Chevron U.S.A. Products Company
2410 Camino Ramon, San Ramon, California • Phone (510) 842-9500
Mail Address: P.O. Box 5004, San Ramon, CA 94583-0804

Marketing Department

92 [illegible] 3:25

August 11, 1992

3812

Ms. Jennifer Eberle
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

Re: Former Chevron Service Station #9-0020
1633 Harrison, Oakland

Dear Ms. Eberle:

Enclosed we are forwarding the **Soil Remediation Work Plan** dated August 4, 1992, prepared by our consultant Geraghty & Miller, Inc. for the above referenced site. This work plan proposes to install a soil vapor extraction system to remediate the petroleum hydrocarbons in the subsurface soils in the vicinity of monitor well MW-7. Also enclosed is a copy of the soil vapor extraction feasibiloity test results prepared by Pacific Environmental Group, Inc.

We would appreciate your review and formal concurrence prior to implementation of this work plan. If you have any questions or comments, please do not hesitate to contact me at (510) 842-9581.

Very truly yours,
CHEVRON U.S.A. PRODUCTS COMPANY

Nancy Vukelich
Site Assessment and Remediation Engineer

Attachment

cc: Mr. Rich Hiett, RWQCB-Bay Area
Ms. B.C. Owen
Mr. L.E. Jones, 225/1510
File (9-0020W3)

GERAGHTY & MILLER, INC.
Environmental Services

AUG 07 '92 PWM

Ground Water *Engineering* *Hydrocarbon* *Remediation* *Education*

August 4, 1992
Project No. RC13601

Ms. Nancy Vukelich
Chevron U.S.A. Products Company
2410 Camino Ramon
P.O. Box 5004
San Ramon, CA 94583-0804

SUBJECT: Soil Remediation Work Plan for Installation of a Soil Vapor-Extraction System at Former Chevron Service Station #9-0020, 1633 Harrison Street, Oakland, California.

Dear Ms. Vukelich:

Geraghty & Miller, Inc. (Geraghty & Miller) has developed this work plan for the installation of a soil vapor extraction (SVE) system at the Chevron U.S.A. Products Company (Chevron) site referenced above (Figure 1). The goal of the SVE system is to select, install, and operate a soil-vapor extraction system in the vicinity of Monitor Well MW-7. Site-specific remediation criteria will be established after the start-up of the SVE system.

BACKGROUND

Former Chevron Service Station #9-0020 is located in a residential and commercial district at the intersection of 17th and Harrison Streets in Oakland, California (Figure 2). The site is presently used as a commercial parking lot and has been used as such since site abandonment in 1972.

In October of 1988, Western Geologic Resources (WGR) installed three ground-water monitoring wells (MW-1 through MW-3) at the locations shown in Figure 3. Soil samples collected at 5-foot intervals to a depth of 25 feet detected no concentrations of total fuel hydrocarbons (TFH) (U.S. Environmental Protection Agency [USEPA] Method 8020) or benzene, toluene, ethylbenzene, and xylenes (BTEX) (USEPA Method 8020), with the exception of the boring for Monitor Well MW-2, which reported TFH at a concentration of 12 parts per million (ppm) characterized as oil (USEPA Method 8020) at a depth of 19 feet

In April of 1989, an additional subsurface investigation was performed at the site by WGR. Four soil borings (B-4 through B-7) were drilled to a total depth of 22 to 24 feet below ground surface, where ground water was first encountered (Figure 3). These borings were abandoned by grouting to surface with neat cement. An additional five borings (B-8 through B-12) were drilled to depths of approximately 31 to 36 feet below ground surface and completed as ground-water Monitor Wells MW-4 through MW-8, respectively (Figure 3). Soil samples were collected from Borings B-4 through B-12 at approximately 5-foot intervals. Samples were submitted to the laboratory for analysis of total purgeable petroleum hydrocarbons (TPPH), carbon tetrachloride (CT), tetrachloroethane (PCE), trichloroethane (TCE), and 1,1,1-trichloroethane (TCA). The analytical methods used for these analyses were not available to Geraghty & Miller. Soil Borings B-4 through B-7, B-9, B-10, and B-12 had no detectable concentrations of the previously-mentioned compounds. Boring B-8 (MW-4) had concentrations of TPPH ranging from 600 parts per ppm collected from samples at 4.5 feet and 9.6 feet, and TCA at 0.1 ppm at a depth of 9.6 feet. Boring B-11 (MW-7) had concentrations of TPPH ranging from below detection to 50,000 ppm collected from a sample at 23.5 feet below ground surface. TCA was also detected in the sample collected from B-11 at 23.5 feet at a concentration of 0.2 ppm.

In June of 1990, WGR drilled an additional four soil borings (B-13 through B-16) at the site (Figure 3). Samples from Borings B-13 through B-15 were collected on approximate 5-foot intervals beginning at a depth of 16 feet. Samples from Boring B-16 were collected at 5-foot intervals beginning at a depth of 6 feet. The total depth of these borings varied between 26 feet and 30 feet. Selected soil samples were analyzed for TPPH by USEPA Method 8015, for BTEX by USEPA Method 8020, and for halocarbons by USEPA Method 8010. TPPH, BTEX, and halocarbons were not detected in any soil samples collected and analyzed from Borings B-13 through B-16. The borings were completed as 2-inch monitoring wells (MW-12 through MW-9, respectively). These wells were completed with screened sections ranging from 5 feet to 8 feet located at the bottom of each well.

In October of 1991, Pacific Environmental installed four additional on-site soil borings (BA through BD) and two additional off-site ground-water monitoring wells (MW-13 and MW-14) (Figure 3). MW-13 and MW-14 were drilled to a total depth of approximately 28 feet. Soil samples were collected from approximate 5-foot intervals and

submitted for analysis by halogenated volatile organics (MW-14 only; USEPA Method 8010), TPH as gasoline (TPH-G) (USEPA Method 8015, modified), and BTEX (USEPA Method 8020). TPH-G and BTEX were not detected in any of the soil samples analyzed, with the exception of a soil sample collected from Boring BD from a depth of 25 feet below ground surface, which contained TPH-G at a concentration of 120 ppm and benzene, toluene, ethylbenzene, and xylenes at concentrations of nondetect (less than 0.03), 0.16, 1.8, and 0.14 ppm, respectively.

According to the most recent ground-water sampling data available to Geraghty & Miller (Sierra Environmental Services, March 13, 1992), TPPH and BTEX have been consistently identified in Monitor Wells MW-7, MW-9, and MW-13. Levels of TPPH have been detected intermittently near the analytical detection limits in Monitor Wells MW-3, MW-5, MW-6, MW-8, MW-11, and MW-12. Figure 4 presents the results of the most recent ground-water sampling.

In December of 1991, Pacific Environmental Group (Pacific) conducted a **SVE pilot test for the purposes of determining the feasibility of using SVE for the remediation of volatile hydrocarbons in the vicinity of MW-4 and MW-7.** The SVE pilot test was conducted using a 2.5-hp regenerative blower. Vacuums of 40 and 55 inches water column (in.w.c.) were applied to Monitor Well MW-7, and vacuum response observations were made in MW-6 and MW-8. Pacific reported no measurable vacuum response in either MW-6 or MW-8. The volumetric air-flow rate during the extraction from MW-7 was less than 10 standard cubic feet per minute (scfm). Concentrations of TPH-G analyzed by USEPA Method 8015, modified, from samples collected from MW-7 ranged from 8,400 to 18,000 ppmv with an assumed molecular weight equal to that of hexane. Pacific also conducted a vapor-extraction test on Monitor Well MW-4 while monitoring the vacuum response in MW-2 and MW-5. Prior to applying a vacuum to MW-4, depth to water was 24.08 feet below ground surface and the top of screen was at 14 feet below ground surface. During this test, 40 in.w.c. was applied to MW-4. Again, no measurable vacuum was detected in Monitor Wells MW-2 or MW-5. A single air sample collected from Monitor Well MW-4 detected concentrations of TPH-G at 32 ppmv. The volumetric air flow from Monitor Well MW-4 during this vacuum test was less than 10 scfm. Because applying vacuums in excess of 40 in.w.c. would raise the water in the well above the screened interval and inhibit air flow, Pacific conducted a second vapor test on MW-4 by applying a positive pressure of approximately 80 in.w.c. A positive pressure of 0.02 in.w.c. was detected in MW-2.

Based on the results of the SVE test, Pacific concluded that a vacuum of 137 in.w.c. would be necessary to extract approximately 20 scfm from wells of similar construction. Pacific estimated a radius of influence of 18 feet; however, the data set used and the calculations for determining the radius of influence or required vacuum and extraction rate were not provided to Geraghty & Miller.

In January 1992, Pacific conducted soil-excavation activities in the vicinity of Monitor Well MW-4. This work was done to remove the hydrocarbon-affected soils previously identified in the vicinity of MW-4. The final dimensions of the soil excavation were approximately 20 feet by 12 feet by 14 feet deep. A total of 13 soil samples was collected from within the excavation. All samples were analyzed for TPH as diesel (TPH-D) (USEPA Method 8015, modified), TPH-G (USEPA Method 8015, modified), and BTEX (USEPA Method 8020). Additionally, three of the samples from the excavation were analyzed for halogenated volatile organics by USEPA Method 8010. TPH-G and TPH-D were detected in the southern sidewall sample from a discolored zone at concentrations of 310 ppm and 270 ppm, respectively, at a depth of approximately 8 feet. No halogenated volatile organics were detected in any of the samples.

In addition to the excavation, a trench was cut across the estimated locations of the former tanks. Although the tanks were not encountered, construction debris, including piping and concrete slabs, was found beneath the surface in this area.

REMEDIATION APPROACH

In order to initiate the recovery of hydrocarbons from the soil in the vicinity of Monitor Well MW-7, Chevron has requested that Geraghty & Miller install and operate a soil-vapor extraction (SVE) system at the above-referenced site. Chevron has requested that Geraghty & Miller obtain a Bay Area Air Quality Management District (BAAQMD) air-discharge permit using Pacific's vapor pilot test results, and design and install a flexible vapor-extraction and abatement system that would operate effectively under the conditions encountered during the pilot test (i.e., 20 scfm at 137 in.w.c.). Because of the relatively high vacuum required to extract 20 scfm, a ground-water dewatering system will be installed in the vapor-extraction well to prevent upwelling and mounding of the ground water during vapor extraction. The extraction rate, vacuum, and effective radius of influence will be verified during the operation of the proposed system. Once site-specific

cleanup goals are determined, the system can be modified and augmented as an additional scope of work to achieve these goals.

The following scope of work describes the installation of a vapor-extraction system consisting of a vapor-extraction blower and a catalytic or thermal oxidation unit with a vapor-well dewatering system designed to prevent ground-water upwelling into the vapor-abatement system. The vapor-well dewatering system is designed only to keep water from wetting the screened section of the vapor-extraction well during the operation of the SVE system. The details of the vapor-extraction system will be determined after the completion of Tasks 2 and 3. The assumptions and design criteria for the dewatering system are presented below.

Based on the geologic characteristics of the saturated zone (fine sands interbedded with clayey sands) (WGR, June 1989), and on the most recent ground-water sampling results (Sierra, March 13, 1992), it is anticipated that the water flow rate from Well MW-7 could range from 0.5 to 2 gpm and that the total petroleum hydrocarbon (TPH) concentrations could range from 3,300 micrograms per liter (µg/L) to 11,000 µg/L. These flow and concentration values result in a probable TPH mass-throughput range from 0.02 lbs TPH/day to 0.26 lbs TPH/day.

This TPH mass-throughput range is most economically treated by aqueous-phase carbon using two 200-pound carbon drums, considering their low capital and operating costs over an estimated 1-year SVE project. While 200-pound units can be relatively attractive for TPH mass throughputs of 0 to 0.1 lbs/day due to their low capital costs, they may prove uneconomical, compared to two 1,000-pound carbon vessels, should actual flow-rates and concentrations prove the higher estimates correct. A bioreactor offers substantial savings in operating costs over carbon consumption, if after a period of consistent operation, the actual TPH mass-throughput range is predominantly over 1 lb/day, and the length of the project exceeds the estimated one year.

An important design consideration for this project is that the incremental cost of modifying the system later, if the TPH-mass throughput differs from the anticipated range, is relatively low in comparison with installing and operating an over-designed system.

Due to the low project cost using 200-pound carbon aqueous carbon vessels over the anticipated range of TPH-mass throughput and the short duration of the well

dewatering/SVE project (one year), the flow-rate and hydrocarbon-concentration data that would be obtained from a temporary pump test of MW-7 would not be expected to affect the selection of the initial treatment system. This is because a temporary system would include obtaining necessary permits, installing a pump in Well MW-7, and siting an aqueous-carbon water-treatment system similar to the one described or, alternatively, a temporary water-storage tank for the extracted ground water.

SCOPE OF WORK

TASK 1: DEVELOP WORK PLAN AND CONTINUING CLIENT CONTACT

Geraghty & Miller has developed this work plan based on Chevron's request to have Geraghty & Miller install a SVE system to reduce the concentrations of hydrocarbons in the soil in the vicinity of MW-7. This task also includes continuing contact with Chevron during the implementation of this work plan.

TASK 2: SELECTION OF ABATEMENT EQUIPMENT

Data from the pilot test, applicable air discharge regulations, and operational experience from similar sites will all be used to design the SVE system for effective operation, minimal operational cost, and ease of permitting. Geraghty & Miller will produce a cost estimate for the most appropriate vapor-abatement technology, based on the results of the Pacific Environmental pilot test. The selection process will conclude with the recommendation of specific technology, a manufacturer's unit, and its required flow rate and destruction efficiency. This task will also consist of recommending an appropriate blower for this site. The costs will reflect the assumption that Chevron will purchase the equipment directly from the equipment manufacturer.

TASK 3: DETAIL DESIGN OF SOIL-VAPOR EXTRACTION SYSTEM

This task consists of designing site-specific installation features to meet the requirements for the system, including modifications to the abatement system to incorporate the selected blower (if appropriate), locating the system components within the enclosure, designing an automatic telephone dialer connection within the abatement unit's control system, identifying the source of the natural gas supply (if needed), and specification of electrical and plumbing connections. Geraghty & Miller will produce four sketches for the purpose of obtaining building permits and communicating with subcontractors. The

sketches will consist of a site layout, enclosure layout, utility connection detail, and control panel layout. It is assumed that these sketches will be sufficient for permitting and implementing this project. If necessary, engineering drawings can be designed and produced as an additional task.

TASK 4: BUILDING AND FIRE DEPARTMENT PERMITTING

Geraghty & Miller will obtain building, electrical, and fire department permits (if required) from the City of Oakland for equipment-installation activities. This task assumes that the design and drawings completed in Task 3 will be accepted by the City of Oakland Building Department for the purpose of obtaining building permits. This task also assumes that the equipment selected by Chevron for this site will meet the requirements of the Fire Department without modification or additional approval by others such as Underwriters Laboratories.

TASK 5: AIR DISCHARGE PERMITTING OF SOIL-VAPOR EXTRACTION SYSTEM

Based on the results of the Pacific Environmental vapor pilot test, it is anticipated that catalytic oxidation will emerge as the most cost-effective abatement equipment for continuing soil-vapor extraction at the site. An air permit application will be submitted to the BAAQMD. An Application for Authority to Construct and Permit to Operate will be completed, Data Forms G, A, P, P-201, and a Risk Screening Analysis form will be completed, and a package of equipment specifications pertaining to the SVE system will be prepared for submission to the BAAQMD. It is anticipated that the BAAQMD will take approximately 2 months to grant authority to construct. It is assumed that Chevron will pay the permit fees (currently $486) directly to the BAAQMD.

TASK 6: MODIFICATION OF TREATMENT EQUIPMENT

Based on experience in siting catalytic oxidation units within the jurisdiction of the BAAQMD, it is anticipated that the manufacturer's units will have to be modified to comply with air-permit conditions and to avoid exceeding air-discharge limits. This consists of retrofitting a control circuit for system shutdown in the event of low temperature or low air flow. This modification will be implemented by Geraghty & Miller. If additional modifications are needed for BAAQMD compliance, they will be implemented as an additional scope of work.

TASK 7: PURCHASE AND INSTALL CONTINUOUS TEMPERATURE RECORDER

Currently, the BAAQMD requires that a continuous chart recorder be configured to record the temperature of the catalyst bed or thermal reactor chamber of an oxidation unit (Permit Handbook, BAAQMD, September 25, 1991). This task consists of the acquisition, installation, and adjustment of a two-channel strip chart recorder or circular chart recorder. The unit will be capable of recording data for at least 30 days so that no additional site visits are required, once monthly effluent monitoring is permitted by the BAAQMD.

TASK 8: PROVIDE AND INSTALL ALARM CIRCUITRY

In order to ensure compliance with BAAQMD permit conditions and to avoid the treatment system being shut down for several weeks between site visits, the abatement equipment's control circuitry will be modified. Additional alarm circuits will be installed to detect and respond to blower failure, low-temperature or high-temperature conditions in the abatement equipment, power failure, or low flow rate. A connection to the existing telephone autodialer will be provided, installed, and configured to call Geraghty & Miller's equipment response line in the event of an alarm condition.

TASK 9: CONNECT BLOWER ASSEMBLY TO ABATEMENT EQUIPMENT

It is assumed that a motor starter must be sized, purchased, and installed; pipe must be laid from the blower to the abatement equipment; and safety interlocks (such as low-temperature shutdown or automatic ambient air purge) with their associated electrical conduit, wiring, and connections must be installed. An overload relay and a shut-off switch, as required by the National Electric Code, will be purchased and installed.

TASK 10: SHIPMENT OF ABATEMENT UNIT

The abatement equipment will have to be shipped to the site and installed within the existing enclosure. It is assumed that Chevron will have the equipment manufacturer ship the abatement unit to Geraghty & Miller's Richmond facility for assembly, modification, and testing. This task consists of the freight charges from Richmond, California, to the site in Oakland and rental of a crane.

TASK 11: INSTALLING PIPING AND ELECTRICAL CONNECTIONS TO TREATMENT SYSTEM

After the BAAQMD has issued an authority to construct, the equipment will be installed at the site. It is assumed that the electric service will be pulled from a PG&E junction box located adjacent to the property. The exact location of PG&E electrical service will be determined during the detail design task. Installation of the system consists of connecting to the electrical supply, purchasing and installing new circuit breakers, and completing the vapor piping between the vapor extraction well (MW-7) and the abatement system. If the selected abatement system requires natural gas, this will be installed and connected as an additional task. It is assumed that the chosen abatement system will be located in an enclosure to be built in the west corner of the lot.

TASK 12: DEWATERING SYSTEM INSTALLATION

Pump Installation

Geraghty & Miller will install a $^1/_2$ hp, three-wire, 240-volt single-phase electric submersible pump in Well MW-7. A pump protector (Coyote Box™) will be installed in the treatment enclosure for on/off control and run-dry protection of the ground-water pump. Both the pump and the pump protector are to be provided from Chevron inventory if they are available.

Trench and Piping Installation

The containment piping will consist of 2-inch diameter PVC Schedule 40 conduit. A 3/4-inch, hydrocarbon-resistant rubber hose will be pulled through this pipe from the extraction well to the treatment enclosure. The subsurface piping for the treated ground-water discharge will run from the treatment enclosure to an approved EBMUD sewer line connection point; it is assumed that this piping will be 2-inch diameter PVC Schedule 40 conduit. The City of Oakland may require that a vacuum break be installed prior to the sewer connection point. The final connection point for the sewer discharge line will be determined during the detail design task. All piping between the extraction well, enclosure, and discharge point will be below grade at a depth of 24 inches for the electrical conduit and 18 inches for the ground-water extraction and sewer discharge conduit. The trench will be backfilled and compacted with native material.

Treatment-System Enclosure

The treatment-system enclosure will consist of a 4-sided, lockable chain-link fence with vinyl slats. To fit the two 200-pound carbon vessels, associated piping, and the vapor-abatement equipment, the enclosure needs to be at least 10 feet wide, 12 feet deep, and 8 feet high. It is assumed that no concrete supporting pad will be required for the carbon units or the vapor-abatement equipment. If one is needed, it will be installed as an additional task. The supporting poles for the fence will be set 1 foot below grade and encased in concrete. The proposed location for the treatment-system enclosure is shown in Figure 5. These dimensions are subject to change, pending system-location approval by the site operator, Chevron, and the City of Oakland.

Electrical Service Installation

Pending further investigation of existing electrical service at the site, Geraghty & Miller will install a service connection from the nearest PG&E service connection point. The exact placement and source of electrical service will be determined during the detail design task.

Carbon Vessels

The ground-water treatment system will consist of two 200-pound aqueous phase activated carbon units arranged in series (Figure 6). The first vessel will be for loading and the second vessel will be for backup. It is assumed that the carbon drums will be purchased by Chevron from Westates Carbon. The ground-water treatment system will include a Geraghty & Miller pre-engineered ancillary equipment package to be installed on the carbon drums. The equipment package consists of the following:

- 1-1/2-inch diameter reinforced flex hose with camlock connectors for secure and rapid connection and alternation of loading and backup service units;
- One 20-inch particulate filter, with convenient fiber-cartridge feature;
- A pressure gauge before and after the particulate filter, to indicate need for filter-cartridge replacement;
- One pressure regulator with gauge to limit influent pressure to the carbon vessels in order to protect the vessels from distention and possible rupture;
- One air-release valve for each carbon vessel to avoid accumulation of air in the vessel, which would impair treatment capacity;

- A 1-inch diameter totalizing flowmeter installed on the effluent pipe from the carbon system;
- Three water sample ports: before, between, and after the carbon units in each set.

TASK 13: DEWATERING AND SVE SYSTEM STARTUP

Startup activities will include two site visits to start the equipment and collect the required samples of the treatment-system influent and effluent. At this time, EBMUD has a policy of accepting discharges of treated ground water. EBMUD may require that the treatment system be sampled prior to issuing a permit to discharge. Upon receipt of the permit application and the initial laboratory results, EBMUD will determine the sampling constituents and frequency. The factors used by EBMUD to determine the constituents for analysis and the sampling frequency include:

- The concentration of petroleum hydrocarbons in the ground water for determining carbon loading;
- The design capacity of the treatment unit;
- The level of preventive maintenance;
- The frequency of sampling between carbon vessels; and
- Consistent compliance with discharge limits.

After the SVE system has been installed, the BAAQMD will be given written notification of the starting date. During startup, the system will be adjusted for optimal operating conditions. When stable operation is achieved, the influent and effluent will be sampled. Operational parameters, including flow rate, temperature, concentration, and destruction efficiency, will be measured and calculated. Within 30 days of startup, a letter summarizing the above data will be sent to the BAAQMD.

TASK 14: SVE OPERATION AND MAINTENANCE

Once the system has been started, Geraghty & Miller will operate the equipment and monitor the SVE system to optimize vapor-phase hydrocarbon removal and destruction rates and to comply with the air discharge permit. This task assumes that the BAAQMD will require twice-monthly sampling of the vapor abatement equipment. Utility costs will be billed directly to Chevron.

TASK 15: MONTHLY SVE COMPLIANCE REPORT

It is assumed that the BAAQMD will require monthly reporting. After receipt of the laboratory analyses of air samples, an air-discharge compliance report will be generated (if requested), sent to the BAAQMD, and copied to Chevron. The report will consist of a single-page cover letter, a table showing destruction efficiency, hours of operation, and calculated emissions, and a copy of the most recent air-sampling data.

TASK 16: DEWATERING SYSTEM OPERATION AND MAINTENANCE

This task assumes that sampling operation and maintenance visits to the site will be on a monthly basis, but this may be reduced to quarterly upon demonstrating to EBMUD that the treatment system is operating reliably. During each site visit, samples from the treatment system's influent and effluent will be collected from the sampling ports, and the total amount of water discharged will be recorded from the totalizer. This task does not include unscheduled visits due to site conditions, vandalism, or mechanical failures. This task assumes that the influent and effluent samples will be analyzed for TPH-G by USEPA Method 8015, modified, and for BTEX by USEPA Method 8020. All EBMUD fees will be billed directly to Chevron.

This task includes the preparation of one spent-carbon profile form needed for the transport and destruction of spent carbon from the site. It also includes the scheduling of one carbon changeout to be done during one of the regularly scheduled sampling events. Westates Carbon will provide removal of spent carbon and delivery of new carbon and will bill for their services directly to Chevron. It is assumed that Westates Carbon will leave the carbon vessels in working order and that an additional site visit will not be necessary to restart the system.

TASK 17: PREPARATION OF DISCHARGE COMPLIANCE REPORTS

As required by EBMUD, a letter report containing the results of the analysis of the treatment system influent and effluent and totalizer readings will be prepared and submitted, along with analytical results and chain-of-custody documentation. This task consists of obtaining dewatering system effluent samples and submitting them to the laboratory for analysis. The current sanitary discharge permit requires quarterly analyses for water quality, metals, USEPA Method 624, and USEPA Method 625. As required by the sanitary discharge permit, a quarterly report will be submitted by Geraghty & Miller which

consists of the results of the discharge ground-water analysis and volume of discharged ground water.

TASK 18: SOIL VAPOR/GROUND-WATER EXTRACTION PROGRESS REPORT

After the first 3 months of SVE system operation, a Soil Vapor Extraction Progress Report will be submitted to Chevron. This report will follow the standard Chevron reporting format for a SVE progress report.

TASK 19: REQUEST FOR A REDUCTION IN AIR PERMIT MONITORING REQUIREMENTS

After 3 months of SVE system operation, Geraghty & Miller will petition for a revision in the air permit sampling and/or reporting requirements. Assuming that the initial air discharge permit requires twice-monthly sampling with monthly reporting, Geraghty & Miller will request monthly sampling with quarterly reporting.

LABORATORY ANALYSIS

Grab samples of soil vapors from the SVE pilot test and the abatement unit effluent will be analyzed for TPH (USEPA Method 8015, modified) and BTEX (USEPA Method 8020). Laboratory analytical results will be used to comply with BAAQMD permit conditions and to determine the mass of TPH removed by the vapor system. Quarterly grab samples of ground-water discharge will be analyzed for the constituents requested by EBMUD. Laboratory services will be provided by Superior Precision Analytical. Analytical costs will be billed directly to Chevron by Superior.

Geraghty & Miller appreciates the opportunity to be of service to Chevron. If you have any questions or need further information, please do not hesitate to call.

Sincerely,
GERAGHTY & MILLER, INC.

Nasser M. Shuaib
Designer

Kent O'Brien
Project Manager/Hydrogeologist

Gary W. Keyes, P.E.
Principal Engineer/Associate

Attachments
Figure 1 Site Location Map
Figure 2 Site Plan
Figure 3 Boring Locations
Figure 4 Monitor-Well Locations with Ground-Water Analytical Results
Figure 5 Proposed Vapor System Layout
Figure 6 Schematic of Water Treatment System

Attachment 1 Boring Log for MW-7

REFERENCES

Bay Area Air Quality Management District. September 25, 1991. Permit Handbook.

Pacific Environmental Group, Inc. January 14, 1992. Findings of Subsurface Investigation at Former Chevron USA Station 9-0020, 1633 Harrison and 17th Street, Oakland, California.

———. April 1, 1992. Results of Soil Vapor Extraction Feasibility Test on December 14, 1992, at Former Chevron Station 9-0020, 1633 Harrison Street, Oakland, California.

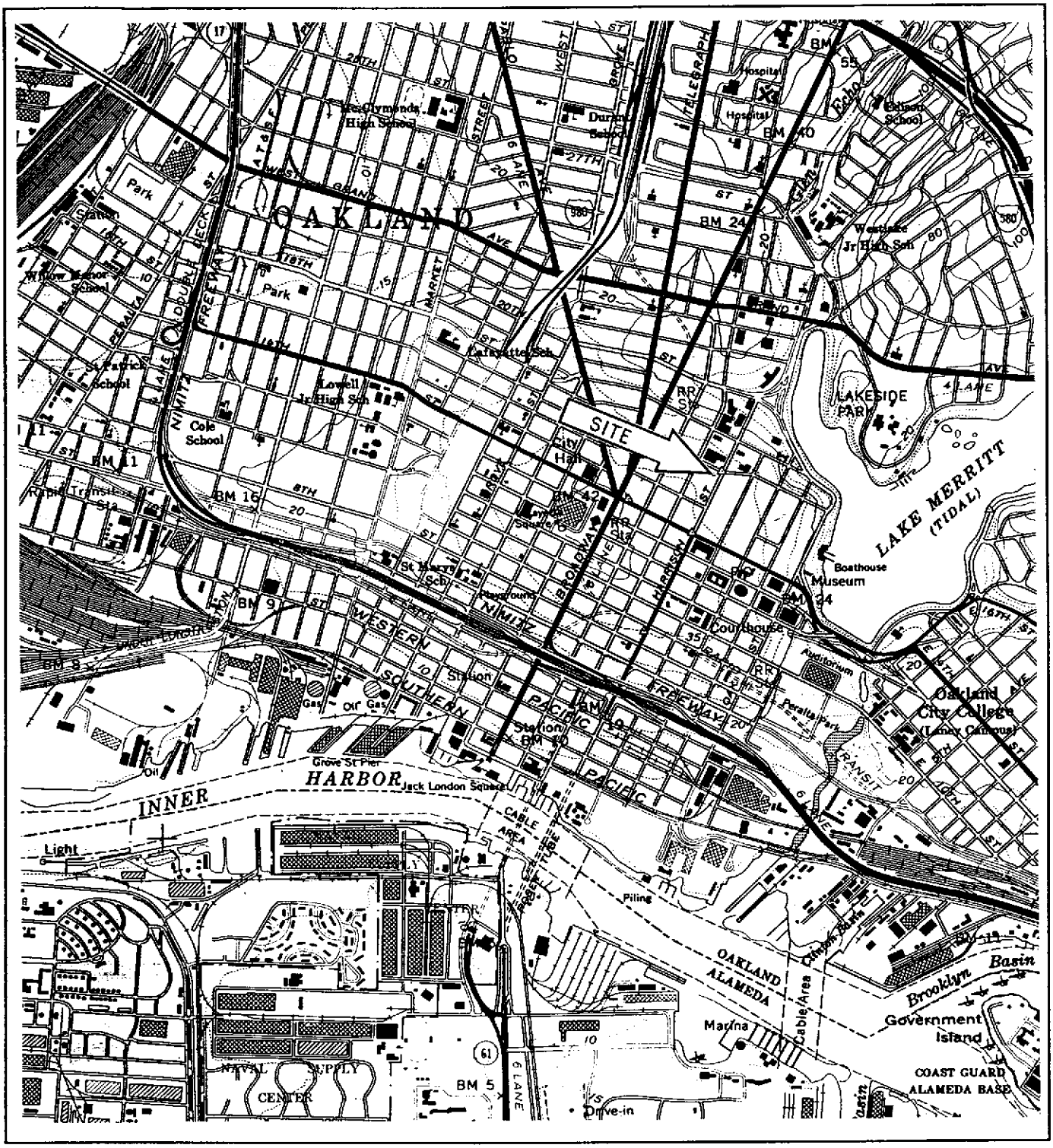
———. June 2, 1992. Results of Soil Excavation Activities Performed on January 7, 8, 9, and 22, 1992, at Former Chevron USA Service Station 9-0020, 1633 Harrison Street at 17th Street, Oakland, California.

Sierra Environmental Services. March 13, 1992. Quarterly Ground-Water Sampling, Former Chevron Service Station #9-0020, 1633 Harrison Street, Oakland, California.

Western Geologic Resources, Inc. January 24, 1989. Letter Report on Soil Sampling and Monitoring Well Installation at Chevron SS #90020, Oakland, California.

———. June 1989. Subsurface Investigation, Former Chevron Service Station #90020, 17th and Harrison, Oakland, CA.

———. July 1990. Off-Site Subsurface Investigation, Former Chevron Service Station #90020, 1633 Harrison Street, Oakland, California.



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1 0 1/2 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 20 FEET

0°25' 7 MILS 16½' 283 MILS

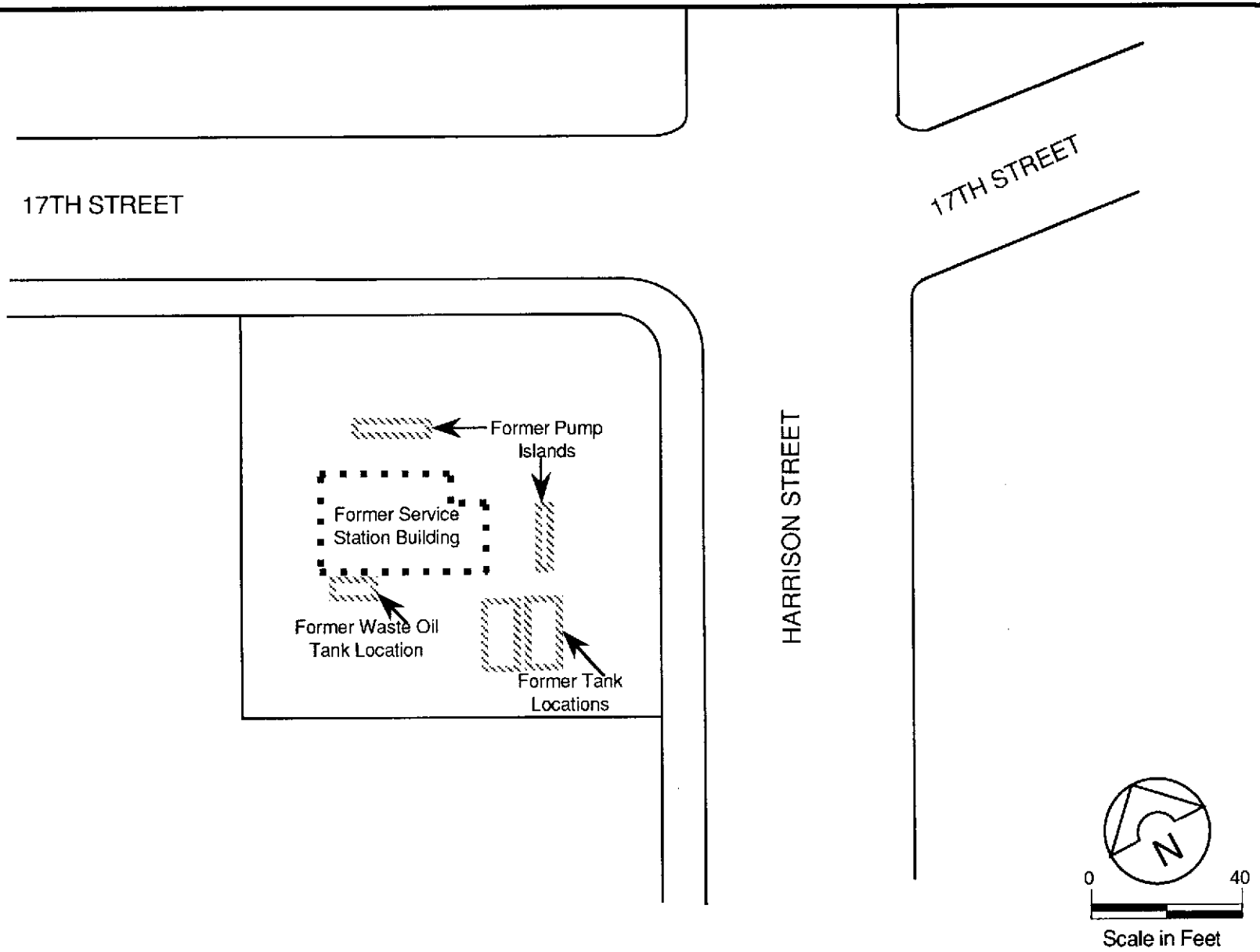
CALIF ANGLE LOCATION

GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC13600

SITE LOCATION MAP
Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
1



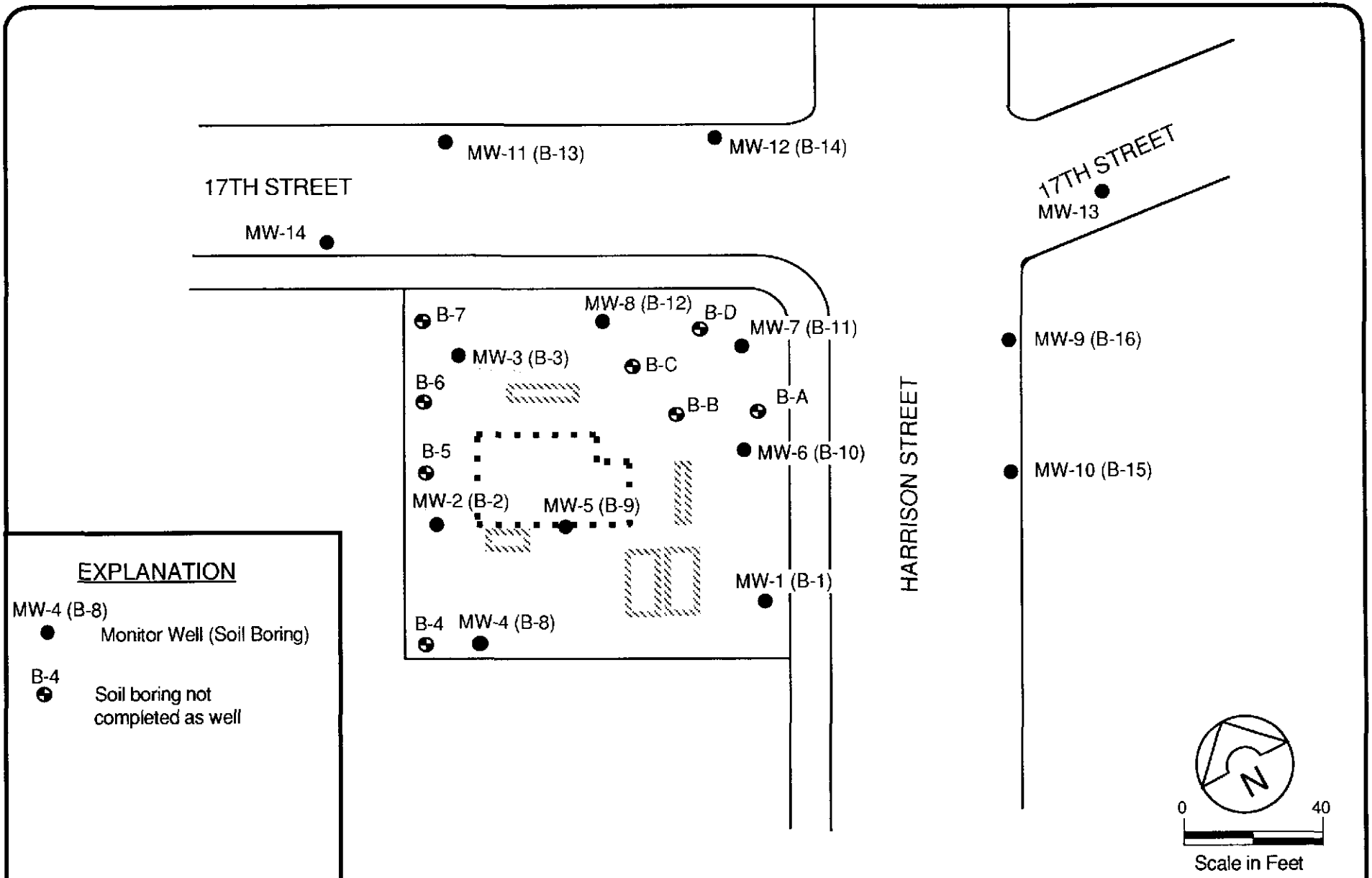
GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC13600

LOCATIONS OF FORMER STRUCTURES

Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
2



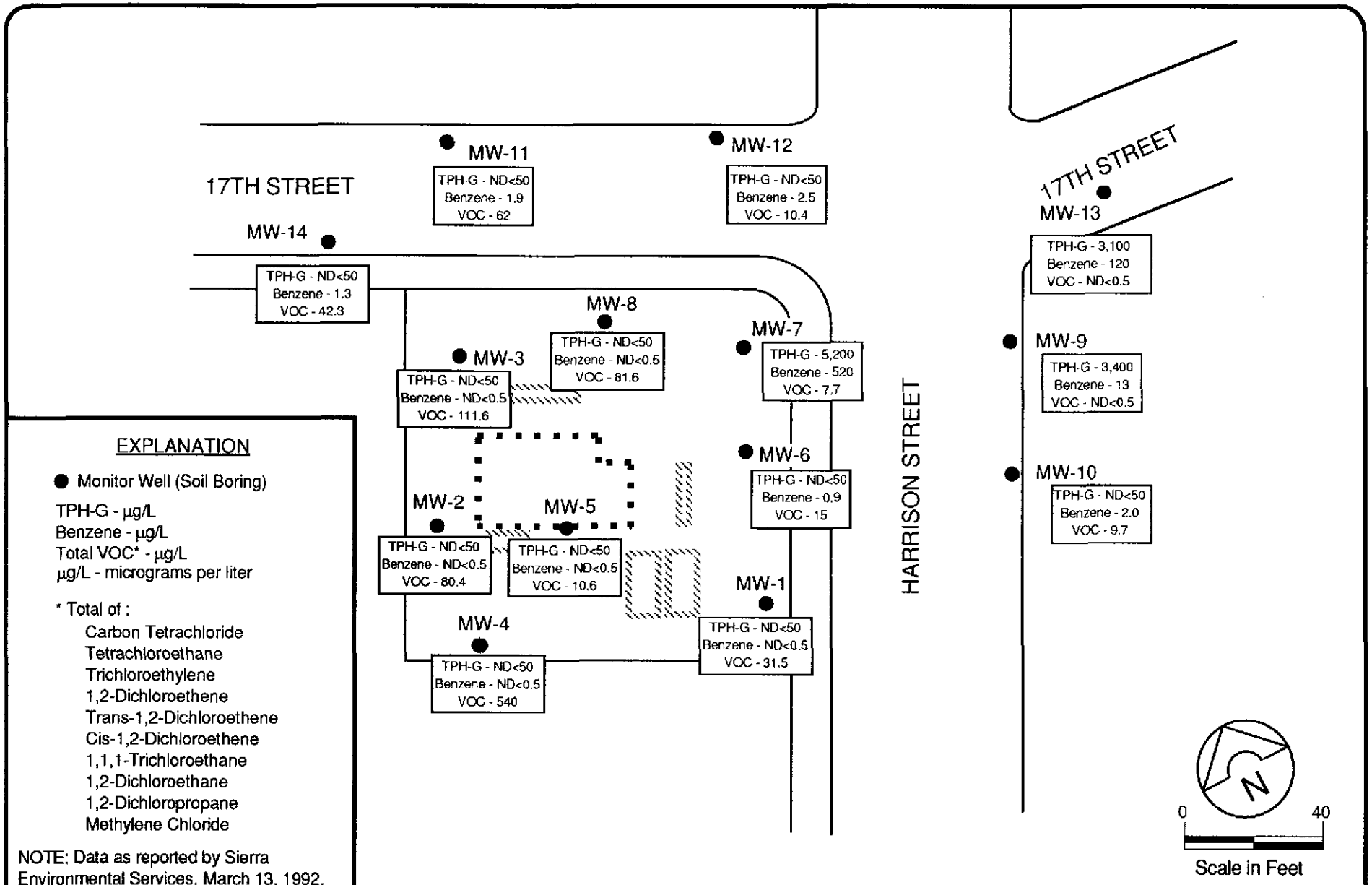
GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC13600

BORING AND MONITOR WELL LOCATIONS

Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
3



EXPLANATION

- Monitor Well (Soil Boring)

TPH-G - µg/L
Benzene - µg/L
Total VOC* - µg/L
µg/L - micrograms per liter

* Total of :
- Carbon Tetrachloride
- Tetrachloroethane
- Trichloroethylene
- 1,2-Dichloroethene
- Trans-1,2-Dichloroethene
- Cis-1,2-Dichloroethene
- 1,1,1-Trichloroethane
- 1,2-Dichloroethane
- 1,2-Dichloropropane
- Methylene Chloride

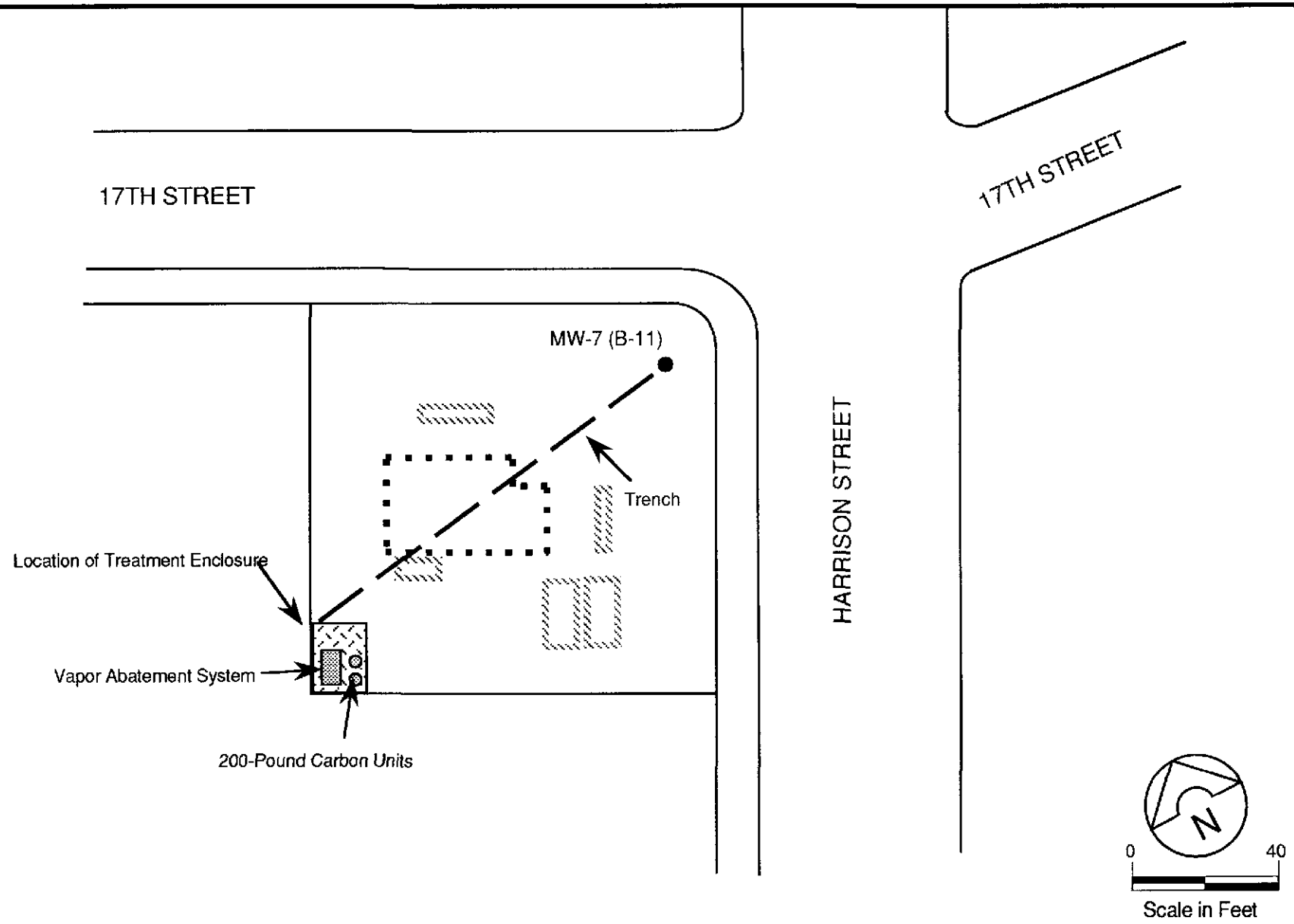
NOTE: Data as reported by Sierra Environmental Services, March 13, 1992.

GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC13600

Monitor Well Locations with Ground-Water Analytical Results
Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
4

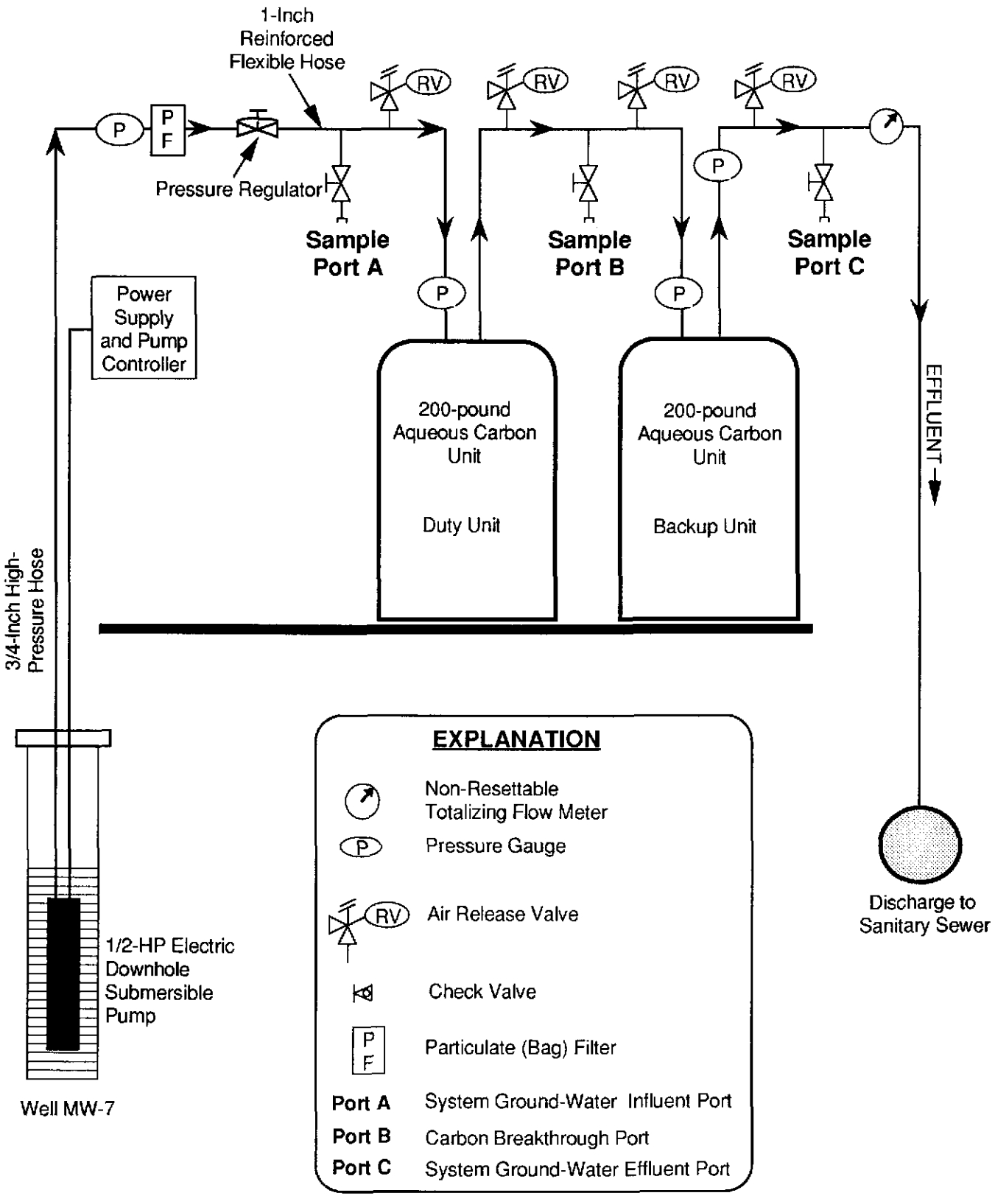


GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC13600

Proposed Vapor System Layout
Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
5



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Environmental Services

Project No. RC13600

SCHEMATIC OF GROUND-WATER TREATMENT SYSTEM
Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
6