GeoStrategies Inc.

LETTER REPORT
VAPOR EXTRACTION/AIR-SPARGING SYSTEM START UP AND QUARTERLY GROUNDWATER MONITORING FIRST QUARTER 1994

at

ARCO Station 5387
20200 Hesperian Boulevard
Hayward, California

792601-19

Prepared for

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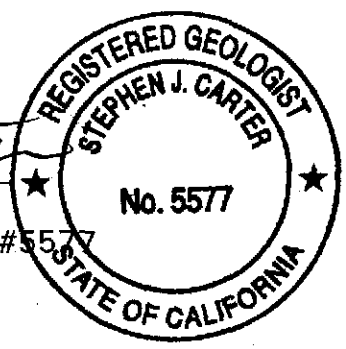


June 30, 1994

GeoStrategies Inc.

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

July 13, 1994

Subject: Vapor Extraction/Air-sparging System Start Up and Quarterly Groundwater Monitoring Report - First Quarter 1994 for ARCO Station 5387, 20200 Hesperian Boulevard, Hayward, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), GeoStrategies Inc. (GSI) has prepared this letter report describing the vapor extraction/air-sparging system start up and summarizing the results of the first quarter 1994 groundwater monitoring at the above-referenced site. The objectives of the quarterly monitoring are to evaluate changes in groundwater levels, changes in petroleum hydrocarbons in the shallow groundwater beneath the site, and to evaluate the performance of the interim remediation system at the site. Groundwater monitoring and sampling was performed by ARCO's contractor, Integrated Wastestream Management (IWM) of Milpitas, California, and included measuring depths to groundwater, subjectively analyzing groundwater for the presence of petroleum product, collecting groundwater samples from the wells for laboratory analysis, and directing a State-certified laboratory to analyze the groundwater samples. The field work associated with start-up, operation and maintenance of the soil and groundwater interim remediation system was performed by Gettler-Ryan Inc. (G-R) of Dublin, California.

1.0 SITE BACKGROUND

The operating ARCO Station is located at the intersection of Hesperian Boulevard and West Sunset Drive in Hayward, California, as shown on the Vicinity Map, Figure 1. In August 1986, Groundwater Technology, Inc.

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

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

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

In December 1993 and January 1994, Golden West Construction Company constructed a soil and groundwater remediation system at the site, and GSI installed seven additional air-sparging wells (AS-3 through AS-9) and one additional vapor extraction well (AV-4) to provide additional sparging and vapor extraction points for the system. The results of drilling were described in the GSI report dated June 23, 1994.

Quarterly groundwater monitoring and sampling of the site wells began in December 1991. Groundwater samples are currently analyzed for total petroleum hydrocarbons calculated as gasoline (TPH-G) and gasoline constituents benzene, toluene, ethylbenzene and xylenes (BTEX) according to Environmental Protection Agency (EPA) Methods 5030/8020/California DHS LUFT Method. Historical monitoring and sampling data are presented in Tables 1A and 2A included in Appendix A.

2.0 INTERIM REMEDIATION SYSTEM DESCRIPTION

The interim soil and groundwater remediation system was installed in December 1993 and January 1994, and began operation on February 15, 1994. The system currently utilizes vapor extraction and air-sparging. The system does not employ groundwater extraction and treatment at this time, however subsurface piping, groundwater recovery wells and stub-outs within the remediation system compound are available for future use, should groundwater extraction become necessary.

2.1 Interim Vapor Extraction/Air-sparging Remediation System

The system consists of vapor extraction (VE) wells, air-sparging (AS) wells, associated piping, internal combustion engine (ICE) for vapor extraction and abatement, sparge blower and control panel with alarm monitor/telemetry unit. Specifically, the system is comprised of the following components:

VE wells:	MW-1, MW-3, AV-1, AV-3, AV-4, AS-1
AS wells:	AS-1 through AS-9
IC engine:	VR Systems; Model V-3; 150 cfm , 18 in Hg
Sparge blower:	Westmoore Ltd.; Conde #6; 3HP, 25 cfm, 10 psi
Control panel:	Fabricated by Gettler-Ryan
Auto-dialer:	Silent Knite; Model 1410

The system operates under the Bay Area Air Quality Management District (BAAQMD) Permit to Operate No. 11813 issued on April 5, 1994, and expiring on April 5, 1995. A copy of the permit is included in Appendix B. Vapor extraction began on February 15, 1994. Air-sparging was not started until March 15, 1994 because of delays by Pacific Gas & Electric in installing electric service at the site. System operation is limited to regular daytime working hours due to complaints from nearby residents

about the noise caused by vapor extraction equipment. See Section 4.3 for data detailing system performance.

3.0 FIRST QUARTER 1994 ACTIVITIES

A summary of activities performed at the site during the first quarter 1994 is presented below:

- Completed installation of the interim soil and groundwater remediation system.

- Initiated operation of the vapor extraction system on February 15, 1994. Samples of the extracted vapor were collected from the influent and effluent ports of the IC engine on February 15, 16, and 17, 1994. These vapor samples were analyzed for TPH-G and BTEX.

- Initiated operation of the air-sparging system on March 15, 1994. Samples of the extracted vapor were collected from wells AV-1, AV-3, AV-4, MW-1, MW-3, AS-1, and from influent and effluent ports of the IC engine before and after sparging began. These samples were analyzed for TPH-G and BTEX.

- Performed operation and maintenance of the interim remediation system. Influent and effluent samples were collected biweekly (February 24, and March 7, 15 and 28, 1994) and analyzed for TPH-G and BTEX per the permit requirements.

- Depth-to-water (DTW) measurements were obtained by IWM in groundwater monitoring wells MW-1 through MW-3, A-4, A-5, A-7 through A-10, and recovery wells AR-1 and AR-2; each well was inspected for the presence of floating product; and groundwater samples were collected from the wells on February 16 and 17, 1994. Groundwater samples were analyzed for TPH-G and BTEX.

4.0 INTERIM REMEDIATION SYSTEM MONITORING

4.1. Interim Vapor Extraction System Start-up

The soil vapor extraction system was started on February 15, 1994, by G-R. During the first three days of operation the system was monitored as required by BAAQMD permit conditions. The flow rate, hydrocarbon concentration, pressure and temperature of both the influent vapor stream into the IC engine and the effluent vapor stream from the engine exhaust were recorded during start-up monitoring on February 15, 16, and 17, 1994. In addition, bag samples were collected and analyzed for TPH-G and BTEX using EPA Methods 5030/8015 Modified/8020 by Sequoia Analytical of Redwood City, California (Sequoia), a California State-certified laboratory (Hazardous Waste Testing Laboratory #1210). These data were used to calculate emission rates and destruction efficiencies for the ICE. A start-up report dated March 9, 1994, was prepared by GSI and submitted to the BAAQMD. Upon BAAQMD approval of this report, Permit to Operate No. 11813 was issued for the subject site (see Appendix B).

Initial operation of the vapor extraction system utilized all available VE wells, AV-1, AV-3, AV-4, AS-1, MW-1 and MW-3. Currently, all wells except MW-3 are active. System performance data is summarized from start-up to the end of the first quarter of 1994 in Tables 1 and 2. Analytical results for air samples are summarized in Table 3. Field monitoring sheets, laboratory analytical reports and chain-of-custody forms for air samples are included in Appendix C.

4.2. Air-sparging Start-up

After PG&E installed electric service at the site, the sparge blower was connected and air-sparging was started. Based on a review of VE and AS well construction details, groundwater TPH-G and benzene concentrations, and system performance, sparging was initiated in wells AS-1, AS-4, and AS-9 on March 15, 1994. These wells were chosen because of their proximity to VE wells which could provide recovery of any stripped hydrocarbons resulting from the injection of sparge gas into the subsurface.

The start-up of air-sparging operations at the site had measurable effect on the performance of the vapor extraction system. On March 15, 1994, during air-sparging start-up, the concentration of hydrocarbons was monitored before and after sparging began using both a field monitoring instrument and bag samples for laboratory analysis. Concentrations were monitored in the total influent vapor stream as well as in extracted vapors from individual wells. Bag samples were submitted to Sequoia for analysis of TPH-G and BTEX. The laboratory analytical results indicated that although there was no significant increase in the TPH-G concentrations in individual wells, there was a significant increase in the total influent concentrations. The TPH-G concentration in the influent vapor stream increased from 560 parts per million by volume (ppmv) before sparging to 1200 ppmv after sparging, or 114%, after approximately two hours of sparging. A round of confirmatory samples was taken on March 28, 1994 to evaluate whether the increase in concentrations was transient. Samples were collected from the influent vapor stream before and approximately five hours after sparging. Laboratory analytical results showed an increase from 450 parts per million by volume (ppmv) to 490 ppmv, or 9%. These results indicated that the increase that sparging had on extracted vapor concentrations was transient. A summary of the data collected during sparging start-up activities is presented in Table 4.

4.3. Interim Vapor Extraction System Monitoring and Sampling

Monitoring was performed to satisfy BAAQMD permit conditions and to provide data for efficient operation of the vapor extraction system. In order to satisfy permit conditions for monitoring for hydrocarbon concentrations (Condition No. 10455), bag samples of the extracted vapors were collected from the system influent and effluent vapor streams and submitted for laboratory analysis for TPH-G and BTEX. The bag samples were collected at a minimum of every two weeks. Flow data from the influent to the IC engine and effluent from the engine exhaust, which included differential pressure measured using a pitot tube and Magnehelic® differential pressure gauge, temperature and pressure, were taken during each monitoring event. The data were used to calculate standard flow rates for both vapor streams. The flow rates combined with the laboratory analytical results were used to calculate emission rates. Other system parameters which were monitored included sparge

air flow rate and pressure, water knockout fluid level, and individual well vacuum and hydrocarbon concentration, which were used for evaluating system performance and maximizing hydrocarbon recovery. The results of the monitoring activities are presented in the following section. System observation and maintenance (O&M) were also performed regularly. This included various repairs, minor modifications and service on system components.

4.4. Interim Vapor Extraction System Performance

Vapor extraction performance during the first quarter 1994 began with system start-up on February 15, 1994. Tables 1 and 2 summarize the vapor extraction system performance and operation data.

Total operational hours for the quarter were 339 hours through April 1, making the system approximately 31% operational. Operation of the system has been limited to a nominal 10 hours a day, from 8:00 am to 6:00 pm, because of complaints from nearby residents regarding the noise generated by equipment on-site.

The hydrocarbon concentration in extracted vapors has decreased by approximately 84% during the quarter, from 2800 ppmv during start-up to 450 ppmv on March 28, 1994. Recovery rates for TPH-G have ranged from 0.15 pounds per operational hour (lbs/hr) to 0.48 lbs/hr. For benzene, recovery rates have ranged from 0.001 lbs/hr to 0.013 lbs/hr. Approximately 105.64 pounds (17.61 gallons) of TPH-G were removed during the first quarter of 1994. A total of 1.35 pounds (0.186 gallons) of benzene were removed over this period.

4.5. Interim Vapor Extraction System Destruction Efficiency

Under Condition No. 10455 of the BAAQMD's Permit to Operate No. 11813, the vapor extraction system is required to operate at a minimum destruction efficiency of 97% for hydrocarbon concentrations between 1000 ppmv and 3000 ppmv. The destruction efficiencies for the system during the first quarter 1994, ranged from 98.74% to 99.78% for TPH-G and 98.27% to 99.93% for Benzene, well above the required efficiencies.

5.0 FIRST QUARTER 1994 GROUNDWATER SAMPLING RESULTS

5.1. Groundwater Level Measurements and Gradient Evaluation

Depth to water-level measurements were obtained from groundwater monitoring wells MW-1 through MW-3, A-4, A-5, A-7 through A-10, and recovery wells AR-1 and AR-2 by IWM field personnel on February 16, 1994. Groundwater monitoring well A-6 was not monitored this quarter because it was paved over during construction of the interim remediation system. Static groundwater levels were measured from the surveyed top of the well casing and recorded to the nearest $\pm$0.01 foot. Water-level data were referenced to Mean Sea Level (MSL) datum and used to construct a potentiometric map of the first encountered groundwater beneath the site (Figure 4). Based on the February 16, 1993, water level data, shallow groundwater beneath the site flows to the west at an approximate hydraulic gradient of 0.003.

Each well was inspected for the presence of floating product. Floating product was not observed in any well this quarter, and has never been observed in any well at this site. Depth-to-groundwater and floating product observations for the current quarter are presented in Table 5 and in the IWM groundwater sampling report (Appendix D). Current and historical water-level data and floating product observations are summarized in Table 1A included in Appendix A.

5.2. Laboratory Analytical Results of Groundwater Samples

Wells MW-1 through MW-3, A-4, A-5, A-7 through A-10, AR-1 and AR-2 were purged and groundwater samples were collected from these wells on February 16 and 17, 1994, by IWM field personnel. Samples were analyzed for TPH-G and BTEX using EPA Methods 5030/8020/California DHS LUFT Method. Groundwater samples were analyzed by Columbia Analytical Services, Inc. of San Jose, California (Columbia), a California State-certified laboratory (Hazardous Waste Testing Laboratory #1426).

Current quarter chemical analytical data are presented in Table 5 and have also been added to the Historical Groundwater Quality Database presented in Table 2A in Appendix A. TPH-G concentrations were nondetectable (less than 50 ppb) in groundwater samples collected from off-site wells

A-8 and A-9. TPH-G was detected in samples collected from other site wells at concentrations ranging between 52 parts per billion (ppb) and 15,000 ppb. Benzene concentrations were reported as nondetectable (less than 0.50 ppb) in groundwater samples collected from on-site well A-4 and off-site wells A-8 through A-10. Benzene was detected in samples collected from other site wells at concentrations ranging between 2.8 ppb and 1,800 ppb. The IWM groundwater sampling report, laboratory analytical reports and the Chain-of-Custody form are presented in Appendix D. Chemical isoconcentration maps for TPH-G and benzene are presented on Figure 5 and 6, respectively.

6.0 CONCLUSIONS

The vapor extraction system began operation on February 15, 1994, and air-sparging was initiated on March 15, 1994. The vapor extraction system was 31% operational during the first quarter of 1994. System operation, which includes vapor extraction and sparging, is currently limited to daytime hours.

The average product recovery rate for the first quarter 1994 was 0.31 lbs/hr. Approximately 106 pounds (17.6 gallons) of TPH-G and 1.35 pounds (0.186 gallons) of benzene have been recovered during the first quarter 1994.

Air-sparging appears to have a positive effect on hydrocarbon recovery. The intermittent operation of the system makes good use of the transient effect of air-sparging on hydrocarbon concentrations in the extracted vapors.

Groundwater elevations increased an average of about 1.15 feet between October 1993 and February 1994. The gradient and flow direction are consistent with the previously interpreted gradients and flow directions for this site.

Concentrations of TPH-G have remained nondetectable in wells A-8 and A-9; have increased in wells A-7 and AR-1; have decreased in well A-10; and have not changed significantly in other sampled wells since the last quarter. Concentrations of benzene have remained nondetectable in wells A-4 and A-8 through A-10; have increased in wells A-7, AR-1 and MW-3;

have decreased in well AR-2; and have not changed significantly in other sampled wells since the last quarter.

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

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

7.0 ACTIVITIES PLANNED FOR THE SECOND QUARTER 1994

- Connect two additional wells to the vapor extraction system to maximize hydrocarbon recovery using the ICE before conversion to a carbon adsorbtion system.

- Perform operation and maintenance duties for the vapor extraction/air-sparging system.

- Perform quarterly monitoring and sampling of site wells.

If you have any questions, please call us at (510) 551-8777

Table 1
Vapor Extraction System Performance Data
ARCO Station 5387
Hayward, California

Beginning Date	15-Feb-94	15-Feb-94	16-Feb-94	17-Feb-94	24-Feb-94	7-Mar-94	7-Mar-94	14-Mar-94	15-Mar-94	25-Mar-94	28-Mar-94
Ending Date	15-Feb-94	16-Feb-94	17-Feb-94	24-Feb-94	7-Mar-94	7-Mar-94	14-Mar-94	15-Mar-94	25-Mar-94	28-Mar-94	1-Apr-94
Down-time (days)*	0.00	0.08	0.42	6.42	8.04	0.00	5.42	0.67	6.04	2.63	2.25
Total Operation (days)	0.75	0.92	0.58	0.58	2.96	0.33	1.58	0.33	3.96	0.38	1.75
Total Operation (hours)	18	22	14	14	71	8	38	8	95	9	42
Operational Hours to Date	18	40	54	68	139	147	185	193	288	297	339
Benzene Concentrations											
Average Influent (ppmv)	69	20	44	22	30	19	NS	8.5	NS	2.7	NS
Average Effluent (ppmv)	ND	ND	ND	ND	ND	ND	NS	ND	NS	ND	NS
TPH-G Concentrations											
Average Influent (ppmv)	2800	1400	1900	1500	1800	1400	NS	1200	NS	450	NS
Average Effluent (ppmv)	ND	ND	ND	ND	ND	ND	NS	ND	NS	ND	NS
Flow Rates											
Average Influent (scfm)	16	12	13	15	14	17	19	29	39	33	39
Average Effluent (scfm)	42	68	66	71	76	66	70	79	76	82	71
Benzene Recovery Data											
Recovery Rate (lbs/hr)	0.013	0.003	0.007	0.004	0.005	0.004	0.004	0.003	0.003	0.001	0.001
Recovery Rate (lbs/day)	0.316	0.069	0.163	0.094	0.124	0.092	0.098	0.072	0.069	0.026	0.023
Destruction Efficiency (%)	99.93%	99.45%	99.78%	99.59%	99.66%	99.60%	99.62%	99.40%	99.57%	98.27%	98.74%
Product Recovered (lbs)	0.237	0.063	0.095	0.055	0.368	0.031	0.156	0.024	0.275	0.010	0.040
Product Recovered To Date (lbs)	0.237	0.300	0.395	0.450	0.818	0.848	1.004	1.028	1.302	1.312	1.352
Product Recovered To Date (gal)	0.033	0.041	0.054	0.062	0.113	0.117	0.138	0.142	0.180	0.181	0.186
TPH-G Recovery Data											
Recovery Rate (lbs/hr)	0.44	0.17	0.24	0.22	0.26	0.23	0.26	0.35	0.48	0.15	0.18
Recovery Rate (lbs/day)	10.67	4.00	5.87	5.35	6.22	5.62	6.34	8.50	11.47	3.62	4.31
Destruction Efficiency (%)	99.78%	99.06%	99.37%	99.26%	99.31%	99.35%	99.38%	99.48%	99.63%	98.74%	99.08%
Product Recovered (lbs)	8.00	3.67	3.42	3.12	18.40	1.87	10.03	2.83	45.39	1.36	7.53
Product Recovered To Date (lbs)	8.00	11.67	15.09	18.21	36.61	38.49	48.52	51.36	96.74	98.10	105.64
Product Recovered To Date (gal)	1.33	1.95	2.52	3.04	6.10	6.41	8.09	8.56	16.12	16.35	17.61

*System does not operate on weekends; between February 17, 1994 and March 7, 1994 the system had excess downtime due to computer problems.

ppmv = parts per million by volume
TPH-G = total petroleum hydrocarbons as gasoline
scfm = standard cubic feet per minute
lbs/hr = pounds per operational hour
lbs/day = pounds per day - uncorrected
lbs = pounds
gal = gallons
NS = Not Sampled; Recovery data calculated using most recent previous sample data
ND = None Detected; Recovery data calculated using laboratory detection limits

Notes:

1. Molecular weights used in recovery calculations are 86 for TPH and 78 for benzene.
2. Densities used in recovery calculations are 6.0 lbs/gal for TPH and 7.25 lbs/gal for benzene.
3. Average Influent Flow is total flow from well field, Average Effluent Flow includes total products of combustion.

Table 2
Vapor Extraction Well Status
ARCO Station 5387
Hayward, California

Date	2/15/94	2/16/94	2/17/94	2/24/94	3/7/94	3/14/94	3/25/94	3/28/94
AV-1								
Active	Y	Y	Y	Y	Y	Y	Y	Y
Vacuum (in WC)	NM	NM	NM	NM	NM	32	52	40
HC Concentration (ppm)	13170	13680	14000	13400	NM	5600	2300	900
AV-3								
Active	Y	Y	Y	Y	Y	Y	Y	Y
Vacuum (in WC)	NM	NM	NM	NM	NM	26	52	20
HC Concentration (ppm)	6700	2800	1550	2300	NM	1110	50	300
AV-4								
Active	Y	Y	Y	Y	N	Y	Y	Y
Vacuum (in WC)	NM	NM	NM	NM	NM	14	18	20
HC Concentration (ppm)	4800	2220	1600	1900	NM	90	10	200
AS-1								
Active	Y	Y	Y	Y	Y	Y	Y	Y
Vacuum (in WC)	NM	NM	NM	NM	NM	30	52	40
HC Concentration (ppm)	6100	4900	4800	4550	NM	900	60	2720
MW-1								
Active	Y	Y	Y	Y	Y	Y	Y	Y
Vacuum (in WC)	NM	NM	NM	NM	NM	30	50	40
HC Concentration (ppm)	11550	6500	7800	8260	NM	3270	1500	1500
MW-3								
Active	Y	Y	Y	Y	N	Y	N	N
Vacuum (in WC)	NM	NM	NM	NM	NM	14	NM	10
HC Concentration (ppm)	5800	4950	4770	4710	NM	1320	20	100
AR-1								
Active	N	N	N	N	N	N	N	N
Vacuum (in WC)	NM	NM	NM	NM	NM	NM	NM	NM
HC Concentration (ppm)	NM	NM	NM	NM	NM	NM	NM	NM
AR-2								
Active	N	N	N	N	N	N	N	N
Vacuum (in WC)	NM	NM	NM	NM	NM	NM	NM	NM
HC Concentration (ppm)	NM	NM	NM	NM	NM	NM	NM	NM

in WC = inches of water column
HC = hydrocarbon
ppm = parts per million
Y = yes
N = no
NM = Not Measured

Note: HC Concentrations are qualitative field measurements only and are not used in any calculations

TABLE 3
LABORATORY ANALYTICAL RESULTS FOR AIR SAMPLES
ARCO Station 5387
Hayward, California

SAMPLE ID	SAMPLE DATE	TPH-G (PPMV)	BENZENE (PPMV)	TOLUENE (PPMV)	ETHYLBENZENE (PPMV)	XYLENES (PPMV)
Inf.	15-Feb-94	2,800	69	6.4	28	48
Eff.	15-Feb-94	<2.3	<0.019	<0.016	<0.014	<0.014
Inf.	16-Feb-94	1,400	20	19	6.0	16
Eff.	16-Feb-94	<2.3	<0.019	<0.016	<0.014	<0.014
Inf.	17-Feb-94	1,900	44	6.1	14	28
Eff.	17-Feb-94	<2.3	<0.019	<0.016	<0.014	<0.014
Inf.	24-Feb-94	1,500	22	<0.016	12	28
Eff.	24-Feb-94	<2.3	<0.019	<0.016	<0.014	<0.014
Inf.A	07-Mar-94	1,800	30	13	8.5	32
Eff.A	07-Mar-94	<2.3	<0.019	<0.016	<0.014	<0.014
Inf.B	07-Mar-94	1,400	19	9.8	6.0	20
Eff.B	07-Mar-94	<2.3	<0.019	<0.016	<0.014	<0.014
Inf.1*	15-Mar-94	560	3.4	4.3	3.0	20
AS1-1*	15-Mar-94	1,300	17	6.9	3.5	9.0
AV1-1*	15-Mar-94	2,700	17	8.0	8.8	22
AV3-1*	15-Mar-94	640	6.9	1.2	<0.7	6.7
AV4-1*	15-Mar-94	870	2.3	4.3	1.2	3.5
MW1-1*	15-Mar-94	3,800	38	35	9.2	81
MW3-1*	15-Mar-94	190	<0.95	0.88	<0.84	5.3
Inf.2**	15-Mar-94	1,200	8.5	6.9	4.2	25
Eff.**	15-Mar-94	<2.3	<0.019	<0.016	<0.014	<0.014
AS1-2**	15-Mar-94	490	7.2	<0.8	1.5	1.2
AV1-2**	15-Mar-94	900	6.0	8.0	5.8	25
AV3-2**	15-Mar-94	450	2.2	0.88	0.85	8.1
AV4-2**	15-Mar-94	64	<0.475	<0.4	<0.35	<0.35
MW1-2**	15-Mar-94	3,600	38	332	9.5	83
MW3-2**	15-Mar-94	200	<0.19	<0.16	<0.14	<0.14
Inf.A*	28-Mar-94	450	2.7	2.1	0.32	5.1
Inf.B**	28-Mar-94	490	<0.95	3.2	<0.7	23
Eff.	28-Mar-94	<2.3	<0.019	<0.016	<0.014	<0.014

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
PPMV = Parts Per Million by Volume.
Inf. = Influent Sample.
Eff. = Effluent Sample.
* = Sample collected before sparging began.
** = Sample collected after sparging began.
Note: On March 7, 1994, influent and effluent samples were collected in the morning (marked A) and in the afternoon (marked B).

Table 4
Air Sparging Start-up Data
ARCO Station 5387
Hayward, California

Date	Time	Event	AS-1		AV-1		AV-3		AV-4		MW-1		MW-3		Influent	
			TPH-G (ppmv)	Increase (%)	TPH-G (ppmv)	Increase (%)	TPH-G (ppmv)	Increase (%)	TPH-G (ppmv)	Increase (%)	TPH-G (ppmv)	Increase (%)	TPH-G (ppmv)	Increase (%)	TPH-G (ppmv)	Increase (%)
3/15/94	9:30	VE	1300	NA	2700	NA	640	NA	870	NA	3800	NA	190	NA	560	NA
3/15/94	12:16	VE/AS	490	-62%	900	-67%	450	-30%	64	-93%	3600	-5%	200	5%	1200	114%
3/28/94	14:00	VE	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	450	NA
3/28/94	19:00	VE/AS	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	490	9%

Date	Time	Event	AS-1		AV-1		AV-3		AV-4		MW-1		MW-3		Influent	
			HC (ppm)	Increase (%)	HC (ppm)	Increase (%)	HC (ppm)	Increase (%)	HC (ppm)	Increase (%)	HC (ppm)	Increase (%)	HC (ppm)	Increase (%)	HC (ppm)	Increase (%)
3/15/94	9:30	VE	560	NA	5860	NA	300	NA	330	NA	2460	NA	0	NA	NM	NA
3/15/94	10:20	VE/AS	650	16%	6180	5%	460	53%	680	106%	3960	61%	820	NA	NM	NA
3/15/94	11:13	VE/AS	630	13%	5800	-1%	460	53%	600	82%	3810	55%	800	NA	NM	NA
3/15/94	12:16	VE/AS	720	29%	5870	0%	450	50%	620	88%	3660	49%	730	NA	NM	NA

TPH-G = total petroleum hydrocarbons as gasoline; laboratory analysis
ppmv = parts per million by volume; laboratory analysis
HC = hydrocarbons; field monitoring
ppm = parts per million; field monitoring
NM = Not Measured
NA = Not Applicable

TABLE 5

CURRENT GROUNDWATER MONITORING DATA
ARCO Station 5387
Hayward, California

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

Current CAL EPA Action Levels: Toluene 100 ppb

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

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

TABLE 5

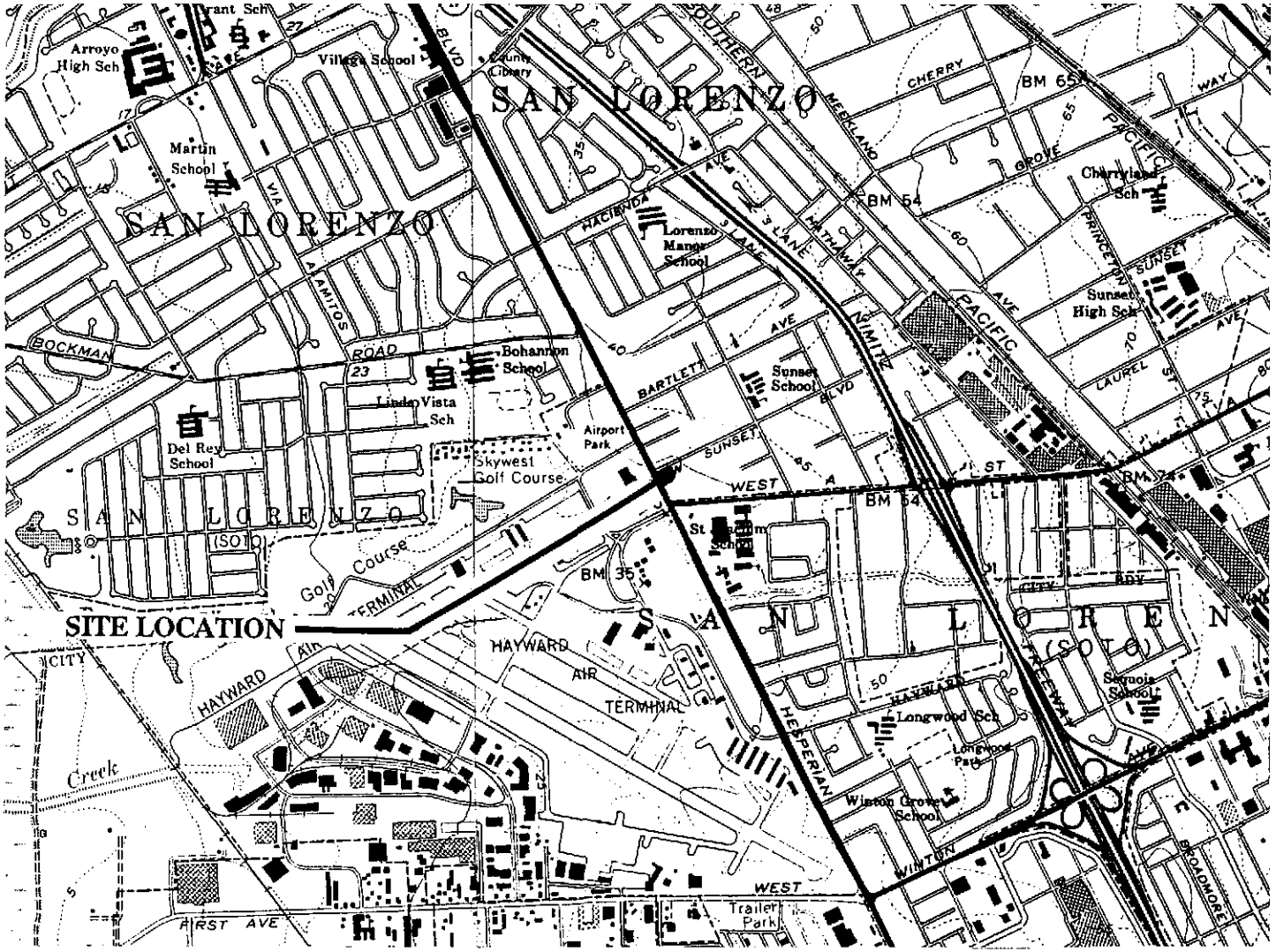
CURRENT GROUNDWATER MONITORING DATA
ARCO Station 5387
Hayward, California

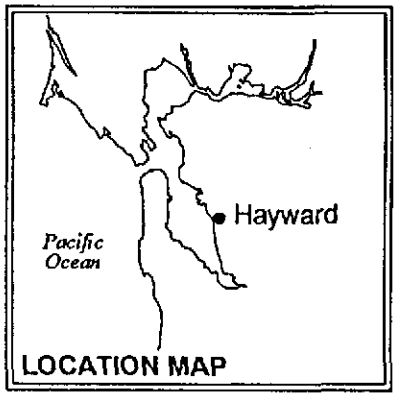
WELL NO.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	WELL ELEV. (FT)	STATIC WATER ELEV. (FT)	PRODUCT THICKNESS (FT)	DEPTH TO WATER (FT)
MW-1	17-Feb-94	24-Feb-94	1,200	130	12	54	58	37.26	25.40	0.00	11.86
MW-2	17-Feb-94	24-Feb-94	15,000	1,800	21	850	540	37.99	25.18	0.00	12.81
MW-3	17-Feb-94	24-Feb-94	3,100	160	<10	36	8.6	36.80	25.27	0.00	11.53
A-4	17-Feb-94	24-Feb-94	320	<0.50	<0.50	28	0.9	39.46	25.44	0.00	14.02
A-5	17-Feb-94	24-Feb-94	340	2.8	<0.50	13	2.9	38.47	25.27	0.00	13.20
A-6	16-Feb-94	Not sampled	---	---	---	---	---	---	Not monitored	---	---
A-7	16-Feb-94	24-Feb-94	1,300	38	<1	35	25	39.38	24.94	0.00	14.44
A-8	16-Feb-94	24-Feb-94	<50	<0.50	<0.50	<0.50	<0.50	36.76	25.29	0.00	11.47
A-9	16-Feb-94	24-Feb-94	<50	<0.50	<0.50	<0.50	<0.50	38.19	25.20	0.00	12.99
A-10	17-Feb-94	24-Feb-94	52	<0.50	<0.50	<0.50	<0.50	38.66	24.50	0.00	14.16
AR-1	17-Feb-94	24-Feb-94	4,700	1,100	<10	140	26	37.46	25.31	0.00	12.15
AR-2	17-Feb-94	24-Feb-94	130	2.9	<0.50	15	0.8	37.98	25.22	0.00	12.76
XDUP-1 (MW-2)	17-Feb-94	24-Feb-94	14,000	1,900	21	750	480	---	---	---	---

TABLE 5

CURRENT GROUNDWATER MONITORING DATA
ARCO Station 5387
Hayward, California

WELL NO.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	WELL ELEV. (FT)	STATIC WATER ELEV. (FT)	PRODUCT THICKNESS (FT)	DEPTH TO WATER (FT)
MW-1	17-Feb-94	24-Feb-94	1,200	130	12	54	58	37.26	25.40	0.00	11.86
MW-2	17-Feb-94	24-Feb-94	15,000	1,800	21	850	540	37.99	25.18	0.00	12.81
MW-3	17-Feb-94	24-Feb-94	3,100	160	<10	36	8.6	36.80	25.27	0.00	11.53
A-4	17-Feb-94	24-Feb-94	320	<0.50	<0.50	28	0.9	39.46	25.44	0.00	14.02
A-5	17-Feb-94	24-Feb-94	340	2.8	<0.50	13	2.9	38.47	25.27	0.00	13.20
A-6	16-Feb-94	Not sampled	---	---	---	---	---	---	Not monitored	---	---
A-7	16-Feb-94	24-Feb-94	1,300	38	<1	35	25	39.38	24.94	0.00	14.44
A-8	16-Feb-94	24-Feb-94	<50	<0.50	<0.50	<0.50	<0.50	36.76	25.29	0.00	11.47
A-9	16-Feb-94	24-Feb-94	<50	<0.50	<0.50	<0.50	<0.50	38.19	25.20	0.00	12.99
A-10	17-Feb-94	24-Feb-94	52	<0.50	<0.50	<0.50	<0.50	38.66	24.50	0.00	14.16
AR-1	17-Feb-94	24-Feb-94	4,700	1,100	<10	140	26	37.46	25.31	0.00	12.15
AR-2	17-Feb-94	24-Feb-94	130	2.9	<0.50	15	0.8	37.98	25.22	0.00	12.76
XDUP-1 (MW-2)	17-Feb-94	24-Feb-94	14,000	1,900	21	750	480	---	---	---	---





N

0 2000

Scale in Feet

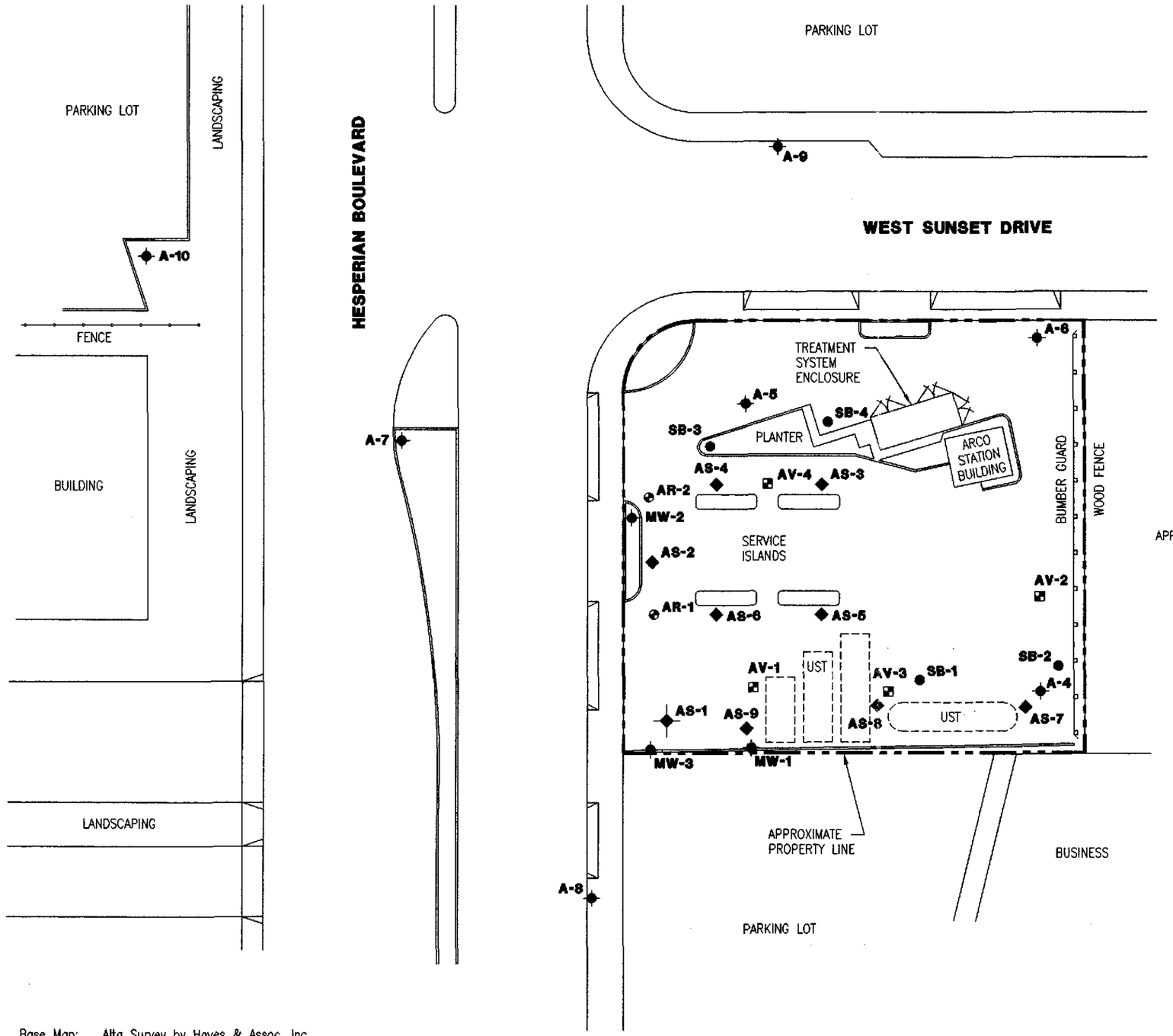
Base Map: USGS Topographic Map

GeoStrategies Inc.

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

FIGURE **1**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7926		11/91	



EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- Vapor extraction well
- Air sparge/vapor extraction well
- Air sparging well
- Soil boring

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

0 40

Scale in Feet

FIGURE 2

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

DATE 4/94

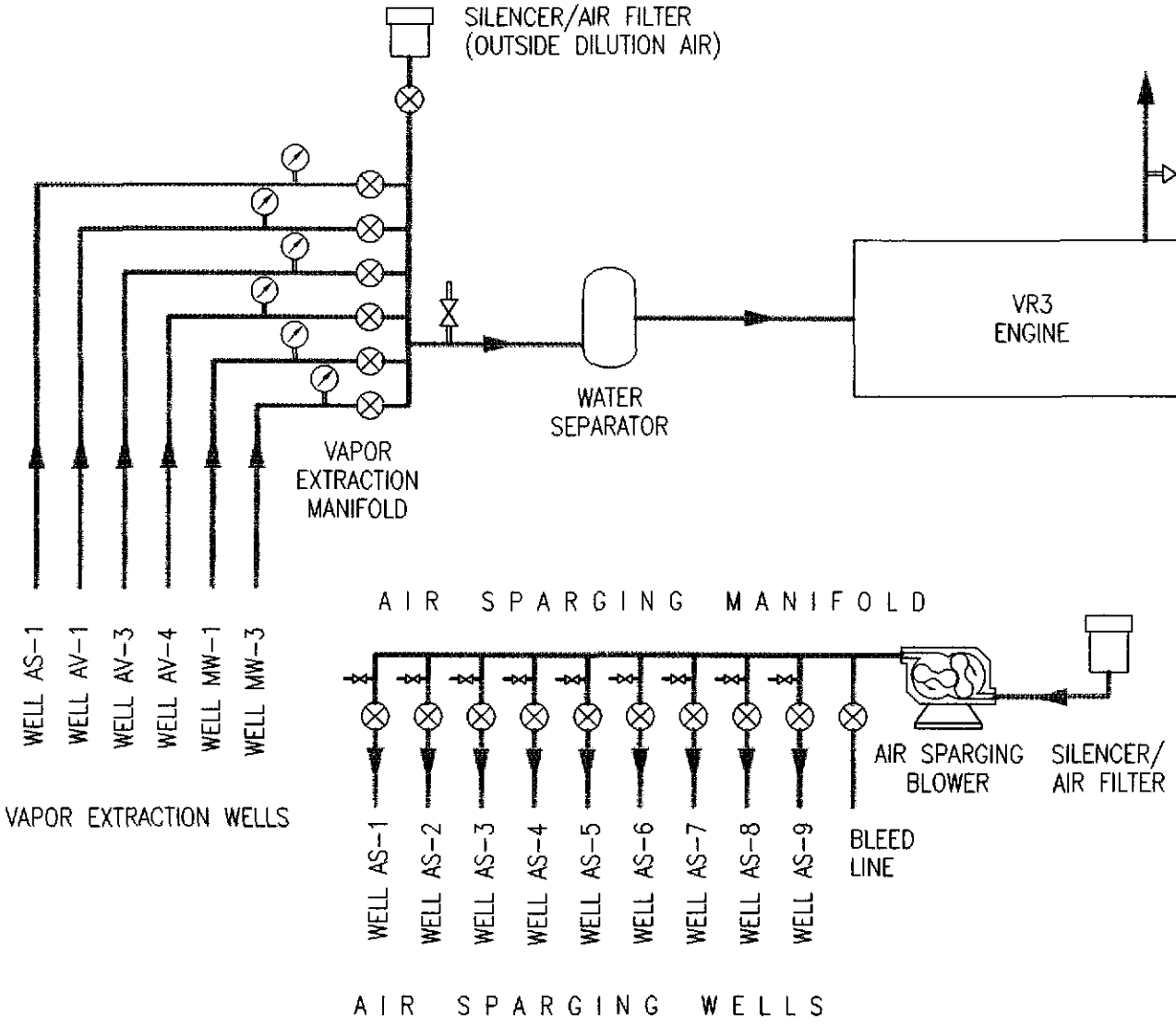
REVISED DATE 7/94

REVIEWED BY

JOB NUMBER 792670-19

GeoStrategies Inc.

GSI



NOTES

1. DIAGRAM FOR VAPOR EXTRACTION SYSTEM WITH AIR SPARGING.

GeoStrategies Inc.

PROCESS FLOW DIAGRAM – VAPOR EXTRACTION
ARCO Service Station #5387
20200 Hesperian Boulevard
Hayward, California

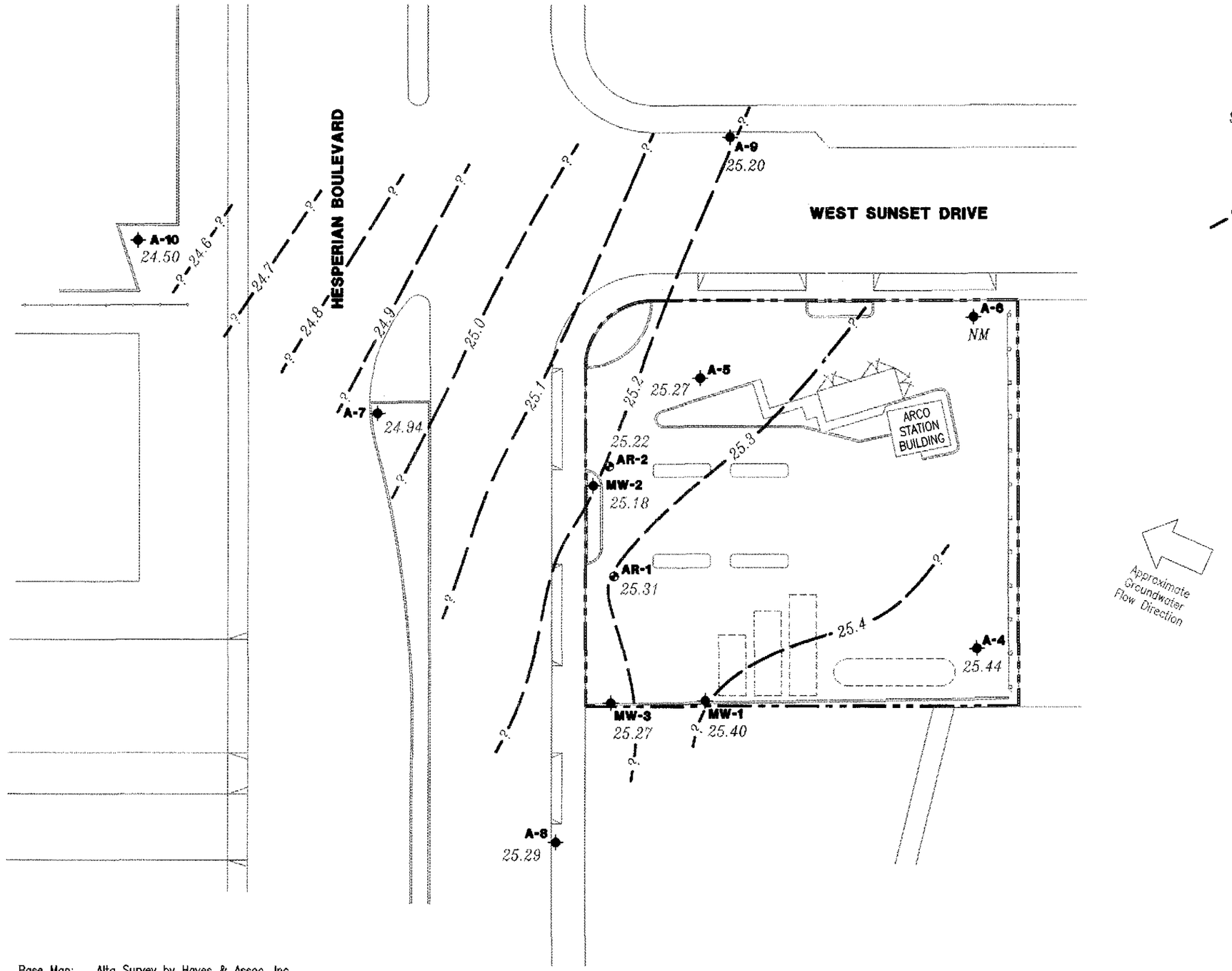
FIGURE
3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792670-19	BS	7/94	

FIGURE **4**

EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- *99.99* Groundwater elevation in feet referenced to Mean Sea Level (MSL) measured on February 16, 1994
- *99.99* Groundwater elevation contour. Approximate Gradient = 0.003
- *NM* Not monitored

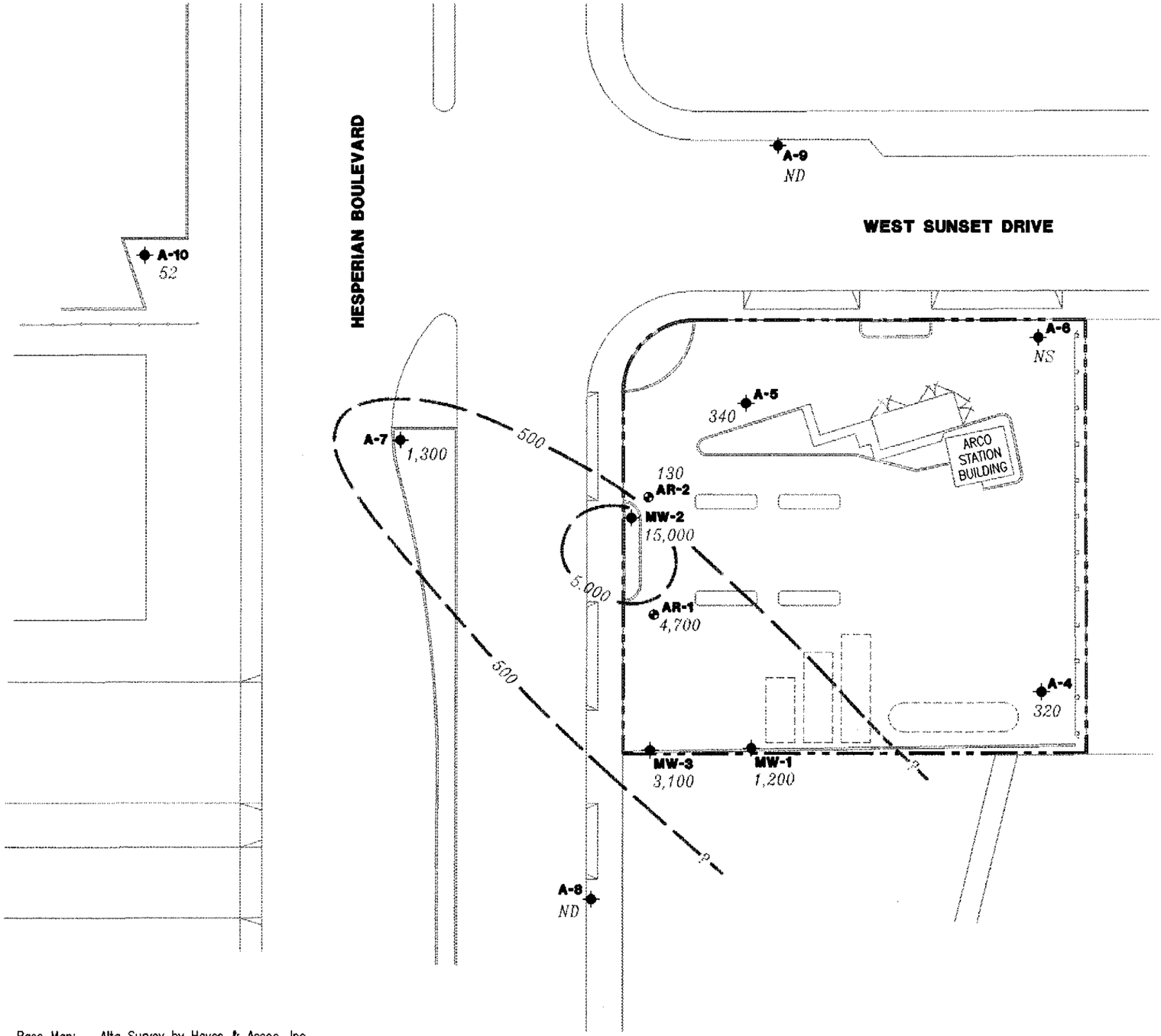


Base Map: Alta Survey by Hayes & Assoc. Inc. dated 8/13/86 and field observations.

POTENTIOMETRIC MAP
ARCO Service Station #5387
20200 Hesperian Boulevard
Hayward, California

GeoStrategies Inc.

DATE	REVIEWED BY	JOB NUMBER	REVISED DATE
4/94	KP	792670-19	7/94



EXPLANATION

- ◆ Groundwater monitoring well
- ◕ Groundwater recovery well
- *500* TPH–G (Total Petroleum Hydrocarbons calculated as Gasoline) concentration in ppb sampled on February 16 & 17, 1994
- *500* TPH–G isoconcentration contour
- *ND* Not Detected (See laboratory reports for detection limits)
- *NS* Not Sampled

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

0 40
Scale in Feet

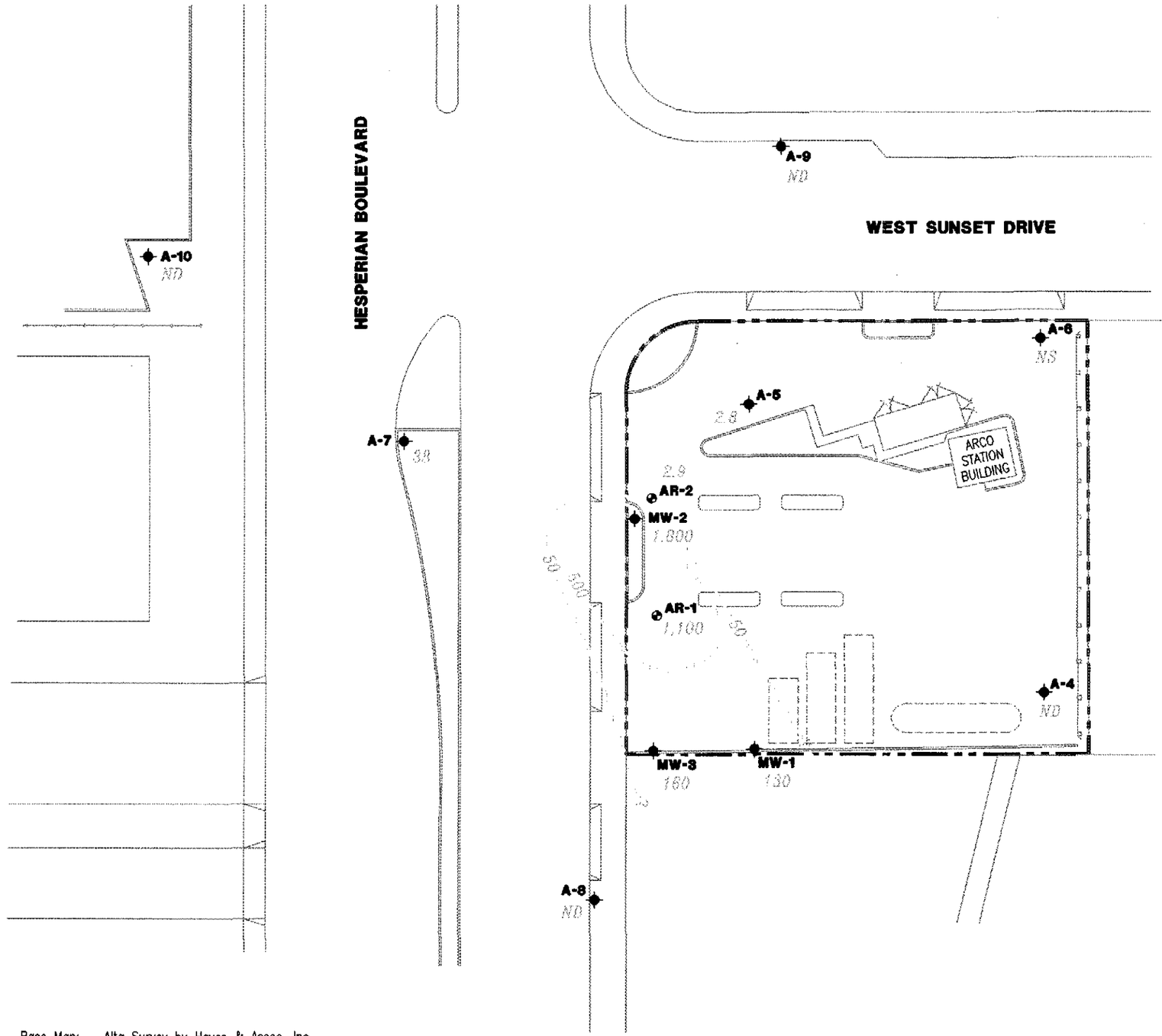
FIGURE 5

TPH–G ISOCONCENTRATION MAP
ARCO Service Station #5387
20200 Hesperian Boulevard
Hayward, California

GeoStrategies Inc.

GSI

JOB NUMBER 792670–19
DATE 4/94
REVISED DATE 7/94
REVIEWED BY KS



EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- 5.00 — Benzene concentration in ppb sampled on February 16 & 17, 1994
- 5.00 — Benzene isoconcentration contour
- ND — Not Detected (See laboratory reports for detection limits)
- NS — Not Sampled

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

0 40
Scale in Feet

BENZENE ISOCONCENTRATION MAP
ARCO Service Station #5387
20200 Hesperian Boulevard
Hayward, California

GeoStrategies Inc.

GSI

JOB NUMBER 792670-19
REVIEWED BY
DATE 4/94
REVISED DATE 7/94

FIGURE 6

TABLE 1A

HISTORICAL WATER-LEVEL DATA
ARCO Station 5387
Hayward, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
08-Aug-86	MW-1	11.25	38.36	27.11	0.00
24-Dec-91	MW-1	16.12	38.36	22.24	0.00
10-Mar-92	MW-1	13.34	38.36	25.02	0.00
09-Jun-92	MW-1	14.12	38.36	24.24	0.00
14-Sep-92	MW-1	15.34	38.36	23.02	0.00
12-Nov-92	MW-1	15.46	38.36	22.90	0.00
11-Feb-93	MW-1	11.95	38.36	26.41	0.00
14-Apr-93	MW-1	11.65	38.36	26.71	0.00
12-Aug-93	MW-1	12.93	38.36	25.43	0.00
26-Oct-93	MW-1	14.13	38.36	24.23	0.00
16-Feb-94	MW-1	11.86	37.26	25.40	0.00
08-Aug-86	MW-2	11.62	38.58	26.96	0.00
24-Dec-91	MW-2	16.50	38.58	22.08	0.00
10-Mar-92	MW-2	13.50	38.58	25.08	0.00
09-Jun-92	MW-2	14.52	38.58	24.06	0.00
14-Sep-92	MW-2	15.78	38.58	22.80	0.00
12-Nov-92	MW-2	15.98	38.58	22.60	0.00
11-Feb-93	MW-2	12.27	38.58	26.31	0.00
14-Apr-93	MW-2	12.01	38.58	26.57	0.00
12-Aug-93	MW-2	13.81	38.58	24.77	0.00
26-Oct-93	MW-2	14.53	38.58	24.05	0.00
16-Feb-94	MW-2	12.81	37.99	25.18	0.00
08-Aug-86	MW-3	10.61	37.77	27.16	0.00
24-Dec-91	MW-3	15.60	37.77	22.17	0.00
10-Mar-92	MW-3	12.90	37.77	24.87	0.00
09-Jun-92	MW-3	13.60	37.77	24.17	0.00
14-Sep-92	MW-3	14.78	37.77	22.99	0.00
12-Nov-92	MW-3	14.92	37.77	22.85	0.00
11-Feb-93	MW-3	11.65	37.77	26.12	0.00
14-Apr-93	MW-3	11.16	37.77	26.61	0.00
12-Aug-93	MW-3	12.82	37.77	24.95	0.00
26-Oct-93	MW-3	13.60	37.77	24.17	0.00
16-Feb-94	MW-3	11.53	36.80	25.27	0.00
24-Dec-91	A-4	17.60	39.86	22.26	0.00

TABLE 1A

HISTORICAL WATER-LEVEL DATA
ARCO Station 5387
Hayward, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
10-Mar-92	A-4	14.76	39.86	25.10	0.00
09-Jun-92	A-4	15.63	39.86	24.23	0.00
14-Sep-92	A-4	16.83	39.86	23.03	0.00
12-Nov-92	A-4	16.97	39.86	22.89	0.00
11-Feb-93	A-4	13.43	39.86	26.43	0.00
14-Apr-93	A-4	13.06	39.86	26.80	0.00
12-Aug-93	A-4	14.94	39.86	24.92	0.00
26-Oct-93	A-4	15.52	39.86	24.34	0.00
16-Feb-94	A-4	14.02	39.46	25.44	0.00
24-Dec-91	A-5	16.85	38.94	22.09	0.00
10-Mar-92	A-5	13.83	38.94	25.11	0.00
09-Jun-92	A-5	14.91	38.94	24.03	0.00
14-Sep-92	A-5	16.14	38.94	22.80	0.00
12-Nov-92	A-5	16.35	38.94	22.59	0.00
11-Feb-93	A-5	13.21	38.94	25.73	0.00
14-Apr-93	A-5	12.97	38.94	25.97	0.00
12-Aug-93	A-5	14.12	38.94	24.82	0.00
26-Oct-93	A-5	14.72	38.94	24.22	0.00
16-Feb-94	A-5	13.20	38.47	25.27	0.00
24-Dec-91	A-6	16.88	39.07	22.19	0.00
10-Mar-92	A-6	13.73	39.07	25.34	0.00
09-Jun-92	A-6	14.95	39.07	24.12	0.00
14-Sep-92	A-6	16.20	39.07	22.87	0.00
12-Nov-92	A-6	16.35	39.07	22.72	0.00
11-Feb-93	A-6	13.04	39.07	26.03	0.00
14-Apr-93	A-6	12.23	39.07	26.84	0.00
12-Aug-93	A-6	14.18	39.07	24.89	0.00
26-Oct-93	A-6	14.85	39.07	24.22	0.00
16-Feb-94	A-6	Not Sampled			
24-Dec-91	A-7	18.11	39.95	21.84	0.00
10-Mar-92	A-7	15.30	39.95	24.65	0.00
09-Jun-92	A-7	16.12	39.95	23.83	0.00
14-Sep-92	A-7	17.35	39.95	22.60	0.00
12-Nov-92	A-7	17.47	39.95	22.48	0.00

TABLE 1A

HISTORICAL WATER-LEVEL DATA
ARCO Station 5387
Hayward, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
11-Feb-93	A-7	13.80	39.95	26.15	0.00
14-Apr-93	A-7	13.60	39.95	26.35	0.00
12-Aug-93	A-7	15.54	39.95	24.41	0.00
26-Oct-93	A-7	16.28	39.95	23.67	0.00
16-Feb-94	A-7	14.44	39.38	24.94	0.00
14-Sep-92	A-8	14.19	37.23	23.04	0.00
12-Nov-92	A-8	14.35	37.23	22.88	0.00
11-Feb-93	A-8	11.25	37.23	25.98	0.00
14-Apr-93	A-8	12.33	37.23	24.90	0.00
12-Aug-93	A-8	12.41	37.23	24.82	0.00
26-Oct-93	A-8	13.02	37.23	24.21	0.00
16-Feb-94	A-8	11.47	36.76	25.29	0.00
14-Sep-92	A-9	16.12	38.71	22.59	0.00
12-Nov-92	A-9	16.29	38.71	22.42	0.00
11-Feb-93	A-9	12.31	38.71	26.40	0.00
14-Apr-93	A-9	12.01	38.71	26.70	0.00
12-Aug-93	A-9	13.90	38.71	24.81	0.00
26-Oct-93	A-9	14.86	38.71	23.85	0.00
16-Feb-94	A-9	12.99	38.19	25.20	0.00
07-Dec-92	A-10	16.81	38.94	22.13	0.00
11-Feb-93	A-10	13.15	38.94	25.79	0.00
14-Apr-93	A-10	12.93	38.94	26.01	0.00
12-Aug-93	A-10	14.87	38.94	24.07	0.00
26-Oct-93	A-10	15.65	38.94	23.29	0.00
16-Feb-94	A-10	14.16	38.66	24.50	0.00
14-Sep-92	AR-1	15.21	38.11	22.90	0.00
12-Nov-92	AR-1	15.36	38.11	22.75	0.00
11-Feb-93	AR-1	12.81	38.11	25.30	0.00
14-Apr-93	AR-1	11.77	38.11	26.34	0.00
12-Aug-93	AR-1	13.55	38.11	24.56	0.00
26-Oct-93	AR-1	13.98	38.11	24.13	0.00
16-Feb-94	AR-1	12.15	37.46	25.31	0.00
30-Mar-93	AR-2	11.53	38.39	26.86	0.00
14-Apr-93	AR-2	11.87	38.39	26.52	0.00

TABLE 1A

HISTORICAL WATER-LEVEL DATA
ARCO Station 5387
Hayward, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
12-Aug-93	AR-2	13.59	38.39	24.80	0.00
26-Oct-93	AR-2	14.25	38.39	24.14	0.00
16-Feb-94	AR-2	12.76	37.98	25.22	0.00

Notes:
1. Static water elevations referenced to Mean Sea Level (MSL). Site wells except well A-6 were resurveyed on February 1 and 22, 1994.
2. Well elevations and depth-to-water measurements were measured from the top of the well box until October 1993, and from the top of the well casing beginning February 1994.

TABLE 2A

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 5387
Hayward, California

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
08-Aug-86	MW-1	7040	132	8.7	439	230
24-Dec-91	MW-1	2200	190	8.5	6.9	2.6
10-Mar-92	MW-1	2800	270	29	56	39
09-Jun-92	MW-1	2900	960	27	99	63
14-Sep-92	MW-1	2600	450	<5.0	45	21
12-Nov-92	MW-1	1600	310	7.2	22	8.9
11-Feb-93	MW-1	4000	510	47	200	91
14-Apr-93	MW-1	1700	260	20	100	70
12-Aug-93	MW-1	830	60	3.8	39	3.6
26-Oct-93	MW-1	8800	140	<10	41	<10
17-Feb-94	MW-1	1200	130	12	54	58
08-Aug-86	MW-2	1910	20.1	2.8	1.8	---
24-Dec-91	MW-2	23000	1500	1100	480	1400
10-Mar-92	MW-2	210000	44000	3900	1700	5800
09-Jun-92	MW-2	33000	2300	370	780	2600
14-Sep-92	MW-2	16000	3700	100	470	1000
12-Nov-92	MW-2	16000	3800	86	470	910
11-Feb-93	MW-2	27000	3500	720	1600	3800
14-Apr-93	MW-2	27000	3500	220	2200	5100
12-Aug-93	MW-2	16000	1600	27	1300	1200
26-Oct-93	MW-2	12000	1200	<25	510	330
17-Feb-94	MW-2	15000	1800	21	850	540
08-Aug-86	MW-3	7450	510	549	409	1380
24-Dec-91	MW-3	6800	450	10	610	45
10-Mar-92	MW-3	11000	2500	75	400	560
09-Jun-92	MW-3	16000	2000	69	1300	2600
14-Sep-92	MW-3	14000	630	<50	1500	2400
12-Nov-92	MW-3	7400	400	<25	860	330
11-Feb-93	MW-3	8600	580	<20	710	300
14-Apr-93	MW-3	6900	300	8.8	580	99
12-Aug-93	MW-3	3400	56	<5	190	<5
26-Oct-93	MW-3	2900	42	<10	76	<10
17-Feb-94	MW-3	3100	160	<10	36	8.6
24-Dec-91	A-4	1900	29	1.9	25	29

TABLE 2A

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 5387
Hayward, California

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
10-Mar-92	A-4	7400	37	<0.60	11	73
09-Jun-92	A-4	4500	3.2	1.5	37	16
14-Sep-92	A-4	1300	<2.5	2.5	61	6.8
12-Nov-92	A-4	610	7.2	0.98	34	0.97
11-Feb-93	A-4	740	2.4	<0.50	5.0	3.5
14-Apr-93	A-4	380	<0.50	<0.50	10	1.6
12-Aug-93	A-4	1200	0.93	<0.50	0.91	<0.50
26-Oct-93	A-4	160	<0.50	<0.50	1.0	<0.50
17-Feb-94	A-4	320	<0.50	<0.50	28	0.9
24-Dec-91	A-5	1600	35	<0.30	32	52
10-Mar-92	A-5	1000	21	<1.5	43	100
09-Jun-92	A-5	680	1.6	<0.30	14	16
14-Sep-92	A-5	770	34	<2.5	51	65
12-Nov-92	A-5	520	12	0.96	29	36
11-Feb-93	A-5	150	3.0	<0.50	5.1	1.5
14-Apr-93	A-5	190	1.6	<0.50	1.5	0.97
12-Aug-93	A-5	230	5.4	<0.50	5.3	0.94
26-Oct-93	A-5	190	1.7	<0.50	5.5	2.0
17-Feb-94	A-5	340	2.8	<0.50	13	2.9
24-Dec-91	A-6	<30	<0.30	<0.30	<0.30	<0.30
10-Mar-92	A-6	<30	<0.30	<0.30	<0.30	<0.30
09-Jun-92	A-6	<30	<0.30	<0.30	<0.30	<0.30
14-Sep-92	A-6	<50	<0.50	<0.50	<0.50	<0.50
12-Nov-92	A-6	<50	<0.50	<0.50	<0.50	<0.50
11-Feb-93	A-6	<50	<0.50	<0.50	<0.50	<0.50
14-Apr-93	A-6	<50	<0.50	<0.50	<0.50	<0.50
12-Aug-93	A-6	<50	<0.50	<0.50	<0.50	<0.50
26-Oct-93	A-6	<50	<0.50	<0.50	<0.50	<0.50
16-Feb-94	A-6	Not sampled				
24-Dec-91	A-7	10000	88	16	170	610
10-Mar-92	A-7	320	9.3	0.54	8.8	34
09-Jun-92	A-7	340	11	1.1	8.9	26
14-Sep-92	A-7	510	12	<2.0	30	51
12-Nov-92	A-7	760	17	0.83	50	73

TABLE 2A

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 5387
Hayward, California

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
11-Feb-93	A-7	260	20	1.0	11	21
14-Apr-93	A-7	1300	89	2.1	48	87
12-Aug-93	A-7	360	9.0	<0.50	13	9.0
26-Oct-93	A-7	99	1.7	<0.50	4.0	3.0
16-Feb-94	A-7	1300	38	<1	35	25
14-Sep-92	A-8	<50	<0.50	<0.50	<0.50	<0.50
12-Nov-92	A-8	<50	<0.50	<0.50	<0.50	<0.50
11-Feb-93	A-8	<50	<0.50	<0.50	<0.50	<0.50
14-Apr-93	A-8	<50	<0.50	<0.50	<0.50	<0.50
12-Aug-93	A-8	<50	<0.50	<0.50	<0.50	<0.50
26-Oct-93	A-8	<50	<0.50	<0.50	<0.50	<0.50
16-Feb-94	A-8	<50	<0.50	<0.50	<0.50	<0.50
14-Sep-92	A-9	<50	<0.50	<0.50	<0.50	<0.50
12-Nov-92	A-9	<50	<0.50	<0.50	<0.50	<0.50
11-Feb-93	A-9	<50	<0.50	<0.50	<0.50	<0.50
14-Apr-93	A-9	<50	<0.50	<0.50	<0.50	<0.50
12-Aug-93	A-9	<50	<0.50	<0.50	<0.50	<0.50
26-Oct-93	A-9	<50	<0.50	<0.50	<0.50	<0.50
16-Feb-94	A-9	<50	<0.50	<0.50	<0.50	<0.50
07-Dec-92	A-10	660	30	<2.5	<2.5	<2.5
11-Feb-93	A-10	210	<0.50	0.97	<0.50	<0.50
14-Apr-93	A-10	770	<0.50	3.0	0.76	1.9
12-Aug-93	A-10	390	<0.50	<0.50	<0.50	0.84
26-Oct-93	A-10	290	<0.50	<0.50	<0.50	<0.50
16-Feb-94	A-10	52	<0.50	<0.50	<0.50	<0.50
14-Sep-92	AR-1	820	67	<1.0	8.8	6.7
12-Nov-92	AR-1	140	66	<0.50	4.3	3.7
11-Feb-93	AR-1	360	190	<2.5	8.6	<2.5
14-Apr-93	AR-1	420	240	5.2	30	8.7
12-Aug-93	AR-1	370	150	<2	11	<2
26-Oct-93	AR-1	240	98	<2	11	<2
17-Feb-94	AR-1	4700	1100	<10	140	26
30-Mar-93	AR-2	390	4.1	1.6	<0.50	47
14-Apr-93	AR-2	310	18	<0.50	0.67	36

TABLE 2A

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 5387
Hayward, California

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
12-Aug-93	AR-2	130	16	<0.50	1.7	0.57
26-Oct-93	AR-2	110	15	<0.50	1.8	<0.50
17-Feb-94	AR-2	130	2.9	<0.50	15	0.8

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

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

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

April 5, 1994

Arco Products Company
c/o GeoStrategies Inc.
6747 Sierra Court, Suite G
Dublin, CA 94568

Attn: ***Miguel Bordallo***

Application Number: 11813
Equipment Location:
20200 Hesperian Blvd.
San Lorenzo, CA 94580

Gentlemen:

Attached are your Permits to Operate the following:

S-10	**Soil Vapor Extraction system consisting of a Tuthill, MD-3206 5 HP vacuum blower, and ancillary equipment, abated by A-1, or A-2, A-3, and A-4 arranged in series.**
A-1	**VR Systems model V3, Internal Combustion Engine.**
A-2	**Westates VSC-2000, 2,000 lb capacity Carbon Adsorption Vessel.**
A-3	**Westates VSC-2000, 2,000 lb capacity Carbon Adsorption Vessel.**
A-4	**Westates VSC-2000, 2,000 lb capacity Carbon Adsorption Vessel.**

See Condition Number 10455.

All Permits should be posted in a clearly visible and accessible place on or near the equipment to be operated, or kept available for inspection at any time.

Operation of this equipment in violation of District Regulations or any permit conditions is subject to penalty action.

In the absence of specific permit conditions to the contrary, the throughputs, fuel and material consumptions, capacities and hours of operation described in your permit application will be considered maximum allowable limits. A new permit will be required before any increase in these parameters, or change in raw material handled may be made.

Please include your permit number with any correspondence with the District. If you have any questions on this matter, please call **Robert E. Cave - Air Quality Engineer Assistant at (415) 749-5114 or Scott A. Owen - Supervising Air Quality Engineer at (415) 749-4693.**

Very truly yours,

Milton Feldstein
Air Pollution Control Officer

by _____
Permit Services Division

JAS:REC:SAO:myl
Attachment

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

PERMIT TO OPERATE No. 11813

PLANT No. 9092

SOURCE No. 10

Arco Products Company

IS HEREBY GRANTED A PERMIT TO OPERATE THE FOLLOWING EQUIPMENT:

Soil Vapor Extraction system consisting of a Tuthill, MD-3206 5 HP vacuum blower, and ancillary equipment, abated by A-1, or A-2, A-3, and A-4 arranged in series.
A-1 VR Systems model V3, Internal Combustion Engine.
A-2 Westates VSC-2000, 2,000 lb capacity Carbon Adsorption Vessel.
A-3 Westates VSC-2000, 2,000 lb capacity Carbon Adsorption Vessel.
A-4 Westates VSC-2000, 2,000 lb capacity Carbon Adsorption Vessel.

LOCATED AT: 20200 Resperian Blvd.
San Lorenzo, CA 94580

CONDITIONS: [X] YES [ ] NO *(All permit conditions must be complied with at all times *)*

If YES, See Attached *Condition No.* 10455

MILTON FELDSTEIN
AIR POLLUTION CONTROL OFFICER

Date April 5, 1994

By _____
Permit Services Division

EXPIRATION DATE April 5, 1995

THIS PERMIT DOES NOT AUTHORIZE ANY VIOLATION OF THE RULES AND REGULATIONS OF THE BAAQMD OR THE HEALTH AND SAFETY CODE OF THE STATE OF CALIFORNIA. THIS PERMIT IS NOT TRANSFERABLE TO ANOTHER PERSON WITHOUT APPROVAL FROM THE DISTRICT.

* *Compliance with conditions contained in this permit does not mean that the permittee is currently in compliance with District Rules and Regulations. It is the responsibility of the permittee to have knowledge of and be in compliance with all District Rules and Regulations.*

COND# 10455 ----------

1. Precursor Organic Compound (POC) emissions from Source S-10 shall be abated by either Abatement device A-1, I.C. Engine, or A-2, A-3, & A-4, three 2,000 pound activated carbon vessels arranged in series, during all periods of operation.
2. The POC destruction efficiency of Abatement devices A-1, A-2, A-3, & A-4 shall be maintained at a minimum of 98.5% by weight for inlet concentrations greater than or equal to 3000 ppmv. For inlet concentrations below 3000 ppmv and greater than or equal to 1000 ppmv, a minimum destruction efficiency of 97% shall be maintained. For inlet concentrations below 1000 ppmv, a minimum destruction efficiency of 90% shall be maintained. The minimum destruction efficiency of 90% shall be waived if total emissions from the operation are less than 1 pound per day VOC and benzene emissions are less than 0.02 pounds per day.
3. A-1 shall be properly maintained and kept in good operating condition at all times. In no event shall Benzene emissions to the atmosphere exceed 0.02 pounds per day.
4. To determine compliance with Conditions 2 and 3, for operation of A-1, the operator of this equipment shall:
   a. Analyze inlet gas stream to determine the flow rate and concentration of total POC present for each of the first three days of operation. Thereafter, the inlet gas shall be analyzed to determine the flow rate and concentration of total POC once every two weeks.
   b. Analyze exhaust gas to determine the concentration of benzene and total POC present for each of the first three days of operation. Thereafter, the exhaust gas shall be analyzed to determine the concentration of benzene and total POC once every two weeks.
   c. Calculate the benzene emission rate in pounds per day and the POC destruction efficiency based on the exhaust gas analysis and the operating exhaust flow rate. The soil vapor flow rate shall be decreased, if necessary, to demonstrate compliance with Conditions 2 and 3.
   d. Submit to the District the test results and emission calculations for the first three days of operation within one month of start-up. All source test methods used shall be subject to the prior approval of the Source Test Section of the District Technical Division.
5. The operator of this source shall maintain the following information in a District-approved log for each month of operation of A-1:
   a. days of operation
   b. inlet and exhaust flow rate
   c. inlet and exhaust sampling date
   d. analysis results
   e. calculated emissions of benzene in pounds per day.

   Such records shall be retained and made available for inspection by the District for two years following the

date the data is recorded.

6. Once influent concentrations fall below 1000 ppmv, the abatement device may be changed from A-1, I. C. Engine to A-2, A-3, & A-4, three carbon canisters arranged in series. Such changeover shall take place only after written notification of said abatement change has been received by the District. Operation of the source shall then be subject to the conditions which follow.
7. The second to last carbon vessel, A-3, shall be changed out with unspent carbon upon breakthrough, defined as the detection at the outlet of the higher of the following:
   a. 10 % of the inlet stream concentration to the carbon vessel.
   b. 10 ppmv (measured as C1).

   This shall be measured by a Flame-ionization Detector (FID) or other method approved in writing by the APCO.
8. The last carbon vessel, A-4, shall be changed out with unspent carbon upon detection of 10 ppmv (measured as C1) as measured with a Flame-ionization Detector (FID) or other method approved in writing by the APCO.
9. The limits set forth in Conditions # 7 and # 8 shall apply to non-methane hydrocarbon emissions. To determine the presence of methane in the exhaust stream, a reading shall be taken with and without a carbon filter tip fitted on the OVA-FID probe. Concentrations measured with the carbon filter tip in place shall be considered methane for the purpose of these permit conditions.
10. The operator of this source shall monitor with an OVA-FID or other method approved in writing by the APCO at the following locations:
    a. At the inlet to carbon vessel A-3.
    b. At the exhaust of A-3; the inlet to carbon vessel A-4.
    c. At the outlet of carbon vessel A-4; the carbon vessel that is last in series prior to venting to the atmosphere.
11. These monitor readings shall be recorded in a monitoring log at the time they are taken. The monitoring results shall be used to estimate the frequency of carbon change out necessary to maintain compliance with conditions number 7 and 8.
12. To maintain compliance with conditions number 7 and 8, the monitoring shall be conducted on a daily basis. The operator of this source may propose for District review, based on actual measurements taken at the site during operation of the source, that the monitoring schedule be changed based on the decline in organic emissions and/or the demonstrated breakthrough rates of the carbon vessels. Written approval by the District must be received by the applicant prior to a change to the monitoring schedule.
13. The operator of this source shall maintain the following information in a District approved log for each month of operation of A-2, A-3, and A-4:
    a. The hours of operation.
    b. Each monitor reading or analysis result for the day of operation they are taken.
    c. The number of carbon vessels removed from service.

Any exceedance of conditions number 7 and/or 8 shall be reported to the Permits Division with the log as well as the corrective action taken. In addition, an exceedance of conditions number 7 and/or 8 shall be submitted to the District Enforcement Section at the time it occurs. The submittal shall detail the corrective action taken and shall include the data showing the exceedance as well at the time of occurrence.

14. The operator shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this conditional Authority to Construct/Permit to Operate. All measurements, records and data required to be maintained by the applicant shall be retained for at least two years following the date the data is recorded.

15. Upon final completion of the remediation project, the operator of Source S-10 shall notify the district within two weeks of decommissioning the operation.

SEQUOIA ANALYTICAL

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

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Project: Arco 5387-94-4B

Enclosed are the results from 2 air samples received at Sequoia Analytical on February 15,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4B91701	Air, Inf.	2/15/94	EPA 5030/8015 Mod./8020
4B91702	Air, Eff.	2/15/94	EPA 5030/8015 Mod./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

Todd Olive
Project Manager

A-7126.01

SEQUOIA ANALYTICAL

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

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387-94-4B	Sampled:	Feb 15, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received:	Feb 15, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Feb 16, 1994
Attention: Joel Coffman	First Sample #:	4B91701		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4B91701 Inf.	Sample I.D. 4B91702 Eff.	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.
Purgeable Hydrocarbons	2.3	2,800	N.D.				
Benzene	0.019	69	N.D.				
Toluene	0.016	6.4	N.D.				
Ethyl Benzene	0.014	28	N.D.				
Total Xylenes	0.014	48	N.D.				
Chromatogram Pattern:		Gas & Non-Gas Mix, + < C8	--				

Quality Control Data

Report Limit Multiplication Factor:	100	1.0
Date Analyzed:	2/15/94	2/15/94
Instrument Identification:	GCHP-2	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	147 *	94

* -Coelution Confirmed

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

SEQUOIA ANALYTICAL

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

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387-94-4B
6747 Sierra Court, Suite J	Matrix:	Liquid
Dublin, CA 94568		
Attention: Joel Coffman	QC Sample Group: 4B91701 -02	Reported: Feb 16, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4B74203	G4B74203	G4B74203	G4B74203
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	2/15/94	2/15/94	2/15/94	2/15/94
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	85	89	88	90
Matrix Spike Duplicate % Recovery:	93	98	97	97
Relative % Difference:	9.0	9.6	9.7	7.5

LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Todd Olive
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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. C 53872-94-43

Chain of Custody

ARCO Facility no. 5387	City (Facility) San Lorenzo	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) 551-7555	Fax no. (Consultant) 551-7888
Consultant name Groundwater Resources Inc	Address (Consultant) 6747 Sierra Ct Suite J Dublin CA		Contract number 07-073

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other Air	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 (Gas)	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease* 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
Inf		1			X			2-15-94	9:30		X				C	1A						
Eff		1			X			2-15-94	9:25		X				C	2A						

Special detection Limit/reporting: Standard

Special QA/QC: Standard

Remarks: GPH 9726 TC

Lab number: 9402917

Turnaround time

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

Condition of sample:

Temperature received:

	Date	Time			
Relinquished by sampler	2-15-94	16:08	Received by		
Relinquished by			Received by		
Relinquished by			Received by laboratory	Date 2-15-94	Time 16:08

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

SEQUOIA ANALYTICAL

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

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Project: Arco 5387-94-4B

Enclosed are the results from 2 air samples received at Sequoia Analytical on February 16,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4BA0601	Air, Inf	2/16/94	EPA 5030/8015 Mod./8020
4BA0602	Air, Eff	2/16/94	EPA 5030/8015 Mod./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

TOlive

Todd Olive
Project Manager

A-7926.

SEQUOIA ANALYTICAL

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

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387-94-4B	Sampled: Feb 16, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received: Feb 16, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported: Feb 17, 1994
Attention: Joel Coffman	First Sample #:	4BA0601	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4BA0601 Inf	Sample I.D. 4BA0602 Eff
Purgeable Hydrocarbons	2.3	1,400	N.D.
Benzene	0.019	20	N.D.
Toluene	0.016	19	N.D.
Ethyl Benzene	0.014	6.0	N.D.
Total Xylenes	0.014	16	N.D.
Chromatogram Pattern:		Gas + Non-gas mix < C8	--

Quality Control Data

Report Limit Multiplication Factor:	100	1.0
Date Analyzed:	2/16/94	2/16/94
Instrument Identification:	GCHP-2	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%) *- Coelution Confirmed	141 *	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

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

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

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387-94-4B
6747 Sierra Court, Suite J	Matrix:	Liquid
Dublin, CA 94568		
Attention: Joel Coffman	QC Sample Group:	4BA0601-02

Reported: Feb 17, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4B84501	G4B84501	G4B84501	G4B84501
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	2/16/94	2/16/94	2/16/94	2/16/94
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	110	110	110	110
Matrix Spike Duplicate % Recovery:	110	110	110	110
Relative % Difference:	0.0	0.0	0.0	0.0

LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 5387-94-4B

Chain of Custody

ARCO Facility no. 5387	City (Facility) San Lorenzo	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) 510-551-7444	Fax no. (Consultant) 551-7888
Consultant name Gettler Ryan Inc.	Address (Consultant) 6747 Sierra Ct Suite J Dublin CA		Contract number 07-673

Method of shipment: CR

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other Air	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 (gas)	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
Inf		1			4			2-16-94	15:05		X					9402A06-01				
Eff		1			4			"	15:59		X									-02

Special detection Limit/reporting: Standard

Special QA/QC: Standard

Remarks: CR # 9926.70

Lab number:

Turnaround time

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

Condition of sample:

Temperature received:

Relinquished by sampler	Date 2-16-94	Time 17:50	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: D. Stenstrom — Date 2/16/94 — Time 1750

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

APPC-3292 (2-91)

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 9406. (415) 364-9600 FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520 (510) 686-9600 FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834 (916) 921-9600 FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Project: Arco 5387-94-4B/San Lorenzo

Enclosed are the results from 2 air samples received at Sequoia Analytical on February 18,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4BB3401	Air, Infl	2/17/94	EPA 5030/8015 Mod./8020
4BB3402	Air, Effl	2/17/94	EPA 5030/8015 Mod./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

Todd Olive
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 9406. (415) 364-9600 FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520 (510) 686-9600 FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834 (916) 921-9600 FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387-94-4B/San Lorenzo	Sampled:	Feb 17, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received:	Feb 18, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Feb 22, 1994
Attention: Joel Coffman	First Sample #:	4BB3401		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4BB3401 Infl	Sample I.D. 4BB3402 Effl
Purgeable Hydrocarbons	2.3	1,900	N.D.
Benzene	0.019	44	N.D.
Toluene	0.016	6.1	N.D.
Ethyl Benzene	0.014	14	N.D.
Total Xylenes	0.014	28	N.D.
Chromatogram Pattern:		Gas + Non-gas mix < C8	--

Quality Control Data

Report Limit Multiplication Factor:	100	1.0
Date Analyzed:	2/18/94	2/18/94
Instrument Identification:	GCHP-2	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	130	102

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 9406. (415) 364-9600 FAX (415) 364-9233
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819 Striker Avenue, Suite 8, Sacramento, CA 95834 (916) 921-9600 FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Client Project ID: Arco 5387-94-4B/San Lorenzo
Matrix: Liquid
QC Sample Group: 4BB3401-02

Reported: Feb 22, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4BA1306	G4BA1306	G4BA1306	G4BA1306
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	2/18/94	2/18/94	2/18/94	2/18/94
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	100	103
Matrix Spike Duplicate % Recovery:	99	100	100	100
Relative % Difference:	1.0	0.0	0.0	3.0
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Todd Olive
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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 5387-94 4B

Chain of Custody

ARCO Facility no.	5387
City (Facility)	San Lorenzo
Project manager (Consultant)	Joel Coffman
Laboratory name	Sequoia
ARCO engineer	Mike Whelan
Telephone no. (ARCO)	
Telephone no. (Consultant)	551-7555
Fax no. (Consultant)	551-7888
Contract number	
Consultant name	Groundw. Ryan / GSI
Address (Consultant)	6747 Sierra Ct Suite G Dublin CA
Method of shipment	GR
Special detection Limit/reporting	Standard; 9402B34
Special QA/QC	Standard
Remarks	GR# 9926.70
Lab number	

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other (Air)	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 (Gas)	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 ☐		
Int		1			+			2-17-94	17:43		+								-01			
Eff		1			+			2-17-94	17:40		+								-02			

Condition of sample:

Temperature received:

Relinquished by	Date	Time	Received by	Date	Time
Relinquished by sampler: [signature]	2-18-94	12:08	Received by		
Relinquished by			Received by		
Relinquished by			Received by laboratory: [signature]	2-18-94	12:08

Turnaround time

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

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

Sequoia Analytical

1080 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Project: Arco 5387-San Lorenzo

Enclosed are the results from 2 air samples received at Sequoia Analytical on February 24,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4BE2801	Air, Inf	2/24/94	EPA 5030/8015 Mod./8020
4BE2802	Air, Eff	2/24/94	EPA 5030/8015 Mod./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

Todd Olive
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387-San Lorenzo	Sampled:	Feb 24, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received:	Feb 24, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Feb 25, 1994
Attention: Joel Coffman	First Sample #:	4BE2801		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4BE2801 Inf	Sample I.D. 4BE2802 Eff
Purgeable Hydrocarbons	2.3	1,500	N.D.
Benzene	0.019	22	N.D.
Toluene	0.016	N.D.	N.D.
Ethyl Benzene	0.014	12	N.D.
Total Xylenes	0.014	28	N.D.
Chromatogram Pattern:		Gas + Non-gas mix < C8	--

Quality Control Data

Report Limit Multiplication Factor:	250	1.0
Date Analyzed:	2/24/94	2/24/94
Instrument Identification:	GCHP-17	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%)	76	85

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

Sequoia Analytical

o80 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Client Project ID: Arco 5387-San Lorenzo
Matrix: Liquid
QC Sample Group: 4BE2801-02

Reported: Feb 25, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Vincent	R. Vincent	R. Vincent	R. Vincent
MS/MSD Batch#:	G4BC7303	G4BC7303	G4BC7303	G4BC7303
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	2/24/94	2/24/94	2/24/94	2/24/94
Instrument I.D.#:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	88	93	99	100
Matrix Spike Duplicate % Recovery:	83	93	97	97
Relative % Difference:	5.8	0.0	2.0	3.0
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Todd Olive
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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 53873-94-11

Chain of Custody

ARCO Facility no. 538 T	City (Facility) San Lorenzo	Project manager (Consultant) Joel Coffman	Laboratory name Spectra
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) 510-551-7555	Fax no. (Consultant) 551-7888
Consultant name Cortlev Ryan / GSI	Address (Consultant) 6747 Sierra Ct Suite G Dublin CA		Contract number 07-073

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other Air	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
TMW	01A	1			X			2-24-94	14:35		X									
BTB	02A	1			X			X	4:30		X									

Special detection Limit/reporting: Standard

Special QA/QC: Standard

Remarks: GK # 9926.7C

Lab number: 9402E28

Turnaround time

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

Method of shipment: Col

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 2-24-94 Time 15:55	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date 02.24.94 Time 1555

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

APPC-3292 (2-91)

Sequoia Analytical

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1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Project: Arco, 5387-94-4B

Enclosed are the results from 2 air samples received at Sequoia Analytical on March 7,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4C35701	Air, Eff. A	3/7/94	EPA 5030/8015 Mod./8020
4C35702	Air, Inf. A	3/7/94	EPA 5030/8015 Mod./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

Todd Olive
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Project ID:	Arco, 5387-94-4B	Sampled:	Mar 7, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received:	Mar 7, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Mar 8, 1994
Attention: Joel Coffman	First Sample #:	4C35701		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4C35701 Eff. A	Sample I.D. 4C35702 Inf. A	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.
Purgeable Hydrocarbons	2.3	N.D.	1,800				
Benzene	0.019	N.D.	30				
Toluene	0.016	N.D.	13				
Ethyl Benzene	0.014	N.D.	8.5				
Total Xylenes	0.014	N.D.	32				
Chromatogram Pattern:		--	Gas & Non-Gas Mix				

Quality Control Data

Report Limit Multiplication Factor:	1.0	50
Date Analyzed:	3/7/94	3/7/94
Instrument Identification:	GCHP-3	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	90	120

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Client Project ID: Arco, 5387-94-4B
Matrix: Liquid
QC Sample Group: 4C35701 - 02

Reported: Mar 8, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4C17702	G4C17702	G4C17702	G4C17702
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	3/7/94	3/7/94	3/7/94	3/7/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	100	100
Matrix Spike Duplicate % Recovery:	110	110	100	107
Relative % Difference:	9.5	9.5	0.0	6.8
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Todd Olive
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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company

Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. 5387-94-4B

ARCO Facility no. 5387	City (Facility) San Lorenzo	Project manager (Consultant) Joel Coffman	Laboratory name Digital
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) 510-551-7555	Fax no. (Consultant) 551-7888
Consultant name GSI	Address (Consultant) 6747 Sierra Ct Suite G Dublin CA		Contract number

Method of shipment: GC

Special detection Limit/reporting: Standard

Special QA/QC: Standard

Remarks: GC #472

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other (Air)	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
EPA		1		1	1			3-7-94	1108		1					9403		3570		--	01
INA		1			1			3-7-94	1110		1									--	02

Lab number

Turnaround time

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

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 3-7-94 Time 1425	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date 03/07/94 Time 1425

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

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Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Project: Arco 5387-94-4B

Enclosed are the results from 2 air samples received at Sequoia Analytical on March 7,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4C39301	Air, Inf B	3/7/94	EPA 5030/8015 Mod./8020
4C39302	Air, Eff B	3/7/94	EPA 5030/8015 Mod./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

Todd Olive
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387-94-4B	Sampled:	Mar 7, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received:	Mar 7, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Mar 9, 1994
Attention: Joel Coffman	First Sample #:	4C39301		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4C39301 Inf B	Sample I.D. 4C39302 Eff B
Purgeable Hydrocarbons	2.3	1,400	N.D.
Benzene	0.019	19	N.D.
Toluene	0.016	9.8	N.D.
Ethyl Benzene	0.014	6.0	N.D.
Total Xylenes	0.014	20	N.D.
Chromatogram Pattern:		Gas + Non-gas mix < C8	--

Quality Control Data

Report Limit Multiplication Factor:	50	1.0
Date Analyzed:	3/8/94	3/8/94
Instrument Identification:	GCHP-3	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	110	114

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Client Project ID: Arco 5387-94-4B
Matrix: Liquid
QC Sample Group: 4C39301-02
Reported: Mar 9, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4C28504	G4C28504	G4C28504	G4C28504
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	3/8/94	3/8/94	3/8/94	3/8/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	95	97	98	97
Matrix Spike Duplicate % Recovery:	96	98	96	93
Relative % Difference:	1.0	1.0	2.1	4.2
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Todd Olive
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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 5387-94-4B

Chain of Custody

ARCO Facility no. 5387	City (Facility) San Carlos
ARCO engineer Mike Whelan	Telephone no. (ARCO)
Project manager (Consultant) Joel Coffman	
Telephone no. (Consultant) 551-7555	Fax no. (Consultant) 551-7888
Consultant name GSI	Address (Consultant) 6747 Sierra Ct Dublin CA
Laboratory name Sequoia	Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other (Air)	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
InfB		1			X			3-7-94	1915		X					9403393				-01		
BHB		1			X			3-7-94	1925		X									-02		

Please report with data taken on 3-7-94 from this same project.

Method of shipment: GR

Special detection Limit/reporting: Standard

Special QA/QC: Standard

Remarks: GR # 9912 DC

Lab number

Turnaround time
- Priority Rush 1 Business Day ☒
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☐

Condition of sample:

Temperature received:

Relinquished by	Date	Time	Received by	Date	Time
Relinquished by sampler [signature]	3-7-94	8:08	Received by		
Relinquished by			Received by		
Relinquished by			Received by laboratory [signature]	3/7/94	2008

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

Sequoia Analytical

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Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Project: Arco 5387

Enclosed are the results from 15 air samples received at Sequoia Analytical on March 15,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4B86302	Air, AS1-1	3/15/94	EPA 5030/8015 Mod./8020
4B86303	Air, AV1-1	3/15/94	EPA 5030/8015 Mod./8020
4B86304	Air, AV3-1	3/15/94	EPA 5030/8015 Mod./8020
4B86305	Air, AV4-1	3/15/94	EPA 5030/8015 Mod./8020
4B86306	Air, MW1-1	3/15/94	EPA 5030/8015 Mod./8020
4B86308	Air, AS1-2	3/15/94	EPA 5030/8015 Mod./8020
4B86309	Air, AV1-2	3/15/94	EPA 5030/8015 Mod./8020
4B86310	Air, AV3-2	3/15/94	EPA 5030/8015 Mod./8020
4B86311	Air, AV4-2	3/15/94	EPA 5030/8015 Mod./8020
4B86312	Air, MW1-2	3/15/94	EPA 5030/8015 Mod./8020
4C86301	Air, INF 1	3/15/94	EPA 5030/8015 Mod./8020
4C86307	Air, MW3-1	3/15/94	EPA 5030/8015 Mod./8020
4C86313	Air, MW3-2	3/15/94	EPA 5030/8015 Mod./8020
4C86314	Air, INF2	3/15/94	EPA 5030/8015 Mod./8020
4C86315	Air, Eff	3/15/94	EPA 5030/8015 Mod./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

Todd Olive
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
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Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387	Sampled: Mar 15, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received: Mar 15, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported: Mar 16, 1994
Attention: Joel Coffman	First Sample #:	4C86301	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4C86301 INF 1	Sample I.D. 4B86302 AS1-1	Sample I.D. 4B86303 AV1-1	Sample I.D. 4B86304 AV3-1	Sample I.D. 4B86305 AV4-1	Sample I.D. 4B86306 MW1-1
Purgeable Hydrocarbons	2.3	560	1,300	2,700	640	870	3,800
Benzene	0.019	3.4	17	17	6.9	2.3	38
Toluene	0.016	4.3	6.9	8.0	1.2	4.3	35
Ethyl Benzene	0.014	3.0	3.5	8.8	N.D.	1.2	9.2
Total Xylenes	0.014	20	9.0	22	6.7	3.5	81
Chromatogram Pattern:		Gas & Non Gas Mix, + < C8	Gas	Gas & Non Gas Mix, + < C8	Gas	Gas	Gas & Non Gas Mix, + < C8

Quality Control Data

Report Limit Multiplication Factor:	50	50	50	50	50	100
Date Analyzed:	3/15/94	3/15/94	3/15/94	3/15/94	3/15/94	3/15/94
Instrument Identification:	GCHP-2	GCHP-3	GCHP-2	GCHP-3	GCHP-3	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%) * - Coelution Confirmed	89	116	182 *	86	102	98

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387	Sampled:	Mar 15, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received:	Mar 15, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Mar 16, 1994
Attention: Joel Coffman	First Sample #:	4C86307	Amended:	May 24, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4C86307 MW3-1	Sample I.D. 4B86308 AS1-2	Sample I.D. 4B86309 AV1-2	Sample I.D. 4B86310 AV3-2	Sample I.D. 4B86311 AV4-2	Sample I.D. 4B86312 MW1-2
Purgeable Hydrocarbons	2.3	190	490	900	450	64	3,600
Benzene	0.019	N.D.	7.2	6.0	2.2	N.D.	38
Toluene	0.016	0.88	N.D.	8.0	0.88	N.D.	32
Ethyl Benzene	0.014	N.D.	1.5	5.8	0.85	N.D.	9.5
Total Xylenes	0.014	5.3	1.2	25	8.1	N.D.	83
Chromatogram Pattern:		Gas	Gas	Gas & Non Gas Mix, + < C8	Gas & Non Gas Mix, + < C8	Gas & Non Gas Mix, + < C8	Gas & Non Gas Mix, + < C8

Quality Control Data

Report Limit Multiplication Factor:	50	50	50	50	25	50
Date Analyzed:	3/15/94	3/15/94	3/15/94	3/15/94	3/16/94	3/15/94
Instrument Identification:	GCHP-3	GCHP-3	GCHP-2	GCHP-2	GCHP-3	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%) * -Coelution Confirmed	103	110	101	112	108	141 *

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Project ID:	Arco 5387	Sampled: Mar 15, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received: Mar 15, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported: Mar 16, 1994
Attention: Joel Coffman	First Sample #:	4C86313	Amended: May 24, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4C86313 MW3-2	Sample I.D. 4C86314 INF2	Sample I.D. 4C86315 Eff	Sample I.D.	Sample I.D.	Sample I.D.
Purgeable Hydrocarbons	2.3	200	1,200	N.D.			
Benzene	0.019	N.D.	8.5	N.D.			
Toluene	0.016	N.D.	6.9	N.D.			
Ethyl Benzene	0.014	N.D.	4.2	N.D.			
Total Xylenes	0.014	N.D.	25	N.D.			
Chromatogram Pattern:		Non Gas Mix, < C8	Gas & Non Gas Mix, + < C8	Discrete Peaks			

Quality Control Data

Report Limit Multiplication Factor:	10	100	1.0
Date Analyzed:	3/16/94	3/15/94	3/16/94
Instrument Identification:	GCHP-2	GCHP-2	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	115	117	122

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

Sequoia Analytical

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Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Client Project ID: Arco 5387
Matrix: Liquid
QC Sample Group: 4C86301 - 13

Reported: Mar 16, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4C51805	G4C51805	G4C51805	G4C51805
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	3/15/94	3/15/94	3/15/94	3/15/94
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	96	97	98	100
Matrix Spike Duplicate % Recovery:	100	100	100	103
Relative % Difference:	4.1	3.0	2.0	3.0
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Sequoia Analytical

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Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Client Project ID: Arco 5387
Matrix: Liquid
QC Sample Group: 4C86301 - 13

Reported: Mar 16, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4C70201	G4C70201	G4C70201	G4C70201
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	3/15/94	3/15/94	3/15/94	3/15/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	110	110	103
Matrix Spike Duplicate % Recovery:	100	100	100	103
Relative % Difference:	0.0	9.5	9.5	0.0
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Todd Olive
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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 5387-93-4C

Chain of Custody

ARCO Facility no. 5387	City (Facility) Hayward	Project manager (Consultant) Joel Coffman	Laboratory name SEQ
ARCO engineer Mike Wetmore	Telephone no. (ARCO) —	Telephone no. (Consultant) 551-7484	Fax no. (Consultant) (510) 551-7888
Consultant name Gettler-Ryan Inc	Address (Consultant) 6747 Sierra Ct. Suite J Dublin CA. 94568		Contract number 07-073

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
INF1		1			X			3-15	0930		X								01			
AS1-1		1			X														02			
AV1-1		1			X														03			
AV3-1		1			X														04			
AV4-1		1			X														05			
MW1-1		1			X														06			
MW3-1		1			X														07			
AS1-2		1			X														08			
AV1-2		1			X														09			
AV3-2		1			X														10			
AV4-2		1			X														11			
MW1-2		1			X														12			
MW3-2		1			X														13			
INF2		1			X														14			
EFF		1			X														15			

Special detection Limit/reporting: Standard

Special QA/QC: 5 Day

Remarks: P.O. # 9926

Lab number: 9403863

Turnaround time

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

Condition of sample:

Temperature received:

Relinquished by sampler	Date 3-15-94	Time 1435	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Date 3/16/94 Time 1429

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

APPC-3292 (2-91)

Sequoia Analytical

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Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

RECEIVED MAR 31 1994

Project: Arco, 5387-94-4B

Enclosed are the results from 3 air samples received at Sequoia Analytical on March 28,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4CG6501	Air, Eff.	3/28/94	EPA 5030/8015 Mod./8020
4CG6502	Air, Inf. A	3/28/94	EPA 5030/8015 Mod./8020
4CG6503	Air, Inf. B	3/28/94	EPA 5030/8015 Mod./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

Todd Olive
Project Manager

Sequoia Analytical

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Gettler Ryan/Geostrategies	Client Project ID:	Arco, 5387-94-4B	Sampled: Mar 28, 1994
6747 Sierra Court, Suite J	Sample Matrix:	Air	Received: Mar 28, 1994
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod./8020	Reported: Mar 29, 1994
Attention: Joel Coffman	First Sample #:	4CG6501	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 4CG6501 Eff.	Sample I.D. 4CG6502 Inf. A	Sample I.D. 4CG6503 Inf. B	Sample I.D.	Sample I.D.	Sample I.D.
Purgeable Hydrocarbons	2.3	N.D.	450	490			
Benzene	0.019	N.D.	2.7	N.D.			
Toluene	0.016	N.D.	2.1	3.2			
Ethyl Benzene	0.014	N.D.	0.32	N.D.			
Total Xylenes	0.014	N.D.	5.1	23			
Chromatogram Pattern:		--	Gas + Non-Gas Mix, + < C8	Gas			

Quality Control Data

Report Limit Multiplication Factor:	1.0	10	50
Date Analyzed:	3/28/94	3/28/94	3/28/94
Instrument Identification:	GCHP-17	GCHP-3	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%)	92	118	82

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

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

Sequoia Analytical

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Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Client Project ID: Arco, 5387-94-4B
Matrix: Liquid
QC Sample Group: 4C66501, 03

Reported: Mar 29, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4CD4406	G4CD4406	G4CD4406	G4CD4406
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	3/28/94	3/28/94	3/28/94	3/28/94
Instrument I.D.#:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	99	99	100
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	0.0	1.0	1.0	0.0
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Todd Olive
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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court, Suite J
Dublin, CA 94568
Attention: Joel Coffman

Client Project ID: Arco, 5387-94-4B
Matrix: Liquid
QC Sample Group: 4C66502

Reported: Mar 29, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G4CD1406	G4CD1406	G4CD1406	G4CD1406
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	3/28/94	3/28/94	3/28/94	3/28/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	100	100
Matrix Spike Duplicate % Recovery:	94	94	92	93
Relative % Difference:	6.2	6.2	8.3	7.3

LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

4CG6501.GET <3>

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 5387 f94-413

Chain of Custody

ARCO Facility no. 5387	City (Facility) San Lorenzo	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) 551-7555	Fax no. (Consultant) 551-7888
Consultant name GSI	Address (Consultant) 6747 Sierra Ct Suite G Dublin		Contract number

Method of shipment: COR

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
Eff		1			X			3/28/94	14:38		X				9410365					-01
InfA		1			X				14:44		X									-02
InfB		1			X				17:18		X									-03

Special detection Limit/reporting: Standard

Special QA/QC: Standard

Remarks: COR/# 9929.70

Lab number

Turnaround time

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

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 3-28-94 Time 20:05	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date 3/28/94 Time 20:05

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

APPC-3292 (2-91)

GETTLER-RYAN INC.

VENTING ENGINE LOG SHEET

CUSTOMER: Arco # 5387

LOCATION: 20200 Hesperian
San Lorenzo, CA

JOB #: 9926.2C

DATE: 2-15-94

TIME:	0909						
ENGINE RPM:	1768						
ENGINE HRS:	6555						
WELL NUMBERS:	~~MW-2~~	AS-1	MW-1	AV-1	~~AV-2~~	AV-3	MW-3
INLET HC PPM:	5530ppm	~~5400~~ 6100	~~6100~~ 11550	~~11550~~ 13170	~~13170~~ 11550 ~~9800~~	5700	5800
CO PERCENT:	0	0	0	.23	.44	0.4	0
EXHAUST HC PPM:	0ppm						
PROPANE READING:	Cha-1 1171	Mw-2 9697					
INFLUENT FLOW CFM:	16						
ENG. EXHAUST TEMP:	1076.						
ENG. EXHAUST PRESS:	0.28"						
H2O TEMPERATURE:	78. °F						
OIL TEMPERATURE:	197°F						
DUTY CYCLE:	33.1						
BYPASS VALVE:	5.9						
WELL VAC:	-11"						

Stack temp 935°F

MAINTENANCE/REPAIRS:

propane 58%

COMMENTS/RESULTS:

OPERATOR: _____

GETTLER-RYAN INC.

VENTING ENGINE LOG SHEET

CUSTOMER: Arco #5387

LOCATION: 20200 Hesperian
San Lorenzo CA

JOB #: 9926

DATE: 2-16-94

TIME:	13:00						
ENGINE RPM:	1782						
ENGINE HRS:	6577						
WELL NUMBERS:	A11	MW-3	A S1	MW-1	AV-1	AV-4	AV-3
INLET HC PPM:	4430	4950	4900	850	13680	2220	2800
CO PERCENT:	—	-0.01	-0.01	-0.03	-0.03	-0.01	-0.03
EXHAUST HC PPM:	0ppm						
PROPANE READING:	9729						
INFLUENT FLOW CFM:	12						
ENG. EXHAUST TEMP:	1088/876						
ENG. EXHAUST PRESS:	0.70						
H2O TEMPERATURE:	177						
OIL TEMPERATURE:	167						
DUTY CYCLE:	37.1						
BYPASS VALVE:	-1.2						
WELL VAC:	-11						

MAINTENANCE/REPAIRS:

COMMENTS/RESULTS:

OPERATOR: F. Cline

6747 Sierra Court, Suite J • Dublin, California 94568 • (510) 551-7555

GETTLER-RYAN INC.

VENTING ENGINE LOG SHEET

CUSTOMER: Arco #5387

LOCATION: 20200 Hesperian San Lorenzo CA

JOB #: 1920

DATE: 2-17-94

TIME:	9:00	3:30	17:30				
ENGINE RPM:	[illegible]	1793	1807				
ENGINE HRS:	6584	6585	6591				
WELL NUMBERS:	All	All	All				
INLET HC PPM:		nt	3720				
CO PERCENT:		nt					
EXHAUST HC PPM:	~~[illegible]~~ 0	nt	00ppm				
PROPANE READING:	973900	973800	974%				
INFLUENT FLOW CFM:	0	11	13				
ENG. EXHAUST TEMP:	0	1021	1021 / 532				
ENG. EXHAUST PRESS:	0	nt	0.65				
H2O TEMPERATURE:	[illegible]	172	177				
OIL TEMPERATURE:	[illegible]	149	163				
DUTY CYCLE:	0	35.9	34.1				
BYPASS VALVE:	[illegible]	-3.7	-3.7				
WELL VAC:	0	-13	-12				

MAINTENANCE/REPAIRS: Ar. pane [illegible] 15% Propane 70%

MW-3 AS1 - MW-1 AV-1 AV-4 AV-3
4770 460 98000 718000 1600 1550

COMMENTS/RESULTS:

OPERATOR: F Cline

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GETTLER-RYAN INC.

VENTING ENGINE LOG SHEET

CUSTOMER: Arco 5357

LOCATION: 20200 Hesperian Blvd
San Lorenzo CA

JOB #: 9926

DATE: 2-24-94

TIME:	14:40						
ENGINE RPM:	1850						
ENGINE HRS:	6605						
WELL NUMBERS:	A11	MW-3	AS1	MW-1	AV-1	AV-4	AV-3
INLET HC PPM:	9740	4710	4550	8260	>13400	1900	2300
CO PERCENT:							
EXHAUST HC PPM:	0 ppm						
PROPANE READING:	976300						
INFLUENT FLOW CFM:	15						
ENG. EXHAUST TEMP:	1059 / 912°F						
ENG. EXHAUST PRESS:	0.78						
H2O TEMPERATURE:	177						
OIL TEMPERATURE:	167						
DUTY CYCLE:	38.9						
BYPASS VALVE:	2.7						
WELL VAC:	-12"						

MAINTENANCE/REPAIRS: Replaced sensor, board, restarted @ 12:00 pm, running 2:00 pm

84% in tank

Ind Air 61°F

COMMENTS/RESULTS:

OPERATOR: F Cline

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gettler — ryan inc.

VENTING ENGINE LOG SHEET

CUSTOMER: Arco # 5387

LOCATION: 20200 Hesperian Blvd San Lorenzo CA

JOB #: 9928.70

DATE: 3-7-94

TIME:	11:00				~~12:30~~	19:15	
ENGINE RPM:	1808					1844	
ENGINE HRS:	6076					6884	
WELL NUMBERS:	AS-1	MW-1	AV-1	AV-3		Same	
INLET HC PPM:	3710					2500	
CO PERCENT:	0					0	
EXHAUST HC PPM:	0ppm					0ppm	
PROPANE READING:	9600					9800	
INFLUENT FLOW CFM:	15					18	
ENG. EXHAUST TEMP:	1085					1004 / 868	
ENG. EXHAUST PRESS:	0.93" H2O					0.65"	
H2O TEMPERATURE:	176					174	
OIL TEMPERATURE:	164					159	
DUTY CYCLE:	36.9					39.5	
BYPASS VALVE:	6.8					6.7	
WELL VAC:	24"					36"	

Ind A / Eff A

Ind B / Eff B

MAINTENANCE/REPAIRS: propane 53% 44%

Samples Taken Beginning ~~end~~ end of day.

COMMENTS/RESULTS:

Engine Started 10:00

AV-4 & MW-3 ~~at~~

OPERATOR: E. Cline

REV. 12/92

GSI

ICE SYSTEM MONITORING DATA SHEET

Client: ARCO
Site:

Job#:
Field Technician:
Date:

EXTRACTION WELL #	MW3	MW1	MW1	AV1		
Time	1537	1510	1515	1580	1582	1520
Pipe ID @ Influent (in)	2"	2"	2"	2"	2"	2"
Differential Pressure (in WC)	2	.10"	3	3	1"	
Vacuum (in WC)	30"	30"	30"	32"	30"	26"
Temperature (F)	66°	66°	66°	66°	66°	
HC Concentration (ppm)	1320	900	3170	5600	50	1110
(Monthly) Sampled (Y/N) / ID#	N	N	N	N	N	N
INFLUENT						
Time	1552					
Flow (cfm)	50					
Vacuum (in WC)	30"					
Temperature (F)	66°					
HC Concentration (ppm)	3010					
Sampled (Y/N) / ID#	N					
EFFLUENT						
Pipe ID @ Effluent (in)	3"					
Differential Pressure (in WC)	.11"					
Temperature (F)	1046/1091					
HC Concentration (ppm)	11					
Sampled (Y/N) / ID#	N					
SYSTEM						
Engine #						
Active on Arrival (circle one):	Y (N)	Y N		Y N		Y N
Engine Hours	6728					
Engine RPM	1200					
Electric Meter						
Gas/Propane Meter	995200					
Duty Cycle	36.1					
Bypass Valve	1.3					

Monitoring Device (circle one): FID PID (IR)

Comments: Could not locate [illegible]

Supplies Used:

Note: Attach status printout.

gettler — ryan inc.

VENTING ENGINE LOG SHEET

CUSTOMER:

JOB#: 9926

LOCATION:

DATE: 7-15

				Sample		
TIME:	1000	1015		1215		
ENGINE RPM:	1829			1840		
ENGINE HPS:	6728			6730		
WELL NUMBERS:	ALL			ALL		
INLET HC PPM: Intake	1480 / 60	1390		/ 62		
CO PERCENT:						
EXHAUST HC PPM:						
PROPANE READING:	117448			117818 2.1/2		
INFLUENT FLOW CFM:	27			32		
ENG. EXHAUST TEMP:	1174			1157 / 1032		
ENG. EXHAUST PRESS				.96		
H2O TEMPERATURE:						
OIL TEMPERATURE:						
DUTY CYCLE:						
BYPASS VALVE:	22-3			22		
WELL VAC:	22			25		

MAINTENANCE/REPAIRS:

COMMENTS/RESULTS:

OPERATOR:

Rev. 7/90

2150 west winton avenue • hayward california 94545-1210 • (510) 783-7500

GSI

ICE SYSTEM MONITORING DATA SHEET

Client: Arco 5357 Job#: 9924

Site: San Lorenzo Field Technician:

Date: 3-25-94

EXTRACTION WELL #	MW-3	AS-1	MW-1	A-V-1	AV-4	AV-3
Time	15:46	16:00				
Pipe ID @ Influent (in)	2"	2"	2"	2"	2"	2"
Differential Pressure (in WC)	0	0.25	0.30	0.30	0.10	0.30
Vacuum (in WC)	0	52	50	52	18	52
Temperature (F)	77	63	62	63	62	62
HC Concentration (ppm)	20 ppm	60 ppm	1500	2300	10 ppm	50 ppm
(Monthly) Sampled (Y/N) / ID#	N	N	N	N	N	N

INFLUENT			
Time	15:45		1702
Flow (cfm)	45		28 cfm
Vacuum (in WC)	-56"		56"
Temperature (F)	62 °F		62 °F
HC Concentration (ppm)	500 ppm @ Engine	700 ppm @ Manf	1260 ppm @ Manf
Sampled (Y/N) / ID#	N		

EFFLUENT			
Pipe ID @ Effluent (in)	3"		3"
Differential Pressure (in WC)	0.185		0.58"
Temperature (F)	972.6		970
HC Concentration (ppm)	0 ppm @ Stack		0 ppm
Sampled (Y/N) / ID#	N		N

SYSTEM						
Engine #	15					
Active on Arrival (circle one):	(Y)	N	Y	N	Y	N
Engine Hours	6625					
Engine RPM	1817					
Electric Meter	00036					
Gas/Propane Meter	107564				55% manifold	
Duty Cycle	37					
Bypass Valve	35.5					

Monitoring Device (circle one): FID PID IR

Comments: Water in MW-1

Supplies Used:

MW-3 off

AS-1 4" Vacuum 0.25" Flow

AV-1 54" Vac Flow 0.25"

AV-1 54" Vac Flow 0.25"

~~AV-4 10" Vac Flow 0.10~~

AV-3 10" Vac Flow 0.10

} Tuning

Note: Attach status printout.

GSI

ICE SYSTEM MONITORING DATA SHEET

Client: Arco # 5387 Job#: 9926

Site: 20000 Hesperian Field Technician: F. Cho

San Lorenzo CA Date: 3.26.99

EXTRACTION WELL #						
Time	14:00	14:00	14:00	14:00	14:00	14:2?
Pipe ID @ Influent (in)	2"	2"	2"	2"	2"	2"
Differential Pressure (in WC)	unable to measure					
Vacuum (in WC)	10	40	40	40	20	20
Temperature (F)	63	63.4	63.4	62.0		
HC Concentration (ppm)	100	2720	1500	900	200	300
Sampled (Y/N) / ID#	N	N	N	N	N	N

INFLUENT			
Time	14:37		
Flow (cfm)	36		
Vacuum (in WC)	37		
Temperature (F)	63°F		
HC Concentration (ppm)	510ppm		
Sampled (Y/N) / ID#	Inl A Yes		

EFFLUENT			
Pipe ID @ Effluent (in)	3"		
Differential Pressure (in WC)	1.03		
Temperature (F)	1040		
HC Concentration (ppm)	0ppm		
Sampled (Y/N) / ID#	Yes 1244		

SYSTEM						
Engine #						
Active on Arrival (circle one):	(Y)	N	Y	N	Y	N
Engine Hours	6834					
Engine RPM	1800					
Electric Meter						
Gas/Propane Meter	1008677					
Duty Cycle	32.2					
Bypass Valve	35.1					

Monitoring Device (circle one): FID PID (IR)

Comments: Sparging

Inflow 9psi
6CFM pressure

Well #	AS-2	As-1	AS-9	AS5	AS6	AS-4 / AS3	AS-8	AS-7
	off	6.0	7.5	off	off	6.25	off	off

Supplies Used:

Note: Attach status printout.

GSI

ICE SYSTEM MONITORING DATA SHEET

Client: Avco # 5387
Site: 20200 Hesperian San Lorenzo CA

Job#: 9929.13
Field Technician: E. Clin
Date: 4-1-94

EXTRACTION WELL #	MW-3	~~AS-1~~	~~MW-1~~	AV-1	~~AV-4~~	~~AV-3~~
Time	14:00	←				
Pipe ID @ Influent (in)	2"					
Differential Pressure (in WC)	N/T					
Vacuum (in WC)	16"	49"	48"	48"	20"	21"
Temperature (F)	57	57	57	56	57	57
HC Concentration (ppm)	100	2250	1700	1500	350	100
Sampled (Y/N) / ID#	N	←	←	←	←	←
INFLUENT						
Time	14:00					
Flow (cfm)	44					
Vacuum (in WC)	51"					
Temperature (F)	570F					
HC Concentration (ppm)	1260					
Sampled (Y/N) / ID#	NO					
EFFLUENT						
Pipe ID @ Effluent (in)	3"					
Differential Pressure (in WC)	~~0.3~~ 0.75					
Temperature (F)	993					
HC Concentration (ppm)	6 ppm					
Sampled (Y/N) / ID#	NC					
SYSTEM						
Engine #	15					
Active on Arrival (circle one):	(Y) N		Y N		Y N	
Engine Hours	6876					
Engine RPM	1820					
Electric Meter	1015133					
Gas/Propane Meter	1015133					
Duty Cycle	38.2					
Bypass Valve	32.1					

Monitoring Device (circle one): FID PID IR

Comments: Sparging 10psi @ 5cfm
~~AS-1~~
6.5 psi AS-4
~~AS-4~~ 7.5 psi
8.5 psi

Supplies Used:

Note: Attach status printout.

I NTEGRATED
W ASTESTREAM
M ANAGEMENT, INC.

March 10, 1994

Ms. Barbara Sieminski
GeoStrategies Inc.
6747 Sierra Court
Suite G
Dublin, CA. 94568

Dear Ms. Sieminski:

Attached are the field data sheets and analytical results for quarterly ground water sampling at ARCO Facility No. 5387 in San Lorenzo, California. Integrated Wastestream Management measured the depth to water and collected samples from wells at this site on February 17, 1994.

Sampling was carried out in accordance with the protocols described in the "Request for Bid for Quarterly Sampling at ARCO Facilities in Northern California".

Please call us if you have any questions.

Sincerely,
Integrated Wastestream Management

Tom DeLon
Project Manager

Walter H. Howe
Registered Geologist

950 AMES AVENUE MILPITAS, CA. 95035 (408) 942-8955

Summary of Ground Water Sample Analyses ARCO Facility No.A-5387, San Lorenzo, California

WELL NUMBER	MW-1	MW-2	MW-3	AR-1	AR-2	A-4	A-5	A-6	A-7	A-8	A-9
DATE SAMPLED	2/17/94	2/17/94	2/17/94	2/17/94	2/17/94	2/17/94	2/17/94	2/17/94	2/17/94	2/17/94	2/17/94
DEPTH TO WATER	11.86	12.81	11.53	12.15	12.76	14.02	13.20	*	14.44	11.47	12.99
SHEEN	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
PRODUCT THICKNESS	NA	NA	NA	NA	NA	NA	NA	*	NA	NA	NA
TPHg	1,200	15,000	3,100	4,700	130	320	340	*	1,300	ND	ND
BTEX											
BENZENE	130	1800	160	1,100	2.9	ND	2.8	*	38	ND	ND
TOLUENE	12	21	<10	<10	ND	ND	ND	*	<1	ND	ND
ETHLYBENZENE	54	850	36	140	15	28	13	*	35	ND	ND
XYLENES	58	540	8.6	26	0.8	0.9	2.9	*	25	ND	ND

FOOTNOTES:

Concentrations reported in ug/L (ppb).

TPHg = Total Purgeable Petroleum Hydrocarbons (USEPA Method 8015 Modified)

BTEX Distinction (USEPA Method 8020)

PCE = Tetrachloroethene (USEPA Method 8010)

DCE = cis-1, 2-Dichloroethene (USEPA Method 8010)

TCE = Trichloroethene (USEAP Method 8010)

N.D. = Not Detected.

* = No sample, well was paved over.

950 AMES AVENUE MILPITAS, CA 95035 (408) 942-8955

I NTEGRATED
W ASTESTREAM
M ANAGEMENT

A5387Q42.XLS

Summary of Ground Water Sample Analyses ARCO Facility No.A-5387, San Lorenzo, California

WELL NUMBER	A-10
DATE SAMPLED	2/17/94
DEPTH TO WATER	14.16
SHEEN	NONE
PRODUCT THICKNESS	NA
TPHg	52
BTEX	
BENZENE	ND
TOLUENE	ND
ETHILYBENZENE	ND
XYLENES	ND

FOOTNOTES:

Concentrations reported in ug/L (ppb).
TPHg = Total Purgeable Petroleum Hydrocarbons (USEPA Method 8015 Modified)
BTEX Distinction (USEPA Method 8020)
PCE = Tetrachloroethene (USEPA Method 8010)
DCE = cis-1, 2-Dichloroethene (USEPA Method 8010)
TCE = Trichloroethene (USEAP Method 8010)
N.D. = Not Detected.

950 AMES AVENUE MILPITAS, CA 95035 (408) 942-8955

DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT NO: _____ LOCATION: 20200 Hesperian blvd SC. DATE: 2-16-94 / 2-17-94

CLIENT/STATION#: Arco 5387 FIELD TECHNICIAN: Vince / FRANCISCO DAY OF WEEK: Wednesday Thursday

WEATHER: Cloudy/cool PRECIPITATION: HEAVY / LIGHT ✓ APPROX. TEMP.: 64°

DTW ORDER	WELL ID	SURFACE SEAL	LID SECURE	GASKET	LOCK	EXPANDING CAP	TOTAL DEPTH (Feet)	FIRST DEPTH TO WATER (Feet)	SECOND DEPTH TO WATER (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	FLOATING PRODUCT THICKNESS (Feet)	SHEEN PRESENT YES / NO	COMMENTS
11	MW-1	OK	YES	OK	OK	OK	28.7	11.86	11.86	N/A	N/A	N/A	NO	2" well box filled w/ 35 gallons H_2O
2	MW-2	OK	YES	OK	OK	OK	27.1	12.81	12.81					2" well box filled w/ H_2O
10	MW-3	OK	YES	OK	OK	OK	28.8	11.53	11.53					
3	AR-1	OK	YES	OK	OK	OK	34.9	12.15	12.15					6"
5	AR-2	OK	YES	OK	OK	OK	35.4	12.76	12.76					6"
9	A-4	OK	YES	OK	OK	OK	35.0	14.02	14.02					3"
7	A-5	OK	YES	OK	OK	OK	29.9	13.20	13.20					3"
6	A-6													well was paved over NO SAMPLE
1	A-7	OK	YES	OK	OK	OK	35.6	14.44	14.44					6"
4	A-8	OK	YES	OK	OK	OK	34.7	11.47	11.47					2" well box filled w/ H_2O
12	A-9	OK	YES	OK	OK	OK	34.1	12.99	12.99					2" Filled w/ H_2O well box
8	A-10	OK	YES	OK	OK	OK	34.2	14.16	14.16					2"

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-1

CLIENT/STATION #: ARCO 5387 ADDRESS: 20200 HESPERIAN BLVD

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 28.7 - DTW 11.86 X GALLON/LINEAR FT. 0.17 X CASING VOLUME 3 = CALCULATED PURGE 8.58 ACTUAL PURGE 9.0

DATE PURGED: 2-17-94 START (2400 HR) 1211 END (2400 HR) 1216
DATE SAMPLED: 2-17-94 START (2400 HR) 1335 END (2400 HR) 1335

TIME (2400 HR)	VOLUME (GAL.)	pH (UNITS)	E.C. (UMHOS/ CM@25 C)	TEMP. (F)	COLOR (VISUAL)	TURBIDITY (VISUAL)
1212	3	6.59	0.93	56.9	CLOUDY	
1214	6	6.65	0.91	56.2	CLEAR	
1216	8	6.66	0.94	55.8	CLEAR	

FIELD QC SAMPLES COLLECTED AT THIS WELL (I.E., FB-1, XDUP-1): _____

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (TEFLON)	___ 2" Bladder Pump	___ Bailer (TEFLON)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Dedicated		✓ Bailer Disposable	___ Dedicated
Other: _____		Other: _____	

REMARKS: _____

PRINT NAME: FRANCISCO ABUNGAN

SIGNATURE: Francisco Abungan

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-2

CLIENT/STATION #: ARCO 5387 ADDRESS: 20200

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 27.1 - DTW 12.81 X GALLON LINEAR FT. 0.17 X CASING VOLUME 3 = CALCULATED PURGE 7.28 ACTUAL PURGE 7.50

DATE PURGED: 2-17-94 START (2400 HR) 1306 END (2400 HR) 1312

DATE SAMPLED: 2-17-94 START (2400 HR) 1346 END (2400 HR) 1346

TIME (2400 HR)	VOLUME (GAL.)	pH (UNITS)	E.C. (UMHOS/ CM@25 C)	TEMP. (F)	COLOR (VISUAL)	TURBIDITY (VISUAL)
1307	2	6.75	1.01	65.6	CLEAR	
1309	5	6.69	0.94	65.1	CLEAR	
1312	7.	6.68	1.02	64.8	CLEAR	

FIELD QC SAMPLES COLLECTED AT THIS WELL (I.E., FB-1, XDUP-1): _____

PURGING EQUIPMENT

___ 2" Bladder Pump
✓ Centrifugal Pump
___ Submersible Pump
___ Dedicated
___ Bailer (TEFLON)
___ Bailer (PVC)
___ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
✓ Bailer Disposable
___ Bailer (TEFLON)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: Francisco Montano

SIGNATURE: Francisco Montano

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-3

CLIENT/STATION #: ARCO 5387 ADDRESS: 20200 HESPERIAN BLVD

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 26.8 - DTW 11.53 X GALLON LINEAR FT. 0.17 X CASING VOLUME 3 = CALCULATED PURGE 8.80 ACTUAL PURGE 9.0

DATE PURGED: 2-17-94 START (2400 HR) 1145 END (2400 HR) 1150
DATE SAMPLED: 2-17-94 START (2400 HR) 1321 END (2400 HR) 1321

TIME (2400 HR)	VOLUME (GAL.)	pH (UNITS)	E.C. (UMHOS/ CM@25 C)	TEMP. (F)	COLOR (VISUAL)	TURBIDITY (VISUAL)
1147	2	6.76	0.90	6.03	CLOUDY	
1148	5	6.66	0.96	5.98	CLOUDY	
1150	8	6.65	0.98	5.95	CLEAR	

FIELD QC SAMPLES COLLECTED AT THIS WELL (I.E., FB-1, XDUP-1): _____

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (TEFLON)	___ 2" Bladder Pump	___ Bailer (TEFLON)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Dedicated		✓ Bailer Disposable	___ Dedicated
Other: _____		Other: _____	

REMARKS: _____

PRINT NAME: FRANCISCO ABANGAN

SIGNATURE: Francisco Abangan

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-4

CLIENT/STATION #: Arco 5387 ADDRESS: 2020 HESPERIAN BLVD.

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 35.0 - DTW 19.02 X GALLON LINEAR FT. 0.38 X CASING VOLUME 3 = CALCULATED PURGE 23.91 ACTUAL PURGE _____

DATE PURGED: 2-17-94 START (2400 HR) 945 END (2400 HR) 951
DATE SAMPLED: 2-17-94 START (2400 HR) 1015 END (2400 HR) 1015

TIME (2400 HR)	VOLUME (GAL.)	pH (UNITS)	E.C. (UMHOS/ CM@25 C)	TEMP. (F)	COLOR (VISUAL) DTW 14.0	TURBIDITY (VISUAL)
947	5	6.86	0.86	61.3	CLOUDY	
948	12	6.77	0.89	59.8	CLEAR	
950	18	6.70	0.93	59.6	CLEAR	
951	24	6.65	0.88	58.7	CLEAR	

FIELD QC SAMPLES COLLECTED AT THIS WELL (I.E., FB-1, XDUP-1): _____

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (TEFLON)	___ 2" Bladder Pump	___ Bailer (TEFLON)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Dedicated		✓ Bailer Disposable	___ Dedicated
Other: _____		Other: _____	

REMARKS: _____

PRINT NAME: FRANCISCO ABUNGAN

SIGNATURE: Francisco Abungan

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-5

CLIENT/STATION #: ARCO 5387 ADDRESS: 20200 HESPERIAN BLVD

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 29.9 - DTW 13.20 X GALLON (LINEAR FT.) 0.38 X CASING (VOLUME) 3 = CALCULATED (PURGE) 19.03 ACTUAL PURGE 19.00

DATE PURGED: 2-17-94 START (2400 HR) 1005 END (2400 HR) 1016
DATE SAMPLED: 2-17-94 START (2400 HR) 1115 END (2400 HR) 1115

TIME (2400 HR)	VOLUME (GAL.)	pH (UNITS)	E.C. (UMHOS/ CM@25 C)	TEMP. (F)	COLOR (VISUAL) DTW 13.1 =	TURBIDITY (VISUAL)
1008	5	6.69	0.90	56.6	CLOUDY	
1009	10	6.61	1.00	56.4	CLEAR	
1012	15	6.56	0.97	55.9	CLEAR	
1016	19	6.54	1.61	55.3	CLEAR	

FIELD QC SAMPLES COLLECTED AT THIS WELL (I.E., FB-1, XDUP-1): _____

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (TEFLON)	___ 2" Bladder Pump	___ Bailer (TEFLON)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Dedicated		✓ Bailer Disposable	___ Dedicated
Other: _____		Other: _____	

REMARKS: _____

PRINT NAME: Francisco Abungan

SIGNATURE: Francisco Abungan

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-7

CLIENT/STATION #: ARCO 5387 ADDRESS: 20200 HESPERIAN BLVD

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 35.6 - DTW 14.44 X GALLON ~~0.66~~ 0.38 X CASING VOLUME 3 = CALCULATED PURGE ~~41.69~~ 24.17 ACTUAL PURGE 25.0

DATE PURGED: 2-~~18~~-94 START (2400 HR) 1500 END (2400 HR) 1570
DATE SAMPLED: 2-~~18~~-94 START (2400 HR) 1521 END (2400 HR) 1531

DTW 15.0

TIME (2400 HR)	VOLUME (GAL.)	pH (UNITS)	E.C. (UMHOS/ CM@25 C)	TEMP. (F)	COLOR (VISUAL)	TURBIDITY (VISUAL)
1501	3	6.86	1.04	65.7	clear	
1502	10	6.87	1.06	65.3	clear	
1505	15	6.84	1.04	65.1	clear	
1507	20	6.81	1.06	65.0	clear	
1510	25	6.80	1.06	64.9	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (I.E., FB-1, XDUP-1): _____

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (TEFLON)	___ 2" Bladder Pump	___ Bailer (TEFLON)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Dedicated		✓ Bailer Disposable	___ Dedicated
Other: _____		Other: _____	

REMARKS: _____

PRINT NAME: Vince Valdes

SIGNATURE: Vince Valdes

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-8

CLIENT/STATION #: Arco 5387 ADDRESS: 20200 HESPERIAN BLVD

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 34.7 - DTW 11.47 x GALLON/LINEAR FT. 0.17 x CASING VOLUME 3 = CALCULATED PURGE 11.84 ACTUAL PURGE 12.0

DATE PURGED: 2-16-94 START (2400 HR) 1336 END (2400 HR) 1341
DATE SAMPLED: 2-16-94 START (2400 HR) 1349 END (2400 HR) 1349

TIME (2400 HR)	VOLUME (GAL.)	pH (UNITS)	E.C. (UMHOS/ CM@25 C)	TEMP. (F)	COLOR (VISUAL)	TURBIDITY (VISUAL)
1337	2	6.68	1.01	65.3	clear	
1339	6	6.78	0.99	65.0	clear	
1340	9	6.81	1.05	64.8	clear	
1341	12	6.83	1.06	64.6	clear	

11.0

FIELD QC SAMPLES COLLECTED AT THIS WELL (I.E., FB-1, XDUP-1): _____

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (TEFLON)	___ 2" Bladder Pump	___ Bailer (TEFLON)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Dedicated		✓ Bailer Disposable	___ Dedicated
Other: _____		Other: _____	

REMARKS: _____

PRINT NAME: VINCE VALDES

SIGNATURE: _____

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-9

CLIENT/STATION #: Arco 5387 ADDRESS: 20200 HESPERIAN BLVD

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 34.1 - DTW 12.99 X GALLON LINEAR FT. 0.17 X CASING VOLUME 3 = CALCULATED PURGE 10.76 ACTUAL PURGE 11.0

DATE PURGED: 2-16-94 START (2400 HR) 1415 END (2400 HR) 1421
DATE SAMPLED: 2-16-94 START (2400 HR) 1435 END (2400 HR) 1435

DTW 13.5

TIME (2400 HR)	VOLUME (GAL.)	pH (UNITS)	E.C. (UMHOS/ CM@25 C)	TEMP. (F)	COLOR (VISUAL)	TURBIDITY (VISUAL)
				61.1		
1417	1	7.35	0.92	59.3	cloudy	
1419	5 3	7.47	0.99	60.7	clear	
1421	8	7.24	0.97	60.2	clear	
					clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (I.E., FB-1, XDUP-1): _____

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (TEFLON)	___ 2" Bladder Pump	___ Bailer (TEFLON)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Dedicated		✓ Bailer Disposable	___ Dedicated
Other: _____		Other: _____	

REMARKS: _____

PRINT NAME: Francisco Abungan

SIGNATURE: Francisco Abungan

AGE 10 OF 10 DATE: 2-17-94 CLIENT/STATION #: ARCO 5387 ADDRESS: 20200 Hesperian BLVD.

WELL ID: AR-2 TD 35.4 DTW 12.76 x 1.5 Gal./Linear Ft. x 3 Casing Volume = 101.88 Calculated Purge

DATE PURGED: 2-17-94 TIME (2400 HR): 935 - 1000 DTW: 12.76
DATE SAMPLED: 2-17-94 TIME (2400 HR): 1010 DTW: 25.0

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	E.C. (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
935	4	7.01	1.21	62.8	clear
939	20	7.08	1.10	62.6	clear
945	50	6.86	1.04	62.1	clear
952	75	6.94	1.08	62.0	cloudy
1000	102	6.97	1.07	61.8	clear

Total purge: 102 = (102) PH 6.97 E.C. 1.07 TEMP 61.8

PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.

REMARKS:

WELL ID: AR-1 TD 34.9 DTW 12.15 x 1.5 Gal./Linear Ft. x 3 Casing Volume = 102.37 Calculated Purge

DATE PURGED: 2-17-94 TIME (2400 HR): 1030-1108 DTW: 34.9
DATE SAMPLED: 2-17-94 TIME (2400 HR): 1122 DTW: 16.0

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	E.C. (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1030	5	6.88	1.15	63.3	cloudy
1039	35	6.93	1.09	63.0	clear
1050	65	6.90	1.07	62.8	clear
1059	89	6.74	1.05	62.4	clear
1108	103	6.75	1.06	62.1	clear

Total purge: 103 =

PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.

REMARKS:

WELL ID: A-10 TD 34.2 - DTW 14.16 x 0.17 Gal./Linear Ft. x 3 Casing Volume = 10.22 Calculated Purge

DATE PURGED: 2-17-94 TIME (2400 HR): 1124-1128 DTW: 14.16
DATE SAMPLED: 2-17-94 TIME (2400 HR): 1137 DTW: 14.2

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	E.C. (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1124	2	7.11	1.01	63.0	clear
1125	5	7.18	1.04	62.8	clear
1127	8	7.24	1.05	62.4	clear
1128	11	7.21	1.08	62.1	clear

Total purge: 110

PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.

REMARKS:

WELL ID: _____ TD _____ - DTW _____ x _____ Gal./Linear Ft. x _____ Casing Volume = _____ Calculated Purge

DATE PURGED: _____ TIME (2400 HR): _____ DTW: _____
DATE SAMPLED: _____ TIME (2400 HR): _____ DTW: _____

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	E.C. (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge:

PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.

REMARKS:

PRINT NAME: Vince Welder SIGNATURE: Vince Welder

Columbia Analytical Services, Inc.

March 2, 1994

Service Request No. SJ94-0232

Gina Austin
Tom DeLon
IWM
950 Ames Avenue
Milpitas, CA 95035

Re: **ARCO Facility No. A5387**

Dear Ms. Austin/Mr. DeLon:

Attached are the results of the water samples submitted to our lab on February 23, 1994. For your reference, these analyses have been assigned our service request number SJ94-0232.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/kmh

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NR	Not Requested
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: IWM
Project: ARCO Facility No. 5387

Date Received: 02/23/94
Service Request No.: SJ94-0232
Sample Matrix: Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

Sample Name:		MW-1	MW-2	MW-3
Date Analyzed:		02/24/94	02/24/94	02/24/94
Analyte	**MRL**			
Benzene	0.5	130.	1,800.	160.
Toluene	0.5	12.	21.	<10. *
Ethylbenzene	0.5	54.	850.	36.
Total Xylenes	0.5	58.	540.	8.6
TPH as Gasoline	50	1,200.	15,000.	3,100.

Sample Name:		AR-1	AR-2	A-4
Date Analyzed:		02/24/94 **	02/24/94	02/24/94
Analyte	**MRL**			
Benzene	0.5	1,100.	2.9	ND
Toluene	0.5	<10. *	ND	ND
Ethylbenzene	0.5	140.	15.	28.
Total Xylenes	0.5	26.	0.8	0.9
TPH as Gasoline	50	4,700.	130.	320.

* Raised MRL due to high analyte concentration requiring sample dilution.
* This sample was part of the analytical batch started on February 24, 1994. However, it was analyzed after midnight so the actual date analyzed is February 25, 1994.

Approved by: Kathleen M Murphy Date: March 3, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	Date Received:	02/23/94
Project:	ARCO Facility No. 5387	Service Request No.:	SJ94-0232
		Sample Matrix:	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

Sample Name:		A-5	A-7	A-8
Date Analyzed:		02/24/94	02/24/94	02/24/94
Analyte	**MRL**			
Benzene	0.5	2.8	38.	ND
Toluene	0.5	ND	<1. *	ND
Ethylbenzene	0.5	13.	35.	ND
Total Xylenes	0.5	2.9	25.	ND
TPH as Gasoline	50	340.	1,300.	ND

Sample Name:		A-9	A-10	XDup
Date Analyzed:		02/24/94	02/24/94	02/24/94
Analyte	**MRL**			
Benzene	0.5	ND	ND	1,900.
Toluene	0.5	ND	ND	21.
Ethylbenzene	0.5	ND	ND	750.
Total Xylenes	0.5	ND	ND	480.
TPH as Gasoline	50	ND	52.	14,000.

* Raised MRL due to high analyte concentration requiring sample dilution.

Approved by: Keenan A Murphy Date: March 3, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	Date Received:	02/23/94
Project:	ARCO Facility No. 5387	Service Request No.:	SJ94-0232
		Sample Matrix:	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

	Sample Name:	Method Blank
	Date Analyzed:	02/24/94
Analyte	MRL	
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
TPH as Gasoline	50	ND

Approved by: _____ Date: March 3, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 5387

Date Received: 02/23/94
Service Request No.: SJ94-0232
Sample Matrix: Water

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery α,α,α-Trifluorotoluene
MW-1	02/24/94	98.
MW-2	02/24/94	99.
MW-3	02/24/94	89.
AR-1	02/24/94	97.
AR-2	02/24/94	89.
A-4	02/24/94	96.
A-5	02/24/94	98.
A-7	02/24/94	102.
A-8	02/24/94	87.
A-9	02/24/94	81.
A-10	02/24/94	88.
XDup	02/24/94	102.
A-8 (MS)	02/24/94	86.
A-8 (DMS)	02/24/94	84.
Method Blank	02/24/94	82.
	CAS Acceptance Criteria	62-112

Approved by: Kenneth Murphy Date: March 3, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 5387

Date Received: 02/23/94
Service Request No.: SJ94-0232

Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
µg/L (ppb)

Date Analyzed: 02/24/94

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	25.	25.7	103.	85-115
Toluene	25.	25.4	102.	85-115
Ethylbenzene	25.	25.0	100.	85-115
Total Xylenes	75.	75.8	101.	85-115
TPH as Gasoline	250.	247.	99.	90-110

Approved by: Kevin A Murphy Date: March 3, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 5387

Date Received: 02/23/94
Service Request No.: SJ94-0232
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline
EPA Methods 5030/California DHS LUFT Method
µg/L (ppb)

Sample Name: A-8
Date Analyzed: 02/24/94

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
TPH as Gasoline	250.	ND	285.	269.	114.	108.	67-121

Approved by: Kathy Murphy Date: March 3, 1994

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. IWM-94-SQC

Chain of Custody

ARCO Facility no. A.5387	City (Facility) SAN LORENZO	Project manager (Consultant) TOM DeJon	Laboratory name Columbia
ARCO engineer Kyle Christie	Telephone no. (ARCO)	Telephone no. (Consultant) 408/942 8955	Fax no. (Consultant) 408/942 1499
Consultant name IWM	Address (Consultant) 950 Ames Av. Milp Ca 95035		Contract number 07077

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☒ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	XDVP on HW-2
F.B.	1-2	2		✓		✓	✓	2-16-94	1320		✓	✓									
MW-1	3-4	2		✓		✓	✓	2-17-94	1335		✓	✓									
MW-2	5-8	4		✓		✓	✓		1346		✓	✓									✓
MW-3	9-10	2		✓		✓	✓		1321		✓	✓									
AR-1	11-12	2		✓		✓	✓		1122		✓	✓									
AR-2	13-14	2		✓		✓	✓		1010		✓	✓									
A-4	15-16	2		✓		✓	✓		1015		✓	✓									
A-5	17-18	2		✓		✓	✓		1115		✓	✓									
A-7	19-20	2		✓		✓	✓	2-16-94	1521		✓	✓									
A-8	21-22	2		✓		✓	✓	2-16-94	1349		✓	✓									
A-9	23-24	2		✓		✓	✓	2-16-94	1435		✓	✓									
A-10	25-26	2		✓		✓	✓	2-17-94	1137		✓	✓									

Special detection Limit/reporting

Special QA/QC

Remarks: Hold on F.B.

Lab number: SJ94-0232

Turnaround time

Priority Rush 1 Business Day	☐
Rush 2 Business Days	☐
Expedited 5 Business Days	☐
Standard 10 Business Days	☒

Condition of sample: OK		Temperature received: cool	
Relinquished by sampler: Vince Saldés	Date/Time: 2-23-94 1520	Received by:	Date/Time: 2-23-94 1520
Relinquished by	Date/Time	Received by	
Relinquished by	Date/Time	Received by laboratory	Date / Time

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)