

C A M B R I A

Don Hwang
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Alameda County
OCT 18 2002
Environmental Health

October 15, 2002

Re: **Subsurface Investigation Work Plan**
Shell-branded Service Station
1285 Bancroft Avenue
San Leandro, California
Incident #98996067
Cambria Project #244-0504



Dear Mr. Hwang:

On behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell), Cambria Environmental Technology, Inc. (Cambria) is submitting this *Subsurface Investigation Work Plan* in accordance with the recommendations in our September 20, 2002 *Third Quarter 2002 Monitoring Report*. The objective of this investigation is to install two offsite-monitoring wells that will be used to define the downgradient extent of methyl tertiary butyl ether (MTBE) in groundwater and to provide for ongoing groundwater monitoring downgradient of the site. The site background and proposed scope of work for this investigation are presented below.

SITE BACKGROUND

Site Description: The operating Shell-branded service station is located at the northwest corner of Bancroft and Estudillo Avenues in San Leandro, California (Figures 1 and 2). There are three underground storage tanks (USTs) onsite. The area surrounding the site is primarily residential. The site is approximately 65 feet above mean sea level and slopes gently towards San Francisco Bay to the west. San Leandro Creek is located approximately 500 feet northwest of the site.

Groundwater Depth and Flow Direction: The depth to groundwater at the site has ranged from approximately 29 to 45 feet below grade (fbg) since monitoring began in 1990. Since 2000, the depth to groundwater has ranged from 29 to 40 fbg. Groundwater flows west to southwesterly as determined from water-level measurements collected between the first quarter 1990 and the third quarter 2002.

Oakland, CA
San Ramon, CA
Sonoma, CA

**Cambria
Environmental
Technology, Inc.**

1144 65th Street
Suite B
Oakland, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

Site Lithology: Sediments encountered beneath the site consist of clayey silt, clayey sand and silty clayey sand to approximately 20 fbg and silty clay, clayey sand and sandy gravel from approximately 30 to 50 fbg.

Waste-Oil Tank Removal: In November 1986, Petroleum Engineering of Santa Rosa, California removed a 550-gallon waste-oil tank and installed a new 550-gallon fiberglass tank in the former tank pit. Immediately following the tank removal, Blaine Tech Services (Blaine) of San Jose, California collected soil samples beneath the former tank location at nine fbg. The soil samples contained 83 parts per million (ppm) petroleum oil and grease and 583 ppm total oil and grease (TOG). After additional excavation, Blaine collected another soil sample at 9.5 fbg, which contained 89 ppm TOG. No groundwater was encountered in the tankpit.

Well Installation: In March 1990, Weiss Associates (Weiss) installed groundwater monitoring well MW-1 adjacent to the waste-oil tank. No petroleum constituents were detected in soil samples analyzed from boring MW-1. The maximum total petroleum hydrocarbons as gasoline (TPHg) concentration in groundwater from well MW-1 was 0.51 ppm.

Subsurface Investigation: In February 1992, Weiss advanced two soil borings upgradient and downgradient of the existing USTs and converted them into monitoring wells MW-2 and MW-3, respectively. A maximum TPHg concentration of 8,800 ppm was detected in boring BH-B, which was converted into monitoring well MW-2. No benzene was detected in this investigation.

Dispenser Replacement Sampling: In October 1995, Weiss collected soil samples from beneath the former dispensers. A maximum TPHg concentration of 130 ppm was detected in soil sample D-2A located 2 fbg beneath the northern dispenser-island. A maximum benzene concentration of 0.31 ppm was detected in soil sample L-1, located 2 fbg beneath the product piping lines on the south end of the site.

Well Installation: In May 1999, Cambria advanced four borings and converted them into groundwater monitoring wells MW-5, MW-6, MW-7, and MW-8. Soil samples collected from boring MW-5 contained maximum concentrations in soil of 10.5 ppm TPHg at 40.5 fbg, 0.0475 ppm benzene at 35.5 fbg, and 2.25 ppm MTBE at 35.5 fbg.

Site Investigation and Risk Based Corrective Action (RBCA) Evaluation: During June 2000, six soil borings were drilled and soil and soil vapor samples were collected. These samples were analyzed and results were used to evaluate potential health risk to offsite occupants in the vicinity of the site. ASTM Designation E-1739-95 guidelines for petroleum release sites were used to perform this evaluation. This evaluation showed that calculated excess cancer risk posed by the site was below the target risk level of 10^{-6} , and that the current offsite conditions do not pose a significant risk to offsite occupants directly adjacent to the site.

June 2001 RBCA Report: At the request of Alameda County Health Care Services Agency (ACHCSA), Cambria collected in-situ vapor and physical soil property samples and prepared a RBCA analysis of the potential risk to offsite receptors posed by hydrocarbons originating from the site. The results of the analysis indicated that current offsite conditions do not pose a significant risk to offsite occupants directly adjacent to the site.

April 2002 Enhanced UST Testing: On April 3, 2002, Shell voluntarily conducted enhanced testing of the USTs at the site. During the investigation, a crack in the secondary containment system was identified and repaired.



PROPOSED SCOPE OF WORK

As proposed in the September 20, 2002 *Third Quarter 2002 Monitoring Report*, Cambria will install two groundwater-monitoring wells (MW-9 and MW-10) at an approximate total depth of 45 to 50 fbg, west and southwest of MW-1 and MW-6. The proposed well locations are shown on Figure 2. Sampling and well construction will be completed as described in our Standard Field Procedures for Soil Borings and Monitoring Wells (Attachment A).

Upon ACHCSA approval of this work plan, Cambria will complete the following tasks:

Utility Location: Cambria will notify Underground Service Alert (USA) of our proposed drilling activities. USA will have the utilities in the vicinity identified.

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

Permits: Cambria will obtain from the Alameda County Public Works Agency, CWP property owner, and the City of San Leandro all permits, access agreements and encroachment permits required for drilling and installation of the monitoring wells.

Well Installation and Sampling Activities: Using a hollow-stem auger drill rig, Cambria will install two groundwater-monitoring wells (MW-9 and MW-10) to a depth of approximately 60 fbg. During drilling activities, soil samples will be collected from each boring for lithologic description at 5-foot intervals to the total depth of the boring at approximately 45 to 50 fbg. Soil samples from the capillary fringe directly above the saturated zone will be collected and submitted for chemical analysis. Well construction and sampling will be completed as described

in our Standard Field Procedures for Soil Borings and Monitoring Wells (Attachment A). Groundwater from the wells will be sampled during the fourth quarter of 2002 monitoring event.

Well Development and Top of Casing Survey: Blaine will develop the monitoring wells at least 72 hours after well installation and at least 72 hours prior to sampling. Virgil Chavez Land Surveying of Vallejo, California will survey the top of casing elevations to mean sea level.

Laboratory Analyses: Selected soil and groundwater samples will be analyzed by a State-certified laboratory for:

- TPHg by EPA Method 8015,
- Benzene, toluene, ethylbenzene and xylenes and MTBE by EPA Method 8260

Subsurface Investigation Report: After the analytical results are received, Cambria will prepare a report that, at a minimum, will contain:

- A summary of the site background and history;
- Descriptions of drilling and sampling activities;
- Soil boring and monitoring well logs;
- Tabulated analytical results for soil;
- Analytical reports and chain-of-custody forms;
- A discussion of the hydrocarbon distribution in the subsurface; and
- Conclusions and recommendations

SCHEDULE

Drilling is tentatively scheduled for November 5 and 6, 2002. Permit applications for installation of the two monitoring wells are presented as Attachment B. Upon receiving written approval of this work plan from the ACHCSA, Cambria will complete encroachment permission, access agreements and finalize the drilling schedule. Cambria will provide ACHCSA with a 72-hour notice prior to field activities. We anticipate submitting our investigation report within 60 days of completing the fieldwork.



CLOSING

We appreciate the opportunity to work with you on this project. Please call Melody Munz at (510) 420-3324 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc



M. Munz
Melody Munz
Project Engineer

Matthew W. Derby
Matthew W. Derby, P.E.
Senior Project Engineer

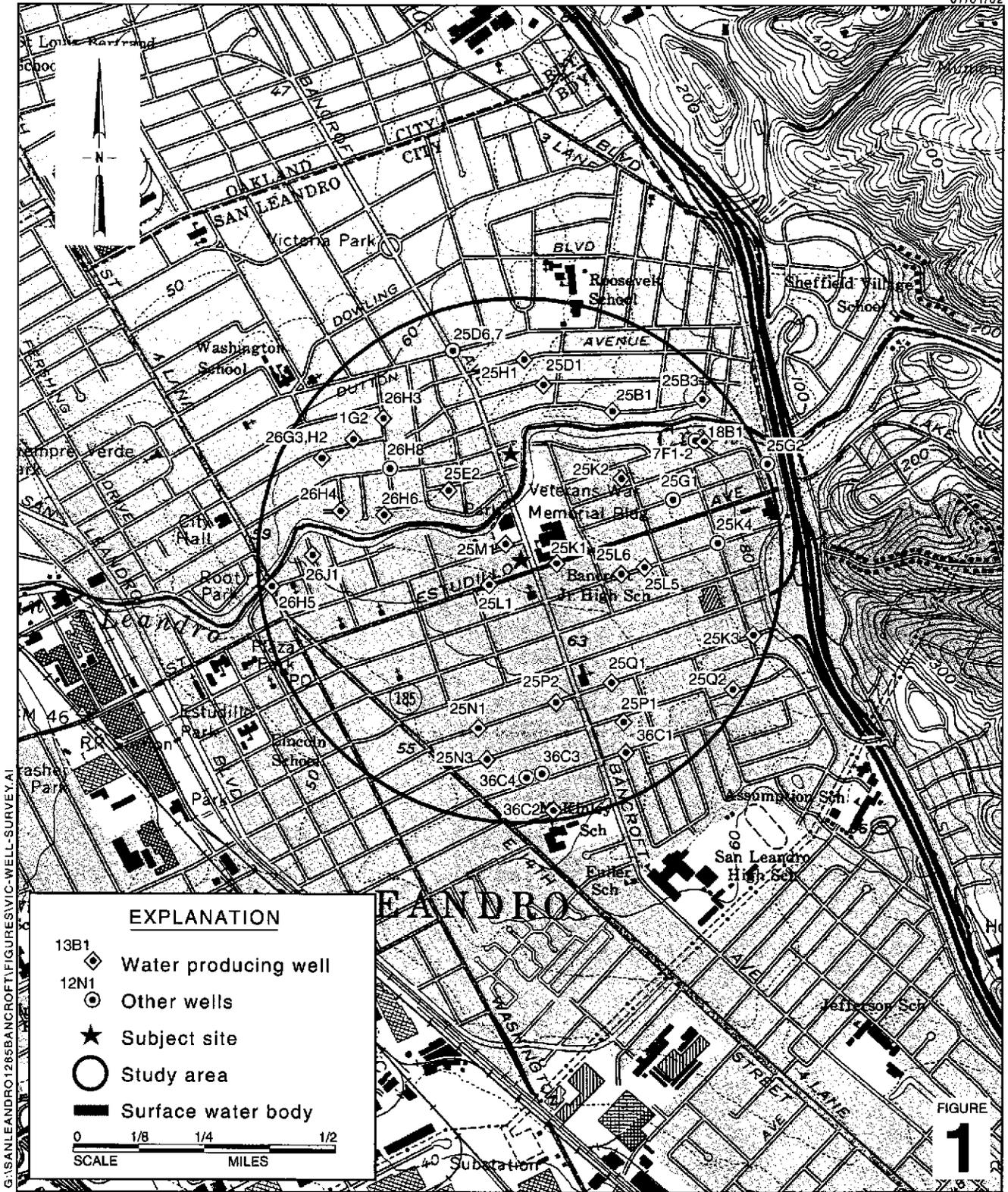


Figures: 1 - Vicinity/Area Well Survey Map
2 - Proposed Monitoring Well Location Map

Attachments: A - Standard Field Procedures for Soil Borings and Monitoring Wells
B - Permit Application

cc: Karen Petryna, Shell Oil Products US, P.O. Box 7869, Burbank, CA 91510-7869
Victor Lemon, City of San Leandro, 835 East 14th Street, San Leandro, CA 94577

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Shell-branded Service Station
 1285 Bancroft Avenue
 San Leandro, California
 Incident #98996067

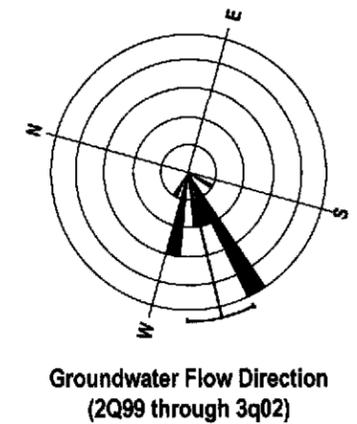


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**Vicinity / Area Well
 Survey Map**
 (1/2-Mile Radius)

EXPLANATION

-  Proposed monitoring well location
- MW-1**  Monitoring well location
-  Irrigation well location



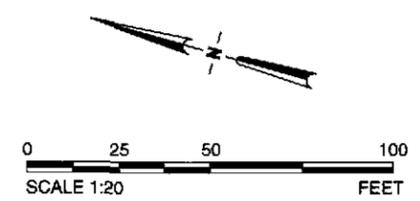
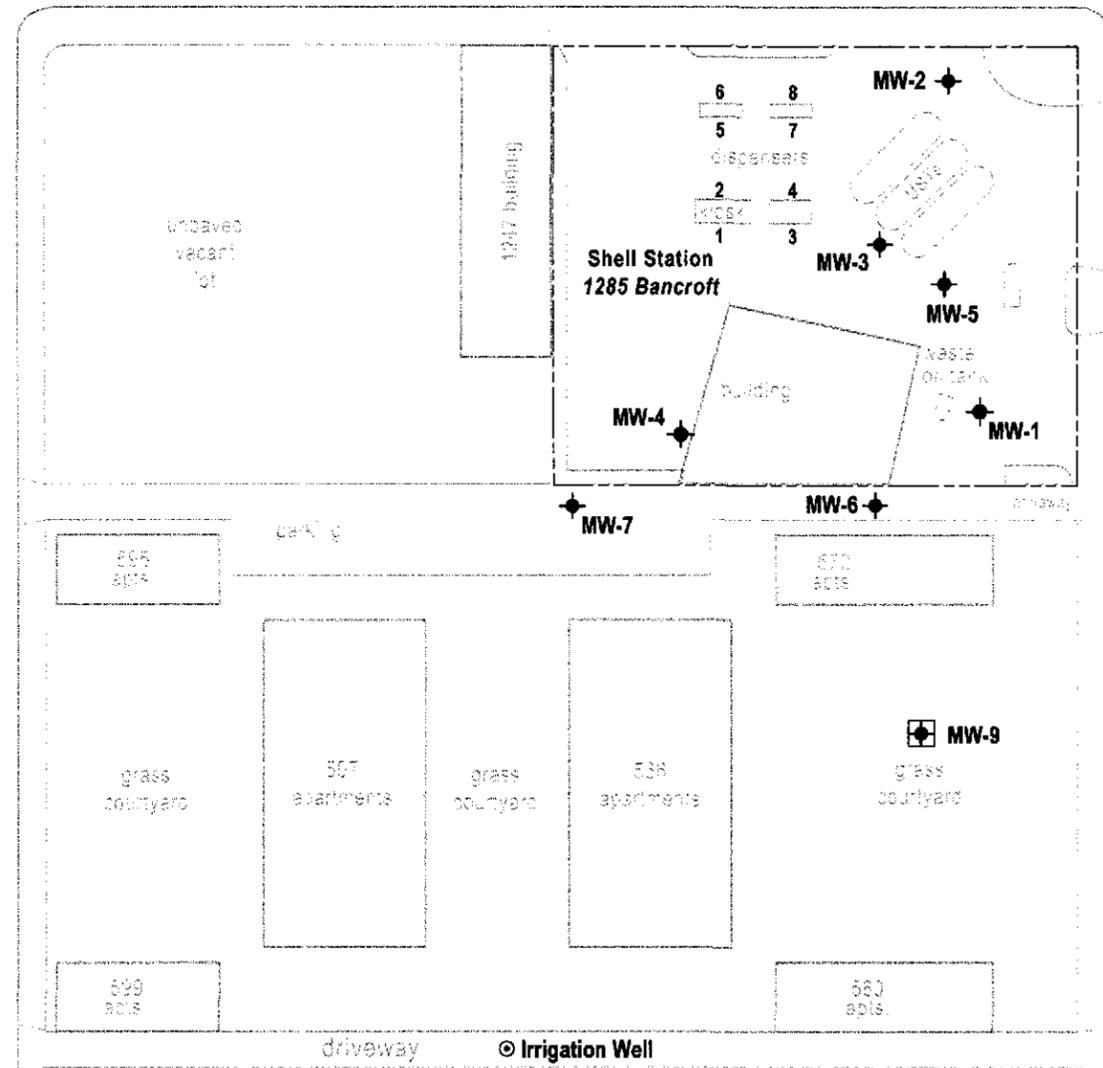
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City of San Leandro
Memorial Park

BANCROFT AVENUE

CALLAN AVENUE

ESTUDILLO AVENUE



Proposed Monitoring Well
Location Map



C A M B R I A

FIGURE
2

Shell-branded Service Station
1285 Bancroft Avenue

San Leandro, California
Incident #98996067

ATTACHMENT A

Standard Field Procedures for Soil Borings and Monitoring Wells

CAMBRIA

STANDARD FIELD PROCEDURES FOR SOIL BORINGS AND MONITORING WELLS

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.

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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 ft below and 5 ft 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 ft 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 ft above the well screen. A two ft 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.

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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

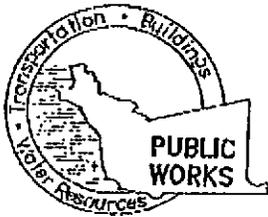
Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate 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.

F:\TEMPLATE\SOPs\Wells-borings-gw.wpd

Attachment B

Well Permit Application

ATTN: James Yoo



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION

399 ELMHURST ST. HAYWARD CA. 94544-1395

PHONE (510) 670-6633 James Yoo

FAX (510) 782-1939

APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRILLING PERMIT APPLICATIONS
DESTRUCTION OF WELLS OVER 45 FEET REQUIRES A SEPARATE PERMIT APPLICATION

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 1285 Bowercroft Avenue
San Leandro, CA 94599

PERMIT NUMBER _____
WELL NUMBER _____
APN _____

CLIENT Name Shell Oil Products Co. (US)
Address P.O. box 7869 Phone (559) 645-9306
City Berkeley, CA Zip 94710-7869

PERMIT CONDITIONS
Circled Permit Requirements Apply

A. GENERAL

1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted original Department of Water Resources-Well Completion Report.
3. Permit is void if project not begun within 90 days of approval date

APPLICANT Name Stewart Dalie - Cambria Environmental
Address 1194 65th Street Fax 510-420-9170
City Oakland, CA Phone 510-420-3339
Zip 94608

B. WATER SUPPLY WELLS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

TYPE OF PROJECT

<input checked="" type="checkbox"/> Well Construction		Geotechnical Investigation	
<input type="checkbox"/> Cathodic Protection		General	
<input type="checkbox"/> Water Supply		Contamination	
<input checked="" type="checkbox"/> Monitoring	X	Well Destruction	

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

PROPOSED WATER SUPPLY WELL USE

<input type="checkbox"/> New Domestic		<input type="checkbox"/> Replacement Domestic	
<input type="checkbox"/> Municipal		<input type="checkbox"/> Irrigation	
<input type="checkbox"/> Industrial		<input type="checkbox"/> Other	

D. GEOTECHNICAL

Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.

DRILLING METHOD:

<input type="checkbox"/> Mud Rotary		<input type="checkbox"/> Air Rotary		<input checked="" type="checkbox"/> Auger	X
<input type="checkbox"/> Cable		<input type="checkbox"/> Other			

E. CATHODIC

Fill hole anode zone with concrete placed by tremie.

DRILLER'S NAME: Gregg Drilling

DRILLER'S LICENSE NO. CS7-4856165

F. WELL DESTRUCTION

Send a map of work site. A separate permit is required for wells deeper than 45 feet.

WELL PROJECTS

Drill Hole Diameter 8" in. Maximum
Casing Diameter 2" in. Depth 60'
Surface Seal Depth _____ ft. Owner's Well Number MW-10

G. SPECIAL CONDITIONS

NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable for geotechnical and contamination investigations.

GEOTECHNICAL PROJECTS

Number of Borings _____ Maximum
Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE Nov 5, 2002

ESTIMATED COMPLETION DATE Nov 6, 2002

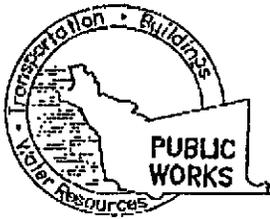
APPROVED _____ DATE _____

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-6R.

APPLICANT'S SIGNATURE Stewart Dalie DATE 9/25/02

PLEASE PRINT NAME STEWART A. DALIE III Rev. 3-04-02

Attn: James Yoo



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
 399 ELMHURST ST. HAYWARD CA. 94544-1395
 PHONE (510) 670-6633 James Yoo
 FAX (510) 782-1939

APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRILLING PERMIT APPLICATIONS
 DESTRUCTION OF WELLS OVER 45 FEET REQUIRES A SEPARATE PERMIT APPLICATION

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 1285 Bancroft Avenue
San Leandro, CA 94699

PERMIT NUMBER _____
 WELL NUMBER _____
 APN _____

CLIENT
 Name Shell Oil Products Co. (US)
 Address P.O. Box 7869 Phone (559) 645-9306
 City Burbank, CA Zip 91510-7869

PERMIT CONDITIONS
 Circled Permit Requirements Apply

APPLICANT
 Name Steu Delle - Cambria Environmental
 Address 1194 65th Street Fax 510-420-9170
 City Oakland, CA Phone 510-420-3339
 Zip 94608

A. GENERAL

1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted original Department of Water Resources-Well Completion Report.
3. Permit is void if project not begun within 90 days of approval date

TYPE OF PROJECT

- | | |
|---|--|
| <input checked="" type="checkbox"/> Well Construction | <input type="checkbox"/> Geotechnical Investigation |
| <input type="checkbox"/> Cathodic Protection | <input type="checkbox"/> General |
| <input type="checkbox"/> Water Supply | <input type="checkbox"/> Contamination |
| <input type="checkbox"/> Monitoring | <input checked="" type="checkbox"/> Well Destruction |

B. WATER SUPPLY WELLS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

PROPOSED WATER SUPPLY WELL USE

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> New Domestic | <input type="checkbox"/> Replacement Domestic |
| <input type="checkbox"/> Municipal | <input type="checkbox"/> Irrigation |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Other |

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

DRILLING METHOD:

- | | | |
|-------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> Mud Rotary | <input type="checkbox"/> Air Rotary | <input checked="" type="checkbox"/> Auger |
| <input type="checkbox"/> Cable | <input type="checkbox"/> Other | |

D. GEOTECHNICAL

Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.

DRILLER'S NAME: Gregg Drilling

E. CATHODIC

Fill hole anode zone with concrete placed by tremie.

DRILLER'S LICENSE NO. CS-4850-165

F. WELL DESTRUCTION

Send a map of work site. A separate permit is required for wells deeper than 45 feet.

WELL PROJECTS

Drill Hole Diameter 8" in. Maximum
 Casing Diameter 2" in. Depth 60' ft.
 Surface Seal Depth _____ ft. Owner's Well Number MW-9

G. SPECIAL CONDITIONS

NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable for geotechnical and contamination investigations.

GEOTECHNICAL PROJECTS

Number of Borings _____ Maximum
 Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE Nov 5, 2002
 ESTIMATED COMPLETION DATE Nov 6, 2002

APPROVED _____ DATE _____

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-6R.

APPLICANT'S SIGNATURE Steu Delle DATE 9/25/02

PLEASE PRINT NAME STEWART A. DELLE III Rev.3-04-02