TANK PROTECT ENGINEERING
Of Northern California, Inc.

TANK PROTECT ENGINEERING
2821 Whipple Road
Union City, CA 94587-1233
(510) 429-8088 • (800) 523-8088
FAX (510) 429-8089

May 18, 1994

Messrs. Aaron and Stanley Wong
2200 E. 12th Street
Oakland, CA 94606

Re: First Quarter Report, 1994, Credit World Auto Sales, 2345 E. 14th Street, Oakland, CA 94601

Dear Messrs. Wong:

Tank Protect Engineering of Northern California, Inc. (TPE) is pleased to submit this quarterly letter report of environmental services conducted at the subject site. Previous work conducted at the site is summarized and work conducted during the subject quarter is presented in detail.

BACKGROUND

Work performed by others during the second half of 1988:

- August 5, 1988 - West Coast Tank Company of Campbell, California removed one 8,000-gallon and two 6,000-gallon underground gasoline storage tanks; one 1,000-gallon underground waste oil storage tank; 2 dispenser islands; and associated piping from the site.

- August 25, 1988 - SCS Engineers (SCS) of Dublin, California collected soil samples from beneath the former locations of each gasoline tank and the waste oil tank. Samples collected from beneath the gasoline tanks were analyzed for total petroleum hydrocarbons as gasoline (TPHG) by the United States Environmental Protection Agency (EPA) Method 8015; for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method

8020; and for lead by EPA Method 7420. Samples collected from beneath the waste oil storage tank were analyzed for total petroleum hydrocarbons as diesel (TPHD) by EPA Method 8015, for total oil & grease (TOG) by Standard Method 503E, and for volatile organics by EPA Method 624. The reader is referred to SCS's September 19, 1988 letter report to Mr. Dino Gonis for documentation of the work conducted on August 5 and 25, 1988.

- October 3, 1988 - California Environmental Consultants (CEC) drilled 3 soil borings, B-1 through B-3, to characterize the soil in the vicinity of the tanks. Borings B-1 and B-2 were drilled in the area of the former underground gasoline tanks and boring B-3 was drilled in the area of the former waste oil tank. One soil sample and 1 "grab" groundwater sample were collected from each boring. Soil samples were collected at depths of about 15 feet. The reader is referred to CEC's November 21, 1988 letter report to Mr. Dino Gonis for documentation of the work and analytical results.

Work performed by others during 1991:

- May 22, August 21, and August 22, 1991 - Earth Systems Environmental, Inc. (ESE), under subcontract to Mobile Labs, installed 3 groundwater monitoring wells, MW-1 through MW-3, and drilled 5 soil borings, TH-1 through TH-5, as a further characterization of soil and groundwater contamination.

- August 23, 1991 - ESE collected groundwater samples from the monitoring wells, 1 day after their construction and development. The samples were analyzed for TPHG by Modified EPA Method 8015 and for BTEX by EPA Method 602. The reader is referred to ESE's December 23, 1991 Phase I Soil and Ground Water Assessment report for documentation of the work conducted during May and August, 1991.

Work performed by others during the first half, 1992:

- April 16, 1992 - NKJ Environmental Monitoring (NKJ) measured depth-to-groundwater in each well and found floating product present in all wells. The thickness of product ranged from 0.16 to 5.12 feet. The reader is referred to NKJ's May 1, 1992 letter report to Mobile Labs, Inc. for documentation of the work.

Communications with the Alameda County Health Care Services Agency (ACHCSA) during second half, 1992:

- October 19, 1992 - ACHCSA sent a letter to Messrs. Aaron and Stanley Wong (Wong) titled Request for Report of Subsurface Investigation and Workplan Addendum for Former Taxi Taxi, Inc. at 2345 E. 14th St., Oakland, CA 94601. This letter requested additional information about the tank closure, disposition of stockpiled soil, and an additional workplan to further characterize soil and groundwater contamination.

- October 30, 1992 - ACHCSA sent a letter to Wong titled Subsurface Investigation at Former Taxi Taxi at 2345 E. 14th St., Oakland, CA 94601. This letter approved ESE's recommendations for installation of 2 additional groundwater monitoring wells and recommended a product removal system.

Work performed by the TPE during second quarter, 1993:

- June 11, 1993 - Conducted a site visit and measured depth-to-groundwater and free product thickness in each of the 3 wells for preparation of a groundwater gradient map for the site.

- June 18, 1993 - Submitted a Workplan for Construction of Groundwater Monitoring Wells (WP) to Wong for their approval and delivery to the

ACHCSA and the California Regional Water Quality Control Board-San Francisco Bay Region (CRWQCB).

- June 25, 1993 - ACHCSA submitted a letter to Wong approving TPE's WP.

Work performed by TPE during third quarter, 1993:

- July 22 and 23, 1993 - Drilled 2 soil borings and converted the borings into groundwater monitoring wells (TMW-4 and TMW-5). Collected and analyzed 3 soil samples from each boring for TPHG and BTEX.

- July 26, 1993 - Developed monitoring wells TMW-4 and TMW-5.

- August 10, 1993 - Surveyed the top-of-casing (TOC) of all 5 monitoring wells.

- August 17, 1993 - Measured depth-to-groundwater and free product thickness in wells MW-1 through TMW-5 for evaluation of groundwater flow direction and gradient and collected a groundwater sample from each well for analysis for TPHG and BTEX. Additionally, a trip blank sample was analyzed for TPHG and BTEX.

Work performed by TPE during the fourth quarter, 1993:

- November 4, 1993 - Submitted a Preliminary Site Assessment Report, Credit World Auto Sales, 2345 E. 14th Street, Oakland, CA 94601 to Wong for their approval and delivery to the ACHCSA and CRWQCB.

WORK PERFORMED BY TPE DURING FIRST QUARTER, 1994:

- March 28, 1994 - Measured depth-to-groundwater and free product thickness in wells MW-1 through TMW-5 for evaluation of groundwater flow direction and gradient and collected 5 groundwater samples for analysis for TPHG and BTEX. Additionally, a trip blank sample was analyzed for TPHG and BTEX.

- March 31, 1994 - Measured depth-to-groundwater and free product thickness in wells MW-1 through TMW-5 for evaluation of groundwater flow direction and gradient.

Details of the work conducted on March 28 and 31, 1994 are presented below.

Groundwater Gradient

On March 28, 1994, TPE personnel detected positive pressure in the casings of some wells indicating depth-to-groundwater may not be stabilized. Consequentely, TPE loosened all well caps and resampled the wells for depth-to-water on March 31, 1994.

On March 31, 1994, depth-to-groundwater was measured from TOC in wells MW-1 through TMW-5 to the nearest 0.01 foot using an electronic Solinst water level meter. A minimum of 3 repetitive measurements were made for each level determination to ensure accuracy. Depth-to-groundwater was subtracted from the TOC elevation, measured relative to mean sea level, to calculate the elevation of the groundwater level in each well (see attached Table 1). If floating product was present, the groundwater elevation was corrected by multiplying the floating product thickness by a density of .75 and adding the resultant value to the groundwater elevation.

Attached Figure 1 is a groundwater gradient map constructed from the data collected on March 31, 1994.

Groundwater flow direction on March 31, 1994 ranges from southwest to north-northeast with a gradient of .05 feet per foot in the northerly direction. Average

groundwater elevations, changes in average groundwater elevations, groundwater flow directions, and groundwater gradients are tabulated in attached Table 2.

Groundwater Sampling and Analytical Results

On March 28, 1994, groundwater samples were collected from each of the 5 groundwater monitoring wells. Before sampling, each well was purged a minimum of 3 wetted well volumes with a dedicated polyethylene bailer and until the temperature, conductivity, and pH of the water in the wells had stabilized. Since dedicated bailers were used for each well sampled, no decontamination was necessary between sampling events. The water samples were collected in laboratory provided, sterilized, 40-milliliter glass vials having Teflon-lined screw caps; measured for turbidity; and labeled with project name, date, time collected, sample number, and sampler name. The samples were immediately stored on ice for transport to California State Department of Health Services (DHS) certified Trace Analysis Laboratory, Inc. (TAL), located in Hayward, California accompanied by chain-of-custody documentation. All groundwater samples were analyzed for TPHG by the DHS Method and for BTEX by the Modified EPA Method 8020.

Floating product was observed and measured in well MW-2 at a thickness of .54 feet. Gasoline odor was detected in all wells except TMW-4. No floating product was detected in well TMW-4. Table 3 summarizes the thickness of floating product measured in each well. The floating product was easily removed by bailing at the time of sampling.

Purge water is stored on site in 55-gallon drums labeled to show material stored, known or suspected contaminant, date filled, expected removal date, company name, contact person, and telephone number.

See attached protocols for TPE's sample handling, groundwater monitoring well sampling, and quality assurance and quality control procedures.

Chemical analyses detected TPHG and BTEX chemicals in 4 wells. TPHG was detected in wells MW-1, MW-2, MW-3, and TMW-5 at concentrations of 34,000 parts

per billion (ppb), 14,000 ppb, 8,400 ppb, and 70,000 ppb, respectively. The reader is referred to Table 4 for a summary of BTEX concentrations detected in these wells.

Analytical results for TMW-4, an upgradient well, were nondetectable.

A trip blank (sample TMW-6) was analyzed for TPHG and BTEX; all analytical results were nondetectable.

Analytical results are summarized in attached Table 4 and documented in an attached certified analytical report and a chain-of-custody.

RECOMMENDATIONS

Presently, the groundwater contaminant plume beneath the subject site has not been defined. TPE recommends that quarterly groundwater sampling of all 5 groundwater monitoring wells be continued to evaluate gradient and monitor contaminant concentrations. TPHG concentrations decreased and BTEX concentrations increased in all wells, except TMW-4, since the last sampling event. Analytical results for TMW-4 were nondetectable.

The next sampling event for wells MW-1 through TMW-5 is proposed to take place on about June 28, 1994. All wells are proposed to be analyzed for TPHG and BTEX.

An additional 2 copies of this report have been included for your delivery to:

Mr. Barney Chan
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 94621

California Regional Water Quality
Control Board - San Francisco Bay Region
Toxics Cleanup Division
2101 Webster Street, Suite 500
Oakland, CA 94612

TPE recommends that this quarterly report be submitted with a signed cover letter from Messrs. Aaron and Stanley Wong.

If you have any questions, please call TPE at (510) 429-8088.

Sincerely,

John V. Mrakovich, Ph.D.
Registered Geologist

Jeff Farhoomand, M.S.
Civil Engineer

cc: File
Attachments

TABLE 1
GROUNDWATER ELEVATION

Well Name	Date	TOC[1] Elevation (Feet SD[2])	Depth-to-Water from TOC (Feet)	Depth to Product From TOC (Feet)	Corrected[3] Groundwater Elevation (Feet MSL[4])
MW-1	08/23/91[5]	100.00	15.42	NA[9]	84.58
	04/16/92[6]	27.33[7]	16.66	11.54	14.51[8]
	06/11/93		12.61	12.60	14.73
	08/17/93		14.40	13.63	13.50[7]
	03/31/94		12.64	ND	14.69
MW-2	08/23/91[5]	98.585	13.77	NA	84.815
	04/16/92[6]	25.92[7]	15.38	12.57	12.65[8]
	06/11/93		13.185	ND[10]	12.74
	08/17/93		14.04	14.03	11.89
	03/31/94		13.61	13.07	12.72[8]
MW-3	08/23/91[5]	99.25	15.07	NA	84.18
	04/16/92[6]	27.57[7]	14.14	13.98	13.55[8]
	06/11/93		14.275	ND	13.30
	08/17/93		15.77	ND	11.80
	03/31/94		14.35	ND	13.22
TMW-4	08/17/93	26.50[7]	13.26	ND	13.24
	03/31/94		12.40	ND	14.10
TMW-5	08/17/93	26.51[7]	12.98	12.95	13.55
	03/31/94		11.39	ND	15.12

1 TOP-OF-CASING.

2 SITE DATUM ESTABLISHED BY ESE.

3 ELEVATION CORRECTED FOR FLOATING PRODUCT USING .75 DENSITY OF GASOLINE.

4 MEAN SEA LEVEL.

5 WATER LEVEL MEASUREMENTS BY ESE.

6 WATER LEVEL MEASUREMENTS BY NKJ.

7 TOC SURVEYED 8/10/93 BY PROFESSIONAL ENGINEER.

8 CORRECTED GROUNDWATER ELEVATION BY TANK PROTECT ENGINEERING.

9 NOT AVAILABLE.

10 NOT DETECTED.

TABLE 2
GROUNDWATER GRADIENT, FLOW DIRECTION,
AND ELEVATION DATA

Date	Average Groundwater Elevation (Feet-MSL[1])	Change in Average Groundwater Elevation (Feet)	Groundwater Gradient	Groundwater Flow Direction
04/16/92	13.57	---	.021	NW
06/11/93	13.59	.02	.026	NW
08/17/93	12.80	-.79	.029	RADIAL TO THE NORTHWEST
03/31/94	13.97	1.17	.050	RADIAL TO THE NORTHWEST

[1] MEAN SEA LEVEL.

TABLE 3
SUMMARY OF FLOATING PRODUCT THICKNESS

Well Name	Date	Depth-to-Water From TOC[1] (Feet)	Depth-to-Product From TOC (Feet)	Product Thickness (Feet)
MW-1	04/16/92[2]	16.66	11.54	5.12
	06/11/93	12.61	12.60	.01
	08/17/93	14.40	13.63	.77
	03/31/94	12.64	ND	---
MW-2	04/16/92[2]	15.38	12.57	2.81
	06/11/93	13.185	ND[3]	---
	08/17/93	14.04	14.03	.01
	03/31/94	13.61	13.07	0.54
MW-3	04/16/92[2]	14.14	13.98	0.16
	06/11/93	14.275	ND	---
	08/17/93	15.77	ND	---
	03/31/94	14.35	ND	---
TMW-4	08/17/93	13.26	ND	---
	03/31/94	12.40	ND	---
TMW-5	08/17/93	12.98	12.95	.03
	03/31/94	11.39	ND	---

1 TOP-OF-CASING.

2 WATER AND PRODUCT LEVELS MEASURED BY NKJ.

3 NOT DETECTED.

TABLE 4
SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS
(ppb[1])

Sample ID Name	Date	TPHG	Benzene	Toluene	Ethyl-Benzene	Xylenes
MW-1	08/17/93	110,000	270	690	730	3,100
	03/28/94	34,000	4,900	1,800	1,200	4,000
MW-2	08/17/93	49,000	94	240	250	980
	03/28/94	14,000	4,200	<250	910	1,400
MW-3	08/17/93	9,600	4.1	17	28	54
	03/28/94	8,400	2,400	56	67	200
TMW-4	08/17/93	150	<0.5	0.8	1.4	3.7
	03/28/94	<50	<0.5	<0.5	<0.5	<1.5
TMW-5	08/17/93	120,000	340	730	790	3,600
	03/28/94	70,000	23,000	1,500	4,100	15,000
TMW-6[2]	08/17/93	<50	<0.5	<0.5	<0.5	<0.5
	03/28/94	<50	<0.5	<0.5	<0.5	<1.5

1 PARTS PER BILLION.

2 TRIP BLANK.

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

April 15, 1994

Mr. Jeff Farhoomand
Tank Protect Engineering
2821 Whipple Road
Union City, California 94587

Dear Mr. Farhoomand:

Trace Analysis Laboratory received six water samples on March 29, 1994 for your Project No. 267-032894, 2345 East 14th Street, Credit World Auto Sales (our custody log number 4244).

These samples were analyzed for Total Petroleum Hydrocarbons as Gasoline and Benzene, Toluene, Ethylbenzene, and Xylenes. Our analytical report and the completed chain of custody form are enclosed for your review.

Trace Analysis Laboratory is certified under the California Environmental Laboratory Accreditation Program. Our certification number is 1199.

If you should have any questions or require additional information, please call me.

Sincerely yours,

Scott T. Ferriman
Project Specialist

Enclosures

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

LOG NUMBER: 4244
DATE SAMPLED: 03/28/94
DATE RECEIVED: 03/29/94
DATE ANALYZED: 04/08/94 and 04/12/94
DATE REPORTED: 04/15/94

CUSTOMER: Tank Protect Engineering

REQUESTER: Jeff Farhoomand

PROJECT: No. 267-032894, 2345 East 14th Street, Credit World Auto Sales

Sample Type: Water

Method and Constituent:	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/l	34,000	2,500	14,000	5,000	8,400	1,200
Modified EPA Method 8020 for:							
Benzene	ug/l	4,900	25	4,200	250	2,400	12
Toluene	ug/l	1,800	25	ND	250	56	12
Ethylbenzene	ug/l	1,200	25	910	250	67	12
Xylenes	ug/l	4,000	38	1,400	750	200	38

Method and Constituent:	Units	TMW-4 Concentration	TMW-4 Reporting Limit	TMW-5 Concentration	TMW-5 Reporting Limit	TMW-6 Concentration	TMW-6 Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/l	ND	50	70,000	12,000	ND	50
Modified EPA Method 8020 for:							
Benzene	ug/l	ND	0.50	23,000	120	ND	0.50
Toluene	ug/l	ND	0.50	1,500	120	ND	0.50
Ethylbenzene	ug/l	ND	0.50	4,100	120	ND	0.50
Xylenes	ug/l	ND	1.5	15,000	380	ND	1.5

Concentrations reported as ND were not detected at or above the reporting limit.

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

LOG NUMBER: 4244
DATE SAMPLED: 03/28/94
DATE RECEIVED: 03/29/94
DATE ANALYZED: 04/08/94 and 04/12/94
DATE REPORTED: 04/15/94
PAGE: Two

Sample Type: Water

Method and Constituent:	Units	Method Blank Concentration	Method Blank Reporting Limit
DHS Method:			
Total Petroleum Hydrocarbons as Gasoline	ug/l	ND	50
Modified EPA Method 8020 for:			
Benzene	ug/l	ND	0.50
Toluene	ug/l	ND	0.50
Ethylbenzene	ug/l	ND	0.50
Xylenes	ug/l	ND	1.5

QC Summary:

% Recovery: 101, 98
% RPD: 7.1, 11

Concentrations reported as ND were not detected at or above the reporting limit.

Louis W. DuPuis
Quality Assurance/Quality Control Manager

TANK PROTECT ENGINEERING

2821 WHIPPLE ROAD
UNION CITY, CA 94587
(415)429-8088
(800)523-8088
FAX(415)429-8089

4244

LAB: TAL

TURNAROUND: Normal (~~5 day~~) Reg TAT

P.O. #: 808

PAGE 1 OF 1

CHAIN OF CUSTODY

PROJECT NO.: Z67032894

SITE NAME & ADDRESS: 2345 E 14th Street Crestworth Auto Sales

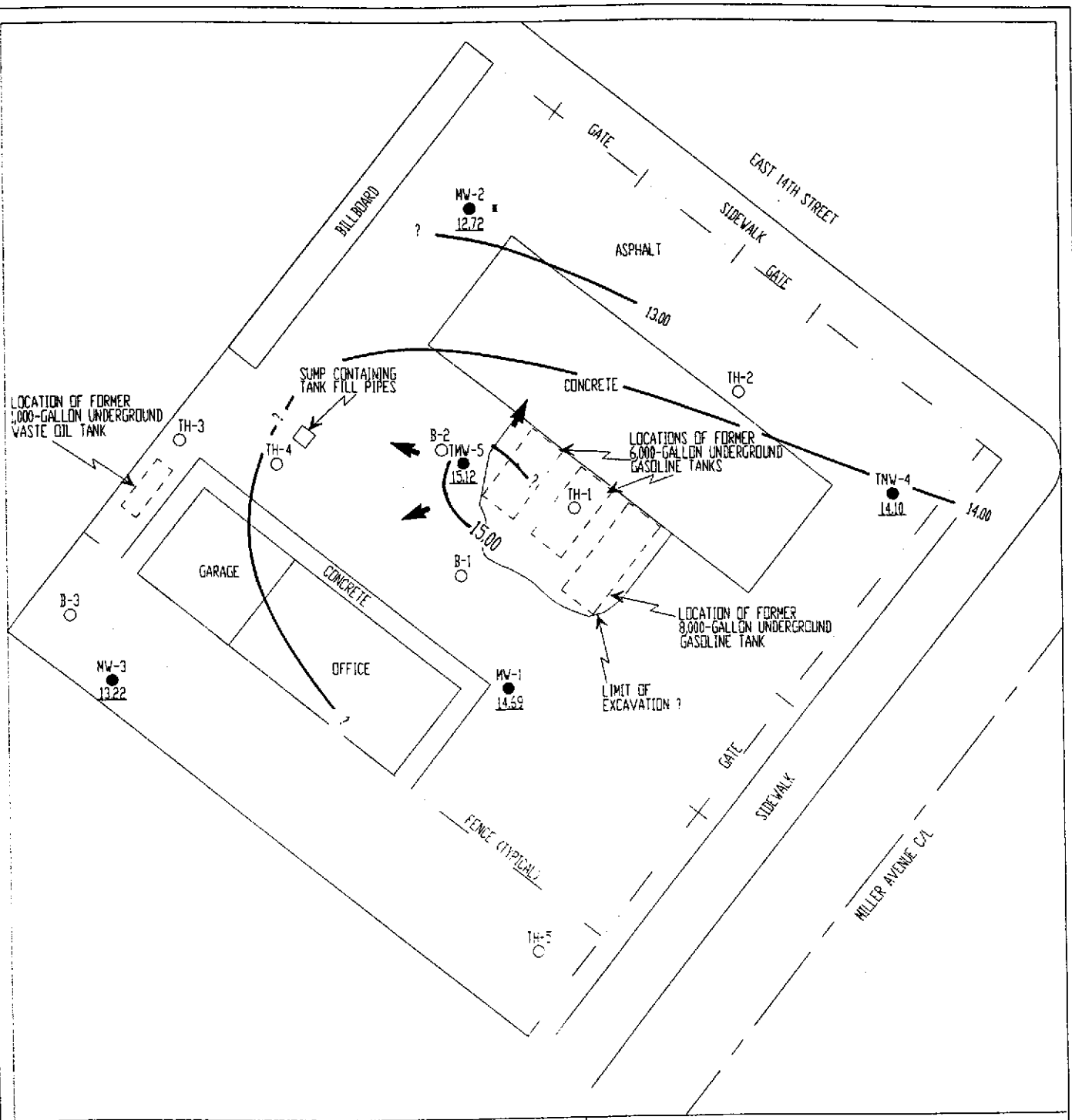
SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER:
Lee Huckins
2821 WHIPPLE ROAD, UNION CITY, CA 94587 (415) 429-8088

ID NO.	DATE	TIME	SOIL	WATER	SAMPLING LOCATION	(1) TYPE OF CON-TAINER	ANALYTES REQUESTED: TOTAL LIGHT HC	AROMATIC HC (BTX)	TOTAL HEAVY HC	OIL & GREASE	VOC SCAN (624's)	OTHER	REMARKS
MW-1	3/28	1420		X		2-40ml	X	X					
MW-2	3/28	1158		X		2-40ml	X	X					
MW-3	3/28	1530		X		2-40ml	X	X					
TMW-4	3/28	1050		X		2-40ml	X	X					
TMW-5	3/28	1240		X		2-40ml	X	X					
TMW-6	3/28	1535		X		2-40ml	X	X					

Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Lee Huckins	3/29/94 11:30	[illegible]	[illegible]	3/29/94 11:31	
Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received for Laboratory by: (Signature) Scott T. Fenwick	Date / Time 3/29/94 11:31	Remarks	

P/u, water, 2 vOAs each, white, Reg TAT

DATE: 3/29/94



LEGEND

TMW-4 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY TPE
MW-1 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS
B-1 ○	NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS
13.22	POTENTIOMETRIC ELEVATION
*	WATER LEVEL ADJUSTED FOR FLOATING PRODUCT
13.00	POTENTIOMETRIC CONTOUR
←	GROUNDWATER FLOW DIRECTION

-N-

0 30

SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN
GROUNDWATER GRADIENT MAP (3/31/94)

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	5/12/94
FIGURE	1
FILE #	267
DRAWN BY	MT
CHECKED BY	AK

SAMPLE HANDLING PROCEDURES

Soil and groundwater samples will be packaged carefully to avoid breakage or contamination, and will be delivered to the laboratory in an iced-cooler. The following sample packaging requirements will be followed.

- Sample bottle/sleeve lids will not be mixed. All sample lids will stay with the original containers and have custody seals affixed to them.

- Samples will be secured in coolers to maintain custody, control temperature, and prevent breakage during transportation to the laboratory.

- A chain-of-custody form will be completed for all samples and accompany the sample cooler to the laboratory.

- Ice, blue ice, or dry ice (dry ice will be used for preserving soil samples collected for the Alameda County Water District) will be used to cool samples during transport to the laboratory.

- Each sample will be identified by affixing a pressure sensitive, gummed label, or standardized tag on the container(s). This label will contain the site identification, sample identification number, date and time of sample collection, and the collector's initials.

- Soil samples collected in brass tubes will be preserved by covering the ends with Teflon tape and capped with plastic end-caps. The tubes will be labeled, sealed in quart size bags, and placed in an iced-cooler for transport to the laboratory.

All groundwater sample containers will be precleaned and will be obtained from a State Department of Health Services certified analytical laboratory.

Sample Control/Chain-of-Custody: All field personnel will refer to this workplan to verify the methods to be employed during sample collection. All sample gathering activities will be recorded in the site file; all sample transfers will be documented in the chain-of-custody; samples are to be identified with labels and all sample bottles are to be custody-sealed. All information is to be recorded in waterproof ink. All TPE field personnel are personally responsible for sample collection and the care and custody of collected samples until the samples are transferred or properly dispatched.

The custody record will be completed by the field technician or professional who has been designated by the TPE project manager as being responsible for sample shipment to the appropriate laboratory. The custody record will include, among other things, the following information: site identification, name of person collecting the samples, date and time samples were collected, type of sampling conducted (composite/grab), location of sampling station, number and type of containers used, and signature of the TPE person relinquishing samples to a non-TPE person with the date and time of transfer noted. The relinquishing individual will also put all the specific shipping data on the custody record.

Records will be maintained by a designated TPE field employee for each sample, site identification, sampling locations, station numbers, dates, times, sampler's name, designation of the samples as a grab or composite, notation of the type of sample (e.g. groundwater, soil boring, etc.), preservatives used, on-site measurement data, and other observations or remarks.

GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

Groundwater monitoring wells will not be sampled until at least 24 to 72 hours (according to local regulatory guidelines) after well development. Groundwater samples will be obtained using either a bladder pump, clear Teflon bailer, or dedicated polyethylene bailer. Prior to collecting samples, the sampling equipment will be thoroughly decontaminated to prevent introduction of contaminants into the well and to avoid cross-contamination. Monitoring wells will be sampled after 3 to 10 wetted casing volumes of groundwater have been evacuated and pH, electrical conductivity, and temperature have stabilized as measured with a Hydac Digital Tester. If the well is emptied before 3 to 10 well volumes are removed, the sample will be taken when the water level in the well recovers to 80% of its initial water level or more.

When a water sample is collected, turbidity of the water will be measured and recorded with a digital turbidimeter. Degree of turbidity will be measured and recorded in nephelometric turbidity units (NTU).

TPE will also measure the thickness of any floating product in the monitoring wells using an interface or probe clear Teflon or polyethylene bailer. The floating product will be measured after well development but prior to the collection of groundwater samples. If floating product is present in the well, TPE will recommend to the client that product removal be commenced immediately and reported to the appropriate regulatory agency.

Unless specifically waived or changed by the local, prevailing regulatory agency, water samples shall be handled and preserved according to the latest EPA methods as described in the Federal Register (Volume 44, No. 233, Page 69544, Table ll) for the type of analysis to be performed.

Development and/or purge water will be stored on site in labeled containers. The disposal of the containers and development and/or purge water is the responsibility of the client.

MEASUREMENTS

Purged Water Parameter: During purging, discharged water will be measured for the following parameters.

Parameter	Units of Measurement
pH	None
Electrical Conductivity	Micromhos
Temperature	Degrees F or C
Depth to Water	Feet/Hundredths
Volume of Water Discharged	Gallons
Turbidity	NTU

Documentation: All parameter measurements shall be documented in writing on TPE development logs.

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

The overall objectives of the field sampling program include generation of reliable data that will support development of a remedial action plan. Sample quality will be checked by the use of proper sampling, handling, and testing methods. Additional sample quality control methods may include the use of background samples, equipment rinsate samples, and trip and field blanks. Chain-of-custody forms, use of a qualified laboratory, acceptable detection limits, and proper sample preservation and holding times also provide assurance of accurate analytical data.

TPE will follow a QA/QC program in the field to ensure that all samples collected and field measurements taken are representative of actual field and environmental conditions and that data obtained are accurate and reproducible. These activities and laboratory QA/QC procedures are described below.

Field Samples: Additional samples may be taken in the field to evaluate both sampling and analytical methods. Three basic categories of QA/QC samples that may be collected are trip samples, field blanks, and duplicate samples.

Trip blanks are a check for cross-contamination during sample collection, shipment, and in the laboratory. Analytically confirmed organic-free water shall be used for organic parameters and deionized water for metal parameters. Blanks will be prepared by the laboratory supplying the sample containers. The blank shall be numbered, packaged, and sealed in the same manner as the other samples. One trip blank will be used for each sample set of less than 20 samples. At least 5% blanks will be used for sets greater than 20 samples. The trip blank is a water sample that remains with the collected samples during transportation and is analyzed along with the field samples to check for residual contamination. The trip blank is not to be opened by either the sample collectors or the handlers.

The field blank is a water sample that is taken into the field and is opened and exposed at the sampling point to detect contamination from air exposure. The water

sample is poured into appropriate containers to simulate actual sampling conditions. Contamination for air exposure can vary considerably from site to site.

The laboratory will not be informed about the presence of field and trip blanks and a false identifying number will be put on the label. Full documentation of these collection and decoy procedure will be made in the site log book.

Duplicate samples are identical sample pairs (collected in the same place and at the same time), placed in identical containers. For soils, adjacent sample liners will be analyzed. For the purpose of data reporting, one is arbitrarily designated the sample, and the other is designated as a duplicate sample. Both sets of results are reported to give an indication of the precision of sampling and analytical methods.

The laboratory's precision will be assessed without the laboratory's knowledge by labeling one of the duplicates with false identifying information. Data quality will be evaluated on the basis of the duplicate results.

Laboratory QA/QC: Execution of a strict QA/QC program is an essential ingredient in high-quality analytical results. By using accredited laboratory techniques and analytical procedures, estimates of the experimental values can be very close to the actual value of the environmental sample. The experimental value is monitored for its precision and accuracy by performing QC test designed to measure the amount of random and systematic errors and to signal when correction of these errors is needed.

The QA/QC program describes methods for performing QC tests. These methods involve analyzing method blanks, calibration standards, check standards (both independent and EPA-certified standards), duplicates, replicates, and sample spikes. Internal QC also requires adherence to written methods, procedural documentation, and record keeping, and the observance of good laboratory practices.