

Shell Oil Company



90 APR -6 AM 10:34

EAST BAY
MARKETING DISTRICT

P.O. Box 4023
Concord, CA 94524
(415) 676-1414

April 3, 1990

Mr. Gil Wistar
County of Alameda
Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

SUBJECT: SHELL SERVICE STATION
999 SAN PABLO AVENUE
ALBANY, CALIFORNIA

Dear Mr. Wistar:

Enclosed is a copy of the Well Installation and Soil Boring Report, dated March 23, 1990, which documents the preliminary soil and groundwater investigation conducted at the subject location.

If you should have any questions or comments regarding this project please do not hesitate to call me at (415) 676-1414 ext. 127.

Very truly yours,

A handwritten signature in cursive script, reading "Diane M. Lundquist".

Diane M. Lundquist
District Environmental Engineer

DML/jw

enclosure

cc: Mr. Tom Callaghan, Regional Water Quality Control Board
Mr. John Werfal, Gettler-Ryan Inc.



GeoStrategies Inc.

WELL INSTALLATION AND SOIL BORING REPORT

Shell Service Station
999 San Pablo Avenue
Albany, California

Report No. 7666-2

March 23, 1990

RECEIVED

MAR 23 1990

GETTLER-RYAN INC.
GENERAL CONTRACTORS
(415) 352-4800



GeoStrategies Inc.

2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545

March 23, 1990

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

Attn: Mr. John Werfal

Re: WELL INSTALLATION AND SOIL BORING REPORT
Shell Service Station
999 San Pablo Avenue
Albany, California

Gentlemen:

This report summarizes the field activities performed by GeoStrategies Inc. (GSI) at the above referenced location (Plate 1). The work was performed in accordance with the GSI work plan dated January 25, 1990. Ten exploratory soil borings were drilled and three of the borings were completed as ground-water monitoring wells. Groundwater samples were collected and analyzed from all site wells on February 5, 1990. Chemical analytical results are presented in this report.

FIELD PROCEDURES

Seven exploratory soil borings (S-A through S-G) were drilled using a truck mounted hollow-stem auger drilling rig according to GSI Field Methods and Procedures (Appendix A). The soil borings were drilled in the vicinity of the existing Underground Storage Tank complex (UGST) and through the proposed new UGST complex. Three ground-water monitoring wells (S-1 through S-3) were installed along the site perimeter: one near San Pablo Avenue, one near Marin Avenue and one near the existing UGSTs. The locations of the soil borings and monitoring wells are shown on Plate 2.

GeoStrategies Inc.

Gettler-Ryan Inc.
March 23, 1990
Page 2

Soils were sampled at approximately five-foot depth intervals. Soil samples were collected using a modified California split-spoon sampler fitted with brass tube liners. A GSI geologist supervised the drilling, described soil samples using the Unified Soil Classification System (ASTM-2488) and Munsell Soil Color Charts. Lithologic logs were prepared for each boring (Appendix B).

A 4-inch long brass tube of soil from each sampled interval was used 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 Meter (OVM) photoionization detector. Head-space analysis results are presented on each boring log in Appendix B.

Soil samples retained for chemical analyses 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, placed in a cooler with blue ice, and transported to International Technology (IT) Analytical Services, a State-certified environmental laboratory located in San Jose, California.

Monitoring Well Design and Installation

Monitoring wells S-1, S-2, and S-3 were installed to total depths of 11.5, 11.5, and 12 feet, respectively. All wells were constructed using 3-inch-diameter Schedule 40 PVC well casing and 0.020-inch factory slotted well screen. The well screen was placed from the bottom of the boring to approximately two feet above observed static water levels. Lonestar #2/12 graded sand was placed in the annular space along the entire screened interval, including two feet above the top of the well screen. A 1-foot bentonite seal, followed by a cement grout seal, was placed above the sand pack. Each well was completed at ground surface with a locking well cap and lock, secured underneath a traffic-rated Christy box. Monitoring well construction details are presented in Appendix B.

GeoStrategies Inc.

Gettler-Ryan Inc.
March 23, 1990
Page 3

Potentiometric Data

Prior to ground-water sampling, water levels were measured in each monitoring well using an electronic oil/water interface probe. Static water levels were measured from the surveyed top of well box and recorded to ± 0.01 foot (Table 1).

Ground-water elevation data for the February 5, 1990 sampling have been plotted and contoured and are presented on Plate 3. Depth to groundwater in the uppermost water-bearing strata ranged from 7.62 to 8.07 feet. The shallow ground-water gradient was calculated to be 0.02 to the northwest.

Floating Product Measurements

Measurements for floating product were made in each monitoring well using an electronic oil/water interface probe. Each well was also inspected with a clean, clear, acrylic bailer to visually confirm interface probe results. Floating product was not observed in any of the monitoring wells.

HYDROGEOLOGIC CONDITIONS

The lithology encountered in nine of the ten exploratory soil borings consisted of primarily low permeability unsaturated silty clay to clayey silt to a depth of approximately 8 feet. All borings encountered a sand with silt and gravel layer at a depth of approximately 9 to 10 feet. Groundwater was first encountered in the sandy strata at depths of approximately 9 to 11 feet below ground surface. The sand with silt and gravel corresponds to the zone of highest observed hydrocarbon concentrations (odor, chemical analyses, and OVM). An undetermined thickness of silt with sand and gravel underlies the saturated sand with silt and gravel. This unsaturated silt layer was observed in all borings with varying amounts of gravel and sand. The gravel contained in the silt appears to be lithified siltstone clasts which resemble the silt matrix.

A cross-section (Plate 5) was prepared from the boring logs along section line A-A' shown on Plate 2.

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Gettler-Ryan Inc.
March 23, 1990
Page 4

CHEMICAL ANALYTICAL DATA

Soil Analytical Data

Soil samples were analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) according to EPA Method 8015 (Modified) and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) according to EPA Method 8020.

Boring S-D was drilled through approximately 15.0 feet of existing UGST backfill. The silt which was encountered at a depth of 15.0 feet contained 94 ppm TPH-Gasoline and was the only analyzed sample from this depth interval which contained detectable levels of petroleum hydrocarbons. Soil samples from the 10-foot depth interval from Borings S-A, S-C, S-F, S-G, and S-1 through S-3 contained the highest concentrations of TPH-Gasoline. TPH-Gasoline levels reported for the 5-foot depth interval samples were ND (none detected) up to a maximum of 48 ppm in Boring S-C. Samples from the 14-15 depth interval in Borings S-B, S-G, S-1, and S-3 did not contain any detectable concentrations of TPH-Gasoline. Soil chemical analytical data are summarized in Table 2. IT Analytical Services chemical analytical reports are presented in Appendix C.

Ground-water Analytical Data

Ground-water samples were collected by Gettler-Ryan Inc. (G-R) from site monitoring wells on February 5, 1990. The ground-water samples were analyzed for TPH-Gasoline according to EPA Method 8015 (Modified) and BTEX according to EPA Method 8020. The G-R Groundwater Sampling Report, IT Analytical Services certified analytical report, and Chain-of-Custody documents are presented in Appendix D. The analytical data are summarized in Table 1.

TPH-Gasoline was detected in all three wells at concentrations ranging from 3.1 to 8.7 ppm. Benzene was also detected in all three wells at concentrations ranging from 0.045 to 1.6 ppm which exceed the Regional Water Quality Control Board (RWQCB) Maximum Contaminant Level (MCL). Plate 4 presents the chemical concentrations detected in each well at the site.

The chemical analytical data indicate that shallow groundwater has been impacted by petroleum hydrocarbons, probably from site storage and piping facilities. Additional data points are needed to further delineate the distribution of dissolved hydrocarbon plume in the upgradient, crossgradient, and downgradient direction.

GeoStrategies Inc.

Gettler-Ryan Inc.
March 23, 1990
Page 5

Quality Control

A Trip Blank was used for the Quality Control (QC) sample. The Trip Blank was prepared at IT using organic-free water. The sample was transported with collected ground-water samples to evaluate sample handling, transport and analytical procedures.

The QC sample chemical analytical results for the Trip Blank were reported as ND. This indicates that no hydrocarbons were introduced into samples during sampling procedures and transport to the laboratory.

DISCUSSION

Static water levels were measured at approximately 7 to 8 feet below ground surface. The apparent increase in water levels from first encountered water depths at approximately 9 feet suggests that the sandy aquifer is confined or semi-confined. The unsaturated conditions observed in the overlying silty clay and the underlying silt suggests that, locally, these are the confining strata.

On average, the soil sample collected at the 10-foot depth interval contained the highest concentrations of TPH-Gasoline and BTEX. Of all the 15-foot depth interval soil samples analyzed, only Boring S-D contained TPH-Gasoline. The distribution of hydrocarbons in the soil suggests that the unsaturated silt which underlies the sandy unit may somewhat retard vertical migration of petroleum hydrocarbons (Plate 5).

The concentrations of dissolved hydrocarbons in the groundwater in all three wells (S-1, S-2, and S-3) indicate that additional monitoring points are necessary to further delineate the plume. Upgradient Well S-3, contained dissolved hydrocarbons at concentrations higher than crossgradient Well S-1. Potentially, an upgradient off-site source may exist. Additional investigations to ascertain a potential upgradient source of contamination should be performed.

GeoStrategies Inc.

Gettler-Ryan Inc.
March 23, 1990
Page 6

SUMMARY

A summary of activities and findings associated with this report is presented below:

- o Ten exploratory soil borings (S-A through S-G) were drilled and three of the borings (S-1 through S-3) were completed as ground-water monitoring wells.
- o The site appears to be underlain by silty clay to a depth approximately 8 to 9 feet. A sandy strata underlies the clays to a depth of approximately 11 to 12 feet. A silt strata was encountered from approximately 12 feet to the total depth explored of 20.5 feet.
- o TPH-Gasoline was detected in soil samples from the soil borings, with the highest concentrations found in the 10-foot depth interval. Concentrations in the 10-foot depth interval ranged from ND to 1,900 ppm. Soil samples from the 15-foot depth interval were reported as ND, except in Boring S-D, which contained 94 ppm TPH-Gasoline.
- o The hydraulic gradient in the shallow aquifer was calculated to be 0.02 and ground-water flow direction is to the northwest.
- o TPH-Gasoline was detected in ground-water samples from all three newly installed wells (S-1 through S-3) at concentrations ranging from 3.1 to 8.7 ppm.
- o Benzene was detected in Wells S-1, S-2, and S-3 at concentrations ranging from 0.045 to 1.6 ppm. These concentrations exceed the current RWQCB MCL for benzene (0.001 ppm).
- o The areal extent of the dissolved hydrocarbon plume has not been adequately delineated. Additional monitoring wells will be installed as outlined in the next section of this report.

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Gettler-Ryan Inc.
March 23, 1990
Page 7

PROPOSED SCOPE OF WORK

After reviewing the results of this investigation GSI recommends the following scope of work:

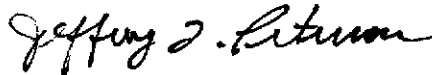
- o Two wells will be installed in Marin Avenue, upgradient from Well S-3, to evaluate background water chemistry and potential off-site sources. One well will be installed in San Pablo Avenue, downgradient from the existing underground storage tanks, to further delineate the downgradient hydrocarbon distribution (Plate 2). All field work will be performed according to the Field Methods and Procedures presented in Appendix A.

If you have any questions, please call.

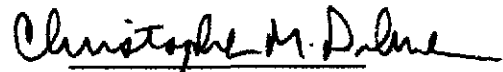
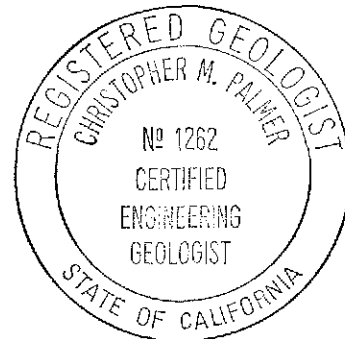
GeoStrategies Inc. by,



Matthew J. Janowiak
Geologist



Jeffrey L. Peterson
Senior Hydrogeologist
R.E.A. 1021



Christopher M. Palmer
C.E.G. 1262, R.E.A. 285

- Plate 1: Vicinity Map
- Plate 2: Site Plan
- Plate 3: Potentiometric Map
- Plate 4: TPH-G/Benzene Concentration Map
- Plate 5: Cross Section A-A'

- Appendix A: Field Methods and Procedures
- Appendix B: Boring Logs
- Appendix C: Soil Chemical Analytical Reports
- Appendix D: Groundwater Sampling Report

MJJ/JLP/mlg

Report No. 7666-2

TABLE 1

GROUND-WATER ANALYSIS DATA

| WELL NO | SAMPLE DATE | ANALYSIS DATE | TPH (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) | WELL ELEV (FT) | STATIC WATER ELEV (FT) | PRODUCT THICKNESS (FT) | DEPTH TO WATER (FT) |
|---------|-------------|---------------|-----------|---------------|---------------|--------------------|---------------|----------------|------------------------|------------------------|---------------------|
| S-1 | 05-Feb-90 | 10-Feb-90 | 3.1 | 0.056 | 0.037 | 0.11 | 0.097 | 41.48 | 33.86 | ----- | 7.62 |
| S-2 | 05-Feb-90 | 10-Feb-90 | 8.7 | 1.6 | 0.058 | 0.16 | 1.0 | 40.73 | 32.66 | ----- | 8.07 |
| S-3 | 05-Feb-90 | 15-Feb-90 | 5.7 | 0.045 | 0.004 | 0.12 | 0.50 | 42.72 | 34.98 | ----- | 7.74 |
| TB | 05-Feb-90 | 13-Feb-90 | <0.050 | <0.0005 | <0.0005 | <0.0005 | <0.001 | ----- | ----- | ----- | ----- |

CURRENT REGIONAL WATER QUALITY CONTROL BOARD MAXIMUM
 CONTAMINANT LEVELS
 CURRENT DHS ACTION LEVELS
 Benzene 0.001 ppm Xylenes 1.750 ppm Ethylbenzene 0.68 ppm
 Toluene 0.100 ppm

TPH = Total Petroleum Hydrocarbons as Gasoline
 PPM = Parts Per Million TB = Trip Blank

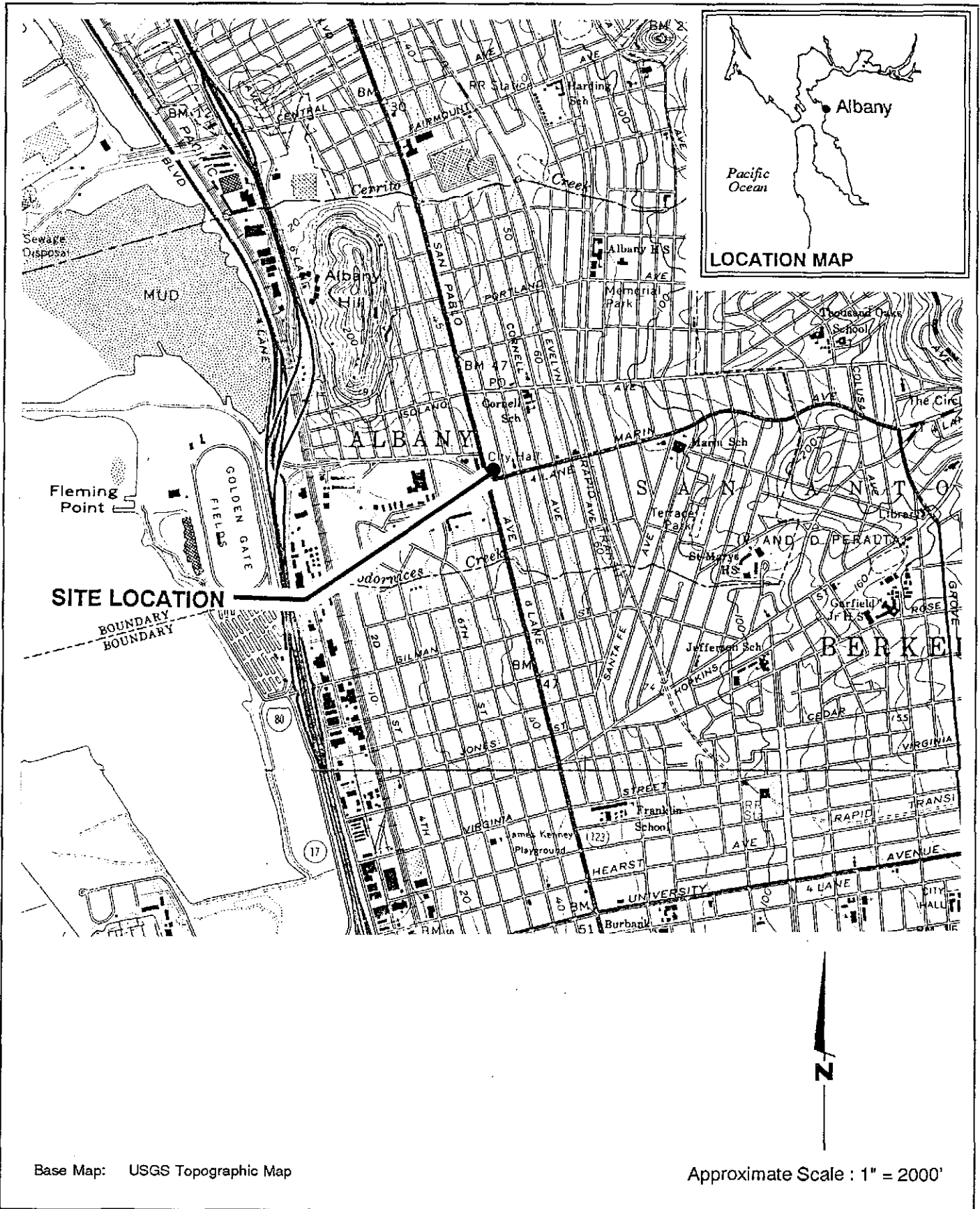
- Note: 1. All data shown as <x are reported as ND (none detected)
- 2. Water level elevations referenced to mean sea level (MSL)
- 3. DHS Action Levels and MCLs are subject to change pending State review

TABLE 2

SOIL ANALYSIS DATA

| BORING NO | SAMPLE DATE | ANALYSIS DATE | TPH (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|-----------|-------------|---------------|-----------|---------------|---------------|--------------------|---------------|
| S-A-5' | 29-Jan-90 | 08-Feb-90 | 13. | 0.26 | <0.025 | 0.46 | 0.91 |
| S-A-10' | 29-Jan-90 | 09-Feb-90 | 1900. | 9.8 | 10. | 41. | 250. |
| S-B-5' | 29-Jan-90 | 09-Feb-90 | 5.6 | <0.025 | <0.025 | 0.028 | 0.09 |
| S-B-15' | 29-Jan-90 | 08-Feb-90 | <2.5 | <0.025 | <0.025 | <0.025 | 0.09 |
| S-C-5' | 29-Jan-90 | 08-Feb-90 | 48. | <0.2 | <0.2 | 0.27 | 0.7 |
| S-C-10' | 29-Jan-90 | 08-Feb-90 | 470. | <1. | 1. | 8. | 28. |
| C-D-15' | 29-Jan-90 | 08-Feb-90 | 94. | 0.63 | 0.31 | 2.5 | 1.4 |
| S-E-5' | 29-Jan-90 | 08-Feb-90 | 21. | 0.38 | 0.036 | 0.40 | 0.44 |
| S-E-10' | 29-Jan-90 | 08-Feb-90 | <2.5 | <0.025 | <0.025 | 0.026 | 0.06 |
| S-F-5' | 29-Jan-90 | 08-Feb-90 | <2.5 | <0.025 | <0.025 | <0.025 | <0.05 |
| S-F-10' | 29-Jan-90 | 08-Feb-90 | 120. | 0.44 | 0.10 | <0.8 | 0.8 |
| S-G-10' | 29-Jan-90 | 08-Feb-90 | 6.5 | 0.032 | <0.025 | <0.025 | 0.07 |
| S-G-15' | 29-Jan-90 | 08-Feb-90 | <2.5 | <0.025 | <0.025 | <0.025 | <0.05 |
| S-3-10' | 30-Jan-90 | 08-Feb-90 | 18. | <0.03 | <0.025 | <0.025 | 0.11 |
| S-3-15' | 30-Jan-90 | 08-Feb-90 | <2.5 | <0.025 | <0.025 | <0.025 | <0.05 |
| S-1-10' | 30-Jan-90 | 09-Feb-90 | 6.2 | <0.06 | <0.025 | 0.096 | 0.32 |
| S-1-14' | 30-Jan-90 | 09-Feb-90 | <2.5 | <0.025 | <0.025 | <0.025 | <0.05 |
| S-2-5' | 30-Jan-90 | 09-Feb-90 | <2.5 | <0.025 | <0.025 | <0.025 | <0.05 |
| S-2-10' | 30-Jan-90 | 09-Feb-90 | 250. | 2.5 | 0.8 | 6.5 | 8.6 |

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



Base Map: USGS Topographic Map

Approximate Scale : 1" = 2000'



GeoStrategies Inc.

Vicinity Map
 Shell Service Station
 999 San Pablo Avenue
 Albany, California

PLATE

1

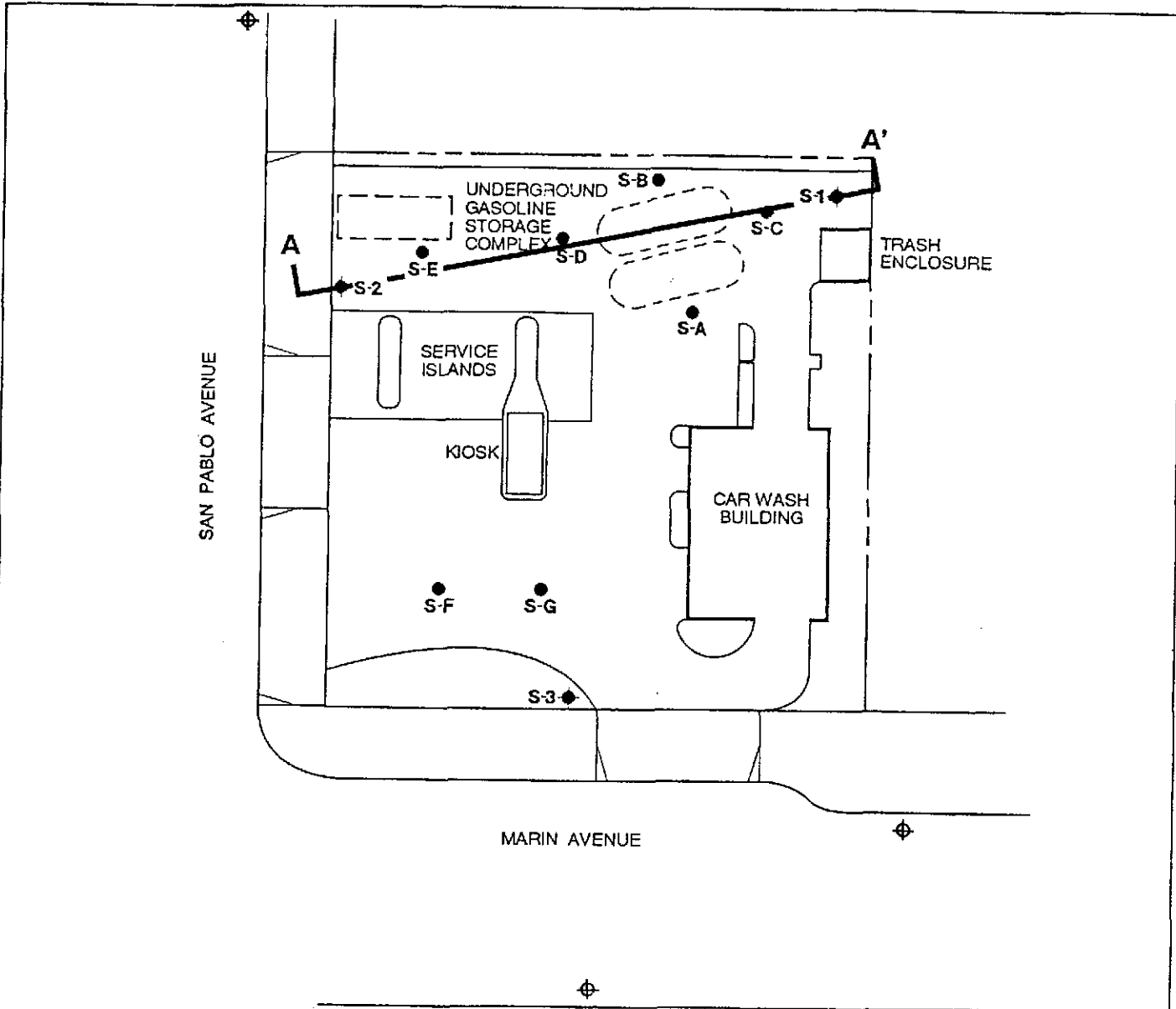
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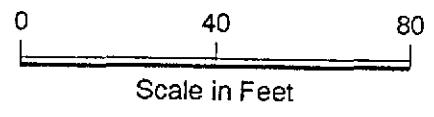
REVISED DATE

REVISED DATE



EXPLANATION

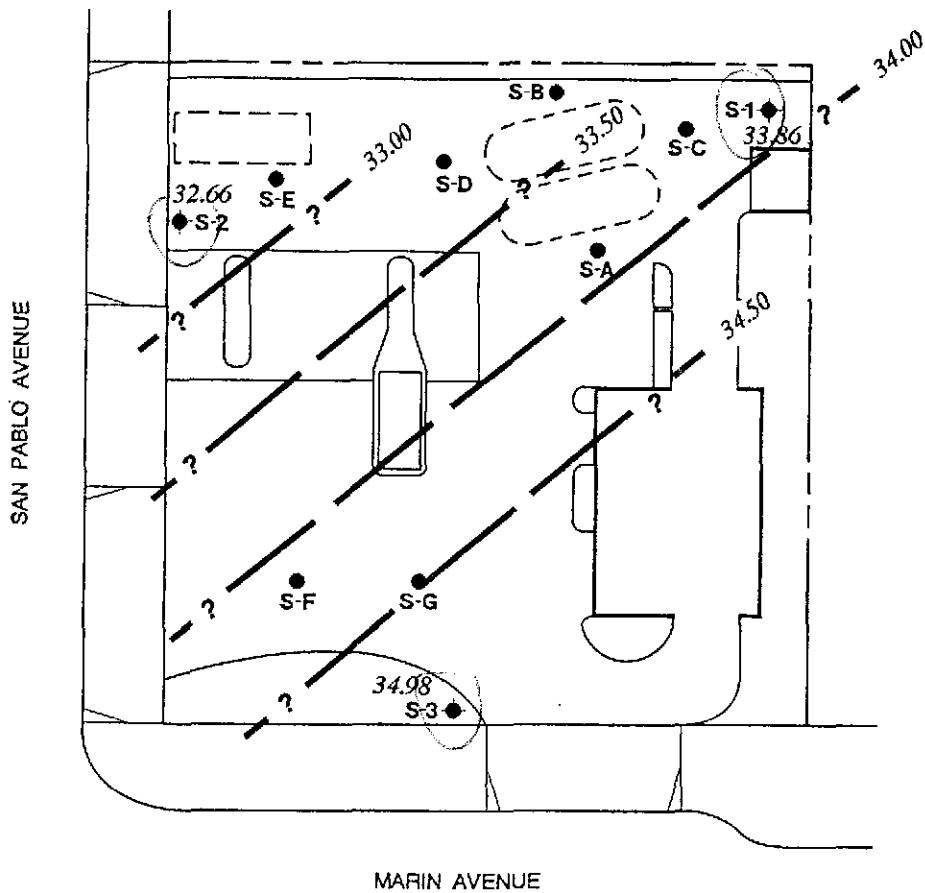
- ◆ S-1 Ground-water monitoring well location
- S-A Soil boring location
- ⊕ Proposed ground-water monitoring well location
- A L Cross-section



GSI GeoStrategies Inc.

Site Plan
 Shell Service Station
 999 San Pablo Avenue
 Albany, California

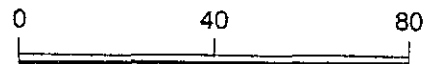
PLATE
2



EXPLANATION

- ◆ S-1 Ground-water monitoring well location
- S-A Soil boring location
- 34.00 — Ground-water elevation contour
Approximate Gradient = 0.02
- 34.98 Ground-water elevation in feet referenced to
Mean Sea Level (MSL) measured on February 5, 1990

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



Scale in Feet



GeoStrategies Inc.

Potentiometric Map
Shell Service Station
999 San Pablo Avenue
Albany, California

PLATE

3

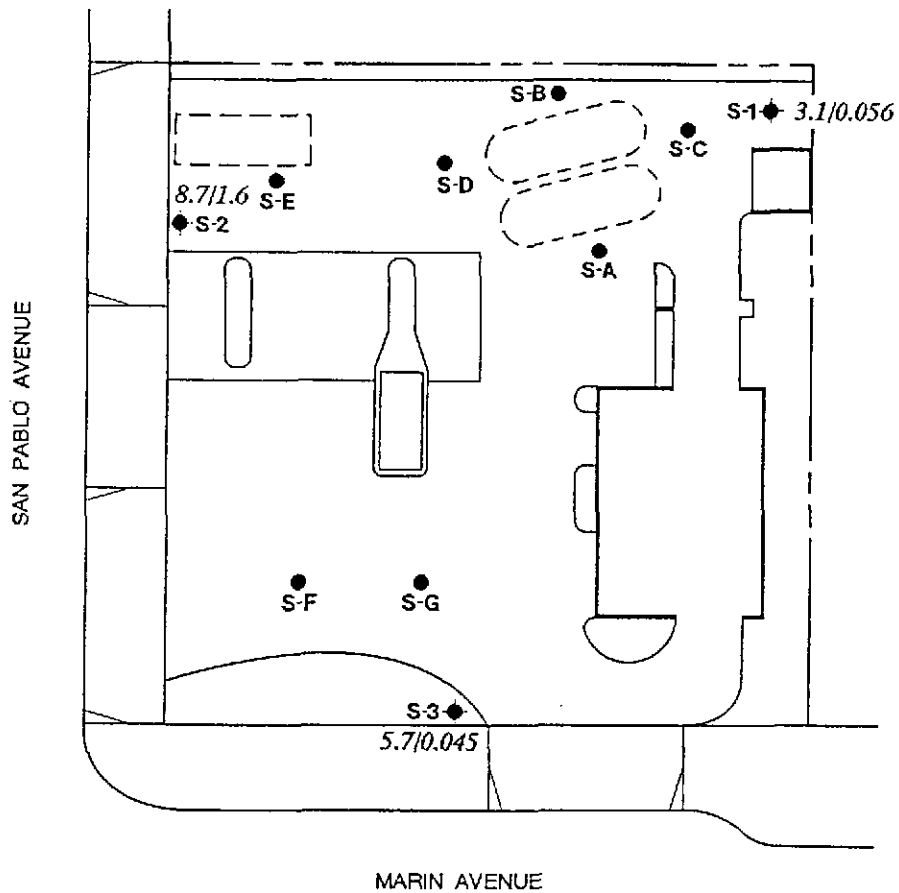
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(Signature) CEG 1262

DATE
3/90

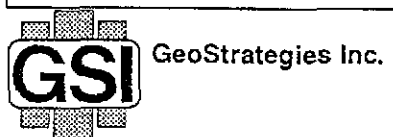
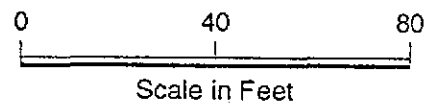
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EXPLANATION

- ◆ S-1 Ground-water monitoring well location
- S-A Soil boring location
- 5.7/0.045 TPH-G (Total Petroleum Hydrocarbons calculated as Gasoline)/Benzene concentrations in ppm sampled on February 5, 1990



TPH-G/Benzene Isoconcentration Map
 Shell Service Station
 999 San Pablo Avenue
 Albany, California

PLATE

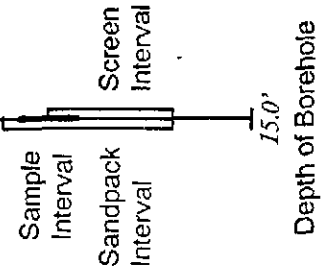
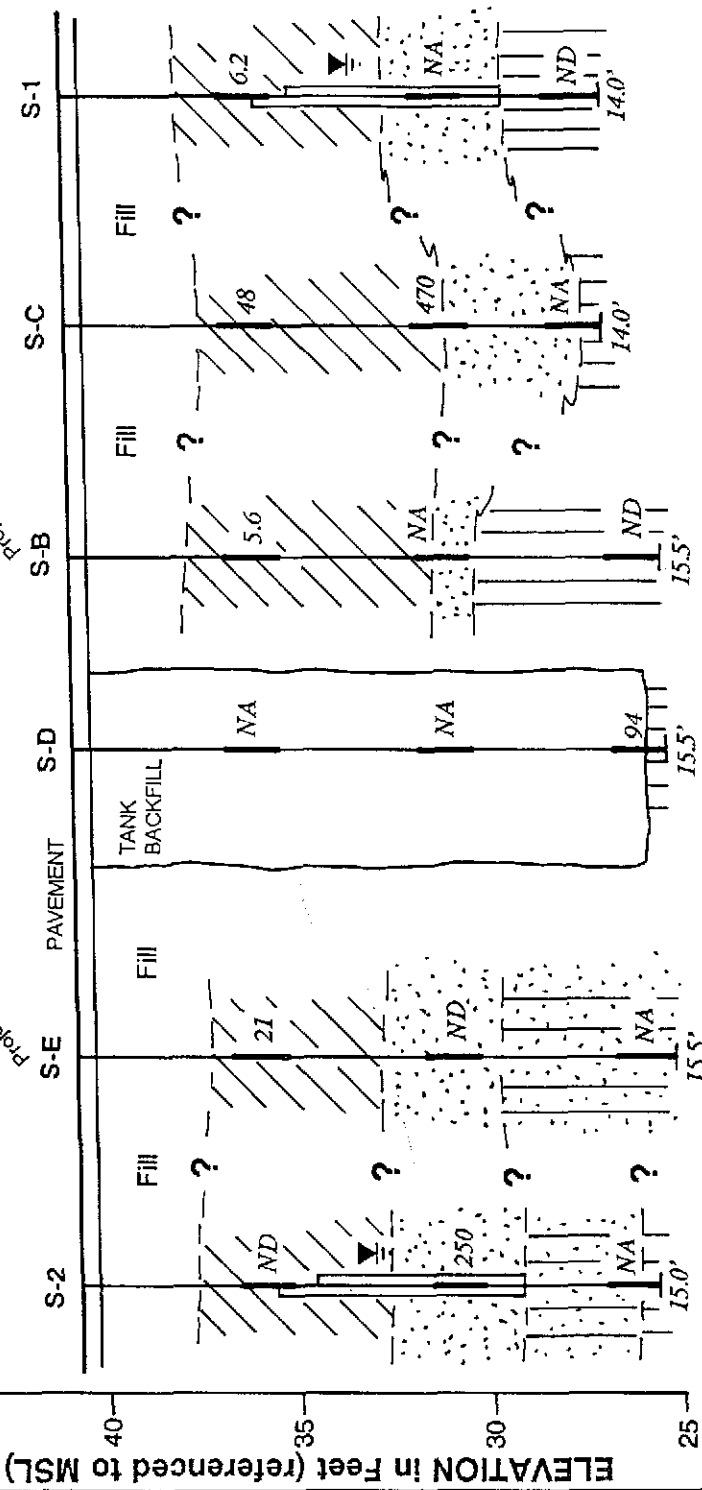
4

SW 45
A
NE

Projected 5' SE
Projected 12' SE

EXPLANATION

- Clays (CL, CH)
- Silts (ML, MH)
- Sands (SP, SW)
- Sands (SM, SC)
- Static Water Level measured on February 5, 1990
- TPH-G concentration in ppm
- Not Detected
- Not Analyzed



Note: General stratigraphic relationships are displayed. Additional horizontal and vertical variations may exist.

HORZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 5'

PLATE 5

Cross-section A-A'
Shell Service Station
999 San Pablo Avenue
Albany, California

GeoStrategies Inc.
GSI

FIELD METHODS AND PROCEDURES

EXPLORATION DRILLING

Mobilization

Prior to any drilling activities, 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 ground water. 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 tremied 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

Monitoring wells will be developed using a submersible pump, bladder pump or bailer. All well developing equipment will be decontaminated prior to development using a steam cleaner and/or Alconox detergent wash. Wells will be developed until discharge water is visibly clear and free of sediment. The adequacy of well development will be assessed by the GSI geologist. Indicator parameters (pH, specific conductance, and temperature) will be monitored and recorded during well development. Field instrument calibrations will be performed according to manufacturer's specifications.

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 ANALYSISQuality 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.



Guidance and Reference Documents Used to Collect Groundwater Samples

These documents are used to verify Gettler-Ryan Inc. sampling procedures and consistent with current regulatory guidance. If site specific work and sampling plans are required, those plans will be developed from these 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 Petroleum 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, Section 2647 (October, 1986) |
| 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) |
| Santa Clara Valley Water District | Guidelines for Preparing or Reviewing Sampling Plans for Soil and Groundwater Investigation of Fuel Contamination Sites (January, 1989) |
| Santa Clara Valley Water District | Investigation and Remediation at Fuel Leak sites: Guidelines for Investigation and Technical Report Preparation (March 1989) |
| American Petroleum Institute | Groundwater Monitoring & Sample Bias; API Publication 4367, Environmental Affairs Department, June 1983 |
| 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.

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) samples 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.

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 3). Both static water-level and separate-phase product thickness are measured to the nearest ± 0.01 foot. The presence of separate-phase product is confirmed using a clean, acrylic or polyvinylchloride (PVC) bailer, measured to the nearest ± 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 3. 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 centrifugal pumping system, or (4) a Teflon or Stainless steel bailer (Figure 4). 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 4. Collected field data during purging activities will be entered on the G-R Well Sampling Field Data Sheet shown in Figure 3. 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 5) 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

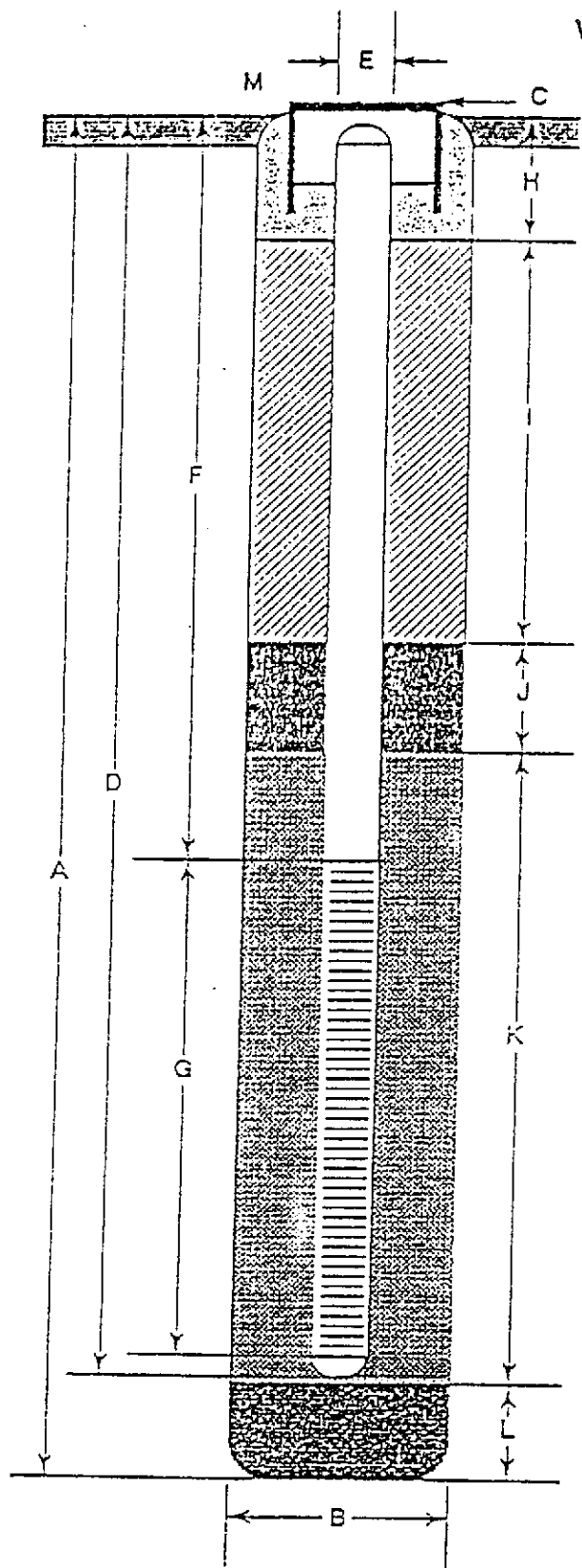
Samples shall always be accompanied by a Chain-of-Custody record. When transferring the samples, the individual relinquishing and receiving the samples will sign, date, and note the time on the Chain-of-Custody record. G-R will be responsible for notifying the laboratory coordinator when and how many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

| <u>Parameter</u> | <u>Analytical Method</u> | <u>Reporting Units</u> | <u>Container</u> | <u>Preservation</u> | <u>Maximum Holding Time</u> |
|--|--------------------------|------------------------|---|--------------------------|-----------------------------|
| 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 | EPA 8020 | mg/l | 50 ml. vial | cool, 4 C | 7 days (w/o preservative) |
| Toluene | | ug/l | glass, Teflon lined septum | HCl to pH<2 | 14 days (w preservative) |
| Ethylbenzene | | | | | |
| Xylenes (BTEX) | | mg/l | 1 l glass, Teflon | | |
| Oil & Grease | SM 503E | ug/l | lined septum | H2SO4 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) |
| Halogenated 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 | 14 days (maximum) |
| Semi-Volatile Organics | 8270 | mg/l ug/l | 40 ml. vial glass, Teflon lined septum | cool, 4 C | 14 days (maximum) |
| Specific Conductance (Field test) | | umhos/cm | | | |
| pH (Field test) | | pH units | | | |
| Temperature (Field test) | | Deg F | | | |

WELL CONSTRUCTION DET



- 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 _____



GeoStrategies Inc.

Well Construction Detail

WELL NO. _____

JOB NUMBER _____

REVIEWED BY RG/CEG

DATE _____

REVISED DATE _____

REVISED DATE _____

COMPANY _____ JOB # _____

LOCATION _____ DATE _____

CITY _____ TIME _____

Well ID. _____ Well Condition _____

Well Diameter _____ in. Hydrocarbon Thickness _____ ft.

Total Depth _____ ft.

Depth to Liquid- _____ ft.

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

| | | | |
|--------------------|-----------|------------|------------|
| Volume Factor (VF) | 2" = 0.17 | 6" = 1.50 | 12" = 5.80 |
| | 3" = 0.30 | 8" = 2.60 | |
| | 4" = 0.66 | 10" = 4.10 | |

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 _____

FOREMAN _____ ASSISTANT _____

Monitoring Well Sampling Protocol Schematic

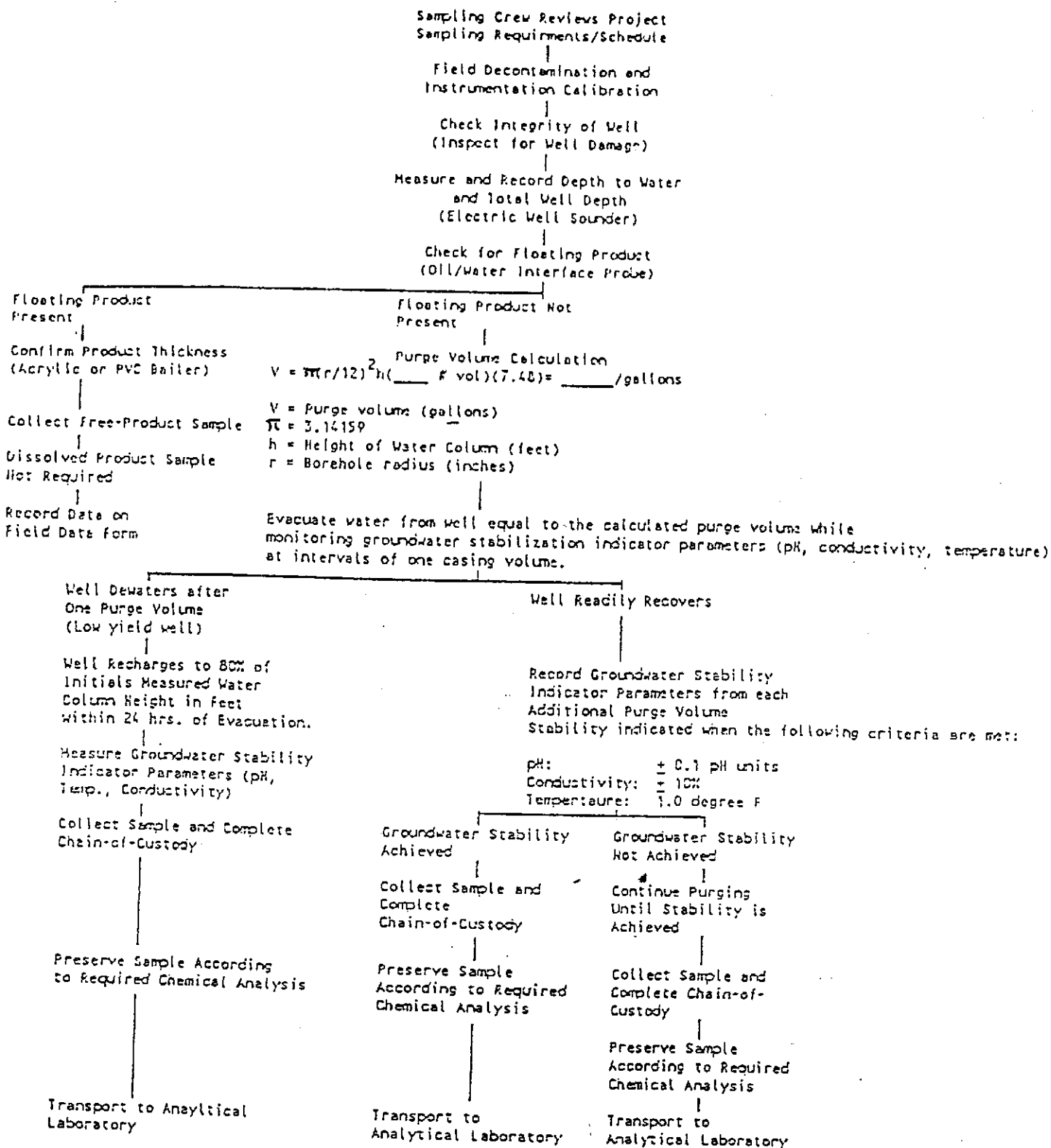


FIGURE 4

| 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 DIATOMACEOUS, 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 | |

- Perm - Permeability
- Consol - Consolidation
- LL - Liquid Limit (%)
- PI - Plastic Index (%)
- G_s - Specific Gravity
- 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 Recovered
- "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.: 7666 | Date: 01/29/90 | Boring No: |
| | Client: Shell Oil Company | S-A | |
| | Location: 999 San Pablo Avenue | Sheet 1 | |
| | City: Albany, California | of 1 | |
| Logged by: M.J.J. | | Driller: Bayland | |
| Casing installation data: | | | |

Drilling method: Hollow-Stem Auger

Hole diameter: 8-Inches

| | | | |
|-----------------------|----------|----------|--|
| Top of Box Elevation: | | Datum: | |
| Water Level | 11.5' | 7.0' | |
| Time | 9:42 | 10:10 | |
| Date | 01/29/90 | 01/29/90 | |

| PID (ppm) | Blows/ft. or Pressure (psf) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|--|
| | | | | 1 | | | | PAVEMENT SECTION - 0.67 feet |
| | | | | 2 | | | | FILL - Gravel (GP) - grey (7.5YR 6/0), loose, dry; 85% coarse angular gravel; 10% medium to coarse sand; trace silt. |
| | | | | 3 | | | | FILL - Sand with Gravel (SP) - light olive brown (2.5Y 5/4), loose, damp; 80% medium to coarse sand; 20% coarse gravel; no chemical odor. |
| | | | | 4 | | | | |
| 93 | 150 250 300 | S&H push | S-A-5 | 5 | | | | CLAYEY SILT (ML/CL) - black (5Y 2.5/1), medium stiff, damp, medium plasticity; 70% silt; 25% clay; 5% coarse gravel; weak chemical odor. |
| | | | | 6 | | | | |
| | | | | 7 | | | | SILTY CLAY (CL/ML) - olive grey (5Y 4/2), stiff, damp; 60% clay; 40% silt; mottled with streaks of grey, weak chemical odor. |
| | | | | 8 | | | | |
| | | | | 9 | | | | |
| 169 | 150 350 200 | S&H push | S-A-10 | 10 | | | | SAND with SILT and GRAVEL (SW-SM) - olive (5Y 4/3), dense, damp; 65% medium to coarse sand; 25% fine to coarse gravel; 10% silt; strong chemical odor. |
| | | | | 11 | | | | |
| | | | | 12 | | | | saturated at 11.0 feet (cuttings) |
| | | | | 13 | | | | |
| | | | | 14 | | | | |
| 19 | 2 3 7 | S&H | S-A-15 | 15 | | | | SILT (ML) - yellowish brown (10YR 5/8), medium stiff, damp; trace clay; some grey mottling; trace black organic stains; no chemical odor. |
| | | | | 16 | | | | |
| | | | | 17 | | | | Bottom of boring at 15.5 feet. |
| | | | | 18 | | | | Bottom of sample at 15.5 feet. |
| | | | | 19 | | | | 01/29/90 |
| | | | | 20 | | | | |

Remarks: Water observed trickling down borehole sidewalls at 11.0 - 11.5 feet.
Backfilled with bentonite to 11.0 feet and cement to surface.

Log of Boring

BORING NO. **S-A**



| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/29/90 | Boring No: |
| | Client: Shell Oil Company | | S-B |
| | Location: 999 San Pablo Avenue | | Sheet 1 |
| | City: Albany, California | | of 1 |
| | Logged by: M.J.J. | Driller: Bayland | |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------|--------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: | Datum: |
| Hole diameter: 8-Inches | | |

| PID (ppm) | Blows/ft or Pressure (psi) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description |
|-----------|----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|--|
| | | | | 1 | | | | PAVEMENT SECTION - 0.67 feet |
| | | | | 2 | | | | FILL - Sand (SP) - olive (5Y 5/4), loose, damp; 95% fine to medium sand; trace gravel; no chemical odor. |
| | | | | 3 | | | | |
| | | | | 4 | | | | |
| 169 | 100 | S&H | S-B-5 | 5 | | | | SILTY CLAY (CL/ML) - olive grey (5Y 4/2), stiff, damp; 60% clay; 35% silt; trace fine to coarse sand; mottled with grey; moderate chemical odor. |
| | 100 | push | | 6 | | | | |
| | 150 | | | 7 | | | | |
| | | | | 8 | | | | |
| | | | | 9 | | | | |
| 345 | 100 | S&H | | 10 | | | | Harder drilling at 9.5 feet. |
| | 250 | push | S-B-10 | 11 | | | | Smoother drilling at 10.5 feet. |
| | 500 | | | 12 | | | | SAND with SILT and GRAVEL (SW-SM) - olive (5Y 4/3), dense, moist; 65% medium to coarse sand; 20% gravel; 10% silt; trace clay; sampler shoe saturated; moderate chemical odor. |
| | | | | 13 | | | | |
| | | | | 14 | | | | |
| 36 | 3 | S&H | S-B-15 | 15 | | | | SILT (ML) - yellowish brown (10YR 5/8), stiff, damp; trace clay; some grey mottling; trace black organic stains; no chemical odor. |
| | 4 | | | 16 | | | | |
| | 10 | | | 17 | | | | |
| | | | | 18 | | | | Bottom of boring at 15.5 feet. |
| | | | | 19 | | | | Bottom of sample at 15.5 feet. |
| | | | | 20 | | | | 01/29/90 |

Remarks: Backfilled with bentonite to 10.0 feet and cement to surface.

| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/29/90 | Boring No: |
| | Client: Shell Oil Company | | S-C |
| | Location: 999 San Pablo Avenue | | |
| | City: Albany, California | | Sheet 1 |
| | Logged by: M.J.J. | Driller: Bayland | of 1 |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------|--------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: | Datum: |
| Hole diameter: 8-Inches | | |

| PID (ppm) | Blows/ft. or Pressure (psf) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Water Level | | Time | Date | Description |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|-------------|--|------|------|--|
| | | | | | | | | 10.5' | | | | |
| | | | | 1 | | | | | | | | PAVEMENT SECTION - 0.67 feet |
| | | | | 2 | | | | | | | | FILL - Clay (CL) - black (5Y 2.5/1), medium stiff, damp, medium plasticity; moderate chemical odor. |
| | | | | 3 | | | | | | | | FILL - Gravel with Sand (GP) - grey (10YR 5/1), loose, moist; 75% coarse gravel; 20% coarse sand; trace silt; trace clay; strong chemical odor. |
| | | | | 4 | | | | | | | | |
| 26 | 100 100 150 | S&H push | S-C-5 | 5 | | | | | | | | SILTY CLAY (CL/ML) - dark greenish grey (5GY 4/1), medium stiff, damp; 60% clay; 40% silt; contaminant stains; strong chemical odor. |
| | | | | 6 | | | | | | | | |
| | | | | 7 | | | | | | | | |
| | | | | 8 | | | | | | | | |
| | | | | 9 | | | | | | | | |
| 86 | 100 150 100 | S&H push | S-C-10.5 | 10 | | | | | | | | increasing silt at 9.0 feet; strong chemical odor. |
| | | | | 11 | | | | | | | | |
| | | | | 12 | | | | | | | | SAND with SILT and GRAVEL (SP-SM) - olive (5Y 4/3), medium dense, saturated; 60% medium to coarse sand; 25% coarse gravel; 10% silt; strong chemical odor. |
| | | | | 13 | | | | | | | | increasing silt and clay at 13.0 feet. |
| 10 | 3 7 11 | S&H | S-C-14 | 14 | | | | | | | | COLOR CHANGE to light olive brown (2.5Y 5/6) at 12.5 feet. |
| | | | | 15 | | | | | | | | SILT (ML) - yellowish brown (10YR 5/8), damp, very stiff; trace clay; no chemical odor. |
| | | | | 16 | | | | | | | | Bottom of boring at 14.0 feet. |
| | | | | 17 | | | | | | | | Bottom of sample at 14.0 feet. |
| | | | | 18 | | | | | | | | 01/29/90 |
| | | | | 19 | | | | | | | | |
| | | | | 20 | | | | | | | | |

Remarks: Backfilled with bentonite to above water (11.5 feet) and cement to surface.

| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/29/90 | Boring No: |
| | Client: Shell Oil Company | | S-D |
| | Location: 999 San Pablo Avenue | | Sheet 1 |
| | City: Albany, California | | of 1 |
| | Logged by: M.J.J. | Driller: Bayland | |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------|--------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: | Datum: |
| Hole diameter: 8-Inches | | |

| PID (ppm) | Blows/ft. or Pressure (psi) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description | |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|-------------|--|
| | | | | | | | | Water Level | 10.0' |
| | | | | 1 | | | | | PAVEMENT SECTION - 0.5 feet |
| | | | | 2 | | | | | |
| | | | | 3 | | | | | |
| | | | | 4 | | | | | FILL - Sand with Gravel (SP) - black (2.5Y N2/0), loose, moist; 90% medium sand; 5% fine sand; trace silt; strong chemical odor. |
| 293 | 100 | S&H push | S-D-5.5 | 5 | | | | | |
| | 100 | | | 6 | | | | | |
| | | | | 7 | | | | | |
| | | | | 8 | | | | | |
| | | | | 9 | | | | | |
| 306 | 0 | S&H | S-D-10 | 10 | | | | | sampler wet at 10.25 feet; strong chemical odor. |
| | 100 | | | 11 | | | | | |
| | | | | 12 | | | | | |
| | | | | 13 | | | | | |
| | | | | 14 | | | | | |
| 302 | 11 | S&H | S-D-15.5 | 15 | | | | | |
| | 16 | | | 16 | | | | | SANDY SILT with GRAVEL (ML) - yellowish brown (10YR 5/6), stiff, damp; 55% silt; 25% medium sand; 20% fine gravel; mottled; sand-filled burrows; moderate chemical odor. |
| | 16 | | | 17 | | | | | |
| | | | | 18 | | | | | Bottom of boring at 15.5 feet. |
| | | | | 19 | | | | | Bottom of sample at 15.5 feet. |
| | | | | 20 | | | | | 01/29/90 |

Remarks: Backfilled with bentonite to 10 feet, cuttings to 1.0 feet and concrete to surface.

| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/29/90 | Boring No: |
| | Client: Shell Oil Company | S-E | |
| | Location: 999 San Pablo Avenue | | |
| | City: Albany, California | Sheet 1 | |
| | Logged by: M.J.J. | Driller: Bayland | of 1 |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------|--------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: | Datum: |
| Hole diameter: 8-Inches | | |

| PID (ppm) | Blows/ft. or Pressure (psf) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description | |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|---|----------|
| | | | | | | | | Water Level | 10.0' |
| | | | | | | | | Time | 14:05 |
| | | | | | | | | Date | 01/29/90 |
| | | | | 1 | | | | PAVEMENT SECTION - 0.5 feet | |
| | | | | 2 | | | | FILL - Clay (CL) - black (5Y 2.5/1), medium stiff, damp; no chemical odor. | |
| | | | | 3 | | | | FILL - Gravel with Sand (GP) - grey (10YR 5/1), loose, moist; 75% coarse gravel; 20% coarse sand; trace silt; trace clay; strong chemical odor. | |
| | | | | 4 | | | | | |
| 121 | 100 150 250 | S&H push | S-E- 5.5 | 5 | | | | SILTY CLAY (CL/ML) - olive brown (2.5Y 4/4), stiff, damp; 70% clay; 30% silt; medium plasticity; moderate chemical odor. | |
| | | | | 6 | | | | | |
| | | | | 7 | | | | | |
| | | | | 8 | | | | | |
| | | | | 9 | | | | | |
| 196 | 150 300 300 | S&H push | S-E- 10.5 | 10 | | | | SAND with SILT (SP-SM) - olive grey (5Y 4/2), dense, saturated; 75% medium sand; 10% silt; 5% clay; moderate chemical odor. | |
| | | | | 11 | | | | | |
| | | | | 12 | | | | | |
| | | | | 13 | | | | | |
| | | | | 14 | | | | SILTY SAND with GRAVEL (SM) - yellowish brown (10YR 5/6), medium dense, damp; 55% medium to coarse sand; 25% fine to coarse gravel; 20% silt; no chemical odor. | |
| 54 | 6 10 14 | S&H | S-E- 15.5 | 15 | | | | Bottom of boring at 15.5 feet. Bottom of sample at 15.5 feet. 01/29/90 | |
| | | | | 16 | | | | | |
| | | | | 17 | | | | | |
| | | | | 18 | | | | | |
| | | | | 19 | | | | | |
| | | | | 20 | | | | | |

Remarks: Backfilled with bentonite to 10 feet and cement to surface.

| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/29/90 | Boring No: |
| | Client: Shell Oil Company | | S-F |
| | Location: 999 San Pablo Avenue | | |
| | City: Albany, California | | Sheet 1 |
| | Logged by: M.J.J. | Driller: Bayland | of 1 |

| | | |
|------------------------------------|-----------------------|--------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: | Datum: |
| Hole diameter: 8-Inches | Water Level: 9.5' | |

| PID (ppm) | Blows/ft. or Pressure (psf) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|---|
| | | | | 1 | | | | PAVEMENT SECTION - 0.67 feet |
| | | | | 2 | | | | FILL - Clay (CL) - black (5Y 2.5/1), medium stiff, damp; no chemical odor. |
| | | | | 3 | | | | CLAY (CL) - light olive brown (2.5Y 5/6), stiff, damp; medium plasticity; faint chemical odor. |
| | | | | 4 | | | | |
| 10 | 100 150 250 | S&H push | S-F- 4.5 | 5 | | | | |
| | | | | 6 | | | | |
| | | | | 7 | | | | COLOR CHANGE to dark olive grey (5Y 3/2), softer at 7.0 feet. |
| | | | | 8 | | | | increasing sand at 7.0 feet. |
| | | | | 9 | | | | |
| 303 | 100 450 250 | S&H push | S-F- 10 | 10 | | | | SAND with SILT and GRAVEL (SP-SM) - very dark grey (2.5Y N3/0), dense, saturated; 75% medium to coarse sand; 15% gravel; 10% silt; strong chemical odor. |
| | | | | 11 | | | | |
| | | | | 12 | | | | |
| | | | | 13 | | | | decreasing gravel increasing silt to 15.0 feet. |
| | | | | 14 | | | | |
| 55 | 6 11 15 | S&H S&H | S-F- 15.5 | 15 | | | | COLOR CHANGE to light olive brown (2.5Y 5/4) at 14.0 feet. SANDY SILT (SM) - light olive brown (2.5Y 5/4), stiff, damp; 60% silt; 30% fine sand; 10% clay; no chemical odor. |
| | | | | 16 | | | | |
| | | | | 17 | | | | |
| | | | | 18 | | | | Bottom of boring at 15.5 feet. Bottom of sample at 15.5 feet. 01/29/90 |
| | | | | 19 | | | | |
| | | | | 20 | | | | |

Remarks: Backfilled with bentonite to 9.5 feet, cuttings to 1.0 feet and concrete to grade.

| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/29/90 | Boring No: |
| | Client: Shell Oil Company | | S-G |
| | Location: 999 San Pablo Avenue | | |
| | City: Albany, California | | Sheet 1 |
| | Logged by: M.J.J. | Driller: Bayland | of 1 |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------|--------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: | Datum: |
| Hole diameter: 8-Inches | | |

| PID (ppm) | Blows/ft. or Pressure (psi) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|---|
| | | | | 1 | | | | PAVEMENT SECTION - 0.5 feet |
| | | | | 2 | | | | FILL - Clay (CL) - black (5Y 2.5/1), medium stiff, damp; medium plasticity; no chemical odor. |
| | | | | 3 | | | | |
| | | | | 4 | | | | |
| 21 | 100 100 150 | S&H push | S-G-5 | 5 | | | | CLAY with SAND (CL) - dark greyish brown (2.5Y 4/2), stiff, damp; 15% medium sand; 10% silt; trace gravel; medium plasticity; no chemical odor. |
| | | | | 6 | | | | |
| | | | | 7 | | | | |
| | | | | 8 | | | | |
| 44 | 350 500 | S&H push | S-G-10 | 9 | | | | SAND with SILT (SW-SM) - very dark greyish brown (2.5Y 4/2), dense, saturated; 65% medium to coarse sand; 10% silt; moderate chemical odor. |
| | | | | 10 | | | | |
| | | | | 11 | | | | |
| | | | | 12 | | | | |
| | | | | 13 | | | | |
| | | | | 14 | | | | SILT with SAND (ML) - yellowish brown (10YR 5/8), very stiff, damp; 75% silt; 15% medium sand; 5% fine to coarse gravel; 5% clay; no chemical odor. |
| 31 | 5 12 20 | S&H | S-G-15 | 15 | | | | Bottom of boring at 15.5 feet. Bottom of sample at 15.5 feet. 01/29/90 |
| | | | | 16 | | | | |
| | | | | 17 | | | | |
| | | | | 18 | | | | |
| | | | | 19 | | | | |
| | | | | 20 | | | | |

Remarks: Backfilled with bentonite to 11.0 feet, cuttings to 1.0 feet and concrete to surface.

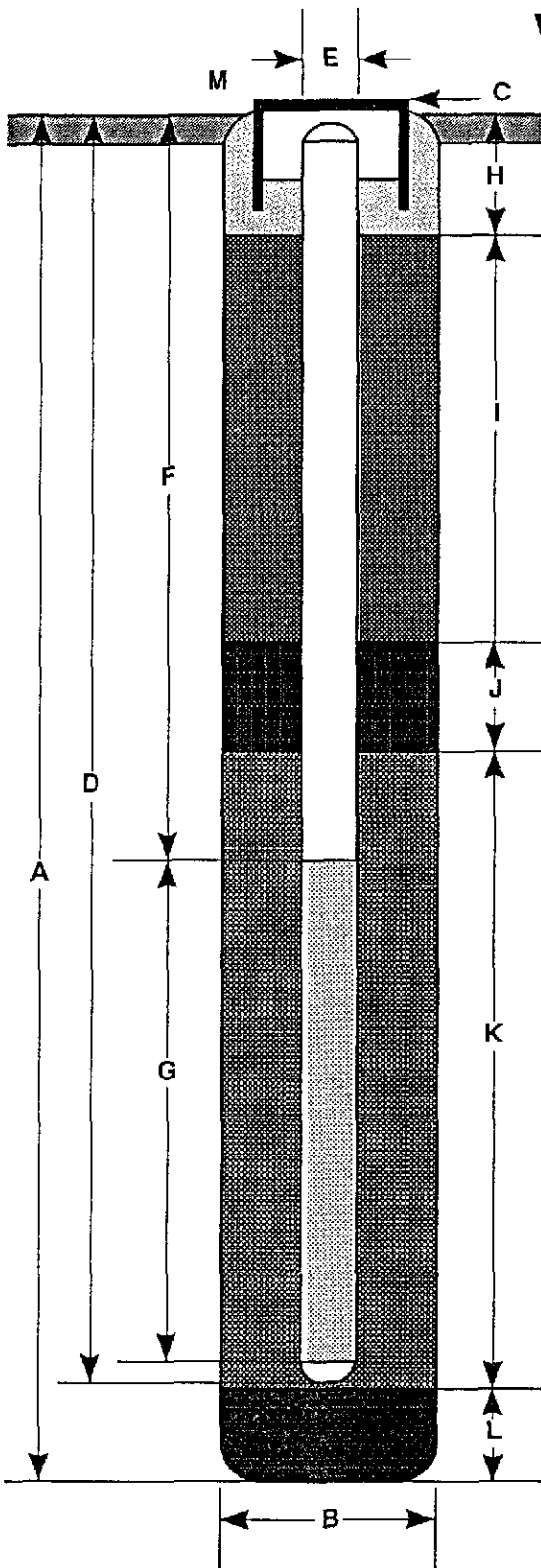
| | | | |
|--|--------------------------------|----------------|------------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/30/90 | Boring No: |
| | Client: Shell Oil Company | | S-1 |
| | Location: 999 San Pablo Avenue | | |
| | City: Albany, California | | Sheet 1 |
| | Logged by: M.J.J. | | Driller: Bayland |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------------|------------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: 41.48 | Datum: MSL |
| Hole diameter: 8-Inches | | |

| PID (ppm) | Blows/ft. or Pressure (psi) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description | |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|-------------|--|
| | | | | | | | | Water Level | |
| | | | | | | | | 9.5' | |
| | | | | | | | | 10:00 | |
| | | | | | | | | 01/30/90 | |
| | | | | 1 | | | | | PAVEMENT SECTION - 0.5 feet |
| | | | | 2 | | | | | FILL - Clay (CL) - black (5Y 2.5/1) |
| | | | | 3 | | | | | |
| | | | | 4 | | | | | |
| 1.0 | 100 | S&H | | 5 | | | | | SILTY CLAY (CL/ML) - dark greenish grey (5GY 4/1), medium stiff, damp; 70% clay; 30% silt; 10% fine sand; no chemical odor. |
| | 100 | push | S-1-5 | 6 | | | | | |
| | 200 | | | 7 | | | | | |
| | | | | 8 | | | | | |
| | | | | 9 | | | | | |
| | 100 | S&H | | 10 | | | | | SAND with GRAVEL (SP-SM) - olive (5Y 4/3), dense, saturated; 60% medium to coarse sand; 25% fine gravel; 10% silt; moderate chemical odor. |
| 91 | 150 | push | S-1-10 | 11 | | | | | Softer drilling at 11.5 feet. |
| | 350-500 | | | 12 | | | | | |
| | | | | 13 | | | | | |
| | 3 | | | 14 | | | | | SILT (ML) - yellowish brown (10YR 5/6), stiff, damp; 85% silt; 15% fine sand; trace clay; no chemical odor. |
| 0.0 | 6 | S&H | S-1-14 | 15 | | | | | Bottom of boring at 14.0 feet. |
| | 11 | | | 16 | | | | | Bottom of sample at 14.0 feet. |
| | | | | 17 | | | | | 01/30/90 |
| | | | | 18 | | | | | |
| | | | | 19 | | | | | |
| | | | | 20 | | | | | |

Remarks: OVM Readings taken 02/06/90.

WELL CONSTRUCTION DETAIL



- A Total Depth of Boring _____ 14.0 ft.
- B Diameter of Boring _____ 8 in.
Drilling Method _____ Hollow-Stem Auger
- C Top of Box Elevation _____ 41.48 ft.
 Referenced to Mean Sea Level
 Referenced to Project Datum
- D Casing Length _____ 11.5 ft.
Material _____ Schedule 40 PVC
- E Casing Diameter _____ 3.0 in.
- F Depth to Top Perforations _____ 6.0 ft.
- G Perforated Length _____ 5.0 ft.
Perforated Interval from _____ 6.0 to _____ 11.0 ft.
Perforation Type _____ Machine Slot
Perforation Size _____ 0.020 in.
- H Surface Seal from _____ 0.5 to _____ 1.0 ft.
Seal Material _____ Concrete
- I Backfill from _____ 1.0 to _____ 4.0 ft.
Backfill Material _____ Cement Grout
- J Seal from _____ 4.0 to _____ 5.0 ft.
Seal Material _____ Bentonite
- K Gravel Pack from _____ 5.0 to _____ 11.5 ft.
Pack Material _____ #2/12 Lonestar sand
- L Bottom Seal _____ 3.5 ft.
Seal Material _____ Bentonite
- M _____

Note: Depths measured from initial ground surface.



GeoStrategies Inc.

Well Construction Detail

WELL NO.

S-1

JOB NUMBER
7665

REVIEWED BY RG/CEG
CWD/CEG 12/2

DATE
3/90

REVISED DATE

REVISED DATE

| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/30/90 | Boring No: |
| | Client: Shell Oil Company | | S-2 |
| | Location: 999 San Pablo Avenue | | |
| | City: Albany, California | | Sheet 1 |
| Logged by: M.J.J. | | Driller: Bayland | of 1 |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------------|------------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: 40.73 | Datum: MSL |
| Hole diameter: 8-inches | Water Level: 9.5' | |
| | Time: 13:00 | |
| | Date: 01/30/90 | |

| PID (ppm) | Blows/ft. or Pressure (psi) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|---|
| | | | | 1 | | | | PAVEMENT SECTION - 0.5 feet |
| | | | | 2 | | | | FILL - Clay (CL) - black (5Y 2.5/1), damp, medium stiff; no chemical odor. |
| | | | | 3 | | | | FILL - Gravel with Sand (GP) - grey (10YR 5/1), moist, loose; 75% coarse gravel; 20% coarse sand; trace silt; trace clay; strong chemical odor. |
| | | | | 4 | | | | SILTY CLAY (CL-ML) - olive brown (2.5Y 4/4), damp, stiff; 70% clay; 30% silt; medium plasticity; no chemical odor. |
| 1.0 | 100 | S&H | S-2-5 | 5 | | | | |
| | 150 | | | 6 | | | | |
| | | | | 7 | | | | |
| | | | | 8 | | | | |
| | | | | 9 | | | | Driller noted change at 8.5 feet. |
| 134 | 100 | S&H | S-2-10 | 10 | | | | SAND with SILT and SAND (SP-SM) - olive grey (5Y 4/2), dense, saturated; 75% medium to coarse sand; 10% silt; strong chemical odor. |
| | 100-500 | push | | 11 | | | | (interbeds of Silty Clay - 5 inches thick) |
| | 100-50 | | | 12 | | | | |
| | | | | 13 | | | | SILTY SAND with GRAVEL (SM) - yellowish brown (10YR 5/6), medium dense, damp; 50% medium to coarse sand; 30% silt; 20% fine sand; no chemical odor. |
| 0.0 | 10 | S&H | S-2-15 | 14 | | | | |
| | 12 | | | 15 | | | | SILT (ML) - yellowish brown (10YR 5/6), stiff, damp; 85% silt; 15% fine sand; trace clay; no chemical odor. |
| | 15 | | | 16 | | | | |
| | | | | 17 | | | | Bottom of boring at 15.0 feet. |
| | | | | 18 | | | | Bottom of sample at 15.0 feet. |
| | | | | 19 | | | | 01/30/90 |
| | | | | 20 | | | | |

Remarks: Backfilled with bentonite to 11.5 feet.
OVM Readings taken 02/06/90.

| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/30/90 | Boring No: |
| | Client: Shell Oil Company | | S-3 |
| | Location: 999 San Pablo Avenue | | |
| | City: Albany, California | | Sheet 1 |
| | Logged by: M.J.J. | Driller: Bayland | of 2 |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------------|------------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: 42.72 | Datum: MSL |
| Hole diameter: 8-Inches | | |

| PID (ppm) | Blows/ft. or Pressure (psf) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|--|
| | | | | 0 | | | | |
| | | | | 1 | | | | TOPSOIL - Peat and Clay |
| | | | | 2 | | | | |
| | | | | 3 | | | | FILL - Silty Clay (CL-ML) - black (5Y 2.5/1), medium stiff, damp; 90% rust stained pockets (0.25 inch diameter); no chemical odor. |
| | | | | 4 | | | | |
| | | | | 5 | | | | SILTY CLAY (CL-ML) - olive grey (5Y 4/2), soft, damp; 15% clay; 35% silt; medium plasticity; no chemical odor. COLOR CHANGE to olive (5Y 4/3) at 5.0 feet. |
| | 100 | S&H | S-3- | 6 | | | | |
| 2.0 | 150 | push | 6.5 | 7 | | | | |
| | 300 | S&H | | 7 | | | | |
| 2.0 | 150 | push | | 8 | | | | SAND with SILT (SW-SM) olive (5Y 4/4), dense, moist; 65% fine to coarse sand; 25% silt; 10% fine gravel; 10% silt; weak chemical odor. increasing gravel at 8.0 feet; saturated. |
| | 500 | | S-3-8 | 8 | | | | |
| | | | | 9 | | | | |
| | 100 | | | 10 | | | | moderate chemical odor. |
| 38 | 150 | | S-3- | 10 | | | | |
| | 450 | S&H | 10.5 | 11 | | | | |
| | 10 | | | 11 | | | | |
| | 12 | | | 12 | | | | SILTY SAND with GRAVEL (SM) - yellowish brown (10YR 5/8), very stiff, damp; 50% medium to coarse sand; 30% silt; 20% fine to coarse gravel; 5% clay; moderate to weak chemical odor. |
| 0.0 | 19 | | S-3-12 | 12 | | | | |
| | | | | 13 | | | | |
| | | | | 14 | | | | |
| | 10 | | | 15 | | | | decreasing gravel at 15.0 feet. |
| 0.0 | 17 | S&H | S-3- | 15 | | | | |
| | 28 | | 15.5 | 16 | | | | |
| | | | | 17 | | | | |
| | | | | 18 | | | | Softer at 18.0 feet. |

Remarks: OVM Readings taken on 02/06/90.

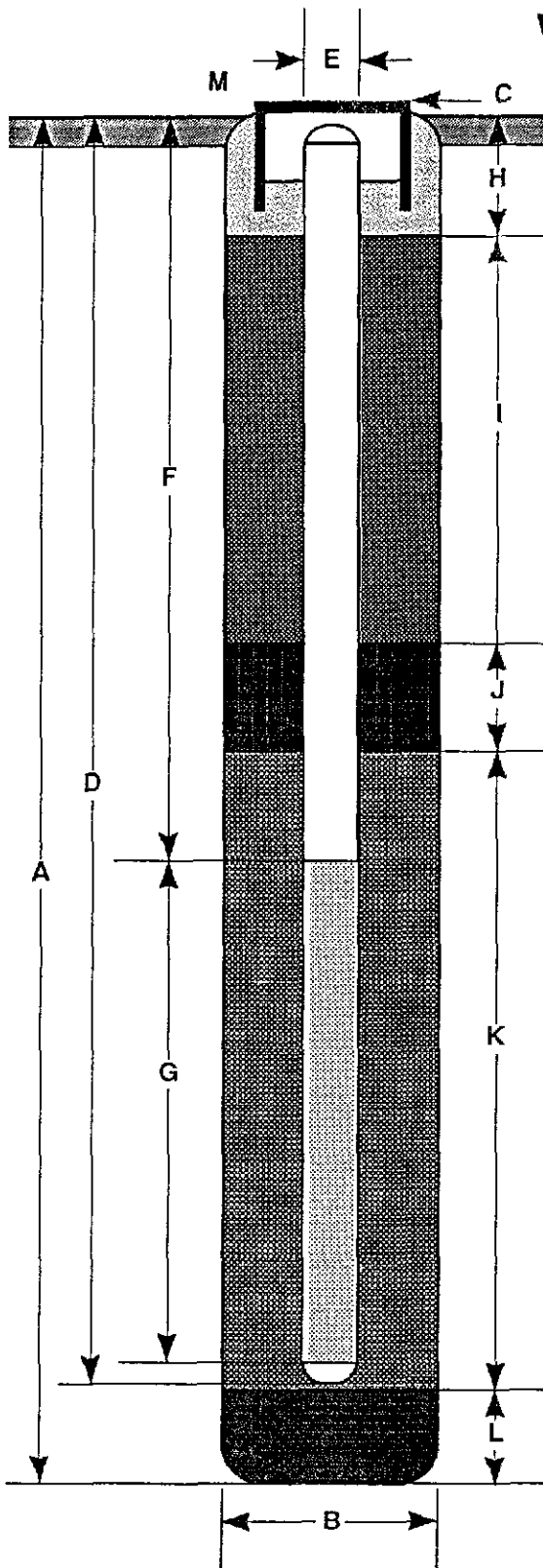
| | | | |
|--|--------------------------------|------------------|------------|
| Field location of boring: (See Plate 2) | Project No.: 7666 | Date: 01/30/90 | Boring No: |
| | Client: Shell Oil Company | | S-3 |
| | Location: 999 San Pablo Avenue | | Sheet 2 |
| | City: Albany, California | | of 2 |
| | Logged by: M.J.J. | Driller: Bayland | |
| Casing installation data: | | | |

| | | |
|------------------------------------|-----------------------|--------|
| Drilling method: Hollow-Stem Auger | Top of Box Elevation: | Datum: |
| Hole diameter: 8-Inches | | |

| PID (ppm) | Blows/ft. or Pressure (psf) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Water Level | | | | Description |
|-----------|-----------------------------|----------------|---------------|-------------|--------|-------------|--------------------------|-------------|--|--|--|--------------------------------|
| | | | | | | | | Time | | | | |
| | 8 | S&H | S-3- | | | | | | | | | |
| 0.0 | 12 | | 19.5 | 19 | | | | | | | | no chemical odor. |
| | 26 | | | 20 | | | | | | | | Bottom of boring at 20.5 feet. |
| | | | | 21 | | | | | | | | Bottom of sample at 20.5 feet. |
| | | | | 22 | | | | | | | | 01/30/90 |
| | | | | 23 | | | | | | | | |
| | | | | 24 | | | | | | | | |
| | | | | 25 | | | | | | | | |
| | | | | 26 | | | | | | | | |
| | | | | 27 | | | | | | | | |
| | | | | 28 | | | | | | | | |
| | | | | 29 | | | | | | | | |
| | | | | 30 | | | | | | | | |
| | | | | 31 | | | | | | | | |
| | | | | 32 | | | | | | | | |
| | | | | 33 | | | | | | | | |
| | | | | 34 | | | | | | | | |
| | | | | 35 | | | | | | | | |
| | | | | 36 | | | | | | | | |
| | | | | 37 | | | | | | | | |
| | | | | 38 | | | | | | | | |

Remarks:

WELL CONSTRUCTION DETAIL



- A Total Depth of Boring _____ 20.5 ft.
- B Diameter of Boring _____ 8 in.
Drilling Method _____ Hollow-Stem Auger
- C Top of Box Elevation _____ 42.72 ft.
 Referenced to Mean Sea Level
 Referenced to Project Datum
- D Casing Length _____ 12.0 ft.
Material _____ Schedule 40 PVC
- E Casing Diameter _____ 3.0 in.
- F Depth to Top Perforations _____ 6.0 ft.
- G Perforated Length _____ 5.5 ft.
Perforated Interval from _____ 6.0 to _____ 11.5 ft.
Perforation Type _____ Machine Slot
Perforation Size _____ 0.020 in.
- H Surface Seal from _____ 0.5 to _____ 1.0 ft.
Seal Material _____ concrete
- I Backfill from _____ 1.0 to _____ 4.0 ft.
Backfill Material _____ Cement Grout
- J Seal from _____ 4.0 to _____ 5.0 ft.
Seal Material _____ Bentonite
- K Gravel Pack from _____ 5.0 to _____ 12.0 ft.
Pack Material _____ #2/12 Lonestar sand
- L Bottom Seal _____ 8.5 ft.
Seal Material _____ Bentonite
- M _____

Note: Depths measured from initial ground surface.



GeoStrategies Inc.

Well Construction Detail

WELL NO.

S-3

JOB NUMBER
7666

REVIEWED BY RG/CEG
UMP CEG 10/2

DATE
3/90

REVISED DATE

REVISED DATE

CERTIFICATE OF ANALYSIS

Gettler-Ryan
2150 West Winton
Hayward, CA 94545
ATTN: John Werfal

Date: February 21, 1990

Work Order Number: T0-01-272

P.

This is the Certificate of Analysis for the following samples:

Client Project ID: GR #7666, Shell, 999 San Pablo Ave.,
Albany, CA
Date Received by Lab: 1/31/90
Number of Samples: 19
Sample Type: Soil

The method of analysis for low boiling hydrocarbons is taken from EPA Methods 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector as well as a photoionization detector. The result for total low boiling hydrocarbons is calculated as gasoline and includes benzene, toluene, ethyl benzene and xylenes.

Reviewed and Approved



Michael E. Dean
Project Manager

MED/an
3 Pages Following - Tables of Results

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Date: February 21, 1990

Client Project ID: GR #7666, Shell, 999 San Pablo Ave., Albany, CA

Work Order Number: TO-01-272

IT ANALYTICAL SERVICES
SAN JOSE, CA

| Lab Sample ID | Client Sample ID | Sample Date | Extraction Date | Date Analysis Completed | Sample Condition on Receipt |
|------------------|---------------------|----------------|--------------------|-------------------------------|-----------------------------------|
| TO-01-272-01 | S-A-5' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-02 | S-A-10' | 1/29/90 | 2/6/90 | 2/9/90 | cool |
| TO-01-272-03 | S-B-5' | 1/29/90 | 2/6/90 | 2/9/90 | cool |
| TO-01-272-04 | S-B-15' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-05 | S-C-5' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-06 | S-C-10' | 1/29/90 | 2/6/90 | 2/8/90 | cool |

Total Petroleum Hydrocarbons - Modified E.P.A. Methods 8015, 8020

ND = None Detected

Results - Milligrams per Kilogram

| Lab Sample ID | Client Sample ID | Low Boiling Hydrocarbons (calculated as Gasoline) | Benzene | Toluene | Ethyl Benzene | Xylenes (total) |
|------------------|---------------------|--|---------|---------|------------------|--------------------|
| TO-01-272-01 | S-A-5' | 13. | 0.26 | ND | 0.46 | 0.91 |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-02 | S-A-10' | 1,900. | 9.8 | 10. | 41. | 250. |
| Detection Limit | | 96. | 1. | 1. | 1. | 2. |
| TO-01-272-03 | S-B-5' | 5.6 | ND | ND | 0.028 | 0.09 |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-04 | S-B-15' | ND | ND | ND | ND | 0.09 |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-05 | S-C-5' | 48. | ND | ND | 0.27 | 0.7 |
| Detection Limit | | 20. | 0.2 | 0.2 | 0.2 | 0.4 |
| TO-01-272-06 | S-C-10' | 470. | ND | 1. | 8. | 28. |
| Detection Limit | | 100. | 1. | 1. | 1. | 2. |

Date: February 21, 1990

Client Project ID: GR #7666, Shell, 999 San Pablo Ave., Albany, CA

Work Order Number: TO-01-272

IT ANALYTICAL SERVICES
SAN JOSE, CA

| Lab Sample ID | Client Sample ID | Sample Date | Extraction Date | Date Analysis Completed | Sample Condition on Receipt |
|------------------|---------------------|----------------|--------------------|-------------------------------|-----------------------------------|
| TO-01-272-07 | S-D-15' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-08 | S-E-5' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-09 | S-E-10' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-10 | S-F-5' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-11 | S-F-10' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-12 | S-G-10' | 1/29/90 | 2/6/90 | 2/8/90 | cool |

Total Petroleum Hydrocarbons - Modified E.P.A. Methods 8015, 8020

ND = None Detected

Results - Milligrams per Kilogram

| Lab Sample ID | Client Sample ID | Low Boiling Hydrocarbons (calculated as Gasoline) | Benzene | Toluene | Ethyl Benzene | Xylenes (total) |
|------------------|---------------------|--|---------|---------|------------------|--------------------|
| TO-01-272-07 | S-D-15' | 94. | 0.63 | 0.31 | 2.5 | 1.4 |
| Detection Limit | | 8.3 | 0.08 | 0.08 | 0.08 | 0.2 |
| TO-01-272-08 | S-E-5' | 21. | 0.38 | 0.036 | 0.40 | 0.44 |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-09 | S-E-10' | ND | ND | ND | 0.026 | 0.06 |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-10 | S-F-5' | ND | ND | ND | ND | ND |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-11 | S-F-10' | 120. | 0.44 | 0.10 | ND | 0.8 |
| Detection Limit | | 7.6 | 0.08 | 0.08 | 0.08 | 0.2 |
| TO-01-272-12 | S-G-10' | 6.5 | 0.032 | ND | ND | 0.07 |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |

Date: February 21, 1990

Client Project ID: GR #7666, Shell, 999 San Pablo Ave., Albany, CA

Work Order Number: TO-01-272

IT ANALYTICAL SERVICES
SAN JOSE, CA

| Lab Sample ID | Client Sample ID | Sample Date | Extraction Date | Date Analysis Completed | Sample Condition on Receipt |
|---------------|------------------|-------------|-----------------|-------------------------|-----------------------------|
| TO-01-272-13 | S-G-15' | 1/29/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-14 | S-3-10' | 1/30/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-15 | S-3-15' | 1/30/90 | 2/6/90 | 2/8/90 | cool |
| TO-01-272-16 | S-1-10' | 1/30/90 | 2/6/90 | 2/9/90 | cool |
| TO-01-272-17 | S-1-14' | 1/30/90 | 2/6/90 | 2/9/90 | cool |
| TO-01-272-18 | S-2-5' | 1/30/90 | 2/6/90 | 2/9/90 | cool |
| TO-01-272-19 | S-2-10' | 1/30/90 | 2/6/90 | 2/9/90 | cool |

Total Petroleum Hydrocarbons - Modified E.P.A. Methods 8015, 8020

ND = None Detected

Results - Milligrams per Kilogram

| Lab Sample ID | Client Sample ID | Low Boiling Hydrocarbons (calculated as Gasoline) | Benzene | Toluene | Ethyl Benzene | Xylenes (total) |
|-----------------|------------------|---|---------|---------|---------------|-----------------|
| TO-01-272-13 | S-G-15' | ND | ND | ND | ND | ND |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-14 | S-3-10' | 18. | ND | ND | ND | 0.11 |
| Detection Limit | | 2.5 | 0.03 | 0.025 | 0.025 | 0.05 |
| TO-01-272-15 | S-3-15' | ND | ND | ND | ND | ND |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-16 | S-1-10' | 6.2 | ND | ND | 0.096 | 0.32 |
| Detection Limit | | 2.5 | 0.06 | 0.025 | 0.025 | 0.05 |
| TO-01-272-17 | S-1-14' | ND | ND | ND | ND | ND |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-18 | S-2-5' | ND | ND | ND | ND | ND |
| Detection Limit | | 2.5 | 0.025 | 0.025 | 0.025 | 0.05 |
| TO-01-272-19 | S-2-10' | 250. | 2.5 | 0.8 | 6.5 | 8.6 |
| Detection Limit | | 39. | 0.4 | 0.4 | 0.4 | 0.8 |

Gettler - Ryan Inc.

ENVIRONMENTAL DIVISION

1353 Chain of Custody

COMPANY Shell

JOB NO. 7666

JOB LOCATION 999 San Pablo Ave

CITY Albany

PHONE NO. _____

AUTHORIZED Stan Koller / John Werpa DATE 1-30-90

P.O. NO. 7666

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|-----------|-------------------|---------------|-------------------|-------------------|-------------------------|
| S-A-5' | 1 | Soil | 1-29-90 | Gas, BTEX | 014/COOL |
| S-A-10' | | | | | |
| S-B-5' | | | | | |
| S-B-15' | | | | | |
| S-C-5' | | | | | |
| S-C-10' | | | | | |
| S-D-15' | | | | | |
| S-E-5' | | | | | |
| S-E-10' | | | | | |
| S-F-5' | | | | | |
| S-F-10' | | | | | |
| S-G-10' | | | | | |
| S-G-15' | | | | | |

RELINQUISHED BY:

Matt Zawick

RECEIVED BY:

Shell 1-30-90 07:00

RELINQUISHED BY:

Shell 1-31-90 10:00

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY LAB:

Matt Zawick / John Werpa 1-31-90 1005

DESIGNATED LABORATORY: IT San Jose

DHS #:

IT/SCY

REMARKS:

Normal TAT 2 Weeks

DATE COMPLETED

FOREMAN

Matt

Gettler - Ryan Inc.

ENVIRONMENTAL DIVISION

1347 Chain of Custody

COMPANY

Shell

JOB NO.

7666

JOB LOCATION

009 San Pablo Ave

CITY

Albany / Diane Lundquist @ Shell

PHONE NO.

AUTHORIZED

~~Diane Lundquist~~ John Werka

DATE

1-30-90

P.O. NO.

7666

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|-----------|-------------------|---------------|-------------------|-------------------|-------------------------|
| S-3-10' | 1 | Soil | 1-30-90 | GOS, BTEX | OK/cool |
| S-3-15' | | | | | |
| S-1-10' | | | | | |
| S-1-14' | | | | | |
| S-2-5' | | | | | |
| S-2-10' | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

RELINQUISHED BY:

Matzenwald U

RECEIVED BY:

Flah 1/31/90 07:30

RELINQUISHED BY:

Flah 1/30/90 1000

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY LAB:

Matzenwald / M. Martin 1-31-90 1005

DESIGNATED LABORATORY:

IT Sam Jose

DHS #:

REMARKS:

Normal TAT (2 weeks)

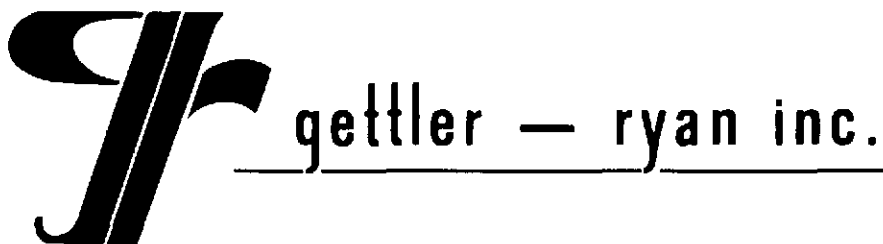
DATE COMPLETED

FOREMAN

[Signature]

GeoStrategies Inc.

**APPENDIX D
GROUND-WATER SAMPLING REPORTS**



February 28, 1990

GROUNDWATER SAMPLING REPORT

Referenced Site: Shell Service Station
999 San Pablo Ave/Marin Ave
Albany, California

Sampling Date: February 5, 1990

This report presents the results of the quarterly groundwater sampling and analytical program conducted by Gettler-Ryan Inc. on February 5, 1990 at the referenced location. The site is occupied by an operating service station located on the northeast corner of San Pablo Avenue and Marin Avenue. The service station has underground storage tanks which contain leaded, unleaded and super unleaded gasoline products.

There are currently three groundwater monitoring wells on site at the locations shown on the attached site map. Recently installed wells S-1, S-2, and S-3 were monitored, developed, and sampled during this event. Product thicknesses and depth readings were monitored by using an electronic interface probe. A clean acrylic bailer was used to visually confirm or detect the presence and thickness of separate phase product. Groundwater depths ranged from 7.62 to 8.07 feet below grade. Separate phase product was 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. 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.

The samples were analyzed at International Technology Corporation - Santa Clara Valley Laboratory located at 2055 Junction Avenue, San Jose, California. The laboratory is assigned a California DHS-HMTL Certification number of 137. The results are presented as a Certified Analytical Report, a copy of which is attached to this report.



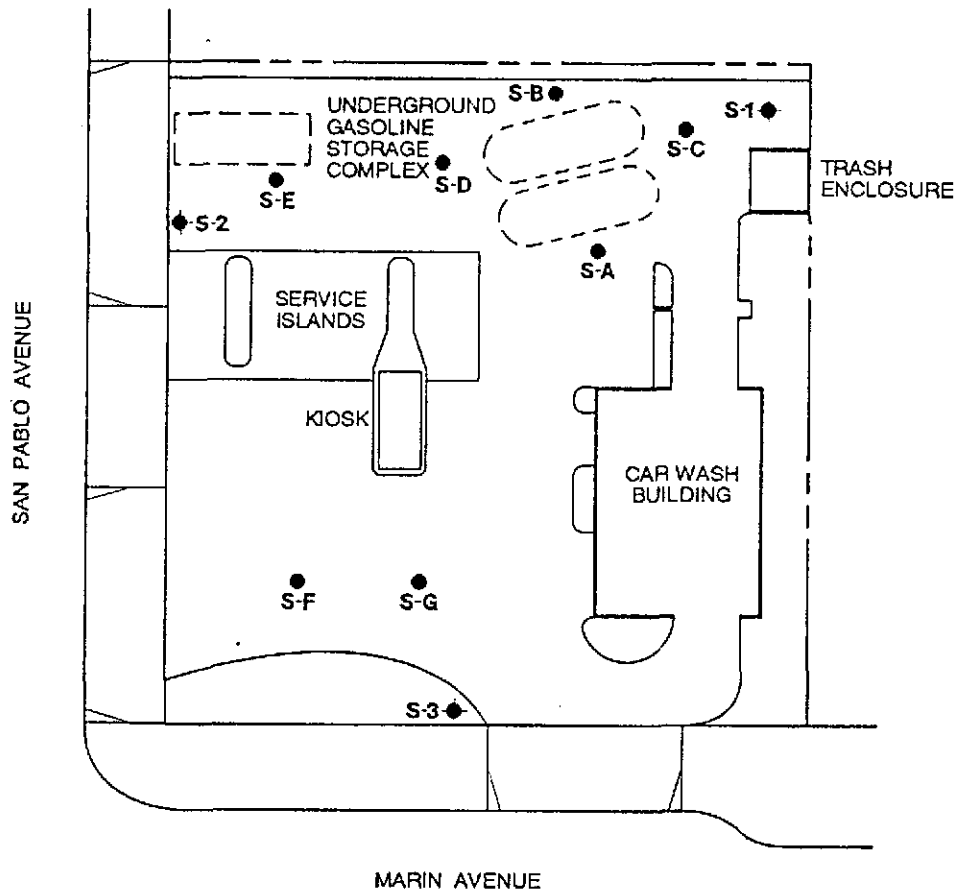
Tom Paulson
Sampling Manager

attachments

TABLE OF MONITORING DATA
GROUNDWATER WELL SAMPLING REPORT

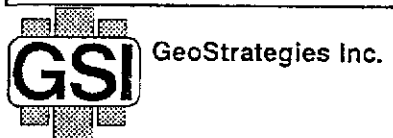
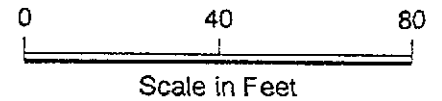
| WELL I.D. | S-1 | S-2 | S-3 |
|-------------------------------|--------|--------|--------|
| Casing Diameter (inches) | 3 | 3 | 3 |
| Total Well Depth (feet) | 11.2 | 12.1 | 11.8 |
| Depth to Water (feet) | 7.62 | 8.07 | 7.74 |
| Free Product (feet) | none | none | none |
| Reason Not Sampled | ---- | ---- | ---- |
| Calculated 4 Case Vol. (gal.) | 5.4 | 6.1 | 6.2 |
| Did Well Dewater? | no | yes | yes |
| Volume Evacuated (gal.) | 17 | 3 | 3 |
| Purging Device | Bailer | Bailer | Bailer |
| Sampling Device | Bailer | Bailer | Bailer |
| Time | 10:20 | 10:33 | 10:43 |
| Temperature (F) * | 61.7 | 60.5 | 60.3 |
| pH* | 6.66 | 6.74 | 6.85 |
| Conductivity (umhos/cm) * | 935 | 1522 | 1155 |

* Indicates Stabilized Value



EXPLANATION

- ◆ S-1 Ground-water monitoring well location
- S-A Soil boring location



Site Plan
 Shell Service Station
 999 San Pablo Avenue
 Albany, California

PLATE



INTERNATIONAL
TECHNOLOGY
CORPORATION

ANALYTICAL SERVICES

RECEIVED

CERTIFICATE OF ANALYSIS

Gettler-Ryan
2150 West Winton
Hayward, CA 94545
ATTN: Tom Paulson

Date: February 26, 1990

Work Order Number: T0-02-043


P.O. Number: MOH 890501A

This is the Certificate of Analysis for the following samples:

Client Project ID: GR #3666, Shell, 999 San Pablo Ave. Albany, CA
Date Received by Lab: 02/05/90
Number of Samples: 4
Sample Type: Water

The method of analysis for low boiling hydrocarbons is taken from EPA Methods 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector as well as a photoionization detector. The result for total low boiling hydrocarbons is calculated as gasoline and includes benzene, toluene, ethyl benzene and xylenes.

Reviewed and Approved


Michael E. Dean
Project Manager

MED/tw
1 Page Following - Table of Results

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Date: February 26, 1990

Client Project ID: GR #3666, Shell, 999 San Pablo Ave. Albany, CA

Work Order Number: TO-02-043

IT ANALYTICAL SERVICES
SAN JOSE, CA

| Lab Sample ID | Client Sample ID | Sample Date | Date Analysis Completed | Sample Condition on Receipt |
|------------------|---------------------|-------------|-------------------------------|-----------------------------------|
| TO-02-043-01 | S-1 | 02/05/90 | 02/10/90 | Cool, pH<2 |
| TO-02-043-02 | S-2 | 02/05/90 | 02/10/90 | Cool, pH<2 |
| TO-02-043-03 | S-3 | 02/05/90 | 02/15/90 | Cool, pH<2 |
| TO-02-043-04 | Trip Blank | ---- | 02/13/90 | Cool, pH<2 |

Total Petroleum Hydrocarbons - Modified E.P.A. Methods 8015, 8020

ND = None Detected

Results - Milligrams per Liter

| Lab Sample ID | Client Sample ID | Low Boiling Hydrocarbons (calculated as Gasoline) | Benzene | Toluene | Ethyl Benzene | Xylenes (total) |
|------------------|---------------------|--|---------|---------|------------------|--------------------|
| TO-02-043-01 | S-1 | 3.1 | 0.056 | 0.037 | 0.11 | 0.097 |
| Detection Limit | | 0.050 | 0.0005 | 0.0005 | 0.0005 | 0.001 |
| TO-02-043-02 | S-2 | 8.7 | 1.6 | 0.058 | 0.16 | 1.0 |
| Detection Limit | | 0.25 | 0.002 | 0.002 | 0.002 | 0.005 |
| TO-02-043-03 | S-3 | 5.7 | 0.045 | 0.004 | 0.12 | 0.50 |
| Detection Limit | | 0.25 | 0.002 | 0.002 | 0.002 | 0.005 |
| TO-02-043-04 | Trip Blank | ND | ND | ND | ND | ND |
| Detection Limit | | 0.050 | 0.0005 | 0.0005 | 0.0005 | 0.001 |

COMPANY Shell Oil Co. ENVIRONMENTAL DIVISION JOB NO.

JOB LOCATION 999 San Pablo Ave.

CITY Albany, CA PHONE NO. 783-7500

AUTHORIZED John Werfal DATE 1-5-90 P.O. NO. 3666

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|------------|-------------------|---------------|-------------------|-------------------|-------------------------|
| S-1 | 3 | liquid | 1/5/90 10:21 | THC (gas) BTXE | |
| S-2 | 3 | ↓ | 10:33 | ↓ | |
| S-3 | 3 | ↓ | 10:43 | ↓ | |
| Trip blank | 2 | ↓ | 1-5-90 | ↓ | |

WIC 204-0079-0109
 AFE Not assigned.
 EXP 544U
 ENG Diane Lundquist

Samples were collected
 2/5/90 not
 1/5/90 phoned lab
 2/22/90

RELINQUISHED BY: *John P. Zwerg* 1-5-90 14:10
 RECEIVED BY:

RELINQUISHED BY:
 RECEIVED BY:
 RECEIVED BY LAB: *John P. Zwerg* 2590 1410

DESIGNATED LABORATORY: IT (sc.u) DHS #: 137

REMARKS:

Normal 2 wk TAT
 lab data due 2/19/90 - phoned Lab 2/7/90

DATE COMPLETED 1-5-90 FOREMAN *John P. Zwerg*