Report on Findings of Soil Gas Investigation
Kaiser Foundation Health Plan, Inc.
Kaiser Mosswood Building
Oakland, California

July 27, 1989
1547

Prepared for:

Kaiser Foundation Health Plan, Inc.
1950 Franklin Street
Oakland, California 94604-3021

LEVINE·FRICKE

July 27, 1989 LF 1547

REPORT ON FINDINGS OF SOIL GAS INVESTIGATION KAISER FOUNDATION HEALTH PLAN, INC. KAISER MOSSWOOD BUILDING OAKLAND, CALIFORNIA

Introduction

Levine·Fricke was retained by Kaiser Foundation Health Plan, Inc. to assess the soil and ground-water quality in the vicinity of two underground gasoline storage tanks and an underground utility vault at the Kaiser Mosswood Building located at 3505 Broadway in Oakland, California (Figure 1). Based upon the information reported to us by Mr. Chuck Harris and Mr. Rick Andrews of Kaiser, we understand that gasoline product was found seeping out of a weephole in a transformer vault in February 1989. The product was contained using absorbant pads. The amount of product seepage diminished greatly after March 1989. At the time of this report, floating product is not seeping into the vault.

To obtain data to assess the presence of gasoline in soil and ground water at the site, Levine·Fricke conducted a soil-gas investigation. This report presents the methods used to conduct this investigation, the results obtained, and our conclusions and recommendations.

Methods of Investigation

On June 6, 1989, Levine·Fricke subcontracted NET Pacific Mobile Laboratory Services of Santa Rosa, California to conduct a soil-gas investigation. The investigation consisted of collecting and analyzing soil-gas samples from soil pore spaces in the unsaturated soil zone at selected locations. The mobile laboratory analyzed the soil-gas samples for total petroleum hydrocarbons (TPH) as gasoline and for the fuel hydrocarbons benzene, toluene, ethylbenzene, and xylenes (BTEX). Soil-gas samples were collected from ten on-site locations around the tanks and the vault based upon results obtained during sampling. The probe locations are shown on Figure 2.

The samples were collected by driving a 1-inch diameter steel pipe with a pointed insert into the soil. Based upon the depth of seepage into the utility vault, we estimate the static ground-water depth to be about 12 feet below ground surface. The soil-gas probes were driven to depths ranging from 9 to 10 feet below ground surface using a pneumatic vibrating head operated by one of the sampling crew. Once the probe was driven to the depth desired, the pointed insert rod was removed. Then, by applying a vacuum of approximately 25 pounds-per-square-inch (psi), gas was removed from the hole. About 1 liter of gas was removed from each location to purge the hole of air introduced when removing the insert rod. After purging, the vacuum was re-applied and samples of about 30 cubic centimeters were removed.

The samples were analyzed with a gas chromatograph immediately after collection using the mobile field equipment. The data was then reduced and results were obtained in the field. Quality assurance/quality control confirmation of the results was performed at NET Pacific's in-house laboratory.

For each probe location, the recovery rate of gas during purging was noted. A quick recovery indicates sediments which are more permeable to flow of gas and liquid.

Results

The soil-gas sample analyses detected concentrations of TPH ranging from below the detection limit of 10 micrograms per liter (ug/L) at the probe #9 location to 14,000 ug/L at the probe #5 location. Three of the ten results (probe samples 5, 6, and 7) indicated TPH concentrations of 10,000 ug/L or greater. The highest concentrations of BTEX compounds were detected in samples collected from the probe #5 location (750, 820, 150, and 630 ug/L, respectively). The lowest BTEX concentrations were detected in samples collected from the probe #9 location. A summary of results is presented in Table 2, and shown on Figure 3.

In general, the probe locations with the higher gasoline concentrations were those with more rapidly recovering sediments. However, probe sample #2 recovered quickly but indicated only 45 ug/L TPH, and probe sample #3 recovered slowly but had a relatively high TPH concentration of 4,500 ug/L.

Conclusions

Based upon the findings of this soil-gas investigation, it appears that soil and ground water around the underground gasoline tanks have been affected by gasoline. The results obtained indicate higher concentrations of gasoline around the tanks than around the utility vault. The floating product seeping into the vault appears to be migrating from the tanks in a relatively narrow path rather than a wide plume. Gasoline concentrations in soil gas do not represent concentrations present in soil and thus should be used only as a qualitative indication of soil and ground-water quality. There are no regulatory action levels for compounds in the soil vapor phase. Additionally, it appears that gasoline product has likely migrated off site, encroaching into the Caltrans easement and below a portion of Broadway Avenue adjacent to the tanks. The thickness and lateral extent of floating product on the ground water cannot be assessed from a soil-gas investigation, although the areas with TPH concentra-tions in soil gas greater than 10,000 ug/L most likely contain soils with elevated gasoline concentrations.

The gasoline-affected areas may coincide with the areas with more permeable sediments at the expected depth of static ground water (about 12 feet below ground surface). However, there is currently insufficient lithologic information available to predict the migration of gasoline in the subsurface soils based upon soil type.

Recommendations

To better assess the extent of gasoline-affected soil and ground water, we recommend conducting a limited investigation which consisting of drilling and installing four shallow monitoring wells. These four monitoring wells will allow us to collect data to assess: 1) the amount of floating gasoline product which may be on the ground water surface; 2) the ground water hydraulic gradient; 3) the extent of gasoline-affected soils; and 4) the soil types present at the site. Accurate data on these conditions will enable us to better identify and implement a cost-effective remediation plan.

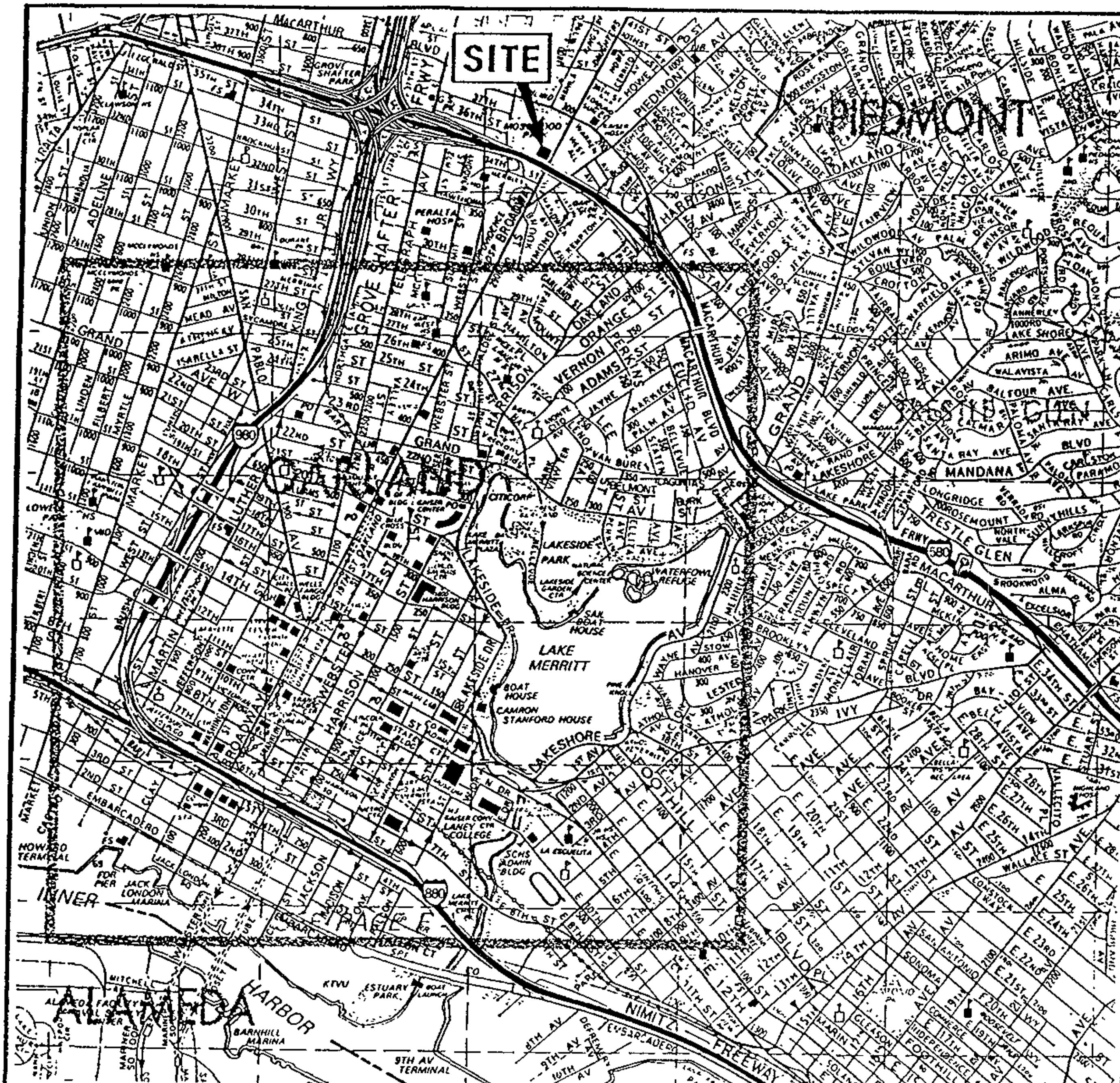
TABLE 1

Summary of Analytical Results
Soil Gas Investigation
Kaiser Mosswood Building
3505 Broadway
Oakland, California

Sample No.	TPH as gas (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Xylenes (ug/L)	Recovery
SG-1	1,800	85	94	36	210	S
SG-2	45	1.4	2.0	0.6	3.7	Q
SG-3	4,500	230	240	9.0	35	S
SG-4	8,300	430	510	90	35	M
SG-5	14,000	750	820	150	630	Q
SG-6	12,000	710	650	71	260	M
SG-7	10,000	660	530	16	50	Q
SG-8	60	3.0	3.3	0.6	1.6	M
SG-9	<10	0.3	0.3	<0.1	<0.1	M
SG-10	1,600	58	100	7.5	28	S

NOTES:

TPH = Total Petroleum Hydrocarbons
Q = Quick recovery
M = Moderate recovery
S = Slow recovery



MAP SOURCE:
Thomas Bros. Map
Alameda and Contra Costa Counties
1989 Edition

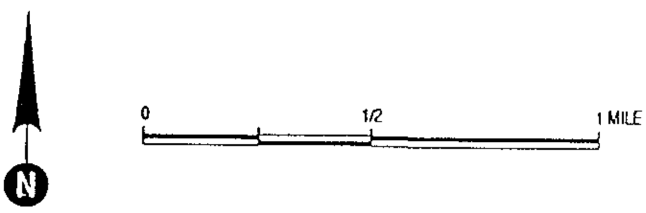


Figure 1 : SITE VICINITY MAP

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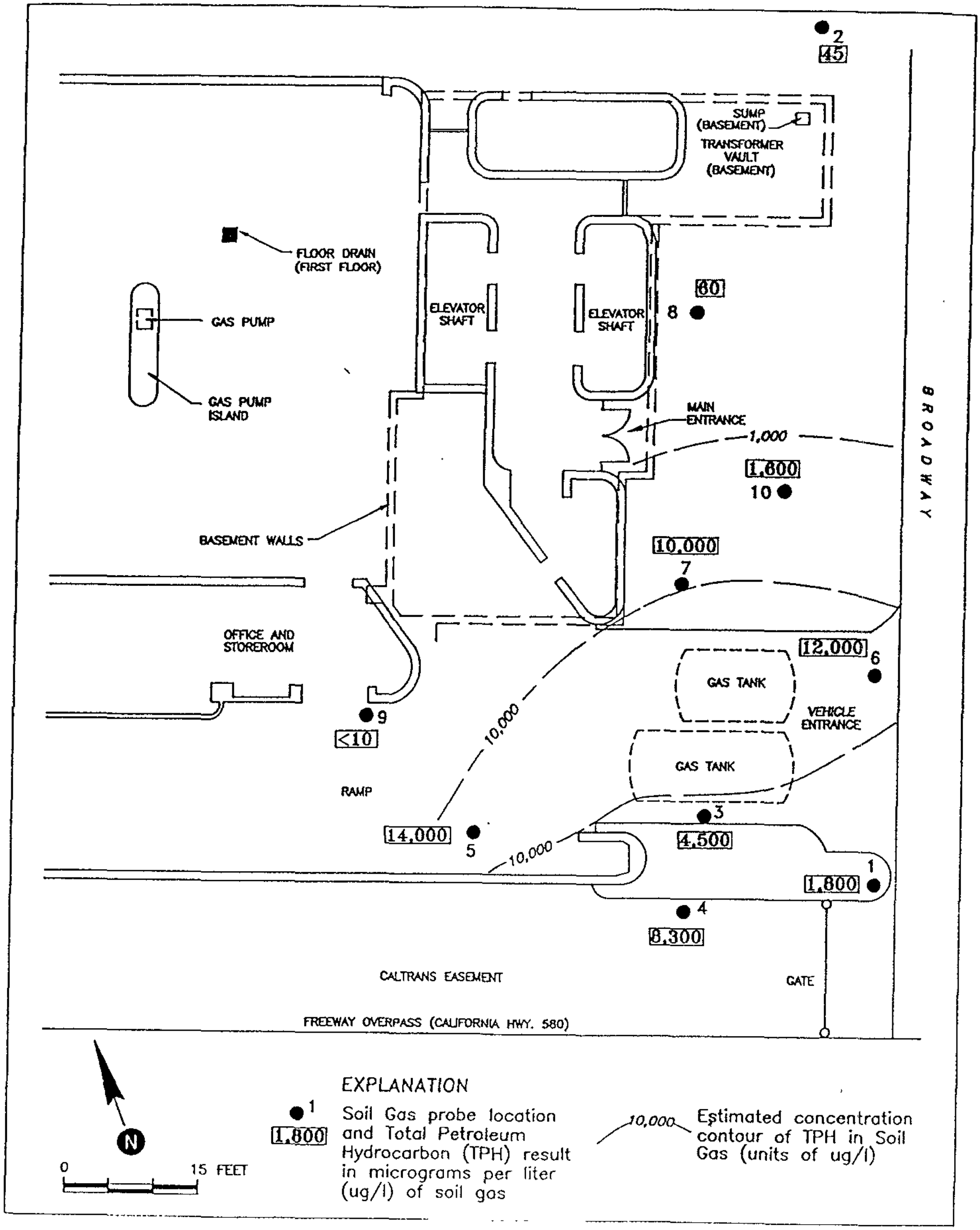

Figure 2 : SITE PLAN WITH SOIL GAS PROBE LOCATIONS AND RESULTS

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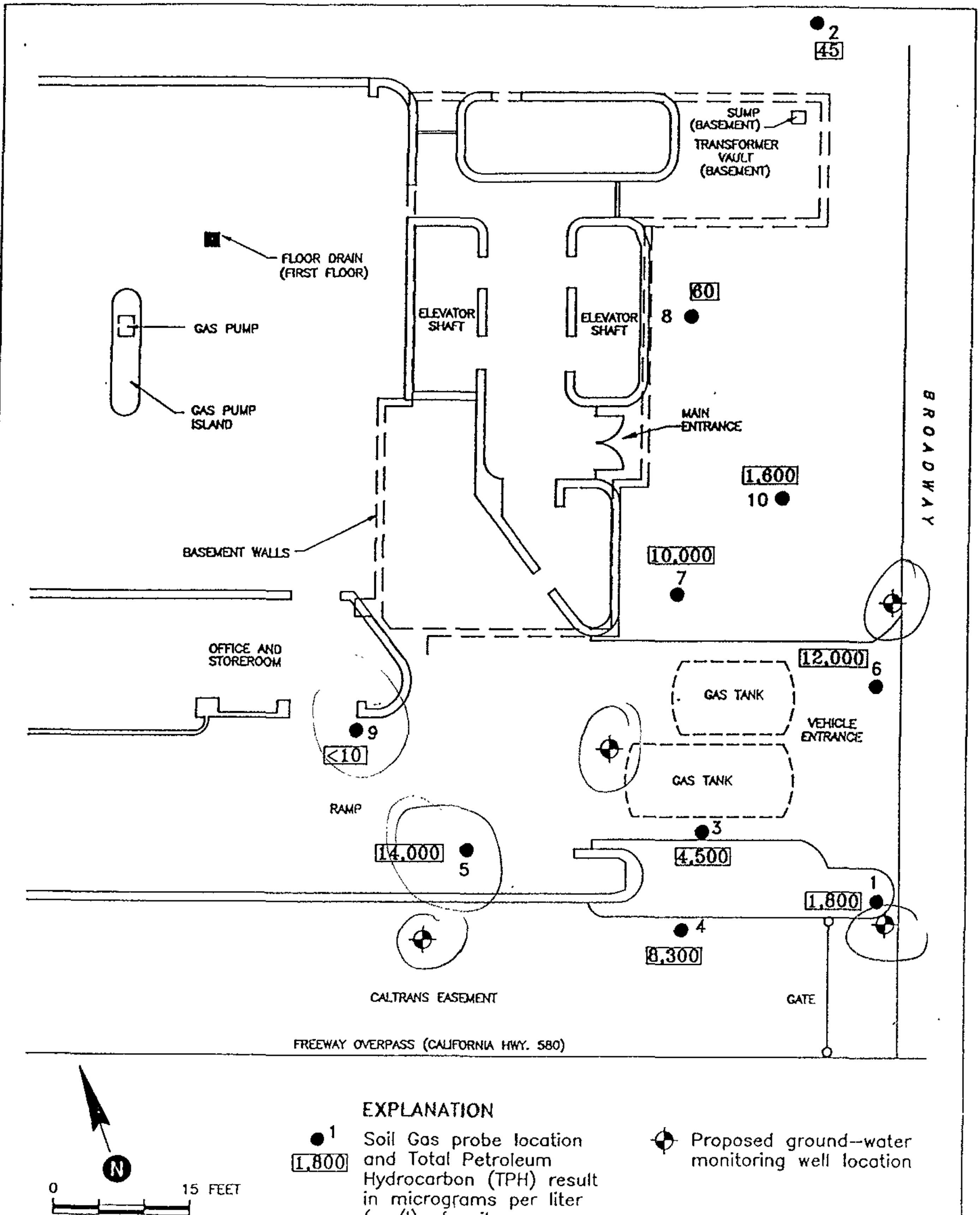

EXPLANATION

● 1 / 1,800 — Soil Gas probe location and Total Petroleum Hydrocarbon (TPH) result in micrograms per liter (ug/l) of soil gas

⊕ — Proposed ground-water monitoring well location

Figure 3 : SITE PLAN WITH SOIL GAS PROBE LOCATIONS AND PROPOSED WELL LOCATIONS

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APPENDIX A

LABORATORY DATA SHEETS

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NET
NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Formerly: ANATEC Labs, Inc.

John Sturman
Levine-Fricke
1900 Powell St.,12th Floor
Emeryville, CA 94608

06-13-89
NET Pacific Log No: 6726
Series No: 430
Client Ref: John Sturman

Subject: Analytical Results for Mobile Laboratory Job, 3505 Broadway, Oakland
Received 06-08-89.

Dear Mr. Sturman:

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Submitted by:

Susan Joy Griffin
Group Leader
Gas Chromatography

Approved by:

William G. Rotz
Group Leader
Mobile Laboratory

/sm

RECEIVED
JUN 16 1989
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KEY TO ABBREVIATIONS

mean	: Average; the sum of the measurements divided by the total number of measurments.
mg/Kg (ppm)	: Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	: Concentration in units of milligrams of analyte per liter of sample, unless noted otherwise.
mL/L/hr	: Milliliters per liter per hour.
MPN/100 mL	: Most probable number of bacteria per one hundred milliliters of sample.
N/A	: Not applicable.
ND	: Not detected; the analyte concentration is less than the listed reporting limit.
NR	: Not requested.
NTU	: Nephelometric turbidity units.
RL	: Reporting limit.
RPD	: Relative percent difference, $[V^1 - V^2 / V \text{ mean}] x100$.
SNA	: Standard not available.
ug/Kg (ppb)	: Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	: Concentration in units of micrograms of analyte per liter of sample.
ug/filter	: Concentration in units of micrograms of analyte per filter.
umhos/cm	: Micromhos per centimeter.
*	: See cover letter for details.

THE COVER LETTER AND KEY TO ABBREVIATIONS ARE AN INTEGRAL PART OF THIS REPORT

Parameter	Reporting Limit (ug/L)	SG-1 8' 06-06-89 0950 (-28966)	SG-2 9' 06-06-89 1015 (-28967)	SG-3 9' 06-06-89 1230 (-28968)	SG-4 9' 06-06-89 1240 (-28969)	SG-5 10' 06-06-89 1350 (-28970)
		Descriptor, Lab No. and Results (ug/L)				
PETROLEUM HYDROCARBONS						
Volatile, as Gasoline	50	1800	45	4500	8300	14000
Benzene	0.5	85	1.4	230	430	750
Ethyl benzene	0.6	36	0.6	9.0	90	150
Toluene	0.5	94	2.0	240	510	820
Xylenes, total	1.5	210	3.7	35	370	630

Parameter	Reporting Limit (ug/L)	SG-6 8.5' 06-06-89 1420 (-28971)	SG-7 9' 06-06-89 1520 (-28972)	SG-8 9' 06-06-89 1522 (-28973)	SG-9 9' 06-06-89 1620 (-28974)	SG-10 9' 06-06-89 1645 (-28975)
		Descriptor, Lab No. and Results (ug/L)				
PETROLEUM HYDROCARBONS						
Volatile, as Gasoline	50	12000	10000	60	ND	1600
Benzene	0.5	710	660	3.0	0.3	58
Ethyl benzene	0.6	71	16	0.6	ND	7.5
Toluene	0.5	650	530	3.3	0.3	100
Xylenes, total	1.5	260	50	1.6	ND	28