GeoStrategies Inc.

# QUARTERLY MONITORING REPORT - Third Quarter 1993

ARCO Station 5387
20200 Hesperian Boulevard
San Lorenzo, California

792601-16

October 28, 1993

GeoStrategies Inc.

Mr. Michael Whelan
ARCO Products Company
Post Office Box 5811
San Mateo, California

October 28, 1993

Subject: **QUARTERLY MONITORING REPORT - Third Quarter 1993**
ARCO Station 5387, 20200 Hesperian Boulevard, San Lorenzo, California.

Mr. Whelan:

This Quarterly Monitoring Report was prepared on behalf of ARCO Products Company (ARCO) by GeoStrategies Inc. (GSI) and presents the results of the third quarter 1993 groundwater sampling for the above referenced site (Plate 1). Sampling data were furnished by the ARCO contractor, EMCON Associates, of San Jose, California (EMCON).

## SITE BACKGROUND

In August 1986, Groundwater Technology, Inc. (GTI) drilled four soil borings (SB-1 through SB-4) and three groundwater monitoring wells (MW-1 through MW-3) at the site. Between October 1991 and March 1993, GSI installed three on-site (A-4 through A-6) and four off-site (A-7 through A-10) groundwater monitoring wells, two groundwater recovery wells (AR-1 and AR-2), one air sparging/vapor extraction well (AS-1), one air sparging well (AS-2), and three vapor extraction wells (AV-1 through AV-3) at the site. The wells were installed to evaluate the horizontal and vertical extent of petroleum hydrocarbons in soil and groundwater beneath the site, and to provide extraction and air sparge points for the assessment of remedial alternatives. The active gasoline underground storage tanks (USTs) are located in the southeastern portion of the site and four service islands are located in the southwestern portion of the

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# TRANSMITTAL

TO: Ms. Juliet Shin
Alameda County Health Agency
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

DATE: October 29, 1993
PROJECT #: 7926.01
SUBJECT: Quarterly Monitoring Report - 3rd Quarter 1993) for ARCO Station 5387

FROM:
Barbara Sieminski
Project Geologist
GeoStrategies, Inc.
2140 West Winton Avenue
Hayward, California 94545

WE ARE SENDING YOU:

| COPIES | DATED | DESCRIPTION |
|---|---|---|
| 1 | 10/28/93 | Quarterly Monitoring Report - Third Quarter 1993, ARCO Station 5387, 20200 Hesperian Boulevard, San Lorenzo, California. |

THESE ARE TRANSMITTED as checked below:

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cc: **Mr. Joel Coffman**, GSI
**Mr. Michael Whelan**, ARCO Products Company
**Mr. Richard Hiett**, RWQCB, (Certified Mail)

Generally flow gradients, flow levels have decreased w/ decreasing water tables. - Juliet

site. The locations of the wells and other pertinent site features are shown on Plate 2, Site Plan.

On October 13 and 14, 1992, GSI performed step-drawdown and constant-rate aquifer tests at the site. These tests were performed to evaluate the feasibility of groundwater extraction and treatment as an interim remedial option.

On March 24 and August 13, 1993, GSI performed vapor extraction and/or air sparging/vapor extraction tests to determine the feasibility of air sparging/vapor extraction as an interim remedial option.

Quarterly groundwater monitoring and sampling of the site wells began in December 1991. Groundwater samples are currently analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) according to EPA Method 8015 (Modified) and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) according to EPA Method 8020.

## CURRENT QUARTER SAMPLING RESULTS

### Groundwater Level Measurements and Gradient Evaluation

Depth to water-level measurements were obtained prior to sampling on August 12, 1993, from each monitoring and recovery well. Static groundwater levels were measured from the surveyed top of the well box and recorded to the nearest $\pm$0.01 foot. Water-level data were referenced to Mean Sea Level (MSL) datum and used to construct a potentiometric map of the first encountered groundwater beneath the site (Plate 3). Data from wells MW-1 and AR-1 were not used in construction of the potentiometric map for this quarter due to anomalous groundwater elevations in these wells. **Based on the August 12, 1993, water level data, shallow groundwater beneath the site flows to the west** at an approximate hydraulic gradient of 0.004.

Each well was inspected for the presence of floating product. **Floating product was not observed in any well this quarter and has never been observed in any well at this site.** Depth-to-groundwater and floating product measurements for the current quarter are presented in Table 1

and in the EMCON groundwater sampling report (Appendix A). Current and historical water-level data and floating product measurements are summarized in Table 2.

Chemical Analyses of Groundwater Samples

Groundwater samples were collected on August 12, 1993, by EMCON Associates of San Jose, California (EMCON). Samples were analyzed for TPH-Gasoline according to EPA Method 8015 (Modified) and BTEX according to EPA Method 8020. Groundwater samples were analyzed by Sequoia Analytical of Redwood City, California (Sequoia), a California State-certified laboratory (Hazardous Waste Testing Laboratory #1210).

Current quarter chemical analytical data are presented in Table 1 and have also been added to the Historical Groundwater Quality Database presented in Table 3. TPH-Gasoline was detected in samples from wells MW-1 through MW-3, A-4, A-5, A-7, A-10, AR-1 and AR-2 at concentrations ranging between 130 parts per billion (ppb) and 16,000 ppb. TPH-Gasoline was nondetectable (less than 50 ppb) in groundwater samples collected from on-site well A-6, and off-site wells A-8 and A-9. Benzene was identified in wells MW-1 through MW-3, A-4, A-5, A-7, AR-1 and AR-2 at concentrations ranging between 0.93 ppb and 1,600 ppb. Benzene concentrations were reported as nondetectable (less than 0.50 ppb) in groundwater samples collected from on-site well A-6, and off-site wells A-8 through A-10. The EMCON groundwater sampling report, laboratory analytical reports and the Chain-of-Custody form are presented in Appendix A. Chemical isoconcentration maps for TPH-Gasoline and benzene are presented on Plates 4 and 5, respectively.

## CONCLUSIONS

Groundwater elevations decreased an average of about 1½ feet between April and August 1993. The gradient and flow direction are consistent with the previously interpreted gradients and flow directions for this site.

Concentrations of TPH-Gasoline have remained nondetectable in wells A-6, A-8 and A-9; have increased from 380 ppb to 1,200 ppb in well A-4, located upgradient to the existing USTs; and have decreased or not

changed significantly in all other wells since the last quarter. Concentrations of benzene have remained nondetectable in wells A-6, and A-8 through A-10; have increased from nondetectable to 0.93 ppb in well A-4; and have decreased or not changed significantly in all other wells since the last quarter.

**The presence of gasoline hydrocarbons in groundwater samples collected from groundwater monitoring well A-4, located upgradient to the existing USTs, may be due to an off-site source.** A 250-gallon gasoline UST was removed from the property located directly southeast and adjacent to the ARCO property. The location of this UST which was removed was directly upgradient to groundwater monitoring well A-4.

GSI's recent review of air photos and environmental files indicated that four other sites located in the immediate upgradient or crossgradient vicinity of the ARCO site are potential secondary sources of hydrocarbons detected in the soil and groundwater at the ARCO site. These sites include: former Shell Service Station located at 20500 Hesperian Boulevard; former UNOCAL Service Station located at 20501 Hesperian Boulevard; former TEXACO/EXXON Service Station located at 20499 Hesperian Boulevard; and Alliance Service Station located at 20450 Hesperian Boulevard.

If you have any questions, please call us at (510) 352-4800

GeoStrategies Inc. by,

Barbara Sieminski
Project Geologist

Stephen J. Carter
Project Manager
R.G. 5577

REGISTERED GEOLOGIST
STEPHEN J. CARTER
No. 5577
STATE OF CALIFORNIA

Table 1. Current Groundwater Monitoring Data
Table 2. Historical Water-Level Data
Table 3. Historical Groundwater Quality Database

Plate 1. Vicinity Map
Plate 2. Site Plan
Plate 3. Potentiometric Map
Plate 4. TPH-G Isoconcentration Map
Plate 5. Benzene Isoconcentration Map

Appendix A: EMCON Groundwater Sampling Report

QC Review: JC

TABLE 1

CURRENT GROUNDWATER MONITORING DATA
ARCO Station 5387
San Lorenzo, California

| WELL NO. | SAMPLE DATE | ANALYZED DATE | TPH-G (PPB) | BENZENE (PPB) | TOLUENE (PPB) | ETHYLBENZENE (PPB) | XYLENES (PPB) | WELL ELEV. (FT) | STATIC WATER ELEV. (FT) | PRODUCT THICKNESS (FT) | DEPTH TO WATER (FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 12-Aug-93 | 19-Aug-93 | 830 | 60 | 3.8 | 39 | 3.6 | 38.36 | 25.43 | 0.00 | 12.93 |
| MW-2 | 12-Aug-93 | 19-Aug-93 | 16,000 | 1,600 | 27 | 1,300 | 1,200 | 38.58 | 24.77 | 0.00 | 13.81 |
| MW-3 | 12-Aug-93 | 19-Aug-93 | 3,400 | 56 | <5 | 190 | <5 | 37.77 | 24.95 | 0.00 | 12.82 |
| A-4 | 12-Aug-93 | 19-Aug-93 | 1,200 | 0.93 | <0.50 | 0.91 | <0.50 | 39.86 | 24.92 | 0.00 | 14.94 |
| A-5 | 12-Aug-93 | 19-Aug-93 | 230 | 5.4 | <0.50 | 5.3 | 0.94 | 38.94 | 24.82 | 0.00 | 14.12 |
| A-6 | 12-Aug-93 | 19-Aug-93 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 39.07 | 24.89 | 0.00 | 14.18 |
| A-7 | 12-Aug-93 | 19-Aug-93 | 360 | 9.0 | <0.50 | 13 | 9.0 | 39.95 | 24.41 | 0.00 | 15.54 |
| A-8 | 12-Aug-93 | 19-Aug-93 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 37.23 | 24.82 | 0.00 | 12.41 |
| A-9 | 12-Aug-93 | 19-Aug-93 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 38.71 | 24.81 | 0.00 | 13.90 |
| A-10 | 12-Aug-93 | 19-Aug-93 | 390 | <0.50 | <0.50 | <0.50 | 0.84 | 38.94 | 24.07 | 0.00 | 14.87 |
| AR-1 | 12-Aug-93 | 19-Aug-93 | 370 | 150 | <2 | 11 | <2 | 38.11 | 24.56 | 0.00 | 13.55 |
| AR-2 | 12-Aug-93 | 19-Aug-93 | 130 | 16 | <0.50 | 1.7 | 0.57 | 38.39 | 24.80 | 0.00 | 13.59 |
| XDUP1 (MW-2) | 12-Aug-93 | 19-Aug-93 | 21,000 | 1,500 | 37 | 1,300 | 1,200 | --- | --- | --- | --- |
| TB | 12-Aug-93 | 19-Aug-93 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | --- | --- | --- | --- |

## TABLE 1

## CURRENT GROUNDWATER MONITORING DATA
## ARCO Station 5387
## San Lorenzo, California

Current Regional Water Quality Control Board Maximum Contaminant Levels:
Benzene 1.0 ppb, Xylenes 1750 ppb, Ethylbenzene 680 ppb

Current DHS Action Levels: *Toluene 100 ppb*

| | | |
|---|---|---|
| TPH-G | = | Total Petroleum Hydrocarbons calculated as Gasoline. |
| XDUP1 | = | Duplicate sample collected from well MW-2. |
| PPB | = | Parts Per Billion. |
| TB | = | Trip Blank |

Notes:
1. All data shown as < x are reported as ND (none detected).
2. Water level elevations referenced to Mean Sea Level (MSL).

TABLE 2

HISTORICAL WATER-LEVEL DATA
ARCO Station 5387
San Lorenzo, California

| MONITORING DATE | WELL NUMBER | DEPTH TO WATER (FT) | WELL ELEVATION (FT) | STATIC WATER ELEVATION (FT) | FLOATING PRODUCT THICKNESS (FT) |
|---|---|---|---|---|---|
| 08-Aug-86 | MW-1 | 11.25 | 38.36 | 27.11 | 0.00 |
| 24-Dec-91 | MW-1 | 16.12 | 38.36 | 22.24 | 0.00 |
| 10-Mar-92 | MW-1 | 13.34 | 38.36 | 25.02 | 0.00 |
| 09-Jun-92 | MW-1 | 14.12 | 38.36 | 24.24 | 0.00 |
| 14-Sep-92 | MW-1 | 15.34 | 38.36 | 23.02 | 0.00 |
| 12-Nov-92 | MW-1 | 15.46 | 38.36 | 22.90 | 0.00 |
| 11-Feb-93 | MW-1 | 11.95 | 38.36 | 26.41 | 0.00 |
| 14-Apr-93 | MW-1 | 11.65 | 38.36 | 26.71 | 0.00 |
| 12-Aug-93 | MW-1 | 12.93 | 38.36 | 25.43 | 0.00 |
| 08-Aug-86 | MW-2 | 11.62 | 38.58 | 26.96 | 0.00 |
| 24-Dec-91 | MW-2 | 16.50 | 38.58 | 22.08 | 0.00 |
| 10-Mar-92 | MW-2 | 13.50 | 38.58 | 25.08 | 0.00 |
| 09-Jun-92 | MW-2 | 14.52 | 38.58 | 24.06 | 0.00 |
| 14-Sep-92 | MW-2 | 15.78 | 38.58 | 22.80 | 0.00 |
| 12-Nov-92 | MW-2 | 15.98 | 38.58 | 22.60 | 0.00 |
| 11-Feb-93 | MW-2 | 12.27 | 38.58 | 26.31 | 0.00 |
| 14-Apr-93 | MW-2 | 12.01 | 38.58 | 26.57 | 0.00 |
| 12-Aug-93 | MW-2 | 13.81 | 38.58 | 24.77 | 0.00 |
| 08-Aug-86 | MW-3 | 10.61 | 37.77 | 27.16 | 0.00 |
| 24-Dec-91 | MW-3 | 15.60 | 37.77 | 22.17 | 0.00 |
| 10-Mar-92 | MW-3 | 12.90 | 37.77 | 24.87 | 0.00 |
| 09-Jun-92 | MW-3 | 13.60 | 37.77 | 24.17 | 0.00 |
| 14-Sep-92 | MW-3 | 14.78 | 37.77 | 22.99 | 0.00 |
| 12-Nov-92 | MW-3 | 14.92 | 37.77 | 22.85 | 0.00 |
| 11-Feb-93 | MW-3 | 11.65 | 37.77 | 26.12 | 0.00 |
| 14-Apr-93 | MW-3 | 11.16 | 37.77 | 26.61 | 0.00 |
| 12-Aug-93 | MW-3 | 12.82 | 37.77 | 24.95 | 0.00 |
| 24-Dec-91 | A-4 | 17.60 | 39.86 | 22.26 | 0.00 |
| 10-Mar-92 | A-4 | 14.76 | 39.86 | 25.10 | 0.00 |
| 09-Jun-92 | A-4 | 15.63 | 39.86 | 24.23 | 0.00 |
| 14-Sep-92 | A-4 | 16.83 | 39.86 | 23.03 | 0.00 |
| 12-Nov-92 | A-4 | 16.97 | 39.86 | 22.89 | 0.00 |
| 11-Feb-93 | A-4 | 13.43 | 39.86 | 26.43 | 0.00 |
| 14-Apr-93 | A-4 | 13.06 | 39.86 | 26.80 | 0.00 |

TABLE 2

HISTORICAL WATER-LEVEL DATA
ARCO Station 5387
San Lorenzo, California

| MONITORING DATE | WELL NUMBER | DEPTH TO WATER (FT) | WELL ELEVATION (FT) | STATIC WATER ELEVATION (FT) | FLOATING PRODUCT THICKNESS (FT) |
|---|---|---|---|---|---|
| 12-Aug-93 | A-4 | 14.94 | 39.86 | 24.92 | 0.00 |
| 24-Dec-91 | A-5 | 16.85 | 38.94 | 22.09 | 0.00 |
| 10-Mar-92 | A-5 | 13.83 | 38.94 | 25.11 | 0.00 |
| 09-Jun-92 | A-5 | 14.91 | 38.94 | 24.03 | 0.00 |
| 14-Sep-92 | A-5 | 16.14 | 38.94 | 22.80 | 0.00 |
| 12-Nov-92 | A-5 | 16.35 | 38.94 | 22.59 | 0.00 |
| 11-Feb-93 | A-5 | 13.21 | 38.94 | 25.73 | 0.00 |
| 14-Apr-93 | A-5 | 12.97 | 38.94 | 25.97 | 0.00 |
| 12-Aug-93 | A-5 | 14.12 | 38.94 | 24.82 | 0.00 |
| 24-Dec-91 | A-6 | 16.88 | 39.07 | 22.19 | 0.00 |
| 10-Mar-92 | A-6 | 13.73 | 39.07 | 25.34 | 0.00 |
| 09-Jun-92 | A-6 | 14.95 | 39.07 | 24.12 | 0.00 |
| 14-Sep-92 | A-6 | 16.20 | 39.07 | 22.87 | 0.00 |
| 12-Nov-92 | A-6 | 16.35 | 39.07 | 22.72 | 0.00 |
| 11-Feb-93 | A-6 | 13.04 | 39.07 | 26.03 | 0.00 |
| 14-Apr-93 | A-6 | 12.23 | 39.07 | 26.84 | 0.00 |
| 12-Aug-93 | A-6 | 14.18 | 39.07 | 24.89 | 0.00 |
| 24-Dec-91 | A-7 | 18.11 | 39.95 | 21.84 | 0.00 |
| 10-Mar-92 | A-7 | 15.30 | 39.95 | 24.65 | 0.00 |
| 09-Jun-92 | A-7 | 16.12 | 39.95 | 23.83 | 0.00 |
| 14-Sep-92 | A-7 | 17.35 | 39.95 | 22.60 | 0.00 |
| 12-Nov-92 | A-7 | 17.47 | 39.95 | 22.48 | 0.00 |
| 11-Feb-93 | A-7 | 13.80 | 39.95 | 26.15 | 0.00 |
| 14-Apr-93 | A-7 | 13.60 | 39.95 | 26.35 | 0.00 |
| 12-Aug-93 | A-7 | 15.54 | 39.95 | 24.41 | 0.00 |
| 14-Sep-92 | A-8 | 14.19 | 37.23 | 23.04 | 0.00 |
| 12-Nov-92 | A-8 | 14.35 | 37.23 | 22.88 | 0.00 |
| 11-Feb-93 | A-8 | 11.25 | 37.23 | 25.98 | 0.00 |
| 14-Apr-93 | A-8 | 12.33 | 37.23 | 24.90 | 0.00 |
| 12-Aug-93 | A-8 | 12.41 | 37.23 | 24.82 | 0.00 |
| 14-Sep-92 | A-9 | 16.12 | 38.71 | 22.59 | 0.00 |
| 12-Nov-92 | A-9 | 16.29 | 38.71 | 22.42 | 0.00 |
| 11-Feb-93 | A-9 | 12.31 | 38.71 | 26.40 | 0.00 |
| 14-Apr-93 | A-9 | 12.01 | 38.71 | 26.70 | 0.00 |

TABLE 2

HISTORICAL WATER-LEVEL DATA
ARCO Station 5387
San Lorenzo, California

| MONITORING DATE | WELL NUMBER | DEPTH TO WATER (FT) | WELL ELEVATION (FT) | STATIC WATER ELEVATION (FT) | FLOATING PRODUCT THICKNESS (FT) |
|---|---|---|---|---|---|
| 12-Aug-93 | A-9 | 13.90 | 38.71 | 24.81 | 0.00 |
| 07-Dec-92 | A-10 | 16.81 | 38.94 | 22.13 | 0.00 |
| 11-Feb-93 | A-10 | 13.15 | 38.94 | 25.79 | 0.00 |
| 14-Apr-93 | A-10 | 12.93 | 38.94 | 26.01 | 0.00 |
| 12-Aug-93 | A-10 | 14.87 | 38.94 | 24.07 | 0.00 |
| 14-Sep-92 | AR-1 | 15.21 | 38.11 | 22.90 | 0.00 |
| 12-Nov-92 | AR-1 | 15.36 | 38.11 | 22.75 | 0.00 |
| 11-Feb-93 | AR-1 | 12.81 | 38.11 | 25.30 | 0.00 |
| 14-Apr-93 | AR-1 | 11.77 | 38.11 | 26.34 | 0.00 |
| 12-Aug-93 | AR-1 | 13.55 | 38.11 | 24.56 | 0.00 |
| 30-Mar-93 | AR-2 | 11.53 | 38.39 | 26.86 | 0.00 |
| 14-Apr-93 | AR-2 | 11.87 | 38.39 | 26.52 | 0.00 |
| 12-Aug-93 | AR-2 | 13.59 | 38.39 | 24.80 | 0.00 |

Notes:
1. Static water elevations referenced to Mean Sea Level (MSL).
2. Well elevations and depth-to-water measurements are measured from the top of the well box.

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 5387
San Lorenzo, California

| SAMPLE DATE | SAMPLE POINT | TPH-G (PPB) | BENZENE (PPB) | TOLUENE (PPB) | ETHYLBENZENE (PPB) | XYLENES (PPB) |
|---|---|---|---|---|---|---|
| 08-Aug-86 | MW-1 | 7040 | 132 | 8.7 | 439 | 230 |
| 24-Dec-91 | MW-1 | 2200 | 190 | 8.5 | 6.9 | 2.6 |
| 10-Mar-92 | MW-1 | 2800 | 270 | 29 | 56 | 39 |
| 09-Jun-92 | MW-1 | 2900 | 960 | 27 | 99 | 63 |
| 14-Sep-92 | MW-1 | 2600 | 450 | <5.0 | 45 | 21 |
| 12-Nov-92 | MW-1 | 1600 | 310 | 7.2 | 22 | 8.9 |
| 11-Feb-93 | MW-1 | 4000 | 510 | 47 | 200 | 91 |
| 14-Apr-93 | MW-1 | 1700 | 260 | 20 | 100 | 70 |
| 12-Aug-93 | MW-1 | 830 | 60 | 3.8 | 39 | 3.6 |
| 08-Aug-86 | MW-2 | 1910 | 20.1 | 2.8 | 1.8 | — |
| 24-Dec-91 | MW-2 | 23000 | 1500 | 1100 | 480 | 1400 |
| 10-Mar-92 | MW-2 | 210000 | 44000 | 3900 | 1700 | 5800 |
| 09-Jun-92 | MW-2 | 33000 | 2300 | 370 | 780 | 2600 |
| 14-Sep-92 | MW-2 | 16000 | 3700 | 100 | 470 | 1000 |
| 12-Nov-92 | MW-2 | 16000 | 3800 | 86 | 470 | 910 |
| 11-Feb-93 | MW-2 | 27000 | 3500 | 720 | 1600 | 3800 |
| 14-Apr-93 | MW-2 | 27000 | 3500 | 220 | 2200 | 5100 |
| 12-Aug-93 | MW-2 | 16000 | 1600 | 27 | 1300 | 1200 |
| 08-Aug-86 | MW-3 | 7450 | 510 | 549 | 409 | 1380 |
| 24-Dec-91 | MW-3 | 6800 | 450 | 10 | 610 | 45 |
| 10-Mar-92 | MW-3 | 11000 | 2500 | 75 | 400 | 560 |
| 09-Jun-92 | MW-3 | 16000 | 2000 | 69 | 1300 | 2600 |
| 14-Sep-92 | MW-3 | 14000 | 630 | <50 | 1500 | 2400 |
| 12-Nov-92 | MW-3 | 7400 | 400 | <25 | 860 | 330 |
| 11-Feb-93 | MW-3 | 8600 | 580 | <20 | 710 | 300 |
| 14-Apr-93 | MW-3 | 6900 | 300 | 8.8 | 580 | 99 |
| 12-Aug-93 | MW-3 | 3400 | 56 | <5 | 190 | <5 |
| 24-Dec-91 | A-4 | 1900 | 29 | 1.9 | 25 | 29 |
| 10-Mar-92 | A-4 | 7400 | 37 | <0.60 | 11 | 73 |
| 09-Jun-92 | A-4 | 4500 | 3.2 | 1.5 | 37 | 16 |
| 14-Sep-92 | A-4 | 1300 | <2.5 | 2.5 | 61 | 6.8 |
| 12-Nov-92 | A-4 | 610 | 7.2 | 0.98 | 34 | 0.97 |
| 11-Feb-93 | A-4 | 740 | 2.4 | <0.50 | 5.0 | 3.5 |
| 14-Apr-93 | A-4 | 380 | <0.50 | <0.50 | 10 | 1.6 |

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 5387
San Lorenzo, California

| SAMPLE DATE | SAMPLE POINT | TPH-G (PPB) | BENZENE (PPB) | TOLUENE (PPB) | ETHYLBENZENE (PPB) | XYLENES (PPB) |
|---|---|---|---|---|---|---|
| 12-Aug-93 | A-4 | 1200 | 0.93 | <0.50 | 0.91 | <0.50 |
| 24-Dec-91 | A-5 | 1600 | 35 | <0.30 | 32 | 52 |
| 10-Mar-92 | A-5 | 1000 | 21 | <1.5 | 43 | 100 |
| 09-Jun-92 | A-5 | 680 | 1.6 | <0.30 | 14 | 16 |
| 14-Sep-92 | A-5 | 770 | 34 | <2.5 | 51 | 65 |
| 12-Nov-92 | A-5 | 520 | 12 | 0.96 | 29 | 36 |
| 11-Feb-93 | A-5 | 150 | 3.0 | <0.50 | 5.1 | 1.5 |
| 14-Apr-93 | A-5 | 190 | 1.6 | <0.50 | 1.5 | 0.97 |
| 12-Aug-93 | A-5 | 230 | 5.4 | <0.50 | 5.3 | 0.94 |
| 24-Dec-91 | A-6 | <30 | <0.30 | <0.30 | <0.30 | <0.30 |
| 10-Mar-92 | A-6 | <30 | <0.30 | <0.30 | <0.30 | <0.30 |
| 09-Jun-92 | A-6 | <30 | <0.30 | <0.30 | <0.30 | <0.30 |
| 14-Sep-92 | A-6 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 12-Nov-92 | A-6 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 11-Feb-93 | A-6 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 14-Apr-93 | A-6 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 12-Aug-93 | A-6 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 24-Dec-91 | A-7 | 10000 | 88 | 16 | 170 | 610 |
| 10-Mar-92 | A-7 | 320 | 9.3 | 0.54 | 8.8 | 34 |
| 09-Jun-92 | A-7 | 340 | 11 | 1.1 | 8.9 | 26 |
| 14-Sep-92 | A-7 | 510 | 12 | <2.0 | 30 | 51 |
| 12-Nov-92 | A-7 | 760 | 17 | 0.83 | 50 | 73 |
| 11-Feb-93 | A-7 | 260 | 20 | 1.0 | 11 | 21 |
| 14-Apr-93 | A-7 | 1300 | 89 | 2.1 | 48 | 87 |
| 12-Aug-93 | A-7 | 360 | 9.0 | <0.50 | 13 | 9.0 |
| 14-Sep-92 | A-8 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 12-Nov-92 | A-8 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 11-Feb-93 | A-8 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 14-Apr-93 | A-8 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 12-Aug-93 | A-8 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 14-Sep-92 | A-9 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 12-Nov-92 | A-9 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 11-Feb-93 | A-9 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 14-Apr-93 | A-9 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |

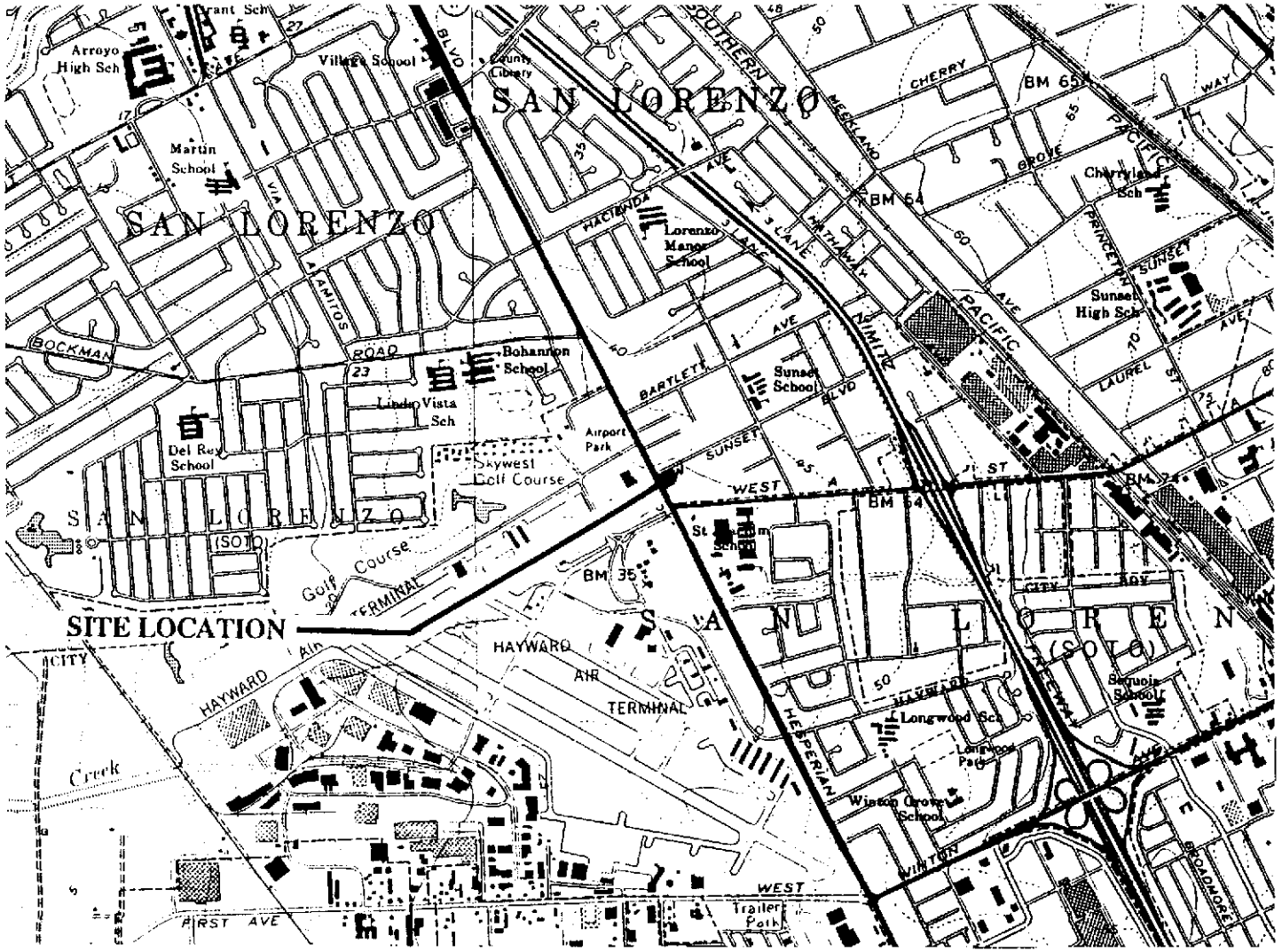
TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 5387
San Lorenzo, California

| SAMPLE DATE | SAMPLE POINT | TPH-G (PPB) | BENZENE (PPB) | TOLUENE (PPB) | ETHYLBENZENE (PPB) | XYLENES (PPB) |
|---|---|---|---|---|---|---|
| 12-Aug-93 | A-9 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 07-Dec-92 | A-10 | 660 | 30 | <2.5 | <2.5 | <2.5 |
| 11-Feb-93 | A-10 | 210 | <0.50 | 0.97 | <0.50 | <0.50 |
| 14-Apr-93 | A-10 | 770 | <0.50 | 3.0 | 0.76 | 1.9 |
| 12-Aug-93 | A-10 | 390 | <0.50 | <0.50 | <0.50 | 0.84 |
| 14-Sep-92 | AR-1 | 820 | 67 | <1.0 | 8.8 | 6.7 |
| 12-Nov-92 | AR-1 | 140 | 66 | <0.50 | 4.3 | 3.7 |
| 11-Feb-93 | AR-1 | 360 | 190 | <2.5 | 8.6 | <2.5 |
| 14-Apr-93 | AR-1 | 420 | 240 | 5.2 | 30 | 8.7 |
| 12-Aug-93 | AR-1 | 370 | 150 | <2 | 11 | <2 |
| 30-Mar-93 | AR-2 | 390 | 4.1 | 1.6 | <0.50 | 47 |
| 14-Apr-93 | AR-2 | 310 | 18 | <0.50 | 0.67 | 36 |
| 12-Aug-93 | AR-2 | 130 | 16 | <0.50 | 1.7 | 0.57 |

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
PPB = Parts Per Billion.

Note: All data shown as <x are reported as ND (none detected).



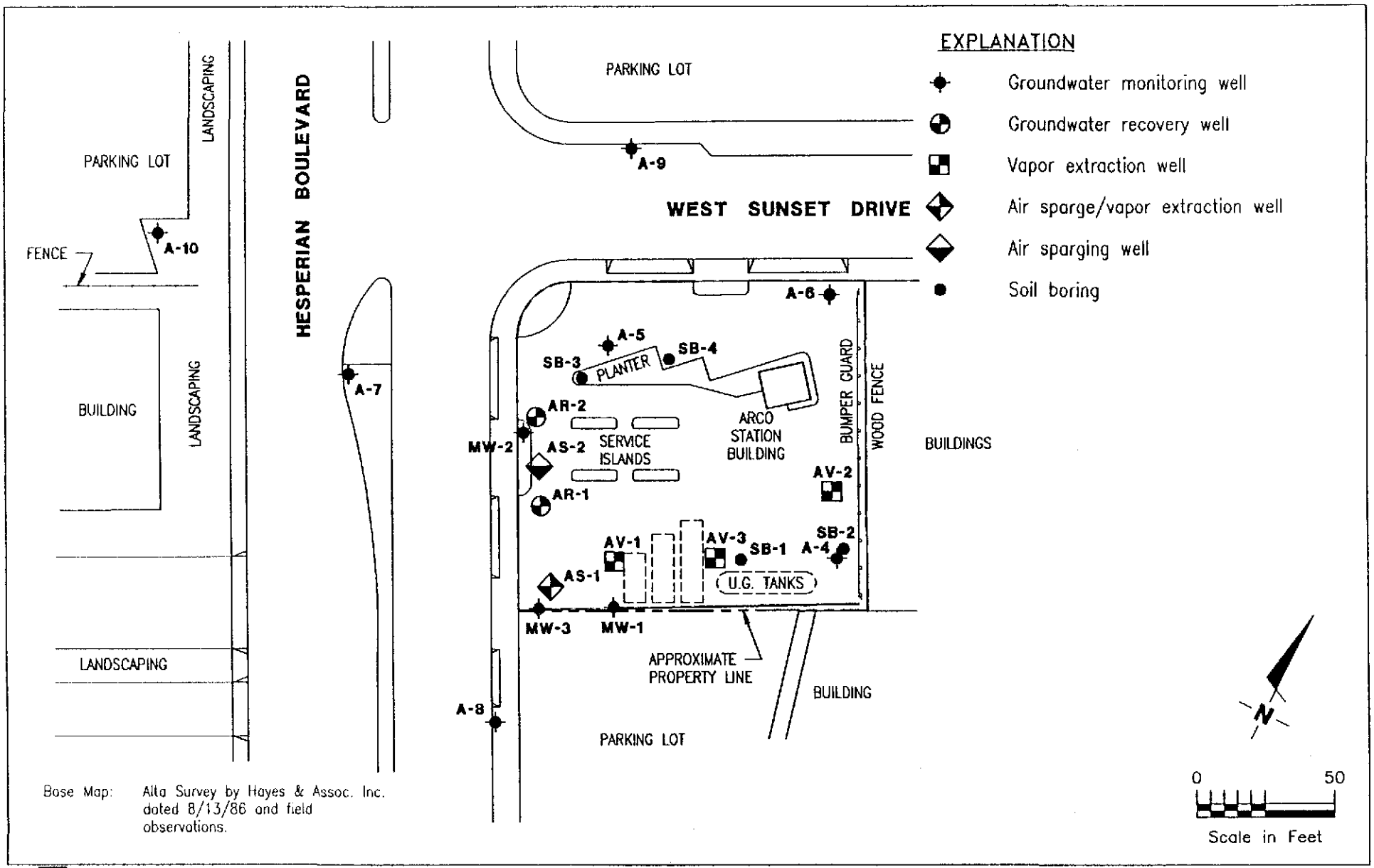

Base Map: USGS Topographic Map

GeoStrategies Inc.

VICINITY MAP
ARCO Service Station #5387
20200 Hesperian Boulevard
San Lorenzo, California

PLATE
1

| JOB NUMBER | REVIEWED BY | DATE | REVISED DATE |
|---|---|---|---|
| 7926 | | 11/91 | |



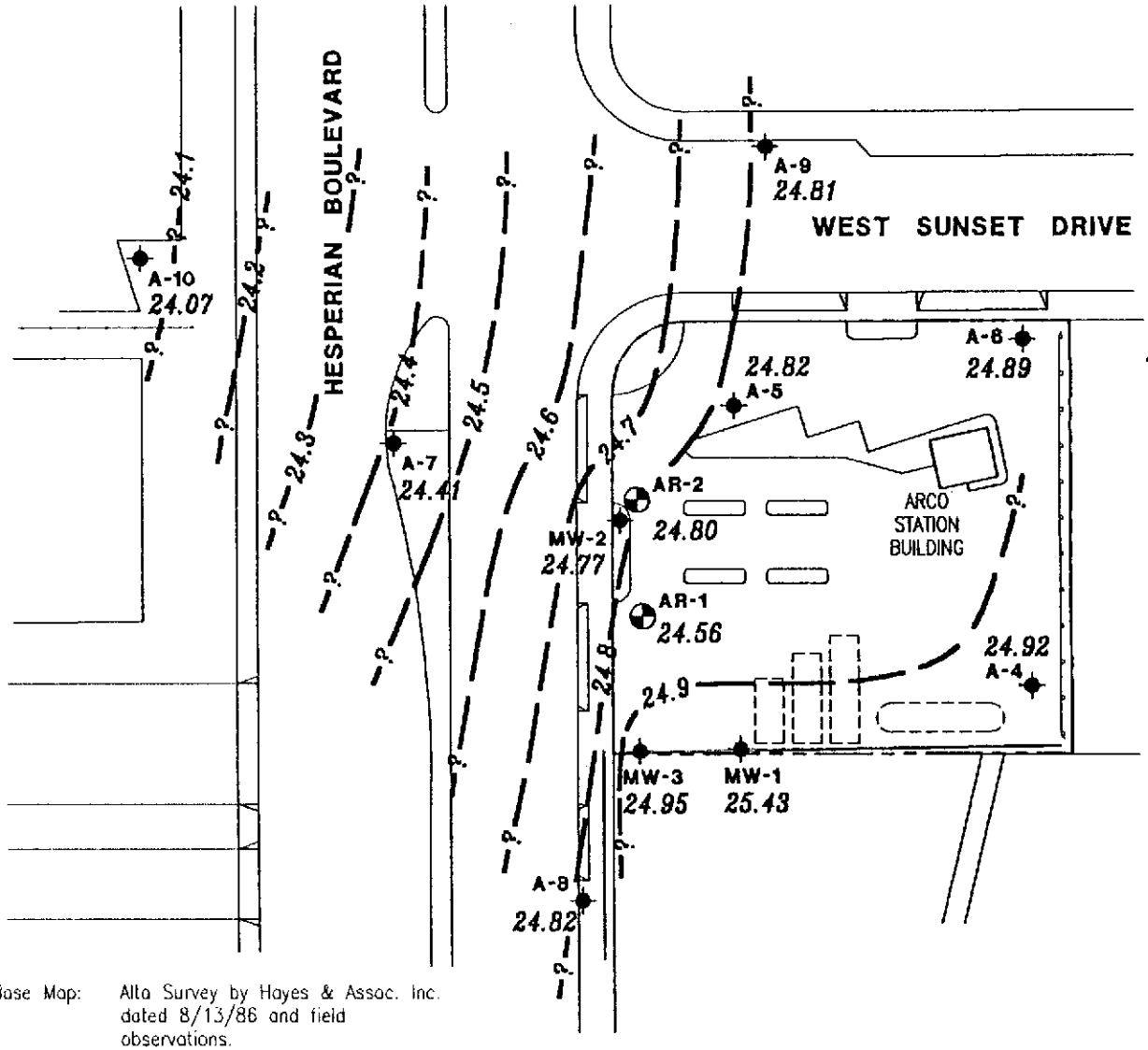

Base Map: Alta Survey by Hayes & Assoc. Inc. dated 8/13/86 and field observations.

GeoStrategies Inc.

SITE PLAN
ARCO Service Station #5387
20200 Hesperian Boulevard
San Lorenzo, California

PLATE 2

| JOB NUMBER | REVIEWED BY | DATE | REVISED DATE |
|---|---|---|---|
| 7926 | BS | 7/93 | |




## EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- 99.99 Groundwater elevation in feet referenced to Mean Sea Level (MSL) measured on August 12, 1993
- Groundwater elevation contour. Approximate Gradient = 0.004

NOTES:
1. Contours may be influenced by irrigation practices and/or site construction activities.
2. Wells AR-1 and MW-1 appear to be anomalous and were not used in contouring.

Base Map: Alta Survey by Hayes & Assoc. Inc. dated 8/13/86 and field observations.

N

0 50

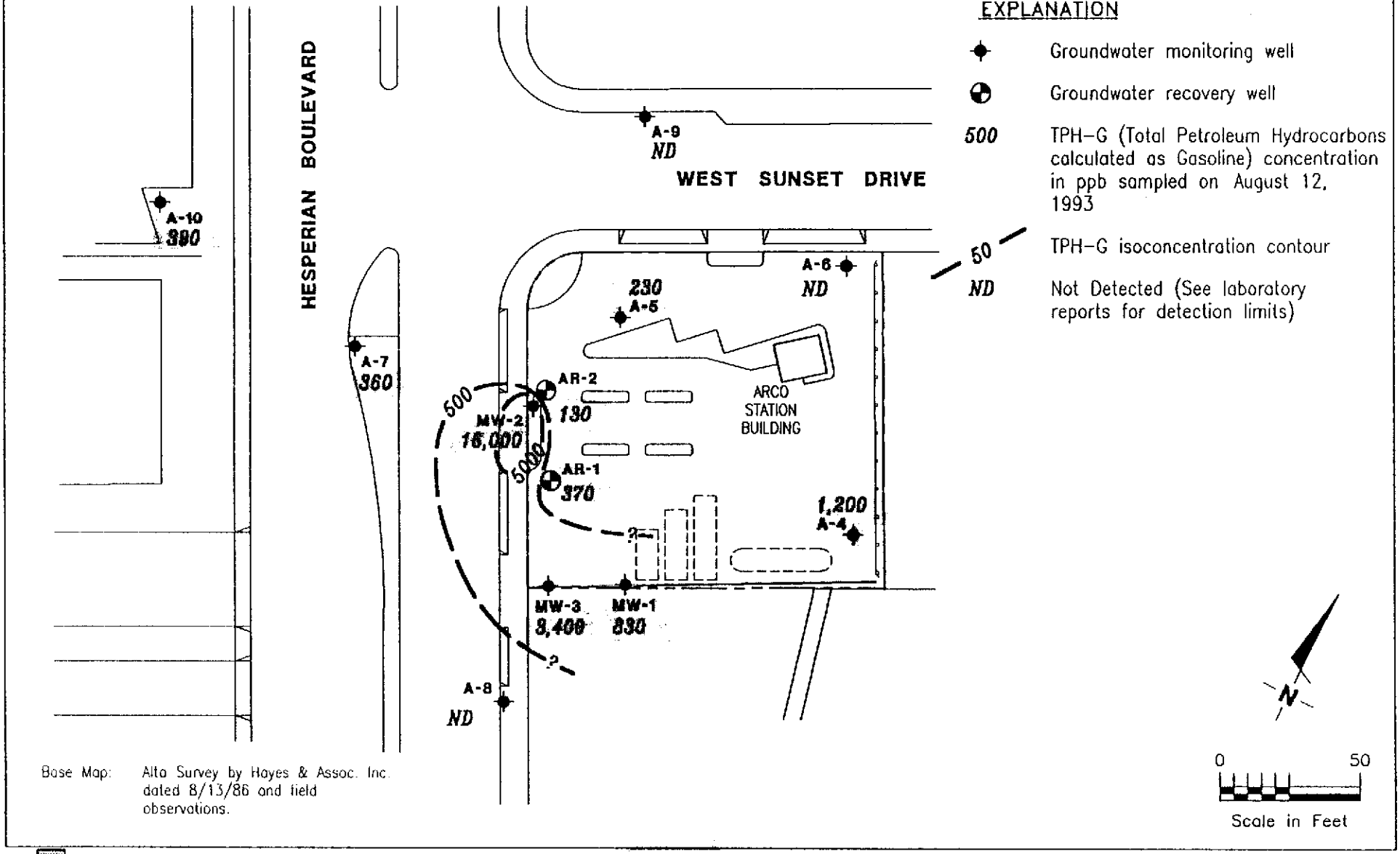
Scale in Feet

GeoStrategies Inc.

**POTENTIOMETRIC MAP**
ARCO Service Station #5387
20200 Hesperian Boulevard
San Lorenzo, California

PLATE **3**

| JOB NUMBER | REVIEWED BY | DATE | REVISED DATE |
|---|---|---|---|
| 792601-16 | | 9/93 | |



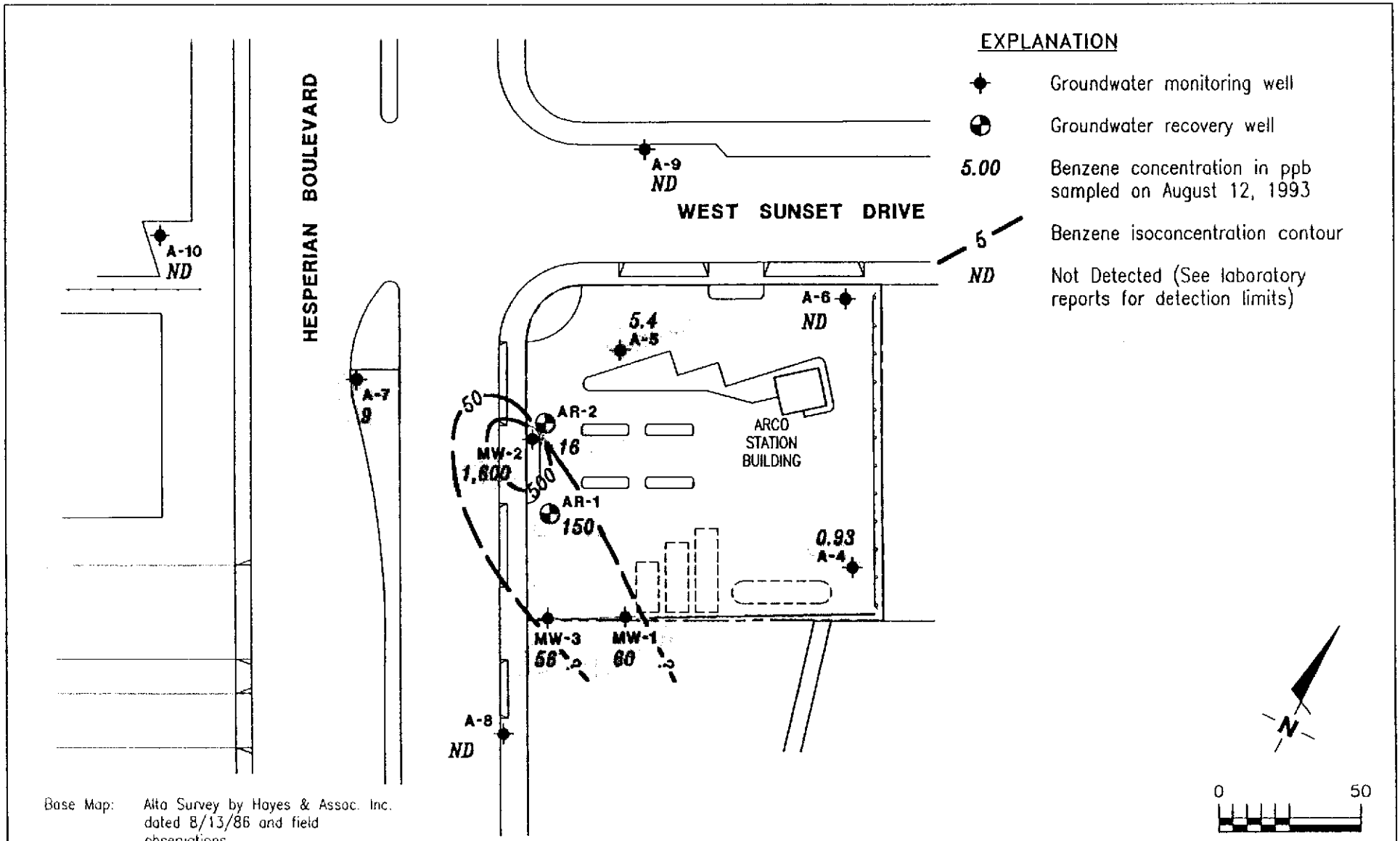

Base Map: Alta Survey by Hayes & Assoc. Inc. dated 8/13/86 and field observations.

GeoStrategies Inc.

**TPH-G ISOCONCENTRATION MAP**
ARCO Service Station #5387
20200 Hesperian Boulevard
San Lorenzo, California

PLATE
**4**

| JOB NUMBER | REVIEWED BY | DATE | REVISED DATE |
|---|---|---|---|
| 792601-16 | | 9/93 | |




Base Map: Alta Survey by Hayes & Assoc. Inc. dated 8/13/86 and field observations.

GeoStrategies Inc.

**BENZENE** ISOCONCENTRATION MAP
ARCO Service Station #5387
20200 Hesperian Boulevard
San Lorenzo, California

PLATE
5

| JOB NUMBER | REVIEWED BY | DATE | REVISED DATE |
|---|---|---|---|
| 792601-16 | | 9/93 | |

emcon Associates
1938 Junction Avenue • San Jose, California 95131-2102 • (408) 453-0719 • Fax (408) 453-0452

AUG 1993

GeoStrategies Inc

Date August 26, 1993
Project 0G70-034.01

To:
Mr. John Vargas
GeoStrategies Inc.
2140 West Winton Avenue
Hayward, California 94545

We are enclosing:

| Copies | Description |
|---|---|
| 1 | Depth To Water / Floating Product Survey Results |
| 1 | Summary of Groundwater Monitoring Data |
| 1 | Certified Analytical Reports with Chain-of-Custody |
| 12 | Water Sample Field Data Sheets |

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the third quarter 1993 monitoring event at ARCO service station 5387, 20200 Hesperian Boulevard, San Lorenzo, CA. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions: (408) 453-2266.

Jim Butera JB

Reviewed by:

Robert Porter, Senior Project Engineer.

## FIELD REPORT
## DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-034.01 STATION ADDRESS : 20200 Hesperian Blvd., Hayward DATE : August 12, 1993

ARCO STATION # : 5387 FIELD TECHNICIAN : Steve Horton / Ian Graham DAY : Thursday

| DTW Order | WELL ID | Well Box Seal | Well Lid Secure | Gasket | Lock | Locking Well Cap | FIRST DEPTH TO WATER (feet) | SECOND DEPTH TO WATER (feet) | DEPTH TO FLOATING PRODUCT (feet) | FLOATING PRODUCT THICKNESS (feet) | WELL TOTAL DEPTH (feet) | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A-8 | good | yes | G-5 | 2268 | yes | 12.41 | 12.41 | ND | ND | 34.9 | – |
| 2 | A-9 | good | yes | G-5 | 2268 | yes | 13.90 | 13.90 | ND | ND | 34.0 | – |
| 3 | A-6 | bad | yes | 15/16" | 2268 | yes | 14.18 | 14.18 | ND | ND | 34.8 | grout needed around cap |
| 4 | A-5 | good | yes | 15/16" | 2268 | yes | 14.12 | 14.12 | ND | ND | 30.0 | water in box |
| 5 | AR-2 | good | yes | 15/16" | 2268 | yes | 13.59 | 13.59 | ND | ND | 35.4 | – |
| 6 | A-4 | good | yes | 15/16" | 2268 | yes | 14.94 | 14.94 | ND | ND | 35.0 | – |
| 7 | AR-1 | good | yes | 15/16" | 2268 | yes | 13.55 | 13.55 | ND | ND | 34.8 | – |
| 8 | A-10 | good | yes | 15/16" | 2268 | yes | 14.87 | 14.87 | ND | ND | 34.4 | – |
| 9 | A-7 | good | yes | G-5 | 2268 | yes | 15.54 | 15.54 | ND | ND | 35.5 | – |
| 10 | MW-1 | good | yes | G-5 | 2268 | yes | 12.93 | 12.93 | ND | ND | 28.3 | – |
| 11 | MW-3 | good | yes | G-5 | 2268 | yes | 12.82 | 12.82 | ND | ND | 29.1 | water in box / soft bottom |
| 12 | MW-2 | good | yes | G-5 | 2268 | yes | 13.81 | 13.81 | ND | ND | 27.2 | soft bottom |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

**SURVEY POINTS ARE TOP OF WELL BOXES**

Summary of Groundwater Monitoring Data
Third Quarter 1993
ARCO Service Station 5387
20200 Hesperian Boulevard, San Lorenzo, California
micrograms per liter (µg/l) or parts per billion (ppb)

| Well ID and Sample Depth | Sampling Date | Depth To Water (feet) | Floating Product Thickness (feet) | TPH[1] as Gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Total Xylenes (ppb) |
|---|---|---|---|---|---|---|---|---|
| MW-1(28) | 08/12/93 | 12.93 | ND.[2] | 830. | 60. | 3.8 | 39. | 3.6 |
| MW-2(26) | 08/12/93 | 13.81 | ND. | 16,000. | 1,600. | 27. | 1,300. | 1,200. |
| MW-3(28) | 08/12/93 | 12.82 | ND. | 3,400. | 56. | <5. | 190. | <5. |
| A-4(34) | 08/12/93 | 14.94 | ND. | 1,200. | 0.93 | <0.5 | 0.91 | <0.5 |
| A-5(29) | 08/12/93 | 14.12 | ND. | 230. | 5.4 | <0.5 | 5.3 | 0.94 |
| A-6(34) | 08/12/93 | 14.18 | ND. | <50. | <0.5 | <0.5 | <0.5 | <0.5 |
| A-7(35) | 08/12/93 | 15.54 | ND. | 360. | 9.0 | <0.5 | 13. | 9.0 |
| A-8(34) | 08/12/93 | 12.41 | ND. | <50. | <0.5 | <0.5 | <0.5 | <0.5 |
| A-9(33) | 08/12/93 | 13.90 | ND. | <50. | <0.5 | <0.5 | <0.5 | <0.5 |
| A-10(34) | 08/12/93 | 14.87 | ND. | 390. | <0.5 | <0.5 | <0.5 | 0.84 |
| AR-1(25) | 08/12/93 | 13.55 | ND. | 370. | 150. | <2. | 11. | <2. |
| AR-2(25) | 08/12/93 | 13.59 | ND. | 130. | 16. | <0.5 | 1.7 | 0.57 |
| X-Dup-1 | 08/12/93 | NA.[3] | NA. | 21,000. | 1,500. | 37. | 1,300. | 1,200. |
| TB-1[4] | 08/12/93 | NA. | NA. | <50. | <0.5 | <0.5 | <0.5 | <0.5 |

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. NA. = Not applicable
4. TB. = Trip blank

# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233


Emcom Associates
1938 Junction Avenue
San Jose, CA 95131
Attention: Jim Butera

Project: EMC-93-5/Arco 5387, Hayward

Enclosed are the results from 14 water samples received at Sequoia Analytical on August 13,1993. The requested analyses are listed below:

| SAMPLE # | SAMPLE DESCRIPTION | DATE OF COLLECTION | TEST METHOD |
|---|---|---|---|
| 3H76801 | Water, MW-1 (28) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76802 | Water, MW-2 (26) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76803 | Water, MW-3 (28) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76804 | Water, A-4 (34) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76805 | Water, A-5 (29) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76806 | Water, A-6 (34) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76807 | Water, A-7 (35) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76808 | Water, A-8 (34) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76809 | Water, A-9 (33) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76810 | Water, A-10 (34) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76811 | Water, AR-1 (25) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76812 | Water, AR-2 (25) | 8/12/93 | EPA 5030/8015/8020 |
| 3H76813 | Water, XDUP-1 | 8/12/93 | EPA 5030/8015/8020 |
| 3H76814 | Water, TB-1 | 8/12/93 | EPA 5030/8015/8020 |

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233


| | | | | |
|---|---|---|---|---|
| Emcon Associates | Client Project ID: | EMC-93-5/Arco 5387, Hayward | Sampled: | Aug 12, 1993 |
| 1938 Junction Avenue | Sample Matrix: | Water | Received: | Aug 13, 1993 |
| San Jose, CA 95131 | Analysis Method: | EPA 5030/8015/8020 | Reported: | Aug 25, 1993 |
| Attention: Jim Butera | First Sample #: | 3H76801 | | |

## TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

| Analyte | Reporting Limit µg/L | Sample I.D. 3H76801 MW-1 (28) | Sample I.D. 3H76802 MW-2 (26) | Sample I.D. 3H76803 MW-3 (28) | Sample I.D. 3H76804 A-4 (34) | Sample I.D. 3H76805 A-5 (29) | Sample I.D. 3H76806 A-6 (34) |
|---|---|---|---|---|---|---|---|
| Purgeable Hydrocarbons | 50 | 830 | 16,000 | 3,400 | 1,200 | 230 | N.D. |
| Benzene | 0.50 | 60 | 1,600 | 56 | 0.93 | 5.4 | N.D. |
| Toluene | 0.50 | 3.8 | 27 | N.D. | N.D. | N.D. | N.D. |
| Ethyl Benzene | 0.50 | 39 | 1,300 | 190 | 0.91 | 5.3 | N.D. |
| Total Xylenes | 0.50 | 3.6 | 1,200 | N.D. | N.D. | 0.94 | N.D. |
| Chromatogram Pattern: | | Gas | Gas | Gas | Gas | Gas | -- |

**Quality Control Data**

| | | | | | | |
|---|---|---|---|---|---|---|
| Report Limit Multiplication Factor: | 2.0 | 50 | 10 | 1.0 | 1.0 | 1.0 |
| Date Analyzed: | 8/19/93 | 8/19/93 | 8/19/93 | 8/19/93 | 8/19/93 | 8/19/93 |
| Instrument Identification: | GCHP-3 | GCHP-3 | GCHP-3 | GCHP-3 | GCHP-3 | GCHP-3 |
| Surrogate Recovery, %: (QC Limits = 70-130%) | 108 | 121 | 120 | 112 | 107 | 105 |

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233


| | | | | |
|---|---|---|---|---|
| Emcon Associates | Client Project ID: | EMC-93-5/Arco 5387, Hayward | Sampled: | Aug 12, 1993 |
| 1938 Junction Avenue | Sample Matrix: | Water | Received: | Aug 13, 1993 |
| San Jose, CA 95131 | Analysis Method: | EPA 5030/8015/8020 | Reported: | Aug 25, 1993 |
| Attention: Jim Butera | First Sample #: | 3H76807 | | |

## TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

| Analyte | Reporting Limit µg/L | Sample I.D. 3H76807 A-7 (35) | Sample I.D. 3H76808 A-8 (34) | Sample I.D. 3H76809 A-9 (33) | Sample I.D. 3H76810 A-10 (34) | Sample I.D. 3H76811 AR-1 (25) | Sample I.D. 3H76812 AR-2 (25) |
|---|---|---|---|---|---|---|---|
| Purgeable Hydrocarbons | 50 | 360 | N.D. | N.D. | 390 | 370 | 130 |
| Benzene | 0.50 | 9.0 | N.D. | N.D. | N.D. | 150 | 16 |
| Toluene | 0.50 | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. |
| Ethyl Benzene | 0.50 | 13 | N.D. | N.D. | N.D. | 11 | 1.7 |
| Total Xylenes | 0.50 | 9.0 | N.D. | N.D. | 0.84 | N.D. | 0.57 |
| Chromatogram Pattern: | | Gas | -- | -- | Gas | Discrete Peaks | Gas |

**Quality Control Data**

| | | | | | | |
|---|---|---|---|---|---|---|
| Report Limit Multiplication Factor: | 1.0 | 1.0 | 1.0 | 1.0 | 4.0 | 1.0 |
| Date Analyzed: | 8/19/93 | 8/19/93 | 8/19/93 | 8/19/93 | 8/19/93 | 8/19/93 |
| Instrument Identification: | GCHP-3 | GCHP-3 | GCHP-3 | GCHP-3 | GCHP-3 | GCHP-3 |
| Surrogate Recovery, %: (QC Limits = 70-130%) | 105 | 94 | 87 | 85 | 106 | 115 |

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233


| | | | | |
|---|---|---|---|---|
| Emcon Associates | Client Project ID: | EMC-93-5/Arco 5387, Hayward | Sampled: | Aug 12, 1993 |
| 1938 Junction Avenue | Sample Matrix: | Water | Received: | Aug 13, 1993 |
| San Jose, CA 95131 | Analysis Method: | EPA 5030/8015/8020 | Reported: | Aug 25, 1993 |
| Attention: Jim Butera | First Sample #: | 3H76813 | | |

## TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

| Analyte | Reporting Limit µg/L | Sample I.D. 3H76813 XDUP-1 | Sample I.D. 3H76814 TB-1 |
|---|---|---|---|
| Purgeable Hydrocarbons | 50 | 21,000 | N.D. |
| Benzene | 0.50 | 1,500 | N.D. |
| Toluene | 0.50 | 37 | N.D. |
| Ethyl Benzene | 0.50 | 1,300 | N.D. |
| Total Xylenes | 0.50 | 1,200 | N.D. |
| Chromatogram Pattern: | | Gas | -- |

**Quality Control Data**

| | | |
|---|---|---|
| Report Limit Multiplication Factor: | 50 | 1.0 |
| Date Analyzed: | 8/19/93 | 8/19/93 |
| Instrument Identification: | GCHP-3 | GCHP-3 |
| Surrogate Recovery, %: (QC Limits = 70-130%) | 99 | 102 |

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233


| | | |
|---|---|---|
| Emcon Associates | Client Project ID: | EMC-93-5/Arco 5387, Hayward |
| 1938 Junction Avenue | Matrix: | Water |
| San Jose, CA 95131 | | |
| Attention: Jim Butera | QC Sample Group: 3H76801-14 | Reported: Aug 25, 1993 |

## QUALITY CONTROL DATA REPORT

| ANALYTE | Benzene | Toluene | Ethyl-Benzene | Xylenes |
|---|---|---|---|---|
| **Method:** | EPA 8020 | EPA 8020 | EPA 8020 | EPA 8020 |
| **Analyst:** | M. Nipp | M. Nipp | M. Nipp | M. Nipp |
| **Conc. Spiked:** | 10 | 10 | 10 | 30 |
| **Units:** | µg/L | µg/L | µg/L | µg/L |
| **LCS Batch#:** | GBLK081993 | GBLK081993 | GBLK081993 | GBLK081993 |
| **Date Prepared:** | N.A. | N.A. | N.A. | N.A. |
| **Date Analyzed:** | 8/19/93 | 8/19/93 | 8/19/93 | 8/19/93 |
| **Instrument I.D.#:** | GCHP-3 | GCHP-3 | GCHP-3 | GCHP-3 |
| **LCS % Recovery:** | 96 | 96 | 98 | 97 |
| **Control Limits:** | 80-120 | 80-120 | 80-120 | 80-120 |
| **MS/MSD Batch #:** | 3H67202 | 3H67202 | 3H67202 | 3H67202 |
| **Date Prepared:** | N.A. | N.A. | N.A. | N.A. |
| **Date Analyzed:** | 8/19/93 | 8/19/93 | 8/19/93 | 8/19/93 |
| **Instrument I.D.#:** | GCHP-3 | GCHP-3 | GCHP-3 | GCHP-3 |
| **Matrix Spike % Recovery:** | 98 | 99 | 100 | 100 |
| **Matrix Spike Duplicate % Recovery:** | 96 | 95 | 97 | 97 |
| **Relative % Difference:** | 2.1 | 4.1 | 3.0 | 3.0 |

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

**ARCO Products Company**
Division of AtlanticRichfieldCompany

**Chain of Custody**

Task Order No. EMC-93-5

| | | | |
|---|---|---|---|
| ARCO Facility no. 5387 | City (Facility) HAYWARD | Project manager (Consultant) JIM BUTERA | Laboratory name SEQUOIA |
| ARCO engineer Kyle Christie | Telephone no. (ARCO) 571-2434 | Telephone no. (Consultant) 453-0719 | Fax no. (Consultant) 453-0452 |
| Consultant name EMCON | Address (Consultant) 1938 Junction Avenue San Jose | | Contract number |

Method of shipment: courier will pick up

| | Sample I.D. | Lab no. | Container no. | Matrix: Soil | Matrix: Water | Matrix: Other | Preservation: Ice | Preservation: Acid | Sampling date | Sampling time | BTEX 602/EPA 8020 | BTEX/TPH EPA M602/8020/8015 | TPH Modified 8015 Gas / Diesel | Oil and Grease 413.1 / 413.2 | TPH EPA 418.1/SM503E | EPA 601/8010 | EPA 624/8240 | EPA 625/8270 | TCLP Metals / Semi VOA / VOA | CAM Metals EPA 6010/7000 TTLC / STLC | Lead Org./DHS / Lead EPA 7420/7421 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MW-1 (28) | | 2 | | X | | X | HCl | 8/12/93 | 14:10 | | X | | | | | 9308768 | | | | |
| 2 | MW-2 (26) | | 2 | | | | | | 8/12/93 | 14:40 | | X | | | | | | | | | |
| 3 | MW-3 (28) | | 2 | | | | | | 8/12/93 | 14:22 | | X | | | | | | | | | |
| 4 | A-4 (34) | | 2 | | | | | | 8/12/93 | 13:02 | | X | | | | | | | | | |
| 5 | A-5 (29) | | 2 | | | | | | 8/12/93 | 11:40 | | X | | | | | | | | | |
| 6 | A-6 (34) | | 2 | | | | | | 8/12/93 | 11:13 | | X | | | | | | | | | |
| 7 | A-7 (35) | | 2 | | | | | | 8/12/93 | 13:40 | | X | | | | | | | | | |
| 8 | A-8 (34) | | 2 | | | | | | 8/12/93 | 10:32 | | X | | | | | | | | | |
| 9 | A-9 (33) | | 2 | | | | | | 8/12/93 | 10:48 | | X | | | | | | | | | |
| 10 | A-10 (34) | | 2 | | | | | | 8/12/93 | 13:21 | | X | | | | | | | | | |
| 11 | MW-1 (25) | | 2 | | | | | | 8/12/93 | 12:36 | | X | | | | | | | | | |
| 12 | MW-2 (25) | | 2 | | | | | | 8/12/93 | 12:16 | | X | | | | | | | | | |
| 13 | XDUP-1 | | 2 | | | | | | | | | X | | | | | | | | | |
| 14 | TB-1 | | 2 | | | | | | | | | X | | | | | | | | | |

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40 ml HCl VOA's (SEQUOIA BOTTLES)

Lab number

Turnaround time

- Priority Rush 1 Business Day
- Rush 2 Business Days
- Expedited 5 Business Days
- Standard 10 Business Days X

Condition of sample:

Temperature received:

| | Date | Time |
|---|---|---|
| Relinquished by sampler | 8/12/93 | 16:00 |
| Relinquished by: Lisa Stenstrom | 8/13/93 | 1440 |
| Relinquished by | | |

| | Date | Time |
|---|---|---|
| Received by: Lisa Stenstrom | | 1410 8/13/93 |
| Received by | | |
| Received by laboratory | 9-13-93 | 1440 |

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

# WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: MW-1 (28)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 X 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

| | | | |
|---|---|---|---|
| CASING ELEVATION (feet/MSL): | NR | VOLUME IN CASING (gal.): | 2.51 |
| DEPTH TO WATER (feet): | 12.93 | CALCULATED PURGE (gal.): | 7.53 |
| DEPTH OF WELL (feet): | 28.3 | ACTUAL PURGE VOL. (gal.): | 8.0 |

DATE PURGED: 8-12-93 Start (2400 Hr) 14:02 End (2400 Hr) 14:05

DATE SAMPLED: 8-12-93 Start (2400 Hr) 14:10 End (2400 Hr) 14:11

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 14:04 | 3.0 | 7.27 | 1149 | 72.0 | Brown | Heavy |
| 14:06 | 5.5 | 7.12 | 1147 | 70.9 | Brown | Heavy |
| 14:08 | 8.0 | 7.03 | 1150 | 71.0 | Brown | Heavy |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: Strong NR (COBALT 0 - 100) NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ____ 2" Bladder Pump | ____ Bailer (Teflon®) | ____ 2" Bladder Pump | X Bailer (Teflon®) |
| ____ Centrifugal Pump | X Bailer (PVC) | ____ DDL Sampler | ____ Bailer (Stainless Steel) |
| ____ Submersible Pump | ____ Bailer (Stainless Steel) | ____ Dipper | ____ Submersible Pump |
| ____ Well Wizard™ | ____ Dedicated | ____ Well Wizard™ | ____ Dedicated |
| Other: ____ | | Other: ____ | |

WELL INTEGRITY: Good LOCK #: 2269

REMARKS: ____

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9209 Temperature °F: ____

( EC 1000 ____ / ____ ) ( DI ____ ) ( pH 7 ____ / ____ ) ( pH 10 ____ / ____ ) ( pH 4 ____ / ____ )

Location of previous calibration: A-8 (34)

Signature: Steve Horton Reviewed By: ____ Page 1 of 2

Rev. 2. 5/91

# WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: MW-2 (26)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 X 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

| | | | |
|---|---|---|---|
| CASING ELEVATION (feet/MSL): | NR | VOLUME IN CASING (gal.): | 2.15 |
| DEPTH TO WATER (feet): | 13.81 | CALCULATED PURGE (gal.): | 6.56 |
| DEPTH OF WELL (feet): | 27.2 | ACTUAL PURGE VOL. (gal.): | 7.0 |

DATE PURGED: 8-12-93 Start (2400 Hr) 14:30 End (2400 Hr) 14:35

DATE SAMPLED: 8-12-93 Start (2400 Hr) 14:40 End (2400 Hr) 14:41

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 14:34 | 2.5 | 6.76 | 1337 | 73.4 | Gray | Heavy |
| 14:36 | 5.0 | 6.84 | 1311 | 71.9 | Gray | Heavy |
| 14:39 | 7.0 | 6.86 | 1326 | 72.8 | Gray | Heavy |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: Strong NR (COBALT 0 - 100) NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): XDUP-1

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ____ 2" Bladder Pump | ____ Bailer (Teflon®) | ____ 2" Bladder Pump | X Bailer (Teflon®) |
| ____ Centrifugal Pump | X Bailer (PVC) | ____ DDL Sampler | ____ Bailer (Stainless Steel) |
| ____ Submersible Pump | ____ Bailer (Stainless Steel) | ____ Dipper | ____ Submersible Pump |
| ____ Well Wizard™ | ____ Dedicated | ____ Well Wizard™ | ____ Dedicated |
| Other: ____ | | Other: ____ | |

WELL INTEGRITY: Good LOCK #: 2268

REMARKS: ____

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9208 Temperature °F: ____

( EC 1000 ____ / ____ ) ( DI ____ ) ( pH 7 ____ / ____ ) ( pH 10 ____ / ____ ) ( pH 4 ____ / ____ )

Location of previous calibration: A-8(34)

Signature: Steve Horton Reviewed By: JMS Page 2 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: OG70-034.01 SAMPLE ID: MW-3 (28)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 X 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 2.65

DEPTH TO WATER (feet): 12.82 CALCULATED PURGE (gal.): 7.97

DEPTH OF WELL (feet): 29.1 ACTUAL PURGE VOL. (gal.): 8.0

DATE PURGED: 8-12-93 Start (2400 Hr) 14:16 End (2400 Hr) 14:22

DATE SAMPLED: 8-12-93 Start (2400 Hr) 14:22 End (2400 Hr) 14:24

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 14:18 | 3.0 | 6.78 | 1127 | 72.8 | Gray | Heavy |
| 14:20 | 5.5 | 6.80 | 1126 | 71.1 | Gray | Heavy |
| 14:22 | 8.0 | 6.77 | 1121 | 71.2 | Gray | Heavy |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: Strong COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ____ 2" Bladder Pump | ____ Bailer (Teflon®) | ____ 2" Bladder Pump | X Bailer (Teflon®) |
| ____ Centrifugal Pump | X Bailer (PVC) | ____ DDL Sampler | ____ Bailer (Stainless Steel) |
| ____ Submersible Pump | ____ Bailer (Stainless Steel) | ____ Dipper | ____ Submersible Pump |
| ____ Well Wizard™ | ____ Dedicated | ____ Well Wizard™ | ____ Dedicated |
| Other: ____ | | Other: ____ | |

WELL INTEGRITY: water in box LOCK #: 2268

REMARKS: ____

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9705 Temperature °F: ____

( EC 1000 ____ / ____ ) ( DI ____ ) ( pH 7 ____ / ____ ) ( pH 10 ____ / ____ ) ( pH 4 ____ / ____ )

Location of previous calibration: A-8 (24)

Signature: [signature] Reviewed By: [signature] Page 3 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: A-4 (34)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 X 4 ___ 4.5 ___ 6 ___ Other ___

| | | | |
|---|---|---|---|
| CASING ELEVATION (feet/MSL): | NR | VOLUME IN CASING (gal.): | 7.35 |
| DEPTH TO WATER (feet): | 14.94 | CALCULATED PURGE (gal.): | 22.04 |
| DEPTH OF WELL (feet): | 35.0 | ACTUAL PURGE VOL. (gal.): | 22.5 |

DATE PURGED: 8-12-93 Start (2400 Hr) 12:54 End (2400 Hr) 13:00

DATE SAMPLED: 8-12-93 Start (2400 Hr) 13:02 End (2400 Hr) 13:03

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 12:56 | 7.5 | 6.83 | 1113 | 71.0 | Clear | Trace |
| 12:58 | 15.0 | 6.82 | 1111 | 71.4 | Clear | Trace |
| 13:00 | 22.5 | 6.90 | 1117 | 71.4 | Cloudy | Slight |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: Moderate COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ___ 2" Bladder Pump | ___ Bailer (Teflon®) | ___ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ___ Bailer (PVC) | ___ DDL Sampler | ___ Bailer (Stainless Steel) |
| ___ Submersible Pump | ___ Bailer (Stainless Steel) | ___ Dipper | ___ Submersible Pump |
| ___ Well Wizard™ | ___ Dedicated | ___ Well Wizard™ | ___ Dedicated |
| Other: ___ | | Other: ___ | |

WELL INTEGRITY: Good LOCK #: 2268

REMARKS: ___

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9205 Temperature °F: ___

( EC 1000 ___ / ___ ) ( DI ___ ) ( pH 7 ___ / ___ ) ( pH 10 ___ / ___ ) ( pH 4 ___ / ___ )

Location of previous calibration: A-8(34)

Signature: [signature] Reviewed By: [signature] Page 4 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: A-5 (29)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ____ 3 X 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 5.82

DEPTH TO WATER (feet): 14.12 CALCULATED PURGE (gal.): 17.46

DEPTH OF WELL (feet): 30.0 ACTUAL PURGE VOL. (gal.): 17.5

DATE PURGED: 8-12-93 Start (2400 Hr) 11:32 End (2400 Hr) 11:38

DATE SAMPLED: 8-12-93 Start (2400 Hr) 11:40 End (2400 Hr) 11:41

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 11:34 | 6.0 | 6.74 | 1178 | 71.1 | Cloudy | Slight |
| 11:36 | 12.0 | 6.72 | 1199 | 70.3 | Cloudy | Slight |
| 11:38 | 17.5 | 6.73 | 1208 | 70.3 | Cloudy | Slight |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: none

COLOR (COBALT 0 - 100): NR

TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ____ 2" Bladder Pump | ____ Bailer (Teflon®) | ____ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ____ Bailer (PVC) | ____ DDL Sampler | ____ Bailer (Stainless Steel) |
| ____ Submersible Pump | ____ Bailer (Stainless Steel) | ____ Dipper | ____ Submersible Pump |
| ____ Well Wizard™ | ____ Dedicated | ____ Well Wizard™ | ____ Dedicated |
| Other: ____ | | Other: ____ | |

WELL INTEGRITY: Water in box LOCK #: 2268

REMARKS: ____

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9208 Temperature °F: ____

( EC 1000 ____ / ____ ) ( DI ____ ) ( pH 7 ____ / ____ ) ( pH 10 ____ / ____ ) ( pH 4 ____ / ____ )

Location of previous calibration: A-9 (34)

Signature: Steve Horton Reviewed By: ____ Page 5 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: OG70-034.01 SAMPLE ID: A-6 (34)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ____ 3 X 4 ____ 4.5 ____ 6 ____ Other ____

| | | | |
|---|---|---|---|
| CASING ELEVATION (feet/MSL): | NR | VOLUME IN CASING (gal.): | 7.56 |
| DEPTH TO WATER (feet): | 14.18 | CALCULATED PURGE (gal.): | 22.68 |
| DEPTH OF WELL (feet): | 34.5 | ACTUAL PURGE VOL. (gal.): | 23.0 |

DATE PURGED: 8-12-93 Start (2400 Hr) 11:05 End (2400 Hr) 11:11

DATE SAMPLED: 8-12-93 Start (2400 Hr) 11:13 End (2400 Hr) 11:14

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 11:07 | 8.0 | 7.31 | 790 | 71.1 | Cloudy | Slight |
| 11:09 | 15.5 | 7.15 | 841 | 69.9 | Cloudy | Slight |
| 11:11 | 23.0 | 7.06 | 869 | 69.6 | Cloudy | Slight |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: none COLOR: NR (COBALT 0 - 100) TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): ____

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ____ 2" Bladder Pump | ____ Bailer (Teflon®) | ____ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ____ Bailer (PVC) | ____ DDL Sampler | ____ Bailer (Stainless Steel) |
| ____ Submersible Pump | ____ Bailer (Stainless Steel) | ____ Dipper | ____ Submersible Pump |
| ____ Well Wizard™ | ____ Dedicated | ____ Well Wizard™ | ____ Dedicated |
| Other: ____ | | Other: ____ | |

WELL INTEGRITY: Grout needed around casing LOCK #: 2269

REMARKS: ____

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9708 Temperature °F: ____

( EC 1000 ____ / ____ ) ( DI ____ ) ( pH 7 ____ / ____ ) ( pH 10 ____ / ____ ) ( pH 4 ____ / ____ )

Location of previous calibration: A-8 (34)

Signature: Steve Horton Reviewed By: ____ Page 6 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: A-7 (35)

PURGED BY: I. GRAHAM / S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM / S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ____ 3 X 4 ____ 4.5 ____ 6 ____ Other ____

| | | | |
|---|---|---|---|
| CASING ELEVATION (feet/MSL): | NR | VOLUME IN CASING (gal.): | 7.31 |
| DEPTH TO WATER (feet): | 15.54 | CALCULATED PURGE (gal.): | 21.95 |
| DEPTH OF WELL (feet): | 35.5 | ACTUAL PURGE VOL. (gal.): | 22.0 |

DATE PURGED: 8-12-93 Start (2400 Hr) 13:32 End (2400 Hr) 13:38

DATE SAMPLED: 8-12-93 Start (2400 Hr) 13:40 End (2400 Hr) 13:42

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 13:34 | 7.5 | 7.06 | 1225 | 73.2 | Cloudy | Slight |
| 13:36 | 15.0 | 7.00 | 1223 | 72.6 | Cloudy | Slight |
| 13:38 | 22.0 | 6.97 | 1217 | 72.8 | Brown | Moderate |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: none

COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ____ 2" Bladder Pump | ____ Bailer (Teflon®) | ____ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ____ Bailer (PVC) | ____ DDL Sampler | ____ Bailer (Stainless Steel) |
| ____ Submersible Pump | ____ Bailer (Stainless Steel) | ____ Dipper | ____ Submersible Pump |
| ____ Well Wizard™ | ____ Dedicated | ____ Well Wizard™ | ____ Dedicated |
| Other: ____ | | Other: ____ | |

WELL INTEGRITY: Good LOCK #: 2269

REMARKS: ____

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9207 Temperature °F: ____

( EC 1000 ____ / ____ ) ( DI ____ ) ( pH 7 ____ / ____ ) ( pH 10 ____ / ____ ) ( pH 4 ____ / ____ )

Location of previous calibration: A-8 (34)

Signature: [signature] Reviewed By: [signature] Page 7 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: A-8 (34)

PURGED BY: I. GRAHAM / S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM / S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 X 3 ___ 4 ___ 4.5 ___ 6 ___ Other ___

| | | | |
|---|---|---|---|
| CASING ELEVATION (feet/MSL): | NR | VOLUME IN CASING (gal.): | 3.65 |
| DEPTH TO WATER (feet): | 12.41 | CALCULATED PURGE (gal.): | 10.97 |
| DEPTH OF WELL (feet): | 34.9 | ACTUAL PURGE VOL. (gal.): | 11.0 |

DATE PURGED: 8-12-93 Start (2400 Hr) 10:24 End (2400 Hr) 10:30

DATE SAMPLED: 8-12-93 Start (2400 Hr) 10:32 End (2400 Hr) 10:33

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 10:26 | 4.0 | 6.96 | 1166 | 73.4 | Brown | Heavy |
| 10:29 | 7.5 | 6.81 | 1147 | 71.1 | Brown | Heavy |
| 10:30 | 11.0 | 6.84 | 1155 | 71.8 | Brown | Heavy |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: none COLOR: NR (COBALT 0 - 100) TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ___ 2" Bladder Pump | ___ Bailer (Teflon®) | ___ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ___ Bailer (PVC) | ___ DDL Sampler | ___ Bailer (Stainless Steel) |
| ___ Submersible Pump | ___ Bailer (Stainless Steel) | ___ Dipper | ___ Submersible Pump |
| ___ Well Wizard™ | ___ Dedicated | ___ Well Wizard™ | ___ Dedicated |
| Other: ___ | | Other: ___ | |

WELL INTEGRITY: Good LOCK #: 2268

REMARKS: ___

Meter Calibration: Date: 8-12-93 Time: 12:13 Meter Serial #: 9208 Temperature °F: 76.8

( EC 1000 983 / 1000 ) ( DI ___ ) ( pH 7 7.00 / 7.00 ) ( pH 10 ___ / 10.00 ) ( pH 4 4.00 / ___ )

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 7 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: OG70-034.01 SAMPLE ID: A-9 (33)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 X 3 ___ 4 ___ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 3.28

DEPTH TO WATER (feet): ~~13.90~~ CALCULATED PURGE (gal.): 9.84

DEPTH OF WELL (feet): ~~34.0~~ ACTUAL PURGE VOL. (gal.): 100

DATE PURGED: 8-12-93 Start (2400 Hr) 10:40 End (2400 Hr) 10:46

DATE SAMPLED: 8-12-93 Start (2400 Hr) 10:49 End (2400 Hr) 10:49

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 10:42 | 3.5 | 7.09 | 904 | 74.9 | Brown | Heavy |
| 10:44 | 7.0 | 7.02 | 766 | 72.2 | Brown | Heavy |
| 10:46 | 10.0 | 6.98 | 874 | 71.6 | Brown | Heavy |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: none

COLOR: NR (COBALT 0 - 100) TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ___ 2" Bladder Pump | ___ Bailer (Teflon®) | ___ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ___ Bailer (PVC) | ___ DDL Sampler | ___ Bailer (Stainless Steel) |
| ___ Submersible Pump | ___ Bailer (Stainless Steel) | ___ Dipper | ___ Submersible Pump |
| ___ Well Wizard™ | ___ Dedicated | ___ Well Wizard™ | ___ Dedicated |
| Other: ___ | | Other: ___ | |

WELL INTEGRITY: Good LOCK #: 2268

REMARKS: ___

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9208 Temperature °F: ___

( EC 1000 ___ / ___ ) ( DI ___ ) ( pH 7 ___ / ___ ) ( pH 10 ___ / ___ ) ( pH 4 ___ / ___ )

Location of previous calibration: A-8(34)

Signature: [signature] Reviewed By: [signature] Page 9 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: A-10 (34)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 X 3 ___ 4 ___ 4.5 ___ 6 ___ Other ___

| | | | |
|---|---|---|---|
| CASING ELEVATION (feet/MSL): | NR | VOLUME IN CASING (gal.): | 3.15 |
| DEPTH TO WATER (feet): | 14.87 | CALCULATED PURGE (gal.): | 9.56 |
| DEPTH OF WELL (feet): | 34.4 | ACTUAL PURGE VOL. (gal.): | 10.0 |

DATE PURGED: 8-12-93 Start (2400 Hr) 13:13 End (2400 Hr) 13:19

DATE SAMPLED: 8-12-93 Start (2400 Hr) 13:21 End (2400 Hr) 13:22

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 13:15 | 3.5 | 6.88 | 1219 | 73.8 | Brown | Heavy |
| 13:17 | 7.0 | 7.00 | 1211 | 72.1 | Brown | Heavy |
| 13:19 | 10.0 | 7.05 | 1222 | 72.3 | Brown | Heavy |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: none

COLOR (COBALT 0 - 100): NR

TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ___ 2" Bladder Pump | ___ Bailer (Teflon®) | ___ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ___ Bailer (PVC) | ___ DDL Sampler | ___ Bailer (Stainless Steel) |
| ___ Submersible Pump | ___ Bailer (Stainless Steel) | ___ Dipper | ___ Submersible Pump |
| ___ Well Wizard™ | ___ Dedicated | ___ Well Wizard™ | ___ Dedicated |
| Other: ___ | | Other: ___ | |

WELL INTEGRITY: Good LOCK #: 2268

REMARKS: ___

Meter Calibration: Date: 8-12-93 Time: 10:12 Meter Serial #: 9709 Temperature °F: ___

( EC 1000 ___ / ___ ) ( DI ___ ) ( pH 7 ___ / ___ ) ( pH 10 ___ / ___ ) ( pH 4 ___ / ___ )

Location of previous calibration: A-5 (34)

Signature: Steve Horton Reviewed By: [illegible] Page 10 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: AR-1 (25)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ____ 3 ____ 4 ____ 4.5 ____ 6 X Other ____

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 31.23

DEPTH TO WATER (feet): 13.55 CALCULATED PURGE (gal.): 93.71

DEPTH OF WELL (feet): 34.8 ACTUAL PURGE VOL. (gal.): 94.0

DATE PURGED: 8-12-93 Start (2400 Hr) 12:21 End (2400 Hr) 12:34

DATE SAMPLED: 8-12-93 Start (2400 Hr) 12:36 End (2400 Hr) 12:35

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 12:24 | 31.5 | 6.95 | 1104 | 74.3 | Brown | Moderate |
| 12:29 | 63.0 | 6.83 | 1196 | 74.7 | Clear | Trace |
| 12:34 | 94.0 | 6.87 | 1221 | 74.2 | Clear | Trace |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: Strong NR (COBALT 0 - 100) NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ____ 2" Bladder Pump | ____ Bailer (Teflon®) | ____ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ____ Bailer (PVC) | ____ DDL Sampler | ____ Bailer (Stainless Steel) |
| ____ Submersible Pump | ____ Bailer (Stainless Steel) | ____ Dipper | ____ Submersible Pump |
| ____ Well Wizard™ | ____ Dedicated | ____ Well Wizard™ | ____ Dedicated |
| Other: ____ | | Other: ____ | |

WELL INTEGRITY: Good LOCK #: 2268

REMARKS: ____

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9705 Temperature °F: ____

( EC 1000 ____ / ____ ) ( DI ____ ) ( pH 7 ____ / ____ ) ( pH 10 ____ / ____ ) ( pH 4 ____ / ____ )

Location of previous calibration: A-8(34)

Signature: Steve Horton Reviewed By: ____ Page 11 of 12

# WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-034.01 SAMPLE ID: AR-2 (25)

PURGED BY: I. GRAHAM | S. HORTON CLIENT NAME: ARCO #5387

SAMPLED BY: I. GRAHAM | S. HORTON LOCATION: HAYWARD, CA.

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ___ 4.5 ___ 6 X Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 52.06

DEPTH TO WATER (feet): 13.59 CALCULATED PURGE (gal.): 96.18

DEPTH OF WELL (feet): 35.4 ACTUAL PURGE VOL. (gal.): 96.5

DATE PURGED: 8-12-93 Start (2400 Hr) 11:58 End (2400 Hr) 12:14

DATE SAMPLED: 8-12-93 Start (2400 Hr) 12:16 End (2400 Hr) 12:17

| TIME (2400 Hr) | VOLUME (gal.) | pH (units) | E.C. (µmhos/cm @ 25° C) | TEMPERATURE (°F) | COLOR (visual) | TURBIDITY (visual) |
|---|---|---|---|---|---|---|
| 12:02 | 32.5 | 7.43 | 1264 | 73.3 | Cloudy | Slight |
| 12:08 | 64.5 | 7.10 | 1287 | 76.6 | Cloudy | Slight |
| 12:14 | 96.5 | 7.09 | 1382 | 77.1 | Cloudy | Slight |
| | | | | | | |
| | | | | | | |

D. O. (ppm): NR ODOR: Strong COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

| PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|---|---|
| ___ 2" Bladder Pump | ___ Bailer (Teflon®) | ___ 2" Bladder Pump | X Bailer (Teflon®) |
| X Centrifugal Pump | ___ Bailer (PVC) | ___ DDL Sampler | ___ Bailer (Stainless Steel) |
| ___ Submersible Pump | ___ Bailer (Stainless Steel) | ___ Dipper | ___ Submersible Pump |
| ___ Well Wizard™ | ___ Dedicated | ___ Well Wizard™ | ___ Dedicated |
| Other: ___ | | Other: ___ | |

WELL INTEGRITY: Good LOCK #: 2268

REMARKS: ___

Meter Calibration: Date: 8-12-93 Time: 10:13 Meter Serial #: 9205 Temperature °F: ___

( EC 1000 ___ / ___ ) ( DI ___ ) ( pH 7 ___ / ___ ) ( pH 10 ___ / ___ ) ( pH 4 ___ / ___ )

Location of previous calibration: A-8(34)

Signature: Steve Horton Reviewed By: ___ Page 12 of 12