enviros®

January 2, 1996

Mr. R. Jeff Granberry
Shell Oil Products Company
P.O. Box 4023
Concord, California 94524

Re: Site Investigation Work Plan
Former Shell Service Station
2703 Martin Luther King Way
Oakland, California
WIC 204-5508-1701

Dear Mr. Granberry:

This work plan has been prepared by Enviros, Inc. (Enviros) on behalf of Shell Oil Products Company in response to the Alameda County Health Care Services Agency (ACHCSA) correspondence dated October 6, 1995 requesting a site investigation to evaluate soil and groundwater conditions. The scope of work presented in this document will comply with Regional Water Quality Control Board (RWQCB) and ACHCSA guidelines.

SITE DESCRIPTION

The subject property is located on the northwest corner of the intersection of Martin Luther King Jr. Way and 27th Street. A Shell service station operated on the property from approximately 1959 to 1979. Shell's underground storage tanks (USTs) were removed after termination of Shell's operation on the site.

In 1979, Acme West Ambulance Company (Acme) purchased the site and installed a 2000 gallon UST for gasoline storage. Acme sold the property to Auto-Tech West (ATW) in 1986. ATW reportedly never used the UST.

The 2000 gallon UST was removed on October 11, 1994 by KTW & Associates. Two soil samples were collected beneath the tank. Chemical analysis of the soil samples indicated the presence of Total Petroleum Hydrocarbons calculated as Gasoline (TPH-G) at concentrations ranging from 870 parts per million (ppm) to 18,000 ppm. Benzene concentrations in these samples ranged from 2.9 ppm to 100 ppm.

A site assessment was performed by ACC Environmental Consultants on May 23, 1995. This included drilling nine soil borings in the vicinity of the former USTs and product dispenser islands with a pneumatic sampling tool and collecting soil and groundwater samples for chemical analysis.

Soils encountered during the investigation consisted of clayey sand to sandy clay. Groundwater was encountered in seven of the nine borings at depths ranging from nine to fourteen feet below grade (fbg).

Concentrations of TPH-G in soil samples ranged from none detected (ND) to 830 ppm. Benzene concentrations ranged from ND to 1.8 ppm. The distribution of TPH-G in soil is shown on Plate 3. Separate-phase hydrocarbons (SPH) were identified in water samples collected from four of the soil borings. TPH-G concentrations in water samples submitted for chemical analysis ranged from ND to 89,000 parts per billion (ppb). Benzene concentrations ranged from ND to 21,000 ppb. The distribution of TPH-G and benzene in groundwater is shown on Plate 4.

Technical Rationale for Proposed Scope of Work

- Petroleum hydrocarbons have been identified in soil and groundwater in the vicinity of the former USTs and the former dispenser islands located along 27th Avenue. ok
- Soil and groundwater sampling indicate that the area in the vicinity of the former dispenser island located along Martin Luther King Jr. Way has not been impacted by petroleum hydrocarbons. ok

The objectives of the activities proposed in this work plan are to delineate the extent of petroleum hydrocarbons in soil and groundwater onsite, and to address interim remediation of separate-phase hydrocarbons..

Work Tasks

Task 1 Permits

Appropriate permits for drilling will be obtained from the ACHCSA

Task 2 Health and Safety Plan

A site-specific Health and Safety Plan will be prepared for field work.

Task 3 Utility Clearance

Proposed drilling locations will be marked and their locations cleared through Underground Services Alert (USA) prior to drilling.

Task 4 Site Investigation

Exploratory borings will be drilled in the approximate locations shown on Plate 5. Borings will be drilled to first encountered groundwater, anticipated to be located at an approximate depth of nine to fourteen fbg. A hydropunch tool will be used to collect a groundwater sample from each boring. These samples will be analyzed for petroleum hydrocarbons on 24-hour turnaround. If results of these samples are non-detect, the borings will be drilled out to a depth approximately 10 feet below first encountered groundwater and completed as a monitoring wells. However, if results indicate that a boring contains petroleum hydrocarbon contamination, it will be backfilled to grade with neat cement. # ?

Each boring will be drilled a using truck-mounted drill rig. Soil samples will be collected from each boring at five foot intervals and at significant lithologic changes for chemical analysis and lithologic description using a modified California split-spoon sampler.

An Enviros geologist will supervise the drilling and describe encountered soils using the Unified Soil Classification System (USCS). Soil sample intervals will be screened in the field for organic vapor by measuring head-space vapors using an organic vapor meter (OVM). Soil samples selected for chemical analysis will be properly sealed, labeled, and entered onto a chain-of-custody record. Soil samples will be preserved in a cooler with ice for transport to a State of California certified laboratory.

An exploratory boring log will be prepared for each boring. Head-space vapor measurements will be recorded on the log.

Wells will be completed using 2-inch diameter Schedule 40 PVC casing. Well screen interval is proposed to be approximately 5 feet above to 10 feet below first encountered groundwater. The sandpack will be placed 1-foot above the top of the well screen followed by a 1-foot thick bentonite seal. Each well will be secured with a locking cap under a traffic-rated well box. Wellhead elevations will be surveyed to Mean Sea Level by a State of California licensed surveyor. A well completion detail will be prepared for each groundwater monitoring well.

Additionally, two soil vapor extraction wells are proposed in the locations shown on Plate 5. The vapor wells will be constructed of 2-inch diameter PVC casing. SVE wells will be installed using a hollow-stem auger drill rig. Lithology will be logged by an Enviros geologist. Soil samples will be collected at 5-foot intervals and at significant lithological changes. An exploratory boring log will be prepared for each vapor well boring.

A well completion log will be prepared for each vapor well.

Standard drilling procedures for soil borings and wells are presented in Appendix A.

Task 5 Well Development

Borings completed as groundwater monitoring wells will be developed and sampled by a Shell-approved sampling contractor.

Task 6 Chemical Analysis

Soil and groundwater samples will be analyzed for TPH-G according to EPA Method 8015 (modified) and BTEX compounds according to EPA Method 8020.

Task 7 Physical Parameter Analysis

Soil samples collected will be tested for physical parameters to facilitate evaluation of Risk Based Corrective Action. These parameters will include soil permeability, dry bulk density, porosity, water content, and fractional organic carbon content.

Task 7 Report Preparation

Following the receipt of chemical analytical results from the laboratory, Enviros will prepare a written report describing field procedures, laboratory results, and boring logs, and presenting conclusions and recommendations.

The scope of work described in this work plan will be performed under the supervision of a registered professional engineer. ok

Schedule

Enviros is prepared to begin work upon approval of this work plan by the ACHCSA and receipt of appropriate permits.

If you have any questions regarding the scope of work outlined in this work plan, please call.

Enviros, Inc.,

Joe Neely
Project Geologist

Diane M. Lundquist, P.E.
Senior Engineer
C46725

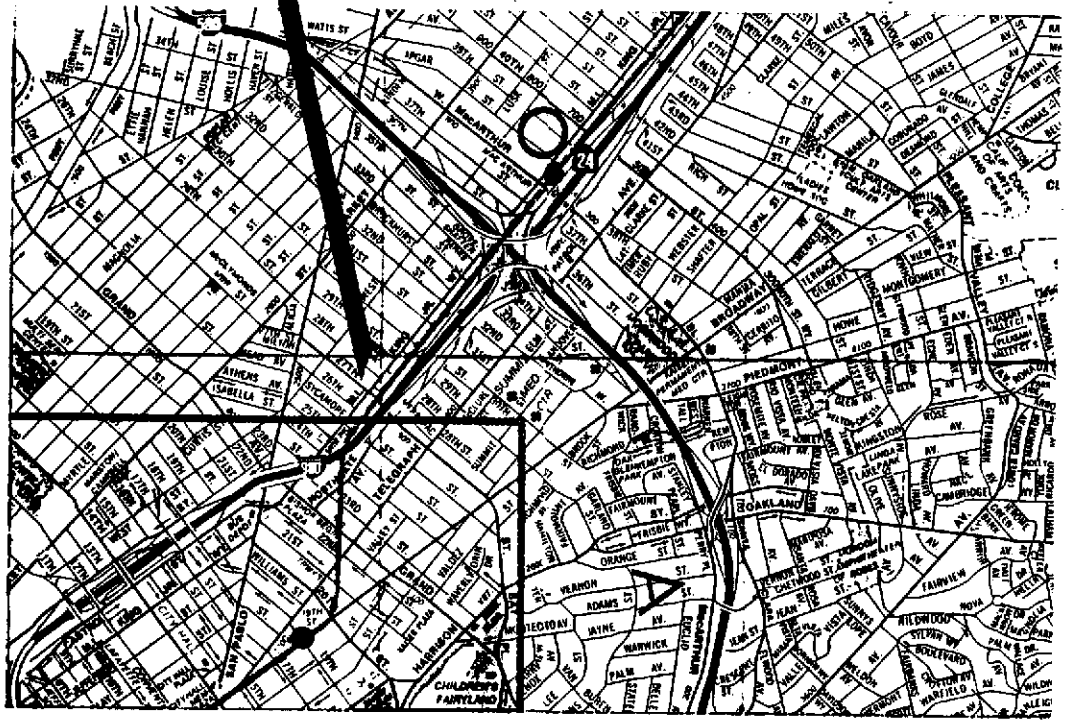
REGISTERED PROFESSIONAL ENGINEER
DIANE M. LUNDQUIST
NO. C46725
CIVIL
STATE OF CALIFORNIA

Attachments

Plate 1.	Vicinity Map
Plate 2.	Site Plan
Plate 3.	Distribution of Petroleum Hydrocarbons in Soil
Plate 4.	Distribution of Petroleum Hydrocarbons in Groundwater
Plate 5.	Proposed Hydropunch/Well Locations
Appendix A	Standard Drilling Procedures

cc: Dale Klettke, ACHCSA
Mr. Rod Kwan, Auto Tech West
Ms. Kim Johansen, Acme Western Ambulance Service

Subject Site



BASE MAP: CALIFORNIA STATE AUTOMOBILE ASSOCIATION

PLATE	VICINITY MAP	enviros®
1	Former Shell Service Station 2703 Martin Luther King Jr. Way Oakland, California	95324
Drawn By: DML	Date: 12-28-95	Approved By: _____ Date: 12-96

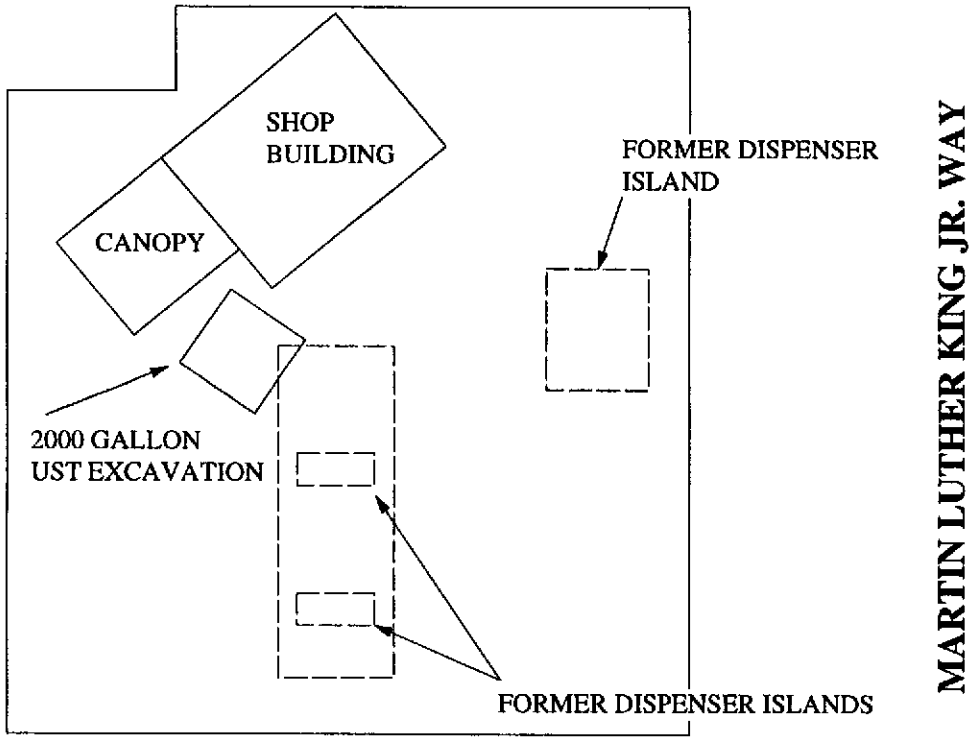
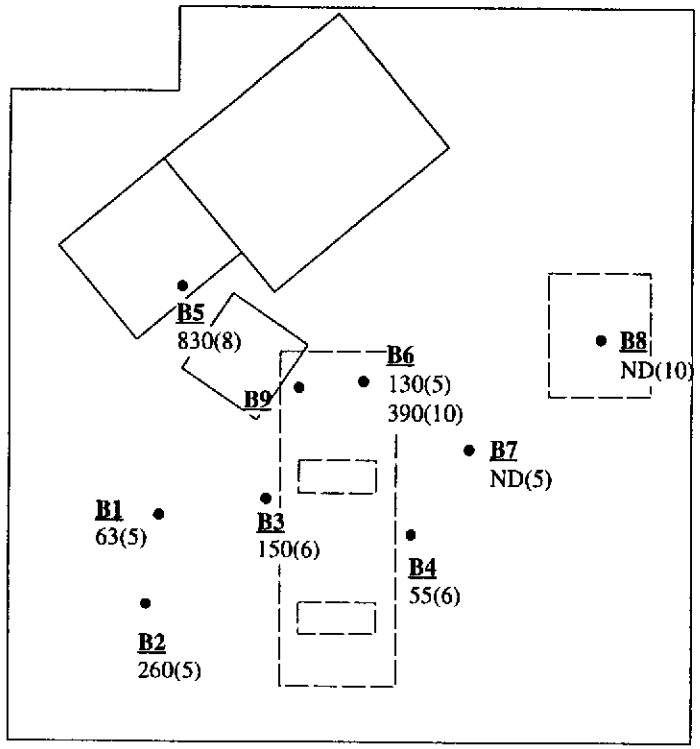


PLATE
2

SITE PLAN
Former Shell Service Station
2703 Martin Luther King Jr. Way
Oakland, California

enviros ®
95324

Drawn By: DML | Date: 12-28-95 | Approved By: _____ | Date: 12-96



27TH AVENUE

MARTIN LUTHER KING JR. WAY

EXPLANATION

- B8 Boring Identification

ND(10) TPH-G Concentration(Depth)

Concentrations in ppm
Depth in feet

N

0 30

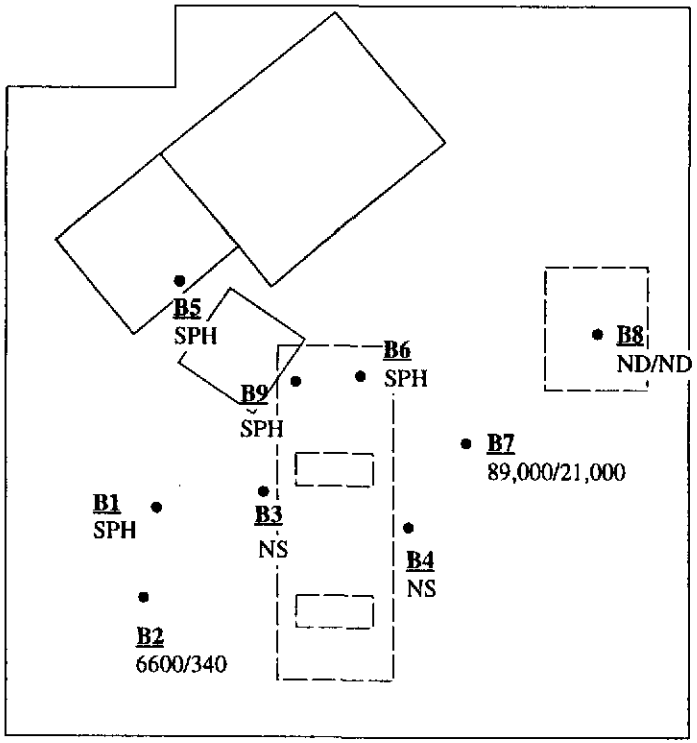
SCALE

PLATE
3

DISTRIBUTION OF PETROLEUM HYDROCARBONS IN SOIL
Former Shell Service Station
2703 Martin Luther King Jr. Way
Oakland, California

enviros ®
95324

Drawn By: DML | Date: 12-28-95 | Approved By: _____ | Date: 1-2-96



27TH AVENUE

MARTIN LUTHER KING JR. WAY

EXPLANATION

- **B8** Boring Identification
- 6600/340 TPH-G/Benzene Concentration
- NS Not Sampled - No water present in boring.

Concentrations in ppb.

N

0 30

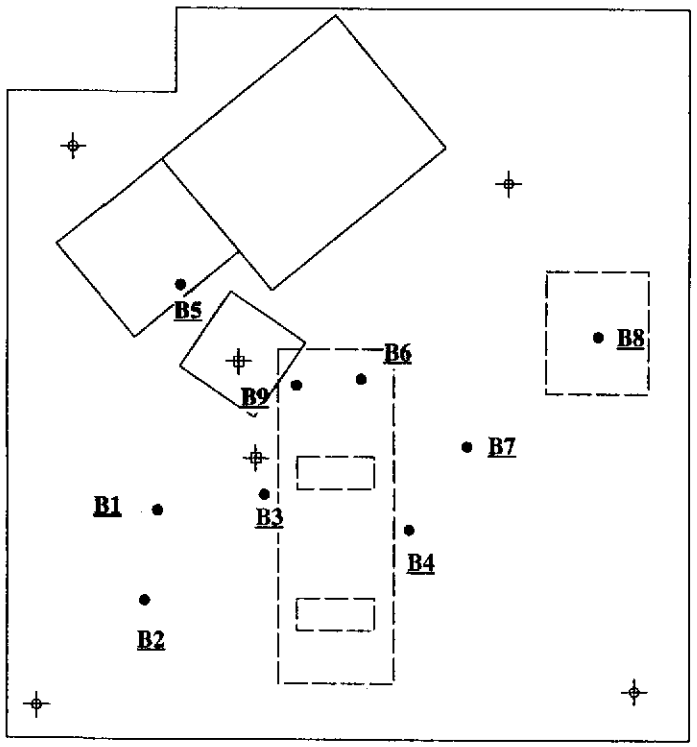
SCALE

PLATE **4**

DISTRIBUTION OF PETROLEUM HYDROCARBONS IN GROUNDWATER
Former Shell Service Station
2703 Martin Luther King Jr. Way
Oakland, California

enviros ®
95324

Drawn By: DML Date: 12-28-95 Approved By: _____ Date: 1-2-96



MARTIN LUTHER KING JR. WAY

27TH AVENUE

EXPLANATION

- B8 Boring Identification (Previous Investigation)
- Proposed Hydropunch Boring/ Monitoring Well
- Proposed Soil Vapor Extraction Well

N

0 30

SCALE

PLATE **5**

PROPOSED HYDROPUNCH BORING/MONITORING WELLS AND SVE WELLS
Former Shell Service Station
2703 Martin Luther King Jr. Way
Oakland, California

enviros ®
95324

Drawn By: DML Date: 12-28-95 Approved By: _____ Date: 12-96

APPENDIX A

FIELD METHODS AND PROCEDURES

EXPLORATION DRILLING

Mobilization

Prior to any drilling activities, Enviros, Inc. (Enviros) will verify that necessary drilling permits have been secured.

Utility locations will be located and drilling will be conducted so as not to disrupt activities at a project site. Enviros will obtain and review available public data on subsurface geology and if warranted, the location of wells within a half-mile of the project site will be identified. Drillers will be notified in advance so that drilling equipment can be inspected prior to performing work.

Drilling

The subsurface investigations are typically performed to assess the lateral and vertical extent of petroleum hydrocarbons present in soils and groundwater. Drilling methods will be selected to optimize field data requirements as well as be compatible with known or suspected subsurface geologic conditions.

Monitoring wells are installed using a truck-mounted hollow-stem auger drill rig or mud-rotary drill rig. Typically, the hollow-stem rig is used for wells up to 100 feet, if subsurface conditions are favorable. Wells greater than 100 feet deep are typically drilled using mud-rotary techniques. When mud rotary drilling is used, an electric log will be performed for additional lithological information. Also during mud rotary drilling, precautions will be taken to prevent mud from circulating contaminants by using a conductor casing to seal off contaminated zones. Samples will be collected for lithologic logging by continuous chip, and where needed by drive sample or core as specified by the supervising geologist.

Geoprobe Drilling Methods

The geoprobe system utilizes a percussion hammer and hydraulically-powered system to drive probes which are approximately 1.75-inches in diameter to the desired depth and retrieve soil and groundwater samples.

Soil Sampling

Shallow soil borings will be drilled using a truck-mounted hollow-stem auger drilling rig, unless site conditions favor a different drilling method. Drilling and sampling methods will be consistent with ASTM Method D-1452-80. The auger size will be a minimum 6-inch nominal outside-diameter (O.D.) No drilling fluids will be used during this drilling method. The augers and other tools used in the bore hole will be steam cleaned before use and between borings to minimize the possibility of cross-contamination between borings.

Soil samples are typically collected at 5-foot intervals as a minimum from ground surface to total depth of boring. Additional soils samples will be collected based on significant lithologic changes and/or potential chemical content. Soil samples from each sampling interval will be lithologically described by an Enviros geologist. Soil colors will be described using the Munsell Color Chart. Rock units will be logged using appropriate lithologic terms, and colors described by the G.S.A. Rock Color Chart.

Head-space analyses will be performed to check for the evidence of volatile organic compounds. Head-space analyses will be performed using an organic vapor analyzer; either an OVA, HNU, or OVM. Organic vapor concentrations will be recorded on the Enviros field log of boring. The selection of soil samples for chemical analysis are typically based on the following criteria:

1) Soil discoloration
2) Soil odors
3) Visual confirmation of chemical in soil
4) Depth with respect to underground tanks (or existing grade)
5) Depth with respect to ground water
6) OVM reading

Soil samples selected for chemical analysis are covered with teflon tape and the ends are capped to prevent volatilization. The samples are labeled and entered on a chain-of-custody form, and placed in a cooler on ice for transport to a State-certified analytical laboratory.

Soil cuttings are stockpiled on-site. Soils are sampled and analyzed for site-specific chemical parameters. Disposition of soils is dependent of chemical analytical results of the samples.

Soil borings not converted to monitoring wells will be backfilled (sealed) to ground surface using either a neat cement or cement-bentonite grout mixture. Backfilling will be tremied by continuously pumping grout from the bottom to the top of the boring where depth exceeds 20' or as required by local permit requirements.

All field and office work, including exploratory boring logs, are prepared under the direction of a registered professional engineer.

Monitoring Well Installation

Monitoring well casing and screen will be constructed of Schedule 40 flush-joint threaded polyvinylchloride (PVC). The well screen will be factory mill-slotted unless additional open area is required (e.g. conversion to an extraction well in a low-yield aquifer). The screen length will be placed adjacent to the aquifer material to a minimum of 2 feet above encountered water. No screen shall be placed in a borehole that potentially created hydraulic interconnection of two or more aquifer units. Screen slot size and well sand pack will be compatible with encountered aquifer materials as confirmed by sieve analysis.

Monitoring wells will be completed below grade (Figure 2) unless special conditions exist that require above-grade completion design. In the event a monitoring well is required in an aquifer unit beneath an existing aquifer, the upper aquifer will be sealed off by installing a steel conductor casing with an annular neat cement or cement-bentonite grout seal. This seal will be continuously tremie pumped from the bottom of the annulus to ground surface.

The monitoring well sand pack will be placed adjacent to the entire screened interval and will extend a recommended minimum distance of 2 feet above the top of the screen. No sand pack will be placed that interconnects two or more aquifer units. A minimum 2 foot bentonite pellet or bentonite slurry seal will be placed above the sand pack. Sand pack, bentonite, and cement seal levels will be confirmed by sounding the annulus with a calibrated weighted tape. The remaining annular space above the bentonite seal will be grouted with a bentonite -cement mixture and will be tremie-pumped from the bottom of the annular space to the ground surface. The bentonite content of the grout will not exceed 5 percent by weight. A field log of boring and a field well completion form will be prepared by Enviros for each well installed.

Decontamination of drilling equipment before drilling and between wells will consist of steam cleaning, and/or Alconox wash.

Well Surveying

Monitoring wells will be surveyed to obtain top of box elevations to the nearest ±0.01 foot. Water level measurements will be recorded to the nearest ±0.01 foot and referenced to Mean Sea Level (MSL). If additional well are required, existing and newly installed wells are surveyed relative to MSL.