SECOND QUARTER
REPORT OF FINDINGS
NOVEMBER 1990

ALAMEDA COUNTY ALCOPARK FACILITY
165 13TH STREET
OAKLAND, CALIFORNIA

Prepared For:

Mr. Terry Hunt
Alameda County General Services Agency
4400 MacArthur Boulevard
Oakland, California 94619

Prepared By:

Environmental Science & Engineering, Inc.
4090 J Nelson Avenue
Concord, California 94520

Project No. 6-90-5042

November 19, 1990

This report, including all related activities, was prepared and conducted by personnel of the Concord, California office of Environmental Science & Engineering, Inc., (ESE) under the direct supervision of Susan S. Wickham, Staff Hydrogeologist and Director of Geosciences (California Registered Geologist No. 3851) and Emilio Gonzalez, Jr., Staff Geologist (California Certified Engineering Geologist No. CEG-1543). We have performed the contracted professional services using that degree of care and skill ordinarily exercised under similar circumstances by other hydrogeologists and engineers practicing in this field. No other warranty, expressed or implied, is made as to the professional advice in this report.

Emilio Gonzalez

Emilio Gonzalez, Jr. (CEG-1543)
Staff Geologist

Date 11-19-90

Susan S. Wickham

Susan S. Wickham (RG 3851)
Staff Hydrogeologist
Director of Geosciences

Date Nov. 19, 1990

TABLE OF CONTENTS

Figures, Tables and Appendices follow text.

TABLE OF CONTENTS
(continued)

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1.0 EXECUTIVE SUMMARY

Environmental Science & Engineering, Inc. (ESE) conducted the second quarterly ground-water monitoring activities at the Alameda County ALCOPARK facility on October 25, 1990 (November 1990 sampling event). The ALCOPARK facility (site) is located at 165 13th Street in Oakland, Alameda County, California (Figures 1, 2). ESE calculated ground-water levels in the three monitoring wells at the site based on depth to ground water measured at each well. ESE observed no free product in any of the wells. ESE collected ground-water samples and submitted them for analyses of gasoline constituents.

Depth to ground water at the site averaged 21.07 feet for the November 1990 sampling event (Table 1). ESE contoured relative ground-water elevations, calculated from depth to water readings, to reveal a ground-water gradient oriented to the northeast at about 0.0024 feet per feet, or about a 0.1 foot drop in ground-water elevation across the site. (Figure 3). This ground-water gradient was the same as that calculated for the August 1990 sampling event (ESE, 1990b).

Concentrations of Total Petroleum Hydrocarbons (TPH) in ground water were 1.2 milligrams per liter (mg/L, or parts per million) in MW-1, 0.12 ug/L in MW-5 and non-detectable (ND) in MW-4. Concentrations for Benzene in ground water were 120 micrograms per liter (ug/L, or parts per billion) in MW-4, 14 ug/L in MW-5 and ND in MW-1. Concentrations for Toluene and Total Xylenes were 7.3 and 46 ug/L, respectively in MW-1, and 1.2 and 0.9 ug/L, respectively, in MW-4. All other results for purgeable aromatics gasoline constituents (Benzene, Ethylbenzene, Toluene and Total Xylenes, or BETX) were ND (Table 2).

Fuel constituents (TVH/TEH) concentrations in all wells were similar to those for the August 1990 sampling event (ESE, 1990b). Results for Benzene concentrations were non-detectable in MW-1 and elevated in MW-4 (120 ug/L) and MW-5 (14 ug/L), a near reversal of earlier results. Results for Ethylbenzene, Toluene and Total Xylenes show trace concentrations in MW-4, compared to ND in August 1990, and comparable levels or ND in MW-1 and MW-5, respectively.

Contour lines of Benzene concentration in ground water (Figure 4) are inferred to show a new plume centered on MW-4. The interpretation of a new Benzene constituent plume is opposite to all other constituent concentration distributions. ESE recommends re-sampling the on-site wells to verify the November 1990 results.

ESE collected a duplicate sample (MW-5-22) and an equipment rinsate sample (MW-4-21) in the field, and maintained a trip blank (Trip Blank) for the project quality assurance program. Analytical result for the duplicate sample shows good agreement with results for the original sample. The equipment rinsate sample showed concentrations of Toluene and Total Xylenes that are slightly above method detection limit. This may mean that the bailer decontamination procedure used was not effective in removing extremely low levels of the least volatile fuel constituents.

Comparison of ground-water elevations and fuel constituent concentrations shows no consistent trends connecting these two parameters. Ground water rose by 0.3 feet at the site since the August 1990 sampling event. This slight rise in water level was accompanied by no significant change in fuel (TPH) concentration in all wells, and an overall decrease in BETX concentration in MW-1.

Comments for the November 1990 sampling event concerning changes in the analytical laboratory, sample labeling and decontamination procedures are contained in additional Appendix C.

2.0 INTRODUCTION

This report is the second of four quarterly reports by Environmental Science & Engineering, Inc. (ESE) presenting the results of ground-water monitoring activities at the Alameda County ALCOPARK facility. The ALCOPARK facility (site) is located at 165 13th Street, Oakland, California (Figure 1). The site is an Alameda County fueling station located northwest of the ALCOPARK parking and vehicle maintenance structure operated by Alameda County at the corner of 13th and Jackson Streets, Oakland, California. The fueling station facilities layout, illustrated in Figure 2, consists a single pump island for dispensing leaded and unleaded gasoline, and two 10,000 gallon underground storage tanks.

This quarterly ground-water monitoring report contains a discussion of ESE's field activities and analytical results for ground-water samples collected on October 25, 1990 (November 1990 monitoring event). The results are illustrated as contour maps of relative ground-water elevations (Figure 3) and concentration of Benzene in ground water (Figure 4). The report also includes a discussion of trends in ground-water elevations versus concentrations of selected fuel constituents in ground water at the site (Table 3, Figure 5).

2.1 Background

Hunter/Gregg, Inc. (Hunter), now ESE, performed a Phase I Site Characterization for the site in March, 1989. Hunter assessed the lateral and vertical extent of petroleum hydrocarbon contamination in the on-site soil and ground water adjacent to the pump island. Hunter presented the results of Phase I Site Characterization in a report dated May 1989.

Alameda County General Services Agency (Alameda County GSA) authorized Hunter's Phase I site characterization to investigate the impact of a fuel leak on the site soil and ground water. The leak was discovered during a fuel line integrity test by Scott Company, January 1989. Soil samples analyzed for the initial investigation contained elevated levels of Total Petroleum Hydrocarbons (TPH), and of Benzene, Ethylbenzene, Toluene and Total Xylenes (BETX).

For the Phase I Site Characterization, Hunter drilled and sampled two soil borings, and drilled, sampled and installed three ground-water monitoring wells and two vapor monitoring wells. Soil and ground-water samples analyzed for that phase of investigation contained similarly elevated levels of hydrocarbon constituents. Soil and ground-water analysis results for the initial and subsequent site investigations are presented in Hunter's Phase I Site Characterization report (Hunter, 1989).

The current investigation consists of on-site ground-water monitoring activities, as required by the San Francisco Bay Area Regional Water Quality Control Board (Regional Board). For this phase, the site ground-water will be monitored, and ground-water samples analyzed for TPH , distinguished as Total Extractable Hydrocarbons (TEH, or diesel) and Total Volatile Hydrocarbons (TVH, or gasoline), and BETX for four consecutive quarters, in compliance with the Regional Board's (1989) recommendations for obtaining site closure.

2.2 Current Investigation

ESE's current on-site investigation consists of monitoring ground-water elevations and sampling ground water. For each sampling event, ESE will follow the instructions contained in the project Work Plan (ESE, 1990a), which includes ESE Standard Operations Procedures. Site activities consist of these tasks:

- Secure work site.

- Measure depth to ground water in each on-site well. Measure thickness of product, if present. Calculate well volume, calculate ground-water elevation. Record ground-water level survey elevation in field logs and forms.

- Purge each well by pumping or bailing. Temporarily store purged ground water in 55-gallon drums on site. The purged ground water will be properly disposed of by Alameda County GSA. While purging, measure ground-water temperature, pH and specific conductance, and observe ground-water color, odor, turbidity and the presence/absence of hydrocarbon product. Record ground-water quality measurements and observations in field logs and forms (Appendix A).

- Sample each well by bailing. Collect ground-water samples in containers provided by the analytical laboratory. Keep filled sample containers chilled in a cooler for transport to the analytical laboratory.

- Record final ground-water quality parameters and depth to ground water. Prepare Chain of Custody documents to accompany the samples to the analytical laboratory.

- Clean work site. Secure and label temporary ground-water storage drums.

- Submit ground-water samples through proper Chain of Custody protocol to the analytical laboratory.

ESE submitted ground-water samples to Curtis & Tompkins, Ltd., a California State-certified analytical laboratory. Curtis & Tompkins analyzed the ground-water samples as listed below.

Analytical Laboratory Schedule

Well Number	Analyses
MW-1	TVH (GC FID 5030), BETX (EPA Method 602)
MW-4*	TEH (GC FID 3510), BETX (EPA Method 8020)
MW-5	TVH, BETX (EPA Method 8020)

---

* MW-4 is the on-site upgradient well. According to information made available by Alameda County GSA, an underground diesel tank existed in a location upgradient from the site, most likely across Jackson Street. That tank was closed by cementing in place on March 1989 (Hunter, 1989). ESE analyzed the MW-4 ground-water sample for TEH (diesel) to establish background concentration and to test for the presence of that constituent in MW-4. ESE assumes that the analysis for BETX may be considered an adequate surrogate for the presence of gasoline in ground water.

ESE analyzed ground water from MW-1 and MW-5 for TVH (gasoline). ESE analyzed all ground-water samples for purgeable aromatics constituents of gasoline (BETX).

ESE used the data obtained each sampling event to construct contour maps of Benzene constituent concentrations. The Benzene results are amenable to contouring. Benzene is also a widely used indicator for establishing clean-up levels for ground water. Starting with the current (November 1990) sampling event, ESE has prepared trend analysis of ground-water analytical results versus ground-water elevation over time.

3.0 NOVEMBER 1990 SAMPLING EVENT

On October 25, 1990, ESE performed the second of four quarterly ground-water monitoring and sampling events. ESE obtained depth to water information, and purged and sampled three on-site monitoring wells. The objective of the ground-water level survey is to estimate the general direction of the ground-water flow at the site. An additional objective is to observe and record product thickness, if detected, for each well. The objective of the sampling program is to monitor the extent of hydrocarbon constituents in the on-site ground water, if present.

3.1 Ground-Water Elevations

Depth to ground water and relative ground-water elevations are presented in Table 1. ESE found no free product in ground water. However, a trace odors of hydrocarbon was detected in ground water from monitoring well MW-1 during purging of that well.

Relative ground-water elevations calculated from depth to water measurements are presented as contours in Figure 3. Depth to ground water on site ranges from 21.40 feet below ground surface (bgs) in MW-4 to 20.89 bgs (MW-1). Relative ground-water elevation contours reveal an overall ground-water gradient to the east, at about 0.0024 ft/ft. This gradient corresponds to a drop of about 0.1 foot in ground-water elevation across the site. The easterly ground-water gradient is the same as calculated for the August 1990 sampling event. Both gradients and flow directions are similar to those calculated for the Phase I Site Characterization (Hunter, 1989).

3.2 Ground-Water Sampling and Analysis

ESE collected ground-water samples from the three on-site wells. ESE submitted the four samples and additional validation samples (duplicate, equipment rinsate, trip blank) for analysis to Curtis & Tompkins on October 25, 1990. Analytical results are summarized in Table 2. The table lists results for TPH concentrations in milligrams per liter (mg/L) and BETX concentrations in micrograms per liter (ug/L). Results of sample analyses are presented in Appendix B: Analytical Results and Chain of Custody Documents

Concentrations of Benzene in ground water for the November 1990 sampling event are contoured in Figure 4. The interpretation presented in Figure 4 is based on the assumption that Benzene concentrations in ground water are uniformly distributed, from a high (120 ug/L) in well MW-4 to very low concentrations in MW-5 and MW-1 (14 ug/L and ND, respectively). This distribution may be modified by the northeasterly ground-water gradient.

3.3 Quality Assurance and Control

For the purpose of field quality assurance and control, ESE collected and submitted a duplicate ground-water sample, an equipment rinsate sample, and a trip blank. For the November 1990 sampling event, these validation samples were labeled as MW-5-22, MW-4-21, and Trip Blank, respectively. The equipment and duplicate samples, and the Trip Blank were preserved, handled, and analyzed in a manner identical to the other ground-water samples.

The purpose of the duplicate sample is to demonstrate the samplers' ability to collect a homogeneous sample. ESE collected the duplicate ground-water sample by pouring water collected in the sampling bailer into two sets of sample containers. The resulting aliquots

are not truly "duplicates", but rather sequential replicates of one sampling episode (one bailer of water from one well). ESE assumes that the water collected contains a uniform distribution of constituents that may be present in the sampler in order to compare the results as true duplicates.

The analytical results obtained for the ground-water and duplicate validation samples are:

Sample Number	TVH (mg/L)	Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Total Xylenes (ug/L)
MW-4-21 (Rinsate)	N/A	ND	ND	1.4	0.6
MW-5-22 (Duplicate)	0.11	13	ND	ND	ND
Trip Blank	N/A	ND	ND	ND	ND

The results of analysis of the ground-water and duplicate validation samples may be compared by using Relative Percent Difference (RPD) (Wolff and others, 1986). RPD is a measure of the similarity between two samples, defined as:

$$RPD = \frac{| D_1 - D_2 |}{(D_1 + D_2) / 2} \times 100, \text{ where}$$

D_1 = First sample result, and

D_2 = Second sample result.

RPD values of 10 percent or less typically indicate good agreement for ground-water samples. Larger RPD values indicate poorer agreement between duplicate results. RPDs are most useful for comparing large numbers of results, which may yield statistically significant trends. They are not as useful for limited sampling results, such as those presented here. RPDs for samples MW-5-21 and MW-5-22 for the five parameters analyzed are:

Constituent	**Relative Percent Difference**
TPH-gas	8.7
Benzene	7.4
Ethylbenzene	N/A
Toluene	N/A
Total Xylenes	N/A.

The equipment rinsate sample is intended to serve as a check on ESE's sampling equipment decontamination procedures. ESE obtained this validation sample by pouring reagent grade distilled deionized water, used for the final rinse in sample bailer decontamination, through the bailer and into appropriate sample containers. ESE collected the equipment rinsate validation sample (MW-4-21) before collecting any ground-water samples from the site. Analytical results for the equipment rinsate validation sample are:

Constituent	**Result**
TPH-gas	N/A
Benzene	ND
Ethylbenzene	ND
Toluene	1.4 (ug/L)
Total Xylenes	0.6 (ug/L).

The detected concentrations of Toluene and Total Xylenes are near the method detection limit (0.5 ug/L). The results may be due to inefficient bailer decontamination procedures as discussed in Section 4.0. ESE assumes that the very low concentrations of Toluene and Total Xylenes detected in ground-water sample MW-4-22 may be considered as much a function of inefficient decontamination of the sampling bailer as actual concentrations of those constituents in ground water.

3.4 Trend Analysis of Ground-Water Elevation and Analytical Data

Comparing trends in ground-water elevations versus hydrocarbon fuel constituent concentrations over time permits assessing the rate at which such concentrations decline or increase in ground water. Declines or increases in constituent concentration are part of a constituent plume fate and transport. This process includes migration, mixing, degradation and/or attenuation of constituents. Another aspect is the change in the ratio of constituent concentrations. Although all constituent concentrations may ideally decrease over time, the more volatile constituents (Benzene, Ethylbenzene) escape more quickly. The composition of a constituent plume thus becomes relatively enriched in the heavier, less volatile constituents (Toluene, Xylenes) when compared to the originally established ratio. This change in constituent plume concentration ratios is generally an indication of plume age.

Ground-water elevations are compared to constituent concentrations on Table 3. The table includes initial (march 1989) data taken from the Site Characterization Report (Hunter, 1989) and from the current investigation (August, November 1990).

In general, relative ground-water elevations for the three on-site wells have fluctuated only slightly (less than 0.2 feet) from March 1989 to November 1990. Trends in constituent concentrations are discussed below.

Total Petroleum Hydrocarbons (TPH). TPH concentrations in MW-1, non-detect (ND) for March 1989, has remained relatively constant since monitoring began (1.5 to 1.2 mg/L). TPH concentrations in MW-4 have been ND for the observation period. TPH concentration in MW-5 has shown a similar pattern to that in MW-1 (ND, 0.67, 0.12 mg/L).

Benzene. Benzene concentrations in MW-1 increased from the initial result of 21 ug/L by a factor of ten, to 200 ug/L in August 1990. The concentration for the November 1990 sampling event is ND. Benzene concentration in MW-4 shows no consistent trend or connection relative to ground-water elevation. Concentrations were 13 ug/L in March 1989, 0.8 ug/L in August 1990 and 120 ug/L in November 1990. Benzene concentration for MW-5 shows a similar pattern. Although ND in March 1989, concentrations in this well were 0.8 ug/L (August 1990) and 13 ug/L (November 1990), a similar ten-fold increase.

Ethylbenzene. Ethylbenzene concentrations in MW-1 show a trend opposed to that for Benzene concentrations. Initially 0.4 ug/L (March 1989), this constituent was ND in August 1990 and 2.2 ug/L in November 1990. The reversed trend compared to Benzene is curious, given the close affinity and chemical behavior of the two constituents. Ethylbenzene concentrations have been relatively unchanged for MW-4 (1.0 ug/L, ND, 1.1 ug/L) and MW-5 (ND, ND, ND).

Toluene, Total Xylenes. Concentrations for these two constituents in MW-1 are similar. Relatively low initial concentrations in March 1989 (3.9 and 4.5 ug/L, respectively) were followed by increases of a factor of ten in August 1990 (45, 53 ug/L, respectively) and subsequent reductions by a similar factor, to 7.3 and 4.6 ug/L, respectively. Concentration trends for these two constituents in MW-4 are relatively steady (1.4 ug/L, ND, 1.2 ug/L for Toluene; ND, ND, 0.9 ug/L for Total Xylenes). These two constituents have not been detected in MW-5 for the observation period.

4.0 DISCUSSION

4.1 Ground-Water Elevations

ESE used the depth to ground water data obtained for the November 1990 sampling event to produce a contour map of relative ground-water elevation (Figure 2). The contour map shows ground-water flow to the east, and a gradient of about 0.0024 ft/ft. This relatively flat gradient indicates ground-water flow toward the topographic low occupied by Lake Merritt (Figure 1). These results are similar to results obtained for the Phase I Site Characterization (Hunter, 1989) and for the August 1990 sampling event (ESE, 1990b).

4.2 Analytical Results

Benzene concentrations in on-site ground water (Table 2) are above the State of California action level for drinking water (5 ug/L) for wells MW-4 and MW-5. Unlike results of the August 1990 sampling event, Benzene concentration for ground water in MW-1 is ND. The drinking water action level is presented for reference only. Site ground water has not been characterized for beneficial use, and drinking water standards may not apply.

A decrease in Benzene concentration in MW-1 of the magnitude reported was not anticipated, given the concentrations of Benzene in ground water reported in March 1989 (21 ppb; Hunter, 1989) and the subsequent increase in August 1990 (220 ug/L). The anticipated Benzene contamination concentration in ground water at MW-1 (10 - 100 ug/L) is about one to two orders of magnitude (10 to 100 times) greater than results obtained for this sampling event.

The concentration of Benzene in ground water for MW-4 was not anticipated. Given the concentration reported for March 1989 (13 ppb; Hunter 1989) and the subsequent ND reported for August 1990, the concentration reported for November 1990 is at least three orders of magnitude (1,000 times) greater than expected for ground water in this, upgradient well.

Benzene concentration in MW-5 for November 1990 (14 ug/L) was about 10 times greater than the concentration reported for August 1990 (1.8 ug/L). Well MW-5 is located downgradient of the gasoline pump and dispenser piping (Figure 2). The well box lies adjacent to and down slope of the fuel pump islands. For the November 1990 sampling event the well protective box was found dry. The pavement nearby is stained from gasoline spills at the pumps but none of the stained area reached the sealed well protective cover. Therefore, it is unlikely that hydrocarbon constituents have been introduced into the well.

One interpretation of the Benzene concentration distribution is that a new constituent "plume" exists in the upgradient portion of the site, near MW-4 (Figure 4). An inferred new Benzene plume in this location is a departure from the conditions postulated in the August 1990 sampling event. If true, it suggests an off-site source to the west, across Jackson Street, in addition to a plume located near the documented former leak.

In our opinion, an off-site source is unlikely. Although an underground diesel tank existed upgradient from the site, it was closed by cementing in place in 1989 (Hunter, 1989). ESE has no documentation of a leak or suspected leak from the tank. In addition, constituent concentration distributions for Ethylbenzene, Toluene and Total Xylenes for this sampling event are opposite to the Benzene constituent concentration distribution.

No sample points exist either up- or downgradient of the site to test either hypothesis, or to more accurately characterize the ground-water. ESE therefore recommends that Alameda County GSA re-sample the wells to verify the November 1990 sample results.

4.3 Quality Assurance and Control

Samples MW-5-22 and MW-4-21 were the duplicate sample and equipment rinsate sample, respectively. Duplicate sample analysis results showed good agreement with results for the ground-water sample for TPH and Benzene. Results of Toluene and Total Xylenes analyses were ND for both the sample and duplicate. The RPD calculation result indicates that ESE's sampling procedure resulted in a generally homogeneous sample. It is important to note, however, that the results are not statistically significant, since they are based on only one sample.

The equipment rinsate sample was taken prior to all other samples. Analytical results for this sample showed concentrations of Toluene and Total Xylenes at or near the method detection limit (1.4 and 0.6 ug/L, respectively). Analytical results for the remaining parameters were non-detect. In ESE's opinion, the observed results do not significantly affect the validity of results for Toluene and Total Xylenes concentrations in MW-4. Please refer to Appendix C for additional comments on Quality Assurance and Control.

5.0 REFERENCES

California Regional Water Quality Control Board, 1989, Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks: Tri-Regional Recommendations. Prepared by Staff of San Francisco Bay Regional Water Quality Control Board; 2 June 1988 (Revised 9 November 1989).

Environmental Science & Engineering, Inc., 1990a, Work Plan, Quarterly Ground-Water Monitoring, Alameda County ALCOPARK Facility, 165 13th Street, Oakland, Alameda County, California. Prepared for Alameda County General Services Agency, Oakland, California; August 10, 1990.

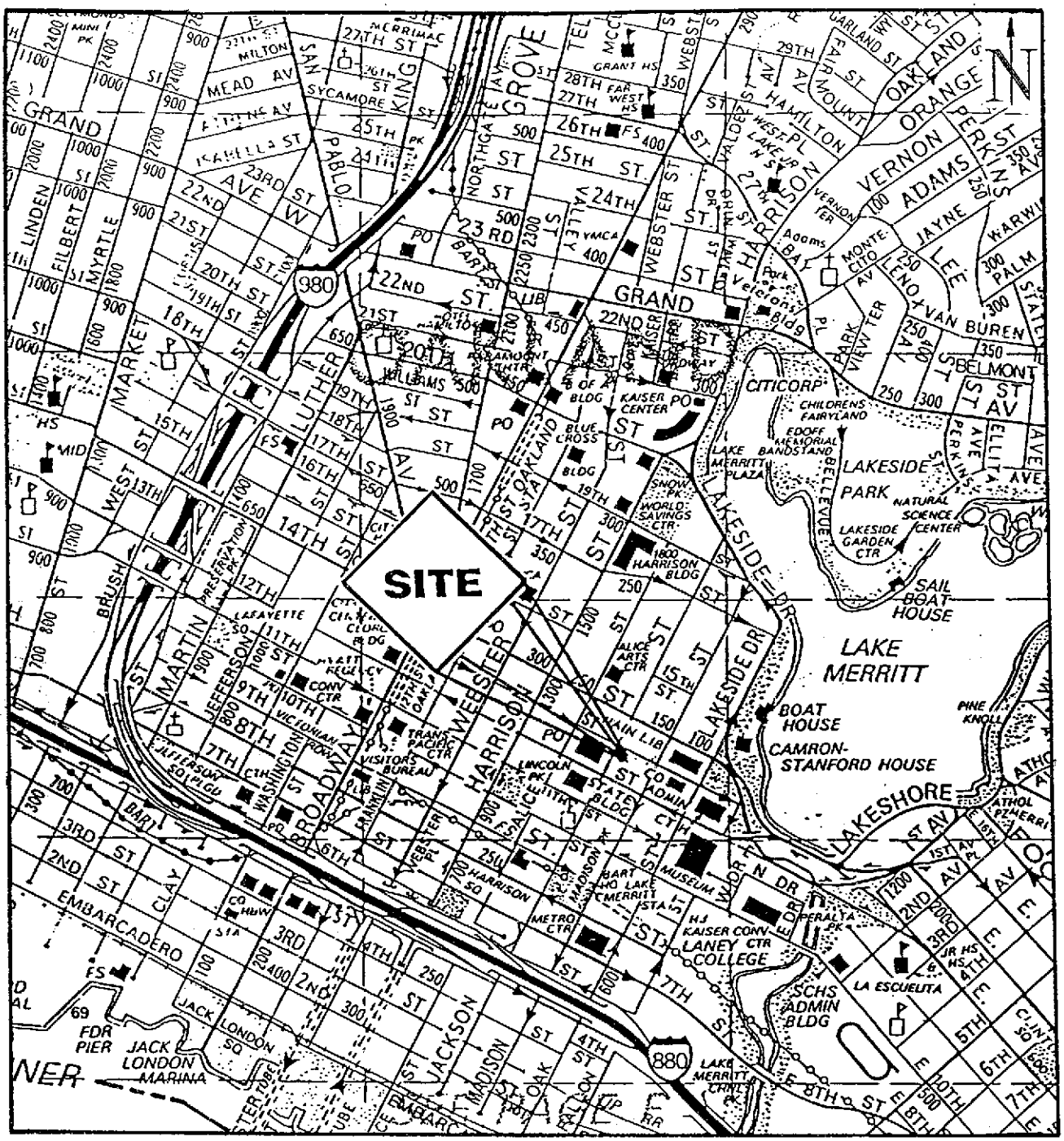
Environmental Science & Engineering, Inc, 1990b, First Quarter Report of Findings, August 1990, Alameda County ALCOPARK Facility, 165 13th Street, Oakland, California. Prepared for Alameda County General Services Agency, Oakland, California; August 27, 1990.

Environmental Science & Engineering, Inc., 1990c, Eastmont Mall Ground-Water Re-Sampling, September 1990, Eastmont Mall, Oakland, California. Prepared for Eastmont Mall, Inc., Oakland, California; October 15, 1990.

Hunter/Gregg, Inc., 1989, Phase I Site Characterization Report for Alameda County Alcopark Facility. Performed for Alameda County General Services Agency - Building Maintenance Department, Oakland, California; May 1989.

Wolff, J.S., M.T. Homsher, R.D. Flotard and J.G. Pearson, 1986, "Semi-Volatile Organic Analytical Methods Performance and Quality Control Considerations," in Perkert, C.L., editor, Quality Control in Remedial Site Investigation: Hazardous and Industrial Solid Waste Testing, Fifth Volume, ASTM STP 925; American Society for Testing and Materials; Philadelphia, PA.

FIGURES



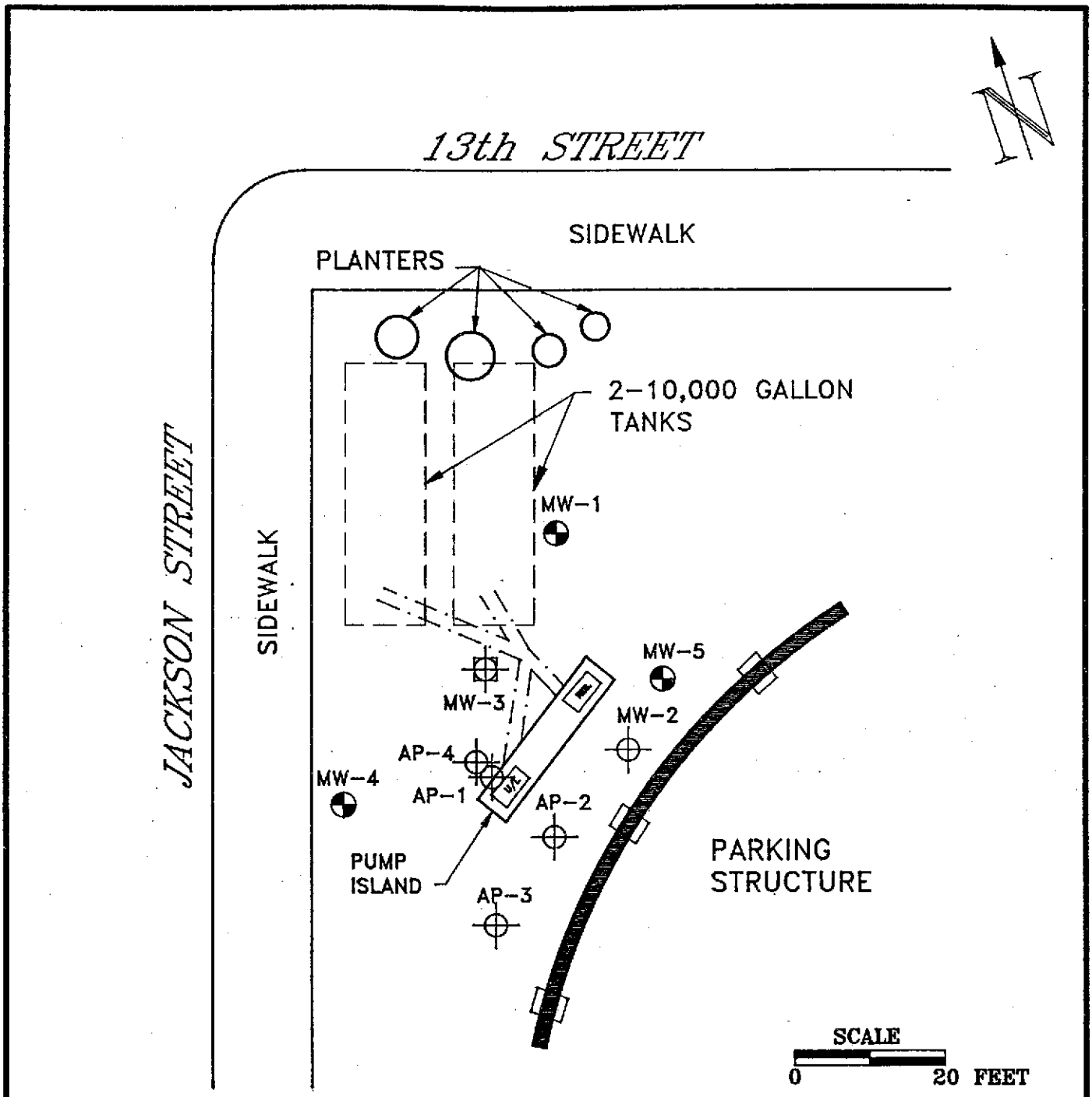
SCALE

0 1250 FEET

	Environmental Science & Engineering, Inc.
	ALAMEDA COUNTY ALCOPARK OAKLAND, CA
	FIGURE 1 LOCATION MAP

DRAWN BY	APPROVED BY	REVISED
CVS		

DATE	FILE NAME	PROJ. NO.
11/90	F1LM10	6-90-5042



LEGEND

- SOIL BORING
- GROUND–WATER MONITORING WELL
- VADOSE MONITORING WELL
- UNDERGROUND PIPING

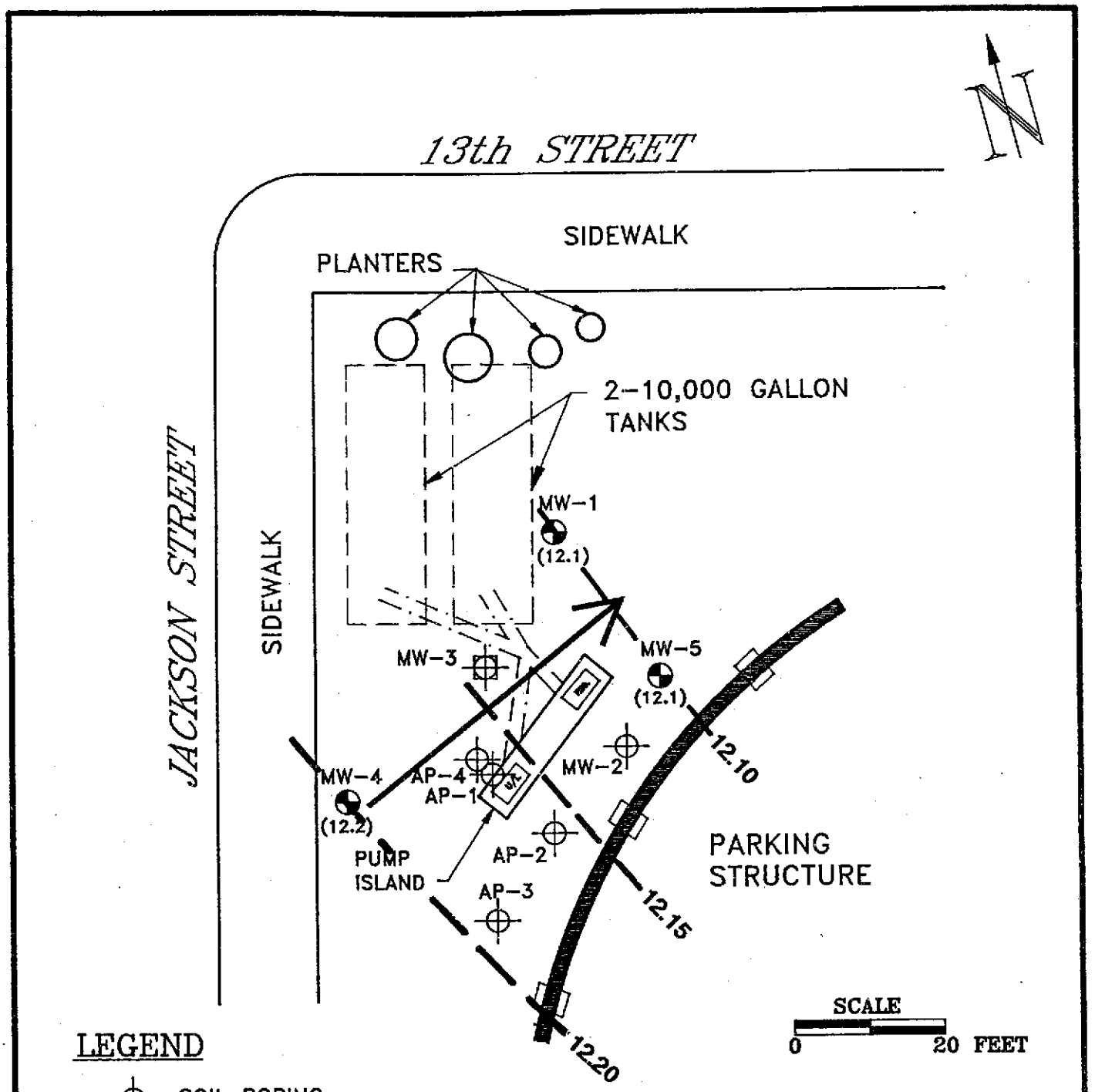
ESE A CILCORP COMPANY
Environmental Science & Engineering, Inc.

ALAMEDA COUNTY
ALCOPARK
OAKLAND, CA

FIGURE 2
SITE PLAN

DRAWN BY	APPROVED BY	REVISED
CVS		

DATE	FILE NAME	PROJ. NO.
11/90	F2SP10	6–90–5042



LEGEND

- SOIL BORING
- GROUND–WATER MONITORING WELL
- VADOSE MONITORING WELL
- UNDERGROUND PIPING
- (12.5) DEPTH TO GROUND WATER (ft)
- 12.20 GROUND–WATER CONTOUR (ft)
- APPROXIMATE GROUND–WATER FLOW DIRECTION

ESE A CILCORP COMPANY

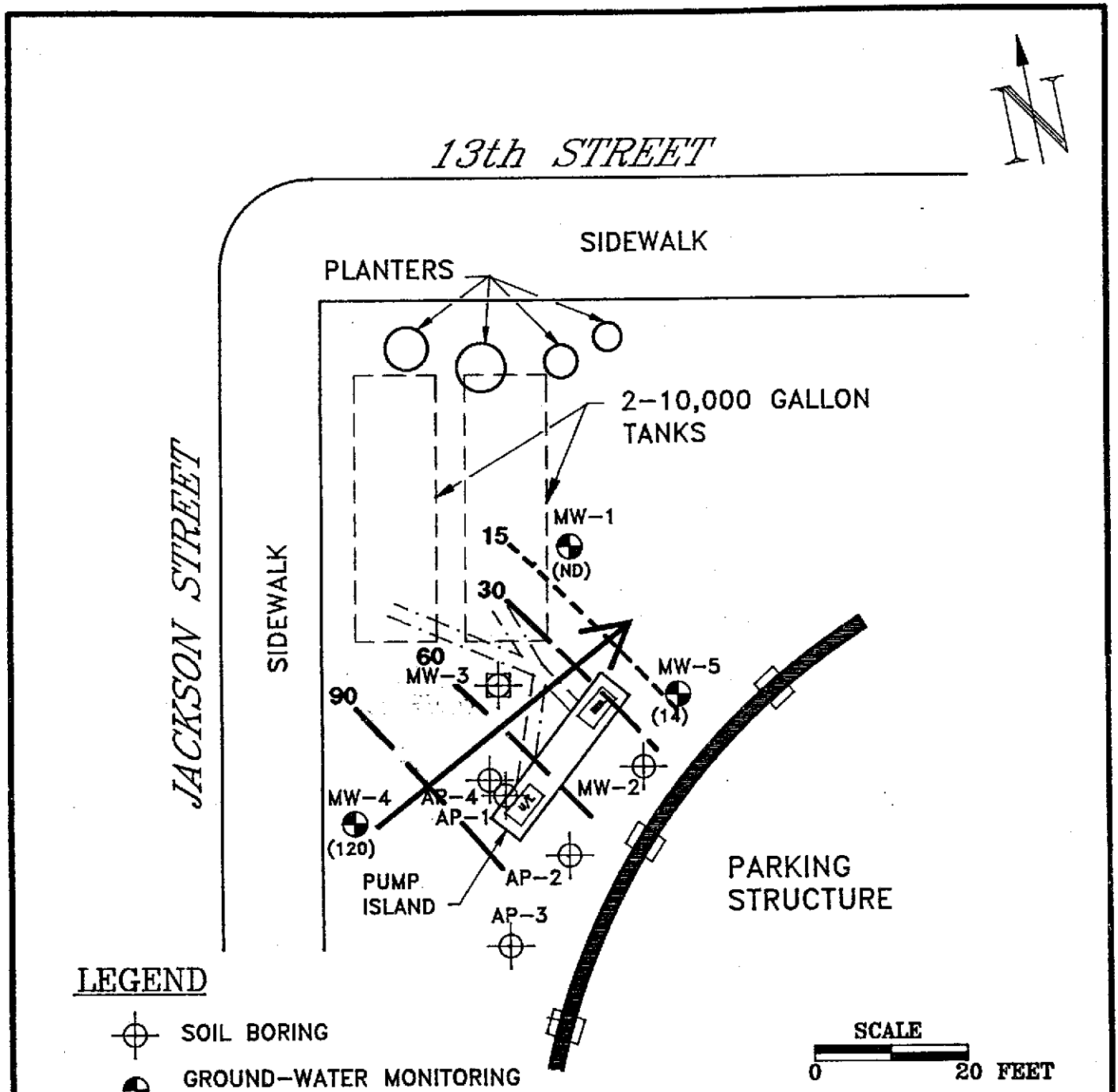
Environmental Science & Engineering, Inc.

ALAMEDA COUNTY
ALCOPARK
OAKLAND, CA

FIGURE 3
RELATIVE GROUND–WATER ELEVATIONS
NOVEMBER 1990

DRAWN BY	APPROVED BY	REVISED
CVS		

DATE	FILE NAME	PROJ. NO.
11/90	F3GWE10	6–90–5042



ESE A CALCORP COMPANY
Environmental Science & Engineering, Inc.

ALAMEDA COUNTY
ALCOPARK
OAKLAND, CA

FIGURE 4
BENZENE CONCENTRATIONS IN GROUND WATER
NOVEMBER 1990

DRAWN BY	APPROVED BY	REVISED
CVS		

DATE	FILE NAME	PROJ. NO.
11/90	F4BC10	6–90–5042

TABLES

TABLE 1

GROUND-WATER ELEVATIONS
for
ALAMEDA COUNTY, ALCOPARK - PROJECT NO. 6-90-5042

NOVEMBER 1990

Well Number [a]	Reference Elevation [b] (Feet)	Depth to Ground Water (Feet)	Ground-Water Elevation (Feet)
MW-1	33.00	20.89	12.1
MW-4	33.63	21.40	12.2
MW-5	33.01	20.91	12.1

Notes:

a. MW-2 and MW-3 are vadose zone wells, not monitored for ground water (see Figure 2).
b. Datum elevation: MW-1 Reference Point assigned elevation of 33.00 feet.

Depth to ground water measured by Environmental Science & Engineering, Inc., on October 25, 1990.

TABLE 2

ANALYTICAL RESULTS
for
ALAMEDA COUNTY, ALCOPARK - PROJECT NO. 6-90-5042

NOVEMBER 1990

Sample Number	TPH (mg/L) [a]	Benzene (ug/L)	Ethyl Benzene (ug/L)	Toluene (mg/L)	Total Xylenes (ug/L)
MW-1-21	1.2	ND	2.2	7.3	46
MW-4-21 [c]	--	ND	ND	1.4	0.6
MW-4-22	--	120	1.1	1.2	0.9
MW-4-23	ND	--	--	--	--
MW-5-21	0.12	14	ND	ND	ND
MW-5-22 [b]	0.11	13	ND	ND	ND
Trip Blank	--	ND	ND	ND	ND

Notes:

BETX Benzene, Ethyl Benzene, Toluene and Total Xylenes
TPH Total Petroleum Hydrocarbons
mg/L Milligrams per liter, or parts per million
ug/L Micrograms per liter, or parts per billion
ND Below detection limit (TPH = 0.05 mg/L, BETX = 0.05 ug/L)
-- Not analyzed for the constituent shown

a. TPH analyzed as gasoline (GC FID/5030) for MW-1 and MW-5, and as diesel (GC FID/3510) for MW-4.
b. Duplicate sample.
c. Equipment rinsate sample.

Samples collected by Environmental Science & Engineering, Inc., on October 25, 1990, and analyzed by Curtis & Tompkins, Ltd, Laboratories. Laboratory reports and chain of custody documents are included in Appendix B.

TABLE 3

GROUND-WATER TRENDS
for
ALAMEDA COUNTY, ALCOPARK - PROJECT NO. 6-90-5042

NOVEMBER 1990

Well MW-1

	March 1989[a]	August 1990	November 1990	February 1991	May 1991
Relative Ground-water Elevation (ft)	12.2	12.3	12.1		
TPH (mg/L)	ND	1.5	1.2		
Benzene (ug/L)	21	200	1.2		
E-benzene [b] (ug/L)	0.4	ND	2.2		
Toluene (ug/L)	3.9	45	7.3		
Xylenes [c] (ug/L)	4.5	53	46		

TABLE 3
(Continued)

Well MW-4

	March 1989[a]	August 1990	November 1990	February 1991	May 1991
Relative Ground-water Elevation (ft)	12.4	12.5	12.2		
TPH (mg/L)	ND	ND	ND		
Benzene (ug/L)	13	0.8	120		
E-benzene [b] (ug/L)	1.0	ND	1.1		
Toluene (ug/L)	1.4	ND	1.1		
Xylenes [c] (ug/L)	ND	ND	0.9		

Well MW-5

	March 1989[a]	August 1990	November 1990	February 1991	May 1991
Relative Ground-water Elevation (ft)	12.2	12.4	12.1		
TPH (mg/L)	ND	0.67	0.12		
Benzene (ug/L)	ND	0.8	13		
E-benzene [b] (ug/L)	ND	ND	ND		
Toluene (ug/L)	ND	ND	ND		
Xylenes [c] (ug/L)	ND	ND	ND		

TABLE 3
(Concluded)

Notes and Abbreviations

a Data for March 1989 taken from Site Characterization Report (Hunter, 1989).

b E-benzene = ethylbenzene

c Xylenes = Total Xylenes

ND Not detected at the laboratory reporting limit (TPH = 0.5 mg/L, BETX = 0.5 ug/L)

TPH TPH expressed as Total Volatile Hydrocarbons (TVH, or gasoline) for MW-1 and MW-5, Total Extractable Hydrocarbons (TEH, or diesel) for MW-4.

APPENDIX A

Water Sample Logs

WATER SAMPLE/WELL DEVELOPMENT LOG

SAMPLE NO.: MW-1-21
WELL NO.: MW-1
PROJECT NAME: Alameda County - Alco Park
PROJECT NO.: 6-90-5042
DATE: 10/25/90

Sample/Well Location: Directly adjacent to (2) 10,000 gallon underground storage tanks. (13th Street)

Weather Conditions: Cool, misty, sunny morning

Field Personnel: S. O'Hare / E. Gonzalez

Prepared by: S. O'Hare Reviewed by:

Time	Cumm Dschg (gallons)	~~pH~~/O_2	Temp (°C)	Spec. Conduct. (umhos/cm)	Color	Odor	Turbidity (NTU)	Remarks
10:40	8	2.7	18	574	clear	Faint Odor	Translucent	Trace Odor Hydrocarbons
10:43	16	2.8	18.5	568	clear	Faint Odor	Translucent	Trace Odor Hydrocarbons
10:46	25	3.0	18	572	clear	None	Translucent	Trace Odor Hydrocarbons
12:48	NA	3.8	18.5	495	clear	None	Translucent	Trace Odor_Post Sample Hydrocarbons

Reference Point (RP): Description: Top of well casing
RP Elevation (feet)/Datum: 33.0
Total Depth (TD, feet): 33.90
Depth to Water (DTW, feet): START 20.89 END 20.89
Water Level (WL, feet): Start 12.11
Water Column (TD-DTW, feet): (Δh) = 13.00
Casing Volume (gallons)*: NA
Well Volume (gallons)*: 13.40
Total Discharge (gallons): 28
Casing Volumes Removed: NA
Well Volumes Removed: 2.01
Flow Estimate (gallons per minute)**: 2.83
Method Used for Estimate**: 5 gallon pail

DEVELOPMENT

Time Start:
Time End:
Development Method(s) & Equipment:
Description of Surge Block or Pump:
Summary of Development Procedures***:

QUALITY ASSURANCE

Method Used to Measure Water Level: Solinist
Sampling Method(s):
Sample Time: 12:45
(Bailer) or Pump Line: New (Cleaned)
Method of Cleaning Bailer/Pump: DeIonized water, Methanol, DDD water
pH Meter No.: NA
Conductivity Meter No.: RP158
Other Instrument No.: O_2 Meter: F9003480
Calibration Date(s) and Results: O_2 Meter calibrated to sea level (10/25/90)
Number, Size of Sample Containers: 2 voa vials (40 ml, amber)
Method of Disposal of Discharged Water: Water stored in 55 gallon drum on site - (for future removal)

* See Notes and Calculations.
** Use Flow Estimate for Surface Water Samples only. Describe in Notes and Calculations.
*** Note Details of Well Development Procedures in Notes and Calculations.

ESE Environmental Science & Engineering, Inc.
A DILCORP Company

WATER SAMPLE/WELL DEVELOPMENT LOG

SAMPLE NO. MW-1-21 (TVH & BTEX) WELL NO. MW-1

PROJECT NAME: Alameda County - Alco Park

PROJECT NO. 6-90-5042 DATE 10/25/90

NOTES AND CALCULATIONS

CASING VOLUME/WELL VOLUME CALCULATIONS

Borehole Diameter (inches):
Height of Water Column or Borehole Annulus within Aquifer (feet):
Borehole Volume (gallons):
Height of Water Column in Casing (feet):
Casing Volume (gallons):
Well Volume (Borehole Volume - Casing Volume, gallons):
Number of Well/Casing Volumes to Remove (gallons):
Total Volume to Remove (gallons):

Well Volume = $\Delta h (3.43)(.3)$
$= (13.0)(3.43)(.3)$
$= 13.4$ gallons
2 Well Volumes = 26.8 gallons

10:18-10:30 - Set up at well. Shannon purges; Pancho takes notes and readings

10:38 - Purge well = 28 gallons

10:50 - Pull out pump + decon

Well MW-1 was pumped and sampled last due to suspect highest levels of contamination

Sample MW-1-21 was analyzed for TVH + BTEX. by Curtis + Tompkins lab. Samples were dropped of after site work complete.

Prepared by: Shannon J. O'Hare Reviewed by: [signature] Date: 10/26/90

ESE Environmental Science & Engineering, Inc.
A CILCORP Company

WATER SAMPLE/WELL DEVELOPMENT LOG

SAMPLE NO.: MW-4-21 / MW-4-22 / MW-4-23 WELL NO.: MW-4

PROJECT NAME: Alameda County - Alco Park

PROJECT NO.: 6-90-5042 DATE: 10/25/90

Sample/Well Location: Adjacent to sidewalk and Jackson Street

Weather Conditions: Cool, foggy morning mist & sunshine

Field Personnel: S. O'Hare / E. Gonzalez

Prepared by: Shannon O'Hare Reviewed by: Sund Gill

Time	Cumm Dschg (gallons)	pH (O_2)	Temp (°C)	Spec. Conduct. (umhos/cm)	Color	Odor	Turbidity (NTU)	Remarks
9:20	5	6.2	15	588	Yellow Brown	None	High	Silty Sand
9:23	10	6.0	19	594	Yellow Brown	None	High	Silty Sand
9:27	15	5.0	19	583	Yellow Brown	None	High	Silty Sand
9:28	21	5.0	19	591	Yellow Brown	None	High	Silty Sand
12:27	NA	4.4	19	557	—	—	—	Post Sample

Reference Point (RP) Description: Top of well casing

RP Elevation (feet)/Datum: 33.63

Total Depth (TD, feet): 35.35

Depth to Water (DTW, feet) START: 21.40 END: 21.40

Water Level (WL, feet) Start: 12.23

Water Column (TD-DTW, feet) (Δh) = 13.95

Casing Volume (gallons)*: NA

Well Volume (gallons)*: 10.3

Total Discharge (gallons): 21

Casing Volumes Removed: NA

Well Volumes Removed: 2.04

Flow Estimate (gallons per minute)**: 2

Method Used for Estimate**: 5 gallon pail

QUALITY ASSURANCE

Method Used to Measure Water Level: Well Sounder

Sampling Method(s):

Sample Time: 12:20 / 12:25 / 12:27

Bailer or Pump Line: New (Cleaned)

Method of Cleaning Bailer/Pump: Deionized water, Methanol, DDD water

pH Meter No.: NA

Conductivity Meter No.: RP158

Other Instrument No.: O_2 Meter: F9003480

Calibration Date(s) and Results: O_2 meter calibrated to sea level (10/25/90)

Number, Size of Sample Containers: 4 x 40 voas ; 1 amber jar

Rinsate (MW-4-21) ; Groundwater (MW-4-22, -23)

Method of Disposal of Discharged Water: Emptied into 55 gallon steel drum (for future disposal)

DEVELOPMENT

Time Start: Time End:

Development Method(s) & Equipment:

Description of Surge Block or Pump:

Summary of Development Procedures***:

* See Notes and Calculations.

** Use Flow Estimate for Surface Water Samples only. Describe in Notes and Calculations.

*** Note Details of Well Development Procedures in Notes and Calculations.

ESE Environmental Science & Engineering, Inc.

A CRLCORP Company

WATER SAMPLE/WELL DEVELOPMENT LOG

SAMPLE NO.: MW-4-21 / MW-4-22 / MW-4-23 — WELL NO.: MW-4

PROJECT NAME: Alameda County - Alco Park

PROJECT NO.: 6-90-5042 — DATE: 10/25/90

NOTES AND CALCULATIONS

CASING VOLUME/WELL VOLUME CALCULATIONS

Borehole Diameter (inches):
Height of Water Column or Borehole Annulus within Aquifer (feet):
Borehole Volume (gallons):
Height of Water Column in Casing (feet):
Casing Volume (gallons):
Well Volume (Borehole Volume - Casing Volume, gallons):
Number of Well/Casing Volumes to Remove (gallons):
Total Volume to Remove (gallons):

Well volume = $\Delta h(2.43)(.3) = 10.3$

$= (13.95)(2.43)(.3)$

$= 10.3$ gallons

2 Well Volumes = 20.6 gallons

8:55 Set up pump. Pancho purges well. Shannon - notes

9:18 - Begin pumping well, to take O2/temp/cond. readings every 5 gallons.

9:29 - Finished purging well. 20 gallons

9:35 - Taking apart hand pump for decon. w/alconox and deIonized water rinse

9:50 - Handpump set up at MW-5

- Sample MW-4-21 was the bailer rinseate and it was analyzed for BTEX only
- Sample MW-4-22 was groundwater, analyzed for BTEX
- Sample MW-4-23 was groundwater, analyzed for TEH (diesel)

Prepared by: Shannon J. Date: 10/26/90 — Reviewed by: [signature]

ESE Environmental Science & Engineering, Inc.
A CILCORP Company

WATER SAMPLE/WELL DEVELOPMENT LOG

SAMPLE NO.: MW-5-21 / MW-5-22 | WELL NO.: MW-5

PROJECT NAME: Alameda County - Alco Park | PROJECT NO.: 6-90-5042 | DATE: 10/25/90

Sample/Well Location: East of Pump Island; Adjacent to curb of parking garage

Weather Conditions: Cool morning mist; sunny

Field Personnel: S. O'Hare / E. Gonzalez

Prepared by: Shannon O'Hare | Reviewed by:

Time	Cumm Dschg (gallons)	pH/O_2	Temp (°C)	Spec. Conduct. (umhos/cm)	Color	Odor	Turbidity (NTU)	Remarks
10:06	10	2.4	18	530	Clear	None	Translucent	
10:09	20	2.8	19	541	Clear	None	Translucent	
10:13	30	2.6	19	544	Clear	None	Translucent	
10:15	35	3.2	18.5	545	Clear	None	Translucent	
12:40	NA	4.8	18.5	457*	–	–	–	Post-Sampling

Reference Point (RP): Description: Top of well casing | RP Elevation (feet)/Datum: 33.01

Total Depth (TD, feet): 34.80 | Depth to Water (DTW, feet): START 20.91 END 20.91 | Water Level (WL, feet): Start 12.10

Water Column (TD-DTW, feet): (Δh) = 13.90 | Casing Volume (gallons)*: NA | Well Volume (gallons)*: 16.3

Total Discharge (gallons): 35 | Casing Volumes Removed: NA | Well Volumes Removed:

Flow Estimate (gallons per minute)**: | Method Used for Estimate**: 5 gallon pail

QUALITY ASSURANCE

Method Used to Measure Water Level: Solinst

Sampling Method(s): | Sample Time: 12:36 / 12:37

Bailer or Pump Line: (Bailer) (New) (Cleaned) | Method of Cleaning Bailer/Pump: Deionized water, Methanol, DDD water

pH Meter No.: NA | Conductivity Meter No.: RP158 | Other Instrument No.: O_2 meter: F9003480

Calibration Date(s) and Results: O_2 meter calibrated to sea level (10/25/90) Conductivity Meter - NA

Number, Size of Sample Containers: 4 voa vials (Groundwater, duplicate)

Method of Disposal of Discharged Water: Poured into 55 gallon steel drum for storage (for future removal)

DEVELOPMENT

Time Start: | Time End:

Development Method(s) & Equipment:

Description of Surge Block or Pump:

Summary of Development Procedures***:

* See Notes and Calculations.
** Use Flow Estimate for Surface Water Samples only. Describe in Notes and Calculations.
*** Note Details of Well Development Procedures in Notes and Calculations.

ESE A CALCORP Company
Environmental Science & Engineering, Inc.

WATER SAMPLE/WELL DEVELOPMENT LOG

SAMPLE NO. MW-5-21 / MW-5-22

WELL NO. MW-5

PROJECT NAME: Alameda County - Alco Park

PROJECT NO. 6-90-5042

DATE 10/25/90

NOTES AND CALCULATIONS

CASING VOLUME/WELL VOLUME CALCULATIONS

Borehole Diameter (inches):
Height of Water Column or Borehole Annulus within Aquifer (feet):
Borehole Volume (gallons):
Height of Water Column in Casing (feet):
Casing Volume (gallons):
Well Volume (Borehole Volume - Casing Volume, gallons):
Number of Well/Casing Volumes to Remove (gallons):
Total Volume to Remove (gallons):

Well volume = $\Delta h (3.92)(.3)$

$= (13.9)(3.92)(.3)$ 2 well volumes = 32.6 gallons

$= 16.3$ gallons

9:50 Set up at well; Shannon purges well, Pancho takes readings

10:00 - Purge well = 35 gallons total

10:16 - Pull out pump and decon. Set up pump at MW-1

Sample MW-5-21 was groundwater, and sample MW-5-22 was a duplicate; both run for TVH/BTEX.

Prepared by: Shannon O'Hare Reviewed by: [signature] Date: 10/26/90

ESE Environmental Science & Engineering, Inc.
A CILCORP Company

APPENDIX B

Analytical Results

Chain of Custody Documents

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 10/25/90
DATE REPORTED: 11/05/90

LAB NUMBER: 102068

CLIENT: ENVIRONMENTAL SCIENCE & ENGINEERING

REPORT ON: 7 WATER SAMPLES

PROJECT #: 6-90-5042
LOCATION: ALAMEDA-ALCO PARK

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102068
CLIENT: ENVIRONMENTAL SCIENCE & ENGINEERING
JOB NUMBER: 6-90-5042
JOB LOCATION: ALAMEDA-ALCO PARK

DATE RECEIVED: 10/25/90
DATE ANALYZED: 10/29/90
DATE REPORTED: 11/05/90

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
102068-1	MW-1-21	1,200	ND(0.5)	7.3	2.2	46
102068-5	MW-5-21	120	14	ND(0.5)	ND(0.5)	ND(0.5)
102068-6	MW-5-22	110	13	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	103

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102068
CLIENT: ENVIRONMENTAL SCIENCE & ENGINEERING
JOB NUMBER: 6-90-5042
JOB LOCATION: ALAMEDA-ALCO PARK

DATE RECEIVED: 10/25/90
DATE ANALYZED: 10/29/90
DATE REPORTED: 11/05/90

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	TOTAL XYLENES (ug/L)	ETHYL BENZENE (ug/L)	REPORTING LIMIT * (ug/L)
102068-2	MW-4-21	ND	1.4	0.6	ND	0.5
102068-3	MW-4-22	120	1.2	0.9	1.1	0.5
102068-7	TRIP BLANK	ND	ND	ND	ND	0.5

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	103

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102068
CLIENT: ENVIRONMENTAL SCIENCE & ENGINEERING
JOB #: 6-90-5042
LOCATION: ALAMEDA-ALCO PARK

DATE RECEIVED: 10/25/90
DATE EXTRACTED: 11/01/90
DATE ANALYZED: 11/05/90
DATE REPORTED: 11/05/90

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT (ug/L)
102068-4	MW-4-23	ND	ND	50

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	7
RECOVERY, %	106

CHAIN OF CUSTODY RECORD

DATE 10/25/90 PAGE 1 OF 1

PROJECT NAME ALAMEDA - ALCO PARK

ADDRESS 597 Center Avenue
Martinez, CA 94553

PROJECT NO. 6-90-5042

SAMPLED BY S. O'Hare / E. Gonzalez

LAB NAME Curtis & Tompkins

ESE Environmental Science & Engineering, Inc.
A CILCORP Company
597 Center Avenue
Suite 350
Martinez, CA 94553
(415) 372-3637
Fax (415) 372-3790

SAMPLE #	DATE	TIME	LOCATION	TVH/BTEX	BTEX	TEH (diesel)	MATRIX	NUMBER OF CONTAINERS	REMARKS (CONTAINER, SIZE, ETC.)
MW-1-21	10/25/90	12:45	—	X			water	2	
MW-4-21	10/25/90	12:20	—		X			2	Please call Pancho
MW-4-22		12:25	—		X			2	or Shannon at (415)372-3637
MW-4-23		12:27	—			X		1	for questions
MW-5-21		12:36	—	X				2	
MW-5-22		12:37	—	X				2	Standard 5 day TAT
Trip Blank		NA	—	X	X			2	
									Sample bottles kept cool

ANALYSES TO BE PERFORMED

RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	date	time
1.			
2.			
3.			
4.			
5.			

13 TOTAL NUMBER OF CONTAINERS

REPORT RESULTS TO:

SPECIAL SHIPMENT REQUIREMENTS

SAMPLE RECEIPT

CHAIN OF CUSTODY SEALS	
REC'D GOOD CONDTN/COLD	
CONFORMS TO RECORD	

INSTRUCTIONS TO LABORATORY (handling, analyses, storage, etc.):

Please include QA/QC report with results.

APPENDIX C

Additional Comments for the November 1990 Sampling Event

Additional Comments for the November 1990 Sampling Event

Please note the following project changes, effective for the November 1990 sampling event.

New Analytical Laboratory

ESE submitted samples to Curtis and Tompkins, a California-certified analytical laboratory. Curtis & Tompkins provides faster turnaround time in sample analysis than the previously used laboratory at comparable cost. The Curtis & Tompkins laboratory is located near the site. ESE can take samples directly tot he laboratory, minimizing handling and, thereby potential for contamination.

Revised Sample Numbers

ESE revised sample numeration for the project. The new sample numbers include an additional prefix (underlined in the example) to indicate the calendar quarter for the sampling event. For example, revised sample numbers for MW-1 are as follows:

Sample Number	Sample Date or Quarter
MW-1-11	First quarter
MW-1-21	Second quarter
MW-1-31	Third quarter, first sample
MW-1-32	Third quarter, additional sample
MW-1-41	Fourth quarter.

A revised Table 2 for the August 1990 sampling event is enclosed for Alameda County General Services Agency. Additional copies of the table are provided for inserting in the First Quarterly Monitoring Report (ESE, 1990b).

New Project Number

ESE's project number has been changed to 6-90-5042.

Quality Assurance/Quality Control

Analytical results for the November 1990 sampling event show detectable concentrations of Toluene and Total Xylenes in the Rinsate sample. There are four possible interpretations for this result:

- The reagent grade distilled water and methanol used for the equipment rinsate contained trace levels of Toluene and Xylenes.
- The sample bailer material reacted with the reagent grade methanol used for decontamination.
- The laboratory is unable to measure constituents near the detection level.
- ESE's decontamination procedures were ineffective in removing hydrocarbon constituents at very low levels.

The first three possibilities are unlikely:

- The sampling bailer is made of clear polyethylene plastic with teflon top and bottom. These material do not normally react with methanol.
- Reagent grade water and methanol are labeled with results of chemical analyses for impurities. A check of the labels for the bottles used in this sampling event reveal no hydrocarbon constituents at the reported levels.
- Curtis & Tompkins is a California certified analytical laboratory. ESE assumes that their laboratory analyses and procedures are valid. A telephone call to the laboratory revealed no unusual circumstances connected with analysis of the samples submitted.

The sampling bailer used had been decontaminated at the end of the previous project, wrapped in aluminum foil and plastic, and stored at the ESE office. Water samples from the previous project potentially contained fuel constituents being monitored at the ALCOPARK site. It is possible that Toluene and Xylenes molecules, the largest, least volatile of the fuel constituents monitored had been trapped in microscopic pits and scratches in the sampling bailer material. However, results for BETX analyses for the last sample taken at that project with the bailer were all ND (ESE, 1990c).

It is also possible that some of the constituents were introduced by handling the bailer. This, too, is discounted, since the rinsate sample is collected using (presumed) sterilized latex gloves and allowing the reagent grade water collected for the sample to flow over the gloves and into the sample bailer.

ESE will modify sampling and decontamination protocol for subsequent sampling events as described below.

- We will continue to purge and sample on-site wells from anticipated least to most concentrated with hydrocarbon constituents. Despite results of the November 1990 sampling event, ESE assumes that MW-1 is the most contaminated on-site well. Therefore, we will continue to purge and sample the on-site wells in this order: MW-4 (upgradient), MW-5 (downgradient), MW-1 (downgradient).

- Dispose of decontamination water for purging equipment (hand pump) before decontaminating the sampling bailer. Double rinse the decontamination containers with potable water, followed by a deionized water rinse, before using them for decontaminating the sampling bailer. This procedure remains unchanged.

- Use reagent grade deionized water and reagent grade methanol for decontaminating the sampling bailer. Reagent grade materials are labeled with results of chemical analysis for impurities. This labeling should provide a check on potential constituents that may be introduced into validation samples. This procedure was put into effect with the November 1990 sampling event.

- Use a new, decontaminated, disposable bailer to obtain the TVH and BETX samples at each well. Such bailers are made of very light weight plastic and are ideal for sampling the volatile constituents, such as TVH and BETX, found near the water surface. Continue to use the present bailer to obtain TEH (diesel) samples.

- ESE will decontaminate the re-usable sampling bailer prior to sampling on-site ground water, whether it has been cleaned previously or not. This double decontamination is a prudent step to take in order to minimize compromising the quality of future samples.

TABLE 2

ANALYTICAL RESULTS
for
ALAMEDA COUNTY, ALCOPARK - PROJECT NO. 02-276-015

AUGUST 1990

Sample Number	TPH (mg/L) [a]	Benzene (ug/L)	Ethyl Benzene (ug/L)	Toluene (mg/L)	Total Xylenes (ug/L)
MW-1-11	1.4	220	ND	51	61
MW-1-12 [b]	1.5	200	ND	45	53
MW-4-11	ND	-	-	-	-
MW-4-12	-	0.8	ND	ND	ND
MW-5-11 [c]	ND	0.8	ND	ND	ND
MW-5-12	0.67	1.8	ND	1.1	ND

Notes:

BETX Benzene, Ethyl Benzene, Toluene and Total Xylenes
TPH Total Petroleum Hydrocarbons
mg/L Milligrams per liter, or parts per million
ug/L Micrograms per liter, or parts per billion
ND Below detection limit

Detection Limits: TPH = 0.05 mg/L BETX = 0.05 ug/L

a. TPH analyzed as gasoline (Method GC FID/5030) for MW-1 and MW-5, and as diesel (Method GC FID/3510) for MW-4.
b. Duplicate sample.
c. Equipment rinsate sample.

Samples collected by Environmental Science & Engineering, Inc., on July 27, 1990, and analyzed by NET Pacific Laboratories. Laboratory reports and chain of custody documents are included in Appendix C.

F:\PROJ..\5042\UPDATED.TBL

TABLE 2

ANALYTICAL RESULTS
for
ALAMEDA COUNTY, ALCOPARK - PROJECT NO. 02-276-015

AUGUST 1990

Sample Number	TPH (mg/L) [a]	Benzene (ug/L)	Ethyl Benzene (ug/L)	Toluene (mg/L)	Total Xylenes (ug/L)
MW-1-11	1.4	220	ND	51	61
MW-1-12 [b]	1.5	200	ND	45	53
MW-4-11	ND	-	-	-	-
MW-4-12	-	0.8	ND	ND	ND
MW-5-11 [c]	ND	0.8	ND	ND	ND
MW-5-12	0.67	1.8	ND	1.1	ND

Notes:

BETX Benzene, Ethyl Benzene, Toluene and Total Xylenes
TPH Total Petroleum Hydrocarbons
mg/L Milligrams per liter, or parts per million
ug/L Micrograms per liter, or parts per billion
ND Below detection limit

Detection Limits: TPH = 0.05 mg/L BETX = 0.05 ug/L

a. TPH analyzed as gasoline (Method GC FID/5030) for MW-1 and MW-5, and as diesel (Method GC FID/3510) for MW-4.
b. Duplicate sample.
c. Equipment rinsate sample.

Samples collected by Environmental Science & Engineering, Inc., on July 27, 1990, and analyzed by NET Pacific Laboratories. Laboratory reports and chain of custody documents are included in Appendix C.

F:\PROJ..\5042\UPDATED.TBL

TABLE 2

ANALYTICAL RESULTS
for
ALAMEDA COUNTY, ALCOPARK - PROJECT NO. 02-276-015

AUGUST 1990

Sample Number	TPH (mg/L) [a]	Benzene (ug/L)	Ethyl Benzene (ug/L)	Toluene (mg/L)	Total Xylenes (ug/L)
MW-1-11	1.4	220	ND	51	61
MW-1-12 [b]	1.5	200	ND	45	53
MW-4-11	ND	-	-	-	-
MW-4-12	-	0.8	ND	ND	ND
MW-5-11 [c]	ND	0.8	ND	ND	ND
MW-5-12	0.67	1.8	ND	1.1	ND

Notes:

BETX Benzene, Ethyl Benzene, Toluene and Total Xylenes
TPH Total Petroleum Hydrocarbons
mg/L Milligrams per liter, or parts per million
ug/L Micrograms per liter, or parts per billion
ND Below detection limit

Detection Limits: TPH = 0.05 mg/L BETX = 0.05 ug/L

a. TPH analyzed as gasoline (Method GC FID/5030) for MW-1 and MW-5, and as diesel (Method GC FID/3510) for MW-4.
b. Duplicate sample.
c. Equipment rinsate sample.

Samples collected by Environmental Science & Engineering, Inc., on July 27, 1990, and analyzed by NET Pacific Laboratories. Laboratory reports and chain of custody documents are included in Appendix C.

F:\PROJ..\5042\UPDATED.TBL

TABLE 2

ANALYTICAL RESULTS
for
ALAMEDA COUNTY, ALCOPARK - PROJECT NO. 02-276-015

AUGUST 1990

Sample Number	TPH (mg/L) [a]	Benzene (ug/L)	Ethyl Benzene (ug/L)	Toluene (mg/L)	Total Xylenes (ug/L)
MW-1-11	1.4	220	ND	51	61
MW-1-12 [b]	1.5	200	ND	45	53
MW-4-11	ND	-	-	-	-
MW-4-12	-	0.8	ND	ND	ND
MW-5-11 [c]	ND	0.8	ND	ND	ND
MW-5-12	0.67	1.8	ND	1.1	ND

Notes:

BETX Benzene, Ethyl Benzene, Toluene and Total Xylenes
TPH Total Petroleum Hydrocarbons
mg/L Milligrams per liter, or parts per million
ug/L Micrograms per liter, or parts per billion
ND Below detection limit

Detection Limits: TPH = 0.05 mg/L BETX = 0.05 ug/L

a. TPH analyzed as gasoline (Method GC FID/5030) for MW-1 and MW-5, and as diesel (Method GC FID/3510) for MW-4.
b. Duplicate sample.
c. Equipment rinsate sample.

Samples collected by Environmental Science & Engineering, Inc., on July 27, 1990, and analyzed by NET Pacific Laboratories. Laboratory reports and chain of custody documents are included in Appendix C.

F:\PROJ..\5042\UPDATED.TBL