NOT APPROVED
10-29-03

URS

August 11, 2003

SS#
10174

Alameda County
AUG 14 2003
Environmental Health

Mr. Amir Gholami, REHS
Hazardous Materials Specialist
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

RE: WORK PLAN FOR HYDROGEN PEROXIDE INJECTION,
ARCO SERVICE STATION #5387,
20200 HESPERIAN BOULEVARD, HAYWARD, CALIFORNIA

Dear Mr. Gholami,

URS Corporation (URS) has prepared this work plan on behalf of Atlantic Richfield Company (ARCO - an affiliated company of the Group Environmental Management Company) for ARCO Service Station #5387, located at 20200 Hesperian Boulevard in Hayward, California (the Site) (Figure 1). This work plan was prepared to perform a hydrogen peroxide injection in the area of the northwestern dispenser. Soil samples collected beneath the northwestern dispenser during the tank, product piping and dispenser removal in February 2002 contained hydrocarbons and methyl tertiary butyl ether (MTBE). URS will perform a hydrogen peroxide injection to mitigate residual hydrocarbons and MTBE in soil and groundwater in the area of the northwestern dispenser.

SITE BACKGROUND

Site Hydrogeology

The dominant Site lithology is a sequence of dark clays grading into sands and gravels at depth greater than 20 feet below ground surface (bgs). Historic cross-sections are located in Attachment B. The Site is located 0.2 miles north of Sulphur Creek in San Lorenzo and approximately 2.5 miles east of San Francisco Bay.

The most recent groundwater data is from the June 27, 2003 second quarter monitoring event (Table 1). Depths to groundwater range from 9.12 feet in MW-3 to 12.95 feet in A-7 and the groundwater gradient from this quarter was approximately 0.005 towards the west (Figure 1). Benzene concentrations in samples collected from all of the sampled wells were not detected at or above the laboratory reporting limits. Confirmed concentrations of MTBE by EPA Method 8260 were found to exist in eight Site wells. The minimum detected MTBE concentration observed in Site samples was in MW-3 at (0.61 micrograms per liter [µg/L]) and the maximum observed was in MW-1 (170 µg/L).

URS Corporation
500 12th Street, Suite 200
Oakland, CA 94607-4014
Tel: 510.893.3600
Fax: 510.874.3268

History of Remedial Action

The Site is a former service station located at the southeastern corner of the intersection of Hesperian Boulevard and West Sunset Drive. The Site is located in an area of commercial and residential development, and is a relatively flat asphalt and concrete covered lot. In August 1986, Groundwater Technology Inc. (GTI) drilled four exploratory soil borings (SB-1 through SB-4) and installed three groundwater monitoring wells (MW-1 through MW-3). In October and December 1991, GSI installed four additional groundwater monitoring wells (A-4 through A-7). In August 1992, GSI installed two offsite groundwater monitoring wells (A-8 and A-9) and one groundwater recovery well (AR-1) at the Site. One off-Site downgradient exploratory soil boring was drilled and completed as groundwater monitoring well A-10 on November 18, 1992. GSI drilled six on-Site exploratory soil borings and installed recovery well AR-2, vapor extraction/air sparging well AS-1, and air sparging well AS-2 in these borings on March 16 and 17, 1993.

An aquifer pumping and recovery test was performed at the Site by GeoStrategies, Inc. on October 13 and 14, 1992 utilizing recovery well AR-1. GeoStrategies evaluation of the step-drawdown test suggested that a pumping rate of 3 gallons per minute (gpm) would be the optimal discharge rate for the constant rate test. Maximum observed drawdown in the pumping well was 12.06 feet. Calculated transmissivity values from the field data plots ranged between 4,147 gallons per day per foot (gpd/ft) to 11,000 gpd/ft. Storativity ranged between 1.09×10^{-4} and 9.92×10^{-2}. Storativity values appear to represent an aquifer that is unconfined to semi-confined. The maximum drawdown was seen in well A-7 at 0.55 feet below initial water-levels. Well A-7 is approximately 80 feet downgradient from the pumping well AR-1. Finally, the well efficiency was calculated to be 16.5% at a constant discharge rate of 3 gpm. Low well efficiency of well AR-1 may be a function of the fine-grained nature of the aquifer in the area around the well (GeoStrategies, 1993).

GeoStrategies performed two vapor extraction tests (VET) and one vapor extraction/air sparging test (VEAT) at the Site on March 24, 1993. A fourth test (VET) was performed on August 13, 1993. These tests were performed on four distinct groups of wells. The effective radius of influence was estimated to be 20 feet. The calculated hydrocarbon removal rates for these tests ranged from 11 lbs/day to 60.7 lbs/day.

In December 1998, an Alameda County Health Care Services Agency (ACHCSA) representative and a Thrifty geologist observed a leak from the impact valve of dispenser No. 8 while overseeing the re-booting of the dispenser piping. Petroleum hydrocarbon constituents were detected in soil samples 8N and 8E collected beneath dispenser No. 8. As a result, ACHCSA requested further assessment under dispenser No. 8.

On June 13, 2000, Delta installed one hand auger soil boring (HA-1) to a total depth of approximately 13 feet bgs at an angle approximately 60° off horizontal. Soil samples were collected at 3-feet, 6-feet, 9-feet, and 12.5-feet bgs for chemical analysis. Based on the analytical results, it appears that the soil beneath dispenser No. 8 was not significantly impacted. Benzene

concentrations were not detected at or above the laboratory reporting limits and MTBE was reported at less than 1 milligram per kilogram.

URS conducted a Dual Phase Extraction (DPE) test between November 4 and November 9, 2002 for approximately 120 hours (the system was shut down for 17.8 hours on November 6 and 7, 2002) on three extraction points (MW-2, AR-2, and EP-1). Test results indicated limited success using DPE on wells MW-2 and AR-1 to mitigate soil and groundwater impacted by hydrocarbons and MTBE. The recent increase in MTBE concentrations at AR-1, MW-1, and MW-2 may be the result of constituents from the vadose zone being flushed into the groundwater by increased infiltration of precipitation. Approximately 20 to 25 percent of the ground surface at the Site is now dirt rather than asphalt and concrete thus allowing for increased infiltration. The dirt areas were left after the removal of four underground storage tanks, product lines, and dispensers in February 2002.

PROPOSED SCOPE OF WORK

Preliminary Site field data suggests that natural attenuation may be reducing hydrocarbon concentrations, at least locally. Based on this data, remediation by chemical oxidation and enhanced intrinsic bioremediation by introduction of hydrogen peroxide into selected on-Site wells is proposed.

Chemical oxidation by hydrogen peroxide application works to destroy organic compounds in wastewater, and in contaminated soil and groundwater, through the Fenton Reaction. The first step in the Fenton Reaction is the reaction between hydrogen peroxide and ferrous iron under acidic conditions (pH 3-6) to produce the hydroxyl radical:

$$Fe^{2+} + H_2O_2 ==> OH\bullet + OH^- + Fe^{3+}$$

The hydroxyl radical then reacts with an organic compound, oxidizing it to produce degraded products. Hydroxyl radicals have a higher oxidation potential than hydrogen peroxide, and a higher second order rate constant. Therefore, hydroxyl radicals are stronger oxidants than hydrogen peroxide and react faster.

In addition to chemically oxidizing organic compounds, hydrogen peroxide application increases the concentration of dissolved oxygen in groundwater. This can enhance naturally occurring bioremediation because most hydrocarbon-consuming organisms are aerobic, and are limited by oxygen availability.

Hydrogen Peroxide Introduction

To chemically oxidize hydrocarbons and enhance intrinsic bioremediation in the Site soil and groundwater, a 7.5% hydrogen peroxide solution will be introduced to wells A-7, AR-1, AR-2, MW-1, MW-2 (Figure 1). The hydrogen peroxide solution will be added into each well to approximately 5 ft below top of casing and allowed to infiltrate. The amount of hydrogen

peroxide added to each well will be based on the diameter of the well, depth to groundwater, and the permeability of the soil. Calculations approximating the volume of hydrogen peroxide necessary for injection are included as Attachment A. Borings logs and well construction details for these wells are in Attachment B. The Health and Safety Plan will be updated to include hazards introduced by hydrogen peroxide injection.

Hydrogen peroxide will be added in one initial event to wells A-7, AR-1, AR-2, MW-1, MW-2 and then at a frequency determined from the initial results. Dissolved oxygen (DO) measurements will be collected from wells A-7, AR-1, AR-2, MW-1, MW-2 prior to adding hydrogen peroxide, and again during quarterly groundwater monitoring. To more accurately monitor the impacts of the hydrogen peroxide on groundwater quality, the wells will be allowed to re-equilibrate one month prior to the collection of quarterly groundwater samples.

Intrinsic Bioremediation Parameters

To assess the level of natural attenuation that is occurring beneath the Site, intrinsic bioremediation parameters will be monitored in groundwater. Groundwater samples will be collected from the monitoring wells during a regularly scheduled monitoring event and analyzed for DO, oxidation/reduction potential (ORP or Eh), pH, conductivity and temperature in the field. In addition to the regular analytical suite, groundwater samples will also be analyzed for alkalinity, nitrate, sulfate and ferrous iron by EPA Methods 310.2, 353.2, 375.4, and 200.7, respectively.

Bioparameter Monitoring

The bioparameters that will be monitored to assess the progress of Site remediation are presented below. These bioparameters will be monitored semiannually during the first and third quarters, except for DO, which will be measured in selected wells monthly.

To summarize these parameter relationships, biodegradation is suggested by an indirect relationship between hydrocarbon concentrations and DO, ORP, nitrate and sulfate concentrations, and a direct relationship between hydrocarbon concentrations and alkalinity and ferrous iron concentrations. The effectiveness of these enhanced natural attenuation activities and the distribution of dissolved hydrocarbons beneath the Site will be periodically reviewed. If warranted, changes to these corrective action activities will be recommended.

- **Dissolved Oxygen:** During aerobic biodegradation, DO levels are reduced as aerobic respiration occurs. DO is the most thermodynamically favored electron acceptor used in aerobic biodegradation of petroleum hydrocarbons. Active aerobic biodegradation of BTEX compounds requires at least 1 ppm DO in groundwater. DO concentrations can be as high as 8 to 13 ppm in oxygen-saturated groundwater. Therefore, DO concentrations that vary inversely to hydrocarbon concentrations indicate the occurrence of aerobic degradation, provided that at least 1 to 2 ppm of DO is present. Based on field measurements obtained on

June 27, 2003, DO ranged from 0.8 (MW-1) to 5.0 (A-6) with a mean of 1.6. Historically, DO in Site wells has ranged from a minimum of 0.8 to a maximum of 6.2 (Table 1).

- **Oxidation-Reduction Potential:** The ORP of groundwater is a measure of electron activity and is an indicator of the relative tendency of a solute species to gain or lose electrons. The ORP of groundwater generally ranges from -400 millivolts (mV) to +800 mV. Under oxidizing conditions the ORP of groundwater is positive, while under reducing conditions the ORP is usually negative. Reducing conditions (negative ORP) suggests that anaerobic biodegradation is occurring. Generally, the ORP of groundwater inside a BTEX plume should be somewhat less than that measured outside the plume.

- **Alkalinity:** The total alkalinity of groundwater indicates the groundwater's ability to neutralize acid. High alkalinity (high pH) conditions occur when groundwater contains elevated hydroxides, carbonates, and bicarbonates of elements such as calcium, magnesium, sodium, potassium, or ammonia. Because these species are created by the respiration of microorganisms, high alkalinity is an indicator of biological activity. However, these species may also result from the dissolution of rock (especially carbonate rocks) and the transfer of carbon dioxide from the atmosphere. Alkalinity also buffers groundwater pH against acid generation by both aerobic and anaerobic biodegradation processes. Higher alkalinity in the source area compared to the areas outside the plume suggests that biodegradation is occurring. Historically, pH in Site wells has ranged from a minimum of 6.3 to a maximum of 7.2 (Table 1).

- **Nitrate:** After DO has been depleted in the microbiological treatment zone, nitrate may be used as an electron acceptor for anaerobic biodegradation. In this process, called denitrification, nitrate is reduced to nitrite. Reduced nitrate concentrations in the source area compared to the areas outside the plume suggests that anaerobic biodegradation is occurring.

- **Sulfate:** After DO and nitrate have been depleted in the microbiological treatment zone, sulfate may be used as an electron acceptor for anaerobic biodegradation. If sulfate concentrations vary indirectly with hydrocarbon concentrations, anaerobic biodegradation of fuel hydrocarbons is probably occurring.

- **Ferrous Iron:** In some cases, ferric iron is used as an electron acceptor during anaerobic biodegradation of petroleum hydrocarbons. In this process, ferric iron is reduced to ferrous iron, which may be soluble in water. Therefore, if the ferrous iron concentrations vary directly with hydrocarbon concentration, anaerobic biodegradation may be occurring.

Groundwater Monitoring

Quarterly monitoring of selected Site wells will continue. Pre-purge and post-purge DO measurements will be taken from the Site wells. Bioparameters including ORP, nitrate, sulfate, alkalinity, and ferrous iron will be analyzed during hydrogen peroxide application.

PROPOSED SCHEDULE

URS will begin the proposed work coordinating and scheduling field activities upon regulatory approval. We anticipate submitting a discussion of the hydrogen peroxide application activities and evaluation of the remediation achieved by hydrogen peroxide application in the quarterly monitoring reports.

If you have any questions or concerns, feel free to contact us at (510) 893-3600.

Sincerely,

URS CORPORATION

Scott Robinson
Project Manager

Barbara J. Jakub, R.G.
Senior Geologist

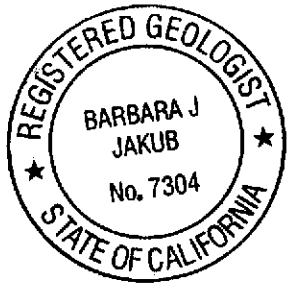
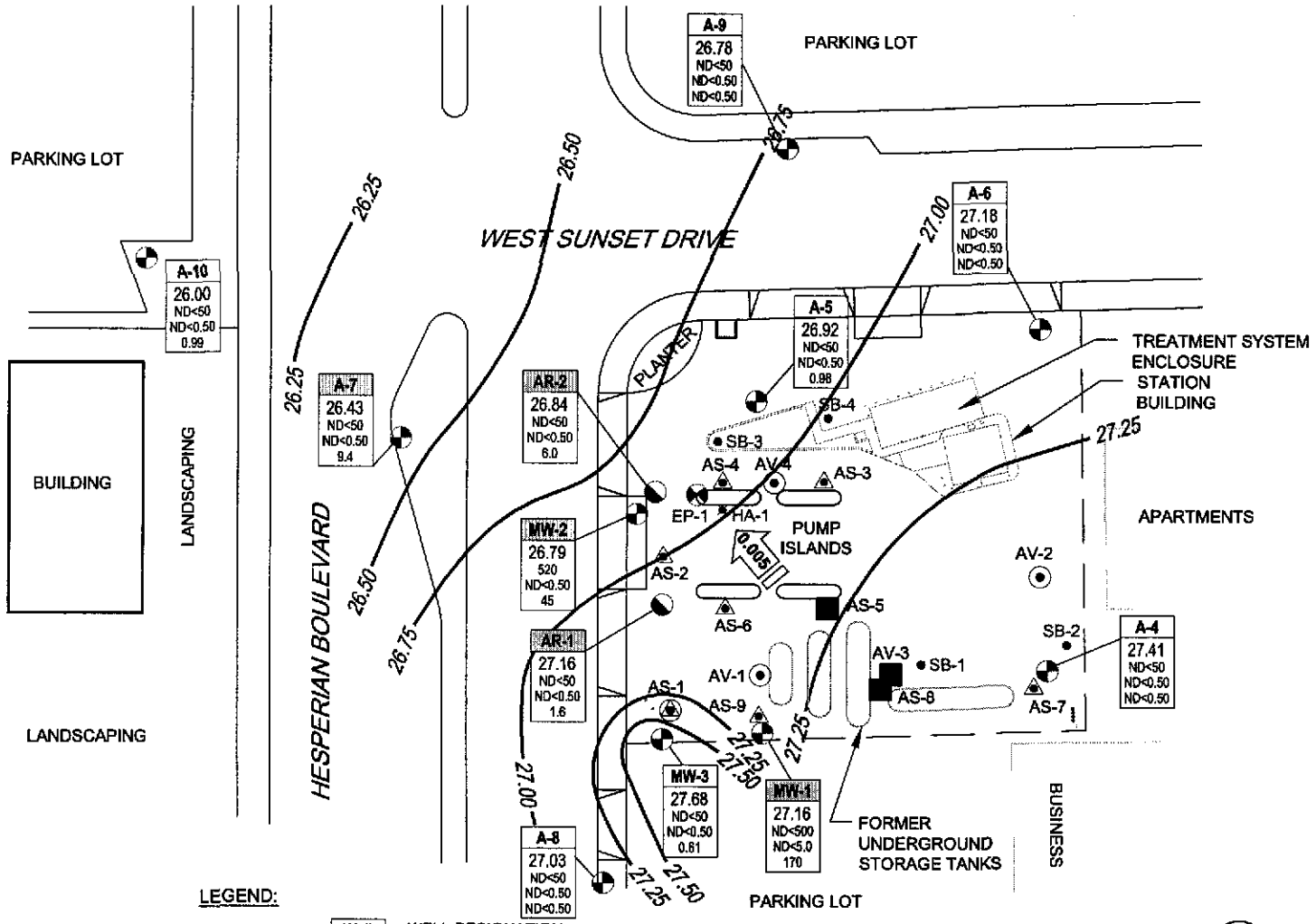


Figure 1: Groundwater Elevation Contour and Analytical Summary Map
Table 1: Groundwater Elevation and Analytical Data
Attachment A: Hydrogen Peroxide Calculations
Attachment B: Historical Cross Sections and Boring Logs

Cc: Mr. Paul Supple, Atlantic Richfield Company (electronic copy uploaded to ENFOS)



LEGEND:

- ABANDONED MONITORING WELL LOCATION
- MONITORING WELL LOCATION
- GROUNDWATER EXTRACTION WELL LOCATION
- SOIL VAPOR EXTRACTION WELL LOCATION
- AIR SPARGE WELL LOCATION
- DUAL AIR SPARGE/SOIL VAPOR EXTRACTION WELL LOCATION
- AIR SPARGE WELL LOCATION
- DUAL AIR SPARGE/SOIL VAPOR EXTRACTION WELL LOCATION
- EXTRACTION POINT
- 26.00 APPOXIMATE GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MSL)
- 0.007 GROUNDWATER FLOW DIRECTION AND GRADIENT (FEET/FOOT)

Well — WELL DESIGNATION
ELEV — GROUNDWATER ELEVATION
TPH-g, Benzene, MTBE — CONCENTRATIONS OF TPH-g, BENZENE AND MTBE IN MICROGRAMS PER LITER (µg/L)

* NOT USED IN GROUNDWATER ELEVATION CONTOURS

ND< NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMITS

Well, ELEV, TPH-g, Benzene, MTBE — PROPOSED HYDROGEN PEROXIDE WELL

NORTH

0 50 100

SCALE IN FEET

NOTE: SITE MAP ADAPTED FROM IT CORPORATION FIGURES. SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

X:\x_env_waste\BP GEM\Sites\Scott Robinson\Paul Supple\5387\Monitoring\Qtr. 2, 2003\Drawings\rev-GWEC-AS_6-27.dwg, 08/06/2003 10:00:46 AM, JKMT, URS

URS

Project No. 38486130

ARCO Service Station 5387
20200 Hesperian Boulevard
Hayward, California

GROUNDWATER ELEVATION CONTOUR AND ANALYTICAL SUMMARY MAP Second Quarter 2003 (June 27, 2003)

FIGURE 1

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
AR-1	09/14/92		38.11	15.21	22.90	820	67	ND<1.0	8.8	6.7	---	---	---
	11/12/92			15.36	22.75	140	66	ND<0.5	4.3	3.7	---	---	---
	02/11/93			12.81	25.30	360	190	ND<2.5	8.6	ND<2.5	---	---	---
	04/14/93			11.77	26.34	420	240	5.2	30	8.7	---	---	---
	08/12/93			13.55	24.56	370	150	ND<2	11	ND<2	---	---	---
	10/26/93			13.98	24.13	240	98	ND<2	11	ND<2	---	---	---
	02/17/94		37.46	12.15	25.31	4,700	1,100	ND<10	140	26	---	---	---
	05/03/94			12.03	25.43	620	130	1.3	48	4.3	---	---	---
	08/17/94		37.33	12.92	24.41	3,600	630	ND<5	200	12	---	---	---
	11/18/94			12.41	24.92	12,100	720	6.1	337	15	---	---	---
	09/26/95		37.46	11.34	26.12	ND	8.3	ND	ND	ND	---	---	---
	12/06/95			11.87	25.59	120	20	ND	20	0.6	---	---	---
	02/14/96			10.48	26.98	ND	ND	ND	ND	0.52	---	---	---
	10/29/96			11.80	25.66	ND	ND	0.99	ND	ND	---	---	---
	01/29/97			11.25	26.21	ND<50	0.41	ND<0.3	ND<0.3	ND<0.3	ND<20	---	---
	04/30/97			12.24	25.22	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97			10.80	26.66	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97			11.90	25.56	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98			11.20	26.26	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98			12.20	25.26	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98			9.10	28.36	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98			9.80	27.66	270	2.1	ND<0.3	3.6	ND<0.5	190	---	---
	01/13/99			10.10	27.36	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99			11.35	26.11	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	1.1	2.9	---	---
	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	2.6*	---	---
	09/23/02	P		11.26	26.20	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.50	20.2	1.6	6.9
	12/09/02	P		11.35	26.11	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.00	26.6	1.8	6.9
	02/11/03[9]	P		9.91	27.55	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	4.7	1.2	6.7
	06/27/03	**NP**		**10.30**	**27.16**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**1.6**	**1.6**	**7.0**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
AR-2	03/30/93		38.39	11.53	26.86	390	4.1	1.6	ND<0.5	47	---	---	---
	04/14/93			11.87	26.52	310	18	ND<0.5	0.67	36	---	---	---
	08/12/93			13.59	24.80	130	16	ND<0.5	1.7	0.57	---	---	---
	10/26/93			14.25	24.14	110	15	ND<0.5	1.8	ND<0.5	---	---	---
	02/17/94			12.76	25.22	130	2.9	ND<0.5	15	0.8	---	---	---
	05/03/94			12.60	25.38	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	08/17/94		38.18	13.86	24.32	3,000	140	140	220	91	---	---	---
	11/18/94			13.33	24.85	623	10.5	10.5	27.9	8.0	---	---	---
	09/26/95		37.98	11.67	26.31	ND	ND	ND	ND	ND	---	---	---
	12/06/95			12.32	25.66	320	12	12	23	2.1	---	---	---
	02/14/96			10.74	27.24	ND	ND	ND	ND	0.76	---	---	---
	10/29/96			11.95	26.03	ND	ND	ND	ND	ND	---	---	---
	01/29/97			11.35	26.63	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97			12.15	25.83	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97			11.20	26.78	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97			12.14	25.84	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98			10.05	27.93	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98			12.10	25.88	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98			9.50	28.48	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98			10.45	27.53	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99			10.50	27.48	ND<50	ND<0.3	0.40	ND<0.3	0.53	ND<20	---	---
	04/29/99			11.48	26.50	ND<50	ND<0.3	ND<0.3	ND<0.3	0.82	ND<5	---	---
	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	17	---	---
	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	39*	---	---
	09/23/02	P		12.22	25.76	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.50	4.43	1.0	7.1
	12/09/02	P		12.30	25.68	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.00	ND<5.00	1.1	7.0
	02/11/03[9]	P		10.80	27.18	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	0.75	1.8	6.9
	06/27/03	**NP**		**11.14**	**26.84**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**6.0**	**0.9**	**6.4**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled	Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
MW-1	08/08/86	38.36	11.25	27.11	7,040	132	8.7	439	230	---	---	---
	12/24/91		16.12	22.24	2,200	190	8.5	6.9	2.6	---	---	---
	03/10/92		13.34	25.02	2,800	270	29	56	39	---	---	---
	06/09/92		14.12	24.24	2,900	960	27	99	63	---	---	---
	09/14/92		15.34	23.02	2,600	450	ND<5.0	45	21	---	---	---
	11/12/92		15.46	22.90	1,600	310	7.2	22	8.9	---	---	---
	02/11/93		11.95	26.41	4,000	510	47	200	91	---	---	---
	04/14/93		11.65	26.71	1,700	260	20	100	70	---	---	---
	08/12/93		12.93	25.43	830	60	3.8	39	3.6	---	---	---
	10/26/93		14.13	24.23	8,800	140	ND<10	41	ND<10	---	---	---
	02/17/94	37.26	11.86	25.40	1,200	130	12	54	58	---	---	---
	05/03/94		11.58	25.68	---	---	---	---	---	---	---	---
	08/17/94	37.33	12.78	24.55	3,900	86	5.1	78	9.4	---	---	---
	11/18/94		12.31	25.02	6,350	112	8.4	107	35	---	---	---
	09/26/95	37.26	11.26	26.00	ND	ND	ND	ND	ND	---	---	---
	12/06/95		12.16	25.10	4,100	0.86	0.46	0.38	0.92	---	---	---
	02/14/96		8.53	28.73	ND	ND	0.56	ND	0.82	---	---	---
	10/29/96		10.23	27.03	130	ND	ND	ND	ND	---	---	---
	01/29/97		8.15	29.11	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97		8.05	29.21	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97		10.50	26.76	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97		11.15	26.11	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98		4.95	32.31	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98		8.10	29.16	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98		8.02	29.24	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	40	---	---
	10/22/98		9.70	27.56	230	0.43	1.9	0.99	0.99	33	---	---
	01/13/99		9.60	27.66	ND<50	0.43	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99		8.05	29.21	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	^31/17	---	---

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
MW-1	01/15/02			---	---	ND<50	ND<0.05	ND<0.5	ND<0.5	ND<0.5	21	---	---
(Cont'd)	04/24/02			---	---	160	1.5	ND<0.50	ND<0.50	ND<0.50	770*	---	---
	09/23/02	(a)		NM	NM	NS	NS	NS	NS	NS	NS	NS	NS
	12/09/02	P		11.22	26.04	998	ND<0.50	ND<0.50	ND<0.50	1.37 (b)	855(d)/ 1310*	2.2	7.0
	02/11/03[e]	P		9.70	27.56	120	ND<0.50	ND<0.50	ND<0.50	ND<0.50	76	1.6	6.7
	06/27/03	**P**		**10.10**	**27.16**	**ND<500**	**ND<5.0**	**ND<5.0**	**ND<5.0**	**ND<5.0**	**170**	**0.8**	**6.8**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled	Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
MW-2	08/08/86	38.58	11.62	26.96	1,910	20.1	2.8	1.8	---	---	---	---
	12/24/91		16.50	22.08	23,000	1,500	1,100	480	1,400	---	---	---
	03/10/92		13.50	25.08	210,000	44,000	3,900	1,700	5,800	---	---	---
	06/09/92		14.52	24.06	33,000	2,300	370	780	2,600	---	---	---
	09/14/92		15.78	22.80	16,000	3,700	10	470	1,000	---	---	---
	11/12/92		15.98	22.60	16,000	3,800	86	470	910	---	---	---
	02/11/93		12.27	26.31	27,000	3,500	720	1,600	380	---	---	---
	04/14/93		12.01	26.57	27,000	3,500	220	2,200	5,100	---	---	---
	08/12/93		13.81	24.77	16,000	1,600	27	1,300	1,200	---	---	---
	10/26/93		14.53	24.05	12,000	1,200	ND<25	510	330	---	---	---
	02/17/94		12.81	25.77	15,000	1,800	21	850	540	---	---	---
	05/03/94		12.63	25.95	---	---	---	---	---	---	---	---
	08/17/94	37.99	13.69	24.30	14,000	850	13	640	270	---	---	---
	11/18/94	38.06	13.18	24.88	14,900	640	3.4	532	156	---	---	---
	09/26/95	37.99	12.23	25.76	5,100	40	25	2.5	18	---	---	---
	12/06/95		12.82	25.17	810	34	23	11	11	---	---	---
	02/14/96		10.87	27.12	420	0.75	0.54	0.64	0.53	---	---	---
	10/29/96		12.95	25.04	670	1.7	1.3	0.6	0.8	---	---	---
	01/29/97		11.15	26.84	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97		11.09	26.90	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97		11.70	26.29	330	ND<0.3	0.58	0.53	ND<0.5	ND<20	---	---
	10/22/97		11.05	26.94	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98		9.50	28.49	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98		11.15	26.84	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98		10.20	27.79	78	ND<0.3	ND<0.3	ND<0.3	ND<0.5	97	---	---
	10/22/98		11.10	26.89	270	0.37	2.0	0.91	0.73	26	---	---
	01/13/99		11.10	26.89	650	5.8	1.0	1.4	1.1	ND<20	---	---
	04/29/99		11.05	26.94	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	^23/16	---	---

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
MW-2	01/15/02			---	---	1,200	15	4.5	ND<0.5	ND<0.5	190	---	---
(Cont'd)	04/24/02			---	---	1,300	18	ND<10	ND<10	ND<10	170*	---	---
	09/23/02	P		12.15	25.84	1,440	11.2	0.730	ND<0.500	ND<1.50	228	1.6	6.9
	12/09/02	P		12.20	25.79	1,770	8.08	0.694	2.47	3.79 (b)	529(d)/ 902*	6.2	6.7
	02/11/03[e]	P		10.79	27.20	1,100	ND<0.50	ND<0.50	ND<0.50	0.53	71	1.2	6.8
	06/27/03	**P**		**11.20**	**26.79**	**520**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**45**	**0.8**	**6.8**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled	Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
MW-3	08/08/86	37.77	10.61	27.16	7,450	510	549	409	1,380	---	---	---
	12/24/91		15.60	22.17	6,800	450	10	610	45	---	---	---
	03/10/92		12.90	24.87	11,000	2,500	75	400	560	---	---	---
	06/09/92		13.60	24.17	16,000	2,000	69	1,300	2,600	---	---	---
	09/14/92		14.78	22.99	14,000	630	ND<50	1,500	2,400	---	---	---
	11/12/92		14.92	22.85	7,400	400	ND<25	860	330	---	---	---
	02/11/93		11.65	26.12	8,600	580	ND<20	710	300	---	---	---
	04/14/93		11.16	26.61	6,900	300	8.8	580	99	---	---	---
	08/12/93		12.82	24.95	3,400	56	ND<5	190	ND<5	---	---	---
	10/26/93		13.60	24.17	2,900	42	ND<10	76	ND<10	---	---	---
	02/17/94	36.80	11.53	25.27	3,100	160	ND<10	36	8.6	---	---	---
	05/03/94		11.36	25.44	2,300	44	ND<2.5	8.0	ND<2.5	---	---	---
	08/17/94	36.87	12.38	24.49	1,900	7.0	ND<9.5	4.4	ND<5	---	---	---
	11/18/94		11.93	24.94	909	1.1	ND<0.5	0.9	4.0	---	---	---
	09/26/95	36.80	10.96	25.84	410	1.3	1.9	2.3	3.3	---	---	---
	12/06/95		11.56	25.24	---	0.9	4.6	3.0	4.3	---	---	---
	02/14/96		7.47	29.33	99	ND	0.49	0.46	ND	---	---	---
	10/29/96		9.80	27.00	250	0.7	0.6	ND	ND	---	---	---
	01/29/97		7.50	29.30	170	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97		12.10	24.70	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97		9.90	26.90	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97		12.10	24.70	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98		7.50	29.30	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98		12.30	24.50	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98		8.30	28.50	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98		9.10	27.70	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99		9.50	27.30	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99		5.93	30.87	ND<50	ND<0.3	0.35	ND<0.3	ND<0.5	ND<5	---	---

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
MW-3	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	7.9	---	---
(Cont'd)	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50*	---	---
	09/23/02	P		10.30	26.50	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.50	ND<0.500	1.0	6.9
	12/09/02	P		10.38	26.42	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.00	ND<5.00	1.7	6.7
	02/11/03[e]	P		8.85	27.95	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.6	6.7
	06/27/03	**P**		**9.12**	**27.68**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**0.61**	**0.9**	**6.8**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled	Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-4	03/06/91	39.46	13.22	26.24	34,000	11,000	870	2,500	2,100	---	---	---
	12/24/91	39.86	17.60	22.26	1,900	29	1.9	25	29	---	---	---
	03/10/92		14.76	25.10	7,400	37	ND<0.60	11	73	---	---	---
	06/09/92		15.63	24.23	4,500	3.2	1.5	37	16	---	---	---
	09/14/92		16.83	23.03	1,300	ND<2.5	2.5	61	6.8	---	---	---
	11/12/92		16.97	22.89	610	7.2	0.98	34	0.97	---	---	---
	02/11/93		13.43	26.43	740	2.4	ND<0.5	5.0	3.5	---	---	---
	04/14/93		13.06	26.80	380	ND<0.5	ND<0.5	10	1.6	---	---	---
	08/12/93		14.94	24.92	1,200	0.93	ND<0.5	0.91	ND<0.5	---	---	---
	10/26/93		15.52	24.34	160	ND<0.5	ND<0.5	1.0	ND<0.5	---	---	---
	02/17/94	39.46	14.02	25.44	320	0.5	ND<0.5	28	0.9	---	---	---
	05/03/94		13.85	25.61	130	ND<0.5	ND<0.5	1.1	ND<0.5	---	---	---
	08/17/94	39.53	14.95	39.53	62	34.58	ND<0.5	ND<0.5	ND<0.5	---	---	---
	11/18/94		14.46	25.07	98	1.3	0.6	ND<0.5	ND<0.5	---	---	---
	12/06/95		13.82	25.71	ND	0.6	ND	ND	ND	---	---	---
	02/14/96		11.24	28.29	ND	ND	2.3	ND	0.71	---	---	---
	10/29/96		13.50	26.03	140	ND	ND	ND	ND	---	---	---
	01/29/97		12.65	26.88	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97		13.97	25.56	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97		12.70	26.83	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97		13.95	25.58	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98		11.90	27.63	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98		13.92	25.61	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98		10.80	28.73	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98		12.60	26.93	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99		12.60	26.93	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99		12.61	26.92	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-4	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	6.2	---	---
(Cont'd)	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50*	---	---
	09/23/02	(a)		NM	NM	NS	NS	NS	NS	NS	NS	NS	NS
	12/09/02	P		13.36	26.17	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.00	ND<5.00	2.4	6.6
	02/11/03[e]	P		11.82	27.71	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	0.53	1.8	6.6
	06/27/03	**P**		**12.12**	**27.41**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**1.2**	**6.7**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled	Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-5	12/24/91	38.94	16.85	22.09	1,600	21	ND<0.30	32	52	---	---	---
	03/10/92		13.83	25.11	1,000	1.6	ND<0.30	43	100	---	---	---
	06/09/92		14.91	24.03	680	34	ND<1.5	14	16	---	---	---
	09/14/92		16.14	22.80	770	12	ND<0.30	51	65	---	---	---
	11/12/92		16.35	22.59	520	3.0	ND<2.5	29	36	---	---	---
	02/11/93		13.21	25.73	150	1.6	0.96	5.1	1.5	---	---	---
	04/14/93		12.97	25.97	190	5.4	ND<0.5	1.5	0.97	---	---	---
	08/12/93		14.12	24.82	230	1.7	ND<0.5	5.3	0.94	---	---	---
	10/26/93		14.72	24.22	190	2.8	ND<0.5	5.5	2.0	---	---	---
	02/17/94	38.47	13.20	25.27	340	ND<0.5	ND<0.5	13	2.9	---	---	---
	05/03/94		13.08	25.39	170	1.4	ND<0.5	4.0	1.9	---	---	---
	08/17/94	38.54	14.18	24.36	270	0.6	ND<0.5	7.3	1.1	---	---	---
	11/18/94		13.73	24.81	338	---	ND<0.5	4.6	ND<0.5	---	---	---
	09/26/95	38.47	12.44	26.03	ND	0.63	1.1	ND	1.2	---	---	---
	12/06/95		12.92	25.55	ND	ND	ND	ND	ND	---	---	---
	02/14/96		10.76	27.71	ND	ND	2.0	ND	1.1	---	---	---
	10/29/96		12.35	26.12	ND	ND	ND	ND	ND	---	---	---
	01/29/97		10.85	27.62	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97		13.56	24.91	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97		11.80	26.67	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97		12.20	26.27	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98		10.12	28.35	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98		13.50	24.97	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98		10.20	28.27	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98		11.50	26.97	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99		10.15	28.32	ND<50	0.32	0.38	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99		11.50	26.97	ND<50	ND<0.3	ND<0.3	ND<0.3	0.58	ND<5	---	---

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-5	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	5.0	---	---
(Cont'd)	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.2*	---	---
	09/23/02	P		12.55	25.92	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.50	1.30	1.0	6.7
	12/09/02	P		12.60	25.87	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.00	ND<5.00	1.9	6.6
	02/11/03[e]	P		11.37	27.10	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	0.97	1.2	6.7
	06/27/03	**P**		**11.55**	**26.92**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**0.98**	**1.5**	**6.8**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled	Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-6	12/24/91	39.07	16.88	22.19	ND<30	ND<0.3	ND<0.3	ND<0.3	ND<0.3	---	---	---
	03/10/92		13.73	25.34	ND<30	ND<0.3	ND<0.3	ND<0.3	ND<0.3	---	---	---
	06/09/92		14.95	24.12	ND<30	ND<0.3	ND<0.3	ND<0.3	ND<0.3	---	---	---
	09/14/92		16.20	22.87	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	11/12/92		16.35	22.72	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	02/11/93		13.04	26.03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	04/14/93		12.23	26.84	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	08/12/93		14.18	24.89	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	10/26/93		14.85	24.22	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	05/03/94		13.66	25.41	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	08/17/94	38.78	14.34	24.44	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	11/18/94		13.76	25.02	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	09/26/95		12.56	26.22	ND	ND	ND	ND	ND	---	---	---
	12/06/95		13.18	25.60	ND	ND	ND	ND	ND	---	---	---
	02/14/96		12.46	26.32	ND	ND	ND	ND	ND	---	---	---
	10/29/96		12.40	26.38	50	ND	ND	ND	ND	---	---	---
	01/29/97		13.85	24.93	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97		12.49	26.29	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97		12.10	26.68	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97		15.20	23.58	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98		13.80	24.98	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98		12.45	26.33	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98		10.30	28.48	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98		11.10	27.68	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99		10.40	28.38	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99		13.80	24.98	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-6	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	5.7	---	---
(Cont'd)	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50*	---	---
	09/23/02	P		12.61	26.17	ND<50	ND<0.500	ND<0.500	ND<0.500	ND<1.50	ND<0.500	1.4	6.8
	12/09/02	P		12.67	26.11	ND<50	ND<0.500	ND<0.500	ND<0.500	ND<1.00	ND<5.00	2.6	6.7
	02/11/03[e]	P		11.21	27.57	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	2.0	6.7
	06/27/03	**P**		**11.60**	**27.18**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**5.0**	**6.9**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled	Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-7	12/24/91	39.95	18.11	21.84	10,000	88	16	170	610	---	---	---
	03/10/92		15.30	24.65	320	9.3	0.54	8.8	34	---	---	---
	06/09/92		16.12	23.83	340	11	1.1	8.9	26	---	---	---
	09/14/92		17.35	22.60	510	12	ND<2.0	30	51	---	---	---
	11/12/92		17.47	22.48	760	17	0.83	50	73	---	---	---
	02/11/93		13.80	26.15	260	20	1.0	11	21	---	---	---
	04/14/93		13.60	26.35	1,300	89	2.1	48	87	---	---	---
	08/12/93		15.54	24.41	360	9.0	ND<0.50	13	9.0	---	---	---
	10/26/93		16.28	23.67	99	1.7	ND<0.50	4.0	3.0	---	---	---
	02/17/94	39.38	14.44	24.94	1,300	38	ND<1	35	25	---	---	---
	05/03/94		14.34	25.04	330	8.1	ND<0.5	7.8	3.7	---	---	---
	08/17/94	39.45	15.40	24.05	350	2.2	ND<0.5	9.6	3.6	---	---	---
	11/18/94		14.95	24.50	412	1.3	ND<0.5	6.2	2	---	---	---
	09/26/95	39.38	13.92	25.46	ND	ND	ND	ND	ND	---	---	---
	12/06/95		14.42	24.96	ND	ND	ND	ND	ND	---	---	---
	02/14/96		12.38	27.00	ND	ND	1.1	ND	0.59	---	---	---
	10/29/96		12.33	27.05	ND	ND	ND	ND	ND	---	---	---
	01/29/97		13.10	26.28	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97		11.70	27.68	ND<20	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97		13.25	26.13	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97		14.42	24.96	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98		13.00	26.38	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98		11.65	27.73	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98		11.20	28.18	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98		13.75	25.63	51	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99		14.45	24.93	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99		13.74	25.64	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-7	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	4.8	---	---
(Cont'd)	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	7.2*	---	---
	09/23/02	P		13.78	25.60	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.50	3.48	0.8	6.7
	12/09/02	P		13.97	25.41	ND<50.0	ND<0.500	ND<0.500	ND<0.500	ND<1.00	ND<5.00	2.2	6.8
	02/11/03[e]	P		12.35	27.03	54	ND<0.50	ND<0.50	ND<0.50	ND<0.50	21	1.7	6.3
	06/27/03	**P**		**12.95**	**26.43**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**9.4**	**1.3**	**6.8**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-8	09/14/92		37.23	14.19	23.04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	11/12/92			14.35	22.88	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	02/11/93			11.25	25.98	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	04/14/93			12.33	24.90	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	08/12/93			12.41	24.82	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	10/26/93			13.02	24.21	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	02/17/94		36.76	11.47	25.29	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	05/03/94			11.35	25.41	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	08/17/94		36.84	12.34	24.50	ND<50	ND<0.5	1.7	ND<0.5	1.4	---	---	---
	11/18/94			11.90	24.94	ND<50	1.0	ND<0.5	ND<0.5	ND<0.5	---	---	---
	09/26/95		36.76	10.94	25.82	ND<50	ND	ND	ND	ND	---	---	---
	12/06/95			11.42	25.34	ND<50	ND	ND	ND	ND	---	---	---
	02/14/96			8.80	27.96	ND<50	ND	0.48	ND	ND	---	---	---
	10/29/96			11.30	25.46	ND<50	ND	ND	ND	ND	---	---	---
	01/29/97			7.60	29.16	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97			10.54	26.22	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97			11.20	25.56	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97			12.14	24.62	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98			4.43	32.33	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98			10.55	26.21	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98			9.07	27.69	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98			12.12	24.64	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99			9.60	27.16	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99			9.08	27.68	ND<50	ND<0.3	ND<0.3	ND<0.3	1.5	ND<5	---	---
	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	5.6	---	---
	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50*	---	---
	09/23/02	P		10.75	26.01	ND<50	ND<0.500	ND<0.500	ND<0.500	ND<1.50	ND<0.500	1.0	6.8
	12/09/02	P		10.81	25.95	ND<50	ND<0.500	ND<0.500	ND<0.500	ND<1.00	ND<5.00	2.1	6.6
	02/11/03[e]	P		9.90	26.86	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.4	6.5
	06/27/03	**P**		**9.73**	**27.03**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**2.0**	**6.8**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-9	09/14/92		38.71	16.12	22.59	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	11/12/92			16.29	22.42	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	02/11/93			12.31	26.40	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	04/14/93			12.01	26.70	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	08/12/93			13.90	24.81	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	10/26/93			14.86	23.85	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	02/17/94		38.19	12.99	25.20	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	08/17/94			14.03	24.16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	11/18/94		37.24	13.44	23.80	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	09/26/95			12.43	25.81	ND<50	ND<0.5	ND	ND	ND	---	---	---
	12/06/95		38.19	13.14	25.05	ND<50	ND<0.5	ND	ND	ND	---	---	---
	02/14/96			9.05	29.14	ND<50	ND	1.8	0.49	0.82	---	---	---
	10/29/96			12.85	25.34	ND<50	ND	ND	ND	ND	---	---	---
	01/29/97			9.02	29.17	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/30/97			12.05	26.14	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<50	---	---
	07/31/97			12.18	26.01	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	10/22/97			7.45	30.74	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	01/28/98			21.25	16.94	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98			12.10	26.09	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98			10.40	27.79	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98			1.55	24.64	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99			12.05	26.14	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99			7.43	30.76	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	4.3	---	---
	04/24/02			---	---	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50*	---	---
	09/23/02	P		12.35	25.84	ND<50	ND<0.500	ND<0.500	ND<0.500	ND<1.50	ND<0.500	1.6	6.8
	12/09/02	P		12.37	25.82	ND<50	ND<0.500	ND<0.500	ND<0.500	ND<1.00	ND<5.00	3.2	7.1
	02/11/03[e]	P		10.97	27.22	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	3.0	6.7
	06/27/03	**P**		**11.41**	**26.78**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**2.9**	**6.7**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

Well Number	Date Sampled		Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	DO (mg/L)	pH
A-10	12/07/92		38.94	16.81	22.13	660	30	ND<2.5	ND<2.5	ND<2.5	---	---	---
	02/11/93			13.15	25.79	210	ND<0.5	0.97	ND<0.5	ND<0.5	---	---	---
	04/14/93			12.19	26.75	770	ND<0.5	3.0	0.76	1.9	---	---	---
	08/12/93			14.87	24.07	390	ND<0.5	ND<0.5	ND<0.5	0.84	---	---	---
	10/26/93			15.65	23.29	290	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	02/17/94		38.66	14.16	24.50	52	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	05/03/94			14.00	24.66	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	08/17/94		38.72	15.08	23.64	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	11/18/94			14.68	24.04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	---
	09/26/95		38.66	13.58	25.08	ND	ND	ND	ND	ND	---	---	---
	12/06/95			14.24	24.42	ND	ND	ND	ND	ND	---	---	---
	02/14/96			6.70	31.96	ND	ND	ND	ND	ND	---	---	---
	10/29/96			14.10	24.56	ND	ND	ND	ND	1.1	---	---	---
	01/29/97			11.20	24.46	ND<50	0.41	4.8	0.6	4.4	37	---	---
	04/30/97			12.66	26.00	ND<20	0.40	4.2	0.5	3.8	50	---	---
	07/31/97			13.20	25.46	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/22/98			12.60	26.06	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	07/08/98			8.08	30.58	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	10/22/98			11.15	27.51	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/13/99			9.60	29.06	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<20	---	---
	04/29/99			11.15	27.51	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND<5	---	---
	01/15/02			---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	17	---	---
	04/24/02			NM	NM	NS	NS	NS	NS	NS	NS	---	---
	09/23/02			DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS
	12/19/02	P		12.75	25.91	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5 (c)	---	---
	02/11/03[e]	P		12.21	26.45	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.9	1.3	6.7
	06/27/03	**P**		**12.66**	**26.00**	**ND<50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**ND<0.50**	**0.99**	**0.8**	**7.2**

Table 1
Groundwater Elevation and Analytical Data

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

TPH	= Total Petroleum Hydrocarbons analyzed using EPA Method 8015B Modified (prior to 2/11/03).
MTBE	= Methyl tertiary butyl ether analyzed by EPA Method 8021B unless otherwise noted (prior to 2/11/03).
DO	= Dissolved oxygen
ND <	= Not detected above laboratory reporting limits.
NM	= Not Measured
NS	= Not Sampled
P	= Purge
NP	= No Purge
" --- "	= Not analyzed/Not available
µg/L	= Micrograms per liter
mg/L	= Milligrams per liter
*	= Analyzed by EPA Method 8260B.
^	= Analytical results as measured by EPA Methods 8020 / 8260.
(a)	= well inaccessible
(b)	= The analyte concentration may be artificially elevated due to coeluting compounds or components.
(c)	= The closing calibration was outside acceptance limits by 2%. This should be considered in evaluating the results. The average % difference for all analytes met the 15% requirement and the QC suggests that the calibration linearity is not a factor.
(d)	= Estimated value. The reported value exceeds the calibration range of the analysis.
(e)	= TPH-g, BTEX, and MTBE analyzed by EPA method 8260 B beginning first quarter monitoring event (2/11/03)
Source	=The data in this table prior to September 2002 was provided to URS by Group Environmental Management Company and its previous consultants. URS has not verified the accuracy of this data

Attachment A
Hydrogen Peroxide Calculations

Hydrogen Peroxide Calulations

ARCO Service Station #5387
20200 Hesperian Blvd.
Hayward, California

	Groundwater Velocity (ft/yr)	Estimated Depth of Well (ft)	Radius of Influence[a] (ft)	Width (ft)	Length (ft)	Area (ft^2)	Volume (ft^3)	Highest Conc. of TPHg (µg/L)	TPHg total mass (kg)	TPH-g in water[b] (kg)	TPH-g in soil[c] (kg)	Stoichiometric $O_2/C_{10}H_{22}$ requirement (g/g)	Mass of O2 Required Water (g)	Mass of O2 Required Soil (g)	θ_2 produced per litter of 7.5% H_2O_2 (g/L)	H_2O_2 required for Water (L)	H_2O_2 required for Soil (L)	H_2O_2 required for Water (Gal)	H_2O_2 required for Soil (Gal)	Safety Factor X 20	Total Requirement of H_2O_2 (Gal)
MW-1	N/A	25.00	10.00	10.00	10.00	100	2500	120	0.0084948	0.0025484	0.0059464	3.50	8.92	20.81	35.3	0.253	0.59	0.07	0.16	20.00	4.46
A-4	N/A	25.00	10.00	10.00	10.00	100	2500	50	0.0035395	0.0010619	0.0024777	3.50	3.72	8.67	35.3	0.105	0.25	0.03	0.06	20.00	1.86
MW-3	N/A	25.00	10.00	10.00	10.00	100	2500	50	0.0035395	0.0010619	0.0024777	3.50	3.72	8.67	35.3	0.105	0.25	0.03	0.06	20.00	1.86
A-8	N/A	25.00	10.00	10.00	10.00	100	2500	50	0.0035395	0.0010619	0.0024777	3.50	3.72	8.67	35.3	0.105	0.25	0.03	0.06	20.00	1.86
AR-1	N/A	25.00	10.00	10.00	10.00	100	2500	50	0.0035395	0.0010619	0.0024777	3.50	3.72	8.67	35.3	0.105	0.25	0.03	0.06	20.00	1.86
MW-2	N/A	25.00	10.00	10.00	10.00	100	2500	1100	0.0778690	0.0233607	0.0545083	3.50	81.76	190.78	35.3	2.316	5.40	0.61	1.43	20.00	40.85
AR-2	N/A	25.00	10.00	10.00	10.00	100	2500	50	0.0035395	0.0010619	0.0024777	3.50	3.72	8.67	35.3	0.105	0.25	0.03	0.06	20.00	1.86
A-5	N/A	25.00	10.00	10.00	10.00	100	2500	50	0.0035395	0.0010619	0.0024777	3.50	3.72	8.67	35.3	0.105	0.25	0.03	0.06	20.00	1.86
A-7	N/A	25.00	10.00	10.00	10.00	100	2500	54	0.0038227	0.0011468	0.0026759	3.50	4.01	9.37	35.3	0.114	0.27	0.03	0.07	20.00	2.01
A-9	N/A	25.00	10.00	10.00	10.00	100	2500	50	0.0035395	0.0010619	0.0024777	3.50	3.72	8.67	35.3	0.105	0.25	0.03	0.06	20.00	1.86
A-10	N/A	25.00	10.00	10.00	10.00	100	2500	50	0.0035395	0.0010619	0.0024777	3.50	3.72	8.67	35.3	0.105	0.25	0.03	0.06	20.00	1.86

NOTE

Calculations for the injection of hydrogen peroxide for site 5387 solely based on the TPHg concentrations found in the groundwater and estimated to be the same in soil. Safety factor of 20 should account for requirements of BOD from soil. Site porosity estimated to be 0.3. Oxygenates concentrations are low, therefore, included in safety factor. Moreover, the historic groundwater velocity for this site has been historically, and is neglected in the calculation. Natural attenuation parameters monitoring highly recommended in order to access microbial activity.

a) Radius of influence from peroxide injection is assumed to be around 10 feet if pressure is applied.

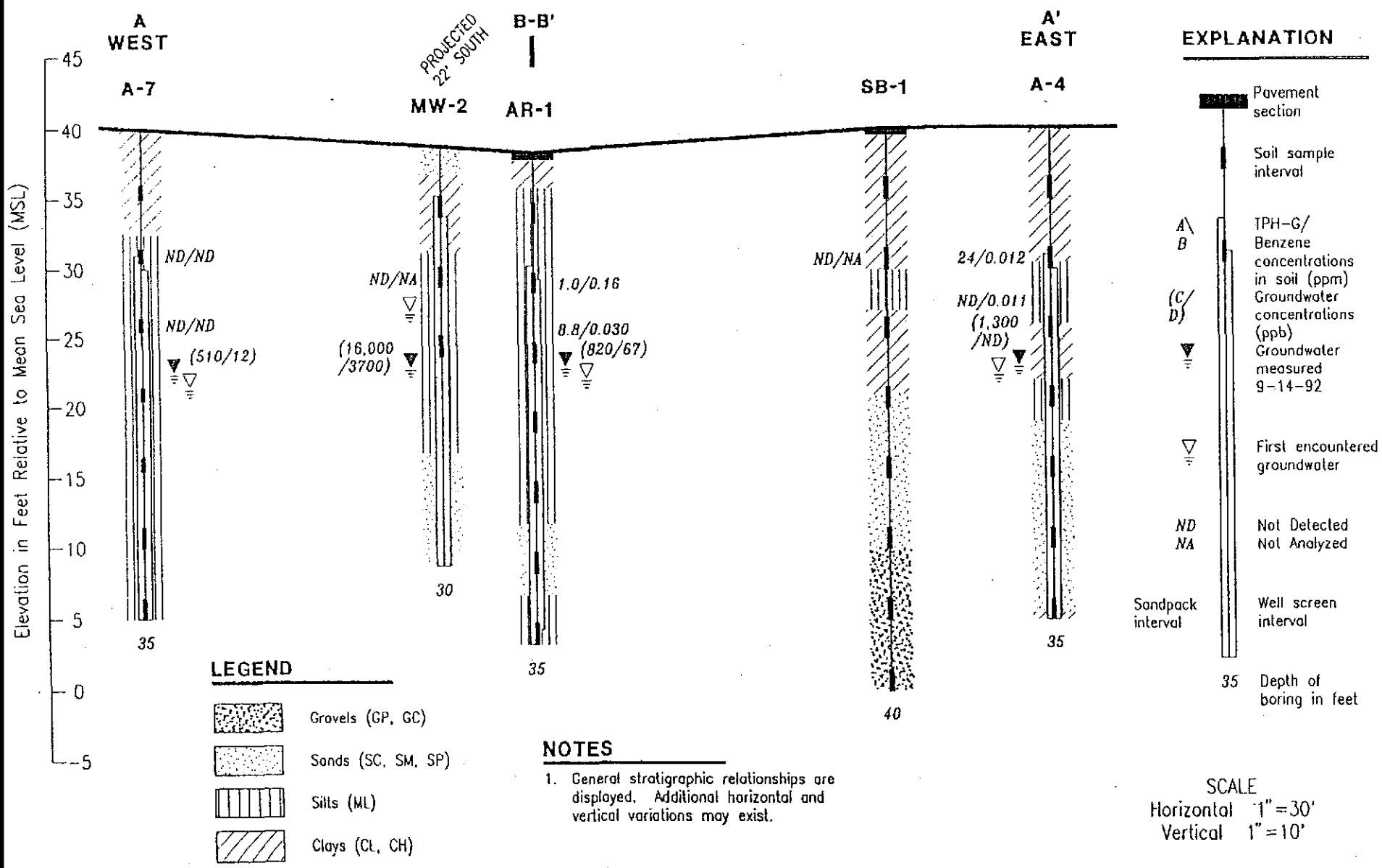
b) Assumed to be 30% of the total TPH-g concentration

c) *Assumed to be 70% of the* total TPH-g concentration

Calculation per well based on TPH-g concentration and a safety factor of 20 because of exclusion of soil BOD, oxygenates, etc.

Attachment B

Historical Cross Sections and Boring Logs



GeoStrategies Inc.

CROSS SECTION A-A'
ARCO Service Station #5387
20200 Hesperian Boulevard
San Lorenzo, California

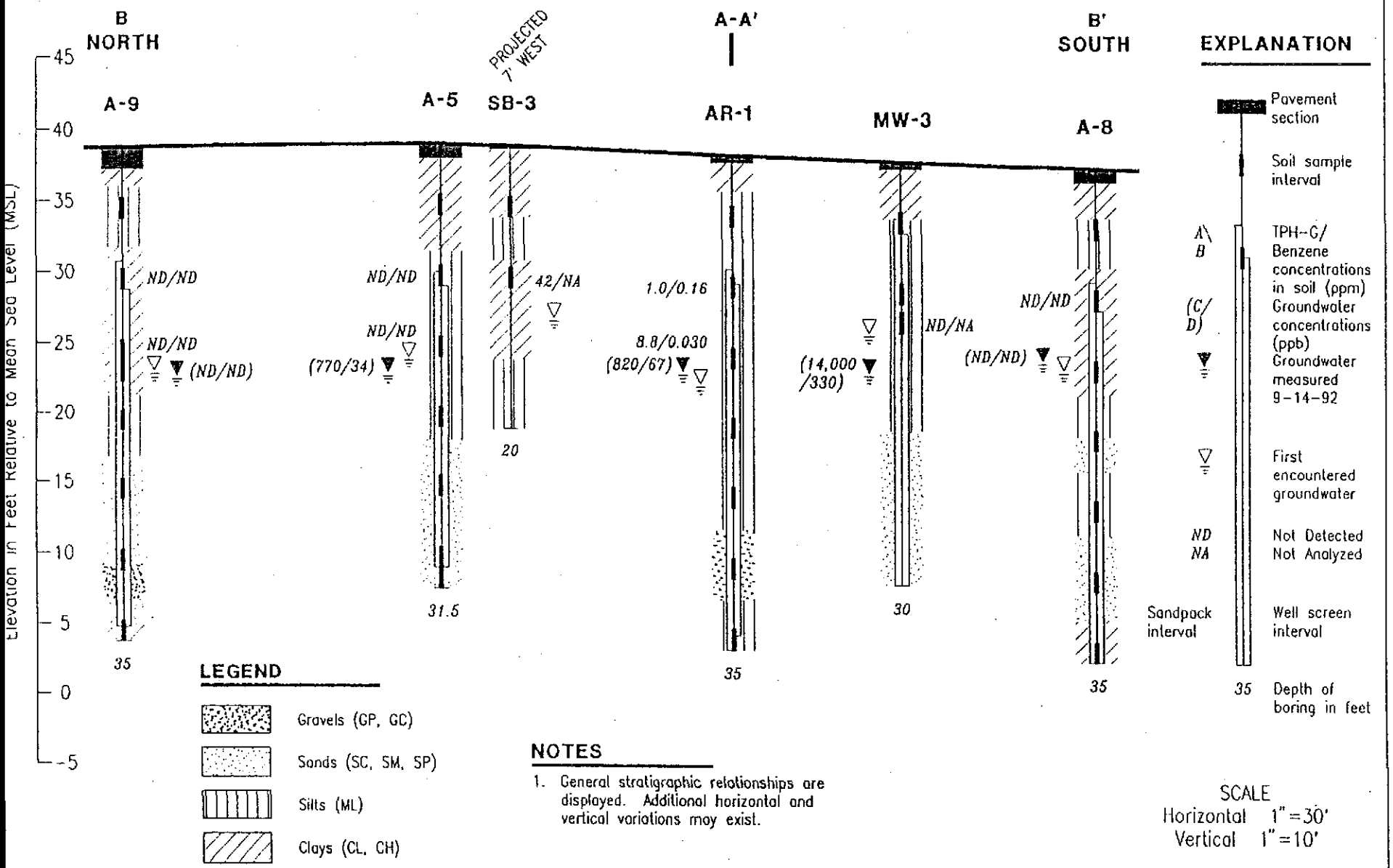
PLATE
3

JOB NUMBER
2608-11

REVIEWED BY

DATE
12/93

REVISED DATE



GeoStrategies Inc.

CROSS SECTION B-B'
ARCO Service Station #5387
20200 Hesperian Boulevard
San Lorenzo, California

PLATE 4

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
92608-11		12/93	

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

LL - Liquid Limit (%)

PI - Plastic Index (%)

PID - Volatile Vapors in ppm

MA - Particle Size Analysis

2.5 YR 6/2 - Soil Color according to Munsell Soil Color Charts (1975 Edition)

5 GY 5/2 - GSA Rock Color Chart

 - No Soil Sample Recovered

 - "Undisturbed" Sample

 - Bulk or Classification Sample

 - First Encountered Ground Water Level

 - Piezometric Ground Water Level

Penetration - Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

GeoStrategies Inc.

Unified Soil Classification - ASTM D 2488-85 and Key to Test Data

Field location of boring

(See Plate 2)

Project No	792608	Date	3/16/93
Client	ARCO Products Company SS#5387		
Location	20200 Hesperian Boulevard		
City	San Lorenzo		
Logged by	RCM	Driller	W. Hazmat
Casing installation date			

Boring No. AR-2

Sheet 1 of 2

Drilling method: Hollow Stem Auger

Hole diameter: 12 inches

Top of Box Elevation: 38.39 Datum: MSL

Water Level	13.5	14.9
Time	14:35	16:48
Date	3/16/93	3/16/93

PID (ppm)	Blows/ft * or Pressure (psi)	Type of Sample	Sample Number	Depth (ft)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
								PAVEMENT SECTION - 0.5 ft.
				1				SILTY CLAY (CL/ML) - black (10YR 2/1); medium stiff, damp, medium plasticity; 55% clay, 45% silt.
				2				
				3				SILT (ML) - dark brown (10YR 4/3); medium stiff, damp, medium plasticity; 70% silt, 15% clay, 15% fine sand.
		S&H		4				
			AR-2					Color change to dark olive gray (5Y 3/2) at 3.5 ft.; 1-inch medium sand lens at 4.0 ft
0	36		5.0	5				
				6				
				7				
				8				
		S&H		9				Greenish gray (5G 4/1); discoloration in rootholes, moist at 8.5 ft.
			AR-2					
62	10		10.0	10				
				11				
				12				
				13				
		S&H		14		▽		Saturated at 13.5 ft.
			AR-2					
1167	18		15.0	15				
				16				
				17				
				18				
		S&H		19				Color change to yellowish brown (10YR 5/6) with greenish gray (5G 4/1); discoloration at 18.5 ft, decrease in sand to 5%.
			AR-2					
121	10		20.0	20				

Remarks: * Converted to equivalent standard penetration blows/ft.

Log of Boring

BORING NO. AR-2

GSI GeoStrategies Inc.

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
792608		3/93		

Field location of boring: (See Plate 2)

Project No: 792606 Date: 3/16/93 Boring No: AR-2
Client: ARCO Products Company SS#5367
Location: 20200 Hesperian Boulevard
City: San Lorenzo Sheet: 2 of 2
Logged by: RCM Driller: W. Hazmat
Casing installation data:
Drilling method: Hollow Stem Auger
Hole diameter: 12 inches
Top of Box Elevation: Datum:
Water Level:
Time:
Date:

PID (ppm)	Blows/ft * or Pressure (psi)	Type of Sample	Sample Number	Depth (ft)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				21				
				22				
				23				
		S&H		24				
107	19		AR-2					SILTY SAND (SM) - dark yellowish brown (10YR 4/4);
			25.0	25				medium dense, saturated; 75% fine sand, 25% silt.
				26				
				27				Lens of fine to coarse sand at 28.5 ft.
				28				
		S&H		29				SILT (ML) - olive brown (2.5Y 4/4); very stiff, very moist,
			AR-2					medium plasticity; 70% silt, 25% clay, 5% fine sand
83	29		30.0	30				
				31				
				32				
				33				
		S&H		34				SILTY SAND (SM) - olive brown (2.5 Y 4/4); medium
			AR-2					dense, very moist; 65% fine to coarse sand, 30% silt, 5%
51	25		35.0	35				clay.
				36				
				37				Bottom of boring at 35.0 ft.
				38				3/16/93
				39				
				40				

Remarks: * Converted to equivalent standard penetration blows/ft.

Log of Boring

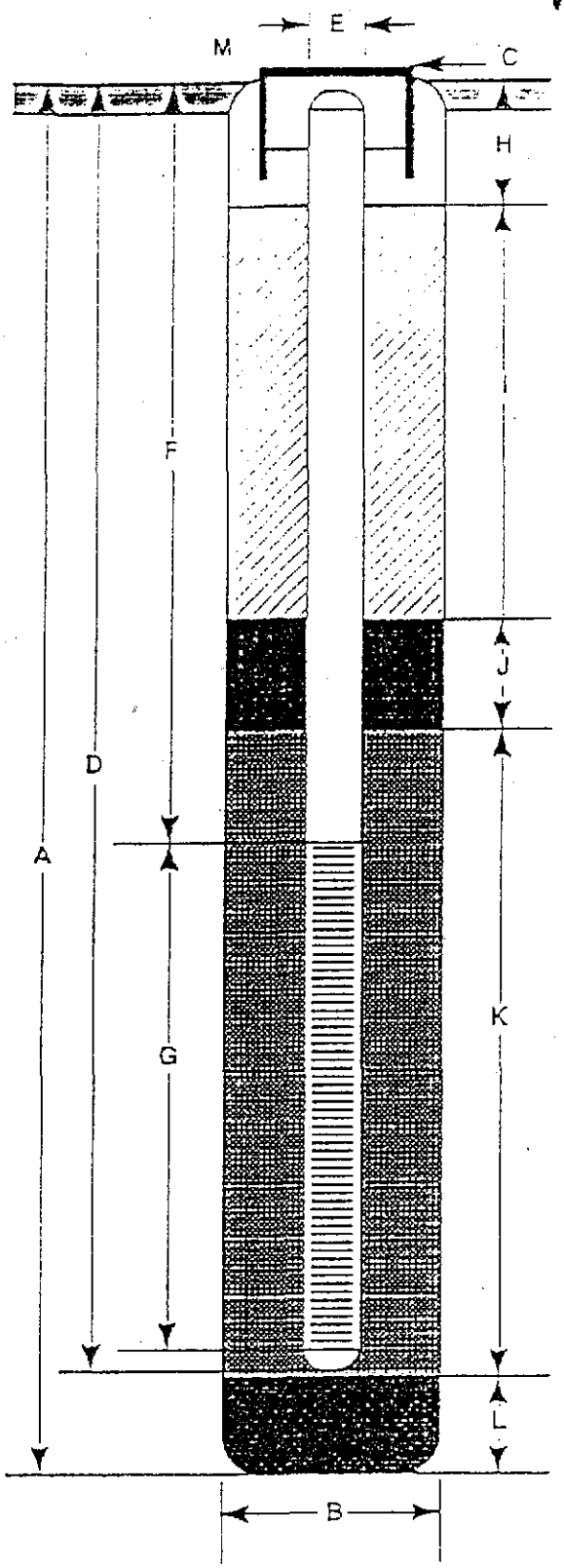
BORING NO.

GeoStrategies Inc.

AR-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
792608		3/93		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 35.0 ft.

B Diameter of Boring 12 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 38.39 ft.
[x] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 35.0 ft.
Material Sch. 40 PVC, Stls. Stl., Cbn Stl.

E Casing Diameter 6 in.

F Depth to Top Perforations 5.0 ft.

G Perforated Length 30.0 ft.
Perforated Interval from 5.0 to 35.0 ft.
Perforation Type Continuous Wrap
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 4.0 ft.
Backfill Material Neat Cement

J Seal from 4.0 to 4.5 ft.
Seal Material Bentonite

K Gravel Pack from 4.5 to 35.0 ft.
Pack Material Lonestar #2/12 Graded Sand

L Bottom Seal ft.
Seal Material

M Waterproof vault box with locking cap and lock.

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO
AR-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
702608		3/93		

Field location of boring: (See Plate 2)

Project No: 792608	Date: 3/16/93	Boring No: AS-1	
Client: ARCO Product Company SS#5387			
Location: 20200 Hesperian Boulevard			
City: San Lorenzo		Sheet: 1 of 2	
Logged by: RCM	Driller: W. Hazmat		
Casing installation data:			
Drilling method: Hollow Stem Auger			
Hole diameter: 12 inches	Top of Box Elevation:	Datum: MSL	
Water Level: 12.0			
Time: 9:18			
Date: 3/16/93			

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
								PAVEMENT SECTION - 0.25 ft.
				1				SILTY CLAY (CL) - very dark gray (10YR 3/1); medium stiff, damp, medium plasticity; 60% clay, 40% silt.
				2				
				3				
		S&H		4				SILT (ML) - very dark brown (10YR 2/2); very stiff, damp, medium plasticity; 80% silt, 20% clay, trace fine sand.
			AS-1					
9	25		5.0	5				
				6				Color change to dark olive gray (10YR 3/2) at 4.5 ft.
				7				
				8				
		S&H		9				Color change to olive gray (5Y 4/2), moist, stiff at 8.5 ft.
			AS-1					
98	13		10.0	10				
				11				
				12		▽		
				13				
		S&H		14				Color change to dark greenish gray (5BG 4/1), saturated at 13.5 ft.
			AS-1					
440	17		15.0	15				
				16				
				17				
				18				
		S&H		19				Color change to olive (5Y 4/3), very stiff, decrease clay to 5%, increase in fine sand to 15%, greenish gray (5GY 4/1); discoloration in rootholes at 18.5 ft.
			AS-1					
15	19		20.0	20				

Remarks: * Converted to equivalent standard penetration blows/ft.

Log of Boring

BORING NO: AS-1

GeoStrategies Inc.

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
792608	RGACEG	3/93		

Field location of boring

(See Plate 2)

Project No	792608	Date	3/16/93
Client	ARCO Products Company SS#5387		
Location	20200 Hesperian Boulevard		
City	San Lorenzo		
Logged by	RCM	Driller	W. Hazmat

Boring No: AS-1

Sheet: 2 of 2

Casing installation date

Drilling method: Hollow Stem Auger

Hole diameter: 12 inches

Top of Box Elevation: Datum:

Water Level

Time

Date

PID (ppm)	Blowcount or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				21				
				22				
				23				
		S&H		24				Color change to dark yellowish brown (10YR 4/4); decrease fine sand to a trace, increase clay to 20%; moist, black (10YR 2/1); mottling at 23.5 ft.
14	19		AS-1	25				
			25.0					
				26				
				27				
				28				
		S&H		29				SILTY SAND (SM) - olive brown (2.5Y 4/4); medium dense, saturated; 55% fine sand, 40% silt, 5% clay.
			AS-1					
11	24		30.0	30				
				31				
				32				
				33				Medium coarse sand at 33.5 ft.
		S&H		34				
			AS-1					
6	27		35.0	35				
				36				Bottom of boring at 35.0 ft. 3/16/93
				37				
				38				
				39				
				40				

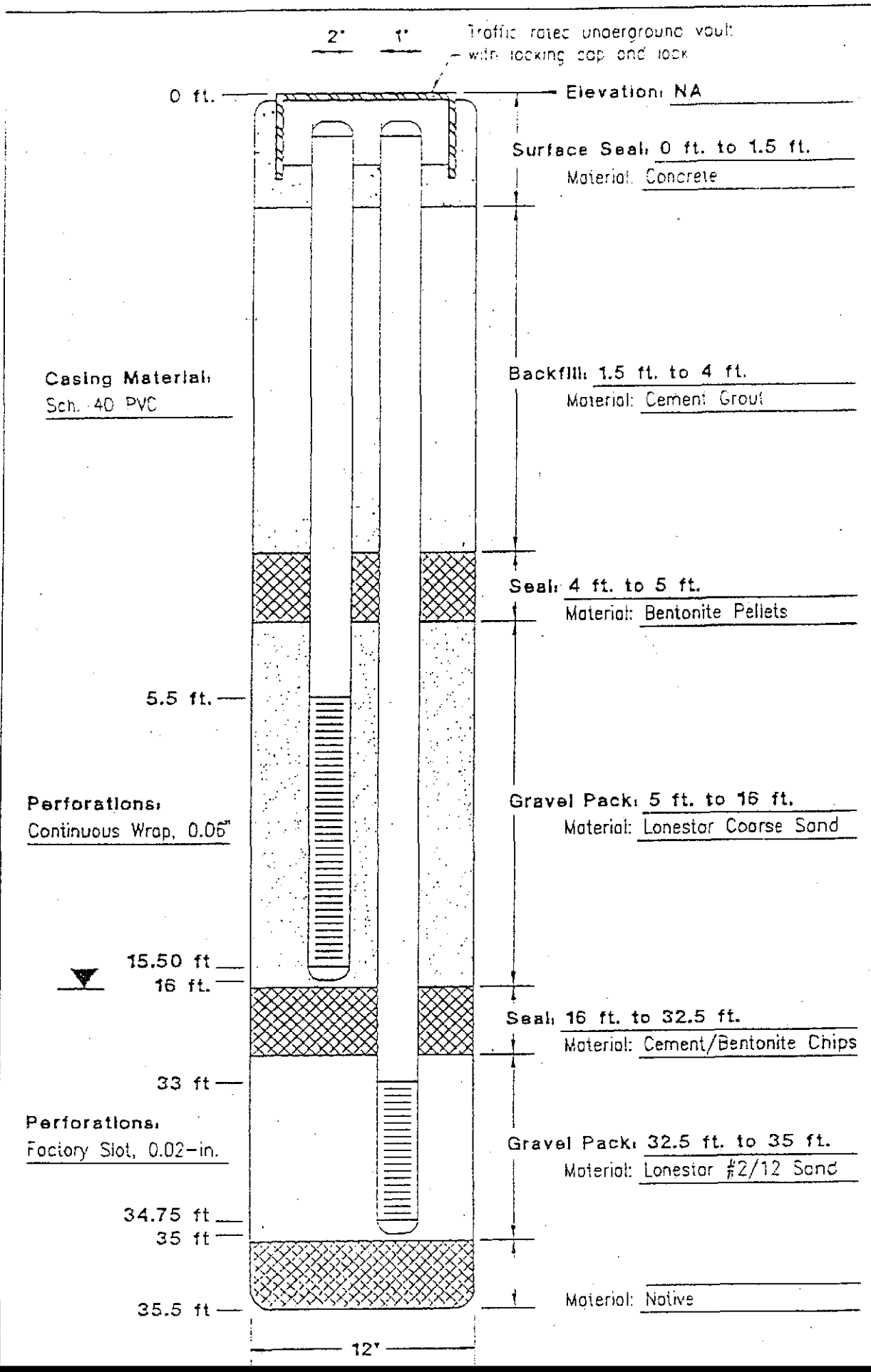
Remarks:

GSI GeoStrategies Inc.

Log of Boring

BORING NO: AS-1

JOB NUMBER | REVIEWED BY RG/CEG | DATE 3/93 | REVISED DATE | REVISED DATE



PLATE

AS-1

WELL CONSTRUCTION DETAIL
Dual Completion Air sparge/Vapor Extraction

REVISED DATE

DATE
5/93

REVIEWED BY

GeoStrategies Inc.

GSI

JOB NUMBER
92608-11

Field location of boring: (See Plate 2)	Project No: 792608	Date: 3/17/93	Boring No: AS-2
	Client: ARCO Products Company SS# 5387		
	Location: 20200 Hesperian Boulevard		Sheet: 1 of 2
	City: San Lorenzo		
	Logged by: RCM	Driller: W. Hazmat	
	Casing installation date:		
Drilling method: Hollow Stem Auger			
Hole diameter: 8 inches	Top of Box Elevation:	Datum:	

Water Level: 13.5
Time: 14:10
Date: 3/17/93

PID (ppm)	Blows/ft* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
								PAVEMENT SECTION - 0.5 ft
				1				SILTY CLAY (CL/ML) - black (10YR 2/1); medium stiff, damp, medium plasticity; 60% clay, 40% silt, rootholes.
				2				
				3				
		S&H		4				SILT (ML) - very dark brown (10YR); very stiff, damp, medium plasticity; 80% silt, 15% clay, 5% fine sand, rootholes.
			AS-2					
6	19		5.0	5				
				6				
				7				
				8				Color change to dark green gray (5GY 4/1); stiff, moist at 8.5 ft.
		S&H		9				
			AS-2					
7	11		10.0	10				
				11				
				12				
				13				
						▽		Color change to olive (5Y 4/3); with dark greenish discolored rootholes; saturated at 13.5 ft.
		S&H		14				
			AS-2					
247	11		15.0	15				
				16				
				17				
				18				
		S&H		19				
			AS-2					Color change to dark yellowish brown (10YR 4/6); moist with black mottling (10YR 2/1) at 19.5 ft.
11	37		20.0	20				

Remarks: * Converted to equivalent standard penetration blows/ft.

Log of Boring

GeoStrategies Inc.

BORING NO: AS-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
792608		3/93		

Field location of boring: (See Plate 2)

Project No	792608	Date 3/17/93	Boring No AS-2
Client	ARCO Products Company SS#5387		
Location	20200 Hesperian Boulevard		Sheet 2
City	San Lorenzo		of 2
Logged by	RCM	Driller W. Hazmat	

Casing installation data

Drilling method: Hollow Stem Auger

Hole diameter: 8 inches

Top of Box Elevation: Datum:

Water Level:
Time:
Date:

PID (ppm)	Blows/ft or Pressure (psi)	Type of Sample	Sample Number	Depth (ft)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				21				
				22				
				23				
								increase clay to to 20%; saturated at 23.5 ft.
		S&H		24				
			AS-2					
0	9		25.0	25				
				26				
				27				
				28				
								SILTY SAND (SM) - light olive brown (2.5Y 5/4); very
		S&H		29				dense, saturated; 75% fine sand, 20% silt, 5% clay
			AS-2					
0	69		30.0	30				
		SPT						Descrease fine to coarse sand to 55%
				31				increase clay to 15%, silt to 30%, at 30.5 ft.
	11							
				32				
								Bottom of boring at 31.5 ft
				33				3/17/93
				34				
				35				
				36				
				37				
				38				
				39				
				40				

Remarks:

Log of Boring

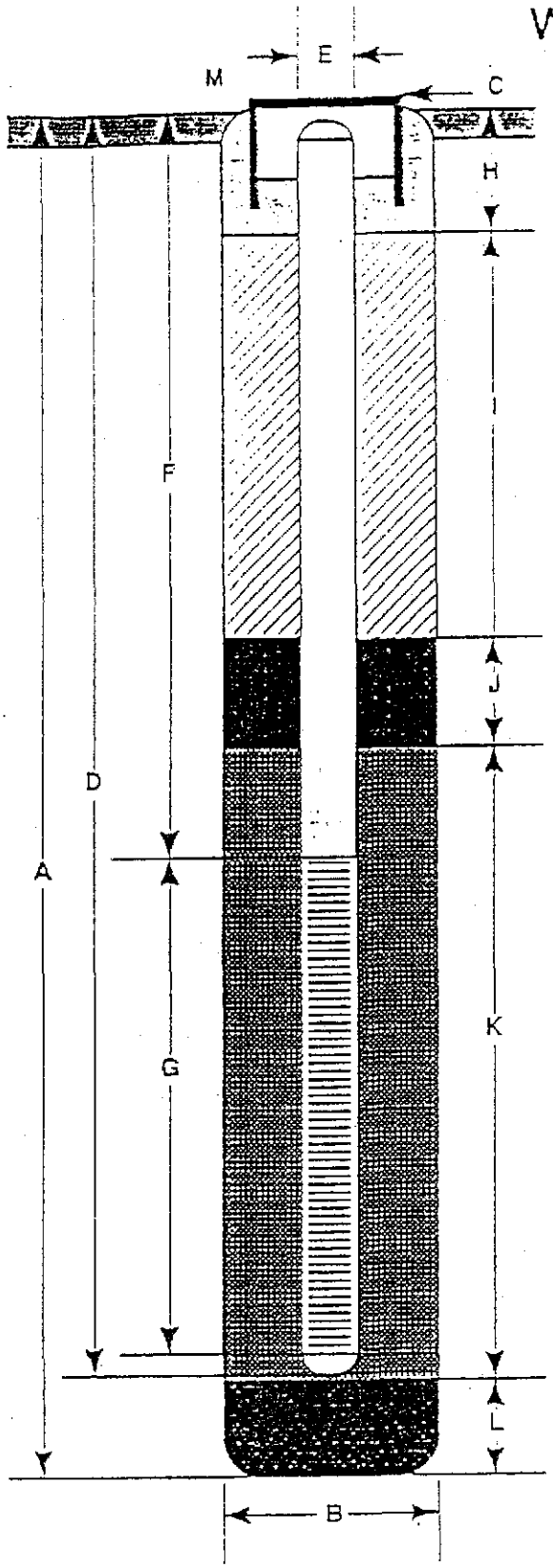
BORING NO

GSI GeoStrategies Inc.

AS-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
		6/93		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 31.5 ft.

B Diameter of Boring 8.0 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation _____ ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project Datum

D Casing Length 30.0 ft.
Material Schedule 40 PVC

E Casing Diameter 1 in.

F Depth to Top Perforations 28.0 ft.

G Perforated Length 2.0 ft.
Perforated Interval from 28.0 to 30.0 ft.
Perforation Type Machine Slotted
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 15.0 ft.
Backfill Material Neat Cement

J Seal from 15.0 to 27.5 ft.
Seal Material Bentonite

K Gravel Pack from 27.5 to 30.0 ft.
Pack Material Lonestar #2/12 Graded Sand

L Bottom Seal 1.5 ft.
Seal Material Bentonite

M Waterproof vault with slip cap.

Note: Depths measured from initial ground surface.

Well Construction Detail

WELL NO

GSI GeoStrategies Inc.

AS-2

JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE

Field location of boring

(See Plate 2)

Project No	792608	Date	3/17/93
Client	ARCO Products Company SS#5387		
Location	20200 Hesperian Boulevard		
City	San Lorenzo		
Logged by	RCM	Driller	W. Hazmat

Boring No. A-A#

Sheet 1 of 1

Casing installation data

Drilling method: Hollow Stem Auger

Hole diameter: 10 inches

Top of Box Elevation: Datum:

Water Level: 13.5
Time: 12:55
Date: 3/17/93

FID (ppm)	Blows/ft or Pressure (psi)	Type of Sample	Sample Number	Depth (ft)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
								PAVEMENT SECTION - 0.25 ft
				1				SILTY CLAY (CL/ML) - black (10YR 2/1); medium stiff, damp, medium plasticity; 70% clay, 30% silt, trace wood fragments (fill).
				2				
				3				
114								
		S&H		4				
			A-A					Trace fill gravel; very stiff at 4.5 ft.
85	18		5.0	5				
				6				
				7				
				8				SILT (ML) - greenish gray (5G 5/1); stiff, moist, medium plasticity; 85% silt, 15% clay, trace fine sand, rootholes.
		S&H		9				
			A-A					
270	13		10.0	10				
				11				Very stiff at 11.0 ft.
		S&H						
			A-A	12				
120	25		12.5					
				13				
						▽		Increase silt to 95%; saturated at 13.5 ft.
		S&H		14				
			A-A					
283	23		15.0	15				
				16				Bottom of boring at 15.0 ft.
				17				3/17/93
				18				
				19				
				20				

Remarks: # Boring A-A was completed as Vapor Extraction Well AV-1
* Converted to equivalent standard penetration blows/ft.

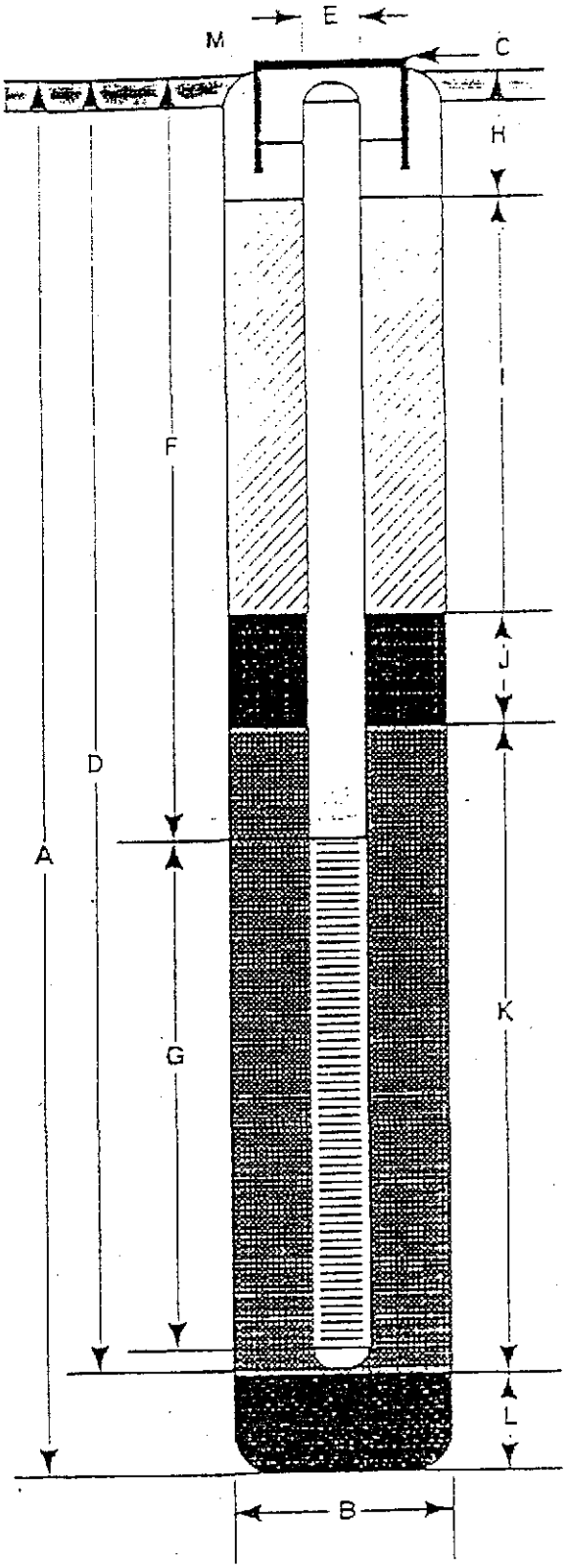
Log of Boring

BORING NO. A-A

GSI GeoStrategies Inc.

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
		3/93		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 15.0 ft.

B Diameter of Boring 10 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation _____ ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project Datum

D Casing Length 15.0 ft.
Material Schedule 40 PVC

E Casing Diameter 4 in.

F Depth to Top Perforations 5.0 ft.

G Perforated Length 10.0 ft.
Perforated Interval from 5.0 to 15.0 ft.
Perforation Type Continuous Wrap
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 4.0 ft.
Backfill Material Neat Cement

J Seal from 4.0 to 4.5 ft.
Seal Material Bentonite

K Gravel Pack from 4.5 to 15.0 ft.
Pack Material Lonestar Coarse Aq. Sand

L Bottom Seal _____ ft.
Seal Material _____

M Waterproof vault box with waterproof locking cap and lock.

Note: Depths measured from initial ground surface.

Well Construction Detail

WELL NO.

GSI GeoStrategies Inc.

AV-1

JOB NUMBER	REVIEWED BY RG/CEG	DATE 2/02	REVISED DATE	REVISED DATE

Field location of boring: (See Plate 2)

Project No: 792608 Date: 3/17/93
Client: ARCO Products Company SS#5387
Location: 20200 Hesperian Boulevard
City: San Lorenzo
Logged by: RCM Driller: W. Hazmat
Casing installation data:
Drilling method: Hollow Stem Auger
Hole diameter: 10 inches
Top of Box Elevation: Datum:
Water Level: 13.5
Time: 9:39
Date: 3/17/93

Boring No: A-B#
Sheet: 1 of 1

FID (ppm)	Blows/ft * or Pressure (psi)	Type of Sample	Sample Number	Depth (ft)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 0.25 ft.
				2				SILTY CLAY (CL/ML) - black (10YR 2/1); medium stiff, damp, medium plasticity; 60% clay, 35% silt, 5% fine to medium sand.
				3				
		S&H		4				
			A-B					
1	9		5.0	5				Gravel, concrete (fill); medium dense, wood fragments at 3.5 ft.
				6				
				7				
				8				
		S&H		9				
			A-B					
0	18		10.0	10				SILT (ML) - olive brown (2.5Y 4/4); very stiff, moist; 75% silt, 20% clay, 5% fine sand, wood fragements/roots.
				11				
				12				
				13		▽		
		S&H		14				
			A-B					
10	15		15.0	15				Greenish gray (5G 5/1), discoloration in rootlets; very moist to saturated at 13.5 ft.
				16				
				17				
				18				
				19				Bottom of boring at 15.0 ft 3/17/93
				20				

Remarks: # Boring A-B was completed as Vapor Extraction Well AV-2.
* Converted to equivalent standard penetration blows/ft

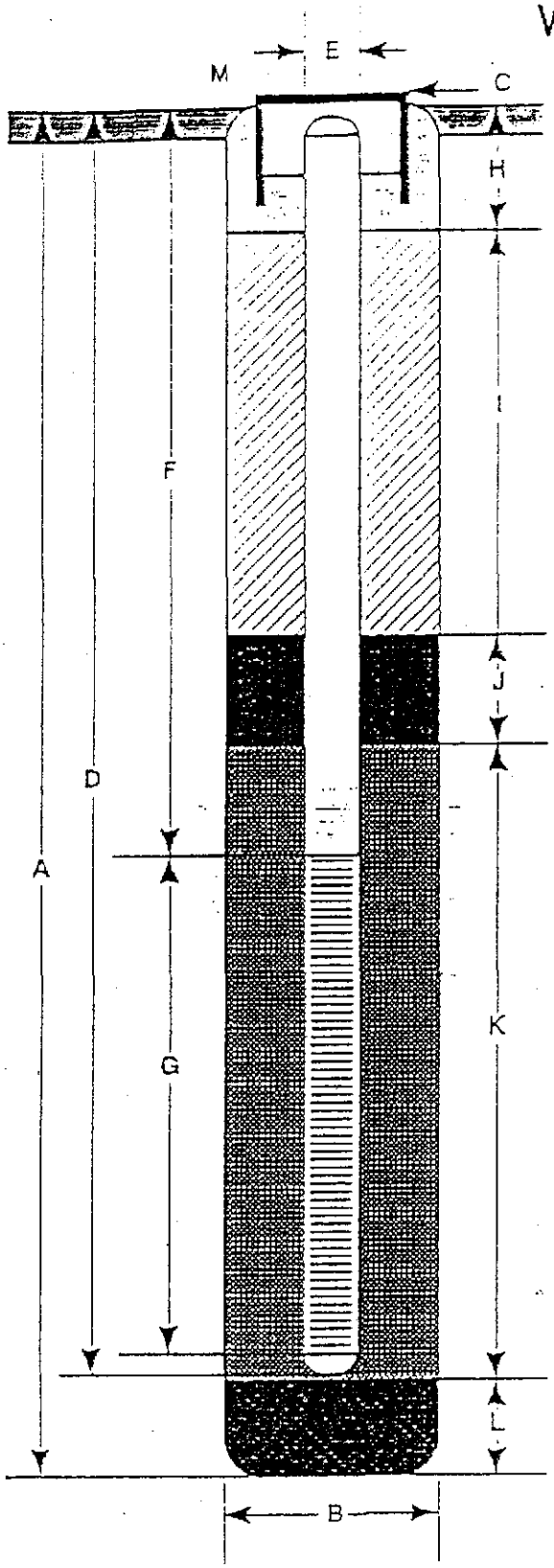
Log of Boring

BORING NO: A-B

GeoStrategies Inc.

JOB NUMBER | REVIEWED BY RG/CEG | DATE 3/93 | REVISED DATE | REVISED DATE

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 15.0 ft.

B Diameter of Boring 10.0 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project Datum

D Casing Length 15.0 ft.
Material Schedule 40 PVC

E Casing Diameter 4 in.

F Depth to Top Perforations 7.0 ft.

G Perforated Length 8.0 ft.
Perforated Interval from 7.0 to 15.0 ft.
Perforation Type Continuous Wrap
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 6.0 ft.
Backfill Material Neat Cement

J Seal from 6.0 to 6.5 ft.
Seal Material Bentonite

K Gravel Pack from 6.5 to 15.0 ft.
Pack Material Lonestar Coarse Aq. Sand

L Bottom Seal ft.
Seal Material

M Waterproof vault box with waterproof locking cap and lock.

Note: Depths measured from initial ground surface.

GSI GeoStrategies Inc.

Well Construction Detail

WELL NO
AV-2

JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE

Field location of boring

(See Plate 2)

Project No	792606	Date	3/17/93
Client	ARCO Products Company SS# 5387		
Location	20200 Hesperian Boulevard		
City	San Lorenzo		
Logged by	RCM	Driller	W. Hazmat
Casing installation data			

Boring No A-C#

Sheet 1 of 1

Drilling method: Hollow Stem Auger

Hole diameter: 10 inches

Top of box Elevation: Datum:

Water Level 13.5
Time 11:01
Date 3/17/93

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Graph Symbol (USCS)	Description
								PAVEMENT SECTION - 0.25 ft
				1				SILT CLAY (CL/ML) - black (10YR 2/1); medium stiff, damp, medium plasticity; 70% clay, 30% silt, trace fine sand.
				2				
				3				
		S&H		4				
			A-C					Color change to dark olive gray (5Y 3/2) - very stiff, fine
16	20		5.0	5				rootlets at 4.0 ft.
				6				
				7				SILT (ML) - dark olive gray (5Y 3/2); very stiff, moist, medium plasticity, 65% silt, 30% clay, 5% fine sand,
				8				rootlets.
		S&H		9				
			A-C					
106	18		10.0	10				
				11				
		S&H						Decreased clay to 10% at 8.5 ft.
			A-C	12				
208	31		12.5					
				13				
						▽		
		S&H		14				
		(Push)	A-C					
847			15.0	15				Greenish gray (5G 5/1) - discoloration in rootlets and 13.5 ft.
				16				
				17				
				18				Bottom of boring at 15.0 ft 3/17/93
				19				
				20				

Remarks: # Boring A-C completed as Vapor Extraction Well AV-3
* Converted to equivalent standard penetration blows/ft.

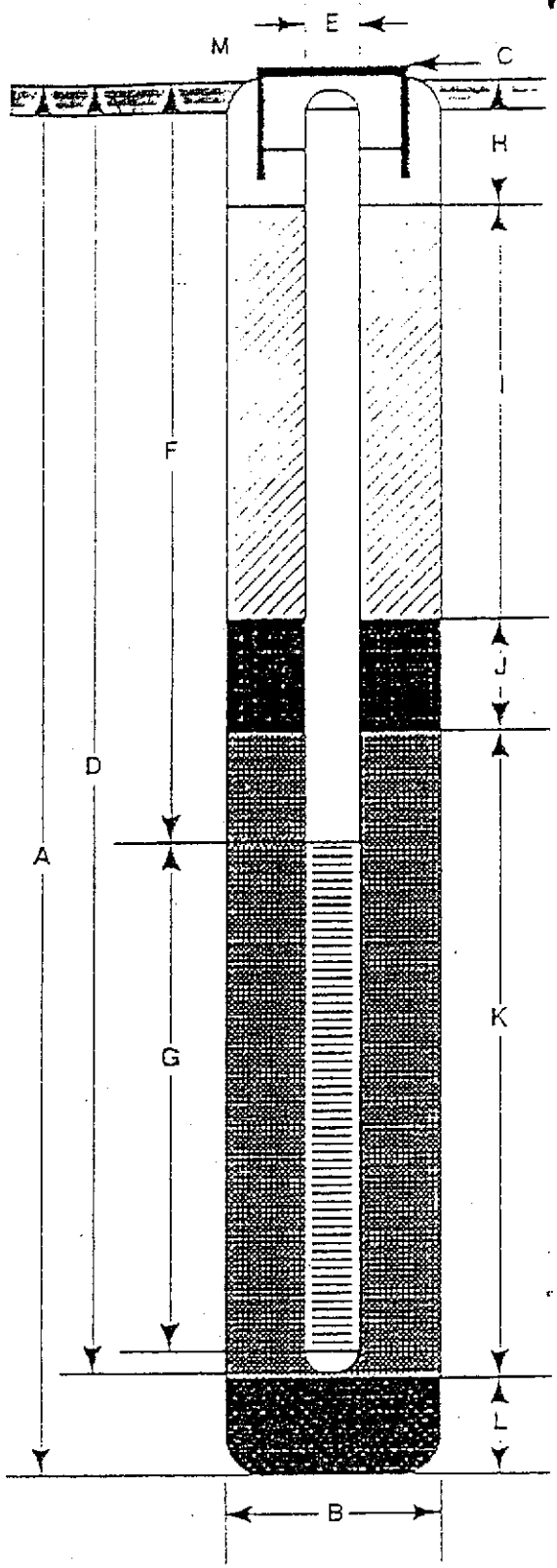
Log of Boring

BORING NO A-C

GSI GeoStrategies Inc.

JOB NUMBER	REVIEWED BY RG/CEG	DATE 3/93	REVISED DATE	REVISED DATE
792606				

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 15.0 ft.

B Diameter of Boring 10.0 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project Datum

D Casing Length 10.0 ft.
Material Schedule 40 PVC

E Casing Diameter 4.0 in.

F Depth to Top Perforations 5.0 ft.

G Perforated Length 10.0 ft.
Perforated Interval from 5.0 to 15.0 ft.
Perforation Type Continuous Wrap
Perforation Size 0.060 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 4.0 ft.
Backfill Material Neat Cement

J Seal from 4.0 to 4.5 ft.
Seal Material Bentonite

K Gravel Pack from 4.5 to 15.0 ft.
Pack Material Lonestar Coarse Aq. Sand

L Bottom Seal ft.
Seal Material

M Waterproof vault box with waterproof locking cap and lock.

Note: Depths measured from initial ground surface.

GSI GeoStrategies Inc.

Well Construction Detail

WELL NO.
AV-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
792608		3/93		

URS

LETTER OF TRANSMITTAL

10/17/03

TO: Scott Seery

FROM: Teresa Tamburello
500 12 th. St.
Oakland, CA 94607

Attention: Alameda County

JOB No. OCT 21 2003

Environmental Health

RE: RE-SEND (WORK PLAN FOR SITE 5378)

The following items are being sent: ☐ Attached ☐ Under separate cover by

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications ☒ Copy of Letter

☐ Other

Copies	Date or Number	Description
1	August 11, 2003	Work Plan for Hydrogen Peroxide Injection Arco Service Station #5387 20200 Hesperian Blvd Hayward, California

Transmittals for reasons checked:

☐ For Your Approval
☐ For Your Use
☐ As Requested
☒ For Review and Comment
☐ No Exceptions Taken
☐ Make Corrections Noted
☐ Amend and Resubmit
☐ Resubmit _____ copies for approval
☐ Submit _____ copies for distribution
☐ Return_____ corrected prints
☐

Remarks: Attached is the work plan you discussed with Scott Robinson that was originally addressed to the wrong person. Sorry about the mix-up. Call if you have any concerns or questions.

Copies:

If enclosures are not as noted, kindly notify us at once.

Teresa Tamburello

URS Corporation
Oakland