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March 18, 2003

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*Alameda County
MAR 26 2003
Environmental Health*

WORKPLAN FOR AN
OZONE-SPARGING TEST
at
Oakland Truck Stop
8255 San Leandro Street
Oakland, California

Submitted by:
AQUA SCIENCE ENGINEERS, INC.
208 West El Pintado Road
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Alameda County
Environmental Health
MAR 26 2003

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1.0 INTRODUCTION

This workplan presents Aqua Science Engineers, Inc. (ASE's) scope of work to conduct a feasibility test in order to evaluate the ozone-sparging technology at the Oakland Truck Stop located at 8255 San Leandro Street, in Oakland, California (Figures 1 and 2). This remediation technology was discussed and recommended as the preferred technology in ASE's corrective action plan (CAP) dated October 23, 2002. This workplan is intended to satisfy the request made by Mr. Barney Chan of the Alameda County Health Care Services Agency (ACHCSA) in his letter dated November 15, 2002 (Appendix A).

2.0 SITE HISTORY AND BACKGROUND INFORMATION

Please refer to the October 23, 2002 CAP for historical information.

3.0 SCOPE OF WORK (SOW)

ASE has developed the following scope of work to provide the necessary data for design and implementation of an ozone-sparging remediation system. The proposed SOW is as follows:

- 1) Prepare a workplan for approval by the ACHCSA. Obtain drilling permits from the Alameda County Public Works Agency (ACPWA).
- 2) Drill three soil borings to approximately 18-foot bgs and install an air sparging well in each boring.
- 3) Analyze a soil sample collected from each boring described above at a CAL-DHS certified analytical laboratory for total petroleum hydrocarbons as gasoline (TPH-G) by modified EPA Method 8015, TPH as diesel fuel (TPH-D) by modified EPA Method 8015, and MTBE, benzene, toluene, ethylbenzene and total xylenes (collectively known as MBTEX) by EPA Method 8021.
- 4) Collect a groundwater sample from each ozone-sparging well for analyses.
- 5) Analyze the groundwater samples at a CAL-DHS certified environmental laboratory for TPH-G by modified EPA Method 8015, TPH-D by modified EPA Method 8015, and MBTEX by EPA Method 8021.

- 6) Conduct an air sparging test for the site.
- 7) Prepare a report detailing the methods and findings of well installation and test.

TASK 1 - PREPARE A WORKPLAN AND OBTAIN DRILLING PERMITS

Based on the site history and the analytical results of soil and groundwater samples collected during previous assessments, ASE has prepared this workplan. A site-specific health and safety plan has been previously prepared for the site and will be present on-site at all times. ASE will obtain a drilling permit from the ACPWA. This permit will also be on-site at all times during the drilling portion of the project. ASE will also notify Underground Service Alert (USA) of the project at least 48 hours prior to subsurface drilling to have underground utility lines marked in the site vicinity.

TASK 2 - DRILL SOIL BORINGS AND INSTALL AIR SPARGING WELLS

Using a drill rig equipped with 5-inch diameter hollow-stem augers, three soil borings will be drilled in the locations depicted on Figure 3. The ultimate boring depth will be based on the lithology. It is ASE's intent to locate the screened casing at the top of the initial water bearing zone, estimated between 14 and 18-feet bgs.

Undisturbed soil samples will be collected continuously for subsurface hydrogeologic description and possible chemical analysis. The samples will be described by the ASE geologist according to the USCS. The samples will be collected by using a macro core sampler pushed by a Geoprobe hydraulic sampling rig. Each sample will be immediately removed from the sampler, trimmed, sealed with Teflon tape and plastic caps, secured with duct tape, labeled with the site location, sample designation, date and time the sample was collected, and the initials of the person collecting the sample. The samples will be placed into an ice chest containing wet ice for delivery under chain of custody to a CAL-DHS certified analytical laboratory.

Soil from the remaining tubes not sealed for analysis will be removed for hydrogeologic description and will be screened for volatile compounds with a photoionization detector (PID). The soil will be screened by

emptying soil from one of the tubes into a plastic bag. The bag will be sealed and placed in the sun for approximately 10 minutes. After the hydrocarbons have been allowed to volatilize, the PID will measure the vapor through a small hole punched in the bag. These PID readings will be used as a screening tool only since these procedures are not as rigorous as those used in an analytical laboratory.

The borings will be turned into ozone-sparging wells OS-1, OS-2 and OS-3. The wells will be constructed with 3/4-inch diameter PVC well casing with a 2-inch diameter by 30-inch long sparge point with 10-50 micron perforations at the bottom. These sparge points will be placed in the location of the permeable water-bearing zone estimated to be between 14 and 18-feet bgs. Lonestar #2/16 sand will be placed between the sparge point and the boring from the bottom of the boring to 1-foot above the top of the sparge point. A 0.5-foot thick bentonite layer will be placed between the sandpack and the overlying cement sanitary seal. A Portland cement sanitary seal will be placed above the bentonite layer to prevent surface water from infiltrating into the well. The wellheads will later be piped individually into the ozone-sparging manifold, which is piped directly to the ozone generator.

TASK 3 - ANALYZE THE CAPILLARY ZONE SOIL SAMPLE

One soil sample from each boring will be analyzed at a CAL-DHS certified analytical laboratory for TPH-G and TPH-D by modified EPA Method 8015, and MBTEX by EPA Method 8021. The soil sample chosen for analysis will be the soil sample that appears to be the most contaminated based on odors, staining or PID readings. If there is no indication of contamination in the boring, then the soil samples collected from the capillary zone will be analyzed.

TASKS 4 & 5 - COLLECT AND ANALYZE A WATER SAMPLE FROM THE OZONE-SPARGING WELLS

ASE will collect a groundwater sample from each ozone-sparging well after waiting at least 72 hours following the well installation. Prior to purging and sampling, ASE will measure the depth to groundwater and check for floating product.

Prior to sampling, the wells will be purged of at least four well casing volumes of groundwater. The temperature, pH and electrical conductivity of evacuated water will be monitored during the well purging. Purging will

continue beyond four well casing volumes if these parameters have not stabilized. Groundwater samples will be collected from the wells using disposable polyethylene bailers. For TPH-G and MBTEX, the groundwater will be decanted from the bailers into 40-ml glass volatile organic analysis (VOA) vials, preserved with hydrochloric acid and sealed without headspace. For TPH-D, the groundwater will be decanted from the bailers into 1-liter amber glass, unpreserved bottles. The samples will then be labeled with the site location, sample designation, date and time the samples were collected, and the initials of the person collecting the samples. The samples will be placed on ice for transport to the analytical laboratory under chain of custody. Purged groundwater will be stored on-site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged. The groundwater samples will be analyzed by a CAL-DHS certified analytical laboratory for TPH-G and TPH-D by modified EPA Method 8015, and MBTEX, by EPA Method 8021.

TASK 6 - CONDUCT AN AIR SPARGING TEST

An air sparging test will be conducted to determine whether ozone-sparging may be an effective method of remediation for the site. The air sparging test will be conducted by injecting compressed air into one of the new ozone-sparging wells at a rate of approximately 2-5 cubic feet per minute (cfm) and 25 pounds per square inch (PSI). This flow and pressure are typical operating parameters of current ozone-sparging generation systems on the market today. Pressure and water levels in the other ozone sparge wells and surrounding monitoring wells will be monitored to determine whether there is any pressure increase in the vadose zone or mounding of the water table. The test will continue until pressures and water table elevations remain stable. Injected air pressure and volume will be adjusted to determine future design criteria of the ozone generating system.

An alternate test technique that may be used will be injecting a tracer gas, such as helium, into the air stream. A helium detector would then be used to measure the concentration of helium, if any, in the surrounding observation wells. The presence of helium in the surrounding wells will be an indication of the area of influence.

TASK 7 - PREPARE A REPORT

Based on the results of the test outlined above, ASE will prepare a remedial action plan (RAP) for the site. This report will include a

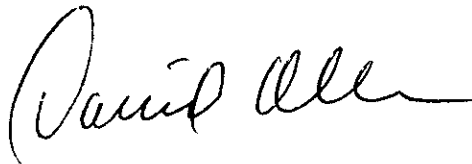
summary of the results, the site background and history, description of the well construction and sampling, tabulated soil and groundwater analytical results, conclusions and recommendations. Assuming the test indicates that this technology can be useful at the site, this RAP will present the detailed design of the ozone-sparging generation system, showing well locations, trenching diagrams, and system drawings.

All of the data and results for the ozone-sparging test detailed above will be discussed, and the field data for the test will be included as appendices. Formal boring logs for the newly installed wells will also be included as will analytical reports and chain of custodys for all samples collected. This report will be submitted under the seal of a California registered civil engineer or geologist.

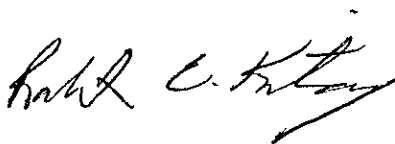
Should you have any questions or comments, please call us at (925) 820-9391.

Respectfully submitted,

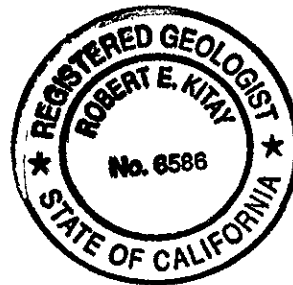
AQUA SCIENCE ENGINEERS, INC.



David Allen, R.E.A.
Senior Project Manager



Robert E. Kitay, R.G., R.E.A.
Senior Geologist



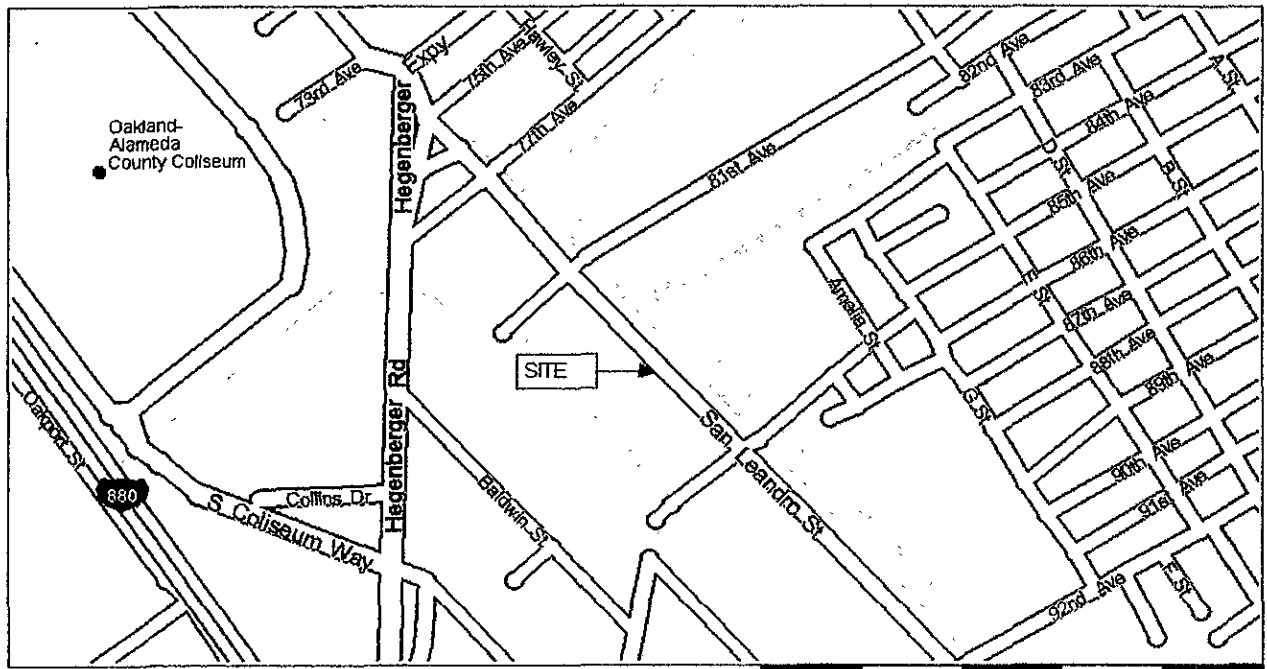
cc: Mr. Nissan Saidian, Property Owner

Mr. Amir Gholami, ACHCSA

FIGURES



NORTH



0 mi 0.1 0.2 0.3 0.4 0.5

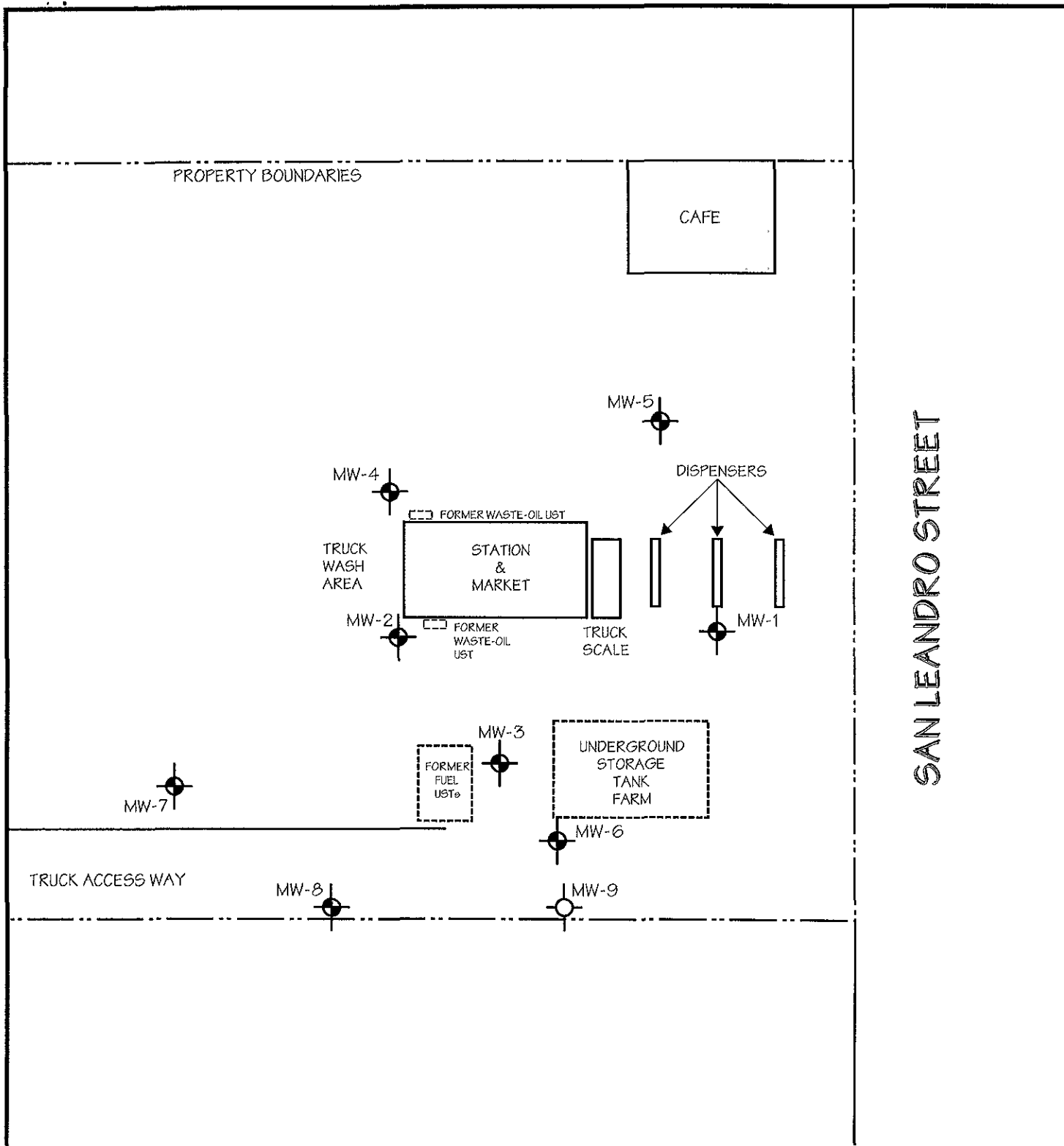
LOCATION MAP

OAKLAND TRUCK STOP
8255 SAN LEANDRO STREET
OAKLAND, CALIFORNIA



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AQUA SCIENCE ENGINEERS, INC.

Figure 1



LEGEND

- MW-9  4-inch diameter Monitoring Well
- MW-4  Monitoring Well



NORTH

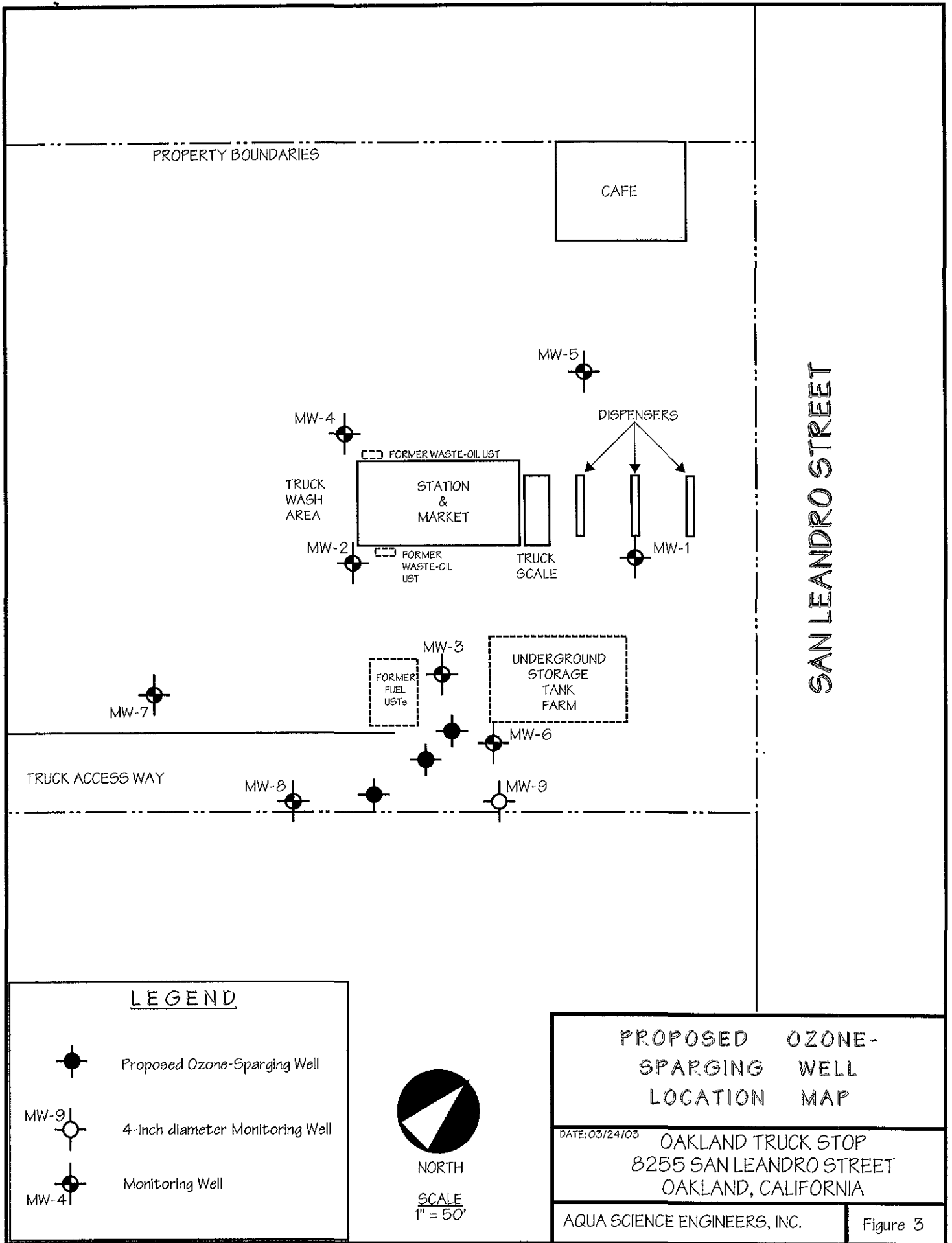
SCALE
1" = 50'

SITE PLAN

OAKLAND TRUCK STOP
8255 SAN LEANDRO STREET
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC.

Figure 2



PROPERTY BOUNDARIES

CAFE

MW-5

DISPENSERS

MW-4

FORMER WASTE-OIL UST

TRUCK WASH AREA

STATION & MARKET

TRUCK SCALE

MW-2

FORMER WASTE-OIL UST

MW-1

MW-7

MW-3

FORMER FUEL USTs

UNDERGROUND STORAGE TANK FARM

MW-6

TRUCK ACCESS WAY

MW-8

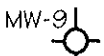
MW-9

SAN LEANDRO STREET

LEGEND



Proposed Ozone-Sparging Well



4-inch diameter Monitoring Well



Monitoring Well



NORTH

SCALE
1" = 50'

PROPOSED OZONE-SPARGING WELL LOCATION MAP

DATE: 03/24/03

OAKLAND TRUCK STOP
8255 SAN LEANDRO STREET
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC.

Figure 3

APPENDIX A

Letter from the ACHCSA

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY

DAVID J. KEARS, Agency Director



November 15, 2002

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

Mr. Nissan Saidian
5733 Medallion Ct.
Castro Valley, CA 94552

Dear Mr. Saidian:

Subject: Soil and Groundwater Assessment, Sensitive Receptor Survey, Tier 1 Risk-Assessment and Corrective Action Plan for Oakland Truck Stop, 8255 San Leandro St., Oakland, CA 94621

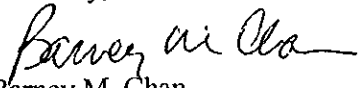
Alameda County Environmental Health, Local Oversight Program (LOP), has received and reviewed the October 23, 2002 referenced report for the above site as prepared by Aqua Science Engineers, (ASE). The following conclusions are made from this report:

- The extent of the petroleum release in groundwater remains undefined in the north, south and east directions from the site.
- Extraction well MW-9 is significantly impacted with MTBE
- The well survey identified three industrial wells within a 2000' radius from the site. Two of the wells are up-gradient, the other well is approximately 1000' to the northwest.
- The pump test from MW-9 yielded unreliable results due to the nearby tank pit and utilities trench, however, influence in MW8 located 66' from MW-9 was observed.
- The Tier 1 Risk Evaluation identified benzene concentration in MW3, exceeding indoor air impact exposure RBSL. In addition, the presence of free product, elevated TPHd levels (up to 50 ppm) and MTBE concentrations, up to 21 ppm in groundwater will require remediation.
- The Corrective Action Plan proposes in-situ chemical oxidation using ozone injection as the recommended remediation method. Our office believes that this method has a potential to be successful. In order to evaluate this technology, please submit a site-specific work plan for the performance of a pilot study. Please provide technical information on the potential hazards of this technique and it's applicability for use at operating gasoline stations.

Please provide your pilot study work plan to our office January 2, 2003.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,


Barney M. Chan
Hazardous Materials Specialist

C: B. Chan, files

✓ Mr. R. Kitay, ASE, 208 West El Pintado Road, Danville, CA 94526
Mr. S. Ramdass, SWRCB Cleanup Fund, 1001 I St., 17th Floor, Sacramento, CA 95814-2828

Pilot8255SanLeandroSt