SIERRA
Environmental Services

May 11, 1993

STID 3160

Jon Legallet
Telegraph Business Properties
1401 Griffith Street
San Francisco, CA 94124

Re: Subsurface Investigation Work Plan
Telegraph Business Park
5427 Telegraph Avenue
Oakland, California
SES Project #4-719-03/05

Dear Mr. Legallet:

As requested, Sierra Environmental Services (SES) presents the following work plan for conducting a grab ground water sampling program at the above-referenced site (Figure 1, Appendix A).

SUMMARY

SES proposes to drill eight to ten borings and collect grab ground water samples from the borings at the site. The locations of the proposed borings are shown on Figure 2 (Appendix A). The ground water analytic data obtained from the borings will be used to help determine future monitoring well locations.

BACKGROUND

The site was formerly a large-scale dry-cleaning establishment. The on-site underground storage tanks were used by previous occupants to store Stoddard solvent, Stoddard solvent waste, and vehicle fuel.

In May, 1992, SES supervised the removal of 17 underground storage tanks from the property.[1] Hydrocarbons as gasoline, diesel, stoddard solvent, and benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in sidewall samples taken from the tank pit excavations. Analytic results are presented in Tables 1 and 2 (Appendix B).

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[1] SES, 1992, Consultant's Tank Pull Report, prepared for Telegraph Business Properties, July 21, 1992, 9 pages and 4 appendices.

TOPOGRAPHIC AND GEOLOGIC SETTING

The site is located on Alameda County, in the city of Oakland. The topography of the site is relatively flat. The ground water gradient (inferred from topography) is to the southwest. The closest surface water is Glenn Echo Creek, which is located approximately one half mile southeast of the site and which flows into Lake Merritt. The site is approximately fifty feet above mean sea level.

The site is underlain by Late Pleistocene Alluvium, which consists of weakly consolidated, slightly weathered, poorly sorted, irregular interbedded clay, silt, sand, and gravel.[2]

SCOPE OF WORK

In order to determine the presence or absence of hydrocarbons in soil and ground water at the site and in the site vicinity, SES proposes to drill eight to ten soil borings at the site and to collect grab ground water samples from the borings. In addition, soil samples will be collected from selected borings. The locations of the proposed soil borings are shown on Figure 2 (Appendix A). The following outlines the proposed scope of work and procedures for this investigation.

1. Prepare a site safety plan specific to this investigation based on past and present site use.

2. Drill eight to ten soil borings to be used as expedient ground water sampling points. The borings will be drilled to a depth of approximately 3 feet below the water table. Soil samples will be collected from selected soil borings above the capillary fringe. Grab ground water samples will be collected from each of the borings. Analyze the soil and grab ground water samples for total purgeable petroleum hydrocarbons as gasoline [TPPH(G)], Stoddard Solvent, total petroleum hydrocarbons as diesel [TPH(D)] and BTEX.

3. Report results and make recommendations for future work.

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[2] Flatland Deposits of the San Francisco Bay Region, California--Their Geology and Engineering Properties, and Their Importance to Comprehensive Planning, E.J. Helley and K.R. Lajoie, U.S. Geological Survey, Geological Survey Professional Paper 943, 88 pages

Each of these tasks is described below.

Task 1 - Site Safety Plan

Using available site history information, SES will prepare a site-specific safety plan. The safety plan will identify potential site hazards and specify procedures to protect site workers. The safety plan will be on-site during field operations.

Task 2 - Ground Water Sampling and Chemical Analyses

The field portion of this investigation has been designed for two days of drilling. The borings will be drilled by Soils Exploration Services of Benicia, California, C57#582696. Verification of the C57 license and Worker's Compensation Insurance maintained by Soils Exploration Services is on file with the Alameda County Health Department.

Prior to drilling, utilities will be located by USA and a private utility locator. The public sewer and sewer laterals will be identified on a site map for the drilling permit.

The borings will be drilled under the supervision of Chris J. Bramer, P.E. #C48846. Permits for the borings will be obtained from the Alameda County Health Department prior to initiation of field work and the permits will be on-site during drilling.

All drilling equipment will be steam-cleaned prior to use, and all sampling equipment will be washed between samples using an EPA-approved detergent such as Liquinox and rinsed with potable water.

Soil samples will be collected from selected borings in steam-cleaned or new brass tubes in accordance with SES Standard Operating Procedure - Soil Sampling (Appendix C). SES personnel will attempt to collect a soil sample at the soil/ground water interface. Soil samples will be collected at intervals of less than 5 feet if there is a change in soil type, or if hydrocarbons are detected by field personnel or with the organic vapor meter.

The soil borings will be drilled using hollow-stem augers to a depth of approximately 3 feet below the water table. A 1.5-inch (inside) diameter 0.010-inch slotted PVC casing will be inserted through the augers and a ground water sample will be collected with a 1-inch bailer. The PVC casing will act as a sediment screen. The samples will be collected and handled in accordance with SES Standard Operating Procedure - Ground Water Sampling (Appendix C).

All borings will be grouted to the surface with grout composed of Portland cement mixed with 3-5 percent bentonite. The grout will be tremied into the borings through a tremie pipe.

Selected soil and ground water samples will be analyzed by a State-certified laboratory. The soil and ground water samples will be analyzed for TPPH(G) and for Stoddard Solvent by EPA Method 8015/5030 and for diesel by EPA Method 8015/3550. In addition, the samples will be analyzed for BTEX by EPA Method 8020. All quality assurance and quality control data supplied by the laboratory will be included with the final report.

Drill cuttings and seam-cleaning rinseate will be stored on-site in 55-gallon Department of Transportation (DOT)-approved drums for disposal. Each drum will be properly sealed and labeled.

Task 3 - Report

A report presenting the results of the investigation will be prepared. The report will include:

Text:

- A summary of the results
- Site background and history
- Topographic and geologic setting
- Description of grab ground water sampling procedures
- Boring abandonment procedures
- Analytic results for soil and ground water
- Conclusions
- Recommendations

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Tables:
- Analytic results for soil
- Analytic results for ground water

Figures:
- Site location map
- Soil borings and grab ground water sampling location map

Appendices:
- Appendix A: Figures
- Appendix B: Tables
- Appendix C: SES Standard Operating Procedures

SES will prepare a schedule for the field work after the work plan has been approved. SES personnel will notify Alameda County Health Department and the Regional Water Quality Control Board 48 hours in advance of field work. If there are delays in obtaining permits or off-site agreements a modified schedule will be prepared.

Thank you for the opportunity to provide services. Please call if you have any questions regarding the proposed work or schedule.

REGISTERED PROFESSIONAL ENGINEER
CHRIS J. BRAMER
C 048846
9/16
CIVIL
STATE OF CALIFORNIA

Sincerely,
Sierra Environmental Services

Jim Green
Staff Environmental Scientist

Chris J. Bramer
Professional Engineer #C48846

JG/CJB/dcp
71903WP.MY3

Attachments: Appendix A - Figures
Appendix B - Tables
Appendix C - SES Standard Operating Procedures

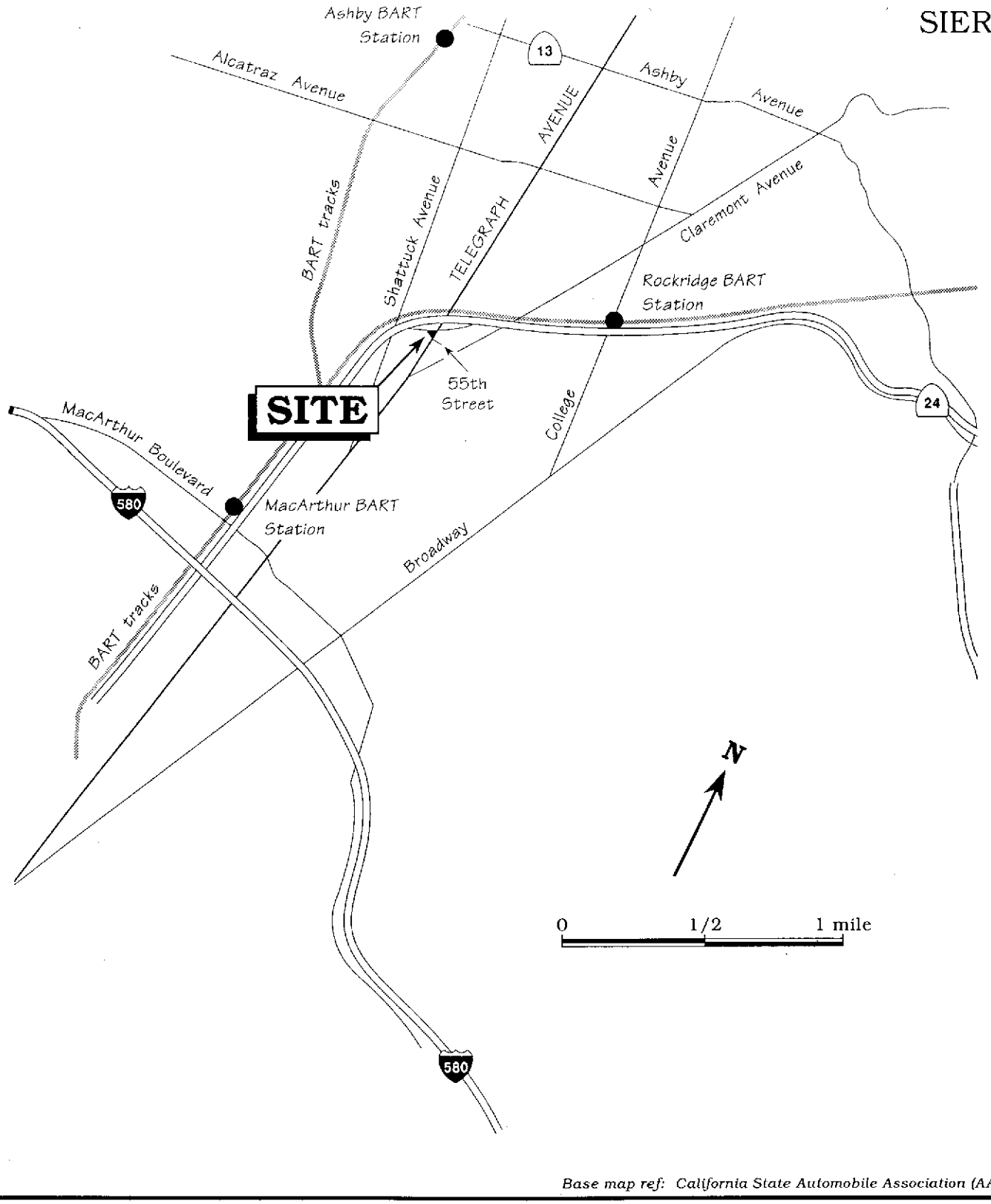

Figure 1. Site Location Map - Telegraph Business Park, 5427 Telegraph Avenue, Oakland, California

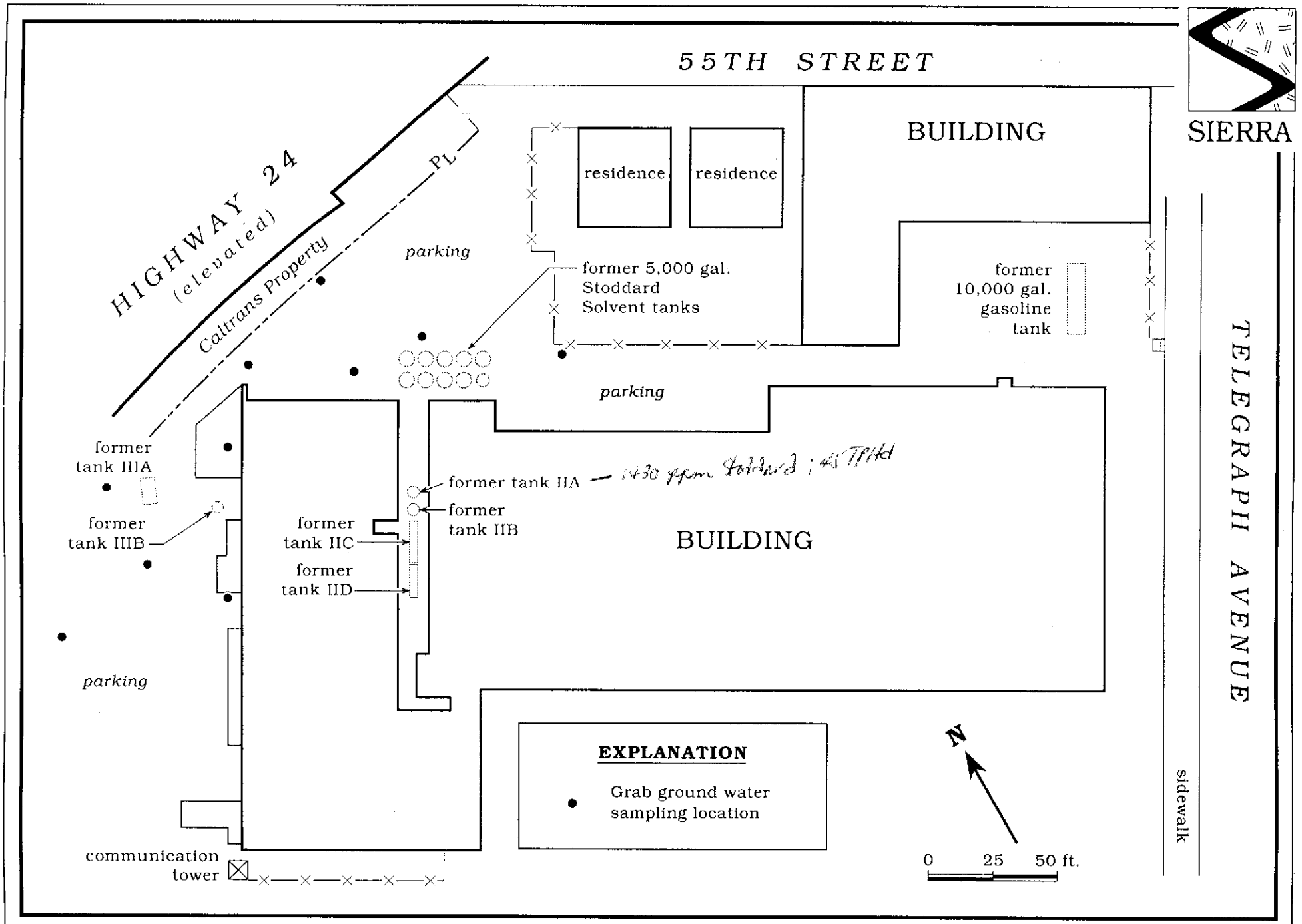

Figure 2. Grab Ground Water Sampling Locations - Telegraph Business Park, 5427 Telegraph Avenue, Oakland, California

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Table 1. Analytic Results for Soil - Tank Pull - Telegraph Business Park, 5427 Telegraph Avenue, Oakland, California

Sample ID	Date Sampled	Analytic Method	TPPH(G)	TPH(D)	Stoddard	O&G	B	T	E	X	Metals
			<----------				ppm				---------->
IE-1	4/29/92	8015/8020	<1[1]	---	---	---	<0.005	<0.005	<0.005	0.007	---
IE-2	4/29/92	8015/8020	<1[1]	---	---	---	<0.005	<0.005	<0.005	0.009	---
IIA-1	5/11/92	8015/8020/5520	<6	45	1,430	<50	<0.3	<0.3	<0.3	6.4	---
IIA-2	5/11/92	8015/8020/5520	<6	120	1,470	<50	<0.3	<0.3	<0.3	5.8	---
IIA-3	5/11/92	8015/8020/5520	<6	47	1,390	<50	<0.3	<0.3	<0.3	4.8	---
IIA-4	5/11/92	8015/8020/5520	<6	24	1,320	<50	<0.3	<0.3	<0.3	4.4	---
IIB-1	5/11/92	8015/8020/5520	<6	33	1,720	2,285	<0.3	<0.3	<0.3	11	---
IIB-2	5/11/92	8015/8020/5520	<6	32	200	<50	<0.06	<0.06	<0.06	0.54	---
IIB-3	5/11/92	8015/8020/5520	<6	120	1,580	240	<0.06	<0.06	<0.06	9	---
IIC-1	5/15/92	8015/8020	---	17[1]	---	---	<0.03	<0.03	<0.03	14	---
IIC-2	5/15/92	8015/8020	---	60[1]	---	---	<0.03	<0.03	<0.03	12	---
IIC-3	5/15/92	8015/8020	---	220[1]	---	---	<0.03	<0.03	<0.03	5.6	---
IIC-4	5/15/92	8015/8020	---	3.8[1]	---	---	<0.005	<0.005	<0.005	<0.005	---
IID-1	5/15/92	8015/8020	---	14[1]	---	---	<0.03	<0.03	<0.03	8.1	---
IID-2	5/15/92	8015/8020	---	31[1]	---	---	<0.03	<0.03	<0.03	26	---
IID-3	5/15/92	8015/8020	---	<1[1]	---	---	<0.005	<0.005	<0.005	<0.005	---
IID-4	5/15/92	8015/8020	---	<1[1]	---	---	<0.005	<0.005	<0.005	<0.005	---

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Table 1. Analytic Results for Soil - Tank Pull - Telegraph Business Park, 5427 Telegraph Avenue, Oakland, California (continued)

Sample ID	Date Sampled	Analytic Method	TPPH(G)	TPH(D)	Stoddard	O&G	B	T	E	X	Metals
			<----------				ppm				---------->
IID-5	5/15/92	8015/8020	---	<1[1]	---	---	<0.005	<0.005	<0.005	0.038	---
IIIA-1	5/11/92	8015/8020	---	260*	---	---	<0.3	<0.3	<0.3	1.8	---
IIIA-2	5/11/92	8015/8020	---	<1	---	---	<0.03	<0.03	<0.03	0.62	---
IIIB-1	5/11/92	8015/8020/5520	<6	<1	570	<50	<0.3	<0.3	<0.3	1.9	---
		6010	---	---	---	---	---	---	---	---	**
IVA-1	5/15/92	8015/8020	---	<1[1]	---	---	<0.005	<0.005	<0.005	0.022	---
IVB-1	5/15/92	8015/8020	---	<1[1]	---	---	<0.005	<0.005	<0.005	0.22	---
IVC-1	5/19/92	8015/8020	---	21[1]	---	---	<0.03	<0.03	<0.03	5.2	---
IVD-1	5/19/92	8015/8020	---	3.9[1]	---	---	<0.03	<0.03	<0.03	9.4	---
IVD-2	5/19/92	8015/8020	---	16[1]	---	---	<0.03	<0.03	<0.03	14	---
IVE-1	5/20/92	8015/8020	---	130[1]	---	---	<0.03	<0.03	<0.03	15	---
IVF-1	5/20/92	8015/8020	---	100[1]	---	---	<0.03	<0.03	<0.03	4.4	---
IVF-2	5/20/92	8015/8020	---	40[1]	---	---	<0.03	<0.03	<0.03	5.8	---
IVG-1	5/21/92	8015/8020	---	<1[1]	---	---	<0.03	<0.03	<0.03	5.7	---
IVH-1	5/21/92	8015/8020	---	<1[1]	---	---	<0.03	<0.03	<0.03	6.9	---
IVH-2	5/21/92	8015/8020	---	<1[1]	---	---	<0.03	<0.03	<0.03	4.6	---
IVI-1	5/22/92	8015/8020	---	50[1]	---	---	<0.03	<0.03	<0.03	27	---

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Table 1. Analytic Results for Soil - Tank Pull - Telegraph Business Park, 5427 Telegraph Avenue, Oakland, California (continued)

Sample ID	Date Sampled	Analytic Method	TPPH(G)	TPH(D)	Stoddard	O&G	B	T	E	X	Metals
			<----------				ppm				---------->
IVJ-1	5/22/92	8015/8020	---	12[1]	---	---	<0.03	<0.03	<0.03	3.9	---
IVJ-2	5/22/92	8015/8020	---	<1[1]	---	---	<0.03	<0.03	<0.03	0.58	---

EXPLANATION:

TPPH(G) = Total Purgeable Petroleum Hydrocarbons as Gasoline
TPH(D) = Total Petroleum Hydrocarbons as Diesel
Stoddard = Stoddard Solvent
O&G = Oil and Grease (non-polar)
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
Metals = Cadmium (Cd), Chromium (Cr), Nickel (Ni), Lead (Pb) and Zinc (Zn)
ppm = Parts per million
--- = Not analyzed

ANALYTIC METHODS:

8015 = EPA Method 8015/5030 for TPPH(G)/Stoddard Solvent
8015 = Modified EPA Method 8015/3550 for TPH(D)
8020 = EPA Method 8020 for BTEX
5520 = EPA Method 5520E&F for O&G
6010 = EPA Method 6010 for Cd, Cr, Pb, Ni and Zn

ANALYTIC LABORATORY:

All samples were analyzed by Precision Analytical Laboratory, Inc. of Richmond, California

NOTES:

* Quantified by the analytical laboratory as "diesel range" hydrocarbons.
** Cadmium, chromium, nickel, lead and zinc detected at 20, 47.5, <1.5, <3, and 67.8 ppm, respectively.
[1] The analytic laboratory reported that a stoddard solvent pattern was observed in the chromatogram.

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Table 2. Analytic Results for Soil - Tank Pull - Volatile Organic Compounds - Telegraph Business Park, 5427 Telegraph Avenue, Oakland, California

Sample ID	Date Sampled	Analytic Method	1,2-DCE	TCE	PCE	BEP	PA	DNO	Other VOCs
			<----------			ppm			---------->
IIA-1	5/11/92	8010	1.6	3.9	43	---	---	---	ND[1]
		8270	---	---	---	0.35	<0.1	<0.13	ND[2]
IIA-2	5/11/92	8010	0.86	2.1	6.0	---	---	---	ND[1]
		8270	---	---	---	2	0.23	<0.13	ND[2]
IIA-3	5/11/92	8010	2.1	0.54	1.4	---	---	---	ND[1]
		8270	---	---	---	0.82	<0.1	0.49	ND[2]
IIA-4	5/11/92	8010	1.9	0.1	0.18	---	---	---	ND[1]
		8270	---	---	---	0.7	<0.1	0.9	ND[2]
IIB-1	5/11/92	8010	1.8	35	210	---	---	---	ND[1]
		8270	---	---	---	<0.1	0.32	<0.13	ND[2]
IIB-2	5/11/92	8010	3.4	0.034	0.16	---	---	---	ND[1]
		8270	---	---	---	0.9	0.1	<0.13	ND[2]
IIB-3	5/11/92	8010	5.2	1.2	4.6	---	---	---	ND[1]
		8270	---	---	---	3.0	<0.1	<0.13	ND[2]
IIIB-1	5/11/92	8010	<0.008	<0.005	<0.018	---	---	---	ND[1]
		8270	---	---	---	<0.1	<0.1	<0.13	ND[2]

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Table 2. Analytic Results for Soil - Tank Pull - Volatile Organic Compounds - Telegraph Business Park, 5427 Telegraph Avenue, Oakland, California (continued)

EXPLANATION:

1,2-DCE = Cis-1,2-dichloroethene
TCE = Trichloroethene
PCE = Tetrachloroethene
BEP = Bis-(2-ethylhexyl)phthalate
PA = Phenanthracene
DNO = Di-n-octylphthalate
ppm = Parts per million
ND = Not detected
HVOCs = Halogenated Volatile Organic Compounds
SVOCs = Semi-volatile Organic Compounds

ANALYTIC METHODS:

8010 = EPA Method 8010 for HVOCs
8270 = EPA Method 8270 for SVOCs

ANALYTIC LABORATORY:

All samples were analyzed by Precision Analytical Laboratory, Inc. of Richmond, California

NOTES:

[1] Other HVOCs were not detected at detection limits ranging from 0.003 to 0.0251 ppm.
[2] Other SVOCs were not detected at detection limits ranging from 0.04 to 1 ppm.

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APPENDIX C
SES STANDARD OPERATING PROCEDURES

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SES STANDARD OPERATING PROCEDURE

LOGGING METHOD

Unconsolidated soil is classified and described by trained SES field personnel. All available information is used, including the following: soil recovered in the sampler, including the soil visible on both ends of the sample retained for possible analysis; soil cuttings generated during drilling; and the drilling contractor's observations of the drill rig's behavior.

Classification and description of unconsolidated soil is accomplished using the American Society of Testing and Materials (ASTM) Methods D2487-85 (Unified Soil Classification System (USCS)) and/or D2488-69 (Description and Identification of Soils (Visual-Manual Procedure)).

The soil classification and description is recorded on the field log sheet by SES field personnel and includes the following information:

1) Soil type;
2) Soil classification;
3) Soil color, including mottling;
4) Moisture content;
5) Plasticity and consistency (fine-grained material) or density (coarse-grained material);
6) Percentages of clay, silt, sand and gravel;
7) Grain size range of sands and gravels;
8) Angularity and largest diameter of gravel component;
9) Estimated permeability;
10) Odor; and
11) Any other observations which would assist in the interpretation of the depositional environment and/or differentiation between the various geologic units expected to be encountered.

In addition to the above, the ground water levels encountered during drilling and measured after the water stabilized is also recorded on the field log.

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SES STANDARD OPERATING PROCEDURE

SOIL SAMPLING

The following describes sampling procedures used by SES field personnel to collect, handle, and transport soil samples. Before samples are collected, careful consideration is given to the type of analysis to be performed so that precautions are taken to prevent loss of volatile components or contamination of the sample, and to preserve the sample for subsequent analysis.

All drilling and sampling equipment is steam-cleaned between boreholes to prevent cross-contamination. The sampler is washed with an EPA approved detergent (such as liquinox or trisodium phosphate) between sample collection. Collection methods specific to soil sampling are presented below.

Soil samples are collected at pre-specified depth intervals or at a sediment/lithologic change for hydrogeologic description and possible chemical analysis. Samples are collected using a modified California split-spoon sampler lined with 2- or 2.5-inch I.D. x 4- or 6-inch long steam-cleaned or new stainless steel or brass tubes. The sampler is lowered into the borehole and driven 18 inches, using a 140-pound hammer. The drilling contractor provides the SES field personnel with the number of blows required to drive the sampler for each 6 inches of penetration.

The sampler is then extracted from the borehole and the middle or bottom brass tube is carefully removed for possible analysis. The soil material is immediately trimmed flush with the tube ends, and sealed with Teflon tape beneath polyethylene end caps. The caps are hermetically sealed to the brass tube with duct tape. The sample is then labeled to include the date, boring number, depth of sample, project number, SES, and the SES field personnel's initials. The samples are put into a plastic "zip-lock" type bag and placed into an ice chest maintained below 4°C with blue ice or dry ice, for transport under chain of custody to the laboratory. The chain-of-custody form includes the project number, analysis requested, sample ID, date analysis and the SES field personnel's name. The form is signed, dated and timed by each person who yields or receives the samples beginning with the field personnel and ending with the laboratory personnel.

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SES STANDARD OPERATING PROCEDURE

OVM READINGS

SES uses an organic vapor meter (OVM) to determine the presence or absence of volatile organic compounds (VOCs), including benzene, toluene, ethylbenzene, and xylenes in soil samples chosen for field screening. The OVM uses a photoionization detector (PID) and is calibrated daily to 100 parts per million of 1-liter of isobutylene. The OVM, which measures in parts per million by volume (ppmv), is used for qualitative, not quantitative, assessment because the correlation between the volume measurements of the OVM and the weight measurements of the laboratory instruments is not well defined.

A field screen sample is obtained from the brass tube immediately above or below the brass tube containing the sample selected for possible analysis. The soil to be screened is removed from the brass tube, and is placed in a pre-cleaned brass tube with aluminum foil and a polyethylene cap on one end. The brass tube is loosely filled to approximately 1/2 full. Another square of aluminum foil is placed on the open end and a polyethylene cap with crossed slits is placed over it.

The field screen sample is allowed to temperature equilibrate for approximately 15 to 30 minutes in the sun, allowing any VOCs which might be present in the soil to volatilize out into the brass tube's headspace. The OVM nozzle is then placed inside the sealed brass tube, through the slits in the cap, in order to measure the VOCs present, if any, in the headspace. The nozzle should remain inside the brass tube for approximately 15 to 30 seconds or until the maximum reading has been recorded on the OVM readout panel.

The depth from which the sample came and the corresponding OVM reading is recorded on the original field log sheet. Field observations, OVM and (odor and staining) readings are used in determining which soil samples are to be analyzed in the laboratory.

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SES STANDARD OPERATING PROCEDURE

GROUND WATER SAMPLING

The following describes sampling procedures used by SES field personnel to collect and handle ground water samples. Before samples are collected, careful consideration is given to the type of analysis to be performed so that precautions are taken to prevent loss of volatile components or contamination of the sample, and to preserve the sample for subsequent analysis. Wells will be sampled no less than 24 hours after well development. Collection methods specific to ground water sampling are presented below.

Prior to sampling, each well is checked for the presence of free-phase hydrocarbons using an MMC flexi-dip interface probe. Product thickness (measured to the nearest 0.01 foot) is noted on the sampling form. Water level measurements are also made using either a water level meter or the interface probe. The water level measurements are also noted on the sampling form.

Prior to sampling, each well is purged of a minimum of four well casing volumes of water using a steam-cleaned PVC bailer, or a pre-cleaned pump. Temperature, pH and electrical conductivity are measured at least three times during purging. Purging is continued until these parameters have stabilized (i.e., changes in temperature, pH or conductivity do not exceed ±0.5°F, 0.1 or 5%, respectively).

The purge water is taken to Chevron's Richmond Refinery for disposal.

Ground water samples are collected from the wells with steam-cleaned Teflon bailers. The water samples are decanted into the appropriate container for the analysis to be performed. Pre-preserved sample containers may be used or the analytic laboratory may add preservative to the sample upon arrival. Duplicate samples are collected from each well as a back-up sample and/or to provide quality control. The samples are labeled to include the project number, sample ID, date, preservative, and the field person's initials. The samples are placed in polyethylene bags and in an ice chest (maintained at 4°C with blue ice or ice) for transport under chain of custody to the laboratory.

The chain of custody form includes the project number, analysis requested, sample ID, date analysis and the SES field person's name. The form is signed and dated (with the transfer time) by each person who yields or receives the samples beginning with the field personnel and ending with the laboratory personnel.

A trip blank and bailer blank accompanies each sampling set, or 5% trip blanks and 5% bailer blanks are included for sets of greater than 20 samples. The bailer blank is prepared by pouring previously boiled water into a steam-cleaned Teflon bailer prior to sampling a well. The trip and bailer blanks are analyzed for some or all of the same compounds as the ground water samples.

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SES STANDARD OPERATING PROCEDURE

MONITORING WELL DESIGN AND CONSTRUCTION

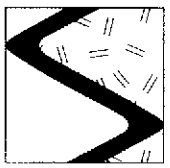
Where possible, information from published and unpublished reports is reviewed prior to installation of monitoring wells. Relevant data includes highest and lowest anticipated ground water elevations, aquifer materials, aquifer yield and contaminants expected. This information is used to aid the field geologist rather than to predetermine how the wells will be constructed. Well construction is based on *site specific conditions* and is determined in the field after discussion with the senior geologist.

The wells are screened to monitor the first water-bearing zone encountered. If high ground water conditions exist the top of the well screen may be set at static water level or below static water level.

Twenty feet of well screen will be used in the wells (five feet above static ground water and fifteen feet below static water) unless a five-foot clay layer is encountered. If a clay layer is encountered, it will be confirmed by sampling. The sampling hole into the underlying confining layer will be sealed with bentonite pellets and the well screen will terminate 0 to 1 foot into the clay layer. When field observations indicate that low permeability materials are acting as an aquitard to prevent movement of contaminants less screen may be used.

Monitoring wells are constructed with flush-threaded, 2-inch or 4-inch diameter, slotted PVC, stainless steel or teflon well screen and PVC, stainless steel or teflon blank casing. The sand pack is sized to retain 90% of the aquifer material based on the observations of the field geologist. The sand is placed into the annular space around the well screen to approximately 2 feet above the top of the well screen. If high ground water conditions exist, the sand may be placed 0 to 1 foot above the top of the well screen. Two feet of bentonite pellets are used to separate the sand from the sanitary surface seal (grout). If high ground water conditions exist 1/2 foot of bentonite may be used to separate the sand from the sanitary surface seal.

The grout (Portland cement with approximately 3-5% bentonite powder) is poured into the annular space above the bentonite pellets. If the surface seal is greater than 5 feet thick, grout consisting of cement mixed with 3-5% bentonite powder will be tremied or pumped into the annular space above the bentonite pellets to prevent the infiltration of surface water into the well.



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If the surface seal is less than 5 feet thick, the grout will be poured from the surface. The resulting seal will be checked for shrinkage within 24 hours and additional grout will be added, if necessary. The surface seal is used to prevent infiltration of surface water into the well.

The monitoring well(s) is locked with a stovepipe or cap and covered with a traffic-rated vault if it is located in a developed area. The well I.D. is clearly marked on the cap or casing.

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STANDARD OPERATING PROCEDURE

SOIL SAMPLING - STOCKPILES AND EXCAVATIONS

The following describes sampling procedures used by SES field personnel to collect, handle, and transport soil samples from stockpiles and excavations. Before samples are collected, careful consideration is given to the type of analysis to be performed so that precautions are taken to prevent loss of volatile components or contamination of the sample, and to preserve the sample for subsequent analysis.

All sampling equipment is washed with an EPA-approved detergent (such as liquinox or trisodium phosphate) between samples. Sample collection methods specific to excavations and stockpiles are presented below.

Samples for both stockpiles and excavations are collected using 2- or 2.5-inch I.D. x 4- or 6-inch long steam-cleaned or new stainless steel or brass tubes. Approximately three inches of soil are removed from the surface of the stockpile or the sidewall or bottom of the excavation immediately prior to sample collection. A backhoe or other machinery may be used to collect a bucket sample from a deep (greater than 5 feet) excavation. The brass tube is driven into the sidewall or bottom of the excavation (or bucket sample), twisted and removed when it has been filled. The soil material is immediately trimmed flush with the tube ends, and sealed with Teflon tape beneath polyethylene end caps. The caps are hermetically sealed to the brass tube with duct tape. The sample is then labeled to include the date, location and number of sample, project number, SES (company name), and the SES field personnel's initials. The samples are put into a plastic "zip-lock" type bag and placed into an ice chest maintained below 4°C with blue ice or dry ice, for transport under chain of custody to the laboratory.

The chain of custody form includes the project number, analysis requested, sample ID, date analysis and the SES field personnel's name. The form is signed, dated and timed by each person who yields or receives the samples beginning with the field personnel and ending with the laboratory personnel.

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SES STANDARD OPERATING PROCEDURE

WELL DEVELOPMENT

SES develops ground water monitoring wells not less than 48 hours after the placement of the surface seal (grouting) to allow sufficient time for the cement grout to set. The wells are developed to restore the natural hydraulic conductivity of the formation(s) to be monitored and to remove all sand and as much fine-grained material as possible.

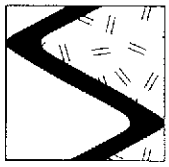
Prior to development, SES field personnel measure the depth to water and the total depth of the well. The total depth measurement is compared to the well completion diagram shown on the field log and any discrepancies are noted.

Well development consists of several cycles of surging and evacuation of water in the well, each ending with measurements of temperature, pH, conductivity, and observation of turbidity.

Surging takes place for several minutes to loosen fines from the screened interval. Position vented surge block several feet below the water surface and surge with an upward motion.

Development shall continue for a period of at least four hours or when ten well volumes have been removed, whichever occurs first, and until ground water removed from the well is clear and visibly free of suspended materials. Note the time and the approximate volume of water removed prior to each determination of the following parameters (and whether well is bailed or pumped dry): pH, temperature, and specific conductivity. These measurements should be made a minimum of five times during well development.

If the water is still cloudy after the four hour period but these three parameters have stabilized, then the well will be considered developed regardless of the volume of water purged from the well. Stabilization of pH, temperature, and specific conductivity will be considered to have occurred when these parameters undergo changes not exceeding ± 0.1, 0.5 degrees F, and 5 percent, respectively.



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After development is completed, the depth to water and the total depth of the well are remeasured. The total depth of the well and the total depth noted on the field log should be approximately the same. All data measured during the procedures described herein are recorded on the SES Well Development Form, which is part of the project file.

The ground water removed from the wells during development remains onsite in 55-gallon Department of Transportation-approved drums. The water is removed by a licensed hauler and taken to an approved disposal facility.