GERAGHTY
& MILLER, INC.
Environmental Services

ALCO
HAZMAT

94 JAN 12 PM 4:08

January 7, 1994
Project No. RC0019.008

Mr. Barney Chan
Division of Hazardous Materials
Department of Environmental Health
Alameda County Health Care Services Agency
80 Swan Way, Room 350
Oakland, California 94621

SUBJECT: Conceptual Remedial Approach
Former Penske Truck Leasing Company Facility
725 Julie Ann Way, Oakland, California.

Dear Mr. Chan:

This letter presents a conceptual approach for soil and groundwater remediation at the former Penske Truck Leasing Co. facility (Penske) referenced above. The conceptual approach incorporates the Regional Water Quality Control Board (RWQCB) Alternative Points of Compliance (APCs) and calculation of site-specific, health-based remediation goals for soil and groundwater beneath the project site. This approach was discussed in a meeting with Alameda County Health Care Services Agency (ACHCS), Department of Environmental Health, Hazardous Materials Division on June 8, 1993, attended by Barney Chan of ACHCS, Marc Althen of Penske, and Paul Hehn and Gary Keyes of Geraghty & Miller, Inc. (Geraghty & Miller).

The meeting discussions included a review of site conditions based on site-assessment activities performed to date, possible options for remediation, and site resolution. Key points of discussion concerned the adequacy of source-removal activities completed at the site, the completeness of site characterization, and the criteria that ACHCS will use to determine cleanup goals for the site. Penske agreed to prepare a conceptual approach for the remedial activities required at the site. Following ACHCS review of the conceptual approach, a meeting among ACHCS, Penske, the RWQCB, and Geraghty & Miller would be held to finalize the approach.

BACKGROUND

The Penske site is a rectangular parcel, approximately 240 by 320 feet, located in southwest Oakland, 1/4 mile east of the San Francisco Bay (Figure 1). In October 1989, four underground storage tanks (USTs) (containing unleaded gasoline, diesel fuel, and waste oil) ranging in volume from 10,000 to 550 gallons were excavated. The approximate locations of the former tanks are shown in Figure 2. Total petroleum hydrocarbons as gasoline (TPH-G) (up to 2,100 milligrams per kilogram [mg/kg]) and diesel (TPH-D) (up to 13,000 mg/kg) were detected in soil samples collected from the vicinity of the former UST locations during soil-assessment activities performed in October 1989. The highest concentrations of TPH-D in the soil samples collected during the tank excavation were detected from Samples No. 1 (2,300 mg/kg), No. 2 (4,400 mg/kg), and No. 3 (13,000 mg/kg) collected from the tank excavation walls near the northeast ends of the former USTs (Figure 2), and from Samples No. 4 (2,800 mg/kg) and No. 5 (4,200 mg/kg) collected from the excavation walls near the southwest ends of the former USTs (Figure 2). In the course of the tank excavation and following the tank excavation, it is estimated that approximately 700 cubic yards of soil were excavated and disposed. The exact amount of soils exposed is not known. The tank excavations were backfilled after excavation with clean pea gravel.

During September 1990, 3 soil borings and 3 groundwater monitor wells were completed at the site. The soil borings were drilled through the tank backfill to collect soil samples from beneath the former tank excavation near the areas of the highest concentrations of TPH-D in the soil samples collected during the tank excavation. The soil borings detected concentrations greater than 100 mg/kg of TPH-D at depths of 15 feet below the ground surface (bgs) in Soil Borings BH-1 (460 mg/kg) and BH-3 (200 mg/kg). The results for TPH-G and BTEX are presented in Table 1.

In accordance with Alameda County and LUFT Manual assessment guidelines, three groundwater monitor wells were completed within 10 feet of the former tank excavations (Figure 3). Monitor Wells MW-1 and MW-3 were completed near the former gasoline and diesel tank excavations and Monitor Well MW-2 was completed near the former waste-oil tank excavation. Soil samples collected during the boring of these monitor wells detected concentrations of TPH-D greater than 100 mg/kg from MW-1 at depths of 10 feet bgs (760 mg/kg) and 15 feet bgs (980 mg/kg); MW-2 at 5 feet bgs (170 mg/kg); and MW-3 at 10 feet bgs (190 mg/kg) and 15 bgs (150 mg/kg). Depth to water encountered during the drilling of these wells was approximately 15 feet bgs.

While TPH-G, TPH-D, and BTEX were detected in the soil samples collected from the monitor well borings, the concentrations for petroleum hydrocarbons are much lower than those detected in soil samples from the walls of the former tank excavations. This would seem to indicate that the higher concentrations for TPH-G, TPH-D, and BTEX are located within the predominantly clays and silts closer to the former tank excavations. While soil samples from Monitor Wells MW-4 and MW-5 have detected TPH-D in the subsurface, the levels detected are lower than the levels detected from the 10 feet and 15 feet bgs samples closer to the former tank excavation from Monitor Well MW-1. Also, the soil samples from downgradient well MW-5 did not detect any concentrations for TPH-G or BTEX. All the above data would seem to indicate that the extent of TPH-G and BTEX have been defined in the soils, both vertically and horizontally. The additional soil samples to be collected from the downgradient monitor wells proposed in the Geraghty & Miller Work Plan dated March 17, 1993, will also assist in any further horizontal definition of petroleum hydrocarbon (particularly TPH-D) in the soils.

The site is underlain by predominantly clay, silt, and clayey sand, and interbedded sands to a depth of approximately 36.5 feet bgs, the total depth explored. The interpreted stratigraphic conditions are presented in Geologic Sections A-A' and B-B' (Figures 4 and 5, respectively). The locations of the geologic sections are shown in Figure 3. The soils in the immediate area of the former USTs consist primarily of lower permeability clays, silty clays, and some clayey sand (Figure 5). It appears that based on the soil sample data from the soil borings, that there is a rapid decrease in the concentrations of the petroleum hydrocarbons in the soils away from the former tank excavations. This would appear to indicate that petroleum hydrocarbons are located mostly within the lower permeability sediments close to and surrounding the former tank excavations.

The groundwater flow in this same area near the former tank excavations and away from the tank excavations also appears to be controlled by these lower permeability sediments. The static depth to water in most of the current groundwater monitor wells is approximately 8 feet bgs. Groundwater elevation data, collected on October 28, 1993, are presented in Figure 6. The approximate direction of groundwater flow is towards the west to northwest. Historically, the highest concentrations of petroleum hydrocarbons in groundwater have been detected in the groundwater samples collected from Monitor Well

MW-1 adjacent to the southern corner of former USTs locations. Concentrations of hydrocarbons, mainly as TPH-D, and typically at least one order of magnitude less than those detected in Monitor Well MW-1, have historically been detected in Monitor Well MW-5 which is located near the western property boundary. As shown by the rapid decrease in petroleum hydrocarbon levels in the groundwater samples collected from Monitor Wells MW-3, MW-4, and MW-5, (summarized in Table 2), the levels would appear to indicate that petroleum hydrocarbons within the groundwater are either extremely slowly migrating within the clays away from the former tank excavation, or are naturally attenuating due to biodegradion and other factors prior to reaching the outer wells.

CONCEPTUAL APPROACH

The conceptual approach for the Penske site will 1) determine criteria necessary to utilize the APC approach to downgradient wells; 2) determine whether the APC approach can be used at this site; 3) utilize risk assessment to determine appropriate soil cleanup criteria in the area of the former UST excavations; 4) use fate-and-transport modeling to determine the concentrations of petroleum hydrocarbons which can remain at the source while protecting against degradation of downgradient groundwater resources; and, 5) use RWQCB Resolution 89-39 regarding high TDS to help determine the compliance criteria for the APC wells.

ALTERNATIVE POINTS OF COMPLIANCE REQUIREMENTS

The regulatory initiative that will be applied at this site will be the APC approach, which was introduced in the October 1992 Basic Plan Amendments by the RWQCB. The APC approach now being implemented by the RWQCB generally allows the achievement of the Basin Plan Water Quality objectives at monitoring wells located downgradient of the plume instead of in the center of the plume. In order to apply APC, certain conditions must be fulfilled: 1) the dissolved hydrocarbons in the groundwater should be in low yielding, fine-grained sediments and it must be demonstrated that migration to the underlying or adjacent aquifers will not occur; 2) adequate source removal must be demonstrated in order to show that future migration of dissolved petroleum hydrocarbons in the groundwater has been limited; 3) a pump-and-treat remediation approach needs to be shown to be inappropriate or not cost-effective; and 4) an acceptable management plan must be developed for managing any residual dissolved petroleum hydrocarbon in the groundwater. The following paragraphs address whether groundwater at the Penske site meets these criteria.

Low yielding sediments, no migration

This site fulfills the first requirement since it is generally underlain by low yielding, fine-grained sediments, with the exception of a clayey sand layer located approximately 15 feet bgs, and a silty sand and sand lenses located approximately 17 - 20 feet bgs (Figure 4). Based on the information provided in the background section, the higher concentrations for petroleum hydrocarbons detected in the soil samples collected during the UST removal were higher than the concentrations in the soil borings completed for groundwater monitoring wells located 10 feet away from the tank excavations. Most of the petroleum hydrocarbons appear to be contained within the silts and clays close to the former tank excavation. The groundwater flow also appears to be controlled in this area by the lower permeable soils. This is indicated by the fact that petroleum hydrocarbon concentrations detected in downgradient groundwater Monitoring Well MW-3, MW-4, and MW-5 are substantially lower than the levels detected closer to the former tank excavation. This reduction in petroleum hydrocarbon levels in downgradient wells would appear to indicate that very limited migration of petroleum hydrocarbons within the groundwater hydraulically downgradient from the former tank excavations is taking place and/or naturally occurring biodegradation of petroleum hydrocarbons is taking place close to the former tank excavations and prior to the water reaching the monitor wells.

Source removal

The original UST removal reports and the excavation and disposal of soils during the tank removal, as described in the background section, indicate that the primary sources of the petroleum hydrocarbons (the USTs and the tank backfill) have been removed from the site. Any additional source areas which remain would consist of petroleum hydrocarbons within the soils near the perimeter of the former tank excavations. As discussed in the above section on migration, it appears that most of the remaining petroleum hydrocarbons are contained within silts and clays close to the former tank excavation. Additional groundwater monitor wells were proposed for installation in a Geraghty & Miller work plan dated March 17, 1993. Soil samples collected during the borings of these additional wells will also aid in any further definition of any potential petroleum hydrocarbons in the soils away from the former tank excavations.

Pump-and-treat approach not effective

Since the petroleum hydrocarbons are contained within the silts and clays close to the former tank excavation, it has been Geraghty & Miller's experience at other sites around the Bay fringe with similar hydrogeologic conditions (pumping from silts and clays), that only low flow rates and small hydraulic capture zones can be anticipated from a pump-and-treat approach within these fine-grained sediments. A pump-and-treat approach would only provide marginal benefit for remediation since petroleum hydrocarbons contained within the silts and clays tend to remain absorbed onto the soil matrix and are only recovered by this approach very slowly, at a high cost, and with very low efficiency.

Acceptable Management Plan

The approach for addressing the fourth APC criteria, for an acceptable management plan for any residual petroleum hydrocarbons, will include fate-and-transport and biomodeling to identify the levels of residual dissolved petroleum hydrocarbons that could remain in the soils at the site while protecting down-gradient beneficial uses of the groundwater. It is anticipated that biomodeling will show that natural biodegradation and other attenuation mechanisms will prevent dissolved hydrocarbons from reaching the downgradient APC monitoring well. This is indicated by an empirical review of the historic groundwater monitoring data which indicate that down-gradient migration of the dissolved petroleum hydrocarbons has been restricted. Using fate-and-transport modeling in this manner has been accepted in concept by the RWQCB. Upon demonstrating with biomodeling that any residual dissolved petroleum hydrocarbons would not migrate to the proposed APC wells, the groundwater monitoring could be focused on only a few wells identified as "sentinel wells." Sentinel wells will be upgradient of the APC wells and downgradient of the maximum extent of migration of any acceptable levels of dissolved petroleum hydrocarbons, as predicted by the biomodeling. Further evaluation may determine that existing wells might be suitable for the use as sentinel wells and APC wells. Monitoring of the sentinel wells will serve to verify the results of the fate-and-transport modeling and confirm compliance. If concentrations in the sentinel wells were to increase over time and exceed compliance levels, appropriate additional measures could be initiated prior to the APC wells being affected.

Penske has agreed in principle, that if additional definition of the extent of petroleum hydrocarbons in the soils close to the former tank excavations is required by Alameda County or the RWQCB based on this review, Penske is prepared to complete additional work. Penske is prepared to complete additional soil borings, if necessary, to further define the extent of petroleum hydrocarbons in the soil. However, based on the current information available at this site, the extent of petroleum hydrocarbons have been defined and additional soil borings should not be necessary. Penske has also agreed in principle that if the concentrations within the sentinel wells exceed maximum acceptable limits determined by this approach, additional measures will be implemented to prevent migration of the petroleum hydrocarbons to the APC wells.

ESTABLISHING SITE-SPECIFIC, HEALTH-BASED CLEANUP GOAL

The above evaluation of the site factors indicates that this site is appropriate for consideration of using an APC approach with respect to protecting the beneficial uses of the down-gradient ground-water resource. The following sections of this proposed remedial approach document propose a scientifially supportable method to develop appropriate cleanup goals for the soil and appropriate compliance levels for the APC wells. Since samples from the shallow groundwater beneath the site have shown total dissolved solids concentrations exceeding 3000 mg/L, RWQCB Resolution 89-39 would suggest that the municipal and domestic supply beneficial uses do not apply to the shallow groundwater and that the drinking water maximum contaminant levels (MCLs) would be too stringent as compliance criteria for the APC wells. Consequently, one of the key issues addressed by this conceptual remedy approach is the scientific and regulatory methodology used to establish the compliance concentrations at the APC wells. The proposed methodology considers downgradient beneficial uses and potential receptors.

Identified potential receptors

Current potential receptors for any petroleum hydrocarbons in the groundwater which may migrate offsite will be identified by reviewing ACHCS records to verify that no municipal, domestic, industrial, or agricultural production wells exist within $^1/_2$ mile of the site. If no wells are identified between the site and the Bay, then it will be assumed that the marine aquatic life in the Bay will be the downgradient receptor. Future potential receptors will be identified based on realistic future uses of the site.

A drainage ditch is located approximately 70 feet west (downgradient) of Monitor Well MW-4 (Figure 3), and the water in this drainage ditch appears to be tidally influenced and connects directly to the San Francisco Bay. It is assumed that the shallow groundwater beneath the Penske site is hydraulically connected to this drainage ditch. Therefore, for the purposes of this determination of potential receptors, this tidally influenced drainage ditch will be assumed to be the closest downgradient receptor. It is proposed that the elevation of the water in the drainage ditch be compared to the shallow groundwater elevation under the Penske site. Due to the tidal connection with the drainage ditch, the marine aquatic life criteria are proposed for the compliance criteria for the APC wells.

PERFORM RISK ASSESSMENT AND FATE-AND-TRANSPORT MODELING

A health-based risk assessment and groundwater fate-and-transport modeling will be performed to establish site-specific cleanup goals for soil and groundwater beneath the site which will be protective of the anticipated future uses of the property, construction workers during any subsequent property redevelopment, and the aquatic environment. The groundwater fate-and-transport and BioPlume II models will be performed to determine what concentrations, if any, of petroleum hydrocarbons will reach the tidally-influenced drainage ditch. If the models indicate that petroleum hydrocarbons will reach the drainage ditch at concentrations exceeding those which will be agreed upon with the RWQCB as being protective of the marine aquatic environment, a back-calculation will be performed to determine what the site-specific cleanup goal should be so that the aquatic criteria are not exceeded.

The BioPlume II, a two-dimensional numerical model for simulating the transport and biodegradation of dissolved petroleum hydrocarbon plumes, will be utilized to predict contaminant behavior in the subsurface environment. This model will be used to predict potential petroleum hydrocarbon levels at site boundaries and to extrapolate, based on calculated risk-based cleanup goals, soil levels which are not expected to act as significant continuing source of potential contamination to the groundwater. In addition, groundwater flow will be modeled to determine the optimal location for the intercept and monitoring of petroleum hydrocarbon plume migration. This conceptual approach to remediation, water quality criteria, and points compliance is intended to maximize the potential for bioremediation while monitoring that the plume remains on the former Penske site.

The health-based risk assessment will be performed to establish site-specific cleanup goals for soil and groundwater beneath the site which will be protective of occupants for the anticipated future uses of the property and construction workers during any subsequent property redevelopment. The appropriate exposure scenarios for the health-based risk assessment will be negotiated with the ACHCS and the RWQCB prior to performing the risk assessment. It is anticipated that cumulative exposures via the following potentially complete pathways will provide the basis for calculations of risk-based cleanup goals: vapor migration into enclosed structures, exposures associated with use of groundwater as a source of industrial water, and/or potential short-term exposures to construction workers onsite. If any exposure pathway or combination of pathways results in a risk due to potential exposure that is greater than a risk considered acceptable, appropriate remedial responses will be proposed for soil and/or groundwater.

RWQCB Resolution 89-39

Based on the results of the fate-and-transport and Bioplume II modeling, groundwater monitor wells will be installed near the hydraulically downgradient perimeter of the site and established as APC wells. It will also be determined if any of the existing wells are acceptable as APC wells. The groundwater quality data collected from the APC wells will be compared to the concentrations predicted in the models and will serve to verify the model results.

In order to determine the groundwater goals for the monitoring of the groundwater and the APC wells, the criteria for the groundwater quality will need to be established. The criteria would normally be the maximum contaminant levels (MCLs). However, at the Penske site, high Total Dissolved Solids (TDS) values have been detected in the wells. The use of RWQCB Resolution 89-39 involves verifying that the water quality goals pertaining to the domestic and municipal beneficial use are not applicable to the shallow groundwater underlying the project site because of the high background concentrations of TDS. According to the RWQCB Resolution 89-39, groundwater containing concentrations of TDS exceeding 3,000 mg/kg may be exempted from being considered as having a potential use as a domestic or municipal supply. Water samples collected at hydraulically downgradient Monitor Wells MW-1 and MW-4 during October 1993 contained TDS concentrations exceeding 3,000 mg/L. Once it is acknowledged that, based on the high TDS values, the groundwater beneath the site does not qualify as domestic or municipal beneficial use, drinking water standards (MCLs) would not be appropriate for groundwater cleanup criteria.

If the MCLs should not apply to the groundwater beneath the site, some other standard for the groundwater cleanup criteria must be established. As described in the section on health-based cleanup goals, a tidally-influenced drainage ditch is located approximately 70 feet west of Monitor Well MW-4. It is assumed that the groundwater beneath the Penske site is hydraulically connected to the water in the drainage ditch. The high TDS values reported in the groundwater represent brackish water values, typical of mixing zones of freshwater and saltwater near coastal margin areas.

Since the groundwater beneath the Penske site is assumed to be hydraulically connected to the tidally-influenced drainage ditch, and since the drainage ditch is directly connected to the water to the San Francisco Bay, this drainage ditch is proposed as the potential receptor for the marine aquatic goals. It is herein proposed that the saltwater cleanup criteria for maximum concentrations of petroleum hydrocarbon allowable in sea water be used for the maximum concentrations allowable in the proposed sentinel wells at the Penske site. Based on information available to Geraghty & Miller, we have prepared Table 3 which lists the known saltwater criteria for petroleum hydrocarbons constituents detected in the groundwater. It is herein proposed that the listed saltwater criteria, be used as the criteria for the maximum allowable concentrations for petroleum hydrocarbon at the sentinel wells at the site. If the maximum allowable concentrations are exceeded in the sentinel wells, additional remedial actions will be undertaken by Penske to prevent the levels of petroleum hydrocarbons acceptable to the RWQCB from reaching the APC wells, and possibly the aquatic receptor. For the purposes of this proposed plan, the aquatic receptor will be the tidally influenced drainage ditch close to the former Penske site perimeter.

Based on the above-listed information and suggested recommendations for using health-based cleanup goals APC and the RWQCB Resolution 8939, it is herein proposed that this approach be acceptable to the RWQCB and ACHCS as a remedial approach for the former Penske facility.

If you have any questions regarding this conceptual remedial approach document, please do not hesitate to call.

Sincerely,
GERAGHTY & MILLER, INC.

Paul V. Hehn
Staff Geologist/Project Manager

Logan M. Blank
Toxicologist/Project Scientist

Gary W. Keyes, P.E.
Principal Engineer/Associate
Richmond, California Office Manager

Attachments:	Table 1	Site Sample Analytical Results
	Table 2	Summary of Groundwater Analytical Results – Monthly and Quarterly Sampling
	Table 3	Comparison of Water Quality Criteria
	Figure 1	Site Location Map
	Figure 2	Site Map
	Figure 3	Site Plan
	Figure 4	Cross Section A-A'
	Figure 5	Cross Section B-B'
	Figure 6	Shallow Groundwater Contours

Table 1: Soil Sample Analytical Results
Former Penske Truck Leasing Co. Facility
725 Julie Ann Way, Oakland, California.

Boring	Date	Depth (feet)	TPH Gasoline (A) (mg/kg)	TPH Diesel (A) (mg/kg)	Benzene (B) (mg/kg)	Toluene (B) (mg/kg)	Ethyl-benzene (B) (mg/kg)	Xylenes (B) (mg/kg)	Total Oil & Grease (mg/kg)	VOCs (C)
MW-1	25-Sep-90	5	2	ND(<10)	0.04	0.015	0.01	0.051	NA	NA
		10	820	760	1	0.56	0.46	4.1	NA	NA
		15	2	980	0.53	2.2	0.93	4.5	NA	NA
MW-2	26-Sep-90	5	1	170	0.14	0.02	0.006	0.031	1400	(D)
		10	ND(<1)	32	ND(<.003)	ND(<.003)	ND(<.003)	ND(<.003)	ND (<50)	ND (E)
		15	4	85	ND(<.003)	ND(<.003)	ND(<.003)	ND(<.003)	68	ND (E)
MW-3	27-Sep-90	5	ND(<1)	ND(<10)	0.005	ND (<.003)	ND(<.003)	ND(<.003)	NA	NA
		10	26	190	ND(<.003)	0.018	0.007	0.096	NA	NA
		15	44	150	0.025	0.18	0.087	0.33	NA	NA
		20	ND (<1)	ND(<10)	ND(<.003)	0.017	ND (<.003)	0.005	NA	NA
BH-1	25-Sep-90	10	ND(<1)	ND(<10)	0.01	ND(<.003)	ND(<.003)	0.006	NA	NA
		15	380	460	3.2	15	4.4	28	NA	NA
		20	150	ND(<10)	2.1	8.1	2.1	12	NA	NA
BH-2	27-Sep-90	10	ND(<1)	ND(<10)	ND (<.003)	ND (<.003)	ND (<.003)	ND (<.003)	ND (<50)	ND (E)
		15	ND(<1)	36	ND(<.003)	ND(<.003)	ND(<.003)	ND(<.003)	ND (<50)	ND (E)
BH-3	28-Sep-90	5	ND(<1)	56	0.004	0.13	0.004	0.019	NA	NA
		10	22	54	ND(<.003)	0.015	0.006	0.057	NA	NA
		15	35	200	0.049	0.44	0.33	1.9	NA	NA

Notes:
(A) Total Petroleum Hydrocarbons Analyzed by USEPA Method 8015, modified.
(B) Analyzed by USEPA Method 8020.
(C) Analyzed by USEPA Method 8240.
(D) Detected: acetone (0.072 mg/kg); benzene (0.045 mg/kg); toluene (0.03 mg/kg); xylenes (0.015 mg/kg).
(E) For detection limits of individual compounds see certified laboratory reports.

( ) = Detection limit
ND = Not detected
NA = Not analyzed

Analysis by Superior Analytical Laboratories, Inc. Martinez, California.

Project No. RC01903

Table 1: Soil Sample Analytical Results
Former Penske Truck Leasing Co. Facility
725 Julie Ann Way, Oakland, California.

Boring	Date	Depth (feet)	TPH Gasoline (a) (mg/kg)	TPH Diesel (a) (mg/kg)	Benzene (b) (mg/kg)	Toluene (b) (mg/kg)	Ethyl-benzene (b) (mg/kg)	Xylenes (b) (mg/kg)
MW-4	2-Feb-93	5	440	4100	1.6	ND (<0.15)	8.3	1.4
		10	26	320	0.38	0.009	0.7	0.56
		15	6	170	0.022	0.045	0.045	0.15
MW-5	2-Feb-93	5	ND (<1)	21	ND(<.003)	ND(<.003)	ND(<.003)	ND(<.003)
		10	ND (<1)	ND (<1)	ND(<.003)	ND(<.003)	ND(<.003)	ND(<.003)
		15	ND(<1)	130	ND(<.003)	ND(<.003)	ND(<.003)	ND(<.003)
Composite Soil Sample:								
SP-1 A-D			ND(<1)	37	ND(<.003)	ND(<.003)	ND(<.003)	0.014

Total Organic Lead:	ND (<2 mg/kg)	(by DHS Method - Luft Manual)
pH:	8.9	(by USEPA Method 9041)
Flashpoint:	>100 degrees C	(by USEPA Method SW-846 Method 1010)
Reactive Cyanide:	ND (<1 mg/kg)	(by USEPA Method 9010)
Reactive Sulfide:	ND (<10 mg/kg)	(by USEPA Method SW 7.3.4.2)

(a) Analyzed by USEPA Method 8015, modified.
(b) Analyzed by USEPA Method 8020.

mg/kg Milligrams per kilogram
( ) Detection limit
ND Not detected

Analysis by Superior Precision Analytical, Inc., San Francisco, California.

Table 2: Summary of Groundwater Analytical Results - Monthly and Quarterly Sampling
Former Penske Truck Leasing Facility,
725 Julie Ann Way, Oakland, California.

Well	Date	TPH Gasoline (a) (µg/L)	TPH Diesel (a) (µg/L)	Benzene (b) (µg/L)	Toluene (b) (µg/L)	Ethyl-benzene (b) (µg/L)	Xylenes (b) (µg/L)	Total Dissolved Solids (c) (mg/L)
MW-1	2-Oct-90	170	2,900	20	18	1.9	5.7	--
	28-Feb-91	260	550	43	1	7	1	--
	25-Mar-91	73	160	10	ND(<0.3)	0.5	ND(<0.3)	--
	1-May-91	ND(<50)	(d)	2.2	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	5-Aug-91	310	330	22	5.5	9.5	23	--
	23-Oct-91	440	1,800	23	21	6.2	35	--
	6-Jan-92	430	1,600	56	8.4	18	22	--
	20-Jul-92	ND(<50)	25,000	0.4	0.8	1	2.1	--
	23-Oct-92	280	6,500	9.3	13	8.2	15	--
	4-Feb-93	68 (f)	320	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	8-Apr-93	180	7,800	0.5	2.1	0.8	13	--
	6-Aug-93	740	17,000	75	100	25	130	3,500
	28-Oct-93	140	7,600	4.7	1.9	3.2	5.4	3,500
MW-2	2-Oct-90	ND(<50)	80	0.4	ND(<0.3)	ND(<0.3)	0.5	--
	28-Feb-91	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	25-Mar-91	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	1-May-91	ND(<50)	(d)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	5-Aug-91	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	23-Oct-91	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	6-Jan-92	11,000	1200 (e)	ND(<0.3)	83	82	940	--
	20-Jul-92	73	120	1.7	3.3	1.1	9.6	--
	23-Oct-92	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	0.5	--
	4-Feb-93	ND(<50)	330 (e)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	8-Apr-93	150	74 (h)	1	2.1	1	13.0	--
	6-Aug-93	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.9)	990
	28-Oct-93	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.9)	1,500
MW-3	2-Oct-90	ND(<50)	90	28	3.1	0.6	1.5	--
	28-Feb-91	ND(<50)	ND(<50)	6	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	25-Mar-91	ND(<50)	ND(<50)	0.6	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	1-May-91	ND(<50)	(d)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	5-Aug-91	ND(<50)	ND(<50)	1.7	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	23-Oct-91	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	6-Jan-92	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	20-Jul-92	66	ND(<50)	1.1	2.2	0.7	6.4	--
	23-Oct-92	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	4-Feb-93	270	ND(<100)(g)	9.8	4.6	4.5	8.7	--
	8-Apr-93	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.9)	--
	6-Aug-93	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.9)	3,400
	28-Oct-93	ND(<50)	ND(<50)	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.9)	2,700
MW-4	4-Feb-93	58 (f)	450	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	8-Apr-93	74	220	19	0.4	ND(<0.3)	ND(<0.9)	--
	6-Aug-93	95	ND(<50)	68	0.9	1.1	ND(<0.9)	5,800
	28-Oct-93	160	600	46	0.7	1.6	1.2	5,200
MW-5	4-Feb-93	ND(<50)	240	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.3)	--
	8-Apr-93	ND(<50)	480	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.9)	--
	6-Aug-93	ND(<50)	120	0.8	ND(<0.3)	ND(<0.3)	ND(<0.9)	2,800
	28-Oct-93	ND(<50)	370	ND(<0.3)	ND(<0.3)	ND(<0.3)	ND(<0.9)	2,400

Table 2: Summary of Groundwater Analytical Results - Monthly and Quarterly Sampling
Former Penske Truck Leasing Facility,
725 Julie Ann Way, Oakland, California.

Well	Date	TPH Gasoline (a) (µg/L)	TPH Diesel (a) (µg/L)	Benzene (b) (µg/L)	Toluene (b) (µg/L)	Ethyl-benzene (b) (µg/L)	Xylenes (b) (µg/L)	Total Dissolved Solids (c) (mg/L)

(a) Analyzed by USEPA Method 8015, modified.
(b) Analyzed by USEPA Method 8020.
(c) Analyzed by USEPA Method 160.1
(d) No results - sample for TPH as diesel not collected.
(e) Diesel range concentration reported. A nonstandard diesel pattern was observed in the chromatogram.
(f) Does not match typical gasoline pattern. Pattern of peaks observed in the chromatograms are indicative of hydrocarbons heavier than gasoline.
(g) Detection limit increased due to insufficient sample amount.
(h) Diesel range concentration reported. The chromatogram shows only a single peak in the diesel range.

( ) Reported detection limit
-- Not analyzed
ND Not detected
µg/L Micrograms per liter
mg/L Milligrams per liter

Analysis by Superior Analytical Laboratories, Inc., San Francisco and Martinez, California.

Table 3: **Comparison of Water Quality Criteria**
Former Penske Truck Leasing Co. Facility
725 Julie Ann Way, Oakland, California

Constituent	MCL (1) (µg/L)	Saltwater Criteria (µg/L)	Concentration at Penske Site (µg/L) (2)
Benzene	1	700 (A)	46
Toluene	1,000 (H)	50,000 (B) 85,000 (D)	1.9
Xylenes	1,750	N.E.	5.4
Ethylbenzene	680	430 (C) 4,100 (D)	3.2
TPH-G	N.E.	N.E.	160
TPH-D	N.E.	N.E.	7,600

No
5000 ppb

need to run GC/MS twenty
no carcinogenic
semivolatiles exist

NOTES:

(1) State of California Drinking Water MCL.

(2) Maximum Concentration Detected during October 28, 1993 Sampling Event.

(A) USEPA National Ambient Water Quality Criteria - Saltwater Aquatic Life Protection (Adverse Effects on a fish species exposed for 160 days).

(B) USEPA National Ambient Water Quality Criteria - Saltwater Aquatic Life Protection (Chronic).

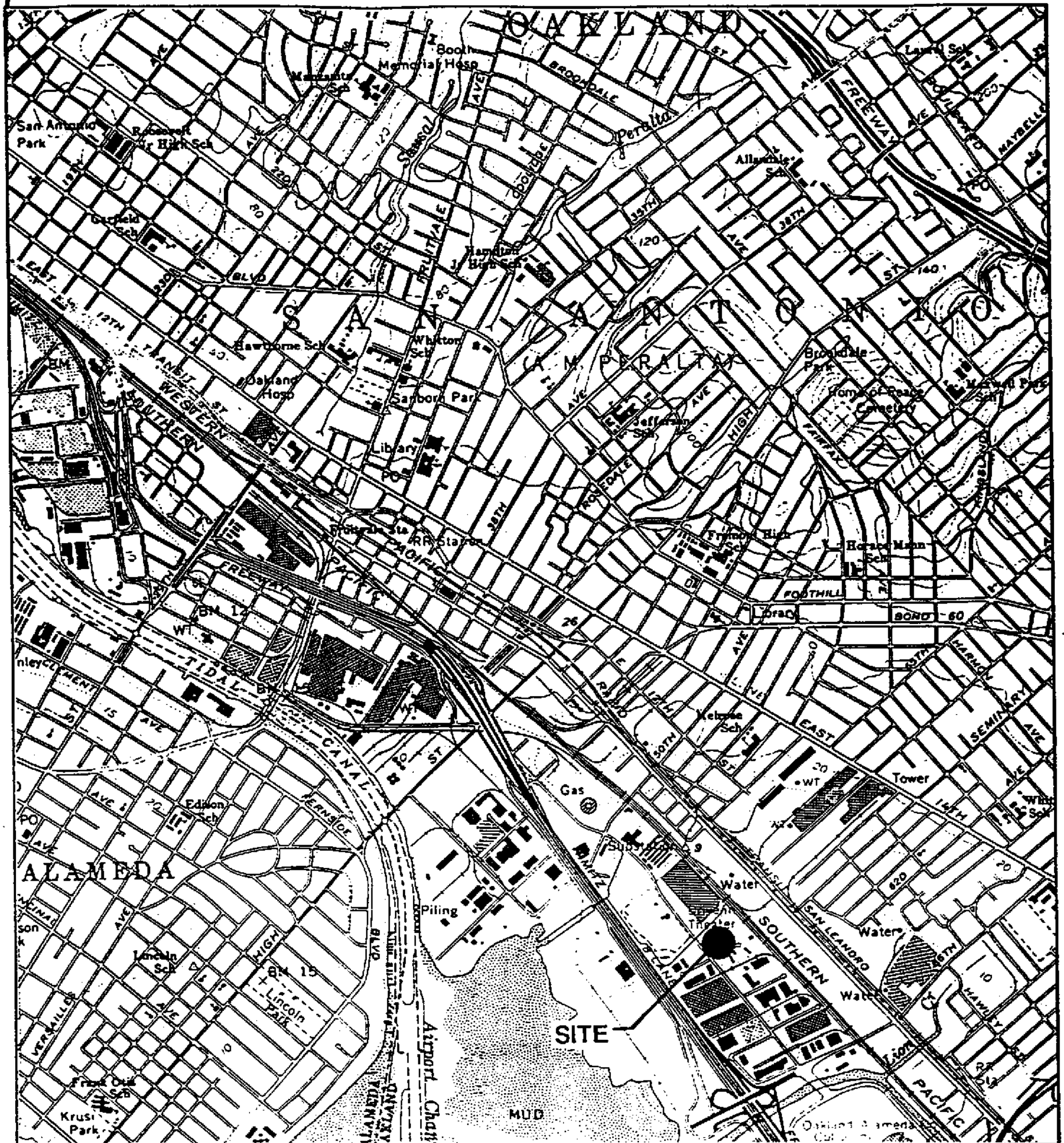
(C) USEPA National Ambient Water Quality Criteria - Saltwater Aquatic Life Protection (Acute).

(D) California Ocean Plan - Numerical Water Quality Objective - Human Health Protection (30 day average).

(E) California Ocean Plan - Numerical Water Quality Objective - Protection of Marine Aquatic Life (30 day average).

(H) USEPA Drinking Water MCL.

N.E. = None Established



Reference: USGS Oakland East, Ca. 7 1/2 Min. Quad
Scale: 1: 24,000

● = Site

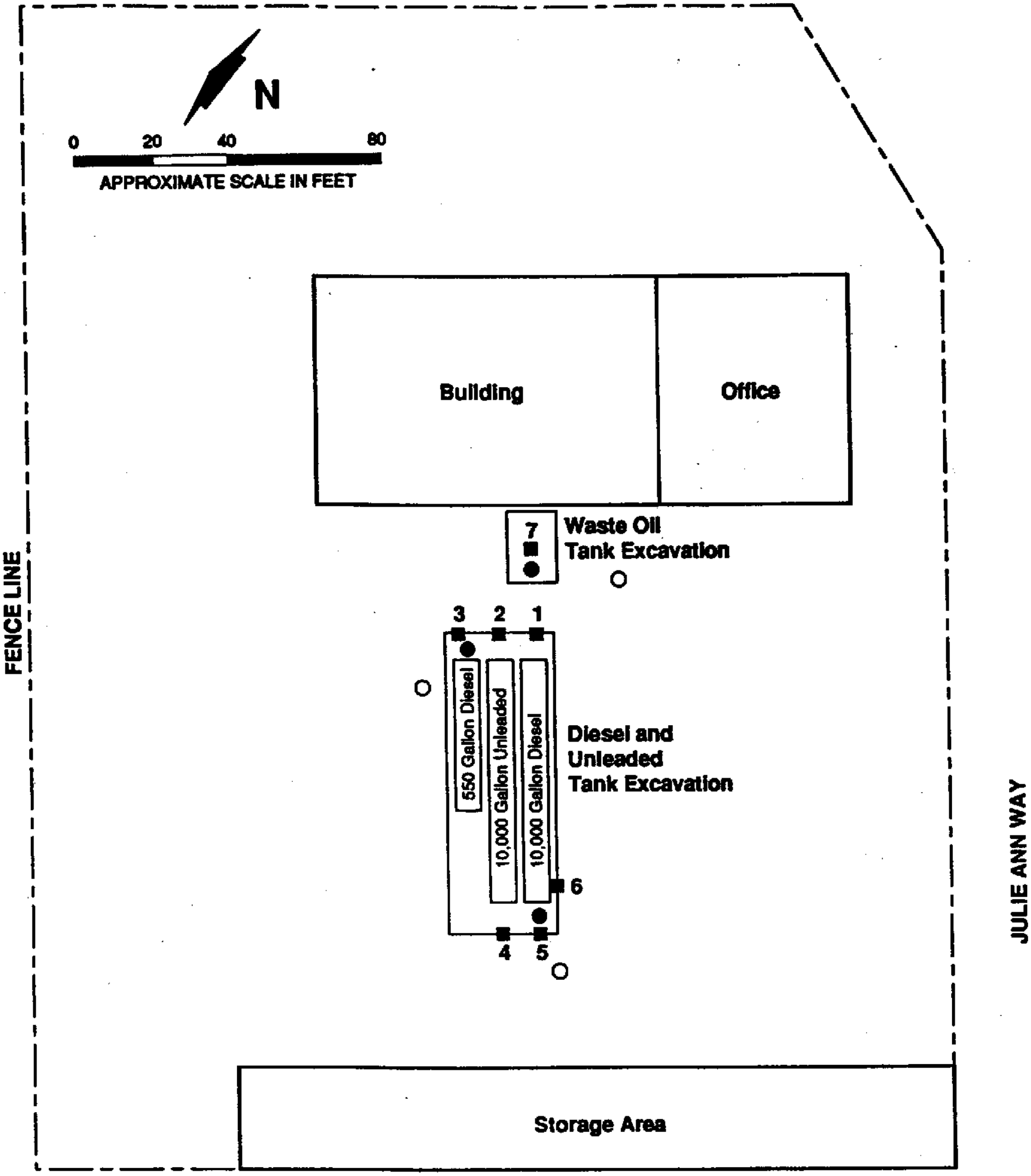
N

GERAGHTY & MILLER, INC.
Environmental Services

Proj. No. RC01903 Date: Oct 15, 1990

SITE LOCATION MAP
Former Penske Truck Leasing Co.
724 Julie Ann Way
Oakland, California

FIGURE
1



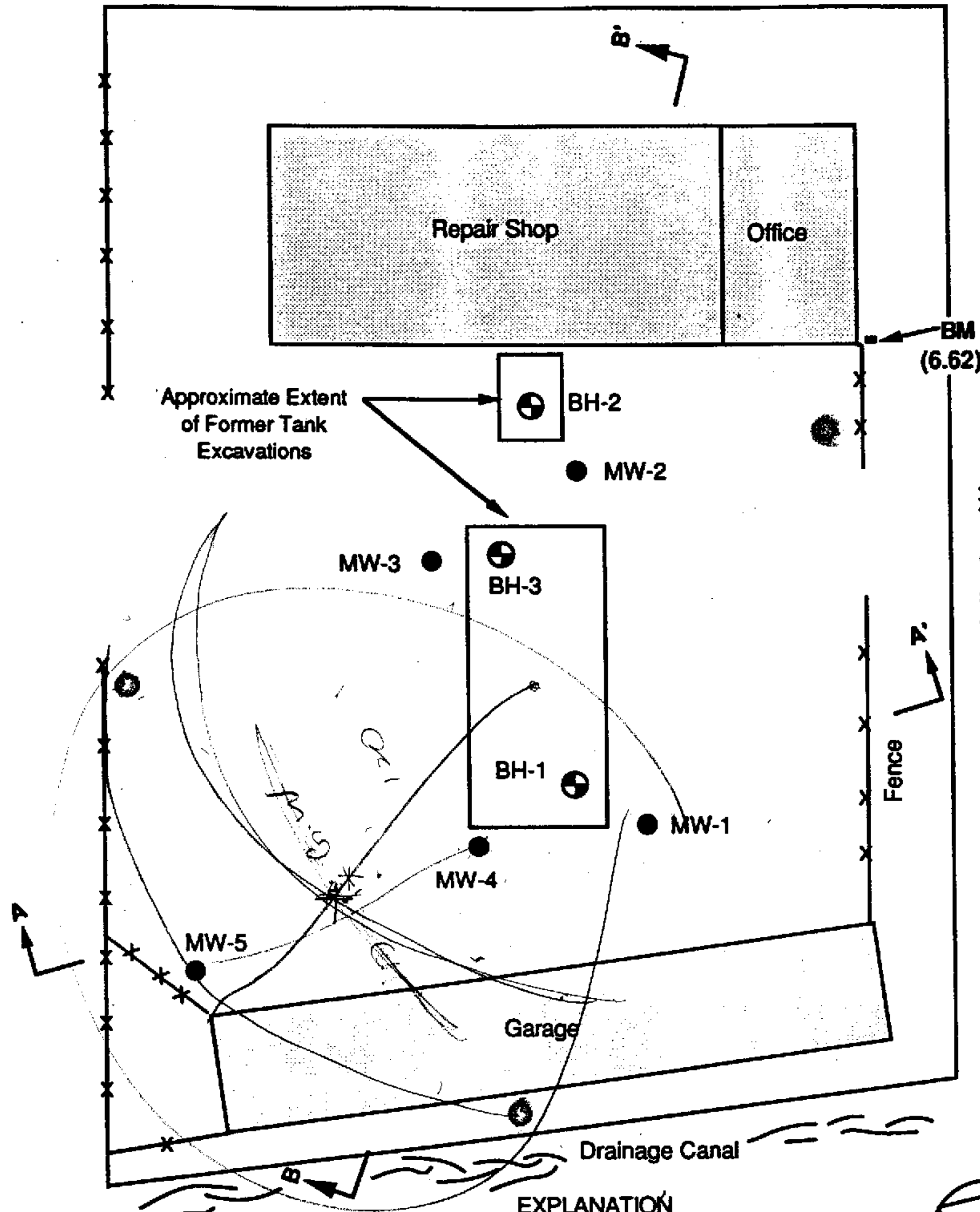
EXPLANATION

■ 1 — Approximate Location of Soil Sample Collected by EA Engineering, Science, and Technology (Scott Co., November 6, 1989)

○ — Proposed Ground-water Monitoring Well

● — Proposed Exploratory Boring

GERAGHTY & MILLER, INC. *Environmental Services* Project No. RC0019.000	**LOCATIONS OF SOIL SAMPLES** Former Penske Truck Leasing Co. Facility 725 Julie Ann Way Oakland, California	FIGURE **2**



EXPLANATION

MW-1 ● Approximate Location of Existing Groundwater Monitor Wells.

○ Approximate Location of a Proposed Additional Groundwater Monitor Wells.

▪ BM Survey Bench Mark (Based on City of Oakland Datum Which is 3 Feet Lower Than Mean Sea Level).

A — A' Line of Cross Section

◐ Approximate location of existing soil borings

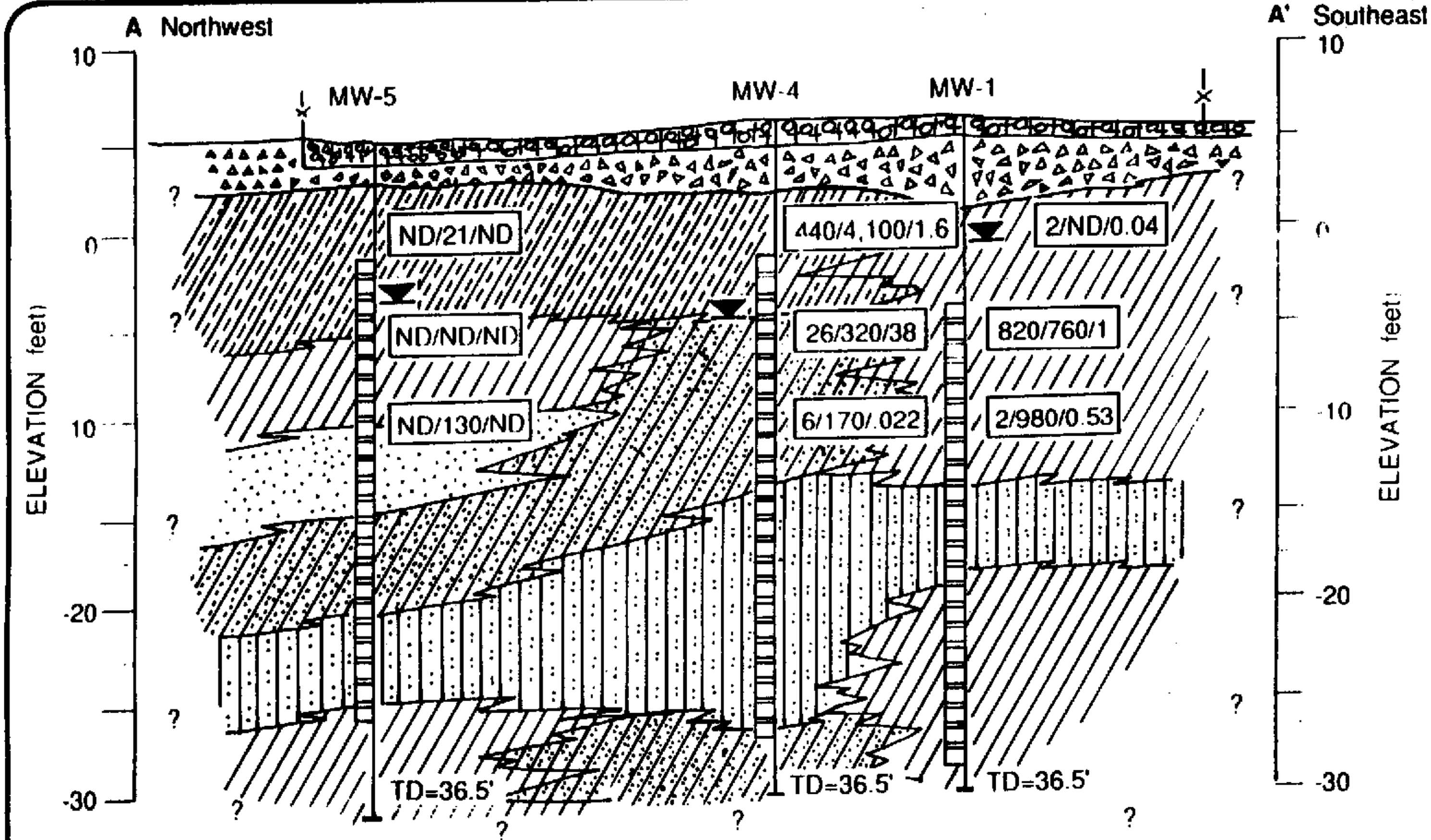
0 — 40
Scale feet

GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC0019.000

SITE PLAN
Former Penske Truck Leasing Co.
725 Julie Ann Way
Oakland, California

FIGURE
3



440/4,100/1.6

Soil sample values in ppm for TPH as gasoline/ TPH as diesel/ benzene. All soil samples collected by Geraghty & Miller, Inc. Soil samples from MW-1 collected 9/25/90. Soil samples from MW-4 and MW-5 collected 2/2/93.

EXPLANATION

- Asphalt
- Rubbley Fill Material
- Organic Clay (OH)
- Clays to Silty Clays to Sandy Clays (CL)
- Clayey Sand (SC)
- Silty Sand (SM)
- Sand (SP)
- Measured Water Level (2/4/93)
- Fence

Ground surface
Blank casing
Well Screen
Bottom of Boring

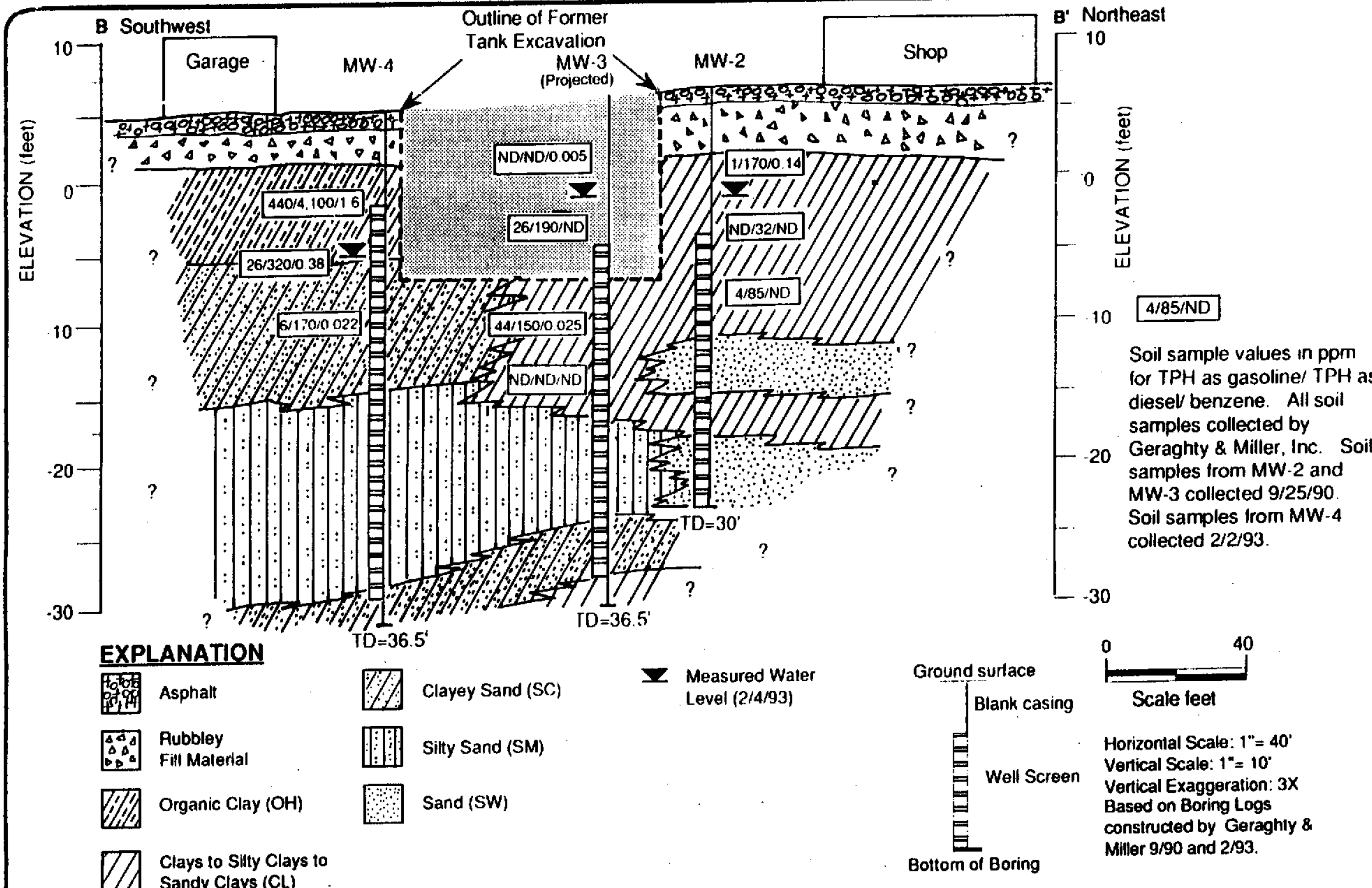
0 40
Scale feet

Horizontal Scale: 1"= 40'
Vertical Scale: 1"= 10'
Vertical Exaggeration: 3X
Based on Boring Logs constructed by Geraghty & Miller 9/90 and 2/93.

GERAGHTY & MILLER, INC.
Environmental Services
Project No. RC01906

CROSS SECTION A - A'
FORMER PENSKE TRUCK LEASING CO. FACILITY
725 Julie Ann Way
Oakland, California

FIGURE
4

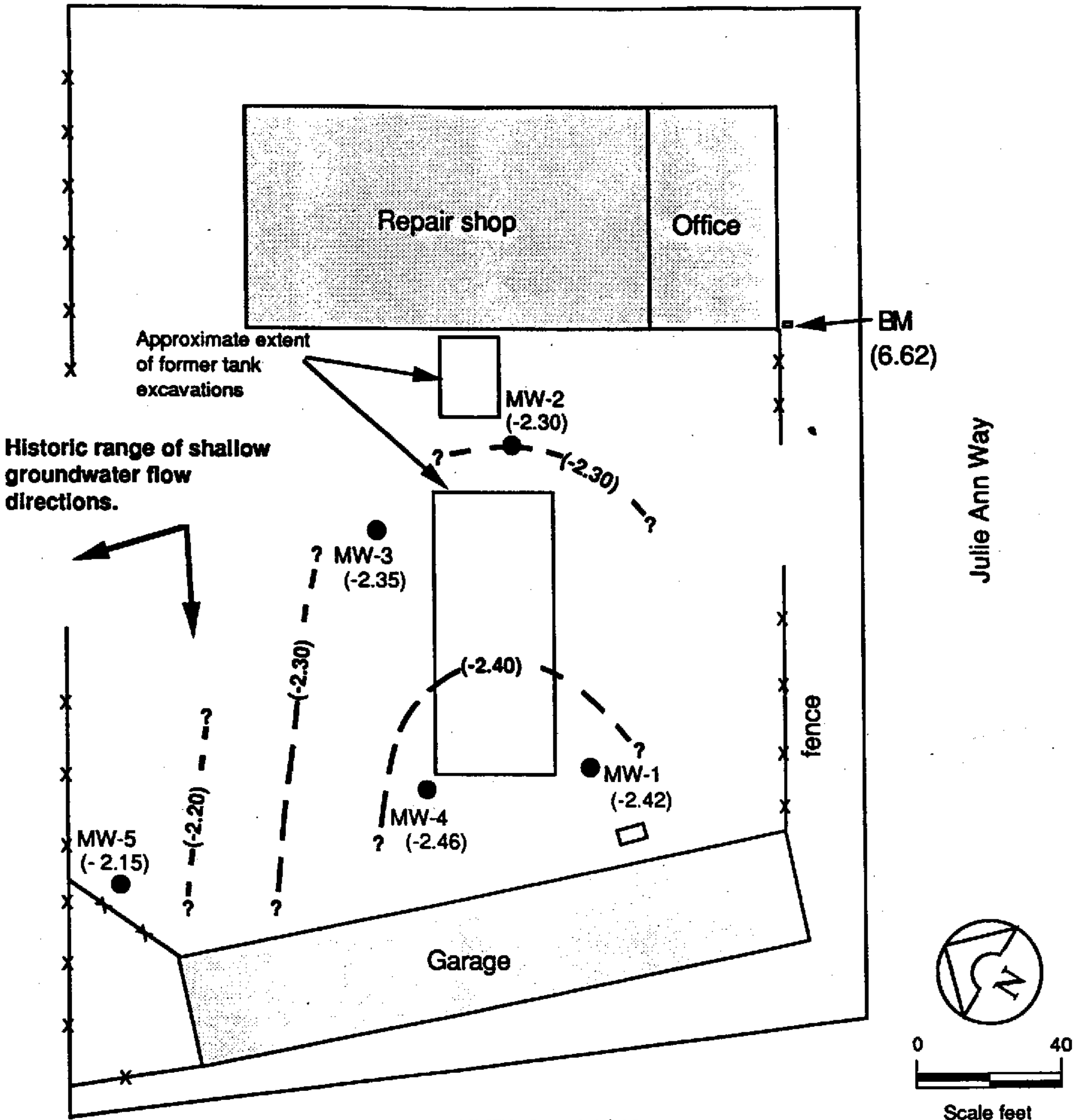


GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC01906

CROSS SECTION B - B'
FORMER PENSKE TRUCK LEASING CO. FACILITY
725 Julie Ann Way
Oakland, California

FIGURE
5



EXPLANATION

MW-1 ⦿ = Approximate location of groundwater monitor wells.

▪ BM = Survey Benchmark (based on City of Oakland datum, which is 3 feet lower than Mean Sea Level).

(-2.30) = Groundwater elevation (feet) relative to benchmark, measured October 28,1993.

? — (-2.40) — ? = Groundwater elevation contour (feet); dashed where inferred(contour interval equals 0.1 feet).

GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC0019.000

SHALLOW GROUNDWATER CONTOURS
Former Penske Truck Leasing Co. Facility
725 Julie Ann Way
Oakland, California

FIGURE

6