GeoStrategies Inc.

WELL INSTALLATION REPORT

Chevron Service Station No. 3864
5101 Telegraph Avenue
Oakland, California

727702-2

January 17, 1991

GeoStrategies Inc.
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545

(415) 352-4800
GENERAL CONTRACTORS

January 17, 1991

Gettler-Ryan Inc.
2150 West Winton Avenue
Hayward, California 94545

Re: WELL INSTALLATION REPORT
Chevron Service Station No. 3864
5101 Telegraph Avenue
Oakland, California

Gentlemen:

This report summarizes the ground-water monitoring well installation and soil sampling performed by GeoStrategies Inc. (GSI) at the above referenced location (Plate 1). Soil borings C-1 through C-4 were drilled on November 14 and 15, 1990 and were subsequently completed as ground-water monitoring wells. The location of these wells are shown on Plate 2. Field work and laboratory analyses were performed in compliance with State of California Water Resources Control Board guidelines for investigations related to leaking underground storage tanks.

SITE BACKGROUND

Underground storage tanks were installed at the site in 1970, and consist of two 10,000-gallon product tanks, one 5,000-gallon product tank, and one 1,000-gallon waste oil tank. Each tank is constructed of steel and was installed with cathodic protection. According to available information from Chevron U.S.A., spills or leaks of petroleum hydrocarbons have not been reported at the site. Tank integrity tests were performed on October 13, 1989 and indicated that the systems tested tight. The site is currently scheduled for abandonment in March, 1991.

Additional site background information is not available to GSI at this time.

FIELD PROCEDURES

Four exploratory soil borings (C-1 through C-4) were drilled using a truck-mounted, hollow-stem auger rig. The borings were subsequently completed as ground-water monitoring wells. Field work was performed according to GSI Field Methods and Procedures (Appendix A). Soil samples were collected at five-foot depth intervals, using a modified California split-spoon sampler fitted with clean brass tube liners. A GSI geologist observed the drilling, described soil samples using the Unified Soil Classification System (ASTM D-2488) and prepared a lithologic log for each borehole. Exploratory boring logs are presented in Appendix B.

Soil Sampling

A 4-inch long brass tube of soil from each sampled interval was collected to perform head-space analysis in the field to screen for the presence of volatile organic compounds (VOCs). Head-space analysis involved transferring soil from the brass liner into a clean glass jar and immediately covering the jar with aluminum foil secured with a ring type threaded lid. After approximately twenty minutes, the foil was pierced and the head-space within the jar was tested for total organic vapor measured in parts per million (ppm) using an Organic Vapor Monitor (OVM) photoionization detector. Head-space analysis results are presented on the exploratory boring logs in Appendix B.

Selected soil samples retained for chemical analysis were collected in clean brass liners, covered on both ends with aluminum foil and sealed with plastic end caps. The samples were labeled, entered on a Chain-of-Custody form and transported in a cooler with blue ice to Superior Analytical Laboratory (Superior), a State-certified laboratory located in Martinez, California.

Monitoring Well Construction

Borings C-1 through C-4 were drilled with 8-inch-diameter hollow-stem augers to total depths of 30.5 to 35.5 feet below existing grade. Each boring was overdrilled and backfilled to a depth of approximately 30 feet with bentonite pellets. Wells C-1 through C-4 were constructed through the augers using 2-inch-diameter Schedule 40 PVC well casing and 0.020-inch factory slotted well screen. Lonestar #2/12 sand was placed in the annular space across the entire screened interval and extended a minimum of 2-feet above the top of the well screen. A 2-foot bentonite seal was placed above the sand pack, followed by concrete to the ground surface. A vault box with a cover was placed at ground surface and a locking cap with lock was then placed on each well. After the concrete seal was given sufficient time to set-up, each well was developed using methods outlined in GSI's Field Methods and Procedures. The well construction details are presented with the boring logs in Appendix B.

HYDROGEOLOGIC CONDITIONS

The site is located on the bay plain in west Oakland, California, approximately two miles east of San Francisco Bay. Temescal Creek flows to the west approximately 400 feet south of the site. Published geologic maps show the area as underlain by alluvial fan deposits consisting of clayey gravel, sandy clay, and sand-clay-silt mixtures of the Quaternary-age Temescal Formation (Radbruch, 1957).

Lithology beneath the site consists of clay, silt, and clayey silty gravel and sand to the total depth explored of 35.5 feet. Silt and clayey silt was observed in the interval from approximately 1 to 9 feet below grade. The interval from 9 to 30 feet consists primarily of interbedded clayey, silty gravel and sand deposits; this material is believed to comprise the uppermost aquifer beneath the site. A sandy clay layer was encountered in each boring at depths of approximately 29 to 30 feet below grade. This layer was observed in Borings C-1 and C-4 at thicknesses of approximately 6.0 and 5.5 feet, respectively, and appears to form a continuous basal aquitard beneath the site.

Ground-water was first encountered at approximately 15.0 to 16.5 feet below grade. Depth to ground-water measurements, taken by Gettler-Ryan Inc. (G-R) December 6, 1990, indicated that ground-water levels stabilized in the wells at depths of between 15.34 and 17.68 feet below the surveyed top of the well box. A hydraulic gradient of 0.038 was calculated from potentiometric data. Groundwater flows west-northwest beneath the site. Ground-water elevation data has been plotted and contoured and is presented on Plate 3 as a potentiometric map. A summary of the potentiometric data is presented in Table 1.

CHEMICAL ANALYSES

Soil and ground-water samples were analyzed for TPH-Gasoline, according to EPA Method 8015 (Modified), and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), according to EPA Method 8020. In addition, soil samples from Boring C-4 were analyzed for Halogenated Volatile Organics (HVOs) according to EPA Method 8010 and Oil and Grease according to Standard Methods Method 503E. Ground-water samples from Well C-4 were also analyzed for HVOs according to EPA Method 8010 and ICAP Metals according to the appropriate EPA Methods. Chemical analyses of soil and ground-water samples were performed by Superior Analytical Laboratories (Superior) and Clayton Environmental Consultants, at State-certified environmental laboratories located in San Francisco and Pleasanton, California, respectively.

Soil Analytical Results

Soil samples for chemical analysis were selected from the 10.5 and 15.5 foot depths in Borings C-2 through C-4 and from the 15.5 foot depth from Boring C-1. The highest levels of TPH-Gasoline were detected in the 15.5 foot soil sample from Borings C-1, C-2, and C-3 at concentrations of 48 parts per million (ppm), 25 ppm, and 270 ppm, respectively. Benzene was identified in the 15.5 foot sample from Boring C-2 and the 10.5 foot sample from Boring C-3 at concentrations of 0.040 ppm and 0.006 ppm, respectively. The soil samples from Boring C-4 were reported as not detected (ND). Results of the soil chemical analyses are presented in Table 2. Soil chemical analytical reports are presented in Appendix C.

Ground-water Analytical Results

Ground-water samples were collected from monitoring wells C-1 through C-4 by Gettler-Ryan (G-R) on December 6, 1990. TPH-Gasoline was detected in Wells C-1, C-2, and C-3 at concentrations of 1900 parts per billion (ppb), 210 ppb, and 210 ppb, respectively. Benzene was identified in Wells C-1, C-2, and C-3 at concentrations of 17 ppb, 140 ppb, and 2 ppb, respectively. TPH-Gasoline and benzene were reported as ND for samples from Well C-4. Chloroform was detected in Well C-4 at concentration of 2 ppb. A summary of TPH-Gasoline and BTEX ground-water analytical results are presented in Table 1. TPH-Gasoline and benzene concentrations from this sampling are presented on Plate 4. The G-R ground-water sampling report, Chain-of-Custody forms, and Superior analytical reports are presented in Appendix D.

SUMMARY OF FINDINGS

The results of this investigation are summarized below:

- Four exploratory borings were drilled on November 14 and 15, 1990. The borings were completed as ground-water monitoring Wells C-1 through C-4.

- Based on the exploratory borings, the lithology of the site appears to consist of clay, silt, and clayey, silty gravel and sand to the total depth explored of 35.5 feet. A basal clay layer has been observed at a thickness of up to 6 feet and appears to be continuous beneath the site.

- TPH-Gasoline was detected in soil samples from the 15.5 foot interval in Borings C-1, C-2, and C-3 at concentrations of 48 ppm, 25 ppm and 270 ppm, respectively. Benzene was identified in the sample from a depth of 15.5 feet in Boring C-2 at a concentration of 0.040 ppm.

- Ground-water samples were collected by G-R on December 6, 1990. TPH-Gasoline was detected in Wells C-1, C-2, and C-3 at concentrations of 1900 ppb, 210 ppb, and 210 ppb, respectively. Benzene was identified in Wells C-1, C-2, and C-3 at concentrations of 17 ppb, 140 ppb, and 2 ppb. TPH-Gasoline and benzene were reported as ND for samples from Well C-4.

If you have any questions, please call.

GeoStrategies Inc. by,

Robert C. Mallory
Geologist

David H. Peterson
Senior Geologist
C.E.G. 1186

REGISTERED GEOLOGIST
DAVID H. PETERSON
No. 1186
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

RCM/DHP/mlg

Plate 1. Vicinity Map
Plate 2. Site Plan
Plate 3. Potentiometric Map
Plate 4. TPH-G/Benzene Concentration Map

Appendix A. GSI Field Methods and Procedures
Appendix B. Exploratory Boring Logs/Well Construction Details
Appendix C. Soil Analytical Report
Appendix D. Gettler-Ryan Inc. Groundwater Sampling Reports

QC Review: JLP/dhp

References Cited

Radbruch, D.H., 1957, Areal and Engineering Geology of the Oakland West Quadrangle, California, Miscellaneous Geologic Investigations Map I-239, U.S. Geological Survey, Washington, D.C.

TABLE 1

GROUND-WATER ANALYSES DATA

WELL NO	SAMPLE DATE	ANALYZED DATE	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	WELL ELEV (FT)	STATIC WATER ELEV (FT)	PRODUCT THICKNESS (FT)	DEPTH TO WATER (FT)
C-1	06-Dec-90	14-Dec-90	1900	17	11	3	21	117.45	102.11	----	15.34
C-2	06-Dec-90	14-Dec-90	210	140	9	2	11	116.16	100.82	----	15.34
C-3	06-Dec-90	14-Dec-90	210	2	<0.5	<0.5	1	115.70	98.84	----	16.86
C-4	06-Dec-90	14-Dec-90	<50	<0.5	<0.5	<0.5	<0.5	116.10	98.42	----	17.68
CD-3	06-Dec-90	14-Dec-90	220	2	0.6	<0.5	2	----	----	----	----
TB	06-Dec-90	14-Dec-90	<50	<0.5	<0.5	<0.5	<0.5	----	----	----	----

CURRENT REGIONAL WATER QUALITY CONTROL BOARD MAXIMUM CONTAMINANT LEVELS
Benzene 1.0 ppb Xylenes 1,750 ppb Ethylbenzene 680 ppb

CURRENT DHS ACTION LEVELS
Toluene 100 ppb

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPB = Parts Per Billion CD = Duplicate Sample TB = Trip Blank

Notes: 1. All data shown as <x are reported as ND (none detected).
2. Static Water elevations referenced to mean sea level (MSL).
3. DHS Action Levels and MCLs are subject to change pending State review.

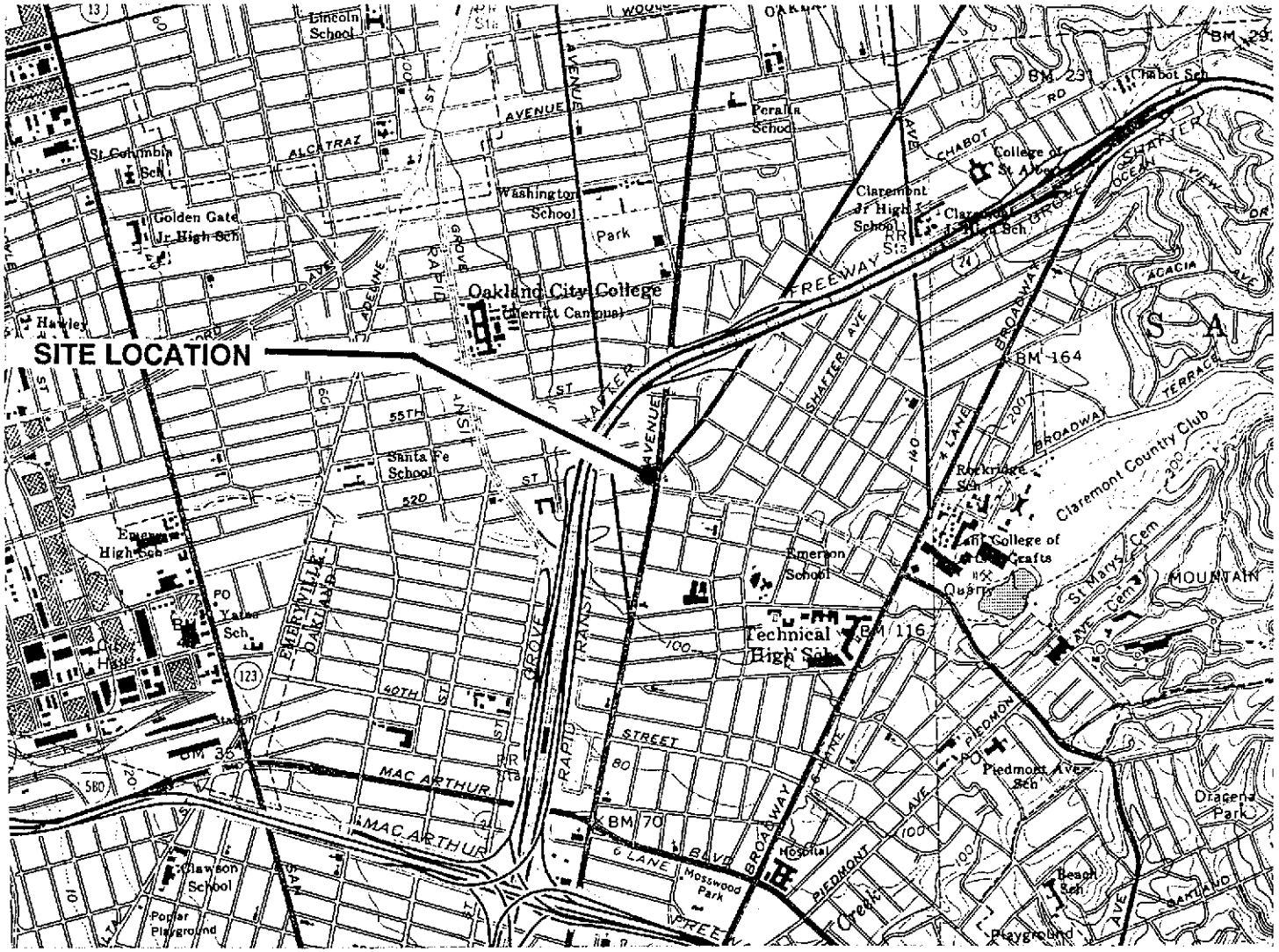
TABLE 2

SOIL ANALYSES DATA

SAMPLE I.D.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	TOG (PPM)
C-1-15.5	14-Nov-90	27-Nov-90	48	<0.025	0.29	0.28	0.60	NA
C-2-10.5	14-Nov-90	27-Nov-90	<1	<0.005	<0.005	<0.005	<0.005	NA
C-2-15.5	14-Nov-90	27-Nov-90	25	0.040	0.092	0.18	0.40	NA
C-3-10.5	15-Nov-90	27-Nov-90	<1	0.006	0.016	0.006	0.021	NA
C-3-15.5	15-Nov-90	27-Nov-90	270	<0.25	0.87	1.5	3.4	NA
C-4-10.5	15-Nov-90	27-Nov-90	<1	<0.005	<0.005	<0.005	<0.005	<50
C-4-15.5	15-Nov-90	27-Nov-90	<1	<0.005	<0.005	<0.005	<0.005	<50

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million
NA = Not Analyzed

Note: 1. All data shown as <x are reported as ND (none detected).



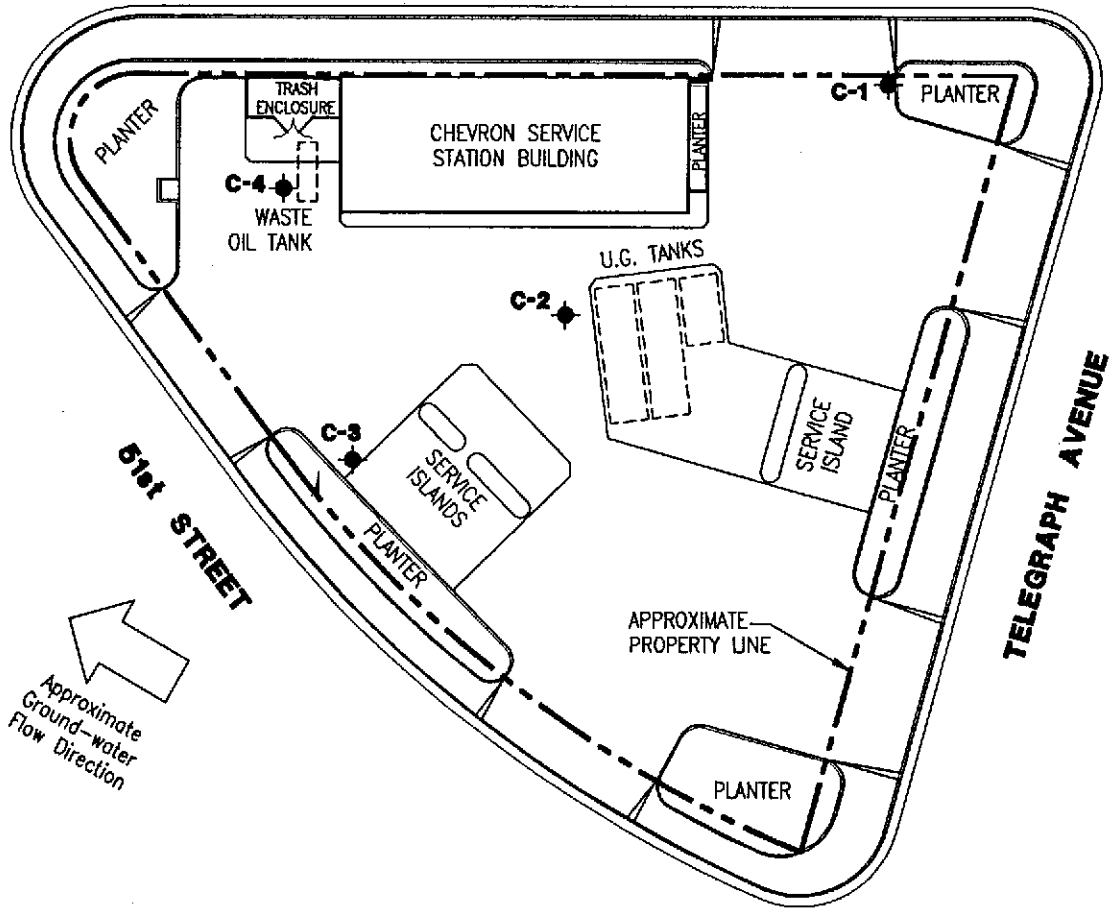
Base Map: USGS Topographic Map

GeoStrategies Inc.

VICINITY MAP
Chevron Service Station #3864
5101 Telegraph Avenue
Oakland, California

PLATE
1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE
7277		9/90	



EXPLANATION

✦ Ground-water monitoring well

Base Map: Chevron Ground & Grade Plan dated 11/90

N

0 40

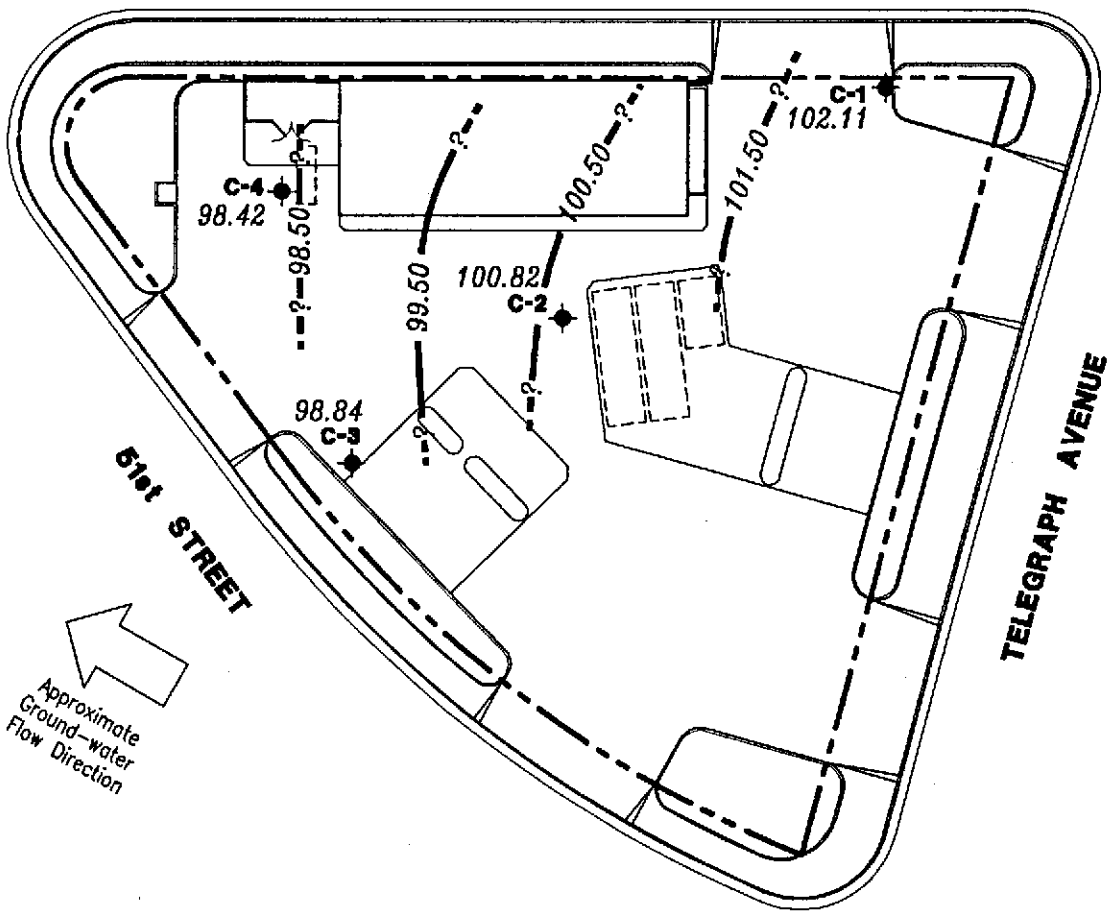
Scale in Feet

GeoStrategies Inc.

SITE PLAN
Chevron Service Station #3864
5101 Telegraph Avenue
Oakland, California

PLATE **2**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
727702-2	DHP	1/91	



EXPLANATION

- Ground-water monitoring well
- 99.99 — Ground-water elevation contour Approximate Gradient = 0.038
- 99.99 — Ground-water elevation in feet referenced to Mean Sea Level (MSL) measured on December 6, 1990

Note: Contours may be influenced by irrigation practices and/or site construction activities.

N

0 40

Scale in Feet

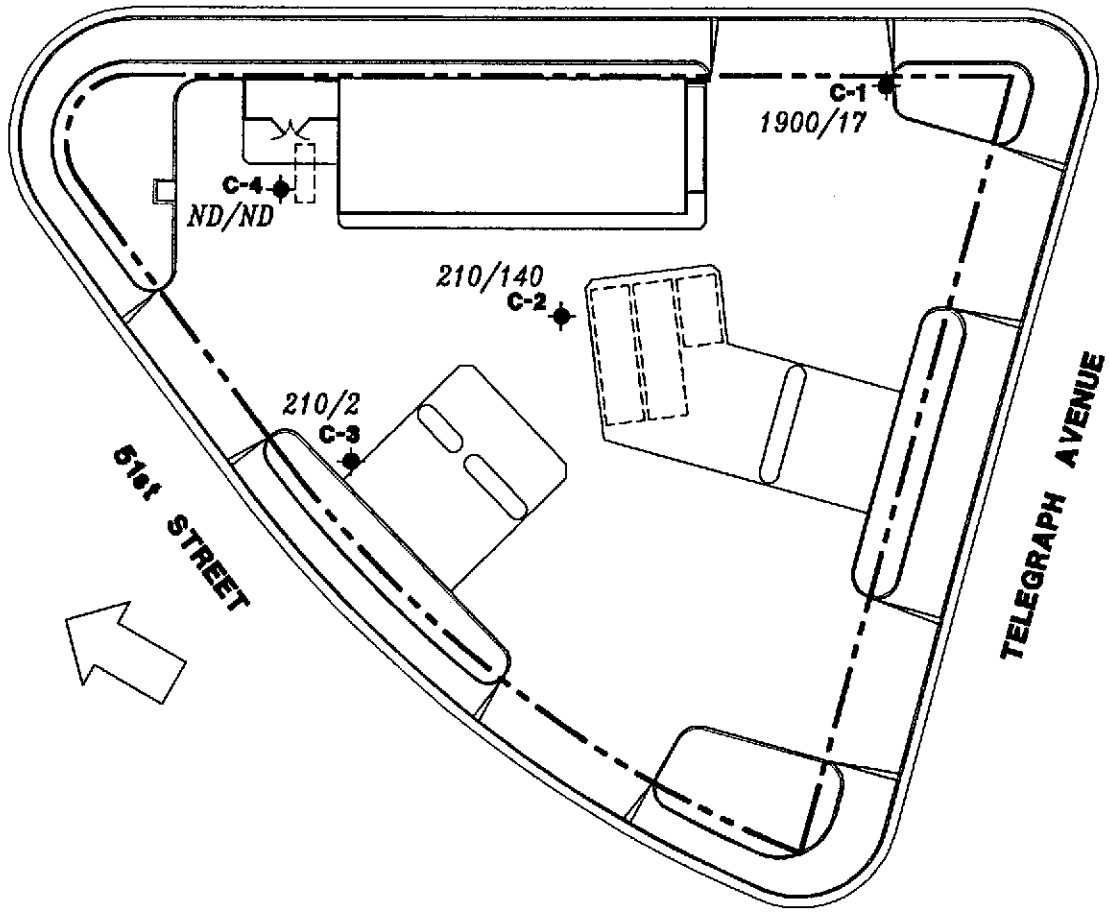
Base Map: Chevron Ground & Grade Plan dated 11/90

GeoStrategies Inc.

POTENTIOMETRIC MAP
Chevron Service Station #3864
5101 Telegraph Avenue
Oakland, California

PLATE 3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
727702-2	DHP	1/91	



EXPLANATION

✦	Ground–water monitoring well
99/9.9	TPH–G (Total Petroleum Hydrocarbons calculated as Gasoline)/Benzene concentrations in ppb sampled on December 6, 1990
ND	Not Detected (See laboratory reports for detection limits)

N

0 40

Scale in Feet

Base Map: Chevron Ground & Grade Plan dated 11/90

GeoStrategies Inc.

TPH–G/BENZENE CONCENTRATION MAP
Chevron Service Station #3864
5101 Telegraph Avenue
Oakland, California

PLATE **4**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
727702–2	DHP	1/91	

APPENDIX A

GSI FIELD METHODS AND PROCEDURES

FIELD METHODS AND PROCEDURES

EXPLORATION DRILLING

Mobilization

Prior to any drilling activities, GeoStrategies Inc. (GSI) will verify that necessary drilling permits have been secured.

Utility locations will be located and drilling will be conducted so as not to disrupt activities at a project site. GSI will obtain and review available public data on subsurface geology and if warranted, the location of wells within a half-mile of the project site will be identified. Drillers will be notified in advance so that drilling equipment can be inspected prior to performing work.

Drilling

The subsurface investigations are typically performed to assess the lateral and vertical extent of petroleum hydrocarbons present in soils and groundwater. Drilling methods will be selected to optimize field data requirements as well as be compatible with known or suspected subsurface geologic conditions.

Monitoring wells are installed using a truck-mounted hollow-stem auger drill rig or mud-rotary drill rig. Typically, the hollow-stem rig is used for wells up to 100 feet, if subsurface conditions are favorable. Wells greater than 100-feet deep are typically drilled using mud-rotary techniques. When mud rotary drilling is used, an electric log will be performed for additional lithological information. Also during mud rotary drilling, precautions will be taken to prevent mud from circulating contaminants by using a conductor casing to seal off contaminated zones. Samples will be collected for lithologic logging by continuous chip, and where needed by drive sample or core as specified by the supervising geologist.

Soil Sampling

Shallow soil borings will be drilled using a truck-mounted hollow-stem auger drilling rig, unless site conditions favor a different drilling method. Drilling and sampling methods will be consistent with ASTM Method D-1452-80. The auger size will be a minimum 6-inch nominal outside-diameter (O.D). No drilling fluids will be used during this drilling method. The augers and other tools used in the bore hole will be steam cleaned before use and between borings to minimize the possibilities of cross-contamination between borings.

Soil samples are typically collected at 5-foot intervals as a minimum from ground surface to total depth of boring. Additional soil samples will be collected based on significant lithologic changes and/or potential chemical content. Soil samples from each sampling interval will be lithologically described by a GSI geologist (Figure 1). Soil colors will be described using the Munsell Color Chart. Rock units will be logged using appropriate lithologic terms, and colors described by the G.S.A. Rock Color Chart.

Head-space analyses will be performed to check for the evidence of volatile organic compounds. Head-space analyses will be performed using an organic vapor analyzer; either an OVA, HNU, or OVM. Organic vapor concentrations will be recorded on the GSI field log of boring (Figure 1). The selection of soil samples for chemical analysis are typically based on the following criteria:

1) Soil discoloration
2) Soil odors
3) Visual confirmation of chemical in soil
4) Depth with respect to underground tanks (or existing grade)
5) Depth with respect to ground water
6) OVA reading

Soil samples (full brass liners) selected for chemical analysis are immediately covered with aluminum foil and the liner ends are capped to prevent volatilization. The samples are labeled and entered onto a Chain-of-Custody form, and placed in a cooler on blue ice for transport to a State-certified analytical laboratory.

Soil cuttings are stockpiled on-site. Soils are sampled and analyzed for site-specific chemical parameters. Disposition of soils is dependent of chemical analytical results of the samples.

Soil Sampling - cont.

Soil borings not converted to monitoring wells will be backfilled (sealed) to ground surface using either a neat cement or cement-bentonite grout mixture. Backfilling will be tremied by continuously pumping grout from the bottom to the top of the boring where depth exceeds 20' or as required by local permit requirements.

All field and office work, including exploratory boring logs, are prepared under the direction of a registered geologist.

Monitoring Well Installation

Monitoring well casing and screen will be constructed of Schedule 40, flush-joint threaded polyvinylchloride (PVC). The well screen will be factory mill-slotted unless additional open area is required (eg. conversion to an extraction well in a low-yield aquifer). The screen length will be placed adjacent to the aquifer material to a minimum of 2-feet above encountered water. No screen shall be placed in a borehole that potentially creates hydraulic interconnection of two or more aquifer units. Screen slot size and well sand pack will be compatible with encountered aquifer materials, as confirmed by sieve analysis.

Monitoring wells will be completed below grade (Figure 2) unless special conditions exist that require above-grade completion design. In the event a monitoring well is required in an aquifer unit beneath an existing aquifer, the upper aquifer will be sealed off by installing a steel conductor casing with an annular neat cement or cement-bentonite grout seal. This seal will be continuously tremie pumped from the bottom of the annulus to ground surface.

The monitoring well sand pack will be placed adjacent to the entire screened interval and will extend a recommended minimum distance of 2-feet above the top of the screen. No sand pack will be placed that interconnects two or more aquifer units. A minimum 2-foot bentonite pellet or bentonite slurry seal will be placed above the sand pack. Sand pack, bentonite, and cement seal levels will be confirmed by sounding the annulus with a calibrated weighted tape. The remaining annular space above the bentonite seal will be grouted with a bentonite-cement mixture and will be tremie-pumped from the bottom of the annular space to the ground surface. The bentonite content of the grout will not exceed 5 percent by weight. A field log of boring and a field well completion form will be prepared by GSI for each well installed.

Decontamination of drilling equipment before drilling and between wells will consist of steam cleaning, and/or Alconox wash.

Well Development

All newly installed wells will be properly developed within 48 hours of completion. No well will be developed until the well seal has set a minimum of 12 hours. Development procedures will include one or more of the methods described below:

Bailing

Bailing will be used to remove suspended sediments and drilling fluids from the well, where applicable. The bailer will be raised and lowered through the column of water in the well so as to create a gentle surging action in the screened interval. This technique may be used in conjunction with other techniques, such as pumping, and may be used alone if the well is of low yield.

Pumping

Pumping will be used in conjunction with bailing or surging. The pump will be operated in such a manner as to gently surge the entire screened interval of the well. This may involve operating the pump with a packer type mechanism attached and slowly raising and lowering the pump, or by cycling the pump off and on to allow water to move in and out of the screened interval. Care will be used not to overpump a well.

Surging

Surging will be performed on wells that are screened in known or suspected high yield formations and/or on larger diameter (recovery) wells. A surge block will be raised and lowered through the entire screened interval, forcing water in and out of the well screen and sand pack. Pumping or air lifting will be used in conjunction with this method of development to remove any sediment brought into the well during surging.

Air Lifting

Air lifting will be used to remove sediment from wells as an alternative to pumping under certain conditions. When appropriate, a surge block designed for use with air lifting will be used to agitate the entire screened interval and water will be lifted out of the well using forced air. When air lifting is performed, the air source will be either nitrogen or filtered air and the procedure will be performed gently to prevent any damage to the well screen or casing and to insure that discharged water is contained.

Well Development - cont.

All well developing equipment will be thoroughly decontaminated prior to development using a steam cleaner and/or Alconox detergent wash and clean water rinse. During development procedures, field parameters (temperature, specific conductance and pH) will be monitored and recorded on well development forms (Figure 3). Equilibration requirements consist of a minimum of three readings with the following accuracy standards:

pH	± 0.1 pH units
Specific Conductance	± 10% of full scale reading
Temperature	± 0.5 degrees Celsius

The wells will be developed until water is visibly clear and free of sediment, and well purging parameters stabilized. A minimum of 8 to 10 well volumes will be purged from each well, if feasible. If well purging parameters have not stabilized before 10 casing volumes have been removed, well development will continue until purging parameters have stabilized and formation water is being drawn into the well. The adequacy of well development will be judged by the field technician performing the well development and based on known formation conditions.

Well Surveying

Monitoring wells will be surveyed to obtain top of box elevations to the nearest ±0.01 foot. Water level measurements will be recorded to the nearest ±0.01 foot and referenced to Mean Sea Level (MSL). If additional wells are required, then existing and newly installed wells are surveyed relative to MSL.

GROUND-WATER SAMPLING AND ANALYSIS

Quality Assurance/Quality Control Objectives

The sampling and analysis procedures employed by Gettler-Ryan Inc. (G-R) for ground-water sampling and monitoring follow specific Quality Assurance/Quality Control (QA/QC) guidelines. Quality Assurance objectives have been established by G-R to develop and implement procedures for obtaining and evaluating water quality and field data in an accurate, precise, and complete manner so that sampling procedures and field measurements provide information that is comparable and representative of actual field conditions. Quality Control (QC) is maintained by G-R by using specific field protocols and requiring the analytical laboratory to perform internal and external QC checks. It is the goal of G-R to provide data that are accurate, precise, complete, comparable, and representative. The definitions for accuracy, precision, completeness, comparability, and representativeness are as follows:

- Accuracy - the degree of agreement of a measurement with an accepted referenced or true value.

- Precision - a measure of agreement among individual measurements under similar conditions. Usually expressed in terms of the standard deviation.

- Completeness - the amount of valid data obtained from a measurement system compared to the amount that was expected to meet the project data goals.

- Comparability - expresses the confidence with which one data set can be compared to another.

- Representativeness - a sample or group of samples that reflects the characteristics of the media at the sampling point. It also includes how well the sampling point represents the actual parameter variations which are under study.

As part of the G-R QA/QC program, applicable federal, state, and local reference guidance documents are followed. The procedures outlined in these regulations, manuals, handbooks, guidance documents, and journals are incorporated into the G-R sampling procedures to assure that; (1) ground-water samples are properly collected, (2) ground-water samples are identified, preserved, and transported in a manner such that they are representative of field conditions, and (3) chemical analysis of samples are accurate and reproducible.

April 20, 1990

Guidance and Reference Documents Used to Collect Groundwater Samples

These documents are used to verify G-R sampling procedures and are consistent with current regulatory guidance. If site specific work and sampling plans are required, those plans will be developed from these documents, and newly received applicable documents.

U.S.E.P.A. - 330/9-51-002	NEIC Manual for Groundwater/Subsurface Investigation at Hazardous Waste Sites
U.S.E.P.A. - 530/SW611	Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities (August, 1977)
U.S.E.P.A. - 600/4-79-020	Methods for Chemical Analysis of Water and Wastes (1983)
U.S.E.P.A. - 600/4-82-029	Handbook for Sampling and Sample Preservation of Water and Wastewater (1982)
U.S.E.P.A. - 600/4-82-057	Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (July, 1982)
U.S.E.P.A. - SW-846#, 3rd Edition	Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (November, 1986)
40 CFR 136.3e,Table II (Code of Federal Regulations)	Required Containers, Preservation Techniques, and Holding Times
Resources Conservation and Recover Act (OSWER 9950.1)	Groundwater Monitoring Technical Enforcement Guidance Document (September, 1986)
California Regional Water Quality Control Board (Central Valley Region)	A Compilation of Water Quality Goals (September, 1988); Updates (October, 1988)
California Regional Water Quality Control Board (North Coast, San Francisco Bay, and Central Valley)	Regional Board Staff Recommendations for Initial Evaluations and Investigation of Underground Tanks: Tri-Regional Recommendations (June, 1988)

Guidance and Reference Documents Used to Collect Groundwater Samples (cont.)

Regional Water Quality Control Board (Central Valley Region)	Memorandum: Disposal, Treatment, and Refuse of Soils Contaminated with Petrol·um Fractions (August, 1986)
State of California Department of Health Services	Hazardous Waste Testing Laboratory Certification List (March, 1987)
State of California Water Resources Control Board	Leaking Underground Fuel Tank (LUFT) Field Manual (May, 1988), and LUFT Field Manual Revision (April, 1989)
State of California Water Resources Control Board	Title 23, (Register #85.#33-8-17-85), Subchapter 16: Underground Tank Regulations; Article 3, Sections 2632 and 2634; Article 4, Sections 2645, 2646, 2647, and 2648; Article 7, Sections 2670, 2671, and 2672 (October, 1986: including 1988 Amendments)
Alameda County Water District	Groundwater Protection Program: Guidelines for Groundwater and Soil Investigations at Leaking Underground Fuel Tank Sites (November, 1988)
American Public Health Association	Standard Methods for the Examination of Water and Wastewaters, 16th Edition
Analytical Chemistry (journal)	Principles of Environmental Analysis, Volume 55, Pages 2212-2218 (December, 1983)
Napa County	Napa County Underground Storage Tank Program: Guidelines for Site Investigations; February 1989.
Santa Clara Valley Water District	Guidelines for Preparing or Reviewing Sampling Plans for Soil and Groundwater Investigation of Fuel Contamination Sites (January, 1989)

Guidance and Reference Documents Used to Collect Groundwater Samples (cont.)

Santa Clara Valley Water District	Investigation and Remediation at Fuel Leak sites: Guidelines for Investigation and Technical Report Preparation (March 1989)
Santa Clara Valley Water District	Revised Well Standards for Santa Clara County (July 18, 1989)
American Petroleum Institute	Groundwater Monitoring & Sample Bias; API Publication 4367, Environmental Affairs Department, June 1983
American Petroleum Institute	A Guide to the Assessment and Remediation of Underground Petroleum Releases; API Publication 1628, February 1989
American Petroleum Institute	Literature Summary: Hydrocarbon Solubilities and Attenuations Mechanisms, API Publication 4414, August 1985
Site Specific (as needed)	General and specific regulatory documents as required.

Because ground-water samples collected by G-R are analyzed to the parts per billion (ppb) range for many compounds, extreme care is exercised to prevent contamination of samples. When volatile or semi-volatile organic compounds are included for analysis, G-R sampling crew members will adhere to the following precautions in the field:

1. A clean pair of new, disposable gloves are worn for each well being sampled.

2. When possible, samples are collected from known or suspected wells that are least contaminated (i.e. background) followed by wells in increasing order of contamination.

3. Ambient conditions are continually monitored to maintain sample integrity.

When known or potential organic compounds are being sampled for, the following additional precautions are taken:

1. All sample bottles and equipment are kept away from fuels and solvents. When possible, gasoline (used in generators) is stored away from bailers, sample bottles, purging pumps, etc.

2. Bailers are made of Teflon or Stainless Steel. Other materials such as plastic may contaminate samples with phthalate esters which interfere with many Gas Chromatography (GC) analyses.

3. Volatile organic ground-water samples are collected so that air passage through the sample does not occur or is minimal (to prevent volatiles from being stripped from the samples): sample bottles are filled by slowly running the sample down the side of the bottle until there is a positive convex meniscus over the neck of the bottle; the Teflon side of the septum (in cap) is positioned against the meniscus, and the cap screwed on tightly; the sample is inverted and the bottle lightly tapped. The absence of an air bubble indicates a successful seal; if a bubble is evident, the cap is removed, more sample is added, and the bottle is resealed.

4. Extra Teflon seals are brought into the field in case seals are difficult to handle and/or are dropped. Dropped seals are considered contaminated and are not used. When replacing seals or if seals become flipped, care is taken to assure that the Teflon seal faces down.

Sample analysis methods, containers, preservatives and holding times are shown on Table 1.

Laboratory and field handling procedures of samples are monitored by including QC samples for analysis with every submitted sample lot from a project site. QC samples may include any combination of the following:

A. Trip Blank: Used for purgeable organic compounds only; QC samples are collected in 40 milliliter (ml) sample vials filled in the analytical laboratory with organic-free water. Trip blanks are sent to the project site, and travel with project site samples. Trip blanks are not opened, and are returned from a project site with the project site samples for analysis.

B. Field Blank: Prepared in the field using organic-free water. These QC samples accompany project site samples to the laboratory and are analyzed for specific chemical parameters unique to the project site where they were prepared.

C. Duplicates: Duplicated samples are collected "second samples" from a selected well and project site. They are collected as either split samples or second-run samples collected from the same well.

D. Equipment Blank: Periodic QC sample collected from field equipment rinsate to verify decontamination procedures.

The number and types of QC samples are determined as follows:

A. Up to 2 wells - Trip Blank Only

B. 2 to 5 Wells - 1 Field Blank and 1 Trip Blank

C. 5 to 10 Wells - 1 Field blank, 1 Trip Blank, and 1 Duplicate

D. More than 10 Wells - 1 Field Blank, 1 Trip Blank, and 1 Duplicate per each 12 wells

E. If sampling extends beyond one day, quality control samples will be collected for each day.

Additional QC is performed through ongoing and random reviews of duplicate samples to evaluate the precision of the field sampling procedures and analytical laboratory. Precision of QC data is accomplished by calculating the Relative Percent Difference (RPD). The RPD is evaluated to assess whether values are within an acceptable range (typically ± 20% of duplicate sample).

SAMPLE COLLECTION

This section describes the routine procedures followed by G-R while collecting ground-water samples for chemical analysis. These procedures include decontamination, water-level measurements, well purging, physical parameter measurements, sample collection, sample preservation, sample handling, and sample documentation. Critical sampling objectives for G-R are to:

1. Collect ground-water samples that are representative of the sampled matrix and,

2. Maintain sample integrity from the time of sample collection to receipt by the analytical laboratory.

Sample analyses methods, containers, preservation, and holding times are presented in Table 1.

Decontamination Procedures

All physical parameter measuring and sampling equipment are decontaminated prior to sample collection using Alconox or equivalent detergent followed by steam cleaning with deionized water. Any sampling equipment surfaces or parts that might absorb specific contaminants, such as plastic pump valves, impellers, etc., are cleaned in the same manner.

Sample bottles, bottle caps, and septa used for sampling volatile organics are thoroughly cleaned and prepared in the laboratory. Sample bottles, bottle caps, and septa are protected from all potential chemical contact before actual usage at a sample location.

During field sampling, equipment placed in a well are decontaminated before purging or sampling the next well. The equipment are decontaminated by cleaning with Alconox or equivalent detergent followed by steam cleaning with deionized water.

Water-Level Measurements

Prior to purging and sampling a well, the static-water levels are measured in all wells at a project site using an electric sounder and/or calibrated portable oil-water interface probe (Figure 4). Both static water-level and separate-phase product thickness are measured to the nearest $\pm$0.01 foot. The presence of separate-phase product is confirmed using a clean, acrylic or polyvinylchloride (PVC) bailer, measured to the nearest $\pm$0.01 foot with a decimal scale tape.

Water-Level Measurements (continued)

The monofilament line used to lower the bailer is replaced between wells with new line to preclude the possibility of cross-contamination. Field observations (e.g. well integrity, product color, turbidity, water color, odors, etc.) are noted on the G-R Well Sampling Field Data Sheet shown in Figure 4. Before and after each use, the electric sounder, interface probe and bailer are decontaminated by washing with Alconox or equivalent detergent followed by rinsing with deionized water to prevent cross-contamination.

As mentioned previously, water-levels are measured in wells with known or suspected lowest dissolved chemical concentrations to the highest dissolved concentrations.

Well Purging

Before sampling occurs, well casing storage water and interstitial water in the artificial sand pack will be purged using (1) a positive displacement bladder pump constructed of inert, non-wetting, Teflon and stainless steel, (2) a pneumatic-airlift pumping system, (3) a centrifigal pumping system, or (4) a Teflon or Stainless steel bailer (Figure 5). Methods of purging will be assessed based on well size, location, accessibility, and known chemical conditions. Individual well purge volumes are calculated from borehole volumes which take into account the sand packed interval in the well annular space. As a general rule, a minimum of 3 and a maximum of 10 borehole volumes will be purged. Wells which dewater or demonstrate slow recharge periods (i.e. low-yield wells) during purging activities may be sampled after fewer purging cycles. If a low-yield (low recovery) well is to be sampled, sampling will not take place until at least 80 percent of the previously measured water column has been replaced by recharge, or as per local requirements. Physical parameter measurements (temperature, pH, and specific conductance) are closely monitored throughout the well purging process and are used by the G-R sampling crew as indicators for assessing sufficient purging. Purging is continued until all three physical parameters have stabilized. Specific conductance (conductivity) meters are read to the nearest ± 10 umhos/cm, and are calibrated daily. pH meters are read to the nearest ± 0.1 pH units and are calibrated daily. Temperature is read to the nearest 0.1 degree F. Calibration of physical parameter meters will follow manufacturers specifications. Monitoring wells will be purged according to the protocol presented in Figure 5. Collected field data during purging activities will be entered on the G-R Well Sampling Field Data Sheet shown in Figure 4. Copies of the G-R Field Data Sheets will be reviewed by the G-R Sampling Manager for accuracy and completeness.

DOCUMENTATION

Sample Container Labels

Each sample container will be labeled by an adhesive label, noted in permanent ink immediately after the sample is collected. Label information will include:

Sample point designation (i.e. well number or code)

Sampler's identification

Project number

Date and time of collection

Type of preservation used

Well Sampling Data Forms

In the field, the G-R sampling crew will record the following information on the Well Sampling Data Sheet for each sample collected:

Project number

Client

Location

Source (i.e. well number)

Time and date

Well accessibility and integrity

Pertinent well data (e.g. depth, product thickness, static water-level, pH, specific conductance, temperature)

Calculated and actual purge volumes

Chain-of-Custody

A Chain-of-Custody record (Figure 6) shall be completed and accompany every sample and every shipment of samples to the analytical laboratory in order to establish the documentation necessary to trace sample possession from time of collections. The record will contain the following information:

- Sample or station number or sample identification (ID)
- Signature of collector, sampler, or recorder
- Date and time of collection
- Place of collection
- Sample type
- Signatures of persons involved in chain of possession
- Inclusive dates of possession

Samples shall always be accompanied by a Chain-of-Custody record. When transferring the samples, the individual relinquishing and receiving the samples will sign, date, and note the time on the Chain-of-Custody record. G-R will be responsible for notifying the laboratory coordinator when and how many samples will be sent to the laboratory for analysis, and what types of analyses shall be performed.

TABLE 1

SAMPLE ANALYSIS METHODS, CONTAINERS, PRESERVATIONS, AND HOLDING TIMES

Parameter	Analytical Method	Reporting Units	Container	Preservation	Maximum Holding Time
Total Petroleum Hydrocarbons (Gasoline)	EPA 8015 (modified)	mg/l ug/l	40 ml. vial glass, Teflon	cool, 4 C HCl to pH<2	14 days (maximum)
Benzene Toluene Ethylbenzene Xylenes (BTEX	EPA 8020	mg/l ug/l	50 ml. vial glass, Teflon lined septum	cool, 4 C HCl to pH<2	7 days (w/o preservative) 14 days (w preservative)
Oil & Grease	SM 503E	mg/l ug/l	1 l glass, Teflon lined septum	H2SO4 or HCl to pH<2	28 days (maximum)
Total Petroleum Hydrocarbons (Diesel)	EPA 8015 (modified)	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C	14 days (maximum)
Halogented Volatile Organics (chlorinated solvents)	8010	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C	14 days (maximum)
Non chlorinated solvents	8020	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C HCl to pH<2	14 days (maximum)
Volatile Organics	8240	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C HCl to pH<2	14 days (maximum)
Semi-Volatile Organics	8270	mg/l ug/l	1 l amber glass, Teflon lined septum	cool, 4 C	7 days extract 40 days (maximum to analyze)
Specific Conductance (Field test)		umhos/cm			
pH (Field test)		pH units			
Temperature (Field test)		Deg F			

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FIELD EXPLORATORY BORING LOG

FIGURE 1

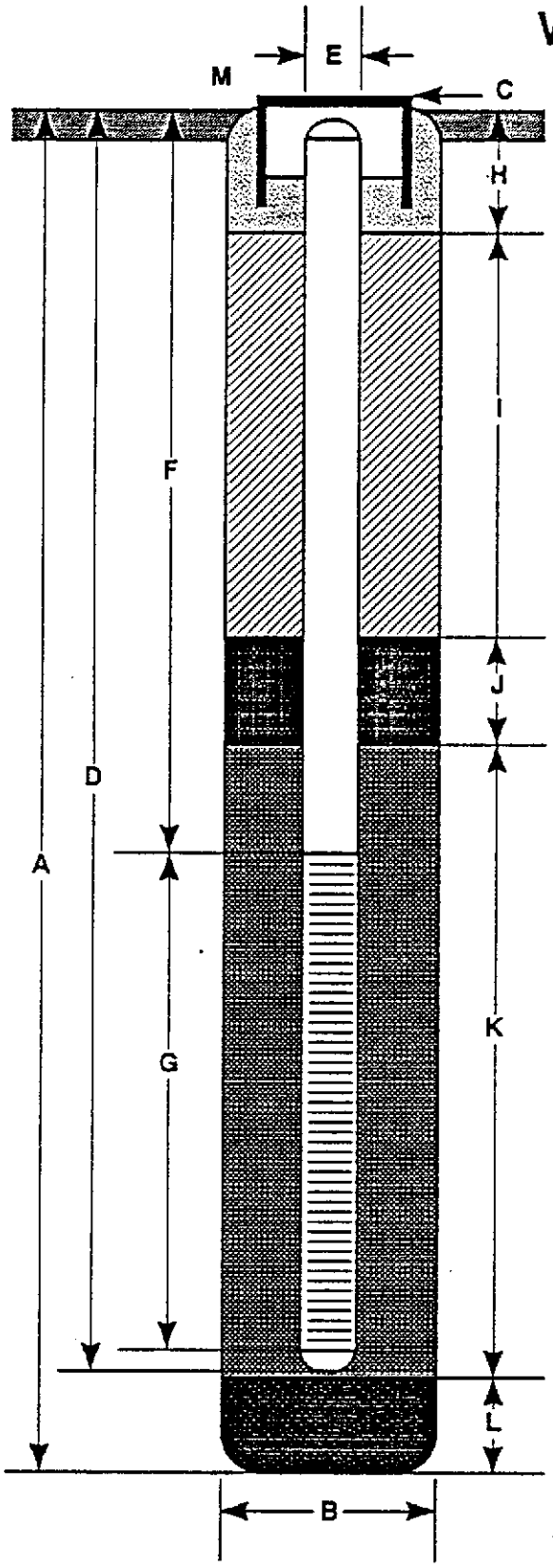
Field location of boring:	Project No.:	Date:	Boring No:
	Client:		
	Location:		
	City:		Sheet
	Logged by:	Driller:	of
Drilling method:	Casing installation data:		
Hole diameter:	Top of Box Elevation:		Datum:

								Water Level				
PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Time				
								Date				
								Description				

Remarks:

WELL CONSTRUCTION DETAIL

FIGURE 2



A Total Depth of Boring _____ ft.

B Diameter of Boring _____ in.
Drilling Method _____

C Top of Box Elevation _____ ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project Datum

D Casing Length _____ ft.
Material _____

E Casing Diameter _____ in.

F Depth to Top Perforations _____ ft.

G Perforated Length _____ ft.
Perforated Interval from _____ to _____ ft.
Perforation Type _____
Perforation Size _____ in.

H Surface Seal from _____ to _____ ft.
Seal Material _____

I Backfill from _____ to _____ ft.
Backfill Material _____

J Seal from _____ to _____ ft.
Seal Material _____

K Gravel Pack from _____ to _____ ft.
Pack Material _____

L Bottom Seal _____ ft.
Seal Material _____

M _____

Note: Depths measured from initial ground surface

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Well Construction Detail

WELL NO.

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE

WELL DEVELOPMENT FORM FIGURE 3

Page_____ of_____

==========

(to be filled out in office)

Client_____ SS#_____ Job#_____

Name_____ Location_____

Well#_____ Screened Interval_____ Depth_____

Aquifer Material_____ Installation Date _____

Drilling Method_____ Borehole Diameter_____

Comments regarding well installation:_____

_____

_____

==========

(to be filled out in the field) Name_____

Date_____ Development Method_____

Total Depth_____ - Depth to liquid_____ = WaterColumn_____

Product thickness_____

_____ x _____ x _____ x 0.0408 = _____gals
Water Column Diameter (in.) #Vol

Purge Start_____ Stop_____ Rate_____ gpm

Gallons	Time	Clarity	Temp.	pH	Conductivity
0					

Total gallons removed_____ Development stop time_____

Depth to liquid _____at_____(time)

Odor of water_____ Water discharged to_____

Comments_____

_____

_____

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

FIGURE 4

COMPANY _____ JOB # _____

LOCATION _____ DATE _____

CITY _____ TIME _____

Well ID. _____ Well Condition _____

Well Diameter _____ in. Hydrocarbon Thickness _____ ft.

Total Depth _____ ft.

Depth to Liquid- _____ ft.

Volume Factor (VF)			
	2" = 0.17	6" = 1.50	12" = 5.80
	3" = 0.38	8" = 2.60	
	4" = 0.66	10" = 4.10	

(# of casing volumes) _____ x _____ x(VF) _____ = (Estimated Purge Volume) _____ gal.

Purging Equipment _____

Sampling Equipment _____

Starting Time _____ Purging Flow Rate _____ gpm.

(Estimated Purge Volume) _____ gal. / (Purging Flow Rate) _____ gpm. = (Anticipated Purging Time) _____ min.

Time	pH	Conductivity	Temperature	Volume

Did well dewater? _____ If yes, time _____ Volume _____

Sampling Time _____ Weather Conditions _____

Analysis _____ Bottles Used _____

Chain of Custody Number _____

COMMENTS _____

FIGURE 5

Monitoring Well Sampling Protocol Schematic

Sampling Crew Reviews Project Sampling Requirements/Schedule

↓

Field Decontamination and Instrumentation Calibration

↓

Check Integrity of Well (Inspect for Well Damage)

↓

Measure and Record Depth to Water and Total Well Depth (Electric Well Sounder)

↓

Check for Floating Product (Oil/Water Interface Probe)

Floating Product Present

Confirm Product Thickness (Acrylic or PVC Bailer)

↓

Collect Free-Product Sample

↓

Dissolved Product Sample Not Required

↓

Record Data on Field Data Form

Floating Product Not Present

Purge Volume Calculation

$V = \pi (r/12)^2 h(\_\% \text{ vol})(7.48) = \_\_\_ / \text{gallons}$

V = Purge volume (gallons)

$\pi = 3.14159$

h = Height of Water Column (feet)

r = Borehole radius (inches)

↓

Evacuate water from well equal to the calculated purge volume while monitoring groundwater stabilization indicator parameters (pH, conductivity, temperature) at intervals of one casing volume.

Well Dewaters after One Purge Volume (Low yield well)

↓

Well Recharges to 80% of Initial Measured Water Column Height in Feet within 24 hrs. of Evacuation.

↓

Measure Groundwater Stability Indicator Parameters (pH, Temperature, Conductivity)

↓

Collect Sample and Complete Chain-of-Custody

↓

Preserve Sample According to Required Chemical Analysis

↓

Transport to Analytical Laboratory

Well Readily Recovers

↓

Record Groundwater Stability Indicator Parameters from each Additional Purge Volume

Stability indicated when the following Criteria are met:

pH :	± 0.1 pH units
Conductivity:	± 10%
Temperature:	1.0 degrees F

Groundwater Stability Achieved

↓

Collect Sample and Complete Chain-of-Custody

↓

Preserve Sample According to Required Chemical Analysis

↓

Transport to Analytical Laboratory

Groundwater Stability Not Achieved

↓

Continue Purging Until Stability is Achieved

↓

Collect Sample and complete Chain-of-Custody

↓

Preserve Sample According to Required Chemical Analysis

↓

Transport to Analytical Laboratory

Gettler - Ryan Inc.
ENVIRONMENTAL DIVISION

Chain of Custody
FIGURE 6

COMPANY _____ JOB NO. _____

JOB LOCATION _____

CITY _____ PHONE NO. _____

AUTHORIZED _____ DATE _____ P.O. NO. _____

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID

RELINQUISHED BY: _____ RECEIVED BY: _____

RELINQUISHED BY: _____ RECEIVED BY: _____

RELINQUISHED BY: _____ RECEIVED BY LAB: _____

DESIGNATED LABORATORY: _____ DHS #: _____

REMARKS: _____

DATE COMPLETED _____ FOREMAN _____

APPENDIX B

EXPLORATORY BORING LOGS

WELL CONSTRUCTION DETAILS

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

LL - Liquid Limit (%)

PI - Plastic Index (%)

PID - Volatile Vapors In ppm

MA - Particle Size Analysis

2.5 YR 6/2 - Soil Color according to Munsell Soil Color Charts (1975 Edition)

5 GY 5/2 - GSA Rock Color Chart

☒ - No Soil Sample Recoverd

■ - "Undisturbed" Sample

⊠ - Bulk or Classification Sample

▽ - First Encountered Ground Water Level

▼ - Piezometric Ground Water Level

Penetration - Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

GeoStrategies Inc.

Unified Soil Classification - ASTM D 2488-85 and Key to Test Data

Field location of boring: (See Plate 2)	Project No.: 7277	Date: 11/14/90	Boring No: C-1
	Client: Chevron Service Station No. 3864		
	Location: 5101 Telegraph Avenue		
	City: Oakland, California		Sheet 1 of 2
	Logged by: RCM	Driller: Bayland	
Drilling method: Hollow Stem Auger	Casing installation data: (See Well Construction Detail)		
Hole diameter: 8-Inches	Top of Box Elevation: 117.45		Datum: MSL

Water Level	15.00'	19.25'
Time	10:20	11:45
Date	11/14/90	11/14/90

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				0				
				1				PAVEMENT SECTION - 1.0 feet.
				2				
				3				
				4				
	500	S&H	C-1-					SILT (ML) - very dark gray (10YR 3/1), damp, medium
0	500	push	5.0	5				stiff, low plasticity; 75% silt; 10% clay; 10% sand; 5% fine gravel; rootholes; organic matter.
				6				
				7				
				8				
				9				
	11							SAND (SW) - brownish yellow (10YR 6/6), damp,
0	11	S&H	C-1-	10				medium dense; 85% sand; 10% fine gravel; 5% silt;
	13		10.5					Fe-oxide staining.
				11				
				12				
				13				
				14				
	11							CLAYEY GRAVEL with SAND (GC) - dark greenish gray
808	11	S&H	C-1-	15		▽		(5GY 4/1), saturated, medium dense; 65% gravel; 20%
	15		15.5					sand; 15% clay.
				16				
				17				
				18				
				19				

Remarks:

GeoStrategies Inc.

Log of Boring

BORING NO. C-1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

Field location of boring:	Project No.: 7277	Date: 11/14/90	Boring No:
(See Plate 2)	Client: Chevron Service Station No. 3864		C-1
	Location: 5101 Telegraph Avenue		Sheet 2
	City: Oakland, California		of 2
	Logged by: RCM	Driller: Bayland	
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 8-Inches	Top of Box Elevation:	Datum:	

	Water Level			
	Time			
	Date			

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
	7			20				CLAYEY SAND (SC) - light olive brown (2.5Y 6/6), saturated, medium dense; 75% sand; 15% clay; 10% gravel.
14.2	8	S&H	C-1-					
	6		20.5					
				21				CLAYEY SILT (ML/CL) - yellowish brown (10YR 5/6), saturated, stiff; 65% silt; 25% clay; 10% fine sand.
				22				
				23				
				24				SAND with CLAY (SW-SC) - dark yellowish brown (10YR 4/4), saturated, medium dense; 85% coarse sand; 10% clay; 5% gravel.
	7							
42.8	10	S&H	C-1-	25				
	19		25.5					
				26				
				27				
				28				
				29				
	4							SANDY CLAY (CL) - dark yellowish brown (10YR 4/6), damp, very stiff, medium plasticity; 70% clay; 25% sand; 5% silt.
19.0	7	S&H	C-1-	30				
	12		30.5					
				31				
				32				
				33				
	7							COLOR CHANGE to strong brown (7.5YR 4/6), hard; increasing sand to 30% at 33.5 feet.
	16	SPT		34				
	29							
				35				Bottom of sample at 34.5 feet.
				36				Bottom of boring at 34.5 feet.
								11/14/90
				37				
				38				
				39				

Remarks:

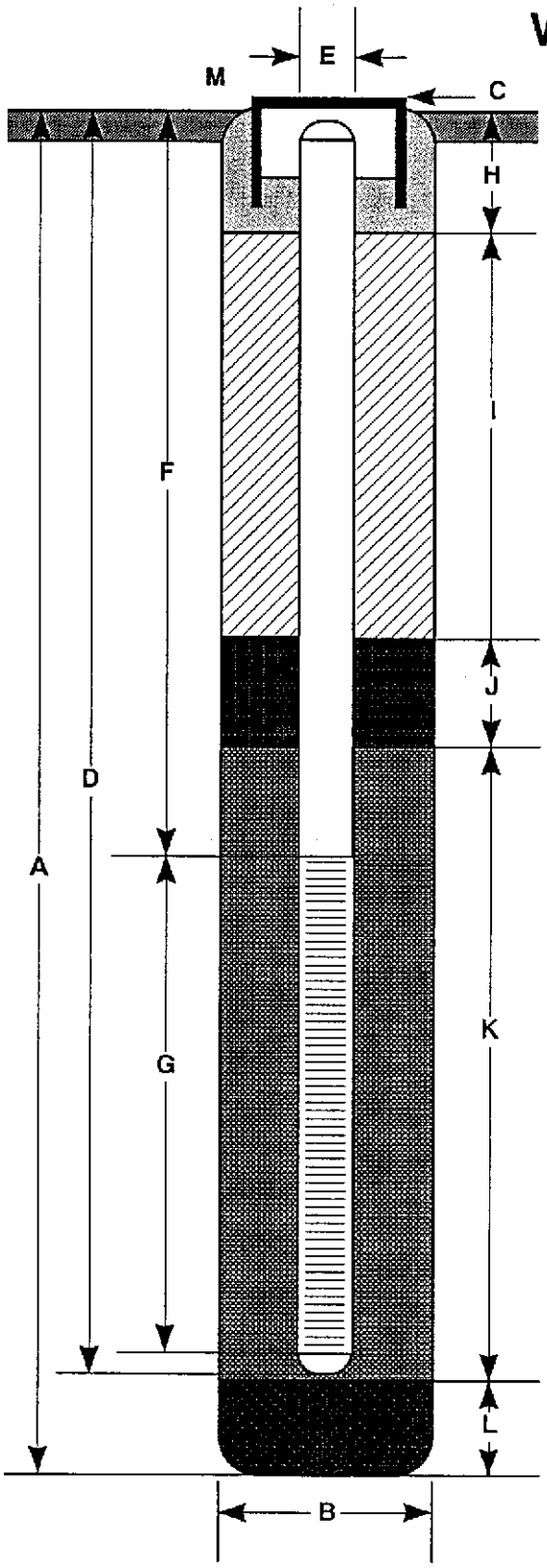
GeoStrategies Inc.

Log of Boring

BORING NO. **C-1**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 34.5 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 117.45 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 30 ft.
Material Schedule 40 PVC

E Casing Diameter 2 in.

F Depth to Top Perforations 10 ft.

G Perforated Length 19.5 ft.
Perforated Interval from 10 to 29.5 ft.
Perforation Type Factory Slotted
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.5 ft.
Seal Material Concrete

I Backfill from 1.5 to 6 ft.
Backfill Material Concrete

J Seal from 6 to 8 ft.
Seal Material Bentonite Pellets

K Gravel Pack from 8 to 30 ft.
Pack Material Lonestar #2/12 Sand

L Bottom Seal 4.5 ft.
Seal Material Bentonite Pellets

M Vault box with locking cap, lock and cover.

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO. C-1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

Field location of boring:	Project No.: 7277	Date: 11/14/90	Boring No:
(See Plate 2)	Client: Chevron Service Station No. 3864		C-2
	Location: 5101 Telegraph Avenue		
	City: Oakland, California		Sheet 1
	Logged by: RCM	Driller: Bayland	of 2
Drilling method: Hollow Stem Auger	Casing installation data: (See Well Construction Detail)		
Hole diameter: 8-Inches	Top of Box Elevation: 116.16		Datum: MSL

Water Level	15.5'	15.4'							
Time	14:45	8:45							
Date	11/14/90	11/15/90							

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				0				
				1				PAVEMENT SECTION - 1.0 feet.
				2				CLAYEY SILT (ML/CL) - very dark gray (10YR 3/1), moist,
				3				medium stiff, medium plasticity; 60% silt; 40% clay.
				4				
	200							Increasing sand to 10%; gravel to 5%; organic matter at
0	200	S&H	C-2-	5				5.5 feet.
	250	push	5.5					
				6				
				7				
				8				
				9				
	3							CLAYEY SAND (SC) - dark yellowish brown (10YR 4/4),
0	4	S&H	C-2-	10				moist, medium dense; 70% sand; 20% clay; 10% gravel
	7		10.5					COLOR CHANGE to olive (5Y 4/4); increasing silt to 5%
				11				at 10.5 feet.
				12				
				13				
				14				GRAVEL with CLAY and SAND (GW-GC) - greenish gray
	6							(5G 5/1), saturated; medium dense; 65% gravel; 25%
914	8	S&H	C-2-	15				sand; 10% clay; strong chemical odor.
	11		15.5					
				16				
				17				
				18				
				19				

Remarks:

GeoStrategies Inc.

Log of Boring

BORING NO. C-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

Field location of boring:	Project No.: 7277	Date: 11/14/90	Boring No:
(See Plate 2)	Client: Chevron Service Station No. 3864		C-2
	Location: 5101 Telegraph Avenue		
	City: Oakland, California		Sheet 2 of 2
	Logged by: RCM	Driller: Bayland	
Drilling method: Hollow Stem Auger	Casing installation data: -		
Hole diameter: 8-Inches	Top of Box Elevation:	Datum:	

	Water Level			
	Time			
	Date			

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
	6			20				GRAVEL with SAND (GW) - olive (5Y 4/4), saturated,
86.5	14	S&H	C-2-					dense; 60% gravel; 35% sand; 5% silt; Fe-oxide staining.
	17		20.5					
				21				
				22				
				23				
				24				
	0							
	0	S&H		25				Very loose at 25.5 feet.
	1							
				26				
				27				
				28				
				29				SAND with CLAY and GRAVEL (SW-SC) - dark yellowish
	14		C-2-					brown (10YR 4/4), saturated, medium dense; 55% sand;
5.0	11	S&H	30.0	30				35% gravel; 10% clay.
	12							SANDY CLAY (CL) - brownish yellow (10YR 6/6), damp,
				31				very stiff, medium plasticity; 65% clay; 35% sand.
				32				
				33				Bottom of sample at 30.5 feet.
								Bottom of boring at 30.5 feet.
				34				11/14/90
				35				
				36				
				37				
				38				
				39				

Remarks:

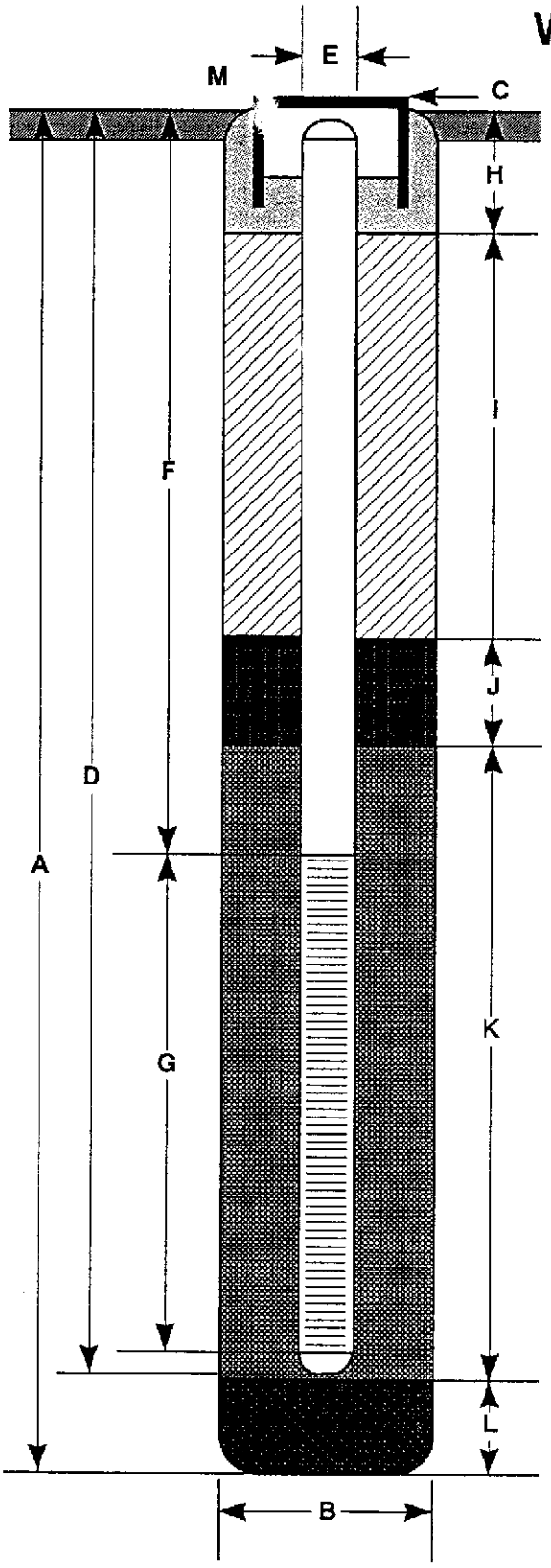
GeoStrategies Inc.

Log of Boring

BORING NO. C-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	PHP	11/90		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 30.5 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 116.16 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 30 ft.
Material Schedule 40 PVC

E Casing Diameter 2 in.

F Depth to Top Perforations 10 ft.

G Perforated Length 19.5 ft.
Perforated Interval from 10 to 29.5 ft.
Perforation Type Factory Slotted
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.5 ft.
Seal Material Concrete

I Backfill from 1.5 to 6 ft.
Backfill Material Concrete

J Seal from 6 to 8 ft.
Seal Material Bentonite Pellets

K Gravel Pack from 8 to 30 ft.
Pack Material Lonestar #2/12 Sand

L Bottom Seal 0.5 ft.
Seal Material Bentonite Pellets

M Vault box with locking cap, lock and cover.

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO. C-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

Field location of boring:	Project No.: 7277	Date: 11/15/90	Boring No:
(See Plate 2)	Client: Chevron Service Station No. 3864		C-3
	Location: 5101 Telegraph Avenue		
	City: Oakland, California		Sheet 1
	Logged by: RCM	Driller: Bayland	of 2
Drilling method: Hollow Stem Auger	Casing installation data: (See Well Construction Detail)		
Hole diameter: 8-Inches	Top of Box Elevation: 115.70		Datum: MSL

Water Level	15.5'	17.1'
Time	10:05	15:30
Date	11/15/90	11/15/90

PID (ppm)	Blows/ft or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				0				
				1				PAVEMENT SECTION - 1.0 feet.
				2				CLAYEY SILT (ML/CL) - very dark brown (10YR 2/2), damp, medium plasticity; 60% silt; 35% clay; 5% fine sand.
				3				
				4				
0	500	S&H	C-3-	5				Medium stiff, damp; organic matter at 4.5 feet.
		push	4.5	6				
				7				
				8				
				9				
	7			10				SAND with SILT (SW-SM) - dark yellowish brown (10YR 3/4), damp, dense; 85% sand; 10% silt; 5% fine gravel; organic matter; Fe-oxide staining.
0	15	S&H	C-3-					
	17		10.5	11				
				12				
				13				
				14				
	7			15				CLAYEY SAND with GRAVEL (SC) - dark greenish gray (5GY 4/1), saturated, dense; 65% sand; 20% clay; 15% fine gravel.
890	14	S&H	C-3-					
	16		15.5			▽		
	8			16				
995	13	SPT						
	16			17		▼		
				18				
				19				

Remarks:

GeoStrategies Inc.

Log of Boring

BORING NO. C-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

Field location of boring:	Project No.: 7277	Date: 11/15/90	Boring No:
(See Plate 2)	Client: Chevron Service Station No. 3864		C-3
	Location: 5101 Telegraph Avenue		
	City: Oakland, California		Sheet 2
	Logged by: RCM	Driller: Bayland	of 2
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 8-Inches	Top of Box Elevation:	Datum:	

	Water Level			
	Time			
	Date			

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
	2							
32.8	5	S&H	C-3-	20				SILTY SAND (SM) - yellowish brown (10YR 5/4), saturated, medium dense; 65% sand; 30% silt; 5% fine gravel; gray green staining to 20.0 feet.
	10		20.5					
				21				CLAYEY GRAVEL with SAND (GC) - dark yellowish brown (10YR 3/4), saturated, medium dense; 55% gravel; 25% sand; 20% clay.
				22				
				23				
				24				
	8							
24.1	15	S&H	C-3-	25				
	18		25.5					Dense at 25.5 feet.
				26				
				27				
				28				CLAYEY SAND (SC) - brownish yellow (10YR 6/6), damp, dense; 70% sand; 30% clay.
				29				
	8							SANDY CLAY (CL) - brownish yellow (10YR 6/6), damp, hard; 65% clay; 30% sand; 5% silt.
9.0	15	S&H	C-3-	30				
	18		30.5					Bottom of sample at 30.5 feet.
				31				Bottom of boring at 30.5 feet.
				32				11/15/90
				33				
				34				
				35				
				36				
				37				
				38				
				39				

Remarks:

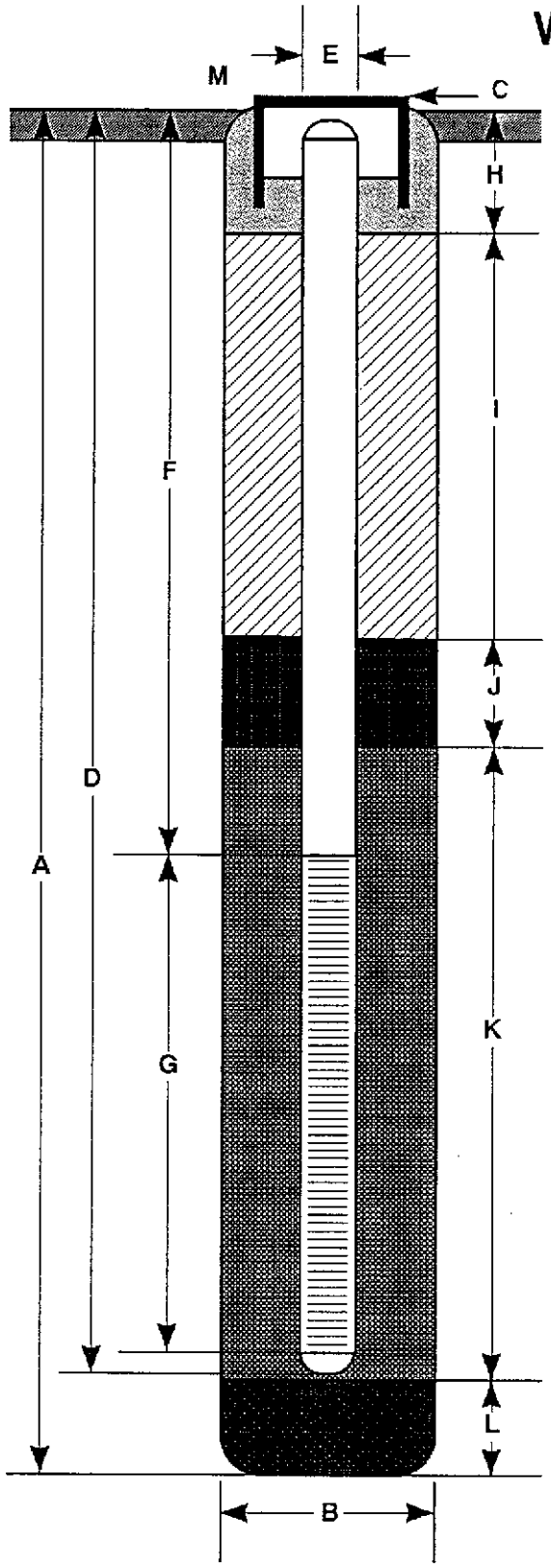
GeoStrategies Inc.

Log of Boring

BORING NO. **C-3**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 30.5 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 115.70 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 30 ft.
Material Schedule 40 PVC

E Casing Diameter 2 in.

F Depth to Top Perforations 10 ft.

G Perforated Length 19.5 ft.
Perforated Interval from 10 to 29.5 ft.
Perforation Type Factory Slotted
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.5 ft.
Seal Material Concrete

I Backfill from 1.5 to 6 ft.
Backfill Material Concrete

J Seal from 6 to 8 ft.
Seal Material Bentonite Pellets

K Gravel Pack from 8 to 30 ft.
Pack Material Lonestar #2/12 Sand

L Bottom Seal 0.5 ft.
Seal Material Bentonite Pellets

M Vault box with locking cap, lock and cover.

Note: Depths measured from initial ground surface.

GSI GeoStrategies Inc.

Well Construction Detail

WELL NO.
C-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

Field location of boring: (See Plate 2)	Project No.: 7277	Date: 11/15/90	Boring No: C-4
	Client: Chevron Service Station No. 3864		
	Location: 5101 Telegraph Avenue		
	City: Oakland, California		Sheet 1 of 2
	Logged by: RCM	Driller: Bayland	
Drilling method: Hollow Stem Auger	Casing installation data: (See Well Construction Detail)		
Hole diameter: 8-Inches	Top of Box Elevation: 116.10	Datum: MSL	

Water Level	16.5'	18.1'	
Time	13:28	15:30	
Date	11/15/90	11/15/90	

PID (ppm)	Blows/ft or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				0				
				1				PAVEMENT SECTION - 1.0 feet.
				2				CLAYEY SILT (ML/CL) - very dark grayish brown (10YR 3/2), damp, medium plasticity; 65% silt; 35% clay; trace fine gravel.
				3				
				4				
	300			5				
0	500	S&H	C-4-					Medium stiff; organic matter; Fe-oxide staining at 5.5 feet.
	500	push	5.5					
				6				
				7				
				8				
				9				
	6			10				CLAYEY SAND with GRAVEL (SC) - yellowish brown (10YR 5/4), damp, medium dense; 60% sand; 25% clay; 15% gravel; Fe-oxide staining.
0	6	S&H	C-4-					
	13		10.5					
				11				
				12				
				13				
				14				
	8			15				Increasing gravel to 25%; dense at 15.5 feet.
0	17	S&H	C-4-					
	19		15.5					
	15			16				
0	16	S&H	C-4-					
	18		17.0	17				Saturated at 16.5 feet.
				18				
				19				

Remarks:

GeoStrategies Inc.

Log of Boring

BORING NO. C-4

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

Field location of boring: (See Plate 2)	Project No.: 7277	Date: 11/15/90	Boring No: C-4
	Client: Chevron Service Station No. 3864		
	Location: 5101 Telegraph Avenue		
	City: Oakland, California		Sheet 2 of 2
	Logged by: RCM	Driller: Bayland	
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 8-Inches	Top of Box Elevation:	Datum:	

	Water Level			
	Time			
	Date			

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
	3							SILTY SAND (SM) - yellowish brown (10YR 5/4), saturated, medium dense; 65% sand; 35% silt; slight gray green discoloration.
0	7	S&H	C-4-20	20				
	12		20.5					
				21				
				22				
				23				
				24				Increasing gravel to 25% at 24.5 feet.
	7							SAND (SW) - pale yellow (2.5Y 7/6), saturated, dense; 95% sand; 5% silt.
0	18	S&H	C-4-25	25				
	29		25.5					
				26				GRAVEL with SILT and SAND (GW-GM) - yellowish brown (10YR 5/4), saturated, dense; 70% gravel; 20% sand; 10% silt.
				27				
				28				
				29				
	4							CLAY with SAND (CL) - light gray (5Y 7/1), damp, very stiff, medium to high plasticity; 70% clay; 20% sand; 10% silt.
0	13	S&H	C-4-30	30				
	11		30.5					
				31				
				32				
				33				
				34				
	7							Increasing sand to 30% at 35.5 feet.
0	8	S&H	C-4-35	35				
	8		35.5					
				36				Bottom of sample at 35.5 feet.
								Bottom of boring at 35.5 feet.
				37				11/15/90
				38				
				39				

Remarks:

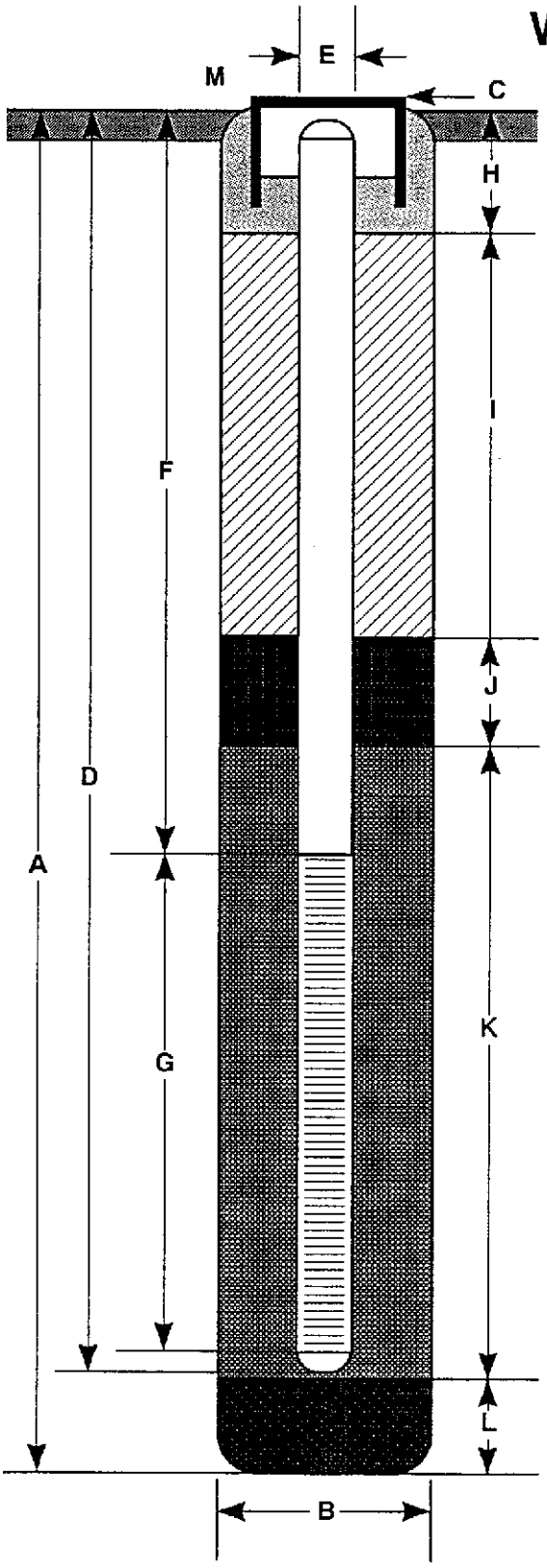
GeoStrategies Inc.

Log of Boring

BORING NO. C-4

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 35.5 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 116.10 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 30 ft.
Material Schedule 40 PVC

E Casing Diameter 2 in.

F Depth to Top Perforations 10 ft.

G Perforated Length 19.5 ft.
Perforated Interval from 10 to 29.5 ft.
Perforation Type Factory Slotted
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.5 ft.
Seal Material Concrete

I Backfill from 1.5 to 6 ft.
Backfill Material Concrete

J Seal from 6 to 8 ft.
Seal Material Bentonite Pellets

K Gravel Pack from 8 to 30 ft.
Pack Material Lonestar #2/12 Sand

L Bottom Seal 5.5 ft.
Seal Material Bentonite Pellets

M Vault box with locking cap, lock and cover.

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO. C-4

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7277	DHP	11/90		

APPENDIX C

SOIL ANALYTICAL REPORT

SUPERIOR ANALYTICAL LABORATORIES, INC.

825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512

DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81936
CLIENT: Geo Strategies
CLIENT JOB NO.: 7277

DATE RECEIVED: 11/19/90
DATE REPORTED: 11/28/90

Lab Number	Customer Sample Identification	Date Sampled	Date Analyzed
81936-11	C-4-10.5	11/15/90	11/27/90
81936-12	C-4-15.5	11/15/90	11/27/90
81936-13	C-1-15.5	11/14/90	11/27/90
81936-14	C-2-10.5	11/14/90	11/27/90
81936-15	C-2-15.5	11/14/90	11/27/90
81936-9	C-3-10.5	11/15/90	11/27/90
81936-10	C-3-15.5	11/15/90	11/27/90

Laboratory Number:	81936 11	81936 12	81936 13	81936 14	81936 15
ANALYTE LIST	Amounts/Quantitation Limits (mg/Kg)				
OIL AND GREASE:	ND<50	ND<50	NA	NA	NA
TPH/GASOLINE RANGE:	ND<1	ND<1	48	ND<1	25
TPH/DIESEL RANGE:	NA	NA	NA	NA	NA
BENZENE:	ND<.005	ND<.005	ND<.025	ND<.005	0.040
TOLUENE:	ND<.005	ND<.005	0.29	ND<.005	0.092
ETHYL BENZENE:	ND<.005	ND<.005	0.28	ND<.005	0.18
XYLENES:	ND<.005	ND<.005	0.60	ND<.005	0.40

Laboratory Number:	81936 9	81936 10
ANALYTE LIST	Amounts/Quantitation Limits (mg/Kg)	
OIL AND GREASE:	NA	NA
TPH/GASOLINE RANGE:	ND<1	270
TPH/DIESEL RANGE:	NA	NA
BENZENE:	0.006	ND<0.25
TOLUENE:	0.016	0.87
ETHYL BENZENE:	0.006	1.5
XYLENES:	0.021	3.4

SUPERIOR ANALYTICAL LABORATORIES, INC.

825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512

DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
Diesel by Modified EPA SW-846 Method 8015
Gasoline by Purge and Trap: EPA MEthod 8015/5030
ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

QA/QC INFORMATION
SET: 81936

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT

Mg/Kg = part per million (ppm)

OIL AND GREASE ANALYSIS By Standard Methods Method 503E:
Duplicate RPD: 13
Minimum Detection Limit in Soil: 50mg/kg

Modified EPA Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Soil: 10mg/kg
Daily Standard run at 200mg/L; %Diff Diesel = NA
MS/MSD Average Recovery = NA: Duplicate RPD = NA

8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Soil: 1mg/kg
Daily Standard run at 2mg/L; %Diff Gasoline = 4
MS/MSD Average Recovery = 103%: Duplicate RPD = 11

8020/BTXE
Minimum Quantitation Limit in Soil: 0.05mg/kg
Daily Standard run at 20ug/L; %Diff = <15%
MS/MSD Average Recovery = 94%: Duplicate RPD = <15

Richard Srna, Ph.D.
Robert Watson For
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11222-2
CLIENT: Geo Strategies
JOB NO.: 7277

DATE SAMPLED: 11/15/90
DATE RECEIVED: 11/19/90
DATE ANALYZED: 11/28/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: C-4-15.5

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane/Vinyl Chloride	10	ND
Bromomethane/Chloroethane	10	ND
Trichlorofluoromethane	5	ND
1,1-Dichloroethene	5	ND
Methylene Chloride	5	ND
trans-1,2-Dichloroethene	5	ND
1,1-Dichloroethane	5	ND
Chloroform	5	ND
1,1,1-Trichloroethane	5	ND
Carbon tetrachloride	5	ND
1,2-Dichloroethane	5	ND
Trichloroethylene	5	ND
1,2-Dichloropropane	5	ND
Bromodichloromethane	5	ND
Cis-1,3-Dichloropropene	5	ND
trans-1,3-Dichloropropene	5	ND
1,1,2-Trichloroethane	5	ND
Tetrachloroethene	5	ND
Dibromochloromethane	5	ND
Chlorobenzene	5	ND
Bromoform	5	ND
1,1,2,2-Tetrachloroethane	5	ND
1,3-Dichlorobenzene	5	ND
1,2-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
Cis-1,2-Dicloroethene	5	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 92 % :MS/MSD RPD =< 2 %

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11222-1
CLIENT: Geo Strategies
JOB NO.: 7277

DATE SAMPLED: 11/15/90
DATE RECEIVED: 11/19/90
DATE ANALYZED: 11/28/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: C-4-10.5

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane/Vinyl Chloride	10	ND
Bromomethane/Chloroethane	10	ND
Trichlorofluoromethane	5	ND
1,1-Dichloroethene	5	ND
Methylene Chloride	5	ND
trans-1,2-Dichloroethene	5	ND
1,1-Dichloroethane	5	ND
Chloroform	5	ND
1,1,1-Trichloroethane	5	ND
Carbon tetrachloride	5	ND
1,2-Dichloroethane	5	ND
Trichloroethylene	5	ND
1,2-Dichloropropane	5	ND
Bromodichloromethane	5	ND
Cis-1,3-Dichloropropene	5	ND
trans-1,3-Dichloropropene	5	ND
1,1,2-Trichloroethane	5	ND
Tetrachloroethene	5	ND
Dibromochloromethane	5	ND
Chlorobenzene	5	ND
Bromoform	5	ND
1,1,2,2-Tetrachloroethane	5	ND
1,3-Dichlorobenzene	5	ND
1,2-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
Cis-1,2-Dicloroethene	5	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 92 % :MS/MSD RPD =< 2 %

Richard Srna, Ph.D.

Laboratory Director

81936

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number 3864
Facility Address 5101 TELEGRAPH AVE. / 51ST ST. OAKLAND
Consultant Project Number 7277
Consultant Name GEOSTRATEGIES INC.
Address 2140 W. WINTON AVE., HAYWARD
Project Contact (Name) JEFF RYAN
(Phone) 783-7508 (Fax Number) 783-1089

Chevron Contact (Name) NANCY VUKELICH
(Phone) 842-9581
Laboratory Name SUPERIOR
Laboratory Release Number 4056670
Samples Collected by (Name) ROBERT MALLORY
Collection Date 11/14/90
Signature Robert C. Mallory

Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	Analyses To Be Performed: BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Chlorinated HC (8010)	Non Chlorinated HC (8020)	Total Lead (AA)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)						Remarks
C-1-15.5	1	S	G	10:20		Y	✓												
C-2-10.5	1	S	G	14:30		Y	✓												
C-2-15.5	1	S	G	14:40		Y	✓												

Please initial: EP
Samples Stored in ice. yes
Appropriate containers yes
Samples preserved. yes
VOA's without headspace. N/A
Comments:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Robert C. Mallory	GSI	11/19/90 15:45	Gordon	Express #1	11-19-90 16:50
Relinquished By (Signature) Gordon	Organization Express #1	Date/Time 11-19-90 16:56	Received By (Signature)	Organization	Date/Time
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time 11/19/90 1654

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
(5 Days)
10 Days
As Contracted

8936

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number 3864
Facility Address 5101 TELEGRAPH AVE./51ST ST. OAKLAND
Consultant Project Number 7277
Consultant Name GEOSTRATEGIES INC.
Address 2140 WEST WINTON AVE. HAYWARD
Project Contact (Name) JEFF RYAN
(Phone) 783-7500 (Fax Number) 783-1089

Chevron Contact (Name) NANCY VUKELICH
(Phone) 842-9581
Laboratory Name SUPERIOR
Laboratory Release Number 405670
Samples Collected by (Name) ROBERT MALLORY
Collection Date 11/19/90
Signature Robert C. Mallory

Sample Number	Number of Containers	Matrix S = Soil W = Water A = Air C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Chlorinated HC (8010)	Non Chlorinated HC (8020)	Total Lead (AA)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)	Organic Lead	Remarks
CP-4-1A	1	S	G	15:39	composite	✓	✓							✓	
CP-4-1B	1	S	G	15:41		✓									
CP-4-2A	1	S	G	15:43	composite	✓	✓							✓	
CP-4-2B	1	S	G	15:45		✓									
C-3-10.5	1	S	G	9:55		✓	✓								
C-3-15.5	1	S	G	10:05		✓	✓								
C-4-10.5	1	S	G	12:59		✓	✓		✓	✓					
C-4-15.5	1	S	G	13:13		✓	✓		✓	✓					

Please initial:
Samples Stored in ice. RP
Appropriate containers. CRS
Samples preserved. CRS
VOA's without headspace. ICE
Comments: N/A

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Robert C. Mallory	GSI	11/19/90/15:45	[signature]	Express	11/19/90 15:50
[signature]	Express	11/19/90 1656	[signature]		
			Received for Laboratory By (Signature)		Date/Time 11/19/90 1656

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
(5 Days)
10 Days
As Contracted

COC-1.DWG/rev. 8/10/90

APPENDIX D

GETTLER-RYAN INC. GROUND-WATER SAMPLING REPORT

gettler — ryan inc.

January 3, 1991

GROUNDWATER SAMPLING REPORT

Chevron U.S.A. Inc.
Post Office Box 5004
San Ramon, California 94583-0804

Referenced Site: Chevron Service Station #3864
5101 Telegraph Ave./51st Street
Oakland, California

Sampling Date: December 6 and 18, 1990

This report presents the results of the groundwater sampling and analytical program conducted by Gettler-Ryan Inc. on December 6 and 18, 1990 at the referenced location. The site is occupied by an operating service station located on the east corner of Telegraph Avenue and 51st Street. The service station has underground storage tanks containing leaded, unleaded, and super unleaded gasoline products.

There are currently four groundwater monitoring wells on site at the location shown on the attached site map. Wells C-1 through C-4 were developed December 3, 1990. Prior to sampling, all wells were inspected for total well depth, water levels, and presence of separate phase hydrocarbons using an electronic interface probe. A clean acrylic bailer was used to visually confirm the presence and thickness of separate phase hydrocarbons. Groundwater depths ranged from 15.34 to 17.68 feet below grade. Separate phase hydrocarbons were not observed in any monitoring wells.

The wells were then purged and sampled. The purge water was contained in drums for proper disposal. Standard sampling procedure calls for a minimum of four case volumes to be purged from each well. Each well was purged while pH, temperature, and conductivity measurements were monitored for stability. Details of the final well purging results are presented on the attached Table of Monitoring Data. In cases where a well dewatered or less than four case volumes were purged, groundwater samples were obtained after the physical parameters had stabilized. Under such circumstances the sample may not represent actual formation water, due to low flow conditions.

Samples were collected, using Teflon bailers, in properly cleaned and laboratory prepared containers. All sampling equipment was thoroughly cleaned after each well was sampled and steam cleaned upon completion of work at the site. The samples were labeled, stored on blue ice, and transported to the laboratory for analysis. A trip blank, supplied by the laboratory, was included and analyzed to assess quality control. A duplicate sample (CD-3), was submitted without well designation to assess laboratory performance. Analytical results for the trip blank are included in the Certified Analytical Report (CAR's). Chain of custody records were established noting sample identification numbers, time, date, and custody signatures.

2150 west winton avenue • hayward, california 94545-1210 • (415) 783-7500

The samples were analyzed by Superior Analytical Laboratory Inc., located at 1555 Burke, Unit 1, San Francisco, California. The laboratory is assigned a California DHS-HMTL Certification number of 1332. The results are presented as a Certified Analytical Report, a copy of which is attached to this report.

Metals analysis were subcontracted to Clayton Environmental Services, located at 1252 Quarry Lane, Pleasanton, California. The lab is assigned a California DHS-HMTL Certification number of 1196.

Tom Paulson
Sampling Manager

attachments

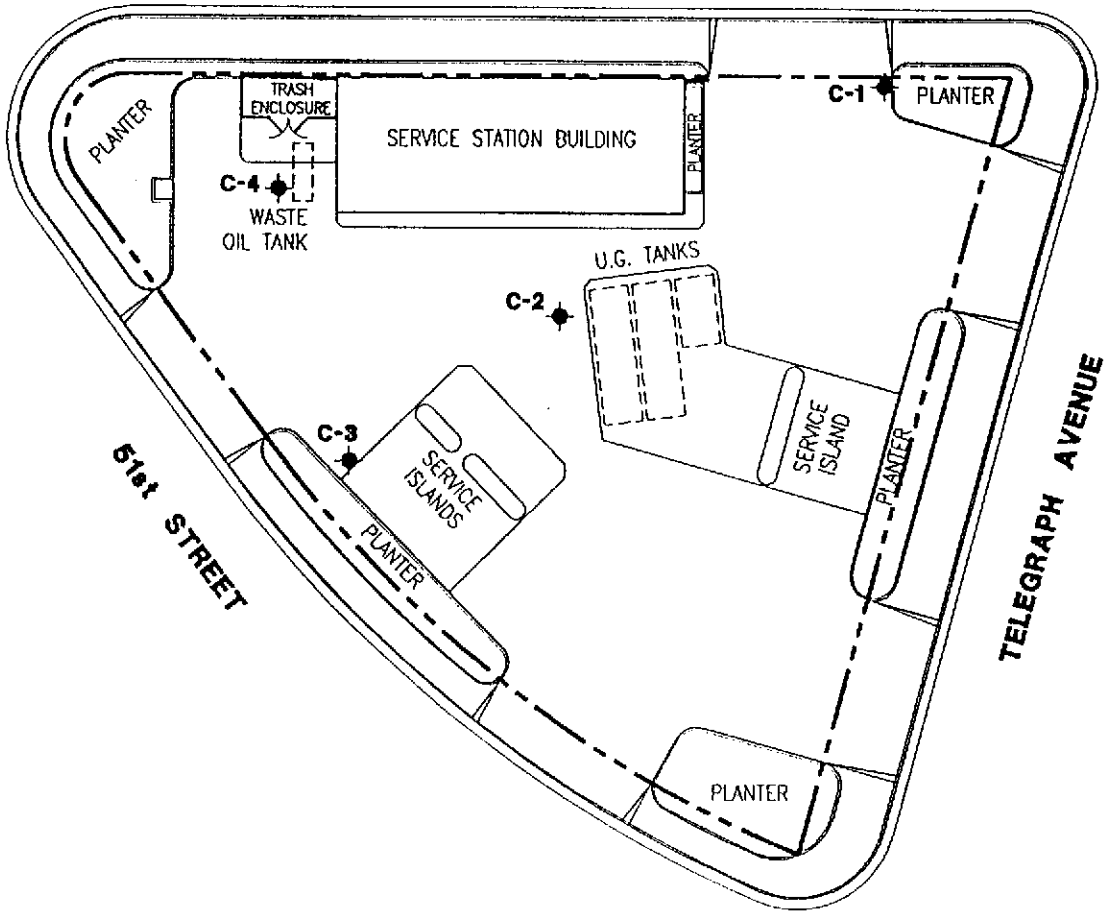
TABLE OF MONITORING DATA
GROUNDWATER WELL SAMPLING REPORT

WELL I.D.	C-1	C-2	C-3	C-4
Date Sampled:	12/6/90	12/6/90	12/6/90	12/6/90 12/18/90
Casing Diameter (inches)	2	2	2	2
Total Well Depth (feet)	29.8	30.0	30.0	30.0
Depth to Water (feet)	15.34	15.34	16.86	17.68
Free Product (feet)	none	none	none	none
Reason Not Sampled	----	----	----	----
Calculated 4 Case Vol.(gal.)	9.8	9.9	8.9	8.4
Did Well Dewater?	no	no	no	no
Volume Evacuated (gal.)	12.5	12.5	11.0	10.5
Purging Device	Bailer	Bailer	Bailer	Bailer
Sampling Device	Bailer	Bailer	Bailer	Bailer
Time	12:59	13:35	14:12	12:18
Temperature (F)*	71.9	69.5	68.6	68.9
pH*	6.55	6.47	6.52	6.95
Conductivity (umhos/cm)*	613	693	645	505

* Indicates Stabilized Value

EXPLANATION

✦ Ground-water monitoring well



Base Map: Chevron Ground & Grade Plan dated 11/90

GeoStrategies Inc.

SITE PLAN
Chevron Service Station #3864
5101 Telegraph Avenue
Oakland, California

PLATE 2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE
7277		11/90	

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11278
CLIENT: Gettler Ryan Inc.
CLIENT JOB NO.: 3277

DATE RECEIVED: 12/10/90
DATE REPORTED: 12/18/90

Lab Number	Customer Sample Identification	Date Sampled	Date Analyzed
11278- 1	C-1	12/06/90	12/14/90
11278- 2	C-2	12/06/90	12/14/90
11278- 3	C-3	12/06/90	12/14/90
11278- 4	C-4	12/06/90	12/14/90
11278- 5	CD-3	12/06/90	12/14/90
11278- 6	Trip Blank	12/06/90	12/14/90

Laboratory Number:	11278 1	11278 2	11278 3	11278 4	11278 5
ANALYTE LIST	Amounts/Quantitation Limits (ug/L)				
OIL AND GREASE:	NA	NA	NA	NA	NA
TPH/GASOLINE RANGE:	1900	210	210	ND>50	220
TPH/DIESEL RANGE:	NA	NA	NA	NA	NA
BENZENE:	17	140	2	ND>0.5	2
TOLUENE:	11	9	ND<0.5	ND>0.5	0.6
ETHYL BENZENE:	3	2	ND<0.5	ND>0.5	ND<0.5
XYLENES:	21	11	1	ND>0.5	2

Laboratory Number:	11278 6
ANALYTE LIST	Amounts/Quantitation Limits (ug/L)
OIL AND GREASE:	NA
TPH/GASOLINE RANGE:	ND<50
TPH/DIESEL RANGE:	NA
BENZENE:	ND<0.5
TOLUENE:	ND<0.5
ETHYL BENZENE:	ND<0.5
XYLENES:	ND<0.5

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 11299
CLIENT: Chevron, USA
CLIENT JOB NO.: 3277

DATE RECEIVED: 12/18/90
DATE REPORTED: 12/21/90

Lab Number	Customer Sample Identification	Date Sampled	Date Analyzed
11299- 1	C-4	12/18/90	12/19/90
11299- 2	TRIP BLANK	12/18/90	12/19/90

Laboratory Number:	11299 1	11299 2
ANALYTE LIST	Amounts/Quantitation Limits (ug/l)	
OIL AND GREASE:	NA	NA
TPH/GASOLINE RANGE:	ND<50	ND<50
TPH/DIESEL RANGE:	NA	NA
BENZENE:	ND<0.5	ND<0.5
TOLUENE:	ND<0.5	ND<0.5
ETHYL BENZENE:	ND<0.5	ND<0.5
XYLENES:	ND<0.5	ND<0.5

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 11299

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/l = part per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 503E:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA-SW846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/l
Standard Reference: NA

EPA-SW846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/l
Standard Reference: 08/24/90

SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/l
Standard Reference: 10/22/90

ANALYTE	REFERENCE	SPIKE LEVEL	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Oil & Grease	NA	NA	NA	NA	NA
Diesel	NA	NA	NA	NA	NA
Gasoline	10/22/90	200ng	89/90	1	75-125
Benzene	10/22/90	200ng	99/102	2	75-130
Toluene	10/22/90	200ng	102/103	1	75-130
Ethyl Benzene	10/22/90	200ng	100/103	3	75-130
Total Xylene	10/22/90	600ng	97/97	0	75-130

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11299-1
CLIENT: Chevron, USA
JOB NO.: 3277

DATE SAMPLED: 12/18/90
DATE RECEIVED: 12/18/90
DATE ANALYZED: 12/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: C-4

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	0.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	2
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard %DIFF = <15%
MS/MSD average recovery = 73 % :MS/MSD RPD =< 6 %

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11299-2
CLIENT: Chevron, USA
JOB NO.: 3277

DATE SAMPLED: 12/18/90
DATE RECEIVED: 12/18/90
DATE ANALYZED: 12/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: Trip Blank

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	0.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	ND
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard %DIFF = <15%
MS/MSD average recovery = 73 % :MS/MSD RPD =< 6 %

Richard Srna, Ph.D.
Laboratory Director

Western Operations

1252 Quarry Lane
Pleasanton, CA 94566
(415) 426-2600
Fax (415) 426-0106

Clayton
ENVIRONMENTAL
CONSULTANTS

December 26, 1990

Mr. Tom Paulson
GETTLER RYAN INC.
2150 W. Winton Ave.
Hayward, CA 94545

Client Ref. No. 3864/3277
Clayton Project No. 90121.47

Dear Mr. Paulson:

Attached is our analytical laboratory report for the samples received on December 19, 1990. A copy of the Chain-of-Custody form acknowledging receipt of these samples is attached.

Please note that any unused portion of the samples will be disposed of 30 days after the date of this report, unless you have requested otherwise.

We appreciate the opportunity to be of assistance to you. If you have any questions, please contact Maryann Gambino, Client Services Supervisor, at (415) 426-2657.

Sincerely,

Ronald H. Peters, CIH
Director, Laboratory Services
Western Operations

RHP/tb
Attachments

Results of Analysis
for
Chevron U.S.A. Inc./Superior Analytical Laboratory

Client Reference: 3864/3277
Clayton Project No. 90121.47

Sample Identification:	C-4	Date Sampled:	12/18/90
Lab Number:	9012147-01	Date Received:	12/19/90
Sample Matrix/Media:	Water	Date Digested:	12/20/90
Digestion Method:	EPA 3010	Date Analyzed:	12/20/90
Analytical Method:	EPA 6010		

Analyte	Concentration (mg/L)	Limit of Detection (mg/L)
Cadmium	<0.005	0.005
Chromium	0.18	0.05
Lead	<0.05	0.05
Nickel	0.25	0.05
Zinc	0.23	0.05

< Less than the indicated limit of detection (LOD)

Results of Analysis
for
Chevron U.S.A. Inc./Superior Analytical Laboratory

Client Reference: 3864/3277
Clayton Project No. 90121.47

Sample Identification:	Method Blank	Date Sampled:	--
Lab Number:	9012147-MB	Date Received:	--
Sample Matrix/Media:	Water	Date Digested:	12/20/90
Digestion Method:	EPA 3010	Date Analyzed:	12/20/90
Analytical Method:	EPA 6010		

Analyte	Concentration (mg/L)	Limit of Detection (mg/L)
Cadmium	<0.005	0.005
Chromium	<0.05	0.05
Lead	<0.05	0.05
Nickel	<0.05	0.05
Zinc	<0.05	0.05

< Less than the indicated limit of detection (LOD)

Quality Assurance Results Summary
for
Clayton Project No. 90121.47

Clayton Lab Number: 9012147-01A
Ext./Prep. Method: EPA3010
Date: 12/20/90
Analyst: SUE
Std. Source: VHG 0309

Analytical Method: EPA6010
Date: 12/20/90
Analyst: SUE
Sample Matrix/Media: WATER
Units: MG/L

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (% RPD)
CADMIUM	ND	2.00	2.09	105	2.00	100	102	75	125	4	20
CHROMIUM	0.180	2.00	2.46	114	2.40	111	113	75	125	2	20
LEAD	ND	2.00	2.09	105	2.00	100	102	75	125	4	20
NICKEL	0.250	2.00	2.27	101	2.23	99	100	75	125	2	20
ZINC	0.230	2.00	2.30	104	2.23	100	102	75	125	3	20

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection
LCL = Lower Control Limit
UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

11299

Chain-of-Custody-Record

Chevron U.S.A., Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number 3864
Facility Address 5101 Telegraph Ave / 51st Oakland
Consultant Project Number 3277
Consultant Name Gettler Ryan Inc
Address 2150 W. Winton Ave Hayward CA
Project Contact (Name) Tom Paulsen
(Phone) 415 783-7560 (Fax Number) 415 783-1689

Chevron Contact (Name) Nancy Vukelich
(Phone)
Laboratory Name Superior SAL
Laboratory Release Number 405 6670
Samples Collected by (Name) E. Cline
Collection Date 12/18/90
Signature

Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	Analyses To Be Performed: BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Chlorinated HC (8010)	Non Chlorinated HC (8020)	Total Lead (AA)	Metals Cd,Cr,Pb,Zn,Ni (ICP or AA)	Remarks
C-4	3	W	G	14:55	HCl / HNO3	Y	X			X			X	
Trip	1	W	"	—	HCl	"	X			X				

RUSH

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
	G/R	12-18-90 15:40			
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time
					12/18/90 15:39

Turn Around Time (Circle Choice)
24 Hrs.
(48 Hrs.)
5 Days
10 Days
As Contracted

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number 3864
Facility Address 5101 Telegraph, Oakland
Consultant Project Number 3277
Consultant Name Gettler-Ryan Inc.
Address 2150 W. Winton, Hayward
Project Contact (Name) Tom Paulson
(Phone) (415)783-7500 (Fax Number) 783-1089

Chevron Contact (Name)
(Phone)
Laboratory Name Superior
Laboratory Release Number 4056670
Samples Collected by (Name) John P. Zwierzycki
Collection Date 12-6-90
Signature John P. Zwierzycki

Sample Number	Number of Containers	Matrix S = Soil W = Water A = Air C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	Analyses To Be Performed: BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Chlorinated HC (8010)	Non Chlorinated HC (8020)	Total Lead (AA)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)	Remarks
C-1	3	W		12:59	HCl	Yes	✓							
C-2				13:35			✓							
C-3				14:12			✓							
C-4				12:18			✓							
CD-3				—			✓							
Trip	1			—			✓							
					TO	Refrigerator				#1				

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
John P. Zwierzycki	Gettler-Ryan	12-6-90/16:33		G/R	12-10-90/0700
	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
	G/R	12-10-90 17:41			
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time
			R.D. Hallenberg 12/10/90		17:40

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
5 Days
10 Days
(As Contracted)

WHITE: LAB COPY

Chain of Custody Record

9012147

Project No. 11299
Project Name Getler Ryan
Samplers
P.O. No.

Superior Analytical Laboratory
1555 Burke St. Unit 1
San Francisco, CA 94124
(415) 647-2081

Sample Number	Date	Time	Location	Matrix	Number of Containers	Sample Preservation	TPH as Gasoline	BTXE	TPH as Diesel	Oil & Grease	8010	8240	X Cd, Cr, Pb, Zn, Ni by ICAP		
11299-1			C-4	H_2O									X		Rec'd 25RL ok

Relinquished By (Signature)	Date/Time	Received By (Signature)	Date/Time
1. Cecilia G. Joaquin	12/19/90 2:15	1. [illegible]	12/19/90 5:00
2.		2.	
3.		3.	
4.		4.	

REMARKS:

Rush Turn Around
need results by 12/26/90
PLEASE report to Tom Paulson @ Getler Ryan
PLEASE INVOICE Chevron