2030 Addison Street #500, Berkeley, California 94704

② Perform monitoring ~5x/mo.
various temp, time of day,
③ cf w/ RBCA calc. using 450ppb benzene at 30'
Move AMS-3 into bldg 3
Move AMS-1 into bldg 5

June 9, 1995

Alameda County Health Agency
Department of Environmental Health
Hazardous Materials Division
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502

687157.08
File: Correspondence

Attention: Ms. Eva Chu

Subject: **Air Monitoring Workplan, Mill Springs Park Apartments, 1809 Railroad Avenue, Livermore, California**

Dear Eva:

Telephone
510.540.6954
Facsimile
510.540.7496

This letter presents EARTH TECH's Workplan to perform air monitoring at the Mill Springs Park Apartment site in Livermore California. This Workplan is in response to the Alameda County Health Agency, Department of Environmental Health (ACHA-DEH), Hazardous Materials Division's request that air monitoring be performed at the subject site. This request was presented at the meeting held on Thursday, May 11, 1995 at your office.

Air Monitoring Workplan

The purpose of the air monitoring will be to evaluate if fugitive emissions are migrating from a light, non-aqueous phase liquid (LNAPL) floating on groundwater underlying the site. The LNAPL has been characterized as gasoline; gasoline is a complex mixture of petroleum hydrocarbons. The LNAPL has been detected at a depth of about 30 feet below ground surface (bgs). Fugitive emissions from the LNAPL could migrate through the non-saturated (vadose zone) soils in a vapor phase state and possibly enter enclosed spaces (i.e. below grade utility vaults, building envelopes, etc.). This could lead to possible exposure via inhalation. In addition, soil vapor containing gasoline can enter enclosed spaces that are not ventilated. This can result in a potential explosive condition or fire hazard due to accumulation of soil vapor containing gasoline. Data collected from the air monitoring program will be used to evaluate the potential for exposure from inhalation and for physical hazards (fire/explosion).

Inhalation Exposure Evaluation: To evaluate the potential for inhalation exposure, standard industrial hygiene air monitoring practices will be utilized. Indoor air samples will be collected from utility rooms located in two of the apartment buildings. Air monitoring will be performed in one building located above the anticipated LNAPL area (Building 2); a second building that is located outside the anticipated area of the LNAPL area will also be monitored (Building 10). A representative outdoor ambient sample will also be collected for baseline comparison purposes. Proposed air monitoring locations are shown on Figure 1.

Air samples will be collected using continuous sampling pumps equipped with charcoal sorbent tubes (coconut shell type) as the collection media. The air samples will be collected over an 8-hour period. Following the 8-hour sample collection period, the collection media samples will be individually labeled by building number and utility room and transported under chain of custody to the analytical laboratory.

The samples (maximum of 5) will be analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) compounds with an additional hydrocarbon scan to determine sources of other hydrocarbon peaks. The samples will be analyzed using the National Institute of Occupational Safety and Health (NIOSH) Method 1501. A sample blank will also be analyzed to evaluate sample media bias for quality assurance and quality control (QA/QC) purposes. The samples will be analyzed by a laboratory accredited by the American Industrial Hygiene Association (AIHA) and a current participant in the AIHA Proficiency Analytical Testing (PAT) Program.

Explosion/Fire Hazard Evaluation: To evaluate the potential fire/explosion potential, real-time air monitoring will be performed by EARTH TECH personnel. This will involve performing a one-day survey of the interior and exterior of selected buildings. Interior spaces would be limited to utility rooms or apartments on the ground floor that are vacant and accessible. The survey of the exterior building areas would include below grade utility vaults and other buried structures.

The presence for flammable gases would be measured using direct reading instruments (i.e. combustible gas indicator (CGI) and organic vapor monitor (PID or FID). Direct reading instruments will be used since they are a reliable and accepted method for monitoring for explosive concentrations of petroleum hydrocarbon vapors.

Equipment Calibration: Monitoring equipment used during the sampling interval will be maintained and calibrated in conformance with the applicable instrument manufacturer recommendations. Calibration results and other pertinent data will be logged and maintained on standard data sheets in conformance with EARTH TECH Field Procedures. These data will be logged before, during and at the conclusion of the sampling interval so that the data can be validated.

Health and Safety Considerations: All field work will be performed in conformance with an existing health and safety plan. Below grade structures that would require confined space entry procedures for physical access would be monitored using remote means (i.e. tube extension to PID/FID/CGI). No EARTH TECH personnel will enter areas that are considered confined spaces.

Report: Following the sampling interval and receipt of the analytical results, EARTH TECH will prepare letter report summarizing the findings from the air monitoring program. The report will include a sample location plan and copies of the analytical results. Data collected during the sample interval will be reviewed to validate the data. Based on review of the data, EARTH TECH will develop conclusions and recommendations whether further air monitoring will be necessary.

Schedule: The air monitoring program would be started within 7 days of approval of the workplan. Chemical analyses will be performed at standard laboratory turnaround. A written report will be submitted within 7 days of receipt of the certified analytical report from the laboratory.

If you have any questions, please contact the undersigned.

Sincerely,

EARTH TECH

Mark Milani, P.E.
Managing Senior Engineer

Attachments: Figure 1 - Air Monitoring Station Plan

Copies: Mr. Jim Hardy, Wingfield Venture Fund
Mr. Robert Poll, EARTH TECH

687157/3/ACHALTR.NO4

NORTH

RAILROAD AVENUE

AMS-1

AMS-2

AMS-3

AMS-4

AMS-5

EXISTING PUBLIC STORM DRAIN ESMT.

EXISTING 21" S.D.

EX. SDMH A

ABANDON EX. SDMH B

EX. SDMH C

EX. SDMH D

EX. CB A

EX. CB B

LEGEND

- ● AMS-5 – AIR MONITORING STATION LOCATION
- ⊕ MONITORING WELL LOCATION

NOTE: AMS-1 THROUGH AMS-4 MONITOR BUILDING INTERIORS.
AMS-5 IS OUTSIDE MONITORING POINT FOR AMBIENT CONDITION

0 60 120

SCALE IN FEET 1"=60'

EARTH TECH

PROJECT: 687157.08

LIVERMORE CALIFORNIA

MILL SPRINGS
PARK APARTMENT

AIR MONITORING STATION PLAN

JUNE 1995

FIGURE 1

2030 Addison Street #500, Berkeley, California 94704

① Approve wp

June 30, 1995

Alameda County Health Agency
Department of Environmental Health
Hazardous Materials Division
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502

687157.08
File: Correspondence

Attention: Ms. Eva Chu

Subject: **Workplan to Support Coordinated Approach to LNAPL Characterization, Mill Springs Park Apartments, 1809 Railroad Avenue, Livermore, California**

Dear Eva:

Telephone
510.540.6954
Facsimile
510.540.7496

INTRODUCTION

This letter presents EARTH TECH's proposed Workplan to support the coordinated approach to characterize the extent and source of a light nonaqueous phase liquid (LNAPL) encountered in the monitoring well at the Mill Springs Park (MSP) Apartment site in Livermore California . This Workplan augments additional characterization being performed by Desert Petroleum Inc. (DP). In addition, this Workplan is submitted with the intent of establishing a coordinated program for the gathering, disseminating and reviewing all necessary and pertinent information needed to develop an effective and efficient course of action. As discussed in our letter dated June 23, 1995, this will require partnering between the Alameda County Health Agency, Department of Environmental Health (ACHA-DEH), Mill Springs Park (MSP) and Desert Petroleum Inc.

The Workplan summarizes the geology and hydrogeology of the Mill Springs site and presents the specific scope of work to be performed in the field. Tables and Figures referenced in the Workplan are presented as attachments.

SITE DESCRIPTION AND USAGE

The site is located at 1809 Railroad Avenue, between South L and South P Streets, in Livermore, California. The site is shown in relation to the city of Livermore on the Vicinity Map, Figure 1. The site was known formerly as the Livermore Superblock. The site has been redeveloped with residential apartments. The current usage of the site is shown on the Site Plan, Figure 2.

EARTH TECH has previously provided environmental consultation and engineering services during the Phase I, Phase II and Final Site Remediation and Closure for the Mill Springs Park Apartment Site. Final site closure was granted by the Regional Water Quality Control

0.6

EARTH TECH

Board in December 1993. As part of previous site closure activities, EARTH TECH performed a groundwater study of the Mill Springs Park site and presented the results in a report dated March 3, 1989. Pertinent portions of this report have been incorporated into this Workplan to provide supporting documentation.

GEOLOGY AND HYDROGEOLOGY

The Mill Springs Park Apartment site is located within the Alameda County Flood Control and Water Conservation District, Zone 7. This agency was contacted regarding available groundwater data. In addition, the Department of Water Resources Bulletin (DWRB) No. 118-2, "Evaluation of Groundwater Resources: Livermore and Sunol Valleys", June, 1974 was reviewed.

Regional Geology and Hydrogeology

The Mill Springs Park Apartment site is located within the Livermore Valley groundwater basin. From review of the DWRB, the Livermore Valley groundwater basin is comprised of numerous groundwater subbasins. The subject site is located within the Mocho subbasin, particularly the Mocho II province which comprises the western portion of the Mocho subbasin.

Groundwater movement in the Livermore Valley generally follows the dip of the topographic surface towards the longitudinal axis of the valley. Groundwater then flows along the longitudinal axis generally in a western direction towards the Bernal subbasin. The regional groundwater flow can be interpreted from the groundwater elevation contour maps, plates 3 though 5. It should be noted that although the general flow direction corresponds closely with the longitudinal axis of the valley, operation of the gravel extraction pits does have a significant impact on both the local and regional groundwater flow regimes. However, the gravel extraction pits do not seem to have a significant impact on groundwater flow in the vicinity of the Mill Springs Park Apartment site.

Groundwater flow occurs in multiple water-bearing units. The principal water bearing units include an upper, unconfined aquifer overlying a series of semi-confined aquifers of the Valley Fill materials (recent alluvium). These units in turn are underlain by a multilayer, confined aquifer system of the Livermore Formation.

Both vertical and horizontal groundwater flow restrictions occur in the aquifer system. Faults, lithologic variations and permeability variations affect horizontal groundwater movement, particularly in the Valley Fill materials. Faults primarily control the hydraulic continuity between individual subbasins. Vertical groundwater movement is often restricted

due to internal stratification of the aquifer materials. Vertical movement between the Valley Fill and Livermore Formation appears to be limited to areas where the Livermore Formation is in direct contact with overlying stream channel deposits (along the Arroyo Valle and Arroyo Mocho stream channels), and to some extent where existing wells penetrate both aquifers.

Mocho Subbasin

The Mocho subbasin is the largest subbasin in the Livermore Valley groundwater basin, and also is one of the most important. The principle streams draining the Mocho subbasin include the Arroyo Seco and the Arroyo Mocho. The Mocho subbasin is bounded to the east by the Tesla Fault, to the west by the central zone of the Livermore Fault, to the north by the Tassajara Formation and to the south by non water bearing marine rocks.

As mentioned earlier, the Mocho subbasin has been divided into two provinces: Mocho I (eastern) and Mocho II (western). The subject site is located within the Mocho II province; consequently, only the Mocho II province will be discussed. In addition, the DWRB states that the near surface materials in both provinces appear to lack lateral hydraulic continuity.

The Valley Fill materials in the Mocho II province consist of sand, gravel and cemented gravel separated by interbeds of silt and clay. The Valley Fill reportedly extends to depths of about 30 feet along the Arroyo Mocho to over 150 feet along the longitudinal axis of the valley. The underlying Livermore Formation consists of sandy gravel and cemented gravel. Individual aquifers are generally separated by aquitards consisting of silty clay and clayey gravel.

The Alameda County Flood Control and Water Conservation District, Zone 7 monitors numerous wells within the Mocho subbasin as well as other subbasins for both water level and water quality. From their monitoring program, Zone 7 has also prepared water level contour maps. Although the water levels have varied, the hydraulic gradient appears to have been relatively consistent, with groundwater flowing to the northwest on a local basis.

Site Geology and Groundwater Level

During installation of the monitoring well (MW-1) at the site, sandy clay gravel fill was encountered from the ground surface to a depth of about five feet. The fill is underlain to the depth explored (about 62 feet) with native soils consisting of interbedded clayey sand, gravelly sand, silty sand, sandy gravel, and silty clay. Detailed subsurface conditions encountered in the boring are presented on the attached boring log.

Free groundwater was first observed during drilling at a depth of about 43½ feet below ground surface (bgs). EARTH TECH has monitored groundwater levels at the site as part of a groundwater monitoring program. Groundwater level data from monitoring well MW-1 is tabulated in Table 1 and presented graphically on Figure 3. In March 1995, LNAPL was detected in the monitoring well at the time well was to be closed.

PROPOSED LNAPL CHARACTERIZATION AND SAMPLING PLAN

The proposed LNAPL characterization program to be performed by EARTH TECH at the Mill Springs Park (MSP) site would include six tasks: Permitting/Utility Clearance, LNAPL Characterization, Groundwater Sampling, Soil Sampling, Waste Management/Site Restoration and Report. Each of these tasks are described briefly below.

Permitting/Utility Clearance

EARTH TECH will obtain necessary drilling permits from ACFCWCD-Zone7 prior to drilling and will submit necessary reports to Zone 7 for permit compliance.

EARTH TECH will contact Underground Service Alert (USA) to clear proposed boring locations of underground utilities. Areas that cannot be cleared by USA will be cleared using a private utility locating service. Final boring locations will be determined after the utility clearance survey is completed.

LNAPL Characterization

EARTH TECH will perform field sampling and analytical testing to estimate the horizontal extent of LNAPL and LNAPL thickness on the MSP site. This objective will be accomplished by performing the following field work.

- Perform one Hydropunch (type II) on MSP property by N Street terminus. If LNAPL is found, the boring would be converted to a monitoring well. the proposed location is shown as H-1 on the Site Plan.

- Perform four Hydropunch borings (type II) along the MSP and Groth Brothers Oldsmobile property line. All field work would be conducted on Groth property. MSP has received permission from Mr. Dick Groth, Owner of Groth Brothers Oldsmobile, to perform this work. The proposed locations are shown as H-2 to H-5 on the Site Plan.

- MSP reserves the option to perform one Hydropunch (type II) on MSP

property in the landscape area along Railroad Avenue between N and O Streets. If LNAPL is found, the boring would be converted to a monitoring well. This option will be exercised depending on the work proposed by DP.

- Purge Monitoring well MW-1 and record thickness of LNAPL. Collect an additional LNAPL sample for characterization.

LNAPL thickness at the Hydropunch and monitoring well locations will be recorded to the nearest 0.01 feet using an electric interface probe. LNAPL samples collected will be subjected to a "fingerprint" analysis so that the chromatograms can be compared.

Groundwater Sampling

Groundwater sampling will be performed to estimate the extent of the dissolved petroleum hydrocarbons associated with the LNAPL plume and the direction of plume migration. The following work will be performed to accomplish this objective.

- Survey the Hydropunch locations, monitoring well on the Groth Brothers Oldsmobile property and the monitoring well on the MSP site. The vertical elevation would be determined using the same datum and monument used by DP so that all vertical elevations are referenced to a common datum and monument.

- Re-sample the monitoring well located on Groth Oldsmobile property.

- Sample the monitoring well located on MSP property.

- Grab groundwater samples would be collected from the Hydropunch locations.

The groundwater samples will be analyzed for total petroleum hydrocarbons (TPH) against gasoline, diesel and fuel oil standards (TPHg, TPHd and TPHfo) using EPA Method 8015 (LUFT). In addition, the groundwater samples will be analyzed for VOCs [benzene, toluene, ethylbenzene and xylenes] using EPA method 8020.

For QA/QC purposes, two field duplicates will be collected so that relative percent difference (RPDs) value can be calculated. In addition, a trip blank and temperature blank will be included in each sample shipment to the analytical laboratory. EARTH TECH Field Procedures will be used for sample collection and handling.

Soil Sampling

SS should be collected at 5' interval, change in lithology, and obvious contam. and selected SS ~~taken~~ submitted for laboratory analysis

To confirm that the LNAPL has originated from an offsite, source, soil samples will be collected from the unsaturated soil zone and field screened using a organic vapor analyzer equipped with a photoionization detector (OVM-PID). The soil samples will be collected during the Hydropunch sampling, and used for lithologic logging purposes. Soil samples would be collected generally at five foot vertical intervals or at changes in lithology. The borings will be logged in the field by field engineer and/or geologist. Depending the results of field screening, selected soil samples may be submitted for chemical or geotechnical analyses.

Chemical analyses may include tests for TPHg, TPHd, TPHfo, and VOCs. Geotechnical analyses may include moisture content, dry density, particle size analysis and other soil index property tests.

For QA/QC purposes, field duplicates will be collected (10% frequency) so that relative percent difference (RPDs) value can be calculated. In addition, a trip blank and temperature blank will be included in each sample shipment to the analytical laboratory. EARTH TECH Field Procedures will be used for sample collection and handling.

Waste Management/Site Restoration

Drill cuttings, decontamination fluid and purge water will managed. Drill cuttings will be placed in bins provided by licensed waste disposal contractor. Purge water and decontamination fluids will be contained in DOT approved 17H (open head style) drums. All drums will labelled with contents and accumulation start date. The waste disposal contractor will collect samples of the drill cuttings, purge water and decontamination fluids for characterization and disposal.

Hydropunch borings will be backfilled with cement grout in conformance with Zone 7 requirements.

Report Preparation

Data obtained during this investigation will be used to prepare figures showing the lateral extent and thickness of LNAPL and the lateral extent of dissolved petroleum hydrocarbons. A figure showing the groundwater elevation using data from this investigation and data from DP will be generated. In addition, the findings, conclusions and recommendations developed from this investigation will be presented in a written report.

As part of this report, EARTH TECH will incorporate all the available data from previous and current investigations on a single map. The map will show the DP site, Groth Brothers Olds site and MSP site and surrounding vicinity so that the data is plotted on a uniform scale. Copies of this map will be made available to all interested parties for their use and comment.

OTHER CONSIDERATIONS

Data and findings developed from this investigation will be made available to all interested parties so that an informed decision can be made jointly by all parties. Data and findings from DP's investigation should also be made available. The sharing of this data is essential in developing a solution that will satisfy the needs of all parties involved.

SCHEDULE

EARTH TECH would begin drilling and sampling within 5 days of approval of the workplan, pending receipt of drilling permits, utility clearance and availability of drilling equipment. All chemical analyses will be performed at 5-day turn around time. EARTH TECH will submit a written report of its findings within two weeks of receipt of the certified analytical reports. Assuming a start date for drilling of July 10, 1995, EARTH TECH anticipates submitting a draft report by August 4, 1995.

If you have any questions, please contact the undersigned.

Sincerely,
EARTH TECH

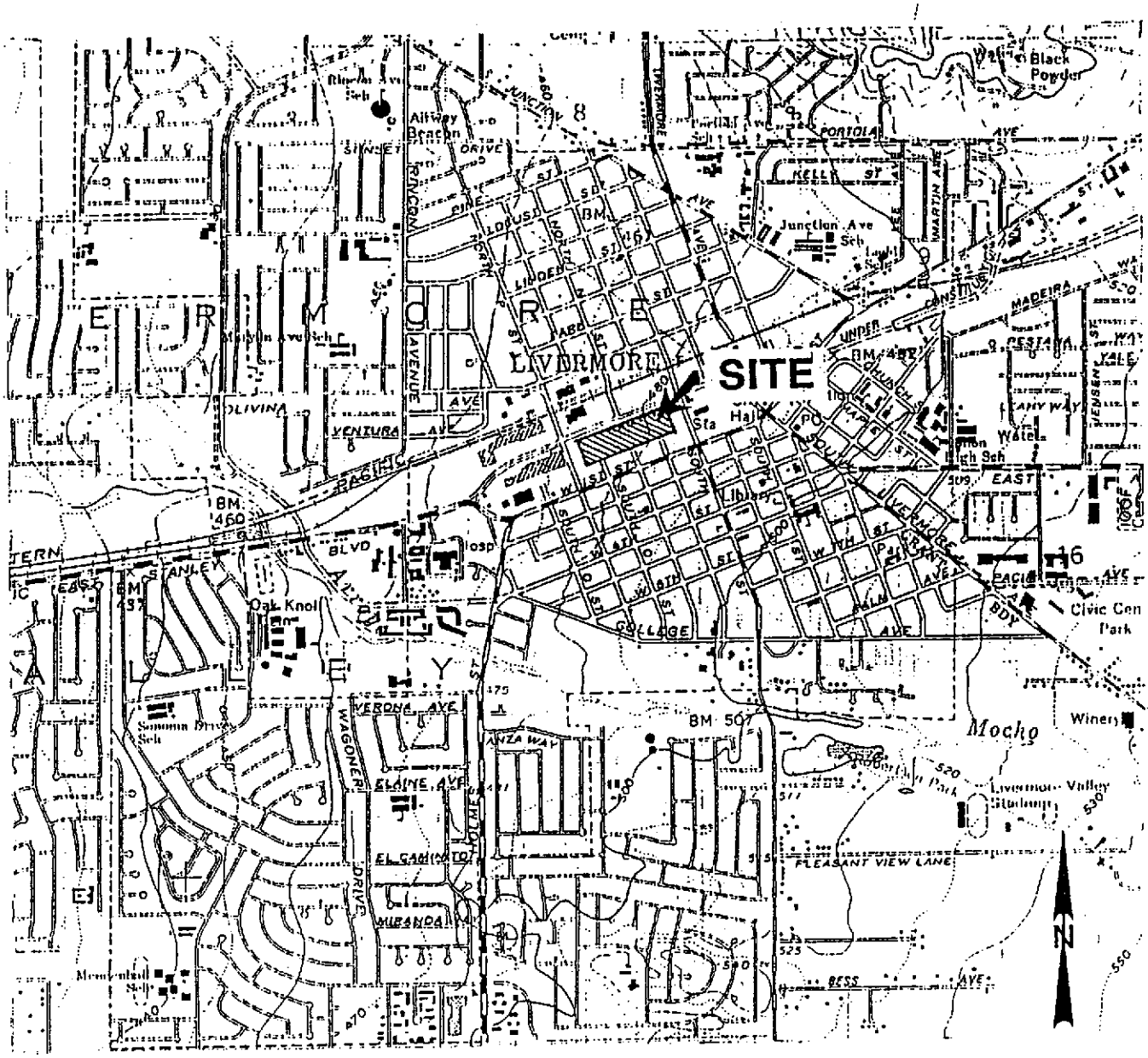
Mark Milani, P.E.
Managing Senior Engineer

MM:mm

cc: Mr. Jim Hardy, Wingfield Venture Fund

Attachments: Figure 1 - Vicinity Map
Figure 2 - Site Plan
Figure 3 - Groundwater Elevation versus Time Plot
Table 1 - Groundwater Data
MW-1 Well Log

687157/3/ACHALTR.NO6



VICINITY MAP

MILL SPRINGS PARK APARTMENTS

Railroad Avenue

Livermore, California

REFERENCE:

Portion of U.S.G.S. 7.5 Minute Topographic Quadrangle Map, Livermore, California, dated 1961, photorevised 1980, at a scale of 1:24,000.

FIGURE 1

NORTH

RAILROAD AVENUE

MW-1

H-1

H-2

H-3

H-4

H-5

EXISTING PUBLIC STORM DRAIN ESMT.

EXISTING 21" SD

EX. SDMH A

EX. SDMH B

EX. SDMH C

EX. SDMH D

EX. CB A

EX. CB B

ABANDON EX SDMH B

PROPOSED 10' WATER EASEMENT (TYP.)

CAL WATER

EX 30" SD

LEGEND

MW-1 ⊕ MONITORING WELL LOCATION

H-5 ⊕ PROPOSED HYDROPUNCH SAMPLE LOCATIONS

SOURCE: BABBITT CIVIL ENGINEERING INC., PLEASANTON, CALIFORNIA

0 60 120

SCALE IN FEET 1"=60'

EARTH TECH

PROJECT: 687157.08

LIVERMORE CALIFORNIA

MILL SPRINGS
PARK APARTMENT

PROPOSED BORING AND GRAB GROUNDWATER SAMPLE LOCATIONS

JUNE 1995

FIGURE 2

Mill Springs Park Apartments
Groundwater Elev/LNAPL Thickness

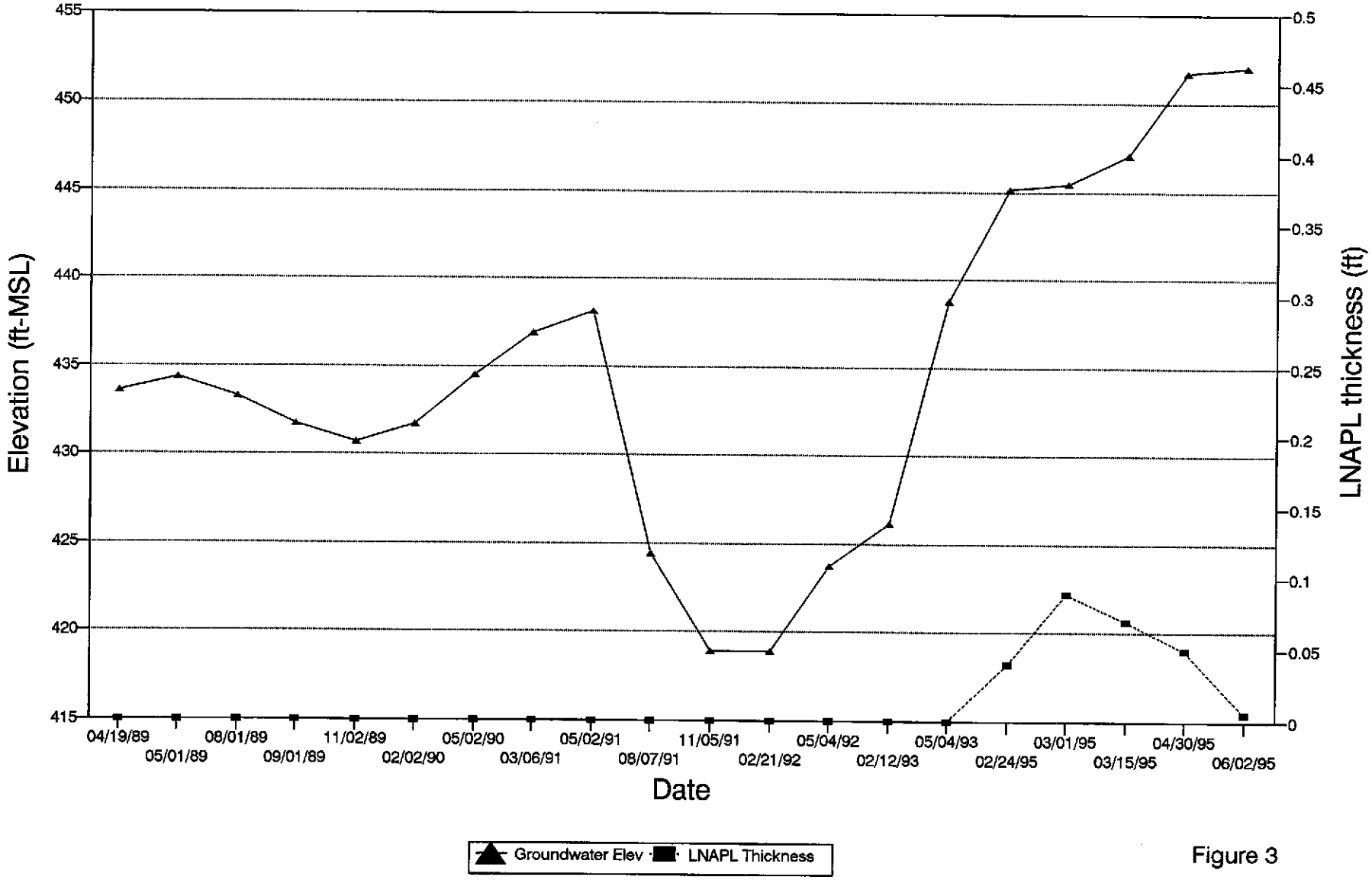


Figure 3

Table 1
Product Thickness and Groundwater Elevation Table

Well Number	TOC Elevation (ft - MSL)	Date Measured	Depth-to-Water (ft)	Depth-to-Product (ft)	Product Thickness (ft)	Groundwater Elevation (ft - MSL)
MW-1	477.08	04/19/89	43.50	ND	ND	433.58
		05/01/89	42.74	ND	ND	434.34
		08/01/89	43.86	ND	ND	433.22
		09/01/89	45.35	ND	ND	431.73
screened ~30-60'		11/02/89	46.39	ND	ND	430.69
		02/02/90	45.36	ND	ND	431.72
		05/02/90	42.58	ND	ND	434.50
	478.18	03/06/91	41.25	ND	ND	436.93
		05/02/91	40.05	ND	ND	438.13
		08/07/91	53.79	ND	ND	424.39
		11/05/91	59.25	ND	ND	418.93
		02/21/92	59.27	ND	ND	418.91
		05/04/92	54.47	ND	ND	423.71
		02/12/93	52.02	ND	ND	426.16
		05/04/93	39.42	ND	ND	438.76
		02/24/95	33.10	33.06	0.04	445.08
		03/01/95	32.78	32.69	0.09	445.40
		03/15/95	31.14	31.07	0.07	447.04
		04/30/95	26.455	26.400	0.055	451.73
		06/02/95	26.160	26.155	0.005	452.02

Notes

1. TOC - Top-of-Casing, MSL - Mean Sea Level
2. TOC elevation for casing raised as part of finish grading. Casing raised 13.25 inches to elevation 478.18
3. Bottom of well at elevation 418.60

AQUA RESOURCES, INC.

OBSERVATION WELL INSTALLATION REPORT

Well # MW-1

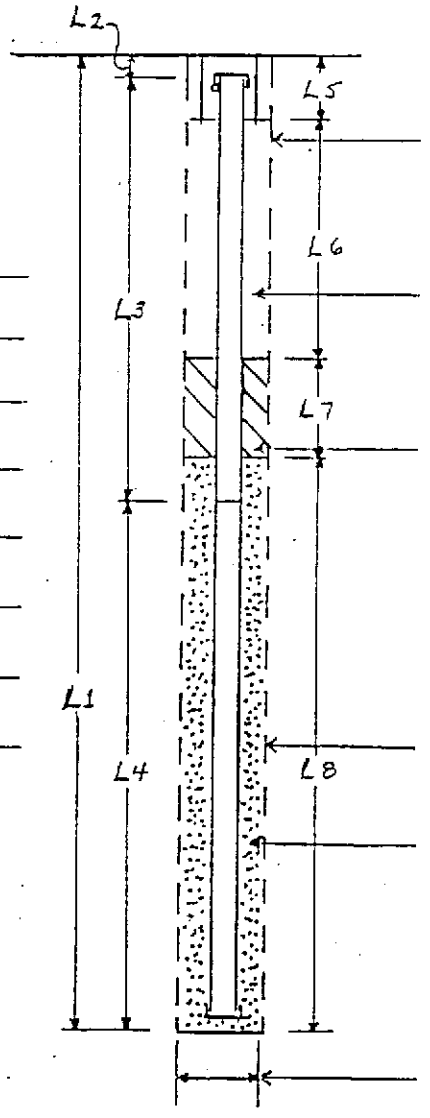
Project Mill Springs Park Apartments (87157.6)

Location Livermore, CA

Type of Rig CME-75 Installed by HEW Drilling Company

Date Started April 20, 1989 Date Finished April 20, 1989

Type of Observation Well Monitoring Well Ground Elev. 477.28 Casing Top, Elev. 477.08



L1 60 feet

L2 0.20 feet

L3 29.8 feet

L4 30 feet

L5 0.5 feet

L6 24.5 feet

L7 3 feet

L8 32 feet

Cap 2" diameter locking cap

Type of Casing 2" diameter, Schedule 40 PVC

Type of Backfill Cement-Bentonite grout, 3 sack mix

Type of Seal Material 3/8" diameter Volclay Bentonite Pellets

Size of Openings 0.020 inches

Type of Filter Material No. 3 RMC Lonestar Sand

Diameter of Boring 8 3/4" diameter

Remarks Well developed on May 1, 1989

Inspected By M. Milani

BORING LOCATION	MW-1	ELEVATION AND DATUM	477.28 feet, Mean Sea Level
DRILLING CONTRACTOR	HEW Drilling Co.	DRILLER	DATE STARTED Apr 20, 1989 / DATE FINISHED Apr 20, 1989
DRILLING EQUIPMENT	CME-75	COMPLETION DEPTH (FT)	61½ / ROCK DEPTH (FT) –
DIAMETER OF BORING	8 3/4 inches	NO. OF DIST. SAMPLES	– / UNDIST. 26 / CORE –
PURPOSE OF BORING	Monitoring Well Installation	WATER FIRST DEPTH (FT)	43½ / COMPL. – / 24 HRS. –
SAMPLING EQUIPMENT	2 ½-inch O.D. Split Barrel	LOGGED BY:	M. Milani / CHECKED BY: P. Rodgers
COMMENTS	140-lb. hammer, 30-inch fall		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG LITHOLOGY	SAMPLES NO.	SAMPLES TYPE	SAMPLES BLOW COUNT	SAMPLES DRILLING RATE/TIME	REMARKS
	Fill: CLAYEY, SANDY GRAVEL, gray-brown, moist, medium dense, fine to coarse grained sand, fine to medium size gravel (GC)						BL=Brass Liner Blow counts per 6-inch drive interval given in ()
5	CLAYEY SAND, red-brown, moist, medium dense, fine to coarse grained, trace gravel (SC)		1	BL	27		(7/12/15) 8:50 2 liners recovered no odor
10	GRAVELLY SAND, gray-brown, moist, medium dense, fine to coarse grained sand, medium size gravel, large gravel in shoe, trace clay (SW)		2	BL	35		(12/17/18) 9:00 2 liners recovered no odor
	SANDY GRAVEL, gray-brown, moist to wet, medium dense, trace clay (GW)						
15	SILTY CLAY, mottled red-brown and yellow-brown moist to wet, soft, trace fine grained sand, moderate plasticity (CL)		3	BL	9		(1/3/6) 9:10 lost lower two samples, resampled, recovered 2 additional liners no odor
	GRAVELLY SAND, red-brown, moist to wet, very dense, fine to coarse grained sand, fine to medium size gravel, iron oxide staining (SW)						
20			4	BL	65		(10/30/35) 9:22 3 liners recovered no odor
	Trace clay below 23 feet						
25	GRAVELLY SAND, blue-gray, moist-wet, dense, fine to coarse grained sand, fine to medium size gravel. (SW)		5	BL	49		(11/22/27) 9:33 2 liners recovered
30							

Project: Mill Springs Park Apartments
Project No. 87157.6

LOG OF BORING

Fig.

AQUA RESOURCES, INC.
BERKELEY, CALIFORNIA

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG LITHOLOGY	SAMPLES NO.	SAMPLES TYPE	SAMPLES BLOW COUNT	SAMPLES DRILLING RATE/TIME	REMARKS
30	GRAVELLEY SAND, continued SILTY SAND, green-gray, wet, medium dense, fine grained (SM)		6	BL	47		(16/31/16) 9:45 2 liners recovered no odor
35	GRAVELLY SAND, green-gray, moist to wet, medium dense, fine grained sand, fine to medium size gravel, with stringers of silty clay (SP)		7	BL	31		(14/19/12) 10:05 3 liners recovered no odor
40			8	BL	95	10"	(30/45/50 [4"]) 10:25 2 liners recovered no odor
	SANDY GRAVEL, brown, wet to saturated, dense, fine to coarse grained sand, medium to coarse size gravel (GW) Saturated below 43½ feet						
45			9	BL	47		Free water encountered during drilling at 43½ feet (14/23/24) 10:45 no odor, 1 liner recovered
50	blue-gray and very dense below 50 feet		10	BL	83		(11/33/50) 11:05 strong odor, 2 liners recovered
55	Mottled gray-brown and blue-gray, fine to coarse grained sand, fine to coarse grained gravel, thin sand interbed between 55 and 55½ feet		11	BL	52		(10/22/30) 11:25 slight odor, 2 liners recovered
60	CLAYEY SAND, brown, saturated, very dense, fine to medium grained sand, trace medium size gravel (SC)		12	BL	83		(14/43/40) 11:50 no odor, 2 liners recovered
	Boring terminated at 61½ feet 2-inch diameter PVC monitoring well installed						
65							
70							

Project

Project No.

CONT. LOG OF BORING

Fig.

AQUA RESOURCES, INC.
BERKELEY, CALIFORNIA

2030 Addison Street #500, Berkeley, California 94704

Telephone
510.540.6954
Facsimile
510.540.7496

July 27, 1995

Alameda County Health Agency
Department of Environmental Health
Hazardous Materials Division
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502

687157.08
File: Correspondence

Attention: Ms. Eva Chu

Subject: **Amendment No.1, LNAPL Characterization Workplan**, Mill Springs Park Apartments, 1809 Railroad Avenue, Livermore, California

Dear Eva:

INTRODUCTION

This letter presents an amendment to EARTH TECH's June 30, 1995 Workplan to characterize the extent and source of a light nonaqueous phase liquid (LNAPL) encountered in the monitoring well at the Mill Springs Park (MSP) Apartment site in Livermore California. This amendment identifies additional boring locations beyond those identified in the original Workplan. In addition, some proposed field activities to be conducted on the Groth Brothers Oldsmobile site have been deleted.

AMENDED LNAPL CHARACTERIZATION AND SAMPLING PLAN

The LNAPL characterization program to be performed by EARTH TECH at the Mill Springs Park (MSP) remains unchanged from that presented in the June 30, 1995 Workplan with the following exceptions:

LNAPL Characterization

EARTH TECH will perform field sampling and analytical testing to estimate the horizontal extent of LNAPL and LNAPL thickness on the MSP site. This objective will be accomplished by performing eleven (11) Hydropunch sample locations. The proposed sample locations are shown on the attached Boring Location Plan, Figure 1. All sample locations are now located on MSP.

LNAPL thickness at the Hydropunch and monitoring well locations will be recorded to the nearest 0.01 feet using an electric interface probe. LNAPL samples collected will be subjected to a "fingerprint" analysis so that the chromatograms can be compared.

Groundwater Characterization

Groundwater level surveys and grab groundwater sampling will be performed to estimate the extent of the dissolved petroleum hydrocarbons associated with the LNAPL plume and the direction of plume migration. The following work will be performed to accomplish this objective.

- Survey the eleven Hydropunch locations and the monitoring well on the MSP site to a common datum.
- Sample the monitoring well located on MSP property.
- Grab groundwater samples would be collected from the Hydropunch locations.

Surveying and sampling of the monitoring well located on Groth Oldsmobile property may not be feasible at this time.

The groundwater samples will be analyzed for total petroleum hydrocarbons (TPH) against gasoline, diesel and fuel oil standards (TPHg, TPHd and TPHfo) using EPA Method 8015 (LUFT). In addition, the groundwater samples will be analyzed for VOCs [benzene, toluene, ethylbenzene and xylenes] using EPA method 8020.

For QA/QC purposes, two field duplicates will be collected so that relative percent difference (RPDs) value can be calculated. In addition, a trip blank and temperature blank will be included in each sample shipment to the analytical laboratory. EARTH TECH Field Procedures will be used for sample collection and handling.

Soil Sampling

To confirm that the LNAPL has originated from an offsite source, soil samples will be collected from the unsaturated soil zone and field screened using a organic vapor analyzer equipped with a photoionization detector (OVM-PID). The soil samples will be collected during the Hydropunch sampling, and used for lithologic logging purposes. Soil samples would be collected generally at five foot vertical intervals or at changes in lithology. The borings will be logged in the field by field engineer and/or geologist. Depending the results of field screening, selected soil samples may be submitted for chemical or geotechnical analyses.

Chemical analyses may include tests for TPHg, TPHd, TPHfo, and VOCs. Geotechnical analyses may include moisture content, dry density, particle size analysis and other soil index property tests.

For QA/QC purposes, field duplicates will be collected (10% frequency) so that relative percent difference (RPDs) value can be calculated. In addition, a trip blank and temperature blank will be included in each sample shipment to the analytical laboratory. EARTH TECH Field Procedures will be used for sample collection and handling.

Waste management and site restoration activities are unchanged. Data obtained during this investigation will be used to prepare figures showing groundwater elevation contours, lateral extent and thickness of LNAPL and the lateral extent of dissolved petroleum hydrocarbons. In addition, the findings, conclusions and recommendations developed from this investigation will be presented in a written report.

SCHEDULE

EARTH TECH will begin drilling and sampling on Monday August 7, 1995. Installation of the Hydropunch sample probes should be completed in two days. Water level measurements, LNAPL thickness measures and grab groundwater sample collection would be performed on August 11, 1995. All chemical analyses will be performed at 5-day turn around time. EARTH TECH will submit a written report of its findings within two weeks of receipt of the certified analytical reports. EARTH TECH anticipates submitting a draft report by September 1, 1995.

If you have any questions, please contact the undersigned.

Sincerely,
EARTH TECH

Mark Milani, P.E.
Managing Senior Engineer

MM:mm

cc: Mr. Jim Hardy, Wingfield Venture Fund

Attachments: Figure 1 - Amended Boring Location Plan

687157/3/ACHALTR.NO7

NORTH

RAILROAD AVENUE

H-1 H-2 H-3 H-4 H-5 H-6 H-7 H-8 H-9 H-10 H-11

MW-1

LEGEND

MW-1 ⊕ MONITORING WELL LOCATION

H-11 ⊕ PROPOSED HYDROPUNCH SAMPLE LOCATIONS

SOURCE: BABBITT CIVIL ENGINEERING INC., PLEASANTON, CALIFORNIA

0 60 120

SCALE IN FEET 1"=60'

EARTH TECH

PROJECT: 687157.08

LIVERMORE CALIFORNIA

MILL SPRINGS
PARK APARTMENT

AMENDED BORING LOCATION PLAN

JULY 1995

FIGURE 1