

PROTECTION

98 JUL -- 7 PM 3: 15 July 1, 1998

Ms. Susan Hugo Alameda County Department of Environmental Health 1131 Harbor Bay Parkway, Suite 250 Alameda, California 94502-6577

Re: **Well Installation Report**

> Shell Service Station 3420 San Pablo Avenue Oakland, California WIC #204-5508-5306 Cambria Project #240-0554

Dear Ms. Hugo:

On behalf of Shell Oil Products Company (Shell), Cambria Environmental Technology, Inc. (Cambria) is submitting this report summarizing the installation of two monitoring wells at the site referenced above. The objective of this work was to replace the monitoring wells abandoned due to site construction activities. The well replacement was requested by the Alameda County Department of Environmental Health (ACDEH). Cambria proposed the well replacement locations in a December 4, 1997 letter to ACDEH, and confirmed the installation plans in a June 15, 1998 facsimile to ACDEH.

SITE SUMMARY

CAMBRIA

ENVIRONMENTAL

TECHNOLOGY, INC.

1144 65TH STREET,

SUITE B

OAKLAND,

CA 94608

PH: (510) 420-0700

Fax: (510) 420-9170

Site Description: The site is a Shell service station undergoing renovation located at the southeast corner of the intersection of 35th Street and San Pablo Avenue in Oakland. Property use in the site vicinity is mixed residential/commercial. Primary surface water bodies in the vicinity of the site are the San Francisco Bay, which is located approximately 1.1 miles west of the site, the Oakland Inner Harbor approximately 2.0 miles south of the site, and Lake Merritt, a tidal lake, approximately 1.4 miles southeast of the site.

The station is currently not in operation. Site renovation activities include replacing product dispensers and piping, grading the site, installing a canopy, and constructing a commercial training center and a retail gasoline station on site (Figure 1). Currently, ground water quality beneath the site is monitored quarterly by nine monitoring wells (six on-site and three off-site wells). Monitoring wells MW-3 and MW-6 were abandoned due to construction activities in December 1997.

Ms. Susan Hugo July 1, 1998

CAMBRIA

PREVIOUS INVESTIGATIONS:

1988 Soil Borings: In August 1988, Ensco Environmental Services, Inc., (Ensco) drilled five soil borings (B-1 through B-5) to a maximum depth of 20.5 feet (ft). Total petroleum hydrocarbons as gasoline (TPHg) were detected at a maximum concentration of 1,400 parts per million (ppm) at 5 ft depth in boring B-1, located at the north end of the UST pit. Benzene was also detected at a maximum concentration of 1.9 ppm in this sample.

1989 Monitoring Wells Installation: In April 1989, Delta Environmental Consultants (Delta) of Rancho Cordova, California, drilled and installed four on-site monitoring wells, MW-1 through MW-4.

1990 Monitoring Wells Installation: In January 1990, Delta drilled and installed five additional monitoring wells, MW-5 through MW-9. Monitoring well MW-5 was drilled to a depth of 26.5 ft below ground surface (bgs) and monitoring wells MW-6 through MW-9 were drilled to depths of 21.5 ft bgs. Monitoring wells MW-5 through MW-8 were located on site, and well MW-9 was located off site to the north, on 35th Street. TPHg was detected at a maximum concentration of 6.1 ppm in soil at 10.5 ft depth in well MW-9. Benzene was detected at a maximum concentration of 0.078 ppm in soil at 5.5 ft depth in well MW-7.

1991 Monitoring Wells Installation: In October 1991, Delta drilled and installed monitoring wells MW-10 and MW-11 off site. TPHg was detected at a maximum concentration of 1.8 ppm in soil at 10 ft depth in boring MW-10. The maximum benzene concentration of 0.06 ppm was also detected in this soil sample.

INVESTIGATION PROCEDURES AND RESULTS

As requested by the ACDEH, Cambria proposed to install two ground water monitoring well to replace abandoned monitoring wells MW-3 and MW-6. The monitoring well locations are shown in Figure 1.

Well Installation Date: June 18, 1998

Personnel Present During Soil Borings and Well Installation Activities:

| Personnel | Title | Company | | | |
|----------------|------------------------|---------------------|--|--|--|
| John Riggi | Staff Geologist | Cambria | | | |
| Cortez Johnson | Project Superintendent | Winmax Construction | | | |
| Jason Ogden | Head Driller | Gregg Drilling | | | |

Soil Boring and Well Installation

Permits: ACPWA Drilling Permit No. 98WR234 (Attachment A).

Drilling Date: The well casing and sand pack were installed and temporarily sealed on

June 18, 1998. The well vaults will be installed upon completion of the

asphalt paving.

Drilling Method: 8-inch hollow stem auger. The first 5 ft of the boring were hand-augered.

Soil Sampling: Samples were collected every five feet using an 18-inch modified California

split spoon sampler with stainless steel liners. Soil samples were not submitted for chemical analysis since previously installed monitoring wells

had been analyzed for that data.

Number of Wells: Two; Monitoring wells MW-3R and MW-6R (Figure 1).

Boring Depth: 31.5 ft below grade (Attachment B).

Ground Water Depth: Ground water was initially encountered at 5.5 ft, and the static water level was

measured at 6.0 ft (Attachment B).

Sediment Lithology: Primarily silty clays, sandy silts, and sandy gravel to the total depth explored

of 31.5 ft (Attachment B).

Well Materials: Monitoring wells MW-3R and MW-6R were constructed using two-inch

diameter, schedule 40 PVC well casing and 0.010-inch slotted well screen

(Attachment B).

Screened Interval: The wells were screened from 4.0 to 30.0 ft below grade (Attachment B).

Well Development: The monitoring wells will be developed, purged, and sampled by Blaine Tech

Services, Inc. (Blaine) of San Jose, California during the Third Ouarter 1998.

Soil Disposal: Soil cuttings produced from the well installations were stockpiled onsite with

the excavated soils generated during site construction activities. Shell will arrange for transportation of the stockpile to an approved disposal/recycling

facility.

CLOSING

Thank you for your assistance with this project. Please call if you have any questions or comments.

NO. C46725

Sincerely,

Cambria Environmental Technology, Inc.

Paul Waite

Project Engineer

Diane M. Lundquist, P.E.

Principal Engineer

Attachments:

A - Well Installation Permit

B - Boring Log and Well Construction Details

C - Standard Field Procedures for Well Installation

cc:

A.E. (Alex) Perez, Shell Oil Products Company, P.O. Box 8080, Martinez, California 94553

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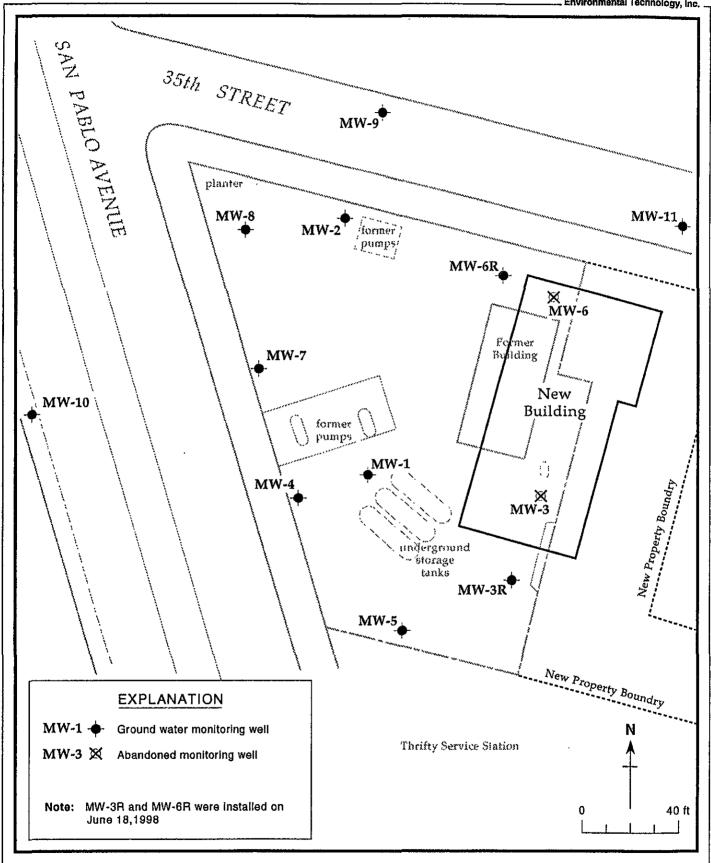


Figure 1. Building and Existing Well Locations - Shell Service Station WIC #204-5508-5306, 3420 San Pablo Avenue, Oakland, California

G IOAKS420FIGURESIWEL-LOCE.AI O6/26/98

ATTACHMENT A

Well Installation Permit



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION

951 TURNER COURT, SUITE 300, HAYWARD, CA 94545-2651 PHONE (510) 670-5575 ANDREAS GODFREY (510) 670-5248 ALVIN KAN FAX (510) 670-5262

DRILLING PERMIT APPLICATION

| FOR APPLICANT TO COMPLETE | for office use | | | | |
|---|---|--|--|--|--|
| LOCATION OF PROJECT 3420 San Pablo Av | PERMIT NUMBER 98 WR 234 WELL NUMBER APN | | | | |
| Celifornia Coordinates Source ft. CCE ft. CCE ft. | PERMIT CONDITIONS | | | | |
| APN | Circled Permit Requirements Apply | | | | |
| CLIENT Shell 8: Products Co. X Address 501 51est Ave Phone 510-335-5027 City Martine 2 Zip AUS 53 APPLICANT Name Cambria Enterprises LLC after 7/1/48 APPLICANT Name Cambria Env. 10 moes 12 Tachnisty Jack Address 1/44 65 57 50.22 Phone 510-420-3305 City Cakland Zip 94608 TYPE OF PROJECT Well Construction General General Water Supply Contamination Monitoring Well Destruction | 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 work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects. 3. Permit is void if project not begun within 90 days of approval date. B. WATER SUPPLY WELLS 1. Minimum surface scal thickness is two inches of coment grow placed by tremie. 2. Minimum scal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation | | | | |
| PROPOSED WATER SUPPLY WELL USE | wells unless a lesser depth is specially approved. (C.) CROUNDWATER MONITORING WELLS | | | | |
| New Domestic | INCLUDING PIEZOMETERS | | | | |
| Municipal Irrigation Q Industrial Q Other Q | Minimum surface seal thickness is two inches of comont grout placed by tremie. | | | | |
| Drilling method: | Minimum scal depth for monitoring wells is the maximum depth practicable or 20 feet. | | | | |
| Mud Rotary C Air Rotary C Auger | D. GEOTECHNICAL | | | | |
| Cable | Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings | | | | |
| Drill Hole Diameter 8-10 in. Maximum Casing Diameter 4 in. Depth 30 ft. Surface Scal Depth 10 ft. Number 2 | E. CATHODIC Fill hale above anode zone with concrete placed by tremit F. WELL DESTRUCTION See attached. G. SPECIAL CONDITIONS | | | | |
| GEOTECHNICAL PROJECTS Number of Borings in. Depth ft. | Λ 1 | | | | |
| ESTIMATED STARTING DATE 6/18/98 ESTIMATED COMPLETION DATE 6/19/48 | APPROVED DATE 6/15/91 | | | | |
| hereby agree to comply with all requirements of this permit and alameda County Ordinance No. 73-68. | | | | | |

_ DATE 6/12/98

APPLICANT'S

ATTACHMENT B

Boring and Well Construction Log

| DRILLING LOG | | | Well ID MW-3R Boring ID MW-3R | | | | | | | |
|--|------------------------------------|--------|-------------------------------|---|---|---------------|----------------------------------|----------------------------------|-----------------|---|
| ŧ . | Client: Shell Oil Products Company | | | Location 3420 San Pablo Avenue, Oakland, California | | | | | | |
| Project No: 240-0554 Phase Task | | | Surfac | e Elev. N | IA ft, | ,···· | Page 1 of 1 | | | |
| Depth (feet) | Blow | Sample | % Rec | İ | Lithologic Description | TPHg (ppm) | Graphic Log | Well Construction Graphics | Depth (feet) | Well Construction Details |
| | | | | | | | | | | T.O.C. Elev. na |
| 0 | Ground Surface | | | | | | ļ | AST//SST//AD | 0 | |
| | - | þ | | ASPHALT Gravelly fill | | | | | - | |
| | - | | | Silty CLAY; (C | CH); black; stiff; moist; | - | | | <u>-</u> | |
| 5 | - | b | | very low estin |)% silt; high plasticity; mated permeability. | i | | | 5 | |
| - | NA NA | X | | Clayey Sandy | SILT: (ML); yellowish um stiff; moist; 20% | 1 | | | - 3 | |
| | | | | clay, 40% silt | t, 30% fine to medium 10% gravel; medium | 1 | 1. | | <u>-</u> | water encountered during drilling @ 6' static water level @ |
| | | | | plasticity; low | estimated permeability. | | | | | 6.25' |
| 10 | NA NA | M | | 20% clay, 40 | % silt, 40% sand. | | | | 10 | |
| | 1 | | | - | | | | | _ | |
| | | | | | | | | | E | |
| 15 |] NA | | | Wet: 25% cla | ev. 40% silt. 30% fine | ŀ | | | 15 | |
| | | M | | grained sand, | y, 40% silt, 30% fine 5% gravel. | | | | - | |
| 1 | _] | | | | | | | | _ | |
| 20 | | | | | | _ | | | - 20 | |
| | - NA | X | | Clayey Silty S brown; mediu | SAND; (SM); yellowish Im_dense; wet; 20% | | | | Ė | |
| | | | | clay, 20% silt sand; medium estimated per | t, 60% fine grained n plasticity; medium | | | | - - | |
| 25 | - | | | estiliated peri | meability. | | | | 25 | |
| | - NA | X | | Silty Sandy G | RAVEL; (GP); brown; | _ | | | | |
| | | | | fine to coarse | % clay, 20% silt, 20% grained sand, 55% | | | | - | |
| | = | | | estimated per | l; no plasticity; high meability. | | . 1 . 1 | | = | |
| 30 | NA NA | M | | Clayey Silty S | AND with gravel; (SM); | | | | 30 | |
| | | | | ll 20% clav. 20 | wn; medium dense; wet; 1% silt, 40% fine to | [| ·1 | | <u>-</u> | bottom of boring @ 31.5 |
| | | | | gravel; low to | ed sand, 20% angular medium plasticity; high meability. | | | | - - | 31.0 |
| 35 | - | | | <u> </u> | | 1 | | | 35 | |
| | | | | | | Ì | | | - - | |
| | | | | | | | | | | |
| Driller Gregg Drilling Development Yield | | | | Development Yield N | A | | Bentonite Sea | al <u>3'</u> | to 1' | |
| Logged By J. Riggi | | | Well Casing 2" | ing 2" Dia. 0' to 4' | | Sand Pack | Sand Pack 3' to 30' | | | |
| Drilling Started 6/18/98 | | | Casing Type Sched | asing Type Schedule 40 PVC | | Sand Pack Ty | Sand Pack Type # 2/12 Sand | | | |
| Drilling Completed 6/18/98 | | | | Dia. <u>4'</u> to <u>30'</u> | | Static Water | Static Water Level 6.25 ft Depth | | | |
| Construction Completed 6/18/98 | | | | en Type Schedule 40 PVC | | | Date <u>6/18/98</u> | | | |
| Development Completed NA | | | Slot Size <u>0.010"</u> | | | Notes: Rhi | no Rig | HSA 8" augers | | |
| Water Bearing Zones NA | | | Drilling Mud NA | | | | | | | |
| | | | | | Grout Type Concre | 919 | | | | · |

| Project No.: 240-0554 Phase Task Surface Elev. NA ft. Page 1 of 1 Well Count 0 | DRILLING LOG | | | | Well ID MW-6R Boring ID MW-6R | | | | | | |
|--|--|-------|----------|------------------|---|---|-------------------|----------------------------|---------------|----------------|---|
| Count Count Count Count Construction Co | Client: Shell Oil Products Company | | | | Location 3420 San Pablo Avenue, Oakland, California | | | | | | |
| O Ground Surface ASPHALT Greelly Fill Sitty CLAY (CH): black; stiff; motat: Sity Clay (Sh): Stiff; light plasticity; very low estimated parmeability. In MA Claywr Sity Clay, So's sit, 10% proved; parmeability. Sity Claywr Sity SAND; (SM); yellowigh brown; motium stiff; motat; 20% proved; parmeability. Sity Claywr Sity SAND; (SM); yellowigh brown; motium stiff, stiff; motat; 20% proved. In MA Claywr Sity SAND; (SM); yellowigh brown; motat; 20% proved. Sity Claywr Sity SAND; (SM); yellowigh brown; motat; 20% stiff; motation setimated permeability. 25 MA Sandy GRAVEL; (GP); brown; motat; 20% stiff; motation setimated depermeability. 26 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 27 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 28 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 29 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 29 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 29 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 29 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 29 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 20 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 20 Ma Sandy GRAVEL; (GP); brown; motation setimated depermeability. 20 Ma Sandy GRAVEL; (GP); brown; motation setimated depermeability. 20 Ma Sandy GRAVEL; (GP); brown; motation setimated depermeability. 21 Ma Sandy GRAVEL; (GP); brown; motation setimated depermeability. 22 Ma Sandy GRAVEL; (GP); brown; motation setimated depermeability. 25 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 25 MA Sandy GRAVEL; (GP); brown; motation setimated depermeability. 26 Ma Sandy GRAVEL; (GP); brown; motation setimated depermeability. 25 Ma Sandy GRAVEL; (GP); brown; motation setimated depe | | | T | | | | _ | · · · · · · · | . | | |
| O Ground Surface ASPHALT Gravells Fill Site CLAY (Clf): black: stift: molet: Gravel stift fill fill fill fill Glaver Site Clf fill Fill fill fill fill fill Fill fill fill fill fill Fill fill fill fill Fill fill fill fill Fill fill fill fill Fill fill fill fill Fill fill fill Fill fill fill fill Fill fill fill fill Fill fill fill Fill fill fill Fill fill fill Fill fill fill Fill fill fill Fill fill fill Fill Fill fill Fil | Depti (feet | Count | Samp | % Re | | • | TPHç mqq) | Graph | Construction | Depti (feet | Construction Details |
| ASPHALT Gravelly Fill Sitty CLAY, ICHI; black; stiff; molet; Sitty Clay Sitty Shalt; stiff; molet; Sitty Shalt; stiff; molet; st | | | | | | | | | | | T.O.C. Elev. na |
| Stray CLAY, ICHI; black; stiff; moint, d0 % (sty, 40 % silt, high plasticity; every fow estimated parmeability. NA Clayar SILT; (ML); clive; medium stiff, moint, 20 % clay, 40 % silt, 10 % explaint and parmeability. In moint, 20 % clay, 40 % silt, 10 % explaint and parmeability. In moint, 20 % clay, 40 % silt, 40 % fine to medium plasticity; low estimated permeability. In moint, 20 % clay, 40 % silt, 40 % fine to medium plasticity; low to medium plasticity; medium dense; moist, 20 % clay, 20 % silt, 40 % fine to medium plasticity; medium dense; moist, 20 % clay, 20 % silt, 60 % sand; medium plasticity; medium dense; moist, 20 % clay, 20 % silt, 60 % sand; medium plasticity; medium dense; moist, 20 % clay, 20 % silt, 60 % sand; medium plasticity; medium dense; moist, 20 % clay, 20 % silt, 30 % fine to conse see the post semiplate gravel; no permeability. 25 NA Sandy GRAVEL: (GP): brown; loose; weet, 5 % clay, 10 % silt, 30 % fine to conse see the post semiplate gravel; no permeability. 26 NA I 10 % clay, 10 % silt, 30 % fine to conse see the post semiplate gravel; no permeability in the semiplate gravel; no conse gerained sand, 50 % engular gravel; no conse gerained sand, 50 % engular gravel; low to medium plasticity; fligh stimated permeability. 27 Driller Gregg Drillling Logged By J. Riggi Drilling Started 6/18/98 Construction Completed 6/18/98 Construction Completed 6/18/98 Construction Completed 6/18/98 Soreen Type Schedule 40 PVC Sand Pack 3' to 30' Static Water Lavel 6.00 ft Depth Device on the post of the post o | 0 | | | | | | | | | _0 | |
| 60% clay, 40% slit; high plasticity; very love stimmated permeability. Clayery SILT; MUL; other, medium plasticity; low slit in the stimsted permeability. In the stimsted permeability is the stimsted permeability. NA clayery Silt; MUL; yellowish provin; medium stiff; moist; 20% clay, 40% slit, 40% fine to medium plasticity; low stimsted permeability. NA clayery Silty SAND; (SM); yellowish provin; medium opermeability. NA clayery Silty SAND; (SM); yellowish provin; medium destinated permeability. Sandy GRAVEL; (SP); brown; loose; wart, 5% clay, 20% slit, 50% sine to medium plasticity; medium estimated permeability. Sandy GRAVEL; (SP); brown; loose; wart, 5% clay, 10% slit, 35% fine to operation of plasticity; high estimated permeability. Sandy GRAVEL; (SP); brown; loose; wart, 5% clay, 10% slit, 35% fine to operate slit; 10% slit, 35% fine to operate slit; 20% clay, 20% slit, 50% sine to coarse grained sand, 50% sand; and slit; 35% fine to operate slit; 20% clay, 20% slit, 50% sine to coarse grained sand, 50% sand; and slit; 20% clay, 20% slit, 50% sine to medium plasticity; high estimated permeability. Driller Gregg Drilling Logged by J. Riggi Drilling Started 6/18/98 Drilling Completed 6/18/98 Drilling Completed 6/18/98 Development Completed 6/18/98 Development Completed 6/18/98 Development Completed 6/18/98 Development Completed NA Water Bearing Zones NA Drilling Mud NA Notes: Rhino Rig HSA 8" augers | | NA | | | | | _/ | | | - - - | |
| Clayer Silt. (ML) relieve medium stiff; moist; 20% clay, 40% silt, 10% grevel; medium plasticity; low stimated short of the plasticity; low to medium stiff; moist; 20% clay, 40% silt, 40% fine to medium plasticity; low to medium stiff; moist; 20% clay, 40% silt, 40% fine to medium plasticity; low to medium stiff; moist; 20% clay, 40% silt, 40% fine to medium plasticity; low to medium estimated permeability. 20 | - | | | | 60% clay, 40 | % silt; high plasticity; | | | | | |
| medium plasticity; low estimated permeability. NA | <u> </u> | NA | X | | Clayey SILT: | (ML); olive; medium | _ | | | - | water encountered |
| Claver Sandy SILT. (MI); yellovish brown; medium attiff; moist; 20% day, 30% silt, 40% send, 5% day, 30% silt, 40% send, 5% day, 36% silt, 40% send, 5% drawel. 20 NA 20% clay, 35% silt, 40% send, 5% drawel. 20 NA 20% clay, 35% silt, 40% send, 5% drawel. 20 NA 20% clay, 35% silt, 40% send, 5% drawel. 21 Driller Sandy Silty SAND; (SM); yellowish brown; medium dense; moist; 20% clay, 20% silt, 30% sand; delum plasticity; medium dense; moist; 20% angular gravel; on plasticity; medium dense; medium grained send, 10% angular gravel; on to medium plasticity; high estimated permeability. 25 Driller Gregg Drilling Development Vield NA 35% fine to coarse grained sand, 10% angular gravel; on to medium plasticity; high estimated permeability. 26 Drilling Started 6/18/98 Casing Type Schedule 40 PVC Schedule | | | | | medium plasti | and, 10% gravel; icity; low estimated | " | | | - | during drilling @ 5.5' static water level @ 6' |
| clay, 40% silt, 40% fine to medium grained sand; low to medium estimated permeability. 20 | | | | | Clavey Sandy | SILT; (ML); yellowish | | | | - | |
| pissticity; low to medium estimated permeability. 20 % clay, 35% silt, 40% sand, 5% gravel. 20 NA Clayey Silty SAND; (SM); yellowish brown; medium dense; moist; 20% clay, 20% silt, 60% sand; medium plasticity; medium estimated permeability. 25 Sandy GRAVEL; (SP); brown; loose; occarse sand, 50% angular gravel; no plasticity; high estimated permeability. 10% claye, 20% silt, 50% sing, angular gravel; no plasticity; high estimated permeability. 10% claye, 30% silt, 50% singular gravel; no plasticity; high estimated permeability. 26 Driller Gregg Drilling Logged By J. Riggi Development Vield NA Well Casing 2" Dia, 0' to 4' Sand Pack 3' to 30' Drilling Started 6/18/98 Drilling Started 6/18/98 Casing Type Schedule 40 PVC Date 6/18/98 Notes: Rhino Rig HSA 8" augers Notes: Rhino Rig HSA 8" augers | 10 | NA NA | H | | clay, 40% silt | , 40% fine to medium | | | | 10 | |
| 20 NA Clavey Sifty SAND; (SM); yellowish brown; medium dense; moist; 20% clay, 10% silt, 35% fine to coarse sand, 50% angular gravel; no plasticity; high stamated permeability. Sandy GRAVEL; (GP); brown; losse; wet; 5% clay, 10% silt, 35% fine to coarse sand, 50% angular gravel; no plasticity; high stimated permeability. Driller Gregg Drilling Logard SaND; (SM); yellow to yellowish brown; medium dense; moist; 20% clay, 20% silt, 50% fine to coarse grained sand, 50% angular gravel. Silty Clavey SAND; (SM); yellow to plasticity; high settimated permeability. Driller Gregg Drilling Logard Sand, 10% angular gravel; low to medium plasticity; high settimated permeability. Development Yield NA Well Casing 2" Dia. 0' to 4' Sand Pack 3' to 30' Sand Pack Type # 2/12 Sand Development Completed 6/18/98 Drilling Completed 6/18/98 Well Screen 2" Dia. 4' to 30' Static Water Level 6.00 ft Depth Date 6/18/98 Development Completed NA Development Completed NA Drilling Mud NA | | | | | plasticity; low | to medium estimated | Ì | | | <u> </u> | |
| 20 NA Clavey Sifty SAND; (SM); yellowish brown; medium dense; moist; 20% clay, 10% silt, 35% fine to coarse sand, 50% angular gravel; no plasticity; high stamated permeability. Sandy GRAVEL; (GP); brown; losse; wet; 5% clay, 10% silt, 35% fine to coarse sand, 50% angular gravel; no plasticity; high stimated permeability. Driller Gregg Drilling Logard SaND; (SM); yellow to yellowish brown; medium dense; moist; 20% clay, 20% silt, 50% fine to coarse grained sand, 50% angular gravel. Silty Clavey SAND; (SM); yellow to plasticity; high settimated permeability. Driller Gregg Drilling Logard Sand, 10% angular gravel; low to medium plasticity; high settimated permeability. Development Yield NA Well Casing 2" Dia. 0' to 4' Sand Pack 3' to 30' Sand Pack Type # 2/12 Sand Development Completed 6/18/98 Drilling Completed 6/18/98 Well Screen 2" Dia. 4' to 30' Static Water Level 6.00 ft Depth Date 6/18/98 Development Completed NA Development Completed NA Drilling Mud NA | | | | | | | | | | <u>-</u> | |
| NA Clayey Silty SAND; (SM); yellowish brown; medium dense; noist; 20% clay, 20% silt, 60% sand; medium plasticity; medium estimated permeability. 25 NA Sandy GRAVEL: (GP); brown; loose; wet; 5% cley, 10% silt, 35% fine to coarse sand, 50% angular gravel; no plasticity; high estimated permeability. NA 10% clay, 10% silt, 30% fine to coarse sand, 50% angular gravel; no plasticity; high estimated permeability. NA 10% clay, 10% silt, 30% fine to permeability. NA 10% clay, 10% silt, 30% fine to plasticity; high estimated permeability. Driller Gregg Drilling Looged sand; noist; 20% clay, 20% silt, 50% fine to medium grained sand, 10% angular gravel; low to medium plasticity; high estimated permeability. Drilling Started 6/18/98 Casing Type Schedule 40 PVC Sand Pack 3' to 30' Static Water Level 6,00 ft Depth Development Completed 6/18/98 Construction Completed 6/18/98 Screen Type Schedule 40 PVC Date 6/18/98 Development Completed NA Sit Size 0.010" Drilling Mud NA | 15 | NA NA | V | | | % silt, 40% sand, 5% | | | | <u> 15</u> | |
| Driller Gregg Drilling Development Yield NA Development Yield NA Development Gray Disasticity; high estimated permeability. | | | | | gravei. | | | | | | |
| Driller Gregg Drilling Development Yield NA Development Yield NA Development Gray Disasticity; high estimated permeability. | | | | | | | | | | - - - | |
| brown; medium dense; moist; 20% clay, 20% sit, 80% sand; medium plasticity; high estimated permeability. NA Sandy GRAVEL (GP); brown; loose; wet; 5% clay, 10% silt, 36% fine to coarse sand, 50% angular gravel; no plasticity; high estimated permeability. NA 10% clay, 10% silt, 30% fine to coarse grained sand, 50% angular gravel. Silty Clayey SAND; (SM); yellow to yellowish brown; medium dense; moist; 20% clay, 20% silt, 50% fine to medium grained sand, 10% angular gravel, low to medium plasticity; high estimated permeability. Driller Gregg Drilling Development Yield NA Well Casing 2" Dia. 0' to 4' Sand Pack 3' to 30' Sand Pack 3' to 30' Sand Pack Type # 2/12 Sand Drilling Started 6/18/98 Well Screen 2" Dia. 4' to 30' Static Water Level 6.00 ft Depth Construction Completed 6/18/98 Screen Type Schedule 40 PVC Date 6/18/98 Development Completed NA Siot Size 0.010" Notes: Rhino Rig HSA 8" augers Rhino Rig HSA 8" aug | 20 | NA | | | Clavey Silty S | SAND: (SM); vellowish | | | | 20 | |
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| | Water Bearing Zones NA | | | | | | | | | | |

ATTACHMENT C

Standard Field Procedures for Well Installation

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling ground water 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 ground water 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 ground water 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

Ground water monitoring wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water 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.

Well Development

Wells are generally developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water 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 ground water are extracted and the sediment volume in the ground water 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.

Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water 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.

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FACSIMILE

To:

Susan Hugo

Organization: Alameda County Department of

Environmental Health

Fax #:

(510) 337-9335

Re:

Well Installation

Shell Station,

3420 San Pablo, Oakland

Date:

July 1, 1998

Pages:

6, including this cover

Ms. Hugo,

Attached is the text of our Well Installation Report for 3420 San Pablo, Oakland. A hard copy, including attachments, will be sent to you.

If you have any questions regarding this report, please contact me at (510) 420-3305. Thank you for your continued assistance with this project.

١.

From the desk of...

Paul Waite Project Engineer Cambria Environmental Technology

1144 65th Street, Suite C Oakland, CA 94608

> (510) 420 3305 Fax: (510) 420 9170



July 1, 1998

Ms. Susan Hugo Alameda County Department of Environmental Health 1131 Harbor Bay Parkway, Suite 250 Alameda, California 94502-6577

Weil Installation Report Re:

> Shell Service Station 3420 San Pablo Avenue Oakland, California WIC #204-5508-5306 Cambria Project #240-0554

Dear Ms. Hugo:

1.

On behalf of Shell Oil Products Company (Shell), Cambria Environmental Technology, Inc. (Carabria) is submitting this report summarizing the installation of two monitoring wells at the site referenced above. The objective of this work was to replace the monitoring wells abandoned due to site construction activities. The well replacement was requested by the Alameda County Department of Environmental Health (ACDEH). Cambria proposed the well replacement locations in a December 4, 1997 letter to ACDEH, and confirmed the installation plans in a June 15, 1998 facsimile to ACDEH.

SITE SUMMARY

CAMPRIA

ENVIRONMENTAL

TECHNOLOGY, INC.

1144 65TH STREET,

Sůtte B

OAKLAND.

CA 9460B

PH: (510) 420-0700

Site Description: The site is a Shell service station undergoing renovation located at the southeast corner of the intersection of 35th Street and San Pablo Avenue in Oakland. Property use in the site vicinity is mixed residential/commercial. Primary surface water bodies in the vicinity of the site are the San Francisco Bay, which is located approximately 1.1 miles west of the site, the Oakland Inner Harbor approximately 2.0 miles south of the site, and Lake Merritt, a tidal lake, approximately 1.4 miles southeast of the site.

The station is currently not in operation. Site renovation activities include replacing product dispensers and piping, grading the site, installing a canopy, and constructing a commercial training center and a retail gasoline station on site (Figure 1). Currently, ground water quality beneath the site is monitored quarterly by nine monitoring wells (six on-site and three off-site wells). Monitoring wells MW and MW-6 were abandoned due to construction activities in December 1997.

FÁX: (510) 420-9170

Ms, Susan Hugo July 1, 1998

CAMBRIA

510 420 9170

PREVIOUS INVESTIGATIONS:

1988 Soil Borings: In August 1988, Ensco Environmental Services, Inc., (Ensco) drilled five soil borings (B-1 through B-5) to a maximum depth of 20.5 feet (ft). Total petroleum hydrocarbons as gasoline (TPHg) were detected at a maximum concentration of 1,400 parts per million (ppm) at 5 ft depth in boring B-1, located at the north end of the UST pit. Benzene was also detected at a maximum concentration of 1.9 ppm in this sample.

1989 Monitoring Wells Installation: In April 1989, Delta Environmental Consultants (Delta) of Rancho Cordova, California, drilled and installed four on-site monitoring wells, MW-1 through MW-4.

1990 Monitoring Wells Installation: In January 1990, Delta drilled and installed five additional monitoring wells, MW-5 through MW-9. Monitoring well MW-5 was drilled to a depth of 26.5 ft below ground surface (bgs) and monitoring wells MW-6 through MW-9 were drilled to depths of 21.5 ft bgs. Monitoring wells MW-5 through MW-8 were located on site, and well MW-9 was located off site to the north, on 35th Street. TPHg was detected at a maximum concentration of 6.1 ppm in soil at 10.5 ft depth in well MW-9. Benzene was detected at a maximum concentration of 0.078 ppm in soil at 5.5 ft depth in well MW-7.

1991 Monitoring Wells Installation: In October 1991, Delta drilled and installed monitoring wells MW-10 and MW-11 off site. TPHg was detected at a maximum concentration of 1.8 ppm in soil at 10 ft depth in boring MW-10. The maximum benzene concentration of 0.06 ppm was also detected in this soil sample.

INVESTIGATION PROCEDURES AND RESULTS

As requested by the ACDEH, Cambria proposed to install two ground water monitoring well to replace abandoned monitoring wells MW-3 and MW-6. The monitoring well locations are shown in Figure 1.

Well Installation Date: June 18, 1998

Personnel Present During Soil Borings and Well Installation Activities:

| Personnel | Title | Company |
|---|---|--|
| John Riggi Cortez Johnson Jason Ogden | Staff Geologist Project Superintendent Head Driller | Cambria Winmax Construction Gregg Drilling |

Ms. Susan Hugo July 1, 1998

CAMBRIA

Soil Boring and Well Installation

Permits:

ACPWA Drilling Permit No. 98WR234 (Attachment A).

Drilling Date:

The well casing and sand pack were installed and temporarily sealed on June 18, 1998. The well vaults will be installed upon completion of the

asphalt paving.

Drilling Method:

8-inch hollow stem auger. The first 5 ft of the boring were hand-augered.

Soil Sampling:

Samples were collected every five feet using an 18-inch modified California split spoon sampler with stainless steel liners. Soil samples were not submitted for chemical analysis since previously installed monitoring wells

had been analyzed for that data.

Number of Wells:

Two; Monitoring wells MW-3R and MW-6R (Figure 1).

Boring Depth:

31.5 ft below grade (Attachment B).

Ground Water Depth:

Ground water was initially encountered at 5.5 ft, and the static water level was

measured at 6.0 ft (Attachment B).

Sediment Lithology:

Primarily silty clays, sandy silts, and sandy gravel to the total depth explored

of 31.5 ft (Attachment B).

Well Materials:

Monitoring wells MW-3R and MW-6R were constructed using two-inch diameter, schedule 40 PVC well casing and 0.010-inch slotted well screen

(Attachment B).

Screened Interval:

The wells were screened from 4.0 to 30.0 ft below grade (Attachment B)

Well Development:

The monitoring wells will be developed, purged, and sampled by Blaine Tech Services, Inc. (Blaine) of San Jose, California during the Third Quarter 1998.

Soil Disposal:

Soil cuttings produced from the well installations were stockpiled onsite with the excavated soils generated during site construction activities. Shell will arrange for transportation of the stockpile to an approved disposal/recycling

facility.

510 420 9170 , 12.05/06

Ms. Susan Hugo July 1, 1998

CAMBRIA

CLOSING

Thank you for your assistance with this project. Please call if you have any questions or comments.

NO. C46725

Sincerely,

Cambria Environmental Technology, Inc.

Paul Waite

Project Engineer

Diane M. Lundquist, P.E.

Principal Engineer

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Attachments:

A - Well Installation Permit

B - Boring Log and Well Construction Details

C - Standard Field Procedures for Well Installation

cc:

η,

tr.

A.E. (Alex) Perez, Shell Oil Products Company, P.O. Box 8080, Martinez, California 94553

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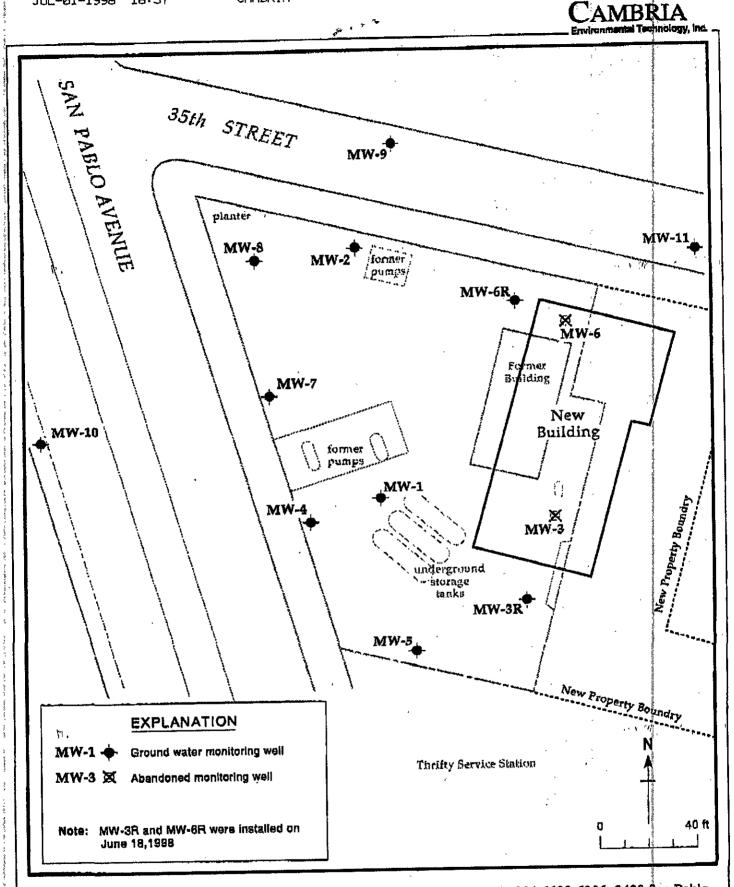


Figure 1. Building and Existing Well Locations - Shell Service Station WIC #204-5508-5306, 3420 San Pablo Avenue, Oakland, California