RW

2/24/89

February 21, 1989

RWQCB
1111 Jackson Street, Room 6040
Oakland, California 94607

Re: Former Chevron SS #9-0020
Harrison and 17th Streets
Oakland, California

Gentlemen:

Enclosed is the subsurface investigation for the above site. As indicated in the report, petroleum hydrocarbons were non-detectable in the groundwater, and detectable in one soil boring as oil. Various halocarbons were detected in all groundwater samples.

Based on the above results, an additional investigation will be performed to determine the source of the chlorinated solvents.

If you have any questions, please contact me at (415) 842-9525.

Very truly yours,

D. MOLLER

By_____
Gordon Davitt
C & M Representative

GJD:vjs:Q416
Enclosure

cc: Alameda County
Environmental Health
470 - 27th Street
Oakland, California 94612

WGR, INC.
Western Geologic Resources, Inc.
Geologic and Environmental Consulting

K. G. HUFFMAN

JAN 2 6 REC'D

24 January 1989

Gordon Davitt
Chevron USA
2410 Camino Ramon
San Ramon, California 94583

Re: Chevron SS #90020
Oakland, California
WGR #1-012.01

Dear Mr.Davitt:

This letter report presents the results of soil sampling and monitoring well installation conducted by Western Geologic Resources, Inc. (WGR) at the abandoned Chevron service station #90020 located at the corner of 17th and Harrison Streets, Oakland, California (Figure 1).

As requested the following scope of work was performed:

1) Drill three soil borings on the site and sample at 5 ft intervals;

2) Complete the borings as 4-inch diameter monitoring wells;

3) Analyze selected soil samples for total fuel hydrocarbons (TFH) by EPA Method 8015, solvent-solvent extraction, followed by gas chromatography using a flame ionization detector (EPA Method 8015) and for aromatic hydrocarbons by EPA Method 8020, headspace extraction followed by gas chromatography using a photo ionization detector (EPA Method 8020);

4) Develop and sample the monitoring wells and analyze the groundwater samples by EPA Methods 8015, 602 (water equivalent of 8020) and EPA Method 624, gas chromatography/mass spectrometry for purgeable priority pollutants;

5) Survey the top of casing for the new monitoring wells and determine groundwater elevations in those wells;

6) Conduct a well canvass for a 1/2 mile radius; and

7) Review field and laboratory data and prepare a report.

553 Headlands Court • Sausalito, CA 94965 • (415) 485-2708

Gordon Davitt/24 Jan 1989

BACKGROUND

The following is a summary of work previously conducted at the site:

January 1988- Soil vapor survey (SVS) conducted by EA Engineering Science and Technology. Concentrations of volatile hydrocarbons ranged from 1 to 140 ppm in twenty two soil vapor points sampled from 11 locations.

SOIL BORINGS AND HYDROGEOLOGY

Soil borings B-1, B-2, and B-3 were drilled on the site (Figure 2 of Attachment A) with hollow stem augers by All Terrain Drilling of Marysville, California, on 26 and 27 October 1988. Boreholes were continuously logged by WGR geologists Thomas Howard and Gail Jones. Soil samples were collected at 5 ft intervals as described in the WGR standard operating procedure for soil sampling (included as Attachment A). Seventeen samples were selected and sent under chain-of-custody to Brown and Caldwell Analytical Laboratories of Emeryville, California, for analysis by EPA Methods 8015 and 8020. Boring logs are included in Attachment B.

The three borings penetrated similar lithologic materials and were terminated upon proving competent confining zone. Low-to moderate-estimated permeability silty sands and moderate-to high-estimated permeability sands were encountered from ground surface to about 30 ft. These sands were underlain by low-estimated permeability silty sands and clayey silts from about 30 to 35 ft. A sandy gravel, which included brick fragments, was encountered in boring B-2 near the former waste oil tank from approximately 17 to 19 ft. This was the only horizon in any of the borings in which odors were encountered. Groundwater was encountered at about 24 ft below grade in borings B-1 and B-2, and at about 23 ft below grade in boring B-3.

MONITORING WELL INSTALLATION AND DEVELOPMENT

The WGR standard operating procedure for monitoring well installation and well development is included as Attachment C. All three borings B-1, B-2 and B-3 were reamed with 12-inch augers and completed as 4-inch diameter monitoring wells MW-1, MW-2 and MW-3, respectively. Well completion details are included on the boring logs included in Attachment B. All three wells were completed in the first water bearing zone with screened intervals extending from approximately 19 to 32 ft below grade level.

Monitoring wells MW-1, MW-2 and MW-3 were developed on 27 and 28 October 1988 by WGR geologic technicians until relatively clear, sand-free water was produced. Development was performed using a combination of airlift, air surge and surgeblock techniques. MW-1 produced approximately 2.5 gallons per minute (gpm) and MW-2 and MW-3 each produced approximately 1.2 gpm. A total of 380 gallons was extracted and temporarily stored onsite in 55-gallon drums, pending analytic results.

WATER SAMPLING

Water samples from wells MW-1, MW-2 and MW-3 were collected on 3 November 1988 according to WGR's standard operating procedure, included as Attachment D. Water samples were sent to Brown and Caldwell Analytical Laboratory of Emeryville under chain-of-custody for analysis by EPA Methods 8015, 602 and 624.

ANALYTIC RESULTS

Analytic results are presented in Table 1. Chain-of-custody forms are included in Attachment E and analytic reports are presented in Attachment F.

Total fuel hydrocarbons (TFH) reported as oil at 12 parts per million (ppm) were detected in the 19 ft sample from boring B-2. TFH were not detected in any other samples that were analyzed. No aromatic hydrocarbons were detected in any soil samples.

Neither TFH nor aromatic hydrocarbons were detected in any of the groundwater samples. However the following halocarbons were detected: Carbon Tetrachloride at 18 ppb, 3 ppb and 8 ppb and Chloroform at 7 ppb, 2 ppb and 6 ppb in monitoring wells MW-1, MW-2 and MW-3, respectively; Tetrachloroethylene was detected at 34 ppb and 84 ppb, Trichloroethylene at 3 ppb and 3 ppb, and Trans-1,2-Dichloroethylene at 10 ppb and 5 ppb in monitoring wells MW-2 and MW-3, respectively.

GROUNDWATER FLOW

All monitoring wells on the site were surveyed for top-of-casing elevations by John Koch, land surveyor, CA Lic #4811, on 3 November 1988. Groundwater elevations on 3 November 1988 were 9.42 ft, 9.70 ft, and 9.55 ft for wells MW-1, MW-2 and MW-3, respectively. Groundwater flow beneath the site is to the east

with an average gradient of 0.41%, as determined by 3 point solution (Figure 4).

WELL SURVEY

A well canvass for a 1/4 mile radius around the site was performed for registered wells on file at the Alameda County Public Works Agency. Records indicated that there are no wells inside the 1/4 mile radius around the site. The area of the well survey is shown on Figure 1.

CONCLUSION

No aromatic hydrocarbons were detected in any soil samples. TFH were only found in one boring, B-2. They were characterized as oil at 12 ppm at 19 ft below grade. Analysis of groundwater samples failed to detect TFH, however, various halocarbons were detected in all wells. No aromatic hydrocarbons were detected in groundwater.

Gordon Davitt/24 Jan 1989

We appreciate the opportunity to provide geologic and environmental consulting services to Chevron and trust this report meets your needs. If you have any questions, please call us at (415)457-7595.

Sincerely,
Western Geologic Resources, Inc.

Thomas M. Howard
Project Geologist

Sherwood Lovejoy, Jr.
Senior Hydrogeologist

Don M. Eisenberg
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
DON M. EISENBERG
36387
CIVIL
STATE OF CALIFORNIA

ad/TMH/SL/DME

FIGURES

1. Site Location Map with 1/4 mile radius well canvass
2. Well Location Map with Chemical Data
3. Potentiometric Map

TABLES

1. Analytic Results for Soil
2. Analytic Results for Water

ATTACHMENTS

A: SOP-2: Soil Sampling
B: Boring Logs
C: SOP-3: Well Installation and Development
D: SOP-4: Water Sampling
E: Chain-of-Custody Forms
F: Analytic Reports

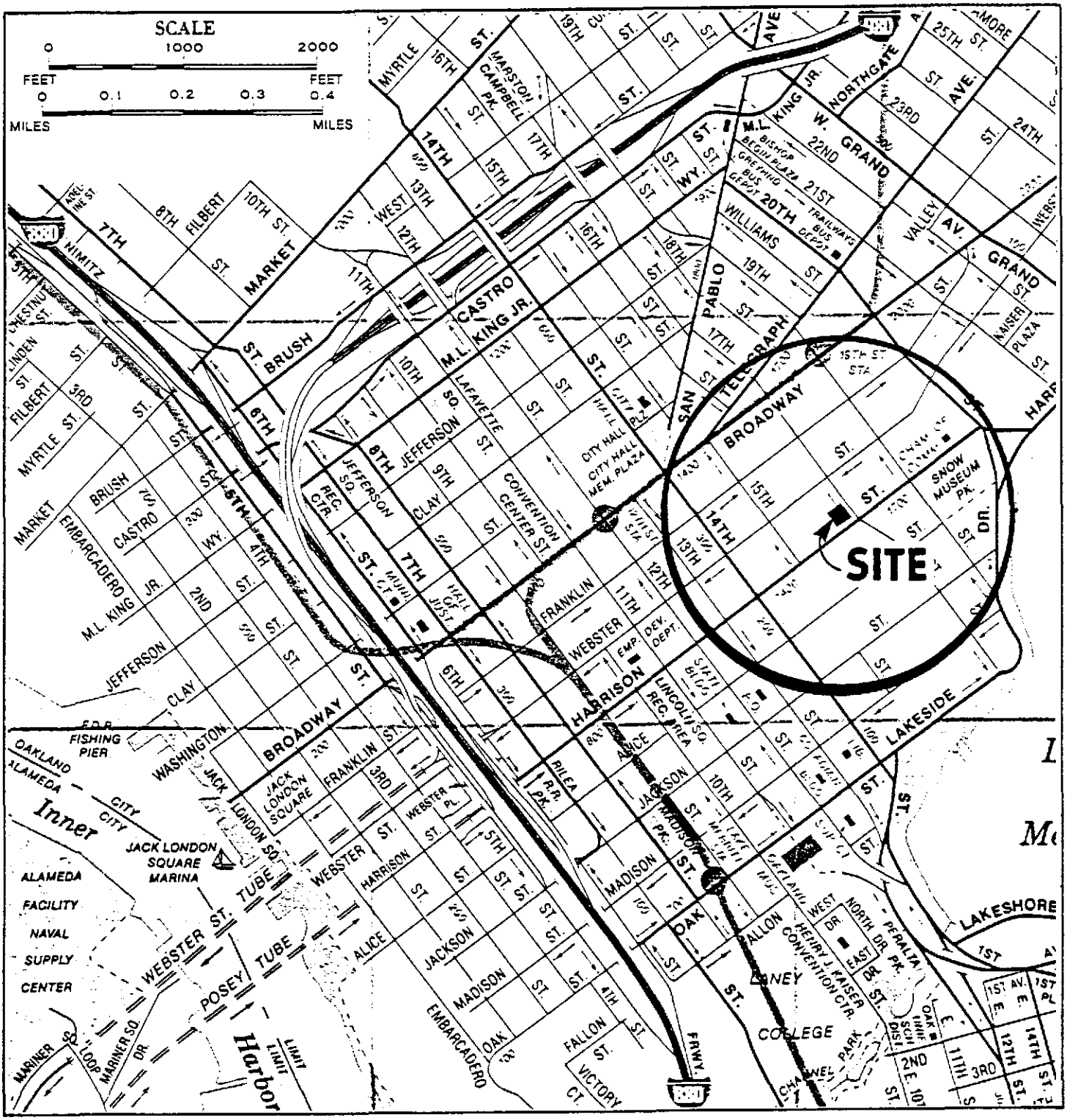


Figure 1. Site Location with 1/4-Mile Radius Well Canvas Area
Chevron SS #90020, Oakland, California.

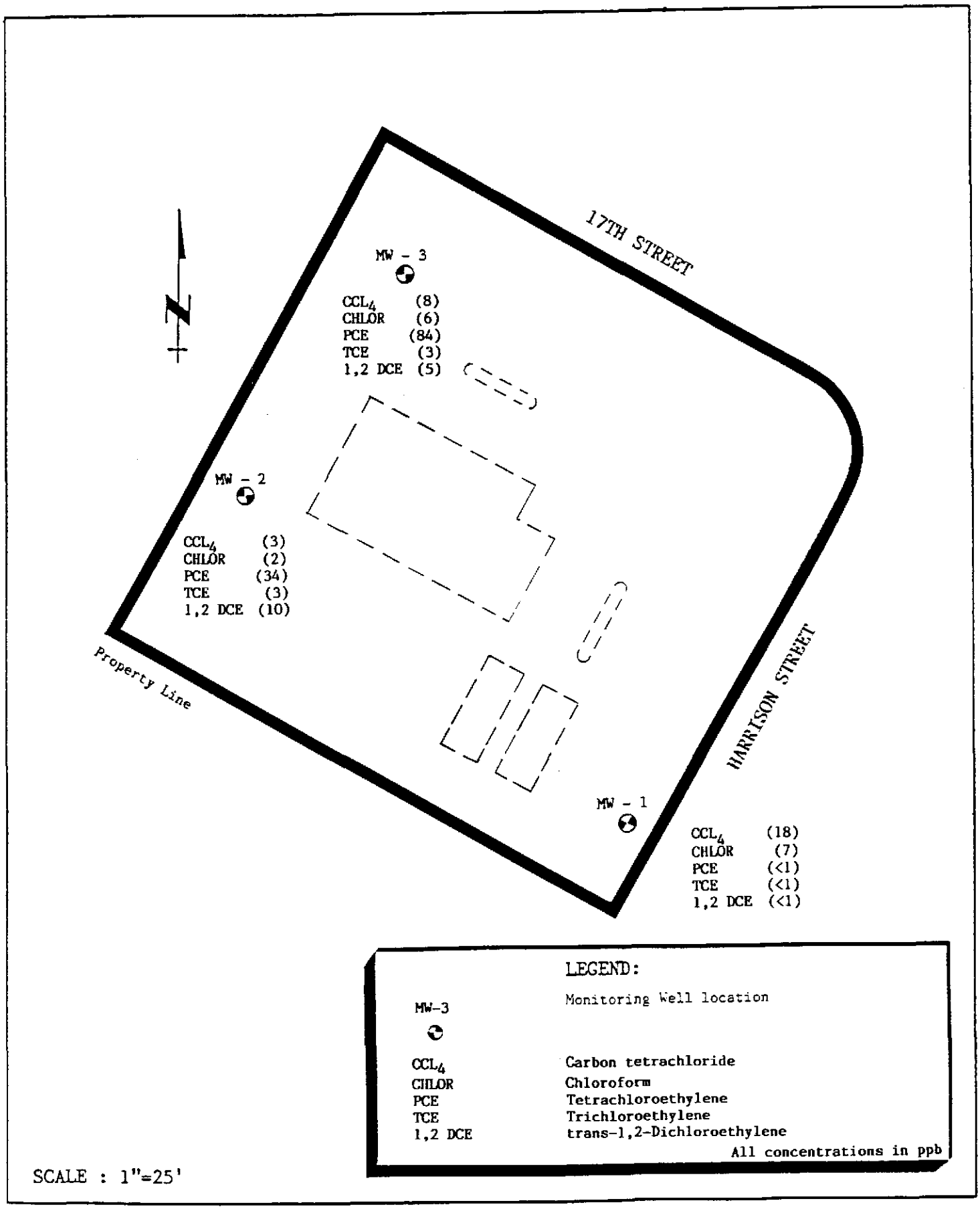


Figure 2. Monitoring Well Locations and Groundwater Chemical Data
Former Chevron SS #90020
17th & Harrison, Oakland, California

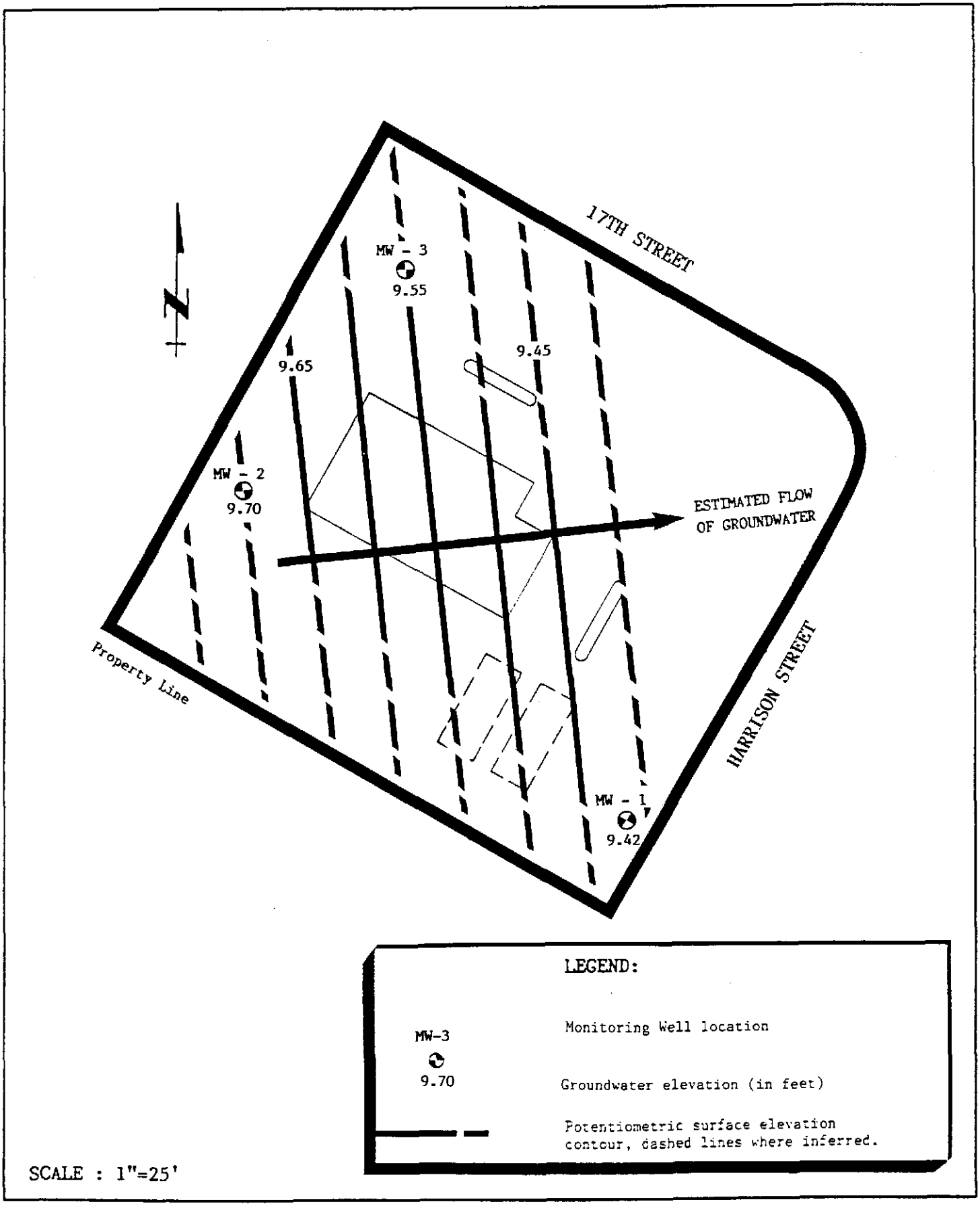


Figure 3. Potentiometric Map for Shallow Groundwater in Wells MW-1, MW-2, & MW-3, 3 Nov 1988, Former Chevron SS #90020, 17th & Harrison, Oakland, California

WGR

TABLE 1. Analytic Results for Soil Samples
Former Chevron Service Station 90020, Oakland, CA

Sample ID	Date	FC	THF	Benzene	Toluene	Xylenes	E-Benzene
			<-----ppm----->				
B-1- 5.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-10.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-15.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-20.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-29.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-34.0	26 Oct 88				NA		
B-2- 5.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-10.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-15.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-19.0	26 Oct 88	OIL	12	<0.3	<0.3	<0.3	<0.3
B-2-20.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-25.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-30.0	26 Oct 88				NA		
B-3- 5.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-10.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-15.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-20.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-25.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-30.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-34.0	26 Oct 88				NA		

Notes:
FC - Fuel characterization
THF - Total fuel hydrocarbons
E-Benzene - Ethyl benzene
NA - Not Analyzed

TABLE 2. Analytic Results for Groundwater
Former Chevron Service Station 90020, Oakland, CA

Monitor Well	Date	FC	THF	Benzene	Toluene	Xylenes	E-Benzene
			<----------ppm---------->				
MW-1	3 Nov 88	---	<1.0	<0.001	<0.001	<0.001	<0.001
MW-2	3 Nov 88	---	<1.0	<0.001	<0.001	<0.001	<0.001
MW-3	3 Nov 88	---	<1.0	<0.001	<0.001	<0.001	<0.001

Notes:
FC - Fuel characterization
THF - Total fuel hydrocarbons
E-Benzene - Ethyl benzene

Additional 624 compounds:

Monitor Well	Date	Carbon Tet	Chlor	PCE	TCE	1,2DCE
		<----------ppb---------->				
MW-1	3 Nov 88	18	7	<1	<1	<1
MW-2	3 Nov 88	3	2	34	3	10
MW-3	3 Nov 88	8	6	84	3	5

Notes:
Carbon Tet - Carbon Tetrachloride
Chlor - Chloroform
PCE - Tetrachloroethylene
TCE - Trichloroethylene
1,2DCE - trans-1,2-Dichloroethylene

WESTERN GEOLOGIC RESOURCES INC.
STANDARD OPERATING PROCEDURES
RE: SOIL SAMPLING
SOP 2

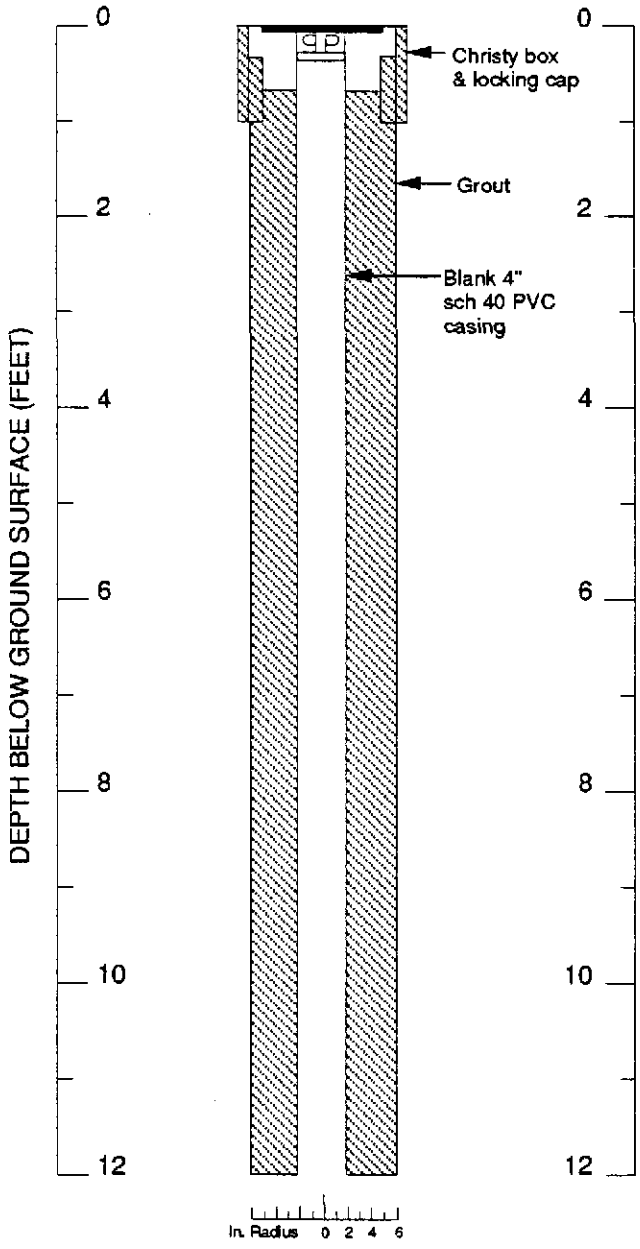
Soil samples for chemical analysis are collected in thin walled brass tubes, 4-in long by 2-in outside diameter. Four of these tubes and a spacer tube are set in a 2-in inside diameter 18-in split barrel sampler.

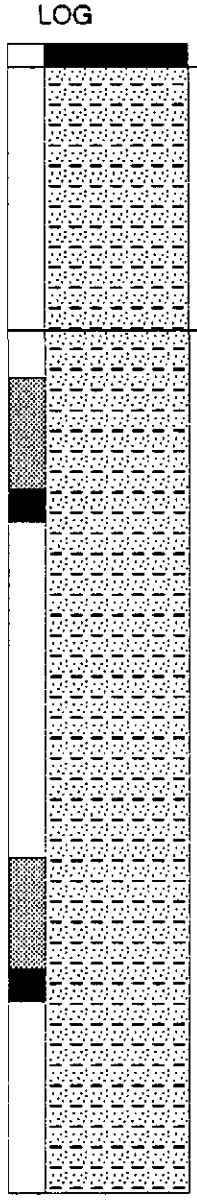
The split barrel sampler is driven it entire length hydraulically or using a 140 pound drop hammer. The sampler is extracted from the borehole and the brass tubes, containing the soil samples, are removed. Upon removal from the sampler, the selected brass tubes are immediately trimmed, capped with aluminum foil and plastic caps. They are then hermetically sealed with duct tape, labeled and refrigerated for delivery, under strict chain of custody, to the analytic laboratory. These procedures minimize the potential for cross-contamination and volatilization of volatile organic compounds (VOCs) prior to chemical analysis.

One soil sample collected at each sampling interval is analyzed in the field using a photoionization detector (PID), a flame ionizing detector (FID) or an explosimeter. The purpose of this field analysis is to qualitatively determine the presence or absence of hydrocarbons and to establish which soil samples will be analyzed at the laboratory. The soil sample is sealed in a zip-lock plastic bag and placed in the sun to enhance volatilization of the hydrocarbons from the soil sample. The data is recorded on the drill logs at the depth corresponding to the sampling point.

Other soil samples are collected to document the stratigraphy and estimate relative permeability of the subsurface materials. All drilling and sampling equipment are steam-cleaned prior to use at each site and between boreholes to minimize the potential for cross-contamination.

MONITOR WELL MW-1





DESCRIPTION

Asphalt

Silty SAND (SM) light brown; medium dense to loose; damp; 20% fine to medium sand; moderate est K

Silty SAND (SM) light brown with orange mottling; medium dense to loose; damp; 20% fine to medium sand; moderate est K

Continues

EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Gradational (hachured), uncertain (dashed) contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Grab sample

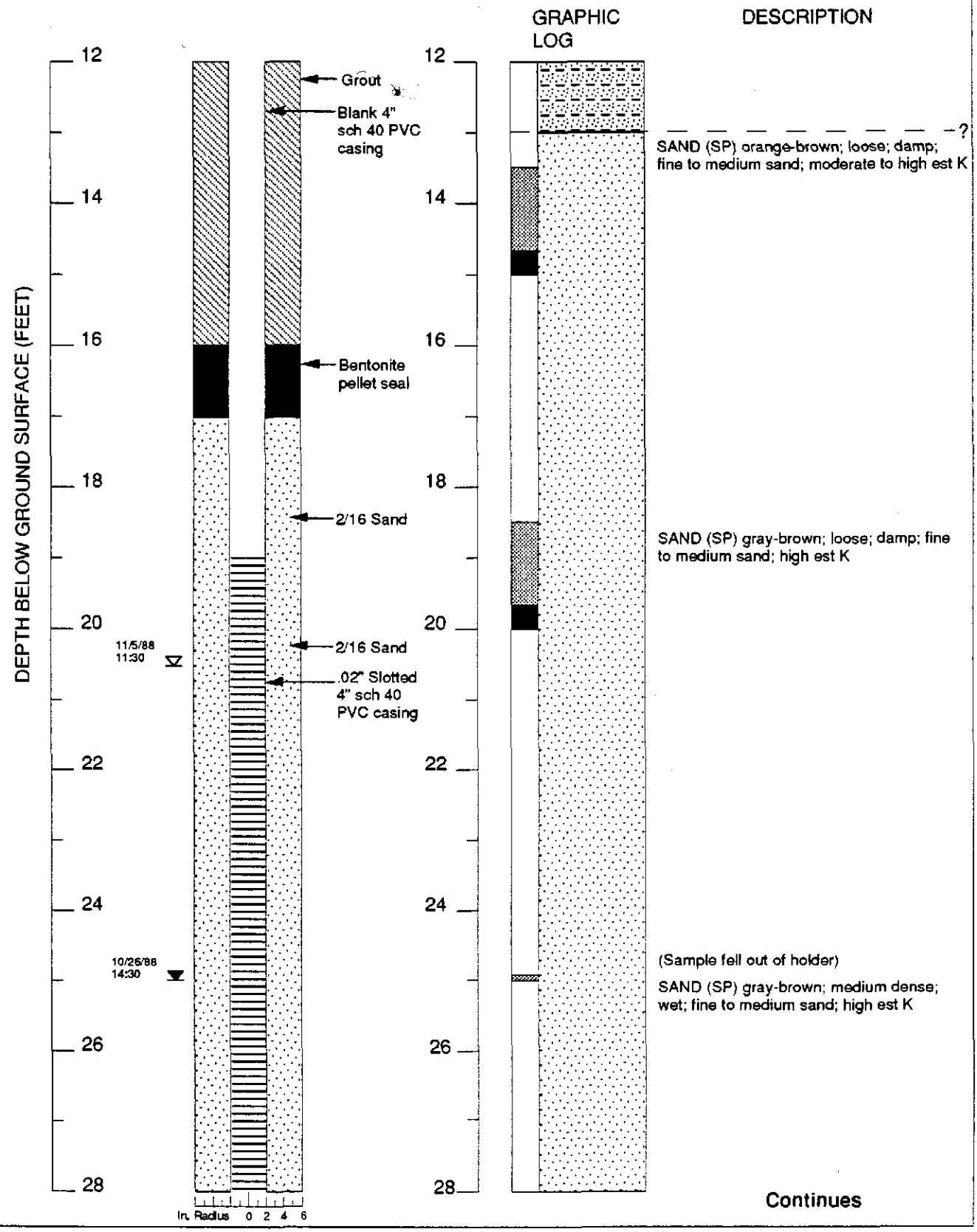
est K = Estimated permeability (hydraulic conductivity)

Logged by: Gail Jones
Supervisor: Tom Howard
Drilling Company: All Terrain
Driller: Wes
Drilling Method: Hollow stem auger
Dates Drilled: 10/26/88
Well Head Completion: Christy box & locking cap
Type of Sampler: 2" split barrel
TD: Drill depth

Boring Log and Well Completion Details MW-1
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

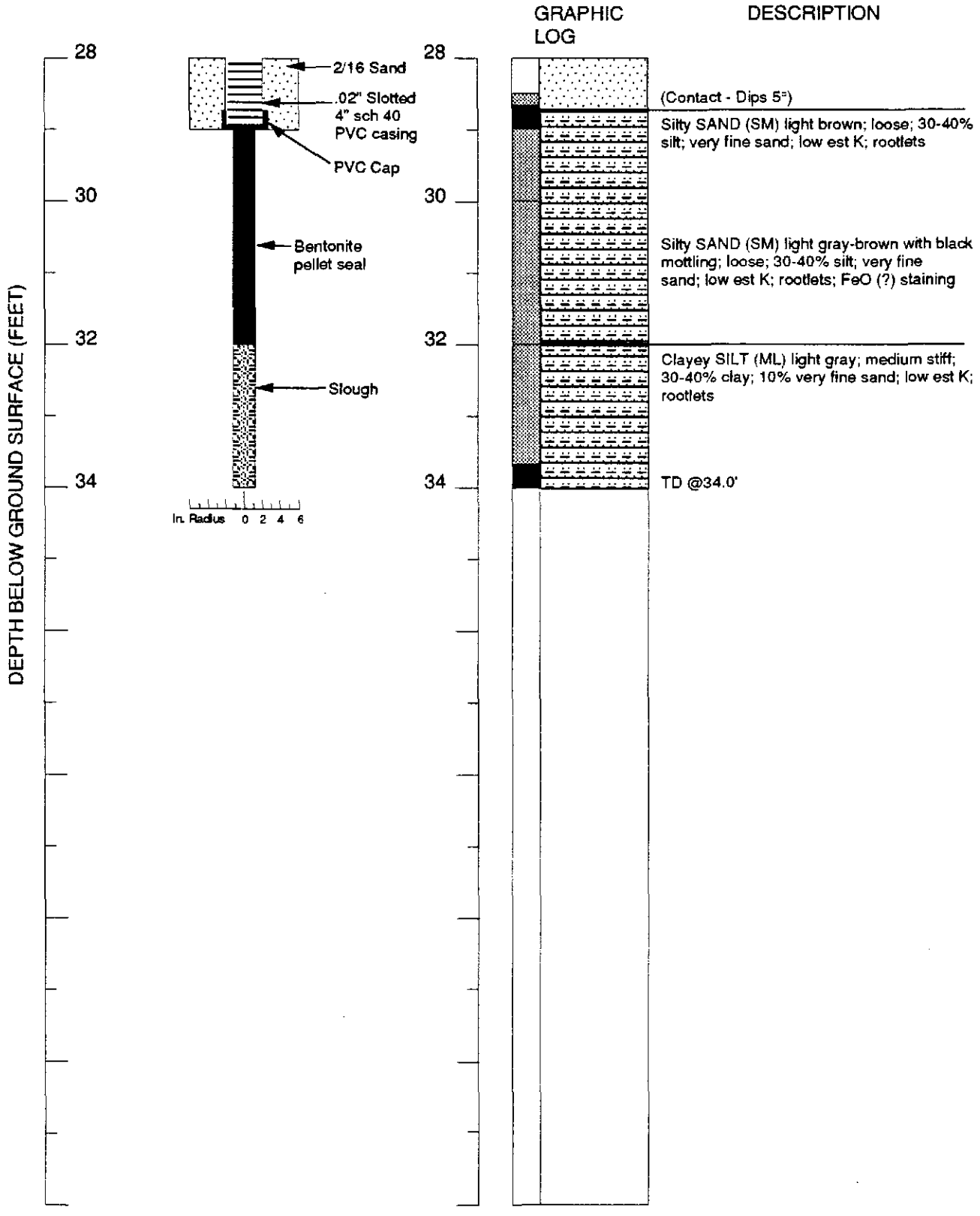
MONITOR WELL MW-1 (cont.)



Boring Log and Well Completion Details MW-1 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

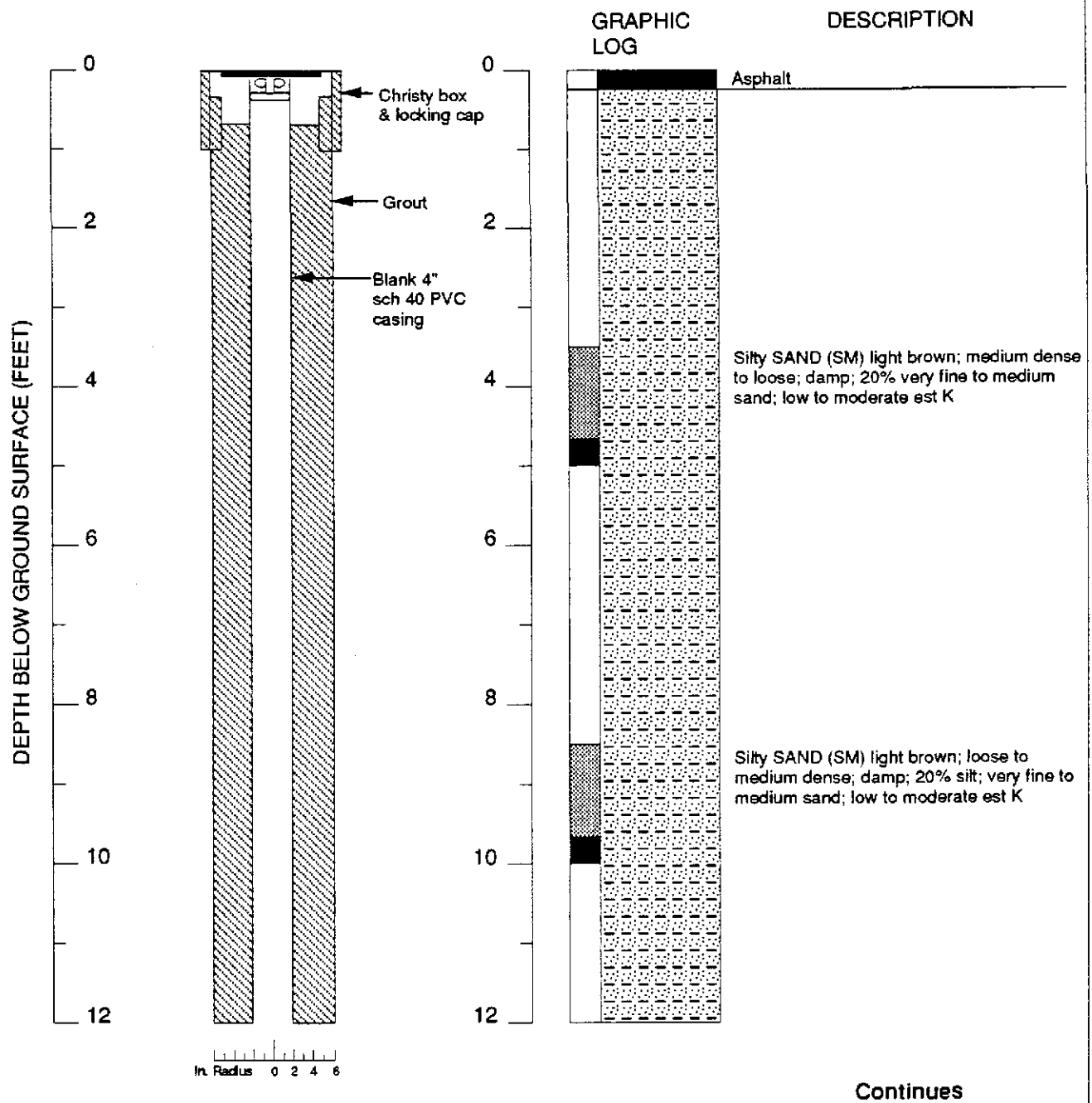
MONITOR WELL MW-1 (cont.)



Boring Log and Well Completion Details MW-1 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

MONITOR WELL MW-2



EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Gradational (hachured), uncertain (dashed) contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Grab sample

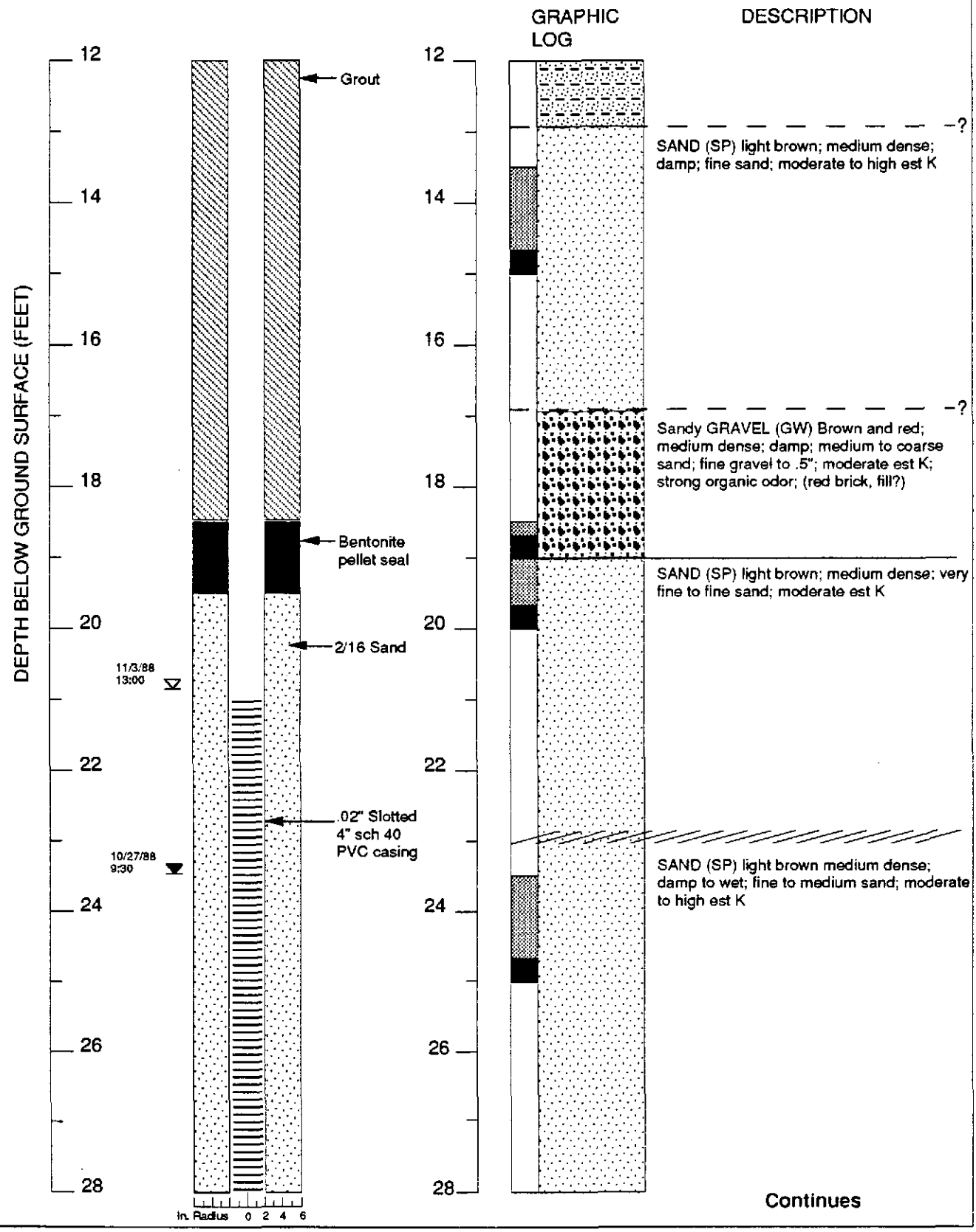
est K = Estimated permeability (hydraulic conductivity)

Logged by: Gail Jones
Supervisor: Tom Howard
Drilling Company: All Terrain
Driller: Wes
Drilling Method: Hollow stem auger
Dates Drilled: 10/27/88
Well Head Completion: Christy box & locking cap
Type of Sampler: 2" split barrel
TD: Drill depth = 33.0 ft

Boring Log and Well Completion Details MW-2
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

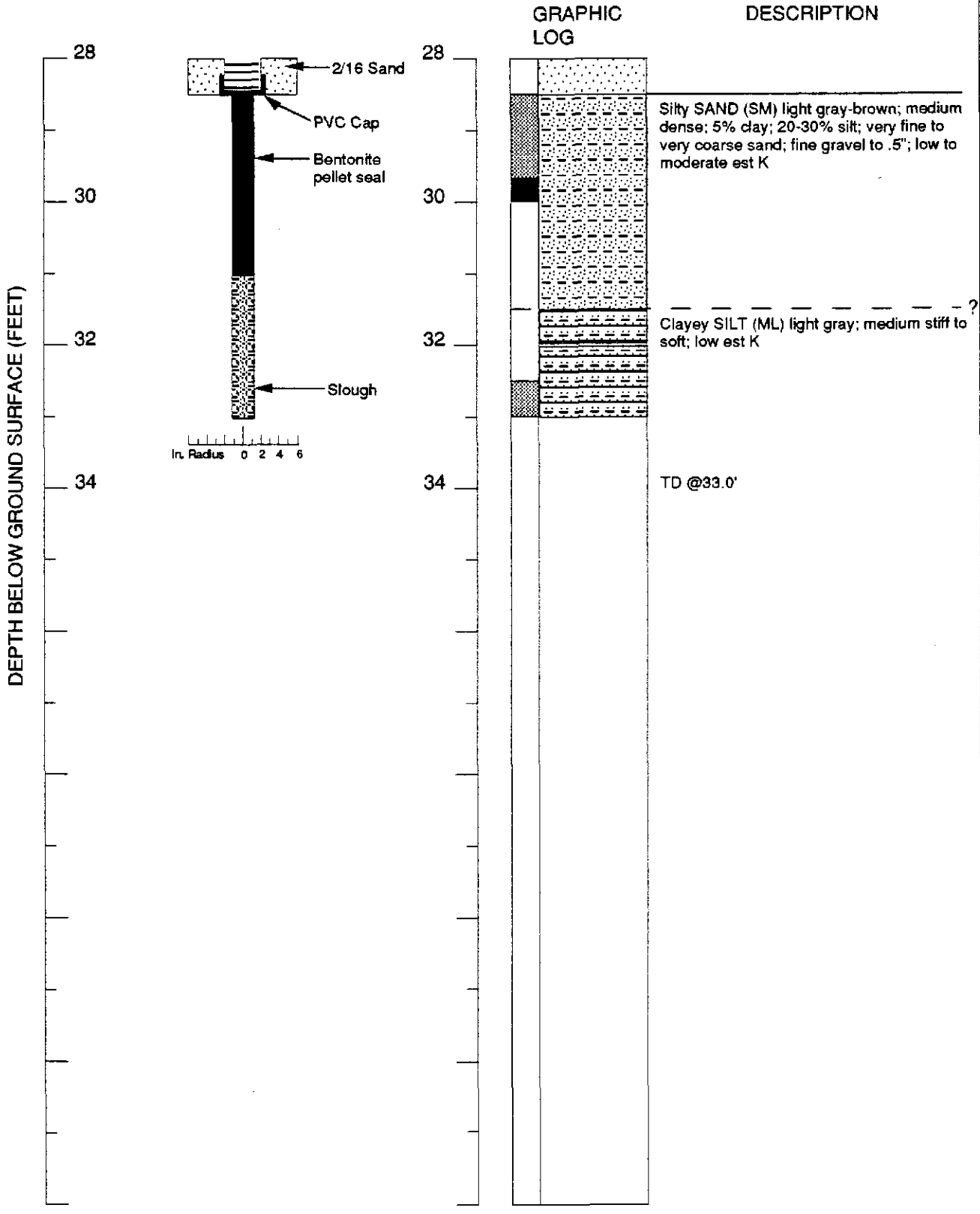
MONITOR WELL MW-2 (cont.)



Boring Log and Well Completion Details MW-2 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

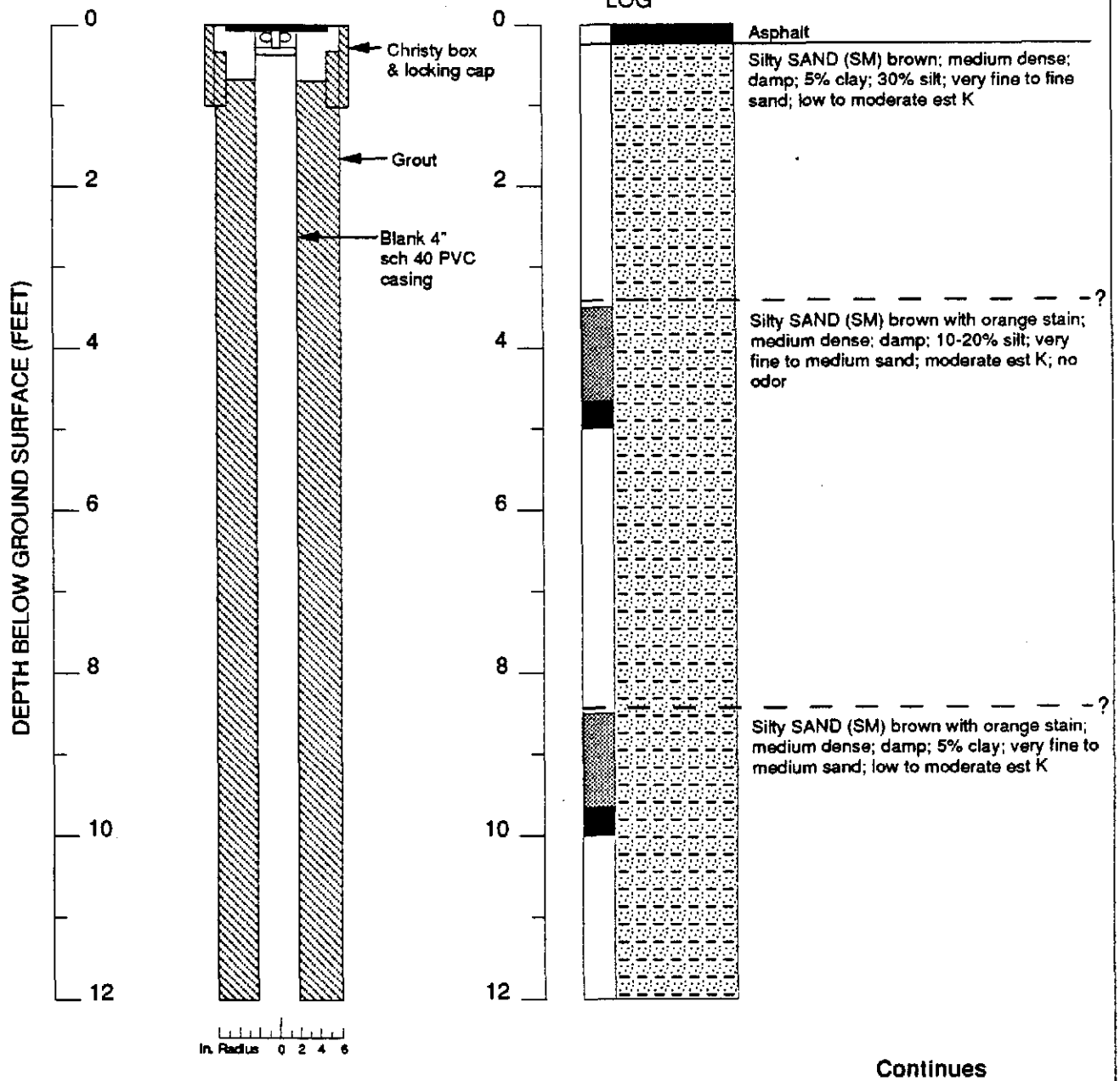
MONITOR WELL MW-2 (cont.)



Boring Log and Well Completion Details MW-2 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

MONITOR WELL MW-3



Continues

EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Gradational (hachured), uncertain (dashed) contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Grab sample

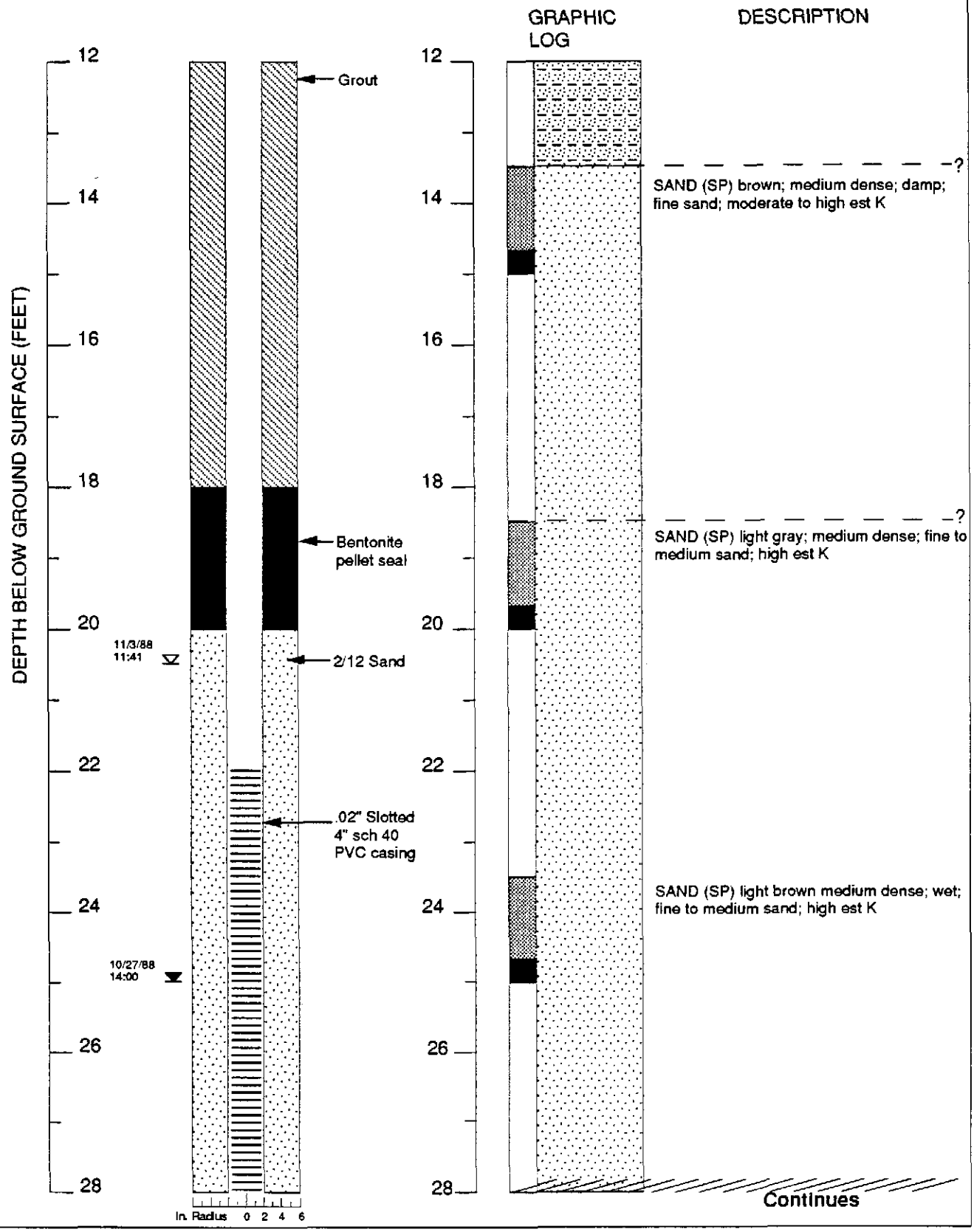
est K = Estimated permeability (hydraulic conductivity)

Logged by: Gail Jones
Supervisor: Tom Howard
Drilling Company: All Terrain
Driller: Wes
Drilling Method: Hollow stem auger
Dates Drilled: 10/27/88
Well Head Completion: Christy box & locking cap
Type of Sampler: 2" split barrel
TD: Drill depth = 35.5 ft

Boring Log and Well Completion Details MW-3
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

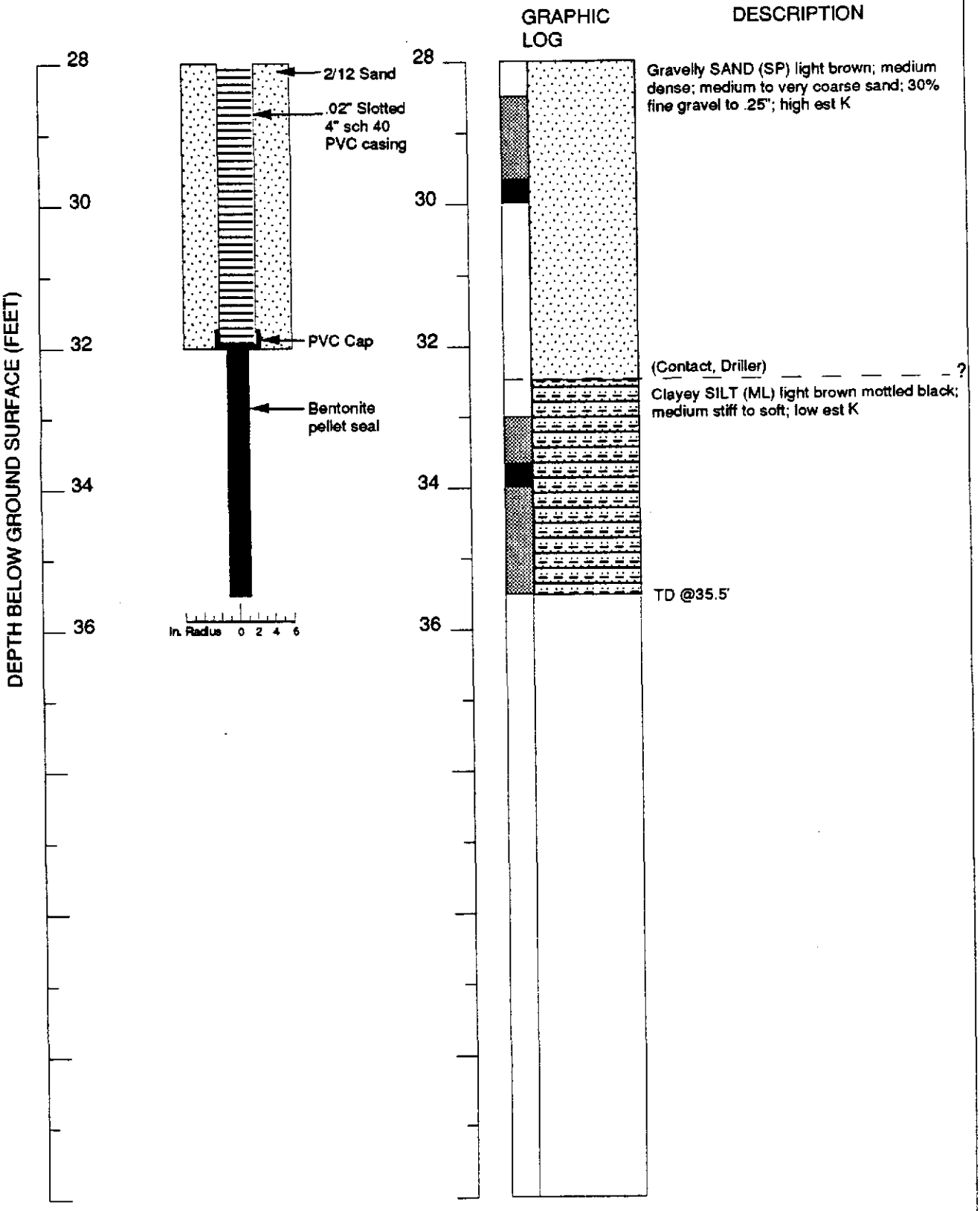
MONITOR WELL MW-3 (cont.)



Boring Log and Well Completion Details MW-3 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

MONITOR WELL MW-3 (cont.)



Boring Log and Well Completion Details MW-3 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

ATTACHMENT C

SOP-3: WELL INSTALLATION AND DEVELOPMENT

WESTERN GEOLOGIC RESOURCES INC.
STANDARD OPERATING PROCEDURES
RE: HOLLOW STEM AUGER MONITORING WELL INSTALLATION AND DEVELOPMENT
SOP 3

The boreholes for monitoring wells are drilled using a truck mounted hollow-stem-auger drill rig. The outside diameter (O.D.) of the borehole will be a minimum of two inches larger than the outside diameter when installing 4-in well screen. The hollow stem auger provides minimal interruption of drilling while permitting soil sampling at desired intervals. Soil samples are collected by hammering a conventional split barrel sampler containing pre-cleaned 2-in brass sample tubes. A geologist from Western Geologic Resources (WGR) continuously logs each borehole during drilling and constantly checks drill cuttings for odors. The sampler is rinsed between samples and steam-cleaned with all other drilling equipment between borings to prevent cross contamination.

Monitoring wells are cased with threaded, factory perforated and blank scheduled 40 PVC. The perforated interval consists of slotted casing generally 0.020-in slot size by 1.5-in long with 42 slots per foot. A PVC cap is fastened to the bottom of the casing with stainless steel screws; no solvents or cements are used. Centering devices may be affixed to the casing to assure even distribution of filter material and grout. The well casing is thoroughly washed and steam-cleaned prior to installation.

After setting the casing inside the hollow stem, sand or gravel filter material is poured into the annular space to fill from the bottom of the boring to 1 ft. above the perforated interval. A 1 to 2 foot thick bentonite plug is placed above this filter material to prevent grout from infiltrating down into the filter material. Neat cement containing about 5% bentonite is then tremied into the annular space above the bentonite plug to the surface. A lockable PVC cap is placed on each well head. Traffic rated Christy boxes are installed around the well for wells in parking lots and driveways while steel stove pipes are set over wells in landscaped areas.

After installation, the wells are thoroughly developed to remove residual drilling materials from the wellbore and to improve well performance by removing any fine material in the filter pack that can pass from the formation into the well. Well development techniques used include pumping, bailing, surging, swabbing, jetting, flushing and airlifting. All development water is collected in 55 gallon drums for temporary storage and analytic results. The developed water is then disposed of properly according to analytic results. To assure that cross contamination does not occur between wells during drilling and development, all development is steam-cleaned.

ATTACHMENT D

SOP-4: WATER SAMPLING

WESTERN GEOLOGIC RESOURCES INC.
STANDARD OPERATING PROCEDURES
RE: GROUND WATER SAMPLING
SOP 4

Prior to water sampling, each well is purged by evacuating a minimum of three well bore volumes of ground water or until the discharge water temperature, conductivity, and pH stabilize. The ground water sample should be taken when the water level in the well recovers to 80% of its static level.

The sampling equipment used consists of a teflon bailer or a stainless steel bladder pump with a teflon bladder. If the sampling system is dedicated to the well, then the bailer is made of teflon but the bladder pump is PVC with a polypropylene bladder. 40 ml glass volatile organic analysis (VOA) vials with teflon septa are used for sample containers.

The ground water sample is decanted into each VOA vial in such a manner that there is a minicus at the top of the vial. The cap is quickly placed over the top of the vial and tightened securely. The VOA vial is then inverted and tapped to see if air bubbles are present. If none are present the sample is labeled and refrigerated for delivery under chain of custody to the laboratory. Label information should include a sample identification number, job identification number, date, time, type of analysis requested and the sampler's name.

For quality control purposes a duplicate water sample is collected for each well. This sample is held at the laboratory unless needed. A trip blank is prepared at the laboratory and placed in the transport cooler. It remains with the cooler and is analyzed by the laboratory along with the ground water samples. A field blank is prepared in the field when sampling equipment is not dedicated. It is prepared after a pump or bailer has been steam-cleaned, prior to use in a second well and is analyzed along with the other samples. The field blank demonstrates the quality of field cleaning procedures to prevent cross-contamination.

To minimize the potential for cross-contamination between wells, all the well development and water sampling equipment that is not dedicated to the well is steam-cleaned between each well. As a second precautionary measure, wells will be sampled in order of least to highest concentrations as established by previous analysis.

ATTACHMENT E

CHAIN-OF-CUSTODY FORMS

CHAIN OF CUSTODY RECORD

BC Log Number _____

Client name	Project or PO#
WESTERN GEOTHERMIC RESOURCES	
Address	**Phone #**
City, State, Zip	**Report attention**

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sampled by / Sample description	Number of containers	Analyses required	Hazardous sample Special handling required	Remarks
	10/11/83		SW	[illegible]	1			[illegible]
				11.0	1			
				15.0	1			
				20.0	1			
				27.0	1			
				24.0	1			

	Signature	Print Name	Company	Date	Time
Relinquished by	[illegible]	[illegible]	[illegible]	10/12/83	7:11
Received by	[illegible]	[illegible]	[illegible]	10/12/83	1:14
Relinquished by	Gail M Jones	Gail M Jones	WGP	10/12/83	4:45
Received by					
Relinquished by					
Received by Laboratory	Frank Morris	Frank Morris	DHC Labs	10/26/83	9:46

BROWN AND CALDWELL LABORATORIES

- ☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
- ☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (818) 795-7553
- ☐ 1200 Pacifico Avenue, Anaheim, CA 92805

Note:
Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

CHAIN OF CUSTODY RECORD

BC Log Number 10.632

Client name: Western Geologic Resources	Project or PO#: 1-012.01	
Address:	Phone #: 451 7595	
City, State, Zip: San Rafael	Report attention: Tom Howard	

Sampled by:

Analyses required: 8015/8020 BTEX TPH; Hazardous sample Special handling required

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	Remarks
	10/21/88		SO	B-2-5.0	1	[illegible]
				B-2-10.0	1	
				B-2-15.0	1	
				B-2-19.0	1	
				B-2-20.0	1	
				B-2-25.0		
				B-2-30.0	1	
				[illegible]	1	[illegible] Turnaround
					1	
				[illegible]	1	
				B-2-20.0	1	
	10/21/88			B-2-25.0		

	Signature	Print Name	Company	Date	Time
Relinquished by	Gail M Jones	Gail M Jones	WGR	10/27/88	1:27
Received by					
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory	Monika Scott	Monika Scott	BCLAB	10.27.88	1:30pm

BROWN AND CALDWELL LABORATORIES

- ☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
- ☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (818) 795-7553
- ☐ 1200 Pacifico Avenue, Anaheim, CA 92805

Note:
Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

CHAIN OF CUSTODY RECORD

BC Log Number 10-6[illegible]2

Client name: Alameda County Water District	Project or PO# 1-012.01
Address	Phone # [illegible]
City, State, Zip	Report attention: John Knudsen

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sampled by / Sample description	Number of containers	Analyses required: 8015/8020 BTEX TPH	Hazardous sample Special handling required	Remarks
	10-27-98		SO	P-2 → P-3	1	✓ ✓		2 week turnaround
	10-27-98		SO	P-3 → P-4	1	✓ ✓		Hold

Signature	Print Name	Company	Date	Time
Relinquished by: Gil H Jones	Gil H Jones	ACE	10/27/98	1:27
Received by				
Relinquished by				
Received by				
Relinquished by				
Received by Laboratory: Monika Scott	Monika Scott	BC Labs	10-27-98	1:32 PM

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Note:
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*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

CHAIN OF CUSTODY RECORD

BC Log Number 88 11-086-4

Client name: W. G. R.	Project or PO#: 1-012.01
Address: 2169 E. Francisco Blvd. Ste B	Phone #: 457-7595
City, State, Zip: San Rafael, CA 94901	Report attention: Tom Howard

Sampled by: MF EB

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	EPA 624 + Xylene	EPA 8015	Fuel Characterization					Hazardous sample Special handling required	Remarks
	11/3/88	—	GW	1201 W, X, Y, Z	4	X	X	X						
		—		1202 W, X, Y, Z	4	X	X	X						
		—		1203 W, X, Y, Z	4	X	X	X						
		—	AQ	Travel Blanks	2	X								

	Signature	Print Name	Company	Date	Time
Relinquished by	Ed Buskirk	Ed Buskirk	W. G. R	11/3/88	15:37
Received by					
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory				11/3/88	15:37

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☐ 1200 Pacifico Avenue, Anaheim, CA 92805

Note:
Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

ATTACHMENT F

LABORATORY REPORTS

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E88-10-600

Received: 26 OCT 88
Reported: 07 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
10-600-1	B-1-5.0	26 OCT 88
10-600-2	B-1-10.0	26 OCT 88
10-600-3	B-1-15.0	26 OCT 88
10-600-4	B-1-20.0	26 OCT 88
10-600-5	B-1-29.0	26 OCT 88

PARAMETER	10-600-1	10-600-2	10-600-3	10-600-4	10-600-5
BTX by PID (EPA-8020)					
Benzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Ethylbenzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Xylene Isomers, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Fuel Hydrocarbons					
Date Analyzed	11.01.88	11.01.88	11.01.88	11.01.88	11.01.88
Total Fuel Hydrocarbons, mg/kg	<10	<10	<10	<10	<10
Other Total Fuel Hydrocarbons	---	---	---	---	---

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NOV 09 1988

Approved _____
Job # _____
Copy To Tom

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ANALYTICAL REPORT

LOG NO: E88-10-600

Received: 26 OCT 88
Reported: 07 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
10-600-6	B-1-34.0	26 OCT 88

PARAMETER	10-600-6
Sample Held, Not Analyzed	HELD

Sim D. Lessley, Ph.D., Laboratory Director

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E88-10-632

Received: 27 OCT 88
Reported: 10 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
10-632-1	B-2-5.0	27 OCT 88
10-632-2	B-2-10.0	27 OCT 88
10-632-3	B-2-15.0	27 OCT 88
10-632-4	B-2-19.0	27 OCT 88
10-632-5	B-2-20.0	27 OCT 88

PARAMETER	10-632-1	10-632-2	10-632-3	10-632-4	10-632-5
BTX by PID (EPA-8020)					
Benzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Ethylbenzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Xylene Isomers, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Fuel Hydrocarbons					
Date Analyzed	11.01.88	11.01.88	11.01.88	11.01.88	11.01.88
Fuel Characterization, .	---	---	---	OIL	---
Total Fuel Hydrocarbons, mg/kg	<10	<10	<10	12	<10

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NOV 14 1988
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Job # 1012.01
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ANALYTICAL REPORT

LOG NO: E88-10-632

Received: 27 OCT 88
Reported: 10 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
10-632-6	B-2-25.0	27 OCT 88
10-632-8	B-3-5.0	27 OCT 88
10-632-9	B-3-10.0	27 OCT 88
10-632-10	B-3-15.0	27 OCT 88
10-632-11	B-3-20.0	27 OCT 88

PARAMETER	10-632-6	10-632-8	10-632-9	10-632-10	10-632-11
BTX by PID (EPA-8020)					
Benzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Ethylbenzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Xylene Isomers, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Fuel Hydrocarbons					
Date Analyzed	11.01.88	11.02.88	11.02.88	11.02.88	11.02.88
Total Fuel Hydrocarbons, mg/kg	<10	<10	<10	<10	<10
Other Total Fuel Hydrocarbons	---	---	---	---	---

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ANALYTICAL REPORT

LOG NO: E88-10-632

Received: 27 OCT 88
Reported: 10 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
10-632-12	B-3-25.0	27 OCT 88
10-632-13	B-3-30.0	27 OCT 88

PARAMETER	10-632-12	10-632-13
BTX by PID (EPA-8020)		
Benzene, mg/kg	<0.3	<0.3
Ethylbenzene, mg/kg	<0.3	<0.3
Toluene, mg/kg	<0.3	<0.3
Total Xylene Isomers, mg/kg	<0.3	<0.3
Total Fuel Hydrocarbons		
Date Analyzed	11.01.88	11.01.88
Total Fuel Hydrocarbons, mg/kg	<10	<10
Other Total Fuel Hydrocarbons	---	---

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ANALYTICAL REPORT

LOG NO: E88-10-632

Received: 27 OCT 88
Reported: 10 NOV 88

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San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
10-632-7	B-2-30.0	27 OCT 88
10-632-14	B-3-34.0	27 OCT 88

PARAMETER	10-632-7	10-632-14
Sample Held, Not Analyzed	HELD	HELD

Sim D. Lessley, Ph.D., Laboratory Director

BROWN AND CALDWELL LABORATORIES
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ANALYTICAL REPORT

LOG NO: E88-11-086

Received: 03 NOV 88
Reported: 17 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-086-1	1201	03 NOV 88
11-086-2	1202	03 NOV 88
11-086-3	1203	03 NOV 88

PARAMETER	11-086-1	11-086-2	11-086-3
Total Fuel Hydrocarbons			
Date Analyzed	11.14.88	11.14.88	11.14.88
Total Fuel Hydrocarbons, mg/L	<1.0	<1.0	<1.0
Other Total Fuel Hydrocarbons	---	---	---

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ANALYTICAL REPORT

LOG NO: E88-11-086

Received: 03 NOV 88
Reported: 17 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-086-1	1201	03 NOV 88
11-086-2	1202	03 NOV 88
11-086-3	1203	03 NOV 88

PARAMETER	11-086-1	11-086-2	11-086-3
Purgeable Priority Pollutants			
Date Extracted	11.11.88	11.11.88	11.11.88
1,1,1-Trichloroethane, ug/L	<1	<1	<1
1,1,2,2-Tetrachloroethane, ug/L	<1	<1	<1
1,1,2-Trichloroethane, ug/L	<1	<1	<1
1,1-Dichloroethane, ug/L	<1	<1	<1
1,1-Dichloroethylene, ug/L	<1	<1	<1
1,2-Dichloroethane, ug/L	<1	<1	<1
1,2-Dichloropropane, ug/L	<1	<1	<1
1,3-Dichloropropene, ug/L	<1	<1	<1
2-Chloroethylvinylether, ug/L	<10	<10	<10
Acrolein, ug/L	<10	<10	<10
Acrylonitrile, ug/L	<1	<1	<1
Bromodichloromethane, ug/L	<1	<1	<1
Bromomethane, ug/L	<1	<1	<1
Benzene, ug/L	<1	<1	<1
Chlorobenzene, ug/L	18	3	8
Carbon Tetrachloride, ug/L	<1	<1	<1
Chloroethane, ug/L	<1	<1	<1
Bromoform, ug/L	7	2	6
Chloroform, ug/L	<1	<1	<1
Chloromethane, ug/L	<1	<1	<1
Dibromochloromethane, ug/L			

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Mr. Tom Howard
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2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-086-1	1201	03 NOV 88
11-086-2	1202	03 NOV 88
11-086-3	1203	03 NOV 88

PARAMETER	11-086-1	11-086-2	11-086-3
Ethylbenzene, ug/L	<1	<1	<1
Methylene chloride, ug/L	<1	<1	<1
Tetrachloroethylene, ug/L	<1	34	84
Trichloroethylene, ug/L	<1	3	3
Trichlorofluoromethane, ug/L	<1	<1	<1
Toluene, ug/L	<1	<1	<1
Vinyl chloride, ug/L	<1	<1	<1
trans-1,2-Dichloroethylene, ug/L	<1	10	5
trans-1,3-Dichloropropene, ug/L	<1	<1	<1
2-Hexanone, ug/L	<1	<1	<1
Acetone, ug/L	<10	<10	<10
Carbon Disulfide, ug/L	<1	<1	<1
Freon 113, ug/L	<1	<1	<1
Methyl ethyl ketone, ug/L	<20	<20	<20
Methyl isobutyl ketone, ug/L	<1	<1	<1
Styrene, ug/L	<1	<1	<1
Vinyl acetate, ug/L	<1	<1	<1
Total Xylene Isomers, ug/L	<1	<1	<1

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ANALYTICAL REPORT

LOG NO: E88-11-086

Received: 03 NOV 88
Reported: 17 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
11-086-4	Travel Blank	03 NOV 88

PARAMETER	11-086-4
Purgeable Priority Pollutants	
Date Extracted	11.14.88
1,1,1-Trichloroethane, ug/L	<1
1,1,2,2-Tetrachloroethane, ug/L	<1
1,1,2-Trichloroethane, ug/L	<1
1,1-Dichloroethane, ug/L	<1
1,1-Dichloroethylene, ug/L	<1
1,2-Dichloroethane, ug/L	<1
1,2-Dichloropropane, ug/L	<1
1,3-Dichloropropene, ug/L	<1
2-Chloroethylvinylether, ug/L	<1
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Bromodichloromethane, ug/L	<1
Bromomethane, ug/L	<1
Benzene, ug/L	<1
Chlorobenzene, ug/L	<1
Carbon Tetrachloride, ug/L	<1
Chloroethane, ug/L	<1
Bromoform, ug/L	<1
Chloroform, ug/L	<1
Chloromethane, ug/L	<1
Dibromochloromethane, ug/L	<1
Ethylbenzene, ug/L	<1
Methylene chloride, ug/L	<1

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ANALYTICAL REPORT

LOG NO: E88-11-086

Received: 03 NOV 88
Reported: 17 NOV 88

Mr. Tom Howard
Western Geologic Resources, Inc.
2169 East Francisco, Suite B
San Rafael, California 94901

Project: 1-012.01

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
11-086-4	Travel Blank	03 NOV 88

PARAMETER	11-086-4
Tetrachloroethylene, ug/L	<1
Trichloroethylene, ug/L	<1
Trichlorofluoromethane, ug/L	<1
Toluene, ug/L	<1
Vinyl chloride, ug/L	<1
trans-1,2-Dichloroethylene, ug/L	<1
trans-1,3-Dichloropropene, ug/L	<1
2-Hexanone, ug/L	<10
Acetone, ug/L	<1
Carbon Disulfide, ug/L	<1
Freon 113, ug/L	<20
Methyl ethyl ketone, ug/L	<1
Methyl isobutyl ketone, ug/L	<1
Styrene, ug/L	<1
Vinyl acetate, ug/L	<1
Total Xylene Isomers, ug/L	

Sim D. Lessley, Ph.D., Laboratory Director