Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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REPORT
LIMITED SUBSURFACE ENVIRONMENTAL INVESTIGATION
at
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

3/27/91

AGS Job 18039-3

Report prepared for

ARCO Products Company
2000 Alameda de las Pulgas
San Mateo, California

by
Applied GeoSystems

for Clark A. Robertson
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March 27, 1991

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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March 27, 1991
AGS 18039-3

Mr. Kyle Christie
ARCO Products Company
P. O. Box 5811
2000 Alameda de las Pulgas
San Mateo, California 94002

Subject: Executive Summary of Limited Subsurface Environmental Investigation at ARCO Station No. 374, 6407 Telegraph Avenue, Oakland, California.

Mr. Christie:

At the request of ARCO Products Company (ARCO), Applied GeoSystems (AGS) performed a limited subsurface environmental investigation to evaluate for the presence of hydrocarbons in soil and ground water at ARCO Station No. 374, Oakland, California. The scope of work included conducting a records search for wells within one mile of the site, researching public records for environmental concerns in the site area, installing four ground-water monitoring wells, collecting and analyzing soil and water samples, and evaluating the ground-water flow direction and gradient.

Four underground storage tanks (USTs) were removed from the southwestern part of the site in 1988. Soil samples collected from the tank pit excavations and from four soil borings drilled in the vicinity of the USTs showed hydrocarbons had impacted the site. Product was detected in one of the boreholes. New USTs were installed in the northeastern part of the site.

During this phase of the investigation, wells MW-1, MW-2, and MW-4 were installed onsite north, east, and west, respectively, of the former USTs, and well MW-3 was installed offsite in the downgradient direction from the USTs. Data from the borings indicate that the shallow soils underlying the site consist of continuous layers of silty and sandy clay with local discontinuous lenses of sandy or silty gravel. Static water level in the wells was about 8 feet below the ground surface.

Analytical testing showed hydrocarbons in the subsurface. Soil samples collected during drilling of the four borings contained concentrations of total petroleum hydrocarbons as gasoline (TPHg) that ranged from less than 2 to 560 parts per million (ppm). TPHg concentrations above 100 ppm were found in the boring for well MW-4 at depths of 8.5 to 13.5 feet. Laboratory analysis of ground-water samples collected from the wells showed concentrations of TPHg ranging from less than 0.02 (MW-1) to 21 ppm (MW-4). The purgeable hydrocarbon constituents benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) were also found in the water samples collected from wells MW-2 through MW-4. TPHg and BTEX were initially detected in well MW-1; however, subsequent sampling and analyses showed no detectable TPHg or BTEX.

Research of the public record for known wells within a one-mile radius of the site revealed twelve wells. Four monitoring wells or wells used for cathodic protection are located in the general downgradient direction of the site.

The beneficial uses of the shallow water-bearing zone in the site vicinity are restricted. The ground-water mineral analysis found total dissolved solids (TDS) at 1,000 parts per million. This value is above the recommended level and at the upper maximum contaminant level for secondary drinking water as listed in Title 22. Results of short-duration aquifer testing of MW-1 suggest a yield of approximately 100 gallons per day (gpd). The minimum yield defined by the California State Water Resources Control Board (Resolution 88-63) for consideration as a municipal or domestic water supply is 200 gpd.

An environmental records search at the Regional Water Quality Control Board (RWQCB) revealed that four underground storage tanks (USTs) were removed in March 1986 from a former service station located on Telegraph Avenue across from the ARCO station. Upon removal, holes were found in one 5,000 gallon gasoline UST and in one 550-gallon waste oil UST. A subsequent subsurface investigation to assess the environmental impact from these possible releases was not performed. This former service station lies in the general upgradient direction from the ARCO Station. Insufficient data exists to assess if releases at the former station have impacted the ground water beneath ARCO Station No. 374.

March 27, 1991
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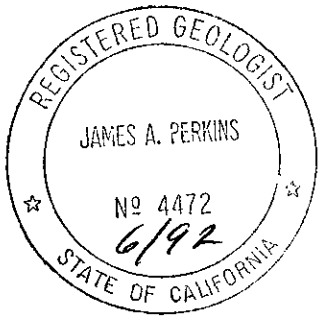
We recommend that copies of this report be submitted to Mr. Dennis Byrne of the Alameda County Health Care Services Agency, Department of Environmental Health, Hazardous Materials Division, 80 Swan Way, Room 200, Oakland, California 94621, and Mr. Richard Heitt of the California Regional Water Quality Control Board, San Francisco Bay Region, 1800 Harrison Street, Suite 700, Oakland, California 94612. Please call if you have any questions regarding this report.

Sincerely,
Applied GeoSystems



James A. Perkins
Project Manager

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REPORT
LIMITED SUBSURFACE
ENVIRONMENTAL INVESTIGATION
at
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

For ARCO Products Company

1.0 INTRODUCTION

At the request of ARCO Products Company (ARCO), Applied GeoSystems (AGS) conducted a limited subsurface environmental investigation to evaluate the presence of hydrocarbon compounds in soil and ground water at ARCO Station No. 374. The scope of work included conducting research of public records for wells within one mile of the site and for areas of environmental concerns near the site, installing four ground-water monitoring wells, collecting and analyzing soil and water samples, and evaluating the ground-water flow direction and gradient. This report presents our findings, interpretations of the field and laboratory data, and conclusions.

1.1 Site Description

ARCO Station No. 374 is located at the northwest corner of the intersection of Telegraph and Alcatraz Avenues in Oakland, California (Plate 1). Pertinent site features include two service islands, a station building, and new underground storage tanks (USTs) in the northeastern part of the site, which replaced four USTs located in the southwestern part of the site (Plate 2). Numerous small commercial businesses and residential apartments are located along Telegraph and Alcatraz Avenues. Residential apartment buildings are west and north of the site. A vacant lot, formerly a gasoline service station, is located on the southeast corner of this the intersection. The surface topography in the area is relatively flat.

1.2 Previous Environmental Work

In 1988, AGS conducted a limited subsurface environmental investigation to evaluate for the presence of hydrocarbons in soil near four existing gasoline USTs. The USTs were located in the southwestern portion of the site. The investigation involved drilling four exploratory soil borings, designated as EB-1 through EB-4, and collecting and analyzing soil samples. Levels of total petroleum hydrocarbons as gasoline (TPHg) detected in the soil samples ranged from 48 to 930 parts per million (ppm). A water sample from boring EB-1, obtained through the hollow stem of the augers, contained one inch of product. Also, sheen was observed on water samples from boreholes EB-2 and EB-4. Additional details are described in AGS Report No. 18039-1, June 15, 1988.

Between June 7 and 10, 1988, the four USTs were removed from the site. No holes were observed in the tanks; however, some of the tar coating had dissolved around the fill port of each tank. Laboratory analysis of soil samples collected from the tank pit found levels

of TPHg to 1,097 ppm. Soil containing TPHg concentrations greater than 1,000 ppm was excavated and removed from the site. Additional details are described in AGS Report No. 18039-2, August 1, 1988.

1.3 Regional Geology and Hydrogeology

The site is located west of the East Bay Hills at an elevation of approximately 160 feet above mean sea level. This area lies within the Berkeley Alluvial Plain; a subarea of the East Bay Alluvial Plain. Soils in the area are mapped as older alluvium that consists of a heterogeneous mixture of poorly consolidated to unconsolidated clay, silt, sand, and gravel units. The sediments were derived mainly from the hills to the east and southeast and represent successive coalescing alluvial fans deposited during the Pleistocene.

The sediments found beneath the East Bay Alluvial Plain are believed to be about 200 feet thick in the Berkeley area, and are the major ground-water source in the region. Water-yielding capabilities are highly variable, and, generally, high yields come only from wells that extend through several of the sand and gravel beds. Ground water in the East Bay Plain occurs dominantly under confined conditions and tends to flow toward the west and southwest from recharge areas to the east (Hickenbottom, 1988).

1.4 Well Search

Records at the California State Department of Water Resources (DWR) in Sacramento, California, were researched to identify domestic or municipal wells within a 1-mile radius of the site. Twelve wells were identified within this zone. the available information well information is summarized in Table 1, and the approximate locations of the 12 wells are shown on Plate 1.

Well Nos. 3, 8, 9, and 10 are located in the general downgradient direction from the site. Well Nos. 3, 8, and 10 are used for ground-water monitoring and for cathodic protection. Well No. 9, located approximately one mile from the site, is used to provide water for a coin-operated laundry business at 5702-B Adeline Street in Oakland, California.

1.5 Environmental Records Search

A records search conducted at the California Regional Water Quality Control Board (RWQCB) and the Alameda County Health Care Services Agency (ACHCSA) revealed a former gasoline service station located across the street from the ARCO station at 6392 Telegraph Avenue. Four USTs (one 10,000-gallon gasoline, two 5,000-gallon gasoline, and one 550-gallon waste-oil) were removed from the property on March 17, 1986. Holes were observed in the waste-oil tank and in one of the 5,000-gallon gasoline tanks. Each tank pit contained water with floating product residue that was subsequently removed (approximately 200 gallons from the waste oil tank pit and 3,400 from the gasoline tank pits). Laboratory analysis of the soil samples collected from the tank pits detected TPHg at levels ranging from less than 0.1 ppm to 105 ppm. Excavated soil was aerated onsite, and then used to backfill the tank pits (AquaScience Engineers, Walnut Creek, California, May 27, 1986).

A water sample was collected from one of the tank pits for laboratory analysis, and as reported "Laboratory results indicate that motor fuel hydrocarbons were below the level of detection (0.05 ppm)". A copy of the laboratory report was not included with the RWQCB file to verify if the appropriate analytical method was used, and the tank pit where the water sample was collected was not identified. No further investigation was conducted to assess if the ground water away from the tank pit was impacted by the fuel release events (Aqua-Science Engineers, Walnut Creek, California, May 27, 1986).

2.0 FIELD ACTIVITIES

This section describes field work conducted during the investigation. Work included: preparations for field work (2.1); drilling of soil borings (2.2); soil sampling and description (2.3); and well construction, development, and sampling (2.4). Field procedures used during the investigation are described in Appendix A.

2.1 Preparations for Field Work

AGS prepared a work plan for ARCO to install three onsite and one offsite ground-water monitoring wells. ARCO submitted this work plan to the ACHCSA, the designated lead regulatory agency overseeing the investigation. The work plan, with some modifications, was accepted by the ACHCSA (AGS Work Plan No. 18039-3W, September 11, 1988).

Permits for constructing ground-water monitoring wells were obtained from the Alameda County Flood Control and Water Conservation District. In addition, an encroachment permit was obtained from the City of Oakland to drill in the public sidewalk at the intersection of Alcatraz Avenue and Irwin Street. Copies of these permits are included in Appendix B. Underground Service Alert was contacted to identify underground public utilities in the vicinity of the proposed well locations.

Field work was conducted in accordance with AGS Site Safety Plan 18039-3S, dated July 5, 1989. This plan describes the safety requirements for the drilling of soil borings at the site and other aspects of the subsurface investigation.

2.2 Drilling of Soil Borings

On July 6 and 7, 1989, personnel from AGS observed Kvilhaug Well Drilling and Pump Co. Inc. (Kvilhaug) of Concord, California, drill four soil borings at the locations shown on Plate 2. Borings for MW-1 (B-1) through MW-4 (B-4) were drilled to an approximate depth of 27 feet. Wells MW-1 and MW-2 were located to provide information on subsurface conditions north and east of the former USTs. Wells MW-3 and MW-4 were located in the inferred downgradient direction of the former USTs.

2.3 Soil Sampling and Description

Soil samples were collected from each of the four borings at 5-foot intervals from approximately 3 feet to 27 feet below the ground surface. An organic vapor meter (OVM) was used to evaluate the organic vapor concentrations in the soil samples.
The Unified Soil Classification System was used as a guide to identify the soil encountered in the borings. A copy of this classification system is shown on Plate 3. Field descriptions of the soil encountered in the borings are presented on the Logs of Borings, Plates 4 through 11. The OVM readings are shown on the Logs in the column labeled P.I.D. (photoionization detector).

The shallow soils underlying the site are silty and sandy clay units with local discontinuous lenses of sandy or clayey gravels. Two geologic cross-section interpretations of the subsurface soils are presented on Plate 12.

2.4 Well Construction, Development, and Sampling

Ground-water monitoring wells (designated MW-1 through MW-4) were installed in the four boreholes. Four inch-diameter polyvinyl chloride pipe was used for the well casing. Following construction, a water sample was collected from each well for subjective evaluation. The wells were then developed to remove accumulated sediment and to stabilize the sand pack. After well development, the ground water was allowed to stabilize for at least 72 hours prior to collecting ground-water samples.

Water samples for subjective evaluations were collected from each well on July 21, 1989. No evidence of product, sheen, or emulsion was observed. Subsequent subjective evaluations of ground-water samples were performed in August and October 1989, and January 1990. No floating product, sheen, or emulsion was detected in the samples collected from the wells MW-1 and MW-2. Well MW-3 contained moderate emulsion in October 1989 and a noticeable hydrocarbon odor in January 1990. Well MW-4 had a sheen in August 1989, and a sheen with emulsion in October 1989. A noticeable hydrocarbon odor was present in January 1990 in well MW-4. Results of subjective evaluations are summarized in Table 2.

3.0 RESULTS OF LABORATORY ANALYSES

Discussed in this section are the results of analyses of soil samples (3.1), water samples (3.2), and general minerals in ground water (3.3). Analyses were conducted at laboratories certified by the State of California.

3.1 Soil Samples

Nine soil samples were analyzed for TPHg by modified Environmental Protection Agency (EPA) Method 8015, and for the purgeable hydrocarbon constituents benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) by EPA Method 8020. Results of analyses of the soil samples are summarized in Table 3. Hydrocarbons were not detected in the samples collected at 3.5 feet depth from each of the four borings. Samples collected at 8.5 feet from borings B-1 and B-4 contained TPHg concentrations of 60 and 310 ppm, respectively. The sample collected at 13.5 feet from boring B-4 contained 560 ppm TPHg. Copies of the Chain of Custody Record and the Analysis Reports are presented in Appendix C.

3.2 Water Samples

Ground-water samples collected during July, August, and October 1989, and during January 1990, were tested for TPHg by the modified EPA Method 8015 and for BTEX by EPA Method 602. TPHg were detected in samples from wells MW-2 through MW-4 during each sampling event and ranged from 0.94 and 21 ppm. BTEX were also detected during each sampling event. The initial sample collected from well MW-1 in July 1989 contained detectable TPHg and BTEX, no TPHg and BTEX were found during the subsequent three sampling events. Cumulative results of the laboratory analyses are summarized in Table 4.

Copies of the Chain of Custody Records and the Analysis Reports are presented in Appendix C.

3.3 Mineral Analysis of Ground Water

To assess the ground-water quality in the shallow water-bearing zone, a sample was collected from monitoring well MW-1 on October 4, 1989, and analyzed for general mineral content. The concentration of chloride, manganese, and total dissolved solids exceeded the maximum contaminant level (MCL) established for secondary drinking water as listed in Title 22. The results of this analysis are summarized in Table 5. Copies of the Chain of Custody Records and Analysis Reports are in Appendix C.

4.0 SITE HYDROLOGY

The ground-water flow direction and gradient (4.1), potential yield of the shallow water-bearing zone (4.2), and assessment of the tidal influence (4.3) are discussed in this section.

4.1 Ground-Water Flow Direction and Gradient

Ron Archer Civil Engineer, Inc., of Pleasanton, California, surveyed the locations of the four wells, and other site features, on July 28, 1989. A copy of the survey summary report is included in Appendix D. Wellhead elevations and water levels were used to calculate the ground-water surface elevation at each well with respect to mean sea level. Ground-water data are summarized in Table 6. The data were used to construct ground-water elevation maps for July 20, August 30, and October 4, 1989, and for January 10, 1990 (Plates 13 through 16, respectively). A ground-water flow direction toward the southwest with a gradient of 0.023 are inferred from the ground-water data.

4.2 Potential Yield of the Shallow Water-Bearing Zone

An approximation of the potential yield of the shallow water-bearing zone was derived using ground-water recovery data from well MW-1. Well MW-1 was pumped dry, and the time and depth to water in the well were measured as the well recovered to approximately 77 percent of its static level over a period of 150 minutes.

Analysis of the recovery data from well MW-1 suggests a yield of approximately 0.07 gallons per minute, or about 100 gallons per day (gpd). This estimated yield is one half of the minimum average sustained yield (200 gpd) established by California State Water Resources Control Board Resolution 88-63 for considering a ground-water source to be potentially

suitable as a municipal or domestic water supply. Limited data collected during quarterly monitoring activity at the site suggests a similar yield in the other three monitoring wells. The methodology used to estimate the yield is presented in Appendix E.

4.3 Assessment of Tidal Influence

The ACHCSA requested that fluctuations in ground-water levels be monitored to assess the influence of tidal action on possible hydrocarbon migration patterns. The site is at an elevation of 160 feet above mean sea level. In compliance with the request by the ACHCSA, the depth to water in well MW-2 was monitored hourly for three hours (about one half of one diurnal tidal cycle) on December 14, 1989. No change in the static water level was observed after the first hour, a decline of 0.02-foot was measured after the second hour, and no change was measured after the third hour.

5.0 HYDROCARBONS IN THE SUBSURFACE

This section includes discussions of the extent and magnitude of hydrocarbons in soil (5.1) and ground water (5.2).

5.1 Hydrocarbons in Soil

The environmental investigation that was conducted during tank removal found hydrocarbons at concentrations greater than 1,000 ppm. Soil containing hydrocarbon levels greater than 1,000 ppm was previously excavated and removed from the site (AGS Report No. 18039-2, dated August 1, 1988). During this phase of the investigation the greatest concentration of hydrocarbons found was 560 ppm (B-4). On the basis of the available data it appears no soil beneath the site contains hydrocarbons at levels above 1,000 ppm. Soil containing hydrocarbon levels greater than 100 ppm appear to be found only in the vicinity of the former USTs.

5.2 Hydrocarbons in Ground Water

Product was observed in a borehole previously drilled (1988) in the vicinity of the former USTs. Floating product was not encountered in wells installed during this investigation, which included well MW-4 located in the vicinity of the borehole where product was previously observed.

Dissolved hydrocarbons are present in the vicinity of the former USTs (MW-4) and offsite, downgradient of the former USTs (MW-3). Dissolved hydrocarbons are also present in well MW-2, located appreciably upgradient of the former USTs. The source of hydrocarbons found in well MW-2 may have originated at the former service station upgradient of the

ARCO site. Additional data are needed to assess this possibility as no subsequent environmental investigation was conducted at the former service station to evaluate the impact of station activities on the ground water.

6.0 CONCLUSIONS

On the basis of results of this and previous investigation it is evident that this site has been impacted by hydrocarbons from the former USTs and possibly from an unidentified offsite source. The unidentified source is probably a result of fuel leaks from the former service station across Telegraph Avenue. Furthermore, AGS concludes that:

- No domestic wells are known to exist within one mile of the site.
- The environmental impact to the ARCO station from documented hydrocarbons releases at the former service station at 6392 Telegraph Avenue cannot be assessed due to the lack of information.
- The beneficial uses of ground water in the shallow water-bearing zone in the vicinity of the site is restricted as ground water exceeds the secondary drinking water standards for some constituents, and the estimated yield of wells that penetrate the zone is only 100 gpd.
- Ground water flows toward the southwest with a gradient of 0.023.
- No tidal influence was observed on the ground water beneath the site.
- Hydrocarbons at levels greater than 560 ppm were not found in soil during this investigation, and that soil containing hydrocarbons at levels greater than 100 ppm appears to be limited to the vicinity of the former USTs.
- Dissolved hydrocarbons are present beneath the southern part of the site (MW-2 and MW-4) and offsite, downgradient of the former USTs (MW-3). Dissolved hydrocarbons found in well MW-2 may have originated at the service station that was located across Telegraph Avenue from the ARCO station.
- The dissolved hydrocarbon plume is not delineated.

7.0 LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental geological practice in the State of California at the time this investigation was performed. This investigation was conducted solely for the purpose of evaluating environmental conditions of the soil and shallow ground water with respect to hydrocarbons in the vicinity of the subject property. No soil engineering or geotechnical recommendations are implied or should be inferred. Evaluations and interpretations of the geologic conditions at the site for the purpose of this investigation were made from a limited number of observation points. Subsurface conditions may vary away from the data points available. Additional work, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of investigation.

8.0 REFERENCES

Applied GeoSystems Report No. 18039-1, June 15, 1988, Limited Environmental Site Assessment at ARCO Service Station No. 374, Telegraph Avenue and Alcatraz Avenue, Oakland, California.

Applied GeoSystems Report No. 18039-2, August 1, 1989 Report Environmental Investigation Related to Underground Tank Removal at ARCO Service Station No. 374, Telegraph Avenue and Alcatraz Avenue, Oakland, California.

AquaScience Engineers, May 27, 1986, Report - Soil and Water Sampling and Determination of Hydrocarbon Contamination from Tank Removal at the Telegraph and Alcatraz Property, 6392 Telegraph Avenue, Oakland, California.

Helley, E.S., Lajoie, K.R., Spangle, W.E., and Blair, M.L., 1979, Flatland Deposits of the San Francisco Bay Region, California: U.S. Geological Survey Professional Paper 943, p. 87.

Hickenbottom K., Muir K., June 1988, Geohydrology and Ground-water Quality Overview, of the East Bay Plain Area, Alameda County, California 205 (j), Figure 8.

TABLE 1
WELLS WITHIN ONE MILE OF
ARCO Station 374
6074 Telegraph Avenue
Oakland, California

Well ID	Well Location	Owner	Year Drilled	Recorded Use
1	3215 Adeline	R. Harkon	1981	Domestic?
2	4801 Oakport	PG&E	1974	Cathodic
3	6125 Telegraph	ARCO	1986	Monitoring
4	Martin & Herman	PG&E	1974	Cathodic
5	5976 Telegraph	Creamery	1935	NA
6	Forest & Claremont	NA	NA	NA
7	Clifton & Claremont	PG&E	1975	Cathodic
8	62nd & Racine	PG&E	1977	Cathodic
9	5702 Adeline	A. Santos	1977	Industrial
10	Market & 57th	PG&E	1974	Cathodic
11	51st & Telegraph	Pacific Rim	1988	Monitoring
12	51st & Telegraph	Kaldveer Ass.	1987	Monitoring

Source: California Department of Water Resources
NA = Information not available

TABLE 2
CUMULATIVE RESULTS OF SUBJECTIVE EVALUATIONS
ARCO Station 374
6074 Telegraph Avenue
Oakland, California

Well	Date	DTW	Floating Product	Sheen	Emulsion	Noticeable Odor
MW-1	07/21/89	8.04	None	None	None	None
	08/30/89	8.47	None	None	None	None
	10/04/89	8.50	None	None	None	None
	01/10/90	6.74	None	None	None	None
MW-2	07/21/89	8.15	None	None	None	None
	08/30/89	8.42	None	None	None	None
	10/04/89	8.40	None	None	None	None
	01/10/90	6.12	None	None	None	None
MW-3	07/21/89	7.58	None	None	None	None
	08/30/89	8.00	None	None	None	None
	10/04/89	7.73	None	None	Moderate	None
	01/10/90	7.78	None	None	None	Present
MW-4	07/21/89	8.09	None	None	None	None
	08/30/89	8.45	None	v.Slight	None	None
	10/04/89	8.57	None	Slight	Slight	None
	01/10/90	7.26	None	None	None	Present

Measurements are in feet.
DTW = Depth to Water (measured in feet below top of casing).

TABLE 3
ANALYTICAL RESULTS OF SOIL SAMPLES
ARCO Station 374
6407 Telegraph Avenue
Oakland, California
(July 1989)

Sample Number	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes
S-3.5-B1	<2	<0.05	<0.05	<0.05	<0.05
S-8.5-B1	60	0.66	2.9	0.99	5.2
S-3.5-B2	<2	<0.05	<0.05	<0.05	<0.05
S-13.5-B2	<2	<0.05	<0.05	<0.05	<0.05
S-18.5-B2	<2	<0.05	<0.05	<0.05	<0.05
S-3.5-B3	<2	<0.05	<0.05	<0.05	<0.05
S-3.5-B4	<5.0	<0.05	<0.05	<0.05	<0.05
S-8.5-B4	310	0.36	4.9	5.2	22
S-13.5-B4	560	12	5.8	12	49
S-0731-B4* (1a,b,c,d)	21	<0.05	<0.05	<0.05	0.37

Results are in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline
< = below the reporting limits of the analytical method.
* = signifies composite sample following aeration.
Sample designation = S-13.5-B4
S = Soil sample
13.5 = Sample depth in feet
B4 = Boring number

TABLE 4
CUMULATIVE RESULTS OF GROUND-WATER ANALYSES
ARCO Station 374
6074 Telegraph Avenue
Oakland, California

Sample Number	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MW-1					
07/21/89	0.033	0.00077	0.0016	0.0015	0.0050
08/30/89	<0.020	<0.00050	<0.00050	<0.00050	<0.00050
10/04/89	<0.020	<0.00050	<0.00050	<0.00050	<0.00050
01/10/90	<0.020	<0.00050	<0.00050	<0.00050	<0.00050
MW-2					
07/20/89	4.2	0.28	0.21	0.038	0.024
08/30/89	4.2	0.16	0.26	0.045	0.24
10/04/89	4.3	0.86	0.30	0.029	0.33
01/10/90	8.0	0.89	0.71	0.12	0.76
MW-3					
07/21/89	0.43	0.0090	0.0048	<0.00050	0.050
08/31/89	1.2	0.085	0.046	0.0084	0.055
10/04/89	7.0	0.58	0.90	0.12	0.67
01/10/90	0.94	0.13	0.059	0.021	0.073
MW-4					
07/21/89	8.7	0.72	0.36	0.12	0.64
08/30/89	7.3	0.63	0.22	0.072	0.32
10/04/89	21	2.3	1.3	0.28	1.3
01/10/90	4.3	0.47	0.25	0.063	0.43

Results are in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline
< = below the reporting limits of the analytical method.

TABLE 5
RESULTS OF GENERAL MINERAL ANALYSIS
ARCO Station 374
6074 Telegraph Avenue
Oakland, California
(October 4, 1990)

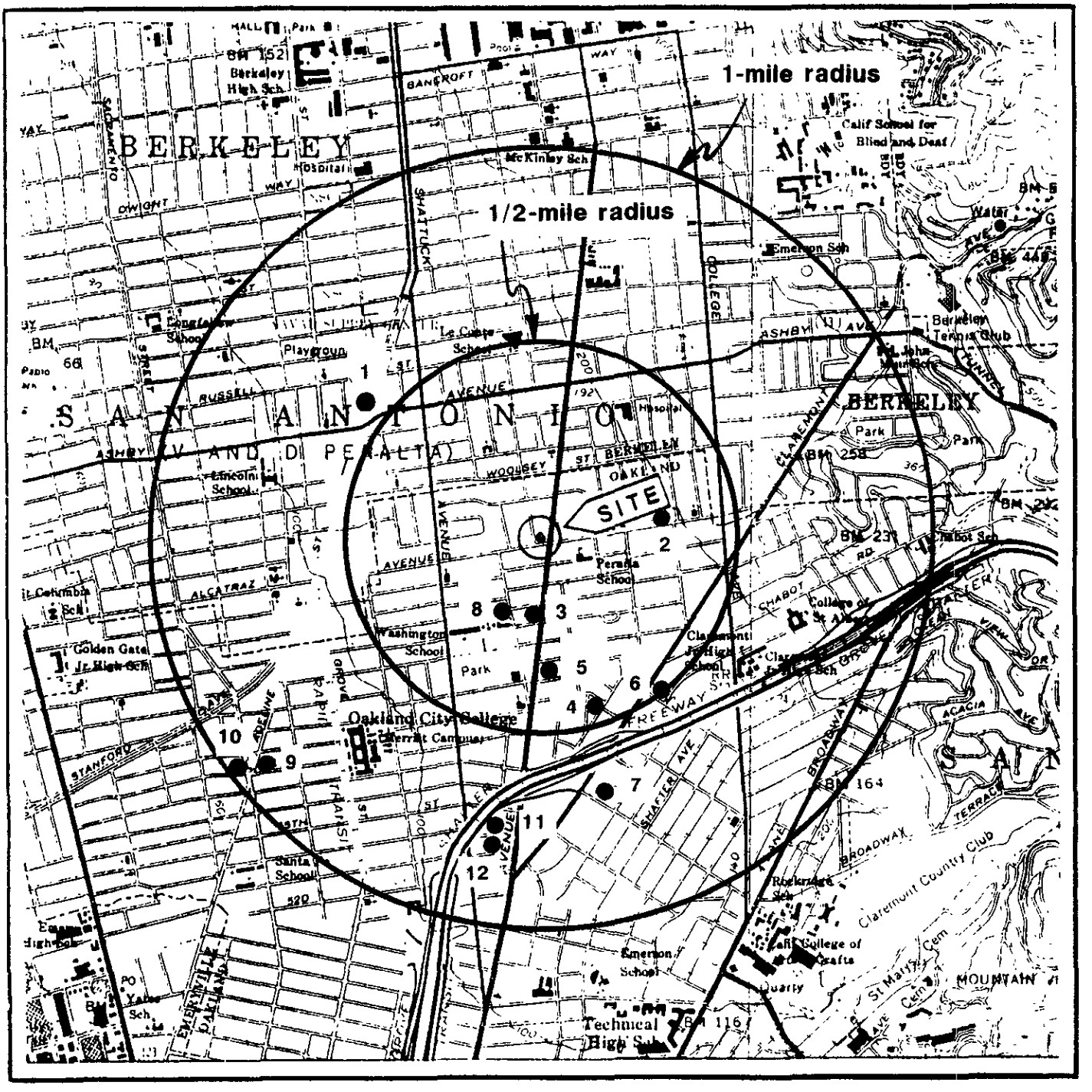
Constituent	MW-1	MCL
Chloride	330	250 Rec 500 Up 600 St
Copper	<0.5	1.0
Iron	0.23	0.3
Manganese	0.061	0.05
Sulfate	120	250 Rec 500 Up 600 St
Total Dissolved Solids	1,000	250 Rec 500 Up
Zinc	0.011	5.0

Results and Values in parts per million with exception of Specific Conductance (micro-mhos/cm or micro-Siemens/cm)
MCL = Maximum Contamination Level for Secondary Drinking Water Standards established by Title 40 of the Code of Federal Regulations Section 143 and Title 22 Section 64445.1 of the California Administrative Code.
Rec = Recommended value.
Up = Upper value.
St = Value for short term use only.
+ = Constituent in ground water which exceeds established SMCL.

TABLE 6
GROUND-WATER SURFACE ELEVATION DATA
ARCO Station 374
6074 Telegraph Avenue
Oakland, California

Well No.	Casing Elevation	Depth to Ground Water	Ground-water Elevation
July 20, 1989			
MW-1	159.44	8.04	151.40
MW-2	158.46	8.15	150.31
MW-3	154.18	7.58	146.60
MW-4	157.08	8.09	148.99
August 30, 1989			
MW-1	159.44	8.47	150.97
MW-2	158.46	8.42	150.04
MW-3	154.18	8.00	146.18
MW-4	157.08	8.45	148.63
October 4, 1989			
MW-1	159.44	8.50	150.94
MW-2	158.46	8.40	150.06
MW-3	154.18	7.73	146.45
MW-4	157.08	8.57	148.51
January 10, 1990			
MW-1	159.44	6.74	152.70
MW-2	158.46	6.12	152.34
MW-3	154.18	7.78	146.40
MW-4	157.08	7.28	149.80

Measurements are in feet.
Elevation measurements are referenced to mean sea level.



Source: U.S. Geological Survey
7.5-Minute Quadrangle
Oakland West/Oakland East
California
Photorevised 1980

12 ● = Well

N

Approximate Scale

2000 1000 0 2000 4000

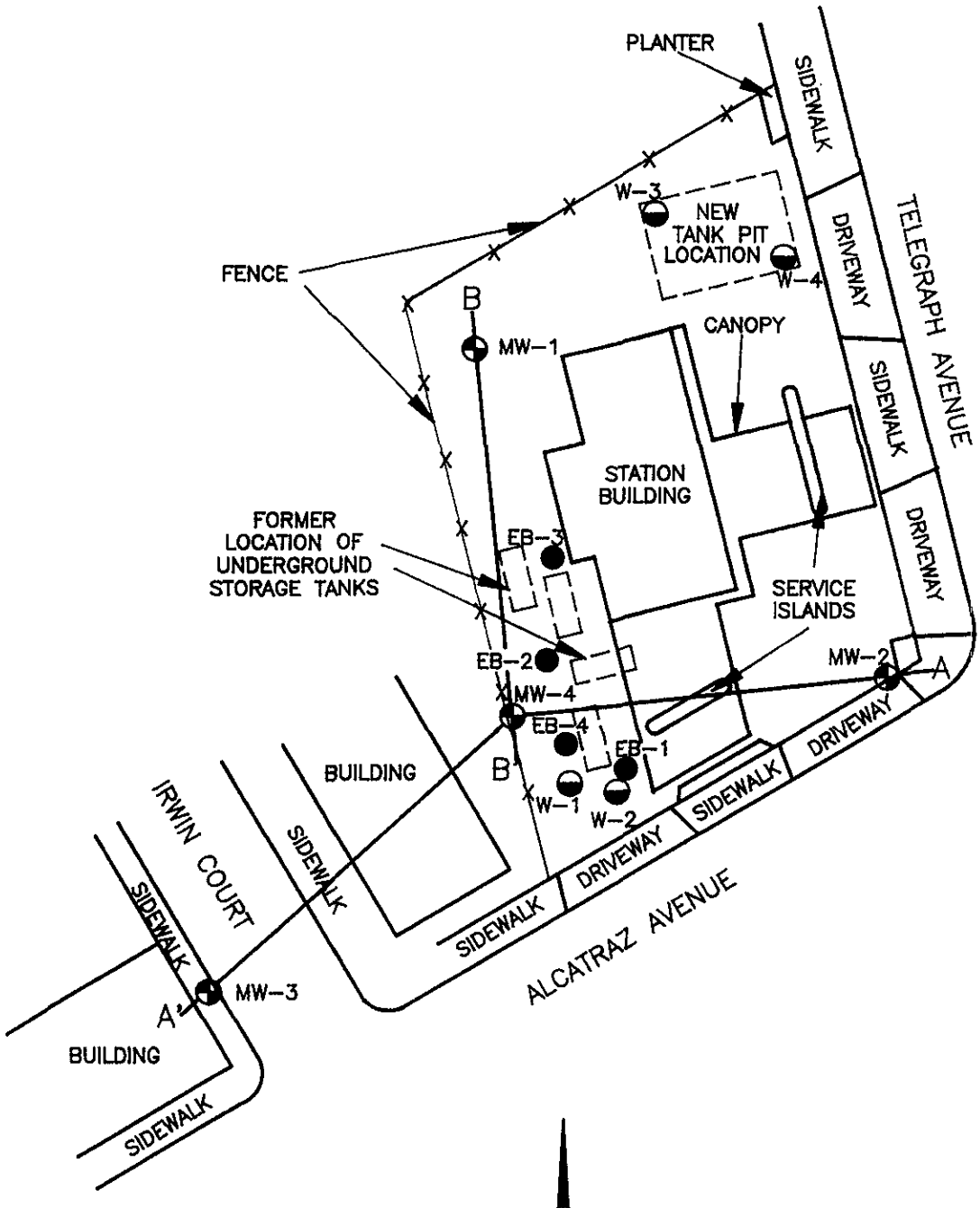
feet

Applied GeoSystems

PROJECT NO. 18039-3

SITE VICINITY MAP
ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE
1



B — B' = Cross section line

MW-4 = Ground-water monitoring well

W-4 = Tank pit monitoring well

EB-4 = Exploratory soil boring

N

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by Ron Archer
Civil Engineer, Inc.

Applied GeoSystems

PROJECT NO. 18039-3

GENERALIZED SITE PLAN
ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE
2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	DESCRIPTION
Coarse-grained soils	Gravel and gravelly soils	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	Sand and sandy soils	SW	Well-graded sand or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures

MAJOR DIVISIONS		LTR	DESCRIPTION
Fine-grained soils	Silts and clays LL<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	Silts and clays LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils. Elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
Highly organic soils		PT	Peat and other highly organic soils


Depth through which sampler is driven


Relatively undisturbed sample


No sample recovered


Static water level observed in well


Initial water level observed in boring

S-10 Sample number


Sand pack


Bentonite annular seal


Neat cement annular seal


Caved native soil


Blank PVC


Machine-slotted PVC

P.I.D. Photoionization detector

BLOWS REPRESENT THE NUMBER OF BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES TO DRIVE THE SAMPLER THROUGH EACH 6 INCHES OF AN 18-INCH PENETRATION.

DASHED LINES SEPARATING UNITS ON THE LOG REPRESENT APPROXIMATE BOUNDARIES ONLY. ACTUAL BOUNDARIES MAY BE GRADUAL. LOGS REPRESENT SUBSURFACE CONDITIONS AT THE BORING LOCATION AT THE TIME OF DRILLING ONLY.

Applied GeoSystems

PROJECT NO. 18039-3

UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOL KEY
ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE
3

Total depth of boring: 28-1/2 feet **Diameter of boring:** 11 inches **Date drilled:** 7-6-89

Casing diameter: 4 inches **Length:** 27 feet **Slot size:** 0.020-inch

Screen diameter: 4 inches **Length:** 20 feet **Material type:** Sch 40 PVC

Drilling Company: Kvilhaug Drilling Company, Inc. **Driller:** Rod and Leroy

Method Used: Hollow-Stem Auger **Field Geologist:** Becky and Keith

Signature of Registered Professional: _____

Registration No.: _____ **State:** CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0					Asphalt.	
				CL	Silty clay, dark brown, slightly damp, medium plasticity, very stiff, rootlets, minor iron staining.	
2		4				
		12				
4	S-3.5	18	0			
6						
8		3		▼		
		5				
	S-8.5	12	110		Sandy clay, grading to clay with gravel, some mottling, slight plasticity, stiff, noticeable odor.	
10						
12				▽		
		15				
		18				
14	S-13.5	20	81		Slightly green, hard.	
16						
18		8				
		10				
	S-18.5	12	0		Silty clay, some sand and gravel, light brown, moist, medium plasticity, very stiff.	
20						

(Section continues downward)

Applied GeoSystems

PROJECT NO. 18039-3

LOG OF BORING B-1/MW-1

ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 4

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				CL	Silty clay, some sand and gravel, light brown, moist, medium plasticity, stiff.	
	S-23	.3 4 7	0		Trace gravel.	
24						
26						
28	S-27	.3 5 7	0			
					Total Depth = 28-1/2 feet.	
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

Applied GeoSystems

PROJECT NO. 18039-3

LOG OF BORING B-1/MW-1

ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 5

Total depth of boring: 28–1/2 feet **Diameter of boring:** 11 inches **Date drilled:** 7–6–89

Casing diameter: 4 inches **Length:** 27 feet **Slot size:** 0.020–inch

Screen diameter: 4 inches **Length:** 20 feet **Material type:** Sch 40 PVC

Drilling Company: Kvilhaug Drilling Company, Inc. **Driller:** Rod and Leroy

Method Used: Hollow–Stem Auger **Field Geologist:** Becky and Keith

Signature of Registered Professional: _____

Registration No.: _____ **State:** CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0						
2		6		CL	Sandy clay, dark brown, damp, slight plasticity, very stiff.	
4	S–3.5	10 12	0			
6						
8		7		▼		
	S–8.5	20 25	0		Silty clay, with some gravel, light brown, damp, hard.	
10						
12		5				
14	S–13.5	7 15	0		Very stiff.	
16				▽		
18		7				
	S–18.5	20 25	0		Silty clay with gravel, brown, moist, hard.	
20					(Section continues downward)	

Applied GeoSystems

PROJECT NO. 18039-3

LOG OF BORING B-2/MW-2

ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 6

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
				CL	Silty clay with gravel, brown, moist, hard.	
22		3				
	S-23	5 12	0		Silty clay, some fine gravel, dark brown, stiff.	
24						
26		10				
	S-27	20 25	0		Silty clay with sand, medium brown, slightly damp, slight plasticity, hard.	
28					Total Depth = 28-1/2 feet.	
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

Applied GeoSystems

PROJECT NO. 18039-3

LOG OF BORING B-2/MW-2

ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 7

Total depth of boring: 28-1/2 feet **Diameter of boring:** 11 inches **Date drilled:** 7-7-89

Casing diameter: 4 inches **Length:** 27 feet **Slot size:** 0.020-inch

Screen diameter: 4 inches **Length:** 20 feet **Material type:** Sch 40 PVC

Drilling Company: Kvilhaug Drilling Company, Inc. **Driller:** Rod and Leroy

Method Used: Hollow-Stem Auger **Field Geologist:** Becky and Keith

Signature of Registered Professional: _____

Registration No.: _____ **State:** CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0					Concrete (4 inches) over baserock (6 inches).	
2		3		CL	Silty clay, with sand and some gravel, medium brown, damp, slight plasticity, stiff, rootlets.	
		10				
4	S-3.5	10	0			
6						
8		2		▼		
		4				
	S-8.5	8	0		Damp.	
10						
12				▽		
		4				
		6				
14	S-13.5	10	8.5		Some mottling, moist.	
16						
		6				
18		5				
	S-18.5	12	9.1		Silty clay, minor gravel, light to medium brown, damp, medium plasticity, stiff.	
20						

(Section continues downward)

Applied GeoSystems

PROJECT NO. 18039-3

LOG OF BORING B-3/MW-3

ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 8

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				CL	Silty clay, minor gravel, light to medium brown, damp, medium plasticity, stiff.	
		.6				
		8				
	S-23	12	0			
24					Very stiff.	
26						
		.5				
		10				
28	S-27	12			Silty clay with sand, slight plasticity.	
					Total Depth = 28-1/2 feet.	
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

Applied GeoSystems

PROJECT NO. 18039-3

LOG OF BORING B-3/MW-3

ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 9

Total depth of boring: 27-1/2 feet **Diameter of boring:** 11 inches **Date drilled:** 7-7-89

Casing diameter: 4 inches **Length:** 27 feet **Slot size:** 0.020-inch

Screen diameter: 4 inches **Length:** 20 feet **Material type:** Sch 40 PVC

Drilling Company: Kvilhaug Drilling Company, Inc. **Driller:** Rod and Leroy

Method Used: Hollow-Stem Auger **Field Geologist:** Becky and Keith

Signature of Registered Professional: _____

Registration No.: _____ **State:** CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0						
2		2 3		CL	Silty clay, some sand and fine-grained gravel, very dark brown, slightly damp, slight plasticity, stiff.	
4	3.5	8	0			
6						
8		3 4				
10	8.5	10	0			
12						
14		4 10		GM	Sandy gravel, some silt, medium brown, very moist, medium dense, obvious odor.	
16	S-13.5	25	41.6			
18		15 15				
20	S-18.5	20	0		Wet, dense.	

(Section continues downward)

Applied GeoSystems

PROJECT NO. 18039-3

LOG OF BORING B-4/MW-4

ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 10

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
				GM	Sandy gravel, some silt, medium brown, very moist, medium dense.	
22						
		6		CL	Silty clay, some sand and gravel, very stiff.	
		12				
	S-23.5	15	0			
24						
26		7				
		20				
	S-27	20	0		Grades more gravelly.	
28					Total Depth = 27-1/2 feet.	
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

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PROJECT NO. 18039-3

LOG OF BORING B-4/MW-4

ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 11

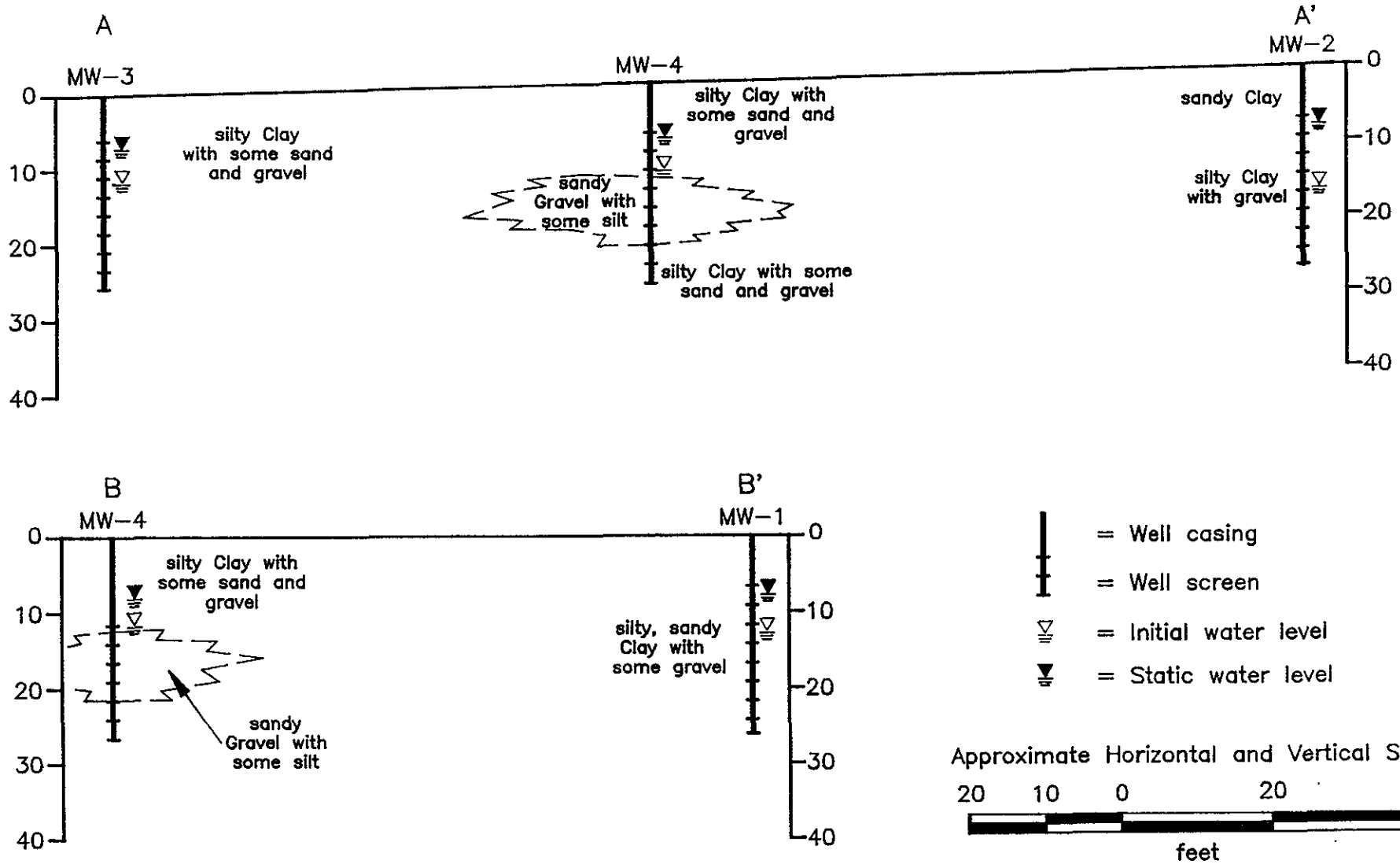
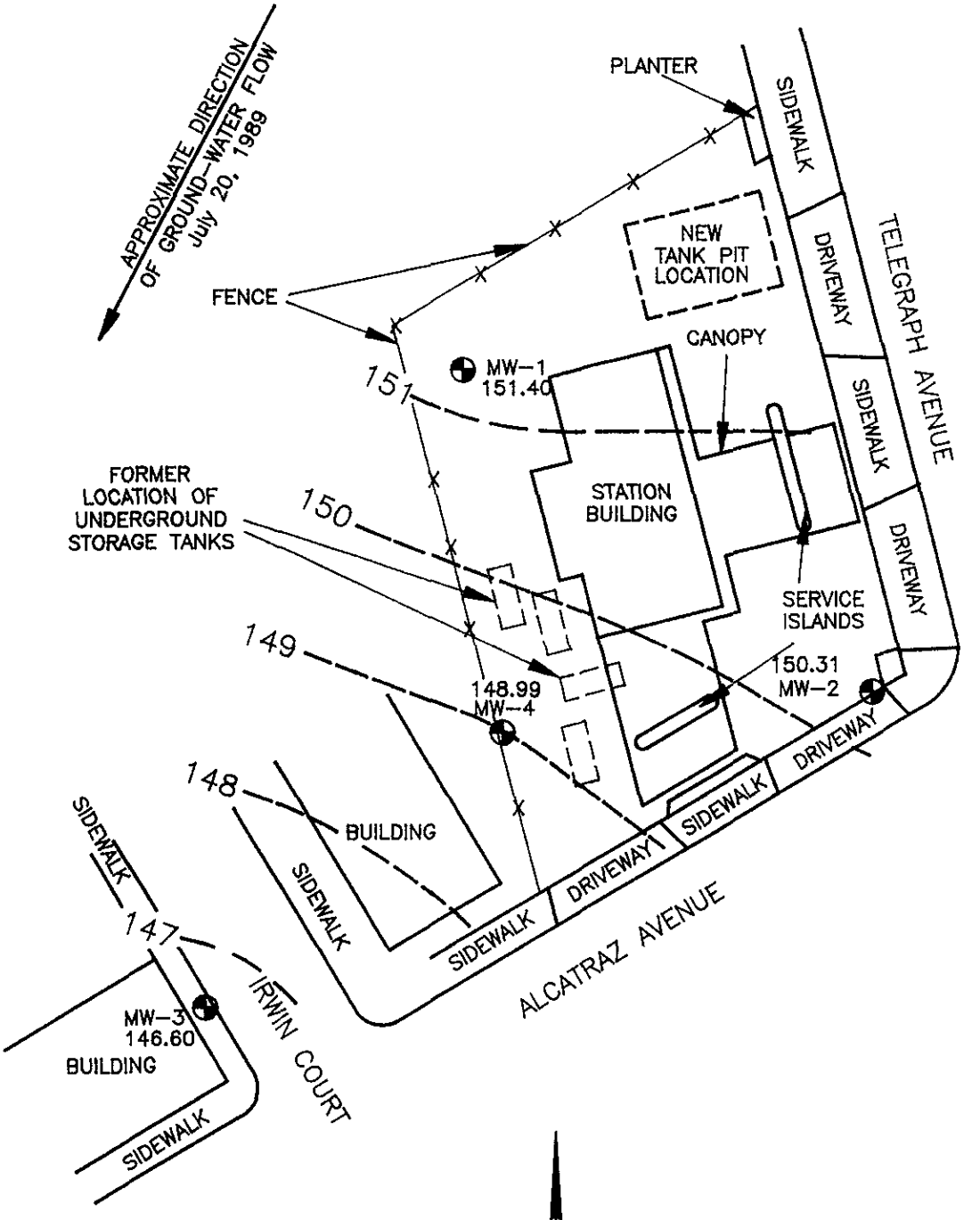


PLATE 12	GEOLOGIC CROSS SECTIONS ARCO Station No. 374 6407 Telegraph Avenue Oakland, California	Applied GeoSystems PROJECT NO. 18039-3



151 = Line of equal elevation of ground water in feet above mean sea level

MW-4 = Ground-water monitoring well

Source: Surveyed by Ron Archer Civil Engineer, Inc.

N

Approximate Scale

40 20 0 40 80

feet

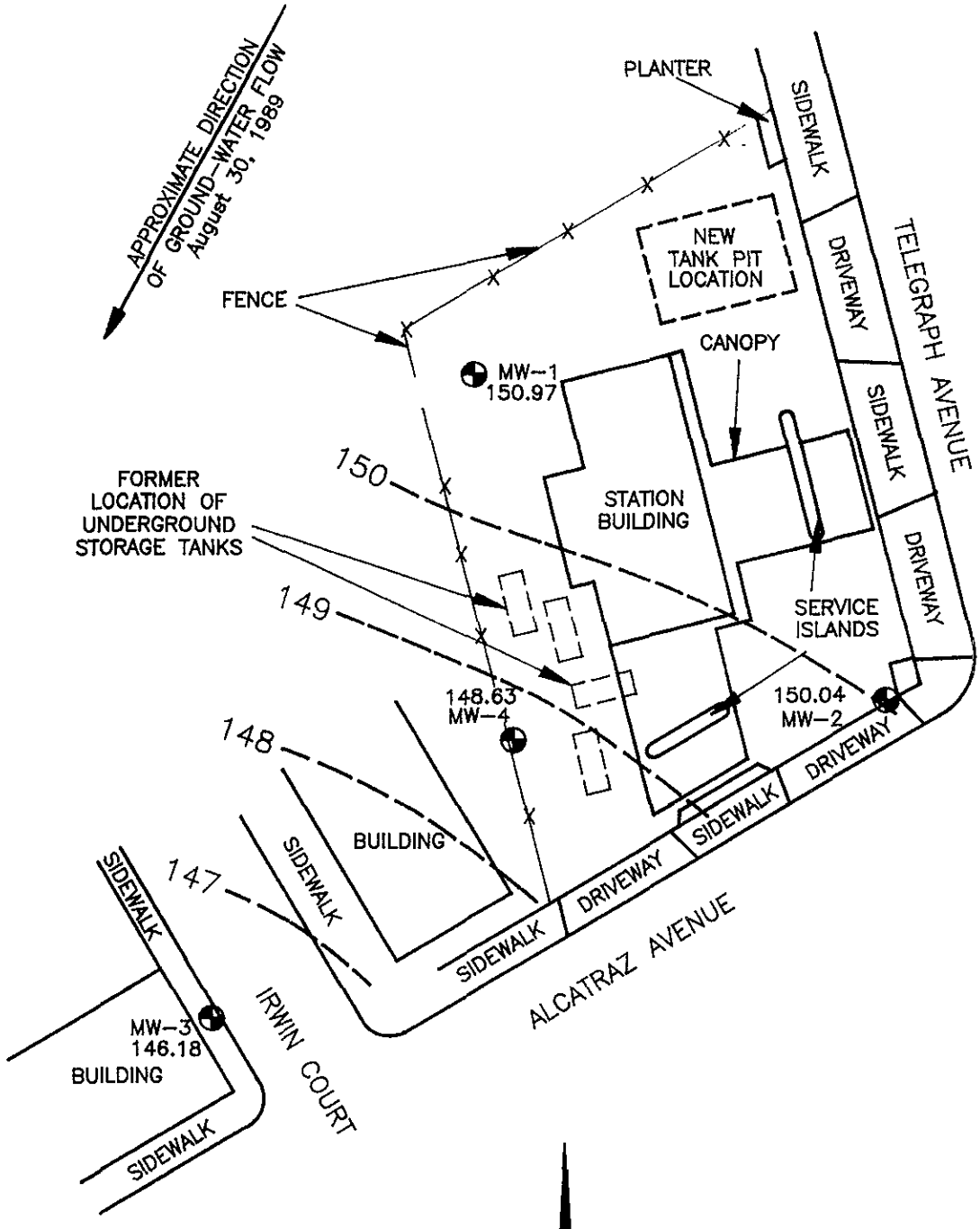
NOTE: Contours produced using SURFER computer graphics software

Applied GeoSystems

PROJECT NO. 18039-3

GROUND-WATER ELEVATION MAP
ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 13



150 = Line of equal elevation of ground water in feet above mean sea level

MW-4 = Ground-water monitoring well

Source: Surveyed by Ron Archer Civil Engineer, Inc.

N

Approximate Scale

40 20 0 40 80

feet

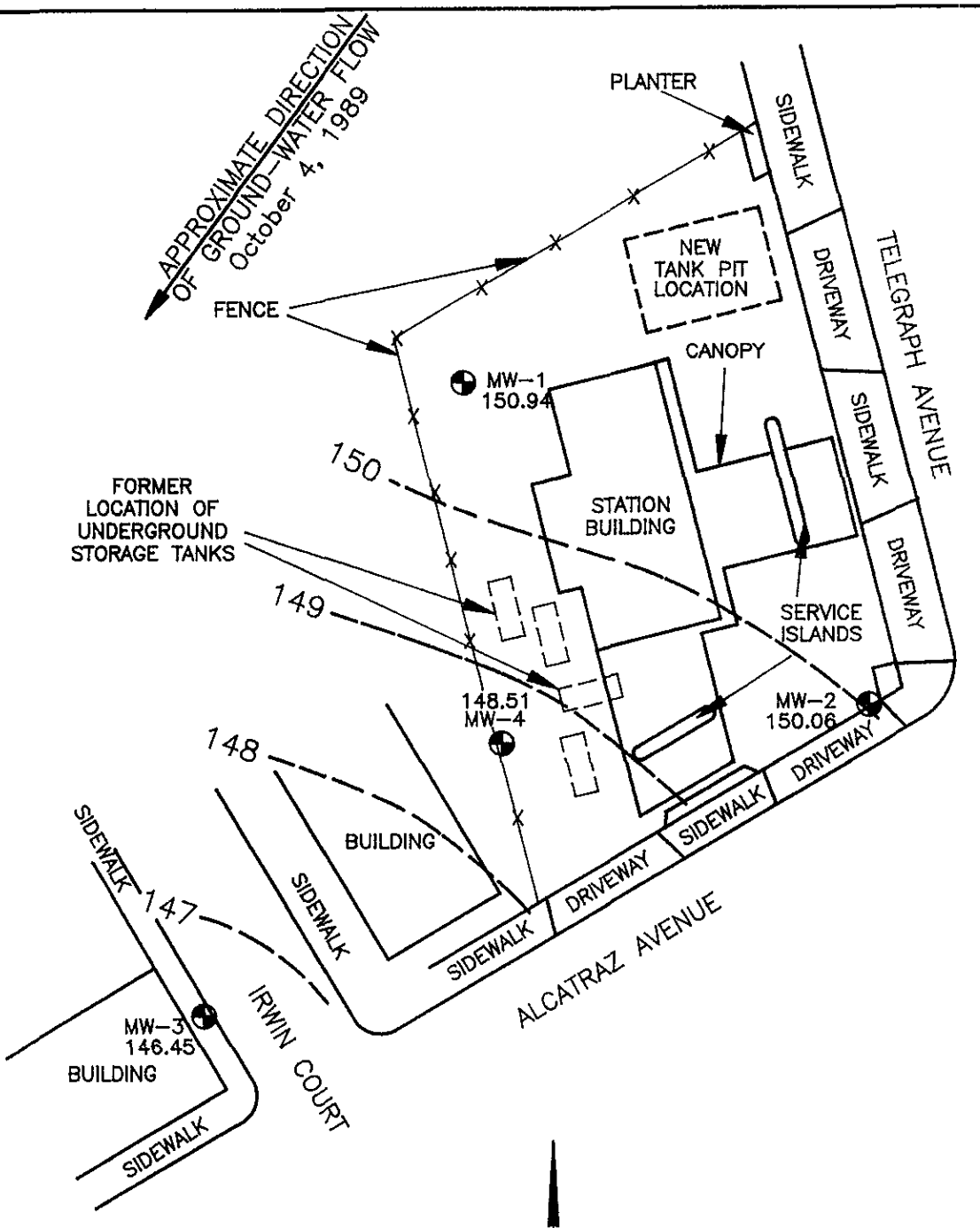
NOTE: Contours produced using SURFER computer graphics software

Applied GeoSystems

PROJECT NO. 18039-3

GROUND-WATER ELEVATION MAP
ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 14



150 = Line of equal elevation of ground water in feet above mean sea level

MW-4 = Ground-water monitoring well

Source: Surveyed by Ron Archer Civil Engineer, Inc.

N

Approximate Scale

40 20 0 40 80

feet

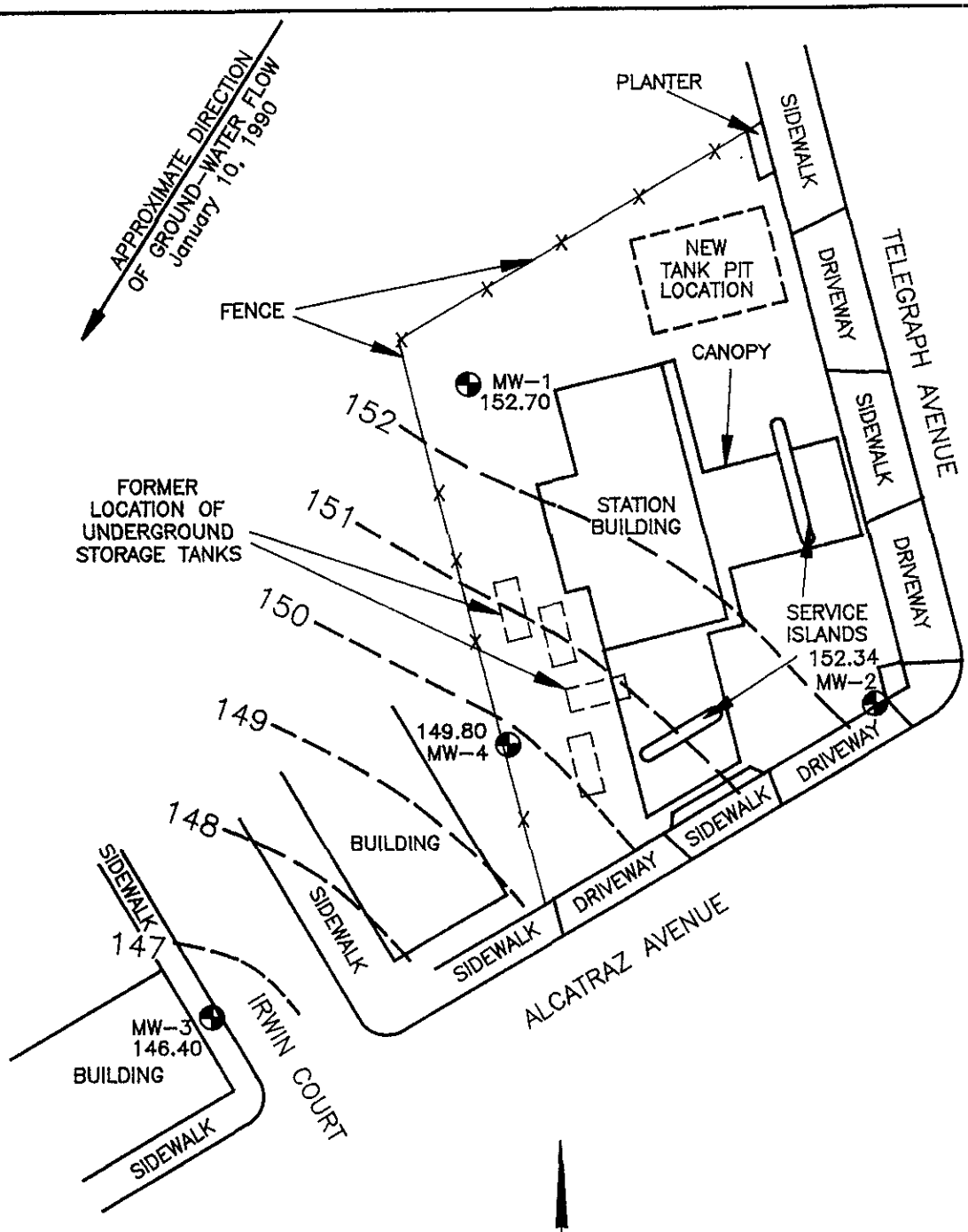
NOTE: Contours produced using SURFER™ computer graphics software

Applied GeoSystems

PROJECT NO. 18039-3

GROUND-WATER ELEVATION MAP
ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 15



Source: Surveyed by Ron Archer
Civil Engineer, Inc.

Applied GeoSystems

PROJECT NO. 18039-3

GROUND-WATER ELEVATION MAP
ARCO Station No. 374
6407 Telegraph Avenue
Oakland, California

PLATE 16

APPENDIX A:
FIELD INVESTIGATION PROCEDURES

FIELD INVESTIGATION PROCEDURES

Drilling of Soil Borings

Prior to drilling, the upper five feet of soil were hand augered to confirm that each location was clear of any underground lines or structures. The borings were drilled using a Mobile B-52 truck-mounted drill rig operated by Kvilhaug Well Drilling and Pump Company, Inc. of Concord, California. Eleven-inch-diameter, continuous flight, hollow-stem augers were used to drill each boring. The augers were steam-cleaned prior to each use.

Auger cuttings were contained in DOT-approved 17H 55-gallon solid-waste drums. These drums were labeled and identified by both boring number and drilling interval. The drums were temporarily stored onsite pending laboratory analysis for hydrocarbon concentrations to assess the proper method of disposal. Following analysis of the soil-boring samples approximately one cubic yard of cuttings from boring B-4 were aerated onsite, re-analyzed, and disposed with the other drill cuttings at a Class III landfill.

Soil Sampling and Classification

Soil samples were collected from each of the borings at 5-foot intervals. Samples were collected using a California-modified, split-spoon sampler containing three 6-inch-long brass sleeves. Samples were collected by advancing the boring to a point immediately above the sampling depth and then driving the sampler through the hollow center of the auger and into the soil. The sampler was driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows needed to drive the sampler each 6-inch increment was counted and recorded to evaluate the relative consistency of the soil.

After recovering the sampler, the sample sleeves were removed and one sample was promptly sealed with aluminum foil, plastic caps, and tape. It was then labeled and placed in iced storage pending transport to a State-certified laboratory for the required testing. A soil sample from each interval was subjectively evaluated for hydrocarbons. Any product discoloration was noted on the Boring Log by the field geologist. An organic vapor meter (OVM) was used to evaluate the organic vapor concentrations in the soil samples. Readings were collected by placing the rubber cup skirting the intake probe flush against the end of the soil sample immediately after the sleeve was removed from the sampler.

The Unified Soil Classification System was used as a guide to identify the soil encountered in the boreholes. A copy of this classification system is shown on Plate 3. Descriptions of

the soil encountered in the boring are presented on the Logs of Borings. The OVM readings are shown on the Logs of Borings in the column labeled "P.I.D."

A Chain of Custody Record was initiated for soil samples collected and accompanied the samples to the laboratory. Copies of the Chain of Custody Record and Laboratory Reports are included in Appendix C.

Well Construction, Development, and Purging

Borings B-1 through B-4 were converted into ground-water monitoring wells MW-1 through MW-4, respectively. The monitoring wells were constructed using 4-inch inside-diameter Schedule 40 polyvinyl chloride (PVC) casing. A 20-foot length of screened casing, perforated by the manufacturer with 0.020-inch-wide slots, was installed in each of the wells. For each of the wells, the perforated casing was set from the bottom of the borehole to approximately 6 feet below the ground surface. Non-perforated PVC casing was set from the top of the screened casing to within a few inches of the ground surface. All casing joints in the wells were flush-threaded, and no glues, chemical cements, or solvents were used in the construction of the wells. The top of each casing is covered with a locking compression cap and the bottom has a threaded end-plug.

The annular space of each well was backfilled with No. 3 sorted sand from the total well depth to approximately one foot above the screened casing. A bentonite plug, approximately one foot thick, was placed above the sand as a seal against cement entering the sand pack. The remaining annulus was backfilled to within a few inches of grade with a slurry of neat cement and approximately 5 percent bentonite. Graphic representation of each well construction is shown in the right column of the corresponding Log of Boring.

An aluminum utility box with a PVC apron was placed over each of the wellheads and set with concrete placed slightly above the ground surface. Each utility box has a watertight seal to protect the ground-water well against surface-water infiltration. A special wrench is necessary to open the utility boxes. This discourages vandalism and reduces the possibility of accidental disturbance of the wells.

After well construction was complete, the depth to static water level in each well was measured to the nearest 0.01-foot using a Solinst electronic water-level indicator. After water-level data were recorded, subjective evaluations were performed on each well by gently lowering a clean Teflon bailer approximately half its length past the air-water interface. Samples were retrieved and inspected for floating product, sheen, or emulsion.

After subjective evaluations were performed, each monitoring well was developed by surging to remove accumulated sediment from the bottom, and purged of between 3 and 5 well volumes of ground water. The purged water was temporarily stored in 17E 55-gallon waste-liquid drums, approved for this use by the Department of Transportation, pending laboratory analyses. Ground-water samples were collected afeter wells were allowed to recover to at least 80 percent static water level as measured by a Solinst electronic water-level indicator. The ground-water samples were collected by using a Teflon bailer thoroughly cleaned with Alconox and water. The bailer was gently lowered past the air-water interface to collect the ground-water sample. The sample was quickly transferred to laboratory-cleaned, 40-milliliter sample vials. Hydrochloric acid was added to the samples as a preservative. The vials were then sealed with Teflon-lined caps, labeled, and placed in iced storage for transport for analytical testing to the Applied GeoSystems Laboratory in Fremont, California (California Hazardous Waste Testing Lab Certificate No. 153) and to Sequoia Analytical in Redwood City, California (Certificate No. 145). A Chain of Custody Record was initiated for each water sampling event and accompanied the samples to the laboratory. Copies of the Chain of Custody Records and Laboratory Reports are included in Appendix C.

APPENDIX B:
WELL PERMITS

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE ♦ PLEASANTON, CALIFORNIA 94566 ♦ (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

(1) LOCATION OF PROJECT 6407 Telegraph Ave. Oakland, CA.

(2) CLIENT
Name Arco Products Co.
Address 2000 Alameda Phone 571-2434
City San Marco, CA Zip 94403

(3) APPLICANT
Name ~~Bill~~ Applied Geo Systems
Address 43245 Mission Phone 651-1906
City Fremont, CA Zip ~~651-1906~~ 94539

(4) DESCRIPTION OF PROJECT
Water Well Construction X Geotechnical ___
Cathodic Protection ___ Well Destruction ___

(5) PROPOSED WATER WELL USE
Domestic ___ Industrial ___ Irrigation ___
Municipal ___ Monitoring X Other ___

(6) PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

WELL PROJECTS
Drill Hole Diameter 10 in. Depth(s) 25 ft.
Casing Diameter 4 in. Number
Surface Seal Depth 8 ft. of Wells 3
Driller's License No. ___

GEOTECHNICAL PROJECTS
Number ___
Diameter ___ in. Maximum Depth ___ ft.

(7) ESTIMATED STARTING DATE 2/6/89
ESTIMATED COMPLETION DATE 2/7/89

(8) I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Bill Howell Date ___

FOR OFFICE USE

PERMIT NUMBER 89361
LOCATION NUMBER ___

Approved Wyman Hong Date 26 Jun 89
Wyman Hong

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Notify this office (484-2600) at least one day prior to starting work on permitted work and before placing well seals.
3. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or bore hole logs and location sketch for geotechnical projects. Permitted work is completed when the last surface seal is placed or the last boring is completed.
4. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie, or equivalent.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie, or equivalent.

E. WELL DESTRUCTION. See attached.

91987

CONDITIONS FOR GRANTING A MINOR ENCROACHMENT PERMIT

TO: Atlantic Richfield Company

ADDRESS: 6407 Telegraph Avenue

1. That this permit shall be revocable at the pleasure of the Director of Public Works.

2. That the permittee, by the acceptance, either expressed or implied, of the minor encroachment permit hereby disclaims any right, title, or interest in or to any portion of the public sidewalk or street area, and agrees that said temporary use of said area does not constitute an abandonment on the part of the City of Oakland of any of its rights for street purposes and otherwise.

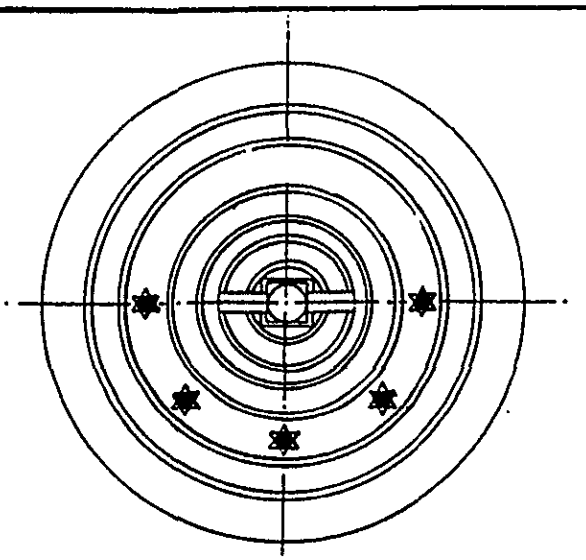
3. The permittee shall maintain in force and effect at all times that said encroachment occupies said public sidewalk area, good and sufficient public liability insurance in the amount of $300,000 for each occurance, and property damage insurance in the amount of $50,000 for each occurance, both including contractual liability insuring the City of Oakland against any and all claims arising out of the existence of said encroachment in said sidewalk area, and that a certificate of such insurance and subsequent notices of of the renewal thereof, shall be filed with the Director of Public Works of the City of Oakland, and that such certificate shall state that said insurance coverage shall not be cancelled or be permitted to lapse without thirty (30) days written notice to said Director of Public Works.

4. That the permittee, by the acceptance, either expressed or implied, of this revocable permit shall be solely and fully responsible for the repair or replacement of any portion or all of said improvements in the event that said improvements shall have failed or have been damaged to the extent of creating a menace or of becoming a hazard to the safety of the general public; and that the permittee shall be liable for the expenses connected therewith.

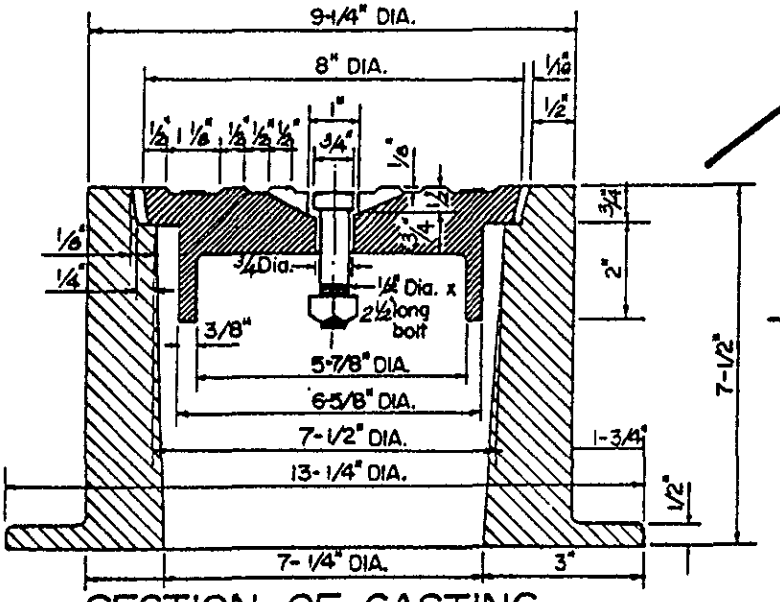
5. That upon the termination of the permission herein granted, permittee shall immediately remove said encroachment from the sidewalk and street area, and any damage resulting therefrom shall be repaired to the satisfaction of the Director of Public Works.

6. That the permittee shall file with the City of Oakland for recordation a Minor Encroachment Permit and Agreement, and shall be bound by and comply with all the terms and conditions of said permit.

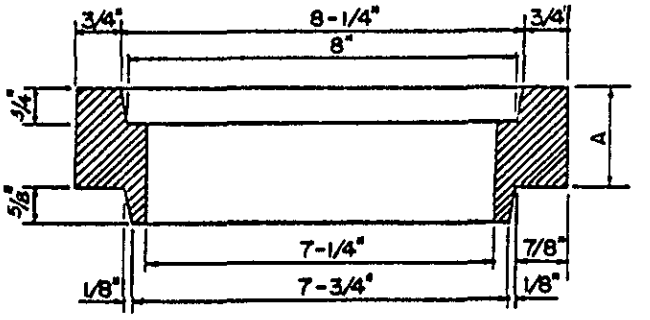
7. That said Minor Encroachment Permit and Agreement shall take effect when all the conditions hereinabove set forth shall have been complied with to the satisfaction of the Director of Public Works, and shall become null and void upon the failure of the permittee to comply with all conditions hereinabove set forth.



PLAN OF CASTING

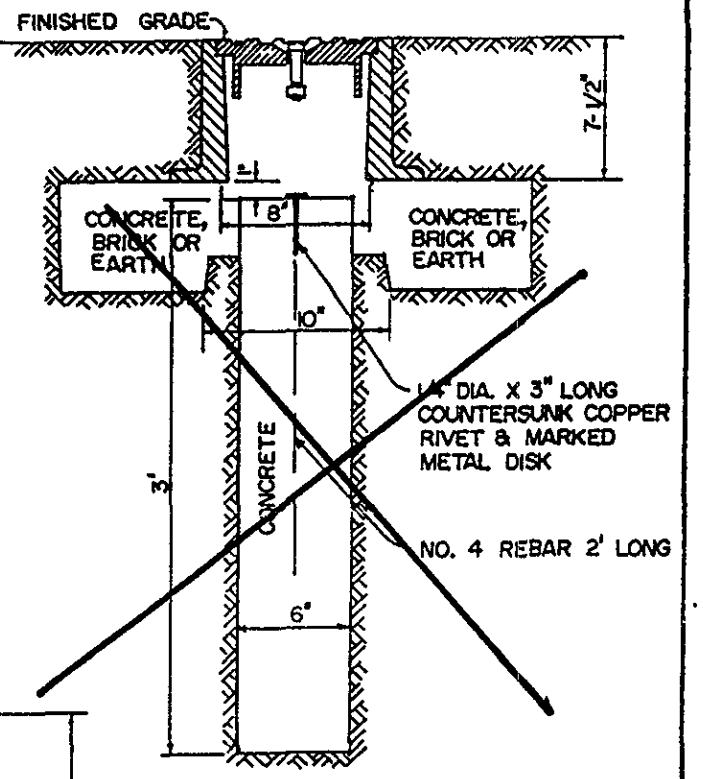


SECTION OF CASTING



A = 1-1/2", 2", 2-1/2", OR 3"

SECTION OF RISER RINGS



SECTION OF MONUMENT

NOTE:

ALL DIMENSIONS TO BE ACCURATE WITHIN 1/16 INCH.

APPROXIMATE WEIGHTS:

FRAME = 59.5 LBS.
COVER = 15.5 LBS.

CITY OF OAKLAND	ENGINEERING AND DESIGN SERVICES DIVISION
EXHIBIT 'B'	DEPUTY DIRECTOR OF PUBLIC WORKS DATE: JULY 1987 REV. DATE: DRWG. S-9

APPENDIX C:
CHAIN OF CUSTODY RECORDS AND ANALYSIS REPORTS

CHAIN OF CUSTODY RECORD

ORIGINAL

Applied GeoSystems
43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): Ruben A. Lopez

Phone: 415-651-1906

LABORATORY: Applied Geo Systems

TURNAROUND TIME: 2 weeks

Project Leader: Bill Howell

Phone No. 415-651-1906

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Ruben A. Lopez	Bill Howell	7/13/89	1510
Bill Howell			
	Received for laboratory by:	7-14-89	1100

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-3.5-B1	18039-3	7/6/89	TPHg, BTEX	frozen
S-8.5-B-1				
S-3.5-B2	18039-3	7/6/89	TPHg, BTEX	frozen
S-13.5-B2				
S-18.5-B2				
S-3.5-B3	18039-3	7/7/89	TPHg, BTEX	frozen
S-3.5-B4	18039-3	7/7/89	TPHg, BTEX	frozen
S-8.5-B4				
S-13.5-B4				

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S01
Project #: 18039-3
Sample #: S-3.5-B1
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	ND		2.0		07-18-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-18-89	
Toluene	ND		0.050		07-18-89	
Ethylbenzene	ND		0.050		07-18-89	
Total Xylenes	ND		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S02
Project #: 18039-3
Sample #: S-8.5-B1
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	60		2.0		07-18-89	
TEH as Diesel						NR
Benzene	0.66		0.050		07-18-89	
Toluene	2.9		0.050		07-18-89	
Ethylbenzene	0.99		0.050		07-18-89	
Total Xylenes	5.2		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S03
Project #: 18039-3
Sample #: S-3.5-B2
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	ND		2.0		07-18-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-18-89	
Toluene	ND		0.050		07-18-89	
Ethylbenzene	ND		0.050		07-18-89	
Total Xylenes	ND		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S04
Project #: 18039-3
Sample #: S-13.5-B2
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	ND		2.0		07-18-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-18-89	
Toluene	ND		0.050		07-18-89	
Ethylbenzene	ND		0.050		07-18-89	
Total Xylenes	ND		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S05
Project #: 18039-3
Sample #: S-18.5-B2
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	ND		2.0		07-18-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-18-89	
Toluene	ND		0.050		07-18-89	
Ethylbenzene	ND		0.050		07-18-89	
Total Xylenes	ND		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S06
Project #: 18039-3
Sample #: S-3.5-B3
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	ND		2.0		07-18-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-18-89	
Toluene	ND		0.050		07-18-89	
Ethylbenzene	ND		0.050		07-18-89	
Total Xylenes	ND		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S07
Project #: 18039-3
Sample #: S-3.5-B4
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	ND		2.0		07-18-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-18-89	
Toluene	ND		0.050		07-18-89	
Ethylbenzene	ND		0.050		07-18-89	
Total Xylenes	ND		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S08
Project #: 18039-3
Sample #: S-8.5-B4
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	310		2.0		07-18-89	
TEH as Diesel						NR
Benzene	0.36		0.050		07-18-89	
Toluene	4.9		0.050		07-18-89	
Ethylbenzene	5.2		0.050		07-18-89	
Total Xylenes	22		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-14-89
Laboratory Number: 90721S09
Project #: 18039-3
Sample #: S-13.5-B4
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	560		2.0		07-18-89	
TEH as Diesel						NR
Benzene	12		0.050		07-18-89	
Toluene	5.8		0.050		07-18-89	
Ethylbenzene	12		0.050		07-18-89	
Total Xylenes	49		0.050		07-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-21-89
Date Reported

CHAIN OF CUSTODY RECORD

Applied GeoSystems
43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): Eblee Westphal
Phone: 651-1906

LABORATORY: Applied GeoSystems

TURNAROUND TIME: 24 hour

Project Leader: Bill Howell
Phone No. 415-651-1906

SHIPPING INFORMATION:
Shipper
Address
Date Shipped
Service Used
Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Eblee Westphal		7-31-89	12:30
	Received for laboratory by:	8-1-89	1100

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-0731-1a (COMPOSITE)				
S-0731-1b (COMPOSITE)	18039-3	7-31-89	TPHg & BETX	ICED
S-0731-1c (COMPOSITE)				
S-0731-1d (COMPOSITE)				

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 08-01-89
Laboratory Number: 90802S01
Project #: 18039-3
Sample #: S-0731-1(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	21		2.0		08-01-89	
TEH as Diesel						NR
Benzene	ND		0.050		08-01-89	
Toluene	ND		0.050		08-01-89	
Ethylbenzene	ND		0.050		08-01-89	
Total Xylenes	0.37		0.050		08-01-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

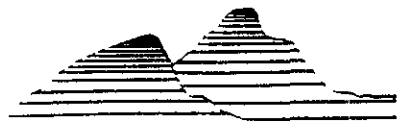
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-02-89
Date Reported

CHAIN OF CUSTODY RECORD



Applied GeoSystems

43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): Jon DeTar

Phone: 651 1906

LABORATORY:
Applied Geo Systems
43255 Mission Blvd
Fremont CA 94539

TURNAROUND TIME: 2 week | NORMAL

Project Leader: Bill Howell

Phone No.

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Jon DeTar			
	Received for laboratory by:	7-21-89	1030

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
W-8.78-MW2	18039-3	7/20/89	TPH	ICED
W-8.06-MW3	18039-3	7/21/89	BTEX	
W-8.44-MW1	18039-3	7/21/89		
W-8.25-MW4	18039-3	7/21/89		

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-21-89
Laboratory Number: 90739W01
Project #: 18039-3
Sample #: W-8.44-MW1
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		0.033		0.020	07-25-89	
TEH as Diesel						NR
Benzene		0.00077		0.00050	07-25-89	
Toluene		0.0016		0.00050	07-25-89	
Ethylbenzene		0.0015		0.00050	07-25-89	
Total Xylenes		0.0050		0.00050	07-25-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-26-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-21-89
Laboratory Number: 90739W02
Project #: 18039-3
Sample #: W-8.78-MW2
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		4.2		0.050	07-25-89	
TEH as Diesel						NR
Benzene		0.28		0.0050	07-25-89	
Toluene		0.21		0.0050	07-25-89	
Ethylbenzene		0.038		0.0050	07-25-89	
Total Xylenes		0.024		0.0050	07-25-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-26-89
Date Reported

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-21-89
Laboratory Number: 90739W03
Project #: 18039-3
Sample #: W-8.06-MW3
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		0.43		0.020	07-25-89	
TEH as Diesel						NR
Benzene		0.0090		0.00050	07-25-89	
Toluene		0.0048		0.00050	07-25-89	
Ethylbenzene		ND		0.00050	07-25-89	
Total Xylenes		0.050		0.00050	07-25-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-26-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 07-21-89
Laboratory Number: 90739W04
Project #: 18039-3
Sample #: W-8.25-MW4
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		8.7		0.20	07-25-89	
TEH as Diesel						NR
Benzene		0.72		0.010	07-25-89	
Toluene		0.36		0.010	07-25-89	
Ethylbenzene		0.12		0.010	07-25-89	
Total Xylenes		0.64		0.010	07-25-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-26-89
Date Reported

CHAIN OF CUSTODY RECORD

SAMPLER (signature): [signature]

Phone: 415-651-1906

LABORATORY: Applied GeoSystems

TURNAROUND TIME: 2 Week

Project Leader: Bill Howell

Phone No. 415-651-1906

Applied GeoSystems

43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-190

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Tim
[signature]			
	Received for laboratory by: [signature]	9-5-89	9:3

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
W-16-MW1	SFJ 18039-3 SFJ	SFJ 8/31/89 SFJ	SFJ BTEX TPH-g SFJ	SFJ iced/HCl SFJ
W-12-MW2				
W-19-MW3				
W-13-MW4				

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 09-05-89
Laboratory Number: 90902W01
Project #: 18039-3
Sample #: W-16-MW1
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		ND		0.020	09-11-89	
TEH as Diesel						NR
Benzene		ND		0.00050	09-11-89	
Toluene		ND		0.00050	09-11-89	
Ethylbenzene		ND		0.00050	09-11-89	
Total Xylenes		ND		0.00050	09-11-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-14-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 09-05-89
Laboratory Number: 90902W02
Project #: 18039-3
Sample #: W-12-MW2
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		4.2		0.020	09-11-89	
TEH as Diesel						NR
Benzene		0.16		0.00050	09-11-89	
Toluene		0.26		0.00050	09-11-89	
Ethylbenzene		0.045		0.00050	09-11-89	
Total Xylenes		0.24		0.00050	09-11-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-14-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 09-05-89
Laboratory Number: 90902W03
Project #: 18039-3
Sample #: W-19-MW3
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		1.2		0.020	09-11-89	
TEH as Diesel						NR
Benzene		0.085		0.00050	09-11-89	
Toluene		0.046		0.00050	09-11-89	
Ethylbenzene		0.0084		0.00050	09-11-89	
Total Xylenes		0.055		0.00050	09-11-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-14-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: William K. Howell

Date Received: 09-05-89
Laboratory Number: 90902W04
Project #: 18039-3
Sample #: W-13-MW4
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline		7.3		0.020	09-11-89	NR
TPH as Gasoline						NR
TEH as Diesel						
Benzene		0.63		0.00050	09-11-89	
Toluene		0.22		0.00050	09-11-89	
Ethylbenzene		0.072		0.00050	09-11-89	
Total Xylenes		0.32		0.00050	09-11-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

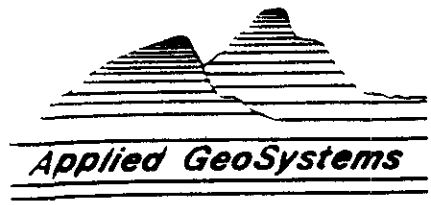
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-14-89
Date Reported

CHAIN OF CUSTODY RECORD



Applied GeoSystems

43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): Jim Kuhlman

Phone: 651-1906

LABORATORY: Applied GeoSystems

TURNAROUND TIME: 5 Week

Project Leader: Bill Howell

Phone No. 651-1906

SHIPPING INFORMATION:

Shipper _____

Address _____

Date Shipped _____

Service Used _____

Airbill No. _____ Cooler No. _____

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Jim Kuhlman			
	Received for laboratory by: Frank Lee	10-5-87	9:10

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
[illegible]	1009-5	10-4-87	TPH + BTX	ICE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: K. William Howell

Date Received: 10-05-89
Laboratory Number: 91011W01
Project #: 18039-3
Sample #: W-10-MW1
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		ND		0.020	10-10-89	
TEH as Diesel						NR
Benzene		ND		0.00050	10-10-89	
Toluene		ND		0.00050	10-10-89	
Ethylbenzene		ND		0.00050	10-10-89	
Total Xylenes		ND		0.00050	10-10-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

10-12-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: K. William Howell

Date Received: 10-05-89
Laboratory Number: 91011W02
Project #: 18039-3
Sample #: W-10-MW2
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		4.3		0.10	10-10-89	
TEH as Diesel						NR
Benzene		0.86		0.00050	10-10-89	
Toluene		0.30		0.00050	10-10-89	
Ethylbenzene		0.029		0.00050	10-10-89	
Total Xylenes		0.33		0.00050	10-10-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

10-12-89
Date Reported

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ANALYSIS REPORT

02121ab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: K. William Howell

Date Received: 10-05-89
Laboratory Number: 91011W03
Project #: 18039-3
Sample #: W-9-MW3
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		7.0		0.20	10-10-89	
TEH as Diesel						NR
Benzene		0.58		0.010	10-10-89	
Toluene		0.90		0.010	10-10-89	
Ethylbenzene		0.12		0.010	10-10-89	
Total Xylenes		0.67		0.010	10-10-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

10-12-89
Date Reported

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ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: K. William Howell

Date Received: 10-05-89
Laboratory Number: 91011W04
Project #: 18039-3
Sample #: W-10-MW4
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		21		0.50	10-10-89	
TEH as Diesel						NR
Benzene		2.3		0.025	10-10-89	
Toluene		1.3		0.025	10-10-89	
Ethylbenzene		0.28		0.025	10-10-89	
Total Xylenes		1.3		0.025	10-10-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

10-12-89
Date Reported

CHAIN OF CUSTODY RECORD

Applied GeoSystems
43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): R. Mark Hamilton [signature]

Phone: 651-1906

LABORATORY: Applied Geo Systems

TURNAROUND TIME: 2 weeks

Project Leader: Bill Howell

Phone No. 415-651-1906

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Mark Hamilton [signature]			
	Received for laboratory by: [signature]	1-10-90	1700

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
[illegible] -MW1	[illegible]	1-10-89	[illegible]	[illegible]
[illegible] -MW2			[illegible]	
[illegible] -MW3	[illegible]		[illegible]	[illegible]
[illegible] -MW4	[illegible]	[illegible]	[illegible]	[illegible]

Applied GeoSystems 43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Bill Howell
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Project: AGS 18039-3

Date Sampled: 01-10-90
Date Received: 01-10-90
BTEX Analyzed: 01-12-90
TPHg Analyzed: 01-12-90
TPHd Analyzed: NR
Matrix: Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	0.00050	0.00050	0.00050	0.00050	0.020	0.10
SAMPLE Laboratory Identification						
W-10-MW1 W1001051	ND	ND	ND	ND	ND	NR

ppm = parts per million = mg/L = milligrams per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.
TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.
TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

01-17-90
Date Reported

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Bill Howell
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Project: AGS 18039-3

Date Sampled: 01-10-90
Date Received: 01-10-90
BTEX Analyzed: 01-12-90
TPHg Analyzed: 01-12-90
TPHd Analyzed: NR
Matrix: Water

	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Total Xylenes ppm	TPHg ppm	TPHd ppm
Detection Limit:	0.0050	0.0050	0.0050	0.0050	0.20	0.10
SAMPLE Laboratory Identification						
W-8-MW2 W1001052	0.89	0.71	0.12	0.76	8.0	NR
W-16-MW4 W1001054	0.47	0.25	0.063	0.43	4.3	NR

ppm = parts per million = mg/L = milligrams per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.
TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.
TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

01-17-90
Date Reported

Applied GeoSystems 43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Bill Howell
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Project: AGS 18039-3

Date Sampled: 01-10-90
Date Received: 01-10-90
BTEX Analyzed: 01-12-90
TPHg Analyzed: 01-12-90
TPHd Analyzed: NR
Matrix: Water

	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Total Xylenes ppm	TPHg ppm	TPHd ppm
Detection Limit:	0.0025	0.0025	0.0025	0.0025	0.10	0.10
SAMPLE Laboratory Identification						
W-12-MW3 W1001053	0.13	0.059	0.021	0.073	0.94	NR

ppm = parts per million = mg/L = milligrams per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.
TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.
TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

01-17-90
Date Reported

APPLIED GEOSYSTEMS IS CERTIFIED BY THE STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 153)

CHAIN OF CUSTODY RECORD

ORIGINAL

Applied GeoSystems

43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-

SAMPLER (signature): [signature]

Phone: 651-906

LABORATORY:
Sequoia

TURNAROUND TIME: 2 weeks

Project Leader: Bill Howell

Phone No. 651-906

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	T
[signature]	Bill Howell	10/5/89	9:
Bill Howell	[signature]	10-5-89	4
	Received for laboratory by: B. L. O[illegible]	10/6 4:30 PM	

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
W-10-MW1	18079	10-4-89	General Mineral Analysis	Cool / intact

SEQUOIA ANALYTICAL

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

Applied GeoSystems	Client Project ID:	1839-3	Sampled:	Oct 4, 1989
43255 Mission Blvd., Suite B	Sample Descript:	Water, W-10-MW1	Received:	Oct 6, 1989
Fremont, CA 94539				
Attention: Bill Howell	Lab Number:	910-1074	Reported:	Oct 24, 1989

GENERAL MINERAL ANALYSIS

Analyte	Detection Limit mg/L (ppm)	Sample Results mg/L (ppm)
Bicarbonate Alkalinity	2.0	180
Calcium	2.0	130
Carbonate Alkalinity	0.5	N.D.
Chloride	0.5	330
Copper	0.01	N.D.
Hardness	2.0	520
Hydroxide Alkalinity	0.001	N.D.
Iron	0.01	0.23
Magnesium	2.0	48
Manganese	0.01	0.061
pH (pH units)	N.A.	6.9
Sodium	0.5	100
Specific Conductance (µmhos/cm)	1.0	1,600
Sulfate	0.5	120
Surfactants	0.02	N.D.
Total Dissolved Solids	5.0	1,000
Zinc	0.01	0.011

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

APPENDIX D:
LAND SURVEY SUMMARY REPORT

RON ARCHER
CIVIL ENGINEER, INC.

CONSULTING • PLANNING • DESIGN • SURVEYING

4133 Mohr Ave., Suite E • Pleasanton, CA 94566
(415) 462-9372

JULY 28, 1989 JOB NO. 1582

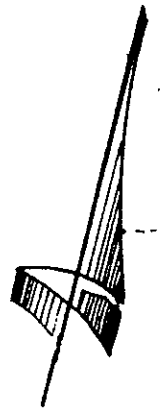
ELEVATIONS OF EXISTING MONITOR WELLS LOCATED AT THE ARCO STATION NO. 374, AT THE INTERSECTION OF TELEGRAPH AVENUE AND ALCATRAZ AVE. CITY OF OAKLAND, ALAMEDA COUNTY, CALIFORNIA

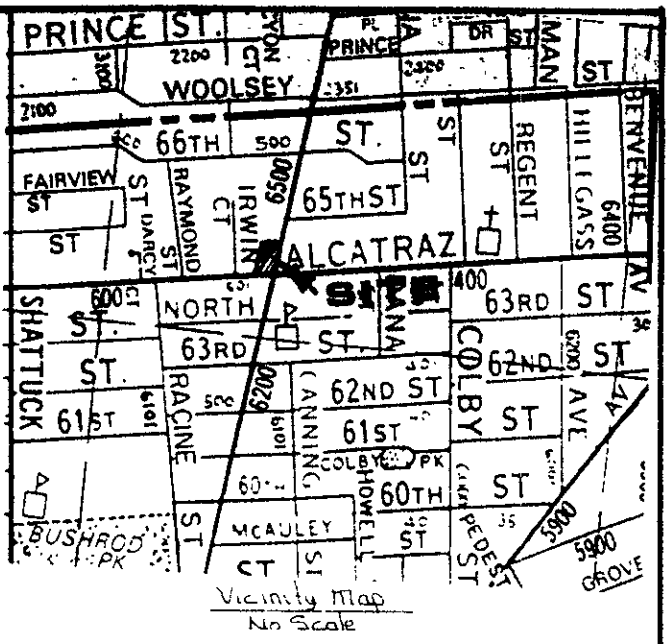
FOR: APPLIED GEOSYSTEMS.
PROJECT NO. 18039-3

BENCHMARK: BENCHMARK DISTROYED BY HANDICAP RAMP SO AN ASSUMED ELEVATION OF 142.80 WAS TAKEN AT FLOWLINE OF GUTTER AT MIDPOINT OF RETURN OF THE SOUTHWEST CORNER OF INTERSECTION OF ALCATRAZ AVENUE AND RACINE STREET WHERE BENCHMARK SHOULD HAVE BEEN.

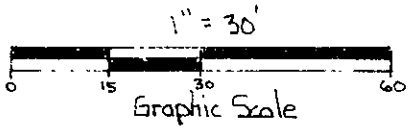
MONITOR WELL DATA TABLE

WELL DESIGNATION	ELEV	DESCRIPTION
M-1	156.31	TOP OF PVC CASING
	157.19	TOP OF BOX
M-2	157.10	TOP OF PVC CASING
	157.92	TOP OF BOX
MW1	159.44	TOP OF PVC CASING
	156.65	TOP OF BOX
MW2	158.46	TOP OF PVC CASING
	158.71	TOP OF BOX
MW3	154.18	TOP OF PVC CASING
	154.42	TOP OF BOX
MW4	157.08	TOP OF PVC CASING
	157.32	TOP OF BOX





AP RAMP SO AN ASSUMED
AT FLOWLINE OF GUTTER
SOUTHWEST CORNER OF
UE AND RACINE STREET WHERE



ABLE

DESCRIPTION
TOP OF PVC CASING TOP OF BOX
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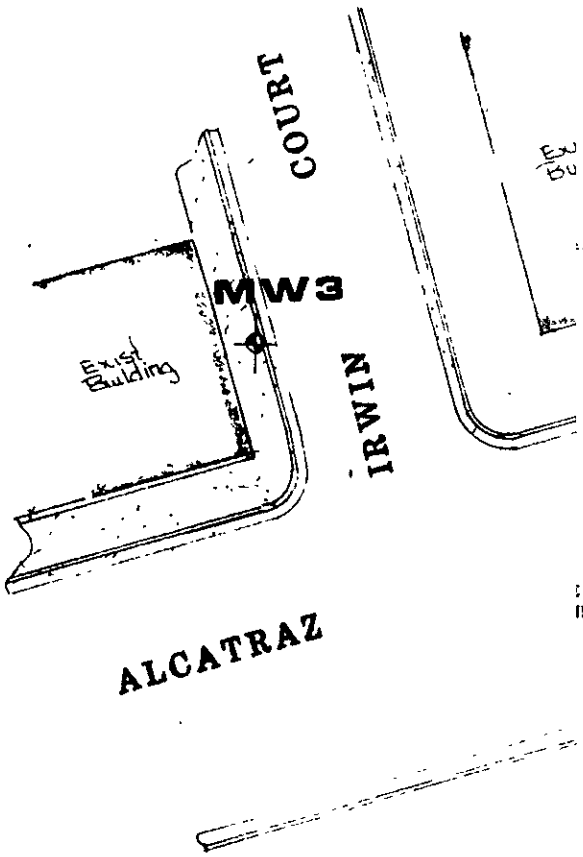

JOB NO. 1582

ARCO STATION
D ALCATRAZ AVE.

RON ARCHER
CIVIL ENGINEER, INC
CONSULTING • PLANNING • DESIGN • SURVEYING
4133 Mohr Ave., Suite E • Pleasanton, CA 94566
(415) 462-8372

APPENDIX E:
METHODOLOGY AND PROCEDURE FOR ESTIMATING YIELD OF WELLS THAT PENETRATE THE SHALLOW WATER-BEARING ZONE

METHODOLOGY AND PROCEDURE FOR ESTIMATING YIELD OF THE SHALLOW WATER-BEARING ZONE

Introduction

The procedure used to estimate the yield of the shallow water-bearing zone initially involved pumping the ground water from well MW-1 at a rate of between 1.3 and 1.4 gallons per minute.
A sustainable discharge rate (where drawdown in the well remained constant) could not be achieved and the well de-watered after 40 minutes. Recovery in the well was subsequently monitored for 150 minutes at which time the well had recovered approximately 77 percent of its initial volume. A copy of the Pumping Test Recording Form listing the data collected during the test is included in this Appendix.

The recovery data were normalized to yield positive recharge values with time by subtracting it from the last recorded depth to water measurement taken at the time the pump was shut off (25.25 feet below the top of the well casing). Plotting the normalized recovery data using a semi-logarithmic scale
(Plate E-1) did not reveal a rapid initial recharge of ground water and a linear equation was found to produce a line of best fit to the data ($y=0.098315 \cdot x + 0.829648$). The data was subsequently re-plotted using a linear-linear scale (Plate E-2).

Because the well recharged slowly, the rate of recovery can be approximated by a linear relationship from which the yield of the shallow water bearing zone is estimated. The assumptions, mathematical methodology, and analysis, used to derive this estimation are presented below.

Assumptions Used in Analysis

The assumptions used in estimating the yield are:

1) For slow-permeability saturated zones, ground-water recovery in a well can be approximated by a linear relationship.

2) For low-permeability saturated zones, following 70 percent recovery of the well, ground-water flow into the well is approximately horizontal, and analogous to natural ground-water flow in the saturated zone.

3) Calculations using data from wells that have not fully

recovered will tend to result in an over estimation of yield.

4) The porosity of the annular space material is much greater than the porosity of the native soil, such that recharge into the well is not artificially impeded.

Methodology Used for Estimating Ground-Water Recharge

The method used to estimate ground-water recharge based on the recovery data collected from well MW-1 is:

1) Well Volume Calculation

The volume of ground water in the well is calculated in terms of gallons per foot of well casing.

2) Well Recovery Rate Calculation

A linear rate of recovery in the well at the end of the test is calculated in terms of feet per minute.

3) Ground-Water Recharge Rate Calculation

The well volume is multiplied by the well recovery rate to yield a ground-water recharge rate at the well in terms of gallons per day.

Mathematical Procedure for Estimating Ground-Water Recharge

1) Well Volume Calculation

The volume of water in a well involves calculating the volume of the borehole, using the porosity of the material in the annular space, and the volume of water in the well. The equation is:

$$[(\pi \cdot r_b^2 \cdot h \cdot p_b) - (\pi \cdot r_w^2 \cdot h \cdot p_b)] + (\pi \cdot r_w^2 \cdot h \cdot p_w)$$

[water volume of annular space] + (volume of well)

where:

r_b = radius of the well boring (ft.)

r_w = radius of the well (ft.)
p_b = porosity of the boring annular space material
p_w = porosity of water in the well
h = height of water column (ft.)

The well boring diameter of MW-1 is 11 inches, therefore:

$r_b = [(11/12) \cdot 1/2] \approx$ **0.458 ft.**

The well diameter of MW-1 is 4 inches, therefore:

$r_w = [(4/12) \cdot 1/2] \approx$ **0.167 ft.**

The porosity of the annular space material (sand) $\approx$ **0.30** (30%)

The porosity of water = **1.0** (100%)

As indicated on the Pumping Test Recording Form, the height of the water column of well MW-1 (with the pump in the well) was:

h = (25.25 ft - 8.20 ft) = **17.05 ft.**

The volume of water in the annular space material is:

$(\pi \cdot 0.458^2 \cdot 17.05 \cdot 0.30) - (\pi \cdot 0.167^2 \cdot 17.05 \cdot 0.30) \approx$ **2.92 ft^3**

The volume of water in the well is:

$(\pi \cdot 0.167^2 \cdot 17.05 \cdot 1.0) \approx$ **1.49 ft^3**

Therefore, one well volume for MW-1 is:

(2.92) ft^3 + (1.49) ft^3 = **4.41 ft^3**

Converting to gallons yields:

(4.41 ft^3 · 7.48 gal./ft^3) $\approx$ **32.99 gals.**

Dividing by the height of the water column yields:

(32.99 gal. ÷ 17.05 ft.) ≈ **1.93 gallons per foot (of casing)**

2) Well Recovery Rate Calculation

From the Pumping Test Recording Form, the last two measurements of time (t) and depth to water (DTW) are used to approximate the rate of horizontal flow into the well:

for t = 120 min. DTW = 13.15 ft.
for t = 150 min. DTW = 12.08 ft.

$\blacktriangle DTW = 1.07$ ft. $\quad \frac{\blacktriangle DTW}{\blacktriangle t} = \frac{1.07 \text{ ft.}}{30 \text{ min.}} \approx$ **0.0357 ft./min.**
$\blacktriangle t = 30$ min.

3) Ground-Water Recharge Rate Calculation

The calculated volume of ground water per foot of well casing multiplied by the rate of ground-water recovery in well MW-1 yields the estimated recharge rate of the shallow saturated zone:

$$1.93 \frac{\text{gal.}}{\text{ft.}} \cdot 0.0357 \frac{\text{ft. of recharge}}{\text{min.}} \approx 0.07 \frac{\text{gal.}}{\text{min.}} = \mathbf{100.8} \frac{\text{gal.}}{\text{day}}$$

"MINI" PUMP TEST RECORDING FORM

Applied GeoSystems

Site Name: Arco - Oakland

Job Number: 18039-3

Date: 12-14-89

Time Begun: _____ Time Completed: _____

Well Number: MW-1 Pumped Well ☒ Observation Well ☒

Geologist: Keith McVicker Time on: _____ Time off: _____

Initial water level measurement without pump: 8.52 Type of Pump: Keck No. 1.

Initial water level measurement with pump in well: 8.20 Pumping Rate: 1.3 - 1.4 g.p.m.

DRAWDOWN

Time (24hr)	Time Since Pump Started	Depth to Water	Drawdown (ft)
	) min.	8.52	0 32
	).25	8.75	0.55
	).50	8.85	0.65
	).75	9.00	0.8
	1.0	9.15	0.95
	1.25	9.33	1.13
	1.5	9.49	1.29
	1.75	9.63	1.43
	2.0	9.75	1.55
	2.5	9.90	1.7
	3.0	10.06	1.86
	3.5	10.20	2.0
	4	10.35	2.15
	5	10.72	2.52
	6	11.00	2.8
	7	11.25	3.05
	8	12.80	4.6
	9	13.40	5.2
	10	14.30	6.1
	11	15.20	7
	12	16.02	7.82
	18	17.66	9.46
	24	20.15	11.95
	30	22.15	13.95

Time (24hr)	Time Since Pump Started	Depth to Water	Drawdown (ft)
	40 min.	25.25	17.05
	50		
	60		
	80		
	100		
	120		
	150		
	180		
	210		
	240		
	270		
	300		

RECOVERY Recovery

Time (24hr)	Time Since Pump Stopped	Depth to Water 25.25	Drawdown (ft) 0
	0.1) min.	25.00	.25
	0.25	24.95	.3
	0.5	24.90	.35
	).75	24.84	.41
	1.0	24.79	.46
	1.25	24.74	.51
	1.5	24.68	.57
	1.75	24.63	.62
	2.0	24.58	.67
	2.5	24.50	.75
	3.0	24.44	.81

Time (24hr)	Time Since Pump Stopped	Depth to Water	Drawdown (ft)
	3.5 min	24.37	.88
	4	24.30	.95
	5	24.15	1.1
	6	23.98	1.27
	7	23.83	1.42
	8	23.68	1.57
	9	23.52	1.73
	10	23.36	1.89
	12	23.04	2.21
	14	22.74	2.51
	18	22.12	3.13
	24	21.33	3 92
	30	20.54	4.71
	40	19.23	6.02
	50	18 00	7.25
	60	16.98	8.27
	80	15.36	9.89
	100	14.00	11.25
	120	13.15	12.1
	150	12.08	13.17
	180		
	210		
	240		
	270		
	300		

25.25 - 8.2 = 17.05

25.25 - 13.15 = 12.1 / 17.05 ≅ 71%

25.25 - 12.08 = 13.17 / 17.05 ≅ 77%

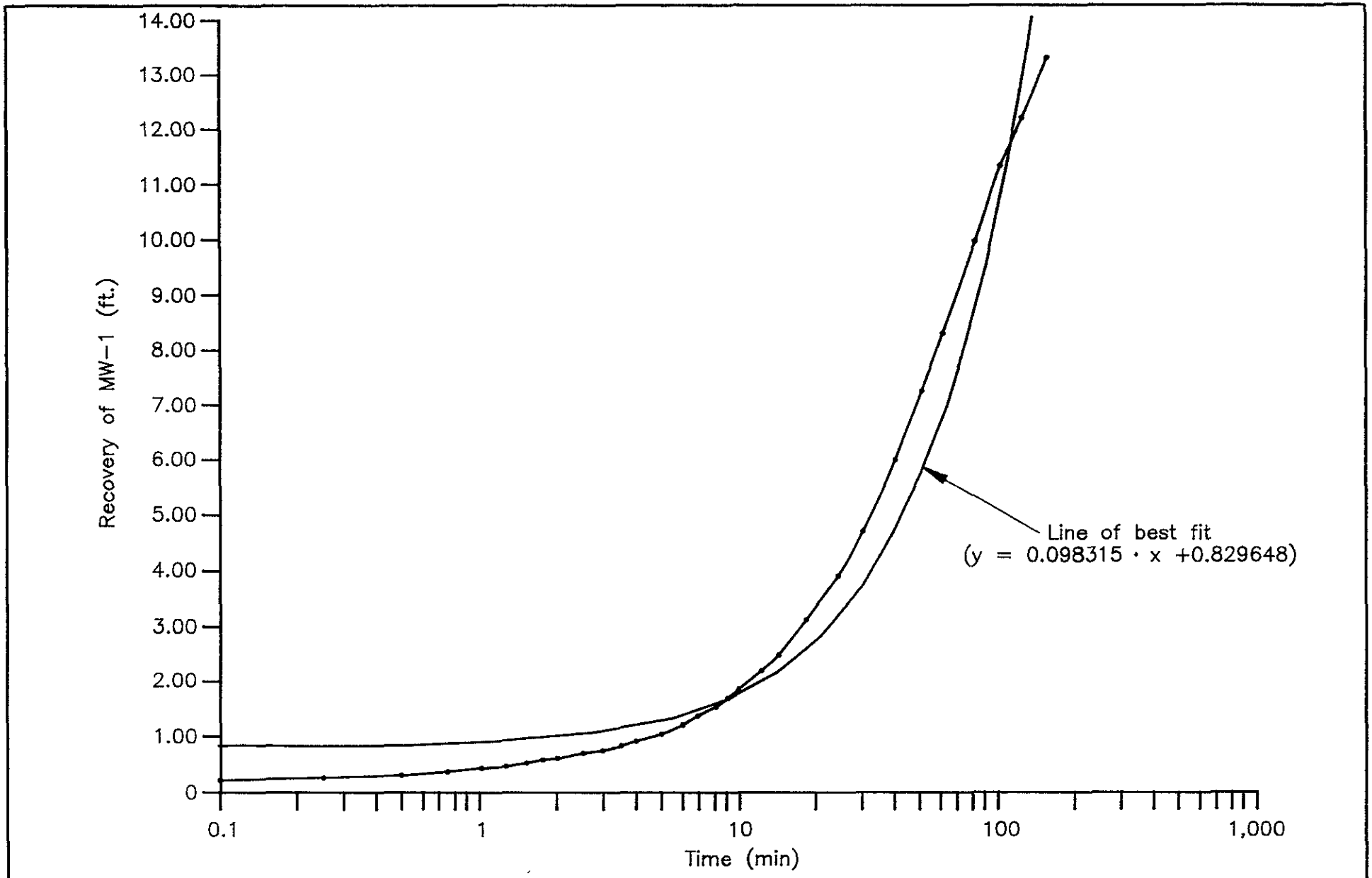

PLATE	SEMI-LOG PLOT OF RECOVERY VERSUS TIME (MW-1) ARCO Station No. 374 6407 Telegraph Avenue Oakland, California	Applied GeoSystems PROJECT NO. 18039-3
E - 1		

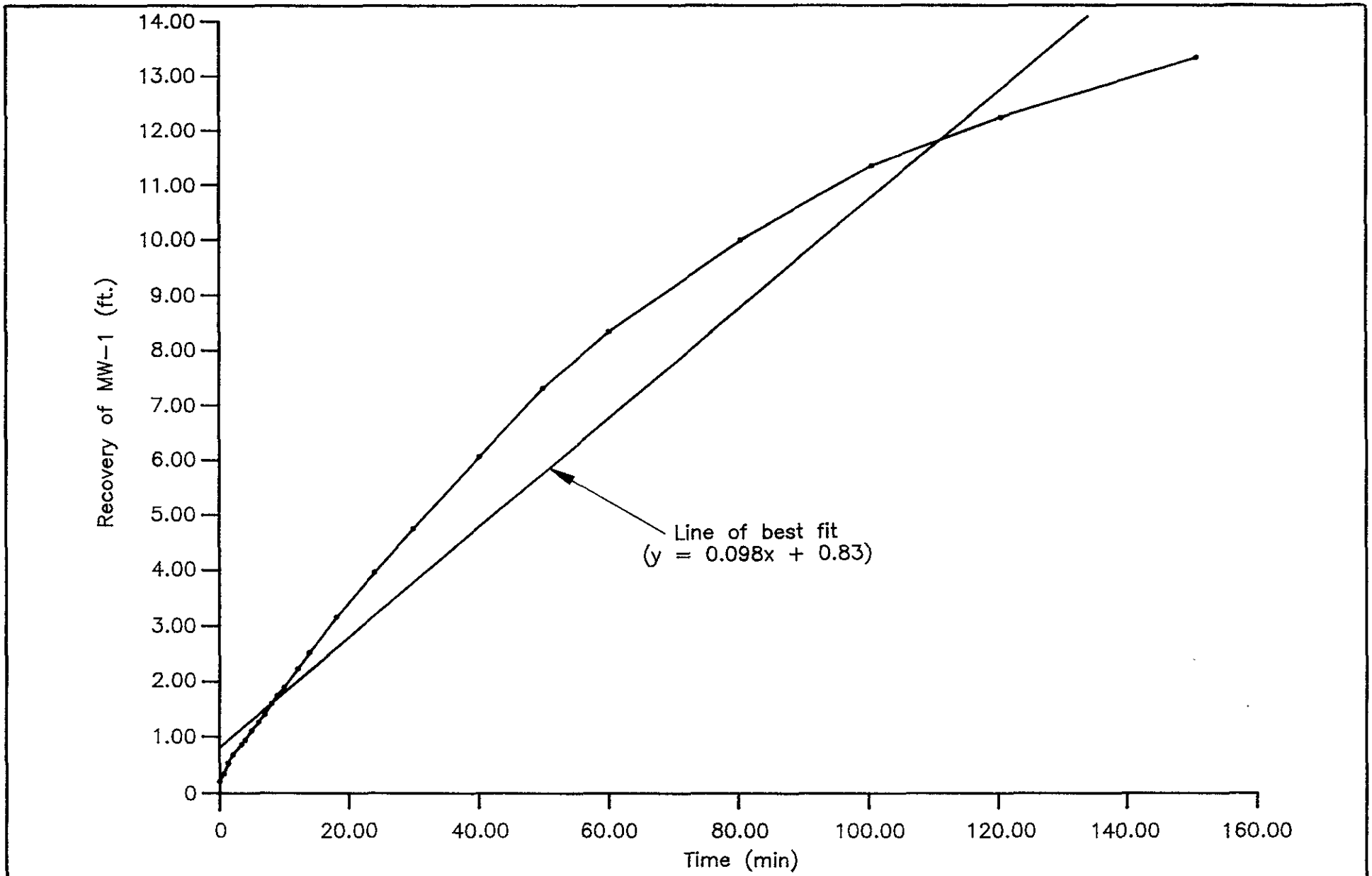

PLATE		
E - 2	**LINEAR-LINEAR PLOT OF RECOVERY VERSUS TIME (MW-1)** **ARCO Station No. 374** **6407 Telegraph Avenue** **Oakland, California**	Applied GeoSystems **PROJECT NO. 18039-3**

Applied GeoSystems

91 APR -1 AM 10: 58

TRANSMITTAL

42501 Albrae Street, Suite 100, Fremont, California 94538
Phone: (415) 651-1906
Fax: (415) 651-8647

TO: Mr. Dennis Byrne
Alameda Co. Health Care Agency
Hazardous Materials Division
80 Swan Way, Room 20
Oakland, California 94621

DATE: 3/29/91
PROJECT NUMBER: 18039-3
SUBJECT: Executive Report of Limited Subsurface Environmental Investigation

FROM: James A. Perkins/Project Manager

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	3/27/91	Executive Report of Limited Subsurface Environmental Investigation at ARCO Station No. 374, 6407 Telegraph Avenue, Oakland, California.

THESE ARE TRANSMITTED as checked below:

[ ] For review and comment [ ] Approved as submitted [ ] Resubmit ___ copies for approval

[ ] As requested [ ] Approved as noted [ ] Submit___ copies for distribution

[ ] For approval [ ] Return for corrections [ ] Return ___ corrected prints

[x] For your files

REMARKS:

Copies: 1 to AGS project file no. 18039-3

Sincerely,

Ashraf Mirza, Branch Manager