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

ST ID 1110

May 14, 1992

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

Re: Former Chevron Service Station #9-0019
210 Grand Avenue, Oakland

Dear Ms. Eberle:

Enclosed we are forwarding a **Ground Water Remediation Work Plan** dated April 15, 1992, prepared by our consultant Geraghty & Miller, Inc. for the above referenced site. This work plan proposes to install a ground water extraction and treatment system. The system design is based on the physical characteristics of the saturated zone and the anticipated extraction flow rates of this zone. During system operation, aquifer transmissivity will be determined to assist in evaluating the effectiveness of the extraction system in obtaining hydraulic capture of the hydrocarbon plume.

but we follow RWQCB cleanup levels!

An evaluation of the surface and ground waters in the site vicinity will also be conducted to determine appropriate cleanup levels. A work plan will be prepared outlining the results of this evaluation along with the proposed steps we plan to implement for future site closure when the extraction system approaches these cleanup levels. This work plan will be submitted to your office for your review and formal concurrence.

Chevron will proceed with the permitting and installation of the remediation system. 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

Enclosure

cc: Mr. Rich Hiett, RWQCB-Bay Area
Mr. Kent O'Brien, Geraghty & Miller
Ms. B.C. Owen
File (9-0019W1)

GERAGHTY & MILLER, INC.
Environmental Services

Apr '92 T.L.H.

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

April 15, 1992
Project No. RC11001

Ms. Nancy Vukelich
Chevron U.S.A. Products Company
2410 Camino Ramon
San Ramon, CA 94583

SUBJECT: Ground-Water Remediation Work Plan for Former Chevron Service Station #9-0019, 210 Grand Avenue, Oakland, California.

Dear Ms. Vukelich:

Geraghty & Miller, Inc. (Geraghty & Miller) has developed this work plan for ground-water remediation activities at the above-referenced site (Figure 1), based on information provided to Geraghty & Miller by Chevron and on Chevron's stated objective of initiating ground-water remediation by installing and operating a ground-water extraction and treatment system at this site.

BACKGROUND

In response to your request, Geraghty & Miller has reviewed the job file provided by Chevron. The job file contained the following reports:

- Report entitled Subsurface Investigation (Western Geological Resources, June 1989);
- Report entitled Sampling Report 900620-G-1 (Blaine Tech Services, August 16, 1990);
- Report entitled Subsurface Investigation (Western Geological Resources, August 1990);
- Report entitled Subsurface Investigation (Western Geological Resources, August 1991); and
- Report entitled Quarterly Ground Water Sampling Report (Sierra Environmental Services, December 23, 1991).

REMEDIATION APPROACH

Chevron has requested that Geraghty & Miller install a ground-water extraction and treatment system at the above-referenced site. Based on the fine-grained characteristics of the saturated zone (Western Geological Resources, June 1989) and the previous ground-water sampling results (Sierra Environmental, March 13, 1992), it is anticipated that the extraction flow rate from Monitor Well MW-5 could range from 0.1 to 2 gpm and that the total petroleum hydrocarbon (TPH) concentrations could range from 12,000 micrograms per liter (µg/L) to 43,000 µg/L. These flow and concentration values result in a probable TPH mass throughput range of 0.01 lbs TPH/day to 0.7 lbs TPH/day.

This TPH mass throughput range is most economically treated by aqueous-phase carbon using two 1,000-pound vessels, considering capital and operating costs over a 5-year economic life. While 55-gallon size carbon drums can be relatively attractive for TPH mass throughputs of 0 to 0.1 lbs/day due to their low capital costs, they are not recommended for this project because their advantage of lower capital cost is negated by the 1,000-pound vessels being surplus from another Chevron site. A biological reactor would have been considered for the site if the anticipated TPH mass-throughput range had predominantly been over 1 lb/day, where a bioreactor offers substantial savings in operating costs over carbon consumption.

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 very favorable project cost using surplus 1,000-pound aqueous carbon vessels over the anticipated range of TPH-mass throughput, the flow-rate and hydrocarbon-concentration data that would be obtained from an aquifer test at this site would not be expected to affect the selection of the initial treatment system. Additionally, the expense of installing a temporary extraction and water treatment/storage system for conducting an aquifer test is nearly that of installing the permanent system described below. This is because a temporary system would include obtaining necessary permits, installing a pump in one of the existing wells, and siting an aqueous-carbon water-treatment system or, alternatively, a temporary water-storage tank for the extracted ground water. Consequently, an aquifer test is not recommended prior to installation of the treatment

system, although a less expensive determination of aquifer transmissivity is recommended during the initial system operation.

The ground-water extraction system will use an existing ground-water monitoring well (MW-5) in the area of the former pump islands to extract ground water (Figure 2). Initially, the ground-water treatment system will consist of two aqueous-phase carbon vessels plumbed in series. Based on the lithology described on the boring logs provided to Geraghty & Miller, the site is underlain by silts and clays. Because of this, it is expected that the flow rate from the initial extraction well will be less than 2 gpm. The aqueous-phase carbon system will be designed to operate at flow rates up to 15 gpm, which would allow for adding extraction wells to the system if required. Operational results, including flow rate and influent concentrations, will be obtained during the first 3 months of operation. These data will be evaluated to determine if the aqueous-carbon treatment system should be augmented with either additional extraction wells or additional treatment equipment upstream of the aqueous carbon units in order to reduce the rate of carbon usage.

While it is likely that an aquifer test will not affect the selection of the initial ground-water treatment system, determination of aquifer transmissivity during initial operation is recommended to help evaluate the effectiveness of the extraction system in obtaining hydraulic capture of the hydrocarbon-affected shallow ground water. Analysis and interpretation of data collected during an aquifer test conducted during the initial operation of the system will determine whether or not the pumping of MW-5 is sufficient to achieve hydraulic control of the shallow ground water affected by the petroleum hydrocarbons. This test may require the installation of additional monitoring wells or well points adjacent to MW-5.

The extent of hydrocarbon-affected ground water to the west of the site has not been defined, as evidenced by the detection of low concentrations of hydrocarbons in MW-6 (Figure 2). While additional ground-water monitoring/extraction wells may be required to further define or remedy the site, the information gained by operating a ground-water extraction system and performing an aquifer test will allow future wells to be strategically located and optimally constructed for site-remediation purposes.

SCOPE OF WORK

TASK 1: REVIEW DOCUMENTS, DEVELOP WORK PLAN, AND PROJECT SETUP

Geraghty & Miller will review documents pertaining to this site provided by Chevron in order to develop an appropriate site work plan. Geraghty & Miller will also develop specifications, as needed, to complete the work plan and will remain in regular contact with Chevron.

TASK 2: DETAIL SYSTEM DESIGN

Design of the remediation system includes sizing and layout of piping, pump, particulate filters, flow meters, sample taps, valves, treatment equipment, electrical service, and control system. Geraghty & Miller will prepare four working sketches for the purpose of obtaining building permits and communicating with subcontractors. The drawings will consist of trenching detail, enclosure layout, sewer connection detail, and control panel layout.

TASK 3: PERMITTING

Geraghty & Miller will negotiate with the East Bay Municipal Water District (EBMUD) to obtain a ground-water discharge permit sufficient to allow for an initial flow rate of 3 gpm. Geraghty & Miller will obtain building, electrical, and street-use permits from the City of Oakland as required for the trenching and equipment installation activities. This task assumes that the design and drawings completed in Task 1 will be accepted by the City of Oakland Building Department for the purpose of obtaining building permits.

TASK 4: SYSTEM INSTALLATION

Pump Installation

Geraghty & Miller will install a $^1/_3$ hp, two-wire, 240-volt single-phase electric submersible pump in Extraction Well MW-5. 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.

Trench and Piping Installation

Approximately 3 feet of subsurface piping will be installed between Extraction Well MW-5 and the treatment system enclosure. The piping will consist of 1-inch diameter PVC Schedule 40 conduit. 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 $1\frac{1}{2}$-inch diameter PVC Schedule 40 conduit. It is assumed that the final connection point for the sewer discharge line as shown in Figure 3 will be approved by the City of Oakland. All piping between the extraction well, enclosure, and discharge point will be below grade at a depth of 30 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 lockable chain-link fence with vinyl slats. The fence will be 8 feet wide, 12 feet deep, and 8 feet high. A 4-inch pad of gravel will be placed within the treatment enclosure as a base for the ground-water treatment system. The supporting poles for the fence will be set 1 foot below grade and encased in concrete.

Electrical Service Installation

According to PG&E, electrical service can be installed to the treatment system enclosure from the existing PG&E utility box located in the vicinity of the southern end of the project site (Figure 3). PG&E will provide the electrical service at the utility box. Geraghty & Miller will trench from the treatment system enclosure to the PG&E utility box The electrical service will consist of a 50-amp, 220-volt, single-phase circuit and a 30-amp, 110-volt single-phase circuit.

Carbon Vessels

The ground-water treatment system will consist of two 1,000-pound aqueous phase activated carbon units arranged in series (Figure 4). The first vessel will be for loading and the second vessel will be for backup. The 1,000-pound carbon units are recommended over the 55-gallon drum-size because the larger units will allow greater flow-rate flexibility and decrease the frequency of carbon changeout. It is assumed that the carbon vessels will be obtained through Chevron's existing inventory. The ground-water treatment system

will include a Geraghty & Miller pre-engineered ancillary equipment package to be installed on the carbon vessels (Geraghty & Miller, July 15, 1991). The equipment package consists of the following:

- 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; and
- Purge-water drum to process water generated during ground-water sampling activities through the treatment system.

TASK 5: SYSTEM STARTUP

Startup activities will include two site visits to start up the equipment and collect the required samples of the treatment-system influent and effluent. 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.

As part of startup, a step-drawdown test will be conducted to determine the sustainable yield of the well.

TASK 6: GROUND-WATER TREATMENT 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 total petroleum hydrocarbons (TPH) as gasoline by USEPA Method 8015, modified, and for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8020. All EBMUD fees will be billed directly to Chevron.

This task includes the preparation of the 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 7: 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.

TASK 8: AQUIFER TEST AND EVALUATION OF GROUND-WATER REMEDIATION SYSTEM

Once the sewer-discharge permit has been received, an aquifer test will be conducted to determine the transmissivity of the aquifer which is then used to calculate the hydraulic capture radius of the pumping well. This test will be conducted at a constant flow rate, using downhole pressure transducers and a data logger. It is assumed that

running the aquifer test for three days will provide sufficient data for the purpose of determining aquifer parameters. As part of this task, two well points will be installed to monitor the response of the shallow aquifer during the aquifer test. This task assumes that well points will be accepted by the regulatory agencies. Geraghty & Miller will prepare a system evaluation report after the first 3 months of operation. This report will include the results of the aquifer test and a description of the ground-water extraction and treatment system operation during the evaluation period. The report will also include ground-water levels and chemical analysis results presented in tabulated form for all on- and off-site monitoring wells; updated potentiometric surface maps for the shallow ground-water table and updated site plans depicting isoconcentration contours; and the description and schedule of any additional site work and/or modifications anticipated, as well as calculations of the quantity of hydrocarbons removed from the recovered ground water.

TASK 9: NEGOTIATIONS WITH EBMUD FOR REDUCTION IN SAMPLING REQUIREMENTS

After the completion of Task 8, Geraghty & Miller will negotiate with EBMUD to obtain a reduction in sampling frequency and/or a reduction in the number of analyses required. If appropriate, Geraghty & Miller will use the results of the aquifer test and the system performance evaluation, along with the operational data, to negotiate a reduction in sampling frequency to quarterly with analysis of the influent and effluent of the carbon system for TPH as gasoline and BTEX. This task consists of one site visit and one request report.

LABORATORY SERVICES

Laboratory services will be provided by Superior Analytical Laboratories, located in San Francisco, California. Analytical costs will be billed directly to Chevron by the laboratory. The laboratory costs have been estimated based on monitoring conditions stipulated in the EBMUD discharge requirements.

EBMUD PERMITTING AND DISCHARGE FEES

Permitting and discharge fees will be billed directly to Chevron by the EBMUD. These costs have been estimated based on a flow rate of 3 gpm.

Geraghty & Miller appreciates the opportunity to be of service to Chevron. If you have any questions regarding this work plan, please do not hesitate to call at (510) 233-3200.

Sincerely,
GERAGHTY & MILLER, INC.

Nasser M. Shuaib
Designer

Kent O'Brien
Project Hydrogeologist

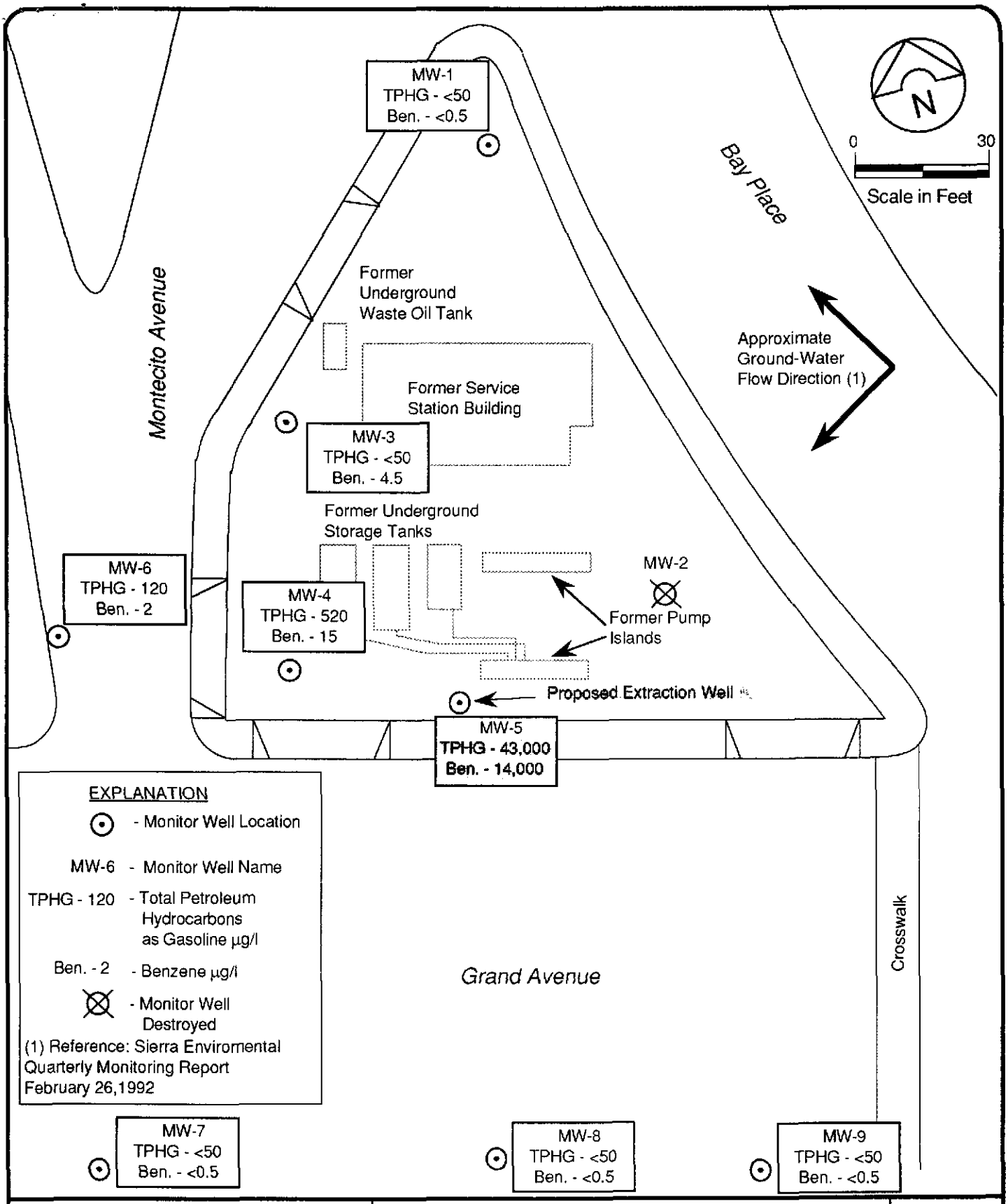
Gary W. Keyes
Principal Engineer/Project Officer

Attachments:

Figure 1	Site Location Map
Figure 2	Site Plan with Hydrocarbon Concentrations
Figure 3	Proposed Treatment System and Utility Locations
Figure 4	Ground-Water Treatment System

Taken from: U.S. Geological Survey, 7.5' Quadrangle, Oakland West

GERAGHTY & MILLER, INC. *Environmental Services*	**SITE LOCATION MAP**	FIGURE
Project No. RC11000	FORMER CHEVRON SERVICE STATION #9-0019 210 Grand Avenue Oakland, California	**1**

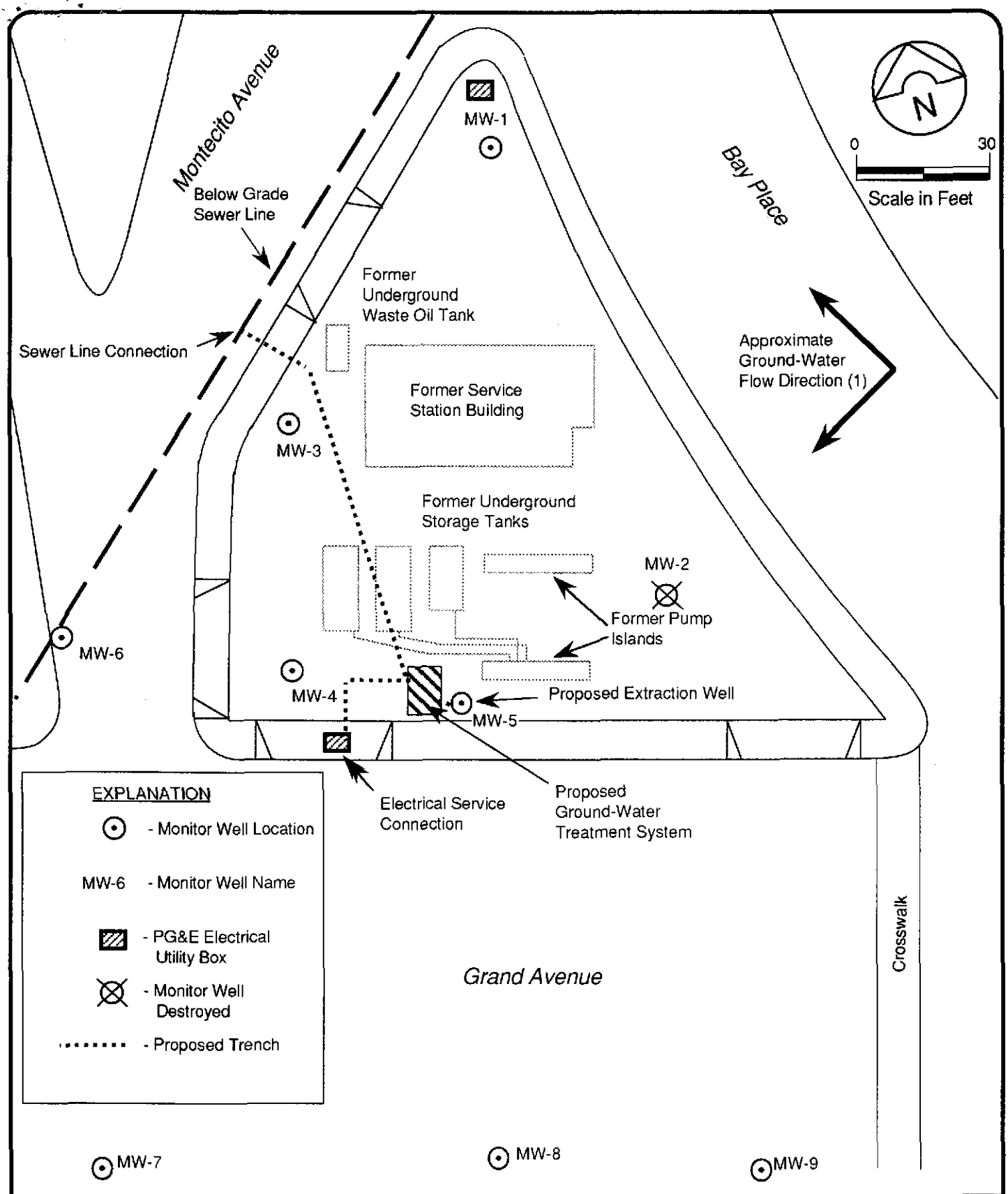


GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC11000

Site Plan with
Hydrocarbon Concentrations
Former Chevron Service Station #9-0019
210 Grand Avenue
Oakland, California

FIGURE
2

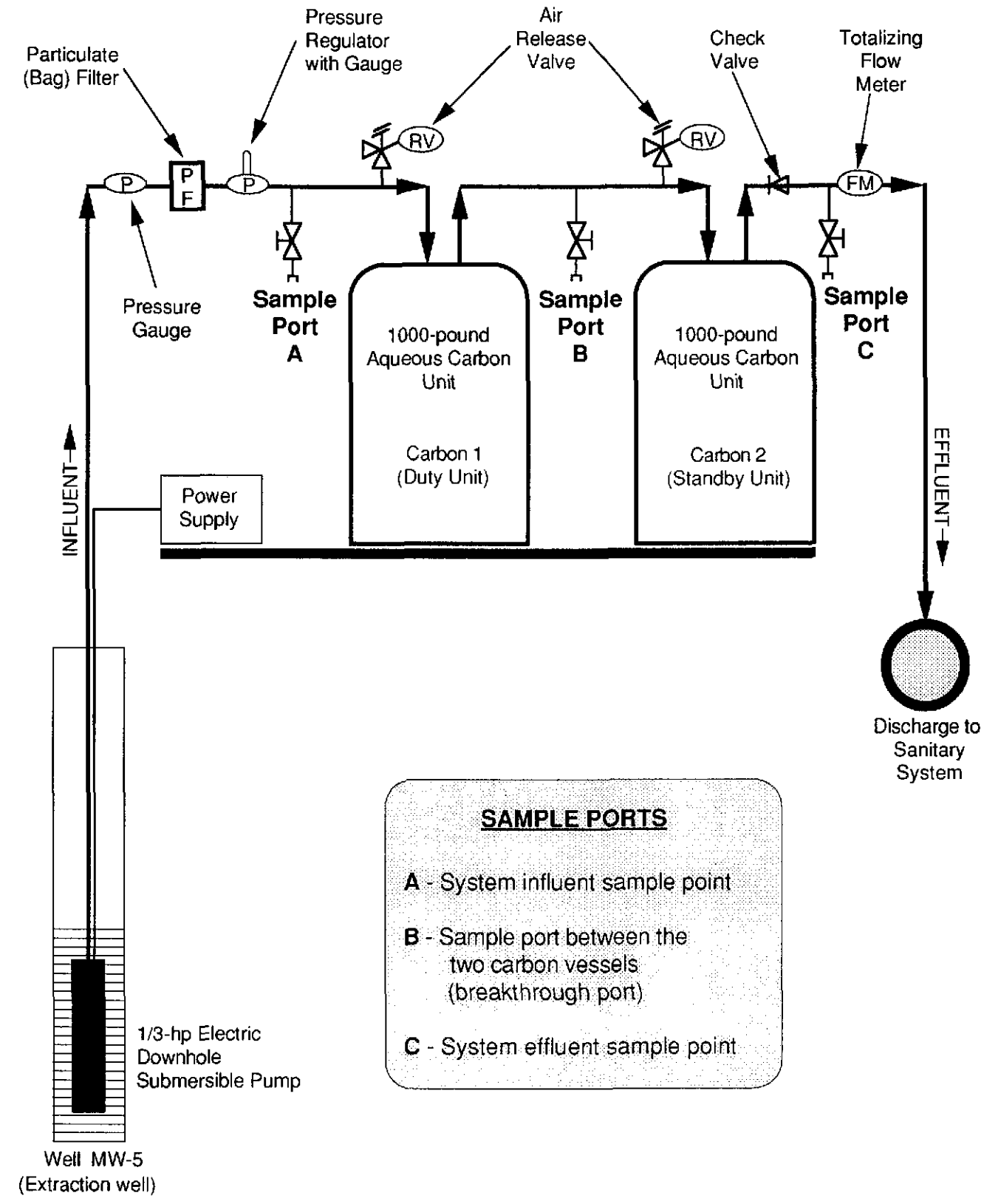


GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC11000

Proposed Treatment System and Utility Locations
Former Chevron Service Station #9-0019
210 Grand Avenue
Oakland, California

FIGURE
3



SAMPLE PORTS

A - System influent sample point

B - Sample port between the two carbon vessels (breakthrough port)

C - System effluent sample point

GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC11001

GROUND-WATER TREATMENT SYSTEM

Former Chevron Service Station #9-0019
210 Grand Avenue
Oakland, California

FIGURE

4