gettler — ryan inc.
general contractors

October 16, 1989

10/19/89

ALAMEDA COUNTY
DEPT. OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS

Mr. Rafat Shahid
County of Alameda
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

Reference: Former Shell Service Station
461 Eigth Street @ Broadway
Oakland, California 94607

Gentlemen:

Enclosed is a copy of the Quarterly Report issued by GeoStrategies Inc., dated October 12, 1989, documenting the groundwater sampling and site activities conducted during the July - September 1989 quarter at the above referenced location.

Please do not hesitate to call should you have any question or comment.

Sincerely,

John P. Werfal
Project Manager

enclosure

cc: Ms. W. Howell, Shell Oil Company
Ms. D. Lundquist, Shell Oil Company
Mr. T. Callaghan, Regional Water Quality Control Board

GeoStrategies Inc.

QUARTERLY REPORT

JULY - SEPTEMBER 1989

Former Shell Service Station
461 8th Street
Oakland, California

Report No. 7644-3

October 12, 1989

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

October 12, 1989

Gettler-Ryan Inc.
1992 National Avenue
Hayward, California 94545

Attn: Mr. John Werfal

Re: QUARTERLY REPORT
Former Shell Service Station
461 8th Street
Oakland, California

Gentlemen:

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

If you have any questions, please call.

GeoStrategies Inc. by,

Ellen C. Fostersmith
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. 285, R.E.A. 1262

ECF/JLP/kj

Report No. 7644-3

1.0 INTRODUCTION

This Quarterly Report has been prepared for the former Shell Service Station located at 461 8th Street, Oakland, California (Plate 1).

This report describes the results of the third quarterly ground-water sampling for 1989 performed by Gettler-Ryan Inc. (G-R), in accordance with the current quarterly monitoring plan for the site. Field work and laboratory analysis methods were performed in compliance with current State of California Water Resources Control Board (SCWRCB) procedures for conducting environmental investigations related to leaking underground fuel tanks. The field and chemical analytical data discussed in this report were collected between July 1, and September 30, 1989.

2.0 SITE HISTORY

In January 1979, the Bay Area Rapid Transit (BART) discovered gasoline leaking into an underground rail tube near the corner of the former Shell Service Station located at 461 8th Street in Oakland, California. As a result, a total of seven monitoring wells were installed (S-1 through S-7) to evaluate soil and ground-water quality conditions at the site by Groundwater Technology Inc. (GTI) in August 1981. Monitoring well S-5 was found to contain approximately 0.5 feet measured thickness of separate-phase petroleum hydrocarbons (floating product).

In 1982, a ground-water recovery system was installed at the site by GTI. In 1983, the discharge permit for the recovery system was revoked because gasoline concentrations in effluent water exceeded established discharge requirements. In 1986, EMCON Associates (EMCON) submitted a report addressing the necessary steps to remove the recovery system. In October 1987, floating product was pumped from Well S-5 using a vacuum truck. In November 1987, the BART tube was checked for gasoline seepage. No seepage or vapors were detected at that time.

Monitoring wells S-1, S-2 and S-3 have been inaccessible and it is believed that these wells were destroyed during station demolition.

Quarterly ground-water sampling at the former Service Station began in October 1988. Wells S-4, S-5 and S-6 were sampled and analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline), and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX). TPH-Gasoline in ground-water samples ranged from 0.13 parts per million (ppm) to 110. ppm. Benzene concentrations ranged from 0.0038 ppm to 29. ppm. The results of this sampling event were reported by G-R in a report dated January 9, 1989. G-R Field Methods and Procedures and Sampling Protocol are presented in Appendix A.

Monitoring wells S-4, S-5 and S-6 were sampled in January 1989. TPH-Gasoline concentrations were identified ranging from none detected (ND) to 94. ppm. Benzene concentrations ranged from 0.0005 ppm to 18.0 ppm. The results of this sampling were reported by G-R on April 14, 1989.

On May 1, 1989, G-R collected ground-water samples for Wells S-5 and S-6. Well S-4 did not contain sufficient water for sampling. TPH-Gasoline concentrations ranged from 95. to 120. ppm. Benzene concentrations ranged form 29. to 43. ppm. The results of the May sampling is presented in the GeoStrategies Inc. (GSI) report dated June 13, 1989.

3.0 GROUND-WATER LEVEL MONITORING

3.1 Potentiometric Data

Prior to ground-water sampling, water levels were measured in each monitoring well using an electric well sounder (Table 1). Static water-levels were measured from the surveyed top of well box and recorded to the nearest ±0.01 foot. Plate 1 presents the location of each well at the site.

Ground-water elevation data for the third quarter have been plotted and contoured and are presented on Plate 2. Water-level measurements used to prepare the quarterly potentiometric map were taken from data collected on the same day that ground-water sampling occurred.

3.2 Floating-Product Measurements

Separate-phase petroleum hydrocarbons (floating product) were measured in each well (if present) using a calibrated portable oil-water interface probe. No floating product was detected in any of the wells sampled.

4.0 CHEMICAL ANALYTICAL DATA

Ground-water samples were collected from site monitoring wells on July 27, 1989. The ground-water samples were analyzed for TPH-Gasoline according to EPA Method 8015 (Modified); and BTEX according to EPA Method 8020. All samples were analyzed by International Technology Analytical Services (IT), a State-certified laboratory located in San Jose, California. The G-R Groundwater Sampling Report for the third quarter performed in 1989 is presented in Appendix B.

TPH-Gasoline concentrations of 52. ppm in S-6 and 110. ppm in S-5 were detected during the third quarter. Benzene concentrations of 20. ppm were detected in both Wells S-5 and S-6. Well S-4 contained insufficient water for sampling.

4.1 Quality Control

No QC samples were run this quarter.

The IT Analytical Services chemical analytical report for this quarter ground-water sampling is presented in Appendix B. G-R Ground-Water Sampling Forms and Chain-of-Custody Forms are included in the Ground-Water Sampling Report presented in Appendix B. G-R Sampling Protocol are presented in Appendix A.

Water-quality data for the quarterly report are summarized in Table 1. TPH and benzene chemical analytical data were used to prepare chemical concentration maps for this quarter (Refer to Plate 3).

5.0 SUMMARY

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

- Water levels were measured in monitoring wells S-4, S-5 and S-6 (Table 1). The potentiometric map was constructed from static water-level data collected for the third quarter (Plate 2). The shallow ground-water gradient was calculated to be 0.006.
- No floating product was observed in any of the wells sampled this quarter.
- TPH-Gasoline was detected in Wells S-5 and S-6 at concentrations of 110. and 52. ppm, respectively.
- Benzene was detected in Wells S-5 and S-6 at concentrations of 20. ppm.
- Well S-4 contained insufficient water for sampling for this quarter.

6.0 PLANNED SITE ACTIVITIES

The following activities are planned for the fourth quarter, October to December 1989, at the site:

- 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 local ground-water gradient will be calculated.
- Chemical data will be used to construct a concentration map for TPH-Gasoline and Benzene.
- Issue a work plan to assess to extent of the dissolved hydrocarbon plume.

TABLE 1

GROUND-WATER ANALYSES DATA

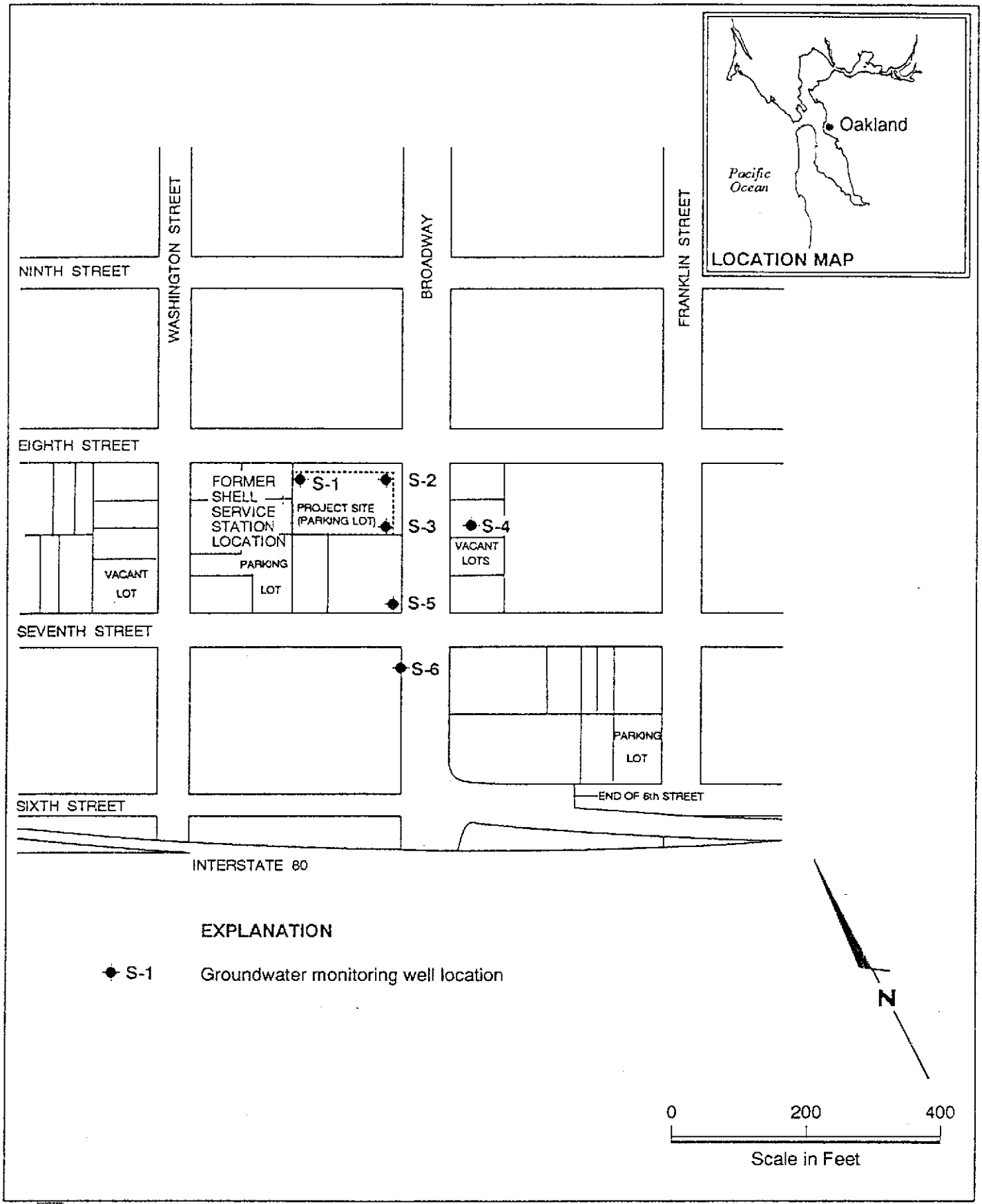
WELL NO	SAMPLE DATE	ANALYSIS DATE	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	WELL ELEV (FT)	STATIC WATER ELEV (FT)	PRODUCT THICKNESS (FT)	DEPTH TO WATER (FT)
S-1	27-Jul-89	----	----	----	----	----	----	----	----	----	----
S-2	27-Jul-89	----	----	----	----	----	----	----	----	----	----
S-3	27-Jul-89	----	----	----	----	----	----	----	----	----	----
S-4	27-Jul-89	----	----	----	----	----	----	93.51	77.67	----	15.84
S-5	27-Jul-89	09-Aug-89	110.	20.	29.	2.400	14.000	99.36	78.95	----	20.41
S-6	27-Jul-89	09-Aug-89	52.	20.	3.2	1.700	5.500	100.58	79.57	----	21.01

TPH = Total Petroleum Hydrocarbons as Gasoline
PPM = parts per million
ND = None Detected

CURRENT DEPARTMENT OF HEALTH SERVICES ACTION LEVELS

Benzene 0.0007 ppm	Xylenes 0.620 ppm
Toluene 0.100 ppm	Ethylbenzene 0.68 ppm

Note: 1. For chemical parameter detection limits, refer to I.T. laboratory reports in Appendix B
2. Water level elevations referenced to project site datum
3. Wells S-1, S-2, and S-3 were not accessable
4. Well S-4 had insufficient water for sampling

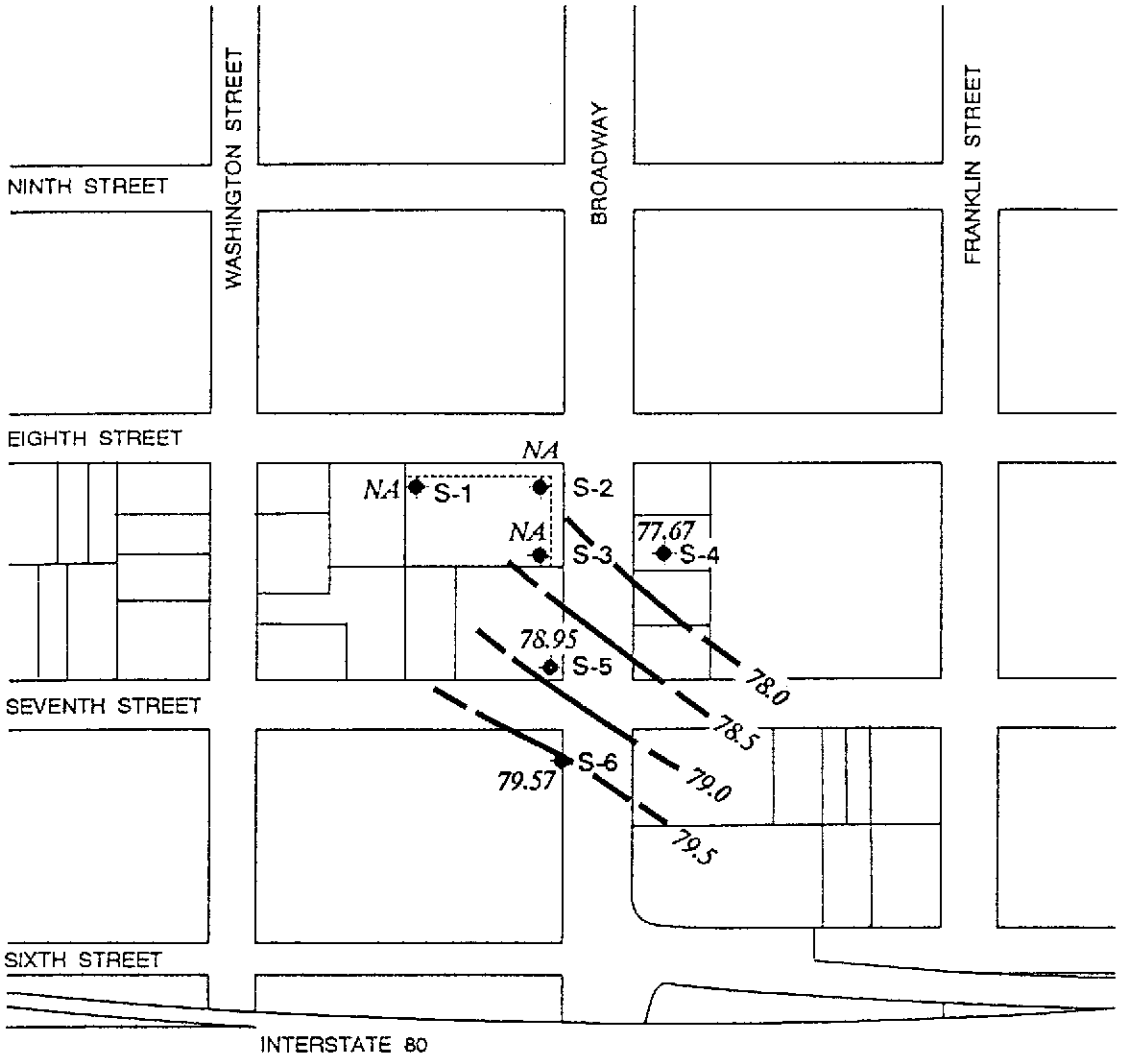


GeoStrategies Inc.

Site Plan
Former Shell Service Station
461 Eighth Street
Oakland, California

PLATE **1**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7644	CMP CEG 1262	10/89		



EXPLANATION

◆ S-1	Groundwater monitoring well location
79.67	Groundwater elevation measured on July 27, 1989 in feet referenced to project datum
78.5	Groundwater elevation contour Approx. Gradient = 0.006
NA	Not Accessible

N

0 200 400

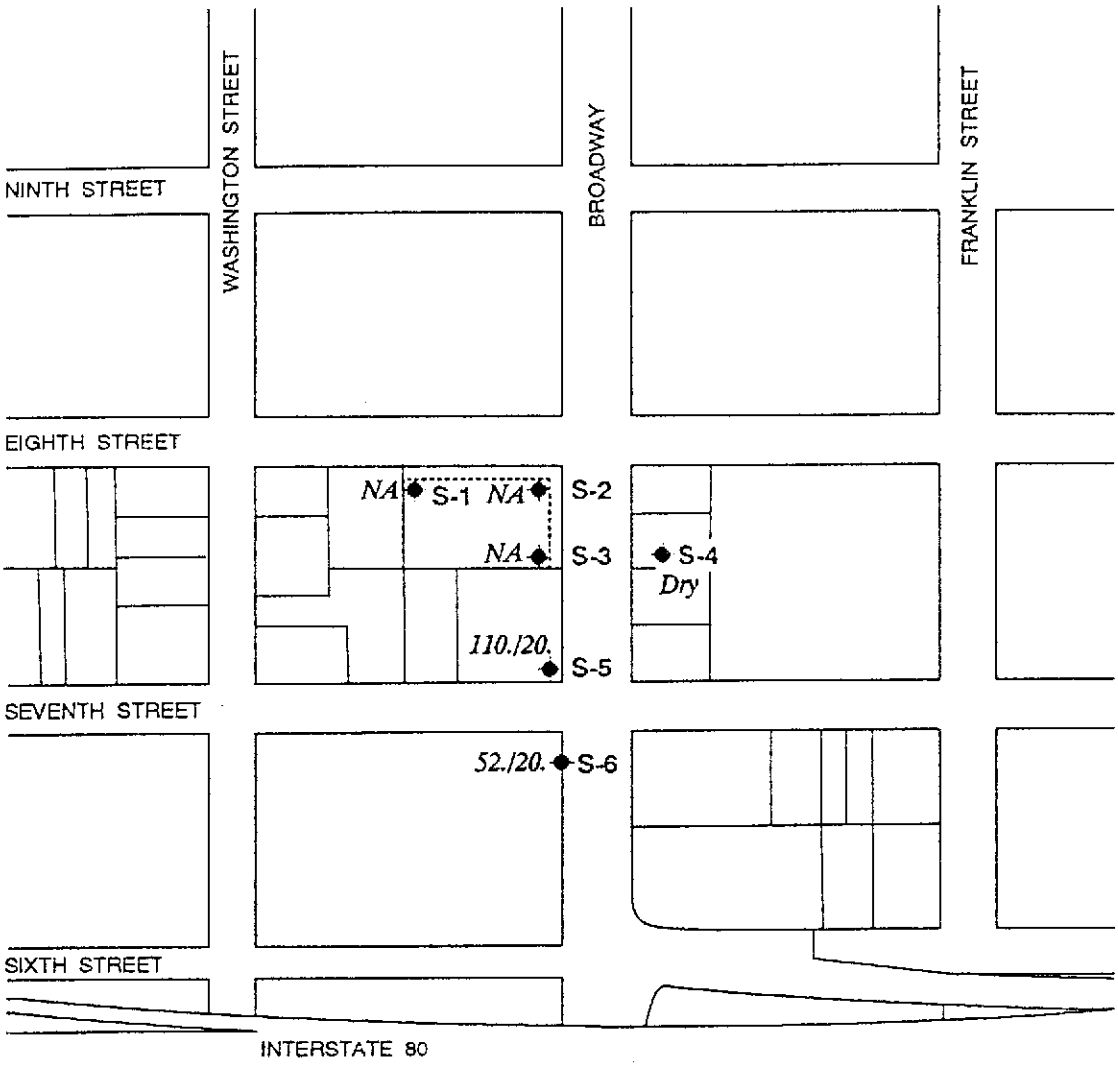
Scale in Feet

GeoStrategies Inc.

Poteniometric Map
Former Shell Service Station
461 Eighth Street
Oakland, California

PLATE **2**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7644	RMP CEG 1263	10/89		



EXPLANATION

◆ S-1	Groundwater monitoring well location
110./21.	TPH (Total Petroleum Hydrocarbon)/Benzene concentrations measured on July 27, 1989 in ppm (parts per million)
NA	Not Accessible

N

0 200 400

Scale in Feet

GSI GeoStrategies Inc.

TPH/Benzene Concentration Map
Former Shell Service Station
461 Eighth Street
Oakland, California

PLATE **3**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7644	RG CEG 12/62	10/89		

APPENDIX A

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.

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)

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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

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

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			

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WELL SAMPLING FIELD DATA SHEET

COMPANY _____ JOB # _____

LOCATION _____ DATE _____

CITY _____ TIME _____

Well ID. _____ Well Condition _____

Well Diameter _____ in. Hydrocarbon Thickness _____ ft.

Total Depth _____ 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	

Depth to Liquid- _____ ft.

(# 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 Data Form

Floating Product Not Present

Purge Volume Calculation

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

V = Purge volume (gallons)
= 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 Colum 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%
Temperature: 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 Custody

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.

August 25, 1989

GROUNDWATER SAMPLING REPORT

Referenced Site: Former Shell Service Station
461 Eighth Street
Oakland, California

Sampling Date: July 27, 1989

This report presents the results of the quarterly groundwater sampling and analytical program conducted by Gettler-Ryan Inc. on July 27, 1989 at the referenced location. The site, located on the northwest corner of 8th Street and Broadway, is no longer an operating service station. The former station had underground storage tanks which contained petroleum products.

There are currently three groundwater monitoring wells on site and three wells off site at the locations shown on the attached site map. The three on site groundwater monitoring wells were inaccessible for the July 27, 1989 sampling event. Prior to sampling, all remaining 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 confirm the presence and thickness of separate phase product. Groundwater depths ranged from 15.84 to 21.01 feet below grade. Separate phase product was not observed in any of the monitoring wells.

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. 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 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. Chain of custody records were established noting sample identification numbers, time, date, and custody signatures.

1992 national avenue • hayward, california 94545-1787 • (415) 783-7500

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.

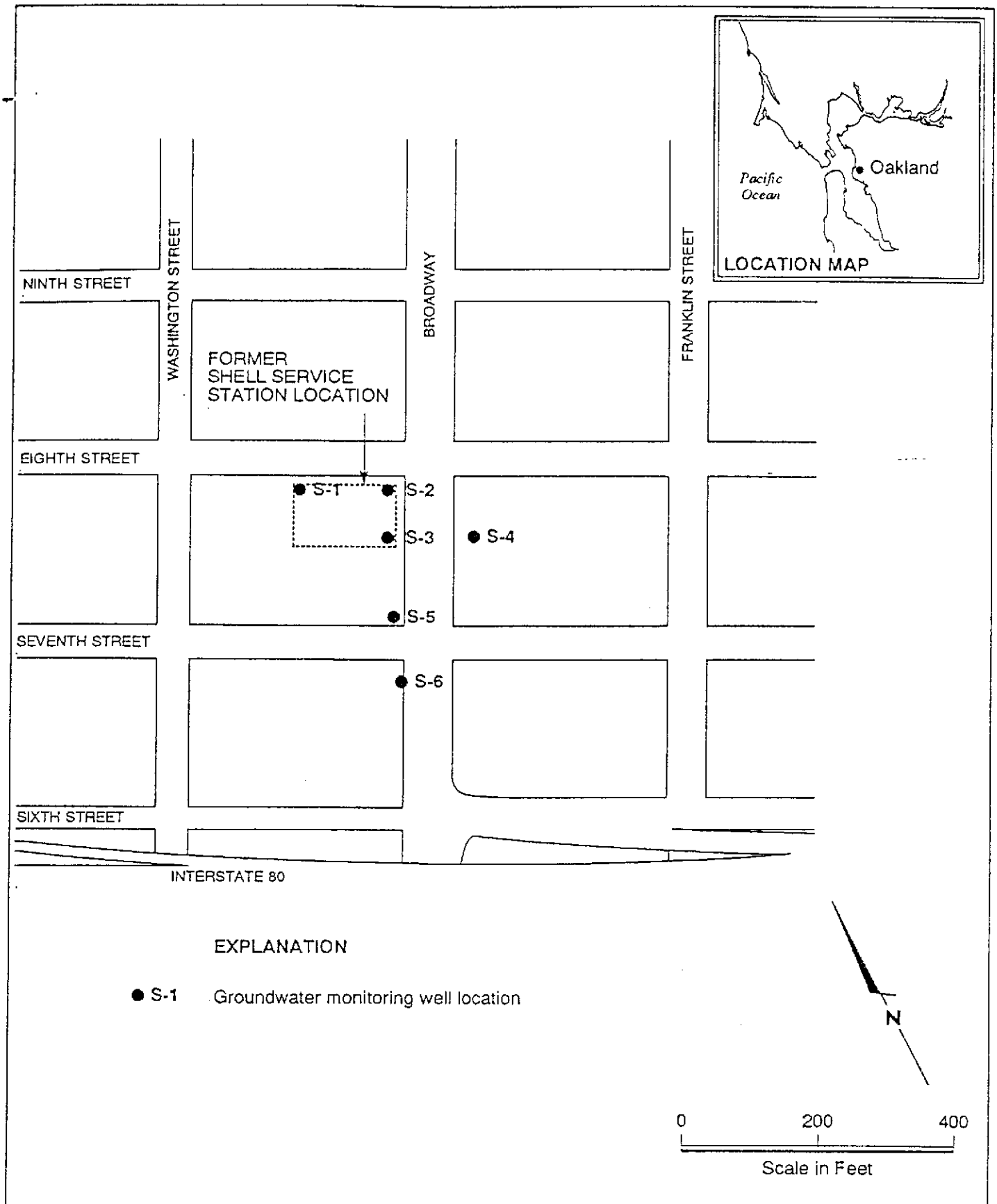
Tom Paulson
Sampling Manager

attachments

TABLE OF MONITORING DATA
GROUNDWATER WELL SAMPLING REPORT

WELL I.D.	S-1	S-2	S-3	S-4	S-5	S-6
Casing Diameter (inches)	4	4	4	4	4	4
Total Well Depth (feet)				16.18	38.40	38.4
Depth to Water (feet)	----	----	----	15.84	20.41	21.01
Free Product (feet)	----	----	----	none	none	none
Reason Not Sampled	inaccessible	inaccessible	inaccessible	insufficient water	----	----
Calculated 4 Case Vol.(gal.)	----	----	----	----	59.4	57.4
Did Well Dewater?	----	----	----	----	no	no
Volume Evacuated (gal.)	----	----	----	----	59.5	59.2
Purging Device	----	----	----	----	Bladder	Bladder
Sampling Device	----	----	----	----	Bladder	Bladder
Time	----	----	----	----	10:48	12:28
Temperature (F)*	----	----	----	----	68.5	67.6
pH*	----	----	----	----	6.45	6.54
Conductivity (umhos/cm)*	----	----	----	----	602	947

* Indicates Stabilized Value



GeoStrategies Inc.

Site Plan
Shell Service Station
461 Eighth Street
Oakland, California

PLATE 1

JOB NUMBER	REVIEWED BY: RG/CEG	DATE	REVISED DATE	REVISED DATE
644		4/89		

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Gettler-Ryan
1992 National Avenue
Hayward, CA 94545
ATTN: John Werfal

Date: August 17, 1989

Work Order Number: S9-07-269-01

P.O. Number: MOH890501A

This is the Certificate of Analysis for the following samples:

Client Project ID:	G-R #3644, Shell, 7th/Broadway, Oakland, CA
Date Received by Lab:	7/27/89
Number of Samples:	2
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/gg
1 Page Following - Tables of Results

Date: August 17, 1989
Client Project ID: G-R #3644, Shell, 7th/Broadway, Oakland, CA

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order Number: S9-07-269

Lab Sample ID	Client Sample ID	Sample Date	Date Analysis Completed	Sample Condition on Receipt
S9-07-269-01	S-5	7/27/89	8/9/89	Cool, pH≤2
S9-07-269-02	S-6	7/27/89	8/9/89	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)
S9-07-269-01	S-5	110.	20.	29.	2.4	14.
Detection Limit		5.0	0.05	0.5	0.1	0.3
S9-07-269-02	S-6	52.	20.	3.2	1.7	5.5
Detection Limit		2.5	0.1	0.05	0.05	0.2

Gettler - Ryan Inc. 39-01-264 ENVIRONMENTAL DIVISION — **Chain of Custody**

COMPANY Shell Oil Company JOB NO. 00478

JOB LOCATION 7th St / Broadway

CITY Oakland, CA (415) PHONE NO. 793-7800

AUTHORIZED John Werfal DATE 7/27/89 P.O. NO. 3644

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
S-5	3	Liquid	7-27/1048	TPH(Gas) BTXE	
S-6	↓	↓	↓ /1228	↓	

RELINQUISHED BY: Kelly J Lye 7/27/89 1437

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY LAB: J. Cofford 7/27/89 1438

DESIGNATED LABORATORY: ET SCV DHS #: 157

REMARKS: Normal TAT Results due 8/10/89

DATE COMPLETED July 27, 1989 FOREMAN Kelly J Lye

ORIGINAL