GeoStrategies Inc.

93 SEP 10 PM 12:37

QUARTERLY MONITORING REPORT - Second Quarter 1993

ARCO Station 2169
899 West Grand Avenue
Oakland, California

792701-14

September 3, 1993

GeoStrategies Inc. **LETTER OF TRANSMITTAL**

Environmental Consulting
Engineering and Geologic Services

93 SEP 10 PM 12:37 9/3/93

TO: Ms. Susan Hugo
ACHCSA
80 Swan Way, Room 200
Oakland, CA 94621

PROJECT NO. 7920 & 7927
SUBJECT: 2nd Quarterly Monitoring Reports - 2nd Quarter 1993 for ARCO Stations 2112 and 2169

THE FOLLOWING ITEMS ARE:

☑ ATTACHED ☐ FORWARDED SEPARATELY VIA _____

QUANTITY	PROJECT NO.	DATE	DESCRIPTION
1	7920.10-13	9/3/93	Quarterly Monitoring/Recovery System Evaluation Report - Second Quarter 1993 for ARCO Station 2112, 1260 Park Street, Alameda, CA
1	7927.01-14	9/3/93	Quarterly Monitoring Report - Second Quarter 1993 for ARCO 2169, 899 West Grand Ave, Oakland, CA

THESE ARE TRANSMITTED as checked below:

☐ For approval
☑ For your use
☐ As requested
☐ For review and
☐ Approved
☐ Approved as noted
☐ Returned for
☐ Other _____

COMMENTS:

Signed: Barbara Sieminski

☑ 2140 W. Winton Avenue, Hayward, CA 94545
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Copies To:

Mr. Michael Whelan - ARCO Products Co.
Mr. Richard Hiett - RWQCB - SF Bay Region

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GeoStrategies Inc.

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

September 3, 1993

Subject: **QUARTERLY MONITORING REPORT - Second Quarter 1993**
ARCO Station 2169, 899 West Grand Avenue, Oakland, California.

Mr. Whelan:

This Quarterly Monitoring Report was prepared by GeoStrategies Inc. (GSI) and presents the results of the second quarter 1993 groundwater sampling for the above referenced site (Plate 1). Sampling data were furnished by the ARCO Products Company contractor.

SITE BACKGROUND

In 1991, GSI conducted a limited site assessment which included drilling of five exploratory soil borings (A-A through A-E) at the site. Four onsite (A-1 through A-4) and two offsite (A-5 and A-6) groundwater monitoring wells, two groundwater recovery wells (AR-1 and AR-2), and three vapor extraction wells (AV-1 through AV-3) were installed at the site by GSI between 1992 and 1993. These wells/borings were drilled to evaluate the horizontal and vertical extent of petroleum hydrocarbons in soil and groundwater beneath the site, and to provide extraction points for future soil and groundwater remediation systems. The former underground storage tanks (USTs) containing gasoline and diesel fuel were replaced in April 1992. The locations of the wells, former and existing tanks and other pertinent site features are shown on Plate 2.

In June 1992, GSI performed a vapor extraction test to determine the feasibility of vapor extraction as a remedial option for the site.

In July 1992, GSI performed an aquifer pumping and recovery test to evaluate the feasibility of groundwater extraction as a groundwater remediation method for the site.

Quarterly groundwater monitoring and sampling of the site wells began in April 1992. Groundwater samples are currently analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) according to EPA Method 8015 (Modified); Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) according to EPA Method 8020; and Total Petroleum Hydrocarbons calculated as Diesel (TPH-Diesel) according to EPA Method 3510.

CURRENT QUARTER SAMPLING RESULTS

Groundwater Level Measurements and Gradient Evaluation

Depth to water-level measurements were obtained from monitoring and recovery wells on April 15, May 22, and June 16, 1993, by EMCON Associates of San Jose, California (EMCON). Depth to water-level measurement was obtained from groundwater monitoring well A-6 on April 16, because on April 15 this well was not accessible due to a car which was parked over it. 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 potentiometric maps (Plates 3 through 5). Well A-6 was not used in construction of the potentiometric map for April 15, 1993, because this well was not monitored on that day. Shallow groundwater beneath the site is interpreteed to flow to the northwest at an average hydraulic gradient of 0.004.

Each well was inspected for the presence of floating product. Floating product has not been observed in any well since quarterly monitoring began in April 1992. Depth to groundwater the current quarter are presented in Table 1 and in the EMCON 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 from wells A-1 through A-5, AR-1 and AR-2 on April 15, 1993, and from well A-6 on April 16, 1993, by EMCON. Samples were analyzed for TPH-Gasoline according to EPA Method 8015 (Modified) and BTEX according to EPA Method 8020. In addition, groundwater samples collected from wells A-1, AR-1 and AR-2 were analyzed for TPH-Diesel according to EPA Method 3510. 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 and BTEX were detected in samples collected from onsite wells A-1, AR-1 and AR-2, and offsite wells A-5 and A-6 at concentrations ranging between 85 parts per billion (ppb) and 27,000 ppb for TPH-Gasoline, and between 1.3 ppb and 3,100 ppb for benzene. Concentrations of TPH-Gasoline and benzene were nondetectable (less than 50 ppb and less than 0.50 ppb, respectively) in groundwater samples collected from onsite wells A-2 trough A-4. TPH-Diesel was nondetectable (less than 50 ppb) in groundwater sample collected from well AR-2. Laboratory analytical results (EPA Method 3510) indicated 420 ppb and 5,400 ppb of non-diesel hydrocarbons in groundwater samples collected from wells A-1 and AR-1, respectively. 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 6 and 7, respectively.

CONCLUSIONS

Groundwater elevations in the site wells decreased an average of about 1½ feet between March and June 1993. The groundwater gradient and

flow direction for this quarter is generally consistent with previously interpreted gradients and flow directions for this site.

Concentrations of TPH-Gasoline have remained nondetectable in wells A-2 through A-4; decreased in wells A-1 (from 3,700 ppb to 210 ppb), A-6 (from 990 ppb to 390 ppb) and AR-2 (from 2,000 ppb to 85 ppb); and have increased in wells A-5 (from 4,900 ppb to 27,000 ppb) and AR-1 (from 15,000 ppb to 17,000 ppb) since the last quarter. Concentrations of benzene have remained nondetectable in wells A-2 through A-4; have decreased in wells A-1 (from 780 ppb to 34 ppb), A-6 (from 1.8 ppb to 1.3 ppb) and AR-2 (from 570 ppb to 15 ppb); and have increased in wells A-5 (from 380 ppb to 3,100 ppb) and AR-1 (from 1,200 ppb to 1,800 ppb) since the last quarter.

If you have any questions, please call.

GeoStrategies Inc. by,

Barbara Sieminski

Barbara Sieminski
Project Geologist

John F. Vargas

John F. Vargas
Senior Geologist
R.G. 5046

REGISTERED GEOLOGIST
JOHN F. VARGAS
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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, April 15, 1993

Plate 4. Potentiometric Map, May 22, 1993
Plate 5. Potentiometric Map, June 16, 1993
Plate 6. TPH-G Isoconcentration Map
Plate 7. Benzene Isoconcentration Map

Appendix A: EMCON Groundwater Sampling Report

QC Review: EM.

TABLES

TABLE 1

CURRENT GROUNDWATER MONITORING DATA
ARCO Station 2169
Oakland, California

WELL NO.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	TPH-D (PPB)	WELL ELEV. (FT)	STATIC WATER ELEV. (FT)	PRODUCT THICKNESS (FT)	DEPTH TO WATER (FT)
A-1	15-Apr-93	22-Apr-93	210	34	11	7.1	20	420*	14.75	4.25	0.00	10.50
	22-May-93	---	---	---	---	---	---	---	14.75	3.42	0.00	11.33
	16-Jun-93	---	---	---	---	---	---	---	14.75	3.24	0.00	11.51
A-2	15-Apr-93	22-Apr-93	<50	<0.50	<0.50	<0.50	<0.50	N/A	15.16	3.96	0.00	11.20
	22-May-93	---	---	---	---	---	---	---	15.16	3.25	0.00	11.91
	16-Jun-93	---	---	---	---	---	---	---	15.16	3.12	0.00	12.04
A-3	15-Apr-93	22-Apr-93	<50	<0.50	<0.50	<0.50	<0.50	<0.50	16.38	4.40	0.00	11.98
	22-May-93	---	---	---	---	---	---	---	16.38	3.68	0.00	12.70
	16-Jun-93	---	---	---	---	---	---	---	16.38	3.54	0.00	12.84
A-4	15-Apr-93	22-Apr-93	<50	<0.50	<0.50	<0.50	<0.50	<0.50	15.89	4.74	0.00	11.15
	22-May-93	---	---	---	---	---	---	---	15.89	4.05	0.00	11.84
	16-Jun-93	---	---	---	---	---	---	---	15.89	3.88	0.00	12.01
A-5	15-Apr-93	22-Apr-93	27,000	3,100	4,000	1,100	4,600	N/A	14.14	4.03	0.00	10.11
	22-May-93	---	---	---	---	---	---	---	14.14	3.43	0.00	10.71
	16-Jun-93	---	---	---	---	---	---	---	14.14	3.30	0.00	10.84
A-6	16-Apr-93	22-Apr-93	390	1.3	1.6	1.7	7.7	N/A	14.17	4.81	0.00	9.36
	22-May-93	---	---	---	---	---	---	---	14.17	3.31	0.00	10.86
	16-Jun-93	---	---	---	---	---	---	---	14.17	3.19	0.00	10.98
AR-1	15-Apr-93	22-Apr-93	17,000	1,800	360	520	1,600	5,400*	15.71	4.45	0.00	11.26

TABLE 1

CURRENT GROUNDWATER MONITORING DATA
ARCO Station 2169
Oakland, California

WELL NO.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	TPH-D (PPB)	WELL ELEV. (FT)	STATIC WATER ELEV. (FT)	PRODUCT THICKNESS (FT)	DEPTH TO WATER (FT)
	22-May-93	---	---	---	---	---	---	---	15.71	3.64	0.00	12.07
	16-Jun-93	---	---	---	---	---	---	---	15.71	3.50	0.00	12.21
AR-2	15-Apr-93	22-Apr-93	85	15	<0.50	<0.50	2.4	<50	15.79	3.98	0.00	11.81
	22-May-93	---	---	---	---	---	---	---	15.79	3.33	0.00	12.46
	16-Jun-93	---	---	---	---	---	---	---	15.79	3.26	0.00	12.53

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

Current DHS Action Levels Toluene 100.0 ppb

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
TPH-D = Total Petroleum Hydrocarbons calculated as Diesel.
PPB = Parts Per Billion.
TB = Trip Blank

* Reported as a non-diesel mix.

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 2169
Oakland, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (ft)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
03-Apr-92	A-1	10.35	14.75	4.40	0.00
20-May-92	A-1	11.66	14.75	3.09	0.00
16-Jun-92	A-1	11.95	14.75	2.80	0.00
17-Jul-92	A-1	12.23	14.75	2.52	0.00
07-Aug-92	A-1	12.16	14.75	2.59	0.00
22-Sep-92	A-1	12.42	14.75	2.33	0.00
13-Oct-92	A-1	12.47	14.75	2.28	0.00
23-Nov-92	A-1	11.83	14.75	2.92	0.00
16-Dec-92	A-1	11.03	14.75	3.72	0.00
28-Jan-93	A-1	9.08	14.75	5.67	0.00
22-Feb-93	A-1	9.46	14.75	5.29	0.00
25-Mar-93	A-1	10.02	14.75	4.73	0.00
15-Apr-93	A-1	10.50	14.75	4.25	0.00
22-May-93	A-1	11.33	14.75	3.42	0.00
16-Jun-93	A-1	11.51	14.75	3.24	0.00
03-Apr-92	A-2	10.97	15.16	4.19	0.00
20-May-92	A-2	12.17	15.16	2.99	0.00
16-Jun-92	A-2	12.43	15.16	2.73	0.00
17-Jul-92	A-2	12.64	15.16	2.52	0.00
07-Aug-92	A-2	12.75	15.16	2.41	0.00
22-Sep-92	A-2	12.88	15.16	2.28	0.00
13-Oct-92	A-2	12.92	15.16	2.24	0.00
23-Nov-92	A-2	12.18	15.16	2.98	0.00
16-Dec-92	A-2	11.52	15.16	3.64	0.00
28-Jan-93	A-2	9.73	15.16	5.43	0.00
22-Feb-93	A-2	9.28	15.16	5.88	0.00
25-Mar-93	A-2	10.57	15.16	4.59	0.00
15-Apr-93	A-2	11.20	15.16	3.96	0.00
22-May-93	A-2	11.91	15.16	3.25	0.00
16-Jun-93	A-2	12.04	15.16	3.12	0.00
03-Apr-92	A-3	11.70	16.38	4.68	0.00
20-May-92	A-3	13.00	16.38	3.38	0.00
16-Jun-92	A-3	13.46	16.38	2.92	0.00

TABLE 2

HISTORICAL WATER-LEVEL DATA
ARCO Station 2169
Oakland, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (ft)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
17-Jul-92	A-3	13.45	16.38	2.93	0.00
07-Aug-92	A-3	12.37	16.38	4.01	0.00
22-Sep-92	A-3	13.71	16.38	2.67	0.00
13-Oct-92	A-3	13.76	16.38	2.62	0.00
23-Nov-92	A-3	13.60	16.38	2.78	0.00
16-Dec-92	A-3	12.31	16.38	4.07	0.00
28-Jan-93	A-3	10.33	16.38	6.05	0.00
22-Feb-93	A-3	10.44	16.38	5.94	0.00
25-Mar-93	A-3	11.27	16.38	5.11	0.00
15-Apr-93	A-3	11.98	16.38	4.40	0.00
22-May-93	A-3	12.70	16.38	3.68	0.00
16-Jun-93	A-3	12.84	16.38	3.54	0.00
03-Apr-92	A-4	10.84	15.89	5.05	0.00
20-May-92	A-4	12.13	15.89	3.76	0.00
16-Jun-92	A-4	12.33	15.89	3.56	0.00
17-Jul-92	A-4	12.60	15.89	3.29	0.00
07-Aug-92	A-4	12.56	15.89	3.33	0.00
22-Sep-92	A-4	12.87	15.89	3.02	0.00
13-Oct-92	A-4	12.87	15.89	3.02	0.00
23-Nov-92	A-4	12.63	15.89	3.26	0.00
16-Dec-92	A-4	11.34	15.89	4.55	0.00
28-Jan-93	A-4	9.40	15.89	6.49	0.00
22-Feb-93	A-4	9.35	15.89	6.54	0.00
25-Mar-93	A-4	10.32	15.89	5.57	0.00
15-Apr-93	A-4	11.15	15.89	4.74	0.00
22-May-93	A-4	11.84	15.89	4.05	0.00
16-Jun-93	A-4	12.01	15.89	3.88	0.00
11-Feb-93	A-5	9.15	14.14	4.99	0.00
25-Mar-93	A-5	9.33	14.14	4.81	0.00
15-Apr-93	A-5	10.11	14.14	4.03	0.00
22-May-93	A-5	10.71	14.14	3.43	0.00
16-Jun-93	A-5	10.84	14.14	3.30	0.00
11-Feb-93	A-6	9.35	14.17	4.82	0.00

TABLE 2

HISTORICAL WATER-LEVEL DATA
ARCO Station 2169
Oakland, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (ft)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
25-Mar-93	A-6	Not measured			
16-Apr-93	A-6	9.36	14.17	4.81	0.00
22-May-93	A-6	10.86	14.17	3.31	0.00
16-Jun-93	A-6	10.98	14.17	3.19	0.00
03-Apr-92	AR-1	11.07	15.71	4.64	0.00
20-May-92	AR-1	12.37	15.71	3.34	0.00
16-Jun-92	AR-1	12.47	15.71	3.24	0.00
17-Jul-92	AR-1	13.00	15.71	2.71	0.00
07-Aug-92	AR-1	12.87	15.71	2.84	0.00
22-Sep-92	AR-1	12.99	15.71	2.72	0.00
13-Oct-92	AR-1	13.05	15.71	2.66	0.00
23-Nov-92	AR-1	12.80	15.71	2.91	0.00
16-Dec-92	AR-1	11.49	15.71	4.22	0.00
28-Jan-93	AR-1	9.46	15.71	6.25	0.00
22-Feb-93	AR-1	10.05	15.71	5.66	0.00
25-Mar-93	AR-1	10.75	15.71	4.96	0.00
15-Apr-93	AR-1	11.26	15.71	4.45	0.00
22-May-93	AR-1	12.07	15.71	3.64	0.00
16-Jun-93	AR-1	12.21	15.71	3.50	0.00
17-Jul-92	AR-2	13.14	15.79	2.65	0.00
07-Aug-92	AR-2	13.25	15.79	2.54	0.00
22-Sep-92	AR-2	13.58	15.79	2.21	0.00
13-Oct-92	AR-2	13.65	15.79	2.14	0.00
23-Nov-92	AR-2	Not measured			
16-Dec-92	AR-2	12.16	15.79	3.63	0.00
28-Jan-93	AR-2	10.26	15.79	5.53	0.00
22-Feb-93	AR-2	10.52	15.79	5.27	0.00
25-Mar-93	AR-2	11.18	15.79	4.61	0.00
15-Apr-93	AR-2	11.81	15.79	3.98	0.00
22-May-93	AR-2	12.46	15.79	3.33	0.00
16-Jun-93	AR-2	12.53	15.79	3.26	0.00

Notes:
1. Static water elevations referenced to Mean Sea Level (MSL).
2. Well elevations and depths-to-water are referenced to the top of the well box.
3. Well AR-2 could not be located on November 23, 1992.

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 2169
Oakland, California

SAMPLE DATE	WELL NO.	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	TPH-D (PPB)
03-Apr-92	A-1	34000	6200	3900	410	3100	6100
17-Jul-92	A-1	5600	3000	500	<100	<100	N/A
13-Oct-92	A-1	5600	980	590	85	910	N/A
28-Jan-93	A-1	3700	780	360	130	460	620*
15-Apr-93	A-1	210	34	11	7.1	20	420*
03-Apr-92	A-2	<30	<0.30	<0.30	<0.30	<0.30	<50
17-Jul-92	A-2	<50	<0.50	<0.50	<0.50	<0.50	N/A
13-Oct-92	A-2	<50	0.57	<0.50	<0.50	<0.50	N/A
28-Jan-93	A-2	<50	<0.50	<0.50	<0.50	<0.50	N/A
15-Apr-93	A-2	<50	<0.50	<0.50	<0.50	<0.50	N/A
03-Apr-92	A-3	200	0.79	0.65	4.4	<0.30	130
17-Jul-92	A-3	<50	<0.50	<0.50	1.3	2.3	N/A
13-Oct-92	A-3	<50	<0.50	<0.50	<0.50	<0.50	N/A
28-Jan-93	A-3	<50	<0.50	<0.50	<0.50	<0.50	N/A
15-Apr-93	A-3	<50	<0.50	<0.50	<0.50	<0.50	N/A
03-Apr-92	A-4	35	<0.30	<0.30	<0.30	<0.30	85
17-Jul-92	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
13-Oct-92	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
28-Jan-93	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
15-Apr-93	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
11-Feb-93	A-5	4900	380	640	140	970	N/A
15-Apr-93	A-5	27000	3100	4000	1100	4600	N/A
11-Feb-93	A-6	990	1.8	5.1	17	7.2	N/A
16-Apr-93	A-6	390	1.3	1.6	1.7	7.7	N/A
03-Apr-92	AR-1	17000	310	1400	320	3000	12000
17-Jul-92	AR-1	44000	4300	1800	1800	10000	N/A
13-Oct-92	AR-1	32000	310	730	570	3100	22000*
28-Jan-93	AR-1	15000	1200	510	510	2600	5300*
15-Apr-93	AR-1	17000	1800	360	520	1600	5400*
17-Jul-92	AR-2	150	6.6	24	6.6	39	N/A
13-Oct-92	AR-2	<50	2.0	0.86	0.51	3.8	58*
28-Jan-93	AR-2	2000	570	13	<10	380	290*
15-Apr-93	AR-2	85	15	<0.50	<0.50	2.4	<50

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 2169
Oakland, California

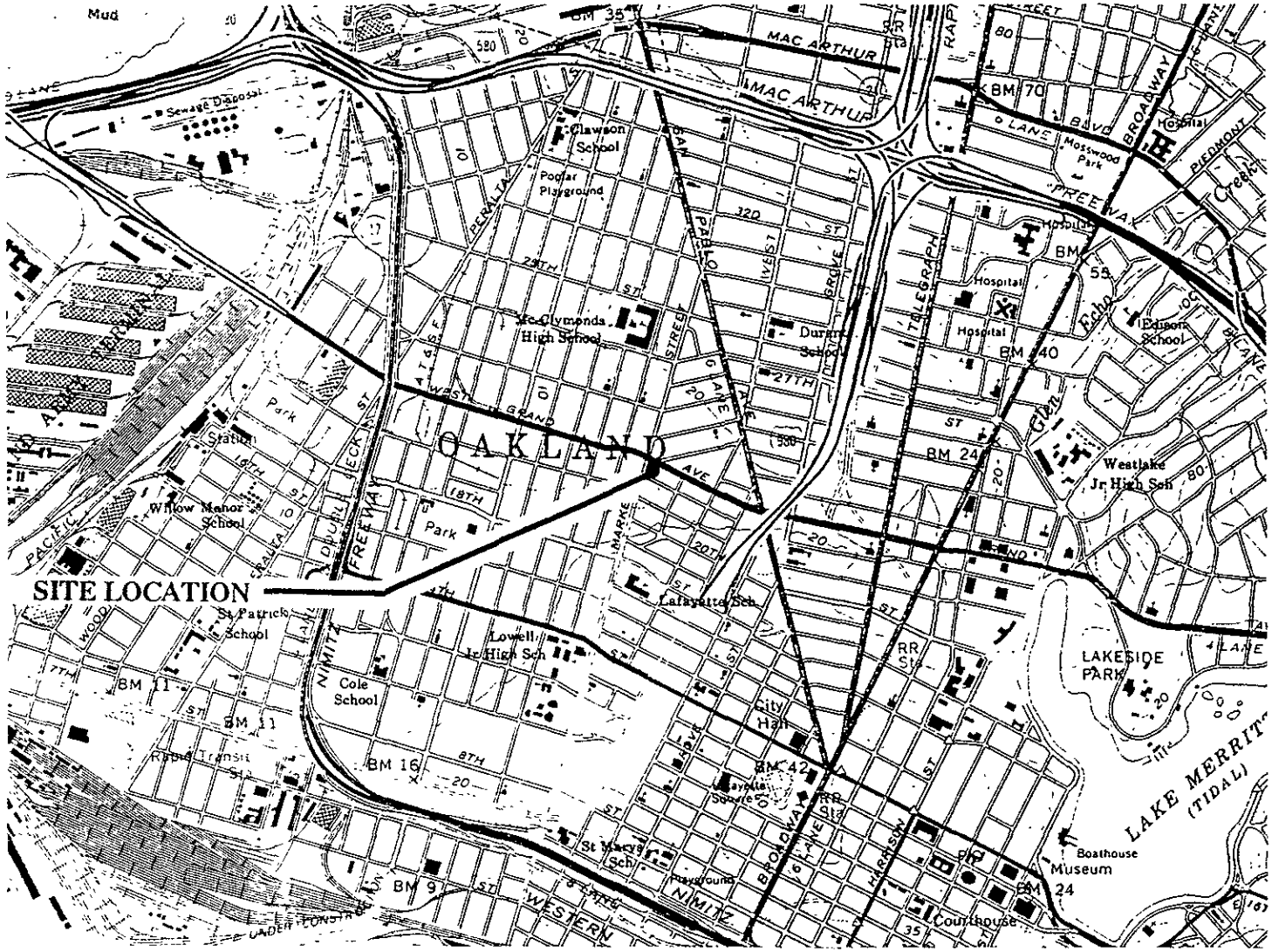
CURRENT REGIONAL WATER QUALITY CONTROL BOARD MAXIMUM CONTAMINANT LEVELS
Benzene 1. ppb Xylenes 1750. ppb Ethylbenzene 680 ppb

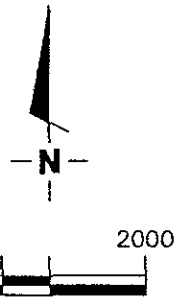
CURRENT DHS ACTION LEVELS Toluene 100

TPH-G	=	Total Petroleum Hydrocarbons calculated as Gasoline.
TPH-D	=	Total Petroleum Hydrocarbons calculated as Diesel.
PPB	=	Parts Per Billion.
N/A	=	Not Analyzed.
*	=	reported as a non-diesel mix.

Notes: 1. All data shown as <x are reported as ND (none detected).

ILLUSTRATIONS



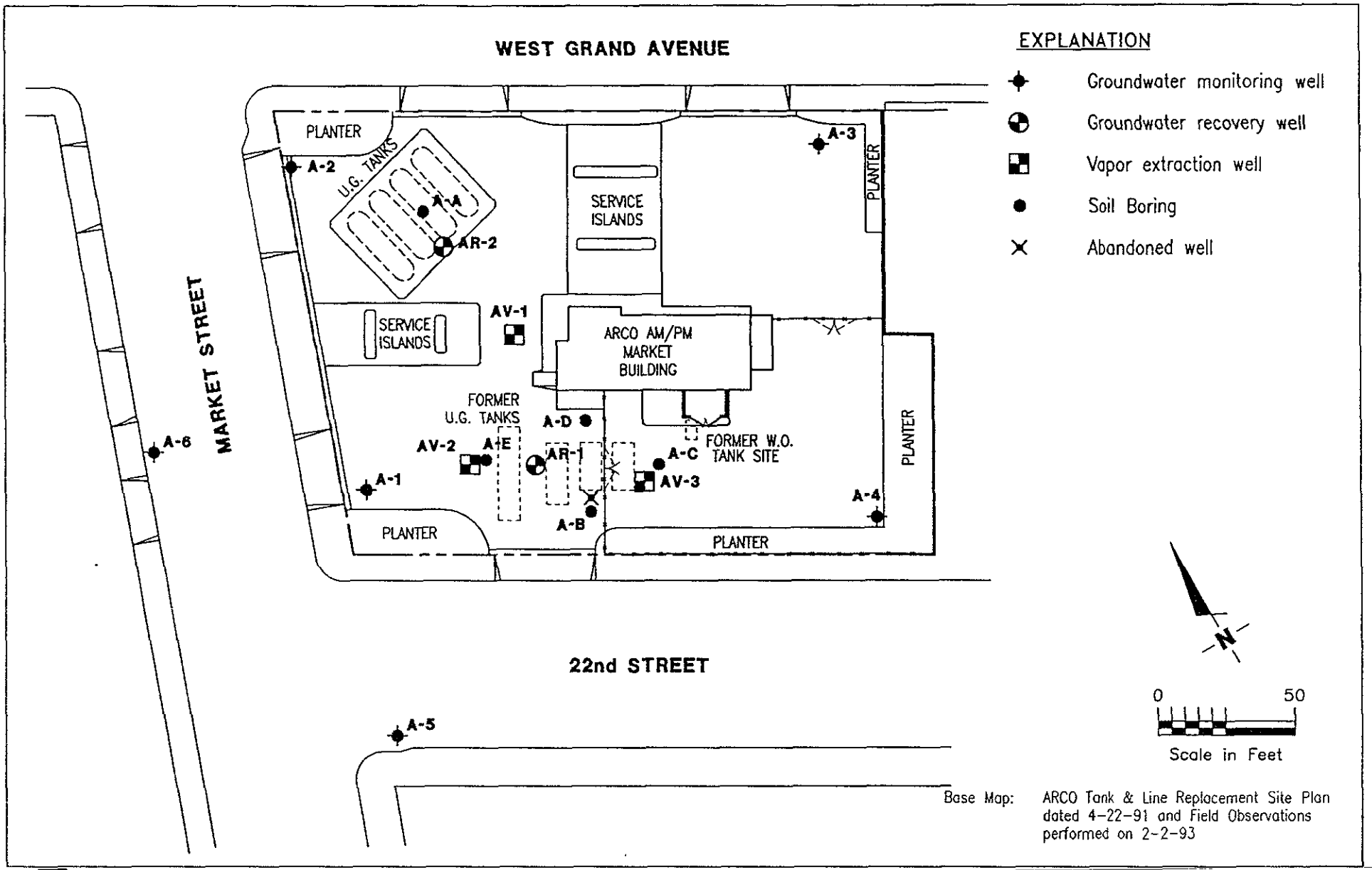


GeoStrategies Inc.

VICINITY MAP
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7927		5/91	



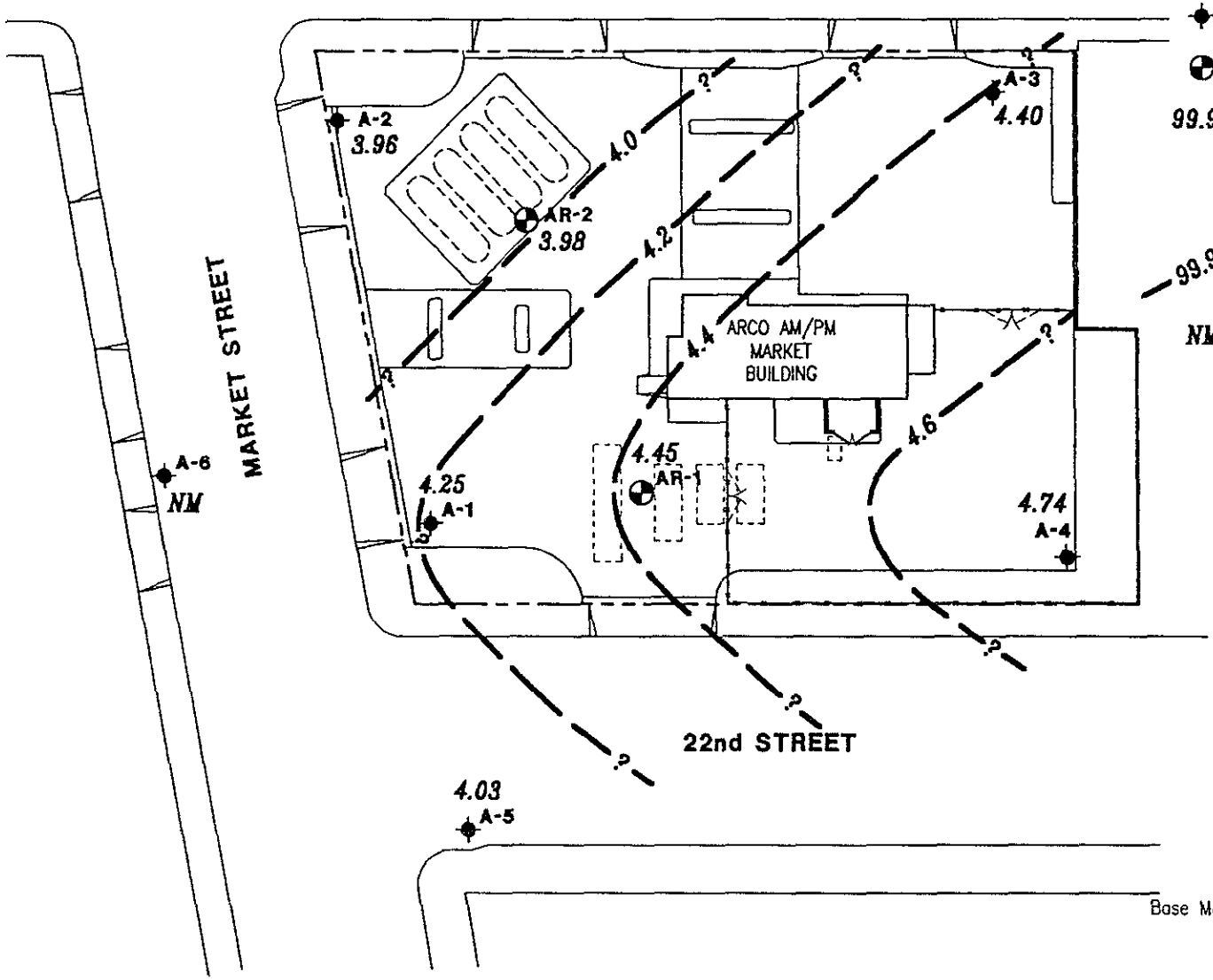
Base Map: ARCO Tank & Line Replacement Site Plan dated 4-22-91 and Field Observations performed on 2-2-93

GeoStrategies Inc.

SITE PLAN
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7927		7/93	



EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- 99.99 — Groundwater elevation in feet referenced to Mean Sea Level (MSL) measured on April 15, 1993
- 99.99 — Groundwater elevation contour. Approximate Gradient = 0.005
- NM — Not Measured

NOTES: 1. Contours may be influenced by irrigation practices and/or site construction activities.

N

0 50

Scale in Feet

Base Map: ARCO Tank & Line Replacement Site Plan dated 4-22-91 and Field Observations performed on 2-2-93

GeoStrategies Inc.

POTENTIOMETRIC MAP (APRIL 15, 1993)
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

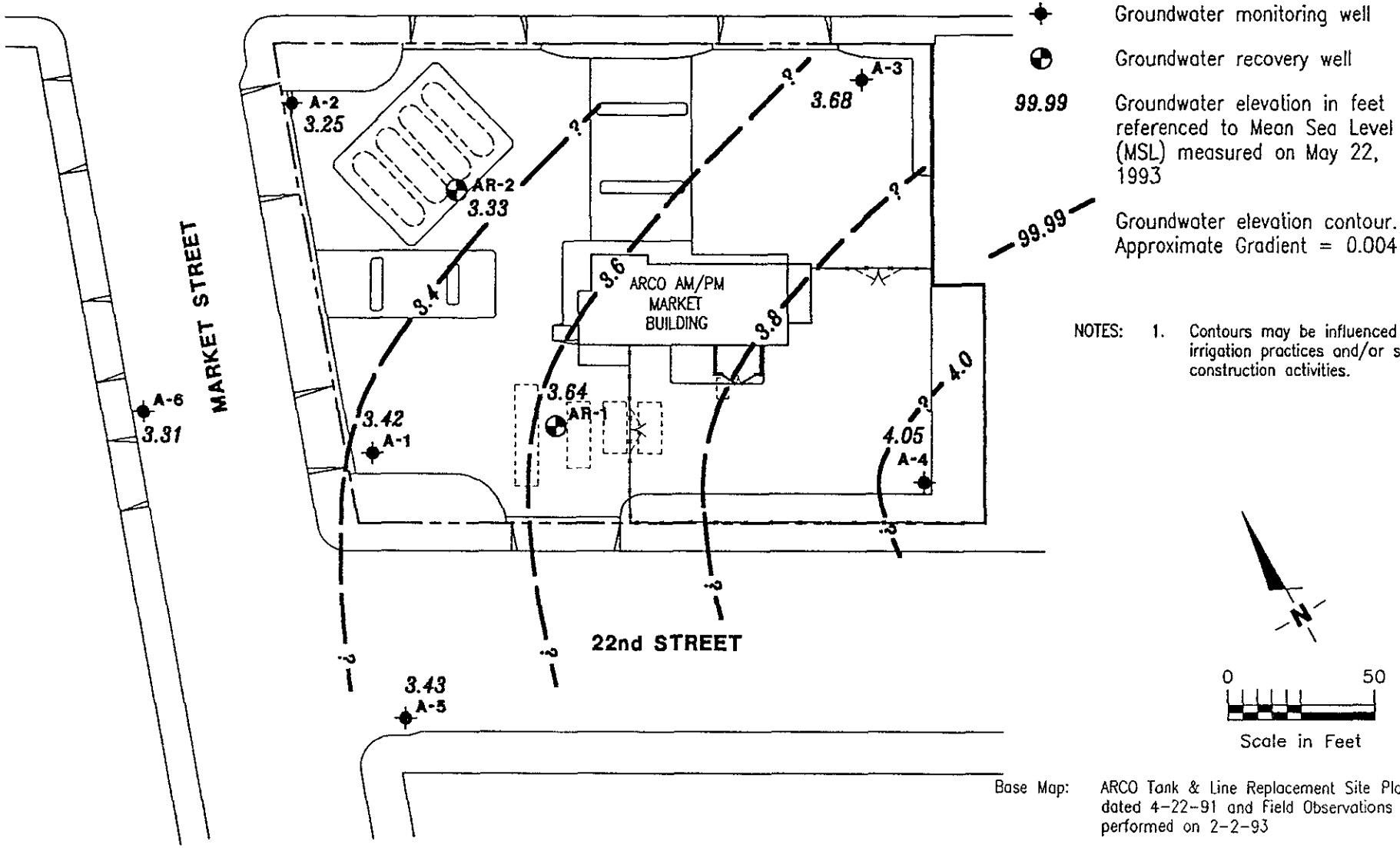
PLATE 3

JOB NUMBER 792701-14

REVIEWED BY

DATE 7/93

REVISED DATE



GeoStrategies Inc.

POTENTIOMETRIC MAP (May 22, 1993)
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

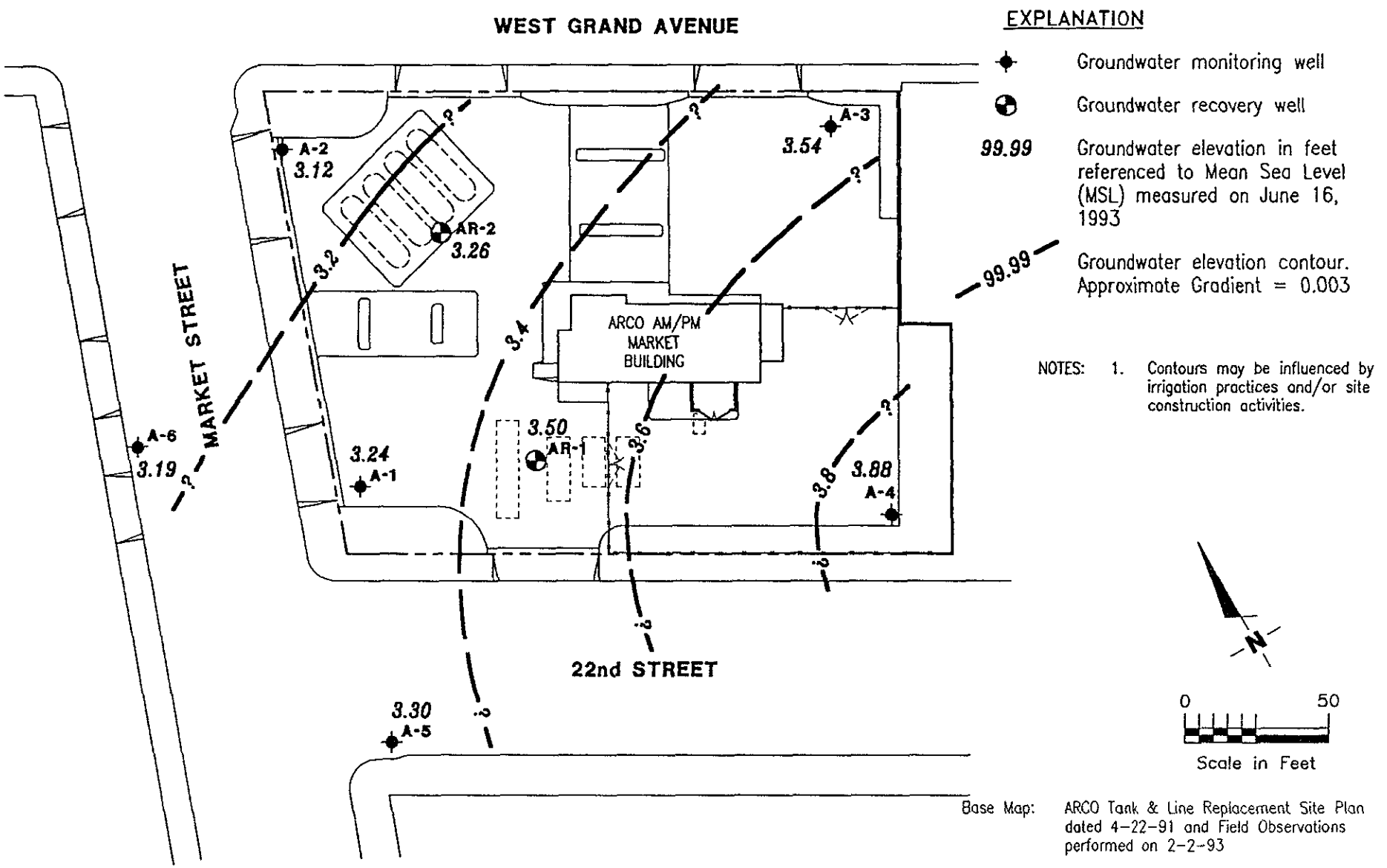
PLATE
4

JOB NUMBER
792701-14

REVIEWED BY

DATE
7/93

REVISED DATE

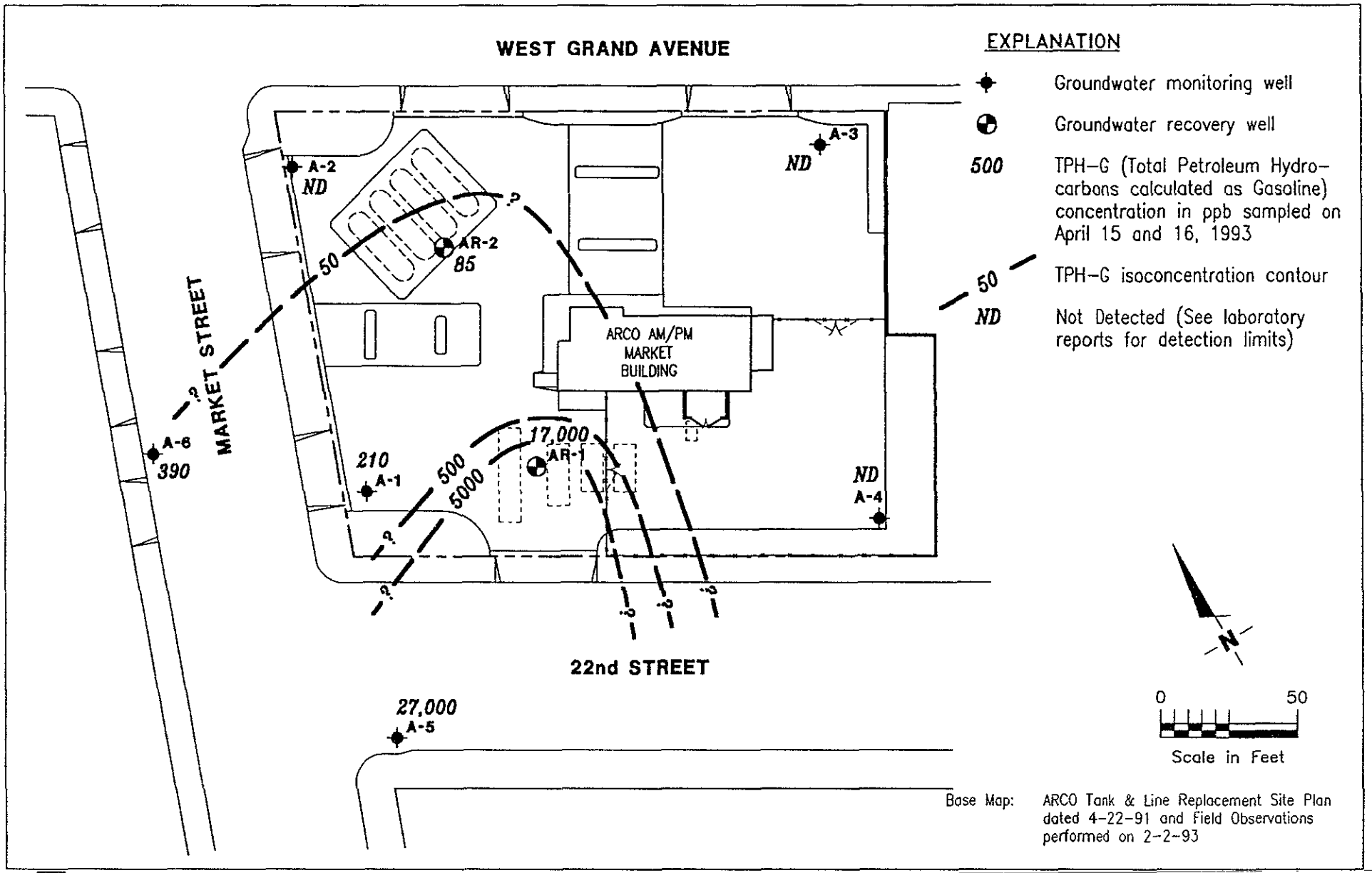


GeoStrategies Inc.

POTENTIOMETRIC MAP (JUNE 16, 1993)
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE 5

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792701-14		7/93	

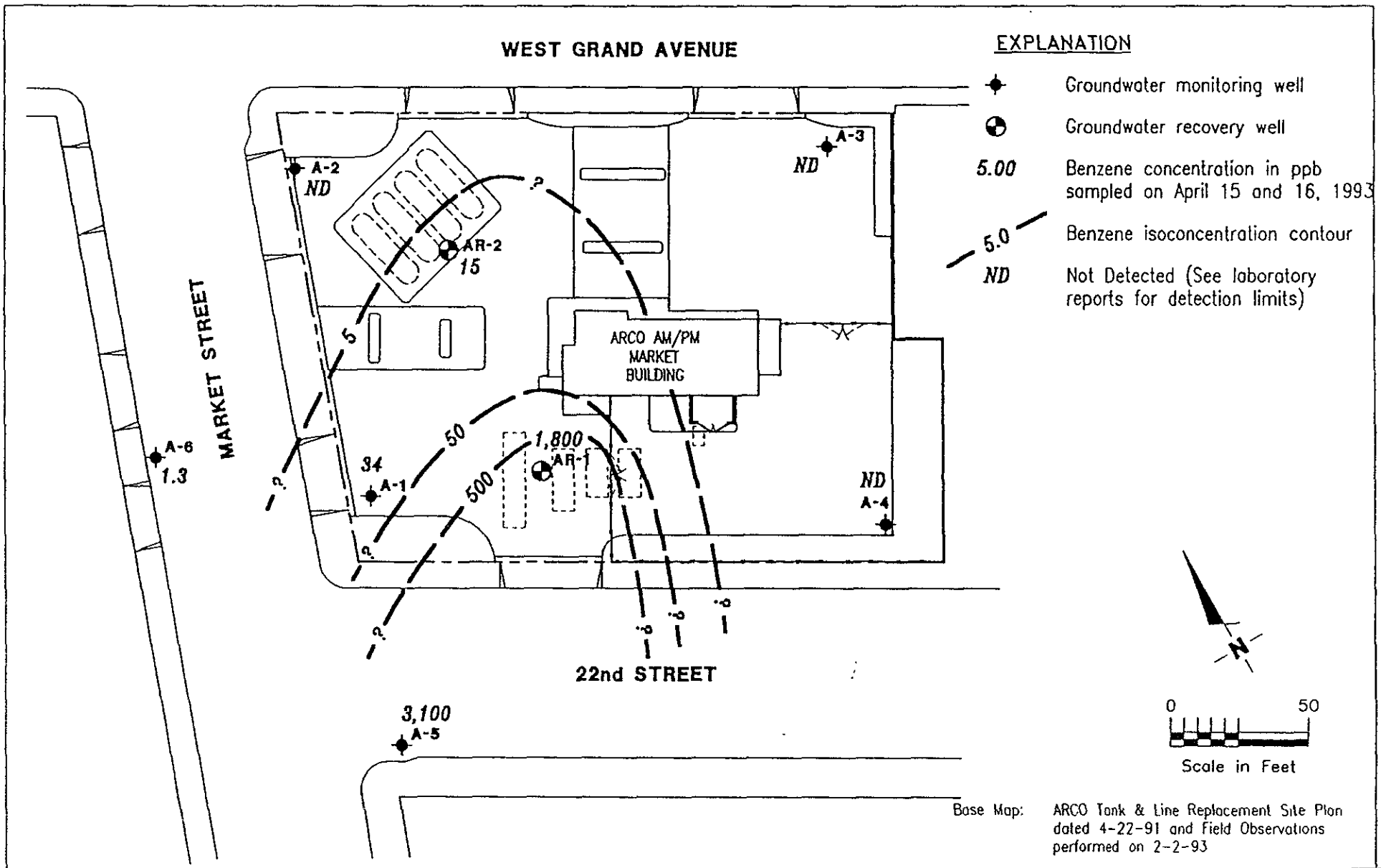


GeoStrategies Inc.

TPH-G ISOCONCENTRATION MAP
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE
6

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792701-14		7/93	



GeoStrategies Inc.

BENZENE ISOCONCENTRATION MAP
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE 7

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792701-14	BS	7/93	

APPENDIX A

EMCON GROUNDWATER SAMPLING REPORT

EMCON Associates
1921 Junction Avenue • San Jose, California 95131-2102 • (408) 453-0719 • fax (408) 453-0452

MAY - 7 1993

GeoStrategies Inc

Date May 4, 1993
Project 0G70-023.01

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
8	Water Sample Field Data Sheets

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the second quarter 1993 monitoring event at ARCO service station 2169, 889 West Grand Avenue, Oakland, CA. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions: (408) 453-2266.

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
ROBERT CURTIS PORTER
No: 4094
EXP: 6/30/96
INDUSTRIAL
STATE OF CALIFORNIA

Jim Butera JB

R. Curt Porter

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-052.01 STATION ADDRESS : 889 West Grand Ave, Oakland, CA DATE : 4-15-93

ARCO STATION # : 2169 FIELD TECHNICIAN : RACHEL DERFER / GALLEGOS 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-3	OK	YES	OK	2068	OK	11.78	11.93	ND	NA	29.1	[illegible]
2	A-2	OK	YES	OK	2268	OK	11.20	11.21	ND	NA	25.2	—
3	A-4	OK	YES	OK	2268	OK	11.15	11.15	ND	NA	28.3	—
4	A-6*	—	—	—	INACCESSIBLE			WELL → VAN	ON TOP OF [illegible]			
5	AR-2	OK	YES	NO	2068	OK	11.81	11.81	ND	NA	29.3	—
6	A-1	OK	YES	OK	2268	OK	10.50	10.50	ND	NA	24.3	STRONG ODOR
7	A-5	OK	YES	NO	2268	OK	10.11	10.1	ND	NA	30.3	STRONG ODOR
8	AR-1	OK	YES	OK	2260	OK	11.26	11.26	ND	NA	24.1	STRONG ODOR [illegible]
												* Well was returned to the following day and sampled.

SURVEY POINTS ARE TOP OF WELL BOXES

Summary of Groundwater Monitoring Data
Second Quarter 1993
ARCO Service Station 2169
889 West Grand Avenue, Oakland, California
micrograms per liter (µg/l) and milligrams per liter (mg/l)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH[1] as Gasoline (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	TPH as Diesel (µg/l)
A-1(24)	04/15/93	10.50	ND.[2]	210.	34.	11.	7.1	20.	420.
A-2(25)	04/15/93	11.20	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.[3]
A-3(29)	04/15/93	11.98	ND.	<50.	<0.5	<0.5	<0.5	<0 5	NR.
A-4(28)	04/15/93	11.15	ND.	<50.	<0.5	<0.5	<0.5	<0 5	NR
A-5(30)	04/15/93	10.11	ND.	27,000.	3,100.	4,000.	1,100.	4,600.	NR
A-6(26)	04/16/93	9.36	ND.	17,000.	1,800.	360.	520.	1,600.	NR
AR-1(27)	04/15/93	11.26	ND.	85.	15.	<0.5	<0.5	2 4	5,400.
AR-2(29)	04/15/93	11.81	ND.	390.	1.3	1.6	1.7	7.7	<1

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. NR. = Not reported, well was not sampled for the above parameter

SEQUOIA ANALYTICAL

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

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

Project: EMC-93-5/Arco 2169, Oakland

Enclosed are the results from 8 water samples received at Sequoia Analytical on April 19,1993. The requested analyses are listed below:

3D82901	Water, A-1 (24)	4/15/93	EPA 3510/3520/8015 EPA 5030/8015/8020
3D82902	Water, A-2 (25)	4/15/93	EPA 5030/8015/8020
3D82903	Water, A-3 (29)	4/15/93	EPA 5030/8015/8020
3D82904	Water, A-4 (28)	4/15/93	EPA 5030/8015/8020
3D82905	Water, A-5 (30)	4/15/93	EPA 5030/8015/8020
3D82906	Water, AR1 (27)	4/15/93	EPA 3510/3520/8015 EPA 5030/8015/8020
3D82907	Water, AR2 (29)	4/15/93	EPA 3510/3520/8015 EPA 5030/8015/8020
3D82908	Water, A-6 (26)	4/15/93	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 2169, Oakland	Sampled: Apr 15, 1993
1938 Junction Avenue	Sample Matrix:	Water	Received: Apr 19, 1993
San Jose, CA 95131	Analysis Method:	EPA 5030/8015/8020	Reported: Apr 30, 1993
Attention: Jim Butera	First Sample #:	3D82901	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 3D82901 A-1 (24)	Sample I.D. 3D82902 A-2 (25)	Sample I.D. 3D82903 A-3 (29)	Sample I.D. 3D82904 A-4 (28)	Sample I.D. 3D82905 A-5 (30)	Sample I.D. 3D82906 AR-1 (27)
Purgeable Hydrocarbons	50	210	N.D.	N.D.	N.D.	27,000	17,000
Benzene	0.50	34	N.D.	N.D.	N.D.	3,100	1,800
Toluene	0.50	11	N.D.	N.D.	N.D.	4,000	360
Ethyl Benzene	0.50	7.1	N.D.	N.D.	N.D.	1,100	520
Total Xylenes	0.50	20	N.D.	N.D.	N.D.	4,600	1,600
Chromatogram Pattern:		Gas	--	--	--	Gas	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	50	40
Date Analyzed:	4/22/93	4/22/93	4/22/93	4/22/93	4/22/93	4/22/93
Instrument Identification:	HP-5	HP-5	HP-5	HP-5	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	110	122	108	111	107	106

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 2169, Oakland	Sampled: Apr 15-16, 1993
1938 Junction Avenue	Sample Matrix:	Water	Received: Apr 19, 1993
San Jose, CA 95131	Analysis Method:	EPA 5030/8015/8020	Reported: Apr 30, 1993
Attention: Jim Butera	First Sample #:	3D82907	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 3D82907 AR-2 (29)	Sample I.D. 3D82908 A-6 (26)
Purgeable Hydrocarbons	50	85	390
Benzene	0.50	15	1.3
Toluene	0.50	N.D.	1.6
Ethyl Benzene	0.50	N.D.	1.7
Total Xylenes	0.50	2.4	7.7
Chromatogram Pattern:		Discrete Peaks	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0
Date Analyzed:	4/22/93	4/22/93
Instrument Identification:	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	108	100

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 2169, Oakland*	*Sampled.* Apr 15, 1993
1938 Junction Avenue	Sample Matrix:	Water	Received: Apr 19, 1993
San Jose, CA 95131	Analysis Method:	EPA 3510/3520/8015	Reported: Apr 30, 1993
Attention: Jim Butera	First Sample #.	3D82901	

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 3D82901 A-1 (24)	Sample I.D. 3D82906 AR1 (27)	Sample I.D. 3D82907 AR2 (29)
Extractable Hydrocarbons	50	420	5,400	N.D.
Chromatogram Pattern:		Non-diesel mix < C13	Non-diesel mix < C13	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	50	1.0
Date Extracted:	4/21/93	4/21/93	4/21/93
Date Analyzed:	4/23/93	4/23/93	4/23/93
Instrument Identification:	*GCHP-5 INJ. B*	*GCHP-5 INJ. B*	*GCHP-5 INJ. B*

Extractable Hydrocarbons are quantitated against a fresh diesel 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
1938 Junction Avenue
San Jose, CA 95131
Attention: Jim Butera

Client Project ID: EMC-93-5/Arco 2169, Oakland
Matrix: Water

QC Sample Group 3D82901-08

Reported: Apr 30, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Fontecha	J. Fontecha	J. Fontecha	J. Fontecha
Conc. Spiked:	20	20	20	60
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	LCS042293	LCS042293	LCS042293	LCS042293
Date Prepared:	4/22/93	4/22/93	4/22/93	4/22/93
Date Analyzed:	4/22/93	4/22/93	4/22/93	4/22/93
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5
LCS % Recovery:	121	114	111	116
Control Limits:	70-130	70-130	70-130	70-130
MS/MSD Batch #:	3040895	3040895	3040895	3040895
Date Prepared:	4/22/93	4/22/93	4/22/93	4/22/93
Date Analyzed:	4/22/93	4/22/93	4/22/93	4/22/93
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5
Matrix Spike % Recovery:	120	120	115	122
Matrix Spike Duplicate % Recovery:	120	115	110	116
Relative % Difference:	0.0	4.3	4.4	5.0

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.

SEQUOIA ANALYTICAL

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

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

Client Project ID: EMC-93-5/Arco 2169, Oakland
Matrix: Water

QC Sample Group 3D82901, 06-07

Reported: Apr 30, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel
Method:	EPA 8015
Analyst:	C. Lee
Conc. Spiked:	300
Units:	µg/L
LCS Batch#:	DBLK042093-X
Date Prepared:	4/20/93
Date Analyzed:	4/21/93
Instrument I.D.#:	GCHP-5 INJ. B
LCS % Recovery:	50
Control Limits:	50-150

MS/MSD Batch #:	DBLK042093-X
Date Prepared:	4/20/93
Date Analyzed:	4/21/93
Instrument I.D.#:	GCHP-5 INJ. B
Matrix Spike % Recovery:	50
Matrix Spike Duplicate % Recovery:	47
Relative % Difference:	6.2

Please note: the blank spike dup of BLK042093-X had a low recovery of 47% (control limits are 50-150%).
There are no more samples to be re-extracted with a new Q.C. set.
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

Task Order No. ~~EMEC-93-1~~ EMC-93-5

Chain of Custody

ARCO Facility no. 2169	City (Facility) OAKLAND	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 ASSOCIATES	Address (Consultant) 1938 Junction Avenue San Jose		Contract number

Method of shipment: Courier all Pickup

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 3 40ml HCl; 2-Liter NP Glass

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	8TEX 8020/EPA 8020	BTEX/TPH GAS EPA M8020/8020/8015	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 ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
A-1(24)		2		X		X	HCl	4-15-93	1137		X							9204829-		01	A/B	
A-2(25)		2		X		X			0955		X									02		
A-3(29)		2		X		X			0932		X									03		
A-4(28)		2		X		X			1025		X									04		
A-5(30)		2		X		X			1206		X									05		
~~A-6~~		2		X		X					X	NO SAMPLES TAKEN		INACCESSIBLE WELL								
AR-1(27)		2		X		X		4-15-93	1248		X									06		
AR-2(29)		2		X		X			1059		X									07		
A-1(24)							NP		1137			X								01	C/P	
AR-1(27)							NP		1248			X								06	C/P	
AR-2(29)							NP		1059			X								07	C/P	
A-6(26)		2		X			HCl	4-16-93	1050			X							✓	08	A/B	

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: J. Butera	4-19-93	0840
Received by: R. Tehlik	4/19/93	0840
Relinquished by: R. Tehlik	4-19-93	0920
Received by:		
Relinquished by:		
Received by laboratory: Laura Arnold	4/19/93	0920

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

(8-91)

Rev. 2. 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO. 0670-052.01 SAMPLE ID: [illegible]

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2169

SAMPLED BY: V LOCATION: 889 W. GRAND AVE, OAKLAND, 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.):	[illegible]
DEPTH TO WATER (feet):	10.41	CALCULATED PURGE (gal.):	15.21
DEPTH OF WELL (feet):	24.2	ACTUAL PURGE VOL. (gal.):	15.50

DATE PURGED: [illegible] Start (2400 Hr) 1122 End (2400 Hr) [illegible]

DATE SAMPLED: 4-5-93 Start (2400 Hr) 1132 End (2400 Hr) 40

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1127	5.50	7.05	1160	68.0	LT GRAY	MOD CLAY
1136	10.50	6.98	1170	68.5	GRAY	CLAY
1153	15.50	7.00	1185	67.5	↓	↓

D. O. (ppm): NR ODOR: STRONG

COLOR (visual): NR (COBALT 0 - 100)

TURBIDITY (visual): 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: OK LOCK #: 2005

REMARKS: ___

Meter Calibration: Date: 4-15-93 Time: [illegible] Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: [illegible]

Signature: [illegible] Reviewed By: [illegible] Page 1 of 3

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-052.01 SAMPLE ID. [illegible]

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2169

SAMPLED BY: V LOCATION: 889 W. GRAND AVE., OAKLAND, 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.):	5.43
DEPTH TO WATER (feet):	11.22	CALCULATED PURGE (gal.):	15.64
DEPTH OF WELL (feet):	25.2	ACTUAL PURGE VOL (gal.):	15.50

DATE PURGED: 4-15-93 Start (2400 Hr) 0946 End (2400 Hr) 0950

DATE SAMPLED: 4-15-93 Start (2400 Hr) 0955 End (2400 Hr) 0957

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0944	5.50	7.15	1093	68.5	LT BROWN	HEAVY
0947	11.00	7.05	1076	68.2	LT GREY	MODERATE
0950	15.50	7.02	1067	68.3	LT GREY	LIGHT

D. O. (ppm): NR ODOR: NONE. 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: OK LOCK #: 2206

REMARKS: ___

Meter Calibration: Date: 4-15-93 Time: 0910 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: [illegible]

Signature: [signature] Reviewed By: JB

EMCON ASSOCIATES

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

PROJECT NO. 0G70-052.01 SAMPLE ID: A-[illegible]

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2169

SAMPLED BY: ↓ LOCATION: 889 W. GRAND AVE., OAKLAND, 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.): 6.21

DEPTH TO WATER (feet): 11.95 CALCULATED PURGE (gal.): 15.53

DEPTH OF WELL (feet): 27.1 ACTUAL PURGE VOL. (gal.): 19.00

DATE PURGED: 4-15-93 Start (2400 Hr) 0912 End (2400 Hr) 0924

DATE SAMPLED: 4-15-93 Start (2400 Hr) 0935 End (2400 Hr) 0935

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0921	6.50	7.51	959	66.5	BROWN	HEAVY
0924	13.00	7.50	955	66.6	BROWN/[illegible]	↓
0924	19.00	7.59	943	66.7	↓	↓

D. O. (ppm): NR ODOR: None 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: OK LOCK #: 3259

REMARKS: WATER IN BOX, [illegible]

Meter Calibration: Date: 4-15-93 Time: [illegible] Meter Serial #: 9203 Temperature °F: [illegible]

(EC 1000 [illegible] / [illegible]) (DI [illegible]) (pH 7 [illegible] / [illegible]) (pH 10 [illegible] / [illegible]) (pH 4 [illegible] / ____)

Location of previous calibration: ____

Signature: [signature] Reviewed By: [initials] Page 5 of 8

Rev. 2. 5/9

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO. 0670-052.01 SAMPLE ID: A-1

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2169

SAMPLED BY: ↓ LOCATION: 889 W. GRAND AVE, OAKLAND, 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.):	6.36
DEPTH TO WATER (feet):	11.11	CALCULATED PURGE (gal.):	18.91
DEPTH OF WELL (feet):	25.3	ACTUAL PURGE VOL. (gal.):	19.00

DATE PURGED: 4-5-93 Start (2400 Hr) 1010 End (2400 Hr) 1020

DATE SAMPLED: 4-5-93 Start (2400 Hr) 1025 End (2400 Hr) 1037

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1014	6.20	7.14	1075	65.9	LT BROWN	LIGHT
1017	12.50	7.22	1101	65.7	LT GREY	1
1020	19.00	7.19	1120	65.7	↓	↓

D. O. (ppm): NR ODOR: NONE 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: OK LOCK #: 2265

REMARKS: ___

Meter Calibration: Date: 4-15-93 Time: ___ Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: ___

Signature: [signature] Reviewed By: JP Page 1 of 8

EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

PROJECT NO. 0670-052.01 SAMPLE ID: [illegible]

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2169

SAMPLED BY: ✓ LOCATION: 889 W. GRAND AVE, OAKLAND, 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.): [illegible]

DEPTH TO WATER (feet): 10.09 CALCULATED PURGE (gal.): [illegible]

DEPTH OF WELL (feet): [illegible] ACTUAL PURGE VOL. (gal.): [illegible]

DATE PURGED: 4-15-93 Start (2400 Hr) [illegible] End (2400 Hr) [illegible]

DATE SAMPLED: 4-15-93 Start (2400 Hr) [illegible] End (2400 Hr) [illegible]

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (μmnos/cm@ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
[illegible]	3.50	7.49	1000	67.0	GREY	[illegible]
1200	7.00	6.96	1036	66.0	↓	↓
1202	10.00	7.00	1054	68.1	↓	↓

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

- ___ 2" Bladder Pump
- X Centrifugal Pump
- ___ Submersible Pump
- ___ Well Wizard™
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)
- ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ DDL Sampler
- ___ Dipper
- ___ Well Wizard™
- X Bailer (Teflon®)
- ___ Bailer (Stainless Steel)
- ___ Submersible Pump
- ___ Dedicated

Other: ___

WELL INTEGRITY: OK LOCK #: 2265

REMARKS: ___

Meter Calibration: Date: 4-15-93 Time: [illegible] Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: [illegible]

Signature: [illegible] Reviewed By: [illegible] Page 5 of 8

Rev 2, 5.9

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: CG70-052.01 SAMPLE ID: 4 (26)

PURGED BY: L RUTH CLIENT NAME: ARCO 2164

SAMPLED BY: L RUTH LOCATION: 889 W GRAND AVE OAKLAND CA

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

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

CASING ELEVATION (feet/MSL): N/R VOLUME IN CASING (gal.): 2.89

DEPTH TO WATER (feet): 9.36 CALCULATED PURGE (gal.): 8.69

DEPTH OF WELL (feet): 27.1 17.74 ACTUAL PURGE VOL. (gal): 9.0

DATE PURGED: 4-16-93 Start (2400 Hr) 1042 End (2400 Hr) 1046

DATE SAMPLED: 4-16-93 Start (2400 Hr) 1050 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1042	3	7.42	1000	66.2	Brown	Heavy
1044	6	7.21	1024	66.5	↓	↓
1046	9	7.18	1028	66.4	↓	↓

D. O. (ppm): N/R ODOR: None N/R (COBALT 0 - 100) NR (NTU 0 - 200)

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

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)
X Centrifugal Pump ___ Bailer (PVC)
___ Submersible Pump ___ Bailer (Stainless Steel)
___ Well Wizard™ ___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump X Bailer (Teflon®)
___ DDL Sampler ___ Bailer (Stainless Steel)
___ Dipper ___ Submersible Pump
___ Well Wizard™ ___ Dedicated
Other: ___

WELL INTEGRITY: ___ LOCK #: 2268

REMARKS: lots of Silt in purge water
car on well found owner to move.
owner of car works for metro cab company

Meter Calibration: Date: 4-16-93 Time: 1000 Meter Serial #: 9010 Temperature °F: 63.2

(EC 1000 998 / 1000) (DI 13.40) (pH 7 ___ / 7.00) (pH 10 ___ / 10.00) (pH 4 4.00 / ___

Location of previous calibration: ___

Signature: Lisa Ruth Reviewed By: JB Page 6 of 7

Rev. 2 5/31

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-052.01 SAMPLE ID: MW-1

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2169

SAMPLED BY: ✓ LOCATION: 889 W. GRAND AVE, OAKLAND, 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.):	24.14
DEPTH TO WATER (feet):	11.27	CALCULATED PURGE (gal.):	72.40
DEPTH OF WELL (feet):	27+	ACTUAL PURGE VOL (gal.):	72.50

DATE PURGED: 4-15-93 Start (2400 Hr) 1222 End (2400 Hr) 1243

DATE SAMPLED: 4-15-93 Start (2400 Hr) 1243 End (2400 Hr) 1252

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1230	24.20	7.78	771	66.1	CLOUDY	LIGHT
1237	49.00	7.82	800	67.5	↓	↓
1243	72.50	7.90	803	68.1	↓	↓

D. O. (ppm): NR ODOR: STRONG 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: OK LOCK #: 2268

REMARKS: WATER IN BOX BELOW LOC

Meter Calibration: Date: 4-15-93 Time: 0910 Meter Serial #: 9203 Temperature °F: ____

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

Location of previous calibration: ____

Signature: [signature] Reviewed By: AB Page 7 of 8

WATER SAMPLE FIELD DATA SHEET

Rev. 2 5/91

EMCON ASSOCIATES

PROJECT NO. 0670-052.01 SAMPLE ID: MW-2 (4")

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2169

SAMPLED BY: V LOCATION: 889 W. GRAND AVE, OAKLAND, CA.

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	11.42
DEPTH TO WATER (feet):	11.82	CALCULATED PURGE (gal.):	34.26
DEPTH OF WELL (feet):	29.3	ACTUAL PURGE VOL (gal.):	34.50

DATE PURGED: 4-15-93 Start (2400 Hr) 1040 End (2400 Hr) 1054

DATE SAMPLED: 4-15-93 Start (2400 Hr) 1054 End (2400 Hr) 1101

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1045	11.50	7.33	863	65.6	RUST/BROWN	HEAVY
1049	23.00	7.23	901	65.7	LT BROWN	LIGHT
1054	34.50	7.20	953	65.5	CLOUDY	LIGHT

D. O. (ppm): NR ODOR: SLIGHT

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: OK LOCK #: 2268

REMARKS: ___

Meter Calibration: Date: 4-15-93 Time: 0910 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: A-3

Signature: Kevin Reichelderfer Reviewed By: JB Page 5 of 5

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

Date June 3, 1993
Project 0G70-052.01

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
	May 1993 monthly water level survey, ARCO
	station 2169, 889 West Grand Ave. Oakland, CA.

For your: X Information Sent by: X Mail

Comments:

Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by: Jim Butera JB

REGISTERED PROFESSIONAL ENGINEER ROBERT CURTIS PORTER No: 4094 Exp. 6/30/96 INDUSTRIAL STATE OF CALIFORNIA

Robert Porter, Senior Project Engineer

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-052.01 STATION ADDRESS : 889 West Grand Ave, Oakland, CA DATE : 5-22-93

ARCO STATION # : 2169 FIELD TECHNICIAN : K REICHELDERFER DAY : SATURDAY

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-2	OK	YES	OK	2268	OK	11.91	11.91	ND	NA	25.2	—
2	A-3	OK	YES	OK	2268	OK	12.70	12.70	ND	NA	27.1	—
3	A-4	OK	YES	OK	2268	OK	11.84	11.84	ND	NA	28.3	—
4	AR-1	OK	YES	OK	2268	OK	12.07	12.07	ND	NA	27.7	—
5	A-1	OK	YES	OK	2268	OK	11.33	11.33	ND	NA	24.4	—
6	AR-2	OK	YES	OK	2268	OK	12.46	12.96	ND	NA	29.1	—
7	A-6	OK	YES	NOK	2268	OK	10.86	10.86	ND	NA	27.7	WATER IN BOX, ABOVE LOCK WELL UNDER PRESSURE
8	A-5	OK	YES	NOK	2268	OK	10.71	10.71	ND	NA	30.3	WATER IN BOX, BELOW LOCK

SURVEY POINTS ARE TOP OF WELL BOXES

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

RECEIVED

JUN 29 1993

GeoStrategies Inc.

Date June 21, 1993
Project 0G70-052.01

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
	June 1993 monthly water level survey, ARCO
	station 2169, 889 West Grand Ave. Oakland, CA.

For your: X Information Sent by: X Mail

Comments:
Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Jim Butera

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER ROBERT CURTIS PORTER NO. 4084 Exp. 6/30/94 INDUSTRIAL STATE OF CALIFORNIA

Robert Porter, Senior Project Engineer

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-052.01 STATION ADDRESS : 889 West Grand Ave, Oakland, CA DATE : 6-16-93

ARCO STATION # : 2169 FIELD TECHNICIAN : K REICHELDERFER DAY : WEDNESDAY

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-2	OK	YES	OK	2268	OK	12.04	12.04	ND	NA	25.2	15/16"
2	A-3	OK	YES	OK	2268	OK	12.84	12.84	ND	NA	29.1	
3	A-4	OK	YES	OK	2268	OK	12.01	12.01	ND	NA	28.4	
4	AR-1	OK	YES	OK	2268	OK	12.21	12.22	ND	NA	27.8	STRONG ODOR
5	A-1	OK	YES	OK	2268	OK	11.51	11.51	ND	NA	24.4	STRONG ODOR
6	AR-2	OK	*YES	OK	~~2268~~	OK	12.53	12.53	ND	NA	29.2	*ROUND 3' DIA LID; 2008 Locking NE Key ca.
7	A-6	OK	YES	NO	2268	OK	10.98	10.98	ND	NA	27.7	BOX FULL OF WATER
8	A-5	OK	YES	NO	2268	OK	10.84	10.84	ND	NA	30.3	WATER IN BOX, BELOW CWC

SURVEY POINTS ARE TOP OF WELL BOXES