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CAMBRIA

MAY 0 2 2002

April 30, 2002

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Agency Response and Investigation Work Plan**
Former Shell Service Station
461 8th Street
Oakland, California
Incident #97093399
Cambria Project #244-1501

Dear Mr. Chan:

Effective March 1, 2002, Equiva Services LLC and Equilon Enterprises LLC are now doing business as (dba) Shell Oil Products US (Shell). On behalf of Shell, Cambria Environmental Technology, Inc. (Cambria) is submitting this *Agency Response and Investigation Work Plan* in response to a March 12, 2002 Alameda County Health Care Services (ACHCSA) letter. Presented below are the site summary, our response to the ACHCSA letter, and our proposed scope of work.

SITE SUMMARY

Site Description: The site is currently a paved parking lot located at the southwest corner of the intersection of 8th Street and Broadway in Oakland, California (see Figure 1). The property was leased by American Oil Company from at least 1965 until 1972 when the lease was assigned to Shell Oil Products Company (Shell). A Shell service station operated on the property from 1972 to 1980. The underground storage tanks (USTs) associated with the former Shell service station were removed after Shell terminated operations at the site in May 1980.

Site History: In January 1979, separate phase hydrocarbons (SPH) were reported in a Bay Area Rapid Transit (BART) tunnel under the intersection of 7th Street and Broadway. Product line testing at the site indicated a pressure leak, and the product lines were replaced in January 1979. The USTs were also tested for tightness and passed. According to the *Bart Recovery Project Log* (chronological list of events – 1/10/97 through 12/3/81) and a 1981 Groundwater Technology, Inc. *Considerations on Infiltration of Gasoline into BART KE Line* report, one observation well is reported to have been drilled to a depth of 25 feet concurrent with piping replacement with no reports of contamination. Separate-phase product samples taken from the BART tube in

Oakland, CA
San Ramon, CA
Sonoma, CA

Cambria Environmental Technology, Inc.

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January 1979 and in May 1981 reported the product as Shell Regular. Approximately 2,600 gallons (48 55-gallon drums) of a gasoline-and-water mixture are reported to have been removed from the BART tunnel between October 1979 and April 1980. The Shell station discontinued operation in May 1980, and all existing improvements, tanks and associated piping were removed at that time. It is unknown whether a UST and piping removal report exists; to date, it has not been located.

Seven monitoring wells (L-1 through L-7) were installed in 1981. Based on recommendations following this investigation, a recovery well was installed in the vicinity of well L-6 (now re-named S-6) in 1982. According to a September 14, 1993 GeoStrategies Inc. (GSI) *Work Plan*, groundwater extraction from the recovery well began in February 1982 and continued until August 1982, when the system was shut down because the effluent discharge exceeded permitted discharge levels.

Wells L-1 through L-3 were destroyed during construction in the mid-1980's and are no longer accessible. Records of the well destructions are not available. Wells L-4, L-5 and L-6 were renamed S-4, S-5 and S-6. Gettler-Ryan Inc. began gauging wells S-4 through S-6 in 1986 and collecting groundwater samples for analysis in 1988. A November 2, 1993 *Work Plan for Soil and Groundwater Sampling* prepared by Enviros, Inc. (Enviros) indicates that groundwater was extracted from wells S-5 and S-6 by bailing or by a vacuum truck beginning in October 1988.

Information collected by GSI and reported in a June 30, 1993 *Phase I Preliminary Site Assessment* identified seven sites with known UST leaks within a ¼-mile radius of the site. One of the seven sites identified is the Oakland Police Department site, which was noted in the *Bart Recovery Project Log* to have replaced leaking USTs in October 1979 and to have accepted product deliveries by a local Shell gasoline distributor. During a review of available regulatory files, GSI noted a permit to repair the product lines and dispensers at the Oakland Police Department parking lot taken out in 1984 by Egan and Paradiso Company, but no additional information was available. It appears that no environmental investigation has been conducted for this site. Info ?

In July 1994, nine soil borings were installed in the vicinity of the former pump islands and the former USTs at the site. Investigation activities are described in an August 16, 1994 Enviros *Site Investigation Report*. The maximum total petroleum hydrocarbons as gasoline (TPHg) and benzene concentrations reported in soil samples were 15 parts per million (ppm) and 0.24 ppm, respectively, collected near the former pump islands. No TPHg or benzene was reported in the area of the former piping or the former UST locations.

In December 1994, onsite monitoring wells S-8, S-9 and S-10 were installed. Investigation activities are described in a February 14, 1995 Enviros *Site Investigation Report and Quarterly Monitoring Report – First Quarter 1995*. Except for 0.014 ppm benzene in sample S-8-21.5, no TPHg or benzene was reported in soil samples collected from wells S-8 and S-9. Except for 760 ppm TPHg and 0.0032 benzene reported in sample S-10-11.5, no TPHg or benzene was reported in soil samples collected from well S-10.

Groundwater Monitoring: Periodic gauging of the site wells began at the site in 1981, and quarterly groundwater monitoring began in late 1988. Depth-to-water has ranged historically between 12.82 and 25.84 feet below grade (fbg), and typically flows south to south-southwest. Historical groundwater monitoring data indicates that onsite monitoring wells S-8, S-9 and S-10 have reported TPHg concentrations ranging from below method detection limits to 4,800 parts per billion (ppb) and benzene concentrations ranging from 1.0 ppb to 1,800 ppb. No SPH have been reported onsite. Prior to 1998, offsite well S-5 consistently reported SPH. Wells S-5 and S-6 have historically reported up to 142,000 ppb TPHg and 29,000 ppb benzene. Currently, Blaine Tech Services, Inc. (Blaine) extracts groundwater from wells S-5 and S-6 during quarterly monitoring activities.

RESPONSE TO MARCH 12, 2002 LETTER

The March 12, 2002 ACHCSA letter requests several action items be completed at the site. Our responses to each request follow excerpts from the ACHCSA letter, as indicated below.

Please provide a rose diagram for the historic groundwater gradient.

A rose diagram is included in the first quarter 2002 monitoring report for the site and on Figure 2 included herein. Based on the rose diagram, groundwater flow at the site is consistently toward the south.

Please provide a site conceptual model to explain the fate and transport of the historic catastrophic fuel release from the piping at this site.

A preliminary site conceptual model (SCM) and supporting documentation is included as Attachment A. This site conceptual model will be amended following future site activities as described below.

Please determine the groundwater flow rate at this site. This typically requires a pumping test or another aquifer testing method. This data should assist in your calculations to determine the feasibility of fuel migration from this site to the BART tunnel location and in developing your site conceptual model.

Groundwater flow velocity is calculated using the relationship shown below:

$v = ki/n$

where: v = groundwater flow velocity (feet per year)
k = hydraulic conductivity (cm/sec)
i = hydraulic gradient (unitless)
n = effective porosity (unitless)

using the conversion factors:
1 foot = 30.48 cm
1 year = 365 days/yr * 24 hrs/day * 60 min/hr * 60 sec/min

Typical soil types encountered at the site are sands and clayey sands, which collectively have hydraulic conductivity estimates ranging from 1 to 1×10^{-7} cm/sec. Based on this range of hydraulic conductivity values, a hydraulic gradient calculated from the first quarter 2002 monitoring event of 0.005, an estimated effective porosity of 0.3, and using the appropriate unit conversions, groundwater flow velocities of between 0 and 17,250 feet per year are calculated using the relationship shown above. While this calculation obviously provides a wide variability, Cambria does not feel it is necessary to gather site specific data to determine the feasibility of fuel migration from the site to the BART tunnel location. Cambria concedes that groundwater beneath the site could have traveled from the site to wells S-5 and S-6. However, it is unlikely that SPHs of such levels as have been measured in wells S-5 and encountered at the BART tunnel location would have traveled from the site to that location without leaving traceable levels onsite or anywhere in between, given the physical propensity for hydrocarbon constituents such as benzene to sorb to soil.

Please research the referenced Westhollow laboratory results, which identified on several occasions the fuel release as Shell product and provide us with a copy of the results.

Shell environmental engineer Karen Petryna contacted Westhollow to obtain copies of the referenced laboratory reports. Unfortunately, the laboratory did not retain records dating back to 1979 and 1981 when the SPH samples were collected, and no additional information was available.

Please discuss the appropriateness of additional soil and groundwater sampling and propose an investigation if warranted.

Cambria believes that additional soil and groundwater sampling is appropriate to further evaluate the source of the hydrocarbons detected in wells S-5 and S-6, and recommends both onsite and offsite investigation as described below.

The release scenario for the alleged downgradient sources has not been provided, as such, we do not concur with your recommendation to suspend groundwater extraction from wells S-5 and S-6. Please continue to gauge all wells on a semi-annual basis, monitor all wells except S-4 on a semi-annual basis and remove product and over-purge wells S-5 and S-6 during these events.

The existing sampling schedule is slightly different than stated by ACHCSA in its letter. Currently, wells S-5, S-6, S-8 and S-9 are gauged and sampled on a quarterly basis, and wells S-4, S-9 and S-10 are gauged on a quarterly basis and sampled on a semi-annual basis. We recommend continued quarterly gauging of all wells, and continued quarterly sampling of wells S-5 and S-6, semi-annual sampling of wells S-8, S-9 and S-10, and annual sampling of well S-4. New wells proposed below would be gauged and sampled on a quarterly basis.

Extraction from wells S-5 and S-6 has been conducted at the site since 1993. SPHs have not been detected in well S-5 since 1998 and have never been detected in well S-6. Cambria recommends that the ACHCSA allow temporary suspension of over-purging to determine steady-state groundwater conditions at the site. Cambria recommends suspension of over-purging in wells S-5 and S-6 for at least two quarters to allow for an analysis of equilibrium concentrations in both wells and a possible SPH sample to be collected. In the event that no SPHs are detected in either well after suspension of over-purging for a minimum of two quarters, Cambria will reinitiate over-purging without collecting a SPH sample.

PROPOSED SCOPE OF WORK

As stated previously, Cambria believes that additional soil and groundwater sampling is appropriate to determine the source of the hydrocarbons detected in wells S-5 and S-6. To that end, Cambria recommends the installation of two onsite monitoring wells, four offsite monitoring wells, and two onsite soil borings. The monitoring wells and soil borings will be installed in the approximate locations shown on Figure 2, assuming the absence of subsurface and overhead obstructions. Due to the danger of drilling in proximity to such large underground structures as

the BART tunnels, Cambria recommends meeting with a representative of BART prior to determining final proposed locations. Our scope of work for this investigation will include the following tasks:

Utility Location: Cambria will notify Underground Service Alert (USA) of our drilling activities. USA will identify utilities in the site vicinity. In addition, Cambria will contact BART and review our sampling proposal with their engineering department. Amended well locations may be provided following discussion with BART.

Site Health and Safety Plan: We will prepare a comprehensive site safety plan to protect site workers. The plan will be reviewed and signed by each site worker and kept onsite during field activities.

Permits: We will obtain the necessary monitoring well installation and encroachment permits from the Alameda County Public Works and the City of Oakland.

Soil Borings: Assuming the absence of subsurface and overhead obstructions, Cambria will advance eight soil borings in the approximate locations shown on Figure 2 using a drill rig equipped with hollow-stem augers. The borings will be advanced to approximately 30 fbg, and six of the eight will be converted to 2-inch diameter groundwater monitoring wells. Soil samples will be collected at 5-foot intervals. All collected soil samples will be transported under chain-of-custody to a State-approved analytical laboratory. Our standard field procedures for soil borings are included as Attachment B.

Groundwater Monitoring Well Installation: The six groundwater monitoring wells will be constructed of PVC and screened with 0.010-inch machined slot. Screen intervals will be determined based upon field conditions. A filter pack consisting of No. 2/12 sand will be installed to 2 feet above the top of the well screen, which will be overlain by 2 feet of bentonite, and bentonite-cement grout to the surface. A traffic-rated vault-box will be installed to protect the wells. The groundwater monitoring wells will be developed by surging and purging at least 10 casing volumes of water. Our standard field procedures for soil borings and monitoring well installation are included in Attachment B.

Chemical Analysis: Selected soil samples will be analyzed by a State-certified analytical laboratory using EPA Method 8260 for TPHg, BTEX and MTBE.

EPA 5030 / 8015

Reporting: Upon receipt of analytical results, we will prepare a report that, at a minimum, will contain:

- A summary of the site background and history;
- Descriptions of the drilling and sampling methods;
- Boring logs;
- Tabulated soil analytical results;
- Analytical reports and chain-of-custody forms;
- An updated SCM for the site; and
- Cambria's conclusions and recommendations.

Schedule: Upon receiving written work plan approval, Cambria will coordinate a meeting with a BART representative. Following a coordinated site visit and possibly further review of BART plans, Cambria will update the ACHCSA as to final proposed monitoring well locations. Following ACHCSA approval of the final proposed monitoring well locations, permits will be acquired and the field work will be scheduled. An investigation report will be submitted approximately 60 days after completing the field activities.

CLOSING

We appreciate the opportunity to work with you on this project. Please call Jacquelyn Jones at (510) 420-3316 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc

Jacquelyn L. Jones
Project Geologist

Diane M. Lundquist, P.E.
Principal Engineer

Figures: 1 - Vicinity/Area Well Survey Map
2 – Proposed Monitoring Well Location Map

Attachments: A – Site Conceptual Model
B – Standard Field Procedures for Monitoring Well Installation

cc: Karen Petryna, Shell Oil Products US, P.O. Box 7869, Burbank, California 91510-7869
Rory Campbell, Hanson, Bridgett, Marcus, Vlahos, & Rudy, 333 Market Street, Suite 2300, San Francisco, California 94105-2173
Wells Fargo Bank National Association, Tr. (Property Owners), c/o Pacific Property, 364 Bush Street, San Francisco, CA 94104-2805
R. Casteel & Co., P.O. Box 6839, Moraga, California 94570

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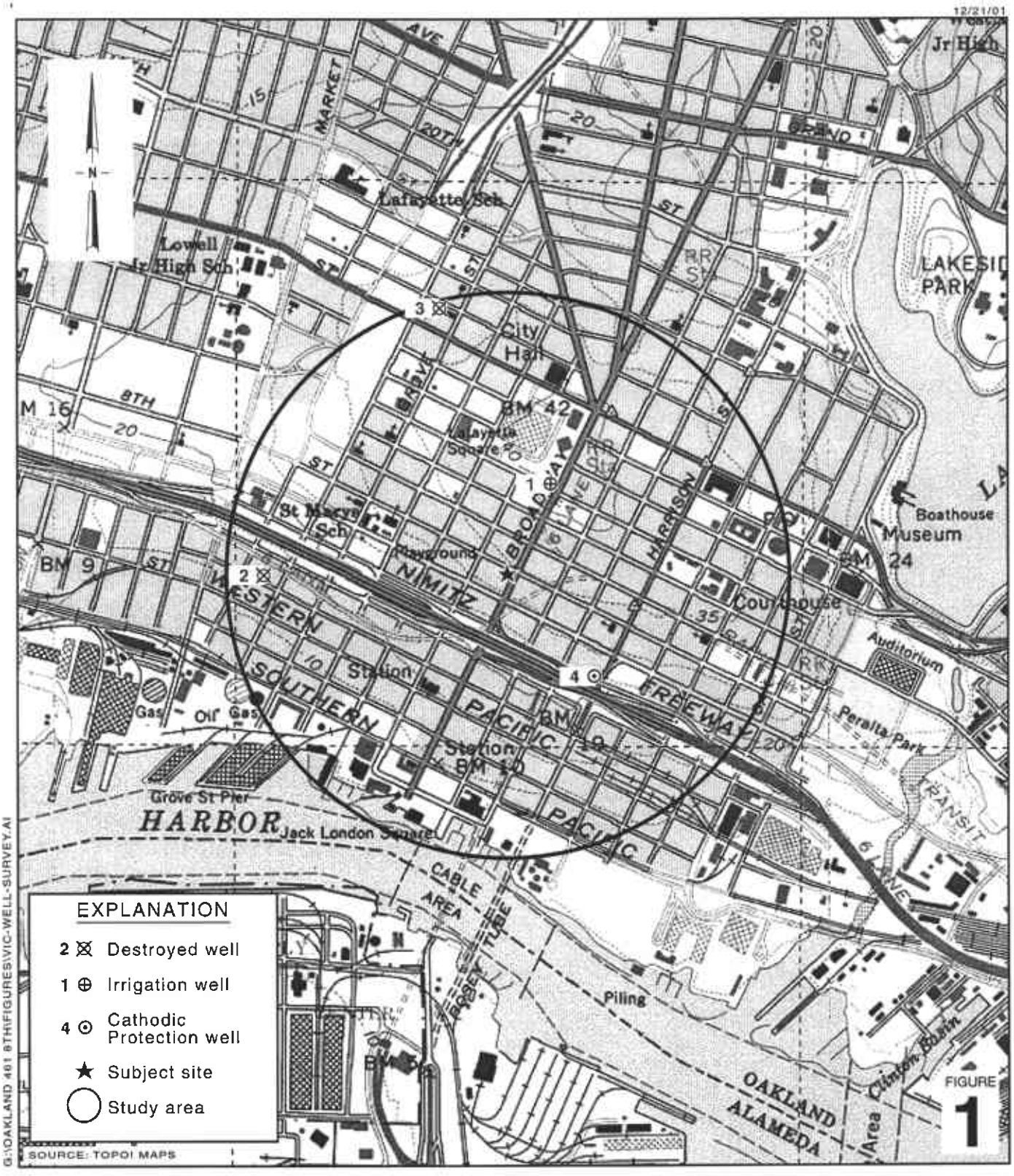

Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97093399

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Vicinity / Area Well Survey Map

1/2 Mile Radius

EXPLANATION

- Proposed monitoring well location
- Proposed soil boring location
- S-4 Monitoring well
- S-1 Abandoned monitoring well
- MH Manhole
- FL = 16.50' Flow line depth below ground surface
- Flow direction indicator
- Underground BART line
- Storm Drain line
- Water line
- Sanitary Sewer line
- Pacific Bell line
- Gas line
- Electrical line

Groundwater Flow Direction
(1Q00 to 1Q02)

Approximate Groundwater Gradient (ft/ft)
(1Q02)

S-1
former UST
S-10
former dispenser islands and fuel lines
Former Shell Station
S-8
S-9
S-6
S-5
S-4
FL = 19.12'
MH
FL = 13.27'
FL = 17.00'
FL = 17.50'
FL = 13.90'
FL = 16.50'
FL = 13.25'
SS
12" W
16" Gas
12" Gas
8" W
4" Gas
14" SS
18" SD
6" Gas
3" Gas
6" W
15" SS

BROADWAY
SIXTH STREET
SEVENTH SRTEET
EIGHTH STREET

Former Chevron Station

0 25 50 100
Scale (ft)

Proposed Monitoring Well Location Map

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Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97083399

FIGURE
2

Attachment A

Site Conceptual Model

SITE CONCEPTUAL MODEL
April 2002
Cambria Environmental Technology, Inc.

Site Address:	461 8th Street	**Incident Number:**	97093399
City:	Oakland, CA	**Regulator:**	Alameda County Health Care Services Agency

Item	Evaluation Criteria	Comments/Discussion
1	**Hydrocarbon Source**	
1.1	Identify/Describe Release Source and Volume (if known)	Shell reported a product line failure in 1979. The total volume of this release is unknown, but is estimated at 1851 gallons. Highest concentrations / separate phase hydrocarbons (SPH) have been detected offsite in wells S-5 and S-6 and in the BART tunnel at approximately Seventh and Broadway. Source of the offsite SPH is unclear based on available data.
1.2	Discuss Steps Taken to Stop Release	In January 1979, SPH were reported in the BART tunnel. Product line testing onsite indicated a pressure leak, and the product lines were replaced in January 1979. The USTs passed tank testing. The Shell station discontinued operation in May 1980, and all existing improvements, tanks and associated piping were removed at this time.
2	**Site Characterization**	
2.1	Current Site Use/Status	The site is currently a paved parking lot located at the southwest corner of the intersection of 8th Street and Broadway in Oakland, California. A Shell service station operated on the property from 1972 to 1980.
2.2	Soil Definition Status	No contamination was detected in soil samples collected during installation of monitoring wells L-1 through L-7 in 1981. Soil sampling conducted in August 1994 near the former dispenser and piping locations detected maximum TPHd, TPHg and benzene concentrations of 14 ppm, 410 ppm and 0.24 ppm, respectively, at a depth of 10 fbg beneath one of the eastern dispenser islands. This boring was not continued below 10 fbg. Benzene was not detected in any of the other soil samples collected during the investigation. Soil samples collected during the installation of well S-8 in 1994 contained a maximum benzene concentration of 0.014 ppm, and no TPHg. Soil samples collected during the installation of well S-9 did not contain any TPHg or BTEX. Up to 760 ppm TPHg and 0.0032 ppm benzene was detected within the former UST pit at a depth of 11.5 feet below grade (fbg) during the installation of well S-10. Soil samples collected from 16.5 and 21.5 fbg in well S-10 did not contain any TPHg or BTEX. Soil contamination originating onsite is defined in the downgradient direction by wells S-4, S-5, S-6 and S-9.

Item	Evaluation Criteria	Comments/Discussion
2.3	Separate-Phase Hydrocarbon Definition Status	SPHs were detected in the BART tunnel during 1979 and 1981. SPHs were detected in offsite well S-5 between 1989 and 1998. No SPHs have been detected in well S-5 since 1998. SPHs have been defined by downgradient well S-6. No SPH has been identified historically on the Shell site.
2.4	Groundwater Definition Status (BTEX)	BTEX is defined downgradient and crossgradient of the site by consistently low to non-detect concentrations in wells S-9 and S-4, respectively. The contamination detected in downgradient wells S-5 and S-6 is undefined, and the source is unknown.
2.5	BTEX Plume Stability and Concentration Trends	Concentrations in onsite well S-10 shown a decreasing to stable trend, while concentrations in wells S-8 and S-9 have shown decreasing concentrations since installation in 1994.
2.6	Groundwater Definition Status (MTBE)	MTBE is not typically detected in the site wells. It is likely that MTBE was never present at the site, and it is not considered at issue at the site.
2.7	MTBE Plume Stability and Concentration Trends	MTBE is not typically detected in the site wells. It is likely that MTBE was never present at the site, and it is not considered at issue at the site.
2.8	Groundwater Flow Direction, Depth Trends and Gradient Trends	Groundwater flow direction at the site has been consistently south to south-southwest during the last two years of monitoring at the site. An approximate groundwater gradient of 0.005 was estimated from the first quarter 2002 monitoring results. The effect of dewatering during construction activities in the vicinity of the site is unknown. It is likely that extensive dewatering took place during construction of the BART tunnels.
2.9	Stratigraphy and Hydrogeology	Subsurface sediment typically consists of sands beneath the site with clayey sands encountered in some borings. Clayey sands and clays were encountered in downgradient well S-6.
2.10	Preferential Pathways Analysis	Identified utilities in the area include water, gas and electric, sanitary sewer and storm drain lines. Depths to water, gas and electric lines are between 2 and 8 fbg. The flow-line elevations of storm drains and sanitary sewer lines in the area are between 13.3 and 17.5 feet amsl. Based on historical depths-to-water ranging from 12.82 to 25.84 fbg, which correspond to between 0.2 and 8.22 feet amsl, utility lines in the area do not encounter groundwater and therefore do not serve as preferential pathways for groundwater migration. The BART lines in the site vicinity are typically buried at between 18 and 20.5 feet and 42 to 42.5 feet to the top of the 18 feet high tunnels. These tunnels do encounter groundwater. The BART tubes were installed by tunneling north of Seventh Street, and therefore do not have significant backfill which would create a preferential pathway.

Item	Evaluation Criteria	Comments/Discussion
2.11	Other Pertinent Issues	
3	**Remediation Status**	
3.1	Remedial Actions Taken	The product lines at the site were replaced in January 1979. The station discontinued operation in May 1980, and all existing improvements, tanks and associated piping were removed at that time. Groundwater extraction was reportedly conducted between February 1982 and August 1982 in the vicinity of well S-6. Approximately 2,600 gallons of a gasoline-and-water mixture are reported to have been removed from the BART tunnel between October 1979 and April 1980. Groundwater extraction from wells S-5 and S-6 has been conducted since as early as 1988. Currently, wells S-5 and S-6 are over-purged during quarterly monitoring events conducted at the site.
3.2	Area Remediated	Remediation has been concentrated offsite in the vicinity of Seventh and Broadway where the highest concentrations/SPHs have been detected.
3.3	Remediation Effectiveness	Remediation appears to have removed the bulk of the SPHs encountered in the BART tube and in well S-5. Concentrations indicate a stable trend, ~~however~~ except, in offsite wells S-5 and S-6.
4	**Well and Sensitive Receptor Survey**	
4.1	Designated Beneficial Groundwater Use	The San Francisco Bay Region RWQCB Basin Plan identifies the following existing beneficial uses for groundwater in this region: Municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply.
4.2	Shallow Groundwater Use	Shallow wells within a half-mile of the site are associated with monitoring use. Other shallow groundwater use is unknown.
4.3	Deep Groundwater Use	There is no known use of deep groundwater in the site vicinity.
4.4	Well Survey Results	A 2001 well survey conducted by Cambria identified one cathodic protection wells, one upgradient irrigation well, and two destroyed wells within 1/2-mile radius of the site. No water-producing wells were identified within 1/2-mile radius of the site. The cathodic protection well was the only well identified in the general downgradient direction. This well is located approximately 1,300 feet south-southeast of the site and is sealed to the total depth of 120 fbg.
4.5	Likelihood of Impact to Wells	Since no water-producing wells were identified within 1/2-mile radius of the site, impact to water wells is unlikely.

Item	Evaluation Criteria	Comments/Discussion
4.6	Likelihood of Impact to Surface Water	Based on a review of the Oakland West California USGS topographic quadrangle, the nearest surface water body is the Oakland Inner Harbor, located approximately 2,400 feet south-southwest of the site at its closest point. Due to its distance, it is unlikely that contamination from the site would impact this water body.
5	**Risk Assessment**	
5.1	Site Conceptual Exposure Model (current and future uses)	The site is currently a paved parking lot located in an area of primarily commercial use.
5.2	Exposure Pathways	Soil and/or groundwater volatilization to outdoor and/or indoor air, commercial exposure.
5.3	Risk Assessment Status	No formal risk assessment has been performed.
5.4	Identified Human Exceedances	No exceedances have been identified or evaluated.
5.5	Identified Ecological Exceedances	No exceedances have been identified or evaluated.
6	**Additional Recommended Data or Tasks**	
6.1		

Attached:

Quarterly groundwater monitoring map and table, 1Q02

2001 well survey map and table

Soil sample location maps and soil analytical tables

Conduit map

Cross-sectional diagrams

Well and boring logs

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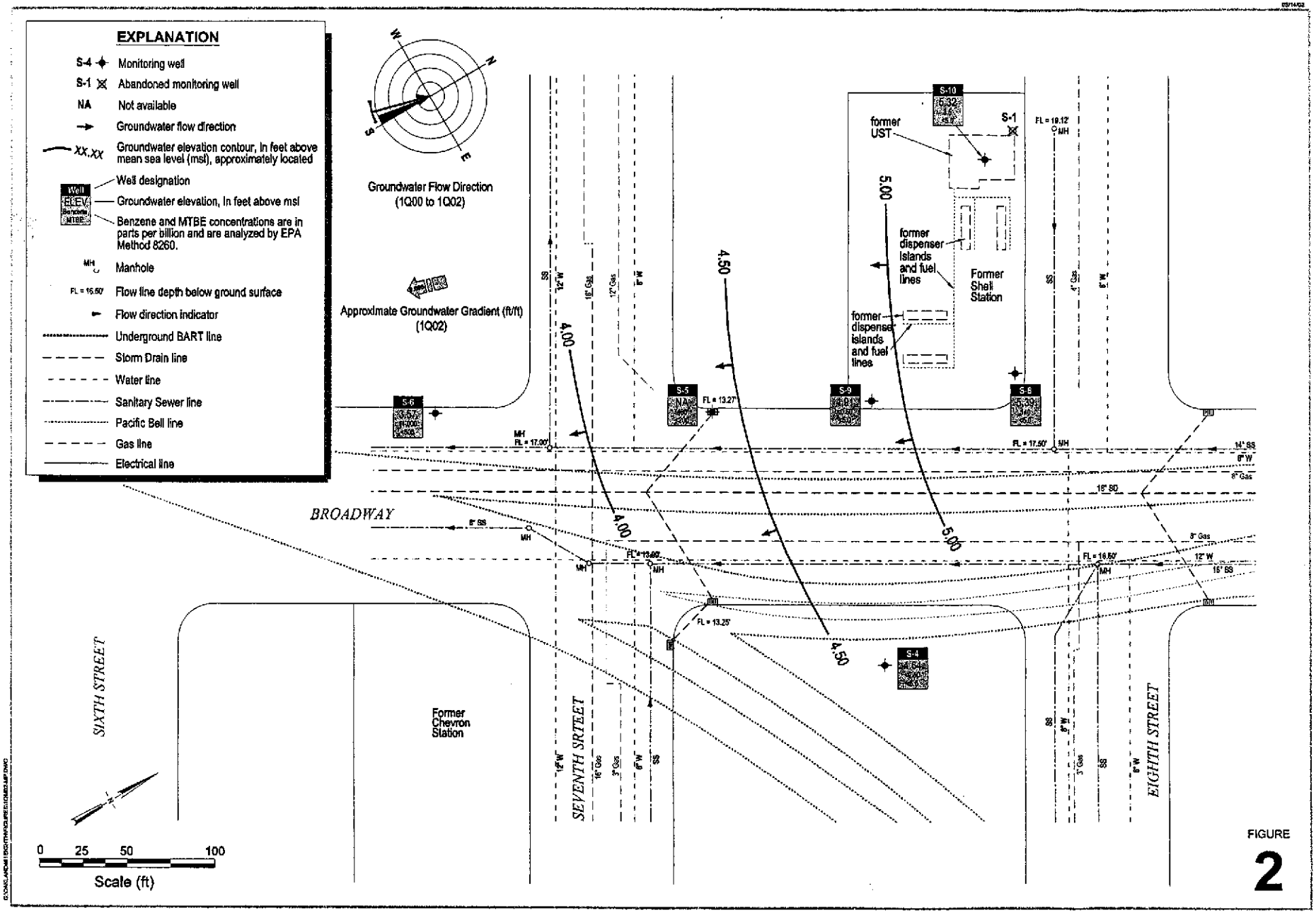

FIGURE

2

Groundwater Elevation Contour Map

January 17, 2002

Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97093399

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WELL CONCENTRATIONS
Former Shell Service Station
461 8th Street
Oakland, CA
Wic #204-5508-6200

Well ID	Date	TPPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)
S-4	10/26/1988	130	3.8	13	4.0	30	NA	NA	93.51 (TOC)	NA	NA	NA
S-4	02/14/1989	<50	0.5	<1	<1	3.0	NA	NA	93.51 (TOC)	12.82	80.69	NA
S-4	05/01/1989	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	16.48	77.03	NA
S-4	07/27/1989	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	15.84	77.67	NA
S-4	10/05/1989	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	15.98	77.53	NA
S-4	01/09/1990	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	15.86	77.65	NA
S-4	04/30/1990	<50	<0.5	<0.5	<0.5	<1	NA	NA	93.51 (TOC)	14.48	79.03	NA
S-4	07/31/1990	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	NA	NA	NA
S-4	10/30/1990	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	NA	NA	NA
S-4	05/06/1991	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	15.23	78.28	NA
S-4	06/27/1991	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	93.51 (TOC)	13.54	79.97	NA
S-4	09/24/1991	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	15.85	77.66	NA
S-4	11/07/1991	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	15.60	77.91	NA
S-4	02/13/1992	<50	<0.5	<0.5	<0.5	3.0	NA	NA	93.51 (TOC)	14.27	79.24	NA
S-4	05/11/1992	Well dry	NA	NA	NA	NA	NA	NA	93.51 (TOC)	NA	NA	NA
S-4	12/03/1992	Well inaccessible		NA	NA	NA	NA	NA	93.51 (TOC)	NA	NA	NA
S-4	05/13/1993	Well inaccessible		NA	NA	NA	NA	NA	93.51 (TOC)	14.81	78.70	NA
S-4	07/22/1993	Well inaccessible		NA	NA	NA	NA	NA	93.51 (TOC)	14.42	79.09	NA
S-4	10/20/1993	Well inaccessible		NA	NA	NA	NA	NA	93.51 (TOC)	NA	NA	NA
S-4	01/25/1994	Well inaccessible		NA	NA	NA	NA	NA	93.51 (TOC)	14.60	78.91	NA
S-4	04/25/1994	Well inaccessible		NA	NA	NA	NA	NA	93.51 (TOC)	14.39	79.12	NA
S-4	07/21/1994	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	93.51 (TOC)	22.29	71.22	NA
S-4	10/24/1994	<500	<0.3	<0.3	<0.3	<0.6	NA	NA	93.51 (TOC)	22.72	70.79	NA
S-4	12/22/1994	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	25.77*	22.25	3.52	NA
S-4	04/20/1995	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	25.77	21.16	4.61	NA
S-4	10/04/1995	<50	1.2	0.7	<0.5	<0.5	NA	NA	25.77	22.25	3.52	NA

WELL CONCENTRATIONS
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Oakland, CA
Wic #204-5508-6200

Well ID	Date	TPPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)
S-4	01/03/1996	<50	0.6	<0.5	<0.5	1.7	NA	NA	25.77	23.28	2.49	NA
S-4	04/11/1996	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	25.77	21.58	4.19	NA
S-4	07/11/1996	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	25.77	21.60	4.17	NA
S-4	10/02/1996	<50	<0.50	<0.50	<0.50	<0.50	2.6	NA	25.77	22.46	3.31	NA
S-4	01/22/1997	<50	0.73	<0.50	<0.50	0.63	<2.5	NA	25.77	20.06	5.71	NA
S-4	07/21/1997	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	25.77	22.10	3.67	NA
S-4	01/22/1998	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	25.77	20.50	5.27	NA
S-4	07/08/1998	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	25.77	20.86	4.91	NA
S-4	10/26/1998	NA	NA	NA	NA	NA	NA	NA	25.77	21.41	4.36	NA
S-4	01/28/1999	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	25.77	22.34	3.43	NA
S-4	04/23/1999	NA	NA	NA	NA	NA	NA	NA	25.77	21.43	4.34	NA
S-4	07/29/1999	<50.0	<0.500	<0.500	<0.500	<0.500	<5.00	NA	25.77	21.45	4.32	NA
S-4	11/01/1999	NA	NA	NA	NA	NA	NA	NA	25.77	22.08	3.69	NA
S-4	01/07/2000	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	25.77	22.29	3.48	NA
S-4	04/11/2000	NA	NA	NA	NA	NA	NA	NA	25.77	21.11	4.66	NA
S-4	07/19/2000	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	NA	25.77	21.19	4.58	NA
S-4	10/12/2000	NA	NA	NA	NA	NA	NA	NA	25.77	22.22	3.55	NA
S-4	01/09/2001	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	NA	25.77	22.17	3.60	NA
S-4	04/06/2001	NA	NA	NA	NA	NA	NA	NA	25.77	21.50	4.27	NA
S-4	07/25/2001	<50	2.0	0.52	<0.50	1.0	NA	<5.0	25.77	21.50	4.27	NA
S-4	11/01/2001	NA	NA	NA	NA	NA	NA	NA	25.77	21.95	3.82	NA
S-4	**01/17/2002 d**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**NA**	**<5.0**	**25.77**	**21.13**	**4.64**	**NA**
S-5	04/16/1987	130000	15000	16000	NA	14000a	NA	NA	99.36 (TOC)	NA	NA	NA
S-5	10/26/1988	110000	20000	25000	2300	10000	NA	NA	99.36 (TOC)	NA	NA	NA
S-5	02/14/1989	94000	16000	21000	1800	10000	NA	NA	99.36 (TOC)	19.87	79.49	NA
S-5	05/01/1989	120000	29000	35000	3100	15000	NA	NA	99.36 (TOC)	21.23	78.13	NA

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S-5	07/27/1989	110000	20000	29000	2400	14000	NA	NA	99.36 (TOC)	20.41	78.95	NA
S-5	10/05/1989	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	20.43	78.94	0.01
S-5	01/09/1990	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	21.16	78.21	0.01
S-5	04/30/1990	100000	13000	22000	2100	11000	NA	NA	99.36 (TOC)	20.96	78.40	NA
S-5	07/31/1990	53000	8300	14000	1200	7400	NA	NA	99.36 (TOC)	20.88	78.48	NA
S-5	10/30/1990	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	21.96	77.42	0.03
S-5	05/06/1991	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	23.00	76.46	0.13
S-5	06/27/1991	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	20.53	78.85	0.03
S-5	09/24/1991	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	21.40	78.01	0.06
S-5	11/07/1991	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	21.33	78.23	0.25
S-5	02/13/1992	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	22.52	77.09	0.31
S-5	05/11/1992	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	22.46	77.36	0.58
S-5	12/03/1992	Well inaccessible		NA	NA	NA	NA	NA	99.36 (TOC)	NA	NA	NA
S-5	05/13/1993	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	22.22	77.36	0.27
S-5	07/22/1993	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	21.68	77.88	0.25
S-5	10/20/1993	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	20.51	79.03	0.23
S-5	01/25/1994	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	21.93	77.57	0.18
S-5	04/25/1994	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	21.97	77.67	0.35
S-5	05/26/1994	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	20.84	78.80	0.35
S-5	06/10/1994	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	21.01	78.61	0.32
S-5	07/21/1994	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	22.18	77.56	0.47
S-5	08/25/1994	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	22.01	77.70	0.44
S-5	09/22/1994	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	22.00	77.48	0.15
S-5	10/24/1994	NA	NA	NA	NA	NA	NA	NA	99.36 (TOC)	22.28	77.53	0.56
S-5	12/22/1994	NA	NA	NA	NA	NA	NA	NA	22.94*	22.88	0.85	0.99
S-5	04/20/1995	NA	NA	NA	NA	NA	NA	NA	22.94	21.66	1.54	0.33
S-5	10/04/1995	NA	NA	NA	NA	NA	NA	NA	22.94	22.18	0.76	NA

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S-5	01/03/1996	NA	NA	NA	NA	NA	NA	NA	22.94	22.80	0.80	0.83
S-5	04/11/1996	NA	NA	NA	NA	NA	NA	NA	22.94	21.15	2.33	0.67
S-5	07/11/1996	NA	NA	NA	NA	NA	NA	NA	22.94	22.62	1.04	0.90
S-5	10/02/1996	NA	NA	NA	NA	NA	NA	NA	22.94	23.07	0.38	0.64
S-5	01/22/1997	NA	NA	NA	NA	NA	NA	NA	22.94	20.83	2.24	0.16
S-5	07/21/1997	NA	NA	NA	NA	NA	NA	NA	22.94	21.16	1.82	0.05
S-5	01/22/1998	NA	NA	NA	NA	NA	NA	NA	22.94	20.04	2.93	0.04
S-5	07/08/1998	220	14	40	5.8	34	3.3	NA	22.94	18.61	4.33	NA
S-5	10/26/1998	NA	NA	NA	NA	NA	NA	NA	22.94	17.31	5.63	NA
S-5	01/28/1999	51000	13000	1200	1200	2400	2400	NA	22.94	20.11	2.83	NA
S-5	04/23/1999	65600	2540	7300	1790	9840	<1000	NA	22.94	19.21	3.73	NA
S-5	07/29/1999	61400	3320	6980	1520	7700	<1000	NA	22.94	14.77	8.17	NA
S-5	11/01/1999	48200	2700	5740	1290	7850	<500	<40.0	22.94	15.56	7.38	NA
S-5	01/07/2000	39000	3900	8500	790	8300	1500	NA	22.94	15.82	7.12	NA
S-5	04/11/2000	29300	1680	5060	1130	6220	<250	NA	22.94	18.19	4.75	NA
S-5	07/19/2000	6420	2110	207	252	681	355	253b	22.94	19.01	3.93	NA
S-5	10/12/2000	41500	2940	4940	1520	7770	<250	<66.7	22.94	19.62	3.32	NA
S-5	01/09/2001	142000	7030	9550	2340	12600	779	NA	22.94	19.94	3.00	NA
S-5	04/06/2001	Well inaccessible		NA	NA	NA	NA	NA	22.94	NA	NA	NA
S-5	04/13/2001	59800	4810	10800	1950	10100	842	<10.0	22.94	14.72	8.22	NA
S-5	07/25/2001	71000	2900	6800	1700	9100	NA	<250	22.94	14.91	8.03	NA
S-5	08/13/2001	NA	NA	NA	NA	NA	NA	NA	22.94	19.43	3.51	NA
S-5	11/01/2001	Unable to locate		NA	NA	NA	NA	NA	22.94	NA	NA	NA
S-5	**01/17/2002 d**	**58000**	**460**	**3300**	**1900**	**8400**	**NA**	**<200**	**c**	**14.27**	**NA**	**NA**
S-6	04/16/1987	81000	16000	9000	NA	6400a	NA	NA	100.58 (TOC)	NA	NA	NA
S-6	10/26/1988	110000	29000	18000	2500	8200	NA	NA	100.58 (TOC)	NA	NA	NA

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S-6	02/14/1989	54000	18000	4500	1400	4000	NA	NA	100.58 (TOC)	20.87	79.71	NA
S-6	05/01/1989	93000	43000	9900	3000	8000	NA	NA	100.58 (TOC)	20.49	80.09	NA
S-6	07/27/1989	52000	20000	3200	1700	5500	NA	NA	100.58 (TOC)	21.01	79.57	NA
S-6	10/05/1989	55000	20000	2900	1600	5500	NA	NA	100.58 (TOC)	21.24	79.34	NA
S-6	01/09/1990	76000	35000	9100	2300	8600	NA	NA	100.58 (TOC)	22.62	77.96	SHEEN
S-6	04/30/1990	39000	13000	2300	900	2800	NA	NA	100.58 (TOC)	22.10	78.48	NA
S-6	07/31/1990	48000	20000	4600	1500	4900	NA	NA	100.58 (TOC)	22.00	78.58	NA
S-6	10/30/1990	27000	7400	900	600	1400	NA	NA	100.58 (TOC)	22.14	78.44	NA
S-6	05/06/1991	35000	3900	2700	2300	3500	NA	NA	100.58 (TOC)	22.40	78.18	NA
S-6	06/27/1991	51000	19000	5600	1700	6300	NA	NA	100.58 (TOC)	21.21	79.37	NA
S-6	09/24/1991	42000	14000	4300	1200	4000	NA	NA	100.58 (TOC)	22.26	78.32	NA
S-6	11/07/1991	39000	11000	2000	800	2300	NA	NA	100.58 (TOC)	22.35	78.23	NA
S-6	02/13/1992	64000	21000	6200	1600	5100	NA	NA	100.58 (TOC)	22.28	78.30	NA
S-6	05/11/1992	57000	22000	7600	2200	7700	NA	NA	100.58 (TOC)	22.10	78.48	NA
S-6	12/03/1992	110000	26000	9400	2100	8700	NA	NA	100.58 (TOC)	22.14	78.44	NA
S-6	05/13/1993	58000	21000	6800	2500	9800	NA	NA	100.58 (TOC)	22.16	78.42	NA
S-6	07/22/1993	70000	31000	14000	3000	13000	NA	NA	100.58 (TOC)	21.64	78.94	NA
S-6	10/20/1993	48000	28000	9800	3200	12000	NA	NA	100.58 (TOC)	21.62	78.96	NA
S-6	01/25/1994	70000	23000	7500	2500	8000	NA	NA	100.58 (TOC)	21.80	78.78	NA
S-6	04/25/1994	61000	16000	4000	1800	5100	NA	NA	100.58 (TOC)	21.68	78.90	NA
S-6	07/21/1994	44000	8200	3600	1400	3900	NA	NA	100.58 (TOC)	21.78	78.80	NA
S-6 (D)	07/21/1994	32000	7800	3400	1300	3700	NA	NA	22.08	NA	NA	NA
S-6	10/24/1994	2936	1184	440.6	163	648.4	NA	NA	100.58 (TOC)	22.06	78.52	NA
S-6 (D)	10/24/1994	2968	770.8	325.3	144	622	NA	NA	22.08	NA	NA	NA
S-6	12/22/1994	32000	7000	2900	790	2400	NA	NA	22.08*	21.91	0.17	NA
S-6 (D)	12/22/1994	32000	8000	3800	1100	3400	NA	NA	22.08	NA	NA	NA
S-6	04/20/1995	56000	15000	3800	1900	4900	NA	NA	22.08	21.38	0.70	NA

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S-6 (D)	04/20/1995	49000	13000	3500	1800	4700	NA	NA	22.08	NA	NA	NA
S-6	10/04/1995	49000	8400	4700	1800	4800	NA	NA	22.08	21.80	0.28	NA
S-6 (D)	10/04/1995	41000	8400	4100	1400	4400	NA	NA	22.08	NA	NA	NA
S-6	01/03/1996	52000	9100	7100	1800	5800	NA	NA	22.08	21.70	0.38	NA
S-6	04/11/1996	59000	11000	7100	2100	6400	<500	NA	22.08	21.62	0.46	NA
S-6 (D)	04/11/1996	59000	11000	6800	1900	6400	<500	NA	22.08	NA	NA	NA
S-6	07/11/1996	72000	18000	6600	2500	8400	<1000	NA	22.08	21.65	2.78	NA
S-6	10/02/1996	57000	11000	6500	1500	5100	<500	NA	22.08	21.80	2.63	NA
S-6	01/22/1997	67000	15000	5000	1800	5400	<1000	NA	22.08	19.95	2.13	NA
S-6 (D)	01/22/1997	63000	15000	4800	1800	5200	<1000	NA	22.08	NA	NA	NA
S-6	07/21/1997	61000	15000	2100	1100	3500	1900	NA	22.08	20.61	1.47	NA
S-6	01/22/1998	46000	14000	3200	1300	3400	<500	NA	22.08	19.82	2.26	NA
S-6	07/08/1998	74000	26000	7500	2200	6200	<1000	NA	22.08	18.20	3.88	NA
S-6	10/26/1998	NA	NA	NA	NA	NA	NA	NA	22.08	18.81	3.27	NA
S-6	01/28/1999	120000	9000	14000	2700	14000	3700	NA	22.08	19.73	2.35	NA
S-6	04/23/1999	58500	15900	1360	1640	3030	<2500	NA	22.08	17.58	4.50	NA
S-6	07/29/1999	36200	10300	760	930	1360	<1000	NA	22.08	21.35	0.73	NA
S-6	11/01/1999	36000	11700	767	865	1670	<1250	<40.0	22.08	19.23	2.85	NA
S-6	01/07/2000	36000	7600	4600	840	3600	<1000	NA	22.08	19.53	2.55	NA
S-6	04/11/2000	14600	7540	205	306	609	621	NA	22.08	18.16	3.92	NA
S-6	07/19/2000	2590	629	63.9	99.6	267	124	72.7b	22.08	18.40	3.68	NA
S-6	10/12/2000	32900	14200	966	1060	1790	<500	<100	22.08	19.52	2.56	NA
S-6	01/09/2001	27600	11200	675	666	1580	1430	<10.0b	22.08	19.69	2.39	NA
S-6	02/05/2001	NA	NA	NA	NA	NA	NA	NA	22.08	19.20	2.88	NA
S-6	04/06/2001	16900	7800	343	172	966	809	<20.0	22.08	18.25	3.83	NA
S-6	07/25/2001	29000	9800	1700	1000	1800	NA	<250	22.08	18.27	3.81	NA
S-6	11/01/2001	41000	15000	2400	1100	2500	NA	<500	22.08	19.30	2.78	NA

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S-6	**01/17/2002 d**	**38000**	**11000**	**1700**	**990**	**2200**	**NA**	**<500**	**22.08**	**18.51**	**3.57**	**NA**
S-8	12/22/1994	600	120	32	5.2	34	NA	NA	27.21	24.87	2.34	NA
S-8	04/20/1995	460	180	23	5.2	21	NA	NA	27.21	23.90	3.31	NA
S-8	10/04/1995	830	210	38	11	42	NA	NA	27.21	24.48	2.73	NA
S-8	01/03/1996	350	61	12	2.5	12	NA	NA	27.21	24.62	2.59	NA
S-8 (D)	01/03/1996	340	54	12	2.4	12	NA	NA	27.21	NA	NA	NA
S-8	04/11/1996	570	140	37	12	47	<6.2	NA	27.21	24.32	2.89	NA
S-8	07/11/1996	980	98	32	9.1	160	<12	NA	27.21	24.10	3.11	NA
S-8	10/02/1996	280	62	13	3.3	25	15	NA	27.21	25.38	1.83	NA
S-8 (D)	10/02/1996	490	110	24	7.0	45	22	<2.0	27.21	NA	NA	NA
S-8	01/22/1997	400	90	13	4.9	25	12	NA	27.21	23.91	3.30	NA
S-8	07/21/1997	2900	380	110	26	260	85	NA	27.21	23.62	3.59	NA
S-8 (D)	07/21/1997	3200	420	120	32	300	130	NA	27.21	NA	NA	NA
S-8	01/22/1998	3800	790	140	42	330	160	NA	27.21	23.52	3.69	NA
S-8 (D)	01/22/1998	3500	780	120	33	300	160	NA	27.21	NA	NA	NA
S-8	07/08/1998	3600	1800	<25	<25	<25	<125	NA	27.21	21.52	5.69	NA
S-8 (D)	07/08/1998	4000	1800	<25	<25	31	<125	NA	27.21	NA	NA	NA
S-8	10/26/1998	NA	NA	NA	NA	NA	NA	NA	27.21	22.01	5.20	NA
S-8	01/28/1999	2000	630	6.2	24	51	43	NA	27.21	23.03	4.18	NA
S-8	04/23/1999	1050	408	<5.00	<5.00	6.65	<50.0	NA	27.21	22.15	5.06	NA
S-8	07/29/1999	955	344	<2.50	6.90	16.2	<25.0	NA	27.21	21.95	5.26	NA
S-8	11/01/1999	1800	550	6.45	15	40.4	<50.0	NA	27.21	22.55	4.66	NA
S-8	01/07/2000	1300	600	11	29	48	<13	NA	27.21	22.87	4.34	NA
S-8	04/11/2000	342	101	4.42	4.24	14.7	21.4	NA	27.21	21.86	5.35	NA
S-8	07/19/2000	579	228	6.37	6.45	25.0	<12.5	NA	27.21	21.93	5.28	NA
S-8	10/12/2000	947	340	8.64	3.26	38.3	<12.5	<2.00	27.21	22.92	4.29	NA

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Well ID	Date	TPPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)
S-8	01/09/2001	1090	394	<10.0	<10.0	33.3	57.6	NA	27.21	23.19	4.02	NA
S-8	04/06/2001	671	182	12.5	16.4	47.1	42.5	NA	27.21	22.46	4.75	NA
S-8	07/25/2001	500	70	6.7	11	23	NA	<5.0	27.21	22.50	4.71	NA
S-8	11/01/2001	1900	250	28	39	180	NA	<5.0	27.21	22.44	4.77	NA
S-8	**01/17/2002 d**	**830**	**140**	**11**	**12**	**89**	**NA**	**<5.0**	**27.21**	**21.82**	**5.39**	**NA**
S-9	12/22/1994	2600	400	150	42	310	NA	NA	26.06	24.37	1.69	NA
S-9	04/20/1995	1900	400	130	51	200	NA	NA	26.06	23.49	2.57	NA
S-9	10/04/1995	3200	590	260	68	280	NA	NA	26.06	24.01	2.05	NA
S-9	01/03/1996	Well inaccessible		NA	NA	NA	NA	NA	26.06	NA	NA	NA
S-9	04/11/1996	2100	440	1500	42	210	<25	NA	26.06	23.61	2.45	NA
S-9	07/11/1996	5200	940	450	120	520	<50	NA	26.06	23.78	2.28	NA
S-9 (D)	07/11/1996	4800	890	430	110	500	<50	NA	26.06	NA	NA	NA
S-9	10/02/1996	3000	680	220	56	270	<62	NA	26.06	24.31	1.75	NA
S-9	01/22/1997	1500	230	71	36	130	<12	NA	26.06	23.08	2.98	NA
S-9	07/21/1997	3400	590	57	19	210	96	NA	26.06	22.83	3.23	NA
S-9	01/22/1998	2600	300	46	<10	270	62	NA	26.06	21.96	4.10	NA
S-9	07/08/1998	820	150	6.2	8	57	<10	NA	26.06	20.85	5.21	NA
S-9	10/26/1998	NA	NA	NA	NA	NA	NA	NA	26.06	21.39	4.67	NA
S-9	01/28/1999	<50	1.0	<0.50	<0.50	<0.50	<2.5	NA	26.06	22.32	3.74	NA
S-9	04/23/1999	NA	NA	NA	NA	NA	NA	NA	26.06	21.41	4.65	NA
S-9	07/29/1999	117	7.77	0.817	0.683	5.05	<5.00	NA	26.06	21.25	4.81	NA
S-9	11/01/1999	NA	NA	NA	NA	NA	NA	NA	26.06	21.92	4.14	NA
S-9	01/07/2000	<50	1.2	<0.50	<0.50	<0.50	<2.5	NA	26.06	22.11	3.95	NA
S-9	04/11/2000	NA	NA	NA	NA	NA	NA	NA	26.06	21.14	4.92	NA
S-9	07/19/2000	Well inaccessible		NA	NA	NA	NA	NA	26.06	NA	NA	NA
S-9	10/12/2000	NA	NA	NA	NA	NA	NA	NA	26.06	22.24	3.82	NA

WELL CONCENTRATIONS
Former Shell Service Station
461 8th Street
Oakland, CA
Wic #204-5508-6200

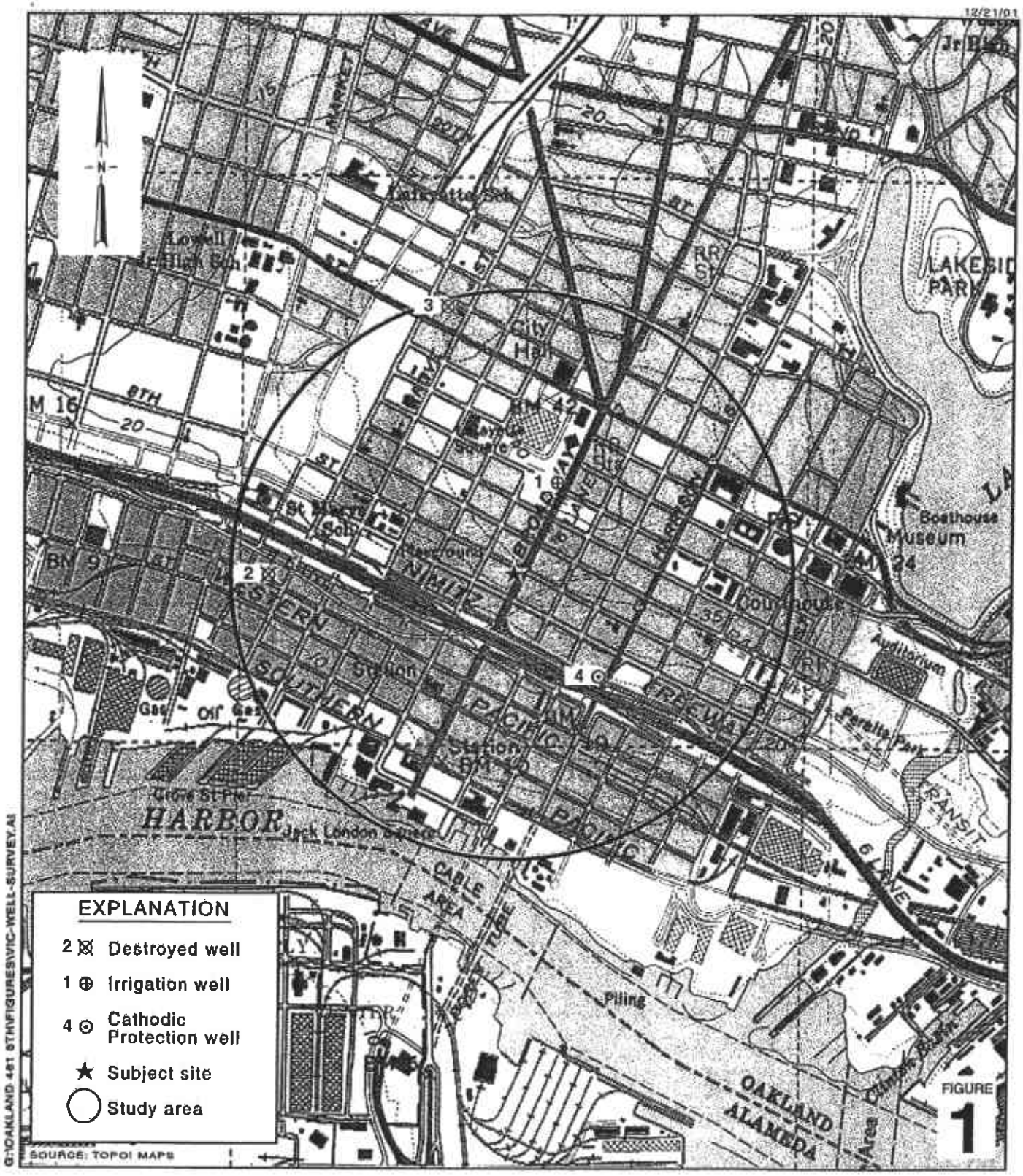
Well ID	Date	TPPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)
S-9	01/09/2001	<50.0	1.45	<0.500	<0.500	<0.500	<2.50	NA	26.06	22.52	3.54	NA
S-9	04/06/2001	NA	NA	NA	NA	NA	NA	NA	26.06	23.61	2.45	NA
S-9	07/25/2001	Well inaccessible		NA	NA	NA	NA	NA	26.06	NA	NA	NA
S-9	08/13/2001	Well inaccessible		NA	NA	NA	NA	NA	26.06	NA	NA	NA
S-9	11/01/2001	NA	NA	NA	NA	NA	NA	NA	26.06	21.78	4.28	NA
S-9	**01/17/2002 d**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**NA**	**<5.0**	**26.06**	**21.15**	**4.91**	**NA**
S-10	12/22/1994	420	27	8.0	18	45	NA	NA	28.04	25.84	2.20	NA
S-10	04/20/1995	820	49	3.7	97	52	NA	NA	28.04	24.92	3.12	NA
S-10	10/04/1995	240	6.5	1.1	16	12	NA	NA	28.04	25.47	2.57	NA
S-10	01/03/1996	1100	27	4.9	110	70	NA	NA	28.04	25.60	2.44	NA
S-10	04/11/1996	530	19	1.6	82	52	<5.0	NA	28.04	25.27	2.77	NA
S-10	07/11/1996	570	16	3.2	53	53	<2.5	NA	28.04	25.46	2.58	NA
S-10	10/02/1996	270	8.2	0.77	24	23	3.3	NA	28.04	25.81	2.23	NA
S-10	01/22/1997	160	4.8	0.73	16	11	<2.5	NA	28.04	24.74	3.30	NA
S-10	07/21/1997	530	5.7	0.70	29	69	<2.5	NA	28.04	24.50	3.54	NA
S-10	01/22/1998	1500	15	<5.0	88	130	<25	NA	28.04	24.44	3.60	NA
S-10	07/08/1998	530	4.8	1.1	47	51	<2.5	NA	28.04	22.36	5.68	NA
S-10	10/26/1998	NA	NA	NA	NA	NA	NA	NA	28.04	22.81	5.23	NA
S-10	01/28/1999	630	4.6	0.98	<0.50	59	<2.5	NA	28.04	23.82	4.22	NA
S-10	04/23/1999	NA	NA	NA	NA	NA	NA	NA	28.04	22.96	5.08	NA
S-10	07/29/1999	728	3.40	<1.00	41.8	38.0	<10.0	NA	28.04	22.63	5.41	NA
S-10	11/01/1999	NA	NA	NA	NA	NA	NA	NA	28.04	23.02	5.02	NA
S-10	01/07/2000	870	8.5	1.3	110	110	<2.5	NA	28.04	23.33	4.71	NA
S-10	04/11/2000	NA	NA	NA	NA	NA	NA	NA	28.04	22.64	5.40	NA
S-10	07/19/2000	612	3.75	<0.500	41.6	43.6	<2.50	NA	28.04	23.04	5.00	NA
S-10	10/12/2000	NA	NA	NA	NA	NA	NA	NA	28.04	23.92	4.12	NA

WELL CONCENTRATIONS
Former Shell Service Station
461 8th Street
Oakland, CA
Wic #204-5508-6200

Well ID	Date	TPPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)
S-10	01/09/2001	647	7.62	1.01	66.2	42.4	<2.50	NA	28.04	24.13	3.91	NA
S-10	04/06/2001	NA	NA	NA	NA	NA	NA	NA	28.04	25.37	2.67	NA
S-10	07/25/2001	340	1.5	<0.50	42	19	NA	<5.0	28.04	25.35	2.69	NA
S-10	11/01/2001	NA	NA	NA	NA	NA	NA	NA	28.04	23.22	4.82	NA
S-10	**01/17/2002 d**	**1100**	**3.5**	**<0.50**	**55**	**46**	**NA**	**<5.0**	**28.04**	**22.72**	**5.32**	**NA**

Abbreviations:
TPPH = Total petroleum hydrocarbons as gasoline by EPA Method 8260B; prior to July 25, 2001, analyzed by EPA Method 8015.
BTEX = Benzene, toluene, ethylbenzene, xylenes by EPA Method 8260B; prior to July 25, 2001 analyzed by EPA Method 8020
MTBE = Methyl-tertiary-butyl ether
TOC = Top of Casing Elevation
TOB = Top of Wellbox Elevation
SPH = Separate-Phase Hydrocarbons
GW = Groundwater
ug/L = Parts per billion
msl = Mean sea level
ft = Feet
<n = Below detection limit
D = Duplicate sample
NA = Not applicable

Notes:
* = Prior to December 22, 1994, well elevations taken from Top of Casing.
a = Ethylbenzene and xylenes combined.
b = This sample analyzed outside of EPA recommended holding time.
c = Depth to water measured from Top of Casing; elevation unknown.
d = Grab sampled.



Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97093399

CAMBRIA

Vicinity / Area Well Survey Map

1/2 Mile Radius

Table 1. Well Survey Results - Shell-branded Service Station, 461 Eighth Street, Oakland, California. Incident # 97093399

Well ID	Well ID	Location	Installation Date	Use	Depth (ft bgs)	Screened Interval (ft bgs)	Sealed Interval (ft bgs)
1	1S/4W-35F12	South of 11th between Clay Street and Broadway	Sept. 23, 1990	IRR	470	180-240, 300-340, 360-380, 430-470	0-90
2	1S/4W-34J2	Between 4th Street and Bart tracks, north of Castro Street	Oct. 12, 1978	DEST	108	36-100	0-24
3	1S/4W26N4	15th and Castro Streets	--	DEST	--	--	--
4	1S/4W-35Q1	6th and Harrison	May 30, 1973	CATH	120	--	0-120

Well Locations provided by the State of California Department of Water Resources

Notes and Abbreviations:

Map ID = Column number refers to map location on Figure 2.

Well ID = California State well identification number as recorded by the Department of Water Resources in Sacramento, California.

IRR = Irrigation

DEST = Destroyed

CATH = Cathodic

-- = Information not provided

EXPLANATION
S-4 Monitoring well location
NINTH STREET
EIGHTH STREET
SEVENTH SRTEET
WASHINGTON STREET
BROADWAY
FRANKLIN STREET
INTERSTATE 880
Former Blue and White Cab Co. 807 Broadway
Former Phillips 66 Station
Former Richfield Station 800 Franklin
8th Street Garage 362 8th
approximate UST location
S-10
S-8
Former Shell Service Station 481 Eighth Street
approximate dispenser island and fuel line locations
S-9
S-5
S-4
Former True B Service 713 Franklin
Former Service Station 625 Washington
City of Oakland Hall of Justice Police Administration Building 455 Seventh Street
S-6
Former Chevron 636 Broadway
Former Flying A Service 629 Franklin
approximate UST Location - Oakland Police Motorpool
0 50 100
Scale (ft)
FIGURE
1
Site Map
CAMBRIA
Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97093389

TABLE 1
SOIL CHEMICAL ANALYTICAL DATA

FORMER SHELL SERVICE STATION
461 8TH STREET,
OAKLAND, CALIFORNIA
WIC 204-5508-6205

WELL NUMBER	SAMPLE NO.	DEPTH (FT.)	SAMPLE DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYL BENZENE (PPM)	XYLENES (PPM)
S-8	S-8-6.5	6.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-8-11.5	11.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-8-21.5	21.5	7-Dec-94	<1	0.014	<0.0025	<0.0025	<0.0025
S-9	S-9-6.5	6.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-9-11.5	11.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-9-21.5	21.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
S-10	S-10-6.5	6.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-10-11.5	11.5	7-Dec-94	760	0.0032	0.028	6.4	6.9
	S-10-16.5	16.5	7-Dec-94	<1	<0.0025	<0.0025	0.0031	<0.0025
	S-10-21.5	21.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025

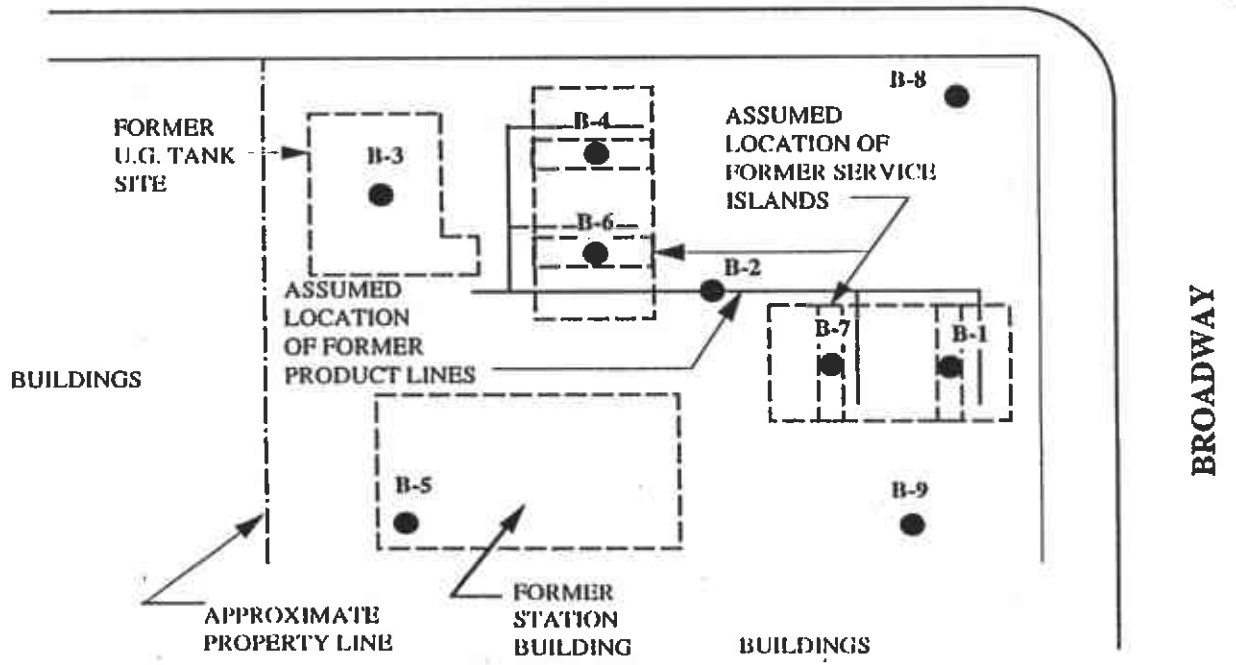
Abbreviations:

FT = Measurements in feet
TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
PPM = Parts Per Million.
<x = Not Detected at detection limit of x

EXPLANATION

● Exploratory Soil Boring

Note: Soil probes driven on 7-6-94 and 7-7-94.



Base Map: GeoStrategies, Inc. Site Plan 9/93

PLATE **2**

SITE PLAN
Former Shell Service Station
461 Eighth Street
Oakland, California

enviros®
E493216

Drawn By: DML/JLP Date: 8-4-94

Approved By: _____ Date: 8-5-94

TABLE 1
SOIL ANALYTICAL DATA
Former Shell Service Station
461 Eighth Street
Oakland, California
WIC 204-5508-6205

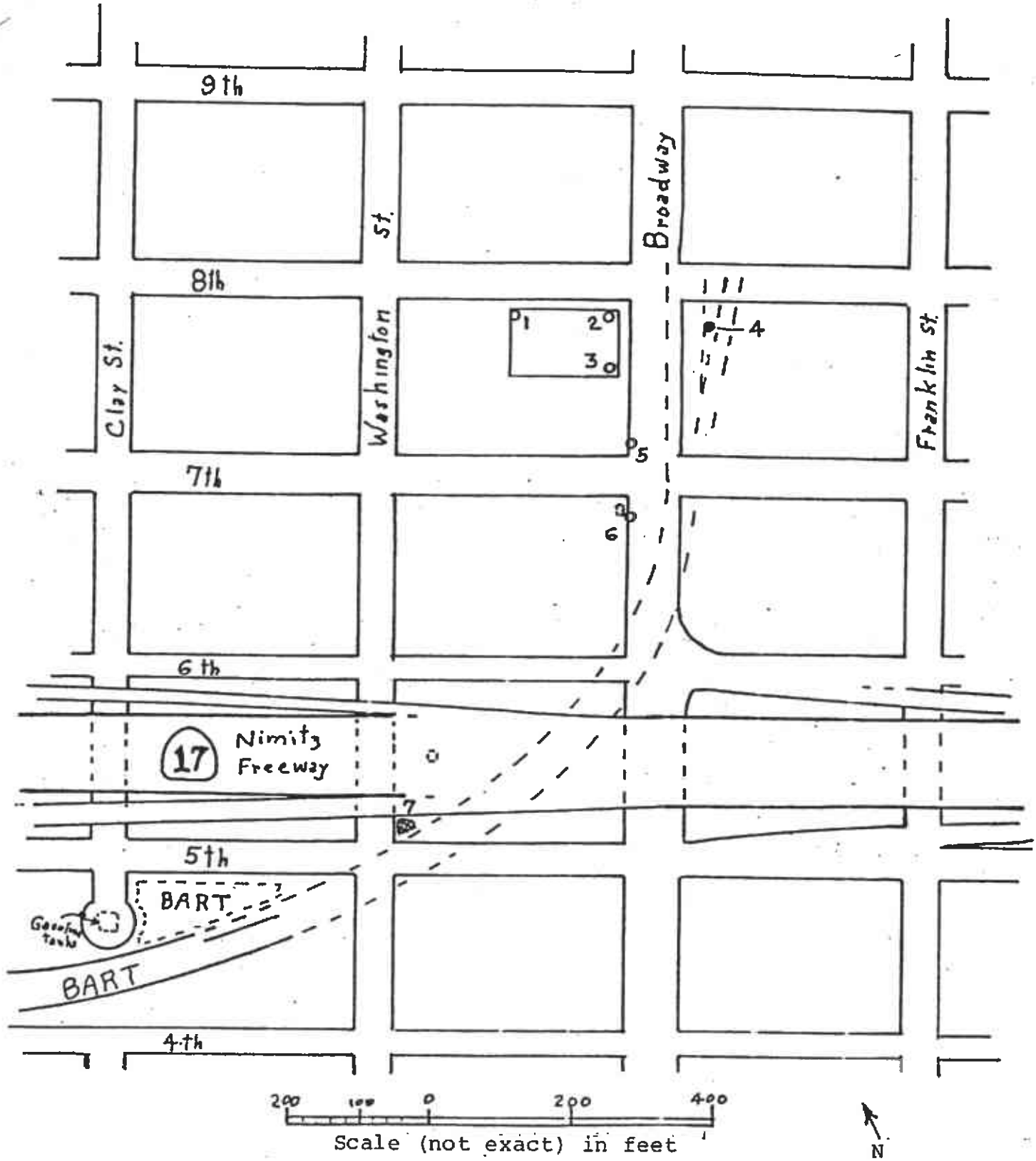
SAMPLE DATE	SAMPLE NO.	DEPTH (FT.)	TPH-G (PPM)	TPH-D (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYL BENZENE (PPM)	XYLENES (PPM)	OIL & GREASE (PPM)
7/6/94	**B1-5.0**	5.0	<1	28a	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B1-10.0**	10.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B2-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B2-15.0**	15.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B2-20.0**	20.0	<1	<2	<0.0025	0.0028b	<0.0025	0.003b	---
7/6/94	**B3-10.0**	10.0	<1	50a	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B3-15.0**	15.0	<1	4.1	<0.0025	<0.0025	<0.0025	0.025	---
7/6/94	**B4-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B4-10.0**	10.0	15	13c	<0.0025	0.037	0.027	0.21	---
7/7/94	**B5-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	54
7/7/94	**B5-9.75**	9.75	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	<50
7/7/94	**B6-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B6-18.5**	18.5	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B7-5.0**	5.0	<1	31a	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B7-10.0**	10.0	14	410c	0.24	0.89	0.31	2.0	---
7/7/94	**B8-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B8-9.0**	9.0	<1	<4	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B9-5.0**	5.0	<1	<1	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B9-14.5**	14.5	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---

Abbreviations:

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
TPH-D = Total Petroleum Hydrocarbons calculated as Diesel.
PPM = Parts Per Million.
<x = Not Detected at detection limit of x
--- = Not Analyzed

Notes:

a = The polltive result appears to be a heavier hydrocarbon than Diesel.
b = Positive result confirmed by secondary column or GC/MS analysis.
c = The positive result appears to be a lighter hydrocarbon than Diesel.



Map of part of Oakland, California
Showing location of proposed
Test wells to be drilled

8-7-81
CFB

BROWN AND CALDWELL
CONSULTING ENGINEERS

ENVIRONMENTAL SCIENCES DIVISION

D. H. CALDWELL, PE Chairman
T. V. LUTGE, PE President
R. C. ABERLEY, PE Exec Vice Pres
S. A. FISHER, Vice Pres

September 30, 1981

Mr. Terry Cowhey
Cowhey Pacific Drilling
P.O. Box 11252
Santa Rosa, CA 94506

705-4

TRANSMITTAL OF GASOLINE FINGERPRINTING RESULTS

Date Sampled: As Noted
Date Received: As Noted

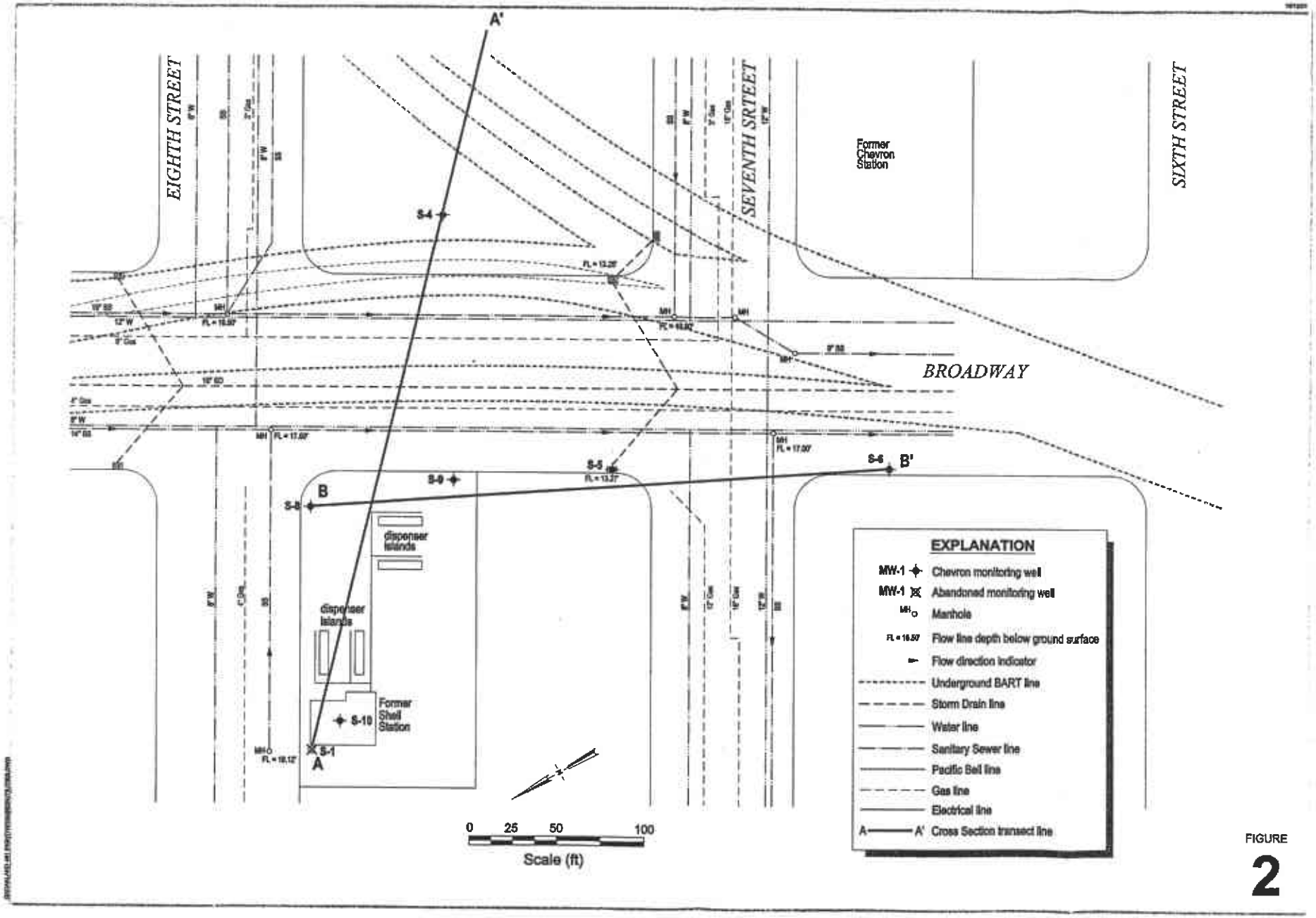
Log No.	Sample Description/Identification	Results
79D1	Gas Standard; 8/25/81	Standard
79D2	Soil Sample L-1; 8/25/81	None Detected
79M2	Soil Sample L-2; 8/26/81	None Detected
80D1	Soil Sample L-3 #1; 8/28/81	None Detected
80D2	Soil Sample L-3 #2; 8/28/81	None Detected
80D3	Soil Sample L-3 #3; 8/28/81	None Detected
81A1	Soil Sample L-4 #1; 8/31/81	None Detected
81A2	Soil Sample L-3 #4; 8/31/81	None Detected
81A3	Gasoline Pump East Oakland; Police Department; 8/31/81	Standard
82W1	Soil Sample L-5 #1; 9/3/81	None Detected
82W2	Soil Sample L-5 #2; 9/3/81	None Detected
82W3	Soil Sample L-6 #1; 9/3/81	None Detected
84E1	Soil Sample L-6 #1; 9/8/81	None Detected
84E2	Soil Sample L-6 #2; 9/8/81	None Detected
84E3	Soil Sample L-6 #3; 9/8/81	None Detected
84E4	Soil Sample L-6 #4; 9/8/81	None Detected

Log No.	Sample Description/Identification	Results
85M1	Soil Sample L-7 #1; 9/10/81	None Detected
85M2	Soil Sample L-7 #2; 9/10/81	None Detected
85M3	Soil Sample L-7 #3; 9/10/81	None Detected

Positive identifications would have been made if the concentration of gasoline had been greater than 250 ppm.

Reported by: _____
Edward Wilson
Laboratory Director

cc Mr. James Ballerino, Cowhey Pacific Drilling



FIGURE

2

Underground Utility Locations and Underground BART Lines

Former Shell-branded Station
461 Eighth Street
Oakland, California

CAMBRIA

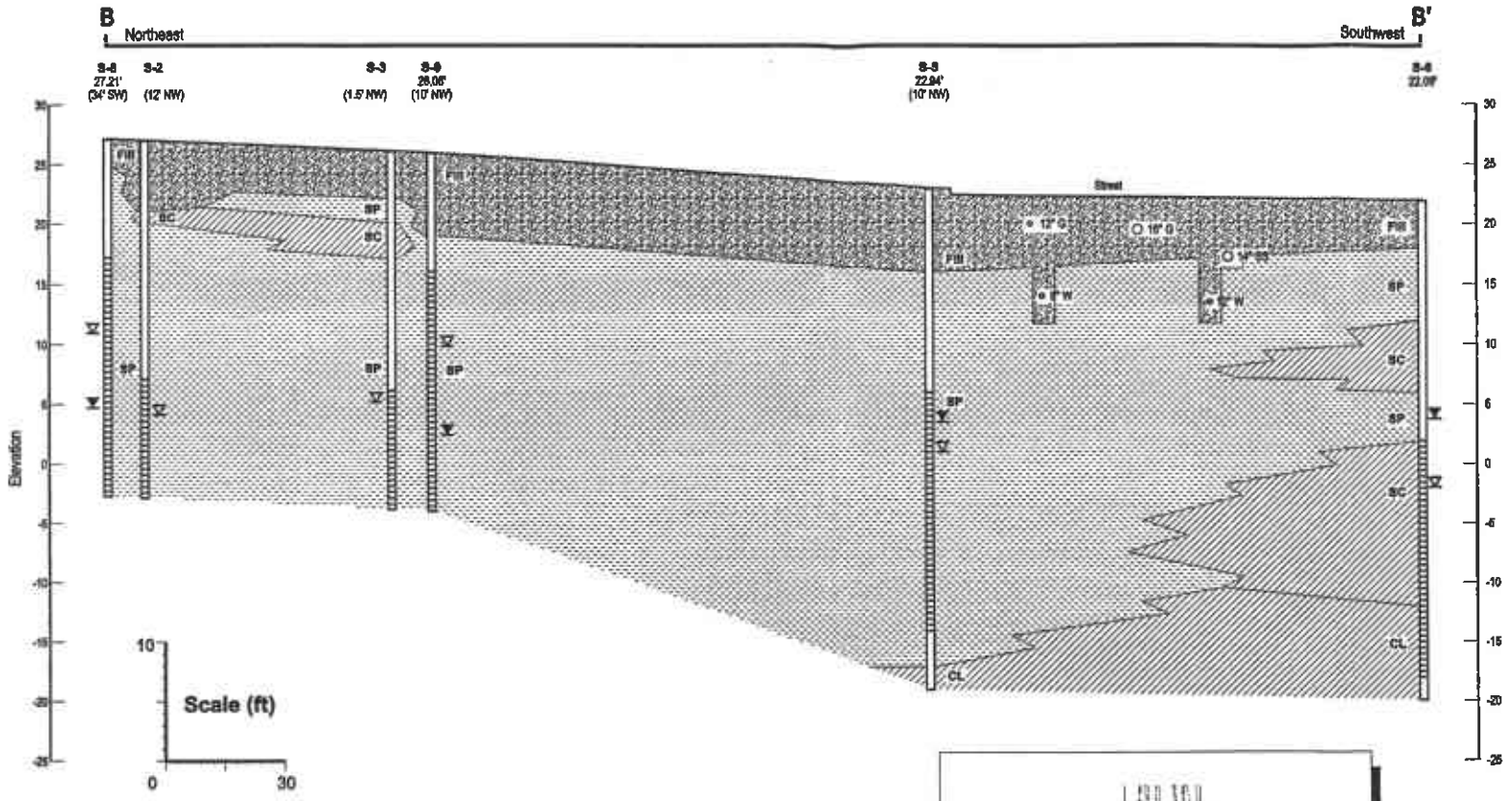
FIGURE

3

Geologic Cross Section A-A'

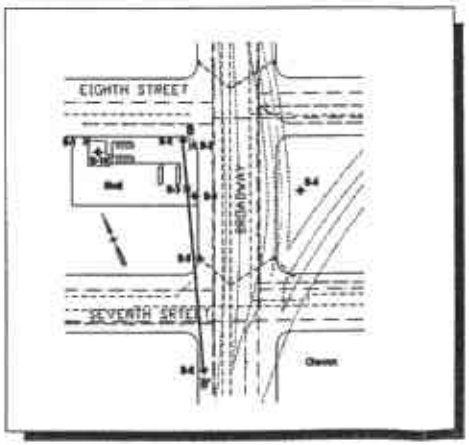
Former Shell Service Station
461 Eighth Street
Oakland, California

CAMBRIA



EXPLANATION

- = Low Permeability Soils
  - SC (Clayey Sand)
  - CL (Clay)
- = High Permeability Soils
  - SP (Poorly Graded Sand)
- = Fill
- Groundwater Monitoring Well
- Well Screen Interval
- Static Water Level on 07/25/01
- Depth of First Encountered Groundwater



Geologic Cross Section B-B'

Former Shell Service Station
461 Eighth Street
Oakland, California

CAMBRIA

FIGURE
4

GROUNDWATER TECHNOLOGY, INC.

Table 1A

DRILLING LOG

Project: Bart/Shell
Name: Oakland, California
Date: 8/25/81

Well Designation: L-1
Driller: Powell
Equip. Used: LDH Hughes 50' Auger

Geologist: J. Ballerino

ime	Diam	Bar	At	Interval from	to		Description of Rock Cuttings	Remarks (e.g. Soft Spots)	SAMPLE #
00	12"			0	4'		Artificial Fill -	silt, sand and clay some small pieces of brick	
				4'	7'		Yellow-brown to brown sand	- slightly damp	
				7'	10'		Becoming moist, plastic, clayey sand		
				10'	17'		Increasing in clay: clayey	sand	
					17'	Lowered Gas	Tech probe: reads 40%	What is sand g.s.?	
				18'	22'	Damp brown	sand yellow & red streaks	smells of gasoline	
				22'	24'	continues lt.	brown sand - water table	begins @ 23'	
0	12"			24'	30'	cont'd sand	and water		
							Hole cased w/4" PVC; 10'	of .020" screen and 20' of unslotted PVC	
							Gravel packed w/ pea gravel		
									Sample No. L-1

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GROUNDWATER TECHNOLOGY, INC.

Table 1B

DRILLING LOG

Project: Bart/Shell
Name: Oakland, California
Date: 8/26/81

Well Designation: L-2
Driller: Powell
Equip. Used: LDH Hughes 50' Auger

Geologist: J. Ballerino

Time	Diam	Bar	At	Interval from	Interval to		Description of Rock Cuttings	Remarks (e.g. Soft Spots)	SAMPLE #
945	12"			0	6'		Artificial fill: brown sand - concrete, asphalt and rock		
				6'	7'		begin clayey sand: light brown to yellow brown, damp		
				7'	10'		well sorted brown sand, some darker streaks		
				10'	12'		small fraction of clay binder		
				12'	15'		loose, unconsolidated uniform sand - moist	(what is g.s ?)	
				15'	16'	Gas detector reads 14% slight gasoline smell			
				16'	18'		cont'd brown, uniform sand, damp		sample no. L-2
				18'	19'	gas detector reads greater than 100% - purged with nitrogen			
				19'	23'	no smell cont'd damp brown sand - (well sorted)			
				23'	24'	begin water seepage			
				24'	26'	hole caving from water			
30	12"			26'	30'	hole kept open only to 26'			
							cased with 4" PVC 10' of slotted .020" screen 20' of regular PVC;		
							gravel packed.		
						Note:	It was necessary to drive casing 4' into sand due to caved condition		
							at bottom of hole.		

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GROUNDWATER TECHNOLOGY, INC.

Table 1C

DRILLING LOG

Project: Bart/Shell
Name: Oakland, California
Date: 8-27-81

Well Designation: L-3
Driller: Powell
Equip. Used: LDH Hughes 50' Auger

Geologist: J. Ballerino

Time	Diam	Bar	At	Interval from	Interval to	Pressure	Description of Rock Cuttings	Remarks (e.g. Soft Spots)	SAMPLE #
00	12"			0	4'		Sand, silt and clay, fill, bits of debris and rock		
				4'	6'		begin uniform grained, damp yellow brown sand		
				6'	9'		some clayey sand		
				9'	11'		cont'd brown sand slight gasoline smell		
							detector reads: 10%		
				11'	12'		damp, uniform sand - some gray sand		L-3 #1
				12'	14'		slight gasoline smell(thin 1mm seam on water of gasoline)		#2
				14'	16'		gas detector reads: 10% sand		
				16'	18 1/2'		gas detector reads: 40% sand		#3
				18 1/2	19 1/2		slightly stiff w/ clay - sand	g.s. ?	
				19 1/2	21'		some gray sand mostly brown sand		
							stronger gasoline smell		#4
				21'	27		water infiltration		
				27'	30'		caving in water-logged sand -re drill		
							several passes to 37' - casing lowered		
							10' of slotted 4" PVC; 20' of reg. PVC		
)	12"						Gravel packed -		

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GROUNDWATER TECHNOLOGY, INC.

Table 1D

DRILLING LOG

Project: Bart/Shell
Name: Oakland, California
Date: 8/31/81

Well Designation: L-4
Driller: Powell
Equip. Used: LDH Hughes 50' Auger & Barrel

Geologist: J. Ballerino

Time	Diam	Bar	At	Interval from	Interval to	Description of Rock Cuttings	Remarks (e.g. Soft Spots)	SAMPLE #
0	12"			0	4'	Fill: sand-silt-clay, rock, debris, concrete and bricks		
				4'	7'	light brown sand (backfill?) some clayey sand		
						slightly moist clayey sand - gas detector: Nil		
				7'	13'	cont'd moist sand - some gray sand mixed		
						detector reads: 3%		
				13'	16'	cont'd moist sand - minor clay. detector reads: 5%		
				16'	21'	brown moist sand - layered gray sand		
				21'	23'	cont'd sand - spoon sample - wet		L-4 #1
				23'	24'	bucket grinding put on auger - clear		
				24'	31'	caving from water at 22' -	g.s.?	
						cont'd drilling out to 35' +		
						able to place 30' of casing:		
						10' slotted PVC @ .020"		
						20' regular PVC		
00	12"					Gravel packed - no evidence of gasoline		

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GROUNDWATER TECHNOLOGY, INC.

Table 1E

DRILLING LOG

Project: Bart/Shell
Name: Oakland, California
Date: 9/2/81

Well Designation: L-5
Driller: Powell
Equip. Used: LDH Hughes 50' Auger

Geologist: J. Ballerino

Time	Diam	Bar	At	Interval from	to		Description of Rock Cuttings	Remarks (e.g. Soft Spots)	SAMPLE #
0	12"			0	5'		Inside drop inlet - storm drain broadway		
							invert elev: -5' below street level		
				5'	7'		fill sand - gas detector: 7%		
				7'	13'		moist brown sand; gas detector: 10%		
				13'	14'		begin wet sand - smells of gasoline		
				14'	15'		gas detector: 15%		#1
				15'	19'		spoon sample-loose sand		
					19'		detector reads: 50%		#2
				19'	22'		sand saturated with gasoline; reads: 80%	g.s ?	
				22'	23'		encountered water - begin revert		
				23'	27'		caving sand - revert not holding well		
				27'	32'		cont'd sand - in water table		
							strong gasoline fumes		
				32'	40'		becoming more compact sand		
							some clay- (gray to gray-green)		
				40'	42'		dense, stiff clay- bay mud - bottom hole		
							cased with 20' slotted PVC .020" (4")		
)	12"						17' regular PVC & gravel packed		

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GROUNDWATER TECHNOLOGY, INC.

Table 1F

DRILLING LOG

Project: Bart/Shell
Name: Oakland, California
Date: 9-3-81 & 9-8-81

Well Designation: L-6
Driller: Powell
Equip. Used: LDH Hughes 50' Auger

Geologist: J. Ballerino

Time	Diam	Bar	At	Interval from	Interval to	Description of Rock Cuttings	Remarks (e.g. Soft Spots)	SAMPLE #
)00	12"			0	2'	Street concrete and old cobblestones		
				2'	4'	mixed fill and cobbles		
					4'	begin brown sand -		
				4'	10'	sand fill some small pieces brick and rock		
				10'	16'	cont'd sand and clayey sand - moist		
					16'	slight gasoline smell ?	- stopped	#1
0						hole 9-3-81 to prepare revert		
0	12"	9-8-81		16'	20'	cont'd sand, gas detector reads: 35%		#2
				20'	24'	slightly clayey sand		
					24'	top of water table - caving sand	(g.s)	#3
				24'	30'	revert introduced		
				30'	34'	wet gray-brown clayey sand		#4
				34'	40'	sand to clay - top of bay mud		
				40'	42'	stiff, dense clay - bay mud		
						placed 40' of casing: 20' slotted PVC .020'		
						and 20' reg. PVC - collar of casing 2" below street level		
0	12"					Gravel-packed		

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GROUNDWATER TECHNOLOGY, INC.

Table 1G

DRILLING LOG

Project: Bart/Shell
Name: Oakland, California
Date: 9-10-81

Well Designation: L-7
Driller: Powell
Equip. Used: LDH Hughes 50' Auger

Geologist: J. Ballerino

Time	Diam	Bar	At	Interval from	Interval to	Description of Rock Cuttings	Remarks (e.g. Soft Spots)	SAMPLE #
030	12"			0	5'	2" asphalt - damp, loose light brown sand		
				5'	12'	cont'd loose brown sand		
				12'	16'	gas detector: Nil - moist sand		
				16'	17'	spoon sample - no gasoline smell		#1
				17'	18'	wet sand becoming slightly clayey-mottled		
					18'	top of water table caving sand		
				18'	24'	cont'd caving - placed revert		
					24'	much water - "quicksand"		#2
				24'	34'	cont'd slow drilling with revert		
					34'	sand - brown - some gray revert "weak"	g.s ?	#3
				34'	40'	becoming clayey sand - (no gasoline smell)		
700	12"			40'	41'	end hole in clayey sand - gray to brown		
						cased with 20' slotted PVC .020" (4")		
						and 20' regular PVC		
						Gravel packed		

Field Exploratory Boring Log B-1

OVM (ppm)	Blows/6"	Sample Number	Depth (ft)	Soil Group (USCS)	Materials Description
					Asphalt
					Baserock
					Sand (SP)
					Dark brown (7.5YR 3/2); loose, dry to damp, sand fine grained.
0		B1 @ 5'	5		
					Very hard driving probe at approximately 8.5 ft.
0		B1 @10.0'	10		Color change to yellowish brown (10Yr 5/4). Refusal at 10.0 ft. due to hard, compacted sands.
					Total depth of boring = 10.5 ft.
			15		
			20		
			25		
			30		

BORING
B-1

SHELL OIL COMPANY
Former Shell Service Station
461 Eighth Street
Oakland, California

Borehole Diameter:	1 inch
Logged by:	JLP
Driller:	ECA
Date Started:	7-6-94
Date Completed:	7-6-94

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Field Exploratory Boring Log B-2

OVM (ppm)	Blows/6"	Sample Number	Depth (ft)	Soil Group (USCS)	Materials Description
					Asphalt
					Baserock
					Sand (SP) Dark brown (7.5YR 3/2); loose, dry to damp, sand fine grained.
0		B2 @ 5'	5		
0		B2 @10.0'	10		Color change to brown (7.5YR 4/4); trace silt Sands very hard at 11.0 ft. Slow penetration with probe.
					Silty Sand (SM) Light olive brown (2.5Y 5/4); silts 20-25%, sand fine grained
0		B2 @15.0'	15		
					Sand (SP) Light olive brown (2.5Y 5/4); dense, moist, fine to medium grained sands, limonitc staining, trace silt.
0		B2 @20.0'	20		Refusal at 20.5 ft. Total depth of boring = 20.5 ft.
			25		
			30		

BORING
B-2

SHELL OIL COMPANY
Former Shell Service Station
461 Eighth Street
Oakland, California

Borehole Diameter:	1 inch
Logged by:	JLP
Driller:	ECA
Date Started:	7-6--94
Date Completed:	7-6-94

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Field Exploratory Boring Log B-3

OVM (ppm)	Blows/6"	Sample Number	Depth (ft)	Soil Group (USCS)	Materials Description
					Asphalt
					Baserock
					Sand (SP)
					Reddish brown (5TR 4/4); medium dense, dry, fine to medium grained sands, trace fine gravel.
0		B3 @ 5'	5		
0		B3 @10.0'	10		Color change to dark reddish brown (5Y 3/2); 10% silt, petroleum odor.
0		B3 @15.0'	15		Color change to grayish brown (2.5Y 5/2); ,5% silt.
					Refusal at 19.5 ft.
NA		B3 @20.0'	20		Total depth of boring = 19.5 ft.
			25		
			30		

BORING
B-3

SHELL OIL COMPANY
Former Shell Service Station
461 Eighth Street
Oakland, California

Borehole Diameter:	1 inch
Logged by:	JLP
Driller:	ECA
Date Started:	7-6--94
Date Completed:	7-6-94

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E493216

Field Exploratory Boring Log B-4

OVM (ppm)	Blows/6"	Sample Number	Depth (ft)	Soil Group (USCS)	Materials Description
					Asphalt
					Baserock
					Sand (SP)
					Dark Brown (10YR 4/3); dense, dry to moist, sands fine grained, silts <5%.
0		B4 @ 5'	5		
					Very hard driving probe at approximately 9.0 ft.
38.4		B4 @10.0'	10		Color change to dark gray (5Y4/1); very dense, dry to moist,
					Refusal at 10.5 ft.
					Total depth of boring = 10.5 ft.
			15		
			20		
			25		
			30		

BORING
B-4

SHELL OIL COMPANY
Former Shell Service Station
461 Eighth Street
Oakland, California

Borehole Diameter:	I inch
Logged by:	JLP
Driller:	ECA
Date Started:	7-6-94
Date Completed:	7-6-94

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Field Exploratory Boring Log B-5

OVM (ppm)	Blows/6"	Sample Number	Depth (ft)	Soil Group (USCS)	Materials Description
					Asphalt
					Baserock
					Sand (SP)
					Dark Brown (2.5YR 3/2); medium dense, dry to moist, sand fine grained.
0		B5 @ 5'	5		
			10		Very hard driving probe at approximately 9.5 ft.
0		B5 @10.0'			
					Refusal at 10.25 ft.
					Total depth of boring = 10.25 ft.
			15		
			20		
			25		
			30		

BORING
B-5

SHELL OIL COMPANY
Former Shell Service Station
461 Eighth Street
Oakland, California

Borehole Diameter:	1 inch
Logged by:	JLP
Driller:	ECA
Date Started:	7-6-94
Date Completed:	7-6-94

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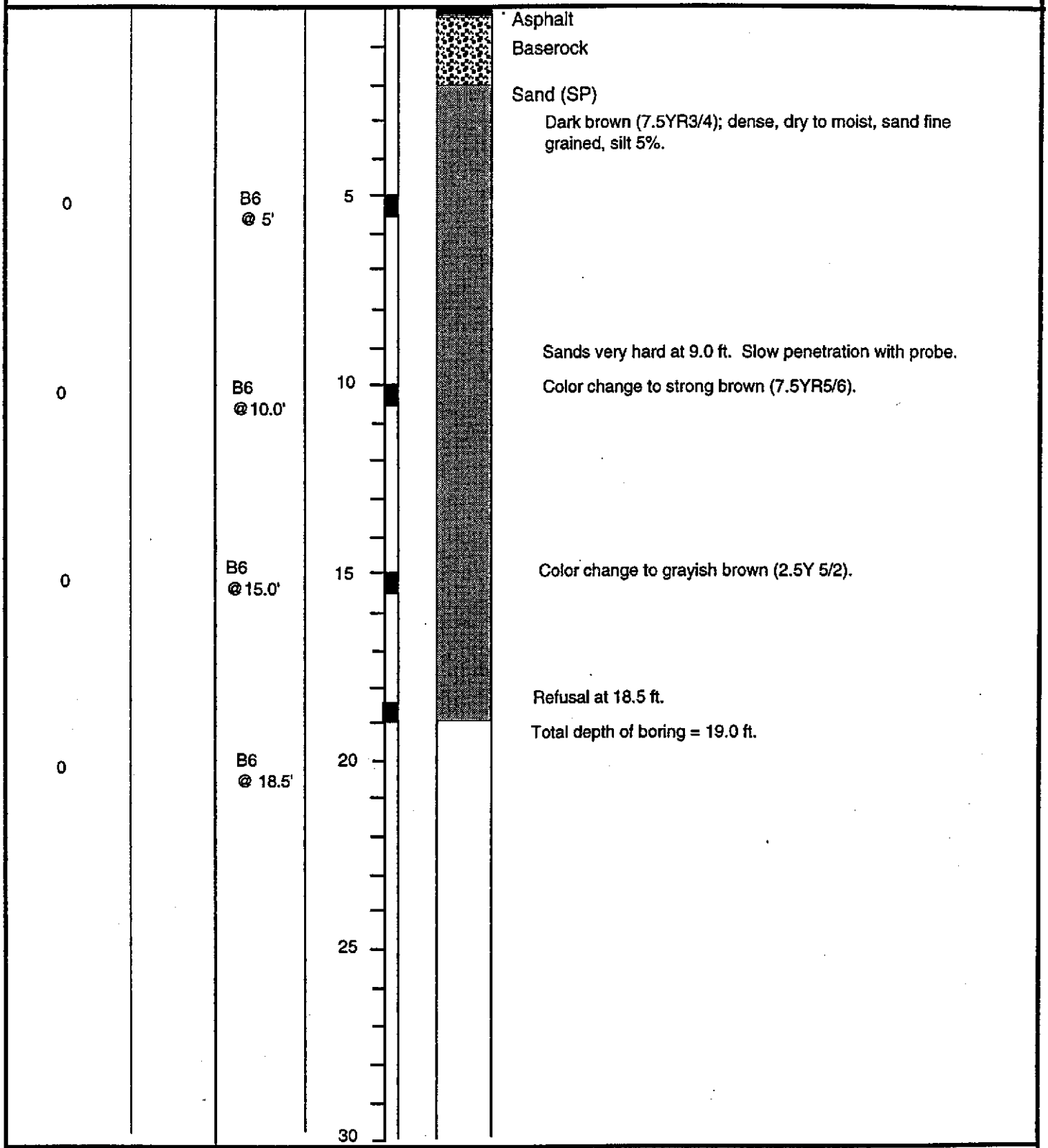
Field Exploratory Boring Log B-6



BORING			
B-6	**SHELL OIL COMPANY** Former Shell Service Station 461 Eighth Street Oakland, California	Borehole Diameter: 1 inch Logged by: JLP Driller: ECA Date Started: 7-7-94 Date Completed: 7-7-94	*enviros* ® **E493216**

Field Exploratory Boring Log B-7

OVM (ppm)	Blows/6"	Sample Number	Depth (ft)	Soil Group (USCS)	Materials Description
					Asphalt
					Baserock
					Sand (SP)
					Dark Brown (7.5YR 3/4); dense, dry to moist, sand fine grained, <5% silt.
6.6		B7 @ 5'	5		
					Very hard driving probe at approximately 8.0 ft.
39.3		B7 @10.0'	10		Color change to strong brown (7.5YR 5/6).
					Refusal at 10.5 ft.
					Total depth of boring = 10.5 ft.
			15		
			20		
			25		
			30		

BORING
B-7

SHELL OIL COMPANY
Former Shell Service Station
461 Eighth Street
Oakland, California

Borehole Diameter:	1 inch
Logged by:	JLP
Driller:	ECA
Date Started:	7-7-94
Date Completed:	7-7-94

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E493216

Field Exploratory Boring Log B-8

OVM (ppm)	Blows/6"	Sample Number	Depth (ft)	Soil Group (USCS)	Materials Description
					Asphalt
					Baserock
					Sand (SP)
					Brown (7.YR 4/4); dense, dry to moist, sand fine grained, silt <5%.
0		B8 @ 5'	5		
					Very hard driving probe at approximately 8.0 ft.
					Refusal at 9.0 ft.
NA		B8 @ 9.0'	10		Total depth of boring = 9.5 ft.
			15		
			20		
			25		
			30		

BORING
B-8

SHELL OIL COMPANY
Former Shell Service Station
461 Eighth Street
Oakland, California

Borehole Diameter:	1 inch
Logged by:	JLP
Driller:	ECA
Date Started:	7-7-94
Date Completed:	7-7-94

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Field Exploratory Boring Log B-9

OVM (ppm)	Blows/6"	Sample Number	Depth (ft)	Soil Group (USCS)	Materials Description
					Asphalt
					Baserock
					Sand (SP)
					Dark brown (7.5YR 4/4); loose to medium dense, dry to moist, fine grained sands, <5% silt.
0		B9 @ 5'	5		
					Color change to yellowish brown (10YR 5/4)
0		B9 @10.0'	10		Color change to dark brown (7.5YR 4/4)
					Sands very hard at 11.0 ft. Slow penetration with probe. Color change to strong brown (7.5YR 4/6)
					Color change to yellowish brown (10YR 5/6).
					Refusal at 14.5 ft.
0		B9 @14.5'	15		Total depth of boring = 14.5 ft.
			20		
			25		
			30		

Continuous Core

BORING			
B-9	**SHELL OIL COMPANY** Former Shell Service Station 461 Eighth Street Oakland, California	Borehole Diameter: 1 inch Logged by: JLP Driller: ECA Date Started: 7-7-94 Date Completed: 7-7-94	*enviros*® E493216

Field Exploratory Boring Log S-8

OVM PPM	Blows/ 6"	Sample Number	Well Construction	Depth (ft)	Soil Group (USCS)	Materials Description
			Wellbox 0 - 1 ft.			0-3" Asphalt
						Sand (SP) - Fill Olive brown (2.5Y 4/4); moist, 75-85% fine to medium sand, 5-10% silt, 5-10% gravel and construction debris.
			Cement 1 - 8 ft.			Sand (SP) Olive brown (2.5Y 4/4); dense, moist, 85-95% fine to medium sand, 5-10% fines, iron staining beginning at 5.5'.
0.0	7 14 30	S-8-6.5	4-in. Sch. 40 PVC	5		
			Bentonite 8 to 9 ft.			
0.0	15 30 30	S-8-11.5		10		@ 10': As above, very dense, moist, some iron staining - less than at 6'.
			Lonestar #3 Sand			
0.0	15 30 40	S-8-16.5	4-in. Sch. 40 PVC - 0.02-in. Slot 10 to 30 ft.	15		@ 15': As above, very dense, moist to wet.
0.2	30 50-5"	S-8-21.5		20		@ 20': As above, color change to dark greenish gray (5GY 4/1), very dense, wet, no iron staining.
0.0	30 50	S-8-26.5		25		@ 25': As above, color change to olive brown (2.5Y 4/3), very dense, wet, some iron staining.
0.0	20 50	S-8-30		30		@ 28.5': As above, very dense, wet. Total Depth of Boring = 30 feet

BORING
S-8

SHELL OIL COMPANY
Former Shell Service Station
461 8th Street
Oakland, California

Borehole Diameter:	10 inches
Logged by:	J. Neely
Driller:	Gregg Drilling
Date Started:	07-Dec-94
Date Completed:	07-Dec-94

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Field Exploratory Boring Log S-9

OVM PPM	Blows/ 6"	Sample Number	Well Construction	Depth (ft)	Soil Group (USCS)	Materials Description
0.0	20 50	S-9-6.5		5		0-3" Asphalt Sand (SP) - Fill Olive brown (2.5Y 4/4); moist, 75-85% fine to medium sand, 5-10% silt, 5-10% construction debris. @ 5': As above, very dense, moist, some iron staining, brick fragments at 5.5', sparse black nodules noted.
0.0	30 50	S-9-11.5		10		Sand (SP) Dark yellowish brown (10YRY 4/4); very dense, moist, 85-95% fine to medium sand, 5-10% fines.
0.0	20 30 50-4"	S-9-16.5		15		@ 15': As above, color change to olive brown (2.5Y 4/4), very dense, moist to wet.
0.7	18 50	S-9-21.5		20		@ 20': As above, color change to dark greenish gray (5GY 4/1), very dense, wet, no iron staining.
56.6	20 50	S-9-26.5		25		@ 25': As above, very dense, wet.
0.0	30 50	S-9-30		30		@ 28.5': As above, dark grayish brown (2.5Y 4/2) very dense, wet. Total Depth of Boring = 30 feet

Wellbox 0 - 1 ft.
Cement 1 - 8 ft.
Bentonite 8 to 9 ft.
Lonestar #3 Sand
4-in. Sch. 40 PVC
4-in. Sch. 40 PVC - 0.02-in. Slot 10 to 30 ft.

BORING
S-9

SHELL OIL COMPANY
Former Shell Service Station
461 8th Street
Oakland, California

Borehole Diameter:	10 inches
Logged by:	J. Neely
Driller:	Gregg Drilling
Date Started:	07-Dec-94
Date Completed:	07-Dec-94

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Field Exploratory Boring Log S-10

OVM PPM	Blows/ 6"	Sample Number	Well Construction	Depth (ft)	Soil Group (USCS)	Materials Description
			Wellbox 0 - 1 ft.			0-3" Asphalt Silty Sand (SC) - Fill Dark Brown (10YR 3/3); moist, 65-75% fine to medium sand, 15-20% fine to medium gravel and construction debris.
13.8	13 20 30	S-10-6.5	Cement 1 - 8 ft. 4-in. Sch. 40 PVC	5		@ 5': As above, very dense, moist.
			Bentonite 8 to 9 ft.			
1420	3 4 5	S-10-11.5	Lonestar #3 Sand 4-in. Sch. 40 PVC - 0.02-in. Slot 10 to 30 ft.	10		Sand (SP) Very dark gray (5Y 3/1); loose, moist, 85-95% fine to medium sand, 5-10% fines.
24.2	15 20 35	S-9-16.5		15		Clayey Sand (SC) Dark olive gray (5Y 3/2); very dense, moist, 80-90% fine to medium sand, 10-20% clayey fines, slight iron staining noted.
19.0	15 30 50	S-10-21.5		20		Sand (SP) Olive gray (5Y 4/2); very dense, moist, 85-95% fine to medium sand, 5-10% fines.
18.5	30 50	S-10-26.5		25		@ 25': As above, very dense, wet.
12.2	30 50			30		@ 30': As above, color change to dark olive brown (2.5Y 3/3) very dense, wet.

BORING
S-10

SHELL OIL COMPANY
Former Shell Service Station
461 8th Street
Oakland, California

Borehole Diameter:	10 inches
Logged by:	J. Neely
Driller:	Gregg Drilling
Date Started:	08-Dec-94
Date Completed:	08-Dec-94

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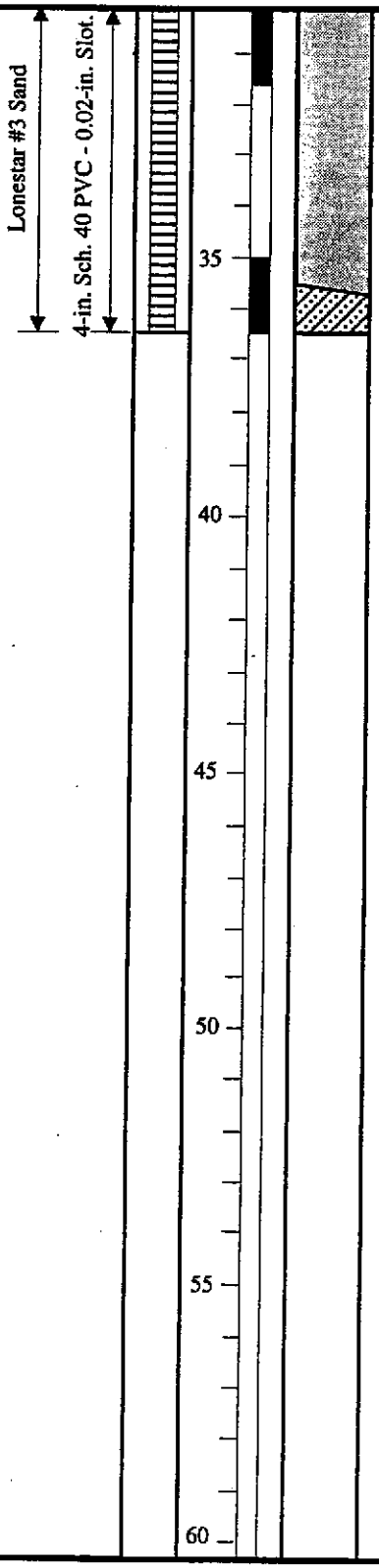
Field Exploratory Boring Log S-10

OVM PPM	Blows/ 6"	Sample Number	Well Construction	Depth (ft)	Soil Group (USCS)	Materials Description
9.0	40 50-4"	S-10-36.5	Lonestar #3 Sand 4-in. Sch. 40 PVC - 0.02-in. Slot.	35 40 45 50 55 60		@ 35': As above, very dense, wet. Clayey Sand (SC) Olive Brown (2.5Y 4/4); very dense, wet, 70-80% fine to medium sand, 10-20% clayey fines. Total Depth of Boring = 36.5 feet



BORING
S-10

SHELL OIL COMPANY
Former Shell Service Station
461 8th Street
Oakland, California

Borehole Diameter:	10 inches
Logged by:	J. Neely
Driller:	Gregg Drilling
Date Started:	08-Dec-94
Date Completed:	08-Dec-94

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Attachment B

Standard Field Procedures for Monitoring Well Installation

CAMBRIA

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4° C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and groundwater depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Groundwater monitoring wells are installed to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 fee below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two feet above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite and covered by plastic sheeting. At least three individual soil samples are collected from the stockpiles and composited at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples in addition to any analytes required by the receiving disposal facility. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Groundwater removed during development and sampling is typically stored onsite in sealed 55-gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Upon receipt of analytic results, the water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

Table 1. Well Survey Results - Shell-branded Service Station, 461 Eighth Street, Oakland, California. Incident # 97093399

Well ID	Well ID	Location	Installation Date	Use	Depth (ft bgs)	Screened Interval (ft bgs)	Sealed Interval (ft bgs)
1	1S/4W-35F12	South of 11th between Clay Street and Broadway	Sept. 23, 1990	IRR	470	180-240, 300-340, 360-380, 430-470	0-90
2	1S/4W-34J2	Between 4th Street and Bart tracks, north of Castro Street	Oct. 12, 1978	DEST	108	36-100	0-24
3	1S/4W26N4	15th and Castro Streets	--	DEST	--	--	--
4	1S/4W-35Q1	6th and Harrison	May 30, 1973	CATH	120	--	0-120

Well Locations provided by the State of California Department of Water Resources

Notes and Abbreviations:

Map ID = Column number refers to map location on Figure 2.

Well ID = California State well identification number as recorded by the Department of Water Resources in Sacramento, California.

IRR = Irrigation

DEST = Destroyed

CATH = Cathodic

-- = Information not provided

ATTACHMENT A

BART Recovery Project Log
(Chronological list of events – 1/10/97 through 12/3/81)

SHELL OIL CO.
EAST BAY DISTRICT

BART RECOVERY PROJECT LOG

This is a report in chronological order of all events and action taken regarding gasoline leakage into BART tube section near 7th St./Broadway, Oakland, California - 1979.

JANUARY 10, 1979

Shell dealer notified District Engineer that local fire inspector received a report from BART that gasoline was leaking into tube area.

District Engineer notified H. O. Engineering Dept., T. Maher.

JANUARY 11, 1979

District Engineer ordered a test on Super Shell, Super Regular (unleaded) and Shell Regular product lines - test failed. All systems shut down to eliminate additional loss of gasoline. Fire inspector requested a Kent-Moore test to be performed on all underground storage tanks.

JANUARY 19, 1979

Sample product taken from BART tube forwarded to Westhollow Lab for analysis. Results: Shell Regular product (leaded) 2-23-79.

JANUARY 22, 1979

All underground storage tanks tested with Kent-Moore tank tightness tester - results indicate all tanks tested satisfactory.

JANUARY 26, 1979

Installation of new fiberglass product and vapor lines to replace 16 year old galvanized steel lines. In addition, one observation well installed at low gradient area of property with negative reports.

FEBRUARY 1979 THROUGH DECEMBER 1979

Open for business.

MAY 19, 1979

District approved gratis delivery for 1,851 gallons.

SEPTEMBER 5, 1979

Issued contract to Industrial Tank Lines to pump out 28 drums of gasoline/ water mixture in BART tube.

OCTOBER, 1979

City of Oakland Police Department removed and replaced leaking underground storage tanks, product deliveries by local Shell distributor.

OCTOBER 5, 1979

Industrial Tank Lines removed gasoline and water mixture from 20 - 55 gallon drums in BART tube.

JANUARY 1980 THROUGH APRIL 1980

Service station open for business and selling all products.

APRIL 2, 1980

Industrial Tank Lines removed gasoline water mixture from 28 - 55 gallon drums in BART tube.

MAY 1980

District terminated leasehold agreement and removed all existing improvements, building and all underground storage tanks.

1981

MAY 1981

BART submitted a copy of proposal prepared by Crowley Environmental Services Corp. for recovery research.

BART RECOVERY PROJECT LOG

MAY 14, 1981

District contracted with Crowley Environmental Services Corp. to perform investigative research and recovery study.

MAY 19, 1981

Issued contract to Groundwater Technology to conduct preliminary investigation to determine extent of contamination and obtain necessary permits for drilling on private and public properties.

MAY 13, 1981

Sample of product taken from BART tube forwarded to Westhollow Lab for analysis. Results: Weathered gasoline or kerosene.

MAY 28, 1981

Sample of product taken from BART tube forwarded to Westhollow Lab for analysis. Results: Identified as Shell Regular.

JUNE 1981

Groundwater Technology working on obtaining necessary approvals and permits to install 7 observation wells on public and private properties.

JULY 5, 1981

Issued a contract to Cowhey Pacific Drilling Co. (subcontractor for Groundwater Technology) to perform services previously contracted to Groundwater Technology.

BART'S insurance carrier required $10,000,000 liability coverage; Groundwater Technology unable to meet insurance requirements.

AUGUST 10, 1981

Groundwater Technology submitted plans to BART for approval on 7 well locations.

AUGUST 26, 1981

BART submitted a letter of approval to Shell for observation well locations.

AUGUST 25, 26, 27 & 31

Cowhey Pacific Drilling Company installed the following observation wells: #1, 2, 3, 4.

SEPTEMBER 2, 3, 8 & 10

Cowhey Pacific Drilling Company installed the following observation wells: #5, 6 & 7.

OCTOBER 19, 1981

Groundwater Technology submitted a preliminary report on observation wells technical geological data.

NOVEMBER 5, 1981

District Engineer received completed study prepared by Groundwater Technology and forwarded copy to Head Office Environmental Engineering, C. Stanley, for reviewing and designing a recovery system.

NOVEMBER 9 - 18, 1981

District Engineer on vacation.

NOVEMBER 19, 1981

BART informed District Engineer the newly completed KE line (tube) is scheduled to receive trains on December 15, 1981.

District notified Head Office Environmental Engineer, C. Stanley, immediately.

NOVEMBER 20, 1981

Advised by C. Stanley via telecon to check with city regarding permit requirements and to install recovery well in the vicinity of observation well #6.

NOVEMBER 23, 1981

Contacted Cowhey Pacific Drilling Company and met on Broadway/7th to verify proposed site for recovery well near casing #6.

NOVEMBER 30, 1981

C. Stanley advised District to obtain Fire Marshall's assistance if problem develops with City of Oakland regarding permits.

DECEMBER 1, 1981

A preliminary meeting with BART, Fire Marshall and City of Oakland resulted in a verbal temporary approval to install recovery system underground on city property. Final approvals will be issued after receipt and review of all plans.

DECEMBER 3, 1981

Special meeting with the above parties and Head Office personnel for further discussion.