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ALTON GEOSCIENCE, INC.

September 4, 1990

Mr. Peter DeSantis
BP Oil Company
2868 Prospect Park Drive, Suite 360
Rancho Cordova, California 95670-6020

30-081

Subject: Supplemental Site Investigation Report
BP Oil Service Station No. 11132
3201 35th Avenue
Oakland, California

Dear Mr. DeSantis:

In accordance with our agreement, Alton Geoscience, Inc. is pleased to submit this report on the supplemental site investigation performed at BP Oil Service Station No. 11132, located at 3201 35th Avenue, Oakland, California.

This report was prepared in response to the concerns of BP Oil Company and the applicable regulatory agencies regarding suspected subsurface contamination at the service station.

A copy of the report should be submitted to the following agencies for their review and approval:

1. Mr. Rafat Shahid
Alameda County Department of Health Services
80 Swan Way, #200
Oakland, California 94621

2. Mr. Tom Callaghan
Regional Water Quality Control Board
San Francisco Bay Region
1800 Harrison Street, Room 700
Oakland, California 94612

The scope of work to conduct further investigation and remedial feasibility study will be submitted under separate cover for your review and consideration.

We would be pleased to discuss the results and findings of this supplemental study. Please call if you have any questions or comments regarding this report.

Sincerely,

ALTON GEOSCIENCE, INC.

Matthew Hopwood
Project Manager

Al Sevilla, R.C.E. 26392
Division General Manager

Enclosures

EXECUTIVE SUMMARY

Supplemental Site Investigation Report
BP Oil Service Station No. 11132
3201 35th Avenue
Oakland, California

This report presents the results and findings of a supplemental site investigation performed at BP Oil Service Station No. 11132, located at 3201 35th Avenue, Oakland, California. The investigative work was performed in accordance with the applicable requirements and guidelines of the San Francisco Regional Water Quality Control Board (RWQCB) and the Alameda County Department of Environmental Health (ACDEH). The scope of work included tasks and activities necessary to (1) assess the nature and extent of subsurface contamination onsite and offsite; and (2) develop appropriate courses of action for further investigation and/or remediation, if warranted.

PROJECT BACKGROUND

On July 30, 1986, Kaprealian Engineering, Inc. (KEI) was retained by Mobil Oil Corporation to install three 2-inch-diameter monitoring wells at this former Mobil Oil service station. Monitoring and sampling of the wells, performed by KEI, indicated detectable levels of total petroleum hydrocarbons (TPH) in both MW-1 and MW-2 at levels up to 210 parts per million (ppm).

SCOPE OF WORK

The scope of the investigative work included the following tasks:

1. Conduct a qualitative shallow ground water survey (QSGWS).
2. Install five soil borings for conversion into one onsite recovery well and one onsite and three offsite ground water monitoring wells.
3. Collect and analyze soil and ground water samples.
4. Analyze field data and laboratory results.
5. Prepare a report presenting the results, findings, and recommendations of the investigation.

The results of these tasks provide the basis for evaluating the need for further investigation and/or remediation.

SUMMARY OF FINDINGS AND CONCLUSIONS

The findings and conclusions of this site investigation study are summarized below:

1. Soil types encountered at the site during drilling generally consisted of silty clay.

2. The average depth to ground water at the site is approximately 20 feet below grade.

3. The ground water elevation contour map, developed from the water level and survey data, indicates a southerly ground water flow direction beneath the site, with an average gradient of approximately 0.01 foot per foot.

4. TPH-G and BTEX constituents detected in the soil samples from the borings onsite and offsite ranged from nondetectable to 700 ppm of TPH-G and 4.8 ppm of benzene. From the data presented herein, the extent of petroleum hydrocarbon constituents in the soil onsite appears to be limited to the southern portion of the site, south of the pump islands and underground fuel tanks.

5. Transmissivity, hydraulic conductivity, and linear velocity of the aquifer (onsite) as determined by the slug testing are 1.71 ft^2/day, 0.12 ft/day, and 1.0 x 10^{-3} ft/day, respectively. These values are representative of soil types with low permeability such as silty clays encountered below the site.

6. Soil samples collected from the soil boring for MW-5, located approximately 150 feet from the site, had detectable levels of TPH-G from 10 feet below grade to the capillary fringe. Contamination throughout the soil column indicates the close proximity of a potential contaminant source. A Quikstop store with underground gasoline storage tanks is located approximately 10 feet from MW-5.

7. The shallow ground water beneath the site has been impacted by free-floating product (detected in MW-1 and MW-2) and dissolved-phase petroleum hydrocarbon constituents, the extent of which cannot be defined at this time based on presently available data.

8. Based on the locations of the monitoring wells and the level of hydrocarbon constituents detected, it appears that the dissolved-phase hydrocarbon contaminant plume has migrated offsite south of the property. This is consistent with the general flow direction of the shallow ground water.

9. There are no existing domestic water supply wells in the immediate vicinity or within a 1/2-mile radius of the site (personal communication, City of Oakland Public Works).

RECOMMENDATIONS

Based on the results and findings of this site investigation study, Alton Geoscience recommends the following activities:

1. Conduct periodic pumping of MW-1, MW-2, and RW-1 to recover free-floating product and control/minimize further contaminant plume migration.

2. Install an automated product recovery system to remove free-product as an interim remedial measure.

3. Conduct a remedial feasibility study and implement a remedial action plan to comply with applicable laws and regulations.

4. Implement a quarterly ground water monitoring and sampling program in accordance with regulatory agency requirements.

Alternative remedial measures that should be evaluated and considered in detail include, but are not limited to, the following:

1. Periodic recovery of ground water followed by treatment to reduce hydrocarbon levels, if necessary, and discharge of treated water to the sanitary or storm sewer system.

2. Continuous recovery and treatment of ground water for discharge to a sanitary or storm sewer system.

ALTON GEOSCIENCE, INC.

DRAFT

SUPPLEMENTAL SITE INVESTIGATION REPORT

BP Oil Service Station No. 11132
3201 35th Avenue
Oakland, California

SUPPLEMENTAL SITE INVESTIGATION REPORT

BP Oil Service Station No. 11132
3201 35th Avenue
Oakland, California

September 4, 1990

Project Number 30-081

This report was based on currently available data and was developed in accordance with current hydrogeologic and engineering practices.

This report was prepared by:

Eric Yoerkey for — 9/4/90

Matthew Taylor
Staff Engineer — Date

[signature] — 9/4/90

Matthew Hopwood
Project Manager — Date

This report was reviewed by:

[signature] — 9/4/90

Al Sevilla
Registered Civil Engineer
No. 26392
Division General Manager — Date

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1.0 INTRODUCTION AND BACKGROUND

BP Oil Company retained Alton Geoscience, Inc. to conduct a Supplemental Site Investigation Study related to subsurface contamination at Service Station No. 11132, located at 3201 35th Avenue, Oakland, California. The site location is shown in Figure 1, while a site plan is shown in Figure 2.

1.1 Purpose and Scope

This supplemental site investigation study was performed to: (1) address the concerns of the San Francisco Bay Regional Water Quality Control Board (RWQCB) and the Alameda County Department of Environmental Health (ACDEH) regarding petroleum hydrocarbon contamination at the site; and (2) determine the nature and extent of hydrocarbon levels in the subsurface soil and ground water.

The scope of the investigative work included the following tasks:

1. Conduct a qualitative shallow ground water survey (QSGWS).

2. Install five soil borings for conversion into one onsite recovery well and one onsite and three offsite ground water monitoring wells.

3. Collect and analyze soil and ground water samples.

4. Analyze field data and laboratory results.

5. Prepare a report presenting the results, findings, and recommendations of the investigation.

The results of these tasks provide the basis for evaluating the need for further investigation and/or remediation.

1.2 Site Description

The site is currently an operating BP Oil service station located on the northeast corner of the intersection of 35th Avenue and Suter Street, Oakland, California. The adjacent properties are primarily residential and commercial developments.

The site is located at an elevation of approximately 160 feet above mean sea level. The location and layout of the underground storage tanks are shown in Figure 2.

1.3 Project Background

On July 30, 1986, Kaprealian Engineering, Inc. (KEI) was retained by Mobil Oil Corporation to install three 2-inch-diameter monitoring wells at this former Mobil Oil service station. Monitoring and sampling of the wells, performed by KEI, indicated detectable levels of total petroleum hydrocarbons (TPH) in both MW-1 and MW-2 at levels up to 210 parts per million (ppm).

1.4 Regional Geology and Hydrogeology

The topography of the surrounding area is characterized by valleys and gentle slopes. The underlying unit in this region consists of Undivided Quaternary deposits (QU). The QU unit's composition and physical properties vary, but consist predominantly of Temescal Formation, which probably includes covered or unrecognized San Antonio Formation and gravel, sand, and clay (Qg), as well as recent alluvium and colluvium and artificial fill.

The site is located in the 580-square-mile Alameda Bay Plain Ground Water Basin drained by the Guadalupe River and Alameda, Coyote, Redwood, and San Francisquito Creeks. The water-bearing material is comprised of younger and older alluvium. The nearest surface water drainage is San Leandro Creek, approximately 1-1/4 miles to the south, which drains into San Leandro Bay. According to the Alameda County Public Works Department, there are no domestic wells within a 1/2-mile of the site. Municipal or domestic water supply in the area is provided by the East Bay Municipal Utilities District which obtains its water from the Mokelumne River.

2.0 FIELD METHODS

The procedures and methods used during field activities were in accordance with applicable regulatory requirements and procedures, outlined in Appendices B and C.

2.1 Qualitative Shallow Ground Water Survey

To determine the lateral extent of ground water contamination, a qualitative shallow ground water survey (QSGWS) was initially conducted. The survey is essentially a screening process to assist in determining the most appropriate locations of the additional monitoring wells necessary to define the lateral extent of hydrocarbon levels in the ground water. The procedure is based on the soil boring technique combined with temporary wells for ground water sampling.

On January 26 and February 1, 1990, Alton Geoscience, Inc. supervised the drilling of eight soil borings to various depths, ranging from 25 to 33 feet below grade, depending on subsurface conditions. The borings were advanced 3 to 4 feet beyond the depth at which first ground water was encountered. Following drilling, the borings were converted into temporary wells (TW-1 through TW-10) by inserting clean, 2-inch-diameter, Schedule 40, polyvinyl chloride (PVC) casing with 0.020-inch slots. Prior to sampling, each temporary well was purged of 2 to 3 gallons of ground water. During sampling, ground water was inspected for the presence of free-floating product or sheen. The samples collected were then decanted into sterile volatile organic analysis (VOA) vials for transport to a state-certified laboratory for analysis under chain of custody documentation. During the QSGWS, free-floating product was encountered in one of the temporary wells, TW-2.

An interim report dated May 10, 1990 presents the results of the QSGWS. A copy of the interim report is included as Appendix A.

2.2 Soil Borings and Sampling

Based on the results of the QSGWS, the locations of the additional soil borings/monitoring wells were selected. On May 9, 1990, prior to commencement of offsite drilling activities, Ground Water Protection Ordinance Permit 90276 was obtained from the Alameda County Flood Control and Water Conservation District. On May 17, 1990, Street Excavation Permit Nos. 9000935, 9000936, and 90009937 were obtained from the City of Oakland Department of Public Works. Copies of the ground water protection ordinance permit and the street excavation permits are presented in Appendix D.

On May 16, 1990, Alton Geoscience supervised the drilling of two soil borings, which were converted into one 2-inch-diameter ground water monitoring well (MW-4) and one 6-inch-diameter recovery well (RW-1). The borings were drilled using 8-inch-diameter and 10-inch-diameter hollow-stem augers to total depths of approximately 40 feet below grade. During drilling, soil samples were collected from the soil borings at 5-foot intervals below grade until the first ground water was encountered at a depth of approximately 27 feet below grade.

On June 25, 1990, Alton Geoscience supervised the drilling of three offsite soil borings, which were converted into 2-inch-diameter ground water monitoring wells (MW-5, MW-6, and MW-7). The borings were drilled using 8-inch-diameter hollow-stem augers to total depths of approximately 35 feet

below grade. During drilling, soil samples were collected from monitoring well borings at 5-foot intervals until the first ground water was encountered, at a depth of about 26 feet below grade in MW-5 and 28 feet below grade in MW-6 and MW-7.

Drilling activities were performed by West Hazmat Drilling Corporation of Rancho Cordova, California using a truck mounted CME 75 drilling rig. The soil samples were collected using a split-spoon sampler lined with stainless steel tubes. The samples recovered for laboratory analysis were wrapped with aluminum foil, capped with polyurethane caps, labeled, wrapped in cellophane tape, and placed immediately in an iced cooler. A description of drilling procedures and soil sampling protocol and copies of boring logs are presented in Appendix B.

2.3 Ground Water Monitoring Well Construction

The soil borings were completed as Ground Water Monitoring Wells MW-4, MW-5, MW-6, and MW-7 and Recovery Well RW-1. The monitoring wells were constructed of clean, 2-inch-diameter, flush-threaded, Schedule 40 PVC, blank casing and 0.020-inch, slotted casing to total depths of 35 to 40 feet below grade. Recovery Well RW-1 was constructed of clean, 6-inch-diameter, flush-threaded, Schedule 40 PVC, blank casing and 0.020-inch, slotted casing to a total depth of approximately 40 feet below grade. Well construction details are shown on the boring logs in Appendix B.

2.4 Monitoring Well Development and Sampling

Development and sampling of the monitoring wells were conducted on July 9, 1990. Prior to sampling, the ground water monitoring wells were purged by pumping approximately 10.5 gallons from MW-3, 28 gallons from MW-4, 20 gallons from MW-5, 27 gallons from MW-6, and 23.5 gallons from MW-7. Monitoring Wells MW-1 and MW-2 were not sampled because of the presence of approximately 0.25 and 0.10 foot of free-floating product.

The water samples were decanted from the bailer into clean containers and transported in an iced cooler to a state-certified laboratory for analysis following proper chain of custody procedures. Water sampling field survey forms documenting field observations during well development/ purging and sampling are presented in Appendix C.

2.5 Ground Water Level Monitoring and Surveying

On July 5, 1990, the monitoring wells were surveyed to the nearest 0.01 foot in reference to City of Oakland benchmark number 2576 with an elevation of 170.467 feet above mean sea level (MSL). The purpose of the survey was to obtain top of casing elevations of the monitoring wells for use in calculating the ground water elevation at each well and determining the ground water flow direction and gradient at the site.

Ground water level monitoring and survey data collected on July 5, 1990 are presented in Table 1. A ground water elevation contour map based on interpretation of the monitoring data is shown in Figure 3.

3.0 ANALYTICAL METHODS

All laboratory analyses of soil and ground water samples were performed by a California state-certified analytical laboratory, using standard test methods of the U.S. Environmental Protection Agency (EPA) and the California Department of Health Services. The laboratory reports and chain of custody records are presented in Appendix E.

3.1 Qualitative Shallow Ground Water Sample Analysis

All ground water samples collected from the temporary wells as part of QSGWS were analyzed for TPH-G with BTEX distinction using EPA Methods 5030 and 602. The results of the laboratory analyses of ground water samples are presented in Table 2 of Appendix A.

3.2 Soil Analysis

Soil samples from the five borings were analyzed for TPH-G with BTEX distinction using EPA Methods 5030 and 8020. The results of the laboratory analyses of the soil samples are presented in Table 2.

3.3 Water Analysis

Ground water samples collected from the monitoring wells were analyzed for TPH-G with BTEX distinction using EPA Methods 5030 and 602. The results of the laboratory analyses of ground water samples are presented in Table 4. TPH-G and benzene isoconcentration maps developed from analytical results of ground water samples are shown in Figure 4 and 5.

4.0 AQUIFER TESTING AND ANALYSIS

Analysis of aquifer characteristics to determine the fate and transport of contaminants in ground water involves several stages. The first is the exploratory stage, in which surface and subsurface geological and geophysical techniques are used to define physical characteristics of the water-bearing formation. Next is the evaluation stage to determine the hydrogeologic parameters and characteristics of the aquifer, which are needed to properly design and construct recovery or extraction wells and to control contaminant migration. The last is the confirmation stage, in which the design and operation of the wells are optimized for the management and remediation of ground water. The following sections are based on the work of Bouwer (1979); Cedergren (1977); Freeze et al (1979) and Thompson (1987).

4.1 Basis of Analysis

The hydraulic properties of aquifers and soil materials that define the rate of water movement into, through, and out of subsurface material, and the water movement's effect on the pieziometric surfaces of water tables, are hydraulic conductivity (K); storage coefficient (S) (or specific yield for an unconfined aquifer); and transmissivity (T).

Hydraulic conductivity is defined as the rate at which water can move through a porous media (soil) under a unit hydraulic gradient. It is primarily dependent upon the porosity and permeability of the soil and the density and viscosity of the water. However, not all water occupying pore spaces in a saturated aquifer can be readily extracted.

One measure of the water-yielding ability of an aquifer is the storage coefficient, which is defined as the volume of water produced per unit horizontal area by a unit drop in the water table level (unconfined aquifers) or the pieziometric surface (confined aquifers).

Another term used to indicate the water-yielding capacity of an aquifer is transmissivity (T). The transmissivity of an aquifer is the product of the hydraulic conductivity and the saturated thickness (b), or:

$$T = Kb$$

where T = Transmissivity in $feet^2/day$
K = Hydraulic conductivity in feet/day
b = Approximate aquifer thickness in feet

Of interest in understanding aquifer characteristics is the movement or yielding capabilities of the water-bearing formation. To determine these parameters, values for one or more of the aquifer properties must be obtained. Various techniques have been developed for obtaining values for these properties or parameters. For example, rate-of-rise or rate-of-fall techniques, such as the auger-hole and slug test method, measure the hydraulic conductivity (K) of the soil profile in shallow ground water.

4.2 Rate-of-Rise or Rate-of-Fall Techniques

In-situ hydraulic conductivity values can be determined from tests performed in a single well or piezometer. The test is initiated by causing an instantaneous change in the water level in a well through a sudden introduction or removal of a volume of water. The recovery of the water level over time is then observed. The procedure requires the use of a pressure sensitive transducer with the probe placed just off the bottom of the well. Water is then immediately introduced or removed from the well, and pressure readings are recorded over time. When water is removed, the test is called a bail test; when water is added, it is known as a slug test.

Bouwer and Rice (1976) developed a procedure for estimating hydraulic conductivity (K) based on the response of the well to a sudden change in the water table. The hydraulic conductivity can be calculated as follows:

$$K = r \cdot \ln(R/r_w) \cdot \ln(Yo/Y_t)/(2L\ t)$$

where:
- R = Effective radial distance over which the head difference is dissipated
- r_w = Radial distance between well center and undisturbed aquifer
- L = Height of perforated section of well through which ground water enters
- Yo = Difference in head elevation at time zero
- Y_t = Difference in head elevation at time t
- t = Time since Yo

When the observed water elevation data are plotted against time (t) on a semi-logarithmic paper (t on the arithmetic scale), the data points should produce a straight line. The data begin to deviate from the straight line relationship at a small change in water table head. To evaluate $1/t \times \ln(Yo/Yt)$ and calculate K, the straight-line portion of the curve should be used. The results of this method are generally considered an appropriate means of estimating the hydraulic conductivity within an order of magnitude.

4.3 Field Test Procedures

Alton Geoscience selected the slug test method based on available hydrogeologic data to estimate the hydraulic conductivity (K) of the aquifer, using Monitoring Wells MW-1, and MW-2. Prior to conducting the aquifer test, depth to water was measured in the wells. The slug tests were performed on July 14, 1990, using a 5-gallon bucket (slug) to inject clean distilled water into the well, and a data logger with a pressure sensitive transducer.

The pressure is converted into head (elevation of water above the transducer) as the water instantaneously rises and then flows into the surrounding aquifer. A computer program was used to statistically analyze the field data and determine hydraulic conductivity based on a shape factor coefficient corresponding to the diameter of the well screen and filter pack surrounding the screen.

4.4 Analysis of Aquifer Parameters

Graphical results showing the plot of the normalized drawdown (Y/Yo) versus time (t) for each ground water monitoring well are included in Appendix F. The Y/Yo term is obtained by dividing each measured drawdown by the maximum drawdown. Y is the drawdown at time t, and Yo is the maximum drawdown immediately following addition of the "slug" of water.

The hydraulic conductivity (K) values calculated for each well tested are:

Well ID	K, ft/day
MW-1	0.090 3×10^{-2}
MW-2	0.154

The average hydraulic conductivity (K) calculated from the test results is 0.122 foot per day. Assuming an aquifer thickness of 14 feet, the average transmissivity (T) of the aquifer is estimated to be 1.71 ft^2/day.

Hydraulic conductivity can also be used to calculate the average linear velocity at which a subsurface fluid moves using Darcy's Law. Darcy's Law can be stated as follows:

$$v = Ki$$

where: v = Darcy velocity of water
K = Hydraulic conductivity of aquifer material
i = Slope of the water table (gradient)

The result of the calculation yields a value representing the horizontal velocity at which a fluid moves through the pore spaces between specified points within the more permeable zone.

Assuming the average hydraulic conductivity of the aquifer is 0.122 foot/day, and the estimated hydraulic gradient at the site is 0.01 foot/foot, the calculation yields an average linear velocity of 1.0×10^{-3} foot/day. At this rate, a fluid particle would travel 2.74 foot per year.

From review of the boring logs, the subsurface soil is comprised primarily of silty clay. According to the United States Geological Survey Water Supply Paper 2220, (1984), the hydraulic conductivity of silty clay formations typically range from 10^{-3} to 10 feet per day, which is consistent with the slug test data.

5.0 SITE GEOLOGY AND HYDROGEOLOGY

A brief description of the pertinent information on the site geology and hydrogeology is presented below.

5.1 Site Geology

The soil borings drilled during this supplemental investigation revealed a consistent stratigraphy beneath the site. Silty clay was the predominant soil type encountered throughout each boring. The soil types encountered during this study were generally consistent with the results of the previous investigation conducted by KEI.

5.2 Site Hydrogeology

The ground water elevations for Monitoring Wells MW-3, MW-4, MW-5, MW-6, MW-7, and RW-1, as measured on July 9, 1990, were used to develop the ground water elevation contour map shown in Figure 3. The data indicates a southerly ground water flow direction, with an average gradient of approximately 0.01 foot per foot. As presented in Table 1, the depth to ground water in MW-1 through MW-7, and RW-1 as measured from

the top of casing on July 9, 1990 ranged from about 17 to 21 feet below grade.

There are no known or reported ground water production wells in use as a domestic or municipal water supply source within the immediate vicinity or a 1/2-mile radius of the site (personal communication, City of Oakland Public Works Department).

6.0 DISCUSSION OF RESULTS

The results of the field activities and laboratory analysis of soil and ground water samples collected during this investigation are presented in Tables 2 and 3 and are discussed below.

6.1 Qualitative Shallow Ground Water Survey

A total of 10 water samples were collected for analysis during the QSGWS, including water samples from Monitoring Wells MW-2 and MW-3. The samples from MW-1 and TW-2 contained free-floating product and were not analyzed. Chemical analysis of water samples revealed TPH-G levels ranging from nondetectable to 240,000 ppb. A summary of analytical results and the TPH-G and benzene isoconcentration maps based on the QSGWS are presented in Appendix A.

6.2 Soil

A total of eighteen soil samples were collected from five borings and analyzed as part of this site investigation study to assess the nature and extent of subsurface soil contamination. The results are discussed below.

- No detectable levels of TPH-G and BTEX constituents were found in the soil samples collected from borings for Monitoring Wells MW-4, MW-6, and MW-7.
- The levels of TPH-G in the soil samples collected from the boring for Recovery Well RW-1 and MW-5 were as high as 50 ppm, and up to 700 ppm, respectively.
- The extent of petroleum hydrocarbon constituents in the soil appears to have migrated offsite (south of the site) and to the zone from 10 feet below grade to the capillary fringe.

6.3 Ground Water

Results of the field survey and laboratory analysis of ground water samples collected from the monitoring wells were used to assess the nature and extent of hydrocarbon constituents in ground water. The results of the laboratory analysis are summarized in Table 4 and discussed below.

- Dissolved-phase TPH-G levels detected in the water samples ranged from nondetectable in Monitoring Wells MW-4, MW-6, and MW-7, to 280 ppb in MW-5. No BTEX constituents were detected in the samples from MW-4, MW-6, and MW-7. However, benzene was detected at levels of 5.3 ppb and 200 ppb in the samples from MW-3 and MW-5, respectively.

- During the sampling event on July 9, 1990, free-floating product was encountered in Monitoring Wells MW-1 and MW-2. The product thickness in MW-1 and MW-2 was 0.25 and 0.10 foot, respectively.

- The sample from Monitoring Well MW-5, the most downgradient offsite monitoring well, had the highest concentrations of TPH-G and BTEX constituents in the soil and ground water samples. It should be noted that MW-5 is located approximately 150 feet from the BP site and immediately adjacent to a Quikstop store with underground gasoline storage tanks.

6.4 Hydrogeologic Characteristics

The aquifer analysis and calculations were based on the assumption that the porous media is isotropic and homogeneous. These conditions, however, seldom exist in the natural subsurface environment. The aquifer located beneath the site is neither isotropic nor homogeneous. It exhibits variations in physical properties both vertically and horizontally. Therefore, the hydraulic conductivity determined by the aquifer test data should only be considered accurate within an order of magnitude of actual values at the specific point within the porous media. Based on the calculated hydraulic conductivity of 0.12 foot per day, the actual hydraulic conductivity could range from 0.012 to 1.2 foot per day. This range of hydraulic conductivity values is typical for soils composed of silty clay which is consistent with the soil encountered at the site.

It should be noted that plume migration does not necessarily occur at the same rate as ground water movement. Darcy's Law governing ground water flow does not consider the hydrodynamic processes of adsorption and dispersion that are involved in the transport of contaminants in ground water.

7.0 FINDINGS AND CONCLUSIONS

The findings and conclusions of this site investigation study are summarized below:

1. Soil types encountered at the site during drilling generally consisted of silty clay.

2. The average depth to ground water at the site is approximately 20 feet below grade.

3. The ground water elevation contour map, developed from the water level and survey data, indicates a southerly ground water flow direction beneath the site, with an average gradient of approximately 0.01 foot per foot.

4. TPH-G and BTEX constituents detected in the soil samples from the borings onsite and offsite ranged from nondetectable to 700 ppm of TPH-G and 4.8 ppm of benzene. From the data presented herein, the extent of petroleum hydrocarbon constituents in the soil onsite appears to be limited to the southern portion of the site, south of the pump islands and underground fuel tanks.

5. Transmissivity, hydraulic conductivity, and linear velocity of the aquifer (onsite) as determined by the slug testing are 1.71 ft^2/day, 0.12 ft/day, and 1.0 x 10^{-3} ft/day, respectively. These values are representative of soil types with low permeability such as silty clays encountered below the site.

6. Soil samples collected from the soil boring for MW-5, located approximately 150 feet from the site, had detectable levels of TPH-G from 10 feet below grade to the capillary fringe. Contamination throughout the soil column indicates the close proximity of a potential contaminant source. A Quikstop store with underground gasoline storage tanks is located approximately 10 feet from MW-5.

7. The shallow ground water beneath the site has been impacted by free-floating product (detected in MW-1 and MW-2) and dissolved-phase petroleum hydrocarbon constituents, the extent of which cannot be defined at this time based on presently available data.

8. Based on the locations of the monitoring wells and the level of hydrocarbon constituents detected, it appears that the dissolved-phase hydrocarbon contaminant plume has migrated offsite south of the property. This is consistent with the general flow direction of the shallow ground water.

9. There are no existing domestic water supply wells in the immediate vicinity or within a 1/2-mile radius of the site (personal communication, City of Oakland Public Works).

TABLES

TABLE 1

SURVEY AND WATER LEVEL MONITORING DATA
July 1990

Well Number	Wellhead Elevation (Feet)	Depth to Water (Feet)	Free Product Thickness (Feet)	Ground Water Elevation (Feet)
MW-1	169.75	21.46	0.22	148.13*
MW-2	168.14	20.24	0.10	147.97*
MW-3	167.17	18.96	----	148.21
MW-4	170.36	21.30	----	149.06
MW-5	165.14	17.97	----	147.17
MW-6	165.40	17.20	----	148.20
MW-7	167.60	19.70	----	147.90
RW-1	168.01	27.93	1.21	**

Note:

* Elevation adjusted assuming 0.75 specific gravity of free product.

** Not an accurate elevation due to the presence of over 0.25 foot of free product.

TABLE 2

RESULTS OF
LABORATORY ANALYSIS OF SOIL SAMPLES
June - July 1990

11132

Boring	Sample Depth (ft)	TPH-G	B	T	E	X
		(Concentrations in Parts Per Million)				
		June 1990				
MW-4	5.0	ND	ND	ND	ND	ND
MW-4	10.0	ND	ND	ND	ND	ND
MW-4	15.0	ND	ND	ND	ND	ND
MW-4	20.0	ND	ND	ND	ND	ND
MW-4	25.0	ND	ND	ND	ND	ND
RW-1	5.0	ND	ND	ND	ND	ND
RW-1	10.0	ND	ND	ND	ND	ND
RW-1	15.0	22	0.72	1.6	0.58	2.2
RW-1	20.0	41	ND	18.0	8.0	40.0
RW-1	25.0	50	1.4	3.3	1.0	5.4
		July 1990				
MW-5	5.0	ND	ND	ND	ND	ND
MW-5	10.0	9.3	ND	0.019	ND	0.11
MW-5	15.0	14	0.16	0.037	0.29	0.42
MW-5	20.0	190	1.8	11	2.5	17
MW-5	25.0	770	4.8	44	13	94
MW-6	15.0	ND	ND	ND	ND	ND
MW-6	20.0	ND	ND	ND	ND	ND
MW-7	15.0	ND	ND	ND	ND	ND

Notes:

TPH-G = Total Petroleum Hydrocarbons as Gasoline
B = Benzene
T = Toluene
E = Ethylbenzene
X = Total Xylenes
ND = Not Detected at Method Detection Limit (refer to Appendix D, Official Laboratory Reports)

TABLE 3

RESULTS OF
LABORATORY ANALYSIS OF GROUND WATER SAMPLES
July 1990

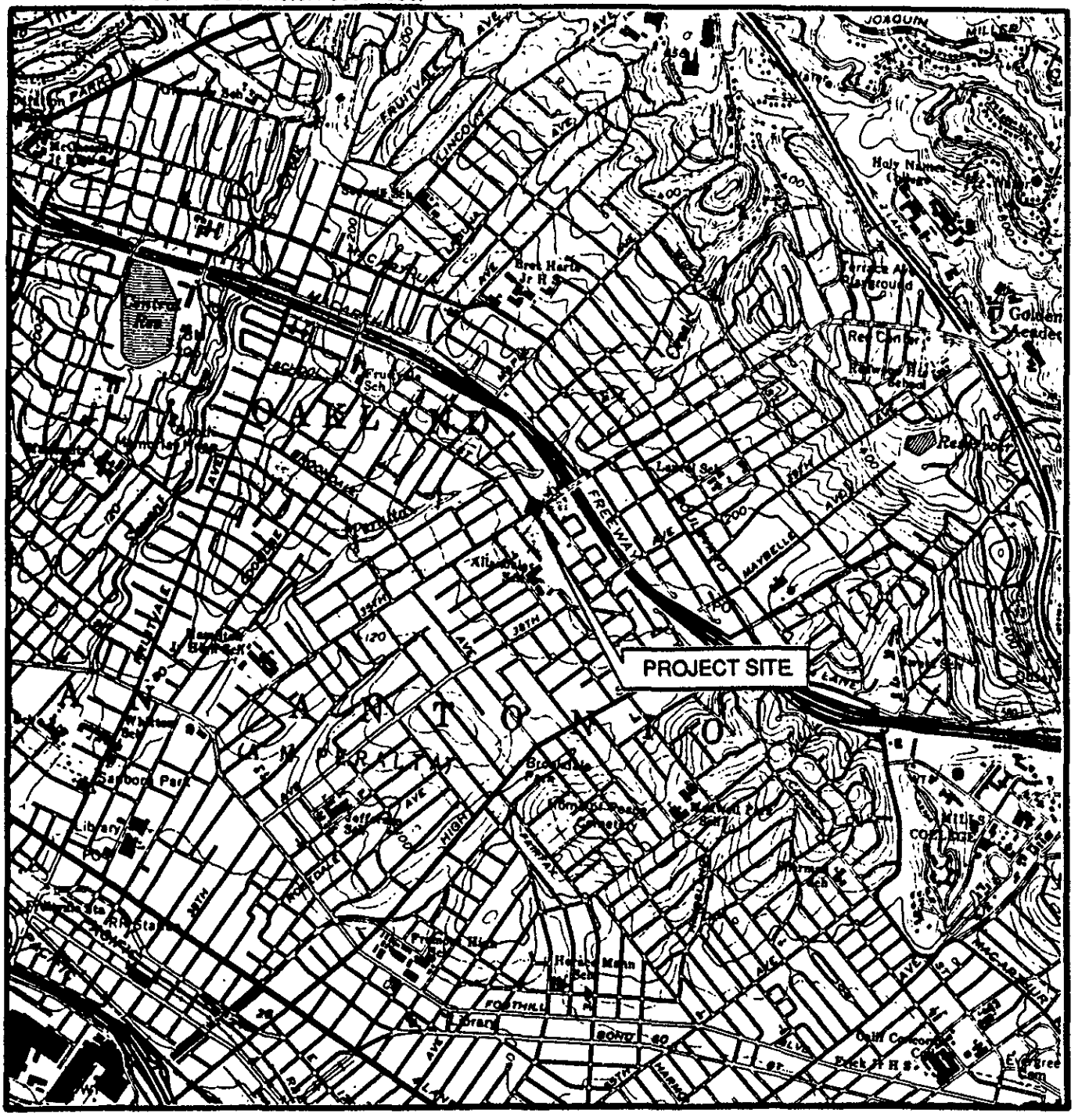
Monitoring Well	TPH-G	B	T	E	X
	(Concentrations in Parts per Billion)				
MW-1	--	--	--	--	--
MW-2	--	--	--	--	--
MW-3	140	5.3	4.6	2.0	3.8
MW-4	ND	ND	ND	ND	ND
MW-5	280	200	210	46	290
MW-6	ND	ND	ND	ND	ND
MW-7	ND	ND	ND	ND	ND

Notes:

TPH-G = Total Petroleum Hydrocarbons as Gasoline
B = Benzene
T = Toluene
E = Ethylbenzene
X = Total Xylenes
ND = Not Detected at Method Detection Limit (refer to Appendix D, Official Laboratory Reports)
-- = No sample collected due to the presence of free floating product

FIGURES

Source: U.S.G.S. Map, East Oakland, California Quadrangle
7.5 minute series. 1959. Photorvised 1980.



N

0. 1000 2000

SCALE IN FEET

FIGURE 1

SITE VICINITY MAP

B P SERVICE STATION NO. 11132
3201 35TH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. 30 - 081

ALTON GEOSCIENCE
1000 Burnett Ave., Ste 140
Concord, CA 94520

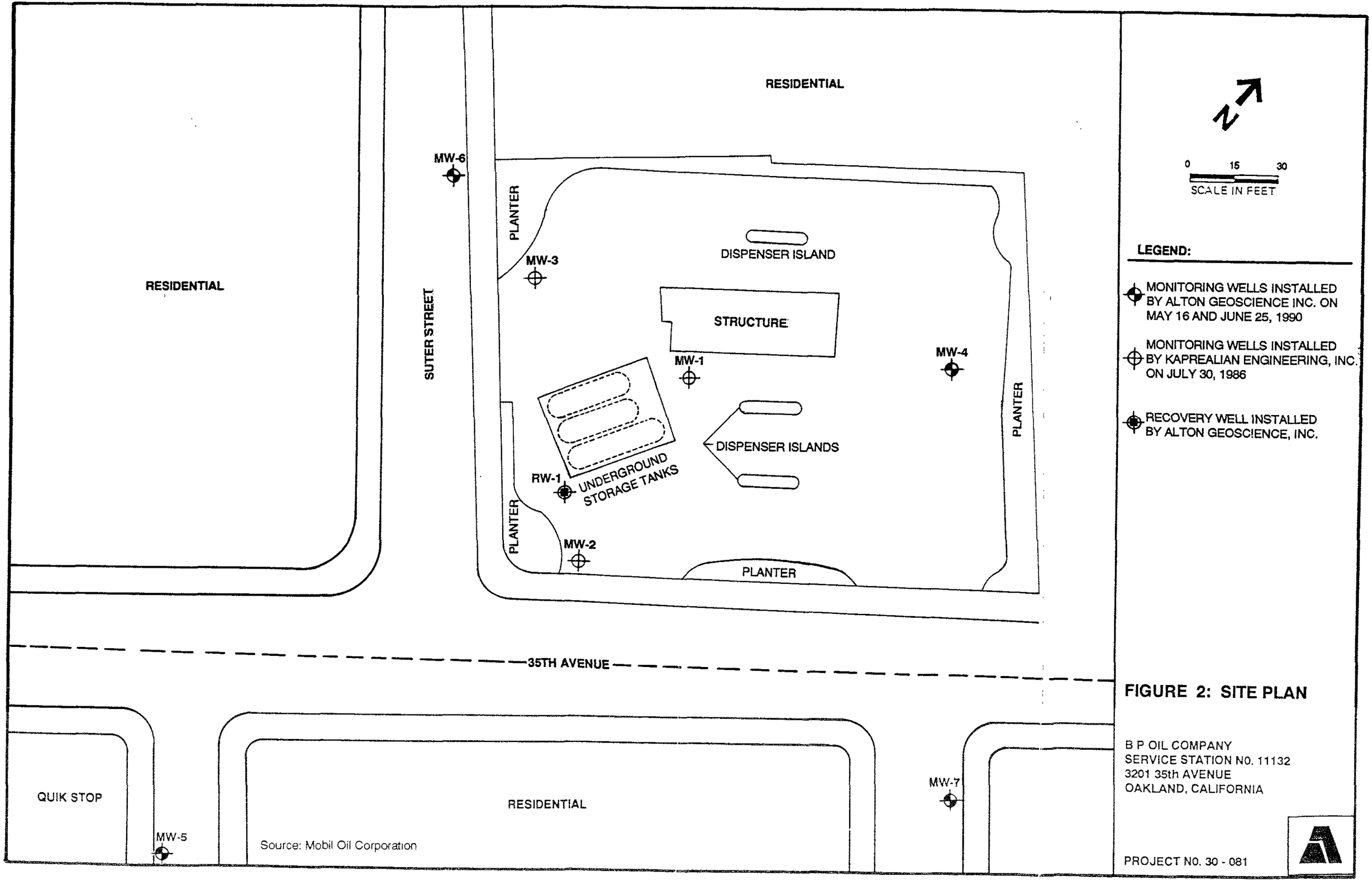


FIGURE 2: SITE PLAN

B P OIL COMPANY
SERVICE STATION N0. 11132
3201 35th AVENUE
OAKLAND, CALIFORNIA

PROJECT N0. 30 - 081

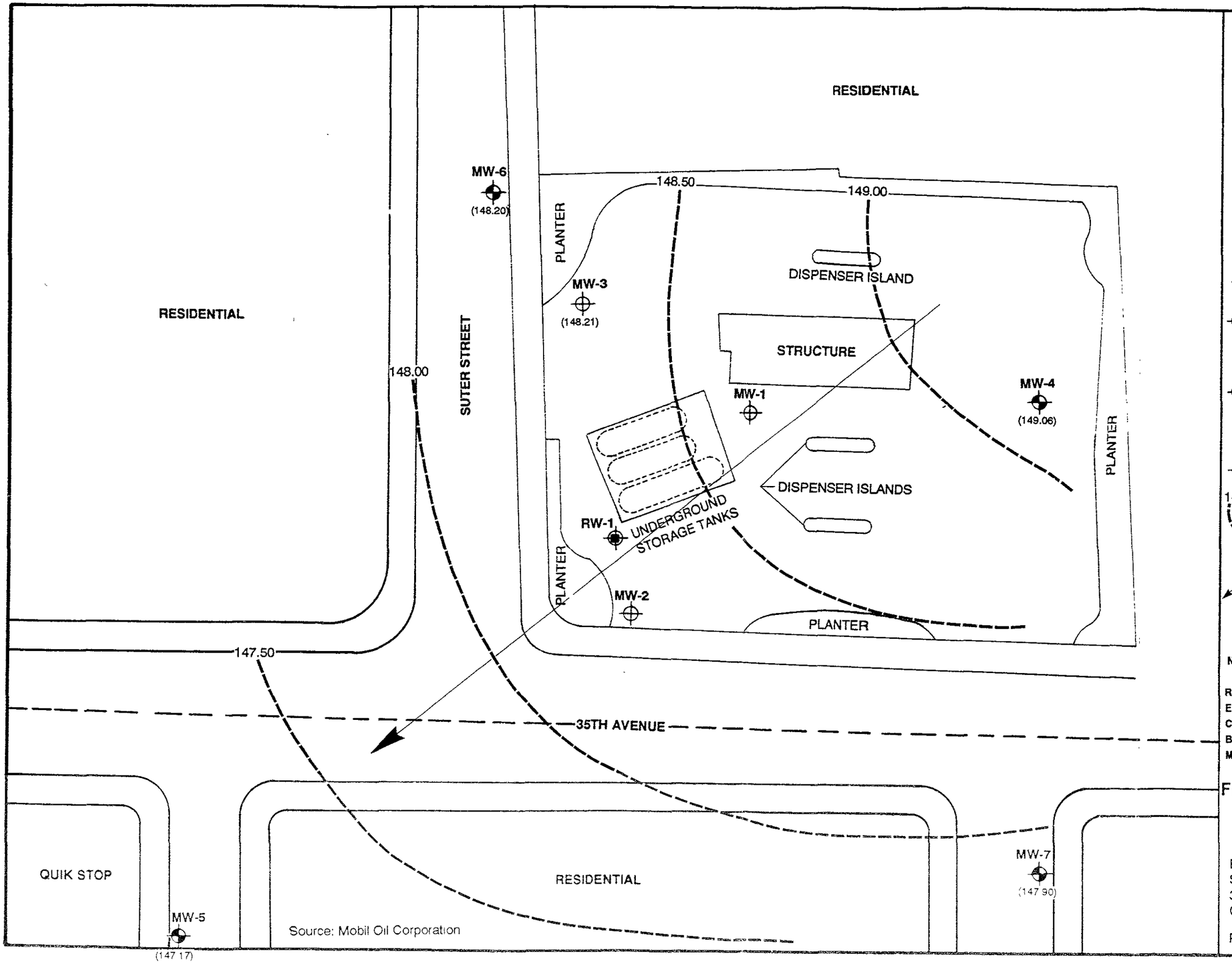
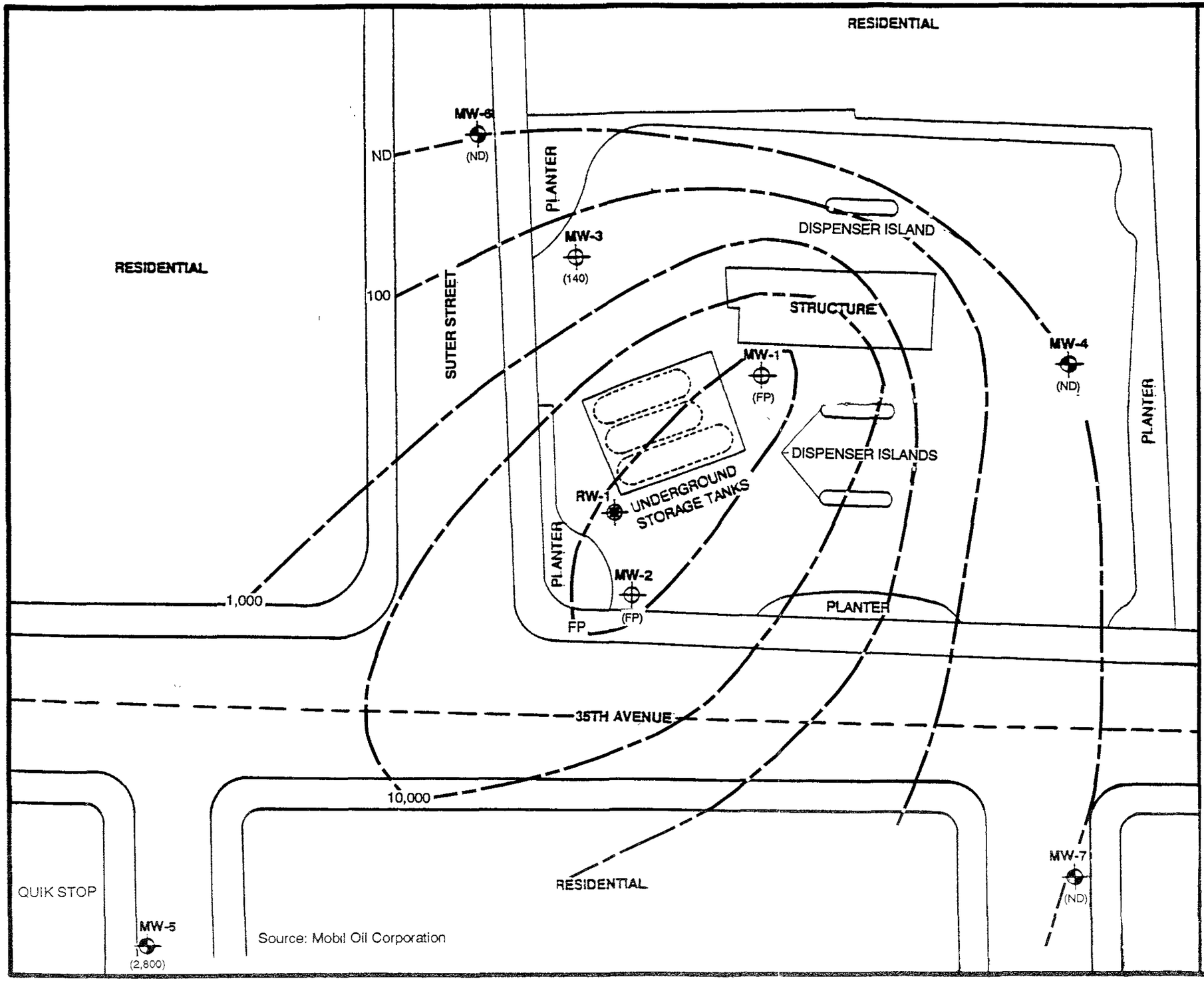


FIGURE 3: GROUND WATER ELEVATION CONTOUR MAP

B P OIL COMPANY
SERVICE STATION NO. 11132
3201 35TH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. 30 - 081



N

0 15 30

SCALE IN FEET

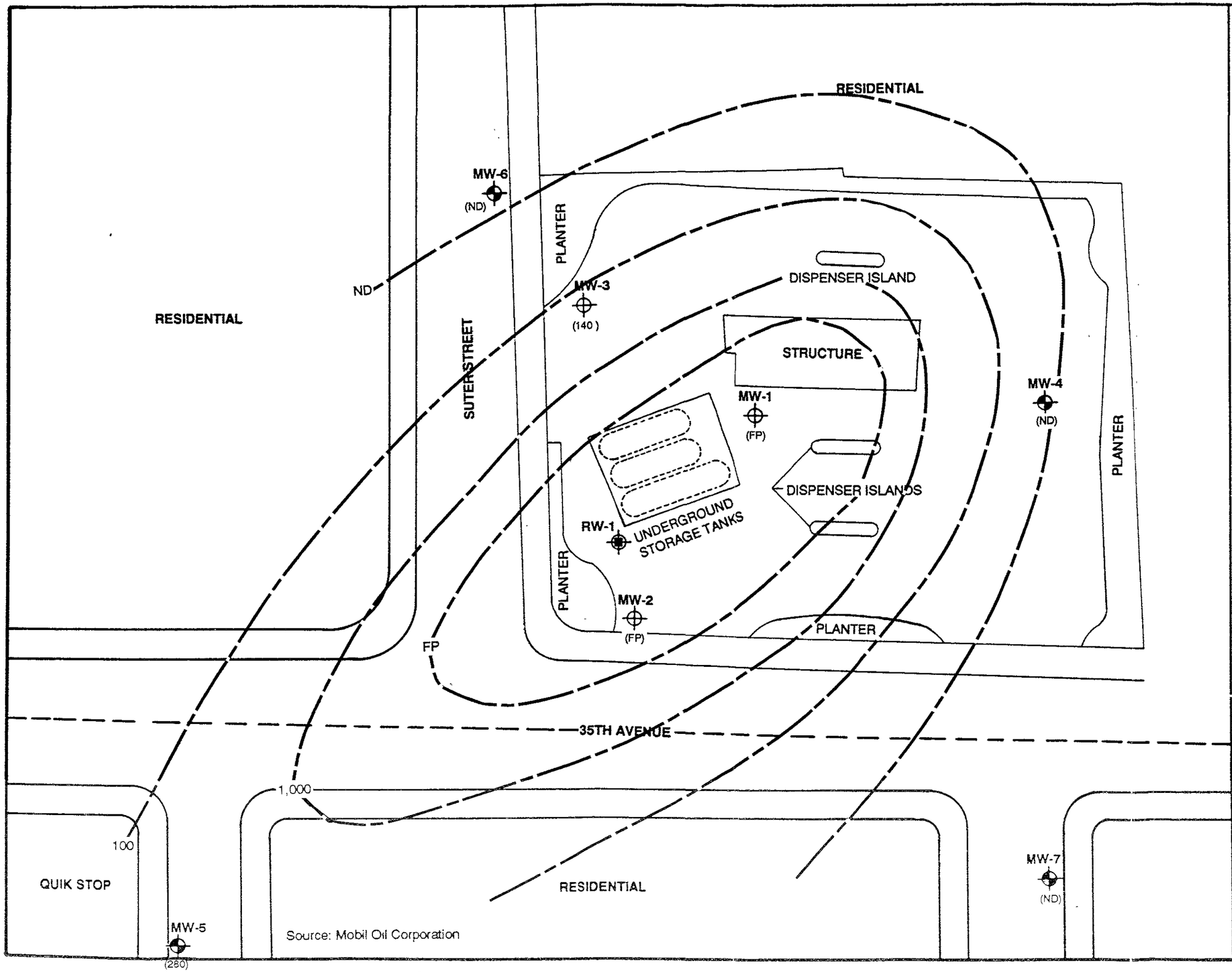
LEGEND:

- MONITORING WELL INSTALLED BY ALTON GEOSCIENCE, INC. ON MAY 16 AND JUNE 25, 1990
- MONITORING WELL INSTALLED BY KAPREALIAN ENGINEERING, INC. ON JULY 30, 1990
- RECOVERY WELL INSTALLED BY ALTON GEOSCIENCE, INC.
- (140) TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (TPH-G) IN PARTS PER BILLION (ppb)
- ND TPH-G ISOCONCENTRATION LINE
- FP FREE PRODUCT FP
- ND NONDETECTABLE ND

FIGURE 4: TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (TPH-G) ISOCONCENTRATION MAP

B P OIL COMPANY
SERVICE STATION NO. 11132
3201 35TH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. 30 - 081



N

0 15 30
SCALE IN FEET

LEGEND:

- MONITORING WELL INSTALLED BY ALTON GEOSCIENCE, INC. ON MAY 16 AND JUNE 25, 1990
- MONITORING WELL INSTALLED BY KAPREALIAN ENGINEERING, INC. ON JULY 30, 1990
- RECOVERY WELL INSTALLED BY ALTON GEOSCIENCE, INC.
- (140) BENZENE CONCENTRATION
- 100 BENZENE ISOCONCENTRATION LINE
- FP FREE PRODUCT
- ND NONDETECTABLE

FIGURE 5: BENZENE ISOCONCENTRATION MAP

B P OIL COMPANY
SERVICE STATION NO. 11132
3201 35th AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. 30 - 081

REFERENCES

REFERENCES

Bouwer, H., and Rice, R. C., A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells; Water Resources Research, Volume 12, 1976, pp. 423-428.

Bouwer, H., Groundwater Hydrology; McGraw-Hill, New York, 1979.

Cedergren, H. R., Seepage, Drainage, and Flownets; John Wiley, 1977.

Freeze, R. A., and Cherry, J. A., Groundwater; Prentice-Hall, 1979.

Thompson, D. B., A Microcomputer Program for Interpreting Time-Lag Permeability Tests; Ground Water, Vol. 25, 1987, pp. 212-218.

APPENDIX A

Interim Report
Qualitative Shallow Ground Water Survey

ALTON GEOSCIENCE, INC.

May 10, 1990

Mr. William J. Hollis
BP Oil Company
2868 Prospect Park Drive, Suite 360
Rancho Cordova, California 95670-6020 30-081

Subject: Interim Report - Preliminary Results of
Qualitative Water Survey, Monitoring, and Sampling
BP Service Station No. 11132
3201 35th Avenue
Oakland, California

Dear Mr. Hollis:

This interim report presents the results of this phase of investigative work completed to date at BP Oil Service Station No. 11132, located at 3201 35th Avenue, Oakland, California. All activities were performed in accordance with the regulations and guidelines of the San Francisco Bay Regional Water Quality Control Board (RWQCB) and the Alameda County Department of Environmental Health (ACDEH).

SCOPE OF WORK

The scope of work performed to date by Alton Geoscience includes the following tasks:

- Survey, monitoring, and sampling of three existing onsite monitoring wells.
- Installation, sampling, and destruction of 10 temporary wells for the qualitative water survey.
- Analysis of 13 water samples by a state-certified analytical laboratory.
- Preparation of this letter report.

SITE DESCRIPTION AND BACKGROUND

The site is currently an operating BP service station at the northern corner of the intersection of 35th Avenue and Suter Street, Oakland, California. The approximate site elevation is 160 feet. Regional surface and ground water flow in the region is to the southwest, towards San Francisco Bay. The nearest surface water drainage is Peralta Creek, about 1/4-mile north of the site.

On July 30, 1986, Kaprealian Engineering, Inc. (KEI) was retained by Mobil Oil Corporation to install three 2-inch-diameter monitoring wells at this former Mobil Oil service station. Monitoring and sampling of the wells, performed by KEI, indicated detectable levels of total petroleum hydrocarbons (TPH) in both MW-1 and MW-2 at levels up to 210 parts per million (ppm).

FIELD METHODS

The procedures and methods used during field activities were in accordance with regulatory requirements of the RWQCB and ACDEH.

Wellhead Survey

On December 12, 1989, the top of casing of the wells was surveyed in reference to an arbitrary datum (MW-1), with an assumed elevation of 160 feet above mean sea level. Depth to water measurements obtained on January 26, 1990 were used to construct the ground water elevation contour map (Figure 2). Wellhead elevations, depth to water measurements, and ground water elevations are presented in Table 1.

Qualitative Ground Water Sampling

On January 26 and February 1, 1990, 10 soil borings were completed to various depths, ranging from 25 to 33 feet below grade, at the locations shown in Figure 2. The drilling was completed by West Hazmat Drilling Company of Rancho Cordova, California, using a CME 75 drill rig equipped with 8-inch-diameter, hollow-stem augers.

The borings were advanced 3 to 4 feet beyond the depth at which ground water was encountered. Following drilling, the borings were converted into temporary wells (TW-1 through TW-10) by inserting clean, 2-inch-diameter, Schedule 40, PVC casing with 0.020-inch slots. The ground water level was allowed to stabilize in the wells. Prior to sampling, each temporary well was purged of 2 to 3 gallons of ground water. During purging, ground water was inspected for the presence of free product or sheen, and then decanted into sterile volatile organic analysis (VOA) containers for transport to a state-certified laboratory for analysis under chain of custody documentation.

Following sample collection, the temporary casing was removed from the boring and steam cleaned. Soil borings were then backfilled with grout slurry and capped with asphalt.

On January 26, 1990, ground water samples were collected from the three existing monitoring wells, following RWQCB guidelines and procedures for well purging and sampling.

Well Monitoring

On January 26, 1990, Monitoring Wells MW-1, MW-2, and MW-3 were surveyed for depth to water and the presence of sheen or free-floating product. Depth to water and product thickness were measured using an electronic sounder. Approximately 0.1 foot of free product was observed in MW-1.

ANALYTICAL METHODS AND RESULTS

Nine of the ground water samples were submitted to a laboratory for analysis. Ground water samples collected from MW-1 and TW-2 were not analyzed due to presence of free product. All laboratory analysis of ground water samples was performed by Superior Analytical, a California state-certified laboratory, using standard test methods of the U.S. EPA and the California Department of Health Services (DHS). Analytical methods used were EPA Method 8015 for total petroleum hydrocarbons as gasoline (TPH) and EPA Method 602 for benzene, toluene, ethylbenzene, and total xylenes (BTEX). Table 2 presents the laboratory results, while the official laboratory report is presented in Attachment A.

DISCUSSION OF RESULTS

The sample from Monitoring Well MW-1 contained 0.1 foot of free product, while Temporary Well TW-2 contained 0.05 foot. Samples from the other monitoring and temporary wells contained levels of dissolved TPH as gasoline and hydrocarbon constituents (BTEX) ranging from nondetectable (ND) to 240,000 parts per billion (ppb). It appears that the contaminant plume in the ground water has migrated downgradient towards the southwest and offsite of the property.

RECOMMENDATIONS

Based on the results of this qualitative ground water survey, and in accordance with our agreement, we recommend the following:

1. Install confirmation/monitoring wells, one upgradient onsite, two crossgradient offsite, and one downgradient offsite.

2. Install a large-diameter recovery well and an automatic recovery system (ARS) onsite to control the migration of the plume and remove free product from the ground water.

3. Perform aquifer tests to determine the hydrogeologic properties of the aquifer at the site as well as an interim remedial measure.

If you have any questions, please contact either of the undersigned at (415) 682-1582.

Sincerely,

ALTON GEOSCIENCE, INC.

Matthew J. Hopwood
Project Geologist

Al Sevilla
Division General Manager

TABLE 1

MONITORING AND SURVEY DATA

Well	Depth to Water (Feet)	Product Thickness (Feet)	TOC Elevation (Feet)	Ground Water Elevation (Feet)
		January 26, 1990		
MW-1	19.48	0.1	160	140.52
MW-2	19.80	---	158.40	138.60
MW-3	20.75	---	157.42	136.67

TOC = Top of Casing

*A 0.8 conversion factor is used to determine water table depression due to the presence of free-floating product interpreted from Levorson, 1967.

TABLE 2

RESULTS OF ANALYSIS
GROUND WATER SAMPLES

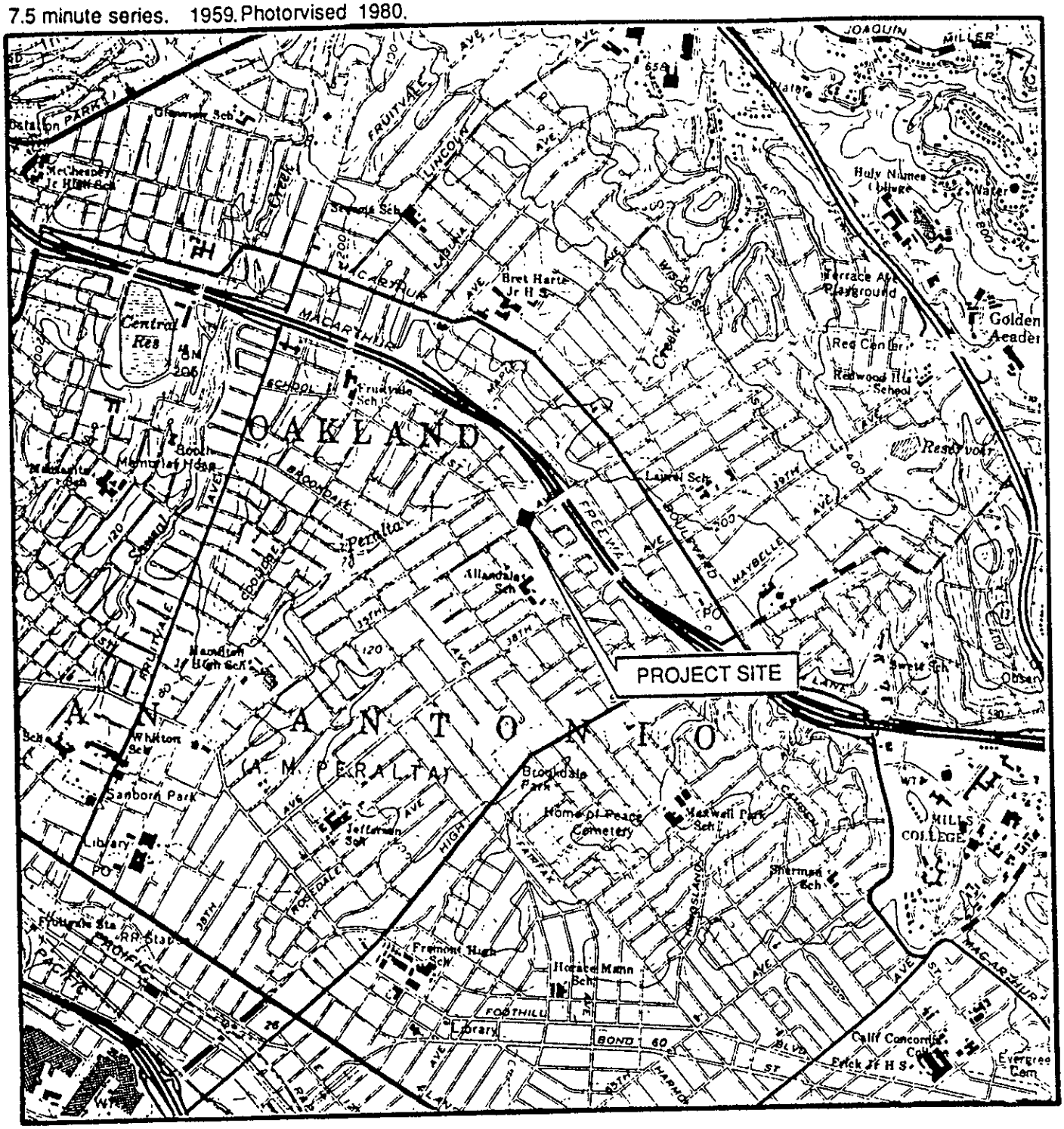
January 26, and February 1, 1990 Sampling

Well	TPH (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)
MW-1	FP	---	---	---	---
MW-2	14,000	580	1,300	460	2,300
MW-3	500	20	30	24	35
TW-1	7,400	230	180	690	1,200
TW-2	FP	---	---	---	---
TW-3	22,000	2,400	2,800	530	4,000
TW-4	ND<100	ND <0.3	ND <0.3	ND <0.3	0.7
TW-5	240,000	1,100	5,100	5,600	28,000
TW-6	20,000	56	910	590	3,700
TW-7	ND<100	ND <0.3	0.4	0.7	4.3
TW-8	ND<100	0.3	0.6	1.1	7.9
TW-9	41,000	2,100	5,700	120	6,900
TW-10	50,000	1,900	7,300	1,400	8,000

ND = Nondetectable
FP = Free Product
ppb = parts per billion
MW = Monitoring Well
TW = Temporary Well

Source: U.S.G.S. Map, East Oakland, California Quadrangle

7.5 minute series. 1959. Photorvised 1980.



N

0 1000 2000

SCALE IN FEET

FIGURE 1

SITE VICINITY MAP

B P SERVICE STATION NO. 11132
3201 35TH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. 30 - 081

ALTON GEOSCIENCE
1000 Burnett Ave., Ste 140
Concord, CA 94520

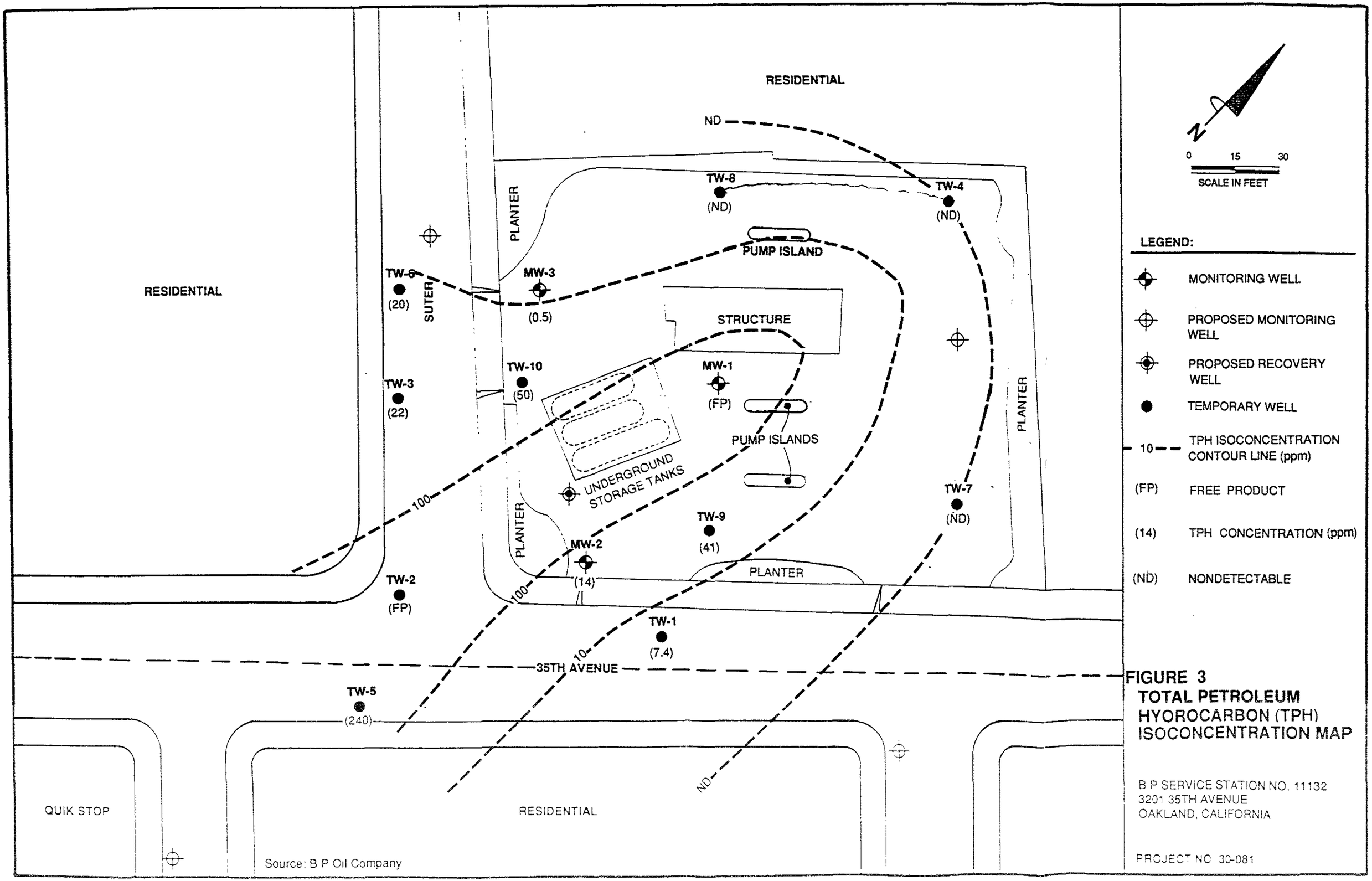
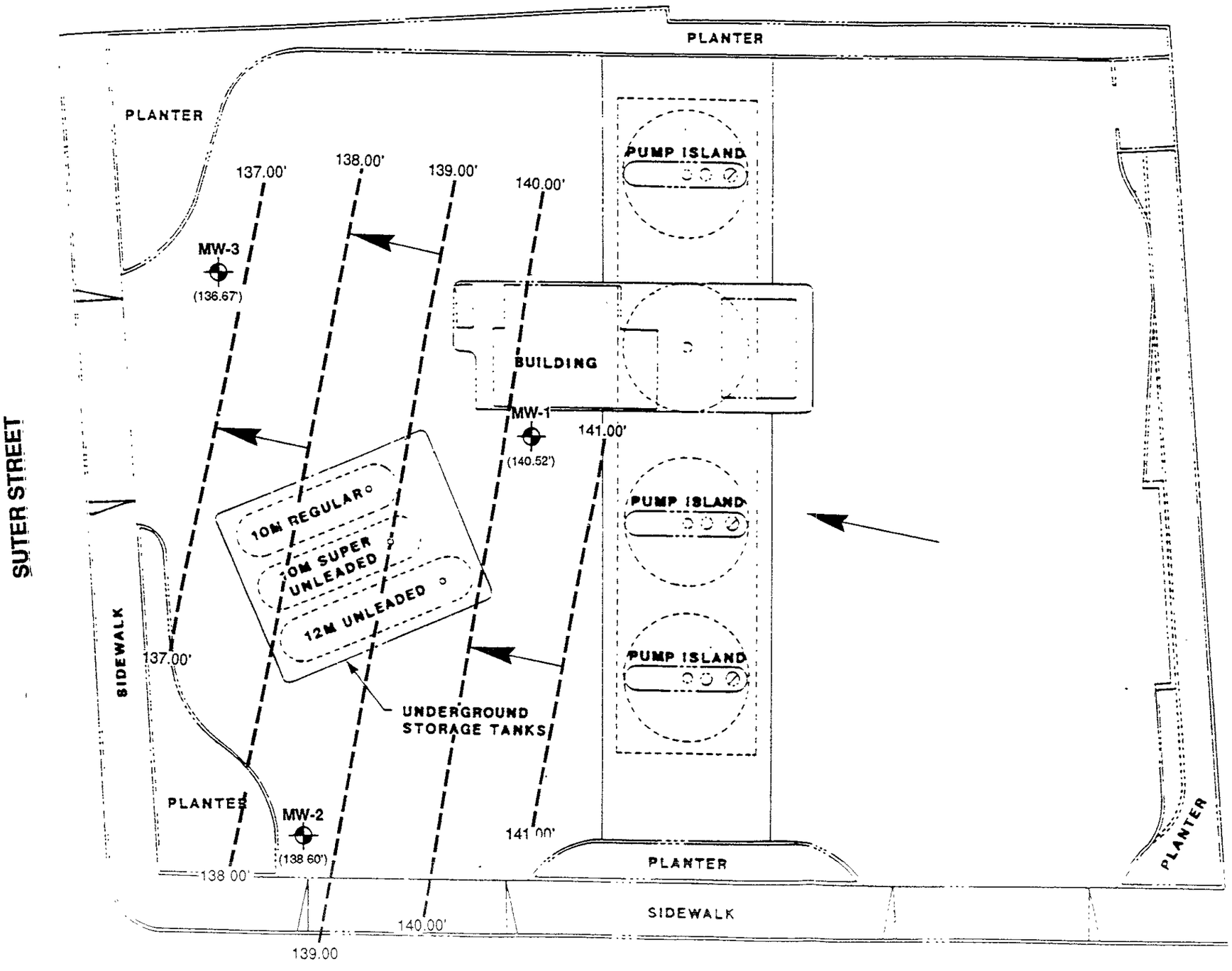


FIGURE 3
TOTAL PETROLEUM HYOROCARBON (TPH) ISOCONCENTRATION MAP

B P SERVICE STATION NO. 11132
3201 35TH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO 30-081



Source B P Oil Company

N

0 10 20
SCALE IN FEET

LEGEND:

⌖	MONITORING WELLS
(140.52')	GROUND WATER ELEVATION
138.00'	GROUND WATER ELEVATION CONTOUR
←	DIRECTION OF GROUND WATER FLOW

FIGURE 2 GROUND WATER ELEVATION CONTOUR MAP

B P SERVICE STATION NO. 11132
3201 35TH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. 30-081

ATTACHMENT A

LABORATORY REPORTS AND
CHAIN OF CUSTODY FORMS

SUPERIOR ANALYTICAL LABORATORY, INC.
1385 FAIRFAX ST., STE. D. • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 80513
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-081

DATE RECEIVED: 02/02/90
DATE REPORTED: 02/09/90

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L) Benzene	Toluene	Ethyl Benzene	Xylenes
1	TW-4	ND<0.3	ND<0.3	ND<0.3	0.7
2	TW-5	1100	5100	5600	28000
3	TW-6	56	910	590	3700
4	TW-7	ND<0.3	0.4	0.7	4.3
5	TW-8	0.3	0.6	1.1	7.9
6	TW-9	2100	5700	1200	6900
7	TW-10	1900	7300	1400	8000

ug/L - parts per billion (ppb)
ug/kg - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/kg
Method Detection Limit in Water: 0.3 ug/L

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 92 %: Duplicate RPD = <10

Edward R. Morales
Laboratory Manager

SUPERIOR ANALYTICAL LABORATORY, INC.
1385 FAIRFAX ST., STE. D. • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 80498
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-081

DATE RECEIVED: 01/29/90
DATE REPORTED: 02/05/90

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L) Benzene	Toluene	Ethyl Benzene	Xylenes
1	MW-2	580	1300	460	2300
2	MW-3	20	30	24	35
3	TW-1	230	180	690	1200
4	TW-3	2400	2800	530	4000

ug/L - parts per billion (ppb)
ug/kg - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/kg
Method Detection Limit in Water: 0.3 ug/L

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 96 %: Duplicate RPD = <2%

Edward R. Morales
Laboratory Manager

SUPERIOR ANALYTICAL LABORATORY, INC.
1385 FAIRFAX ST., STE. D. • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 90108
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-081

DATE RECEIVED: 01/29/90
DATE REPORTED: 02/05/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (mg/L) Gasoline Range
1	MW-2	14
2	MW-3	0.5
3	TW-1	7.4
4	TW-3	22

mg/L - parts per million (ppm)

Method Detection Limit for Gasoline in Soil: 1 mg/kg
Method Detection Limit for Gasoline in Water: 0.1 mg/L

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 10%
MS/MSD Average Recovery = 93%: Duplicate RPD = 5%

Edward R. Morales

Laboratory Manager

SUPERIOR ANALYTICAL LABORATORY, INC.
1385 FAIRFAX ST., STE. D. • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 80513
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-081

DATE RECEIVED: 02/02/90
DATE REPORTED: 02/09/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (mg/L) Gasoline Range
1	TW-4	ND<0.1
2	TW-5	240
3	TW-6	20
4	TW-7	ND<0.1
5	TW-8	ND<0.1
6	TW-9	41
7	TW-10	50

mg/L - parts per million (ppm)

Method Detection Limit for Gasoline in Soil: 0.5 mg/kg
Method Detection Limit for Gasoline in Water: 0.1 mg/L

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 5
MS/MSD Average Recovery = 105%: Duplicate RPD = 2

Edward R. Morales

Laboratory Manager

ALTON GEOSCIENCE
1170 BURNETT AVE., STE. S
CONCORD, CA. 94520 (415) 682-1582

CHAIN of CUSTODY RECORD

PAGE 1 of 1

DATE: 1/29/90 DUE BY: 2/6/90
LABORATORY: Superior

PROJECT NUMBER / MANAGER: 30-081 M. Hopwood
SAMPLERS SIGNATURE: William S. Shipp
PROJECT NAME / ADDRESS: BP, 35th Ave. Oakland
REMARKS OR SPECIAL INSTRUCTIONS:

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATRIX	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	TYPE & NUMBER OF CONTAINERS	SOIL ANALYSIS			WATER ANALYSIS			
										TPH as Gas / BTEX			
MW-2	1/26/90	MW-2	Wate			3x40 ml				X			
MW-3	"	MW-3	"			3 x 40 ml				X			
TW-1	"	TW-1	"			3 x 40 ml				X			
~~TW-2~~	"	TW-2	"			3 x 40 ml				X			
TW-3	"	TW-3	"			3 x 40 ml				X			

CHAIN OF CUSTODY

	SIGNATURE	INCLUSIVE DATES/TIMES			SIGNATURE	INCLUSIVE DATES/TIMES	
1.	William S Shipp	1/29/90	3:30 pm	4.			
2.	[signature]	1/29/90	3:30 pm	5.			
3.				6.			

ALTON GEOSCIENCE
1170 BURNETT AVE., STE. S
CONCORD, CA. 94520 (415) 682-1582

CHAIN of CUSTODY RECORD

PAGE 1 of 1

DATE: 2/2/90 DUE BY: 2/9/90
LABORATORY: Sperior

PROJECT NUMBER / MANAGER: 30-081 SAMPLERS SIGNATURE:
PROJECT NAME / ADDRESS: BP - 98th Oakland

REMARKS OR SPECIAL INSTRUCTIONS:
One Week T.A.

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATRIX	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	TYPE & NUMBER OF CONTAINERS	SOIL ANALYSIS	WATER ANALYSIS: TPH 8015
TW-4	2/1		Water	X		3 VOA's		X
TW-5								X
TW-6								X
TW-7								X
TW-8								X
TW-9								X
TW-10						2 VOA's		X

CHAIN OF CUSTODY

	SIGNATURE	INCLUSIVE DATES/TIMES		SIGNATURE	INCLUSIVE DATES/TIMES	
1.		1100	2/2	4.	2/2/90	2:25 pm
2.	Geri Yordley	9:25 p.m.	2/2	5.		
3.				6.		

APPENDIX B

General Field Procedures and Boring Logs

GENERAL FIELD PROCEDURES

A description of general field procedures conducted during drilling activities is presented below.

Drilling and Soil Sampling

Soil borings/monitoring wells were drilled utilizing 10-inch-diameter, continuous-flight, hollow-stem augers. To avoid cross-contamination, the augers were steam-cleaned prior to drilling each boring.

Soil samples were obtained for soil description, field, and laboratory analysis. Soil samples collected at 5-foot intervals were retrieved ahead of the lead auger utilizing an 18-inch-long by 2-inch-diameter, split spoon sampler lined with 1.5-inch-diameter, stainless steel sample tube inserts. The sampler and sample tubes were washed with a sodium tripolyphosphate solution and rinsed before each sampling event. The sampler was driven by a 30-inch free fall of a 140-pound hammer. Blow counts were recorded for three successive 6-inch intervals.

Upon retrieval from the sampler, the sample tubes were removed and securely sealed with Teflon sheeting and polyurethane caps. The samples were labeled with sample identification, sample depth, geologist's initials, and date of collection. The soil samples were kept on ice prior to and during transport to a state-certified laboratory.

The soil recovered was described in accordance with the Unified Soil Classification System. For each soil type, field estimates of density/consistency, moisture, color, grading, and soil type were recorded on the boring logs.

Monitoring Well Installation and Construction Details

Included in this appendix are monitoring well installation and construction details for monitoring wells installed as part of this study.

Monitoring wells were constructed of 4-inch-diameter, flush-threaded, Schedule 40 PVC blank and screened (0.020-inch slot size) casing. The annular space surrounding the screened portion was backfilled with No. 3 Monterey sand (filter pack) to approximately 2 feet above the top of the screened section. A 1-foot-thick bentonite annular seal was placed above the filter pack and the remaining annulus was grouted

with neat cement to the surface. Utility boxes were installed slightly above grade to minimize infiltration of surface waters. Locking, watertight well caps were installed to ensure the integrity of the well.

ALTON GEOSCIENCE, Inc.
LOG OF EXPLORATORY BORING

PROJECT NO. 30-081 DATE DRILLED 1/29/90
CLIENT BP OIL COMPANY
LOCATION 3201 35TH AVENUE, OAKLAND, CA
LOGGED BY M. TAYLOR APPROVED BY

BORING NO.
WELL NO. MW-4

FIELD SKETCH OF BORING LOCATION

TOP OF CASING ELEVATION 170.34

DRILLING METHOD HOLLOW-STEM AUGER HOLE DIAM. 8"
SAMPLER TYPE MODIFIED SPLIT SPOON
CASING DATA SEE MONITORING WELL CONSTRUCTION DETAIL
DRILLER WEST HAZMAT

WATER LEVEL 26.87
DATE July 9, 1990
TIME

BLOWS PER FOOT(ft)	CGI (PPM)	SAMPLE	DEPTH	WELL CONSTRUCTION OR BORING CLOSURE	USCS	PROFILE	DESCRIPTION
			0	Christy Box			ASPHALT
			2	Portland Cement			
			4		CL		SILTY CLAY; greenish brown; damp, high plasticity stiff
3,4,6	0		6	Bentonite Pellets			
			8				
10,28, 35	0		10	2" sch. 40 PVC Casing	CL		SILTY CLAY; gravelly, greenish brown with rust stain residue, dry to damp, low to medium plasticity , hard
			12				
			14		CL		SILTY CLAY; gravelly, brown, dry to damp, low to medium plasticity hard
10,17, 28	0		16	2" sch. 40 PVC .020 Slot			
			18		CL		SILTY CLAY; gravelly, brown rust residue, dry to damp, low plasticity, hard
14,28, 35	0		20				
			22				
			24	Sand #3 Lonestar	CL		SILTY CLAY; gravelly, brown, moist medium plasticity, hard
7,15, 26	0		26				▽
			28				
			30				
11, 17, 25	0		32		CL		SILTY CLAY; very gravelly, brown wet, medium plasticity
			34				

ALTON GEOSCIENCE, Inc.
LOG OF EXPLORATORY BORING

PROJECT NO. 30-081 DATE DRILLED 1/29/90
CLIENT BP OIL COMPANY
LOCATION 3201 35TH AVENUE, OAKLAND, CA
LOGGED BY M. TAYLOR APPROVED BY _____

BORING NO.
WELL NO.
MW-4

FIELD SKETCH OF BORING LOCATION

TOP OF CASING ELEVATION _____

DRILLING METHOD HOLLOW-STEM AUGER HOLE DIAM. 8"
SAMPLER TYPE MODIFIED SPLIT SPOON
CASING DATA SEE MONITORING WELL CONSTRUCTION DETAIL
DRILLER WEST HAZMAT

WATER LEVEL
DATE
TIME

BLOWS PER FOOT(ft)	CGI (PPM)	SAMPLE	DEPTH	WELL CONSTRUCTION OR BORING CLOSURE	USCS	PROFILE	DESCRIPTION
8,18, 34	0		36	2" sch. 40 PVC .020 Slot	CL		SILTY CLAY; gravelly, brown, dry to damp
			38				
			40				SILTY CLAY; gravelly, brown, moist, medium plasticity
15, 28, 38	0		42	End Cap			
			44				
			46				
			48				
			50				

ALTON GEOSCIENCE, Inc.
LOG OF EXPLORATORY BORING

PROJECT NO. 30-081 DATE DRILLED 2/1/90
CLIENT BP OIL COMPANY
LOCATION 3201 35TH AVENUE, OAKLAND, CA
LOGGED BY M. TAYLOR APPROVED BY

BORING NO.
WELL NO. MW-5

FIELD SKETCH OF BORING LOCATION

TOP OF CASING ELEVATION 165.14

DRILLING METHOD HOLLOW-STEM AUGER HOLE DIAM. 8"
SAMPLER TYPE MODIFIED SPLIT SPOON
CASING DATA SEE MONITORING WELL CONSTRUCTION DETAIL
DRILLER WEST HAZMAT

WATER LEVEL 24.75
DATE July 9, 1990
TIME

BLOWS PER FOOT(ft)	CGI (PPM)	SAMPLE	DEPTH	WELL CONSTRUCTION OR BORING CLOSURE	USCS	PROFILE	DESCRIPTION
			0	Christy Box			ASPHALT
			2	Portland Cement			
			4		CL		SANDY CLAY; gravelly, brown, damp, low plasticity hard
13,23, 35	0		6	Bentonite Pellets			
			8				
			10		CL		SILTY CLAY; gravelly, greenish brown, damp, low plasticity, gas odor present hard
11,25, 39	0		12	2" sch. 40 PVC Casing			
			14		CL		SILTY CLAY; gravelly, greenish brown, moist medium plasticity, gas odor hard
8,11, 21	0		16	2" sch. 40 PVC .020 Slot			
			18		CL		SILTY CLAY; sandy and gravel, greenish brown, moist medium plasticity, gas odor hard
8,23, 33	0		20				
			22				
			24	Sand #3 Lonestar			▽
4,7,13	0		26		CL		SILTY CLAY; gravelly, reddish brown, moist to saturated medium plasticity very stiff
			28				
4,5,8	0		30		CL		SILTY CLAY; with fine sand, tan, damp to medium high plasticity, stiff
			32				
14,17, 22	0		34	End Cap	CL		SILTY CLAY; gravelly, reddish brown moist high plasticity, hard

ALTON GEOSCIENCE, Inc.
LOG OF EXPLORATORY BORING

PROJECT NO. 30-081 DATE DRILLED 2/1/90
CLIENT BP OIL COMPANY
LOCATION 3201 35TH AVENUE, OAKLAND, CA
LOGGED BY M. TAYLOR APPROVED BY

BORING NO.
WELL NO. MW-6

FIELD SKETCH OF BORING LOCATION

TOP OF CASING ELEVATION 165.38

DRILLING METHOD HOLLOW-STEM AUGER HOLE DIAM. 8"
SAMPLER TYPE MODIFIED SPLIT SPOON
CASING DATA SEE MONITORING WELL CONSTRUCTION DETAIL
DRILLER WEST HAZMAT

WATER LEVEL 24.75
DATE July 9, 1990
TIME

BLOWS PER FOOT(ft)	CGI (PPM)	SAMPLE	DEPTH	WELL CONSTRUCTION OR BORING CLOSURE	USCS	PROFILE	DESCRIPTION
			0	Christy Box			
			2	Portland Cement			ASPHALT
			4		CH		SILTY CLAY; gravelly, redish brown, damp, high plasticity , very stiff
10,12, 15	0		6	Bentonite Pellets			
			8		CH		SILTY CLAY; gravelly, reddish brown moist, high plasticity, hard
8,15, 23	0		10				
			12	2" sch. 40 PVC Casing			
			14		CH		SILTY CLAY; gravelly, brown, moist medium high plasticity, very stiff
5,12, 18	0		16	2" sch. 40 PVC .020 Slot			
			18		CH		SILTY CLAY; gravelly, brown, moist to saturated very stiff
11,15, 15	0		20				
			22				
			24	Sand #3 Lonestar			▽
23-30, 50/4"	0		26				NO RECOVERY; large cobble or rock obstruction
			28				
6,13,17	0		30				NO RECOVERY; same
			32				drilled to 35' w/o sample recovery
21,29, 35	0		34	End Cap	CL		SILTY CLAY; gravelly saturated moist, brown, hard

ALTON GEOSCIENCE, Inc.
LOG OF EXPLORATORY BORING

PROJECT NO. 30-081 DATE DRILLED 2/1/9
CLIENT BP OIL COMPANY
LOCATION 3201 35TH AVENUE, OAKLAND, CA
LOGGED BY M. TAYLOR APPROVED BY

BORING NO.
WELL NO. MW-7

FIELD SKETCH OF BORING LOCATION

TOP OF CASING ELEVATION 167.61

DRILLING METHOD HOLLOW-STEM AUGER HOLE DIAM. 8"
SAMPLER TYPE MODIFIED SPLIT
CASING DATA SEE MONITORING WELL CONSTRUCTION DETAIL
DRILLER WEST HAZMAT

WATER LEVEL 27.29
DATE JULY 9, 1990

BLOWS PER FOOT(ft)	CGI (PPM)	SAMPLE	DEPTH	WELL CONSTRUCTION OR BORING CLOSURE	USCS	PROFILE	DESCRIPTION
			0	Christy Box			ASPHALT
			2	Portland Cement			
			4		CH		SILTY CLAY; brown, damp, high plasticity , very stiff
14,14, 15	0		6	Bentonite Pellets			
			8				
			10		CL		SILTY CLAY; gravelly, reddish brown damp medium plasticity, hard
11,27, 39	0		12	2" sch. 40 PVC Casing			
			14		CL		SILTY CLAY; gravelly, reddish brown, damp, hard
15,21, 29	0		16	2" sch. 40 PVC .020 Slot			
			18				
			20		CL		SILTY CLAY; gravelly, brown, moist medium plasticity, hard
36,15, 50/5"	0		22				
			24	Sand #3 Lonestar	CL		SILTY CLAY; gravelly, brown, moist medium plasticity, hard
8,15,21	0		26				▽
			28				
5,8,12	0		30		CL		SILTY CLAY; gravelly, brown, saturated medium plasticity, very stiff
			32				
4,7,10	0		34		CH		SILTY CLAY; tannish brown, moist high plasticity, very stiff

ALTON GEOSCIENCE, Inc.
LOG OF EXPLORATORY BORING

PROJECT NO. 30-081 DATE DRILLED 1/29/90
CLIENT BP OIL COMPANY
LOCATION 3201 35TH AVENUE, OAKLAND, CA
LOGGED BY M. TAYLOR APPROVED BY

BORING NO.
WELL NO. RW-1

FIELD SKETCH OF BORING LOCATION

TOP OF CASING ELEVATION 168.01

DRILLING METHOD HOLLOW-STEM AUGER HOLE DIAM. 12"
SAMPLER TYPE
CASING DATA SEE MONITORING WELL CONSTRUCTION DETAIL
DRILLER WEST HAZMAT

WATER LEVEL 27.93
DATE July 9, 1990
TIME

BLOWS PER FOOT(ft)	CGI (PPM)	SAMPLE	DEPTH	WELL CONSTRUCTION OR BORING CLOSURE	USCS	PROFILE	DESCRIPTION
			0	Christy Box			ASPHALT
			2	Portland Cement			SILTY CLAY; gravels, brown, damp, backfill
			4		CL		SILTY CLAY; gravelly, greenish brown, dry to damp, low plasticity, odor present
9,19, 33	0		6	Bentonite Pellets			
			8		CL		SILTY CLAY; gravelly, greenish brown, dry to damp, medium plasticity, odor present
16,33, 40	0		10				
			12	6" sch. 40 PVC Casing			
			14		CL		SILTY CLAY; gravelly, brown, damp, medium odor present
15,36, 43	0		16	6" sch. 40 PVC .020 Slot			
			18		CL		SILTY CLAY; gravelly, brown, damp, medium plasticity, odor present
.11,16, 25	0		20				
			22				
			24	Sand #3 Lonestar			
6,7, 16	0		26		CL		SILTY CLAY; sandy gravelly, greenish brown, medium plasticity
			28				▽
6,13, 17	0		30		CL		SILTY CLAY; gravelly, sandy (fine) brown, saturated very stiff
			32				
			34				

ALTON GEOSCIENCE, Inc.
LOG OF EXPLORATORY BORING

PROJECT NO. 30-081 DATE DRILLED 1/29/90
CLIENT BP OIL COMPANY
LOCATION 3201 35TH AVENUE, OAKLAND, CA
LOGGED BY M. TAYLOR APPROVED BY

BORING NO.
WELL NO. RW-1

FIELD SKETCH OF BORING LOCATION

TOP OF CASING ELEVATION

DRILLING METHOD HOLLOW-STEM AUGER HOLE DIAM. 10"
SAMPLER TYPE MODIFIED SPLIT SPOON
CASING DATA SEE MONITORING WELL CONSTRUCTION DETAIL
DRILLER WEST HAZMAT

WATER LEVEL
DATE
TIME

BLOWS PER FOOT (ft)	CGI (PPM)	SAMPLE	DEPTH	WELL CONSTRUCTION OR BORING CLOSURE	USCS	PROFILE	DESCRIPTION
6, 16, 29	0		36	2" sch. 40 PVC .020 Slot	CL		SILTY CLAY; gravelly, sandy (fine) brown, saturated, medium high plasticity, hard
			38				
6, 15, 28			40	End Cap			SAME

APPENDIX C

Well Development and Ground Water Sampling and Field Survey Forms

WELL DEVELOPMENT AND WATER SAMPLING PROCEDURES

All purging and ground water sampling equipment was cleaned prior to use to minimize cross-contamination between wells. All equipment in contact with ground water was triple-rinsed prior to each sampling event in successive baths consisting of tripolyphosphate solution, tap water, and deionized water. Prior to sampling, the well was developed and purged in accordance with EPA protocol. During purging, pH, temperature, and conductivity were measured periodically until these parameters stabilized, indicating formation water had entered the well casing. The purged water was pumped into 55-gallon D.O.T.-approved drums prior to disposal or recycling at an appropriate waste disposal facility.

Ground water samples were collected by lowering a 4-inch-diameter, bottom-fill, Teflon bailer just below the water level in the well. The samples were carefully transferred from the check-valve-equipped Teflon bailer to zero-headspace 1-liter and 40-milliliter glass containers fitted with Teflon-sealed caps. All samples were inverted to ensure that entrapped air was not present. Each sample was labeled with sample number, well number, sample date, and engineer's/geologist's initials. The samples remained on ice prior to laboratory analysis.

DAILY FIELD REPORT

JOB NAME:	PROJECT NO.: 30-081	DATE: 7.9.90
LOCATION: 35th Ave Oakland	WEATHER: Sunny	DAY: 1 to 1
CONTRACTOR:	FOREMAN:	
FIELD TECHNICIAN: Watts + Adkins.	INSPECTION/ TESTING OF	

SUMMARY OF OPERATIONS:

9:30-10:50 loaded truck, started paperwork

11:30 - 12:00 travel

12:00 arrive site,
take DTW and Product thickness
for all wells.
Purge and sample MW-4, 5, 6 & 7,
purge and sample MW-3
bail ~.10" free product from MW-2
" ~.25" " " MW-1
No free product in BW-1
measure locations of wells
survey all wells for Jul #2576
clean up site
Note: there are 36 barrels on site
including 5 empty ones.

12:00 leave site, unload truck

1:00 go home ☺

ALTON GEOSCIENCE
1170 Burnett Ave., Ste. S
Concord, CA 94520

SURVEY DATA

DATE: 7/9/90
SURVEY BY: [illegible]

PROJECT NUMBER: 30-081
ADDRESS: 35th & Sutter Oakland

ELEVATION REFERENCE DESCRIPTION:

REFERENCE SOURCE: Bm 25-76 elev: 170.467

4.89

STA.	(+) B.S.	H.I.	(-) F.S.	ELEV.	
Bench	~~4.89~~	~~169.64~~		170.47	
~~Ref~~	4.89				
Bench	4.87	175.36			
TP-1		175.36	5.77	169.59	
MW-7	5.37	174.96	7.35	167.61	
MW-2	7.14	174.75	6.61	168.14	
MW-1		174.75	5.00	169.75	
RW-1		174.75	6.74	168.01	±.01
MW-4		174.75	4.39	170.36	
TP-2		174.75	6.90	167.85	
MW-3	4.66	172.51	5.31	167.17	
MW-6		172.51	7.11	165.4	
TP-3		172.51	5.40	167.11	
	6.75	171.86			
MW-5			6.72	165.14	
	6.90	172.54		165.64	
TP-3			4.95	167.59	
	5.18	172.77			
[illegible]		172.77	5.89	166.88	
MW-8		172.77	5.12	167.65	
MW-1		"	7.24	165.53	
MW-2		"	4.15	168.62	
RW		"	4.28	167.99	
TP-5	6.70	174.69			
MW-4			4.35	170.34	
MW-7			7.08	167.61	
	7.08	174.69			
			5.04	169.65	
BM	5.31	175.36	4.90	170.46	

170.47

1 148.29 + .25 = 148.54
2 147.90
3 148.21
4 149.06
5 147.17
6 148.20
7 147.91
RW 148.02

NOTES:

ALTON GEOSCIENCE, INC
1170 Burnett Ave., Ste. S
Concord, CA 94520

JOB NUMBER 20-081 TECHNICIAN [illegible]

JOB LOCATION [illegible] DATE 7/9/92

PUMPOUT ☐ YES ☐ NO	DATE OF LAST PUMPOUT:			WEATHER: TIME:		COMMENTS (Notes, conditions, etc.)
	HOLD	CUT	LEVEL			
WELL #	DEPTH TO WATER	DEPTH TO PRODUCT	PROD. THICKNESS (in)	TOTAL DEPTH	DEPTH TO PUMP	
MW-4	21.30			[illegible]		
MW-7	[illegible].70			[illegible]		
EW-1	21.46		.2[illegible]"	34.10		
EW-1	19.99			38.5		
MW-2	[illegible]0.24		.10"	34.70		
MW-5	17.97			30.50		
MW-6	[illegible] 0			[illegible]		
[illegible]3	[illegible]			[illegible]		

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-081 Site: BP, 35th Ave Date: 7/9/90

Well: MW-1 Sampling Team: Watts + Adkins

Well Development Method: Pump

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Triple Rinse

Well Development/ Well Sampling Data

Total Well Depth: 34.10 feet Time: _____ Water level Before Pumping: 21.46

Water Column	Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
13.34 feet x	(0.16)	0.65	2.13	4	9.5

Depth Purging From: ____ feet. Time Purging Begins: _____

Notes on Initial Discharge: _____

Time	Volume	pH	Conductivity	T	Notes

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: FREE PRODUCT

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-081 Site: BP, 35th Ave Date: 7/9/90

Well: MW-2 Sampling Team: Watts + Adkins

Well Development Method: Pump

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Triple Rinse

Well Development/ Well Sampling Data

Total Well Depth: 34.40 feet Time: _____ Water level Before Pumping: 20.24

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
_____	feet x	0.16	0.65	_____	_____	_____

Depth Purging From: ____ feet. Time Purging Begins: _____

Notes on Initial Discharge: _____

Time	Volume	pH	Conductivity	T	Notes
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH	_____	_____	_____	_____
Conductivity	_____	_____	_____	_____
Temperature (F)	_____	_____	_____	_____

Presample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: FREE PRODUCT

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-081 Site: BP, 35th Ave Date: 7/9/90

Well: MW-3 Sampling Team: Watts + Adkins

Well Development Method: Pump

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Triple Rinse

Well Development/ Well Sampling Data

Total Well Depth: 31.5 feet Time: _____ Water level Before Pumping: 19.96

Water Column	Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
15.54 feet x	(0.16)	0.65	2.65	4	10.5

Depth Purging From: ____ feet. Time Purging Begins: _____

Notes on Initial Discharge: _____

Time	Volume	pH	Conductivity	T	Notes
4:40	5	8.51	4.49	67.5 ~~7.41~~	Brown + Cloudy
4:45	7	8.38	3.59	62.50	" "
4:48	8	8.26	3.40	62.30	" "
4:51	9	7.22	3.27	59.90	
4:57	10.5	7.19	3.11	60.10	" "

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-081 Site: BP, 35th Ave Date: 7/9/90

Well: MW-3 4 Sampling Team: Watts + Adkins

Well Development Method: Pump

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Triple Rinse

Well Development/ Well Sampling Data

Total Well Depth: ~~24.5~~ 39 feet Time: _____ Water level Before Pumping: ~~14.70~~ 21.30

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
14.10	feet x	0.16	0.65	2.36	_____	08.00

Depth Purging From: ____ feet. Time Purging Begins: _____

Notes on Initial Discharge: _____

Time	Volume	pH	Conductivity x100	T	Notes
____	10	7.37	4.72	80.2	
____	15	8.09	3.54	77.5	"
____	20	8.17	2.79	54.7	"
____	22	8.12	2.75	52.2	
____	24	8.04	2.79	68.3	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH	_____	_____	_____	_____
Conductivity	_____	_____	_____	_____
Temperature (F)	_____	_____	_____	_____

Presample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-081 Site: BP, 35th Ave Date: 7/9/90

Well: MW-5 Sampling Team: Watts + Adkins

Well Development Method: Pump

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Triple Rinse

Well Development/ Well Sampling Data

Total Well Depth: 30.50 feet Time: _____ Water level Before Pumping: 17.97

Water Column	Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
12.53 feet x	(0.16)	0.65	2.0	_____	20

Depth Purging From: ____ feet. Time Purging Begins: _____

Notes on Initial Discharge: _____

Time	Volume	pH	Conductivity	T	Notes
9:20	12	7.78	4.77	5.50	silty brown 220
	~~14~~	~~7.55~~	4.23	55.8	
9:25	15	7.69	4.18	55.6	
	~~16~~	7.56	4.72	55.7	"
9:32	17	7.47	4.73	55.9	"

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-081 Site: BP, 35th Ave Date: 7/9/90

Well: MW-6 Sampling Team: Watts + Adkins

Well Development Method: Pump

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Triple Rinse

Well Development/ Well Sampling Data

Total Well Depth: 34 feet Time: _____ Water level Before Pumping: 17.20

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
16.80	feet x	0.16	0.65	2.68	_____	26.88

Depth Purging From: _____ feet. Time Purging Begins: _____

Notes on Initial Discharge: _____

Time	Volume	pH	Conductivity	T	Notes
4:05	10	8.67	1.83	16.3	BRN, TURBID
____	15	8.22	1.81	59.6	"
____	20	6.35	2.05	~~60~~.01	"
5:15	25	8.28	1.83	62.10	
____	27	7.50	1.83	59.6	
5:30	28	7.74	2.01	59.5	" "

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH	_____	_____	_____	_____
Conductivity	_____	_____	_____	_____
Temperature (F)	_____	_____	_____	_____

Presample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-081 Site: BP, 35th Ave Date: 7/9/90

Well: MW-7 Sampling Team: Watts + Adkins

Well Development Method: Pump

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Triple Rinse

Well Development/ Well Sampling Data

Total Well Depth: ~~34.50~~ feet Time: _____ Water level Before Pumping: ~~19.70~~

Water Column	Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
17.7 feet x	(0.16)	0.65	2.83	_____	~~23.5~~ 23.6

Depth Purging From: ____ feet. Time Purging Begins: _____

Notes on Initial Discharge: _____

Time	Volume	pH	Conductivity	T	Notes
6:15	~~6.75~~ 10	7.76	6.14	51.2	Brown + cloudy
____	~~15~~ 15	~~8.33~~	4.79	56.8	
____	20	~~8.88~~ 7.55	4.29	56.4	
____	22	7.33	4.36	55.2	
____	23.5	7.39	4.19	54.6	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: _____

APPENDIX D

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 3201 35TH ST
OAKLAND CA

(2) CLIENT
Name BP OIL ; Darlene Jacobsen
Address 2868 Prospect Park Dr Phone 916 631 6918
City Rancho Cordova Zip 95670-6620

(3) APPLICANT
Name AITON GEOSCIENCE, INC
Address 1000 Burnett Ave Phone 415 682 1582
City Concord CA Zip 94520

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

(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 ___

DRILLER'S LICENSE NO. C57-554979

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 4 in. Depth ___ ft.
Surface Seal Depth 15 ft. Number 3

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

(7) ESTIMATED STARTING DATE 5/16
ESTIMATED COMPLETION DATE 5/17

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

APPLICANT'S SIGNATURE Matthew A. Taylor Date 5/3/90

FOR OFFICE USE

PERMIT NUMBER 90276
LOCATION NUMBER

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. 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 drilling logs and location sketch for geotechnical projects.
3. 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.
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. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

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

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 4 May 90
Wyman Hong

21989

350 2(REV 12/85)

CITY OF OAKLAND

PERMIT TO EXCAVATE IN STREETS OR OTHER WORK AS SPECIFIED

$105

X9000935

SUTER ST

BP OIL FACILITY #11132

LOCATION: 3801 35th Avenue (street or address)

BETWEEN 35th Ave. (street) AND Suter (street) LAUREL

BP OIL COMPANY
2868 PROSPECT PARK DR., SUITE 360
RANCHO CORDOVA, CA 95670

EXCV 105.00
SUBTL 105.00
CHECK 105.00

NATURE OF WORK: 1 monitoring well on Suter St. North of 35th Avenue

APPLICANT: Alton Geoscience, Inc.

ADDRESS: 1000 Burnett Ave., Suite 140

CITY: Concord STATE: CA ZIP: 94520

PHONE: (415) 682-1582

I hereby affirm that I am exempt from the Contractor's License Law for the following reason (Sec 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he is licensed pursuant to the provisions of the Contractor's License Law Chapter 9 (commencing with Sec. 7000) of Division 3 of the Business and Professions Code, or that he is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than $500):

OWNER/BUILDER

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or through his own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he did not build or improve for the purpose of sale).

☐ I, as owner of the property, am exempt from the sale requirements of the above due to: (1) I am improving my principal place of residence or appurtenances thereto, (2) the work will be performed prior to sale, (3) I have resided in the residence for the 12 months prior to completion of the work, and (4) I have not claimed exemption in this subdivision on more than two structures more than once during any three-year period. (Sec. 7044, Business and Professions Code).

☒ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractor's License Law).

☐ I am exempt under Sec. _____ B.&P.C. for this reason _____

Signature _____ Date 5/10/90

WORKER'S COMPENSATION

I hereby affirm that I have a certificate of consent to self-insure, or a certificate of Workers' Compensation Insurance, or a certified copy thereof (Sec. 3800, Lab. C.).

Policy No. WP89-469257-02 Company Name Fremont Indemnity

☒ Certified copy is hereby furnished.

☐ Certified copy is filed with the city building inspection department.

Signature _____ Date _____

(This section need not be completed if the permit is for one hundred dollars ($100) or less.)

I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Workers' Compensation Laws of California.

Signature _____ Date _____

NOTE TO APPLICANT: If, after making this Certificate of Exemption, you should become subject to the Workers' Compensation provisions of the Labor Code, you must forthwith comply with such provisions or this permit shall be deemed revoked.

CONTRACTOR

I hereby affirm that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

LICENSE AND CLASS 554979 C57 CITY BUSINESS TAX 5966 05-17-90

Approximate Starting Date DATE 5/16/90

Approximate Completion Date DATE 5/19/90

LIMITED OPERATION AREA YES _____ NO _____

DATE STREET LAST RESURFACED DATE _____

24-HOUR EMERGENCY PHONE NUMBER 916 638 7276

Telephone 273-3668 Forty-eight (48) HOURS BEFORE ACTUAL CONSTRUCTION. This Permit Void 90 Days From Issue.

ATTENTION

State law requires that contractor/owner call Underground Service Alert two working days before excavating to have below-ground utilities located. This permit is not valid unless applicant has secured an inquiry identification number issued by Underground Service Alert.

Call Toll Free: 800-642-2444

This permit issued pursuant to all provisions of Chapter 6, Article 2 of the Oakland Municipal Code.

This permit is granted upon the express condition that the permittee shall be responsible for all claims and liabilities arising out of work performed under the permit or arising out of permittee's failure to perform the obligations with respect to street maintenance. The permittee shall, and by acceptance of the permit agrees to defend, indemnify, save and hold harmless the City, its officers and employees, from and against any and all suits, claims or actions brought by any person for or on account of any bodily injuries, disease or illness or damage to persons and/or property sustained or arising in the construction of the work performed under the permit or in consequence of permittee's failure to perform the obligations with respect to street maintenance.

X Tim Whitney Date 5/10/90

Signature of Contractor Owner of Agent

☐ Agent for ☒ Contractor ☐ Owner

UTILITY COMPANY REPORT

Supervisor _____

Completion Date _____

CITY INSPECTOR'S REPORT

	BACKFILL	PAVING
Initials		
Hours		
Date		
Concrete		
Asphalt		
Sidewalk		

Size of Cut: Sq. Ft. _____ Inches _____

Paved by _____ Type _____

Bill No. _____

Charges Backfill _____

Paving _____

Paving Insp. _____

APPROVED

Engineering Services _____ Date _____

Field Services _____ Date _____

Construction _____ Date _____

Traffic Engineering _____ Date _____

Electrical Department _____ Date _____

APPROVED BY DIRECTOR OF PUBLIC WORKS

PER _____

Date 5/17/90

350-2 (REV 12/85)

$105 X9000936

SUTER ST.

CITY OF OAKLAND

PERMIT TO EXCAVATE IN STREETS OR OTHER WORK AS SPECIFIED

BP OIL COMPANY
2868 PROSPECT PARK DR., SUITE 360
RANCHO CORDOVA, CA 95670

BP OIL FACILITY #11132

LOCATION: 3201 35th Avenue (street or address) BETWEEN 35th Ave. (street) AND ~~Suter~~ OCTAVIA (street)

NATURE OF WORK: 1 monitoring well on Suter st. South of 35th Avenue

APPLICANT: Alton Geoscience, Inc.

ADDRESS: 1000 Burnett Ave., Suite 140

CITY: Concord STATE: CA ZIP: 94520

PHONE: (415) 682-1582

EXCV 105.00
CHECK REPORT 105.00
Supervisor ITEM 1
Completion Date ICL 7708 11:02

OWNER/BUILDER

I hereby affirm that I am exempt from the Contractor's License Law for the following reason (Sec 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he is licensed pursuant to the provisions of the Contractor's License Law Chapter 9 (commencing with Sec. 7000) of Division 3 of the Business and Professions Code, or that he is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than $500):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or through his own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he did not build or improve for the purpose of sale).

☐ I, as owner of the property, am exempt from the sale requirements of the above due to: (1) I am improving my principal place of residence or appurtenances thereto, (2) the work will be performed prior to sale, (3) I have resided in the residence for the 12 months prior to completion of the work, and (4) I have not claimed exemption in this subdivision on more than two structures more than once during any three-year period. (Sec. 7044, Business and Professions Code)

☒ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractor's License Law).

☐ I am exempt under Sec. ____ B&P.C. for this reason ____

Signature 5/14/90 Date

WORKER'S COMPENSATION

I hereby affirm that I have a certificate of consent to self-insure, or a certificate of Workers' Compensation Insurance, or a certified copy thereof (Sec. 3800, Lab. C.).

Policy # WP89-469257-02 Company Name Fremont Indemnity

☒ Certified copy is hereby furnished.

☐ Certified copy is filed with the city building inspection department.

Signature Date

(This section need not be completed if the permit is for one hundred dollars ($100) or less.)

I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Workers' Compensation Laws of California.

Signature Date

NOTICE TO APPLICANT: If, after making this Certificate of Exemption, you should become subject to the Workers' Compensation provisions of the Labor Code, you must forthwith comply with such provisions or this permit shall be deemed revoked.

CONTRACTOR

I hereby affirm that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

LICENSE # AND CLASS 554979 C57 CITY BUSINESS TAX # 596620

Approximate Starting Date DATE 5/16/90 05-17-90 #2

Approximate Completion Date DATE 5/19/90

LIMITED OPERATION AREA YES ____ NO ____

DATE STREET LAST RESURFACED DATE ____

24-HOUR EMERGENCY PHONE NUMBER 916 678 7276

Telephone 273-3668 Forty-eight (48) HOURS BEFORE ACTUAL CONSTRUCTION. This Permit Void 90 Days From Issue.

ATTENTION

State law requires that contractor/owner call Underground Service Alert two working days before excavating to have below-ground utilities located. This permit is not valid unless applicant has secured an inquiry identification number issued by Underground Service Alert.

Call Toll Free: 800-642-2444

This permit issued pursuant to all provisions of Chapter 6, Article 2 of the Oakland Municipal Code.

This permit is granted upon the express condition that the permittee shall be responsible for all claims and liabilities arising out of work performed under the permit or arising out of permittee's failure to perform the obligations with respect to street maintenance. The permittee shall, and by acceptance of the permit agrees to defend, indemnify, save and hold harmless the City, its officers and employees, from and against any and all suits, claims or actions brought by any person for or on account of any bodily injuries, disease or illness or damage to persons and/or property sustained or arising in the construction of the work performed under the permit or in consequence of permittee's failure to perform the obligations with respect to street maintenance.

X [signature] Date 5/10/90
Signature of Contractor Owner or Agent

☐ Agent for ☒ Contractor ☐ Owner

CITY INSPECTOR'S REPORT

	BACKFILL	PAVING
Initials		
Hours		
Date		
Concrete		
Asphalt		
Sidewalk		

Size of Cut: Sq. Ft. ____ Inches ____

Paved by ____ Type ____

Bill No. ____

Charges Backfill ____ Paving ____ Paving Insp. ____

APPROVED

Engineering Services ____ Date ____

Field Services ____ Date ____

Construction ____ Date ____

Traffic Engineering ____ Date ____

Electrical Department ____ Date ____

APPROVED BY DIRECTOR OF PUBLIC WORKS

PER [signature]

Date 5/17/90

PM

350-2 (REV 12/85)

CITY OF OAKLAND

PERMIT TO EXCAVATE IN STREETS OR OTHER WORK AS SPECIFIED

$105

X9000937

MANGELS AVE.

BP OIL FACILITY

LOCATION: 3201 35th Avenue (street or address) BETWEEN 35th Ave. (street) AND Suter (street)

BP OIL COMPANY
2868 PROSPECT PARK DR. SUITE 360
RANCHO CORDOVA, CA 95670

NATURE OF WORK: 1 monitoring well on Mangels Ave

APPLICANT: Alton Geoscience, Inc.

ADDRESS: 1000 Burnett Ave., Suite 140

CITY: Concord STATE: Ca ZIP: 94520

PHONE: (415) 682-1582

OWNER/BUILDER

I hereby affirm that I am exempt from the Contractor's License Law for the following reason (Sec 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he is licensed pursuant to the provisions of the Contractor's License Law Chapter 9 (commencing with Sec. 7000) of Division 3 of the Business and Professions Code, or that he is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than $500):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or through his own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he did not build or improve for the purpose of sale).

☐ I, as owner of the property, am exempt from the sale requirements of the above due to: (1) I am improving my principal place of residence or appurtenances thereto, (2) the work will be performed prior to sale, (3) I have resided in the residence for the 12 months prior to completion of the work, and (4) I have not claimed exemption in this subdivision on more than two structures more than once during any three-year period. (Sec. 7044, Business and Professions Code).

☒ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractor's License Law).

☐ I am exempt under Sec. _____, B&P.C. for this reason _____

Signature _____ Date 5/17/90

WORKER'S COMPENSATION

I hereby affirm that I have a certificate of consent to self-insure, or a certificate of Workers' Compensation Insurance, or a certified copy thereof (Sec. 3800, Lab. C.).

Policy # WP89-469257-02 Company Name Fremont Indemnity

☒ Certified copy is hereby furnished.

☐ Certified copy is filed with the city building inspection department.

Signature _____ Date _____

(This section need not be completed if the permit is for one hundred dollars ($100) or less.)

I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Workers' Compensation Laws of California.

Signature _____ Date _____

NOTICE TO APPLICANT: If, after making this Certificate of Exemption, you should become subject to the Workers' Compensation provisions of the Labor Code, you must forthwith comply with such provisions or this permit shall be deemed revoked.

CONTRACTOR

I hereby affirm that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

LICENSE # AND CLASS C57 554979 CITY BUSINESS TAX # 596620

Approximate Starting Date DATE 5/16/90 05-17-90

Approximate Completion Date DATE 5/19/90

LIMITED OPERATION AREA YES _____ NO _____

DATE STREET LAST RESURFACED DATE _____

24-HOUR EMERGENCY PHONE NUMBER 916-638-7276

Telephone 273-3668 Forty-eight (48) HOURS BEFORE ACTUAL CONSTRUCTION. This Permit Void 90 Days From Issue.

ATTENTION

State law requires that contractor/owner call Underground Service Alert two working days before excavating to have below-ground utilities located. This permit is not valid unless applicant has secured an inquiry identification number issued by Underground Service Alert.

Call Toll Free: 800-642-2444

This permit issued pursuant to all provisions of Chapter 6, Article 2 of the Oakland Municipal Code.

This permit is granted upon the express condition that the permittee shall be responsible for all claims and liabilities arising out of work performed under the permit or arising out of permittee's failure to perform the obligations with respect to street maintenance. The permittee shall, and by acceptance of the permit agrees to defend, indemnify, save and hold harmless the City, its officers and employees, from and against any and all suits, claims or actions brought by any person for or on account of any bodily injuries, disease or illness or damage to persons and/or property sustained or arising in the construction of the work performed under the permit or in consequence of permittee's failure to perform the obligations with respect to street maintenance.

X _____ Date _____
Signature of Contractor Owner or Agent

☐ Agent for ☒ Contractor ☐ Owner

OFFICIAL USE ONLY

UTILITY COMPANY REPORT CHECK 105.00

Supervisor _____ ITEM 1

Completion Date 101 7707 11-02-90

CITY INSPECTOR'S REPORT

	BACKFILL	PAVING
Initials		
Hours		
Date		
Concrete		
Asphalt		
Sidewalk		

Size of Cut: Sq. Ft. _____ Inches _____

Paved by _____ Type _____

Bill No. _____

Charges Backfill _____ Paving _____ Paving Insp. _____

APPROVED

Engineering Services _____ Date _____

Field Services _____ Date _____

Construction _____ Date _____

Traffic Engineering _____ Date _____

Electrical Department _____ Date _____

APPROVED BY DIRECTOR OF PUBLIC WORKS

PER _____

Date 5/17/90

APPENDIX E

Laboratory Reports and Chain of Custody Records

ANAMETRIX INC
Environmental & Analytical Chemistry

1961 Concourse Drive, Suite E
San Jose, CA 95131
(408) 432-8192 • Fax (408) 432-8198

August 1, 1990

Mr. Matthew Taylor
ALTON GEOSCIENCES
1000 Burnett Avenue
Suite 140
Concord, CA 94520

Project Number: 30-081
Anametrix Workorder: 9005252

Dear Mr. Taylor:

Enclosed is the reissued Certified Analytical Report (CAR) that you requested. After review of your request, we have determined that a re-issued CAR is in order because of the following reason(s):

At your request, we changed the sample I.D. number from MW 5 to RW 1.

Thank you for your patience. If there is anything more that we can do, please contact me immediately.

Sincerely,

ANAMETRIX, INC.

Sarah R. Schoen, Ph.D.
Laboratory Manager

SRS/dm/3505

Enclosure

REPORT SUMMARY
ANAMETRIX, INC. (408) 432-8192

Client : Alton Geoscience
Address : 1000 Burnett Avenue
Suite 140
City : Concord, CA 94520
Attn. : Matt Hopwood

Anametrix W.O.#: 9005252
Date Received : 05/21/90
Purchase Order#: N/A
Project No. : 30-081
Date Released : 05/30/90

Anametrix I.D.	Sample I.D.	Matrix	Date Sampled	Method	Date Extract	Date Analyzed	Inst I.D.
RESULTS							
9005252-01	MW 4/5	SOIL	05/16/90	TPHg		05/25/90	N/A
9005252-02	MW 4/10	SOIL	05/16/90	TPHg		05/25/90	N/A
9005252-03	MW 4/15	SOIL	05/16/90	TPHg		05/25/90	N/A
9005252-04	MW 4/20	SOIL	05/16/90	TPHg		05/25/90	N/A
9005252-05	MW 4/25	SOIL	05/16/90	TPHg		05/25/90	N/A
9005252-06	RW 1/5	SOIL	05/16/90	TPHg		05/25/90	N/A
9005252-07	RW 1/10	SOIL	05/16/90	TPHg		05/25/90	N/A
9005252-08	RW 1/15	SOIL	05/16/90	TPHg		05/29/90	N/A
9005252-09	RW 1/20	SOIL	05/16/90	TPHg		05/25/90	N/A
9005252-10	RW 1/25	SOIL	05/16/90	TPHg		05/25/90	N/A
QUALITY ASSURANCE (QA)							
9005252-07	RW 1/10	SOIL	05/16/90	SPIKE		05/25/90	N/A

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 4/5
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-01
Analyst : CB
Supervisor : DDG
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 4/10
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-02
Analyst : CR
Supervisor : OPG
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 4/15
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-03
Analyst : CB
Supervisor : DCG
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 4/20
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-04
Analyst : CB
Supervisor : DQG
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 4/25
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-05
Analyst : CB
Supervisor : DDG
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 RW 1/5
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-06
Analyst : CB
Supervisor : DC
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 RW 1/10
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-07
Analyst : 08
Supervisor : 006
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 RW 1/15
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/29/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-08
Analyst : CS
Supervisor : [illegible]
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.05	0.72
108-88-3	Toluene	0.05	1.6
100-41-4	Ethylbenzene	0.05	0.58
1330-20-7	Total Xylenes	0.05	2.8
	TPH as Gasoline	1	22

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 RW 1/20
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-09
Analyst : CG
Supervisor : DUG
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	5	ND
108-88-3	Toluene	5	18
100-41-4	Ethylbenzene	5	8.0
1330-20-7	Total Xylenes	5	40
	TPH as Gasoline	100	410

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 RW 1/25
Matrix : SOIL
Date sampled : 05/16/90
Date anl.TPHg: 05/25/90
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 9005252-10
Analyst : [illegible]
Supervisor : [illegible]
Date released : 05/30/90
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Reporting Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.5	1.4
108-88-3	Toluene	0.5	3.3
100-41-4	Ethylbenzene	0.5	1.0
1330-20-7	Total Xylenes	0.5	5.4
	TPH as Gasoline	10	50

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANAMETRIX INC
Environmental & Analytical Chemistry
1961 Concourse Drive Suite E San Jose, CA 95131
(408) 432-8192 • Fax (408) 432-8198

REPORT

Stephan Rosen
Alton Geoscience
1000 Burnett Avenue
Suite 140
Concord, CA 94520

July 12, 1990
Anametrix W.O.#: 9006329
Date Received : 06/26/90
Project No. : 30-081

Dear Mr. Rosen:

Your samples have been received for analysis. The REPORT SUMMARY lists your sample identifications and the analytical methods you requested. The following sections are included in this report: RESULTS and QUALITY ASSURANCE.

NOTE: Amounts reported are net values, i.e. corrected for method blank contamination.

If there is any more that we can do, please give us a call. Thank you for using ANAMETRIX, INC.

Sincerely,

ANAMETRIX, INC.

Sarah Schoen

Sarah Schoen, Ph.D.
Laboratory Manager

SRS/lm

BTEX MATRIX SPIKE REPORT
EPA METHOD 5030 WITH GC/PID
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 RW 1/10
Matrix : SOIL
Date Sampled : 05/16/90
Date Analyzed : 05/25/90

Anametrix I.D.: 9005252-07
Analyst : CB
Supervisor : JLG
Date Released : 05/29/90

COMPOUND	SPIKE AMT. (mg/Kg)	MS (mg/Kg)	REC MS	%REC LIMITS
Benzene	0.02	0.016	80%	49-159
Toluene	0.02	0.016	80%	53-156
Ethylbenzene	0.02	0.017	85%	54-151
M+P-Xylenes	0.013	0.011	85%	56-157
O-Xylene	0.0067	0.0054	81%	58-154

REPORT SUMMARY
ANAMETRIX, INC. (408) 432-8192

Client : Alton Geoscience
Address : 1000 Burnett Avenue
Suite 140
City : Concord, CA 94520
Attn. : Stephan Rosen

Anametrix W.O.#: 9006329
Date Received : 06/26/90
Purchase Order#: N/A
Project No. : 30-081
Date Released : 07/12/90

Anametrix I.D.	Sample I.D.	Matrix	Date Sampled	Method	Date Extract	Date Analyzed	Inst I.D.
RESULTS							
9006329-01	MW 7/20	SOIL	06/25/90	TPH		06/30/90	N/A
9006329-02	MW 7/25	SOIL	06/25/90	TPH		06/30/90	N/A
9006329-03	MW 5/5	SOIL	06/25/90	TPH		06/30/90	N/A
9006329-04	MW 5/10	SOIL	06/25/90	TPH		07/06/90	N/A
9006329-05	MW 5/15	SOIL	06/25/90	TPH		07/09/90	N/A
9006329-06	MW 5/20	SOIL	06/25/90	TPH		07/09/90	N/A
9006329-07	MW 5/25	SOIL	06/25/90	TPH		07/06/90	N/A
9006329-08	MW 6/15	SOIL	06/25/90	TPH		06/30/90	N/A
9006329-09	MW 6/20	SOIL	06/25/90	TPH		06/30/90	N/A
9006329-10	MW 7/15	SOIL	06/25/90	TPH		06/30/90	N/A
QUALITY ASSURANCE (QA)							
9006329-02	MW 7/25	SOIL	06/25/90	TPH		07/01/90	N/A

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 7/20
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 06/30/90

Anametrix I.D. : 9006329-01
Analyst : CB
Supervisor : DOG
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 7/25
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 06/30/90

Anametrix I.D. : 9006329-02
Analyst : cb
Supervisor : CDG
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 5/5
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 06/30/90

Anametrix I.D. : 9006329-03
Analyst : CA
Supervisor : QC
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 5/10
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 07/06/90

Anametrix I.D. : 9006329-04
Analyst : CS
Supervisor : DG
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.01	ND
108-88-3	Toluene	0.01	0.019
100-41-4	Ethylbenzene	0.01	ND
1330-20-7	Total Xylenes	0.01	0.11
	TPH as Gasoline	1	9.3

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 5/15
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 07/09/90

Anametrix I.D. : 9006329-05
Analyst : CB
Supervisor : DDG
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.01	0.16
108-88-3	Toluene	0.01	0.037
100-41-4	Ethylbenzene	0.01	0.29
1330-20-7	Total Xylenes	0.01	0.42
	TPH as Gasoline	1	14

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 5/20
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 07/09/90

Anametrix I.D. : 9006329-06
Analyst : CB
Supervisor : DOG
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.125	1.8
108-88-3	Toluene	0.125	11
100-41-4	Ethylbenzene	0.125	2.5
1330-20-7	Total Xylenes	0.125	17
	TPH as Gasoline	2	190

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 5/25
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 07/06/90

Anametrix I.D. : 9006329-07
Analyst : CB
Supervisor : KDG
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	1.25	4.8
108-88-3	Toluene	1.25	44
100-41-4	Ethylbenzene	1.25	13
1330-20-7	Total Xylenes	1.25	94
	TPH as Gasoline	25	770

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 6/15
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 06/30/90

Anametrix I.D. : 9006329-08
Analyst : CS
Supervisor : RDG
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 6/20
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 06/30/90

Anametrix I.D. : 9006329-09
Analyst : CB
Supervisor : DDG
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 7/15
Matrix : SOIL
Date sampled : 06/25/90
Date anl.TPHg: 06/30/90

Anametrix I.D. : 9006329-10
Analyst : CB
Supervisor : [illegible]
Date released : 07/12/90

CAS #	Compound Name	Detection Limit (mg/Kg)	Amount Found (mg/Kg)
71-43-2	Benzene	0.005	ND
108-88-3	Toluene	0.005	ND
100-41-4	Ethylbenzene	0.005	ND
1330-20-7	Total Xylenes	0.005	ND
	TPH as Gasoline	1	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

BTEX MATRIX SPIKE REPORT
EPA METHOD 5030 WITH GC/PID
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 30-081 MW 7/25
Matrix : SOIL
Date Sampled : 06/25/90
Date Analyzed : 07/01/90

Anametrix I.D.: 9006329-02
Analyst : CB
Supervisor : DDG
Date Released : 07/12/90

COMPOUND	SPIKE AMT. (mg/Kg)	MS (mg/Kg)	REC MS	MSD (mg/Kg)	REC MSD	RPD	%REC LIMITS
Benzene	0.02	0.021	105%	0.024	120%	13%	50-150
Toluene	0.02	0.021	105%	0.023	115%	9%	50-150
Ethylbenzene	0.02	0.02	100%	0.021	105%	5%	50-150
M+P-Xylenes	0.013	0.013	100%	0.014	108%	7%	50-150
O-Xylene	0.0067	0.0064	96%	0.0067	100%	5%	50-150

SUPERIOR ANALYTICAL LABORATORIES, INC.

825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512

DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81159
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-081

DATE RECEIVED: 07/11/90
DATE REPORTED: 07/17/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (mg/L) Gasoline Range
1	MW-3	0.14
2	MW-4	ND<0.05
3	MW-5	2.8
4	MW-6	ND<0.05
5	MW-7	ND<0.05

mg/L - parts per million (ppm)

Method Detection Limit for Gasoline in Water: 0.05 mg/L

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 9%
MS/MSD Average Recovery = 85%: Duplicate RPD = 4%

Richard Srna, Ph.D.

Laboratory Manager

SUPERIOR ANALYTICAL LABORATORIES, INC.
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81159
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-081

DATE RECEIVED: 07/11/90
DATE REPORTED: 07/17/90

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L) Benzene	Toluene	Ethyl Benzene	Xylenes
1	MW-3	5.3	4.6	2.0	3.8
2	MW-4	ND<0.3	ND<0.3	ND<0.3	ND<0.3
3	MW-5	200	210	46	290
4	MW-6	ND<0.3	ND<0.3	ND<0.3	ND<0.3
5	MW-7	ND<0.3	ND<0.3	ND<0.3	ND<0.3

ug/L - parts per billion (ppb)

Method Detection Limit in Water: 0.3 ug/L

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 103 %: Duplicate RPD = <3%

Richard Srna, Ph.D.

Dorena Srna for
Laboratory Manager

ALTON GEOSCIENCE
1170 BURNETT AVE., STE. S
CONCORD, CA. 94520 (415) 682-1582

CHAIN of CUSTODY RECORD

PAGE of

DATE: 5/16/90 DUE BY: Normal
LABORATORY: AnaMeTrix

PROJECT NUMBER / MANAGER: MATT Holmwood SAMPLERS SIGNATURE: M. Taylor
PROJECT NAME / ADDRESS: 30-081 - 35th AVE. OAKland
REMARKS OR SPECIAL INSTRUCTIONS:

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATRIX	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	TYPE & NUMBER OF CONTAINERS	SOIL ANALYSIS: TPH-G & BTEX			WATER ANALYSIS			
MW 4/5	5/16		Soil			BRASS sleeve							
MW 4/10	"		"			"							
MW 4/15	"		"			"							
MW 4/20	"		"			"							
MW 4/25	"		"			"							
~~MW 5/5~~	5/16	→ Change TO RW 1/5 M.A.T. 8/1/90	"			"							
~~MW 5/10~~ →	"	→ Change RW 1/10 M.A.T. 8/1/90	"			"							
~~MW 5/15~~ →	"	→ Change RW 1/15 M.A.T. 8/1/90	"			"							
~~MW 5/20~~ →	"	→ " RW 1/20 M.A.T. 8/1/90	"			"							
~~MW 5/25~~ →	"	→ " RW 1/25 M.A.T. 8/1/90	"										

CHAIN OF CUSTODY

SIGNATURE	INCLUSIVE DATES/TIMES		SIGNATURE	INCLUSIVE DATES/TIMES	
1. Matthew A. Taylor	5/21/90		4.		
2. [illegible signature]	5/21/90	1045	5.		
3.			6.		

ALTON GEOSCIENCE
1000 BURNETT AVE., STE. 140
CONCORD, CA 94520 (415) 682-1582

CHAIN of CUSTODY RECORD

PAGE 1 of 2

DATE: 6/26/90 DUE BY: Normal
LABORATORY: Anametrix

PROJECT NUMBER / MANAGER: 30-081 SAMPLERS SIGNATURE: Matthew A. Taylor
PROJECT NAME / ADDRESS: BP 0:1 35TH AVE Oakland
REMARKS OR SPECIAL INSTRUCTIONS:

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATRIX	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	TYPE & NUMBER OF CONTAINERS	ANALYSIS: TPH-G+BTEX	ANALYSIS	ANALYSIS
MW 5/5	6/25		Soil			Brass Sleeve			
MW 5/10									
MW 5/15									
MW 5/20									
MW 5/25	6/25		Soil						
MW 6/15									
MW 6/20									
MW 7/15									

CHAIN OF CUSTODY

	SIGNATURE	INCLUSIVE DATES/TIMES		SIGNATURE	INCLUSIVE DATES/TIMES	
1.	Matthew A. Taylor	6/26	8:00 AM	4.		
2.	[signature]	6/26/90	9:35	5.		
3.				6.		

ALTON GEOSCIENCE
1000 BURNETT AVE., STE. 140
CONCORD, CA 94520 (415) 682-1582

CHAIN of CUSTODY RECORD

PAGE 2 of 2

DATE: 6/26/90 DUE BY: Normal
LABORATORY: ANAMETRIX

PROJECT NUMBER / MANAGER: 30-081 SAMPLERS SIGNATURE: Matthew A. Taylor

PROJECT NAME / ADDRESS: BP 011 35TH AVE Ockland CA

REMARKS OR SPECIAL INSTRUCTIONS:

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATRIX	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	TYPE & NUMBER OF CONTAINERS	ANALYSIS: TPH-G + BTEX	ANALYSIS
MW 7/20	6/25		Soil	X		Brass Sleeve	1	
MW 7/25	6/25		Soil	X		" "	1	

CHAIN OF CUSTODY

	SIGNATURE	INCLUSIVE DATES/TIMES		SIGNATURE	INCLUSIVE DATES/TIMES	
1.	Matthew A Taylor	6/26	8:00 Am	4.		
2.	Jay W Manchee	6/26/90	9:35	5.		
3.				6.		

ALTON GEOSCIENCE
1000 BURNETT AVE., STE. 140
CONCORD, CA 94520 (415) 682-1582

CHAIN of CUSTODY RECORD

PAGE of

DATE: 7/10/90 DUE BY:

LABORATORY:

PROJECT NUMBER / MANAGER: 30-081 SAMPLERS SIGNATURE:

PROJECT NAME / ADDRESS: BP 35th + Sutter, Oakland

REMARKS OR SPECIAL INSTRUCTIONS:

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATRIX	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	TYPE & NUMBER OF CONTAINERS	ANALYSIS: TPH g / BTEX	ANALYSIS
MW-3	7/9/90 4:30 P	MW-3	Water			3 x 40ml	X	
	7/9/90 9:40 P	MW-4					X	
	7/9/90 9:35 P	MW-5					X	
	7/9/90 5:31 P	MW-6					X	
	7/9/90 7:00 P	MW-7					X	

CHAIN OF CUSTODY

SIGNATURE	INCLUSIVE DATES/TIMES	SIGNATURE	INCLUSIVE DATES/TIMES
1.		4.	
2.		5.	
		6.	

APPENDIX F

Slug Test Data

SLUG TEST DATA

MW-1

AUGUST 14, 1990

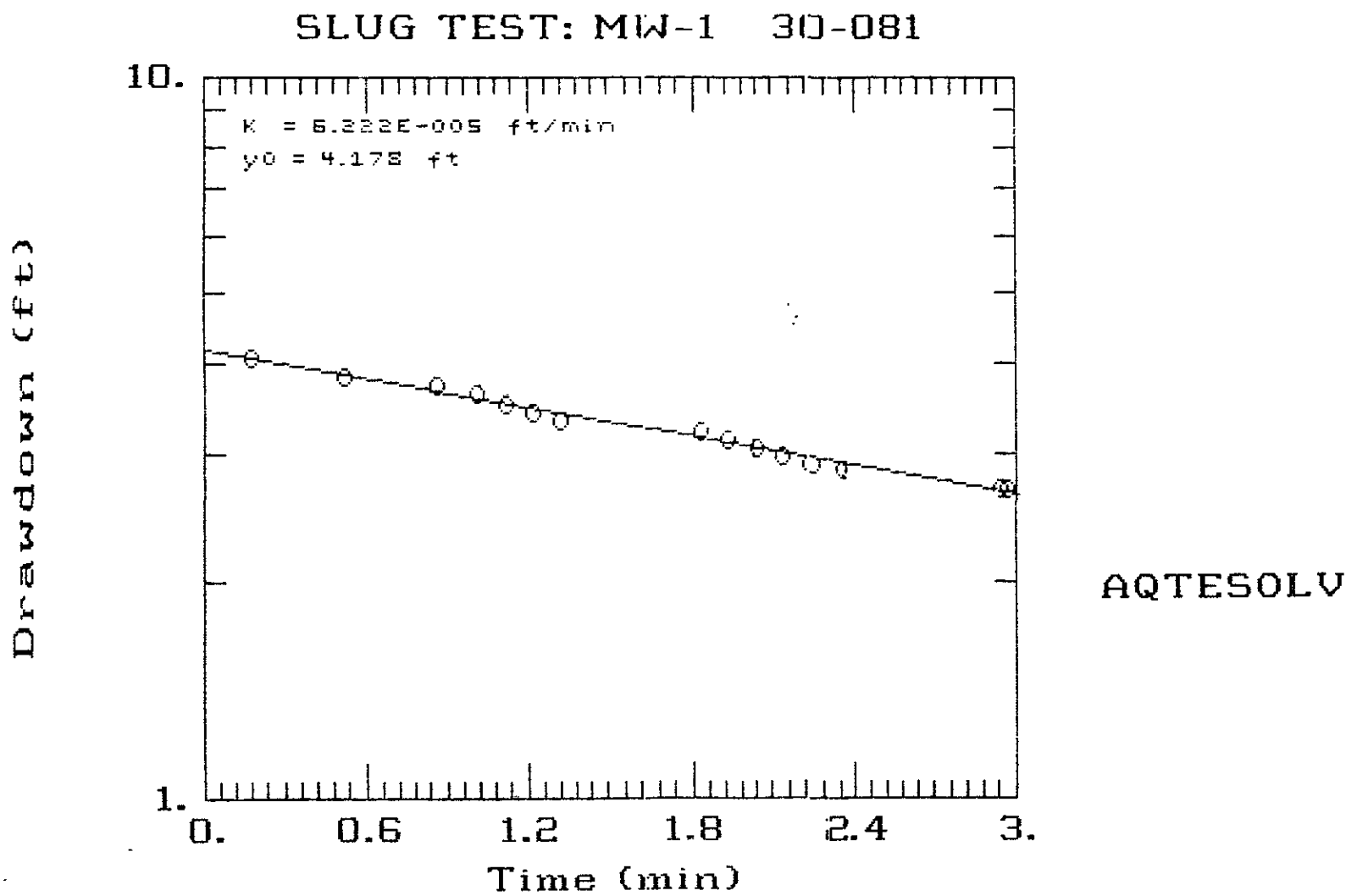
TIME (min)	DRAWDOWN (ft)
0.00	4.17
0.18	4.06
0.52	3.83
0.86	3.73
1.02	3.63
1.12	3.52
1.22	3.42
1.32	3.32
1.83	3.22
1.93	3.13
2.04	3.05
2.14	2.97
2.24	2.91
2.35	2.84
2.95	2.69
2.97	2.68

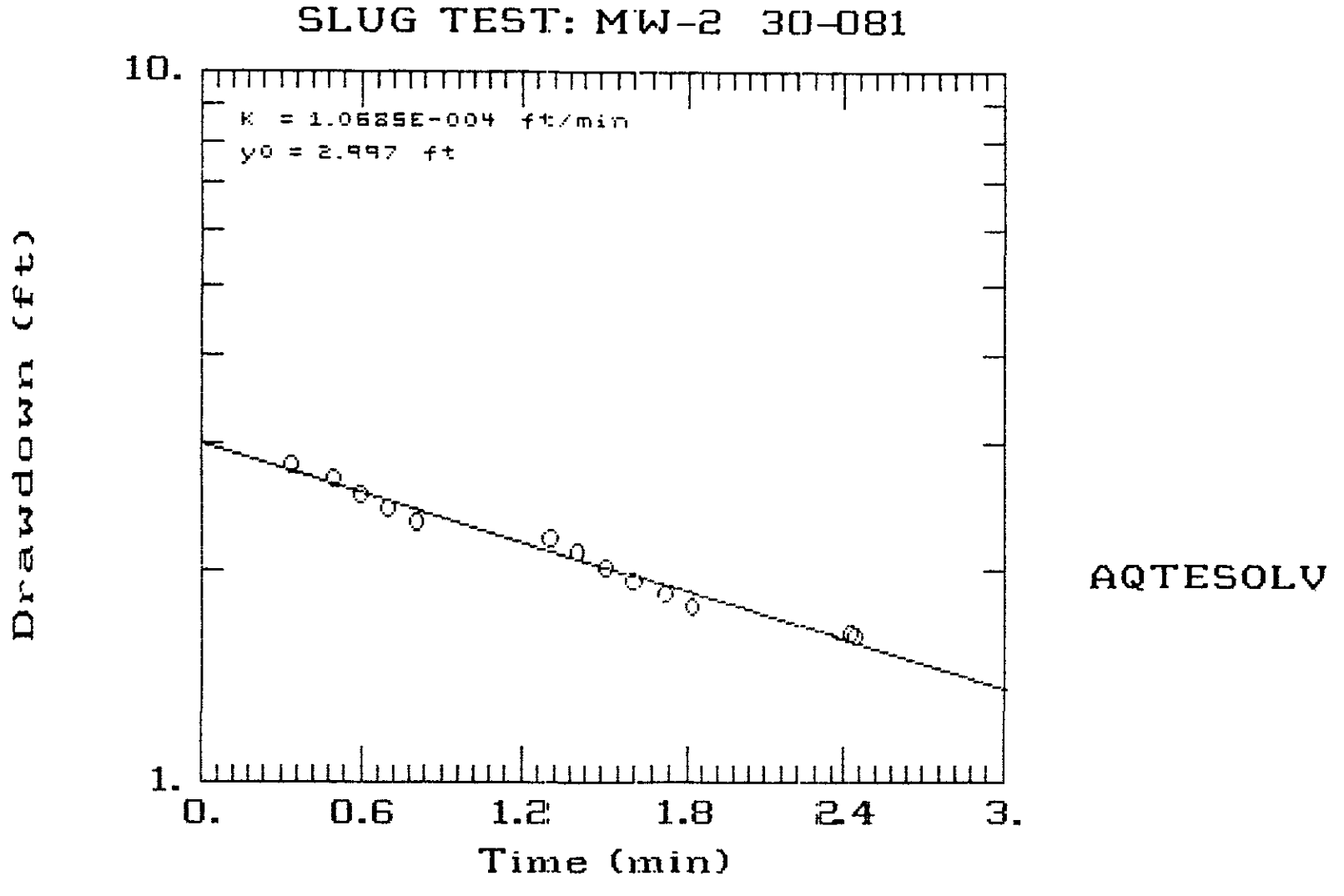
SLUG TEST DATA

MW-2

AUGUST 14, 1990

TIME (min)	DRAWDOWN (ft)
0.00	2.92
0.34	2.79
0.49	2.67
0.56	2.55
0.70	2.44
0.80	2.33
1.31	2.22
1.41	2.12
1.51	2.01
1.62	1.92
1.72	1.84
1.82	1.76
2.43	1.62
2.45	1.61


SLUG TEST: MW-1 30-081
K = 6.222E-005 ft/min
y0 = 4.178 ft
Drawdown (ft)
10.
1.
0.
0.6
1.2
1.8
2.4
3.
Time (min)
AQTESOLV


SLUG TEST: MW-2 30-081
K = 1.0685E-004 ft/min
y0 = 2.997 ft
10.
1.
0.
0.6
1.2
1.8
2.4
3.
Drawdown (ft)
Time (min)
AQTESOLV