Applied GeoSystems, Inc.
A RESNA Company

RESNA
Working To Restore Nature

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
Fax: (408) 264-2435

May 12, 1992
0511RROB
61006.03

Mr. Robert Robles
Texaco Environmental Services
10 Universal City Plaza, 7th Floor
Universal City, California 91608-7812

Subject: Conclusions and Recommendations to accompany the Letter Report of a Vapor-Extraction Test at the Former Texaco Service Station, 1127 Lincoln Avenue, Alameda, California.

Mr. Robles:

As requested by Texaco Environmental Services (TES), the attached letter report presents the methods, results, and conclusions of the vapor-extraction test (VET) performed by RESNA Industries (RESNA) at the subject site and summarizes the information to date regarding previous work at the site. The primary objective of this VET was to collect operational data to evaluate the efficiency and practicality of vapor extraction as a soil remediation alternative at the subject site.

Work performed for this VET included:

- Performing a vapor extraction test (VET)
- Submitting vapor samples for laboratory analysis
- Reviewing previous environmental work performed at this site
- Preparing this letter report of results and conclusions
- Preparing a cost estimate for the recommended work

At the request of TES, RESNA is including recommendations for future work at the subject site in this executive summary. In addition, we have included an estimated budget and preliminary time schedule (Plate A) to perform the recommended future work.

CONCLUSIONS

Based on the results of this VET and on previous work performed at the site, RESNA concludes the following:

- Vapor extraction is a practical and cost effective interim soil remediation alternative at this site, but the efficiency of extraction is currently inhibited by the high groundwater table (5 to 10 feet below grade year round). Use of all existing vapor-extraction wells will be required to remove gasoline hydrocarbon-bearing vapor from onsite soil above the groundwater table with a total maximum airflow estimated at less than 150 cubic feet per minute (cfm) with an effective radius of influence of approximately 18 feet is predicted at each vapor-extraction well, if the existing water table does not drop or can be suppressed by 5 to 10 feet below its present level.

- The highest soil gasoline hydrocarbon concentrations are at or below the groundwater table. The high groundwater table severely restricts the lateral and vertical areas of effective vapor extraction.

- The vertical and lateral extent of gasoline hydrocarbons in soil has not yet been determined, so that it is not known whether existing vapor wells can adequately remediate any offsite soils that may be impacted with gasoline hydrocarbons.

- The high groundwater table severely restricts the lateral and vertical areas of effective vapor extraction. If the existing water table drops by approximately 5 to 10 feet or if a pump test determines that the groundwater table can be lowered at least 5 to 10 feet below the existing groundwater table, the air flow rates are predicted to increase to as high as 300 to 400 cfm, and the radius of influence can be increased because the soils are primarily silty sands. Consequently the cleanup time is predicted to be substantially reduced if the groundwater table can be lowered to at least 5 to 10 feet below existing groundwater table.

RECOMMENDED WORK

Based on the results of this VET and prior work performed at the site, RESNA recommends the following:

Task 1. Aquifer Pump Tests

Perform a step-drawdown test, 24-hour pump test, and estimated six-hour recovery test on monitoring well MW-3 to evaluate sustainable pumping rates and capture radii for the design of a groundwater remediation system. Work includes site set-up and performing the initial step-drawdown test. Water generated during testing will be stored in a 6,500-gallon Baker tank and, upon completion of the testing, the pump test equipment, water, and Baker tank will be removed from the site. A report on the pump test will be prepared. This letter report will include the results of the pump test including transmissivity, storativity, and an interpreted capture radius and continuous pumping rate for engineering design, as well as field methods, and recommendations on the proposed interim remediation alternative for the site.

Task 2. Interim Remedial Action Work Plan

Prepare an Interim Remedial Action Plan (IRAP) for this site and submit it to the California Regional Water Quality Control Board (RWQCB) and the Alameda County Health Care Services Agency (ACHCSA). The IRAP should describe the proposed vapor extraction system, (and groundwater remediation system, if determined feasible by the pump test), proposed system layout, the preliminary construction and operation start-up schedule, and the proposed start-up sampling plan. This task includes engineering and drafting, project management, and support staff necessary for IRAP preparation.

Task 3. Design of Construction Plans and Specifications

This task is the design of the vapor extraction system (VES), including preparation of engineering Plans and equipment Specifications. The scope of the design will be limited to the engineering necessary to obtain Air and Water Discharge Permits, and Building Permits (Task 4) and Contractor Bids (Task 5). Work also includes engineering calculations, in-house Plan checking, one set of minor revisions to the Plans and Specifications by TES, and one by the City Building and Planning Departments.

Task 4. Air Quality Permits and Building Permits

An Authority to Construct and a Permit to Operate the VES will be prepared and submitted to the Bay Area Air Quality Management District (BAAQMD) to allow for construction of the proposed VES. Permits for both the initial abatement system and long-term abatement system will be applied for simultaneously for expediency. Additionally, a water discharge permit will be prepared. A building permit for construction will also be obtained by submitting the Plans and Specifications to the City Building, Planning, and Fire Departments. A Hazardous Waste Storage Permit for condensate collected during operation will also be required by the City Fire Department. One set of minor revisions to the permits to incorporate regulatory agency comments is planned. A Hazardous Materials Management Plan (HMMP), if required by the Fire Department is not included within this scope of work.

Task 5. Bid Phase Services

Prepare a Request for Bid for at least three qualified contractors. Upon receipt of contractor bids, an estimated construction budget can be submitted to TES along with a schedule to construct and begin interim remediation of the soil beneath the site. Interim remediation should begin after the engineering plans and specifications have been approved by the local city agencies, and an Authority to Construct/Permit to Operate has been issued by the BAAQMD. This task includes drafting, project management, review of contractor license and qualification capabilities, meeting with contractors to discuss construction details, and support staff necessary to select the engineering contractor for the construction of the interim remediation system.

Attached is an Estimated Budget and Preliminary Time Schedule (Plate A) to perform Tasks 1 through 5.

RESNA recommends that copies of this letter report should be forwarded to:

Mr. Ariu Levi
Alameda County Health care services Agency
Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 95621

Santa Clara County Program Coordinator
Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

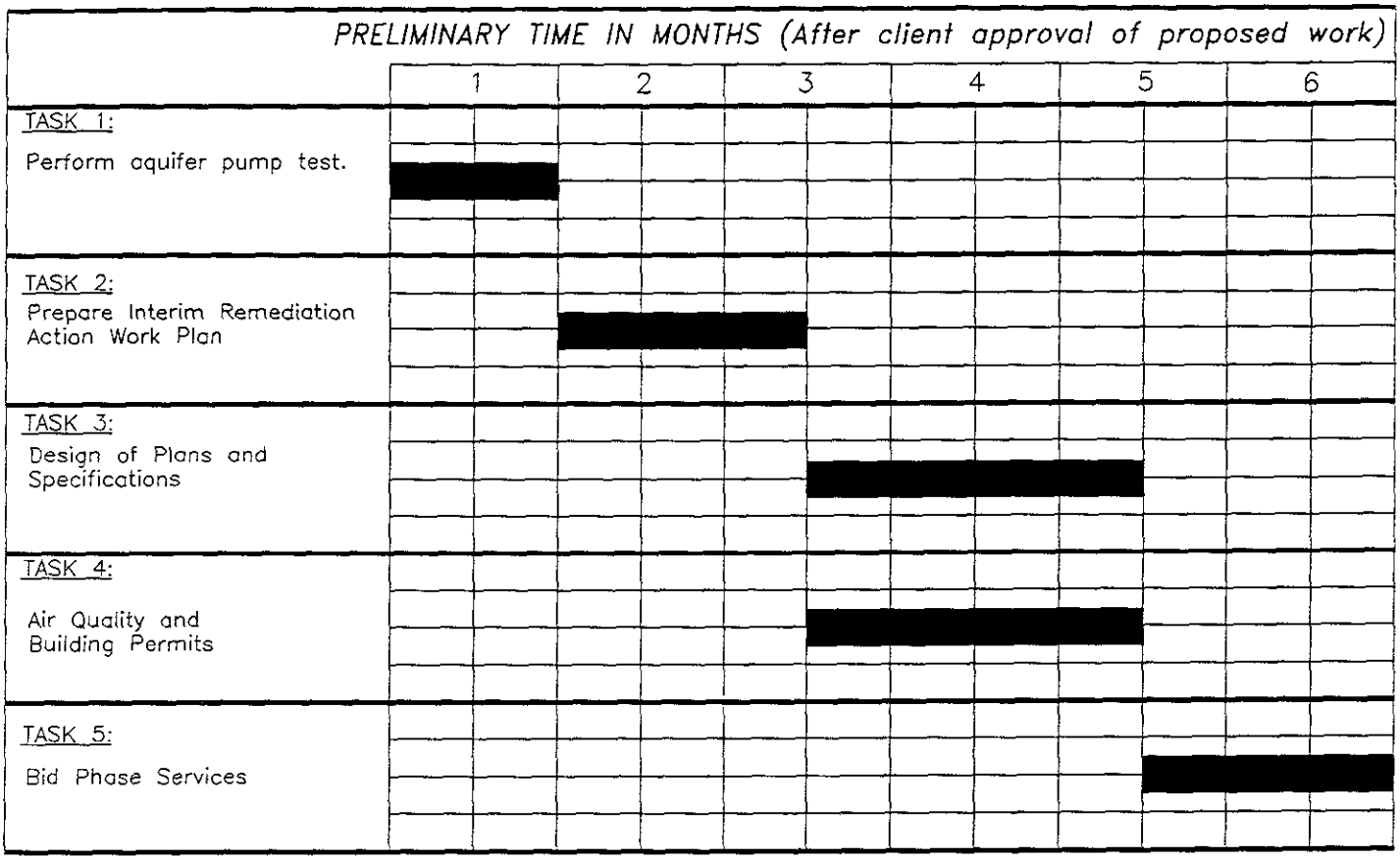
If you have any questions or comments regarding this letter report or attached data, please call us at (408) 264-7723.

Sincerely,
RESNA Industries

Dave Higgins
Project Geologist

Attachments: Plate A: Preliminary Time Schedule
Estimated Budget (2 pages)

Enclosure: Vapor-Extraction Test Letter Report



RESNA

PROJECT 61006.03

PRELIMINARY TIME SCHEDULE
Former Bay Street Texaco Station
1127 Lincoln Avenue
Alameda, California

PLATE

A

**ESTIMATED BUDGET FOR
PUMP TEST, DESIGN AND PERMITTING
OF AN INTERIM REMEDIATION SYSTEM AT
Former Bay Street Texaco Station
1127 Lincoln Avenue
Alameda, California
(Page 1 of 2)**

Costs include a step-drawdown test, 24 hour pump test, and report of results; preparation of an interim remedial action plan (IRAP); design of engineering Plans and Specifications for the interim remediation system, permitting of the system; and Bid Phase services. The total estimated budget is **$32,900** which is valid for 30 days from the date of preparation of this proposal.

TASK 1: **Aquifer Pump Tests** **$9,900**

Costs include travel to the site, field equipment, engineering and geologists services, disposal of pump test water, office preparation time, report write-up, drafting time, and project management.

TASK 2: **Interim Remedial Action Work Plan** **$3,000**

Costs of this task include engineering and drafting time, project management, and support staff.

TASK 3: **Design of Construction Plans and Specifications** **$9,500**

Costs include engineering design of the interim remediation system, including preparation of Plans and Specifications. This task includes engineering and drafting, data analysis,equipment selection, project management, support staff, and one site visit. The scope of the design will be limited to the engineering necessary to obtain Air and Building Permits (Task 4) and Contractor Bids (Task 5).

**ESTIMATED BUDGET FOR
PUMP TEST, DESIGN AND PERMITTING
OF AN INTERIM REMEDIATION SYSTEM AT
Former Bay Street Texaco Station
1127 Lincoln Avenue
Alameda, California
(Page 2 of 2)**

TASK 4:	**Air and Water Permits and Building Permits**	**$7,000**

Costs include State and local permit fees, engineering and drafting, permit preparation, project management, and support staff.

TASK 5:	**Bid Phase Services**	**$3,500**

Costs include engineering and project management time, one meeting with Contractors.

TOTAL ESTIMATED BUDGET:	**$32,900**

This is not a bid or a cost quote; it is an estimated budget based on our understanding of the site. If site conditions alter the scope of the proposed work, additional costs may be incurred or costs may be reduced. If unforeseen conditions are encountered, we will notify TES before continuing work. All work will be charged as time and materials according to the rates listed in the 1992 Texaco Fee Schedule.

Bob Robles
Environmental Coordinator
(818) 505 2476

Texaco Refining
and Marketing Inc

10 Universal City Plaza
Universal City CA 91608

May 19, 1992

Mr. Scott O. Seery
ALAMEDA COUNTY DEPARTMENT OF
ENVIRONMENTAL PROTECTION
80 Swan Way, Room 200
Oakland, CA 94621

SUBJECT: FORMER SERVICE STATION SITE
1127 Lincoln Avenue
Alameda, California

Dear Mr. Seery:

Enclosed for your review is a copy of the results of a vapor extraction test that was recently completed at the above site. We are still evaluating the data contained in this report. However, we can conclude from this report that further studies are required to determine if we can lower the water table in order to significantly affect the cleanup of the underlying soils.

If you have any questions or wish to discuss this further, please call me at (818) 505 2476.

Very truly yours,

Bob Robles

RR:rr
pr

Enclosure

Mr.Leo Pagano
1104 Fountain Street
Alameda, California 94501

California Regional Water Quality Control Board
San Francisco Bay Region
Attention: Rich Hiett
2201 Webster Street, Suite 500
Oakland, California 94612

RRZielinski-Richmond

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3315 Almaden Expressway, Suite 34
San Jose, CA 95118
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LETTER REPORT
VAPOR-EXTRACTION TEST
at
Former Bay Street Texaco Station
1127 Lincoln Avenue
Alameda, California

61006.03 5/12/92

Report prepared for
Texaco Environmental Services
10 Universal City Plaza, 7th Floor
Universal City, California 91608

by
RESNA Industries

Michael J. Hodges
Project Engineer

Philip J. Mayberry
Project Geologist

Joan E. Tiernan, Ph.D., P.E.
Engineering Manager

May 12, 1992

REGISTERED PROFESSIONAL ENGINEER
JOAN E. TIERNAN
No C 044600
Exp. 3-31-94
CIVIL
STATE OF CALIFORNIA

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RESNA
Working To Restore Nature

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May 12, 1992
0511RROB
61006.03

Robert Robles
Texaco Environmental Services
10 Universal City Plaza, 7th Floor
Universal City, California 91608-7812

Subject: Letter Report on a Vapor-Extraction Test Performed at Former Texaco Station, 1127 Lincoln Avenue, Alameda, California.

Mr. Robles:

At the request of Texaco Environmental Services (TES), RESNA Industries (RESNA) has prepared this letter report summarizing the results and conclusions of the vapor-extraction test (VET) performed at the subject site on March 10, 1992. The VET had two objectives: (1) to collect operational data to evaluate the efficiency and practicality of vapor extraction as a soil remediation alternative; and (2) to select the most appropriate off-gas treatment alternative, if the operational data suggest that vapor extraction is a viable soil remediation alternative. The site location is shown on the Site Vicinity Map, Plate 1.

PREVIOUS WORK

In March and April 1991, RESNA installed three groundwater monitoring wells (MW-1 through MW-3), five vapor-extraction wells (VW-1 through VW-5), and drilled seven soil borings at the subject site (Plate 2, Generalized Site Plan). Total petroleum hydrocarbons reported as gasoline (TPHg) in soil ranged from below laboratory detection limits to 9,200 parts per million (ppm) with the greatest concentrations in the eastern portion of the site, at approximately 8½ feet below ground surface (bgs). The depth to water levels have ranged 6 feet bgs to 9½ feet bgs.

Quarterly groundwater monitoring has detected TPHg concentrations ranging from nondetectable to 4,500 parts per billion (ppb). Benzene concentrations have ranged from nondetectable to 1,300 ppb. TPHg and benzene have been detected in all wells since quarterly monitoring began in March 1991 (RESNA, September 1991, January and March 1992).

FIELD WORK

RESNA performed a one day onsite VET on March 10, 1992. The vapor-extraction equipment consisted of: a six-cylinder internal combustion (I.C.) engine; a sampling pump; instrumentation for measuring air flow, air velocity, air pressure, temperature, and volatile organic compound concentrations; and polyvinyl chloride (PVC) piping, fittings, and wellhead connections. RESNA performed the VET in accordance with Bay Area Air Quality Management District (BAAQMD) guidelines.

Three groundwater monitoring wells (MW-1, MW-2, and MW-3) and five vapor-extraction wells (VW-1, VW-2, VW-3, VW-4, and VW-5) were utilized during the VET. Prior to the start of the VET, depth-to-water was measured in all onsite monitoring wells (Table 1).

Recent rains and seasonal groundwater elevation fluctuations have reduced the screened interval available above groundwater in all onsite wells to 0.7 to 1.7 feet. This relatively short available screened interval prevented the use of vapor extraction and flow rates that are typical during a VET, and impacted the test results.

RESNA operated the vapor-extraction equipment on MW-2, the well with the longest available screen interval (1.7 feet), while monitoring the change in induced vacuum response at observation wells VW-5 and VW-2. The distances between well MW-2 and wells VW-5 and VW-2 are 14 feet and 18 feet, respectively. The air flow rate on MW-2 (vapor-extraction well) was approximately 27 cubic feet per minute (cfm) at an applied vacuum of approximately five inches of water column.

The vapor-extraction equipment was operated for approximately three hours to evaluate whether the initial hydrocarbon concentrations in extracted vapor would decrease with time, and to collect additional data to determine the radius of influence of each vapor extraction well. Influent samples were collected ten minutes, one hour, two hours, and three hours after start-up of the vapor-extraction equipment. The sampling pump extracted vapor from each well for a minimum of ten minutes before readings were taken or samples collected. These samples were submitted for laboratory analysis. A portable field combustible gas meter was used to monitor influent vapor concentrations from the extraction well.

LABORATORY METHODS

Ten vapor samples were collected in one-liter Mylar sample bags for laboratory analysis. The vapor samples were analyzed for TPHg and benzene, toluene, ethyl benzene, and total xylene isomers (BTEX) using EPA Methods 8020/8015 by GTEL Environmental Laboratories, Inc. in Concord, California (Hazardous Waste Testing Laboratory Certification

No. 0194). Chain-of-Custody and Laboratory Analysis Report for Vapor Samples are attached as Appendix A.

FIELD AND LABORATORY RESULTS

Field Results

With the I.C. engine operating on MW-2 for approximately three hours, induced vacuum responses were seen in observation wells VW-5 and VW-2 located 14 and 18 feet, respectively from the vapor-extraction well. At a vacuum of 5.0 to 5.5 inches of water column in MW-2 and flow rates of 26 to 28 cfm, the induced vacuums ranged from 0.045 to 0.06 inches of water in the observation wells. This low vacuum response was due primarily to the very small available screen area which ranged from 0.7 feet in VW-5 to 1.7 feet in MW-2; rather than to soil characteristics. This is discussed in more detail in "Discussion" below. The estimated effective radius of influence with this high groundwater table is approximately 18 feet. The effective area of influence is shown in Plate 4. The field results of the VET are summarized in Table 2, Vapor-Extraction Test Field Monitoring Data.

With the I.C. engine operating at a steady-state, there was a slight decrease in observed vacuum and a slight increase in the observed extracted air flow rates. This may be caused by a gradual drying of the soil.

Observed field organic vapor monitoring of extracted vapor using a combustible gas meter at each of the onsite wells reported vapor concentrations in the range of 100 to 31,500 parts per million (ppm).

Laboratory Results

The results of laboratory analyses of vapor samples collected at the vapor-extraction and groundwater monitoring wells, and at the exhaust point of the I.C. engine are summarized on Table 3, Laboratory Analyses of Vapor Samples. Copies of the Chain-of-Custody Record and laboratory analysis reports for the vapor samples collected are attached in Appendix A. Analytical results indicate benzene and TPHg influent concentrations ranging from 47 to 720, and 850 to 34,000 milligrams per cubic meter (mg/m^3), respectively. Analysis of the effluent sample from the I.C. engine, collected to verify the destruction efficiency of the engine, reported benzene and TPHg concentrations of 2 and 51 mg/m^3, respectively. Results of the VET indicate a benzene and TPHg destruction efficiency of 96.0 and 97.2 percent respectively, with the use of an I.C. engine.

DISCUSSION

Discussion of Results

Laboratory results of vapor samples indicate significant levels of gasoline hydrocarbons throughout the eastern portion of the site, in the areas of wells VW-2 and VW-3. See Plate 3, TPHg in Soil at 5½ to 8½ Feet. The relatively low TPHg concentrations reported for well VW-4 may be attributed to the absence of exposed screen interval during the VET. RESNA estimates that the initial TPHg concentration of all wells combined may be as high as 10,000 ppmv (36,000 to 45,000 mg/m^3) at the start-up of the vapor-extraction system.

Due to the high groundwater table which averaged approximately six feet below ground surface (bgs) on March 10, 1992, the observed vacuum impact was low. This is due primarily to restricted air flow as a result of available screened well depths of 0.7 to 1.7 feet. Generally, a minimum of 10 feet of well screen in each well is necessary to obtain optimum air flow. A previous subsurface investigation (RESNA, August 1991) has established that the subsurface geology at the site is primarily fine- to medium-grained silty sand with minor silty gravel, which generally has good air flow characteristics when adequate screen area is available for vapor extraction. The vacuum monitoring results were obtained with an extraction vacuum, flow rate, and well screen area significantly less than a typical operating vapor-extraction system, and thus indicate good communication in the silty sand to silty gravel.

RESNA utilized the sieve analysis, results of the VET, boring logs (including blow counts and soil descriptions), and results at sites with similar subsurface conditions to approximate an effective area of influence using all existing onsite wells. RESNA estimates that without a groundwater system to lower the groundwater table, the vapor-extraction system effective radius of influence will be approximately 18 feet with a total air flow of less than 150 cfm and will include all of the areas of concern in the eastern portion of the site that are above the groundwater table. However, little or no impact will be seen on the impacted soil below the groundwater table. The above-mentioned area of influence can be achieved by inducing a vacuum of approximately 25 inches of water column with an air flow of approximately 50

cfm at each vapor-extraction well. Since the lateral extent of gasoline hydrocarbons have not yet been determined, it is not known at this time whether the existing wells will be adequate to remediate any possible offsite gasoline-impacted soil. This estimated effective area of influence is shown in Plate 4.

Presently, the high groundwater table appears to be present year round (5 to 10 feet bgs) with the highest concentrations of TPHg in soil at or below the water table (RESNA, August 1991). If at some later date it is determined that the existing groundwater table can be suppressed 5 to 10 feet, it may be possible to achieve a significantly larger effective radius of influence and a total air flow up to about 400 cfm.

Potential Interim Remediation Alternatives

The Bay Area Air Quality Management District (BAAQMD) will typically approve four alternatives to control off-gas emissions. These alternatives are thermal oxidation, catalytic oxidation, carbon adsorption, and destruction by an I.C. engine. The high initial hydrocarbon concentrations make the use of both a catalytic oxidizer and activated carbon cost prohibitive. With the present groundwater elevations, the recommended off-gas abatement alternative is an I.C. engine, because I.C. engines are typically used when high concentrations of TPHg exist in extracted vapor and when the soil yields flow rates of less than 150 cfm. With the high groundwater table, air flows are predicted to be less than 150 cfm. A pump test could be performed to determine if the groundwater table can be suppressed at least 5 to 10 feet bgs by groundwater extraction. At that time, another off-gas abatement device which can process higher air flow rates may be recommended.

When hydrocarbon concentrations have been reduced to about 100 ppm by use of the I.C. engine or thermal oxidizer, the off-gas abatement system can be modified to an activated carbon adsorption system to decrease operating costs.

Each vapor-extraction well can be equipped with vacuum gauges, sample ports and valves so that flow out of each well can be adjusted to maximize the rate at which hydrocarbons are removed from the soil. A vapor-extraction system will direct vapor from the five existing vapor wells (VW-1 through VW-5) and convey the vapor to the remediation compound. At the compound, the air will pass through a condensate separator, particulate filters, vacuum blower, and then to the selected off-gas abatement process, and discharged through an exhaust stack.

CONCLUSIONS

Based on the results of this VET and on previous work performed at the site, RESNA concludes the following:

- Vapor extraction is a practical and cost effective interim soil remediation alternative at this site, but the efficiency of extraction is currently inhibited by the high groundwater table (5 to 10 feet below grade year round). Use of all existing vapor-extraction wells will be required to remove gasoline hydrocarbon-bearing vapor from onsite soil above the groundwater table with a total maximum airflow estimated at less than 150 cfm with an effective radius of influence of approximately 18 feet is predicted at each vapor-extraction well, if the existing water table does not drop or can be suppressed by 5 to 10 feet below its present level.

- The highest soil gasoline hydrocarbon concentrations are at or below the groundwater table. The high groundwater table severely restricts the lateral and vertical areas of effective vapor extraction.

- The vertical and lateral extent of gasoline hydrocarbons in soil has not yet been determined, so that it is not known whether existing vapor wells can adequately remediate any offsite soils that may be impacted with gasoline hydrocarbons.

- The high groundwater table severely restricts the lateral and vertical areas of effective vapor extraction. If the existing water table drops by approximately 5 to 10 feet or if a pump test determines that the groundwater table can be lowered at least 5 to 10 feet below the existing groundwater table, the air flow rates are predicted to increase to as high as 300 to 400 cfm, and the radius of influence can be increased because the soils are primarily silty sands. Consequently the cleanup time is predicted to be substantially reduced if the groundwater table can be lowered to at least 5 to 10 feet below existing groundwater table.

It is recommended that copies of this letter report be forwarded to:

Mr. Ariu Levi
Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 95621

Mr. Tom Callaghan
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Please call us at 408-264-7723, if you have any questions regarding this letter report.

Sincerely,
RESNA Industries

Michael J. Hodges
Project Engineer

Philip J. Mayberry
Project Geologist

Joan E Tiernan, Ph.D., P.E.
Engineering Manager

Attachments:

References
Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, TPHg in Soil at 5-1/2 to 8-1/2 Feet
Plate 4, Area of Influence of Upper Extraction System

Table 1, Available Well Screen Survey
Table 2, Vapor-Extraction Test Field Monitoring Data
Table 3, Laboratory Analysis of Vapor Samples

APPENDIX A, Chain of Custody and Laboratory Analysis Reports for Vapor Samples

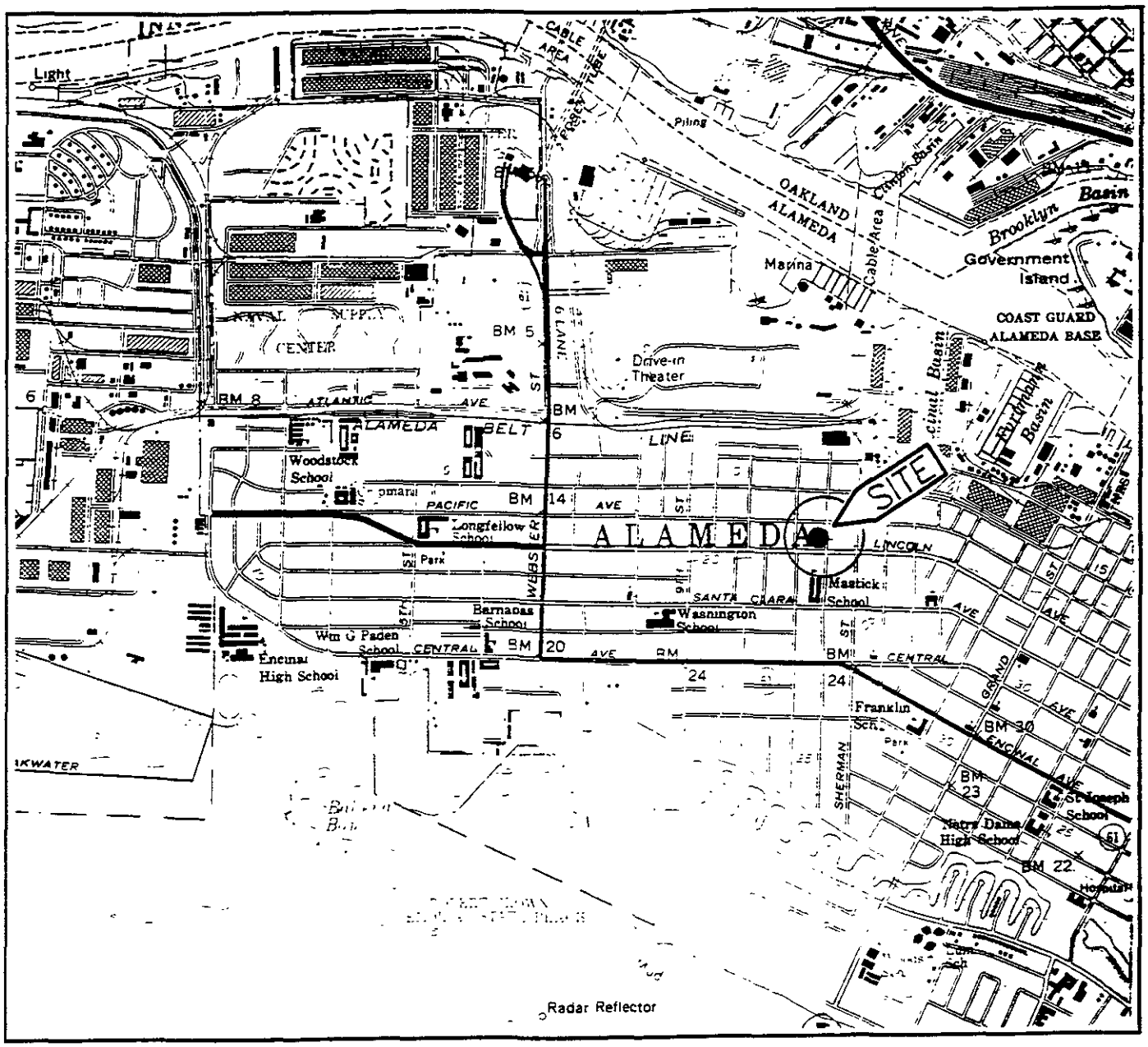
REFERENCES

RESNA, August 1991, Initial Subsurface Environmental Investigation at Former Bay Street Station, 1127 Lincoln Avenue, Alameda, California. RESNA Report No. 61006.01.

RESNA, September 24, 1991, Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1991 at Former Bay Street Texaco Station, 1127 Lincoln Avenue, Alameda, California. RESNA Report No. 61006.01.

RESNA, January 9, 1992, Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1991 at Former Bay Street Texaco Station, 1127 Lincoln Avenue, Alameda, California. RESNA Report No. 61006.01.

RESNA, March 23, 1992, Letter Report, Quarterly Groundwater Monitoring, First Quarter 1992 at Former Bay Street Texaco Station, 1127 Lincoln Avenue, Alameda, California. RESNA Report No. 61006.01.

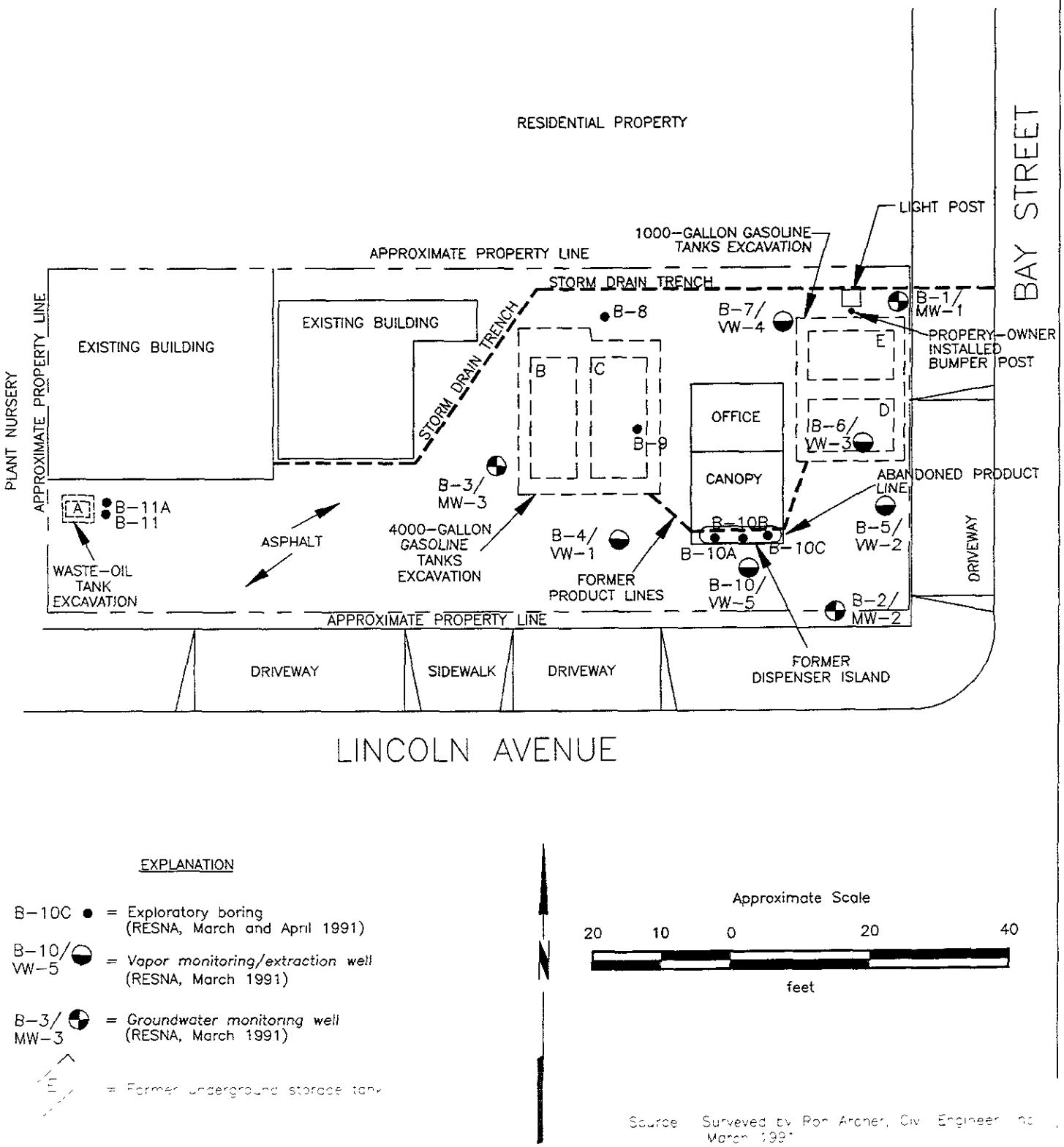


RESNA

SITE VICINITY MAP
Former Bay Street Texaco Station
1127 Lincoln Avenue
Alameda, California

PLATE 1

PROJECT 61006.03



EXPLANATION

B-10C ● = Exploratory boring (RESNA, March and April 1991)

B-10/ VW-5 = *Vapor monitoring/extraction well* (RESNA, March 1991)

B-3/ MW-3 = *Groundwater monitoring well* (RESNA, March 1991)

E = Former underground storage tank

Approximate Scale

20 10 0 20 40

feet

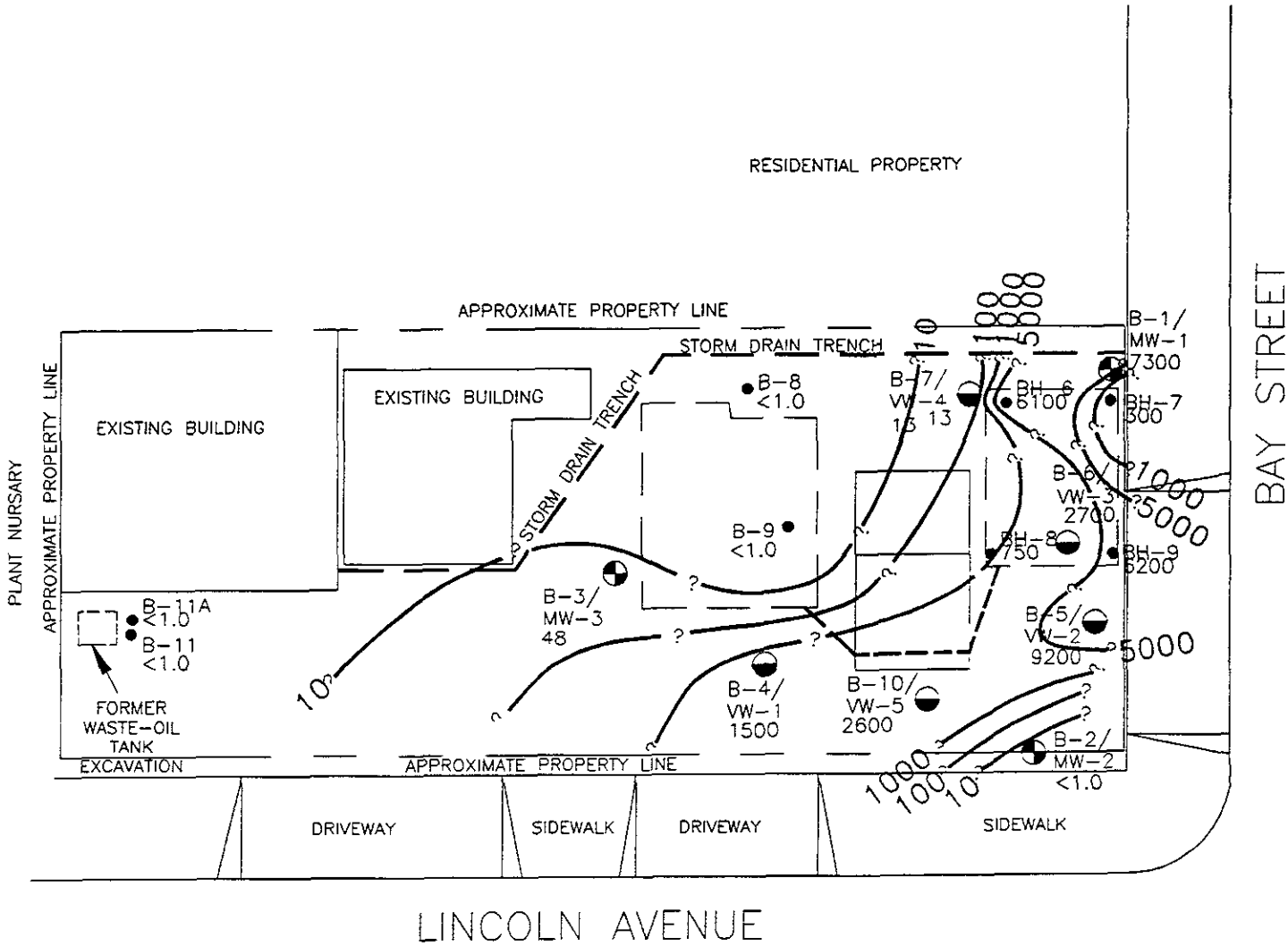
Source: Surveyed by Pon Archer, Civ. Engineer, inc. March 1991

RESNA

PROJECT 61006.03

GENERALIZED SITE PLAN
Former Bay Street Texaco Station
1127 Lincoln Avenue
Alameda, California

PLATE
2



5000 = Line of equal concentration of TPHg in soil, at 5-1/2 to 8-1/2 feet

EXPLANATION

9200 = Concentration of TPHg in soil in ppm, at 5-1/2 to 8-1/2 feet, March 1991

BH-9 ● = Soil sampling locations (by Environmental-Bio-Systems, 9/11/89)

B-11A ● = Soil boring (Applied GeoSystems, March and April 1991)

B-10/ VW-5 = Vapor extraction well (Applied GeoSystems, March 1991)

= Monitoring well (Applied GeoSystems, March 1991)

N

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer, Civil Engineer, no March 199

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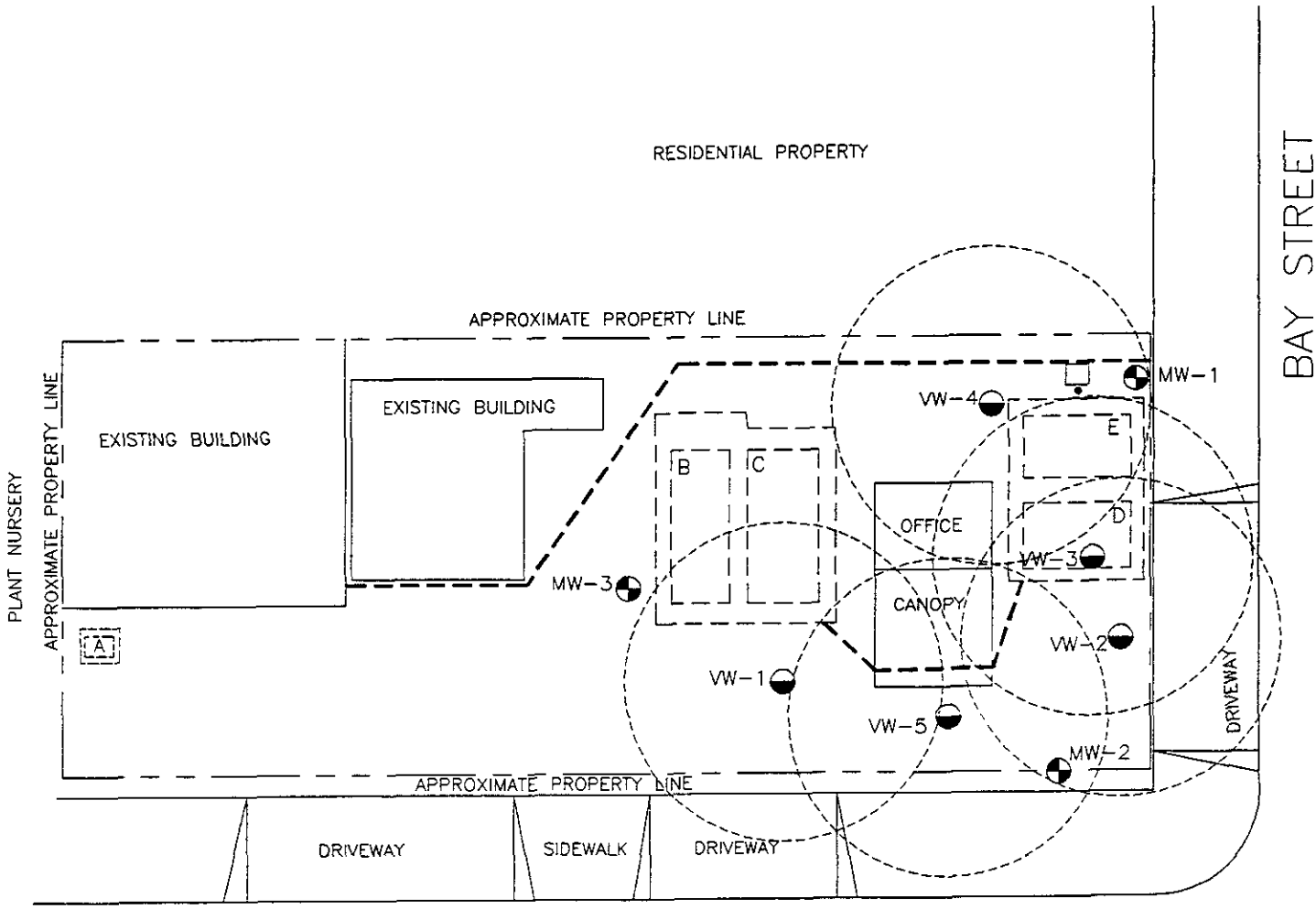
PROJECT 61006.03

TPHg IN SOIL
AT 5-1/2 to 8-1/2 Feet
Former Bay Street Texaco Station
1127 Lincoln Avenue
Alameda, California

PLATE
3



EXPLANATION

- E = Former underground storage tank
- VW-5 = Vapor monitoring/extraction well (RESNA, March 1991)
- MW-3 = Groundwater monitoring well (RESNA, March 1991)
- = Approximate area of influence of Upper Extraction System

N

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer Civ. Engineer Inc. March 1991

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Working to Restore Nature

PROJECT 61006.03

AREA OF INFLUENCE OF UPPER EXTRACTION SYSTEM
Former Bay Street Texaco Station
1127 Lincoln Avenue
Alameda, California

PLATE 4

TABLE 1
AVAILABLE WELL-SCREEN SURVEY
Former Texaco Station
Alameda, California
March 10, 1992

Well Number	Depth to Water	Top of Screen BGS	Bottom of Screen BGS	Total Screen	Available Screen
MW-1	6.09	5.0	21.5	16.5	1.1
MW-2	6.68	5.0	20.5	15.5	1.7
MW-3	6.30	5.0	20.0	15.0	1.3
VW-1	6.37	6.0	9.5	3.5	1.4
VW-2	6.65	6.0	9.5	3.5	1.6
VW-3	6.24	5.5	8.0	2.5	0.7
VW-4	5.70	6.0	8.5	2.5	0.0
VW-5	6.68	6.0	8.0	2.0	0.7

All Table Entries are dimensions measured in feet.
BGS: Below Ground Surface.

TABLE 2
VAPOR EXTRACTION TEST FIELD MONITORING DATA
March 10, 1992

Well Number	Concentration	Oxygen Percent	Subj. (Odor)	Elapsed Time (min)
MW-3	100	12	None	10
VW-1	12,000	5	Strong, old	10
VW-4	1,500	18	Strong, old	10
MW-1	100	18	None	10
VW-3	31,500	9	Strong	10
VW-5	14,300	10	Strong	10
VW-2	22,900	12	Strong	10

Influent Air Stream					Observation Wells	
					VW-5	VW-2
Flow cfm	Concentration	Applied Vacuum	Temp. °F	Elapsed Time (min)	Induced Vacuum	Induced Vacuum
26	2,200	5.1	62	10	0.060	0.060
26	NR	5.5	64	40	0.055	0.060
26	1,800	5.5	66	60	0.055	0.055
26	1,800	5.5	68	70	0.055	0.055
28	1,800	5.0	68	120	0.050	0.050
28	1,900	5.5	68	180	0.045	0.045
				Distance from extraction well MW-2 (feet):	14	18

Flow measured in cubic feet per minute (CFM).
Concentration measured in parts per million by volume (ppmv) on Combustible Gas Meter.
Vacuum measured in inches of water column.

TABLE 3
LABORATORY ANALYSIS OF VAPOR SAMPLES
Former Texaco Station
Alameda, California
March 10, 1992

Sample ID	Sample Location	Elapsed Time of Sample	TPHg	B	T	E	X
A-MW2-10	MW-2	10	2,000	64	75	21	63
A-MW2-60	MW-2	60	1,900	55	43	17	51
A-MW2-120	MW-2	120	1,700	47	29	13	40
A-MW2-180	MW-2	180	1,800	50	26	14	42
A-EFF*	EFF*	180	51	2	7	2	7
A-VW1-10	VW-1	10	7,100	200	150	86	250
A-VW4-10	VW-4	10	850	55	100	10	40
A-VW3-10	VW-3	10	18,000	720	95	89	260
A-VW2-10	VW-4	10	34,000	620	340	110	340
A-VW5-10	VW-5	10	7,400	190	150	62	180

Concentrations reported in milligrams per cubic meter
TPHg: Total petroleum hydrocarbons reported as gasoline (analyzed by EPA Method 8015).
B: benzene, T: toluene, E: ethyl benzene, X: total xylene isomers
BTEX: Analyzed by EPA Method 8020.
*: Effluent vapor sampled after abatement by the internal combustion engine.

APPENDIX A

CHAIN OF CUSTODY AND LABORATORY ANALYSIS REPORTS FOR VAPOR SAMPLES

RESNA

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

PROJECT NO.	PROJECT NAME/SITE		P.O. #:
61006.03	Former Texaco Alameda	1127 Lincoln Ave. Alameda, CA.	

SAMPLERS (SIGN) _____ (PRINT) Patrick Lamb

SAMPLE IDENTIFICATION	DATE	TIME	COMP	GRAB	PRES. USED	ICED	NO. CONTAINERS	SAMPLE TYPE	BTEX (602/8020)	TPHg (8015)	TPHd (8015)	TOG 418.1/5520	601/8010	624/8240	625/8270	Note LEL Conc.'s	REMARKS
A-MW2-10 01	3/10/92	1035			NONE		1	A	X	X						2000	PLEASE REPORT
A-MW2-60 02		1135					1		X	X						2000	RESULTS IN mg/m^3
A-MW2-120 03		1216					1		X	X						2000	† FAX RESULTS
A-MW2-180 04		1335					1		X	X						2000	D. HIGGINS @
A-VW-1-10 05		1140					1		X	X						8000	(408) 264-2435
A-VW-4-10 06		1150					1		X	X						100	
A-VW3-10 07		1315					1		X	X						1000	
A-VW2-10 08		1450					1		X	X						3000	
A-VW5-10 09		1400			X		1		X	X						3000	
A-EFF 10		11:25					1		X	X						0	

RELINQUISHED BY	DATE	TIME	RECEIVED BY:	LABORATORY:	PLEASE SEND RESULTS TO:
	3/11/92	947		GTEL	DALE HIGGINS RESNA 3315 ALMADEN EXP SAN JOSE, CA 95118
RELINQUISHED BY	DATE	TIME	RECEIVED BY:		
RELINQUISHED BY	DATE	TIME	RECEIVED BY:	REQUESTED TURNAROUND TIME: NOTE 72 HR HOLD TIME REQUESTED REGULAR T.A. TIME	
RELINQUISHED BY	DATE 3/11/92	TIME 11:15	RECEIVED BY LABORATORY: Janice Davis	RECEIPT CONDITION:	PROJECT MANAGER: DALE HIGGINS

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080-C Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California
(510) 825-0720 (FAX)

Client Number: RSN04RSN04
Consultant Project Number: 61006.03
Project ID: 1127 Lincoln Ave.
Alameda, CA
Work Order Number: C2-03-291

March 16, 1992

Dave Higgins
RESNA Industries
3315 Almaden Expressway, #34
San Jose, CA 95118

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 03/11/92.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen
Laboratory Director

Client Number: RSN04RSN04
Consultant Project Number: 61006.03
Project ID: 1127 Lincoln Ave.
Alameda, CA
Work Order Number: C2-03-291

Table 1

ANALYTICAL RESULTS

Aromatic Volatile Organics and Total Petroleum Hydrocarbons as Gasoline in Air

Modified EPA Methods 8020 and 8015[a]

GTEL Sample Number		01	02	03	04
Client Identification		A-MW2-10	A-MW2-60	A-MW2-120	A-MW2-180
Date Sampled		03/10/92	03/10/92	03/10/92	03/10/92
Date Analyzed		03/11/92	03/11/92	03/11/92	03/11/92
Analyte	Detection Limit, mg/m^3	Concentration, mg/m^3			
Benzene	0.5	64	55	47	50
Toluene	0.5	75	43	29	26
Ethylbenzene	0.5	21	17	13	14
Xylene, total	0.5	63	51	40	42
BTEX, total	--	220	170	130	130
Gasoline	10	2000	1900	1700	1800
Detection Limit Multiplier		1	1	1	1

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Control Board LUFT Manual protocols, May 1988 revision.

Client Number: RSN04RSN04
Consultant Project Number: 61006.03
Project ID: 1127 Lincoln Ave.
Alameda, CA
Work Order Number: C2-03-291

Table 1 (Continued)

ANALYTICAL RESULTS

Aromatic Volatile Organics and
Total Petroleum Hydrocarbons as Gasoline in Air

Modified EPA Methods 8020 and 8015[a]

GTEL Sample Number		05	06	07	08
Client Identification		A-VW1-10	A-VW4-10	A-VW3-10	A-VW2-10
Date Sampled		03/10/92	03/10/92	03/10/92	03/10/92
Date Analyzed		03/11/92	03/11/92	03/11/92	03/11/92
Analyte	Detection Limit, mg/m^3	Concentration, mg/m^3			
Benzene	0.5	200	55	720	620
Toluene	0.5	150	100	95	340
Ethylbenzene	0.5	86	10	89	110
Xylene, total	0.5	250	40	260	340
BTEX, total	--	690	210	1200	1400
Gasoline	10	7100	850	18000	34000
Detection Limit Multiplier		1	1	1	1

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Control Board LUFT Manual protocols, May 1988 revision.

Client Number: RSN04RSN04
Consultant Project Number: 61006.03
Project ID: 1127 Lincoln Ave.
Alameda, CA
Work Order Number: C2-03-291

Table 1 (Continued)

ANALYTICAL RESULTS

Aromatic Volatile Organics and
Total Petroleum Hydrocarbons as Gasoline in Air

Modified EPA Methods 8020 and 8015[a]

GTEL Sample Number		09	10		
Client Identification		A-VW5-10	A-EFF		
Date Sampled		03/10/92	03/10/92		
Date Analyzed		03/11/92	03/11/92		
Analyte	Detection Limit, mg/m^3	Concentration, mg/m^3			
Benzene	0.5	190	2		
Toluene	0.5	150	7		
Ethylbenzene	0.5	62	2		
Xylene, total	0.5	180	7		
BTEX, total	--	580	18		
Gasoline	10	7400	51		
Detection Limit Multiplier		1	1		

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Control Board LUFT Manual protocols, May 1988 revision.