Texaco Refining
and Marketing Inc

108 Cutting Blvd
Richmond CA 94804



November 30, 1994

**ENV - STUDIES, SURVEYS & REPORTS**
**2225 Telegraph Ave., Oakland, California**

Mr. Thomas Peacock
Alameda County Environmental Health Department
80 Swan Way, Room 200
Oakland, CA 94621

Dear Mr. Peacock:

This letter presents the results of groundwater monitoring and sampling conducted by Blaine Tech Services, Inc. on **August 30, 1994**, at the site referenced above (see Plate 1, Site Vicinity Map). Based on groundwater level measurements, the areal hydraulic gradient was estimated to be south (see Plate 2, Groundwater Gradient Map). The gradient map has been reviewed by a registered professional. TPHg and benzene concentrations are shown on Plate 3. Tables 1 and 2 list historical groundwater monitoring data and analytical results, respectively.

The groundwater treatment system on site ran continously throughout the reporting period.

The certified analytical report, chain-of-custody, field data sheets, bill of lading, and quarterly summary report are in the Appendix, along with Texaco Environmental Services' Standard Operating Procedures.

If you have any questions or comments regarding this site, please call the Texaco Environmental Services' site Project Coordinator, Ms. Karen E. Petryna at (510) 236-9139.

Best Regards,

Rebecca Digerness
Environmental Technician

Karen E. Petryna
Engineer
Texaco Environmental Services

RBD:hs
C:\QMR\2225T\QMR.LET

Enclosures

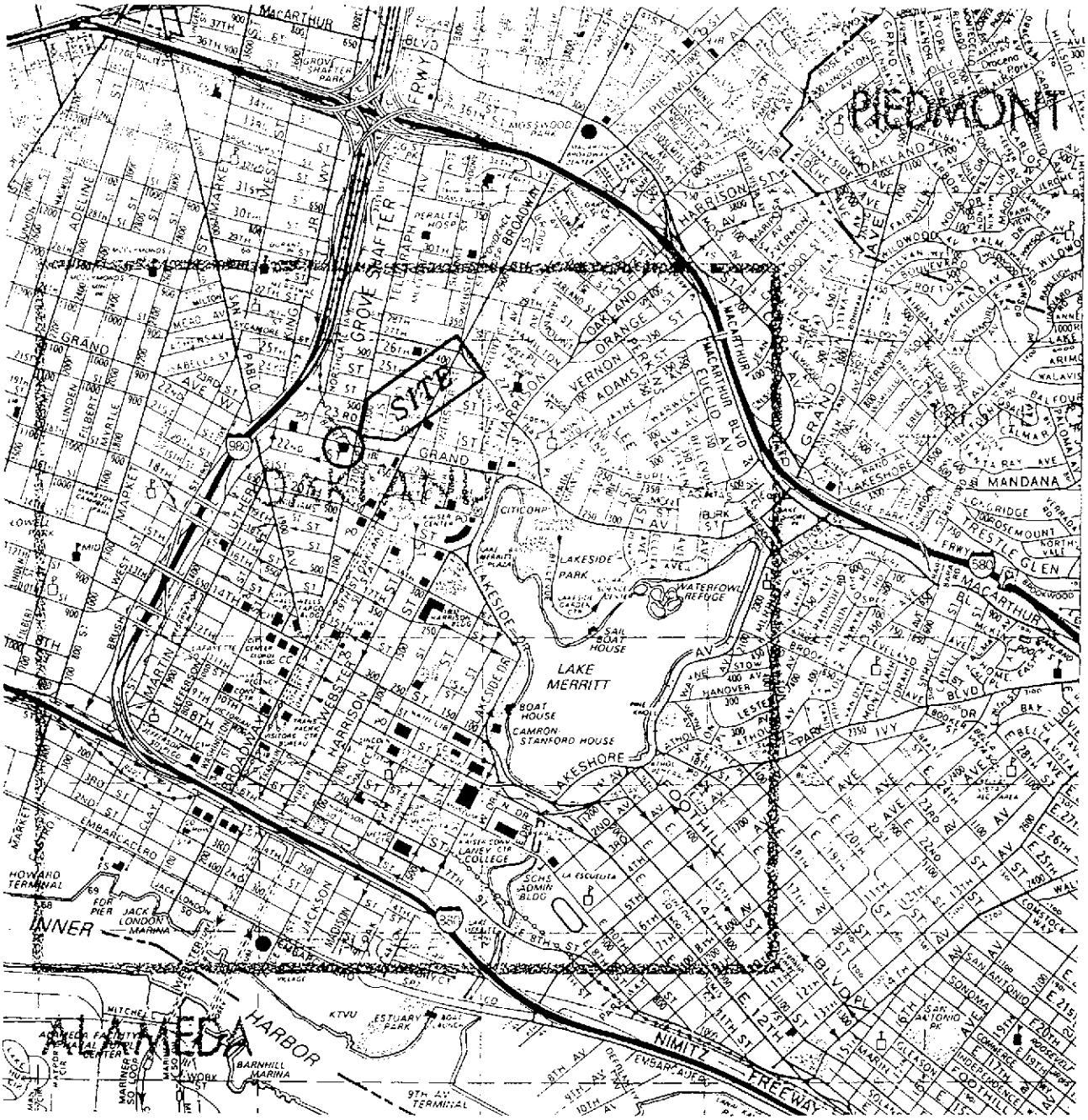
CC: Mr. Richard Hiett
CRWQCB - San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

Mr. Michael Faber
Exxon Company, USA
2300 Clayton Road, Suite 1250
Concord, CA 94524-2032

RAOFile-UCPFile (w/enclosures) RACoughlin-RRZielinski (w/o enclosures)

PR: KEP

# Groundwater Monitoring and Sampling
# Third Quarter, 1994
# at the
# Former Texaco Station
# 2225 Telegraph Avenue
# Oakland, CA




SOURCE:

1993 THE THOMAS GUIDE
ALAMEDA COUNTY, PAGE 9 (B3)

N

0 1/4 1/2 3/4 1

MILE

1" = 2200'

**TEXACO**

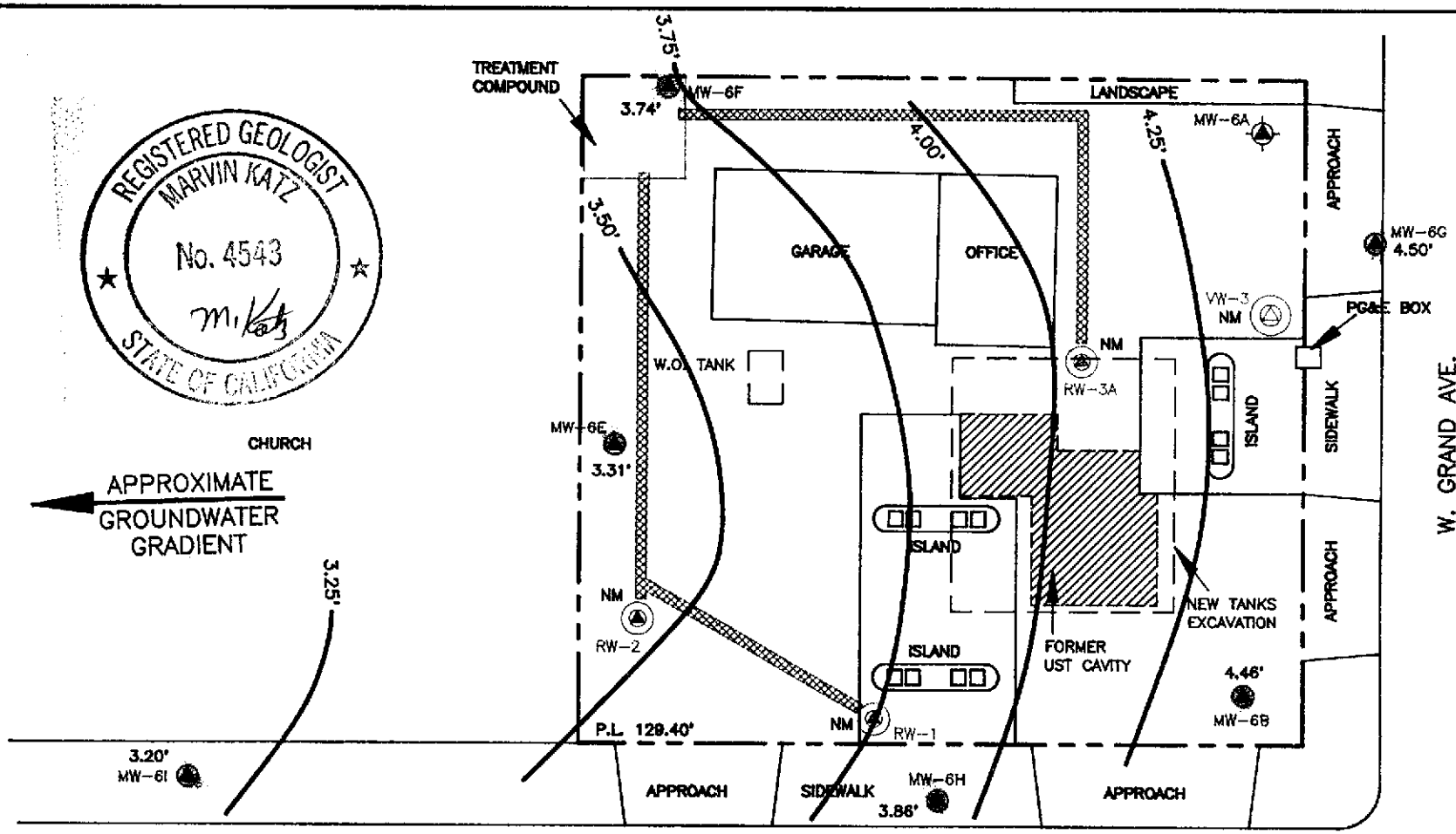
*REFINING AND MARKETING,INC.*
*TEXACO ENVIRONMENTAL SERVICES*

*PLATE 1*

*SITE VICINITY MAP*

*FORMER TEXACO SERVICE STATION*

*2225 TELEGRAPH AVE. / GRAND AVE.,*
*OAKLAND, CALIFORNIA*




TELEGRAPH AVE.

**LEGEND :**

| | |
|---|---|
| VW-3 | VAPOR EXTRACTION WELL LOCATION AND WELL NUMBER |
| MW-6A | PROPERLY ABANDONED WELL LOCATION AND WELL NUMBER |
| MW-1 | GROUNDWATER MONITORING WELL LOCATION AND WELL NUMBER |
| RW-1 | GROUNDWATER RECOVERY/VAPOR EXTRACTION WELL LOCATION AND WELL NUMBER |
| | TEXACO REMEDIATION SYSTEM TRENCH WITH 2" PVC VAPOR EXTRACTION LINE |
| | GROUNDWATER CONTOUR LINE |
| 3.86' | GROUNDWATER ELEVATION (ABOVE MSL) |
| NM | WELL NOT MONITORED |

SOURCE : MATTESON ENGINEERING CONDUCTED SURVEY ON 08/04/1994

N

0 30

FEET

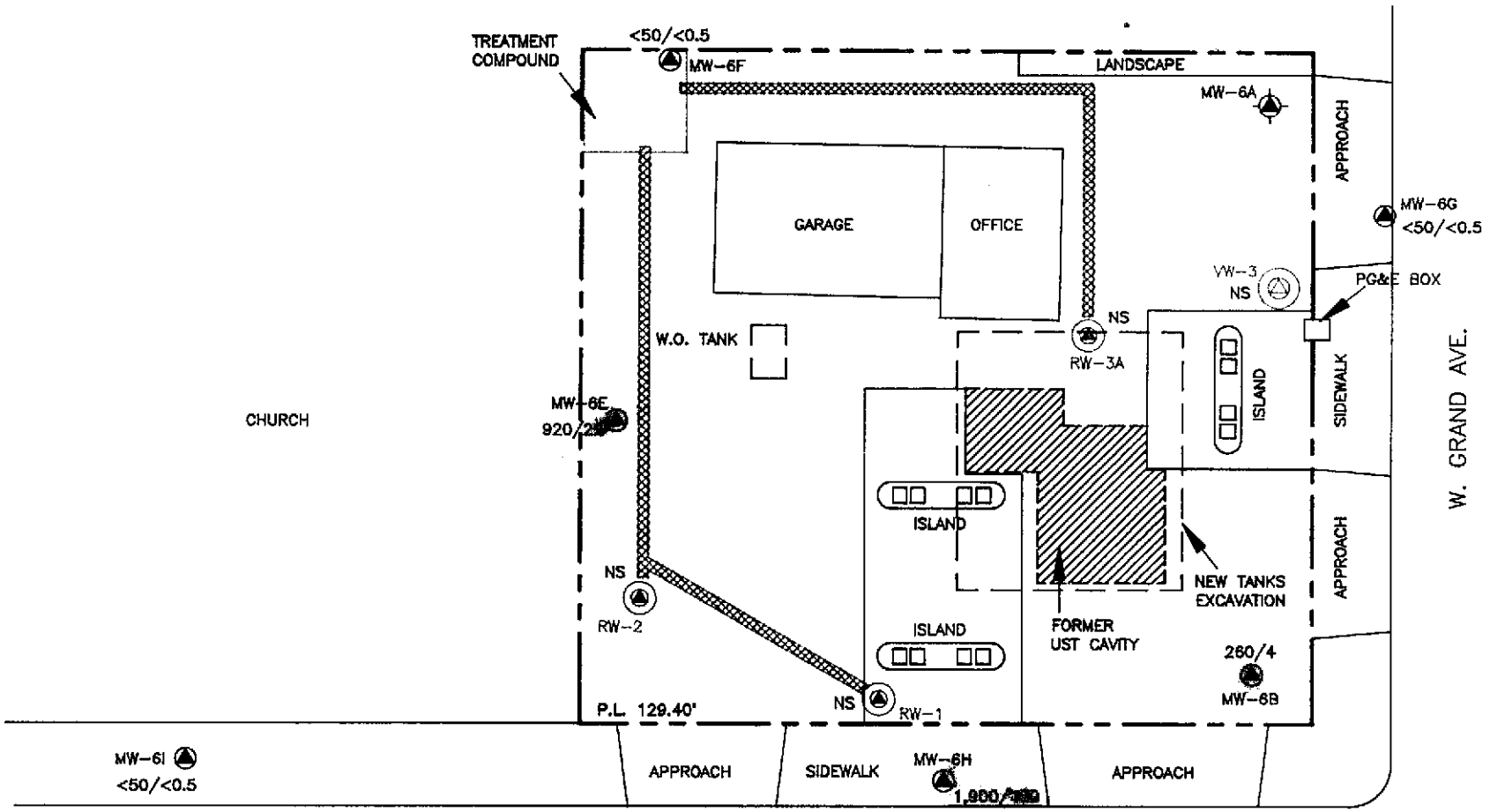
TEXACO
REFINING AND MARKETING INC.
TEXACO ENVIRONMENTAL SERVICES

PLATE 2 : GROUNDWATER GRADIENT MAP
( 08/30/1994 )

FORMER TEXACO SERVICE STATION

2225 TELEGRAPH AVE. / GRAND AVE.,
OAKLAND, CALIFORNIA

| | | | |
|---|---|---|---|
| SCALE | 1"=30'-0" | LOCATION # | 62-468-0195 |
| DRAWN BY | AMA | DATE | 11/21/1994 |
| CHECKED BY | RD | DATE | 11/30/94 |
| DRAWING NO. | (OAKLAND) TE-GR-OK.DWG | | |




LEGEND :

- VW-3 — VAPOR EXTRACTION WELL LOCATION AND WELL NUMBER
- MW-6A — PROPERLY ABANDONED WELL LOCATION AND WELL NUMBER
- MW-1 — GROUNDWATER MONITORING WELL LOCATION AND WELL NUMBER
- RW-1 — GROUNDWATER RECOVERY/VAPOR EXTRACTION WELL LOCATION AND WELL NUMBER
- TEXACO REMEDIATION SYSTEM TRENCH WITH 2" PVC VAPOR EXTRACTION LINE
- <50/<0.5 — TPHg/BENZENE CONCENTRATION IN GROUNDWATER (ppb)
- NS — WELL NOT SAMPLED

TELEGRAPH AVE.

N

0 30

FEET

SOURCE : MATTESON ENGINEERING CONDUCTED SURVEY ON 08/04/1994

TEXACO
REFINING AND MARKETING INC.
TEXACO ENVIRONMENTAL SERVICES

PLATE 3 : TPHg/BENZENE CONCENTRATION IN GROUNDWATER ( 08/30/1994 )

FORMER TEXACO SERVICE STATION

2225 TELEGRAPH AVE. / GRAND AVE., OAKLAND, CALIFORNIA

| | | | |
|---|---|---|---|
| SCALE | 1"=30'-0" | LOCATION # | 62-488-0195 |
| DRAWN BY | AMA | DATE | 11/21/1994 |
| CHECKED BY | RD | DATE | 11/30/94 |
| DRAWING NO. | (OAKLAND) TE-GR-OK.DWG | | |

Table 1
Groundwater Elevation Data
2225 Telegraph Avenue, Oakland, CA

| Well Number | Date Gauged | Elevation of Wellhead (feet) | | Depth to Water (feet, TOC) | Elevation of Groundwater (feet) |
|---|---|---|---|---|---|
| MW-6A | 12/30/91 | | | | Well Destroyed |
| | | | | | |
| MW-6B | 12/15/88 | 98.81 | * | | |
| | 2/25/92 | | | 11.81 | 87.00 |
| | 3/25/92 | | | 11.58 | 87.23 |
| | 6/16/92 | 15.34 | ** | 12.54 | 2.80 |
| | 9/8/92 | | | 12.87 | 2.47 |
| | 11/5/92 | | | 12.70 | 2.64 |
| | 12/14/92 | | | 12.19 | 3.15 |
| | 1/28/93 | | | 11.39 | 3.95 |
| | 2/11/93 | | | 11.70 | 3.64 |
| | 3/9/93 | | | 11.70 | 3.64 |
| | 4/14/93 | | | 11.87 | 3.47 |
| | 5/11/93 | | | 12.22 | 3.12 |
| | 6/17/93 | | | 12.46 | 2.88 |
| | 7/26/93 | | | 12.72 | 2.58 |
| | 8/10/93 | | | 12.82 | 2.52 |
| | 9/21/93 | | | 13.08 | 2.26 |
| | 10/27/93 | | | 13.18 | 2.16 |
| | 11/23/93 | | | 13.07 | 2.27 |
| | 12/17/93 | | | NA | NA |
| | 2/16/94 | | | 12.07 | 3.27 |
| | 5/31/94 | | | 12.42 | 2.92 |
| | 8/30/94 | 17.48 | *** | 13.02 | 4.46 |
| | | | | | |

Table 1
Groundwater Elevation Data
2225 Telegraph Avenue, Oakland, CA

| Well Number | Date Gauged | Elevation of Wellhead (feet) | | Depth to Water (feet, TOC) | Elevation of Groundwater (feet) |
|---|---|---|---|---|---|
| MW-6E | 12/15/88 | 98.99 | * | | |
| | 2/25/92 | | | 13.16 | 85.83 |
| | 3/25/92 | | | 12.15 | 86.84 |
| | 6/16/92 | 15.23 | ** | 13.54 | 1.69 |
| | 9/8/92 | | | 14.78 | 0.45 |
| | 11/5/92 | | | | Not Monitored |
| | 12/14/92 | | | | Not Monitored |
| | 1/28/93 | | | 11.62 | 3.61 |
| | 2/11/93 | | | 12.85 | 2.38 |
| | 3/9/93 | | | 12.83 | 2.40 |
| | 4/14/93 | | | | Not Monitored |
| | 5/11/93 | | | 13.59 | 1.64 |
| | 6/17/93 | | | 13.74 | 1.49 |
| | 7/26/93 | | | 14.01 | 1.22 |
| | 8/10/93 | | | 14.13 | 1.10 |
| | 9/21/93 | | | 14.20 | 1.03 |
| | 10/27/93 | | | 14.34 | 0.89 |
| | 11/23/93 | | | 13.97 | 1.26 |
| | 12/17/93 | | | 13.08 | 2.15 |
| | 2/16/94 | | | 13.34 | 1.89 |
| | 5/31/94 | | | 13.82 | 1.41 |
| | 8/30/94 | 17.63 | *** | 14.32 | 3.31 |
| | | | | | |
| MW-6F | 12/15/88 | 99.91 | * | | |
| | 2/25/92 | | | 12.68 | 87.23 |
| | 3/25/92 | | | 11.93 | 87.98 |
| | 6/16/92 | 16.46 | ** | 14.34 | 2.12 |
| | 9/8/92 | | | 14.75 | 1.71 |
| | 11/5/92 | | | 14.35 | 2.11 |
| | 12/14/92 | | | 12.90 | 3.56 |
| | 1/28/93 | | | 11.60 | 4.86 |
| | 2/11/93 | | | 12.25 | 4.21 |
| | 3/9/93 | | | 12.50 | 3.96 |
| | 4/14/93 | | | 12.71 | 3.75 |
| | 5/11/93 | | | 13.63 | 2.83 |
| | 6/17/93 | | | 14.02 | 2.44 |
| | 7/26/93 | | | | Not Monitored |
| | 8/10/93 | | | | Not Monitored |
| | 9/21/93 | | | 14.80 | 1.66 |
| | 10/27/93 | | | 14.85 | 1.61 |
| | 11/23/93 | | | Not Monitored - Inaccessible | |
| | 12/17/93 | | | 13.86 | 2.60 |
| | 2/16/94 | | | 13.08 | 3.38 |
| | 5/31/94 | | | 14.06 | 2.40 |
| | 8/30/94 | 18.58 | *** | 14.84 | 3.74 |
| | | | | | |

Table 1
Groundwater Elevation Data
2225 Telegraph Avenue, Oakland, CA

| Well Number | Date Gauged | Elevation of Wellhead (feet) | | Depth to Water (feet, TOC) | Elevation of Groundwater (feet) |
|---|---|---|---|---|---|
| MW-6G | 12/15/88 | 99.16 | * | | |
| | 2/25/92 | | | 10.32 | 88.84 |
| | 3/25/92 | | | 9.93 | 89.23 |
| | 6/16/92 | 14.71 | ** | 11.88 | 2.83 |
| | 9/8/92 | | | 12.20 | 2.51 |
| | 11/5/92 | | | 12.02 | 2.69 |
| | 12/14/92 | | | 10.95 | 3.76 |
| | 1/28/93 | | | 9.56 | 5.15 |
| | 2/11/93 | | | 10.04 | 4.67 |
| | 3/9/93 | | | 10.10 | 4.61 |
| | 4/14/93 | | | 10.43 | 4.28 |
| | 5/11/93 | | | 11.05 | 3.66 |
| | 6/17/93 | | | 11.49 | 3.22 |
| | 7/26/93 | | | 11.98 | 2.73 |
| | 8/10/93 | | | 12.17 | 2.54 |
| | 9/21/93 | | | 12.42 | 2.29 |
| | 10/27/93 | | | 13.47 | 1.24 |
| | 11/23/93 | | | 12.48 | 2.23 |
| | 12/17/93 | | | 11.19 | 3.52 |
| | 2/16/94 | | | 10.62 | 4.09 |
| | 5/31/94 | | | 11.40 | 3.31 |
| | 8/30/94 | 16.82 | *** | 12.32 | 4.50 |
| | | | | | |
| MW-6H | 12/15/88 | 97.93 | * | | |
| | 2/25/92 | | | 12.17 | 85.76 |
| | 3/25/92 | | | 11.65 | 86.28 |
| | 6/16/92 | 14.47 | ** | 12.12 | 2.35 |
| | 9/8/92 | | | 12.30 | 2.17 |
| | 11/5/92 | | | 12.05 | 2.42 |
| | 12/14/92 | | | 11.65 | 2.82 |
| | 1/28/93 | | | 11.57 | 2.90 |
| | 2/11/93 | | | 12.22 | 2.25 |
| | 3/9/93 | | | 12.02 | 2.45 |
| | 4/14/93 | | | 12.02 | 2.45 |
| | 5/11/93 | | | 12.35 | 2.12 |
| | 6/17/93 | | | 12.22 | 2.25 |
| | 7/26/93 | | | 12.32 | 2.15 |
| | 8/10/93 | | | 12.30 | 2.17 |
| | 9/21/93 | | | 12.79 | 1.68 |
| | 10/27/93 | | | 13.93 | 0.54 |
| | 11/23/93 | | | 12.46 | 2.01 |
| | 12/17/93 | | | 12.08 | 2.39 |
| | 5/31/94 | | | 12.46 | 2.01 |
| | 8/30/94 | 16.58 | *** | 12.72 | 3.86 |
| | | | | | |

Table 1
Groundwater Elevation Data
2225 Telegraph Avenue, Oakland, CA

| Well Number | Date Gauged | Elevation of Wellhead (feet) | | Depth to Water (feet, TOC) | Elevation of Groundwater (feet) |
|---|---|---|---|---|---|
| MW-6I | 12/15/88 | 97.60 | * | | |
| | 2/25/92 | | | 12.45 | 85.15 |
| | 3/25/92 | | | 12.12 | 85.48 |
| | 6/16/92 | 14.14 | ** | 12.75 | 1.39 |
| | 9/8/92 | | | 12.84 | 1.30 |
| | 11/5/92 | | | 12.75 | 1.39 |
| | 12/14/92 | | | 12.40 | 1.74 |
| | 1/28/93 | | | 12.20 | 1.94 |
| | 2/11/93 | | | 12.40 | 1.74 |
| | 3/9/93 | | | 12.45 | 1.69 |
| | 4/14/93 | | | 12.43 | 1.71 |
| | 5/11/93 | | | 12.73 | 1.41 |
| | 6/17/93 | | | 12.78 | 1.36 |
| | 7/26/93 | | | 12.92 | 1.22 |
| | 8/10/93 | | | 12.97 | 1.17 |
| | 9/21/93 | | | 13.02 | 1.12 |
| | 10/27/93 | | | 13.10 | 1.04 |
| | 11/23/93 | | | 13.02 | 1.12 |
| | 12/17/93 | | | 12.65 | 1.49 |
| | 2/16/94 | | | 12.66 | 1.48 |
| | 5/31/94 | | | 12.90 | 1.24 |
| | 8/30/94 | 16.26 | *** | 13.06 | 3.20 |
| | | | | | |
| RW-1 | 10/16/90 | 97.89 | * | | |
| | 2/25/92 | | | 14.40 | 83.49 |
| | 3/25/92 | | | NA | NA |
| | 6/16/92 | 14.42 | ** | 12.37 | 2.05 |
| | 9/8/92 | | | | Not Monitored |
| | 11/5/92 | | | | Not Monitored |
| | 12/14/92 | | | | Not Monitored |
| | 1/18/93 | | | | Not Monitored |
| | 2/11/93 | | | | Not Monitored |
| | 3/9/93 | | | | Not Monitored |
| | 4/14/93 | | | | Not Monitored |
| | 5/11/93 | | | | Not Monitored |
| | 6/17/93 | | | | Not Monitored |
| | 7/26/93 | | | | Not Monitored |
| | 8/10/93 | | | | Not Monitored |
| | 9/21/93 | | | | Not Monitored |
| | 10/27/93 | | | | Not Monitored |
| | 11/23/93 | | | | Not Monitored |
| | 12/17/93 | | | | Not Monitored |
| | 2/16/94 | | | | Not Monitored |
| | 5/31/94 | | | | Not Monitored |
| | 8/30/94 | 16.79 | *** | | Not Monitored |
| | | | | | |

Table 1
Groundwater Elevation Data
2225 Telegraph Avenue, Oakland, CA

| Well Number | Date Gauged | Elevation of Wellhead (feet) | | Depth to Water (feet, TOC) | Elevation of Groundwater (feet) |
|---|---|---|---|---|---|
| RW-2 (formerly MW-6D) | 10/16/90 | 98.11 | * | | |
| | 2/25/92 | | | 16.27 | 81.84 |
| | 3/25/92 | | | | Not Monitored |
| | 6/16/92 | 14.61 | ** | 12.86 | 1.75 |
| | 9/8/92 | | | | Not Monitored |
| | 11/5/92 | | | | Not Monitored |
| | 12/14/92 | | | | Not Monitored |
| | 1/28/93 | | | | Not Monitored |
| | 2/11/93 | | | | Not Monitored |
| | 3/9/93 | | | | Not Monitored |
| | 4/14/93 | | | | Not Monitored |
| | 5/11/93 | | | | Not Monitored |
| | 6/17/93 | | | | Not Monitored |
| | 8/10/93 | | | | Not Monitored |
| | 9/21/93 | | | | Not Monitored |
| | 10/27/93 | | | | Not Monitored |
| | 11/23/93 | | | | Not Monitored |
| | 12/17/93 | | | | Not Monitored |
| | 2/16/94 | | | | Not Monitored |
| | 5/31/94 | | | | Not Monitored |
| | 8/30/94 | 17.02 | *** | | Not Monitored |
| | | | | | |
| RW-3 (formerly MW-6C) | 8/30/94 | 18.04 | *** | | Not Monitored |
| | | | | | |
| * = Based on assigned benchmark with elevation arbitrarily set at 100 feet. | | | | | |
| ** = Elevation relative to mean sea level (MSL). | | | | | |
| *** = Wells resurveyed 8/4/94, Benchmark is City of Oakland #37J; | | | | | |
| Elevation 17.68 @ intersection of Telegraph & 23rd St. jobsite. | | | | | |
| NA = Not Available | | | | | |

Table 2
Groundwater Analytical Data
2225 Telegraph Avenue, Oakland, CA

| Well Number | Date Sampled | TPH as gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Xylenes (ppb) |
|---|---|---|---|---|---|---|
| MW-6A | | | | | | |
| | 3/25/92 | | Well Damaged | | | |
| | 5/2/92 | | Well Destroyed | | | |
| | | | | | | |
| MW-6B | | | | | | |
| | 3/25/92 | 190 | 31 | 8.6 | 84 | 8.6 |
| | 6/16/92 | 1,700 | 44 | 1.7 | 7.2 | 230 |
| | 9/8/92 | 2,900 | 35 | 8.3 | 110 | 330 |
| | 11/5/92 | 1,400 | 29 | <0.5 | 75 | 190 |
| | 2/11/93 | 210 | 1.2 | <0.5 | 2.8 | 4.3 |
| | 5/11/93 | 570 | 54 | 2.4 | 37 | 36 |
| | 8/10/93 | 1,300 | 48 | 2.4 | 28 | 44 |
| | 10/27/93 | 1,300 | 23 | 1.7 | 25 | 250 |
| | 2/16/94 | 300 | 16 | <0.5 | 3.5 | 2.4 |
| | 5/31/94 | 690 | 21 | 3.9 | 11 | 36 |
| | 8/30/94 | 260 | 4 | 0.62 | 0.82 | 4 |
| | | | | | | |
| MW-6E | | | | | | |
| | 3/25/92 | 830 | 41 | 1 | 3.8 | 16 |
| | 6/16/92 | 3,400 | 300 | 23 | 68 | 510 |
| | 9/8/92 | 480 | 27 | <0.5 | 3.6 | 21 |
| | 11/5/92 | | Not Sampled | | | |
| | 2/11/93 | 270 | 15 | <0.5 | <0.5 | 8.7 |
| | 5/11/93 | <50 | 2.3 | <0.5 | 1.4 | 3.2 |
| | 8/10/93 | 1,700 | 130 | 2.7 | 23 | 140 |
| | 10/27/93 | 100 | 6 | <0.5 | <0.5 | <0.5 |
| | 2/16/94 | 640 | 45 | <0.5 | 12 | 15 |
| | 5/31/94 | 52 | 1.5 | 0.97 | <0.5 | <0.5 |
| | 8/30/94 | 920 | 22 | 0.98 | 5.2 | 33 |
| | | | | | | |
| MW-6F | | | | | | |
| | 3/25/92 | ND | ND | <0.5 | <0.5 | <0.5 |
| | 6/16/92 | ND | ND | <0.5 | <0.5 | <0.5 |
| | 9/8/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 11/5/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 2/11/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 5/11/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 8/10/93 | | Not Sampled | | | |
| | 10/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 2/16/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 5/31/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 8/30/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | | | | | | |

Table 2
Groundwater Analytical Data
2225 Telegraph Avenue, Oakland, CA

| Well Number | Date Sampled | TPH as gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Xylenes (ppb) |
|---|---|---|---|---|---|---|
| MW-6G | | | | | | |
| | 3/25/92 | ND | ND | <0.5 | <0.5 | <0.5 |
| | 6/16/92 | ND | ND | <0.5 | <0.5 | <0.5 |
| | 9/8/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 11/5/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 2/11/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 5/11/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 8/10/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 10/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 2/16/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 5/31/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 8/30/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| MW-6H | | | | | | |
| | 3/25/92 | 920 | 170 | 52 | 25 | 54 |
| | 6/16/92 | 460 | 31 | 11 | 6.8 | 16 |
| | 9/8/92 | 780 | 69 | 23 | 17 | 18 |
| | 11/5/92 | 3,400 | 500 | 260 | 85 | 160 |
| | 2/11/93 | 2,500 | 410 | 170 | 28 | 130 |
| | 5/11/93 | 4,200 | 490 | 270 | 80 | 210 |
| | 8/10/93 | 650 | 83 | 22 | 14 | 29 |
| | 10/27/93 | 1,600 | 130 | 90 | 29 | 130 |
| | 2/16/94 | <50 | <0.5 | <0.5 | <0.5 | 2.9 |
| | 5/31/94 | 1,800 | 370 | 220 | 65 | 210 |
| | 8/30/94 | 1,900 | 130 | 90 | 19 | 86 |
| | | | | | | |
| MW-6I | | | | | | |
| | 3/25/92 | ND | ND | <0.5 | <0.5 | <0.5 |
| | 6/16/92 | ND | ND | <0.5 | <0.5 | <0.5 |
| | 9/8/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 11/5/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 2/11/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 5/11/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 8/10/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 10/27/93 | <50 | <0.5 | <0.5 | <0.5 | 1.1 |
| | 2/16/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 5/31/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | 8/30/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| | | | | | | |
| RW-1 | | | | | | |
| | 6/16/92 | 6,200 | 620 | 1,400 | 240 | 1,400 |
| | 9/8/92 | | Not Sampled | | | |
| | 11/5/92 | | Not Sampled | | | |
| | 2/11/93 | | Not Sampled | | | |
| | 2/16/94 | | Not Sampled | | | |
| | 5/31/94 | | Not Sampled | | | |
| | 8/30/94 | | Not Sampled | | | |
| | | | | | | |

Table 2
Groundwater Analytical Data
2225 Telegraph Avenue, Oakland, CA

| Well Number | Date Sampled | TPH as gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Xylenes (ppb) |
|---|---|---|---|---|---|---|
| RW-2 (formerly MW-6D) | | | | | | |
| | 3/25/92 | NA | NA | NA | NA | NA |
| | 6/16/92 | 28,000 | 2,900 | 1,000 | 120 | 2,700 |
| | 9/8/92 | | Not Sampled | | | |
| | 11/5/92 | | Not Sampled | | | |
| | 5/11/93 | | Not Sampled | | | |
| | 8/10/93 | | Not Sampled | | | |
| | 10/27/93 | | Not Sampled | | | |
| | 2/16/94 | | Not Sampled | | | |
| | 5/31/94 | | Not Sampled | | | |
| | 8/30/94 | | Not Sampled | | | |
| | | | | | | |
| RW-3 (formerly MW-6C) | | | | | | |
| | 8/30/94 | | Not Sampled | | | |
| | | | | | | |
| ppb | parts per billion | | | | | |
| TPHg | Total Petroleum Hydrocarbons as gasoline. | | | | | |
| < | Less than the detection limit for the specified method of analysis. | | | | | |
| NA | Not Analyzed | | | | | |
| ND | Not detectable at or above method detection limit. | | | | | |

**B C Analytical**

*801 Western Avenue*
*Glendale, CA 91201*
*818/247-5737*
*Fax: 818/247-9797*

# ANALYTICAL REPORT

LOG NO: G94-08-350

Received: 31 AUG 94

Mailed: SEP 13 1994

Ms. Rebecca Digerness
Texaco Environmental Services
108 Cutting Boulevard
Richmond, CA 94804

Purchase Order: 94-1446346+4370

Requisition: 624880195
Project: FKEP1015L

REPORT OF ANALYTICAL RESULTS



AQUEOUS

| SAMPLE DESCRIPTION | DATE SAMPLED | TPH/BTEX (CADHS/8020) Date Analyzed | Dilution Factor Times 1 | TPH-g ug/L | Benzene ug/L | Toluene ug/L | Ethyl-Benzene ug/L | Total Xylenes Isomers ug/L |
|---|---|---|---|---|---|---|---|---|
| RDL | | | 1 | 50 | 0.5 | 0.5 | 0.5 | 0.5 |
| 1*MW-6B | 08/30/94 | 09/03/94 | 1 | 260 | 4.0 | 0.62 | 0.82 | 4.0 |
| 2*MW-6E | 08/30/94 | 09/03/94 | 1 | 920 | 22 | 0.98 | 5.2 | 33 |
| 3*MW-6F | 08/30/94 | 09/03/94 | 1 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| 4*MW-6G | 08/30/94 | 09/03/94 | 1 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| 5*MW-6H | 08/30/94 | 09/07/94 | 1 | 1900 | 130 | 90 | 19 | 86 |
| 6*MW-6I | 08/30/94 | 09/03/94 | 1 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| 7*EB | 08/30/94 | 09/02/94 | 1 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| 8*TB | 08/30/94 | 09/02/94 | 1 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |

Karen Petryna
2225 Telegraph Avenue, Oakland
Alameda County

James C. Hein, Laboratory Director

| SAMPLES... | SAMPLE DESCRIPTION.. | DETERM..... | DATE..... ANALYZED | METHOD..... | EQUIP. | BATCH.. | ID.NO |
|---|---|---|---|---|---|---|---|
| 9408350*1 | MW-6B | GAS.BTX.TESNC | 09.03.94 | 8015M.TX | 536-23 | 94562 | 8095 |
| 9408350*2 | MW-6E | GAS.BTX.TESNC | 09.03.94 | 8015M.TX | 536-23 | 94562 | 8095 |
| 9408350*3 | MW-6F | GAS.BTX.TESNC | 09.03.94 | 8015M.TX | 536-23 | 94562 | 8095 |
| 9408350*4 | MW-6G | GAS.BTX.TESNC | 09.03.94 | 8015M.TX | 536-23 | 94562 | 8095 |
| 9408350*5 | MW-6H | GAS.BTX.TESNC | 09.07.94 | 8015M.TX | 536-23 | 94563 | 8042 |
| 9408350*6 | MW-6I | GAS.BTX.TESNC | 09.03.94 | 8015M.TX | 536-23 | 94562 | 8095 |
| 9408350*7 | EB | GAS.BTX.TESNC | 09.02.94 | 8015M.TX | 536-23 | 94562 | 8095 |
| 9408350*8 | TB | GAS.BTX.TESNC | 09.02.94 | 8015M.TX | 536-23 | 94562 | 8095 |

***

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

BC ANALYTICAL

ORDER QC REPORT FOR G9408350

DATE REPORTED : 09/12/94



LABORATORY CONTROL STANDARDS
FOR BATCHES WHICH INCLUDE THIS ORDER

| PARAMETER | DATE ANALYZED | BATCH NUMBER | LC RESULT | LT RESULT | UNIT | PERCENT RECOVERY |
|---|---|---|---|---|---|---|
| 1. TPH-gas/BTEX (CADHS/80 C409331*1 | | | | | | |
| Date Analyzed | 09.03.94 | 94562 | 09/03/94 | 09/03/94 | Date | N/A |
| Benzene | 09.03.94 | 94562 | 11.1 | 12.5 | ug/L | 89 |
| Toluene | 09.03.94 | 94562 | 54.0 | 55.5 | ug/L | 97 |
| Ethylbenzene | 09.03.94 | 94562 | 11.8 | 12.5 | ug/L | 94 |
| Total Xylene Isomers | 09.03.94 | 94562 | 60.1 | 42.5 | ug/L | 141 Q |
| TPH (as Gasoline) | 09.03.94 | 94562 | 1120 | 1000 | ug/L | 112 |
| a,a,a-Trifluorotoluene Reported | 09.03.94 | 94562 | 55.4 | 50.0 | ug/L | 111 |
| a,a,a-Trifluorotoluene Theoretic | 09.03.94 | 94562 | 50.0 | 50.0 | ug/L | 100 |
| 2. TPH-gas/BTEX (CADHS/80 C409332*1 | | | | | | |
| Date Analyzed | 09.03.94 | 94562 | 09/03/94 | 09/03/94 | Date | N/A |
| Benzene | 09.03.94 | 94562 | 10.9 | 12.5 | ug/L | 87 |
| Toluene | 09.03.94 | 94562 | 52.2 | 55.5 | ug/L | 94 |
| Ethylbenzene | 09.03.94 | 94562 | 10.7 | 12.5 | ug/L | 86 |
| Total Xylene Isomers | 09.03.94 | 94562 | 57.4 | 42.5 | ug/L | 135 Q |
| TPH (as Gasoline) | 09.03.94 | 94562 | 1060 | 1000 | ug/L | 106 |
| a,a,a-Trifluorotoluene Reported | 09.03.94 | 94562 | 54.6 | 50.0 | ug/L | 109 |
| a,a,a-Trifluorotoluene Theoretic | 09.03.94 | 94562 | 50.0 | 50.0 | ug/L | 100 |
| 3. TPH-gas/BTEX (CADHS/80 C409418*1 | | | | | | |
| Date Analyzed | 09.06.94 | 94563 | 09/06/94 | 09/08/94 | Date | N/A |
| Benzene | 09.06.94 | 94563 | 10.8 | 12.5 | ug/L | 86 |
| Toluene | 09.06.94 | 94563 | 53.9 | 55.5 | ug/L | 97 |
| Ethylbenzene | 09.06.94 | 94563 | 12.4 | 12.5 | ug/L | 99 |
| Total Xylene Isomers | 09.06.94 | 94563 | 61.3 | 42.5 | ug/L | 144 Q |
| TPH (as Gasoline) | 09.06.94 | 94563 | 865 | 1000 | ug/L | 87 |
| a,a,a-Trifluorotoluene Reported | 09.06.94 | 94563 | 50.4 | 50.0 | ug/L | 101 |
| a,a,a-Trifluorotoluene Theoretic | 09.06.94 | 94563 | 50.0 | 50.0 | ug/L | 100 |
| 4. TPH-gas/BTEX (CADHS/80 C409419*1 | | | | | | |
| Date Analyzed | 09.08.94 | 94563 | 09/08/94 | 09/08/94 | Date | N/A |
| Benzene | 09.08.94 | 94563 | 11.8 | 12.5 | ug/L | 94 |
| Toluene | 09.08.94 | 94563 | 56.5 | 55.5 | ug/L | 102 |
| Ethylbenzene | 09.08.94 | 94563 | 12.8 | 12.5 | ug/L | 102 |
| Total Xylene Isomers | 09.08.94 | 94563 | 63.1 | 42.5 | ug/L | 148 Q |
| TPH (as Gasoline) | 09.08.94 | 94563 | 1100 | 1000 | ug/L | 110 |
| a,a,a-Trifluorotoluene Reported | 09.08.94 | 94563 | 56.6 | 50.0 | ug/L | 113 |
| a,a,a-Trifluorotoluene Theoretic | 09.08.94 | 94563 | 50.0 | 50.0 | ug/L | 100 |

BC ANALYTICAL

ORDER QC REPORT FOR G9408350

DATE REPORTED : 09/12/94



ADDITIONAL LCS PRECISION (DUPLICATES)
BATCH QC REPORT

| PARAMETER | SAMPLE NUMBER | DATE ANALYZED | BATCH NUMBER | LC1 RESULT | LC2 RESULT | UNIT | RELATIVE % DIFF |
|---|---|---|---|---|---|---|---|
| 1. TPH-gas/BTEX (CADHS/80 | | | | | | | |
| Date Analyzed | | 09.03.94 | 94562 | 09/03/94 | 09/03/94 | Date | N/A |
| Benzene | | 09.03.94 | 94562 | 11.1 | 10.9 | ug/L | 2 |
| Toluene | | 09.03.94 | 94562 | 54.0 | 52.2 | ug/L | 3 |
| Ethylbenzene | | 09.03.94 | 94562 | 11.8 | 10.7 | ug/L | 10 |
| Total Xylene Isomers | | 09.03.94 | 94562 | 60.1 | 57.4 | ug/L | 5 |
| TPH (as Gasoline) | | 09.03.94 | 94562 | 1120 | 1060 | ug/L | 6 |
| a,a,a-Trifluorotoluene Reported | | 09.03.94 | 94562 | 55.4 | 54.6 | ug/L | 1 |
| a,a,a-Trifluorotoluene Theoretic | | 09.03.94 | 94562 | 50.0 | 50.0 | ug/L | 0 |
| 2. TPH-gas/BTEX (CADHS/80 | | | | | | | |
| Date Analyzed | | 09.06.94 | 94563 | 09/06/94 | 09/08/94 | Date | N/A |
| Benzene | | 09.06.94 | 94563 | 10.8 | 11.8 | ug/L | 9 |
| Toluene | | 09.06.94 | 94563 | 53.9 | 56.5 | ug/L | 5 |
| Ethylbenzene | | 09.06.94 | 94563 | 12.4 | 12.8 | ug/L | 3 |
| Total Xylene Isomers | | 09.06.94 | 94563 | 61.3 | 63.1 | ug/L | 3 |
| TPH (as Gasoline) | | 09.06.94 | 94563 | 865 | 1100 | ug/L | 24 Q |
| a,a,a-Trifluorotoluene Reported | | 09.06.94 | 94563 | 50.4 | 56.6 | ug/L | 12 |
| a,a,a-Trifluorotoluene Theoretic | | 09.06.94 | 94563 | 50.0 | 50.0 | ug/L | 0 |

BC ANALYTICAL

ORDER QC REPORT FOR G9408350

DATE REPORTED : 09/12/94



MATRIX QC PRECISION (DUPLICATE SPIKES)
BATCH QC REPORT

| PARAMETER | SAMPLE NUMBER | DATE ANALYZED | BATCH NUMBER | MS RESULT | MSD RESULT | UNIT | RELATIVE % DIFF |
|---|---|---|---|---|---|---|---|
| 1. TPH-(8015M/8020) | 9408352*8 | | | | | | |
| Date Analyzed | | 09.02.94 | 94562 | 09/02/94 | 09/02/94 | Date | N/A |
| Benzene | | 09.02.94 | 94562 | 12.0 | 10.0 | ug/L | 18 |
| Toluene | | 09.02.94 | 94562 | 56.0 | 46.7 | ug/L | 18 |
| Ethylbenzene | | 09.02.94 | 94562 | 11.2 | 11.0 | ug/L | 2 |
| Total Xylene Isomers | | 09.02.94 | 94562 | 60.6 | 52.5 | ug/L | 14 |
| TPH (as Gasoline) | | 09.02.94 | 94562 | 1040 | 899 | ug/L | 15 |
| a,a,a-Trifluorotoluene Reported | | 09.02.94 | 94562 | 57.6 | 55.2 | ug/L | 4 |
| a,a,a-Trifluorotoluene Theoretic | | 09.02.94 | 94562 | 50.0 | 50.0 | ug/L | 0 |

BC ANALYTICAL

ORDER QC REPORT FOR G9408350

DATE REPORTED : 09/12/94



MATRIX QC ACCURACY (SPIKES)
BATCH QC REPORT

| PARAMETER | SAMPLE NUMBER | DATE ANALYZED | BATCH NUMBER | MS % | MSD % | TRUE RESULT | UNIT | |
|---|---|---|---|---|---|---|---|---|
| 1. TPH-gas/BTEX (CADHS/80 | 9408352*8 | | | | | | | |
| Benzene | | 09.02.94 | 94562 | 96 | 80 | 12.5 | ug/L | |
| Toluene | | 09.02.94 | 94562 | 101 | 84 | 55.5 | ug/L | |
| Ethylbenzene | | 09.02.94 | 94562 | 90 | 88 | 12.5 | ug/L | |
| Total Xylene Isomers | | 09.02.94 | 94562 | 143 Q | 124 | 42.5 | ug/L | Q |
| TPH (as Gasoline) | | 09.02.94 | 94562 | 97 | 83 | 1070 | ug/L | |
| a,a,a-Trifluorotoluene Reported | | 09.02.94 | 94562 | NC | NC | 50.0 | ug/L | NC |
| a,a,a-Trifluorotoluene Theoretic | | 09.02.94 | 94562 | NC | NC | 50.0 | ug/L | NC |

BC ANALYTICAL

ORDER QC REPORT FOR G9408350

DATE REPORTED : 09/12/94



METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)
FOR BATCHES WHICH INCLUDE THIS ORDER

| PARAMETER | DATE ANALYZED | BATCH NUMBER | BLANK RESULT | RDL | UNIT | METHOD |
|---|---|---|---|---|---|---|
| 1. TPH-(8015M/8020) B409268*1 | | | | | | |
| Date Analyzed | 09.02.94 | 94562 | 09/02/94 | NA | Date | 8015M |
| Benzene | 09.02.94 | 94562 | 0 | 0.3 | ug/L | 8015M |
| Toluene | 09.02.94 | 94562 | 0 | 0.3 | ug/L | 8015M |
| Ethylbenzene | 09.02.94 | 94562 | 0 | 0.3 | ug/L | 8015M |
| Methyl-tert-butylether | 09.02.94 | 94562 | 0 | 10 | ug/L | 8015M |
| Total Xylene Isomers | 09.02.94 | 94562 | 0 | 0.6 | ug/L | 8015M |
| TPH (as Gasoline) | 09.02.94 | 94562 | 0 | 100 | ug/L | 8015M |
| a,a,a-Trifluorotoluene Reported | 09.02.94 | 94562 | 51.9 | NA | ug/L | 8015M |
| a,a,a-Trifluorotoluene Theoretic | 09.02.94 | 94562 | 50.0 | NA | ug/L | 8015M |
| 2. TPH-gas/BTEX (CADHS/80 B409338*1 | | | | | | |
| Date Analyzed | 09.07.94 | 94563 | 09/07/94 | NA | Date | 8015M.TX |
| Benzene | 09.07.94 | 94563 | 0 | 0.5 | ug/L | 8015M.TX |
| Toluene | 09.07.94 | 94563 | 0 | 0.5 | ug/L | 8015M.TX |
| Ethylbenzene | 09.07.94 | 94563 | 0 | 0.5 | ug/L | 8015M.TX |
| Total Xylene Isomers | 09.07.94 | 94563 | 0 | 0.5 | ug/L | 8015M.TX |
| TPH (as Gasoline) | 09.07.94 | 94563 | 0 | 50 | ug/L | 8015M.TX |
| a,a,a-Trifluorotoluene Reported | 09.07.94 | 94563 | 51.0 | NA | ug/L | 8015M.TX |
| a,a,a-Trifluorotoluene Theoretic | 09.07.94 | 94563 | 50.0 | NA | ug/L | 8015M.TX |

: SURROGATE RECOVERIES :
: BC ANALYTICAL : GLEN LAB : 12:46:38 12 SEP 1994 - P. 1 :

| METHOD | ANALYTE | BATCH | ANALYZED | REPORTED | TRUE | %REC | FLAG |
|---|---|---|---|---|---|---|---|
| 9408350*1 | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 48.4 | 50.0 | 97 | |
| 9408350*2 | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 50.6 | 50.0 | 101 | |
| 9408350*3 | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 50.7 | 50.0 | 101 | |
| 9408350*4 | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 50.5 | 50.0 | 101 | |
| 9408350*5 | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94563 | 09/07/94 | 47.1 | 50.0 | 94 | |
| 9408350*6 | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 50.8 | 50.0 | 102 | |
| 9408350*7 | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/02/94 | 51.3 | 50.0 | 103 | |
| 9408350*8 | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/02/94 | 51.3 | 50.0 | 103 | |

: SURROGATE RECOVERIES :
: BC ANALYTICAL : GLEN LAB : 12:46:42 12 SEP 1994 - P. 1 :

| METHOD | ANALYTE | BATCH | ANALYZED | REPORTED | TRUE | %REC | FLAG |
|---|---|---|---|---|---|---|---|
| 9408352*8*R1 | | | | | | | |
| 8015M | a,a,a-Trifluorotoluene | 94562 | 09/02/94 | 52.8 | 50.0 | 106 | |
| 9408352*8*S1 | | | | | | | |
| 8015M | a,a,a-Trifluorotoluene | 94562 | 09/02/94 | 57.6 | 50.0 | 115 | NC |
| 9408352*8*S2 | | | | | | | |
| 8015M | a,a,a-Trifluorotoluene | 94562 | 09/02/94 | 55.2 | 50.0 | 110 | NC |
| 9408352*8*T | | | | | | | |
| 8015M | a,a,a-Trifluorotoluene | 94562 | 09/02/94 | 50.0 | 50.0 | 100 | |
| B409268*1*MB | | | | | | | |
| 8015M | a,a,a-Trifluorotoluene | 94562 | 09/02/94 | 51.9 | 50.0 | 104 | |
| B409338*1*MB | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94563 | 09/07/94 | 51.0 | 50.0 | 102 | |
| C409331*1*LC | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 55.4 | 50.0 | 111 | |
| C409331*1*LT | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 50.0 | 50.0 | 100 | |
| C409332*1*LC | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 54.6 | 50.0 | 109 | |
| C409332*1*LT | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94562 | 09/03/94 | 50.0 | 50.0 | 100 | |
| C409418*1*LC | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94563 | 09/06/94 | 50.4 | 50.0 | 101 | |
| C409418*1*LT | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94563 | 09/08/94 | 50.0 | 50.0 | 100 | |
| C409419*1*LC | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94563 | 09/08/94 | 56.6 | 50.0 | 113 | |
| C409419*1*LT | | | | | | | |
| 8015M.TX | a,a,a-Trifluorotoluene | 94563 | 09/08/94 | 50.0 | 50.0 | 100 | |

GT14-C8-350

# Chain-of-Custody

Page 1 of 1


Texaco Environmental Services
108 Cutting Boulevard
Richmond, California 94804
Phone: (510) 236-3541
FAX: (510) 237-7821


Forward Results to the Attention of Rebecca Digerness
Texaco Project Corordinator: KAREN PETRYNA

Site Name: 2225 TELEGRAPH AVE. OAKLAND, CA
Site Address: 2225 TELEGRAPH AVE. OAKLAND, CA
Contractor Project Number: 940830-Z1
Contractor Name: BLAINE TECH SERVICES
Address: 985 TIMOTHY DR
Project Contact: JIM KELLER
Phone/FAX: (408) 995-5535 (408) 293-8773

Laboratory: B C Analytical
Turn Around Time: AS CONTRACTED
Samplers (PRINT NAME): BRET BLEAN
Sampler Signature: Bret Blean
Date Samples Collected: 8/30/94

| Sample Number | Lab Sample Number | Date/Time Collected | No. of Containers | Type of Containers | Sample Matrix | Preservative | ANALYSIS: TPH gas/BTEX | TPH Diesel | O&G/TRPH (418.1) | TPH Ex. (C8-C36+) | VOCs 8240/624 | P. Halocarbons 8010/60 | P. Aromatics 8020/602 | Organic Lead | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-6B | | 8/30 1235 | 3 | VOAs | | HCL | X | | | | | | | | | | |
| MW-6E | | " 1215 | 3 | " | | " | X | | | | | | | | | | |
| MW-6F | | " 1155 | 3 | " | | " | X | | | | | | | | | | |
| MW-6G | | " 1125 | 3 | " | | " | X | | | | | | | | | | |
| MW-6H | | " 1300 | 3 | " | | " | X | | | | | | | | | | |
| MW-6I | | " 1100 | 3 | " | | " | X | | | | | | | | | | |
| EB | | " 1105 | 3 | " | | " | X | | | | | | | | | | |
| TB | | " - | 2 | " | | " | X | | | | | | | | | | |
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Relinquished by: (Signature) Bret Blean Date: 8/31/94 Time: 1245
Relinquished by: (Signature) Bill Kegan Date: 8-31-94 Time: 3:45
Relinquished by: (Signature) Date: Time:
Method of Shipment:

Received by: (Signature) Bill Kegan Date: 8-31-94 Time: 1245
Received by: (Signature) Glenn Cannon Date: 8-31-94 Time: 3:45
Received by: (Signature) Date: Time:
Lab Comments:

# Well Gauging Data

Project Name: 940830-Z1
Project Number: 624 880 195

Date: 8/30/94
Recorded By: BB

| Well ID | TOC Elev. | DTB (ft. TOC) | Well Dia. (in.) | DTP (ft.) | DTW (ft.) | PT (ft.) | Comments |
|---|---|---|---|---|---|---|---|
| MW-6B | | 18.02 | 2 | | 13.02 | | |
| MW-6E | | 19.60 | 4 | | 14.32 | | |
| MW-6F | | 19.62 | 4 | | 14.84 | | |
| MW-6G | | 19.74 | 4 | | 12.32 | | |
| MW-6H | | 19.74 | 4 | | 12.72 | | |
| MW-6I | | 19.26 | 4 | | 13.06 | | |
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| | | | | | | | |

TOC = Top of casing
DTB = Depth to bottom in feet below TOC
DTP = Depth to product in feet below TOC
DTW = Depth to water in feet below TOC
PT = Product thickness in feet

P:\GWMP\FORMS\TEX-WL.WK1

# Groundwater Sampling Form

Project Name 940830-Z1 Well No. MW-6B

Project Number 624 880 195 Well Type ☐ Monitor ☐ Extraction ☐ Other

Recorded By BB Sampled by BB Date 8/30/94

## WELL PURGING

### PURGE VOLUME

Well casing diameter

☒ 2-inch ☐ 4-inch ☐ Other

Well Total Depth (TD, ft. below TOC) 18.02

Depth to Water (WL, ft. below TOC) 13.02

Depth to free phase hydrocarbons (FP, ft. below TOC)

Number of well volumes to be purged

☒ 3 ☐ 10 ☐ Other

### PURGE METHOD

☒ Bailer - Type TEFLON

☐ Pump - Type

☐ Other

### PUMP INTAKE

☐ Near Top Depth (ft)

☑ Near Bottom Depth (ft)

☐ Other

Pumping Rate .50 gpm

### PURGE VOLUME CALCULATION

5.0 (Water Column Length) X .17 (Multiplier) X .85 × 3 (No. Vols) = 2.6 gals CALCULATED PURGE VOLUME

MULTIPLIER (Casing Dia.[inches] = Gallons/linear ft)
2 = 0.17 | 3 = 0.38 | 4 = 0.66 | 4.5 = 0.83 | 5 = 1.02 | 6 = 1.5 | 8 = 2.6

3.0 gals ACTUAL PURGE VOLUME

### GROUNDWATER PARAMETER MEASUREMENT

Meter Type

| Time/Gallons | pH | Cond. (uomhos/cm) | Temp | ☐ deg C ☒ deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| 1226 / 1 | 7.4 | 1200 | 76.2 | | >200 | gray |
| 1228 / 2 | 7.4 | 1100 | 75.6 | | >200 | " |
| 1230 / 3 | 7.4 | 1100 | 75.2 | | >200 | " |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |

Comments during well purge

Well Pumped dry: YES (NO)

Purge water storage/disposal ☐ Drummed onsite ☒ Other BTS

## WELL SAMPLING

### SAMPLING METHOD

Date/Time Sampled 8/30/94 / 1235

Bailer - Type ☒ TEFLON Sample port ☐ Other ☐

### GROUNDWATER SAMPLE PARAMETER MEASUREMENTS

Meter Type MYRON LpDS

| Date/Time/% Recharge | pH | Cond. (uomhos/cm) | Temp | ☐ deg C ☐ deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| / / | | | | | | |

### SAMPLING PROGRAM

| Sample No. | Container #/Volume | Analysis | Preservatives | Laboratory | Comments |
|---|---|---|---|---|---|
| MW-6B | 3 / 40 ml VOA | TPH-G, BTEX | HCl | BCA | |
| | | | | | |
| | | | | | |
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### QUALITY CONTROL SAMPLES

Duplicate Samples

| Original Sample No. | Duplicate Sample No. |
|---|---|
| | |
| | |

Blank Samples

| Type | Sample No. |
|---|---|
| Trip | |
| Rinsate | |
| Transfer | |
| Other: | |

# Groundwater Sampling Form

Project Name 940830-7A | Well No. MW-6E

Project Number 624 880 195 | Well Type [X] Monitor [ ] Extraction [ ] Other

Recorded By BB | Sampled by BB | Date 8/30/94

## WELL PURGING

### PURGE VOLUME

Well casing diameter

[ ] 2-inch [X] 4-inch [ ] Other

Well Total Depth (TD, ft. below TOC) 19.60

Depth to Water (WL, ft. below TOC) 14.32

Depth to free phase hydrocarbons (FP, ft. below TOC)

Number of well volumes to be purged

[X] 3 [ ] 10 [ ] Other

### PURGE METHOD

[ ] Bailer - Type

[X] Pump - Type Elec.

[ ] Other

### PUMP INTAKE

[ ] Near top Depth (ft)

[✓] Near Bottom Depth (ft)

[ ] Other

Pumping Rate 1.0 gpm

### PURGE VOLUME CALCULATION

5.28 (Water Column Length) X .66 (Multiplier) X 3.5 x 3 (No. Vols) = 10.5 gals CALCULATED PURGE VOLUME

MULTIPLIER (Casing Dia. [inches] = Gallons/linear ft)

2 = 0.17 | 3 = 0.38 | 4 = 0.66 | 4.5 = 0.83 | 5 = 1.02 | 6 = 1.5 | 8 = 2.6

11.0 gals ACTUAL PURGE VOLUME

### GROUNDWATER PARAMETER MEASUREMENT

Meter Type

| Time/Gallons | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [X] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| 1203 / 4 | 7.4 | 1000 | 72.6 | | 9.4 | |
| 1208 / 8 | 7.4 | 900 | 70.2 | | .61 | |
| 1211 / 11 | 7.4 | 900 | 70.2 | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |

Comments during well purge

Well Pumped dry: YES NO

Purge water storage/disposal [ ] Drummed onsite [X] Other BTS

## WELL SAMPLING

### SAMPLING METHOD

Date/Time Sampled 8/30/94 / 1215

Bailer - Type [X] SSB

Sample port [ ] Other [ ]

### GROUNDWATER SAMPLE PARAMETER MEASUREMENTS

Meter Type MYRON LpDS

| Date/Time/% Recharge | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [ ] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| / / | | | | | | |

### SAMPLING PROGRAM

| Sample No. | Container #/Volume | Analysis | Preservatives | Laboratory | Comments |
|---|---|---|---|---|---|
| MW-6E | 3 / 40 ml VOA | TPH-G, BTEX | HCL | BCA | |
| | | | | | |
| | | | | | |
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### QUALITY CONTROL SAMPLES

Duplicate Samples

| Original Sample No. | Duplicate Sample No. |
|---|---|
| | |
| | |

Blank Samples

| Type | Sample No. |
|---|---|
| Trip | |
| Rinsate | |
| Transfer | |
| Other: | |

# Groundwater Sampling Form

Project Name 940830-2A
Project Number 624 880 195
Recorded By BB
Well No. MW-6F
Well Type [X] Monitor [ ] Extraction [ ] Other
Sampled by BB
Date 8/30/94

## WELL PURGING

### PURGE VOLUME

Well casing diameter
[ ] 2-inch [X] 4-inch [ ] Other
Well Total Depth (TD, ft. below TOC) 19.62
Depth to Water (WL, ft. below TOC) 14.84
Depth to free phase hydrocarbons (FP, ft. below TOC)
Number of well volumes to be purged
[ ] 3 [ ] 10 [ ] Other

### PURGE METHOD

[X] Bailer - Type TEFLON
[ ] Pump - Type
[ ] Other

### PUMP INTAKE

[ ] Near top Depth (ft)
[✓] Near Bottom Depth (ft)
[ ] Other
Pumping Rate ____ gpm

### PURGE VOLUME CALCULATION

4.78 (Water Column Length) X .66 (Multiplier) X 3.1 x 3 (No. Vols) = 9.3 gals CALCULATED PURGE VOLUME

MULTIPLIER (Casing Dia.[inches] = Gallons/linear ft)
2 = 0.17 | 3 = 0.38 | 4 = 0.66 | 4.5 = 0.83 | 5 = 1.02 | 6 = 1.5 | 8 = 2.6

10.0 gals ACTUAL PURGE VOLUME

### GROUNDWATER PARAMETER MEASUREMENT

Meter Type

| Time/Gallons | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [X] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| 1140 / 3.5 | 7.6 | 800 | 71.6 | | 80.1 | |
| 1145 / 7.0 | 7.6 | 760 | 71.2 | | 56.7 | |
| 1150 / 10.0 | 7.6 | 760 | 70.8 | | 47.0 | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |

Comments during well purge
Well Pumped dry: YES (NO)
Purge water storage/disposal [ ] Drummed onsite [X] Other BTS

## WELL SAMPLING

### SAMPLING METHOD

Date/Time Sampled 8/30/94 / 1155
Bailer - Type [X] TEFLON
Sample port [ ] Other [ ]

### GROUNDWATER SAMPLE PARAMETER MEASUREMENTS

Meter Type MYRON LpDS

| Date/Time/% Recharge | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [ ] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| / / | | | | | | |

### SAMPLING PROGRAM

| Sample No. | Container #/Volume | Analysis | Preservatives | Laboratory | Comments |
|---|---|---|---|---|---|
| MW-6F | 3 / 40 ml VOA | TPH-G, BTEX | HCL | BCA | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

### QUALITY CONTROL SAMPLES

Duplicate Samples

| Original Sample No. | Duplicate Sample No. |
|---|---|
| | |
| | |

Blank Samples

| Type | Sample No. |
|---|---|
| Trip | |
| Rinsate | |
| Transfer | |
| Other: | |

# Groundwater Sampling Form

Project Name 940830-7A
Well No. MW-68
Project Number 424 880 195
Well Type [X] Monitor [ ] Extraction [ ] Other
Recorded By BB
Sampled by BB
Date 8/30/94

## WELL PURGING

### PURGE VOLUME

Well casing diameter
[ ] 2-inch [X] 4-inch [ ] Other
Well Total Depth (TD, ft. below TOC) 19.74
Depth to Water (WL, ft. below TOC) 12.32
Depth to free phase hydrocarbons (FP, ft. below TOC)
Number of well volumes to be purged
[X] 3 [ ] 10 [ ] Other

### PURGE METHOD

[ ] Bailer - Type
[X] Pump - Type Elec.
[ ] Other

### PUMP INTAKE

[ ] Near top Depth (ft)
[✓] Near Bottom Depth (ft)
[ ] Other
Pumping Rate 1.0 gpm

### PURGE VOLUME CALCULATION

7.42 (Water Column Length) X .66 (Multiplier) X 3 x 4.9 (No. Vols) = 14.7 gals CALCULATED PURGE VOLUME

MULTIPLIER (Casing Dia.[inches] = Gallons/linear ft)
2 = 0.17 | 3 = 0.38 | 4 = 0.66 | 4.5 = 0.83 | 5 = 1.02 | 6 = 1.5 | 8 = 2.6

15.0 gals ACTUAL PURGE VOLUME

### GROUNDWATER PARAMETER MEASUREMENT

Meter Type

| Time/Gallons | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [X] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| 1108 / 5 | 7.6 | 1300 | 73.8 | | 8.1 | |
| 1113 / 10 | 7.5 | 1400 | 73.2 | | 5.1 | |
| 1118 / 15 | 7.5 | 1400 | 73.4 | | 4.4 | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |

Comments during well purge
Well Pumped dry: YES (NO)
Purge water storage/disposal [ ] Drummed onsite [X] Other BTS

## WELL SAMPLING

### SAMPLING METHOD

Date/Time Sampled 8/30/94 / 1125
Bailer - Type [X] SS8
Sample port [ ] Other [ ]

### GROUNDWATER SAMPLE PARAMETER MEASUREMENTS

Meter Type MYRON LpDS

| Date/Time/% Recharge | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [ ] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| / / | | | | | | |

### SAMPLING PROGRAM

| Sample No. | Container #/Volume | Analysis | Preservatives | Laboratory | Comments |
|---|---|---|---|---|---|
| MW-68 | 3 / 40 ml VOA | TPH-G, BTEX | HCL | BCA | |
| | | | | | |
| | | | | | |
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| | | | | | |
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### QUALITY CONTROL SAMPLES

Duplicate Samples

| Original Sample No. | Duplicate Sample No. |
|---|---|
| | |
| | |

Blank Samples

| Type | Sample No. |
|---|---|
| Trip | |
| Rinsate | EB @ 1105 |
| Transfer | |
| Other: | |

# Groundwater Sampling Form

Project Name 940830-7A
Project Number 624 880 195
Recorded By BB
Well No. MW-6H
Well Type [X] Monitor [ ] Extraction [ ] Other
Sampled by BB
Date 8/30/94

## WELL PURGING

### PURGE VOLUME

Well casing diameter
[ ] 2-inch [X] 4-inch [ ] Other
Well Total Depth (TD, ft. below TOC) 19.74
Depth to Water (WL, ft. below TOC) 12.72
Depth to free phase hydrocarbons (FP, ft. below TOC)
Number of well volumes to be purged
[X] 3 [ ] 10 [ ] Other

### PURGE METHOD

[ ] Bailer - Type
[X] Pump - Type Elec.
[ ] Other

### PUMP INTAKE

[ ] Near top Depth (ft)
[✓] Near Bottom Depth (ft)
[ ] Other
Pumping Rate 1.0 gpm

### PURGE VOLUME CALCULATION

7.02 (Water Column Length) X .66 (Multiplier) X 4.6 x 3 (No. Vols) = 13.8 gals CALCULATED PURGE VOLUME

MULTIPLIER (Casing Dia. [inches] = Gallons/linear ft)
2 = 0.17 | 3 = 0.38 | 4 = 0.66 | 4.5 = 0.83 | 5 = 1.02 | 6 = 1.5 | 8 = 2.6

14.0 gals ACTUAL PURGE VOLUME

### GROUNDWATER PARAMETER MEASUREMENT

Meter Type

| Time/Gallons | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [X] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| 1245 / 5 | 7.6 | 580 | 76.0 | | 3.8 | odor |
| 1250 / 10 | 7.6 | 570 | 74.8 | | 4.6 | " |
| 1255 / 14 | 7.6 | 570 | 74.4 | | 3.1 | " |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |

Comments during well purge
Well Pumped dry: YES NO
Purge water storage/disposal [ ] Drummed onsite [X] Other BTS

## WELL SAMPLING

### SAMPLING METHOD

Date/Time Sampled 8/30/94 / 1300
Bailer - Type [X] SS
Sample port [ ] Other [ ]

### GROUNDWATER SAMPLE PARAMETER MEASUREMENTS

Meter Type MYRON LpDS

| Date/Time/% Recharge | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [ ] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| / / | | | | | | |

### SAMPLING PROGRAM

| Sample No. | Container #/Volume | Analysis | Preservatives | Laboratory | Comments |
|---|---|---|---|---|---|
| MW-6H | 3 / 40 ml VOA | TPH-G, BTEX | HCL | BCA | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

### QUALITY CONTROL SAMPLES

Duplicate Samples

| Original Sample No. | Duplicate Sample No. |
|---|---|
| | |
| | |

Blank Samples

| Type | Sample No. |
|---|---|
| Trip | |
| Rinsate | |
| Transfer | |
| Other: | |

# Groundwater Sampling Form

Project Name 940830-2A
Project Number 424 880195
Recorded By BB
Well No. MW-61
Well Type [X] Monitor [ ] Extraction [ ] Other
Sampled by BB
Date 8/30/94

## WELL PURGING

### PURGE VOLUME

Well casing diameter
[ ] 2-inch [X] 4-inch [ ] Other
Well Total Depth (TD, ft. below TOC) 19.26
Depth to Water (WL, ft. below TOC) 13.06
Depth to free phase hydrocarbons (FP, ft. below TOC) ∅
Number of well volumes to be purged
[X] 3 [ ] 10 [ ] Other

### PURGE METHOD

[ ] Bailer - Type
[X] Pump - Type Elec.
[ ] Other

### PUMP INTAKE

[ ] Near top Depth (ft)
[✓] Near Bottom Depth (ft)
[ ] Other
Pumping Rate 1.0 gpm

### PURGE VOLUME CALCULATION

6.2 (Water Column Length) X .66 (Multiplier) X 4.0 x 3 (No. Vols) = 12.0 gals CALCULATED PURGE VOLUME

MULTIPLIER (Casing Dia.[inches] = Gallons/linear ft)
2 = 0.17 | 3 = 0.38 | 4 = 0.66 | 4.5 = 0.83 | 5 = 1.02 | 6 = 1.5 | 8 = 2.6

12. gals ACTUAL PURGE VOLUME

### GROUNDWATER PARAMETER MEASUREMENT

Meter Type

| Time/Gallons | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [X] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| 1044 / 4 | 7.6 | 1100 | 75.4 | | 112.4 | |
| 1049 / 8 | 7.7 | 1000 | 73.8 | | 8.3 | |
| 1053 / 12 | 7.7 | 1000 | 71.4 | | 5.1 | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |
| / | | | | | | |

Comments during well purge
Well Pumped dry: YES (NO)
Purge water storage/disposal [ ] Drummed onsite [X] Other BTS

## WELL SAMPLING

### SAMPLING METHOD

Date/Time Sampled 8/30/94 / 1100
Bailer - Type [X] SSB
Sample port [ ]
Other [ ]

### GROUNDWATER SAMPLE PARAMETER MEASUREMENTS

Meter Type MYRON LpDS

| Date/Time/% Recharge | pH | Cond. (uomhos/cm) | Temp | [ ] deg C [ ] deg F | Turbidity (NTU) | Color/Odor |
|---|---|---|---|---|---|---|
| / / | | | | | | |

### SAMPLING PROGRAM

| Sample No. | Container #/Volume | Analysis | Preservatives | Laboratory | Comments |
|---|---|---|---|---|---|
| MW-61 | 3 / 40 ml VOA | TPH-G, BTEX | HCL | BCA | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |

### QUALITY CONTROL SAMPLES

Duplicate Samples

| Original Sample No. | Duplicate Sample No. |
|---|---|
| | |
| | |

Blank Samples

| Type | Sample No. |
|---|---|
| Trip | |
| Rinsate | |
| Transfer | |
| Other: | |

# SOURCE RECORD BILL OF LADING

FOR NON-HAZARDOUS PURGEWATER RECOVERED FROM GROUNDWATER WELLS AT TEXACO FACILITIES IN THE STATE OF CALIFORNIA. THE NON-HAZARDOUS PURGE-WATER WHICH HAS BEEN RECOVERED FROM GROUND-WATER WELLS IS COLLECTED BY THE CONTRACTOR, MADE UP INTO LOADS OF APPROPRIATE SIZE AND HAULED TO THE DESTINATION DESIGNATED BY TEXACO ENVIRONMENTAL SERVICES (TES).

**Contractor:** Blaine Tech Services
**Address:** 985 Timothy Dr.
**City, State, ZIP:** San Jose, CA 95133
**Phone:** 995-5535

is authorized by Texaco Environmental Services to recover, collect, apportion into loads, and haul the NON-HAZARDOUS WELL PURGEWATER that is drawn from wells at the Texaco facility listed below and to deliver that purgewater to an appropriate destination designated by TEXACO ENVIRONMENTAL SERVICES in either Redwood City, California or in Richmond, California. Transport routing of the Non-Hazardous Well Purgewater may be directed from one Texaco facility to the designated desitnation point; from one Texaco facility to the designated destination point via another Texaco facility; from a Texaco facility via the contractor's facility, or any combination thereof. The Non-Hazardous Well Purgewater is and remains the property of Texaco Environmental Services (TES).

This SOURCE RECORD BILL OF LADING was initiated to cover the recovery of Non-Hazardous Well Purgewater from wells at the Texaco facility described below:

**TEXACO #:** 624 880 195
**Address:** 2225 Telegraph Ave
**City, State, ZIP:** Oakland, CA

| Well I.D. | Gals. | Well I.D. | Gals. |
|---|---|---|---|
| / | | / | |
| groundwell purgewater | / | | / |
| / | | / | |
| / | | / | |
| / | | / | |
| / | | / | |
| / | | / | |
| / | | / | |
| / | | / | |
| / | | / | |

Total gals. 65

added rinse water 5

**Total Gals. Recovered** 70

Job #: 940830-Z1
Date 8/30/94
Time 1315
Signature:

REC'D AT: BTS
Date: 8/30/94
Time: 1700
Signature:

QUARTERLY SUMMARY REPORT
Former Texaco/Current Exxon Service Station
2225 Telegraph Avenue, Oakland, California
Alameda County
Second Quarter, 1994

## HISTORY OF INVESTIGATIVE AND REMEDIAL ACTIONS

A preliminary subsurface investigation and a sensitive receptor survey was conducted in May, 1988. Six shallow monitoring wells were installed on site and seven soil borings were drilled near the pump islands and tanks. Three of the on-site monitoring wells were converted to groundwater recovery wells when the groundwater treatment system was installed at the site in 1990. The underground storage tanks, lines, and dispensers were replaced in late 1991. The treatment system was temporarily shut down between June 4, 1992 and January 27, 1993, and between November 15, 1993 and January 12, 1994.

## WORK PERFORMED DURING THIS QUARTER

Quarterly groundwater monitoring and sampling was performed. Operation and maintenance of the groundwater treatment system was conducted. was treatment system operated

## CHARACTERIZATION STATUS

The extent of petroleum hydrocarbons in soil and groundwater has not been delineated.

## REMEDIATION STATUS

A groundwater treatment system is in operation at the site which extracts groundwater from two recovery wells using air displacement pumps and three liquid phase carbon canisters to treat the groundwater prior to discharge.

## WORK TO BE PERFORMED NEXT QUARTER

Continue quarterly monitoring and sampling to record fluctuations in groundwater elevation and hydrocarbon concentrations and continue operation and maintenance of the groundwater treatment system.

**COMPANY CONTACT:** Karen Petryna (510) 236-9134

V:\RAO_QSR\2225T.QSR

Texaco Environmental Services
Standard Operating Procedures
for Groundwater Monitoring and Sampling

The following are routine procedures to be followed by personnel obtaining field information concerning petroleum product thickness and samples of groundwater during the monitoring and sampling of Texaco sites. These procedures are designed to assure that:

- Information and samples are properly collected.
- Samples are identified, preserved and transported in a manner such that they are representative of field conditions.
- Monitoring and sampling results are reproducible.

Water Level Measurements

Water level measurements are needed to document groundwater flow directions and calculate gradient. By gauging the level of water in a groundwater monitoring well and comparing the complied data, calculations can be made that determine the direction the groundwater at the monitored well is flowing and the groundwater gradient between successive monitoring wells.

- An interface probe or electronic probe is generally used to gauge the level of water in a monitoring well. When using either probe, it is slowly lowered into the well until the oscillating alarm indicating water is heard. Raise the interface probe above the water level and lower it back into the water at least three times to verify that the true depth to water is measured. Without moving the probe, read the numbers on the tape to determine the distance from the predetermined top of the well casing. A chalked, steel add-tape may also be used to gauge the level of water in a monitoring well. When using the steel tape, it is slowly lowered into the well until the chalked portion of the tape encounters water. Read the numbers on the tape to determine the distance from the predetermined top of the well casing. Raise the tape to the surface grade, re-chalk and lower it back into the water at least two times to verify that the true depth to water is measured. Record the depth to water on the Well Gauging Form and Groundwater Sampling Form.

Petroleum Product Thickness Measurements.

If free phase petroleum hydrocarbons (product) are observed floating on the groundwater surface during the water level measurement, the thickness of the product will be measured in each appropriate well. Groundwater samples will not be collected for chemical analysis from wells containing product unless specifically requested by the Project Coordinator. Product thicknesses will be measured using interface probes, and/or acrylic (clear plastic) bailers. The procedures for obtaining level and thickness measurements using each instrument are:

- The level of the top of the product will be measured with an interface probe. When product is suspected but not measurable with the interface probe, a visual evaluation can be made using clear acrylic bailers. A bailer will be lowered into the water/product surface so that the top of the bailer is NOT submerged; the bailer is then removed from

the well and the thickness of the product visually measured and documented on the Well Gauging Form.

- When the interface probe contacts liquid, the visual/audible alarm on the reel will be activated. An oscillating alarm indicates water, a continuous alarm indicates hydrocarbon. To determine the exact thickness of a hydrocarbon layer, the probe should be slowly lowered to the air/hydrocarbon interface until the alarm is activated. with the probe at the exact point where the alarm comes on, read the numbers on the tape to determine the distance from the predetermined top of casing elevation mark. Next, lower the probe through the hydrocarbon layer and well into the water. An oscillating alarm will be obtained. The probe should then be raised slowly to the hydrocarbon/water interface until the point where the alarm changes from oscillating to continuous. The thickness of the hydrocarbon layer is determined by subtracting the first reading from the second reading. Record the calculated value on the Well Gauging Form and Groundwater Sampling Form.

Groundwater Sampling

Groundwater samples will be collected from selected groundwater monitoring wells to provide data which will be statistically representative of local groundwater conditions at the site. Groundwater samples will be collected as follows:

- All measuring and sampling equipment will be decontaminated prior to sample collection from each well and documented on the Groundwater Sampling Form.

- Prior to sampling activity, the water level of the well will be measured and the minimum purge volume of each well will be calculated using the purge volume calculation portion of the Groundwater Sampling Form. A minimum of three casing volumes will be purged prior to sample collection. The actual total volume purged will be recorded on Groundwater Sampling Form.

- Prior to sampling, a submersible pump, centrifugal pump, peristaltic pump, or a Teflon or stainless steel bailer will be used to purge a minimum of three casing volumes from each well. Purge volumes will be estimated using a flow meter or a stopwatch and a bucket to estimate flow rate, from which a time to purge the required volume will be calculated. The pump will be lowered to a depth of two to three feet from bottom of the well. When bailers are used for purging, the bailer should be gently lowered into the water and allowed to fill then removed. Care should be taken to not agitate the water which could release volatile organics.

- Whenever possible, groundwater parameters (pH, temperature (in degrees Celsius [C]), specific conductance (in micromhos per centimeters squared [umhos]), and turbidity (in National Turbidity Units [NTU]) will be monitored and recorded on the Groundwater Sampling Form.

- If a well is purged dry before three casing volumes have been removed, the sample will be taken after the well has recovered to within 80 percent of the static water level prior to purging or after 4 hours when sufficient water volume is available to meet analytical requirements, whichever comes first. Reasonable efforts will be made to avoid dewatering wells by using low-yield pumps as necessary.

- Water samples will be collected with a stainless steel or Teflon bailer. To reduce potential cross contamination, sampling should take place in order from least to most contaminated wells. Bailer strings should be replaced between each well to avoid cross contamination from a bailer string which has absorbed contamination.

- Sample containers will be filled directly from the bailer.

- Use only sample containers prepared and provided by an analytical laboratory. Preservatives are required for some types of samples. Sample containers containing preservatives should be supplied by an analytical laboratory.

- For volatile organics analysis, each sample vial will be filled with sample water so that water stands above the lip of the vial. The cap should then be quickly placed on the vial and tightened securely. The vial should then be checked to ensure that no air bubbles are present prior to labeling the sample.

- Take site blank samples (trip and rinsate) using distilled water or laboratory supplied water from a known uncontaminated source. One trip blank and one rinsate blank sample for each site will be analyzed for each site sampling event.

- Once collected and labeled, all samples will be stored in cooler maintained at 4 degrees Celsius using frozen water ice.

**Sample Custody Procedures**

Sample custody procedures will be followed through sample collection, transfer, analysis and ultimate disposal. The purpose of these procedures is to assure that the integrity of samples is maintained during their collection and transfer. Sample quantities, types and locations will be determined before the actual field work beings. As few people as possible will handle samples. The field sampler is personally responsible for the care and custody of the collected samples until they are properly transferred.

Each sample will be labelled and sealed properly immediately after collection. Sample identification documents will be carefully prepared so that identification and chain-of-custody records can be maintained and sample disposition can be controlled. Forms will be filled out with waterproof ink. The following are sample identification documents that will be utilized during the field operations.

- Sample Identification Label
- Chain-of Custody

Each separate sample will be identified using a label obtained from the laboratory. The sampler will complete all information, using a black waterproof pen, as follows:

The Site ID This is the name assigned to the particular sampling station.

The Sample Source. This will be the name of the well location.

The Analysis Required. This will be indicated for each sample using proper EPA reference

number indicating analytical method.

The Date Taken. This will be the date the sample was collected, using the format MM-DD-YY. Example: 06-15-91

Noting the Time. The time the sample was collected will be given in military time. Example: 1430

The Method of Preservation. Preservation methods will be provided, specifying the type of preservation. For non-acidified samples, "ice" will be indicated.

The Sampler's Name. This will be printed in the "Sampled By" section. The sampler's signature will be written in the "Signed" section.

There is the potential that samples and analysis could be of an evidentiary nature. Therefore, the possession of samples must be traceable from the time samples are collected in the field until the analysis is completed and the data are entered as evidence. The tracing of the samples through the laboratory is accomplished by "chain-of-custody" procedures. Chain-of-Custody Forms will be completed for each set of samples. The sampler will sign the first "Relinquished By" line at the bottom of the chain of custody record, and will indicate the date and time of the custody transfer. Samples will not leave custody of the field technician until relinquished to another party. Custody is defined by the following criteria.

In the Actual Physical Possession. When field personnel have sample in possession, they have "custody".

In View. The field personnel view after being in physical possession.

Special Areas. Sample is kept in a locked area after being in physical possession.

Designated Area. Sample is in a designated, locked-storage area.

Transfer of samples to an analytical laboratory will be done by use of a common carrier or personal delivery. Carrier personnel will personally secure samples and sample containers in such a way that no containers can be opened in transit. The person to whom custody is being transferred will sign on the first "Received By" line of the chain-of-custody record, indicating that custody is being accepted by the carrier for all the samples listed on the sheet. For subsequent transfers of custody, the succeeding relinquish and receipt lines will be used.

Equipment Decontamination

All equipment that comes in contact with potentially contaminated soil or water will be decontaminated prior to and after each use (for example, after each sampling event). All hand bailers and will be decontamination with an Alconox wash with deionized (DI) water rinse.