

20 August 1999
Project No. 1132.04

Mr. Leroy Griffin
City of Oakland Fire Services Agency
Hazardous Materials Management Program
505 – 14th Street, 5th Floor
Oakland, CA 94612

**Subject: 460 Grand Avenue, Oakland, California
Former Gulf Service Station #0006
Alameda County Case Number 3615**

Dear Mr. Griffin:

As we discussed earlier this week, the enclosed information is submitted to your agency for review and action. The 460 Grand Avenue site was a Gulf Service Station, and underground storage tanks (USTs) were removed from the site in 1990 and 1994. Treadwell & Rollo, Inc., applied the Oakland RBCA Tier 2 site screening (Attachment 1) consistent with the Urban Land Redevelopment (ULR) Program to support the conclusion that no institutional controls for future residential land use are required at this site. Alameda County-HazMat issued a Case Closure Summary on November 19, 1996 (Attachment 2), and a Remedial Action Completion Certification on December 3, 1998 (Attachment 3). The Case Closure Summary includes a property use restriction, as follows:

Residential site development would be acceptable, provided that either 1) the development should include a 15' setback distance from Grand Ave., or 2) soil will be excavated within the 15' setback zone, soil samples collected under the purview of this Agency, and laboratory analysis indicates the samples are either non-detect or within acceptable concentrations (as per additional calculations and another revised Risk Evaluation).

Treadwell & Rollo, Inc., used the Oakland RBCA Tier 2 spreadsheet provided through the ULR Program to screen the site using the currently accepted risk based approach. Tier 2 uses site data to establish site-specific target levels (SSTLs) for chemical compounds (the site soil type is "clayey silts"; borings logs are included in the Case Closure Summary). The completed Oakland RBCA Eligibility Checklist (included in Attachment 1) demonstrates that the site is eligible for the Oakland RBCA process. The Oakland RBCA Cover Sheet (Attachment 1) presents the site-specific information, and is consistent with Case Closure Summary. A partial printout of the Oakland RBSLs (risk-based screening levels) table (Attachment 1) shows the results of the Tier 2 analysis for benzene with residential land use, as follows:

Medium	Inhalation of Outdoor Air Vapors	Inhalation of Indoor Air Vapors
Subsurface soil	160 milligrams/kilogram (mg/kg)	3.3 mg/kg
Groundwater	> solubility	6.6 milligrams/Liter (mg/L)

Included in Attachment 1, Table 1 (Summary of Benzene Data) presents a summary of the benzene concentrations in soil used in the risk assessment included in the 19 November 1996 Case Closure Summary as well as a statistical analysis of that data. The 1996 risk assessment used the maximum detected value of benzene in soil and was based on a "forward calculation" to estimate risk due to exposure at that maximum concentration. The current Oakland RBCA process is based on a "backward calculation", resulting in an SSTL. The SSTL is then compared to the site data. The relevant results of the statistical analysis of the same 1996 site data and the results of the Oakland RBCA Tier 2 for residential use are as follows:

Sample mean	1.1 mg/kg
Upper confidence limit (UCL)	2.3 mg/kg
SSTL	3.3 mg/kg (lowest applicable RBSL)

The Oakland ULR Program guidance document states that if "the existing concentration of . . . chemicals of concern at your site is lower than the Tier 2 SSTL . . . , you may immediately petition the lead regulatory agency for site closure". The setback included in the 1996 Case Closure Summary (an institutional control) is not required based on the results of the RBCA Tier 2 analysis—the UCL is less than the SSTL for residential land use. Therefore, it is requested that the Case Closure Summary be amended to allow unrestricted residential land use.

We appreciate your prompt attention to this request. Redevelopment plans are currently underway to return this vacant lot to productive use as new residential units for the City of Oakland. Please call me if you have any questions.

Sincerely yours,
TREADWELL & ROLLO, INC.



Margaret K. (Peggy) Peischl, P.E.
Senior Engineer

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Included to complete this document:

Attachment 1	Oakland RBCA Documentation
Attachment 2	Remedial Action Completion Certificate, 3 December 1998
Attachment 3	Case Closure Summary, 19 November 1996

TABLE 4

ANALYTICAL DATA FOR SOIL SAMPLE T4-1

11-29-90

WASTE OIL TANK EXCAVATION

460 Grand Avenue
Oakland, California

<u>Constituent</u>	<u>Sample T4-1 Concentration (mg/kg)</u>
TVPH as Gasoline	400
TEPH as Diesel	7,100
Oil & Grease	24,000
Tetrachloroethylene	1.0
1,1,1-Trichloroethane	0.25
Benzene	1.2
Toluene	10
Total Xylenes	35
Ethyl Benzene	5.2
Cadmium	0.8
Chromium	12
Lead	40
Nickel	22
Zinc	41

Notes:

mg/kg = milligram per kilogram

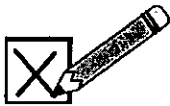
TVPH = total volatile petroleum hydrocarbons

TEPH = total extractable petroleum hydrocarbons

ATTACHMENT 1

Oakland RBCA Documentation

Oakland RBCA Eligibility Checklist



The Oakland Tier 1 RBSLs and Tier 2 SSTLs are intended to address human health and environmental concerns at the majority of small to medium-sized sites in Oakland where commonly-found contaminants are present. Large and/or complicated sites—especially those with continuing releases, special ecological concerns or unusual subsurface conditions—will likely require a Tier 3 analysis. The following checklist is designed to assist you in determining your site's eligibility for the Oakland RBCA levels.

CRITERIA	YES	NO
Source:		
Is there a continuing, <i>primary</i> source of a chemical of concern, such as a leaking container, tank or pipe? (This does <i>not</i> include secondary/residual sources.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is there any mobile or potentially-mobile free product?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are there more than five chemicals of concern at the site, each of which is at a concentration greater than the lowest applicable Oakland RBCA level?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pathways:		
Are there any preferential vapor migration pathways—such as gravel channels or utility corridors—that are potential conduits for the migration, on-site or off-site, of a volatilized chemical of concern?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is there a chemical of concern at the site within 20 feet of a surface water body?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
If groundwater ingestion is <i>not</i> an exposure pathway of concern, does groundwater at the site both (a) exist at depths less than 10 feet <i>and</i> (b) contain volatile chemicals of concern? (If groundwater ingestion <i>is</i> an exposure pathway of concern, this criterion may be disregarded because the Oakland RBCA levels will be protective for all potential groundwater-related exposure scenarios.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are there any existing on-site or off-site structures intended for future use that are adjacent to a volatile chemical of concern and possess at least one of the following?		
(a) A slab-on-grade foundation that is less than 15 cm (6 inches) thick (i.e., that does not meet Uniform Building Code standards)		
(b) An enclosed, below-grade space (e.g., a basement) that has floors or walls less than 15 cm (6 inches) thick		
(c) A crawl space that is not ventilated	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Receptors:		
Are there any immediate health risks to humans associated with contamination at the site (i.e., explosive levels of a chemical or vapor concentrations that could cause acute health effects)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are there any complete pathways to nearby ecological receptors, such as endangered species, wildlife refuge areas, wetlands or other protected areas?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If you answer "no" to all questions, your site is eligible for the Oakland RBCA levels. If you answer "yes" to any of the questions, your site is *not* eligible for the Oakland RBCA levels.

Oakland RBCA Cover Sheet

Project Proponent: Falaschi Brothers
Site Address: 460 Grand Avenue, Oakland, CA 94610
Alameda County Parcel Number(s): 10-779-15-1

Chemicals of Concern		
(1) Benzene	(4)	(7)
(2)	(5)	(8)
(3)	(6)	(9)

Exposure Pathways of Concern	
<i>Surficial Soil</i> <input type="checkbox"/> Ingestion/dermal contact/inhalation <i>Subsurface Soil</i> <input type="checkbox"/> Ingestion of groundwater impacted by leachate <input checked="" type="checkbox"/> Inhalation of indoor air vapors <input checked="" type="checkbox"/> Inhalation of outdoor air vapors	<i>Groundwater</i> <input type="checkbox"/> Ingestion of groundwater <input checked="" type="checkbox"/> Inhalation of indoor air vapors <input checked="" type="checkbox"/> Inhalation of outdoor air vapors <i>Water Used for Recreation</i> <input type="checkbox"/> Ingestion/dermal contact

Land Use Scenario	
<input checked="" type="checkbox"/> Residential	<input type="checkbox"/> Commercial/Industrial

Method of Analysis	
<input type="checkbox"/> Tier 1	
<input checked="" type="checkbox"/> Tier 2	(specify soil type: <input type="checkbox"/> Merritt sands <input type="checkbox"/> sandy silts <input checked="" type="checkbox"/> clayey silts)
<input type="checkbox"/> Tier 3	Model(s) employed: <input type="checkbox"/> Oakland RBCA <input type="checkbox"/> Other(s) (specify:)

Application of RBCA Levels	
<input type="checkbox"/> As evidence that no further action required	
<input type="checkbox"/> As target cleanup levels for removal or treatment of chemical(s) of concern	
<input checked="" type="checkbox"/> Other (specify: As evidence to remove setback requirement for residential use included in Case Closure Summary, Alameda County HazMat, 11/19/96)	

Containment Measures	
<input type="checkbox"/> Cap (specify material:)	<input type="checkbox"/> Vapor barrier (specify material:)
<input type="checkbox"/> Other(s) (specify:)	
<i>Exposure pathways that will be affected:</i>	

Institutional Controls			
<input type="checkbox"/> Permit tracking	<input type="checkbox"/> Deed restriction	<input type="checkbox"/> Deed Notice	<input type="checkbox"/> Water well restriction
<input type="checkbox"/> Access control	<input type="checkbox"/> Other(s) (specify:)		

Public Notification	
<i>Specify all actions to be taken:</i>	

Submitted by: Margaret K. (Peggy) Peischl, P.E.; Treadwell & Rollo, Inc. **Date submitted:** 20 August 1999

Oakland RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthra-cene	Arsenic	Barium	Benz(a)-anthracene	Benzene	Benzo(a)-pyrene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					2.6E+00		1.7E+00	1.9E+01	1.7E-01	
			Hazard	2.3E+03	2.3E+03	3.7E+03	1.2E+04	1.8E+01	5.0E+03		6.3E+01		
		Commercial/ Industrial	Carcinogenic					9.5E+00		4.3E+00	4.9E+01	4.3E-01	
			Hazard	1.1E+04	1.1E+04	1.8E+04	5.6E+04	1.5E+02	7.1E+04		3.0E+02		
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	1.6E+02	SAT	
			Hazard	SAT	SAT	1.2E+05	SAT				6.5E+02		
		Commercial/ Industrial	Carcinogenic							SAT	6.2E+02	SAT	
			Hazard	SAT	SAT	SAT	SAT				SAT		
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	3.3E+00	SAT	
			Hazard	SAT	SAT	1.2E+04	SAT				1.1E+01		
		Commercial/ Industrial	Carcinogenic							SAT	5.2E+01	SAT	
			Hazard	SAT	SAT	SAT	SAT				3.2E+02		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic						4.4E+00	1.3E+02	1.4E+01	4.5E-03	1.2E+01
			Hazard	4.0E+02	2.7E+02	1.5E+00	SAT	4.4E+00	1.3E+02		4.5E-03	1.2E+01	
		Commercial/ Industrial	Carcinogenic					4.4E+00	1.3E+02	5.8E+01	4.5E-03	1.2E+01	
			Hazard	SAT	SAT	9.7E+00	SAT	4.4E+00	1.3E+02		4.5E-03	1.2E+01	
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic					5.0E-02	1.0E+00	5.6E-04	1.0E-03	2.0E-04	
			Hazard	9.4E-01	9.4E-01	1.6E+00	>Sol	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
		Commercial/ Industrial	Carcinogenic					5.0E-02	1.0E+00	2.4E-03	1.0E-03	2.0E-04	
			Hazard	>Sol	>Sol	1.0E+01	>Sol	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>Sol	6.6E+00	>Sol	
			Hazard	>Sol	>Sol	4.0E+04	>Sol				2.2E+01		
		Commercial/ Industrial	Carcinogenic							>Sol	1.0E+02	>Sol	
			Hazard	>Sol	>Sol	>Sol	>Sol				6.3E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>Sol	>Sol	>Sol	
			Hazard	>Sol	>Sol	9.5E+05	>Sol				>Sol		
		Commercial/ Industrial	Carcinogenic							>Sol	>Sol	>Sol	
			Hazard	>Sol	>Sol	>Sol	>Sol				>Sol		
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-02		1.6E-04	6.3E-02	1.1E-05	
			Hazard	1.1E+00	1.7E+00	4.2E+01	>Sol	1.2E-01	2.8E+01		1.8E-01		

*Italicized concentrations based on California MCLs
 SAT = RBSL exceeds saturated soil concentration of chemical
 >SOL = RBSL exceeds solubility of chemical in water

atc
 Risk -5
 10

(c) (sf) (diff)

TABLE 1
Summary of Benzene Data
 460 Grand Avenue, Oakland, California

Sample	Depth (feet, bgs)	x	x ²
WO-8	4.5	0.0005	0.00000025
WO-9	5.5	0.077	0.005929
IX-18	4	0.18	0.0324
IX-15	5	1.2	1.44
IX-13	5.5	0.41	0.1681
IX-11	5	0.6	0.36
C-3	5	0.008	0.000064
C-2	5	13	169
C-1*	5	0.0025	0.00000625
IX-20*	5	0.0025	0.00000625
WO-10*	5	0.0025	0.00000625
WO-11*	4.5	0.0025	0.00000625
WO-7*	5	0.0025	0.00000625
WO-5*	5	0.0025	0.00000625

↑
 Possible
 concentrations
 ↓

conserv 10

Sum of Values	Sx	15.4905	
Sum of Values Squared	Sx ²	171.01	
Number of Samples	n	14	
Sample Mean	\bar{x}	1.1	
Variance	s ²	11.836	
Sample St. Dev.	s	3.440	
Standard Error of Sample	s _x	0.919	
Degrees of Freedom	n-1	13	
t _{.20} for n-1 degrees of freedom	t _{.20}	1.35	
Confidence Interval	CI	2.3	Upper CI
(two-tailed with probability = 0.20 or one-tailed with probability = 0.10)		-0.1	Lower CI

*Assume value of 1/2 the Reporting Limit (0.005 mg/kg) for NDs
 Statistical Analysis per:
Test Methods for Evaluating Solid Waste, SW-846, Third Edition,
 Vol. 2, USEPA, November 1986

ATTACHMENT 2

Remedial Action Completion Certificate

3 December 1998

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
DAVID J. KEARS, Agency Director



P.R.B.

DEC 1 1998

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

REMEDIAL ACTION COMPLETION CERTIFICATE

StID 3615 former Gulf Service Station #0006, 460 Grand Ave., Oakland, CA, 94610
(3-10,000, 2-250 gallons tanks removed)

December 3, 1998

Phillip R. Briggs, Project Manager Site Assessment & Remediation
Chevron Products Co.
6001 Bollinger Canyon Rd.
Bldg. L, Rm. 1110
PO Box 6004
San Ramon, CA 94583-0904

Dear Mr. Briggs:

This letter confirms the completion of site investigation and remedial action for the underground storage tank formerly located at the above-described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former underground storage tank are greatly appreciated.

Based on information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, no further action related to the underground tank release is required.

This notice is issued pursuant to a regulation contained in Title 23, Section 2721(e) of the California Code of Regulations.

Please contact our office if you have any questions regarding this matter.

Sincerely,

Mee Ling Tung, Director

cc: Chuck Headlee, RWQCB
Dave Deaner, SWRCB
Leroy Griffin, OFD

ATTACHMENT 3

Case Closure Summary

19 November 1996

01-0611

ENVIRONMENTAL
PROTECTION
97 APR 31 PM 3:08

CASE CLOSURE SUMMARY
Leaking Underground Fuel Storage Tank Program

I. AGENCY INFORMATION

Date: 11/19/96

Agency name: **Alameda County-HazMat** Address: **1131 Harbor Bay Pky**
City/State/Zip: **Alameda CA 94502** Phone: **(510) 567-6700**
Responsible staff person: **Jennifer Eberle** Title: **Hazardous Materials Spec.**

II. CASE INFORMATION

Site facility name: **Former Gulf Service Station #0006**
Site facility address: **460 Grand Ave., Oakland CA 94610**
RB LUSTIS Case No: **N/A** Local Case No./LOP Case No.: **3615**
ULR filing date: **12/4/90** SWEEPS No: **N/A**

Responsible Parties: Addresses: Phone Numbers:
Phil Briggs, Chevron Products Co., PO Box 5004, San Ramon CA 94583-0804 (510-842-9136)

Falaschi Brothers, c/o Jack Gibson, The Legal Solutions Group, 1629-5th Ave., San Rafael CA 94901 (415-460-0100 ext.13)

<u>Tank No:</u>	<u>Size in gal.:</u>	<u>Contents:</u>	<u>Closed in-place or removed?:</u>	<u>Date:</u>
1	10,000	gasoline	removed	11/29/90
2	10,000	gasoline	removed	11/29/90
3	10,000	gasoline	removed	11/29/90
4	250	waste oil	removed	11/29/90
5	250	waste oil	removed	01/05/94

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and type of release: **apparent piping leak**
Site characterization complete? **YES**
Monitoring Wells installed? **YES** Number: **four**
Proper screened interval? **YES**
Highest GW depth below ground surface (DTW): **2.31'bgs on 3/22/95 in C-3**
Lowest GW depth: **7.31'bgs on 9/20/95 in C-4**
Flow direction: **consistently south, towards Lake Merritt**
Most sensitive current use at present: **vacant lot**

Leaking Underground Fuel Storage Tank Program

Are drinking water wells affected? NO Aquifer name: n/a
 Is surface water affected? Probably not, since the downgradient well C-4 has been ND
 Nearest SW name: Lake Merritt is approx 550' south of the site
 Report(s) on file at Alameda County, 1131 Harbor Bay Pky, Alameda CA 94502

Treatment and Disposal of Affected Material:

<u>Material</u>	<u>Amount</u> <u>(include units)</u>	<u>Action (Treatment</u> <u>of Disposal w/destination)</u>	<u>Date</u>
Tank	four USTs	disposed to Erickson, #89891087 and #89891108,	11/29 & 30/90
Tank's Contents and Rinsate	10,235 gal	disposed to Refineries Services, #89804855, #89802491, and #89804851	11/27 & 28/90
Soil	approx 350 yd3	disposed to Forward Landfill	Jan 1994
	approx 450 yd3	disposed to Redwood Landfill	Jan 1994
Groundwater	10,000 gal	disposed to Chevron's Richmond refinery	1/26/93

Maximum Documented Contaminant Concentrations - - Before and After Cleanup

Contaminant	Soil (ppm)		Water (ppb)	
	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>
TPH (Gas)	1,700 ^a	2,300 ⁱ	2,300 ^c	80 ^g
TPH (Diesel)	7,100 ^b	200 ^c	170 ^f	NA ^g
Benzene	1.2 ^b	13 ⁱ	53 ^c	0.93 ^g
Toluene	10 ^b	80 ⁱ	160 ^c	ND ^g
Ethylbenzene	47 ^a	83 ⁱ	36 ^c	ND ^g
Xylene	260 ^a	440 ⁱ	160 ^c	ND ^g
Oil & Grease	24,000 ^b	ND ^c	ND ^f	ND ^h
PCE	1.0 ^b	0.074 ^d	ND ^f	ND ^h
1,1,1-TCA	0.25 ^b	0.042 ^d	ND ^f	ND ^h
1,2-DCB	ND ^b	0.048 ^d	ND ^f	ND ^h
1,2-DCA	ND ^b	0.028 ^d	ND ^f	3.5 ^h
Cd	0.8 ^b	10.8 ^d	ND ^f	ND ^h
Cr	12 ^b	58 ^d	ND ^f	190 ^h
Pb	40 ^b	12 ^d	ND ^f	70 ^h
Ni	22 ^b	74 ^d	ND ^f	360 ^h
Zn	41 ^b	83 ^d	70 ^f	380 ^h
MTBE				8.7

Leaking Underground Fuel Storage Tank Program

- ^a from piping samples collected 12/4/90
- ^b from waste oil tank excavation, collected 11/29/90
- ^c from final excavation samples which were in the long term vadose zone (0-5.5' bgs), as used for the risk evaluation, collected Jan 1-21, 1994
- ^d from final excavation samples (HVOCs in WX-3 and WO-9, and metals in H-S and WX-3), collected Jan 1-21, 1994
- ^e from grab water sample from open fuel tank excavation, collected 11/29/90
- ^f from grab water sample from open waste oil tank excavation, collected 12/4/92
- ^g from last round of MW sampling, collected 12/12/95
- ^h from MW sampling conducted on 12/16/92
- ⁱ from soil sampling in borehole for well C-2, 12/14/92

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? Undetermined

Does completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? Undetermined

Does corrective action protect public health for current land use? see comments in section V. regarding the risk evaluation

Site management requirements: **Commercial site development is acceptable with the site in its present condition. Residential site development is acceptable, providing that either 1) the development includes a 15' setback distance from Grand Ave., or 2) soil is excavated within the 15' setback zone, soil samples are collected under the purview of this Agency, and laboratory analysis indicates the samples are either non-detect or within acceptable concentrations (as per additional calculations and possibly another revised Risk Evaluation).**

Should corrective action be reviewed if land use changes? YES; see comments above

Monitoring wells Decommissioned: Not yet

Number Decommissioned: 0 Number Retained: 4

List enforcement actions taken: Pre-Enforcement Review Panel 7/27/93, Legal Request for Submittal of a Technical Report signed by Steven Ritchie of the RWQCB and dated 9/27/93

List enforcement actions rescinded: none

Leaking Underground Fuel Storage Tank Program

V. ADDITIONAL COMMENTS, DATA, ETC.

The property was reportedly first developed in the late 1940s, and operated as a service station by a series of parties. The property was reportedly purchased by Gulf Oil Co. in 1961, when the existing USTs were replaced with three new 10,000-gallon gasoline USTs. Gulf Oil Co. reportedly operated the service station from 1961 through 1978. The Falschi brothers reportedly purchased the property in August 1978, and reportedly removed the fuel dispensers and emptied the USTs. The station had reportedly not been used since 1978.

On 11/29/90, four USTs were removed, under purview of Gil Wistar of Alameda County. There were three 10,000-gallon fuel USTs and one 250-gallon waste oil UST. According to Mr. Wistar's notes, Fuel Tank #1 had deep pitting and no apparent holes, while Fuel Tank #2 had deep pitting and at least 2 small holes. Fuel Tank #3 appeared to be in better condition, while Waste Oil Tank #4 had numerous small holes. There were two tank excavations: one for the fuel USTs and one for the waste oil UST. Seven soil samples were collected and one grab water sample was collected (from the fuel tank pit). Four piping samples were collected on 12/4/90. See Figure 1 and 2, and Tables 1 through 4.

Results from the six fuel tank soil samples were unremarkable: ND TPHg and ND benzene except for one hit of 0.019 mg/kg benzene; maximum lead result was 3.8 mg/kg. The water sample contained 2,300 ug/L TPHg, ND TPHd, and 53 ug/L benzene. The maximum concentrations from the piping samples included 1,700 mg/kg TPHg and 0.0066 mg/kg benzene. The waste oil tank soil sample contained 400 mg/kg TPHg, 7,100 mg/kg TPHd, 24,000 mg/kg O&G, 1.2 mg/kg benzene, 1.0 mg/kg PCE, and 0.25 mg/kg 1,1,1-TCA. The stockpiled soils were apparently not sampled.

On 12/4/92, the stockpiled soils were sampled, groundwater was pumped out of the excavations, the pit water from the waste oil tank excavation was sampled, and pit water from the fuel tank excavation was resampled. Results from the fuel tank stockpiled soils indicated ND TPHg and ND BTEX. Results from the waste oil tank stockpiled soils indicated ND TPHg, ND BTEX, 8400 mg/kg O&G, ND HVOCs, 190 mg/kg TPHd, ND Cd, 23 mg/kg Cr, 88 mg/kg Pb, 30 mg/kg Ni, and 340 mg/kg Zinc. Results from the fuel tank pit water sample indicated ND TPHg, ND BTEX and ND Pb. Results from the waste oil tank pit water sample indicated ND TPHg, ND BTEX, 170 ug/L TPHd, ND HVOCs, ND Cd, ND Cr, ND Pb, ND Ni, and 0.07 mg/L Zn. See Table 5 and Figure 2A.

Three monitoring wells were installed on 12/14/92 and 12/15/92. Soils were sampled in the boreholes. See Figure 5, 5A, 5B, 5C for locations and boring logs, and Table 6 for results. The downgradient boring (C2) near the pump island had significant soil concentrations.

Leaking Underground Fuel Storage Tank Program

On 3/19/93, the former waste oil tank pit, located at the northeast edge of the property, was overexcavated and resampled. Four sidewall samples were collected at 6'bgs. There was water in the excavation. Results indicated up to 21,000 mg/kg O&G, 730 mg/kg TPHg, 3,200 mg/kg TPHd, 2.1 mg/kg benzene, 0.320 mg/kg 1,1,1-TCA, 0.610 mg/kg PCE, and 0.065 mg/kg 1,2-DCB in sample WE. The results were not tabulated. See **Figure 4**.

On 12/28/93, the service station was demolished. This allowed better access to the former waste oil tank pit in the northeastern edge of the property, for the purpose of removing residual soil contamination. On 1/3/94, another UST was discovered below the former service station. It appeared to be a 250-gallon waste oil UST. Soil samples (WX series) were collected from the overexcavation of the former waste oil tank pit in the northeastern edge of the property. In addition, an oil/water separator was removed; soil samples (SM series) were collected. Two hydraulic hoists were removed; soil samples HS and HN were collected. Sample results in these locations were unremarkable, with the exception of sample WX-3 from the northern edge of the property (1,300 mg/kg TPHd and 970 mg/kg TOG at 3'bgs); see **Figure 6 & 7, Tables 7 & 8**.

On 1/5/94, the pump islands were excavated. There was a strong gasoline odor. Several samples (IX series) were collected in the pump island excavation. The newly-discovered 250-gallon waste oil UST was removed. There were 2 large corrosion holes on the top; the bottom and sides appeared intact. Approximately 150 gallons of waste oil were pumped out on 1/4/94. Four soil samples were initially collected from the newly-discovered 250-gallon waste oil UST excavation (WO series). See **Table 7 and Figure 6**.

On 1/20/94 and 1/21/94, further overexcavation ensued in the areas of the former islands and the newly discovered waste oil UST/hydraulic hoists. The data is compiled in **Tables 7 and 8**. See **Figures 5, 6, and 7 also**.

During these activities, approximately 350 yd³ of soil were removed from the waste oil tank excavation and disposed at Forward Landfill. Approximately 450 yd³ of soil were removed from the pump island excavation and disposed at Redwood Landfill. This makes a total of approximately 800 yd³ of soil removed from this site.

The final sampling locations are depicted in **Figure 7**, with the exception of sample WO-7, which was overexcavated. The residual benzene concentrations left in place are samples WO-8, WO-9, IX-7, IX-11, IX-12, IX-13, IX-14, IX-15, IX-16, IX-17, IX-18, IX-19, IX-21, and IX-22.

Further subsurface investigation was conducted offsite and downgradient in Grand Avenue in May 1995. A fourth monitoring well (C4) was installed; two additional borings were attempted but not completed, due to the presence of utilities. See **Figure 9 for the boring log of C4**.

Leaking Underground Fuel Storage Tank Program

Groundwater was sampled and monitored for 8 events between 12/16/92 and 12/12/95 in the first three wells, and for 3 events between 6/5/95 and 12/12/95 in the downgradient well (C4). See **Table 9**. Results indicated low to ND concentrations of benzene and TPHg. Groundwater flow direction was consistently south, towards Lake Merritt. See **Figure 8**.

An ASTM RBCA Tier 2 risk evaluation was prepared by Chevron Research and Technology Company (CRTC), dated 5/20/96. They evaluated indoor inhalation for a residential scenario, for both soil and groundwater conditions. The risk evaluation was amended to address the concerns of the soil sampling selection and correct the solutions to the equations. The soil samples selected contained benzene at a depth of 0 to 5.5'bgs, the expected long term vadose zone. These samples included WO-8, WO-9, IX-11, IX-13, IX-15, and IX-18. Two scenarios were evaluated: conservative and plausible. The conservative scenario used the maximum site benzene concentration in groundwater and the average of the six benzene impacted soil samples, not including ND samples. The plausible scenario used the 12/12/95 (final) benzene concentration in groundwater (well C2), and the average benzene concentration of the 14 soil samples taken in the 0-5.5'bgs interval, including ND samples.

Results of the amended risk evaluation indicated a risk value of 4.05×10^{-5} for the conservative scenario, and a risk value of 1.7×10^{-5} for the plausible scenario. These risk values are combined values for soil and groundwater. **These are acceptable risk values for commercial/industrial development of the site.**

The risk assessment was revised again, since the soil sampling results from the three monitoring wells (C1 to C3) were not included in calculating the benzene concentrations. The revised results were transmitted to the County via fax from CRTC dated 1/10/97. The benzene concentrations were calculated using the arithmetic average. After some debate, it was decided that this was the best method for small UST sites such as this; the geometric average is used on large Superfund sites. It was also decided to use the calculated risk for the *plausible scenario*, and not the conservative scenario. The risk was calculated to be 8.85×10^{-5} . Since this number approaches 1×10^{-4} , **the risk was considered acceptable for a commercial/industrial scenario.**


Residential site development would be acceptable, providing that either 1) the development should include a 15' setback distance from Grand Ave., or 2) soil will be excavated within the 15' setback zone, soil samples are collected under the purview of this Agency, and laboratory analysis indicates the samples are either non-detect or within acceptable concentrations (as per additional calculations and another revised Risk Evaluation).


Leaking Underground Fuel Storage Tank Program

No further investigations are recommended since this site appears to meet the SF Bay RWQCB's definition of a low risk groundwater case. To summarize, the reasons that this case should be closed are as follows:

- * The sources have been removed (five USTs, 10,000 gallons of water from the excavation, and approximately 800 cubic yards of contaminated soil);
- * The site has been adequately characterized;
- * The groundwater downgradient well (C4) has been ND for BTEX and TPHg;
- * Although there is a sensitive environmental receptor in the site vicinity (Lake Merritt lies approximately 600 feet from the site), this distance is a significant and unlikely distance for a hydrocarbon plume to travel;
- * There is no significant risk to human health, based on the tier 2 risk evaluation. **The risk is acceptable for commercial/industrial development of the site. Residential site development would be acceptable, providing that either 1) the development should include a 15' setback distance from Grand Ave., or 2) soil will be excavated within the 15' setback zone, soil samples are collected under the purview of this Agency, and laboratory analysis indicates the samples are either non-detect or within acceptable concentrations (as per additional calculations and another revised Risk Evaluation).**)

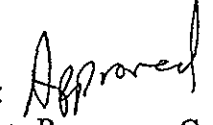
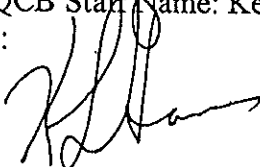
VI. LOCAL AGENCY REPRESENTATIVE DATA

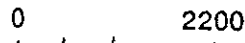
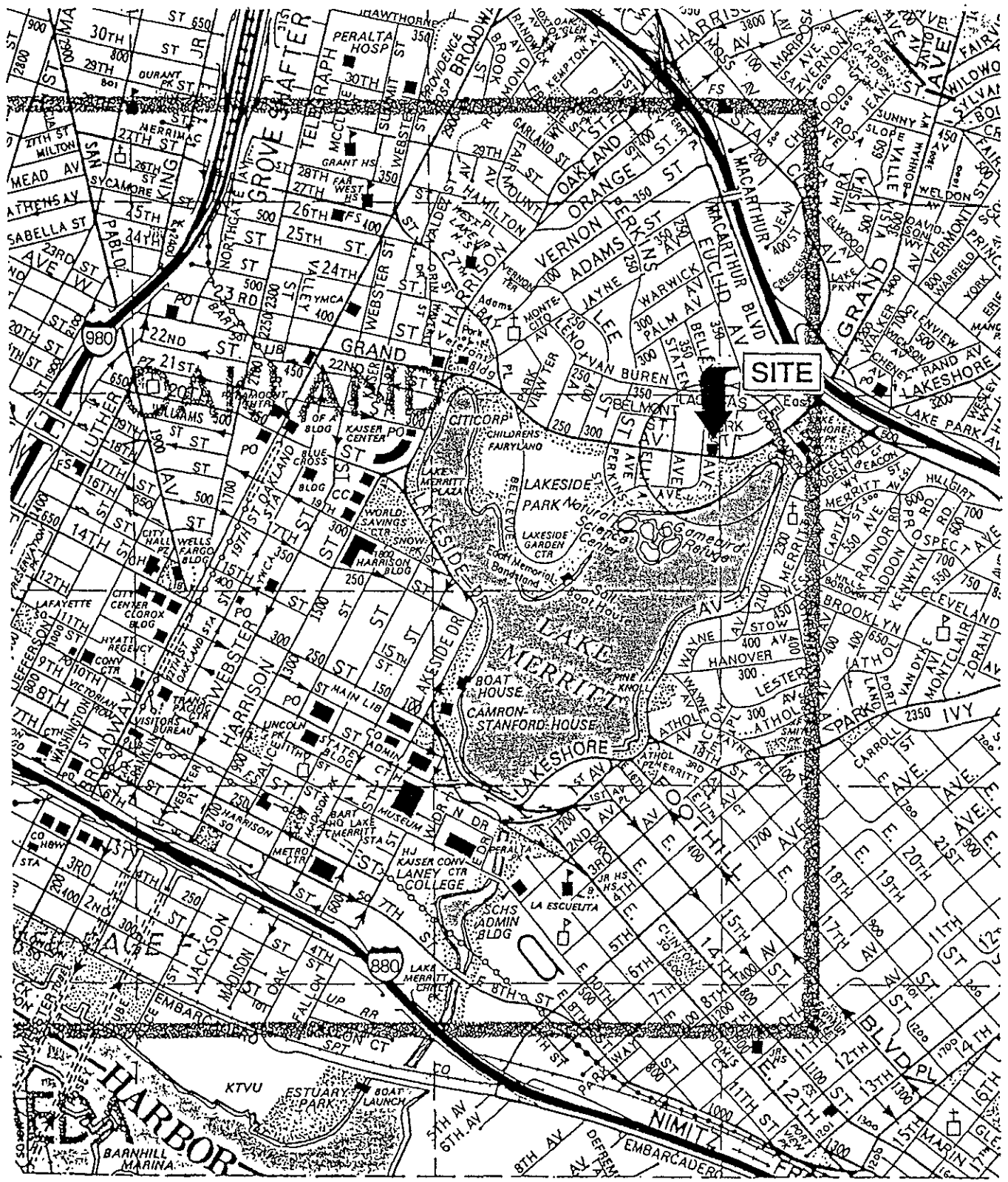
Name: Jennifer Eberle Title: Hazardous Materials Specialist
Signature:  Date: 1-30-97

Reviewed by
Name: Madhulla Logan Title: Hazardous Materials Specialist
Signature:  Date: 4-1-97

Name: Tom Peacock Title: Manager of LOP
Signature:  Date: 4-1-97

VII. RWQCB NOTIFICATION

Date Submitted to RWQCB: 4-2-97 RWQCB Response: 
RWQCB Staff Name: Kevin Graves Title: Associate Water Resources Control Engineer
Date: 



Approximate Scale in Feet

Reference: Thomas Brothers Map, 1988

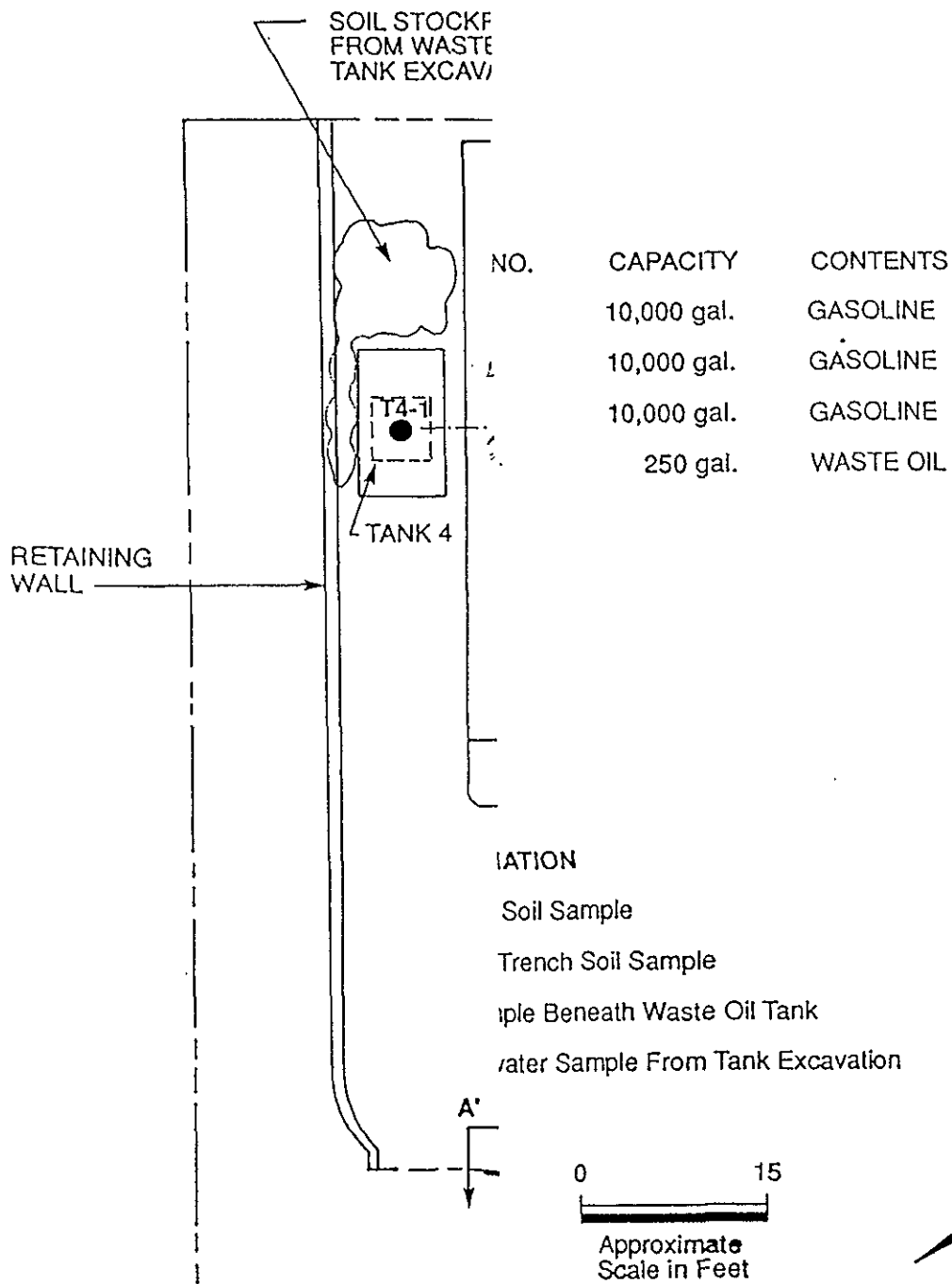
460 GRAND AVENUE (at BELLEVUE)
OAKLAND, CALIFORNIA

VICINITY MAP

TREADWELL & ASSOCIATES, INC.
Consulting Engineers and Scientists

Project No. 1132A

Figure 1



460 GRAND AVENUE (at BELLEVUE)
OAKLAND, CALIFORNIA

SITE PLAN

Project No. 1132A

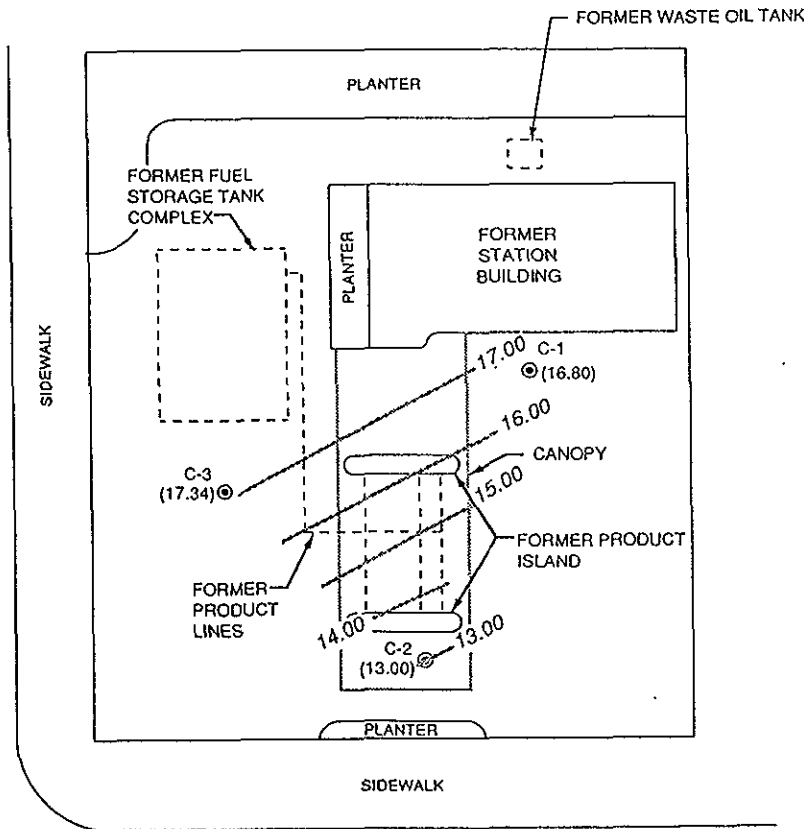
Figure 2

TREADWELL & ASSOCIATES, INC.
Consulting Engineers and Scientists

Figure 3



BELLEVUE AVENUE



LEGEND

C-1 GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

(16.80) GROUNDWATER ELEVATION IN FEET - MSL

14.00 GROUNDWATER ELEVATION CONTOUR IN FEET - MSL

12-16-92

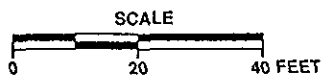


APPROXIMATE DIRECTION OF GROUNDWATER FLOW

GRAND AVENUE

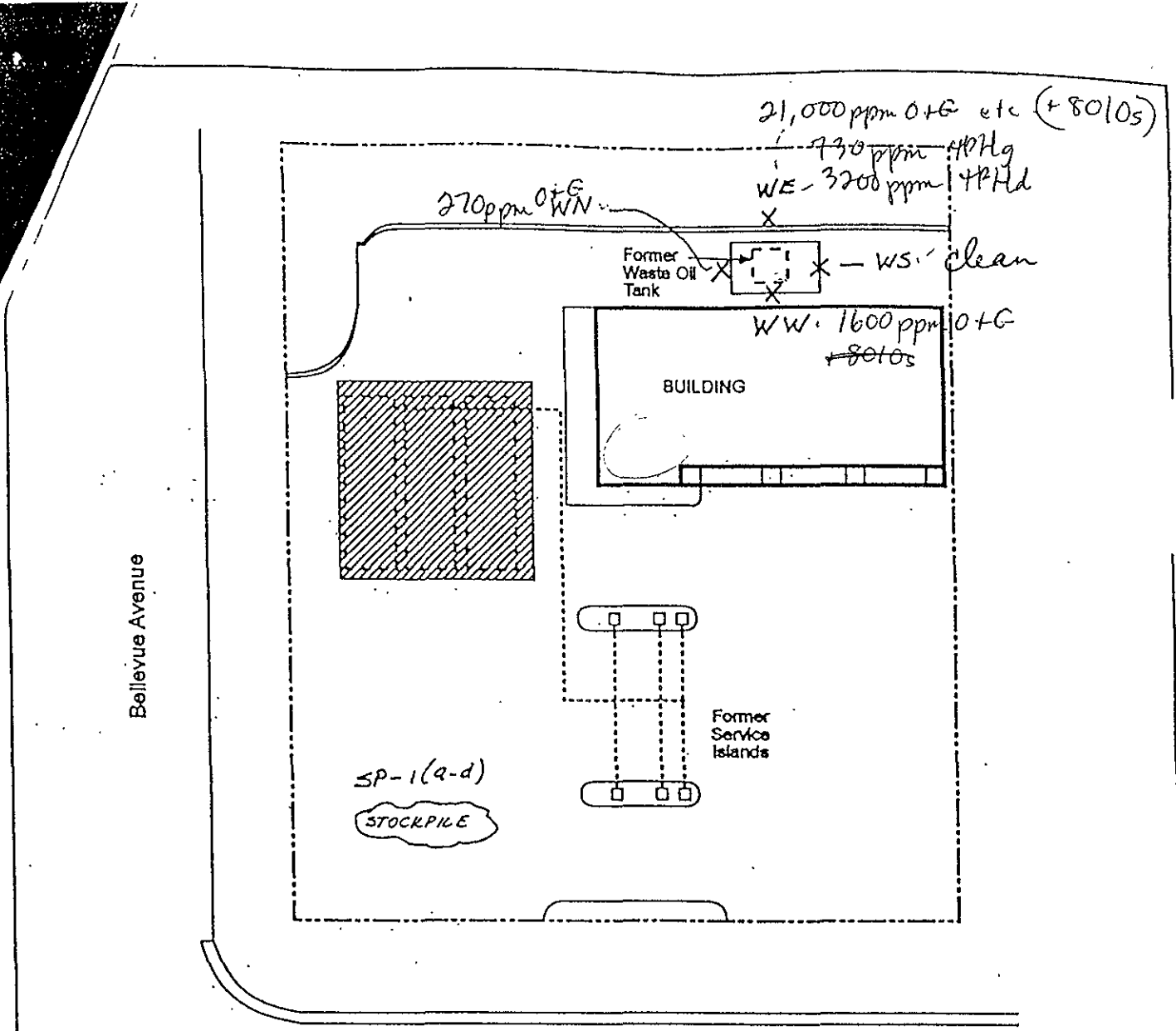
MAP TAKEN

PACIFIC ENVIRONMENTAL GROUP, INC.

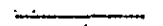




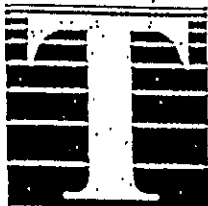
FORMER GULF SERVICE STATION 0006
460 Grand Avenue at Bellevue Avenue
Oakland, California

GROUNDWATER ELEVATION CONTOUR MAP



LEGEND

-  Product Line
-  Former Underground Storage Tanks
-  Limit of Excavation



**Touchstone
Developments**
Environmental Management

Site Plan
Former Chevron Station 9-0008
460 Grand Avenue at Bellevue
Oakland, California

FIGURE

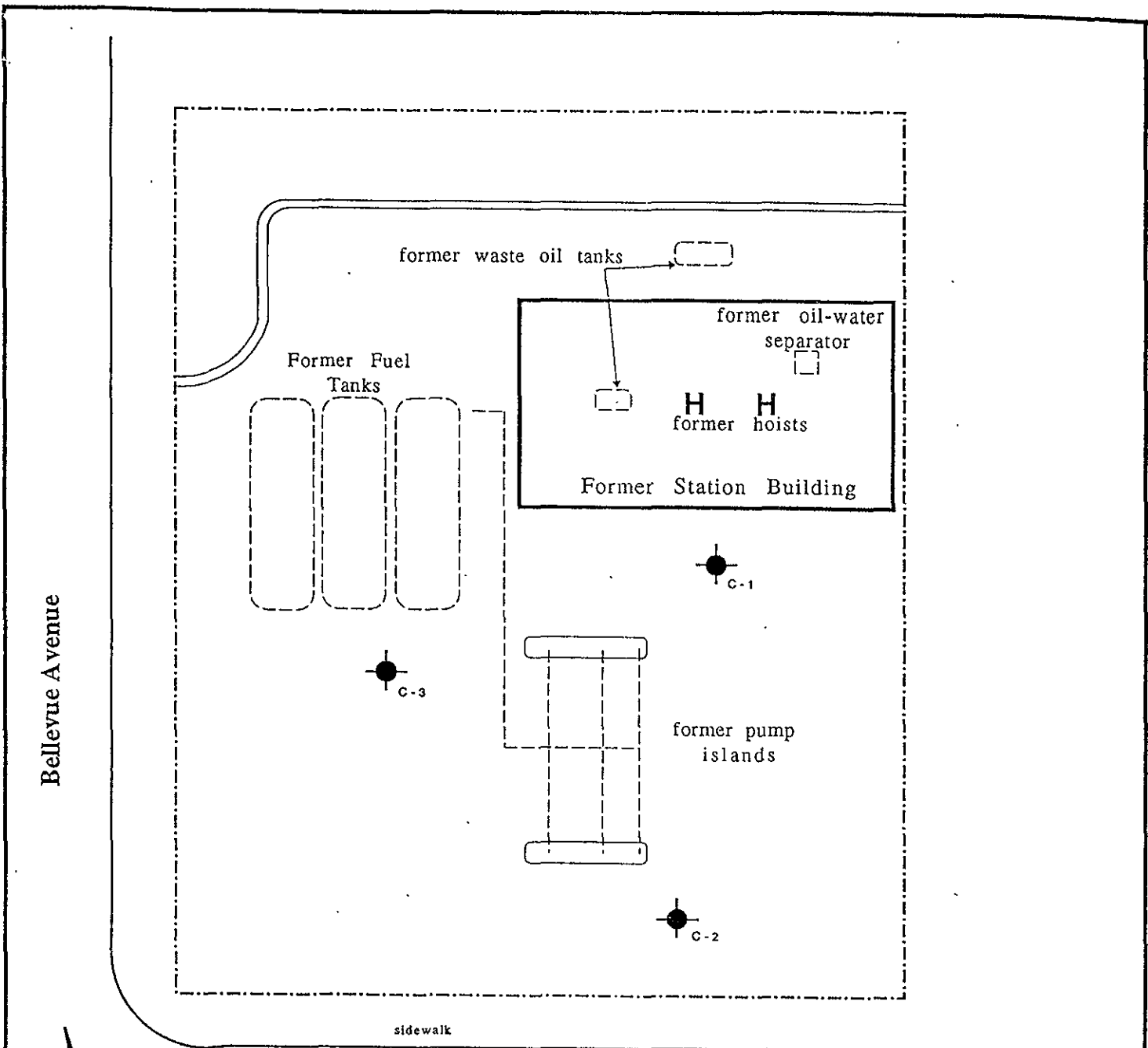
4

PROJECT NUMBER
0006-1

DRAWN
PM

APPROVED.

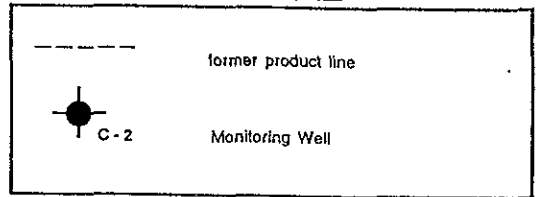
DATE
1/93



Bellevue Avenue

Grand Avenue

LEGEND

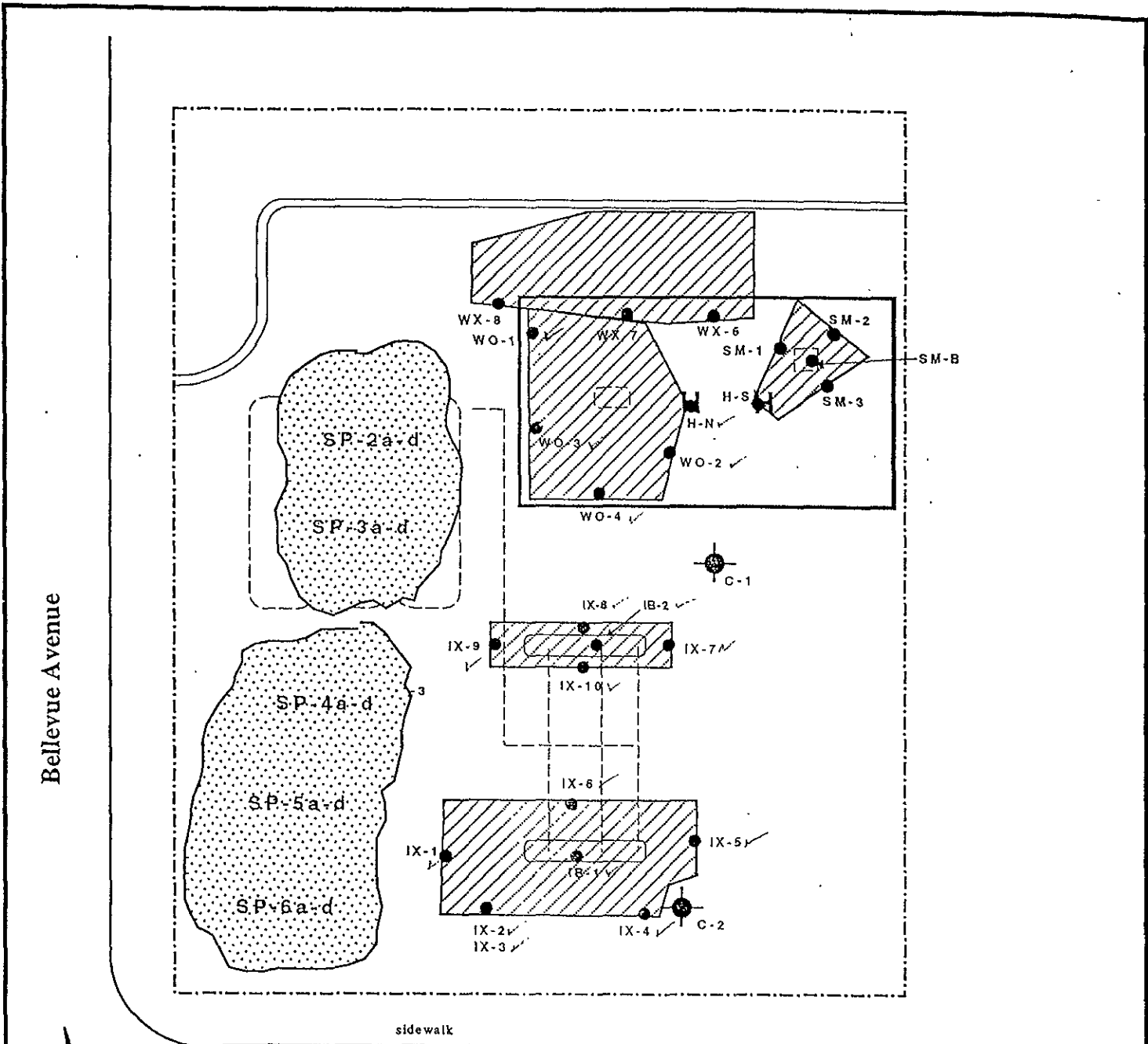


scale 1" = 20'



Site Plan
460 Grand Avenue
Oakland, California

Figure 4 5	
3-13-94	mjt
Project Number 0006-2	



Bellevue Avenue

Grand Avenue

sidewalk

LEGEND

	former product line
	Monitoring Well
	sample location
	excavation limits
	stockpiled soil

scale 1" = 20'



Excavation & Sampling
in progress
460 Grand Avenue
Oakland, California

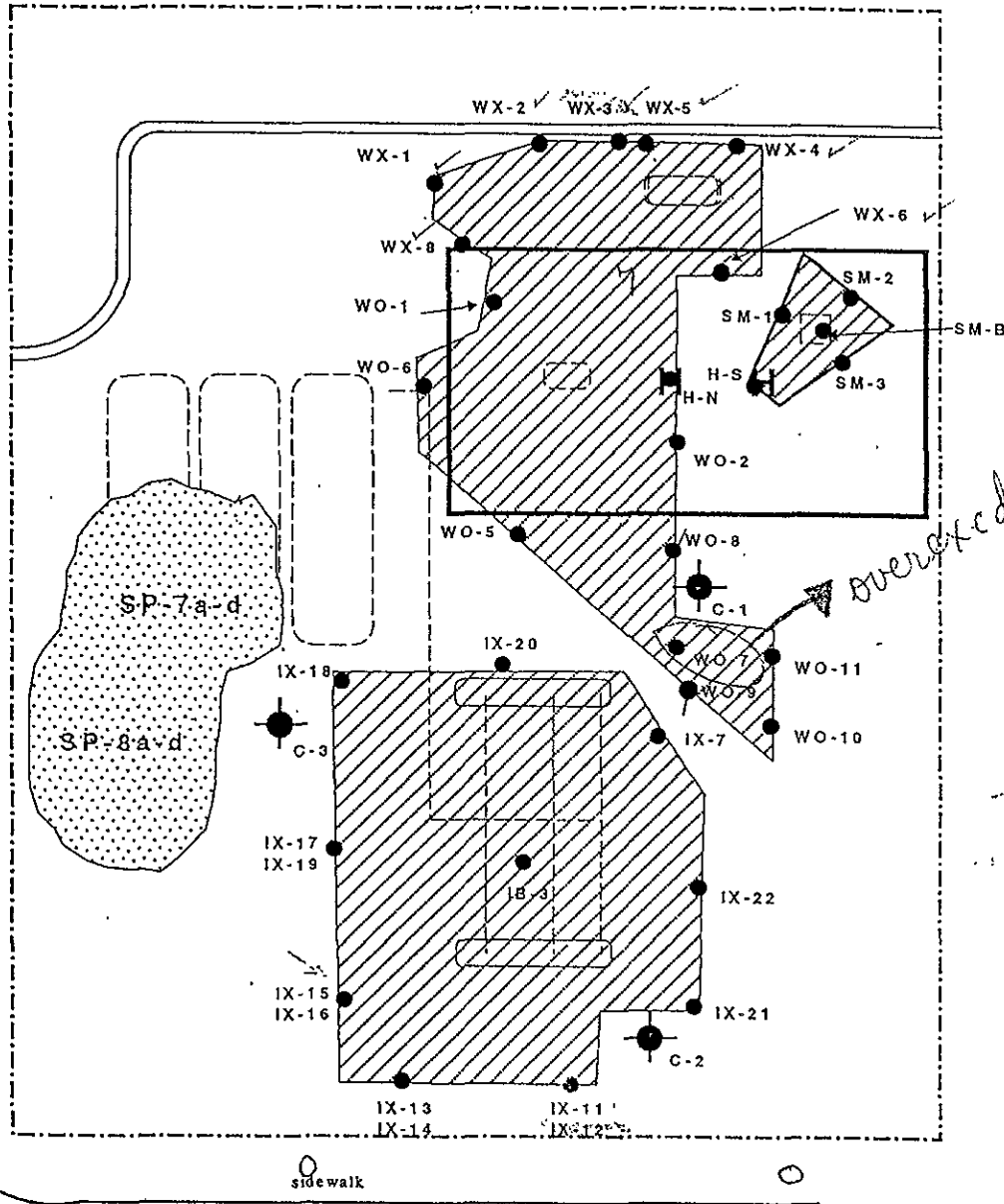
Figure *46*

3-13-94

mjt

Project Number 0006-2

Bellevue Avenue



lots left in pl
 > 1000 ppm TP
 > 100 ppm TP



Grand Avenue

future SBs ?

scale 1" = 20'

LEGEND

	former product line
	Monitoring Well
	sample location
	excavation limits
	stockpiled soil



**Touchstone
 Developments**
 Environmental Management

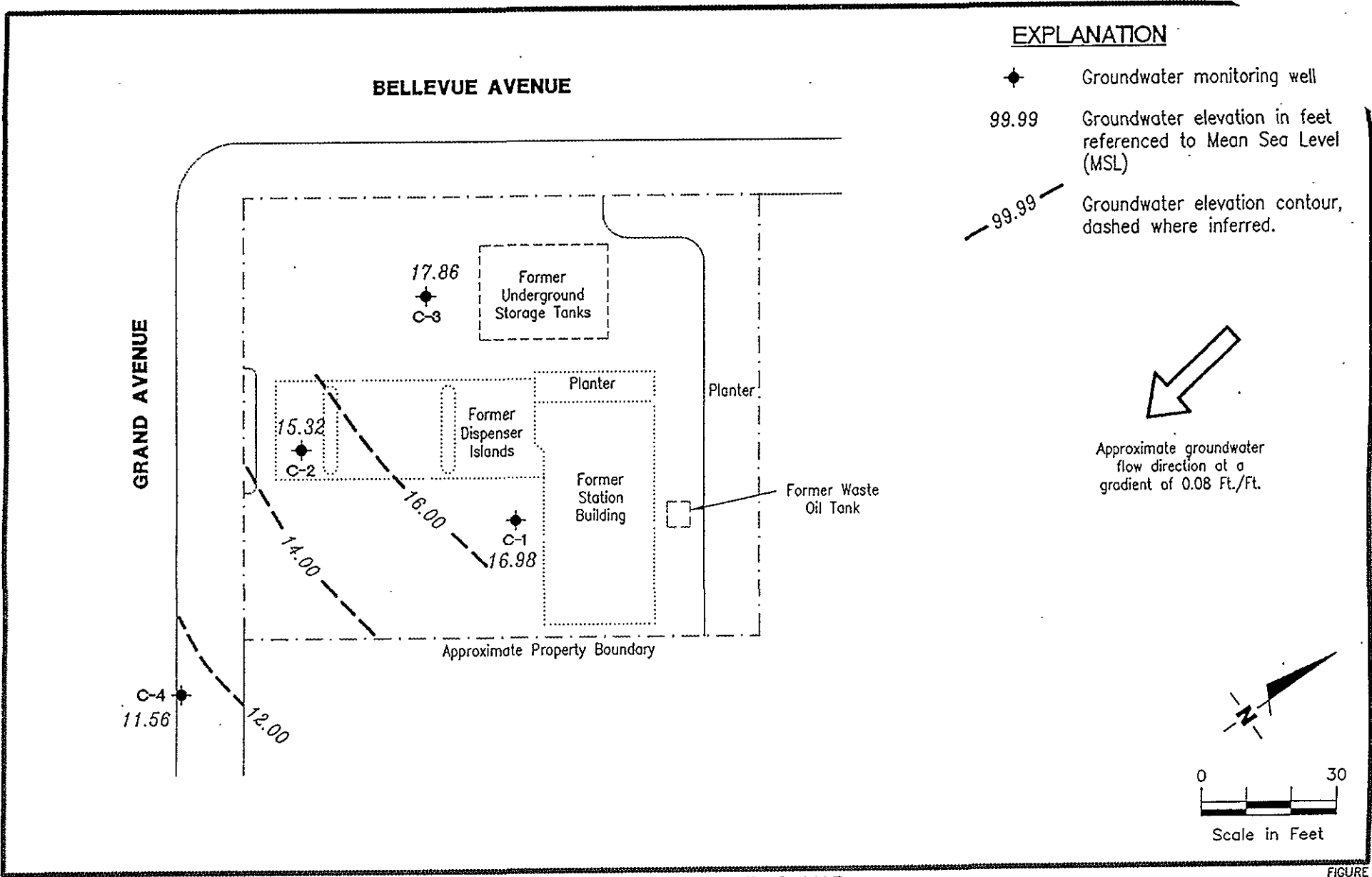
Final Excavation &
 Sample Locations
 460 Grand Avenue
 Oakland, California

Figure 7

3-13-94

mjt

Project Number 0006-2



Gettler - Ryan Inc.

6747 Sierra Ct., Suite J (510) 551-7555
Dublin, CA 94568

POTENTIOMETRIC MAP

Former Gulf Service Station No. 0006
460 Grand Avenue
Oakland, California

FIGURE
Fig. 8

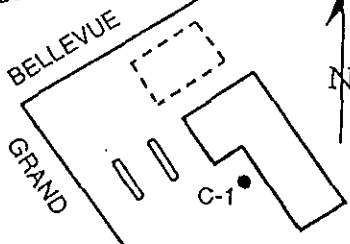
JOB NUMBER
5208.80

REVIEWED BY
PCS

DATE
December 12, 1995

REVISED DATE

LOCATION MAP



NORTHING EASTING ELEVATION

PACIFIC ENVIRONMENTAL GROUP, INC.

WELL NO. C-1
PAGE 1 OF 1

PROJECT NO. 325-31.01
 LOGGED BY: DEM
 DRILLER: BAYLANDS
 DRILLING METHOD: HSA
 SAMPLING METHOD: CAL MOD
 CASING TYPE: Sch 40 PVC
 SLOT SIZE: 0.020"
 GRAVEL PACK: 2/12 SAND

CLIENT: CHEVRON
 DATE DRILLED: 12/14/92
 LOCATION: 460 GRAND AVE., OAK
 HOLE DIAMETER: 8"
 HOLE DEPTH: 20'
 WELL DIAMETER: 2"
 WELL DEPTH: 15'
 CASING STICKUP: -0.37'

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
CEMENT SAND BENTONITE				2			FILL	Asphalt.
				4			ML	CLAYEY SILT: medium to light brown (5Y 4/3); low plasticity; blue gray mottling to 2 cm; micaceous; trace fine to medium sand; no product odor.
	Dp	142	push	6				
	Dp	1.0	22	8			CL	CLAY: olive brown (5Y 5/3); silty; micaceous; very stiff; no product odor.
	W/Sat	ND	18	10			SP	SAND: medium brown (2.5Y 4/4); <5% fines; fine to medium sand; orange brown mottling; micaceous; medium dense; no product odor.
				12				
				14			SP	
				16				
				18				
				20			CL	CLAY: yellowish brown (10YR 5/4); silty; low plasticity; micaceous; trace 1 mm wide orange brown liesegang banding; very stiff; no product odor.
				22				
				24				
				26				
				28				
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				

BOTTOM OF BORING AT 20'

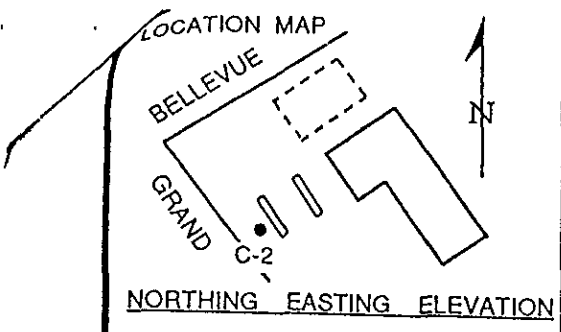
Fig. 5A

PACIFIC ENVIRONMENTAL GROUP, INC.

WELL NO. C-2
PAGE 1 OF 1

PROJECT NO. 325-31.01
 LOGGED BY: DEM
 DRILLER: BAYLANDS
 DRILLING METHOD: HSA
 SAMPLING METHOD: CAL MOD
 CASING TYPE: Sch 40 PVC
 SLOT SIZE: 0.020"
 GRAVEL PACK: 2/12 SAND

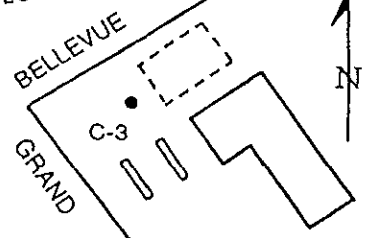
CLIENT: CHEVRON
 DATE DRILLED: 12/14/92
 LOCATION: 460 GRAND AVE., OAK
 HOLE DIAMETER: 8"
 HOLE DEPTH: 16-1/2"
 WELL DIAMETER: 2"
 WELL DEPTH: 15'
 CASING STICKUP: -0.34'



WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
CEMENT				2			FILL	Asphalt.
				4			ML	SANDY SILT (2.5Y5/3); low plasticity; 15-25% fine sand; stiff; faint product odor.
SAND	Dry	1.4	12	6				
	Dry	13	16	8			CL	CLAY: (10YR5/4); low plasticity; orange brown mottling; blue gray mottling; stiff; no product odor.
	Mst/Wt	11.8	17	12			SC	CLAYEY SAND (2.5Y5/3); 30-40% fines; micaceous; sandier and wet at 15-1/2 to 16'; medium dense; no product odor.
BENTONITE	Dry	ND	29	14			ML	CLAYEY SILT: (5Y5/3); low plasticity; micaceous; 1-2 mm wide orange brown; liesegang banding; very stiff; no product odor.
				16				BOTTOM OF BORING AT 16-1/2'
				18				
				20				
				22				
				24				
				26				
				28				
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				

Fig 5B

LOCATION MAP



NORTHING EASTING ELEVATION

PACIFIC ENVIRONMENTAL GROUP, INC.

WELL NO. C-3
PAGE 1 OF 1

PROJECT NO. 325-31.01
 LOGGED BY: DEM
 DRILLER: BAYLANDS
 DRILLING METHOD: HSA
 SAMPLING METHOD: CAL MOD
 CASING TYPE: Sch 40 PVC
 SLOT SIZE: 0.020"
 GRAVEL PACK: 2/12 SAND

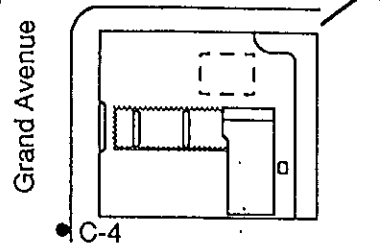
CLIENT: CHEVRON
 DATE DRILLED: 12/15/92
 LOCATION: 460 GRAND AVE., OAK
 HOLE DIAMETER: 7-1/4"
 HOLE DEPTH: 15'
 WELL DIAMETER: 2"
 WELL DEPTH: 15'
 CASING STICKUP: -0.34'

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS	
				2			FILL SC	Asphalt.	
				4					CLAYEY SAND: (5GY 4/1); 15-25% fines; fine sand; dense; faint to moderate product odor.
		Dp	320	40	6			CL	CLAY: (5G 5/1); low plasticity; micaceous; medium brown mottling; silty; hard; no to faint product odor.
		Dp	0.6	19	8				@8-1/2': (2.5Y 4/2); silty; blue green mottling; trace 1-2 cm nodules fine gray sand; stiff; no product odor.
		Sat	ND		10			SC	CLAYEY SAND: medium brown; 30-40% fines; fine to medium sand; medium dense; no product odor.
		Dp	ND	16	12				
					14			CL	CLAY: (5Y 4/2); silty; low plasticity; micaceous; 10-20% blue green mottling; stiff; no product odor.
					16				
					18				
					20				
					22				
					24				
					26				
					28				
					30				
				32					
				34					
				36					
				38					
				40					
				42					
				44					

BOTTOM OF BORING AT 15'

Fig 5C

LOCATION MAP
Bellevue Avenue



PACIFIC ENVIRONMENTAL GROUP, INC.

WELL NO. C-4
PAGE 1 OF 1

PROJECT NO. 325-031.01
 LOGGED BY: CTH
 DRILLER: V&W
 DRILLING METHOD: HSA
 SAMPLING METHOD: CALMOD
 CASING TYPE: Sch 40 PVC
 SLOT SIZE: 0.020"
 GRAVEL PACK: 2 x 12 SAND

CLIENT: CHEVRON
 DATE DRILLED: 5-4-95
 LOCATION: 460 Grand Avenue
 HOLE DIAMETER: 8"
 HOLE DEPTH: 21.5'
 WELL DIAMETER: 2"
 WELL DEPTH: 20'
 CASING STICKUP: NA

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
	Dry	0	30	2			ML	CONCRETE: 0-6" ARTIFICIAL FILL: 6"-1.5'
	Mst <i>static</i>	1.2	38	4			ML	SILT: light yellowish brown; low plasticity; minor orange brown mottling; very stiff; no product odor.
				6			ML	CLAYEY SILT: light yellowish brown; low plasticity; orange brown streaks; very stiff; no product odor.
	Mst	1.3	41	14			SP	SAND: dark yellowish brown; 5% fines; orange brown; mottling; minor mica; dense; no product odor.
	Wt	0	39	16			ML	SILT: light yellowish brown; low plasticity; minor orange brown mottling; very stiff; no product odor.
18								
				20				
				22				
				24				
				26				
				28				
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				

BOTTOM OF BORING AT 21.5'

Fig. 9

TABLE 1
 SIDEWALL SOIL SAMPLE ANALYTICAL DATA

11-29-90

FUEL TANK EXCAVATION

460 Grand Avenue
 Oakland, California

Sample No.	TVPH as Gasoline (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)	Ethyl Benzene (mg/kg)	Lead (mg/kg)
T1-1	ND	ND	0.10	ND	ND	NT
T1-2	ND	ND	0.097	ND	ND	3.8
T2-1	ND	ND	0.14	ND	ND	NT
T2-2	ND	0.019	0.065	ND	ND	ND
T3-1	ND	ND	0.220	ND	ND	NT
T3-2	ND	ND	0.063	ND	ND	3.4
Detection Limit	1.0	0.005	0.005	0.005	0.005	2.5

Notes:

TVPH = total volatile petroleum hydrocarbons
 mg/kg = milligram per kilogram
 ND = not detected at or above reporting limit
 NT = not tested

TABLE 2
ANALYTICAL DATA FOR WATER SAMPLE W-1

11-29-90

FUEL TANK EXCAVATION

460 Grand Avenue
Oakland, California

Sample No.	TVPH as Gasoline (mg/l)	TEPH as Diesel (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Total Xylenes (mg/l)	Ethyl Benzene (mg/l)
W-1	2.3 = 2,300ppb	ND	0.053 = 53ppb	0.160	0.160	0.036

Notes:

TVPH = total volatile petroleum hydrocarbons
TEPH = total extractable petroleum hydrocarbons
mg/l = milligrams per liter
ND = not detected at or above reporting limit

12-4-90

TABLE 3

PIPELINE TRENCH SOIL SAMPLE ANALYTICAL DATA

460 Grand Avenue
Oakland, California

Sample No.	TVPH as Gasoline (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)	Ethyl Benzene (mg/kg)
P-1	1,700	ND	8.7	260	47
P-2	90	ND	1.7	4.7	0.89
P-3	ND	0.0066	0.18	0.033	0.0053
P-4	ND	ND	0.036	0.0055	ND

These were collected from 6" into the native soil from the product line trench.

Notes:

TVPH = total volatile petroleum hydrocarbons
 mg/kg = milligram per kilogram
 ND = not detected at or above reporting limit

~~Table A:~~ Analytical Summary

Table 5 - 12-4-92

Fuel Tank Stockpile Samples (Soil)

Sample ID # S-1 S-2 S-3 S-4 S-5 S-6 S-7 S-8

Sample Date 12/4/92 ✓
 Laboratory Superior ✓
 TPH-Gas Not detected at or above the detection limit (ND) ✓
 Benzene ND ✓
 Toluene ND ✓
 Ethylbenzene ND ✓
 Xylene(ppm) ND ✓

Fuel Tank Excavation Water Sample

Sample ID # FT-1

Sample Date 12/4/92 ✓
 Laboratory Superior ✓
 TPH-Gas ND ✓
 Benzene ND ✓
 Toluene ND ✓
 Ethylbenzene ND ✓
 Xylenes ND ✓
 Total Lead ND ✓

Waste Oil Tank Excavation and Stockpile Samples

Sample ID # W-1 (Soil) WT-1 (Water)

58 ppm

ppm

Sample Date 12/4/92 ✓
 Laboratory Superior ✓
 TPH-Gas ND ✓
 Benzene ND ✓
 Toluene ND ✓
 Ethylbenzene ND ✓
 Xylenes ND ✓
 TPH-Diesel 190 ✓
 Oil&Grease 8400 ✓
 Nickel 30 ✓
 Cadmium ND ✓
 Chromium 23 ✓
 Lead 88 ✓
 Zinc 340 ✓
 8010 ND ✓

12/4/92
 Superior
 ND ✓
 ND ✓
 ND ✓
 ND ✓
 ND ✓
 0.170 ppm = 170 ppb ✓
 ND ✓
 17 ND ✓
 ND ✓
 ND ✓
 ND ✓
 0.07 ✓ = 70 ppb
 ND ✓

Table 6

~~Table 2~~

Summary of Soil Analytical Results Total Petroleum Hydrocarbons (TPH as Gasoline and BTEX Compounds)

Former Gulf Service Station 0006
460 Grand Avenue
Oakland, California

Boring Number	Sample Date	Sample Depth (feet)	TPH as Gasoline (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)
C-1	12/14/92	5 - 6-1/2	8.6*	ND	ND	0.024	0.012
		8-1/2 - 10	ND	ND	ND	ND	ND
C-2	12/14/92	5 - 6-1/2	2,300	13	80	83	440
		8-1/2 - 10	ND	ND	0.006	ND	0.017
C-3	12/15/92	5 - 6-1/2	0.6	0.008	ND	0.012	ND
		8-1/2 - 10	ND	ND	ND	ND	ND
EB-1	12/15/92	6-1/2 - 7	3.3	0.094	0.30	0.16	0.73
Detection Limits:			0.3	0.005	0.005	0.005	0.005
TPH = Total petroleum hydrocarbons ppm = Parts per million ND = Not detected * A typical chromatograph pattern; see certified analytical reports.							

Table 1

~~Table A~~: Analytical Summary for Over-excavation Samples (in ppm)

Waste Oil Tank Excavation Sampling Results

Sample ID	Depth (FT)	TPH-gas	Benzene	Toluene	Ethyl Benzene	Xylenes	TPH-D	TOG	8010	8270	Metals
WX-1 ✓	6 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	2 ✓	ND ✓	ND ✓	ND ✓	• ✓
WX-2 ✓	5.5 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	• ✓
WX-3 ✓	3 ✓	30 ✓	ND ✓	ND ✓	ND ✓	0.95 ✓	1300 ✓	970 ✓	• ✓	• ✓	• ✓
WX-4 ✓	6 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	470 ✓	ND ✓	ND ✓	ND ✓	• ✓
WX-5 ✓	6 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	24 ✓	ND ✓	ND ✓	ND ✓	• ✓
WX-6 ✓	6 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	3 ✓	ND ✓	ND ✓	ND ✓	• ✓
WX-7 ✓	6 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	14 ✓	ND ✓	ND ✓	ND ✓	• ✓
WX-8 ✓	6 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓	2 ✓	ND ✓	ND ✓	ND ✓	• ✓
WO-1 ✓	6 ✓	ND ✓	ND ✓	ND ✓	ND ✓	0.008 ✓	ND ✓	ND ✓	ND ✓	ND ✓	• ✓
WO-2 ✓	6 ✓	ND ✓	ND ✓	ND ✓	ND ✓	0.011 ✓	ND ✓	ND ✓	ND ✓	ND ✓	• ✓
WO-3 ✓	6.5 ✓	170 ✓	ND ✓	ND ✓	0.36 ✓	0.34 ✓	gone 4400 ✓	120 ✓	ND ✓	ND ✓	• ✓
WO-4 ✓	6.5 ✓	27 ✓	ND ✓	0.007 ✓	0.064 ✓	0.18 ✓	gone 130 ✓	210 ✓	ND ✓	ND ✓	• ✓
WO-5 ✓	5 ✓	ND ✓	ND ✓	ND ✓	ND ✓	0.005 ✓	ND ✓	ND ✓	NA ✓	NA ✓	NA ✓
WO-6 ✓	5 ✓	5* ✓	ND ✓	ND ✓	ND ✓	0.011 ✓	17* ✓	ND ✓	NA ✓	NA ✓	NA ✓
WO-7 ✓	5 ✓	16* ✓	ND ✓	0.008 ✓	ND ✓	0.066 ✓	gone 51* ✓	ND ✓	NA ✓	NA ✓	NA ✓
WO-8 ✓	4.5 ✓	10* ✓	0.005 ✓	0.007 ✓	0.007 ✓	0.031 ✓	gone 200* ✓	ND ✓	NA ✓	NA ✓	NA ✓
WO-9 ✓	5.5 ✓	49 ✓	0.077 ✓	0.71 ✓	0.99 ✓	6.43 ✓	10 ✓	ND ✓	• ✓	ND ✓	NA ✓
WO-10 ✓	5 ✓	18 ✓	ND ✓	ND ✓	0.084 ✓	0.36 ✓	90 ✓	ND ✓	ND ✓	ND ✓	NA ✓
WO-11 ✓	4.5 ✓	ND ✓	ND ✓	ND ✓	ND ✓	0.006 ✓	2 ✓	ND ✓	ND ✓	ND ✓	NA ✓

1-3-94
1-5-94
1-20
1-21

LIQ STLC

Pump Island Excavation Sampling Results

Sample ID	Depth (FT)	TPH-gas	Benzene	Toluene	Ethyl Benzene	Xylenes
IB-1 ✓	9 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓
IB-2 ✓	7 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓
IB-3 ✓	9 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓
IX-1 ✓	8.5 ✓	18 ✓	0.97 ✓	2.2 ✓	0.4 ✓	2.5 ✓
IX-2 ✓	8.5 ✓	1900 ✓	2 ✓	11 ✓	15 ✓	66 ✓
IX-3 ✓	3 ✓	390 ✓	1.3 ✓	5.8 ✓	1.9 ✓	8.7 ✓
IX-4 ✓	8 ✓	84 ✓	0.89 ✓	3.2 ✓	2.6 ✓	16 ✓
IX-5 ✓	8 ✓	4 ✓	0.73 ✓	0.62 ✓	0.12 ✓	0.62 ✓
IX-6 ✓	7 ✓	ND ✓	ND ✓	ND ✓	ND ✓	0.008 ✓
IX-7 ✓	7 ✓	ND ✓	0.016 ✓	0.013 ✓	0.017 ✓	0.068 ✓
IX-8 ✓	6 ✓	1 ✓	0.023 ✓	0.21 ✓	0.056 ✓	0.38 ✓
IX-9 ✓	7 ✓	1 ✓	0.005 ✓	0.064 ✓	0.032 ✓	0.21 ✓
IX-10 ✓	7.5 ✓	ND ✓	ND ✓	ND ✓	ND ✓	ND ✓
IX-11 ✓	5 ✓	3 ✓	0.6 ✓	0.24 ✓	0.097 ✓	0.5 ✓
IX-12 ✓	9 ✓	2600 ✓	12 ✓	120 ✓	46 ✓	240 ✓
IX-13 ✓	5.5 ✓	21 ✓	0.41 ✓	0.077 ✓	0.19 ✓	0.13 ✓
IX-14 ✓	10 ✓	7 ✓	1 ✓	0.92 ✓	0.2 ✓	0.78 ✓
IX-15 ✓	5 ✓	9 ✓	1.2 ✓	1.2 ✓	0.13 ✓	0.68 ✓
IX-16 ✓	9.5 ✓	780 ✓	3.7 ✓	31 ✓	20 ✓	100 ✓
IX-17 ✓	6 ✓	7 ✓	0.25 ✓	1.2 ✓	0.32 ✓	1.9 ✓
IX-18 ✓	4 ✓	15 ✓	0.18 ✓	0.49 ✓	0.52 ✓	3.1 ✓
IX-19 ✓	8.5 ✓	ND ✓	0.11 ✓	0.01 ✓	0.055 ✓	0.029 ✓
IX-20 ✓	5 ✓	ND ✓	ND ✓	0.006 ✓	ND ✓	0.008 ✓
IX-21 ✓	6 ✓	900 ✓	1.7 ✓	35 ✓	16 ✓	110 ✓
IX-22 ✓	6 ✓	14 ✓	0.26 ✓	0.94 ✓	0.17 ✓	1.5 ✓

1-21
20-94
1-21

✓ hits left in place
highest hits:
1,300 TPHd WX-3 3' bgs
970 TOG WX-3 "
2,600 TPHg IX-12 4' bgs
12 benzene IX-12 "

* = see certified analytical reports
NA = analysis not requested
ND = not detected
TPH-gas = Total petroleum hydrocarbons calculated as gasoline
TPH-D = Total petroleum hydrocarbons calculated as diesel
TOG = Total oil and grease

HITS

Table 8

~~Table B~~: Analytical Summary for Hoist & Sump Excavation Samples (in ppm)

Hoist Sampling Results

1-3-94

Sample ID	Depth (FT)	TPH-gas	Benzene	Toluene	Ethyl Benzene	Xylenes	TPH-D	TOG	8010	8270	Metals
H-N ✓	7 ✓	ND	ND	ND	ND	ND	ND	ND	ND ✓	ND ✓	*
H-S ✓	8 ✓	ND	ND	ND	ND	ND	ND	ND	ND ✓	ND ✓	*

Oil-Water Separator Sampling Results

1-3-94

Sample ID	Depth (FT)	TPH-gas	Benzene	Toluene	Ethyl Benzene	Xylenes	TPH-D	TOG	8010	8270	Metals
SM-B ✓	7 ✓	ND	ND ✓	ND	ND	ND	ND ✓	ND ✓	ND ✓	ND ✓	*
SM-1 ✓	5 ✓	1 ✓	ND ✓	ND	ND	0.012	10 ✓	ND ✓	*	ND ✓	*
SM-2 ✓	5 ✓	ND ✓	ND ✓	ND	ND	ND	3 ✓	ND ✓	ND ✓	ND ✓	*
SM-3 ✓	5 ✓	ND ✓	ND ✓	ND	ND	ND	5 ✓	ND ✓	ND ✓	ND ✓	*

✓ hits left in place

~~Table C~~: Analytical Summary for Stockpile Samples (in ppm)

Stockpile Sampling Results

waste oil

1-5-94

1-20

imp island

Sample ID	TPH-gas	Benzene	Toluene	Ethyl Benzene	Xylenes	TPH-D	TOG	8010	8270	Metals
SP-2a-d	47 ✓	ND ✓	0.093	0.26	1.9	1200 ✓	2500 ✓	*	ND ✓	*
SP-3a-d	33 ✓	ND ✓	0.065	0.54	0.17	220 ✓	100 ✓	*	ND ✓	*
SP-4a-d	150 ✓	ND ✓	3	5	20	NA	NA	NA	NA	ND
SP-5a-d	1300 ✓	0.8 ✓	30	21	120	NA	NA	NA	NA	NA
SP-6a-d	2600 ✓	1.8 ✓	86	40	230	NA	NA	NA	NA	NA
SP-7a-d	130 ✓	ND ✓	2.2	2.9	20	NA	NA	NA	NA	NA
SP-8a-d	180 ✓	ND ✓	1.4	3.5	27	NA	NA	NA	NA	NA

<10X STLC
ND soluble Pb
ND org. Pb

Aerated Stockpile Sampling Results

1-19

1-26

Sample ID	TPH-gas	Benzene	Toluene	Ethyl Benzene	Xylenes
SP-4a-d	33 ✓	ND ✓	0.096	0.086	1
SP-5a-d	88 ✓	0.006 ✓	0.19	0.19	2.4
ASP-6a-d	36 ✓	ND ✓	0.11	0.067	0.72
ASP-7a-d	53 ✓	ND ✓	0.059	0.23	1.8
ASP-8a-d	14 ✓	0.29 ✓	0.89	0.27	1.3

* = see certified analytical reports
 NA = analysis not requested
 ND = not detected
 TPH-gas = Total petroleum hydrocarbons calculated as gasoline
 TPH-D = Total petroleum hydrocarbons calculated as diesel
 TOG = Total oil and grease

hits



Table 9

Table 1. Water Level Data and Groundwater Analytical Results - Former Gulf Service Station 0006, 460 Grand Avenue, Oakland, California

Well ID/ TOC (ft)	Date	DTW (ft)	GWE (msl)	Product						
				Thickness* (ft)	TPH(G) <-----ppb----->	B	T	E	X	MTBE
C-1/ 22.48 ¹	12/16/92 ^{2,3,4,5}	5.68	16.80	0	<50	<0.5	<0.3	<0.3	<0.4	—
	6/22/94	5.55	16.93	0	<50	<0.5	<0.5	<0.5	<0.5	—
	9/26/94	6.07	16.41	0	<50	<0.5	<0.5	<0.5	<0.5	—
	12/12/94	5.28	17.20	0	<50	2.9	3.8	<0.5	<0.5	—
	3/22/95	2.86	19.62	0	<50	<0.5	<0.5	<0.5	<0.5	—
	6/5/95	4.86	17.62	0	<50	<0.5	<0.5	<0.5	<0.5	—
	9/20/95	5.82	16.66	0	<50	<0.5	<0.5	<0.5	<0.5	—
	12/12/95	5.50	16.98	0	<50	<0.50	<0.50	<0.50	<0.50	8.7
C-2/ 20.49 ¹	12/16/92 ^{2,3,6,7}	7.49	13.00	0	640	63	83	37	90	—
	6/22/94	5.48	15.01	0	200	2.8	4.5	1.5	15	—
	9/26/94	6.02	14.47	0	<50	1.1	1.1	<0.5	0.5	—
	12/12/94	5.17	15.32	0	77	2.8	4.6	3.4	15	—
	3/22/95	2.60	17.89	0	590	<0.5	<0.5	38	130	—
	6/5/95	5.29	15.20	0	<50	<0.5	<0.5	1.9	4.9	—
	9/20/95	5.59	14.90	0	<50	<0.5	<0.5	<0.5	<0.5	—
	12/12/95	5.17	15.32	0	80	0.93	<0.50	<0.50	<0.50	5.1
C-3/ 22.51 ¹	12/16/92 ^{2,3,3,8}	5.17	17.34	0	<50	<0.4	<0.3	<0.3	<0.4	—
	6/22/94	5.10	17.41	0	140	5.6	3	4.2	4.4	—
	9/26/94	5.66	16.85	0	51	4.2	4.2	0.7	1.5	—
	12/12/94	4.60	17.91	0	<50	2.6	3.6	1.1	4.2	—
	3/22/95	2.31	20.20	0	<50	<0.5	<0.5	<0.5	<0.5	—
	6/5/95	4.61	17.90	0	<50	0.6	<0.5	<0.5	<0.5	—
	9/20/95	5.09	17.42	0	<50	<0.5	<0.5	<0.5	<0.5	—
	12/12/95	4.65	17.86	0	<50	<0.50	<0.50	<0.50	<0.50	0.91
C-4/ 18.44 ⁹	6/5/95	7.24	11.20	0	<50	<0.5	<0.5	<0.5	<0.5	—
	9/20/95	7.31	11.13	0	<50	<0.5	<0.5	<0.5	<0.5	—
	12/12/95	6.88	11.56	0	<50	<0.50	<0.50	<0.50	<0.50	<0.60
Trip Blank TB-LB	6/22/94	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	9/26/94	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	12/12/94	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	3/22/95	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	6/5/95	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	9/20/95	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	12/12/95	---	---	---	<50	<0.50	<0.50	<0.50	<0.50	<0.60



Table 9

~~Table 1.~~ Water Level Data and Groundwater Analytical Results - Former Gulf Service Station 0006, 460 Grand Avenue, Oakland, California
(continued)

EXPLANATION:

DTW = Depth to water
TOC = Top of casing elevation
GWE = Groundwater elevation
TPH(G) = Total Purgeable Petroleum Hydrocarbons as Gasoline
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
MTBE = Methyl-tertiary-butyl ether
ppb = Parts per billion
— = Not analyzed/not applicable

ANALYTICAL METHODS:

TPH(G) = EPA Method 8015/5030
BTEX = EPA Method 8020
MTBE = EPA Method 8020

NOTES:

Water level elevation data and laboratory analytic results prior to March 22, 1995 were compiled from Quarterly Monitoring Reports prepared for Chevron by Sierra Environmental Services.

NOTES: (continued)

- * Product thickness was measured with an MMC flexi-dip interface probe on and after June 22, 1994.
- ¹ TOC elevation is actually top of box elevation.
- ² TPH(D) was also analyzed but not detected at detection limits of 50 ppb.
- ³ Motor oil was also analyzed but not detected at detection limits of 200 ppb.
- ⁴ Cadmium, chromium, lead, nickel and zinc were also analyzed but not detected at detection limits of 0.005, 0.01, 0.05, 0.02, and 0.01 ppm, respectively.
- ⁵ Analysis by EPA method 8010 for Halogenated Volatile Organic Compounds (HVOCs) was also performed. HVOCs were not detected at detection limits of 0.2 to 4.0 ppb.
- ⁶ Cadmium, chromium, lead, nickel and zinc were also analyzed. Chromium, Nickel and zinc were detected at 0.05, 0.08 and 0.08 ppm, respectively. Other metals not detected.
- Analysis by EPA method 8010 for HVOCs was also performed. 1,2-Dichloroethane was detected at 3.5 ppb. Other HVOCs were not detected at detection limits of 0.2 to 4.0 ppb.
- * Cadmium, chromium, lead, nickel and zinc were also analyzed. Chromium, lead, nickel and zinc were detected at 0.19, 0.07, 0.36 and 0.38 ppm, respectively. Cadmium was not detected at detection limits of 0.005 ppm.
- ⁹ TOC for well C-4 was surveyed June 9, 1995 by Mission Engineers of Santa Clara, California.