■ ADVANCED ENVIRONMENTAL CONCEPTS INC ■

November 1, 2000

Mr. Don Hwang
Alameda County Health Care Services Agency
Environmental Health Services
1131 Habor Bay Parkway, Suite #250
Alameda, CA 94502-6577

Regarding: **Additional Groundwater Assessment Workplan**
Vogue Tyres
240 W. McArthur Blvd.
Oakland, California
Stld 6059

Dear Mr. Hwang:

Please find enclosed the revised Additional Groundwater Assessment Workplan prepared by **Advanced Environmental Concepts, Inc.** (AEC) for the above referenced project/location.

Enclosed please find that report, which AEC is submitting for your review.

Should you have any questions or require clarification on any aspects of the enclosed, please do not hesitate to contact our office at (661) 831-1646.

Respectfully yours,

Advanced Environmental Concepts, Inc.

Debbie Irwin
Project Coordinator / Office Administrator

Attachments: Reports (1)

ADVANCED ENVIRONMENTAL CONCEPTS INC

Advanced Environmental Concepts, Inc. is pleased to present the following:

Additional Groundwater Assessment Workplan

for

Former Vogue Tyres Facility

240 West MacArthur Boulevard
County of Alameda • Oakland, California

This report has been prepared for:

Mr. Warren Dodson

October 2000

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Table of Contents

• ENVIRONMENTAL CONCEPTS WITH DESIGN IN MIND •

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

1.0 INTRODUCTION

Mr. Warren Dodson, owner of the subject property, has authorized **Advanced Environmental Concepts, Inc. (AEC)** to prepare this additional groundwater assessment workplan. The former service station facility is located at 240 West MacArthur Boulevard in Oakland, California. The regulatory contact for this project is Mr. Don Hwang of the Alameda County Health Care Services Agency (ACHCSA). The location of the facility is shown on **Figure 1**.

1.1 Purpose

The drilling and sampling of additional soil borings and the installation and sampling of additional groundwater monitoring wells described in this workplan have the following objectives, as requested in a May 16, 2000 letter issued to Mr. Warren Dodson by the ACHCSA:

- To further delineate and characterize the vertical and lateral limits of the contaminant plume and assess the potential offsite migration of gasoline-range petroleum hydrocarbons, volatile organic compounds (specifically benzene), and the oxygenated fuel additive Methyl Tertiary Butyl Ether (MTBE);
- To evaluate Benzene concentrations beneath the subject property and adjoining commercial parcels in accordance with the City of Oakland's modified version of the Tier 1 Table of American Society for Testing and Materials' Risk Based Corrective Action Guidelines (ASTM RBCA E 1739-95); and
- To evaluate the presence or absence of horizontal and vertical conduits which could act as preferential pathways for the dissolved plume.

1.2 Response to May 16, 2000 Letter

The following section is in response to the May 16, 2000 letter from Alameda County to Mr. Warren Dodson regarding Vogue Tyres.

1) Contrary to Mr. Buck's statement that "Quarterly sampling has shown that the contaminants are generally degrading passively...", groundwater contamination doesn't appear ti be attenuating. Instead, Total Petroleum Hydrocarbons as Gasoline (TPH-G) nas increased in MW3 from the last sampling on January 19, 1999, compared to the previous quarter, October 19, 1998. Benzene has increased from the last sampling on January 19, 1999, compared to the previous quarter, October 19, 19998 in MW1, MW2, and MW3. Methyl Tertiary-Butyl Ether (MTBE) has increased in MW1 and MW3 with MTBE as high as 2,100 μg/l, and MTBE is not decreasing in MW2. He attributes the spikes of elevated concentrations to seasonal precipitation changes. This trend is not readily apparent when groundwater contaminant concentrations are compared to sample dates. Therefore, quarterly groundwater monitoring needs to be continued until the plume has stabilized as indicated by decreases or no change in concentrations of contaminants. Although passive biroremediation us the usual remedial alternative, more aggressive remediation may be proposed.

   Response: AEC concurs with the recommendation for continued quarterly groundwater sampling. Future mitigation strategy will be planned based on the results of the additional assessment defined within this work plan.

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

2) Additionally, the increasing contaminant concentrations may indicate that the contaminant plume may have migrated off site. Therefore, further delineation and characterization of the plume is required. A perched lens consisting of a less permeable clayey silt and a water-bearing zone that is 3 feet thick was not apparent from a review of the boring logs. Even if these statements were true, only the vertical extent of contamination would be limited but not the horizontal extent. Also, in order for the water source to be of insufficient volume for municipal or domestic use, Regional Board Resolution No. 89-39, "Sources of Drinking Water" states that it must not be capable of supplying a single well with an average sustained yield of 200 gallons per day.

Response: The additional borings and monitoring wells proposed within this workplan will serve to provide horizontal delineation data. Additionally, it is our interpretation that Resolution No. 89-39 also defines "Sources of Drinking Water" to include limitations on the maximum allowable Total Dissolved Solids. AEC proposes to sample groundwater beneath the property and analyze it for drinking water parameters prior to undertaking extensive aquifer pump tests.

3) Concentrations of Methyl Tertiary-Butyl Ether (MTBE) in groundwater beneath the site were as high as 2,100 μg/l. The Regional water Quality Control Board is currently not closing any sites with MTBE concentrations exceeding 200 μg/l.

Response: None required

4) Thje benzene concentration of 1,200 ppb found in the most recent groundwater monitoring sample collected on January 19, 1999 exceeded the human health protective threshold value of 214 ppb for a 1/100,000 risk at a commercial site, per the Tier 1 Table of the American Society for Testing and Materials' Risk Based Corrective Action Guidelines (ASTM RBCA E 1739-95). Unless it can be shown that the groundwater-vapor intrusion from groundwater to buildings and the groundwater volatilization to outdoor air exposure pathways are limited, the benzene concentrations must be evaluated.

Response: AEC understands the City of Oakland has developed a modified RBCA to be applied to sites located within city boundaries. AEC intends to utilize the modified parameters in performing the requested risk assessment, subject to Alameda County approval.

5) The next round of groundwater monitoring needs to include analyses for additional oxygenates and additives, specifically ether oxygenates: Tertiary Amyl Methyl Ether (TAME), Diisopropyl Ether (DIPE), Ethyl Tertiary Butyl Ether (ETBE), Tertiary Butyl Alcohol (TBA); and the lead scavengers Ethylene Dibromide (EDB) and Ethylene Dichloride (EDC, also known as 1,2-Dichloroethane and 1,2-DCA). Future analyses need not include any of these constituents no found in the next round of groundwater monitoring.

Response: Evaluation of the fuel oxygenates TAME, DIPE, ETBE, TBA, and the lead scavengers EDB and EDC was performed during the June 2000 quarterly groundwater sampling event. No detectable concentrations of any of these constituents were present, as shown by the June 2000 sampling. Based on these analytical results, AEC recommended discontinuing future analysis for these oxygenated compounds and lead scavengers in AEC's Quarterly Groundwater Sampling Report issued on August 11, 2000. Additional analyses for these compounds will not be performed within the scope of this workplan unless required by ACHCSA prior to commencement of drilling and sampling operations.

• ENVIRONMENTAL CONCEPTS WITH DESIGN IN MIND •

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

6) The presence or absence of horizontal and vertical conduits with could act as preferential pathways for the dissolved plume needs to be evaluated.

Response: Evaluation of preferential pathways is incorporated within the scope of this workplan.

7) Lastly, "Phase 2 Subsurface Investigation Report" dated February 14, 1997 by All Environmental, Inc., tabulated Polynuclear Aromatic Hydrocarbons (PNA's) concentrations in soil sampled January 1997, for all six borings in Table 1, on page 3. These concentrations for PNA's in soil were as high as 41 mg/kg. However, the "Chain of Custody Record" showed that PNA analyses were only requested for BH2,L3-15'; BH3,L3-15', and BH2W. These concentrations for PNA's were all nondetectable. Hence the PNA concentrations in the report differed from those reported by the laboratory. Explain the discrepancy.

Response: Upon careful review of the All Environmental, Inc. report dated February 14, 1997, it appears the positive PNA data was tabulated in error. Only the three samples listed were apparently analyzed for PNA's and all were below detection limits. AEC apologizes for this oversight.

1.3 Scope of Work

The scope of services described in this workplan are summarized below for clarification purposes. Detailed investigative methods are presented in section 4.0 of this report:

1. Procure City of Oakland Encroachment Permits for the drilling of exploratory soil borings and installation of groundwater monitoring wells within the public easement;
2. Locate underground utilities using client records and Underground Service Alert (USA);
3. Using a hydraulically driven geoprobe soil sampling device, advance three exploratory soil borings in the area downgradient from the former UST location;
4. Using a limited access hollow-stem auger unit, advance two additional soil borings and convert the borings to 2-inch diameter groundwater monitoring wells;
5. Sample all soil borings at intervals of 5-feet, and at the capillary fringe, and have selected soil samples analyzed for TPH-gasoline, BTXE, and MTBE.
6. Develop and sample each of the groundwater monitoring wells and submit the collected samples to a California-certified analytical laboratory for TPH-gasoline, BTXE, and MTBE;
7. Conduct a visual survey of the site and nearby areas for potential surface conduits and combine the surface data with logged subsurface soil profile data in order to evaluate the potential presence of preferential vertical and horizontal pathways for migration of dissolved plume components;

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

8. Prepare a report detailing the findings of this assessment and providing conclusions and recommendations based on this third phase of environmental study combined with data obtained from previous studies and cumulative groundwater monitoring program.

1.4 Schedule

Advanced Environmental Concepts, Inc. anticipates beginning the services described in this workplan within two weeks upon approval by the ACHCA, City of Alameda, and authorization to proceed from Mr. Warren Dodson. Drilling will commence only after applicable permits have been obtained from the Zone 7 Water Agency and the City of Oakland. The installation of the monitoring wells should be completed within two days of mobilization to the site.

2.0 BACKGROUND

Historic records indicate that a Gulf station had been located at the site since at least 1950 until it was demolished. An existing Shell Service Station is currently located adjacent to and south of the subject site. The adjoining Shell Station has been a retail fueling and auto service station since at least 1952. Three 10,000-gallon underground storage tanks and two fueling islands were operated at the former Gulf station located at the subject property from approximately 1950 until the demolition of the facility. Gulf's underground tank emplacement was in the northern area of the property, now developed with the current site building. The tanks, dispensers, and product piping are thought to have been excavated and removed at some unidentified time prior to construction of the currently existing building. No documentation of the removal was available to verify that the tanks were actually excavated and removed before the existing building was constructed. In order to evaluate whether or not the tanks remained in place beneath the existing structure, a geophysical magnetometer survey was conducted by Mittlehauser Corporation on February 14, 1991. The report of findings described a large magnetic anomaly located in the northwestern portion of the former Gulf station. The anomaly signature was not characteristic of USTs and was interpreted to represent widely-spaced reinforcement shoring placed for sidewall support during the UST removals. A smaller anomaly depicted by a signature typical of metal underground tanks did identify the presence of a 350 gallon waste oil UST in the area west of the former auto service bays. A small waste sump was identified visually at the same time.

Mittlehauser Corporation vacuumed the remaining liquid waste from the UST and sump, steam cleaned the sump, and disposed of the waste liquid and cleaning rinseate in March of 1991. The sump was excavated and removed following steam cleaning operations. Soil stained with what appeared to be oily waste residue was observed around the former sump area. Soil samples were collected and analyzed for total oil and grease, diesel-range petroleum hydrocarbons, and kerosene-range petroleum hydrocarbons. Laboratory results indicated a concentration of 2,600 mg/kg total oil and grease but no detectable concentrations of either diesel or kerosene. Contaminated soil was adequately excavated and removed from the sump area, as demonstrated by confirmation sampling.

The 350 gallon waste oil UST cleaned by Mittlehauser in 1991 was finally excavated and removed by All Environmental, Inc (AEI) on October 3, 1996. Visual staining was observed within the sidewalls and floor of the excavation during the tank removal operations. As directed by Alameda County officials, AEI over excavated the visually impacted soil and then collected confirmation soil samples to ensure that adequate soil removal had been performed. Laboratory analyses of the confirmation samples indicated no detectable concentrations of petroleum compounds remained in the former waste oil emplacement.

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

Six exploratory soil borings were advanced in the area around Gulf's former gasoline tank emplacement and fueling island locations by AEI on January 8, 1997. Groundwater was encountered at approximately 16 feet below grade level (BGL). Soil and groundwater samples collected and analyzed from three of the soil borings (BH-4, BH-5, and BH-6) exhibited significant gasoline-range petroleum hydrocarbons beneath the site. Results of the soil analyses are listed in **Table 1;** groundwater results are listed in **Table 2**. Based on this phase of soil and groundwater analytical data, ACHCSA required additional subsurface investigation to further evaluate underlying soil and groundwater conditions.

Table 1
Exploratory Soil Borings - Phase 1
Analytical Results of Soil Samples
January, 1997
(ppm)

Sample ID	TPH-d	TPH-g	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE
BH-1-15'	ND	ND	ND	ND	ND	ND	ND
BH-2-15'	ND	ND	ND	ND	ND	ND	ND
BH-3-15'	ND	ND	ND	ND	ND	ND	ND
BH-4-15'	370	1100	ND	ND	14	4.4	ND
BH-5-15'	1.9	2.1	0.009	0.006	0.016	ND	ND
BH-6-15'	140	190	0.25	0.5	3.6	0.84	ND
Detection Limits	50	1.0	0.005	0.005	0.005	0.005	0.005

ND: Non-detected at indicated level of detection.

Total lead concentrations in soil ranged from 4.6 milligrams per kilogram (mg/kg) to 23 mg/kg, well below the recommended action level of 50 mg/kg. MTBE was below detectable concentrations for all samples analyzed. Analysis for total oil and grease was performed on samples from borings BH-2 and BH-3 and resulted in detectable concentrations less than 50 mg/kg. Poly nuclear aromatics (PNA) analyses did not exhibit detectable concentrations within soil or groundwater samples.

The groundwater samples were analyzed in accordance with California Department of Health Services (CA DHS) method for total petroleum hydrocarbons as gasoline and diesel (TPH-g,d) and EPA Method 8020 for volatile aromatics (BTXE) and methyl tertiary butyl ether (MTBE). Groundwater samples were also analyzed for total lead, oil and grease, and PNAs. Results of the laboratory analyses are summarized below. Units are reported in micrograms per Liter (μg/L), equivalent to parts per billion (ppb). Results of these analyses are listed in **Table 2.**

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

Table 2
Exploratory Soil Borings - Phase 1
Analytical Results of Groundwater Samples
January, 1997
(ppb)

Sample ID	TPH-d	TPH-g	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE
BH1W	490	330	2.0	0.72	1.3	ND	ND
BH2W	320	ND	ND	ND	ND	ND	ND
BH4W	NA	6600	58	13	2740	110	ND
BH6W	450	13,000	870	65	570	130	320
Detection Limits	10	1.0	0.005	0.005	0.005	0.005	0.005

ND: Non-detected at indicated level of detection.
NA: Not analyzed

Soluble lead concentrations were below detection limits in all samples analyzed. MTBE ranged from below detectable concentrations to 320 ug/L in BH6W. Total oil and grease analysis performed on BH2W resulted in concentrations below 5 mg/L and PNA analysis results were below detectable concentrations. ACHCSA reviewed the results of this first phase of assessment and required additional borings and groundwater monitoring wells to be installed in order to further delineate the identified gasoline and diesel plume(s).

Three Geoprobe soil borings (BH-7, BH-8, and BH-9), and four groundwater monitoring wells (MW-1, MW-2, MW-3, and MW-4) were drilled proximal to the western dispenser islands, and south, west, and north of the former Gulf tank emplacement on August 7, 1997 under supervision of Advanced Environmental Concepts (AEC). The groundwater monitoring wells and Geoprobe borings were positioned to assess the vertical and lateral migration of gasoline and diesel-range petroleum hydrocarbons in the subsurface and to evaluate groundwater quality.

Soil analyses were performed by Associated Laboratories, Inc. to determine the presence and concentrations of hydrocarbons and MTBE at the subject site by EPA methods 8015M and 8020. Analytical results for soil samples are presented in **Table 3**. Units are in milligrams per kilogram (mg/kg) which are equivalent to parts per million (ppm).

Table 3
Exploratory Soil Borings - Phase 2
Analytical Results - Soil Borings
August 7, 1997
(ppm)

Sample ID	TPH-d	TPH-g	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE
BH-7-12'	<10	<5	<0.005	<0.005	<0.015	<0.005	<0.05
BH-7-16'	<10	<5	<0.005	<0.005	<0.015	<0.005	<0.05

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

Sample ID	TPH-d	TPH-g	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE
BH-8-8'	<10	<5	<0.005	<0.005	<0.015	<0.005	<0.05
BH-8-12'	<10	168	0.02	<0.005	5.1	0.45	<0.05
BH-8-16'	<10	21	0.027	0.07	0.75	<0.005	<0.05
BH-9-8'	<10	<5	<0.005	0.032	0.28	0.029	<0.05
BH-9-12'	<10	<5	<0.005	0.012	<0.015	<0.005	<0.05
BH-9-16'	<10	<5	<0.005	<0.005	<0.015	<0.005	<0.05
MW-1-10'	<10	<50	<0.005	<0.005	<0.015	<0.005	<0.05
MW-1-17'	<10	<5	<0.005	0.031	<0.015	<0.005	<0.05
MW-2-10'	<10	<5	<0.005	<0.005	<0.015	<0.005	<0.05
MW-2-17'	<10	16	0.035	0.037	0.15	0.018	<0.05
MW-3-10'	<10	<5	<0.005	<0.005	<0.015	<0.005	<0.05
MW-3-15'	<10	<5	0.027	<0.005	<0.015	<0.005	<0.05
MW-4-10'	<10	<5	<0.005	<0.005	<0.015	<0.005	<0.05
MW-4-17'	<10	<5	<0.005	<0.005	<0.015	<0.005	<0.05
Detection Limits	10	5	0.005	0.005	0.015	0.005	0.05

ND: Non Detected at indicated limit of detection

Water analyses were performed by Associated Laboratories, Inc. to determine the presence and concentrations of hydrocarbons at the subject site by EPA methods and 8015M and 8020. Analytical results for groundwater samples are presented in **Table 4**. Units are in micrograms per Liter (μg/L) which are equivalent to parts per billion (ppb).

Table 4
Exploratory Soil Borings - Phase 2
Analytical Results - Water Samples
August 8, 1997
(ppb)

Sample ID	TPH-d	TPH-g	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE
MW-1	<1,000	1,140	110	16	112	15	43
MW-2	<1,000	5,530	108	36	144	33	925
MW-3	<1,000	8,500	450	30	106	53	1,080

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

Sample ID	TPH-d	TPH-g	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE
MW-4	<1,000	<500	<0.5	<0.5	<1.5	<0.5	<20
Detection Limits	1,000	500	0.5	0.5	01.5	0.5	20

ND: Non Detected at indicated limit of detection

Table 5
Exploratory Soil Borings - Phase 2
Biological Factors - Monitor Wells
August 8, 1997
(ppb)

Sample ID	2580 B	300.0 (Nitrate)	300.0 (Sulfate)	310.1	3500 FED	360.1
MW-1	311	7.1	92	238	0.10	8.2
MW-2	331	0	43	398	0.50	6.3
MW-3	330	0	56	368	ND	7.9
MW-4	307	19.5	87	140	ND	7.8
Detection Limits	n/a	5	5	5	0.1	n/a

2580B: Redox Potential @ Temp
300.0: Nitrate As NO3 by Ion Chromatograph
310.1 Alkalinity
3500FED: Ferrous Iron
360.1: Dissolved Oxygen, Membrane Electrode

The following tables summarize the cumulative analytical results for **AEC**'s ongoing groundwater sampling program. Units are presented in micrograms per liter (µg/L) which are equivalent to parts per billion (ppb).

Table 6
Quarterly Groundwater Monitoring Program
Analytical Results - Monitoring Wells
(ppb)

Sample ID	Date	TPH-g	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE
MW-1	08/8/97	1,140	110	16	112	15	NA
	12/3/97	ND	ND	ND	31	ND	NA
	03/16/98	370	8.9	ND	2.2	ND	18
	07/9/98	6,400	1,300	23	58	3.7	97

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

Sample ID	Date	TPH-g	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE
	10/19/98	2,500	360	44	150	1.3	ND
	01/19/99	2,700	1,200	28	78	140	130
MW-1	6/26/00	27,000	5,200	500	3,100	320	1,300
MW-2	08/08/97	5,350	108	36	144	33	NA
	12/3/97	1,600	73	ND	ND	ND	NA
	3/16/98	3,400	830	100	240	210	870
	07/09/98	3,100	25	2.2	0.9	ND	1,900
	10/19/98	4,300	ND	1.2	1	ND	4,200
	01/19/99	2,900	160	8.9	7.4	6.9	2,100
MW-2	06/26/00	2,700	200	17	16	30	680
MW-3	08/08/97	8,500	450	30	106	53	NA
	12/03/97	5,200	180	6	9.3	5	NA
	03/16/98	1,000	6.0	ND	ND	ND	810
	07/09/98	6,400	490	57	78	23	220
	10/19/98	2,100	ND	ND	ND	ND	ND
	01/19/99	4,400	450	65	42	26	1,300
MW-3	06/26/00	1,700	110	13	13	34	96
MW-4	08/08/97	ND	ND	ND	ND	ND	NA
	12/03/97	ND	ND	ND	ND	ND	NA
	03/16/98	ND	ND	ND	ND	ND	ND
	07/09/98	ND	ND	ND	ND	ND	ND
	10/19/98	ND	ND	ND	ND	ND	ND
	01/19/99	ND	ND	ND	ND	ND	ND
MW-4	06/26/00	<50.0	<0.5	<0.5	<0.5	<0.5	<0.5
Detection Limits		50	0.5	0.5	0.5	0.5	0.5

ND: Not detected at the indicated level of detection
TPH-g: Total Petroleum Hydrocarbons as gasoline

4400 ASHE ROAD #206 • BAKERSFIELD, CA 93313 661/831-1646 • FAX 661/831-1771

In accordance with directives issued by ACHCS in a letter dated May 16, 2000, groundwater samples collected during June 2000 were also analyzed for the presence of ether oxygenates, specifically: Tertiary Amyl Methyl Ether (TAME), Diisopropyl Ether (DIPS), Ethyl Tertiary Butyl Ether (ETBE), Tertiary Butyl Alcohol (TBA) and the following lead scavengers: Ethylene Dibromide (EDB), Ethylene Dichloride (EDC), and 1,2-Dichloroethane (1,2-DCA). The following Table 7 presents the results of these additional analyses.

Table 7
Analytical Results
Ether Oxygenates & Lead Scavengers

Sample ID:	Date:	TAME	DIPE	ETBE	TBA	EDB	EDC	1,2-DCA
MW-1	06/26/00	<50.0	<50.0	<50.0	<1,000	<5.0	<5.0	<5.0
MW-2	06/26/00	<5.0	<5.0	<5.0	<100.0	<0.5	<0.5	<0.5
MW-3	06/26/00	<5.0	<5.0	<5.0	<100.0	<0.5	<0.5	<0.5
MW-4	06/26/00	<5.0	<5.0	<5.0	<100.0	<0.5	<0.5	<0.5
Units:		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l

The current state maximum contaminant levels (MCLs) for drinking water adopted by the California Department of Health Services, Title 22 are as follows:

Benzene..... 1 µg/L
Toluene..... 2000 µg/L
Ethylbenzene..... 680 µg/L
Total Xylenes..... 1750 µg/L
MTBE ..... 13 µg/L

Based on review of previous environmental studies combined with the laboratory analyses obtained during AEC's ongoing groundwater monitoring program and the calculated hydraulic gradient, Alameda County is requiring an additional phase of exploratory borings and two additional groundwater monitoring wells. This third phase of subsurface exploration is intended to delineate the downgradient extent of migration of the contaminant plume(s) and provide data pertaining to the stability of the plume(s) and concentrations of volatile organic compounds (specifically benzene) and MTBE. This work plan outlines the methods and procedures to be used during the course of this additional assessment.

3.0 SITE CHARACTERISTICS

The Dodson property is located east of the San Francisco Bay in the foothills of Oakland. The foothills of Oakland are composed of alluvial fans and non-marine terraces with elevations ranging from 150 to 500-feet above mean sea level. The area slopes regionally to the southwest with gradients ranging from 25 to 200-feet per mile.

Recent alluvial deposits comprise near surface sediments in the area beneath the subject property. These sediments consist of unconsolidated gravels, sands, silts, and clays. Generally, the coarser grained sediments are deposited near the inland hills as alluvial fans, whereas deposition of progressively finer grained

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sediments occurs toward the San Francisco Bay and marshlands. The upper fan areas are interpreted as intake areas where recharge of groundwater occurs. Hydraulic continuity may exist between alluvial sediments of the fan areas and certain water-bearing sediments of the central lowlands. Replenishment of groundwater occurs in the intake area by infiltration from major streams and from seasonal precipitation.

The current groundwater flow direction is calculated at North 178° West, and the gradient is 0.50'/100'. These values were calculated based on the latest depth measurements made during the June 2000 quarterly monitoring event. Although there have been shifts in the gradient over time, the general trend has always been toward the north and northwest.

4.0 WORK PLAN

AEC proposes to drill and sample a total of five soil borings at the subject site. Two of these borings will be completed as additional groundwater monitoring wells in order to provide water quality information in the downgradient direction. The installation of new wells will require an encroachment permit from the City of Oakland due to the proximity of the city easement. The borings will be drilled to approximately 20-feet bgl. Soil sampling will occur at intervals of 5-feet, and at the capillary fringe. The monitoring wells will be positioned to evaluate the residual gasoline concentrations in the capillary fringe, and identify the stability of the plume migration. The monitoring wells will be designated MW-5 and MW-6 and advanced on the north side of Howe Street. Location of the proposed borings and groundwater monitoring wells are plotted on **Figure 2**. These locations may be 'stepped out' based on actual field observations. Well construction details are presented on **Figure 3**. AEC anticipates the perforated casing interval will be set from ten to twenty feet BGL in order to accommodate groundwater level fluctuations.

4.1 Drilling Methods

The borings to be completed as monitoring wells will be advanced using Gregg Drilling's Rhino track-mounted limited access rig, equipped with 8-inch O.D., hollow-stem, continuous-flight augers in accordance with ASTM Method D 1452-80 for soil investigations and sampling by auger borings. The three borings which are not planned for completion as monitoring wells will be advanced using a hydraulically driven probe.

Prior to drilling each boring, the augers and probe stems will be steam cleaned to minimize the potential for downhole or cross-hole contamination affecting a potentially "clean" location. No water or other liquids will be added to any boring. Drill cuttings generated during advancement of hollow-stem auger borings will be enveloped in plastic sheeting or placed drums and stored on-site pending laboratory analytical results. If laboratory analyses indicate that the cuttings are impacted by hydrocarbons or volatile organic compounds, transportation and disposal or treatment will be the responsibility of the Client.

Once groundwater is encountered, two of the borings will be advanced an additional 5 feet into the water-bearing zone and completed as 2-inch diameter groundwater monitoring wells. AEC will obtain groundwater monitoring well permits from Alameda County prior to any boring activity.

5.0 INSTALLATION OF MONITORING WELLS

The monitoring wells will be constructed according to **Figure 3** and installed in the following manner: Approximately 20-feet of 2-inch diameter, flush-threaded, Schedule 40 PVC casing with an end cap, will be

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set in the well through the auger after the final depth has been reached and sampling is complete. The bottom 10-feet of casing will consist of 0.010-inch diameter factory-slotted liner, thus approximately 5-feet of slotted casing will be above the potentiometric surface allowing for seasonal fluctuations in the water table. Number 2/16 kiln-dried Monterey sand will be slowly poured down the annulus while removing five feet of auger at a time. The volume of added sand per foot will be tracked and the filter pack thickness continuously measured during this process in order to ensure bridging does not occur. The filter pack will extend from the bottom of the casing to one foot above the screened interval. Six feet of bentonite chips will be poured and hydrated to form an impermeable seal above the filter pack. A cement slurry will be used to fill the annular space to within one foot of grade level. A traffic-rate metal well cover box will then be cemented in and sloped to minimize water accumulation.

5.1 Well Development/Sampling

The monitoring wells will be developed using a submersible pump after installation. The wells will be pumped until the effluent is clear and free of fine-grained soil particles and then be allowed to stand and regain equilibrium before measuring the static depth to groundwater and collection of samples for laboratory analysis. The water depth sounder will be washed in a solution of phosphate-free Alconox and triple rinsed with distilled water prior to initial use and between each well in order to minimize the potential for cross-site or cross-well contamination.

Groundwater removed during the well development process will be pumped into appropriately labeled DOT approved 55-gallon drums and stored on-site pending the outcome of laboratory analyses. If the analyses identify the presence of significant concentrations of contaminants, the water will be transported to an authorized disposal facility under standard Uniform Hazardous Waste Manifest protocol. The Client is responsible for costs associated with transport and disposal of impacted groundwater.

Groundwater samples will be collected using new Teflon bailers, one dedicated to each well. The water samples will be transferred to clean 40 ml VOA vials having Teflon septa (for gasoline constituents and volatile organic compounds), and 1 Liter amber jars (for oil & grease and/or diesel constituents). Care will be exercised to ensure that no air pockets are present in any of the vials containing samples to be analyzed for volatile or semi-volatile organic compounds.

The VOA vials and sample bottles will be labeled, placed in a protective covering, stored on blue ice, and recorded on a Chain-Of-Custody Record. Samples will be analyzed for TPH-g,d BTEX, and MTBE according to EPA methods 8015 modified and 8021B, respectively. Positive MTBE results will be confirmed using EPA Method 8260B.

6.0 EVALUATION OF CONDUITS

In order to evaluate the potential presence of conduits which may act as preferential pathways for contaminant migration, AEC proposes to perform a visual survey of the subject property and surrounding areas and review of public agency records. The visual survey will identify the presence of onsite and nearby wells, drains, sewer systems, pits, sumps, streams, rivers, and any other readily identifiable features judged to present a significant potential to increase the vertical migration of contaminants within the subsurface. Preferential pathways in the horizontal plane will be evaluated based on 3-dimensional interpretation of soil lithologies and textures logged by the AEC geologist during the drilling and sampling operations combined with previous subsurface investigation data and information pertaining to nearby features such as underground pipelines and utility corridors, building foundations, wall footings, etc.

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7.0 EVALUATION OF BENZENE EXPOSURE PATHWAYS

In order to evaluate the potential pathways for groundwater-vapor intrusion from groundwater to buildings and the groundwater volatilization to outdoor air exposure, AEC will perform a review of current and historical data and evaluate current site conditions and possible conduits to assess the pathway for pathway. If these pathways are found to be limited, further evaluation of these potential exposure pathways will not be warranted.

8.0 REPORT OF FINDINGS

Following the completion of the field work and laboratory analyses of collected samples, AEC will prepare and present a final report documenting the methods and procedures used in this project. The report will present field data and laboratory analytical data and resultant interpretation and will also include AEC's conclusions and recommendations for this facility.

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9.0 REMARKS/SIGNATURES

This workplan represents **Advanced Environmental Concepts, Inc.'s** professional opinions. These opinions are based on currently available data and were arrived at in accordance with accepted hydrogeologic and environmental engineering practices. No other warranty, expressed or implied, is given.

This workplan was prepared by:

Advanced Environmental Concepts, Inc.

Jonathan L. Buck
Project Hydrogeologist
California Environmental Assessor II #20017

This workplan has been prepared under my direct supervision:

Ailsa S. Le May
Registered Professional Geologist #6717

DOC16II

- SITE AREA -

Prestige Products Corporation

240 West MacArthur Blvd.

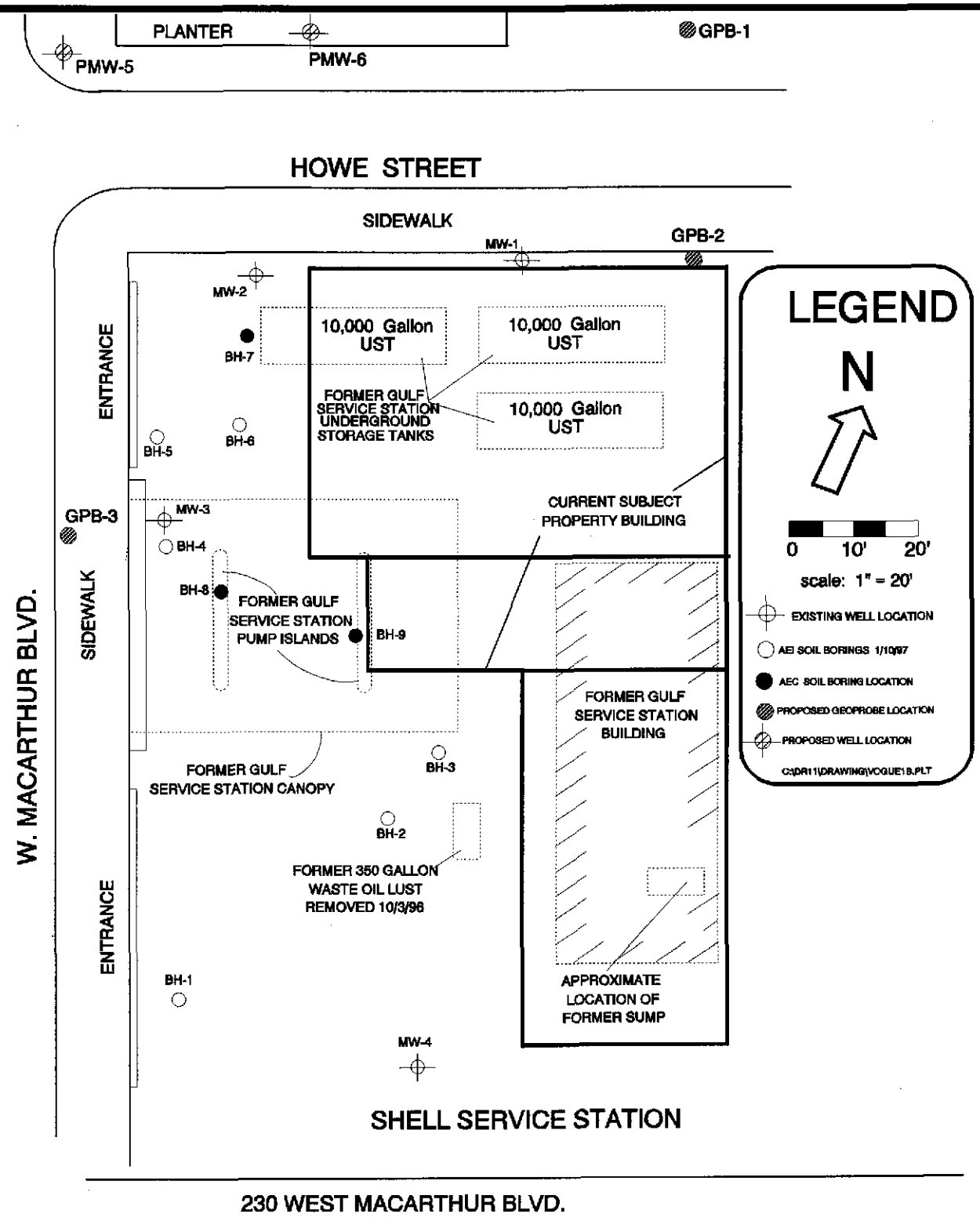
County of Alameda - Oakland, California

FIGURE

1

• ADVANCED ENVIRONMENTAL CONCEPTS INC •

ADVANCED ENVIRONMENTAL CONCEPTS
P.O. BOX 40672 BAKERSFIELD, CA 93384



ADVANCED ENVIRONMENTAL CONCEPTS INC

ADVANCED ENVIRONMENTAL CONCEPTS
P.O. BOX 40672 BAKERSFIELD, CA 93384

- Proposed Boring Locations -

VOGUE TYRES

Prestige Products Corporation

240 West MacArthur Blvd.

County of Alameda - Oakland, California

FIGURE

2

Health & Safety Plan

for
Former Vogue Tyres Facility
Warren Dodson Property
240 West MacArthur Boulevard
County of Alameda • Oakland, California

Introduction:

A Site Safety Plan (SSP) has been designed to address safety provisions needed during the site soil assessment/remediation. Its purpose is to provide established procedures to protect all on-site personnel from direct skin contact, inhalation, or ingestion of potentially hazardous materials that may be encountered at the site. The SSP establishes personnel responsibilities, personal protective equipment standards, decontamination procedures and emergency action plans.

Advanced Environmental Concepts, Inc. seeks to enter the property described above for the purpose of conducting a site assessment. The work will consist of exploratory soil coring using both hollow-stem auger and hydraulic probe equipment, soil and groundwater sampling, and groundwater monitor well installation for the purpose of assessing hydrocarbon-impacted soil and groundwater.

Undisturbed soil samples will be collected to assess the extent of hydrocarbon impacted soil at the subject site. Each sample to be chemically analyzed will be collected in a brass sleeve, capped with lined plastic lids, sealed with tape, and immediately stored in a cooler with frozen Blue Ice immediately. All Chain-of-Custody protocol will be followed.

Drilling equipment will be brought to the site and operated by:

Gregg Drilling
1014 E. South Street
Anaheim, California 92805

Contractor's License # C57-574490

This SSP describes the means for protecting all on-site personnel from exposure to contamination and/or personal injury while conducting on-site activities. As described below, AEC will strive to meet all requirements promulgated by the California Department of Health Services.

Responsibilities of Key Personnel:

All personnel on-site will have assigned responsibilities. Mr. Jonathan L. Buck will serve as Project Manager and on-site geologist. He will also serve as Site Safety Officer (SSO). As SSO, Mr. Buck will ensure that on-site personnel have received a copy of the SSP. Personnel will be required to document their full understanding of the SSP before admission to the site. Compliance with the SSP will be monitored at all times by the SSO. Appropriate personal protective equipment, listed below, will be available and utilized by all on-site personnel. Prior to beginning work, the SSO will conduct a "tailgate safety" training session to assure that all personnel are aware of safe work practices and potential exposure risks. Mr. Buck will also be responsible

for keeping field notes, collecting and securing samples, and assuring sample integrity by adherence to Chain-of-Custody protocol.

All on-site employees will take reasonable precautions to avoid unforeseen hazards. After documenting their understanding of the SSP, each on-site employee will be responsible for strict adherence to all points contained herein. Any deviation observed will be reported to the SSO and corrected. On-site employees are held responsible for performing only those tasks for which they are qualified. Provisions of this SSP are mandatory and personnel associated with on-site activities will adhere strictly hereto.

Job Hazard Analyses:

Hazards likely to be encountered on-site include those commonly encountered when operating any mechanical equipment, such as the danger of falling objects or moving machinery. Simple precautions will reduce or eliminate risks associated with operating such equipment.

A drilling contractor has been employed to deliver and operate all drilling equipment. Qualified personnel only will have any contact with this equipment. All on-site personnel, including the excavation contractor and his employees, are required to wear hard hats when in close proximity to excavating equipment. Latex sampling gloves will be worn by persons collecting or handling samples to prevent exposure to contaminants. Gloves will be changed between samples and used ones discarded, to avoid cross-contamination. Proper respiratory equipment will be worn if vapor contamination levels on-site exceed action levels as determined using a Photoionization Detector (PID). Action levels requiring respiratory apparatus will be 10-ppm above background level in the breathing zone. Furthermore, no on-site smoking, open flames or sparks will be permitted in order to prevent accidental ignition.

Risk Assessment Summary:

Exposure to chemicals anticipated on-site include gasoline, diesel, and benzene, toluene, and xylene (BTX). These chemicals represent a hazard because they are moderately to extremely toxic and most are highly flammable.

Threshold Limit Values (TLV's), Short Term Exposure Limits (STEL's) and Toxicity levels (LD50, oral-rat), all in mg/kg (ppm), are listed below:

Compound	TLV	STEL	Toxicity
Gasoline	200	300	----
Diesel	50	75	----
Benzene	10	25	4894
Toluene	100	150	5000
Xylenes	100	150	4300

Benzene is considered an extreme cancer hazard.

Exposure Monitoring Plan:

A PID will be used to monitor vapor concentrations around the site. Should concentrations exceed TLV's, protective measures will be taken. Passive dosimeter badges will be placed in downwind locations if PID readings indicate high levels of volatile organics in the breathing space.

Personal Protective Equipment:

Personnel on-site will have access to respirators with organic vapor cartridges. Replacement cartridges will be available on-site as needed. When handling samples, the on-site Geologist will wear latex gloves. Hard hats will be worn by all personnel on-site when in proximity of drilling equipment.

Work Zones and Security Measures:

Access to the site will be restricted to authorized personnel. A set of cones, placards, or wide yellow tape surrounding the site will define the perimeter, if necessary. The Project Manager will be responsible for site security.

Decontamination Measures:

Avoidance of contamination whenever possible is the best method for protection. Common sense dictates that on-site personnel avoid sitting, leaning or placing equipment on potentially contaminated soil. A ll personnel will be advised to wash their hands, neck and face with soap and water before taking a break or leaving the site. Respirators will be washed with soap and water following each day's use.

Drilling and sampling equipment used will be decontaminated by steam-cleaning. Sampling equipment will be decontaminated before each sample is collected.

General Safe Work Practices:

On-site personnel will be briefed each day in "tailgate" meetings as to the day's goals and equipment to be used. Anticipated contaminants and emergency procedures will be reviewed. Appropriate personal protective equipment will be put on and verified correct by the SSO, including respirator fit.

Drilling and sampling equipment will be steam-cleaned before arriving on-site. Split-spoon sampling equipment will be cleaned before each use. Augers will be steam-cleaned between borings.

The on-site engineer will oversee operations and log borings. The Sample Coordinator will assure that proper protocol is used at all times in collecting and handling samples.

Training Requirements:

The SSO will conduct a "tailgate" training session before work begins which will include contaminant properties, warning signs, health hazard data, risk from exposure and emergency first aid. All chemicals are to be covered and the SSO will assure that everyone fully understands site hazards.

Medical Surveillance Program:

According to CFR 29, 1910.120, Paragraph (f), employees who wear respirators thirty (30) days or more during one (1) year or who have been exposed to hazardous substances or health hazards above established permissible exposure limits are required to be monitored medically. All site personnel are required to have had a complete physical (including blood chemistry) within the past year.

Record Keeping:

Documentation will be kept on personnel exposed to contaminant hazards on the job site according to OSHA regulations. These will include documentation that employees have received training on the SSP, respiratory protection, MSDS forms and all emergency procedures. These will be reviewed during the pre-work training meeting.

Exposure records on each job will be kept for thirty (30) years to meet requirements. Included will be names and social security numbers of employees, medical evaluations, on-the-job logs from entry to exit, First Aid administered, visits on-site by outside persons and personal air-monitoring records.

Contingency Plans:

In the event of an accident, injury, or other emergency, the Project Director, Senior Project Manager, or other person, will notify the appropriate government agencies or individuals as follows:

1. Police, Fire, or Ambulance Emergency
   9 - 1 - 1

2. Alameda County Health Care Services Environmental Protection Division
   1131 Harbor Bay Parkway, Suite 250
   Alameda, California 94502-6577
   (510) 567-6700

3. Emergency Hospital:
   Kaiser Permanente Hospital
   280 W. MacArthur Boulevard
   Oakland, California

I have read the Health and Safety Plan and understand the contents herein:

NAME:	COMPANY