Shell Oil Company

EAST BAY MARKETING DISTRICT

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

March 7, 1990

Mr. Rick Mueller
City of Pleasanton
Pleasanton Fire Department
Post Office Box 520
Pleasanton, California 94566-0802

SUBJECT: SHELL SERVICE STATION
3790 HOPYARD ROAD
PLEASANTON, CALIFORNIA

Dear Mr. Mueller:

Enclosed is a copy of the Quarterly Report, dated March 1, 1990, which documents the groundwater sampling and site activities conducted between October-December 1989 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,

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.

QUARTERLY REPORT

OCTOBER - DECEMBER 1989

Shell Service Station
3790 Hopyard Road
Pleasanton, California

Report No. 7632-4

March 1, 1990

GeoStrategies Inc.
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545
(415) 352-4800

March 1, 1990

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

Attn: Mr. John Werfal

Re: QUARTERLY REPORT
Shell Service Station
3790 Hopyard Road
Pleasanton, California

Gentlemen:

This quarterly report has been prepared for the above referenced site, for the October through December, 1989 quarter.

If you have any questions, please call.

GeoStrategies Inc. by,

Matthew J. Janowiak
Geologist

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

REGISTERED GEOLOGIST
CHRISTOPHER M. PALMER
№ 1262
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

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

MJJ/JLP/mlg

Report No. 7632-4

1.0 INTRODUCTION

This Quarterly Report has been prepared by GeoStrategies Inc. (GSI) for the Shell Service Station located at 3790 Hopyard Road in Pleasanton, California (Plate 1).

This report describes the results of the fourth quarterly groundwater sampling for 1989 performed by Gettler-Ryan Inc. (G-R), on December 14 and 15, 1989, in accordance with the quarterly sampling plan for the site. Field work and laboratory analytical methods were performed in compliance with current State of California Water Resources Control Board (SWRCB) procedures for conducting environmental investigations related to leaking underground fuel tanks. The field and chemical analytical data discussed in this report were collected between October 1 and December 31, 1989.

2.0 SITE HISTORY

EMCON Associates (EMCON) drilled five borings (S-A through S-E) in tank backfill prior to tank removal. Laboratory analysis of soil samples ranged from None Detected (ND) to 5,100 parts per million (ppm) for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline). A temporary monitoring well was installed in boring S-C. The results are summarized in the EMCON report dated March 21, 1986.

Pacific Environmental Group (PACIFIC) installed two monitoring wells (S-1 and S-2) and two tank complex monitoring wells (ST-1 and ST-2), satisfying the requirements of a letter from the City of Pleasanton Fire Department, dated October 15, 1987, requiring an aspirated vapor monitoring system. The results of the investigation are summarized in the PACIFIC report dated December 4, 1987.

PACIFIC installed three additional ground-water monitoring wells (S-3, S-4, and S-5) to further define the extent of contamination. A report dated March 10, 1988, documents a half-mile radius well survey and groundwater analysis ranging from not detected (ND) to 5.1 ppm for TPH-Gasoline. PACIFIC states that the nearby Arroyo Mocho Canal most likely acts as a hydraulic barrier between the site and a nearby municipal well.

Woodward-Clyde Consultants (WCC) conducted a soil investigation prior to the underground storage tank (UGST) replacement. The findings of the investigation are summarized in the WCC report dated April 22, 1988.

The UGST and the piping were replaced, S-1 was destroyed, and contaminated soils removed in August 1988.

WCC installed two additional ground-water monitoring wells (S-6 and S-7) to further define the extent of contamination. Groundwater analysis ranged from ND to 1.1 ppm for TPH-Gasoline. The report agrees with PACIFIC in regard to the Arroyo Mocho Canal acting as a hydraulic barrier. The WCC report is dated January 18, 1989.

WCC installed two additional ground-water monitoring wells (S-8 and S-9) to further define the extent of contamination. Groundwater analysis ranged from ND to 3.8 ppm for TPH-Gasoline. The results of the investigation are summarized in the WCC report dated May 11, 1989.

GSI prepared a work plan, dated July 18, 1989, proposing the installation of one monitoring well and one recovery well to be used for interim recovery. An addendum to the work plan, dated September 19, 1989, was issued proposing multiple extraction wells based on site lithology.

On December 4, 1989, GSI issued a quarterly report describing the installation of one ground-water monitoring well (Well S-10) and three ground-water recovery wells (Wells SR-1, SR-2, and SR-3).

3.0 GROUNDWATER LEVEL MONITORING

3.1 Potentiometric Data

Prior to ground-water sampling, on December 14, 1989, water levels were measured in each well using an electronic oil-water interface probe. Static water levels were measured from the surveyed top of well box and recorded to the nearest ±0.01 foot (Table 1). Plate 2 presents the location of each well at the site

Ground-water elevation data for December 14, 1989, have been contoured and plotted and are presented on Plate 3. Depth to groundwater in the uppermost water-bearing strata ranged from 12.47 to 17.49 feet below ground surface. Potentiometric data indicate that shallow groundwater beneath the site flows in a southerly direction, with an approximate hydraulic gradient of 0.01.

3.2 Floating Product Measurements

Each well was monitored for separate-phase (floating product) petroleum hydrocarbons using a portable oil-water interface probe. Floating product thicknesses were measured (if present) and recorded to the nearest ±0.01 foot. All wells were checked with a clean, clear, acrylic bailer to visually confirm interface probe results and to check for the presence of a sheen. No separate-phase petroleum hydrocarbons were detected in any of the monitoring or recovery wells during this quarter.

4.0 CHEMICAL ANALYTICAL DATA

Groundwater samples were collected by G-R on December 14 and 15, 1989. The groundwater samples were analyzed for TPH-Gasoline according to EPA Method 8015 (Modified) and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) according to EPA Method 8020. All analyses were performed by International Technology (IT) Analytical Services, a State-certified environmental laboratory located in San Jose, California.

The highest TPH-Gasoline concentration was identified in Well SR-3 at a concentration of 2.4 ppm. The highest benzene concentrations were detected in Well SR-3 at a concentration of 0.31 ppm. A total of 7 wells were found to contain aromatic fractions of petroleum hydrocarbon products above established Maximum Contaminant Levels (MCLs) set by the Regional Water Quality Control Board (RWQCB). These data are presented in Table 1. A TPH-Gasoline Isoconcentration Map (Plate 4) and a Benzene Isoconcentration Map (Plate 5) have been prepared using the quarterly analytical data.

4.1 Quality Control

Quality Control (QC) samples for the fourth quarterly groundwater sampling included a field blank and a trip blank. The field blank was prepared in the field using organic-free water, provided by IT Analytical Services, to evaluate field sampling procedures and ambient site conditions. The trip blank was prepared by IT Analytical Services using organic-free water to evaluate field and laboratory handling procedures. QC procedures during field sampling are summarized in the G-R Sampling Protocol in Appendix A. The G-R Groundwater Sampling Report, Chain-of-Custody form, and the IT Laboratory certified analytical report for this quarter are presented in Appendix B.

5.0 SUMMARY

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

- Water levels were measured in selected wells on December 14, 1989, and indicate that groundwater flows in a southerly direction. The calculated hydraulic gradient is 0.01.
- No separate-phase product was detected in any of the wells.
- TPH-Gasoline concentrations in ground-water samples ranged from ND in Wells S-3, S-7, S-8, S-9, and S-10 to 2.4 ppm in Well SR-3.
- Benzene concentrations in groundwater ranged from ND in Wells S-3, S-7, S-8, and S-10 to 0.31 ppm in Well SR-3. Wells SR-1, SR-2, SR-3, S-2, S-4, S-5 and S-6 contained benzene concentrations in excess of current RWQCB MCLs.

6.0 PLANNED SITE ACTIVITIES

The following activities are planned for the first quarter of 1990.

- All scheduled wells will be sampled and analyzed for TPH-Gasoline according to EPA Method 8015 (Modified) and BTEX according to EPA Method 8020.
- Water levels will be measured monthly and selected data will be used to prepare a potentiometric map across the site. The shallow ground-water gradient will be calculated.
- Chemical data will be used to construct isoconcentration maps for TPH-Gasoline and benzene.
- Aquifer testing will be performed to evaluate aquifer characteristics.

References Cited

EMCON Associates, 1986, letter report describing the drilling of soil borings S-A through S-E: Project No. 800-02.01, dated March 21, 1986.

Pacific Environmental Group, Inc., 1987, letter report describing the installation of monitoring wells S-1 and S-2, and tank complex monitoring well ST-1 and ST-2: Project No. 101-08.01, dated December 4, 1987.

Pacific Environmental Group, Inc., 1988, letter report describing the installation of monitoring wells S-3, S-4, and S-5: Project No.101-08.02, dated March 10, 1988.

Woodward-Clyde Consultants, 1988, Memorandum describing a preliminary soil investigation: Project No. 8820011A, dated April 22, 1988

Woodward-Clyde Consultants, 1989, Environmental Assessment Report (Wells S-6 and S-7 installed): Project No. 8820011A-0066, dated January 18, 1989.

Woodward-Clyde Consultants, 1989, Phase II Environmental Assessment (Wells S-8 and S-9 installed): Project No. 8820011A-0118, dated May 11, 1989.

GeoStrategies Inc., 1989, Work Plan: Report No. 7632-1, dated July 18, 1989.

GeoStrategies Inc., 1989, Work Plan Addendum: Report No. 7632-2, dated September 19, 1989.

GeoStrategies Inc., 1989, Quarterly Report describing the results of ground-water sampling and installation of Wells S-10, SR-1, SR-2, and SR-3: Report No. 7632-3

TABLE 1

GROUND-WATER ANALYSIS DATA

WELL #	SAMPLE DATE	ANALYZED 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-2	14-Dec-89	20-Dec-89	0.16	0.056	0.0005	0.021	0.003	329.21	314.75	----	14.46
S-3	14-Dec-89	19-Dec-89	<0.05	<0.0005	<0.0005	<0.0005	<0.001	327.67	315.20	----	12.47
S-4	14-Dec-89	19-Dec-89	0.21	0.021	<0.0005	0.030	0.023	328.53	314.67	----	13.86
S-5	14-Dec-89	20-Dec-89	1.7	0.30	0.086	0.067	0.14	329.66	313.35	----	16.31
S-6	15-Dec-89	20-Dec-89	0.32	0.0010	<0.0005	0.0026	<0.001	327.62	313.12	----	14.50
S-7	15-Dec-89	20-Dec-89	<0.05	<0.0005	<0.0005	<0.0005	<0.001	328.67	311.80	----	16.87
S-8	14-Dec-89	20-Dec-89	<0.05	<0.0005	<0.0005	<0.0005	<0.001	327.00	312.40	----	14.60
S-9	15-Dec-89	20-Dec-89	<0.05	0.0005	<0.0005	<0.0005	<0.001	328.24	310.75	----	17.49
S-10	15-Dec-89	20-Dec-89	<0.05	<0.0005	<0.0005	<0.0005	<0.001	326.55	312.55	----	14.00

CURRENT REGIONAL WATER QUALITY CONTROL BOARD MAXIMUM CONTAMINANT LEVELS

Benzene 0.001 ppm Xylenes 1.750 ppm Ethylbenzene 0.68 ppm

CURRENT DHS ACTION LEVELS

Toluene 0.100 ppm

TPH = Total Petroleum Hydrocarbons as Gasoline
PPM = Parts Per Million SF = Field Blank
SR = Recovery Well TB = Trip Blank

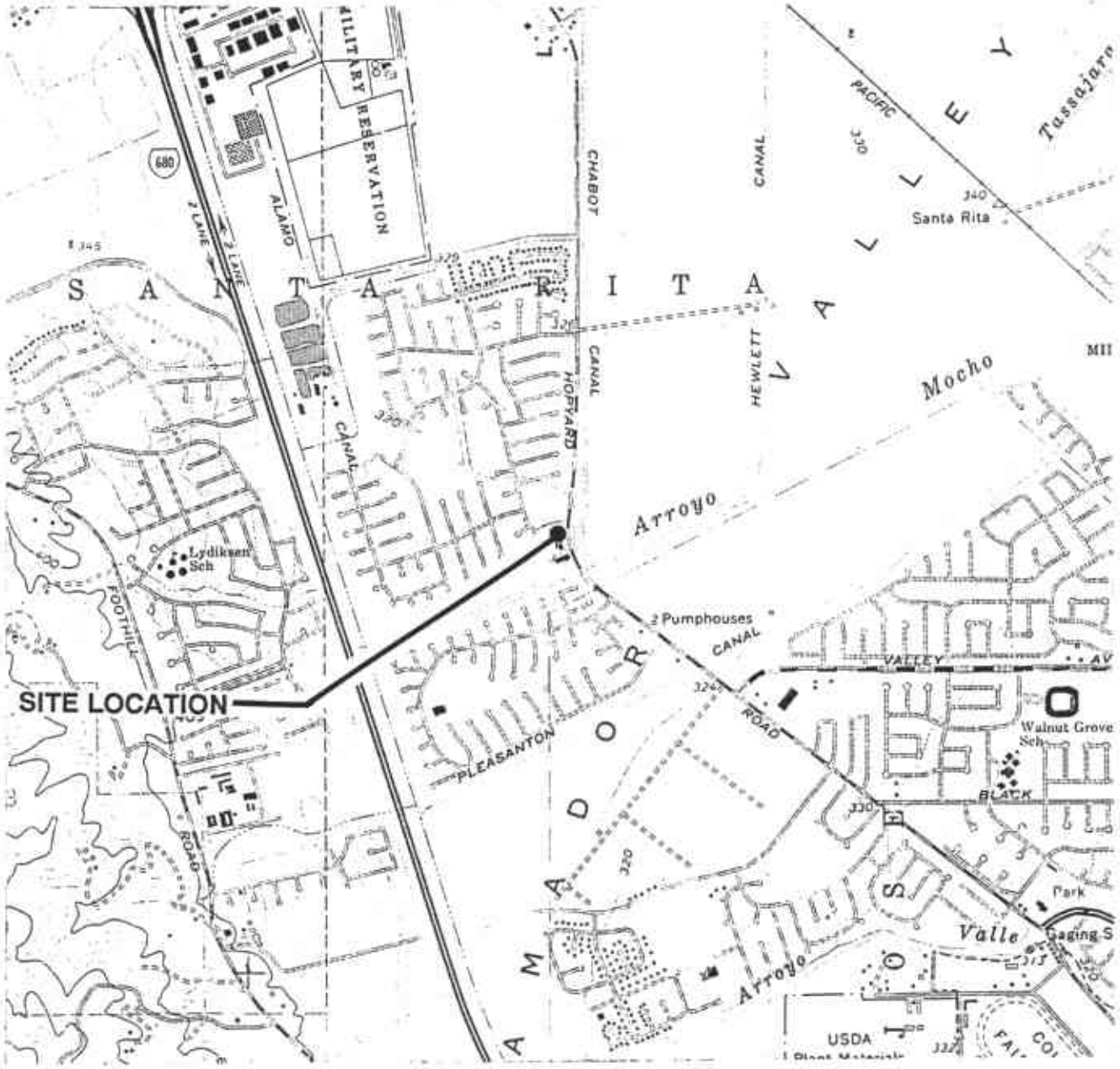
Note: 1. For chemical parameter detection limits, refer to I.T. Laboratory reports
2. Water Level elevations referenced to mean sea level (MSL)
3. DHS Action Levels and MCL are subject to change pending State review
4. All data shown as <x is reported as ND (none detected)

Project No. 7632-4

TABLE 1

GROUND-WATER ANALYSIS DATA

WELL #	SAMPLE DATE	ANALYZED 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)
SR-1	14-Dec-89	20-Dec-89	0.50	0.21	<0.0005	0.016	0.016	329.78	313.60	----	16.18
SR-2	14-Dec-89	21-Dec-89	1.1	0.017	<0.0005	0.1	0.067	328.35	314.11	----	14.24
SR-3	14-Dec-89	20-Dec-89	2.4	0.31	0.027	0.17	0.34	329.11	314.74	----	14.37
SF-6	15-Dec-89	20-Dec-89	<0.05	<0.0005	<0.0005	<0.0005	<0.001	----	----	----	----
TB	14-Dec-89	20-Dec-89	<0.05	<0.0005	<0.0005	<0.0005	<0.001	----	----	----	----



Base Map: USGS Topographic Map

Approx. Scale: 1" = 2000'

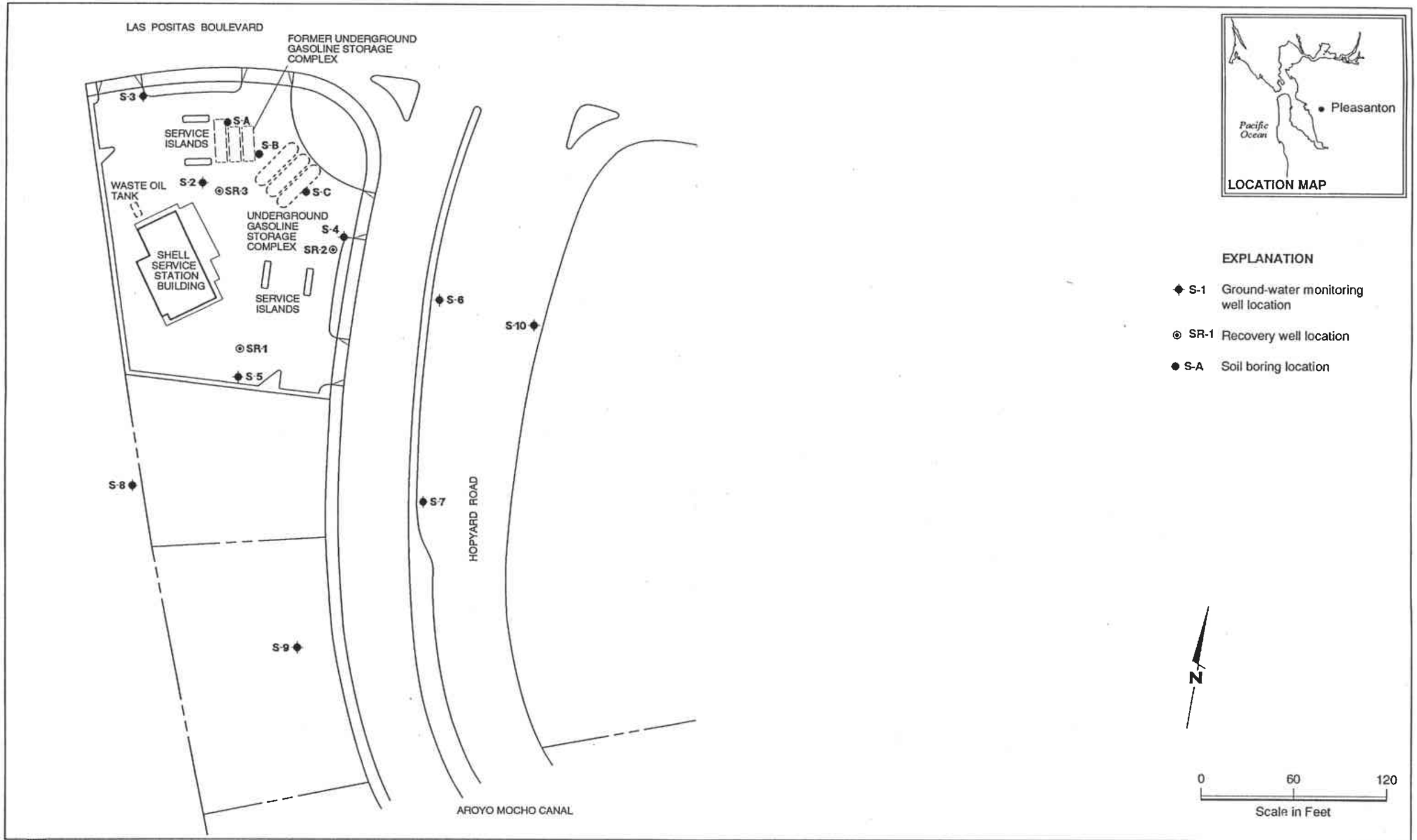
GeoStrategies Inc.

Vicinity Map

Shell Service Station
3790 Hopyard Road
Pleasanton, California

PLATE
1

JOBNUMBER	REVIEWEDBYRG/CEG	DATE	REVISEDDATE	REVISEDDATE
7632		11/89		

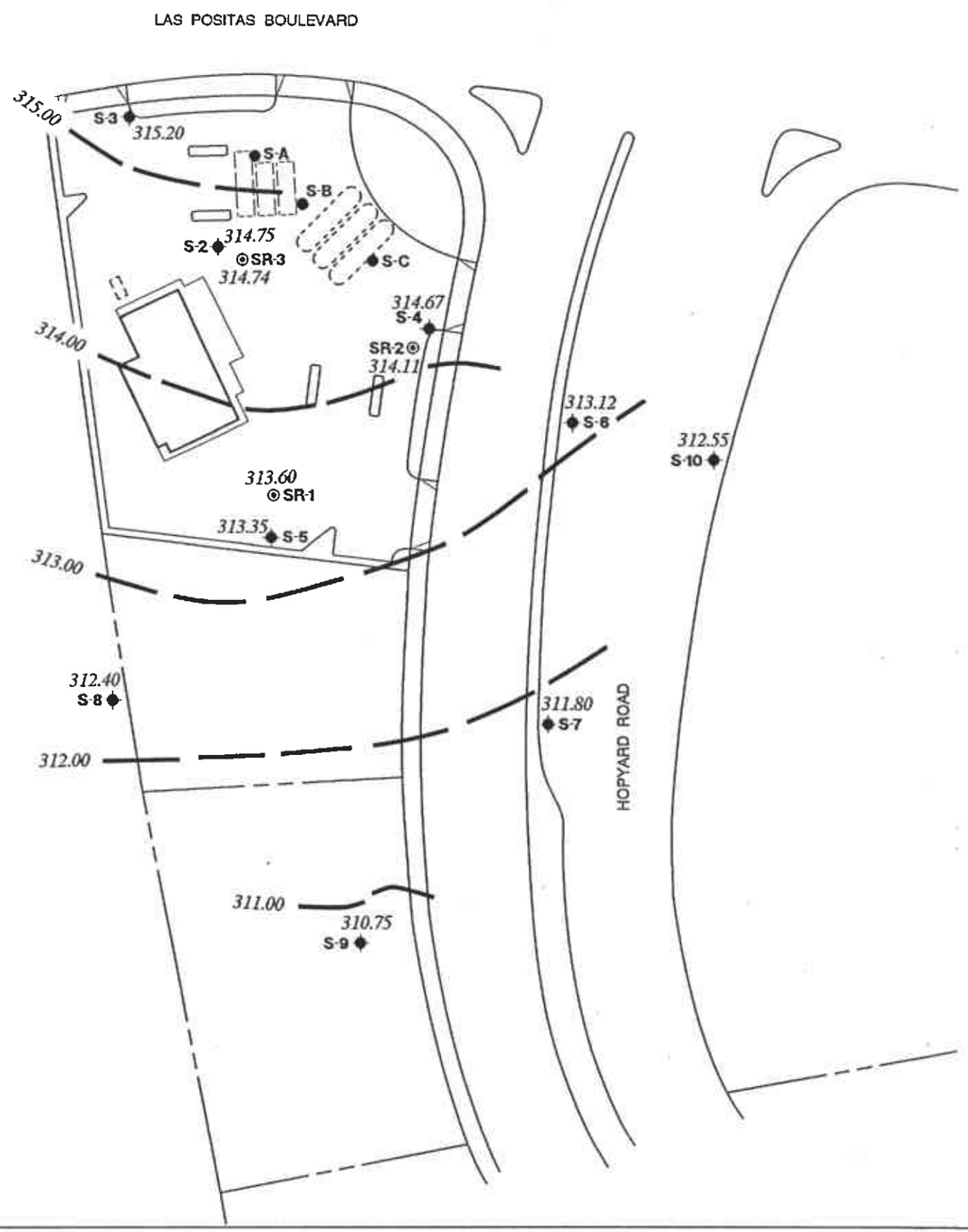


GeoStrategies Inc.

Site Plan
Shell Service Station
3790 Hopyard Road
Pleasanton, California

PLATE
2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7632	CWP CEG 1262	2/90		



EXPLANATION

- ◆ S-1 Ground-water monitoring well location
- ⊙ SR-1 Recovery well location
- ● S-A Soil boring location
- 313.00 Ground-water elevation contour Approximate Gradient = 0.01
- 314.11 Ground-water elevation measured on December 14, 1989 in feet referenced to Mean Sea Level (MSL)

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

N

0 60 120

Scale in Feet

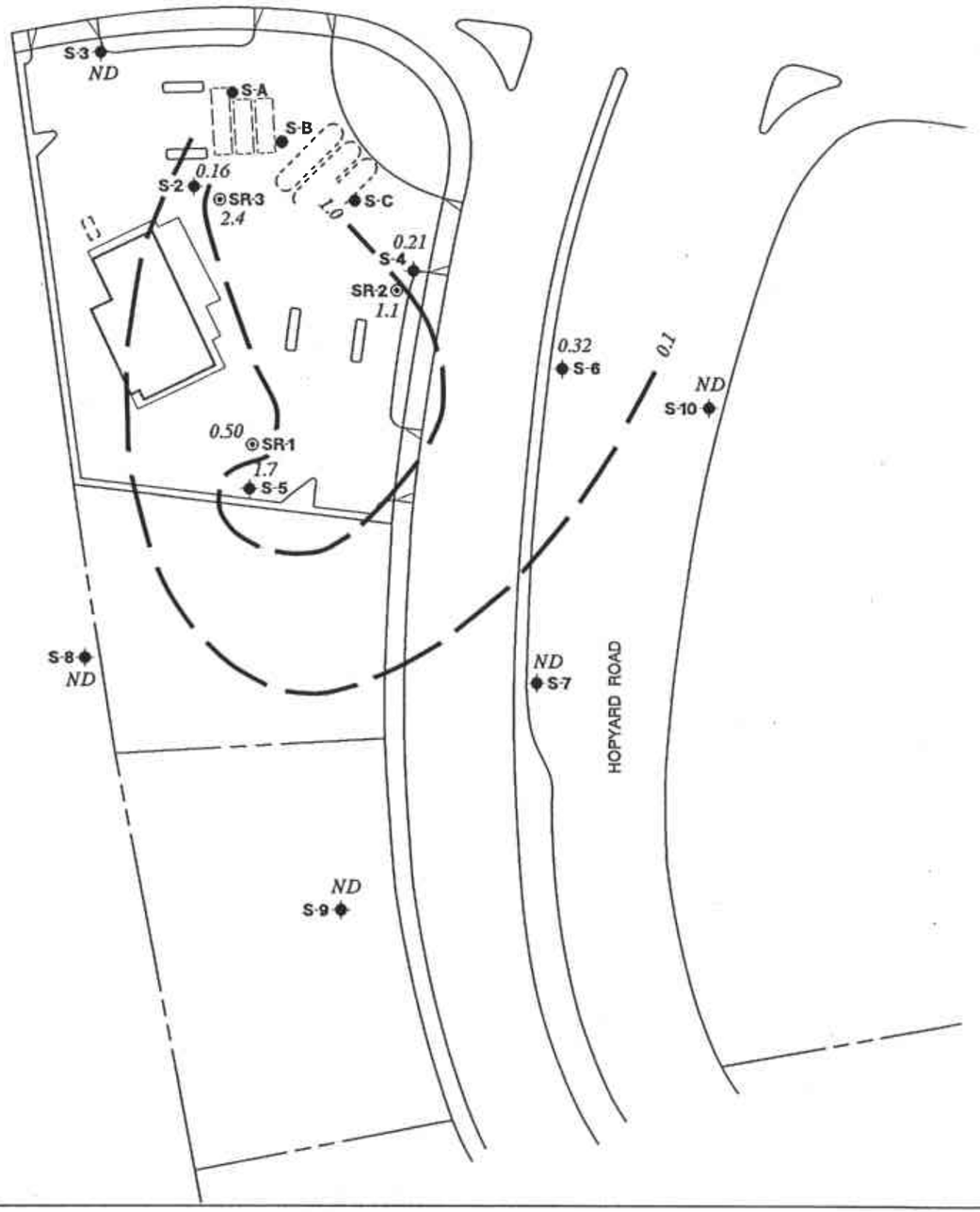
GeoStrategies Inc.

Potentiometric Map
Shell Service Station
3790 Hopyard Road
Pleasanton, California

PLATE
3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7632	CMP CEG 12/92	2/90		

LAS POSITAS BOULEVARD



EXPLANATION

- S-1 — Ground-water monitoring well location
- SR-1 — Recovery well location
- S-A — Soil boring location
- 0.21 — TPH (Total Petroleum Hydrocarbon) concentration in ppm sampled December 14/15, 1989
- 1.0 — TPH isoconcentration contour
- ND — Not Detected (see laboratory reports for detection limits)

N

0 60 120

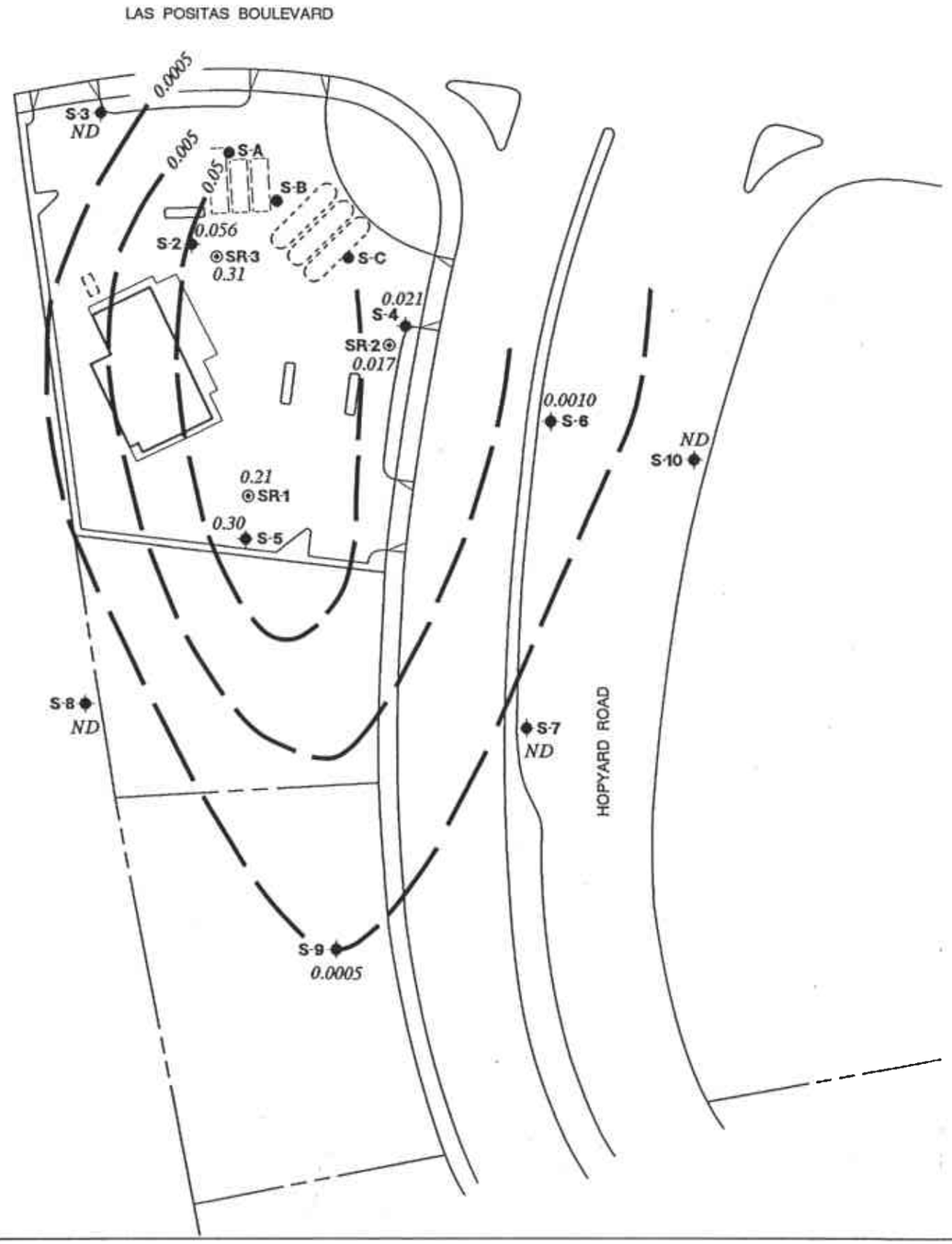
Scale in Feet

GeoStrategies Inc.

TPH Isoconcentration Map
Shell Service Station
3790 Hopyard Road
Pleasanton, California

PLATE **4**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7632	CWP 0FC, 1262	2/90		



EXPLANATION

- S-1 Ground-water monitoring well location
- SR-1 Recovery well location
- S-A Soil boring location
- *0.31* Benzene concentration in ppm sampled December 14/15, 1989
- 0.005 Benzene isoconcentration contour
- *ND* Not Detected (see laboratory reports for detection limits)

N

0 60 120

Scale in Feet

GeoStrategies Inc.

Benzene Isoconcentration Map
Shell Service Station
3790 Hopyard Road
Pleasanton, California

PLATE **5**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7632	CEG 1262	2/90		

APPENDIX A
FIELD METHODS AND PROCEDURES

GROUND-WATER SAMPLING AND ANALYSIS

Quality Assurance/Quality Control Objectives

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

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

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

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

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

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

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

August 15, 1989

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)

gettler — ryan inc. (415) 783-7500
general and environmental contractors

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 centrifigal 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

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general and environmental contractors

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.

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general and environmental contractors

TABLE 1

SAMPLE ANALYSIS METHODS, CONTAINERS, PRESERVATIONS, AND HOLDING TIMES

Parameter	Analytical Method	Reporting Units	Container	Preservation	Maximum Holding Time
Total Petroleum Hydrocarbons (gasoline)	EPA 8015 (modified)	mg/l ug/l	40 ml. vial glass, Teflon	cool, 4 C HC1 to pH<2	14 days (maximum)
Benzene Toluene Ethylbenzene Xylenes (BTEX)	EPA 8020	mg/l ug/l mg/l	50 ml. vial glass, Teflon lined septum 1 l glass, Teflon	cool, 4 C HC1 to pH<2	7 days (w/o preservative) 14 days (w preservative)
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)
Halogented Volatile Organics (chlorinated solvents)	8010	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C	14 days (maximum)
Non chlorinated solvents	8020	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C HCl to pH<2	14 days (maximum)
Volatile Organics	8240	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C	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			

GeoStrategies Inc.

FIELD EXPLORATORY BORING LOG

Field location of boring:

Project No.: | Date: | Boring No:

Client:

Location:

City: | Sheet

Logged by: | Driller: | of

Casing installation data:

Drilling method:

Hole diameter:

Top of Box Elevation: | Datum:

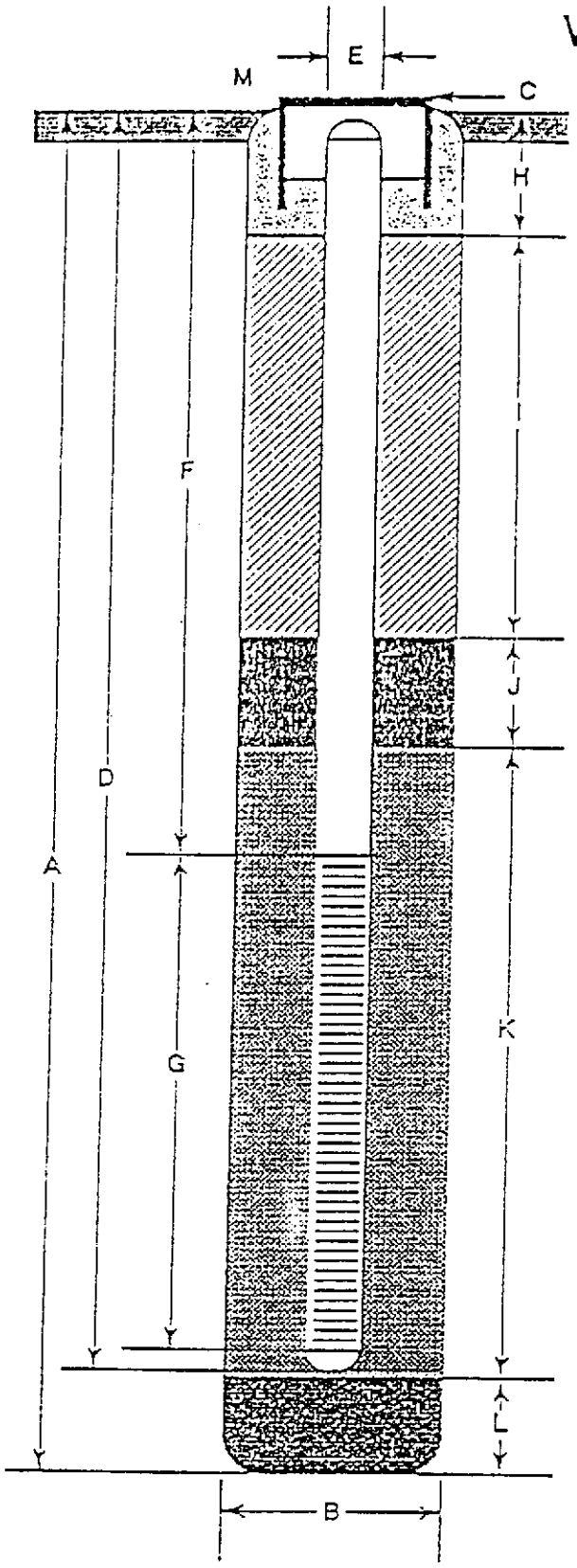
Water Level				
Time				
Date				

PID (ppm)	Blowcnt. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description

Remarks:

FIGURE 1

WELL CONSTRUCTION DETAIL



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

FIGURE 2

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY _____ JOB # _____

LOCATION _____ DATE _____

CITY _____ TIME _____

Well ID. _____ Well Condition _____

Well Diameter _____ in. Hydrocarbon Thickness _____ ft.

Total Depth _____ ft.

Depth to Liquid- _____ ft.

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

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

Purging Equipment _____

Sampling Equipment _____

Starting Time _____ Purging Flow Rate _____ gpm.

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

Time	pH	Conductivity	Temperature	Volume

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

Sampling Time _____ Weather Conditions _____

Analysis _____ Bottles Used _____

Chain of Custody Number _____

COMMENTS _____

FOREMAN _____ ASSISTANT _____

FIGURE 3

Monitoring Well Sampling Protocol Schematic

Sampling Crew Reviews Project Sampling Requirments/Schedule

Field Decontamination and Instrumentation Calibration

Check Integrity of Well (Inspect for Well Damage)

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

Check for Floating Product (Oil/Water Interface Probe)

Floating Product Present

Confirm Product Thickness (Acrylic or PVC Bailer)

Collect Free-Product Sample

Dissolved Product Sample Not Required

Record Data on Field Date Form

Floating Product Not Present

Purge Volume Calculation

$V = \pi(r/12)^2 h(\_\_\_\_ \#\ vol)(7.48) = \_\_\_\_\_$/gallons

V = Purge volume (gallons)
π = 3.14159
h = Height of Water Column (feet)
r = Borehole radius (inches)

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

Well Dewaters after One Purge Volume (Low yield well)

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

Measure Groundwater Stability Indicator Parameters (pH, Temp., Conductivity)

Collect Sample and Complete Chain-of-Custody

Preserve Sample According to Required Chemical Analysis

Transport to Anayltical Laboratory

Well Readily Recovers

Record Groundwater Stability Indicator Parameters from each Additional Purge Volume

Stability indicated when the following criteria are met:

pH:	± 0.1 pH units
Conductivity:	± 10%
Temperaure:	1.0 degree F

Groundwater Stability Achieved

Collect Sample and Complete Chain-of-Custody

Preserve Sample According to Required Chemical Analysis

Transport to Analytical Laboratory

Groundwater Stability Not Achieved

Continue Purging Until Stability is Achieved

Collect Sample and Complete Chain-of-Custody

Preserve Sample According to Required Chemical Analysis

Transport to Analytical Laboratory

FIGURE 4

Gettler - Ryan Inc.
ENVIRONMENTAL DIVISION

Chain of Custod

COMPANY _____ JOB NO. _____

JOB LOCATION _____

CITY _____ PHONE NO. _____

AUTHORIZED _____ DATE _____ P.O. NO. _____

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

RELINQUISHED BY: _____ RECEIVED BY: _____

RELINQUISHED BY: _____ RECEIVED BY: _____

RELINQUISHED BY: _____ RECEIVED BY LAB: _____

DESIGNATED LABORATORY: _____ DHS #: _____

REMARKS: _____

DATE COMPLETED _____ FOREMAN _____

FIGURE 5

APPENDIX B

CHEMICAL ANALYTICAL REPORTS

GROUNDWATER SAMPLING REPORT

CHEMICAL ANALYTICAL REPORTS

gettler — ryan inc.

January 5, 1990

GROUNDWATER SAMPLING REPORT

Referenced Site: Shell Service Station
3790 Hopyard Road/Las Positas Boulevard
Pleasanton, California

Sampling Date: December 14 & 15, 1989

This report presents the results of the quarterly groundwater sampling and analytical program conducted by Gettler-Ryan Inc. on December 14 and 15, 1989 at the referenced location. The site is occupied by an operating service station located on the southwest corner of Hopyard Road and Los Positas Boulevard. The service station has underground storage tanks containing regular leaded, unleaded and super unleaded gasoline products and waste oil.

There are currently four groundwater monitoring wells on site, five off site, and three recovery wells at the locations shown on the attached site map. Prior to sampling, the wells were inspected for total well depth, water levels, and presence of separate phase product using an electronic interface probe. A clean acrylic bailer was used to visually detect the presence of separate phase product. Separate phase product was not observed in any of the monitoring wells. Groundwater depths ranged from 12.47 to 17.49 feet below grade.

The wells were then purged and sampled. 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. In cases where a well dewatered or less than four case volumes were purged, groundwater samples were obtained after the physical parameters had stabilized. The purge water was contained in drums for proper disposal. Details of the final well purging results are presented on the attached Table of Monitoring Data.

Samples were collected, using Teflon bailers or bladder pumps, 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 field blank (SF-6) and a trip blank, supplied by the laboratory, were included and analyzed to assess quality control. Analytical results for the blanks are included in the Certified Analytical Report (CAR's). Chain of custody records were established noting sample identification numbers, time, date, and custody signatures.

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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

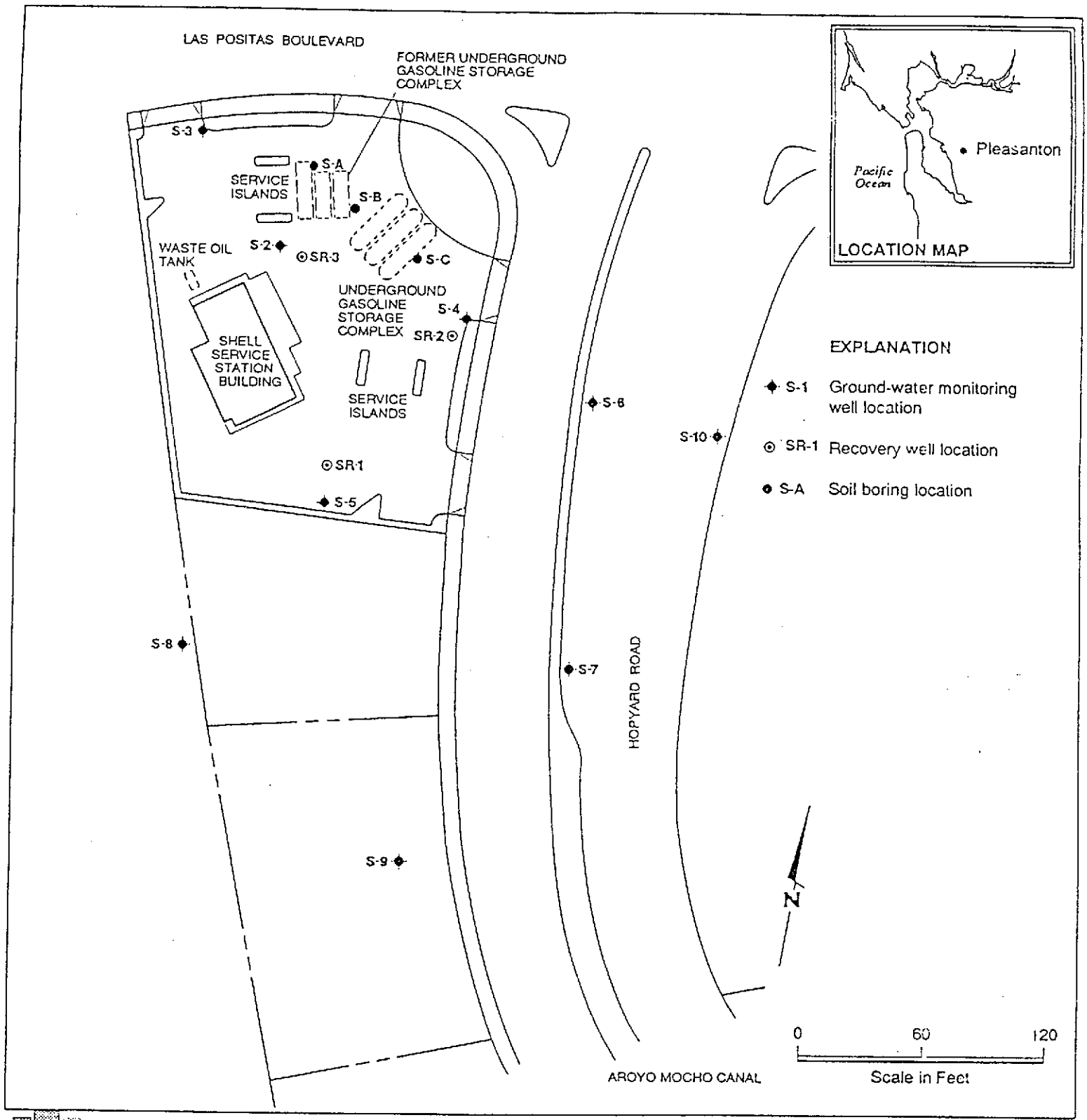
WELL I.D.	S-2 12-14-89	S-3 12-14-89	S-4 12-14-89	S-5 12-14-89	S-6 12-15-89	S-7 12-15-89
Casing Diameter (inches)	3	4	4	3	3	3
Total Well Depth (feet)	33.8	34.8	35.1	34.3	33.9	34.8
Depth to Water (feet)	14.46	12.47	13.86	16.31	14.50	16.87
Free Product (feet)	none	none	none	none	none	none
Reason Not Sampled	----	----	----	----	----	----
Calculated 4 Case Vol.(gal.)	29.4	33.9	32.2	27.4	29.6	27.2
Did Well Dewater?	no	no	no	no	no	no
Volume Evacuated (gal.)	37	42	25	34.2	37	34
Purging Device	Bladder	Airlift	Bladder	Bladder	Bladder	Bladder
Sampling Device	Bladder	Bailer	Bladder	Bladder	Bladder	Bladder
Time	11:47	14:32	14:30	11:52	10:41	09:54
Temperature (F)*	65.9	67.7	63.8	65.8	66.6	65.8
pH*	6.86	6.16	7.05	5.90	6.03	6.50
Conductivity (umhos/cm)*	4560	4020	3980	2800	2860	4720

* Indicates Stabilized Value

TABLE OF MONITORING DATA
GROUNDWATER WELL SAMPLING REPORT

WELL I.D.	S-8 12-14-89	S-9 12-15-89	S-10 12-15-89	SR-1 12-14-89	SR-2 12-14-89	SR-3 12-14-89
Casing Diameter (inches)	3	4	3	4	4	4
Total Well Depth (feet)	33.5	34.6	34.5	35.2	35.3	35.1
Depth to Water (feet)	14.60	17.49	14.00	16.18	14.24	14.37
Free Product (feet)	none	none	none	none	none	none
Reason Not Sampled	----	----	----	----	----	----
Calculated 4 Case Vol.(gal.)	28.8	26.0	31.2	50.4	55.6	54.7
Did Well Dewater?	no	no	no	no	no	no
Volume Evacuated (gal.)	36	32.5	39.1	63	70	68.6
Purging Device	Bladder	Bladder	Bladder	Bladder	Bladder	Bladder
Sampling Device	Bladder	Bladder	Bladder	Bladder	Bladder	Bladder
Time	14:04	08:50	11:45	11:08	14:22	12:16
Temperature (F)*	65.5	65.3	65.4	66.2	65.6	67.5
pH*	6.04	6.59	6.22	6.00	6.83	6.76
Conductivity (umhos/cm)*	5370	4550	2740	5440	4160	4100

* Indicates Stabilized Value



GeoStrategies Inc.

Site Plan
Shell Service Station
3790 Hopyard Road
Pleasanton, California

PLATE

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
632		11/89		

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Gettler-Ryan
2140 West Winton
Hayward, CA 94545

Date: 01/02/90

Attention: John Werfal

Work Order: S9-12-198 P.O. Number: MOH 890501A

This is the Certificate of Analysis for the following samples:

Client Project ID: GR #3632, 3790 Hopyard Rd., Pleasanton
Date Received: 12/15/89
Number of Samples: 14
Sample Type: water

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

PAGES	LABORATORY #	SAMPLE IDENTIFICATION
2	S9-12-198-01	S-2
3	S9-12-198-02	S-3
4	S9-12-198-03	S-4
5	S9-12-198-04	S-5
6	S9-12-198-05	S-6
7	S9-12-198-06	S-7
8	S9-12-198-07	S-8
9	S9-12-198-08	S-9
10	S9-12-198-09	S-10
11	S9-12-198-10	SR-1
12	S9-12-198-11	SR-2
13	S9-12-198-12	SR-3
14	S9-12-198-13	SF-6
15	S9-12-198-14	Trip Blank

Reviewed and Approved:

Michael E. Dean
Project Manager

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-2**
SAMPLE DATE: **12/14/89**
LAB SAMPLE ID: **01**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	**0.16**
Benzene	0.0005	**0.056**
Toluene	0.0005	**0.0005**
Ethylbenzene	0.0005	**0.021**
Xylenes (total)	0.001	**0.003**

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-3**
SAMPLE DATE: **12/14/89**
LAB SAMPLE ID: **02**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/19/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	None
Benzene	0.0005	None
Toluene	0.0005	None
Ethylbenzene	0.0005	None
Xylenes (total)	0.001	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-4**
SAMPLE DATE: **12/14/89**
LAB SAMPLE ID: **03**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/19/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	**0.21**
Benzene	0.0005	**0.021**
Toluene	0.0005	**None**
Ethylbenzene	0.0005	**0.030**
Xylenes (total)	0.001	**0.023**

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-5**
SAMPLE DATE: **12/14/89**
LAB SAMPLE ID: **04**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	1.7
Benzene	0.0005	0.30
Toluene	0.0005	0.086
Ethylbenzene	0.0005	0.067
Xylenes (total)	0.001	0.14

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-6**
SAMPLE DATE: **12/15/89**
LAB SAMPLE ID: **05**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	0.32
Benzene	0.0005	0.0010
Toluene	0.0005	None
Ethylbenzene	0.0005	0.0026
Xylenes (total)	0.001	None

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-7**
SAMPLE DATE: **12/15/89**
LAB SAMPLE ID: **06**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	None
Benzene	0.0005	None
Toluene	0.0005	None
Ethylbenzene	0.0005	None
Xylenes (total)	0.001	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-8**
SAMPLE DATE: **12/14/89**
LAB SAMPLE ID: **07**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	**None**
Benzene	0.0005	**None**
Toluene	0.0005	**None**
Ethylbenzene	0.0005	**None**
Xylenes (total)	0.001	**None**

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-9**
SAMPLE DATE: **12/15/89**
LAB SAMPLE ID: **08**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	None
Benzene	0.0005	0.0005
Toluene	0.0005	None
Ethylbenzene	0.0005	None
Xylenes (total)	0.001	None

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **S-10**
SAMPLE DATE: **12/15/89**
LAB SAMPLE ID: **09**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	None
Benzene	0.0005	None
Toluene	0.0005	None
Ethylbenzene	0.0005	None
Xylenes (total)	0.001	None

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **SR-1**
SAMPLE DATE: **12/14/89**
LAB SAMPLE ID: **10**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	0.50
Benzene	0.0005	0.21
Toluene	0.0005	None
Ethylbenzene	0.0005	0.016
Xylenes (total)	0.001	0.016

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **SR-2**
SAMPLE DATE: **12/14/89**
LAB SAMPLE ID: **11**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/21/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	1.1
Benzene	0.0005	0.017
Toluene	0.0005	None
Ethylbenzene	0.0005	0.10
Xylenes (total)	0.001	0.067

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **SR-3**
SAMPLE DATE: **12/14/89**
LAB SAMPLE ID: 12
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: 12/20/89

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	2.4
Benzene	0.0005	0.31
Toluene	0.0005	0.027
Ethylbenzene	0.0005	0.17
Xylenes (total)	0.001	0.34

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **SF-6**
SAMPLE DATE: **12/15/89**
LAB SAMPLE ID: **13**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	None
Benzene	0.0005	None
Toluene	0.0005	None
Ethylbenzene	0.0005	None
Xylenes (total)	0.001	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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

CLIENT SAMPLE ID: **Trip Blank**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **14**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **12/20/89**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons, calculated as Gasoline	0.05	None
Benzene	0.0005	None
Toluene	0.0005	None
Ethylbenzene	0.0005	None
Xylenes (total)	0.001	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 01/02/90
Client Project ID: GR #3632, 3790 Hopyard Rd.

Work Order: S9-12-198

TEST NAME: **Modified 8015/8020**

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, ethylbenzene and xylenes.

Gettler - Ryan Inc. — ENVIRONMENTAL DIVISION — 1257 **Chain of Custody**

COMPANY Shell Oil Co. JOB NO.

JOB LOCATION 3790 Hopyard Rd.

CITY Pleasonton, CA PHONE NO. 783-7500

AUTHORIZED John Werfal DATE 12-14-89 P.O. NO. 3632

	SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
1	S-2	3	liquid	12/14/89 11:47	THC (gas) BTXE	cool/ice
2	S-3	3		10:32		
3	S-4	3		14:30		
4	S-5	3		11:54		
5	S-6	3		12/15/89 10:42		
6	S-7	3		9:54		
7	S-8	3		12/14/89 14:05		Bubble-
8	S-9	3		12/15/89 8:50		
9	S-10	3		11:47		
10	SR-1	3		12/14/89 11:10		
11	SR-2	3		14:22		
12	SR-3	3		12:16		

RELINQUISHED BY: John P. Zwerzyck 13:25 12-15-89 RECEIVED BY:

RELINQUISHED BY: RECEIVED BY:

RELINQUISHED BY: RECEIVED BY LAB: 12/15/89 13:28

DESIGNATED LABORATORY: IT (SCV) DHS #: 137

REMARKS: WIC # 204-6138-0501 AFE # 986624

Exp Code 5440 Shell Eng Diane Lundquist

DATE COMPLETED 12-15-89 FOREMAN John P. Zwerzyck

ORIGINAL

Gettler - Ryan Inc. — 54-12-148 — ENVIRONMENTAL DIVISION — 1022 **Chain of Custody**

COMPANY Shell Oil Co. JOB NO.

JOB LOCATION 3790 Hopyard Rd.

CITY Pleasonton, CA PHONE NO. 783-7500

AUTHORIZED John Werfel DATE 12-14-89 P.O. NO. 3632

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
13 SF-6	3	liquid	12-15-89/10:42	THC(gas) BTXE	cool/ice (6)
14 Trip Blank	1	↓	12-11-89	↓	

RELINQUISHED BY: John P. Kwerngas 13:25 12/15/89

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY LAB: 12/15/89 13:28

DESIGNATED LABORATORY: IT (SCV) DHS #: 137

REMARKS: WIC # 204-0138-0501
AFE # 986624 Exp Code 5440
Shell Eng. Digne Lundquist

DATE COMPLETED 12-15-89 FOREMAN John P. Kwerngas

ORIGINAL

APPENDIX C

HISTORICAL DATABASE

CHEMICAL DATA

ANALYTICAL LOG

SAMPLE DATE	SAMPLE POINT	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	E.B. (PPM)	XYLENES * (PPM)
06-Nov-87	S-1	0.92	0.23	<0.005	----	0.15
16-Feb-88	S-1	3.5	1.3	<0.04	----	0.5
06-Nov-87	S-2	16	0.87	<0.1	----	2.7
16-Feb-88	S-2	1.8	0.44	<0.01	----	0.14
13-Oct-88	S-2	0.55	0.11	0.001	0.045	0.015
01-Feb-89	S-2	0.62	0.17	0.002	0.062	0.014
08-Mar-89	S-2	1.9	0.26	0.27	0.130	0.26
28-Jun-89	S-2	0.32	0.088	0.001	0.032	0.01
08-Sep-89	S-2	0.23	0.08	0.001	0.03	0.015
16-Feb-88	S-3	<0.05	<0.0005	<0.001	----	<0.004
13-Oct-88	S-3	<0.05	<0.0005	<0.001	<0.001	<0.003
01-Feb-89	S-3	<0.05	<0.0005	<0.001	<0.001	<0.003
08-Mar-89	S-3	<0.05	<0.0005	<0.001	<0.001	<0.003
28-Jun-89	S-3	<0.05	<0.0005	<0.001	<0.001	<0.003
08-Sep-89	S-3	<0.05	<0.0005	<0.001	<0.001	<0.003
16-Feb-88	S-4	5.1	0.16	0.008	----	0.73
13-Oct-88	S-4	0.53	0.024	0.001	0.025	0.016
01-Feb-89	S-4	1.1	0.033	0.002	0.02	0.024
08-Mar-89	S-4	0.65	0.037	0.001	0.035	0.027
28-Jun-89	S-4	0.67	0.11	<0.001	0.085	0.071
08-Sep-89	S-4	0.38	0.032	<0.001	0.036	0.026
16-Feb-88	S-5	1	0.04	0.086	----	0.18
13-Oct-88	S-5	0.56	0.066	0.02	0.018	0.036
01-Feb-89	S-5	0.18	0.027	0.008	0.009	0.013
08-Mar-89	S-5	3.8	0.52	0.53	0.260	0.57
28-Jun-89	S-5	<0.05	0.0038	<0.001	0.002	<0.003
08-Sep-89	S-5	0.11	0.025	0.002	0.002	0.012
13-Oct-88	S-6	1.1	0.013	0.001	0.042	0.033
01-Feb-89	S-6	0.34	0.0038	<0.001	0.008	0.003
08-Mar-89	S-6	0.19	0.0038	<0.001	0.007	0.003
28-Jun-89	S-6	0.48	0.015	<0.001	0.006	<0.003
08-Sep-89	S-6	0.27	0.0013	0.001	0.007	<0.003
13-Oct-88	S-7	<0.05	0.0006	0.001	<0.001	<0.003
01-Feb-89	S-7	<0.05	<0.0005	<0.001	<0.001	<0.003
08-Mar-89	S-7	<0.05	<0.0005	<0.001	<0.001	<0.003
28-Jun-89	S-7	<0.05	<0.0005	<0.001	<0.001	<0.003
08-Sep-89	S-7	<0.05	<0.0005	<0.001	<0.001	<0.003
08-Mar-89	S-8	<0.05	0.0012	0.001	<0.001	<0.003
28-Jun-89	S-8	<0.05	0.0008	0.001	<0.001	<0.003
08-Sep-89	S-8	<0.05	<0.0005	<0.001	<0.001	<0.003

ANALYTICAL LOG

SAMPLE DATE	SAMPLE POINT	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	E.B. (PPM)	XYLENES * (PPM)
08-Mar-89	S-9	<0.05	<0.0005	<0.001	<0.001	<0.003
28-Jun-89	S-9	<0.05	<0.0005	<0.001	<0.001	<0.003
08-Sep-89	S-9	<0.05	0.0017	0.002	<0.001	<0.003
11-Aug-89	S-10	<0.05	<0.0005	<0.001	<0.001	<0.003
08-Sep-89	S-10	<0.05	<0.0005	<0.001	<0.001	<0.003
11-Oct-89	SR-1	0.2	0.1	<0.001	0.01	0.01
11-Oct-89	SR-2	0.88	<0.010	0.001	0.029	0.033
11-Oct-89	SR-3	0.5	0.092	0.01	0.043	0.1

ALL DATA SHOWN AS <X ARE REPORTED AS ND (NONE DETECTED)

ETHYLBENZENE & XYLENES COMBINED PRIOR TO OCTOBER, 1988