwest-to-southeast-trending ridge line. The surface elevation at the site is approximately 10 feet above mean sea level. The site is situated on the northern flank of a small hill and the local land surface slopes generally southwest toward Lake Merritt. Lake Merritt, the closest surface body of water, is approximately 600 feet to the west of the site.

The materials encountered during drilling were predominantly silty, sandy clay interbedded with layers or lenses of fine sand with varying percentages of clay and silt. On June 23, 1992, the groundwater levels at the site ranged between 4.38 feet below grade at MW-7 to 24.14 feet below grade at MW-8. The relatively deeper groundwater levels at MW-3 and MW-8 suggest that the shallow groundwater encountered beneath the site during drilling may be perched on the clay material. A potentiometric surface map (Figure 3) was prepared using the water level data collected on June 23, 1992. Figure 3 shows a groundwater flow direction to the west-southwest with a gradient of approximately 0.01 foot per foot. The groundwater level data are presented in Table 1.

4.2 Water Well Survey

Groundwater Technology contracted Ms. Gayle Crable to review the records of the Department of Water Resources (DWR) in Sacramento, California for all groundwater wells within a one half mile radius of the site. The DWR records were reviewed on July 14, 1992. The DWR records showed 31 wells and one boring at 11 locations. Twenty eight of the wells were designated as being used for monitoring or testing. No municipal or private drinking water wells were on record at the DWR within a one half mile radius of the site. A copy of the notes taken at the DWR are included in Attachment D.

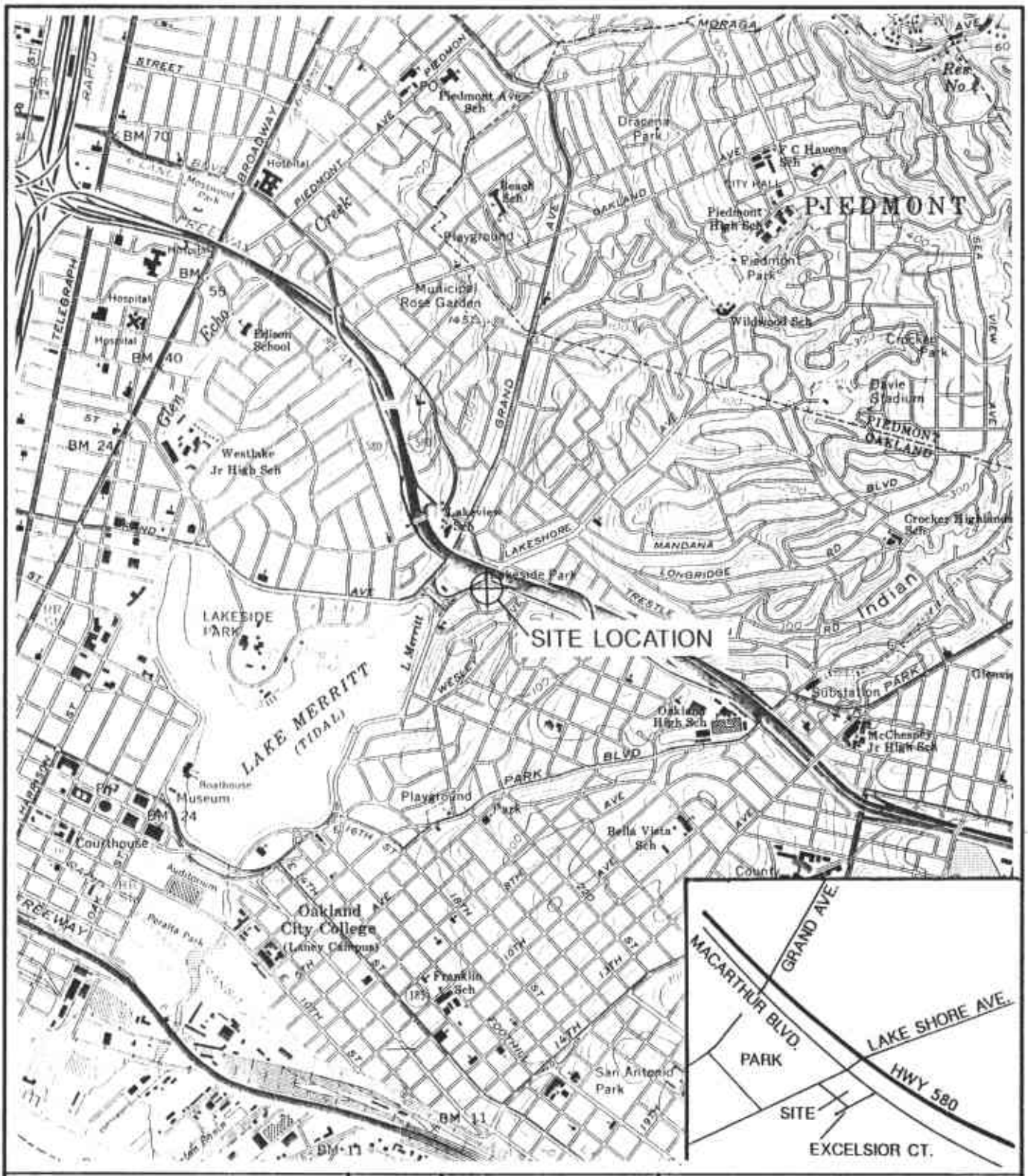
4.3 Analytical Results for Soil

The soil samples selected for chemical testing were dependent on the interpreted depth to groundwater and the results of the PID screening. Analytical results showed gasoline hydrocarbons only in the samples collected from boring MW-8 at 10.5 feet below grade, and from MW-1 at 20.5 feet below grade. The only benzene concentration reported above method detection limits (MDL) was 0.006 parts per million (ppm) in the sample collected from boring MW-1. The only TPH-as-gasoline concentration reported above the MDL was 13 ppm in the sample collected from boring MW-8. Analytical results for the soil samples collected from borings MW-5, MW-6, and MW-7 showed no BTEX or TPH-as-gasoline concentrations above method detection limits (MDL). The analytical results showed a TPH-as-diesel fuel concentration only in the sample collected from boring MW-8 at 2 ppm. Results of all soil samples analyses are summarized in Table 2 and the laboratory results are enclosed in Appendix E.

4.4 Analytical Results for Groundwater

Analytical results for groundwater samples collected on June 23, 1992 reported detectable TPH-as-gasoline concentrations in the groundwater samples collected from MW-1, MW-3, and MW-4. Concentrations of TPH-as-gasoline ranged between 630 parts per billion (ppb) in the sample from MW-3 to 7,700 ppb in the sample from MW-1. No BTEX or TPH-as-gasoline concentrations were reported above the method detection limit (MDL) in the samples collected from MW-5 and MW-8. The analytical results reported TPH-as-diesel fuel concentrations only in the samples collected from wells MW-1 and MW-6 at 2,000 ppb and 120 ppb, respectively. Results of all water sample analyses are summarized in Table 1, and the laboratory reports are enclosed in Appendix E.

FIGURES



GROUNDWATER TECHNOLOGY
4057 PORT CHICAGO HWY
CONCORD, CA 94520
(510) 671-2387

N

SCALE: 0 FEET 2000

SITE LOCATION MAP

CLIENT: CHEVRON U.S.A. PRODUCTS CO.
SERVICE STATION No. 9-0121

DATE: 7/27/92

LOCATION: 3026 LAKESHORE AVENUE
OAKLAND, CALIFORNIA

FIGURE: 1

LAKE MERRITT PARK

MW-7

N

LAKESHORE AVE.

MacARTHUR BLVD.

U/G TANKS

MW-8

2

4

3

14'-16' bgs PLASTIC BARRIER to prevent infiltration of gas vapors to/from 1

7" DIAMETER STORM SEWER

CHANCERY OFFICE DIOCES OF OAKLAND ANNEX

RESIDENTIAL APARTMENT COMPLEXES

EXCELSIOR CT.

MW-5

MW-6

BEACON STREET

LEGEND

⊙ MONITORING WELL

0 30 60

SCALE FEET

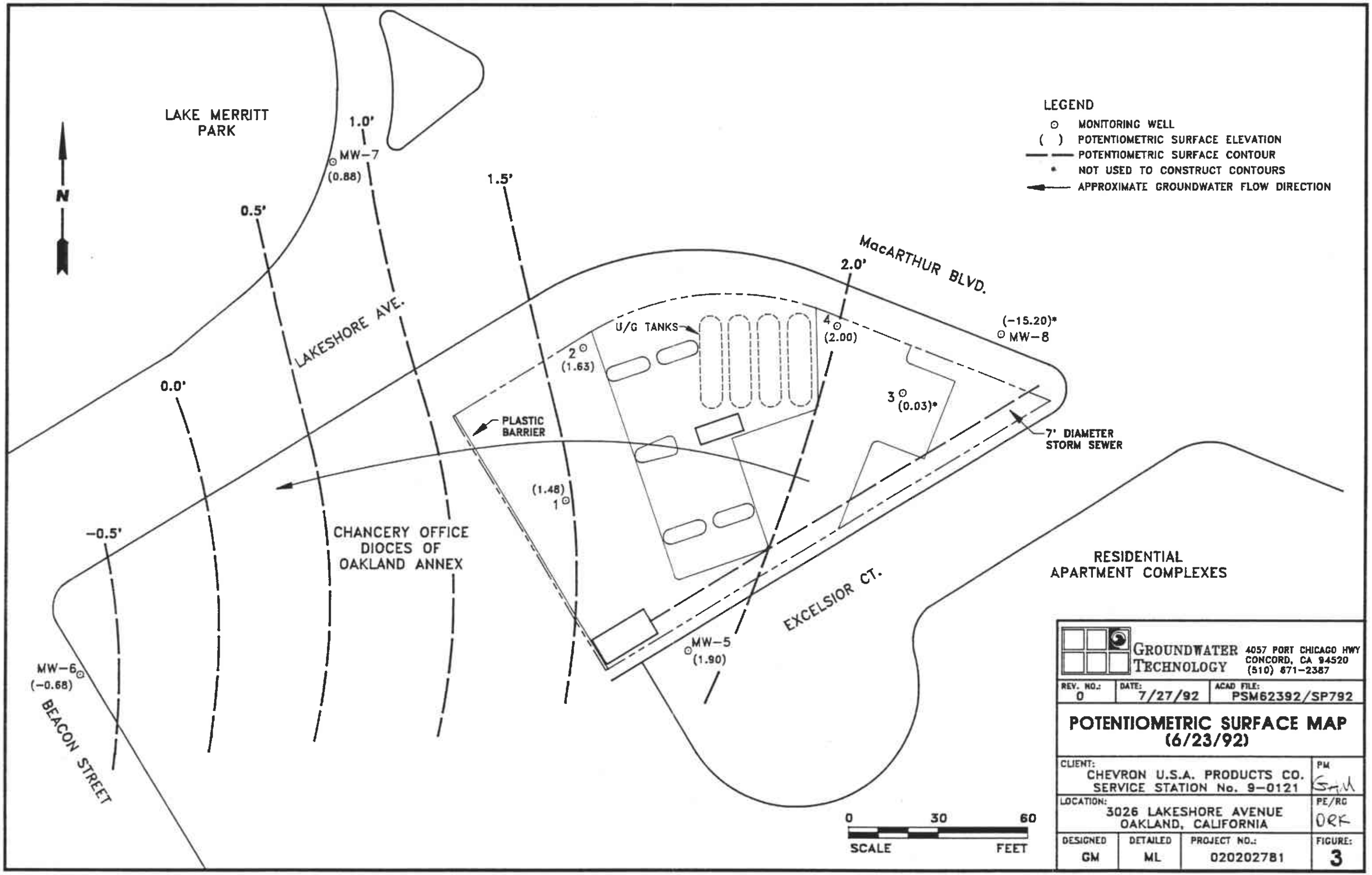
GROUNDWATER TECHNOLOGY 4057 PORT CHICAGO HWY CONCORD, CA 94520 (510) 671-2387

REV. NO.:	DATE:	ACAD FILE:
0	7/9/92	SP792

SITE PLAN

CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0121	PM SAM
LOCATION: 3026 LAKESHORE AVENUE OAKLAND, CALIFORNIA	PE/RG DRK

DESIGNED	DETAILED	PROJECT NO.:	FIGURE:
GM	ML	020202781	2



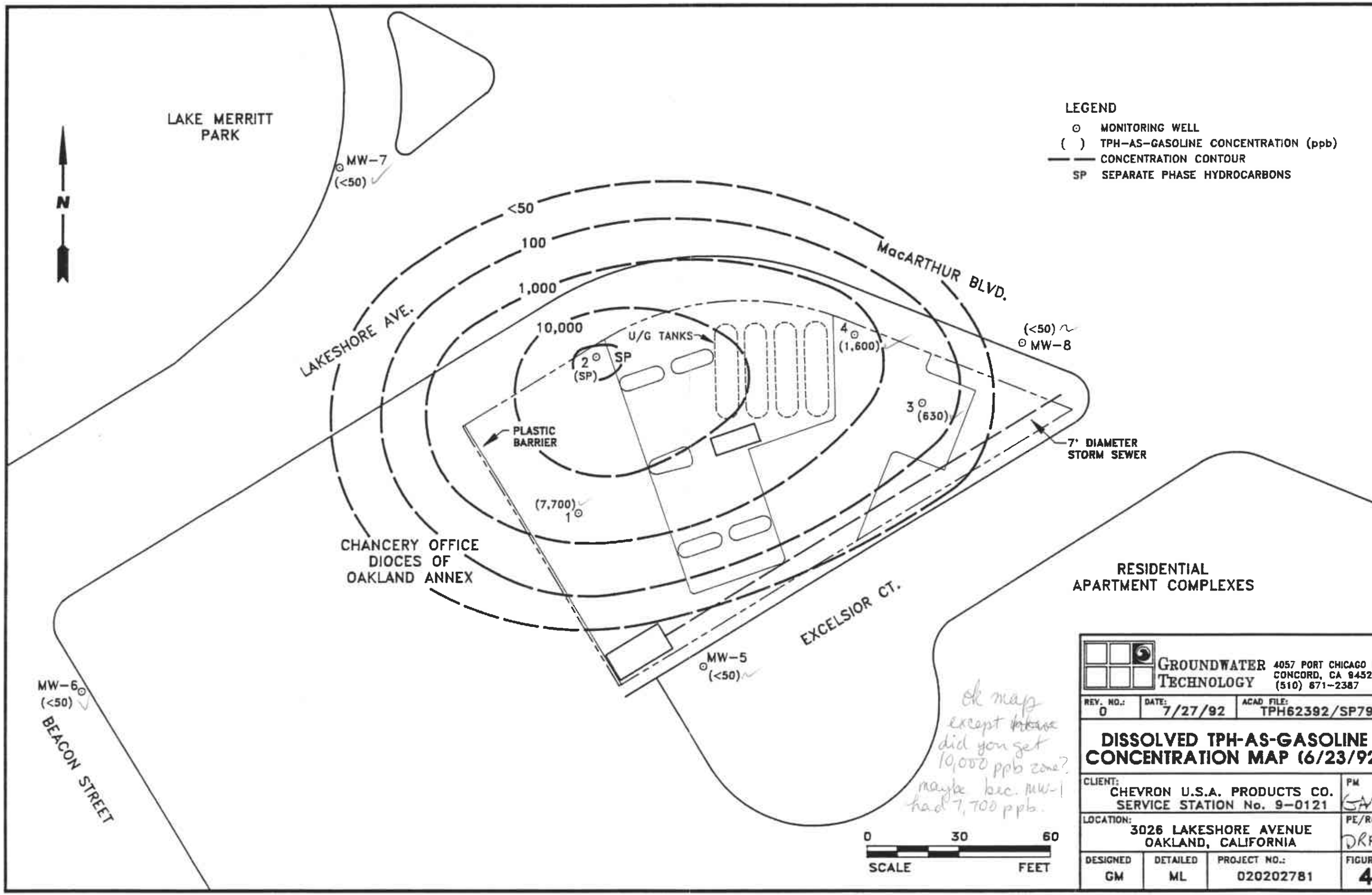
GROUNDWATER TECHNOLOGY
4057 PORT CHICAGO HWY
CONCORD, CA 94520
(510) 671-2387

REV. NO.:	DATE:	ACAD FILE:
0	7/27/92	PSM62392/SP792

POTENTIOMETRIC SURFACE MAP (6/23/92)

CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0121	PM: G.M
LOCATION: 3026 LAKESHORE AVENUE OAKLAND, CALIFORNIA	PE/RG: ORK

DESIGNED	DETAILED	PROJECT NO.:	FIGURE:
GM	ML	020202781	3



ok map except ~~Mac~~ did you get 10,000 ppb zone? maybe bec. MW-1 had 7,700 ppb.

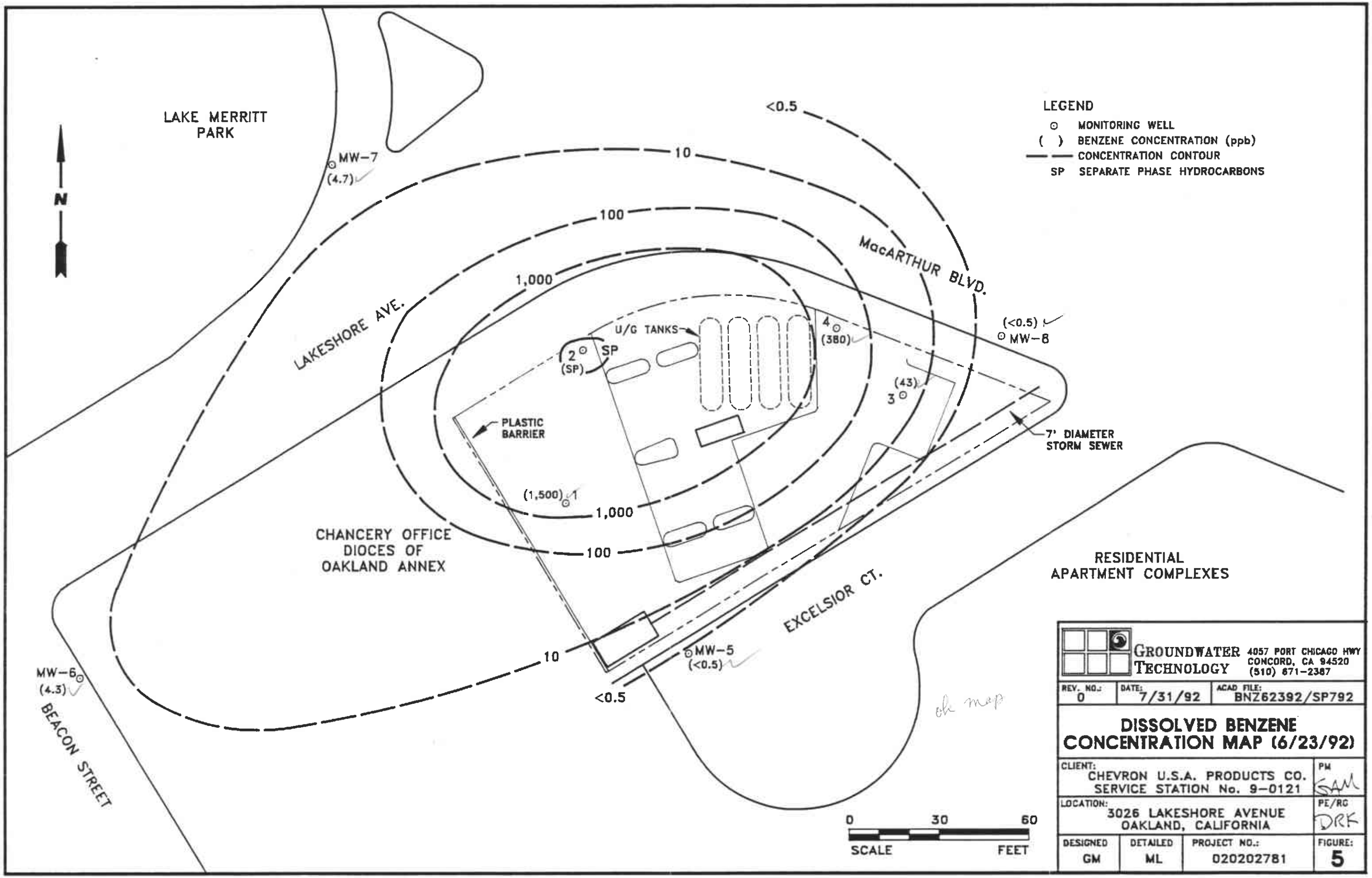
GROUNDWATER TECHNOLOGY
4057 PORT CHICAGO HWY
CONCORD, CA 94520
(510) 671-2387

REV. NO.:	DATE:	ACAD FILE:
0	7/27/92	TPH62392/SP792

DISSOLVED TPH-AS-GASOLINE CONCENTRATION MAP (6/23/92)

CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0121	PM: GAM
LOCATION: 3026 LAKESHORE AVENUE OAKLAND, CALIFORNIA	PE/RG: DRF

DESIGNED	DETAILED	PROJECT NO.:	FIGURE:
GM	ML	020202781	4



GROUNDWATER TECHNOLOGY
4057 PORT CHICAGO HWY
CONCORD, CA 94520
(510) 671-2387

REV. NO.:	DATE:	ACAD FILE:
0	7/31/92	BNZ62392/SP792

DISSOLVED BENZENE CONCENTRATION MAP (6/23/92)

CLIENT: CHEVRON U.S.A. PRODUCTS CO.
SERVICE STATION No. 9-0121

PM: SAM

LOCATION: 3026 LAKESHORE AVENUE
OAKLAND, CALIFORNIA

PE/RG: DRF

DESIGNED	DETAILED	PROJECT NO.:	FIGURE:
GM	ML	020202781	5

TABLES

TABLE 1
HISTORICAL GROUNDWATER ANALYTICAL RESULTS AND MONITORING DATA
(Results in parts per billion)

sep. phase HC thickness

WELL NO.	CASING ELEV.	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENE	TPH-AS-GASOLINE	TPH-AS-DIESEL	DTW (ft)	SPT (ft)	GWE (ft)
MW-1	6.82	08/20/91	1,700	21	220	34	5,100	260	5.20	0.00	1.62
		09/30/91	Separate-phase hydrocarbons present						5.67	SHEEN	1.15
		10/28/91							5.30	0.03	1.50
	6.89	01/08/92	770	13	95	31	5,400	—	5.15	SHEEN	1.67
		01/13/92	---	---	---	---	---	*4,400	---	---	---
		06/23/92	1,500	40	230	100	7,700	*2,000	5.41	0.00	1.48
MW-2	6.27	08/20/91	3,700	55	530	75	9,300	600	4.35	0.00	1.92
		09/30/91	2,600	47	440	68	3,500	---	4.99	0.00	1.28
		10/28/91	1,800	29	290	53	4,600	---	4.91	0.00	1.36
		01/08/92	4,300	70	<25	130	14,000	---	4.64	SHEEN	1.63
		01/13/92	---	---	---	---	---	*38,000	---	---	---
		06/23/92	---	---	---	---	---	---	4.64	0.02	1.63
MW-3	8.71	08/20/91	200	13	15	12	3,100	200	8.45	0.00	0.26
		09/30/91	150	8.3	13	6.7	1,000	---	8.74	0.00	-0.03
		10/28/91	120	6.7	11	7.5	1,200	---	8.76	0.00	-0.05
		01/08/92	120	0.9	4.1	3.4	410	---	8.77	0.00	-0.06
		01/13/92	---	---	---	---	---	*220	---	---	---
		06/23/92	43	0.8	8.2	3.4	630	<50	8.68	0.00	0.03
MW-4	7.37	08/20/91	870	4	3	9	1,800	160	5.05	0.00	1.32
		09/30/91	830	5.5	2.7	12	670	---	5.67	0.00	1.70
		10/28/91	990	5.8	4.8	19	2,800	---	5.81	0.00	1.56
		01/08/92	1,200	10	7	18	2,900	---	5.34	0.00	2.03
		01/13/92	---	---	---	---	---	*1,000	---	---	---
		06/23/92	380*	6.5	3	12	1,600	<50	5.37	0.00	2.00

GROUNDWATER TECHNOLOGY

TABLE 1
HISTORICAL GROUNDWATER ANALYTICAL RESULTS AND MONITORING DATA
(Results in parts per billion)

WELL NO.	CASING ELEV.	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENE	TPH-AS-GASOLINE	TPH-AS-DIESEL	DTW (ft)	SPT (ft)	GWE (ft)
MW-5	14.14	06/23/92	<0.5	<0.5	<0.5	<0.5	<50	<50	12.24	0.00	1.90
MW-6	4.46	06/23/92	4.3	<0.5	0.8	0.9	<50	120	5.14	0.00	-0.68
MW-7	5.26	06/23/92	4.7	<0.5	<0.5	<0.5	<50	<50	4.38	0.00	0.88
MW-8	8.94	06/23/92	<0.5	<0.5	<0.5	<0.5	<50	<50	24.14	0.00	-15.20

DTW = Depth to groundwater
GWE = Groundwater elevation in feet above mean sea level
SPT = Separate-phase hydrocarbon thickness
* = Diesel range concentration reported. The laboratory reported that the majority of peaks were observed in the gasoline range of the chromatogram, or that the pattern observed in the chromatogram was not typical of diesel.
— = Not applicable, not analyzed, not measured

TABLE 2
ANALYTICAL RESULTS FOR SOIL SAMPLES
COLLECTED ON JUNE 12 AND 19, 1992
(Concentration in parts per million)

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (ft)	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	TPH-AS-GASOLINE	TPH-AS-DIESEL
MW-1	MW1A	6/19/92	20.5	0.006	0.019	<0.005	0.015	<1	<1
MW-5	MW5D	6/12/92	20.5	<0.005	<0.005	<0.005	<0.005	<1	<1
MW-6	MW6A	6/12/92	5.5	<0.005	<0.005	<0.005	<0.005	<1	<1
MW-7	MW7A	6/12/92	5.5	<0.005	<0.005	<0.005	<0.005	<1	<1
MW-8	MW8A	6/19/92	5.5	<0.005	<0.005	<0.005	<0.005	<1	<1
	MW8B		10.5	<0.005	0.006	0.012	0.078	13	2*

MDL

TPH = Total petroleum hydrocarbons

* = The analytical laboratory reported that the pattern observed in the chromatogram was not typical of diesel.

very low levels

R2781A1.GM
(030503)

GROUNDWATER TECHNOLOGY

APPENDIX A

WELL INSTALLATION PERMITS

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (510) 484-2600

2 June 1992

Groundwater Technology
4057 Port Chicago Highway
Concord, CA 94520

Gentlemen:

Enclosed is drilling permit 92281 for a monitoring well construction project at 3026 Lakeshore Avenue in Oakland for Chevron U.S.A.

Please note that permit condition A-2 requires that a well construction report be submitted after completion of the work. The report should include drilling and completion logs, location sketch, and permit number.

If you have any questions, please contact Wyman Hong or me at 484-2600.

Very truly yours,

Craig A. Mayfield

Craig A. Mayfield
Water Resources Engineer

WH:mm
Enc.

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (510) 484-2600

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 3026 Lakeshore Ave. Oakland, California

CLIENT
Name Chevron U.S.A. Products Company
Address P.O. Box 5004 Phone 842-9581
City San Ramon Zip 94583

APPLICANT
Name Groundwater Technology, Inc.
Address 4057 North Chicago Hwy Phone 671-2387
City Concord Zip 94520

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	X
Monitoring	X	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other None
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

DRILLER'S LICENSE NO. 482390

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 25 ft.
Surface Seal Depth 5 ft. Number 5

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE May 28, 1992
ESTIMATED COMPLETION DATE May 28, 1992

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Greg A. Welch Date 4-30-92

FOR OFFICE USE

PERMIT NUMBER 92281
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 1 Jun 92
Wyman Hong

51991

APPENDIX B

DRILL LOGS AND WELL CONSTRUCTION SPECIFICATIONS

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-1**

Project CHV/3026 Lakeshore Ave. Owner CHEVRON U.S.A. Products Company
Location Oakland, California Project No. 02020 2781 Date drilled 06/19/92
Surface Elev. ____ Total Hole Depth 21.5 ft. Diameter 10 inches ft.
Top of Casing 6.89 ft. Water Level Initial 6 ft. Static 5.41 ft.
Screen: Dia 4 in. Length 15 ft. Type/Size 0.020 in.
Casing: Dia 4 in. Length 4 ft. Type SCH 40 PVC
Filter Pack Material Lapis Lustre 2/12 Rig/Core Type Mobile B-53/split spoon
Drilling Company Kvilhaug Well Drilling Method Hollow stem auger Permit # 92281
Driller Mike Crocker Log By Greg Mischel
Checked By Dave Kleesattel License No. RG# 5136 Dan Klaetsch

See Site Map For Boring Location

COMMENTS:

The original MW-1 was destroyed using 10-inch augers. The 3/4-inch casing was removed and replaced with 4-inch casing.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						Concrete
2						CRUSHED ROCK about one-inch diameter (fill)
4						
6						*Static groundwater level at 5.41 feet.* *Encountered groundwater at 6 feet on 06/19/92 (1700 hours).*
8						
10						
12						
14						
16						
18						Brown CLAY with little silt (medium stiff, saturated)
20		15	A 4 6 11		CL	
22						End of boring at 21.5 feet. Slough up to 19 feet. Constructed groundwater monitoring well at 19.0 feet.
24						

Drilling Log

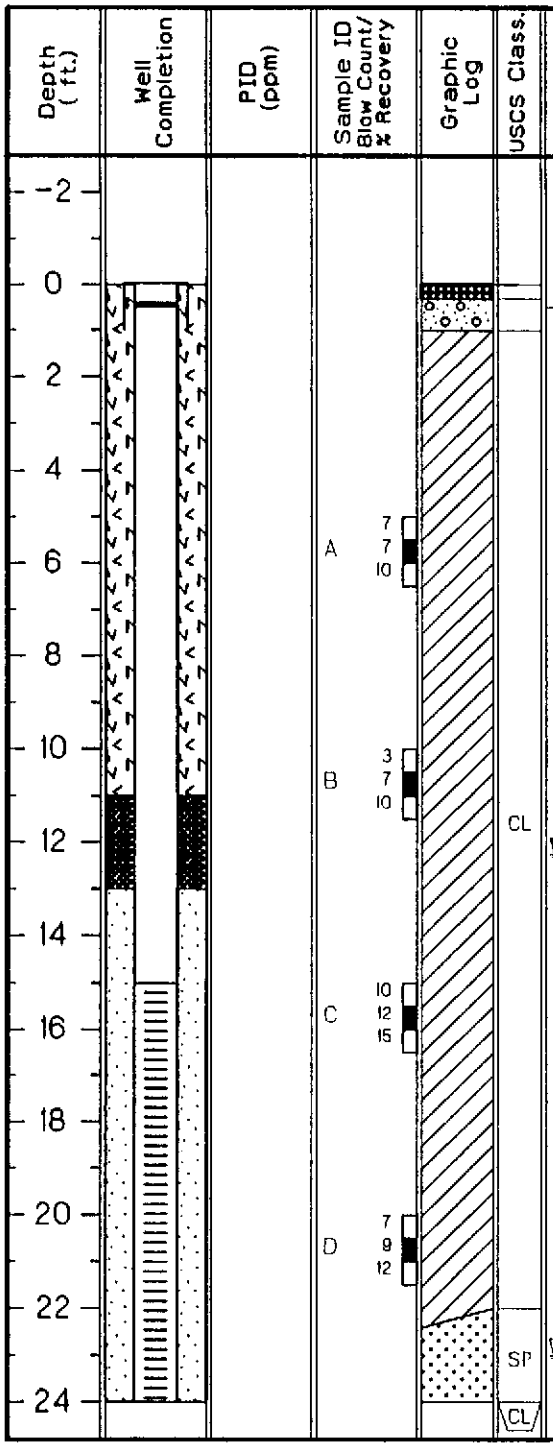
GROUNDWATER TECHNOLOGY

Monitoring Well **MW-5**

Project CHV/3026 Lakeshore Ave. Owner CHEVRON U.S.A. Products Company
Location Oakland, California Project No. 02020 2781 Date drilled 06/12/92
Surface Elev. 14.56 ft. Total Hole Depth 35.0 ft. Diameter 8 inches ft.
Top of Casing 14.14 ft. Water Level Initial 23 ft. Static 12.24 ft.
Screen: Dia 2 in. Length 20 ft. Type/Size 0.020 in.
Casing: Dia 2 in. Length 15 ft. Type SCH 40 PVC
Filter Pack Material Lapis Lustre 2/12 Rig/Core Type Mobile B-53/split spoon
Drilling Company Kvilhaug Well Drilling Method Hollow stem auger Permit # 92281
Driller Mike Crocker Log By Steve Kranyak
Checked By Dave Kleesattel License No. RG# 5136 David Klaetke

See Site Map For Boring Location

COMMENTS:



Description

(Color, Texture, Structure)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%

ASPHALT
Coarse base aggregate

Brown silty CLAY with trace sand and gravel (stiff, moist)

Dark brown silty CLAY with trace sand and gravel (stiff, moist)

Static groundwater level at 12.24 feet.

Light brown silty CLAY (stiff, moist)

Light brown silty CLAY (stiff, very moist)

Brown fine SAND

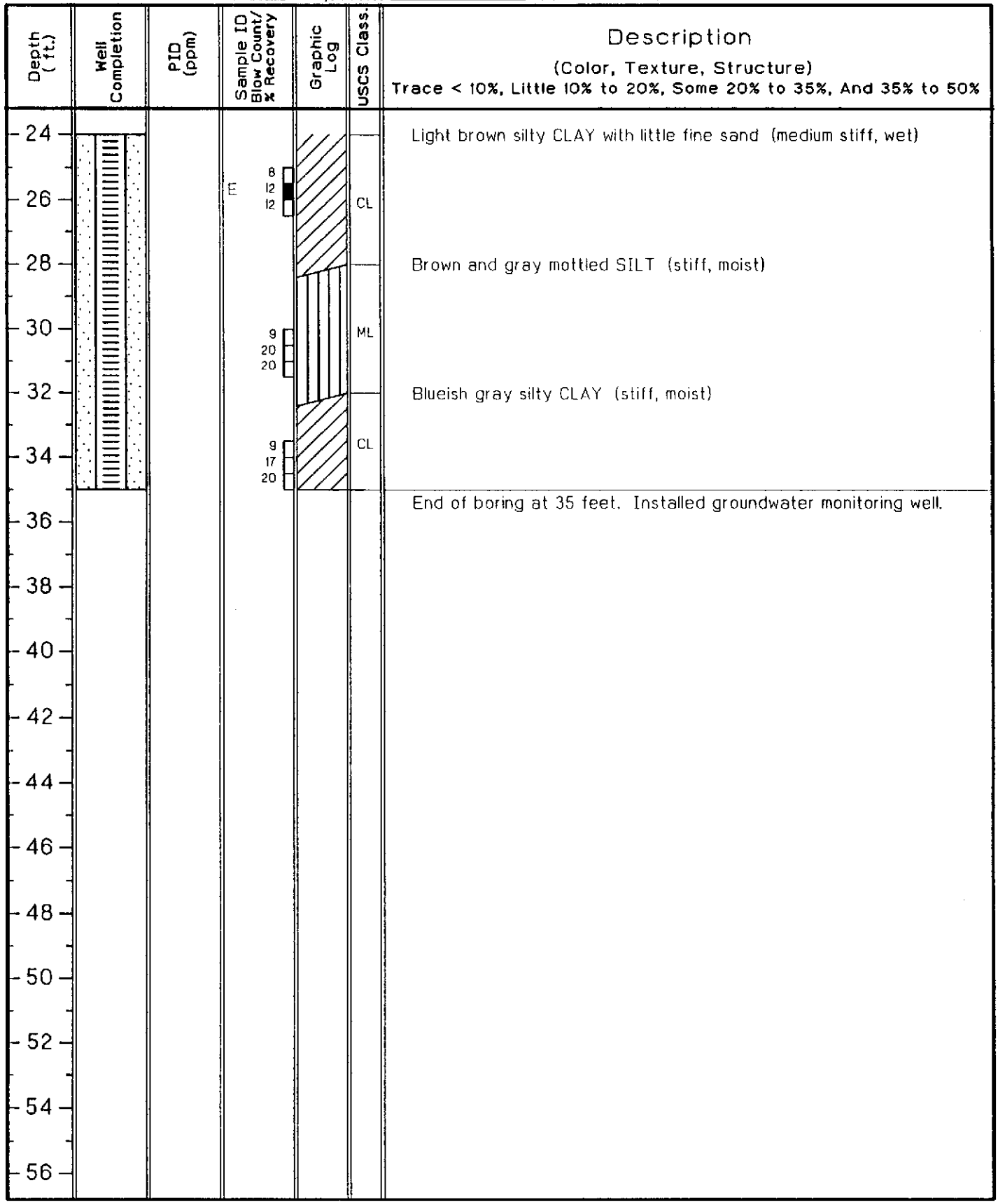
Encountered groundwater at 23 feet on 06/12/92.

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-5**

Project *CHV/3026 Lakeshore Ave.* Owner *CHEVRON U.S.A. Products Company*
Location *Oakland, California* Project No. *02020 2781* Date drilled *06/12/92*



Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-6**

Project *CHV/3026 Lakeshore Ave.* Owner *CHEVRON U.S.A. Products Company*
Location *Oakland, California* Project No. *02020 2781* Date drilled *06/12/92*
Surface Elev. *5.32 ft.* Total Hole Depth *20.0 ft.* Diameter *8 inches ft.*
Top of Casing *4.46 ft.* Water Level Initial *7 ft.* Static *5.14 ft.*
Screen: Dia *2 in.* Length *15 ft.* Type/Size *0.020 in.*
Casing: Dia *2 in.* Length *4 ft.* Type *SCH 40 PVC*
Filter Pack Material *Lapis Lustre 2/12* Rig/Core Type *Mobile B-53/split spoon*
Drilling Company *Kvilhaug Well Drilling* Method *Hollow stem auger* Permit # *92281*
Driller *Mike Crocker* Log By *Steve Kranyak*
Checked By *Dave Kleesattel* License No. *RG# 5136* D. J. Kleesattel

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) — Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						ASPHALT
2						Coarse base aggregate
4						Gray brown silty CLAY with organic matter (soft, wet)
6		0	A 3 3 4			*Static groundwater level at 5.14 feet.*
8					CL	*Encountered groundwater at 7 feet on 06/12/92.* Gray brown silty CLAY with sand and gravel (soft, wet)
10		0	B 1 1 1			Gray brown silty CLAY (soft, wet)
12						(grades with fine sand)
14						
16		0	C 1 2 3		SM	Gray silty fine SAND with clay (loose, wet)
18					ML	Tan brown clayey SILT with some very fine sand (medium stiff, wet)
20			D 4 7 9			End of boring at 20 feet. Installed groundwater monitoring well.
22						
24						

Drilling Log

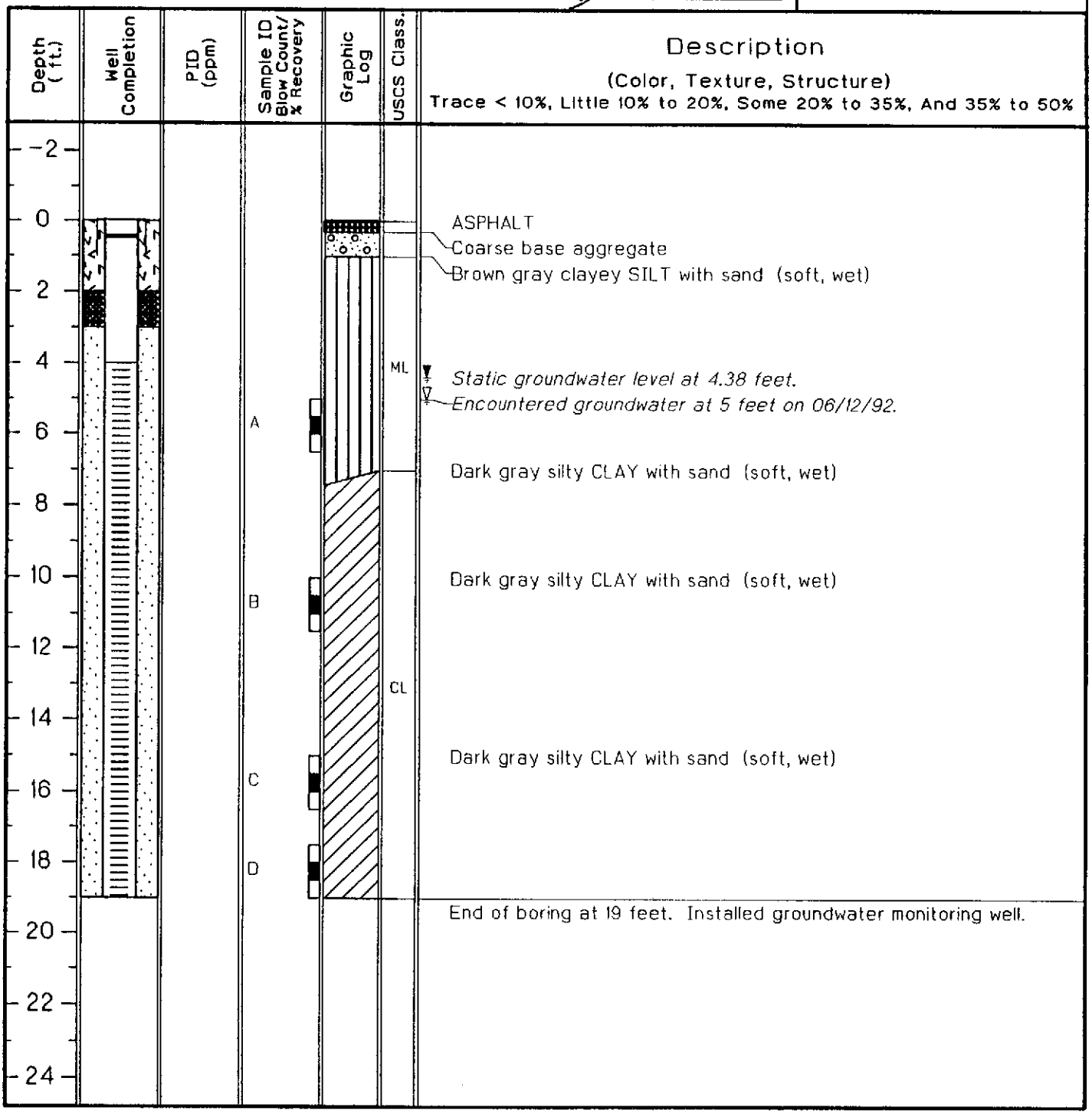
GROUNDWATER TECHNOLOGY

Monitoring Well **MW-7**

Project CHV/3026 Lakeshore Ave. Owner CHEVRON U.S.A. Products Company
Location Oakland, California Project No. 02020 2781 Date drilled 06/12/92
Surface Elev. 5.62 ft. Total Hole Depth 19.0 ft. Diameter 8 inches ft.
Top of Casing 5.26 ft. Water Level Initial 5 ft. Static 4.38 ft.
Screen: Dia 2 in. Length 15 ft. Type/Size 0.020 in.
Casing: Dia 2 in. Length 4 ft. Type SCH 40 PVC
Filter Pack Material Lapis Lustre 2/12 Rig/Core Type Mobile B-53/split spoon
Drilling Company Kvilhaug Well Drilling Method Hollow stem auger Permit # 92281
Driller Mike Crocker Log By Steve Kranyak
Checked By Dave Kleesattel License No. RG# 5136

See Site Map For Boring Location

COMMENTS:



Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-8**

Project *CHV/3026 Lakeshore Ave.* Owner *CHEVRON U.S.A. Products Company*
Location *Oakland, California* Project No. *02020 2781* Date drilled *06/19/92*
Surface Elev. *9.23 ft.* Total Hole Depth *30.0 ft.* Diameter *8 inches ft.*
Top of Casing *8.94 ft.* Water Level Initial *10 ft.* Static *24.14 ft.*
Screen: Dia *2 in.* Length *20 ft.* Type/Size *0.020 in.*
Casing: Dia *2 in.* Length *5 ft.* Type *SCH 40 PVC*
Filter Pack Material *Lapis Lustre 2/12* Rig/Core Type *Mobile B-53/split spoon*
Drilling Company *Kvilhaug Well Drilling* Method *Hollow stem auger* Permit # *92281*
Driller *Mike Crocker* Log By *Greg Mischel*
Checked By *Dave Kleesattel* License No. *RG# 5136* David Kleesattel

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						CONCRETE
2						Gray CLAY with little silt (soft, moist)
4						
6		6	A 4 4 6			
8						
10		254	B 3 4 5			*Encountered groundwater at 10 feet on 06/19/92 (1300 hours).* Gray CLAY with little silt and trace sand and gravel (soft, moist)
12					CL	
14						
16		0	C 5 7 11			Brown and gray CLAY with some silt and little sand and gravel (medium stiff)
18						
20		0	D 7 11 13			Brown silty CLAY (stiff)
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-8**

Project *CHV/3026 Lakeshore Ave.* Owner *CHEVRON U.S.A. Products Company*
Location *Oakland, California* Project No. *02020 2781* Date drilled *06/19/92*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						*Static groundwater at 24.14 feet.*
26		0	E		CL	Gray silty CLAY (stiff, moist)
28						
30						End of boring at 30 feet. Backfilled with bentonite up to 25 feet. Installed groundwater monitoring well at 25 feet.
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						

APPENDIX C

GROUNDWATER TECHNOLOGY STANDARD OPERATING PROCEDURES (SOPS)

GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING GROUNDWATER MONITORING
SOP 8

Groundwater monitoring of wells at the site shall be conducted using an ORS Environmental Equipment (ORS) INTERFACE PROBE™ and SURFACE SAMPLER™. The INTERFACE PROBE™ is a hand-held, battery-operated device for measuring depth to petroleum product and depth to water as measured from an established datum (*i.e.*, top of the well casing which has ben surveyed). Separate-phase hydrocarbon (product) thickness is then calculated by subtracting the depth to product from the depth to water. In addition, water elevations are adjusted for the presence of fuel with the following calculation:

(Product Thickness) (0.8) + (Water Elevation) = Corrected Water Elevation

Note: The factor of 0.8 accounts for the density difference between water and petroleum hydrocarbons.

The INTERFACE PROBE™ consists of a dual-sensing probe which utilizes an optical liquid sensor and electrical conductivity to distinguish between water and petroleum products. A coated steel measuring tape transmits the sensor's signals to the reel assembly where an audible alarm sounds a continuous tone when the sensor is immersed in petroleum product and an oscillating tone when immersed in water. The INTERFACE PROBE™ is accurate to 1/16th inch.

A SURFACE SAMPLER™ shall be used for visual inspection of the groundwater to note sheens (difficult to detect with the INTERFACE PROBE™), odors, microbial action, etc.

The SURFACE SAMPLER™ used consists of a 12-inch-long case acrylic tube with a Delrin ball which closes onto a conical surface creating a seal as the sampler is pulled up. The sampler is calibrated in inches and centimeters for visual inspection of product thickness.

To reduce the potential for cross contamination between wells, the monitorings shall take place in order from the least to the most contaminated wells. Wells containing separate-phase hydrocarbons (free product) should be monitored last. Between each monitoring the equipment shall be washed with laboratory-grade detergent and double rinsed with distilled water.

GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING WATER SAMPLING METHODOLOGY
SOP 9

Before water sampling, each well shall be purged by pumping a minimum of four well volumes or until the discharge water indicates stabilization of temperature conductivity and pH. If the well is evacuated before four well volumes are removed or stabilization is achieved, the sample should be taken when the water level in the well recovers to 80 percent of its initial level.

Retrieval of the water sample, sample handling and sample preservation shall be conducted according to Standard Operating Procedure 10 concerning "Sampling for Volatiles in Water." The sampling equipment used shall consist of a Teflon® and/or stainless steel samplers which meet U.S. Environmental Protection Agency (EPA) regulations. Glass vials with Teflon® lids should be used to store the collected samples.

To ensure sample integrity, each vial shall be filled with the sampled water in such a way that the water stands above the lip of the vial. The cap should then be quickly placed on the vial and tightened securely. The vial should then be checked to ensure that air bubbles are not present prior to labeling of the sample. Label information should include a sample identification number, job identification, date, time, type of analysis requested, and sampler's name. Chain-of-custody records shall be completed according to Standard Operating Procedure (SOP) 11 concerning chain of custody.

The vials should be immediately placed in high quality coolers for shipment to the laboratory. The coolers should be packed with sufficient ice or freezer packs to ensure that the samples are kept below 4° Celsius (C). To minimize sample degradation the prescribed analysis shall take place within seven days of sample collection unless specially prepared acidified vials are used.

To minimize the potential for cross contamination between wells, all the well development and water sampling equipment which contacts the groundwater shall be cleaned between each sampling. As a second precautionary measure, the wells shall be sampled in order of increasing contaminant concentrations (the least contaminated well first, the most contaminated well last) as established by previous analysis.

STANDARD OPERATING PROCEDURE 10
CONCERNING SAMPLING FOR VOLATILES IN WATER
(DISSOLVED GASOLINE, SOLVENTS, ETC.)
SOP 10

1. Use only vials properly washed and baked.

2. Use clean sampling equipment. Scrub with Alconox or equivalent laboratory detergent and water followed by a thorough water rinse. Complete with a distilled water rinse.

   Sampling equipment which has come into contact with liquid hydrocarbons (free product) should be regarded with suspicion. Such equipment should have tubing and cables replaced and all resilient parts washed with laboratory detergent solution as indicated above. Visible deposits may have to be removed with hexane. Solvent washing should be followed by detergent washing, as indicated above.

   This procedure is valid for volatile organic analysis only. For extractable organics (for example, pesticides, or base neutrals for U.S. Environmental Protection Agency [EPA] Method 625 a final rinse with pesticide-grade isopropyl alcohol), followed by overnight or oven drying will be necessary.

3. Take duplicate samples. Mark on forms as a single sample with two containers to avoid duplication of analyses.

4. Take a site blank using distilled water or known uncontaminated source. This sample will be run at the discretion of the project manager.

5. Fill out labels and forms as much as possible ahead of time. Use an indelible marker.

6. Preservatives are required for some types of samples. Use specially prepared vials marked as indicated below, or use the appropriate field procedure (SOP 12 for acidification). Make note on forms that samples were preserved. Always have extra vials in case of problems. Samples for volatile analyses should be acidified below pH 2 upright. Eye protection, foot protection, and disposable vinyl gloves are required for handling. Samples designated for expedited service and analyzed within seven (7) days of sampling will be acceptable without preservation. Acid-causing burns. Glasses or goggles (not contact lenses) are necessary for protection of the eyes. Flush eyes with water for 15 minutes if contact occurs and seek medical attention. Rinse off hands frequently with water during handling.

   For sampling chlorinated drinking water supplies for chlorinated volatiles, samples shall be preserved with sodium thiosulfate. Use vials labeled "CONTAINS THIOSULFATE." No particular cautions are necessary.

7. Fill vial to overflowing with water, avoiding turbulence and bubbling as much as possible. Water should stand above lip of vial.

8. Carefully, but quickly, slip cap onto vial. Avoid dropping the Teflon® septum from cap by not inverting cap until it is in contact with the vial. Disc should have Teflon® face toward the water. Also avoid touching white Teflon® face with dirty fingers.

9. Tighten cap securely, invert vial, and tap against hand to see there are not bubbles inside.

10. Label vial, using indelible ink, as follows:

    A. Sample I.D. No.
    B. Job I.D. No.
    C. Date and Time
    D. Type of analysis required
    E. Your name

11. Unless the fabric-type label is used, place Scotch™ tape over the label to preserve its integrity.

12. For chain-of-custody reasons, sample vial should be wrapped end-for-end with Scotch™ tape or evidence tape and signed with indelible ink where the end of the tape seals on itself. The septum needs to be covered.

13. Chill samples immediately. Samples to be stored should be kept at 4° Celsius (C) (30° Fahrenheit [F]). Samples received at the laboratory above 10°C (as measured at glass surface by a thermocouple probe), after overnight shipping, will be considered substandard, so use a high quality cooler with sufficient ice or freezer packs.

14. Fill out Chain-of-Custody Manifest and Analysis Request Form (see Chain of Custody Procedures, SOP 11).

GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING CHAIN OF CUSTODY
SOP 11

1. Samples must be maintained under custody until shipped or delivered to the laboratory. The laboratory will then maintain custody. A sample is under custody if:

    a) It is in your possession
    b) It is in your view after being in your possession
    c) You locked it up after it was in your possession
    d) It is in a designated secure area

2. Custody of samples may be transferred from one person to another. Each transferer and recipient must date, sign and note the time on the chain-of-custody form.

3. In shipping, the container must be sealed with tape, and bear the sender's signature across the area of bonding at the ends of the tape to prevent undetected tampering. Each sampling jar should be taped and signed as well. Scotch tape works well.

4. Write "sealed by" and sign in the "Remarks" box at the bottom of the form before sealing the box. Place form in a plastic bag and seal it inside the box.

5. The "REMARKS" section of the form is for documenting details such as:

    a) Correlation of sample numbers if samples are split between labs.
    b) QC numbers when lab is logging in the samples.
    c) Sample temperature and condition when received by lab.
    d) Preservation notation.
    e) pH of samples when opened for analysis (if acidified).
    f) Sampling observation or sampling problem.

6. The chain-of-custody form should be included inside the shipping container. A copy should be sent to the project manager.

7. When the samples are received by the lab, the chain-of-custody form will be dated, signed, and the time noted by a laboratory representative. The form will be retained in the laboratory files along with shipping bills and receipts .

8. At the time of receipt of samples by the laboratory, the shipping container will be inspected and the sealing signature will be checked. The samples will be inspected for condition and bubbles, and the temperature of a representative sample container will be measured externally by a thermocouple probe (held tightly between two samples) and recorded. The laboratory QC numbers will be placed on the labels, in the accession log, and on the chain-of-custody form. If samples are acidified, their pH will be measured by narrow range pH paper at the time of opening for analysis. All comments concerning procedures requiring handling of the samples will be dated and initialed on the form by the laboratory person performing the procedure. A copy of the completed chain-of-custody form with the comments on sample integrity will be returned to the sampler.

GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING SOIL SAMPLING METHODOLOGY
SOP 14

1. Soil samples should be collected and preserved in accordance with Groundwater Technology Standard Operating Procedure (SOP 15) concerning Soil Sample Collection and Handling when Sampling for Volatile Organics. A hollow stem soil auger should be used to drill to the desired sampling depth. A standard 2 inch diameter split spoon sampler 18 inches in length shall be used to collect the samples. The samples are contained in 2 inch diameter by 6 inch long thin walled brass tube liners fitted into the split spoon sampler (three per sampler).

2. The split spoon sampler should be driven the full depth of the spoon into the soil by a 140 pound hammer. The spoon shall then be extracted from the borehole and the brass tube liners containing the soil sample removed from the sampler. The ends of the liner tubes should be immediately covered with aluminum foil, sealed with a teflon or plastic cap, and taped with duct tape. After being properly identified with sample data entered on a standard chain of custody form the samples shall be placed on dry ice (maintained below 4~C) and transported to the laboratory within 24 hours.

3. One of the three soil samples retrieved at each sample depth shall be analyzed in the field using a photoionization detector and/or explosimeter. The purpose of the field analysis is to provide a means to choose samples to be laboratory analyzed for hydrocarbon concentrations and to enable comparisons between the field and laboratory analyses. The soil sample shall be sealed in a plastic bag and allowed to equilibrate with the air surrounding the soil for approximately 10 minutes. One of the two field vapor instruments shall be used to quantify the amount of hydrocarbon released to the air from the soils. The data shall be recorded on the drill logs at the depth corresponding to the sample point.

GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING SOIL SAMPLE COLLECTION AND
HANDLING WHEN SAMPLING FOR VOLATILE ORGANICS
SOP 15

1. Use a sampling means which maintains the physical integrity of the samples. The project sampling protocol will designate a preferred sampling tool. A split spoon sampler with liners, or similar tube sampler which can be sealed, is best.

2. The samples should be sealed in the liner, with teflon plugs (The "California Sampler") or plastic caps.

3. For sending whole-core samples (above):

   A. Seal ends of liner with teflon plugs or plastic caps, leaving no free air space inside.

   B. Tape with duct tape.

   C. Label the sample with the following information: sample identification, depth, date and time, project number and required analyses.

   D. Place in plastic bag labeled with indelible marker. Use Well #, depth, date, and job #.

   E. Place inside a second bag and place a labelling tag inside outer bag.

   F. Enclose samples in a cooler with sufficient ice or dry ice to maintain samples at 4 degrees C during shipment.

   G. Seal cooler with a lock, or tape with samplers signature so tampering can be detected.

   H. Package cooler in a box with insulating material. Chain of custody forms can be placed in a plastic bag in this outer box.

   I. If dry ice is used, a maximum of 5 pounds is allowed by Federal Express without special documents(documents are easy to obtain but are not necessary for under 5 pounds). Write "ORM-A dry ice", "_____ pounds, for research" on outside packaging and on regular airbill under classification. UPS does not accept dry ice.

   J. Soil cores kept a 4 degrees C are only viable for up to 7 days when aromatic hydrocarbons are involved. The lab should prepare the samples in methanol once in the lab.

4. Good sampling practice would include preparing 1 out of 5 samples to be prepared in duplicates for analysis. These 4 out of 20 samples will be used for the following purposes:

   A. One in every 20 samples should be analyzed as a field replicate to evaluate the precision of the sampling technique. A minimum of 1 sample per data set is suggested.

   B. An additional 1 in 20 samples should be selected by sampler to be prepared in duplicate as alternative to Step (A). Choose a different soil type if available.

C. The remaining 2 in 20 samples should be used by lab for spiking with reference materials for internal QC.

Other QC procedures can be specified at the project manager's discretion. See Table 3-2 (reference 2) attached.

5. Decontamination of equipment in the field requires a detergent wash, with a distilled water rinse.

REFERENCES

1. Soil Sampling Quality Assurance Users Guide, U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, NV, EPA 600/4-84-043, May 1984.

2. Preparation of Soil Sampling Protocol. Techniques and Strategies, U.S. EPA, Environmental Monitoring Systems Laboratory, Las Vegas, NV, EPA 600/4-83-020, August 1983 (PB83-206979).

3. Test Methods for Evaluating Solid Waste, U.S. EPA, Office of Solid Waste and Emergency Response, Washington, D.C., SW 846, July 1982.

GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING OPERATION/CALIBRATION OF
PHOTOIONIZATION ANALYZER
SOP 19

1. The Thermo Environmental Instruments Inc. Model 580B OVM Photoionization Analyzer shall be used, using photoionization, to measure the concentration of trace gases over a range of less than 1 ppm to 2,000 ppm. The specific instrument used for investigations related to hydrocarbon contamination should be calibrated for direct readings in parts per million (ppm) volume/volume of isobutylene. Specifics of the detection principle/theory and functions of various components can be found in the manufactures instruction manual.

2. To assure optimum performance, the photoionization analyzer should be calibrated with a standard gas mixture of known concentration from a pressurized container. A daily procedure for calibration involves bringing the probe and readout close to the calibration gas, cracking the valve on the tank and checking the instrument reading. This provides a useful spot check for the instrument.

3. A procedure conducted weekly for more accurate calibration of the instrument from a pressurized container is to connect one side of a "T" to the pressurized container of calibration gas, another side of the "T" to a rotameter and the third side of the "T" directly to the 8" extension to the photoionization probe (see Figure 2). Crack the valve of the pressurized container until a slight flow is indicated on the rotameter. The instrument draws in the volume of sample required for detection, and the flow in the rotameter indicates an excess of sample. Now adjust the span pot so that the instrument reads the exact value of the calibration gas. (If the instrument span setting is changed, the instrument should be turned back to the standby position and the electronic zero should be readjusted, if necessary).

APPENDIX D

WELL SURVEY DATA COLLECTED FROM THE DEPARTMENT OF WATER RESOURCES ON JULY 14, 1992

CP = Cathodic Protection

M = Monitoring

Sheet 1 of 1

Inventory of Wells Located in Township 1S Range 3W Section 30, County Alameda Lakeshore

Owner	Owner's Address	Well Location	Year Drilled	Use
PG+E	4801 Oakport, O	E/o Palomo + Calmar	75	CP
		Section 31		
Wm. Wong	2419 Park, O	Monclair + DARWin	88	Boring
		1S 4W Sec. 25		
Martini Co.	3669 Grand, O.	3509 Grand	91	M
Chevron, USA	2410 Camino Ramon, SR	210 Grand (9 wells)	90	M
PG+E	4801 Oakport, O	Adams + Lee	74	CP
Quik Stop Markets	P.O. Box 5742, Fremont	363 Grand	88	M
		(2 wells)		
"	"	" (6 wells)	90	"
Shell	13980 Willow Pass Rd.	350 Grand	91	"
	Ste. 900, Concord			
Texaco	10 Universal, Universal City	500 Grand	89	M
		(2 wells)		
"	"	" (3 wells)	90	M
Ranger Pipeline	2010 Ocean #E, SF.	637 Beacon	89	M
Unocal	2000 Crow Canyon #400	3220 Lakeshore	90	Test
	San Ramon	(3 wells)		
		Section 36		
PG+E	4801 Oakport, O.	Brooklyn + Haddon	76	CP

Information is only as current as DWR's current files: 7/14/92

APPENDIX E

LABORATORY REPORTS AND CHAIN-OF-CUSTODY RECORDS

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

GROUNDWATER TECHNOLOGIES INC.
Attn: Sandra Lindsey

Project 020202781
Reported 06/22/92

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
85993- 4	MW5D	06/12/92	06/22/92	Soil
85993- 6	MW6A	06/12/92	06/22/92	Soil
85993-10	MW7A	06/12/92	06/22/92	Soil

RESULTS OF ANALYSIS

Laboratory Number:	85993- 4	85993- 6	85993-10
Diesel:	ND<1	ND<1	ND<1
Gasoline:	ND<1	ND<1	ND<1
Benzene:	ND<.005	ND<.005	ND<.005
Toluene:	ND<.005	ND<.005	ND<.005
Ethyl Benzene:	ND<.005	ND<.005	ND<.005
Xylenes:	ND<.005	ND<.005	ND<.005
Concentration:	mg/kg	mg/kg	mg/kg

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 85993

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
mg/kg = parts per million (ppm)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Soil: 50mg/kg

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Soil: 1mg/kg

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Soil: 1mg/kg

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Soil: 0.005mg/kg

ANALYTE	SPIKE LEVEL	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Diesel:	200 ppm	94/92	2	70-130
Gasoline:	200 ng	92/97	5	70-130
Benzene:	200 ng	83/82	1	70-130
Toluene:	200 ng	89/81	2	70-130
Ethyl Benzene:	200 ng	87/90	3	70-130
Xylenes:	200 ng	83/86	4	70-130

Richard Srna, Ph.D.

Veronica V Tanguilig (for)
Laboratory Director

Fax copy of Lab Report and COC to Chevron Contact: ☐ No [redacted] Yes

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number: # 9-0121
Facility Address: 3022 [redacted] Lakeshore Avenue Oakland
Consultant Project Number: 020202781
Consultant Name: Groundwater Tech
Address: 4057 Port Chicago Hwy
Project Contact (Name): Sandra Lindsey
(Phone) 510 671 2387 (Fax Number)

Chevron Contact (Name): Nancy Vukelich
(Phone): 842-9581
Laboratory Name: Superior Analytical
Laboratory Release Number: 4403170
Samples Collected by (Name): Steve Kramyak
Collection Date: 6/12/92
Signature:

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	Analyses To Be Performed: BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)	Hold					Remarks
MW5A	1	1	S	G	7:45		yes									X					
B	2	↓	↓	↓	↓		↓									X					
C	3															X					
D	4							X	X												
E	5															X					
MW6A	6							X	X												
B	7															X					
C	8																				
D	9															X					
MW7A	10	✓	✓	✓	4:05		✓	X	X												

Please Initial:
Samples stored in ice. X
Appropriate containers X
Samples preserved X
VOA's without headspace N/A
Comments: X

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
[redacted]	GTI	6/12/92			
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time
			Brenda L Oliver	SUP	6/15/92 12:45

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
5 Days
10 Days
As Contracted

COC-3.DWG/03 91/HCH

Superior Precision Analytical, Inc.
835 Arnold Drive, Suite 106 • Martinez, California 94553 • (510) 229-0166 / fax (510) 229-0916

GROUNDWATER TECHNOLOGIES INC.
Attn: GREG MISCHEL

Project 020202781
Reported 07/13/92

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
86051- 1	MW-8A	06/19/92	07/09/92	Soil
86051- 2	MW-8B	06/19/92	07/09/92	Soil
86051- 6	MW-1A	06/19/92	07/09/92	Soil

RESULTS OF ANALYSIS

Laboratory Number:	86051- 1	86051- 2	86051- 6
Diesel:	ND<1	2*	ND<1
Gasoline:	ND<1	13	ND<1
Benzene:	ND<.005	ND<.005	0.006
Toluene:	ND<.005	0.006	0.019
Ethyl Benzene:	ND<.005	0.012	ND<.005
Xylenes:	ND<.005	0.078	0.015
Concentration:	mg/kg	mg/kg	mg/kg

* Diesel range concentration. The pattern observed in the chromatogram was not typical of diesel.

Superior Precision Analytical, Inc.
835 Arnold Drive, Suite 106 • Martinez, California 94553 • (510) 229-0166 / fax (510) 229-0916

CERTIFICATE OF ANALYSIS

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 86051

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
mg/kg = parts per million (ppm)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Soil: 50mg/kg

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Soil: 1mg/kg

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Soil: 1mg/kg

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Soil: 0.005mg/kg

ANALYTE	SPIKE LEVEL	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Diesel:	200 ng	100/100	0	70-130
Gasoline:	200 ng	92/89	3	70-130
Benzene:	200 ng	101/96	5	70-130
Toluene:	200 ng	100/97	3	70-130
Ethyl Benzene:	200 ng	105/102	3	70-130
Xylenes:	200 ng	95/93	3	70-130

Richard Srna, Ph.D.
Laboratory Director

Fax copy of Lab Report and COC to Chevron Contact: ☐ No

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number: 9-0121
Facility Address: 3026 Lakeshore Ave., Oakland, CA
Consultant Project Number: 020202781
Consultant Name: Groundwater Technology, Inc.
Address: 4057 Port Chicago Hwy, Concord, CA
Project Contact (Name): Greg Mischel
(Phone): 671-2387 (Fax Number): 685-9148

Chevron Contact (Name): Nancy Vukelich
(Phone): 842-9581
Laboratory Name: Superior Analytical
Laboratory Release Number: 440370
Samples Collected by (Name): Greg Mischel
Collection Date: June 19, 1992
Signature: Greg A. Mischel

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)	Hold					Remarks
								Analyses To Be Performed														
MW-9A	1		S	G	11:55		✓	✓	✓												
MW-9B	2		S	G	12:05		✓	✓	✓												
MW-9C	3		S	G	12:10		✓									✓					
MW-9D	4		S	G	12:20		✓									✓					
~~MW-1A~~			~~S~~	~~G~~																	
MW-8E	5		S	G	12:30		✓									✓					
MW-1A	6		S	G	3:20		✓	✓	✓												

Please Initial:
Samples Shipped in Ice: FT
Appropriate containers: ✓
Samples preserved: X NA
VOA's without headspace: NA
Comments:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Greg Mischel	GTI	6/22/92			
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time
			FTanguilig		6-22-92 1:00PM

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
5 Days
10 Days
As Contracted

COC-3.DWG/03 91/HCH

Superior Precision Analytical, Inc.
835 Arnold Drive, Suite 106 • Martinez, California 94553 • (510) 229-0166 / fax (510) 229-0916

GROUNDWATER TECHNOLOGIES INC.
Attn: Sandra Lindsey

Project 020302090
Reported 07/13/92

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
86085- 1	SB-LB	06/23/92	06/30/92	Water
86085- 2	RBMW6	06/23/92	06/30/92	Water
86085- 3	MW6	06/23/92	07/09/92	Water
86085- 5	MW7	06/23/92	07/09/92	Water
86085- 7	MW8	06/23/92	07/09/92	Water
86085- 9	MW5	06/23/92	07/09/92	Water
86085-11	MW3	06/23/92	07/09/92	Water
86085-13	MW4	06/23/92	07/09/92	Water
86085-15	MW1	06/23/92	07/09/92	Water

RESULTS OF ANALYSIS

Laboratory Number:	86085- 1	86085- 2	86085- 3	86085- 5	86085- 7
			MW6	MW7	MW8
Gasoline:	ND<50	ND<50	ND<50	ND<50	ND<50
Benzene:	ND<0.5	ND<0.5	4.3	4.7	ND<0.5
Toluene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Ethyl Benzene:	ND<0.5	ND<0.5	0.8	ND<0.5	ND<0.5
Xylenes:	ND<0.5	ND<0.5	0.9	ND<0.5	ND<0.5
Diesel:	NA	NA	120	ND<50	ND<50
Concentration:	ug/L	ug/L	ug/L	ug/L	ug/L

Laboratory Number:	86085- 9	86085-11	86085-13	86085-15
	MW5	MW-3	MW4	MW-1
Gasoline:	ND<50	630	1600	7700
Benzene:	ND<0.5	43	380	1500
Toluene:	ND<0.5	0.8	6.5	40
Ethyl Benzene:	ND<0.5	8.2	3.0	230
Xylenes:	ND<0.5	3.4	12	100
Diesel:	ND<50	ND<50	ND<50	2000*
Concentration:	ug/L	ug/L	ug/L	ug/L

Superior Precision Analytical, Inc.
835 Arnold Drive, Suite 106 • Martinez, California 94553 • (510) 229-0166 / fax (510) 229-0916

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 86085

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/L

ANALYTE	SPIKE LEVEL	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	200 ng	91/97	7	70-130
Benzene:	200 ng	91/101	10	70-130
Toluene:	200 ng	92/102	10	70-130
Ethyl Benzene:	200 ng	92/101	10	70-130
Xylenes:	200 ng	90/99	10	70-130
Diesel:	200 mg	95/111	15	70-130

* Diesel range concentration reported. The pattern of peaks in the chromatogram is typical of gasoline.

Richard Srna, Ph.D.
Laboratory Director

Fax copy of Lab Report and COC to Chevron Contact: ☐ Yes ☐ No 86085

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number 9-0121
Facility Address 3026 Lakeshore Ave., Oakland, CA
Consultant Project Number 020302090
Consultant Name Groundwater Technology, Inc.
Address 4057 Port Chicago Hwy., Concord, CA
Project Contact (Name) Sandra Lindsey
(Phone) 671-2387 (Fax Number) 685-9148

Chevron Contact (Name) Nancy Nikolich
(Phone) 842-9581
Laboratory Name Superior Analytical
Laboratory Release Number 440-3170
Samples Collected by (Name) ~~HECTOR~~ HECTOR MERINO
Collection Date 6/23/92
Signature Hector Merino

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	Analyses To Be Performed: BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)	HOLD					Remarks
SB-LB	1	1	W	G			Y	X													
RBMW6	2	1						X													
MW6	3	3						X													
MW6		1							X												
RBMW7	4*	1														X					
MW7	5	3						X													
MW7		1							X												
RBMW8	6*	1														X					
MW8	7	3						X													
MW8		1							X												
RBMW5	*8	1														X					
MW5	9	3						X													
MW5		1	X	X			X		X												

Please Initial:
Samples Stored in Ice.
Appropriate containers.
Samples preserved
VOA's without headspace
Comments:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Hector Merino	GTI	6/23/92			
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time 9:50 6/26/92

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
5 Days
10 Days
As Contracted

COC-3.DWG/03 91/MCH

Fax copy of Lab Report and COC to Chevron Contact: ☐ No 86085

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number: 9-0121
Facility Address: 3026 LAKESHORE AVE, OAKLAND CA.
Consultant Project Number: 020302090
Consultant Name: Groundwater Technology Inc.
Address: 4059 PORT CHICAGO HWY, CONCORD CA.
Project Contact (Name): SANDRA GUDSEM
(Phone): 671-2387 (Fax Number): 685-9148

Chevron Contact (Name): NANCY VUKELICH
(Phone): 842-9581
Laboratory Name: SUPERIOR ANALYTICAL
Laboratory Release Number: 440-3176
Samples Collected by (Name): HECTOR MERINO
Collection Date: 6/23/92
Signature: [signature]

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)	HOLD				Remarks
RBMW3	10	1	W	G		HCl										X				
MW3	>11	3				HCl		X	X											
MW3		1				NONE			X											
BBMW4	12	1				HCl										X				
MW4	>13	3				HCl		X	X											
MW4		1				NONE			X											
RBMW1	14	1				HCl		X												
MW1	>15	3				HCl		X	X											
MW1		1	X	X		NONE			X											

Please Initial:
Samples Stored in ice
Appropriate containers
samples preserved
VOA's without headspace
Comments:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
[signature]	GTI	6/23/92			
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time
			[signature]		6/26/92 9:50

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
5 Days
10 Days
As Contracted