



July 5, 2001

Ms. Eva Chu
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502

Re: Pacific Galvanizing, 715 46th Avenue, Oakland

Dear Ms. Chu:

Per your request, please find enclosed a copy of the groundwater monitoring well installation report and closure report (which gives monitoring results) for Pacific Galvanizing in Oakland. I hope this helps.

Sincerely,

A handwritten signature in cursive script that reads "Kathy Rushmore".

Kathy Rushmore
Senior Staff Environmental Scientist



ALCO
HAZMAT
94 JAN 20 PM 1:41

Mr. Thomas F. Peacock
Supervising Hazardous Materials Specialist
Alameda County Health Care Services Agency
Dept. of Environmental Health
Hazardous Materials Division,
UST Local Oversight Program
80 Swan Way, Room 200
Oakland, California 94621

January 11, 1994

Subject: Report for Monitoring Well Installation, and Soil and
Groundwater Sampling at 715-46th Avenue, Oakland, California.

Dear Mr. Peacock:

H₂OGEOL is pleased to submit this report for the installation of one monitoring well with soil and groundwater sampling at 715-46th Avenue, Oakland, California.

Sincerely,
H₂OGEOL A GroundWater Consultancy

Wayne Akiyama
Associate, Hydrogeologist

Gary D. Lowe, R.G., C.E.G.
Principal, Hydrogeologist
Sole Proprietor

Attachments

REPORT FOR MONITORING WELL INSTALLATION,
SOIL AND GROUNDWATER SAMPLING PROGRAM
AT
715-46TH AVENUE
OAKLAND, CALIFORNIA

January 11, 1994

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**REPORT FOR MONITORING WELL INSTALLATION,
SOIL AND GROUNDWATER SAMPLING PROGRAM
AT
715-46TH AVENUE
OAKLAND, CALIFORNIA**

1.0 INTRODUCTION

H₂OGEOL was retained by Pacific Galvanizing to complete a Work Plan involving monitoring well installation, soil sampling and groundwater sampling at 715-46th Avenue, Oakland, California (Figure 1). This project was authorized by Mr. Rudy Foertsch by his authorization letter dated October 21, 1993. The Work Plan was authorized by Mr. Thomas F. Peacock, Supervising Hazardous Materials Specialist of the Alameda County Health Care Agency (ACHCA) in a letter to Mr. Foertsch dated November 17, 1993.

Field work was conducted by Mr. Wayne S. Akiyama, associate hydrogeologist with H₂OGEOL. The investigation was directed by Mr. Gary D. Lowe, a Registered Geologist and Certified Engineering Geologist in the state of California.

1.1 Background Information

The purpose of these field activities was to determine whether groundwater has been impacted by fuel that had leaked from an underground storage tank, formerly located along the west side of 46th Avenue, adjacent to the subject site.

Three underground fuel storage tanks (USTs) were removed by others from this site on August 3, 1990, as referenced by Kaprealian Engineering, Inc.'s report dated October 19, 1990. Two of the USTs were located within the same excavation within 46th Avenue, while the third UST was located in the southeast corner of Pacific Galvanizing's yard, also at the subject site. (Figure 2)

This work is being conducted as outlined in H₂OGEOL's Work Plan dated October 28, 1993. The borehole was drilled and the monitoring well was installed according to the Drilling Permit Application Permit No. 93641 issued by Zone 7 Water Agency. A copy of the Drilling Permit Application is presented in Attachment A.

1.2 Regional and Site Specific Geology

The site is located in the Coast Range Geologic Province of California, on the eastern edge of San Francisco Bay. The San Francisco Bay is a structural depression formed in the late Pliocene. This depression was drowned by rising

seas in the interglacial stages of the Pleistocene Epoch (Oakeshott, 1978). This structural depression extends south into the Santa Clara and San Benito Valleys and extends north into San Pablo Bay and the Sonoma and Napa Valleys.

The site was constructed on a thin layer of fill placed over, Undivided Quaternary deposits as described by Dorothy H. Radbruch, 1969. A concrete diversion for Peralta Creek is located to the north west is located along the southwest side of the subject site. These undivided Quaternary deposits would most likely be associated with the natural stream deposits associated with Peralta Creek.

Groundwater movement is influenced by gravity pulling groundwater from higher elevations toward San Francisco Bay. Groundwater movement also may be influenced by the location of the site in relation to the natural course of Peralta Creek.

The location of the monitoring well was established by review of investigations of facilities in the vicinity of the site. These investigation reports were reviewed at the Regional Water Quality Control Board, San Francisco Bay Region's (RWQCB) office in Oakland, California. The sites are listed below:

Shell Mini Mart, 630 High Street, Oakland BC-608-3737
EXXON Station, 720 High Street, Oakland BC-608-136
PG&E, 4930 Coliseum Way, Oakland SC-608-67

The direction of groundwater flow from these three sites ranged from north 80 degrees west to south 24 degrees west. This variability of the direction of flow is presented on Figure 2 along with the proposed location of the monitoring well.

2.0 FIELD INVESTIGATIONS

Field investigation consisted of the drilling of one borehole and the completion of a monitoring well within this borehole (MW-1). The borehole was drilled and MW-1 was constructed on December 2, 1993. This variability of the direction of flow was presented on Figure 2 of the October 28, 1993 workplan.

2.1 Drilling and Sampling Procedures

Drilling activities were conducted in accordance with the RWQCB, Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites.

The borehole for monitoring well MW-1 was drilled by Soils Exploration Services, Inc. (a licensed C-57 driller) using a CME-55 drill rig using 8-inch outer diameter continuous flight hollow stem augers. Soil samples were collected using a Modified California Sampler accepting 2.5-inch brass tubes.

Soil samples for laboratory analyses were selected from each borehole by visually screening soil samples. The soil samples selected were collected from depths of

6.5 and 11.0 feet below ground surface. To collect a sample, the sampler was fitted with precleaned thin-walled brass tubes. The sampler was lowered into the borehole, and advanced 18-inches downward. When the sampler was extracted from the borehole and disassembled, the tube corresponding to the desired sampling interval was chosen. The ends of the tube were covered with aluminum foil and a cap plug and then secured by electrical tape to ensure air tightness.

The sealed tubes were labeled and then individually placed into Zip-Loc™ bags. The tubes were then placed onto ice in an ice chest maintained at 4 degrees Celsius with ice, while awaiting transport to Sequoia Analytical Laboratories, a state certified laboratory for analysis following proper chain of custody documentation. The soil sample analytical results and their appropriate analytical methods are presented in Table 1.

2.2 Monitoring Well Construction

Upon reaching the desired depth, 2-inch schedule 40 PVC well casing and slotted screens were installed into the boreholes. Monitoring well MW-1 was constructed with screen slotted to 0.020-inch. Lonestar #3 size sand was poured into the annulus from the ground surface. After the required amount of sand was added to the annulus, a bentonite seal was placed above the sand pack. The bentonite was hydrated with potable water poured from the surface. A neat cement seal was added to prevent infiltration of the sand pack from surface runoff. The well was secured with a locking cap and traffic rated box, set to drain away from the lid and onto the pavement. The lithologic log and the well construction diagram is presented in Attachment B.

The monitoring well was developed after the cement had set and cured. The well was developed in order to reduce the amount of sediment and to improve the efficiency of water flow into the well.

2.3 Decontamination

To reduce the risk of contamination, steam cleaned augers were used to drill the borehole. All PVC casing and screen were pre-cleaned by Longyear and sealed in plastic bags for transport to the site. The soil sampler was washed with trisodium phosphate, triple rinsed with tap and distilled water before each sample run.

2.4 Geologic Logging

During drilling of the borehole, soil characteristics were logged in the field by a hydrogeologist. Distinguishing features such as soil composition, color, texture, relative moisture content, and unusual odors were noted. The soil characteristics were described in the field according to the Unified Soil Classification System. This information is presented in the borehole logs in Attachment B.

2.5 Disposition of Cuttings

The soil cuttings that were generated during the drilling process were placed into a visquine lined bin, provided by Pacific Galvanizing for temporary storage, while awaiting laboratory analytical results.

3.0 GROUNDWATER SAMPLING

The water level was measured in MW-1 on December 6, 1993 and recorded on Water Sampling Field Survey Form (Attachment C). The depth to groundwater was measured at 8.61 feet below the casing rim. A groundwater sample was collected from MW-1 on the same day. Prior to purging the monitoring well, the groundwater was checked for floating product. The analytical results of the water analyses are presented in Appendix D.

3.1 Sample Collection Methodology

The possible presence of free product was measured in the monitoring well MW-1, prior to purging using a clean translucent teflon bailer and twine. No visible free product, nor a product sheen was observed on the groundwater surface. The bailer was then decontaminated with trisodium phosphate detergent and tap water, followed by a tap water rinse and distilled water rinse.

Next, groundwater was purged from the monitoring well. Purging was done to remove stagnant well water and to ensure that the groundwater sample was representative of the aquifer. The well was purged using an electrical down hole pump.

During purging, temperature, specific conductivity, and pH were measured and recorded. As soon as the well was purged and specific conductance had stabilized to a fluctuation of 15% or less (indicating that the water was representative of the aquifer), the groundwater sample was collected. The field data is presented on a Water Sampling Field Survey Form (Appendix C).

The groundwater sample was collected using the previously cleaned bailer and a new length of twine. Groundwater sample was placed into three 40 milliliter vials

3.2 Disposition of Purge Water

The water generated from the purging and sampling process was placed into one 55-gallon drum for temporary storage, awaiting laboratory results.

3.3 Chain of Custody

Chain-of-custody documentation was completed and accompanied the soil samples and the groundwater sample to the laboratory with the ice chest. The chain-of-custody forms are presented along with the analytical results in Attachment D.

The soil and groundwater samples were analyzed by Sequoia Analytical of Concord California, a State Certified Laboratory.

4.0 LABORATORY ANALYTICAL RESULTS

All soil and groundwater samples were analyzed at the Sequoia Analytical Laboratories for fuel compounds as required by the Tri-Regional Agreement. The samples were analyzed for the following constituents by the following methods:

Constituent	Method
Benzene, toluene, ethylbenzene and total xylenes (BTEX)	EPA Method 8020
Total Petroleum Hydrocarbons as gasoline (TPH-g)	EPA Modified Method 8015

The results are summarized in Table 1. The complete laboratory results are presented in Appendix D.

Soil samples were collected and submitted to the laboratory on December 2, 1993. The groundwater sample was collected and submitted to the laboratory on December 6, 1993. The analytical results from these soil and groundwater samples are presented below.

Soil samples from the 6.5-foot depth interval had neither TPH-g detected at or above the detection limit of 1-milligrams per kilogram (mg/kg). The soil sample from the 6.5-foot depth interval did not have benzene, toluene, ethylbenzene nor total xylenes (BTEX) detected at or above 0.005 mg/kg. The soil sample from the 11-foot depth interval had TPH-g and BTEX detected. The concentration of TPH-g was 77 mg/Kg. Benzene was detected at a concentrations of 0.12 mg/kg, toluene was detected at 0.48 mg/kg, ethylbenzene was detected at 0.31 mg/Kg, and total xylenes were detected at 0.82 mg/Kg, respectively.

The groundwater sample had detectable levels of fuel hydrocarbons. The results of the groundwater sample showed that TPH-g was detected at 79 micrograms per liter ($\mu\text{g}/\text{l}$). BTEX was not detected in the groundwater sample at or above the detection limit of 0.5 $\mu\text{g}/\text{l}$.

5.0 CONCLUSIONS

TPH as gasoline and BTEX were detected in a soil sample collected at the 11-foot depth interval from borehole MW-1. The soil sample from the 6.5-foot depth interval in MW-1 showed no concentration of TPH-g nor BTEX at or above the respective detection limits.

Based upon the where the contamination was found in the sample, it is possible that the contamination detected in the 11-foot soil sample was caused by the leaking underground tank and/or associated piping.

Fuel hydrocarbons as TPH-g was also detected in groundwater at a very low concentration, with no BTEX detected in the groundwater sample.

6.0 REFERENCES

California Regional Water Quality Control Board, 1990, *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites*: Prepared by staff of North Coast, San Francisco Bay and Central Valley Regional Water Quality Control Boards.

Radbruch, Dorothy H., 1969, *Aerial and Engineering Geology of the Oakland East Quadrangle, California*, : USGS Geologic Quadrangle Maps of the United States Map GQ-769.

Marshack, Jon B. Dr. Env., 1991, *A Compilation of Water Quality Goals*: Staff Report of the California Regional Water Quality Control Board, Central Valley Region.


Oakeshott, Gordon B., 1978, *California's Changing Landscapes, A Guide to the Geology of the State*: McGraw-Hill, Inc.

7.0 REPORT CERTIFICATION


This report addressing the installation of one monitoring well at 715-46th Avenue in Oakland, California has been prepared by H₂OGEOL A GroundWater Consultancy, by and under the professional supervision of the sole proprietor. The procedures and specifications are presented in accordance with generally accepted professional environmental hydrogeologic practice. There is no other warranty, either expressed or implied. This report incorporates information, assumptions and interpretations for investigation reports examined at the RWQCB for the following properties: Shell Mini Mart, 630 High Street, EXXON Station, 720 High Street, and PG&E, 4930 Coliseum Way, in Oakland, California.

January 12, 1994

This report was prepared by:


Wayne S. Akiyama
Associate, Hydrogeologist

Reviewed by:


Gary D. Lowe, R.G., C.E.G.
Principal, Hydrogeologist
H₂OGEOL A GroundWater Consultancy

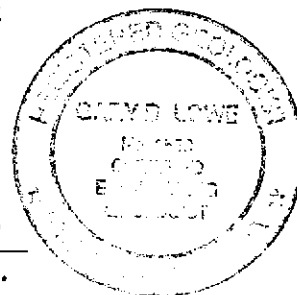
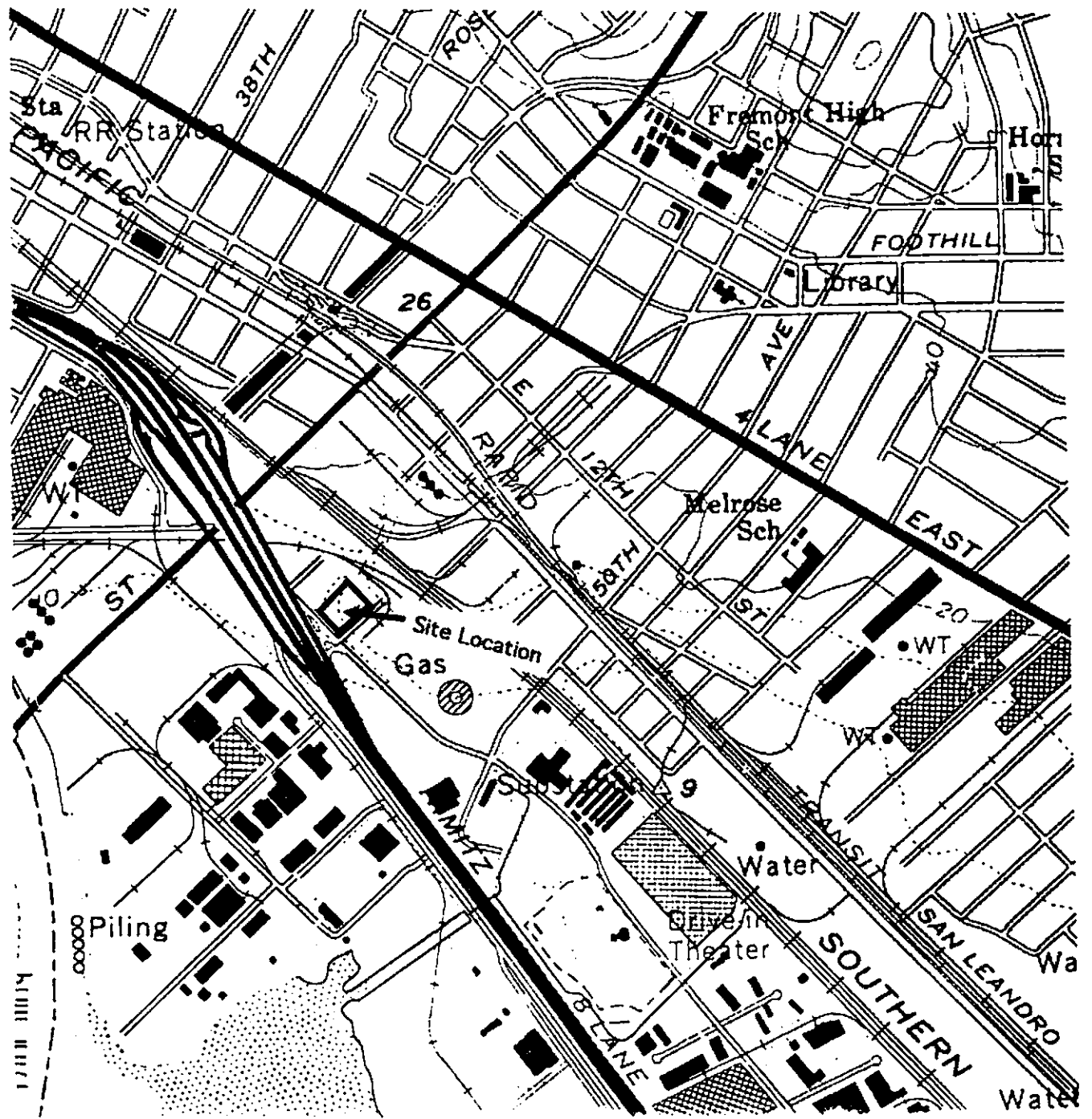


TABLE 1
 Analytical Results of Soil and Groundwater Samples
 Pacific Galvanizing Site
 715-46th Avenue
 Oakland, California

Sample No.\ Constituent	Sample Date	Units	Depth Interval (in feet)	TPH-gasoline	Benzene	Toluene	Ethylbenzene	Total Xylenes
SOIL SAMPLES								
MW1-5	12/2/93	(mg/Kg)	5	<1.0	<.005	<.005	<.005	<.005
MW1-10	12/3/93	(mg/Kg)	10	77	0.12	0.48	0.31	0.82
GROUNDWATER SAMPLE								
MW-1	12/6/93	(mg/l)	--	0.079	<.0005	<.0005	<.0005	<.0005
Notes: NA-Not Available								
California Maximum Contaminant Levels for Drinking Water*								
Primary MCLs		mg/l		NA	0.001	NA	0.680	1.750
U.S. EPA MCLs		mg/l		NA	0.005	1	0.700	10

* Source: Marshack, Jon B., 1991

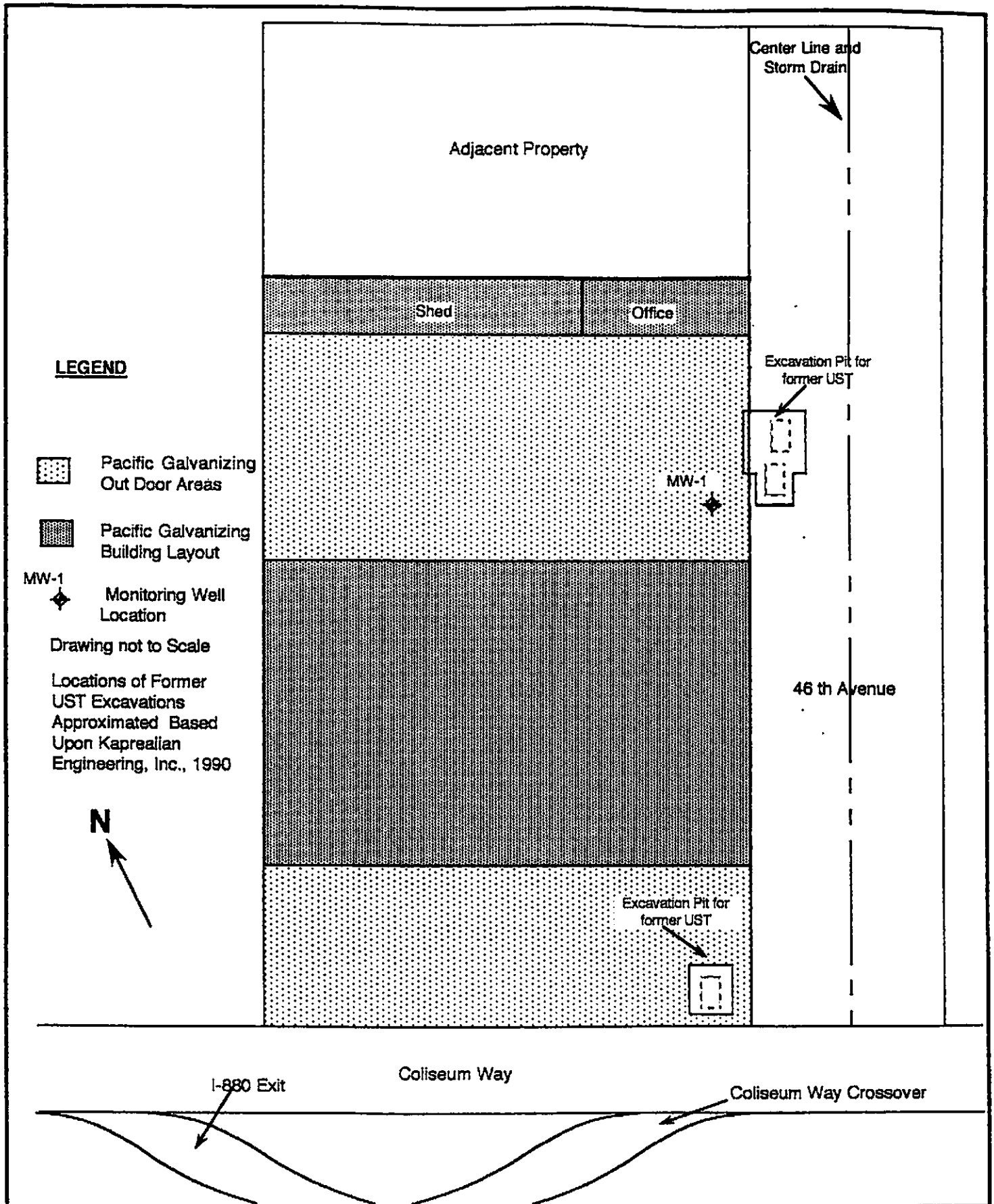


1000 0 1000 2000 3000 4000

H₂OGEOL
A GROUNDWATER CONSULTANCY

SITE LOCATION MAP
PACIFIC GALVANIZING
715-46TH AVENUE
OAKLAND, CALIFORNIA

FIGURE
1



LEGEND

Pacific Galvanizing Out Door Areas

Pacific Galvanizing Building Layout

MW-1 Monitoring Well Location

Drawing not to Scale

Locations of Former UST Excavations Approximated Based Upon Kaprealian Engineering, Inc., 1990



Center Line and Storm Drain

Adjacent Property

Shed

Office

MW-1

Excavation Pit for former UST

46th Avenue

Excavation Pit for former UST

I-880 Exit

Coliseum Way

Coliseum Way Crossover

Attachment A

Zone 7 Drilling Permit Application and DWR FORM 188



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

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

19 November 1993

H2O Geol A Groundwater Consultancy
P.O. Box 2165
Livermore, CA 94551

Gentlemen:

Enclosed is drilling permit 93641 for a monitoring well construction project at 715 - 46th Avenue in Oakland for Pacific Galvanizing.

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 at extension 235 or me at extension 233.

Very truly yours,

Craig A. Mayfield
Water Resources Engineer III

WH:mm
Enc.



ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE

PLEASANTON, CALIFORNIA 94588

VOICE (510) 484-2600

FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

NAME OF PROJECT 715-46th AVENUE
OAKLAND

PERMIT NUMBER 93641
LOCATION NUMBER _____

PACIFIC GALVANIZING
ADDRESS 715-46th AVENUE Voice (510) 261-2331
OAKLAND Zip _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

CONTACT
H2O GEOL A GROUNDWATER CONSULTANCY
Fax (510) 373-9211
P.O. Box 2165 Voice (510) 373-9211
VERMONT Zip 94551

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.

SOILS EXPLORATION SERVICE

TYPE OF PROJECT
Construction _____
Cathodic Protection _____
Water Supply _____
Monitoring _____
Geotechnical Investigation
General _____
Contamination _____
Well Destruction _____

WATER SUPPLY WELL USE
Domestic _____ Industrial _____ Other _____
Irrigation _____

DRILLING METHOD:
Rotary _____ Air Rotary _____ Auger _____
Other _____

DRILLER'S LICENSE NO C57 582696

PROJECTS
Well Hole Diameter 8 in. Maximum _____
 casing Diameter 2 in. Depth 25 ft.
 surface Seal Depth ~5 ft. Number 1

TECHNICAL PROJECTS
Number of Borings _____ Maximum _____
 bore Diameter _____ in. Depth _____ ft.

PROPOSED STARTING DATE 12-2-93
PROPOSED COMPLETION DATE 12-2-93

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

Approved Wyman Hong Date 18 Nov 93
Wyman Hong

CONTACTS
SURE Wayne J. Freeman Date 11-18-93

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

Attachment B
Borehole Logs and Well Completion Diagrams

MAJOR DIVISION			Symbol	SOIL DESCRIPTION	
COARSE - GRAINED SOILS > 50 % coarser than # 200 sieve	GRAVELS Over half of coarse fraction larger than No. 4 sieve.	Clean gravels with less than 5 % fines	GW	Well graded gravels, gravel-sand mixtures, little or no fines.	
		Gravels with over 12 % fines	GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.	
			GM	Silty gravels, poorly graded gravel-sand-clay mixtures, non-plastic fines.	
			GC	Clayey gravels, poorly graded gravel-sand-clay mixtures, plastic fines.	
	SANDS Over half of the coarse fraction finer than No.4 sieve.	Clean sands with less than 5 % fines	SW	Well Graded sands, gravelly sands, little or no fines.	
			SP	Poorly graded sands, gravelly sands, little or no fines.	
		Sands with over 12 % fines	SM	Silty sands, poorly graded sand-silt mixtures, non-plastic fines.	
			SC	Clayey sands, poorly graded sand-clay mixtures, plastic fines.	
			SILTS AND CLAYS Liquid limit less than 50 %	ML	Inorganic silts & very fine sands, silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays, low-med. plasticity, gravelly clays, sandy clays, silty clays, lean clays.
SILTS AND CLAYS Liquid limit greater than 50%	OL	Organic silts, organic silty clays, low plasticity.			
	MH	Micaceous or diatomaceous silts, volcanic ash, elastic silts,			
	CH	High plasticity clays, fat clays.			
HIGHLY ORGANIC SOILS		OH	High plasticity organic silts and clays.		
		Pt	Peat and other fibrous organic soils.		

SILTS AND CLAYS	U.S. Standard Series Sieve			Clear Square Sieve Openings			COBBLES	BOULDERS
	200	40	10	4	3/4"	3"		
	Sand			Gravel				
	Fine	Medium	Coarse	Fine	Coarse			

KEY TO SAMPLE PTS.

	Undisturbed soil sample collected for chemical analysis
	Undisturbed soil samples collected for classification and/or geotechnical testing

SANDS & GRAVELS	BLOWS/FT*	SILTS & CLAYS	BLOWS/FT*
Very Loose	0-4	Very Soft	0-2
Loose	4-10	Soft	2-4
Medium Dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-16
Very Dense	> 50	Very Stiff	16-32
		Hard	> 32

Blow Count = Number of blows it takes for a 140 lb. hammer, falling 30 inches, to drive the sampler 12 inches into the ground.

- Static water level in the monitoring well.
- First Encountered Water in borehole.

Note: Soil color names and coding refer to Munsell Soil Color Chart.



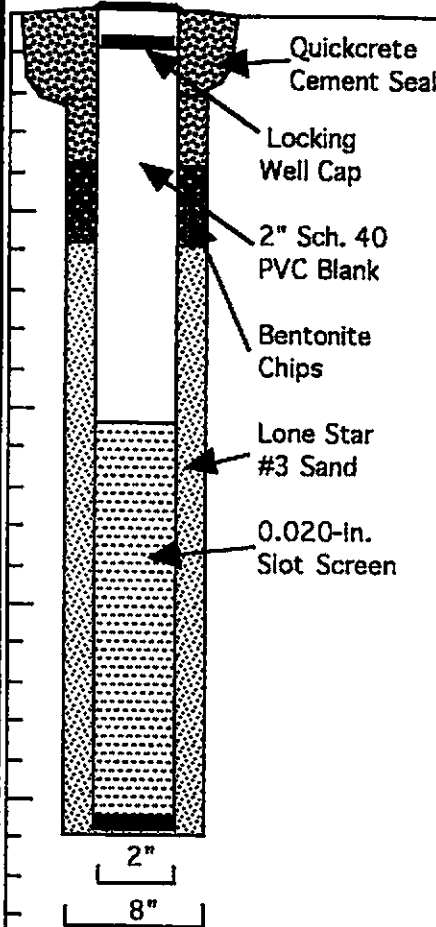
SOIL CLASSIFICATION CHART AND KEY TO TEST DATA

Figure

Project No. _____ Appr: _____ Date: 7-21-93

Well Installation Diagram

Diversified Well Products
Traffic-Grade Street Box



Sample No.

Blows/6"

Depth (ft.)

Sample Pts.

Equipment CME - 55 Hollow Stem Auger

Elevation _____ Date Drilled 12-2-93

MW1-5

MW1-10

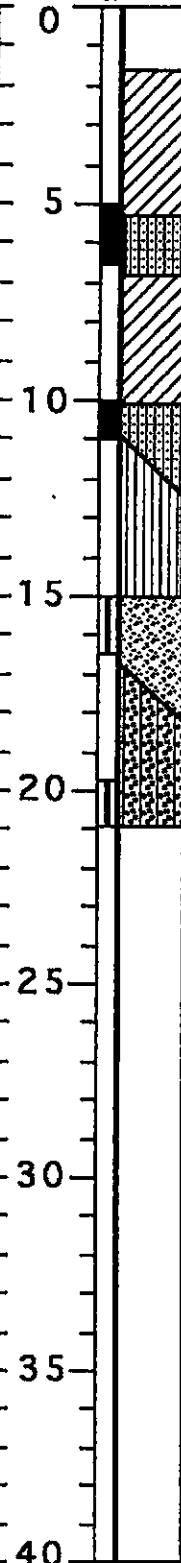


5
11
20

7
11
15

8
28
23

14
14
7



Asphalt 6-inches thick, basegravel 1-foot thick
SILTY CLAY, (CL), 5Y3/2 dark olive gray, moist to very moist.

SILTY SAND, (SM), 5GY 6/1, green gray silts and fine to very fine sand 60-70% and silt and clay 30-40%, rootlets and nat'l charcoal, v. faint fuel odor.

SILTY CLAY, (CL), 5Y 4/2 olive gray, stiff to very stiff, sl. moist to moist.

GRAVELLY SILTY SAND, (SM) to GRAVELLY SANDY SILT, (ML), 10YR 3/4 dk yellow brown to 5Y4/2 olive gray, rounded to subrounded gravel, fine to v. fine sand- 40-60%, 10-20% silt, 10-20% gravel, no root casts, fuel odor, grades to silt.

GRAVELLY SANDS (SW), 10YR 5/4 yellow brown, rounded to subrounded coarse sands, 60% and fine gravel, 10-15% v. fine sand and silt, no odor.

SILTY GRAVEL to SANDY GRAVEL (GM-GW), 10YR 7/2 light gray to 6/4 light yellow brown, loose to v. loose gravels and coarse sand, no odor.

Total Depth: 20.9 Feet
 First Encountered Water Depth: ~16.7 feet below ground surface.
 Static Water Depth (12/6/93): 8.61 feet below ground surface.

Well Log



Log of Borehole MW-1 and Well Completion Diagram

715-46th Avenue
Oakland, California

FIGURE

Project No. _____ Appr: _____ Date: 12-10-93

Attachment C
Water Sampling Field Survey Form

Water Sampling Field Survey Form

Job No.: _____ Site: Pacific Gasworks Date: 12-06-73

Well No.: MW-1 Sampling Team: WSA

Sampling Method: TEFLON boiler

Field Conditions: Cloudy cold

Describe equipment D-Con before sampling this well: TSD WASH. TRIPLE RUNGE TAP WATER
TRIPLE RUNGE DISTILLED WATER

Total depth of well: 20.73 ^{to bottom of screen} feet Time: 09:46

Depth to water before pumping: 8.61 feet

	Diameter		Volume	Purge Factor	Volume To Purge
	2-in.	4-in.			
Height of Water Column: <u>12.12</u> feet	* <u>0.16</u>	0.65	= <u>1.93</u> gal.	* <u>5</u>	= <u>9.7</u>
Depth purging from: <u>203</u> feet			<small>Pump in 21A: 09:50</small>	<small>Pump in 21B: 09:53</small>	
			$\pi * r^2 * L * 7.48 =$ _____ gallons		

Time	Volume Purged (In Gallons)	pH (Units)	Conductivity (µmhos/cm@ 25°C)	T (°C)	Notes
<u>10:03</u>	<u>10</u>	<u>6.79</u>	<u>3,440</u>	<u>19.7</u>	<u>1st 3 min v. muddy</u> <u>U. S. filter</u>
<u>10:08</u>	<u>15</u>	<u>7.09</u>	<u>2,770</u>	<u>19.6</u>	<u>10:08 wait 30 sec</u> <u>10:10 recharge</u>
<u>10:13.25</u>	<u>20.175</u>	<u>6.92</u>	<u>2,810</u>	<u>19.8</u>	
<u>10:15.26</u> ^{to: out}	<u>18.5</u>	<u>6.67</u>	<u>2,720</u>	<u>19.7</u>	
<u>10:19.46</u>	<u>20.5</u>	<u>6.65</u>	<u>2,650</u>	<u>19.6</u>	<u>10:46 wait for well to</u> <u>clear</u>

Purge to close filter
 Sample time 11:33
 U.S. filter 21
 Recovery 11.0

Attachment D
Laboratory Analytical Results



SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(510) 686-9600 • FAX (510) 686-9689

H2OGEOL	Client Project ID: Pacific Galvanizing	Sampled: Dec 2, 1993
P.O. Box 2165	Sample Matrix: Soil	Received: Dec 3, 1993
Livermore, CA 94551	Analysis Method: EPA 5030/8015/8020	Reported: Dec 17, 1993
Attention: Gary Lowe	First Sample #: 312-0205	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 312-0205 MW-1-5	Sample I.D. 312-0206 MW-1-10
Purgeable Hydrocarbons	1.0	N.D.	77
Benzene	0.005	N.D.	0.12
Toluene	0.005	N.D.	0.48
Ethyl Benzene	0.005	N.D.	0.31
Total Xylenes	0.005	N.D.	0.82
Chromatogram Pattern:	--	Gasoline	

Quality Control Data

Report Limit Multiplication Factor:	1.0	10
Date Analyzed:	12/14/93	12/15/93
Instrument Identification:	HP-4	HP-4
Surrogate Recovery, %: (QC Limits = 70-130%)	97	86

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL


Karen L. Enstrom
Project Manager



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(510) 686-9600 • FAX (510) 686-9689

H2OGEOL
P.O. Box 2165
Livermore, CA 94551
Attention: Gary Lowe

Client Project ID: Pacific Galvanizing
Matrix: Solid

QC Sample Group: 3120205-206

Reported: Dec 17, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A.Tuzon	A.Tuzon	A.Tuzon	A.Tuzon

MS/MSD	Benzene	Toluene	Ethyl Benzene	Xylenes
Batch#:	3120648	3120648	3120648	3120648
Date Prepared:	12/14/93	12/14/93	12/14/93	12/14/93
Date Analyzed:	12/14/93	12/14/93	12/14/93	12/14/93
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
Conc. Spiked:	0.40 mg/kg	0.40 mg/kg	0.40 mg/kg	1.2 mg/kg
Matrix Spike % Recovery:	95	93	95	93
Matrix Spike Duplicate % Recovery:	90	93	93	93
Relative % Difference:	5.4	0.0	2.1	0.0

LCS Batch#:	LCS121493	LCS121493	LCS121493	LCS121493
Date Prepared:	12/14/93	12/14/93	12/14/93	12/14/93
Date Analyzed:	12/14/93	12/14/93	12/14/93	12/14/93
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
LCS % Recovery:	95	95	96	95

% Recovery Control Limits:	Benzene	Toluene	Ethyl Benzene	Xylenes
	55-145	47-149	47-155	56-140

Please Note:

The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Karen L. Enstrom
Project Manager

Gary D. Lowe, R.G., C.E.G.

H₂OCELL A GROUND WATER CONSULTANCY

P.O. Box 2165 ■ Livermore, California 94551

Chain of Custody

DATE 12-13 PAGE 1 OF 1

PROJ MGR <u>Gary Lowe</u>					ANALYSIS REPORT													NUMBER OF CONTAINERS			
COMPANY <u>H₂OCELL</u>					TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) WBTex (EPA 902, 8020)	TPH - Diesel (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520 E&F)	PESTICIDES/PCB (EPA 608, 8080)	PHENOLS (EPA 604, 8040)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	METALS Cd, Cr, Pb, Zn, Ni	CAM METALS (17)		PRIORITY POLLUTANT METALS (13)	EXTRACTION (TCLP, STLC)	
SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) WBTex (EPA 902, 8020)	TPH - Diesel (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520 E&F)	PESTICIDES/PCB (EPA 608, 8080)	PHENOLS (EPA 604, 8040)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	METALS Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	EXTRACTION (TCLP, STLC)	NUMBER OF CONTAINERS	
MW-1-S	12-2	09:49	Soil			x															
MW-1-LV	12-2	09:59	Soil			x															

3120205
↓
0206

PROJECT INFORMATION		SAMPLE RECEIPT		RELINQUISHED BY 1		RELINQUISHED BY 2		RELINQUISHED BY 3	
PROJECT NAME <u>Pacific Groundwater</u>	TOTAL NO. OF CONTAINERS	CHAIN OF CUSTODY SEALS		<u>Walter A. Bergman</u> 12/13/05 (SIGNATURE) (TIME)		<u>Walter A. Bergman</u> 12/13/05 (SIGNATURE) (TIME)		<u>Walter A. Bergman</u> 12/13/05 (SIGNATURE) (TIME)	
PROJECT NUMBER	REC'D GOOD CONDITION/COLD	CONFORMS TO RECORD		<u>Walter A. Bergman</u> 12/13/05 (PRINTED NAME) (DATE)		<u>Walter A. Bergman</u> 12/13/05 (PRINTED NAME) (DATE)		<u>Walter A. Bergman</u> 12/13/05 (PRINTED NAME) (DATE)	
SHIPPING ID NO	LAB NO								
VIA									
SPECIAL INSTRUCTIONS/COMMENTS: <u>NEEDING (12/13/05)</u>				RECEIVED BY 1		RECEIVED BY 2		RECEIVED BY (LABORATORY) 3	
				<u>Melissa Creusere</u> 9:26am (SIGNATURE) (TIME)		<u>Melissa Creusere</u> 12/13/05 (SIGNATURE) (TIME)		<u>Melissa Creusere</u> 12/13/05 (SIGNATURE) (TIME)	
				<u>SAL</u> (PRINTED NAME) (DATE)		<u>SAL</u> (PRINTED NAME) (DATE)		<u>SAL</u> (PRINTED NAME) (DATE)	

Gary D. Lowe, R.G., C.E.G.

H2O201 A GROUND WATER CONSULTANCY

P.O. Box 2165 • Livermore, California 94551

Chain of Custody

DATE 12/13 PAGE 1 OF 1

PROJ MGR G.D. Lowe
 COMPANY H2O201
 ADDRESS 11012 2165
Livermore, CA
 SAMPLERS (SIGNATURE) [Signature] (PHONE NO) (510) 251-1141

ANALYSIS REPORT

SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) w/STEX (EPA 802, 8020)	TPH - Diesel (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520 E&F)	PESTICIDES/PCB (EPA 608, 8080)	PHENOLS (EPA 604, 8040)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418 1)	METALS Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	EXTRACTION (CLP, STLC)	NUMBER OF CONTAINERS
MW 1-5	12-6	09:49	Soil			*														
MW 1-10	12-6	09:51	Soil			*														

3/20205
 ↓
 0206

PROJECT INFORMATION		SAMPLE RECEIPT		RELINQUISHED BY 1		RELINQUISHED BY 2		RELINQUISHED BY 3	
PROJECT NAME <u>Metric Groundwater</u>	TOTAL NO. OF CONTAINERS	RELINQUISHED BY (SIGNATURE) <u>[Signature]</u>	RELINQUISHED BY (TIME)	RELINQUISHED BY (SIGNATURE)	RELINQUISHED BY (TIME)	RELINQUISHED BY (SIGNATURE)	RELINQUISHED BY (TIME)	RELINQUISHED BY (SIGNATURE)	RELINQUISHED BY (TIME)
PROJECT NUMBER	CHAIN OF CUSTODY SEALS	RELINQUISHED BY (PRINTED NAME) <u>W. Lowe</u>	RELINQUISHED BY (DATE) <u>12-13</u>	RELINQUISHED BY (PRINTED NAME)	RELINQUISHED BY (DATE)	RELINQUISHED BY (PRINTED NAME)	RELINQUISHED BY (DATE)	RELINQUISHED BY (PRINTED NAME)	RELINQUISHED BY (DATE)
SHIPPING ID NO	REC'D GOOD CONDITION/COLD	(COMPANY)		(COMPANY)		(COMPANY)		(COMPANY)	
VIA	CONFORMS TO RECORD	RECEIVED BY (SIGNATURE) <u>Melissa Creusere</u>	RECEIVED BY (TIME) <u>9:26 am</u>	RECEIVED BY (SIGNATURE)	RECEIVED BY (TIME)	RECEIVED BY (SIGNATURE)	RECEIVED BY (TIME)	RECEIVED BY (SIGNATURE)	RECEIVED BY (TIME)
SPECIAL INSTRUCTIONS/COMMENTS <u>NEEDING 10/20/2000</u>	LAB NO	RECEIVED BY (PRINTED NAME) <u>Melissa Creusere</u>	RECEIVED BY (DATE) <u>12/13/06</u>	RECEIVED BY (PRINTED NAME)	RECEIVED BY (DATE)	RECEIVED BY (PRINTED NAME)	RECEIVED BY (DATE)	RECEIVED BY (PRINTED NAME)	RECEIVED BY (DATE)
		(COMPANY) <u>SAL</u>		(COMPANY)		(COMPANY)		(COMPANY)	



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H2OGeol
P.O. Box 2165
Livermore, CA 94551
Attention: Gary Lowe

Client Project ID: Pacific Galvanizing
Sample Matrix: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 312-0403

Sampled: Dec 6, 1993
Received: Dec 6, 1993
Reported: Dec 17, 1993

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit $\mu\text{g/L}$	Sample I.D. 312-0403 MW-1
Purgeable Hydrocarbons	50	79
Benzene	0.5	N.D.
Toluene	0.5	N.D.
Ethyl Benzene	0.5	N.D.
Total Xylenes	0.5	N.D.

Chromatogram Pattern: Gasoline

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Analyzed:	12/9/93
Instrument Identification:	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	98

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL


Karen L. Enstrom
Project Manager

Gary D. Lowe, R.G., C.E.G.

H₂O GEC A GROUND WATER CONSULTANCY

P.O. Box 2165 ▪ Livermore, California 94551

Chain of Custody

DATE 12-6-93 PAGE 1 OF 1

PROJ. MGR <u>GARY LOWE</u> COMPANY <u>H₂O GEC</u> ADDRESS <u>P.O. BOX 2165</u> <u>LIVERMORE, CA 94551</u>					ANALYSIS REPORT																		NUMBER OF CONTAINERS	
					TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) w/BTEX (EPA 602, 8020)	TPH - Diesel (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520 E&F)	PESTICIDES/PCB (EPA 608, 8080)	PHENOLS (EPA 604, 8040)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	EXTRACTION (TCUP, STLG)					
SAMPLERS (SIGNATURE) <u>Wayne S. Okunuma (SIO) 256-6746</u> (PHONE NO.)					SAMPLE ID. <u>MW-1</u>					DATE <u>12-6-93</u>					TIME <u>11:38</u>					MATRIX <u>WATER</u>				LAB ID.
										<u>X</u>					<u>3120403 A-C</u>									<u>3</u>
<u><NO PRES.></u>																								
PROJECT INFORMATION					SAMPLE RECEIPT					RELINQUISHED BY 1.				RELINQUISHED BY 2.				RELINQUISHED BY 3.						
PROJECT NAME: <u>PACIFIC CALIFORNIA</u>		TOTAL NO. OF CONTAINERS			CHAIN OF CUSTODY SEALS				RECEIVED BY 1.				RECEIVED BY 2.				RECEIVED BY (LABORATORY) 3.							
PROJECT NUMBER:		CHAIN OF CUSTODY SEALS			REC'D GOOD CONDITION/COLD				(SIGNATURE) <u>Wayne S. Okunuma</u>				(SIGNATURE) _____				(SIGNATURE) <u>Melissa C. Russell</u>							
SHIPPING ID NO		CONFORMS TO RECORD			RECEIVED BY 1.				RECEIVED BY 2.				RECEIVED BY (LABORATORY) 3.											
VIA:		LAB NO			(PRINTED NAME) <u>WAYNE S. OKUNUMA</u>				(PRINTED NAME) _____				(PRINTED NAME) <u>MELISSA C. RUSSELL</u>											
SPECIAL INSTRUCTIONS/COMMENTS:					(DATE) <u>12-6-93</u>				(DATE) _____				(DATE) <u>12/6/93</u>											
SPECIAL INSTRUCTIONS/COMMENTS:					(COMPANY) _____				(COMPANY) _____				(COMPANY) _____											
SPECIAL INSTRUCTIONS/COMMENTS:					(SIGNATURE) _____				(SIGNATURE) _____				(SIGNATURE) _____											
SPECIAL INSTRUCTIONS/COMMENTS:					(TIME) _____				(TIME) _____				(TIME) _____											
SPECIAL INSTRUCTIONS/COMMENTS:					(DATE) _____				(DATE) _____				(DATE) _____											