GROUNDWATER REMEDIATION INVESTIGATION WORK PLAN

245 8th Street
Oakland, CA 94607

1-27-95

Prepared For

Mr. Victor Lum
245 8th Street
Oakland, CA 94607

Prepared By

All Environmental, Inc.
2641 Crow Canyon Road, Suite 5
San Ramon, CA 94583

REGISTERED GEOLOGIST
Charles M. Kissick
No. 1567
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

January 27, 1995

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1.0 INTRODUCTION

All Environmental, Inc. (AEI) has prepared this workplan on behalf of Mr. Victor Lum, in response to his request for a groundwater remediation program at 245 8th Street in Oakland, California.. The focus of this investigation is to investigate the feasibility and need for installing a groundwater remediation system at the site. AEI proposes one soil boring to be drilled and completed as a monitoring well. This project would include borehole "logging", soil sampling and analysis, well construction, well development, and groundwater sampling and analysis. The results of this investigation will be used to design a groundwater remediation program, if one is deemed necessary. Depending on the severity of groundwater contamination and on the geologic conditions, as determined by this proposed investigation, systems will be recommended to either remove floating fuel product, and/or to treat the groundwater itself. Prior to the commencement of field activities, this work plan will be approved by the Alameda County Health Care Services Agency.

2.0 SITE DESCRIPTION

The site is located at the southeast corner of 8th Street and Alice Street in Oakland. (Figure 1: Site Location Map). The topography of the site in relatively flat, with an elevation of about 32 feet. The nearest significant surface water is Lake Merritt, located approximately 2200 feet to the northeast, and the Alameda Inner Harbor, located about 2400 feet to the south-southwest. The narrow waterway connecting Lake Merritt with the Inner Harbor lies approximately 2200 feet to the southeast.

One building is located on the property, which contains both an auto repair shop and an office. A large stockpile of soil, from material excavated when seven tanks were removed from the site, remains on the property. The property surrounding the building is a paved parking lot. (Figure 2: Site Map)

3.0 SITE BACKGROUND

Five underground storage tanks were removed from the site in June, 1993 by AEI. The tanks consisted of four 1000-gallon gasoline tanks, and one 250-gallon waste oil tank. Prior to removal, approximately 425 gallons of waste product were pumped from the tanks. Two additional tanks, 6000-gallon gasoline tanks, were removed in August of 1994 by AEI.

Soils taken from the excavations were found to be contaminated, with as much as 3700 ppm TPH-gasoline in stockpile soil, and 160 ppm TPH-gasoline in soils taken from the bottom of one of the excavations. There is a known source of hydrocarbon contamination of groundwater across the intersection from the site, in an upgradient direction. The excavations were backfilled with clean import material.

4.0 GEOLOGY AND HYDROGEOLOGY

The site is located on Quaternary eolian (wind-blown) deposits of sand and silty/clayey fines known as the Merritt Sand. Based on observations made during the tank removal, the local soil deposits consist of sandy clay in the upper 12 feet. The nature of the site deposits at greater depths is not known at this time. The depth to groundwater in the vicinity is approximately 18 feet. Local groundwater flow is believed to be generally to the south, based on information from wells on neighboring properties.

5.0 SOIL BORING INVESTIGATION

The plan for site investigation includes one hollow stem auger boring, soil sampling and analysis, monitoring well construction, well development, and groundwater sampling and analysis. The boring will be drilled at the former location of the 6000-gallon gasoline tank

that was farthest from 8th Street, as shown in Figure 3, Well Location Map. The boring will be advanced to approximately ten feet below the top of the groundwater table, or to a total depth of about 28 feet. The inside diameter of the well casing will be 4 inches.

Soil samples taken from the two borings will be tested for:

1) Total Petroleum Hydrocarbons as Gasoline (TPHG) (EPA 5030/8015);
2) BTEX (EPA 8020); and
3) Total Lead (AA).

All tests will be performed at a state certified laboratory (Priority Environmental Labs).

The completed well will be about 28 feet deep with 20 feet of screen. The screen will extend 10 feet below the water table, and 10 feet above. A Mobile Drill B-57 or CME 75 hydraulic rotary drill with hollow stem augers will be used. good - lots of screen

The soil borings will be continuously logged onsite by a geologist using the Unified Soil Classification System. Undisturbed soil samples will be taken at 5 foot intervals, starting at 5 foot depth, with a hammer-driven California Modified split spoon sampler. The sampler will be advanced ahead of the auger tip by successive hammer blows. The samples will be collected for visual classification and chemical analysis in two-inch brass tubes. A total of two soil samples from the boring will be analyzed at a state certified laboratory. The soil samples selected for chemical testing will be determined by the geologist onsite at the time of sampling.

Samples designated for laboratory analysis will be sealed on the ends with aluminum foil, plastic caps, and tape. The samples will be placed in an ice chest with dry ice and delivered to a State certified laboratory with chain of custody documents.

A detailed description of sample collection and handling procedures by Priority Labs is appended to this work plan (Appendix B: Sampling Quality Assurance and Quality Control Procedure).

All sampling equipment will be cleaned in buckets with brushes and a TSP or Alconox solution, then rinsed twice with tap water. The drill rig and augers will be steam cleaned prior to drilling and onsite before departure. Rinsates will be contained onsite in sealed, labeled drums.

Cuttings generated during drilling will be stored onsite in 55 gallon drums. Onsite treatment or offsite disposal of contaminated drill cuttings is not a part of this work scope. It is likely that a licensed hauler will be contracted to transport the soils as non-hazardous waste, under appropriate manifests, to a local landfill facility.

6.0 GROUNDWATER INVESTIGATION

The soil boring, as described above, will be converted to a 4" diameter monitoring well. If necessary, this well will be converted to an extraction well. The well will be constructed of 4-inch flush-threaded Schedule 40 PVC casing, with up to 20 feet of .02" factory-slotted well screen. The top of the well screen will extend up to 10 feet above the encountered groundwater level to account for maximum seasonal fluctuations (Figure 4: Well Construction Diagram). The well casing will be inserted through the augers to a point a few inches above the borehole terminus where it will be suspended until the well is secured within a sand pack. Sand (#3) will be poured through the augers in one- to two-foot lifts up to about two feet above the top of the perforated casing. One to two feet of bentonite pellets will be placed above the sand, and activated with tap water. The seal will be finished up to the surface with cement/bentonite grout. A locking top cap and a flush-mounted watertight well cover will be installed.

The well will be developed by pumping water into a DOT 17H drum until the water appears to be reasonably clear with a minimum of 10 well volumes removed. Because information may be required regarding the permeability of the soils surrounding the well (in case it is used for groundwater extraction), a time history of groundwater recovery will be made. The depth to groundwater will be measured in specific time increments and the rate of recovery will be used to estimate the permeability of the soils.

Groundwater will be checked for sheen and free product prior to purging and sampling. Free product and sheen will be measured with an acrylic bailer which will be lowered slowly to the groundwater surface and filled about half full for direct observation.

The well will be allowed to recharge and groundwater samples will be obtained in a pre-cleaned bailer, secured in 1 liter and 40 ml volatile organic analysis vials, placed in a cooler with ice and delivered to a State certified laboratory with chain of custody documents. All water samples will be analyzed for:

1) TPHG (EPA 5030/8015);
2) BTEX (EPA 5030/8020); and
3) Total Lead (AA). → not necessary

Well development and sampling equipment will be decontaminated as described above.

7.0 SITE SAFETY

Prior to commencement of field activities, a site safety meeting will be held at a designated command post near the working area. Emergency procedures will be outlined at this meeting. Also, the hazards of the known or suspected chemicals of interest will be explained. Level D personal protection equipment is the anticipated maximum amount of

protection needed. A site safety plan which conforms to Part 1910.120 (i) (2) of 29 CFR will be on site at all times during the performance of this project. (Appendix A: Health & Safety Plan)

A working area will be established with barricades and warning tape to delineate the zone where hard hats and steel-toe shoes must be worn, and where unauthorized personnel will not be allowed. If, during drilling, fuel product odors are deemed to be substantial, half-face respirators with organic vapor cartridges will be worn. Air monitoring device?

A nearby hospital will be designated in the site safety plan as the emergency medical facility of first choice. A map with a course plotted to the hospital will be onsite.

8.0 ESTIMATED SCHEDULE

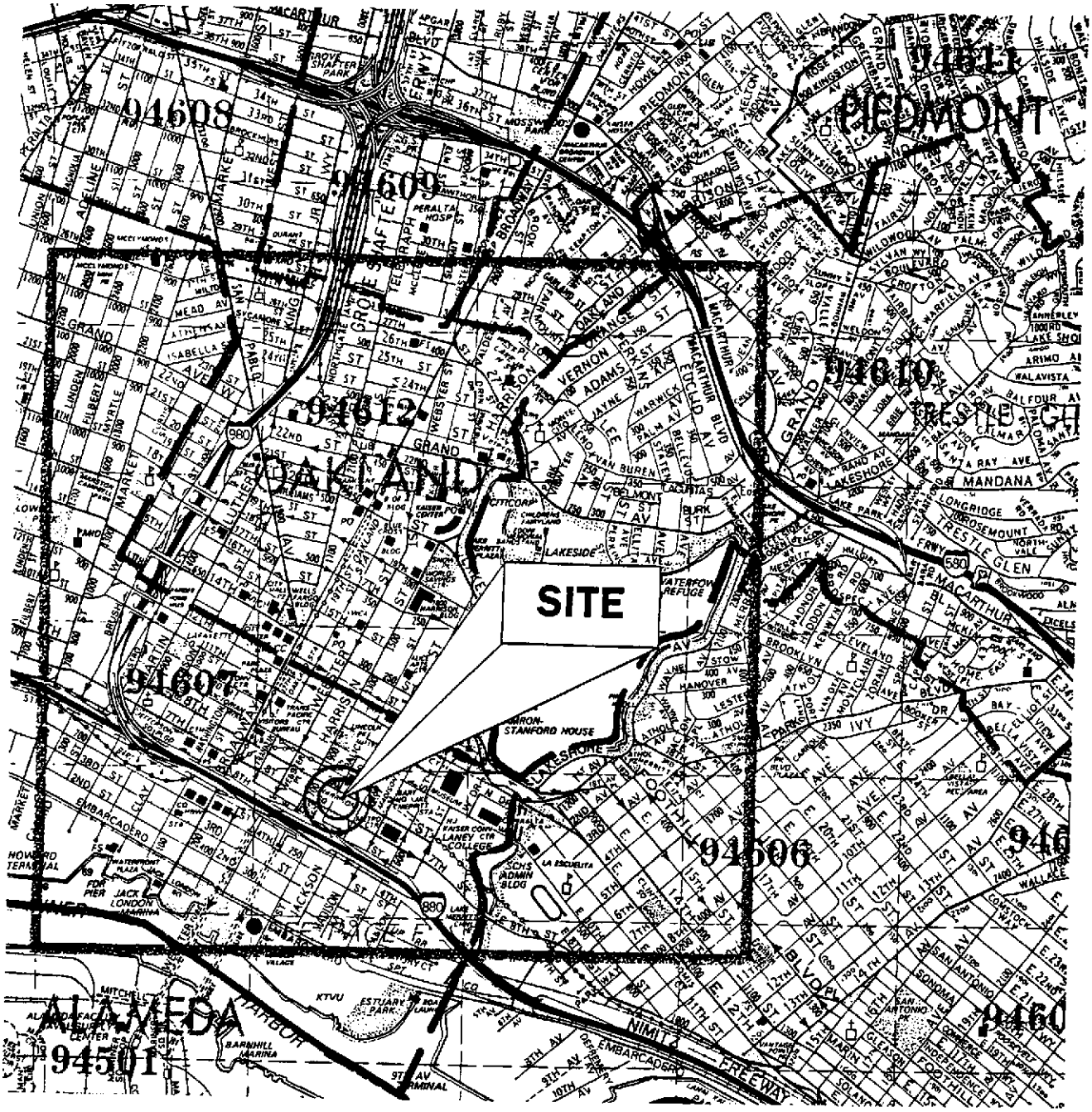
Upon acceptance of this workplan by the Alameda County Health Services Agency, work will commence within a two week period, weather permitting. The Alameda County Health Care Services Agency will be given adequate notification of the scheduled day of drilling. Soil and groundwater laboratory results will be obtained within two weeks of collection. The final report will be prepared and copies will be delivered to the Alameda County Health Care Services Agency and the Regional Water Quality Control Board (CRWQCB). The proposed project schedule is as follows:

no need ↑

Week 1-2:	Drilling and Well Sampling
Week 3:	Laboratory Analysis
Week 4-5:	Preparation of Final Report

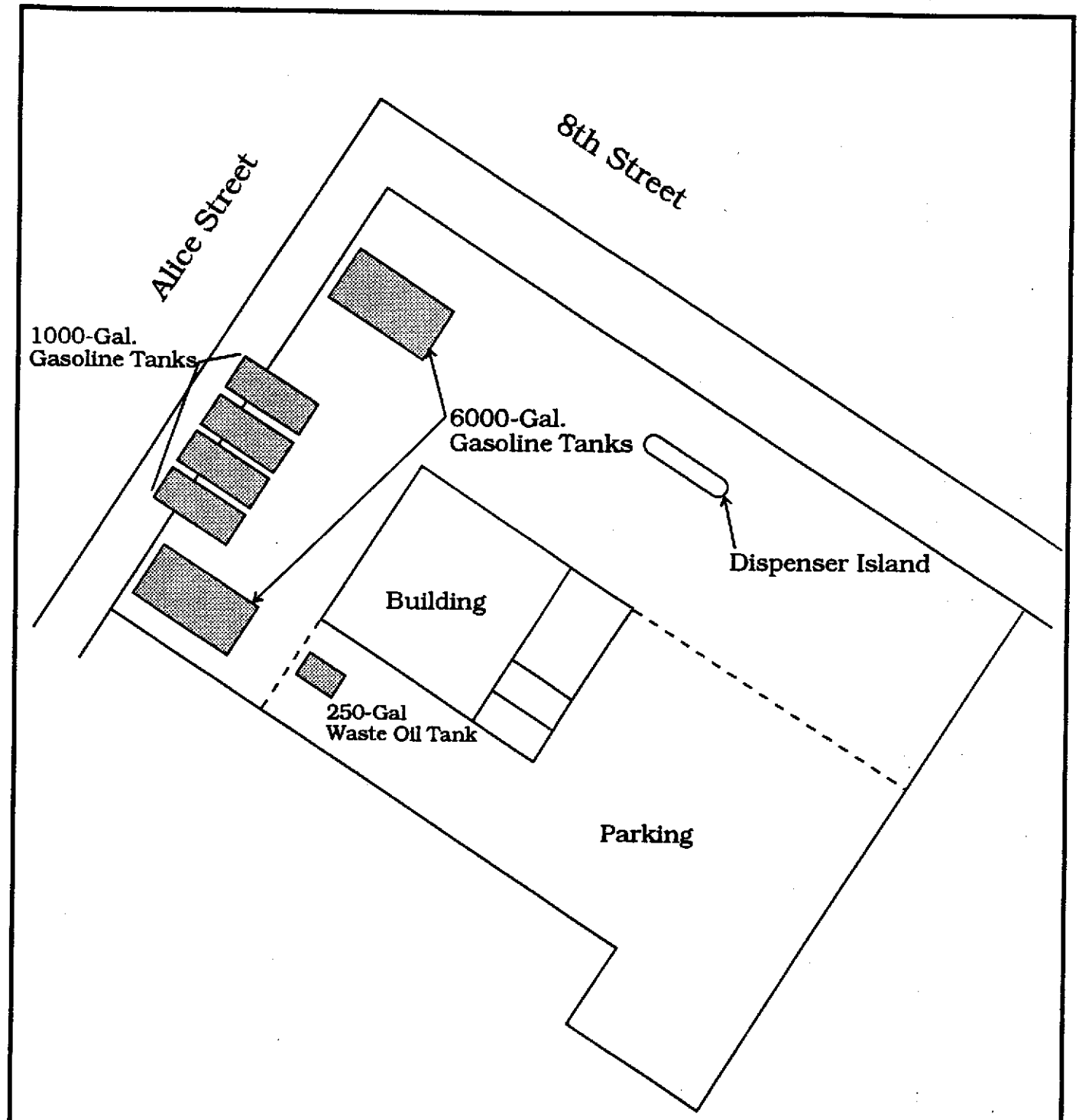
9.0 FINAL REPORT

A complete and final report of methods, findings, and conclusions from work proposed herein will be submitted to the client for forwarding to the appropriate agencies. The report will include alternative recommendations on groundwater remediation. The report will be submitted under the seal of a State Registered Geologist, Mr. Charles Kissick (#5024) and a State Registered Chemical Engineer, Mr. Guy Roy (#3187).



FROM:
THOMAS BROS. MAPS
1994

ALL ENVIRONMENTAL, INC. 2641 CROW CANYON ROAD, SAN RAMON		
SCALE: 1" = 1/4 MILE	APPROVED BY:	DRAWN BY: J.S. ANDERSON
DATE: 6 SEPTEMBER 94		REVISED: J.S. ANDERSON
SITE LOCATION MAP		
245 8TH STREET		DRAWING NUMBER: FIGURE 1



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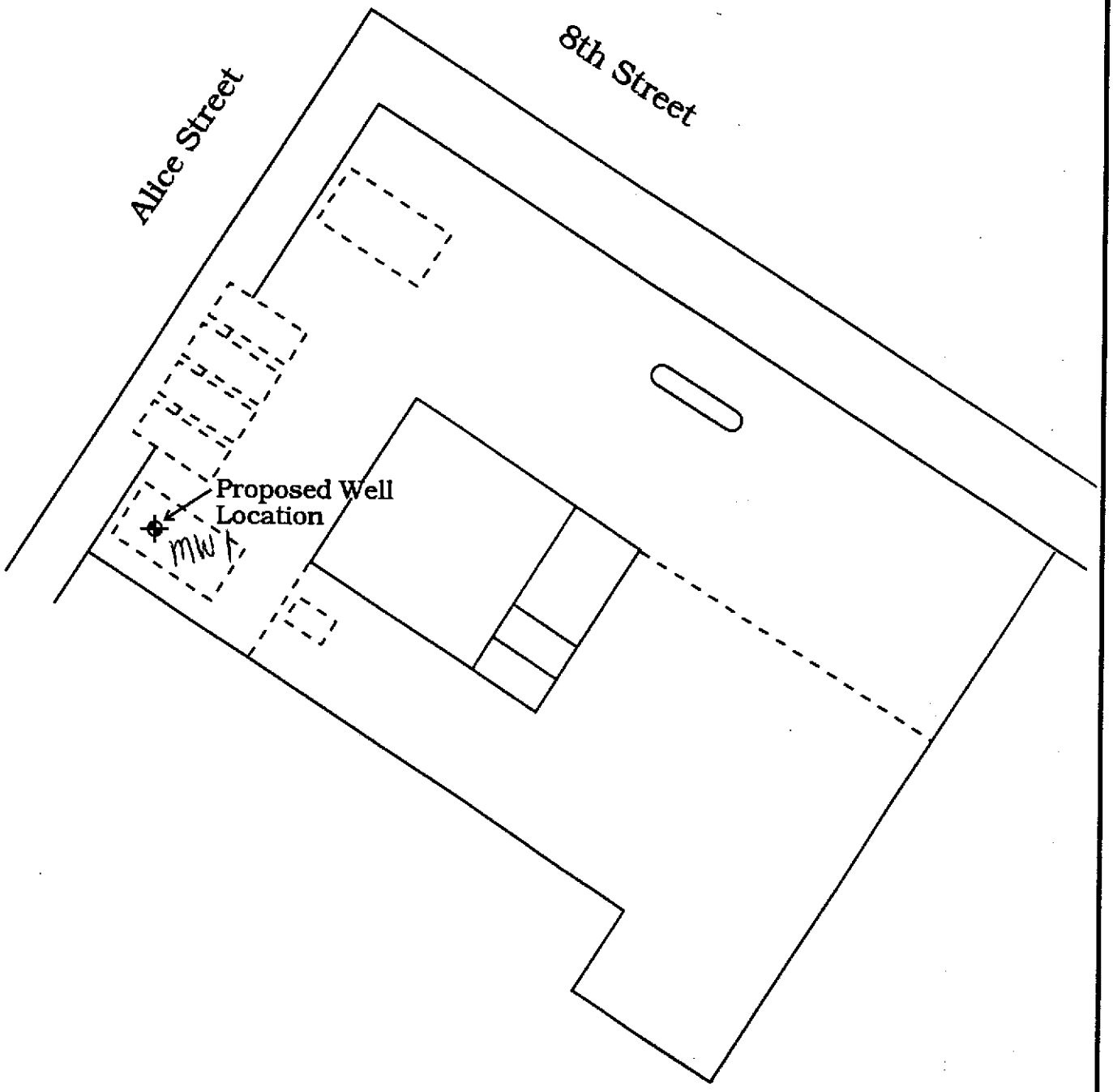
Scale, feet

ALL ENVIRONMENTAL, INC.
2641 CROW CANYON ROAD, SAN RAMON, CA

DRAWN BY:		REVISED BY:
DATE:		APPROVED BY:

SITE PLAN

245 8th Street, Oakland | FIGURE 2



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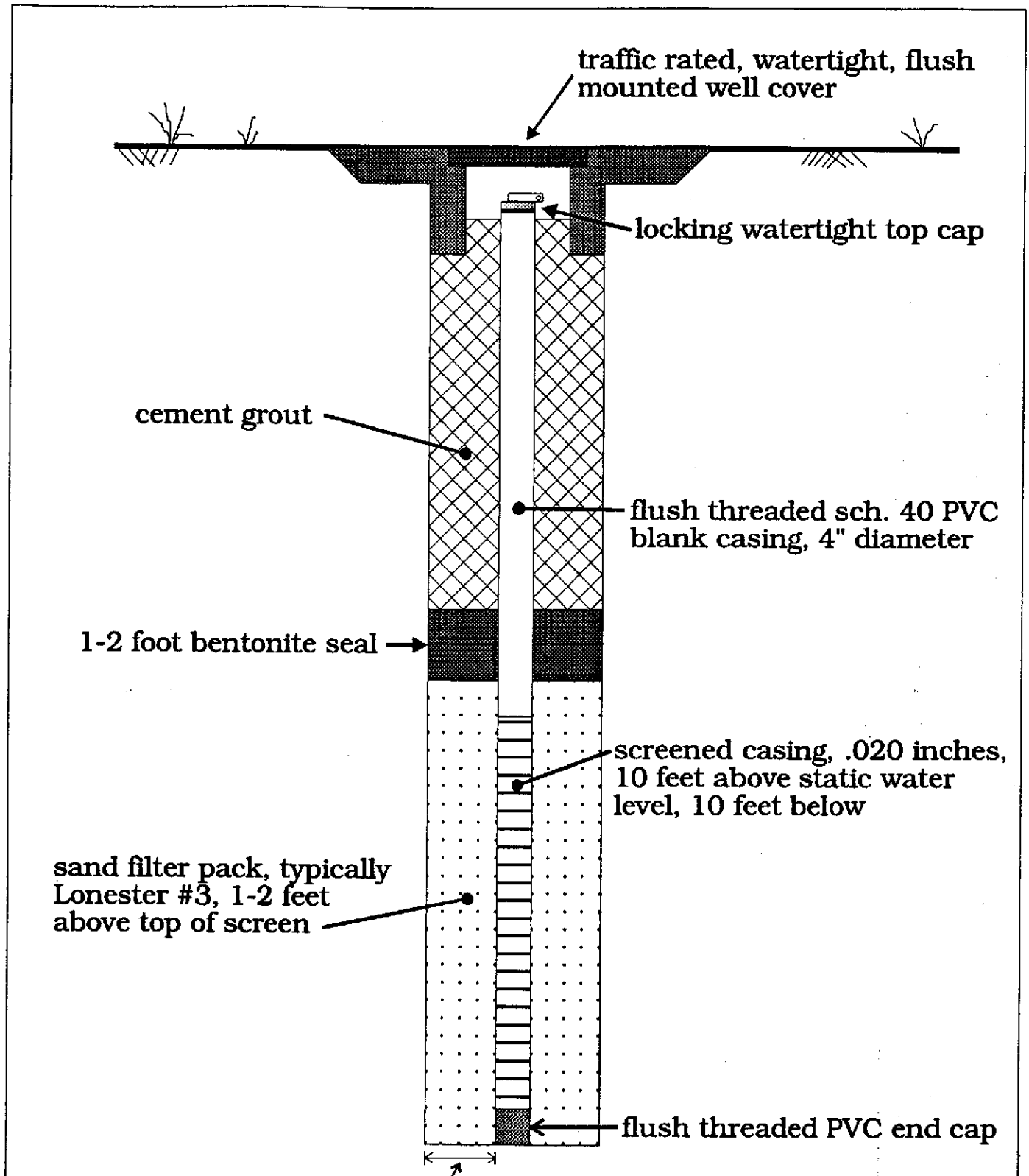
Scale, feet

ALL ENVIRONMENTAL, INC. 2641 CROW CANYON ROAD, SAN RAMON, CA		
DRAWN BY:		REVISED BY:
DATE:		APPROVED BY:
WELL LOCATION MAP		
245 8th Street, Oakland		FIGURE 3



ALL ENVIRONMENTAL, INC. 2641 CROW CANYON ROAD, SAN RAMON, CA		
DRAWN BY:		REVISED BY:
DATE:		APPROVED BY:
WELL CONSTRUCTION DIAGRAM		
245 8th Street, Oakland		FIGURE 4

APPENDIX A

HEALTH & SAFETY PLAN

HEALTH AND SAFETY PLAN

for

245 8th Street

Oakland, CA

Prepared for:

Victor Lum

245 8th Street

Oakland, CA 94607

A. INTRODUCTION

This Site Specific Health and Safety Plan is written for the installation of one groundwater monitoring well at 245 8th Street in Oakland. All job site personnel will follow CAL OSHA safe operating practices as outlined in 29 CFR 1910 and 1926, as well as established guidelines set forth by All Environmental, Inc.

B. WORK DESCRIPTION

Prepared by: Charles Kissick, Project Manager

Site Manager: Charles Kissick

Address: 245 8th Street
Oakland, CA

Scope of Work: All Environmental, Inc. (AEI) will install one groundwater monitoring well at the referenced site. The boring will be drilled using a hollow stem auger rig, and soil samples will be collected at 5-foot intervals. The soil samples will be sealed in stainless steel or brass tubes and plastic end caps and stored in an ice chest. The samples will be transported under chain of custody to an approved laboratory for analytical analyses. Soil cuttings from the borings will be stored on site in sealed drums and disposed of at a later time, using methods that will depend on results of analytical tests on the soils. Drilling and sampling equipment will be cleaned between holes and between soil samples.

C. SITE/WASTE CHARACTERISTICS

Hazard Level:	Serious:	Low: XXX
	Moderate: XXX	Unknown:

Waste Type:	Solid:	Contaminated Soil
	Sludge:	None
	Liquid:	Water
	Gas:	None

Hazard Characteristics: Flammable, Toxic

There will be a five foot boundary surrounding the drilling areal. The area within this boundary is considered an exclusion zone and only qualified personnel will be allowed to enter. All

personnel arriving or departing the site should log in before entering the exclusion zone. All activities on site must be cleared through the Site Manager.

D. HAZARD EVALUATION

Potential chemical hazards include skin and eye contact or inhalation exposure to potentially toxic concentrations of hydrocarbon vapors. The potential toxic compounds that may exist at the site are listed below with descriptions of specific health effects of each. The list includes the primary potential toxic constituents that may be found at sites which previously handled petroleum hydrocarbons, including home heating diesel fuel.

1. Benzene
   a. Colorless to light yellow, flammable liquid with an aromatic odor.
   b. Toxic hazard by **inhalation, adsorption, ingestion** and **skin and/or eye contact.**
   c. Exposure may irritate eyes, nose and respiratory system and may cause acute restlessness, convulsions, nausea, or depression. Benzene is carcinogenic.*
   d. Permissible exposure level (PEL) for a time weighted average (TWA) over an eight hour period is 1.0 ppm.

2. Toluene
   a. Colorless liquid with a sweet, pungent, benzene like odor.
   b. Toxic hazard by **inhalation, adsorption, ingestion** and **skin and/or eye contact.**
   c. Exposure may cause fatigue, weakness, confusion, euphoria, dizziness, headaches, dilated pupils, lacrimation, nervousness, insomnia, paresthesia, and dermatitis.
   d. Permissible exposure level for a time weighted average over an eight hour period is 100 ppm.

3. Xylene
   a. Colorless liquid with an aromatic odor.
   b. Toxic hazard by **inhalation, adsorption, ingestion** and **skin and/or eye contact.**
   c. Exposure may irritate eyes nose and throat and may cause dizziness, excitement, drowsiness, incoordination, corneal vacuolization, anorexia, nausea, vomiting, and dermatitis.
   d. Permissible exposure level for a time weighted average over an eight hour period is 100 ppm.

4. Ethylbenzene
   a. Colorless liquid with an aromatic odor.
   b. Toxic hazard by **inhalation, ingestion,** and **skin and/or eye contact.** Ethylbenzene is carcinogenic.*
   c. Exposure may irritate eyes and mucous membrane and may cause headaches, dermatitis, narcosis and loss of consciousness.
   d. Permissible exposure level for a time weighted average over an eight hour period is 100 ppm.

5. Lead
   a. A heavy ductile soft grey metal.
   b. Toxic hazard by **inhalation, ingestion,** and **skin and/or eye contact.**
   c. Exposure may cause weakness, nausea, lassitude, diarrhea, insomnia, anorexia, inflamed mucous membranes and abdominal pains. Lead is carcinogenic.*
   d. Permissible exposure level for a time weighted average over an eight hour period is .05 ppb (in vapor).

6. Diesel
   a. Colorless to dark brown, combustible liquid with an aromatic odor
   b. Toxic hazard by **inhalation, ingestion, skin and/or eye contact.**
   c. Inhalation of vapors may depress the central nervous system, increasing reaction times, and decreasing pulse rate and blood pressure. Skin irritant.
   d. Occupational exposure limit 5.0 ppm (in vapor).

7. Gasoline
   a. Colorless liquid with a strong aromatic odor. Highly volatile and extremely flammable.
   b. Toxic hazard by **inhalation, adsorption, ingestion** and **skin and/or eye contact.**
   c. Inhalation of vapors can cause depression of the central nervous system with symptoms such as headache, dizziness, nausea, and loss of coordination. Skin contact can cause defatting of the skin, skin irritation and dermatitis. Benzene is a major constituent of gasoline.
   d. Permissible exposure level for a time weighted average over an eight hour period is 300 ppm.

*** Known to the State of California to cause cancer.**

Charles Kissick has been designated to coordinate access control and security on site. All work will strictly follow OSHA guidelines. A safe perimeter has been established at a five foot radius drilling end of the drill rig. These boundaries are identified by yellow caution tape and orange safety cones. Additional hazards on site include heavy equipment and overhead lifting equipment. Only 40-hour trained personnel will operate equipment or perform any duty associated with this project.

A FIRST AID KIT AND A 40 POUND BC FIRE EXTINGUISHER WILL BE AVAILABLE ON SITE.

EMERGENCY SERVICES ARE AVAILABLE BY DIALING 911 ON THE TELEPHONE LOCATED IN THE SITE MANAGER'S VEHICLE. THIS VEHICLE WILL BE ON SITE AT ALL TIMES.

E. PERSONAL PROTECTIVE CLOTHING

Based on evaluation of potential hazards, level "D" protective clothing has been designated as the appropriate protection for this project. The level of protective clothing will be upgraded if the organic vapor levels in the operator's breathing zone exceeds 5 ppm above background levels continuously for more than five minutes, or if any single reading exceeds 25 ppm. If this occurs then level C protection will be used. If the organic concentration in the operator's breathing zone exceed's 200 ppm for 5 minutes and/or the organic vapor concentration two feet above the excavation exceeds 1,000 ppm or 10% of the lower explosive limit, then the equipment will be shut down and the site evacuated. If organic vapor concentrations exceed 200 ppm and work continues then level B protection will be required.

"EPA Standard Operating Safety Guidelines" defines the levels of protective clothing as follows:

LEVEL A:
Fully encapsulating suit / SCBA / Hard hat / Steel toe boots / Safety gloves.

LEVEL B:
Splash resistant suit / SCBA / Hard Hat / Steel toe boots / Safety gloves.

LEVEL C:
Half face respirator / Hard hat / Safety glasses / Steel toe boots / Coveralls / Gloves.

LEVEL D:
Coveralls / Hard hat / Safety Glasses / Steel toe boots / Gloves.

If air purifying respirators are authorized, organic vapor w-filter is the appropriate canister for use with the involved substances and concentrations. A competent individual has determined that all criteria for using this type of respiratory protection have been met.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE COMPANY SAFETY OFFICER, G. W. ROY.

F. MONITORING INSTRUMENTS

The following environmental monitoring instruments shall be used on site at specified intervals.

A hydrocarbon meter will be used to monitor air in the work area and at the boundaries of the work area.

G. EMERGENCY HOSPITAL

The closest hospital with an emergency room is:

PERALTA HOSPITAL **(510) 451-4900**

DIRECTIONS FROM THE JOB SITE:

EXIT JOB SITE AND GO:

East (right) on 8th Street;
Left on Jackson;
Left on Lakeside;
Lakeside turns into Harrison;
Left on 27th Street;
Right on Telegraph;
Right on 30th Street;
Hospital located on left, at 450 30th Street.

H. READ AND SIGN

The work party was briefed on the contents of this plan on _____ at 8:00 am. All site personnel have read the above plan and are familiar with its provisions.

NAME:	SIGNATURE:	COMPANY NAME:

APPENDIX B

SAMPLING QA/QC PROCEDURE

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURE

I. QA OBJECTIVES:

We at Priority Environmental Labs (PEL), commit to a quality assurance program designed to guarantee our analytical results are valid and properly documented.

II. SAMPLING PROCEDURES:

Sampling should be done according to EPA guidelines. Precautions are taken to avoid sample contamination and to maintain sample integrity. Proper containers and preservation techniques are used if necessary. For example, with water samples requiring volatile organic analysis, 40 ml vials with teflon-lined septa are used. For water samples requiring semi-volatile organic analysis, 1-liter glass bottles with teflon-lined septa are used.

In case we provide these containers for our clients, we buy only EPA-approved containers. Once they arrive, they are washed in detergent and rinsed first with tap water then with deionized water.

III. SAMPLE CUSTODY:

The sampler is required to secure his samples upon arrival at the laboratory. Next, samples are inspected by our receiver to assure that proper containers, their conditions, and needed preservatives are used. Our receiver also inspects all necessary information such as sample identification, time of collection, sampling techniques, analysis required, etc. If needed, we can provide clients with our chain of custody. A PEL file number is assigned to each batch of samples to identify it.

Finally, samples are ready to be stored in refrigerators which are daily monitored to make sure their temperatures are less than 4 degrees centigrade.

IV. CALIBRATION PROCEDURES AND FREQUENCY

For routine analyses, a five-point calibration curve is used. Then, a mid-point standard is run every day. If the response factor of this mid-point standard is less than 20% of the calibration curve, the average response factor from the calibration will be used for calculation. Otherwise, a new calibration curve will be established after needed correction measures are performed.

For non-routine analyses, a three-point calibration curve will be established and its average response factor is used for calculation.

V. ANALYTICAL PROCEDURES:

Analyses are performed according to methods in Test Methods for Evaluating Solid Waste, SW-846, Third Edition, LUFT, Methods for Organic Chemical Analysis of Municipal and Industrial Waste Water, EPA - 600/4-82-057, and other methods approved by either EPA or DHS.

In general, before analyzing samples, we run a reagent water blank to make sure that our instrument, glassware and reagents are free of contamination.

For each batch of samples, we analyze a sample blank by running a reagent water blank or a clean sample of similar matrix to that of real sample through all steps of preparation and measurement.

Next, a mid-point standard is run to check the validity of our existing calibration curve. Now, we are ready to analyze samples. A duplicate sample and a spiked sample are to be run for any batch of samples or for every ten samples to check the precision of the result and the percentage of recover of compounds spiked.

VI. DATA REDUCTION, VALIDATION AND REPORTING:

The analyst responsible for the analysis will perform data reduction and validation by strictly following guidelines set by appropriate approved methods.

Later, his data interpretation and calculation will be checked by a supervisor for validity before a typed report is issued. Both the analyst and his supervisor will proofread the report for any error before sending it to the client.

A copy of the report along with a copy of the chain of custody, chromatogram if any, calculation sheets and other information related to the analysis will be kept on file.

VII. INTERNAL QUALITY CONTROL CHECKS:

For every batch of sample, a quality control check sample will be run. This check sample will have all analyses needed to be determined in real samples. If any problem occurs, the corresponding supervisor will determine the appropriate corrective action.

VIII. PERFORMANCE AND SYSTEM AUDITS:

Several times a month, the supervisor will test the measurement systems with samples of known compositions or behavior to evaluate precision and accuracy without the knowledge of the analyst to determine whether the measurement systems are being used appropriately.

IX. PREVENTIVE MAINTENANCE:

All instruments in the laboratory are regularly checked and maintained following manufacturer's suggestions. Any replacement, modification is timely recorded in an instrument record logbook.

X. PROCEDURES FOR DATA PRECISION AND ACCURACY:

We follow the quality assurance criteria set by the California Department of Health Services.

XI. CORRECTIVE ACTION:

Whenever a problem occurs, we will apply the following procedures:

- Identifying and defining the problem.
- Assigning responsibility for investigation the problem.
- Investigating the cause of the problem.
- Determine corrective action to eliminate the problem which may be a combination of:
    - *A thorough check of instruments.
    - *A thorough check of standards, reagents, deionized water.
- Accepting responsibility for the corrective action.
- Evaluating its effectiveness.
- Verifying that the corrective action has eliminated the problem.

XII. QUALITY ASSURANCE REPORT:

Our quality assurance program is maintained periodically. QA/AC data are recorded in different logbooks for different methods of analyses. These logbooks are weekly reviewed by our laboratory director.

The final report sent to our clients also includes all quality control data obtained while running samples.