TERRA VAC
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FIRST
RA

March 26, 1997

Jennifer Eberle
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, CA 94502-6577

Re: No Further Action Requests- draft addendums/revisions
Former Chevron Stations 9-4587, 9-4516
Oak Street, Oakland, CA
14th Street, Oakland, CA

Dear Ms. Eberle:

Enclosed are: 1) a draft addendum to the November 12, 1996, Final Report on the 609 Oak Street Chevron site, and; 2) a revised draft copy of the Final Report for the 14 th Street Chevron site. We have supplied additional data and attempted to clarify those items you requested and had discussed with Mark Frye. Because groundwater data for the remainder of 1996 is now available, that information has also been utilized to further show the low risk remaining at the sites.

Sincerely,
Terra Vac Corporation

Robert Dahl
Project Manager

cc: Phil Briggs, Chevron
30-0219.20

Addendum to Request for No Further Active Remediation
Former Chevron Station 3-4587
609 Oak Street
Oakland, California

DRAFT

This addendum attempts to clarify information presented in the Final Remediation and Request for No Further Active Remediation Report, prepared by Terra Vac for Chevron and dated November 12, 1996, for the 609 Oak Street, Oakland site. Additional background information is also provided. Pages are referenced where clarification was requested.

p. 3 : The capillary fringe noted to be present at the interface of the vadose and saturated zones, is considered to be saturated.

p. 4 : Attached is a table listing all soil sample results for TPHg and benzene. The average TPHg concentration of 400 ppm applies to the 2.5-3 foot depth and was derived by averaging the six samples collected around the fuel islands when excavating the piping. That soil was actually removed/aerated. To remain with a very conservative approach, total pounds were calculated based on a 1000 ppm average. The average benzene concentration utilized for RBCA modelling was based on the documented vadose zone samples of a composite sample taken at 7 feet bgs in 1987 with 150 ppm benzene, and the five foot samples at CR-1, DVSP-4 and SP7. Half the detection limit was used for those samples reported as below detection limits. The resulting benzene average, with a 90 percent upper confidence limit, was 5 mg/kg. Had the benzene concentrations for the samples collected during excavation and removal of the fuel pipelines also been utilized, an even lower average of 0.4 mg/kg would have been calculated.

A more realistic average can be attained by factoring both the expected degradation over time since the 1987 sample was collected and the reasonable assumption that of the 4500 pounds removed by the DVE system, twenty five percent (1100 pounds vs a conservative estimate of 1300 pounds in the area) came from this impacted soil area. The removal efficiency of the system for the area can be seen from the initial high vapor concentration at DVSP-5 of 34 mg/l TPH decreasing by 95 percent to 1.7 mg/l in the vapor stream. Utilizing a conservative benzene degradation half-life rate of 720 days (*Handbook of Environmental Degradation Rates*, by Howard, Boethling, Jarvis, Meylan, and Michalenko, 1991), residual benzene after 10 years may be estimated to be 5 mg/kg. Assuming 95 percent removal via active remediation, 0.25 mg/kg benzene may remain in a very localized area. This figure then brings the representative subsurface soil concentration to 0.085 mg/kg benzene.

p. 5 : Section 3.2.4 The soil volume cited of 45 x 45 x 6 feet is based on an areal extent of 45 by 45 feet and an impacted depth of 6 feet (between 2.5 and 8.5 feet bgs),

since 2.5 feet of soil at the surface were removed or aerated and we've defined saturated soils as beginning at 8.5 feet below surface.

p. 5 : Section 3.3 **The average** benzene concentration was derived by using all **available sample data for C-1, C-2 and CR-1 from the second quarter of 1995** to the **second quarter of 1996.** These wells are the only existing wells that had significant dissolved concentrations. Had we used more of the onsite wells, the representative concentration would have been much lower. Every reported value was used, with half the detection limit utilized for those values reported as less than detection limits. This earlier high concentration data was utilized not just to be conservative but also to have a large enough sample set to be meaningful.

Utilizing the now available groundwater data at these same wells for all of 1996 only, inputting detection limit values for those reported as under detection limits, and eliminating the earlier data, the representative concentration would be 0.0039 mg/l, substantially below the site specific target level for the potential exposure pathways for groundwater.

In the final two quarters of 1996, most of the wells associated with the site have indicated less than detection limits of dissolved benzene in groundwater and no wells have contained greater than 4.2 ppb benzene in the time period.

p. 9 : Section 5.2. DVSP-6 and DVSP-7 should read SP-6 and SP-7. The 160 mg/kg benzene found at 9.7 feet bgs at SP-6 is considered to be in the saturated zone. Well logs note encountering water at near 10 feet bgs, and groundwater monitoring data from the previous day (12/19/95) indicates a depth to water of 8.75 feet bgs at nearby CR-1.

Well Survey : All wells within 1/2 mile of the site were located through the Alameda County Public Works, which provided a printout of permitted wells on August 26, 1996. A copy of the printout is included.

Risk Based Corrective Action, GSI Software

"The RBCA Spreadsheet System is designed to complete all calculations required for Tier 1 and Tier 2 of the RBCA planning process, as defined in ASTM E-1739 "Standard for Risk-Based Corrective Action at Petroleum Release Sites." Risk assessment procedures employed are consistent with current U.S. EPA guidelines." (*Appendix A, Guidance Manual for Risk-Based Corrective Action*, Groundwater Services Inc., Houston, Texas).

Under Tier 2, Site Specific Target Levels (SSTLs) for soil and groundwater cleanup goals are determined on the basis of site-specific information and/or points of exposure, utilizing a spreadsheet system of linked worksheets in Microsoft Excel 5.0. Simple

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analytical models are employed in conjunction with additional site data to calculate Tier 2 SSTL values consistent with EPA recommended practices. The printout included titled Default Parameters, shows all data used in the modelling formulas. Those figures in italics are inputted site-specific data. Default values are set at the most conservative level, so if site specific data is not available, values used will calculate the most protective limits regardless. If MCL's are designated as the offsite exposure limit at a specific distance, the model will then back calculate the value onsite that would result in exceeding MCL at the point of compliance offsite. Federal MCLs are default values so the California benzene MCL of 0.001 mg/l was an additional site specific change to the program. 1ppb

gw

The goal of the Tier 2 evaluation is to determine whether or not remedial measures (additional measures in this case) will be required to meet target risk limits at relevant points of exposure. The 1996 data for wells C-1, C-2 and CR-1, with the resulting worksheet 9.3 here included, shows that the representative concentration onsite of 0.0039 mg/l benzene is five orders of magnitude (100,000) times less than the SSTL for groundwater volatilization to indoor air, and that to exceed MCLs at 1000 feet offsite, solubility limits would have to be exceeded onsite. Historical groundwater data generally support the model in that wells C-6 and C-7 at 80 feet down or cross gradient from the site have been below detection limits for benzene since 1994 with only a total of five samples above detection limits (with a maximum of 9.3 ppb) since 1989. benzene?

→ what is it?

soil

Subsurface soil values, using 0.0825 mg/kg benzene as representative, are four orders of magnitude (10,000 times) less than the SSTL of 610 mg/kg, for volatilzation to indoor air (RBCA worksheet 9.2).

C1-C3 incl. 1988 documents
7-19-83 GR ltr

Table 1

Soil Sample Results, mg/kg
Chevron 9-4587, Oakland

Boring	Depth	Date	TPH-g	Benzene	Toluene	Ethylbenzene	Xylenes
87087T3#2&3	7	3/27/87	1300	150	430	na	270
C-4	10.5	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
C-4	15.5	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
C-5	10.5	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
C-5	15.5	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
C-6	9	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
C-6	15	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
CR-1	5	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
CR-1	10	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
CR-1	15	9/19/90	<1	<0.05	<0.05	<0.05	<0.05
Tank pull				0.26			
SE	11.5	10/17/94	600	3.6	11	9	37
SW	9	10/17/94	18	0.093	0.16	0.36	1.2
ES	10	10/17/94	42	0.24	0.22	0.32	1.6
EN	11	10/17/94	2	0.27	0.12	0.023	0.12
NE	10.5	10/17/94	3700	27	200	69	400
NW	10.5	10/17/94	5	0.52	0.16	0.091	0.44
WN	10.5	10/17/94	40	0.2	0.12	0.8	2.4
P-1	3	10/17/94	1400	5	82	30	220
P-2	2.5	10/17/94	260	0.26	3	1.7	16
P-3	2.5	10/17/94	380	<0.1	15	5.9	39
P-4	2.5	10/17/94	410	0.36	4.4	2.3	33
P-5	2.5	10/17/94	<1	<0.005	<0.005	<0.005	<0.005
P-6	3	10/17/94	29	0.021	0.042	0.091	0.16
DVE-1	10.3	7/12/95	<1	0.31	0.098	0.025	0.12
DVE-2	14	7/11/95	7.6	1	0.032	0.43	1.3
DVE-3	10.2	7/10/95	<1	0.13	0.071	0.021	0.082
DVE-4	10.1	7/11/95	2.8	0.24	<0.005	0.1	0.16
DVE-5	18.8	7/11/95	5.6	0.045	0.055	0.26	1.3
DVSP1	15.5	7/11/95	8.5	4.2	<0.005	0.1	0.16
DVSP2	10.5	7/11/95	<1	0.066	<0.005	0.0096	<0.005
DVSP3	15.5	7/10/95	<1	0.012	0.0082	0.0074	0.045
DVSP4	5.5	7/10/95	<1	<0.005	<0.005	<0.005	<0.005
DVSP5	10.5	7/12/95	700	15	8.3	25	140
(DN) SP6	9.7	12/20/95	11,000	160	1,300	300	1,600
SP6	14.7	12/20/95	4.4	0.81	0.22	0.24	0.56
SP7	4.7	12/20/95	<1	<0.005	<0.005	<0.005	<0.005
SP7	9.3	12/20/95	1.2	<0.005	0.038	0.009	0.032
SP7	14.3	12/20/95	3.1	1.2	0.068	0.19	0.18
SP7	19.3	12/20/95	<1	<0.005	0.0086	<0.005	0.067
SP7	24.3	12/20/95	<1	<0.005	<0.005	<0.005	<0.005
C-7	9.5	2-1-91	<1	<0.005			
C-7	15.0	2-1-91	<1	<0.005	0.010	<0.005	0.015

Well list GSI 11-30-90

interim removal borings

* samples above 9.5' were used for avg benz calc.

RBCA Worksheets
Worksheet 9.2- Subsurface Soils (rep. concentration assumes residual of 0.25 mg/kg at 1987 dispenser line leak area)
Worksheet 9.3- Groundwater (C-1, C-2 and CR-1 1996 data only)

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 9.2**

Site Name: Chevron 9-4587
Completed By. R.A. Dahl
Site Location: Oak Street, Oakland
Date Completed: 8/21/1996

SUBSURFACE SOIL SSTL VALUES (> 3 FT BGS)

Target Risk (Class A & B) 2.9E-7 ■ MCL exposure limit?
Target Risk (Class C) 1.0E-5 ■ PEL exposure limit?
Target Hazard Quotient 1.0E+0

Calculation Option: 2

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration		Soil Leaching to Groundwater			X	Soil Volatilization to Indoor Air		X	Soil Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)		Residential: (on-site)	Commercial: (on-site) (PEL)		Residential: (on-site)	Commercial: (PEL) (on-site)		(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene	8.5E-2	NA	NA	NA		NA	6.1E+2		NA	>Res		6.1E+2	☐	<1

= .085ppm

610 ppm

Software: GSI RBCA Spreadsheet Serial: G-337-YAX-542
Version: v 1.0

This is based on using biodeg rate for 1987 sample.

They used UCL mean instead of avg, which is fine if you have lg # samples. But Madhulla said it's not ok, bec not enough samples.

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 9.3**

Site Name: Chevron 9-4587
Site Location: Oak Street, Oakland

Completed By: R.A. Dahl
Date Completed: 3/20/1997

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 2.9E-7
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

■ MCL exposure limit?
■ PEL exposure limit?

Calculation Option: 2

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	X Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		X Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: 1000 feet	Commercial: (on-site)	Regulatory(MCL): 1000 feet	Residential: (on-site)	Commercial: (on-site) (PEL)	Residential (on-site)	Commercial: (on-site) (PEL)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	3.5E-3	>Sol	NA	>Sol	NA	3.8E+2	NA	>Sol	3.8E+2	☐	<1

≈ .0035mg/L = 3.5ppb

380 ppb

< 380ppm

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-337-YAX-542

using PEL

Site Name: Chevron 9-4587
Site Location: Oak Street, Oakland

Completed By: R.A. Dahl
Date Completed: 3/20/1997

TIER 2 GROUNDWATER CONCENTRATION DATA SUMMARY

CONSTITUENTS DETECTED		Analytical Method			Detected Concentrations		
CAS No.	Name	Typical Detection Limit (mg/L)	No. of Samples	No. of Detects	Maximum Conc. (mg/L)	Mean Conc. (mg/L)	UCL on Mean Conc. (mg/L)
71-43-2	Benzene	5.0E-03	9	9	3.8E-02	1.4E-03	3.5E-03

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Chevron 9-4587 | Job Identification: 30-0219 | Software: GSI RBCA Spreadsheet
Site Location: Oak Street, Oakland | Date Completed: 3/20/97 | Version: v 1 0
Completed By: R.A. Dahl

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined

DEFAULT PARAMETERS

Exposure Parameter	Definition (Units)	Residential Adult	Residential (1-6yrs)	Residential (1-16 yrs)	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (l/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa.in	Inhalation rate indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5 8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2-yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)	***FALSE***				
gwMCL?	Use MCL as exposure limit in groundwater?	TRUE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Groundwater Pathways:				
GW.i	Groundwater Ingestion	TRUE	FALSE	
GW.v	Volatilization to Outdoor Air	FALSE	TRUE	
GW.b	Vapor Intrusion to Buildings	FALSE	TRUE	
Soil Pathways				
S.v	Volatiles from Subsurface Soils	FALSE	TRUE	
SS.v	Volatiles and Particulate Inhalation	FALSE	TRUE	FALSE
SS.d	Direct Ingestion and Dermal Contact	FALSE	TRUE	FALSE
S.l	Leaching to Groundwater from all Soils	FALSE	FALSE	
S.b	Intrusion to Buildings - Subsurface Soils	FALSE	TRUE	

Matrix of Receptor Distance and Location on- or off-site		Residential Distance	Residential On-Site	Commercial/Industrial Distance	Commercial/Industrial On-Site
GW	Groundwater receptor (cm)	3 0E+04	FALSE	3 0E+04	FALSE
S	Inhalation receptor (cm)		FALSE		TRUE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	***2.9E-07***	
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	
Opt	Calculation Option (1, 2, or 3)	2	
Tier	RBCA Tier	2	

Surface Parameters	Definition (Units)	Residential	Commercial/Industrial Chronic	Commercial/Industrial Construction
t	Exposure duration (yr)	30	25	1
A	Contaminated soil area (cm^2)	***1.9E+06***		1.0E+06
W	Length of affected soil parallel to wind (cm)	***1.2E+03***		1.0E+03
W gw	Length of affected soil parallel to groundwater (c	***1.4E+03***		
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02		
delta	Air mixing zone height (cm)	2.0E+02		
Lss	Definition of surficial soils (cm)	***9.1E+01***		
Pe	Particulate areal emission rate (g/cm^2/s)	2 2E-10		

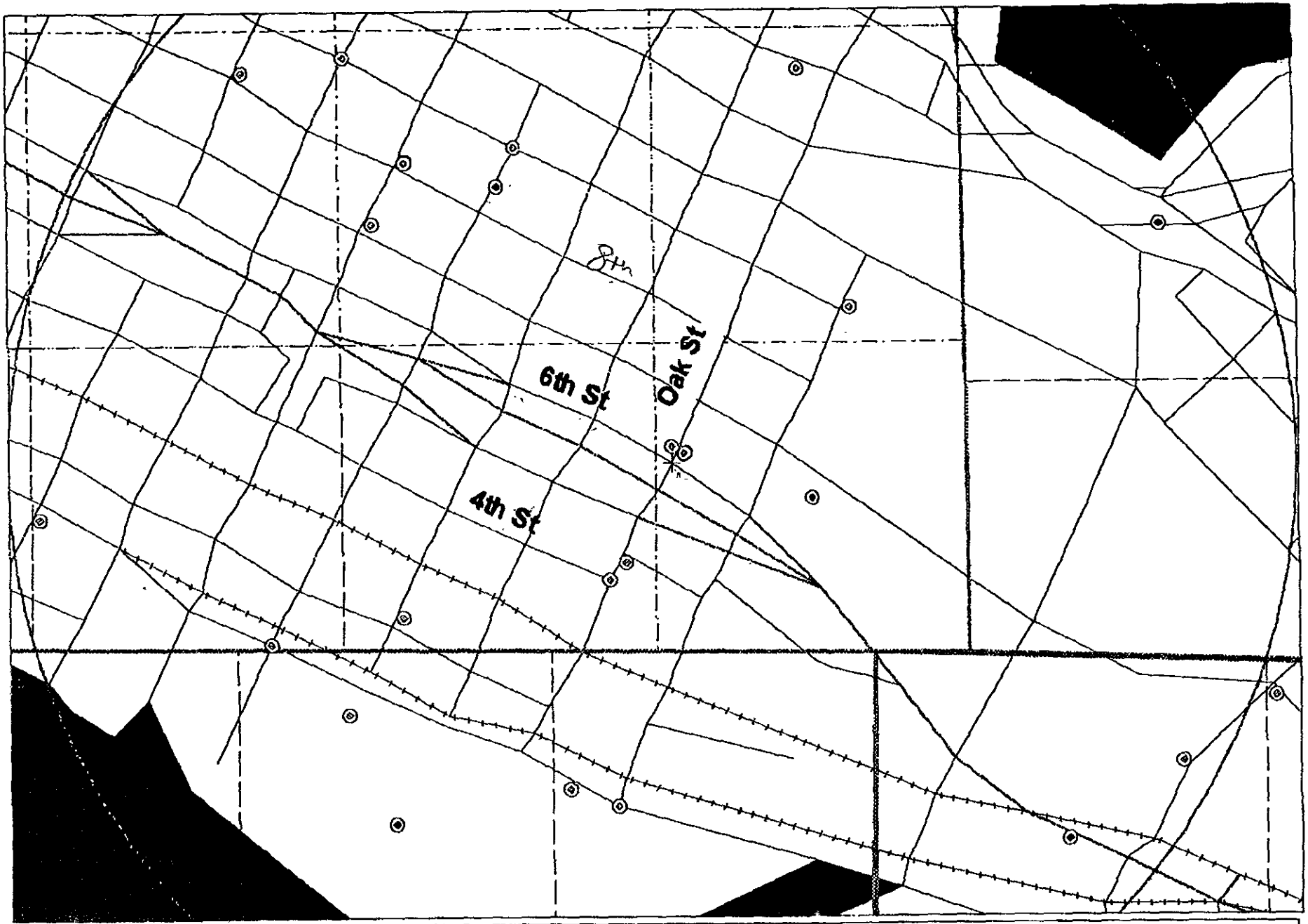
Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater infiltration rate (cm/yr)	3 0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	***1.9E+02***
Ugw.tr	Groundwater Transport velocity (cm/yr)	***5.0E+02***
Ks	Saturated Hydraulic Conductivity(cm/s)	
grad	Groundwater Gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	1.8E+03
Sd	Depth of groundwater source zone (cm)	3 0E+02
BC	Biodegradation Capacity (mg/L)	
BIO?	Is Bioattenuation Considered	TRUE
phi.eff	Effective Porosity in Water-Bearing Unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1 0E-03

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	***3.0E+00***		
hv	Vadose zone thickness (cm)	***2.6E+02***		
rho	Soil density (g/cm^3)	1 7		
foc	Fraction of organic carbon in vadose zone	0 01		
phi	Soil porosity in vadose zone	0 38		
Lgw	Depth to groundwater (cm)	***2.6E+02***		
Ls	Depth to top of affected soil (cm)	***7.6E+01***		
Lsubs	Thickness of affected subsurface soils (cm)	***1.7E+02***		
pH	Soil/groundwater pH	6 5		
		capillary	vadose	foundation
phi.w	Volumetric water content	0 342	0.12	0 12
phi.a	Volumetric air content	0.038	0 26	0.26

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2 0E+02	3 0E+02
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1 5E+01	
eta	Foundation crack fraction	0.01	

Dispersive Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersion coefficient (cm)	3.0E+03	
ay	Transverse dispersion coefficient (cm)	1.0E+03	
az	Vertical dispersion coefficient (cm)	1 5E+02	
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

Registered Wells Within 1/2 Miles of Site
ALAMEDA COUNTY PUBLIC WORKS
August 26, 1996



1/2 MILE RADIUS
08/26/1996

WELL #	CITY	ADDRESS	OWNER	PHONE	USE	DR.DATE	DIAM	TOT.DEPTH	DTW	ST.ELEV	WA.ELEV	YIELD	LOG	WQ	WL	DATAORGN	MARGIN
1S/4W 35G66	OAK	1220 Harrison St	Frank G. Mar Assoc MW-1	0	MON	4/92	2	36	24	0	0	0	D	0	0	D	
1S/4W 35H	OAK	165 13TH ST	ALAMEDA COUNTY SERVICES	0	BOR	03/89	10	16	0	0	0	0	G	0	0	L	
1S/4W 35H 1	OAK	ALICE & 14 ST	MOOSE CLUB	0	ABN	/27	0	150	21	37	0	0	?	0	1	L	
1S/4W 35H 2	OAK	165 13TH ST	ALAMEDA COUNTY SERVICES	0	MON	03/89	4	35	23	0	0	0	G	0	0	L	
1S/4W 35H 3	OAK	165 13TH ST	ALAMEDA COUNTY SERVICES	0	MON	03/89	2	24	23	0	0	0	G	0	0	L	
1S/4W 35H 4	OAK	165 13TH ST	ALAMEDA COUNTY SERVICES	0	MON	03/89	2	35	23	0	0	0	G	0	0	L	
1S/4W 35H 5	OAK	165 13TH ST	ALAMEDA COUNTY SERVICES	0	MON	03/89	4	35	24	0	0	0	G	0	0	L	
1S/4W 35H 6	OAK	165 13th Street	Alameda County Services	0	MON	10/92	2	20	7	0	0	0	D	0	0	D	
1S/4W 35J 1	OAK	125 12th Street	Western Union	0	DOM	5/91	6	33	6	0	0	3	D	0	0	D	
1S/4W 35K	OAK	800 Harrison Street	Unocal Corporation	0	MON	6/91	2	33	23	0	0	0	G	0	0	D	
1S/4W 35K	OAK	706 HARRISON	?	0	BOR	10/88	0	15	0	0	0	0	G	0	0	L	
1S/4W 35K 1	OAK	6 & HARRISON ST	PACIFIC GAS AND ELECTRIC	0	CAT	6/73	0	120	0	0	0	0	D	0	0	L	
1S/4W 35K 2	OAK	9TH ST & ALICE ST	FIRE STATION #12	0	MON	06/89	2	37	22	100	0	0	G	0	0	L	
1S/4W 35K 3	OAK	Webster St. & 9th St.	City of Oakland	0	TES	11/90	4	46	29	0	0	0	G	0	0	D	
1S/4W 35K 4	OAK	Webster & 9th Streets	City of Oakland Redvlpmnt	0	MON	7/90	4	37	30	39	9	0	G	0	0	D	
1S/4W 35K 5	OAK	800 Harrison St	Unocal Corp MW1	0	MON	5/91	2	35	24	0	0	0	G	1	1	D	
1S/4W 35K 6	OAK	800 Harrison St	Unocal Corp MW2	0	MON	5/91	2	33	22	0	0	0	G	1	1	D	
1S/4W 35K 7	OAK	800 Harrison St	Unocal Corp MW3	0	MON	5/91	2	33	23	0	0	0	G	1	1	D	
1S/4W 35K 8	OAK	800 Harrison St.	Unocal #0752 MW-7	0	MON	4/93	2	33	22	0	0	0	G	0	0	D	
1S/4W 35K 9	OAK	800 Harrison St.	Unocal #0752 MW-8	0	MON	4/93	2	31	21	0	0	0	G	0	0	D	
1S/4W 35K10	OAK	800 Harrison Street	Unocal Corporation MW4	0	MON	9/92	2	33	23	0	0	0	G	0	0	D	
1S/4W 35K11	OAK	800 Harrison Street	Unocal Corporation MW5	0	MON	10/92	2	32	23	0	0	0	G	0	0	D	
1S/4W 35K12	OAK	800 Harrison Street	Unocal Corporation MW6	0	MON	10/92	2	32	22	0	0	0	G	0	0	D	
1S/4W 35L	OAK	800 FRANKLIN ST	BILL LOUIE	0	BOR	05/88	0	28	28	35	7	0	G	0	0	L	
1S/4W 35L	OAK	800 Franklin St	Tom Chiu B-1	0	BOR*	9/91	0	30	25	0	0	0	G			D	
1S/4W 35L 2	OAK	800 Franklin Street	Alex Shaw, Dynagroup	0	MON	9/89	2	35	23	33	10	0	G	0	1	D	
1S/4W 35L 3	OAK	800 Franklin Street	Alex Shaw, Dynagroup	0	MON	9/89	2	35	23	34	11	0	G	0	1	D	
1S/4W 35L 4	OAK	800 Franklin Street	Alex Shaw, Dynagroup	0	MON	9/89	2	34	24	34	10	0	G	0	1	D	
1S/4W 35L 5	OAK	Webster St. & 9th St.	City of Oakland	0	MON	12/89	4	38	28	37	9	0	G	0	0	D	
1S/4W 35L 6	OAK	Webster & 9th St.	City of Oakland	0	MON	1/91	4	40	19	0	0	0	D	0	0	D	
1S/4W 35L 7	OAK	Webster & 9th St.	City of Oakland	0	PIE	11/90	2	37	0	0	0	0	?	0	0	D	
1S/4W 35L 8	OAK	Webster & 9th St.	City of Oakland	0	PIE	11/90	2	37	0	0	0	0	?	0	0	D	
1S/4W 35L 9	OAK	Webster & 9th Streets	City of Oakland Redvlpmnt	0	MON	8/90	4	19	15	0	0	0	G	0	0	D	
1S/4W 35L10	OAK	Webster & 9th Streets	City of Oakland Redvlpmnt	0	MON	8/90	4	19	15	0	0	0	G	0	0	D	
1S/4W 35L11	OAK	800 Franklin St	Tom Chiu MW-4	0	MON	10/91	2	35	25	0	0	0	G	0	0	D	
1S/4W 35L12	OAK	800 Franklin St	Tom Chiu MW-5	0	MON	10/91	2	35	26	0	0	0	G	0	0	D	
1S/4W 35L80	OAK	9th and Webster Streets	City of Oakland Redevelop	0	DES	1/90	6	45	0	0	0	0	?	0	0	D	
1S/4W 35M	OAK	424 MARTIN LUTHER KING JR	TEXACO (2-BORINGS)	0	BOR	8/87	7	20	14	0	0	0	D			L	Yes
1S/4W 35M 1	OAK	7 ST	CO. COURTHOUSE (JAIL)	0	GEO*	6/76	0	0	0	0	0	0	G	0	0	L	Yes
1S/4W 35M 1	OAK	424 MLK JR. WAY	TEXACO REF. & MARK. INC.	0	DES	8/87	2	30	15	0	0	0	G	0	0	L	Yes
1S/4W 35M 2	OAK	7 ST	ALAMEDA CO.	0	GEO*	1/79	0	0	0	0	0	0	G	0	0	L	Yes
1S/4W 35M 2	OAK	424 MLK JR. WAY	TEXACO REF. & MARK. INC.	0			0	0	0	0	0					A	Yes
1S/4W 35M 3	OAK	424 MLK JR. WAY	TEXACO REF. & MARK. INC.	0	DES	08/87	2	30	15	0	0	0	G	0	0	L	Yes
1S/4W 35N 4	OAK	424 M. LUTHER KING JR WY	TEXACO REFN. & MARKETING	0	DES	08/87	2	30	16	0	0	0	G	0	0	L	Yes
1S/4W 35N 5	OAK	424 M. LUTHER KING JR. WY	TEXACO REFN & MARKETING	0	DES	08/88	2	30	13	0	0	0	G	0	0	L	Yes
1S/4W 35N 2	OAK	BOATEL & WATER STS.	PORT OF OAKLAND	0	MON	12/87	2	25	5	0	0	0	D	0	0	L	Yes
1S/4W 35N 3	OAK	1ST & WASHINGTON STS.	PORT OF OAKLAND	0	MON	9/87	2	45	7	0	0	0	D	0	0	L	Yes
1S/4W 35N 4	OAK	1ST & WASHINGTON STS.	PORT OF OAKLAND	0	MON	9/87	2	60	7	0	0	0	D	0	0	L	Yes
1S/4W 35N 5	OAK	66 JACK LONDON SQ.	PORT OF OAKLAND	0	MON	01/88	2	55	5	0	0	0	D	0	0	L	
1S/4W 35N 6	OAK	530 Water St (1st & Wash)	Port of Oakland	0	MON	3/90	2	50	10	0	0	0	D	0	0	D	Yes
1S/4W 35N 7	OAK	530 Water St (1st & Wash)	Port of Oakland	0	MON	3/90	2	50	10	0	0	0	D	0	0	D	Yes
1S/4W 35Q 1	OAK	208 Jackson Street	East Bay Parking	0	MON	05/90	2	10	6	0	0	0	G	0	0	D	
1S/4W 35Q 2	OAK	208 Jackson Street	East Bay Parking	0	MON	05/90	2	10	6	0	0	0	G	0	0	D	
1S/4W 35Q 3	OAK	208 Jackson Street	East Bay Parking	0	MON	05/90	2	10	6	0	0	0	G	0	0	D	
1S/4W 35Q 4	OAK	609 Oak St.	Chevron	0	MON	11/90	2	17	12	0	0	0	G	0	0	D	
1S/4W 35Q 5	OAK	609 OAK STREET	CHEVRON USA	0	MON	8/90	2	26	16	0	0	0	G	0	0	D	
1S/4W 35Q 6	OAK	609 Oak St.	Chevron USA	0	MON	9/90	2	15	3	100	97	0	G	0	0	D	
1S/4W 35Q 7	OAK	609 Oak St.	Chevron USA	0	MON	9/90	2	30	16	0	0	0	D	0	0	D	
1S/4W 35Q 8	OAK	609 Oak St.	Chevron USA	0	MON	9/90	2	30	14	0	0	0	D	0	0	D	
1S/4W 35Q 9	OAK	300 Oak Street	Nancy Cotteral	0	MON	12/91	4	20	5	0	0	0	D	0	0	D	
1S/4W 35Q10	OAK	300 Oak Street	Nancy Cotteral	0	MON	12/91	4	20	6	0	0	0	D	0	0	D	
1S/4W 35Q11	OAK	400 Oak St	Post Tool MW-1	0	MON	12/91	4	20	0	0	0	0	G	0	0	D	

WELL #	CITY	ADDRESS	OWNER	PHONE	USE	DR.DATE	DIAM	TOT.DEPTH	DTW	ST.ELEV	WA.ELEV	YIELD	LOG	WQ	WL	DATAORGN	MARGIN
1S/4W 35A 1	OAK	ALICE ST	P.T. & T BLDG	0	GRO*	?	0	0	0	0	0	0	G	0	0	L	
1S/4W 35F	OAK	CRN OF 12TH & BROADWAY	APC BUILDING	0	BOR	07/88	0	19	0	0	0	0	G	0	0	L	Yes
1S/4W 35F 2	OAK	CRN OF 12TH & BROADWAY	APC BUILDING	0	MON	09/88	2	31	0	0	0	0	G	0	0	L	Yes
1S/4W 35F 3	OAK	CRN OF 12TH & BROADWAY	APC BUILDING	0	MON	07/88	2	30	5	0	0	0	G	0	0	L	Yes
1S/4W 35F 4	OAK	CRN OF 12TH & BROADWAY	APC BUILDING	0	MON	07/88	2	30	22	0	0	0	G	0	0	L	Yes
1S/4W 35G	OAK	HARRISON (BET. 12 & 13)	EAST BAY ASIAN LOCAL DEV-	0	BOR	10/87	8	36	25	0	0	0	G	0	0	L	
1S/4W 35G	OAK	11th AND WEBSTER STREET	CITY OF OAKLAND	0	BOR	7/87	5	61	0	0	0	0	G	0	0	L	
1S/4W 35G	OAK	1020 WEBSTER ST	MOON LOON	0	BOR	05/88	0	30	29	38	9	0	G	0	0	L	
1S/4W 35G 1	OAK	11th & WEBSTER Sts.	CITY OF OAKLAND	0	MON	5/87	4	39	24	0	0	0	G			L	
1S/4W 35G 2	OAK	11TH & WEBSTER STS	CITY OF OAKLAND	0	MON	12/87	4	45	26	0	0	0	D	0	0	L	
1S/4W 35G 3	OAK	10TH & WEBSTER STS	CITY OF OAKLAND	0	MON	12/87	4	40	27	0	0	0	D	0	0	L	
1S/4W 35G 4	OAK	11TH & WEBSTER STS	CITY OF OAKLAND	0	MON	12/87	4	44	26	0	0	0	D	0	0	L	
1S/4W 35G 5	OAK	10TH & WEBSTER STS	CITY OF OAKLAND	0	MON	12/87	4	42	26	0	0	0	D	0	0	L	
1S/4W 35G 6	OAK	10TH & WEBSTER STS	CITY OF OAKLAND	0	MON	03/88	4	66	0	39	0	0	G	0	0	L	
1S/4W 35G 7	OAK	11TH & WEBSTER STS	CITY OF OAKLAND	0	TES	03/88	4	44	25	0	0	0	D	0	0	L	
1S/4W 35G 8	OAK	10TH & FRANKLIN STS	CITY OF OAKLAND	0	TES	03/88	4	43	26	0	0	0	D	0	0	L	
1S/4W 35G 9	OAK	11TH & FRANKLIN STS	CITY OF OAKLAND	0	TES	03/88	4	48	24	0	0	0	D	0	0	L	
1S/4W 35G10	OAK	10TH & WEBSTER STS	CITY OF OAKLAND	0	TES	03/88	4	44	25	0	0	0	D	0	0	L	
1S/4W 35G11	OAK	10TH & FRANKLIN STS	CITY OF OAKLAND	0	TEST	04/88	4	64	38	0	0	0	D	0	0	L	
1S/4W 35G12	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	40	0	0	0	0	G	0	0	L	
1S/4W 35G12	OAK	13TH & HARRISON	FRANK MAR COMM. HOUSING	0			0	0	0	0	0	0				A	
1S/4W 35G13	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	39	0	0	0	0	G	0	0	L	
1S/4W 35G13	OAK	13TH & HARRISON	FRANK MAR COMM. HOUSING	0			0	0	0	0	0	0				A	
1S/4W 35G14	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	39	0	0	0	0	G	0	0	L	
1S/4W 35G15	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G16	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	39	0	0	0	0	G	0	0	L	
1S/4W 35G17	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	37	0	0	0	0	G	0	0	L	
1S/4W 35G18	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G19	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G20	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	36	0	0	0	0	G	0	0	L	
1S/4W 35G21	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G22	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G23	OAK	PACIFIC RENAISANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	40	0	0	0	0	G	0	0	L	
1S/4W 35G24	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	39	0	0	0	0	G	0	0	L	
1S/4W 35G25	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	39	0	0	0	0	G	0	0	L	
1S/4W 35G26	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	39	0	0	0	0	G	0	0	L	
1S/4W 35G27	OAK	PACIFIC RENAISANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	43	0	0	0	0	G	0	0	L	
1S/4W 35G28	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	43	0	0	0	0	G	0	0	L	
1S/4W 35G29	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	43	0	0	0	0	G	0	0	L	
1S/4W 35G30	OAK	PACIFIC RENAISSANCE	CITY OF OAKLAND	0	EXT	01/89	4	43	0	0	0	0	G	0	0	L	
1S/4W 35G31	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	40	0	0	0	0	G	0	0	L	
1S/4W 35G32	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	EXT	01/89	4	39	0	0	0	0	G	0	0	L	
1S/4W 35G33	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	40	0	0	0	0	G	0	0	L	
1S/4W 35G34	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	40	0	0	0	0	G	0	0	L	
1S/4W 35G35	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	40	0	0	0	0	G	0	0	L	
1S/4W 35G36	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0			0	0	0	0	0	0				A	
1S/4W 35G37	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G38	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	39	0	0	0	0	G	0	0	L	
1S/4W 35G39	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	41	0	0	0	0	G	0	0	L	
1S/4W 35G40	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G41	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G42	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	41	0	0	0	0	G	0	0	L	
1S/4W 35G43	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	INJ	01/89	4	41	0	0	0	0	G	0	0	L	
1S/4W 35G44	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	MON	02/89	4	43	14	0	0	0	G	0	0	L	
1S/4W 35G45	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	MON	02/89	4	40	32	0	0	0	G	0	0	L	
1S/4W 35G46	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	MON	01/89	4	38	0	0	0	0	G	0	0	L	
1S/4W 35G47	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	MON	01/89	4	40	32	0	0	0	G	0	0	L	
1S/4W 35G48	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	MON	01/89	4	40	32	0	0	0	G	0	0	L	
1S/4W 35G49	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	MON	01/89	4	38	32	0	0	0	G	0	0	L	
1S/4W 35G50	OAK	PACIFIC RENAISSANCE PLAZA	CITY OF OAKLAND	0	MON	02/89	4	40	28	0	0	0	G	0	0	L	
1S/4W 35G54	OAK	WEBSTER ST & 10TH ST	OAKLAND REDEVELOP. AGENCY	0	MON	02/89	4	40	0	0	0	0	G	0	0	L	
1S/4W 35G55	OAK	WEBSTER ST & 10 ST	OAKLAND REDEVELOP. AGENCY	0	MON	02/89	4	40	0	0	0	0	G	0	0	L	

WELL #	CITY	ADDRESS	OWNER		PHONE	USE	DR.DATE	DIAM	TOT.DEPTH	DTW	ST.ELEV	WA.ELEV	YIELD	LOG	WQ	WL	DATAORGN	MARGIN
1S/4W 15QL2	OAK	400 Oak St	Post Tool	MW-2	0	MON	12/91	4	20	0	0	0	0	G	0	0	D	
1S/4W 3SR 1	OAK	609 6TH ST	KEN BETTS		0	MON	02/88	4	12	10	0	0	0	D	0	0	L	
1S/4W 3SR 2	OAK	610 Oak St.	American Fund Plan	MW1	0	DES	4/93	2	25	9	0	0	0	D	0	0	D	
1S/4W 3SR 2	OAK	610 Oak St.	American Fund Plan	MW1	0	MON	2/93	2	25	9	0	0	0	D	0	0	D	
1S/4W 3SR 3	OAK	610 Oak St.	American Fund Plan	MW1R	0	MON	5/93	2	25	8	0	0	0	D	0	0	D	
1S/4W 36M 2	OAK	6TH & CLAY	NEW COURTHOUSE SITE		0	GEO*	11/75	0	0	0	0	0	0	G	0	0	L	
1S/4W 36M 3	OAK	6 & CLAY ST	TERRARESEARCH INC.		0	GEO*	5/75	0	0	0	0	0	0	G	0	0	L	
1S/4W 36N	OAK	900 Fallon St.	Laney College		0	MON	5/89-	2	20	14	103	89	0	G	0	0	D	
1S/4W 36N	OAK	900 Fallon St.	Laney College		0	TES	11/90	2	30	0	0	0	0	D	0	0	D	
1S/4W 36N 1	OAK	900 Fallon St.	Laney College		0	DES	4/88	5	50	0	0	0	0	D	0	0	D	
1S/4W 36N 2	OAK	900 Fallon St.	Laney College		0	IRR	12/90	8	190	30	0	0	44	D	0	0	D	
1S/4W 36N 3	OAK	900 Fallon St.	Laney College		0	MON	5/89-	2	20	11	97	86	0	G	0	0	D	
1S/4W 36N 4	OAK	900 Fallon St.	Laney College		0	MON	5/89-	2	20	14	100	86	0	G	0	0	D	
1S/4W 36N 5	OAK	900 Fallon St.	Laney College		0	MON	6/90*	6	0	12	0	0	0	G	0	0	D	
1S/4W 36N 6	OAK	900 Fallon St.	Laney College		0	MON	6/90*	2	20	13	102	89	0	G	0	0	D	
1S/4W 36P 1	OAK	E. 11 & 5 AV	PACIFIC GAS AND ELECTRIC		0	CAT	4/74	0	120	0	0	0	0	D	0	0	L	Yes
2S/4W 1D 1	OAK	WPRR & LK MERRITT CHANNEL	UNION PACIFIC RR		0	CAT	3/85	10	175	0	0	0	0	D	0	0	L	
2S/4W 1D 2	OAK	LAKE MERRITT PUMP STA	COUNTY OF ALAMEDA		0	MON	02/88	2	31	8	0	0	0	G	0	0	L	
2S/4W 1D 3	OAK	251 5th Ave	Port of Oakland	MW-1	0	MON	5/92	2	13	9	0	0	0	G	0	0	D	
2S/4W 2A 1	OAK	45 EMBARCADERO	BEDFORD PROPERTIES		0	TES	09/89	2	14	11	0	0	0	D	0	0	L	
2S/4W 2A 2	OAK	45 EMBARCADERO	BEDFORD PROPERTIES		0	TES	09/89	2	9	5	0	0	0	D	0	0	L	
2S/4W 2A 3	OAK	255 Fallon/Embarcadero	George Vukasin		0	MON	05/90	0	11	7	0	0	0	G	0	0	D	
2S/4W 2A 4	OAK	255 Fallon/Embarcadero	George Vukasin		0	MON	05/90	0	11	7	0	0	0	G	0	0	D	
2S/4W 2A 5	OAK	255 Fallon/Embarcadero	George Vukasin		0	MON	05/90	0	11	7	0	0	0	G	0	0	D	
2S/4W 2B 2	OAK	EMBARCADERO & MADISION	KTVU TV		0	GEO*	6/78	0	0	0	0	0	0	G	0	0	L	
2S/4W 2B 3	OAK	ALICE & EMBARCADERO	PG&E		0	CAT	2/75	0	120	0	0	0	0	D	0	0	L	
2S/4W 2B 4	OAK	Embarcadero && Jackson St	Port of Oakland	MW-E&J	0	MON	9/92	2	32	6	0	0	0	G	0	0	D	