



**GROUNDWATER
SAMPLING POINT INSTALLATION
AND REMEDIATION
WORKPLAN**

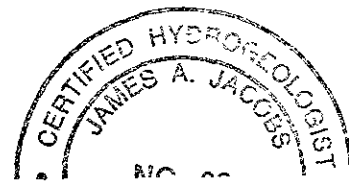
3927 EAST 14th STREET
OAKLAND, CALIFORNIA

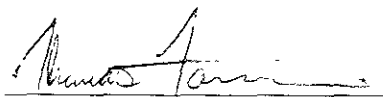
Artesian Job No. 197-002-01

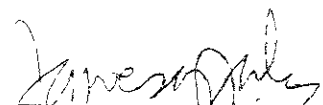
Prepared For:

Mr. Ruben Hausauer
c/o
The Law Offices of Tommy A. Conner
444 De Haro Street, Suite 121
San Francisco, California 94107

April 8, 1997




Thomas Fortner
Project Geologist


James A. Jacobs, C.H.G. #88
Principal Hydrogeologist

INTRODUCTION

Artesian Environmental (Artesian) is pleased to present this workplan to the Law Offices of Tommy A. Conner who represents Mr. Ruben Hausauer (owner of the subject property). This workplan has been prepared to satisfy the Alameda County Health Care Services Agency (ACHCSA) request for site remediation and the installation of one groundwater sampling point.

SITE SETTING

The Hausauer site is located at 3927 East 14th Street at 40th Avenue, Oakland, California. One 550 gallon underground storage tank (UST) was removed from beneath the side walk along 40th Avenue in August 1996. Soil samples collected from beneath the UST contained up to 5,000 milligrams per kilogram (mg/kg) (equivalent to parts per million [ppm] total petroleum hydrocarbons as motor oil (TPH-mo), 1,700 ppm total petroleum hydrocarbons as diesel (TPH-d), and 940 ppm total petroleum hydrocarbons as gasoline (TPH-g). Groundwater samples collected from groundwater monitoring well MW-1 (closest to the former UST) contained 7,400 micrograms per liter ($\mu\text{g/L}$) (equivalent to parts per billion [ppb]) TPH-g and 1,200 ppb benzene. The furthest down gradient well (MW-2) contained 6,300 ppb TPH-g, 7,400 ppb TPH-d, 2,100 ppb TPH-mo and 170 ppb benzene. Several subsurface investigations have occurred at the Hausauer site since September 1993. There are presently three groundwater monitoring wells at the Hausauer site.

An adjacent site (Motor Partners site) located southwest (cross-gradient) of the Hausauer site, is reported to have petroleum impacted soil and groundwater associated with two former USTs located at 1234 40th Avenue. A 1,000 gallon gasoline UST and a 500 gallon waste oil UST were removed from the site in October 1990. Soil samples collected from beneath the USTs contained up to 1,600 ppm TPH-g and 650 ppm TPH-d. Groundwater samples collected from Motor Partners monitoring well MW-1 contained 67,000 ppb TPH-g, 53,000 TPH-d, and 1,200 ppb benzene. There are presently four groundwater monitoring wells at the Motor Partners site.

PERMITTING

The City of Oakland requires an excavation in order to remove contaminated soils. Alameda County Zone 7 Water Agency requires a drilling permit for monitoring well installations. The Bay Area Air Quality Management District (BAAQMD) will be notified of the excavation activities. Underground utility lines will be located by Underground Service Alert (USA) prior to drilling. Artesian will provide limited magnetic and induction line locating services to aid in locating buried pipes and utilities prior to drilling.

SITE SAFETY PLAN

A site safety plan will be prepared and will be on-site during all field activities. All persons in the decontamination area will be informed of the safety regulations on-site and sign the site safety forms.

FIELD ACTIVITIES

Groundwater Sampling Point Installation (mw)

Artesian will advance one continuous core soil boring to approximately 20 feet below ground surface (bgs). Based upon previous investigations at the site anticipated depth to groundwater is approximately 5 feet bgs. The boring will be advanced by FAST-TEK's C-57 license # 589008 utilizing a truck-mounted 5400 Geoprobe direct penetration technology (DPT) soil sampling rig. The boring will be located approximately 100 feet down gradient of monitoring well MW-2.

Logging of soils encountered will be performed by the site geologist under the supervision of a California Certified Hydrogeologist using the Unified Soils Classification System (ASTM D248890). Soil samples will be screened for organic vapors with a Photo Ionization Detector (PID) at 4 foot intervals. The soil samples yielding the highest PID reading or the sample collected from the vadose zone will be submitted for laboratory analyses. Standard Operating Procedures for DPT soil sampling are attached.

The boring will be completed as a 1-inch diameter groundwater sampling point. The screen shall consist of 0.010-inch slotted PVC with a #2/12 Monterey sand pack. The screened interval will be placed from 4 to 20 feet bgs. A 1-foot bentonite seal will be placed above the sand pack, portland cement will be placed above the bentonite seal. The sampling event will be completed using water tight traffic-rated box set in concrete and secured with locking water-tight caps. A licensed surveyor will survey the top of the well casings within 0.01 foot accuracy horizontally, and vertically relative to mean sea level to allow calculation of groundwater flow direction and gradient. Well elevations at the Hausauer site will be referenced to a local benchmark.

All drilling and soil sampling equipment will be decontaminated prior to and following each use by using a high pressure hot water wash. Sampling equipment will be decontaminated using a phosphate and chlorine-free detergent wash, and two deionized water rinses. Decontamination water and soil cuttings will be stored on site in labeled DOT-approved containers, pending results of laboratory analyses.

Groundwater Sampling Point Development

A minimum of 72 hours will be allowed between groundwater sampling point installation and development. Development techniques include pumping, bailing, and surging. Approximately three to ten wetted screen volumes will be purged during development. The groundwater sampling point will be considered fully developed when consistent pH, temperature and conductivity readings indicate characteristic groundwater for the aquifer. Development and decontamination water will be stored on site in labeled DOT-approved containers, pending results of laboratory analyses. Because development can volatilize contaminants present, the groundwater sampling point will be allowed to rest for a minimum of 24 hours prior to the first sampling event.

Groundwater Sampling

Artesian will sample the three existing groundwater monitoring wells and the newly installed groundwater sampling point at least 24 hours following well development. Prior

to groundwater sampling, each well will be purged by pumping or bailing a minimum of three well casing volumes of groundwater while taking measurements of pH, temperature, and electrical conductivity between each well casing volume. The wells will be considered stabilized and ready for sampling when two subsequent measurements of these three parameters are within 10% of each other. Groundwater samples will be collected using a 1.5-inch diameter disposable bailer and new nylon string, and decanted into labeled, laboratory supplied bottles. The samples will then be stored on ice, and transported under chain-of-custody control to a California state certified laboratory. Artesian's standard operating procedures for well sampling are included in the attachments.

Excavating and Oxygen Release Compound Placement

Artesian will excavate contaminated soils from the former UST excavation until field screening equipment indicate non-detect levels of organic vapors or physical obstructions are encountered. Prior to excavating, shoring will be installed to protect the building and street from soil failure, the anticipated depth of the excavation is 12 feet. Confirmation soil samples will be collected from the excavation to assess impacted soils left in place. Groundwater will be pumped from the excavation and properly disposed of. Excavated soils will be stockpiled between plastic pending laboratory analytical results. The UST excavation will be backfilled with imported clean fill at the end of the day. The imported fill material will be mixed with an oxygen release compound (ORC) to enhance insitu bio-remediation.

LABORATORY ANALYSES

Soil samples will be field screened using a PID. One soil sample collected from the boring, two soil samples collected from the former UST excavation, and four groundwater samples collected from the monitoring wells will be submitted to a State of California Certified laboratory for analyses. The soil and groundwater samples will be analyzed for TPH-g, TPH-d, and TPH-mo by EPA Method 8015M, benzene, toluene, ethyl benzene, and total xylenes (BTEX) and Methyl Tert-Butyl Ether (MTBE) by EPA Method 8020.

A soil and groundwater sample will also be submitted to a biochemistry laboratory for a bio-assay. The assay will establish bio-available levels of nutrients, pH, and native bacteria densities useful for determining the effectiveness of insitu bio-remediation.

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REPORT PREPARATION

A written report describing the field activities and summarizing the laboratory results can be prepared. The report will be prepared under the supervision of a California Certified Hydrogeologist and will include boring logs, well installation diagrams, a potentiometric map of groundwater, laboratory reports, chain-of-custody forms, laboratory quality control documents, and recommendations, as appropriate.

ATTACHMENTS

Artesian Environmental

Standard Operating Procedures

SOIL SAMPLING

Hand Samples: Undisturbed soil samples are obtained using a slide hammer hand sampler with a single sampling cup at the end. The sampler holds one (1), clean, six inch long by two inch diameter brass tube. The sample is obtained by hammering the cup and tube into the undisturbed soil. The sampler is removed, opened, and the brass tube containing the sample is extracted.

Electric Drive Samples: Undisturbed soil samples are obtained using a continuous coring, 0.75 inch, lined, steel sampler. The sampler is driven into the soil using an electric rotary hammer. The sampler holds one, four foot by one inch diameter, new, plastic, sampling liner. After driving the steel sampler three to four feet, the sampler is extracted and the sampling liner containing the sample is removed.

Pneumatic Drive Samples: Undisturbed soil samples are obtained using a 1.0 inch, steel, outer drive casing, fitted with a 0.5 inch, inner soil sampler, fitted with a brass liner. The casing is pneumatically driven to the desired depth, an inner plug rod is removed and the sampler is inserted into the casing. The sample is obtained by hammering the sampling cup into the undisturbed soil. After driving the sampler six inches, it is extracted and the sampling liner containing the sample is removed.

California Split-spoon Samples: Undisturbed soil samples are obtained using a California Split-spoon sampler fitted with three six inch long by two inch diameter brass tubes. The sampler is lowered down inside a hollow stem auger after the auger plug has been removed. The sampler is then driven at least eighteen inches. The sampler is usually driven using a 140 pound hammer dropping 30 inches at each blow. After driving the sampler, the sampler is extracted and the sampling liner containing the sample is removed.

Immediately after extraction the sample tube ends are sealed with Teflon tape, plastic cap plugs, and isolated in hermetically sealed locking plastic bags.

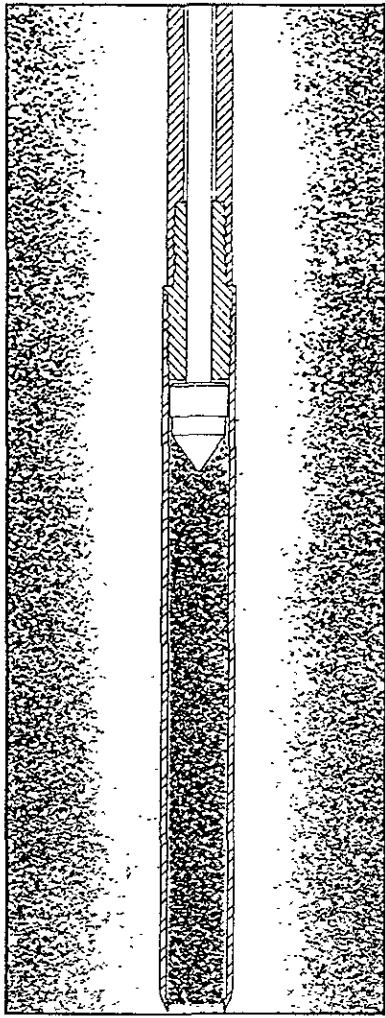
All samples are labeled and chilled to 4° C for transportation to a California State certified hazardous materials laboratory. Chain of Custody documentation accompanies all samples to the laboratory. A copy of the Chain of Custody documentation is attached to the Certificate of Analysis.

All soil samples are collected in accordance with California Regional Water Quality Control Board (RWQCB) procedures described in the *Leaking Underground Fuel Tank (LUFT) Field Manual*, the *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites*, and local regulatory guidelines.

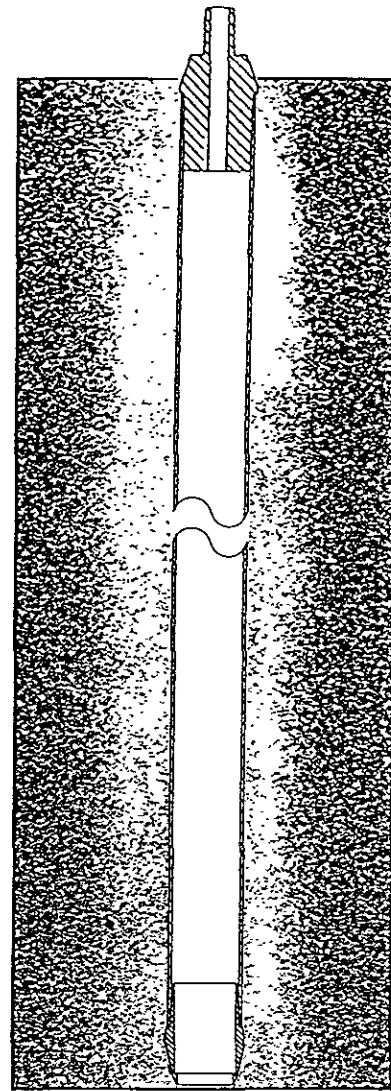
Standard Environmental Protection Agency (EPA), San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), and Department of Health Services (DHS) methodologies for sampling and analyses are routinely utilized.

Chain of Custody documentation accompanies all samples to the laboratory. A copy of the Chain of Custody documentation is attached to the Certificate of Analysis.

Soil cuttings and excess sampling materials are properly stored and labeled on site in DOT 17-H containers pending off site disposal.



Discrete Sampling: After the probe is driven to the selected sampling depth, the point is retracted and the probe is driven down to obtain a discrete soil sample.



Continuous Core Sampling: Samples are obtained from the initial insertion of the sampling tool down to the full extent of the boring. The clear PETG sample tubes are then cut to the desired size for analysis.

The Large Bore Sampler obtains a 22" X 1-1/16" core up to depths of 30' below ground surface.
 The Macro-Core Sampler obtains a 45" X 1.5" core up to 20' below ground surface.
 The Continuous Core Sampler obtains a continuous 1" diameter sample for the entire drilling depth.
 The clear PETG sample tubes used in each method can be cut to any desired length for analyses
 Soil disposal is not required with any of these methods.

Artesian Environmental Consultants is a general engineering contracting firm certified for drilling and hazardous waste removal (A C57, Haz Waste #624461)

Artesian Environmental Consultants uses proprietary drilling equipment as well as Geoprobe, Clements, Mobile Drill, and Arts Manufacturing

Soil Sampling System

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 3100 Kerner Blvd., Suite C • San Rafael, CA 94901
 TEL (800) 959-4801; FAX (415) 257-4805

Artesian Environmental Consultants

Standard Operating Procedures

SOIL EXCAVATION AND SAMPLING

Excavated soil is screened and segregated in the field using a vapor analyzing device such as a photo-ionization detector (PID) or organic vapor analyzer (OVA). Documentation of soil removal activities include field reports and photographs. After the removal of soil having obvious staining, odor or detectable levels of organic vapors as detected on a PID or OVA, confirmatory soil samples in the walls and floor of the excavation will be selected at least every 20 feet laterally. Additional samples will be selected on the recommendation of the geologist and regulator. All sampling will be performed with a backhoe.

Soil samples for chemical analysis are collected in pre-cleaned, thin-walled tubes, typically 6-inches long and 2-inches in the outside diameter. After removing the top 2-inches of soil, the sample tube is pushed or driven with a wooden mallet into the native soil near the teeth of the backhoe bucket. The brass tube is immediately capped on both ends with Teflon tape, trimmed and hermetically sealed with plastic end caps. The samples are then labeled and placed in individual see-through zip-lock plastic storage bags. The samples are stored in an ice chest with crushed ice to maintain a constant temperature of 4 ° Celsius. A thermometer is kept in the ice chest to ensure that the proper temperature is maintained. The samples are then delivered under chain-of-custody procedures to a state-certified hazardous materials testing laboratory. The above mentioned procedures minimize the potential for cross-contamination and volatilization of volatile organic compounds (VOCs) prior to chemical analysis.

Artesian Environmental Consultants

Standard Operating Procedures

MONITORING WELL SAMPLING

Prior to groundwater sampling, initial water level and floating liquid hydrocarbon measurements are recorded for each well. Each well is sounded for depth to ascertain if silting has occurred and to verify the actual depth below ground surface. These measurements are used to calculate the volume for each well. At this time, all non-dedicated pumping and sampling supplies are washed with an Alconox solution, rinsed with clean water, and final rinsed with either distilled or deionized water to prevent any cross contamination from other sampling events.

Each well is purged by evacuating a minimum of three well-casing volumes of groundwater from the well. The well water may be evacuated either by bailing; or pumping. Any of the following may be used for bailing: a dedicated pvc bailer, sterile disposable polyethylene bailer, or a stainless steel bailer. For pumping the groundwater out of the well, a downhole impeller type pump (dedicated or removable with PVC tubing), a downhole dedicated bladder pump, or a surface peristaltic pump is used.

After three to four well volumes are pumped, each well is permitted to recharge to at least 80% of original capacity or for two hours; whichever occurs first. The water is then measured to verify whether the well has stabilized. Stabilization is determined by measuring the parameters of pH; temperature; and electrical conductivity. Stabilized measurements indicate that formation water has entered the well. When two subsequent measurements of these three parameters are within 10% of each other, the well is considered stabilized and is ready to be sampled.

The samples are collected using a new polyethylene bailer with a bottom siphon and nylon cord. The bailers are disposable, and therefore, never reused. The groundwater sample is visually inspected for the presence of free product in the sampling bailer. Agitation is minimized during sample retrieval to prevent aeration during the transfer from the well to the laboratory prepared sample containers. Duplicate water samples are collected from the well and siphoned into three, 40 ml, VOA, septum top vials, with additional 950 ml samples collected in an amber glass bottles or polyethylene bottles depending on the analyses to be performed. The VOA vials are filled completely, leaving no headspace, and are sealed with Teflon-lined lids. All samples are labeled, chilled to 4° C in an ice chest, and sent to a California State Certified hazardous materials testing laboratory under chain-of-custody documentation .

All groundwater samples are collected in accordance with California Regional Water Quality Control Board (RWQCB) procedures described in the *Leaking Underground Fuel Tank (LUFT) Field Manual*, the *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites*, and local regulatory guidelines.

Standard Environmental Protection Agency (EPA), San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), and Department of Health Services (DHS) methodologies for sampling and analyses are routinely utilized.

Chain of Custody documentation accompanies all samples to the laboratory. A copy of the Chain of Custody documentation is attached to the Certificate of Analysis.

Monitor well purge water is properly stored and labeled on site in DOT 17-H containers pending off site disposal.

April 23, 1997



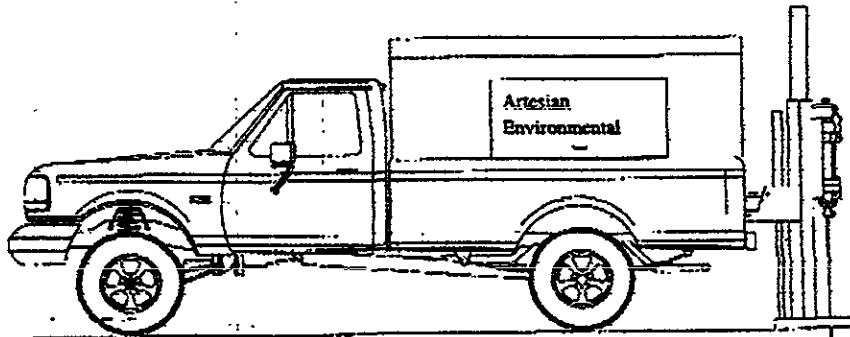
To: Tommy A. Conner, Esq.
Law Offices of Tommy A. Conner
444 De Haro Street, Suite 121
San Francisco, CA 94107

Re: Hausauer/3927 East 14th Street
Oakland, California
Proposal 97-04-002-197

Dear Mr. Conner:

Artesian Environmental Consultants (Artesian) is pleased to present a bid to install one groundwater sampling point and site remediation at the above referenced site. A workplan dated April 8, 1997 has been prepared by Artesian for the proposed work.

EQUIPMENT: Artesian has in-house portable and a truck-mounted Geoprobe 5400 rig and other direct penetration technology (DPT) equipment. Direct push drilling methods do not generate soil cuttings which require disposal. Maximum depth range for the Geoprobe 5400 rig is 50 or 60 feet. The equipment is limited access and portable equipment is also available. Angle drilling can be performed up to 30 degrees from vertical using the Geoprobe 5400 rig or to any angle by hand held methods. As a licensed driller, Artesian also uses Mobile Minute Man limited access drilling rigs and Mobile B-57 and B-61 hollow stem auger drilling rigs.



GEOPROBE 5400 DIRECT PENETRATION TECHNOLOGY (DPT) RIG

BACKGROUND

Artesian, incorporated in California in 1990, specializes in environmental support services and is licensed by the state as a general engineering contracting firm certified for hazardous waste removal, well drilling and asbestos abatement (# 624461: A, B, C-57, Haz., and Asb). The firm performs technical and operational services for attorneys, Fortune 500 firms as well as leading environmental consulting firms. The company offers environmental consulting, limited-access, environmental, and geotechnical drilling services; third-party independent soil and water sampling; tank removal; and soil and groundwater contracting services. All field employees have the required 29 CFR 1910.120 forty hour

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safety training and supervisory course work as well as medical monitoring and refresher classes as required by OSHA.

INSURANCE

Artesian has a general and professional liability/errors coverage for \$2,000,000. Artesian has \$1,000,000 workers compensation coverage and vehicle coverage. If requested, Artesian can send an original certificate to the client or name the client as additionally insured.

CONFIDENTIALITY AGREEMENT

All work is completely confidential.

ESTIMATE

Artesian has prepared the following bid as an estimate of costs. This bid is valid for 90 days.

ITEM	UNITS	RATE	TOTAL
Field Work Preparation			
Workplan/site safety plan preparation	8	* \$75 per hour	\$600
Permitting/project management	12	* \$75 per hour	\$900
Permits	1	* \$500 estimated	\$500
Waste Profile	2	* \$75 per hour	\$150
Modeling	2	* \$75 per hour	\$150
		sub total	\$2,300
Groundwater Sampling Point Installation			
DPT Drilling Equip	2	* \$115 per hour	\$230
Mob/Demob, Travel	2	* \$105 per hour	\$210
PID	1	* \$50 per day	\$50
Geologist	4	* \$75 per hour	\$300
Well Materials	1	* \$125 per well	\$125
Support Truck	1	* \$100 per day	\$100
Steam Cleaner	1	* \$50 per day	\$50
Generator/pump	1	* \$50 per day	\$50
Licensed Surveyor	1	* \$475 per event	\$475
		sub total	\$1,590
Groundwater Sampling Point Development			
Field Technician	4	* \$59 per hour	\$236
Truck	1	* \$100 per day	\$100
Development Equip	1	* \$100 per day	\$100
		sub total	\$436
Groundwater Sampling and Site Remediation			
Field Technician	10	* \$59 per hour	\$590
Truck	1	* \$100 per day	\$100
Sampling Equip	1	* \$100 per day	\$100
PID	1	* \$50 per day	\$50
Shoring	1	* \$500 per event	\$500

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Backhoe and operator	1	* \$750 per day	\$750
Geologist	10	* \$75 per hour	\$750
Laborer	10	* \$35 per hour	\$350
Imported Backfill	50	* \$16 per ton	\$800
Vac Truck/Water disp	500	* \$1.35 per gallon	\$675
Sidewalk Repair	1	* \$600 per event	\$600
ORC	200	* \$14 per pound	\$2,800

sub total \$8,065

Laboratory Analyses (10 day turn around time)

TPH-g/BTEX/MTBE	7	* \$75 per sample	\$525
TPH-d/TPH-mo	7	* \$75 per sample	\$525
Bio-assay	2	* \$300 per sample	\$600
Soil Disposal Profile			
TPH-g/BTEX	1	* \$60 per sample	\$60
TPH-d/TPH-mo	1	* \$75 per sample	\$75
TRPH	1	* \$75 per sample	\$75
Volatile Organics	1	* \$175 per sample	\$175
Semi Volatile Organics	1	* \$210 per sample	\$210
LUFT Metals	1	* \$95 per sample	\$95

sub total \$2,340

Report Preparation

Geologist	16	* \$75 per hour	\$1,200
Graphics	6	* \$40 per hour	\$240
C.H.G. Review	2	* \$95 per hour	\$190

sub total \$1,630


TOTAL \$16,361

FEE

Artesian will perform the above scope of work on a time and materials basis. The client is only billed for actual costs. Additional services or supplies can be obtained as a change order to this contract. By authorizing Artesian to proceed, the client is agreeing to pay for the work performed. Payment is due within 60 days of receiving the invoice.

AUTHORIZATION TO PROCEED

The total estimated cost for the scope of work defined is \$16,361 based on a time and materials basis. To authorize the work, please have the client sign this agreement. Please call me at (415) 257-4801 if you have any questions.


 Thomas Fortner
 Project Geologist
 Date: 4/23/97

 Client:
 Representing:
 Date:

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